INTERCON-PRINTSERVER
USER MANUAL II

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Contents

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This manual was written with the best care possible. Nonetheless SEH Computertechnik GmbH assumes no liability for any damage which may occur on parts of the network caused by incorrect instructions or details given in this manual. If you detect any mistakes, please contact us.

4. Release April 1998

Conventions

The following conventions are used:

Italic	all previous actions.
`COURIER`	texts on the screen or printer, or program names.
`COURIER BOLD`	stands for all user input actions.
Bold	screen menu selections.
✔	**This point contains important information which you should heed.**
✘	**Failure to observe a point marked with "✘" could lead to a malfunction of the print server.**

1 Overview of InterCon Versions

This manual was written for the following print server versions:

IC53-ETHER-KYO
IC53-ETHER-KYO-5
IC53-ETHER-KYO-FL
IC60-TOKEN-KYO
IC73-FAST-KYO-TX

IC55-ETHERPOCKET
IC55-ETHERPOCKET-FL

IC57-ETHER-EPSON
IC77-FAST-EPSON-TX

IC59-ETHER-KYO2
IC59-ETHER-KYO2-FL
IC69-TOKEN-KYO2
IC79-FAST-KYO2-TX

The following operating systems and protocols are supported:

Novell:

Supported Operating Systems (Network Protocol: IPX)

- Novell NetWare 3.x
- Novell NetWare 4.x (Bindery and NDS mode)

Supported Operating Systems (Network Protocol: SPX)

- Novell NetWare 3.x (RPRINTER)
- Novell NetWare 4.x (NPRINTER)

Protocol Frame Types:

- Ethernet II / IEEE 802.2 / IEEE 802.3 / SNAP
- Token Ring

UNIX:

Supported Operating Systems (Network Protocol: TCP/IP)

- BSD UNIX systems (for example SunOS, Ultrix, etc.)
- System V UNIX systems (for example SCO, HP-UX, Interactive)
- AIX UNIX systems (IBM RS6000, etc.)
- BS2000 (RSO Spool V. 2.3A, V. 3.0)

Supported Protocols:

- BOOTP
- RARP, ARP
- IP, ICMP
- UDP, TCP
- FTP (File Transfer Protocol)
- LPD (Line Printer Daemon Protocol)
- TFTP (Trivial File Transfer Protocol)

Supplied printerscripts for spooling systems (BSD, System V and AIX)

APPLE:

Supported Operating System (Network Protocol: AppleTalk/EtherTalk)

- Version 7

Microsoft Windows:

Supported Operating System (Network Protocol: TCP/IP)

- Windows 95
- Windows NT 3.51
- Windows NT 4.0

Windows95 is supported via SEH PrintMonitor program.

IBM OS2:

Supported Operating System (Network Protocol: TCP/IP)

- Warp Connect Version 3

SMNP:

Supported Operating System (Network Protocol: TCP/IP and IPX)

- MIB II
- SEH Private MIB

HTTP/HTML:

Supported Operating System (Network Protocol: TCP/IP)

- Configuration of print servers via Internet Browsers

DHCP

Supported Operating System (Network Protocol: TCP/IP)

- Configuration of TCP/IP parameters

2 General

All print servers run multiple protocols simultaneously in mixed networks. Supported protocols include IPX, IP, Ether/TokenTalk, SNMP and HTTP/HTML. All protocols work simultaneously, allowing the network printers located in mixed environments (UNIX, Novell, APPLE and OS/2) to make contact with the print server.

2.1 Functional Overview

Under Novell the print server is installed with the help of the PCONSOLE program as a Novell print server. By attaching a print queue to this print server, all print jobs in this queue will be sent to the print server.

Under TCP/IP the print server is installed as an independent host. A printer connected to the print server may be installed either as a *local* printer using the FTP protocol for transferring data, or as a network printer by using the Line Printer Daemon Protocol (LPD). All shellscripts for installing a *local* printer under UNIX System V, BSD and AIX are included in the software. They will be installed as printer interfaces and will then transfer all data to your print server.
You can install the print server as a Remote Printer by using the Line Printer Daemon Protocol (LPD) or print directly via TCP ports.

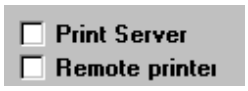
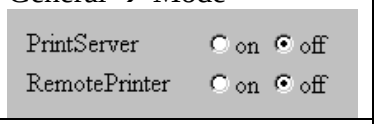
When using Apple EtherTalk, the print server mounts the connected printer in a network to the workstation used by the host.

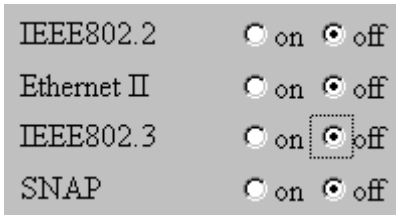
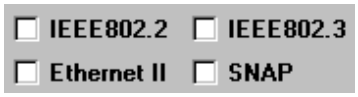
Via FTP, Administration Tool, SNMP or Internet Browser you can edit all parameters necessary for operating the print server under Novell, TCP/IP and EtherTalk.

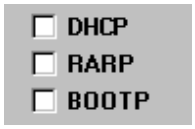
2.2 How to Switch off Selected Protocols

The print server frequently sends data telegrams to the network using multiple protocols. To minimise this network traffic you can switch off the print server protocols.

You can deactivate the protocols under Windows (IPX protocol) by using the Administration Tool. Under TCP/IP you can edit the configuration file named `params` which can be loaded and saved via FTP. You also can switch off the protocols within an Internet Browser (TCP/IP).

Protocol	Operating system		
	FTP (TCP/IP)	Windows (IPX)	HTML (HTTP)
IPX *Print-services*	`nw_pserver = off` `nw_rprinter = off`	Config → Print server → NetWare → General → Mode 	Configuration → Novell → General → Mode 

IPX *General Protocol*	`nw_802_2 = off`
	`nw_802_3 = off`
	`nw_eth 2 = off`
	`nw_snap = off`
		Config → Print server → NetWare → Services
		 
			Configuration → Novell → Services
			 

TCP/IP	`ip_dhcp = off`
	`ip_bootp = off`
	`ip_rarp = off`
		Config → Print server → TCP/IP → Protocol
		 
			Configuration → TCP/IP
			 

Apple/ EtherTalk	`appletalk = off`	Config → Print server → Apple 	Configuration → Apple → 

✔ **After the „IPX Print services" are switched off, the print server continues sending broadcast messages to the network. This is necessary for the Administration Tool to find the print servers in the network.**

Should all Novell packets be switched off, then all Frame Header types of Novell must also be deactivated on the print server.

2.3 Notes

- For automatic network connector recognition, the print server must be connected to the Ethernet or Token Ring network !

- For best performance under TCP/IP the Novell protocol type should not be set to IEEE802.3.

- All protocols not used by the print server in your network should be switched off. (see chapter 2.2 *How to Switch off Selected Protocols*).

3 Configuration Software

You can use different programs for the print server's administration. The following chapter will show you the programs and other possibilities for configuration.

Print server parameters can be edited using the Administration Tool under Windows, with any HTML 3.x compatible Internet Browser or via the FTP protocol.

3.1 Configuration via Internet Browser (HTTP/HTML)

The print server supports the HTTP/HTML protocol and can be configured using any HTML 3.x compatible Internet Browser.

In order to use an Internet Browser you have to install the TCP/IP protocol on your PC or host. A valid IP address must be registered on the print server.

To enter an IP address on the Print server, please use the Windows administrations tool (IPX protocol) or the `arp` and `ping` programs (TCP/IP).

Edit the ARP table

```
arp -s <Internet address> <Hardware address>
```

Example:

```
arp -s 192.0.0.123 00-c0-eb-00-01-ff
```

✘ **Within some operating systems, for example all Microsoft Windows systems (except Windows NT 4.0), you must make contact with a workstation in the network using the `ping` command before using the `arp` command for the first time. If this is not possible in your network you have to use the Administration Tool (IPX protocol) for configuration.**

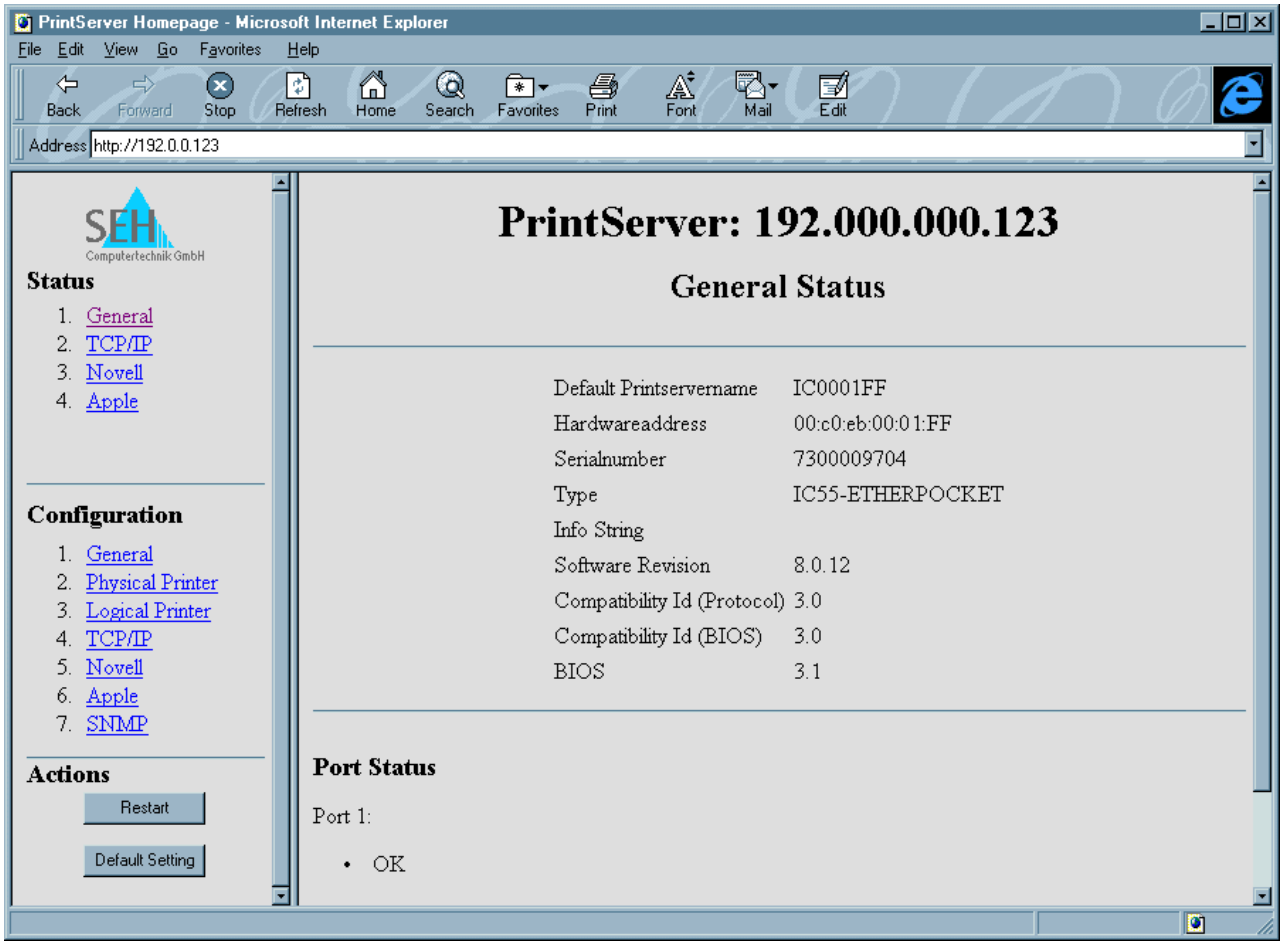
Assign a new IP address to the print server.

```
ping  <Internet address>
```

Example:

```
ping 192.0.0.123
```

Start your Internet Browser and enter the IP address of the print server. The print server will be connected and its homepage will be displayed on the host computer.



Inside the left frame of the Internet Browser (the Internet Browser should support frames; HTML 3.x compatible) three menus are displayed:

- Status
- Configuration
- Actions

3.1.1 Status Menu

This menu displays all of the different protocols status information, the version number of the print server, the print status of the print server and the current connections to Novell file servers etc.

GENERAL

Default Print Server Name	*Default print server name*
Hardware Address	*Hardware address of the print server*
Serial Number	*Serial number*
Type	*Type / Product name*
Info String	*Additional information / Groups*
Software Revision	*Software version*
Hardware Revision	*Hardware version*
Compatibility Id (Protocol)	*BIOS version*
Compatibility Id (BIOS)	*BIOS version*
BIOS	*BIOS version*

TCP/IP

TCP slots	*Shows the current TCP attachments to the print server*
ARP cache	*Shows the ARP Cache on the print server*

Novell

NetWare General	*General NDS parameters (Name, Header, ...)*
NetWare RPrinter	*Parameter and Status for R/NPRINTER Mode*
NetWare PServer	*Parameter and Status for PSERVER Mode*
NetWare PServer FileServerTable	*Preconfigured file server list*
NetWare PServer ConnectionTable	*Attachment to Novell file servers*
NetWare PServer QueueTable	*Attachment to Novell print queues*
Netware SapTable	*Internal SAP table within the print server*
Netware RipTable	*Internal RIP table within the print server*

Apple

AppleTalk	*AppleTalk protocol active*
LocalTalk	*LocalTalk within the printer active*
Printer Name	*Printer name (Default: ICxxxxxx)*
Printer Zone	*Apple Zone*
Entity type(s)	*Printer type*
AppleTalk Net.Node	*AppleTalk Net address*

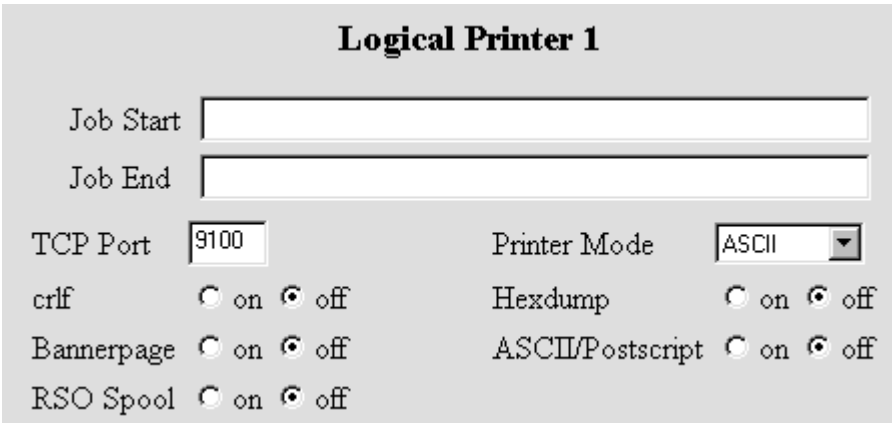
3.1.2 Configuration Menu

General

Info String	*Additional information / Groups*
Password	*Print server configuration password*

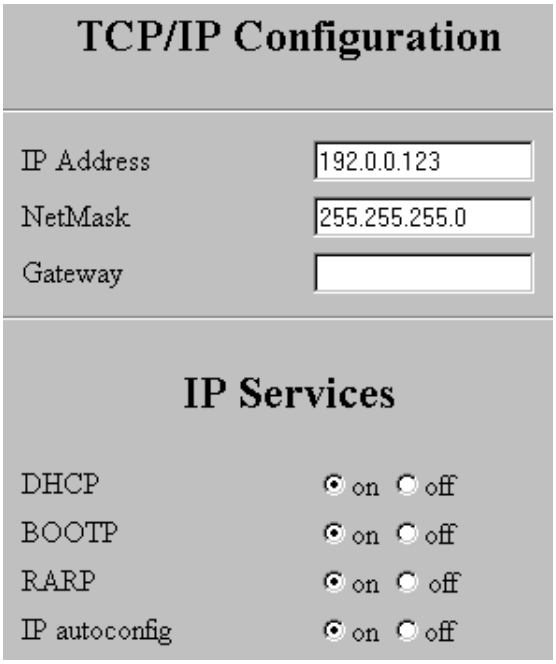
Logical Printer

Job Start	*Character string sent before print job*
Job End	*Character string sent after print job*
TCP-Port	*TCP-Port address*
Printer Mode	*Printer emulation for status page*
crlf	*Converts LF -> CR*
Hexdump	*Prints data as HEX dump*
Bannerpage	*Prints a bannerpage within LPD protocol*
ASCII/Postscript	*Converts ASCII -> PostScript*
RSO Spool	*Support of RSO Spool (BS2000)*



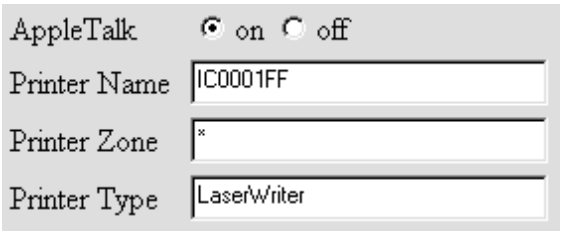
TCP/IP

IP Address	*IP address of the print server*
NetMask	*Net mask of the print server*
Gateway	*Gateway address of the print server*
DHCP	*Activate DHCP protocol*
BOOTP	*Activate BOOTP protocol*
RARP	*Activate RARP protocol*
IP autoconfig	*Activate IP address allocation via ARP*



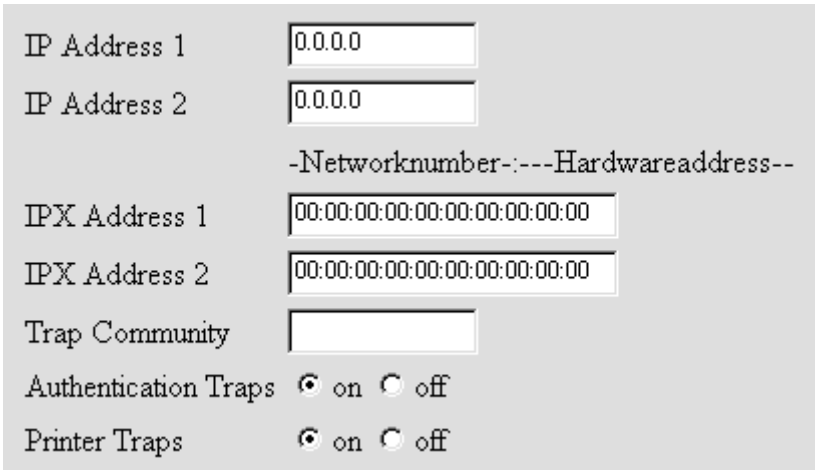
Apple

Appletalk	*Activate Appletalk protocol*
Printer Name	*Printer Name*
Printer Zone	*Apple Zone*
Printer Type	*Printer type*



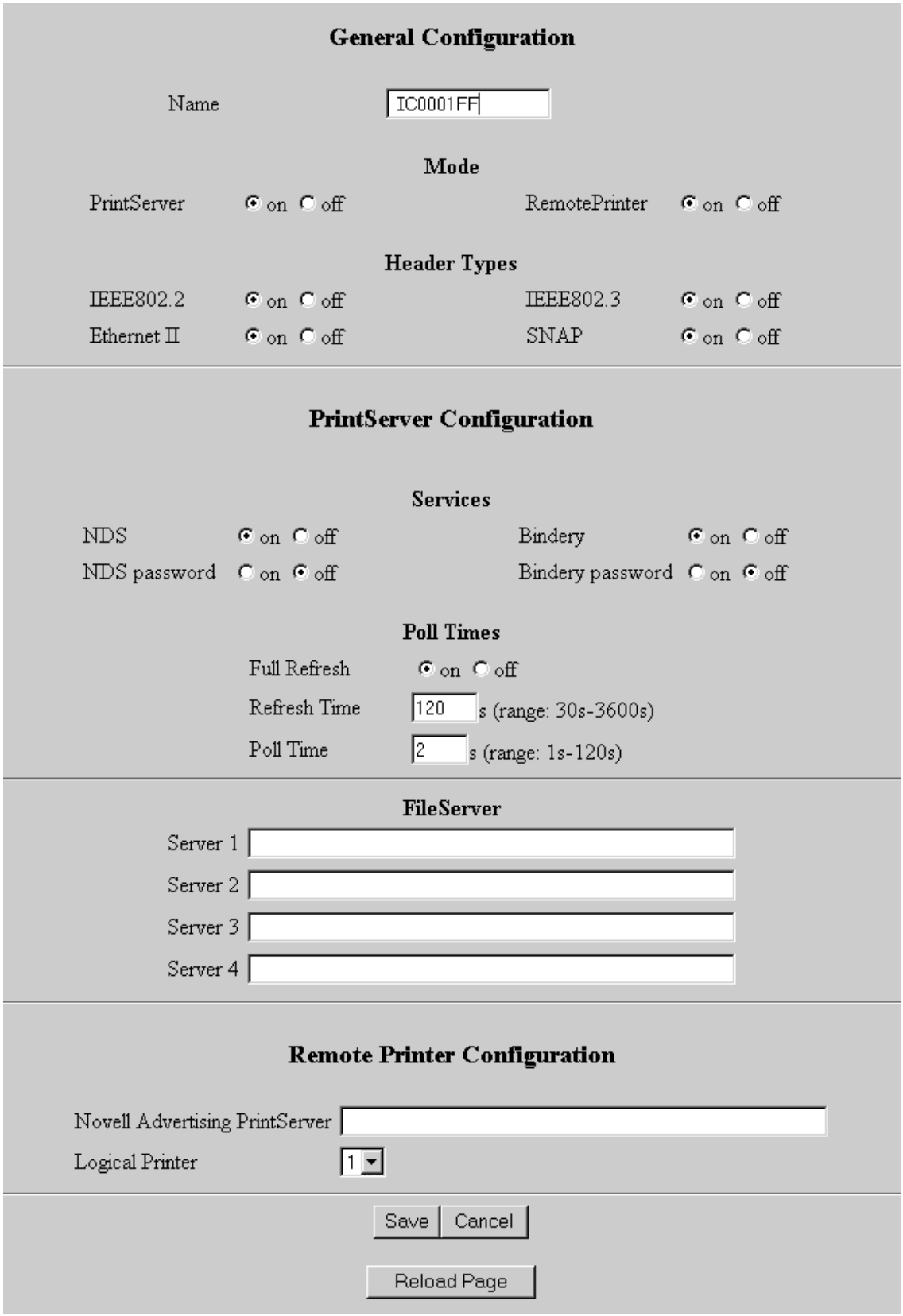
SNMP

IP Address 1	*IP Trap address No. 1*
IP Address 2	*IP Trap address No. 2*
IPX Address 1	*IPX Trap address No. 1*
IPX Address 2	*IPX Trap address No. 2*
Trap Community	*Community name*
Authentication Traps	*Authentication traps*
Printer Traps	*Activate printer traps*



Novell

Name	*Novell Print server name*
Print server	*Activate print server mode*
RemotePrinter	*Activate RemotePrinter mode*
NDS	*Activate NDS mode*
Bindery	*Activate Bindery mode*
NDS password	*NDS - Automatic password*
Bindery password	*Bindery - Automatic password*
IEEE802.2	*Support of IEEE802.2 Frame Header*
IEEE802.3	*Support of IEEE802.3 Frame Header*
Ethernet II	*Support of Ethernet II Frame Header*
SNAP	*Support of SNAP Frame Header*
Full Refresh	*Get current network status*
Refresh Time s (range: 30s-3600s)	*„Refresh" time in seconds*
Poll Time s (range: 1s-120s)	*Print queue poll time in seconds*
Server 1-4	*Preconfigured file servers*
Novell Advertising Print server	*Name of the Novell PSERVER.EXE / .NLM Module*
Logical Printer	*Logical Printer for R/NPRINTER*



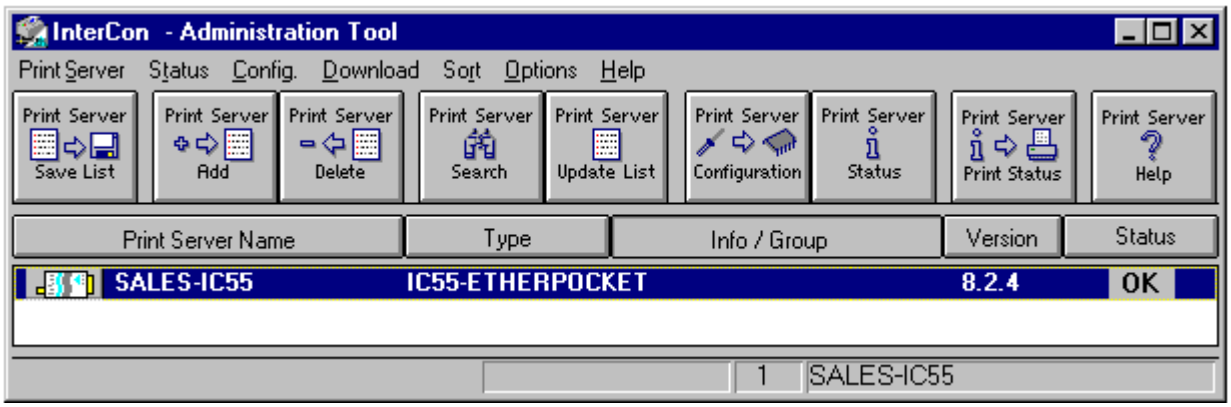
3.1.3 Actions Menu

Restart	*Restarts the print server*
Default Setting	*All parameters set to default*

3.2 Configuration via the Administration Tool

Using the Administration Tool you can change the print server configuration, download a new software version into the Flash EPROM, view statistics of Novell queues and servers, create a print server list which will be loaded after a restart and view printer errors.
Install the Administration Tool from the InterCon-CD.

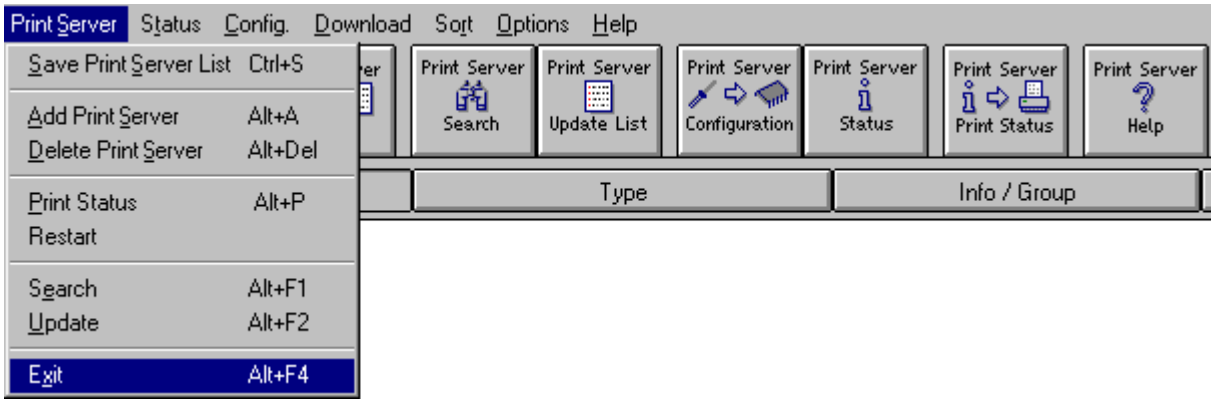
This window will be displayed after starting the Administration Tool:



If SNMP parameters are active (TRAP IPX address) all errors which might occur on the printer (for example: Paper End) will be displayed in the status window without having to restart the software.

✘ **The Administration Tool must have the IPX protocol installed on your PC.**

3.2.1 Print Server Menu



`Save Print Server List` All print servers contained in the current print server list are saved in the `server.lst` file. After a restart all print servers saved in the list will be displayed, even if they are not present in the network (These print servers are displayed in grey).

`Add Print Server` Add a new print server to the current print server list by entering its name.

`Delete Print Server` Delete a print server from the current print server list.

`Print Status` The print status command causes a status page printout of the selected print server.

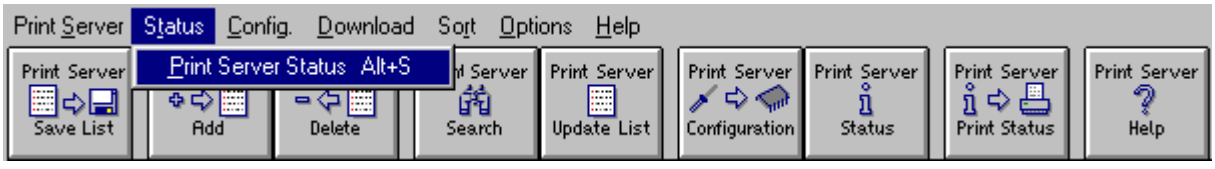
`Restart` Causes a restart of the selected print server.

`Search` New print servers are searched for in the network (depends on the settings in the `Options` menu.)

`Update` The status of the current print server list and the parameters are updated.

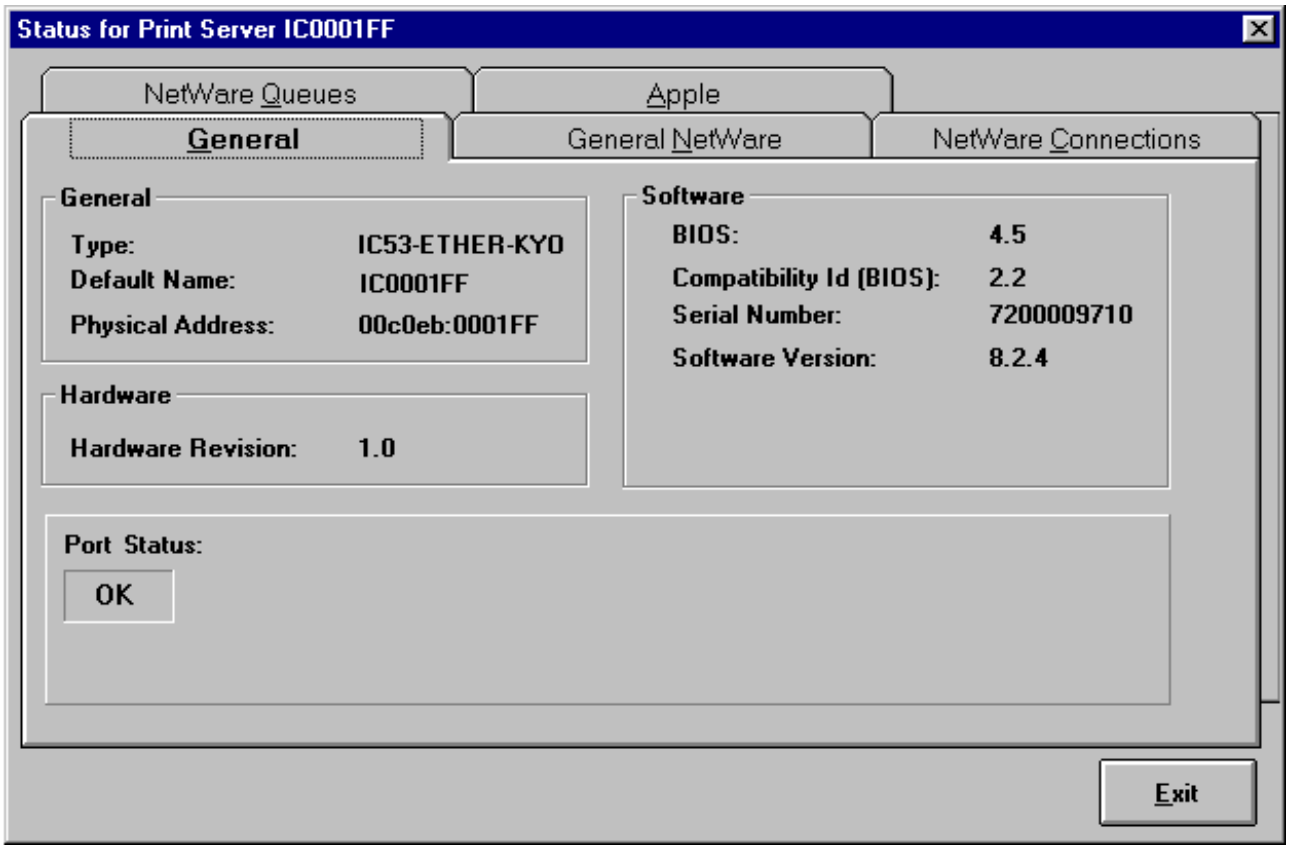
`Exit` Exit program.

3.2.2 Status Menu

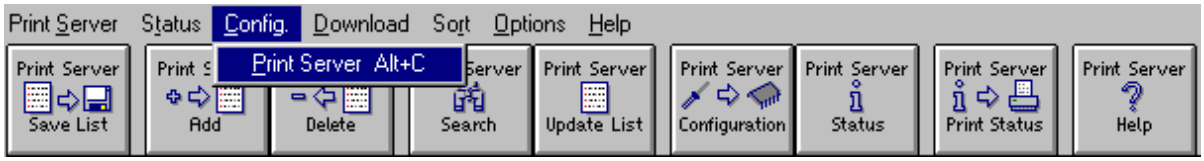


`Print Server Status` This status window is divided into different sections. Within `General` all general information like type, default name, physical address, hardware, software versions and port status are displayed.

Under `General Netware` all NDS status information is displayed. In the `Netware Connections` and `Netware Queues` sections all installed Novell servers and queues are displayed. If an error occurred during the last connection the error message was saved. Under the `Apple` operating system, name and zone of the print server are displayed.



3.2.3 Config Menu

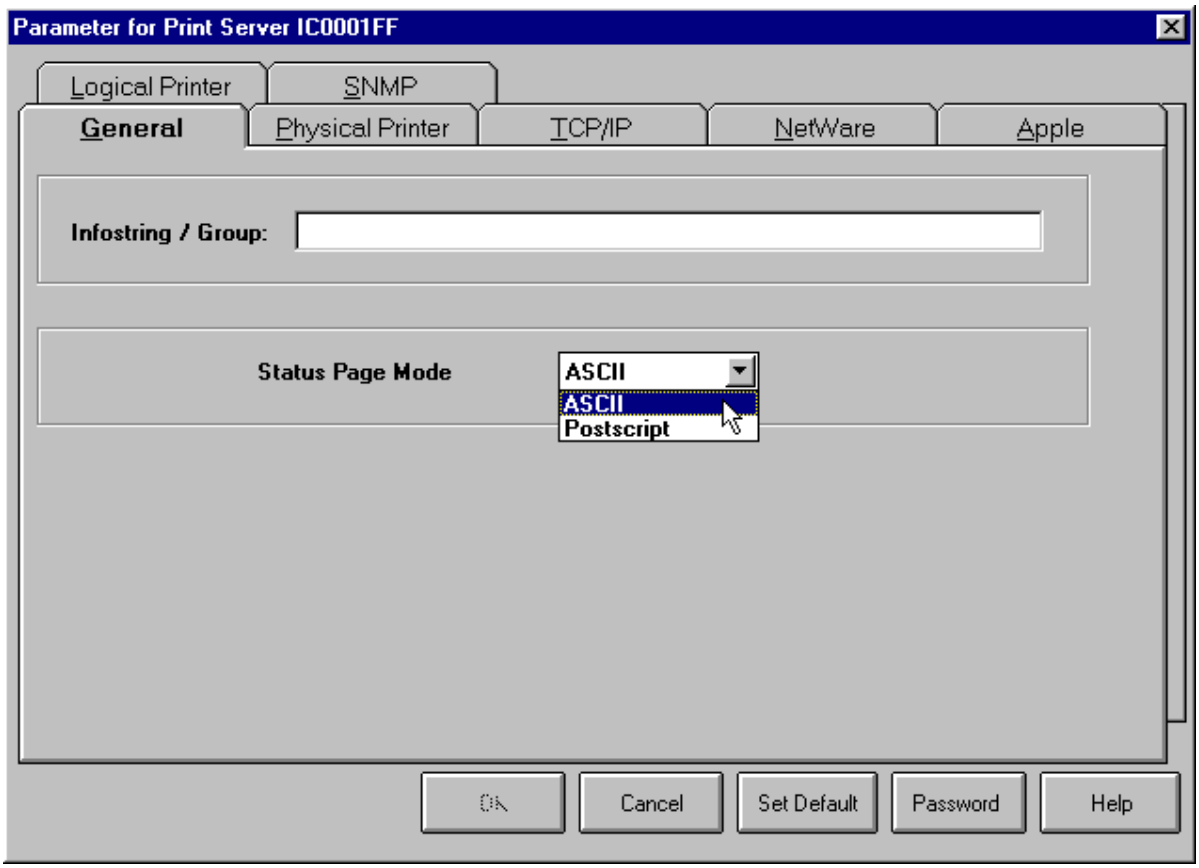


`Print Server`

To change the configuration of the selected print server choose `Print Server` within the `Config` menu. A pop-up window divided into sections (General, TCP/IP, Netware, Apple, Logical Printer and SNMP) will appear.

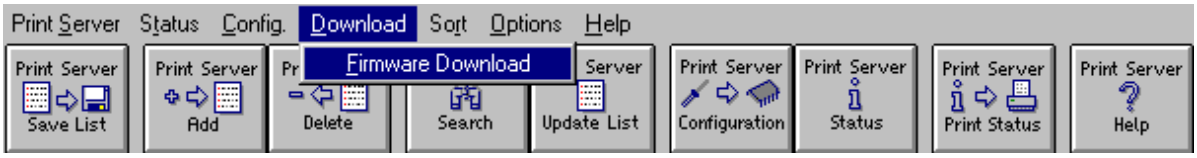
Within these sections you can change all parameters of the selected operating system. After editing the parameters press the

OK button to save the changes made. Now press the YES button if you are sure that you want to start the parameter download.

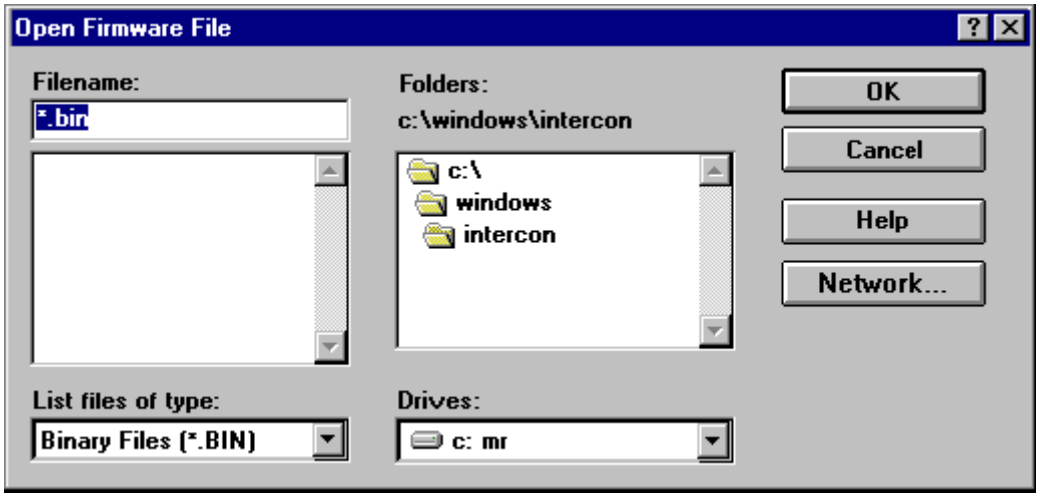


General:	Use the Infostring/Group to enter more information (for example: Groups) for the selected print server. This information will be displayed in the status window after restarting the Windows Administration Tool.
Physical Printer:	Use the Physical Printer menu to change the hardware specifications of the print server. (see Appendix).
TCP/IP:	Change TCP/IP parameters within this menu.
Netware:	Change Netware parameters within this menu.
Logical Printer:	Change the settings for the logical printers within this menu.
SNMP:	Change SNMP parameters within this menu.

3.2.4 Download Menu

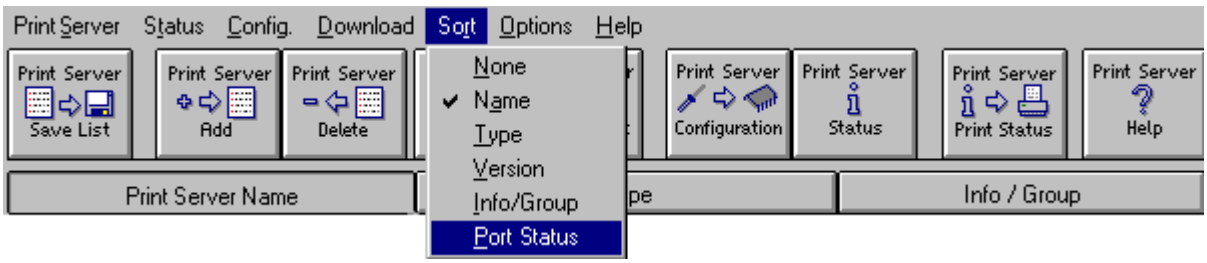


`Firmware Download` — The print server firmware can be updated within this menu. The binary file targeted for downloading to the print server will be controlled by the selected print server in order to avoid errors during the download process.



After confirmation choose the target directory where the binary file should be downloaded to.

3.2.5 Sort Menu



`None` — No sorting method contained in the print server list.

`Name` — Sort the print server list by name.

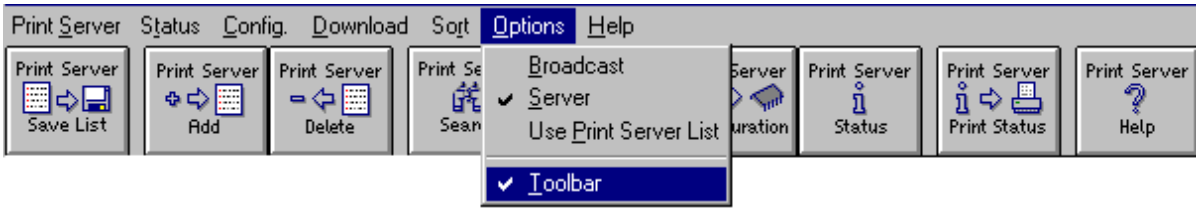
`Type` — Sort the print server list by type.

`Version` — Sort the print server list by software version.

`Info/Group` — Sort the print server list by info/group.

`Port Status`	Sort the print server list by errors.

3.2.6 Options Menu



`Broadcast`	Novell file servers will be searched for in the network via broadcast.
`Server`	Novell file servers will be used to detect other file servers in the network.
`Use Print Server List`	Only print servers listed in the `server.lst` file will be displayed.
`Toolbar`	Switches the toolbar on and off.

3.2.7 Help Menu

`Index`	Help system
`Using Index`	Help system
`About`	Software version and further information about the Administration Tool.

3.3 Configuration via File Transfer Protocol (FTP)

The print server supports the TCP/IP protocol and FTP (File Transfer Protocol). This enables the user to make changes in the print server configuration.

To use the FTP protocol you must install the TCP/IP protocol on to your PC or host. A valid IP address must have been saved on the print server.

To enter an IP address on the print server use the Administration Tool (IPX protocol) or the `arp` and `ping` programs (TCP/IP).

Edit the ARP table

```
arp -s <Internet address> <Hardware address>
```

Example:

```
arp -s 192.0.0.123 00-c0-eb-00-01-ff
```

✘ **Within some operating systems, for example all Microsoft Windows systems (except Windows NT 4.0), you must contact a workstation in the network via the `ping` command before using the `arp` command for the first time. If this is not possible in your network, you will have to use the Administration Tool (IPX protocol) for the configuration procedure.**

Assign a new IP address to the print server.

```
ping  <Internet address>
```

Example:

```
ping 192.0.0.123
```

To change the configuration of the print server a configuration file must be created. This file will then be sent via `ftp` to the print server host. If no configuration file exists simply get the file from the print server host via `ftp` and change the entries. Please copy the following procedure in order to obtain a configuration file via `ftp`:

Jump to the directory where you wish to create the configuration file. Start the File Transfer Protocol and connect to the print server host:

```
% ftp 192.0.0.123
```

You will be asked for a user name. The entry is arbitrary. Type the following in order to list all files located on the print server host:

```
ftp> ls
```

The FTP server on the print server host will display the following:

```
200 PORT command successful.
150 ASCII data connection for NLST (192.168.0.49,1046).
sys5.sh
bsd.sh
aix.sh
params
status
226 Transfer complete.
41 bytes received in 0.11 seconds (0.37 Kbytes/sec)
```

The `*.sh` files are shellscripts for the installation as a 'local printer'. The next file listed is the print server's configuration file named `params`. Get this file by using the following command:

```
ftp> get params
```

Now modify the configuration file. You can use any available text editor. In order to save the changed configuration file on the print server you must restart the File Transfer Protocol and connect to the print server host. Upload the configuration file to the print server host by inputting the following command:

```
ftp> put params
```

If the configuration file name to be uploaded does not match the configuration file name on the print server host, you will have to rename the configuration file to match the file name expected by the print server host during the upload procedure, for example:

```
ftp> put CONFIG.DAT params
```

The file will be uploaded and the changed configuration parameters will be saved on the print server. During this procedure the red LED of the print server is active for about 5 seconds. After the file transfer the FTP server on the print server host will display the following message:

```
226 Transfer complete.
```

End the FTP protocol:

```
ftp> quit
```

The print server restarts automatically.

3.4 Configuration using the DHCP Protocol

The dynamic allocation of IP addresses using DHCP (Dynamic Host Configuration Protocol) assumes the presence of a system that co-ordinates the allocation of IP addresses to logical host names. This is the job of the Domain Name Servers (DNS), which must be dynamically configured by the DHCP server. Under Windows NT 4.x the DNS server can be configured so that it passes on all name requests to the WINS server if the DNS server cannot itself correctly process the name request.

Once the print server has received the IP address of a WINS server from the DHCP server, the print server transmits the WINS server a name registration request. Here the print server's host name (parameter sys_name) and its IP address (parameter ip_address) are used. The WINS server's answer contains the inserted name's period of validicity from the WINS data base. Once the period of validicity has expired, the print server renews its registration.

For the installation of a print server on a DHCP server please read the relevant operating systems manual.

Changing the host name

The host name can only be changed using the FTP protocol. Change to the directory where you intend to save the newly created configuration file. Start the File Transfer Protocol and open a connection to the print server host:

```
% ftp 192.0.0.123
```

Retrieve this file by entering the following command:

```
ftp> get params
```

Modify the print server host name in the configuration file. You may use any text editor of your choice.

```
sys_name        = IC01149F
```

In order to save the edited configurations parameters on the print server, start the File Transfer Protocol and open a connection to the print server host. Transmit the configuration file to the print server host by entering the following command:

```
ftp> put params
```

✔ **Once the print server is switched on, broadcasts (DHCP / BOOTP / RARP) are transmitted. If these broadcasts are not answered the print server terminates this process after a time period of one minute. During this period the print server attempts to contact the following servers in the following order every five seconds DHCP → BOOTP → RARP.**

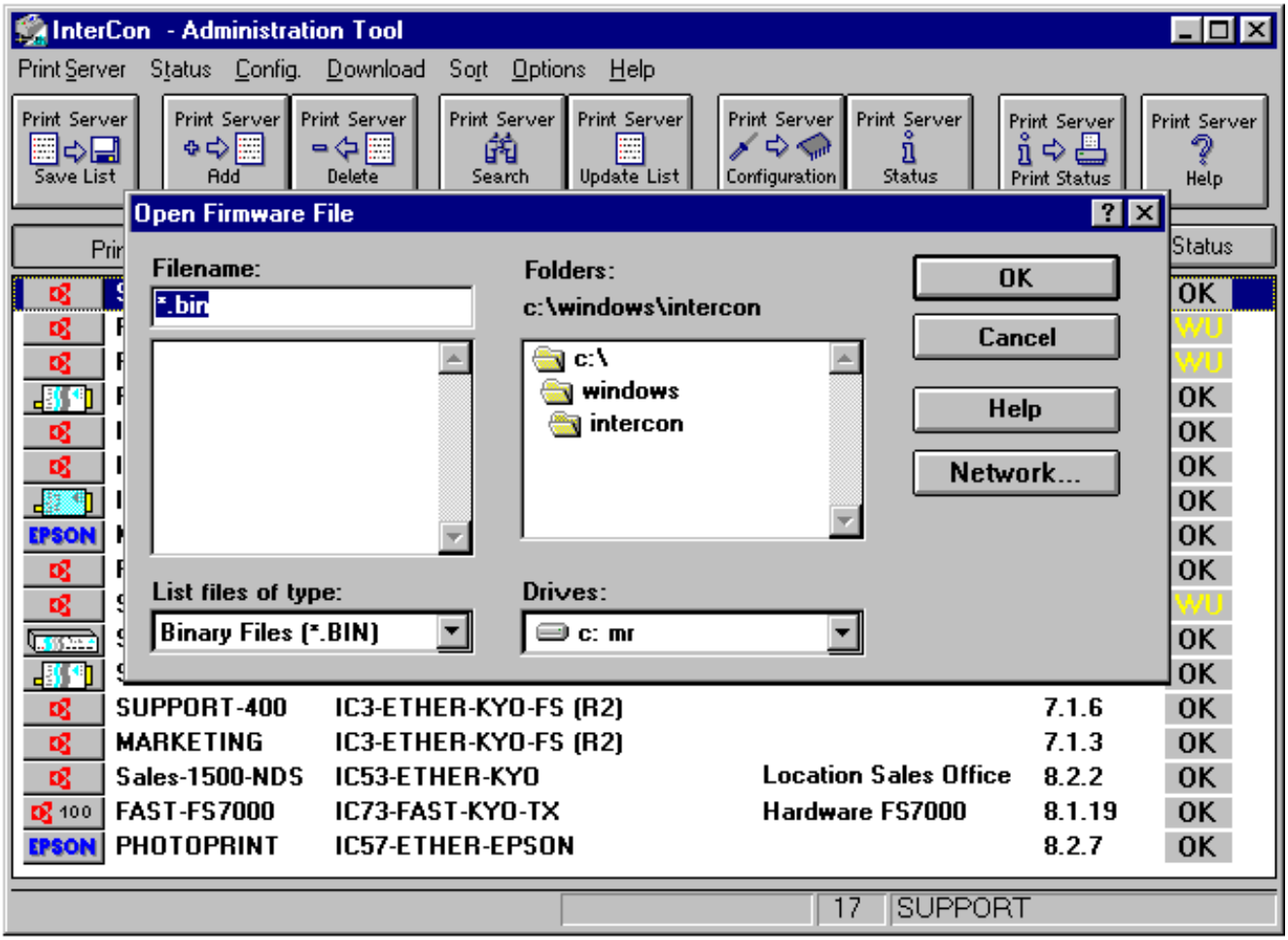
4 Software Update

New software versions can be downloaded to the print server via the network. Different methods are implemented on the print server for the download procedure. The following chapter describes the print server software update under Windows (IPX protocol) and TCP/IP via TFTP protocol.

4.1 Windows (IPX protocol)

Start the Windows „InterCon Administration Tool". Select the print server for the software update. Press the key combination ALT-D for the download menu.

A window named „`Open Firmware File`" will be displayed. Select the download file and confirm your choice by pressing `OK`. You will now be asked if you really want to start the download procedure. After confirmation by pressing the `YES` button, the download begins.



4.2 TCP/IP (TFTP protocol)

A software update via TCP/IP can be done by following the steps below:

- Register for the print server download (FTP connection)
- Set the download parameters (TFTP connection)
- Transfer the software update to the print server (TFTP connection)

In order to make software updates of the print server as comfortable as possible, you can download all the data via network directly to the print server. If the print server is installed in a network with TCP/IP protocol, the Trivial File Transfer Protocol (TFTP) will be used for the download.

Please note before downloading:

- The print server must be switched on and be visible in the network
- Print jobs should be finished and the printer should be deactivated before the update procedure, due to the fact that a download will terminate any print job.
- The download procedure will last about 20 seconds.
- All parameters saved in the print server are retained after the download.
- After the software update the print servers should be restarted.

Please follow these steps for a successful software update:

Jump to the directory where the binary file for the software update is located. Start the File Transfer Protocol (FTP) and connect to the print server:

```
% ftp 192.0.0.123
```

You will be asked for a user name. The entry is arbitrary. Entering the following command switches the print server to download mode:

```
ftp> quote SITE LOAD ON
```

The print server rejects all incoming print jobs and waits for the software update binary file to be transmitted via TFTP.

If you wish to reactivate the printer without downloading the software update, switch the print server to printing mode by entering:

```
ftp> quote SITE LOAD OFF
```

Start the Trivial File Transfer Protocol and connect to the print server:

```
% tftp 192.0.0.123
```

Use these commands for:

- Transfer mode switched to binary
- Timeout for retrying sending packets set to 30 seconds
- Total timeout for transfer set to 15 minutes

```
tftp> binary
tftp> rexmt 30
tftp> timeout 900
```

If you wish to observe the transfer, switch to trace mode by entering:

```
tftp> trace
```

Upload the software update binary file (e. g. `po_828.bin`):

```
tftp> put po_828.bin
```

If trace is activated, the number of the sent and confirmed data packets are displayed. After receiving the first data packet the Flash EPROM of the print server will be erased. After 10 seconds the next data packets follow.

During the data transfer to the print server the red LED of the print server continuously shines. If the TFTP protocol reports that the data transfer is finished, then the download of the software update binary file is completed. Exit the TFTP protocol by entering:

```
tftp> quit
```

If a network error occurs during the download procedure the print server will wait for the next data packet until the network is stabilised. If the timeout exceeds the pre-set value the TFTP protocol terminates the data transfer. The print server must then be restarted.

After being switched on the print server will detect that the EPROM is not completely reprogrammed. (Notice that the red LED is flashing very fast). The print server now waits for the binary file transfer. Start the TFTP protocol and continue as described above.

5 Installation in Novell Networks

Under Novell the print server processes print jobs stored in print queues on a Novell NetWare file server, or gets print jobs from a Novell NetWare print server if installed as a Remote Printer.

The print server can process print jobs from a NetWare 3.x (Bindery) file server and a NetWare 4.x (NDS) file server simultaneously, or can work simultaneously as a Remote Printer.

5.1 Functional Overview

The print server can be installed as a Novell remote printer and as a Novell print server. After the print server is switched on in Novell network, it sends broadcast data packets using a **Nearest Query** or **General Query** signal into the network. This signal looks for the nearest network file server. The SAP (Service Advertising Protocol) broadcast packets are sent using the Novell protocol types IEEE_802.2, IEEE_802.3, ETHERNET_II and SNAP.

The print server automatically recognises changes in the network environment because a reconfiguration is undertaken every two minutes. This time interval can be changed.

Remote Printer Mode: If the print server is installed as a remote printer (RPRINTER NetWare3.x, NPRINTER Novell NetWare 4.x), all print jobs will be sent to the print server via a Novell print server (PSERVER.NLM or PSERVER.EXE). Up to 16 RPRINTERs can be supported under NetWare3.x, where as up to 256 NPRINTERs can be supported under NetWare 4.x.

Print Server Mode: The print server is able to process print jobs from several file servers (NDS and Bindery). Moreover, the print server can be assigned multiple print queues on each file server. In all, up to 16 print queues can be supported on 16 file servers (NDS and Bindery).

If the print server is configured on a file server, in other words registered as a print server using the Novell program PCONSOLE and then assigned to a print queue, the queue will be scanned for print jobs periodically. If there are jobs for the print server, they will be processed and printed accordingly. The time period for scanning the print queue can be set.

The print server has an internal SAP list which initialises from the start once per SAP sequence and stays active according to the Novell conventions. This table is limited to 16 file servers and 8 NDS servers if both services are switched on.

Until the first successful connection is made the bindery services try to use all file servers listed in the SAP list (max. 16) as a boot server. The servers are checked in the order of the least number of Hops needed to make a connection (distance to the router).

The print server has a RIP (Route Information protocol) cache to avoid unnecessary RIP requests. These RIP requests occur if a server located in the network is contacted by the print server.

If a print server has a bindery queue and a NDS queue on a NDS server, then the first service detected will be chosen. In the normal case it will be NDS, because the NDS refresh occurs before the Bindery refresh (if both are switched on).

Bindery:
The first file server detected by the Nearest Query Request answers this signal. The print server then looks into the bindery of this file server to look for any other file servers. Network configuration information is saved in the binderies generated by the Novell file servers. The protocol type of the first file server which contacted the print server determines the protocol type for print servers in the whole network environment. However, the protocol used can be assigned by the user using the configuration software.
You can select which file server should be contacted by the print server by using the configuration software. However, the print server can then only connect to the file servers entered in the file server list.

NDS:
In contrast to the bindery services, the allocations between the objects can be requested directly in the hierarchic NDS System. Every NDS server knows all the objects of its own NDS tree. All NDS servers listed in the SAP table are examined in the order they appear in the SAP table until an NDS server locates an object that knows the name of the print server.

Using the print server object, all related printer objects and therefore all queues can be directly determined from the attribute values. A queue can be found via several printer objects and therefore be assigned to different logical printers.

More than one login to different NDS servers may be necessary (one login and several authentications) but, besides of the first randomly chosen NDS server, only those NDS servers will be contacted that contain attribute data of the objects configured for the print server.

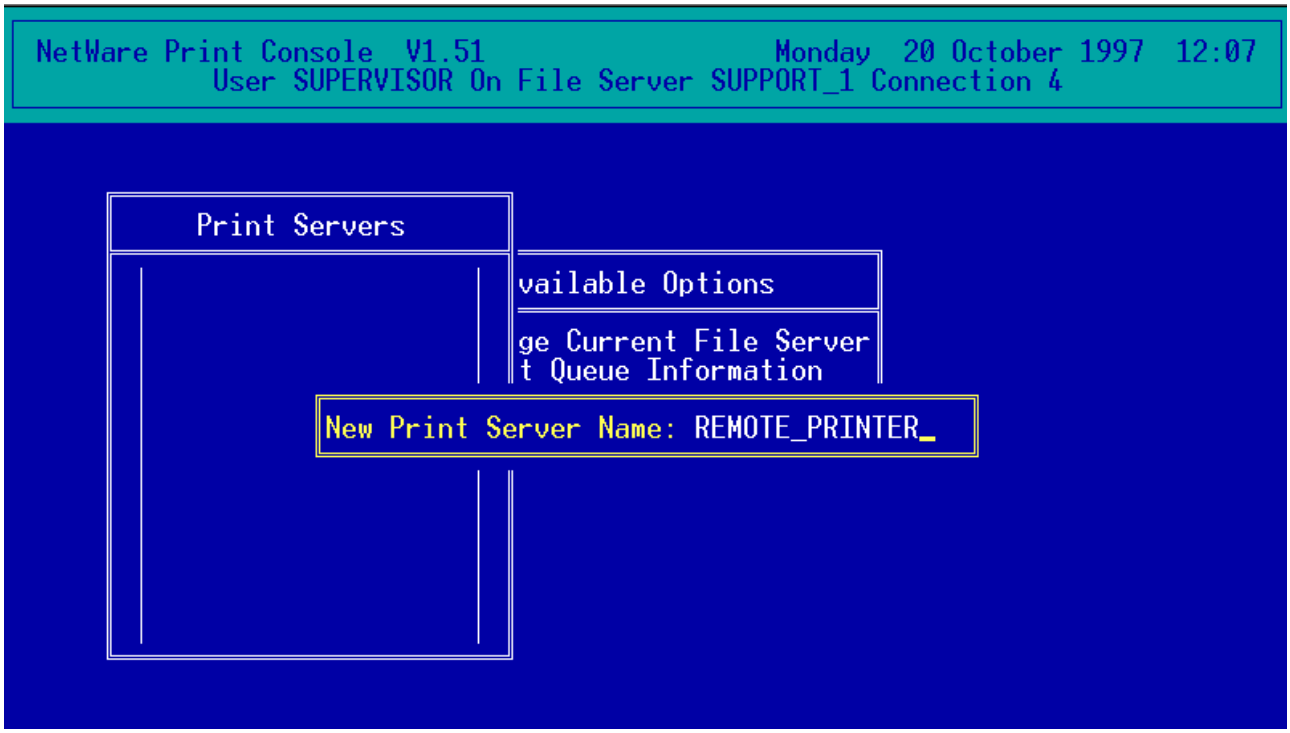
5.2 Installation as a Remote Printer

The print server can be installed as a Novell Remote Printer in a Novell Network. Therefore a Novell NetWare PSERVER has to be started. As a Remote Printer the print server will need no connection.

5.2.1 NetWare 3.x

- Log in as a `SUPERVISOR` and start the PCONSOLE program

- Install a Novell NetWare print server
  Go to the print server information menu and press `INSERT`. Add a new print server by entering its name and press `ENTER`.
  Example: `REMOTE_PRINTER`

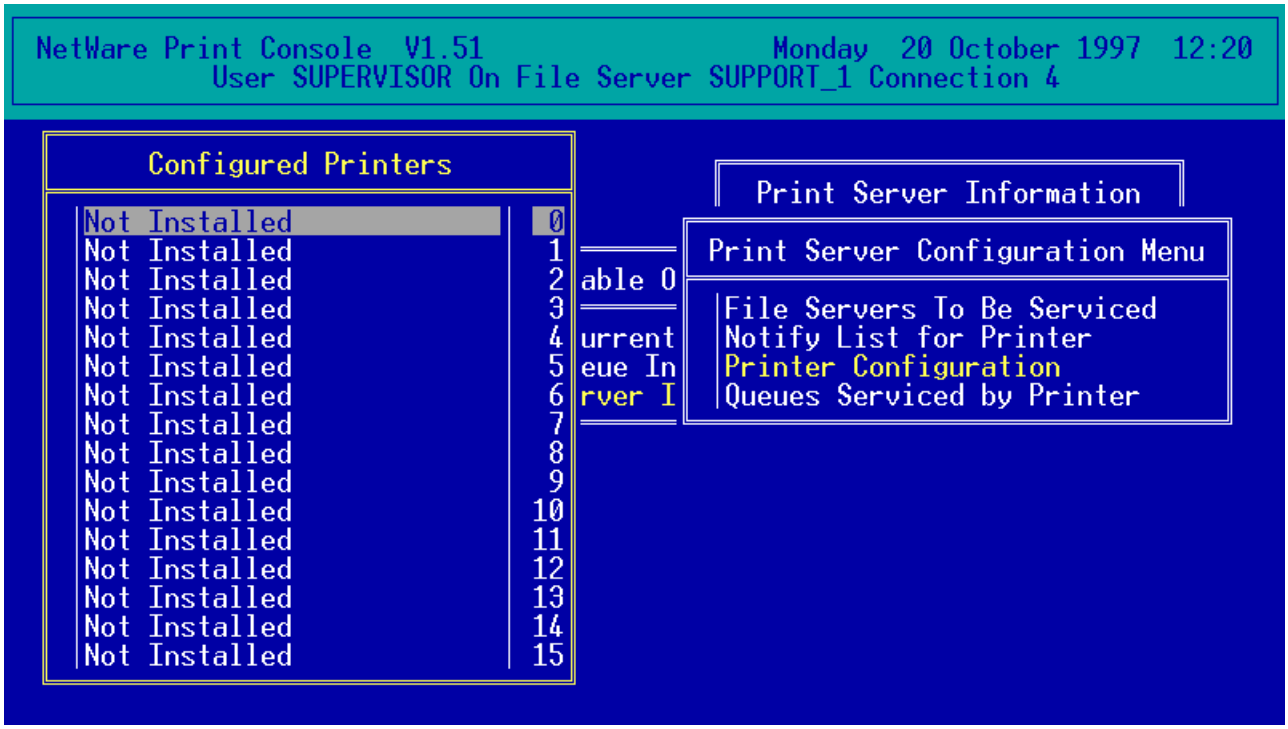


- Install a printer
  Select the print server in the print server information menu. Choose the `Print server Configuration` menu, select the `Printer Configuration` sub-menu and press `ENTER`.

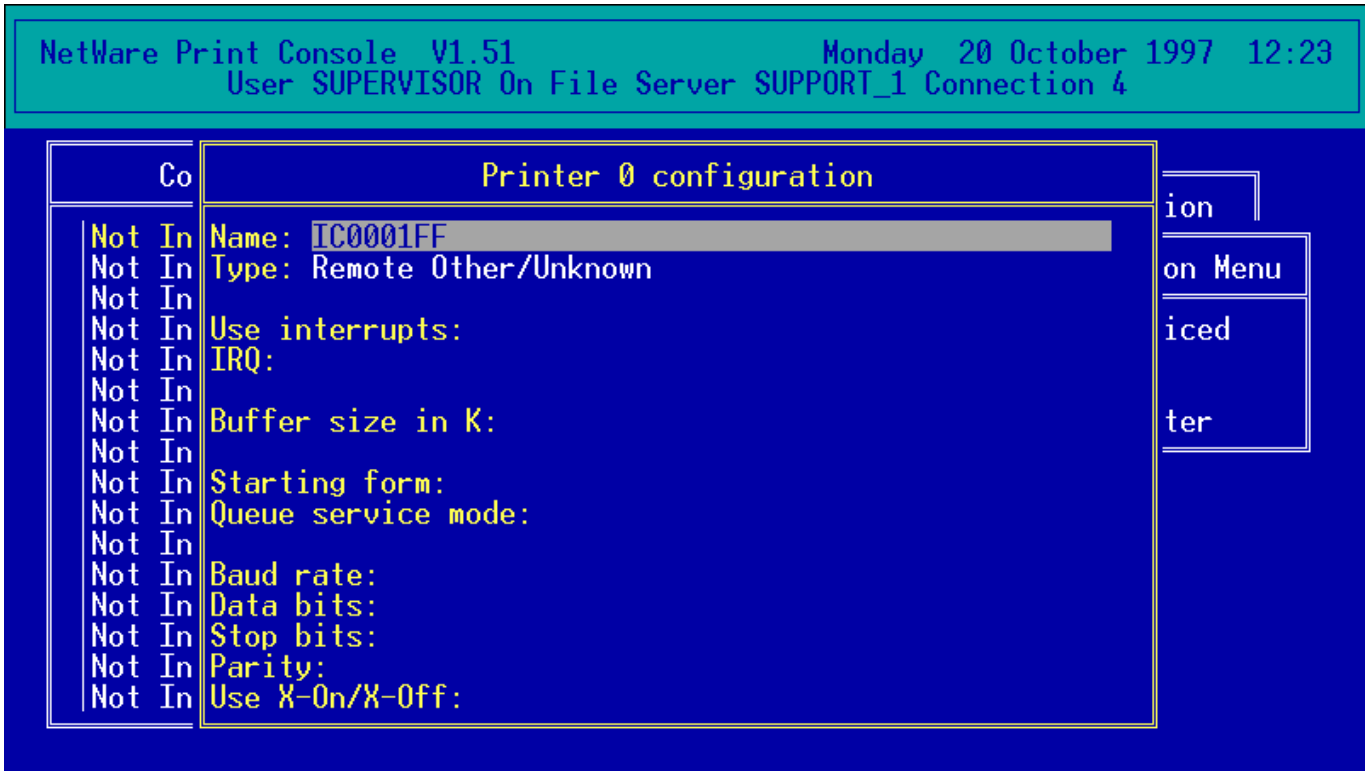
  Now enter the Novell Name `ICxxxxxx` of the InterCon-PrintServer as the new printer.

  `xxxxxx` = last three groups of the hardware address

  Example: Hardware address: `00:c0:eb:00:01:ff`
  InterCon Novell Name: `IC0001FF`



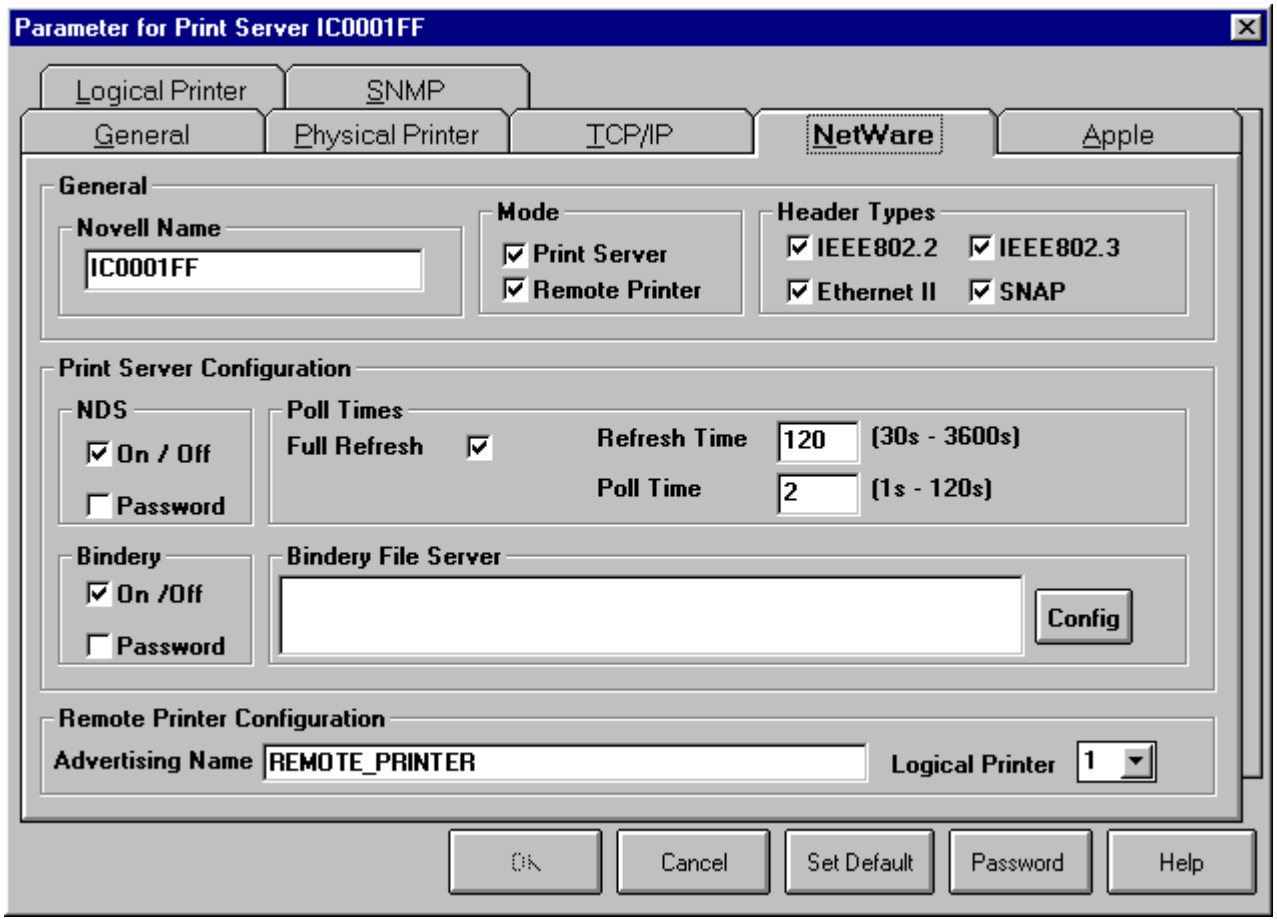
Choose `Remote Other/Unknown` as the printer type.



- Assigning a print queue
  Select the newly installed printer in the `Queues Serviced by Printer` menu and press the `INS` key. Using the `INS` key you can choose a queue from the displayed queue list. In order to assign the print server a new queue you must install a new print queue and then follow the steps list above.

  Exit the `PCONSOLE` program by pressing the `ESCAPE` key several times

- Configure the PSERVER.NLM (or PSERVER.EXE under Novell NetWare 3.x) name on the InterCon-PrintServer using a HTML browser, Administration Tool or FTP.
  Example: `REMOTE_PRINTER` via Administration Tool



- Start the PSERVER (`PSERVER.NLM` / `.EXE`) and select the newly installed Novell print server. (Example: `REMOTE_PRINTER`)

5.2.2 NetWare 4.x

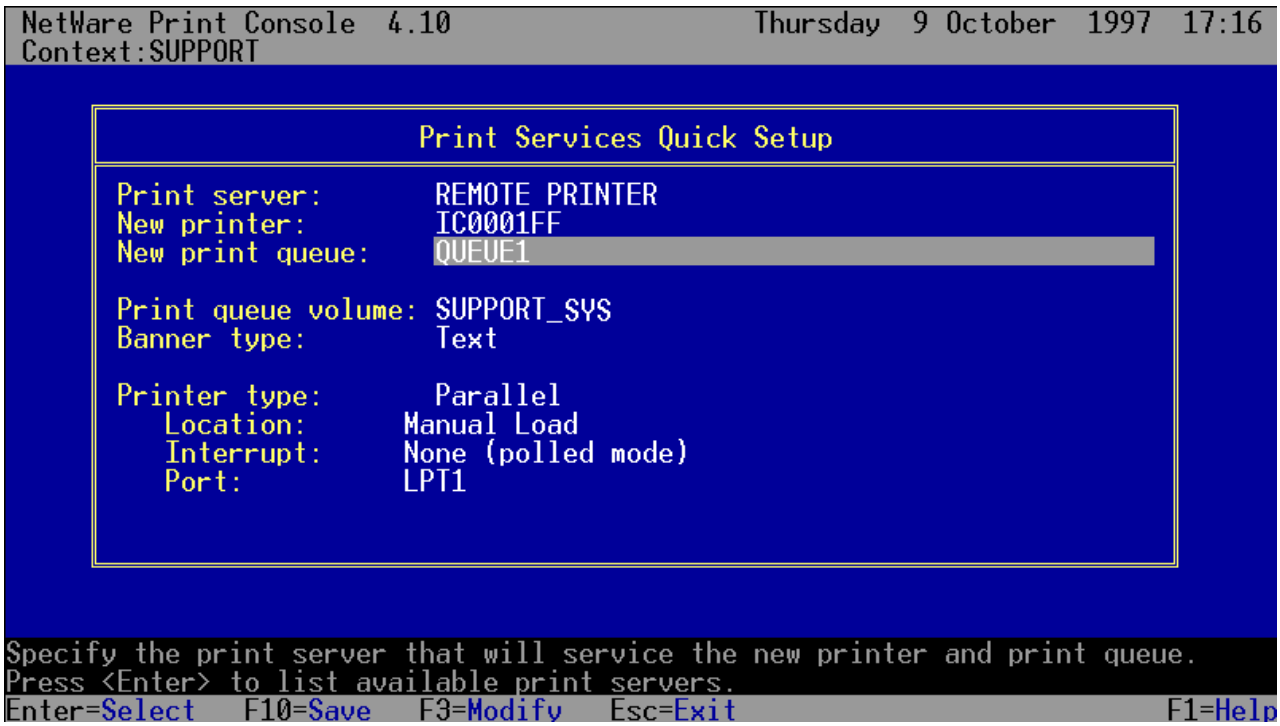
- Start the PCONSOLE program and choose „Quick Setup".

- Install a print server, a printer and a print queue.
  Example:

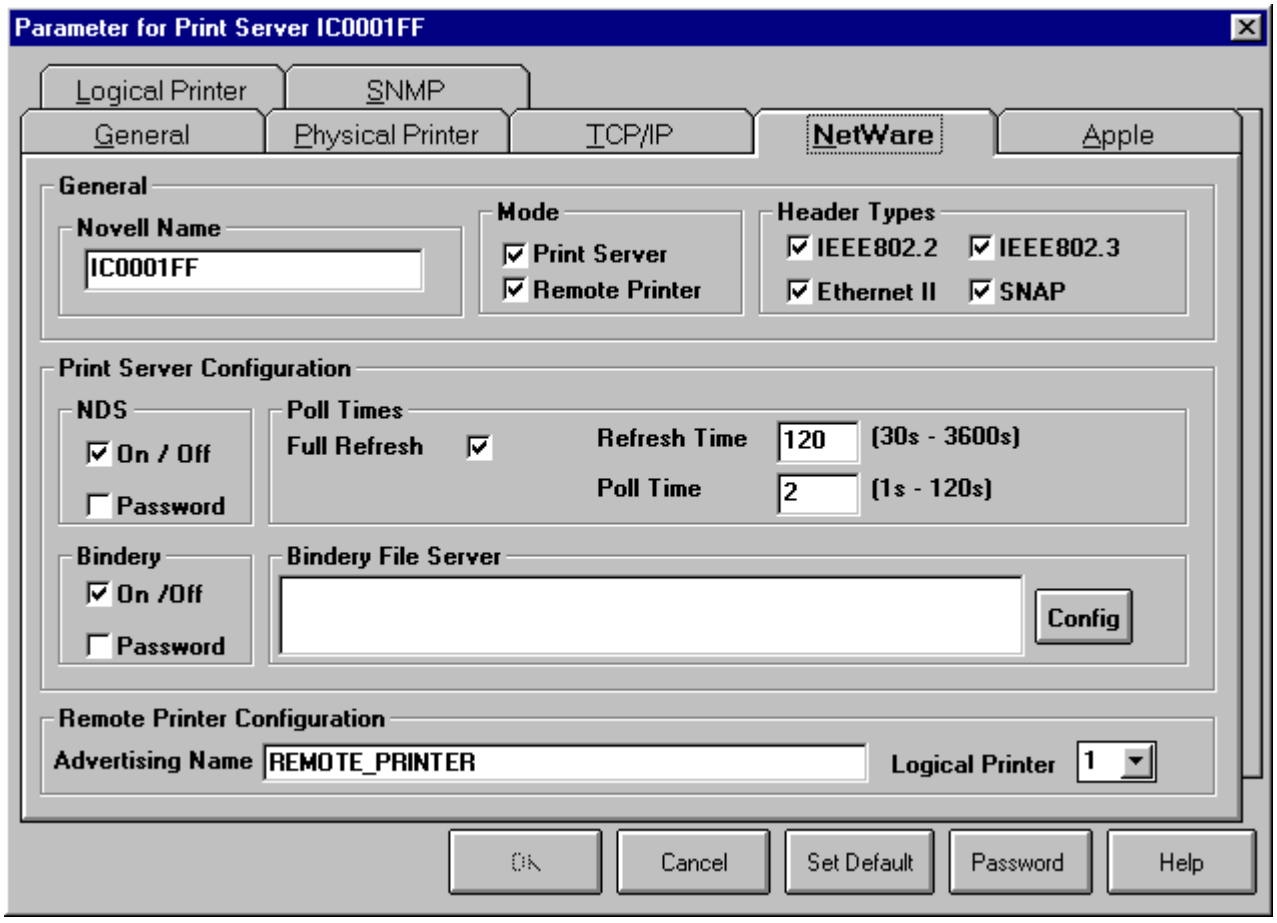
Print server:	`REMOTE_PRINTER`	(Name of the PSERVER.NLM (.EXE)
New printer:	`ICxxxxxx`	(Novell Name of the InterCon-PrintServer)
New print queue:	`QUEUE1`	

  `xxxxxx` = last three groups of the hardware address

  Example: Hardware address: `00:c0:eb:00:01:ff`
  InterCon Novell Name: `IC0001FF`



- Configure the PSERVER.NLM (or PSERVER.EXE under Novell NetWare 3.x) name on the InterCon-PrintServer via HTML browser, Administration Tool or FTP.
  Example: `REMOTE_PRINTER` via Administration Tool



- Start the PSERVER (`PSERVER.NLM` / `.EXE`) and select the newly installed Novell print server. (Example: `REMOTE_PRINTER`)

5.3 Installation as a Novell Print Server

Use the PCONSOLE program to install the InterCon-PrintServer as a Novell print server. Within the print server mode each print server requires its own USER connection.

5.3.1 Novell NetWare 3.x and 4.x (Bindery Mode)

To install the print server in Novell NetWare 3.x and 4.x (bindery mode) you have to:

- activate the Netware 4.x bindery emulation for the context
- enter the print server
- create a print queue or select an existing one
- assign the print server to a print queue as 'queue server'

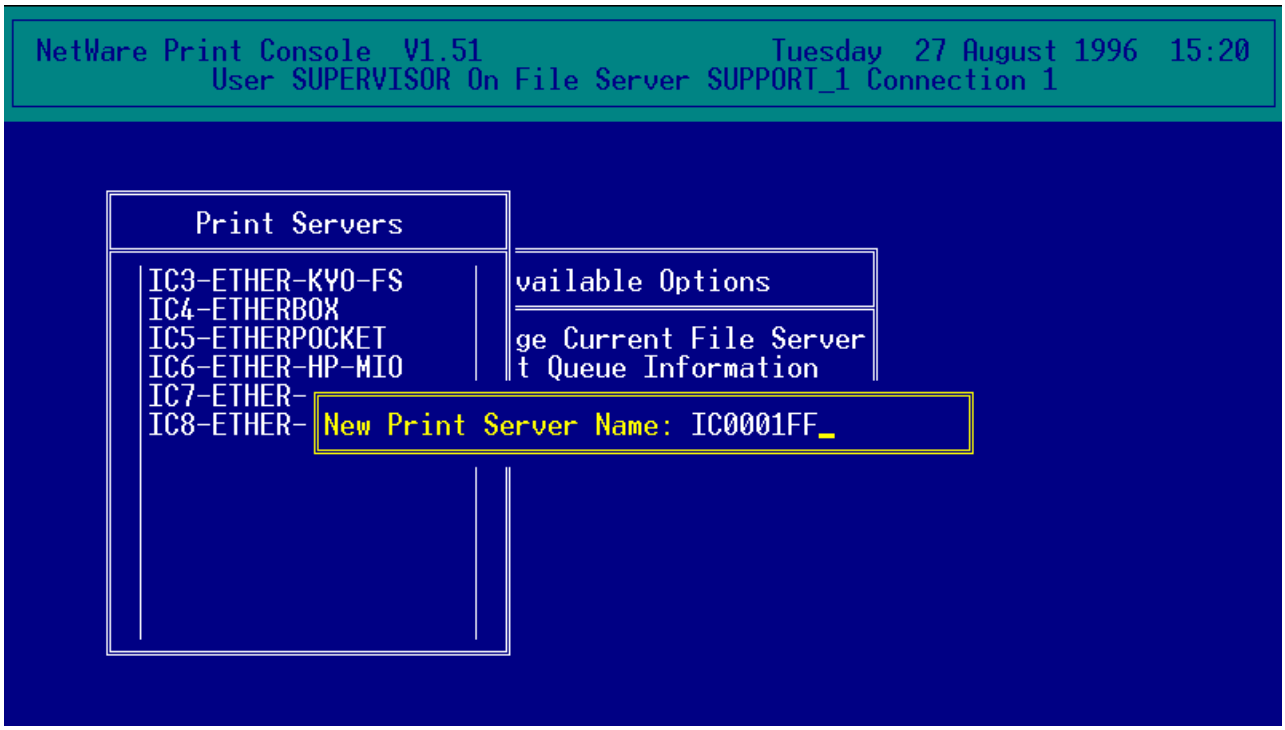
Installation can be done without rebooting the file server.

✘ **Log in as supervisor on a workstation and start the Novell PCONSOLE program.**

5.3.1.1 Setting up a print server

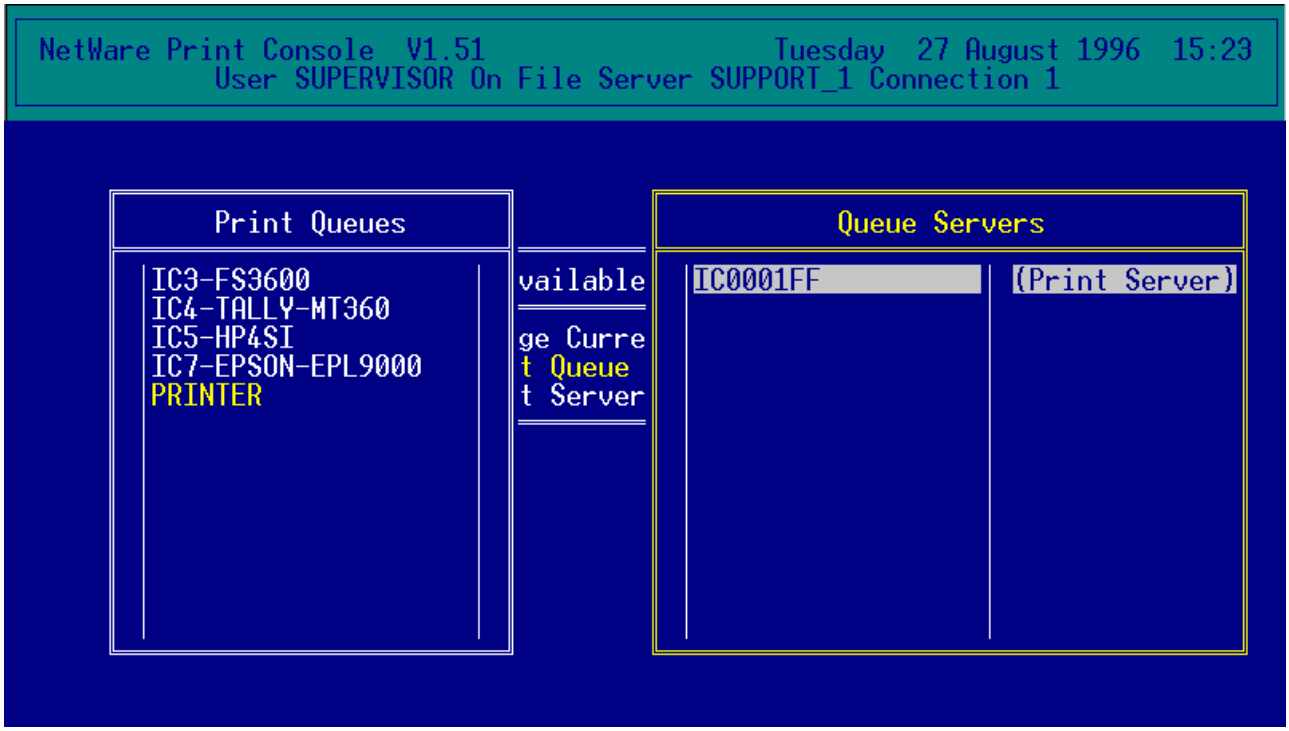
✘ **Novell NetWare 4.x: Start the bindery emulation. Insert `set bindery = <context>` into the file server's console. Activate the bindery mode in the PCONSOLE by pressing the F4 key.**

Select **Print Server Information** in the PCONSOLE program and press **ENTER**; a list of the print servers which are already configured will appear.



Press **INSERT** and enter the name of the print server. Each print server has its own specific name made up out of the two letters IC and the last three groups of its hardware address. This hardware

address is printed on the print server. For example: if the hardware address is `00c0eb0001FF`, then the name of the print server is `IC0001FF`.
In the `PCONSOLE` program's main menu select `Print Queue Information`, press `ENTER` and a list of the print queues which are already configured will appear.



Now select a queue name and press `ENTER`, the `Print Queue Information` menu appears.

Example: `Printer`

Select the menu `Queue Servers` and press `ENTER`. A list of the print servers configured for this print queue is shown on the screen.

Press `INSERT` to configure a new print server for the selected print queue. All available print servers will appear in a list. Now select the name of the print server and press `ENTER`.

Exit the `PCONSOLE` program by pressing `ESCAPE` several times. Your print server can be assigned up to a maximum of 16 print queues.

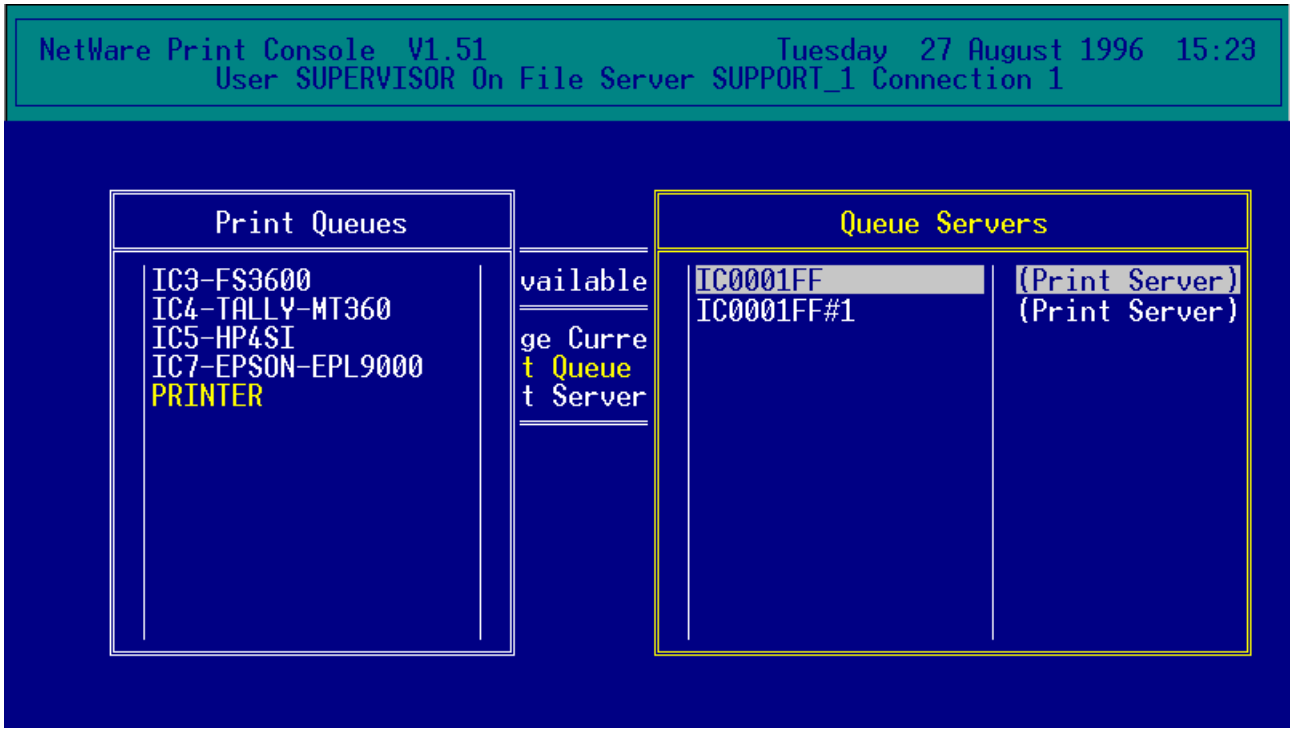
The steps described above must be repeated for each print queue to be serviced.

If the print server needs to service print queues on other file servers in the network, you have to select the other file server with `PCONSOLE` and repeat the installation on this server as described above.

Your print server is now installed as a Novell print server.

5.3.1.2 Allocation of logical printers

To print data via a logical printer you have to install a further print server with the name of the print server and the ending #n (n = 1-8). Assign this print server as a „Queue Server" to the print queue.



The second print server name is no 'real existing print server' in the network. Its only purpose is to assign the logical printers.

5.3.2 Novell NetWare 4.x (NDS Mode)

In order to install the print server under Novell NetWare 4.x (NDS mode) you must:

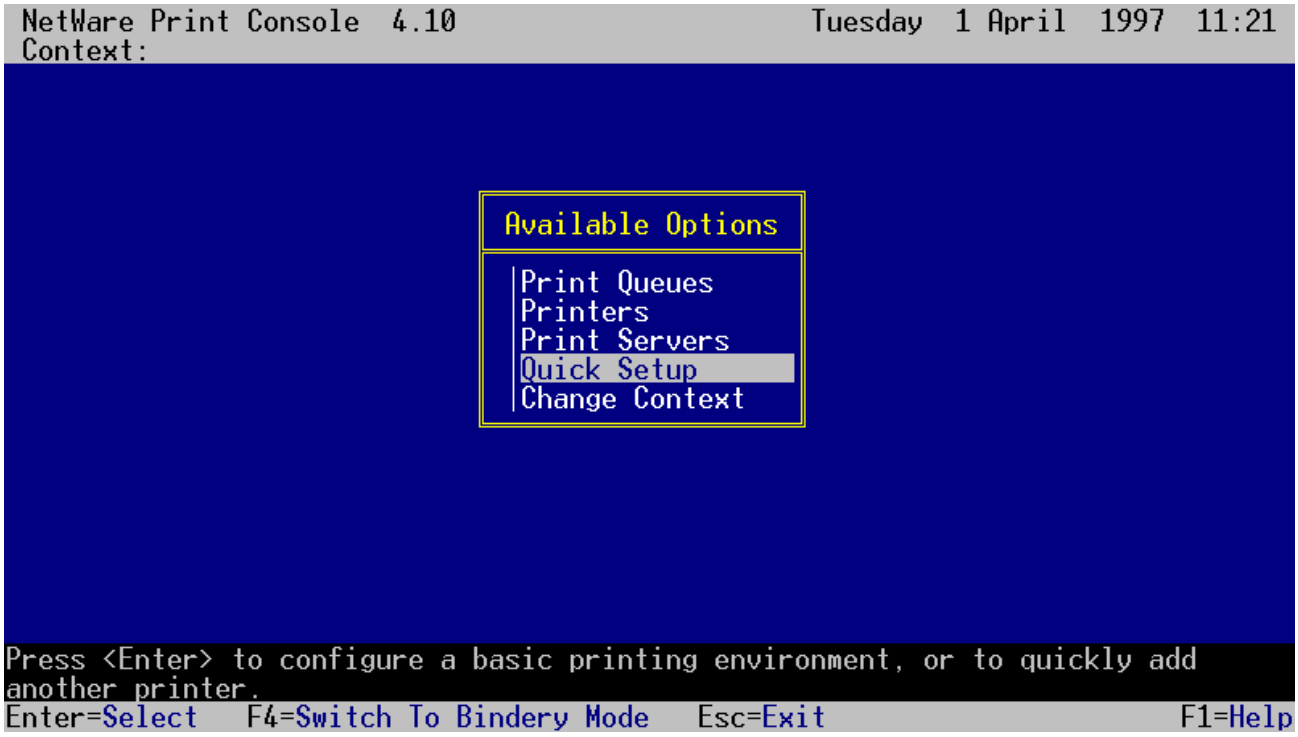
- set up the print server
- set up the printer
- create a print queue or select an existing one

Installation can be done without having to reboot the file server.

✘ **Log in as Admin on a workstation in order to install under Novell NetWare 4.x.**

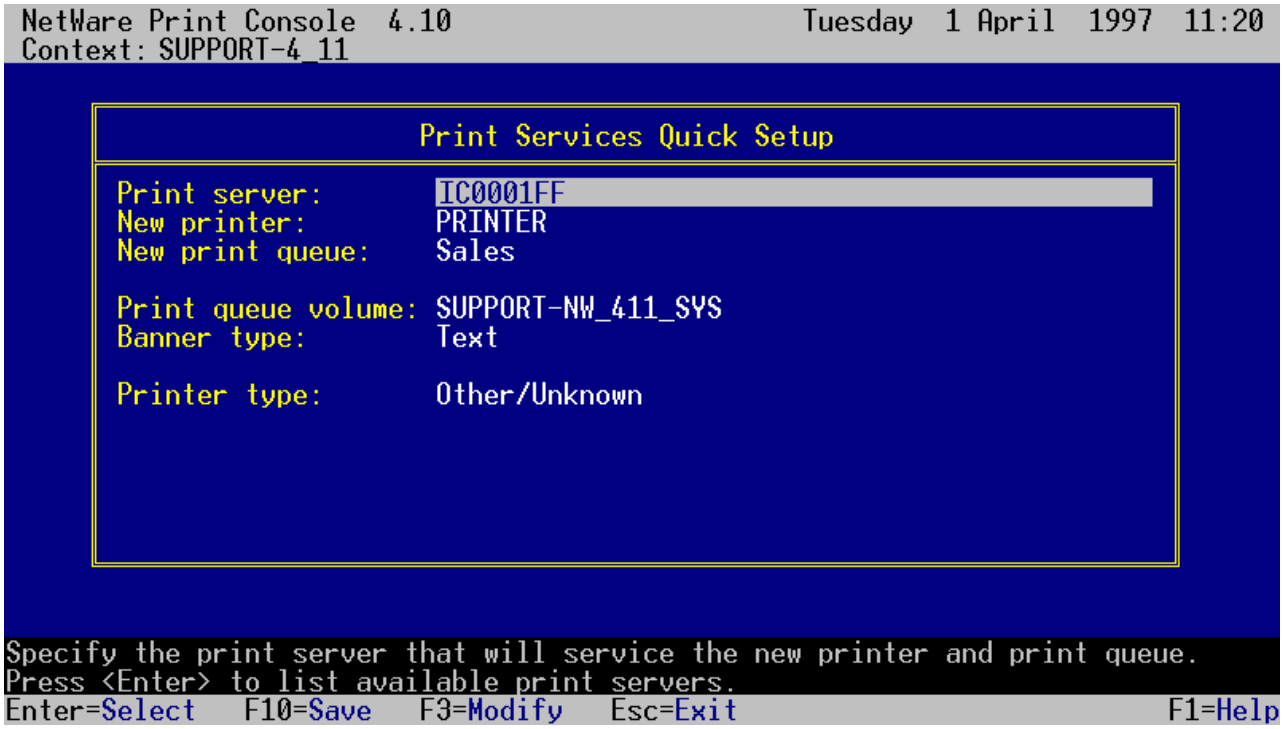
5.3.2.1 Installation via PCONSOLE program (DOS)

Start the PCONSOLE program. Select `Quick configuration` and press `ENTER`.



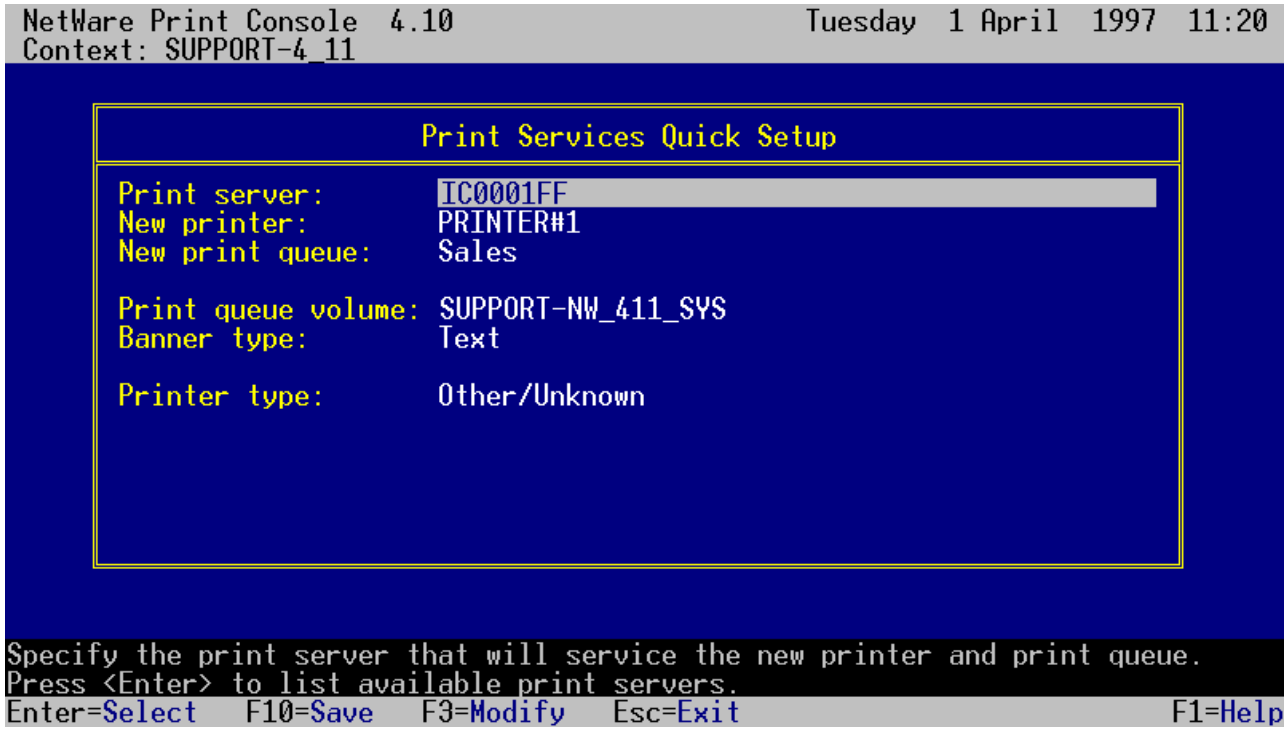
In the `Print Services Quick Setup` enter the name of the print server within the `Print Servers` menu. Each print server has its own specified name made up of the two letters `IC` and the last three groups of its hardware address. This Ethernet hardware address is printed on the print server. For example: if the hardware address is `00c0eb0001FF` the name of the print server is `IC0001FF`.

You can change the print server name using the Administration Tool, via Internet Browser or `ftp` (Default: `ICxxxxxx`). Choose the name of the new printer and print queue as you see fit.



5.3.2.2 Assignment of logical printers

To use a logical printer under Novell NetWare 4.x install the print server as described in chapter 5.3.2.1. Choose the printer name as you see fit, but with the specific ending #n (n = 1-8). Using these numbers you can choose up to eight logical printers.



5.4 Activate a Password on the Print Server

If it is intended to use a print server password on the Novell file server, then this function must be activated in the print server. Use the Administration Tool to activate the automatic password mechanism in the `Netware` menu.

If this parameter is active, the print server logs on to the file server with a new password whenever it restarts. The print server generates the password by randomly.

✘ **This password can not be changed by the user. The print server and the Novell file server interact together to generate a new password every time the print server is started.**

5.5 Novell Protocol Types

The protocol type active on the Novell NetWare file server is automatically recognised by the print server. Supported are IEEE_802.2, IEEE_802.3, Ethernet_II and SNAP (IEEE802.5 Token Ring). After the start the print server tries to connect a Novell file server by using all supported protocol types. Automatic protocol recognition is configured by the manufacturer.

You can use the Administration Tool, an Internet Browser or FTP to change the Frame Header Type to your specific needs.

6 Installation in Windows Networks

This chapter describes the installation of the print server under Microsoft Windows. Within Windows NT 3.51 and NT 4.0, the TCP/IP and LPD protocols are used. For Windows95 you can use the SEH PrintMonitor.

6.1 Windows95 (SEH Print Monitor)

This chapter describes the installation of a print server under Microsoft Windows 95. Use the SEH PrintMonitor to install the print server to Windows95 peer to peer networks. All print jobs will be sent via TCP/IP protocol to the print server.

- install the TCP/IP protocol on your Windows95 PC
- assign an IP address to the print server
- open a „MS-DOS" window
- change the ARP table

```
arp -s <Internet Address> <Hardware Address>
```

Example:

```
arp -s 192.0.0.123 00-c0-eb-00-01-ff
```

✘ **Within some operating systems, for example all Microsoft Windows systems (except Windows NT 4.0), you must contact a workstation in the network via the `ping` command before using the `arp` command for the first time. If this is not possible in your network you have to use the Administration Tool (IPX protocol) for configuration.**

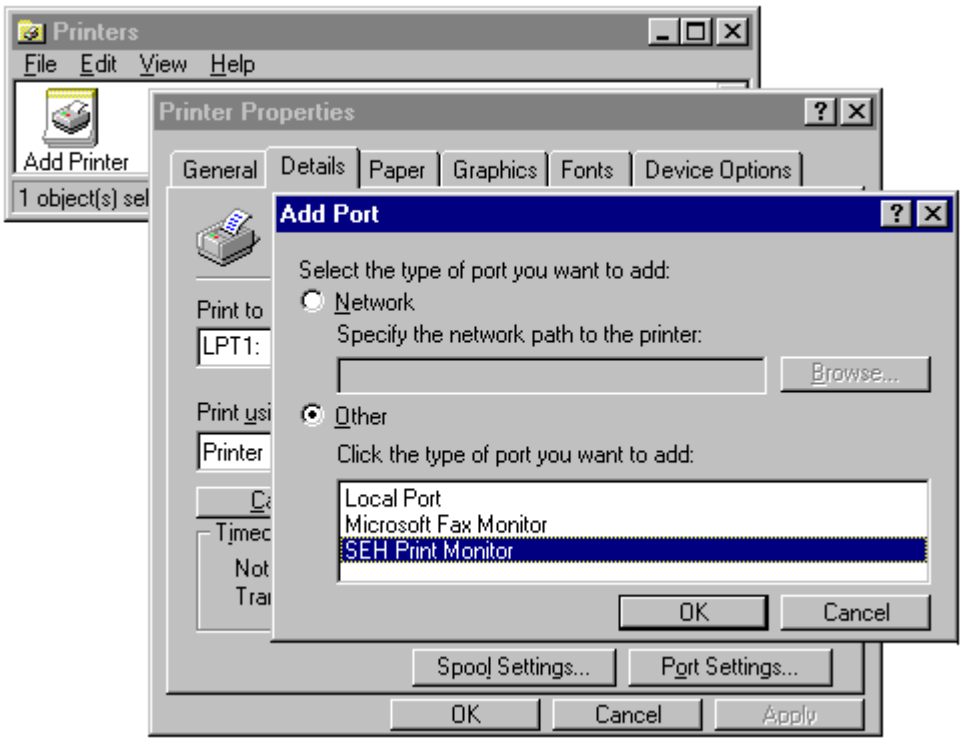
- assign a new IP address to the print server

```
ping  <Internet address>
```

Example:

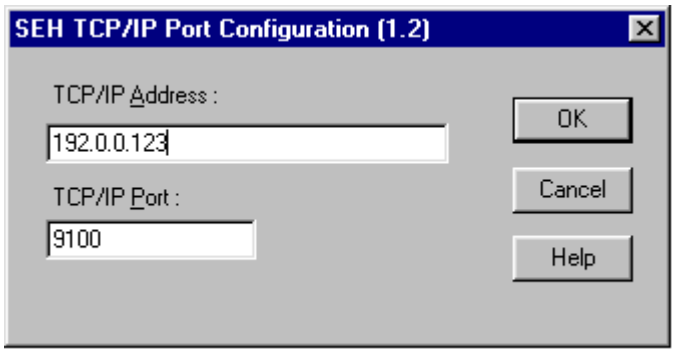
```
ping 192.0.0.123
```

- install a new printer as local printer. Use *LPT1: printer* as the assigned printer port
- start the `PRINTMON.EXE` installation program. Follow all prompts.



- Select a new printer driver for the print server and change the *Printer Properties*. Select *Add Port* . In the *Other* menu the SEH PrintMonitor is displayed.

- Insert the IP address and the TCP/IP port of the print server



In place of the IP address you can also enter the host name (from PrintMonitor Version 1.7 onwards). Please change the entry in the file in the file `c:\windows\hosts`.
For example:

```
# Hosts file: names of the local hosts
#
# Hosts Format:
#  IP_NUMBER            HOSTNAME        ALIASES
#
#
192.0.0.123    printer1
```

TCP/IP-Port =	2900: Bi-directional communication	(logical printer No.8)
	9100: Standard port	(logical printer No.1)

The installation is complete.

6.2 Windows NT 3.51

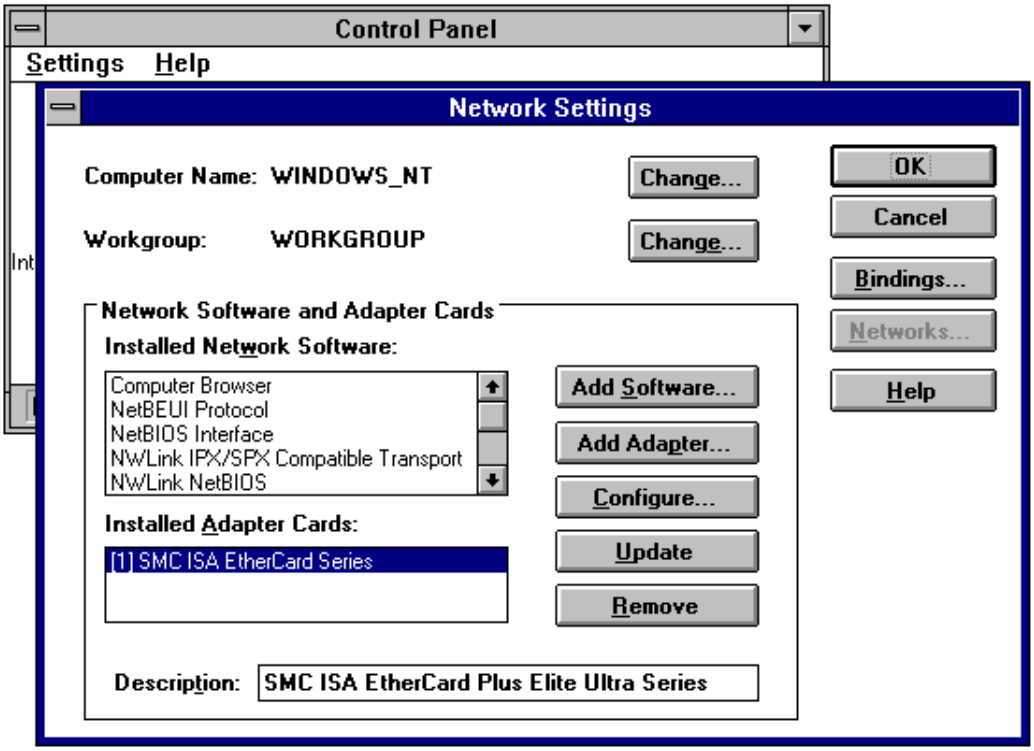
In order to use the print server in Windows NT 3.51 networks you must install an IP address on to the print server. The TCP/IP and LPD protocols must also be activated on the NT server.

6.2.1 Starting the TCP/IP and FTP Services under Windows NT

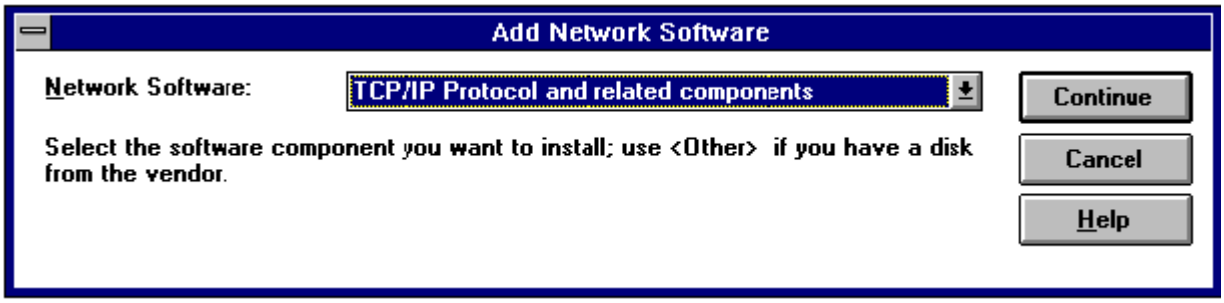
Install the TCP/IP protocol and other services.

• click on the `Control Panel` symbol

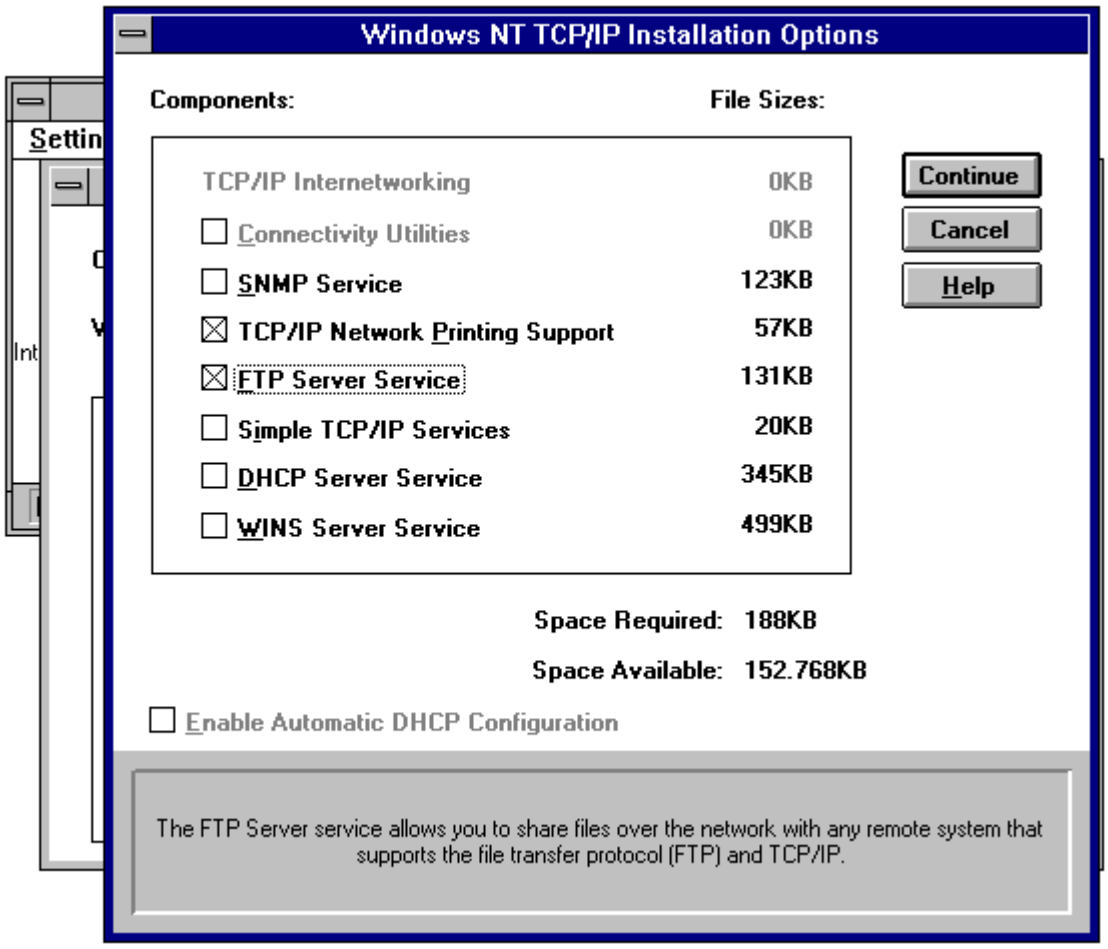
• click on the `Network` symbol. The following window will open:



• activate `Add Network Software` and choose TCP/IP Protocol and related components. Now press the `Continue` button.



- Select `TCP/IP Printer Support` and `FTP Server Service` and activate the `Continue` button. Now both services will be installed.



- Click the `OK` button within the `Network Properties` menu. You will now be asked to enter some TCP/IP address information. To configure the protocol, you need the IP address and the subnet mask of the network board of your server. Ask your network administrator to get this address information. Now press the `OK` button.

6.2.2 Saving the IP Address on the Print Server

• open a „MS-DOS“ window

• change the ARP table of your computer

Within the ARP table, the allocation of the IP address to the physical hardware address is saved. With the help of this table the IP address of the print server can be assigned using the network.

✘ **Within some operating systems, for example all Microsoft Windows systems (except Windows**

NT 4.0), you must contact a workstation in the network via the `ping` command before using the `arp` command for the first time. If this is not possible in your network you have to use the Administration Tool (IPX protocol) for configuration.

```
arp -s <IP address> <Hardware address>
```

Example:
`arp -s 192.0.0.123 00-c0-eb-00-01-ff`

• enter the PING command to assign the IP address to the print server

```
ping  <IP address>
```

Example:

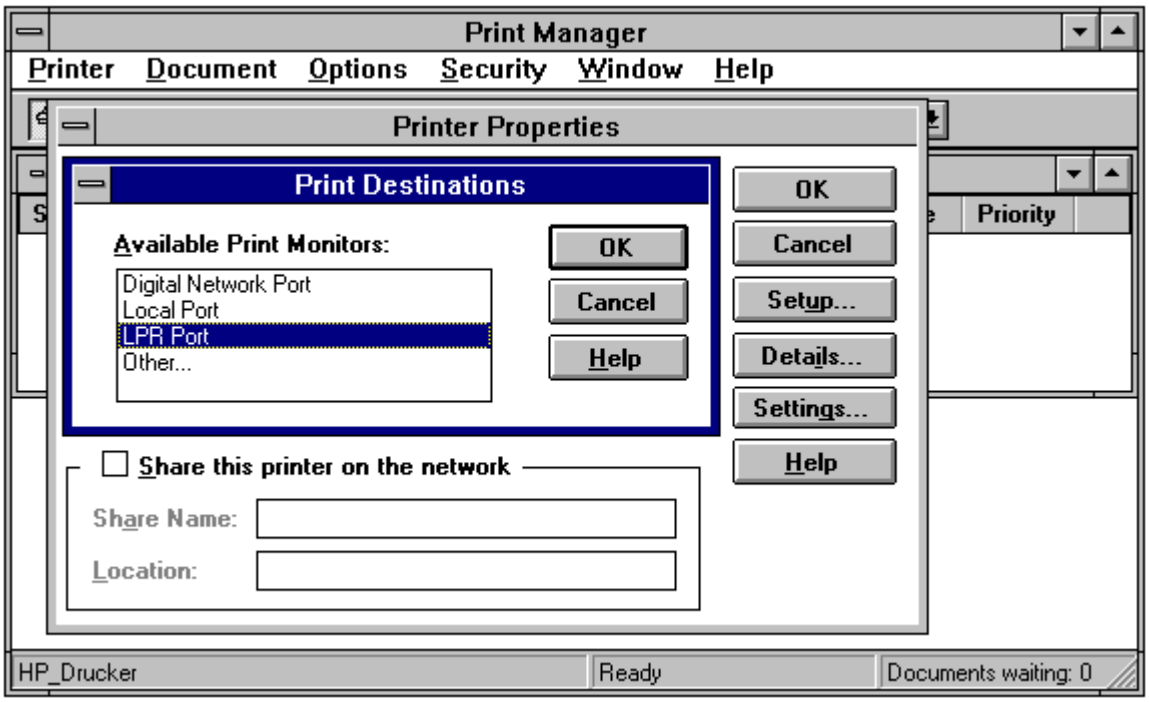
```
ping 192.000.000.123
Pinging 192.000.000.123 with 32 bytes of data:
Reply from 192.000.000.123: bytes=32 time=55ms TTL=32
Reply from 192.000.000.123: bytes=32 time=2ms TTL=32
Reply from 192.000.000.123: bytes=32 time=2ms TTL=32
Reply from 192.000.000.123: bytes=32 time=2ms TTL=32
```

Now the print server has saved its IP address and can be connected to the spooler system. You can furthermore send print jobs via `ftp` to the print server.

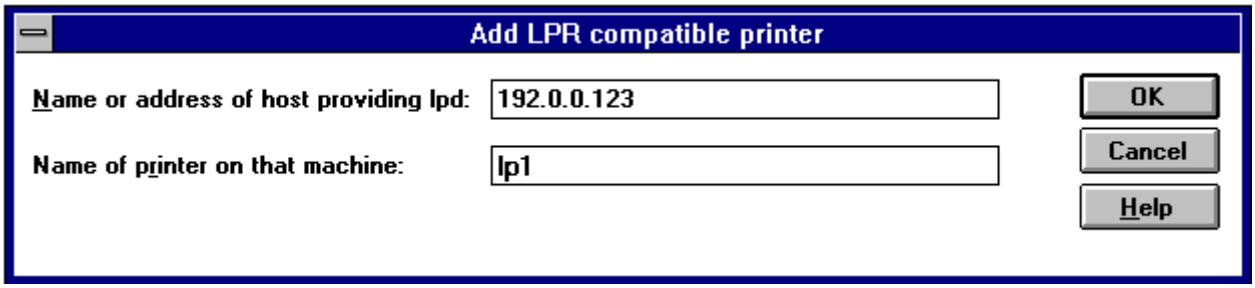
6.2.3 Adding the Print Server to the Windows Print Manager

- activate the `Print Manager`.
- select the printer driver and choose `Properties` within the `Printer` menu.
- Choose `Others ...` in the `Print Destination` menu.

- Select `LPR Port` as Print Monitor. Click the `OK` button.



- Enter the name of the print server at `Name or address of host providing lpd:`. The `Name of the printer on that machine` has to be the name of the logical printer of the print server (lp1-lp8). If no name is chosen, all print jobs will be printed via the logical printer No. 1 (Default: lp1).



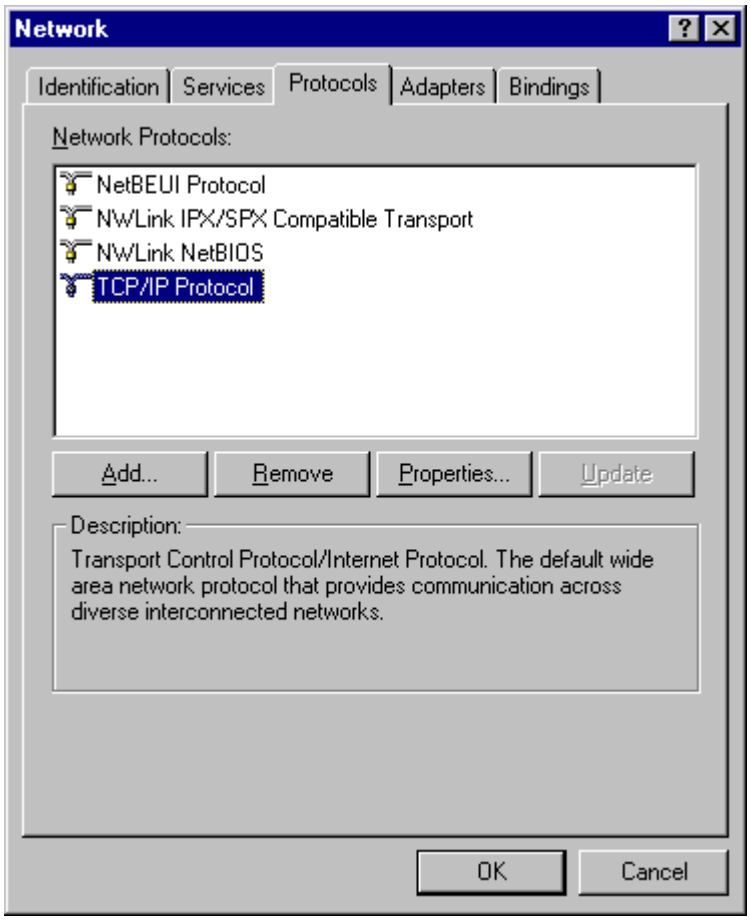
The installation is complete.

6.3 Windows NT 4.0

In order to use the print server in Windows NT 4.0 networks you must install an IP address on to the print server. The TCP/IP and LPD protocols must also be activated on the NT server.

6.3.1 Starting the TCP/IP Protocol under Windows NT

• Click on START and activate the Control Panel. Now choose the Network icon. In the Protocols menu you can install network protocols. Choose the TCP/IP protocol and press to OK button.



• You will now be asked to enter some TCP/IP address information. To configure the protocol you need the IP address and the subnet mask of the network board of your server. Ask your network administrator to get this address information. Now press the OK button.

Your Windows NT 4.0 Server now supports the TCP/IP protocol.

6.3.2 Saving the IP Address on the Print Server

• Open a „MS-DOS“ window

• Change the ARP table of your computer

Within the ARP table the allocation of an IP address to the physical hardware address is saved. With this table the IP address of the print server can be assigned via network.

✘ **Within some operating systems, for example all Microsoft Windows systems (except Windows NT 4.0), you must contact a workstation in the network via the `ping` command before using the `arp` command for the first time. If this is not possible in your network you have to use the Administration Tool (IPX protocol) for configuration.**

```
arp -s <IP address> <Hardware address>
```

Example:
`arp -s 192.0.0.123 00-c0-eb-00-01-ff`

• Enter the `PING` command to assign the IP address to the print server

```
ping  <IP address>
```

Example:
`ping 192.000.000.123`

```
Pinging 192.000.000.123 with 32 bytes of data:

Reply from 192.000.000.123: bytes=32 time=55ms TTL=32
Reply from 192.000.000.123: bytes=32 time=2ms TTL=32
Reply from 192.000.000.123: bytes=32 time=2ms TTL=32
Reply from 192.000.000.123: bytes=32 time=2ms TTL=32
```

Now the print server has saved its IP address and can be connected to the spooler system. From now on you can send print jobs using `ftp` to the print server.

6.3.3 Installing the Microsoft TCP/IP Printing Services

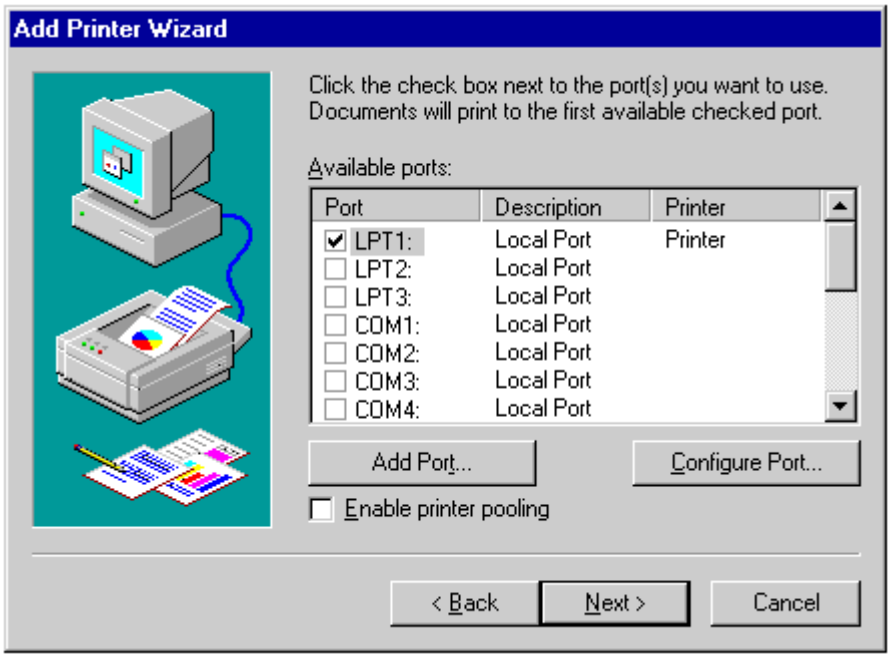
In order to print via TCP/IP you have to install the TCP/IP Printing Services.

Activate the `Control Panel.` Choose `Network.` Click `Services` within the `Network` menu. Now select `Microsoft TCP/IP Printing` and press the `OK` button. Now you can select a LPR port (for printing via TCP/IP and LPD protocol) within the *`Printer Ports`* menu.

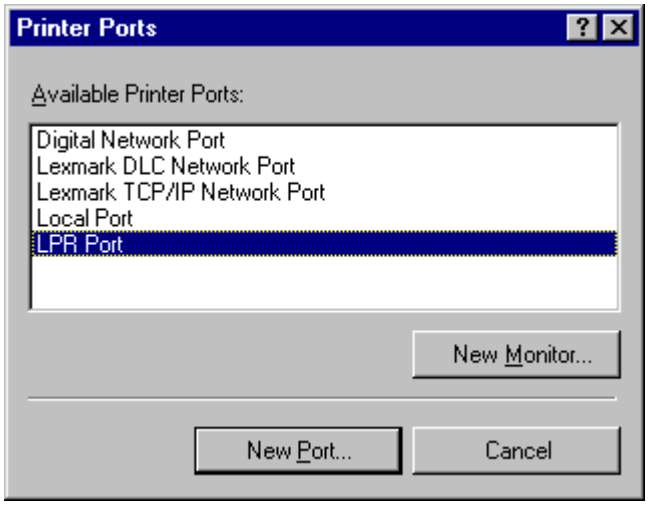
6.3.4 Adding the Print Server to the Windows Print Manager

- Click on START and choose the `Control Panel.` Now click on the `Printer` icon. Choose your printer or install a new printer driver.

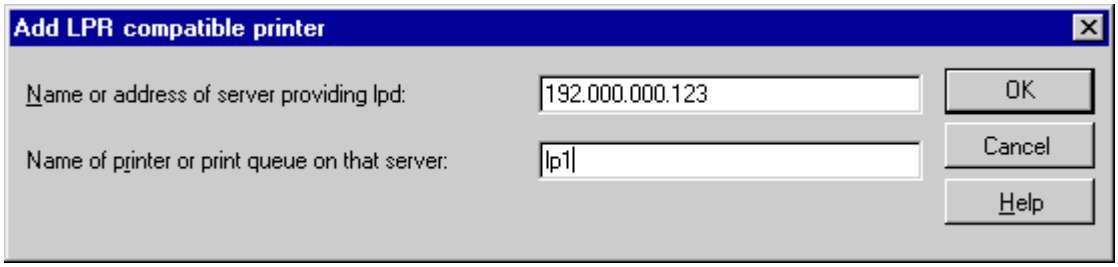
- In the `Printers` menu select `Add Printer Wizard`, then `Printer Ports` and finally choose `Add LPR compatible printer.`



- Choose the `LPR port` from the `Printer Ports` menu.



• You will now be asked to enter some TCP/IP address information. To configure the LPR port you need the IP address and the logical printer serving the print jobs of the printer.



Enter the name of the print server at `Name or address of host providing lpd:`. The `Name of the printer on that machine` must have the name of the logical printer of the print server (lp1-lp8). If no name is chosen, all print jobs will be printed via the logical printer No. 1 (Default: lp1).

The installation of the print server under Windows NT 4.0 is complete.

6.4 Changing the Print Server Configuration

IPX protocol:
You can change the print server configuration using the Administration Tool. To use this software tool the IPX protocol **must** be installed on your Windows NT system.

TCP/IP protocol:
The configuration of the print server can also be changed via FTP. Open a FTP connection to the print server and load the configuration file named `params` onto your computer. This file contains all parameters and settings of the print server and can be edited.

Example:

```
C:\>ftp 192.0.0.123
Connected to 192.0.0.123.
220 IC0001FF FTP server (InterCon version 8.1.10) ready.
User (192.0.0.123:(none)):
230 User (none) logged in.
ftp> get params
200 PORT command successful.
150 ASCII data connection for params (192.0.0.100,1041).
226 Transfer complete.
2313 bytes received in 0.61 seconds (3.79 Kbytes/sec)
ftp> quit
221 Goodbye.
```

Save your edited parameters using the `put` command. The print server will change its configuration after the FTP connection is closed using the `quit` command.

Example:

```
C:\>ftp 192.0.0.123
Connected to 192.0.0.123.
220 IC0001FF FTP server (InterCon version 8.1.10) ready.
User (192.0.0.123:(none)):
230 User (none) logged in.
ftp> put params
200 PORT command successful.
150 ASCII data connection for params (192.168.0.49,1044).
226 Parameter file written, please QUIT.
2313 bytes sent in 0.00 seconds (2313000.00 Kbytes/sec)
ftp> quit
221 Goodbye.
```

This page was intentionally left blank.

7 Installation in UNIX Networks

A print server is an independent host in your local Internet network. To gain access to this host different addresses are used on the different levels of the communication protocols.

This chapter shows how to install the print server in different UNIX networks with different protocols.

7.1 Functional Overview

A host is addressed by its world-wide unique **hardware address**. This hardware address is pre-set in the network interface of the host by the manufacturer.

On the Internet protocol level the host is addressed by its **Internet address**. This address consists of four address groups which are separated by a period and which have values between 0 and 255. The Internet addresses in a local network must be unique and assigned by the system administrator.

On the user level, the host is normally addressed by its name which can be chosen by the user. This **hostname** is used at user level by network services like FTP (File Transfer Protocol).

Before installing the print server into your network you must determine all parameters needed or ask your system administrator for the values. All changeable parameters may be loaded, edited and saved in the `params` file using `ftp`.

Printer Hardware Address

This address is pre-set by the manufacturer and can be found on the print server (refer to the Appendix). The address consists of 12 hexadecimal numbers divided into 6 address groups of two numbers each. The first three address groups designate the manufacturer of the network board. The last three address groups stand for the individual board.

Example:
If you see the hardware address 00c0eb0001ff on your print server, the manufacturer code is 00c0eb, while 0001ff is the individual number of your print server.

For better readability, the 6 address groups of the hardware address are normally separated in by a period or a colon in data entries. In our example, it would be written:

`00.c0.eb.00.01.ff or 00:c0:eb:00:01:ff.`

Hostname of the Print Server

This entry is the hostname by which the print server will be addressed in the local network. You may choose any name, but it is recommended to use a name which has some connection to the network board or printer used.

Internet Address of the Printer

The Internet address is the address by which the printer will be logically addressed in your local network. This address may not be used more than once in your local network. No other restrictions are made, but it would be better to ask your system administrator for a free network Internet address. An Internet address is marked free if this address is not entered in the `/etc/hosts` file on any of the local network computers.

A 4 Byte long Internet address is made up of a Network ID and a Host ID. However, the address depends on the network classification used; in a classification C network, the Network ID is formed by the first 3 Bytes of the Internet address.

Example:
You have a Network ID of classification C and you have been allocated the Network ID 192.0.0. The Host IDs 0 and 255 are reserved for broadcast addresses. So your valid Internet addresses lie in the range from 192.0.0.1 to 192.0.0.254, for example 192.0.0.123.

Net Mask

Certain bits of the Host ID of an Internet address can be used to describe sub-networks. The network mask assigns the separation into (sub) Network ID and Host ID.

Example:

Without using sub-networks, the NetMask in the example above would be 255.255.255.0. If one bit of the Host ID is used to define two sub-networks, the Net Mask has to be set to the value 255.255.255.128.

Now the Host IDs will be restricted to the range from 1 to 127. Following Internet addresses would then be valid:

192.0.0.1 - 192.0.0.127 in the first subnet,
192.0.0.129 - 192.0.0.254 in the second subnet.

Default Gateway

The is the gateway's Internet address to which the print server sends IP packets destined for other networks.

Printer Name

Your print spooler uses this name to address the printer after installation. This name can be freely chosen, but must be unique in your network. It may be useful if the name describes the connected printer. You can assign several logical printers to a physical printer which use different printer emulation.

Example:

You installed a printer. A good name may be printer1 or printer1_ps for the same physical printer in postscript emulation, or printer1_hp for the emulation of a HP LaserJet.

Print Spooler

The print server supports the print spoolers `lpsched` (*System V UNIX*), `lpd` (*BSD UNIX*) and `qdaemon` (*AIX*). Please refer to your systems manual or ask your system administrator which of the UNIX variations is installed on your workstation, and which print spooler is selected. If you can see the `/usr/lib/lpsched` file installed on your system you may have a System V UNIX or BSD, and UNIX if the files `/usr/lib/lpd` and `/etc/printcap` are installed.

Network Service BOOTP and RARP

Please find out now if any, or which of these network services are available in your system. If the files `/etc/bootpd` (ULTRIX: `/usr/etc/bootpd`) and `/etc/bootptab` are present, then BOOTP is implemented. If the files `/usr/etc/rarpd` and `/etc/rarpd.cf` or `/etc/ethers` are installed, then the RARP service is available. Depending on the UNIX implementation of your system the files may have different pathnames.

Using the 8 TCP ports

Besides the access to the printer ports of the print server gained via FTP, the print server provides a TCP socket for each printer port. The socket's port number may be assigned parameters (refer to logical printer). This option is primarily aimed at hosts supporting a direct TCP/IP connection of network printers.

7.2 How to install the Print Server to UNIX Networks

First of all, the print server must be installed as a TCP/IP host. The description of this installation step can be found in section 7.3 *Installation as a TCP/IP Host*. Please refer to this section and follow these steps:

- enter the print server into the `etc/hosts` file
- enter the print server into the ARP table (or install a boot protocol)

Integrating the print server to the spooler system of your UNIX system depends on the chosen installation:

Installation as a remote printer:
This integration uses the Line Printer Daemon Protocol (LPD). The printer has to be registered into the UNIX spooler system. Please refer to details in section *7.7 Installation As a Remote Printer (LPD).*

Installation as a network printer:
Some UNIX systems support an integration of network printers via a direct TCP connection. The print server offers TCP ports with configurable port numbers for a direct data transfer to each single printer port.

This installation depends on your UNIX system. Installation notes can be found in section *7.8 Installation As a Network Printer (TCP).*

Installation as a local printer:
You install a local printer (from the view of the UNIX spooler). The printer interfaces transfer the print job data via File Transfer Protocol (FTP) to the print server.
In order to enable this, the printer interfaces (shellscripts) have to be adapted to your system. Finally, the printer has to be integrated into the UNIX spooler system.
Section 7.8 *Installation As a Local Printer* describes the process.

You might also use the possibility to send data via FTP directly to the print server, bypassing the UNIX spooler system in the process. For details please refer to section *7.6 Printing without the UNIX Spooler System*

✔ **In the following description of a print server in UNIX networks, the print server (in connection with a printer) will be referred to as a network printer or print server host (and FTP server).**

7.3 Allocation of the IP Address

Generally, TCP/IP Hosts may be addressed at the user command level (for example ping, ftp, tftp) either by their names or directly via the Internet address. On the Internet protocol level only the Internet address is used, and on the lower Ethernet protocol level the hardware address is used. Allocation of hostnames, Internet and hardware addresses are saved in the files shown below:

`/etc/hosts`	allocation of hostnames to Internet address
`/etc/bootptab`	allocation of Internet address to hardware addresses
`/etc/rarpd.cf`	allocation of Internet address to hardware addresses
`/etc/ethers`	allocation of hostname to hardware addresses

The `/etc/hosts` file can be found on each computer connected to the network. The other files only exist if special network services are implemented.

While the allocation of a hostname to the Internet address is saved in the `/etc/hosts` file, the information about the allocation of the 'Internet to hardware address' is stored in an internal system table. This table is managed by the '*Address Resolution Protocol*' (ARP). The ARP table may be listed and edited by the user command `arp`.

When the print server is switched on for the first time, it sends a broadcast message asking for its Internet address. The protocols DHCP, BOOTP and RARP are used alternately. Whether the broadcast message is sent or not, and which protocols are used, depends on the parameter settings.

If one of these services is available in the network and if its configuration file has the requested data, an answer is sent to the print server. The print server now permanently saves its Internet address (meaning that the print server will know its Internet address the next time it is switched on). When a UNIX Computer addresses the print server host via ftp, it examines its ARP table for the hardware address of the print server. If this address is non-existent (or out of date) the UNIX computer sends a broadcast request for the address into the network using the ARP protocol. Since the print server already knows the allocation, it answers the request. After updating the entry in its ARP table, the UNIX computer tries to establish the `ftp` connection to the print server.

If neither a DHCP / BOOTP nor a RARP server responds to the print server's Internet address request, the print server host uses the first network telegram addressed to its hardware address to determine its Internet address. In order to specifically send such a telegram, the UNIX computer must have the print server's hardware address listed its ARP table. This address must be manually entered into the ARP table.

The TCP/IP print server host installation consists of the following steps. Depending on the UNIX system used some of the following steps may be skipped:

- Updating the `/etc/hosts` file
- Updating the internal system ARP table.
  (Skip if the DHCP/BOOTP or RARP service is implemented in your system)

or

- Installation of a boot protocol

✘ **The installation of the print server host must be done as a privileged user. The computer used for this installation must be located in the same (sub-) network as the print server.**

Please log-in as a privileged user (root) into a computer located on the same network as the print server. The system now prompts #.

7.3.1 Updating the /etc/hosts File

Go to the directory /etc and insert a line into the /etc/hosts file. This line should contain the allocation between the Internet address and the hostname of the print server host.

```
<Internet address>     <Hostname>
```

In our example, the line would be:

```
192.0.0.123            IC0001FF
```

7.3.2 Updating the Internal ARP System Table

If neither the BOOTP service nor the RARP service is activated, please enter the hostname of the print server and its hardware address in the ARP table using the following command line:

```
# arp -s <Hostname> <Hardware address>
```

In our example, the line would be:

```
# arp -s IC0001FF 00:c0:eb:00:01:ff
```

This entry is now saved in the ARP table permanently. This means that this entry is available until your UNIX computer is booted again.

On IBM´s AIX (Ethernet) operating system, the ARP command has the following format:

```
# arp -s ether <Hostname> <Hardware address>
```

In our example, the line would be:

```
# arp -s ether IC0001FF 00:c0:eb:00:01:ff
```

For an installation to a Token Ring network, please refer to your system's manual pages concerned with `arp`.
The installation of the print server as a TCP/IP Host is now complete. Connect the print server to your network and switch on the print server.

Use the `ping` command to check if the print server is addressable under TCP/IP. Please type in the following command:

```
# ping <Hostname>
```

In our example the command would be:

```
# ping IC0001FF
```

The implementation of the `ping` command is system dependent, so please refer to the `ping` section of the manual.

If the print server is addressable under TCP/IP, you can gain access via `ftp` to the print server Host. Details may be found in the appendix of this manual.

7.3.3 Boot Protocol BOOTP

In order to use the boot protocol BOOTP follow the description in this chapter step by step.

Updating the /etc/bootptab file

If the BOOTP service is installed on your system please insert this entry in your `/etc/bootptab` configuration file:

Ethernet: `<Hostname>:ht=ether:ha=<Hardware adr>:ip=<Internet adr>`
Token Ring: `<Hostname>:ht=tr:ha=<Hardware adr>:ip=<Internet adr>`

In our example, the line would be:

Ethernet: `IC0001FF:ht=ether:ha=00.c0.eb.00.01.ff:ip=192.0.0.123`
Token Ring: `IC0001FF:ht=tr:ha=00.c0.eb.00.01.ff:ip=192.0.0.123`

Please note that all address groups of the hardware address are separated by (optional) periods in this file entry, whilst the colons separate the individual fields.

In the ULTRIX operating system the format of the `etc/bootptab` file differs from the format shown here. Here the entry has this format:

Ethernet: `<Hostname> 1 <Hardware adr> <Internet adr>`
Token Ring: `<Hostname> 6 <Hardware adr> <Internet adr>`

In our example, the line would be:

Ethernet: `IF001FF 1 00:c0:eb:00:01:ff 192.0.0.123`
Token Ring: `IF001FF 6 00:c0:eb:00:01:ff 192.0.0.123`

All field entries are separated by a tab. Please also refer to the manual pages of your system under the section `bootp`.

Error! Bookmark not defined.**Adapting the Files /etc/inetd.conf and /etc/services**

Normally the BOOTP service is not active all the time. It is activated by a request from the network daemon inetd. This daemon uses the configuration file `/etc/inetd.conf` to determine which service is activated by which request. If order for `inetd` to start the BOOTP daemon `bootpd`, the `/etc/inetd.conf` file must contain the following line:

```
bootps dgram udp   wait  root  /etc/bootpd bootpd
```

Please make certain that this entry exists and that it is not marked as a comment (the # -character indicates a comment line).

The used port numbers and protocols of the services are determined in `/etc/services`. Please make sure that the file contains the following lines:

```
bootps      67/udp        # bootp server
bootpc      68/udp        # bootp client
```

If you changed the `/etc/inetd.conf` file, a signal 1 (HUP) must be sent to `inetd` so that this process re-reads the configuration file `/etc/inetd.conf`. The process ID of `inetd` is located in the first column of the following command:

```
# ps -e | grep inetd
```

Now send the signal 1 to the process `inetd`:

```
# kill -1 <PID of inetd>
```

The adaptation of the BOOTP service to the print server Host is finished.

7.3.4 Boot Protocol RARP

In order to use the RARP boot protocol RARP follow the description in this chapter step by step.

Updating the /etc/rarp.cf File

If the RARP service is installed on your system either the `/etc/ethers` file or the `/etc/rarpd.cf` file has to be updated. Which file should be supplemented depends on the implementation of the RARP service in your UNIX system. Please read the manual page about `rarpd`.

Please insert a line in the RARP configuration file `/etc/rarpd.cf` containing the allocation of the Internet address to the hardware address of the print server.

Syntax: `<Internet address>` `<Hardware address>`

Example: `192.0.0.123` `00:c0:eb:00:01:ff`

Updating the /etc/ethers File

Please insert a line into the `/etc/ethers file` containing the allocation of the hardware address to the hostname of the print server.

Syntax: `<Hardware address>` `<Hostname>`

Example: `00:c0:eb:00:01:ff` `IC0001FF`

Now the adaptation of the RARP service to the print server host is completed. Please check whether `rarpd` will be automatically started after a system boot or not.

(for example in `/etc/rc.local` or `/etc/rc2.d/S...`).

7.4 Changing the Print Server Configuration

In order to change the print server configuration, a configuration file must be created. This file is sent to the print server host using the `ftp` command. The best way to create the configuration file is to download the file from the print server host via `ftp` for editing purposes. The following lines show how it is done:

Go to the directory where the configuration file is to be created. Now start the File Transfer Protocol and connect to the print server host:

```
% ftp 192.0.0.123
```

You will be asked for the username. The entry is arbitrary. List all files of the print server host:

```
ftp> ls
```

The FTP server on the print server host will respond like this:

```
200 PORT command successful.
150 ASCII data connection for NLST (192.0.0.120,9100).
sys5.sh
bsd.sh
aix.sh
params
status
226 Transfer complete.
41 bytes received in 0.11 seconds (0.37 Kbytes/sec)
```

The `*.sh` files are shellscripts for the installation as a „local printer". The next file in our example is the print server configuration file `params`. Get this file by entering the following command:

```
ftp> get params
```

Edit the configuration file. Any text editor (for example vi) may be used. To save the modified configuration parameters on the print server please call up the File Transfer Protocol and connect to the print server host. Upload the configuration file to the print server host:

```
ftp> put params
```

If the name of the configuration file does not match the file name on the print server host, you have to enter the destination file name expected by the print server host:

```
ftp> put CONFIG.DAT params
```

The file will now be sent and the configuration parameters will be saved in the print server. The red LED of the print server remains active during this process. This process lasts about 5 seconds. After this, the FTP server responds:

```
226 Transfer complete.
```

Please end the FTP process: `ftp> quit`

The print server restarts automatically.

7.5 Changing an existing IP Address

Should the print server be installed in different networks with differing IP addresses, then it could be possible that the saved print server's IP address is no longer recognised.

In order to save a new print server IP address permanently you can choose from three possibilities:

1. Change in the configuration file
2. Re-entry into the ARP table
3. Change via boot protocols

1. Change of the configuration file

Load the configuration file via `ftp`. Change the `ip_address` parameter with an editor. Save the configuration file on the print server.

2. Re-entry into the ARP table

Switch off the print server. Delete all print server entries from the boot protocols (DHCP/BOOTP or RARP) and the ARP protocol configuration files to avoid that the print server gets an IP address assigned from the boot protocol after being switched on.
Now enter the new IP address into the `/etc/hosts` file. Change the ARP table by entering the ARP protocol again.
Enter the `ping` command and switch on the print server which will now get a new IP address.

✔ **The `ip_autoconf` parameter must be switched on.**

3. Change by boot protocol

Change the configuration file of the boot protocol by entering the new IP address. Restart the boot protocol and switch on the print server.

7.6 Printing without the UNIX Spooler System

The printer script created during the software installation of your print server writes all data to be printed into a temporary file and opens the connection to the print server's FTP server. The temporary file is transmitted using this connection. The destination file name on the print server uses the name of the printer port.

However, you may send FTP commands without using the spooler system. In the example shown below, a file named demofile containing some graphic data will be printed on the print server:

```
% ftp 192.0.0.123
C:\>ftp 192.000.000.123
Connected to 192.000.000.123.
220 IC0001FF FTP server (InterCon version 8.1.10) ready.
Name (192.000.000.123:(none)):
230 User (none) logged in.
ftp> binary
200 TYPE set to I.
ftp> put demofile
200 PORT command successful.
150 Binary data connection for LPT1 (192.0.0.123,9100).
226 Transfer complete.
424452 bytes sent in 3.18 seconds (133.48 Kbytes/s)
ftp> quit
221 Goodbye.
```

7.7 Installation as a Remote Printer (LPD)

The print server supports the Line Printer Daemon Protocol. The installation of a remote printer using this protocol is shown below. Please note that the print server must be installed as a TCP/IP host.

The installation on your system may differ from that described in this manual; so please refer to the print spooler section of your UNIX system manual.

✔ **The LPD protocol sends a print job from the user host to a remote host on which the data is spooled. Following this, a file containing control data will be sent to the remote host. The two files are combined by the remote host and transferred to the printer which is connected to the remote host.**

The print server host has, as the remote host, no RAM capacity installed to save the print data and sends the print job directly to the printer ignoring the control data file.

Thus, all options inputted after entering the lp command will be ignored, if the print server is installed as a remote host.

The bannerpage and the lpd protocol can be switched off on the print server by setting the parameters of the logical printers.

Changing LF -> CR is possible by printing via a logical printer.

7.7.1 IBM AIX (Version 3.x)

Log in as root, start SMIT and follow the menus as described below:

```
"DEVICES"
    "PRINTER/PLOTTER"
        "MANAGE REMOTE PRINTER SUBSYSTEM"
            "CLIENT SERVICES"
              "REMOTE PRINTER QUEUES"
                     "ADD REMOTE QUEUE"
```

Enter the parameters within this screen mask:

```
Name of QUEUE                [] 
Queuing DISCIPLINE           [first come first serve]
ACTIVATE the queue ?         [yes]
Destination HOST             []
Pathname SHORT FILTER        [ ]
Pathname LONG FILTER         [ ]
Name of QUEUE for remote printer  []
```

The parameters for our example are:

```
Name of QUEUE                [IC0001FF]
Queuing DISCIPLINE           [first come first serve]
ACTIVATE the queue ?         [yes]
Destination HOST             [192.0.0.123]
Pathname SHORT FILTER        [ ]
Pathname LONG FILTER         [ ]
Name of QUEUE for remote printer  [lp1]
```

„Name of Queue“ = Name of the Queue
„Destination HOST“ = Hostname or IP address of the print server
„Name of QUEUE ...“ = Logical printer of the print server

Compare the entries in the queue with `REMOTE PRINTER QUEUEDEVICES.`
In some cases the queue must be restarted:

`MANAGE LOCAL PRINTER SUBSYSTEM → LOCAL PRINTER QUEUES`

Within `/etc/qconfig` this entry was added:

```
IC0001FF:
   device=drp0
   up=true
   host=192.0.0.123
   rq=lp1

drp0:
   backend=usr/lpd/rembak
```

The installation is complete.

7.7.2 IBM AIX (Version 4.x)

Log in as root, start SMIT and follow the menus as described below:

```
"DEVICES"
    "PRINTER/PLOTTER"
        "PRINT SPOOLING"
           "ADD A PRINT QUEUE"
               "OTHER"
```

Enter the parameters within this screen mask:

```
[TOP]
 * Name of QUEUE to add                      [IC0001FF]
 * Name of QUEUE DEVICE to add               [drp0]
 * BACKEND PROGRAM pathname                  [/usr/lpd/rembak]
   ACTIVATE the queue?                       yes
   Should this become the DEFAULT queue?     no
   Queuing DISCIPLINE                        first come first serve
   ACCOUNTING FILE pathname                  []
   HOSTNAME of remote server                 [192.0.0.123]
   Name of QUEUE of remote server            [lp1]
   Pathname of the SHORT FORM FILTER
   for queue status output                   [IC0001FF]
   Pathname of the LONG FORM FILTER
   for queue status output                   [IC0001FF]
[MORE...6]
```

Confirm the entries by pressing ENTER. Check the entry for your queue in (SMIT):

```
      "PRINTER/PLOTTER" ->
           "PRINT SPOOLING" ->
                "MANAGE PRINT QUEUES"
```

or enter lpstat.

Within `/etc/qconfig` this entry was added:

```
IC0001FF:
   device=drp0
   up=true
   host=192.0.0.123
   rq=lp1

drp0:
   backend=usr/lpd/rembak
```

The installation is complete.

7.7.3 AIX (without SMIT)

In a UNIX system AIX the print server has to be installed as a remote printer, as described below:

1. To halt the Print Daemon enter the following command:

```
# enq -G
```

2. Insert the print server into the `/etc/qconfig` file:

```
Printer name:
host = hostname
rq = logical printer
device = drp0

drp0: backend = /usr/lpd/rembak
```

In our example the entry would be:

```
printer:
host = IC0001FF
rq = lp1
device = drp0

drp0: backend = /usr/lpd/rembak
```

3. Start the Print Daemon:

```
# enq -U -Pprint queuename
```

The installation of the print server as a remote printer is completed.

7.7.4 HP-UX

Under the UNIX System HP-UX the installation of the print server as a remote printer can be done using the SAM Administration Tool, or by directly using the HP VUE (Visual User Environment).

1. System Administrations Manager (SAM)

After starting the SAM software tool select the `Printers and Plotters` option. Within this menu please select `Printers and Plotters`. Go to `Add Remote Printer/Plotter.` within the `Actions` menu. Here some entries are required.

Please enter the printer, remote printer and system names and activate the option certifying that the remote printer is installed on a BSD System:

```
              Printer Name _____________________
       Remote System Name _____________________
      Remote Printer Name _____________________
[ Remote Cancel Model... ] rcmodel_____________
[ Remote Status Model... ] rsmodel_____________
      [Printer Class... ]_____________________
[ ] Make this the system default printer.
[ ] Allow anyone to cancel a request.
[ ] Remote printer is on a BSD system.
```

In our example the entries would be:

```
              Printer Name printer_____________
       Remote System Name IC0001FF_____________
      Remote Printer Name lp1_________________
[ Remote Cancel Model... ] rcmodel_____________
[ Remote Status Model... ] rsmodel_____________
      [Printer Class... ]_____________________
[ ] Make this the system default printer.
[ ] Allow anyone to cancel a request.
[X] Remote printer is on a BSD system.
```

The remote printer name is the port name of the print server.

2. HP VUE (Visual User Environment)

After starting the HP VUE activate the `Printer/Plotter` manager icon. In the `List` menu select the `Printers/Plotters` option. Within the `Actions` menu select `Add Remote Printer/Plotter...`, to do the required entries (see *1. System Administrations Manager (SAM)*)

To print the status of the print server, use the `Printer/Plotter Manager` or, within a shell, the `lpstat` program.

7.7.5 SunOS

Enter a new printer to the `/etc/printcap` configuration file by adding the following entry:

```
<Printername>:\
:lp=:rm=<Hostname>:rp<logical Pprinter>:
```

In our example the entry would be:

```
printer:\
:lp=:rm=IC0001FF:rp=lp1:
```

Now enable the printer by entering:

```
# lpc
lpc> enable <Printername>
lpc> start <Printername>
lpc> quit
```

In our example the entries would be:

```
# lpc
lpc> enable printer
lpc> start printer
lpc> quit
```

The installation of the print server as a BSD Remote Printer in the UNIX SunOS System is complete.

7.7.6 SCO UNIX (Version 3.2)

To support 'Remote Line Printing' under SCO 3.2, the Remote Line Printing (RLP) must be installed on the SCO Server:

Log in as Root. Start the RLP installation by starting `mkdev rlp`.

```
Please enter the printer name (q to quit): printer

Is printer a remote printer or local printer (r/l)? r

Please enter name of the remote host that printer is attached
to: IC0001FF

      Printer is attached to host IC0001FF

Is this correct? (Y/N) y
Would you like that your host name appears in IC0001FF's
/etc/hosts equiv or /etc/hosts.lpd file.
Make sure that hp4 appears in IC0001FF's /etc/printcap file
(BSD format)
Make sure that hp4 has a spool directory on IC0001FF
Putting hp4 in printer description file an creating spool dir
        Updating LP information...done
        Updating /usr/spool/lp/default...done
```

Edit the `/etc/printcap` file:

`# vi /etc/printcap`

`:lp=:rm=printer:rp=printer:sd=/usr/spool/lpd/printer` (older version)

`:lp=:rm=printer:rp=lp1:sd=/usr/spool/lpd/printer` (newer version)

Reboot the system to restart RLP and the new lpd spooler respectively.

`# lpstat -t printer`

7.7.7 UnixWare (Version 4.2 - 1.1.2)

Installation of a remote printer under UnixWare:

Inform the UnixWare system that the spooler on the remote system (print server) belongs to a BSD system.

```
# lpsystem -t bsd <Hostname>
```

In our example the entries would be:

```
# lpsystem -t bsd IC0001FF
```

Install the print server as a remote printer in the UnixWare spooler.

```
# lpadmin -p <Printername> -s <Hostname>!<Logical Printer> -I ""
```
(Data will not be changed / for Binary files)

```
# lpadmin -p <Printername> -s <Hostname>!<Logical Printer> -I pcl
```
(transforms LF to CR+LF)

In our example the entries would be:

```
# lpadmin -p printer -s IC0001FF!lp1 -I pcl
```

Enable the printer by typing in the following commands:

```
# accept <printername>
# enable <printername>
```

In our example the entries would be:

```
# accept printer
# enable printer
```

The installation of the print server as a BSD remote printer is complete.

7.7.8 System V (General)

To install the print server as a remote printer please log in as a privileged user. Then follow the steps shown to install the print server for the print spooler lpsched (System V).

Enter the print server as a remote host. This enables your UNIX system's local print spooler to send print jobs to the print server.

```
# lpsystem -t bsd <Hostname>
```

In our example the entry would be:

```
# lpsystem -t bsd IC0001FF
```

Install the local printer. The print jobs of the local printer will be sent to the specified printer port of the print server.

```
# lpadmin -p <Printername> -s <Hostname>!<Logical Printer>
```

In our example the entries would be:

```
# lpadmin -p printer -s IC0001FF!lp1
```

Enable the printer by typing in the following commands:

```
# accept <Printername>
# enable <Printername>
```

In our example the entries would be:

```
# accept printer
# enable printer
```

The installation of the print server as a BSD remote printer is complete.

7.8 Installation as a Network Printer (TCP-Ports)

This installation depends on the UNIX system used and therefore can not be universally described in this manual.

The print server supports the TCP-Ports 9100 (lp1), 9101 (lp2), 9102 (lp3), 9103 (lp4) 9104 (lp5), 9105 (lp6), 9106 (lp7), and 2900 (lp8). Data sent to these ports will be printed on the selected printer port.

The TCP/IP port numbers for each printer port may be configured without any restrictions.

For the variables used by your UNIX system please refer your UNIX system manual.

7.9 SINIX SPOOL V4.x

The installation for direct printing via the TCP-Ports of the print server and SINIX spool V4.x is described below:

1) Install the IP address on the print server (`arp`, `ping`; see UNIX system manual).

2) Install a new server in the spool system:

```
xpadd -srv <server_name> -sp <priority>
```

Example:
```
xpadd -srv server1 -sp PRIORITY
```

3) Install a new supervisor in the spool system:

```
xpadd -spv <supervisor_name> -se <server_name>
```

Example:
```
xpadd -spv admin -se server1
```

4) Enter a new printer:

```
xpadd    -dev <printer_name>
         -da <hostname TCP-Port>
         -su <supervisor_name>
         -co <connection>
         -aa -pc <printer_control_language>
```

Example:
```
xpadd    -dev printer
         -da 'IC0001FF 9100'
         -su admin
         -co LAN
         -aa
         -pc HP-LASERJET
```

5) Activate the printer:

```
xpchange  -dev <printer_name>
          -st <status>
          -si <accept job>
          -so <execute job>
```

Example:
xpchange -dev intercon -st ACTIVE -si ON -so ON

6) Test the new printer:

```
xpadd -job -dr <file_name> -de <printer_name>
```

Example:
xpadd -job -dr /etc/hosts -de printer

7.10 Installation as a Local Printer (FTP)

After the installation of the print server as a TCP/IP-Host is successfully completed, the print server must be entered into the UNIX spooler system.

The following spooler systems are supported:

System V	lpsched
BSD	lpd
IBM/AIX	qdaemon

The installation of the print server is dependent on the UNIX spooler system used. The following description only shows the basic actions for the different spooler systems. Because each command implementation is specific to the system used, you should refer the corresponding pages of your UNIX system manual.

7.10.1 Print Server Directories

All files specially needed by the print server should be located in the `/etc/printserver` directory. To create this directory log in as privileged user (root). Now the system prompts #. Go to the `etc` directory and create the new print server directory. Switch to the new directory and create a subdirectory named interfaces.

```
# cd /etc
# mkdir print server
# cd print server
# mkdir interfaces
```

Load the shellscripts from your print server:

```
# ftp 192.168.0.123
Connected to 192.168.0.123.
220 IC0001FF FTP server (InterCon version 8.1.10) ready.
User (192.168.0.123:(none)):
230 User (none) logged in.
ftp> ls
200 PORT command successful.
150 ASCII data connection for NLST (192.168.0.49,1034).
sys5.sh
bsd.sh
aix.sh
params
status
226 Transfer complete.
41 bytes received in 0.22 seconds (0.19 Kbytes/sec)
```

`sys5.sh`	shellscript for SystemV UNIX systems
`bsd.sh`	shellscript for BSD UNIX systems
`aix.sh`	shellscript for IBM AIX UNIX systems

Example: To load the shellscript for systemV UNIX:

```
ftp> get sys5.sh
200 PORT command successful.
150 ASCII data connection for sys5.sh (192.168.0.49,1035).
226 Transfer complete.
15700 bytes received in 0.38 seconds (41.32 Kbytes/sec)
ftp> quit
221 Goodbye.
```

The `*.sh` files are prime examples of standard printer interfaces of the print spoolers `lpsched`, `lpd` and `qdaemon` supported by the print server. All adjusted printer interfaces of the installed print servers have to be copied into the `/etc/printserver/interfaces` subdirectory.

All log files of the last print job are stored in the `/tmp` subdirectory. In case of an error the information contained in the log file can give you some clues as to what may have caused the problem.

After all said parameters have been assigned and all directories created, you can start the print server installation. This installation is divided into two parts. First, the print server will be installed as a TCP/IP-Host in your local network. After this, one or more network printers will be added to your print spooler system.

7.10.2 Description of the Printer Interfaces

All included printer interfaces (shellscripts) for connecting the print server into the UNIX spooler system should be seen as prime examples and therefore have to be adjusted to your UNIX systems environment.

This section describes the basic functions of these scripts.

Some variables are initialised at the beginning of the scripts. These variables are described below.

A protocol file which is named after the printer with the ending `.last`, is stored in the `/tmp` directory. This file contains a protocol of the print job, e.g. starting time of the print job, parameters for addressing the printer interface and the FTP commands.

Depending on the spooler system, all data to be printed will be transmitted via the standard input channel to the script, or the name of the file to be printed will be transmitted to the script as a parameter.

A bannerpage is created in the scripts. This depends on the `nobanner` variable, which is initialised by `no`. This variable may be set to `yes` by the option `-o nobanner` in the `lp` command.

✘ **This bannerpage is not postscript compatible. If a postscript printer is connected, the printout of the bannerpage has to be suppressed. Do so by initialising the nobanner variable with yes . The `nofilebreak` variable also has to be initialised `yes` for postscript printers.**

All data to be printed is stored in a temporary file named `/tmp/xxx.d` and then sent to the print server host via FTP. The name of the FTP destination file defines the printer port of the print server. The transmission mode of the FTP servers is pre-set to binary to suppress the translation of `LF` to `CR+LF`. This permits the correct transmission of graphic data. To print out text data correctly the translation must be done by the printer.

After the data is sent the print server FTP server reports:

```
226 Transfer complete.
```

The script ends the job and sends a return value 0 to the spooler. This indicates a successful print job. If the chosen printer port is busy because a different printer under UNIX or Novell is printing at the same time, the print server FTP server reports:

```
552 No print slot available.
```

Further processing of the script depends on the initialisation of the `MAXR` variable.

If the script ended without printing any data, a return value of 129 (system V UNIX respectively AIX) or 1 (BSD UNIX) is sent to the spooler, indicating that the print jobs has to be repeated.

For a description of the variables of the scripts please refer to the corresponding part in the appendix.

7.10.3 System V Print Spooler lpsched

To install a print server into the system V print spooler `lpsched` please follow these steps:

1. Adjust the printer interface
2. Create a printer device
3. Enter the printers into the spooler system
4. Enable and start the printer

1. Adjust the printer interface

Copy the `/etc/printserver/sys5.sh` file into the subdirectory `/etc/print-server/interfaces` and rename this copy with the name of the print server to be installed. Now select the subdirectory `/etc/print server/interfaces`. Depending on the implementation of the print spooler it might also be necessary also to adjust the permission for the printer interface. Please refer to the `lpadmin` section in your systems manual.

```
# cd /etc/printserver
# cp sys5.sh interfaces/<printername>
# cd interfaces
```

The printer interface in our example is named `/etc/printserver/interfaces/printer` and so the following commands have to be entered:

```
# cd /etc/printserver
# cp sys5.sh interfaces/printer
# cd interfaces
```

Some minor changes in the printer interface `/etc/print server/interfaces/<printer-name>` are necessary. These are described in the appendix. The settings for the variables `HOST, PORTS, FTP` and possibly `HEADER` and `TRAILER` have to be changed.

2. Generating a Printer Device

The print spooler needs information about a printer device. Due to the fact that the print server doesn't need a physical device, a link to the null device is given. Please enter the following command:

```
# ln -f /dev/null /dev/<printername>
```

In our example, the command would be:

```
# ln -f /dev/null /dev/printer
```

3. Mounting the Printer into the Spooler System

With the help of the `lpadmin` command the System V print spooler will be administrated. To mount the print server into the print spooler system, the print spooler first has to be halted. Now the new printer is mounted and the spooler has to be started again. Some UNIX implementations allow mounting new printers without having to stop the print spooler. Please enter the following commands:

```
# lpshut
# lpadmin -p <printername> \
  -v /dev/<printername> \
  -i /etc/printserver/interfaces/<printername>\
  -F beginning -o nobanner
# /usr/lib/lpsched
```

In our example, the lpadmin command would be:

```
# lpshut
# lpadmin -p printer \
  -v /dev/printer \
  -i /etc/printserver/interfaces/printer
  -F beginning -o nobanner
```

In some cases the `lpadmin` command expects a full pathname (for example `/usr/lib/lpadmin`). Using the `-F beginning` option determines that in case of an error the print job will be started again. With the `-o nobanner` option you may switch off the bannerpage when starting the print job. These options are not available in all implementations of the `lpadmin` command. They are missing for example in the *HP-UX* and *BULL OS* UNIX systems; here you also have to note that between a variable and its value no space character is entered.

Due to the fact that the named printer device is a copy of the null device and can be written on by any user, the `lpadmin` sends a warning which looks like this example:

```
UX:lpadmin: WARNING: "/dev/<printername>" is accessible by others
TO FIX:     If other users can access it you may
            get unwanted output. If this is not what you
            want change the owner to "lp" and change the
            mode to 0600.
            Processing continues.
```

4. Enabling and Starting the Printer

After the print server is mounted into the spooler system, use the `accept` command to notify the print spooler to accept print jobs for the printer. At this time the spooler can take the print jobs without sending them to the printer. Sending can only take place after the printer is enabled:

Please enter the following command:

```
# accept <printername>
# enable <printername>
```

In our example, these commands would be:

```
# accept printer
# enable printer
```

The full pathname may possibly need to be entered.

Now the installation of the print server into the system V print spooler is complete. With the following command you could print the printer interface of our example on the new installed printer:

```
# lp -dprinter /etc/printserver/sys5.sh
```

7.10.4 BSD Print Spooler lpd

To install the print server into a *BSD print spooler lpd*, please follow these steps:

1. Adjust the output filter
2. Create a printer device
3. Create the spool directory
4. Enter the printer into the spooler system
5. Enable and start the printer

1. Adjusting the Output Filter

Copy the `/etc/printserver/bsd.sh` file into the subdirectory `/etc/printserver/interfaces` and rename this copy with the name of the print server to be installed. Now select the subdirectory `/etc/print server/interfaces` to edit the file mode of the created file.

```
# cd /etc/printserver
# cp bsd.sh interfaces/<printername>
# cd interfaces
# chmod 755 <printername>
```

The output filter of our example is named `/etc/printserver/interfaces/printer` so the following commands would be entered:

```
# cd /etc/printserver
# cp bsd.sh interfaces/printer
# cd interfaces
# chmod 755 printer
```

Some minor changes in the output filter `/etc/printserver/interfaces/<printername>` are necessary. They are described in the appendix. The settings for the variables `HOST`, `PORTS`, `FTP` and possibly `HEADER` and `TRAILER` have to be changed.

2. Creating the Printer Device

The print spooler needs information about a printer device. Due to the fact that the print server doesn't need a physical device, a link to the null device is given. Please enter the following command:

```
# ln -f /dev/null /dev/<printername>
```

In our example, the command would be:

```
# ln -f /dev/null /dev/printer
```

3. Creating the Spool Directory

Creating a spool directory for the print server and setting the permissions is described below:

```
# mkdir /usr/spool/<printername>
# chmod 770 /usr/spool/<printername>
# chown daemon /usr/spool/<printername>
# chgrp daemon /usr/spool/<printername>
```

In our example, the following command would be:

```
# mkdir /usr/spool/printer
# chmod 770 /usr/spool/printer
# chown daemon /usr/spool/printer
# chgrp daemon /usr/spool/printer
```

4. Entering the Printer into the Spooler System

The `/etc/printcap` file is the configuration file for the printers in the BSD spooler system. To integrate the print server into the spooler system a new printer entry must be edited into the `/etc/printcap` file:

```
<printername>:\
 :lp=/dev/<printername>:\
 :of=/etc/printserver/interfaces/<printername>:\
 :sd=/usr/spool/<printername>:
```

The entry in our example would be:

```
printer:\
 :lp=/dev/printer:\
 :of=/etc/printserver/interfaces/printer:\
 :sd=/usr/spool/printer:
```

The first line of the entry must be at the beginning of a new line, and all following lines must begin with a tab character. Lines followed by a new line belonging to the previous entry have to be closed by a \ (backslash) character. No other characters should be placed between the last character of the line and the backslash. The backslash must be the last character of the line.

Please note:

For printing **PostScript** data on the print server, the entry of the printer in the `/etc/printcap` file must to contain the `sh` flag (*suppress header*). In our example, we would enter:

```
printer:\
 :lp=/dev/printer:\
 :of=/etc/printserver/interfaces/printer:\
 :sd=/usr/spool/printer:sh:
```

5. Enabling and Starting the Printer

The `lpc` command administrates the BSD print spooler. This command, probably given with its full pathname, prompts `lpc>`. Entering `help` gives you an overview of all commands supporting this tool. Use the `enable` command to notify the print spooler to accept print jobs for the printer. At this time the spooler can take the print jobs without sending them to the printer. Sending can take place only after the printer is enabled by the start command. A shortcut is the `up` command which is similiar to the both commands described above. The `quit` command ends `lpc` .

Please enter the following commands:

```
# lpc
lpc> enable <printername>
lpc> start <printername>
lpc> quit
```

In our example these commands would be:

```
# lpc
lpc> enable printer
lpc> start printer
lpc> quit
```

Now the installation of the print server into the BSD print spooler is complete. Using the following command the output filter of our example would be printed on the newly installed printer :

```
# lpr -Pprinter /etc/printserver/bsd.sh
```

7.10.5 AIX Print Spooler qdaemon

To install the print server into the AIX print spooler `qdaemon`, please follow these steps:

1. Adjust the printer backend
2. Create a printer device
3. Enter the printer into the spooler system
4. Enable and start the printer

1. Adjusting the Printer Backend

Copy the `/etc/printserver/aix.sh` file from the installation disk into the subdirectory named `/etc/printserver/interfaces` and rename this copy to the name of the print server to be installed. Now select the subdirectory `/etc/print server/interfaces`.

```
# cd /etc/printserver
# cp aix.sh interfaces/<printername>
# cd interfaces
```

The printer backend in our example is named `/etc/printserver/interfaces/printer` so the following commands would be entered:

```
# cd /etc/printserver
# cp aix.sh interfaces/printer
# cd interfaces
```

A few changes in the printer backend `/etc/print server/interfaces/<printername>` are necessary. They are described in the appendix. The settings for the variables `HOST`, `PORTS`, `FTP` and possibly `HEADER` and `TRAILER` have to be changed.

Save the edited file and change the file mode as follows:

```
# chmod 2555 /etc/printserver/interfaces/<printername>
# chown bin /etc/printserver/interfaces/<printername>
# chgrp printq /etc/printserver/interfaces/<printername>
```

In our example the commands would be:

```
# chmod 2555 /etc/printserver/interfaces/printer
# chown bin /etc/printserver/interfaces/printer
# chgrp printq /etc/print server/interfaces/printer
```

2. Creating the Printer Device

The print spooler needs information about a printer device. Due to the fact that the print server doesn't need a physical device, a link to the null device is given. Please enter the following command:

```
# ln -sf /dev/null /dev/<printername>
```

In our example the command would be:

```
# ln -sf /dev/null /dev/printer
```

3. Entering the Printer into the Spooler System

The `mkque` command administrates the AIX print spooler. Please enter the following command:

```
# mkque -q<printername> -a"up = "'TRUE' && mkquedev \
  -q<printername> -d<printername> \
  -a"file = /dev/<printername>" \
  -a"backend = /etc/printserver/interfaces/<printername>"
```

The `mkque` command in our example would be:

```
# mkque -qprinter -a"up = "'TRUE' && mkquedev \
  -qprinter -dprinter \
  -a"file = /dev/printer" \
  -a"backend = /etc/printserver/interfaces/printer"
```

The full pathname (for example `/usr/lib/mkque`) may possibly be needed when entering the `mkque` command.

4. Enabling and Starting the Printer

After entering the print server into the spooler system the `enq` command should be sent to the print spooler. This command tells the print spooler to accept print jobs for this printer and to start the printer.

Please enter the following command:

```
# enq -U -P<printername>
```

In our example the command would be:

```
# enq -U -Pprinter
```

The full pathname may possibly be needed for this command.

The installation of the print server into the AIX print spooler is now complete.

8 Apple

The print server works in EtherTalk, in AppleTalk Phase II networks via the Ethernet network. This chapter deals with the functional overview and the installation of the print server to Apple networks.

8.1 Functional Overview

After being switched on for the first time the print server tests a temporary address in a predefined network area (probe), otherwise the last used address will be contacted (the print server saves the last used address). If, after 10 aarp probe packets no protest is made, this address will be used. In case of protest the next higher address is tried.

Via ZIP, broadcast information for a configured zone will be taken from a router. If no router answers within 5 broadcasts, it is presumed that no zones exist in the network and the default zone „*“ is used.

If a router answers the broadcast, the print server receives zone validation, the default zone, the network area and the multicast address of the valid zone.

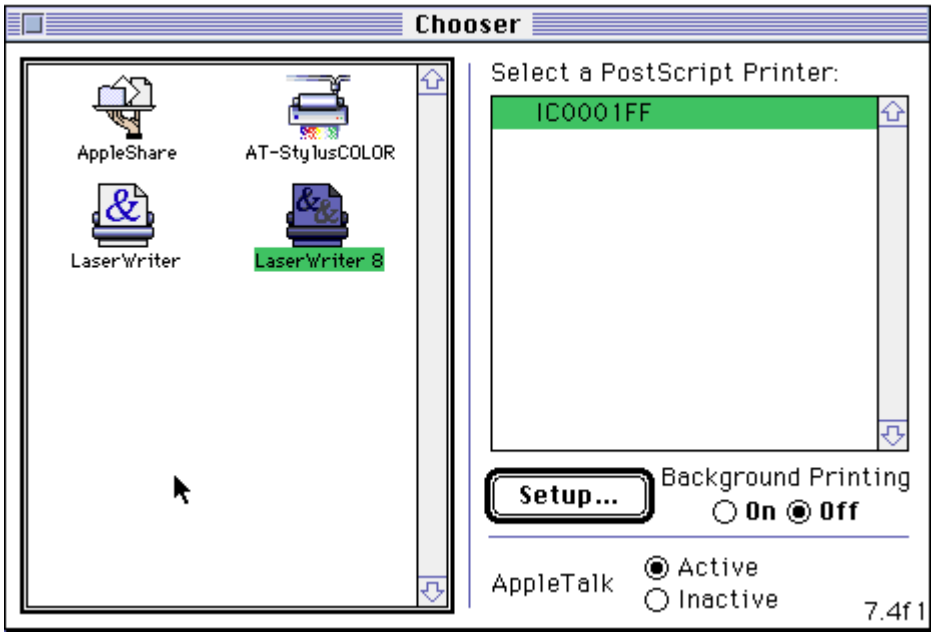
After the physical address and the zone are determined, the print server tests if the node name is used by an other node. Therefore 3 NBP (Name Binding protocol) *lookup* packets are sent and the print server awaits the reaction within the network.

If the name already exists in the network, the chosen name will be expanded automatically by the print server (for example: APPLE -> APPLE_0 ... APPLE_999).

The print server Apple name and the Apple name within the printer (printer dependable) will be compared after each print job. If the print server name differs from the name in the printer, the name of the printer will be changed. To avoid problems with some printers the space character will be replaced by the underline character.

8.2 Installation

After selecting the CHOOSER in the Apple menu the print server will appear under its specific printer driver.



8.3 Name and Zone Setting

The name and zone can be changed with any "Namer Tool" program such as the Apple LaserWriter Tool. You can change the name to any character string (max. length 32 characters) in the format <Name><.Zone>. Each of the two partial strings can be empty. The <Name> and <.Zone> entries changes one or both parameters. After changing the <Zone> parameter the print server will become invisible for the 'Namer Tool'. This will also happen if the name was changed. You have to restart the print server to activate the dynamic name determination.

Example:

<Name><.Zone>

Printer1.Sales

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9 BS2000 (TCP/IP) Installation

RS0 Spooler Version 2.3A and Version 3.0A:

The print server supports the TCP/IP protocol for BS2000. A valid IP address must have been saved on the print server.

To enter an IP address on the print server please use the Windows Administrations Tool (IPX protocol) or the `arp` and `ping` programs (TCP/IP).

Edit the ARP table

```
arp -s <Internet address> <Hardware address>
```

Example:

```
arp -s 192.0.0.123 00:c0:eb:00:01:ff
```

✘ **Within some operating systems, for example all Microsoft Windows systems (except Windows NT 4.0), you must contact a workstation in the network via the `ping` command before using the `arp` command for the first time. If this is not possible in your network you have to use the Administration Tool (IPX protocol) for configuration.**

Assign a new IP address to the print server.

```
ping  <Internet address>
```

Example:

```
ping 192.0.0.123
```

Install the InterCon-PrintServer with its IP address in the RS0 spooler. Use the TCP-Port address 2900 (logical printer No. 8) for this.

Default Values for logical printer No. 8:

```
lp8_tcp_port    = 2900
lp8_job_start   =
lp8_job_end     =
lp8_crlf        = off
lp8_banner      = off
lp8_ascii_ps    = off
lp8_hexdump     = off
lp8_rso_spool   = on
```

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10 Appendix

10.1 General Parameters

General Parameters

Parameter	Default	Description
info	*empty*	Information string on status page
passwd	*empty*	Configuration password *Password for write community*

Token Ring Parameter

Parameter	Default	Description
tr_speed	**Jumper on print server (see Technical Manual)**	Token Ring Speed
tr_etr	off	Early Token Release
tr_sri	off	Source Routing
tr_laa	00:00:00:00:00:00	Logical Hardware Address

TCP/IP Parameters

Parameter	Default	Description
ip_address	000.000.000.000	IP address
ip_net_mask	000.000.000.000	Network Mask
ip_gateway	000.000.000.000	Gateway address
ip_dhcp	off	DHCP protocol
ip_bootp	on	BOOTP protocol
ip_rarp	on	RARP protocol
ip_autoconf	on	Accepts a new IP address via ARP

System Parameters

Parameter	Default	Description
sys_contract	empty	Name or person who administrates the printer (MIB-II parameter)
sys_name	ICxxxxxx	Printer name (MIB-II parameter)
sys_location	empty	Printer's physical location (MIB-II parameter)

SNMP Parameters

Parameter	Default	Description
snmp_ip_trap1	000.000.000.000	IP Trap address No. 1
snmp_ip_trap2	000.000.000.000	IP Trap address No. 2
snmp_ipx_trap1	00:00:00:00:00:00:00:00:00:00	IPX Trap address No. 1 * (Network No. + Node address)
snmp_ipx_trap2	00:00:00:00:00:00:00:00:00:00	IPX Trap address No. 2 * (Network No. + Node address)
snmp_trap_com	public	Trap community
snmp_trap_aut	on	Trap authentication

snmp_trap_pr	on	Trap of printer

* Example: snmp_ipx_trap1 = 10:00:00:00:08:00:09:c0:d4:4a

Network number = 10:00:00:00 (Novell network number)
Node Address = 08:00:09:c0:d4:4a (Node address of PC)

Apple Parameters

Parameter	Default	Description
appletalk	on	Activates Apple-/EtherTalk protocol
apple_name	Icxxxxxx	Apple name or Printer name
apple_zone	*	AppleTalk Zone
apple_ptype	LaserWriter	Apple Printer type in Chooser Menu

Novell NetWare Parameters

Parameter	Default	Description
nw_name	Icxxxxxx	Novell NetWare Name
nw_pserver	on	PRINT SERVER Mode
nw_rprinter	on	R/NPRINTER Mode
nw_psname	*empty*	File server Name with PSERVER.EXE/.NLM running
nw_lspx	1	logical printer for R/Nprinter
nw_nds	on	Novell Netware Directory Services
nw_bindery	on	Novell NetWare Bindery Mode
nw_802_2	on	Novell IEEE802.2 Frame Header
nw_802_3	on	Novell IEEE802.3 Frame Header
nw_eth2	on	Novell Ethernet II Frame Header
nw_snap	on	Novell Snap Frame Header
nw_full_update	on	Novell Network Update
nw_update_time	120	Time for Network Update
nw_poll_time	2	Poll time Print queues
nw_server1	*empty*	Novell File server
nw_server2	*empty*	Novell File server
nw_server3	*empty*	Novell File server
nw_server4	*empty*	Novell File server

Logical Printers

Parameter	Default	Description
lp1_rso_spool	off	RSO Spooler Support - lp1
lp2_rso_spool	off	RSO Spooler Support - lp2
lp3_rso_spool	off	RSO Spooler Support - lp3
lp4_rso_spool	off	RSO Spooler Support - lp4
lp5_rso_spool	off	RSO Spooler Support - lp5
lp6_rso_spool	off	RSO Spooler Support - lp6
lp7_rso_spool	off	RSO Spooler Support - lp7
lp8_rso_spool	on	RSO Spooler Support - lp8
lp1_tcp_port	9100	TCP-Port Address - lp1
lp2_tcp_port	9101	TCP-Port Address - lp2
lp3_tcp_port	9102	TCP-Port Address - lp3
lp4_tcp_port	9103	TCP-Port Address - lp4

lp5_tcp_port	9104	TCP-Port Address - lp5
lp6_tcp_port	9105	TCP-Port Address - lp6
lp7_tcp_port	9106	TCP-Port Address - lp7
lp8_tcp_port	2900	TCP-Port Address - lp8
lp1_job_start	*empty*	Start String before print data - lp1
lp2_job_start	*empty*	Start String before print data - lp2
lp3_job_start	*empty*	Start String before print data - lp3
lp4_job_start	*empty*	Start String before print data - lp4
lp5_job_start	*empty*	Start String before print data - lp5
lp6_job_start	*empty*	Start String before print data - lp6
lp7_job_start	*empty*	Start String before print data - lp7
lp8_job_start	*empty*	Start String before print data - lp8
lp1_job_end	*empty*	End String after print data - lp1
lp2_job_end	*empty*	End String after print data - lp2
lp3_job_end	*empty*	End String after print data - lp3
lp4_job_end	*empty*	End String after print data - lp4
lp5_job_end	*empty*	End String after print data - lp5
lp6_job_end	*empty*	End String after print data - lp6
lp7_job_end	*empty*	End String after print data - lp7
lp8_job_end	*empty*	End String after print data - lp8
lp1_crlf	off	Converts LF → CR - lp1
lp2_crlf	on	Converts LF → CR - lp2
lp3_crlf	off	Converts LF → CR - lp3
lp4_crlf	off	Converts LF → CR - lp4
lp5_crlf	off	Converts LF → CR - lp5
lp6_crlf	off	Converts LF → CR - lp6
lp7_crlf	off	Converts LF → CR - lp7
lp8_crlf	off	Converts LF → CR - lp8
lp1_banner	off	Print Bannerpage (LPD) - lp1
lp2_banner	off	Print Bannerpage (LPD) - lp2
lp3_banner	off	Print Bannerpage (LPD) - lp3
lp4_banner	on	Print Bannerpage (LPD) - lp4
lp5_banner	off	Print Bannerpage (LPD) - lp5
lp6_banner	off	Print Bannerpage (LPD) - lp6
lp7_banner	off	Print Bannerpage (LPD) - lp7
lp8_banner	off	Print Bannerpage (LPD) - lp8
lp1_ascii_ps	off	Converts ASCII to PostScript - lp1
lp2_ascii_ps	off	Converts ASCII to PostScript - lp2
lp3_ascii_ps	on	Converts ASCII to PostScript - lp3
lp4_ascii_ps	off	Converts ASCII to PostScript - lp4
lp5_ascii_ps	off	Converts ASCII to PostScript - lp5
lp6_ascii_ps	off	Converts ASCII to PostScript - lp6
lp7_ascii_ps	off	Converts ASCII to PostScript - lp7
lp8_ascii_ps	off	Converts ASCII to PostScript - lp8
lp1_hexdump	off	Prints data in HEX format - lp1
lp2_hexdump	off	Prints data in HEX format - lp2
lp3_hexdump	off	Prints data in HEX format - lp3

lp4_hexdump	off	Prints data in HEX format - lp4
lp5_hexdump	on	Prints data in HEX format - lp5
lp6_hexdump	off	Prints data in HEX format - lp6
lp7_hexdump	off	Prints data in HEX format - lp7
lp8_hexdump	off	Prints data in HEX format - lp8

Default settings of the logical printers:

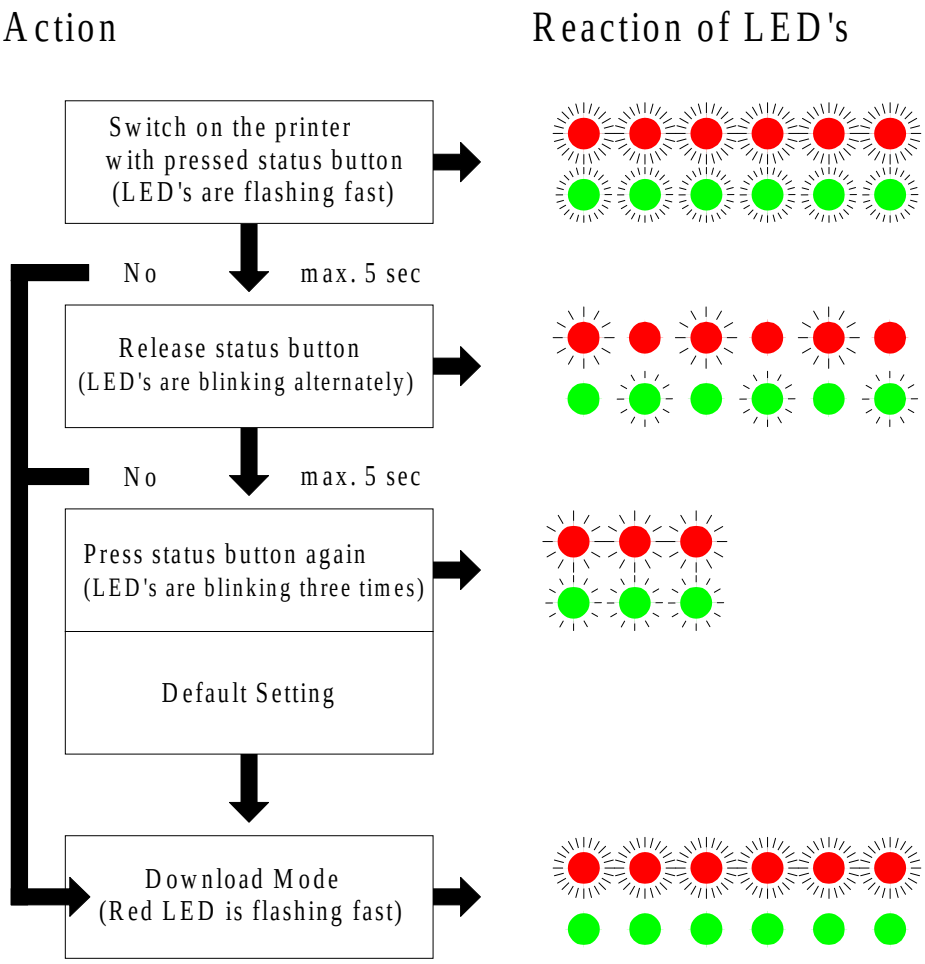
	lpn_crlf	lpn_ascii_ps	lp_banner	lpn_hexdump	lpn_rso_spool	TCP_Port
Log. Printer No. 1						9100
Log. Printer No. 2	•					9101
Log. Printer No. 3		•				9102
Log. Printer No. 4			•			9103
Log. Printer No. 5				•		9104
Log. Printer No. 6						9105
Log. Printer No. 7						9106
Log. Printer No. 8					•	2900

10.2 Status Button

You can print a the print server status page and a list of all print server parameters by pressing the status button. This button can also be used to reset the print server back to its default settings.

10.2.1 Default Setting / Download Mode

In order to set all parameters back to their default values, switch the print server on and press the status button simultaneously (both LEDs flash fast). Release the button (both LEDs flash alternately). If you press the status button again within 5 seconds, the print server will reset to its default values (both LEDs flash 3 times to indicate this). Now the print server stays in download mode (indicated by the flashing red LED). If you should miss the 5 sec time limit for pressing the status button the print server ends up in this mode. After being switched off and on all parameters of the print server remain unchanged.



10.2.2 Printing a Status Page

While the print server is active:

- Press status button once → status page is printed
- Press and hold status button (min 5 sec.) → status page and parameter list are printed

✔ **With the IC73-FAST-KYO-TX or IC77-FAST-EPSON-TX you must press the button twice within 5 seconds to print out the status page and the parameter list.**

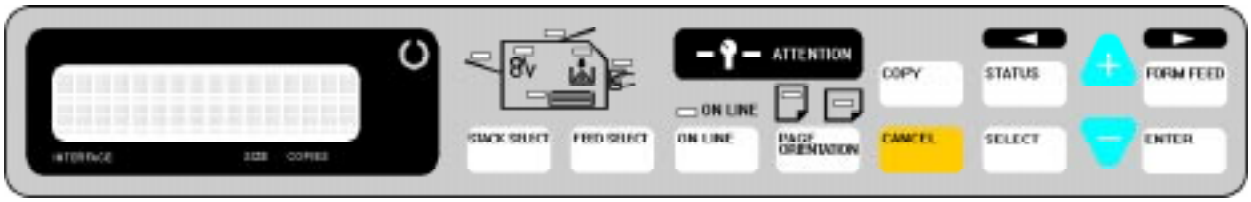
10.3 Kyocera Print Server (IC53, IC60, IC73)

10.3.1 Configuration via Printer Panel

The following parameters can be changed via the KYOCERA printer panel:

- IP address
- Net Mask
- Gateway address
- DHCP / BOOTP / RARP protocol
- IP Auto Configuration
- Apple protocol
- Novell NetWare protocol
- Restart function

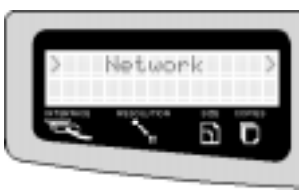
Display for KYOCERA PRINTER FS-1500, FS-1550(+), FS-1600(+)
FS-3400, FS-3600(+), FS-3500, FS-6500



Display for KYOCERA FS-1700, FS-3700, FS-7000

✔ **The next pictures show the printer panel of the KYOCERA FS-1700/FS-3700. Button and display functions are similiar at all former KYOCERA printers like FS-1500 for example.**

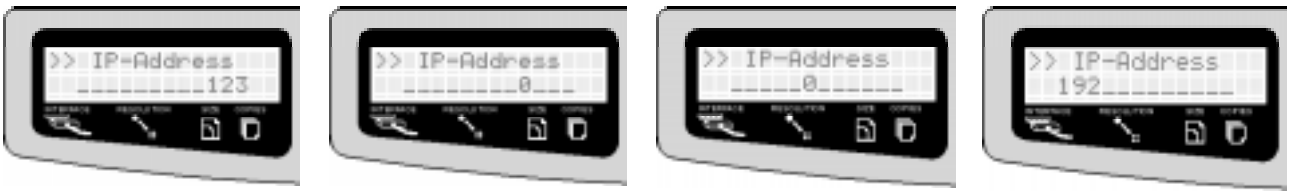
Network Menu



Select the Others menu. Press `FORMFEED`. Press the „ - " button twice - and the `Network` menu is displayed. Press the `FORMFEED` button several times to see the first print server parameter.

✔ **The Network menu is always in English regardless of the printer's language setting.**

IP address

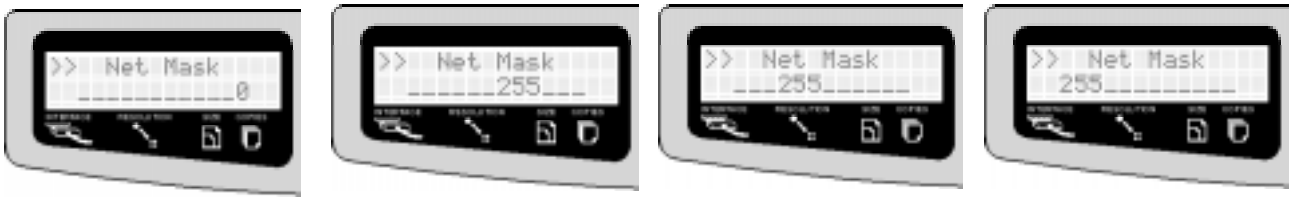


Change IP address: ENTER
Change the value: Button „ + “ and „ - “
Save Byte value: ENTER
Next IP Byte: Button „ + “

Gateway address

Changing the Gateway address is identical to changing the „IP-Address“.
Next Option: Press the „ + “ button.

Network mask



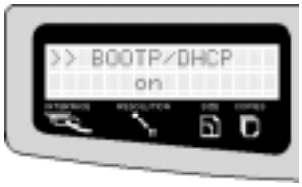
Changing the Network mask is identical to changing the „IP-Address“.
Next Option: Press the „ + “ button.

Apple protocol

Apple Option: ENTER
OFF / ON: Button „ + “ and „ - “
Save configuration: ENTER

Next Option: *Button „ + “*

BOOTP/RARP and DHCP protocol



BOOTP/DHCP Option: ENTER
OFF / ON: Button „ + “ and „ - “
Save configuration: ENTER

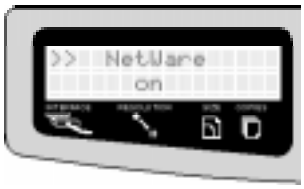
Next Option: *Button „ + “*

IP AutoConf (Changing the IP Address via „arp/ping“)

IP AutoConf Option: ENTER
OFF / ON: Button „ + “ and „ - “
Save configuration: ENTER

Next Option: *Button „ + “*

Novell NetWare protocol (Bindery + NDS)



NetWare Option: ENTER
OFF / ON: Button „ + “ and „ - “
Save configuration: ENTER

Next Option: *Button „ + “*

Restart print server

Restart Option: ENTER
OFF / ON: Button „ + “ and „ - “
Save configuration: ENTER

Next Option: *Button „ + “*

This activates all changed parameters without switching the printer off and on (Apple/NetWare protocol).

10.3.2 Parameters

Kyocera Parameter

Parameter	Default	Description
pp1_panel	on	Change parameters via printer panel

10.4 Kyocera Print Server (IC59, IC69, IC79)

10.4.1 Configuration via Printer Panel

The following parameters can be changed using the Kyocera printer panel.

- TCP/IP (IP Address, Net Mask, Gateway Address)
- DHCP Protocol
- APPLE Protocol
- NOVELL NetWare Protocol (Frame Header)

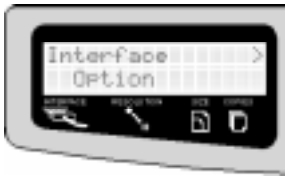
Display for KYOCERA FS-3700+ (similiar to FS-7000)

Display for KYOCERA FS-800

✔ **The following parameters were changed using KYOCERA FS-3700+. Please take note that the printer has the correct firmware installed in order to support the panel mode.**

Should a password be set on the print server then all settings made using the printer panel are ignored.

Network Menu

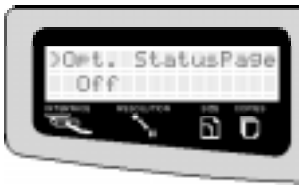


Choose the „Interface - Option" menu. Press „FORMFEED". This should allows the user to access the Novell NetWare menu.

Novell NetWare

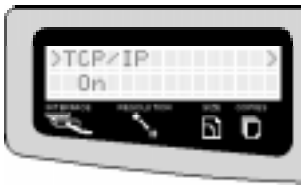
In order to switch the Novell protocol on or off, the user must press „ENTER" button and then either the „+" or „ - " button. In order to confirm the input „ENTER" button must be pressed. Via the „Form Feed" button the user can access the Novell sub-menu where the Novell Frame Header can be chosen (for control instructions see how to switch Novell protocols on and off).

Opt. Status Page



Opt. Status page:	ENTER
OFF / ON:	Button „ + " and „ - "
Save Configuration:	ENTER
Next Option:	*Button „ + "*

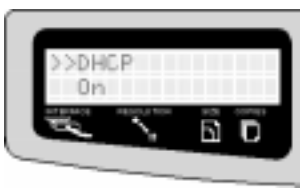
TCP/IP Protocol



TCP/IP Protocol:	ENTER
OFF / ON:	Button „ + " and „ - "
Save Configuration:	ENTER
TCP/IP Sub-menu:	*Button „Form Feed"*

Whenever the TCP/IP protocol is switched off, all other „active" TCP/IP protocols (BOOTP, DHCP, RARP) are also automatically switch off.

TCP/IP Parameter



In the menu TCP/IP, the DHCP protocol can be turned on and off, the Subnet Mask, Gateway and the IP Address can be changed.

Choose Menu Point:	Button „ + “ and „ - “
Choice:	ENTER
Move Cursor:	Button „Form Feed“ and „Cancel“
Change Address:	Button „ + “ and „ - “
Save Configuration:	ENTER

APPLE / EtherTalk Protocol

EtherTalk Protocol:	ENTER
OFF / ON:	Button „ + “ and „ - “
Save Configuration:	ENTER
Next Option:	*Button „ + “*

10.4.2 Configuration via Prescribe Commands

When IC59/69/79 and Kyocera printers are used with KUIO interfaces, several print server parameters can be changed using Prescribe sequences:

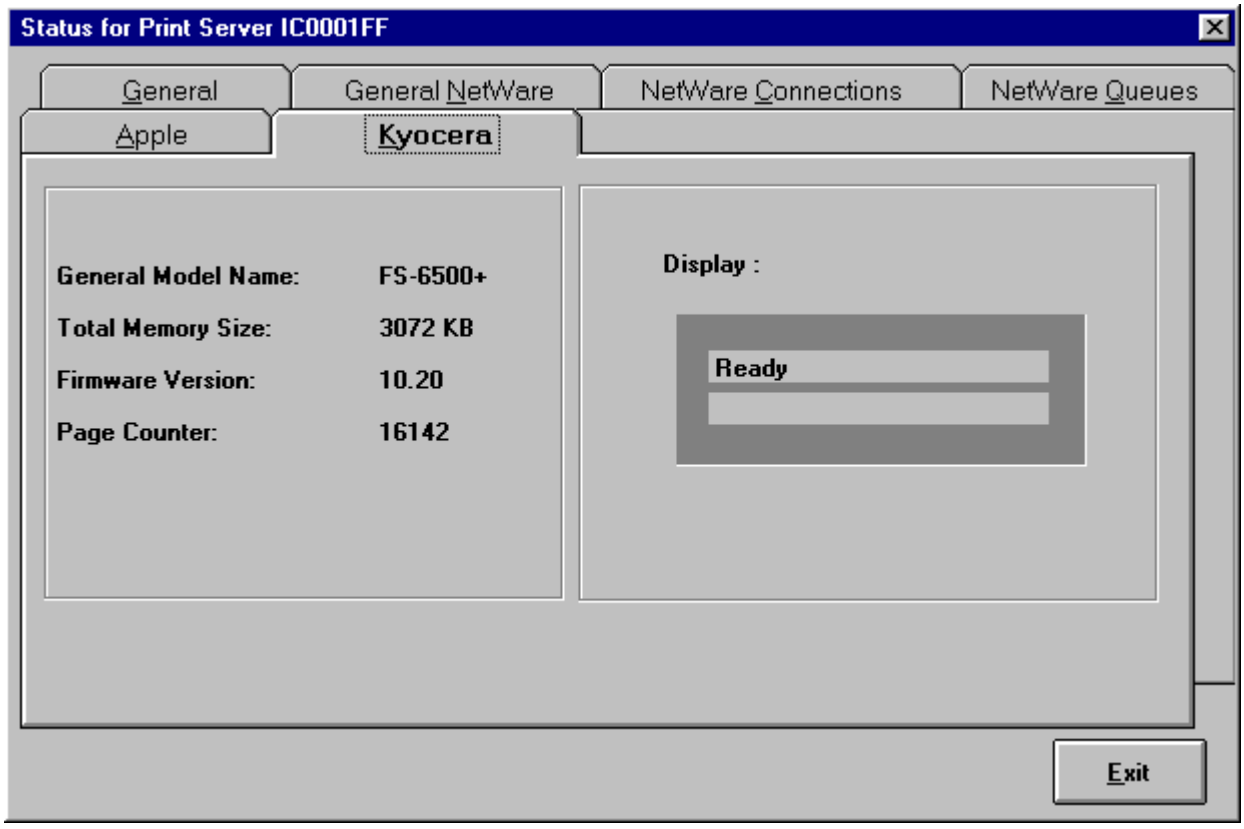
`!R!SIOP2,"IPX:0";EXIT;`	Novell NetWare Protocol off
`!R!SIOP2,"IPX:1";EXIT;`	Novell NetWare Protocol on
`!R!SIOP2,"APPLE:0";EXIT;`	Apple EtherTalk Protocol off
`!R!SIOP2,"APPLE:1";EXIT;`	Apple EtherTalk Protocol on
`!R!SIOP2,"IP:192.168.000.149";EXIT;`	Setting an IP-Address
`!R!SIOP2,"SUBNET:255.255.255.000";EXIT;`	Setting a TCP/IP Net Mask
`!R!SIOP2,"DEFAULT:192.168.000.004";EXIT;`	Setting a Gateway Address

Create a file using an editor of choice. Insert one of the above listed commands into this file and transfer it as a print file to the Kyocera printer. The file can be transferred using one of the available printer ports (parallel, serial, OPTION). For further Prescribe commands please read the printer manual.

✔ **Should a password be set on the PrintServer then any changes made using Prescribe commands are ignored.**

10.5 Administration Software

In the Administration Tool a KYOCERA folder will be displayed within the print server's status folder.



When selecting this folder the following KYOCERA printer status information is displayed:

General model name:	*Printer Model*
Total memory size:	*RAM installed (Max.)*
Firmware version:	*Printer Firmware Version*
Page counter:	*Page counter of Printer*
Display:	*Shows the current printer display*

✔ **Status information about KYOCERA printers can only be displayed in FS „+" models and FS- 1700 / FS-3700 and FS-7000.**

10.6 Pocket Print Server (IC55)

Physical Printer

Parameter	Default	Description
pp1_ecp	off	ECP-Mode

General Parameters

Parameter	Default	Description
sp_mode	ASCII	Data format for printing the status page

10.7 Epson Print Server (IC57, IC77)

Physical Printer

Parameter	Default	Description
pp1_psmode	auto	LocalTalk or standard PostScript mode

General Parameters

Parameter	Default	Description
sp_mode	ASCII	Data format for printing the status page

10.8 Shellscript

Here all variables that can be modified during the installation of the network printer are displayed:

`HOST:` Hostname of the print server. The default setting

```
HOST=_HOST_
```

must be changed to:

```
HOST=<Hostname of print server>
```

Example:

```
HOST=IC0001FF
```

`PORTS:` Name of the destination file when sending data to the print server via FTP. This specifies the chosen printer ports of the print server. The default setting

```
PORTS=lp1,lp2,lp3,lp4,lp5,lp6,lp7,lp8
```

specifies all logical printer ports of the print server. If you want your print data to be printed by a specific logical printer, you must select that logical printer port.
For example:

```
PORTS=lp2
```

`FTP:` contains the complete path of the FTP command. The default setting

```
FTP=ftp
```

must be modified depending on the UNIX system used; for system V UNIX or AIX for example to:

```
FTP=/usr/bin/ftp
```

and for BSD UNIX for example to:

```
FTP=/usr/ucb/ftp
```

`WAIT:` contains a delay time in seconds. The default setting:

```
WAIT=1
```

can remain unchanged.

`MAXR:` contains a loop counter. This loop counter determines the behaviour of the script if the print data could not be transmitted; for example, if the selected printer

port is busy. If the MAXR parameter is initialised with the value 0, the script is terminated.

In all other cases, (MAXR > 0) the data will once again de sent via FTP to the printer after a delay time defined by the WAIT variable. After each try the loop counter will be decremented and the delay time doubled. This continues until the data is printed or the parameter MAXR becomes 0; the script ends. If MAXR is initialised with the value of -1 the script will only be terminated if the data could be printed. The default setting

MAXR=10

determines a maximum wait time for a printer port marked free is 1024 seconds (which is about 15 minutes).

H_PRESCR: contains a string causing a prescribe-compatible printer to print all LF characters following as CR+LF characters

T_PRESCR: contains a string causing a prescribe-compatible printer to print all LF characters following as LF characters

H_HPLJET: contains a string causing a HP-LaserJet-compatible printer to print all LF characters following as LF+CR characters

T_HPLJET: contains a string causing a HP-LaserJet-compatible printer to print all LF characters following as LF characters

HEADER: contains a string which will be sent to the printer in front of each print job.

TRAILER: contains a string which will be sent to the printer after each print job. This string may be used to change the emulation of the printer or to tell the printer how to interpret the LF (LineFeed) characters.

The setting

```
HEADER=${H_PRESCR}
TRAILER=${T_PRESCR}
```

can be useful for the print server built-in versions for KYOCERA printers. When using printers with a HP LaserJet emulation the setting should be changed to:

```
HEADER=${H_HPLJET}
TRAILER=${T_HPLJET}
```

For the character strings of the emulation please refer to the corresponding printer manual. If you wish to suppress the translation of `LF` characters on the printer, delete the entries to the right of the equal sign when initialising the variables `HEADER` and `TRAILER`:

```
HEADER=
TRAILER=
```

10.9 Functions of the FTP Server (TCP/IP)

10.9.1 FTP Commands

The following commands are implemented in the print servers FTP server :

```
ABOR  HELP  LIST  MODE  NLST
NOOP  PASS  PORT  QUIT  RETR
SITE  STOR  STRU  TYPE  USER
```

All FTP commands described above are not normally entered by the user, but are generated by the operating system on the local FTP server. The commands known to the user such as `open, close, user, put, get, quit`, etc. are translated into real FTP commands. To send one of the real commands directly the `quote` command is implemented in the operating system. In addition to this parameter the real FTP command and its parameters will be sent as parameters of the `quote` command.

The entry

```
ftp> User <Username>
230 User <Username> logged in.
ftp>
```

is the same as:

```
ftp> quote USER <Username>
230 User <Username> logged in.
ftp>
```

10.9.2 SITE Commands

The `SITE` command is used to activate some system specific service commands in the print server's own FTP server. The `SITE` commands implemented in this FTP server are:

```
HELP  RESET IDLE  LOAD  STPn
```

HELP [< sp >< string >]
< string >:=SITE command
Shows the syntax of the named SITE command

RESET
Resets all parameters of the print server to their default values

IDLE [< sp >< dec.integer >]
< dec.integer >:=max.IdleTime
Shows and sets the time after which the print server host shuts down the FTP connection if the partner FTP doesn't sent any data. The value must be in range between 30 and 7,200 seconds.
The pre-set value is 900 seconds.

LOAD [< sp > ON | OFF]
Shows the name of the binary file expected for download via tftp, shows and sets the print server status. In 'ON'-status, no print jobs will be accepted and the download mode will be activated. In the 'OFF'-status, the print server is ready for printing, which is the normal status.

STP
Causes the printout of a status page on the printer

Because the FTP command SITE is not supported by all operating surfaces (some implementations know the site command) the SITE command has to be entered with the help of quote. For example:

```
ftp> quote SITE IDLE
200 Current IDLE time limit is 900 seconds; max 7200.
ftp> quote SITE IDLE 300
200 Maximum IDLE time set to 300 seconds.
ftp>
```