NCR 7450 Workstation

Release 2.5

Software User's Guide

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Issue A
June 1996

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Preface

Audience

This book is written for programmer / analysts, software / hardware integrators, system administrators, and field / system engineers.

References

*C Programmer's Guide to NetBIOS, Schwaderer, W. David, Howard W. Sams & Company, 1989

IEEE 802.2 Link Level LAN Standard

NCR LAN Manager Installation Guide (ST-2115-34)

NCR LAN Manager Get Ready, Get Set, Go (ST-2115-33)

NCR LAN Manager User's Guide for MS-OS/2 (ST-2115-39)

NCR LAN Manager User's Guide for DOS (ST-2115-41)

NCR LAN Manager Administrator's Guide (ST-2115-36)

NCR LAN Manager Administrator's Reference (ST-2115-37)

NCR Hubless StarLAN Wiring Guide (ST-2113-57)

NCR 7020 StarLAN Hub Hardware Installation (ST-2112-12)

NCR 7020 StarLAN Hub Site Preparation (ST-2500-A42)

NCR Ethernet Wiring Guide (ST-2110-82)

NCR LAN Manager 2.1a Installation and Configuration Guide

NCR LAN Manager Network Device Driver Guide (ST-2115-35)

NCR LAN Manager Quick Reference for Administrators (ST-2115-38)

NCR LAN Manager Quick Reference for Users (ST-2115-40)

NCR StarLAN Wiring Guide (ST-2111-24)

RFC 1001/1002 NETBIOS over TCP/IP

NDIS Microsoft/3COM Network Driver Interface Specification

System Load Protocol Standard
(IEEE Std. 802.1E, October 12, 1990)

UNIX SYSTEM V/386 RELEASE 4 User's Reference Manual
(AT&T, Copyright 1991, UNIX System Laboratories, Inc.)

NCR OS/2 SLP/SLF LAN Loader User's Guide (ST-2117-07)

NCR Windows NT SLP/SLF LAN Loader User's Guide
(ST-2132-31)

System 3000 Model 3335 User Guide (ST-2119-54)

Installing the System 3000 Model 3341 and 3345 (ST-2114-57)

Ethernet Local LAN Module Installation (150-0011905)

NCR 7450 Hardware Installation and Service (ST-2122-17)

NCR Retail WaveLAN Installation Guide (ST-2121-02)

NCR KDS 2755 Toolset Programming Information (D2-0456-A)

NCR KDS 2755 Toolset Diagnostics (D2-0458-A)

NCR KDS 2755 Workstation Toolset Site Preparation
(ST-2500-B11)

NCR 7450 and 705x Programming Information (ST-2122-18)

NCR 7450 and 705x Programming Windows Help (D9-0169-A)

Hardware Precaution

DO NOT connect or disconnect the transaction printer, or any other workstation-powered peripheral, while the workstation is powered on.

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System Overview

Revision Record

Issue	Date	Remarks
A	Feb 94	First printing
B	Dec 94	Microsoft Flash File System, BootP LAN Loading, OS/2 RPL LAN Loading, OS/2 VDM support, added Installable Device Drivers chapter, added Trouble-Shooting section.
C	Feb 95	Added Windows NT Loader
D	Aug 95	Added PCMCIA-ATA, Enhanced BootP/SLP Loader, Mobile POS
E	Sept 95	Added support for Novell ODI, Windows 95 VxD, Windows for Workgroups, LAN Server 4.0, Windows NT Network Clinet 3.0
F	April 96	Added Wedge peripheral support.

Federal Communications Commission (FCC)

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取扱説明書に従って正しい取り扱いをして下さい。

Chapter 1

System Overview

Overview

This book provides information to help you successfully install system and retail software on NCR 7450 workstations. Also discussed is how to install the retail software in a DOS session of an OS/2 2.1 7450 workstation/server. The software included in this release is:

- Off-the-shelf Microsoft® DOS (All references to DOS in this document refer to MS-DOS® 6.0 or later.)
- Off-the-shelf OS/2® 2.1
- Off-the-shelf Microsoft Windows NT 3.5 or 3.1
- Device drivers for retail functionality
- Diagnostic support
- Communications products for retail

DOS 6 Advantages

Load Device Drivers in High Memory

DOS 6 offers the ability to load all device drivers and most of DOS in high memory, which makes an additional 150 K of base memory available for the application.

Industry Standard Remote Loading

Both disk-based and diskless workstations are supported with this release. Diskless 7450 workstations can be downloaded with the operating system over a LAN from a server or from a 7450 workstation / server. The retail software is downloaded using industry-standard load protocols; *System Load Protocol (SLP),* and *Remote Program Load (RPL), TCP/IP (bootP), and Novell*.

Phar Lap Extender Support

For those applications that exceed the memory allocations afforded by DOS 6 the platform supports the Phar Lap DOS Extender. The Extender allows a seamless interface to extended memory for any application currently written to the platform. This allows the application developer to take advantage of all memory in the system as executable memory.

System Description

The 7450 workstation can be loaded either by a PC server, which can be one of the following:

- UNIX V.4 PC with UNIX System Load Protocol (SLP) loader for IEEE 802.1E SLP broadcast loading.
- UNIX V.4 PC with LAN Manager for UNIX RPL loading
- PC server running the OS/2 1.2, 1.3, or 2.1 Operating System.
- 7450 Workstation/server running the OS/2 2.1 Operating System.
- Windows NT 3.1 or 3.5 PC w/Windows NT SLP/SLF Loader
- Windows NT 3.51 PC for RPL loading

Load Methods Supported

	DOS PC/7450 Server	OS/2 PC Server	UNIX PC Server	OS/2 7450 Workstation/ Server	NT 3.5 PC Server	NT 3.1 PC Server
SLP Load Support	X	X	X	X	X	X
RPL Load Support	-	X	X	X	X	-

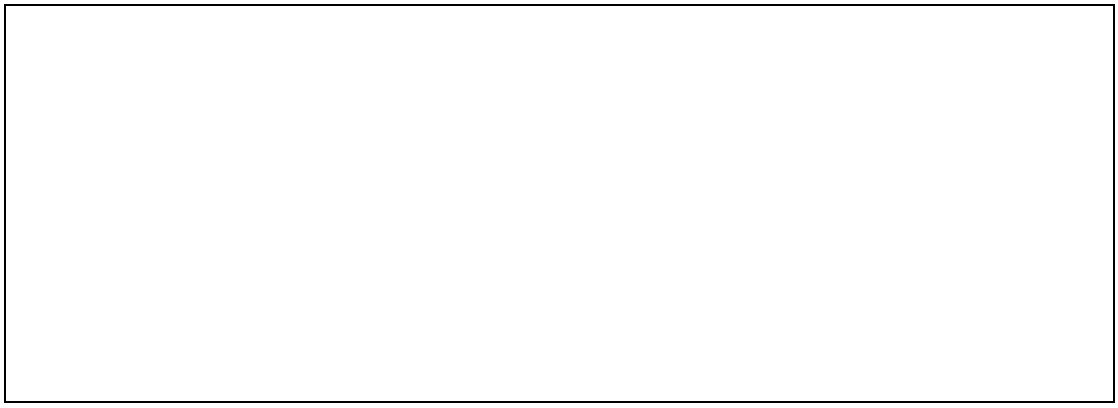
LAN Configurations

The 7450 Network Driver Interface Specification (NDIS) MAC driver is compliant with the Microsoft/3Com NDIS, version 1.0.0/2.0.1.

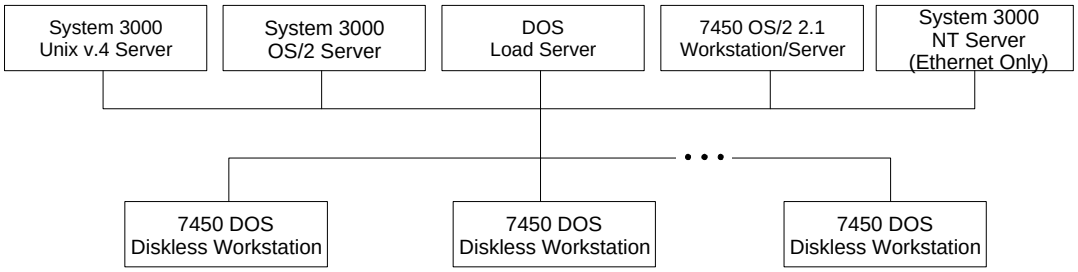
Connections for IEEE 802.2 compliant clients are supported. Diskless workstation loading is provided by the IEEE 802.1E/802.1m SLP (broadcast) standard, the IBM RPL (non-broadcast) standard, or BootP/TFTP (non-broadcast).

The 7450 system can be installed in a variety of StarLAN/Ethernet configurations. The following illustrations are typical examples.

7450 DOS Client - StarLAN or 10BaseT Ethernet



7450 DOS Client - Hubless StarLAN or 10Base2 Ethernet



NOTE: Hubless StarLAN can have a maximum of 8 nodes

NOTE: 10BASE2 Ethernet is not available on the 7450-2000 Workstation

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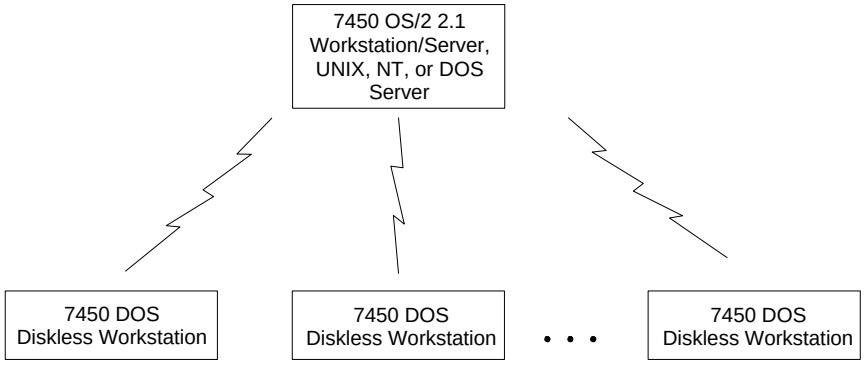
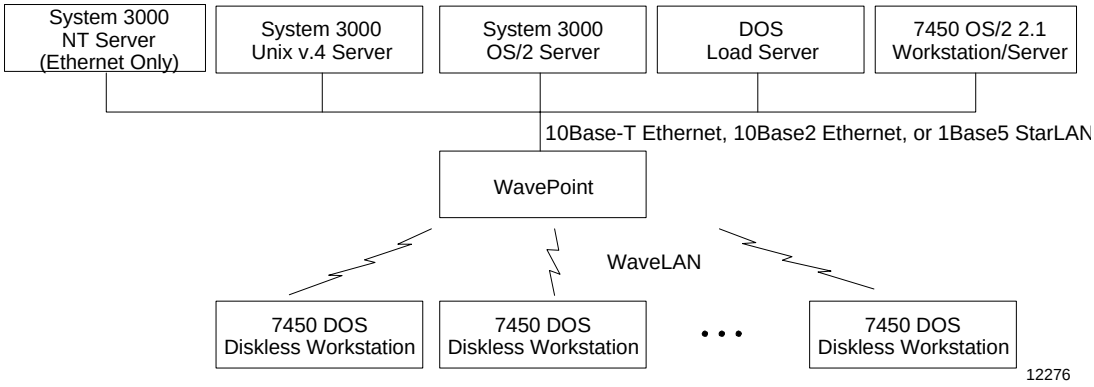
7450 DOS Client - WaveLAN



12275

7450 DOS Client - WaveLAN with WavePoint Bridge



System Server

Hardware

- Hard Drive
- Flex Drive
- LAN Adapter

Software (as required)

- UNIX V.4 Operating System
  - NetBIOS
  - WIN-TCP Transport and Applications
  - LAN Manager for UNIX
  - UNIX SLP Loader
- OS/2 1.2.2, 1.3, or 2.1
  - OS/2 SLP/SLF Loader
  - OS/2 LAN Server
  - OS/2 LAN Manager
- MS-DOS 6
  - DOS SLP Loader
  - NetBIOS
  - TCP/IP
- Windows NT 3.1 or 3.51
  - Remoteboot Service
  - Windows NT SLP/SLF Loader

7450 Workstation

Hardware

- 2 x 20 or VGA Operator Display
- Hard Disk (as required)
- Retail/Comm Board
- 2 x 20 Customer Display (as required)

Software

- MS-DOS 6
- Retail Platform Software
- Wollongong TCP Client Software (as required)
- Microsoft Netbeui (as required)
- Microsoft LAN Manager (as required)
- IBM LAN Requester (as required)

Development System

Hardware

- PC-Compatible
- VGA Operator Display
- Hard Disk
- Flex Disk
- LAN Adapter

Software

- MS-DOS 6
- OS/2 2.1 (as required)
- Retail Platform Software
- Wollongong TCP Client Software (as required)
- Microsoft Netbeui (as required)
- Microsoft LAN Manager (as required)
- IBM LAN Server (as required)

Workstation Loading Schemes

The 7450 supports the following loading schemes:

- Local Hard Drive
- SLP
- RPL
- BootP / TFTP
- Local PCMCIA Card
- Local Flex Diskette
- Novell Netware

Each load scheme requires specific support packages as discussed later in this book.

Local Hard Drive

This is used when you want to boot the application locally from the 7450's hard drive and to have access to the workstation's local hard drive. LAN communications is optional in this configuration.

System Load Protocol (SLP)

SLP (System Load Protocol) is an IEEE standard load protocol (IEEE 802.1E and 802.1m) that permits you to broadcast load the workstations and download files from the server. SLP offers many of the same advantages as RPL over standalone workstations.

Why Use SLP?

SLP offers several advantages over stand-alone workstations.

Enhanced Network Security

Workstations that start remotely can only run software made available through the server.

Software Version Control

With SLP loading, it is possible to update many workstations' operating environments by updating the files on a single server.

Centralized Disk Resources

Widely accessed data resources can be placed on a single disk as opposed to a number of individual workstations disks.

Workstation Costs

Diskless workstations are less expensive, but they do have drawbacks that should be circumvented. If the server is taken off line, the diskless workstation cannot be used as a stand-alone workstation.

Advantages of SLP Over RPL

- SLP permits broadcast loading, which permits many workstations to be downloaded simultaneously. This decreases download time, particularly on large networks. Network traffic is decreased.
- Workstations can join a download that is in progress. This can decrease load time and network traffic.
- Error recovery requires only missed frames to be re-transmitted. RPL requires all frames from the point of the error to be re-transmitted. Therefore, error recovery is faster and requires less traffic with SLP.

- The server selection is configurable via the Load Selector parameter at the loader. With RPL, the first server to respond is ALWAYS used.
- Neither LAN Manager nor LAN Server is required with SLP.
- Key position may be used to select load.

How Does SLP Work?

The following description provides a brief overview of the sequence of events during an SLP load.

1. The workstation initializes the LAN adapter card.

2. The workstation's LAN adapter broadcasts a LoadRequestPDU, identifying its Terminal ID and adapter LAN ID.

3. The server listens for LoadRequestPDUs, and checks the workstation's Terminal ID against its Terminal and Group file configurations.

4. If the server is able to provide the requested load, it sends a LoadResponsePDU to the workstation. If the same file is currently being sent to other workstations, this workstation is added to the existing group. Otherwise a new group is created.

5. The workstation chooses the server which responded to its request with the highest LoadSelector value. The workstation sends a GroupStatusPDU to the chosen server to request all blocks of the load.

6. Upon receipt of the GroupStatusPDU, the server updates the list of blocks to be sent.

7. If a new group has been created, the server waits a configurable amount of time for other workstations to join the group (Accum State). Otherwise, the workstation starts to receive the load from the server immediately.

8. The server sends the boot block via LoadDataPDUs.

   - If a frame is missed, the workstation sends a GroupStatusPDU to request missing frames.
   - The workstation does not require that the frames be sent in a particular order, therefore only missed frames are re-transmitted.
   - When the server has sent all of the blocks requested, it transmits a GroupStatusRequestPDU and enters a wait state to allow workstations to request missed blocks. (The number of GroupStatusRequestPDUs sent and the length of the wait state are configurable.)

9. Once the entire boot block has been received, the workstation passes control to the boot block.

10. The operating system and network driver are loaded from the boot block.

11. Additional files may be loaded over the network via the SLPREDIR driver, which uses the same protocol to communicate with the server.

Remote Program Load (RPL)

RPL (also called *Remoteboot Service*) makes it possible to start a workstation over the LAN. The workstation broadcasts a request for boot records, and the server responds by automatically establishing a connection and loading the appropriate files into the workstation's memory.

From the server's point of view, RPL is merely another service. From the client, or workstation, point of view, the main requirement is a network adapter card that contains a LAN ROM.

RPL is used when you prefer all software to reside on the server. Only the operating system and retail device drivers are downloaded to the 7450 workstations.

Also, since RPL is part of LAN Manager/LAN Server, full LAN Manager/LAN Server services are available.

Why Use RPL?

RPL offers several advantages over stand-alone workstations.

Enhanced Network Security

Workstations that start remotely can only run software made available through the server.

Software Version Control

With the RPL service, it is possible to update many workstations' operating environments by updating the files on a single server.

Centralized Disk Resources

Widely accessed data resources can be placed on a single disk as opposed to a number of individual workstations disks.

Workstation Costs

Diskless workstations are less expensive, but they do have drawbacks that should be circumvented. If the server is taken off-line, the diskless workstation cannot be used as a stand-alone workstation.

How Does RPL Work?

The following description provides a brief overview of the sequence of events during an RPL load.

1. The workstation initializes the LAN adapter card.
2. The workstation's LAN adapter broadcasts a *find* frame, identifying its adapter ID.
3. The server listens for *find* frames, and checks the workstation's adapter ID against its *RPL.MAP* file.
4. If the adapter ID is known, the server sends a *found* frame, identifying its adapter ID to the workstation.
5. The workstation LAN adapter accepts the first *found* frame it receives and sends a *send.file.request* frame to that adapter ID.
6. Upon receipt of the *send.file.request* frame, the server uses the *file.data.response* frame to send to a boot block. Frames are sent until the entire boot block has been received. If a frame is missed, the frames must be re-transmitted from the point of the missed frame.
7. Control is first passed to *rplboot.sys*, which moves each network driver and RPL disk (*rpldisk.sys*) into high conventional memory (just below 640 K).

8. Next, control is passed to *rplstart.com*, which reads the boot sector.

9. *rpldisk.sys* establishes a NetBIOS session to the file server, and reads the boot sector (the boot sector is a normal DOS boot sector).

10. While processing *config.sys* and *autoexec.bat*, the redirector is loaded, initialized, and started.

11. *rplinit.exe* is run as the first workstation service in *lanman.ini*.
    Three things are established:

    - User identity
    - Session to the file server
    - Connection to drive C:

Local PCMCIA Card

This scheme is used when you want to boot the application locally from the 7450's PCMCIA Card interface. See the *PCMCIA Load* chapter.

Installing the Hardware

Prior to hardware installation, the site should be checked to confirm that it has been prepared in accordance with the site preparation requirements for the hardware involved.

The following documents provide information necessary to plan for the installation of certified 7450 configuration components.

System Servers

No special site preparation is required for the PC server. Use the associated user documentation for hardware installation reference.

Development System

See your user documentation.

7450 Workstations

NCR 7450 Workstation Site Preparation, ST-2500-B41
NCR 7450 Hardware Installation and Service, ST-2122-17

LAN Communications

NCR Ethernet Wiring Guide, ST-2118-82
NCR StarLAN Wiring Guide, ST-2111-24
NCR Retail WaveLAN Installation Guide, ST-2121-02
NCR Hubless StarLAN Wiring Guide, ST-2113-57
NCR 7020 StarLAN Hub Hardware Installation, ST-2112-12
NCR 7020 StarLAN Hub Site Preparation, ST-2500-A42

Migration Issues

The following are issues you should consider when migrating from earlier releases of the 7450.

- Release 1.x drivers cannot be run on Release 2.x hardware.
- Except for the LAN ROM, Release 2.x BIOS images cannot be used on Release 1.x hardware.
- Release 2.0 drivers can be used on Release 1.x hardware.

Chapter 2

Retail Platform Software Installation

Overview

This chapter provides procedures for installing the 7450 Retail Software on a PC development system and how to perform a hard disk load on an NCR 7450 Workstation.

Installing Software on the Development System

Installation Considerations

Retail application programs are developed on a PC-compatible. The application can be written in either "C" or BASIC. The Phar Lap DOS Extender is also supported in "C".

The 7450/DOS device drivers are installable drivers that are loaded by way of the *config.sys* file as on PCs.

Note: The software installation procedures discussed in this book modify the *autoexec.bat* and *config.sys* files. You may want to make backup copies of your originals before starting this process.

The installation programs on each of the install diskettes use small amounts of environment space. Normally, the default amount of environment space is adequate. However, if you experience difficulty trying to load the software on the specified drive, it is very likely that you have run out of environment and need to increase it. Try increasing the environment space by 256 K.

Installation Procedure

Install the following software on the Development System, as required by your application.

- *7450 Retail Platform for DOS and OS/2 VDM Support* (LPIN: G370-0383-0000)
- *Phar Lap DOS Extender* (Phar Lap as is)
- *Phar Lap DOS Extender Support* (LPIN: G370-0385-0000)
- *7450 Remote Log & Tally Access for DOS* (LPIN: G370-0389-0000)
- *MicroTouch Touch Screen Drivers and Utilities* (LPIN: G370-0525-0000)
- *KDS Support for 7450 Terminal* (LPIN: G370-0529-0000)

See Appendix A for a complete listing of all the run-time software.

Use the following procedure for installing the software.

1. Insert diskette 1 of the software package that you wish to install.
   Note: The install programs use the DOS *xcopy* command. Make sure this command is in your system path.

2. Enter the installation command.

   ```
   a:\install
   ```

   Note: The install program should not be run while *Current Directory* = A:

3. Follow the screen prompts. At the completion of the installation of this disk you are directed to merge a newly created *autoexec.xxx* (xxx varies with each package) with your existing *autoexec.bat*. A simple way to accomplish this is to use the DOS *copy* command:

   ```
   copy \autoexec.bat + \retaildd\autoexec.xxx \autoexec
   .bat
   ```

   Use the same procedure to merge the *config.sys* file entries.

4. Repeat this procedure, as required, for each of the other packages.

System Initialization

The device drivers are installed as the system boots, according to how you have configured your *config.sys* file. Each driver displays a version banner as it loads, however, no initialization is performed at this time. The *ncrinit* program, called by the *autoexec.bat* file, initializes the drivers.

Refer to *NCR 7450 and 705x Programming Information* (ST-2122-18) or *NCR 7450 and 705x Programming Windows Help* (D9-0169-A) for programming information to develop your retail application. See the *Installable Device Drivers* chapter in this book, for information on installing specific 7450 device drivers.

Installing Software on a 7450 Disk-Based Workstation

After developing your retail application you can install the application on a disk-based 7450 workstation for testing purposes.

Enabling the Hard Disk

1. Boot the 7450.
2. At the main menu, select *Configuration*.
3. Follow the menus to *Disk Types* and set *Hard Drive 0* to the correct parameters.

   Release 1.x Workstations: Install the drive as a type 01 and enter the parameter information from the chart below.

   Release 2.x Workstations: The user defined disk types for Release 2.x are type 46 or 47.

   Auto Detection: Release 2.0 workstations have an Auto Detect option where the drive parameters are read directly from the drive, rather than entering them manually.

The following hard disks are certified for the 7450.

Size	Conner No.	Cyln	Heads	Sectors
80 MB	CP-30084E*	903	4	46
120 MB	CP-30104*, CP-30104H*	900	15	17
170 MB	CFA-170A	903	8	46
200 MB	CP-3204F*, CP-30204*	1024	15	27
210 MB	CFS-210A	685	16	38
340 MB	CFA-340A	665	16	63
420 MB	CFS-420A	826	16	63

* Discontinued drives, reference only

4. Exit *Configuration Setup*.
5. Partition and format the hard disk.
6. Install the operating system.
7. Reboot the system, select *Load Program* from the main menu.

Installing the Software

The procedures for loading the software on a disk-based 7450 workstation are the same as discussed earlier in this chapter in the section titled *Installing 7450 Retail Platform Software on the Development System*, except for the obvious differences in certain application development software.

Chapter 3

Windows 95 Support

Overview

This chapter identifies issues that need to be considered when using the 7450 as a Windows 95 Workstation / Server

WINDOWS 95 Considerations

- The WINDOWS 95 platform does not support the 7450 Sleep Mode. UPS is the only power control that is supported.
- The physical device drivers have no corresponding Virtual Device Drivers (VxDs) to provide virtualized access to the device. Care should be taken so that multiple Virtual Display Machines (VDMs) do not attempt to simultaneously access the device.
- You should use care when shutting down VDMs from the workplace shell. If an application is shut down using this method while communicating with a chip such as the RS-485 chip or the 8042 chip for the MSR / OCIA, the chip could be left in an inoperable state until a subsequent system reboot. It is recommended that the VDM be terminated by EXITing from within the VDM, rather than externally from the work space shell. This is done by typing *EXIT* at the command line.
- Command line switches are required for the following drivers:

CMOSDRIV.DOS	/ NOBLOCK
CONSOLDD.DOS	/ NOSAVE
NPOWER.DOS	/ VDM

- TAPS Virtual Device Driver (TAPS VxD) is required.

TAPS VxD

The TAPS VxD provides applications running in a DOS Virtual Machine (VM) with TAPS access to existing DOS drivers without having to change the applications, TAPS, or DOS drivers.

Specifically, TAPS asynchronous commands are of concern, since a particular application's TAPS control block is often swapped out of the memory allocated to it by the initiating VM by the time the interrupt representing asynchronous event completion occurs.

By mapping TAPs asynchronous control blocks to global memory visible within all VMs, monitoring the completion of the global control blocks, and then remapping the global control blocks to the original application visible control blocks, the TAPS VxD provides TAPS asynchronous command support for VM applications in the WINDOWS 95 multitasking environment.

Installing TAPS VxD

To install the TAPS VxD, add the following line to the *SYSTEM.INI* file.

```
[386Enh]
device=<path>\taps_vxd.386
; The following line is only needed in Windows 3.1 and
should replace the line "keyboard=*VKD"
keyboard=c:\retaildd\wedgevkd\vkd.386
; The following line is needed for both Windows 3.1 and
; WIN 95
device=c:\retaildd\wedgevkd\vkfilter.386
```

Note: Default <path> is `c:\windows\system`

Modifying the Global Data Area

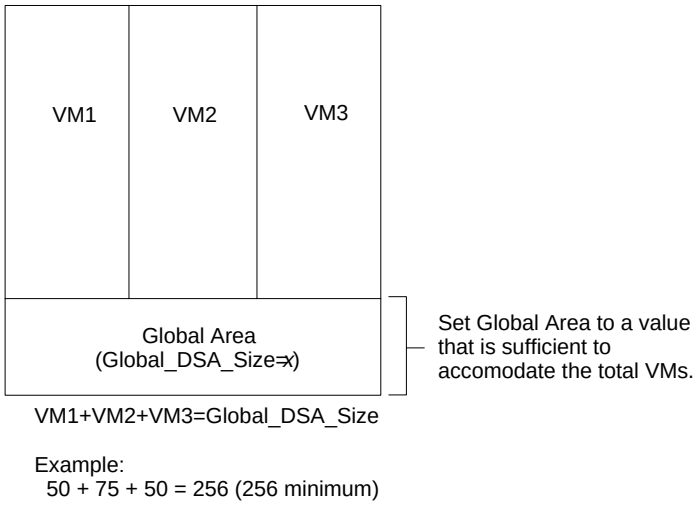
The *SYSTEM.INI* file may be modified to include a parameter to specify a configurable size for the Global Data area that contains the global control blocks. The default size of this area is 2K, but by including the following lines in *SYSTEM.INI* it may be changed.

```
[TAPS_VxD]
Global_DSA_Size=x
```

where *x* must be a decimal integer greater than or equal to 256. Default is 2048.

If the value specified is less than 256, then TAPS_VxD automatically sets it to 256. If this value is too small for normal operating conditions then out-of-memory scenarios (ETIOD_NORESOURCES) will occur frequently when trying to allocate global control blocks. If it is set too large, then memory is wasted for each VM.

Example: Printing large graphic data such as a large logo or a signature from a signature capture device will require an increase in the default Global Data Area.



Note: It is not recommended to run retail applications in more than one VM at a time.

Overview

This chapter identifies issues that need to be considered when using the 7450 as a Windows 95 Workstation / Server

WINDOWS 95 Considerations

- The WINDOWS 95 platform does not support the 7450 Sleep Mode. UPS is the only power control that is supported.
- The physical device drivers have no corresponding Virtual Device Drivers (VxDs) to provide virtualized access to the device. Care should be taken so that multiple Virtual Display Machines (VDMs) do not attempt to simultaneously access the device.
- You should use care when shutting down VDMs from the workplace shell. If an application is shut down using this method while communicating with a chip such as the RS-485 chip or the 8042 chip for the MSR / OCIA, the chip could be left in an inoperable state until a subsequent system reboot. It is recommended that the VDM be terminated by EXITing from within the VDM, rather than externally from the work space shell. This is done by typing *EXIT* at the command line.
- Command line switches are required for the following drivers:

CMOSDRIV.DOS	/ NOBLOCK
CONSOLDD.DOS	/ NOSAVE
NPOWER.DOS	/ VDM

- TAPS Virtual Device Driver (TAPS VxD) is required.

TAPS VxD

The TAPS VxD provides applications running in a DOS Virtual Machine (VM) with TAPS access to existing DOS drivers without having to change the applications, TAPS, or DOS drivers.

Specifically, TAPS asynchronous commands are of concern, since a particular application's TAPS control block is often swapped out of the memory allocated to it by the initiating VM by the time the interrupt representing asynchronous event completion occurs.

By mapping TAPs asynchronous control blocks to global memory visible within all VMs, monitoring the completion of the global control blocks, and then remapping the global control blocks to the original application visible control blocks, the TAPS VxD provides TAPS asynchronous command support for VM applications in the WINDOWS 95 multitasking environment.

Installing TAPS VxD

To install the TAPS VxD, add the following line to the *SYSTEM.INI* file.

```
[386Enh]
device=<path>\taps_vxd.386
; The following line is only needed in Windows 3.1 and
should replace the line "keyboard=*VKD"
keyboard=c:\retaildd\wedgevkd\vkd.386
; The following line is needed for both Windows 3.1 and
; WIN 95
device=c:\retaildd\wedgevkd\vkfilter.386
```

Note: Default <path> is `c:\windows\system`

Modifying the Global Data Area

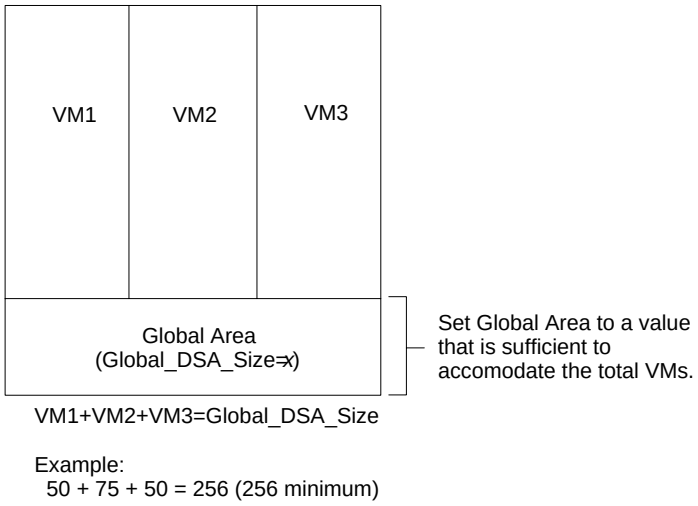
The *SYSTEM.INI* file may be modified to include a parameter to specify a configurable size for the Global Data area that contains the global control blocks. The default size of this area is 2K, but by including the following lines in *SYSTEM.INI* it may be changed.

```
[TAPS_VxD]
Global_DSA_Size=x
```

where *x* must be a decimal integer greater than or equal to 256. Default is 2048.

If the value specified is less than 256, then TAPS_VxD automatically sets it to 256. If this value is too small for normal operating conditions then out-of-memory scenarios (ETIOD_NORESOURCES) will occur frequently when trying to allocate global control blocks. If it is set too large, then memory is wasted for each VM.

Example: Printing large graphic data such as a large logo or a signature from a signature capture device will require an increase in the default Global Data Area.



Note: It is not recommended to run retail applications in more than one VM at a time.

Overview

This chapter identifies issues that need to be considered when using the 7450 as a Windows 95 Workstation / Server

WINDOWS 95 Considerations

- The WINDOWS 95 platform does not support the 7450 Sleep Mode. UPS is the only power control that is supported.
- The physical device drivers have no corresponding Virtual Device Drivers (VxDs) to provide virtualized access to the device. Care should be taken so that multiple Virtual Display Machines (VDMs) do not attempt to simultaneously access the device.
- You should use care when shutting down VDMs from the workplace shell. If an application is shut down using this method while communicating with a chip such as the RS-485 chip or the 8042 chip for the MSR / OCIA, the chip could be left in an inoperable state until a subsequent system reboot. It is recommended that the VDM be terminated by EXITing from within the VDM, rather than externally from the work space shell. This is done by typing *EXIT* at the command line.
- Command line switches are required for the following drivers:

CMOSDRIV.DOS	/ NOBLOCK
CONSOLDD.DOS	/ NOSAVE
NPOWER.DOS	/ VDM

- TAPS Virtual Device Driver (TAPS VxD) is required.

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The TAPS VxD provides applications running in a DOS Virtual Machine (VM) with TAPS access to existing DOS drivers without having to change the applications, TAPS, or DOS drivers.

Specifically, TAPS asynchronous commands are of concern, since a particular application's TAPS control block is often swapped out of the memory allocated to it by the initiating VM by the time the interrupt representing asynchronous event completion occurs.

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Installing TAPS VxD

To install the TAPS VxD, add the following line to the *SYSTEM.INI* file.

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should replace the line "keyboard=*VKD"
keyboard=c:\retaildd\wedgevkd\vkd.386
; The following line is needed for both Windows 3.1 and
; WIN 95
device=c:\retaildd\wedgevkd\vkfilter.386
```

Note: Default <path> is `c:\windows\system`

Modifying the Global Data Area

The *SYSTEM.INI* file may be modified to include a parameter to specify a configurable size for the Global Data area that contains the global control blocks. The default size of this area is 2K, but by including the following lines in *SYSTEM.INI* it may be changed.

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[TAPS_VxD]
Global_DSA_Size=x
```
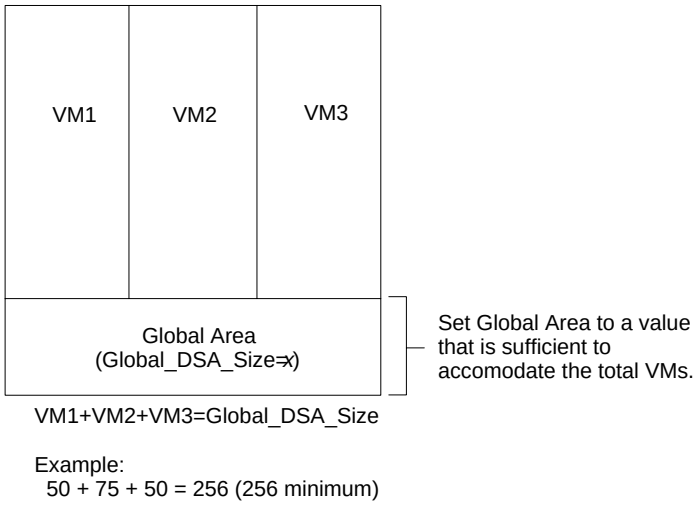

where *x* must be a decimal integer greater than or equal to 256. Default is 2048.

If the value specified is less than 256, then TAPS_VxD automatically sets it to 256. If this value is too small for normal operating conditions then out-of-memory scenarios (ETIOD_NORESOURCES) will occur frequently when trying to allocate global control blocks. If it is set too large, then memory is wasted for each VM.

Example: Printing large graphic data such as a large logo or a signature from a signature capture device will require an increase in the default Global Data Area.



Note: It is not recommended to run retail applications in more than one VM at a time.

Chapter 4

OS/2 VDM Software Installation

Overview

This chapter provides procedures for installing the retail software on a 7450 Workstation/Server in order for it to also function as a retail workstation. The workstation functionality resides in an OS/2 Virtual DOS Machine (VDM) session.

Note: All references to OS/2 in this chapter apply to both OS/2 2.1 and OS/2 Warp.

Configuring an OS/2 VDM Session for a Workstation

The 7450 Workstation/Server can operate in a mixed environment, where both standard PC and POS capabilities are required. The OS/2 VDM (Virtual DOS Machine) platform provides this functionality. The POS functionality runs in a VDM session.

OS/2 VDM Considerations

There are several migration issues to consider when using the 7450 as an OS/2 workstation/server.

- Protected mode access of retail peripherals is not possible in an OS/2 session. Access is permitted only in a single DOS or Windows session.
- There is no text mode shell as in previous NCR OS/2 platforms. You must use the Presentation Manager.
- Device drivers are loaded into the VDM using the *DOS Settings* for the VDM. Any corresponding *config.sys* lines under DOS, including the DEVICE= lines, must be integrated into the *DOS Settings* (DEVICE=) since the VDM has no associated *config.sys* file. An *autoexec.bat* file for the VDM is similarly controlled through the *DOS Settings* for the VDM.
- The CDS driver must be the last device driver listed in the VDM's *DOS Settings* (DEVICE=) entries.
- There is no *standby* control capability included in the VDM. The only power control supported is *UPS*.

- Care should be taken when shutting down an OS/2 VDM from the OS/2 desktop task manager. If an application is shut down using this method while communicating with a chip (such as the RS-485 chip or the 8042 chip for the MSR/OCIA), the chip could be left in an inoperable state until a subsequent system reboot. It is recommended that the VDM be terminated by *EXIT*ing from within the VDM, rather than terminating externally from the OS/2 desktop task manager.
- In a DOS session, if you are using a PC-style keyboard, the CTRL-ALT-DEL key sequence causes the system to reboot. If you are using an NCR Big-Ticket keyboard, the CTRL-ALT-DEL key sequence does nothing.
- The switches in the DEVICE= command lines in the VDM *DOS Settings* must be in all UPPERCASE.
- Do NOT use the Time and Date driver (CLOCKDD.DOS) in a VDM session. Use the Real Time Clock.
- Do NOT use the RS-232 driver (SERIALDD.DOS) in a VDM session. Use VCOM.SYS (included with OS/2). If SERIALDD.DOS is used, it must be exclusive to the VDM session.
- Several of the retail device drivers require the */VDM* switch in their *DOS Settings* (DEVICE=) entries.
  - consoldd.dos
  - npower.dos
  - cmosdriv.dos
  - dsd.dos
  - cdsd.dos

Refer to the chapter *Installing Device Drivers* for more information about the /VDM switch.

- Command line parameters for `DEVICE=` in the *DOS Settings* window in the VDM must be specified with hexadecimal values rather than their decimal equivalents. Use of decimal values result in an error.

  Example: use `<path>MFP.DOS /P:0x02`
  rather than `<path>MFP.DOS /P:2`

- In DOS Settings for the VDM, the HW_TIMER setting should be *ON*. This setting permits direct access to the hardware timer ports. Otherwise, the system intercepts timer requests and emulates the timer. Several retail drivers require access to the hardware timer ports, and the overhead in emulating the timer can cause problems. Timing sensitive software may require that the HW_TIMER setting be On.

  Note: The HW_TIMER setting should NOT be *ON* for multiple DOS sessions. This can cause programs in these sessions to interfere with each another.

- The OS/2 DOS box setting KBD_BUFFER_EXTEND should be set to OFF if OCIA and the Input Sequencer. is used. If set ON, wrong data can be displayed when scanning.

Creating the VDM Session

The OS/2 VDM permits the 7450 to operate as a full retail workstation from within a VDM session. The following procedures outline how to configure the 7450 running OS/2 with such a session.

1. From the OS/2 *Desktop* double-click on *OS/2 System* icon.
2. Double-click on the *Command Prompts* icon.
3. Place the mouse cursor on the *DOS Full Screen* icon and click the right mouse button.
4. Click on the *Create another* (arrow button) from the pop-up window list.
5. Click on *Default* from the pop-up window list.
6. Select *Desktop* from the pop-up window.
7. Enter the name of the new DOS session in the *New Name:* field.
8. Save your entries by clicking on the *Create* button.
9. Enter an asterisk (*) in the *Path and file name* field in the pop-up window.
10. Close the window.

Installing 7450 Retail Platform Software in the VDM Session

Installing the 7450 retail software in a VDM session is similar to installing the software onto a disk-based workstation. The primary difference is the way the configuration file is built. The 7450/DOS Device Drivers are installable drivers that are normally loaded by way of a *config.sys* file. In VDM sessions the configuration information is built from within the VDM windows.

Note: The install programs use the DOS *xcopy* command. Make sure this command is in your

system path.

1. Double-click on the new VDM DOS session.

2. Insert the retail platform diskette.
   7450 Retail Platform for DOS and OS/2 VDM Support (LPIN: G370-0383-0000)

3. Enter the installation command.

```
a:\install
```

Creating the VDM *autoexec.** File

1. Use an ASCII editor to create an auto-executing startup file in the root directory. This file is unique to the VDM session and functions the same as regular *autoexec.bat* files when the VDM session is entered. Pick a name other than *autoexec.bat*.

Example: *autoexec.vdm*

2. Make the following entry in the file.

```
\retaildd\ncrinit
```

Creating the VDM *config.sys* File

1. Print out the *config.tmp* file for reference. You will use this information to build the configuration information from within the VDM configuration windows.

2. Return to the OS/2 Desktop by typing `EXIT`.

3. Place the mouse cursor on the VDM icon and click the right mouse button.

4. Click on *Open* (arrow button) from the pop-up window.

5. Click on *Settings* from the pop-up window.

6. Select *Session*.

7. Select *DOS settings . . .*

8. Select *DOS_AUTOEXEC* from the setting list. Use this setting to specify the name of the *autoexec.** you created in the previous section.

9. Select *DOS_DEVICE* from the setting list. Enter the full name and path, excluding *DEVICE=*, for each of the retail device drivers for this VDM session. Use the *config.tmp* file (from step #1) for reference.

Example: `c:\retaildd\miscdriv.dos`

Note: The following retail device drivers require the */VDM* switch. The switch must be in UPPER CASE.

- consoldd.dos
- npower.dos
- cmosdriv.dos
- dsd.dos
- cdsd.dos

Caution: CDSD.DOS **MUST** be the **LAST** entry. Refer to the chapter *Installing Device Drivers* for more information about the /VDM switch.

10. Select *Save* when entries are complete.

11. Close the *Settings* window.

System Initialization

The device drivers are installed as you enter the VDM session. Each driver displays a version banner as it loads, however, no initialization is performed at this time. The *ncrinit* program, called by the *autoexec.vdm* file, initializes the drivers.

Refer to *NCR 7450 and 705x Programming Information* (ST-2122-18) or *NCR 7450 and 705x Programming Windows Help* (D9-0169-A) for programming information to develop your retail application. See the *Installable Device Drivers* chapter in this book, for information on installing specific 7450 device drivers.

Chapter 5

Installing the 7450 LAN Network Adapter

Overview

This chapter discusses the procedures for installing/configuring the 7450 LAN Network Adapter in the following environments:

- Windows 95 (Network Client 4.0)
- IBM LAN Server 4.0
- Network Client 3.0 for DOS
- Windows for Workgroups

Windows 95 (Network Client 4.0)

Installing the LAN Adapter

1. From the Windows 95 Desktop, choose *My Computer*.
2. From the My Computer group, choose *Control Panel.*
3. From the Control Panel group, choose *Network.*
4. From the Network dialog box, choose *Add.*
5. From the Select Network Component Type dialog box, choose *Adapter.* Choose *Add.*
6. From the Select Network Adapters dialog box, choose *Have Disk.*
7. Insert the following diskette.
   NDIS MAC Drivers for DOS
   (LPIN: G370-0437-0000)
8. From the Install From Disk dialog box, enter **a:** in the *Copy manufacturer's files from:* box. Choose *OK.*
9. From the Select Network Adapters dialog box, choose your adapter type from the list of choices:
   - NCR 7450 Ethernet / StarLAN Adapter
   - NCR 7450 PCMCIA WaveLAN Adapter

   Choose *OK*
10. If you are using Ethernet / StarLAN, reboot the system for the changes to take effect. If you are using WaveLAN, continue with the following steps.

11. Go to *Control Panel.*

12. Select *System* and go to the *Device Manager* tab.

13. Expand the *PCMCIA Sockets* device by clicking on the plus (+) graphic.

14. Select *PCIC or compatible PCMCIA controller* and look at its properties.

15. Under *Device usage*, remove any checked boxes for devices where this device should not be used.

`Original Configuration (Current)` should not be checked.

16. Choose OK to save changes.

17. Shut down and reboot the system for the changes to take effect.

IBM LAN Server 4.0

Installing the LAN Adapter

1. From the OS/2 Desktop, choose *IBM LAN Services.*
2. From the IBM LAN Services dialog box, choose *OS/2 LAN Services Installation/Configuration*.
3. At the Welcome! screen, choose *OK.*
4. From the Easy or Tailored Installation / Configuration dialog box, choose *Tailored.*
5. From the Installation Tasks dialog box, choose *Install or configure this workstation*. Choose *OK.*
6. From the Server Type dialog box, choose the type of server you want to install and choose *OK.*
7. A dialog box is displayed asking if you want to re-install this version of MPTS. Choose *No.*
8. From the LAPS Configuration dialog box, under the Network Adapters section, select the *Other Adapters.* button.
9. Insert the following diskette.
   NDIS MAC Drivers for OS/2
   (LPIN: G370-0501-0000)
10. At the path dialog box, enter **A:\IBMCOM\MACS**. Choose *OK.*

11. From the Network Adapters list, choose your NCR 7450 adapter type:
    - NCR 7450 Ethernet Adapter
    - NCR 7450 StarLAN Adapter
    - NCR 7450 WaveLAN / PCMCIA Adapter
12. With the adapter type selected, choose *Add*.

If you are using the OS/2 SLP/SLF Loader:

13. From the LAPS Configuration dialog box, under the Other Protocols section, choose *Other Protocols*.
14. Insert the following diskette.
    OS/2 SLP/SLF Loader
    (LPIN: G370-0503-0000)
15. At the path dialog box, enter **A:\IBMCOM\PROTOCOL**.
    Choose *OK*.
16. From the Network Adapters list, choose your NCR 7450 protocol type:
    - NCR Broadcast Loader Interface Module (BLIM.OS2)
    - NCR Ethernet Loader Interface Module (ELIM.OS2)
    - NCR StarLAN Loader Interface Module (SLIM.OS2)
17. With the protocol type selected, choose *Add*.
18. Follow the system prompts and complete system configuration. Save the changes. Shut down and reboot the system for the changes to take effect.

For more information see the *NCR OS/2 SLP/SLF LAN Loader User's Guide*, (ST-2117-07).

Network Client 3.0 for DOS

Installing the LAN Adapter

1. At the DOS prompt, type **cd C:\NET** (or where Network Client is installed).
2. Run the install program. Type **SETUP.EXE** and press **ENTER.**
3. Use the arrow keys to select *Change Network configuration.* Press **ENTER**.
4. Use the arrow keys to select *Add Adapter.* Press **ENTER**.
5. Use the arrow keys to select *Network adapter not shown on list below* . . . and Press **ENTER**.
6. Insert the following diskette.
   NDIS MAC Drivers for DOS
   (LPIN: G370-0437-0000)
7. At the path dialog box, type **A:\.** Press **ENTER**.
8. From the list of network adapters, choose your adapter type:
   - NCR 7450 Ethernet / StarLAN Adapter
   - NCR 7450 PCMCIA WaveLAN Adapter
9. Press Enter
10. Follow the setup prompts to complete the installation.
11. Shut down and reboot the system for the changes to take effect.

Windows for Workgroups

Installing the LAN Adapter

1. From the Windows Desktop, choose *Network.*
2. From the Network group, choose *Network Setup.*
3. From the Network Setup dialog box, choose *Drivers.*
4. From the Network Drivers dialog box, choose *Add Adapter*.
5. From the Add Network Adapter dialog box, choose *Unlisted or Updated Network Adapter.* Choose *OK.*
6. Insert the following diskette.
   NDIS MAC Drivers for DOS
   (LPIN: G370-0437-0000)
7. From the Install Driver dialog box, type **a:** in the *Copy manufacturer's files from:* box. Choose *OK.*
8. From the Unlisted or Updated Network Adapter dialog box select your adapter type:
   - NCR 7450 Ethernet / StarLAN Adapter
   - NCR 7450 PCMCIA WaveLAN Adapter

   Choose *OK*
9. At the Network Drivers dialog box, make sure that the network protocols are correct. The defaults are *Microsoft NetBEUI and IPX/SPX Compatible Transport with NetBIOS*. Remove any unused protocols. Choose *Close.*

10. From the Network Setup dialog box, choose *OK*.
11. Reboot the system for the changes to take effect.

Chapter 6

SLP LAN Loading

Overview

This chapter provides procedures for performing an *SLP System Load* to 7450 workstations from a PC server running either UNIX, OS/2, Windows NT, or DOS (or a 7450 workstation/server).

Topics in this chapter include:

- Installing SLP Software
- Creating an SLP Boot Block
- Creating a Secondary Load File
- Configuring SLP on the Server
- Configuring the Workstation for SLP
- Performing an SLP load

SLP is a broadcast protocol that the loader uses to download the operating system, retail device drivers, and application to the workstations. The SLP protocol also provides for *transparent* file transfer from the server to the workstations using the SLPREDIR driver.

Wedge Loading Considerations

The correct TAPS drivers must be loaded based on the current hardware configuration. Where there is a mix of wedge/non-wedge devices, an "automatic" load mechanism is needed. If all the hardware is the same or if the terminals are loaded from disk, its problably just as easy configure the config.sys files with the appropriate drivers. If there is a mixture of workstation types, you can use one of the follow two methods.

Method 1:

Assuming a LAN load is being used, the SLP loader can be configured to selectively load different boot blocks based on the terminals TERMINAL ID. This is done using the TERM.TXT and GROUP.TXT config files (see Index).

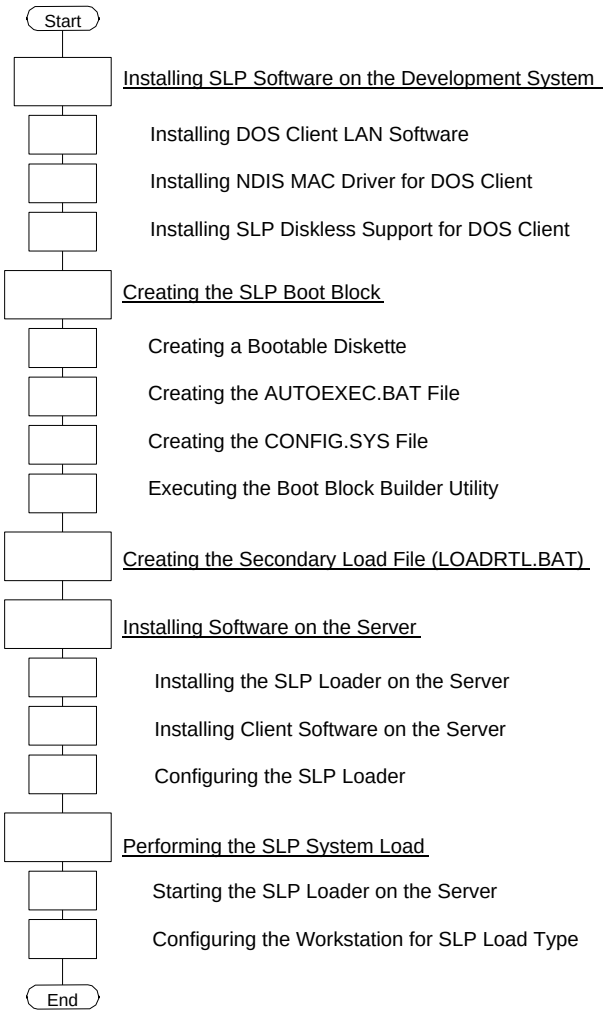
Method2:

This method involves running the WEDGECFG utility to determine the presence or absence of wedge hardware in order to subsequently load the appropriate drivers using the LOADDEV utility (originally developed for loading drivers not initially contained in a LAN boot block). LOADDEV.COM is part of LPIN G370-383-0000. Also included is a file called WEDGECHK.BAT which can be called from or added directly to AUTOEXEC.BAT.

For information about the WEDGECFG utility, see the *Wedge Software User's Guide* (BD20-1368-A).

SLP Software Installation Flowchart

The flowchart below shows an overview of the installation and loading procedures that are discussed in this chapter.



Installing SLP Software on the Development System

Caution: These procedures make modifications to your *autoexec.bat* and *config.sys* files. You may want to make backup copies of your original files before proceeding.

Note: The install programs use the DOS *xcopy* command. Make sure this command is in your system path.

This chapter assumes that the software discussed in Chapter 2, *7450 Retail Software Installation* is installed on your development system.

Installing DOS Client LAN Software

1. Insert the following diskette:

   If you are using Netbeui:

   Microsoft Netbeui v2.2 for DOS Client
   (LPIN: G370-0387-0000)

   If you are using Wollongong TCP/IP:

   Wollongong TCP/IP Runtime 2.0 for DOS
   (LPIN: F075-03x0-0000)*

   or

   Wollongong TCP/IP Access 3.0 for DOS
   (LPIN: F075-02x0-0000)*

* LPIN depends on the number of users you have license for

2. Enter the installation command and follow the screen prompts.

```
a:\install
```

Note: If you are using some other LAN software, refer to your user documentation and follow the installation instructions.

Installing NDIS MAC Driver for DOS Client Software

1. Insert the following diskette:

   NDIS MAC Drivers for DOS Client diskette (LPIN: G370-0437-0000)

2. Enter the installation command and follow the screen prompts.

```
a:\install
```

Note: If you are using other LAN software (other than Netbeui or TCP/IP), do Steps 1 & 2 above and then replace Steps 3-5 with the procedures provided by your LAN Client software to install the MAC driver.

3. Merge *autoexec.xxx* and *config.xxx* with your existing *autoexec.bat* and *config.sys*.

   If you are using Netbeui:

```
copy \autoexec.bat + \netbeui.2_2\autoexec.net \autoexec.bat
copy \config.sys + \netbeui.2_2\config.net \config.sys
```

If you are using Wollongong TCP/IP:

Follow the instructions / sample files that are included with the TCP / IP software.

4. Use an ASCII editor to modify the *config.sys* file. Delete the *REM* statement on the line that contains the 7450 LAN hardware device driver for your system configuration. The choices are:

   - NCRCSMA LAN Driver for 7450 terminals (Ethernet and StarLAN)
   - NCR WVPCMCIA Driver for 7450 terminals (WaveLAN / PCMCIA)

5. A base *protocol.ini* file has been created on the target drive (`\netbeui.2_2\`). Also created were LAN-specific files that MUST be added to the *protocol.ini* file. Merge the 7450 configuration file *(protocol.csm* for Ethernet / StarLAN, or *protocol.wvp* for WaveLAN / PCMCIA*)* with the *protocol.ini* file

   If you are using Netbeui:

   ```
   cd \netbeui.2_2
   copy protocol.ini + protocol.xxx protocol.ini
   ```

   Note: See *Netbeui Parameters for PROTOCOL.INI* in the Appendix for more information.

   If you are using Wollongong TCP/IP:

   Follow the instructions / sample files that are included with the TCP / IP software.

Installing SLP Diskless Support for DOS Client

1. Insert the following diskette in your development system.

   SLP Diskless Support for DOS Client
   (LPIN: G370-0439-0000)

2. Enter the installation command and follow the screen prompts.

   ```
   a:\install
   ```

3. At the completion of the installation of this diskette you are directed to merge the newly created *config.slp* with your existing *config.sys*. A simple way to accomplish this is to use the DOS *copy* command:

   ```
   copy \config.sys + \retaildd\config.slp \config.sys
   ```

   Make sure the drivers are installed in the following sequence in *config.sys*:

   - protman.dos
   - MAC driver (ncrcsma or wvpcmcia)
   - blim.dos
   - slpredir.dos
   - lancache.dos (if used)

Creating the SLP Boot Block

Note: The procedures in this section primarily describe how to build a *Conventional* boot block image. Variations for creating *Enhanced* and *Extended* boot blocks are noted. For more information about the differences in the three versions of the builder, see the *Boot Block Builder* section in the *Utilities* chapter.

An SLP Boot Block is a set of files (combined into an image) that the server initially downloads to the workstations to establish LAN communications. The files are assembled on a bootable flex disk.

The maximum size of the Boot Block is approximately 300 KB *(Conventional only)*. Files that cause your image to exceed this limit should be excluded from the image and copied to the server by way of a secondary load file (discussed later).

Creating a Bootable Diskette

1. Use the DOS *format* command to create a bootable diskette. Use the switch options that perform an unconditional format and that transfer the DOS operating system to the diskette.

   ```
   format a: /u /s
   ```

2. Copy the following files to the diskette.

If you are using Netbeui:

```
copy c:\netbeui.2_2\protman.dos a:
copy c:\netbeui.2_2\protman.exe a:
copy c:\netbeui.2_2\protocol.ini a:
copy c:\netbeui.2_2\netbeui.exe a:
copy c:\netbeui.2_2\netbind.com a:
copy c:\netbeui.2_2\ncrcsma.dos a:
 or wvpcmcia.dos (if using WaveLAN/PCMCIA)
copy c:\dos\himem.sys a:
copy c:\dos\ramdrive.sys a:
copy c:\retaildd\blim.dos a:
copy c:\retaildd\slpredir.dos a:
copy c:\retaildd\lancache.dos a:
copy c:\retaildd\cdsd.dos a:
 (Conventional boot block)
copy c:\retaildd\serialdd.dos a:
 (Conventional boot block)
```

Note: All of the retail drivers can be loaded into the image if you are creating an *Enhanced* or *Extended* boot block

```
copy c:\retaildd\lanboot.dos a:
 (Enhanced or Extended boot block)
copy c:\retaildd\*.dos a:
 (Enhanced or Extended boot block)
```

If you are using Wollongong TCP/IP:

Follow the instructions/sample files that are included with the TCP/IP software.

When to Use PROTMANS and NETBINDS

(Conventional Boot Blocks Only)

The example above (and throughout this section) uses *protman.exe* and *netbind.com* drivers. The *protmans.dos* and *netbinds.exe* drivers are older versions of the Microsoft Protocol Manager Driver and NetBIND Utility (*protman.dos, protman.exe,* and *netbind.com* are from Microsoft LAN Manager 2.2).

Because *protmans.dos* and *netbinds.exe* do not support dynamic loading of the protocol driver, they handle the *protocol.ini* image differently, requiring less memory than the newer versions. A smaller DOSWORKAREA is required, so the Boot Block may be larger. (Refer to the *Builder* section of the *Utilities* chapter in this book.)

When using NetBINDS/PROTMANS with Netbeui

(Conventional Boot Blocks Only)

If you are using NetBINDS/PROTMANS with Netbeui, the procedures are the same as above except:

- Replace *protman.dos* with *protmans.dos*
- Replace *netbind.com* with *netbinds.exe*
- Omit *protman.exe*
- Change *protocol.ini:* Under the PROTMAN section, comment out the DYNAMIC & PRIORITY options.

Creating Autoexec.bat

Use an ASCII editor to create an *autoexec.bat* file.

Caution: Create this file on the diskette to avoid corrupting your development system *autoexec.bat* file. Below are suggested examples:

If you are using Netbeui:

```
copy a:\command.com c:
set comspec=C:\command.com
PATH C:\
a:\NETBEUI.EXE
a:\NETBIND.COM
C:
loadrtl.bat
```

The above example does the following:

- copies *command.com* from the image to the RAM drive
- changes *set comspec=* to its new location on the RAM drive
- sets the *PATH* to RAMDrive C: (this could be D: if C: is being used)
- executes *NETBEUI* and *NETBIND* in order to initiate the LAN communications
- changes from drive A: (disk image) to the RAM Drive (C:)
- executes *loadrtl.bat*. This file uses secondary redirection to load the additional files from the server. See *Creating the Secondary Load File* section for an explanation of how to create this file.

If you are using Wollongong TCP/IP:

```
copy a:\command.com c:
set comspec=C:\command.com
PATH C:\
a:\pwconfig -N:65
```

```
a:\ndis -I:a -D:1
a:\netbind
a:\pwtcp
a:\netbios
d:
loadrtl.bat
```

When using NetBINDS/PROTMANS with Netbeui

If you are using NetBINDS/PROTMANS with Netbeui, the procedures are the same as above except:

- Replace *netbind.com* with *netbinds.exe*

Creating CONFIG.SYS

Use an ASCII editor to create a *config.sys* file.

Caution: Create this file on the diskette to avoid corrupting your development system *config.sys* file. Below are suggested examples: The sequence shown below is critical!

If you are using Netbeui or Wollongong TCP/IP:

```
device=a:\himem.sys
 (Conventional boot block)
  or
device=a:\himem.sys /testmem:off
 (Enhanced or Extended boot block)
device=a:\lanboot.dos
 (Enhanced or Extended boot block)
files=30
buffers=15
dos=high
device=a:\cdsd.dos
 (Conventional boot block)
device=a:\serialdd.dos
 (Conventional boot block)
```

Note: All of the retail drivers can be loaded into the image if you are creating an *Enhanced* or *Extended* boot block

```
Stacks=12,300
device=a:\protman.dos /i:a:\
device=a:\ncrcsma.dos
  or wvpcmcia.dos (if using WaveLAN/PCMCIA)
device=a:\blim.dos
device=a:\slpredir.dos /i /D:C
device=a:\ramdrive.sys 1024 /e
device=a:\lancache.dos (if used)
```

The above *config.sys* example does the following:

- loads the communication drivers *protman.dos, your LAN adapter driver,* and *blim.dos* in the workstation
- sets up redirection (*slpredir.dos*) to the server by redirecting access to the RAM drive (C: in this example)
- sets up a RAM drive (C: in this example. If a hard disk (or other drives) are present the RAM drive will use a different drive letter.)
- sets up LAN caching (*lancache.dos*) (drive D: in this example) for loading large files over the LAN**. The** *lancache.dos* driver is optional. Refer to the *Installable Device Drivers* chapter for more information.

Note: In order to use files on the RAM drive without *slpredir.dos* attempting to redirect the files over the network, use the DOS *SUBST* command (from the DOS Supplemental disk) to set up another drive letter for the RAM disk.

Example: SUBST F: C:
Use F: to access the RAM drive without interference from *slpredir*.

Verify the disk by booting the workstation from it.

When using NetBINDS/PROTMANS with Netbeui

If you are using NetBINDS/PROTMANS with Netbeui, the procedures are the same as above except:

- Replace *protman.dos* with *protmans.dos*

- Remove both *protman.dos* and *protman.exe* from the disk

Executing the Boot Block Builder Utility

Run the Boot Block Builder utility on the development system to create the SLP load image. Refer to the *Utilities* chapter in this book for additional information about the Boot Block Builder utility.

```
cd \retaildd\utils
lanload
```

The *lanload* batch file starts the BUILDER which reads the newly created diskette to generate the SLP load image (*lanload.bbk)*. The image is written to the following directory.

```
c:\retaildd\utils\
```

This file will be copied to the server later in the installation procedures.

Note: If, after building the bootable diskette, you make changes to the diskette (files are changed or deleted), the diskette can become fragmented. This causes the boot block image to be appear larger than necessary. Rather than starting over (reformatting the diskette) you can run the DOS *DEFRAG* Utility to remove wasted space on the diskette before running the Boot Block Builder utility.

Creating the Secondary Load File (loadrtl.bat)

Use an ASCII editor to create the *loadrtl.bat* (Load Retail) batch file.

Caution: Do not put this file on the same diskette with the device drivers. It is not intended to be part of the Boot Block. This file will later be copied to a specific directory on the server.

The secondary load file is used to load the remainder of the files. Since the image has a size limitation, the retail drivers and associated application files must be loaded by way of secondary redirection, using the *loaddev* (Load Device) utility. The *loaddev* file is resident on the server (discussed later in this chapter in the section titled *Copying the Workstation Files to the Server*). See the *Utilities* chapter for more information about *loaddev*.

Conventional Boot Block

```
dis_img.com
loaddev.com /d:c:\dsd.dos
loaddev.com /d:c:\clockdd.dos
loaddev.com /d:c:\cmosdriv.dos
loaddev.com /d:c:\consoldd.dos /D
loaddev.com /d:c:\imsr.dos /UB
loaddev.com /d:c:\inputseq.dos
loaddev.com /d:c:\linkman.dos
loaddev.com /d:c:\miscdriv.dos
loaddev.com /d:c:\mfp.dos
loaddev.com /d:c:\ocia.dos /UB
loaddev.com /d:c:\rdisplay.dos
loaddev.com /d:c:\npower.dos
loaddev.com /d:c:\pcrs.dos
ncrinit.exe
```

The above example does the following using redirection to the server for files:

- disables the disk image *(dis_img)* and returns drive a: to the flex drive (this should be done whether you have a flex drive or not)
- loads all of the retail device drivers (similar to the way *config.sys* would). The drivers are transferred from the server to the RAM drive (C: in this example) via the *slpredir* driver.

  Note: To improve the load performance, it is recommended that you specify complete file names (including extensions) for files which will be downloaded by the *slpredir* driver. If no extension is specified for a file that is to be executed, *slpredir* will request *.BAT, .COM, .EXE* (in this order), just as DOS does.

- executes the retail device driver initialization program (*ncrinit*)

Enhanced/Extended Boot Block

All of the retail drivers can be loaded into the image, leaving only the following lines in the secondary load file.

```
dis_img.com
ncrinit.exe
```

Installing Software on the Server

This section discusses the procedures for preparing the server for downloading the SLP files. Variations with the different servers are identified.

Installing the SLP Loader on the Server

UNIX Server

1. Insert the following diskette in the server:

   SLP Loader for UNIX Server
   (LPIN: G370-0438-0000)

2. Enter the installation command and follow the screen prompts. Use the default sub directory for SLP *(/slpldr)*.

   ```
   pkgadd -d diskette1
   ```

OS/2 Server

1. Insert the following diskette in the server:

   OS/2 SLP/SLF Loader
   (LPIN: G370-0503-0000)

2. Enter the installation command and follow the screen prompts. Use the default sub directory for SLP *(c:\retaildd\loader)*.

   ```
   a:install
   ```

Note: The OS/2 Loader contains many features that are not discussed in this chapter. For more information about the loader see the *NCR OS/2 SLP/SLF LAN Loader User's Guide*, ST-2117-07.

DOS Server

1. Insert the following diskette in the server:

   DOS SLP Loader
   (LPIN: G370-0502-0000)

2. Enter the installation command and follow the screen prompts. (Use the default sub directory for SLP *(c:\retaildd\slp_tsr)*.

   ```
   a:install
   ```

   Note: The DOS SLP Loader can be run in Windows from a DOS session. However, you must de-install the TSR before exiting the DOS session
   (SLP_TSR /d).

Windows NT Server

1. Insert the following diskette in the server:

   Windows NT SLP/SLF Loader
   (LPIN: G370-0610-0000)

2. Enter the installation command and follow the screen prompts. (Use the default sub directory for SLP *(c:\retaildd\loader32)*.

   ```
   a:install
   ```

Installing Client Software on the Server

Install the appropriate client software on the server, depending on your server type.

UNIX Server

The UNIX Package Add utility establishes the proper paths for the UNIX server.

OS/2 Server

OS/2 1.x and Microsoft LAN Manager

OS/2 servers require the LAN Manager Setup Utility. Use the import options in LM to install the LAN adapter and the BLIM/SLIM/ELIM protocol driver of choice. BLIM is recommended. Use SLIM or ELIM as additional driver(s), if the server has multiple LANs.

LAN Manager *Setup* should modify *config.sys* as follows:

```
device=c:\lanman\drivers\protman\protman.os2 /i:c:\lanman
 (protocol.ini path)
device=c:\lanman\drivers\(Your LAN Adapter)
device=c:\lanman\drivers\protocol\blim\blim.os2
```

Refer to the *OS/2 NetBIOS NDIS User's Guide* (ST-2117-14), or your LAN Manager documentation for more detailed information.

OS/2 2.1 and IBM LAN Server

The LAN adapter driver may be installed via LAPS. The BLIM/SLIM/ELIM drivers are copied by the OS/2 Loader LPINs *install.cmd* if LAN Server is installed. LAPS.EXE must be used to configure the BLIM/SLIM/ELIM driver. BLIM is recommended.

Use SLIM or ELIM as additional driver(s), if the server has multiple LANs.

LAN Server *LAPS* program should modify *config.sys* as follows:

```
device=c:\ibmcom\protman.os2 /i:c:\ibmcom\ (protocol.ini path)
device=c:\ibmcom\macs\(Your LAN Adapter)
device=c:\ibmcom\protocol\blim.os2
```

Refer to your IBM LAN Server documentation for more detailed information.

DOS Server

1. Insert the following diskette:

   If you are using Netbeui:

   Microsoft Netbeui v2.2 for DOS Client
   (LPIN: G370-0387-0000)

   If you are using Wollongong TCP/IP:

   Wollongong TCP/IP Runtime 2.0 for DOS
   (LPIN: F075-03x0-0000)*

   or

   Wollongong TCP/IP Access 3.0 for DOS
   (LPIN: F075-02x0-0000)*

   * LPIN depends on the number of users you have license for

   Note: If you are using some other NDIS LAN software, refer to your user

documentation and follow the installation instructions.

2. Enter the installation command and follow the screen prompts.

```
a:\install
```

3. Insert the following diskette:

   NDIS MAC Drivers for DOS Client
   (LPIN: G370-0437-0000).

4. Enter the installation command and follow the screen prompts.

```
a:\install
```

5. Merge *autoexec.net* and *config.net* (when using Netbeui) or merge *autoexec.pw* and *config.pw* (when using TCP/IP) with your existing *autoexec.bat* and *config.sys*.

   If you are using Netbeui:

```
copy \autoexec.bat + \netbeui.2_2\autoexec.net \autoexec.bat
copy \config.sys + \netbeui.2_2\config.net \config.sys
```

   If you are using Wollongong TCP/IP:

   Follow the instructions/sample files that are included with the TCP/IP software.

6. Use an ASCII editor to modify the *config.sys* file. Delete the *REM* statement on the line that contains the device driver for your system. Delete the *REM* statement on the line that contains the BLIM driver.

```
device=c:\(client s/w path)\protman.dos /i:c:\retaildd\slp_tsr
device=c:\(client s/w path)\(your LAN adapter driver)
device=c:\retaildd\blim.dos
```

7. A base *protocol.ini* file has been created on the target drive (`\netbeui.2_2\` when using NetBEUI). Also created were LAN-specific files that MUST be added to the *protocol.ini* file. Merge the 7450 configuration file *(*for example: *protocol.csm* for 7450 Ethernet/StarLAN*)* with the *protocol.ini* file

   ```
   cd \netbeui.2_2 (or cd \pathway)
   copy protocol.ini + protocol.xxx protocol.ini
   ```

   Note: See *Netbeui Parameters for PROTOCOL.INI* in the Appendix for more information.

Windows NT Server

Install the Windows NT Broadcast Loader (BLIMNT) and the LAN Adapter driver on the NT server.

1. Click on: *Control Panel*
2. Click on: *Network*
3. Click on: *Add Software*
4. Select: *Other*
5. Insert the following diskette:

   Windows NT SLP/SLF Loader
   (LPIN: G370-0610-0000)

6. Select: *BLIM Transport*
7. Click on: *Bindings*

8. Click on: *OK* at Network Bindings window.

9. Click on: *OK* at Network Settings window.

Note: The Warning Message displays is a reminder that BLIM can only bind to one LAN adapter. Duplicate selections can be disabled by selecting the Bindings option.

10. Restart system

Copying the Workstation Files to the Server

1. On the Development System, copy the following files to a diskette.

```
copy c:\retaildd\utils\lanload.bbk a:\
copy c:\retaildd\utils\dis_img.com a:\
copy c:\retaildd\utils\loaddev.com a:\
copy c:\retaildd\*.DOS a:\
copy c:\retaildd\ncrinit.* a:\
copy c:\loadrtl.bat a:\
```

2. On the server, create a sub directory for the workstation DOS files as defined in *groupdir.txt*.

Example:

```
            mkdir /slpldr/dosfiles          (UNIX Server)
md c:\retaildd\loader\dosfiles   (OS/2 Server)
md c:\retaildd\slp_tsr\dosfiles  (DOS Server)
md c:\retaildd\loader32\dosfiles (Windows NT Server)
```

3. Insert the diskette from Step #1 into the server and copy the load files to the hard disk.

   UNIX Server

   Use the UNIX *doscp* command to copy the files to a UNIX server.

Note: All DOS filenames on UNIX servers (except for the boot block) must be in UPPERCASE.

```
doscp a:\lanload.bbk  /slpldr/dosfiles/lanload.bbk
doscp a:\loaddev.com  /slpldr/dosfiles/LOADDEV.COM
doscp a:\dis_img.com  /slpldr/dosfiles/DIS_IMG.COM
doscp a:\retaildd\*.DOS  /slpldr/dosfiles/*.DOS
doscp a:\retaildd\ncrinit.* /slpldr/dosfiles/NCRINIT.*
doscp a:\loadrtl.bat  /slpldr/dosfiles/LOADRTL.BAT
```

OS/2 Server

```
copy a:\lanload.bbk  c:\retaildd\loader\dosfiles↵
 \lanload.bbk
copy a:\loaddev.com  c:\retaildd\loader\dosfiles↵
 \loaddev.com
copy a:\dis_img.com  c:\retaildd\loader\dosfiles↵
 \dis_img.com
copy a:\retaildd\*.DOS  c:\retaildd\loader\dosfiles↵
 \*.DOS
copy a:\retaildd\ncrinit.* c:\retaildd\loader↵
 \dosfiles\ncrinit.*
copy a:\loadrtl.bat c:\retaildd\loader\dosfiles↵
 \loadrtl.bat
```

DOS Server

```
copy a:\lanload.bbk c:\retaildd\slp_tsr\dosfiles↵
 \lanload.bbk
copy a:\loaddev.com c:\retaildd\slp_tsr\dosfiles↵
 \loaddev.com
copy a:\dis_img.com c:\retaildd\slp_tsr\dosfiles↵
 \dis_img.com
copy a:\retaildd\*.DOS  c:\retaildd\slp_tsr\dosfiles↵
 \*.DOS
copy a:\retaildd\ncrinit.* c:\retaildd\slp_tsr↵
 \dosfiles\ncrinit.*
copy a:\loadrtl.bat c:\retaildd\slp_tsr\dosfiles↵
 \load rtl.bat
```

Windows NT Server

```
copy a:\lanload.bbk  c:\retaildd\loader32\dosfiles↵
 \lanload.bbk
copy a:\loaddev.com  c:\retaildd\loader32\dosfiles↵
 \loaddev.com
copy a:\dis_img.com  c:\retaildd\loader32\dosfiles↵
\dis_img.com
copy a:\retaildd\*.DOS  c:\retaildd\loader32↵
 \dosfiles\*.DOS
copy a:\retaildd\ncrinit.*  c:\retaildd\loader32↵
 \dosfiles\ncrinit.*
copy a:\loadrtl.bat c:\retaildd\loader32\dosfiles↵
 \loadrtl.bat
```

4. Copy all of the files that you referenced in *loadrtl.bat* (created earlier in this chapter in the section titled *Creating the Secondary Load File)* to the server. Copy them to the same directory you used in Step 3.

5. Copy your application and any other files that need to be transferred to the server. Copy them to the same directory you used in Step 3.

Configuring the SLP Loader

This section discusses the SLP configuration files. Your requirements may vary. Use an ASCII editor to make any changes.

Note: To have the new parameters invoked, you must restart the loader for UNIX and DOS servers. (See *Performing the SLP System Load* in this chapter.)

ILD Configuration File (ildcf)

UNIX Servers ONLY: Assign the SLP broadcast LAN address in the ILD configuration file on the server. This is the address that the server uses to receive SLP information on the LAN.

ildcf *(/etc/ild/ildcf)*

Change the *multicast1=000000000000* line to:

```
multicast1=0180C2000011
```

The LAN must be stopped and restarted to invoke the ildcf entry.

Note: This address is specified in the IEEE standard for SLP and should not be changed.

SLP Loader Configuration File

The SLP Configuration File is used to define the operating parameters for the loader application including (but not limited to) time-out values, retry values, error logging information and path names of other configuration files.

Restart the Loader

To have the new parameters invoked, you must restart the loader for UNIX and DOS servers. (See the section *Performing the SLP System Load.*)

Caution: Care should be exercised when modifying values from the default.

For each server platform, valid operating parameter names and ranges of values are defined within the following files:

`/slpldr/slp.cfg`	(UNIX Server)
`\retaildd\loader\loader.ini`	(OS/2 Server)
`\retaildd\slp_tsr\loader.ini`	(DOS Server)
`\retaildd\loader32\loader32.ini`	(Windows NT Server)

These files, and their valid parameters and values, are listed below.

UNIX Server (/slpldr/slp.cfg)

Sample SLP Loader Configuration File.

Note: Except for "zero", omitting a parameter invokes its default.

```
adapter=0             ;0-3      Physical point attachment (PPA) number to be used by
                      ;         SLP Loader; For additional adapter(s) repeat parameter
                      ;         line with new number(s). (Up to four total)
autoupdate            ;         Include this parameter and the loader will
                      ;         automatically add any new terminal ID(s) to external
                      ;         Terminal file; omit otherwise
blockdelaytime=1      ;0-999    Time (milliseconds) between load data messages
console=2             ;0-2      Severity level of console error message
case=lowerfirst       ;         Possible values: upper, lower, upperfirst, lowerfirst.
                      ;         Default is no case change.
filereqaccumtime=1    ;0-60     Wait time (seconds) before responding to request for
                      ;         filename.
groups=group.txt      ;         Group Definition filename
groupdir=groupdir.txt ;         Group Directory filename
keyreqaccumtime=10    ;0-60     Wait time (seconds) before responding to key position
                      ;         request for initial boot block.
ldstatuswaittime=1    ;0-60     Wait time (seconds) after LoadResponse PDU or
                      ;         GroupStatusRequest PDU before response (GroupStatus
                      ;         PDU) is expected from workstation.
logdestination=both   ;         Possible values: unity, both. Default is loader log
                      ;         only.
logfile=r_slp_data.log;         Error log filename
loglevel=0            ;0-2      Severity level of error messages used by loader
loglimit=200          ;100-1000 Number of log file entries before wraparound
maxloads=4            ;1-8      Maximum number of simultaneous transfers (load groups)
                                allowed
messagefile=slp.msg   ;         Mandatory file; customize for customer or language
messagesize=1470      ;100-1470;Desired load data message size (bytes)
processorid=0         ;0-9      Unique server ID; If multiple servers are used, each
                      ;         should have distinct processorid
statusretrycount=1    ;1-10     Number of retries if workstation does not respond
                      ;         within ldstatuswaittime.
terminalcount=256     ;100-1000 Maximum number of workstations to be loaded
terminals=term.txt    ;         Terminal Definition filename
updatetime=15         ;1-1440   Interval (minutes) between updates to tallies and
                      ;         terminal definition file. Omit this parameter to append
                      ;         new statistics to existing loader tallies; otherwise
                      ;         reset occurs.
zero                  ;         Omit this parameter to append new statistics to
                      ;         existing loader tallies. Otherwise reset occurs.
```

OS/2 Server (\retaildd\loader\loader.ini)

Sample SLP Loader Configuration File.

```
editor = \os2\e.exe
GROUPS=Group.txt
GROUPDIR = Groupdir.txt
lan = broadcast
logfile = logfile
loglevel= 2
Loglimit= 1024
MAXLOADS=5
TERMINALS = term.txt
BlockDelayTime = 0
FileReqAccumTime = 2
KeyReqAccumTime = 5
LDStatusWaitTime = 3
MessageSize = 1470
ProcessorID = 0
StatusRetryCount = 2
```

When a parameter is not included, the default value is used. An example Configuration file *(Loader.ini)* is included on the *OS/2 SLP/SLF Loader* install disk.

The following is a list of the defined parameters used for SLP loading.

EDITOR *(Default = <none>, Values = path\name up to 100 characters)*

This optional parameter identifies the ASCII text editor to be used. If not specified, editing from within the Loader is prohibited. The parameter is limited to 100 characters. The complete path and filename, including the extension, must be specified.

GROUPS *(Required parameter, Values = path\name up to 100 characters)*

This parameter specifies the name of the Group file. The Group file defines each Load Group. Each

definition contains the Group name, the name of the download file for each workstation key position, and a description of the Group. If this parameter is not specified the Loader fails initialization.

GROUPDIR (***Default = <none>, Values = path\name up to 100 characters)***

This parameter specifies the name of the Group Directory file. This file contains load Group information for SLP loads. Each definition contains the Group name, the Load Selector value, a Search Path, and a Description of the Group.

LAN ***(Required parameter, Values = broadcast, StarLAN, Ethernet)***

This parameter specifies the LAN driver used by the Loader application for communication. Valid entries are *StarLAN*, *Ethernet*, or *broadcast*. There is no default value, A LAN **must** be specified. When *broadcast* is specified the Loader interfaces with the BLIM driver. When *Ethernet* is specified the Loader interfaces with the ELIM driver. When *StarLAN* is specified the Loader interfaces with the SLIM driver.

LOGFILE ***(Default=<None>, Values = path\name up to 100 characters)***

This parameter specifies the name of the Log file. This file contains a record of all errors, data transfer events, and start up information. If this parameter is not specified, event logging does not occur.

LOGLEVEL ***(Default = 1, Range = 1 . . . 3)***

This parameter permits you to choose what information is included in the Log file. Range definitions are:

Parameter Value	Definition
loglevel = 1	Log only error messages
loglevel = 2	Log error messages and the times of completed data transfer events
loglevel = 3	Log error messages, events, and traffic received. This level is intended primarily for debugging purposes

LOGLIMIT *(Default = 512, Range = 1 . . . 1024)*

This parameter specifies the maximum number of event records that are to be kept in the Log file. When the Log file reaches its limit, the oldest records are overwritten.

Note: Once a Log file is opened at a specific size, the *loglimit* for that file cannot be changed. The configuration parameter *loglimit* must match the original *loglimit* of the specified file during program startup or auto-reconfiguration to use the specified Log file. If *loglimit* is changed anytime after it is initialized, a new log file is setup and the old Log file is renamed using the original name with a *.BAK* extension.

Hint: Name the Log files so that they identify the size of the Log file. (256.log or 1024.log). This is helpful because after the Log file is created, you can not tell the exact size of the file

MAXLOADS *(Default = 5, Range = 1 . . . 8)*

The maximum number of simultaneous transfers (SLF downloads, SLF broadcast file transfers, or SLP loads) allowed. The resources for each thread are acquired at startup and each load Group requires

approximately 7KB of dynamic memory. Each SLP Load Group dynamically allocates over 8 KB of additional memory while loading. Since each Load Group uses additional resources, it is best to limit the number of loads to a number that reflects the requirements of your system.

TERMINALS *(Default = <none>, Values = path\name up to 100 characters)*

This parameter specifies the name of the optional Terminal file. This file contains the LAN address (LAN ID for 705x or TERMINAL ID for 7450) and Load Group of each workstation on the network.

BLOCKDELAYTIME *(Default = 0, Range = 0 . . . 999)*

This parameter specifies the minimum delay (in ms) between transmitting *LoadDataPDUs* to load devices. If a *LoadRequestPDU* specifies *LD_min_delay* greater than *BlockDelayTime*, then the *LD_min_delay* value from the *LoadRequestPDU* overrides this parameter. These *LoadRequestPDUs* are usually requests from the *slpredir* driver.

FILEREQACCUMTIME *(Default = 2, Range = 0 . . . 60)*

This parameter specifies the amount of time (in seconds) the Loader waits in the *LS_Accum* state for *LoadRequestPDUs* containing a file name from requesting devices on the network prior to transmitting the *LoadResponsePDU*. These *LoadRequestPDUs* are requests from the Boot ROM for a Boot Block load.

KEYREQACCUMTIME *(Default = 5, Range = 0 . . . 60)*

This parameter specifies the amount of time (in seconds) the Loader waits in the *LS_Accum* state for

LoadRequestPDUs containing a key position from requesting devices on the network prior to transmitting the *LoadResponsePDU*.

Note: FILEREQACCUMTIME and KEYREQACCUMTIME is the amount of time (in seconds) the Loader waits after the first request for other workstations to join the load, before responding to the requests.

LDSTATUSWAITTIME *(Default = 3, Range = 0 . . . 60)*

This parameter specifies the amount of time the Loader waits for a *GroupStatusPDU* after transmission of either the *LoadResponsePDU* or *GroupStatusRequestPDU*. The interval after *LoadResponsePDUs* permit other workstations to join the load, before the load begins. The interval after the *GroupStatusRequestPDU* gives workstations time to re-request missed frames.

MESSAGESIZE *(Default = 1470, Range = 100 . . . 1470)*

This parameter specifies the number of data bytes transmitted in each *LoadDataPDU*. It does not include the overhead required to transmit that data. Entering the *MessageSize* parameter overrides the Loader's 1470 default message size except when the *max_block_size* specified in the *LoadRequestPDU* is less than the configured *MessageSize*. The Loader may override the specified *MessageSize* when that size would force the Loader to exceed the number of bytes allocated to process a file.

PROCESSOR ID *(Default = 0, Range = 0 . . . 9)*

This parameter specifies the load server processor ID. It provides the user with the ability to configure

a multiple processor / multiple load server system. The maximum number of load servers on a LAN is 10. The *ProcessorID* is used to create a unique set of Group addresses each of the server's Groups. This parameter is necessary to insure that each load server creates a unique Group Address for each Load Group created. The *ProcessorID* should be set to a different value on each load server on the network.

STATUSRETRYCOUNT *(Default = 1, Range = 1 . . . 10)*

This parameter specifies the number of times the *GroupStatusRequestPDU* is transmitted to solicit a *GroupStatusPDU* from the load device should no response occur to the status request. This gives workstations an opportunity to request missed frames.

See the *OS/2 SLP/SLF LAN Loader User's Guide*, ST-2117-07, for more information.

DOS Server (\retaildd\slp_tsr\loader.ini)

Sample SLP Loader Configuration File.

```
ALERT=3
AUTOUPDATE=1
FILEREQACCUMTIME=1000
GROUPDIR=groupdir.txt
GROUPS=group.txt
INACTIVE=10000
KEYREQACCUMTIME=1000
LAN=blimdos$
LDSTATUSWAITTIME=2500
LOGFILE=slp_tsr.log
LOGLEVEL=1
LOGLIMIT=30000
MESSAGESIZE=1470
PATH=c:\retaildd\slp_tsr
```

```
PROCESSORID=1
STATUSRETRYCOUNT=1
TERMINALS=term.txt
```

Parameter Values

ALERT *(Default = 2, Range = 0 .. 3)*

Specifies the level of alert notification used when the loader becomes active:

```
0 - No Alert
1 - Sound
2 - Pop-up box
3 - Sound & Pop-up box
```

AUTOUPDATE ***(Default = 1, Range = 0 .. 1)***

0- New (undefined) terminals must be manually added to external terminal file or the loader will not respond to their request.

1- New (undefined) terminals will automatically be assigned to the default group (first group in group file) and appended to external terminal file.

FILEREQACCUMTIME ***(Default = 3000 millsecs, Range = 1 .. 30000 millsecs)***

Wait time (milliseconds) before responding to a request for file.

GROUPDIR (no default)

This REQUIRED parameter defines the name of the group directory file. The file contains a group name, an associated directory search path, and a load selector to be assigned to the group

GROUPS ***(no default)***

This REQUIRED parameter defines the name of the group file. The file contains a group name and a file for each key position on the workstation.

INACTIVE ***(Default 10000 millsecs, Range = 1 .. 30000 millsecs)***

This parameter specifies the amount of time the Loader TSR will remain active after a completed load operation.

KEYREQACCUMTIME *(Default = 5000 millsecs, Range = 1 .. 30000 millsecs)*

Wait time (milliseconds) before responding to a key position request for an initial boot block file.

LDSTATUSWAITTIME *(Default = 2500 millsecs, Range = 2500 .. 30000 millsecs)*

Wait time (milliseconds) after LoadResponse PDU or GroupStatusRequest PDU before response (GroupStatus PDU) is expected from workstation.

LOGFILE *(no default)*

This REQUIRED parameter specifies the name of the error log file. If an error exists within the named file, a warning will be displayed to the screen and the loader will not install.

LOGLEVEL *(Default = 1, Range = 0 .. 3)*

The LOG LEVEL parameter specifies the log entry severity level used by the loader:

```
0 - Fatal errors only
1 - Warning errors
2 - State Machine Information
3 - System Load Protocol trace.
    (GREATLY impacts loader performance)
```

LOGLIMIT *(Default = 5000, Range = 100 .. 30000)*

This parameter specifies maximum file size of the log file. When the file reaches its maximum limit, a wraparound will occur and the older records will be overwritten.

MESSAGESIZE *(Default = 1470, Range = 1 .. 1470)*

Desired load data message size (bytes).

PATH ***(Default = Working directory, Range = 100 characters)***

The PATH parameter is followed by a list of sub-directory paths to be searched by the loader when looking for a requested file. Multiple sub-directory listings can be used as long as they are separated by a semicolon. The PATH defined for each group within the GROUPDIR file takes precedence over the path defined here.

PROTECT ***(No Default, Range = LAN IRQ Values: 2 - 15)***

This parameter should be used if the following symptom is experienced:
The SLP_TSR is active (may be indicated by pop-up message) but it is not responding to load requests. If this occurs, this parameter should be set to the IRQ number used by the LAN adapter.

PROCESSORID ***(Default = 0, Range = 0 .. 9)***

Unique server ID; If multiple servers are used, each should have a distinct ProcessorID.

STATUSRETRYCOUNT ***(Default = 1, Range = 1 .. 10)***

Number of GroupStatusRequests sent to each workstation.

TERMINALS ***(no default)***

This REQUIRED parameter specifies the name of the terminal file.

Windows NT Server (\retaildd\loader32\loader32.ini)

Sample SLP Loader Configuration File.

```
editor = \winnt\system32\edit.com
GROUPS=Group.txt
GROUPDIR = Groupdir.txt
logfile = logfile
loglevel= 2
Loglimit= 1024
MAXLOADS=5
TERMINALS = term.txt
BlockDelayTime = 10
FileReqAccumTime = 2
KeyReqAccumTime = 5
LDStatusWaitTime = 1
MessageSize = 1470
ProcessorID = 0
StatusRetryCount = 2
```

When a parameter is not included, the default value is used. An example Configuration file *(Loader32.ini)* is included on the *Windows NT SLP/SLF Loader* install disk.

Parameter Values

The following is a list of the pre-defined parameter names and their meanings used for SLP loading.

EDITOR *(Default = <none>, Values = path\name up to 100 characters)*

This optional parameter identifies the ASCII text editor to be used. If not specified, editing from within the Loader is prohibited. The parameter is limited to 100 characters. The complete path and filename, including the extension, must be specified.

GROUPS *(Required parameter, Values = path\name up to 100 characters)*

This parameter specifies the name of the Group file. The Group file defines each Load Group. Each definition contains the Group name, the name of the

download file for each workstation key position, and a description of the Group. If this parameter is not specified, the Loader fails initialization.

GROUPDIR (***Default = <none>, Values = path\name up to 100 characters)***

This parameter specifies the name of the Group Directory file. This file contains load Group information for SLP loads. Each definition contains the Group name, the Load Selector value, a Search Path, and a Description of the Group.

LOGFILE ***(Default=<None>, Values = path\name up to 100 characters)***

This parameter specifies the name of the Log file. This file contains a record of all errors, data transfer events, and start up information. If this parameter is not specified, event logging does not occur.

LOGLEVEL ***(Default = 1, Range = 1 . . . 3)***

This parameter permits you to choose what information is included in the Log file. Range definitions are:

Parameter Value	Definition
loglevel = 1	Log only error messages.
loglevel = 2	Log error messages and the times of completed data transfer events.
loglevel = 3	Log error messages, events, and traffic received. This level is intended primarily for debugging purposes.

LOGLIMIT *(Default = 512, Range = 1 . . . 1024)*

This parameter specifies the maximum number of event records that are to be kept in the Log file. When the Log file reaches its limit, the oldest records are overwritten.

Note: Once a Log file is opened at a specific size, the *loglimit* for that file cannot be changed. The configuration parameter *loglimit* must match the original *loglimit* of the specified file during program startup or auto-reconfiguration to use the specified Log file. If *loglimit* is changed anytime after it is initialized, a new log file is setup and the old Log file is renamed using the original name with a *.BAK* extension.

Note: Name the Log files so that they identify the size of the Log file. (256.log or 1024.log). This is helpful because after the Log file is created, you cannot tell the exact size of the file.

MAXLOADS *(Default = 5, Range = 1 . . . 12)*

The maximum number of simultaneous transfers (SLF downloads, SLF broadcast file transfers, or SLP loads) allowed. The resources for each thread are acquired at startup and each load Group requires

approximately 7KB of dynamic memory. Each SLP Load Group dynamically allocates over 8 KB of additional memory while loading. Since each Load Group uses additional resources, it is best to limit the number of loads to a number that reflects the requirements of your system.

TERMINALS *(Default = <none>, Values = path\name up to 100 characters)*

This parameter specifies the name of the optional Terminal file. This file contains the LAN address (LAN ID for 705x or TERMINAL ID for 7450) and Load Group of each workstation on the network.

BLOCKDELAYTIME *(Default = 0, Range = 1 . . . 999)*

This parameter specifies the minimum delay (in ms) between transmitting *LoadDataPDUs* to load devices. If a *LoadRequestPDU* specifies *LD_min_delay* greater than *BlockDelayTime*, then the *LD_min_delay* value from the *LoadResquestPDU* overrides this parameter. These *LoadRequestPDUs* are usually requests from the *slpredir* driver.

FILEREQACCUMTIME *(Default = 2, Range = 0 . . . 60)*

This parameter specifies the amount of time (in seconds) the Loader waits in the *LS_Accum* state for *LoadRequestPDUs* containing a file name from requesting devices on the network prior to transmitting the *LoadResponsePDU*. These *LoadRequestPDUs* are requests from the Boot ROM for a Boot Block load.

KEYREQACCUMTIME *(Default = 5, Range = 0 . . . 60)*

This parameter specifies the amount of time (in seconds) the Loader waits in the *LS_Accum* state for

LoadRequestPDUs containing a key position from requesting devices on the network prior to transmitting the *LoadReponsePDU*.

Note: FILEREQACCUMTIME and KEYREQACCUMTIME is the amount of time (in seconds) the Loader waits after the first request for other workstations to join the load, before responding to the requests.

LDSTATUSWAITTIME *(Default = 1, Range = 0 . . . 60)*

This parameter specifies the amount of time the Loader waits for a *GroupStatusPDU* after transmission of either the *LoadResponsePDU* or *GroupStatusRequestPDU*. The interval after *LoadResponsePDUs* permit other workstations to join the load, before the load begins. The interval after the *GroupStatusRequestPDU* gives workstations time to re-request missed frames.

MESSAGESIZE *(Default = 1470, Range = 100 . . . 1470)*

This parameter specifies the number of data bytes transmitted in each *LoadDataPDU*. It does not include the overhead required to transmit that data. Entering the *MessageSize* parameter overrides the Loader's 1470 default message size except when the *max_block_size* specified in the *LoadRequestPDU* is less than the configured *MessageSize*. The Loader may override the specified *MessageSize* when that size would force the Loader to exceed the number of bytes allocated to process a file.

PROCESSOR ID *(Default = 0, Range = 0 . . . 9)*

This parameter specifies the load server processor ID. It provides the user with the ability to configure

a multiple processor / multiple load server system. The maximum number of load servers on a LAN is 10. The *ProcessorID* is used to create a unique set of Group addresses each of the server's Groups. This parameter is necessary to insure that each load server creates a unique Group Address for each Load Group created. The *ProcessorID* should be set to a different value on each load server on the network.

STATUSRETRYCOUNT *(Default = 1, Range = 1 . . . 10)*

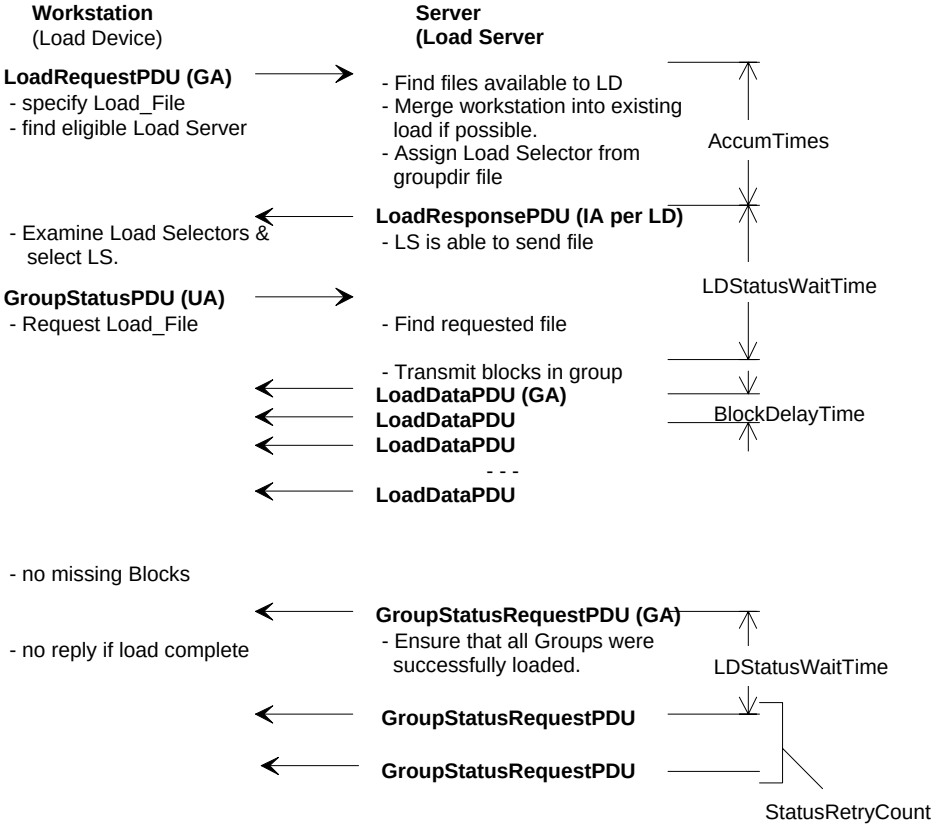
This parameter specifies the number of times the *GroupStatusRequestPDU* is transmitted to solicit a *GroupStatusPDU* from the load device should no response occur to the status request. This gives workstations an opportunity to request missed frames.

Tuning the SLP Configuration Parameters

Refer to *How Does SLP Work?* in Chapter 1 to understand the sequence of events in an SLP load. The optimum values for the parameters will vary with the network configuration, particularly with the number of workstations. The following guidelines should be observed to optimize SLP loading:

- *FileReqAccumTime* and *KeyReqAccumTime* should be long enough to permit workstations to join a Group, but not so long that the first workstation times out (before the Loader responds). Workstations may join a Load Group at any time during the load, but it is most efficient if they join during the *accum state.*
- *FileReqAccumTime* should be very short. 1-2 seconds is recommended. Configuration of this parameter should be coordinated with the *SLPREDIR* command line parameters at the workstations.
- If workstations time out while waiting for the Loader, try decreasing *accum*, *wait*, and *blockdelay* times at the loader, or adjusting *SLPREDIR* parameters.
- A large value for *MessageSize* is recommended to minimize overhead.

- Zero is recommended for *BlockDelayTime* unless workstations are frequently missing frames and having to request that the Loader re-send them. When downloading a boot block, this may be identified by frequent or long pauses between updates of the frame count. It is acceptable to miss a few frames while downloading a boot block, but many frames should not be missed. If the ROM or MAC driver tallies indicate many errors with lack of receive resources or receiver not ready, it is likely that the server is sending blocks too fast for the workstation to handle.
- The DOS SLP Loader can load only one file at a time. Multiple workstations may download the same file simultaneously, but requests for different files will be ignored by the DOS Loader. The number of files that can be downloaded simultaneously by the UNIX and OS/2 Loaders is configurable. Loader and SLPREDIR parameters should be tuned with this in mind.
- Set the *LogLevel* parameter to an appropriate value for your system. Generally, logging only errors is desired for the best performance. Other log levels may be useful for troubleshooting.
- The **Load Selector** field in the *Groupdir* file is used to specify which server the workstation should choose when multiple servers on the network respond. The workstation chooses the server specifying the highest **Load Selector** from those responding to its request. However, the *accum* times on the servers can also affect which server is chosen. If the *accum* time of one server is longer than the other(s), it may not respond quickly enough to the workstation to be chosen even if it has the highest load selector.



Additional Information for SLP Loading

See *Installing the SLP Redirection Driver (SLPREDIR)* section in the *Installable Device Drivers* chapter in this book. Also, see the *Trouble-Shooting* chapter for help in resolving load problems.

Group Definition File (group.txt)

The Group File is used to specify the download file (depending on the keylock position) that is to be downloaded to the workstation(s). The keylock position on the workstation is used to determine which Boot Block file is to be downloaded to each workstation. Enter the names of the boot block files in the *group.txt* configuration file according to how you want to download the load images. The first group in the file is the default group.

group.txt

`/slpldr/group.txt`	(UNIX Server)
`\retaildd\loader\group.txt`	(OS/2 Server)
`\retaildd\slp_tsr\group.txt`	(DOS Server)
`\retaildd\loader32\group.txt`	(Windows NT Server)

File Parameters:

```
;GROUP DEFINITION FILE
;
;Group  Ex Key Pos   L Key Pos    R Key Pos   S Key Pos
;
infolan lanload.bbk  lanload.bbk  lanload.bbk lanload.bbk
```

The sample above selects the same image to be downloaded in all keylock positions.

Note: Lines beginning with a semicolon (;) are comment lines.

UNIX:

Maximum of 50 Groups, maximum of 10 characters per Group name; *Key Pos* filenames are case-sensitive. The *Group* name field must be in lower case for UNIX servers. The *Key Pos* fields must match the upper/lower case filenames on the server.

OS/2:

Maximum of 30 Groups, maximum of 10 characters per Group name; *Key Pos* filenames are not case-sensitive

DOS:

Maximum of 10 Groups, maximum of 10 characters per Group name; *Key Pos* filenames are not case-sensitive

Windows NT:

Maximum of 200 Groups, maximum of 10 characters per Group name; *Key Pos* filenames are not case-sensitive

A download can be prohibited when the workstation is in a specific key position by entering a dash (-) for the file name for that key position. If a workstation requests an SLP download from a key position that is not set up, the Loader ignores the request.

Group Directory Definition File (groupdir.txt)

The Group Directory file defines additional information about Groups for SLP loads.

Load Selector Field

The Load Selector is used by the workstation to determine which server to select if multiple servers respond to its load request. If all other parameters are equally acceptable, the server with the highest Load Selector is chosen. This feature may be used to specify which server normally loads each group of workstations and which server(s) load each group when its primary server is not available. The range of valid Load Selectors is -128 to 127 (default is 0).

Search Path

Assign the search path for the SLP image and associated application files for each Group. This is user defined. The sample below establishes the path on the server as the path for all of the DOS files on the server. Edit the following file to suit your specific requirements.

groupdir.txt

```
/slpldr/groupdir.txt            (UNIX Server)
\retaildd\loader\groupdir.txt   (OS/2 Server)
\retaildd\slp_tsr\groupdir.txt  (DOS Server)
\retaildd\loader32\groupdir.txt (Windows NT Server)
```

Note: Lines beginning with a semicolon (;) are comment lines.

UNIX Server

File Parameters: Maximum of 50 Groups; Search Path is case-sensitive (colon delimiters)

```
;GROUP DIRECTORY DEFINITION FILE
;
;Group   Load Selector  Search Path          Comment
;
infolan  0              .:/slpldr/dosfiles   Sample
```

Note: The *Group* name field must be in lower cased for UNIX servers. The *Search Path* field must match the upper/lower case filenames on the server.

OS/2 Server

File Parameters: Maximum of 30 Groups; Search Path is not case-sensitive (semi-colon delimiters)

```
;GROUP DIRECTORY DEFINITION FILE
;
;Group   Load Selector  Search Path                   Co
mment
;
infolan  0           c:\retaildd\loader\dosfiles;bbk  Sa
mple
```

When a file is requested, the OS/2 Loader searches for the file in the following manner:

- If the request is a key request and the file specified in the Group file includes a path, that path is used to locate the file.
- The current directory is searched.
- The path specified for the group in the Group Directory file is searched.

- All directories specified by the environment variable *PATH* are searched.
- All directories specified by the environment variable *DPATH* are searched.

DOS Server

File Parameters: Maximum of 10 Groups; Search Path is not case-sensitive (semi-colon delimiters)

```
;GROUP DIRECTORY DEFINITION FILE
;
;Group   Load Selector  Search Path                    Co
mment
;
infolan  0            c:\retaildd\slp_tsr\dosfiles;bbk Sa
mple
```

When a file is requested, the DOS Loader first searches the directory path listed for the group in the *groupdir.txt* file. If the file is not found, the directory path specified by the *PATH* parameter in the loader configuration file (*loader.ini)* will be searched. Therefore, files which are common to all groups should be located in sub-directories specified by the *PATH* parameter. Files which are designated for specific groups should be located in separate sub-directories and referenced by assigning those sub-directory paths to the appropriate group within the *groupdir* file.

Windows NT Server

File Parameters: Maximum of 200 Groups; Search Path is not case-sensitive (semi-colon delimiters)

```
;GROUP DIRECTORY DEFINITION FILE
;
```

```
;Group   Load Selector  Search Path                    Co
mment
;
infolan  0            c:\retaildd\loader32\dosfiles;bbk S
ample
```

When a file is requested, the Windows NT Loader searches for the file in the following manner:

- If the request is a key request and the file specified in the Group file includes a path, that path is used to locate the file.
- The current directory is searched.
- The path specified for the group in the Group Directory file is searched.

Terminal Definition File (term.txt)

The Terminal file is used to assign each workstation in the system to a specific Group for downloading purposes. These groups are defined in the Group and Groupdir files.

The Terminal ID (8-digit LAN configuration parameter) is unique to each workstation. It can be assigned by the user or it can be automatically generated by the system.

The *autoupdate* parameter in the SLP configuration file is used to select whether to automatically update the terminal file. Workstations not assigned to a particular group in *term.txt* file are assigned to the default group.

UNIX:

The *autoupdate* parameter line must be enabled (NOT commented out).

OS/2:

The OS/2 Loader has a menu option for rebuilding the Terminal file from the current list of terminals (rather than having an AutoUpdate parameter). The terminal file does not have to exist when the loader is started. However, the terminal file name and path must appear in the configuration file (loader.ini) in order to use the Loader's Build function to write the new Terminal IDs to the file on disk. If the terminal file does not exist, the Loader sets up an empty file if terminal file rebuild is selected. For more information see the *NCR OS/2 SLP/SLF LAN Loader User's Guide* (ST-2117-07).

DOS:

The *autoupdate* parameter line must be set to *autoupdate=1* (this is the default).

Windows NT:

The Windows NT Loader has a menu option for rebuilding the Terminal file from the current list of terminals (rather than having an AutoUpdate parameter). The terminal file does not have to exist when the loader is started. However, the terminal file name and path must appear in the configuration file (loader32.ini) in order to use the Loader's Build function to write the new Terminal IDs to the file on disk. If the terminal file does not exist, the Loader sets up an empty file if terminal file rebuild is selected. For more information see the *NCR Windows NT SLP/SLF LAN Loader User's Guide* (ST-2132-31).

File Parameters:

term.txt

```
/slpldr/term.txt            (UNIX Server)
\retaildd\loader\term.txt   (OS/2 Server)
\retaildd\slp_tsr\term.txt  (DOSServer)
\retaildd\loader32\term.txt (Windows NT Server)

;TERMINAL DEFINITION FILE
;Terminal ID    Group Name   Comment

000010502430    infolan      Manual or autoupdate entry
```

Note: Lines beginning with a semicolon (;) are comment lines.

UNIX:

Maximum of 256 Terminal IDs per Group; Six bytes (12 digits) maximum for each Terminal ID. The *Group* name field must be in lower case on UNIX servers.

OS/2:

Maximum of 256 Terminal IDs; Maximum of 30 Groups; Six bytes (12 digits) maximum for each Terminal ID

DOS:

Maximum of 100 Terminal IDs; Six bytes (12 digits) maximum for each Terminal ID

Windows NT:

Maximum of 256 Terminal IDs; Maximum of 200 Groups; Six bytes (12 digits) maximum for each Terminal ID

Restart the Loader

To have the new parameters invoked, you must restart the loader for UNIX and DOS servers. (See the following section.)

Performing the SLP System Load

Downloading to the workstations is accomplished by starting the SLP Loader on the server and configuring the workstations for SLP LAN load.

Starting the SLP Loader on the Server

1. **UNIX Server ONLY:** Add *current directory* to the path on the server, if necessary. This can be done by issuing the following command.

   ```
   PATH=$PATH:.:
   ```

Caution: Use care in entering this command. Improper entry can cause serious system conditions.

2. Change directory to the directory containing the loader.

   ```
   cd /slpldr            (UNIX Server)
   cd \retaildd\loader   (OS/2 Server)
   cd \retaildd\slp_tsr  (DOS Server)
   cd \retaildd\loader   (Windows NT Server)
   ```

3. Start the loader.

   ```
   startslp              (UNIX Server)
   loader                (OS/2 Server)
   slp_tsr               (DOS Server)
   loader32              (Windows NT Server)
   ```

Stopping the SLP Loader

The following commands stop the loader.

`stopslp`	(UNIX Server)
`Select Exit`	(OS/2 Server)
`slp_tsr /d`	(DOS Server)
`Select Exit`	(Windows NT Server)

Configuring the 7450 Workstation for SLP Load

Perform the following for each of the workstations:

1. Turn the Keylock to the *Ex* position and boot the workstation.
2. At the main menu, select *CONFIGURATION*
3. Select *CHANGE PARAMETERS.*
4. Follow the menus to *Terminal ID*. Set the ID to a value. **This MUST be a unique number on the network.**
5. Follow the menus to *LAN Load Type* and select *IEEE SLP*.
6. Make sure the 7450 is setup to perform a network boot.

   7450 Release 1.x
   - Disable any bootable hard drives (set the *Type* to *00).*
   - Remove any flex disks or PCMCIA cards

   7450 Release 2.x
   - Remove any PCMCIA cards

- Follow the menus to *LOAD SEQUENCE* and set the sequence to cause the 7450 to look for a *NETWORK* boot as the first bootable device.

7. Exit the configuration menus. *Configuration Setup* may require a reboot, depending on what parameters were changed.

8. Select *Load Program* from the Main Menu.

Note: If WaveLAN and Ethernet/StarLAN ROMs are both present in the 7450, and booting from Ethernet/StarLAN is desired, the WaveLAN Load Type must be set to *None*. Also, if this is not done, the ROMs can not be mapped out to free up address space.

For more information about configuring the 7450, see the *Configuration Setup* chapter in the *7450 Hardware Installation and Service* book, ST-2122-17.

Touch Screens

Before a LAN load is requested from the server, the user is prompted to press any key on the workstation. Touch input is not accepted. If a key is not pressed, the workstation times out after 30 seconds and begins the load process. If a keyboard is not present, the user must wait for the 30-second time-out period before the load process begins.

Starting a Remote Disk-Based Workstation

A workstation with a hard disk can be started remotely four ways:

- You can disable the hard disk by setting the *Disk Type* to 00.
- You can make the hard disk non-bootable. This can be done by running the *rplenabl* utility. The *rplenabl* utility hides the boot track on the hard disk but retains access to the disk. The *rpldsabl* utility unhides the boot track.

  Note: The *rplenabl* and *rpldsabl* utilities are provided with network software, such as Microsoft LAN Manager and IBM LAN Server.

- You can make the partitions on the hard disk not-bootable using the *fdisk* utility. However, once a partition is make *bootable*, *fdisk* does not permit you to return to all non-bootable partitions. You are forced to have one *bootable* partition.
- On Release 2.x, you can set the Load Sequence to cause the network to boot first.

System Initialization

The device drivers are installed as the system boots, according to how you have configured your *config.sys (or stdcfg50.sys)* file. Each driver displays a version banner as it loads, however, no initialization is performed at this time. The *ncrinit* program initializes the drivers.

Refer to *NCR 7450 and 705x Programming Information* (ST-2122-18) or *NCR 7450 and 705x Programming Windows Help* (D9-0169-A) for programming information to develop your retail application. See the *Installable Device Drivers* chapter in this book, for information on installing specific 7450 device drivers.

Chapter 7

Bootp LAN Loading

Overview

This chapter provides procedures for performing a *BootP system Load* to 7450 workstations from a UNIX server.

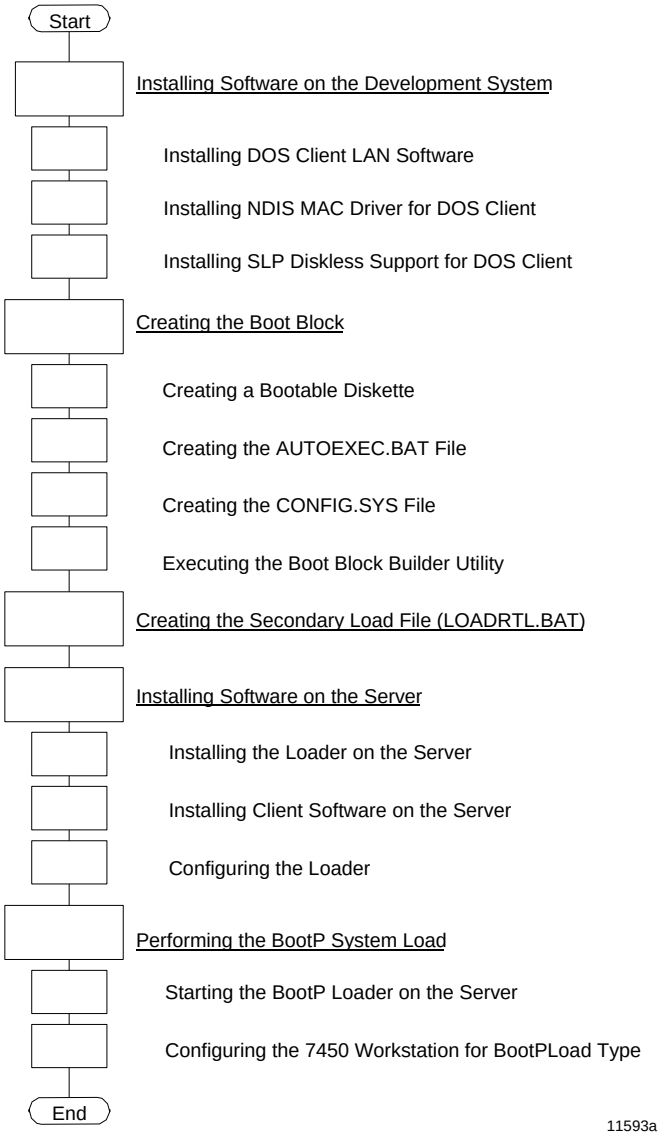
Topics in this chapter include:

- Installing BootP Software
- Creating a Boot Block
- Configuring BootP on the Server
- Configuring the Workstation for BootP
- Performing a BootP load

BootP is an IP/UDP protocol which allows a diskless 7450 to discover its own address, the address of a server host, and the name of the Boot Block to be loaded into memory and executed (see RFC 951).

Trivial File Transfer Protocol (TFTP) is the very simple protocol used to transfer the Boot Block from the server to the workstation.

BootP Software Installation Flowchart



Installing Software on the DOS Development System

Caution: These procedures make modifications to your *autoexec.bat* and *config.sys* files. You may want to make backup copies of your original files before proceeding.

This chapter assumes that the software discussed in Chapter 2, *7450 Retail Software Installation* is installed on your development system.

Installing DOS Client LAN Software

1. Insert one of the following proper Wollongong TCP/IP diskettes:

   Wollongong TCP/IP Runtime 2.0 for DOS
   (LPIN: F075-03x0-0000)*
   or
   Wollongong TCP/IP Access 3.0 for DOS
   (LPIN: F075-02x0-0000)*

   * LPIN depends on the number of users you have license for

2. Enter the installation command and follow the screen prompts.

   ```
   a:\install
   ```

Note: If you are using some other LAN software, refer to your user documentation and follow the installation instructions.

Installing NDIS MAC Driver for DOS Client Software

1. Insert the following diskette:

   NDIS MAC Drivers for DOS Client diskette
   (LPIN: G370-0437-0000)

2. Enter the installation command and follow the screen prompts.

   ```
   a:\install
   ```

3. Follow the procedures provided by your LAN Client software to install the MAC driver.

Installing SLP Diskless Support for DOS Client

1. Insert the following diskette in your development system.

   SLP Diskless Support for DOS Client
   (LPIN: G370-0439-0000)

2. Enter the installation command and follow the screen prompts.

   ```
   a:\install
   ```

3. At the completion of the installation of this diskette you are directed to merge the newly created *config.slp* with your existing *config.sys*. A simple way to accomplish this is to use the DOS *copy* command:

   ```
   copy \config.sys + \retaildd\config.slp \config.sys
   ```

Make sure the drivers are installed in the following sequence in *config.sys*:

- protman.dos
- MAC driver (ncrcsma or wvpcmcia)

Creating the SLP Boot Block

Note: The procedures in this section primarily describe how to build a *Conventional* boot block image. Variations for creating *Enhanced* and *Extended* boot blocks are noted. For more information about the differences in the three versions of the builder, see the *Boot Block Builder* section in the *Utilities* chapter.

An Boot Block is a compressed set of files (combined into an image) that the server initially downloads to the workstations to establish LAN communications. The files are assembled on a bootable flex disk.

The maximum size of the Boot Block is approximately 300 KB *(Conventional only)*.. Files that cause your image to exceed this limit should be excluded from the image and copied to the server by way of a secondary load file (discussed later).

Creating a Bootable Diskette

1. Use the DOS *format* command to create a bootable diskette. Use the switch options that perform an unconditional format and that transfer the DOS operating system to the diskette.

   ```
   format a: /u /s
   ```

2. Copy the following files to the diskette.

```
copy c:\pathway\ncrcsma.dos a:
 or wvpcmcia.dos (if using WaveLAN / PCMCIA)
copy c:\pathway\protocol.ini a:
copy c:\pathway\protman2.exe a:
copy c:\pathway\pwtcp.exe a:
copy c:\pathway\pwtcp.sys a:
copy c:\pathway\pwbind.exe a:
copy c:\pathway\ndis.exe a:
copy c:\pathway\bootp.exe a:
copy c:\dos\himem.sys a:
copy c:\dos\emm386.exe a:
copy c:\retaildd\cdsd.dos a:
 (if used)(Conventional boot block)
copy c:\retaildd\serialdd.dos a:
 (if used) (Conventional boot block)
```

Note: All of the retail drivers can be loaded into the image if you are creating an *Enhanced* or *Extended* boot block

```
copy c:\retaildd\lanboot.dos a:
  (Enhanced or Extended boot block)
copy c:\retaildd\*.dos a:
  (Enhanced or Extended boot block)
```

Note: Some of these files are installed in the pathway directory when installing the NDIS MAC Drivers for the DOS diskette. After installing the NDIS MAC Drivers for the DOS diskette, you are prompted to merge a protocol.xxx file into your protocol.ini file.

If you are using NFS:

Copy the following files from the Wollongong Pathway NFS diskette to the diskette.

```
mount.exe
```

```
nfs.exe
```

Creating the Autoexec.bat File

Use an ASCII editor to create an *autoexec.bat* file.

Caution: Create this file on the diskette to avoid corrupting your development system *autoexec.bat* file. Below are suggested examples:

Note: Drive a: in the *autoexec.bat* and *config.sys* files is the memory image drive.

Using Wollongong TCP/IP:

```
a:\ndis -D:3
rem The -D:3 designates the third section in
rem the Protocol.ini file as the NDIS MAC
a:\pwbind
a:\bootp
a:\pwtcp
a:\nfs
rem For nfs, set local drive x: to be redirected to
rem the server
rem a:\mount x: \\Server IP\/server/download user
rem password /r:1024 /w:1024
set path = x:\
set comspec = x:\command.com
rem pull remainder of files from the redirected drive x:
loadrtl.bat
```

Creating the CONFIG.SYS File

Use an ASCII editor to create a *config.sys* file.

Caution: Create this file on the diskette to avoid corrupting your development system *config.sys* file. Below are suggested examples: The sequence shown below is critical!

Using Wollongong TCP/IP:

```
device=a:\himem.sys
 (Conventional boot block)
 or
device=a:\himem.sys /testmem:off
 (Enhanced or Extended boot block)
device=a:\lanboot.dos
 (Enhanced or Extended boot block)
DOS = HIGH, UMB
device = a:\emm386.exe i=c800-efff frame=none ram
files=60
buffers=15
stacks= 12,300
lastdrive=0
rem These retail drivers must be in the boot block
device=a:\cdsd.dos
  (Conventional boot block)
device=a:\serialdd.dos
  (Conventional boot block)
```

Note: All of the retail drivers can be loaded into the image if you are creating an *Enhanced* or *Extended* boot block

```
device=a:\protman2.exe /i:a:\
device=a:\pwtcp.sys
device=a:\ncrcsma.dos
 or wvpcmcia.dos (if using WaveLAN/PCMCIA)
rem The other retail drivers can be loaded later using
rem NFS redirection and LOADDEV.
```

The above config.sys example loads the communication drivers *protman2.exe*, and the LAN adapter driver in the workstation

Verify the disk by using it to boot the workstation.

Executing the Boot Block Builder Utility

Run the Boot Block Builder utility on the development system to compress the diskette file into a BootP load image. Refer to the *Utilities* chapter in this book for additional information about the Boot Block Builder utility.

```
cd \retaildd\utils
lanload
```

The *lanload* batch file starts the BUILDER which reads the newly created diskette to generate the BootP load image (*lanload.bbk)*. The image is written to the following directory.

```
c:\retaildd\utils\
```

This file will be copied to the server later in the installation procedures.

Note: If, after building the bootable diskette, you make changes to the diskette (files are changed or deleted), the diskette can become fragmented. This causes the boot block image to be appear larger than necessary. Rather than starting over (reformatting the diskette) you can run the DOS *DEFRAG* Utility to remove wasted space on the diskette before running the Boot Block Builder utility.

Creating the Secondary Load File (loadrtl.bat)

Use an ASCII editor to create the *loadrtl.bat* (Load Retail) batch file.

Caution: **Do not** put this file on the same diskette with the device drivers. It is not intended to be part of the Boot Block. This file will later be copied to a specific directory on the server.

The secondary load file is used to load the remainder of the files. Since the image has a size limitation, the retail drivers and associated application files must be loaded by way of secondary redirection, using the *loaddev* (Load Device) utility. The *loaddev* file is resident on the server (discussed later in this chapter in the section titled *Copying the Workstation Files to the Server*). See the *Utilities* chapter for more information about *loaddev*.

An example of the secondary load file is shown below.

Conventional Boot Block

```
dis_img.com
loaddev.com /d:c:\dsd.dos
loaddev.com /d:c:\clockdd.dos
loaddev.com /d:c:\cmosdriv.dos
loaddev.com /d:c:\consoldd.dos /D
loaddev.com /d:c:\imsr.dos /UB
loaddev.com /d:c:\inputseq.dos
loaddev.com /d:c:\linkman.dos
loaddev.com /d:c:\miscdriv.dos
loaddev.com /d:c:\mfp.dos
loaddev.com /d:c:\ocia.dos /UB
loaddev.com /d:c:\rdisplay.dos
loaddev.com /d:c:\npower.dos
loaddev.com /d:c:\pcrs.dos
ncrinit.exe
```

The above example does the following using redirection to the server for files:

- disables the disk image *(dis_img)* and returns drive a: to the flex drive (this should be done whether you have a flex drive or not)
- loads all of the retail device drivers (similar to the way *config.sys* would). The drivers are transferred from the server to the NFS shared drive (C: in this example).
- executes the retail device driver initialization program (*ncrinit*)

Enhanced/Extended Boot Block

All of the retail drivers can be loaded into the image, leaving only the following lines in the secondary load file, leaving only the follow two lines in the secondary load file.

```
dis_img.com
ncrinit.exe
```

Installing Software on the Server

This section discusses the procedures for preparing the server for downloading the files.

Installing the Loader Software on the Server

BootP is installed when UNIX is installed

Installing the File Transfer Software on the Server

1. The Trivial File Transfer Protocol (TFTP) tool is installed with UNIX and can be used to transfer files after the workstation has been loaded. TFTP provides a limited subset of the commands provided by FTP. Refer to the TFTP man pages for information on using the tool

2. If you are using NFS, install the Wollongong Pathway NFS package.

Copying the Workstation Files to the Server

1. On the Development System, copy the following files to a diskette.

```
copy c:\retaildd\utils\lanload.bbk a:\
copy c:\retaildd\utils\dis_img.com a:\
copy c:\retaildd\utils\loaddev.com a:\
copy c:\retaildd\*.DOS a:\
copy c:\retaildd\ncrinit.* a:\
copy c:\loadrtl.bat a:\
```

2. On the server, change to the sub directory for the workstation DOS files.

Example: cd /usr/etc (UNIX Server)

3. Insert the diskette from Step #1 into the server and copy the load files to the hard disk.

   Use the UNIX *doscp* command to copy the files to a UNIX server.

```
doscp a:\lanload.bbk  /usr/etc/lanload.bbk
doscp a:\loaddev.com  /usr/etc/LOADDEV.COM
doscp a:\dis_img.com  /usr/etc/DIS_IMG.COM
doscp a:\retaildd\*.DOS  /usr/etc/*.DOS
doscp a:\retaildd\ncrinit.*  /usr/etc/ncrinit
doscp a:\loadrtl.bat  /usr/etc/LOADRTL.BAT
```

   Ensure that the file permissions on the boot file (lanload.bbk) are set to public readable.

4. Copy all of the files that you referenced in *loadrtl.bat* (created earlier in this chapter in the section titled *Creating the Secondary Load File)* to the server. Copy them to the same directory you used in Step 3.

5. Copy your application and any other files that need to be transferred to the server. Copy them to the same directory you used in Step 3.

Configuring the BootP Loader

This section discusses the BootP configuration files. Your requirements may vary. Use an ASCII editor to make any changes.

Note: To have the new parameters invoked, you must restart the loader for UNIX server.

Bootptab Configuration File

Add an entry for each workstation in the bootptab configuration file. At a minimum, the following fields should be specified.

bootptab (*usr/etc/bootptab*)

```
ht = Hardware Type (ex. Ethernet)
ha = Hardware Address of workstation (ex. 08000e26011f)
ip = IP Address (ex. 150.1.1.113)
BF = Bootfile name (ex. /usr/etc/lanload.bbk)
```

Refer to the BOOTPD man pages for further information.

Tlid Configuration File

On older versions of UNIX, you may have to edit the *tlid.conf* file to remove the comment marker (#) from in front of the TFTP service. The TFTP service is used with BootP as part of the initial loading procedure. (Refer to TFTPD man pages for additional information.)

tlid.conf (*usr/etc/tlid.conf*)

Address Resolution Protocol (ARP) tables

If you have an old version of WIN-TCP, you may need to modify the arpbypass table by hand. (This is done automatically on newer versions.) For each workstation to be loaded use arpbypass -t 4 add IP.IP.IP.IP 0x123456.0x789abc. (Refer to the ARPBYPASS man pages for further information.)

Performing the BootP System Load

Downloading to the workstations is accomplished by starting the BootP Loader on the server and configuring the workstations for a BootP BootP LAN load.

Starting the BootP Loader on the Server

1. Add *current directory* to the path on the server, if necessary. This can be done by issuing the following command.

   ```
   PATH=$PATH:.:
   ```

Caution: Use care in entering this command. Improper entry can cause serious system conditions.

2. Change directory to the directory containing the loader.

   `cd /usr/etc` (UNIX Server)

3. Start the loader.

   `./bootpd` (UNIX Server)
   bootpd can be started with multiple (-d) switches to provide diagnostics

Stopping the BootP Loader

To stop the BootP loader, kill the process.

Configuring the 7450 Workstation for BootP Load

Perform the following for each of the workstations:

1. Turn the Keylock to the *Ex* position and boot the workstation.
2. At the main menu, select *CONFIGURATION*
3. Select *CHANGE PARAMETERS.*
4. Follow the menus to *LAN Load Type* and select *BOOTP.*
5. Make sure the 7450 is setup to perform a network boot.
   - Remove any PCMCIA cards
   - Follow the menus to *LOAD SEQUENCE* and set the sequence to cause the 7450 to look for a *NETWORK* boot as the first bootable device.
6. Exit the configuration menus. *Configuration Setup* may require a reboot, depending on what parameters were changed.
7. Select *Load Program* from the Main Menu.

Note: If WaveLAN and Ethernet/StarLAN ROMs are both present in the 7450, and booting from Ethernet/StarLAN is desired, the WaveLAN Load Type must be set to *None.* Also, if this is not done, the ROMs can not be mapped out to free up address space.

For more information about configuring the 7450, see the *Configuration Setup* chapter in the *7450 Hardware Installation and Service* book, ST 2122-17.

Starting a Remote Disk-Based Workstation

A workstation with a hard disk can be started remotely four ways:

- You can disable the hard disk by setting the *Disk Type* to 00.
- You can make the hard disk non-bootable. This can be done by running the *rplenabl* utility. The *rplenabl* utility hides the boot track on the hard disk but retains access to the disk. The *rpldsabl* utility unhides the boot track.

  Note: The *rplenabl* and *rpldsabl* utilities are provided with network software, such as Microsoft LAN Manager and IBM LAN Server.

- You can make the partitions on the hard disk not-bootable using the *fdisk* utility. However, once a partition is make *bootable*, *fdisk* does not permit you to return to all non-bootable partitions. You are forced to have one *bootable* partition.
- On Release 2.x, you can set the Load Sequence to cause the network to boot first.

System Initialization

The device drivers are installed as the system boots, according to how you have configured your *config.sys* file. Each driver displays a version banner as it loads, however, no initialization is performed at this time. The *ncrinit* program initializes the drivers.

Refer to *NCR 7450 and 705x Programming Information* (ST-2122-18) or *Windows Help for TAPS - NCR 7450 and 705x* (D9-0169-A) for programming information to develop your retail application. See the *Installable Device Drivers* chapter in this book, for information on installing specific 7450 device drivers.

Chapter 8

RPL LAN Loading From a UNIX Server

Overview

This chapter provides procedures for performing an *RPL System Load* to 7450 workstations from a UNIX v.4 PC server. These procedures assume you are using a development system as discussed in chapter 2, *Software Installation: 7450 Retail Software*.

Other workstation loading schemes are discussed elsewhere in this book (see the book *Contents*).

Topics in this chapter include:

- Installing the software on the Development System
- Installing the software on the Server
- Configuring RPL on the Server
- Configuring the Workstation for RPL
- Performing an RPL load

Configuration Files

RPL uses several files for configuring and customizing the RPL workstations. This chapter discusses how to create and customize these files.

RPL.MAP

RPL.MAP is an ASCII file that contains records describing boot blocks, profiles, and configurations for the workstations.

DOSBB.CNF

DOSBB.CNF is a boot block configuration file which specifies the network drivers for the workstations.

DEFAULT.FIT

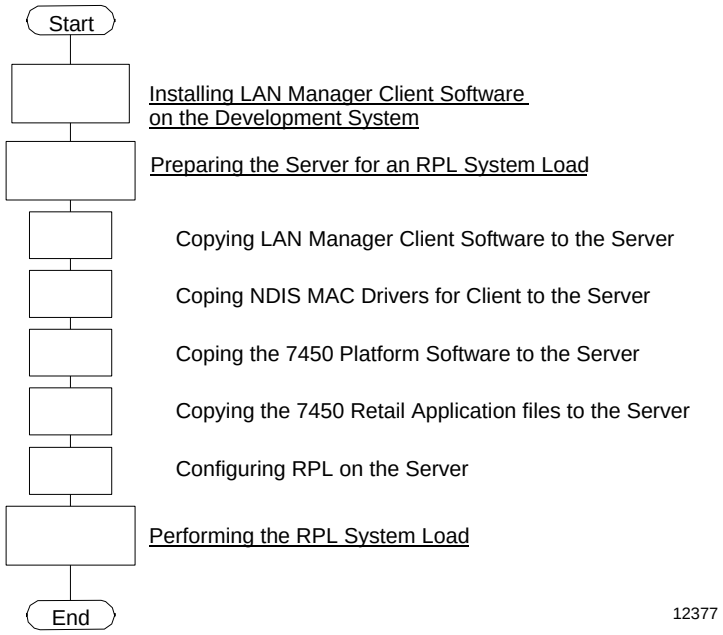
A FIT (File Index Table) is an ASCII file which provides paths to the server files for the workstations.

RPLMGR.INI

The RPLMGR.INI file contains configuration information that defines the operating environment for each RPL workstation.

RPL Software Installation Flowchart

The flowchart below shows an overview of the installation and loading procedures that are discussed in this chapter.



Installing LAN Manager Client Software on the Development System

1. Insert the following diskette in the Development System.

   DOS and OS/2 Setup Program
   (LMU-127-2)

2. Change to drive A: and enter the install command.

   ```
   a:
   ncrsetup
   ```

3. Follow the screen prompts. You will be asked to insert other LAN Manager diskettes (LMU-128 through LMU-132). Not all of the diskettes are used.

4. When asked for the Network Adapter Driver,

   - Select *Other* (use TAB key)
   - Insert the *NDIS MAC Drivers for DOS Client* diskette
     (LPIN: G370-0437-0000).
   - Select: *NCR 7450 Ethernet Adapter* (for Ethernet / StarLAN)
     or *NCR 7450 WaveLAN/PCMCIA Adapter* (for WaveLAN / PCMCIA)
   - Select: *Netbeui* protocol (use the space bar to make the selection)
   - Computername: *user defined*

- Username: press *user defined*
- LAN Manger with Windows: No

5. Reboot the system at the completion of the installation.

Preparing the Server for an RPL System Load

This section discusses the procedures for copying the 7450 workstation DOS files to the server that are required to boot the workstations. In an RPL environment, all of the workstation (client) files reside on the server, including the DOS operating system. Preparing the server for RPL loading includes:

- Installing LAN Manager with Remoteboot on the Server (it is assumed this has been installed previously)
- Copying LAN Manager Client Software to the Server
- Copying NDIS MAC Drivers for Client to the Server
- Copying the 7450 Platform Software to the Server
- Configuring RPL on the Server

Copying LAN Manager Client Software to the Server

Before files can be copied from the Development System to the server you must establish the path on both ends. During a boot, the system establishes a path to a directory on the server that the Development System can share. You can check the status of the *sharefiles* by entering the following command on the server.

```
net share
```

In the list that is displayed, you should see the follow two entries:

```
Sharename   Resource                          Remark
------------------------------------------------------------
C$          C:\                               Root Share
RPLFILES    C:\VAR\OPT\LANMAN\RPL\RPLFILES
```

If these entries are present, skip step 1 in the following procedures.

1. Enter the following commands on the server.

   ```
   net share C$=C:\
   net share rplfiles=c:/var/opt/lanman/rpl/rplfiles
   ```

2. Establish the new path on the Development System. Enter the following on the Development System.

   ```
   net logon admin
   net use v: \\servername.serve\rplfiles
   ```

   This entry gives the Development System access to the */var/opt/lanman/rpl/rplfiles* directory on the server as logical drive v:\.

3. On the Development System, issue the setup command.

```
v:\binfiles\binb\rplsetup
```

4. Respond to the message prompts as follows:

```
Copy files from (A:\) :
```

Press *ENTER*

```
Copy files to (C:\LANMAN\RPL\RPLFILES) :
```

Enter: *V:*

```
Install LAN Manager for MS-
DOS remoteboot workstations?
```

Enter: *Y*

```
Install LAN Manager for MS OS/2 remoteboot workstatio
ns?
```

Enter: *N*

5. At the prompt, insert the following diskette and follow the messages.

StarGROUP LAN Manager 2.1A
DOS Setup
(Disk ID: LMU-128)

Copying NDIS MAC Drivers for Client to the Server

1. Insert the following diskette in the Development System:

   NDIS MAC Driver for DOS Client
   (LPIN: G370-0437-0000)

2. Establish a path to the *root* directory on the server.

   ```
   net use x: \\servername.serve\C$
   ```

3. Copy the NDIS MAC drivers to the server.

   For Ethernet/StarLAN:

   ```
   copy a:\mslanman.dos\drivers\ethernet\ncrcsma\ncrcsma
   .dos
     x:\var\opt\lanman\rpl\bblock\ndis
   ```

   For WaveLAN/PCMCIA:

   ```
   copy a:\mslanman.dos\drivers\wavelan\wvpcmcia\↵
    wvpcmcia.dos  x:\var\opt\lanman\rpl\bblock\ndis
   ```

Copying the 7450 Platform Software to the Server

This section discusses copying the 7450 platform software to directories on the server as specified in the */var/opt/lanman/rpl/fits/default.fit* file.

1. In the Development System, insert the following diskette:

   7450 Retail Platform for DOS and OS/2 VDM Support (LPIN: G370-0383-0000)

2. Copy the retail platform files to the server.

```
copy a:\retaildd  v:binfiles\binr
copy a:\retaildd\diag  v:binfiles\binr
```

Note: Diagnostics is loaded in the above example. Your store environment may prefer to use the PCMCIA interface to run diagnostics.

3. Remove the hidden and system attributes from the DOS Operating System files on the Development System so they can be copied to the server.

```
c:\dos\attrib -s -h \*.sys
```

4. Copy the O/S and DOS files to the server.

```
copy c:\io.sys v:binfiles\dos500
copy c:\msdos.sys v:binfiles\dos500
copy c:\command.com v:binfiles\dos500
```

5. Replace the hidden and system attributes of the O/S files on the Development System.

```
c:\dos\attrib +s +h c:\io.sys
c:\dos\attrib +s +h c:\msdos.sys
```

Copying the 7450 Retail Application Files to the Server

Copy your retail application and all associated files to the server. Put them in the directories as specified in the FIT (File Index Table) file. The following is what the *default* FIT file contains (*shared DOS files* section).

default.fit (/var/opt/lanman/rpl/fits)

```
;shared DOS files
C:\IO.SYS  (BINFILES)\DOS500\IO.SYS
C:\MSDOS.SYS  (BINFILES)\DOS500\MSDOS.SYS
C:\BOOTSECT.COM  (BINFILES)\DOS500\BOOTSECT.COM
C:\DOS  (BINFILES)\DOS500
```

In the above example, all DOS files must be copied to the same directory as was the operating system.

```
/var/opt/lanman/rpl/rplfiles/binfiles/dos500.
```

The workstation FIT files are defined in *rpl.map*.

Configuring RPL on the Server

This section specifies the RPL protocol.

Settings in LANMAN.INI

The server uses part of its resources to download boot-block information to the workstations. With the default setting *maxthreads=10* in the *[Remoteboot]* section of the *lanman.ini* file, the server can download 10 blocks simultaneously to 10 workstations. If your network contains more than 10 workstations, and the workstations often start simultaneously, you will notice a decrease in the workstation's ability to start quickly. To increase the number of simultaneous start-ups, increase the value of *maxthreads*.

Example: If you have 100 workstations on your network, use *maxthreads=25*. (This decreases the number of threads for other processes.)

Use the VI editor and add the following lines to *lanman.ini*.

lanman.ini (*/var/opt/lanman/lanman.ini*)

```
[ remoteboot ]
maxthreads=10
rpl1=dlc.so /dev/lan 0
```

Creating the PROTOCOL.INI and DOSBB.CNF Files

1. Use an ASCII editor to create the *protocol.ini* and *dosbb.cnf* files.

Note: If you are using WaveLAN/PCMCIA instead of Ethernet or StarLAN, *WVPCMCIA* replaces *NCRCSMA* in the following examples.

protocol. ini

```
[protman]
  drivername = protman$
  dynamic = yes
  priority = netbeui

[netbeui]
  drivername = netbeui$
  bindings = ncrcsma
  names = 5
  ncbs = 8
  packets = 20
  pipeline = 10
  sessions = 4
  stacksize = 512
  lanabase = 0
; dlcretries = 15

[xnsnb]
  DRIVERNAME = XNSNB$
  BINDINGS = ncrcsma
  MAXPROCESSES = 12
  FGTICKS = 2
  BGTICKS = 2
  MAXROUTES =
  MAXSOCKETS =
  MAXXMITDESCS =
  NONGROUPS =
  SHAREGROUPS =
  LOGINLIBRARY = YES
  COURIERLIBRARY = NO
  NETBIOSGROUPS =
  lanabase = 1

[xnstp]
  DRIVERNAME = XNSTP$
  LOAD = XNSTP[CB]
  BINDINGS = ncrcsma
  MAXPROCESSES = 12
  FGTICKS = 2
  BGTICKS = 2
  MAXROUTES =
```

```
  MAXSOCKETS =
  MAXXMITDESCS =
  NONGROUPS =
  SHAREGROUPS =
  LOGINLIBRARY = YES
  COURIERLIBRARY = NO
  NETBIOSGROUPS =
  lanabase = 1
[tcpip]
  DRIVERNAME = TCPIP$
  IPADDRESS0 = (TCPIP_ADDRESS)
  SUBNETMASK0 = (TCPIP_SUBMASK)
  DEFAULTGATEWAY0 = (TCPIP_GATEWAY)
  NBSESSIONS = 6
  LOAD = tcptsr[c],tinyrfc[c],emsbfr[cr]
  UNLOAD = "unloadt /notsr[dc]"
  bindings = ncrcsma
  lanabase = 1
[ncrcsma]
    drivername      = NCRCSMA$
    maxrequests     = 6
    maxtransmits    = 6
    nummulticast    = 10
    receivebufsize  = 256
```

Note: See *Netbeui Parameters for PROTOCOL.INI* in the Appendix.

dosbb.cnf

```
; DOS on NCR Ethernet
BASE 110H
RPL BBLOCK\RPLBOOT.SYS
LDR BBLOCK\RPLSTART.COM ~
DAT BBLOCK\NETBEUI\NCR\PROTOCOL.INI
DRV BBLOCK\RPLDISK.SYS ~ 4 M
EXE BBLOCK\RPLPRO1.COM ~ 2 ~
EXE BBLOCK\RPLBIND2.EXE ~ ~
EXE BBLOCK\PROTMAN.EXE ~ ~
EXE BBLOCK\RPLBIND1.EXE ~ ~
DRV BBLOCK\TCPIP\TCPDRV.DOS /I:C:\LANMAN.DOS ~ ~
EXE BBLOCK\NETBEUI\NETBEUI.EXE ~ 10~
DRV BBLOCK\NDIS\NCRCSMA.DOS ~  4 ~
DRV BBLOCK\PROTMAN.DOS /I:C:\LANMAN.DOS ~ M
```

2. Make a sub-directory on the server for the *protocol.ini* and *dosbb.cnf* files.

   ```
   mkdir /var/opt/lanman/rpl/bblock/netbeui/ncr
   ```

3. Copy the *protocol.ini* and *dosbb.cnf* files into the new directory.

4. Copy a second copy of the *protocol.ini* file into the following directory.

   ```
   /var/opt/lanman/rpl/rplfiles/binfiles/lanman.dos
   ```

Configuring RPL.MAP

Use the vi editor and make the following two additions to the RPL configuration file on the server.

rpl.map (/var/opt/lanman/rpl/rpl.map)

```
; NCR boot block record
yyyyyyyyyyyy BBLOCK\NETBEUI\NCR\DOSBB.CNF 2 6 A ~ DOS~NCR
~Ethernet 08000E ~ ,,, ~ RDOS ~ ~ ~ ~ ~ ~
```

```
; default workstation records
08000E??????? ???????? D FITS\DEFAULT (RPL_SERVER_NAME) S
 ~ ~ ~ ,,, ~ RDOS ~ DEFAULT *~NCR~7450~* ~ ~ ~
```

Configuring the ILD File

1. Use the vi editor to assign the RPL broadcast LAN address in the ILD configuration file on the server. This is the address that the server uses to receive RPL information on the LAN.

ildcf (/etc/ild/ildcf)

Change the *multicast1=000000000000* line to:

```
multicast1=030002000000
```

Note: This address is specified in the IBM RPL standard and should not be changed.

2. Perform a system shutdown on the server.

   ```
   shutdown -y -i6 -g0
   ```

3. Start the RPL loader.

   ```
   net start rpl
   ```

   This step is to verify that the RPL loader was started during system boot.

Performing an RPL System Load

Configuring the 7450 Workstation for RPL Load Type.

1. Turn the Keylock to the *Ex* position and boot the workstation.
2. At the main menu, select *CONFIGURATION*
3. Select *CHANGE PARAMETERS.*
4. Follow the menus to *LAN Load Type* and select *IBM RPL.*
5. Make sure the 7450 is setup to perform a network boot.

   7450 Release 1.x

   - Disable any bootable hard drives (set the *Type* to *00*).
   - Remove any flex disks or PCMCIA cards

   7450 Release 2.x

   - Remove any PCMCIA cards.
   - Follow the menus to *LOAD SEQUENCE* and set the sequence to cause the 7450 to look for a *NETWORK* boot as the first bootable device.
6. Exit the configuration menus. *Configuration Setup* may require a reboot, depending on what parameters were changed.

7. Select *Load Program* from the Main Menu.

Note: If WaveLAN and Ethernet/StarLAN ROMs are both present in the 7450, and booting from Ethernet/StarLAN is desired, the WaveLAN Load Type must be set to *None*. Also, if this is not done, the ROMs can not be mapped out to free up address space.

For more information about configuring the 7450, see the *Configuration Setup* chapter in the *7450 Hardware Installation and Service* book, ST 2122-17.

Starting a Remote Disk-Based Workstation

A workstation with a hard disk can be started remotely four ways:

- You can disable the hard disk by setting the *Disk Type* to 00.
- You can make the hard disk non-bootable. This can be done by running the *rplenabl* utility. The *rplenabl* utility hides the boot track on the hard disk but retains access to the disk. The *rpldsabl* utility unhides the boot track.

  Note: The *rplenabl* and *rpldsabl* utilities are provided with network software, such as Microsoft LAN Manager and IBM LAN Server.

- You can make the partitions on the hard disk not-bootable using the *fdisk* utility. However, once a partition is make *bootable, fdisk* does not permit you to return to all non-bootable partitions. You are forced to have one *bootable* partition.
- On Release 2.x, you can set the Load Sequence to cause the network to boot first.

System Initialization

The device drivers are installed as the system boots, according to how you have configured your *config.sys (or stdcfg50.sys)* file. Each driver displays a version banner as it loads, however, no initialization is performed at this time. The *ncrinit* program initializes the drivers.

Refer to *NCR 7450 and 705x Programming Information* (ST-2122-18) or *NCR 7450 and 705x Programming Windows Help* (D9-0169-A) for programming information to develop your retail application. See the *Installable Device Drivers* chapter in this book, for information on installing specific 7450 device drivers.

Chapter 9

RPL LAN Loading From a OS/2 Server

Overview

This chapter provides procedures for performing a *Remote IPL (Initial Program Load)* from a 7450 workstation / server to a diskless 7450 workstation.

Workstation / Server Software Requirements

The following software is required on the workstation / server. Refer to the documentation provided with OS / 2 and LAN Server for installation procedures.

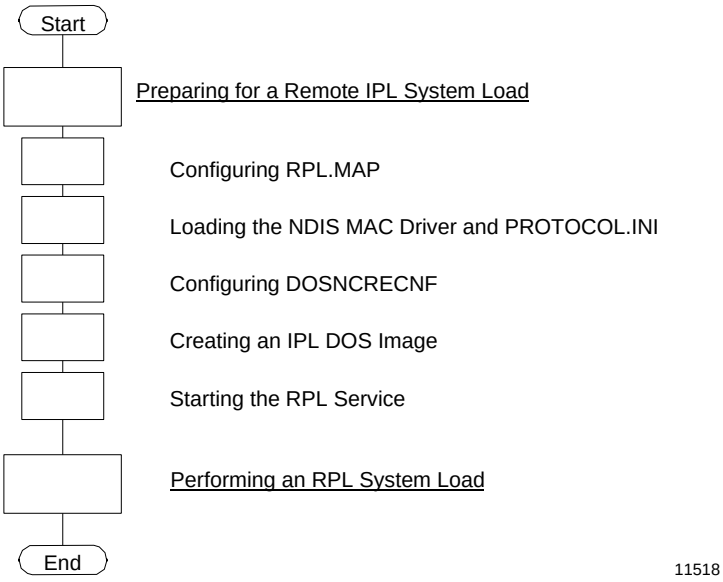
- OS / 2 2.1
- LAPS (LAN Adapter and Protocol Support)
- LAN Server 3.01
  - DOS LAN Requester 2.0
  - LAN Support Program 1.31
  - DOS (5.0 or later)
  - Remote IPL (Initial Program Load) service

or

- OS / 2 3.0
- LAPS (LAN Adapter and Protocol Support)
- LAN Server 4.0
  - DOS LAN Requester 2.0 (or later)
  - LAN Support Program 1.38
  - DOS (5.0 or later)
  - Remote IPL (Initial Program Load) service

RPL Software Installation Flowchart

The flowchart below shows an overview of the installation and loading procedures that are discussed in this chapter.



Preparing for a Remote IPL System Load

This section discusses the procedures for configuring a 7450 workstation / server to perform Remote IPL downloading to diskless 7450 workstations.

There are three primary steps involved in performing a Remote IPL load.

1. Creating the IPL DOS image
2. Configuring the 7450 Workstation / Server for Remote IPL downloading.
3. Configuring the 7450 Workstation(s) to receive the download.

Configuring RPL.MAP *(\ ibmlan \ rpl \ rpl.map)*

RPL.MAP contains requester and server records that define the behavior of the Remote IPL service for each DOS requester (workstation). Each requester must have a set of server and requester records in this file. The server records must be added manually. Requester records are entered automatically by the Remote IPL service.

Use an ASCII editor and enter the server record in RPL.MAP.

```
; server records for DOS
yyyyyyyyyyyy dosncre.cnf  3 10 N IBMLAN$ DOS~NCR~ETHERNET
   ~ ~ ,,, Z R_DNCRETH ~ ~
```

Note: The above entry must be on one line.

Loading the NCR 7450 NDIS MAC Driver and PROTOCOL.INI

1. Change directory to:

   IBMLAN\RPL\DOS

2. Create a new subdirectory called *NCRCSMA (or WVPCMCIA)* and change into it.

   Note: Use *NCRCSMA* for Ethernet or StarLAN. Use *WVPCMCIA* for WaveLAN / PCMCIA.

3. Insert the following diskette:

   NDIS MAC Driver for DOS Client diskette (LPIN: G370-0437-0000).

4. Perform the following:

```
copy a:\MSLANMAN.DOS\DRIVERS\ETHERNET\NCRCSMA\↵
 NCRCSMA.DOS
copy a:\RETAILDD\PROTOCOL.NET + a:\MSLANMAN.DOS\↵
 DRIVERS\ETHERNET\NCRCSMA\PROTOCOL.INI  PROTOCOL.INI
```

   For WaveLAN installations:

```
copy a:\MSLANMAN.DOS\DRIVERS\WAVELAN\WVPCMCIA\↵
 WVPCMCIA.DOS
copy a:\RETAILDD\PROTOCOL.NET + a:\MSLANMAN.DOS\↵
 DRIVERS\WAVELAN\WVPCMCIA\PROTOCOL.INI  PROTOCOL.INI
```

Configuring DOSNCRE.CNF

1. Change directory to:

   ```
   \IBMLAN\RPL
   ```

2. Make a copy of one of the sample configuration files.

   ```
   copy DOSND3EI.CNF DOSNCRE.CNF
   ```

3. Use the ASCII editor to modify *DOSNCRE.CNF.*

   Change:

   ```
   DAT DOS\ELNKII\PROTOCOL.INI
   ```

   To:

   ```
   DAT DOS\NCRCSMA\PROTOCOL.INI
    or
   DAT DOS\WVPCMCIA\PROTOCOL.INI
   ```

   Change:

   For LS 3.01:

   ```
   DRV DOS\ELNKII.DOS ~ ~ ~
   ```

   For LS 3.01:

   ```
   DRV C:\IBMLAN\DOSLAN\LSP\DOS\ELNKII.DOS ~ ~ ~
   ```

   To:

   ```
   DRV DOS\NCRCSMA\NCRCSMA.DOS ~ ~ ~
    OR DRV DOS\WVPCMCIA\WVPCMCIA.DOS ~ ~ ~
   ```

Creating an IPL DOS Image for LAN Server 3.01

An IPL DOS image is a file containing a binary representation of a bootable DOS diskette. Additional files contained in the image are user defined. It may contain only the DOS boot files (`command.com, io.sys, msdos.sys, boot.rec`), or it may contain the entire complement of retail drivers and the application.

The image can be created either from a preconstructed diskette containing all of the required workstation files, or from an *image definition file* on the workstation/server. Examples of both methods are discussed in this chapter.

Note: The procedures discussed in this section are for instructional purposes only. They will likely require modification to suit your particular requirements.

Creating an IPL DOS Image From a Diskette

There are two phases involved in this procedure.

- Build a bootable diskette. Copy all of the files to the diskette that are required to boot a workstation and run the application.
- Create the IPL DOS image from the diskette.

Building a Bootable Diskette

1. Use the DOS *format* command to create a bootable diskette. Use the switches that perform an unconditional format and transfers the DOS operating system to the diskette.

```
format a: /u /s
```

2. Copy the following files to the diskette.

```
COPY C:\IBMLAN\DOSLAN\NET\STDCFG50.SYS A:
COPY C:\IBMLAN\DOSLAN\NET\ETH_AUT.BAT A:
COPY C:\IBMLAN\DOSLAN\NET\STD_SET.BAT A:
COPY C:\IBMLAN\DOSLAN\NET\INT21USE.COM A:
COPY C:\IBMLAN\DOSLAN\NET\SMDISP.EXE A:
COPY C:\IBMLAN\DOSLAN\NET\XSRW.SM A:
COPY C:\IBMLAN\DOSLAN\NET\NET.COM A:
COPY C:\IBMLAN\DOSLAN\NET\NETWORK.MSG A:
COPY C:\IBMLAN\DOSLAN\NET\NETWORK1.CMD A:
COPY C:\IBMLAN\DOSLAN\NET\REDIR40.EXE A:
COPY C:\IBMLAN\DOSLAN\NET\XSI4.EXE A:
COPY C:\IBMLAN\DOSLAN\NET\CHKDBCS.COM A:
COPY C:\IBMLAN\DOSLAN\NET\USEWRK.COM A:
COPY C:\IBMLAN\DOSLAN\DOS\RAMDRIVE.SYS A:
COPY C:\CONFIG.SYS A:
* COPY C:\IBMLAN\DOSLAN\DOS\HIMEM.SYS A:
* COPY C:\IBMLAN\DOSLAN\DOS\EMM386.EXE A:
* COPY C:\IBMLAN\DOSLAN\DOS\ANSI.SYS A:
* COPY C:\IBMLAN\DOSLAN\DOS\SETSEV.SYS A:
```

* Optional entries

3. Copy all the files from the RETAILDD directory that are referenced in *config.sys*.

4. Use an ASCII editor to modify the *config.sys* file. Change all path references from drive C: to A:.

5. Rename the supplied startup batch file *(eth_aut.bat*).

```
ren A:\ETH_AUT.BAT  A:\AUTOEXEC.BAT
```

6. Merge *config.sys* with the supplied startup file *(stdcfg50.sys)*.

```
copy A:\CONFIG.SYS + A:\STDCFG50.SYS  A:\CONFIG.SYS
```

(See the *Reference Files* section later in this chapter for example files.)

Creating the IPL Image

1. Select the *LAN Services* icon from the Presentation Manager.
2. Select the *LAN Requester* icon.
3. Login with System Administrator privileges.
4. Select *Definitions* from the action bar.
5. Select *IPL Images . . .* from the pull-down menu.
6. Select one of the sample image files to use as a model.

   STH3H500 for Ethernet 3.5 high-density DOS 5.00

7. Select *Actions* from the action bar.
8. Select *Create* from the pull-down menu.
   - Enter the *Image ID*
     User defined: the name of the image you are creating.
   - Enter a *Description* of the image.
     User defined: descriptive data only.
   - Select whether or not you are using a *Definition File*.
     Select *No*
   - Select *ENTER*
9. Exit *Manage Images* from the action bar.

10. Select *Definitions* from the action bar.

11. Select *Machine parameters . . .* from the pull-down menu.

12. Select *New* from the Machine ID list.

13. Select *Actions* from the action bar.

14. Select *Create* from the pull-down menu.

15. Select *Remote IPL workstation* from the Machine Types window.

16. Enter the Remote IPL Requester Definition information (one for each workstation being loaded.)

    - Enter the *Machine ID*.
      User defined: name of the workstation. (No spaces permitted)
    - Enter the *Description* of the workstation.
      User defined: descriptive data only.
    - Enter the *Network Adapter ID*.
      This is unique for every workstation. The 7450 network ID can be determined by viewing *REVIEW HARDWARE* in the *Configuration Setup* menus. On the 7450 the Network Adapter ID is referred to as the *LAN ID*.

Caution: If both Ethernet / StarLAN and WaveLAN / PCMCIA are present, make sure you use the LAN ID for the correct LAN.

- Enter the *IPL server* name.
  Place the cursor in the blank area for this option and press F4. Select from the list and press ENTER.
- Enter the *Server record identifier*.
  Place the cursor in the blank area for this option and press F4. Select *R_NCRETH* from the list and press ENTER.
- Press ENTER.
- Enter the *Image ID*.
  Place the cursor in the blank area for this option and press F4. Select from the list and press ENTER.
- This completes entering the *IPL Requester Definition* information. Select ENTER.

17. Select the source drive of the diskette.
This is normally *A*.

18. Insert the diskette and press ENTER. The IPL image is created on the workstation / server.

19. Go to the *Performing an RPL System Load* section in this chapter.

Re-Making the Image from Diskette

If you make adjustments to the diskette files, you need to create a new image. Rather than starting from the beginning, you can perform the following procedures.

1. Select *Definitions* from the Main Panel action bar.

2. Select *IPL Images* from the pull-down menu.

3. Select the name of the *Image ID* you previously defined.

4. Select *Make* from the action bar.

5. Select *To server . . .* from the pull-down menu. This creates the IPL DOS image on the workstation / server.

6. Select the source drive of the diskette. This is normally *A*.

7. Select the *Destination Server.*

8. Insert the diskette and press ENTER. The IPL image is created on the workstation / server.

9. Go to the *Performing an RPL System Load* section in this chapter.

Creating an IPL DOS Image from an Image Definition File

This procedure creates an IPL DOS image in a similar manner as discussed earlier in *Creating an IPL DOS Image from a Diskette*. The primary difference in this method is that it uses a definition file to define the source of all of the files on the workstation / server that are used to create the image rather than making a diskette image.

The image definition file is an ASCII file containing a list of files used by the IPL Requester. Standard image definition files are bundled with LAN Server 3.0. You may use these as models to create your own images. Once an image is created, you can assign it to one or more remote IPL requesters.

Note: Do not delete the GUEST user ID. The GUEST account is used by the requester to gain access to certain server directories.

The procedures discussed in this chapter utilize the following supplied LAN Server files to boot the workstation and to set up the redirection functionality.

```
\IBMLAN\DOSLAN\NET\STD_AUT.BAT
\IBMLAN\DOSLAN\NET\xsrw.bat
\IBMLAN\DOSLAN\NET\xsrw1.bat
\IBMLAN\DOSLAN\NET\stdcfg50.sys
\IBMLAN\DOSLAN\NET\std_set.bat
```

At system startup *autoexec.bat* executes and calls an initialization batch file named *xsrw.bat*. This file then calls a second initialization file named *xsrw1.bat*.

Entries can be added to the end of *xsrw1.bat* to perform additional commands that your system may require. In this example, only *ncrinit* has been added to initialize the retail device drivers in the workstation.

Note: The image build routine uses the *std_aut.bat* file to generate *autoexec.bat*, *stdcfg50.sys* to generate *config.sys*, and *std_set.bat* to generate *setenv.bat*.

Creating the Image

1. Select the *LAN Services* icon from the Presentation Manager.
2. Select the *LAN Requester* icon.
3. Login with System Administrator privileges.
4. Select *Definitions* from the action bar.
5. Select *IPL Images . . .* from the pull-down menu.
6. Select the following sample image file to use as a model.

   STH3H500 – for Ethernet 3.5 high-density DOS 5.0
7. Select *Actions* from the action bar.
8. Select *Create* from the pull-down menu.

   - Enter the *Image ID*
     User defined: the name of the image you are creating.
   - Enter a *Description* of the image.
     User defined: descriptive data only.
   - Select whether or not you are using a *Definition File*.
     Select *Yes*.

Editing the Image Definition File

1. From the *Manage Images* menu, select the newly created Image ID.
2. Select *Actions* from the action bar.

3. Select *Edit image definition . . .* from the pull-down menu.

4. At the end of the file, make entries for each of your retail device drivers. The image build routine uses these entries to locate the files as the image is built.

Note: These should be mirror image entries of your retail *config.sys* file without the *device=* on each line.

Example: `C:\RETAILDD\CDSD.DOS`

5. Save the updated file and exit *Manage Images.*

6. Select *Definitions* from the action bar.

7. Select *Machine parameters . . .* from the pull-down menu.

8. Select *New* from the Machine ID list.

9. Select *Actions* from the action bar.

10. Select *Create* from the pull-down menu.

11. Select *Remote IPL workstation* from the Machine Types window.

12. Enter the Remote IPL Requester Definition information.

    - Enter the *Machine ID.*
      User defined: name of the workstation; must be 8 characters or less without spaces.

- Enter the *Description* of the workstation.
  User defined: descriptive data only.
- Enter the *Network Adapter ID*.
  This is unique for every workstation. The 7450 network ID can be determined by viewing *REVIEW HARDWARE* in the *Configuration Setup* menus. On the 7450 the Network Adapter ID is referred to as the *LAN ID*.

Caution: If both Ethernet / StarLAN and WaveLAN / PCMCIA are present, make sure you use the LAN ID for the correct LAN.

- Enter the *IPL server* name.
  Place the cursor in the blank area for this option and press F4. Select from the list and press ENTER.
- Enter the *Server record identifier*.
  Place the cursor in the blank area for this option and press F4. Select from the list and press ENTER.
- Press ENTER.
- Enter the *Image ID*.
  Place the cursor in the blank area for this option and press F4. Select from the list and press ENTER.
- Press ENTER.
- Return to the *LAN Requester* menu.

13. Select *Definitions* from the action bar.

14. Select the name of *Image ID* you previously defined.

15. Select *Make* from the action bar.

- Select *To server . . .*
  This creates the IPL DOS image on the workstation / server.
- Select the *Destination Server* from the list.
- Select ENTER.
  The DOS image should be built now and complete without any errors.

Creating an IPL Image for LAN Server 4.0

An IPL DOS image is a file containing a binary representation of a bootable DOS diskette. Additional files contained in the image are user defined. It may contain only the DOS boot files (`command.com, io.sys, msdos.sys, boot.rec`), or it may contain the entire complement of retail drivers and the application.

The image is created from an *image definition file* on the workstation / server. The following section shows how to create the image.

Note: The procedures discussed in this section are for instructional purposes only. They will likely require modification to suit your particular requirements. Consult the on-line documentation under *Network Administrator Task* sections; Managing Remote IPL, and Advanced Procedures for the Remote IPL Service.

Creating an IPL DOS Image from an Image Definition File

The image definition file is an ASCII file containing a list of files used by the IPL Requester. Standard image definition files are bundled with LAN Server 4.0. You can use these as models to create your own images. Once an image is created, you can assign it to one or more remote IPL requesters.

Note: Do not delete the GUEST user ID. The GUEST account is used by the requester to gain access to certain server directories.

The procedures discussed in this chapter utilize the following supplied LAN Server files to boot the workstation and to set up the redirection functionality.

```
\IBMLAN\DOSLAN\RIPL.BAT
\IBMLAN\DOSLAN\NET\STD_AUT.BAT
\IBMLAN\DOSLAN\NET\HMA_CFG.SYS
\RETAILDD\CONFIG.TMP
```

At system startup *autoexec.bat* executes and calls an initialization batch file named *ripl.bat*. Entries can be added to the end of *ripl.bat* to perform additional commands that your system may require. In this example, another batch file is called to perform workstation and retail functions.

Note: The *hma_cfg.sys* and *config.tmp* files are used to create *retail.bat*. The image build routine uses *retail.sys* to generate *config.sys* and *std_aut.bat* to generate *autoexec.bat*.

Creating the Image

1. Select the *LAN Services* icon from the Presentation Manager.
2. Select the *LAN Server Administrator*.
3. Open the appropriate server object.
4. Select the *DOS Image Definitions* icon.
5. Select one of the following sample image files to use as a model.

   STD3HHMA – for 3.5 inch 1.44 MB image with full redirector and High Memory (HIMEM) support.

   STD3HBAS – for 3.5 inch 1.44 MB image with basic redirector
6. Press mouse button 2. Select *Create another.*
7. Type the new definition name, *IMAGE.*
8. Choose *Create.*

Editing the Image Definition File

1. Double click on the newly created Image Definition File icon.
2. Choose *Edit*.
3. At the end of the file, make entries for each of your retail device drivers. The image build routine uses these entries to locate the files as the image is built. You will be editing the image definition file: `\IBMLAN\DCDB\IMAGES\IMAGE.DEF`.

Note: These should be mirror image entries of your retail *config.sys* file, without the *device*= on each line.

Example: `C:\RETAILDD\CDSD.DOS`

4. Save the updated file and exit *IMAGE-Settings View*.
5. Select *IMAGE* Definition icon.
6. Press mouse button 2. Select the arrow that is to the right of *Make Image*.
7. Select *To Server*.
8. Type the name of the target server. This is the name of the server where the image will be created.
9. Choose *OK*.

Creating the Remote IPL Requester Definition

1. From the desktop, open *LAN Services*.
2. Open *LAN Server Administration*.
3. Open the appropriate server object.
4. Open *Remote IPL Requesters*.
5. Select *Remote IPL Requester Template*.
6. Press mouse button 2. Select *Create another*.
7. Select *Enable DOS requester* under *Status*.

8. Enter the Remote IPL Requester Definition information.

   - Enter the *Machine ID*.
     User defined: name of the workstation; must be 8 characters or less without spaces.
   - Enter the *Description* of the workstation.
     User defined: descriptive data only.
   - Enter the *Network Adapter Address*.
     This is unique for every workstation. The 7450 network ID can be determined by viewing *REVIEW HARDWARE* in the *Configuration Setup* menus. On the 7450, the Network Adapter ID is referred to as the *LAN ID*.

Caution: If both Ethernet / StarLAN and WaveLAN / PCMCIA are present, make sure you use the LAN ID for the correct LAN.

9. Select the *Parameter* tab.

10. Select the server record identifier from the pull-down list.

    `R_DNCRETH`

11. Select an image ID. The images displayed are the images you created in the steps earlier (IMAGE).

12. Choose *Create*.

    Note: This adds the following line to the `\IBM\RPL\RLP.MAP` file:

```
08000E?????? MACH_ID ~ IMAGE SERVER_NAME DOMAIN ↵
  ~ ~ ~ ,,, Z R_DNCRETH ~ ~ ~
```

where: ?????? is the remainder of the *Network Adapter Address.*

Starting and Stopping the RPL Service

The RPL service must be started at the server in order to perform RPL loads. Go to an OS/2 command prompt and enter the following command:

```
net start rpl
```

To stop the RPL service, first stop any workstations performing RPL requests. Then, at a command prompt on the server enter the following command:

```
net stop rpl
```

Warning: Do not stop the server while RPL loads are occurring. LAN Server will sometimes trap the OS/2 server. This trap halts the server, requiring a reboot.

Performing an RPL System Load

Configuring the 7450 Workstation for RPL Load Type.

1. Turn the Keylock to the *Ex* position and boot the workstation.
2. At the main menu, select *CONFIGURATION*.
3. Select *CHANGE PARAMETERS*.
4. Follow the menus to *LAN Load Type* and select *IBM RPL*.
5. Make sure the 7450 is setup to perform a network boot.

   7450 Release 1.x

   - Disable any bootable hard drives (set the *Type* to *00*).
   - Remove any flex disks or PCMCIA cards.

   7450 Release 2.x

   - Remove any PCMCIA cards.
   - Follow the menus to *LOAD SEQUENCE* and set the sequence to cause the 7450 to look for a *NETWORK* boot as the first bootable device.

6. Exit the configuration menus. *Configuration Setup* may require a reboot, depending on what parameters were changed.

7. Select *Load Program* from the Main Menu.

Note: If WaveLAN and Ethernet/StarLAN ROMs are both present in the 7450, and booting from Ethernet/StarLAN is desired, the WaveLAN Load Type must be set to *None*. Also, if this is not done, the ROMs can not be mapped out to free up address space.

For more information about configuring the 7450, see the *Configuration Setup* chapter in *7450 Hardware Installation and Service* (ST 2122-17).

Starting a Remote Disk-Based Workstation

A workstation with a hard disk can be started remotely four ways:

- You can disable the hard disk by setting the *Disk Type* to 00.
- You can make the hard disk non-bootable. This can be done by running the *rplenabl* utility. The *rplenabl* utility hides the boot track on the hard disk but retains access to the disk. The *rpldsabl* utility unhides the boot track.

  Note: The *rplenabl* and *rpldsabl* utilities are provided with network software, such as Microsoft LAN Manager and IBM LAN Server.

- You can make the partitions on the hard disk not-bootable using the *fdisk* utility. However, once a partition is make *bootable, fdisk* does not permit you to return to all non-bootable partitions. You are forced to have one *bootable* partition.
- On Release 2.x, you can set the Load Sequence to cause the network to boot first.

System Initialization

The device drivers are installed as the system boots, according to how you have configured your *config.sys (stdcfg50.sys* or *retail.sys)* file. Each driver displays a version banner as it loads, however, no initialization is performed at this time. The *ncrinit* program initializes the drivers.

Refer to *NCR 7450 and 705x Programming Information* (ST-2122-18) or *NCR 7450 and 705x Programming Windows Help* (D9-0169-A) for programming information to develop your retail application. See the *Installable Device Drivers* chapter in this book, for information on installing specific 7450 device drivers.

Reference Files for LAN Server 3.01

The following files are those that were used in this chapter. They are for reference only. Lines that were added / modified are in **BOLD.**

DOSNCRE.CNF

```
; DOS Boot Block Configuration
; NDIS LAN Support Program Drivers
BASE 110H (minimum)
RPL DOS\RPLBOOT.SYS
LDR DOS\RPLLOADR.COM ~
DAT DOS\LT2.MSG
DAT D:\IBMLAN\DOSLAN\LSP\DXM.MSG
DAT DOS\NCRCSMA\PROTOCOL.INI
EXE D:\IBMLAN\DOSLAN\LSP\NETBIND.COM ~ ~ ~
DRV D:\IBMLAN\DOSLAN\LSP\DXMJ0MOD.SYS ~ 14 ~
DRV D:\IBMLAN\DOSLAN\LSP\DXMA0MOD.SYS 001 ~ ~
DRV DOS\NCRCSMA\NCRCSMA.DOS ~ ~ ~
DRV D:\IBMLAN\DOSLAN\LSP\PROTMAN.DOS /I: ~ ~
```

Note: If you are using WaveLAN / PCMCIA, use *WVPCMCIA* in place of *NCRCSMA*.

PROTOCOL.INI (Ethernet)

```
[PROTMAN]
DRIVERNAME = PROTMAN$
DYNAMIC = YES
PRIORITY = NETBEUI
[BLIM]
DRIVERNAME = BLIMDOS$
BINDINGS = "NCRCSMA"
[NETBEUI_XIF]
Drivername = netbeui$
BINDINGS = "NCRCSMA"
LANABASE = 0
; NCR 7450 NDIS LAN Driver
; This driver supports the following topologies on the
7450
; workstation:
; - 10BASET Ethernet
; - 10BASE2 Ethernet
; - 1BASE5 StarLAN
; - Hubless StarLAN
; drivername NCRCSMA$ NCRCSMA$
; maxrequests 6 1-10
; maxtransmits 6 1-50
; nummulticast 10 5-20
; receivebufsize 256 256-1514
;   ** The remaining parameters are read from RTC
; CMOS on a 7450 workstation **
; lanirq 10 5,10,11,12
; ioportaddress 0x200 0x200, 0x220, 0x240, 0x260,
; 0x280, 0x2a0, 0x2c0, 0x2e0
; ramaddress 0xB000 0xC000, 0xC400, 0xC800, 0xCC00,
; 0xD000, 0xD400, 0xD800, 0xDC00,
; 0xE000, 0xE400, 0xE800, 0xEC00
; linkintegrity on off,on (used only with 10BASET)
[ncrcsma]
drivername = NCRCSMA$
maxrequests = 6
maxtransmits = 6
nummulticast = 10
receivebufsize = 256
```

Note: See *Netbeui Parameters for PROTOCOL.INI* in the Appendix for more information.

PROTOCOL.INI (WaveLAN / PCMCIA)

```
[PROTMAN]
DRIVERNAME = PROTMAN$
DYNAMIC = YES
PRIORITY = NETBEUI
[BLIM]
DRIVERNAME = BLIMDOS$
BINDINGS = "NDIS_MAC"
[NETBEUI_XIF]
DRIVERNAME = netbeui$
BINDINGS = "NDIS_MAC"
LANABASE = 0
[NDIS_MAC]
; NCR 7450 WaveLAN/PCMCIA NCIS Driver
;
; This driver supports the WaveLAN/PCMCIA adapter on↵
 the 7450.
; PARAMETER DEFAULT VALID VALUES
; --------- ------- ------------
; drivername WVPCMCI$ WVPCMCI$
; maxrequests 6 1-10
; maxtransmits 6 1-50
; nummulticast 10 5-20
; numrxbuffers 15 6-32
;
; ** The remaining parameters are read from RTC CMOS on↵
 a 7450 **
; irq 11 5,10,11,12
; ioportaddress 0x300 0x300, 0x310, 0x320,
; 0x330, 0x350, 0x360,
; 0x380, 0x390, 0x3A0
; ramaddress 0xB400 0xB000, 0xB400, 0xC800, 0xCB00,
; 0xCC00, 0xCF00, 0xD000, 0xD300,
; 0xD400, 0xD700, 0xD800, 0xDB00,
; 0xDC00, 0xDF00, 0xE000, 0xE300,
; 0xE400, 0xE700, 0xEB00, 0xEF00
; centerfreq "915" "915", "2412", 2412.5", ..., "2487"
;
drivername = WVPCMCI$
maxrequests = 6
maxtransmits = 6
nummulticast = 10
numrxbuffers = 15
```

RPL.MAP

```
; server record fields:
; 1 = yyyyyyyyyyy
; 2 = boot block configuration file (.cnf)
; 3 = number of retries before default boot
; 4 = time window for retries (in seconds)
; 5 = acknowledge (A,N)
; 6 = loader parameters (~ for os2, image share name for↵
 dos)
; 7 = descriptive comment
; 8,9, = ~
; A = ,,,
; B = ~
; C = workstation type; first letter is always R
; D,E = ~
; server records for dos
yyyyyyyyyyy dosbbtr.cnf 3 10 N IBMLAN$ DOS~TOKEN~RING ~↵
 ~ ,,, Z R_DTK ~ ~
yyyyyyyyyyy dosbbtrm.cnf 3 10 N IBMLAN$↵
 DOS~TOKEN~RING~XMEM ~ ~ ,,, Z R_DTKM ~ ~
yyyyyyyyyyy dosbbpc.cnf 3 10 N IBMLAN$ DOS~PCNET ~ ~↵
 ,,, Z R_DPC ~ ~
yyyyyyyyyyy dosbbpcm.cnf 3 10 N IBMLAN$ DOS~PCNET~XMEM↵
 ~ ~ ,,, Z R_DPCM ~ ~
yyyyyyyyyyy dosbbet.cnf 3 10 N IBMLAN$ DOS~IBM~ETHERNET↵
 ~ ~ ,,, Z R_DET ~ ~
yyyyyyyyyyy dosndtr.cnf 3 10 N IBMLAN$↵
 DOS~TOKEN~RING~NDIS ~ ~ ,,, Z R_DTK_NDIS ~ ~
yyyyyyyyyyy dosndet.cnf 3 10 N IBMLAN$↵
 DOS~IBM~ETHERNET~NDIS ~ ~ ,,, Z R_DET_NDIS ~ ~
;yyyyyyyyyyy dosnd3ei.cnf 3 10 N IBMLAN$↵
 DOS~3COM~ETHERLINK~II ~ ~ ,,, Z R_D3CELNK_II ~ ~
;yyyyyyyyyyy dosnd3em.cnf 3 10 N IBMLAN$↵
 DOS~3COM~ETHERLINK~MC ~ ~ ,,, Z R_D3CELNK_MC ~ ~
yyyyyyyyyyy dosncre.cnf 3 10 N IBMLAN$ DOS~NCR~ETHERNET↵
 ~ ~ ,,, Z R_DNCRETH ~ ~
; workstation record fields:
; 1 = adapter id (12 hex digits)
; 2 = workstation name
; 3 = ~
; 4 = image file for dos (.img), fit file for os2 (.fit)
; 5 = name of rpl server
; 6 = boot drive for OS2, domain name for DOS
```

```
; 7,8,9 = parameters for device drivers 1,2,3
; A = additional memory for device drivers 1,2,3.↵
 Default: ,,,
; B = ~ for os2, Z for dos
; C = workstation type; first letter is R -> enabled, D↵
 -> disabled
; D = ~
; E = volumeid string
; default workstation records
08000E22B515 MACH_ID ~ IMAGE IP7450 IP ~ ~ ~ ,,,↵
 Z R_DNCRETH ~ ~ ~
```

IMAGE.DEF (Image Definition File)

```
; Standard IBM DOS LAN Requester Program RIPL image
definition for ; a PC with 3.5" 1.4M A: diskette 3.5/1.4M
?:\IBMLAN\DOSLAN\NET\STDCFG50.SYS CONFIG.SYS
?:\IBMLAN\DOSLAN\NET\STD_AUT.BAT AUTOEXEC.BAT
?:\IBMLAN\DOSLAN\NET\STD_SET.BAT SETENV.BAT
?:\IBMLAN\DOSLAN\NET\INT21USE.COM
?:\IBMLAN\DOSLAN\NET\SMDISP.EXE
?:\IBMLAN\DOSLAN\NET\XSRW.SM
?:\IBMLAN\DOSLAN\NET\NET.COM
?:\IBMLAN\DOSLAN\NET\NETWORK.MSG
?:\IBMLAN\DOSLAN\NET\NETWORK1.CMD
?:\IBMLAN\DOSLAN\DOS\RAMDRIVE.SYS
?:\IBMLAN\DOSLAN\NET\REDIR40.EXE
?:\IBMLAN\DOSLAN\NET\XSI4.EXE
?:\IBMLAN\DOSLAN\NET\CHKDBCS.COM
?:\IBMLAN\DOSLAN\NET\USEWRK.COM
C:\DOS\HIMEM.SYS
C:\DOS\EMM386.EXE
C:\RETAILDD\CDSD.DOS
C:\RETAILDD\MISCDRIV.DOS
C:\RETAILDD\RDISPLAY.DOS
C:\RETAILDD\LINKMAN.DOS
C:\RETAILDD\MFP.DOS
C:\RETAILDD\INPUTSEQ.DOS
C:\RETAILDD\CMOSDRIV.DOS
C:\RETAILDD\OCIA.DOS
C:\RETAILDD\IMSR.DOS
C:\RETAILDD\DSD.DOS
C:\RETAILDD\CONSOLDD.DOS
C:\RETAILDD\CLOCKDD.DOS
C:\RETAILDD\SERIALDD.DOS
C:\RETAILDD\NPOWER.DOS
C:\RETAILDD\PCRS.DOS
C:\RETAILDD\NCRINIT.EXE
```

STDCFG50.SYS (CONFIG.SYS)

```
SHELL=A:\COMMAND.COM /E:2000 /P
LASTDRIVE=~~~~~B
FILES=30
BUFFERS=20
FCBS=16,8
rem DEVICE=A:\RAMDRIVE.SYS 10 128 16 ~~~~~3
rem **** These lines may be added if needed ****
device=c:\dos\ansi.sys
device=c:\dos\setver.exe
device=A:\himem.sys
device=A:\emm386.exe noems
device=c:\dos\ramdrive.sys 1024 /e
dos=high,umb
STACKS=12,300
devicehigh=A:\cdsd.dos /PCOFF
devicehigh=A:\miscdriv.dos
devicehigh=A:\rdisplay.dos
devicehigh=A:\linkman.dos
devicehigh=A:\mfp.dos
devicehigh=A:\inputseq.dos
devicehigh=A:\cmosdriv.dos /NOBLOCK
devicehigh=A:\ocia.dos /UB
devicehigh=A:\imsr.dos /UB
devicehigh=A:\dsd.dos
devicehigh=A:\consoldd.dos /D
devicehigh=A:\clockdd.dos
devicehigh=A:\serialdd.dos
devicehigh=A:\npower.dos
device=A:\pcrs.dos
REM device = a:\protman.dos /i:a:\
REM *** NCR CSMA LAN Driver for 7450 terminals
(Ethernet/StarLAN)
REM device = a:\ncrcsma.dos
```

Explanation of Changes to CONFIG.SYS

The PROTMAN.DOS and NCRCSMA.DOS drivers are installed in the RIPL process and are REMarked out in this CONFIG.SYS file. The RAMDRIVE.SYS line was changed from the original to provide a larger RAM disk. This may or may not be necessary for your configuration. The RAM disk provided in the original command line is sufficient to hold the files that the RIPL process requires.

ETH_AUT.BAT (AUTOEXEC.BAT)

```
@ECHO OFF
REM
REM DOS LAN Requester - Diskless workstation AUTOEXEC.BAT
REM ------------------------------------------------------
CALL SETENV.BAT ~~~~~B
SET PATH=
SET PANS=/L:A:\XSRW.SM
SMDISP  cwsm1 /N %PANS%
IF ERRORLEVEL 1 GOTO OUT
NET START RDR %XSRW% %XSDC% /RPL /WRK:110121101000000↵
 >NUL:
IF ERRORLEVEL 1 GOTO FAILED
ECHO DOS LAN Requester started
GOTO NETUSE
REM Net Start Failed
:FAILED
SMDISP cwse1 %PANS%
GOTO OUT
REM Use Programs Fileset
:NETUSE
SMDISP cwsm2 %PANS%
IF ERRORLEVEL 1 GOTO OUT
:REUSE
INT21USE %XSPD%: %XSRS% >NUL:
IF NOT ERRORLEVEL 1 GOTO END
SMDISP /W:10 cwsw1 %PANS%
IF ERRORLEVEL 1 GOTO OUT
GOTO REUSE
:END
SET PANS=
SET PCLPCVD=C
XSI4
IF ERRORLEVEL 1 GOTO NOVDISK
IF NOT EXIST %PCLPCVD%:\XSCVDSET.BAT GOTO NOVDISK
CALL %PCLPCVD%:\XSCVDSET.BAT > NUL:
:COPYR
COPY %XSPD%:\DOSLAN\NET\XSRW.BAT %PCLPCVD%:\ >NUL:
IF EXIST %PCLPCVD%:\XSRW.BAT GOTO COPYR1
@ECHO COPY XSRW.BAT FAILED, RETRY ...
GOTO COPYR
:COPYR1
COPY %XSPD%:\DOSLAN\NET\XSRW1.BAT %PCLPCVD%:\ >NUL:
IF EXIST %PCLPCVD%:\XSRW1.BAT GOTO CONT
```

```
@ECHO COPY XSRW1.BAT FAILED, RETRY ...
GOTO COPYR1
:CONT
%PCLPCVD%:\XSRW.BAT
GOTO OUT
:NOVDISK
@ECHO NO VDISK DEFINED
:OUT
SET PANS=
```

STD_SET.BAT (SETENV.BAT)

STD_SET.BAT is renamed to *SETENV.BAT* during the image build. *SETENV.BAT* is called by *AUTOEXEC.BAT*.

```
rem Set leaves leading & trailing spaces on the variable.
rem This upsets things like 'copy %xslstd%\x y'. However,
PATH strips them.
rem So pass our tilde things through path!!!
rem
rem Set up Machine Name as field 2 of wksta. rec.
rem
path=~~~~~~~2
SET xsrw=%path%
rem
rem For Default boot, use the adapter ID instead.
rem
IF %xsrw% == DEFAULT GOTO UseAdapterID
IF %xsrw% == default GOTO UseAdapterID
GOTO UseMachineName
:UseAdapterID
path=~~~~~~~~~~~~1
SET xsrw=%path%
:UseMachineName
path=~~~~~~~4
SET xsimage=%path%
path=~~~~~~~5
SET xsrs=%path%
path=~~~~~~~6
SET xsdc=%path%
SET xslstd=%1
IF %1 == D SET xspd=C
IF %1 == E SET xspd=D
IF %1 == F SET xspd=E
IF %1 == G SET xspd=F
IF %1 == H SET xspd=G
IF %1 == I SET xspd=H
IF %1 == J SET xspd=I
IF %1 == K SET xspd=J
IF %1 == L SET xspd=K
IF %1 == M SET xspd=L
IF %1 == N SET xspd=M
IF %1 == O SET xspd=N
IF %1 == P SET xspd=O
```

```
IF %1 == Q SET xspd=P
IF %1 == R SET xspd=Q
IF %1 == S SET xspd=R
IF %1 == T SET xspd=S
IF %1 == U SET xspd=T
IF %1 == V SET xspd=U
IF %1 == W SET xspd=V
IF %1 == X SET xspd=W
IF %1 == Y SET xspd=X
IF %1 == Z SET xspd=Y
path=~~~~~~~C
SET xstype=%path%
```

XSRW.BAT (Diskless Workstation Initialization, Part 1)

XSRW.BAT is called by *AUTOEXEC.BAT*.

```
@ECHO OFF
BREAK OFF
REM DOS LAN Requester - Diskless/Diskette workstation
Initialization
REM ----------------------------------------------------
--
REM Configuration Information
SET PCLPXS=%XSPD%:\DOSLAN\NET
SET DLRDOS=%XSPD%:\DOSLAN\DOS
REM The following two lines should remain consecutive↵
 for upgrade process
SET COMSPEC=%XSPD%:\DOSLAN\DOS\COMMAND.COM
PATH %PCLPCVD%:\;%PCLPXS%;%DLRDOS%
SET ISPPGM=%PCLPXS%\
SET ISPPRO=%PCLPXS%\
SET ISPMSG=%PCLPXS%\
SET CCNF=%ISPPRO%CEIM.CNF
SET XSLCNF=%CCNF%
SET PCLPENV=2000
SET PCLPLANG=US
SET SHELLR=0
REM
REM End of Configurable Parameters; DO NOT CHANGE↵
 BELOW THIS LINE
REM
============================================================
%PCLPXS%\XSI3.EXE
%PCLPCVD%:\XSRW1.BAT
```

XSRW1.BAT (Diskless Workstation Initialization, Part 2)

XSRW1.BAT is called by *XSRW.BAT* .

```
REM DOS LAN Requester-Diskless w/s Initialization↵
 (part 2)
REM ================================================
@echo off
%XSPD%:
CD \DOSLAN\NET
IF NOT %XSTYPE% == RW GOTO DISKBOOT
%PCLPXS%\RPLTERM
:DISKBOOT
%PCLPXS%\XSI2 %XSTYPE% /PSN:%XSRS%
IF ERRORLEVEL 1 GOTO END
IF EXIST %PCLPCVD%:\XSXLN.BAT %DLRDOS%\ATTRIB -R↵
 %PCLPCVD%:\XSXLN.BAT
IF EXIST %PCLPCVD%:\CEIM.CNF %DLRDOS%\ATTRIB -R↵
 %PCLPCVD%:\CEIM.CNF
IF EXIST %PCLPCVD%:\TUT.PRO %DLRDOS%\ATTRIB -R↵
 %PCLPCVD%:\TUT.PRO
IF EXIST %PCLPCVD%:\EIM.PRO %DLRDOS%\ATTRIB -R↵
 %PCLPCVD%:\EIM.PRO
IF EXIST %PCLPCVD%:\ISPD.MSG %DLRDOS%\ATTRIB -R↵
 %PCLPCVD%:\ISPD.MSG
:CPYF1
COPY %PCLPXS%\XSXLN.BAT %PCLPCVD%:\ >NUL:
IF EXIST %PCLPCVD%:\XSXLN.BAT GOTO CPYF2
@ECHO COPY XSXLN.BAT FAILED, RETRY...
GOTO CPYF1
:CPYF2
COPY %PCLPXS%\CEIM.CNF %PCLPCVD%:\ >NUL:
IF EXIST %PCLPCVD%:\CEIM.CNF GOTO CPYF3
@ECHO COPY CEIM.CNF FAILED, RETRY...
GOTO CPYF2
:CPYF3
COPY %ISPPRO%TUT.PRO  %PCLPCVD%:\ >NUL:
IF EXIST %PCLPCVD%:\TUT.PRO GOTO CPYF4
@ECHO COPY TUT.PRO FAILED, RETRY...
GOTO CPYF3
:CPYF4
COPY %ISPPRO%EIM.PRO  %PCLPCVD%:\ >NUL:
IF EXIST %PCLPCVD%:\EIM.PRO GOTO CPYF5
@ECHO COPY EIM.PRO FAILED, RETRY...
GOTO CPYF4
```

```
:CPYF5
COPY %ISPMSG%ISPD.MSG  %PCLPCVD%:\ >NUL:
IF EXIST %PCLPCVD%:\ISPD.MSG GOTO ATTRF
@ECHO COPY ISPD.MSG FAILED, RETRY...
GOTO CPYF5
:ATTRF
%DLRDOS%\ATTRIB +R %PCLPCVD%:\XSXLN.BAT
%DLRDOS%\ATTRIB +R %PCLPCVD%:\CEIM.CNF
%DLRDOS%\ATTRIB +R %PCLPCVD%:\TUT.PRO
%DLRDOS%\ATTRIB +R %PCLPCVD%:\ISPD.MSG
%DLRDOS%\ATTRIB -R %PCLPCVD%:\EIM.PRO
SET ISPPRO=%PCLPCVD%:\
SET ISPMSG=%PCLPCVD%:\
SET CCNF=%ISPPRO%CEIM.CNF
SET XSLCNF=%CCNF%
REM Bring up the Full Screen Interface
rem CLS
rem %PCLPXS%\NET
:END
REM Clear the screen before displaying DOS prompt
CLS
REM NET LOGON GUEST /DOM:IP
@echo on
net logon term1
net use d: windows
net use e: retaildd
net use n: nice
net use h: term1
path=%PATH%;h:\;d:\;e:\;e:\utils;n:\bin;n:\vb
ncrinit
h:
tsr
win /s
```

Explanation of Changes to XSRW1.BAT

The additions at the end of XSRW2.BAT are explained below. These changes represent a *typical* system configuration. Your setup will vary accordingly.

```
@echo on
```

The echo was turned on so the command is displayed before the results of the command are displayed. In each case the result of the command should be "The command completed successfully." The commands are described below:

net logon term1

Using LAN Server User Profile Management Services, the user name TERM1 was created with no password in a group called TERMINAL. The "net logon" command will logon the user. The user could have a profile defined (by running LAN Services - LAN Requester) with file assignments for the user which would accomplish the following "net use" steps, or it can be done here.

If there is more than one workstation in the LAN, and each workstation requires a different type of load, at this point some method would be inserted to determine which workstation is being loaded, and load what was needed for each workstation. This could also be accomplished by having a specific boot image file for each workstation, in which a batch file with a unique name would be substituted for the XSRW1.BAT file.

net use d: windows

This assigns drive D: to the alias WINDOWS. The alias WINDOWS was defined on the server to be the directory and its sub-directories containing a copy of MS Windows. The TERMINAL group was given all access privileges to these directories.

net use e: retaildd

This assigns drive E: to the alias RETAILDD. The alias RETAILDD was defined on the server to be the directory and its sub-directories containing a copy of the retail drivers (G370-0383). The TERMINAL group was given all access privileges to these directories.

net use n: nice

This assigns drive N: to the alias NICE. The alias NICE was defined on the server to be the directory and its sub-directories containing a copy of the Nice Client software (G370-0372). The TERMINAL group was given all access privileges to these directories.

net use h: term1

This assigns drive H: to the alias TERM1. The alias TERM1 was defined on the server to be the directory and its subdirectories containing files which are specific to this terminal. The TERMINAL group was given all access privileges to these directories. Each TERMx user is assigned to the group TERMINAL.

path=%PATH%;h:\;d:\;e:\;e:\utils;n:\bin;n:\vb

This sets the PATH to include the directories assigned above. The H: drive must come before the D: drive so that the Windows files specific to each workstation are used.

ncrinit

This initializes the retail workstation drivers.

h:

This puts us into the HOME directory. This is automatically set if a home directory has been set in the user profile.

tsr

This runs the NICE tsr which provides an interface between the real mode retail workstation drivers and Windows.

win /s

This starts MS Windows in standard mode. If the Program Manager does not need to be used, then the name of the application should be placed in the shell= line of the SYSTEM.INI file (see the last pages of Appendix B in NICE Client Programming Information for C for more details on the use of this line).

Note: These instructions assume that the FAT file system is being used on the server.

Installation of MS Windows is generally described in Appendix B of the *NICE Client Programming Information for C*, ST-2123-00 or *NICE Client Programming Information for Visual Basic*, ST-2123-01.

To load the software, the server should be booted from DOS. All of the software should be placed in the default directories except for DOS. The DOS files should be copied to the directory `C:\IBMLAN\DOSLAN\DOS`.

Use the standard Windows installation, but there should be no need to load any of the utilities programs. When it displays the screen for installation of the utilities, un-check all of the boxes.

A separate directory (the home directory) should be set up for each workstation which will be supported. Within that directory should be the files required by Windows as specified in the section *Setting Up 7450 Release 1.0 Workstations for Windows* (WIN.INI, SYSTEM.INI, PROGMAN.INI, CONTROL.INI, and WIN.COM). Copy these files to each workstation's home directory.

The *.INI files should be edited to change the location of the files which will be loaded. The Windows and NICE Client installations places all of the programs on drive C:, but when the diskless workstation is booting, drive C: is the RAM disk. If the network drive assignments are set in XSRW1.BAT as specified above, the Windows directory will be the root of drive D: and the NICE binaries will be in N:\BIN.

Reference Files for LAN Server 4.0

The following files are those that were used in this chapter. They are for reference only. Lines that were added / modified are in **BOLD.**

DOSCSMA.CNF

```
; DOS Boot Block Configuration (3COM EtherLink II↵
 adapter)
; NDIS LAN Support Program Drivers
BASE 7C0H
RPL DOS\RPLBOOT.SYS
LDR DOS\RPLLOADR.COM ~
DAT DOS\NCRCSMA\PROTOCOL.INI
DAT C:\IBMLAN\DOSLAN\LSP\DXM.MSG
EXE C:\IBMLAN\DOSLAN\LSP\NETBIND.COM ~ ~ ~
;**NETBIOS and IEEE 802.2↵
 ****************************************
;DRV C:\IBMLAN\DOSLAN\LSP\DXMT0MOD.SYS↵
 PBA=0~S=12~ST=12~C=14~O=N ~ ~
;DRV C:\IBMLAN\DOSLAN\LSP\DXME0MOD.SYS ~ 10 ~
;**NETBIOS and IEEE 802.2↵
 ****************************************
;
;**NETBIOS*********************************************↵
 *************
DRV C:\IBMLAN\DOSLAN\LSP\DXMJ0MOD.SYS ~ 17 ~
;**NETBIOS*********************************************↵
 *************
DRV C:\IBMLAN\DOSLAN\LSP\DXMA0MOD.SYS 001 ~ ~
DRV DOS\NCRCSMA\NCRCSMA.DOS ~ ~ ~
DRV C:\IBMLAN\DOSLAN\LSP\PROTMAN.DOS /I: ~ ~
```

PROTOCOL.INI (Ethernet)

```
[PROTMAN]
DRIVERNAME = PROTMAN$
DYNAMIC = YES
PRIORITY = NETBEUI
[BLIM]
DRIVERNAME = BLIMDOS$
BINDINGS = "NCRCSMA"
[NETBEUI_XIF]
Drivername = netbeui$
BINDINGS = "NCRCSMA"
LANABASE = 0
; NCR 7450 NDIS LAN Driver
; This driver supports the following topologies on the
7450
; workstation:
; - 10BASET Ethernet
; - 10BASE2 Ethernet
; - 1BASE5 StarLAN
; - Hubless StarLAN
; drivername NCRCSMA$ NCRCSMA$
; maxrequests 6 1-10
; maxtransmits 6 1-50
; nummulticast 10 5-20
; receivebufsize 256 256-1514
;   ** The remaining parameters are read from RTC
; CMOS on a 7450 workstation **
; lanirq 10 5,10,11,12
; ioportaddress 0x200 0x200, 0x220, 0x240, 0x260,
; 0x280, 0x2a0, 0x2c0, 0x2e0
; ramaddress 0xB000 0xC000, 0xC400, 0xC800, 0xCC00,
; 0xD000, 0xD400, 0xD800, 0xDC00,
; 0xE000, 0xE400, 0xE800, 0xEC00
; linkintegrity on off,on (used only with 10BASET)
[ncrcsma]
drivername = NCRCSMA$
maxrequests = 6
maxtransmits = 6
nummulticast = 10
receivebufsize = 256
```

Note: See *Netbeui Parameters for PROTOCOL.INI* in the Appendix for more information.

PROTOCOL.INI (WaveLAN / PCMCIA)

```
[PROTMAN]
DRIVERNAME = PROTMAN$
DYNAMIC = YES
PRIORITY = NETBEUI
[BLIM]
DRIVERNAME = BLIMDOS$
BINDINGS = "NDIS_MAC"
[NETBEUI_XIF]
DRIVERNAME = netbeui$
BINDINGS = "NDIS_MAC"
LANABASE = 0
[NDIS_MAC]
; NCR 7450 WaveLAN/PCMCIA NCIS Driver
;
; This driver supports the WaveLAN/PCMCIA adapter on↵
 the 7450.
; PARAMETER DEFAULT VALID VALUES
; --------- ------- ------------
; drivername WVPCMCI$ WVPCMCI$
; maxrequests 6 1-10
; maxtransmits 6 1-50
; nummulticast 10 5-20
; numrxbuffers 15 6-32
;
; ** The remaining parameters are read from RTC CMOS on↵
 a 7450 **
; irq 11 5,10,11,12
; ioportaddress 0x300 0x300, 0x310, 0x320,
; 0x330, 0x350, 0x360,
; 0x380, 0x390, 0x3A0
; ramaddress 0xB400 0xB000, 0xB400, 0xC800, 0xCB00,
; 0xCC00, 0xCF00, 0xD000, 0xD300,
; 0xD400, 0xD700, 0xD800, 0xDB00,
; 0xDC00, 0xDF00, 0xE000, 0xE300,
; 0xE400, 0xE700, 0xEB00, 0xEF00
; centerfreq "915" "915", "2412", 2412.5", ..., "2487"
;
drivername = WVPCMCI$
maxrequests = 6
maxtransmits = 6
nummulticast = 10
numrxbuffers = 15
```

RPL.MAP

```
; server record fields:
; 1 = yyyyyyyyyyy
; 2 = boot block configuration file (.cnf)
; 3 = number of retries before default boot
; 4 = time window for retries (in seconds)
; 5 = acknowledge (A,N)
; 6 = loader parameters (~ for os2, image share name for↵
 dos)
; 7 = descriptive comment
; 8,9, = ~
; A = ,,,
; B = ~
; C = workstation type; first letter is always R
; D,E = ~
; server records for dos
yyyyyyyyyyy dosbbtr.cnf 3 10 N IBMLAN$ DOS~TOKEN~RING ~↵
 ~ ,,, Z R_DTK ~ ~
yyyyyyyyyyy dosbbtrm.cnf 3 10 N IBMLAN$↵
 DOS~TOKEN~RING~XMEM ~ ~ ,,, Z R_DTKM ~ ~
yyyyyyyyyyy dosbbpc.cnf 3 10 N IBMLAN$ DOS~PCNET ~ ~↵
 ,,, Z R_DPC ~ ~
yyyyyyyyyyy dosbbpcm.cnf 3 10 N IBMLAN$ DOS~PCNET~XMEM↵
 ~ ~ ,,, Z R_DPCM ~ ~
yyyyyyyyyyy dosbbet.cnf 3 10 N IBMLAN$ DOS~IBM~ETHERNET↵
 ~ ~ ,,, Z R_DET ~ ~
yyyyyyyyyyy dosndtr.cnf 3 10 N IBMLAN$↵
 DOS~TOKEN~RING~NDIS ~ ~ ,,, Z R_DTK_NDIS ~ ~
yyyyyyyyyyy dosndet.cnf 3 10 N IBMLAN$↵
 DOS~IBM~ETHERNET~NDIS ~ ~ ,,, Z R_DET_NDIS ~ ~
;yyyyyyyyyyy dosnd3ei.cnf 3 10 N IBMLAN$↵
 DOS~3COM~ETHERLINK~II ~ ~ ,,, Z R_D3CELNK_II ~ ~
;yyyyyyyyyyy dosnd3em.cnf 3 10 N IBMLAN$↵
 DOS~3COM~ETHERLINK~MC ~ ~ ,,, Z R_D3CELNK_MC ~ ~
yyyyyyyyyyy dosncre.cnf 3 10 N IBMLAN$ DOS~NCR~ETHERNET↵
 ~ ~ ,,, Z R_DNCRETH ~ ~
; workstation record fields:
; 1 = adapter id (12 hex digits)
; 2 = workstation name
; 3 = ~
; 4 = image file for dos (.img), fit file for os2 (.fit)
; 5 = name of rpl server
; 6 = boot drive for OS2, domain name for DOS
```

```
; 7,8,9 = parameters for device drivers 1,2,3
; A = additional memory for device drivers 1,2,3.↵
 Default: ,,,
; B = ~ for os2, Z for dos
; C = workstation type; first letter is R -> enabled, D↵
 -> disabled
; D = ~
; E = volumeid string
; default workstation records
08000E22B515 MACH_ID ~ IMAGE IP7450 IP ~ ~ ~ ,,,↵
 Z R_DNCRETH ~ ~ ~
```

IMAGE.DEF

```
;for 3.5 inch 1.44MB image with full redirector and↵
 High Memory (HIMEM) support
;
;      Standard IBM DOS LAN Services Program RIPL↵
 image definition for a
;      PC with 3.5" 1.4MB A: diskette with full↵
 redirector and HIMEM support.
;      Loading all NCR retail drivers.
;
3.5/1.4M
?:\retaildd\RETAIL.SYS CONFIG.SYS
?:\IBMLAN\DOSLAN\NET\STD_AUT.BAT AUTOEXEC.BAT
?:\IBMLAN\DOSLAN\NET\FULL_NET.INI NETWORK.INI
?:\IBMLAN\DOSLAN\NET\NET.EXE
?:\IBMLAN\DOSLAN\NET\NET.MSG
?:\IBMLAN\DOSLAN\NET\DLSHELP.SYS
?:\IBMLAN\DOSLAN\NET\CONNECT.EXE
?:\IBMLAN\DOSLAN\DOS\HIMEM.SYS
?:\IBMLAN\DOSLAN\DOS\EMM386.EXE
?:\retaildd\cdsd.dos
?:\retaildd\clockdd.dos
?:\retaildd\cmosdriv.dos
?:\retaildd\consoldd.dos
?:\retaildd\dsd.dos
?:\retaildd\imsr.dos
?:\retaildd\inputseq.dos
?:\retaildd\linkman.dos
?:\retaildd\mfp.dos
?:\retaildd\miscdriv.dos
?:\retaildd\npower.dos
?:\retaildd\ocia.dos
?:\retaildd\pcrs.dos
?:\retaildd\rdisplay.dos
?:\retaildd\serialdd.dos
```

RETAIL.SYS (CONFIG.SYS)

```
rem **
rem ** Retail CONFIG.SYS for 7450 Workstation
rem **

rem **** These lines may be added if needed ****
DEVICE=a:\HIMEM.SYS /TESTMEM:OFF
rem DEVICE=a:\ANSI.SYS
rem DEVICE=a:\EMM386.EXE i=C800-E800 x=E800-F000 NOEMS
rem DEVICE=a:\RAMDRIVE.SYS 512 512 64 /E

BUFFERS=15
FILES=30
FCBS=16,8
DOS=HIGH
STACKS=12,300
LASTDRIVE= ~ ~ ~ ~ ~ B

DEVICE=A:\DLSHELP.SYS

rem * ATA Driver: Recovers PCMCIA-ATA card after return↵
 from Standby Mode.
rem DEVICEhigh=a:\ATADRV.DOS

rem * Common Driver Services Driver: Used by other 7450↵
 drivers.
DEVICEhigh=a:\CDSD.DOS /PCOFF

rem * Enhanced Clock Driver: Adds TAPS interface.
DEVICEhigh=a:\CLOCKDD.DOS

rem * CMOS Totals Memory Driver
DEVICEhigh=a:\CMOSDRIV.DOS /APPDATA:2048

rem * Enhanced Console Driver: Keyswitch, keyboard input↵
 sequencing,
DEVICEhigh=a:\CONSOLDD.DOS /D

rem * Diagnostics Services Driver: Logs, tallies,↵
 tracing.
DEVICEhigh=a:\DSD.DOS
```

```
rem * Integrated MSR Driver.
DEVICEhigh=a:\IMSR.DOS /UB

rem * Input Sequencer: Sequence keyboard, ocia, msr,↵
 other input.
DEVICEhigh=a:\INPUTSEQ.DOS /T

rem * RS485 Link Manager: Required by printer driver.
DEVICEhigh=a:\LINKMAN.DOS

rem * Retail Printer Driver: 7150/7155/7156/7193 support.
DEVICEhigh=a:\MFP.DOS /P:1 /W:0

rem * Retail Printer Driver: 7192 only.
rem DEVICEhigh=a:\mfp7192.dos

rem * Miscellaneous Driver: Speaker, cash drawer.
DEVICEhigh=a:\MISCDRIV.DOS

rem * Power Controlled Recovery Driver: Main portion↵
 (can) be loaded in UMBs).
DEVICEhigh=a:\NPOWER.DOS

rem * OCIA Driver.
DEVICEhigh=a:\OCIA.DOS /UB

rem * Power Controlled Recovery Driver: Conventional↵
 memory portion.
DEVICE=a:\PCRS.DOS

rem * Remote (Customer) Display Driver.
DEVICEhigh=a:\RDISPLAY.DOS /D40 /P:1

rem * Remote MSR (MSR 4430) Driver.
rem DEVICEhigh=a:\rmsr.dos

rem * Serial Driver: Interrupt driven I/O.
DEVICEhigh=a:\SERIALDD.DOS /TALLYMAX

SHELL=A:\COMMAND.COM /E:2000 /P
```

STD_AUT.BAT (AUTOEXEC.BAT)

```
@echo off
prompt $P$G

cls
@echo   ÚÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ¿
@echo   ³                       ³
@echo   ³                       ³
@echo   ³          Starting the NETWORK        ³
@echo   ³                       ³
@echo   ³                       ³
@echo   ÀÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÙ

NET START

rem Call "CONNECT.EXE drive server machine" to connect↵
 to the RIPL Server.
rem
rem "drive" is connected to \\server\ibmlan$$
rem "drive-1" is connected to \\server\wrkfiles

cls
@echo   ÚÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ¿
@echo   ³                       ³
@echo   ³                       ³
@echo   ³     Connecting to the RIPL Server    ³
@echo   ³                       ³
@echo   ³                       ³
@echo   ÀÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÙ

connect ~~~~~B ~~~~~~~~~~~~~~~5 ~~~~~~~~~~~~~~~2↵
 ~~~~~~~~~~~~~~~6

rem   CALL "RIPL.BAT LASTDRIVE"

path=~~~~~B
%path%:\DOSLAN\NET\RIPL.BAT ~~~~~B ~~~~~~~C
```

RIPL.BAT

```
set path=%1:\DOSLAN\NET;%1:\DOSLAN\DOS;
set comspec=%1:\DOSLAN\DOS\COMMAND.COM

%1:
CD DOSLAN\NET

if not %2 == RW GOTO DISKBOOT
%1:\DOSLAN\NET\RPLTERM
:DISKBOOT

rem pause
@echo on
rem NET LOGON *
y:
retail.bat
```

Explanation of Changes to RIPL.BAT

The additions at the end of RIPL.BAT are explained below. These changes represent a *typical* system configuration. Your setup will vary accordingly.

rem Net LOGON *

The logon command is moved to RETAIL.BAT so that each workstation has their own Logon ID automated.

y:

Change to the y: drive that was created during the CONNECT command done in *AUTOEXEC.BAT*. This drive points to the `\\SERVERNAME\WRKFILES` shared resource. The directory corresponds to the `C:\IBMLAN\RPLUSERS\MACH_ID` directory on the server.

retail.bat

The batch file that is created and placed in the `C:\IBMLAN\RPLUSERS\MACH_ID` directory on the server.

RETAIL.BAT

```
NET LOGON TERM1
net use r: \\SERVER_NAME\RETAILDD
r:\
ncrinit
```

Explanation of RETAIL.BAT

net logon term1

Using LAN Server User Profile Management Services, the user name TERM1 was created with no password in a group called TERMINAL. The `"net logon"` command will logon the user. The user could have a profile defined (by running LAN Services - LAN Requester) with file assignments for the user which would accomplish the following `"net use"` steps, or it can be done here.

If there is more than one workstation in the LAN, and each workstation requires a different type of load, at this point some method would be inserted to determine which workstation is being loaded, and load what was needed for each workstation.

net use r: retaildd

This assigns drive E: to the alias RETAILDD. The alias RETAILDD was defined on the server to be the directory and its sub-directories containing a copy of the retail drivers (G370-0383). The TERMINAL group was given all access privileges to these directories.

path=%PATH%;r:\;r:\utils

This sets the PATH to include the directories assigned above. The H: drive must come before the D: drive so that the Windows files specific to each workstation are used.

ncrinit

This initializes the retail workstation drivers.

Chapter 10

Novell LAN Loading

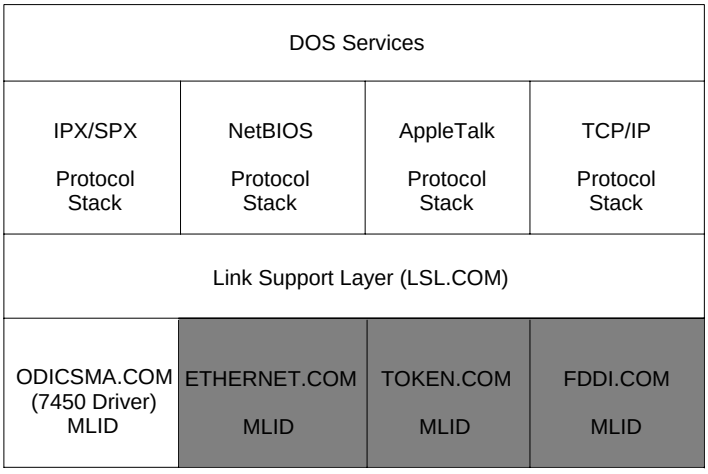
Overview

This chapter provides procedures to perform a system load to 7450 disk-based workstations from a Novell server. Novell system administration knowledge is assumed.

Topics in this chapter include:

- Installing the 7450 ODI Driver
- Installing the ODI Retail Value-Add Device Driver
- Performing the system load

The 7450 Open Data Link Interface (ODI) driver conforms to the Netware® ODI specification. The key elements of the ODI specification are illustrated below.



12378

The ODI specification permits multiple network protocols and LAN adapters (physical boards) to be used concurrently on the same workstation or file server. ODICSMA.COM is the 7450 ODI device driver.

Netware® Shell Workstation Environment

The key components of the Netware shell workstation environment are four terminate-and-stay-resident (TSR) programs:

- LSL™ (Link Support Layer™)
- OCICSMA.COM (7450 ODI network board driver)
- IPXODI (IPX Protocol Stack)
- VLM.EXE (DOS Requester) or NETX.EXE (Network Shell)

Only the 7450 ODI driver is supplied by NCR. The other components should be ordered directly from Novell or through a third party.

Note: The 7450 ODI driver requires LSL, Version 2.11 (or later).

Installing the 7450 ODI Driver

This procedure installs the 7450 ODI Driver and associated Novell terminate-and-stay-resident programs (TSRs).

Note: The install program uses the DOS *xcopy* command. Make sure this command is in your system path.

1. Insert the following diskette into the 7450:

   Novell Support for DOS Client
   (LPIN: G370-0657-0000)

2. Enter the installation command.

   ```
   a:\install
   ```

3. Use an ASCII editor to modify the *autoexec.bat* file. Add the following line:

   ```
   C:\NWCLIENT\START657.BAT
   ```

   This *start657.bat* file loads the ODI Driver and TSRs in their proper sequence.

   Start657.bat

   ```
   cd \nwclient
   lsl.com /C=NET657.CFG
   odicsma.com
   ipxodi.com
   vlm.exe
   cd \
   ```

Each of the TSRs can be *Unloaded* simply by using the *U* switch in the command line.

Example: `vlm.exe u`

The TSRs must be *Unloaded* in the reverse order that they were installed. They can be re-loaded from the command line.

Example: `vlm.exe`

Net657.cfg Configuration File

The 7450 ODI driver uses the information stored in the configuration file *NET657.CFG* to set initialization parameters.

Note: The IRQ, PORT, and MEM parameter information in the configuration file is ignored on 7450 workstations. On 7450s, the 7450 ODI driver obtains its IRQ, PORT, and MEM information from CMOS.

A sample *NET657.CFG* file is listed below. Since all of the LINK ODICSMA parameters are optional, they have been commented out.

Sample NET657.CFG File

```
;
;7450 ODI Driver (ODICSMA.COM) Section.  This is an ODI
;DOS Client Driver written to ODI Driver Sepcification
;Version 4.0.
;
LINK DRIVER ODICSMA
;
;The 7450 ODI Driver obtains its irq, port and
;mem from CMOS.  These values can be changed via
;Level 1 Configuration Setup on the 7450.
```

```
; irq=10                ;5
                        ;10 Default
                        ;11
                        ;12

; port=200              ;200 Default
                        ;220
                        ;240
                        ;260
                        ;280
                        ;2A0
                        ;2C0
                        ;2E0
; mem=B0000             ;B0000 Default
                        ;B4000
                        ;C8000
                        ;CC000
                        ;D0000
                        ;D4000
                        ;D8000
                        ;DC000
                        ;E0000
                        ;E4000
                        ;E8000
                        ;EC000

; frame=Ethernet_802.2  ;Ethernet_802.2 Default
                        ;Ethernet_802.3
                        ;Ethernet_II
                        ;Ethernet_SNAP

; Receivebufsize=256    ;size (in bytes) of each receive
                        ;buffer. Valid values are
                        ;256-1514. The default is 256.

; lanpacer              ;for non-7450 AT LANPACER Adapter
                        ;support. The default is 7450 POS
                        ;LANPACER.
```

Installing the ODI Retail Value-Add Device Driver

The purpose of the ODI Retail Value-Add Device Driver (ODIVALUE.DOS) is to permit the 7450 ODI driver to communicate with other 7450 retail device drivers to achieve power management, error logs, tallies and tracing.

Note: The 7450 ODI driver functions properly in a Netware DOS Client environment without the ODIVALUE.DOS driver, however, no ODI Retail Value-Adds are supported.

Specify *ODIVALUE.DOS* in *CONFIG.SYS* as follows:

```
DEVICE=[drive:]\[path]\ODIVALUE.DOS
```

[drive:][path] – is the disk drive and directory path of the ODIVALUE.DOS file.

Performing the System Load

Configuring the 7450 Workstation for a Novell Download

Perform the following for each of the workstations:

1. Turn the Keylock to the *Ex* position and boot the workstation.
2. At the main menu, select *CONFIGURATION*
3. Select *CHANGE PARAMETERS.*
4. Follow the menus to *LAN Load Type* and select *Novell RLP*.
5. Make sure the 7450 is setup to perform a network boot.

   7450 Release 1.x
   - Disable any bootable hard drives (set the *Type* to *00)*.
   - Remove any flex disks or PCMCIA cards

   7450 Release 2.x
   - Remove any PCMCIA cards
   - Follow the menus to *LOAD SEQUENCE* and set the sequence to cause the 7450 to look for a *NETWORK* boot as the first bootable device.
6. Exit the configuration menus. *Configuration Setup* may require a reboot, depending on what parameters were changed.
7. Select *Load Program* from the Main Menu.

Note: If WaveLAN and Ethernet/StarLAN ROMs are both present in the 7450, and booting from Ethernet/StarLAN is desired, the WaveLAN Load Type must be set to *None*. Also, if this is not done, the ROMs can not be mapped out to free up address space.

For more information about configuring the 7450, see the *Configuration Setup* chapter in the *7450 Hardware Installation and Service* book, ST-2122-17.

Touch Screens

Before a LAN load is requested from the server, the user is prompted to press any key on the workstation. Touch input is not accepted. If a secondary keyboard is not present, the user must wait for the 30-second time-out period before the load process begins.

System Initialization

The retail device drivers are installed as the system boots, according to how you have configured your *config.sys* file. Each driver displays a version banner as it loads, however, no initialization is performed at this time. The *ncrinit* program initializes the drivers.

Refer to *NCR 7450 and 705x Programming Information* (ST-2122-18) or *NCR 7450 and 705x Programming Windows Help* (D9-0169-A) for programming information to develop your retail application. See the *Installable Device Drivers* chapter in this book, for information on installing specific 7450 device drivers.

Chapter 11

PCMCIA Load

Overview

This chapter provides procedures for performing an *PCMCIA Flash Card System Load* on the workstations.

Topics in this chapter include:

- Creating a Boot Block
- Configuring the Workstation for PCMCIA Load
- Performing a PCMCIA System Load

This scheme is used when you want to boot the application locally from the 7450's PCMCIA Card interface.

Creating a PCMCIA Boot Card

To create a *PCMCIA Flash Boot Card* you first build a *bootable* floppy diskette which has all of the necessary files on it to load the workstation. The files are then compressed into an image and copied to a flash memory card using the *flashutl* utility.

Note: These procedures assume you are using a development system as discussed in chapter 2, *Software Installation: Development System* to create the bootable diskette.

You also need the following in order to create the boot card.

- System that has PCMCIA flash card capabilities (disk-based 7450 workstation).
- Copy of the *7450 Flash Load Support for DOS* utilities, LPIN G370-0440-0000.

Creating the Bootable Diskette

1. Use the DOS *format* command to create a bootable diskette:

```
format a: /u /s
```

Creating the AUTOEXEC.BAT and CONFIG.SYS Files

2. Use an ASCII editor to create a *autoexec.bat* file for the diskette.

Caution: Make sure you create the file on drive a. Your system very likely already has an *autoexec.bat* file on drive c. Failure to select drive a will overwrite the current file on drive c.

3. Enter the appropriate lines in the file according to your system requirements.

Example: *autoexec.bat*

```
set lib=a:\libs
set include=a:\include
a:\ncrinit
```

4. Close and save the file.

5. Create a *config.sys* file in the same manner as the *autoexec.bat* file as required to support your system.

Example: *config.sys*

```
device=a:\himem.sys
device=a:\emm386.exe noems X=E000-E7FF
```

Note: E000-E7FF is the default PCMCIA window. See the memory map at the front of the *Installable Device Drivers* chapter.

```
device=a:\ramdrive.sys 512 512 64 /e
```

```
buffers=15
files=30
DOS=HIGH,UMB
STACKS=12,300
devicehigh=a:\cdsd.dos     /PCOFF
devicehigh=a:\miscdriv.dos
devicehigh=a:\rdisplay.dos
devicehigh=a:\linkman.dos
devicehigh=a:\mfp.dos
devicehigh=a:\inputseq.dos
devicehigh=a:\cmosdriv.dos /APPDATA:2048
devicehigh=a:\ocia.dos     /UB
devicehigh=a:\imsr.dos     /UB
devicehigh=a:\dsd.dos
devicehigh=a:\consoldd.dos /D
devicehigh=a:\clockdd.dos
devicehigh=a:\serialdd.dos
```

Copying the Retail Device Drivers to Diskette

6. Copy the appropriate Retail Device Drivers to the diskette.

```
copy c:\retaildd\dsd.dos a:
copy c:\retaildd\cdsd.dos a:
copy c:\retaildd\clockdd.dos a:
copy c:\retaildd\cmosdriv.dos a:
copy c:\retaildd\consoldd.dos a:
copy c:\retaildd\imsr.dos a:
copy c:\retaildd\inputseq.dos a:
copy c:\retaildd\linkman.dos a:
copy c:\retaildd\miscdriv.dos a:
copy c:\retaildd\mfp.dos a:
copy c:\retaildd\ocia.dos a:
copy c:\retaildd\rdisplay.dos a:
copy c:\retaildd\serialdd.dos a:
```

Copying the Application and System Files to Diskette

7. Copy the appropriate system files to the diskette.

```
copy c:\dos\himem.sys a:
copy c:\dos\ramdrive.sys a:
copy c:\dos\emm386.exe a:
```

8. Copy your retail application and all other required DOS files to the diskette.

Creating the Boot Block Image

1. Insert the following diskette:

   7450 Flash Load Support for DOS
   (LPIN: G370-0440-0000)

2. Enter the installation command and follow the screen prompts.

   ```
   a:\install
   ```

   The install batch file copies all of the files from the diskette to the proper directories on drive c.

3. Change directory to:

   ```
   c:\retaildd\utils
   ```

4. Enter the following command:

   ```
   pcmcia
   ```

   The program prompts you to insert the boot diskette.

5. Insert the boot diskette and press *[Enter]*. The program creates a boot image, named *pcmcia.bbk*, and places it in the current directory on drive c.

   At the completion of this program, the boot image (*pcmcia.bbk)* resides in the current directory.

```
c:\retaildd\utils
```

6. Enter the following command:

   ```
   flashutl
   ```

7. From the menu, select:
   1. Create a load card

8. Insert a flash card into the PCMCIA connector and press any key to continue. The next screen prompts you for the path of the boot image file. Press ENTER.

9. Select the boot image file (PCMCIA.BBK) and press ENTER. The flash card is erased and the new image file is written to the flash card.

Error Messages

`ERROR - No more space on card`

Meaning: – A larger memory card is needed to accommodate the size of the boot block image.

`ERROR - Write to card failed`

Meaning: – A hardware failure occurred on the card.

Action: – Replace the card

`ERROR - Cannot erase card`

Meaning: – A hardware failure occurred on the card.

Action: – Replace the card

`ERROR - Unknown card type`

Meaning: – Card is not compatible with FLASHUTL.EXE.

ERROR - Card was removed

Meaning: – The card was removed from the socket during a read or write operation.

ERROR - Card is write protected

Meaning: – The write protect switch on the memory card must be disabled in order to determine the card type or to modify its contents.

ERROR - PCMCIA Window Conflict

Meaning: – An upper memory block conflict has occurred.

Action: – Verify that an external ROM is not present at the card_seg location indicated in FLASHUTL.INI. Also, make sure the UMB location is excluded by the EMM386 driver.

ERROR - RAM Cards not supported

Meaning: – Memory dump functionality is only supported on Flash memory cards.

ERROR - Internal PCMCIA card not found

Meaning: – A PCMCIA card was not detected in the socket indicated.

Performing a PCMCIA System Load

Configure each of the 7450 Workstation for a PCMCIA Load.

1. Boot the workstation.
2. At the main menu, select *Configuration*.
3. Follow the menus to *PCMCIA* and select *ENABLE SOCKET 1*.
4. Select an address that does not conflict with any other devices.
5. Exit the configuration menus, and reboot the workstation.
6. Insert the bootable PCMCIA card.
7. After the reboot, Select *Load Program*.

Chapter 12

Installable Device Drivers

Retail Device Drivers

All retail device drivers can be installed in upper memory (above 640 KB) except for *PCRS.DOS*. The following illustration presents the upper memory area of the 7450 system. Use the map on the left if you are using a CRT, or the map on the right if you are using a 2x20 operator display. If you are using the Phar Lap memory extender, the memory above 1 MB is available for use by the applications. The area from C8000 up to F0000 is open for drivers in varying degrees depending on what communication method you use.

Address	RUN TIME MAP (CRT)	Open for Drivers	RUN TIME MAP (2 X 20)	Open for Drivers
F0000	PC-BIOS		PC-BIOS	
E8000	Free	up to 160 K	Free	up to 320 K
E0000	PCMCIA #1 if used as boot method, or free		PCMCIA #1 if used as boot method, or free	
D0000	Third Party ROMs, 2nd COMM Board, or Free		Third Party ROMS, 2nd COMM Board, or Free	
C8000	Shared RAM		Shared RAM	
C0000	VGA BIOS | Free if Code | CGA	64 K if using CGA	Free	
B8000	VGA Screen | Free if Memory | CGA		Free	
B0000	Free	32 K	Free	
A0000	Enhanced ROM VGA BIOS Data		Free	

LAN RAM may be in B000-EFFF. Ethernet / StarLAN uses 16K window for Shared RAM.
WaveLAN / PCMCIA uses a 4K RAM window. These are configurable through *Config Setup*. VGA area is not used on 2 x 20 only systems.

Note: Make sure `STACKS=12,300` is located in the *config.sys* file.

Installing the Common Device Services Driver (CDSD)

The CDS driver is an installable driver. In order to use the CDS driver, you must have the following command line in your *config.sys* file. Provided in your software package is a default *config.sys* file called *config.tmp* which contains sample (default) command lines for the drivers. Check that file for a default command line for this driver.

```
DEVICE=[d:][path]CDSD.DOS[/SEM:x][/PCOFF][/VDM][/PC]
```

[d:][path] – is the drive and directory path containing the CDSD.DOS file

/SEM:x – specifies the number of system semaphores available. A value of 0 disables system semaphores. The default is 8. In a multi-tasking environment, the OCIA driver uses semaphores to protect against two tasks trying to access the OCIA hardware at the same time. Therefore, it is not a good idea to completely disable semaphores.

/PCOFF – specifies that standard PC handling of the OFF switch should be used. This means that when the OFF switch is pressed, the workstation is powered off regardless of the keylock position. If this option is not specified, secure mode OFF switch handling is used and the workstation is only powered OFF if the keylock is in the S (supervisor) position.

/VDM – permits the driver to run in an OS/2 2.1 VDM session. You MUST use this parameter when running OS/2. When this parameter is used the CDSD driver must be the LAST device driver listed in the *DOS_DEVICE* entries, in the DOS Settings window of the VDM setup.

/PC – permits the CDSD.DOS driver to install on a

PC. If this options is not used on a PC, the driver will not install and error CDS005 will be displayed.

Note: The CDSD driver must be present in the *config.sys* file in order to use any of the other retail device drivers.

Note: The CDSD driver can NOT be loaded via *loaddev*. It must be loaded in *config.sys* in order to take advantage of the STACKS parameter.

Successful Load Message

When the Common Device Services Driver is installed, the following message is displayed.

```
NCR 7450 RELEASE 2.01.01
Common Driver Services Driver Revision A
CDS$ loaded.
```

Error Messages

`CDS001: Invalid command line format`

Meaning: – A command line option used invalid syntax.

`CDS002: Unknown option`

Meaning: – A command line option used invalid syntax.

`CDS003: No value specified`

Meaning: – There is no value specified for the command line option.

`CDS004: Invalid character in numeric`

Meaning: – A value for the command line is invalid.

`CDS005: Not a retail terminal`

Meaning: – The workstation is not an NCR 7450.

NCRINIT Messages

When *ncrinit.exe* is run to initialize the drivers, the CDSD driver may display one of the following warning messages.

`WCDSI_SEM_DEFAULT_CL`

Meaning: – An error on the CDSD.DOS command line occurred. The number of available semaphores was set to the default of 8.

Action: – Correct the error in the CDSD.DOS command line. The proper syntax for the semaphore option is "DEVICE=CDSD.DOS /SEM:#".

`WCDSI_SEM_DEFAULT_MEM`

Meaning: – There is not enough memory available to allocate the number of semaphores requested on the CDSD.DOS command line. The number of available semaphores was reduced to the default 8.

Action: – Reduce the number of semaphores requested to the minimum required by your configuration. If CDSD.DOS is being loaded into an Upper Memory Block using 'DEVICEHIGH=", either load it into conventional memory using "DEVICE=" or use the "SIZE=#" option of DEVICEHIGH to allocate extra upper memory for the semaphores.

WCDSI_SEM_DISABLED

Meaning: – There is not enough memory to allocate the system semaphore structures. Semaphore support has been disabled. The system is still operational but problems can occur if a multitasking shell is used.

Action: – If CDSD.DOS is being loaded into an Upper Memory Block using 'DEVICEHIGH=", either load it into conventional memory using "DEVICE=" or use the "SIZE=#" option of DEVICEHIGH to allocate extra upper memory for the semaphores.

Installing the Time / Date Driver (CLOCKDD)

The Time and Date driver is an installable driver. In order to use the Clock driver, you must have the following command line in your *config.sys* file.

```
DEVICE=[drive:][path]CLOCKDD.DOS
```

[drive:][path] – is the disk drive and directory path where the CLOCKDD.DOS file is located.

Note: Do not use this driver if you are running in an OS/2 2.1 VDM session.

Successful Load Message

When the Time / Date Driver is installed, the following message is displayed.

```
NCR 7450 RELEASE 2.01.01
Clock Driver Revision A
CLOCK$ loaded.
```

Error Messages

`CLK001: Invalid command line format`

Meaning: – Command line options used invalid syntax.

`CLK002: Unknown option`

Meaning: – One of the command line options was invalid.

`CLK003: Unable to isolate DOS driver`

Meaning: – The standard DOS clock driver, CLOCK$, could not be found in the driver chain.

NCRINIT Messages

When *ncrinit.exe* is run to initialize the driver, no Time / Date Driver error messages are displayed.

Installing the CMOS Driver (CMOSDRIV)

The CMOS memory is accessed through two device drivers, a character driver called *CMOS* to access both the system and application data areas, and a block driver to access the file data area. The drive specification for the block driver is determined by DOS when the driver is initialized. The drivers are installable and are contained in one module. To use them you must have one of the following command lines in your *config.sys* file. Provided in your software package is a default *config.sys* file called *config.tmp* which contains sample (default) command lines for the drivers. Check that file for a default command line for this driver.

```
DEVICE=[drive:][path]CMOSDRIV.DOS/APPDATA:xxxx]↵
 [/NOBLOCK][/NOSUMCHECK][/VDM]
```

[drive:][path] – The drive and directory path containing the CMOS driver file.

/APPDATA:xxxx – The /APPDATA parameter determines the amount of space to allocate between the CMOS application data area and the CMOS file data area. The xxxx specifies the decimal number of bytes (including sumcheck bytes) to be allocated to the application data area when a file area format is issued. The actual number of bytes formatted is rounded up to the nearest multiple of 128. If no parameter is given for /APPDATA, the default is to allocate the maximum space possible for the application area, leaving no space for the file data area. To allocate all of the application area for a file area, specify /APPDATA:0.

The /APPDATA parameter does not change anything until the file data area is formatted through the CMOS character driver.

/NOBLOCK – The /NOBLOCK parameter tells the CMOS driver to not install the CMOS block device. Using this parameter frees a drive letter when CMOS is not used for file access.

/NOSUMCHECK – This parameter disables sumchecking across the system data area and the application/file data areas. Omitting this parameter enables sumchecking as in previous releases of TAPS.

/VDM – The VDM parameter permits the driver to run in an OS/2 2.1 VDM session. The parameter disables the CMOS block driver. You MUST use this parameter when running OS/2.

If the block driver is to be used, the CMOS file data area must contain a minimum size of 640 bytes. If less than 640 bytes is allocated to the file area, the Format sets the file size area to zero.

Note that if you change the /APPDATA parameter, reload the workstation, and then format the file area, you may lose some of the your data in the application data area of CMOS. This is because the size of the file data area and the application data area sizes float depending on the value of the /APPDATA parameter.

The CMOS drivers require the services of the Common Driver Services (CDS) driver in order to provide system services to other drivers.

The CMOS drivers also require the services of the Diagnostic Services Driver (DSD) to perform error logging. If the DSD is not installed, the CMOS driver continues to operate normally minus error logging and tallies.

Successful Load Messages

When the CMOS Driver is installed, the following message is displayed.

```
NCR 7450 RELEASE 2.01.01
CMOS Character Driver Revision A
CMOS Loaded
NCR 7450 RELEASE 2.01.01
NCR CMOS Block Driver Revision A
CMOSBLK loaded.

    Drive Letter: x
    Disk Size: xxK
    Sector Size: 128 bytes
    Allocation Unit: 1 sector
    Directory Entries: 16
```

Note: The CMOS block device is not compatible with DOS's *Smartdrive*. *Smartdrive* is unable to handle the 128-byte sector size used by the CMOS block device. In order to use the CMOS block device, you must make one of the following changes:

- Remove smartdrive completely
- Disable smartdrive caching of the CMOS block device. Do this by using the minus option on the end of the smartdrive device specification in your *config.sys* file as follows:

  ```
  Device=C:\windows\smartdrv.exe D-
  ```

  . . . where *D* is the drive letter assigned to the CMOS block device and displayed when the device is installed.

- Change the smartdrv *elementsize* to 2048 (or less). Do this by using the /E option on the smartdrive device specification in your *config.sys* file as follows:

  ```
  Device=C:\windows\smartdrv.exe /E:2048
  ```

  The *elementsize* value must be a power of 2 (i.e. 512, 1024, 2048, etc.).

Error Messages

`CMOS001 Invalid CMOS Header`

Meaning: – The CMOS Header may have been destroyed.

Action: – Reinitialize CMOS through Configuration Setup. If that doesn't fix the problem, replace the Retail Board.

`CMOS002 No Retail Board Present`

Meaning: – There is no Retail Board installed.

`CMOS003 Unknown terminal type`

Meaning: – The loader is unable to determine if the workstation is an NCR 7450.

`CMOS004 Invalid command line format`

Meaning: – The command line option has invalid syntax.

`CMOS005 Unknown option`

Meaning: – One of the command line options is invalid.

`CMOS006 No value specified`

Meaning: – There is no value specified for one of the command line options.

`CMOS007 Invalid character in numeric`

Meaning: – A value for the command line option is incorrect.

`CMOS008 /APPDATA invalid without block driver`

Meaning: – You have used both the /NOBLOCK option (or /VDM) and the /APPDATA option in the command line. Use only one.

NCRINIT Messages

When *ncrinit.exe* is run to initialize the drivers, the CMOS Driver may display one of the following warning messages:

`WCMOSI_OUT_OF_BOX`

Meaning: – A CMOS "out-of-box" condition was detected at driver load time. All system area CMOS was cleared.

It is important to know that the size and the contents for the CMOS block driver are not modified by the *config.sys* setting during a DOS LOAD. This is necessary to prevent a diagnostic load from possibly using a different boundary setting and corrupting the contents of the CMOS drive.

Therefore, the application must use the character driver interface to format the block driver. By choosing this scheme, there are a number of possible scenarios whenever the block driver is formatted based on what the *config.sys* command line for the CMOSDRIV.DOS driver is set to and the current state of the block drive. The following table shows these conditions

config.sys entry	Out-of-box	Format when CMOS block driver is present	CMOS when block driver is NOT present
`DEVICE=CMOSDRIV.DOS /APPDATA:####`	#### bytes (rounded up) are reserved for the Application Data Area. The remaining space is reserved for the block device.	#### bytes (rounded up) are reserved for the Application Data Area. The remaining space is reserved for the block device. This results in the previous boundary being changed yielding a WCMOS_SIZE_CHANGED warning if the value #### was modified in *config.sys* between formats or if the /APPDATA:0 parameter was in effect during the last format.	#### bytes (rounded up) are reserved for the Application Data Area. The remaining space is reserved for the block device. This results in the previous boundary being changed yielding a WCMOS_SIZE_ CHANGED warning
`DEVICE=CMOSDRIV.DOS /APPDATA:0`	All of the Application Data Area is formatted as a block device.	All of the Application Data Area is formatted as a block device. This results in the previous boundary being changed, yielding a WCMOS_SIZE_CHANGED warning if the /APPDATA:#### parameter was in use during the previous format	All of the Application Data Area is formatted as a block device. This results in the previous boundary being changed, yielding a WCMOS_SIZE_ CHANGED warning.
`DEVICE=CMOSDRIV.DOS`	0 bytes of the Application Data Area are reserved as a block device.	0 bytes of the Application Data Area are reserved as a block device. This results in the previous boundary being changed, yielding a WCMOS_SIZE_CHANGED warning	0 bytes of the Application Data Area are reserved as a block device.

Installing the Console Driver (CONSOLDD / CONSOLEW)

The Console driver is an installable driver. To use the TAPS interface to the keyboard and the operator display (CRT, LCD, DynaKey, or 2x20), you must have the following command line in your *config.sys* file. Provided in your software package is a default *config.sys* file called *config.tmp* which contains sample (default) command lines for the drivers.

Standard 7450 Console Driver (CONSOLDD)

```
DEVICE=[drive:][path]CONSOLDD.DOS [/D][/NOCLICK]↵
[/NOSAVE][/NOLOWPWR][/SWAP][/TOUCH][/VDM][/WIN][/NOLOCK]
```

Wedge Console Driver (CONSOLEW)

```
DEVICE=[drive:][path]CONSOLEW.DOS [/D][/NOCLICK]↵
[/NOSAVE][/NOLOWPWR][/SWAP][/TOUCH][/ACD][/TELEPHONE]↵
[/WIN][/NOLOCK]
```

Note: The Console Driver requires the services of the Miscellaneous driver to provide key clicks. Consequently, to receive key clicks, you must also have the following line in your *config.sys* file:

```
DEVICE=[drive:][path]MISCDRIV.DOS
```

Command Line Options

[drive:][path] – is the disk drive and directory path where the CONSOLDD.DOS file is located.

/D – controls the effect of a keystroke which takes place when the screen is blank. Normally, the application accepts the keystroke, then unblanks the display device. With the /D option enabled, the application drops the keystroke, but still unblanks the screen.

/NOCLICK – Sets the intial keyclick mode to

KBD_DISABLE_CLICK. The default is KBD_ENABLE_CLICK

/SWAP – determines the format of keyboard data that is read from the Input Sequencer using the IS_READ TAPS command. Data from the keyboard is 2 bytes long. By default, the first byte is the scan code and the second byte is the key code. If the /SWAP option is used, the key code is returned first followed by the scan code.

/NOSAVE – indicates that the default screen save mode should be SCR_DISABLE. If /NOSAVE is not used, the default mode is SCR_BLANK. Regardless of the default screen save mode chosen, the current screen save mode can always be modified using the SCR_SAVE_MODE TAPS command.

Note: If screen blanking is enabled, CRT screen blanking occurs after 5 minutes. LCD (Touch/ DynaKey) occurs after 30 minutes.

Caution: When the retail device driver screen saver is used running under Windows, the operator display cannot be unblanked by keyboard input. Windows hooks the keyboard interrupt and doesn't pass it down the chain. Use the */NOSAVE* option when running under Windows, or take the appropriate actions within your application.

/VDM – permits the driver to run in an OS/2 2.1 VDM session. You MUST use this parameter when running OS/2. Be aware that the Partial Scroll ANSI escape sequence is inoperable under OS/2.

Note: The TAPS keyboard commands, KBD_READ_ID, KBD_LOCK, and KBD_CONFIG are not supported in VDM sessions. These commands return EKBD_NO_FEATURE.

/TOUCH – enables screen save control in response to *touch* input. When this option is used, the console driver unblanks the screen when touch input is received, and discards the associated touch data. This option is only supported if a touch driver supporting the Application Pointing Device Interface (APDI) is present. Also, if the screen save mode is disabled using either the */NOSAVE* option or the *SCR_SAVE_MODE* TAPS command, the */TOUCH* option has no effect.

/NOLOWPWR – prevents a display from being placed into a low power mode while the screen save is active. A display that is in a low power mode may require several seconds to refresh the screen upon returning from screen save while a display that is not in a low power mode will refresh instantly. The trade off is a power savings versus a quick screen save refresh.

/ACD – used to enable the Alt-Ctrl-Delete key sequence. As a security measure, this sequence is disabled by default.

/TELEPHONE – used to set the keypad layout to reflect the orientation of a telephone. The default layout, calculator, reflects the layout of a standard PC keyboard.

/WIN – permits the driver to run in a Windows DOS Box. The functional limitations of using /WIN are the same as using the /VDM option in an OS/2 DOS Box, except that the KBD_READ_ID is supported using /WIN and not with /VDM.

/NOLOCK – This option sets the keylock type to KBD_RETAIL_TYPE. The default keylock type is KBD_PC8_TYPE. In the KBD_RETAIL_TYPE mode, the keylock operation is changed so that the "L" position does not prevent keyboard input. See the discussion of the TAPS KBD_LOCK command in *7450 & 705x Programming Information* (ST-2122-18) for more information on keylock types.

Successful Load Message

When the 7450 standard Console Driver is installed, the following message is displayed.

```
NCR 7450 RELEASE 2.01.01
Console Driver Revision A
CON loaded.
```

When the wedge Console Driver is installed, the following message is displayed.

```
NCR WEDGE RELEASE 1.00.00
Console Driver Revision A
CON loaded.
```

Error Messages

CON001: Invalid command line format

Meaning: – Command line options used invalid syntax.

CON002: Unknown option

Meaning: – One of the command line options was invalid.

`CON003: Unable to allocate memory`

Meaning: – There was not enough memory available to load the driver.

NCRINIT Messages

When *ncrinit.exe* is run to initialize the drivers, the Console Device Driver may display one of the following warning messages:

`WCONI_NO_APDI_DRIVER`

Meaning: – The user has specified the */TOUCH* command line option which requires the use of the Application Pointing Device Interface (APDI). The APDI is not available. Therefore, the */TOUCH* option is not supported.

Action: – If */TOUCH* is required, an APDI driver must be installed. For example, the MicroTouch APDI driver is installed by adding the following line to your *config.sys* file.

```
device=mtsapdi.sys
```

`WCONI_NO_APDI_DEVICE`

Meaning: – The user has specified the */TOUCH* command line option which uses the Application Pointing Device Interface (APDI) to receive information about the touch device. The APDI was unable to find a device. Therefore, the */TOUCH* option can not be supported.

Action: – If */TOUCH* support is required, the APDI device must be connected and properly configured so it can be recognized by the APDI. If */TOUCH* support is not required, the option should be removed from the *consoldd.dos* entry in the *config.sys* file.

Installing the Diagnostic Services Driver (DSD)

The DSD is an installable driver. In order to use the DSD Driver, you must have the following command line in your *config.sys* file. Provided in your software package is a default *config.sys* file called *config.tmp* which contains sample (default) command lines for the drivers. Check that file for a default command line for this driver.

```
DEVICE=[d:][path]DSD.DOS[/EVENT:{ON|OFF}-↵
 event[,event]...][/CLASS:{ON | OFF} - class[,class]...]↵
 [/BUFFERSIZE:buffersize][/VDM][/LTTSR-MINSEV]
```

[d:path] – Specify the drive and path containing the DSD.DOS file.

/EVENT – Event specifies an event type on which to enable tracing.

*	all trace event
STRAT	strategy entry and exit
INTR	hardware IRQ entry and exit
SHARED_IRQ	IRQ sharing callback routine entry and exit
TAPS	TAPS entry and exit
SERVICE	entry and exit of driver provided services
NDIS	NDIS entry and exit
APPL	single application trace event

/CLASS – class specifies a driver class on which to enable tracing.

*	all classes
BASE	enhanced base device drivers
RETAIL	retail device drivers
COMMS	communication device drivers
DIAG	diagnostic device drivers
APPL_RETAIL	applications
APPL_COMMS	applications
APPL_DIAG	applications

/BUFFERSIZE – buffer specifies the size, in bytes, of the RAM buffer for extended trace. The default value is 504 bytes. A value of 0 results in no RAM buffer being allocated and has the effect of disabling all extended tracing and aborting command line parameter processing. The value specified here is rounded down to the nearest even multiple of the DIAG_TRACE_RECORD size.

/VDM – The VDM parameter permits the driver to run in an OS/2 2.1 VDM session. You MUST use this parameter when running OS/2.

/LTTSR-MINSEV – Specifies the severity level of error log entries sent to the remote log and tally TSR. These error log entries are sent to the host.

Command line parameters are processed from left to right just as if they were a series of commands. By default all events and classes are off, yielding no extended tracing. The /EVENT and /CLASS parameters can be used to turn on/off specific events and classes. If a single /EVENT:ON-event is provided on the command line without a /CLASS parameter, all classes are turned on. Likewise, if a single /CLASS:ON-class is provided on the command line without a /EVENT parameter, all events are turned on. Notice there can be multiple /EVENT or /CLASS parameters on the command line, however, there can be only one /BUFFERSIZE parameter. Therefore, consider the following command lines for the DSD:

`DEVICE=DSD.DOS`

Meaning: – Extended tracing disabled with a 504 byte RAM trace buffer being allocated. Tracing can still be enabled from an application interface.

DEVICE=DSD.DOS /EVENT:ON-TAPS,STRAT /CLASS:ON-RETAIL

Meaning: – Extended tracing for TAPS and strategy entry and exit points enabled for retail drivers.

DEVICE=DSD.DOS /EVENT:ON-* /EVENT:OFF-INTR /CLASS:ON-*↵
/CLASS:OFF-BASE

Meaning: – Extended tracing enabled for all events and classes except for base drivers and interrupt routines.

DEVICE=DSD.DOS /EVENT:ON-TAPS /BUFFERSIZE:1024

Meaning: – Extended tracing for TAPs events for all classes. 1K trace buffer.

DEVICE=DSD.DOS /BUFFERSIZE:0 /EVENT:ON /CLASS:ON

Meaning: – No RAM buffer is allocated, extended tracing disabled even via application interface, and all parameters following /Buffersize:0 are ignored.

The DSD requires the services of the CDS driver and the CMOS character driver in order to operate effectively. In the event the CDS driver is not installed, the DSD is not able to perform secondary initialization nor access a number of critical services provided by the CDS driver, making DSD inoperable, with the exception of Standard Trace. In the event the CMOS driver is not installed, the DSD indicates an error status upon exit of secondary initialization. The DSD continues to operate, but is unable to update error logs and tallies to CMOS. Error logs are still sent to the log and tally TSR, but an error status is returned to all application and TSR requests for error log or tally access.

Successful Load Message

When the Diagnostic Services Driver is installed, the following message is displayed.

```
NCR 7450 RELEASE 2.01.01
Diagnostic Services Driver Revision A
DSD$ loaded.
```

Error Messages

The DSD always installs during DOS Init. The only error situation is the event that the RAM trace buffer can not be allocated. In the event this error occurs, the following two messages are displayed:

```
NCR Diagnostic Services Driver [DSD$] ↵
 Version ##.##.### loaded
    [DSD$] Unable to allocate trace buffer
    [DSD$] Extended Trace Disabled
```

NCRINIT Messages

When *ncrinit.exe* is run to initialize the drivers, the Diagnostic Services Driver may display one of the following warning messages:

EDIAGI_TALLY_AREA_OVERFLOW

Meaning: – The Tally area of CMOS has been exceeded. There is not enough room to maintain tallies for all of the drivers which are installed in the system.

Action: – Delete any unused drivers from the config.sys file, clear CMOS, and reboot the terminal. If this is unsuccessful, contact AT&T GIS Customer Support.

EDIAGI_DUPLICATE_TALLIES

Meaning: – A device driver attempted to register a Tally Block which differs from the Tally Block already defined for the driver. This can result from a newer (or older) revision of a driver being installed on the system.

This error condition can also result from changing the number of serial ports used by the SERIALDD driver.

Action: – Remove the previous Tally Block definition by reinitializing the CMOS memory from the Config/Setup menu. This clears all of the device driver tallies. In addition, all configuration data and application data is lost.

DEIAGI_TRACE_NO_RAM_BUFFER

Meaning: – The Diagnostic Services Device driver was unable to allocate memory for extended tracing. All APIs which that control tracing return error status.

Action: – The amount of memory to allocate for tracing is specified on the `DEVICE=` line for the DSD.DOS driver in the *config.sys* file. Try reducing this parameter. If the parameter can not be further reduced, try reordering the *config.sys* so DSD.SYS is installed very early in the boot process. If this does not correct the problem, remove any unused device drivers from the *config.sys* file.

Installing the Integrated MSR Driver (IMSR / IMSRW)

The MSR driver is an installable driver. In order to use the MSR driver, you must have the following command line in your *config.sys* file. Provided in your software package is a default *config.sys* file called *config.tmp* which contains sample (default) command lines for the drivers. Check that file for a default command line for this driver.

```
DEVICE=[drive:][path]IMSR.DOS [/UB]
```

[drive:][path] – is the disk drive and directory path where the IMSR.DOS file is located.

/UB – is an option which causes the driver to reset the inactivity timer and refresh the console screen whenever a card is swiped. This means that if the screen goes blank due to inactivity, swiping a card restores the screen.

Successful Load Message

When the MSR Driver is installed, the following message is displayed.

```
NCR 7450 RELEASE 2.01.01
MSR Driver Revision A
INTMSR loaded.
```

Error Messages

IMSR001: No retail board present

Meaning: – There is no Retail Board installed.

IMSR002: Invalid command line format

Meaning: – A command line option used invalid syntax. Make sure that the /UB is the only option on the command line.

`IMSR003: Unknown option`

Meaning: – One of the command line options used is invalid. Make sure that the /UB is the only option on the command line.

NCRINIT Messages

When *ncrinit.exe* is run to initialize the drivers, the Integrated MSR may display the following error message:

`EMSRI_NO_RETAIL`

Meaning: – The retail board (and consequently the MSR Firmware) is either missing from the current terminal hardware configuration or it is not working properly. Therefore, no MSR Driver functionality exists since the MSR Driver cannot communicate with the retail board's MSR firmware.

Action: – If MSR Driver functionality is desired, install a working retail board. If MSR Driver functionality is not desired, memory can be saved by removing the following line from the *config.sys* file.

```
DEVICE=C:\RETAILDD\IMSR.DOS
```

Installing the Input Sequencer Driver (INPUTSEQ)

The Input Sequencer driver is an installable driver. In order to use the Input Sequencer driver, you must have the following command line in your *config.sys* file. Provided in your software package is a default *config.sys* file called *config.tmp* which contains sample (default) command lines for the drivers. Check that file for a default command line for this driver.

```
DEVICE=[d:][path]INPUTSEQ.DOS [/Q:xxx][/N:zz][/T]
```

[d:] [path] – The drive and directory path containing the INPUTSEQ.DOS file.

/Q:xxx xxx – specifies the size of the Input Sequencer queue. The default size for the queue is 80 entries. If you specify a size less than 80 entries, the default size is used. The maximum size permitted is 255. The memory required to allocate each entry is one byte.

/N:zz zz – specifies the number of entries in the Input Sequencer Tag table. The default size for the table is 7 entries. If you specify less than 7 entries, the default is used. The maximum limit is 255. The memory required to allocate each entry is 10 bytes.

/T – specifies the type of Tag interface. If the /T option is not present, the interface is compatible with previous Retail DOS platforms, which used a bit mask to enable or disable tag recognition. This interface is provided for migration.

If the /T option is present, then the one-byte tag is used to enable or disable individual tag recognition. AT&T **highly recommends** this method for ease of use.

Device Name	Tag with /T (Default)	Bit Mask Without /T	Bit Mask Equate
OCIA Port 1	O	01h	OCIA_PORT1
OCIA Port 2	P	02h	OCIA_PORT2
Integrated MSR	M	10h	MSR
Keyboard	K	20h	KBD

All drivers must register tags with the Input Sequencer. The Input Sequencer evaluates whether the solicited tag is valid or not. Drivers may ask for any character to be their tag except a blank. If a blank character (20h) is found in the tag field, the Input Sequencer assumes the calling driver wants to be assigned a tag. In this case, the Input Sequencer assigns the driver an ASCII number in the range '0' - '9'. If the driver requests an already assigned tag, the Input Sequencer assigns the driver a unique tag. If the driver wishes to specify a tag, it is recommended the tag be in the range of 'a' - 'z' or 'A' - 'Z', except for reserved tags ('K', 'O', 'P', 'o', 'p', 'M'). Therefore, the application should use the APIs provided to determine which tag is assigned to a given driver.

Successful Load Message

When the Input Sequencer is installed, the following message is displayed.

```
NCR 7450 RELEASE 2.01.01
Input Sequencer Driver Revision A
KBD_SCAN loaded.
```

Error Messages

`IS001: Invalid command line format`

Meaning: – A command line option used invalid syntax.

`IS002: Unknown option`

Meaning: – One of the command line options used is invalid.

`IS003: No value specified`

Meaning: – There is no value specified for the command line option.

`IS004: Invalid character in numeric`

Meaning: – A value for the command line is invalid.

`IS005: Unable to allocate memory`

Meaning: – There is not enough memory available to load the driver.

`IS006: Value out of range`

Meaning: – The value entered on the command line is outside of the permitted range.

NCRINIT Messages

When *ncrinit.exe* is run to initialize the driver, the no specific error messages are displayed by the Input Sequencer.

Installing the Transaction Printer Driver and Link Manager (MFP and LINKMAN)

The Transaction Printer driver is an installable driver. In order to use the Transaction printer driver, you must install the Transaction printer driver and the RS-485 Link Manager by having the following command lines in your *config.sys* file. Provided in your software package is a default *config.sys* file called *config.tmp* which contains sample (default) command lines for the drivers. Check that file for a default command line for this driver.

MFP Driver

```
DEVICE=[drive:][path]MFP.DOS[/P:n][/W:xxx][/Q:xx][/AC]↵
 [/NC] [/NOPCHK][/SEPSEN][/LPAPER][/LOWUA][/C705X]
```

drive: path – is the disk drive and directory path where the LINKMAN.DOS and MFP.DOS files are located.

/P:n – This parameter lets you specify the number of printers the driver should support. It permits the driver to minimize the data area necessary to support n printers. The value *n* can be in the range 1 to 8. The default value is 1 printer. Values outside the range cause the device driver to not install.

/W:xxx – This parameter specifies the time to wait for subsequent output requests to be sent to the printer, if multiple requests are sent to the printer at the same time. Previously, multifunction printer drivers supported a non-configurable 100 millisecond delay in the event the application wanted multiple requests sent to the printer at the same time. To maintain compatibility with existing applications, the default is still 100 milliseconds. The maximum is now 200 ms. Values out side this range causes the printer driver to not install. Release 2.x: For 7156, 7193, and 2207 printers the default is 0.

/Q:xx – This parameter specifies the size of the print request queue. The value of xx can range from 8 to 20 asynchronous requests. The default value=8.

/AC – Always combine. This parameter specifies that the printer should combine print lines from different stations whenever possible.

/NC – Never combine. This parameter specifies that the printer should not combine print lines from different stations at any time.

/NOPCHK – Indicates that the form-out sensor should not be checked during slip printing on a 7155 or 7156 printer. This forces the application to detect a no slip condition.

/SEPSEN – Separate sensor checking for paper status command on a 7155 printer. Trailing edge bit 0 reports paper only if the form-out sensor is covered.

/LPAPER – For printers that have a journal exhaust sensor, a paper low warning status should be returned, instead of a journal exhaust error.

/LOWUA – Forces the use of low order link unit addresses for all printers.
Release 2.x: This is the default since there is no high order link.

/C705X – Indicates to treat linefeeds LF and carriage returns CR in a 7052 DOS 3.3 compatible mode, with one LF for every two consecutive LFs encountered.

LINKMAN Driver

```
DEVICE=[drive:][path]LINKMAN.DOS [/N:xxx]
```

/N:xxx – This parameter specifies the number of RS-485 devices connected to the link. The default is four and the maximum is 255. If you wish to use more than four printers, you must increase the default.

Successful Load Messages

When the Link Manager is installed, the following message is displayed.

```
NCR 7450 RELEASE 2.01.01
Link Manager Driver Revision A
LINKMAN$ loaded.
```

When the Printer Manager is installed, the following message is displayed.

```
NCR 7450 RELEASE 2.01.01
Multifunction Printer Driver Revision A
TRANPTR loaded.
TRANPT1 loaded.
```

Note: The terms Multifunction Printer and Transaction Printer are the same.

Link Manager Error Messages

`LINK001: No retail board present`

Meaning: – There is no Retail Board installed.

`LINK002: Invalid command line format`

Meaning: – A command line option used invalid syntax.

LINK003: Unknown option

Meaning: – One of the command line options used is invalid.

LINK004: No value specified

Meaning: – There is no value specified for the command line option.

LINK005: Invalid character in numeric

Meaning: – A value for the command line is invalid.

LINK006: Unable to allocate memory

Meaning: – There is not enough memory available to load the driver.

LINK007: Value out of range

Meaning: – The value entered on the command line is outside of the permitted range.

Multifunction Printer Error Messages

TRANPTR001: Unknown option

Meaning: – One of the command line options used is invalid.

TRANPTR002: No value specified

Meaning: – There is no value specified for the command line option.

TRANPTR003: Invalid character in numeric

Meaning: – Invalid command line value entry.

TRANPTR004: Invalid command line format

Meaning: – A command line option used invalid syntax.

`TRANPTR005: No retail board present`

Meaning: – There is no Retail Board installed.

`TRANPTR006: Unable to allocate memory`

Meaning: – There is not enough memory available to load the driver.

`TRANPTR007: Value out of range`

Meaning: – The value entered on the command line is outside of the permitted range.

NCRINIT Messages

When *ncrinit.exe* runs to initialize the driver, one of the following warning messages may appear.

`EMFPI_PRINTER_NOT_AVAILABLE`

Meaning: – The appropriate Transaction Terminal Printer is not available. The printer is either not connected or turned off.

Action: – If the printer is not connected, **DO NOT** connect it while the terminal is ON. Either take the terminal to *STANDBY* or turn it OFF before connecting it. If the printer is turned off, turn it on and send a TAPS_REINIT command to the printer. If the printer is connected and is ON, replace the cable and/or the printer.

`EMFPI_BAD_CONFIG`

Meaning: – The appropriate Transaction Terminal Printer is not available. The printer is either not connected or turned off.

Caution: If the printer is not connected, DO NOT connect it while the workstation is powered on. Turn OFF the workstation before connecting the printer. If when you turn the workstation and printer back on, this error message reappears, replace the cable and/or the printer.

Installing the NCR 7192 Printer Driver (MFP7192 and LINKMAN)

The NCR 7192 Printer driver is an installable driver. In order to use this driver, you must install the 7192 printer driver and the RS-485 Link Manager by having the following command lines in your *config.sys* file. Provided in your software package is a default *config.sys* file called *config.tmp* which contains sample (default) command lines for the drivers. Check that file for a default command line for this driver.

MFP7192 Driver

```
DEVICE = [drive:] [path] MFP7192.DOS [/TO:timeout]
```

[drive:][path] – is the disk drive and directory path where the MFP7192.DOS files are located.

/TO:timeout – This parameter specifies the duration of a protective timer in seconds. Whenever data is sent to the printer, the printer must respond within this amount of time, or a time-out error is returned. The default value is 28 seconds.

LINKMAN Driver

```
DEVICE = [drive:] [path] LINKMAN.DOS [/N:xxx]
```

[drive:][path] – is the disk drive and directory path where the LINKMAN.DOS files are located.

/N:xxx – This parameter specifies the number of RS-485 devices connected to the link. The default is four and the maximum is 255. The 7192 printer driver only supports one printer.

Successful Load Messages

When the Link Manager is installed, the following message is displayed.

```
NCR 7450 RELEASE 2.01.01
Link Manager Driver Revision A
LINKMAN$ loaded.
```

When the Printer Manager is installed, the following message is displayed.

```
Hardware Platform and Release Number
NCR 7192 Printer Driver  Revision A
TRANPTR loaded.
```

Note: The terms Multifunction Printer and Transaction Printer are the same.

Link Manager Error Messages

LINK001: No retail board present

Meaning: – There is no retail board on the NCR 7450 workstation.

LINK002: Invalid command line format

Meaning: – A command line option used invalid syntax.

LINK003: Unknown option

Meaning: – One of the command line options invalid.

LINK004: No value specified

Meaning: – No value was specified for a command line option.

LINK005: Invalid character in numeric

Meaning: – The value for a command line option was invalid.

LINK006: Value out of range

LINK007: Unable to allocate memory

Meaning: – There was not enough memory available to load the driver.

When the Printer is installed, the following messages may appear.

Multifunction Printer Error Messages

MFP001: Bad command line format.

MFP002: Unknown option.

Meaning: – One of the command line options was invalid.

MFP003: No value specified.

Meaning: – There was no value specified for one of the command line options.

MFP004: Bad character in value.

Meaning: – The value for one of the command line options was incorrectly entered.

MFP005: Out of memory

NCRINIT Messages

When *ncrinit.exe* is run to initialize the driver, the driver does not check for the Link Manager or attempt to access the printer. Therefore, no messages are returned.

The first attempt to access the printer is when the driver is opened, but the driver open does not return an error. Link or printer problems are not reported until TAPS commands are issued.

Installing the Miscellaneous Driver (MISCDRIV)

The Miscellaneous driver is an installable driver. In order to use the Miscellaneous driver, you must have the following command line in your *config.sys* file.

```
DEVICE=[drive:][path]MISCDRIV.DOS
```

[drive:][path] – The drive and directory path containing the MISCDRIV.DOS file is located.

There are no command line parameters associated with the Miscellaneous Driver. Any text on the command line is ignored.

Error Messages

EMISC_TONE_ON

Meaning – One of the tone sounding TAPS commands (MISC_PLAY_NOTE, MISC_PLAY_STANZA, or MISC_PLAY_SONG) didn't execute because another application was using the speaker to play a note, song, or stanza.

Action – Retry the command when the speaker is not in use. Also, MISC_TONE_OFF may be used to turn the speaker off before trying the command, but caution should be used when doing this since another application's speaker usage will be affected.

EMISC_NO_BATTERY

Meaning – While trying the TAPS command MISC_UPS_CONTROL with MISC_UPS_ENABLE in the aux field, the workstation had no battery and therefore UPS support was not possible.

Action – Install a battery in the workstation.

EMISC_7450_ONLY_CMD

Meaning – UPS control is not possible on a non-7450 workstation.

Action – Execute the command causing this error on a 7450 workstation only.

EMISC_NO_HW_PD

Meaning – The 705x workstation hardware did not power down when the MISC_POWER_DOWN TAPS command was tried.

Action – Replace the processor board on the 705x workstation. This error should only occur if there is a hardware malfunction.

EMISC_NPOWER

Meaning – Tried to go to standby mode when the NPOWER driver wasn't installed in the system.

Action – Make sure that the NPOWER driver is installed in the system before going to standby mode.

EMISC_IFACE_ERROR

Meaning – Miscellaneous driver received an error from the driver supporting the cash drawer.

Action – Using the diagnostic services driver, look at the error log to analyze error.

EMISC_IFACE_MISSING

Meaning – No cash drawer supporting driver has been installed or the supporting driver is not configured to support a cash drawer.

Action – Install and configure a cash drawer supporting driver.

OS Error Messages

RPERR_BAD_COMMAND

Meaning – The MISC driver received an unrecognized command from the operating system.

Action – Access the MISC driver through the standard TAPS interface only.

RPERR_GEN_FAILURE

Meaning – The MISC driver has not undergone secondary initialization.

Action – Run NCRINIT.EXE before accessing the MISC driver.

Successful Load Message

When the Miscellaneous Driver is installed, the following message is displayed.

```
NCR 7450 RELEASE 2.01.01
Miscellaneous Driver Revision A
MISC loaded.
```

The Miscellaneous driver always installs successfully.

NCRINIT Messages

When *ncrinit.exe* is run to initialize the driver, no specific error messages are displayed by the Miscellaneous driver.

Installing the Power Control Drivers (NPOWER and PCRS)

The Power Control system requires that two drivers be installed, "NPOWER$" and "PCRS$".

The NPOWER$ driver determines idle by monitoring:

- The individual retail drivers critical flag indicator
- Activity monitors of keyboard I/O (INT 9h), video I/O (INT 10h), disk I/O (INT 13H), communication I/O (INT 14h), NETBIOS (INT 5Ch), and printer I/O (INT 17h), and the shared IRQ.

In addition, to determine inactivity idle used by the automatic standby feature, NPOWER$ provides monitor input sequencing and screen unblank services which are provided by way of the CSDS driver architecture.

The NPOWER$ driver supports a command line parameter which disables the idle checking for the following IRQs:

- INT 9 : Keyboard I/O
- INT10 : Video I/O
- INT13: Disk I/O
- INT14: Serial Port I/O
- INT5C: Netbios
- INT 17: Parallel printer

This parameter is /NOTIRQ:x,y,z.

Examples:

- `/NOTIRQ:5C` /* Disable the NetBIOS IRQ */
- `/NOTIRQ:5C, 17` /* Disables both the NetBIOS irq and the parallel printer IRQ*/
- `/NOTIRQ:9,10,13,14,17,5C` /* Disables all of them ! */

The Power Control Driver is accessed by using the driver name *NPOWER$*. The driver is an installable driver that is specified in the *config.sys* file in the following manner:

```
DEVICE=[d:][path]NPOWER.DOS[/AT:xx][/DT:yy][/BID:zz]↵
 [/VDM] [AUTO:xx][/OFF]
```

[d:][path] – is the drive and directory path containing the NPOWER.DOS file.

/AT:xx – Table size for application callback routines. Default is 4. Each table entry is 4 bytes (Seg: Offset of the real mode address)

/DT:yy – Table size for driver re initialization routines. Default is 30. Each table entry is 4 bytes (Seg: Offset of the real mode address)

/BID:zz – Battery Indication Delay time. Default: 10 seconds. zz can range from 0 to 9999, -1 indicates ride-through. Battery Indication Delay (BID) is the amount of time the driver waits before notifying the application that AC power has failed. This time may be used to ride-through brown-out times.

/VDM – The VDM parameter permits the driver to run in an OS/2 2.1 VDM session. You MUST use this parameter when running OS/2.

Note: UPS is supported in the VDM session. Standby is not supported.

/AUTO:xx – Automatic standby inactivity time. xx specifies the number of inactive minutes required before going into automatic standby mode. The default is 15 minutes. Setting this parameter to zero disables Auto Standby.

/OFF – This parameter enables the OFF switch while in Standby mode. The default is to disable the OFF switch when the terminal is in Standby mode.

A second device driver is required for use with power control. This entry is put into *config.sys* as:

```
DEVICE =[D:][PATH]PCRS.DOS[/RI]
```

[d:][path] – is the drive and directory path containing the NPOWER.DOS file.

/RI – Modem ring indicator enabled. This parameter permits the terminal to wake up from STANDBY with the modem ring indicator signal . The modem ring indicator may come in on RS-232 port one or two.

Caution: The PCRS.DOS file must be kept in low memory. Do Not load it into high memory.

Successful Load Message

When the Power Control Driver is installed, the following message is displayed.

```
NCR 7450 RELEASE 2.01.01
Power Control Driver Revision A
NPOWER$ loaded.
```

When the Power Control Support Driver is installed, the following message is displayed.

```
NCR 7450 RELEASE 2.01.01
Power Control Support Driver
PCRS$ loaded.
```

Power Control Driver Error Messages

NPOWER001: Invalid command line format

Meaning: – A command line option used invalid syntax.

NPOWER002: Unknown option

Meaning: – One of the command line options used is invalid.

NPOWER003: No value specified

Meaning: – There is no value specified for the command line option.

NPOWER004: Invalid character in numeric

Meaning: – A value for the command line is invalid.

NPOWER005: Value out of range

Meaning: – The value entered on the command line is outside of the permitted range.

NPOWER006: Unable to allocate memory

Meaning: – There is not enough memory available to load the driver.

Power Control Support Driver Error Messages

PCRS001: Driver cannot be loaded high

Meaning: – This driver must be loaded into low memory.

PCRS002: Invalid command line format

Meaning: – A command line option used invalid syntax.

PCRS003: Unknown option

Meaning: – One of the command line options used is invalid.

NCRINIT Messages

When *ncrinit.exe* is run to initialize the driver, one of the following messages may be displayed.

EPCRI_NO_PCRS The Power Support driver (PCRS.DOS) is required for successful NPOWER operation.

Meaning: – Use `DEVICE=PCRS.DOS` to add the Power Control Support Driver to the *config.sys* file. This driver must be loaded in the lower 640K conventional memory of the system.

EPCRI_TABLE_FULL The internal driver table is too small.

Meaning: – The internal driver table stores the driver standby and re-initialization routines. The default value is 30 but may be increased by adding the parameter /DT:yy on the *config.sys* line for the NPOWER.DOS driver (`DEVICE=NPOWER.DOS /DT:yy`)

Installing the OCIA Driver (OCIA)

The OCIA driver is an installable driver. In order to use the OCIA driver, you must have the following command line in your *config.sys* file. Provided in your software package is a default *config.sys* file called *config.tmp* which contains sample (default) command lines for most if not all of the drivers. Check that file for a default command line for this driver.

```
DEVICE=[drive:][path]OCIA.DOS [/P:x][/UB]
```

[drive: path] – is the disk drive and directory path where the OCIA.DOS file is located.

/P:x – Specifies the number of OCIA ports to support. The default is 2.

/UB – Enables unblanking of the CRT or 2x20 display whenever OCIA messages are received (restores the display when an item is scanned).

Successful Load Message

When the OCIA driver is installed, the following message is displayed.

```
NCR 7450 RELEASE 2.01.01
OCIA Driver Revision A
OCIA1 loaded.
```

This message is repeated for each installed OCIA device.

```
OCIA2 loaded.
etc. . . .
```

Error Messages

`OCIA001: No retail board present`

Meaning: – No retail board installed on the workstation, so the OCIA hardware is not present.

OCIA002: Invalid command line format

Meaning: – The command contains incorrectly formatted information.

OCIA003: Unknown option

Meaning: – The option selected is not recognized.

OCIA004: No value specified

Meaning: – The /P:x option was specified on the command line without a value for x.

OCIA005: Invalid character in numeric

Meaning: – A non-digit character appeared in the x value for the /P:x option.

OCIA006: Value out of range

Meaning: – The x value specified for the /P:x option is not within the valid range.

OCIA007: Unable to allocate memory

Meaning: – Memory could not be allocated to hold the unit instance data for the requested number of OCIA channels.

The OCIA driver uses the CDS Driver services including Shared IRQ handling. Therefore, the CDS Driver (CDSD.DOS) must be installed for proper operation of the OCIA driver.

NCRINIT Messages

When NCRINIT.EXE is run to initialize the driver, one of the following messages may appear.

WOCIAI_NOT_PRESENT

Meaning: – The hardware for the port has failed or the port is not supported.

Action: – If the port that failed is supported by the hardware (only ports 1 and 2 are supported) then replace the retail board. Otherwise, make sure that a maximum of two ports are configured in the *config.sys* file by using DEVICE=OCIA.DOS /P:2.

EOCIAI_HW_INIT_FAILED

Meaning: – The OCIA interface hardware could not be initialized.

Action: – Replace the retail board.

Installing the PCMCIA-ATA Driver (ATADRV$)

The ATADRV driver is an installable driver that is required to support a PCMCIA-ATA device following a return from Standby Mode. In order to use this driver, you must have the following command line in your *config.sys* file. Provided in your software package is a default *config.sys* file called *config.tmp* which contains sample (default) command lines for the drivers. Check that file for a default command line for this driver.

```
DEVICE=[d:][path]ATADRV.DOS
```

[d:][path] – is the drive and directory path containing the ATADRV.DOS file

Successful Load Message

When the PCMCIA-ATA Driver is installed, the following message is displayed.

```
NCR 7450 Release 2.01.01
PCMCIA-ATA Standby Mode Recovery Driver Revision A
ATADRV$ loaded.
```

Error Messages

`ATA001: No PCMCIA-ATA Card Configured`

Meaning: – A PCMCIA-ATA card was not found in an enabled socket.

Installing the Retail Display Driver (RDISPLAY)

The Retail Display driver is an installable driver. In order to use the displays (operator or customer), you must have the following command line in your *config.sys* file. Provided in your software package is a default *config.sys* file called *config.tmp* which contains sample (default) command lines for the drivers. Check that file for a default command line for this driver.

```
DEVICE=[drive:][path]RDISPLAY.DOS [/P:n][/D40][/CS:n]↵
 [/NOSAVE][/DUP]
```

[drive:][path] – is the disk drive and directory path of the RDISPLAY.DOS file.

/P:n – Specifies the number of display pages to support for each display. Valid values are 1-4 with a default of 4. Use of fewer display pages reduces the driver memory requirements by 122 bytes per page.

Therefore, if two 2x20 displays are attached and the /P:1 option is used, the driver allocates only 1 display page per device instead of 4. This results in a savings of 3 display pages per device or 732 bytes (122 x 6) of RAM.

/D40 – Specifies to use all 40 of the descriptors on the 2x20 display. If this option is not selected, only 16 of the 40 descriptors are used. This makes the display compatible with previous 16-descriptor displays.

/CS:n – Specifies the character set to use. Valid values are:

1- Code page 850 (Default)
2 - Katakana
3 - Code page 866 Cyrillic

Once a character set is selected, it cannot be changed unless the driver is reloaded.

/NOSAVE – Indicates that the default screen save mode should be SCR_DISABLE. If /NOSAVE is not used, the default is SCR_BLANK. Regardless of the default screen save mode chosen, the current screen save mode can always be modified using the SCR_SAVE_MODE TAPS command.

/DUP – Duplicates all output sent to *rdisplay.dos* to two retail customer displays. When this switch is used, a CRT or LCD Operator Display must be present.

Caution: When the retail device driver screen saver is used running under Windows, the customer display cannot be unblanked by keyboard input. Windows hooks the keyboard interrupt and doesn't pass it down the chain. It is recommended that you use the */NOSAVE* option when running under Windows, or take the appropriate actions within your application.

Successful Load Message

When the Remote Display Driver is installed, the following message is displayed.

```
NCR 7450 RELEASE 2.01.01
Retail Display Driver Revision A
REMDISP loaded.
```

Error Messages

`SCR001: No retail board present`

Meaning: – The retail board containing the retail display hardware is not present

SCR002: Invalid command line format

Meaning: – Command line options used invalid syntax.

SCR003: Unknown option

Meaning: – One of the command line options is invalid.

SCR004: No value specified

Meaning: – The /P:n or /CS:n option is used without a value for n.

SCR005: Invalid character in numeric

Meaning: – The /P:n or /CS:n option contains a bad value for n.

SCR006: Number of pages invalid

Meaning: – The /P:n option contains a value other than 1, 2, 3, or 4.

SCR007: Character set invalid

Meaning: – The /CS:n option contains a value other than 1, 2, or 3.

SCR008: Unable to allocate memory

Meaning: – There is not enough memory available to load the driver.

SCR009: No retail displays connected

Meaning: – No retail displays are connected.

SCR010: Multiple operator displays connected

Meaning: – Both a CRT/LCD and a 2x20 console display are detected. If a CRT/LCD is present, a 2x20 display attached to the operator connector is invalid.

SCR011: Invalid display attached to operator connector

Meaning: – A display other than a 2x20 is attached to the operator connector.

SCR012: REMDISP not loaded

Meaning: – /DUP option only valid with CRT/LCD and two retail displays. A display other than a 2x20 is attached to the operator connector.

NCRINIT Messages

When NCRINIT.EXE is run to initialize the driver, one of the following warning messages may appear.

ESCRI_HW_INIT_FAILED

Meaning: – Unable to communicate with display firmware.

WSCRI_NO_ENHANCED_CON

Meaning: – A 2x20 operator display is being used without the Enhanced Console driver, CONSOLDD.DOS. Without the Enhanced Console Driver, an application can not issue TAPS commands to the display.

Action: – Add the following line to the *config.sys* file:

```
device=consoldd.dos.
```

Installing the Remote MSR Driver (RMSR)

The RMSR driver can be specified in CONFIG.SYS in the following manner:

```
DEVICE=[drive:][path]RMSR.DOS [/UB]
```

[drive:][path] – is the disk drive and directory path where the RMSR.DOS file can be located.

[/UB] – is an option which causes the driver to reset the inactivity timer and turn the console screen blank whenever a card is swiped. Thus, if the screen goes blank due to inactivity, swiping a card restores the screen. Leaving [/UB] out of the command line leaves this option off.

Your software package should contain a default CONFIG.SYS file called CONFIG.TMP which contains sample (default) command lines for most if not all of the drivers. Check that file for a default command line for this driver.

If RMSR driver functionality is desired, install a working retail board. If RMSR driver functionality is not desired, memory can be saved by removing the `DEVICE=C:\RETAILDD\RMSR.DOS` line from the CONFIG.SYS file.

Successful Load Message

```
Hardware Platform and Release Number
NCR RMSR Driver  Revision A
RMSR loaded.
```

Error Messages

`RMSR001: No retail board present`

Meaning: – There is no Retail Board on the NCR 7450 workstation.

`RMSR002: Invalid command line format`

Meaning: – Ensure that the /UB is the only option on the command line.

`RMSR003: Unknown option`

Meaning: – Ensure that the /UB is the only option on the command line.

NCRINIT Messages

When *ncrinit.exe* is run to initialize the drivers, the Remote MSR may display the following error message:

`EMSRI_NO_RETAIL`

Meaning: – The retail board (and consequently the MSR Firmware) is either missing from the current terminal hardware configuration or it is not working properly. Hence, no RMSR driver functionality exists since the RMSR driver cannot communicate with the 4430 MSR/PIN Pad.

Installing the RS-232-C Driver (SERIALDD)

The RS-232-C driver is an installable driver. In order to use the RS-232-C driver, you must have the following command line in your *config.sys* file. Provided in your software package is a default *config.sys* file called *config.tmp* which contains sample (default) command lines for the drivers. Check that file for a default command line for this driver.

Caution: Do not use this driver in an OS/2 VDM. See *Installation Notes* later in this chapter.

```
DEVICE=[drive:][path]SERIALDD.DOS[/N:x]↵
 [/c:IRQi,aaaa,xxx][/C:NONE][/UB][TALLYMAX][/SIGLOW]
```

[drive: path] – is the disk drive and directory path where the SERIALDD.DOS file is located.

/N:x – Specifies the number of communications channels to install. The default is 2. The values 1, 2, 3, and 4 are the only legal values.

/c:IRQi,aaaa,xxx – This option permits communication channels to use nonstandard interrupt request and I/O port address settings.

c	channel number 1, 2, 3, or 4
i	The number of the interrupt request to be used. The interrupt is in the range of 3 to 7.
aaaa	The Port I/O address in hexadecimal. The selection indicates the lowest number in a range of eight port addresses. The value should be evenly divisible by eight. All four hexadecimal digits must be present on the command line.

xxx Permits you to specify the size of the buffering space which is to be reserved for the specific channel. This buffering is used for the reception of incoming communications data. The memory size may range from 50 to 5000. The driver needs one word of memory to register each received character. The driver releases any memory associated with a channel which cannot be activated by hardware.

Note: This option may be used to define non-standard serial port positions. Non-standard port positions may be required when an add-in serial card defines a serial port on a different IRQ or base port than the SERIALDD default.

/C:NONE – This option is an alternate to the previous one. It is used to explicitly tell the Serial Comm Driver that it is not to use channel (c).

/UB – This option enables unblanking of the CRT or 2x20 display whenever input sequencing is enabled for a port and a message is received from that port. Any received messages will be returned to the application even if the screen was blank when the message was received.

/TALLYMAX – This option causes the Serial Communications Driver to register tally blocks for the maximum number (4) of communication channels supported. For new terminal installations, inclusion of TALLYMAX is recommended. If the number of installed channels changes in the future, a sufficient number of tally blocks will already be set up within the CMOS area. Thus, the CMOS will not

require re-initialization. For software upgrades in current workstation installations, this parameter may be omitted. The Serial Communications Driver acts as earlier driver releases, and only registers as many tally blocks as the largest channel number (example: if COM3 is installed, but COM4 is not, then 3 tally blocks are registered). CMOS does not require re-initialization until the largest channel number must be changed.

/SIGLOW – permits the application to process plug and play information properly:

1. On tio_open, the driver will set/leave the DTR and RTS lines low.
2. The application sets the baud to 1200, data bits to 7, and parity and stop bits to none, using the serialdd COM_SET_CTRL_BAUD command.
3. The application changes the serialdd parameters:

```
cp_dtr_rts = COM_DTR_ON | COM_RTS_ON;

cp_control = COM_CTS_OUTHAND;  // or other values
 depending on the device using the COM_SET_PARAMS
 command.
```

4. The Plug-and-Play device will send its configuration information.
5. The application reads the information.
6. The application changes the baud and line control to the rate needed after config.

If the /SIGLOW option is not specified, then serialdd will raise the DTR and RTS lines high on a tio_open. This is the behavior for previous versions, and is the most common signal state for peripherals.

All of the above parameters may be used to define non-standard serial port position. Non-standard port positions may be required if you install an add-on serial card that defines a serial port on a different IRQ or base port than the *serialdd* default.

In all other cases, the serial port positions should not be moved from their default positions. Doing so may create a conflict between the ROM BIOS and driver definitions. This particularly effects the DOS *mode* command when it is used to change serial parameters. The *mode* command changes the BIOS but does not change the driver values.

Successful Load Messages

When the Serial Device Driver is installed, the following example message may be displayed.

```
NCR 7450 RELEASE 2.01.01
Serial Communications Driver Revision A
COM1 loaded.

Configuration:  IRQ4 Port 03F8 Receiver size 100: Ready.
```

The message above indicates that the installation was successful. However, the port I/O address may not be set to the correct value, or the serial port may be disabled through the BIOS configuration setup. (An error tone sounds and the installation pauses for 5 seconds or until a key is pressed.)

Error Messages

SER001: Invalid command line format

Meaning: – A command line option used invalid syntax.

SER002: Unknown option

Meaning: – One of the command line options used is invalid.

SER003: No value specified

Meaning: – There is no value specified for the command line option.

SER004: Invalid character in numeric

Meaning: – A value for the command line is invalid.

SER005: Unable to allocate memory

Meaning: – There is not enough memory available to load the driver.

SER006: Value out of range

Meaning: – The value entered on the command line is outside of the permitted range.

SER007: no SERIAL PORTS FOUND

Meaning: – The BIOS did not detect any serial ports, and the command line did not specify the number of ports or their location.

NCRINIT Messages

When *ncrinit.exe* is run to initialize the driver, the RS-232-C driver is always successful.

Installation Notes

- The RS-232-C serial driver (SERIALDD.DOS) uses the CDS Driver (CDSD.DOS) services. Therefore, the CDS Driver must be installed for proper operation of the RS-232-C serial driver.
- If the NCR serial driver is to be used with any other serial driver such as a mouse driver, then you must ensure one of the following:

  1. Reserve the hardware I/O channels and interrupt vectors to be accessed by the alternate driver or process. This can be accomplished by specifying at load time one of the following two options:

  /N:x - Use this option to set the number of channels to be controlled by the Serial Communications Driver if the channel(s) to be reserved are of higher number than the last channel to be controlled by the Serial Communications Driver.

  Example: If a 7450 2.0 terminal has 3 serial channels and the application needs to use the Serial Communications Driver to control channels 1 and 2, and another driver, TSR, or library to control channel 3, then add the option /N:2 to the CONFIG.SYS DEVICE line.

  /c:NONE - Use this option to tell the Serial Communications Driver not to use channel (c) if the channel(s) to be reserved are of lower number than the last channel to be controlled by the Serial Communications Driver.

Example: If a 7450 2.0 terminal has 3 serial channels and the application needs to use the Serial Communications Driver to control channels 1 and 3, and another driver, TSR, or library to control channel 2, then add the option /2:NONE to the CONFIG.SYS DEVICE line.

These two options permit the alternate device driver to acquire the interrupt request assignment and to control the hardware registers.

2. The two serial drivers may be able to share the hardware resources. The Serial Communications Driver will not act to control the hardware registers or the interrupt vector for a channel unless that specific channel is opened. With this in mind, it would be possible for two different applications to use the resources in unique ways.

   - The *serialdd* driver expects the COM1 and COM2 ports to be *PC Type* in *Configuration Setup*. Otherwise *ncrinit* initializes COM1 as COM2 and visa-versa.
   - Do not use this driver in an OS/2 VDM. Use the OS/2 virtual driver, which is automatically available to a DOS application. This precludes the use of any TAPS specific commands.
   - The *serialdd* driver must be installed in *config.sys* in order to take advantage of the STACKS parameter. It may NOT be installed via *loaddev*.

Installation Examples

For the first three examples, assume a 7450 Release 2.0 terminal with 4 serial ports. For this terminal, the driver works with the 7450 Release 2.0 BIOS to determine the port addresses and IRQs of all ports, so that configuration is very straightforward.

```
DEVICE=C:\RETAILDD\SERIALDD.DOS
```

Meaning: – Installs the Serial Communications Driver with support for all 4 ports as COM1 through COM4, using the proper IRQ value and port address and the default receiver buffer size for each port.

```
DEVICE=C:\RETAILDD\SERIALDD.DOS /N:2
```

Meaning: – Installs the Serial Communications Driver with support for only the first 2 ports as COM1 and COM2, using the proper IRQ value and port address and the default receiver buffer size for each port. Ports 3 (COM3) and 4 (COM4) are not handled by the driver.

```
DEVICE=C:\RETAILDD\SERIALDD.DOS /N:3↵
 /2:NONE /3:,,500
```

Meaning: – Installs the Serial Communications Driver with support for only ports 1 and 3. Port 1 is COM1 and uses its proper IRQ value and port address and the default receiver buffer size. Port 3 is COM3 and uses its proper IRQ value and port address; the receiver buffer size is set to 500 characters. Ports 2 (COM2) and 4 (COM4) are not handled by the driver.

For the next example, assume a 7450 Release 2.0 terminal with 2 serial ports plus a vendor's ISA card that supplies 2 additional ports at addresses 0x0278 and 0x0378 and IRQs 5 and 7. (You must ensure that these addresses and IRQs do not conflict with other devices. In this case, a conflict with a parallel port is likely unless it has been disabled.) The 7450 BIOS can only reliably detect 7450-supplied serial ports, so you should explicitly specify the IRQs and port addresses of the additional ports.

```
DEVICE=C:\RETAILDD\SERIALDD.DOS /N:4↵
 /1:,,50 /3:IRQ5,278 /4:IRQ7,378,1200
```

Meaning: – Installs the Serial Communications Driver with support for all 4 ports. Port 1 (COM1) uses the proper IRQ value and port address; the receiver buffer size is 50 characters. Port 2 (COM2) uses the proper IRQ value and port address and the default receiver buffer size. Port 3 (COM3) uses IRQ 5 and port address 0x0278 and the default receiver buffer size. Port 4 (COM4) uses IRQ 7 and port address 0x0378; the receiver buffer size is 1200 characters.

Touch Module Drivers

The 7450 Touch Screen Module is supported by the MicroTouch Systems (MTS) Touch Screen Drivers and Utilities package. This package contains the documentation and software necessary for an application to interface to the 7450 Touch Screen Module in the DOS and Windows environments.

The MTS package, which is supplied intact from MicroTouch Systems, contains four software components:

- *DrivePoint User's Guide* (9005901)
- *Pad Manager User's Guide* (9007101)
- *TouchWare User's Guide* (19-207)
- *TruePoint Touch Monitor Guide to Operations* (19-205)

Each component includes a manual that describes the component's features and a software diskette that contains the component's software drivers and utilities.

DrivePoint

The DrivePoint software contains, among other things, two DOS device drivers.

- MTSAPDI.SYS
- MTSTOUCH.SYS

The MTSAPDI.SYS driver (also comes as a TSR called MTSAPDI.COM) is a low level driver that interfaces to the hardware, and contains a single API. The MTSTOUCH.SYS driver interfaces with the MTSAPDI and provides two APIs.

When DrivePoint is used, the MTSAPDI driver must be installed because it interfaces with the hardware. If the application programmer chooses to use the MTSAPDI API, then the MTSTOUCH driver is not needed. If the application programmer chooses to use one of the MTSTOUCH APIs, then both the MTSTOUCH and MTSAPDI drivers must be installed.

The MTSTOUCH driver provides the "pads" feature. A "pad" is an application- defined region that returns a single value when any part of the region is touched. The choice of API is left to the discretion of the application programmer.

The MTSAPDI and two MTSTOUCH APIs are proprietary MTS interfaces and are described in the MicroTouch DrivePoint User's Guide.

Two value-added features are added to the 7450 software that support the MTS DrivePoint software.

- The Console driver has been modified so that screen unblanking can occur when the touch screen is touched.
- Two libraries have been added that simplify the interface to the MTSAPDI driver from a Phar Lap application.

The 7450 Release 2.0 Console Driver provides screen unblanking when the DrivePoint software is used. This feature is activated by adding the "/TOUCH" parameter to the console driver's command line. When the screen is blanked, the user can touch the screen to unblank the display. The coordinate data that is generated when the screen is unblanked is not passed to the application.

Two libraries are included with the 7450 Release 2.0 software that provide a Phar Lap application with a simple and efficient interface to the MTSAPDI driver.

- MTSR.DLL
- MTSP.LIB

MTSR.DLL is a real mode DLL that is called by the MTSAPDI driver when coordinate data is available. When MTSR.DLL is invoked, it retrieves the coordinate data from the MTSAPDI driver and passes it to a protected mode routine in the Phar Lap application for processing.

MTSP.LIB contain two protected mode library functions. The first function establishes the link between the MTSAPDI driver, MTSR.DLL, and the Phar Lap application. The second function breaks this link.

Pad Manager

Pad Manager is a utility that allows the application developer to define and save pad regions that can be used by applications in conjunction with the DrivePoint MTSTOUCH driver. For additional information, refer to the *MicroTouch Pad Manager User's Guide*.

Touchware

The TouchWare software contains a DOS Mouse Emulator driver and a Windows driver. These drivers use the touch screen module to emulate the standard PC mouse in the DOS and Microsoft Windows environments. Microsoft Windows is supported on the 7450 through the 7450 NICE Client. For additional information about the TouchWare software, refer to the *MicroTouch TouchWare User's Guide.*

TruePoint Touch Monitor

This software contains a diagnostics utility (MicroCal) and some sample programs. In order for the touch screen module to work with the power management feature of the 7450 terminal, the MicroCal program must be used to "lock" the data protocol and communication parameter used by a particular driver into the touch screen module. The parameters must be "locked" when ever a new touch screen module is used or when the software driver changes from the DrivePoint driver to a TouchWare driver and visa versa.

When the DrivePoint software is used, The data protocol parameter should be set to **Hex - Stream** and the auto-baud detection parameter should be set to "disabled". The communication parameters should be set to desired values and the MTSAPDI driver should be configured to match these desired values via the command line parameters (see MicroTouch DrivePoint User's Guide).

When the TouchWare software is used, the data protocol parameter should be set to **Tablet - Stream** and the **Auto-baud Detection** parameter should be set to **disabled**. The communication parameters should not be set using the MicroCal program because the configuration utilities that are provided with the TouchWare software will automatically configure the communications parameters.

The MicroCal program also contains a calibration feature and an accuracy test that can be used to set and verify calibration of the touch screen module.

Installing the Wedge Driver (WEDGEDD.DOS)

The Wedge Driver is an installable driver which provides an interface between the Wedge Controller firmware, the Host Keyboard Controller firmware, and certain 7450/7452 Retail Device Drivers. Specifically, the Wedge Driver serves as a supplemental driver which can be used in conjunction with the Integrated MSR and Console device drivers to allow transparent access to the Keylock, Cash Drawer, RS232 Serial Input Scanner Port, and Integrated Magnetic Stripe Reader on the Wedge Keyboard. Additionally, on 7452 workstations, the Wedge Driver provides access to the Speaker on the Wedge Keyboard.

The Wedge Driver provides high level services to other drivers, or to an application, that allow the drivers or application to communicate with the various devices on the wedge keyboard (MSR, Keylock, Cash Drawer, Speaker, RS232 Serial port) without having to interact directly with the underlying hardware.

In order to use the driver, you must have the following command line in your *config.sys* file. Provided in your software package is a default *config.sys* file called *config.tmp* which contains sample (default) command lines for the drivers. Check that file for a default command line for this driver.

```
DEVICE=[drive:][path]WEDGEDD.DOS[/DRAWER][/JIS][/SCAN]↵
[/TABLE:n][/TAG:n][/UART:xxxx][/UB][/WIN][/SAVE_CONFIG]
```

[drive: path] – is the disk drive and directory path where the SERIALDD.DOS file is located.

/DRAWER – Indicates that a cash drawer interface exists on the RS232 scanner port. If specified, then the Clear-To-Send (CTS) and Request-To-Send (RTS) signals are not available to the RS232 scanner. If the

/DRAWER option is specified, the user should additionally include the /UART command line option (see below), with the Control IN bit set to *Ignore* and the Control Out bit set to *Ignore* (UART = 0x0F00). The /DRAWER command line option conflicts with the /SCAN option: they can not both be specified.

/JIS – Specifies that a Japanese Industry Standary (JIS) encoded Magnetic Stripe Reader (MSR) read head is utilized. If this switch is not specified, use of the International Organization for Standardization (ISO) encoded read head is assumed.

/SCAN – Indicates that the RS232 Serial Input port is to be enabled for scanning. If this switch is not specified, then the serial input port will be disabled for scanning. The /SCAN option conflicts with the /DRAWER option: they can not both be specified.

/TABLE n – Specifies the sentinel table to be used with the Wedge Driver. The sentinel table describes the start and end sentinels which are used for each of the wedge devices. The /TABLE command option is used to define the value of the "wedge" start sentinel. The user may choose between the following table numbers:

01 = Wedge start sentinel is hex 08 {default}

02 = Wedge start sentinel is hex 20

03 = Wedge start sentinel is hex 0E

/TAG n – Specifies a tag letter to be used with the Input Sequencer Driver to indicate input from the Wedge serial input port. For example, /TAG:R designates "R" as the tag interface for the wedge serial input port.

/UART:xxxx – Specifies the parameters to be used with the Universal Asynchronous Receiver/Transmitter (UART) Serial communications chip. xxxx represents a two-byte parameter containing a definition of the parameters to be used, as follows:

BYTE 1

bits 6,7 = Baud rate

bits 4,5 = Parity

bits 2,3 = Control OUT settings

bits 0,1 = Control IN settings

BYTE 2

bit 7 = Data bits

The default setting if the /UART option is not specified is 8000 hex (9600 baud, strip parity, Control OUT = CTS, Control IN = RTS, 10-bit data).

/UB – Option to unblank the CRT or 2x20 display whenever the user scans data via the RS232 scanner. If this option is specified and the display has blanked due to inactivity, then, if the user scans an item via an RS232 scanner which is attached to the wedge device, the display will be unblanked.

/WIN – permits the driver to run in a Windows DOS Box. The functional limitations of using /WIN are the same as using the /VDM option in an OS/2 DOS Box, except that the KBD_READ_ID is supported using /WIN and not with /VDM.

/SAVE_CONFIG – This option instructs the driver to save the wedge firmware settings in the wedge EEPROM. The default is not to save the settings in the wedge EEPROM.

Note: The Wedge Driver relies upon the services of the CDS Driver. The CDS Driver must be installed in order for the Wedge Driver to operate correctly.

Successful Load Messages

When the Serial Device Driver is installed, the following example message may be displayed.

```
NCR 7452 RELEASE 1.00.00
Wedge Driver Revision A
Loaded.
```

NCRINIT Messages

When *ncrinit.exe* is run to initialize the driver, the

Error Messages

`WDG001: Invalid command line format`

Action – Make sure command line parameters have the correct syntax.

`WDG002: Unknown option`

Action – Ensure that command line contains only valid options.

`WDG003: No value specified`

Meaning – The /UART or /TAG option was specified without a parameter.

Action – Specify a value.

`WDG004: Invalid character in numeric`

Meaning – The /UART option was specified with a letter in its parameter. Ensure that only decimal or hex digits are used as parameters.

`WDG005: Value out of range`

Meaning – The value specified for the /TABLE option was not in the range of 1 to 3.

`WDG006: Invalid TAG parameter`

Meaning – The /TAG option was specified with a value other than “A” - “Z”, or “a” - “z”.

`WDG007: Invalid UART parameter`

Meaning – The /UART flags conflict with the /DRAWER option.

Action – Specify “ignore” for the UART Control IN/OUT bits, or delete the /DRAWER option.

`WDG008: Unable to allocate memory`

Meaning No memory is available for the driver structures.

Retail Initialization File (NCRINIT)

The *ncrinit.exe* file is used to initialize the retail device drivers after they have been installed (via *config.sys)*. It is usually the last entry in the *autoexec.bat* file.

Note: NCRINIT must be executed **AFTER** the NetBIOS NetBIND procedure when the power management drivers and NetBIOS are installed. If NCRINIT is installed **BEFORE** the NetBIND occurs, NPOWER.DOS can not hook the NetBIOS interface properly.

Specify *ncrinit* in *autoexec.bat* as follows:

```
NCRINIT [/DW][/DC][/DP][/DA][/P][R:x][/V[:fn]]
```

/DW – Disable Warnings

/DC – Display Corrective Actions

/DN – Display Numeric values for Warning and Error Messages. This is useful when loading diskless workstations and the *ncrinit.msg* file is not present. NCRINIT attempts to open the message file. If the message file is not present, the open is redirected to the server, resulting in time-outs and excessive LAN messages. The */DN* parameter disables the open message file function.

/DP – Display Power-up Record

/DA – Display All Status's

/P – Pause On Error

/R:x – RAM Drive Specification

/V – View Driver Status's on Screen

/V:fn – Driver Status's written to file

Successful Load Message

When *ncrinit* successfully initializes the retail drivers, the following message is displayed.

```
NCRINIT Complete.
```

Error Messages

WINIT_IS_TAG_CHANGED

Meaning: – The Input Sequencer Driver returned a TAG different from the one requested.

WINIT_NO_IS

Meaning: – The Input Sequencer driver is not installed in the system. This driver will not be able to be accessed via the input sequencer. The driver can still be accessed directly.

Action: – To install the Input Sequencer, add the following to the *config.sys* file:

```
"DEVICE=\RETAILDD\INPUTSEQ.DOS"
```

WINIT_NO_OCIA

Meaning: – The OCIA driver is not installed in the system, or an incorrect version of the OCIA driver is installed.

Action: – To install the OCIA driver, add the following to the *config.sys* file:

```
"DEVICE=\RETAILDD\OCIA.DOS".
```

Make sure you are using the correct version of the OCIA driver. Some peripherals, such as the Remote

MSR4430, require a particular version of the OCIA driver to operate properly. Consult the documentation for the required version of the OCIA driver.

EINIT_NO_CMOS

Meaning: – The CMOS driver is not installed. This driver requires CMOS services in order to operate correctly.

Action: – To install the CMOS driver, add the following line to the *config.sys* file.

```
device =\retaildd\cmosdriv.dos
```

If the CMOS driver is in *config.sys* and the services are still unavailable, make certain a retail board is installed in the terminal.

EINIT_NO_LINK_SERVICE

Meaning: – The LINKMAN$ driver is not installed. This driver requires LINKMAN$ services in order to operate correctly.

Action: – Make certain the LINKMAN$ driver is specified in the *config.sys* file. If the LINKMAN$ driver is in *config.sys* and the services are still unavailable, make certain a retail board is installed in the terminal. If this message still occurs, run diagnostics on the RS-485 part.

Communication Drivers

Installing the NDIS Broadcast Loader Interface Module (BLIM)

BLIM.DOS serves two functions:

- DOS loader interface to the NDIS MAC driver
- User interface to the NDIS MAC driver when downloading redirected files to the workstations

Specify *BLIM.DOS* in *config.sys* as follows:

```
DEVICE=[drive:][path]BLIM.DOS
```

[drive:][path] – is the disk drive and directory path of the BLIM.DOS file.

BLIM.DOS has no command line parameters.

The *PROTMAN.DOS* driver reads the *BLIM.DOS* parameters from *PROTOCOL.INI* and passes an image of the file to all NDIS communications drivers that request it.

Example PROTOCOL.INI File

The following *PROTOCOL.INI* file contains `drivername` and `bindings`, which are the only acceptable *BLIM.DOS* parameters:

```
; PROTOCOL.INI file for NETBEUI and NCR Ethernet adapter
[protman]
    drivername = PROTMAN$
[netbeui_xif]
    drivername = NETBEUI$
    bindings = NCRCSMA
[blim]
    drivername = BLIMDOS$
    bindings = NCRCSMA
[ncrcsma]
    drivername = NCRCSMA$
```

drivername – Defines the name used to open BLIM.DOS.

bindings – Identifies the other communications modules that *BLIM.DOS* must attach to. Must match the name supplied to the MAC driver.

Error Messages

`BLM001: Could not open Protocol Manager`

Meaning: – The protocol manager could not be opened.

Action: – Verify that the protocol manager is specified properly in *CONFIG.SYS*, that the referenced *PROTOCOL.INI* file exists, and that the specified path of the *PROTOCOL.INI* file is correct.

`BLM002: Error Communicating with Protocol Manager`

Meaning: – The protocol manager did not respond to a request issued to it.

Action: – Verify that the protocol manager is specified properly in *CONFIG.SYS*, that the referenced *PROTOCOL.INI* file exists, and that the specified path for the *PROTOCOL.INI* file is correct.

BLM003: Call to GetProtInfo Failed

Meaning: – The GetProtInfo call to the protocol manager did not complete successfully.

Action: – Verify that the protocol manager is specified properly in *CONFIG.SYS*, that the referenced *PROTOCOL.INI* file exists, and that the specified path of the *PROTOCOL.INI* file is correct.

BLM004: Could not register with Protocol Manager

Meaning: – The protocol manager did not allow the module to register with it.

Action: – Verify that the protocol manager is specified properly in *CONFIG.SYS*, that the referenced *PROTOCOL.INI* file exists, and that the specified path of the *PROTOCOL.INI* file is correct.

BLM005: Module [BLIM] was not found in *PROTOCOL.INI*

Meaning: – The [BLIM] section was not found in *PROTOCOL.INI*.

Action: – Verify that the [BLIM] section is present in *PROTOCOL.INI* and that it is spelled correctly.

BLM006: DRIVERNAME Keyword not found in PROTOCOL.INI

Meaning: – The DRIVERNAME keyword was not found in the [BLIM] section of *PROTOCOL.INI*.

Action: – Verify that the DRIVERNAME keyword is present in the [BLIM] section of *PROTOCOL.INI* and that it is spelled correctly.

BLM007: DRIVERNAME *BLIMDOS$* was not found in *PROTOCOL.INI*

Meaning: – The drivername *BLIMDOS$* was not found following the DRIVERNAME keyword in *PROTOCOL.INI*.

Action: – Verify that *BLIMDOS$* follows the DRIVERNAME keyword in the [BLIM] section of *PROTOCOL.INI* and that it is spelled correctly.

BLM008: BINDINGS Keyword not found in *PROTOCOL.INI*

Meaning: – The BINDINGS keyword was not found in the [BLIM] section of *PROTOCOL.INI*.

Action: – Verify that the BINDINGS keyword is present in the [BLIM] section of *PROTOCOL.INI* and that it is spelled correctly.

BLM009: Invalid number of parameters on Keyword

Meaning: – An incorrect number of parameters was specified following keyword.

Action: – Select valid parameter(s) for the specified keyword.

BLM010: Parameter on Keyword is required to be a string

Meaning: – The parameter following keyword must be of the type string.

Action: – A string parameters must begin with a non-numeric character or must be enclosed in quotes.

BLM013: Invalid Keyword [*keyword*] found in *PROTOCOL.INI*

Meaning: – An invalid keyword was found in the [BLIM] section of *PROTOCOL.INI.*

Action: – Remove the invalid keyword from the file.

BLM014: Multiple occurrences of Keyword [*keyword*] found in *PROTOCOL.INI*

Meaning: – A keyword appears multiple times in the [BLIM] section of *PROTOCOL.INI.*

Action: – Remove the extra occurrences of the keyword.

Installing the LAN Cache Driver (LANCACHE)

The LAN Cache Driver is an installable driver. To use the TAPS interface to the LAN cache you must have a command line like the following in your *config.sys* file. Provided in your software package is a default *config.sys* file called *config.slp* which contains sample (default) command lines for the drivers. Check that file for a typical command line for this driver.

```
DEVICE=[drive:][path]LANCACHE.DOS [/S:InitCacheSize]↵
 [/F:MaxFileSize][/R:NumXferRetries][/SHRINK]
```

[drive:][path] – Specifies the location of the LANCACHE.DOS file.

/S:InitCacheSize – Specifies the initial size of the memory cache (in KB). The permitted range is 8 KB through 8192 KB. The default is 64 KB.

/F:MaxFileSize – Specifies the maximum file size (in KB) that the cache can transfer. Use of this parameter creates the File Allocation Table (FAT) and the number of sectors per cluster at initialization. The permitted range is 8 KB through 8172 KB.

/R:NumXferRetries – Specifies the number of retries to pass to the SLPREDIR when requesting a file to be transferred. The permitted range is 0 to 100 retries. The default is 5 retries.

/SHRINK – Enables the LAN Cache driver to automatically SHRINK the cache size down to the minimum possible when Windows is invoked. This provides more extended memory for Windows if needed.

The LAN Cache Driver uses extended memory, therefore HIMEM.SYS (or some other extended memory manager) must be installed first. Since the LAN Cache Driver must interface to the SLPREDIR.DOS driver, the SLPREDIR.DOS driver must also be installed before the LAN Cache Driver.

If there is not enough extended memory to create a cache of the specified size, LAN Cache displays an error and does not install.

The LAN Cache works with the SLP Redirector *(SLPREDIR.DOS)* to transfer drivers, applications and other files over the LAN. The files are cached so that workstation RAM (*RAMDISK*) does not need to be double the size of the file in order to load the file. It is sent to the workstation as part of the initial boot block or can be transferred later by the redirector.

All the files requested with the redirector's drive letter are loaded by way of the cache. Because it is write-protected, *LANCACHE.DOS* can only load files. All files requested with its drive letter are loaded into the cache.

Successful Load Message

When the LANCACHE Driver is installed, the following message is displayed.

```
NCR 7450 RELEASE 2.01.01
LAN Cache Driver Revision A
LC BLK loaded.

CACHE$ loaded.
```

Error Messages

LANCACHE001: Could not open Redirector

Meaning: – The SLPREDIR driver could not be opened.

Action: – Verify that the SLPREDIR is specified properly in *CONFIG.SYS*.

LANCACHE002: Incorrect DOS version

Meaning: – The DOS version is incorrect.

Action: – The 7450 platform software is certified for DOS 5.0 and above.

LANCACHE003: DOS IOCTL error with Redirector

Meaning: – The SLPREDIR driver did not respond to the IOCTL request issued to it.

Action: – Verify that the SLPREDIR is specified properly in *CONFIG.SYS*.

LANCACHE004: Could not allocate base memory during initialization

Meaning: – There was not enough system memory for the driver to install with the data needed.

Action: – If installing in upper memory blocks try rearranging the installed order of the drivers.

LANCACHE005: Extended Memory Manager not present

Meaning: – The *HIMEM.SYS* or some other XMS driver is not installed.

Action: – Verify that the XMS driver is specified properly in *CONFIG.SYS*.

LANCACHE006: No extended memory available

Meaning: – Zero extended memory is available.

Action: – Check the amount of memory in the system and how it is distributed.

LANCACHE007: Bad Extended Manager control chain

Meaning: – The Extended manager control chain is corrupted.

Unable to use extended memory.

LANCACHE008: Error in extended memory allocation

Meaning: – An error was returned when the LAN cache tried to allocate extended memory for the cache.

Action: – Check the amount of memory in the system and how it is distributed.

LANCACHE009: Insufficient extended memory available for MIN_CACHE_SIZE

Meaning: – Not enough memory above 1 MB to accommodate even a minimum cache.

Action: – Check what other drivers or applications are using extended memory to verify enough memory for the cache.

LANCACHE010: XMS function not implemented

Meaning: – XMS driver not supporting all functions needed by the LAN Cache in order for it to use extended memory for its cache area.

LANCACHE011: Cache Size out of range

Meaning: – The /S: command line parameter is smaller than 8 KB or larger than 8192 KB.

LANCACHE012: Max file size out of range

Meaning: – The /F: command line parameter is

smaller than 8 KB or larger than 8172 KB.

LANCACHE013: Cache size too large for amount of extended memory available

Meaning: – There is not enough extended memory to accommodate either the default cache size or cache size requested by a command line parameter.

Action: – Reduce the /S: parameter until the cache fits in the extended memory available.

LANCACHE014: Cache size too small for Redirector Block size

Meaning: – The cache size must be larger than 2 redirector blocks in order to cache files.

Action: – The redirector blocks are determined by the server, and can be adjusted in the server's configuration file.

LANCACHE015: Redirector file transfer retries out of range

Meaning: – The /R: command line parameter is smaller than 0 or greater than 100.

Action: – Fix the number of retries and reinstall

LANCACHE030: Invalid command line format

Meaning: – Syntax error on command line.

LANCACHE031: Unknown option

Meaning: – Driver does not recognize a command line option.

LANCACHE032: No value specified

Meaning: – Required value for command line option was not specified.

`LANCACHE033: Invalid character in numeric`

Meaning: – Invalid numeric value entered as command line option.

DOS Error Message

`General Failure reading drive [lancache drive:]`

Meaning: – The *SLPREDIR* driver could not transfer the file error freely. (Even if the directory entry for the file appears correct, the file may not have been transferred.)

Action: – 1. Verify LAN operations

Action: – 2. SLP load parameters for *SLPREDIR* or the loader may need to be adjusted.

Installation Notes

- The SLP Redirector plus an XMS-compliant memory manager (*HIMEM.SYS*) must be installed ahead of *LANCACHE.DOS*.
- DOS assigns the LAN cache drive the next available drive letter in the system. Make sure that *LASTDRIVE* is set according to the number of block devices being loaded.
- If *LANCACHE.DOS* is installed after *SLPREDIR.DOS*, its drive letter is automatically included as a target drive for broadcast file transfer.
- LANCACHE.DOS will not work with SLPRDR6X.DOS

Migration Issues

The DOS Extender (Phar Lap) consists of a bound protect mode application with *RUN286.EXE* and *DLLs*. Since only one file can be opened in the cache at a time, there may be some conflict loading both the application and the *DLLs* through the cache.

Example:
```
LIBPATH=[drive:]\[path]
[drive:]\PLAPPL.EXE
```

The `[drive:]`of LIBPATH should point to the RAM disk drive letter and the `[drive:]`of the Phar Lap APPL should point to the LAN cache drive letter.

Installing the NDIS MAC Driver

The NDIS MAC drivers work with the Protocol Manager (*PROTMAN.DOS*) to provide an NDIS interface between the server LAN adapter and an NDIS compatible communications stack (such as Microsoft Netbeui or Wollongong TCP/IP) at the workstation.

PROTMAN.DOS, which is further described in the NDIS specification

- Provides configuration information from the *PROTOCOL.INI* file to the other drivers
- Enables the protocol driver to bind with NDIS MAC Driver into the desired protocol hierarchy.

Specify *PROTMAN.DOS* in *CONFIG.SYS* as follows:

```
DEVICE=[drive:]\[path]\PROTMAN.DOS /I: [drive:]\[path]
```

[drive:][path] – is the disk drive and directory path of the PROTOCOL.INI file.

If you are using Ethernet or StarLAN, specify *NCRCSMA.DOS* in *CONFIG.SYS* as follows:

```
DEVICE=[d:]\[path]\NCRCSMA.DOS
```

Or, if you are using WaveLAN/PCMCIA, specify *WVPCMCIA.DOS* in *CONFIG.SYS* as follows:

```
DEVICE=[d:]\[path]\WVPCMCIA.DOS
```

The Protocol Manager (*PROTMAN.DOS*) entry must occur in *CONFIG.SYS* ahead of the NDIS MAC Driver *(NCRCSMA.DOS* or *WVPCMCIA.DOS)* entry, and must include the path to *PROTOCOL.INI.*

The Protocol must be specified in either *CONFIG.SYS* or *AUTOEXEC.BAT* although its location in either of these files does not matter.

Note: If you are using the IBM LAN Requester (DOS), *IBMLRFIX.COM* should be loaded before a NET START is performed.

Note: For more information and error messages on the DOS NDIS MAC drivers refer to the *DOS NetBIOS NDIS LAN User's Guide* (ST-2117-13).

Example PROTOCOL.INI File for Netbeui and NCR Ethernet Adapter

```
[PROTMAN]
    DRIVERNAME = PROTMAN$
    DYNAMIC = YES
    PRIORITY   = NETBEUI
[BLIM]
    DRIVERNAME = BLIMDOS$
    BINDINGS   = "NDIS_MAC"
[NETBEUI_XIF]
    DRIVERNAME = NETBEUI$
    BINDINGS   = "NDIS_MAC"
    LANABASE   = 0
[NDIS_MAC]
    drivername = NCRCSMA$
;   This driver supports the following on the 7450:
;    - 10BASET Ethernet
;    - 10BASE2 Ethernet
;    - 1BASE5 StarLAN
;    - Hubless StarLAN
;    PARAMETER             DEFAULT       VALID VALUES
;    ---------             -------       ------------
;    drivername            NCRCSMA$      NCRCSMA$
;    maxrequests           6             1-10
;    maxtransmits          6             1-50
;    nummulticast          10            5-20
;    receivebufsize        256           256-1514
```

```
;  ** The remaining parameters are read from RTC CMOS**
;lanirq         10        5,10,11,12
;ioportaddress  0x200     0x200, 0x220, 0x240, 0x260,
;                         0x280, 0x2a0, 0x2c0, 0x2e0
;ramaddress     0xB000    0xC000, 0xC400, 0xC800, 0xCC00,
;                         0xD000, 0xD400, 0xD800, 0xDC00,
;                         0xE000, 0xE400, 0xE800, 0xEC00
;linkintegrity  on        off,on (used only with 10BASET)
    drivername      = NCRCSMA$
    maxrequests     = 6
    maxtransmits    = 6
    nummulticast    = 10
    receivebufsize  = 256
```

Example PROTOCOL.INI File for WaveLAN/PCMCIA Adapter

```
[PROTMAN]
  DRIVERNAME = PROTMAN$
  DYNAMIC    = YES
  PRIORITY   = NETBEUI
[BLIM]
  DRIVERNAME = BLIMDOS$
  BINDINGS   = "NDIS_MAC"
[NETBEUI_XIF]
  DRIVERNAME = netbeui$
  BINDINGS   = "NDIS_MAC"
  LANABASE   = 0
[NDIS_MAC]
; NCR 7450 WaveLAN/PCMCIA NCIS Driver
;    This driver supports the WaveLAN/PCMCIA adapter.
;
;    PARAMETER             DEFAULT       VALID VALUES
;    ---------             -------       ------------
;    drivername            WVPCMCI$      WVPCMCI$
;    maxrequests           6             1-10
;    maxtransmits          6             1-50
;    nummulticast          10            5-20
;    numrxbuffers          15            6-32
;
; ** The remaining parameters are read from RTC CMOS **
; irq             11      5,10,11,12
; ioportaddress   0x300   0x300, 0x310, 0x320,
;                         0x330, 0x350, 0x360,
;                         0x380, 0x390, 0x3A0
; ramaddress      0xB400  0xB000, 0xB400, 0xC800, 0xCB00,
;                         0xCC00, 0xCF00, 0xD000, 0xD300,
;                         0xD400, 0xD700, 0xD800, 0xDB00,
;                         0xDC00, 0xDF00, 0xE000, 0xE300,
;                         0xE400, 0xE700, 0xEB00, 0xEF00
; centerfreq  "915"  "915", "2412", 2412.5", ..., "2487"
    drivername      = WVPCMCI$
    maxrequests     = 6
    maxtransmits    = 6
    nummulticast    = 10
    numrxbuffers    = 15
```

NCRCSMA Driver Error Messages

`LAN001: No hardware adapter present.`

Meaning: – There is no Retail / Communications Board in the 7450.

Action: – Verify there is a Retail / Communications Board installed.

`LAN002: Could not open Protocol Manager.`

Meaning: – The protocol manager is either not installed or cannot be opened.

Action: – Verify that the protocol manager is specified properly in *CONFIG.SYS*, that the referenced *PROTOCOL.INI* file exists, and that the specified path for the *PROTOCOL.INI* file is correct.

`LAN003: GetProtocolManagerInfo failed -- Invalid Function.`

Meaning: – The CSMA driver sent an invalid function to the protocol manager.

Action: – Verify that the protocol manager is specified properly in *CONFIG.SYS*, that the referenced *PROTOCOL.INI* file exists, and that the specified path for the *PROTOCOL.INI* file is correct.

`LAN004: GetProtocolManagerInfo failed -- Info Not Found.`

Meaning: – Information requested by the CSMA driver was not found by the protocol manager.

Action: – Verify that the protocol manager is specified properly in *CONFIG.SYS*, that the referenced *PROTOCOL.INI* file exists, and that the specified path for the *PROTOCOL.INI* file is correct.

LAN005: GetProtocolManagerInfo failed -- General Failure.

Meaning: – Any other error status returned to the CSMA driver from the protocol manager, other than errors LAN003 and LAN004.

Action: – Verify that the protocol manager is specified properly in *CONFIG.SYS*, that the referenced *PROTOCOL.INI* file exists, and that the specified path for the *PROTOCOL.INI* file is correct.

LAN006: RegisterModule failed -- Invalid Function.

Meaning: – While trying to register itself with the protocol manager, the CSMA driver sent an invalid function to the protocol manager.

Action: – Verify that the protocol manager is specified properly in *CONFIG.SYS*, that the referenced *PROTOCOL.INI* file exists, and that the specified path for the *PROTOCOL.INI* file is correct.

LAN007: RegisterModule failed -- Already Registered.

Meaning: – The CSMA driver tried to register itself twice with the protocol manager.

Action: – Verify that the protocol manager is specified properly in *CONFIG.SYS*, that the referenced *PROTOCOL.INI* file exists, and that the specified path for the *PROTOCOL.INI* file is correct.

LAN008: RegisterModule failed -- General Failure.

Meaning: – The CSMA driver received some other error status from the protocol manager while trying to register itself.

Action: – Verify that the protocol manager is specified properly in *CONFIG.SYS*, that the referenced *PROTOCOL.INI* file exists, and that the specified path for the *PROTOCOL.INI* file is correct.

LAN009: No configuration information was found for NCRCSMA$.

Meaning: – No configuration information was found in the protocol.ini file for the CSMA driver.

Action: – Verify that *PROTOCOL.INI* has a section with `DRIVERNAME=NCRCSMA$`.

LAN010: "keyword" - bad keyword found.

Meaning: – An invalid keyword was found in the protocol.ini file.

Action: – Remove the invalid keyword from the file.

LAN011: "keyword" - keyword has too many parameters.

Meaning: – A valid keyword in the protocol.ini file had more parameters than expected.

Action: – Select valid parameter(s) for the specified keyword.

LAN012: "keyword" - parameter is of wrong type.

Meaning: – A valid keyword in the protocol.ini file and the wrong type of data (i.e. decimal not hex, or numeric not ASCII).

Action: – Correct the parameter in *PROTOCOL.INI*.

LAN013: MaxRequests parameter is out of range.

Meaning: – The number of MaxRequests must be in the range 1 - 10.

Action: – Correct the parameter in *PROTOCOL.INI*.

LAN014: MaxTransmits parameter is out of range.

Meaning: – The number of MaxTransmits must be in the range 1 - 50.

Action: – Correct the parameter in *PROTOCOL.INI*.

LAN015: NumMulticast parameter is out of range.

Meaning: – The number of multicasts must be in the range 5 - 20.

Action: – Correct the parameter in *PROTOCOL.INI*.

LAN016: ReceiveBufSize parameter is out of range.

The Receive Buffer Size must be in the range 256 - 1514.
Correct the parameter in *PROTOCOL.INI*.

LAN017: LANIRQ parameter is out of range.

Meaning: – The IRQ must be set to one of the following: 5, 10, 11, or 12. (This parameter is only valid when running the driver on an AT&T adapter)

Action: – Correct the parameter in *PROTOCOL.INI*.

LAN018: IOPortAddress parameter is out of range.

Meaning: – The IO Port Address must be set to one of the following: 200, 220, 240, 260, 280, 2A0, 2C0, or 2E0. (This parameter is only valid when running the driver on an AT&T adapter)

Action: – Correct the parameter in *PROTOCOL.INI*.

LAN019: Multiple NCRCSMA$ modules found in PROTOCOL.INI.

Meaning: – There was more than one occurrence of the following entry: DriverName = NCRCSMA$.

Action: – Remove the extra occurrences of the keyword.

LAN020: "keyword" - found in module in PROTOCOL.INI more than once.

Meaning: – A keyword may only be listed one time in the protocol.ini file.

Action: – Remove the extra occurrences of the keyword.

LAN021: DOS_IOCTL call to Protocol Manager failed.

Meaning: – The interface between the NCRCSMA driver and the protocol manager failed.

Action: – Verify that the protocol manager is specified properly in *CONFIG.SYS*, that the referenced *PROTOCOL.INI* file exists, and that the specified path for the *PROTOCOL.INI* file is correct.

LAN022: Link Integrity parameter is illegal.

Meaning: – This parameter is not valid in a 7450 terminal.

Action: – Remove the invalid parameter in *PROTOCOL.INI*.

LAN023: RAM address parameter is illegal.

Meaning: – This parameter is not valid in a 7450 terminal.

Action: – Remove the invalid parameter in *PROTOCOL.INI*.

LAN024: Extra adapter type specified on command line.

Meaning: – The NCRCSMA config.sys command line should only contain one adapter type. If the terminal is a 7450, then no adapter type is needed.

Action: – Correct the line in *CONFIG.SYS*.

LAN025: Invalid command line format.

Meaning: – An NCRCSMA command line parameter in the config.sys did not begin with the "\" character.

Action: – Correct the line in *CONFIG.SYS*.

LAN026: Unknown option.

Meaning: – An NCRCSMA command line parameter in the config.sys was invalid.

Action: – Correct the line in *CONFIG.SYS*.

LAN027: Media type parameter is illegal.

Meaning: – The protocol.ini keyword "MEDIA" must be set to "TP" for 10BaseT or "AUI" for 10Base2. (This parameter is only valid when running the driver on an AT&T adapter)

Action: – Correct the parameter in *PROTOCOL.INI*.

LAN028: IRQ value in CMOS is out of range.

Meaning: – The IRQ value in CMOS is invalid.

Action: – Correct using Config Setup.

LAN029: IOPortAddress value in CMOS is out of range.

Meaning: – The IO Port Address value in CMOS is invalid.

Action: – Correct using Config Setup.

LAN030: RAM address value in CMOS is out of range.

Meaning: – The RAM address value in CMOS is invalid.

Action: – Correct using Config Setup.

LAN031: CMOS check sum failed.

Meaning: – LAN parameter area of RTC CMOS is corrupted.

Action: – Reinitialize from Config Setup.

LAN032: "keyword" - illegal parameter on a 7450 unit.

Meaning: – This protocol.ini keyword is only to be used when the NCRCSMA driver is running on a PC with an AT&T LAN card.

Action: – Correct the parameter in *PROTOCOL.INI*.

LAN033: MEDIA parameter illegal on non-AT&T adapter.

Meaning: – The protocol.ini MEDIA parameter is only valid for AT&T adapters.

Action: – Correct the parameter in *PROTOCOL.INI*.

LAN035: Unable to allocate memory.

Meaning: – No more memory available under OS/2.

LAN036: Unable to install at specified IRQ.

Meaning: – OS/2 system call to install at specified IRQ failed, possibly because another driver is already installed there.

Resolve the IRQ conflict.

LAN037: Unable to install Timer handler.

Meaning: – OS/2 system call to link the NCRCSMA timer handler to the OS/2 timer routine failed, probably due to too many links already established.

NDIS Driver/NetBIND Error Messages

The following error can occur when the NDIS Driver Bind is performed (when NetBIND is executed or when "`load NETBEUI`" is executed).

32 ALREADY_STARTED:

Meaning: – The Protocol Manager has already started the network drivers.

Action: – None

33 INCOMPLETE_BINDING:

Meaning: – This bind-time error occurs when the Protocol Manager cannot complete all of the bindings described in the bindings list, most probably due to missing modules.

Action: – Verify the drivers are specified correctly in *CONFIG.SYS* and *protocol.ini*. Verify the drivers install correctly.

34 DRIVER_NOT_INITIALIZED:

Meaning: – This bind-time error occurs when the MAC does not initialize properly during system boot, and a subsequent request is made to the MAC.

Action: – Correct problems which caused any drivers to fail installation.

35 HARDWARE_NOT_FOUND:

Meaning: – This bind-time error occurs when the network adapter is not found by the MAC.

Action: – Check for configuration conflicts (I/O Base, IRQ, RAM Base, etc.). Verify the hardware is working.

36 HARDWARE_FAILURE:

Meaning: – This error occurs in the following cases: network adapter reset failed, network adapter diagnostics failed, network adapter is not responding, network adapter is not found by the MAC. This error can be considered fatal.

Action: – Check for configuration conflicts (I/O Base, IRQ, RAM Base, etc.). Verify the hardware is working.

37 CONFIGURATION_FAILURE

Meaning: – This bind-time error occurs when the configuration is unacceptable to the network adapter.

Action: – Check for configuration conflicts (I/O Base, IRQ, RAM Base, etc.).

38 INTERRUPT_CONFLICT:

Meaning: – This bind-time error occurs in OS/2 only, when an interrupt from some other device in the computer conflicts with the network adapter's interrupt.

Action: – Resolve the IRQ conflict.

39 INCOMPATIBLE_MAC:

Meaning: – This bind-time error occurs when a protocol determines a MAC is not compatible for the binding operation. Thus, binding cannot proceed.

Action: – Verify the drivers are specified correctly in *CONFIG.SYS* and *protocol.ini*. Verify the drivers install correctly.

40 INITIALIZATION_FAILED:

Meaning: – This bind-time error occurs when a protocol fails its initialization.

Action: – Verify the drivers are specified correctly in *CONFIG.SYS* and *protocol.ini*. Verify the drivers install correctly.

41 NO_BINDING:

Meaning: – This bind-time error occurs to indicate that the binding was not performed. This error can occur if a protocol driver took an error exit during its initialization or if a protocol driver has its upper level incorrectly specified as a MAC.

Action: – Verify the drivers are specified correctly in *CONFIG.SYS* and *protocol.ini*. Verify the drivers install correctly.

42 NETWORK_MAY_NOT_BE_CONNECTED:

Meaning: – This bind-time error indicates the adapter may not be connected to a network. It is intended to be suggestive of corrective action by the user.

Action: – Check the cable connection / Check for configuration conflicts (I/O Base, IRQ, RAM Base, etc.). Verify the hardware is working.

43 INCOMPATIBLE_OS_VERSION

Meaning: – This bind-time error indicates that a protocol or MAC driver does not support the version of DOS or OS/2 being used.

Use a valid operating system and driver combination.

44 ALREADY_REGISTERED:

Meaning: – This error is returned by the Protocol Manager if an attempt is made to register a module with a module name already registered with the Protocol Manager. It is also returned from a RegisterStatus primitive to indicate that the name is already registered.

Action: – Verify drivers are specified correctly in *CONFIG.SYS* and *protocol.ini.*

45 PATH_NOT_FOUND:

Meaning: – This error is returned by the DOS Protocol Manager if PROTMAN.EXE could not be found when attempting to execute a BindAndStart or UnbindAndStop command.

Action: – Verify that *PROTMAN.EXE* is present.

46 INSUFFICIENT_MEMORY:

Meaning: – This error is returned by the DOS Protocol Manager if PROTMAN.EXE could not be loaded due to insufficient DOS memory when attempting to execute a BindAndStart or UnbindAndStop command.

Action: – Free up memory for *PROTMAN*. Try using the *load high* option for installing the drivers to free up conventional memory.

47 INFO_NOT_FOUND

Meaning: – This error is returned by the DOS Protocol Manager in a GetProtocolManagerInfo command if the *PROTOCOL.INI* structured configuration memory image is not present or was previously invalidated due to being overwritten or corrupted.

Action: – Another application or TSR may be corrupting the image which is located in upper conventional memory. Try rearranging your application load sequence so that the network load or NetBIND occurs earlier (soon after *PROTMAN* is loaded).

48 GENERAL_FAILURE:

Meaning: – Unspecified failure during execution of the function.

Action: – Verify the drivers are specified correctly in *CONFIG.SYS* and *protocol.ini*. Verify the drivers install correctly. Check for configuration conflicts (I/O Base, IRQ, RAM Base, etc.). Verify the hardware is working.

WaveLAN/PCMCIA Driver Error Messages (WVPCMCIA)

WVP001: No WaveLAN/PCMCIA adapter found.

Meaning: – There is no WaveLAN/PCMCIA adapter found in the 7450.

Action: – Verify there is a WaveLAN/PCMCIA Board installed. Resolve RAM Base conflicts.

`WVP002: Could not open Protocol Manager.`

Meaning: – The Protocol Manager is either not installed or cannot be opened.

Action: – Verify that the protocol manager is specified properly in *CONFIG.SYS*, that the referenced *PROTOCOL.INI* file exists, and that the specified path for the *PROTOCOL.INI* file is correct.

`WVP003: GetProtocolManagerInfo failed -- Invalid Function.`

Meaning: – The WaveLAN / PCMCIA driver sent an invalid function to the Protocol Manager.

Action: – Verify that the protocol manager is specified properly in *CONFIG.SYS*, that the referenced *PROTOCOL.INI* file exists, and that the specified path for the *PROTOCOL.INI* file is correct.

`WVP004: GetProtocolManagerInfo failed -- Info Not Found.`

Meaning: – Information requested by the WaveLAN / PCMCIA driver was not found by the Protocol Manager.

Action: – Verify that the protocol manager is specified properly in *CONFIG.SYS*, that the referenced *PROTOCOL.INI* file exists, and that the specified path for the *PROTOCOL.INI* file is correct.

WVP005: GetProtocolManagerInfo failed -- General Failure.

Meaning: – Any other error status returned to the WaveLAN / PCMCIA driver from the Protocol Manager, other than errors WVP003 and WVP004.

Action: – Verify that the protocol manager is specified properly in *CONFIG.SYS*, that the referenced *PROTOCOL.INI* file exists, and that the specified path for the *PROTOCOL.INI* file is correct.

WVP006: RegisterModule failed -- Invalid Function.

Meaning: – While trying to register itself with the Protocol Manager, the WaveLAN / PCMCIA driver sent an invalid function to the Protocol Manager.

Action: – Verify that the protocol manager is specified properly in *CONFIG.SYS*, that the referenced *PROTOCOL.INI* file exists, and that the specified path for the *PROTOCOL.INI* file is correct.

WVP007: RegisterModule failed -- Already Registered.

Meaning: – The WaveLAN / PCMCIA driver tried to register itself twice with the Protocol Manager.

Action: – Verify that the protocol manager is specified properly in *CONFIG.SYS*, that the referenced *PROTOCOL.INI* file exists, and that the specified path for the *PROTOCOL.INI* file is correct.

WVP008: RegisterModule failed -- General Failure.

Meaning: – The WaveLAN / PCMCIA driver received some other error status from the Protocol Manager while trying to register itself.

Action: – Verify that the protocol manager is specified properly in *CONFIG.SYS*, that the referenced *PROTOCOL.INI* file exists, and that the specified path for the *PROTOCOL.INI* file is correct.

WVP009: No configuration information was found for WVPCMCI$.

Meaning: – No configuration information was found in the PROTOCOL.INI file for the WaveLAN / PCMCIA driver.

Action: – Verify *PROTOCOL.INI* has section with `DRIVERNAME=WVPCMCI$.`

WVP010: "keyword" - bad keyword found.

Meaning: – An invalid keyword was found in the PROTOCOL.INI file.

Action: – Remove the invalid keyword from the file.

WVP011: "keyword" - keyword has too many parameters.

Meaning: – A valid keyword in the PROTOCOL.INI file had more parameters than expected.

Action: – Select valid parameter(s) for the specified keyword.

WVP012: "keyword" - parameter is of wrong type.

Meaning: – A valid keyword in the PROTOCOL.INI file had the wrong type of data (i.e. decimal not hex, or numeric not ASCII).

Action: – Correct the parameter in *PROTOCOL.INI*.

WVP013: MaxRequests parameter is out of range.

Meaning: – The number of MaxRequests must be in the range 1 - 10.

Action: – Correct the parameter in *PROTOCOL.INI*.

WVP014: MaxTransmits parameter is out of range.

Meaning: – The number of MaxTransmits must be in the range 1 - 50.

Action: – Correct the parameter in *PROTOCOL.INI*.

WVP015: NumMulticast parameter is out of range.

Meaning: – The number of multicast addresses must be in the range 5 - 20.

Action: – Correct the parameter in *PROTOCOL.INI*.

WVP016: NumReceiveBuffers parameter is out of range.

Meaning: – The number of receive buffers must be in the range 6 - 32.

Action: – Correct the parameter in *PROTOCOL.INI*.

WVP017: IRQ parameter is out of range.

Meaning: – The IRQ must be set to one of the following: 5, 10, 11, or 12. (This parameter is only valid when running the driver on a non-7450 terminal.)

Action: – Correct the parameter in *PROTOCOL.INI*.

WVP018: IOPortAddress parameter is out of range.

Meaning: – The IO Port Address must be set to one of the following: 300, 310, 320, 330, 350, 360, 380, 390, or 3A0. (This parameter is only valid when running the driver on a non-7450 terminal.)

Action: – Correct the parameter in *PROTOCOL.INI*.

WVP019: Multiple WVPCMCI$ modules found in PROTOCOL.INI.

Meaning: – There was more than one occurrence of the following entry: DriverName = WVPCMCI$.

Action: – Remove the extra occurrences of the keyword.

WVP020: "keyword" - found in module in PROTOCOL.INI more than once.

Meaning: – A keyword may only be listed one time in the *PROTOCOL.INI* file.

Action: – Remove the extra occurrences of the keyword.

WVP021: DOS_IOCTL call to Protocol Manager failed.

Meaning: – The interface between the WaveLAN / PCMCIA driver and the Protocol Manager failed.

Action: – Verify that the protocol manager is specified properly in *CONFIG.SYS*, that the referenced *PROTOCOL.INI* file exists, and that the specified path for the *PROTOCOL.INI* file is correct.

WVP022: RAM address parameter is illegal.

Meaning: – This parameter is not valid in a 7450 terminal.

Action: – Remove the invalid parameter in *PROTOCOL.INI*.

WVP023: Invalid command line format.

Meaning: – A WaveLAN / PCMCIA command line parameter in the CONFIG.SYS file did not begin with the "\" character.

Action: – Remove the invalid parameter in *PROTOCOL.INI*.

WVP024: Unknown command line option.

Meaning: – A WaveLAN / PCMCIA command line parameter in the CONFIG.SYS file was invalid.

Action: – Correct the line in *CONFIG.SYS*.

WVP025: IRQ value in CMOS is out of range.

Meaning: – The IRQ value in CMOS is invalid.

Action: – Correct using *Config Setup*.

WVP026: IOPortAddress value in CMOS is out of range.

Meaning: – The IO Port Address value in CMOS is invalid.

Action: – Correct using *Config Setup*.

WVP027: RAM address value in CMOS is out of range.

Meaning: – The RAM address value in CMOS is invalid.

Action: – Correct using *Config Setup*.

WVP028: CMOS check sum failed.

Meaning: – WaveLAN parameter area of RTC in CMOS is corrupted.

Action: – Re-initialized from Config Setup.

WVP029: "keyword" - illegal parameter on a 7450 unit.

Meaning: – This PROTOCOL.INI keyword is only to be used when the WaveLAN / PCMCIA driver is running on a non-7450 terminal.

Action: – Correct the line in *CONFIG.SYS*.

WVP030: Unable to allocate memory.

Meaning: – No more memory available under OS / 2.

Action: – Correct the line in *CONFIG.SYS*.

`WVP031: No PCIC found.`

Meaning: – A PC Card Interface Controller was not found. The PCIC is the hardware component that controls the PCMCIA socket. There is a possible I/O conflict at 3E0 - 3E1 or a possible PCMCIA hardware problem.

Action: – Resolve the I/O conflict at 3E0h - 3E1h. Run diagnostics on the PCMCIA interface. Replace the board with the PCMCIA socket.

`WVP032: CIS checksum error.`

Meaning: – The checksum of the Configuration Information Structure on the WaveLAN/PCMCIA adapter is corrupted. There is a possible RAM or I/O conflict.

Action: – Resolve the RAM Base and I/O Base conflicts. Verify that the WaveLAN/PCMCIA card is present. Replace the WaveLAN/PCMCIA card.

`WVP033: Wrong adapter in socket.`

Meaning: – The WaveLAN/PCMCIA adapter was not found. There is a possible RAM or I/O conflict.

Action: – Resolve the RAM Base and I/O Base conflicts. Verify that the WaveLAN/PCMCIA card is present. Replace the WaveLAN/PCMCIA card.

`WVP034: Error in powering up adapter.`

Meaning: – The WaveLAN/PCMCIA adapter did not power up correctly. There is a possible RAM or I/O conflict.

Action: – Resolve the RAM Base and I/O Base conflicts. Verify that the WaveLAN/PCMCIA card is present. Replace the WaveLAN/PCMCIA card.

WVP035: CIS error.

Meaning: – The Configuration Information Structure on the WaveLAN / PCMCIA adapter is corrupted. There is a possible RAM or I / O conflict.

Action: – Resolve the RAM Base and I / O Base conflicts. Verify that the WaveLAN / PCMCIA card is present. Replace the WaveLAN / PCMCIA card.

WVP036: PSA error.

Meaning: – The Parameter Storage Area on the WaveLAN / PCMCIA adapter is corrupted. There is a possible RAM or I / O conflict.

Action: – Resolve the RAM Base and I / O Base conflicts. Verify that the WaveLAN / PCMCIA card is present. Replace the WaveLAN / PCMCIA card.

WVP037: Unable to install at specified IRQ.

Meaning: – OS / 2 system call to install at specified IRQ failed, possibly because another driver is already installed there. There is a possible IRQ conflict.

Action: – Resolve the IRQ conflict.

WVP038: Unable to install timer tick handler.

Meaning: – OS / 2 system call to link the WaveLAN / PCMCIA timer handler to the OS / 2 timer routine failed, probably due to too many links already established.

WVP039: CenterFreq parameter is out of range.

Meaning: – The CenterFreq parameter must be 915 MHz or 2412 - 2487 MHz, in 0.5 MHz increments.

Action: – Correct the CenterFreq parameter in PROTOCOL.INI.

Installing the SLP Redirection Driver (SLPREDIR, or SLPRDRLG)

The SLP Redirector provides broadcast file transfer from a server that is running the SLP loader. The redirector is sent to the workstation as part of the initial boot block and is primarily used to transfer secondary load files down from the server.

There are two versions of the SLP redirection driver:

- SLPREDIR - maximum size of the file that can be transferred is 9,408,000 bytes.
- SLPRDRLG - permit larger files to be transferred, but uses more memory

Note: Except for the differences listed above the two redircection drivers are identical. This discussion in this section only refers to SLPREDIR but applies to both.

Using the SLP Redirector

The Redirector must have a *disk drive* to transfer the files to. The *disk drive* can be a standard disk drive or you can use the LAN Cache Driver. Standard disk drives include hard drives, flex drives, and RAM drives. In a diskless system a RAM drive is used.

Using the LAN Cache Driver

When using a standard disk drive, the Redirector first transfers the down-loaded file to the local disk drive, then loads the file from the local drive. This requires sufficient disk space to accommodate the size of the file. If you are using a RAM drive, this can be a significant RAM requirement for large files.

Example: If the file being requested is a large file (2 MB for example) you must have a 2 MB RAM Drive. Instead, the LAN Cache driver can be used.

By using the LAN Cache driver, only the size of the cache (default 64K) is needed to transfer the file. After the file is loaded into memory, the LAN Cache can be used again to transfer additional files.

Note: Only one file can be opened at a time on the cache.

Example: If a Phar Lap application is being loaded, the DLL files remain open during the execution of the application. Therefore, the DLL files must be transferred onto a RAM Disk and the Phar Lap application can be transferred through the LAN Cache.

Installing the Driver

The SLP Redirector is an installable driver. To use this driver you must have a command line like the following in your *CONFIG.SYS* file. Provided in your software package is a default *CONFIG.SYS* file called *config.slp* which contains sample (default) command lines for the drivers. Check that file for a typical command line for this driver.

Note: The SLP Redirector will not install if *BLIM.DOS* is not present. *BLIM.DOS* must be installed first.

Specify *SLPREDIR.DOS* in *CONFIG.SYS* as follows:

```
DEVICE=[d:][path]SLPREDIR.DOS[/D:xx][/P:x][/MIN:x]↵
 [/MAX:x] [/I][/R1:x][/R2:x][/A:x]
```

[d:][path] – The drive and directory path containing the *SLPREDIR.DOS* file.

/D:xx – A string of letters representing all the drives that should be redirected. If no drives are specified, only the *LANCACHE* drive will be redirected.

/P:x – The name of the directory where files should be deleted from to create space on the disk. It will be a directory off of the root of the drive in use. The directory will default to the name *SLPREDIR* if none is specified.

/MIN:x – Minimum Delay in milliseconds that is needed between frames. This value will be sent to the server and the server will add this delay between every frame that is transmitted to the workstation. The default value is 0. The valid range of values is 0 - 127 milliseconds.

/MAX:x – Maximum Delay in milliseconds that the terminal will wait for a frame from the server. Once data is being received, the terminal will wait this much time before requesting a re-transmit of the missing frames. The default value is 5000 milliseconds. The valid range of values is 128 - 32767 milliseconds.

/I – Indicates Immediate load. Tells the driver to respond to the first valid Load Response message instead of waiting the entire Accumulation timer value (*/A*). This causes the load to start faster. This parameter is recommended if a response is expected from only one server or if it doesn't matter which server performs the load.

The */I* parameter should not be used if multiple servers are present and are configured using the *load*

selector parameter in *groupdir.txt* to load certain workstations or files.

/R1:x – Request Retry count. The terminal will retry the Load Request this many times before returning a file not found error. The default value is 2. The valid range of values is 1 - 100 retries.

Note: For the DOS Loader, if you are experiencing load problems, try increasing the */R1* parameter to a higher value. The DOS Loader can load only one file at a time. If there are more than 2-3 workstations or multiple groups, increase this parameter so that the Loader has more opportunities to receive the Load Request. The OS/2 and UNIX Loaders can download up to 8 files at a time. If there are more than 8 groups or a high number of workstations (750), this retry parameter should be increased accordingly.

/R2:x – Time-out Retry count. The terminal will retry this many times when a time-out occurs in the middle of a load. The default value is 3. The valid range of values is 1 - 100 retries.

/A:x – Accumulation time in milliseconds that the terminal will wait for servers to respond to its load request. The terminal will wait for this amount of time for servers to respond before selecting a server to receive the requested file. Default value is 3000 milliseconds. Valid range of values is 1 - 30000 milliseconds.

If you are loading a large number of workstations (>10) you may encounter an extreme slow down in loading. Adjust the /A parameter for *slpredir.dos* to 1000 or greater.

For the DOS Loader, the */A* parameter can be reduced to gain some performance.

Note: To Improve the load performance, it is recommended that you specify complete file names (including extensions) for files which will be downloaded by the *slpredir* driver. If no extension is specified for a file to be executed, *slpredir* will request *.BAT, .COM, .EXE* (in this order) just as DOS does.

Error Messages

`SLP001: BLIM driver was not found`

Meaning: – The `BLIM` driver could not be opened.

Action: – Verify that the `BLIM` module is specified properly in *CONFIG.SYS* and that the *PROTOCOL.INI* file contains the information needed for the `BLIM` driver.

`SLP002: Call to BLIM Driver failed`

Meaning: – The `BLIM` driver did not respond to a request issued to it.

Action: – Verify that the `BLIM` driver is specified properly in *CONFIG.SYS* and that the *PROTOCOL.INI* file contains the information needed by the `BLIM` driver.

`SLP003: Deletable directory path too long`

Meaning: – The path specified for the deletable directory parameter */P* is longer than eight characters.

Action: – Correct the command line parameter.

`SLP004: Bad command line format`

Meaning: – Command line had unexpected characters such as an option that didn't start with /.

Action: – Correct the command line parameter.

`SLP005: Unknown option`

Meaning: – A parameter was specified which did not match any of the expected parameters.

Action: – Correct the command line parameter.

`SLP006: No value specified`

Meaning: – No value was given for a parameter that requires a value.

Action: – Correct the command line parameter.

`SLP007: Bad character in value`

Meaning: – An invalid character appeared in the string specifying an integer value.

Action: – Correct the command line parameter.

`SLP008: Minimum Delay out of range`

Meaning: – The minimum delay parameter */MIN* was outside of the valid range of 0-127 milliseconds (default: 0 milliseconds).

Action: – Correct the command line parameter.

`SLP009: Maximum Delay out of range`

Meaning: – The maximum delay parameter */MAX* was outside of the valid range of 128-32767 milliseconds (default: 5000 milliseconds).

Action: – Correct the command line parameter.

SPL010: Accumulation Time out of range

Meaning: – The accumulation time parameter */A* was outside of the valid range of 1-30000 milliseconds (default: 3000 milliseconds).

Action: – Correct the command line parameter.

SPL011: Request retry count out of range

Meaning: – The request retry count parameter */R1* was outside of the valid range of 1-100 retries (default: 3 retries).

Action: – Correct the command line parameter.

SLP012: Timeout retry count out of range

Meaning: – The time-out retry count parameter */R2* was outside of the valid range of 1-100 retries (default: 3 retries).

Action: – Correct the command line parameter.

DOS Error Message

`File Not Found`

Meaning: – Most likely to occur if the file is not present at the server.

Action: – Check for the file at the server and check the loader configuration.

Meaning: – The server timed out requesting a file, possibly because the server was busy.

Action: – Adjust the timing and retry parameters for the loader and for *SLPREDIR*.

Meaning: – If the SLP Redirector driver *(slpredir)* detects that there is not enough space on the redirected drive to transfer the file, DOS returns the *File Not Found* error message. Although the file is actually found and DOS should have returned the *Insufficient Disk Space* message, DOS is not aware that it is performing redirection from a remote disk drive.

Action: – Either make your RAMDISK larger or delete files to make room by using the /P parameter in *slpredir*.

Meaning: – This error can also occur if the LAN communications stack is not operating correctly.

Action: – Verify that the LAN drivers installed and bound successfully. Run the loadable diagnostics to verify the communication stack is working.

Chapter 13

Flash File System

Introduction

The Microsoft Flash File system is a file system that can be installed in addition to the MS-DOS FAT file system. This file system makes flash memory cards appear as a readable and writeable disk drives.

Hardware Requirements

- PCMCIA Standard 2.01 Interface
- Removable Memory Card

Software Requirements

- MS-DOS 5.0 or later
- Flash File System 2.0c For DOS Client

PCMCIA Memory Types

Flash Media

Flash memory has a number of characteristics that restrict the type of operations that a file system may perform on flash media. The following are six requirements for this file system mandated by the characteristics of Flash based media. The file system must:

- adapt to the native block size of the memory devices that the media is using
- minimize the need to rewrite any fixed areas in the media
- first erase a block before it can reclaim deallocated space within a block

- evenly distribute the erasure of blocks within the media
- evenly distribute directory and file control structures and data in the media

Also, directory and file control structures must not rely on the absolute location of related control structures or data within the media.

SRAM Media

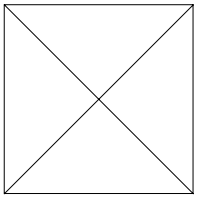
This file system will also support media that is based on SRAM memory, if they are formatted for the FAT file system. Whenever media is inserted or removed, the file system is notified by a device driver. If new media is inserted that the flash device driver cannot recognize as formatted for flash, the file system will stop redirecting file system accesses to the flash component of the file system. File accesses are then directed to the FAT file system.

File System Organization

The Microsoft Flash File System is organized and implemented in three distinct parts.

- The file system redirector intercepts the disk operations passed to DOS by an application, translates them into generic file operations, and passes them to the file system driver.
- The file system driver accepts generic file operations passed to it by the file system redirector, implements the logic of the Flash File System, and passes low-level I/O requests to the device driver.

- The device driver accepts low-level I/O requests passed to it by the file system driver and interacts directly with host system interface to the flash memory devices.



This architecture allows the system to provide a consistent API to applications while allowing for very different implementations of the physical device. The redirector and drivers are loaded with all the other device drivers at system boot time.

PCMCIA PC Memory Cards

The following memory cards are supported by the 7450 workstation.

Intel

- IMC001FLKA - 1 MB Flash Card - Series 1
- IMC002FLKA - 2 MB Flash Card - Series 1
- IMC004FLKA - 4 MB Flash Card - Series 1
- IMC002FLSA - 2 MB Flash Card - Series 2
- IMC004FLSA - 4 MB Flash Card - Series 2
- IMC010FLSA - 10 MB Flash Card - Series 2

Mitsubishi

- MF81MI-GIEATXX - 1 MB Flash Card
- MF31MI-L2DATXX - 1 MB SRAM
- MF82MI-GIEATXX - 2 MB Flash Card
- MF32MI-L2DATXX - 2 MB SRAM
- MF84MI-GIEATXX - 4 MB Flash Card

AMD

- AMC002FLKA - 2 MB Flash Card

Installing the Flash File System

1. Insert the installation diskette.
   Microsoft Flash File System 2.0c for DOS Client
   LPIN: G370-0504-0000

2. At the DOS prompt, type `A:` and press ENTER.

3. Type *install [drive:].*
   where: *drive* = the drive designator of the drive onto which you want to install the Flash File System.

You may view the directory to verify that the appropriate files were copied. The files that should be in the `FFS20` directory on your designation drive are:

- ms-flash.sys
- flashcmp.exe
- icardrv1.exe
- memcard.exe
- config.ffs

ICARDRV1.EXE

ICARDRV1.EXE is a device driver used by the File System Driver *MS-FLASH.SYS* to interact with the 7450 hardware. It must be set to match the PCMCIA in the 7450 workstation. See the *Configuration Setup* chapter in the *7450 Workstation Hardware Installation and Service* manual for information on setting the PCMCIA base address.

Note: *ICARDRV1.EXE* **MUST** be installed before *MS-FLASH.SYS* in *config.sys.*

MS-FLASH.SYS

MS-FLASH.SYS installs the Flash File System on the workstation. Please refer to the list of memory cards supported by the 7450 workstation in the *PCMCIA PC Memory Card* Section of this documentation.

MEMCARD.EXE

MEMCARD is a utility used to format, partition, and erase memory cards.

The *memcard* command can be used the following two ways:

- If you type *memcard* at the command prompt, you are given a series of menus to partition, format, erase, and check a memory card.
- If you use switches with the *memcard* command directly from the command prompt, you can format memory cards and check flash memory cards for errors.

FLASHCMP.EXE

FLASHCMP.EXE is an optional device driver that compresses the files as they are saved on a Flash memory card. Only those files saved after *FLASHCMP.EXE* is installed are compressed. If the *FLASHCMP.EXE* device driver is not installed, or if the */nocomp* switch is used when installing the *MS-FLASH.SYS* device driver, the saved files are not compressed.

Note: The device command for *FLASHCMP.EXE* must appear before *MS-FLASH.SYS* in your *config.sys* file.

CONFIG.FFS

The *CONFIG.FFS* file contains an example of the instructions required in *config.sys* for the Flash File System Installation.

Command References

ICARDRV1.EXE Commands

Syntax

```
device=[drive:][path]icardrv1.exe [/part=] [/base=]↵
[/slots=] [/queue=]
```

Parameters

[drive:][path] – Specifies the location of the icardrv1.exe.

Switches

/part – Specifies the maximum number of partitions per card.
Default = 1

/base – Specifies the starting address of the PCMCIA memory window in system memory. Valid entries are A0, A1, A2...E0 hex which selects a 32K memory window at A0000H, A1000H, A2000H...E0000H respectively.
Default = D000h

Caution: This parameter **MUST** be set to match the PCMCIA address in the 7450. Since the default setting for the PCMCIA card is E000, the default */base=* parameter setting would be */base=E0*. If you change the PCMCIA setting in the 7450, be sure to match it with a new */base=* setting.

/slots – Specifies the number of PCMCIA slots supported.
Default = 1 (7450 1.x hardware only supports 1 slot.)

Do not specify */slots = 2* unless the second slot is used for Flash File System.

Example: Do not specify */slots = 2* if a WaveLAN / PCMCIA is used in slot 2.

The Flash File System will not function with a PCMCIA-ATA card if the */slots* switch specifies the slot occupied by the ATA device. *ICARDRV1.EXE* will attempt to access the PCMCIA-ATA device and will destroy its configuration, causing drive C: to become inaccessible.

/queue – Specifies the number of concurrent erasures for cards that support background erasure (1-9)
Default = 2

/port – 100h - 300h. Location of ports. This parameter is preset at the factory and should NOT be changed.

MS-FLASH.SYS Commands

Syntax

```
device=[drive:][path]ms-flash.sys [/nocomp] [/cleanup=n]↵
[/erase=n] [/cache=e/x/n]
```

Parameters

[drive:][path] – Specifies the location of the MS-FLASH.SYS file.

Switches

/nocomp – Specifies that files saved on a flash memory card are NOT compressed. Use this switch if you load the *flashcmp.exe* device driver to start compression, but do not want files on your flash drive to be compressed. Only those files saved after you first use the */nocomp* switch do not get compressed.

/cleanup=n – Specifies how frequently deleted space is reclaimed. When you delete files from your flash memory card, the space that becomes free is not immediately available for use. Periodically, the Flash File System searches the card to identify these areas and to make the space available. Valid values for *n* range from 1 (least frequently) to 10 (most frequently). The default value is 5. Full memory cards work more efficiently with a higher number, and empty memory cards are more efficient with a lower number.

/erase=n – Specifies the maximum difference of erase counts between two adjacent blocks on a Flash memory card. Valid values for n range from 250 to 2000. The default value of 500 is recommended.

/cache=e/x/n – Specifies whether the Flash File System cache should be created in expanded memory (**e**), extended memory (**x**), or not at all (**n**).

The default value is **(e)**. If you do not have expanded memory, the default value is **(x)**.

Note: Install *icardrv1.exe* before installing *ms-flash.sys* file.

MEMCARD.EXE Commands

Syntax

```
memcard /fmt=drive:[/v=label]
memcard /chk=drive:[/f]
```

Parameters

drive: – Specifies the drive you want to format.

label – Specifies the volume label.

Switches

/fmt= – Formats the memory card partition associated with the specified drive.

/v= – Specifies a volume name for the newly formatted memory card.

/chk= – Checks the specified flash memory card partition for errors and displays a status report. If no drive is specified, *memcard* will check the current drive.

Using Memcard

Memcard is a setup and maintenance program used to maintain memory cards. You can use Memcard to do the following:

- Create and format a new partition
- Format an existing partition
- Delete a partition

- Display partition information
- Erase an entire memory card
- Check for errors, fix errors, and display the status of a memory card
- Select a different memory card slot

Usage Procedures

1. At the command prompt, type *memcard*. The following menu is displayed.

```
       PC Memory Card Setup Program Version 2.0
          (c) 1991-1992 Microsoft Corporation
Memcard Options
Current memory card slot: 1
Choose one of the following:
1. Create and format a new partition
2. Format an existing partition
3. Delete a partition
4. Display partition information
5. Erase entire memory card
6. Check memory card and fix errors
7. Select next memory card slot
Enter your choice. [4]
To quit memcard, press ESC.
```

2. Type the option you want to use and press ENTER.

3. To return to the main menu or to quit *memcard*, press the ESC key.

FLASHCMP.EXE Commands

Syntax

```
device=[drive:][path]flashcmp.exe
```

Parameters

[drive:][path] – Specifies the location of the *flashcmp* file.

Note: Install *flashcmp.exe* before installing *ms-flash.sys* in *config.sys*.

Chapter 14

Utilities

Boot Block Builder (BUILDER.EXE)

The boot block utility *(BUILDER.EXE)* generates the boot block images that are used when loading from an SLP server or when booting from a Flash card. It uses data from a DOS boot diskette and a configuration file (*LANLOAD.CFG* for SLP loading or *PCMCIA.CFG* for Flash card loading) to create the boot image.

The only requirement to build the base boot block image is a DOS boot diskette and the boot block files. However, to handle the SLP LAN loading scheme, the LAN drivers, extended and high memory drivers, SLP redirector driver *(SLPREDIR.DOS)*, and LAN cache driver *(LANCACHE.DOS)* are included in the image. The DOS boot diskette must contain the two system files that are required to boot and operate a DOS system, plus the following boot block files:

SLP Loading

- BB_INIT.SYS Parses and sets up the boot block
- BB_DISK.SYS INT 13h handler for boot block diskette requests when booting from the LAN

PCMCIA Loading

- BB_INIT.SYS Parses and sets up the boot block
- PCCARD.SYS INT 13 handler for booting from PCMCIA

BUILDER.EXE reads the entire boot diskette, sector by sector, storing the 7450 platform files and the DOS boot files as a boot block image. Booting from this image is the same as booting from the original boot diskette.

Note: The diskette must be formatted with both the /u switch (unconditional formatting) and the /s switch (creates a system disk).

If, after building the bootable diskette, you make changes to the diskette (files are changed or deleted), the diskette can become fragmented. This causes the boot block image to be appear larger than necessary. Rather than starting over (reformatting the diskette) you can run the DOS *DEFRAG* Utility to remove wasted space on the diskette before running the Boot Block Builder utility.

Command Line Parameters

BUILDER.EXE is executed from the DOS command line.

```
[drive:][path]BUILDER [/C:[d:][path]xxxxxxxx.xxx][/H][/HCFG][/NC]
```

[drive:][path]

specifies the location of *BUILDER.EXE*.

/C:[drive:][path]xxxxxxxx.xxx

specifies the location of the configuration file that *BUILDER.EXE* uses when creating the boot block image. The default name for this configuration file is *BUILDER.CFG*. Two sample configuration files are provided: *lanload.cfg* for SLP booting, and *pcmcia.cfg* for PCMCIA card booting.

/H

displays the BUILDER version number and displays information about the command line parameters.

/HCFG

displays the BUILDER version number and displays information about the image configuration file.

/NC

causes the BUILDER to build a non-compressed disk image (not used for SLP LAN boot block images).

Boot Block Image Types

You can create three different types of boot images with the Builder Utility. Each type has its own characteristics and limitations. The following table lists the types of images, and some of their characteristics. In later sections, the actual parameters needed to create the images are defined.

	Conventional Boot Block Images	Enhanced Boot Block Images	Extended Boot Block Images
Maximum Image Size	~400K	~600K	~1.44M
Requires LAN ROM update to 7450 2.1	No	No	Yes
Location of downloaded image	Conventional memory	Conventional memory	Extended memory
Final disk image location	Conventional memory	Extended memory	Extended memory
LANBOOT.DOS Required	No	Yes	Yes

These boot block types apply to LAN boot blocks. Since PCMCIA loading does not have the same memory contraints, conventional boot blocks should always be adequate for PCMCIA loads.

Conventional Boot Block

Conventional images are normally compressed and downloaded into conventional memory (<640K). These images have a limited size due to the initialization required by DOS and the various device drivers in the downloaded configuration.

BUILDER.CFG Parameters

The following table summarizes the available configuration file parameters for a Conventional Boot Block (defaults to BUILDER.CFG).

BUILDER.CFG parameter	Required	Default	Effect on Load Image
INIT	Yes	*None*	Boot Init file, usually BB_INIT.SYS
DISK	Yes	*None*	Boot Redirector file, usually BB_DISK.SYS *(PCMCIA loads use PCCARD.SYS)*
LOADSEG	No	0x7C0	Segment where image is loaded in conv. memory
TRANSFERSEG	No	0x7C0	Segment where execution starts after image load
IMAGEFILE	No	BOOTBLK.SLP	Image File Name
DRIVE	No	A:	Diskette drive to read actual boot disk
COMMENT	No	DOS500.IMG	Comment for image file

BUILDER.CFG parameter	Required	Default	Effect on Load Image
* SECTORREAD	No	ON	Boot disk read sector by sector versus Track read.
DOSWORKAREA	No	175	Kbytes to reserve for Initialization
DOUBLESPACE	No	OFF	If “OFF, removes DBLSPACE.BIN from image
DRIVESPACE	No	OFF	If “OFF, removes DRVSPACE.BIN from image
EXTENDEDMEMONLY	No	OFF	If “ON, creates extended boot image
ENHANCEDLOAD	No	OFF	If “ON, creates enhanced boot image
EXTENDEDWORKSIZE	No	64	Kbytes to reserve at 1M boundary*(only valid if non-conventional image created)*

* The recommended setting for SECTORREAD is OFF. If this parameter is set ON and EMM386 is used, the 7450 will suffer a degradation in performance.

Sample Conventional Boot Block Configuration Files

LANLOAD.CFG

```
INIT    bb_init.sys
DISK    bb_disk.sys
LOADSEG 0x7c0
TRANSFERSEG 0x7c0
IMAGEFILE   lanload.bbk
DRIVE   A
COMMENT DOS 6 Image
SECTORREAD  OFF
DOSWORKAREA 175
DOUBLESPACE OFF
```

PCMCIA.CFG

```
INIT    bb_init.sys
DISK    pccard.sys
LOADSEG 0x7c0
TRANSFERSEG 0x7c0
IMAGEFILE   pcmcia.bbk
SECTORREAD  OFF
COMMENT DOS 6.0 IMAGE
```

CONFIG.SYS Parameters

There are no special CONFIG.SYS recommendations to use Conventional Boot Blocks.

Tuning the DOSWORKAREA Parameter

DOSWORKAREA (SLP Loading Only)

This Parameter is used to specify how much memory in KB is left between the end of the memory image and the top of 640 KB. DOS puts a portion of *command.com* and certain buffers in this area which takes up about 64 KB. Microsoft's PROTMAN then puts a temporary *protocol.ini* image below the *command.com* work area which takes about 94 KB. Use the following table and memory map to calculate the size of your DOSWORKAREA parameter.

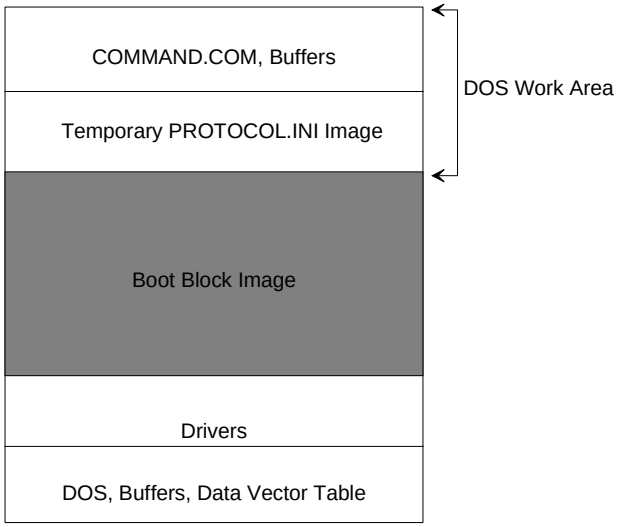
Example: Your workstation configuration consists of DOS 6.0 and Microsoft LM.

S/W Product	Size (K)	#1	#2
DOS 6.X	75	75	75
DOS 5.0	65		
DOS 3.3	20		
PROTMAN / NETBIND	100	100	
PROTMANS / NETBINDS	0		0
PROTMAN2 / PWBIND	0		
DOSWORKAREA		175	75

PROTMAN / NETBIND are used with Microsoft LAN Manager 2.2 and certain versions of Wollongong TCP / IP.

PROTMANS / NETBINDS are used with Microsoft LAN Manager 1.x and certain versions of Wollongong TCP / IP.

PROTMAN2 / PWBIND are used with certain versions of Wollongong TCP / IP.



Enhanced Boot Block Creation

Enhanced Boot Images are a combination of Conventional images and Extended images. These images have a larger size limitation than Conventional images, but do not require an update of the LAN ROM to the 7450 Release 2.1 LAN ROM. These Enhanced Images are loaded into conventional/base memory and then copied into extended memory during the initialization phase. The downloaded image is in compressed form, and the image is decompressed into extended memory for use by the redirected image.

BUILDER.CFG Parameters

The following table summarizes the available configuration file parameters for a Conventional Boot Block (defaults to BUILDER.CFG).

BUILDER.CFG parameter	Required	Default	Effect on Load Image
INIT	Yes	None	Boot Init file, usually BB_INIT.SYS
DISK	Yes	None	Boot Redirector file, usually BB_DISK.SYS *(PCMCIA loads use PCCARD.SYS)*
LOADSEG	No	0x7C0	Ignored (Value used is 0x7C0)
TRANSFERSEG	No	0x7C0	Ignored (Value used is 0x7C0)
IMAGEFILE	No	BOOTBLK.SLP	Image File Name
DRIVE	No	A:	Diskette drive to read actual boot disk
COMMENT	No	DOS500.IMG	Comment for image file
* SECTORREAD	No	ON	Boot disk read sector by sector versus Track read
DOSWORKAREA	No	175	Ignored, value is not used

BUILDER.CFG parameter	Required	Default	Effect on Load Image
DOUBLESPACE	No	OFF	If OFF, removes DBLSPACE.BIN from image
DRIVESPACE	No	OFF	If OFF, removes DRVSPACE.BIN from image
EXTENDEDMEMONLY	No	OFF	If ON, creates extended boot image
ENHANCEDLOAD	Yes	ON	If ON, creates enhanced boot image
EXTENDEDWORKSIZE	No	64	Kbytes to reserve at 1M boundary *(only valid if non-conventional image is created)*

* The recommended setting for SECTORREAD is OFF. If this parameter is set ON and EMM386 is used, the 7450 will suffer a degradation in performance.

The EXTENDEDWORKSIZE parameter allows for placing the disk image in extended memory at a location that is best suited for the system configuration. For example, if the EXTENDEDWORKSIZE parameter was set to the default of 64K and a 2M extended RAMDISK was then used, there would be a fragmentation of extended memory once the disk image was no longer needed (indicated by the execution of DIS_IMG.COM).

The following figures show the fragmentation:

Memory Address	Active Disk Image	Image After DIS_IMG.COM
1M	DOS / HMA / Himem	DOS / HMA / Himem
1M + 64K	Boot Disk Image (uncompressed)	Available (but isolated)
xxxx	RAMDisk (xx in size)	RAMDisk (xx in size)

Memory Address	Active Disk Image	Image After DIS_IMG.COM
xxxx + xx	Available	Available

By entering an EXTENDEDWORKSIZE parameter that is greater than the size of the RAMDisk + 64K, the free extended memory will be in one continuous address space when the image is no longer needed. This space can be used by the application later. An example of this allocation is as follows:

Memory Address	Active Disk Image	Image After DIS_IMG.COM
1M	DOS / HMA / Himem	DOS / HMA / Himem
1M + 64K	RAM Disk	RAM Disk
xxxx	Free	Free
Parameter	Boot Disk Image (uncompressed)	
Parameter + ?	Free	

Sample Enhanced Boot Block Configuration Files

LANLOAD.CFG

```
INIT    bb_init.sys
DISK    bb_disk.sys
IMAGEFILE  lanload.bbk
DRIVE   A
COMMENT DOS 6 Image
SECTORREAD OFF
DOUBLESPACE OFF
ENHANCEDLOAD   ON
EXTENDEDWORKSIZE   64
```

CONFIG.SYS Parameters

The following recommendations affect the CONFIG.SYS file when using Enhanced Boot Images:

- A High Memory support driver, such as HIMEM.SYS, must be present.
- The /TESTMEM:OFF parameter must be used on the HIMEM.SYS device line to prevent the destructive test that HIMEM performs from overwriting the Extended Memory boot image.
- It is HIGHLY recommended to include the LANBOOT.DOS driver immediately after the HIMEM.SYS line to safeguard the extended memory boot image from other users of extended memory, such as EMM386 and various RamDisks.

Sample CONFIG.SYS File

```
DEVICE=HIMEM.SYS /TESTMEM:OFF
DEVICE=LANBOOT.DOS
DEVICE=RAMDRIVE.SYS 2048 /E
DOS=HIGH
```

Extended Boot Block

Extended Boot Images are images that make full use of extended memory. These images have a larger size capacity (~1.44M) than the Enhanced images. Use of Extended Images requires that the LAN ROM be at least a 7450 Release 2.1 LAN ROM. These Extended images are loaded directly into extended memory by the LAN ROM which necessitates the newer LAN ROM. The downloaded image is not compressed and directly copied into extended memory also in non-compressed form.

BUILDER.CFG Parameters

The following table summarizes the available configuration file parameters (defaults to BUILDER.CFG).

BUILDER.CFG parameter	Required	Default	Effect on Load Image
INIT	Yes	None	Boot Init file, usually BB_INIT.SYS
DISK	Yes	None	Boot Redirector file, usually BB_DISK.SYS [PCMCIA loads use PCCARD.SYS]
LOADSEG	No	0x7C0	Ignored (Value used is 0x7C0)
TRANSFERSEG	No	0x7C0	Ignored (Value used is 0x7C0)
IMAGEFILE	No	BOOTBLK.SLP	Image File Name
DRIVE	No	A:	Diskette drive to read actual boot disk
COMMENT	No	DOS500.IMG	Comment for image file
* SECTORREAD	No	ON	Boot disk read sector by sector versus Track read
DOSWORKAREA	No	175	Ignored, value is not used
DOUBLESPACE	No	OFF	If OFF, removes DBLSPACE.BIN from image
DRIVESPACE	No	OFF	If OFF, removes DRVSPACE.BIN from image
EXTENDEDMEMONLY	Yes	ON	If ON, creates extended boot image
ENHANCEDLOAD	No	OFF	If ON, creates enhanced boot image
EXTENDEDWORKSIZE	No	64	Kbytes to reserve at 1M boundary *(only valid if non-conventional image created)*

* The recommended setting for SECTORREAD is OFF. If this parameter is set ON and EMM386 is used, the 7450 will suffer a degradation in performance.

EXTENDEDWORKSIZE

The EXTENDEDWORKSIZE parameter allows for placing the disk image in extended memory at a location that is best suited for the system configuration. For example, if the EXTENDEDWORKSIZE parameter was set to the default of 64K and a 2M extended RAMDisk was then used, there would be a fragmentation of extended memory once the disk image was no longer needed (indicated by the execution of DIS_IMG.COM). The following figures show the fragmentation:

Memory Address	Active Disk Image	Image After DIS_IMG.COM
1M	DOS / HMA / Himem	DOS / HMA / Himem
1M + 64K	Boot Disk Image (uncompressed)	Available (but isolated)
xxxx	RAMDisk (xx in size)	RAMDisk (xx in size)
xxxx + xx	Available	Available

By entering an EXTENDEDWORKSIZE parameter that is greater than the size of the RAMDisk + 64K, the free extended memory will be in one continuous address space when the image is no longer needed. This space can be used by the application later. An example of this allocation is as follows:

Memory Address	Active Disk Image	Image After DIS_IMG.COM
1M	DOS / HMA / Himem	DOS / HMA / Himem
1M + 64K	RAM Disk	RAM Disk
xxxx	Free	Free
Parameter	Boot Disk Image (uncompressed)	
Parameter + ?	Free	

Sample Extended Boot Block Configuration Files

LANLOAD.CFG

```
INIT    bb_init.sys
DISK    bb_disk.sys
IMAGEFILE   lanload.bbk
DRIVE   A
COMMENT DOS 6 Image
SECTORREAD OFF
DOUBLESPACE OFF
EXTENDEDMEMONLY    ON
EXTENDEDWORKSIZE   64
```

CONFIG.SYS Parameters

The following recommendations affect the CONFIG.SYS file when using Enhanced Boot Images:

- A High Memory support driver, such as HIMEM.SYS, must be present.
- The /TESTMEM:OFF parameter must be used on the HIMEM.SYS device line to prevent the destructive test that HIMEM performs from overwriting the Extended Memory boot image.
- It is HIGHLY recommended to include the LANBOOT.DOS driver immediately after the HIMEM.SYS line to safeguard the extended memory boot image from other users of extended memory, such as EMM386 and various RamDisks.

Sample CONFIG.SYS File

```
DEVICE=HIMEM.SYS /TESTMEM:OFF
DEVICE=LANBOOT.DOS
DEVICE=RAMDRIVE.SYS 2048 /E
DOS=HIGH
```

Boot Block Builder (BUILDER .EXE) Error Messages

BLDR001: Configuration file not found: [*filename*]

Meaning: – The Builder could not locate the configuration file specified

Action: – Verify that the configuration file exists in the directory specified. Default value: Builder.cfs

BLDR002: 'INIT' file not found: [*filename*]

Meaning: – The *[filename]* listed in the INIT parameter of the configuration file could not be found.

Action: – Verify that the *[filename]* exists in the directory specified.

BLDR003: 'DISK' file not found: [*filename*]

Meaning: – The *[filename]* listed in the DISK parameter of the configuration file could not be found.

Action: – Verify that the *[filename]* exists in the directory specified.

BLDR004: Cannot create the boot disk image file: [*filename*]

Meaning: – There was an error received when the Builder attempted to create the *[filename]* boot disk image.

Action: – Verify that there is enough disk space available and directory specified has been created.

BLDR005: Cannot read diskette in drive : [*drive letter*]

Meaning: – An error occurred when trying to read the boot disk.

Action: – Verify that the drive is working correctly and that the disk is correctly inserted into the drive.

BLDR006: Invalid command line parameter: [*parameter*]

Meaning: – There was a usage error in a specified command line parameter.

Action: – Review the usage of the command line parameters by executing the Builder with the /H option.

BLDR007: Invalid config file parameter: [*parameter*]

Meaning: – There was a parameter listed in the configuration file that was not recognized.

Action: – Review the usage of the configuration file parameters by executing the Builder with the /HCFG option.

BLDR008: Out of memory

Meaning: – There was not enough memory to run the Builder.

Action: – Verify that there is enough conventional memory available

BLDR010: 'INIT' parameter not found in config file.

Meaning: – The INIT parameter is a mandatory parameter of the configuration file.

Action: – Verify that the INIT parameter is listed in the configuration file specified.

BLDR011: 'DISK' parameter not found in config file.

Meaning: – The DISK parameter is a mandatory parameter of the configuration file.

Action: – Verify that the DISK parameter is listed in the configuration file specified.

BLDR012: Write Failure to file: [*filename*]

Meaning: – Could not write the Boot Block file.

Action: – Verify that there are no bad sectors on the destination drive.

BLDR013: Read Failure from file: [*filename*]

Meaning: – Could not read from the Boot Block disk.

Action: – Verify that there are not bad sectors on the source drive disk.

BLDR014: Boot diskette error: [*filename*]

Meaning: – General error reading from boot disk.

Action: – Try using another diskette.

BLDR015: INT 13H error: [*error*]

Meaning: – Low level INT 13 error while reading from the boot disk.

Action: – If using older drive hardware, make sure that the SECTORREAD parameter in the configuration file is set to ON.

BLDR016: Invalid config file parameter value: [*value*].

Meaning: – There is a value for a configuration file parameter that is not correct or out of range.

Action: – Review the usage of the configuration file parameters by executing the Builder with the /HCFG parameter.

`WARNING The Image may be too large`

Meaning: – Image has become corrupted

Remove files from the image or reduce the DOSWORKAREA.

`INFO Extended memory required is: [amount]`

Meaning: – Estimate of extended memory needed in the 7450 to successfully load the image

Action: – None. Information only

`WARNING Enhanced Image may be too large.`

Meaning: – Image has become corrupted

Action: – Remove files from the image

Boot Block Initialization File (BB_INIT.SYS) Error Messages

The following errors can occur after the image has been downloaded.

`BI001: Duplicate File found in Boot Block.`

Meaning: – Multiple system files found in the image (two *BB.INIT*)

Action: – Correct *BUILDER.CFG* and rebuild the image

`BI002: File not found in Boot Block.`

Meaning: – Required file not found (no BB_Disk, etc.)

Action: – Correct *BUILDER.CFG* and rebuild the image

`BI003: Incorrect DISK file for Uncompressed Image.`

Meaning: – *BB_DISK* specified for PCMCIA type image

Action: – Convert to the proper *BB_DISK/PCCARD.SYS*

BI004: Disk Image should be Uncompressed

Meaning: – Wrong type of Extended image was downloaded

Action: – Invoke *BUILDER* with the */NC* option

BI005: Not enough Extended Memory for Load Image

Meaning: – The image tried to use more memory than permitted

Action: – Rebuild the image with a smaller *EXTENDEDWORKSIZE*, or add extended memory to the 7450, or remove file(s) from the boot image

LANBOOT Error Messages

LANBOOT001: Invalid command line format

Meaning: – An unknown parameter was on the *DEVICE*= line

Action: – Remove / correct the line in *CONFIG.SYS*

LANBOOT002: Boot Block Redirector not located in system

Meaning: – *BB_DISK* (supports extended images) was not located

Action: – Update to the latest utilities or remove *LANBOOT*(not needed)

LANBOOT003: Boot Block type does not use extended memory

Meaning: – Wrong version of *BB_DISK*

Action: – Update to latest version and rebuild the image

LANBOOT004: Required XMS support driver not present

Meaning: – *HIMEM.SYS* or equivalent not in the configuration

Action: – Add the proper *HIMEM.SYS* line to *CONFIG.SYS* and rebuild the image

`LANBOOT005: XMS memory allocation failed`

Meaning: – A request to allocate memory from *HIMEM* failed

Action: – Change *EXTENDEDWORKSIZE* and rebuild the image

`WARNING: Boot Block Image starts in reserved area`

Meaning: – The image starts in the first 64K of extended memory (usually *HIMEM.SYS*)

Action: – This warning is information only to inform you of the condition. Verify if image is desired in the HMA area.

`WARNING: Boot Block Image contained in reserved area`

Meaning: – The image completely resides in the reserved XMS memory

Action: – This warning is information only to inform you of the condition. You may want to move it to avoid conflicts.

`WARNING: Boot Block Image is in conventional memory`

Meaning: – Old style image is being used. LAN boot is not required.

Action: – Remove *LANBOOT.DOS* from *CONFIG.SYS*, if desired

Boot Block Image Disable Utility (DIS_IMG.COM)

This utility must be run after accessing all the files from the Boot Block. It is best run as the first file in *LOADRTL.BAT*. If image corruption occurs while running an application or a utility after an SLP download, verify that the *DIS_IMG* utility has been run.

Boot Block Image Disable Utility Error Messages

`NCR Image Disable [`*`version`*`]`

Meaning: – This message displays when *DIS_IMG.COM* runs, along with one of the "`DISIMG`*`n`*" messages below.

`DISIMG1: Uninstalled INT 13h handler.`

Meaning: – Boot block redirection is terminated and the INT 13h vector is restored. The boot block is no longer in the INT 13h chain.

`DISIMG2: Boot Block image deactivated.`

Meaning: – Boot block redirection is terminated but the INT 13h vector could not restore the original address because other processes have chained into the interrupt. The boot block is still in the INT 13h chain but is in the passive mode.

`DISIMG3: Boot Block image not found.`

Meaning: – The image was already disabled, or an image was never present.

Note: This utility must be run after accessing all the files from the Boot Block. It is best run as the first file in *LOADRTL.BAT*. If image corruption occurs while running an application or a utility after an SLP download, verify that the *DIS_IMG* utility has been run.

Device Driver Loader (LOADDEV.COM)

LOADDEV.COM loads character and block device drivers from *AUTOEXEC.BAT* or the command line after *config.sys* parsing and loading is complete.

Note: When viewing memory with DOS *MEM* or some other command, all of the drivers appear to be installed as *LOADDEV*.

Initialization

Enter the following command, in the order shown:

```
[loadhigh] [path]LOADDEV.COM [/U][/S:hexsize][/NOPAUSE] /
D:[path]drivername [command line for driver]
```

/S:[hexsize]

is an optional parameter that forces LOADDEV to reserve hex size bytes of memory for the device driver during driver installation.

Example: To reserve 11,424 bytes of memory, enter "`/S:2CA0`" on the LOADDEV command line.

Use this option if the size of the driver becomes larger after it is installed. This will prevent the installed driver from over writing another area of memory.

Example: If a driver is loaded in upper memory and there is only 10 K available, and the size of the file is 9 K, *LOADDEV* will attempt to install the driver in 9 K. If after the driver installs the

run time size is 11 K, the driver could have written over ROM. By telling *LOADDEV* that the driver needs 11 K to run, *loaddev* will not try to load it into upper memory.

/U

used only with the *loadhigh* option - prevents *LOADDEV* from using conventional memory when attempting to load a device driver. If the */U* parameter is not present and *LOADDEV* determines there is not enough space in the UMB to hold both itself and the device driver, *LOADDEV* will either copy itself to conventional memory to make more space, or it will load the device driver in conventional memory.

/D:[path] drivername [command line for driver]

is mandatory, and identifies the device driver and its command line parameters that *LOADDEV.COM* loads into the DOS chain

/NOPAUSE

disables the prompt telling you to hit a key when the driver cannot be loaded successfully. This should only be used when the driver install errors can be ignored.

Device Driver Loader Error Messages

LD001: Dev driver filename required

Meaning: – Must have the `/D:[path]drivername` option on the command line.

Action: – Correct the command line.

LD002: Blk Driver failure - No drives

Meaning: – There were no block device drive letters available in the system.

Action: – Increase the `LASTDRIVE=` environment variable in *config.sys*.

LD003: Driver install failure: [driver name][DOS INIT failure message]

Meaning: – The device driver returned an error from the initialization routine due to a driver error.

Action: – Action should be based on the error messages displayed by the device driver.

LD004: Invalid command line argument

Meaning: – Check command line arguments for accuracy.

LD005: Not enough memory for driver [driver name]

Meaning: – There is either not enough conventional memory or not enough UMBs available to load this device driver.

Action: – If you are attempting to load in upper memory (LoadHigh), try loading in conventional memory.

Action: – Either the /S: parameter value is too large or too many drivers have been loaded.

LD006: Unable to load driver file [driver name][DOS INIT failure message]

Meaning: – The LOADDEV Utility could not load the driver into memory based on a DOS error. This error usually occurs when the device driver can not be found.

Action: – Verify that the drivername and the path (if specified) by the /D:[path]drivername correctly identifies the device driver and its location.

LD007: Invalid version of DOS

Meaning: – LOADDEV is not supported on DOS versions less than 3.3.

LD008: Driver not supported by LOADDEV: [SERIALDD.DOS or CDSD.DOS]

Meaning: – These drivers should not be loaded by LOADDEV. Use only `DEVICE=` in *config.sys*.

`LD009: Unable to open driver`

Meaning: – The driver specified by the "/D:<drivername> command line parameter could not be found.

Action: – Verify that the driver exists in the specified path.

`LD010 Driver larger than 64K`

Meaning: – LOADDEV does not load drivers that are larger than 64K.

`Warning: Loading driver in conventional memory`

Meaning: – The size of the UMB is not large enough to accommodate the device driver. LOADDEV loaded the driver in the lower 640 K area.

Flash File Transfer Utility (FLASHUTL.EXE)

FLASHUTL.EXE supports the following 7450 workstation PCMCIA (flash) card activities:

- Flash card memory dump
- Flash card load

FLASHUTL.EXE Functions

Create a Bootable Card

Creates a card that boots a 7450 workstation. If FLASHUTL.EXE is run in batch mode (load file is specified on the command line) all messages display as when it runs interactively; but no user intervention is required.

Copy Card to Card

This option duplicates a card. It reads the source card and stores the entire card in a temporary file on the hard drive. FLASHUTL.EXE copies the temporary file onto one or more new cards in succession.

Note: The source and target cards must be of the same size and type.

Create a Memory Dump Card

This option creates a card that can accept a memory dump of a 7450 workstation.

Copy a Memory Dump from a Card to a Disk File

This option moves the memory dump data from a memory dump card into a user-specified file on the hard drive.

Erase a Card

This option erases all data from a card.

Perform an Erase/Read/Write Diagnostic Test on a Card

This option performs the following diagnostic tests:

- Erase entire card
- Write a test pattern to a portion of the card
- Read back the data that was written to the card
- Verify that the data was both written and read correctly
- Repeat steps 2-4 until the entire card has been tested

Warning: This test is destructive, and leaves the test pattern on the card.

Command Line Parameters

FLASHUTL.EXE is executed from the DOS command line.

```
[d:] [\path\] FLASHUTL [loadfile] [curr_slot]
```

[d:] [\path\]

the drive and path where FLASHUTL.EXE file is located.

[load file]

the optional full path and file specification for the loadable (*.BBK) file used to create a loadable flash card.

Note: When `[load file]` is included on the command line, FLASHUTL.EXE automatically runs in the batch processing mode.

/[curr_slot]

an optional slot number to be enabled. This value dictates which card slot's card is programmed. The value range is 0 (slot 1) or 1 (slot 2).

Configuring FLASHUTL.INI

FLASHUTL.EXE configuration options are specified in the FLASHUTL.INI file, which must be located in the same directory with FLASHUTL.EXE. The configuration requirements include the following:

- The `[flashutl]` line must be first
- If a configuration line repeats, only the last occurrence is used
- Unknown variables are ignored
- Comments are not allowed
- Integer values may be entered in decimal (###), hexadecimal (0x####) or octal (\###)

Example FLASHUTL.INI File

```
[flashutl]
    win_attr=0x17
    help_attr=0x47

    error_attr=0x4f
    card_seg=0xc800
    num_slots=1
    curr_slot=0
    dump_code=c:\flashutl\mdflash.bin
    dump_dir=c:\flashutl\
    load_code=c:\flashutl\int_19h.sys
    slp_dir=c:\loadfile\*.bbk
```

win_attr

Controls the FLASHUTL.EXE window colors, by summing the desired values from the list below:

0x00 Black background

0x10 Blue background

0x20 Green background

0x40 Red background

0x01 Blue foreground characters

0x02 Green foreground characters

0x04 Red foreground characters

0x08 Bright foreground characters

0x80 Blinking foreground characters

Example: 0x17 yields white (blue + green + red = white) characters on a blue background. The default is black characters on a white background.

help_attr

Controls the color of the on-line help window, using the same variables and default as win_attr.

error_attr

Controls the color of the error messages displayed, using the same variables and default as win_attr.

card_seg

Defines the four-hexadecimal-digit memory segment (0xC800, for example) where FLASHUTL.EXE maps the PCMCIA window. The default is the temporary value in CMOS specified by the ROM setup program; or 0xE000 if no value is specified. Terminating FLASHUTL.EXE restores the default.

num_slots

Tells FLASHUTL.EXE how many PCMCIA hardware card slots are available: The default is 1.

def_slot

Tells FLASHUTL.EXE which card slot to use, where: 0 = slot 1 (default); 1 = slot 2; and so forth.

dump_code

The path and file specification for the dump logic file used to create a memory dump card. The default is "MDFLASH.BIN".

dump_dir

The path to the directory to which all memory dump cards are copied when "Copy memory dump to disk file" is selected. NOTE: End this path with a "\" character, which is also the default.

load_code

The path and file specification for the loadable card logic file used to make the flash card bootable. NOTE: This is *not* the *.BBK load file that defines the booted configuration. The default is "INT_19H.SYS".

bbk_dir

The path and file specification for the boot block load file, which must be created using BUILDER.EXE. The file specification may contain wild cards. The default is "*.BBK."

PCMCIA Interface Controller

FLASHUTL.EXE runs on any workstation or PC that provides a PCMCIA 2.0 card interface using the Intel 82365SL PCMCIA Interface Controller (PCIC). When copying using two card slots, however, copies must be made from the first slot to the second slot. Access to the PCIC is via I/O ports 3E0h and 3E1h.

PCMCIA Flash Cards

PCMCIA cards supported include any PCMCIA 2.0 memory card that is compatible with the Intel flash programming interfaces defined for Series 1 and Series 2 cards. Since FLASHUTL.EXE must issue commands to the flash card's memory devices in order to determine the card type and size, the card's write protect switch must always be off. No writes are actually made to the flash card without the user's explicit permission.

After FLASHUTL.EXE formats a flash card, it displays the amount of memory that can be dumped to the card. In general, this is equal to the total capacity of the card minus the size of an erase zone. Due to the block erase nature of flash devices, an entire erase zone must be reserved for MDFLASH.BIN itself. Consequently, if a 1MB Series 1 card with 8x128K bulk erase parts is used, a maximum of 768 KB of memory could be dumped (1024 KB-256 KB). Therefore, a 1MB card holds the 64 KB system CMOS, the 640 KB base system memory, and the first 64 KB of extended memory.

When selecting a card to be formatted to perform a flash card load, remember that the card must be large enough to hold both the load (*.BBK) image and the loadable card logic (INT_19H.SYS).

Chapter 15

Trouble-Shooting

Trouble-Shooting Guide

This section provides helps and hints for various conditions that can be encountered while installing the 7450 software. Either corrective action or an explanation is given for each condition.

SLP Load Problems

Refer to the *Tuning SLP Parameters* section in the *SLP LAN Loading* chapter for information on improving SLP performance.

DOS Error Message *File Not Found* When Doing an SLP Load

Meaning: – There are several conditions where this error could occur. The conditions and suggested actions are listed below.

1. File is not present at the server.

Action: – Check for the file at the server and check the loader configuration.

2. The server timed out requesting a file, possibly because the server was busy.

Action: – Adjust the timing and retry parameters for the loader and for *SLPREDIR*.

3. If the SLP Redirector driver *(slpredir)* detects that there is not enough space on the redirected drive to transfer the file, DOS returns the *File Not Found* error message. Although the file is actually found and DOS should have returned the *Insufficient Disk Space* message, DOS is not aware that it is performing redirection from a remote disk drive.

Action: – Either make your RAMDISK larger or delete files to make room by using the /P parameter in *slpredir*.

4. This error can also occur if the LAN communications stack is not operating correctly.

Action: – Verify that the LAN drivers installed and bound successfully. Run the loadable diagnostics to verify the communication stack is working.

DOS Error Message *General Failure* Reading LANCACHE drive

Meaning: – The SLPREDIR driver could not transfer the file error free.

Action: – Adjust SLP load parameters for the loader and SLPREDIR. Verify LAN operation.

7450 Hangs After First Stage of SLP Load

Meaning: – 7450 hangs after the Boot Block is downloaded, as control is passed to the Boot Block, or if the wrong file is loaded.

Action: – If the hang occurs after the initial part of the load, the file downloaded may not be a Boot Block file. Check the server configuration. Verify that the workstation's *Terminal ID* is unique on the network. Duplicate *Terminal IDs* can cause intermittent load problems.

These problems are more likely to occur with staggered loads than with workstations that are loading together.

7450 Halts Randomly After Booting from SLP

Meaning: – The workstation halts randomly after performing an SLP boot.

Action: – Check your *boot image* files to see if you have included the following lines to install certain retail device drivers.

```
device=a:\cdsd.dos
device=a:\serialdd.dos
```

These two retail drivers must loaded by the boot image instead of by the secondary load file *(loadrtl.bat)*.

Image Corrupted During an SLP Load

Meaning: – The Boot Block image may be too large.

Action: – Remove files from the image or reduce the DOSWORKAREA parameter. Or, try running the DOS DFRAG Utility on the boot diskette to reduce the size of the image. Rebuild the Boot Block image.

Image Corruption After an SLP Load

Meaning: – The image gets corrupted while running an application or utility, after an SLP load.

Action: – Verify that the DIS_IMG Utility has been run. For more information see *Tuning SLP Configuration Parameters* in the *SLP LAN Loading* chapter and *Installing the SLP Redirection Driver (SLPREDIR)* section in the *Installable Device Drivers* chapter.

Frequent Pauses or Many Frames Missed During SLP Load

Meaning: – Zero is recommended for BlockDelaytime parameter in the loader configuration file unless workstations are frequently missing frames and having to request that the Loader resend them. when downloading a boot block, this may be identified by frequent or long pauses between updates of the frame count. It is acceptable to miss a few frames while downloading a boot block, but many frames should not be missed. If the LAN ROM or NDIS MAC driver tallies indicate many errors with lack of receive resources or receiver not ready, it is likely that the server is sending blocks too fast for the workstation to handle.

Downloading Files Take Much Longer than Expected

Meaning: – To improve the load performance, it is recommended that you specify complete file names (including extensions) for files which will be downloaded by the *slpredir* driver. If no extension is specified for a file to be executed, *slpredir* will request *.BAT, .COM, .EXE* (in this order) just as DOS does.

Action: – The server timed out requesting a file, possibly because the server was busy. Adjust the timing and retry parameters for the loader and for *SLPREDIR*.

RPL Load Problems

7450 Consistently Hangs, Times Out, or Displays *MEMORY ERROR* Message During RPL Load

Meaning: – Check BASE parameter in RPL configuration file *DOSBB.CNF/DOSNCRE.CNF/etc.* on the server. It should be at lease 110H to avoid overwriting LAN Boot ROM data. Time outs are normally caused by network problems, but the BASE parameter may cause consistent time outs.

PCMCIA Load Problems

PCMCIA Load Failure

Meaning: – Check the PCMCIA address in *Configuration Setup*. Look for conflicts with ROMs, memory windows, etc. If EMM386 is installed, the PCMCIA window (32 K starting at address configured) must be excluded.

Action: – Make sure PCMCIA is enabled in *Configuration Setup*.

Miscellaneous Problems

Cannot Recover from Screen Blanking in Windows

Meaning: – When the retail device driver screen saver is used running under Windows, the operator display cannot be unblanked.

Action: – Windows hooks the keyboard interrupt and doesn't pass it down the chain. Because of this, if the screen blanks it isn't restored. Similarly, the customer display cannot be unblanked by keyboard input.

Avoid using the screen saver option in the operator display driver *(consoldd.dos)*. Use the */NOSAVE* option. It is also recommended to use the */NOSAVE* option for the customer display driver *(remdisp.dos)*.

Text Too Large on LCD Display in VDM Session

Meaning: – The text is sometimes over-sized on LCD Operator Displays when in an OS/2 2.1 VDM session.

Action: – Add the *MODE 80* command to your *autoexec.** file.

Underscores on LCD Display During Power Up

Meaning: – There are random underscores on some of the words while *config.sys* is processed.

Action: – This occurs only on LCD displays. No harm is done.

Random Lock-Ups, Particularly When DOS Commands are Issued

Meaning: – Check the STACKS parameter in *config.sys*. The recommended value is `STACKS=12,300`. If this is not adequate, increase the number and/or size of stacks.

Release 1.x Drivers Run on 2.x Hardware

Meaning: – Release 1.x drivers are not supported on Release 2.x hardware.

Action: – If 1.x drivers are inadvertently installed on 2.x hardware, CMOS must be reinitialized before the 2.x drivers will function properly.

Lock-Ups or Other Errors When Loading Drivers High

Meaning: – The DEVICEHIGH *config.sys* command is used to load device drivers into the upper memory area. By default, MS-DOS uses the file size of the driver to determine if it will fit in an upper memory area. However, some drivers are larger than their file size when they are loaded into memory.

Example: MTSTOUCH.SYS

Unpredictable errors, including lockups, will occur if these drivers are loaded into an area that is too small.

Command line parameters should be used with DEVICEHIGH to specify the amount of memory required to load any driver that requires more memory than its full size. This enables MS-DOS to find an upper memory area that is large enough for each driver.

The MEM command may be used to determine the size required for each driver. Refer to your MS-DOS documentation for more information on using DEVICEHIGH and MEM.

Appendix A

7450 System Software IDs

Software LPINs

Microsoft DOS 6.22 Operating System (LPIN: D370-0369-0000, Release 2.01.01)

This package is identical to the off-the-shelf Microsoft product. No changes have been made to any of the files.

- Base Drivers
- Standard Drivers
- DOS Kernel
- Standard Utilities

7450 Retail Platform for DOS and OS/2 VDM Support (LPIN: G370-0383-0000, Release 2.01.01)

This disk contains:

- Retail device drivers (*.DOS). There are *config.sys* file entries for each of these.
- Include files (*.H for "C"; *.BI for BASIC). These contain defined constants and structures that are included in your application.
- Library files ("C" TAPS, BASIC TAPS, and VCO/V). These are the retail libraries that are linked with your application

Filename	Description
ATADRV.DOS	PCMCIA-ATA Standby Mode Recovery Driver
CDSD.DOS	Common Driver Services Driver
CLOCKDD.DOS	Clock Driver
CMOSDRIV.DOS	7450 CMOS Driver
CONSOLDD.DOS	Console Driver
CONSOLEW.DOS	Wedge Console Driver
DSD.DOS	Diagnostic Services Driver

Filename	Description
IMSR.DOS	Integrated MSR Driver
IMSRW.DOS	Wedge MSR Driver
INPUTSEQ.DOS	Input Sequencer Driver
LINKMAN.DOS	RS-485 Link Manager Driver
LOADDEV.COM	Character / block device driver loader
MFP.DOS	Multifunction Printer Driver
MFP7192.DOS	7192 Printer Driver
MISCDRIV.DOS	Miscellaneous Driver
NPOWER.DOS	Power Control Driver
PCRS.DOS	Power Control Support Driver
OCIA.DOS	OCIA Driver
RDISPLAY.DOS	Retail Display Driver
RMSR .DOS	Remote MSR Driver
SERIALDD.DOS	Serial Driver
NCRINIT.EXE	Driver Initialization Utility
NCRINIT.MSG	NCRINIT Initialization MSG File
DIAG.EXE	Loadable Diagnostics utility
DIAG.MSG	Loadable Diagnostics message file
WEDGEDD.DOS	Wedge Driver
WEDGECHK.BAT	Batch file for loading TAPS driver based on the presence or absence of wedge hardware

Phar Lap DOS Extender Support (LPIN: G370-0385-0000, Release 2.00.04)

This diskette contains Phar Lap versions of the retail Include Files, Libraries, and DLL's that are used with TAPS, VCO, Touch Screen, and the NetBIOS routines. Also included is a runtime version of the Phar Lap software. The Phar Lap files can be used to run applications that have been compiled using Phar Lap. For application development using Phar Lap, you must purchase the *Phar Lap 286 | Dos Extender Software Development Kit (SDK)*.

Disk 1

Filename	Description
AUTOEXEC.PHL	
480X16.LIB	VCO/V VGA Video Function Library
ATIMER.H	TAPS/P Include file for TIM_* API's
C_JVCOV.LIB	VCO/V Japanese Phar Lap Library
C_PVCOV.LIB	VCO/V Phar Lap Library
C_TAPSP.LIB	TAPS/P Library
NETBDLL.DLL	NetBIOS/P Protect Mode DLL
NETBDLL.H	NetBIOS/P Include file for API's
NETBDLL.LIB	NetBIOS/P Protect mode import library
NETBIOS3.H	NetBIOS/P Standard include file
NETREAL.DLL	NetBIOS/P Real Mode DLL
NETREAL.LIB	NetBIOS/P Real Mode import library
TAPSIOP.H	TAPS/P Include file for TIO_* API's
TAPSPDLL.DLL	TAPS/P Protect Mode DLL
TAPSPDLL.LIB	TAPS/P Protect Mode import library
TAPSRDLL.DLL	TAPS/P Real Mode DLL
TAPSRDLL.LIB	TAPS/P Real Mode import library
TERMEXP.H	TAPS/P Include file for TEX_* API's

Filename	Description
TRANPTRP.H	TAPS/P Include file for TPM_* API's
VCO.H	VCO/V Include file for all VCO/V API's
VCOERRNO.H	VCO/V Include file for all VCO/V error code definitions
VCOMAIN.H	VCO/V Include file for VCO/V configuration
VCOMAINJ.H	VCO/V Include file for Japanese VCO/V configuration
VCOVSD.C	VCO/V Small demo program source
VCOVSD.EXE	VCO/V Small demo program
VCOVTINY.C	VCO/V Tiny demo program source
VCOVTINY.EXE	VCO/V Tine demo program
C_LVCOV.LIB	VCO/V Large model "C" Lib
C_MVCOM.LIB	VCO/V Medium model "C" Lib
B_VCOV.LIB	VCO/V BASIC Library
MTSR.DLL	Touch Screen DLL
MTSP.LIB	Touch Screen Library

Disk 2

Filename	Description
CFIG286.EXE	Reports Phar Lap switches used
DOSCALLS.DLL	Supports OS/2 DOS* API's
INT33.DLL	Protected mode INT 33 mouse driver
KBDCALLS.DLL	Support for OS/2 KBD* API's
MONCALLS.DLL	Support for OS/2 MON* API's
MOUCALLS.DLL	Support for OS/2 MOU* API's
MSG.DLL	Support for OS/2 MSG emulation
NAMPIPES.DLL	Support for OS/2 named pipes

Filename	Description
NCR286.EXE	Phar Lap DOS Extender
NCR286D.EXE	Phar Lap DOS Extender (debug version)
NLS.DLL	Support for OS/2 natural language
PHARLAP.386	Virtual device driver for Windows
QUECALLS.DLL	Support for OS/2 queue API's
SESMGR.DLL	Supt. for OS/2 session mgr. functions
TELLME.EXE	Hardware test and config. reporter
TELLPROT.EXE	Subset of TELLME.EXE
VIOCALLS.DLL	Supports OS/2 VIO* API's

Microsoft Netbeui v2.2 for DOS Client (LPIN: G370-0387-0000, Release 1.01.00)

This package provides a NetBIOS communication transport layer. In addition to this package, *NDIS MAC Driver for DOS Client* (G370-0437-0000) is required.

Filename	Description
LOAD.COM	Dynamically Loads the specified protocol
UNLOAD.COM	Dynamically Unloads the specified protocol
NETBEUI.EXE	Microsoft NetBIOS
NETBIND.COM	Binds the loaded protocols
PROTMAN.DOS	Protocol manager
PROTMAN.EXE	Protocol manager (works with PROTMAN.DOS)
PROTMANS.DOS	Protocol manager
NETBINDS.DOS	Binds the loaded protocols

Remote Log & Tally Access for DOS (LPIN: G370-0389-0000, Release 1.01.02)

This package contains a TSR routine that sends Error Log records (immediately), Power-Up Log records (when polled), and Tally information (when polled) to the server. The TSR communicates over NetBIOS using the NCB SEND command, therefore NetBIOS must also be installed to use this feature.

Filename Description

LTTSR.EXE Remote access to error logs and tallies

NDIS MAC Driver for DOS Client (LPIN: G370-0437-0000, Release 2.01.01)

The *Network Driver Interface Specification (NDIS) Media Access Control (MAC) Driver for DOS Client* software uses the Protocol Manager (PROTMAN.DOS) to provide an NDIS interface between the server LAN adapter and a communication stack at the workstation. This diskette also contains files that are only used on NCR products.

Filename	Description
NCRCSMA.DOS	7450 Ethernet / StarLAN NDIS MAC Driver
WVPCMCIA.DOS	7450 WaveLAN / PCMCIA NDIS MAC Driver
SLAN.DOS	705x StarLAN NDIS MAC Driver for Retail DOS 3.3
SLAN6X.DOS	705x StarLAN NDIS MAC Driver for DOS 6
NCR8003.DOS	705x Ethernet / MCA StarLAN NDIS MAC Driver for Retail DOS 3.3
NCR836X.DOS	705x Ethernet NDIS MAC Driver for DOS 6
NCRWAVE.DOS	7052 WaveLAN NDIS MAC Driver for Retail DOS 3.3
NCRWV6X.DOS	7052 WaveLAN NDIS MAC Driver for DOS 6
BLIM.DOS	Broadcast Loader Interface Module Driver
PROTOCOL.INI	Configuration file(s) for LAN Adapter
*.NIF	Driver Configuration files for Microsoft LAN Manager and IBM LAN Server
BLIM.XIF	Driver Configuration file for Microsoft LAN Manager
IBMLRFIX.COM	TSR for use with IBM LAN Requester
WAVESET.EXE	7450 WaveLAN / PCMCIA Adapter

Filename	Description
	Configuration Utility
NETBDOS.EXE	NetBIOS Diagnostic (ping pong) Program
NETBDOSP.EXE	NETBDOS.EXE for Phar Lap
PCLNDIAG.EXE	705x StarLAN Diagnostics
EZSETUP.EXE	705x Ethernet Adapter Configuration Utility
DIAGNOSE.EXE	705x Ethernet / MCA StarLAN Diagnostic Program
PTPDIAG.EXE	WaveLAN Point-to-Point Diagnostics
ENABLER.SYS	Enabler driver used with PTPDIAG.EXE for WaveLAN / PCMCIA
AUTOEXEC.NET	Sample Autoexec.bat for use with G370-0387-0000
AUTOEXEC.PW	Sample Autoexec.bat for use with G370-0441-0000 and G370-0442-0000

SLP Loader for UNIX Server (LPIN: G370-0438-0000, Release 2.00.00)

This package permits you to download SLP files from a UNIX server to a 7450 workstation using System Load Protocol (SLP). The files on this diskette are on a UNIX formatted diskette and must be installed on the UNIX server using PKGADD.

Filename	Description
SLP.CFG	Configuration file for SLPLDR
SLP.MSG	Message file used by SLPLDR
SLPLDR	SLP loader application
STARTSLP	Script file to start SLPLDR
STPSLP	Script file to stop SLPLDR
TERM.TXT	Terminal definition file
GROUP.TXT	Group definition file
GROUPDIR.TXT	Group search directory definition file

SLP Diskless Support for DOS Client (LPIN: G370-0439-0000, Release 2.01.01)

This package contains the files that are used to build an SLP file from a server.

Filename	Description
BUILDER.EXE	Boot Block Image Builder Utility
LANLOAD.CFG	Sample Configuration file for LAN boot block builds
LANLOAD.BAT	Sample Batch file to execute *BUILDER.EXE*
BB_INIT.SYS	Boot Block initialization file
BB_DISK.SYS	INT 13 Handler for booting from LAN
LOADDEV.COM	Character / block device driver loader
DIS_IMG.COM	Disk Image Disabler; returns Int 13h back to flex disk

Filename	Description
LANCACHE.DOS	Block driver for transferring files over the LAN
SLPREDIR.DOS	Redirector for transferring files (up to 9 MB each) over the LAN using the BLIM interface
SLPRDRLG.DOS	Redirector for transferring files (up to 45 MB each) over the LAN using the BLIM interface
SLPRD6X.DOS	Redirector for transferring files over the LAN for the DIR/DLC interface (705x only)
LANBOOT.DOS	Driver for protecting Extended LAN load images.

7450 Flash Load Support for DOS (LPIN: G370-0440-0000, Release 2.01.01)

This package permits you to build a bootable Flash Card using the System Load Protocol (SLP).

Filename	Description
BUILDER.EXE	Boot Block Image Builder Utility
PCMCIA.CFG	Configuration file for PCMCIA Boot Block builds
PCMCIA.BAT	Batch file for generating PCMCIA Boot Blocks
BB_INIT.SYS	Boot Block Initialization file
PCCARD.SYS	INT 13 Handler for booting from PCMCIA
INT_19H.SYS	INT 13 handler for PCMCIA
DIS_IMG.COM	Utility to disable the Boot Block Image and return INT 13 to the flex drive
FLASHUTL.EXE	Flash Card Utility
FLASHUTL.INI	Flash Utility Configuration File
MDFLASH.BIN	Required to create memory dump flash card

NDIS MAC Driver for OS/2 Client (LPIN: G370-0501-0000, Release 2.01.01)

Filename	Description
NCRCSMA.OS2	7450 StarLAN/Ethernet NDIS MAC Driver
WVPCMCIA.OS2	7450 WaveLAN/PCMCIA NDIS MAC Driver
SLAN.OS2	705x StarLAN NDIS MAC Driver for OS/2
NCR8003.OS2	705x Ethernet/StarLAN MCA NDIS MAC Driver for OS/2
NCRWAVE.OS2	705x WaveLAN NDIS MAC Driver for OS/2
PROTOCOL.INI	Configuration file(s) for LAN Adapter
*.NIF	Driver Configuration files for IBM LAN Server and Microsoft LAN Manager
NETBOS2.EXE	NetBIOS diagnostic (ping pong) program
WAVESET.EXE	7450 WaveLAN/PCMCIA adapter configuration utility
PCLNDIAG.EXE	705x StarLAN Diagnostics
EZSETUP.EXE	705x Ethernet Configuration Utility
DIAGNOSE.EXE	705x Ethernet Diagnostic Program
PTPDIAG.EXE	WaveLAN Point-to-Point Diagnostics
ENABLER.SYS	Enabler driver used with PTPDIAG.EXE for WaveLAN/PCMCIA

DOS SLP Loader (LPIN: G370-0502-0000, Release 1.00.01)

Filename	Description
SLP_TSR.EXE	DOS SLP Loader TSR
SLP_TSR.MSG	Message File Used by SLP_TSR.EXE
SLP_TSR.LOG	SLP error log
TERM.TXT	Terminal definition file
GROUP.TXT	Group definition file
GROUPDIR.TXT	Group Search Directory definition file
LOADER.INI	SLP Loader configuration file

OS/2 SLP/SLF Loader (LPIN: G370-0503-0000, Release 2.00.01)

This package permits you to download files from an OS/2 workstation/server to a 7450 workstation (using SLP), or to a 705x workstation (using SLF or SLP).

Filename	Description
LOADER.EXE	OS/2 SLP/SLF Loader
LOADER.INI	SLP Loader configuration file
SLM.MSG	Message File Used by LOADER.EXE
TERM.TXT	Terminal definition file
GROUP.TXT	Group definition file
GROUPDIR.TXT	Group Search Directory Definition File
BLIM.OS2	NDIS Broadcast Load Interface Module
SLIM.OS2	NDIS StarLAN Load Interface Module
ELIM.OS2	NDIS Ethernet Load Interface Module
*.XIF	Driver Configuration files for Microsoft LAN Manager
*.NIF	Driver Configuration files for IBM LAN Server

Microsoft Flash File System 2.0c for DOS Client (LPIN: G370-0504-0000, Release 2.00.00)

The Flash File System permits you to use a PCMCIA memory cards as a disk file system.

Filename	Description
MS-FLASH.SYS	Microsoft Flash File System driver
FLASHCMP.EXE	Microsoft Compression program
MEMCARD.EXE	Microsoft Card Formatting / Partitioning utility
ICARDRV1.EXE	Intel Low-Level driver
CONFIG.FFS	Configuration file for Flash File System

MicroTouch Touch Screen Drivers and Utilities (LPIN: G370-0525-0000, Release 1.01.00)

This LPIN includes the MicroTouch software and documentation, including *TruePoint, Pad Manager,* and *DrivePoint.*

KDS Support for 7450 (LPIN: G370-0529-0000, Release 2.01.04)

Filename	Description
2755DRV.SYS	Kitchen Display System Driver (KDS) CRT & Keypad
EVENT.SYS	Event Timer Driver
2755DIAG.EXE	Kitchen Display System Diagnostics Utility
DIAGKDS.LIB	Kitchen Display System Diagnostics Library

Windows NT SLP / SLF Loader (LPIN: G370-0610-0000, Release 1.00.00)

This package permits you to download files from a Windows NT PC server to a 7450 workstation (using SLP), or to a 705x workstation (using SLF or SLP).

Filename	Description
LOADER32.EXE	Windows NT SLP / SLF Loader
LOADER32.INI	SLP Loader configuration file
LOADER32.MSG	Message File Used by LOADER32.EXE
TERM.TXT	Terminal definition file
GROUP.TXT	Group definition file
GROUPDIR.TXT	Group Search Directory Definition File
BLIMNT.SYS	NDIS Broadcast Load Interface Module
OEMSETUP.INI	Installation data
DISK1	Installation Data

Novell Support (LPIN: G370-0657-0000, Release 2.02.00)

Filename	Description
ODICSMA.COM	7450 ODI Driver
DRIVER.DOS	Product support list file used by the ODI installation program
ODIVALUE.DOS	ODI Retail Value-Add Device Driver. Permits the 7450 ODI driver to communicate with other 7450 retail device drivers to achieve power management, error logs, tallies and tracing.

Wedge Support (LPIN: G370-0701-0000 Release 1.0)

This disk provides the Wedge Configuration Utility and sample programs that interface directly to the wedge input stream, instead of communicating with the Wedge Driver *(WEDGEDD.DOS)*. The Keyboard Buffer Driver is provided which increases the wedge data rate from 40 cps to 500 cps and the keyboard buffer size from approximately 16 to 400 words.

Filename	Description
WEDGECFG.EXE	Wedge Configuration Utility
KEYBBUFR.SYS	Wedge Keyboard Buffer Driver
ALLPARMS.CFG	Examples of each possible WEDGECFG parameter
DEFAULTS.CFG	Factory default WEDGECFG parameters
README.TXST	Description of sample files and how to use them
SAMPLE1.C	Source to the *default-mode* sample
SAMPLE2.C	Source to the *configured-using-WEDGECFG-mode* sample
SAMPLE3.C	Source to the *programming-to-the-wedge* sample

Filename	Description
SAMPLE3S.C	Source subroutines for SAMPLE3
SAMPLE1.MAK	MS-C++ NMAKE file for SAMPLE
SAMPLE2.MAK	MS-C++ NMAKE file for SAMPLE2
SAMPLE3.MAK	MS-C++ NMAKE file for SAMPLE3
SAMPLE2.CFG	WEDGECFG input file for SAMPLE2
SAMPLE3.H	Include file used by SAMPLE3
SAMPLE5.C	Sample code to access the keyboard part number and ID, keypad layout, and Alt-Ctl-Del mode.
SAMPLE5S.C	Subroutines for SAMPLE5.C
SAMPLE5.H	Include file for SAMPLE5.C
SAMPLE5.MAK	Makefile for SAMPLE5.C
MICROSEC.ASM	Subroutines that provide microsecond timing
SCANCODE.TXT	Key-Code to Scan-Copde to ASCII-Code translation table

7450 Memory Dump Analyzer (P / N: 497-0403186, Release 01.01.04)

This software is used format data retrieved from a 7450 memory dump. This is a Windows application. Install it from the Program Manager by using the normal procedures as installing other Windows applications. This diskette is only available from the Worldwide Service Parts Center.

Filename	Description
MSSETUP.EX	Installation / Setup file
MSTEST.EX	Installation / Setup file
CMDIALOG.VB_	Visual Basic file
MDA.DL_	DLL for MDA
MDA7450.EX_	MDA executable file
MDA7450.IN_	Installation / Setup file
MDA7450.LY_	Installation / Setup file
MDA7450.MS_	Installation / Setup file
MSCOMSTF.DL_	Installation / Setup file
MSCUISTF.DL_	Installation / Setup file
MSDETECT.IN_	Installation / Setup file
MSDETSTF.DL_	Installation / Setup file
MSINSSTF.DL_	Installation / Setup file
MSSHLSTF.DL_	Installation / Setup file
MSUILSTF DL_	Installation / Setup file
SETUP.EXE	Installation / Setup file
SETUP.LST	Installation / Setup file
SETUPAPI.IN_	Installation / Setup file
THREED.VB_	Visual Basic file for MDA execution
VBRUN200.DL_	Visual Basic file for MDA execution

7450 Diagnostics and BIOS Images (P / N: 497-0011051 - Diskette, Release 1.x)

(P / N: 497-0403119 - Flash Card, Release 1.x)

(P / N: 497-0404737 - Diskette, Release 2.x)

(P / N: 497-0404739 - Flash Card, Release 2.x)

This is a bootable diskette / flash card with a user-friendly menu for running the diagnostic application and programming the BIOS images.

The diagnostic files and the retail drivers are also included on *7450 Retail Platform for DOS and OS/2 VDM Support* (G370-0383-0000). This media is only available from the Worldwide Service Parts Center.

Filename	Description
DIAG.MSG	Diagnostics Message File
DIAG.EXE	Extended Diagnostics utility
CDSD.DOS	Common Services Device Driver
CLOCKDD.DOS	Clock Driver
CMOSDRIV.DOS	7450 CMOS Driver
CONSOLDD.DOS	Console Driver
DSD.DOS	Diagnostic Services Driver
INPUTSEQ.DOS	Input Sequencer Driver
IMSR.DOS	Integrated MSR Driver
LINKMAN.DOS	RS-485 Link Manager Driver
MFP.DOS	Multifunction Printer Driver
MFP7192.DOS	7192 Printer Driver
MISCDRIV.DOS	Miscellaneous Driver
OCIA.DOS	OCIA Driver
RDISPLAY.DOS	Retail Display Driver
RMSR .DOS	Remote MSR Driver
SERIALDD.DOS	Serial Driver
NPOWER.DOS	Power Control Recovery Driver
PCRS.DOS	Power Control Support Driver

Filename	Description
LOAD.COM	Loads the specified protocol
UNLOAD.COM	Unloads the specified protocol
PROTMAN.EXE	Protocol Manager
PROTMAN.DOS	Protocol Manager
NETBEUI.EXE	Microsoft NetBIOS
NETBIND.COM	Binds the loaded protocols
NETBIND.EXE	Binds the loaded protocols
BLIM.DOS	Broadcast Loader Interface Module Driver
NCRCSMA.DOS	7450 StarLAN / Ethernet NDIS MAC Driver
WVPCMCIA.DOS	7450 WaveLAN / PCMCIA NDIS MAC Driver
PROTOCOL.INI	Configuration File for NDIS LAN Drivers
NCRINIT.EXE	Driver Initialization Utility
NCRINIT.MSG	NCRINIT Initialization MSG File
COMMAND.COM	Bootable Diskette
AUTOEXEC.BAT	Bootable Diskette
CONFIG.SYS	Bootable Diskette
NETBDOS.EXE	Ping-Pong Application
FLSHBPRG.EXE	Flash BIOS Programming Utility
PCBIOS.B2X	PC BIOS Image (Rel 2.x)
PCSETUP.B2X	PC Setup Image (Rel 2.x)
VGABIOSM.B2X	VGA BIOS Image for CRT / Mono LCD (Rel 2.x)
VGABIOSC.B2X	VGA BIOS Image for CRT / Color LCD (Rel 2.x)
LCDBIOS.BIN	VGA CRT and Mono LCD ROM

Filename	Description
	Update Image (Rel 1.x)
LCDBIOSC.BIN	VGA Color LCD ROM Update Image (Rel 1.x)
PTPDIAG.EXE	WaveLAN Point-to-Point Diagnostics
ENABLER.SYS	Enabler driver used with PTPDIAG.EXE for WaveLAN / PCMCIA
ENHBIOS.B2X	Enhanced BIOS Image (Rel 2.x)
INTGRAFW.B2X	INTEGRA Firmware Image (Rel 2.x)
LANBIOS.BIN	LAN ROM Image
WAVEPROM.BIN	WaveLAN / PCMCIA ROM Image (Rel 2.x)

Wollongong TCP / IP Pathway Access 3.2 for DOS

The *Wollongong TCP/IP Pathway Access for DOS* is a superset of *Wollongong TCP/IP Pathway Runtime for DOS*. It contains the transport communication layer, RFC1001 / 1002 (NetBIOS) interface, and applications for Windows (such as Access) and applications for DOS (such as FTP and TELNET). In addition to this package, *NDIS MAC Driver for DOS Client* (G370-0437-0000) and any server software are required.

LPIN	Description
F075-0200-0000	1-User
F075-0220-0000	4-User
F075-0230-0000	8-User
F075-0240-0000	16-User
F075-0250-0000	32-User
F075-0260-0000	64-User
F075-0270-0000	128-User

LPIN	Description
F075-0280-0000	256-User
F075-0290-0000	512-User

Wollongong TCP / IP Pathway Runtime 2.0 for DOS

The *Wollongong TCP/IP Pathway Runtime for DOS* is a subset of *Wollongong TCP/IP Pathway Access for DOS*. It contains the transport communication layer and RFC1001 / 1002 (NetBIOS) interface. No application software is included. In addition to this package, *NDIS MAC Driver for DOS Client* (G370-0437-0000) and server software are required.

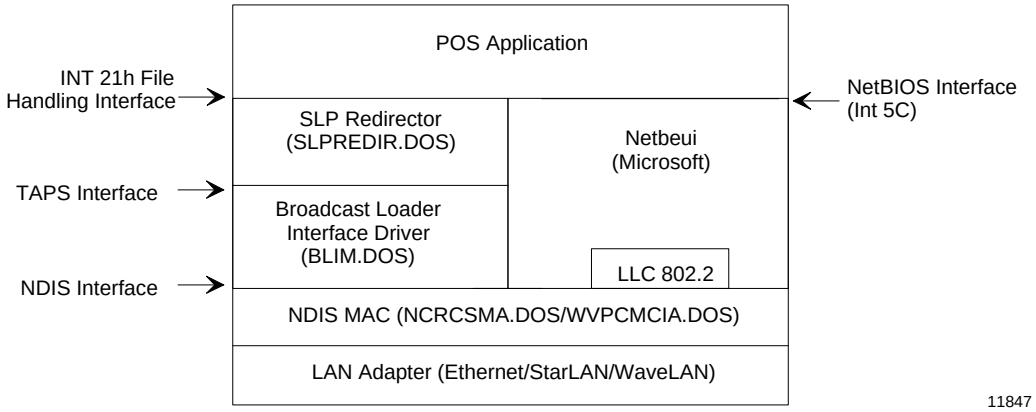
LPIN	Description
F075-0300-0000	1-User
F075-0320-0000	4-User
F075-0330-0000	8-User
F075-0340-0000	16-User
F075-0350-0000	32-User
F075-0360-0000	64-User
F075-0370-0000	128-User
F075-0380-0000	256-User
F075-0390-0000	512-User

Appendix B

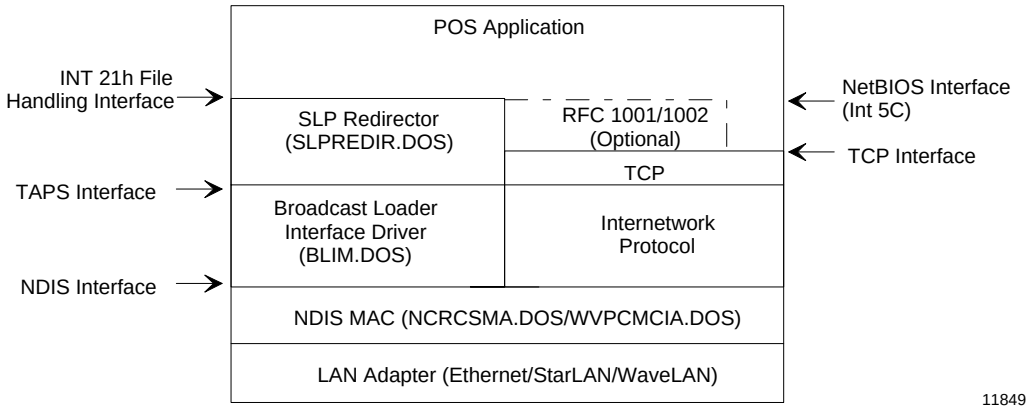
Communications Interfaces (Stacks)

SLP Load

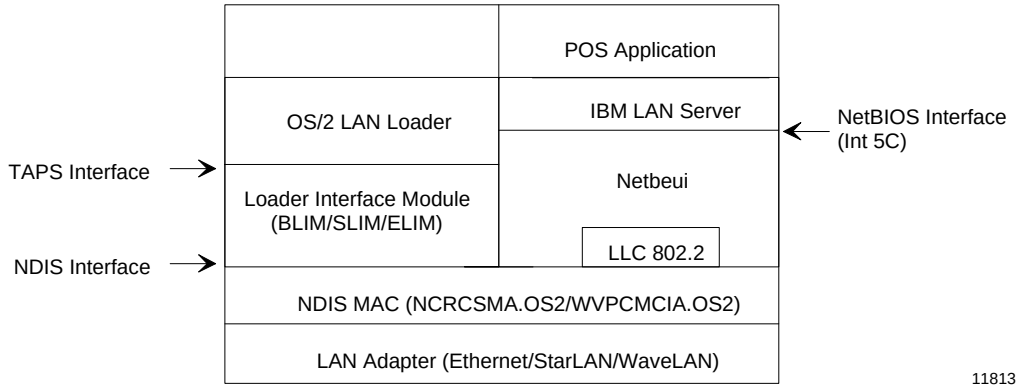
7450 DOS Workstation: Using Microsoft NetBEUI



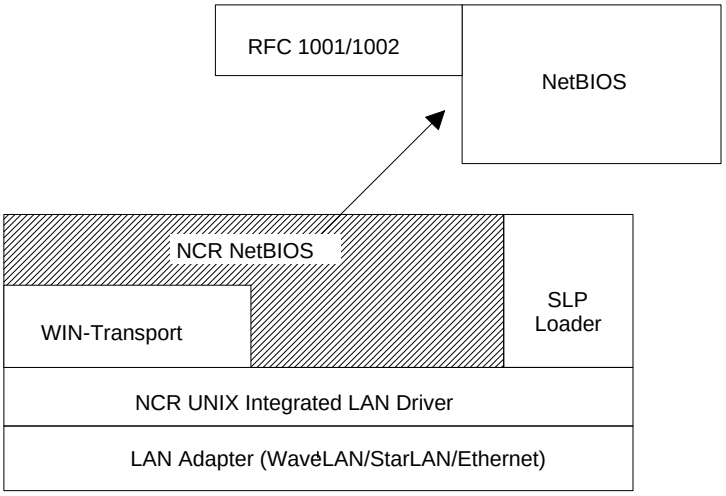
7450 DOS Workstation: Using Wollongong TCP / IP



7450 OS / 2 Workstation / Server

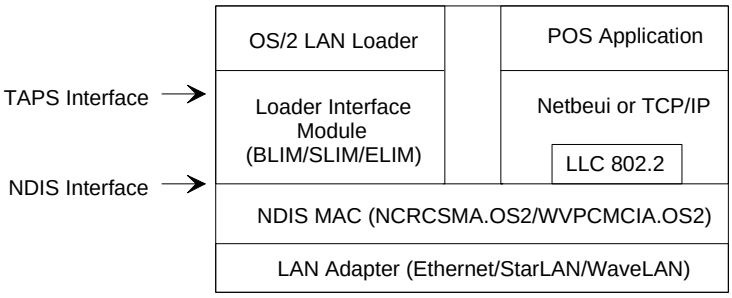


PC Server : UNIX V.4 SLP Loader



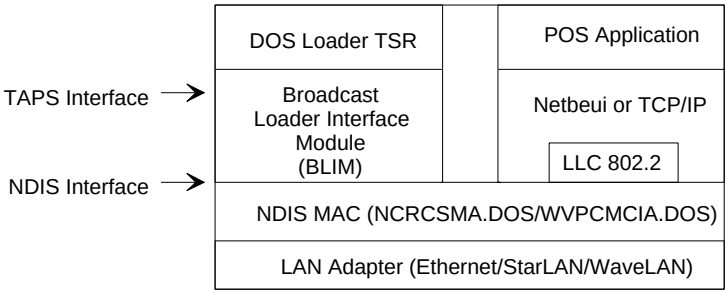
11843

PC Server : OS/2 SLP Loader



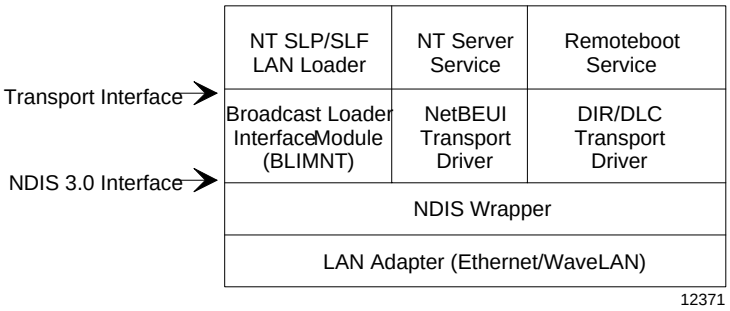
11850

PC Server : DOS Load Server



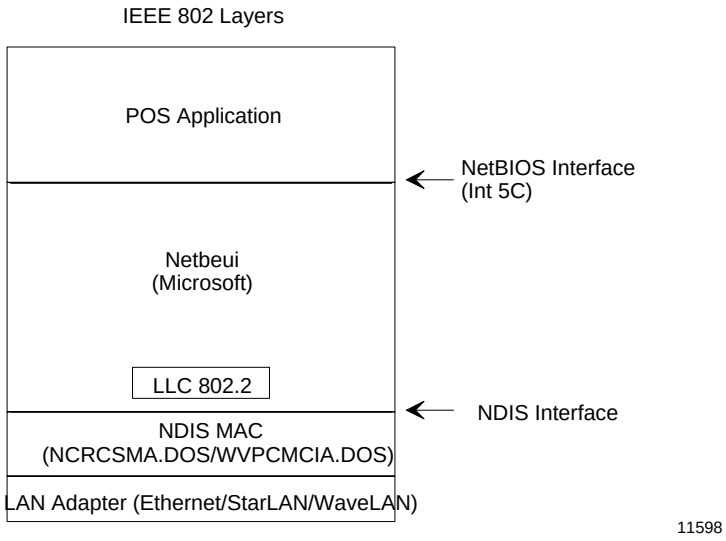
11851

PC Server : Windows NT Load Server

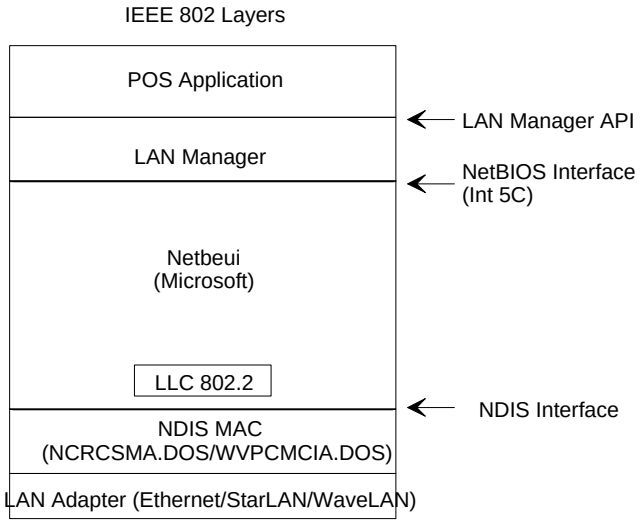


RPL, Local Hard Drive, or PCMCIA Load

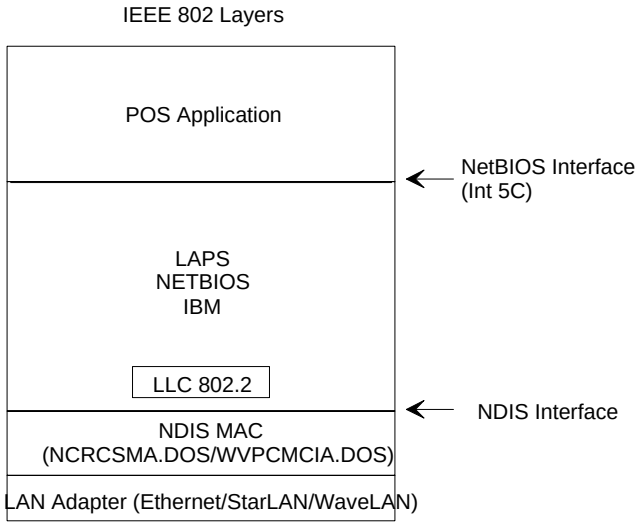
Using Microsoft Netbeui



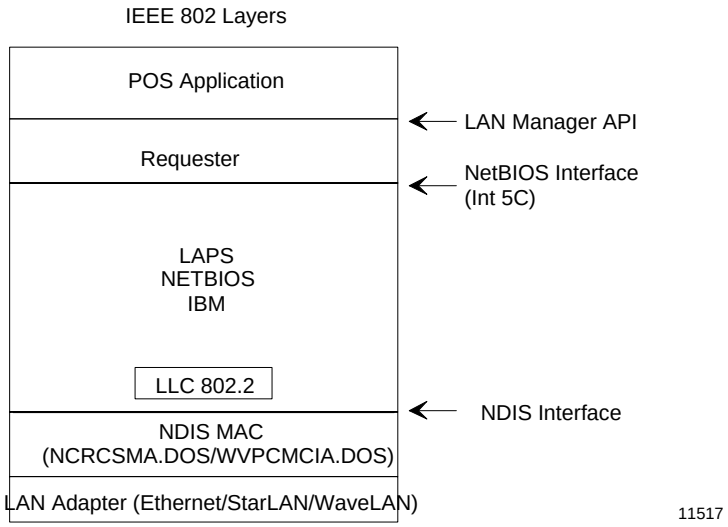
Using Microsoft LAN Manager and Netbeui



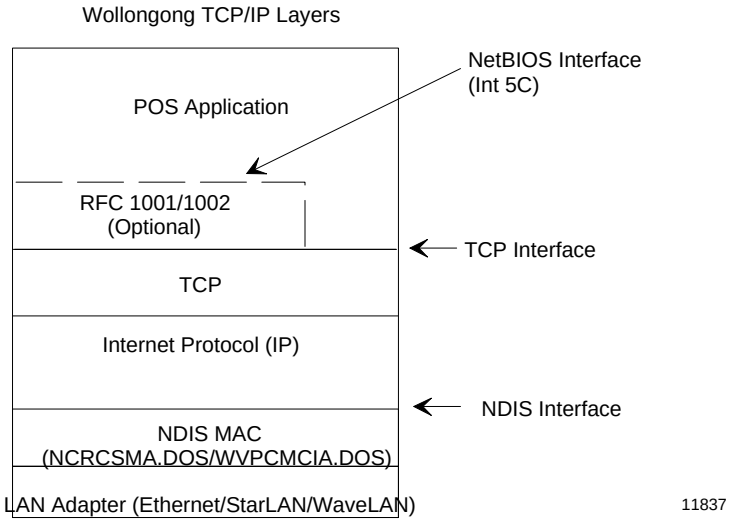
Using IBM LAPS



Using IBM LAN Requester NetBIOS



Using Wollongong TCP/IP



Appendix C

NetBEUI Parameters for Protocol.ini

Introduction

The *protocol.ini* file stores configuration information for all protocol and Network Device Interface Specification (NDIS) drivers.

When you start the workstation, the Protocol Manager program (*protman.dos* defined in *config.sys*) reads the *protocol.ini* file and passes the information in this file to the various network drivers as they are loaded. After the system in initialized, you can run the `netbind` command (either manually or in a batch file such as *autoexec.bat*) and the Protocol Manager binds the protocol and NDIS MAC drivers together. After this is done, you can access the NetBIOS commands.

In the *protocol.ini* file, there is a software module associated with each defined section. The module / section is represented by a name in square brackets.

```
[section-name]
 Name1 = value1
 Name2 = value2
```

Each section must have at least one entry: the `drivername= entry`, which specifies the drivername associated with this section.

In addition, every section that defines a protocol driver (NetBEUI) must have a `bindings=` entry, showing the driver or drivers to which the protocol binds. Bindings are specified in a top-down fashion, with each driver having a `bindings=` entry for the driver(s) at the next lower network layer.

NetBEUI Parameters

Use the default values when installing the NetBEUI driver. You can adjust the values later, when you have an idea of network performance. The following table summarizes the possible entries and values in the *protocol.ini* section.

When one of these parameters is entered in the *protocol.ini* file, it may be either uppercase or lowercase. Also, you only need to supply the parameters that you wish to change from the default, and they may be in any order.

The NetBEUI section has two required entries:

```
drivername = netbeui$
bindings =
```

It is also recommended that you set each of the following parameters equal to the number of workstations with which you plan to communicate.

```
sessions =
ncbs =
```

NetBEUI Parameters for protocol.ini:

ENTRY	MINIMUM	MAXIMUM	DEFAULT
ADAPTRATE	0	65,535	1,000 Milliseconds
BINDINGS	1 Character	8 Characters	None
CHAINX5C	0	1	0
DATAGRAMPACKETS	2	300	2 Packets
DLCRETRIES	1	65,535	5 Retries
DRIVERNAME	-	-	NETBEUI$
LANBASE	0	255	0
LOOPPACKETS	1	250	1 Packet
MAXIN	1	127	1 Packet
MAXOUT	1	127	1 Packet
MAXTRANSMITS	1	10,000	6 Packets
MINTRANSMITS	0	9,999	2 Packets
NAMES	2	254	17 Local Names
NCBS	1	255	12 NCB Descriptors
NETBIOSRETRIES	1	50	2 Retries
NETBIOSTIMEOUT	500	9890	500 Milliseconds
PACKETS	1	580	50 Packets
PIGGYBACKACKS	0	1	1 binary
PIPELINE	1	200	20 Packets
SESSIONS	3	117	6 Sessions
STACKSIZE	512	4096	2,048 Bytes
T1	50	65,535	500 Milliseconds
T2	50	65,535	200 Milliseconds
TI	1000	65,535	30,000 Milliseconds
WINDOWERRORS	0	10	0 Errors

A description of each of the parameters in the NetBEUI section is contained in the following paragraphs:

ADAPTRATE

Specifies the time in milliseconds between runs of the **adaptive window algorithm**. For each link, the NetBEUI driver uses the algorithm to tune the MAXIN and MAXOUT values to match the remote station's values as closely as possible. The algorithm also considers the conditions of the link (such as receiver adapter buffers, load, etc,).

When no dropped packets are detected, the adaptive window algorithm increases the send window (see MAXOUT). If dropped packets are detected, then the algorithm decreases the send window. Similarly, the algorithm adjusts the receive window based on time-out expiration of the t1 and t2 timers. Adaptrate should be large with respect to t1 and t2, usually above one second, but it can be smaller than ti.

A value of 0 turns off the algorithm, meaning that the MAXIN and MAXOUT values never change.

BINDINGS

Names the module that NetBEUI binds to. The NetBEUI driver can bind to only one NDIS driver under DOS.

CHAINX5C

Indicates that another protocol stack is chained by NetBEUI for INT 5C NCB processing. This must have the binary value 1 (on) if there are multiple protocol stacks.

DATAGRAMPACKETS

Specifies the number of data descriptors to allocate for packet sizing NetBIOS datagrams (both broadcast and directed) into UI-frames. The NetBEUI driver sends these UI-frames when performing SEND.DATAGRAM and SEND.BROADCAST.DATAGRAM NCB functions.

Increase the value of this entry if the NetBEUI driver is sending a large number of datagrams (for example, if this computer sends a lot of broadcast messages). The most common use of the datagrampackets entry in LAN Manager is the server announcement, which typically uses one data descriptor every minute and returns it immediately.

DLCRETRIES

Specifies the number of transmission retries that NetBEUI makes before assuming that the receiver's DLC layer is not responding. You can lower the value on a highly reliable network, where few packets are dropped. Raise the value on a network that is dropping many packets.

The types of network adapters on the network affect reliability, as some have limited buffering capabilities and may drop packets because of a buffer resource problem.

See the Netbiosretries entry for another limit on transmission attempts.

DRIVERNAME

Identifies the network driver. For the NetBEUI driver, the drivername is NetBEUI$.

LANABASE

Specifies the first LANA number serviced by the NetBEUI protocol. The NetBEUI driver accepts an NCB when the NCB's LANA number is equal to or higher than lanabase and lower than [lanabase plus the number of media access control drivers bound to the NetBEUI driver]. For more information about multiple protocol stacks, see chainx5c.

LOOPPACKETS

Specifies the number of frames to be looped back at one time.

MAXIN

Specifies the number of NetBIOS message packets to receive before sending an acknowledgment. This number is often called the DLC receive window.

When the adaptrate entry is present and it has the value zero, the MAXIN value is not dynamically adjusted. Otherwise, the NetBEUI driver adjusts the MAXIN value as described under the adaptrate entry.

Set the MAXIN value to be near but not greater than MAXOUT. If MAXIN is greater than MAXOUT, the t2 timer times out frequently and wastes link bandwidth.

MAXOUT

Specifies the number of NetBIOS message packets to send before expecting an acknowledgment. This number is often called the DLC send window.

When the adaptrate entry is present and it has the value zero, the MAXOUT value is not dynamically adjusted. Otherwise, the NetBEUI driver adjusts the MAXOUT value as described under the adaptrate entry.

Set the MAXOUT value to be near but not less than MAXIN. If MAXOUT is less than MAXIN, the t2 timer times out frequently and wastes link bandwidth.

MAXTRANSMITS

Specifies the number of packets that the NetBEUI driver can pass at once to the NDIS adapter card driver. If this number is small, the NetBEUI driver queues the packets internally. If this number is large, the NDIS adapter card driver takes greater responsibility for queuing the packets.

The value of this entry depends entirely on the NDIS adapter card driver's capabilities. You can experiment with the value and watch its effect on performance.

MINTRANSMITS

Specifies the number of transmission confirmations that NetBEUI must receive from the NDIS adapter card driver before sending more packets, after the NDIS adapter card driver returns an out-of-resource condition. This value should be smaller than MaxTransmits.

The value 0 has the same effect as the value 1.

The value of this entry depends entirely on the NDIS adapter card driver's capabilities. You can

experiment with the value and watch its effect on performance.

NAMECACHE

Specifies the number of remote names to store in a name cache.

If a name is in the cache, the NetBEUI driver doesn't need to broadcast to find it. If a name isn't in the cache, or if the cache is disabled (namecache=0), the NetBEUI driver always broadcasts to a NetBIOS functional address to send datagrams or establish sessions.

A name remains in the cache until one of the following events occurs:

- The named station does not respond.
- The cache is full; a new name replaces the oldest name.

NAMES

Sets the maximum number of NetBIOS names that may be defined. The first name is always the network adapter card's ID number.

NCBS

Specifies the number of NCB descriptors to allocate for managing NCBs submitted to NetBEUI. This controls the number of NCBs that can be submitted at once.

NETBIOSRETRIES

Specifies the number of times the NetBEUI driver retries transmissions of UI-frames at the NetBIOS

level before assuming that the receiver is not present. This is for name claims, session setups, and similar activities.

See the dlcretries entry for another limit on transmission attempts.

NETBIOSTIMEOUT

Specifies the time, in milliseconds, that the NetBEUI driver waits between retrying transmissions. See the Netbiosretriesentry.

PACKETS

Specifies the number of I-frame packet descriptors that the NetBEUI driver can use to build DLC frames from NetBIOS messages.

A 63K message typically consumes 50 packets. Increase the value of this entry for a server that sends to multiple clients simultaneously.

PIGGYBACKACKS

Controls whether NetBEUI sends and requests data acknowledgments piggybacked with incoming data. This increases network performance by sending data and an acknowledgment of received data in the same frame. A binary 1 means to send and request piggybacked acknowledgments; 0 means not to send and request them.

If `piggybackacks=1` on your computer and the other computer does not support piggybacks, the other computer should ignore the request and send a normal acknowledgment. You may want to set `piggybackacks=0` when the other computer may not

be returning sufficient packets to send piggybacks at a satisfactory rate.

PIPELINE

Specifies the number of NetBIOS message packets that are pre-built and waiting in a pipeline for each session. Increase this value if you usually send long streams of packets. Decrease the value if you expect to send short, occasional bursts of packets.

SESSIONS

Sets the maximum number of NetBIOS sessions that may be open at one time.

STACKSIZE

Sets the size, in bytes, of NetBEUI's internal stack.

The default value works well with all tested NDIS drivers. Some other NDIS drivers, however, may consume more stack and cause a stack crash. If this happens, increase the value of this entry. Some NDIS drivers, on the other hand, may not need much stack, and you can decrease the value of this entry to free up memory for other applications.

You could try decreasing it for a lightly-used network, but a spike of activity could then result in a stack crash.

t1

Controls the DLC re-transmission timer value, in milliseconds, for NetBIOS links. This is the delay before re-transmitting a frame if no DLC acknowledgment is received.

The three DLC timer entries must obey the following mathematical rules:

T1 should be several times larger than t2. On an Ethernet or Token-Ring network, a good value for t1 is 100-500. On asynchronous links (for example, a modem), t1 should be much larger, perhaps over 3,000, to permit for link delays. You may also want to increase t1 for a workstation that communicates with heavily-loaded servers.

t2

Sets the DLC delayed acknowledgment timer value, in milliseconds. This timer determines the delay

before acknowledging a received frame when the receive window has not been reached.

Ordinarily, the receiver of NetBIOS message packets collects the packets until the receive window (MAXIN) is full. The receiver then sends an acknowledgment to the sender. Often, however, the sender doesn't send enough packets to fill the receive window, and won't send any more until getting the acknowledgment signal. The t2 timer sends that acknowledgment.

If you set t2 too high, there may be long delays between transmissions (while the sender is waiting for acknowledgment). If you set t2 too low, you might generate acknowledgments before the receive window fills up, thus wasting time and lowering performance. In general, increase t2 when using a heavily-loaded network and decrease it for a lightly-loaded network.

See the t1 entry for an explanation of the relationship of the three DLC timer entries.

ti

Sets the DLC inactivity timer value, in milliseconds. This timer determines how often the NetBEUI driver checks an inactive link to see if it is still operational. In general, keep the ti value between 10,000 and 30,000 milliseconds to minimize unnecessary activity.

WINDOWERRORS

Specifies the minimum number of dropped packets that can occur between runs of the adaptive window algorithm before the algorithm can decrease the send window (see the adaptrate entry).

Without this minimum, a temporary load spike on the network could cause the adaptive window algorithm to decrease the send window too quickly. Keep the value low on a lightly-loaded network, and increase it for a heavily loaded network.

Glossary

Glossary

B

Bootstrap A program used to establish another program.

D

Disk Image A typical disk image consists of system files plus the NDIS driver, protocol manager, NetBIOS driver, extended and upper memory drivers, SLP redirector driver, LAN Cache driver, CDSD driver, SERIALDD driver, and CONFIG.SYS.

Data Compression The Boot Block Builder compresses the entire boot disk image (default) using the Run Length Encoding algorithm.

I

The data structure contained in the Load Server that the Loadable Device wishes to load.

INIT File (BB_INIT.SYS) NCR's boot block init code that is used to set up the boot block image for reading by the DISK File.

L

LD Loadable Device. A station on the network that is capable of accepting a load from a Load Server.

LS Load Server. A station on the network that is capable of providing a load for a Loadable Device.

P

Ping-Pong A test frame sent from an initiator workstation to a responder workstation and echoed back to the initiator workstation when running *NETBDOS.EXE* or *NETBOS1.EXE*.

R

Redirector Component that intercepts local disk data requests and transfers the request to local memory (RAM redirector) or remote server (LAN redirector).

Run Length Encoding A compression technique that will physically reduce the size of any character repeating sequence. Any character that appears 4 or more times is replaced by the three character sequence consisting of compression indicator, the repeated character and the number of consecutive occurrences.

S

SLP System Load Protocol. IEEE 802.1E / 802.1m standard which defines a protocol to load the memory of data processing equipment installed on IEEE 802 networks.

SLP Loader (SLPLDR, SLP_TSR, LOADER, LOADER32) Downloads LAN devices using the IEEE 802.1E / 802.1m System Load Protocol (SLP).

System Files *IO.SYS, MSDOS.SYS, COMMAND.COM* for DOS.

T

TSR Terminate and stay resident.

X

XMS Lotus / Intel / Microsoft / AST eXtended Memory Specification.

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