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**IBM LOCAL AREA NETWORKS IN
AN OFFICE SYSTEMS ENVIRONMENT**

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ABSTRACT

This document is intended to be an aid to those involved in planning, installing, and/or using a Local Area Network in an Office Systems environment.

The primary aim is to describe the uses of Local Area Networks in several different Office Systems Environments, and provide the administrator with planning/implementation hints and tips. It is not intended that this document present an exhaustive investigation of the operational aspects of the Token-Ring Network, the PC Network or any other application program mentioned or described herein.

OSPSPC OSPCDW WSPCN3EM WSPCNAPP

(xx pages)

This bulletin is intended primarily for personnel who will be involved in the installation and use of Token-Ring Networks and/or PC Networks in an Office Systems environment. Administrator assessment and planning considerations are also discussed.

Some knowledge of DOS, Local Area Networks, Token-Ring and PC Network protocols, and of the IBM Cabling System is assumed. Also required is a basic understanding of the interaction between the IBM PC and IBM Host systems in a 3270 emulation environment.

The document is organized into two sections. The first is concerned with the planning and implementation of a local area network. The second investigates the implementation and use of currently available IBM Office Systems software on the LAN.

Section One is organized into the following subject areas:

- **Background:** A brief history of Local Area Networks is followed by a comparison of the Token-Ring Network and PC Network; their different transmission methods and capabilities are discussed.
- **Hardware:** The Hardware required to run a local area network is listed and a short description of each component is given.
- **Software:** The software required to implement a simple local area network is described.
- **Planning:** Aspects which should be considered when planning for a Local Area Network are discussed; areas covered include Administrator selection, security considerations, naming conventions, and sharing LAN resources.

Section Two discusses the implementation and use of the software, including the following IBM Office Systems software products:

- PC Local Area Network Program 1.1,
- Host connection, including PC 3270 Emulation Version 2 and PC 3270 Emulation Version 3,
- DisplayWrite Assistant,
- DisplayWrite 3,
- DisplayWrite 4,
- Personal Services/PC Release 2, and
- PROFS/PC Support.

Also, Section Two describes several 'typical' office scenarios, analyzing each, with suggestions concerning the use of each product and a description of some of the pitfalls that may be met.

The following abbreviations are used throughout this document:

DISOSS	Distributed Office System Support
DOS	Disk Operating System
DWA	DisplayWrite Assistant
DW3	DisplayWrite 3 Version 1.10
DW370	DisplayWrite 370
DW4	DisplayWrite 4
GN/S	Gateway with Network Station, associated with PC3270EM.
LAN	Local Area Network (TRN and/or PCN)
MSAU	MultiStation Access Unit
N/S	Network Station, associated with the PC3270EM.
PCN	PC Network
PCNP	PC Local Area Network Program Version 1.1
PC3270EM	the PC 3270 Emulation Programs as a group
PROFS	PROFS at the Host
PROFS/PCS	PROFS/PC Support
PS/PC	Personal Services/PC
PS/370	Personal Services/370
S/370	System/370
TRN	Token-Ring Network
W/S	LAN Workstation, associated with the PCNP

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SECTION I - PLANNING AND IMPLEMENTATION

This section provides some background information, plus planning and installation considerations for an Office Systems LAN. It begins with a brief history of the IBM LAN. It then goes on to examine the differences between the PCN and the TRN, from a more-or-less technical viewpoint. Included is a list of the hardware and software required to install simple LANs, both TRN and PCN.

This section concludes with a discussion of the planning required before installing a LAN. Issues such as Administrator selection, naming conventions, security requirements and error recovery are covered. Also, hints and tips regarding efficient usage of the LAN, derived from practical experience, are included.

1.0 BACKGROUND AND GENERAL INFORMATION

1.1 THE PC NETWORK AND PC NETWORK PROGRAM

In August 1984, IBM announced the IBM PC Network (PCN) and IBM PC Network Program. This new hardware and software allowed for the integration of most members of the Personal Computer family into a local area network environment. The PC Network Program provided a messaging function and server functions for document filing and printing.

The PCN uses a broadband transmission protocol which transmits and receives data on separate frequencies over a single COAX cable. A channel arbitration protocol called Carrier Sense, Multiple Access with Collision Detection (CSMA/CD) is the method used to regulate transmissions over the COAX cable. The current implementation of the PCN has a maximum data transmission rate of approximately two million bits per second (2Mb/s). The PC's are attached to the PCN through a PC Network adapter card which is a customized implementation of a CSMA/CD broadband protocol. This implementation does not conform to IEEE or ECMA standards.

The PCN topology is similar to a tree, with the main COAX cable being the trunk, the individual PC's being leaves, and the COAX connection between the PC's and the main cable being the branches.

To provide a consistent, containable interface to the PCN adapter IBM extended the PC Basic Input/Output System (BIOS) program with the Network Basic Input/Output System (NETBIOS), which controls the communications channel between DOS and the PCN adapter itself. Then, to allow access to this NETBIOS, IBM provided an Application Program Interface (API). This API provided both IBM and customer written Personal Computer application programs easy access to the PCN adapter. The PC Network Program itself is a NETBIOS application, running directly over NETBIOS and DOS. The PC Network Program requires no software other than DOS and NETBIOS to function properly on a PCN.

1.2 THE PC NETWORK SNA 3270 EMULATION PROGRAM

Concurrent with the announcement of the PC Network, IBM provided SNA 3270 emulation services on the network by announcing the IBM PC Network SNA 3270 Emulation Program. This program supported 3270 SDLC Communications between System/370 (S/370) based applications and Personal Computers attached to the PC Network.

The PC Network SNA 3270 Emulation Program provides two distinct functions to LAN attached PC's:

- A 'gateway' function - which monitors and controls the use of the physical attachment to the Host system, also providing a subset of the 3274-51C control unit services to other LAN attached PC's. The PC Network SNA 3270 Emulation Program allows a single PC attached to a PC Network to act as a 'gateway' through which all communications between the Host and the other LAN attached PC's pass. This eliminates the need for each PC to have its own communication adapter, allowing more efficient usage of Host resources.

- 3278/9 emulation function - which MUST be used by any PC on the LAN that wishes to establish a Host session including the 'gateway' PC.

The combination of the LAN and the PC Network SNA 3270 Emulation Program provides the PC user with two 'operating environments': the environment of the LAN (and DOS), and the environment of the Host session. These two environments are, to some extent, compatible with each other. For example, a LAN user can use Personal Services PC (PS/PC) with DISOSS, or PROFS/PC Support with PROFS. PS/PC and PROFS/PC Support are both DOS applications written specifically to interact with DISOSS and PROFS, respectively. The PC Network SNA 3270 Emulation Program supports the kind of interaction required between the LAN/DOS and the Host environments for these programs to function properly.

Of course the user has direct access to the DISOSS functions (via PS/370) and PROFS facilities, as 3278/9 emulation supports direct interaction between the Host and the LAN attached PC. The emulation program also provides PC/Host file transfer facilities, so that interchange of Displaywrite compatible documents (and other document types) with Host applications is possible.

The PC Network SNA 3270 Emulation Program uses the PC Network Adapter NETBIOS extension and does not require, or use, the PC Network Program software. This program is, like the PC Network Program, a NETBIOS application, requiring only DOS and NETBIOS to function properly on a LAN.

1.3 THE TOKEN-RING NETWORK

In October 1985 IBM announced the Token-Ring Network (TRN). The TRN is a general purpose local area network whose topology is a star wired ring. It uses baseband signalling and token passing protocol for transmission control, and conforms to the IEEE 802.5 and ECMA 89 standards. A PC is attached to the TRN with a TRN PC Adapter card that conforms to the IEEE 802.2 standard. The TRN has a maximum data transmission rate of approximately 4Mb/s, twice the PCN.

The TRN, like the PCN, uses the NETBIOS extensions to provide communications between DOS and the network itself. However, since the PCN adapter and the TRN adapter cards are significantly different, an additional program, called the Adapter Support Interface, can be used in a TRN attached PC to bridge between the TRN PC Adapter and NETBIOS. Thus, as the TRN can use the NETBIOS extensions, the PC Network Program will operate correctly on a TRN attached PC in a manner identical to a PCN attached PC. And, in like fashion, the PC Network SNA 3270 Emulation Program will execute on a TRN attached PC in a manner identical to a PCN attached PC.

In April, 1986 IBM announced the IBM PC Local Area Network Program Version 1.1 (PCLANP). This new program product replaced the original IBM PC Network Program. The PCLANP contains all of the function of the original PC Network Program plus additional messaging functions and support for the new announced PC 3270 Emulation programs.

Also announced were the new PC 3270 Emulation programs:

- PC 3270 Emulation Program, Entry Level
- PC 3270 Emulation Program Version 2.0

- PC 3270 Emulation Program Version 3.0

These programs provide PC/LAN - Host connectivity in a wide variety of environments. The PC 3270 Emulations Programs Version 2.0 and 3.0 are referenced collectively in this document as PC3270EM.

1.4 PC NETWORK OR TOKEN-RING NETWORK ?

In as much as the PCN and the TRN appear to provide identical capabilities, a reasonable question to ask would be 'What, then, are the differences between the Token-Ring Network and the PC Network, and why would I choose one rather than the other?'

From a user's viewpoint, most of the currently available functions are almost indistinguishable between the two. Other than the transmission mechanism and communication protocol used, as alluded to above, and explained in more detail below, the only obvious difference is that a TRN requires an additional program, the Adapter Support Interface (TOKREUI), which requires approximately 13kb of RAM. Most other facilities and functions appear (to the user) to be identical.

From the hardware viewpoint the difference lies primarily in the method of transmission used and of the throughput rates. The PCN uses a broadband system, operating at approximately 2Mb/s, while the TRN uses a Baseband system for data transmission operating at approximately 4Mb/s.

From a strategic/planning viewpoint, the major differences lie in the users 'best guess' about what IBM's development strategies will be. In recent months, announcements have been made which seem to place the PCN in a small, local, single department type of environment, while the TRN, with its higher throughput rate, is being positioned to 'tie' all of those individual departments together, and to provide easy access to a S/370 or other Host facility.

The speculations made here concerning the strategic distinction between the PCN and the TRN, and the proper position of each, are solely the personal opinions of the authors and advisor of this document. These speculations are in no way meant to imply that IBM is in fact positioning the PCN or the TRN in the manner described.

1.4.1 BROADBAND TRANSMISSION

Broadband data transmission is very similar to the method used by radio or TV stations. A radio or TV station is allocated a range of frequencies (a band) between which a signal may be sent. The information may be encoded on that signal using one of the many available modulation techniques. In much the same way, the PCN transmits and receives data within a certain frequency band. One advantage of a broadband system is that it is designed to accommodate a multitude of frequency ranges, each range being used simultaneously by a different device type. For example, one frequency range can be used for voice communications, another for TV, and yet another for LAN communications. The PCN uses two of the many frequency ranges available to satisfy its communications requirements. Although IBM provides a frequency translation unit that supports only the two frequency bands required by the PCN, vendor devices can be designed so they support the 2 PCN frequencies plus whatever other

frequency bands are required by the user, such as CATV, audio communications, etc.

A 75 Ohm coaxial cable provides the PCN with a reliable, low maintenance transmission medium. The PCN uses a Carrier Sense, Multiple Access with Collision Detection (CSMA/CD) protocol for transmission at approximately 2 Mb/s.

Using the CSMA/CD technique, before a station can send data over the LAN, it must 'listen' to determine whether another device is already transmitting or not. The station will wait until the LAN is not being used before it starts to send its own data. It is possible that two stations start sending together and a collision of the data transmitted can occur, garbling the data transmitted by each station. Both transmitting stations can detect that the data is garbled and will cease transmission. Each station will then wait for some random (different) amount of time before they again try to retransmit their data.

In all CSMA type LANs there is a time lapse between the transmission of data by one station and the detection of this condition by another potential sender. The longer the gap is, the higher the probability that another sender will begin to send its own data with another station already transmitting. The number of transmission collisions is related to this time lapse, among other things. The utilization of the carrier medium is therefore limited more by collision probabilities than by the amount of data transmitted. Utilization of 20% is considered quite good.

1.4.2 BASEBAND TRANSMISSION

Baseband transmission involves putting the data signal directly into (onto) the transmission media, without being modulated with a carrier signal. The information flows along a single pipe or channel that can be shared by different devices by allocating time slices for each transmitting device. This allocation process is called Time Division Multiplexing (TDM). The data put onto a baseband LAN can be almost anything digital, including digitized voice, data or video.

Data rates can exceed 100 Mb/s, depending on the quality of the physical medium. Currently, the IEEE 802.5 standard for baseband Token-Ring networks calls for transmission speeds of either 1 or 4 Mb/s. The IBM TRN is designed to operate at a speed of 4 Megabits/sec.

Because of TDM, the TRN can efficiently use much of the design-point bandwidth. Utilization of 70% or even more can be achieved without severe network throughput degradation. It is also possible to create a priority scheme so, for example, voice traffic can be given priority over (more time slices than) data traffic. With the recent transmission media announcements (optical fiber and copper repeaters) the problems of geographic separation are somewhat reduced. It is possible to have the interconnections between LAN's extend many miles, although practical considerations will probably limit the physical extent of interconnected LAN's.

The token passing technique for ring access control is based on the use of a pre-defined bit pattern, called a 'token', which continually circulates around the ring in only one direction. In normal operation only a single token circulates around the ring at any one time. When a station requires access to the ring, it waits until a 'free' token passes by. By virtue of the station receiving this 'free' token, the station can begin its own transmission. The transmitting

station changes the token's bit pattern, inserting destination and source addresses, and other information, and in so doing, transforms the token into a data frame. During the time while the frame is being transmitted around the ring toward the destination, no token exists, and therefore no other station will attempt to send its own data. The frame is received and retransmitted by all intermediate stations on the ring until the station for whom the frame is intended (was addressed) receives the frame and copies the data to its internal memory. The destination station will then change the frame bit pattern slightly to show that it received the data and retransmit it around the ring. The originating station, on reception of the altered frame, will remove the frame from the ring and send a new 'free' token. If the destination station is not active, or for some reason cannot receive the frame of data, the frame will eventually circulate back around to the originating station, which, as before, will remove the frame from the ring and send a new 'free' token.

Within a TRN there must be some method for controlling the token itself. For example, who puts the first 'free' token on the ring? There must also be a way to handle error conditions which might put a permanently busy (not free) token onto the ring. Each IBM device on the TRN is capable of complete ring/token control, meaning that there is a mechanism within each TRN attached device for determining which of the active devices is the ring 'controller'.

The IEEE 802.5 standard specifies that a balanced, shielded twisted wire pair of 150 ohms (+ or - 15 ohms) impedance must be used as the medium interface cable for TRN's. Although not mentioned in the original standard, optical fibers, with their low susceptibility to electromagnetic interference and high speed potential, may play an important role in future LAN developments.

2.0 HARDWARE

This chapter lists the various hardware components required for a PC to participate in either the PCN or the TRN. Included is a short description of each component and its function within the LAN environment.

2.1 PC NETWORK

This section lists those hardware components required to set up a simple PCN, the quantities required of each, and a brief description of each component.

- IBM PC Network Adapter (6450213): one for each PC that is going to participate in the PCN.
- IBM Translator Unit and 8-way Splitter with connection hardware (5178001): one per network; the 8-way Splitter unit supports up to 8 PC's.
- 120 Volt Transformer (6450238): one per translator unit.
- IBM Base Expander (6450230): required if more than 8 PC's are to participate in the network; the Base Expander unit supports any combination of up to 8 short, medium or long distance kits.
- IBM Short, Medium, or Long Distance Kits (6450231, 6450232, 6450233): in lengths of 1, 400 and 800 feet, respectively, are required if Expander units are used to attach more than 8 PC's to the PCN.
- IBM Coaxial Cable in lengths of 25,50,100 or 200 feet (6450234 - 37): required in sufficient quantities and lengths to connect the PC's to the Splitter unit or, if used, the Expander unit(s).

A fully configured PCN system, using IBM components, can support up to 72 PC's, with no PC being more than 1000 feet away from the translator unit.

2.1.1 PC NETWORK ADAPTER

The IBM PC Network adapter is the hardware element that must be installed in each PC that will participate in a PCN. Each card has a unique serial number, contained in ROM, that is used as the network identifier for the PC where that adapter is installed. It may be installed in a PC, PC/XT, Portable PC or PC/AT, and occupies one full size slot.

The IBM PC Network Adapter card contains several hardware components, each of which carries out a specific function. Refer to the 'PC Network Technical Reference' manual (6322505) for a complete description of this Adapter.

2.1.2 TRANSLATOR UNIT AND 8-WAY SPLITTER

The IBM PC Network Translator Unit provides the frequency translation and amplification required for a broadband network. A single translator unit can support a network consisting of up to 72 networked PC's.

The 8-way Splitter hardware that comes with the translator unit supports up to 8 PC's. Each PC can be located up to 200 feet away from the 8-way Splitter.

2.1.3 BASE EXPANDER

This component, when attached to the 8-way Splitter, allows the connection of up to eight Short, Medium, or Long Distance Kits. The expander is used when more than eight PC's are connected to the network, or when a distance of more than 200 feet is required between the translator unit and a PC.

2.1.4 SHORT, MEDIUM, OR LONG DISTANCE KITS

Each of these kits allow you to connect 8 additional computers to the network. The three kits are:

- Short distance Kit; attaches directly to the Base Expander via 1 foot of cable
- Medium distance Kit; attaches to the Base Expander through 400 feet of cable
- Long Distance Kit; attaches to the Base Expander through 800 feet of cable

2.2 TOKEN-RING NETWORK

This section lists those hardware components required to set up a simple TRN, the quantities required of each, and a brief description of each component.

- IBM PC Token-Ring Adapter I or II (6339100 or 67X0438) - one required for each PC that is going to participate in the TRN.
- IBM TRN-PC Adapter Cable (6339098) - one per PC that is going to participate in the network.
- IBM Token-Ring Multi-Station Access Unit (6091014) - as many as are required to support the number of PC's that are going to participate in the network; each MSAU supports 8 PC's, and up to 32 MSAU's can be 'daisy-chained' together, providing support for a maximum of 256 PC's per network.
- Patch Cables (8642551) - as many as are required to chain MSAU's together, one between each pair of MSAU's.

2.2.1 TOKEN-RING NETWORK ADAPTER

A Token-Ring adapter card must be installed in each PC that is to be a participant in the TRN. The card occupies one full size slot. It must be customized to specify the interrupt level which will control communications between itself and the PC by the setting of some DIP switches on the card. See the 'PC Network Adapter Guide to Operations' (SA27-3710) for a detailed description of the switch settings.

There are two different Token-Ring Adapters available, Type I and Type II, which have been designed for use in different environments. Type I adapters are installed in PC's attached to a single TRN. Type II Adapters are used in four different environments:

- The use of two Type II adapters in a single PC allow that PC to be connected to two TRN's simultaneously; this allows the connection, or bridging, of TRN's when that PC is running the Token-Ring Network Bridge Program.
- A Type II adapter also supports the attachment of a TRN to the IBM System/36.
- The IBM Industrial Computer can be attached to the TRN via a Type II adapter.
- The Type II adapter can also be installed in an PC attached to a single TRN.

When a PC is attached to two TRN's simultaneously and executing the TRN Bridge Program, the PC is dedicated to the task of providing the bridge between the two networks.

You can mix Type I and Type II adapters on the same TRN. This includes PC's on daisy chained MSAU's. The only restriction is that Type II adapters MUST be installed in the 'bridge' PC if the Token-Ring Network Bridge Program is to be used to interconnect two Token-Ring Networks.

2.2.2 TOKEN-RING NETWORK MULTI-STATION ACCESS UNIT (MSAU)

The MSAU is a wiring concentrator that supports up to eight attached PC's to form a star-wired network. Attaching PC's are simply plugged into the unit using the IBM TRN-PC Adapter Cable. MSAU's can be interconnected to form larger networks by using Patch Cables. The unit can detect whether an attached PC is active or not by reacting to the presence or absence of a special signal from that PC. If the MSAU doesn't detect the signal it bypasses the PC, electrically excluding it from the network.

2.3 SUMMARY OF PART NUMBERS

The hardware required for a simple PCN is:

- IBM PC Network Adapter with an adapter cable (6450213)

- IBM Translator Unit with connection hardware (5178001)
- 120 Volt Transformer (6450238)
- IBM Base Expander (6450230)
- IBM Short, Medium, or Long Distance Kit (6450231-6450233)
- IBM Coaxial Cable in lengths of 25,50,100 or 200 feet (6450234-37)

The hardware required for a simple TRN is:

- IBM PC Token-Ring Adapter I (6339100), or
- IBM PC Token-Ring Adapter II (67X0438)
- IBM Token-Ring Multi Station Access Unit (6091014)
- IBM TRN PC Adapter Cable (6339098)
- IBM Adapter Cable (8642551)

3.0 SOFTWARE

Regardless of how specific software requirements vary between installations, all LAN installations require a minimal set of programs to form the basis of a network. DOS provides support for the PC's themselves. Software control of the Network is provided by Network Basic Input/Output Services, NETBIOS, which for the PCN resides on the PC Network Adapter card in ROM, or for the TRN is loaded from disk/diskette into RAM.

This chapter discusses these basic software requirements. The various products are described in the order that they are (typically) loaded into the PC. Listed below is the software required for each type of network. Following that, a short description of each software product, and of its function within the LAN.

BASIC PC NETWORK SOFTWARE

- PC Network Adapter software (data transfer protocols, NETBIOS)
- DOS 3.1 or 3.2
- IBM PC Local Area Network Program (PCLANP)

BASIC TOKEN-RING NETWORK SOFTWARE

- Token-Ring Network PC Adapter software (data transfer protocols)
- DOS 3.1 or 3.2 (3.2 is preferred)
- IBM Token-Ring Adapter Support Program (TOKREUI)
- IBM Token-Ring Network NETBIOS Program (NETBEUI)
- IBM PC Local Area Network Program (PCLANP)

NETWORK INTERCONNECTION AND CONTROL

- IBM Token-Ring Network/PC Network Interconnection Program
- IBM Token-Ring Network Bridge Program
- IBM Token-Ring Manager Program

3.1 BASIC PC NETWORK SOFTWARE

3.1.1 PC NETWORK ADAPTER SOFTWARE

The PCN adapter provide the hardware some 'on-board' software, in ROM, that support network protocol functions and the return of network and command status to the PC. The adapter supports five layers of the data transfer protocol, namely:

- Physical layer

- Link layer
- Network layer
- Transport layer
- Session layer

Each of these layers provide certain services to the PC and to the network.

The physical layer uses the RF modem on the adapter and the interface logic to the Intel 82586 Communications Controller. The link layer is contained primarily in hardware by using the Intel 82586. The other three layers (network, transport and session) are carried out using the Intel 80188 processor and ROM on the PCN adapter. Also, these last three layers provide a reliable virtual connection service, a name support facility, and a low overhead datagram service.

3.1.2 PC NETWORK ADAPTER NETBIOS

Network Basic Input/Output System microcode (NETBIOS) which resides in the PCN adapter's ROM provides the program and control interface between PC applications and the LAN.

The PCN is designed to logically and physically connect two or more Personal Computers together. NETBIOS presents a high level interface to an applications programmer eliminating the need to know network protocol details when developing software for the network. This high level interface improves system performance by off-loading networking tasks onto the adapter. Also, this off-loading feature saves memory because the network programs are in the adapter's memory and not in the Personal Computer's memory.

3.1.3 DOS 3.1 AND 3.2

The IBM Personal Computer Disk Operating System (DOS) Versions 3.1 and 3.2 provide all of the familiar functions contained in previous releases of DOS, plus specific LAN support and a few new commands not related directly to the LAN. DOS 3.1 requires approximately 40Kb of memory while DOS 3.2 uses approximately 46kb of memory.

DOS 3.1 provides specific support for the PCN, while DOS 3.2 supports both the PCN and the TRN. This, however, is not a hard-and-fast rule. Any program that executes properly under DOS 3.1 will also execute properly under DOS 3.2, however, the converse isn't true. Programs written to run under DOS 3.2 will not necessarily execute properly under DOS 3.1. Also, applications written specifically for the TRN will not necessarily execute properly on the PCN, and vice-versa. It is possible for applications to take advantage of some of the unique characteristics of each of the networks, although for obvious reasons we recommend that the programmer not make this a common practice.

3.1.4 PC LOCAL AREA NETWORK PROGRAM

The PC Local Area Network Program allows PC's on either a PCN or a TRN to use the disk and/or printer resources of other PC's on the network. The PC's whose resources are being used, or 'shared', are called 'Servers'. There may be more than one Server on the network.

When a non-server PC loads a program from a Server, it is as though the program was loaded from a disk on the non-server PC. However, a Server cannot run a program for a non-server PC, the server merely provides easily accessible disk storage for that non-server PC.

The PCLANP is loaded by a command (NET START) which would normally be in the user's AUTOEXEC.BAT file. This command loads into memory the code required to communicate with other PC's and then returns control to DOS. The user then has a choice of using either a menu or command driven interface to do such things as send a message, start or stop using a remote (server) disk or printer, and more.

The PCLANP is discussed in more detail in the Chapter "PC Local Area Network Program" on page 29.

3.2 BASIC TOKEN-RING NETWORK SOFTWARE

3.2.1 TOKEN-RING ADAPTER SOFTWARE

The TRN adapter, like the PCN adapter, has some hardware and 'on-board' software in ROM that support network protocol functions and the return of network and command status to the PC. This hardware and software provide 3 levels of access (to the TRN) to the applications programmer. These are:

- The Direct Interface.
- The DLC Service Access Point (SAP) Interface.
- The DLC Station Interface.

If an application is written that uses these interfaces, that program replaces the Adapter Support Interface, discussed in the next section, and will be totally responsible for completely handling the use of the adapter card. Control and command information must be fed to the adapter and all sequencing and interrupt handling must be managed by that application. This, of course, puts a tremendous burden on the applications programmer.

3.2.2 ADAPTER SUPPORT INTERFACE

The Adapter Support Interface (TOKREUI) is a software program supplied on the Adapter Diagnostic diskette that is packaged along with the PC Token-Ring Adapter. This program controls the communication between the TRN and applications running in the PC system unit itself. The Adapter Support Interface program is loaded after DOS but before NETBIOS as it must be able to start

the TRN adapter card if required. There are four access paths to the Token-Ring supported by the Adaptor Support Interface:

- APPC Interface - This high-level interface offers customer written application programs the ability to communicate over a TRN using LU 6.2 protocol.
- NETBIOS Interface - This interface also provides high level LAN services for an application program; most of the responsibility for operating the Token-Ring adapter is assumed by the NETBIOS program if it is used.
- DLC Interface - This interface permits an application program to use the Logical Link Control (LLC) sublayer of Data Link Control Protocol for communications which conform to IEEE type I or II communications.
- Direct Interface - This interface permits control function requests to be transmitted directly with no protocol assistance using standard control blocks and parameters.

Figure 1 illustrates the four access levels described above.

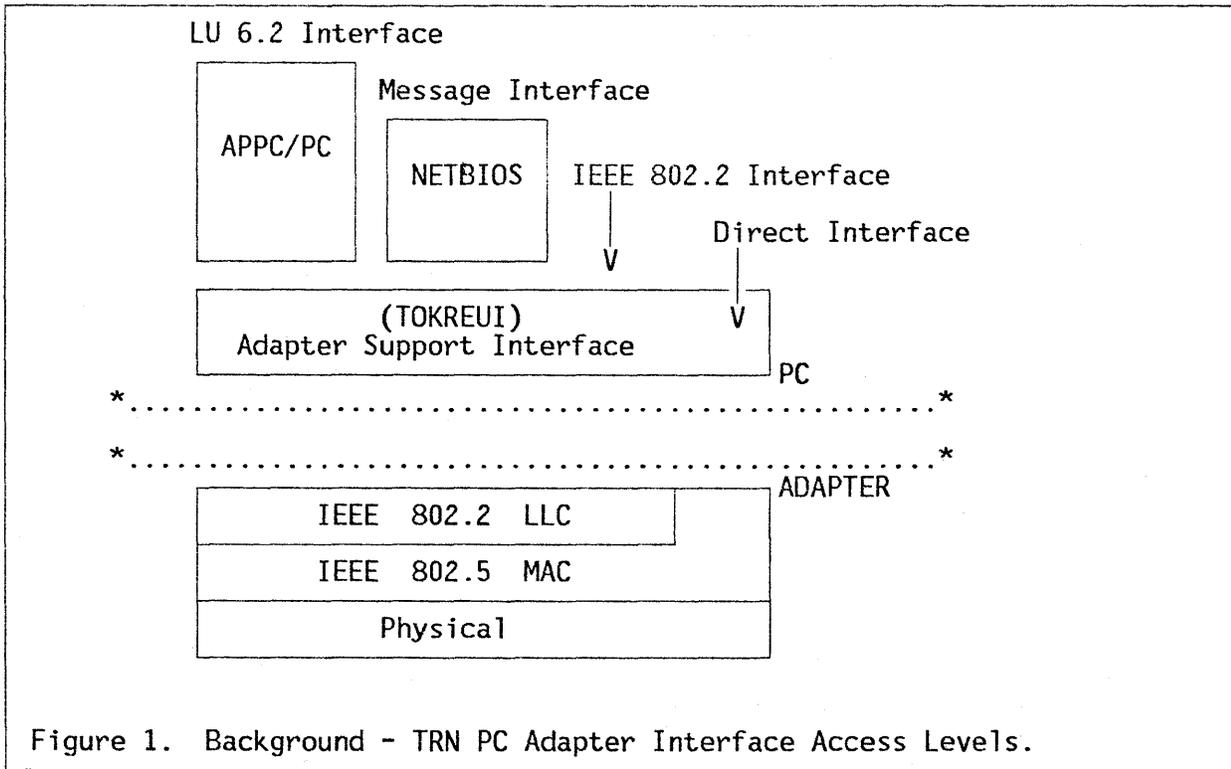


Figure 1. Background - TRN PC Adapter Interface Access Levels.

There are some control functions that can be performed ONLY through the Direct interface, regardless of the interface level actually used by the application. Among these functions are:

- Initialization of the adapter card.
- Open the adapter card for access to the network.
- Closing off the adapter cards access to the network.

When the Adapter Support Interface is loaded into the PC, two levels of interface are immediately available on the TRN; the DLC Interface, and the Direct Interface. An application program can then access the adapter using either interface by simply setting up and filling in standard control blocks in memory (called Common Command Blocks, or CCB's) and then calling the Adapter Support Interface with an interrupt request.

To have high-level interfaces available on the TRN for applications to use, either NETBIOS or the APPC/PC program must be purchased and loaded into the PC's memory after the Adapter Support Interface has been loaded.

When a user program issues the X'5C' interrupt, the adapter will examine the control block that was passed along with the interrupt. If it is a NETBIOS call and it is for the Token-Ring adapter, as opposed to the PC Network adapter, the interrupt handler will pass control to the Token-Ring NETBIOS interface module (NETBEUI) which is memory resident. If the command in the control block is a DLC or Direct command, the interrupt handler will move the block to the shared RAM area so that the contents are available for the adapter microcode. Finally, the interrupt handler will issue an interrupt to start the process of handling the requested function within the adapter.

Besides the four access levels described above, the TRN PC adapter provides three additional access paths for the application programmer who wishes to bypass (not use) the Adapter Interface Support program (TOKREUI). These three additional access paths are:

- The DLC Service Access Point (SAP) Interface.
- The DLC Station Interface.
- The Direct Interface.

These three paths provide the programmer with direct access to the adapter card itself, its control registers and such. If any of the three paths are used the programmer is totally responsible for handling the adapter card. Control and command information must be loaded into shared RAM located on the adapter card and all sequencing and interrupt handling must be managed by the application. The application that uses one of these three paths actually replaces TOKREUI.

3.2.3 TOKEN-RING NETWORK NETBIOS PROGRAM

The NETBIOS code for the TRN provides one of the 4 access paths to the TRN adapter through the Adapter Support Interface. In the TRN environment NETBIOS is not on the adapter card in ROM, as it is on the PCN adapter, but is a separate program which must be loaded into the PC's memory. The implementation of NETBIOS for the TRN is a superset of that available on the PCN adapter. Therefore, from a NETBIOS perspective, any program which runs correctly on a PCN will also run correctly on the TRN. However, the converse is not necessarily true. It is also the case the user need not load NETBIOS at all if none of the applications to be used on the network require the NETBIOS interface. The implication is that the applications have been written to one of the other TRN interfaces, or the user has an application that is equivalent to NETBIOS.

The Adapter Support Interface program (TOKREUI) provides DLC and Direct access to the TRN adapter while the NETBIOS Interface Program (NETBEUI)

provides access to the RAM resident NETBIOS code. TOKREUI must be loaded into the PC's memory before NETBEUI is.

3.2.4 DOS 3.1 AND 3.2

Most of the information discussed in "DOS 3.1 and 3.2" on page 14 applies to the TRN and to the PCN. Also, a portion of the DOS 3.2 enhancements for the TRN mentioned in that section provide additional error recovery reporting facilities.

3.2.5 TOKEN-RING NETWORK LOCAL AREA NETWORK PROGRAM

The functionality of the IBM Local Area Network Program when used in a TRN environment is identical to that when it is used in a PCN environment. See the chapter "PC Local Area Network Program" on page 29 for more information.

3.3 NETWORK INTERCONNECTION AND CONTROL SOFTWARE

3.3.1 TOKEN-RING NETWORK/IBM PC NETWORK INTERCONNECT PROGRAM

This program supports the connection of two PCN's or one TRN and one PCN. A dedicated PC running only the interconnect program is physically attached to both networks using the appropriate network adapters. Network application programs to be used across the two LANs via the interconnect program must use network basic input/output (NETBIOS) communication protocols.

3.3.2 TOKEN-RING NETWORK BRIDGE PROGRAM

The IBM TRN Bridge program, with two IBM TRN Adapter II's, interconnect two TRNs thereby increasing the number of devices that can communicate with each other in a TRN environment. The IBM TRN Bridge Program supports the sending and receiving of messages across and between the interconnected TRNs.

A dedicated PC running only the bridge program is physically attached to both networks.

3.3.3 TOKEN-RING NETWORK MANAGER

The IBM Token-Ring Network Manager program monitors a TRN for failures, and provides information and control functions that assist a user with problem determination and error recovery on the Network. The failures recorded by the program include soft and hard errors. A soft error is recorded when an

error threshold of transient, recoverable errors is exceeded. In that case the Network Manager notifies the user of the impending loss of a network resource. A hard error is recorded when a permanent error actually causes the loss of a network resource.

3.4 SUMMARY OF PART NUMBERS

The specific software required for a simple LAN will depend on whether you are installing a PC Network or a Token-Ring Network.

For a PCN the following software is required:

- DOS 3.1 or 3.2 (6024211 or 6280057)
- PC Network Adapter NETBIOS (on the adapter card)
- IBM PC Local Area Network Program (6280063)

For a TRN you require the following software:

- DOS 3.1 or 3.2 (6024211 or 6280057)
- IBM Token-Ring Network PC Adapter Support Software (provided with the TRN PC Adapter)
- IBM Token-Ring Network NETBIOS Program (6467037)
- IBM PC Local Area Network Program (6280063)

To connect two networks together, you can use the IBM Token-Ring Network/PC Network Interconnect Program (6467036), which allows the connection of a TRN and a PCN, or two PCN's, or the IBM Token-Ring Network Bridge program (6403831) which allows for the connect of two TRN's.

To monitor the activity and condition of a TRN you can use the IBM Token-Ring Network Manager Program (6476046).

To ensure a successful LAN installation, it is necessary to put some time aside for planning purposes. We think one of the first tasks to be completed should be the selection and training of a LAN Administrator. Once the Administrator understands the fundamentals of the LAN, he or she can then establish the framework within which the Network will run. Input will be required from all intended LAN users regarding the applications to be used and the security requirements for their information.

Standards and procedures need to be established that cover device naming, directory creation and sharing so that as the network grows, the addition of new users will not disrupt those already using the LAN.

This chapter investigates the planning required to install a LAN. First the selection of the LAN Administrator and backup key personnel is discussed, for establishing the needs of users and the standards and procedures to be followed. Security advantages of using a LAN are discussed, along with the different methods for sharing disks and directories between users. To ease the task of establishing the exact size of a proposed LAN, and listing the applications users will require, we have created two checklists. The first gives the LAN Administrator a clear idea of the size of the overall network, and of the type of network configuration each LAN user requires. The second checklist looks at the specific software required by the various LAN users, so that a profile can be built up for each individual user of the LAN.

4.1 THE LAN ADMINISTRATOR

The LAN Administrator should be chosen as early as possible in the planning cycle, with a back-up person selected as well. Ideally, they would both be very familiar with the PC and the concepts of Local Area Networks, besides being familiar with user requirements. They would be responsible for establishing the rules for training the users and installing, customizing, and maintaining the TRN at each installation site. These two people would then be able to support users of the LAN and provide a point of contact for the Host administrator.

4.2 SECURITY WHEN SHARING NETWORK DEVICES

4.2.1 DISK/DIRECTORY ACCESS LEVELS

With the increasing use of electronic media to store and transfer information, how to ensure that the information remains secure is a growing concern to users. This is especially true in the dynamic office systems environment. To share resources (Network devices, in this instance) in a secure fashion, the TRN can be configured to restrict, or limit, access to the devices shared by a TRN Server. Network devices are disks, directories, subdirectories and printers that can be accessed by the PCLANP. An additional benefit of the TRN is the ability to assign different levels of access to each LAN user who accesses the disks/directories shared by a Server.

The levels of access provided by the PCLANP Server configuration are:

1. Read - user can view, type or copy a file to the display or to their own directory.
2. Write - user can modify information in the files, but can't view information that's already in the files. You may wish to use Write access with applications specifically designed for use on a network.
3. Read/Write/Create - users can view files, make changes to the files, create files, and delete files. You should use Read/Write/Create access to share directories that you want remote computers to be able to use and change.
4. Write/Create - users can change the information in the file, delete files, and create new files, but they can't view the contents of existing files.
5. Read/Write - users can view and make changes to existing files, and copy to their own directory, but they can't create new files or delete existing files.

The table in (Figure 2) summarizes the security levels and their capabilities.

Task	Security Level				
	1	2	3	4	5
Copy file from Server to Personal Directory	X		X		X
Copy file from personal directory to Server (replace) existing file		X	X	X	X
Create new file on Server			X	X	
Delete existing file on Server			X	X	X

Figure 2. Planning - Security Levels supported by the PC LAN Program

To share the same subdirectory with different access rights for different people, the subdirectory must be shared more than once. Each time you share the subdirectory, it is given a different network name, password, and access right. Each LAN user is then told the network name (and password) that you want them to use when accessing that subdirectory. Each network name, of course, has different access rights, therefore each different type of user has different access rights. Sharing the same subdirectory more than once gives you more flexibility in controlling the way the files in your subdirectories are used by different LAN users.

For more information concerning device sharing see "PC Local Area Network Program" on page 29.

4.3 NAMING CONVENTIONS

Each user on the network is identified by a unique LAN user name. People using the LAN send messages to each other using their unique LAN name. If you also intend to provide Host sessions, each LAN user who will have a Host session will also require another unique name for the Host session. During our testing, we named the LAN W/S's and Host N/S's in this manner:

Unique LAN User Name	Unique Host Session Name
JENNI	VJENNI
MARK	VMARK
GRACE	VGRACE

By simply inserting a 'V' before the LAN user name, we were able to easily identify Host sessions, although you are by no means restricted to this system. There are three important points to remember when establishing your own system:

- It should be consistent.
- It should have room for the addition of new unique user names as the network grows.
- It should be easy for the users to remember.

4.4 PLANNING CHECKLISTS

Establishing exactly who will be using the LAN and what functions are required is one of the most important tasks the LAN Administrator will undertake in the planning phase.

To make the planning process easier, we have designed two planning checklists. The first, shown in Figure 3 on page 24, would be used by the LAN Administrator to determine the number and type of users on the LAN. The use of the checklist can help avoid such planning problems as too many users requesting Host connection. Remember, using an SDLC connection, a single GW PC can support 32 Host sessions (including its own).

The second checklist, shown in Figure 4 on page 25, would be used by the LAN Administrator to establish the exact software requirements of each individual LAN users.

Besides the software specified in the Planning Checklists, each N/S will require some or all of the following software (depending on specific requirements) to participate in the LAN:

- PC Network
 - DOS 3.2 (6280057)
 - IBM PC LAN Program (6280083)
- Token-Ring Network
 - DOS 3.2 (6280057)
 - IBM Token-Ring Network PC Adapter Interface Support (TOKREUI) (69X7755)
 - IBM Token-Ring Network NETBIOS Program (NETBEUI) (6467037)
 - IBM PC Local Area Network Program (6280083)
 - IBM Token-Ring Network Manager (6467037)

SECTION II - OFFICE SYSTEMS SOFTWARE

This section investigates the implementation and use of various IBM Office Systems software products on the LAN. It begins with a description of four different categories of PC based program products:

1. The first category includes network control programs such as:
 - The PC Local Area Network Program
2. The second program product category covered provides PC/LAN to Host communication capabilities:
 - PC 3270 Emulation Version 2
 - PC 3270 Emulation Version 3
3. The third category encompasses the Displaywrite series:
 - Displaywrite Assistant
 - Displaywrite 3 Version 1.1
 - Displaywrite 4
4. The fourth category covers what has come to be known as 'personal services' programs which include:
 - Personal Services/PC Release 2
 - PROFS/PC Support

This section goes on to examine various ways of combining the programs which belong to these four categories with corresponding Host products in an attempt to achieve an 'integrated office system'. The section concludes with a discussion of current limitations of, and potential future directions in, the LAN applications - Host communications areas.

5.0 PC LOCAL AREA NETWORK PROGRAM

This chapter discusses the implementation and use of the PC Local Area Network Program Version 1.1 (PCLANP) (6280063).

The PCLANP is the replacement product for the IBM PC Network Program. It is compatible with the PC 3270 Emulation Programs Versions 2 and 3, and with TOPVIEW Version 1.1 and the DisplayWrite series. Compatible, in this instance, means that once the LAN has been started, the PCLANP code does not interfere with the execution of these other programs.

The PCLANP provides file, print and message functions for LAN attached PC's. The LAN users can share application programs, data files, disks and directories across the network.

There are several methods available to the LAN user for accessing the capabilities of the PCLANP. The first is a set of menus available which guide the user through the tasks of:

- Installing and configuring a LAN attached PC.
- Establishing a file/disk/directory sharing environment.
- Sending, receiving and forwarding messages to/from/for other LAN users, and.
- Sharing, using and managing LAN printers.

The second method available to the LAN user for accessing these same capabilities is via a set of network commands, invoked at the DOS prompt (generally C>), and the third is to issue the network commands from within some .BAT (PC batch) file. Both the menus and the networks commands will be briefly described in this chapter.

5.1 LAN ATTACHED PC CONFIGURATIONS

The PCLANP supports four basic PC configurations, listed in order of functionality, lowest to highest:

1. Redirector
2. Receiver
3. Messenger
4. Server

The Redirector can send messages and use shared network disks, directories and printers. Note that the Redirector CANNOT receive any messages. This configuration, because of its low functionality level, requires the least amount of memory.

The Receiver can perform all the tasks that the Redirector can, plus it can receive and log (save) messages.

The Messenger has all the functionality of the Receiver, plus it can use the network request keys, receive messages for other N/S's and transfer its messages to other N/S's.

The server, having the highest level of functionality requires the most memory. It has all the capabilities of the Messenger plus the added ability to share its disks, directories and printers.

Figure 5 illustrates approximately how much memory is used by each of the four configurations described above.

PCLANP Configuration	Memory* Required	Available Tasks
Redirector	140K	Use shared network devices Send messages
Receiver	158K	Redirector's tasks plus; Log messages to file or printer Receive messages
Messenger	249K	Receiver's tasks plus; Receive messages on behalf of another PC Allow another PC (Messenger or Server) to receive own messages Use the Network Request Key (Ctrl-Alt-Break)
Server	296K	Messenger's tasks plus; Share own devices (disks and printers) with other PC's

Figure 5. PCLANP - Device Configurations on the Network * Figures are approximate and should be used as a guide only

Note that, as Figure 5 shows, if a PC is configured as a server, only 344K (approximately) is left for other applications. This requires careful planning for other applications that support primary and secondary partitions, like the PC3270EM programs, which run in their own primary partitions, but can support other programs, like DisplayWrite 3 or 4, running in their secondary partitions.

The amount of memory used (to establish the memory requirements in the figure above) includes only DOS 3.2, TOKREUI, NETBEUI and the PCLANP.

5.2 STARTING THE NETWORK

The normal sequence of events in starting the network is:

- For a TRN
 1. IPL (from a cold start, NOT CTRL-ALT-DEL)

2. Establish a PATH to all relevant subdirectories
 3. Load TOKREUI
 4. Load NETBEUI (with positional parameter if required)
 5. Start the PC LAN Program (explained below)
 6. Start other applications
- For a PCN
 1. IPL (from a cold start, NOT CTRL-ALT-DEL)
 2. Establish a PATH to all relevant subdirectories
 3. Start the PC LAN Program (explained below)
 4. Start other applications

Notice that the PCLANP is always started before any other applications. This is because the PCLANP will not start if another application has already initialized the LAN adapter. Therefore you MUST start the PC LAN program before any other program that might start the adapter.

As mentioned earlier, there are several different methods of starting the network. You can invoke the network commands from any kind of .BAT file, for example an AUTOEXEC.BAT, from the DOS prompt manually, or you can use the Network Menus.

5.2.1 NETWORK MENUS

If you are going to use the network menus, you must have already loaded:

1. DOS,
2. TOKREUI and
3. NETBEUI

either via an AUTOEXEC.BAT file, or manually from the DOS prompt. Once this has been done you can actually start the network.

When you type 'NET' at the DOS prompt, you're presented with the first Net Start menu shown in Figure 6 on page 32. This menu prompts you for the network name of your workstation which can be up to 15 characters long and MUST be unique in the network (this is where naming conventions come into play).

After you have named your network station, you are guided through a series of menus, beginning with Figure 7 on page 32, designed to determine precisely what type of configuration you want (or require). The questions start at Server level, the highest function level, and continue down to the Redirector level, the lowest function level.

```
Starting the Network                                PC LAN PROGRAM
Please type in a network name for your computer
_____

Enter - Continue                                F1 - Help
Esc - Exit
```

Figure 6. PCLANP - 'Starting the Network' main menu

Once you have made your selections, you are shown a list of the functions you will be able to perform, shown in Figure 8 on page 33. If you wish to change the session configuration, you can do so by simply answering the prompt with an 'N' for No to the question 'Do you want to do these tasks?'. You will be returned to the menu shown in Figure 6 and given the chance to change your selections.

5.2.2 FASTPATH

Although the menu approach is easy to use, if you go through the same process every day to set up your N/S, you might prefer to issue network commands rather than work through the menus. These command can be included in a .BAT file of some sort (AUTOEXEC.BAT, for example) or can be issued directly from the DOS prompt.

```
Starting the Network (Continued)                    PC LAN PROGRAM
Please type in a network name for your computer
_____

To start the Network you have to choose how you want to use
the network. Type Y (Yes) or N (No) for the following and
press Enter:

Y Share your printer? Disks? Directories?

Enter - Continue                                F1 - Help
Esc - Exit                                      Tab - Cursor to next field
```

Figure 7. PCLANP - 'Starting the Network' menu 2

```

PC LAN PROGRAM
Starting the Network (Continued)

You will be able to do the following:

. Send messages to other computers
. Use Network disks, directories, and printers
. Receive messages from other computers
. Allow saving of messages in a save file
. Use the network request key to interrupt your work and use
  the network program
. Receive messages for other names
. Transfer messages to other computers
. Share your disks, directories and printers

Y Do you want to do these tasks?

Enter - Continue          F1 - Help
Esc - Exit                Tab - Cursor to next field

```

Figure 8. PCLANP - 'Starting the Network' menu 3

For example, the AUTOEXEC.BAT file shown in Figure 9 on page 33 will load the appropriate programs and start the users N/S in a server configuration.

```

REM
REM EXAMPLE AUTOEXEC.BAT FILE TO START
REM A LAN ATTACHED PC IN A SERVER CONFIGURATION
REM
REM FIRST SET UP A PATH TO ALL THE RELEVANT DISKS
REM AND DIRECTORIES
REM
PATH <path.....>
REM
REM NEXT LOAD TOKREUI AND NETBEUI. THEY MUST BE
REM IN ONE OF THE SUBDIRECTORIES IDENTIFIED IN THE
REM PATH COMMAND.
REM
TOKREUI
NETBEUI
REM
REM NEXT START THE N/S AS A SERVER. THE PCLANP MUST
REM BE IN ONE OF THE SUBDIRECTORIES IDENTIFIED IN THE
REM PATH COMMAND.
REM
NET START SRV JENNI /NBC:5 /NBS:8K
REM
REM AND THAT'S ALL THERE IS TO IT

```

Figure 9. PCLANP - AUTOEXEC.BAT - starting a server

This AUTOEXEC.BAT will start a network session for N/S named JENNI which is configured at the server level of function. Note that the server is not yet sharing any disks/directories/printers, however.

5.3 SHARING NETWORK DEVICES

5.3.1 SHARING DISKS/DIRECTORIES - NETWORK MENUS

In order for the server PC to actually share devices with other LAN users, you can, as before, use the 'NET' menu approach, or you can issue network commands. If you decide to use the Network Menus, you will be guided through a series of panels within which you specify to the PCLANP what to share, with whom, and at what security access level. We first look at how to use the Network menus, and then at how to use the 'NET SHARE' command.

Figure 10 on page 35 shows the Network menu used to share disks and/or directories. Only PC's defined as servers can share their resources and only servers have access to this menu.

Following along with the example started above, the N/S JENNI is configured as a SERVER. JENNI is going to share a subdirectory named 'TEXT'. In the menu shown in Figure 10 on page 35, the "DOS name for disk or directory" is the path and directory name that the person using the W/S JENNI would normally use to access the shared device. In this example the 'TEXT' subdirectory is itself a subdirectory of the APPS subdirectory. The "Network name for your disk or directory" can be up to 8 characters long. It is the name that other N/s users who will actually access the shared subdirectory will use. In this example we have given the shared subdirectory a network name of 'DOCS'. Should password security be required a password of up to 8 characters in length can be keyed in. A word of warning though, the password, when keyed, is displayed on the screen. And finally, the menu allows you to choose what level of access you are going to assign to the network name. By identifying the subdirectory 'TEXT' with different unique network names, each network name being associated with a different level of access, different LAN users can be granted only that level of access appropriate to their job or responsibility.

5.3.2 SHARING DISKS/DIRECTORIES - FASTPATH

It is also possible to use a DOS command rather than the network menus to share a directory. Here, to use the previous example, the user of the N/S JENNI would key:

```
NET SHARE DOCS=C:\APPS\TEXT SECRET /WC
```

Note that a password of 'SECRET' has been specified. When a password is specified, the PCLANP will require that any other LAN attached W/S needing access to the DOCS network device know that password and provide it to the PCLANP at the appropriate time.

You can also issue the commands from within an AUTOEXEC.BAT file, immediately following the 'NET START' command, shown in Figure 11 on page 36.

Note that if the 'NET SHARE' command is to be placed in an AUTOEXEC.BAT file, it may be preferable not to key in the password as this presents a potential security exposure. Instead, the command can be keyed in as illustrated in Figure 11 on page 36, with an asterisk in place of the password. When the N/S JENNI reaches the point in the .BAT file when it is about to execute the

'NET SHARE' commands, execution of the .BAT file will be suspended and the user of the N/S JENNI will be asked to key in the passwords. Once the passwords are given, the N/S continues with its execution of the .BAT file.

Also note that the subdirectory 'TEXT' was shared twice; once as DOCS1 and once as DOCS2. They are shared with different access levels, providing an additional measure of security. Users of other LAN attached W/S's who use the Network name DOCS1, along with its password, have RW access to the subdirectory meaning they cannot create new files in the subdirectory, nor can they delete existing files from the subdirectory. Users of other W/S's that use the Network name DOCS2 have RWC access to the subdirectory, meaning they can create new files and delete or modify existing files.

Once the network has been started, either via the 'Starting the Network' menus, or from a .BAT file, the user can issue additional network commands either from the DOS prompt or from additional network menus.

5.3.3 SHARING SINGLE FILES

To share an individual file it must reside in a subdirectory by itself as the smallest entity that can be shared is an entire subdirectory. When a subdirectory <sub1> is shared with other LAN attached N/S's, each N/S that has access to <sub1> also has access to all subdirectories subordinate to <sub1>.

```

PC LAN PROGRAM
Start Sharing Your Disk or Directory

DOS name for disk or directory
C:\APPS\TEXT

Network name for your disk or directory
DOCS

Password for disk or directory (Optional)
SECRET

Other users can

1 Read only           4 Write/Create/Delete
2 Read/Write         5 Read/Write/Create/Delete
3 Write only

5 Choice

Tab - Cursor to next field
Enter - Continue      F1 - Help
Esc - Previous Menu   Ctrl-Home - Return to Main Menu
```

Figure 10. PCLANP - 'Start Sharing Your Disk or Directory' menu

5.3.4 SHARING DISKETTE DRIVES

Sharing diskette drives is probably not such a good idea as it can cause problems:

- Diskettes may be write-protected
- Diskette drive doors may be left open
- Diskettes can be inadvertently changed

5.3.5 PAUSING WHILE SHARING RESOURCES

You may temporarily stop, and then restart, using/sharing all of your network devices (disks, directories and printers) if need be. For example, if you have a physical drive B: on your computer, but are using a shared network disk on some other LAN server as your logical drive B:, you must 'pause' in using the shared network disk drive B: to be able to use your own physical drive B: again.

5.4 CHANGING PARAMETERS

If you change a command parameter in your AUTOEXEC.BAT file, you MUST power off/on the PC to re-execute the AUTOEXEC.BAT file. Using CTRL-ALT-DEL to perform a 'warm-IPL' will not reset the switches and registers on the Adapter card.

```

:
:
REM
TOKREUI
NETBEUI
REM
REM NEXT START THE N/S AS A SERVER. THE PCLANP MUST
REM BE IN ONE OF THE SUBDIRECTORIES IDENTIFIED IN THE
REM PATH COMMAND.
REM
NET START SRV JENNI /NBC:5 /NBS:8K
REM
REM NOW START SHARING NETWORK DEVICES
REM ONLY A SUBDIRECTORY
REM
NET SHARE DOCS1=C:\APPS\TEXT * /RW
NET SHARE DOCS2=C:\APPS\TEXT * /RWC
REM
REM AND THAT'S ALL THERE IS TO IT
```

Figure 11. PCLANP - AUTOEXEC.BAT - server sharing subdirectories

5.5 CHANGING BUFFER SIZE

The number (NBC) and size (NBS) of network buffers used in the NET START command, shown in JENNI's AUTOEXEC.BAT file example above, can be altered to reduce or increase the amount of memory used by the PCLANP. Speed may be increased by increasing the value of either of these parameters, but this will take up more memory, thereby reducing the ability of the PC to run other applications.

5.6 SAVING THE NETWORK CONFIGURATION

Option 7 of the main 'Starting the Network' menu of the PCLANP should only be used after you have become familiar with the changes it makes to your N/S. This option will create a new AUTOEXEC.BAT file, replacing your current one. If you wish to standardize access for users, you may wish to invoke this option for each PC. If you select option 7 by mistake, however, press the 'ESC' key to exit the menu. This allows you to escape from that option and your original AUTOEXEC.BAT file will remain unchanged.

5.7 ERRORS WHEN STARTING THE NETWORK

When you start any configuration of the PCLANP, the program obtains the minimum amount of NETBIOS resources (memory) required for setting up its own N/S. If another application is subsequently loaded, for example PC3270EM, which requires additional NETBIOS resources, but these were not made available to NETBIOS when the N/S was started, you might get one of the following messages:

89 (or 96) Unable to load, not enough NCB's
94 Too many sessions on PC Network

When this occurs you must either not use that particular application, or restart the N/S with additional resources specified on the NET START command.

5.7.1 CRITICAL ERRORS ON THE SERVER

If the server, while performing some network task, stumbles on some sort of critical error and cannot continue, DOS (which is not active in the foreground until the server function has completed) will wait indefinitely for the server to complete or respond. Thus, users at the remote computers will not be able to access any disks/directories/files that the server is sharing, or submit any files to print at the servers shared printer, until the error has been corrected. Therefore it is important that errors at the server be corrected immediately.

It is also important to realize that if the only correction possible is a re-IPL, then all users accessing that servers shared devices will lose that access. At first glance this may not seem important, in that access has already been interrupted; but if the server also happened to be acting as a gateway PC for other N/S's using PC3270EM, re-IPLing the server will immediately drop all

communications with the Host, dropping all of the other LAN users Host sessions in the process.

6.0 HOST CONNECTION

When attaching your LAN to a S/370 Host system, there are several planning aspects to consider. The LAN Administrator must determine:

- Which LAN users require Host access
- Which Host office applications are required:
 - PROFS
 - DISOSS
- That the appropriate Host definitions have been updated to include the LAN users.

This chapter begins with an overview of the connection requirements, and Host connectivity, for LAN users. We go on to describe the three PC 3270 Emulation programs available to LAN users:

- PC 3270 Emulation Program Entry Level (59X9904)
- PC 3270 Emulation Program Version 2 (59X9951)
- PC 3270 Emulation Program Version 3 (59X9969)

A description is then given of how to customize the PC 3270 Emulation Programs for use by GW PC's, N/S PC's and GN/S PC's. Finally we move to the Host system to examine the tailoring required for successful communication.

6.1 OVERVIEW OF CONNECTION REQUIREMENTS

DIA communication on a LAN is currently available only using the IBM 3270 Emulation programs. With a properly configured PC, the user can log on to either a VM or MVS Host system from a N/S which emulates a 3278/9 Model 2 type terminal. This provides the user with direct access to the following Host based Office Systems Products:

- PROFS
- PS/370
- DW/370, both VM/CMS and MVS versions

and indirect access to the PROFS and DISOSS via PROFS/PC Support and Personal Services/PC (or PS/370), respectively.

Access to PROFS provides the user with all of the standard PROFS functions, services and distribution capabilities.

Access to PS/370 provides the user with all of the standard PS/370 functions, access to the DISOSS HDL, and the capability to distribute DIA/DCA documents, letters, etc., through the Host SNA network.

Use of DW/370 provides the user with the capability of creating and revising RFT, FFT, and other types of documents, suitable for PROFS or PS/370-DISOSS.

Since PROFS Vers. 2.1 provides a 'bridge' to DISOSS, Office System users have extended capabilities to exchange documents, letters, etc. The user can:

- Use PROFS to distribute to PS/370-DISOSS users, through the SNA Network, or
- Use PS/370 and DISOSS to distribute to PROFS users using the PROFS-DISOSS bridge.

The documents and letters can be created, reviewed and revised using DW/370 which can be accessed from 3 different Host operating environments:

- From the PS/370 environment,
- From the CMS environment, or
- From the PROFS environment (invoked from the PROFS Command Line).

The document can also be created by DW3 locally, at the PC, and uploaded to the Host using either the SNA 3270 Emulation file transfer facilities, PROFS/PC Support, or Personal Services/PC

The LAN user may choose between three operating environments:

- Host, emulating a 3278/9 terminal,
- PC, using PROFS/PC Support, PS/PC or SNA 3270 file transfer to exchange documents with other systems, or
- A combination of Host and PC environments.

6.2 PC 3270 EMULATION PROGRAM ENTRY LEVEL

The IBM PC 3270 Emulation Program Entry Level provides the PC with the ability to emulate and IBM 3278 Model 2 or 3279 Model 2A or S2A displays via a:

- IBM 3274 Control Unit,
- IBM 3276,
- IBM 4321, 4331, 4361 Processors, or a
- IBM 4701 Finance Controller

when used with the 3278/79 Adapter. Entry level supports 2 sessions, a 3278/79 session and a PC DOS session and supports the base data stream. The Entry Level program is a direct replacement for, and enhancement of, the IBM 3278/79 Emulation Program Version 2.0 and is compatible with both the PCN and the TRN.

The Entry Level program has dual session capability (LAN/DOS and Host), and provides file transfer facilities between the PC and the Host sessions. It also

REQUIRES the use of a 3278/79 Emulation adapter, meaning that it cannot be used through a GW, or as a GW, as can Versions 2.0 and 3.0, discussed below. Every PC that uses the Entry Level program MUST have a 3278/79 Emulation adapter installed and attached to one of the control units or CPUs listed above.

In that the PC3270 Emulation Entry Level program cannot be used either as a GW PC for other N/S's, or through some other N/S gateway PC, it will not be discussed in "Tailoring PC 3270 Emulation for Host Connection" on page 45.

6.3 PC 3270 EMULATION PROGRAM V2.0

PC 3270 Emulation Version 2.0 extends the capabilities of the Entry Level program by providing support for:

- Remote SDLC communications,
- The definition of a GW PC which controls the physical communications media,
- 3287 printer emulation,
- Compatibility with a LAN attached PC defined at the server level of function with PCLANP, and
- Support of TOPVIEW 1.1.

PC 3270 Emulation Version 2.0 is a replacement for, and enhancement of, the IBM PC Network SNA 3270 Emulation Program.

LAN attached PC's wishing to access Host applications can do so via the GW PC which must have either an SDLC or 3278/79 adapter installed and connected appropriately, and must have the PC 3270 Emulation program loaded. Every PC on the LAN that requires Host session capabilities, other than the GW PC need only have the PC 3270 Emulation program loaded. This configuration, where a single LAN attached PC provides physical communication media control for an entire network makes much more effective use of Host resources.

Version 2.0 provides the PC user with 2 'real' partitions, and a 'virtual' partition. The two 'real' partitions are the PC DOS (and LAN) session and the Host (emulation) session. The third, or 'virtual' session is provided by pressing the 3270 Request Tasks key (F10) when in 3270 emulation mode.

S/370 Host connectivity may be achieved in various ways. For example:

- If the GW on a TRN uses remote SDLC communications, it is attached to an IBM 3725. The GW emulates a 3274 and optionally a 3270 type display and a 3287 printer. Attached to the GW via the LAN, the other PC's are configured as display and printer only. This allows greater flexibility in the use of the IBM 3725 and IBM S/370. In this configuration the GW PC supports up to 32 3270 printer/display sessions.
- If the GW PC uses 3278/79 (DFT) communications, the connection is to an IBM 3274 Control Unit. In this configuration the GW PC supports up to five 3270 printer/display sessions.

Access to IBM S/370 Host Office System functions is provided via:

- PS/PC to DISOSS/370

- PROFS/PC Support to PROFS

File Transfer is provided via:

- MVS/TSO, VM/CMS, CICS/VS
- PC DOS command line and batch file support for Send and Receive
- Menu interface for file transfer in emulation session

PC 3270 Emulation Version 2.0 is compatible with the server level of function on the LAN when used with PROFS/PC-PROFS, and with the Redirector level of function when used on the LAN with PS/PC-DISSOSS.

How you configure Version 2.0 determines the amount of memory it will require to execute. The following parameters affect the memory size of PC 3270 Emulation Version 2.0:

- Configuration Type (Standalone, Network Station, GW or GN/S),
- Communications Type (SDLC, DFT or Token-Ring),
- 3270 Printer Use (Screen Print, Host, Screen Print and Host or None),
- File transfer (Yes or No),
- Application Programming Interface (Presentation Space, Response Interface, both or none), and
- Alternate tasks (Yes or No).

PROFS/PC Support uses the Send and Receive file transfer facility of the PC 3270 Emulation program. PS/PC uses the File Transfer and Presentation Space Application Programming Interface features of the PC 3270 Emulation program.

6.3.1 PRESENTATION SPACE APPLICATION PROGRAMMING INTERFACE (PSCAPI)

PSCAPI is a program packaged along with PC 3270 Emulation. It provides a subset of the 3270 PC functions to the application Programmer. PS/PC uses the PSCAPI for document distribution between DISSOSS and the IBM PC 3270 Emulation program.

6.3.2 CONFIGURATIONS

Version 2.0 supports four PC environments, namely:

- Standalone Station - A PC with a Host connection but no LAN attachment; in this configuration the PC can emulate one 3278/3279 display with an attached 3287 printer.
- Gateway (GW) - A PC attached to a Host and to a LAN, providing Host connection services to one or more of the other LAN Work Stations (W/S).

- Network Station (N/S) - A PC connected to a LAN, emulating a 3278/3279 display and an attached 3287 printer. This PC uses a Gateway for Host connection.
- Gateway with Network Station (GN/S) - As in the previous item, this configuration allows a PC to not only emulate a 3278/3279 display and attached 3287 printer, but also to provide Host connection services.

Each LAN W/S that runs PC3270EM (except GW) supports one Host display session and may be configured to support a Host printer session. You may use the Hot Key (Alt-Esc) to switch between the Host session and the DOS/LAN session.

6.3.3 GATEWAY CONFIGURATION TESTED

In our tests, a PC AT was used as the gateway PC, configured as a GN/S. It used an SDLC card and modem to gain access to the Host system, via the 3274 Control Unit emulation capabilities of the emulation program. It was configured (on the TRN) as a server and shared its disks and its printer.

The program sizes shown in Figure 12 are only approximations and are included solely to provide the user with the proper perspective. The figures were obtained with the following software loaded into the PC:

- DOS 3.2
- TOKREUI 0.2
- NETBEUI 0.2
- PC Local Area Network Program 1.1
- PC 3270 Emulation Version 3.0

PROGRAM	SIZE
DOS	46K
TOKREUI	13K
NETBEUI	46K
SERVER	191K
PSCAPI	10K
PSCAPG	253K
TOTAL	558K

— PCLANP - Server
 — PC3270EM - API
 — PC3270EM - GW

Figure 12. PC3270EM - Installed Gateway Configuration

The PC3270EM program Communication Profile was tailored as follows:

- Configuration GW with Network Station
- Communication Attachment SDLC

- Alternate Tasks Yes
- File Transfer Yes
- 3270 Printer Use No
- API Presentation Space

6.3.4 RESTRICTIONS

The configuration described in Figure 12 on page 43, when loaded, did not leave enough available RAM for the following programs to load and/or execute:

- Displaywrite Assistant
- Displaywrite 3 Version 1.1
- Displaywrite 4
- PROFS/PC Support
- PS/PC

The TOPVIEW program could not be loaded as it is only supported in a LAN Redirector configuration.

6.4 PC 3270 EMULATION PROGRAM V3.0

PC3270 Emulation Version 3.0 extends the capabilities of Version 2.0 by providing support for the Cooperative Processing Service Request Interface (SRI) for IBM PC communications.

It also supports, besides to the DFT and SDLC attachment capabilities, an attachment feature called 'Token-Ring Network'. Choosing this feature allows the GW PC to support the other LAN attached N/S's through a 3725 attached directly to the TRN. In this situation the GW PC need not have an SDLC or 3278/79 adapter as the GW uses the TRN itself to pass information to, and receive information from, the 3725.

It is most important that if the 3725 is attached directly to the TRN, and a GW is to provide access to the 3725 for the other LAN attached N/S's, that the software loading sequence for the GW be as follows:

1. IPL - and DOS 3.2 loads
2. TOKREUI - Adapter Support Interface
3. NETBEUI ,1,1 - NETBIOS with positional parameters
4. PSCPG - PC 3270 Emulation Vers. 3

Note that the NETBEUI has some positional parameters associated with it. The NETBEUI command should be entered exactly as shown above. These parame-

ters are not required, and must be omitted, when the PC is configured either as a N/S, or as a Standalone PC.

6.5 ASYNCHRONOUS COMMUNICATIONS SERVER PROGRAM

The IBM Asynchronous Communications Server Program provides the capability for IBM PC's on either the TRN or PCN to access ASCII applications via switched communication lines using the ROLM CBX II, a PBX, or the switched public network. Each asynchronous server can control two point-to-point lines for other LAN attached W/S's. The Asynchronous Communications Server Program operates in much the same way as the PC 3270 Emulation programs in that the server only controls the Physical line. Each LAN attached PC wishing to use one of the lines must be running its own asynchronous application, for example IBM 3101 Emulation.

6.6 TAILORING PC 3270 EMULATION FOR HOST CONNECTION

Each Standalone PC, GW PC, Network Station or GW and Network Station needs to be customized before it can be used for the first time.

Although this section describes the tailoring of PC 3270 Emulation Version 3.0, it applies (usually) to PC 3270 Emulation Version 2.0 as well.

The changes the user makes in customizing the software is saved in PSCA0101.PG1 and is automatically used on later loads of the 3270 code. If values are changed that affect memory, the operator will be prompted to return to DOS and reload PSCPG to allocate the correct amount of memory.

As discussed before, not all changes affect memory allocation. The '3270 Task Selection' is the first menu displayed after the copyright notice, shown in Figure 13 on page 46. The main menu allows the user to either change the program options or start a 3270 communication session.

6.6.1 COMMUNICATION PROFILE TASKS

Figure 14 on page 47 shows the menu displayed when the operator chooses option 'b' from the 3270 Task Selection Menu. You ought to select the configuration first, and according to the choice made, some of the other menu options (f, g or h), will, or will not, be made available to you. If you are unsure which configuration to select, refer to your Checklist sheet, shown in Figure 10 on page 35 which will explain the choices available.

Option 'b', choice 3 is displayed only when configuring Version 3. PC 3270 Emulation Version 2 does not have that option.

If available, options 'f' through 'h' take you to other panels. If you have selected a Network Station configuration, you will only need to select option 'f' to complete your customizing. If you are configuring a GW you will need to select options 'g' and 'h'. If you are configuring a GN/S you will need to select options 'f', 'g' and 'h'.

```
3270 TASK SELECTION

ID  ITEM
a   Communicate
b   Communication Profile Tasks
z   Exit

Type ID letter to choose ITEM; press ENTER:
```

Figure 13. PC 3270 Emulation Vers. 3 - 'Task Selection' menu

6.6.2 COMMUNICATION SETUP MENU

When you select option 'f' from the Communication Profile Tasks Menu, the Communication Setup Menu is displayed. This menu, shown in Figure 15 on page 47, is used for all configurations, (Option 'a' on the Communications Profile Tasks Menu), except the GW without a Network Station (choice 3).

Option 'a' allows you to specify whether PC 3270 should stop you from entering alphabetic data in numeric fields.

Option 'b' defines the Host print options for this station's printer when operating in 3287 emulation mode. The options are:

- 1 - Screen Print using the PRINT key
- 2 - Host print provides support for Host applications to connect to the printer as though it were a 3287
- 3 - Both 1 and 2
- 4 - No Host support for the printer will be provided, i.e., only a display session is required.

If you select File Transfer, PC 3270 will prompt you for a module name. The default is IND\$FILE. This is the name of the Host program that handles File Transfer at the Host end. There are two instances when you may have to change this default:

- If you use a CICS Host, you can only use a four-character transaction name, commonly DSV1.

Chg Profile		Ext 101	
COMMUNICATION PROFILE TASKS			
ID	ITEM	YOUR CHOICE	POSSIBLE CHOICES
a	Configuration	2	1 = Standalone 2 = Network Station 3 = Gateway 4 = Gateway with Network Station
b	Communication Attachment	1	1 = SDLC 2 = DFT 3 = IBM Token-Ring Network
c	Alternate Tasks	1	1 = Yes 2 = No
d	3270 Keyboard	101	1 - 999
e	3270 Keyboard Remap	2	1 = Yes 2 = No
f	Create or Revise Communication Setup		
g	Create or Revise Modem and Line Description		
h	Create or Revise Gateway Setup		
z	Return to Task Selection		

Type ID letter to choose ITEM; press ENTER:

Figure 14. PC 3270 Emulation Vers. 3 - 'Communication Profile Tasks' menu

Chg Profile		Ext 101	
COMMUNICATION SETUP			
ID	ITEM	YOUR CHOICE	POSSIBLE CHOICES
a	3270 Numeric Lock	1	1 = Yes 2 = No
b	3270 Printer Use	3	1 = Screen Print 2 = Host 3 = Screen Print and Host 4 = None
c	File Transfer	1	1 = Yes 2 = No
d	Application Programming Interface (API)	1	1 = Presentation Space 2 = Service Request/Response Interface 3 = Both 4 = None
e	Station Name	VJENNI	Up to 15 characters

When finished with this menu, press ENTER.

Type ID letter to choose ITEM; press ENTER:

Figure 15. PC 3270 Emulation Vers. 3 - 'Communication Setup' menu

- With many National Languages, the dollar sign, (\$) is not a valid character. You have to change the name manually so that it is the same as the name of the File Transfer Host program.

Option 'd' determines the type of Application Programming Interface which will be used. If you will be using PC 3270 Emulation with PROFS/PC Support or Personal Services/PC, you will need to select Presentation Space (choice 1).

The 'e' option identifies the unique name of the network station. Only uppercase characters are valid. If lowercase is entered they will be translated to upper-case characters. Option 'e' does not appear if on the Communication Profile Tasks menu (Figure 14 on page 47) the choice made for option 'a' (Configuration) was 1 (Standalone).

6.6.3 3270 PRINTER SETUP MENU

The menu shown in Figure 16 on page 49 only appears if you have specified choices 1, 2, or 3 for option 'b' (3270 Printer Use) in the Communication Setup menu (Figure 15 on page 47).

This panel allows you to specify various printer parameters. Option 'a' is used to show whether you want print output to be sent to the printer or to a data set (deferred printing). If 'a' is set to 2 = Disk, options 'b' through 'f' are not applicable. You may change the destination (Printer or Disk) and the data set name dynamically in the 3270 Printer Requests panel, but those changes will be forgotten when you terminate PC 3270.

6.6.4 MODEM AND LINE DESCRIPTION MENU

Option 'g' (Create or Revise Modem and Line Description) on the Communication Profile Tasks Menu, is available when the Standalone, GW, or GN/S configurations are chosen in Figure 14 on page 47. It allows the user to describe the SDLC modem and line descriptions.

This menu is not available (and is not used) when DFT attachment or N/S has been selected. The parameters in this panel depend entirely on the definitions in your Host communications products and the modem that services your communications line. Consult your Host communications personnel to find the appropriate values.

Physical Unit ID, option 'a', specifies the control unit id (in Hexadecimal) to identify the control unit to which the PC is attached. If option 'b' (Network Facility) shows a switched line, the Physical Unit ID must match the PU IDNUM parameter in the NCP. On both leased and switched lines, the Physical Unit ID can be used to identify the control unit. In our example, 62205 informs the NPDA operator that the Physical Unit is in Department 62, Room 205.

Chg Profile		3270 PRINTER SETUP	
ID	ITEM	YOUR CHOICE	POSSIBLE CHOICES
a	3270 Print Destination	1	1 = Printer 2 = Disk
b	Lines Per Inch	1	1 = 6 LPI 2 = 8 LPI
c	Line Spacing	1	1 = Single 2 = Double
d	Maximum Page Length	66	1-99
e	Maximum Print Position	80	1-158
f	Compress Line Spacing	2	1 = Yes 2 = No
g	Form Feed in Any Position	2	1 = Yes 2 = No
h	Override Formatted Print	2	1 = Yes 2 = No
i	Add Form Feed	3	1 = After Print Key 2 = After Print 3 = No
j	Printer Device Name	1	1 = LPT1(PRN) 2 = LPT2 3 = LPT3

When finished with this menu, press ENTER.

Type ID letter to choose ITEM; press ENTER:

Figure 16. PC 3270 Emulation Vers. 3 - '3270 Printer Setup' menu

6.6.5 GATEWAY SETUP MENU

Option 'h' (Create or Revise Gateway Setup) on the Communication Profile Tasks Menu must be selected when configuring a GW PC. This menu, shown in Figure 18 on page 50, is used to define the name of the GW station and to select the maximum number of Host sessions that the GW will support (including its own, if the GW PC is also to be used as a N/S). The user is asked to fill in the names of the Network Stations themselves in the next panel, reached by pressing ENTER.

6.6.6 LIST OF NETWORK STATIONS MENU

This menu, shown in Figure 19 on page 51, is reached from the 'Gateway Setup' menu, by pressing Enter. The 'List of Network Stations' menu is used to define the individual station names. If a particular station emulates both a display and a printer, you must enter its name twice (as VJENNI is). Options 'i' and 'j' define the display and printer sessions themselves, respectively.

Display and printer session numbers (03-09) in the Gateway's table of definitions must match those of the Host exactly, or a communications error will occur. The station names on the 'List of Network Stations' menu must also match the names specified on each PC on the LAN in the 'Communication Setup' menu (Figure 16) option 'e'. Note that the Network Station Names start with 02, as Network Station Name 01 is reserved for the GW PC itself.

Chg Profile		Ext 101		
MODEM AND LINE DESCRIPTION				
ID	ITEM	YOUR CHOICE	POSSIBLE CHOICES	
a	Physical Unit ID	62259		
b	Network Facility	2	1 = Switched 2 = Dedicated 3 = Switched Backup	
c	SDLC Station Address	E0		
d	Continuous Carrier	2	1 = Yes 2 = No	
e	Half Speed	1	1 = Yes 2 = No	
f	NRZI Encoding	1	1 = Yes 2 = No	
g	Answer-Tone Generation	2	1 = Yes 2 = No	
h	End With REQDISCONT	2	1 = Yes 2 = No	
i	Destination Address	00000000	0 - 79999999	

When finished with this menu, press ENTER.

Type ID letter to choose ITEM; press ENTER:

Figure 17. PC 3270 Emulation Vers. 3 - 'Modem and Line Description' menu

Chg Profile		Ext 101	
GATEWAY SETUP			
ID	ITEM	YOUR CHOICE	POSSIBLE CHOICES
a	Gateway Name	VGATEWAY	Up to 15 Characters
b	Maximum Number of Sessions	8	8, 16, 24, or 32

When finished with this menu, press ENTER.

Type ID letter to choose ITEM; press ENTER

Figure 18. PC 3270 Emulation Vers. 3 - 'Gateway Setup' menu

Chg Profile	VGATEWAY	Ext 101
LIST OF NETWORK STATIONS		
ID ITEM	YOUR CHOICE	POSSIBLE CHOICES
a Network Station Name 02	VGRACE	Up to 15 Characters
b Network Station Name 03	VGRACE	Up to 15 Characters
c Network Station Name 04	VJENNI	Up to 15 Characters
d Network Station Name 05	VJENNI	Up to 15 Characters
e Network Station Name 06	VMARK	Up to 15 Characters
f Network Station Name 07	VMARK	Up to 15 Characters
g Network Station Name 08		Up to 15 Characters
h Network Station Name 09		Up to 15 Characters
i Display Sessions 2 4 6		02-09 Separated by spaces
j Printer Sessions 3 5 7		
Press the PgDn key to see more. When finished, press ENTER.		
Type ID letter to choose ITEM; press ENTER:		

Figure 19. PC 3270 Emulation Vers. 3 - 'List of Network Stations' menu

6.6.7 CONFIGURATION PATHS

We have completed a brief description of tailoring PC3270EM for a simple LAN. Before proceeding on with tailoring the Host system, a review of the configuration paths is appropriate. Figure 20 on page 52 shows the paths available to each configuration.

6.7 TAILORING THE HOST SYSTEM

We have just completed a brief description of the tailoring required to configure PC3270EM to suit various LAN environments (GW, N/S, GN/S). However, the tailoring of the Host system is equally important a task, and in the users installation may well require the cooperation of Host systems personnel (particularly the Host Office Systems Administrator).

To successfully communicate with the Host, it is necessary that each LAN attached PC that requires Host access be properly defined to the Host system. There are three elements that must be defined before successful communication can occur. They are:

- Line definitions
- Physical unit definitions, if the Gateway PC is emulating a 3274-51C
- Logical unit definitions for all of PC's on the LAN which will be communicating with the Host

The LAN Administrator will need to contact the Host Administrator to ensure that these definitions are properly specified.

6.7.1 LINE DEFINITION

A communication line from the Host system will be assigned to the gateway. The gateway PC is attached to the Host through a modem if the communications method specified for option 'b' in Figure 14 on page 47 specified SDLC. It is necessary to tell the Host system such things as the speed of the line and type of modem used. Figure 21 on page 53 shows the definitions we used when testing Host communications.

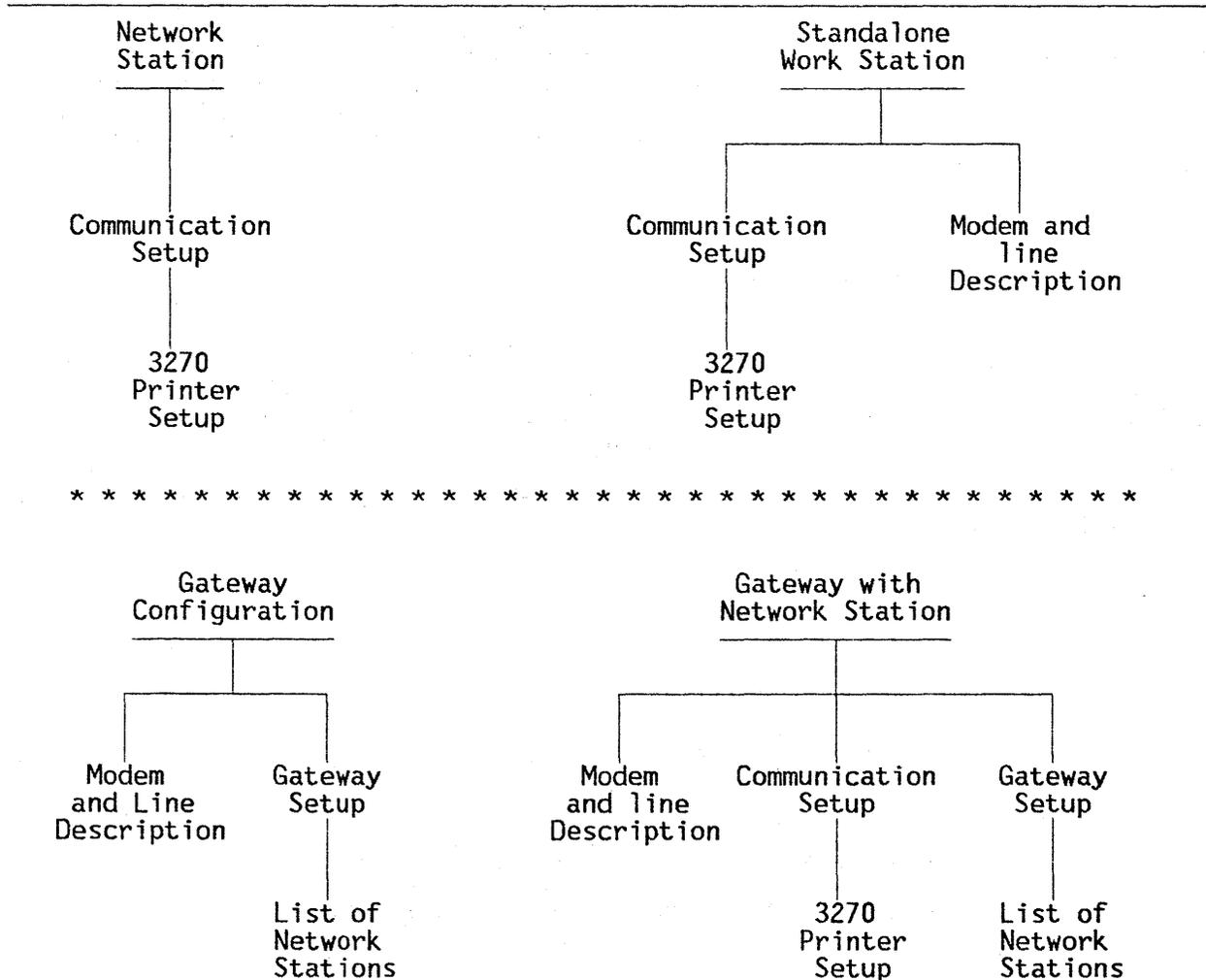


Figure 20. PC 3270 Emulation Vers. 3 - Communication profile paths

6.7.2 GATEWAY DEFINITION

Once the communication line to the GW PC has been defined, the GW and its attaching devices must be defined. The GW is given a unique Physical Unit (PU) address and is defined as shown in Figure 22 on page 54.

An LU definition must be created for each logical device attached to the Token-Ring that is to be recognized by the Host.

The local address (LOCADDR) for each PC is derived from the List of Network Stations menu information that was keyed into the PC. Therefore it is very important that what is keyed in the List of Network Stations menu (Figure 19 on page 51), about device types - printer or display, and LU address, is matched EXACTLY in these Host definitions.

6.7.3 CICS TCT DEFINITION

If users of your network wish to use a CICS application, for example, Personal Services/370 or DISOSS (via PS/PC), the LAN Administrator must ensure that there has been an entry made in the Terminal Control Table (TCT) for them, shown in Figure 23 on page 54. If this is not done, CICS will reject any sign-on attempt made by that user. Also note in the example TCT table the feature 'UCTRAN' is not specified. If this feature is enabled PS/PC will not function properly.

6.7.4 HOST ADDRESSING EXAMPLE

Figure 24 on page 55 shows the TRN configuration that provides a basis for this document, and provides a guide on how the LAN administrator might set up the network so that the definitions used throughout the LAN are unique and match the corresponding communication definitions in the Host.

```
L24024  LINE  ADDRESS=(022)*
          SPAN=SPH11L,
          OWNER=M11,
          SPEED=9600,**
          DUPLEX=(FULL),**
          LPDATS=YES,**
          NEWSYNC=(NO),**
          NRZI=YES,***
          RETRIES=(7,4,5)
          VNCA=('113.....',SMFR)
```

Where * Represents Line Address
** Modem & Line Characteristics. (These may vary according to the type of modem you use)
*** This must match the choice made in the Modem and Line Description menu - Figure 17 on page 50

Figure 21. PC3270EM - Example VTAM/NCP Line Definition

```

P24024Q PU ADDR=E0, (GW PC SDLC Station address)
          ANS=CONTINUE, (Don't break the x-domain
                        sessions)
          MAXDATA=265, (Maximum amount of data)
          MAXOUT=7, (Maximum SDLC frames before
                   response)
          PACING=0, (Pacing set by bind image)
          PASSLIM=8,
          PUTYPE=2,
          RETRIES=(,1,4), (4 retries, 1 second between)
          DISCNT=(NO), (VTAM)
          ISTATUS=ACTIVE, (VTAM)
          SSCPFM=USSSCS, (VTAM)
          MODETAB=M327X, (Modetable)
          USSTAB=US3276, (VTAM)
          VPACING=0 (VTAM)
          VNCA=('2.TRGWB622549.',NOACTY,SMFR)
***** 3274 Gateway for Token-Ring LU definitions *****
T24024Q1 LU LOCADDR=2,
           DLOGMOD=DSILGMOD,
           ISTATUS=ACTIVE
T24024Q2 LU LOCADDR=3
           DLOGMOD=3287MS,
           ISTATUS=ACTIVE
           :
           :

```

Figure 22. PC3270EM - Example VTAM/NCP PU/LU Specs for GW and LAN

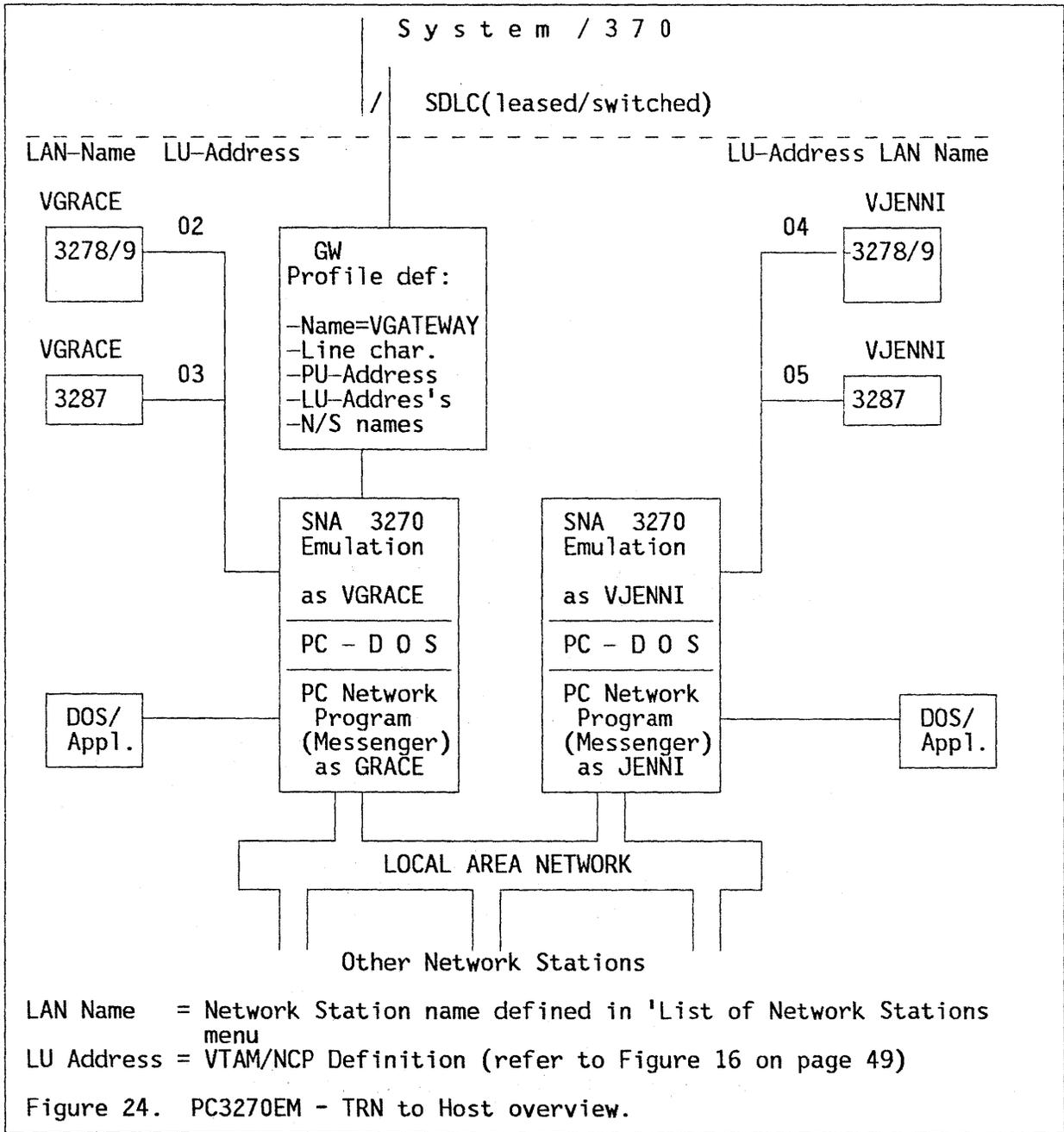
However, only those PC's using PC3270EM are shown here to provide an overview of the relationships between the N/S's and the Host where communications parameters must correspond.

```

* Terminal Definition for LU/NETNAME=P24024Q1 (3278/9 Mod2)
DFHTCT TYPE=TERMINAL, TRMIDNT=OS01,
TRMTYPE=LUTYPE2, TRMMODL=2
ACCMETH=VTAM, DEFSCRN=(24,80),
FEATURE=(DCKYBD),
GMMMSG=YES, NETNAME=T24024Q1
LOGMODE=DSILGMOD,
RUSIZE=256, BUFFER=1536
TIOAL=3600, RELREQ=(NO, YES)
CHNASSY=YES
TRMSTAT=TRANSCEIVE

```

Figure 23. PC3270EM - Example Terminal Control Table (TCT) Definition



As can be seen in the figure, the gateway provides the only physical link to the Host, and controls all of the Host-LAN communications for the LAN attached N/S's. The LAN Administrator would probably want to define the gateway with the help of Host System Administrator. The various setup definitions reflect:

- The LAN N/S name of the GW,
- The communication characteristics (modem type, address, protocol),
- One PU-address for each gateway, acquired from the Host Administrator,
- The N/S LU-address's, starting with 02, and

- The association between the N/S LU-address's and the LAN N/S names (if the gateway also includes a PC 3270 N/S itself, the gateway's LU-address for its 3270 display session must be 02, and the LAN N/S name must match the LAN GW name).

7.0 THE DISPLAYWRITE FAMILY

This chapter provides a brief overview of the PC based DisplayWrite family of text processors and a discussion of how these can be used and shared in a LAN environment.

The DisplayWrite family is composed of three program products:

- DisplayWrite Assistant (59X9958)
- DisplayWrite 3 Version 1.1 (6280845)
- DisplayWrite 4 (74X9904 - 5.25 inch diskettes)
(74X9913 - 3.5 inch diskettes)

Each of the DisplayWrite programs have what might be termed 'indeterminate' memory requirements. What this means is that DisplayWrite 3, for example, after being invoked but before loading, will check to see how much free memory is available and will load code on the basis of available memory. So, it is not possible to specify how much memory will be used by DisplayWrite in any particular instants. It is possible, however, to specify absolute minimum requirements, and maximum usage. Figure 25 lists these memory requirements.

	Minimum Memory Required	Maximum Memory Used
DisplayWrite Asst.	170K	220K
DisplayWrite 3	228K	335K
DisplayWrite 4	365K	*

* in certain environments DW 4 will use as much of the 640K byte memory space as is available

Figure 25. DW - DisplayWrite family memory requirements

While DisplayWrite Assistant is officially a member of the Assistant Series, DisplayWrite 3 Ver. 1.1 and DisplayWrite 4 are members of the DisplayWrite family.

DisplayWrite Assistant provides IBM Writing Assistant like functions and additional selected DisplayWrite functions. DisplayWrite Assistant provides the user with basic text processing capabilities for creating and printing documents. The user interface is completely new and closely resembles the TOPVIEW program, with pop-up and pull-down windows and such. It contains a spelling verification/synonym search facility and an extensive Help facility. It provides a table-driven printer support capability so that the user can work with printers not directly supported by IBM.

DisplayWrite Assistant provides automatic conversion of RFT (Revisable Form Text) documents to DisplayWrite Assistant internal format when the user attempts to revise the RFT document. When the revision session is over,

DisplayWrite Assistant can automatically convert the internal form document back to RFT format. This really enhances the usability aspects of document interchange. Note, however, that since the functional level of DisplayWrite Assistant is somewhat less than the other DisplayWrite programs, the actual content of the documents interchanged may not be absolutely compatible.

DisplayWrite 3 Version 1.1 has been available for some time now, since October 1985. It is a menu-based, high-function text processor that can be used as a standalone program, or can be used with Host interface products such as PS/PC or PROFS/PC Support to provide document creation, editing and conversion support for those programs on the PC.

Like DisplayWrite Assistant, DisplayWrite 3 provides automatic conversion of RFT documents to and from DisplayWrite 3 internal format. DisplayWrite 3 also provides automatic conversion of FFT (Final Form Text) documents to and from DisplayWrite 3 internal format.

DisplayWrite 4 is a full-function text processing program. It has a new, streamlined user interface, with pop-up and pull-down menus and screens, an extensive context sensitive Help facility, voice/audio support, and enhanced document interchange capabilities. It includes mouse pointing device support, APA display support, and its printer support is fully table driven.

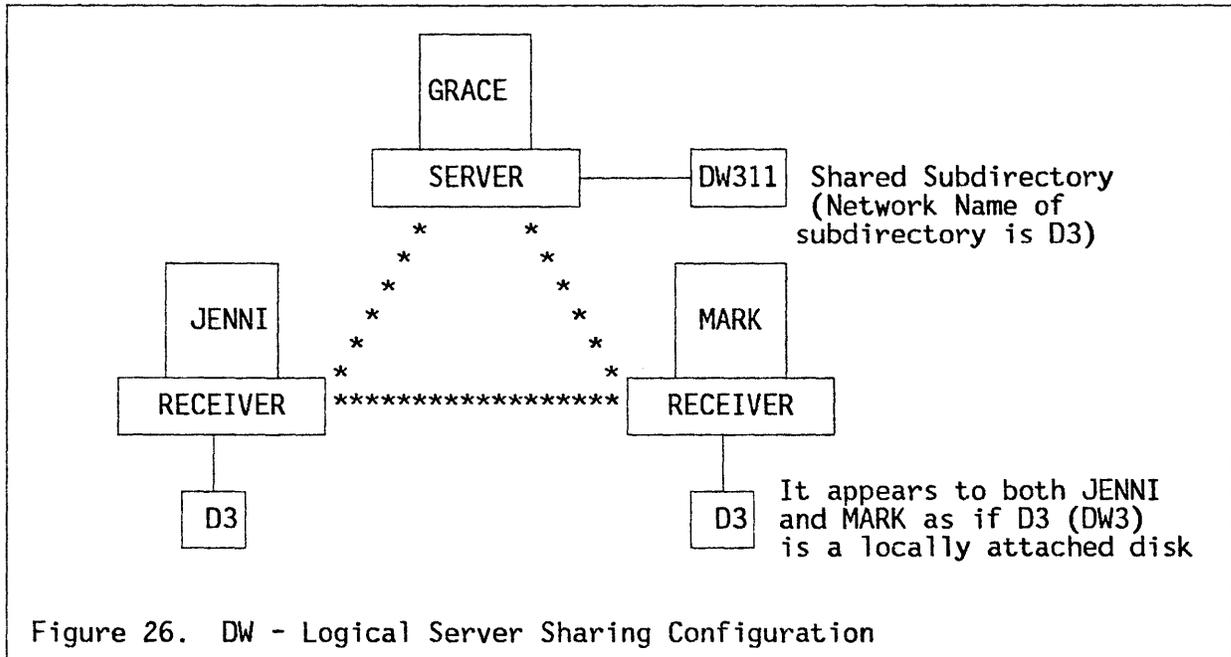
All of the DisplayWrite family program products are compatible with the IBM LAN's. When run on the Network, they offer the user a variety of options in operation. A N/S server may share its directory which contains the DisplayWrite programs with the other N/S's on the network. Standard form letters and shell documents can also be shared amongst the LAN users if those letters and documents are placed in a subdirectory accessible by all LAN users.

7.1 SHARING DISKS AND DIRECTORIES

If available disk space is a problem for some LAN users, the ability to place the DisplayWrite programs in a subdirectory on the server, to be shared by all LAN users, may provide one possible solution. Of course the appropriate security access levels must be used. As the shared subdirectory would contain executable code only, we suggest that 'read only' access be granted to the various LAN users to prevent any accidental corruption of the executable code. In this way, each LAN user is able to use the DisplayWrite programs as if they were on each users own hard disk, even though they physically reside on the server.

Also, the task of archiving documents can be made easier if the documents are all stored on a common shared disk at some server N/S. Only those users with the appropriate security access authorization would be able to delete documents and/or files from that shared subdirectory/disk, but all users should be able to create new files, and replace existing ones.

Figure 26 on page 59 shows how we organized (logically) our network. In this example, GRACE is the Server, and JENNI and MARK are Network Stations, neither of whom have any of the DisplayWrite programs on their local disks. GRACE shares the subdirectories, via the NET SHARE command, which contains the DisplayWrite programs using, appropriately enough, network names of DWA, DW3 and DW4. MARK and JENNI invoke the 'NET USE' command to gain access to the various subdirectories at the server. They can then invoke the DisplayWrite programs as though they were resident on their own PC's.



The set of 8 sequential figures, beginning with Figure 27 give examples of .BAT files which allow:

- The server (GRACE) to share subdirectories containing DisplayWrite Assistant, DisplayWrite 3 Ver. 1.1 and DisplayWrite 4,
- The user working at the server N/S to access the DisplayWrite programs and
- The users at other N/S's to use those shared subdirectories and start the various DisplayWrite programs.

Figure 27 shows a portion of the AUTOEXEC.BAT file that might be used by the server to start the network and set up the subdirectory sharing environment.

```

      :
      :
NET START SRV GRACE /SRV:1 /NBC:5 /NBS:21 /CMD:11
NET SHARE DA=C:\DWA /R
NET SHARE D3=C:\DW311 /R
NET SHARE D4=C:\DW4 /R
NET SHARE GLOBAL=C:\SHARED /RWC
NET SHARE PRINTER=LPT1

```

Figure 27. DW - Portion of Server's AUTOEXEC.BAT file

As Figure 27 shows, the server's Network Name is GRACE and is sharing:

- Its C:-DWA subdirectory as read only (/R) with a Network Name of DA,

- Its C:-DW311 subdirectory as read only with a Network Name of D3,
- Its C:-DW4 subdirectory as read only with a Network Name of D4,
- Its C:-SHARED subdirectory as read/write/create/delete with a Network Name of GLOBAL and
- Its LPT1: printer with a Network Name of PRINTER.

Note that there are no passwords associated with any of the directories to be shared. They could be required, of course, and the user would have to provide them at the appropriate time.

As might be assumed, the C:\DWA subdirectory contains all of the DisplayWrite Assistant code, the C:\DW311 subdirectory contains all of the DisplayWrite 3 Version 1.1 code, and the C:\DW4 subdirectory contains all of the DisplayWrite 4 code.

Figure 28 is an example of the .BAT file that might be used by the person working at the server to start DisplayWrite Assistant. This .BAT file would reside in the root directory of the C: drive.

```
ECHO OFF
CD C:\DWA
DWALOGO
IF ERRORLEVEL 27 GOTO END
IF ERRORLEVEL 13 GOTO DWA
GOTO END
:DWA
DISPLAY %1
:END
```

Figure 28. DW - Servers .BAT file to start DisplayWrite Assistant

Figure 29 shows an example of the .BAT that might be used by the person working at the server to start DisplayWrite 3 Version 1.1.

```
ECHO OFF
REM RELEASE 1.1
CD >C:\DW311\DW3ODIR.BAT
C:
CD C:\DW311
C:DW3PG C:\DW311,C:\PRIVATE\MYPROFIL.UPR,C080
C:
CD C:\DW311
IF NOT EXIST DW3ODIR.BAT GOTO LABEL
DW3ODIR
:LABEL
```

Figure 29. DW - Servers .BAT file to start DisplayWrite 3 Version 1.1

This .BAT file would reside in the root directory of the server. Note the following:

- The MODE and PRINT commands have been removed.
- The KQE commands have been removed.
- The directory where DisplayWrite 3 1.1 can find the server user's profile (MYPROFIL.UPR) has been changed to reflect the fact that the user profile now resides in the C:\PRIVATE subdirectory, that subdirectory not being shared with other LAN users.

Figure 30 on page 62 shows an example of the .BAT file that might be used by the person working at the server to start DisplayWrite 4.

This .BAT file would reside in the root directory of the C: drive at the server. Note the following:

- The directory where DisplayWrite 4 can find the local server users' profile (MYPROFIL.PRF) has been changed to reflect the fact that the user profile now resides in the C:\PRIVATE subdirectory, that subdirectory not being shared with other LAN users.

As the four figures above show, the person working at the server N/S uses a .BAT file that accesses the three DisplayWrite programs in much the same fashion as a non-LAN user might. The next four figures, starting with Figure 31 on page 63 show how a user working at another N/S might use the servers subdirectories and invoke the same three programs. Note the .BAT files used by the other N/S's reside in the root directory of each of the other PC's, not at the server. There is nothing that prevents them from residing in a shared subdirectory at the server, of course.

Figure 31 on page 63 illustrates a portion of the AUTOEXEC.BAT file that another N/S might use to access the subdirectories and the printer already shared by the server.

As described in the figure above, the N/S is started with a N Network Name of MARK, in a Receiver configuration. The N/S uses:

- The subdirectory associated with the Network Name DA, assigned by the server GRACE, as the N/S's D: drive,
- The subdirectory associated with the Network Name D3, assigned by the server, as the N/S's E: drive,
- The subdirectory associated with the Network Name D4, assigned by the server, as the N/S's F: drive,
- The subdirectory associated with the Network Name GLOBAL, assigned by the server, as the N/S's G: drive, and
- The printer associated with the Network Name PRINTER, also assigned by the server Grace, as the N/S's LPT1: printer.

Note that the N/S MARK has 'read only' access to DA, D3 and D4, and has read/write/create/delete access to GLOBAL. There were no passwords associated with any of the shared devices, so none were included into the .BAT file.

```

ECHO OFF
REM RELEASE 1.0
CD >C:\DW4\DW4ODIR.BAT
CD >C:\DW4\DW4DDIR.LST
CD \DW4
DW4PG C:\PRIVATE\MYPROFIL.PRF,,C:\DW4,,C
C:
CD C:\DW4
IF NOT EXIST DW4ODIR.BAT GOTO LABEL1
DW4ODIR
:LABEL1

```

Figure 30. DW - Servers .BAT file to start DisplayWrite 4

Figure 32 on page 63 shows a .BAT file that might be used from MARK, after accessing the servers shared devices, shown in Figure 31 on page 63, to start DisplayWrite Assistant.

Note that the .BAT file used by the N/S is very similar to that used by the server. The main differences are that the N/S loads the DisplayWrite Assistant from its logical D: drive and then, after exiting DisplayWrite Assistant, returns to its physical C: drive.

There is a small problem, however, with sharing DisplayWrite Assistant in this manner. Note that there is nowhere for the user to specify where personal profile information is to be stored, as there is with DisplayWrite 3 1.1 and DisplayWrite 4. This means that if a N/S user tries to change DisplayWrite Assistant's profile information, the N/S, when trying to save those changes to disk (here the logical D: drive), will see a 'Disk error....' message because the D: drive was shared by the server as read only.

Although DisplayWrite Assistant does actually save the profile information in a separate file, it expects to find that file in the subdirectory from which the program was invoked. In the sharing environment set up by the server GRACE, above, that subdirectory is write protected. As a remedy, the LAN administrator might want to set up the profile options at initial installation time and simply inform the other N/S users that they can not change the profile. Or, the Administrator could give the subdirectory that contains the DisplayWrite code a read/write/create/delete security access level, but then all of the other LAN N/S users would be able to change the profile information at their whim, creating a terribly frustrating environment for the users.

The two best options appear to 1) tell the users that they will not be allowed to change the profile information, or 2) supply everybody on the LAN with their own copy of DisplayWrite Assistant.

Figure 33 on page 64 shows the .BAT file that the user at a N/S might use to start DisplayWrite 3 Version 1.1.

Notice that the file shows that the program is to be loaded from the N/S's E:\ logical drive, actually the servers C:\DW311 physical drive. The .BAT file also shows that the users profile (MYPROFIL.UPR) is to be found in the local N/S's physical C:\ directory, which gives, of course, read/write create/delete access to the local user.

```

      :
      :
NET START RCV MARK /SRV:2 /CMD:11 /NBC:5 /NBS:2K
NET USE D: \\GRACE\DA
NET USE E: \\GRACE\D3
NET USE F: \\GRACE\D4
NET USE G: \\GRACE\GLOBAL
NET USE LPT1: \\GRACE\PRINTER

```

Figure 31. DW - Portion of N/S's AUTOEXEC.BAT file

Figure 34 on page 64 shows the .BAT file that the user of a N/S might use to start DisplayWrite 4.

Note the similarities between this .BAT file and the one that starts DisplayWrite 3 Ver 1.1. The concepts are the same although the implementation is slightly different.

The .BAT shows that the program is loaded from the local N/S's logical F: drive, (actually the servers C:\DW4 subdirectory). The profile information is taken from the local N/S's physical C:\ directory.

7.2 STANDARD LETTERS AND DOCUMENTS

In a word processing environment, the ability to create and maintain a set of standard letters and documents is very important. The TRN allows you to set up a directory which contains your standard documents, with appropriate access granted to those who need it. You may wish to grant different levels of access to different users. For example, Executive Secretary's may need to actually change the text of the form letters from time to time, whereas a typist would only need whatever standard format is in use at the time. To share the same directory with two different levels of access, you need to share the directory twice. Each time you request the PCLANP to share the directory, you give it a different Network Name and access level. By telling users the Network Name rather than a path, the LAN administrator is free to reconfigure the hard file, altering the physical path, etc., without having to advise users of the changes,

```

ECHO OFF
D:
DWALOGO
IF ERRORLEVEL 27 GOTO END
IF ERRORLEVEL 13 GOTO DWA
GOTO END
:DWA
DISPLAY %1
:END
C:

```

Figure 32. DW - N/S's .BAT file to start DisplayWrite Assistant

```

ECHO OFF
REM RELEASE 1.1
CD >C:\DW3ODIR.BAT
CD C:\
E:
DW3PG E:\,C:\MYPROFIL.UPR,BW80
C:
CD C:\
IF NOT EXIST DW3ODIR.BAT GOTO LABEL
DW3ODIR
:LABEL

```

Figure 33. DW - N/S's .BAT file to start DisplayWrite 3 Version 1.1

so long as the administrator alters the servers AUTOEXEC.BAT file to conform to the new disk configuration.

7.3 ARCHIVING DOCUMENTS AND LETTERS

Storing documents and letters on shared directories makes the job of archiving (back-up) much easier. Archiving can be done for all DisplayWrite network users by a single (unmarried) person and the backed-up/archived documents can be centrally stored if required. Storing on shared network disks also provides a handy system management tool.

7.4 SECURITY

The TRN architecture gives the LAN Administrator the opportunity to create disks that require a password for access besides security level assigned for access. In this way the Administrator can provide a secure place for sensitive or confidential information. Users not only need to know the Network Name

```

ECHO OFF
REM RELEASE 1.0
CD >C:\DW4ODIR.BAT
CD >C:\DW4DDIR.LST
F:
CD F:\
DW4PG C:\MYPROFIL.PRF,F:\,C:\,C:\,C
C:
CD C:\
IF NOT EXIST DW4ODIR.BAT GOTO LABEL1
DW4ODIR
:LABEL1

```

Figure 34. DW - N/S's .BAT file to start DisplayWrite 4

of the disk or directory, they also need to know its password before they are granted access, and then they are only granted the level of access associated with that particular Network Name.

7.5 HELP

Whether users have DisplayWrite resident on their own PCs or are using a network directory, they have access to all the DisplayWrite Help text online. Should they require extra assistance, they can use the messaging facilities of the network to send a message to the Supervisor requesting further assistance.

8.0 PERSONAL SERVICES/PC

Personal Services/PC (PS/PC) (6476054) is an 'office-oriented mail and library management system' that uses your IBM Personal Computer to support Document Interchange Architecture. This support provides a wide range of automated mail and library functions to the LAN attached PC user, and also to standalone PC users. The general classes of functions provided by PS/PC include:

- Document Distribution Services,
- Document Library Services, and
- Other Host functions.

PS/PC supports three different operations scenarios:

1. You can communicate with users of a properly configured DISOSS/370 Office System network,
2. You can communicate with another PC supporting (running) PS/PC, and
3. You can communicate with users of a properly configured Series/1 running Series/1 Office Connect.

Communications with a DISOSS/370 user can be achieved via:

- An asynchronous dial up connection to the DISOSS/370 Host,
- Connection to a 4700 PC, PC PC-XT, or PC-AT attached to a 4700 Controller with RM4700CTRLR pass-through, or
- Connection to the Host using PC3270EM.

Communications with another PC supporting PS/PC can be made ONLY via an asynchronous dial up connection between the two PC's.

Communications with a Series/1 running Series/1 Office Connect can be achieved via:

- An asynchronous dial up connection with the Series/1 Host, or
- Connection with the Series/1 via an attached TRN.

Although PS/PC supports a wide variety of operating environments, this chapter will only discuss the DISOSS/370 environment.

8.1 FUNCTIONS

You can use your PC to send and receive documents and messages to and from any user within your Host office system. These documents and messages can be in either RFTDCA, FFTDCA or ASCII format, depending on the needs of the individual users. The user can also cancel the receipt of a document or message awaiting delivery at the Host, and can distribute documents that are stored in the Host library.

The library services provided include the ability to store, search for, retrieve, and delete documents in the Host library. The user can also modify the access codes of, and add keywords to, documents already stored in the library.

PS/PC provides a local file cabinet which stores, and from which you process, your mail. Using the file cabinet, you can view, send, print, or transform the documents therein. You can change the information concerning any item listed in the file cabinet or delete the item from the cabinet. A document not included in the file cabinet (is external to the cabinet) can be erased from your local PC disk, if that document has a reference to it in the file cabinet. Personal Services/PC, if requested, can create additional file cabinets. For example, if you want your mail separated according to the month received, you might want to create a file cabinet for each month.

The experienced DOS user can access the IBM PC's Disk Operating System (DOS) from Personal Services/PC and execute a program to edit or create documents to be sent to other PS/PC users.

8.2 HOST CONNECTION REQUIREMENTS

To connect a LAN attached W/S to a DISOSS/370 Host system, you need the following Host system 'stuff':

- For all attachment types, the DISOSS/370 Version 3 Release 2 program product, either the MVS version (5665-290) or the VSE version (5666-270),
- The DISOSS/370 Version 3 Release 2 Program Temporary Fix. For MVS PTF#UP90187 is required, and for VSE, PTF#UP90188,
- For asynchronous communication to the PC, the Network Terminal Option (Program Product 5737-XX7), or other protocol converter capable of converting LU 1 and Teletype device datastreams, is required on a 3705 or 3725 Multiplexor; Network Terminal Option Release 2 provides the required asynchronous support.

8.3 LAN CONNECTION REQUIREMENTS

To use PS/PC in a LAN environment you need the following LAN software:

- DOS 3.2
- TOKREUI (for Token Ring only)
- NETBEUI (for Token Ring only)
- PC LAN Program 1.1 (if needed for access to LAN functions)
- PC 3270 Emulation Version 2.0 or 3.0
- PS/PC Version 1.2

There is at least one major point to remember when running PS/PC in a LAN environment: PS/PC CANNOT be placed in a subdirectory shared by a server to be used by other LAN attached workstations through the NET SHARE and

NET USE facilities of the PCLANP. This is because PS/PC requires write access to the subdirectory where the program code is kept for control purposes, etc.

8.4 TEST CONFIGURATIONS

The list below describes the levels of software, and the two PC3270EM configurations we used during our testing of PS/PC.

- DOS 3.2
- TOKREUI 0.2
- NETBEUI 0.2
- 3270 Emulation 2.0
 - Configuration A - Alternate Tasks = Yes, Print = Yes, File Transfer = Yes, API = Yes
 - Configuration B - Alternate Tasks = Yes, Print = No, File Transfer = Yes, API = Yes
- Personal Services/PC Version 1.2

We tried to load and run several different combinations of PC3270EM, PCLANP and PS/PC with the results shown in Figure 35. The figure shows whether we were able to load the software into a LAN attached PC, configured as shown, or not.

		NETBEUI	TOKREUI	PC3270EM	PSPC	NOTES
REDIRECTOR	A	YES	YES	YES	YES	
	B	YES	YES	YES	YES	
RECEIVER	A	YES	YES	YES	YES	
	B	YES	YES	YES	YES	
MESSENGER	A	YES	YES	YES	NO	1
	B	YES	YES	YES	NO	1
SERVER	A	YES	YES	YES	NO	2
	B	YES	YES	YES	NO	2

Note: 1 There was insufficient memory to complete initialization
 2 There was insufficient memory for the PC to attempt initialization.
 A shows PC3270EM configuration A
 B shows PC3270EM configuration B

Figure 35. PS/PC - Configurations Supporting PS/PC

As can be seen in Figure 35, only the Receiver and Redirector configurations had sufficient memory available to load PS/PC. If PS/PC completes the initialization process, all functions are available.

8.5 INSTALLING PS/PC

The PS/PC installation process will create three new subdirectories in the root directory of the hard disk in the LAN attached PC's. Diskette based installation is also possible but not recommended. The installation process places the PS/PC code in these three subdirectories. The .BAT file used to start PSPC, called PSPCRUN.BAT, is placed in the PSPC.SYS subdirectory. All the user has to do to start PS/PC (after, of course, loading all of the prerequisite software) is to make the PSPC.SYS subdirectory the current directory and type PSPCRUN at the DOS prompt. The user can also copy the PSPCRUN.BAT file to the root, if desired, to start PSPC from the root directory.

8.6 TAILORING PS/PC

After installing PS/PC, the user must tailor the program to meet the Host system requirements. This involves making sure that the appropriate connection type is being used, that the automatic Logon messages and commands are specified correctly (if automatic Logon is used), that the user ID and password are correct, that the CICS transaction ID is correct, etc.

8.6.1 MAIN TASKS MENU

Therefore, after starting PS/PC for the first time, from the Main Tasks menu, shown in Figure 36 on page 71, select option 6 - 'User Defaults'.

This causes the User Defaults menu, shown in Figure 37 on page 72, to be displayed.

8.6.2 USER DEFAULTS MENU

The User Defaults menu shown in Figure 37 on page 72 lists those aspects of PS/PC which the user can personalize. The first option that should be selected is '3 Attachment', which leads to the Host Attachment menu shown in Figure 38 on page 72. This menu lists the various Host connection possibilities available to the user.

As can be seen in Figure 38 on page 72, PS/PC supports four communications options. The option used in a LAN environment is Option 2 (PC3270EM). Once the appropriate attachment option is chosen, the user presses ENTER to register the selection within PS/PC and returns to the User Defaults menu.

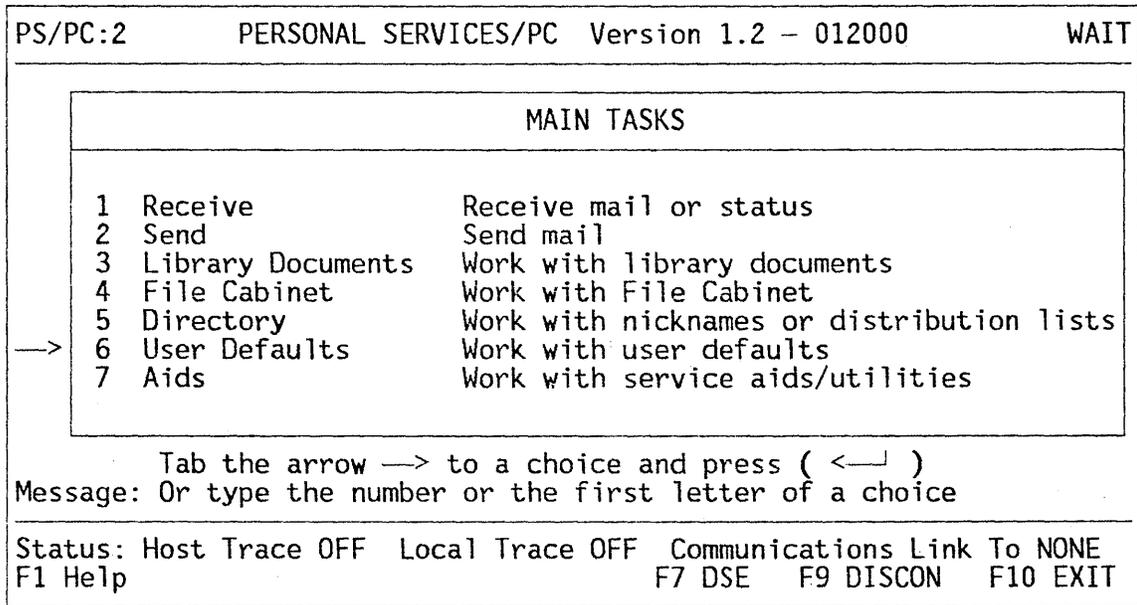


Figure 36. PS/PC - 'Main Tasks' menu

8.6.3 HOST LOGON/LOGOFF DEFAULTS MENU

The Host Logon/Logoff Defaults menu, shown in Figure 39 on page 73, is displayed when the user selects Option 5 from the User Defaults menu. The Host Logon/Logoff Defaults menu allows the user to specify automatic logon/logoff procedures. Host Messages are those 'things' written to the screen by the Host, which PS/PC must wait for before proceeding; for example, the MVS logo screen is considered a Host message. User commands are those commands that the user would normally enter manually from the keyboard during the logon process.

In our example we assume that the MVS logo screen is displayed BEFORE initiating PS/PC. Thus PS/PC need not wait for 'Host Message 1' to be sent from the Host system and can go immediately to User Command 1. Again, in our example and for our Host system setup, the first command the user would normally enter from the MVS logo screen would be 'LOG CICS11', thus this is what is specified as User Command 1. In our specific Host system environment, the response to the 'LOG CICS11' command is that a CICS/VS logo screen is displayed.

AND THIS IS AS FAR AS THE USERS LOGON PROCEDURE SHOULD GO.

As every Host system implementation is different, we expect that the sequence of commands and messages will almost certainly be different for each system. The user needs to specify that sequence of commands and messages that would normally be used to bring up the CICS logo screen. Check with your Host coordinator for the correct logon sequence.

The Host Transaction ID, in our example DSV1, represents the transaction ID used to invoke the various DISOSS transactions.

PS/PC:5	USER DEFAULTS	WAIT																		
<p>WORK WITH USER DEFAULTS</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 5%; text-align: right;">1</td> <td style="width: 30%;">Disk Paths</td> <td>Disk defaults</td> </tr> <tr> <td style="text-align: right;">2</td> <td>Personal</td> <td>Your ID, password, methods of operation</td> </tr> <tr> <td style="text-align: right;">→ 3</td> <td>Attachment</td> <td>Host attachment type</td> </tr> <tr> <td style="text-align: right;">4</td> <td>Communications</td> <td>For Asynchronous Communications and 3270-PC</td> </tr> <tr> <td style="text-align: right;">5</td> <td>Logon</td> <td>Host logon/logoff information</td> </tr> <tr> <td style="text-align: right;">6</td> <td>Host Password</td> <td>Change your Host password</td> </tr> </table>			1	Disk Paths	Disk defaults	2	Personal	Your ID, password, methods of operation	→ 3	Attachment	Host attachment type	4	Communications	For Asynchronous Communications and 3270-PC	5	Logon	Host logon/logoff information	6	Host Password	Change your Host password
1	Disk Paths	Disk defaults																		
2	Personal	Your ID, password, methods of operation																		
→ 3	Attachment	Host attachment type																		
4	Communications	For Asynchronous Communications and 3270-PC																		
5	Logon	Host logon/logoff information																		
6	Host Password	Change your Host password																		
<p style="text-align: center;">Tab the arrow → to a choice and press (←)</p> <p>Message: Or type the number or the first letter of a choice</p>																				
<p>Status: Host Trace OFF Local Trace OFF Communications Link To NONE F1 Help F5 Previous F7 DSE F8 Main F9 Discon</p>																				

Figure 37. PS/PC - 'User Defaults' menu

PS/PC:4	HOST ATTACHMENT	WAIT
<p>Host Attachment → 2</p> <ul style="list-style-type: none"> 1 = Asynchronous Communications 2 = PC 3270 Emulation Program, Version 2.0 or or 3.0 or 3270-PC 3 = PC 3270 Emulation Program, Entry Level 4 = PC Support/38 or Series/1 Office Connect 		
<p>How your PC is connected to the Host</p> <p>Message: Type the number for your Host attachment and press (←)</p>		
<p>Status: Host Trace OFF Local Trace OFF Communications Link To NONE F1 Help F5 Previous F7 DSE F8 Main F9 Discon</p>		

Figure 38. PS/PC - 'Host Attachment' menu

PS/PC:11	HOST LOGON/LOGOFF DEFAULTS	WAIT
Note: This panel applies only for Host Attachment types 1, 2, and 3.		
Host Transaction ID ———> DSV1		
For automatic logon		
Host Message 1	—————>	
User Command 1	—————>	LOG CICS11
Host Message 2	—————>	RALEIGH
User Command 2	—————>	
Host Message 3	—————>	
User Command 3	—————>	
Host Message 4	—————>	
Complete logon manually —> 2		
For automatic logoff		
Command	—————>	CSSF LOGOFF
Acknowledgement	—————>	COMPLETE
An identifier required for Host connection		
Message: Make additions or changes, then press (<—)		
Status: Host Trace OFF Local Trace OFF Communications Link To NONE		
F1 Help	F5 Previous	F7 DSE F8 Main F9 Discon

Figure 39. PS/PC - 'Host Logon/Logoff Defaults' menu

After specifying the appropriate messages and commands, the user presses ENTER to register the menu contents within PS/PC and return to the User Defaults menu.

8.6.4 PERSONAL DEFAULTS MENU

After you have completed the Logon/Logoff Defaults menu, the user should select Option 2 from the User Defaults menu to personalize the various personal default options. The Personal Defaults menu shown in Figure 40 on page 74 is displayed.

The User ID and Host Address should be obtained from the Host Coordinator. In our example the Type of Password is 3 (which means that this particular User ID has no password associated with it).

Help is almost always available for most of the options displayed in all of the menus by simply tabbing to the option in question and reading the message displayed at the bottom of the screen.

Note that in this particular menu, when the cursor has been tabbed to the Host Password option, the password is displayed. This may present a security exposure if PS/PC is used in a high risk environment.

PS/PC:6	PERSONAL DEFAULTS	WAIT
User Name _____>	John Baylis	
User ID _____>	JOHNPC3	
Type of Password _____>	3	
Host Password _____>	4444444	
Host Address _____>	RISC03	
Host Printer Name _____>		
Job Name for Host Print Request _____>	PCJOB	
Maximum Size of Received Documents _____>	40	
Maximum Documents to Find _____>	100	
Maximum Minutes to Find Documents _____>	5	
AND Separator Character _____>	,	
OR Separator Character _____>	/	
String Cutoff Character _____>	*	
Receive RFT Documents via Host _____>	1	
Fidelity Messages _____>	1	
Beep when an Error Occurs _____>	1	
Your address at the Host		
Message: Make additions or changes, then press (<—)		
Status: Host Trace OFF Local Trace OFF Communications Link To NONE		
F1 Help F5 Previous F7 DSE F8 Main F9 Discon		

Figure 40. PS/PC - 'Personal Defaults' menu

8.6.5 CHANGING YOUR HOST OFFICE SYSTEM PASSWORD MENU

When you first receive a USERID, you may wish to change the assigned password to something more easily remembered. This can be done by selecting Option 6 from the User Defaults menu. This causes the Change Your Host Password menu to be displayed, shown in Figure 41 on page 75. You will be asked for your current password and your new password. Of course, passwords should be kept confidential, and should not be shared between users.

8.7 USING PERSONAL SERVICES/PC

After personalization of PS/PC, all that remains is to use the program. Sending and receiving of documents and messages, use of the file cabinets, and use of the Host Distribution and Library services is as described in the user documentation provided with PS/PC, and thus will not be discussed here.

From the user's view, using PS/PC in a LAN environment is just like using it in a Standalone environment. Primarily because, as mentioned before, each LAN attached PC that will be using PS/PC MUST have its own local copy of the executable code.

PS/PC:7	CHANGE YOUR HOST PASSWORD	WAIT
When entering your password, uppercase and lowercase are important. PASSWORD, Password, and password are all different.		
Your Current Password —————>		
Your New Password —————>		
Your current Host password Message: Enter the passwords and press (<—)		
Status: Host Trace OFF Local Trace OFF Communications Link To NONE F1 Help F5 Previous F7 DSE F8 Main F9 Discon		

Figure 41. PS/PC - 'Change Your Host Password' menu

9.0 PROFS/PC SUPPORT

PROFS/PC Support (5664309) is a PC based application that operates with PROFS Version 2. PROFS/PC Support (PROFS/PCS) extends many of the office system functions normally reserved for use by a Host based PROFS system to users of LAN attached PC's.

PROFS/PCS uses a set of menus and panels very similar to those of the Host PROFS system. The PROFS/PCS user has in-basket processing capability for both notes and documents, can view and process the PROFS mail locally at the PC, and can also print notes and documents locally.

PROFS/PCS also allows a LAN attached PC user to store and mail PC files, and store DisplayWrite 1, A, 2, 3, and 4 files in the Host PROFS data base. The user can then distribute these DisplayWrite files to other PROFS and PROFS/PCS users.

9.1 FUNCTIONS

The LAN attached PROFS/PC Support user can:

- Upload PC and DisplayWrite files to PROFS and distribute those files to other PROFS, PROFS/PC Support and non-PROFS users
- Download the PROFS mail to the PC so that it can be processed at the users convenience, even at another PC
- Download PROFS documents to the PC for viewing, forwarding, filing and/or printing
- Use the PC mail log information to track PROFS documents downloaded to the PC
- Print a PROFS document, a Host computer system document, or a PC document at the PC
- Work with DOS and other program products from within the PROFS/PC Support environment
- Send and receive files between the Host computer and the LAN attached PC

More information, and the specific instructions needed to perform these tasks can be found in the General Help and Field Help panels once the user begins working with PROFS/PCS.

9.2 HOST CONNECTION REQUIREMENTS

The following lists some of the Host system requirements:

- PROFS Version 2

- VM/SP Version 2.1 PC File Transfer Program

9.3 LAN CONNECTION REQUIREMENTS

To run PROFS/PC Support, the LAN attached PC requires the following software:

- DOS 3.2
- TOKREUI (for Token-Ring only)
- NETBEUI (for Token-Ring only)
- PC LAN Program 1.1 (if needed for access to LAN functions)
- PC 3270 Emulation Version 2.0 or 3.0
- IBM PC EZ-VU II Runtime Facility
- PROFS/PC Support

9.4 CONFIGURATION TESTED

The configuration of PC 3270 Emulation Version 2.0 we used during testing was:

Alternate Tasks = Yes
Print = Yes
File Transfer = Yes
API = Yes

Figure 42 on page 79 lists the functions available to a TRN attached PC user with the N/S configured as shown. Note that many functions are not available, depending on the N/S configuration used. PROFS/PCS, unlike PS/PC, completes the loading process with no problems; however, not all of the functions presented in the various menus are necessarily available to the user. The figure gives an idea of what some of the limitations are.

		CONFIGURATION			
		RDR	RCV	MSG	SRV
	Transfer Notes	Yes	Yes	Yes	Yes
F	Transfer Documents	Yes	Yes	Yes	No
U	View a Document	Yes	Yes	No	-
N	File a Document	Yes	Yes	Yes	-
C	Forward a Document	Yes	Yes	Yes	-
T	Return Mail to Host	Yes	Yes	Yes	Yes
I	Send and Receive Files	Yes	Yes	Yes	No ?
O	Run DisplayWrite A	Yes	Yes	No	No
N	Run DisplayWrite 3	Yes	No	No	No
	Run DisplayWrite 4	No	No	No	No

Figure 42. PROFS/PCS - Configurations vs. Functions.

9.5 INSTALLING PROFS/PC SUPPORT

The PROFS/PC Support installation process creates two new subdirectories in the root directory on the hard disk of the LAN Attached PC. The installation process places the PROFS/PC Support code in these two directories. The .BAT file used to start PROFS/PC Support, called PROFS.BAT, is placed in the root directory. All the user has to do to start PROFS/PC Support is type PROFS at the DOS prompt. Installation of PROFS/PC Support on a diskette based system is also supported, but we don't recommend that it be done; the swapping of diskettes makes the operation of the program somewhat tedious.

9.6 TAILORING PROFS/PC SUPPORT

When starting PROFS/PC Support for the first time, the user is asked to update his/her communications profile. Therefore, from the Main Menu, shown in Figure 43 on page 80, select option F7 'Set up the communications options', and the menu shown in Figure 46 on page 83, is displayed. However, before discussing the tailoring in more detail, the Main Menu has an interesting feature that needs explanation.

9.6.1 PROFS/PC SUPPORT MAIN MENU

Figure 43 on page 80 shows the PROFS/PC Support Main Menu. The list of functions displayed in that menu can be tailored to suit the users individual needs. A file named COMMAND.LST, located either on the DATA diskette or the \PROFSPC subdirectory on the fixed disk, contains a list of those item that are displayed. This file can be modified by the user with EDLIN or some other editor. However, the user must always be aware of the fact that when invocation of a function or program, for example DisplayWrite 3, is attempted from the PROFS/PC Support Main Menu, either via a function key (selecting a Main

Menu option) or from the Command Line at the bottom of the screen, part of the PROFS/PC Support program and EZ-VU II Runtime Facility remains in memory. This means that there may not be enough memory available for DOS to load and execute the function or program requested.

Each line of the COMMAND.LST file defines an option selectable via a function key from the Main Menu screen. The functions listed in that menu are in the same order as they appear in the COMMAND.LST file.

The order of functions, the description of each function that will be displayed in the Main Menu, and even the function available can be changed by simply editing the COMMAND.LST file. For example, the user may want to move 'Learn to use PROFS/PC Support' from the first menu choice on the primary screen to the secondary screen after having become familiar with the system. In its place, the user may want to put some other command, for example, 'NET' to invoke the PCLANP menus. Figure 44 on page 81 shows an example of a tailored COMMAND.LST file. Figure 45 on page 82 shows the resulting main menu. A complete explanation of how to change the COMMAND.LST file is given in the 'Getting Started with the Professional Office System Version 2 PC Support' manual provided with PROFS Version 2.

PROFS/PC SUPPORT MAIN MENU				PC A00																																																										
Press one of the following function keys				Time 8:00 am																																																										
F1 Learn to Use PROFS/PC Support F2 Work with the mail F3 Send a note F4 Send and receive files F5 Look at the mail log F6 Print a document at the PC F7 Set up the communications options F8 Communicate with Host by phone lines	<table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <td colspan="2">1986</td> <td colspan="3">APRIL</td> <td colspan="2">1986</td> </tr> <tr> <td>S</td><td>M</td><td>T</td><td>W</td><td>T</td><td>F</td><td>S</td> </tr> <tr> <td></td><td></td><td></td><td></td><td>1</td><td>2</td><td>3</td> </tr> <tr> <td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td> </tr> <tr> <td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td> </tr> <tr> <td>18</td><td>19</td><td>20</td><td>21</td><td>22</td><td>23</td><td>24</td> </tr> <tr> <td>25</td><td>26</td><td>27</td><td>28</td><td>29</td><td>30</td><td>31</td> </tr> <tr> <td colspan="7" style="text-align: right;">Day of Year: 111</td> </tr> </table>						1986		APRIL			1986		S	M	T	W	T	F	S					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Day of Year: 111						
1986		APRIL			1986																																																									
S	M	T	W	T	F	S																																																								
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4	5	6	7	8	9	10																																																								
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18	19	20	21	22	23	24																																																								
25	26	27	28	29	30	31																																																								
Day of Year: 111																																																														
Command: ()																																																														
F9-General help F10-Field help PgDn PgUp Esc-End																																																														

Figure 43. PROFS/PCS - 'PROFS/PC Support Main Menu'.

Figure 44 on page 81 shows an example of a tailored COMMAND.LST file that PROFS/PCS uses to construct its main menu. Guidelines on how to structure this type of file can be found in the guide 'Getting Started with Professional Office System - PC Support' (5664-309).

Figure 45 on page 82 shows the PROFS/PCS main menu that is displayed as a result of tailoring the COMMAND.LST file shown in Figure 44 on page 81.

Note that DisplayWrite 3 can be invoked from within the PROFS/PCS environment itself. The ability of any other application to load and run from within the PROFS/PCS environment is, of course, dependent on many other factors. These include, but are not limited to, the total amount of memory in the PC, how the PC3270EM program is configured, how the N/S is configured for LAN functions, the ability of the other application to perform partial loads, etc.

Work with the mail	COMMAIL
Send a note	NOTE
Send and receive files	XFER
Look at the mail log	MAILLOG
Print a document at the PC	PRINTR
Work with DOS within PROFS/PCS	COMMAND
DisplayWrite 3	DW3
- Available -	
Communicate with host by phone lines	ASYNCH
Set up the communications options	PROFILE
Learn to use PROFS PC Support	HELP

Figure 44. PROFS/PCS - Example of tailored COMMAND.LST file

9.6.2 SET UP THE COMMUNICATIONS OPTIONS MENU

The menu shown in Figure 46 on page 83 is displayed when the user selects option F7 from an unaltered PROFS/PC Support Main Menu. This menu allows the user to specify the communications configuration to be used. After making a choice, the word 'SELECTED' will appear next to the option chosen (3270-PC Communications, in our example). We recommend that the option to 'Look at the messages during file transfer' be changed to Yes. This directs any error messages, etc., which may be generated during file transfer to the screen for viewing. This makes the task of correcting operational errors much simpler.

Notice in Figure 46 on page 83 that there is no option specifying Token-Ring, or PC-Network, or any other similar communication environment. As happens in many situations, deciding what to do or select is left to the users skill, knowledge, or experience. For a LAN attached PC the proper choice is as shown above, 3270-PC Communications. The Session ID field is left blank. This is the proper choice regardless of the actual communication configuration being used by the GW station, because PROFS/PC Support not controlling the communication session, the PC 3270 Emulation program is. In this environment, PROFS/PC Support cannot tell the difference between the PC 3270 Emulation program and the 3270-PC Control Program.

9.7 HOST CONNECTION

Before sending files from the PC to the Host, or receiving files at the PC from the Host, or refreshing the mail, or sending and receiving documents, you must ENSURE that you have done the following:

- On the PC
 - Loaded the PC3270EM API (PSCAPI.COM) code; this is most easily done from within the AUTOEXEC.BAT file
 - Specified within the PC3270EM profile that File Transfer and API support is desired by choosing Yes for the appropriate options
- On the Host

```

PROFS/PC SUPPORT MAIN MENU                                PC A00
Press one of the following function keys                  Time 8:00 am

F1 Work with the mail
F2 Send a note
F3 Send and receive files
F4 Look at the mail log
F5 Print a document at the PC
F6 Work with DOS within PROFS/PCS
F7 DisplayWrite 3
F8 - Available -

Command: ( )
F9-General help  F10-Field help  PgDn  PgUp  Esc-End

```

1986		APRIL					1986	
S	M	T	W	T	F	S		
				1	2	3		
4	5	6	7	8	9	10		
11	12	13	14	15	16	17		
18	19	20	21	22	23	24		
25	26	27	28	29	30	31		
Day of Year: 111								

Figure 45. PROFS/PCS - Tailored 'PROFS/PC Support Main Menu'.

- Logged onto the Host and started the PROFS application
- Entered the PROFS CMSREADY state. Refer to Figure 47 on page 84 and Figure 48 on page 85 for the menus to use.

Figure 47 on page 84 shows the Host PROFS main primary menu as configured on our system. 'CMSREADY' is entered on the command line at the bottom of the screen and the user presses ENTER. Figure 48 on page 85 shows the resulting screen, the CMSREADY state screen. Following the instructions on the screen, the user would 'hot-key' back to the PC session, start PROFS/PC Support, if it is not already started, and refresh the mail, send or receive documents, or do whatever needs to be done.

When finished, the user 'hot-keys' back to the Host session, presses PF12 to exit the CMSREADY state, quits the PROFS application, and signs off the Host. 'Hot-keying' back to the PC session, the user can go on with whatever else needs to be done.

9.8 MEMORY CONSTRAINTS

Even though a menu option appears on some PROFS/PC Support screen, it does not necessarily follow that there is enough free memory for that option to load and execute. PROFS/PC Support will display one of several messages when insufficient memory situations occur.

For example, with PROFS/PC Support running on a N/S configured as a server that doesn't provide any printer support, the option to send a file from the PC to the Host is displayed in one of the PROFS/PC Support menus. If that option is selected, PROFS/PC Support will allow the user to fill in all the appropriate fields and submit the request to PROFS/PC Support by pressing ENTER. A message will then be displayed advising the user that the amount of available memory is not able to support the transaction requested.

```

                SET UP THE COMMUNICATIONS OPTIONS                PC P00

Press one of the function keys below to select the type of
communications you have, and complete the related information. Then
press ENTER.

F1  3278/79 Emulation

F2  3270-PC Communications                SELECTED
     Session ID: ( )

F3  Asynchronous Communications
     Line Speed: (300)
     Port Number: (1)
     Line Parity: (0)
     Stop Bits:  (1)

F4  No connection to the Host system

Look at the messages during file transfer (Y)
Make sure the files are transferred      (Y)

F9-General Help  F10-Field help          Esc-Cancel

```

Figure 46. PROFS/PCS - 'Set Up The Communications Options' menu

Similarly, with a N/S running PROFS/PC Support and configured as a server which provides printer support, the user can again select File Transfer from the main menu. And, after reading and understanding the example above, the reader knows that PROFS/PC Support is not going to allow this option to complete either. After all, the previous example was one where the server did not support any printing functions. In this example the server does support printing, which requires even more memory. The difference is that now PROFS/PC Support merely refreshes (clears and redisplay) the Main Menu without posting any error messages. It is left to the user to infer that this happened because there is 'NO CORE' available for the task.

9.9 RESTRICTIONS

There are quite stringent Host communications timing requirements in non-SNA environments. When you have begun File Transfer in PC3270EM, and are using the PCLANP, the DOS TYPE and COPY commands, and the PC printer, should not be used other than from the 3270 Request Tasks menu. Otherwise, unpredictable, but certainly erroneous, conditions will result.

```

R I S C  PROFS Version 2  R I S C                A00
Press one of the following PF keys.
PF1 Process schedules                               Time: 5:44 PM
PF2 Open the incoming mail
PF3 Search for documents
PF4 Process notes and messages
PF5 Prepare documents
PF6 Process documents from other sources
PF7 Process the mail log ( documents )
PF8 Check the outgoing mail

          1986      APRIL      1986
          S   M   T   W   T   F   S
PF4      6   7   8   9  10  11  12
PF7     13  14  15  16  17  18  19
PF8     20  21  22  23  24  25  26
          27  28  29  30

PF10 Nicknames, Dlists, Greetings, Author      Day of Year: 111
PF11 Go to next menu for more functions
          PF9 Help  PF12 End
----- Help desk: HARDOUIN  Ext 5560 -----

====> CMSREADY

```

Figure 47. PROFS/PCS - 'PROFS' menu: How to get the Host into the CMSREADY state.

CMSREADY

You are now in CMSREADY state.

Toggle back to the PC to begin exchanging information between PROFS and the PC.

Note: When you have finished exchanging information, you can exit the CMSREADY state by pressing PF12.

VM READ

Figure 48. PROFS/PCS - PROFS 'CMSREADY' display screen

10.0 TOPVIEW VERSION 1.1

TOPVIEW provides a multi-window PC environment intended to increase the productivity of IBM Personal Computer users. The TOPVIEW program provides the function and architecture for:

- Running multiple and diverse DOS applications concurrently on a PC,
- Viewing multiple applications on the display, and
- Exchanging compatible data between applications

The DOS applications may consist of independently executing programs or may be defined as a program group and executed. Also, TOPVIEW will interpret and execute DOS Batch files. The user can also execute a selected group of DOS commands against individual, or groups of, files by selecting the DOS Services option.

The more experienced user may wish to directly interact with DOS for a selected group of DOS commands through TOPVIEW's DOS command processor. Either or both methods of executing DOS commands can be used concurrently with the execution of user applications.

A program swapping option allows the user to more effectively use the installed hardware environment of a personal computer. Within limitations, TOPVIEW automatically swaps out programs to a fixed disk or a RAM memory based virtual disk when the total memory requirements of DOS, TOPVIEW and the User's applications exceed installed addressable RAM Memory.

10.1 CURRENT LIMITATIONS

Currently, TOPVIEW may only be loaded when a LAN attached PC is configured as a Redirector on the Network. This limits the effectiveness of the LAN as the PC is only able to send messages and not receive. TOPVIEW's own execution environment requires approximately 220K of RAM, thus limiting the number of other applications which can be run with it, as each application specifies a minimum amount of memory required to execute, which TOPVIEW does not swap. The Alternate Tasks feature of IBM PC 3270 Emulation is not supported under TOPVIEW.

11.0 SAMPLE OFFICE SCENARIO

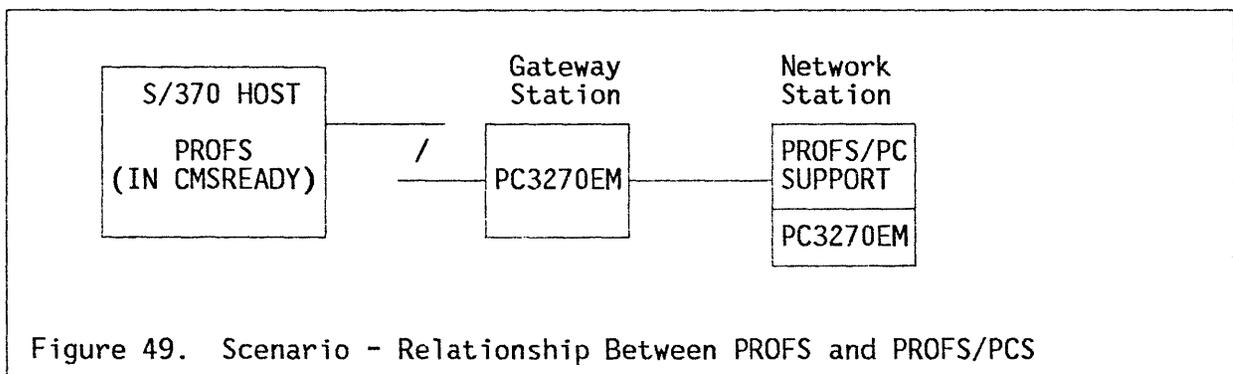
This chapter discusses how one might implement an 'IBM Office System' in a LAN environment. We look at how PROFS, PROFS/PCS, the DisplayWrite series, Personal Services/PC and DISOSS can provide LAN users with a comprehensive set of office system functions and capabilities which allows their active participation in an integrated office system which includes both PC's and Host systems. References to DisplayWrite are meant to include all of the currently supported DisplayWrite programs, DisplayWrite 4, DisplayWrite 3 Ver. 1.1 and DisplayWrite Assistant.

11.1 PROFS/PC SUPPORT AND PROFS

PROFS/PCS allows the PC user to locally (at the PC) perform many of the tasks usually performed by the Host PROFS System. Mail can be exchanged between the Host and the PC for local PC processing, and can be downloaded to diskette for easy transportation between the office and home.

It is important to distinguish between PROFS on the Host system and PROFS/PCS which is resident on the PC. In Figure 49 we can see the relationship between the two products.

PROFS on the Host must be running in the N/S users Host session (partition) if exchange of PROFS notes and documents with the PC is to occur.



11.2 PROFS AND DISPLAYWRITE

To better describe how a LAN based office system can be set up, we discuss how a secretary might complete the following tasks:

- Creating letters and documents
 - Confidential letters and documents
 - Documents to be updated by DisplayWrite/370
- Printing letters and documents

- On PC attached printers
- At the Host printing
- Handling electronic notes and messages
 - Between LAN users
 - Receiving PROFS mail
 - Sending PROFS mail
- Filing and retrieving documents at the Host

The logical view that the secretary might have of the W/S environment is shown in Figure 50 on page 91.

The actual implementation of the logical view shown in Figure 50 on page 91 is shown in Figure 51 on page 91. Note that in the logical view it appears as if the CONF1 disk/directory is attached to the secretary's W/S, while the printer seems to be attached to the server's W/S. It also appears, to the secretary, that the local W/S is directly attached to the Host system. Contrast the logical view of what seems to be the case with the actual setup shown in Figure 51 on page 91.

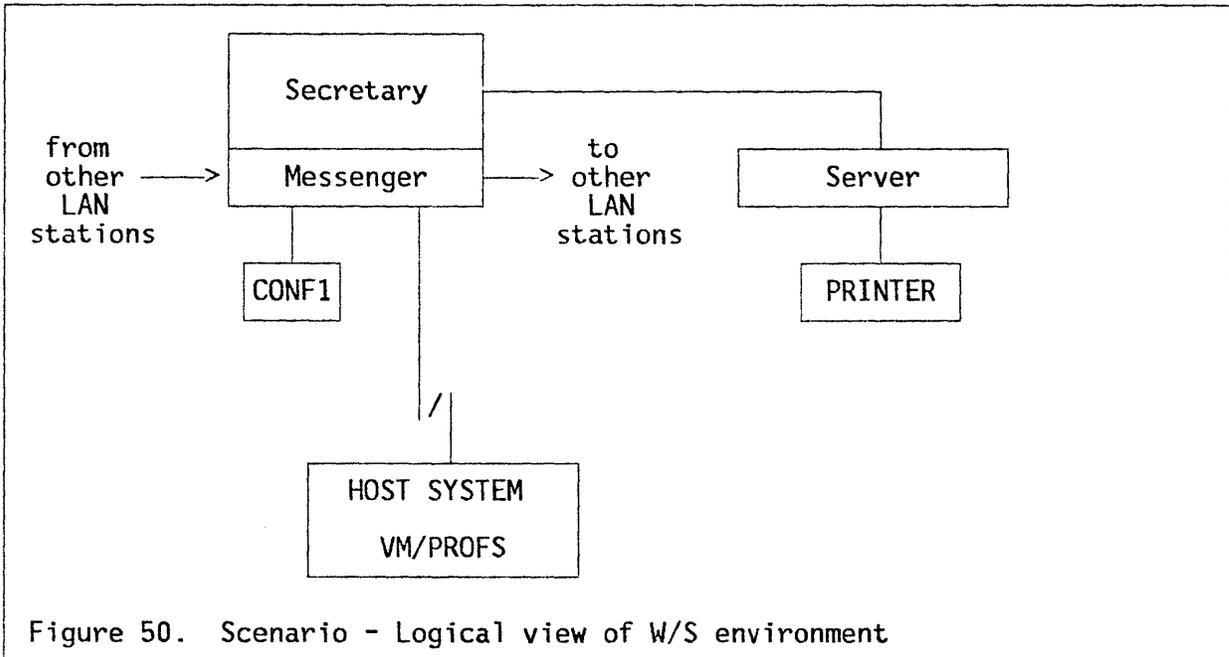
11.2.1 CREATING LETTERS AND DOCUMENTS

11.2.1.1 CONFIDENTIALITY

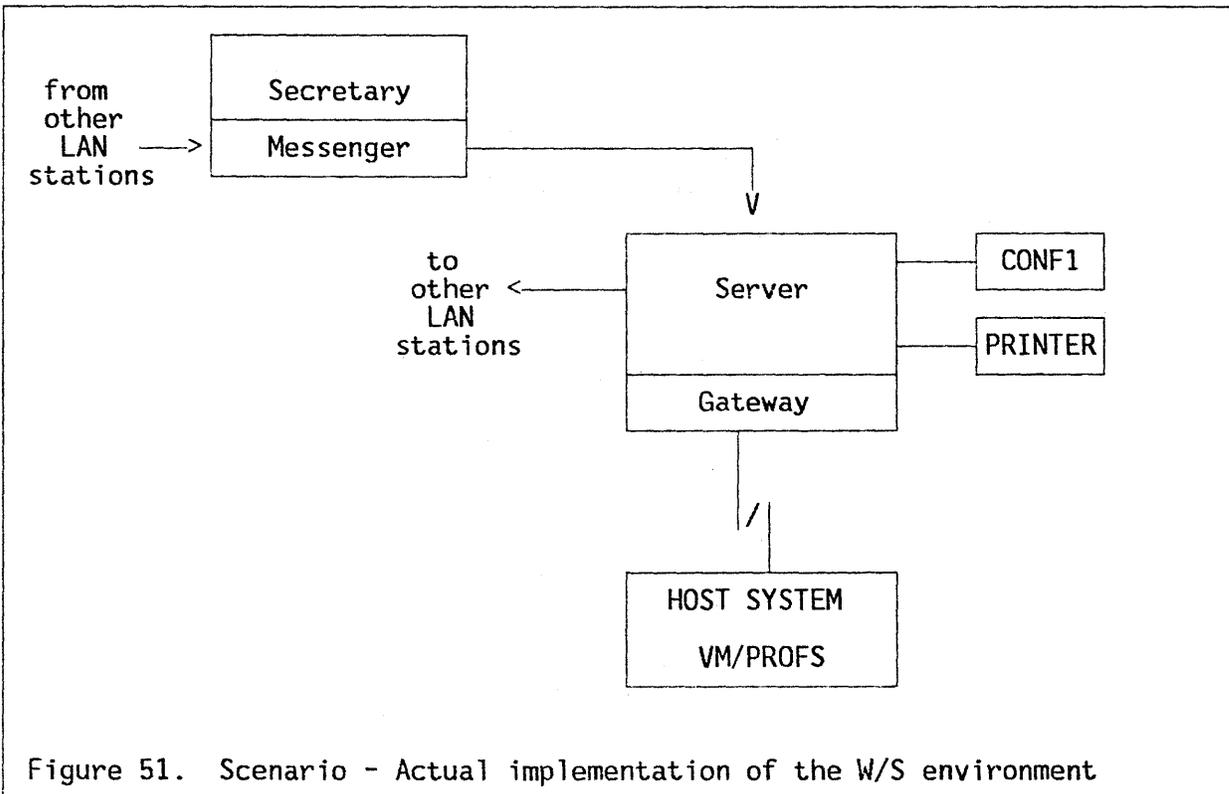
A major consideration when using PC's to work with sensitive information is how to insure that the information is secured against unauthorized access. For example, in our scenario, the secretary has to create a confidential letter using DisplayWrite, called SECRET.DOC, save it in a confidential subdirectory at the LAN server called JENNI, and print it on the PC printer, LPT1:, shared by the LAN server called ROLF.

Before starting DisplayWrite, the secretary issues the NET USE command to gain access to a confidential subdirectory, CONF1, at the LAN server JENNI, and to the printer at the LAN server ROLF. Since JENNI shared the subdirectory with password protection specified, the password must be keyed by the secretary before access is granted. Figure 52 on page 92 shows the commands used at the servers to share the confidential subdirectory and the printer, and the commands used by the secretary to gain access to the directory and the printer.

In requiring passwords, only those who have the proper passwords can access the confidential subdirectory and printer. In those instances where the SHARE and USE commands are part of an AUTOEXEC.BAT file, the password is specified as an asterisk. When the file is being processed, the PCLANP pauses each time it finds an asterisk and prompts the user to enter the required password. This eliminates the potential security problem of having passwords hard coded into .BAT files. Note, however, that the password will be displayed on the screen as it is keyed in. Once the secretary has access to the confidential subdirectory and printer, the letters (or documents) can be created in the normal fashion, making sure that the drive specifier for the letter is the same



as that chosen to access the confidential subdirectory. On completion of the letter, the secretary can send it to be printed either at the LAN server ROLF, where the confidential printer is located, using the normal DisplayWrite Print Document menus. The output will be directed to the LAN server printer automatically by the PCLANP.



At the server JENNI:

- 1) NET SHARE SAFE=C:\SHARED\CONF1 * /WC
if shared from a .BAT file, or
- 2) NET SHARE SAFE=:\SHARED\CONF1 SECRJENN /WC
if shared from the DOS prompt.

At the server ROLF:

- 1) NET SHARE ROLFPRNT=LPT1: *
if shared from a .BAT file, or
- 2) NET SHARE ROLFPRNT=LPT3: SECRROLF
if shared from the DOS prompt.

At the secretary's N/S:

- 1) NET USE E: \\JENNI\SAFE *
- 2) NET USE LPT1: \\ROLF\ROLFPRNT *
if used from a .BAT file, or
- 1) NET USE E: \\JENNI\SAFE SECRJENN
- 2) NET USE LPT1: \\ROLF\ROLFPRNT SECRROLF
if used from the DOS prompt.

Figure 52. Scenario - Sharing a confidential subdirectory and printer

In another similar situation, if a non-confidential document was created which, after revision, requires the security of the confidential subdirectory CONF1, the secretary must again gain access to the confidential subdirectory. The now confidential document can simply be copied from the secretary's PC to the confidential directory at the LAN server using the DOS COPY command.

Note that users of the LAN server machine itself have access to all disks/directories/subdirectories in that machine in exactly the fashion as a normal N/S user has access to all of the resources physically present at that N/S. This may be cause for some concern. Therefore, in much the same fashion as the network operator of a Host system is, in essence, a 'trusted' employee, so must the user of the LAN server machine be 'trusted'.

11.2.1.2 LETTERS AND DOCUMENTS TO BE EDITED BY DW/370.

PROFS/PC Support allows documents to be exchanged between the PC and the Host system so that, among other things, documents created by DisplayWrite can be revised and updated by DisplayWrite/370. DisplayWrite/370 documents have an internal format, and file type, of RFT (Revisable Form Text). Therefore, if you want to upload a DisplayWrite document to the Host that might be accessed by DisplayWrite/370, the document must first be converted from DisplayWrite internal text format (<name>.TXT for DW3, <name>.DOC for DW4, and <name>.TX for DWA) to Revisable Form Text. This procedure is easily accomplished using the conversion utilities provided with each of the DisplayWrite products.

In our example, we used PROFS/PC Support to transfer the document from the PC to the Host. The menu shown in Figure 53 on page 93 illustrates how the secretary would transfer a DisplayWrite document (or letter) named SECRET.RFT to the Host system.

SEND FILES TO THE HOST SYSTEM		PC-N20
<p>To send one file, type the information below. Press F7. To send several files at the same time, type the information below. Press ENTER to complete the information about another file. Continue to press ENTER to type information about more files. Then press F7 to send all the files</p>		
From PC -		
Drive:	(E)	← disk or diskette
Path:	\	
File name:	(SECRET.RFT)	← filename.ext
To the Host system -		
File name:	(SECRET)	
File type:	(RFT)	
File mode:	(A5)	
A readable file? (Y/N):	(N)	← A DisplayWrite file is non-readable, for example
<p>F3-Clear the screen F5-Choose file from subdirectory F7-Send F9-General help F10-Field help Esc-Return</p>		

Drive: E is the drive identifier used by the secretary to access the server subdirectory CONF1

Path: The CONF1 subdirectory of the server is the root directory of the E drive at the N/S

File Name: Name of the document to be sent - here the Revisable Format Text version of the document SECRET

File name: This is the name the document will have when placed on the users A (191) disk at the Host

File type: This must be RFT if you wish to use DW/370

File mode: The disk you wish to store documents on. In our example it is the A disk

Readable File: For the transmission of DisplayWrite documents this must be N.

Figure 53. Scenario - Send a DisplayWrite document to PROFS

The document we sent from the PC (created by DisplayWrite) to the Host (to be revised by DisplayWrite/370) contained several text format control characters. The table shown in Figure 54 on page 94 below lists some of the DisplayWrite controls that have DisplayWrite/370 equivalents, and some that don't.

11.2.2 PRINTING LETTERS AND DOCUMENTS

The secretary has several printing options available. Output can be directed to a PC printer, for example the Quietwriter, to obtain letter quality output. If substantial amounts of information are to be printed, the secretary may prefer to use a Host system printer such as the 3800.

DisplayWrite Control	DW/370 Equivalent?	DW/370 Name and control Control
Bold	YES	Emphasis <BES>
Centre Command	YES	Centre <CTR>
Column Layout	NO	Column Layout* <BCL>
Cursor Draw	NO	
Footnote	NO	Note Reference* <NR>
Format Change		
Margins	YES	Format Change <LFC>
Tabs	YES	Format Change <LFC>
Right Justification	YES	Format Change <LFC>
Half Up	YES	Superscript <SPS>
Half Down	YES	Subscript <SBS>
Keep	YES	Keep <BK>
Outline	NO	Auto-Outline* <AO>
Overstrike	YES	Overstrike <BOS>
Required		
Backspace	YES	Backspace <BS>
Carrier Return	YES	Req Carrier Ret <RCR>
Space	YES	Req Space <RSP>
Tab	YES	Req Tab <RT>
Stopcode	NO	Unknown <?>
Underscore		
String	YES	Begin/End Underscore <BUS>
Single Word	NO	Word Underscore <WUS>
Variable	NO	Insert* <INS>

An asterisk (*) shows that the code cannot be created by DW/370. However, DW/370 can recognize some of the controls created by other systems and flag them so that they are ignored when the document is processed. The exception to this is the Index control. DW/370 will honor this code when adjusting and printing but not when displaying lines on the screen. Since DWA does not recognize all of the controls implemented by DW3, DW4 or DW/370, the figure above is not meant to imply that all the controls listed are either recognized or honored by DWA.

Figure 54. Scenario - DisplayWrite to/from DisplayWrite/370 fidelity

11.2.2.1 PC ATTACHED PRINTERS

A PC configured as a server can share its locally attached printer with all of the other PC's attached to the LAN. It is necessary that the server PC 'share' the PC on the network and that the secretary 'use' that printer, supplying the appropriate password when requested, shown in Figure 52 on page 92. If the secretary wanted to advise the supervisor that there was confidential output being sent, a network message could be sent to the supervisor requesting that the supervisor collect the printout and store it in a secure place until the secretary could retrieve it.

This could be accomplished by the secretary keying the following command from the DOS prompt:

```
NET SEND SUPER Please place Bronkowski letter in Security bin.
```

When the message arrives at the supervisor's PC, the PC beeps and displays a 'Message Waiting' notice at the bottom of the screen to let the supervisor know a message has arrived.

11.2.2.2 CONTROLLING THE PC PRINT QUEUE

Files submitted to the server for printing are temporarily placed on the server's fixed disk in the directory that contains the network programs. These files are printed in FIFO order. The print queue manager can control up to 99 files. The PCLANP and DOS at the server are responsible for managing the print queue.

The 'Check or Change the Print Queue' menu allows you to see the files that are waiting to be printed on your printer and make changes to the queue. You can:

- HOLD files in the queue so that they remain in the queue and are not printed,
- RELEASE files in the queue that are being held or have a printer error so that the file can be printed/reprinted,
- CANCEL a file in the queue, which removes the file from the queue,
- Choose PRINT NOW for a file in the queue that you want to print immediately; the file that is currently printing stops printing and the specified file starts printing, and
- Choose PRINT NEXT for a file in the queue that you want to print after the file that is currently printing.

The user of the server computer itself (in this instance the supervisor) must determine how to control the print queue from the messages sent by the other remote LAN W/S's. For example, if the confidential letter SECRET.TXT has been placed in the print queue, but has now become urgent, the secretary can send a network message to the supervisor requesting that SECRET.TXT be printed either immediately or next. The supervisor would then manipulate the queue to make this happen.

11.2.2.3 USING HOST ATTACHED PRINTERS

If the document to be printed is a large draft, or statistical report, it may be preferable to upload it to the Host for printing. By transferring the PC file to the Host using PROFS/PC Support, the user gains access to the various Host printing facilities. The PC file should be either an ASCII format file, which PROFS/PC Support regards as readable, or an RFT format file, which PROFS/PC Support regards as non-readable.

If a DisplayWrite document is to be transferred to the Host for printing, the user must either:

- Use the 'ASCII Save' function from within DisplayWrite to save the document (letter) in an ASCII format, or

- Convert the document to RFT using the DisplayWrite conversion utilities

If the document is saved as an ASCII file it would be sent to the Host as a 'Readable' file and could be immediately submitted for printing. However, if the document were converted to RFT format, it would be sent to the Host as 'Non-Readable' and the DisplayWrite/370 conversion facilities would be used to format the document for printing on the 3800, 6670 or 1403.

11.2.3 ELECTRONIC NOTES AND MESSAGES

11.2.3.1 BETWEEN LAN USERS

Using the NET SEND command, it is possible for a LAN user to exchange messages with other N/S's individually, or send messages to all of the other N/S's active on the network at the same time. To send a message to all of the active computers on the LAN (known as a broadcast message) simultaneously the user would use an asterisk for the name of the computer to whom the message is to be sent. Thus, if the server is about to stop sharing of its locally attached printer, the server user would issue the following broadcast message from the DOS prompt:

```
NET SEND * Please cease using ROLFPRNT till further notice.
```

All of the other N/S's active on the LAN would receive the message. The secretary, in our example, would then issue the following command:

```
NET USE LPT1: /D
```

The server user would then issue the following command from the DOS prompt to actually stop the sharing of the printer:

```
NET SHARE ROLFPRNT /D
```

11.2.3.2 RECEIVING PROFS MAIL

The secretary can use PROFS PC Support to check if any new mail has arrived. Option F2 'Work with the mail' is first selected from the Main PROFS PC Support Menu. The 'Work with the Mail' screen, shown in Figure 55 on page 97, is displayed.

Note that this screen carries the S289 warning message to check that the Host state is CMSREADY before transmitting. The secretary must be signed onto the Host, must have initiated PROFS, and entered the CMSREADY state before attempting to send or receive mail. The secretary must remain aware of where the mail is at any particular time. In Figure 55 on page 97 the menu text shows that the mail is at the HOST system; when the mail has been successfully received by the PC for local processing, the message changes to show that the mail is now at the PC.

To view the mail at the PC, the user must first 'refresh' the mail at the PC. By selecting Option F1 'Refresh the mail at the PC, the user transfers

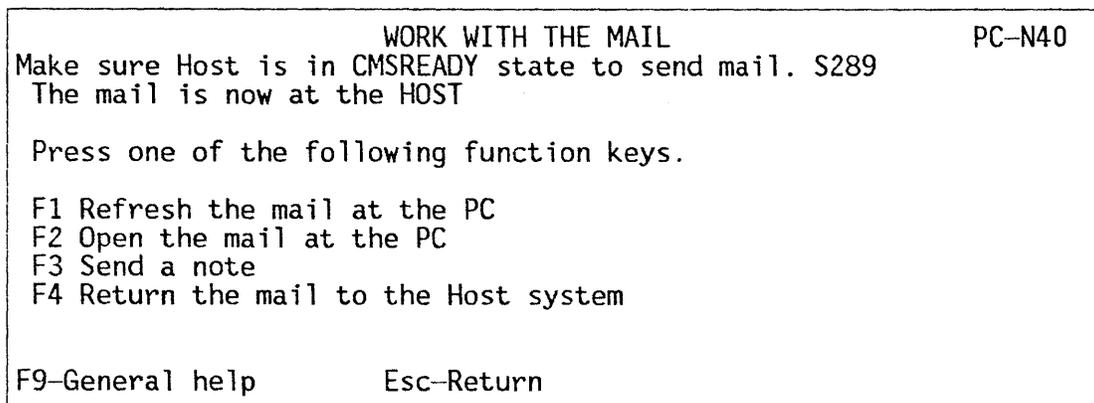


Figure 55. Scenario - PROFS/PC Support - Work with Mail

(downloads) the mail from the Host to the PC. Figure 56 on page 98 is the display seen during the transfer process:

When the mail has been successfully downloaded to the PC, the 'Work with the Mail' menu is re-displayed. The secretary would then select Option F2 to open the mail currently residing at the PC. When the secretary has finished reviewing/processing the mail, it can be returned to the Host system by the secretary selecting F4 'Return the mail to the Host system'.

It is important to note that if a document is downloaded to the PC it MUST BE returned to the Host with the SAME NAME.

11.2.3.3 CREATING AND SENDING PROFS/PC SUPPORT MAIL

PROFS/PC Support provides the PC user with a subset of the note processing functions available on the Host PROFS system. The user may send a note from PROFS/PC Support using nicknames or distribution lists that were created on the Host system. To send a note, either option F3 is selected from the 'Work with the Mail' menu or option F3 is selected from the Main PROFS/PC Support menu. In either case, the user will be presented with the 'Send a Note' Menu, shown in Figure 57 on page 98. The note will be sent either when the mail is 'refreshed' or 'returned to the Host'.

11.2.4 FILING, SEARCHING FOR AND RETRIEVING PROFS DOCUMENTS

When the secretary is asked to retrieve a document that has been filed in the PROFS document library, The 'Search for Documents' option will be selected from the PROFS Host menu. Note that a document search cannot be issued from the PROFS/PC Support session, but must be issued from the Host PROFS session.

The 'Search for Documents' menu, shown in Figure 58 on page 99, is displayed. From this screen the secretary can use keywords, document type, author and recipient to help find the document required.

```

YOU ARE SENDING OR RECEIVING INFORMATION NOW      PC-X01

A description of your notes and documents is being sent to the PC.

Relax. This may take a few minutes.
----- Messages -----
Note: As you receive messages, this screen may move up.

C>

```

Figure 56. Scenario - PROFS/PCS - Sending and Receiving Information

In our example the secretary is looking for a memo that was sent to all staff regarding the May sales results. To find the document quickly, the secretary inserts the words 'May' and 'Sales' as keywords and initiates the search.

When the search has been completed, the 'Completed Search for Documents' screen is displayed, which notes how many documents PROFS found that match the search criteria. The secretary is then presented with several choices. PF1 is pressed as this displays the list of the documents found and the mail log comments.

The 'List of the Documents Found' screen is displayed, shown in Figure 59 on page 99. From this list, clearly the document the secretary has been asked to find is the second one, with the subject 'May Sales Results'. If necessary, the document may be viewed to verify that it is in fact the correct version. Besides, the secretary is able to forward the document to another PROFS user, view the distribution list, or print the document.

```

SEND A NOTE                                          PC-E04

Send to: {
Subject: { }

F1-Top F2-Bottom F3-Erase line F4-Add line F5-Get/Put file F6-Format
F7-Send F8-Print F9-General help F10-Field help PgDn PgUp Esc-Cancel

```

Figure 57. Scenario - PROFS/PC Support - Send a Note

```

SEARCH FOR DOCUMENTS                                D01
To search another mail log, type: (user name or distribution list)
Type the information below. To change the search, press the PF key(s).
Time period: ----- / -----
From: ----- / ----- / -----
AND
Keyword:  May ----- / Sales ----- / -----
AND
To: ----- / ----- / -----
AND
Identifier:  --- / --- / ---
AND
Type: ----- / ----- / -----
AND
Action: ----- / ----- / -----

PF1 Find documents due: -----

PF2 Find the documents that have all the key words
PF3 Replace AND with OR in the search above
Now, press ENTER to start the search.
PF9 Help      PF12 Return

```

Figure 58. Scenario - PROFS - Search for Documents

11.2.5 CURRENT LIMITATIONS

During our testing, it was found that DisplayWrite 3 and PROFS/PC Support could only coexist when the N/S was configured as a Redirector, with no 3270 Print facilities for PC3270EM. If the user wants to run DisplayWrite 3 and PROFS/PC Support on a Receiver configuration, they must exit the PROFS/PC Support application before starting the DisplayWrite 3 application. To minimize

```

LIST OF THE DOCUMENTS FOUND                                D04
Press the PF key for the document you want.
--FROM-- -- TO -- ACTION IDENT TYPE DOCUMENT NO.
PF1 JOHNSON      MULDOON          Doc 8512ORL30004
   Subject: May Sales Forecast
PF2 JOHNSON      ALL STAFF          Memo 8612ORL30096
   Subject: May Sales Results

To look at all of these documents, type ALL here and press ENTER
PF9 Help PF10 Next Screen PF11 Previous Screen PF12 Return

```

Figure 59. Scenario - PROFS - List of Documents Found

the keystrokes necessary to do this, we provide a sample <name>.BAT file to cycle between PROFS/PC Support and DisplayWrite 3.

The .BAT file shown in Figure 60 on page 101 cycles between PROFS/PC Support and DisplayWrite 3 until the user presses CTRL-BREAK. When the user exits PROFS/PC Support, they are given the opportunity to exit the loop by using (CTRL-BREAK). Striking any other key will automatically invoke DisplayWrite 3. When DisplayWrite 3 is exited, the user is once again given the opportunity to go back to DOS. If the exit is not taken, the user is returned to PROFS/PC Support. The DisplayWrite 3 code is, of course, contained in the C:\APPS\TEXT subdirectory, while the PROFS/PC Support code is in the C:\PROFSPC subdirectory.

11.2.6 MEMORY ESTIMATES

The various memory estimates shown in Figure 61 on page 101 were taken with no print support provided for the N/S. If print support is required, an additional 10K must be added to the PC3270EM memory sizes shown. If print support is added, DisplayWrite 3 will no longer have sufficient room to load when the N/S is configured as a Redirector.

11.3 PERSONAL SERVICES/PC

Personal Services/PC (PS/PC) is used to access a DISOSS/370 network consisting of a mixture of different device types. For example, a manager using PS/PC may ask a secretary to type up a memo. Both the manager and the secretary use LAN attached PC's. The secretary uses DisplayWrite 3 or 4 to create the memo. The manager requests that the memo be returned for review before being distributed to other professionals, who use Personal Services/370 via fixed function type terminals (327x type devices).

The secretary creates the memo locally, using a 'read only' shared subdirectory on the LAN server containing the DW3 or 4 code. The rough draft of the memo is placed in a read/write/create shared subdirectory on the LAN server and notifies the manager that the rough draft is ready by sending the manager a LAN message. The manager, having access to the same read/write/create subdirectory, reviews the rough draft, makes a few changes using DWA since the manager has access to a read-only shared subdirectory that contains the DWA code, and then notifies the secretary that the memo is ready for distribution. At this point the secretary, again using DW3 or 4, converts the document to Final Form Text (FFT), and saves the converted document either at the LAN server or locally. The secretary, if not already in session with Host, would start PC3270EM and initiate a CICS session. Hot-keying back to the DOS session, the secretary would then start, and use, PS/PC to distribute the FFT format memo, from the LAN server or the local PC - wherever it was saved, to the other professionals via DISOSS.

Although this example is simple in nature, the concept of using the LAN to simplify the creation, storage, review, and eventual distribution of memos and documents is very powerful.

```

PATH=C:\PROFSPC;C:\APPS\TEXT;C:\PROFSDATA;C:\
&GML.TOP
COMMAND /C PROFS
PAUSE (CTRL-BREAK) will return you to DOS, or press ENTER
COMMAND /C DW3
PAUSE (CTRL-BREAK) will return you to DOS, or press ENTER
GOTO TOP

```

Figure 60. Scenario-.BATfilelinkingDisplayWrite3andPROFS/PCSupport

11.3.1 SUPPORTED DOCUMENT TYPES

Notice that in the example described above the secretary converted the memo to FFT for distribution. The secretary could have converted the memo to Revisable Form Text (RFT), or could have distributed it as a PC file. In any case, when PC's are connected to a DISOSS/370 (or any other Host system) network, it is important to be aware of the type of documents and files that can be sent to other users, and what must be considered to insure revision and print fidelity of that file or document once it has been distributed.

Usually, a PS/PC user can send and receive four types of DIA defined documents:

Program	RDR	RCV	MSG	SRV
DOS	46	46	46	46
TOKREUI	13	13	13	13
NETBEUI	46	46	46	46
Not Available for use	35	53	144	191
Subtotal for LAN	140	158	249	296
PC 3270 EMULATION	186	186	186	186
Subtotal for LAN + EM	326	344	435	482
PROFS/PC SUPPORT	274	274	274	274
Subtotal for PROFS/PC Su. + LAN + EM	600	618	709	756
DW3 *	228	228	228	228
TOTAL for N/S **	632	649	741	787

* When DW3 is invoked from within PROFS/PC Support, some of the PROFS/PC Support memory is released, thus providing DisplayWrite with enough memory to load. The memory shown is the minimum amount required by DW3 alone to load.

** The TOTAL row shows the approximate amount of memory required with DW3 invoked from the PROFS/PC Support Main Menu.

Figure 61. Scenario - Approximate Memory Requirements for PROFS/PCSupport and DisplayWrite 3

- RFT (Revisable Form Text),
- FFT (Final Form Text),
- Messages (up to 256 bytes) and
- PC-PVT (PC files).

If a document is sent to a PS/PC user which is not in one of the three DIA document types listed above, then DISOSS/370 will attempt to transform the document into one that DISOSS knows PS/PC can receive. DISOSS knows what document types can be sent to a PS/PC user because of the information contained in the DIA SIGN-ON command sent from the PC to DISOSS/370 when a CICS transaction is issued to DISOSS by the PC. There is actually a multitude of information contained in the SIGN-ON, including information concerning the character sets PS/PC supports.

In a DISOSS/370 system, if a document cannot be delivered to the intended recipient because it is of an incompatible type, it is held in the DISOSS delivery queue until cancelled by either a) the recipient or b) the DISOSS/370 administrator.

A PS/PC user cannot cancel distribution, so the DISOSS/370 administrator must be notified to do this for the PS/PC user.

11.3.2 ENSURING DOCUMENT DELIVERY

In our example, above, if the secretary needs to know if all of the intended recipient(s) have received the memo the secretary specifies COD (Confirmation of Delivery) in the PS/PC 'Send' menu. Although the File Cabinet has a reference to the fact that the document has been sent, and when it was sent, there is no information concerning the list of intended recipients, nor whether they have received it.

When specifying COD, the secretary also asked DISOSS/370 to return a Distribution Status document. As the memo is delivered to each recipient, or there was some sort of system error during its attempted delivery, the secretary is notified by the receipt of a Distribution Information document containing that information. There is one Distribution Information document returned to the secretary for each successful delivery or error condition.

11.3.3 KEEPING TRACK OF RECEIVED DOCUMENTS

The secretary has two ways of categorizing the incoming mail: Date or Tag. The Tag is an optional 1-8 character identifier assigned to one or more items in a File Cabinet. All incoming mail is given a tag of NEWMAIL, unless there was an error during reception of the document, in which case that mail item will have a tag of STATUS.

It is important that the tag of newly received mail be changed as possible if management of the File Cabinet by Tag is desired. The secretary could choose such tags as PENDING or HANDLED for items that require attention, or have been attended to. The secretary can assign a (future) date to some item with a PENDING Tag, making it possible to maintain 'required-by' information. Items

that are of general interest and do not require specific action can be Tagged as GENERAL. The secretary can also print or delete newly received mail items without moving them to a filing cabinet.

11.3.4 FILE CABINET ITEMS

- Document items - File cabinet items can be created to describe documents on a PC's fixed disk or in a LAN server shared subdirectory. A document item can also contain a message that is associated with the referenced document. After creating a document item, the various file cabinet options can be used to work with the document it describes.
- External Reference items - A file cabinet item can be created to describe the contents and location of documents not stored in the file cabinet itself. These external reference items can also contain a message that is associated with the external document. After creating an external reference item, it can be used as a reminder of that document's physical location.

11.3.5 DISK OR DISKETTE FOR THE FILE CABINET

The table shown in Figure 62 summarizes the benefits and drawbacks of using a fixed disk or removable diskette as a File Cabinet and for storing received documents.

Media	Benefits	Drawbacks
Diskette	Secure in a shared PC environment Easy to manage disk full situation but may need to copy some File Cabinet items	Less room for received documents Need to keep inserting diskette to send docs
Disk	More room for received documents No need to insert any diskettes	Insecure in a shared PC environment Need to manage disk space carefully No need to copy File Cabinet items when diskette is full

Figure 62. Scenario - PS/PC - Disk or Diskette for a File Cabinet ?

11.3.6 WHAT TO DO WHEN A FILE CABINET IS FULL

If, during the reception of a document, the disk/diskette being used to receive the document runs out of space, an entry will be placed in the File Cabinet with the tag RECERR. The incomplete file will be deleted. The document will still be on the DISOSS/370 delivery queue in its entirety.

If the File Cabinet is on a fixed disk, some files will have to be deleted to make room for the incoming mail. If a diskette is being used as the destination for incoming mail, a new file cabinet would have to be created on another diskette, and the receive transaction re-started.

APPENDIX A. NETWORK STATION CONFIGURATION

This appendix contains approximate memory requirements for a LAN attached PC, configured as a Network Station in PC3270EM, and configured, shown in the leftmost column in the PCLANP. The following abbreviations apply:

- P - PC3270EM Printer use required (Y/N)
- A - PC3270EM Alternate Tasks required (Y/N)
- F - PC3270EM File Transfer required (Y/N)
- DOS - DOS 3.2
- NET - includes TOKREUI, NETBEUI and the PCLANP
- 3270 - PC 3270 Emulation Version 2.0

All figures are in K (1024) bytes.

	P Y	P N	A Y	A N	F Y	F N	DOS	NET	3270	TOTAL
SRV	x		x		x		44	239	196	479
SRV		x	x		x		44	239	186	469
SRV		x		x	x		44	239	163	446
MSG	x		x		x		44	194	196	434
MSG		x	x		x		44	194	186	424
MSG		x		x	x		44	194	163	401
RCV	x		x		x		44	102	196	342
RCV		x	x		x		44	102	186	332
RCV		x		x	x		44	102	163	309
RDR	x		x		x		44	84	196	324
RDR		x	x		x		44	84	186	314
RDR		x		x	x		44	84	163	291

Figure 63. Appendix A - Network Station Configuration

APPENDIX B. GATEWAY STATION CONFIGURATION

This appendix contains approximate memory requirements for a LAN attached PC, configured as a Gateway Station in PC3270EM, and configured in the PCLANP, shown in the leftmost column . The following abbreviations apply:

- P - PC3270EM Printer use required (Y/N)
- A - PC3270EM Alternate Tasks required (Y/N)
- F - PC3270EM File Transfer required (Y/N)
- DOS - DOS 3.2
- NET - includes TOKREUI, NETBEUI and the PCLANP
- 3270 - PC 3270 Emulation Version 2.0

All figures are in K (1024) bytes.

	P Y	P N	A Y	A N	F Y	F N	DOS	NET	3270	TOTAL
SRV SRV	N/A	N/A	x	x	N/A N/A		44 44	239 239	190 182	473 465
MSG MSG	N/A	N/A	x	x	N/A N/A		44 44	194 194	190 182	428 420
RCV RCV	N/A	N/A	x	x	N/A N/A		44 44	102 102	190 182	336 328
RDR RDR	N/A	N/A	x	x	N/A N/A		44 44	84 84	190 182	318 310

Figure 64. Appendix B - Gateway Configuration

APPENDIX C. GATEWAY WITH NETWORK STATION

This appendix contains approximate memory requirements for a LAN attached PC, configured as a Gateway plus Network Station in PC3270EM, and configured in the PCLANP, shown in the leftmost column. The following abbreviations apply:

- P - PC3270EM Printer use required (Y/N)
- A - PC3270EM Alternate Tasks required (Y/N)
- F - PC3270EM File Transfer required (Y/N)
- DOS - DOS 3.2
- NET - includes TOKREUI, NETBEUI and the PCLANP
- 3270 - PC 3270 Emulation Version 2.0

All figures are in K (1024) bytes.

	P Y	P N	A Y	A N	F Y	F N	DOS	NET	3270	TOTAL
SRV	x		x		x		44	239	251	534
SRV		x	x		x		44	239	241	524
SRV		x		x	x		44	239	233	516
MSG	x		x		x		44	194	251	489
MSG		x	x		x		44	194	241	479
MSG		x		x	x		44	194	233	471
RCV	x		x		x		44	102	251	397
RCV		x	x		x		44	102	241	387
RCV		x		x	x		44	102	233	379
RDR	x		x		x		44	84	251	379
RDR		x	x		x		44	84	241	369
RDR		x		x	x		44	84	233	361

Figure 65. Appendix C - Gateway + Network Station Configuration

APPENDIX D. MANUALS

This appendix lists some of the manuals that were used during the preparation of this document, or that provide additional, more detailed, information on specific LAN subjects.

IBM PC NETWORK 3270 EMULATION PROGRAM PC Network 3270 Emulation Release 2 Guide	GG24-1695
IBM PC NETWORK PROGRAM PC Network Guide PC Network and PC Network Program Introduction	Z320-9437 GG24-1691
IBM TOKEN-RING NETWORK Token-Ring and Network Basic Input/Output System Application Token-Ring PC Adapter Guide to Operations Token-Ring NETBIOS Program Users Guide Token-Ring Network Installation Guide Token-Ring Network PC Products Description and Installation	GG24-1737 SA27-3710 SC30-3393 GA27-3678 GG24-1739
PROFS PC SUPPORT Getting Started with the Professional Office System - PC Support (5664-309)	SH20-6805
PERSONAL SERVICES/PC DISOSS/370 Version 3 Release 2 Support for Personal Services/PC Technical Reference Personal Services/PC Office Systems Interconnection: Guide to Connecting Personal Services/PC to DISOSS	SC30-3286 SC30-3332 GG24-1714

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APPENDIX E. LAN COMPATIBLE PROGRAMS

This appendix lists SOME of the programs that have claimed compatibility with the Token Ring Network and/or the PC Network. We do NOT claim to have tested them all, or even most of them.

Programs marked with an * are discussed within the body of the text.

APPLICATION DEVELOPMENT

6280057 DOS 3.2*
6024003 Basic Compiler 1.0
6024216 Basic Compiler 2.0
6280072 C Compiler 1.0
6024011 Cobol 1.0
6024012 Fortran 1.0
6024127 Fortran 2.0
6024128 Pascal 2.0
6024200 Professional Fortran 1.0
6024138 Sort 1.0
6024205 Graphics File System 1.1
6024203 Graphics Kernel System 1.1
6280076 Graphics Development Toolkit 1.1k
6024205 Graphics Plotting System
6024002 Macro Assembler 1.0
6024193 Macro Assembler 2.0
6317025 EZ-VU Runtime
6317026 EZ-VU Development

ASSISTANT SERIES

6024144 IBM Writing Assistant
6024147 IBM Graphing Assistant
6024145 IBM Filing Assistant
6024146 IBM Reporting Assistant
6024148 IBM Planning Assistant
6024089 IBM Drawing Assistant
6024151 IBM Assistant Executive Solutions
6024152 IBM Assistant Accounting Solutions
6024150 IBM Assistant Home Solutions
6024135 IBM Assistant Planning Solutions
6024051 IBM Personal Editor
59X9958 IBM DisplayWrite Assistant

PERSONAL DECISION SERIES

6410937 PDS Reports
6410936 PDS Data
6410939 PDS Plans
6410940 PDS Words

COMMUNICATIONS

6024042 IBM 3101 Emulation
59X9904 IBM PC 3270 Emulation Entry Level*
59X9969 IBM PC 3270 Emulation Version 3*
6024037 IBM BSC 3270 Emulation
1642003 IBM Asynchronous Communications Server*

TOKEN-RING AND PC NETWORKS

6467036 IBM Token-Ring Network/PC Network Interconnection*
6403831 IBM Token-Ring Network Bridge Program*
6280063 IBM PC Local Area Network Program*
6467037 IBM Token-Ring Network NETBIOS Program*
6476046 IBM Token-Ring Network Manager*
6317042 IBM LAN Print Manager

PERSONAL SERVICES

5664309 PROFS PC/Support*
6476054 Personal Services/PC*
6280741 IBM Voice/Phone Assistant
6280742 IBM Voice Activated Keyboard
6024455 IBM Topview*

DISPLAYWRITE AND OTHER EDITORS

6024197 DisplayWrite Medical
6024190 DisplayWrite Legal
6280845 DisplayWrite 3 1.1*
74X9904 DisplayWrite 4
6024048 IBM Professional Editor

EDUCATION

6024076 Logo
6024075 Teacher's Quiz Designer
6024104 Missing Letters
6024072 Listen to Learn
6024136 Logo Learner

Biology Series

6024316 Cell Functions - Growth and Mitosis
6024317 Chemicals of Life I
6024344 Chemicals of Life II
6024409 Chemicals of Life III
6024318 The Leaf: Structure and Physiology
6024319 Light, Plants and Photosynthesis
6024320 Passive Transport
6024321 Plants: Growth and Specialization
6024343 Pathology
6024345 Modern Genetics
6024346 Human Life Processes I
6024411 Human Life Processes II
6024407 Cytology and Histology
6024408 Mendelian Genetics
6024410 Regulation and Homeostasis
6024412 The Environment I
6024413 The Environment II
6024414 Human Life Processes III
6024415 Pollination and Fertilization
6024416 Taxonomy

Earth Science Series

6024121 Hydrological Cycle
6024122 Ground Water

6024123 Surface Water
6024124 Moisture in the Atmosphere
6024322 Earthquakes
6024323 Volcanoes
6024324 Landslides

Physics Series

6024403 Investigating Acceleration
6024404 Investigating Gravitational Forces
6024405 Investigating Thermal Energy
6024406 Investigating Conservation of Energy
6024466 Investigating Wave Interference
6024464 Investigating Electric Fields
6024465 Investigating Models of Light

Electric Poet Courses

6024093 Comma Cat
6024067 Dictionary Dog

Private Tutor

6024063 Learning DOS
6024081 Learning to Program in Basic
6024069 Computers and Communications
6024325 Reading and Comprehension
6024326 Vocabulary Building Skills
6024327 Word Knowledge Skills
6024084 Language Skills
6024305 Math Computation Skills
6024297 Basic Number Concepts
6024307 Preparing for Geometry and Algebra
6024308 Solving Math Word Problems
6024085 Capitalization Skills
6024083 Punctuation Skills
6024086 Spelling Skills
Multiplication Tables

ACCOUNTING

AAS

6317050 Accounts Payable
6317051 Billing and Accounts Receivable
6317049 General Accounts
6317053 Inventory Control/Purchasing
6317054 Job Cost
6317052 Payroll

BMS

6410958 Accounting Extension
6410951 Accounts Payable
6410960 Accounts Payable Training
6410952 Accounts Receivable
6410961 Accounts Receivable Training
6410957 Financial Extension
6410950 General Ledger
6410959 General Ledger Training

6410955 Inventory Accounting
6410964 Inventory Accounting Training
6410965 LAN Access Edition
6410954 Order Entry/Invoicing
6410963 Order Entry/Invoicing Training
6410953 Payroll
6410962 Payroll Training

BAS

6466989 Accounts Payable
6466990 Accounts Receivable
6466988 General Accounts
6466955 Information Management
6466993 Inventory Control
6466992 Network Extension
6466994 Order Entry
6466991 Payroll

ALTERNATE FIELD: When you have started a PC 3270 Station that is configured for Alternate Tasks, you can switch to a DOS session with the Hot Key combination. This session is called the Alternate Field in PC 3270. It is also known as the Alternate Partition or the Alternate Task in some documentation.

API: Application Program Interface, which allows you to write a program that will automate some of the tasks on a computer.

BASEBAND: The transmission of an analog signal at its original frequency.

BROADBAND: A general term used to describe wide bandwidth equipment or systems that can carry a large portion of the electromagnetic spectrum. A broadband communications system can accommodate all broadcast and many other services.

CHARACTER SET: The total number of different displayed characters including alphabets, numerics, and special symbols. Alphabets may be shown as uppercase only or as uppercase and lowercase.

CMS: Conversational Monitor System. IBM interactive handling system in the VM environment.

CSMA/CD: Carrier Sense Multiple Access with Collision Detection. A technique by which many independent nodes can share a common broadcast communication channel without requiring a central transmission allocation authority.

CMSREADY STATE: The state in which you place the host computer that lets PROFS and the PC exchange information.

FILE CABINET: An area in Personal Services/PC that contains items referencing each mail transaction that

occurs and each entry that you create.

FORMATTED DOCUMENT: In the PROFS host system pertaining to a document that has been laid out by the Document Composition Facility (DCF) Text Processor Program. This means that the text has been arranged with preset margins and page lengths. Any DCF commands that were included in the text are translated and used in the formatted document.

GATEWAY: Communications server acting as a translator to change the internal network protocol to the required external protocol, and vice versa.

HOT KEY: A key combination (Alt-Esc) that switches PC 3270 from the 3270 session to the Alternate Field or vice versa.

LAN: Local Area Network; a system for gathering or exchanging information within a limited geographical area, usually within a building or group of buildings near by.

LU: Logical Unit, a Systems Network Architecture (SNA) term. Can be an application in the host (IMS, CICS, TSO, etc.) or a terminal. When you log on to a host application, you will have an LU-LU session with that specification.

MESSENGER: A configuration of the PC LAN Program, supporting Receiver functions and also allowing the user to send messages from full-screen panels.

NETBIOS: A LAN architecture, introduced with the PC Network products. Gives a standardized interface that allows programs to establish sessions with programs on other stations on the LAN. The interface is supported by the PC Network Adapter and by the Token-Ring NETBIOS Program.

NETWORK STATION: A PC 3270 configuration, which uses a Gateway to provide 3270 connection services.

NODE: A network location where communication links begin, end or intersect.

PATH: On the PC, a series of sub-directories where a specific file can be found on the disk or diskette.

PC LAN PROGRAM: IBM PC LAN Program Version 1.1.

RECEIVER: A configuration of the PC LAN Program. Contains Redirector function plus the capability to receive messages from other PC LAN stations.

REDIRECTOR: The most basic configuration of the PC LAN Program. Can use Server resources.

SERVER: The full function configuration of the PC LAN Program. Allows other PC LAN stations to share disks, directories and printers. Includes the functions provided by the Messenger.

STANDALONE STATION: A configuration of PC 3270. Has a host connection but no PC 3270 LAN sessions.

TOGGLE: To change sessions between the PC and the host computer by pressing a key or combination of keys.

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Reader's Comment Form

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