M208
WORKGROUP
HUB/PRINT SERVER

Installation and Configuration Manual

Manual Version 5.5
Firmware Version 5.5

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⬙ PREFACE

Who Should Use This Manual

A system administrator or someone with a good understanding of the protocol involved should perform the installation and configuration procedures in this manual.

Organization of This Manual

This manual covers each aspect of the M208 and contains these chapters:

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Contents, organization, and conventions used in this manual.

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General Conventions

These are some of the conventions followed in this manual:

- At the bottom of each page is the name of the chapter, the section, and the page number.

- The header contains an icon to represent which chapter you are currently reading.

- Names of other publications and references to other sections in this manual are in *italics*.

Caution

Cautions are indicated to warn of any undesirable effects an action may cause.

Note   Notes are added to make you aware of certain steps or considerations, and sometimes to provide tips or suggestions.

Computer Entry and Display Conventions

Command syntax and examples are formatted as follows:

- The Courier font in **boldface** indicates command entries.

    $ **ping ftp.microplex.com**

- Regular Courier font indicates displayed results.

    ftp.microplex.com is alive

- Arguments separated by the *or* symbol (|) mean that a choice must be made.

    list default com1|com2

- Square brackets [ ] around something indicates that it is optional.

    set sysinfo name [*namestring*]

- Command names, entries, and example references are **bold** along with directories and file names. **Boldface** is also used if emphasis is needed.

    Enter **npwrite** when you see...

    sends data to the M208 named **spike**...

- Variable values are shown in *italics* both in command syntax, output, and in text.

    ping *ipname*

    ipname is alive

    Please enter the ***ipname*** at the prompt.

- *Italics* are also used for emphasis.

📖 GETTING TO KNOW THE M208

Overview

The purpose of this chapter is to get you acquainted with the M208. It contains an overview of the M208's features, an overview of the Hub's architecture, an overview of the Print Server's architecture, and an overview of basic Print Server installations in each of the supported environments.

M208 Features

With the Microplex M208 Workgroup Hub/Print Server, you can easily expand your network and locate laser printers, dot matrix printers, plotters, and other peripherals anywhere on the LAN rather than attaching them directly to a host system. Installation is also quick and simple in any of the supported environments.

Hub/Remote Access Features

- **auto-discovery/auto-senses** when a device is connected to a port,

- **automatically detects network collisions**,

- **automatically segments a port** when the port experiences excessive collisions or other undesirble Ethernet activity,

- **duplicate address protection**: if two units have the same address, both ports are automatically segmented,

- **any port** can be used as the network connection or to **cascade** M208s,

- **automatic reverse receive parity** to correct miswiring,

- **extensive monitoring and status reports** via the **npsh** command set,

- **SNMP management** via MIB II and custom MIBs,

- **SLIP** support on the serial ports for dial-up or leased line **remote access** to the local network

- **NPWin** for Windows-based configuration and management,

Print Server Features

General Features

- **one high-speed, IEEE 1284-I compliant** parallel port,
- **four-speed parallel port** to support any peripheral, slow or fast,
- **two serial** ports,
- **multi-level configuration security** through passwords and permission levels,
- **SNMP support** through MIB II, custom MIBs, and custom traps to aid in network management,
- **multiple printer destinations** for printing flexibility,
- **load-balancing** so a job can be redirected to an idle printer instead of waiting for a particular one to free up,
- the choice to **disable** selected Print Server **services**,
- **extra printing functionality** such as carriage return insertion to remove some of the processing burden from the host,
- **banner/trailer page generation,**
- **autosensing** of job/file format for **ASCII to PostScript conversion** or for **automatic switching** of the printer's emulation mode,
- **header and trailer strings** to instruct printers in tray selection, font, pitch, simplex/duplex, and other options,
- **logging** to keep track of **job, user, page count**, **checksum,** and **printer error** information,
- TCP/IP **syslog and SMTP (email) support** for additional logging functionality,
- **backchanneling** for printers to send various PostScript messages about: print-job status, paper out, paper jam, busy, toner out, etc. back through a serial port,
- **queuing** of all print jobs on LANs or WANs, while supporting up to **four printers simultaneously**,

TCP/IP Features

- **further configuration security** through TCP access lists,
- **scrambled print job data** to protect the job as it passes over the network,

- **ability** to **telnet** and **ping** to another host on the network from the M208 allowing for terminal server capabilities,

- up to **256** simultaneous **TCP connections**,

- **GOSIP RFC-1042 support,**

- **IP Routing** support for communications over separate networks,

- **FTP daemon** support for printing, unit monitoring, and configuration,

- **SLIP** support for serial port network communications,

- IP packet **fragmentation** support,

Novell Features

- **support** for **all** versions of NetWare, including NetWare 4,

- **simultaneous support** of **multiple Novell frame types**,

- **encrypted password** support,

- **queueing** on up to **32 queues** over **16 file servers**,

- ability to add a **preferred Novell file server list,**

- **automatic frame type sensing** of all Novell frame types,

AppleTalk Features

- **quick printer setup** through the Chooser,

- ability to **disable certain print destinations** on the M208 so they don't all appear in the Chooser,

- **configurable AppleTalk zones**,

NetBIOS Features

- **NetBIOS over TCP/IP support** for Windows NT, Windows 95, and Windows for Workgroups (WfW),

- **simple printer setup**,

Printer Support

The M208 is compatible with PC's, UNIX systems, Macintosh computers, minis, and mainframes as long as *at least one* of the following is present:

TCP/IP

- an LPR client to interact with our Line Printer Daemon on the unit,

- an RSH client (i.e. rsh, remsh, rcmd) to interact with our RSH Daemon,

- the ability to print directly to a TCP port number on our unit; we have a TCP port number mapped to each I/O port on the unit by default (i.e. com1 is 4000),

Other

- NetWare support,

- AppleTalk over EtherTalk support,

- NetBIOS over TCP/IP support,

For a listing of the printing standards supported, please see *Standards Supported* on page 193.

Overview of the Hub Architecture

The M208 includes a fully managable eight port Ethernet hub. Hubs are stable network devices that perform signal regeneration (including amplification, symmetry, and retiming), packet forwarding, and routing. When a hub is presented with a data signal, it automatically regenerates and transmits the data signal to all the other hub ports without any modification to the signal.

The M208 has a total of nine Ethernet ports, eight 10Base-T (RJ45) and one AUI port. Any port on the M208 can serve as the network connection for the unit.

Very little configuration is required for the hub as it becomes fully operational as soon the the unit is powered up. To install the hub, simply attach it to the network and connect other Data Terminal Devices (DTEs) to it.

For more information on hub installation and configuration please see *USING THE HUB* on page 19.

Overview of Print Server Architecture

This section will provide an overview of how the M208's Print Server component works. To better understand this, it is important to understand *I/O ports*, *destinations* and *models*.

I/O Ports

The M208 has three I/O ports; one parallel and two serial ports. Printers can be attached to any or all of the three I/O ports. Each I/O port has an internal queuing mechanism that automatically queues print jobs on a first-come, first-serve basis even if the print jobs come from different network environments (e.g. Novell and TCP/IP).

Destinations

When you send a print job to the Print Server, the print job doesn't go directly to an I/O port but first goes to a *destination*. A destination can be thought of as *logical* place on the M208 to send print jobs. Each destination has an *I/O port* and a *model* (see below) associated with it. The purpose of our *destinations* is to allow you the ability to configure a number of different print setups on the Print Server.

There are six pre-defined destinations on the M208 and each of them, by default, is associated to one of the three I/O ports on the unit (two destinations per I/O port). By default, the destinations have names such as d1prn, d2com1, d3com2, etc. If you like, any of these destination names can be changed to be something more meaningful.

Models

Each destination on the unit also has a *model* associated with it. The six models (one per destination) can be thought of as a series of mini-filter that can do special processing to the print job data. For example, a model can be set up to do such things as ASCII to PostScript conversion (a2ps) or carriage return insertion (onlcr).

By default, all six models on the M208 are initially set up to be **raw**. When raw, they simply pass data through to the I/O port untouched. By default, the models are named *m1* through to *m6* but can be changed to be something more meaningful.

Models only need to be reconfigured when you want to do special processing to all the print jobs that are sent to a particular destination.

Summary

When you are doing a print setup, you must direct print jobs to a particular ***destination*** which is mapped to an ***I/O port*** to which the printer(s) is attached. The destination's associated ***model*** is then used for any extra processing of the data, if required. Each I/O port has an internal queuing mechanism that automatically queues print jobs on a first-come, first-serve basis.

For more information on I/O ports, destinations, and models, please see *M208 INTER-NAL ARCHITECTURE* on page 89.

Figure 1:   Print Server Operating Logic
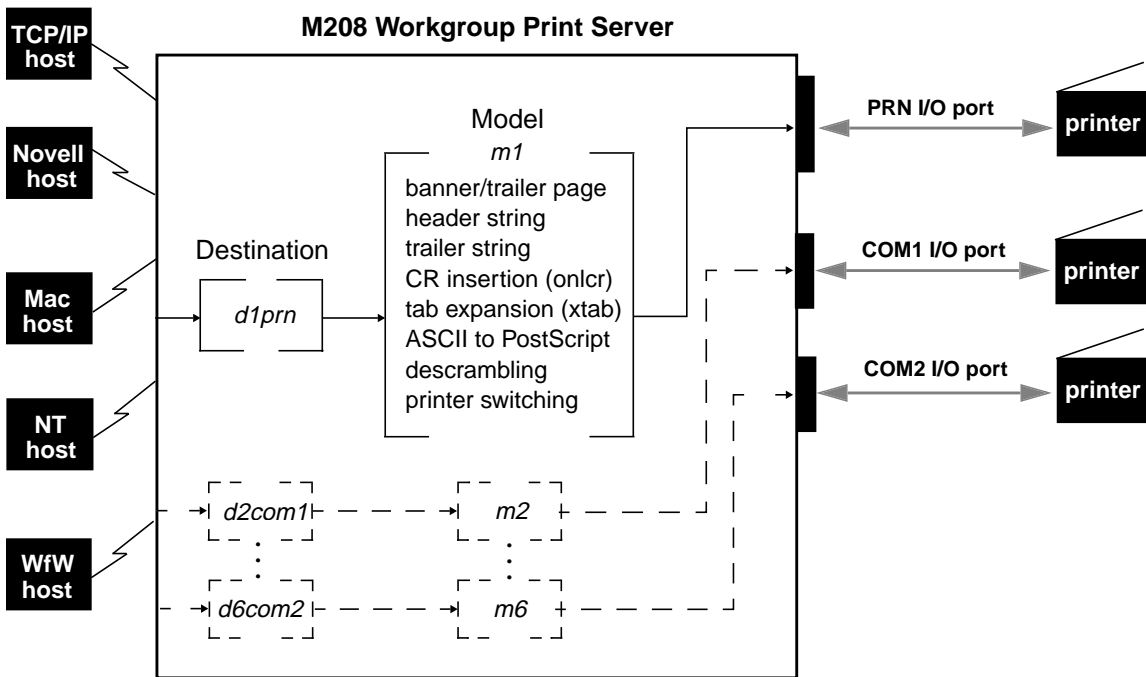
This example follows a print job sent to destination *d1prn*.
d1prn is associated with model *m1* and the I/O port *prn*.

When the data is passed through the associated model, any job processing specified by the model is performed on the data.

If no additional processing is specified, the data is passed through to the I/O port untouched.

Overview of Print Server Installation

This section will provide an overview of the basic steps required to install the M208 in the various supported environments: Unix, Novell (PSERVER and RPRINTER), Net-BIOS over TCP/IP, and AppleTalk.

Note   Before installing the M208, it may be useful to look at Appendix A, *Planning Your Print Setup* on page 203 for advantages/disadvantages of various configuration options.

Basic Unix Configuration

The following outlines the basic steps required to add a M208 to a Unix network.

Once the unit is physically attached to the network, you need to:

1   Assign an IP address, netmask, and possibly a default router to the M208. This can be done in several ways:

- automatically with **ezsetup** or **npconfig** (Option 1 from the Main Menu). Please see page 36.

- manually through the network using **ARP**. Please see page 37.

- manually through the network using **RARP**. Please see page 38.

- manually through the network using **BOOTP**. Please see page 39.

- manually through the **COM port**. Please see page 40.

2   Configure the print setup on the host to print to this unit. This can be done in several ways depending on your host system.

- automatically with **ezsetup** or **npconfig** (Option 2 from the Main Menu) Please see page 36.

- manually for a BSD Unix environment. Please see page 47.

- manually for a System V Unix environment. Please see page 51.

- manually for a AIX Unix environment. Please see page 59.

Basic Novell Configuration

PSERVER Setup

The following outlines the basic steps required to add a M208 to a Novell network using a PSERVER setup and applies to any Netware version. The M208 replaces a dedicated workstation running PSERVER.EXE or PSERVER.NLM so these are no longer needed.

Once the unit is physically attached to the network, you need to:

1   Enter into a PCONSOLE session. PCONSOLE is used for the entire print setup.

2   Create a new queue.

3   Create a new print server. The name will be is M_*xxxxxx* where *xxxxxx* is the last six digits of the Ethernet address as found on the bottom of the unit.

4   Add a new printer and type in the name of one of the eight default destinations on the unit. (e.g. d1prn, d2com1,etc.) At the prompt for the **type** field, select DEFINED ELSEWHERE. If this is not available, choose PARALLEL.

5   Associate this printer with the queue defined in Step 2.

6   Reboot the M208 and wait about a minute for it to connect to the file server.

RPRINTER Setup

The following outlines the basic steps required to add a M208 to a Novell network using a RPRINTER setup and applies to any Netware version. The M208 interacts with an existing PSERVER running PSERVER.EXE or PSERVER.NLM.

Once the unit is physically attached to the network, you need to:

1   Enter into a PCONSOLE session.

2   Create a new queue.

3   Select an existing PSERVER and define a new remote printer. The printer name can be anything but the type must be REMOTE OTHER/UNKNOWN.

4   Associate this printer with the queue created in step 2.

5   Exit PCONSOLE.

6   Restart PSERVER. (e.g. PSERVER.NLM)

7   Go to SYS:\LOGIN and create a directory named M_*xxxxxx* where *xxxxxx* is the

last six digits of the Ethernet address as found on the bottom of the unit.

8 Inside this directory, create a file called CONFIG.

9 Enter the line: `set rprinter add pservername printernumber dest-name` where *pservername* is the existing PSERVER's name, *printernumber* is the defined number for this printer in that PSERVER, and *destname* is a M208 destination (e.g. d1prn, d3com2, etc.).

10 Reboot the Print Server and wait about a minute for it to connect to the file server.

For more information on Novell PSERVER or RPRINTER configuration, please see *CONFIGURING THE M208 FOR NOVELL* on page 63.

Basic Windows Configuration

The following outlines the basic steps required to add a M208 to a Windows NT Version 3.5 network using the LPR print method.

Once the unit is physically attached to the network, you need to:

1 Ensure that the appropriate network software is installed on your host system. In the **Network Settings** dialogue box, make sure you see these in the **Installed Network Software** scroll box:

   • MS TCP/IP Printing
   • TCP/IP Protocol
   • Simple TCP/IP Service

2 Make sure your workstation has an IP address and netmask.

3 Assign an IP address and netmask to the M208. Use a PC or terminal connected to the Print Server's serial port to do this. Please see *Manual Configuration Through the COM Port* on page 40 for information on completing this step.

4 On your NT workstation, select the **Print Manager**.

5 Select **Create a Printer** from the **Printer** menu.

6 Define the printer name and driver. In the **Print to** field, select **Other...**

7 Choose **LPR port** from the displayed list and select **OK**.

8 Enter in the name or IP address of the Print Server.

9 Fill in the destination on the Print Server and select **OK**. The destination will be

the name of one of the eight default destinations on the unit. (e.g. d1prn, d3com2, etc.)

For more information on NetBIOS over TCP/IP configurations, please see *CONFIG-URING THE M208 FOR WINDOWS* on page 79.

Basic AppleTalk Configuration

The following outlines the basic steps required to add a M208 to an AppleTalk network.

Note   An AppleTalk setup does not require any Print Server configuration; the network parameters are automatically configured for you once the M208 is booted on the network.

Once the unit is physically attached to the network, you need to:

1   Select **Chooser** from the Apple Menu.

2   Select the **Laserwriter** icon.

A list of available printers will appear. By default, the format of each name is `M208name_papname` where ***M208name*** is the name of the M208 and ***papname*** is an M208 I/O port. Both names are configurable.

Example   `M_000BF5_prn`

is the printer associated with the M208 named **M_000BF5** using the parallel port.

3   From the list of printers, select one to print to.

For more information on AppleTalk configurations, please see *CONFIGURING THE M208 FOR APPLETALK* on page 75.

INSTALLING THE M208 ON THE NETWORK

Overview

The first step of your M208 setup is to attach it to the network. This section tells you how to do that and also covers the M208's network interfaces.

Preparing for Installation

Before unpacking and installing the hardware, read the *FCC Warning*.

FCC Warning

This equipment generates, uses and can radiate radio frequency energy. If it is not installed and used as directed in this manual, interference to radio communications may result. The equipment has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart B of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference. In such a case the user will be required to correct the interference at the expense of the user.

Unpacking the M208

Before unpacking the M208, check the package for any obvious damage resulting from mishandling. If the outside box is damaged, open it and check for any damage to the contents. Immediately report any damage to the shipping company.

Unpack the M208 and check the contents and serial numbers against the packing slip. Immediately report any errors or shortages to your vendor. If everything is in acceptable order, fill out the **Warranty Registration/Customer Survey** card and mail it in.

Site Requirements

Environment

Prepare to install the M208 in a clean, well-ventilated environment protected from extremes of temperature, humidity, mechanical shock, or vibration. Provide enough space at the front and back of the unit for cable connections.

Location

Prepare to install the M208:

- within four meters (13 feet) of a grounded 115 or 230 VAC outlet,

- within five meters (15 feet) of any device connected to the parallel port (PRN)

- within 15 meters (50 feet) of any device connected to the serial ports (COM1 or COM2).

Grounding, Power, and Connection

Ensure that the electrical outlet is properly grounded.

Power is supplied to the M208 from an external transformer through a two-meter (six-foot) output cord to a 6 position mini din. The external transformer connects through a two-meter (six-foot) line cord to a 3-prong 115 or 230 VAC outlet.

Figure 2:   M208 Diagram

M208 Front View

M208 Rear View
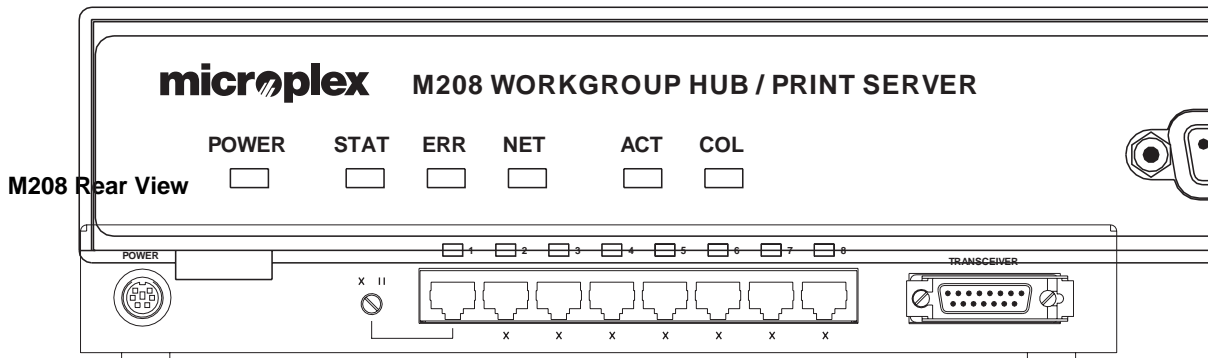
Connecting the M208 to the Network

To connect the M208 to the network:

1   Connect Data Terminal Equipment (DTE) and other hubs/backbone to the appropriate ports (10Base-T or AUI port). Please see *Hub Installation* on page 20 for further details.

1   Connect peripherals to the appropriate I/O ports. Please see *Connecting Peripherals* on page 17 for details on each of the M208's I/O ports.

2   Unpack and plug in the power supply. The connector plugs into the back of the M208. Watch the lights on the from panel of the M208 as they cycle through the power-on self test. When the test is complete, the POWER light is on and STAT is flashing.

Connecting Peripherals

A maximum of three devices can be attached to an M208's I/O ports at the same time; one on the parallel port and two on the serial ports.

Parallel Port Connections (PRN)

One 25-pin female DB-25S connector with an IBM PC compatible pinout are provided on the rear panel for connection to a printer using a parallel port. This port can be configured with various parameters depending on the attached printer. These parameters include:

*   **ackmode** for printers (usually non-laser printers) that use the $\overline{ACK}$ signal for the trigger of next data transfer rather than the BUSY signal,

*   **autofeed** for printers (usually non-laser printers) that require the $\overline{AUTOFD}$ line to be asserted,

*   **bbmode** for simulating an attached printer,

*   **fastmode** for high performance parallel interfaces that can handle an increased transfer rate,

*   **slowmode** for slower parallel interfaces which require slower transfer rates.

*   v**slowmode** for printers that require ever slower data transfer rates.

Please see *list prn* on page 100, *set prn* on page 112, and *PRN Pinout* on page 183.

Serial Port Connections (COM1, COM2)

Two 9-pin male DE-9P connectors with IBM PC AT compatible pinouts are provided for connection to printers using serial ports. Each of these ports have various parameters which control such things as:

• parity selection, generation, and detection,

• hardware flow control,

• software flow control,

• character description.

For more information, please see *list com1/com2* on page 98, *set com1/com2* on page 105, and *9-Pin COM1/COM2 Pinout* on page 184.

Note   For best performance, connect RXD lines (Pin 2) to ground on cables connected to equipment that do not drive the transmit data signal (i.e. some printers). This will prevent induced noise from being processed as data.

You have now completed the basic installation of the M208 onto the network and now it must be configured for use. Please continue with the appropriate chapters for information pertaining to the hub component of the unit and for information pertaining to configuring the M208 for your particular environment:

• *USING THE HUB* on page 19,

• *CONFIGURING THE M208 FOR TCP/IP* on page 31,

• *CONFIGURING THE M208 FOR NOVELL* on page 63,

• *CONFIGURING THE M208 FOR APPLETALK* on page 75,

• *CONFIGURING THE M208 FOR WINDOWS* on page 79.

▣ USING THE HUB

Overview

The M208 Workgroup Hub/Print Server includes a fully managable and intelligent eight port Ethernet hub. Hubs (or multi-port repeaters) are stable network devices that perform signal regeneration (including amplification, symmetry, and retiming), packet forwarding, and routing. When a hub is presented with a data signal, it automatically regenerates and transmits the data signal to all the other hub ports without any modification to the signal.

Very little configuration is required for the hub as it becomes fully operational as soon the unit is powered up.

M208 Hub Features

The following is a list of features for the hub component of the M208:

- auto discovery/auto-sensing: the M208 automatically senses when a device is connected to a port and begins transmitting data signals to that port,

- auto-port segmentation: the hub will automatically segment a port when the port experiences excessive collisions or sends extremely long (illegal) Ethernet packets,

- intelligent segmentation recovery: if a port becomes segmented due to undesirable Ethernet activity, the port will automatically return to normal operation when the undesirable activity disappears,

- collision detection: when two nodes try to transmit data at the same time, the M208 will transmit a jam signal telling the nodes that a collision has occurred. Once the collision condition is removed, the M208 terminates the jam signal and resumes normal operation,

- cascading hubs: any port can be used to cascade M208s,

- automatic reverse receive parity to correct miswiring: the M208 can automatically reverses the polarity of the receive pair if it senses the parity to be incorrect,

- configuration and management in a Windows environment using **NPWin**,

- full hub monitoring capabilities using the **npsh** command set,

- remote network management via private MIBs: the M208's private MIB file contains all the variables and traps required to manage the hub using an SNMP manager,

Hub Installation

You can use any of the network ports to connect the M208 to computers, to other hubs/backbone, or to other Data Terminal Equipment (DTE).

Connectors

The M208 has 9 network connectors: eight 10Base-T (RJ45) connectors, and one AUI connector.

Cable Requirements for Connecting to the Backbone or to Other Hubs

To connect the M208 to the backbone or to another hub, a crossed-over cable is required unless port #1 is used, then a straight through cable can be used as long as the switch next to the port is set accordingly. By default, the switch is set to accept a straight-through cable.

Cabling Requirements for Connecting to DTE's

To connect other DTE's to the M208, a straight-through cable is required unless port #1 is used, then a crossed-over cable can be used as long as the switch next to the port is set accordingly.

For the pinouts of the twisted-pair cable, please see *Twisted-Pair Cable Pinouts* on page 21. For the pinouts of the AUI cable, please see *THICK (Transceiver) Connector Pinouts* on page 180.

Note   Port #1 is the only port that can be set (using the external switch) to accept either a crossed-over or straight-through cable. Ports #2-8 are internally crossed-over.

Figure 3:   Twisted-Pair Cable Pinouts

Twisted-Pair Straight-Through Cable

M208 End			DTE End
Signal	Pins	Pins	Signal
Receive +	1 ←————— 1		Transmit +
Receive -	2 ←———— 2		Transmit -
Transmit +	3 ————→ 3		Receive +
Transmit -	6 ————→ 6		Receive -

Twisted-Pair Crossover Cable

M208 End			Backbone/Hub End
Signal	Pins	Pins	Signal
Receive +	1	6	Transmit -
Receive -	2	3	Transmit +
Transmit +	3	2	Receive -
Transmit -	6	1	Receive +

Hub Configuration

The hub component of the M208 becomes fully operationable as soon as the unit is powered up and thus very little configuration is required. However, to facilitate communications with the M208 and to utilize the M208's print server capabilities, it is necessary to configure the unit with an IP address.

Other hub configuration options as well as the **npsh** commands to perform the configuration are detailed below. All hub configuration can also be performed using the included NPWin software utility included with the M208.

Note   In order to use the print server functions of the M208, an IP address must be config-

ured on the unit.

Configuring the M208 with an IP address

There are a number of ways to configure the M208 with an IP address, either automatically with a shell script or manually.

Please see *Computer-aided Configuration with ezsetup or npconfig* on page 36, *Manual Configuration Through the Network with ARP* on page 37, *Manual Configuration Through the Network with RARP* on page 38, *Manual Configuration Through the Network with BOOTP* on page 39, or *Manual Configuration Through the COM Port* on page 40, or *USING NPWIN* on page 127 for step-by-step instructions.

Enabling/Disabling a Port

This feature allows you to manually enable or disable a particular port. By **default**, all ports are **enabled** and the M208 will auto-sense when a device is connected to the port and will start sending data signals to the port.

Note A port that has been manually disabled will not auto-sense when a device is attached to it. You must manually enable any port that has been manually disabled before auto-sensing will work.

To disable a particular port, please follow the steps below:

1 Login to the M208 as a **root** user.

2 At the **npsh** prompt, type the following command:

config hub [*portnum*] [-]enable

where ***portnum*** is the number between 1 and 9 of the port that you want to disable.

Note The **config hub** command stores the configuration setting to EEPROM and automatically resets the unit.

Enabling/Disabling Link Integrity on a 10Base-T Port

This feature allows you to stop a port from generating a link integrity signal. This signal informs a hub of the presence of a device connect to it over a twisted-pair cable and of the integrity of that link. By **default**, link integrity is **enabled** on all ports.

If you have a non-10Base-T product connected to the hub, you may need to disable the link integrity on that particular port or else the port will experience excessive collisions and auto-partition itself.

To disable link integrity on a specific port, please follow the steps below:

1   Login to the M208 as a **root** user.

2   At the **npsh** prompt, type the following command:

    config hub [*portnum*] [-]li

    where *portnum* is the number between 1 and 8 of the port that you want to disable link integrity.

Note   This command is not applicable to port 9 which is the AUI port.

Note   If the port LED stays lit even when no device is attached, this indicates that link integrity has been turned **off** for that particular port.

Enabling/Disabling Reversing Receive Polarity on a Port

This feature allows you to turn off the automatic reverse receive polarity on a port. By **default**, reverse receive polarity is **enabled**.

Note   If you disable this feature on a port, you must ensure that you are using the correct wiring for the port. Please see *Twisted-Pair Cable Pinouts* on page 21 for details.

To disable reverse receive polarity of a specific port, please follow the steps below:

1   Login to the M208 as a **root** user.

2   At the **npsh** prompt, type the following command:

    config hub [*portnum*] [-]revxpol

    where *portnum* is the number between 1 and 8 of the port that you want to disable reverse receive polarity.

Note   This command is not applicable to port 9 which is the AUI port.

Enabling/Disabling SQE Test on the AUI port

The SQE Test is a signal that tests the signal detection electronics in the transceiver and lets the hub know that the collision detection circuits and signal paths are working correctly. The SQE Test is only applicable to the AUI port and by **default**, the SQE Test is **disabled**.

If you are using the AUI port via a external transceiver, the SQE Test signal could be interpreted by the transceiver as a collision and may cause a collision signal to be generated to the rest of the network. Generally, when you are using an external transceiver on the AUI port, ensure that the SQE Test is disabled.

If you are using the AUI port without an external transceiver, the SQE Test can be used to verify the integrity of the connection.

To enable the SQE Test on port 9, please follow the steps below:

1   Login to the M208 as a **root** user.

2   At the **npsh** prompt, type the following command:

```
config hub 9 sqe
```

Monitoring the Hub

Monitoring the hub can be done on two levels, by observing the LED lights on the both the front and back panels of the unit and by using the hub monitoring features included in the **npsh** command set.

Hub Monitoring Using the LEDs

The M208's hub component has ten LEDs associated with it: two LEDs on the front panel indicating collisions and general hub activity and eight LEDs on the back indicating port activity.

The collision LED (COL) on the front panel will flash when the hub is experiencing transmission collisions. The rate of flash corresponds to the amount of collisions that the hub is experiencing.

The activity LED (ACT) on the front panel will flash when the hub is experiencing network activity. The rate of flash corresponds to the amount of network activity the hub is experiencing.

The port activity LEDs on the back panel will flash when the port is receiving data from the network. The rate of flash corresponds to the amount of data being sent or received by the port.

Note   When a port has been auto-segmented, the port activity LED will flash slowly until the hub terminates the auto-segment condition.

Hub Monitoring Using npsh

The command set **npsh** provides extensive information regarding the operation of the hub including both the general operational status of the hub as well as information specific to each port. This information is valuable for monitoring the operation of the hub and for troubleshooting your network.

To monitor the operations **of the hub as a whole**, please follow the steps below:

1   Login to the M208 as a **root** or **guest** user.

2   At the **npsh** prompt, type the following command:

    list hub

A screen showing the general operational status of the hub, various counters, and the configuration of each port is displayed.

To monitor the configuration and operational status **of a particular port**, please follow the steps below:

1   Login to the M208 as a **root** or **guest** user.

2   At the **npsh** prompt, type the following command:

    list hub [*portnum*]

where ***portnum*** is the number between 1 and 9 of the port that you want to monitor.

A screen showing information specific to the configuration and operation of the desired port is displayed.

Definitions of Ethernet Terms in List Hub Output

The following defines the Ethernet terms used in the output of the **List Hub** command.

Alignment Errors	Displays the number of frames detected with an Frame Check Sequence (FCS) error and a framing error.
Auto Partitioned	Displays whether the port has been auto-partitioned because of undesirable Ethernet activity.
Auto Partitions	Displays the number of instances where the M208 has auto-partitioned this port.

Collisions	Displays the number of occurrences where the port has activity on both its receive and transmit pairs. This is a normal event within a CSMA/CD network. Excessive collisions, however, may indicate an over-loaded network or a wiring error.
Data Rate Mismatches	Displays the number of occurrences where the frequency or data rate of the incoming signal is different from the local transmit frequency.
Enabled	Displays whether the port is enabled. If enabled, data received on another port is transmitted on the transmit pair. If disabled, the transmit pair is inactive while the receive pair is active.
FCS Errors	Displays the number of frames detected on a port with an invalid Frame Check Sequence (FCS).
Frame Too Longs	Displays the number of frames that exceed the maximum valid packet length of 1518 bytes.
Last Scr Address	Displays the value of the Ethernet source address field of the last valid frame it received.
Late Events	Displays the number of instances where a collision is detected after the LateEvent Threshold in the frame. This attribute will be counted by both the Late Events attribute as well as the Collisions attribute.
Link Integrity Test	Displays whether the port has the link integrity test enabled.
Link Status	Displays whether the port passed the link status test.
Loop Back Test	Displays whether the AUI port passed the loop back test.
MJLP Error	Displays whether the M208 has a MAU Jabber Lockup Protection (MJLP) error. A MJLP error is where the port transmits for a period longer than the maximum packet length.
Operating Status	Displays the operation status of the M208, either operational or failure.

Readable Frames	Displays the number of valid frames received by the port.
Readable Octets	Displays the number of valid octets received by the port.
Rx Polarity Reversed	Displays whether the receive polarity has been automatically reversed on the port. This occurs when the receive pair is miswired.
Runts	Displays the number of instances where activity is detected with a duration greater than the ShortEventMaxTime but less than the minimum valid frame time.
Short Events	Displays the number of instances where activity is detected with a duration less than ShortEventMaxTime. This is a normal event in a CSMA/CD network.
Source Address	Displays the number of Ethernet source address changes on the received packets.
SQE Test	Displays whether the AUI port has the SQE Test enabled.
Src Address Match	Displays a confirmation that the Ethernet address on the last frame received matches that of the previous frame. This indicates that either the DTE has been changed or the port is connected to another hub.
Total Errors	Displays the total number of errors detected by the M208.
Total Frames	Displays the total number of valid frames received on all the ports of the M208.
Total Octets	Displays the total number of octets received on all the ports of the M208.
Transmit Collisions	Displays the number of transmit collisions detected by the M208 on all of the ports.
Very Long Events	Displays the number of times the transmitter is active in excess of the MAU jabber lockup protection timer.

SNMP Management Features

The M208 includes a private Management Information Base (MIB) file that contains a number of variables and traps that can be used to configure, monitor and manage all aspects of the unit. The M208 supports both MIB II and private MIBs, allowing it to be a fully managed agent using a SNMP manager such as HP's *OpenView*, Sun's *Sun-Net Manager*, and Castle Rock's, *SNMPc*.

The MIB is included in a file called **mplxmib.txt** that can found on the host software disk. This file can also be downloaded from the Microplex FTP site (**ftp.microplex.com: support/m208/misc/mplxmib.txt**) or can be accessed via the Microplex Web site (**http://www.microplex.com/**).

For a complete description of SNMP, the MIB file, and how to set up an SNMP user, please see *Managing With SNMP* on page 141.

Troubleshooting the Hub

This section covers some basic troubleshooting tips regarding the operation of the hub component of the M208. For information on troubleshooting the print server component of the M208, please see *TROUBLESHOOTING THE M208* on page 159.

Basic Troubleshooting Tips

- Ensure that the connections are secure and the hub is powered-up,

- If a transceiver is connected to the AUI port, make sure the SQE test is turned off. If you connect a transceiver to the AUI port and the SQU test is turned on, excessive collisions, short events, or dropped packets between the M208 and the device connected to the AUI port can occur,

- Ensure that you have a valid network topology and that you are complying with standard Ethernet practices regarding length of cable runs, number of hops, etc.

Additional Troubleshooting Tips

- If you plug a device into one of the RJ45 ports (Hub to DTE) and the LED does not turn on, try plugging it into port one and setting the selector switch to the crossed-over position (X). If this works, either use port one or change to a straight-through cable.

- If you plug another hub into one of the RJ45 ports (Hub to Hub) and the LED does not turn on, try plugging it into port one and setting the selector switch to the straight-through position (||). If this works, either use port one or change to a crossed-over cable.

- If you plug a device into one the RJ45 ports (DTE to Hub) and the LED turns on but does not flicker when you know the device should be receiving data from another active device, make sure that reverse receive polarity is enabled for the port or correct the receive pair.

🌐 CONFIGURING THE M208 FOR TCP/IP

Overview

If you are setting the M208 in a TCP/IP environment, this chapter will help you with all aspects of the setup process. The provided host software is introduced and then steps are given for configuring the M208 for communications over the network and for printing. Since TCP/IP encompasses a wide variety of system types, the common ones are covered in detail to help you get printing in a TCP/IP environment.

Host Software

The TCP/IP software provided includes two setup programs, source code, interface files, and various printing-related programs such as:

- **a2ps** for ASCII to PostScript conversion,

- **onlcr** for carriage return insertion,

- **banner** for banner page generation,

- **chr** for echoing ASCII characters and strings to standard output,

- **npscramble** for print job scrambling,

- **npd** for bi-directional communications when printing,

- **npwrite** for direct socket printing.

chr is the only mandatory binary when using one of the interface scripts for printing. The extra processing binaries (**a2ps**, **onlcr**, **banner**) can be configured for the host to perform or they can each be set on the M208 alleviating the host of these extra tasks.

Note   To be utilized on a host, they must be used in conjunction with an interface file. Otherwise, please see *USING THE M208'S COMMAND SET* on page 93 for information on the commands necessary to set these features on the M208. By setting these features on the M208, the compilation of **chr** may be the only one required.

Compiling Host Software

Some compilation may be needed before adding print setups to your host unless you have **SunOS 4.1.x**, **Solaris 2.x**, or **SCO Unix**. Pre-compiled binaries are provided for these. **npconfig** can be used to do the compilation or you can try and compile each program independently. For the **npconfig** method, please:

1   Select **Detailed Configuration Options . . .** from the **npconfig** Main Menu.

2   Select **Manage Host Software . . .** from the Options Sub-Menu.

3   Select **Compile Host Software** and answer the prompts until compiled.

For more information on all of this provided host software, please see the next sub-sections.

ezsetup and npconfig

ezsetup and **npconfig** are the two installation programs provided; one is for a very quick, simple setup and the latter is for a more detailed configuration or for maintaining and troubleshooting the M208. Both programs help you configure your M208 and direct print jobs to it.

ezsetup provides two choices only; these are the *same* as the first two choices of **npconfig**'s Main Menu. Within minutes, you will have configured the M208 so it can be recognized on the network and your host will be able to send print jobs successfully to it.

If you want to spend more time manipulating the extra capabilities of the M208 and your host's configuration, use **npconfig**. It can be used to configure a print destination on your host and it can also be used as a M208 management utility allowing you to monitor, change, and troubleshoot the unit.

Both setup scripts create individual log files, **/tmp/ezsetup.log** and **/tmp/npconfig.log**, which simultaneously log a copy of all of the commands executed as you run through each of these scripts.

Please refer to *Table 1: npconfig/ezsetup Main Menu*, and *Table 2: npconfig Detailed Configuration Options Sub-Menu* for an explanation of the menus.

Table 1:   npconfig/ezsetup Main Menu

Option	Description
Configure New Unit	Add a M208 to your network. This option provides for: IP name, IP address, hardware address, netmask, and for **root** and **guest** passwords. (**ezsetup** as well)
Configure Host Setup	Configure a print destination on the host including communication mechanism and processing options. (**ezsetup** as well)
Detailed Configuration Options . .	See *Table 2: npconfig Detailed Configuration Options Sub-Menu*.
Check Current Print Server Status	Display current status of a M208 and associated I/O ports.
Cancel a Print Job in the Print Server	Display current status of a M208, current print jobs within it, and a prompt for a print job to be cancelled.

Table 2:   npconfig Detailed Configuration Options Sub-Menu

Option	Description
Select Print Server	Select the M208 you want to configure.
Configure Print Server's Destinations. . .	Configure M208 destination settings: name, I/O port, back-channel, model, logpath, state, alternate destination, and service(s).
Configure Print Server's Models . . .	Configure M208 model settings: name, type, banner page, carriage return insertion (**onlcr**), tab expansion (**xtab**), descrambling, ASCII to PostScript conversion (**a2ps**), and header and trailer strings.
Configure Print Server's I/O Ports . . .	Configure M208 I/O port settings: state, timeout, handshaking, parity, and speed.

Table 2:   npconfig Detailed Configuration Options Sub-Menu

Option	Description
Configure Print Server's Log-paths . . .	Configure M208 logpath settings: name, type, and port.
Configure Print Server's Users . . .	Add and remove users. Change user passwords and user types.
Configure Print Server's Novell Options . . .	Configure and list the M208 Novell settings: name, frame type, and PSERVER password. List M208 PSERVER and RPRINTER configuration.
Configure Print Server's Network Options . . .	Configure M208 IP address, netmask, routing entries, frame type, and RARP and BOOTP settings. Restore unit to default settings. List all network-related settings.
Manage Print Server's System Information . . .	Display and modify system information of a M208: M208 name, contact name, location string, log details, descramble key, license key, and module(s).
Configure Print Server's Permanent Settings . . .	For Print Server settings, query current status and store changes to/from EEPROM and factory defaults.
Debug Print Server . . .	Use M208 debug commands. Begin and start I/O port tests.
Manage Host Software . . .	Install manual pages, compile source code, and install binaries and scripts provided on the host software media.
Remote Host Security . . .	Specify TCP hosts/networks that can communicate with the M208.

M208 Configuration

When the M208 is first installed on a TCP/IP network, you are unable to communicate with it since its network parameters are not initialized. During configuration, the following parameters are initialized and saved in EEPROM:

- IP address (mandatory),

- netmask or sub-netmask(mandatory),

- **root** user password (recommended for security),

- **guest** user password (recommended for security).

Initializing these parameters permits configuration of all remaining settings through any of these five ways:

1   computer-aided configuration with **ezsetup** or **npconfig,**

2   manual configuration with a terminal connected to COM1,

3   manual configuration through the network with RARP,

4   manual configuration through the network with BOOTP,

5   manual configuration through the network with ARP.

Once you have completed any one of these methods, you will notice the STAT LED flashing on once per second. This means the M208 is configured and recognizable on the network. At this point, you can then configure a host for printing by continuing with *Host Configuration* on page 42. This will complete your entire print setup unless you want to enhance it.

If you want to continue with any of the following procedures, please find them as indicated in other sections of this manual:

- Add to or change configuration of your M208. Please see *USING THE M208'S COMMAND SET* on page 93.

- Utilize more advanced features of the Print Server. Please see *USING THE M208'S ADDITIONAL OPTIONS* on page 131.

Computer-aided Configuration with ezsetup or npconfig

Note   If you choose computer-aided configuration, you must log on to your system as **root** or **superuser** and use the host software diskette or tape supplied with your M208. If the software is not provided, or you need a different medium, contact your vendor.

To configure the M208 with the aid of a script, you must:

1   Insert the host software medium into the drive.

2   Login as **root** user.

3   **cd** to a directory with at least three megabytes of free space.

4   Transfer the compressed tar file from the media onto the host:

   tar xvf /dev/*devicename*

   devicename is usually **fd0** for a diskette.

5   Uncompress this file. Enter:

   uncompress npdist.tar.1.Z

6   Untar this file. Enter:

   tar xvf npdist.tar.1

   A list of files displays and scrolls up on the screen as **tar** executes and several files and sub-directories are created.

7   Assign an IP address and IP name to the M208 in your host table (**/etc/hosts**, **hosts nis** map, or DNS name tables).

8   Run **ezsetup** or **npconfig**. Enter:

   ./ezsetup or **./npconfig**

Note   If running the host software on an HP/UX system, you need to explicitly set the Korne shell by adding "**ksh**" before "**./ezsetup**" or "**./npconfig**".

9   Enter the number for **Configure New Unit** from the Main Menu.

10 Follow the prompts.

For more information, please see *ezsetup and npconfig* on page 32.

Manual Configuration Through the Network with ARP

To manually configure the M208 using the network, go to a host terminal and do the following:

1 Log on to your system as **root** user.

2 Assign an IP address and IP name to the M208 in your host table (**/etc/hosts**, **hosts nis** map, or DNS name tables).

3 Find the Ethernet address for the M208 on the bottom of the unit. It must be entered as part of this procedure.

4 Use the **arp** command to add an entry in the host's **arp** able. This is the most common syntax for this command:

Syntax   **arp -s *ipname* *ethernetaddress***

where ***ipname*** is the M208's IP name or IP address and ***ethernetaddress*** is that of the M208.

Note   If this syntax doesn't apply, look in your host's reference manual to find the proper syntax for the **arp** command.

5 **telnet** to the M208. This will bring up a login screen.

   telnet *ipname*

6 Log into the Print Server as **root**.

7 At the password prompt, press **<Enter>**. No password is required at this point as the M208 is still unconfigured.

Note   This WARNING message is normal at this point so you can ignore it:

   STORED AND CURRENT VALUES DIFFER

   You should now see a prompt displayed that has the M208 IP address followed by a colon, then **root**.

   ipaddress:root>

8 Store the new IP address and netmask in EEPROM so that the M208 can remember its configuration after reboots. Enter:

   store tcpip *ifnum* addr *ipaddress*

   store tcpip *ifnum* mask *netmask*

Note   *ifnum* is the index to a particular Network Interface. *ifnum* will always be **1** for the M208 since there is only one network interface, Ethernet.

9   [Optional, but recommended] Configure **root** and **guest** user passwords with the following commands.

```
set user passwd root newrootpasswd
```

```
set user passwd guest newguestpasswd
```

10   Save these configurations to EEPROM. Enter:

```
save
```

11   Verify the IP address and netmask. Enter:

```
list stored tcpip
```

These are now stored in EEPROM.

12   Logout of the Telnet session with **quit**. Then reboot the M208 by powering the unit off, then on.

13   Test the equipment and configuration after installation is complete. Enter at the shell prompt on your UNIX machine:

```
ping ipname
```

Manual Configuration Through the Network with RARP

The RARP daemon provides a mechanism for dynamic IP address assignment. When a RARP-configured TCP/IP host boots, it broadcasts a RARP request for an IP address. Your network must have this daemon running on some host. If you do not know whether your network has one, please ask your system administrator or configure the M208 with one of the other methods in this section.

To configure the M208 with RARP, you need to:

1   Make an entry in the **/etc/ethers** file for the new M208.

Example   `00:80:72:00:AB:CD spike`

entry for the M208 named **spike** which has this Ethernet address.

2   Start the RARP daemon if it isn't running. Send a HUP signal to it with the **kill** command:

```
kill -HUP pid
```

3   Reboot the M208. After the STAT LED flashes regularly, wait another ten seconds to allow the RARP process to complete.

4   Test the new IP address by trying a **ping** with the new IP name:

    ping *ipname*

5   [Optional, but recommended] At this point, set up the user passwords. Please see *set user* on page 117.

If no response is given by the M208, the RARP process probably failed. Reboot the unit and try one of the other methods mentioned in this section.

Manual Configuration Through the Network with BOOTP

BOOTP is a protocol for configuring the M208 as it boots. During the boot sequence, the M208 can broadcast a BOOTP request and if a BOOTP server is running on the network configured to respond to the requesting device, it will provide the M208 with its IP address, netmask, default router, and a time server from which to query the current time (GMT) and the timezone in which the M208 is located.

By default, the M208 will broadcast a BOOTP request when it boots. The following command can be used to control this request:

store tcpip *ifnum* opts [[-]rarp] [[-]bootp]

On the BOOTP server, there must be an entry in /etc/bootptab similar to this:

```
M208:\
    :sm=netmask:\
    :hd=/usr/boot:\
    :bf=null:\
    :gw=default router:\
    :ht=ethernet:\
    :ha=network address:\ (e.g. 0080720000DC)
    :ip=ipaddress:\
    :ts=time server:\
    :to=timezone: (in seconds from GMT)
```

Manual Configuration Through the COM Port

A terminal, PC, or laptop can be connected to one of the M208's COM ports for configuration purposes. A straight-through serial cable is normally needed unless a PC is attached; in this case, a null modem cable can be used. Please see *Serial Cable Schematic* on page 186 for more details.

To configure the M208 through the serial ports, you need to:

1 Configure your terminal settings according to the following specifications, unless the COM port's parameters have been modified on the M208:

Baud rate: 9600	**Data bits**: 8
Stop bits: 1	**Parity**: NONE
Receive handshake: XON/XOFF	**Transmit handshake**: XON/XOFF

2 Turn on the M208 power. Wait until the STAT LED flashes regularly and then press the **<Break>** key on your terminal once.

Note   If you see garbage characters on the screen, check the baud rate and parity settings of the terminal. If you aren't getting anything, it may be your cable.

3 Press **<Enter>** for the local host (i.e. the M208) when the prompt appears asking for an Internet address to login to.

4 Login as **root** when asked for a login name.

5 Press **<Enter>** at the password prompt. No password is required at this point, as the M208 is still unconfigured.

6 Store the new IP address and netmask in EEPROM so that the M208 can remember its configuration after reboot. Enter:

store tcpip *ifnum* addr *ipaddress*

store tcpip *ifnum* mask *netmask*

Note   *ifnum* is the index to a particular Network Interface. *ifnum* will always be **1** for the M208 since there is only one network interface, Ethernet.

7 [Optional, but recommended] Configure **root** and **guest** user passwords with the following commands:

set user passwd root *newrootpasswd*

set user passwd guest *newguestpasswd*

8   Save these configurations to EEPROM. Enter:

save

9   Verify the IP address and netmask. Enter:

list stored tcpip

These are now stored in EEPROM.

10   After configuration, turn the M208 off, then on. This reboots the M208 and automatically logs you out of the terminal session.

11   Test the equipment and configuration after installation is complete. Enter at the shell prompt on your UNIX machine:

ping *ipname*

Restoring to Factory Defaults

If at any time you'd like to restore the M208's *network* settings to their original state, you can do so with an **npsh** command or by utilizing jumpers within the M208 itself. Please see *Restoring To Factory Defaults* on page 135 for more details on this process.

Host Configuration

When setting up a print destination on a Unix host, you have the option to utilize a computer-aided script such as **ezsetup** or **npconfig** or to do all of the appropriate steps manually.

If you decide to go with one of the provided installation scripts, select **Configure Host Setup** from the Main Menu of either program to configure a print setup on your host. It will step you through some questions and then perform all of the necessary setup commands for you. Please see *ezsetup and npconfig* on page 32 for more information on these scripts.

The rest of this section introduces you to different printing methods, with the spooler and without, and discusses each of the *manual* steps for these environments:

- BSD,

- System V,

- Sun NeWSprint and Adobe TranScript,

- AIX,

- PC.

Direct Printing Without the Spooler

Before configuring the spooling system, test that basic communications are working with the M208 and attached printers. Perform tests by sending print jobs directly to the M208 and bypassing the spooler altogether. You can send print jobs directly to the M208 with either **npwrite** or **rsh/rcmd/remsh.**

The **rsh/rcmd/remsh** program provides the same functions as the **npwrite** program except that the **rsh/rcmd/remsh** program exits with an error code when the network connection is down. **npwrite** continually tries until the job is completed. Remember this behavior when you are manually modifying your interface script because some spooler systems simply send a message about the error but the job gets flushed. The **npr.if** interface script gives you examples of how this behavior should be handled.

npwrite

The data transfer program **npwrite** is provided with the host software shipped with the M208. It sends data to the unit over a TCP connection. Data is read from a file or, if no

file is specified, from standard input. The format of the data is not altered by this program so make sure it is in printer-ready format.

The syntax for **npwrite** is:

Syntax   **npwrite *ipname portname* [*filenames*]**

where:

    ipname   M208 IP name or IP address.

    portname   I/O port on the M208 (i.e. **prn**, **com1**, **com2**).

    filenames   [optional]. Filename(s) to be printed. If no filename is specified, data is read from standard input.

Example   **npwrite 192.75.11.32 prn testfile.txt**

           npwrite spike com2 testfile.txt

           cat testfile.txt | npwrite 192.75.11.32 prn

where **spike** and **192.75.11.32** are the M208's IP name and IP address.

For more information on **npwrite**, please refer to the online manual pages. If the **npwrite** binary is not available for your UNIX machine, use **rsh/rcmd/remsh** instead.

rsh/rcmd/remsh

The **rsh/rcmd/remsh** programs are remote command execution clients that talk to the **rshd** server in the M208. **rsh, rcmd,** and **remsh** are actually the same programs but have different names on different UNIX systems; some systems may even have another name for remote command. Enter **man rshd** to display the online manual pages for information on the remote shell server for your version of UNIX.

The Print Server provides **lp, lpstat,** and **cancel** programs for print services through the **rshd** server. The **lp** command reads data from standard input and sends it to the specified port as follows:

•   on SCO UNIX, either of the following:

Example   **rcmd spike lp -d d1prn < testfile.txt**

           cat testfile.txt | rcmd spike lp -d d1prn

•   on Sun UNIX, either of the following:

Example   **rsh spike lp -d d1prn < testfile.txt**

cat testfile.txt | rsh spike lp -d d1prn

where **spike** is the M208's IP name and **d1prn** is the destination.

Printing Via the Spooler

Once you know your communications are correct and you can successfully print directly to the Print Server, you can integrate the spooler.

Interface scripts play important roles in BSD spooling environments and especially with System V print spoolers. BSD systems also provide a remote printing method that utilizes the spooler but needs *no* script or host software at all.

The following sections elaborate on different spooling environments and provide the manual steps for full host configuration in various environments. **ezsetup** or **npconfig**, in most cases, can be used instead to simplify the setup process. Please see *ezsetup and npconfig* on page 32 for further details.

npr.if Interface Script

The **npr.if** interface script provided works in most environments, but it can be replaced by a custom interface script if you have other requirements. It is usually a UNIX script which reads parameters from the command line, processes the job according to the parameters, and sends it to the destination.

Two interface scripts, **nprbsd.if** and **nprsysv.if**, are shipped in *raw* state. These inter-face scripts can be named anything you would like. Load the appropriate one for your system spooler type and use it in this state if the M208 can do sufficient processing. The M208 itself contains enough processing options, when they are turned on, to han-dle most processing needs *without* the need for host software. Some of these options include ASCII to PostScript conversion (**a2ps**) and carriage return insertion (**onlcr**). Therefore, host software may be unnecessary and you can turn off all processing options on the host. Please see *Host Software* on page 31 to find out more about these options.

Note   If you require high-speed printing, use one of the interface scripts with host process-ing turned on. This removes processing load from the Print Server and increases print-

ing throughput.

Both **ezsetup** and **npconfig** utilize the appropriate interface script by renaming it to **npr***printername***.if**, where *printername* is the name of the printer on the host. To install one of these scripts manually, please refer to the section that applies to your host: the *BSD UNIX* section starting on page 47 or the *System V UNIX* section starting on page 51.

Custom Interface Scripts

If an interface script is to be used for your print setup, you have three choices:

1   Use **npr.if** provided in the host software.

2   Use a pre-defined script for your particular printer.

3   Use a script you have created yourself.

The **npr.if** method is explained throughout this section. However, if you have a pre-defined printer script or a script of your own, there are certain modifications you must make in order for it to work with the M208.

The important part of an interface script is where it sends the print job. With the M208, the data must be captured and sent over the network for printing, since your printer is no longer locally attached. There are two possible ways to make this happen with your current script:

1   Encapsulate your script's code with brackets ( ) and after the closing bracket, add a command to send the data to the M208 for printing.

2   Use **npd** as the print method.

Both of these methods are explained on the next page.

Modifying Your Script

If you choose to simply edit the script, you need to understand how an interface file works. The structure of any standard interface file should be as follows:

```
process options
(
generate printer setup characters
generate banner page data for each file
```

```
translate data to printer format
) | communication program
```

where ***communication program*** is the command executing **rsh/rcmd**/**remsh** or
npwrite so the print job is redirected over the network to the M208.

Example
```
(
FILE=$6
#the spool file is found in the sixth parameter on System V
cat $FILE | onlcr
#filter the job
) | rcmd spike lp -d d3com1
```

where **spike** is the name of the M208 and the print jobs are being sent to its destina-
tion **d3com1** by remotely executing the M208's **lp** print command.

Please see *npwrite* on page 42, *rsh/rcmd/remsh* on page 43, and *lp* on page 102 for
more details on each command's syntax.

Note   Even if you have a very simplistic script, it's important that you enclose your script
with brackets and then add in a ***communication program*** at the end.

Using npd and Your Own Script

If **npd** is the print method you would like to use with your interface script, you need to
start the **npd** daemon on your host and then incorporate it into your print setup. Please
see *npd Pseudo-device Interface* on page 54 to find out more about **npd** and how to
get it started.

Once you have this daemon running, you can go ahead and work it into your printer
configuration. For BSD systems, this requires an **lp=** field in your printcap entry along
with the standard **if=** field for the name of your interface script. The **lp=** field is filled
in with the name of the **npd** *devicefile* used in **npd**'s startup command. If you have a
System V setup, the **-v** option in the **lpadmin** command will equal the **npd** *devicefile*.

BSD UNIX

BSD systems allow you to print remotely or to print with an interface file for a locally attached printer. This is configured within the **/etc/printcap** database.

lpd Remote Printing

The **lpd** daemon spools files locally, then sends them to an M208 acting as a remote printer. As interface scripts cannot be used with this spooling method, processing must be done by the Print Server.

This method should be used in the following conditions:

- your UNIX host supports BSD 4.3 LPD protocol,

- no bi-directional communication is required between the printer and printing application,

- you want to avoid using special host software.

In BSD printing, two files are sent to the Print Server, a data file and a control file. The control file contains information about originating user and host. However, since the control file may not arrive before the data file in the current LPD standards, fully detailed banner pages cannot be guaranteed**.**

Setting up lpd Remote

To manually add an M208 printer as a remote printer entry on your BSD UNIX host, you need to add an entry to the /**etc/printcap** file and then create its associated files and directories.

Here is an example of what the printcap entry should look like followed by a description of the commands necessary to create these entries:

Example
```
ps|PostScript printer on spike's com2 port:\
:lp=:\
:rp=d3com2:\
:rm=spike:\
:sd=/usr/spool/lpd/spike/ps:\
:lf=/usr/spool/lpd/spike/ps/log:\
:af=/usr/spool/lpd/spike/ps/acct:
```

where **ps** is the printer name sending jobs to the destination **d3com2** on the M208 named **spike**.

To create the necessary entries for this example, these commands are needed:

```
cd /usr/spool/lpd
mkdir spike
mkdir spike/ps
touch spike/ps/log spike/ps/acct
chown -R daemon.daemon spike
chmod -R g+rwX,o+rX spike
```

Once this is done, you can then start this printer.

```
lpc start ps
```

To send a print job, use this syntax:

Syntax   **`lpr -Pprintername filename`**

BSD Interface Script Printing

If you decide not to go with a remote printer setup, you can use an interface file instead. This interface script is specified in **/etc/printcap** with the **if=** entry instead of the **rm**= and **rp**= entries. The script is called by the **lpd** daemon with the following syntax:

Syntax   **`nprbsd.if -wwidth -llength -iindent -nlogin -hhost acct_file`**

where:

nprbsd.if	Name of the interface script.
width	Width of page in characters.
length	Length of page in lines.
indent	Number of characters of indent from left margin.
login	Login name of person originating the print request.
host	Name of host where the print job originates.
acct_file	File where accounting data is stored.

Setting up an Interface Script

To manually set up your host with an interface file, you need to add an entry to the **/etc/printcap** file and then create and edit its associated files and directories.

Here is an example of what the printcap entry should look like followed by a descrip-

tion of the commands necessary to create these entries:

Example

```
hp:\
  :sh:pw#80:mx#0\
  :lp=/dev/spike.com2:\
  :sd=/usr/spool/lpd/spike/com2:\
  :lf=/usr/spool/lpd/spike/com2/log:\
  :af=/usr/spool/lpd/spike/com2/acct:\
  :if=/usr/spool/lpd/spike/com2/npr.if:
```

where **hp** is the printer name sending jobs to the M208 named **spike** through the inter-face file **npr.if**.

To create these entries, please do the following:

1   Create the printer's spooling directory and associated files.

```
cd /usr/spool/lpd
mkdir spike
mkdir spike/com2
touch spike/com2/log spike/com2/acct
chown -R daemon.daemon spike
chmod -R g+rwX,o+rX spike
```

2   Copy the **nprbsd.if** file from the host software medium to the spooling directory. Copy the file as **npr.if** or name it something more meaningful.

```
cp nprbsd.if /usr/spool/lpd/spike/com2/npr.if
cd /usr/spool/lpd/spike/com2
chown daemon.daemon npr.if
chmod g+rwX,o+rX npr.if
```

3   Edit the **npr.if** variables to suit your system environment. Look for the comment section beginning with "EDIT THESE VARIABLES" and at the end of this large comment block, you will find these:

Note   When defining these variables, remember that each is *case sensitive*. Please define them as seen in these descriptions. In addition, a further description of these variables is included in the large comment block before them.

NPDIR_PATH   (mandatory) Define the directory location of **chr**, **banner,** **onlcr**, **a2ps,** and **npscramble** binaries. Usually **/usr/local/bin.**

Note   These binaries must be copied over from the host software medium. Please see

Host Software on page 31 for more details.

COMM_PROG   (mandatory) Specify a communication program to transfer data to the M208 (i.e. **npwrite, rsh**). If the program is **npwrite**, define the **UNIT_PORT** variable. Otherwise, define the **LP_DEST** variable.

PRINTER_TYPE   (mandatory) Specify printer type (i.e. **raw, ascii, ps**, **hp**, **pcl-ps, gen7170**).

UNIT_NAME   (mandatory) Define the M208 IP name.

UNIT_PORT   (conditional) Specify the M208 port name (i.e. **prn, com1, com2**). Use only when **COMM_PROG** is defined as **npwrite**.

LP_DEST   (conditional) Specify M208 destination name. Use only when **COMM_PROG** is defined as **rsh**.

Example
```
#END_MARK_1
NPDIR_PATH=/usr/local/bin
COMM_PROG=rsh
UNIT_NAME=spike
LP_DEST=d3com2
PRINTER_TYPE=hp
BANNERPAGE=1
#START_MARK_1
```

Note   Additional variables can also be defined within this variable section as indicated by **BANNERPAGE=1**. Some other options are ASCII to PostScript conversion, carriage return insertion, and scrambling. By setting a particular variable to a 1, this option is then turned on and a 0 turns it off. These too are described further in the beginning of **npr.if**.

4   Create the **lp=** device that is used as a locking mechanism for contending print jobs.

```
touch /dev/spike.com2
chmod go+rw /dev/spike.com2
```

5   Start the print spooler.

```
lpc start hp
```

6 Try printing with the following syntax:

Syntax   **`lpr -Pprintername filename`**

System V UNIX

Printing in a System V environment *requires* the use of an interface file. It also consists of:

- the **lp** printer interface program,
- the **lpsched** printing scheduler,
- a set of programs that act as interfaces between scheduler and printing device.

The scheduler copies the file into a spooling directory and calls the interface program when the job is ready to go to the M208. It processes the job according to the script's settings and then sends it over to the M208 for printing.

The interface script is usually kept in **/usr/spool/lp/admins/lp/interfaces** and carries the same name as the associated printer. It is copied there from the original interface file in **/usr/spool/lp/model** when the **lpadmin** command is executed.

The interface script is called with the following syntax:

Syntax   **`ps203 reqid username title copies options file1 ...`**

where:

ps203	Name of the interface script which is also the printer name on the host.
reqid	Print job identification.
username	ID of the user requesting the job.
title	Title of the print job if desired.
copies	Number of copies of each file to be printed.
options	Additional switches for extra job processing options**.**
file1	Spool file.
...	Indicates additional spool files.

Setting up an Interface Script

The following steps are the manual instructions for setting up your host with **npr.if**:

Note   The example commands provided represent a print setup involving a printer named **hp**, an M208 named **spike**, and a printer attached to the M208's **com2** port.

1   Copy the **nprsysv.if** file from the host software medium to the model directory. Copy the file as **npr.if** or name it something more meaningful.

```
cp nprsysv.if /usr/spool/lp/model/npr.if
```

2   Edit the **npr.if** variables to match your system requirements. Look for the comment section beginning with "EDIT THESE VARIABLES" and at the end of this large comment block, you will find these:

Note   When defining these variables, remember that each is *case sensitive*. Please define them as seen in these descriptions. In addition, a further description of these variables is included in the large comment block before them.

NPDIR_PATH   (mandatory) Define the directory location of **chr**, **banner, onlcr**, **a2ps**, and **npscramble** binaries. Usually **/usr/local/bin.**

Note   These binaries must be copied over from the host software medium. Please see *Host Software* on page 31 for more details.

COMM_PROG   (mandatory) Specify a communication program to transfer data to the M208 (i.e. **npwrite, rsh, rcmd**, **remsh**). If the program is **npwrite**, define the **UNIT_PORT** variable. Otherwise define the **LP_DEST** variable.

PRINTER_TYPE   (mandatory) Specify printer type (i.e. **raw, ascii, ps**, **hp**, **pcl-ps, gen7170**).

UNIT_NAME   (mandatory) Define the M208 IP name.

UNIT_PORT   (conditional) Specify the M208 port name (i.e. **prn, com1, com2**). Use only when **COMM_PROG** is defined as **npwrite**.

LP_DEST   (conditional) Specify M208 destination name. Use only when **COMM_PROG** is defined as **rsh, rcmd**, or **remsh**.

Example   `#END_MARK_1`
                 `NPDIR_PATH=/usr/local/bin`
                 `COMM_PROG=rcmd`
                 `UNIT_NAME=spike`
                 `LP_DEST=d4com2`
                 `PRINTER_TYPE=hp`
                 `BANNERPAGE=1`
                 `#START_MARK_1`

Note   Additional variables can also be defined within this variable section as indicated by **BANNERPAGE=1**. Some other options are ASCII to PostScript conversion, carriage return insertion, and scrambling. By setting a particular variable to a 1, this option is then turned on and a 0 turns it off. These too are described further in the beginning of **npr.if**.

3   Create the dummy output device file used as a locking mechanism between contending print jobs.

```
touch /dev/spike.com2
chmod go+rw /dev/spike.com2
```

4   Install a new printer specifying printer name, interface script name, and dummy device created in Step 3.

```
/usr/lib/lpadmin -php -mnpr.if -v/dev/spike.com2
```

5   Start the scheduler.

```
lpsched
```

6   Enable the printer and allow it to accept requests.

```
enable hp
accept hp
```

7   Try printing a file with the following syntax:

Syntax   `lp -dprintername filename`

npd Pseudo-device Interface

The **npd** pseudo-tty daemon is used when bi-directional communications is required between the printer and printing application, and when changes to the printer's interface script are undesirable.

Some applications like Sun NeWSprint and Adobe TranScript work best with a bi-directional communications channel to the printer because they can provide more details on the printer status. For example, PostScript printers can send error messages back to the application as they occur. **npd** is used in this case making use of the TCP protocol and pseudo-tty device drivers.

Figure 4:   npd Overview
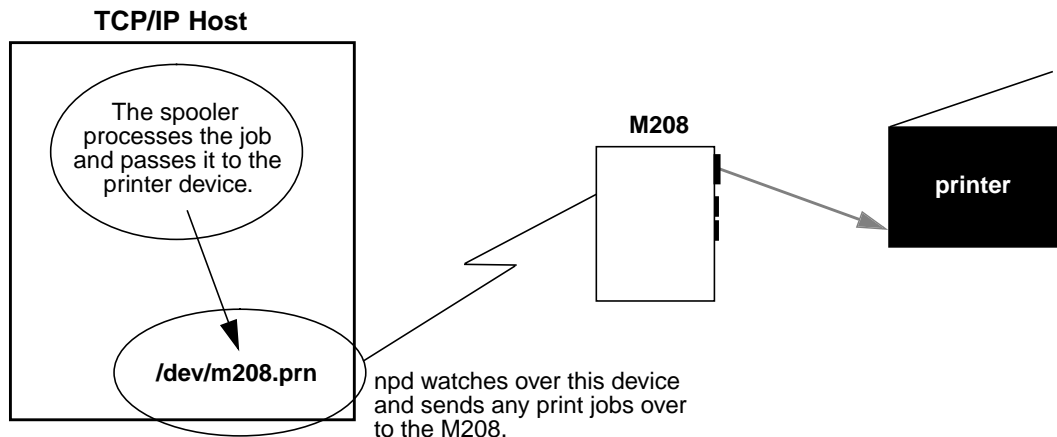
Starting npd

Starting the **npd** daemon is all that is needed to utilize **npd**. Integrating any special applications can then be done anytime thereafter.

Use the following syntax to start **npd**:

Syntax   **npd** *devicefile ipname portname*

where:

devicefile   Name for a pseudo-tty pair's slave device acquired by **npd.**

ipname   M208 IP name or IP address.

portname   M208 I/O port name (i.e. **prn, com1, com2**).

Note   The *devicefile* cannot exist prior to starting **npd** and this particular **npd** daemon cannot be running already. It is possible to have more than one daemon running on the same host, however, as long as they are not using the same *devicefile*.

Example   **npd /dev/spike.com2 spike com2**

starts an **npd** daemon utilizing **/dev/spike.com2** to send print jobs to the printer attached to **com2** on the M208 named **spike**.

By default, npd looks in the /dev directory to find a free pseudo-tty pair (/dev/pty?? and /dev/tty?? files). However, if your UNIX system has these files in a different directory, you can specify the directory pathname with a **-p** option.

Example   **npd -p /dev/pty /dev/spike.com2 spike com2**

where **/dev/pty** is the directory to be searched for a free pseudo-tty pair.

Some systems such as HPUX place the master and slave devices in separate directories (e.g. **/dev/ptym** and **/dev/pty**). Specify where each of the pairs reside with the **-pm** and **-ps** options.

Example   **npd -pm /dev/ptym -ps /dev/pty /dev/spike.com2 spike com2**

where **/dev/ptym** is the directory searched to find a free pseudo-tty pair's master device and **/dev/pty** is the directory used for locating the pseudo-tty pair slave device.

npd locks

As **npd** acquires an exclusive lock on the M208 port, it is possible to lock out other daemons that may reside on other UNIX hosts. Therefore, **npd** is designed to timeout and release the lock if the pseudo-tty pair is idle for a specified time (30 seconds is the

default). You can modify this value with the **-t** option.

Example   **npd -t 60 /dev/spike.com2 spike com2**

for the timeout to occur in **60** seconds.

Testing npd

Once **npd** has been started, it's a good idea to test and see if **npd** is working before trying to print through the spooler. This is one test method.

Example   **cat test.txt > /dev/spike.com2**

redirects the **cat** output of **test.txt** to the **npd** device **/dev/spike.com2** which is then sent to the M208 named **spike**.

Modifying a Host to Use npd

If you want the **npd** daemon to start every time you reboot your UNIX machine, edit your **.rc** file to include the appropriate **npd** startup command line (from the previous section). After **npd** starts, integrate the print spooler into this pseudo-tty setup.

In BSD print spooler systems, modify the **lp=** field in the appropriate printer entry in the /**etc/printcap** file. Set **lp=** to the *devicefile* argument of the **npd** program.

On System V systems, the **-v** option in the **lpadmin** command will equal the *device-file*.

Stopping npd

Whenever an **npd** daemon starts, it makes a log entry in the **/usr/adm/npdlog** file. The contents of this file have the following naming information:

pid ipname port masterfile slavefile devicefile

where:

pid	Process ID of **npd** daemon.
ipname	M208 IP address or IP name serviced by **npd**.
port	M208 I/O port used by **npd** (i.e. **prn, com1**, **com2**).
masterfile	Master device used by **npd**.
slavefile	Slave device used by **npd**.

devicefile   Name linked to the *slavefile* by **npd**.

Example   **153 spike com2 /dev/ptyq1 /dev/ttyq1 /dev/spike.com2**

is the log entry for the **npd** daemon using process ID **153**.

You can acquire the process ID of the **npd** daemon that needs to be stopped and then execute the following **kill** command for that process:

Syntax   **kill -TERM** *pid*

Applications Using npd

Sun NeWSprint

Sun NeWSprint page accounting works with PostScript printers. It utilizes the bi-directionality of the M208's serial ports to get this status back to the host.

If the printer is attached to one of the parallel ports, no page information comes back from the printer. This causes Sun NeWSprint to assume a communication problem and disable the queue. To avoid this, remove the **af=** field in the **/etc/printcap** entry and set the **HANDLER_INTERFACE** variable to **PARALLEL** in the **.param** file located in the printer's spooling directory.

Add a new Sun NeWSprint printer entry with the **add_np_printer** program. The pseudo-tty device is a serial interface. Therefore, when this program prompts you for a device interface, select **Serial** and device suffix **a** for *any* port on the unit.

After NeWSprint creates the necessary spooling directory and entry in the **/etc/print-cap** file, set the **lp=** field in the new entry to the *devicefile* argument of the **npd** program.

Example   The modified **/etc/printcap** entry looks like this for a PostScript printer named **ps** attached to **com2** on the M208 named **spike**:

```
# entry for a PostScript printer on a serial port
ps|PostScript|PostScript on spike's com2 port:\
:lp=/dev/spike.com2:\
:sd=/b/newsprint/lpd/spike/com2:\
:lf=/b/newsprint/lpd/spike/com2/log:\
:af=/b/newsprint/lpd/spike/com2/acct:\
:if=/b/newsprint/lpd/if:\
:gf=/b/newsprint/lpd/gf:\
:nf=/b/newsprint/lpd/nf:\
```

```
:tf=/b/newsprint/lpd/tf:\
:rf=/b/newsprint/lpd/rf:\
:vf=/b/newsprint/lpd/vf:\
:cf=/b/newsprint/lpd/cf:\
:df=/b/newsprint/lpd/df:\
:of=/b/newsprint/lpd/of:\
:mx#0:\
:sf:\
:sb:\
:br#19200:\
:xc#0177777:\
:ms=-parity,ixon,-opost,-ixany:
```

Note If you are using a PostScript printer, remember to include **:sh:** in this entry to suppress the standard LPD header.

Adobe TranScript

Adobe TranScript page accounting works with PostScript printers. It utilizes the bi-directionality of the unit's serial ports to get this status back to the host.

If the printer is attached to one of the parallel ports, no page information comes back from the printer. This causes Adobe TranScript's **pscomm** to assume a communication problem and disable the queue. To avoid this, replace the **pscomm** program with Microplex's equivalent **npcomm.sh** program in the **.options** file which redirects the data to the M208. **npcomm.sh** is found in the host software.

Create and edit this **.options** file in the printer's spooling directory with global *read* permissions. This setup uses **rsh/rcmd/remsh** or **npwrite** to talk to the unit.

Add the following variable definitions in this **.options** file:

NPDIR_PATH	Define the directory location of **npcomm.sh** program. Usually **/usr/local/bin**.
PSCOMM	Redefine the communication program used by **psint.sh** to use **npcomm.sh** instead of **pscomm**.
RCMD	Specify the name of the remote shell command to use for transferring data to the M208 (i.e. **rsh**).
UNIT_NAME	Define the M208 IP name or IP address.
LP_DEST	Specify the M208 destination name.

Use the **mkprinter.sh** program to add a new Adobe TranScript printer entry. For now,

use **/dev/ttypa** as the device interface for any port on the M208. When the program creates the spooling directory and entry in **/etc/printcap** file, set the **lp=** field to the *devicefile* argument from **npd**.

Example   For a PostScript printer named **ps** attached to **com1** on the M208 named **spike**:

```
ps|PostScript|PostScript on spike's com1 port:\
:lp=/dev/spike.com1:\
:sd=/usr/spool/lpd/spike/com1:\
:lf=/usr/adm/printers/ps-log:\
:af=/usr/adm/printers/ps-acct:\
:br#19200:rw:fc#0000374:fs#0000003:\
:xc#0:xs#0040040:mx#0:sf:sb:\
:if=/usr/local/lib/ts/psif:\
:of=/usr/local/lib/ts/psof:\
:gf=/usr/local/lib/ts/psgf:\
:nf=/usr/local/lib/ts/psnf:\
:tf=/usr/local/lib/ts/pstf:\
:rf=/usr/local/lib/ts/psrf:\
:vf=/usr/local/lib/ts/psvf:\
:cf=/usr/local/lib/ts/pscf:\
:df=/usr/local/lib/ts/psdf:
```

Note   Using **:sh:** in this entry will suppress headers and also prevent TranScript from printing out banner pages if they are set in the **.options** file.

AIX

IBM has a unique print spooler system that uses the **qdaemon** program. Use the following steps to interface with the M208 using **rsh**:

Note   These steps and associated examples refer to a setup with a queue named **queue2**, a queue device named **lp0**, printing to the destination **d1prn** on the M208 named **spike**.

1   Create a device. Enter:

   smit pdp

2   Select **Printer/Plotter** and then **Add a Printer/Plotter**. Follow the prompts until SMIT executes the "**mkdev**" command to create this device.

Note   Select "parallel" as the interface even if you have a printer attached to the M208's serial port.

Select **p** as the *port number*.

Select **ppa0** as the adapter.

Select a printer type that best matches what you are using.

Select a device **lp0**. If this device is not available, go back and select "Remove a Printer/Plotter" and remove **lp0** making it available for your next run through. AIX has a limit of four physical devices. If you run out, IBM suggests deleting the device after completing a print setup thus making it available for future setups.

3 Create a new queue. Enter:

```
mkque -q queue2
```

4 Create a queue device to do the one-to-one mapping with the printer and specify the backend program for the **qdaemon** to send print jobs to. Enter:

```
mkquedev -d lp0 -q queue2 -a 'backend = /usr/lib/lpd/
piobe'
```

Note   Sometimes /usr/lpd/piobe is the location of this backend program.

5 Create a virtual printer. This associates the queue, queue device, printer/plotter name, data type, and printer/plotter type. Enter:

```
mkvirprt -q queue2 -d lp0 -n lp0 -s pcl -t hplj3
```

Note   **-s** is usually **pcl** but can also be **ps (Postscript)** or **asc (ASCII)**. This does not seem to affect the output on the printer so it may be best to use **pcl**.

6 Change the **pio-file** for your queue. This will be located in **/usr/lib/lpd/pio/cus-tom** and will be called **queue2:lp0** after the queue and queue device names. Change the line beginning with **307 mo::**. Enter:

```
307 mo::rsh spike lp -d d1prn
```

Note   This file is only created after the **mkvirprt** command has been executed in Step 5. This step redirects the print job over the network to the M208.

For destinations other than **d1prn**, please see *Destinations* on page 89.

7 Run **chvirprt** since the print setup has been altered and needs updating. Enter:

```
chvirprt -q queue2 -d lp0
```

Note   If you need to delete an entire print setup, use the **rmvirprt** command.

This is the **/etc/qconfig** entry created for this particular setup:

Example

```
queue2:                              queue stanza
    device = lp0                     by mkquedev (queue device)
    up = TRUE                        printer's ready to go
lp0:                                 queue device stanza
    backend = /usr/lib/lpd/piobe     for local printing
```

For further information on these commands, please see your AIX system documentation.

Other TCP/IP Print Methods

NCSA

NCSA is a freeware package available on the Internet at **zaphod.ncsa.uiuc.edu** in the directory **/PC/Telnet/msdos/contributions.** The file is **tel23bin.zip**. It contains an **lpr** client for DOS that is compatible with the Print Server.

You can send jobs to the M208 with the following command syntax:

Syntax   **lpr -S*ipname* -P*destname***

where *ipname* is the M208 IP name or IP address and *destname* is the name of a M208 destination.

Example   **lpr -Sspike -Pd4com2**

sends a print job to **d4com2** on the M208 named **spike**.

FTP's PC/TCP

FTP Software markets a package called **PC/TCP** which provides an **lpr** client for DOS that is compatible with the M208.

Jobs can be sent to the M208 directly with the following command syntax after an entry has been made for the Print Server in the host table:

Syntax   **lpr -S*ipname* -P*destname***

where *ipname* is the M208's IP name or IP address and *destname* is the name of an M208 destination.

Example   **lpr -Sspike -Pd4com2**

sends a print job to **d4com2** on the M208 named **spike**.

Note FTP's package also provides Windows printing along with several other software packages on the market. These are just two possible applications that will work with the M208. Please see the user manuals of the appropriate applications for more information.

Direct Socket Printing

The M208 provides a socket interface for custom printing applications. Programs can open a TCP connection to a TCP port on the Print Server. The specified port number corresponds to a destination on the M208, and data is processed according to the model associated with this destination. Please see *list pserver* on page 100, *list dest* on page 99, and *list model* on page 100 for more details.

npwrite is a sample program that performs this way. It is included in the host software shipped with your M208. For examples, please refer to *Direct Printing Without the Spooler* on page 42.

FTP Daemon

The FTP Daemon provides an additional method to submit print jobs to the M208. For a complete discussion of printing and other M208 functions using the FTP Daemon, please see *FTP Daemon* on page 146.

Now that your TCP/IP host is configured for printing, please look to the following for further configuration options:

• Add to or change configuration of your M208. Please see *USING THE M208'S COMMAND SET* on page 93 and *USING NPWIN* on page 127.

• Utilize more advanced features of the M208. Please see *USING THE M208'S ADDITIONAL OPTIONS* on page 131.

📘 CONFIGURING THE M208 FOR NOVELL

Overview

This chapter introduces the M208's configuration possibilities along with the various methods of printing available within a Novell environment. The M208 works with different NetWare versions, including version 4, and we provide setup steps for each.

Host Software

NetWare's PCONSOLE is generally used to change passwords, add print servers, add remote printers, and add queues to be serviced. It can be used for both a PSERVER or RPRINTER setup. To install a M208 in a Novell environment, PCONSOLE is used for the entire installation. The following pages give step-by-step examples of installing the M208 in various Novell environments.

Even though the entire print set-up is done through PCONSOLE, you may want to communicate directly with the M208 in order to modify settings, monitor the unit, etc. To communicate with the M208, the optional host software, **npsh.exe** is included. **npsh.exe** is a DOS executable program that can be run from a DOS prompt on a NetWare workstation.

npsh.exe, does these things:

npsh nvplist	Lists all of the M208's on the network; each name is in the format **M_xxxxxx** (where *xxxxxx* equals the last six digits of the unit's Ethernet address) by default regardless of whether it is configured as a PSERVER or an RPRINTER. This name is configurable.
npsh *unitname*	Starts a Telnet-like session with the named Print Server allowing you to configure, monitor, and troubleshoot the unit with its built-in command set.
npsh *unitname command*	Initiates a single *command* with **guest** access only to the unit instead of entering into a complete session.

To communicate with the unit using **npsh.exe**, you need to:

1 From a DOS prompt on a Novell workstation, begin an **npsh** session with the unit.

npsh *unitname*

Starts a Telnet-like session with the named M208 with **guest** access only.

2 To obtain **root** access to the unit, type:

supervisor

A standard login screen is displayed prompting you for the login name and password.

3 Login to the unit as a **root** user.

root

Note   Root users require the use of a password as configured in the unit's user list.

4 Enter the password. If this password is not yet set, press **enter** at the password prompt. Otherwise, enter the password that is already stored on the unit.

password

You are now logged in to the unit as a **root** user and can access any **npsh** command on the unit.

Note   Because **npsh.exe** makes use of broadcasts, you may have problems communicating across a router.

Please see *User Accounts and Permissions* on page 94, *USING THE M208'S COMMAND SET* on page 93 and *USING NPWIN* on page 127 for further details.

M208 Configuration

The M208 configuration in a Novell environment is much simpler than that required in a TCP/IP one. No addresses, masks, or router entries are necessary and in most cases, the M208 can simply be connected to the network, turned on, and then configured for printing from a Novell station through PCONSOLE. The only parameters that you may want to set is a PSERVER password or possibly the frame type. Please see *store pserver* on page 120. This type of configuration is done using **npsh.exe** as detailed in the previous section.

Host Configuration

The M208 can act as either a PSERVER or as a RPRINTER in a Novell environment. It supports encrypted passwords and it is capable of servicing up to 16 file servers and 32 queues as a PSERVER. One M208 can handle eight RPRINTER setups.

PSERVER Bootup

When booting as a PSERVER, the M208 gets a server list from the first file server it contacts. The unit then contacts those servers on that list to see if there is a queue that needs servicing. The queues are then be polled every 5 seconds (by default) by the Print Server to see if there are any jobs queued.

RPRINTER Bootup

When booting as a RPRINTER, the M208 again gets a server list from the first file server it contacts. For each server found on that list, it then looks for a file called **SYS:\LOGIN\M_xxxxxx\CONFIG** where *xxxxxx* is the last six hexadecimal digits in the Ethernet address found on the bottom of the unit. This file contains one **set rprinter** command for each RPRINTER serviced by the M208 since the RPRINTER settings do not hold their effect through a power cycle.

Note If the M208 loses a connection to a file server (as a PSERVER) or to a PSERVER (as a RPRINTER), it will automatically reconnect when that server becomes available again.

Following is the configuration steps for a PSERVER setup, a RPRINTER setup, as well as the options available for NetWare 4 environments.

PSERVER Setup (Pre-NetWare 4)

This procedure configures the Novell file server to use an M208 as a PSERVER in a non-NetWare 4 environment. Please see *NetWare 4 Options* on page 71 for more on a NetWare 4 setup.

Note The M208 **replaces** a dedicated workstation running PSERVER.EXE or PSERVER.NLM on the file server, so these are no longer needed.

To set up the unit as a PSERVER in a non-NetWare 4 environment, you need to:

Step	Action	Result of Action
1	Log in to Novell as **supervisor**.	Gives you supervisor rights.
2	Enter **PCONSOLE**.	PCONSOLE's Main Menu displays.
3	Select PRINT QUEUE INFORMATION.	List of currently-defined queues comes up.
4	Press **\<Insert\>** to add a queue.	Asks for new queue's name.
5	Type in this new name in any format you like and press **\<Enter\>**.	New queue is added to list.
6	Press **\<Escape\>**.	Returns to PCONSOLE's Main Menu.
7	Select PRINT SERVER INFORMATION.	A list of existing print servers displays.
8	Press **\<Insert\>** to add a server.	Prompts for the server's name.
9	Type the name of the M208. By default, it is **M_xxxxxx** where *xxxxxx* equals the last six digits of the unit's Ethernet address. (e.g. M_000BF5)	This new server is added to the list.
10	Select it and press **\<Enter\>**.	PRINT SERVER INFORMATION menu comes up.
11	Select PRINT SERVER CONFIGURATION.	This menu displays.
12	Select PRINTER CONFIGURATION.	A list of configured printers is displayed.
13	Select the first item listed as NOT INSTALLED and press **\<Enter\>**.	The PRINTER *N* CONFIGURATION window comes up where *N* equals the selected printer.

Step	Action	Result of Action
14	Type in the name of one of the eight default destinations on the unit for the **Name** field (e.g. d1prn, d3com2, etc.) and go to the **Type** field.	Cursor sits at the **Type** field with a printer name now assigned.
15	Press **<Enter>** at this field and then select DEFINED ELSEWHERE.	Comes back to the PRINTER *N* CONFIG-URATION window.
16	Press **<Escape>** and select **Yes** to save changes.	Gives you the option to define more printers.
17	Press **<Escape>** again.	Returns to PRINT SERVER CONFIGU-RATION menu.
18	Select QUEUES SERVICED BY PRINTER.	A list of defined printers displays.
19	Select one of these printers.	A list of queues comes up. It will be empty the first time you use it.
20	Press **<Insert>**.	Displays a list of available queues.
21	Select the queue created earlier to ser-vice this printer and press **<Enter>**.	Asks for a priority.
22	Press **<Enter>** to select the default. This is fine for most cases.	Comes back to queue list.
23	Press **<Escape>** back to Main Menu	Main Menu displays.
24	Reboot the M208 by unplugging and plugging it back in.	Unit will boot up and see the new queue that it has to service. This may take a minute.
25	Check CURRENTLY ATTACHED SERVERS once you have gone into view the appropriate queue.	You should see the M208's name displayed (e.g. M_000BF5).
26	Press **<Escape>** until you have exited PCONSOLE.	The configuration is complete.

This procedure associates an existing PSERVER with a remote M208 acting as a RPRINTER in a pre-NetWare 4 environment. It is the PSERVER's responsibility to get jobs from the queue and to pass them off to the M208 acting as the remote printer. Unlike a PSERVER set-up, the M208 does not deal directly with the queues.

Note   As a RPRINTER, the M208 does not use a login ID. In addition, a non-M208 PSERVER (e.g. PSERVER.NLM) must be running for RPRINTER to operate.

A RPRINTER set up requires the use of a configuration file. This file is required to tell the M208 to act as a RPRINTER upon boot up since RPRINTER settings do not hold their effect through a power cycle. Once the unit boots up, the Print Server contacts file servers it knows about and on each one, looks for the file **SYS:\LOGIN\M_xxxxxx\CONFIG** where **xxxxxx** is the last six digits (in hexadecimal) of the Ethernet address as found on the bottom of the unit. If it finds this file, it reads in each entry as if it were an **npsh** command entered right on the unit.

Note   To ensure that the M208 contacts the file server that contains the CONFIG file, set up the appropriate file server as a preferred file server. Please see *Setting Preferred File Servers* on page 140 for more information.

Caution

If you are using a configuration file and you have changed the name of the M208, you must change the name of the directory containing this file.

To set up the unit as a RPRINTER in a pre-Netware 4 environment, you need to:

Step	Action	Result of Action
1	Log in to Novell as **supervisor**.	Gives you supervisor rights.
2	Enter **PCONSOLE**.	PCONSOLE's Main Menu displays.
3	Select PRINT QUEUE INFORMATION.	List of currently-defined queues comes up.
4	Press **<Insert>** to add a queue.	Asks for new queue's name.
5	Type in this new name in any format you like and press **<Enter>**.	New queue is added to list.

Step	Action	Result of Action
6	Press **<Escape>**.	Returns to PCONSOLE's Main Menu.
7	Select PRINT SERVER INFORMA-TION.	A list of existing print servers displays.
8	Select one of the print servers and press **<Enter>**.	Display's PRINT SERVER INFORMA-TION menu.
9	Select PRINT SERVER CONFIGU-RATION.	Brings up this menu.
10	Select PRINTER CONFIGURA-TION.	Displays a list of printers associated with the print server.
11	Select or create a printer name which you want to install as a remote printer and press **<Enter>**.	PRINTER *N* CONFIGURATION window displays where *N* equals the selected printer.
12	Put the cursor on the **Type** field and press **<Enter>**.	A list of options comes up.
13	Select REMOTE OTHER/UNKNOWN.	This displays in the **Type** field.
14	Ignore the other fields and press **<Escape>** to save these changes.	Takes you back to the list of printers.
15	Press **<Escape>** until you are at the PRINT SERVER CONFIGURATION menu again.	Displays this menu.
16	Select QUEUES SERVICED BY PRINTER.	A list of defined printers for this print server is shown.
17	Select the printer you previously defined and press **<Enter>**.	An empty queue list comes up.
18	Press **<Insert>**.	A list of available queues displays.
19	Select the queue you want this printer to service and press **<Enter>**.	Prompts you for a priority.

Step	Action	Result of Action
20	Press **<Enter>** to use the default. Usually this is fine.	Returns you to the queue list.
21	Press **<Escape>** until you have exited PCONSOLE.	You're now at the command prompt.
22	Start **PSERVER**.	Starts the PSERVER so the M208 can service it as an RPRINTER.
23	In **SYS VOLUME** on the file server, change to the **\LOGIN** directory.	You will be at this prompt.
24	Create a directory named after the M208. By default, this will be **M_xxxxxx** where *xxxxxx* is the last six digits of the unit's Ethernet address. (e.g. M_000BF5)	This directory is created.
25	Within this directory, create a file called **CONFIG** and open it for editing.	A blank file displays.
26	Enter the line: `set rprinter add pservername printernumber destname` where *pservername* equals the existing PSERVER's name, *printernumber* equals the defined number for this printer in that PSERVER, and *destname* equals an M208 destination (e.g. d1prn, d3com2, etc.).	One entry is written in the file. One entry is required for each RPRINTER serviced by the M208.
27	Reboot the M208 to enable these changes.	The M208 will boot up and read this entry from the **CONFIG** file and set itself to act as an RPRINTER.

NetWare 4 Options

NetWare 4 introduces NDS and some new frame types. The M208 can be used in a NetWare 4 environment with either of these options:

- Set the M208 up as a PSERVER replacing a dedicated workstation running PSERVER.EXE or PSERVER.NLM on the file server. The M208 **replaces** these loadable PSERVER's so they are no longer needed.

- Set the M208 up as a RPRINTER interacting with an existing PSERVER.

Note   If following a PSERVER setup, *bindery emulation* is required.

Included in this sub-section are the steps for a PSERVER setup since the steps have changed now that bindery emulation is required. A RPRINTER setup is not included since the only changes from a pre-NetWare 4 RPRINTER setup are some name changes in PCONSOLE.

To configure the unit as a PSERVER in a NetWare 4 environment, you need to:

Step	Action	Result of Action
1	Log in to Novell as **supervisor**.	Gives you supervisor rights.
2	Enter **PCONSOLE**.	PCONSOLE's Main Menu displays.
3	Press F4.	Puts you into bindery emulation mode and displays Main Menu.
4	Select PRINT QUEUES.	List of currently-defined queues comes up.
5	Press **<Insert>** to add a queue.	Asks for new queue's name.
6	Type in this new name and press **<Enter>**.	New queue is added to list.
7	Press **<Escape>**.	Returns to PCONSOLE's Main Menu.
8	Select PRINT SERVERS.	A list of existing print servers displays.
9	Press **<Insert>** to add a new print server.	Prompts you for the name of the print server.

Step	Action	Result of Action
10	Type the name of the M208. By default, it is **M_xxxxxx** where *xxxxxx* equals the last six digits of the unit's Ethernet address. (e.g. M_000BF5)	This new server is added to the list.
11	Select this new print server and press **<Enter>**.	PRINT SERVER INFORMATION menu displays.
12	Select PRINTERS.	A list of defined printers comes up.
13	Press **<Insert>** to add a printer to the list.	Prompts you for the printer name, type, and some additional fields.
14	Type in the name of one of the eight default destinations on the unit for the **Name** field (e.g. d1prn, d3com2, etc.) and go to the **Type** field.	Cursor moves to this field.
15	Press **<Enter>** at this field and then select DEFINED ELSEWHERE. If DEFINED ELSEWHERE is not available, choose PARALLEL.	Brings you back to the printer's window.
16	Press **<Enter>** on the **Print Queues Assigned** field.	List of available queues is displayed.
17	Press **<Insert>** to display all queues; select the one you defined earlier and press **<Enter>.**	You are prompted for a priority
18	Select a priority and press **<Enter>**. Priority 1 should be fine.	Printer's window displays with fields now filled in.
19	Press **<Escape>** until you are back to Main Menu.	Main Menu is displayed.
20	Reboot the Print Server by unplugging and then plugging it back in.	Unit resets and realizes its new configuration. It then attaches to the queue after 30 seconds or so.

Step	Action	Result of Action
21	Check the CURRENTLY ATTACHED SERVERS once you have gone into view the appropriate queue.	You should see the M208's name displayed (e.g. M_000BF5).
22	Press **<Escape>** until you are out of PCONSOLE.	You will be back at the command line and the M208 is now configured.

If you want to continue with any of the following procedures, please find them as indicated in other sections of this manual:

- Add to or change configuration of your M208. Please see *USING THE M208'S COMMAND SET* on page 93 and *USING NPWIN* on page 127.

- Utilize more advanced features of the M208. Please see *USING THE M208'S ADDITIONAL OPTIONS* on page 131.

- Troubleshoot Novell installation and printing problems. Please see *Novell Problems* on page 163.

CONFIGURING THE M208 FOR APPLETALK

Overview

This chapter will cover the few steps required to get your print jobs printing to an M208 in an AppleTalk over EtherTalk environment.

Note   The M208 does not support LocalTalk.

M208 Configuration

An AppleTalk setup does not require any Print Server configuration; the network parameters are automatically configured for you once the M208 is booted on the network. If you wish to modify some of the M208's default settings, you can use the built-in **npsh** command set. Please see *USING THE M208'S COMMAND SET* on page 93 for more on the available commands.

Note   There is no host software provided for the Macintosh. To do any configuration on the unit, you must rely on:

- **npsh** commands available through a *telnet* session. These commands could be issued from a Macintosh workstation if you a running program like NCSA Telnet and MacTCP is installed on your system.

- a Novell workstation running the host software **npsh.exe.**

- a Windows workstation running the NPWin software utility,

- a terminal, PC, or laptop connected to one of the serial ports on the M208.

Host Configuration

Once you have physically attached the M208 to the network, the following steps will get your Apple host printing to the M208:

1   Select **Chooser** from the Apple Menu.

2   Select the appropriate print driver icon (e.g. **Laserwriter** icon).

A list of available printers will appear. By default, the format of each name is

M208name_papname where ***M208name*** is the name of the M208 and ***papname*** is an M208 I/O port. Both names are configurable.

Example   `M_000BF5_prn`

is the printer associated with the M208 named **M_000BF5** using the parallel port.

Note   The Print Server's default name is **M_xxxxxx** where *xxxxxx* equals the last six digits of the unit's Ethernet address found on the bottom of the unit.

3   From the list of printers, select one to print to.

You have now configured your AppleTalk system to print to the M208.

Additional Configuration Options

AppleTalk Zones

If the M208 does not come up in the correct AppleTalk zone, you can configure a particular zone name on the unit. To do this, start an **npsh** session with the unit and enter the following command:

store pserver apple zone [*zonename*]

reset

where ***zonename*** is the zone where you want the M208 to appear.

To clear the AppleTalk zone, type the command without entering a ***zonename*** and press **<Enter>**.

Changing M208 Name

By default, the M208's name is *M208name_papname* where ***M208name*** is the name of the M208 and ***papname*** is an M208 I/O port. The **npsh** command, **list pserver**, will give you a listing showing both the M208 name and the papname.

The following example details the steps necessary to change the name that appears in the Chooser from **M_000BF5_prn** to **Sales_laser**.

1   Start an **npsh** session with the unit.

2   Enter the name that you would like to appear for the M208 (e.g. Sales). This will make up the first part of the name in the Chooser.

```
store pserver name Sales
```

Note This new name will also affect Unix, Novell and NetBIOS setups.

3   Enter the name that you would like to appear for the papname (e.g. laser). This will make up the second part of the name in the Chooser.

```
store pserver applepap prn name laser
```

4   Reset the unit so the changes take effect.

```
reset
```

Removing Excess Printers from the Chooser

When you first install an M208 in an AppleTalk environment, you will notice that four printers show up in your Chooser; one printer for each **destination** on the M208 that has AppleTalk services enabled.

If you want to limit the number of printers showing up in the Chooser, you need to disable the AppleTalk service from the related destination's list of services. To do this, start an **npsh** session with the unit and follow the steps below:

1   Display a listing of the M208's characteristics across all protocols.

```
list pserver
```

2   Look at the Apple Pap section of the listing to learn the **destination** name that corresponds with the unnecessary printer's **papname**.

3   For each printer that you do not want to appear in the Chooser, disable the Apple-Talk service from the corresponding **destination's** list of services. Type the following command:

```
set dest destname service -appletalk
```

Note You can also turn off any other services that are not required by this destination bin the same way.

4   Repeat the previous step until you have removed the AppleTalk service from each of destinations that correspond to the papname of the unnecessary printers.

5   Save the changes to EEPROM.

```
save
```

Disabling the AppleTalk Module

If you have several Microplex M208s in your network and only some of them are servicing AppleTalk networks, it is a good idea to turn off the entire AppleTalk module from the particular M208. This will not only save on M208 resources but will ensure that only appropriate M208s show up in the Chooser.

To disable the AppleTalk module, start an **npsh** session with the unit and follow the steps below:

1   Remove AppleTalk from the available protocols.

    set sysinfo module -appletalk

2   Save the changes to EEPROM.

    save

If you want to continue with any of the following procedures, please find them as indicated in other sections of this manual:

•   Add to or change configuration of your M208. Please see *USING THE M208'S COMMAND SET* on page 93 and *USING NPWIN* on page 127.

•   Utilize more advanced features of the M208. Please see *USING THE M208'S ADDITIONAL OPTIONS* on page 131.

⊞ CONFIGURING THE M208 FOR WINDOWS

Overview

This chapter discusses the M208's support for Windows. The M208 provides support for Windows NT, Windows for Workgroups (WfW), and Windows 95. Examples are provided for each of these environments.

In a Windows environment, TCP/IP is the data transfer protocol used for printing. This means that IP addresses and netmasks are required in your Windows stations along with the appropriate TCP/IP software. This chapter will also discuss how you set this up in your environment.

Print Methods Overview

A Central Host

The recommended print method for a Windows environment is to have a central host act as a spooler for jobs before they are sent to the Print Server/printer. The reason for this is that the central workstation has the ability to store the spooled jobs while they are waiting to go to the Print Server/printer. The Windows Print Manager would rather see the data get spooled centrally rather than having to hold on to the data until the Print Server/printer can accept it.

An example of this setup would be an Windows NT host which allows WfW stations to spool to it. The NT host would have the only print setup going to the Print Server/printer directly and it would be *shared* across the network. In this way, the WfW station could send jobs to this *shared* printer on the NT host. All WfW jobs would first spool to the NT host before being sent to the Print Server/printer for printing.

Print Setup Possibilities

There are two print methods available with the M208 in a Windows environment:

LPR - Berkeley's Line Printer Protocol which uses TCP/IP to transfer data to the Print Server's built-in Line Printer Daemon.

NetBIOS -NetBIOS over TCP/IP used to transfer data to the Print Server.

NetBIOS is further broken down into these two setup procedures:

"net use" - Microsoft's shared resource feature.

Print Manager - Microsoft's management tool for printing.

Choosing one of these methods depends entirely on what's available with your particular Windows software. The following is a list of what is supported in each:

Windows NT and NT/AS - LPR and NetBIOS ("net use" and Print Manager)

Windows for Workgroups - NetBIOS ("net use" and Print Manager)

Windows 95 - NetBIOS (Print Manager)

Note   Regardless of which method you choose, TCP/IP will always be used in some way.

Basic Setup Steps

In each of these environments, the basic setup steps required to get you printing from one of these hosts are to:

1   Ensure that you have the appropriate network software installed on your Windows host.

2   Configure the Windows host with an IP address and netmask.

3   Configure the M208 with an IP address and netmask.

4   Create a printer and select a method of printing to the M208 (e.g. LPR).

TCP/IP Setup

Setting Up TCP/IP Services on Your Windows Stations

The following section gives step-by-step directions on how to install the necessary network software in the supported environments.

Windows NT LPR Network Software Installation

1   Go to the **Main** program group.

2   Double click on **Control Panel**.

3   Double click on **Network**.

4   A dialogue box will appear showing your current network settings. Under **Installed Network Software**, check to see if **MS TCP/IP Printing** shows. If it doesn't, you'll need to perform the following steps.

5   Select **Add New Software**.

6   Select **TCP/IP Protocol and Components**.

7   Click on **Continue**.

8   Select **TCP/IP Printing Support** from the TCP/IP components list that displays. You may also want to select **Connectivity Utilities**.

9   Click on **Continue**.

Windows NT NetBIOS Network Software Installation

1   Go to the **Main** program group.

2   Double click on **Control Panel**.

3   Double click on **Network**.

4   A dialogue box will appear showing your current network setting. Under **Installed Network Software**, check to see if **NetBIOS TCPIP->Streams Environment** appears. If not, you'll need to add this new software by clicking on the **Add New Software Button**.

Windows For Workgroups NetBIOS Network Software Installation

1   Make sure that you have the **Microsoft TCP/IP-32** group in your **Program Manager**. If you do not have the file, **wfwt32.exe**, you can download it from:

   • Compuserve in "MS Software Library"

   • Microsoft's FTP site, ftp.microsoft.com, under "Softlib/MSLFILES"

   • Microplex's FTP site, ftp.microplex.com, under "support/misc"

2   Once this is placed in a directory on you WfW station, you will need to double click on the **Network Setup** icon in the **Network Group**.

3   Click on **Drivers**.

4   Since the TCP/IP services will not yet be listed here, click on **Add Protocols**.

5   Select **Unlisted**.

6   Specify the directory where the file exists. A new **TCP/IP-32** program group will

then be created which will include FTP, Telnet, etc.

Note   At this point, you will be prompted with a dialogue box asking for the TCP/IP network settings (i.e. IP address and netmask) for this WfW station. Fill these in at this time.

Windows 95 NetBIOS Network Software Installation

1   Make sure that **File and Printer Sharing for Microsoft Networks** is installed in your **Network** setup. If not, you'll need to perform the following steps.

2   Open **Settings:Control Panel** folder.

3   Double click on the **Network** icon.

4   Select **Add**.

5   Select **Service**.

6   Select **File and Printer Sharing for Microsoft Networks** from the list.

7   Click **OK**.

8   Click **OK** again since this service will now show in the list to the left.

Configuring TCP/IP On Your Windows Workstations

Since TCP/IP is used as the data transfer protocol, IP addresses and netmasks must be assigned to your Windows workstation(s) if you haven't already done so.

If you are not familiar with IP addresses and are sure that this network **will not** go onto the Internet, the following are some sample settings to use:

	IP Address	**Netmask**
Host 1	192.1.1.1	255.255.255.0
M208	192.1.1.2	255.255.255.0
Host 2	192.1.1.3	255.255.255.0

and so on...

The following sections will detail how you configure TCP/IP settings on the different Windows platforms.

Windows NT IP Address and Netmask Configuration

1   Go to the **Main** program group.

2   Double click on **Control Panel**.

3   Double click on **Network**.

4   Select **TCP/IP Protocol** from **Installed Network Software** list.

5   Click on the **Configure** button.

6   A dialogue box will come up asking for network settings. Fill in the IP address and netmask for this workstation and then click **OK**.

Windows for Workgroups IP Address and Netmask Configuration

Configuring an IP address and netmask for the WfW workstation is part of the procedure involved in installing NetBIOS Network Software. Please see *Windows For Workgroups NetBIOS Network Software Installation* on page 81 for more details.

Windows 95 IP Address and Netmask Configuration

1   Open the **Settings:Control Panel** folder.

2   Double click on the **Network** icon.

3   Under the **Installed Network Software** list, select the entry dealing with the **TCP/IP Protocol**.

4   Click on **Configure**.

5   A dialogue box will come up asking for network settings. Fill in the IP address and netmask for this workstation and then click **OK**.

M208 Configuration

Since TCP/IP is being utilized, the M208's configuration involves storing an IP address and a netmask. This is normally handled with the **arp** command but in the case of Windows NT and WfW, this does not work reliably. Therefore, the best way to store an IP address and a netmask is to connect a terminal, PC, or laptop to one of the M208's serial ports. This will log you into the unit where you can store the IP address and netmask.

To configure a M208 with its network settings, please see *Manual Configuration*

Through the COM Port on page 40 for detailed instructions.

Once you have configured the unit, you will notice the STAT LED flashing on once per second. This means the M208 is configured and recognizable on the network. At this point, you can now configure your host.

Host Configuration

Now that your workstation(s) and the M208 have IP addresses and netmasks, you can now configure a print setup. There are several methods available depending on what Windows package you are using. If you experience Windows-related printing problems after completing these setups, please see *TROUBLESHOOTING THE M208* on page 159 for more information.

Windows NT Version 3.5x

LPR Method

1 Create a print path and printer; select **Main**.

2 Select **Control Panel**.

3 Select **Printers** which loads up the **Print Manager**.

4 Select **Create a Printer** from the **Printer** menu.

5 Define the printer name and driver; in the **Print to** field, select **Other...**.

6 Choose **LPR port** from the list that comes up and select **OK**.

7 Fill in the host name or IP address of the M208.

8 Fill in the *destination* or queue on the M208 (e.g. d1prn) and select **OK**.

   where:

   destination   Is a pre-defined destination or queue on the M208 that is automatically mapped by default to an I/O port. For example, destination **d1prn** is automatically mapped to the PRN port. Please see *Destinations* on page 89 for a more detailed description. Please note that destinations are **case sensitive** and are **lowercase** by default.

This printer is now available for printing and will interact with the M208's built-in

Line Printer Daemon using TCP/IP.

NetBIOS Using Print Manager Method

Note   In order to use this method, you must first configure the M208 with a Microsoft Networks Workgroup name. This can be done by telneting to the M208, starting an **npsh** session with the unit, and issuing the following command:

```
store pserver smb workgrp workgroupname
```

where ***workgroupname*** is the name of the Microsoft Networks Workgroup that you want the M208 to be included in (e.g. ***Engineering***).

Note   You must reset the M208 for this command to take affect.

1   Ensure that the network connection is functioning properly between the Windows NT workstation and the M208. Try to ping or telnet to the unit.

2   Open **Print Manager**.

3   Select **Connect Network Printer** from the **Printer** menu or click on the appropriate toolbar item.

4   A list of network services will appear. Double click on the **Microsoft Windows Network**.

5   A list of known workgroups will appear. Double click on the workgroup name that you previously configured the M208 under (e.g. Engineering).

6   Double click on the M208 once the list of registered devices in this workgroup appears.

7   A list of destinations (e.g. d1prn) with NetBIOS service enabled will appear. These are read directly from the M208. Select one of them.

8   Print Manager will then ask to install a local printer driver. Click on **OK**.

9   A dialogue box appears providing a list of possible printer drivers. Once you select one, click on **OK**.

This printer is now available for printing using NetBIOS over TCP/IP.

Windows for Workgroups (WfW)

NetBIOS Using Print Manager Method

Note   In order to use this method, you must first configure the M208 with a Microsoft Networks Workgroup name. This can be done by telneting to the M208, starting an **npsh** session with the unit, and issuing the following command:

```
store pserver smb workgrp workgroupname
```

where ***workgroupname*** is the name of the Microsoft Networks Workgroup that you want the M208 to be included in (e.g. ***Engineering***).

Note   You must reset the M208 for this command to take affect.

1   Ensure that the network connection is functioning properly between the Windows workstation and the M208. Try to ping or telnet to the unit.

2   Open **Print Manager**.

3   Select **Connect Network Printer** from the **Printer** menu or click on the appropriate toolbar item.

4   A list of known workgroups will appear. Double click on the workgroup name that you previously configured the M208 under (e.g. Engineering).

5   Double click on the M208 once the list of registered devices in this workgroup appears.

6   A list of destinations (e.g. d1prn) with NetBIOS service enabled will appear. These are read directly from the M208. Select one of them.

7   Click **OK**.

This printer is now available for printing using NetBIOS over TCP/IP.

Windows 95

NetBIOS Using Print Manager Method

Note   This setup assumes that you have already created a local printer using the **Add a New Printer** icon in the **Settings:Printer** folder. You can use any port here such as LPT1 or LPT2 when creating this printer.

Note   In order to use this method, you must first configure the M208 with a Microsoft Net-

works Workgroup name. This can be done by telneting to the M208, starting an **npsh** session with the unit, and issuing the following command:

```
store pserver smb workgrp workgroupname
```

where ***workgroupname*** is the name of the Microsoft Networks Workgroup that you want the M208 to be included in (e.g. ***Engineering***).

Note   You must reset the M208 for this command to take affect.

1   Ensure that the network connection is functioning properly between the Windows workstation and the M208. Try to ping or telnet to the unit.

2   Open the **Settings:Printer** folder.

3   Double click on the target printer that you created earlier.

4   Select **Properties** from the **Printer** menu.

5   Select the **Details** tab and click on the **Add Port...** button.

6   Select the **Browse** button.

7   A list of network services will appear. Double click on the **Entire Network**.

8   A list of known workgroups will appear. Double click on the workgroup name that you previously configured the M208 under (e.g. Engineering).

9   Double click on the M208 once the list of registered devices in this workgroup appears.

10 A list of destinations (e.g. d1prn) with NetBIOS service enabled will appear. These are read directly from the M208. Select one of them.

11 Click on **OK** to exit the **Browse for Printer** dialogue box.

12 Click on **OK** to exit the **Properties** dialogue box.

This printer is now available for printing using NetBIOS over TCP/IP.

If you want to continue with any of the following procedures, please find them as indicated in other sections of this manual:

- For problems related to Windows printing, please see *TROUBLESHOOTING THE M208* on page 159.

- Add to or change configuration of your M208. Please see *USING THE M208'S COMMAND SET* on page 93 and *USING NPWIN* on page 127.

- Utilize more advanced features of the M208. Please see *USING THE M208'S ADDITIONAL OPTIONS* on page 131.

M208 INTERNAL ARCHITECTURE

Overview

This chapter will provide a more detailed description of the internal operating architecture of the M208 including: destinations, models, variables, logpaths, and I/O ports.

Destinations

The M208 provides six printer destinations that are used by all hosts. A destination can be thought of as *logical* place on the M208 to which hosts send their print jobs. Destinations allow you the ability to configure a number of different print setups on the M208.

Destinations map a name, with a nine-character maximum, to the I/O ports and by default, each I/O port comes with two destinations mapped to it. The **default destination** names are:

d1prn	d2com1	d3com2
d4prn	d5com1	d6com2

Any of the six destinations can be matched to any of the three I/O ports, and each destination uses one of the defined models for processing. The destination list is limited to a maximum of six entries, and is configured through the **npsh** interface on the Print Server. Default destination names can also be changed to something more meaningful.

An alternate destination can also be configured so that a print job goes to another printer if the defined printer is busy, in error, or off-line.

Destination definitions include: name, I/O port, backchannel, model used, logpath, state, service(s) supported, and alternate destination.

See also: *list dest* on page 99**,** *set dest* on page 107, *Making An Alternate Print Destination* on page 133, *Manipulating the M208's Services* on page 133, and *USING NPWIN* on page 127.

Models

Each destination on the M208 also has a *model* associated with it. The six models (one per destination) can be thought of as a series of mini-filter that can do special processing to the print job data. These processing options include:

- banner page generation,

- header string insertion,

- trailer string insertion,

- tab expansion (**xtab**),

- carriage return insertion (**onlcr**),

- ASCII to PostScript conversion (**a2ps**),

- print job descrambling.

The default model names are *m1* to *m6* and each comes mapped to a particular destination. By default, the model settings are **raw**, that is, they simply pass data through to the I/O port untouched. This provides a clean slate to begin your configuration. Model names can be changed to be something more meaningful.

Note   The models are *not* capable of multiple copies and throughput may decrease if **onlcr** or **a2ps** is enabled.

Each **model definition** includes: name, type, and some of these processing parameters, if any.

See also: *list model* on page 100*, set model* on page 110, *Setting Up Special Job Processing* on page 132, and *USING NPWIN* on page 127.

Table 3:   **Model Types**

Setting	Inclusions
raw	No content sensing. Jobs are assumed to match the printer type, or else the printer does the autosensing and switching.

Table 3:   **Model Types**

Setting	Inclusions
pcl-ps	For printers that *cannot* autosense the print job format and switch modes by themselves. Precedes each job with a string to switch from PostScript to PCL, or vice versa, depending on job content. These strings must be specified in the setup command.
a2ps	Convert ASCII jobs to PostScript or pass PostScript jobs directly to PostScript printers.

Variables

Variables are actually utilized within the M208's *models* and are useful for defining lengthy header or trailer strings. This might be necessary for certain printer switch strings, for example. Each variable consists of a combination of escape codes and text for this printer control.

Variables are used to make efficient use of the limited space in these header and trailer strings. Only nine elements can be included in these strings. Each element can be one of the following:

letter   `a`

code   `0x40`

variable   `$FF`

Therefore, you could make up a series of variables and specify each of these (up to nine) in the header or trailer string. Each variable could then contain up to 14 elements of its own.

Please see *Variable Definitions* on page 177 for a description of all pre-defined variables. You can also create your own variables to add to this list.

Logpaths

The term *logpath* comes from the UNIX **syslog** logging system. With the M208, each destination can report statistics on: user, page count, job name, and printer errors. In addition, a checksum calculation can be obtained to confirm data integrity when a job is sent to the printer.

Logging occurs either through a printer or terminal connected to an I/O port, or through a Telnet session to a particular TCP port. A logpath can also be configured to report statistics via email to a particular user. This can then be saved to a file if desired. In addition, messages can be logged to SYSLOGD on a particular TCP/IP host.

Each logpath is associated with a particular destination and the six default logpath names range from *l1* to *l6*. Logpath names can be changed to be something more meaningful.

Logpath definitions include: name, log port, and log type.

See also: *list logpath* on page 100, *set logpath* on page 108, *Capturing Printer Feedback* on page 134, and *USING NPWIN* on page 127.

I/O Ports

The M208 comes with three I/O ports: one IEEE 1284-I compliant parallel port and two serial ports. These ports have several parameters such as flow control and baud rate, that can be manipulated to best suit your attached peripherals. These parameters are configured using the **set** commands while **list** commands display each port's settings. Please refer to the following commands for the indicated information:

- To learn more about the I/O port parameters, please see:

  Connecting Peripherals on page 17.

- To look at current I/O port settings, please see:

  list com1/com2 on page 98 and *list prn* on page 100.

- To change I/O port settings, please see:

  set com1/com2 on page 105 and *set prn* on page 112.

USING THE M208'S COMMAND SET

Overview

At this point in the manual, you should have your M208 installed and configured on the network and at least one host configured to print to it. This section's purpose is to give you the basic tools to add to your print setup by introducing the Print Server's command set.

npsh Overview

On the Print Server itself, is an entire command set, **npsh**, allowing for M208 parameter configuration, display, and execution. These commands can be utilized through one of these methods:

- a Telnet session,

- a remote command (i.e. **rsh/rcmd/remsh**),

- **npconfig** (please see *npconfig Detailed Configuration Options Sub-Menu* on page 33),

- DOS host software (please see *Host Software* on page 63),

- a terminal on the COM1 port (please see *Manual Configuration Through the COM Port* on page 40).

The M208 can support up to 256 simultaneous TCP connections and 10 simultaneous Telnet sessions. All **npsh** commands except **lp** are available to all of the above methods. The **lp** command is available only to **rsh/rcmd/remsh** clients. Please refer to *lp* on page 102.

Note The M208 can be configured, managed and monitored using the included Graphical User Interface (GUI) software. Please see *USING NPWIN* on page 127 for more details.

Note The M208's parameters can also be manipulated through the FTP daemon and through SNMP. Please see *FTP Daemon* on page 146 and *Managing With SNMP* on page 141 for more details.

npsh Prompt

When **npsh** is accessed through a Telnet or COM1 terminal session, a prompt is displayed after login to indicate that it is ready to accept a command from the user. The Telnet prompt is formatted *ipaddress*:*userid*> where ***ipaddress*** is the IP address of the M208, and ***userid*** is the user ID of the currently logged-in user.

Example   192.75.11.32:root>

where **192.75.11.32** is the M208's IP address and the user is **root**.

The COM1 I/O port's login prompt is formatted *userid*>.

Example   root>

where the user logged into the COM1 port is **root**.

User Accounts and Permissions

When you log into the M208, you either log in as a **guest** or as **root** user. The commands you will be able to utilize on the Print Server depend on which login name you use. By default, there is one **root** user and one **guest** user; users can then be added to this with either permission level.

Users with **root** permission can execute all commands; users with **guest** permission *cannot* do any configuration and can only execute commands that display settings on the M208. However, they can use **ping** and **telnet** as well.

Please use *list user* on page 102 to look at current settings. As **root** user, please refer to *set user* on page 117 to change these settings. For a complete command set reference, please see *npsh Command Set* on page 95.

Redirecting Output from Commands

You can redirect output from any **npsh** command to any I/O port with the redirection character **>**. The syntax is:

Syntax   ***command > ioportname***

where ***command*** is a valid **npsh** command and ***ioportname*** can be **prn, com1**, or **com2**.

Examples **list tcpip > prn**

sends current network settings to the first parallel port.

chr $FF > prn

sends a **formfeed** to **PRN**.

npsh Basic Commands

Before reading on about the M208's command set, it is important to understand some of the basic commands involved.

Set commands affect only current settings, not stored settings in EEPROM. The **save** command is used after **set** to save the new settings to EEPROM.

Store commands only affect stored settings in EEPROM but not the current settings. This means the M208 must be **reset** to make any changes take effect. For example, if you change the current settings of the IP address and the netmask, this will only take effect after a reset (warm boot) from EEPROM, or after a power-on (cold boot).

C**onfig hub** commands are functionally similar to a store command followed by a reset command. The **config hub** command stores the setting to EEPROM and automatically resets the unit. The **config hub** command only works with the hub settings.

npsh Command Set

Command Syntax

The commands in this section are listed alphabetically by title and include all commands available on the M208.

The command syntax follows the command name, where:

- Arguments enclosed by brackets [ ] are optional.

- Arguments in *bold italics* are user-defined strings.

- Arguments separated by the *or* symbol (|) mean that a choice must be made.

An explanation of what the command does and how to use it follows the syntax. All

examples for a particular command are provided at the end of that command's main section and when another command or other information may be useful, a reference is given.

cancel

cancel *jobid*

Delete a job from the M208's internal queue.

See also: *lpstat* on page 103.

chr

chr *arguments*

Used with redirection, the **chr** command sends output control codes to the printer. Separate *arguments* with spaces. *Arguments* can be a combination of words, any printable character, or the common set of **$BS, $TAB, $ESC, $DEL, $EOF, $NULL, $FF, $LF,** or **0xhh** (hexadecimal code for any character).

Example   **chr $LF**

causes an extra **linefeed** before the next prompt.

See also: *Redirecting Output from Commands* on page 94.

config hub

config hub [*portnum*] *arguments*

Configure hub port parameters. The *arguments* can be the following and if used with a **"-"**, the *arguments* will be reversed:

Note   The **config** command is functionally similar to a store command followed by a reset command. The **config** command stores the setting to EEPROM and automatically resets the unit. The **config** command only works with the hub settings.

[-]enable   Enables or disables a particular port. If a port has been disabled, it must be enabled before it will autosense a device attached to it.

[-]li	Enables or disables link integrity on a port. This command is only applicable to port numbers one through eight (10Base-T ports).
[-]revrxpol	Enables or disables reverse receive polarity on a port. This command is only applicable to port numbers one through eight (10Base-T ports).
[-]sqe	Enables of disabled the SQE test on port nine. This command is only applicable to port nine, the AUI port.

See also: *list hub* on page 99 and *Hub Configuration* on page 21.

Debug Commands

The **debug** set of commands displays detailed debugging information about memory, the network interface, and protocols.

debug

```
debug ip|lpq|mem|netbios|nif|novell|tcp
```

Display debugging information for a particular module.

disable

```
disable ioportname|destname
```

Disable the specified I/O port so jobs are queued but not printed or disable the specified destination so any new jobs are rejected. *ioportname* is one of the three I/O ports on the unit and *destname* is the name of one of the unit's destinations.

See also: *enable* on page 97, *list dest* on page 99, *list com1|com2* on page 98, and *list prn* on page 100.

enable

```
enable ioportname|destname
```

Enable the specified I/O port so jobs queued are printed or enable the specified destination so new jobs are processed. *ioportname* is one of the three I/O

ports on the unit and ***destname*** is the name of one of the units destinations.

See also: *disable* on page 97, *list dest* on page 99, *list com1/com2* on page 98, and *list prn* on page 100.

keycode

keycode *escapecharacter*

List the hexadecimal value of ***escapecharacter***.

See also: *telnet* on page 124.

List Commands

The **list** command provides these three possibilities:

list *choice*	List current settings.
list default *choice*	List default settings.
list stored *choice*	List stored settings in EEPROM.

choice can refer to a number of parameters. All possible options are listed next.

list arp

list arp

List the contents of the M208's **arp** table.

list com1|com2

list com1|com2

List the current settings of the serial I/O port.

See also: *set com1/com2* on page 105.

list date

list date

List the current date.

See also: *set date* on page 107.

list dest

> `list dest`
>
> List current M208 destination definitions and their properties including: name, I/O port, backchannel, model used, logpath, state, alternate destination, and service(s).
>
> `list dest destname`
>
> List the specified M208 destination's complete current settings. *destname* is the desired destination.
>
> See also: *Destinations* on page 89 and *set dest* on page 107.

list diff

> `list diff`
>
> List the differences between current settings and EEPROM settings.

list hub

> `list hub`
>
> List the general operational status of the hub as well as the general status of each port.
>
> `list hub portnum`
>
> List the information specific to the configuration and operation of the desired port. *portnum* is the number (one to nine) of the desired port.

list ifc

> `list ifc`
>
> Display all of the NIT modules' physical properties such as their interface number and Ethernet address.

list key

> `list key`
>
> List the license details and license key number.

list logins

> `list logins`

List users currently logged into the Print Server.

See also: *User Accounts and Permissions* on page 94 and *list user* on page 102.

list logpath

> `list logpath`

List the current settings of all logpaths.

See also: *Logpaths* on page 92 and *set logpath* on page 108.

list model

> `list model`

List the current processing options for all models.

> `list model modelname`

List the specified M208 model's complete current settings. *modelname* is the desired model.

See also: *Models* on page 90 and *set model* on page 110.

list prn

> `list prn`

List current settings of the parallel I/O port.

See also: *set prn* on page 112.

list pserver

> `list pserver`

List common print server characteristics across all protocols.

See also: *store pserver* on page 120.

list rprinter

list rprinter

List information about the Novell RPRINTER configuration. Entry will appear if the M208 has made a connection to the file server.

See also: *Host Configuration* on page 65, *set rprinter* on page 114, and *debug* on page 97.

list sysinfo

list sysinfo

List the current M208 system information.

Note This output will not include the descramble key even if you have set one.

See also: *set sysinfo* on page 114, *set logpath* on page 108, *ping* on page 103, and *telnet* on page 124.

list tcpip

list tcpip

List all properties of the TCP stack.

See also: *Getting Ready for Complex Networks* on page 137 and *store tcpip* on page 122.

list test

list test

List the status of output I/O port tests.

See also: *start* on page 118 and *stop* on page 119.

list time

list time

List the current time.

See also: *set time* on page 116.

list user

list user [*userid*|all]

List current settings of a particular user indicated by *userid*, or all users. Current settings include user ID and permissions.

See also: *User Accounts and Permissions* on page 94, *list logins* on page 100, and *set user* on page 117.

list var

list var

List current settings of all variables.

See also: *Variable Definitions* on page 177, *set var* on page 117, and *Variables* on page 91.

load

load

Load the settings stored in EEPROM and use them as the current settings. These settings include: destinations, models, logpaths, user, TCP, I/O ports, variables, system information, and portmaps. This does *not* affect *network* parameters. Use this after a power failure to restore settings saved in EEPROM.

load default

Load the factory settings and use them as the current settings. Use this in combination with **store net from default** when reinstalling the M208.

See also: *save* on page 104 and *store tcpip* on page 122.

lp

lp *options* -d *destname*

Print to the M208 using standard TCP/IP **rsh/rcmd/remsh**. *destname* is the name of the M208 destination. This command in default mode will show any parallel port printer errors to the user. The *options* are:

-v   Show incremental byte counts as the job is printing and show the job's position in the queue as it moves to the top.

-V	Show number of bytes printed.
-onlcr	Insert a CR character before LF characters.
-t*tabwidth*	Number of spaces for the tab in the range of 1 to 16.
-off	Generate a FF character at the end of the job.
-oeof	Generate an EOF character at the end of the job.
-u*username*	The name of the user that will be printed on the banner page.
-f*filename*	The name of the file that will be printed on the banner page.

Note   **lp** can only be used with a remote command (i.e. **rsh/rcmd/remsh**).

Example   **`rsh spike lp -d d1prn -off < test.txt`**

prints the file **test.txt**, followed by a **formfeed** to the M208 destination **d1prn** on the Print Server named **spike**.

lpstat

`lpstat`

Display active and queued jobs on the Print Server and I/O port status.

See also: *cancel* on page 96.

ping

`ping ipname`

Ping another TCP/IP host on the network indicated by ***ipname***.

`ping [-s] ipname [packetsize[count]]`

Continually ping another TCP/IP host on the network specified by ***ipname***. This can be an IP address or an IP name. ***packetsize*** is the datagram packet size which defaults to 64 bytes if no size is included in the syntax. ***count*** is the number of requests to be sent.

Note   To utilize the IP name, the DNS server's IP address must be set first so the

M208 can resolve the IP name. Please see *set sysinfo* on page 114 for more information.

reset

reset

Restore current settings to those stored in EEPROM. Performs a warm boot or hardware reset, simulating a power-on reset. Use this after a power failure.

save

save

Save the current settings to EEPROM. These parameters include: system information, destinations, models, logpaths, variables, I/O ports, and port-maps. Resetting the unit is *not* required.

save default

Caution

This command overwrites *everything* and saves factory settings of all parameters to EEPROM, except the factory-programmed Ethernet addresses. The changes do *not* affect the current operating parameters until the M208 is reset.

See also: *load* on page 102, *reset* on page 104, and *Set Commands* on page 104.

Set Commands

Change the current parameters. The three command possibilities are:

set *choice parameters*   Set some parameters.

set *choice* from default   Set default parameters.

set *choice* from stored   Set stored parameters from EEPROM.

choice and *parameters* can be any of the following options described next.

Note   Once you have **set** any parameters, you need to issue a **save** command to store these new values to EEPROM.

set com1|com2

`set com1|com2` *arguments*

Configure serial I/O port parameters. *arguments* generally have the same syntax and meaning as UNIX *stty* command options. Use the optional "**-**" where indicated to reverse the command. The possible *arguments* are:

[-]parenb   Enable [disable] parity generation and detection.

[-]parodd   Select odd [even] parity.

[-]rtsflow   Set RTS low when the M208 is not ready to accept data. With "**-**", RTS output is constantly high, and the M208 does not use the RTS line to control input flow.

[-]ctsflow   Observe [ignore] CTS input and don't transmit data if it is low.

cs5|cs6|cs7|cs8   Select character size (five to eight bits).

50|110|134|300|600|1200|2400|4800|9600|19200|38400
    Set terminal baud rate to the selected value.

[-]cstopb   Use two [one] stop bits per character.

[-]istrip   Strip input characters to seven bits. With "**-**", do not strip.

[-]ixon   Enable [disable] START/STOP output flow control.

[-]ixoff   Ask the system to send [not send] START/STOP characters when the input queue is nearly empty/full.

[-]ixany   Allow any character to restart output. With "**-**", only restart with a START character.

[-]parity   Enable **parenb**, disable **parodd**, and set **cs7** (seven-bit character size). With "**-**", disable **parenb**, and set **cs8** (eight-bit character size).

[-]ignbrk   Enable [disable] break detection to prevent error messages.

[-]igndcd	Disable this feature if you are using a modem connected to the COM port to establish terminal sessions.
[-]onlcr	Enable [disable] carriage return insertion.
[-]opost	Allow output processing such as **onlcr, xtab,** and descrambling. With "-", do not allow any of this processing.
[-]slip	Sets the specified serial port as a dedicated SLIP connection.

Note This command will fail if the serial port is already configured as a print destination. Users must reconfigure the M208's destinations so that none of the destinations are mapped to the serial port that you want to use as a dedicated SLIP connection.

| **flush** | Flush the data in the serial I/O port input and output buffers. |
| **unlock** | Release the access lock on the serial I/O port. |

Caution

When an I/O port is active, **unlock** can cause output from two jobs to mix.

```
set com1|com2 timeout <INT>
```

Terminate the print job sent to the I/O port if it is not printed after the timeout period (*INT* is time in minutes in the range of 0 to 255). If the timeout is set to zero (0), the timeout feature is disabled.

Note Printer errors will cause the M208 to postpone printing until the printer is fixed regardless of this timeout feature being set or not. Therefore, no data will be lost.

```
set com1|com2 xtab <INT>|none
```

Sets the tabstop width. *INT* is an integer within the range 1 to 16.

Example   **`set com1 4800 cs7 cstopb parodd`**

sets **COM1** to **4800** bps (bits per second), **7 data bits**, **2** stop bits, and **odd parity**.

See also: *list com1/com2* on page 98.

set date

`set date year month day`

Set the current date. *year* is four digits, *month* is from 1 to 12, and *day* is the number in the month.

See also: *list date* on page 98.

set dest

`set dest destname alternate alternatedestname`

Set up an alternate destination for the print job if that particular *destname*'s printer is busy, in error mode, or off-line. *alternatedestname* is the alternate destination to send to.

See also: *Making An Alternate Print Destination* on page 133.

`set dest destname backchannel [com1|com2]`

Establish a return path for printer feedback when printing to a non-bidirectional parallel port. *backchannel* can be a serial I/O port.

`set dest destname ioport prn|com1|com2`

Associate a destination with an I/O port so that jobs sent to that destination appear on the specified port.

`set dest destname logpath logpathname`

Associate a logpath with a destination. Please see *set logpath* on page 108 to configure this *logpathname*.

`set dest destname model modelname`

Associate a model with a destination. Jobs sent to the named destination are

processed according to the options defined in the named model. Please see *set model* on page 110 to configure this **modelname**.

set dest *destname* **name** *newname*

Change the current name of a destination to a new name. **destname** is the current name and **newname** is the new name you wish to give the destination. This **newname** must be nine characters or less or else it will be truncated. In addition, all names are *case sensitive*.

Caution

When you change a destination name, you may have to reconfigure the host to reflect the change.

set dest *destname* **service [[-]socket] [[-]lpd] [[-]lpsched] [[-]rprinter] [[-]pserver] [[-]appletalk] [[-]netbios] [[-]ftpd]**

Set the destination to handle only certain print server services.

See also: *Manipulating the M208's Services* on page 133.

Examples   **set dest d1prn alternate d2com1**

where print jobs going to **d1prn** are redirected to **d2com1**'s printer if the original printer is currently busy, in error, or off-line.

set dest d1prn ioport prn

set dest d1prn backchannel com1

associates **d1prn** with **PRN** and **COM1** to receive printer feedback.

See also: *Destinations* on page 89 and *list dest* on page 99.

set logpath

set logpath *logpathname* **name** *newname*

Rename a set of printer logging options. **logpathname** is the current name and **newname** is the new name you wish to give the logpath. This **newname** must be nine characters or less or else it will be truncated. In addition, all names are

case sensitive.

```
set logpath logpathname port tcpport|prn
|com1|com2|email|syslog
```

Send the printer logging information either to a TCP port number, to one of the M208's I/O ports, to a particular user's email address, or to SYSLOGD on a TCP/IP host. **tcpport** is a TCP port in the range 1,024 to 65,000.

If the **email** or **syslog** option is selected, please see *set sysinfo* on page 114 for setting up IP addresses to send to.

Note   Do not use an I/O port for *both* printing jobs and printing logs.

```
set logpath logpathname type [job] [user] [pgcnt]
[cksum] [printer] [ioport]
```

Establish the type of printer logging. These types can be combined by placing a space between each entry:

job   Contents of job log.

user   Username of print job.

pgcnt   Number of pages each job uses. Needs bi-directional communication. Not completely secure from user manipulation.

cksum   16-bit checksum value to confirm integrity of data printed.

printer   Printer errors are logged. The type of errors is dependant on the particular printer's reporting abilities. Needs bi-directional communication.

ioport   Monitors printer error and out-of-paper messages through the parallel port pins.

See also: *Logpaths* on page 92, *list dest* on page 99, *list logpath* on page 100, and *Capturing Printer Feedback* on page 134.

set model

> **set model** *modelname* **banner [ps|text|auto] [after]**

Indicate if destinations using *modelname* are to send a banner page. If a banner page is to be sent, indicate the type according to the printer attached. Specifying **after** will print a trailing banner at the end of the job.

Note   The banner type and the printer type must match.

> **set model** *modelname* **stty [[-]onlcr] [[-]descramble] [xtab <1-16>|none]**

Control extra job processing done by the model specified by *modelname*:

onlcr   Indicate whether or not isolated linefeed characters should be converted to CR LF (carriage return - linefeed) pairs. Turn this on when lines *stair-step* down the page, starting a new line without returning to the original line beginning.

Note   **onlcr** may slow throughput performance on the unit.

descramble   Set the model to automatically descramble any print jobs passing through. These jobs must pass through the scrambling filter, **npscramble**, on a TCP/IP host first. If they do not, the jobs will pass through as is.

Note   To set this feature on, you must configure the descramble key first. Please see *set sysinfo* on page 114 for more on this requirement and for further details, please see *Host Software* on page 31 and *Scrambling/Descrambling* on page 138.

xtab   Sets the tabstop width within the range of **1** to **16**.

> **set model** *modelname* **header** *headerstring*

Set the header string for a named model. The header precedes every job that goes to a destination using the named model. *headerstring* is a string with a maximum of nine elements; each element may include a letter, code (e.g. 0x04), or variable (e.g. $FF).

```
set model modelname name newname
```

Change the name of a model to a new name. ***modelname*** is the current name of the model and ***newname*** is the new name you wish to give the model. This ***newname*** must be nine characters or less or else it will be truncated. In addition, all names are *case sensitive*.

```
set model modelname trailer trailerstring
```

Set the trailer contents for a named model. The trailer is appended to the end of every job that goes to any destination associated with the named model. ***trailerstring*** is a string with a maximum of nine elements; each element may include a letter, code (e.g. 0x04), or variable (e.g. $FF).

```
set model modelname type a2ps [pageorient[page-
size[rows|width]]] [cont]
```

Convert text jobs from ASCII to PostScript before sending them to the printer. PostScript jobs are not processed, but passed on without conversion. The **a2ps** default settings are portrait, letter, 60 rows, and 80 columns.

pageorient	Direction of page: portrait | landscape.
pagesize	Size of page: letter | legal | exec | a4.
rows	Number of rows in page.
width	Number of characters per line.
cont	Continuously senses print job for data format. For example, if there is a PostScript banner page in front of a PCL print job, the M208 will sense both parts of the job separately and do the conversion. Enabling this feature will decrease output performance.

```
set model modelname type pcl-ps [pclswvar psswvar]
```

Switch printer modes if the printer is not capable of doing this on its own but is capable of printing both PCL and PostScript jobs. To do this, the model appends a header and trailer string to each job switching the printer to and from the appropriate mode. The switch strings must be provided to tell the

printer how to change between PCL and PostScript modes.

If no parameters are specified, the model defaults to the switching strings for an HP LJIIIsi printer. *pclswvar* is the switching string to change modes to PCL and *psswvar* is the switching string to change modes to PostScript.

See *set var* on page 117 to set a new variable with a particular switch string or *Variable Definitions* on page 177 for the pre-defined switching variables.

```
set model modelname type raw
```

Set the model specified to no sensing and no conversion. In this mode, there is no ASCII to PostScript processing and no switching strings appended to the jobs.

Examples   **set model m4 header $ESC \&k2**

sets the header string of the model **m4** with *five* elements. Invokes CR insertion.

Note   When inputting a "**$**" or a "**&**" and you're using RSHD to execute this command, you must place a "****" beforehand so the local shell interpretor doesn't parse it out.

```
set model m3 type pcl-ps $HP3-SWPCL $HP3-SWPS
```

sets the model **m3** to switch printer modes between PCL and PostScript for an HPLJIIIsi-compatible printer. The two variables defined represent a PCL switch string and a PostScript one.

See also: *Models* on page 90 and *list model* on page 100.

set prn

```
set prn arguments
```

Configure parallel I/O port parameters. The *arguments* can be the following and if used with a "**-**", the *arguments* will be reversed:

[-]ackmode   Use the $\overline{\text{ACK}}$ signal for the trigger of next data transfer. This can generally be used with older printers. With "**-**", the BUSY signal is used as the trigger.

[-]autofd   Assert $\overline{\text{AUTOFD}}$ line for CR insertion. This only affects printers that support this function.

[-]bbmode	Simulate an attached printer even if a printer isn't really there.	
[-]fastmode	Increase transfer rate.The parallel interface of the attached printer must be able to support this increased rate and if using this mode, use only with short (less than two meter) low-capacitance cabling.	
[-]onlcr	Enable [disable] carriage return insertion.	
[-]opost	Allow output processing such as **onlcr, xtab,** and descrambling. With "-", do not allow any of this processing.	
[-]slowmode	Slow the transfer rate to match that of a PC's parallel port. Might be necessary with older, slower laser printers.	
[-]vslowmode	Slow the transfer rate even more to accommodate certain printers.	
flush	Flush the data in the parallel I/O port's output buffer.	
unlock	Release the access lock on the parallel I/O port.	

Caution

Using the **unlock** option when an I/O port is active can cause output from two jobs to intermix.

```
set prn timeout <INT>
```

Terminate a print job sent to the parallel I/O port if it is not printed after the timeout period (*INT* is time in minutes). If the timeout is set to zero (0), the timeout feature is also disabled.

Note   Printer errors will cause the M208 to postpone printing until the printer is fixed regardless of this timeout feature being set or not. Therefore, no data will be lost.

set prn xtab <*INT*>|none

Sets the tabstop width. *INT* is an integer within the range 1 to 16.

Example   **set prn fastmode -ackmode**

sets **PRN** to high performance mode and to *not* use the $\overline{\text{ACK}}$ handshake.

See also: *list prn* on page 100.

set rprinter

set rprinter add *pservername printernumber destname*

Initiate a connection to a Novell PSERVER so that the M208 can act as a remote printer. A non-M208 PSERVER must be pre-configured to recognize a remote printer.

pservername   Name of the PSERVER to connect to.

printernumber Number of the printer as defined in the PSERVER display.

destname   Destination name on the M208.

set rprinter del *pservername printernumber*

Disable a remote printer connection.

See also: *Host Configuration* on page 65 and *list rprinter* on page 101.

set sysinfo

set sysinfo contact [*contactstring*]

Set a person to contact in case of system trouble. If *contactstring* is not included in the syntax, the field is emptied.

set sysinfo descramblekey *key*

Set the *key* value used for descrambling print jobs from TCP/IP hosts. This *key* is a four digit hexadecimal value obtained from the host software, **npscramble**. Within the **npscramble.c** source code, there is a variable called **SR_KEY** which contains the default key value. This can be changed to any

four digit hex value you'd like.

If you change the key value in **npscramble.c**, you must recompile the source code and then use this *key* in the **set sysinfo** command.

```
set sysinfo dns ipaddress
```

Set the DNS server's IP address so the M208 can resolve names used with **ping** and **telnet**. Please see *ping* on page 103 or *telnet* on page 124.

```
set sysinfo email emailname@ipaddress
```

Set the user's email address to receive printer logging information. ***email-name*** is the IP name of the user to send mail to. ***ipaddress*** is the IP address where the mail is stored. See also *set logpath* on page 108 to set printer logging to **email**.

```
set sysinfo location [locationstring]
```

Set the physical location of the M208. If the ***locationstring*** is not included in the syntax, the field is emptied.

```
set sysinfo loginfo [[-]sys] [[-]tcp] [[-]ipx] [[-]spx]
```

Select the M208 debugging information type. Usually this information includes unexpected errors or exceptions from the unit and can be broken down into:

sys   General system messages.

tcp   TCP stack messages.

ipx   IPX stack messages.

spx   SPX stack messages.

Note   This debugging information is from the M208 only, not from the printer. Please see *set logpath* on page 108 and *Capturing Printer Feedback* on page 134 for details on acquiring printer logging.

```
set sysinfo logport prn|com1|com2|syslog
```

Set the I/O port to receive M208 debugging information or set it to go back to
SYSLOGD on a TCP/IP host. If the **syslog** option is selected, you must set the
IP address of the host it will send the details back to.

```
set sysinfo module [[-]novell] [[-]appletalk]
```

Set the Print Server to handle particular protocol modules.

See also: *Manipulating the M208's Services* on page 133.

```
set sysinfo name [namestring]
```

Set the name of the M208. This is just a string and is not used in the operation
of the unit. If *namestring* is not included in the syntax, the field is emptied.

```
set sysinfo syslog ipaddress
```

Set the IP address of the host which will receive debugging information from
the unit and printer logging through SYSLOGD. Please see the earlier **set sys-
info** commands and *set logpath* on page 108 for further **syslog** configuration.

Examples   `set sysinfo descramblekey ABCD`

sets the descramble key to match the value found in **npscramble.c**.

```
set sysinfo email fred@192.123.125.12
```

sets **fred** as the user to receive printer logging as long as the logport is set to
email. This printer logging just includes job information.

See also: *list sysinfo* on page 101.

set time

```
set time hour minute [second]
```

Set the current time. *hour* is based on the 24 hour system, *minute* and *second*
are from 0 to 59.

See also: *list time* on page 101.

set user

set user add|delete *userid*

Define a new user or delete a current one. ***userid*** is the user's login ID.

> **Caution**
>
> Any user can be deleted so be careful using this command. You might delete all the **root** user types. If this happens, configuration capability is no longer available through any of the normal methods. Instead, you must set the unit back to defaults with the jumper settings. Please see *Restoring To Factory Defaults* on page 135.

set user passwd *userid* [*password*]

Set a password for a specific user. ***userid*** is the user's login ID. ***password*** is the desired password for this user. ***password*** must be less than eleven characters and if it is not included in the syntax, the user's password is cleared.

Note   If you forget the root password, you can use a TCP/IP host and RSHD as *superuser* to set the users back to factory defaults (**set user from default**) or you can use the jumper method mentioned in *Restoring To Factory Defaults* on page 135.

set user type *userid* root|guest

Set a user with **guest** or **root** permissions. ***userid*** is the user's login ID.

See also: *list user* on page 102, *list logins* on page 100, and *User Accounts and Permissions* on page 94.

set var

set var *varname* *string*

Create a named variable with a specific string. ***string*** is a space-separated list of words, hex numbers (e.g. 0x04), and references to other variables or constants.

Example   **set var NEW_VAR $ESC E**

sets a variable named **NEW_VAR** with an HP PCL defined printer reset.

Note   When inputting a "**$**" or a "**&**" and you're using RSHD to execute this command, you must place a "****" beforehand so the local shell interpretor doesn't parse it out.

See also: *Variables* on page 91, *Variable Definitions* on page 177, and *list var* on page 102.

slip

slip

Configures the serial port as a SLIP connection from a terminal or PC connected to the particular serial port. This command cancels **npsh** on the serial port and starts SLIP. Once the connection is broken, SLIP is automatically stopped and the serial port returns to **npsh** mode.

See also: *Serial Line IP* on page 154.

start

start fox|tts|loopb [prn|com1|com2]

Start an ASCII output test on the specified I/O port. If no I/O port is specified, the command affects all of them.

These tests are for confirming that the serial and parallel I/O ports on the M208 are communicating properly with connected devices. Three different types of tests can be done:

1   **fox** message test.
    A continuous stream of text is sent to the output I/O port as follows:

    1 The quick brown fox jumps over the slow lazy dog's back 1234567890 :!@#$&().

    2 The quick brown fox jumps over the slow lazy dog's back 1234567890 :!@#$&().

    3 The quick brown fox jumps over the slow lazy dog's back 1234567890 :!@#$&().

    4 The quick brown fox jumps over the slow lazy dog's back 1234567890 :!@#$&().

    ...

    When the line counter reaches 99, it is reset to 0.

2   **tts** message test.
    A continuous stream of Gandalf 400C TTS compatible text is sent to the

output I/O port as follows:

THE QUICK BROWN FOX JUMPS OVER THE LAZY DOG 1234567890 DE
THE QUICK BROWN FOX JUMPS OVER THE LAZY DOG 1234567890 DE
THE QUICK BROWN FOX JUMPS OVER THE LAZY DOG 1234567890 DE
THE QUICK BROWN FOX JUMPS OVER THE LAZY DOG 1234567890 DE
...

3   **loopback** test.
     Any input characters from the device attached to the output I/O port are
     echoed back as output characters.

See also: *stop* on page 119 and *list test* on page 101.

stop

```
stop all|prn|com1|com2
```

Stop an output test on the specified I/O port(s).

See also: *start* on page 118 and *list test* on page 101.

Store Commands

Change critical parameters such as network, I/O port, and protocol settings.
The three command possibilities are:

`store choice parameters`	Store some values.
`store choice from default`	Store default settings.
`store choice from current`	Store current settings.

choice and *parameters* can be any of the options listed next.

Note   Once you **store** any parameters, you need to issue a **reset** command or do a
cold reboot of the M208 to apply the changes. Otherwise, you will still be
using the current settings.

For the **store** commands, these new words are important to know:

ifnum   Interface number. An index to a Network Interface Tap
             (**NIT**). *ifnum* will always be **1** for the since there is only one
             network interface, Ethernet.

NIT   Network Interface Tap. A module that serves as a generic interface between the data link protocol layer (i.e. Ethernet) and higher network protocol layers. Each NIT is indexed by an interface number (**ifnum**).

papname   Printer Access Protocol (PAP) name. An AppleTalk name for each printer defined on the host. Makes up the second half of the name listed in the Chooser and is transparently mapped to an M208 destination. There can be a maximum of four printers which can point to any one of eight destinations on the M208.

store pserver

```
store pserver name newservername
```

Store a new name for the M208 indicated by *newservername*. This name will affect Novell, AppleTalk, and NetBIOS setups.

```
store pserver apple zone [zonename]
```

Store a particular AppleTalk zone on the unit. To clear the AppleTalk zone, type **store pserver apple zone** and press enter.

```
store pserver applepap papname dest destname
```

Alter the AppleTalk printer specified by *papname* to print to the destination indicated by *destname*. This name does not appear in the Chooser.

```
store pserver applepap papname driver chooser_driver
```

Change the AppleTalk printer specified by *papname* to use the printer driver name specified by *chooser_driver*. This driver is selected in the Chooser menu.

```
store pserver applepap papname name newpapname
```

Change the AppleTalk printer name that appears in the Chooser. *papname* makes up the second half of the name and is transparently mapped to an M208 destination.

Example   **`store pserver applepap prn name hp4si`**

changes the AppleTalk printer named **prn** to **hp4si**.

`store pserver opts [[-]jobsecurity]`

Allows users to cancel print jobs on the unit without having to be root users.
Disabling jobsecurity allows all users to issue the **cancel** command.

`store pserver novell frametype [ethernet2 | 802.3 | 802.2`
`| 802.2snap | autosense]`

Store a particular frame type for the M208 to adhere to in a Novell environment.

Note   The M208 provides simultaneous support for all Novell frame types.

`store pserver novell fserver add fservername`

Adds a specified Novell file server as a preferred file server. This feature is
useful in a large Novell network so that the M208 does not ignore important
file servers. If this feature is not enabled, the M208 will only acknowledge the
first 16 file servers it senses.

`store pserver novell fserver del fservername`

Deletes a particular Novell file server from the M208's list of preferred file
servers.

`store pserver novell opts [[-]spxkeepalive]`

Allows users to disable the keepalive packets sent by the M208 to the host in
order to maintain an SPX connection. The [-] disables *spxkeepalive*.

`store pserver novell passwd [password]`

Store the *password* for the M208 to use when logging in to the file server.
This password must match the password set in PCONSOLE.

store pserver novell polltime [*time*]

Store the *time* (in seconds) between polling by the unit to see if print jobs are in the queue on the file server. This is applicable to a PSERVER setup only.

Note   The M208's NET LED will flash according to this *polltime*.

store pserver smb workgrp *workgroupname*

Store the M208's workgroup name for Microsoft Networks (i.e. Windows for Workgroups, Windows NT, and Windows 95). Microsoft Networks use these names to organize groups of computers into workgroups so that when browsing certain functions, users see only computers belonging to a particular workgroup rather than all the computers on the network.

Note   If no *workgroupname* has been specified, the default name is WORKGROUP (note all capitals). This is a standard Windows default.

store tcpip

store tcpip *ifnum* addr *ipaddress*

Store the *ipaddress* for the NIT module specified by *ifnum*.

Note   *ifnum* will always be **1** for the M208 since there is only one network interface, Ethernet.

store tcpip *ifnum* frametype [[-]] ethernet2] | [[-]802.2snap]

Control the frame type(s) used by the NIT module specified by *ifnum*.

store tcpip *ifnum* mask *netmask*

Store the netmask for the NIT module specified by *ifnum*.

store tcpip *ifnum* opts [[-]rarp] [[-]bootp]

Enable or disable the RARP and BOOTP for the NIT module specified by *ifnum*.

```
store tcpip opts [-]ipforward
```

Enables the IP forwarding or routing functions of the M208. By default, the gateway is disabled. This command must be used in conjuction with the **store tcpip proxy** command below.

```
store tcpip proxy add [host|net] targetipaddress [/tar-
getnetmask]
```

Enables the M208 to respond to ARP requests for IP addresses that are different than the interface configuration of the M208.

```
store tcpip proxy del targetipaddress
```

Removes this entry from the proxy ARP table.

```
store tcpip route add|del default routeripaddress ifnum
```

Add or delete a default router entry in the M208's routing table for the NIT module specified by *ifnum*.

```
store tcpip route add [host|net] targetipaddress[/target-
netmask] routeripaddress ifnum|com1|com2 [metric]
```

Add a specific route to the M208's routing table.

Example   `store tcpip route add 192.75.30.11 192.75.30.3 1`

stores a host with IP address **192.75.30.11** into the unit's routing table for the first NIT module. The router's IP address is **192.75.30.3**.

```
store tcpip route add|del default routeripaddress ifnum
```

Add or delete a default router entry in the M208's routing table.

```
store tcpip route del [host|net] targetipaddress ifnum
```

Delete a specific route from the routing table of the NIT module specified by *ifnum*.

```
store tcpip tcp access [root] add|del ipaddress [/net-
```

mask]

Add or delete a host or network in the TCP connection access list. An empty list allows any host to have TCP sessions with the M208.

Example   **store tcpip tcp access add root 192.75.30.11**

Provides the host with IP address **192.75.30.11 root** access to the M208.

store tcpip tcp opts [-]keepalive

Enable or disable the keepalive packet usage in the TCP stack.

store tcpip tcp rxwin *packetsize*

Modify the receive window size property for TCP connections. *packetsize* is the number of full size packets and must be in the range **1** to **8**. The higher the number, the less simultaneous TCP connections.

See also: *list tcpip* on page 101.

supervisor

supervisor

Gives you **root** permissions when utilizing the Novell host software, **npsh.exe**, to start a full session with the M208.

See also: *Host Software* on page 63 and *User Accounts and Permissions* on page 94.

telnet

telnet *ipname* [*escapecharacter* [*portnumber*]]

Telnet from the M208 to another host on the network specified by its *ipname*. *ipname* can be either an IP address or an IP name. By specifying a TCP *portnumber,* you can also connect to a specific socket on the target host.

If *escapecharacter* is used, it resets the key sequence to exit you to command mode indicated by the **telnet>** prompt. In this mode, you can execute:

quit   Exit the Telnet session.

?   Print the help information.

By default, **Ctrl-]** is the *escapecharacter*. To reset this value, please see *key-code* on page 98. This will give you the hexadecimal representation of the *escapecharacter* you want to use which can be substituted into this **telnet** command.

Note   To utilize IP name, the DNS server's IP address must be set first so the unit can resolve the IP name. Please see *set sysinfo* on page 114 for more information.

USING NPWIN

Overview

NPWin is an SNMP-based software utility that allows you to perform all unit configuration and management in a *point-and-click*, Windows environment. NPWin provides all the same configuration and management functionality available with the built-in **npsh** command set. NPWin also includes an extensive, context-sensitive, on-line help system to explain the features and how they work.

System Requirements

NPWin requires a workstation capable of running Windows 3.11, Windows NT, or Windows 95. The workstation must also be configured with an IP address and netmask, have TCP/IP services available, and be on the same local IP network as the M208.

Note A Windows workstation on a Novell IPX network will **not** be able to communicate with the M208.

Note Please read the SETUP.TXT file for a list of compatible TCP/IP stacks.

Installation

Please follow the steps below to install the NPWin software on to your Windows workstation:

1   Start File Manager.

2   Insert disk labelled **NPWin** into drive A.

3   Double-click on the SETUP.EXE icon and answer the dialogue boxes as they appear.

    The installation scripts take the following actions:

    • asks for a directory name, the default is c:\npwin
    • installs several files into this directory

4 Change to the specified directory, and double click on the NPWIN.EXE icon to launch the software.

Print Server/Hub Configuration

NPWin allows you to configure the M208 in a point-and-click, graphical environment. NPWin has been designed to be very intuitive and easy-to-use; the best way to learn about its features and potential is to start it up, open a session with a unit, and browse around. Also, NPWin has an extensive context-sensitive, on-line help system available to assist you with your configuration options.

To run the software, simply double-click the NPWIN.EXE icon and start a session with the unit. If the unit has not yet been added to the list of available units, please follow the steps outlined in *Starting a NPWin Session With An Unconfigured Unit* on page 128.

Note NPWin communicates with the M208 over the TCP/IP protocol. You must ensure that you have TCP/IP services available on the workstation running NPWin.

Starting a NPWin Session With An Unconfigured Unit

To start a session with an unconfigured M208, please follow the steps below:

Note These steps relate to establishing a stored IP address in the M208. If your network uses a dynamically assigned IP address, please see *Manual Configuration Through the Network with RARP* on page 38 and *Manual Configuration Through the Network with BOOTP* on page 39 for more information.

Step	Action	Result of Action
1	Double click the **NPWIN.EXE** icon to start the software.	A dialogue box appears prompting for the type of network.
2	Select **IP** from the dialogue box. (This is the default setting).	NPWin is started and the **Open Print Server Session** dialogue box appears.

Step	Action	Result of Action
3	Select **Add** from the dialogue box.	A new unit IP configuration window appears.
4	Enter the IP address, serial number, netmask, and IP name (optional) of the M208. **Note:** The serial number is the six digit number found on the bottom of the unit.	
5	Select **OK**.	Returns to window showing previously configured Microplex Hub/Print Servers.
6	Select the M208 that you have just added.	A dialogue box appears asking if you want to either **View** or **View and Change** the configuration.
7	Select **View and Change**.	Window appears asking for SNMP password. No password is yet configured at this point so proceed to next step.
8	Select **OK**.	Window appears with graphical view of M208 Hub/Print Server.
9	Configure unit as desired.	

Note   The IP address entered in Step 4 will be saved to the M208's EEPROM.

If the unit already has an IP address or if the IP address is assigned dynamically, the unit should show up in the list of already configured units when you select Open Print Server Session. If it doesn't, try clicking on the Scan button. Otherwise, you may have to manually enter the IP address of the unit.

♖ USING THE M208'S ADDITIONAL OPTIONS

Overview

As of now, you will have configured your M208 and you're probably printing to it successfully. The purpose of this chapter is to enhance your print setup by describing some of the additional features that the M208 provides. It is broken down into the following sections:

General Options

Network Security

The M208 provides various built-in security methods to protect the Print Server and its configuration. These include passwords and permission levels.

In addition, TCP/IP and Novell environments each have further security measures. Please see *Maintaining Network Security* on page 138 and *Setting Password Security*

on page 140 for more information.

Setting passwords and assigning a permission level to users eliminates the possibility of any unwanted users from getting into the M208's command set and manipulating the current settings. To configure passwords and to learn more about the two different permission levels provided for users, please see *set user* on page 117 and *User Accounts and Permissions* on page 94. To view the current user settings, see *list user* on page 102.

Using Different Naming Schemes

By default, the M208 is named **M_xxxxxx** where *xxxxxx* is the last six digits of the Ethernet address as found on the bottom of the unit. This name affects a Novell, AppleTalk, and NetBIOS setup. To change this name to something more suitable for your printing environment, please see *store pserver* on page 120.

> ### Caution
>
> If you decide to reconfigure the default name and you are using a CONFIG file to set M208 parameters with your Novell setup, you must remember to rename the directory containing this file.

Setting Up Special Job Processing

Printing with the M208 adds a lot of extra job processing options to your current print setup. No matter the environment, you now have the choice of several helpful features including:

- ASCII to PostScript conversion (**a2ps**),
- carriage return insertion (**onlcr**),
- tab expansion (**xtab**),
- banner page generation,
- load-balancing (sending to another printer if the current one is busy),
- printer mode switching and general printer manipulation.

These are just some of the many features provided and with each of these, you may set

them on the host within an interface file, **nprbsd.if** or **nprsysv.if**, or on the Print Server itself. The choice is completely up to you.

Automatically you are given the choice between six different **destinations** on the M208 allowing for six different possible print setups; each of these print setups is defined by the extra processing specified by it's associated **model**. It is the model that defines most of these extra processing options.

To make use of these special job processing features, please read over the appropriate host configuration section or the full list of extra job processing options documented in *set model* on page 110.

Manipulating the M208's Services

The M208 has a lot of functionality and along with the benefits this provides, there's one main drawback: the more features it has, the more memory it requires. Therefore, you have been given the ability to control this somewhat.

If you are not utilizing all of the protocols provided on the M208, you can disable the unused ones providing more memory for the protocol(s) in use. Please see *set sysinfo module [[-]novell] [[-]appletalk]* on page 116 for the command details.

In addition to disabling certain modules, you can also disable destination services. Not every destination on the M208 needs to have the same functionality and in the case of an AppleTalk setup, you probably don't want every destination appearing in the Chooser. Please see *set dest* on page 107 and *Removing Excess Printers from the Chooser* on page 77 for further details.

Making An Alternate Print Destination

If more than one printer is attached to the M208, you can make the best use out of each one with load-balancing. Normally, you would print to one destination on the unit and your print jobs would go to that printer only. This can be a waste of users' time if more than one printer is attached; one of the attached printers could be sitting idle while another is being overloaded with print jobs. Setting an alternate destination overcomes this by keeping all printers busy. Also, if the specified printer goes off-line or into error mode, the job will be printed by the alternate printer.

Please see *set dest* on page 107 for details on how to set up an alternate destination so your print jobs can get re-routed to an alternate printer.

Capturing Printer Feedback

One of the key aspects of maintaining a computing environment is monitoring printer status and logging this information to useful places. The M208 allows just that through logpaths or through a backchannel method. In addition, the Print Server's **lp** command provides parallel port printer status and job information as a user sends a job.

Logpath Method

The easiest and most reliable method is to utilize the many logpath options available on the Print Server. These include logging printer feedback to:

• a particular user's email address through SMTP,

• SYSLOGD on a particular TCP/IP host,

• a TCP port number in the range of 1,024 to 65,000 to which you can **telnet** to,

• another I/O port where a printer or terminal is attached to display the information.

To configure any of these logpath options, please see *set logpath* on page 108.

Note   I/O ports and SYSLOGD can be used to capture M208 debugging information as well as printer logging. Please see *set sysinfo* on page 114 for more details.

Backchannel Method

In addition, printer feedback can be directed to a serial I/O port through the use of a backchannel method. For example, if you like the speed of the parallel port but need the printer status, you could set up a backchannel to one of the serial ports. From here, you have two choices:

1   Utilize host software to obtain this data such as Adobe TranScript or Sun NeWS-print with **npd** (see *npd Pseudo-device Interface* on page 54).

2   Make use of the I/O port's associated destination (see *list pserver* on page 100) and manipulate its logpath to use one of the choices mentioned earlier in this sub-section.

Note   To make use of a backchannel method, the printer must be able to support input on one port and be able to output status on another.

Please see *set dest* on page 107 to configure a backchannel.

Lp Method

The M208 provides its own version of the **lp** print command. This is used in conjunction with **rsh/rcmd/remsh** within an interface script or directly from the command line on the host. By default, it provides parallel port printer status and can also be configured to report incremental byte counts as the job prints. It can also show the job position in the M208's queue as it moves to the top.

Note   Using **lp** will provide printer error messages as well as job status.

If **lp** is used from the command line, any printer status will come right back to the screen. If used within an interface script, the messages will go to the log file located in the spooling directory.

Note   Since **lp** must be used with **rsh/rcmd/remsh** only, this feature is only offered with a print setup utilizing an interface script or with a **rsh/rcmd/remsh** command from the command line on the host.

Controlling the Frame Types Used by the M208

Various frame types can be used by the Print Server at any given time but each supported protocol's frame type configuration is completely separate from another protocol's. This frame type support is configurable.

Novell and TCP/IP are the only protocols that offer this configuration. The M208 provides simultaneous support of multiple Novell frame types. Please see *store pserver* on page 120 and *store tcpip* on page 122 to find out which frame types are offered in each environment.

TCP/IP Options

Restoring To Factory Defaults

Once and a while, it is necessary to set the M208's *network* parameters back to factory defaults whether it is because you are moving the M208, you are changing your addressing schemes, or you just want to start from scratch. These network parameters include: IP address, netmask, and routing table entries.

Two methods are available for doing this:

1   physically moving jumpers inside the Print Server,

2   issuing a command on the M208 and rebooting.

Either way will produce an M208 that has all of the *network* settings it came with originally. Each method is described next.

Through Jumpers

For normal operation, the unit has its S3 strap on pins 1 and 2 for EEPROM Enable. Moving the strap from this position to pins 3 and 4, or DEFAULT IP, will override your *network* settings and put the unit to factory defaults. Please see *M208 Jumper Settings* on page 137 for the jumper locations.

```
┌─────────────────┐
│   Caution       │
└─────────────────┘
```

The inside of the M208 is sensitive to static electricity so be sure to ground yourself to the chassis before touching any internal components.

To manually set the unit to defaults:

1   Open the cover.

2   Move the jumper strap from pins 1 and 2 to 3 and 4.

3   Power up the unit in its default state and configure as desired.

4   After configuring the Print Server, be sure to return the jumper strap to EEPROM Enable and repower the unit.

Through npsh

To restore the *network* default settings through the M208's command set:

1   Use a Telnet session or connect a terminal to a COM port of the Print Server.

2   Once logged in as a **root** user, restore factory defaults by entering:

    store tcpip from default

3   Reboot the M208 and reconfigure its settings according to one of the methods discussed in *M208 Configuration* on page 35.

Figure 5:   M208 Jumper Settings
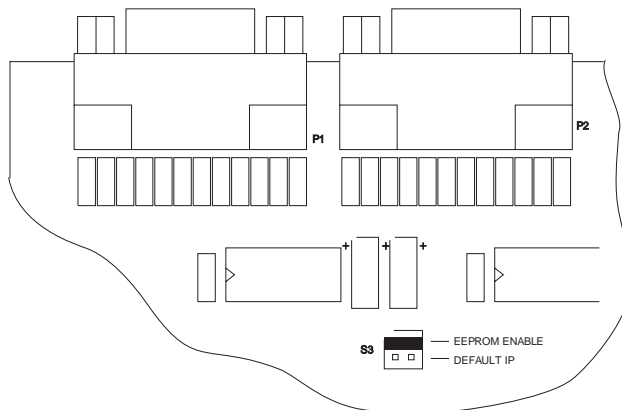
Getting Ready for Complex Networks

The default settings on the M208 allow printing in a simple network without routers. You need to add routing information to communicate or print from hosts on other networks.

To do this, you can establish either of the following:

• default routes for generic or unknown network addresses to use,

• static routes to known network addresses such as a particular host or network.

To set a default router or a static route, please see *store tcpip* on page 122 and to look at the current routing entries, please see *list tcpip* on page 101.

Remotely Managing the M208

In a TCP/IP environment, various methods are available for remotely monitoring the M208. These include:

• a Telnet session,

• using **rsh/rcmd/remsh** and a command from the unit's command set,

- using **npconfig**'s *Detailed Configuration Options Sub-Menu*,

- using the FTP Daemon,

- through an SNMP manager.

Maintaining Network Security

Besides the general security measures mentioned in *Network Security* on page 131, the M208 provides two more for TCP/IP environments. These include:

- a TCP access list,

- scrambling/descrambling of print jobs.

Access List

The **TCP access list** is protects the M208 and its configuration while the scrambling protects your print data from being viewed by others as it passes over the network to the M208.

The M208 has the ability to control host access to printer destinations and remote command execution services. This is done using an access list, similar in function to the UNIX **.rhosts** file. If the access list is empty, any host can have access to the M208's services. If there are entries in the access list, only those hosts specified have access to these services. Although the maximum number of entries is 10, each entry can refer to a network or a host so more than 10 machines can be enabled.

Note   Only users that have **root** permission can configure the remote host access entries. Users with **guest** permission can only display these entries.

To set up the access list, please see *store tcpip* on page 122 and to look at the current settings, see *list tcpip* on page 101.

Scrambling/Descrambling

A **second method of security** is provided through data **scrambling/descrambling**. This TCP/IP security method protects users' print data as it is sent across the network to the M208 for printing. A binary is provided on the host, **npscramble**, which scrambles the print job. Then when it reaches the Print Server, the job is descrambled for printing.

Note   This scrambling method will protect against casual viewing with network analyzers. However, it is *not* encrypted and *cannot* be considered safe from cryptographic attack.

To utilize this feature, you need to:

1   Look into the **npscramble.c** source code for a variable called **SR_KEY**. This contains a four digit hexadecimal value to be used as the descrambling key on the M208.

2   Log into the M208 as **root** user and set this value as the key. Enter:

    set sysinfo descramblekey *key*

3   Set descrambling on in the model you are utilizing. Enter:

    set model *modelname* stty descramble

4   Save these new settings. Enter:

    save

5   Incorporate **npscramble** into your print setup on your host. Scrambling can be set within **npr.if** or added to the command line when printing.

Example   **cat test.txt | npscramble | rsh spike lp -d d1prn**

where **test.txt** is piped through **npscramble** for scrambling and then sent for printing on the M208 **spike**'s destination **d1prn**.

Please see *Host Software* on page 31, *Printing Via the Spooler* on page 44, and *set model* on page 110.

Using the Terminal Server Capabilities

The M208's built-in command set includes **telnet** which allows the unit to act as a terminal server as well as a M208. The M208's terminal serving capabilities can be used in a number of ways including connecting a terminal to a network or using a terminal as an output device.

To use the M208's terminal serving capabilities to connect a terminal to the network, you need to:

1   Physically attach the terminal to one of the serial ports on the M208.

2   Press the **<Break>** key and at the prompt, type in the IP address of the host that you want to connect to.

3   Login to the host.

In addition, **ping** is provided for testing TCP/IP configuration parameters and network connections with target hosts. Please see *ping* on page 103 and *telnet* on page 124 for command details.

Novell Options

Setting Password Security

Besides the general security measures mentioned in *Network Security* on page 131, a Novell setup provides further password security. A password can be set on the M208 and within your PCONSOLE setup so that when the M208 tries to login to the file server, the passwords are compared.

To configure a PSERVER setup with password protection:

1   Establish a password on the M208.

    Please use *store pserver* on page 120.

2   Reset or reboot the Print Server to make the password take affect.

3   Enter **PCONSOLE** as **supervisor** on your Novell host.

4   Select PRINT SERVER INFORMATION from the Main Menu.

5   Select the appropriate M208 and press **<Enter>**.

6   Select CHANGE PASSWORD.

7   At the prompts, type and retype the new password used on this M208 PSERVER. Press **<Enter>** when you are finished.

Note   These steps may vary for NetWare 4 environments.

Setting Preferred File Servers

The M208 allows you to specify a list of preferred file servers in a Novell environment. This feature is useful in a large Novell network so that the M208 does not ignore important file servers. If this feature is not enabled, the M208 will only acknowledge the first 16 file servers it senses.

To add a preferred file server to the M208:

1. Login to the M208 through an **npsh** session as a **root** user.

2. At the **npsh** prompt, enter:

   store pserver novell fserver add *fservername*

   where *fservername* is the name of the Novell file server you want to add as a preferred file server.

   This adds the specified file server as a preferred file server on the M208.

3. Repeat steps 1 and 2 to add additional preferred file servers.

   For more information, please see *store pserver novell fserver add fservername* on page 121.

Managing With SNMP

SNMP (Simple Network Management Protocol) is a protocol for internetwork management services. This protocol provides a means for computers (or *agents*) to be managed remotely by *managers*. The level of management depends on the manager and agent and can go from providing information such as statistics to providing full management capabilities of the agent.

MIB (Management Information Base) files are a description of managed objects available in an agent. MIB files provide the data for the manager so they can remotely manage the agent. A MIB file is simply a formal description of the way an agent can be accessed using SNMP and what functions can be managed.

The M208 is a fully manageable SNMP agent that supports MIB-II, custom MIB's and traps.

MIB II Support

The M208 is MIB II compliant allowing SNMP managers to monitor protocol, network, and routing statistics.

Custom MIBs and Traps

The M208 provides a custom MIB definition file which consists of several variables and traps. In fact, the MIB file represents all of the possible configuration options such as hub settings, destination settings, network configurations, print queue status, loading of defaults, etc.

The M208's custom MIB definition file is included on the host software disk in a file called **mplxmib.txt**. This file can also be downloaded from the Microplex FTP site (**ftp.microplex.com: support/m208/misc/mplxmib.txt**) or can be accessed via the Microplex Web site (**http://www.microplex.com/**).

Custom MIB Variables

The variables found within the custom MIB definition file describe every type of internal information that can be accessed on the M208 by an SNMP manager. These variables can be divided into two groups: system variables and product variables.

System Variables

The first grouping of variables contains general information about the M208 such as firmware version, serial number, etc. In addition to these, it includes a trap table which defines what SNMP managers will receive the traps generated by the M208. The trap table can have up to ten entries, but only the first entry is saved to EEPROM.

Product Variables

The second grouping of variables contains information defining all of the remaining functionality of the M208. The product variables are divided into:

config group	All configuration components such as models, destinations, logpaths, and users.
status group	All dynamic monitoring components such as print queues, user logins, and RPRINTER configurations.
command group	This includes the commands save, load, and reset.
Note	These variables can have read, write, or read-write permissions. Along with these permissions there are other elements that can limit the write access to these variables. Please see *SNMP Security* on page 144 and *User Accounts and Permissions* on page 94 for more information.

Print Server Traps

A trap is an event generated by an agent to indicate a significant event to the manager. The M208 generates three traps regarding the print server component:

coldstart	A generic trap generated every time the M208 is powered on or reset.
authenticationFailure	A generic trap generated whenever a disallowed access is attempted.
lpqIOStatusChanged	The only custom trap. This trap is generated whenever an I/O port's status changes.
Note	No trap is generated on a CTS change on the serial ports, only on a DCD change.

Hub Traps

The M208 generates nine traps regarding the hub component:

rptrHealth	This trap conveys information related to the operational status of the repeater and is part of the 802.3 repeater specification.
m208PortDataRateMismatch	A trap generated when the rptrMonitorPort-Data-RateMismatches variable changes for any port.
m208PortPartionStateChange	A trap generated when the port partition state changes for any port.
m208PortLinkTestStatus Change	A trap generated when the link test status for a port has changes.
m208GroupMJLPTrap	A trap generated when the m208Group-MJLPStatus variable changes.
m208PortLoopBackError Status-Change	A trap generated when a loop back error condition occurs.
m208PPortSQETestError Status-Change	A trap generated when a SQE test error occurs.
m208PPortAddrTrackSrcAddr-Match	A trap generated when the source address to match is received on a different port.
m208PPortAddrTrackSrcAddr-Changed	A trap generated when a the source address on a port changes.

SNMP Security

SNMP does not include any formal type of security definition. However, security can be accomplished using *communities*. A *community* is a string that is sent with every SNMP request and is used to define a certain view of the MIB. By doing this, you can control what parts of the MIB are accessed by SNMP managers.

To access the M208's custom MIB, the *public* community string can be used to read any variable that have **read** access. To restrict **write** access, there is an additional security step implemented. This involves defining a user named **snmp** on the M208 with **root** privileges. The password defined for this **snmp** user will then be used as the *community string* which allows **write** access.

Note   If no **snmp** user is defined with **root** privileges, no **write** requests will be accepted by the M208.

Adding an SNMP User

To add a user named **snmp** with **root** privileges, please follow the steps below:

1   Login to the M208 as a **root** user.

2   Add a user named **snmp**.

   set user add snmp

3   Set the user type to **root**.

   set user type snmp root

4   Set the password for the **snmp** user.

   set user passwd snmp *snmppassword*

5   Save the changes.

   save

The user **snmp** is now created and *snmppassword* is the only community string which will allow **write** access.

Compiling and Monitoring the Custom MIB

For read-only SNMP functionality, please follow the steps below:

1   Copy the M208 MIB definition file from the host software disk in a file called **m208mib.txt**. This file can also be downloaded from the Microplex FTP site (**ftp.microplex.com: support/m208/misc/mplxmib.txt**) or can be accessed via

the Microplex Web site (**http://www.microplex.com/**).

2   Compile this MIB description file to work with your SNMP manager.

3   Using your SNMP manager, view the particular MIB variables that you wish to monitor.

Note   If you are using Sun's *SunNet Manager*, you will need to download a special MIB file (**ftp.microplex.com: support/m208/misc/mplxmib.txt.SNM**) from the Microplex FTP site. This file can also be accessed via the Microplex Web site.

Note   If you are using Castle Rock Computing's *SNMPc*, you will need to rename the MIB variable *UInteger32* to another name such as *U32*.

Writing to the Custom MIB

The following example explains how to use the custom MIB variables to set the M208's parameters. For example, to set the M208's com2 properties to 19200, cs8, ixon, please follow the steps below:

Note   This example assumes that the snmp password has been defined as *custommib*, that the M208's ipname is *spike,* and that the SNMP manager is the Tricklets package.

1   Set up an **snmp** user with **root** privileges on the M208. Please see *Adding an SNMP User* on page 144 for details.

2   Issue the following configuration commands using the snmp user's password as the community string.

```
echo "m208IfComSpeed[1.4]=19200" | snmp-set spike
custommib

echo "m208IfComCharS[1.4]=8" | snmp-set spike custommib

echo "m208IfComIxon[1.4]=2" | snmp-set spike custommib
```

Setting the M208 to Send Traps to an SNMP Manager

The M208 continuously generates traps but unless the trap table is filled in, no SNMP manager will receive this information. To set the M208 to send traps to a particular SNMP manager, please follow the steps below:

Note   This example assumes that the snmp password has been defined as *custommib*, that the M208's ipname is *spike,* and that the SNMP manager is the Tricklets package.

1   Set up a **snmp** user with **root** privileges on the M208. Please see *Adding an*

SNMP User on page 144 for details.

2 Set the following M208 trap variables using your SNMP manager. The actual syntax of the commands will depend on the particular SNMP manager you are using.

```
echo "trapCommunity[1]=\"building-A\"" | snmp-set spike
custmmib
```
where **building-A** is the string that you want the M208 to send with the trap information. This community string has a 14 character maximum.

```
echo "trapDest[1]=192.75.11.11" | snmp-set spike
custommib
```
where **192.75.11.11** is the IP address of your SNMP manager.

Note   To disable the entry in the trap table, set the IP address to 0.0.0.0

The M208 will now send trap information with the community string *building-A* to the SNMP manager with the IP address *192.75.11.11*. For more information on these trap variables, please see their description in the custom MIB definition file.

Note   The trap table can hold up to ten entries but only the first entry is stored in EEPROM. If you turn the unit off, you will lose the additional entries.

FTP Daemon

The FTP Daemon provides an additional method to access the M208. Using the FTP Daemon, users are able to submit print jobs, cancel print jobs, monitor the print queue, and upload/download M208 configuration files. Users FTP to the M208 as if it were any other computer on the network.

For the purposes of FTP, a pseudo file system has been defined on the M208 to allow access to the unit's functions. Three types of users can access this file system: **root**, **guest**, and **anonymous**. **Root** and **guest** correspond to the entries in the M208's user list; **anonymous** is a special type that does not require a password. For each directory or file within this file system, there are access restrictions according to the type of user logged in.

M208 FTP File System

The M208 FTP file system is where you execute all **ftp** commands on the unit. Please see the examples on the following pages for a complete description of the commands and how they are executed.

The following is the structure of the file system you will see when you **ftp** to the unit:

/queue

Contains three files with information pertaining to the print queue associated with each of the M208's ports (i.e. prn, com1, com2). These files allow you to view the current status of each queue.

/dest

Contains six subdirectories, one for each of the six print destination on the M208. Please see *Destinations* on page 89 to better understand destinations and printing. These directories are where files are **put** in order to print.

/jobs

Contains files representing all the print jobs currently queued. The only command available for these files is **del**, which cancels the job.

/config

Contains three subdirectories: **current**, **stored**, and **default**. Each of the files in these subdirectory represents one data structure of the M208. The files in the **current** directory reflect the current configuration, files in the **stored** directory reflect the stored configuration, and files in the **default** directory reflect the default configuration. These files are in binary format.

/exec

This directory is used as a command interpreter directory. Any file with M208 configuration commands that is **put** to this directory will be interpreted as a series of **npsh** commands.

Printing A File Using FTP

The following example shows how to print a file using FTP:

1 Change to the local directory where the file to print resides.

2 Login to the M208 using **ftp**.

   ftp *ipname*

3 Login as **guest**, **root,** or **anonymous**.

Note   **Guest** and **root** users require the use of passwords as configured in the unit's user list. **Anonymous** is a special login that does not require a password.

4   Change to the **/dest** directory that you want to print to.

cd dest/*destinationname*

5   Change the mode to correspond to the type of file to be printed. Choose binary mode if the file to be printed contains both text and graphics and ASCII mode if the file is text only. The default mode is always ASCII.

bin

6   Copy the file you want to print to this directory.

put *filename*

The file is spooled and printed.

7   Logout of the FTP session.

quit

Removing a Print Job Using FTP

The following example shows how to remove a print job using FTP:

1   Login to the M208 using **ftp**.

ftp *ipname*

2   Login as **guest**, **root** or **anonymous**.

3   Change to the **/jobs** directory

cd jobs

4   Display a list of current print jobs.

ls

Displays listing of all queued print jobs by their ID number.

5   Remove desired print job from the list.

del *jobname*

6   Logout of the FTP session.

quit

Monitoring a Print Queue Using FTP

The following example shows how to monitor a print queue using FTP:

1. Login to the M208 using **ftp**.

   ftp *ipname*

2. Login as **guest**, **root** or **anonymous**.

3. Change to the **/queue** directory

   cd queue

4. Turn interactive mode off.

   prompt

   This enables you to copy a number of files without having to respond to prompts by the M208.

5. Download all files in the print queue directory.

   mget *

   Files prn, com1, and com2 are downloaded to the users local directory.

6. Logout of the FTP session.

   quit

7. View file with information pertaining to print queue status.

   cat prn com1 com2

Note   This command gives you the same information as a **lpstat** in **npsh**. **cat** is a UNIX command; with DOS, use the **type** command.

Configuring M208 Parameters Using FTP

Users have two ways of configuring the M208's parameters using FTPD. The first is by uploading binary files to the /**config** directory and the second is by uploading text configuration files to the /**exec** director**y**. We discuss each method and give appropriate examples below.

1. /config directory

The /**config** directory is divided into three subdirectories; **current**, **stored**, and **default**. Each of the files in these sub-directories represent one data structure regarding the configuration of the unit. These files can be used to make a backup copy of the unit's configuration parameters or to copy configuration parameters from one unit to another.

Note The configuration files are in binary form and their format may differ between firmware versions. Users may not be able to upload a configuration file that was downloaded from a previous version.

Copying a Configuration Using FTP

The following example shows how to copy a configuration file using FTP:

1 Login to the M208 using **ftp**.

   ftp *ipname*

2 Login as **root**.

   You must be a **root** user in order to copy a configuration file.

3 Change to the **config/stored** directory.

   cd config/stored

4 Set mode to binary.

   bin

5 Turn off the interactive mode.

   prompt

6 Download all the files in this directory.

   mget *

   Downloads a copy of all files in the **config/stored** directory to the user's local directory on their host.

7 Logout of the FTP session.

   quit

Now you have a copy of the M208's stored configuration parameters. These files can be saved for archival purposes, used to reconfigure the unit to a previous setting, or used to set a number of units to the same configuration.

Note It is only necessary to save the files from the **stored directory**. Files from the default and current directory are not required in order to restore a unit's configuration.

Restoring a Configuration Using FTP

FTP can be used to restore a configuration saved from the unit or restore a configuration saved from another unit.

Note   If you are restoring a configuration saved from another unit, the configuration must be of the same version as the unit receiving the configuration.

1   Change to the local directory on the host where the saved configuration files reside.

2   Login to the M208 using **ftp**.

   ftp *ipname*

3   Login as **root**.

Note   You must be a **root** user in order to FTP files to the /**config** directory.

4   Change to the **config/stored** directory.

   cd config/stored

5   Set mode to binary. Configuration files are always in binary form.

   bin

6   Turn off the interactive mode.

   prompt

7   Upload all the files from the user's local directory.

   put *

   Copies all files from the local directory to the **config/stored** directory.

8   Logout of the FTP session.

   quit

Note   It will be necessary to **reset** the M208 for the changes to take effect.

2. /exec directory

Using the /**exec** directory, users can upload a text file that includes a number of configuration commands. When this file is placed in the /**exec** directory, the commands contained in it are executed as if they were commands entered sequentially from a telnet session using **npsh**. This feature enables the user to create a single text configuration file that can be used to quickly and easily configure a number of M208s.

Note   The command syntax for the text configuration file is exactly the same as if you were entering individual commands with **npsh** through a telnet session. Please see *USING THE M208'S COMMAND SET* on page 93 for details regarding the commands and

their syntax.

The configuration file can be seen as simply a user-defined script that includes a number of configuration commands to be executed. Comments describing the configuration can also be included in this file provided they follow the correct syntax.

The following is an example of a simple configuration file:

Example

```
; These are comments for the example config file.
; Note that comments have to start at the beginning of a
; line and be preceded by an ';'
;
version 5.6
; If this command is found and the current version does not
; correspond to the command parameter, the file execution
; will abort.
;
redirect prn
load default
set dest d1prn name newdest
set dest d2com1 name another
set dest newdest ioport com2
set model m1 name newmod
set prn slowmode
set com1 cs8 19200 istrip
save
```

Note   The above example includes a line for the **version number**. Because the commands and/or syntax **may** change from one firmware version to another, an old configuration file may be incompatible with the current version. By entering a version number, the transfer will be aborted and the user notified to check if the commands are compatible with the current firmware version if the version numbers do not match.

Note   The above example includes the **load default** command. This is optional. Including **load default** ensures that you always begin a configuration from the factory default settings.

Note   The above example uses the **redirect** command. This redirects standard output to a specified port with an attached monitor or printer. This allows the user to monitor the commands as they are being executed. Without the **redirect** command, users will see no output from the commands as they are being executed.

It is important to ensure that the redirect port's parameters are not altered in commands that follow or else the output may be affected.

Note It is not possible to generate a text configuration file from an existing binary configuration file in the **/config** directory.

Executing a Configuration File Using FTP

The following example shows how to execute a configuration file using FTP:

1 Change to the local directory where the text configuration file resides.

2 Login to the M208 using **ftp**.

   ftp *ipname*

3 Login as **root**.

Note You must be a root user in order to FTP files to the /**exec** directory.

4 Change to the /**exec** directory.

   cd exec

5 Copy the text configuration file to the **exec directory**.

   put *filename*

   The M208's parameters are now set according to the commands in the configuration file.

Note Depending on the specific commands in the configuration file, it may be necessary to **reset** the M208 for the commands to take effect. Basically, the same rules apply whether you are using **npsh** to issue commands or a configuration file to issue commands. For more information on the rules regarding configuration commands and options, please see *USING THE M208'S COMMAND SET* on page 93

6 Logout of the FTP session.

   quit

Note If two FTP clients try to send configuration files to the exec directory at the same time, the second file will fail.

Serial Line IP

Serial Line IP (SLIP) is a protocol used to connect two networks using a serial line. The M208's serial ports support SLIP allowing the M208 to be used to provide remote hosts with dial-up access to the local network via a modem.

SLIP is a very simple protocol and does not have any type of packet identification, error detection/correction, or address configuration. It relies on upper level protocols (IP, TCP and UDP) for such tasks. With SLIP, every IP packet that is to be sent to the remote network is just sent through the serial line followed by a byte to indicate the end of that packet. SLIP does not allow communications with Novell or AppleTalk network.

SLIP is very useful if you want, for example, to allow remote users access to the local network or to allow users to send print jobs to a remote office rather than sending a fax.

There are two ways to enable SLIP on the serial ports:

- As a dedicated SLIP connection.
- As a temporary SLIP connection

Configuring a Serial Port as a Dedicated SLIP Connection with an Attached Modem

The following example explains how to set up a serial port as a dedicated SLIP connection with an attached modem. This procedure will provide one remote host dial-in access to the local network via a modem attached to the serial port, com1.

Note   This example assumes that the remote host is already configured with an IP address and has TCP/IP and SLIP available.

1   Login to the M208 and enter the following **npsh** commands to set the serial port to SLIP and to configure other necessary serial port settings.

    set com1 slip ignbrk ctsflow rtsflow -ixon -inoff [baud rate]

    save

Note   The baud rate must correspond to the baud rate of the attached modem.

2   Add a route to the M208's routing table for the remote host.

    store tcpip route add host [*remotehost ipaddress*] [*remote-*

```
                  host ipaddress] [ioportname]
```

Example   **store net route add host 192.147.242.3 192.147.242.3 com1**

3 Configure the M208 to answer ARP requests for this remote host so that anything
   destined for this remote host will go to the M208.

```
                  store tcpip proxy add host [remotehost ipaddress]
```

Example   **store tcpip proxy add host 192.147.242.3**

4 Enable the IP gateway option on the M208 so that data packets will be sent from
   the Local M208 network to the remote host.

```
                  store tcpip opts gateway
```

5 Reset the M208 to make these settings take effect.

```
                  reset
```

The remote host can now dial-in to the modem and become part of the M208's net-
work as if it were a new host on that network. Basically, whatever a host on the local
network can do, the remote host can do.

Note   A dedicated SLIP connection can be the source of a security hole because anyone with
the dial-in modem number can access the local network.

Note   A serial port **cannot** be configured as both a SLIP connection **and** a print server desti-
nation. Any destinations that are configured to the serial port must be reconfigured to
another I/O port.

Configuring a Serial Port as a Temporary SLIP Connection with an Attached Modem

The following example explains how to set up a serial port as a temporary SLIP con-
nection with an attached modem. This procedure will provide remote host dial-in
access to the local network via a modem but will terminate SLIP on the serial port
when the connection is broken.

Note   This example assumes that the remote host is already configured with an IP address
and has TCP/IP and SLIP available.

1 Login to the M208 and enter the following **npsh** commands to configure the serial
   port to the Neisseria settings.

```
                  set com1 ignbrk ctsflow rtsflow -ixon -inoff [baud rate]

                  save
```

Note   The baud rate must correspond to the baud rate of the attached modem.

2   Add a route to the M208's routing table for the remote host.

store tcpip route add host [*remotehost ipaddress*] [*remote-host ipaddress*] [*ioportname*]

Example   **store net route add host 192.147.242.3 192.147.242.3 com1**

3   Configure the M208 to answer ARP requests for this remote host so that anything destined for this remote host will go to the M208.

store tcpip proxy add host [*remotehost ipaddress*]

Example   **store tcpip proxy add host 192.147.242.3**

4   Enable the IP gateway option on the M208 so that data packets will be sent from the Local M208 network to the remote host.

store tcpip opts gateway

5   Create logins for the users who will be dialing-in from a remote host.

set user add *userid*

set user passwd *userid* [*password*]

6   Reset the M208 to make these settings take effect.

reset

7   The remote host can now dial-in to the modem. Once the connection is made with the M208, they will be given a standard login screen where they will type their user id and password and press **<Enter>**.

8   The standard **npsh** message will appear. At the prompt, type:

slip

This configures the serial port to SLIP for as long as the connection is maintained. When the connection is dropped, the serial port reverts back to standard **npsh** mode.

The remote host is now part of the M208's network as if it were a new host on that network. Basically, whatever a host on the local network can do, the remote host can do.

Note   The M208 detects that the connection was dropped via the DCD signal on the serial port pin. When connecting via a modem, this is usually handled by the modem itself. If you are connecting to the serial port via a null modem cable, make sure that the cable carries the DCD signal from the remote host so that the M208 will revert back to

npsh mode when the remote computer is turned off.

Note   A serial port **cannot** be configured as both a SLIP connection **and** a print server desti-
nation. Any destinations that are configured to the serial port must be reconfigured to
another I/O port.

For more information on SLIP, please see *set com1/com2* on page 105.

IP Routing

IP routers allow computers connected to two (or more) separate networks to commu-
nicate with each other. The M208 IP routing capabilities allows the unit to be Wide
Area Network compatible.

For information on configuring the M208's IP routing features, please see *store tcpip
opts [-]ipforward* on page 123 and *store tcpip route add/del default routeripaddress
ifnum* on page 123.

? TROUBLESHOOTING THE M208

Overview

This chapter will help you with various problems you may encounter throughout your print setup or when printing. There are five main sections in this chapter:

1   Common Problems

2   TCP/IP Problems

3   Novell Problems

4   AppleTalk Problems

5   Windows Problems.

Common Problems

? The M208 doesn't power up with the correct LED sequence

Please refer to *LED Patterns* on page 188. This table describes different LED startup patterns that are possible on the M208.

Note   If at any time after the bootup process the ERR LED comes on, please contact your local vendor.

TCP/IP Problems

Communication Related

? You cannot ping the M208

There are a number of possible reasons for this:

•   Have you rebooted the Print Server? Sometimes something this simple will solve various communication problems.

•   Is the network connector fastened on tightly to the Print Server?

- Have you checked your network connection to the M208? Try it at a new location on your network if possible or swap in another device.

- Have you made an entry in your host table (**/etc/hosts**, **host nis** map, or DNS name table) for the M208?

- Have you tried to **ping** with the IP address instead of the IP name? This will eliminate any name-lookup issues and focus more on the communications between the M208 and your host.

- Is it possible that a duplicate IP address has been assigned?

- Did you use the correct netmask for your particular environment?

- Has the M208 been moved from another network? If so, it needs to be reconfigured to integrate with its new location. This includes a new IP address and netmask at the minimum. Please see *Restoring To Factory Defaults* on page 135 and *M208 Configuration* on page 35 for possible configuration methods.

- Is there a router between the M208 and your host? If so, a default router or a static route must be configured on the unit so the Print Server knows how to get its response back to the originating host. Please see *store tcpip* on page 122 and *Getting Ready for Complex Networks* on page 137.

- Have you set any hosts or networks in the M208's TCP access list? If so, only these entries can access the unit. Please see *list tcpip* on page 101 to view current entries.

- Do you have a RARP or BOOTP server running on your network? By default, the M208 comes with the RARP and BOOTP request turned *on* so although you may have stored a particular network configuration in the units EEPROM, a RARP or BOOTP server may supply new *network* parameters upon bootup. To turn off RARP and BOOTP on the unit, please see *store tcpip* on page 122.

If none of these help, try the following:

- Store the network parameters or view the currently stored settings via a terminal on COM1 or COM2. This logs you into the unit's command set where you can get a better understanding of what's going wrong. Please see *Manual Configuration Through the COM Port* on page 40.

- Reset the unit to default settings. Please see *Restoring To Factory Defaults* on page 135. Once the unit is in the default state, use one of the configuration options listed in *M208 Configuration* on page 35 to reconfigure it.

![?] You cannot Telnet to the M208

If you are unable to **ping** the Print Server as well, please see *Communication Related* on page 159. If it is **telnet** only that you are having problems with, these points should be considered:

- Are you able to **telnet** to another host on your network or **telnet** from another host? If not, look into your host's TELNET configuration.

- Have you tried rebooting the M208?

- Does the fourth octet of the M208's given IP address equal 0 or 255? Each of the four octets in the IP address should be between 1 and 254.

Printing Related

![?] You've completed your print setup but nothing is printing

This can be the most frustrating problem since you've gone through the configuration process and suddenly you don't know what's happening - "it's supposed to work now." Here are some things to check over:

- Are you able to communicate with the M208? If you are having communication problems, please see *Communication Related* on page 159.

- Is the printer online and in the correct mode for the file being sent to it?

- Is the printer spooler up and running on the host?

- Have you confirmed communications between the M208 and the printer? This can easily be done with the ASCII output tests provided on the unit. Please see *start* on page 118 for information on these various tests. If you are not successful with these, look at flow control, I/O port settings, or possibly the cable.

- Is anything happening on the printer when the print job is sent? Sometimes, the print job may have gotten to the printer but just may need a manual form-feed. If this is the case, please see *set model* on page 110 for information on trailer strings.

- Is the print job data even getting to the M208? Once you've sent the job from the host, try continuous **lpstat** commands on the Print Server. You should see the byte count for that particular port incrementing as the job passes through. If you are not seeing this happen, you may need to try a larger job or else consider some of the other suggestions in this section.

?

- If you're using **npr.if** to print, are the host binaries installed on your system in a general directory such as **/usr/local/bin**? Please see *Printing Via the Spooler* on page 44 for more on interface file printing.

- Are there any error messages in your email, a log file, or other standard error files on your particular host? These messages can be very helpful in narrowing down the problem.

- Are all permissions correct on relative directories and files? Usually the error message files will indicate permission problems but it's still something to confirm.

- Might the destination or I/O port on the M208 be disabled? Please see *disable* on page 97 and *enable* on page 97 for more on this feature.

If you are not able to print successfully yet, try the following:

Avoid the print spooler altogether by printing directly to the M208 from your host. If you are successful, go over your host's print setup.

Example   **`cat test.txt | rsh spike lp -d d1prn`**

sends **test.txt** to the M208 named **spike** to be remotely printed on the printer attached to **d1prn**. The print spooler is not used at all.

Note   **npwrite** can also be used to send print jobs without spooler intervention. Please see *Direct Printing Without the Spooler* on page 42.

?   Your print job comes out formatted incorrectly

In a TCP/IP environment, this generally happens if no carriage return insertion has been incorporated into the printing process. The M208 can handle this task or it can be set on the host system with the use of **onlcr**. To set this feature on the Print Server, please see *set model* on page 110. For the host, a variable, ONLCR_YN, in the provided interface file, **nprbsd.if** or **nprsysv.if**, must be set to 1. Please see *Printing Via the Spooler* on page 44.

?   Your data comes out garbled

This tends to happen when PCs are used with a TCP/IP software package and they are printing to a Unix system or directly to the M208 where **onlcr** is turned on. DOS jobs have difficulty with this carriage return insertion and will therefore, print out incorrectly. To solve, make sure **onlcr** is turned off in the model associated with the destination that you are printing to and it is not set in the interface script if one is used

somewhere in the print path.

Note Any printing from PCs should have a "raw" setup.

Some other things to consider when garbled data persists are:

- tab expansion (**xtab**) set on with graphic jobs,

- cable used between the M208 and the printer,

- type of flow control being used on the M208 and a serial printer.

If you cannot eliminate the garbling, you may want to try printing *without* the Print Server to see if the problem persists.

Novell Problems

Communication Related

? **No connection is made with the M208 after you have completed the print setup**

Whether you have configured the Print Server as a PSERVER or as an RPRINTER, there are several things to confirm:

- Have you tried repowering the M208 Wait about a minute before checking to see if it has logged in and attached to a queue.

- Is the network connector fastened tightly to the unit?

- When going through the setup steps, did you name the M208 **M_xxxxxx** where *xxxxxx* equals the last six digits of the Ethernet address? This is the default format of the unit's name whether it is acting as a PSERVER or as an RPRINTER.

Note This **M_xxxxxx** name must have six digits after the "_" so if necessary, pad out each byte with a zero (0).

- Has the M208's name been changed from its default of **M_xxxxxx** and if so, have you incorporated this new name into your setup?

- When setting the M208 up as a PSERVER, did you specify a destination on the M208 (e.g. d1prn) for the printer name and did you remember this name is *case sensitive*?

?

Note   M208 destinations are case sensitive so they will not be recognized if they are typed
incorrectly. By default, they are all in *lowercase*. If you are setting up in a NetWare 4
environment, the destination must be renamed to *uppercase* to match PCONSOLE's
entry. Please see *set dest* on page 107 for information on changing names.

- In a PSERVER setup, did you ensure that you were in bindery emulation mode? If
  you were, then did you do your entire print setup (i.e. queue, print server, printer)
  in this mode? It is important to create all print setup elements in this mode.

- Is there a password set for the M208 to utilize when it is logging in to the file
  server? Make sure the M208's PSERVER password matches that of the
  PCONSOLE's PSERVER setup or set both places to *no* password.

- Is there an entry when a **list rprinter** is done on the M208? When the M208 is
  configured as an RPRINTER, this command should produce the appropriate entry.
  Please see *Host Software* on page 63 for details on using the provided DOS host
  software, **npsh.exe**, to communicate with the unit in a Novell-only environment.

- Have you tried using the M208's **debug novell** command to see if it even
  recognizes any file servers on the network? You can use the DOS host software,
  npsh.exe, to communicate with the unit.

- If you look in CURRENT QUEUE STATUS within the PRINT QUEUE
  INFORMATION menu in PCONSOLE, can new servers attach to this queue?

- If you're configuring the M208 as an RPRINTER, have you setup the CONFIG
  file accordingly? Is SYS VOLUME correct for your particular environment or was
  it configured differently upon your Novell installation?

- If the M208 has logged in to the file server but has not attached to the queue, there
  may be a permission problem. Make sure the appropriate users have rights to this
  queue (they should be in the group "everyone.") Also, you may have to assign the
  queue to "root" so that is available to everyone.

If none of these help your situation, you may want to try the whole setup again. Com-
pletely delete the setup that is giving you trouble and go through the setup again fol-
lowing each step carefully.

Note   Be sure to reboot the M208 before beginning a new setup and after completing either a
PSERVER or RPRINTER setup. Wait at least a minute for the M208 to login and
attach to a queue.

Printing Related

? **The job goes to the queue but nothing prints**

If nothing is printing, make sure you have a connection to the M208 first. Please see *Communication Related* on page 163 if you are having connection-related problems. Otherwise, consider these points to solve any printing problems you may be having in your Novell environment:

- Does the job leave the queue or is it stuck there indefinitely? If it leaves properly, the problem points to the actual printing mechanism on your Novell system (i.e. CAPTURE, NPRINT, etc.), to the print job format, or to the printer itself. Otherwise, concentrate on the configuration steps you've taken on your system.

- Have you confirmed that you can print from the M208 to the printer ignoring the Novell setup altogether? Please see *start* on page 118 for a good test you can try.

- Is anything happening on the printer when the print job is sent? Sometimes, the print job may have gotten to the printer but just may need a manual formfeed. If this is the case, please see *set model* on page 110 for information on trailer strings.

- Is the printing mechanism you are using (i.e. CAPTURE, NPRINT, etc.) configured to service the appropriate queue?

- Is the M208 configured as the queue's **Currently Attached Server**? If not, make sure you have associated the queue and the printer. Please see *Host Configuration* on page 65.

- Is there a hold on the print job? If you select the job from PCONSOLE's CURRENT PRINT JOB ENTRIES, change the **User Hold** or **Operator Hold** to *no*.

- If you look in PCONSOLE's CURRENT QUEUE STATUS within the PRINT QUEUE INFORMATION menu, is the server configured to service entries in this queue? It is possible to turn servicing *off* here.

These are just a few things to confirm. If you are still having printing problems at this point, try rebooting the M208 and either go over every step you took in your configuration process, or try a new setup paying special attention to each step explained in *Host Configuration* on page 65.

? ───

? **The job prints but it comes out incorrectly**

This category really can be broken down into several sub-categories such as lost characters, garbled data, extra banner pages, or blank pages at the end of the job. However, the reason for these mishaps can generally be traced to the printing mechanism used on your Novell system. These points should be considered when configuring your print method (i.e. CAPTURE, NPRINT, etc.):

• Did you include the **No Tabs** option?

• Did you specify **No Banner** with PostScript printers?

• Did you turn off banner pages and formfeeds if this is already taken care of within an application or on the M208? Doubling up of these types of print features is easy to do since these options are provided both on the M208 (in a *model*) and within the print command.

• Are you running the latest version of PSERVER (later than 1.22)? If not, upgrade the PSERVER software.

• In a PSERVER setup, did you ensure that the printer name (e.g. d1prn) was set up as *"Defined Elsewhere"*?

• Is the timeout option in the CAPTURE command set high enough so the printer doesn't time out before the print processing has had a chance to complete? This can be a problem with graphic jobs.

Some other things to consider when garbled data persists are:

• tab expansion (**xtab**) set on (in a *model*) with graphic jobs,

• the right driver for the printer if printing from within Windows,

• cable used between the M208 and the printer,

• type of flow control being used on the M208 and a serial printer.

With other print methods, the only thing to remember here is to configure the print job for **Byte Stream**. This will pass the data to the M208 untouched.

For additional information on these suggestions or on various Novell printing mechanisms, please refer to your NetWare user manuals.

AppleTalk Problems

? The Laserwriter icon in the Chooser Menu doesn't display any printer destinations

In this situation, these things should be considered:

- Are you using EtherTalk rather than LocalTalk or TokenTalk?

- Is "EtherTalk" chosen in the **Control Panel's Network** icon?

- Have you checked the M208 and the Apple system's Ethernet connections?

- Have you configured the M208 to show up in the correct AppleTalk Zone. Please see *AppleTalk Zones* on page 76 for information on doing this.

Windows Problems

Windows NT 3.5x

? Queue hangs

Hanging print jobs or queues with Windows NT 3.5x usually means there's a problem at the host end. Most likely the printer and M208 are sitting on the network waiting for some form of activity but the host is not doing anything. This is very typical for any LPR printing with Windows NT 3.5 and is possible with NT 3.51 as well.

The first thing to check is that the printer is in fact ready to go, meaning it is willing to accept more data. The best way to do this is to the use the **lpstat** command found on the M208. In fact, this command's output will tell you where exactly the problem is. Therefore, you'll want to telnet into the unit when the hanging occurs and issue **lpstat**. Search under the appropriate I/O port you are printing to and see if you see any messages like:

- "printing data - blocked"

  If you see this message with the seconds to the right of the "blocked" message incrementing with every **lpstat** command you issue, then the printer is not allowing the M208 to pass data to it. This will hang the print queue because the M208 cannot take more data in its output buffer until the "blocked" message goes away (i.e. the printer sends the signal saying it's okay to send more data). Once the

printer is cleared of any error situation and the "blocked" message goes away, the print job should then go through and the queue should move along properly.

However, if the printer is in fact online and ready to print but you're still seeing "blocked" messages, there may be a problem with the communications between the M208's I/O port and the printer. Possibly the cable is faulty and the send signal isn't getting through to the M208 or maybe the printer and M208 aren't communicating properly. If this is the case, you need to look closely at the settings on both the printer's interface and the M208's I/O port interface. Another option is to try another printer to see if it works any better.

• "printing data - waiting"

Anytime you see this message, the M208 says it knows about the print connection but it is waiting for the host to send data. Currently the unit's buffer has some room in it for more data but the host is not co-operating. Therefore, you need to look to the host to see why it is hung up. Look for errors that might lead you in the right direction and definitely make sure the host can still see the M208 on the network using "ping" or "telnet".

This "waiting" message is very common when using NT's LPR client with NT version 3.5. Microsoft has a known bug that hangs up LPR printing periodically but this is supposed to be fixed with NT v3.51 according to Microsoft's online Knowledge Base.

? **Various other errors**

Printing in a Windows NT environment can produce various errors that do not always mean too much to the user at first glance. Some common ones are "Windows cannot write to this file." or "A network error has occurred."

In most cases, the errors are all related to the LPR bug with Microsoft NT 3.5. That or an error comes up because the M208 cannot take more data for some reason (i.e. the printer is in an error state). Windows has a real problem if it can't send all of the print job data right away so if it's blocked from sending data, its spool file builds and builds leading to an error like the ones mentioned. Be sure to check the **lpstat** output on the M208 to determine where the problem is and if it's host related, keep the LPR bug in mind.

Windows for Workgroups

? **Printer and Network Errors**

Anytime you have several Windows for Workgroups (WfW) stations printing directly to a M208, you may run into various printer and network errors. The problem occurs when one station is sending a print job to the printer and another station tries to send a print job to the same printer at the same time. The M208 tells the second station to hold on to its data until it has finished with the first job. However, the Print Manager on this second station doesn't like this and errors out. This requires that the user on the second station resubmit their job when the printer is clear again.

This problem will occur with any external M208 that does not spool entire print jobs (which is the case for every print server on the market today). The Print Manager likes to send the data it spools immediately and if it can't do this (because the printer is already busy with another job) it will produce an error saying the network or printer is busy.

The best solution to this problem is to then have a central spooling station (like an NT server) which allows each WfW station to spool the print job immediately to the serverls hard drive. The NT server then can sit with the print job until the print server/printer can take it. The M208 then only deals with one station and it goes through each job as it gets queued up.

Note   It is not possible to set up a WfW station as the central spooling device since you cannot share a printer on the network that is already being shared. It is because a "net use" connection is used between this central station and the print server that causes the problem. However, a central NT station can offer a shared network printer to these WfW stations.

☎ GETTING HELP WITH THE M208

Overview

This is an important chapter to read if you are in need of any assistance with the M208. It covers the procedures for obtaining technical support, upgrade packages, and general product information and software, and it explains Microplex's warranty policy.

Help Methods Available

Support and information regarding your Microplex product can be obtained via several methods:

- WWW site: **http://www.microplex.com/**,
- FTP site: **ftp.microplex.com**,
- Email: **info@microplex.com** or **support@microplex.com**,
- Tel: +1 604 444-4232 or +1 800 665-7798 (in North America),
- Fax: +1 604 444-4239.

These methods are described next.

WWW Site

Microplex's HTTP site contains information on the company as well as detailed information on the M208 including data sheets and technical bulletins. In addition, the latest software and manuals are always available.

Using whatever Web browser you have available, you need to get to the URL, **http://microplex.com/**.

FTP Site

The FTP site contains similar data to the HTTP site.

The site is located at **ftp.microplex.com** and once logged in as an "**anonymous**" user, change to the directory **/support** where you'll find various sub-directories

related to the different products and information available.

If you cannot access this site over the Internet, a 1-900 number is also provided. This is a dial-up line that goes directly to this FTP site. You can login "**anonymous**" and no password is required. The number is **1-900-468-7727**.

Note   A fee is charged for using this number.

Email

Two email addresses are provided if you want to contact Microplex. Please write to `info@microplex.com` if you have any general product questions or problems with the unit. Contact `support@microplex.com` if you need technical assistance but before doing so, please see *Technical Support* on page 172.

For specific service and support procedures, please see the following sub-sections.

Technical Support

Microplex offers technical support for any problems you may have with your M208. It is available through any of the methods mentioned in *Help Methods Available* on page 171.

If you decide to call Microplex, you may be placed in a call queue depending on the current support load. A support technician will get back to you as soon as one comes available.

Note   Email is usually the quickest option.

Requirements Before Contacting Technical Support

Before contacting Microplex for help, it is important that you:

• go through the troubleshooting suggestions described in *TROUBLESHOOTING THE M208* on page 159,

• delete your current print setup and try again.

If the printing problem still persists, please have this information on hand to speed up the technical support process:

- M208 firmware version (please see *list sysinfo* on page 101),

- M208 I/O port settings (please see *list com1*/*com2* on page 98 or *list prn* on page 100),

- host print setup including the host type and print method used,

- any special processing done on the host or on the Print Server,

- description of the problem including the troubleshooting steps you have tried.

Note   The more details you have for the support technician and the more prepared you are, the better.

Upgrade Procedure

The M208's upgrade procedure is simple due to its FLASH memory. ROMs do not need to be replaced on the Print Server but rather, the ROM code itself can be easily downloaded to the unit. The latest code can be obtained from any of the places mentioned in *Help Methods Available* on page 171.

There are three files that are required for the upgrade process:

1 **m208dl.hex.Z** is the FLASH upgrader,

2 **m208hex.Z** is the Print Server binary,

3 **download.txt** explains the upgrade procedure.

Note   Host software is also available for the various versions of firmware.

WWW Site

To get these from the WWW site, you need to:

1 Click on **Technical Support** on the home page.

2 Under the section "M208 Hub/Print Server", click on **Upgrading Firmware**.

3 Follow the instructions in Step 1 under "Start Here" and download **m208dl.hex** and **m208.hex**.

Note   To obtain the upgrade instructions, just print out the **Upgrading Flash Firmware** page. In addition, to get the latest host software, click on **Host Software** under the

section "M208 Hub/Print Server" on the **Technical Support** page.

If using the FTP site, you need to change to the directory
`/support/m208/rom` where these upgrade files exist. Enter into **binary** mode and
then **get** each file.

Change to `/support/m208/host/current` to get the latest host software. Once in
binary mode, **get** the file **m208npdist.tar.1.Z**.

Note   To be notified of any new releases, make sure you send in your **Warranty Registra-
tion/Customer Survey** card. This will keep you current on any new advancements.

Warranty

Microplex Systems Ltd. warrants this product to be free from defects in workmanship
and material for the duration of three (3) years from the time of the original purchase
date. During this period, Microplex will repair or replace a defective product with a
new or rebuilt product at no extra charge except as stipulated below.

At no time shall Microplex's liability exceed the replacement cost of the subject item.

All express and implied warranties for this product including all warranties of Mer-
chantability, Suitability, and Fitness for a particular application are limited to three (3)
years from the time of the original purchase date. In no event shall Microplex be liable
for Loss of Use, Loss of Profits or Revenues, or other Indirect, Incidental, or Conse-
quential Damages. This warranty does not imply the right to loaner or replacement
units during the time required to perform repairs.

To obtain service under this warranty, the defective product must be returned to
Microplex in packaging that will prevent damage from occurring while in transit. A
Return Merchandise Authorization (RMA) number must be obtained from Microplex
prior to shipping the product. This number should be clearly marked on a label affixed
to the outside of the package.

This warranty does not cover any losses or damage caused by:

• shipping,

• improper installation, use, or maintenance,

• unauthorized repair, modification, alteration, or replacement of components,

- excessive environmental conditions including electrical power surges, temperature, humidity, or any other irregularities,

- negligence or abuse.

Warranty Claim Procedure

Please use the following guidelines when shipping goods back for warranty claim:

- Get an RMA number and shipping instructions from Microplex using one of the methods mentioned in *Help Methods Available* on page 171.

- Indicate the RMA number clearly on the address label of the shipping carton.

- Include a copy of the invoice/receipt.

- Package the product securely, in original packaging if possible, to prevent damage during shipping.

- Ship **ONLY BY FEDERAL EXPRESS**, insured and collect.

Note   Using any other shipping company may result in charges to your company. Microplex will pre-pay the return shipping charges with Federal Express.

- If you ship from a country other than Canada, type (on any paper) a commercial invoice containing the following information:

- your address,

- Microplex's address (as *consignee*),

- country of origin of the product (i.e. Canada),

- number of packages in the shipment,

- description of the product,

- quantity,

- total value of shipment (your total purchase price),

- reason for return (e.g. warranty repair),

- a declaration.

This invoice must accompany the returned product to meet Canadian customs require-ments. Please see *Sample Commercial Invoice* on page 176.

Figure 6:   **Sample Commercial Invoice**

COMMERCIAL INVOICE from
Leslie Smith
ABC Corporation
1234 Western Parkway
Anycity, NC
USA, 27511

DATE OF EXPORT: *02/12/95*   **AIR WAYBILL NO.**: *123-12341234*

CONSIGNEE: **IMPORTER (IF OTHER THAN CONSIGNEE)**

Microplex Systems Ltd.
8525 Commerce Court   *same as consignee*
Burnaby, B.C.
V5A 4N3, CANADA

COUNTRY OF ORIGIN: *Canada*

 # OF
PKGS   **COMPLETE DESCRIPTION OF GOODS**   **QTY**   **TOTAL VALUE**

1   *Print Server*   *1*   *$xxx.xx*

REASON FOR RETURN: warranty repair

I declare all information contained in this invoice to be true and correct.

                                          Leslie Smith   *02/12/95*

SIGNATURE   **NAME AND TITLE**   **DATE**

M208 SPECIFICATIONS

Variable Definitions

list default var

Name	Hexadecimal	Description
BS	08	backspace
FF	0C	formfeed
CR	0D	carriage return
SP	20	space
LF	0A	linefeed
TAB	09	tab
ESC	1B	escape
DEL	7F	delete
EOT	04	end of transmission
NUL	00	NULL character
PCL-POP	1B 26 6C 30 4F	portrait page orientation
PCL-POL	1B 26 6C 31 4F	landscape page orientation
PCL-PORP	1B 26 6C 32 4F	reverse portrait page orientation
PCL-PORL	1B 26 6C 33 4F	reverse landscape page orientation
PCL-PSZ1	1B 26 6C 31 41	executive page size
PCL-PSZ2	1B 26 6C 32 41	letter page size
PCL-PSZ3	1B 26 6C 33 41	legal page size
PCL-PSZ4	1B 26 6C 32 36 41	A4 page size
PCL-PSRC0	1B 26 6C 30 48	eject page paper source
PCL-PSRC1	1B 26 6C 31 48	upper tray paper source
PCL-PSRC2	1B 26 6C 32 48	manual feed paper source

Name	Hexadecimal	Description
PCL-PSRC3	1B 26 6C 33 48	manual envelope feed paper source
PCL-PSRC4	1B 26 6C 34 48	lower tray paper source
PCL-PSRC6	1B 26 6C 36 48	envelope feeder paper source
PCL-PDST1	1B 26 6C 31 47	upper output bin paper destination
PCL-PDST2	1B 26 6C 32 47	reader output bin paper destination
PCL-RST	1B 45	printer reset
PCL-JSEP	1B 26 6C 31 54	job separation
HP3-SWPCL	1B 25 2D 31 32 33 34 35 58 40 50 4A 4C 20 45 4E 54 45 52 20 4C 41 4E 47 55 41 47 45 20 3D 20 50 43 4C 0A	PCL-5 PJL command to switch printer into PCL Language mode
HP3-SWPS	1B 25 2D 31 32 33 34 35 58 40 50 4A 4C 20 45 4E 54 45 52 20 4C 41 4E 47 55 41 47 45 20 3D 20 50 6F 73 74 53 63 72 69 70 74 0A	PCL-5 PJL command to switch printer into PostScript Language mode
PAC-SWPCL	1B 26 6C 31 30 35 37 2E 33 32 32 35 39 4A	PacificPage PE cartridge command to switch printer into PCL Language mode
PAC-SWPS	1B 26 6C 35 30 35 37 2E 31 30 35 38 4A	PacificPage PE cartridge command to switch printer into PostScript Language mode

Hardware Specifications

Network Interfaces

Provides compatibility with TCP/ICMP/IP and 802.3 Ethernet protocols.

UTP   IEEE 802.3 10Base-T UTP Ethernet female RJ45 connector

THICK Ethernet   IEEE 802.3 10BASE5 Thick-wire Ethernet female DA15 AUI connector through Transceiver/Tap.

Table 4:   UTP (RJ45) Connector Pinout

Pin	Signal	Source	Pin	Signal	Source
1	Transmit+	M208	5	none	none
2	Transmit-	M208	6	Receive-	Network
3	Receive+	Network	7	none	none
4	none	none	8	none	none

Transceiver Pinout
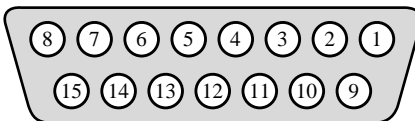
Table 5:   THICK (Transceiver) Connector Pinouts

Pin	Signal	Pin	Signal
1	Gnd	9	Collision-
2	Collision+	10	Transmit-
3	Transmit+	11	Gnd
4	Gnd	12	Receive-
5	Receive+	13	Power
6	Power Return	14	Gnd
7	N.C.	15	N.C.
8	Gnd		

Printer Support

Parallel Ports (PRN)   IBM PC compatible parallel interface (Centronics). IEEE 1284-I compliant.

Female DB25 connectors.

DMA-driven state-machine implementation supports data rates in excess of 280,000 characters per second.

Figure 7:   Parallel Port Timing
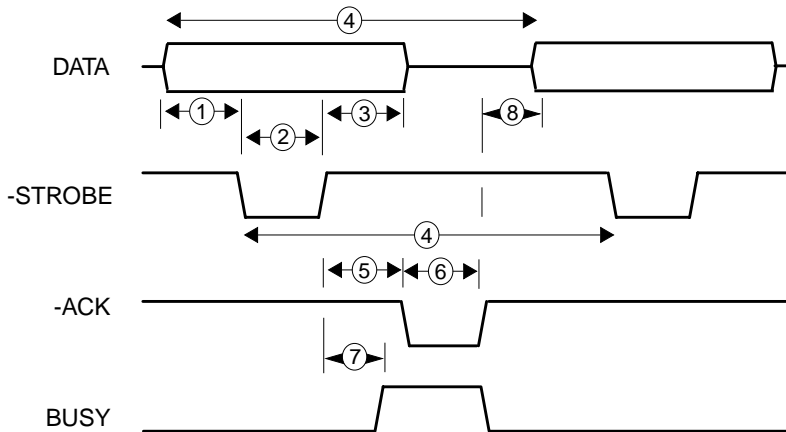
Table 6:   Parallel Port Timing

#	Characteristic	Fastmode (μS)			Normal (μS)			Slowmode (μS)			vSlowmode (μS)		
		min	max	typ	min	max	typ				min	max	typ
1	Data Setup			0.5			2.0			8.0			16.0
2	$\overline{\text{Strobe}}$ Width			0.5			2.0			8.0			16.0
3	Data Hold			0.5			2.0			8.0			16.0
4	Cycle Time	2.0	3.0	2.5	8.0	9.0	8.5	32.0	33.0	32.5	64	65	64.5
8	Peripheral Ready to Start of Next Byte	-0.5	1.0		-2.0	4.0		-8	16		-16	32	
Independent of Mode (Dependant on Peripheral)													
5	$\overline{\text{Strobe}}$ Negated to $\overline{\text{Ack}}$ Asserted				0.0								
6	$\overline{\text{Ack}}$ Cycle Width				2.5								
7	$\overline{\text{Strobe}}$ Negated to Busy Asserted				0.0								
Transfer Rate													
	Characters Per Second (kcps)		280 +			125 +			30			15	

Parallel Port Pinout
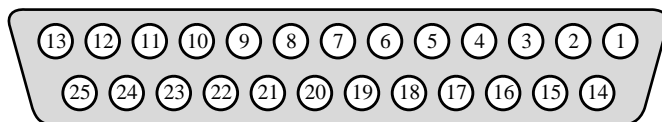
Table 7: PRN Pinout

Pin	Signal	Source	Pin	Signal	Source
1	-STROBE	M208	10	-ACK	PRINTER
2	DATA 1	M208	11	BUSY	PRINTER
3	DATA 2	M208	12	PE	PRINTER
4	DATA 3	M208	13	SLCT	PRINTER
5	DATA 4	M208	14	-AUTOFD	M208
6	DATA 5	M208	15	-ERROR	PRINTER
7	DATA 6	M208	16	-INIT	M208
8	DATA 7	M208	17	-SLCTIN	M208
9	DATA 8	M208	18-25	GROUND	-

Serial Ports (COM1, COM2)   Dual bi-directional IBM AT compatible serial interfaces, male DE09 connectors.

Data rates supported: 50 to 38,400 bps.

Serial Port Pinouts   The M208 acts as a DTE with this 9-pin pinout.
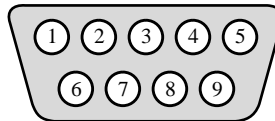
Table 8:   9-Pin COM1/COM2 Pinout

Pin	Abbr.	Name	Source	EIA	CCITT
1	DCD	Data Carrier Detect	DCE	CF	109
2	RXD	Receive Data	DCE	BB	104
3	TXD	Transmit Data	DTE	BA	103
4	DTR	Data Terminal Ready	DTE	CD	108.2
5	GND	Signal Ground	-	AB	102
6	DSR	Data Set Ready	DCE	CC	107
7	RTS	Request To Send	DTE	CA	105
8	CTS	Clear To Send	DCE	CB	106
9	+12V	12V PWR Supply	DTE	N/A	N/A

Most often printers are attached are 25-pin DTE's with the following pinout:

Table 9:   25-Pin Serial Device Pinout

Pin	Abbr.	Name	Source	EIA	CCITT
2	TXD	Transmit Data	DTE	BA	103
3	RXD	Receive Data	DCE	BB	104
4	RTS	Request To Send	DTE	CA	105
5	CTS	Clear To Send	DTE	CB	106
6	DSR	Data Set Ready	DCE	CC	107
7	GND	Signal Ground	-	AB	102
8	DCD	Data Carrier Detect	DCE	CF	109
20	DTR	Data Terminal Ready	DTE	CD	108.2
22	RI	Ring Indicator	DCE	CE	125

Flow Control Methods

The M208's serial ports support both software and hardware flow control.

Software: XON/XOFF (default setting)

Hardware: RTS/CTS

Minimal cable requirements for software flow control are pins 2, 3, and 7. This may not be as robust as hardware flow control so a fuller cable pinout is recommended providing either flow control method.

Note

To find out what is being used on the M208's serial ports, use the npsh command **list com1|com2**. This will show either "ixon" for software flow control or "cts flow" for hardware flow control. Use the npsh command **set com1|com2** to change these settings.

Note

It is important that the settings on the M208's serial ports are the same as on the printer's serial interface.

Serial Cable Schematic

The schematic below shows the most common 9-pin to 25-pin setup. This setup relies on the DTR signal meaning that the printer must toggle DTR if it can or cannot take more data. If the printer uses another signal to do this, this schematic will not work. The key to hardware flow control working then is to know what signal the printer toggles when it is able to take more data and once you know this, you can make this signal go to the CTS pin (Pin 8) on the M208's serial interface.

Typical 9-pin to 25-pin RS-232C cable
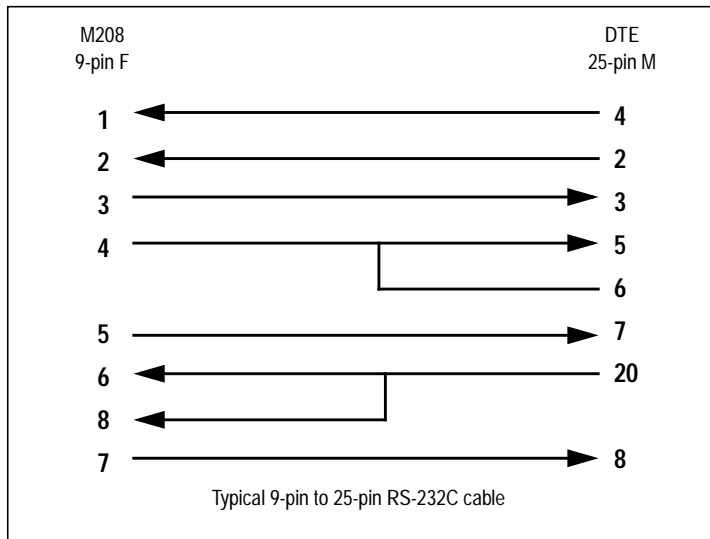
Note

Sometimes devices are attached to the M208's serial ports that have 9-pin connectors (e.g. a PC attached to the serial port for configuration purposes). When choosing the correct 9-pin to 9-pin cable for this, the key pins are 2 and 3 on both ends which must relate to transmit and receive. Transmit on one side must always go to receive on the other and vice versa or else there will be no communications between the two devices.

186   **M208 SPECIFICATIONS: Hardware Specifications**

Electrical Details

External Transformer Power Requirements	**Typical**	115VAC +/- 10% 0.1 A, 60Hz 220VAC +/- 10% 0.05 A, 50/60Hz
	Maximum	115VAC +/- 10% 0.2 A, 60Hz 220VAC +/- 10% 0.1 A, 50/60Hz.

Low Voltage AC Power Requirements	**Typical**	16V AC +/- 10%, 600mA (no AUI)
	Maximum	16V AC +/- 10%, 1200mA (w/AUI)

Customer-supplied external transformers must be rated at 20 VA or greater for proper operation.

Power Supply Options   External transformer available in 120V/60Hz or 220 - 240V/50Hz.

Power Socket

AC in 16V

AC +   6 4 ———   5 3   AC -

2 1
Ground Return
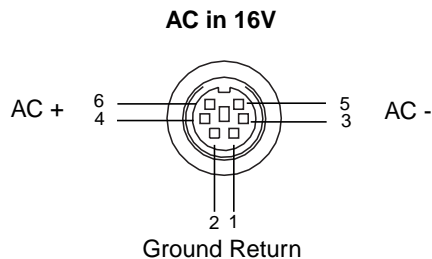
M208 Print Server LED's

LED Indicators

PWR	Power supply.
STAT	System status.
ERR	System error.
NET	Data to network.

Table 10: LED Patterns

STAT	ERR	NET	Mode	STAT	ERR	NET	Mode
ON	ON	ON	PIA/CPU Test	FLASH	OFF	-	Run Mode
ON	OFF	ON	RAM Test	FLASH	ON	-	Auto-Reset Mode
ON	OFF	OFF	ROM Test	OFF	FLASH	ON	License Violation
ON	ON	OFF	EEPROM Test	FLASH	FLASH	OFF	Firmware Panic
OFF	ON	OFF	COM1/COM2 Test	OFF	FLASH	OFF	Watchdog Alarm
OFF	ON	ON	Network Interface Test	ON	FLASH	OFF	Spurious Interrupt
OFF	OFF	ON	PRN Test	ON	FLASH	ON	Hardware Exception

Power-on Self Test   The seven-stage power-on self test performs diagnostics on the processor, RAM, ROM, EEPROM, serial ports, parallel port, and network interface. The STAT, ERR, and NET LEDs indicate which test is currently in progress.

Run and Auto-Reset Modes   Run Mode is the normal operating state of the M208. Auto-Reset mode is entered when the watchdog timer is triggered and the Print Server has reset itself. In either mode, the STAT LED flashes differently depending on whether the unit's IP address is configured and COM1 monitor is active**.**

Table 11:   Run and Auto-Reset Mode Description

STAT	Rate	Indicates
Flashes On	once per second	Normal Mode, IP address configured
Flashes On	2.5 times per second	Monitor Mode, IP address not configured
Flashes Off	once per second	Normal Mode, IP address configured
Flashes Off	2.5 times per second	Monitor or Download Mode, IP address not configured
Flashes off	once per 2 seconds	Download Mode, IP address configured

License Violation   An invalid license mask and key forces the M208 into license-violation mode after **three minutes** of operation. The mask and key settings are printed on the serial number label at the time of shipment.

Firmware Panic   Unrecoverable errors detected by the M208 firmware force the Print Server into Firmware Panic mode. Manually reset the M208 to resume normal operation.

Watchdog Halt   The watchdog timer is a hardware device that resets the system if not serviced regularly by the CPU. The purpose of the watchdog is to prevent the CPU from entering an infinite loop because of some hardware or firmware problem. After a watchdog interrupt, some diagnostic information is saved for debugging and the M208 resumes operation in Auto-Reset Mode. The M208 will auto-reset up to 16 times before entering non-operational Watchdog Halt.

Spurious Interrupt   Unsupported interrupts force the M208 into this non-operational mode and typically indicate a hardware problem.

Hardware Exception   Bus errors, address errors, and illegal instructions force the M208 into this non-operational mode.

Physical Details

Dimensions	Metric	27 cm W x 3.4 cm H x 19 cm D
	Imperial	10.8" W x 1.3" H x 7.6" D
Weight	With external transformer	1.7 kg, 3.7 lbs
	Without external transformer	1 kg, 2.2 lbs

Environmental Details

Operating $\quad$ 0° C to 50° C

Storage $\quad$ -40° C to 70° C

95% maximum humidity, non-condensing.

Software Specifications

Table 12:   TCP/IP Port Numbers

#	Description	#	Description
20	TCP Protocol for FTPD (data)	21	TCP Protocol for FTPD (control)
23	TCP Protocol TELNETD port	68	BOOTP Client port
161	UDP port for SNMP	515	TCP Protocol BSD 4.3 LPD port
514	TCP Protocol Remote command daemon port	4000	TCP Protocol COM1 port
4010	TCP Protocol COM1 port for logging	4200	TCP Protocol COM2 port
4210	TCP Protocol COM2 port for logging	4400	TCP Protocol PRN1 port
4410	TCP Protocol PRN1 port for logging	4600	TCP Protocol PRN2 port
4610	TCP Protocol PRN2 port for logging	514	UDP SYSLOG client support

Client application software can send raw data to COM1, COM2, and PRN by opening a socket to the associated TCP port number. Such connections are queued along with LPD and **rsh/rcmd/remsh** print jobs so that applications must close the socket to permit subsequent jobs that are queued to print by other methods.

Note   There can be 256 simultaneous TCP connections depending on the current memory available. 10 simultaneous TELNET connections are possible.

Standards Supported

ARC (Ethernet Address Control Protocol)

ARP (Address Resolution Protocol)

BOOTP (Bootstrap Protocol)

ICMP (Internet Address Resolution Protocol)

IEEE 802.3 10Base-T UTP Ethernet

IEEE 802.3 10Base5 Thick-cable Ethernet

GOSIP RFC-1042 (Government Open Systems Interconnection Profile)

IP (Internet Protocol)

IPX (Internetwork Packet Exchange)

LPD (Line Printer Daemon Protocol)

NetBIOS/SMB (Network Basic Input Output System/Server Message Block)

PAP (Printer Access Protocol)

PSERVER, /RPRINTER, NPRINTER

RARP (Reverse Address Resolution Protocol)

RFC-1001 (NetBIOS over TCP/IP)

RSHD (Remote Command Execution Protocol)

SMTP (Simple Mail Transfer Protocol)

SNMP (Simple Network Management Protocol)

TCP (Transmission Control Protocol)

TELNET (Telnet Protocol)

UDP (User Datagram Protocol).

📕 GLOSSARY

a2ps	ASCII to PostScript translation program.
ARP	Address Resolution Protocol.
AUI	Attachment Unit Interface. An IEEE term for the connection between a controller and a transceiver.
autosensing printer	Printer that automatically switches between PostScript (PS) and HP Print Control Language (PCL), depending on the type of print job.
backbone	The primary connectivity mechanism of a hierarchical distributed system. All systems that have connectivity to an intermediate system on the backbone are assured of connectivity to each other.
backchannel	Device for reverse-direction communication from the peripheral, providing printer status information such as PostScript page counting.
banner page	A page printed before the print job including details about that job.
bps	Bits per second.
centralized spooling	Sending all print jobs to a central host for storage until a printer becomes available.
checksum	16-bit value to confirm integrity of the data printed.
Chooser	Feature within the Macintosh's operating system that controls system devices.
collision	The event occurring when two or more nodes contend for the network at the same time. This is usually caused by the time delay that the signal requires to travel the length of the network.
collision Domain	A single CSMA/CD network in which there will be a collision of two computer attached to the system when both transmit at the same time.
configuration (CONFIG) file	File that the M208 reads upon bootup in a Novell environment. This file contains **npsh** commands which the Print Server executes as if they were entered on the unit itself. This file is neces-

sary if the M208 is configured as an RPRINTER but optional otherwise.

cps	Characters per second.
CR	Carriage return.
CSMA/CD	Carrier Sense Multiple Access / Collision Detect. A network arbitration scheme used on Ethernet. A station with a message to send starts sending if there is no carrier detected on the transmission medium. If a collision occurs, transmission is abandoned and retried after a delay.
daemon	A continuously running process that handles system-wide functions, such as network administration or line printer spooling and is not associated with a user.
DCE	Data Communications Equipment.
default router	A device on a communications network that assists message delivery. On a single network linking many computers through a mesh of possible connections, a router receives transmitted messages and forwards them to their correct destinations over the best available route. On an interconnected set of local area networks (LANs) using the same communications protocols, a router acts as a link between LANs, so messages can be sent between them.
destination	Conceptual destination (similar to a *logical queue*) within the M208 firmware that defines the print job and directs it to a specific I/O port.

Note On the host, any number of print destinations can be defined. These are not the same as M208 destinations.

DMA	Direct Memory Access. A high-speed technique for moving data into and out of memory.
domain	A group of computers administered together.
domain name server (DNS)	Host providing responses to queries for a given IP name's IP address.
DTE	Data Terminal Equipment. A device connected to an Ethernet network.

EEPROM	Electrically-Erasable, Programmable Read-Only Memory. Preserves data after power is removed.
Ethernet	A type of network cabling and signalling specification developed in the last 1970's. This standard was later enhanced and, in 1985, Ethernet II was released.
ezsetup	Quick and easy installation script that runs on a TCP/IP host and configures both the M208 and a host for printing.
FCC	Federal Communications Commission of the United States of America.
FF	Formfeed.
FLASH memory	Allows for upgrade without replacing ROMs inside the Print Server.
FTP Daemon	File Transfer Protocol Daemon for uploading/downloading files in TCP/IP.
GOSIP	Government Open Systems Interconnection Profile. A U.S. government document allowing new networks to use OSI protocols.
header strings	Strings that precede print jobs used to control the printer and set printing options.
host	A computer attached to a network. Location of print job origin.
hub	Hubs (or multi-port repeaters) are stable network devices that provide connectivity between DTE's. Hubs perform the basic functions of restoring signal amplitude and timing, collision detection and notification, and signal broadcast to lower-level hubs and DTE's.
ifnum	Interface number. An index to a Network Interface Tap (**NIT**). *ifnum* will always be **1** for the M208 since there is only one network interface, Ethernet.
interface file	Host filter that processes the print job before it is sent to the M208.
IP Router	IP routers allow computers connected to two or more separate networks to communicate with each other. IP routers forward data packets that do not belong on the local network.

Jabber	The condition when a transceiver's carrier sense electronics malfunctions, and the transceiver broadcasts in excess of the specified 150ms range time limit and creates an oversized frame. Usually caused by a faulty network interface card in a device on the network.
Jam	A short encoded sequence emitted by a transmitting node overriding other colliding packet signals. It is the method by which Ethernet indicates to all network nodes that a collision occurred.
kbps	Kilobytes per second.
LAN	Local Area Network. A data communications network which is geographically limited (typically to a 1 km radius) allowing easy interconnection of terminals, microprocessors and computers within adjacent buildings. Ethernet and FDDI are examples of standard LANs.
late events	A late event (or late collision) occurs when two devices transmit at the same time, but due to cabling errors, neither detects a collision.
link integrity signal	A test signal that informs a hub of the presence of a DTE connect to it over a twisted-pair cable and of the integrity of that link.
LF to CLRF mapping	Linefeed to carriage return-linefeed conversion.
load-balancing	Balancing print jobs between more than one printer so each printer is kept busy.
logpath	Logging path. Format and location for printer logging information.
LPD	Line printer daemon. A program used for printing on BSD systems.
MIB	Management Information Base. A set of variables (database) that can be accessed via a network management protocol.
model	Specifies a destination's characteristics. Each model includes one or more settings that act as mini-filters for each job passing through the associated destination.
NetBIOS	Network Basic Input Output System. Standard interface to PC networks.

netmask	A binary value used to sub-network IP inter-networks.
netname	An IP name.
Sun NeWSprint	SunPics (SUN) system for open network printing.
NIT	Network Interface Tap. A module that serves as a generic interface between the data link protocol layer (i.e. Ethernet or Token Ring) and higher network protocol layers. Each NIT is indexed by an interface number (***ifnum***).
npd	NetPrint Daemon. Daemon for handling bi-directional TCP/IP printing requirements.
npconfig	NetPrint setup and configuration. An in-depth management utility allowing you to install, monitor, change, and troubleshoot the M208.
npscramble	NetPrint scramble. A program that scrambles print job data before sending it over a TCP/IP network to the M208 where it is descrambled and printed.
npsh	Command shell on the M208 used for parameter configuration and display and for print job monitoring and troubleshooting.
npwrite	NetPrint write. A program to send data directly from a UNIX host to an M208.
onlcr	A filtering program that adds carriage returns to all solitary line-feeds.
output processing	On the M208, this refers to carriage return insertion **(onlcr)**, tab expansion **(xtab)** settings, and print job descrambling. Referred to as "opost" in the model.
papname	Printer Access Protocol (PAP) name. An AppleTalk name for each printer defined on the host. Makes up the second half of the name which appears in the Chooser. There can be a maximum of four printers which are transparently mapped to any one of six destinations on the M208.
parity	The quality of *even* or *odd* for a quantity. Mechanism for checking integrity of a data byte. Usually used in serial communications.

PDV	Path Delay Value. The maximum time between the first bit and the last bit of the overlapping transmission of the two DTEs colliding across a path.
Physical Media	The physical cabling used to connect two computers. Some examples include fiber optic, coax, and twisted pair.
ping	Command to test an IP connection.
pio file	AIX spooling system configuration file.
PPP	Point-to-Point Protocol. The successor to SLIP, PPP provides router-to-router and host-to-network connections over synchronous and asynchronous circuits.
pseudo-tty	A UNIX facility for accessing network resources through standard UNIX *device* interfaces.
RARP	Reverse Address Resolution Protocol. A mechanism for a network device to discover its address dynamically when it boots.
rarpd daemon	Server that responds to requests for address discovery.
repeater	See Hub.
RFC	Request For Comment. A set of documents that specify the Internet protocols and provide other relevant information about the Internet.
router	A device that forwards Internet Protocol (IP) packets to their destination.
rsh/rcmd/remsh	Executes a command on a different host.
Runt Frame	An Ethernet frame that is too short. A runt frame has fewer than the 60 bytes in the data fields required. If the frame length is less than 53 bytes, a runt frame indicates a normal collision. A frame less than 60 bytes, but at least 53 bytes, indicates a late collision. Runt frames are usually the result of a collision, a faulty device on the network, or software gone awry.
SLIP	Serial Line IP. A protocol used to connect two internet hosts using a serial line.
SMIT program	AIX device administration program.
SNMP	Simple Network Management Protocol. A standard protocol used

	to monitor IP gateways, hosts, and the networks to which they attach.
spooling	Storing data in memory or in a file until it can be printed.
SQE	Signal Quality Error. A test signal generated by Ethernet transceiver to test the electronics and the collision handling of the DTE and the transceiver.
switchable	Capable of printing both PCL and PostScript files. The M208 attaches a header and trailer string to a print job to switch printer modes.
SYSLOGD	System Message Logger. Collects messages sent from system processes and routes them to a common destination.
tab expansion	Expanding a tab character in the data to its required width in spaces (**xtab**).
tar	Command for archiving data onto a permanent storage medium.
TCP	Transmission Control Protocol used for reliable end-to-end communication over an IP connection.
TCP/IP	Name given to the suite of protocols (including but not limited to TCP and IP) that govern the transmission and services of a network.
TCP port	A logical connection point in the software on a TCP/IP host.
TELNET	Command and protocol to establish a terminal connection to a remote host over a TCP/IP network.
TranScript	Printing system developed by Adobe to facilitate printing of PostScript documents. Referred to as Adobe TranScript.
trailer strings	Strings that follow print jobs used to control the printer and set printing options.
transceiver	Transmitter-receiver. The physical device that connects a host interface to a local area network, such as Ethernet. Ethernet transceivers contain electronics that apply signals to the cable and sense collisions.

⬚ APPENDIX A

Planning Your Print Setup

In this appendix, you will find information that will help you with your print setup including the advantages and disadvantages of your various configuration options.
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Table 13:   Configuration Considerations

Setting	Advantages	Disadvantages
Port Used:		
Parallel ports	High speed and IEEE 1284-I compliant.	Need bi-directional printer if using 1284-I capabilities.
Serial ports	Bi-directional. Allows connection of alternate device, such as modem.	Lower throughput than parallel.
TCP/IP Print Methods:		
lpd communications	Print without an interface file. No host software required and easy setup.	Not available on all UNIX systems. Output processing must be done on the Print Server, not on the host.
rsh/rcmd/remsh communications	Available on most UNIX systems. Allows for processing on the host to improve unit's performance.	Requires an interface file on a BSD system (System V hosts need one anyways).
npd communications	Allows bi-directional communication. Uses standard UNIX device interface.	Requires host software. **npd** may have to be compiled for your system.
Novell Print Methods:		
PSERVER	Faster print process. Replaces a dedicated workstation or frees up file server resources.	Takes up a NetWare user license. Requires bindery emulation if using NetWare 4.

Table 13: Configuration Considerations

Setting	Advantages	Disadvantages
RPRINTER	Doesn't take up a NetWare user license.	A non-M208 print server (PSERVER) must be running.
Processing Location:		
Output processing performed on host	Increases M208 throughput.	Increases overhead on host system and requires host software.
Output processing performed on M208	Interface files optional and no host software required.	Decreases M208 throughput.
Optional Processing:		
Backchannel	Access to printer status and can be used with applications that do page counting.	Requires use of a serial I/O port. Decreases throughput.
Banner page	Job identification at printer output.	Decreases throughput. Requires an extra page to be printed.
Tab expansion (**xtab**)	Flexible tab widths.	Decreases throughput.
Carriage return insertion (**onlcr**)	Adds carriage returns to solitary linefeeds. Eliminates stair-stepping on ASCII printers.	Decreases throughput.
ASCII to PostScript conversion (**a2ps**)	Autosenses print job type and converts ASCII files for printing on PostScript printers.	Decreases throughput.
Switchable printer control	Use one printer for both PCL and PostScript jobs.	Requires header and trailer strings to manually switch printer between modes.

Table 13:   Configuration Considerations

Setting	Advantages	Disadvantages
Load-balancing	Print job goes to first available printer rather than waiting for a busy one.	May print on a printer that's not compatible with the print job format.
Descrambling	Some print job security as data travels over the network.	Requires binary on host system and lowers throughput.

APPENDIX B

Repeater Specifications

In this appendix, you will find information related to the repeater specification of the hub component of the M208.

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Table 14: Data and Collision Propagation Delays

Parameter	Min (ns)	Max (ns)
Data Propagation Delays		
Data on AUI to data out on any TP port	190	370
Data on any TP port to data out on AUI	340	520
Data on any TP port to data out on any TP port	340	520
Collision Propagation Delays		
AUI CI active to Jam sequence on AUI	290	470
AUI CI active to Jam sequence on any TP port	290	470
TP RX active to Jam sequence on AUI	340	520
TP RX active to Jam sequence on any TP port	340	520
Preamble		
Input	Maximum of 32 bits including SFD	
Output	64 bits including SFD (last 2 bits are 1,1)	

.

Table 15:   AUI Interface (IEEE 802.3 Compliant)

Parameter	Typical	Range
Signalling Rate	10 Mb/s	5 to 10 Mb/s
DO Output Voltage	900 mV	62 to 1100 mV
DO Common Mode	2.5 V	520
Output Voltage Threshold Level		160 to 275 mV
AUI Cable Length		50 m

Table 16:   UTP Interface (IEEE 802.2 10Base-T Compliant)

Parameter	Typical	Range
Transmitter		
Peak Differential Signal Amp.	2.5 V	2.2 to 2.8 V
Transmitter Jitter	3.5 ns	
Harmonics Content		>27 dB below fund.
Common Mode Output Voltage		<50 mV
Silence Voltage	0	40 mV
Link Test Pulse	100 ns	60 to 130 ns
Output Impedance	80 Ohm	
UTP Length		100 m
Receiver		
Receiver Threshold	-400 mV	-300 to -520 mV
Input Impedance	10 kOhm	

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