**AIX Access for DOS User's
Administrator's Guide**

Document Number SC23-2042-0

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Edition Notice
 First Edition (March 1989)

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About This Book
 This book explains how to install and administer the AIX Access for DOS
Users Program on the IBM PS/2, IBM RT work station, and IBM System/370
computers running the AIX operating system with AIX DOS Server. It covers
the responsibilities for installation, daily operation, and maintenance of
Access program software. For information on the operation of Access
program from the user's point of view, refer to *AIX Access for DOS Users
User's Guide*.

 Access Program software allows you to:

>   Integrate your personal computer into your existing AIX host compute
>   network.

>   Use the file services of one or more AIX hosts while running DO
>   applications as if the host were a fixed disk.

>   Conduct a standard AIX session from your personal computer

>   Execute AIX commands from your personal computer

>   Use a DOS version of the AIX **vi** editor program on your personal
>   computer.

 Subtopics
Who Should Use This Book
Conventions
Organization Of This Book
Related Publications

Who Should Use This Book

This book is for the administrator of the system and the person who
installs the host software and manages the daily operation of the system.

This guide assumes you are familiar with AIX commands and basic system
administration activities such as loading diskettes, making directories,
adding users, and starting up the host. It also assumes you are familiar
with the information contained in *AIX Access for DOS Users User's Guide*.
Familiarity with basic DOS commands and with your network hardware is
useful but not required.

Conventions

This guide uses several typographic conventions to help you distinguish
between DOS and AIX commands and file names and to help you recognize text
you must type exactly as shown. These conventions are as follows:

The following typeface is used to show exactly what you must enter
Use the lowercase Courier font for both AIX and DOS commands:

```
on - mv /u/mary/messagetoall /u/mary/message
```

Italics indicate generic information for which you must substitut
actual values. The following example indicates that you should supply
the names of the source and target files to be used by the **on - mv**
command:

on - mv *file1 file2*

For AIX, the path separator is a slash (/) and the switch character i
a hyphen (-).

For DOS, the path separator is a backslash (\) and the switc
character is a slash (/).

Prompts are shown (in bold) only in examples that might be confusin
without them.

Examples do not explicitly show carriage returns, but a carriag
return should be typed at the end of each line.

Organization Of This Book

This book has six chapters and two appendixes as follows:

Chapter 1, "Introduction," acquaints you with the Access program software
and configuration requirements for your AIX host computer.

Chapter 2, "About AIX Access for DOS Users Program," explains the services
and utilities of the Access program.   It also discusses aspects of the
DOS environment that may be unfamiliar.

Chapter 3, "AIX Access for DOS Users Program Networks," discusses the
networks that support Access program operation.

Chapter 4, "AIX Access for DOS Users Program Administration," discusses
the administration of the Access program, supporting daily operation of
Access program, tailoring your host system to meet your requirements, and
enabling and disabling ports. It also discusses DOS software
compatability.

Chapter 5, "System Architecture for AIX Access for DOS Users Program,"
describes the system architecture for the experienced administrator who
wants to know more about Access program operation.

Chapter 6, "Some Problem-Solving Tools for AIX Access for DOS Users
Program," suggests some troubleshooting procedures for you to follow when
Access program users experience problems they cannot solve themselves.

Appendix A, "Installing the AIX DOS Server for the AIX Access for DOS
Users Program," provides instructions for installing the Access program
host software.

Appendix B, "AIX Access for DOS Users Program System Messages," explains
the messages you might receive from the Access program.

The following terms apply to this book:

Personal computer   The IBM Personal Computer, the IBM Personal Computer
                        XT, the IBM Personal Computer XT Model 286, the IBM
                        Personal Computer AT, or the IBM PS/2.

DOS   The IBM Personal Computer Disk Operating System (DOS)
                        program (Version 3.3).

AIX   Any one of the AIX Operating Systems with AIX DOS
                        Server.

LAN   Means local area network and refers to a connection
                        path from your personal computer to a host by an
                        Ethernet or a Token-Ring adapter.

Related Publications

AIX Access for DOS Users User's Guide describes how to use the AIX Access
for DOS Users Program.

Installing and Customizing the AIX Operating System provides step-by-step
instructions for installing and customizing the AIX Operating System.

Table of Contents

1.0 Chapter 1. Introduction

CONTENTS

1.1 About this Chapter

This chapter provides an introduction to the AIX Access for DOS Users
Program. It explains the configuration requirements for the AIX host
computer, including the types of adapters, their requirements, and their
restrictions. Personal computer requirements and restrictions are also
discussed.

1.2 AIX Access for DOS Users Program

The Access program software package allows a personal computer to
communicate with AIX hosts. With the Access program and either an RS-232
serial interface or a LAN connection to an AIX host, you can run DOS
applications using data from the AIX file system. You can store files and
DOS applications on the AIX host and access them as if they were on a
local fixed disk.

When you use the host file services of the Access program, you can share
files in a network while protecting them from unauthorized access. You
can also share host resources, such as a laser printer.

The Access program can also emulate a VT100 or PC Scancode terminal,
allowing you to conduct a regular AIX session.

DOS users need to know nothing about AIX to use host file services. You
can treat the AIX system as an enhanced disk drive connected directly to
your personal computer. Users familiar with both DOS and AIX can combine
host file services and terminal emulation, toggling back and forth between
the two modes. For example, you could create a text file in host file
services mode using a DOS word-processing package, then switch to terminal
emulation mode to include that file in an AIX mail message.

1.3 Minimum Requirements
Several minimum requirements must be met for the AIX Access for DOS Users
Program to function efficiently. The following sections discuss these
requirements.

Subtopics
1.3.1 Host and Network Requirements for Ethernet-Based Communications
1.3.2 Host and Network Requirements for Token-Ring-Based Communication
1.3.3 Host Requirements for RS-232-Based Communications
1.3.4 Personal Computer Requirements
1.3.5 Personal Computer Restrictions

1.3.1 Host and Network Requirements for Ethernet-Based Communications

To use the Access program software over an Ethernet network, you must have the following:

One or more IBM PS/2 Model 70 or 80, IBM RT work station, or IB System/370 computers.

The AIX Operating System with AIX DOS Server

One of the following network adapters for each host

For an IBM PS/2

-   Ungermann-Bass NET/One IBM PS/2 adapter

For an IBM RT work station

-   IBM RT Personal Computer Baseband Adapter for use with Ethernet

For an IBM System/370

-   Intel Fastpath, a CETI (Continuously Executing Transfer Interface) device

-   IBM 8232 LAN Channel Station with an Ethernet adapter

-   ILAN Ethernet adapter (for IBM 9370 models only).

Terminating resistors (or ***terminators***) for any unused connections on the network.

Appropriate network hardware (connectors, cables, transceivers) t connect the host and personal computer.

1.3.2 Host and Network Requirements for Token-Ring-Based Communication

To use the Access program software over a Token-Ring connection path, you must have the following:

One or more IBM PS/2 Model 70 or 80, IBM RT work station, or IB System/370 computers.

The AIX Operating System with AIX DOS Server

One of the following network adapters for each host

For an IBM PS/2

-    IBM Token-Ring Network Adapter/A

For an IBM RT work station

-    IBM RT Personal Computer Token-Ring Network Adapter

For an IBM System/370

-    IBM 8232 LAN Channel Station with a Token-Ring Adapter

-    ILAN Token-Ring Adapter (IBM 9370 Models only).

Appropriate network hardware to connect the host and persona computers.

1.3.3 Host Requirements for RS-232-Based Communications

To use the Access program software over RS-232, you must have the
following:

    One or more IBM PS/2 Model 70 or 80, IBM RT work station, or IB
    System/370 computers.

    The AIX Operating System with the AIX DOS Server

    One host RS-232 port for each personal computer to be connected

    Each personal computer connected by RS-232 requires an RS-232 cabl
    with appropriate connectors to attach to an RS-232 port on the host
    and an asynchronous communications adapter in the personal computer.

1.3.4 Personal Computer Requirements

The following personal computer hardware and software are required for
Access program operation. Refer to *AIX Access for DOS Users User's Guide*
for further information on personal computer configuration.

   One or more IBM personal computers (PC, PC XT, or PC AT) or PS/2
   configured as described in Chapter 1 of *AIX Access for DOS Users
   User's Guide.*

   The following network adapters

   For Ethernet connection to IBM PC, PC XT, PC XT Model 286, PC AT, and
   IBM PS/2 Models 25 and 30

   -    Ungermann-Bass PC NIC Model 2274A

   -    3Com EtherLink

   For Ethernet connection to IBM PS/2 Models 50, 60, 70, and 80

   -    Ungermann-Bass NIC Model IBM PS/2

   For IBM Token-Ring connection to IBM PC, PC XT, PC XT Model 286, PC
   AT, and IBM PS/2 Models 25 and 30

   -    IBM Token-Ring Adapter

   For IBM Token-Ring connection to IBM PS/2 Models 50, 60, 70, and 80

   -    IBM Token-Ring Adapter/A

   For RS-232 connection to IBM PC, PC XT, PC XT Model 286, PC AT, and
   IBM PS/2 Models 25 and 30

   -    IBM Serial/Parallel Adapter

   -    IBM Asynchronous Adapter

   For RS-232-C connection to IBM PS/2 Model 50, 60, 70, and 80

   -    IBM PS/2 Dual Asynchronous Adapter.

   The AIX Access for DOS Users Program personal computer software a
   contained on the distribution diskettes.

   IBM DOS Version 3.3

1.3.5 Personal Computer Restrictions
PC Scancode terminal emulation can only be used with IBM PS/2 and IBM
System/370 hosts.

1.4 Installation of Adapters in Host

The network adapter required for Ethernet or Token-Ring Access program
network service should be installed in the host according to the
installation instructions for the adapter.

1.5 Installing AIX DOS Server Program

Before you can use the AIX Access for DOS Users Program, you must first install the Server program on your AIX system. This program allows communication between the personal computer and the host. The AIX Operating System distribution media contains all the files required for your host to support the Access program. Before reading further, you should follow the instructions in Appendix A, "Installing the AIX DOS Server for the AIX Access for DOS Users Program." Once the Server program is installed on your host, it is automatically initialized whenever you start the host system.

This guide assumes you have installed the AIX DOS Server Program as described in Appendix A.

1.6 AIX Access for DOS Users Program System Configuration

The maximum number of personal computer users an Access program network
can support depends on several factors. The number of Access program
RS-232 users is limited by the RS-232 hardware installed in your host.
Note that the RS-232 hardware required by the Access program is the same
RS-232 hardware required for standard asynchronous terminals.

There is no explicit limit to the number of Access program LAN users the
system can support, but the number of Access program emulation sessions
per host is limited to the number of enabled ntys or ptys in the system.
Only one terminal emulation session can be invoked per DOS machine
connected to your host. See "Enabling and Disabling Terminal Emulation
Ports" in topic 4.4.3 for more information on enabling ptys and ntys.

If you use a LAN, system configuration depends on the performance you
want. A maximum number of personal computers for your Access program
network cannot be recommended because of the variables affecting
performance. However, you should consider the following information when
designing your network:

    Host systems with greater processing capacity can support more Acces
    program users.

    Typically, Access program file service users place a lower load on th
    host system than standard terminal users performing similar
    operations.

    Performance over a LAN is likely to be better than performance over a
    RS-232 serial interface.

    As on any AIX machine, system response depends on the number and typ
    of applications being used.

2.0 Chapter 2.   About AIX Access for DOS Users Program

CONTENTS

Subtopics

2.1 About this Chapter

This chapter explains the services and utilities provided by the Access program. Some definitions concerning the DOS environment are included at the end of this chapter for administrators who are not familiar with DOS.

2.2 Host and Personal Computer (AIX and DOS) Integration

When the network hardware and software are installed, users can access
both host (AIX) and personal computer (DOS) resources. The Access program
supplies two major services that integrate network hosts and personal
computers as well as a number of utilities that enhance the AIX/DOS
interface. These services and utilities are briefly described below.

Subtopics
2.2.1 Host File Service
2.2.2 Terminal Emulation Service
2.2.3 AIX Access for DOS Users Program Utilities

2.2.1 Host File Service

When you log in to the Access program from your personal computer, you
have access to the same AIX files as when you access the AIX host in any
other way. These files are available to DOS on a virtual drive specified
by the Access program in the login connection message. To the user, the
virtual drive has the characteristics of a DOS drive attached to the
user's personal computer. With the Access program the user can:

    Create or access files on the virtual drive using DOS commands o
    applications by specifying the virtual drive identifier as part of the
    file name

    Change the default drive to the virtual driv

    Copy files from diskette or local fixed disk to the virtual driv
    following the same procedures used to copy to a local disk

    Execute non-interactive AIX processes from DO

    Print DOS files on a remote printe

    Create directories on the virtual drive using the DOS **mkdir** command

    Set DOS search paths that specify directories on the virtual drive

You can do almost anything with the remote AIX drive during a file service
session that you can do with a local drive on a stand-alone personal
computer.

2.2.2 Terminal Emulation Service

The Access program software enables a personal computer to emulate a
standard VT100 or PC Scancode (IBM System/370 or IBM PS/2 hosts only)
terminal. Personal computer users can connect to the AIX host and conduct
standard interactive AIX or DOS sessions as though they were using
terminals rather than personal computers running DOS. One advantage of
using terminal emulation is that users who are more familiar with AIX than
with DOS can work in the environment that is more comfortable. Another
advantage is that all users have access to AIX commands that are not
directly accessible from the DOS environment.

Under Ethernet or Token-Ring, users can freely combine file service and
terminal emulation sessions. The Access program allows you to suspend
your work at any time with either service and switch to the other service.
Unless you explicitly terminate your current service, you will find any
ongoing jobs in the state you left them when you return to that service.

Note: Concurrent file service and terminal emulation is not supported
under RS-232.

2.2.3 AIX Access for DOS Users Program Utilities

The Access program provides several utility programs that enhance the user
interface between DOS and AIX. These utilities, listed below, are
supplied on the AIX Access for DOS Users personal computer distribution
diskettes and can be invoked from the DOS environment of the personal
computer. The **aix2dos** and **dos2aix** utilities are also supplied in the host
software.

   The **dos2aix** and **aix2dos** commands convert text files from DOS text
   format to AIX text format and from AIX text format to DOS text format.

   The **jobs** command displays the status of AIX jobs initiated by the **on**
   command.

   The **kill** command terminates **on**-initiated jobs.

   The **on** command causes AIX programs to be executed from the DOS
   environment.

   The printer **printer** directs DOS printing to a local (personal
   computer) printer or a remote (AIX) printer.

   The **udir** command lists files and directories on the virtual drive in
   AIX format.

For information on the Access program procedures of special interest to
the administrator of the system, (for example, backup and file-locking
procedures) refer to Chapter 4, "AIX Access for DOS Users Program
Administration."

2.3 The DOS Environment

As administrator of the system, you should be familiar with the AIX
environment, including commonly used commands, files, messages, and
procedures. Some familiarity with the DOS environment is also helpful.
Some common DOS terms are used in this guide:

Application software: Programs designed for specific purposes, such as
accounting or word processing. These programs are generally commercially
distributed.

Disk: A magnetic disk. In this guide, the term *disk* specifically refers
to a fixed disk, not a diskette. (See also *fixed disk*.)

Diskette: A thin, flexible magnetic disk permanently enclosed in a
semi-rigid protective jacket. Synonymous with flexible disk and floppy
disk.

Distribution diskette: One of the diskettes packaged with AIX Access for
DOS Users, containing the AIX Access for DOS Users personal computer
software. (See also *working diskette*.)

DOS drive: The personal computer hardware associated with DOS diskettes
or fixed disks. DOS drives are named with letters followed by a colon.
By convention, diskette drives are usually designated A and B, and a local
fixed disk is designated C. The contents of the disk or diskette on each
drive are presented to the DOS user as separate file systems (each having
its own root), unlike AIX, which presents the contents of mounted drives
as part of a single, integrated file system. (See also *DOS volume* and
virtual drive.)

DOS executable files: DOS executable files are invoked by name, like AIX
executable files. DOS, however, requires executable files to end with one
of these three-letter extensions: **.bat, .com**, or **.exe**. (For example,
executable files familiar to DOS users include **autoexec.bat** and
command.com.)

The **.bat** files are equivalent to AIX shell files. They are text files
containing a list of DOS commands that are executed when the file is
invoked. The **autoexec.bat** file is a special file contained in the root
directory of the fixed disk or the Access program working diskette that is
executed automatically whenever the personal computer is started. The
.com and **.exe** files are machine-readable DOS programs that DOS recognizes
and distinguishes on the basis of the file name extension (**.com** or **.exe**)
and internal format.

DOS search path: The directories that DOS searches for commands. The DOS
search path is analogous to the AIX search path, except:

   Under DOS, the current directory is *always* searched first.

   DOS search paths can include different DOS drives, each containing a
   independent file system.

DOS volume: The contents of a DOS disk or diskette. DOS allows you to
identify the contents of a disk or diskette with a volume label (see the
DOS **format** and **vol** commands). *Volume* is sometimes used interchangeably
with *drive*, but *drive* more precisely refers to the personal computer
hardware associated with a disk or diskette. (See also *DOS drive*.)

<u>Emulate</u>: To simulate one system with another, so that the simulating computer system accepts the same data, executes the same programs, and achieves the same results. The Access program software enables a personal computer to emulate a standard VT100 or PC Scancode terminal.

<u>Fixed disk</u>: A rigid magnetic disk housed in either the system unit or an expansion unit of a personal computer. It is used for mass storage.

<u>Function keys</u>: Special keys on the personal computer keyboard that perform tasks usually requiring more than one keystroke or tasks that cannot be performed with keys representing standard characters. The function keys are labeled **F1** through **F10** for standard keyboards and **F1** through **F12** on IBM PS/2 or enhanced keyboards.

<u>Virtual drive</u>: An AIX host when accessed from the personal computer for host file services. The **login** program identifies such drives when the user logs in to the Access program. The drives are called *virtual* because they do not use the hardware of a local DOS drive, but can nevertheless be treated as one. (See also *DOS drive*.)

<u>Working diskette</u>: The diskette from which DOS is started and from which the Access program software is loaded. The Access program user creates the working diskette by combining the DOS system files with the contents of the AIX Access for DOS Users distribution diskettes. (See also *Distribution diskette*.)

3.0 Chapter 3.   AIX Access for DOS Users Program Networks

CONTENTS

3.1 About this Chapter

This chapter describes the characteristics of the local area network (LAN)
hardware and software related to the Access program. For further
information on network administration, consult your LAN and host system
hardware documentation. Network administration required specifically for
the Access program is covered in Chapter 4, "AIX Access for DOS Users
Program Administration."

3.2 LAN Characteristics

The Access program uses adapters as the communication medium. Ethernet
and Token-Ring adapters are high-bandwidth, low-delay communication media
using link-level data transmission protocols that allow a computer to send
packets of data to other computers. The maximum bandwidth is typically 10
megabits per second. This bandwidth is shared by all computers using the
network.

The Access program software uses Ethernet or Token-Ring when selected for
all data traffic between the personal computer and the host system.

To use terminal emulators, the Access program creates virtual serial lines
between the personal computer and the host. These virtual serial lines
operate independently of and concurrently with the Access program
file-sharing mechanism.

3.3 RS-232 Characteristics

The RS-232 serial adapter is a low-bandwidth, point-to-point communication medium and data transmission protocol that supports data transfer between two computer systems. Typical RS-232 bandwidths are under 10 kilobits per second.

The Access program uses the host system's terminal ports in the same manner as a normal terminal. No physical RS-232 lines must be reserved for the Access program service. While file service is being provided, the Access program uses a simple frame-based communications protocol with moderate-sized packets of data.

3.4 AIX Host Hardware and Software

The network controller adapter used by the AIX host can be an Ethernet
adapter, a Token-Ring adapter, or both. Under control of the kernel, the
adapter allows the AIX host to communicate over the Ethernet or Token-Ring
adapter. The Token-Ring controller can be connected to the ring directly
or through an IBM 8228 Multistation Access unit.

The AIX host driver is the software which provides the interface between
the network hardware and the various processes that use the network. It
can handle a fixed number of network **ports** or logical connections. Each
port has an associated set of **input buffers** where incoming packets of data
are temporarily placed until a process asks for them. Open, read, and
write functions can be performed independently on each network port. The
driver is responsible for separating incoming network packets of data and
placing these packets into input buffers reserved for the various network
ports. The correct buffer is specified by a data field either in the
network address or in the packet of data.

The network can support multiple high-level protocols simultaneously.

3.5 Personal Computer Hardware and Software

The Access program personal computers can use either the Ethernet or
Token-Ring adapter as a network controller. For more information see
Chapter 1, "Introduction." The adapter plugs into the personal computer
according to instructions contained in *AIX Access for DOS Users User's
Guide*. The Access program's network driver software is part of the Access
Program software.

The network driver software is the interface between the network hardware
and the rest of the Access program software. The driver performs the
packet-separation function for the Access program software.

3.6 Multiple Hosts and Networks

The Access program host software can support multiple simultaneous
personal computer users. Each concurrent personal computer user is
handled independently of all others. The only limits are those imposed by
the operating system, such as the number of processes in the system and
the number of simultaneous network connections allowed.

The Access program host software can simultaneously support Ethernet and
RS-232 or Token-Ring and RS-232 connections to personal computers.
Because the host software supports a LAN connection independently from
RS-232, your Access program system can use a LAN only, RS-232 only, or
both media simultaneously.

Access program networks using Ethernet or Token-Ring can have multiple AIX
hosts as well as multiple personal computers. Access program personal
computer users can access any host on the network for which they have an
AIX account.

The Access program personal computer user can connect to more than one
host at a time. If the personal computer is connected to a network that
includes more than one host, the user can change from one host to another
simply by changing drives.

The Access program personal computer software supports both RS-232 and LAN
connections. If the personal computer has the necessary hardware for both
media, the user can choose either medium for an Access program session.

3.7 TCP/IP Networking

The Access program uses the standard ARPA Internet Protocol (IP) and User
Datagram Protocol (UDP) for communication between network hosts and
personal computers. Standard IP routes packets of data between machines,
whereas UDP provides simple process-to-process datagram service based on
IP. The AIX/RT TCP/IP program must be installed on RT work stations.

Subtopics
3.7.1 Internet Addresses
3.7.2 Internet Network Address Mapping

3.7.1 Internet Addresses

All hosts and personal computers on the network must have unique Internet
addresses at which they can receive data. An Internet address is a 32-bit
(4-byte) numeric value that specifies a particular network and a
particular machine on that network.

Internet addresses are specified in a standard format of four fields
separated by dots. For example, each of the four fields in 72.235.82.101
(numbers are decimal values) represents 1 byte of the complete Internet
address. Internet addresses can also be specified in octal or hexadecimal
notation, using the standard convention of a leading 0 to imply octal and
a leading 0x or 0X to imply hexadecimal.

See "Assigning Internet Addresses to Personal Computers" in topic 4.2.2
and "Assigning Internet Addresses in a Multihost AIX Access for DOS Users
Program Network" in topic A.1.3.1 for complete information about assigning
Internet addresses.

3.7.2 Internet Network Address Mapping

Network addresses are unique addresses that are physically encoded in each
network adapter in both the host and the personal computer. The network
address is assigned by the hardware manufacturer and usually cannot be
changed after the adapter is manufactured. The AIX TCP/IP networking
protocols use the network address to identify each machine on the network.
When a personal computer communicates with hosts, the network address of
the adapter in the personal computer is transmitted to the hosts along
with the Internet address. The network hosts map the transmitted Internet
address to the network address and retain this information in a table.
When any host needs to transmit data to a particular personal computer,
the host refers to the table that maps Internet to network addresses. The
host identifies the personal computer to which it addresses data based on
the correlation of the Internet and network addresses.

4.0 Chapter 4. AIX Access for DOS Users Program Administration

CONTENTS

Subtopics

4.1 About this Chapter

This chapter discusses managing your Access program system. The following
sections should help you manage the Access program.

   "Getting Started with AIX Access for DOS Users Program" in topic 4.2
   discusses starting and stopping host servers, assigning Internet
   addresses to personal computers, and adding and removing Access
   program users.

   "Supporting AIX Access for DOS Users Program Operation" in topic 4.3
   section explains the **/usr/lib/terminfo** entries for terminal emulation,
   administering network printers, managing Access program AIX processes,
   backing up system data, copy protection, and error messages.

   "Tailoring Your AIX Access for DOS Users Program System" in topic 4.4
   discusses managing AIX disk resources and load, establishing shared
   personal computer software libraries, changing default file permission
   modes, enabling and disabling terminal emulation ports, and DOS
   software compatibility.

To support everyday operation of the Access program system, you must be
familiar with the topics discussed in the first two sections.

4.2 Getting Started with AIX Access for DOS Users Program
As the administrator of the system, you may need to start or stop server
daemons, assign Internet addresses, and add or remove users.

Subtopics
4.2.1 Starting and Stopping Host Servers (Daemons)
4.2.2 Assigning Internet Addresses to Personal Computers
4.2.3 Adding Users
4.2.4 Removing Users

4.2.1 Starting and Stopping Host Servers (Daemons)

Once the host software is installed according to the instructions in
Appendix A, the DOS Server is operational each time you start the host
system. Occasionally, you might need to stop DOS Server operation, for
example, to change the default **umask** in the **/etc/rc.pci** file. Stopping
the DOS Server does not shut down the entire system. To stop DOS Server
operation, you must be logged in as root. You can restart the DOS Server
daemons with **/etc/rc.pci**, or you can restart the host system.

The utility **/etc/rc.pci** starts the DOS Server daemons
/usr/pci/bin/pciconsvr.ip and **/usr/pci/bin/pcimapsvr.ip**. (For a more
complete explanation of this utility, refer to Chapter 5, "System
Architecture for AIX Access for DOS Users Program.")

Note that whenever you intend to stop the DOS Server, you should inform
all Access program users currently logged in that service will be
terminated.

To stop the DOS Server daemons follow these steps:

1. Inform all Access program users currently logged in that service will
    be terminated.

2. Enter the **ps -ef** command to find the process IDs (pids) of currently
    running processes.

3. Find the process IDs of the processes that have the prefix **pci** (for
    example, **/usr/pci/bin/pciconsvr.ip** and **/usr/pci/bin/pcimapsvr.ip**).

4. Use the **kill** command (**kill pid pid**) on those process IDs.

5. Invoke **/usr/pci/bin/sharectl -r**

To restart the DOS Server, do one of the following:

   Invoke **/etc/rc.pci**.

   Reset the system

4.2.2 Assigning Internet Addresses to Personal Computers

Access program networks with hosts running the AIX Operating System use
the ARPA UDP/IP protocols for communication between network hosts and
personal computers. For these protocols to work properly, all personal
computers and hosts on an Access program network must have Internet
addresses that are both compatible and unique. Appendix A, "Installing
the AIX DOS Server for the AIX Access for DOS Users Program" discusses
assigning Internet addresses to AIX hosts.

In general, the term *host* is used in this guide to refer to an IBM PS/2,
IBM RT work station, or IBM System/370 computer running the AIX Operating
System with AIX DOS Server and supporting a network of Access program
users. The UDP/IP protocols, however, treat *both* AIX systems and Access
program personal computers as network hosts. Access program personal
computers must therefore have Internet addresses that meet the same
requirements as the AIX hosts on the network.

Access program personal computer users must know their assigned Internet
addresses when they create their Access program working diskettes. (See
AIX Access for DOS Users User's Guide, Appendix A.) The unique Internet
address associated with each personal computer is stored on the Access
program working diskette and transmitted to the network AIX host whenever
the user establishes an Access program session.

To assign Internet addresses to a personal computer complete the folowing
steps:

1. Reserve a block of Internet addresses for future assignment to
    personal computers.

2. Assign a unique address from the reserved block of addresses to each
    network personal computer as a network user is added.

3. Assist users as necessary in creating a working diskette with a
    correct Internet address.

The procedure for reserving a block of Internet addresses is described in
the following paragraphs. For further information on assigning Internet
addresses to personal computers, see "Adding Users" in topic 4.2.3.

Internet address requirements for personal computers are the same as for
hosts. Both hosts and personal computers must have:

    Internet addresses in the same clas

    Identical network portions of the Internet addres

    Unique host portions of the Internet address

To meet these requirements, complete the following steps:

1. Determine the Internet address of any AIX host on the Access program
    network by entering:

        grep **hostname** /etc/hosts

    The *hostname* is the name of a network host. (If you do not know the
    name of a network host, you can use the **uname -n** command to determine
    it.) The system displays the Internet address together with the name

of the host and (if applicable) any aliases that refer to the host.
For example, the system might display:

```
  89.0.2.1      host1       happy
```

The Internet address has a standard format of four numeric fields
separated by periods, as shown in this example. Make a note of this
Internet address.

2. Determine the *class* of the Internet address. The address class is
    determined by the first field of the Internet address, as follows:

First Field of
Internet Address Class

```
  0-127           A
128-191           B
192-255           C
```

Note that the values shown are decimal. Internet addresses can also
use octal or hexadecimal notation using the standard convention of a
leading 0 to imply octal and a leading 0x or 0X to imply hexadecimal.

The example host1 address of 89.0.2.1 is a Class A address because the
value of the first field is between 0 and 127.

3. Determine the network portion of the Internet address. Depending on
    the class of the address (which you determined in step 2), the network
    portion of the address is specified in the first field, the first two
    fields, or the first three fields of the Internet address, as follows:

```
              Fields Devoted
Network       to Network
Class         Portion of Address

A             1
B             2
C             3
```

Refer to Appendix A, "Installing the AIX DOS Server for the AIX Access
for DOS Users Program," for further information on determining the
network portion of the Internet address.

Since it is a Class A address, the network portion of the example
Internet address of 89.0.2.1 is 89. The remainder of the address
(0.2.1 in the example) is the host portion of the Internet address.

Make a note of the network portion of the Internet address used by
your network. It will be part of the Internet address you assign to
all personal computers using the Access program network.

4. Determine which Internet *host* addresses are available for assignment
    to personal computers. Since Internet host addresses must be unique,
    you must find out which Internet host addresses have already been
    assigned. The file **/etc/hosts**, located on the nameserver for your
    network AIX host, lists all Internet addresses currently assigned to
    any network machines. Inspect this file for all Internet address with
    the same network portion.

For example, you might find that the following Internet addresses with

a network portion of 89 have already been assigned:

```
89.200.1.1      89.200.1.4
89.200.1.2      89.200.1.6
89.200.1.3      89.200.1.8
```

In this example, you could reserve for assignment to personal computers any Internet addresses that have 89 in the first field and *do not* have values of 200.1.1, 200.1.2, 200.1.3, 200.1.4, 200.1.6, 200.1.8 for the host portion of the address.

Note that the number of Internet address fields devoted to the host portion of the address (and therefore the number of addresses that can be reserved for personal computers or AIX hosts) depends on the class of the network. Class A networks (as in the preceding example) can have as many hosts as can be uniquely addressed in three host address fields. Class B networks limit the number of hosts to those that can be uniquely addressed in two host address fields, and Class C networks limit the number of hosts to the number of unique addresses in one host address field.

In addition to the requirement for a unique host address and the limitations imposed by network class, the following requirements apply to the host portion of Internet addresses:

The value of each field must be less than 256 (decimal).

You cannot assign 0 or 255 (decimal) to all host address fields in an Internet address. This means that addresses such as 89.0.0.0 and 89.255.255.255 cannot be used. Equivalent octal or hexadecimal values are also prohibited.

See Appendix A, "Installing the AIX DOS Server for the AIX Access for DOS Users Program," for more detailed description of these limitations.

Now consider the previous example in which the six Internet addresses 89.200.1.1, 89.200.1.2, 89.200.1.3, 89.200.1.4, 89.200.1.6, and 89.200.1.8 are already assigned to existing network machines.

Based on all the requirements that apply to Internet addresses, the following addresses are available for assignment to personal computers:

All addresses between 89.0.0.1 and 89.200.1.0

89.200.1.5 and 89.200.1.7

All addresses between 89.200.1.9 and 89.200.200.254.

Make a note of the Internet addresses that are available for assignment to personal computers on your Access program network.

5. Reserve a block of Internet addresses from the list of available addresses from which you will assign addresses as personal computers are added to the network. This block can be chosen arbitrarily, but you should choose a range that will not conflict with foreseeable AIX host additions to the network or other existing or planned network interfaces.

In our example, you might reserve the Internet addresses between
89.200.200.0 and 89.200.200.254 for assignment to personal computers.
This block is clearly distinct from the addresses already assigned to
AIX hosts and, with 200 legal values, allows ample room for network
growth.

4.2.3 Adding Users

To add a user to your Access program network, perform the following steps:

1. Create an AIX account with the **adduser** command.

2. Attach the user's personal computer to the host by Ethernet, Token-Ring, or RS-232.

3. Assign an Internet address chosen from the block of addresses reserved for personal computers to the user's personal computer. Enter this address in the file **/etc/hosts** and inform users that they should use the assigned address when creating their Access program working diskette. Remember, each computer in the network must have a unique Internet address.

    For example, assume you have reserved the Internet addresses from 89.200.200.0 through 89.200.200.254 for network personal computers. The first personal computer to be added to the network would be assigned the Internet address 89.200.200.0; the second would be assigned 89.200.200.1, and so on. When you add these addresses to **/etc/hosts**, use the standard format:

    Internet address   official host name   aliases

    where *Internet address* is the address in the standard four-field format with dots separating the fields; *official host name* is the name of the personal computer being added to the network; and *aliases* (an optional field) is a list of any names other than the official personal computer name that the machine is known by. The official host names of your personal computers on the network are arbitrary, but you might wish to establish a meaningful naming convention.

    For example, assume a personal computer identified as pc5 with the Internet address 89.200.200.4 is being added to the network. Add the following entry to **/etc/hosts**:

        89.200.200.4 pc5

    Any number of spaces or tabs can separate the parts of the **/etc/hosts** entry, and the entry can appear anywhere in the **/etc/hosts** file.

    Users may need help when they create their Access program working diskettes. Refer to *AIX Access for DOS Users User's Guide*, Appendix A, for complete instructions on installing the Access program on personal computers.

    Note: Access program AIX hosts associate an Internet address with a specific personal computer. If two personal computers are initialized from the same Access program working diskette, they both have the same Internet address, violating the requirement that all network machines have unique addresses. To avoid such problems, it is safest to associate an Internet address (and therefore a working diskette) with a particular personal computer on the network.

4. When you add users, you might need to enable additional terminal emulation ports. Refer to "Enabling and Disabling Terminal Emulation Ports" in topic 4.4.3.

4.2.4 Removing Users

You can remove an Access program user from the network in any of the
following ways:

    Delete the user's AIX account following the usual AIX procedure

    Disconnect the user's personal computer from the network

    Collect the user's Access program working diskette (and also th
    Access program distribution diskette).

Once the user's account has been removed, you should perform the same
functions you would when removing any AIX account, including deleting,
archiving, or transferring files.

When you remove users, you might also want to disable terminal emulation
ports. Refer to "Enabling and Disabling Terminal Emulation Ports" in
topic 4.4.3.

4.3 Supporting AIX Access for DOS Users Program Operation

Several aspects of the Access program require special attention. You can
adjust certain files to support specific program functions. Included in
the following sections are discussions of terminal emulation, print
programs, processes, back-up and copy procedures, file and record locking,
troubleshooting and error messages.

Subtopics
4.3.1 Entries in /usr/lib/terminfo for Terminal Emulation with IBM System/370
4.3.2 Administering Network Printers
4.3.3 Managing AIX Processes
4.3.4 System Backup Procedures
4.3.5 Copy Protection
4.3.6 File and Record Locking for the RT Work Station and IBM PS/2
4.3.7 AIX Permission Modes
4.3.8 AIX Access for DOS Users Program Error Messages

4.3.1 Entries in /usr/lib/terminfo for Terminal Emulation with IBM System/370

The following section does not apply when you are using the IBM RT work station.

The Access program terminal emulator (**em.com**) requires a special entry in **/usr/lib/terminfo** called **VT100-em**. The emulator simulates a standard VT100 or PC Scancode terminal. The AIX system is preconfigured with the correct **/usr/lib/terminfo** entry, which can be set with the **TERM** environment variable.

4.3.2 Administering Network Printers

With the Access program **printer** command, users can specify explicit print
programs for up to three print streams: LPT1, LPT2, and LPT3. When the
user sets **printer** with no print program in effect for the specified print
stream, the Access program automatically spools print jobs from the
personal computer to the AIX print stream LPT1. The default print program
for LPT1 is installed with the Access program host software. It is
defined in the file **/etc/rc.pci**.

Be sure that the default settings in the **rc.pci** file are appropriate for
your system. In addition, you might want to change the default system
printer to suit the needs of your user community. Remember that making
this change affects all AIX system users, not just those connected through
the Access program.

To change the default system printer, you must edit the **rc.pci** file. Use
the following steps to change the default system printer:

1. Choose a time that least affects system users.

2. Warn any users connected to the host through the Access program that
    service is about to stop.

3. Stop all Access program processes.

4. Edit the **rc.pci** file:

    The **rc.pci** file defines the **printpath** and **printprog** variables.

       printprog=/usr/pci/bin/pciprint
       printpath=/usr/pci/bin:/bin:/usr/bin
       export printpath printprog

    The **printprog** variable is the default print program, and the **printpath**
    variable is a list of directories the system must search for print
    programs.

    a. Edit **printprog** so that it contains your default print program.
        (In the preceding example, the default print program is **pciprint**.)

    b. Edit **printpath** so that it contains the paths to any user-invoked
        print programs on the system. (In the preceding example, the
        directories that are to be searched are: **/usr/pci/bin**, **/bin**, and
        /usr/bin.)

5. Restart the Access program.

For further information on administering AIX printers, refer to your AIX
system documentation.

4.3.3 Managing AIX Processes

All Access program users who establish terminal emulation or file service sessions cause AIX processes to be executed on the host. When AIX commands are invoked during a terminal emulation session, the host executes these commands as though they were issued from a terminal connected directly to the host. Managing these processes is no different from managing any other processes invoked from an AIX terminal.

When file service users execute DOS commands on the virtual drive, the DOS Server translates the commands into equivalent AIX commands and executes them on the AIX system. In general, the DOS Server manages these AIX processes transparently to the user, and they rarely require intervention by the person who administers the system.

With the Access program **on** command, however, Access program file service users can invoke AIX processes that are not under the control of the Access program software. A user who is unfamiliar with AIX might use **on** inappropriately and start a runaway process--that is, a defective process that consumes AIX resources and never terminates. If the user cannot terminate the process, the administrator should intervene and kill the process.

When necessary, use the AIX **ps** command to find out information about Access program AIX processes, just as you would to find out about any other AIX processes. Note that processes invoked by **on** are not associated with a terminal, so you must invoke **ps** with the appropriate option to display status information for *all* processes.

For example, assume that a user with the user name **fred** has invoked a process **/u/fred/bin/doit** that needs to be killed. To find out the process number that needs to be killed, issue the **ps -ef** command. Among the displayed data, you might see lines similar to this:

```
  UID   PID  PPID  C   STIME TTY  TIME COMMAND

  fred   346   345  1   Apr 7   3  9:48 /u/fred/bin/doit
```

From this display, you can see that the process you need to kill is number 346.

4.3.4 System Backup Procedures

The presence on the AIX host of the Access program host software and files created by Access program users does not affect standard system backup procedures. Access program users can, of course, use their personal computers to back up files from the AIX host to their own local disks. However, such procedures should not be used as a substitute for regular backups of the entire AIX file system done by the person who administers the system.

4.3.5 Copy Protection

Access program users may not use multiple Access program disks with the
same serial number. The following paragraphs describe the Access program
copy-protection system and recommend corrective procedures to be used when
a user's personal computer is disabled by the copy-protection mechanism.

Using the Access program simultaneously from two personal computers
requires two Access program disks created from two different licensed
Access program distribution diskettes. Users can make backup copies of
their distribution diskettes or working diskettes, but they cannot use
more than one copy at a time.

Copy protection prevents the illegal duplication and use of Access program
software. It is illegal to simultaneously operate two or more personal
computers with Access program software derived from one licensed
distribution diskette. Each diskette is distributed with some unique data
in the **bridge.sys** file that must be present in the file for correct
operation.

When the Access program system detects two personal computers
simultaneously using Access program disks created from the same
distribution diskette, the second personal computer to log in to the
Access program is halted. A message is displayed stating that a
copy-protection violation has occurred. You can recover from this
condition by turning off the personal computer and restarting using a
unique Access program disk for each personal computer.

4.3.6 File and Record Locking for the RT Work Station and IBM PS/2

A file is locked when one user has the file open, and no other user can access it. Instead of locking a whole file, the record being used in that file can be locked. You can lock the contents of the entire file, or you can just lock those records being used.

For example, a networked word-processing program prevents two users from modifying the same file at the same time (file locking), whereas a networked database management program lets two or more users access the database file at once, but prevents simultaneous record access (record locking).

How and whether a particular application uses file or record locking depends on the application. For instance, one application might not lock records at all, another might lock only the record being accessed, and a third might lock all records from the one in use to the bottom of the file. Some standalone applications lock files; others do not. If an application is designed to open a file, make its own working copy, and close the file, the file is not locked. However, if the application keeps the file open, it usually locks it to other users. Attempts to access a locked file yield either an **Access denied** or **File locked** error message. See "Troubleshooting File and Record Locking for the RT Work Station and IBM PS/2" in topic 4.3.6.1 for more locked-file information.

A file set to read-only mode with the DOS **attrib** or AIX **chmod** commands is always open for reading, but nobody can write to it. DOS program files used to execute commands should be set to **Read only** to avoid use conflicts.

File and record locking capabilities are built into the Access program and become available automatically when the Access program is installed and started. Access program file and record locking uses AIX shared memory and semaphores for operation.

The Access program supports IBM DOS Version 3.3 file and record locking facilities that are used by many networked DOS applications.

Subtopics
4.3.6.1 Troubleshooting File and Record Locking for the RT Work Station and IE

4.3.6.1 Troubleshooting File and Record Locking for the RT Work Station and IE

There are several ways for shared memory or files to become corrupted or otherwise damaged. For example, the kernel could lose a shared-memory segment or semaphore, which corrupts the shared memory but might not affect user files. However, a subsequent interrupt signal that the server cannot catch (such as **kill -9**) can terminate the server process. If this happens, files are left open and locks are left on, which may cause damage and make records inaccessible.

Files can also be damaged if a user issues the DOS **copy** or **backup** command on a virtual drive file accessed by another user through an application using record locking. The user receives a DOS error message indicating that no copy was made; however, a partial (and therefore corrupt) version could actually exist.

Some possible indicators of shared-memory corruption include:

    Finding a file that seems locked when no other users are logged i

    Accessing a file when the file is shown as locked

If you suspect the shared memory is corrupted, you can test it by using the command **/usr/pci/bin/sharectl -p**. This command prints the global open-file table and file-header table entries on open files. When no files are open (and no locks are on), the command returns nothing. If information is returned when no Access program users are logged in, you can assume the shared memory is corrupted.

If you are having difficulties with file or record locking, proceed as follows to determine the problem and its solution.

Warning: Be sure all Access program users are logged off before you proceed; otherwise, file damage can result.

If the Access program is newly installed, the problem could be a conflict with another AIX application using shared memory; in particular, the other application might have assigned the same shared-memory identifiers or **keys** that the Access program uses.

To check this, first use the AIX command **ipcs** (interprocess communication status) or its equivalent to display the status of shared memory. If there is no conflict, you should get a listing similar to the following:

            m   0x7372666f
            m   0x73726866
            m   0x7372746c
            s   0x6c737372

The character **m** indicates a shared-memory segment, and the character **s** represents the semaphore set. The hexadecimal numbers are keys; each one is an identifier for one of the shared-memory segments or for the semaphore set. If any key is missing from the table, that key is already used on your system and you have a conflict with another application. The solution is to change one set of keys. If you cannot change the set for the other application, contact your authorized IBM representative for assistance.

If shared-memory key conflicts are ruled out, the problem is likely to be

a corruption of the Access program's shared-memory segments. To check for
memory segment corruption, follow this procedure:

1. Request that all Access program users log off.

2. Enter:

    ps -ef

    to make sure all processes whose names start with **pcidossvr** are gone.

3. Run the **/usr/pci/bin/sharectl -p** command.

If the shared memory is uncorrupted, there is no response from this
command. However, since this command displays information about files
locked by Access program users, any display (when no users are logged in)
means files with locks in place have been left open and are probably
corrupted.

If corruption has occurred, go through the following steps to remove and
reinitialize the shared memory for record locking:

1. To reinstate the key, enter:

    /usr/pci/bin/sharectl -i

2. To remove the shared memory, enter:

    /usr/pci/bin/sharectl -r

3. To reinitialize the shared memory, enter:

    /usr/pci/bin/sharectl -i

4.3.7 AIX Permission Modes

The Access program supports the standard AIX file permission modes. Both
file-service and terminal-emulation users have the same privileges and
restrictions regarding access to host files as other AIX system users.

The user's **umask** determines the permission mode with which an AIX file is
created. Users connected directly to the AIX system use the default AIX
umask, or they can change their own **umask** to reflect their preferred
default permission modes. The Access program **umask** for RS-232 and LAN
users is also determined by users. Users either use the default AIX **umask**
or specify their own **umask**.

Access program file-service users connected to the host all have the same
umask, which cannot be changed by individual users. The person who
administers the system, however, can change the system-wide **umask** that
affects these users.

The following example shows the contents of a typical AIX directory with
files and subdirectories created using Access program file service over.
The list is produced with the **ls -l** command. Read, write, and execute
permissions are shown in the first column.

```
-rw-rw-r--  1 jones    usr       3400 Mar 13 11:09 bdgtmemo
drwxrwxr-x  3 jones    usr        436 Mar  7 18:21 chapter.one
-rw-rw-r--  1 jones    usr       2400 Mar 18 16:31 message
drwxrwxr-x  2 jones    usr         92 Mar 18 16:32 pci
-rw-rw-r--  1 jones    usr       1465 Mar  4 10:56 prjctmem
drwxrwxr-x  3 jones    usr        228 Mar 18 18:43 report
-rw-rw-r--  1 jones    usr       3278 Mar  7 18:53 staff
-rw-rw-r--  1 jones    usr       2400 Mar  5 11:06 status.rep
```

To change the **umask** for Access program file-service users:

1. Stop the execution of the DOS Server.

2. Modify **/etc/rc.pci**:

    Change the line to reflect your desired **umask**, such as:

       umask 22

3. Restart the DOS Server .

There are no special DOS Server considerations associated with AIX groups.

Note: The **umask** entry in the **/etc/rc.pci** does not affect terminal
        emulation users.

For further information on permission modes and groups, refer to the
descriptions of **chmod**, **chown**, **umask**, **group**, and **setuid** in your host system
documentation.

4.3.8 AIX Access for DOS Users Program Error Messages

The Access program host software responds to all serious Access program error conditions by invoking the **/usr/pci/errlogger** shell script, which logs the error messages to **/usr/spool/pcilog/errlog**.

4.4 Tailoring Your AIX Access for DOS Users Program System

As soon as you install your Server program, users can begin to utilize the
AIX host resources made available by the Access program file service,
terminal emulation, and the special Access program utilities. No special
configuration of the system is required. As you become familiar with
Access program operation, however, you might want to tailor the system to
accommodate the way you and the system users prefer to use the system.
This section includes the following sections:

>   "Managing Host System Disk Resources and Load," which discusses the
>   host resources required for Access program use
>
>   "Establishing Shared Personal Computer Software Libraries," which
>   outlines how to store DOS utilities and application programs on the
>   AIX host
>
>   "Enabling and Disabling Terminal Emulation Ports," which explains how
>   to increase or decrease the number of terminal emulation sessions
>   supported by your host
>
>   "DOS Software Compatibility," which outlines the technical
>   requirements for DOS software to operate concurrently with the Access
>   program.

Subtopics
4.4.1 Managing Host System Disk Resources and Load
4.4.2 Establishing Shared Personal Computer Software Libraries
4.4.3 Enabling and Disabling Terminal Emulation Ports
4.4.4 DOS Software Compatibility

4.4.1 Managing Host System Disk Resources and Load

Although the Access program system requires no special procedures for managing host system disk space, you should advise inexperienced users that they are sharing a disk and should conserve disk space. If your Access program system uses multiple hosts, you can use them to your advantage by distributing user accounts among the different hosts to balance system load and disk space use on the various machines.

The task of load management on Access program hosts is essentially the same as for any AIX machine.

The Access program allows users the flexibility of alternating between local work (done on a local diskette or fixed disk) and remote work (done on an AIX virtual drive). The load on the remote AIX machine is heavier, of course, when Access program users are using the virtual drive. Depending on the requirements of your installation, you could either encourage or discourage the use of the virtual drive for DOS programs, which can be run either from the user's local disk or from the virtual drive (assuming the programs are installed on the virtual drive). For example, to discourage use of the virtual drive for DOS programs, you can limit the number of publicly accessible directories containing DOS programs.

4.4.2 Establishing Shared Personal Computer Software Libraries

The Access program administrator of the system is responsible for creating
and administering libraries of DOS software used by the network-wide
community of Access program users. The software libraries managed by the
administrator of the system are analogous to personal libraries created on
the AIX disk by individual Access program users to store their own copies
of personal computer software. The difference is that the shared
libraries created by the administrator of the system are accessible to all
system users rather than to only a single user.

To create a publicly accessible library of DOS software on the AIX disk,
follow these procedures:

1. Choose the DOS software you want to store and execute on the AIX disk.
    Access program utilities such as **dos2aix**, **em**, **printer**, **udir**, and
    aix2dos can be installed on the AIX disk. (These utilities are
    distributed with the Access program personal computer software.) You
    can also install on the AIX disk any other internally developed,
    site-licensed, or public domain DOS software that can be stored on and
    executed from a fixed disk. Such DOS programs might be obtained
    off-the-shelf or created with any of the widely available utilities
    that run under DOS for writing, compiling, and linking DOS programs.
    Some copy-protected DOS programs cannot be installed on the AIX disk.
    Such programs are generally not internally developed, site-licensed,
    or public domain, however, and therefore may be illegal to install in
    a publicly accessible AIX directory.

2. Log in to a host AIX system from a personal computer using the Access
    program.

3. Make a directory on the AIX disk to store the software you have
    selected. This directory must be easy to find and execute for all
    Access program users. For example, **/usr/pci/pcbin** directory can be
    used as a standard directory for DOS executable programs.

4. Install the DOS programs in **/usr/pci/pcbin** on the AIX virtual drive as
    you would install them in a subdirectory on a local fixed disk.
    During the installation procedure, refer to the virtual drive by the
    name Access program returns when you log in.

5. Set the AIX permission modes for the DOS files and the directory
    containing them so Access program users can access the files. The DOS
    files must be readable, but do not need AIX execute permission.
    Directories must be readable and executable. Write permission is also
    often required for directories containing DOS applications, since many
    applications create temporary files when executed. You can use the
    Access program **on** command to run the AIX **chmod** to set the modes
    correctly.

    To make a file on virtual drive D readable by all other users but
    writable only by you, enter:

       on d: chmod 644 **filename**

    To make a directory on virtual drive D readable, writable, and
    executable by all users, enter:

       on d: chmod 777 **directory**

6. Inform Access program users where newly installed software is located,
    and be prepared to assist them in setting their DOS search paths
    appropriately. For example, assume an Access program user has a
    personal computer with one fixed disk and normally has a DOS search
    path set to **C:\bin**. The Access program virtual drive for this user is
    normally drive D. To make **/usr/pci/pcbin** easily accessible, the
    user's search path should be set with the command:

       path=c:\bin;d:\usr\pci\pcbin

    The **path** command can be added to the user's **autoexec.bat** file to make
    it effective every time the user starts the personal computer. For
    further information on using the **autoexec.bat** file with the Access
    program, refer to *AIX Access for DOS Users User's Guide*.

Subtopics
4.4.2.1 Tailoring Your Software Libraries
4.4.2.2 Software Libraries for Access Program AIX Commands

4.4.2.1 Tailoring Your Software Libraries

Subdirectories within **/usr/pci/pcbin** can be used to group DOS files
together. Consider the following factors when you evaluate the need for
subdirectories of DOS software:

> A single directory containing all personal computer software i
> convenient because it is easily accessible to all Access program
> users. The directory can be included in the search paths of all
> Access program users, so users can easily find it.

> A single directory containing all personal computer programs ca
> become unmanageable when it contains a large number of personal
> computer programs. For example, a single personal computer
> application program can contain several files (sometimes including
> both executable and data files). If many such programs are in the
> same directory, it can be difficult to keep track of which files
> belong to what programs. With a large number of files in the same
> directory, there is a risk of file name conflicts between existing
> files and new ones you want to add.

> To reduce confusion, you can create subdirectories for individua
> personal computer programs or groups of related programs. When you
> add such directories, however, remember that users must be informed
> that these directories exist and that the directories should be added
> to their search paths.

As an example, consider the following use of the **/usr/pci/pcbin** directory:

```
                        /usr/pci/pcbin
                              |
  _____
  |        |              |            |            |             |
  n  printer.exe        spread      udir.exe     cn_mv           wp
                          |                         |
                 _____|_____        _____|_____
                 |        |        |        |       |       |
               edit    merge    spread     edit    sort    spe
```
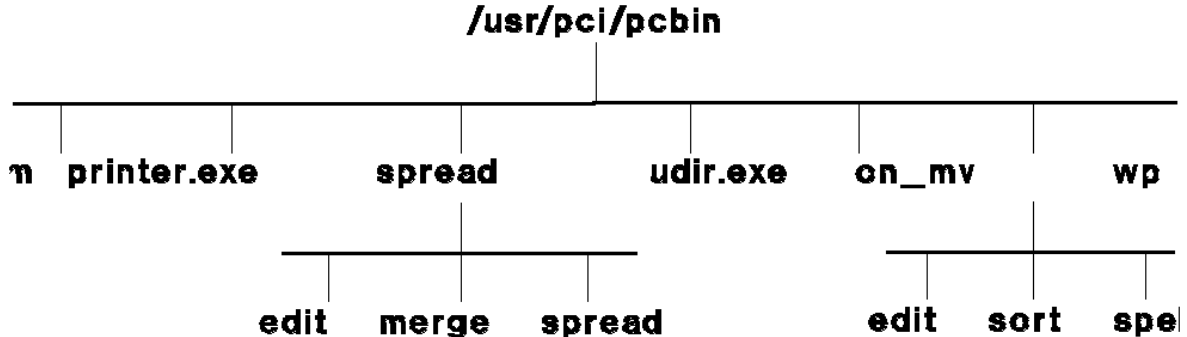
In this example, separate subdirectories are created for a word-processing
program (**wp**) and a spreadsheet program (**spread**). The subdirectories allow
the files for the two different applications to be grouped separately.
Since both applications have files named **edit**, using two subdirectories
also avoids a file name conflict. The standard Access program utilities
remain immediately subordinate to **/usr/pci/pcbin**. For this example, DOS
search paths for Access program users would be set to include
/usr/pci/pcbin, **/usr/pci/pcbin/wp**, and **/usr/pci/pcbin/spread**.

4.4.2.2 Software Libraries for Access Program AIX Commands

The directory **/usr/bin** is recommended for storing utilities for Access
program users that are executable under AIX. You can add AIX programs to
this directory. In general, the same tailoring issues apply as with
libraries of DOS software. It is not recommended that you create
subdirectories within **/usr/bin**, however. Consider the following factors
for AIX software libraries. These factors do not apply to DOS libraries:

> AIX programs must be executable, unlike DOS programs, which must b
> readable.

> Search paths for AIX programs are relevant only for users who log i
> as AIX users--that is, users logging in from terminals and Access
> program terminal-emulation users. Do not set AIX search paths for
> Access program file service users.

4.4.3 Enabling and Disabling Terminal Emulation Ports

If you are using terminal emulation on a LAN with IBM System/370 or IBM
PS/2, you must first create a Network Terminal device (nty) using the AIX
devices command.

If you are using terminal emulation on a LAN with an RT workstation, you
must first create an Asynchronous Pseudoterminal device (pty) using the
AIX **devices** command.

If you are using terminal emulation over an RS-232 connection, you must
first add a Teletype device (tty) device using the AIX **devices** command.

Access program terminal emulation can be used in the following ways:

1. Over a LAN concurrently with Access program file services. (The user
    first logs in to Access program file services with the **login** command
    and then invokes **em**.)

2. Over a LAN independently of Access program file services. (The user
    invokes **em** after starting the Access program working diskette, without
    logging in to Access program file services.)

3. Over RS-232 independently of Access program file services.

When terminal emulation is used over RS-232 independently of a file
services session (case 3 above), the AIX host treats the user's personal
computer like a standard asynchronous terminal in all respects.
Administration of such personal computers, therefore, requires no special
procedures.

In the following description, references to emulation over a LAN include
emulation both with and without a file services session.

For a more thorough description of the operation of terminal emulation,
see Chapter 5, "System Architecture for AIX Access for DOS Users Program."

For the IBM System/370 and IBM PS/2, the number of ntys determine the
number of terminal emulation ports over a LAN.

For the RT work station, the number of ptys determines the number of
terminal emulation ports over a LAN.

Subtopics
4.4.3.1 Procedure for Enabling and Disabling Ports

4.4.3.1 Procedure for Enabling and Disabling Ports

To change the number of terminal emulation ports available for the IBM
System/370 and IBM PS/2, follow these procedures:

>   To decrease the number of ports, use the **devices** command to delete an
>   nty from your system.
>
>   To increase the number of ports one at a time, use the **devices** command
>   to add an nty to your system. Set the value for **automatic enable** to
>   **TRUE**. Set the terminal type to **VT100-em** and the parity type to **even**.
>   To enable a device without restarting the system, use the **penable**
>   command.

To change the number of terminal emulation ports available for the RT
computer, follow these procedures:

>   To decrease the number of ports, use the **devices** command to delete a
>   pty. Remember that a pty device can be used for other purposes in
>   addition to Access program terminal emulation, such as for a TELNET
>   protocol. Be careful when you delete a pty.
>
>   To increase the number of ports one at a time, use the **devices** command
>   to add a pty to your system. Set the values for **logger** and **automatic
>   enable** to **TRUE**. Set the terminal type to **VT100**. To enable a device
>   without restarting the system, use the **penable** command.

For more information on adding devices, refer to your system documentation
for installing and customizing your IBM RT work station.

4.4.4 DOS Software Compatibility

Most DOS software is compatible with Access program operation, DOS
applications running on personal computers can access files on the AIX
host through the Access program. DOS applications can also be stored on
and executed from the AIX disk, as described in "Establishing Shared
Personal Computer Software Libraries" in topic 4.4.2.

The following list summarizes the constraints on DOS software used with
the Access program. In general, applications will operate with the Access
program if they *do not*:

    Overlay the DOS or BIOS area of storage

    Program the 8259 interrupt controller in a way that interferes wit
    the use of Access program.

    Disable interrupts, fail to issue an end-of-interrupt or IRET on
    hardware interrupt level, or mask-selected interrupt levels for more
    than 100 ms.

    Use interrupts 13, 25, or 26 for access to the virtual drive

    Configure hardware device registers that belong to the networ
    hardware used by the Access program.

    Make incorrect use of timer interrupts

    Use memory not assigned to them by the operating system

Note that there may be other limitations for operation.

In general, you can use any DOS command or utility with files on the
virtual drive. However, since AIX handles all disk-management functions
for the virtual drive, the following DOS commands are unnecessary and
cannot be used for the virtual drive:

assign
chkdisk
diskcomp
diskcopy
fdisk
format
label
print
sys
tree.

Unpredictable results can occur if you try to use these commands.

IBM DOS print spooling is not supported.

5.0 Chapter 5. System Architecture for AIX Access for DOS Users Program

CONTENTS

5.1 About this Chapter

This chapter provides an architectural overview of the Access program
system. It lists the software modules for DOS and AIX and briefly
describes each. Starting and stopping the Access program is discussed
along with establishing and using connections between the host and a
personal computer. Access program utilities and various types of terminal
emulation are also discussed.

5.2 Access Program Modules for DOS
The following Access program modules operate on the personal computer
under DOS:

pciinit.exe   Initializes the Access program.

nty.exe   Initializes terminal emulation.

bridge.sys   Provides basic Access program support.

config.sys   Identifies device drivers to be loaded by DOS.

l*xxx*.sys or m*xxx*.sys
                         Identifies the Ethernet or Token-Ring device driver,
                         where xxx is a mnemonic for the device driver.

login.exe   Establishes a host connection for host file services.

logout.exe   Terminates a host file services session.

dos2aix.exe   Converts text files in DOS format to AIX format.

em.com   Establishes a terminal emulation session.

jobs.exe   Displays the status of AIX jobs initiated by the **on**
                         command.

kill.exe   Terminates **on**-initiated jobs.

on.exe   Causes AIX programs to be executed from the DOS
                         environment.

printer.exe   Directs output to local or remote printer.

udir.exe   Lists virtual drive directory contents in AIX style.

aix2dos.exe   Converts text files in AIX format to DOS format.

vi.exe   DOS version of the AIX **vi** command.

5.3 DOS Server Software Modules for AIX

The following DOS Server modules operate on the host under AIX:

/etc/rc.pci

> This program starts **pciconsvr.ip.** and **pcimapsvr.ip**.

/usr/pci/prot

> This program provides copy protection over RS-232 serial interfaces.

/usr/pci/errlogger

> This file is linked to **/usr/pci/bin/errlogger**.

/usr/pci/features

> This file contains features supported by the server. This file contains **NO**, which means that nty terminal emulation is supported (for IBM PS/2 and IBM System/370 only).

/usr/spool/pcilog/consvr-log

> This file contains debugging logs generated when the debugging option is used on **pciconsvr.ip**.

/usr/spool/pcilog/mapsvr-log

> This file contains debugging logs generated when the debugging option is used on **pcimapsvr.ip**.

/usr/spool/pcilog/errlog

> This file contains messages from **/usr/ pci/bin/errlogger**.

/usr/pci/bin/printpty

> This program is invoked by the DOS Server to find available ptys (RT work stations only).

/usr/pci/bin/pcimapsvr.ip

> This program is a daemon that listens for broadcast requests for site tables from **login**. It also listens for broadcasts from **pciconsvrs** on the network. Options for this program are described in Appendix A, "Installing the AIX DOS Server for the AIX Access for DOS Users Program."

/usr/pci/bin/pciconsvr.ip

> This program is a daemon that listens for a connection request from **login**. It also broadcasts **pciconsvr host name here** messages, indicating that the host is available for Access program service. Options for this program are described in Appendix A, "Installing the AIX DOS Server for the AIX Access for DOS Users Program."

/usr/pci/bin/pciconsvr.232

> This program functions the same as **pciconsvr.ip,** but works over RS-232.

/usr/pci/pcidossvr.232

> This program is linked to **/usr/pci/bin/pciconsvr.232**. It is a daemon that functions the same as **pcidossvr.ip**, but works over RS-232.

/usr/pci/2/8/7/pcidossvr.ip

> This program maintains an exclusive dialogue with the

personal computer module **bridge.sys**. It executes AIX
commands on behalf of the personal computer user and
transmits the results back to the personal computer.

/usr/pci/bin/pcidosout.ip

This program is a process invoked during terminal emulation
over a LAN. It takes data passed from the AIX shell via
the pseudo-tty (pty) and sends it over the network to the
personal computer (for RT work station only).

/usr/pci/2/8/7/pcidossvr.232

This program maintains an exclusive dialog with the
personal computer module. It works like the **pcidosssvr.ip**,
except that it works over RS-232.

/usr/pci/bin/pciprint

This program is the default print program.

/usr/pci/bin/pcistatus

This program displays a list of running Access program
processes.

/usr/pci/bin/sharectl

This program initializes, removes, and prints information
about shared memory.

/usr/pci/bin/errlogger

This program is a utility invoked automatically when the
Access program encounters a serious error. It logs the
error in **/usr/spool/pcilog/errlog**.

/usr/pci/bin/aix2dos

This program converts text files in AIX format to DOS
format.

/usr/pci/bin/dos2aix

This program converts text files in DOS format to AIX
format.

Subtopics
5.3.1 Starting and Stopping the AIX DOS Server Software on Personal Computers
5.3.2 Establishing an Access program Connection between a Personal Computer ar
5.3.3 Using an Established AIX Access for DOS Users Program Connection
5.3.4 AIX Access for DOS Users Program Utilities
5.3.5 Using IBM System/370 and IBM PS/2 Terminal Emulation
5.3.6 Using RT Terminal Emulation
5.3.7 Using the Terminal Emulator without Establishing a File Services Sessior
5.3.8 Ending a File Services Session

5.3.1 Starting and Stopping the AIX DOS Server Software on Personal Computers

The Access program must be installed and initialized on the personal computer, and the AIX DOS Server program must be installed and initialized on the host. The **pciinit.exe** program on the personal computer initializes the personal computer side of the Access program. The **pciinit** command is normally invoked from the user's **autoexec.bat** file, so it is executed automatically when the personal computer is started.

Note the following diagram:

```
┌─────────────────────┐       ┌─────────────────────┐
│                     │       │                     │
│  ┌───────────────┐  │       │  ┌───────────────┐  │
│  │  PCIINIT.EXE  │  │       │  │  /etc/rc.pci  │  │
│  └───────────────┘  │       │  └───────────────┘  │
│                     │       │                     │
│        PC           │       │      HOST 1         │
│                     │       │                     │
└─────────────────────┘       └─────────────────────┘
```
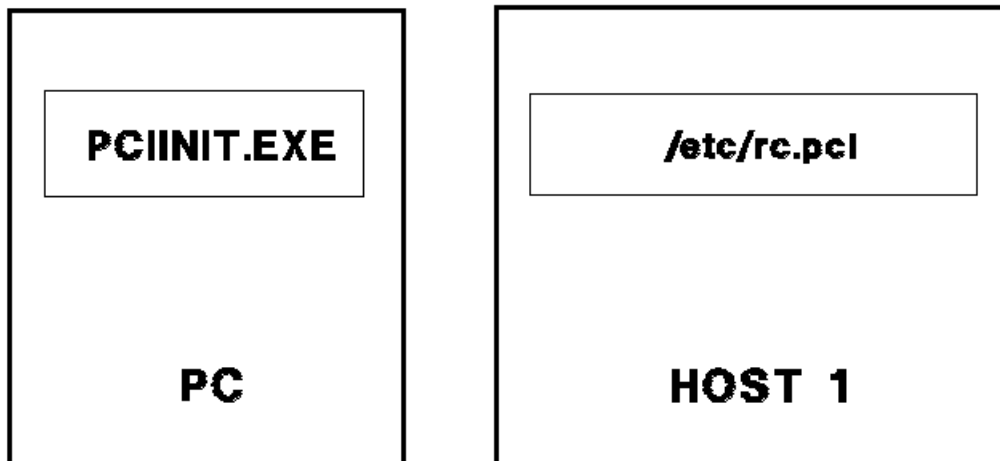
Modules that support the Access program service on the personal computer are loaded as device drivers at start time. These device drivers are specified in **config.sys**. With a LAN, these device drivers are **bridge.sys** and **l***xxx***.sys** or **m***xxx***.sys**. **bridge.sys** is the basic Access program support module. **l***xxx***.sys** or **m***xxx***.sys** is the LAN driver where *xxx* is a mnemonic for the specific driver. All communication originating from the personal computer side of the Access program and destined for the network passes through the LAN driver.

Module **/etc/rc.pci** initializes the DOS Server on the host. Its purpose is to start the two Access program daemons, **/usr/pci/bin/pciconsvr.ip** and **/usr/pci/bin/pcimapsvr.ip**, that run on the host. The **rc.pci** module also establishes the AIX environment in which the DOS Server runs.

5.3.2 Establishing an Access program Connection between a Personal Computer an

To begin an Access program file service session, the personal computer
user executes the **login** command. **login.exe (login)** broadcasts over the
network a request for a site map. A site map is a table, such as the one
below, that lists all the hosts to which the personal computer can
connect.
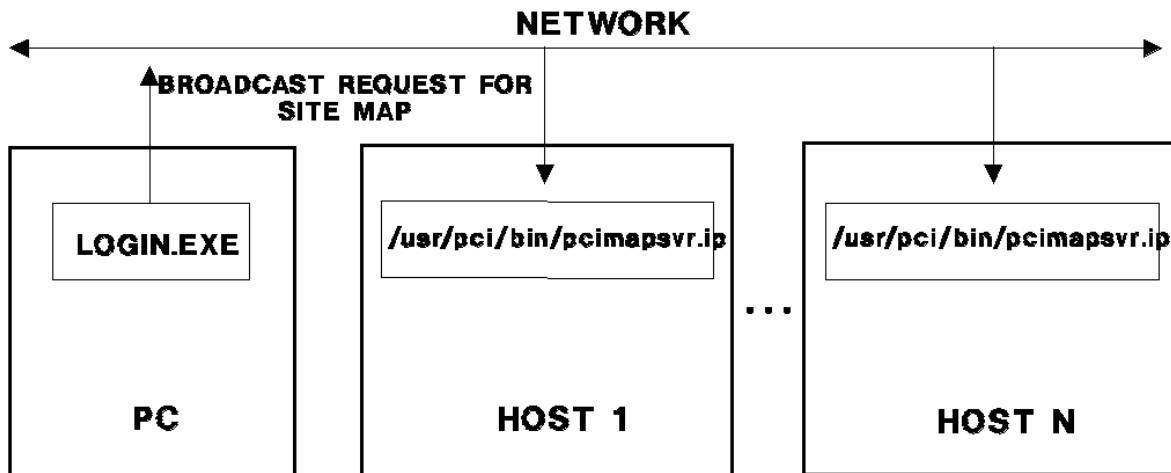
The mapserver daemon **/usr/pci/bin/pcimapsvr.ip (pcimapsvr)** on each host
has two related functions:

1. To listen for broadcast **pciconsvr host name here** messages from each
    host running the Access program. (The module that broadcasts the
    messages is **/usr/pci/bin/pciconsvr.ip**.) Each **pcimapsvr** keeps a table
    of available hosts that is updated approximately every 30 seconds
    based on these broadcasts.

2. To listen for broadcast requests for site maps issued by **login** and
    send the current site map to any **login** process that requests it.

In response to **login**'s request for a site map, therefore, each **pcimapsvr**
returns its current site map, as illustrated in the following diagram:

NETWORK

```
          SITE MAP RETURNED TO
               LOGIN.EXE

┌─────────────┐   ┌─────────────────────┐        ┌─────────────────────┐
│             │   │                     │        │                     │
│ ┌─────────┐ │   │ ┌─────────────────┐ │        │ ┌─────────────────┐ │
│ │LOGIN.EXE│ │   │ │/usr/pci/bin/    │ │        │ │/usr/pci/bin/    │ │
│ │         │ │   │ │pcimapsvr.ip     │ │  ...   │ │pcimapsvr.ip     │ │
│ └─────────┘ │   │ └─────────────────┘ │        │ └─────────────────┘ │
│             │   │                     │        │                     │
│     PC      │   │      HOST 1         │        │      HOST N         │
└─────────────┘   └─────────────────────┘        └─────────────────────┘
```
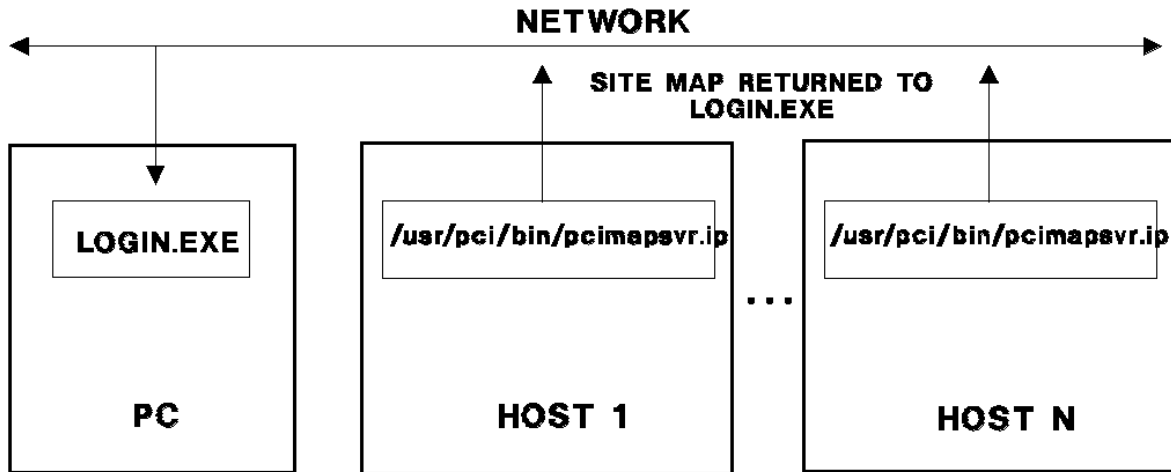
On the personal computer side, **login** listens for the first returned site map and ignores any other incoming site maps from other hosts.

login displays for the personal computer user the list of available hosts. The user selects a host from the list, and **login** formats and sends a connection request to **/usr/pci/bin/pciconsvr.ip (pciconsvr)** on the selected host, as illustrated in the following diagram:

NETWORK

CONNECTION REQUEST

```
┌─────────────┐              ┌──────────────────────────────────┐
│             │              │                                  │
│ ┌─────────┐ │              │      ┌─────────────────────┐     │
│ │LOGIN.EXE│ │              │      │/usr/pci/bin/        │     │
│ │         │ │              │      │pciconsvr.ip         │     │
│ └─────────┘ │              │      └─────────────────────┘     │
│             │              │                                  │
│     PC      │              │            HOST 1                │
└─────────────┘              └──────────────────────────────────┘
```
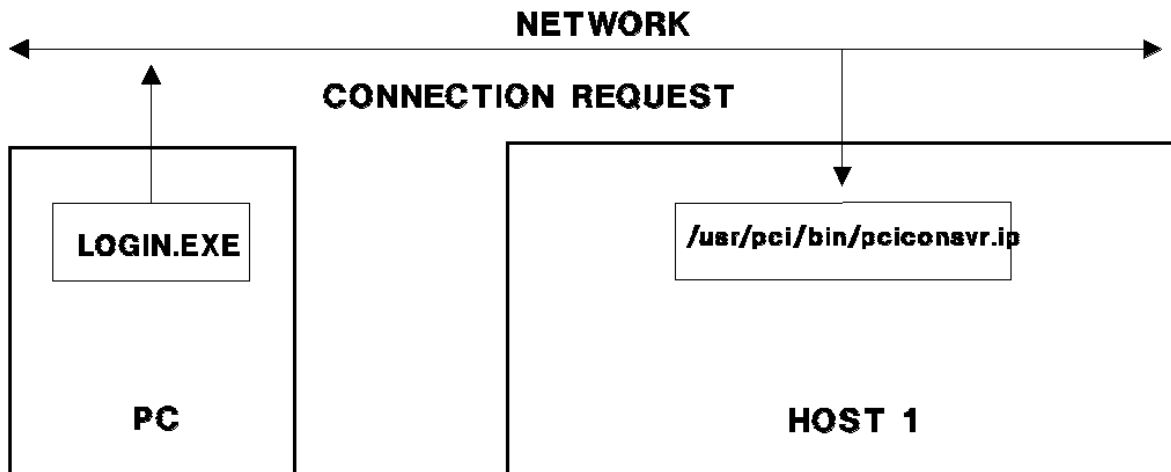
Note that the connection request need not be directed to the same host that provided the site map to **login**. Since each **pcimapsvr**, under normal circumstances, has a current list of all available hosts, **login** can use the site map provided by any **pcimapsvr**.

Like the **pcimapsvr**, each **pciconsvr** has more than one job:

1. To broadcast **pciconsvr host name here** messages approximately every 30 seconds. These messages are used by each **pcimapsvr** to update its lists of available hosts.

2. To manage the connection between the personal computer and the host. This task includes several subordinate tasks. The connection management process begins when a **pciconsvr** receives a connection request, as illustrated.
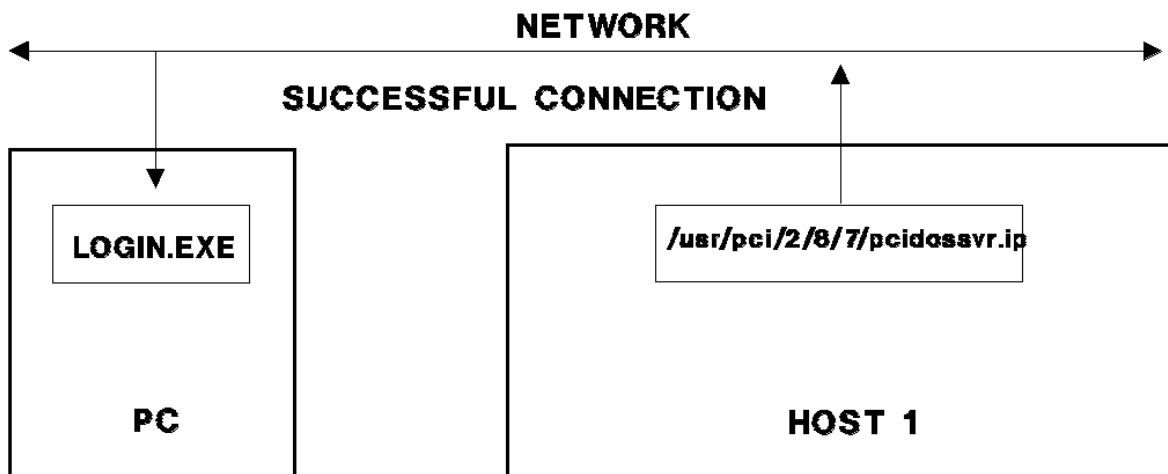
When the **pciconsvr** receives a connection request from **login**, it assigns a
port number for use in subsequent communication with the personal
computer, and generates a new process, **/usr/pci/2/8/7/pcidossvr.ip
(pcidossvr)**, as illustrated in the following diagram:

```
┌─────────────────────────────────────────────────────────┐
│                                                           │
│                  ┌───────────────────────┐                │
│                  │  /usr/pci/bin/pciconsvr.ip │           │
│                  └───────────────────────┘                │
│                              │                            │
│                              ▼                            │
│                  ┌───────────────────────┐                │
│                  │ /usr/pci/2/8/7/pcidossvr.ip │          │
│                  └───────────────────────┘                │
│                                                           │
│                        HOST 1                             │
│                                                           │
└─────────────────────────────────────────────────────────┘
```
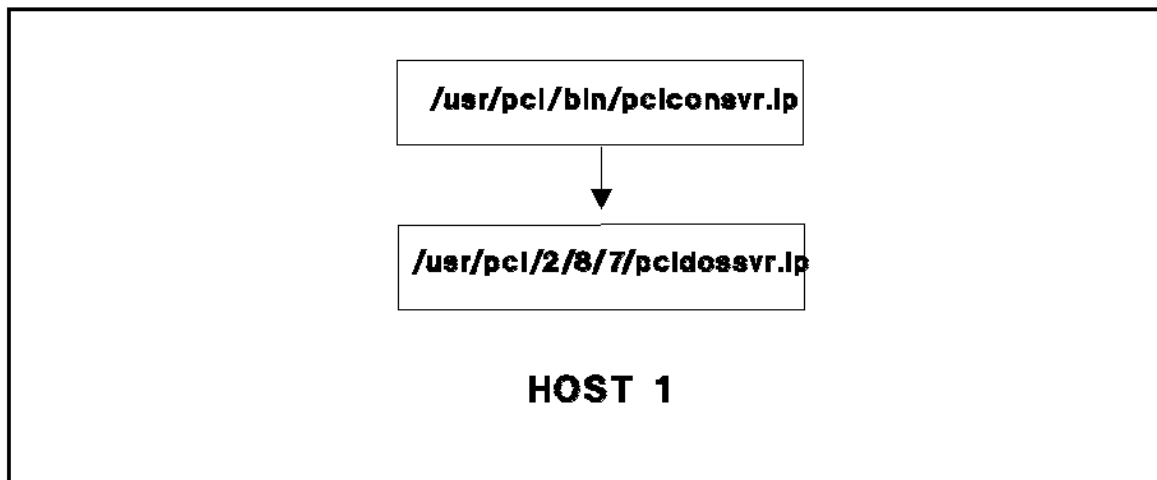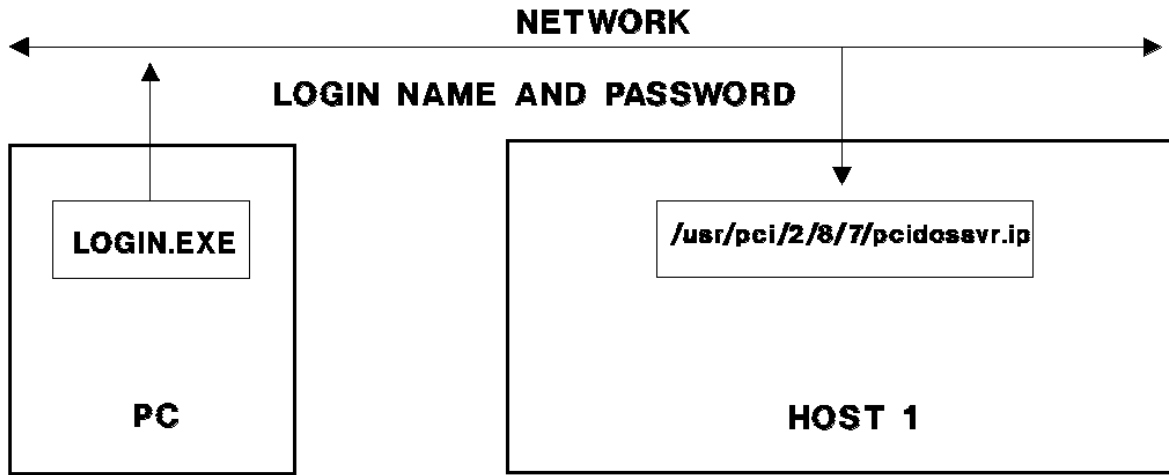
The **pcidossvr** inherits the port from the **pciconsvr** and informs **login** that
a connection was successfully established, as illustrated below:

```
          ◄────────────── NETWORK ──────────────────►
                  │
            SUCCESSFUL CONNECTION          ▲
                  │                        │
   ┌──────────────┼─────┐    ┌─────────────┼──────────────┐
   │              ▼     │    │  ┌──────────────────────┐  │
   │    ┌───────────────┐│    │  │ /usr/pci/2/8/7/pcidossvr.ip │ │
   │    │  LOGIN.EXE    ││    │  └──────────────────────┘  │
   │    └───────────────┘│    │                            │
   │                     │    │                            │
   │         PC          │    │         HOST 1             │
   └─────────────────────┘    └────────────────────────────┘
```

login then prompts the user for user name and password and transmits them
to the **pcidossvr**, as the following diagram illustrates:

NETWORK

LOGIN NAME AND PASSWORD

```
┌─────────────────┐          ┌──────────────────────────────────┐
│                 │          │                                  │
│  ┌───────────┐  │          │   ┌──────────────────────────┐   │
│  │ LOGIN.EXE │  │          │   │ /usr/pci/2/8/7/pcidossvr.ip │   │
│  └───────────┘  │          │   └──────────────────────────┘   │
│                 │          │                                  │
│                 │          │                                  │
│       PC        │          │             HOST 1               │
└─────────────────┘          └──────────────────────────────────┘
```

The **pcidossvr** validates the user name and password, changes its own user
and group IDs to those of the logged-in user, and informs **login** that the
process has successfully completed. **login** tells the user which drive the
AIX file system is available on, welcomes the user to the Access program,
and returns the DOS prompt to the user.

5.3.3 Using an Established AIX Access for DOS Users Program Connection

Bidirectional communication can occur between the personal computer and
the host. On the personal computer side, the **bridge.sys** module takes over
the task of communicating with the remote host.

A top-level view of the operation of **bridge.sys** follows:
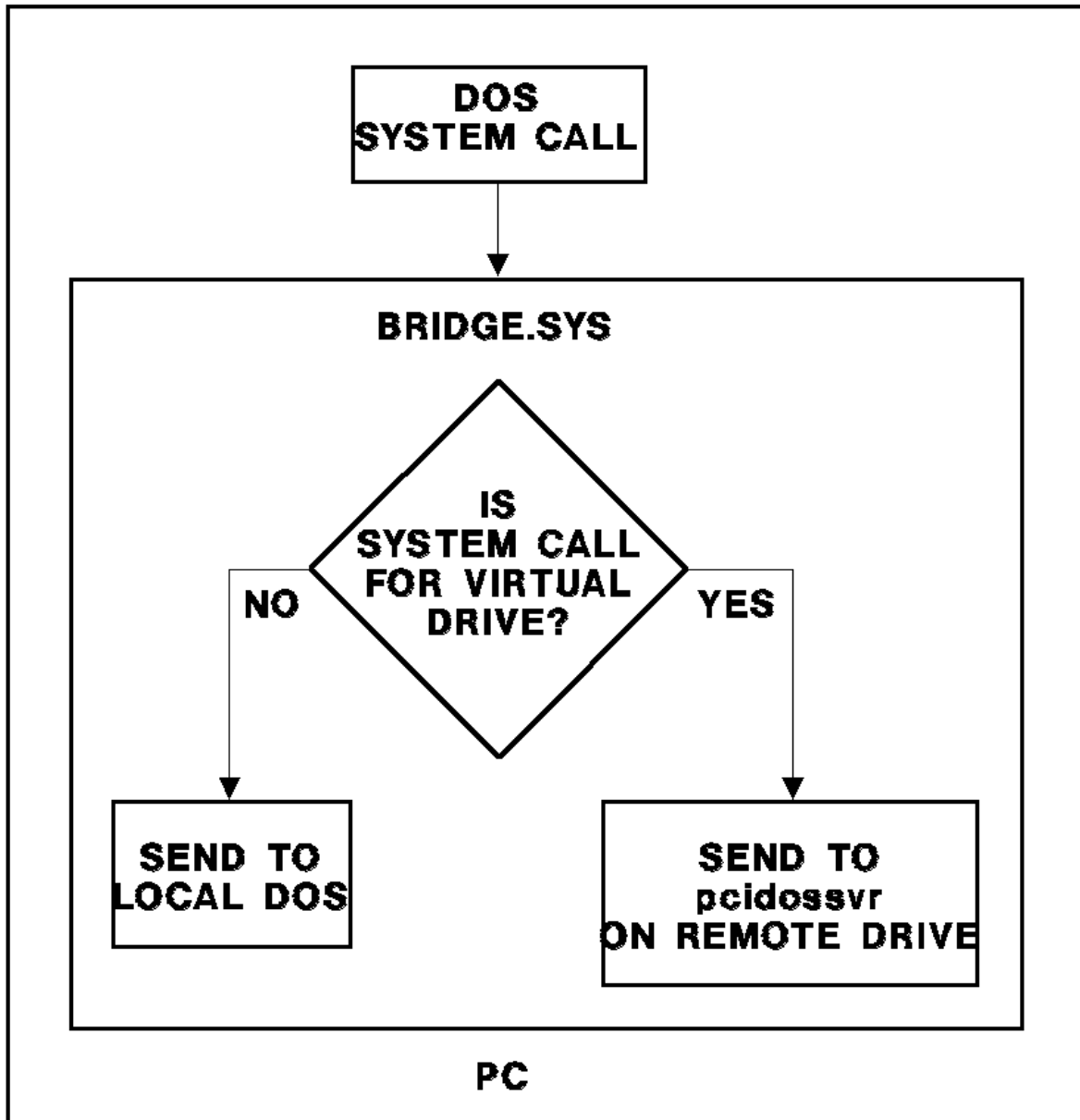
As shown in the illustration above, **bridge.sys** is interposed between the
user's invocations and the local DOS that the user started on the personal
computer. The **bridge.sys** module intercepts all DOS system calls (the
principle one is **int 21h**). If the system call is a request for a local
device, **bridge.sys** passes it unmodified to the local DOS. If the request
is for the remote (virtual) drive, **bridge.sys** formats a transaction and
sends it to its **pcidossvr** on the AIX host to be processed.

The **pcidossvr** module on the remote AIX host translates the user's standard
DOS system calls into appropriate AIX commands, executes them on behalf of

the user, and translates the results back to **bridge.sys.**

5.3.4 AIX Access for DOS Users Program Utilities

When an Access program file service session has been established as
described in the previous section, the following special Access program
utilities become useful:

> **printer**
> **udir**
> **on**.

These DOS commands allow the user to manipulate and display data on the
remote AIX drive in ways not allowed by standard DOS. For descriptions of
their operation, see *AIX Access for DOS Users User's Guide*. The following
Access program commands can be used independently of file services, as
well as during a file service session:

> **/usr/pci/bin/dos2aix** (AIX executable) and **dos2aix.exe** (DOS executable)

> **/usr/pci/bin/aix2dos** (AIX executable) and **aix2dos.exe** (DOS executable)

> **em.com**.

For a description of both the DOS and AIX executable versions of **dos2aix**
and **aix2dos**, refer to *AIX Access for DOS Users User's Guide*. This guide
also describes the **em** command from the user's point of view.

5.3.5 Using IBM System/370 and IBM PS/2 Terminal Emulation

When the Access program user wants to communicate with the remote AIX
system through AIX rather than DOS commands, the terminal emulation
program **em.com** (**em**) is used. When **em** is invoked, it broadcasts a request
for a site map, as **login** does. When the site map is returned, the user
chooses the host for the terminal emulation session. The **em** command then
requests a connection to the network tty driver on the remote host:
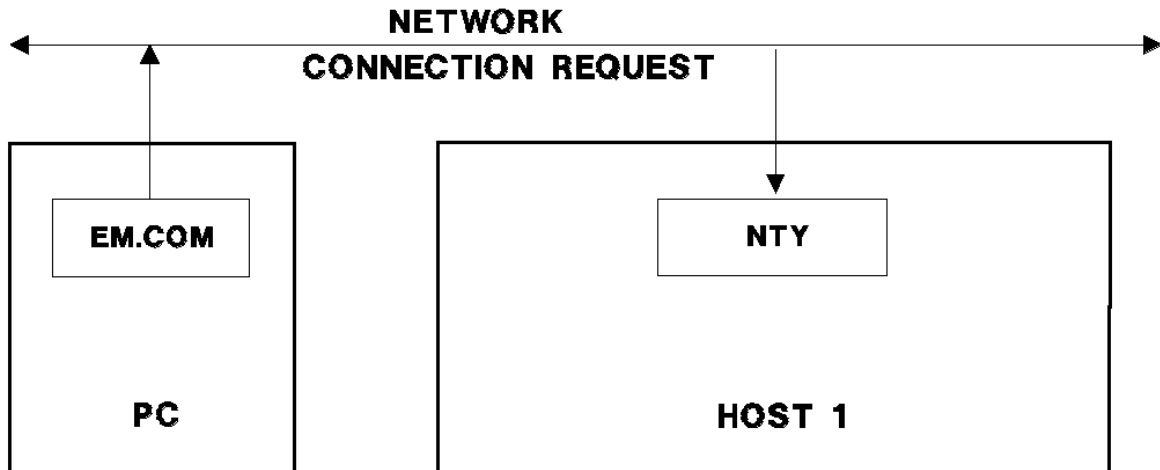
A network tty (nty) on the AIX side presents the AIX shell to the personal
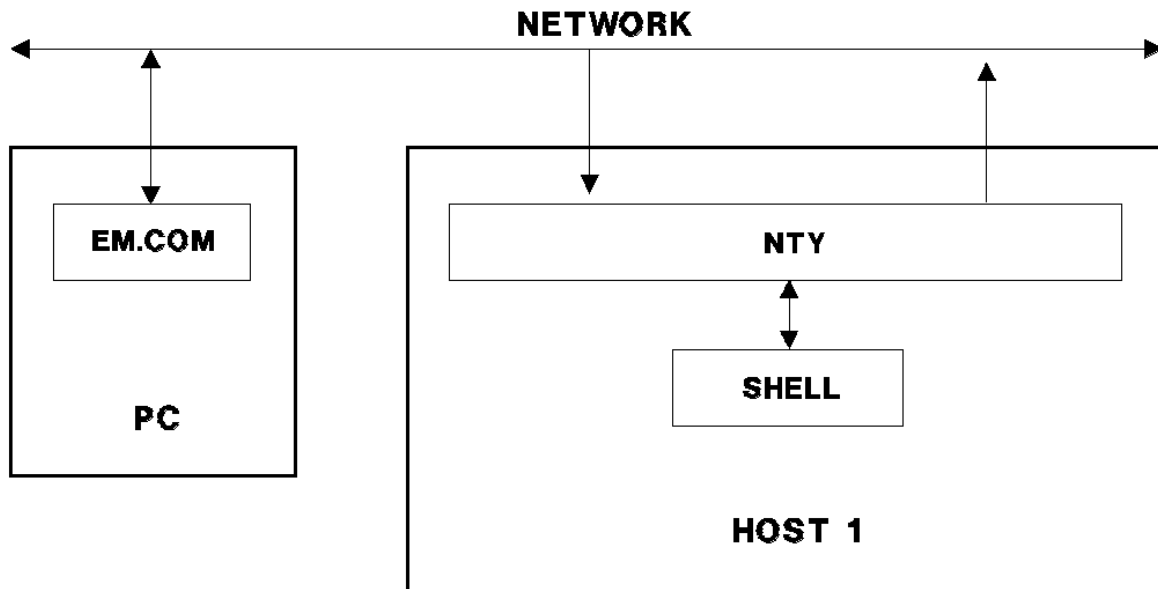computer user.

The following events occur when the driver receives the request from **em** to
make a connection:

> The **pcidossvr** opens an available nty on the control side. If no nty
> is available, use the **devices** command to add an nty.

> Once the connection to the nty is made, **getty** starts a login process
> on the nty.

The following illustration depicts the end result of this process:

NETWORK

```
┌─────────────────────┐        ┌───────────────────────────────────────────┐
│                     │        │                                           │
│   ┌───────────┐     │        │   ┌─────────────────────────────────┐     │
│   │  EM.COM   │     │        │   │              NTY                │     │
│   └───────────┘     │        │   └─────────────────────────────────┘     │
│                     │        │                    ↕                      │
│                     │        │            ┌───────────────┐              │
│                     │        │            │     SHELL     │              │
│        PC           │        │            └───────────────┘              │
│                     │        │                                           │
│                     │        │              HOST 1                       │
└─────────────────────┘        └───────────────────────────────────────────┘
```

When **em** is invoked during an Access program file services session, the
terminal emulation process does not terminate file service. The user can
alternate between standard Access program file service and terminal
emulation. Data sent by **em** to the remote host is marked as terminal
emulation data and is processed as described in the previous example. To
suspend terminal emulation (without permanently terminating the emulation
process), the user presses **F10**. This allows the user to resume the file
service session. To return to terminal emulation, the user reinvokes **em**
and is returned to the ongoing emulation session.

To terminate the emulation session, the user presses **F7**, closing the
connection between the personal computer and the host. The nty driver
sends a **sighup** signal to the AIX process associated with that nty. The
AIX shell closes the nty and exits. The user can then resume Access
program file service.

5.3.6 Using RT Terminal Emulation

When the Access program user wants to communicate with the remote AIX
system through AIX rather than DOS commands, the terminal emulation
program **em.com** (**em**) is used. When invoked, **em** broadcasts a request for a
site map, as **login** does. When the site map is returned, the user chooses
the host for the terminal emulation session. The **em** command then requests
the **pcidossvr** on the remote host to start an AIX shell.

NETWORK

CONNECTION REQUEST

EM.COM

/usr/pci/2/8/7/pcidossvr.ip

PC

HOST 1
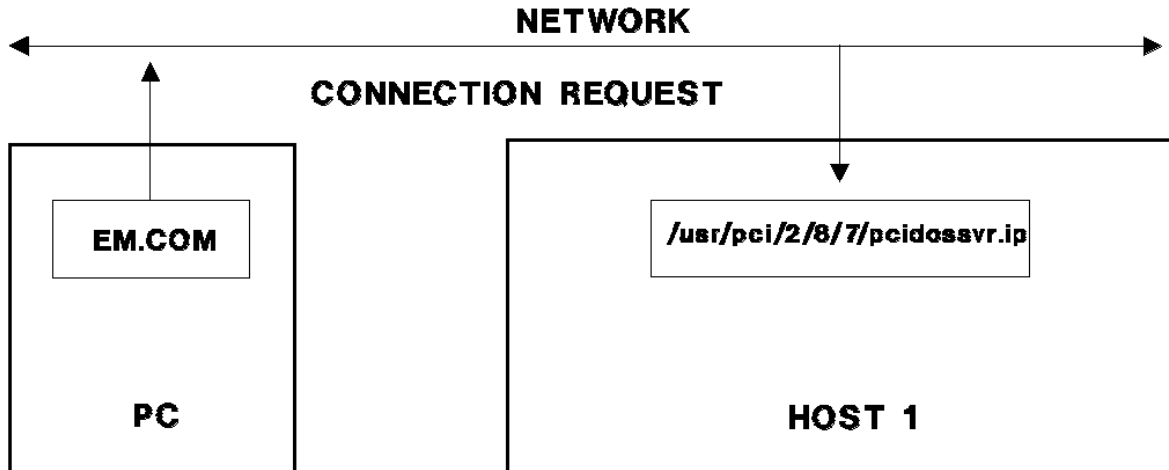
The AIX shell is presented to the personal computer user through a pseudo
tty (pty) on the AIX side.

The following events occur when the **pcidossvr** receives the request from **em**
to start an AIX shell:

The driver selects an available pty

Once the control side of the pty is opened, **getty** starts a login
operation on the slave side of that pty.

The **pcidossvr** generates another process, **/usr/pci/bin/pcidosout.ip
(pcidosout)**, which is responsible for sending characters from the AIX
shell (through the pty) back to the user.

The following illustration depicts the end result of this process:

NETWORK

```
┌──────────────┐        ┌─────────────────────────────────────────────┐
│              │        │                                             │
│ ┌──────────┐ │        │  ┌──────────────────┐  ┌──────────────────┐ │
│ │  EM.COM  │ │        │  │/usr/pci/2/8/7/pci │  │/usr/pci/bin/pcido │ │
│ └──────────┘ │        │  │      dossvr.ip    │  │    sout.ip        │ │
│              │        │  └──────────────────┘  └──────────────────┘ │
│     PC       │        │            │                    ▲           │
│              │        │            ▼                    │           │
│              │        │         ┌──────────────┐                    │
└──────────────┘        │         │     PTY      │                    │
                        │         └──────────────┘                    │
                        │                ▲                            │
                        │                ▼                            │
                        │         ┌──────────────┐                    │
                        │         │    SHELL     │                    │
                        │         └──────────────┘                    │
                        │                                             │
                        │                    HOST 1                   │
                        │                                             │
                        └─────────────────────────────────────────────┘
```
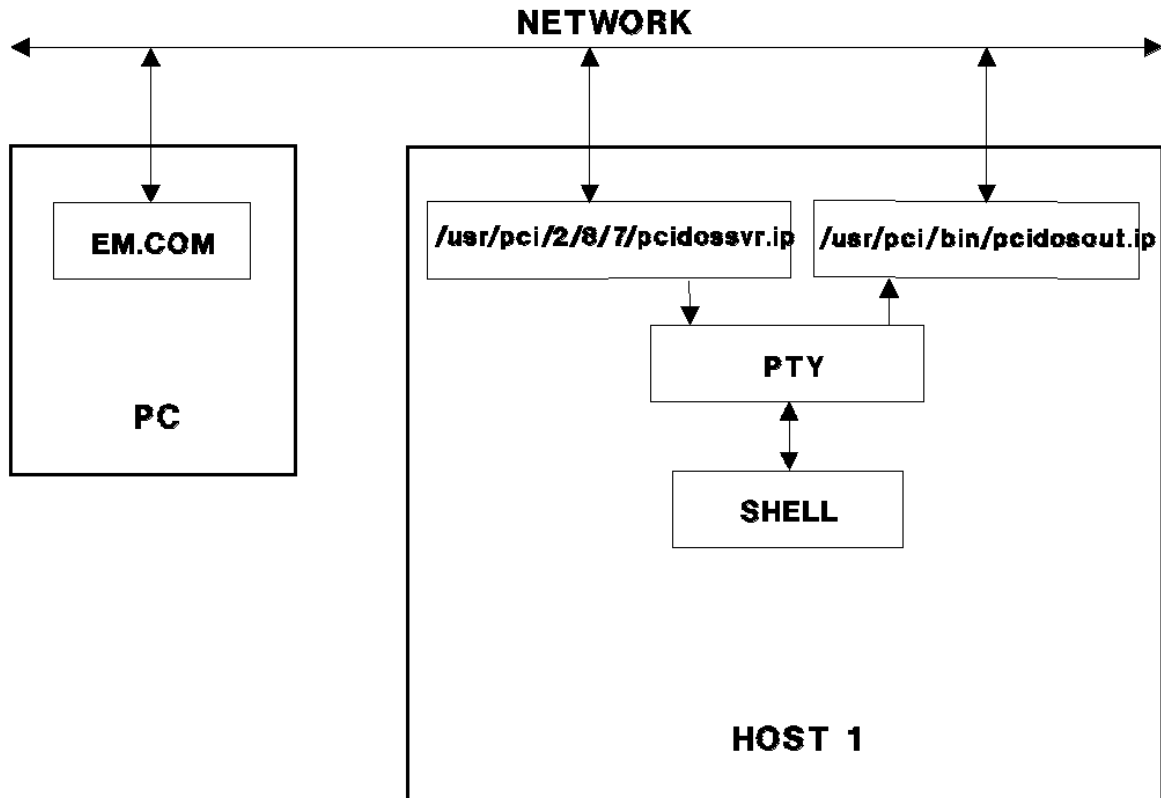
The **pcidosout** process is required because the **pcidossvr** cannot listen for Access program file service messages from the network while it listens for characters sent from the pty. The **pcidosout** process reads characters from the pty and sends them back to the user.

When **em** is invoked during an Access program file services session, the terminal emulation process does not terminate file service. The user can alternate between standard Access program file service and terminal emulation. Data sent by **em** to the remote host is marked as terminal emulation data and is processed as described above. To suspend terminal emulation (without terminating the emulation session), the user presses **F10**. This allows the user to return to DOS and continue using the file services session. To return to terminal emulation, the user reinvokes **em** and is returned to the ongoing emulation session.

To terminate the emulation session, the user presses **F7**. A request to terminate emulation goes to the **pcidossvr**, which kills the **pcidosout** process. The **pcidossvr** closes the control side of the pty. The pty driver sends a **sighup** signal to the AIX process associated with that pty. The AIX shell closes the server side of the pty and exits. The user can then use **F10** to return to DOS and continue using Access program file service.

5.3.7 Using the Terminal Emulator without Establishing a File Services Session

The terminal emulator can be used without first establishing a file service session--that is, without logging into the Access program. The Access program must be initialized (using **pciinit.exe**) for emulation to work, however.

When **em** is invoked without a file services session, it broadcasts a request for a site map, as with a file services session. When the user chooses the desired host for terminal emulation, **em** invokes a **pcidossvr** for the user. The user can then log in to the AIX host and use terminal emulation as described above.

When the emulator is invoked outside of a file services session, the user cannot alternate between terminal emulation and file service. DOS is still available locally, and the user can alternate between terminal emulation and local DOS by using the **F10** key and invoking **em** as described above.

5.3.8 Ending a File Services Session

When the personal computer user executes the Access program **LOGOUT.EXE**
command, a terminate request is sent to the **pcidossvr** as illustrated in
the following diagram:

NETWORK

TERMINATE REQUEST

LOGOUT.EXE

/usr/pci/2/8/7/pcidossvr.ip

PC

HOST 1
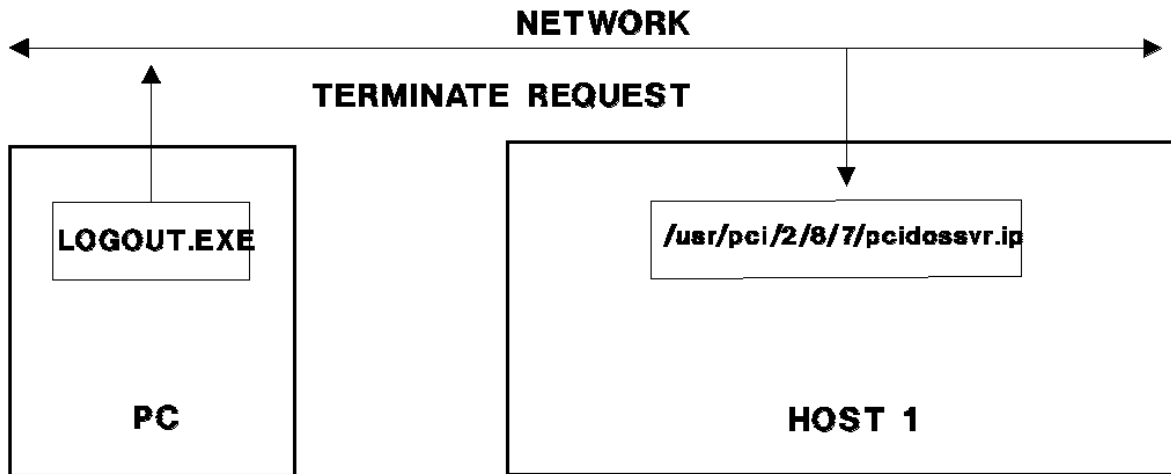
For the RT work station, the **pcidossvr** sends a terminate request signal to
any **pcidosout** process that might still exist, terminating any **em** session
to that host, then exits. When the **pcidosout** and **pcidossvr** processes
exit, the **pciconsvr** frees the network port and updates its status tables.

5.4 Software Structure for AIX Access for DOS Users Program over RS-232

To use the Access program over an RS-232 serial interface, the Access
program on both the personal computer side and the host side must be
installed and initialized, and **bridge.sys** is loaded on the personal
computer side, as for a LAN. However, no network device driver (such as
lxxx.sys or **mxxx.sys**) is required.

When the user invokes the **login** command, a site map is requested and
returned to the user, again like a LAN. The list of available hosts
displayed for the user by **login** identifies the RS-232 line as one of the
available hosts. (If the LAN is not also available to the user, no other
hosts are listed.)

No **pciconsvr** is used with RS-232. Instead, when the user selects the
RS-232 line, **login** invokes a terminal emulator specifically for the
purpose of logging in to the remote host, as illustrated in the following
diagram:
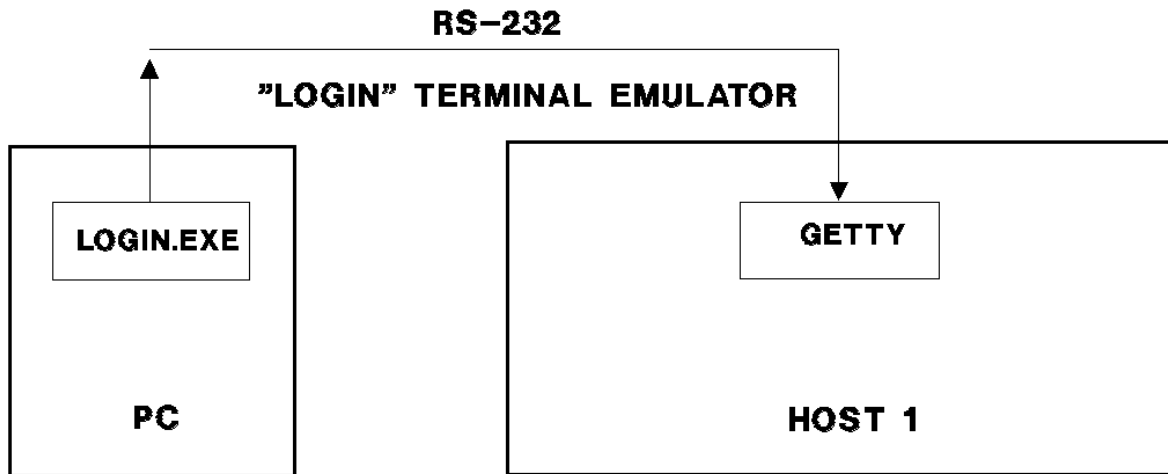
Using the login terminal emulator, the user logs in to the AIX host as
though from a terminal. When the login is finished, the user enters **F9**,
terminating the login terminal emulator. The user then invokes
/usr/pci/2/8/7/pcidossvr.232 on the host, as illustrated in the following
diagram:

RS-232

EXECUTE /usr/pcl/2/8/7/pcidossvr.232

```
+-------------------+        +-------------------------------+
|                   |        |                               |
|   +-----------+   |        |   +-----------------------+   |
|   | "F9"      |   |        |   |        SHELL          |   |
|   | LOGIN.EXE |   |        |   +-----------------------+   |
|   +-----------+   |        |                               |
|                   |        |                               |
|        PC         |        |            HOST 1             |
+-------------------+        +-------------------------------+
```
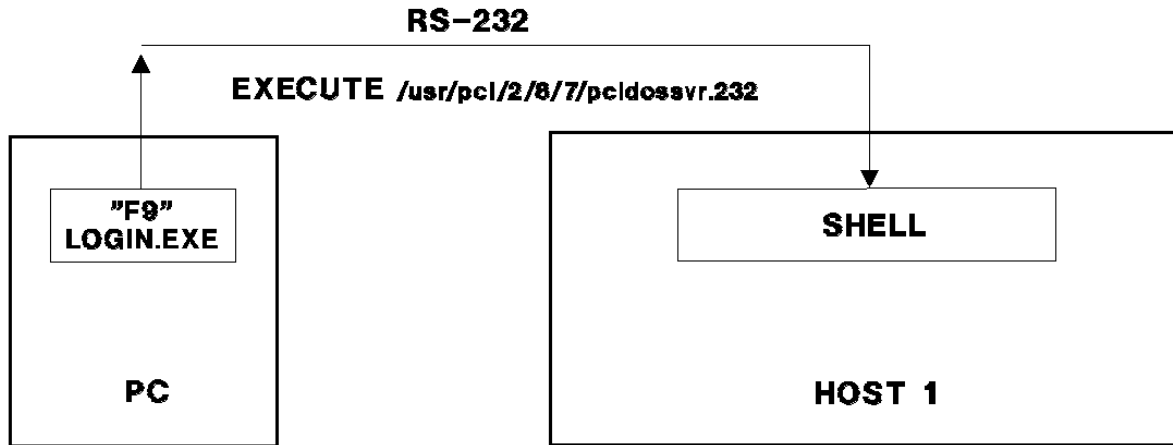
As with Ethernet, **login** tells the user on which drive the AIX file system is available, welcomes the user to the Access program, and returns the DOS prompt to the user. Unlike Ethernet, the **pcidossvr** for RS-232 does not validate the user name and password or change its user and group IDs. Because the user has logged in directly to the AIX system as a standard AIX user, the AIX login process validates the user, and the **pcidossvr** automatically inherits the user and group IDs.

The user can communicate with the remote host and use Access program utilities as with Ethernet, as shown in the following diagram:

RS-232

```
+-------------------+        +-------------------------------+
|                   |        |                               |
|   +-----------+   |        |   +-----------------------+   |
|   |BRIDGE.SYS |   |        |   |    pcidossvr.232      |   |
|   +-----------+   |        |   +-----------------------+   |
|                   |        |                               |
|                   |        |                               |
|        PC         |        |            HOST 1             |
+-------------------+        +-------------------------------+
```
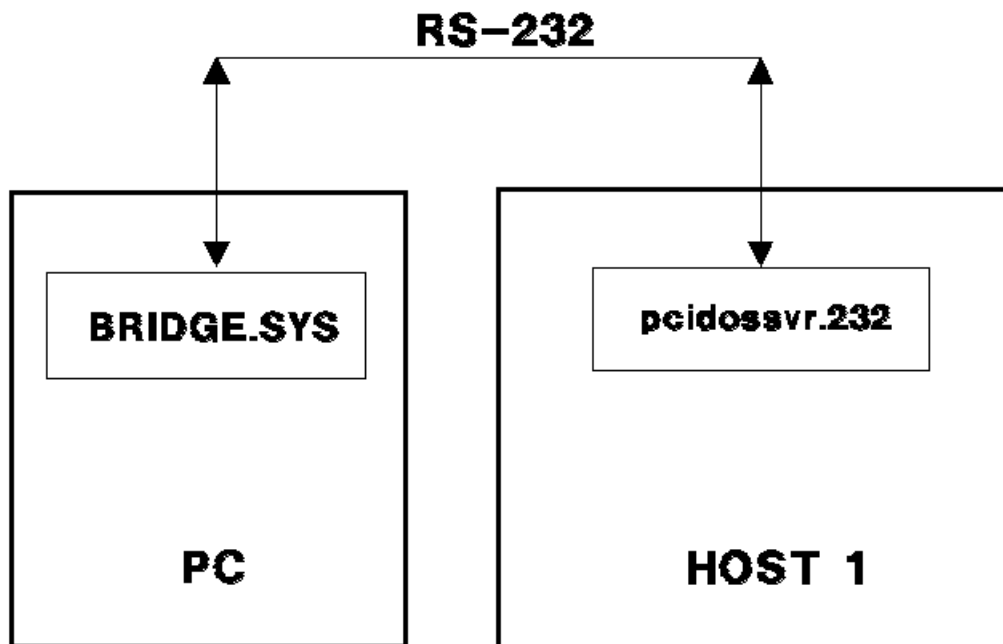
The software structure and operation for terminal emulation over RS-232 is the same as with a LAN.

6.0 Chapter 6. Some Problem-Solving Tools for AIX Access for DOS Users Progra

CONTENTS

6.1 About this Chapter

As administrator of the system, you may assist users with problems they
encounter using the Access program. The problem determination procedures
in this chapter can help you determine if a problem is hardware-related,
software-related, or caused by user error.

For hardware problems, refer to the technical reference or guide to
operations for the user's personal computer. For user-error and software
problems not described in this chapter, refer to the DOS *Reference Manual*
or *User's Guide*. This chapter discusses the Access program errors.

This chapter breaks down problems into their components and addresses
these components in order.

When an error occurs, note error messages and directory contents to help
determine the problem.

Before using the procedures in this chapter, try to reproduce the problem
you are having on a different personal computer. Make sure you use the
same software and hardware environment in running your duplication test.

If you cannot reproduce the problem, it could have been caused by a loose
connection between the personal computer and the network or by hardware
problems internal to the personal computer. If the problem was not a
loose connection, your personal computer might need repair. If the
problem persists on another personal computer, continue this procedure to
classify it.

Most Access program problems occur in one of four major areas: system
startup, establishing communication, proper usage, and normal operation.
You can use the following procedure to determine in which area to begin
your investigation:

1. Does the failure occur during loading or Access program
    initialization, before you attempt to log in?

    Yes: Start with "Problems with System Startup" in topic 6.2.

    No: Continue with the next question.

2. Does the failure prevent a session from being established?

    Yes: Start with "Problems Establishing Communication" in topic 6.3.

    No: Continue with the next question.

3. Does the failure occur during an Access program session?

    Yes: Start with "Problems with Usage" in topic 6.4. If your problem
    is not described there, continue with "Problems with Normal
    Operations" in topic 6.5.

    No: The problem is not related to the Access program. Refer to your
    application or hardware manual.

Refer to the proper heading in this section, as determined above, to find
the cause of and solution for your problem. If you try the corrective
actions described and the same problem persists, report the problem to
your IBM service representative.

6.2 Problems with System Startup

This section helps you determine the cause of a problem occurring during system initialization, before you attempt to log in.

The Access program system must be installed on working diskettes (that is, diskettes containing the DOS system files) or a fixed disk. The installation procedure given in *AIX Access for DOS Users User's Guide* combines the required Access program files on diskettes (or a fixed disk) with the DOS operating system, creating working diskettes.

Attempt to start the personal computer from the working disk or diskettes containing the Access program by turning on the personal computer or by holding the **Ctrl** and **Alt** keys while you press the **Del** key. When first turned on, the personal computer runs a Power-On Self Test (POST). On a successful POST, it prints a series of messages of the form *xxx* **kilobytes**, indicating the amount of memory tested. Compare the POST when starting with your Access program working diskette to a POST when starting from your DOS system disk without the Access program.

Answer the following questions to determine if your problem can be attributed to a system-startup error.

1. Did the POST complete correctly without producing any error messages when the personal computer was powered on?

    Yes: Continue with the next question.

    No: Refer to the guide to operations for your personal computer.

2. Was a **Non-System disk or disk error** message displayed?

    Yes: The disk does not have the correct operating system files on it for DOS to load. Refer to your guide to operations and *AIX Access for DOS Users User's Guide* for the procedures for creating an Access program working disk.

    No: Continue with the next question.

3. Were the banners **AIX Access for DOS Users @(#) Release 1.1** and **drivername, @(#) Release 1.1** (where drivername is the name of the driver) displayed?

    Yes: Continue with the next question.

    No: The file **config.sys** must be present on the root of the Access program disk and must contain the following lines:

       device = l**xxx**.sys (or m**xxx**.sys)
       device = bridge.sys

    where *xxx* is a mnemonic for the device driver. The first line can be omitted if the Access program is not being used with a LAN. There might be directories specified for the devices -- that is, you might see **\pci\bridge.sys**.

    Repeat the Access program installation process found in the *AIX Access for DOS Users User's Guide* if necessary to correct this problem.

4. Was a **Bad or missing bridge.sys** or **Bad or missing l*xxx*.sys** (or

m_xxx_**.sys**) message displayed?

Yes: The file **bridge.sys** or **l**_xxx_**.sys** (or **m**_xxx_**.sys**) was not found in
the location specified in the **config.sys** file. Ensure that the file
is present in the locations specified by **config.sys**. Repeat the
Access program installation process in *AIX Access for DOS Users User's
Guide* if necessary to correct this problem.

No: Continue with the next question.

5. Does the file **autoexec.bat** exist in the root of the Access program
    disk?

    Yes: The file should contain a line similar to the following

      pciinit -ixxx.xxx.xxx.xxx

    where **xxx.xxx.xxx.xxx** is the LAN internet address you entered during
    the installation process. This line tells DOS to run **pciinit.exe**.

    If this line is missing from the **autoexec.bat** file, add it using any
    text editor or by repeating the installation procedure.

    No: Repeat the installation process found in *AIX Access for DOS Users
    User's Guide* to create an appropriate **autoexec.bat** file.

6. Was the message **Bad command or file name** displayed?

    Yes: The program **pciinit.exe** was not found. It must be in a place
    where it can be executed at startup from the file **autoexec.bat**. It
    must either be in the root of the Access program disk, or in a
    subdirectory specified in the search path. Repeat the installation
    process to place the file in the correct location.

    No: Continue with the next question.

7. Was the message **pciinit: cannot find correct BRIDGE device** displayed?

    Yes: If the answer to question 4 was yes, this message should not
    occur. This message is displayed, however, if there was a failure in
    steps 3 or 4. Repeat the Access program installation process
    described in *AIX Access for DOS Users User's Guide* to correct this
    problem.

    No: Continue with the next question.

8. Was the message **AIX Access for DOS Users Version 1.1 Initialized**
    displayed?

    Yes: The resident part of the Access program initialization has
    succeeded. You should continue with the section on establishing
    communication.

    No: If you have verified the contents of **autoexec.bat**, then **pciinit**
    should have been executed. If an error message was displayed (other
    than the ones described above), report the problem to your IBM
    representative. If your personal computer appears to have hung (the
    screen is blank and the personal computer is not doing anything for a
    few minutes), your network connection could be disconnected, loose, or
    faulty.

6.3 Problems Establishing Communication

Two programs establish communication with the AIX host. If you want to
initiate host file services, run the **login** program. If you want to use
your personal computer to emulate a PC Scancode (IBM System/370 and IBM
PS/2) or VT100 terminal, run the **em** program. This section helps you
determine the cause of a problem occurring during attempts to establish
communication with your AIX host.

Refer to Appendix B of *AIX Access for DOS Users User's Guide* for errors
that are not covered here.

Answer the following questions to help determine the problem and solve it.

1. After executing **login** or **em**, was the message **Bad command or file name**
    displayed?

    Yes: The **login.exe** or **em.com** file is not in the current directory nor
    in a directory that is listed in your DOS search path. The path is
    normally set during system startup by **autoexec.bat**. To set the path
    yourself, see the DOS user's guide. If **login.exe** or **em.com** is not on
    your disk, repeat the Access program installation process.

    No: The **login** program should have displayed a full-screen Host
    Selection menu. The **em** program should have displayed an
    initialization screen. Continue with the next question.

    If the screen does not display a full-screen Host Selection Menu,
    check the connections to your host or see your authorized IBM
    representative.

2. Was the message **AIX Access for DOS Users Not Installed** or **AIX Access
    for DOS Users Not Initialized** displayed?

    Yes: You have a problem with system startup. Go to that section to
    determine the exact nature of the problem.

    No: If you are using **login**, continue with question 4. If you are
    using **em**, continue with the next question.

3. Does the personal computer hang after you execute **em**?

    Yes: Check the current directory on the drive from which you invoked
    em for an obsolete **em.ses** file left from a previous, aborted session.
    If such a file exists, delete it and try executing **em** again.

    There could be a host-connection problem. Check your personal
    computer's connectors to ensure you are connected to the network.
    Verify that the network is operational, and restart your system to try
    again.

    You might not have enough memory left to execute the emulator. Remove
    the memory-resident programs from your **autoexec.bat**. Restart your
    system and try **em** again with no other memory-resident programs
    installed.

    If none of the above suggestions work, report the problem to your IBM
    representative.

No: Consult the error message section of this manual for any further **em** errors. If the problem is not described, report the problem to your IBM representative.

4. When running the **login** program, was the message **Selected Host Not Available** or **Selected Host Not Available Try Again?** displayed?

    Yes: You selected a host that became unavailable after it was included in the Host Selection menu, or your selected path cannot accommodate any more users, or there was a network communication problem. Be sure the network is working and your personal computer is properly connected. Try to select the same connection path again. If it fails again, try a different connection path if one is available. If that works, check that the desired host is up and running the DOS Server and that the hardware between the user's personal computer and the host is operational.

    No: Continue with the next question.

5. Was the message **Login incorrect. Try Again? (y or n):** displayed?

    Yes: There are two possible problems in this case.

    a. The user name or password you entered at the prompts was incorrect. Check that you are using the proper user name and have the correct password. Enter **y** to try again.

    b. The shared memory tables needed for file and record locking have not been initialized. See "File and Record Locking for the RT Work Station and IBM PS/2" in topic 4.3.6 for instructions on how to initialize the files.

    No: Consult Appendix B, "AIX Access for DOS Users Program System Messages," for any further **login** errors.

6.4 Problems with Usage

This section describes some common Access program problems that result
from incorrect Access program use. Use the following questions to
determine if your problem is caused by improper use of the Access program.

1. Was a message indicating you are out of room on your disk displayed
    when you were trying to suspend a terminal emulation session?

    Yes: If you receive this message when you leave terminal emulation
    without closing the session (**F7**), you do not have enough room in the
    current directory on the drive from which you invoked **em** for the
    em.ses file.

    Regardless of the program you were running, you must remove some files
    from your working disk in order to make room to save files.

    No: Continue with the next question.

2. Did you try unsuccessfully to print a file on the virtual drive?
    (Make sure the printer is operational and not jammed.)

    a. If you entered **printer** and then used one of the following:

            The Print Screen key

            The **copy** command to copy your file to the print device (LPT1)

        did your file fail to print at all?

        Yes: Check that the AIX print spooler is enabled.

        Try other DOS printing methods, and see the discussion of printers
        in *AIX Access for DOS Users User's Guide*. If your file still does
        not print, report the problem to your authorized IBM
        representative.

        No: Continue with the next question.

    b. Are you printing from within an application program and expecting
        to see the printout before you leave the program?

        Yes: You must use **printer** /Tn, which enables the timeout option on
        the default host to spool your printing after n seconds, where n
        has a value between 5 and 3600.

        Note that if you use **printer** /X0, your printing is not spooled
        unless you explicitly request print spooling by issuing **printer**
        /P.

        No: Continue with the next question.

    c. Are other files embedded in your listing when you use the **print**
        program?

        Yes: This print program should not be used with remote printing.
        See *AIX Access for DOS Users User's Guide*.

        No: If your printing problem is not described here or in the error
        messages section, contact your authorized IBM representative.

3. Do you have strange file names with ' (apostrophes) embedded in them?

    Yes: File names with apostrophes in them are usually AIX file names that cannot be translated directly to DOS file names. Read the section in *AIX Access for DOS Users User's Guide* on naming files.

    No: Continue with the next question.

4. Are there files you can see when using **em** that do not appear when using host file services, even if you run the **udir** program?

    Yes: When logged in to AIX you can use directory commands that allow you to see hidden files (files beginning with a period). To see these files while using host file services, use **udir - h**. You can use **on - mv** to rename these files so they are visible to the DOS operating system. See your DOS *User's Guide* for a description of legal DOS names.

    No: Continue with the next question.

5. Does an edited file, when printed or edited again, appear to have changed?

    Yes: The application used to edit the file did not support file locking, and the Access program has no other mechanism to prevent two users from concurrently writing to a file for which they both have write permission. In addition, the Access program cannot prevent one user from overwriting a file that has just been updated by another user.

    Usually, as a result of concurrent updating, the changes made by the last user writing and closing the file are preserved and those made earlier are lost. Multiple users must coordinate their efforts and serialize the updates they make.

    No: Continue with the next question.

6. On the virtual drive, do you see a file whose permissions appear to have changed?

    Yes: There are differences in the DOS and AIX file permissions that can be visible to the users. This is especially true when using the AIX **chmod** command to change AIX permissions to control certain types of file sharing.

    If file permissions are set in a particular way by using the AIX **chmod** command and the file is updated by using almost any DOS program, the AIX **chmod** operation must be repeated because most DOS programs perform updates by renaming the existing file, then creating a new file with the updated contents of the original file. The new file is created with default permissions according to the AIX **umask** environment variable, set when the Access program is started. A common default for this variable sets all permissions to read and write for files, and to read, write, and execute for directories.

    No: Continue with the next question.

7. Do you see a directory on the virtual drive, but cannot access or write to it, or do the permissions appear to have changed?

Yes: A confusing situation can occur when the Access program users access directories for which they do not have read permission. If the programs or files they are accessing are opened with a DOS **open** system call, the open succeeds. If you try to search the directory for a file, the search fails. Some libraries are known to perform directory searches even when this is unneeded, resulting in certain programs that fail to open files if the user does not have read permission for the directory.

No: Continue with the next question.

8. Are you having system resource or sporadic failures like **cannot create file**, **cannot open file**, or **file not found**, or find you cannot execute a file on the virtual drive?

    Yes: Such failures are most commonly caused by AIX file or directory permission conflicts. Review the discussion of file permissions in *AIX Access for DOS Users User's Guide*.

    No: Continue with the next question.

9. Do you see a file on the virtual drive, but when you try to access it, get a **File locked** or **Access denied** message, or find that another user is able to access a file that should have been locked?

    Yes: If other users are logged in when this happens, you are probably unable to access the file because another user has opened it with an application that locks the file. In this case, you must wait until the other user has finished and the file is closed before you can access it.

    However, if no other users are logged in and you receive one of these messages, there could be something wrong with record locking. For assistance in diagnosing and correcting the problem, see "File and Record Locking for the RT Work Station and IBM PS/2" in topic 4.3.6.

    No: Continue with the next question.

10. When using the virtual drive, do you see miscellaneous error messages that appear to be incorrect, such as **Drive not Ready**?

    Yes: Some DOS programs perform operations that cannot be supported by the Access program. For example, there are **bios** functions that perform read and write operations on physical disk blocks. An operation of this kind cannot be mapped into a corresponding operation on a host volume. Programs using a function of this type produce error diagnostics. Fortunately, only a small number of programs used today do not operate correctly under the Access program. Refer to the following section "Problems with Normal Operations" to isolate this type of error.

    No: Check Appendix B of the *AIX Access for DOS Users User's Guide* to see if the error you are investigating is explained. If not, refer to "Problems with Normal Operations" to determine whether your problem is related to the Access program.

6.5 Problems with Normal Operations

This section addresses problems that occur during an established Access
program session. A procedure is provided in this section for determining
if your problem is indeed an Access program problem.

If your problem is with one of the utilities provided with the Access
program (other than **pciinit**, **login**, and **em**), read the appropriate section
in *AIX Access for DOS Users User's Guide* that describes the utility. the
Access program internal problems are the main focus of this section.

Most Access program operation problems fall in two main groups: problems
caused by the Access program, and problems resulting from the presence in
memory of the Access program. The basic approach to isolating your
problem is to re-create the conditions that produced the problem, but
without the Access program software being present. If this test passes,
try again with the Access program present, but not active. Use the
following procedure as a guide for doing these tests.

Before you continue, carefully note the steps that led up to the
appearance of the problem when running your application program. You will
repeat these steps later.

1. Copy to a DOS disk all the files used when the problem occurred. This
    can include data files, DOS programs, and configuration files. The
    DOS disk can be a diskette or a fixed disk. This disk is referred to
    as the ***test volume***.

2. Remove the Access program device driver references from the **config.sys**
    file on your working disk, as follows:

    a. Make a copy of **config.sys**, so you do not lose your original file.
        Using any text editor, remove the following two lines from the
        config.sys file:

            device = l**xxx**.sys (or m**xxx**.sys)
            device = bridge.sys

        where *xxx* is a mnemonic for the device driver. There might be
        directories specified before the file names (for example, you
        could see **\pci\bridge.sys**). Remove these two lines entirely.
        (Note that the first line might not be present if the Access
        program is not being used with a LAN.)

    b. Make a copy of **autoexec.bat**, so you do not lose your original
        file. Edit **autoexec.bat** using any text editor to remove the line
        beginning with:

            pciinit

3. Fix the path or environment.

    If the path and any environment variables are set up to use the
    virtual drive, they must be changed to reflect the locations of the
    files you moved to the DOS test volume. Changing these variables
    could require changes to **autoexec.bat** or other configuration files, or
    changes to the manual procedure you go through to run the program.
    Here are some examples of likely changes. Other changes not listed
    below might be specified in the application program manual.

a. Display your path. Does your path contain references to the virtual drive?

   Yes: Set your path (using path=**n:dir1; m:dir2**..., where **n** and **m** are drive specifiers not on the virtual drive, and the **dir** entries are directories that you want the command line processor to search).

   No: Continue with the next step.

b. Depending on your application program, you might need to have all the data files in the same directory as your application program. This directory might need to be on your current drive. Are all programs and data files for this test located on the test volume so they can be found using the path?

   Yes: Continue with the next step.

   No: Correct the path or move the program or data files appropriately.

4. Now restart DOS without the Access program. Confirm that the Access program is not present by checking for any banners printed during the start process saying **AIX Access for DOS Users**. If any such banners appear, something was omitted in the steps above and should be corrected before proceeding.

5. Now perform the sequence you noted earlier that produced the error. Is the error still present?

   Yes: The error has nothing to do with the Access program, and the user should determine if the error is in the application program or in DOS itself. This is best done by referring to the troubleshooting sections of the application program manual or by referring to the guide to operations for your personal computer.

   No: If the error does not occur, the problem is either in the Access program or occurs because the Access program is present but not actually responsible for the error. The latter case can occur if programs or devices disregard DOS guidelines or sound programming practices. Continue with the following steps to determine which is the case.

6. Test whether the presence of the Access program causes the error, as follows:

   a. Restore the file **config.sys** to its original contents by copying the file you saved back into **config.sys**.

   b. Restart the system, noting that this time banners should appear for the device drivers installed as part of the the Access program. However, no banner should appear saying the Access program has been initialized.

   c. Do not run the program **pciinit** from the **autoexec.bat** file or manually, since this would activate the Access program.

   d. The Access program is now present in the system memory but is passive. It has no effect on the system other than taking up a certain amount of memory.

e.   Now perform the sequence that produced the error.

Is the error still present?

Yes: The DOS program that fails in this case (but succeeds when the
Access program is NOT resident in memory) is written incorrectly but
might work without the Access program. Some application programs use
DOS system calls that the Access program does not support. Contact
your authorized IBM representative to determine whether your
application program is known to cause the Access program problems.

No: If you have not made any mistakes, you have found an Access
program problem and should contact your authorized IBM representative
for assistance. Please be prepared to give the representative all
relevant information concerning the problem.

Subtopics
6.5.1 Debugging Tools

6.5.1 Debugging Tools

The Access program provides you with two tools to help trace
communications between a host and a personal computer: the **doswhat** and
setdebug commands.

The **doswhat** command behaves like the standard AIX **what** command, except
that it executes under DOS and operates on DOS or AIX files on either a
terminal emulator or a local drive. Running the **doswhat** command displays
identifying information such as the release number and the compilation
date contained in specified files.

The **setdebug** command controls and displays the Access program remote log
and extended debug status. It runs as an application program on DOS, but
its I/O and operation are styled after AIX commands. The **setdebug** command
manipulates the four parameters in the DOS portion of the Access program
that control disposition of the remote log and extended debug messages.

For more information on the use of the **doswhat** and **setdebug** commands,
refer to the command summary in *AIX Access for DOS Users User's Guide*.

A.0 Appendix A. Installing the AIX DOS Server for the AIX Access for DOS User

CONTENTS

Subtopics

A.1 About this Appendix

This appendix describes the procedures for installing the AIX DOS Server
Program so that users can communicate with the Access program.

This appendix is organized as follows:

> The "Host and Network Hardware and Software Requirements" section
> explains the host and network prerequisites for starting Access
> program.

> The "Personal Computer Hardware and Software Requirements" section
> provides a review of the personal computer hardware and software
> requirements discussed in *AIX Access for DOS Users User's Guide*.

> The "Before Installing the AIX DOS Server" section outlines the steps
> you should take before starting Access program.

> The "Installation Procedures" section contains a step-by-step
> description of the actions required to configure AIX to start Access
> program.

> The "AIX DOS Server Files and System Modifications" section is a
> summary of the files that implement Access program.

Subtopics
A.1.1 Host and Network Hardware and Software Requirements
A.1.2 Personal Computer Hardware and Software Requirements
A.1.3 Before Installing the AIX DOS Server
A.1.4 Installation Procedures
A.1.5 AIX DOS Server Installation Messages
A.1.6 AIX DOS Server Files and System Modifications

A.1.1 Host and Network Hardware and Software Requirements

Before you can install the Server program and start the Access program,
you need certain hardware and software.

Subtopics
A.1.1.1 Requirements for an Ethernet Environment
A.1.1.2 Requirements for a Token-Ring Environment
A.1.1.3 Requirements for an RS-232 Environment

A.1.1.1 Requirements for an Ethernet Environment

Before installing the AIX DOS Server in an Ethernet environment, you must
have the following hardware and software:

> One or more IBM PS/2 Model 70 or 80, IBM RT, or IBM System/37
> computers.

> The AIX Operating System with AIX DOS Server. (AIX/RT TCP/IP progra
> installed on the IBM RT workstation only.)

> One of the following network adapters for each host

> For an IBM PS/2

> -   Ungermann-Bass NET/One PS/2 board

> For an IBM RT work station

> -   IBM RT Personal Computer Baseband Adapter for use with Ethernet

> For an IBM System/370

> -   Intel Fastpath, a CETI (Continuously Executing Transfer Interface)
>   device

> -   IBM 8232 LAN Channel Station with an Ethernet adapter

> -   ILAN Ethernet adapter (for IBM 9370 models only).

> Terminating resistors (or **terminators**) for any unused connections on
> the network.

> Appropriate network hardware (connectors, cables, transceivers) t
> connect the host and personal computer.

A.1.1.2 Requirements for a Token-Ring Environment

Before installing the Access program software (the Server program) in a
Token-Ring environment, you must have the following hardware and software:

One or more IBM PS/2 Model 70 or 80, IBM RT work station, or IB
System/370 computers.

The AIX Operating System with AIX DOS Server. (AIX/RT TCP/IP progra
installed on the IBM RT workstation only.)

One of the following network adapters for each host

For an IBM PS/2

-    IBM Token-Ring Network Adapter/A

For an RT work station

-    IBM RT Personal Computer Token-Ring Network Adapter

For an IBM System/370

-    IBM 8232 LAN Channel Station with a Token-Ring Adapter

-    ILAN Token-Ring Adapter (IBM 9370 Models only).

Appropriate network hardware to connect the host and persona
computers.

A.1.1.3 Requirements for an RS-232 Environment

Before installing the AIX DOS Server in an RS-232 environment, you must have the following hardware and software:

One or more IBM PS/2 Model 70 or 80, IBM RT work station, or IB System/370 computers.

The AIX Operating System with the AIX DOS Server. (AIX/RT TCP/I program installed on AIX/RT work station.)

One host RS-232 port for *each* personal computer to be connected.

Each personal computer connected via RS-232 requires an RS-232 cabl with appropriate connectors to attach to an RS-232 port on the host and an asynchronous communications adapter in the personal computer.

One asynchronous communications port for *each* Access program RS-232 user.

Standard RS-232 cable to connect each asynchronous communication adapter in the host to the asynchronous communications adapter in a personal computer.

Appropriate connectors to attach the RS-232 cable to the asynchronou communications adaptors in the host and personal computers. The connectors required depend on the asynchronous communications adaptors used.

A.1.2 Personal Computer Hardware and Software Requirements

The following personal computer hardware and software is required for
Access program operation. Refer to *AIX Access for DOS Users User's Guide*
for further information on personal computer configuration.

    One or more IBM personal computers (PC, XT, or AT) or IBM PS/
    configured as described in Chapter 1 of *AIX Access for DOS Users
    User's Guide.*

    The following network adapters

    For Ethernet connection for IBM PC, PC XT, PC XT Model 286, AT, and
    IBM PS/2 Model 25 and 30

    -   Ungermann-Bass PC NIC Model 2274A

    -   3Com EtherLink

    For Ethernet connection for IBM PS/2 Models 50, 60, 70, 80

    -   Ungermann-Bass NIC Model IBM PS/2

    For IBM Token-Ring connection for IBM PC, PC XT, PC XT Model 286, AT,
    and IBM PS/2 Model 25 and 30

    -   IBM Token-Ring Network PC Adapter

    For IBM Token-Ring connection for IBM PS/2 Model 50, 60, 70, or 80

    -   IBM Token-Ring Adapter/A

    For RS-232 connection for IBM PC, PC XT, PC XT Model 286, AT, and IBM
    PS/2 Model 25 and 30

    -   IBM Serial/Parallel Adapter

    -   IBM Asynchronous Adapter

    For RS-232-C connection for IBM PS/2 Model 50, 60, 70, or 80

    -   PS/2 Dual Asynchronous Adapter.

    The Access program personal computer software contained on the Acces
    program distribution diskette.

    IBM DOS Version 3.3

A.1.3 Before Installing the AIX DOS Server

Before installing the AIX DOS Server, check that you have met all software
requirements.

If you are running AIX DOS Server on more than one host in a multihost
network, follow the instructions in the following section, "Assigning
Internet Addresses in a Multihost AIX Access for DOS Users Program
Network" in topic A.1.3.1. Otherwise, skip to "Installation Procedures"
in topic A.1.4.

Subtopics
A.1.3.1 Assigning Internet Addresses in a Multihost AIX Access for DOS Users F
A.1.3.2 Changing Host Internet Addresses

A.1.3.1 Assigning Internet Addresses in a Multihost AIX Access for DOS Users P

The Access program networks with hosts running the AIX operating system.
It uses the ARPA TCP/IP protocols for communication between network hosts
and personal computers. For these protocols to work properly, all
personal computers and hosts on a Access program network must have
Internet addresses that are both compatible and unique. Assigning
personal computer Internet addresses is discussed in "Assigning Internet
Addresses to Personal Computers" in topic 4.2.2 and in "Adding Users" in
topic 4.2.3. Host requirements are covered here.

If your network has only one Access program host, you need not be
concerned with assigning or changing your host's Internet address. If
your network has more than one host, all hosts must have:

    Internet addresses in the same clas

    Identical network portions of the Internet addresse

    Unique host portions of the Internet address

To make sure these requirements are met, follow these steps. The
following example shows three hosts on your network named *host1, host2,*
and *host3*. (If you do not know the name of your hosts, use the **uname -n**
command to find out.)

1. Determine the Internet address of all hosts by checking the entry in
    the file **/etc/hosts** corresponding to each host. An easy way to do
    this is to enter:

      grep **hostname** /etc/hosts

    on each host. That is, on host1, type:

      grep host1 /etc/hosts

    On host2, type:

      grep host2 /etc/hosts

    On host3, type:

      grep host3 /etc/hosts

    In each case, the system should display the Internet address together
    with the name of the host and (if applicable) any aliases that refer
    to the host. For example, in response to the commands shown
    previously, the system might display the following lines:

      89.0.2.19   host1   happy
      89.1.2.20   host2
      89.0.2.35   host3   doc

    The Internet address has a standard format of four numeric fields
    separated by periods, as shown in this example. Make a note of the
    Internet address for each host.

2. Determine the **class** of each Internet address. The address class is
    determined by the first field of the Internet address, as follows:

```
First Field of
Internet Address     Class

   0-127             A
 128-191             B
 192-255             C
```

Values shown are decimal. Internet addresses can also use octal or
hexadecimal notation using the standard convention of a leading 0 to
imply octal or a leading 0x or 0X to imply hexadecimal.

In our example, host1, host2, and host3 all have Class A Internet
addresses, since the value of the first field (89) is between 0 and
127.

Make a note of the address class for each host on your network. If
your hosts are not all in the same class, you must change the Internet
address of one or more of your hosts so they are all in the same
class. See the recommendations at the end of this section if you need
to change Internet addresses.

3. Determine whether all hosts have the same network portion of the
    Internet address. Depending on the address class used by your network
    (which you determined in step 2), the network portion is specified in
    the first field, the first two fields, or the first three fields of
    the Internet address, as follows:

```
              Fields Devoted
Network       to Network
Class         Portion of Address

A             1
B             2
C             3
```

To further clarify this convention, consider the following three
Internet addresses, each representing a different class:

A. Class A address:

B. Class B address:

Network Portion **Host Portion**

•132 • 119•

C. Class C address:

Network Portion **Host Portion**

498 • 198•
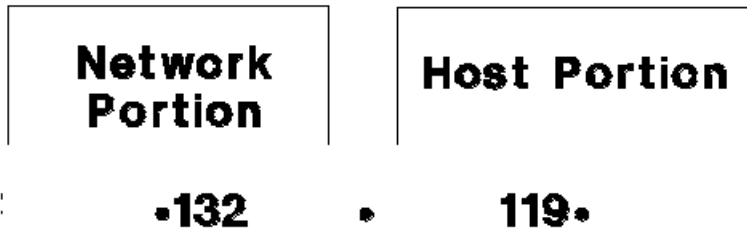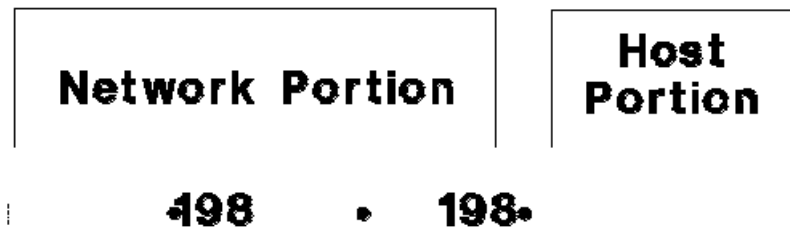
As shown in these examples, the portion of the Internet address not
used for the network address is used for the host address.

Our example host1, host2, and host3 addresses (89.0.2.19, 89.1.2.0,
and 89.0.2.35) all have the same network address, since they are all
Class A addresses and the first field in each address is the same. If
your hosts do not all have the same network address, you must change
the Internet address of one or more of your hosts so the network
addresses are the same. See the recommendations at the end of this
section if you need to change Internet addresses.

4. Determine whether the host portion of the Internet address of each
    host on your network is unique. To do this, inspect the Internet
    address of each host on your network as described in step 3 of this
    section, but now look at the host portion of the address rather than
    the network portion of the address. The host address must be unique.
    Our example host1, host2, and host3 Internet address have unique host
    address portions, since they are all Class A addresses and the last
    three fields are unique. If your hosts do not have unique host
    addresses, you must change the Internet address of one or more of your
    hosts so the host addresses are unique. See the following
    recommendations if you need to change Internet addresses.

A.1.3.2 Changing Host Internet Addresses

You must change the Internet address of one or more of your hosts if they do not all have Internet addresses in the same class, identical network addresses, and unique host addresses. Changing a host's Internet address is a simple procedure, provided that the only network interface used by your host is to the Access program LAN.

If any of your Access program AIX hosts have other network interfaces (for example, interfaces to ARPA interface message processors), the procedure for changing Internet addresses is more complex. If you have such AIX hosts in your Access program network, it is assumed that you are experienced in the administration of Internet addresses.

To change Internet addresses on hosts in a simple Access program network (one without multiple network interfaces or external network connections), follow these procedures:

1. Change the entry for your host in **/etc/hosts** to reflect the desired Internet address.

2. Reset the operating system.

For example, assume you have two hosts with incompatible Internet addresses:

    The first, host1, has an Internet address of 184.221.124.32 (a Class address).

    The second, host2, has an Internet address of 205.198.143.2 (a Class address).

To work on a Access program network, both hosts must be in the same class, have the same network address, and have unique host addresses. Normally, you would keep the existing Internet address on one host, so change host2 to be compatible. To make this change, follow these steps:

1. The Internet address for host1 is a Class B address since its first field is between 128 and 191. The network address therefore takes up two fields of the complete Internet address: 184.221. It follows that the Internet address of host2 must also start with 184.221.

2. The values chosen for the remaining fields of the Internet address and the host address are constrained only by the following considerations:

        The value of each field must be less than 256 (decimal).

        The host address must be unique. That is, it cannot conflict with an existing host address on the same network. To meet this requirement, look in the file **/etc/hosts** to find out which Internet host addresses have already been used by machines on your network.

        You cannot use all binary zeros or all binary ones as values for all Internet host address fields. That is, Internet addresses such as 184.221.0.0 should not be used. This requirement exists because the Internet broadcast network address is derived from the complete Internet address. It is derived by converting the host portion of the address to all zeros or all ones (depending on the

implementation). An Internet address with a host portion of all
zeros or all ones could conflict with the Internet broadcast
network address.

Note that the restriction against ones and zeros applies to 8-bit
bytes filled with binary ones or zeros used for *all* host address
fields. Equivalent octal, decimal, or hexadecimal values should
not be used. The complete list of prohibited values is:

Binary	Octal	Decimal	Hexadecimal
0	0	0	0
11111111	0377	255	Oxff

For example assume that you have checked **/etc/hosts** and found that
the addresses 184.221.0.1 and 184.221.0.2 are used by other
machines on your network, in addition to 184.221.124.32, which is
used by host1. You could then assign to host2 any Internet
address between 184.221.0.3 and 184.221.200.254, except for
184.221.124.32. As an example, choose the address 184.221.0.3.

3. Now edit the file **/etc/hosts** on *both* host1 and host2 and change any
    existing entry for host2 to reflect the new Internet address, or else
    add an entry if none exists. The standard format for **/etc/hosts**
    entries is:

    Internet address   official host name   aliases

    where *Internet address* is the address in the standard four-field
    format with dots separating the fields; *official host name* is the name
    of your AIX host (which you can find out with the **uname -n** command);
    and *aliases* is a list of any names other than the official host name
    that the machine is known by.

    If host2 currently has an entry in **/etc/hosts** of:

      205.198.143.2   host2   doc

    you would change this entry to:

      184.221.0.3   host2   doc

    Similarly, if **/etc/hosts** on host1 has no entry for host2, you would
    add to **/etc/hosts** the line:

      184.221.0.3   host2   doc

    Any number of spaces or tabs can separate the parts of the **/etc/hosts**
    entry.

4. Now reset the operating systems for both host systems.

A.1.4 Installation Procedures

After assigning the appropriate addresses, follow these steps to install
the AIX DOS Server Program.

1. Log in to the host system as root or as a member of the system group.

2. Be sure that your host filesystem has at least 1500 blocks of disk
    space available before you attempt installation.

3. If this installation is an update or a reinstallation, you must first
    kill the two daemons associated with the DOS Server. See the steps in
    "Starting and Stopping Host Servers (Daemons)" in topic 4.2.1 to stop
    these processes.

4. Insert the AIX DOS Server distribution diskette in the drive.

5. Install AIX DOS Server by typing:

        installp

6. Once the installation is complete, remove the AIX DOS Server
    distribution diskette from the diskette drive.

7. Invoke **/etc/rc.pci**.

Once installed, the AIX DOS Server will be invoked whenever your system is
restarted.

A.1.5 AIX DOS Server Installation Messages

If your AIX system is not configured properly, you might see one or more
error messages or warnings. Refer to Appendix B, "AIX Access for DOS
Users Program System Messages," for explanations of these messages and
suggested recovery procedures.

A.1.6 AIX DOS Server Files and System Modifications

Following is a table showing the AIX DOS Server files that are created and the AIX files and directories that are modified during the host software installation process.

The complete table of AIX DOS Server files and system modifications is presented here to give you an overview of the AIX DOS Server program software architecture. For further information on the system architecture, refer to Chapter 5, "System Architecture for AIX Access for DOS Users Program." The list of files and system modifications is also useful as a troubleshooting tool. Compare the actual contents of your AIX file system against Table A-1 if you need to verify the presence of the Access program on your host.

Table A-1. AIX DOS Server Files
AIX DOS Server Files

/usr/pci	A directory containing Access program files.
/usr/pci/bin	A directory containing Access program files.
/usr/pci/prot	A program that provides copy protection over an RS-232.
/usr/pci/errlogger	This file is linked to **/usr/pci/bin/errlogger**
/usr/pci/bin/errlogger	This program is invoked automatically when the Access program encounters an error. It logs the error in **/usr/spool/pcilog/errlog**.
/usr/pci/bin/pciconsvr.ip	A daemon that listens for connection request from personal computer **login** command. It also broadcasts **pciconsvr** *host name* **here** messages.
/usr/pci/2/8/7/pcidossvr.ip	A daemon that maintains an exclusive dialogue with **bridge.sys** on a personal computer. It executes AIX commands on behalf of the personal computer user and transmits the results back to the personal computer.
/usr/pci/bin/pciconsvr.232	A program that functions the same as **pciconsvr.ip**, but works over RS-232.
/usr/pci/pcidossvr.232	A file that is linked to **/usr/pci/bin/pciconsvr.232**. It is a daemon that functions the same as **pcidossvr.ip**, but works over RS-232.
/usr/pci/bin/pcimapsvr.ip	A daemon that listens for broadcast requests for site tables. It also listen for broadcasts from **pciconsvrs** announcing their presence.

/usr/pci/bin/pcidosout.ip	A program that is invoked during terminal emulation over a LAN. It takes data passed from the AIX shell via the pseudo-tty (pty) and sends it over the network to the personal computer (for RT work station only).
/usr/pci/2/8/7/pcidossvr.232	A program that maintains an exclusive dialog with the personal computer module. It works like **pcidosssvr.ip**, except that it works over RS-232.
/usr/pci/bin/pciprint	The default print program.
usr/pci/bin/printpty	This program is invoked by the DOS Server to find available ptys (RT work station only).
/usr/pci/bin/pcistatus	A file that lists currently running Access program processes.
/usr/pci/features	A file that contains features supported by the server. Currently this file contains **NO**, which means that nty terminal emulation is supported. (For IBM PS/2 and IBM System/370 only.)
/usr/spool/pcilog	A directory that stores Access program logging information.
/usr/spool/pcilog/consvr-log	A file that contains debugging logs from **pciconsvr.ip** when debug option is used for **pciconsvr.ip**.
/usr/spool/pcilog/mapsvr-log	A file that contains debugging logs from **pcimapsvr.ip**.
/usr/spool/pcilog/errlog	A file that contains messages from **/usr/pci/bin/errlogger**.
/usr/pci/bin/sharectl	A program that initializes, removes, and prints information about shared memory (depending on option used).
/usr/pci/bin/dos2aix	A program that converts DOS-style text files to AIX-style text files.
/usr/pci/bin/aix2dos	A program that converts AIX-style text files to DOS-style text files.
/etc/rc.pci	A program that is invoked from **/etc/rc.include**. Starts Access program daemon servers on host.

AIX Files and Directories Modified by the Install Script

/etc/rc.include	Modified to include **rc.pci**. (For RT work station only.)
/etc/init.dir/Singl2multi	Modified to include **rc.pci** (For IBM

System/370 and IBM PS/2.)

Options for AIX DOS Server Daemons

pciconsvr.ip -D[0|ffff]
-L[0|ffff] -B [-F{featureFile}]

-D This flag is the debugging option
for the Connection server
(**pciconsvr.ip**). If **ffff** is
specified, debugging logs will be
logged in
/usr/spool/pcilog/consvr-log. If 0
is specified, no logs will be
logged.

-F This option is for the debugging of
the DOS server. If **ffff** is
specified, a log file
/usr/spool/pcilog/dossvr.{pid} is
created when a PC to AIX file
service connection has made. **pid** is
the process id of the **pcidossvr.ip**
that got forked. If 0 is specified,
no log file will be created.

-B This flag enables the BSD 4.3
broadcast option. This flag has to
be on because the AIX connection
server uses BSD 4.3 socket calls.

-F This flag is optional. This option
causes the connection server to look
at the **/usr/pci/features** for the
list of DOS Server options the
kernel supports. Currently the
connection server only supports one
option (for example, **NO**). If **NO** is
in the **/usr/pci/features**, this means
that the kernel supports the High
Performance Terminal Emulation.
(For IBM PS/2 only.)

pcimapsvr.ip -D[0|ffff]

-D This is the debugging option for the
Map server **(pcimapsvr.ip)**. If **ffff**
is specified, debugging logs will be
logged in
/usr/spool/pcilog/mapsvr-log. If 0
is is specified, no logs will be
logged.

B.0 Appendix B.   AIX Access for DOS Users Program System Messages

CONTENTS

B.0 Appendix B.   AIX Access for DOS Users Program System Messages

B.1 About this Appendix

This appendix lists Access program host messages that the administrator
might see. During execution of the Access program, the error logger logs
error messages to the **/usr/spool/pcilog** directory.

Messages can also be generated when installing the AIX DOS Server Program.
These messages are not handled by the **errlogger** program, but are displayed
on the host system console.

Messages can appear during execution of the Access program and during
installation startup. Each message in this appendix is accompanied by an
explanation of the cause of the message and a recommended response. In
the messages, italics denote generic information for which the system
substitutes actual values. For example, *device name* in a message is
replaced by the name of an actual device, and *amount* and *n* are replaced by
numbers.

The abbreviation **errno** stands for AIX system error number. When an error
number appears in an Access program message, it means there was an error
condition reported by the underlying AIX system. To find out the cause of
the problem, consult the list of error numbers and causes. On many
systems this list is online in the file **/usr/include/sys/errno.h**. If your
system does not have this file, consult your host system documentation.

B.2 AIX Access for DOS Users Program Execution-Time Messages

The following messages can be seen during execution of the Access program:

Can't exec DOS server '/usr/pci/2/8/7/pcidossvr.ip'*errno*

Cause: The **pciconsvr** could not start the **pcidossvr** process.

Action: Check that the file **/usr/pci/2/8/7/pcidossvr.ip** exists and has execute permission for all AIX users. The personal computer user should try logging in to the Access program again.

Can't exec DOS server '/usr/pci/2/8/7/pcidossvr.232'*errno*

Cause: The **pciconsvr** could not start the **pcidossvr** process.

Action: Check that the file **/usr/pci/2/8/7/pcidossvr.232** exists and has execute permission for all AIX users. The personal computer user should try logging in to the Access program again.

Can't open network - Bye

Cause: This is an Access program initialization problem. The **pciconsvr** tried to open the network for normal Access program communication and failed. The Access program files are probably corrupted, or the network interface adapter is not installed.

Action: Check to make sure the network interface adapter is installed, and then restart the host.

Connection server can't open network

Cause: The Access program connection server **/usr/pci/bin/pciconsvr.ip** could not open a network port. The most likely cause is that the port is already open because the connection server is already running. Only one connection server process can be running on a host.

Action: None required. Do not try to execute the connection server when it is already running.

Error getting current working directory

Cause: Access program login over RS-232 failed because the AIX system call **getpwuid** or **getuid** failed.

Action: Verify that the user has a valid AIX account. The user should retry logging in.

Error *errno* **on get_tty**

Cause: The initialization of the terminal port for terminal emulation over RS-232 failed.

Action: Refer to the reported error number for a precise description of problem. Take appropriate action to restore AIX system resources.

Error *errno* **on STDIN set_tty**

Cause: An attempt to set terminal modes for RS-232.

Action: Refer to the reported error number and take appropriate action.

memory:Can't get *amount* **bytes**

Cause: The Access program server process cannot allocate memory required for its tables. The AIX system call **malloc** failed.

Action: Retry the operation. If the problem persists, the system might be in an unstable state and should be restarted.

memory:Can't resize to *amount*

Cause: The Access program server process cannot allocate memory required for its tables. The AIX system call **malloc** failed.

Action: The system might be in an unstable state and should be restarted.

Probe timeout-disconnect dev *names***, pid** *n*

Cause: A personal computer has disconnected from the host without logging out. The host has killed Access program processes associated with this personal computer.

Action: None required on the host. This condition is fatal for the personal computer. To re-establish a host connection, the user must log in again.

Too many reXMITS

Cause: This is a terminal emulation error.   The **pcidosout** process tried to transmit data to the personal computer, but the personal computer did not acknowledge the transmissions. The terminal emulation process is therefore terminated.

Action: Retry terminal emulation.

TTY Write error:*errno*

Cause: This is a terminal emulation error. The terminal emulator tried to write to a terminal device and failed.

Action: Refer to the reported error number for the cause of the problem and take appropriate action to restore system resources.

B.3 AIX DOS Server Program Installation Diagnostics

The following error messages can appear during installation:

ERROR Installation cannot continue because an error occurred when copying files from the distribution disk.

Cause: The installation procedure encountered a problem when copying files from the distribution diskette. The following situations might cause this problem:

> The door to the diskette drive might be open

> The diskette drive heads might not be properly aligned

> The distribution diskette might be damaged

Action: To correct this error, try one or more of the following procedures:

> Remove and reinsert the distribution diskette in the diskette drive

> Restart the installation procedure

> Perform the installation procedure on another AIX system, i
> possible.

> Get a replacement diskette from your dealer

ERROR This package needs n blocks in file system /usr. There are only n blocks left.

Cause: Your **/usr** file system does not have enough room to install AIX DOS Server Program.

Action: Back up any unused or little-used files on the **/usr** file system and delete them. Then, try running the installation procedure again.

ERROR Installation cannot continue because the following file is missing:*filename*

Cause: One of the standard AIX files is missing from your system. The error message specifies the missing file.

Action: Install the missing AIX file again.

**NOTE: Access program is currently running. It must be stopped before a new installation can be performed.

Cause: An AIX DOS Server is currently running on the host. You must stop the AIX DOS Server before installing Access program.

Action: Stop the AIX DOS Server using the procedure described in "Starting and Stopping Host Servers (Daemons)" in topic 4.2.1.

ERROR You must be logged in to the console to install AIX DOS Server.

Cause: You must be logged as **root** on the console to install AIX DOS Server Program. You cannot install AIX DOS Server Program from a

terminal.

Action: Log in as **root** on the system console and start the installation procedure again.

ERROR Installation cannot continue because the TCP/IP package has not been installed yet.

Cause: The TCP/IP package must be installed on your RT workstation before you can install AIX DOS Server Program.

Action: Install the TCP/IP package and then start the AIX DOS Server Program installation procedure again.