IBM

LANClient Control Manager Supplement G05L-1905-0

for IBM PCs Without Diskette Drives

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> **Note**
>
> Before using this information and the product it supports, be sure to read the information in Appendix A, "Notices and Trademarks" on page 37.

Contents

About This Book

This book will help you to become more familiar with IBM's LANClient Control Manager's (LCCM) operation with models of the PC 300GL that do not have diskette drives (Models 6272-88X, -89X, -90X, and 91X - hereafter referred to as the disketteless PC 300GL). Included in this book are methodologies and procedures that help explain the differences between this workstation and other IBM client workstations using LCCM.

This book supplements the information provided in the LANClient Control Manager's *Training and Procedures Guide* and is intended for network administrators already familiar with LCCM. To effectively use this book, you need a copy of the LANClient Control Manager *Training and Procedures Guide* for your particular server network and have read through it carefully.

Also, to familiarize yourself with the basic concepts of remote network management and protocols, refer to IBM's *Network Administrator's Guide*. The guide and other LCCM publications are available from World Wide Web. For web site addresses, see Appendix B, "World Wide Web Sites on the Internet" on page 39.

This book contains new information and modified procedures that are not included in the LCCM's *Training and Procedures Guide*. The following table is a guide to new and modified information relating to the *Training and Procedures Guide* and what information remains unchanged.

Training and Procedures Guide	**Supplemental information in this book**
Chapter 1, Overview and Concepts of LCCM	New concepts, see Chapter 1
Chapter 2, Installing and Running LCCM	Unchanged
Chapter 3, Working with the Interface	Unchanged
Chapter 4, Procedures	New procedures, see chapter 2
Chapter 5, Hybrid RPL Training Exercises	New instructions, see chapters 2 and 3
Chapter 6, Example Files	New example files, see chapter 4
Chapter 7, LCCM Utilities	Unchanged

Also included is a "Notices and Trademarks" section, a "World Wide Web" section, and an index.

Chapter 1. Overview of LCCM's Management of the disketteless PC 300GL

Overview

The disketteless PC 300GL is designed specifically for the network-managed environment with either a Ethernet or Token-Ring adapter installed and BIOS already configured for a network RPL startup sequence. Although the absence of a removable media drive (diskette and CD-ROM drives) enhances security by preventing unauthorized software from being installed from or copied to diskette or CD, it does present a challenge when creating a donor workstation from which to create client workstation images. Also, maintenance tasks that have been done traditionally through diskette or CD must be done through the network.

Because LCCM manages the workstation through a network connection, there is no need for a diskette or CD-ROM drive on the client. When LCCM processes tasks on the disketteless PC 300GL, it behaves like other IBM client workstations.

Donor Creation

Donor creation is the cornerstone for using LCCM as an image distribution tool. Without a diskette or CD-ROM drive on the donor workstation, installation processes and data transference must take place either between the LCCM server and the client workstation or, on the donor workstation's hard disk. The creation of a donor must start with the preparation of the donor workstation hard disk.

Most software applications need to be installed using external media with the operating system functioning. These processes are outside LCCM's standard abilities. Instead, LCCM will act as the transport mechanism for data and installation batch files from the server to the donor workstation.

Partitioning and file structure

Partitioning and defining the file structure of the donor's hard drive is key to creating an image that can be managed remotely and efficiently in the future. In general, the donor workstation's hard drive must have the following directory structure on it's active root partition.

```
C:\ --|
       |-OS_INST
       |
       |-IBMDIAG
       |
       |-DRIVERS
```

Note: You can name these directories any name you want, but the following names will be used throughout this book.

\OS_INST: This directory will contain the operating system's installation files.

> **Note:**   The directory, OS_INST, should be named after the type of operating system being installed on the system. For directory structure naming and placement on the LCCM server, see "Setting up the LCCM Server" on page 6.

\IBMDIAG: This directory will contain the contents of the IBM PC Enhanced Diagnostic diskette.

\DRIVERS: This directory will have subdirectories containing the contents of the PC 300GL device driver diskettes.

When installing an operating system, remember that LCCM supports only a FAT16 based partition for client workstation maintenance.

Installing Diagnostics

To run the IBM PC Enhanced Diagnostics,a DOS bootable partition must be on the client workstation. The diagnostic program runs an intensive and systematic set of diagnostics through a DOS runtime environment. This version will not run effectively from a DOS prompt window inside another operating system.

Windows 95 will allow the client workstation user to restart the workstation in a DOS environment without having to install DOS beforehand. Windows NT and OS/2 Warp will allow the user to select a DOS environment, provided that DOS was installed before the installation of Windows NT and that a dual boot startup process was created for both Windows NT and OS/2 Warp. For Windows NT, LCCM creates this dual boot process with a bootable DOS partition through it's *Hybrid-NT RPL* process. This procedure is covered fully in LCCM's *Training and Procedures Guide*. For information on creating DOS and other operating system images on donor workstations, see Chapter 2, "Creating a disketteless PC 300GL Donor" on page 5.

Installing Device Drivers

Device drivers are a crucial part of successfully maintaining a client workstation though it's life cycle. Because one cannot just walk up to this client workstation and insert an update diskette into the diskette drive, advanced planning and preparation must be made to the existing structure to include these files. By following the directory structure referenced earlier, you can see that file space has been allocated for these files. For procedures on installing these files, see Chapter 2, "Creating a disketteless PC 300GL Donor" on page 5.

Transporting the Donor Image

Transporting the image is the final step for building a donor workstation. LCCM's *Training and Procedures Guide* requires you to use the Donor Boot and BACKUP.BAT batch file process to copy the donor image to the LCCM server. This process is initiated from the donor and requires attendance at the donor workstation.

There is a new process called CLIENTCOPY that removes the need for the previous procedure. This new procedure allows for any client workstation on the LCCM LAN segment to become a donor workstation. The procedure is initiated from the server and uses both "push" and "pull" protocols to process the donor image. This process also removes the need for attendance at the donor workstation. For information on this new procedure, see Chapter 3, "Transporting Images" on page 17.

Chapter 2. Creating a disketteless PC 300GL Donor

Introduction

This section provides instructions on creating a donor workstation. Using the partitioning and directory structure mentioned in Chapter 1, each procedure will install an operating system or direct the downloading of installation files to the donor workstation.

At any time LCCM can download device drivers and diagnostics to the donor workstation, but only if the target partition has been formatted as a FAT16 partition. Device drivers and diagnostics must be downloaded to the donor workstation before an operating system installation takes place.

To create a donor image on a disketteles PC 300GL:

1. Satisfy the requirements for an LCCM environment. See "Prerequisites."

2. Set up the LCCM server to contain the installation and data files for each operating system to be installed, along with device drivers and the IBM PC Enhanced Diagnostics diskette files. See "Setting up the LCCM Server."

3. Disable the diskette device controller on the disketteless PC 300GL. See "Setting up the Client Donor" on page 9.

4. Create the operating system on the donor workstation. For more information, start with "Creating a DOS/Windows Donor" on page 10.

5. And finally, install applications, if any. See "Installing Applications" on page 15.

Prerequisites

Before you begin, you must have the following:

- A server attached to the LAN. The server must be functioning and have LANClient Control Manager already installed.
- The LANClient Control Manager Defaults notebook must be set up with the proper default information.
- A disketteless PC 300GL donor workstation. This workstation has a network adapter and meets the minimum hardware requirements to run any operating system.
- A copy of each donor workstation's operating system installation and data files placed in the appropriate LCCM server directory.
- The required number of licenses for all operating systems used in the creation of the donor workstation and subsequent client workstation images.
- IBM PC Enhanced Diagnostic diskette program files copied to the LCCM server IBMDIAG directory.
- All PC 300GL device drivers copied into the appropriate LCCM server DRIVERS\PC300GL subdirectories.

Setting up the LCCM Server

Within the *LCCM_install_dir*\, there are subdirectories from which LCCM pushes or pulls data from the donor workstation. The subdirectories are:

- \LCCLIENT for Novell NetWare

- \CLNTFILE for Windows NT

- \CLNTFILE for OS/2 Warp

Because this book deals with all server versions of LCCM v1.1, it is assumed that the network administrator knows which subdirectory in which to place the installation, image and batch files.

Within this directory:

1. Create an installation subdirectory for every operating system to be installed. Using a Windows 95 installation directory as an example, the LCCM server should follow this structure:

```
\LCCLIENT
    or
\CLNTFILE-|
          |-WIN95CAB
          |
          |-IBMDIAG
          |
          |-DRIVERS
```

Note: You can name these directories any name you want, but the following names will be used throughout this procedure:

\LCCLIENT or \CLNTFILE: This is LCCM's mapped client to server directory. In this procedure, this directory is mapped as drive X and the client hard disk is C. Your drive designations might be different.

WIN95CAB: This directory will contain the Windows 95 .CAB files and SETUP.EXE file.

Note: Other operating systems will have their own directory, except for Windows NT. (See LCCM's *Training and Procedures Guide*.) The other directory names are:

- IBMDOS70 - IBM PC DOS 7.0

- WINSTAL - Windows 3.1

- W311NST - Windows 3.11 (WFW)

IBMDIAG: This directory will have subdirectories that contain the contents of the DOS-based diagnostic diskette for a specific model.

DRIVERS: This directory will have subdirectories containing the contents of the individual device driver diskettes.

2. Insert the Windows 95 CD into the server's CD ROM drive.

3. Copy the content of the WIN95 directory on the CD to the server's WIN95CAB directory.

For other operating systems:

- For DOS, copy all DOS files, including IBMBIO.COM, IBMDOS.COM, and COMMAND.COM into the IBMDOS70 directory.

Note: IBM PC DOS is not a machine specific operating system, like Windows 95. The DOS directory can be transferred from one workstation to another or, to a server directory. The differentiation between workstations reside in the AUTOEXEC.BAT and CONFIG.SYS files. However, for DOS to be an active operating system on a client workstation, these rules must be followed:

a. The hard drive's active boot partition must be formatted using FAT16.

b. IBMBIO.COM and IBMDOS.COM must be the first two files applied, repsectively, to the first sectors of the hard disk's root partition, before any other files are applied.

c. COMMAND.COM must be at the same version level as that of the first two .COM files.

LCCM, through an .LCI file, will obey the above rules to create a DOS partition on a client or donor workstation. It will transfer the .COM files first and copy the rest of the files into a DOS directory. LCCM will, if necessary, edit the CONFIG.SYS and AUTOEXEC.BAT files through the personalization process.

- For Windows 3.1, copy all Windows 3.1 diskette files or CD-ROM files into the WINSTAL directory.

- For Windows 3.11, copy all Windows 3.11 diskette files or CD-ROM files into the W311NST directory.

4. Using the client's Ready-to-Configure CD, use the Diskette Factory feature to create diskettes for the following:

- All device drivers that pertain to the model you are installing.
- IBM PC Enhanced Diagnostics.

   Note: You might want to check the IBM Personal Systems Web site to see if later versions of device drivers are available. The files can be accessed at IBM's desktop support World Wide Web site. For the IBM URL address, see Appendix B, "World Wide Web Sites on the Internet" on page 39.

5. If you have an IBM PCI Wake On LAN Token-Ring Adapter installed in the client, create diskette 1 (LANAID and Diagnostics) and diskette 2 (Drivers) from the Token-Ring CD. See the documentation included on the Token-Ring CD for more information.

6. Create a directory under the DRIVERS directory and give it a name that identifies the client model or type. For example, PC300GL.

   Note: You can name this directory any name you want, but the name PC300GL will be used throughout this procedure.

7. Under the PC300GL directory, create a separate directory for each device driver diskette.

   Note: You might want to name the directories by function (for example AUDIO1, VIDEO1, NETWRK1, NETWRK2 and so on). It is also a good idea to create a log file containing the descriptions of each directory. A typical log file could look like the following:

```
NETWRK1: IBM 100/10 EtherJet PCI Adapter with Wake on LAN
         (Diskette 1: Device Drivers) Version 2.5
NETWRK2: IBM 100/10 EtherJet PCI Adapter with Wake on LAN
         (Diskette 2: Diagnostics and Help) Version 2.5
VIDEO1:  CIRRUS CLGD5446 Driver for Windows 95
         Version X.X
AUDIO1:  IBM 16-bit Sound Card for Windows 95
         Version X.X
```

8. Copy the content of each device driver diskette into its respective directory on the server.

- Use XCOPY to copy the subdirectories under the server's DRIVERS directory to the clients DRIVERS directory. For example,

```
XCOPY X:\DRIVERS *.* C:\DRIVERS *.* /s
```

> **Note:** If any of the device driver diskettes have a deep directory structure
> causing the XCOPY command to exceed 56 characters, the XCOPY
> command will terminate before copying all of the directories. If this
> occurs, use an archive program like PKZIP for DOS to zip the server's
> DRIVERS directory (and all subdirectories) into a single file residing on
> the client, then unpack it on the client.

9. Create a directory under the IBMDIAG directory and give it a name that identifies
   the client model or type. For example, PC300GL.

   > **Note:** You can name this directory any name you want, but the name PC300GL
   > will be used throughout this procedure.

10. Copy the content of the IBM PC Enhanced Diagnostic diskette into the
    IBMDIAG\PC300GL directory on the server.

As updates to device drivers, BIOS and diagnostics occur, you will need to identify
different levels by the product release date.

Setting up the Client Donor

Setting up a disketteless PC 300GL to become a donor workstation involves the same
methodology as that referred to in the LCCM *Training and Procedures Guide*. However,
one additional step is required, disabling the diskette drive controller.

Some installation programs reference a diskette drive during the installation process
which might cause the installation program to hang. By disabling the diskette drive
controller, the installation process bypasses the diskette recognition phase.

To disable the diskette drive controller:

1. Press **F1** during the startup sequence to enter the Configuration/Setup Utility Menu.

2. Select **System Security** from this main menu.

3. Select **Secure Hard Disk Drives and Diskette Drives** from the System Security
   menu.

4. In the Diskette Drive Access field, change the field from Enable to **Disable**.

5. Use the escape key to return to the main menu.

6. Select **Exit Setup** from the main menu and then select **Yes** to save the new settings
   and exit the Setup Utility.

OS/2 Warp Donor Workstation

The best method to install OS/2 Warp over an OS/2 network is by using LCCM in
conjunction with the IBM LAN CID Utility.

The IBM LAN CID Utility is a software distribution manager that redirects product
installation files to clients using SRVIFS, a NETBIOS application over your LAN. Thus,
the LAN CID Utility provides what is termed a redirected installation. The LAN CID
Utility is comprised of REXX procedures and several supporting modules that tracks the

current state of an installation across restarts and ensure that each step is run in the correct sequence.

LANClient Control manager allows you to RPL to a client the equivalent of the two boot diskettes required to start CID installation.

Creating a DOS/Windows Donor

The following instructions describe the general steps for installing DOS and downloading Windows 3.1 (3.11) installation software to a donor workstation for each server version of LCCM. In addition, you need to refer to the client workstation's Ready-to-Configure (RTC) CD for workstation specific driver information and diskette creation.

Token ring exception: For information on creating specific Token Ring drivers, see the Token Ring PCI Wake on LAN CD-ROM supplied with the hardware.

To install PC DOS 7.0 and Windows 3.1 (3.11) on the donor workstation:

1. Prepare the LCCM server by creating the WINSTAL directory and copying the Windows 3.1 installation and data files to the WINSTAL directory. See "Setting up the LCCM Server" on page 6 for more information.

2. Within the Software Profile Details notebook of LCCM, create a new profile and name it DOS_Donor.

3. Assign an .LCP file according to the partitioning requirements of the donor client workstation.

4. Using a text editor, create an .LCI file:

   a. This file will format the required boot partition, make the hard disk DOS bootable, and copy the DOS files from LCCM's installation directory to the DOS directory on the donor. It will create a WINSTAL directory on the donor and copy the installation files from LCCM to the WINSTAL directory. Finally, it will create and transfer directory structure and files for device drivers and IBM PC Enhanced Diagnostic diskette files.

   Note: This a generic file that works in the Windows NT server version of LCCM. Novell NetWare and OS/2 network administrators already familiar with LCCM will be able to recognize where their own directory structure will change to suit their own server.

   This file is also a generic file for the installation on DOS/Windows 3.1. DOS/Windows 3.11 follows the same batch file process except that the server and destination directories for the operating system installation files are changed to the W311NST directory.

```
REM **** Begin Process *****
net logoff
net logon administrator password
format D: < C:\lccm\format.dat
xcopy C:\lccm\IBMDOS70\ibmbio.com d:\
xcopy C:\lccm\IBMDOS70\ibmdos.com d:\
xcopy C:\lccm\IBMDOS70\command.com d:\
D:
md DOS
cd DOS
xcopy C:\lccm\IBMDOS70\*.* D:
cd \
md WINSTAL
cd WINSTAL
xcopy C:\lccm\WINSTAL\*.* D:
cd \
cd \lccm
REM Ready to copy diagnostics to d:
D:
cd \
md ibmdiag
cd ibmdiag
xcopy C:\lccm\ibmdiag\*.* d: /s
D:
cd \
md drivers
cd drivers
md netwrk1
REM TRANSPORT 100/10 ETHERNET DISK 1
C:
cd\
cd lccm\drivers\100disk1
C:\LCCM\PKZIP netwrk1.zip -rp *.*
xcopy netwrk1.zip d:\drivers\netwrk1
d:
cd\
cd drivers
cd netwrk1
C:\lccm\pkunzip -d netwrk1.zip D:
REM TRANSPORT 100/10 ETHERNET DISK 2
D:
cd \
cd drivers
md netwrk2
cd netwrk2
C:
cd\
cd lccm\drivers\100disk2
C:\LCCM\PKZIP netwrk2.zip -rp *.*
xcopy netwrk2.zip d:\drivers\netwrk2
d:
cd\
cd drivers
cd netwrk2
C:\lccm\pkunzip -d netwrk2.zip D:
REM TRANSPORT TOKEN RING PCI WAKE ON LAN DISK 1
D:
cd \
cd drivers
md tokdisk1
cd tokdisk1
C:
cd\
cd lccm\drivers\tokdisk1
C:\LCCM\PKZIP tokdisk1.zip -rp *.*
xcopy tokdisk1.zip d:\drivers\tokdisk1
d:
cd\
cd drivers
cd tokdisk1
C:\lccm\pkunzip -d tokdisk1.zip D:
```

```
REM TRANSPORT TOKEN RING PCI WAKE ON LAN DISK 2
D:
cd\
cd drivers
md tokdisk2
cd tokdisk2
C:
cd\
cd lccm\drivers\tokdisk2
C:\LCCM\PKZIP tokdisk2.zip -rp *.*
xcopy tokdisk2.zip d:\drivers\tokdisk2
d:
cd\
cd drivers
cd tokdisk2
C:\lccm\pkunzip -d tokdisk2.zip D:
REM **** Finished Process ********
```

      b. Save the file as DOSWIN.LCI.

5. Assign the DOSWIN.LCI file to the DOS_Donor software profile and close the Software Profile Details notebook.

6. Assign the donor workstation to the DOS_Donor profile and process this assignment.

7. Turn the donor workstation back on after LCCM has finished processing the donor workstation.

8. Change the directory to \WINSTAL and start the installation process.

9. When you need to install the required device drivers, direct the program to the appropriate \DRIVERS subdirectory located on the donor workstation's hard disk.

    Note: Refer to your device driver's README.TXT file to select the correct Windows 3.1 (3.11) device drivers.

This completes the task for creating a Windows 3.1 (3.11) operating system with the appropriate device drivers and IBM PC Enhanced Diagnostics for the diskletteless PC 300GL. See "Installing Applications" on page 15 for information on installing applications on the donor workstations.

Creating a Windows 95 Donor

The process of installing Windows 95 takes place on the donor workstation's hard disk. The ability of Windows 95 to update itself from it's CAB files also creates the necessity of having the CAB files placed directly on the client workstation. By having the CAB files on the client workstation, there is no need for a network connection to pull the cab files from a server thereby eliminating unnecessary client/server traffic.

Selected subdirectories under LCCM's DRIVERS directory will be transferred to the donor during this procedure. The network adapter device driver files must be on the donor hard disk at the time of Windows 95 installation. Windows 95 cannot connect back to the LCCM server during installation to receive the device driver files. Diagnostics files are transferred to the donor during this procedure to create a Windows 95 image with diagnostics included.

To install Windows 95 on the donor workstation:

1. Within the Software Profile Details notebook of LCCM, create a new profile and name it WIN95_Donor.

2. Assign an .LCP file according to the partitioning requirements of the donor client workstation.

3. Using a text editor, create an .LCI file:

   a. This file will format the required boot partition and copy the Windows 95 CAB files directory to the directory on the client. Also, it will create and download the directories and files for diagnostics and device drivers.

      Note: This a generic file that works in the Windows NT server version of LCCM. Novell NetWare network administrators already familiar with LCCM will be able to recognize where their own directory structure will change to meet LCCM's requirements.

```
REM **** Begin Process *****
net logoff
net logon administrator password
format d: < C:\lccm\format.dat
xcopy C:\lccm\nt\ibmbio.com d:\
xcopy C:\lccm\nt\ibmdos.com d:\
xcopy C:\lccm\nt\command.com d:\
C:
cd \
md WIN95CAB
cd WIN95CAB
xcopy C:\lccm\WIN95CAB\*.* D:
cd \
cd \lccm
REM Ready to copy diagnostics to d:
D:
cd \
md ibmdiag
cd ibmdiag
xcopy C:\lccm\ibmdiag\*.* d: /s
D:
cd \
md drivers
cd drivers
md netwrk1
REM TRANSPORT 100/10 ETHERNET DISK 1
C:
cd\
cd lccm\drivers\100disk1
C:\LCCM\PKZIP netwrk1.zip -rp *.*
xcopy netwrk1.zip d:\drivers\netwrk1
d:
cd\
cd drivers
cd netwrk1
C:\lccm\pkunzip -d netwrk1.zip D:
REM TRANSPORT 100/10 ETHERNET DISK 2
D:
cd \
cd drivers
md netwrk2
cd netwrk2
C:
cd\
cd lccm\drivers\100disk2
C:\LCCM\PKZIP netwrk2.zip -rp *.*
xcopy netwrk2.zip d:\drivers\netwrk2
d:
cd\
cd drivers
cd netwrk2
C:\lccm\pkunzip -d netwrk2.zip D:
```

```
REM TRANSPORT TOKEN RING PCI WAKE ON LAN DISK 1
D:
cd \
cd drivers
md tokdisk1
cd tokdisk1
C:
cd\
cd lccm\drivers\tokdisk1
C:\LCCM\PKZIP tokdisk1.zip -rp *.*
xcopy tokdisk1.zip d:\drivers\tokdisk1
d:
cd\
cd drivers
cd tokdisk1
C:\lccm\pkunzip -d tokdisk1.zip D:
REM TRANSPORT TOKEN RING PCI WAKE ON LAN DISK 2
D:
cd \
cd drivers
md tokdisk2
cd tokdisk2
C:
cd\
cd lccm\drivers\tokdisk2
C:\LCCM\PKZIP tokdisk2.zip -rp *.*
xcopy tokdisk2.zip d:\drivers\tokdisk2
d:
cd\
cd drivers
cd tokdisk2
C:\lccm\pkunzip -d tokdisk2.zip D:
REM **** Finished Process ********
```

   b. Save the file as W95DON.LCI.

4. Assign the W95DON.LCI file to the WIN95_Donor software profile and close the Software Profile Details notebook.

5. Assign the donor workstation to the WIN95_Donor profile and process this assignment.

6. Turn the donor workstation back on after LCCM has finished with the donor workstation.

7. Change the directory to \WIN95CAB and start the installation process.

8. When the Windows 95 installation process prompts you for device drivers, use the browse button to select the appropriate \DRIVERS subdirectory.

9. When the appropriate directory has been found, type in the appropriate device driver's .INF file.

   Note: Refer to your device driver's README.TXT file to select the correct Windows 95 device driver. IBMFESET.INF is not a device driver, it is the 100/10 PCI adapter's diagnostic installation file.

This completes the task for creating a Windows 95 operating system with the appropriate device drivers and IBM PC Enhanced Diagnostics for the disketteless PC 300GL. See "Installing Applications" on page 15 for information on installing applications on the donor workstations.

Creating a Windows NT Donor

Creating a Windows NT donor image is supported only in the Windows NT server version of LCCM. The specific process for creating a Windows NT donor image is unchanged from LCCM's *Training and Procedures Guide*. By default, LCCM creates a DOS selection within the Windows NT boot selector menu. As long as the partition is FAT16 based, DOS level diagnostics can be added to the partition using an .MNS file process. See "Installing Diagnostics through Maintenance" on page 24 for installing the IBM PC Enhanced Diagnostics diskette files on a client workstation.

For information detailing the installation of Windows NT on a donor workstation, consult your copy of LCCM's *Training and Procedures Guide*.

Installing Applications

There are two ways in which to install applications on the disketteless PC 300GL. The first way is to create installation directories within LCCM, have LCCM download the installation files directly to the donor client workstation and run the installation locally. This creates some unnecessary steps and wasted file space on the server. Also, the installation directories would have to be deleted from the donor client workstation after the installation process.

The second way, while not using LCCM, is a more direct and convenient way of installing applications on the donor client workstation. The recommended steps to installing applications would be to "pull" the installation process across a network connection from the server to the client.

Using the network connections provided with Windows 3.11 (Windows for Workgroups) or Windows 95 in a Windows NT networking environment, create a shared directory the connects the disketteless PC 300GL to the server's CD-ROM drive. Windows 95 has functionality built in to it that allows for new applications to be installed directly from the network. See "Network Installed Applications" in the *Windows 95 Resource Kit* book from Microsoft Press ISBN 1-55615-678-2.

In a Novell NetWare environment, instead of sharing the CD-ROM drive, the network administrator mounts the CD-ROM drive as a network directory and maps a client drive to it. The application is then installed over the network.

If the applications are DOS based in setup, LCCM can be used as the network link to the server. Install the applications across the network using the same .LCI file from the PC DOS 7.0 instructions. This process works with only DOS based applications. Windows based applications must run in a Windows environment.

Chapter 3. Transporting Images

Transporting Images

CLIENTCOPY is a new procedure that allows for any client workstation on the LCCM LAN segment to become a donor workstation. The procedure is initiated from the server and uses both "push" and "pull" protocols to process the donor image. This process also removes the need for attendance at the donor workstation. The implications of this file means that any client workstation on an LCCM network segment can be a prospective donor client workstation.

You may still use the Donor Boot process detailed in LANClient Control Manager Using as .MNS file, either method can be used to transport images to the LCCM server.

To create a CLIENTCOPY process:

1. Within the client mapped directory of LCCM (\LCCLIENT for Novell NetWare, \CLNTFILE for Windows NT and OS/2 Warp), create a new directory, naming it LANCLI.

2. Copy all the LCCM image processing files from the *LCCM_install_dir* to the \LANCLI directory. They are:

    - LCATTRIB

    - DISKDOS

    - DOSLFNBK (Not provided with the OS/2 LCCM version)

3. Using a text editor, create an .MNS file with the following content:

    Note: This a generic file that works in the Windows NT server version of LCCM. Novell NetWare and OS/2 network administrators already familiar with LCCM will be able to recognize where their own directory structure will change to suit their own server.

```
REM **** Begin Process *************

REM log off server with client privileges
REM and logon as an ADMIN with full
REM privileges.  NetWare users do not
REM have to use this part.
net logoff
net logon administrator password

REM Change the server directory to LCCM
REM from \TMP directory.  Windows NT
REM environment creates a C:\ drive for
REM the server and assigns the client
REM boot partition as D:
cd \
cd \lccm
d:
cd \
md lancli
cd lancli

REM Transfer the files from the server's
REM LANCLI directory to the donor's
REM directory.
xcopy C:\lccm\lancli\*.* d:

REM Change to the donor's directory and
REM process the image protocols.
D:
CD \
\lancli\DISKDOS /F=D:\lancli\WIN95BT.bs /D=D /R=R
\lancli\LCATTRIB D:\ /A /S
\lancli\DOSLFNBK D:\

REM Change to the server's LCCM directory
REM and prepare the image for transport
REM directory.
C:
cd \lccm
MD preload
CD preload

REM Transport the donor image to the new
REM LCCM image directory.
C:\LCCM\PKZIP C:\LCCM\preload\CLIENTXX.ZIP -r -P D:\*.*

REM Remove LCCM's tracks from the donor
REM workstation and reset the file
REM attributes on the donor.
D:
CD \
\lancli\LCATTRIB D:\ /R /S
CD lancli
del *.exe
del Win95bt.bs
CD \
del lcattr.atr
del backup.lfn
RD lancli

REM *** finished the clientcopy process
```

4. Save the file as CLNTCOPY.MNS.

5. Assign CLNTCOPY.MNS file to the target donor workstation in the donor's Individual Client Details Maintenance page.

6. Check Run Maintenance File if LCCM hasn't checked the box for you.

7. Click OK to exit the Individual Client Details notebook.

8. Click Process to run the maintained file.

This completes the CLIENTCOPY task for LCCM.

Chapter 4. New Maintenance Tasks

Flashing the 100/10 Network Adapter

You can use LCCM to flash the adapter EEPROM over the LAN without any operator intervention at the client.

Note: LCCM Version 1.X supports RPL only. If you use LCCM to change the adapter protocol from RPL to DHCP, LCCM will no longer be able to communicate with the client.

Using the Flash Diskette Files as a Maintenance Process

The flash process takes place on a client workstation as a maintenance file process of LCCM. Using this method allows for an unattended flash process to take place on the client workstation.

To flash the 100/10 Adapter on a client workstation:

1. Copy the Flash Diskette files to the server.

   a. Create a directory within the mapped LCCM directory and name it ADAPTER.

      You can use any name you want, but the directory name ADAPTER will be used in the remainder of this procedure to identify this server directory

   b. Copy the content of the Flash diskette into the ADAPTER directory.

2. Create an adapter response file.

   There are two possible responses, "r" or "d." Using "r" will flash the 100/10 PCI adapter into a RPL network ready card, and "d" will flash the adapter into a DHCP network ready card.

   a. Using a text editor, create a file that has the following content:

   ```
   r
   <carriage return>
   ```

   Note: Do not type "<carriage return>" on the line following the response. Press the enter key to include a carriage return after the response.

   b. Save the file as 100_10R.DAT.

3. Create an .MNS file.

   a. Using a text editor, create a file that has the following content:

   ```
   REM use "ctty con" for Novell NetWare server versions
   REM in the next line.
   ctty con
   C:
   cd\lccm\ADAPTER
   C:\lccm\ADAPTER\futil.exe -ibm pd0189.bin rboot273.rom < C:\lccm\adapter\100_10R.dat
   ```

   b. Save the file as ADAPT-R.MNS.

      Note: The character strings pd0189 and rboot273 might change from version to version. To ensure you have the correct character strings for your version of the Flash diskette, do the following:

      1) Open the CONFIG.SYS file located in the ADAPTER directory.

      2) In the CONFIG.SYS file, verify that the character strings in the last line matches the line you entered in the ADAPT-R.MNS file. Change the character strings the ADAPT-R.MNS file if necessary.

4. Within the Maintenance page of the Individual Client Details notebook, select the ADAPT-R.MNS file and make sure the **Run Maintenance file** has been checked.

5. Click **OK** to close the notebook.

6. Click **Process** to run the maintenance file process on the client workstation.

You have completed the 100/10 PCI Adapter flash maintenance file process.

Dummy-based Software Profiles

IBM ships each client workstation with an operating system, hardware specific drivers, and some client specific applications. Some work environments may wish to keep this "preload" as a client workstation specific image. However, to maintain, upgrade and manage these images, LCCM must recognize, or assign, the client workstation to a software profile. Assigning an existing software profile to a client workstation with an existing preload will destroy that preload.

To maintain a client workstation through LCCM, the network administrator has two options to choose from. The first method is to copy the donor to the server and then create a software profile that will push the image back down on the client. This method should be used only when there are a small number of preload images. It is too time consuming to create a new software profile for each preload image and then to use LCCM to create a cloned image of the preload, only then to push that clone back down onto the same client workstation.

The alternate method allows for multiple workstations to fall under the same software profile without being identical workstations or images. The objective is to create a dummy software profile.

To create a dummy software profile:

1. In LCCM, create a software profile, naming it PRELOAD_IMAGES.

2. Using a text editor, create a DUMMY.LCI file with only REM statements.

   EXAMPLE: REM ***** Process Completed ******

3. Assign a client workstation to this profile, and any other client workstations that will keep a pre-existing image.

4. Process the client workstations.

By assigning a dummy profile to a client workstation, the client is then recognized by LCCM has having an assigned profile but has not lost it's original preload image. The preload image may now be maintained through periodic maintenance files. For example, the first maintenance file should be the cloning of the preload up to the server as a backup image to the client workstation.

For further identification, list the operating system and applications installed on the client workstation in the Comments field of the Details page in the Individual Clients Details notebook. This will differentiate itself from others included in this PRELOAD_IMAGES software profile.

Device Driver Updates

As a client workstation progresses through its life cycle, maintenance to the client workstation will be required through updates and additions to the existing software. Because of the different methods used by device driver developers in their installation routines, not all device drivers can be installed over the LAN using the same techniques.

LCCM automates this process and transports the updated files to a specific client or group of clients using Windows 95 or Windows NT. You can perform the process during hours when the client is normally off, and the process requires no operator intervention at the client. There are two supported methods of automating device driver updates.

The first method involves a donor machine and an extensive knowledge of the Window's Registry program. You must replace the device driver and update the Registry using the Registry strings found in the device driver's .INF file. See Chapter 12, "Network Technical Discussion," in Microsoft's *Windows 95 Resource Kit*.

The other method is to download the installation diskette image to the \DRIVERS directory on the client file and editing the Registry to run the installation program once. This method also assumes that the network administrator has a working knowledge the Windows' Registry program.

To create a device driver installation program:

1. See Appendix C, "Windows 95 INF Files," in Microsoft's *Windows 95 Resource Kit*.

To update OS/2 device drivers, use the procedure provided in the device driver manufacturer's documentation, but when prompted for the source and target paths, instead of assigning drive A as the source, type in the path of the directory on your local hard disk or the drive and directory of a remote hard disk that contains the appropriate device driver files.

Installing Diagnostics through Maintenance

LCCM does not support the transport of a standard RPL diagnostic image to a client in a Windows NT Network environment unlike Novell NetWare and PS/2 Warp's version of LCCM. However, for every server version of LCCM, diagnostics can be delivered to the client workstations hard drive as part of a donor image or after the image creation process as a maintenance file process. While building a donor image, IBM PC Enhanced Diagnostics must be installed in the IBMDIAG directory on the donor hard disk. See Chapter 2, "Creating a disketteless PC 300GL Donor" on page 5.

If the donor image has been created previously, or a client workstation lacks the IBM PC Enhanced Diagnostics, the diagnostic program can be installed on the client workstation as part of a maintenance file process.

There are some restrictions to creating an LCCM diagnostic maintenance file process on a client workstation. They are:

• The client workstation's hard disk must have the active boot partition formatted as a FAT16 based partition.

- The operating system must contain a dual boot or multi boot startup selector which has DOS as one of its selections. Windows 95 is the exception to this rule, because it can restart the client workstation in an DOS environment.

- The client workstation must be an assigned client. If the client workstation has a preload image or pre-existing condition that does not require a software profile, a dummy software profile must be created for this situation. See "Dummy-based Software Profiles" on page 23.

Installing IBM PC Enhanced Diagnostics

Usually diagnostics are installed as part of the donor image creation process. (See Chapter 2, "Creating a disketteless PC 300GL Donor" on page 5.) However, diagnostics can be installed on a client system though an .MNS file.

To create a diagnostic maintenance file image:

Note: This is a generic maintenance file that will work on the Windows NT version of LCCM. It will download diagnostic files to the \IBMDIAG directory on the root partition of the client hard disk. The drive letters and LCCM mapped directories of this file will have to be modified slightly to run on other server versions of LCCM.

1. Make sure the PC 300GL complies with the maintenance file process restrictions.

2. Follow the instructions for copying the IBM PC Enhanced Diagnostics to the LCCM server. See "Setting up the LCCM Server" on page 6.

3. Using a text editor, create a .MNS file with the following text:

```
D:
cd \
md IBMDIAG
cd IBMDIAG
xcopy C:\lccm\IBMDIAG\PC300GL\*.* D:
```

4. Save the file as DOCTOR.MNS

5. Within the Maintenance page of the Individual Client Details notebook, select the DOCTOR.MNS file and make sure the **Run Maintenance file** has been checked.

6. Click **OK** to close the notebook.

7. Click **Process** to run the maintenance file process on the client workstation.

Network Adapter Diagnostics Maintenance

Like diagnostics, network adapter diagnostics can be downloaded to a client workstation use LCCM's maintenance file process or as part of the donor image creation. When Windows NT installs the 100/10 PCI adapter device driver, it also installs the diagnostic program as well. Windows 95 must install the 100/10 PCI adapter diagnostic program using the IBMFESET.INF installation file included in the RTC CD.

Copying diagnostic files to the client workstation through a maintenance file involves the same process as installing IBM PC Enhanced Diagnostics through a maintenance file. See "Setting up the LCCM Server" on page 6 for more information on LCCM directory structure and see "Installing IBM PC Enhanced Diagnostics" for creating an .MNS file.

Chapter 5. Example Files

Introduction

The files in this section are provided as examples that can be used with LANClient Control Manager.

DOS/WIN Donor Installation for Novell NetWare

Note: Change the WINSTAL directory to W311NST when installing Windows 3.11 instead of Windows 3.1.

```
REM **** Begin Process *****
ctty com
format C: < h:\utils\format.dat
xcopy h:\IBMDOS70\ibmbio.com C:\
xcopy h:\IBMDOS70\ibmdos.com C:\
xcopy h:\IBMDOS70\command.com C:\
C:
md DOS
cd DOS
xcopy h:\IBMDOS70\*.* C:
cd \
md WINSTAL
cd WINSTAL
xcopy h:\WINSTAL\*.* C:
cd \
cd \lccm
REM Ready to copy diagnostics to C:
C:
cd \
md ibmdiag
cd ibmdiag
xcopy h:\ibmdiag\*.* C: /s
C:
cd \
md drivers
cd drivers
md netwrk1
REM TRANSPORT 100/10 ETHERNET DISK 1
h:
cd\
cd \drivers\100disk1
h:\UTILS\PKZIP netwrk1.zip -rp *.*
xcopy netwrk1.zip C:\drivers\netwrk1
C:
cd\
cd drivers
cd netwrk1
h:\pkunzip -d netwrk1.zip C:
REM TRANSPORT 100/10 ETHERNET DISK 2
C:
cd \
cd drivers
md netwrk2
cd netwrk2
h:
cd\
cd lccm\drivers\100disk2
h:\PKZIP netwrk2.zip -rp *.*
xcopy netwrk2.zip C:\drivers\netwrk2
C:
cd\
cd drivers
cd netwrk2
h:\lccm\pkunzip -d netwrk2.zip C:
```

```
REM TRANSPORT TOKEN RING PCI WAKE ON LAN DISK 1
C:
cd \
cd drivers
md tokdisk1
cd tokdisk1
h:
cd\
cd lccm\drivers\tokdisk1
h:\LCCM\PKZIP tokdisk1.zip -rp *.*
xcopy tokdisk1.zip d:\drivers\tokdisk1
C:
cd\
cd drivers
cd tokdisk1
h:\lccm\pkunzip -d tokdisk1.zip c:
REM TRANSPORT TOKEN RING PCI WAKE ON LAN DISK 2
C:
cd \
cd drivers
md tokdisk2
cd tokdisk2
h:
cd\
cd lccm\drivers\tokdisk2
h:\LCCM\PKZIP tokdisk2.zip -rp *.*
xcopy tokdisk2.zip C:\drivers\tokdisk2
C:
cd\
cd drivers
cd tokdisk2
h:\lccm\pkunzip -d tokdisk2.zip C:
REM **** Finished Process ********
```

DOS/WIN Donor Installation for Windows NT

```
REM **** Begin Process ******
net logoff
net logon administrator password
format d: < C:\lccm\format.dat
xcopy C:\lccm\ibmbio.com d:\
xcopy C:\lccm\ibmdos.com d:\
xcopy C:\lccm\command.com d:\
d:
cd \
md DOS
cd DOS
xcopy C:\lccm\IBMDOS70\*.* d:
cd \
md WINSTAL
cd WINSTAL
xcopy C:\lccm\winstal\*.* d:
REM Ready to copy diagnostics to d:
D:
cd \
md ibmdiag
cd ibmdiag
xcopy C:\lccm\ibmdiag\*.* d: /s
D:
cd \
md drivers
cd drivers
md netwrk1
REM TRANSPORT 100/10 ETHERNET DISK 1
C:
cd\
cd lccm\drivers\100disk1
C:\LCCM\PKZIP netwrk1.zip -rp *.*
xcopy netwrk1.zip d:\drivers\netwrk1
d:
cd\
cd drivers
cd netwrk1
C:\lccm\pkunzip -d netwrk1.zip D:
REM TRANSPORT 100/10 ETHERNET DISK 2
D:
cd \
cd drivers
md netwrk2
cd netwrk2
C:
cd\
cd lccm\drivers\100disk2
C:\LCCM\PKZIP netwrk2.zip -rp *.*
xcopy netwrk2.zip d:\drivers\netwrk2
d:
cd\
cd drivers
cd netwrk2
C:\lccm\pkunzip -d netwrk2.zip D:
```

```
REM TRANSPORT TOKEN RING PCI WAKE ON LAN DISK 1
D:
cd \
cd drivers
md tokdisk1
cd tokdisk1
C:
cd\
cd lccm\drivers\tokdisk1
C:\LCCM\PKZIP tokdisk1.zip -rp *.*
xcopy tokdisk1.zip d:\drivers\tokdisk1
d:
cd\
cd drivers
cd tokdisk1
C:\lccm\pkunzip -d tokdisk1.zip D:
REM TRANSPORT TOKEN RING PCI WAKE ON LAN DISK 2
D:
cd \
cd drivers
md tokdisk2
cd tokdisk2
C:
cd\
cd lccm\drivers\tokdisk2
C:\LCCM\PKZIP tokdisk2.zip -rp *.*
xcopy tokdisk2.zip d:\drivers\tokdisk2
d:
cd\
cd drivers
cd tokdisk2
C:\lccm\pkunzip -d tokdisk2.zip D:
REM **** Finished Process ********
```

Windows 95 Donor Installation for Novell NetWare

Note: The donor workstation must be bootable to run the Windows installation process. IBMBIO.COM, IBMDOS.COM, and COMMAND.COM are copied from the IBMDOS70 installation directory to the donor workstation to make the donor hard disk bootable.

```
REM **** Begin Process *****
ctty com
format C: < h:\utils\format.dat
xcopy h:\IBMDOS70\ibmbio.com C:\
xcopy h:\IBMDOS70\ibmdos.com C:\
xcopy h:\IBMDOS70\command.com C:\
C:
md DOS
cd DOS
xcopy h:\IBMDOS70\*.* C:
C:
cd \
md WIN95CAB
cd WIN95CAB
xcopy h:\WIN95CAB\*.* C:
REM Ready to copy diagnostics to C:
C:
cd \
md ibmdiag
cd ibmdiag
xcopy h:\ibmdiag\*.* C: /s
C:
cd \
md drivers
cd drivers
md netwrk1
REM TRANSPORT 100/10 ETHERNET DISK 1
h:
cd\
cd \drivers\100disk1
h:\UTILS\PKZIP netwrk1.zip -rp *.*
xcopy netwrk1.zip C:\drivers\netwrk1
C:
cd\
cd drivers
cd netwrk1
h:\pkunzip -d netwrk1.zip C:
REM TRANSPORT 100/10 ETHERNET DISK 2
C:
cd \
cd drivers
md netwrk2
cd netwrk2
h:
cd\
cd lccm\drivers\100disk2
h:\PKZIP netwrk2.zip -rp *.*
xcopy netwrk2.zip C:\drivers\netwrk2
C:
cd\
cd drivers
cd netwrk2
h:\lccm\pkunzip -d netwrk2.zip C:
```

```
REM TRANSPORT TOKEN RING PCI WAKE ON LAN DISK 1
C:
cd \
cd drivers
md tokdisk1
cd tokdisk1
h:
cd\
cd lccm\drivers\tokdisk1
h:\LCCM\PKZIP tokdisk1.zip -rp *.*
xcopy tokdisk1.zip d:\drivers\tokdisk1
C:
cd\
cd drivers
cd tokdisk1
h:\lccm\pkunzip -d tokdisk1.zip c:
REM TRANSPORT TOKEN RING PCI WAKE ON LAN DISK 2
C:
cd \
cd drivers
md tokdisk2
cd tokdisk2
h:
cd\
cd lccm\drivers\tokdisk2
h:\LCCM\PKZIP tokdisk2.zip -rp *.*
xcopy tokdisk2.zip C:\drivers\tokdisk2
C:
cd\
cd drivers
cd tokdisk2
h:\lccm\pkunzip -d tokdisk2.zip C:
REM **** Finished Process ********
```

Windows 95 Donor Installation for Windows NT

```
REM **** Begin Process *****
net logoff
net logon administrator password
format d: < C:\lccm\format.dat
xcopy C:\lccm\nt\ibmbio.com d:\
xcopy C:\lccm\nt\ibmdos.com d:\
xcopy C:\lccm\nt\command.com d:\
C:
cd \
md WIN95CAB
cd WIN95CAB
xcopy C:\lccm\WIN95CAB\*.* D:
cd \
cd \lccm
REM Ready to copy diagnostics to d:
D:
cd \
md ibmdiag
cd ibmdiag
xcopy C:\lccm\ibmdiag\*.* d: /s
D:
cd \
md drivers
cd drivers
md netwrk1
REM TRANSPORT 100/10 ETHERNET DISK 1
C:
cd\
cd lccm\drivers\100disk1
C:\LCCM\PKZIP netwrk1.zip -rp *.*
xcopy netwrk1.zip d:\drivers\netwrk1
d:
cd\
cd drivers
cd netwrk1
C:\lccm\pkunzip -d netwrk1.zip D:
REM TRANSPORT 100/10 ETHERNET DISK 2
D:
cd \
cd drivers
md netwrk2
cd netwrk2
C:
cd\
cd lccm\drivers\100disk2
C:\LCCM\PKZIP netwrk2.zip -rp *.*
xcopy netwrk2.zip d:\drivers\netwrk2
d:
cd\
cd drivers
cd netwrk2
C:\lccm\pkunzip -d netwrk2.zip D:
```

```
REM TRANSPORT TOKEN RING PCI WAKE ON LAN DISK 1
D:
cd \
cd drivers
md tokdisk1
cd tokdisk1
C:
cd\
cd lccm\drivers\tokdisk1
C:\LCCM\PKZIP tokdisk1.zip -rp *.*
xcopy tokdisk1.zip d:\drivers\tokdisk1
d:
cd\
cd drivers
cd tokdisk1
C:\lccm\pkunzip -d tokdisk1.zip D:
REM TRANSPORT TOKEN RING PCI WAKE ON LAN DISK 2
D:
cd \
cd drivers
md tokdisk2
cd tokdisk2
C:
cd\
cd lccm\drivers\tokdisk2
C:\LCCM\PKZIP tokdisk2.zip -rp *.*
xcopy tokdisk2.zip d:\drivers\tokdisk2
d:
cd\
cd drivers
cd tokdisk2
C:\lccm\pkunzip -d tokdisk2.zip D:
REM **** Finished Process ********
```

CLIENTCOPY Maintenance File

```
REM **** Begin Process *************

REM log off server with client privileges
REM and logon as an ADMIN with full
REM privileges.  NetWare users do not
REM have to use this part.
net logoff
net logon administrator password

REM Change the server directory to LCCM
REM from \TMP directory.  Windows NT
REM environment creates a C:\ drive for
REM the server and assigns the client
REM boot partition as D:
cd \
cd \lccm
d:
cd \
md lancli
cd lancli

REM Transfer the files from the server's
REM LANCLI directory to the donor's
REM directory.
xcopy C:\lccm\lancli\*.* d:

REM Change to the donor's directory and
REM process the image protocols.
D:
CD \
\lancli\DISKDOS /F=D:\lancli\WIN95BT.bs /D=D /R=R
\lancli\LCATTRIB D:\ /A /S
\lancli\DOSLFNBK D:\

REM Change to the server's LCCM directory
REM and prepare the image for transport
REM directory.
C:
cd \lccm
MD preload
CD preload

REM Transport the donor image to the new
REM LCCM image directory.
C:\LCCM\PKZIP C:\LCCM\preload\CLIENTXX.ZIP -r -P D:\*.*

REM Remove LCCM's tracks from the donor
REM workstation and reset the file
REM attributes on the donor.
D:
CD \
\lancli\LCATTRIB D:\ /R /S
CD lancli
del *.exe
del Win95bt.bs
CD \
del lcattr.atr
del backup.lfn
RD lancli

REM *** finished the clientcopy process
```

Appendix A. Notices and Trademarks

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Appendix B. World Wide Web Sites on the Internet

The Internet's World Wide Web is an excellent source of information for most of your questions about networking, client/server technologies and computers. Also, documentation found on the World Wide Web is the latest and most accurate. IBM's goal of providing professional online technical support begins with IBM's web sites. Any information, such as guides or technical manuals, can be found on an IBM web site. Documentation for LCCM and IBM's *Network Administrator's Guide* can be found at:

```
http://www.us.pc.ibm.com/desktop/lccm/
```

Networking software and network device driver updates for the disketteless models of the PC 300GL can be found at:

```
For Ethernet:
http://www.networking.ibm.com/nes/nesether.htm

For Token-Ring:
http://www.networking.ibm.com/nes/nestoken.htm
```

Support for all IBM commercial desktop models, including the PC 300 GL (Models 6272-88X, -89X, and 90X), can be found at:

```
http://www.us.pc.ibm.com/support/desktop/desktop_support.html
```

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