

IBM

*Personal Computer
Productivity Series*

3278/79
Emulation
Control Program

User's Guide



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Productivity Series*

**3278/79
Emulation
Control Program**

User's Guide

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About This Book

This manual explains how to use your IBM Personal Computer or IBM Personal Computer XT with the IBM Personal Computer 3278/79 Emulation Adapter and the IBM Personal Computer 3278/79 Emulation Control Program to simulate many of the functions of an IBM 3278 and 3279 typewriter keyboard (U.S. English) and the IBM 3278 Model 2 Display Station or the IBM 3279 Model 2A Color Display Station.

The IBM Personal Computer 3278/79 Emulation Control Program allows you to:

- Integrate your IBM Personal Computer into your existing host computer network
- Use your IBM Personal Computer as a single work station.

Throughout this manual, the term “Personal Computer” refers to either the IBM Personal Computer or the IBM Personal Computer XT. The term “PC3278 Control Program” refers to the IBM Personal Computer 3278/79 Emulation Control Program. The term DOS 2.1 refers to the IBM Disk Operating System program (version 2.1 or later).

Helpful Features

A keyboard aid and a reference card are provided. These aids provide a summary of the extended keyboard uses, the commands, and the status indicators.

Who Should Use This Manual

This manual is for anyone using an IBM Personal Computer who wants to use information that exists in a host environment.

You should have a general knowledge of the IBM Personal Computer Disk Operating System, Version 2.1 (DOS 2.1) and be familiar with the communications for your host computer system.

Organization of this Manual

This manual has seven chapters and five appendixes.

Chapter 1. Introduction acquaints you with the PC3278 Control Program and adapter.

Chapter 2. Preparing Your Diskettes and Fixed Disk provides instructions to merge the PC3278 Control Program with DOS 2.1.

Chapter 3. Starting the PC3278 Control Program describes the methods available to start the PC3278 Control Program.

Chapter 4. Using The Keyboard tells you how the PC3278 Control Program redefines the keyboard to emulate an IBM 3278 Keyboard (U.S. English) and the key combinations used to switch modes.

Chapter 5. Printing tells you how to print information displayed on your screen to a printer attached to either your Personal Computer or an IBM 3274 Control Unit.

Chapter 6. Transferring a File tells you how to transfer files to and from the IBM Personal Computer and either VM/CMS or MVS/TSO.

Chapter 7. Some Problem-Solving Tools helps you determine if a problem is hardware related, software related, or caused by operator error.

Appendix A. Messages explains the messages that can appear on your screen.

Appendix B. Operator Information Area in Host Computer Mode contains a chart of 3278 status indicators to help you understand the symbols that appear in the Operator Information Area of your screen.

Appendix C. File Transfer ASCII to EBCDIC Translation shows the translations between ASCII and EBCDIC during file transfer.

Appendix D. Bibliography lists manuals from the IBM Personal Computer library and the IBM 3270 library to help you understand your system.

Appendix E. Glossary defines many of the words, acronyms, terms, and phrases used in this publication.

Related Publications

IBM Personal Computer *Disk Operating System, Version 2.1*, Part Number 6024001

IBM Personal Computer *Guide to Operations*, Part Number 6936741

IBM Personal Computer *Hardware Maintenance and Service*, Part Number 6025072

IBM Personal Computer *Technical Reference*, Part Number 6025005

IBM Personal Computer XT *Guide to Operations*, Part Number 6936810

IBM Personal Computer XT *Hardware Maintenance and Service*, Part Number 6936809

IBM Personal Computer XT *Technical Reference*, Part Number 6936808

IBM Personal Computer 3278/79 Emulation Adapter Hardware Maintenance and Service, Part Number 1502337

IBM Personal Computer 3278/79 Emulation Adapter Option Instructions, Part Number 1502335

IBM Personal Computer 3278/79 Emulation Adapter Technical Reference, Part Number 1502336

IBM Personal Computer 3278/79 Emulation Adapter Installation/Problem Determination Guide, Part Number 6936421

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Chapter 1. Introduction

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IBM Personal Computer 3278/79 Emulation

The IBM Personal Computer 3278/79 Emulation Adapter, when used with the IBM Personal Computer 3278/79 Emulation Control Program, allows your IBM Personal Computer or IBM Personal Computer XT to emulate many of the functions of the 3278 and 3279 typewriter keyboard (U.S. English) and one of the following:

- IBM 3278 Model 2 Display Station
- IBM 3279 Model 2A or S2A Color Display Station.

The following four colors are supported:

- White
- Red
- Blue
- Green

The Personal Computer 3278/79 Emulation Control Program allows you to execute a host computer session and a Personal Computer DOS 2.1 application at the same time. Data can be transferred between your Personal Computer and a host computer when the Personal Computer 3278/79 Emulation Control Program is used with the IBM host-supported File Transfer Program.

Note: File Transfer is not supported on a 4701 Finance Communications Controller.

Minimum Requirements

To use the PC3278 Control Program, you must have the following:

Personal Computer

- Either the IBM Personal Computer or the IBM Personal Computer XT System Unit
- 128K bytes of memory
- One 160K-byte (single-sided) diskette drive or 320K-byte (double-sided) diskette drive with a 5-1/4" Diskette Drive Adapter
- The IBM Personal Computer Monochrome Display with the IBM Monochrome Display & Printer Adapter or a Color Display with the Color/Graphics Monitor Adapter
- DOS 2.1
- The IBM Personal Computer 3278/79 Emulation Adapter
- The IBM Personal Computer 3278/79 Emulation Control Program

Control Unit

The IBM Personal Computer 3278/79 Emulation Adapter can be attached to any of the following:

- A 3274 Control Unit configured for a 3278 Model 2 Display Station or 3279 Model 2A Color Display Station with a 3278 Keyboard (U.S. English)
- The 4321/4331 Display/Printer Adapter with the specify code #9843 installed
- The 4361 Display/Printer Adapter
- The 4701 Finance Communication Controller, using feature #3101.

A coaxial cable connecting the Personal Computer to the Control Unit is required.

Host

The IBM host-supported File Transfer Program #5664-281 for VM/CMS or the IBM host-supported File Transfer Program #5665-311 for MVS/TSO is required to allow transfer of data between the Personal Computer and the host computer.

Note: File Transfer is not supported on a 4701 Finance Communication Controller.

Compatibility

Many IBM Software products will run concurrently with the IBM 3278/79 Emulation Control Program on both the IBM Personal Computer and the IBM Personal Computer XT. Contact your marketing representative for specific details.

Applications may operate concurrently with the 3278/79 Emulation Control Program if they do not:

- Overlay the DOS or BIOS area of storage.
- Use interrupt vectors hex 50 through hex 57.
- Use adapter I/O port, hex 2D0 through hex 2DF.
- Program the 8259 interrupt controller.
- Use cassette interrupt hex 15.
- Disable interrupts, fail to issue an end-of-interrupt (IRET) on a hardware interrupt level, or mask selected interrupt levels for more than 100 milliseconds.
- Use IBM PC DOS print spooling.
- Use the following key combinations:
 - Alt + Esc
 - Alt + S
 - Alt + R

- Write directly to the video buffer

Note: Applications which write directly to the video buffer must be run in a “suspended” mode.

This list of limitations for concurrent operation may not be complete.

Installation of Adapter

The IBM Personal Computer 3278/79 Emulation Adapter can be installed in any full-size system unit expansion slot of the IBM Personal Computer or IBM Personal Computer XT System Unit. *Do not install the adapter in an IBM Expansion Unit.*

A coaxial cable connects the adapter to the 3274 Control Unit; the 4321/4331/4361 Display/Printer Adapter; or a 4701 Finance Communication Controller, using feature #3101. The PC3278 Control Program is the program that allows emulation.

Chapter 2. Preparing Your Diskettes and Fixed Disk

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Introduction

This chapter describes how to merge the PC3278 files with your DOS 2.1 files.

Your PC3278 Control Program diskette is in a plastic jacket at the back of this manual. The diskette contains the control program, the programs necessary to send and receive files, and a program that can be used to create an autoexec.bat file. The PC3278 Control Program diskette does not contain the DOS files needed to load the PC3278 Control Program or to establish a Personal Computer session.

Follow the instructions in this chapter to make a copy of your DOS 2.1 diskette and back up your PC3278 Control Program diskette. The copy of the DOS 2.1 diskette will be used to merge DOS 2.1 and PC3278 Control Program files.

If you have diskette drive(s) only, use the section of this chapter that matches the drive configuration of your Personal Computer. If you have a Fixed Disk Drive(s), use the section of this chapter for Fixed Disk Drive(s).

One Diskette Drive System—Single-Sided Diskette

Follow these instructions to make a copy of your DOS 2.1 diskette, back up your PC3278 Control Program diskette, and merge the two diskettes. You need two blank diskettes. For further information on the commands used in this procedure, refer to the IBM Personal Computer *Disk Operating System 2.1* manual.

Making Backup Diskettes

1. Use a felt-tip pen and label one of the blank diskettes DOS 2.1/PC3278. Label the other blank diskette PC3278 BACKUP.
2. Insert the DOS 2.1 diskette that you received with your DOS 2.1 manual into the diskette drive.
3. Switch **ON** your System Unit if you have not already done so. If the System Unit is already **ON**, press and hold Ctrl and Alt; then press Del (system reset). Release all three keys.
4. DOS asks for today's date; enter the date.
5. DOS asks for the time; enter the time.

The following message appears:

```
The IBM Personal Computer DOS  
Version 2.10 (C)Copyright IBM Corp 1981, 1982, 1983
```

```
A>
```

6. Type:

diskcopy

7. Press Enter (↵).

The following message appears:

Insert source diskette in drive A:

Strike any key when ready

8. Leave the DOS 2.1 diskette in the diskette drive. For this procedure, use the DOS 2.1 diskette as your “source” diskette.

With only one diskette drive, you must exchange diskettes during the DISKCOPY procedure. A message appears on your screen when an exchange is needed.

9. Press any key. The “in use” light comes on while the DOS 2.1 diskette is being read; this message is then displayed:

Insert target diskette in drive A:

Strike any key when ready

10. Remove your DOS 2.1 diskette and insert the diskette labeled DOS 2.1/PC3278. For this procedure, use the diskette labeled DOS 2.1/PC3278 as your “target” diskette.

11. Press any key.

12. The “in use” light comes on while the target diskette is being written. The screen continues to ask for the source or target diskette until the copy is complete. Follow the messages on your screen until the following message appears:

Copy complete

Copy another (Y/N)?

13. Type:

y

The following message appears:

Insert source diskette in drive A:

Strike any key when ready

14. Remove the diskette labeled DOS 2.1/PC3278 from the diskette drive. You will merge the PC3278 files later.

15. Store your original DOS 2.1 diskette in a safe place.

16. Insert the PC3278 Control Program diskette (located at the back of this book) into the diskette drive. Use the PC3278 Control Program diskette as the “source” diskette.

17. Press any key. The “in use” light comes on while the PC3278 Control Program diskette is read; this message is then displayed:

Insert target diskette in drive A:

Strike any key when ready

18. Remove your PC3278 Control Program diskette and insert the diskette labeled PC3278 BACKUP. Use the diskette labeled PC3278 BACKUP as the “target” diskette.

19. Press any key.

20. The “in use” light comes on while the PC3278 BACKUP diskette is written. The screen continues to ask for the source or target diskette until the copy is complete. Follow the messages on your screen until the following message appears:

Copy complete

Copy another (Y/N)?

21. Type:

n

The following message appears:

Insert COMMAND.COM disk in drive A
and strike any key when ready

22. Your PC3278 backup copy is complete. Remove the PC3278 BACKUP diskette from the diskette drive.

23. Store your original PC3278 Control Program diskette in a safe place.
24. Insert the diskette labeled DOS 2.1/PC3278 into the diskette drive.
25. Press any key. The DOS prompt A> appears.

Continue with “Merging the PC3278 Control Program with DOS 2.1.”

Merging the PC3278 Control Program with DOS 2.1

A single-sided diskette cannot easily contain all the files on your DOS 2.1 diskette and your PC3278 Control Program diskette. The following instructions tell you how to merge your DOS 2.1 diskette with only the portion of the PC3278 Control Program diskette that allows you to set up a host or dual computer session. The SEND.COM and RECEIVE.COM files will not be included on the merged diskette. Use your PC3278 BACKUP diskette for transferring files.

1. Use the DOS CHKDSK command to check the amount of available space on the diskette labeled DOS 2.1/PC3278. To merge the PC3278 Control Program with DOS 2.1, you must have at least 23K bytes of available space. If you do not have sufficient space, use the DOS ERASE command and erase from the diskette labeled DOS 2.1/PC3278 those files you do not use. Do **not** erase **COMMAND.COM**.

If you want to include all of the PC3278 files on your diskette labeled DOS 2.1/PC3278, then you must have at least 63K bytes of available space. If you have 63K bytes available, go to “Merging the PC3278 Control Program with DOS 2.1” located in the section entitled “One Diskette Drive System—Double-Sided Diskette” in this chapter.

For further information on DOS 2.1 commands, refer to the IBM Personal Computer *Disk Operating System 2.1* manual.

The DOS prompt **A>** should be displayed.

2. Remove the diskette labeled DOS 2.1/PC3278 from the diskette drive and insert the PC3278 BACKUP diskette into the diskette drive.
3. Type:

```
copy a:pc3278.com b:
```

4. Press Enter (↵). With only one diskette drive, you must exchange diskettes during the COPY procedure. A message appears on your screen when an exchange is needed.

COPY messages read as if you have two drives instead of one. Think of the messages as referring to diskettes instead of drives.

During this procedure, your PC3278 BACKUP diskette is the drive A diskette and the diskette labeled DOS 2.1/PC3278 is the drive B diskette.

5. The “in use” light comes on while a PC3278.COM file is being read; this message is then displayed:

Insert diskette for drive B: and strike any key when ready

6. Remove your PC3278 BACKUP diskette and insert the diskette labeled DOS 2.1/PC3278.
7. Press any key. The “in use” light comes on while the file is being written. When the copy is complete, the DOS prompt A> appears.
8. Remove the diskette labeled DOS 2.1/PC3278 and insert your PC3278 BACKUP diskette.
9. Type:

```
copy a:autoexec.p78 b:* .bat
```

10. Press Enter (←↵).

11. When the following message appears:

Insert diskette for drive A: and strike any key when ready

press any key.

12. When the following message appears:

Insert diskette for drive B: and strike any key when ready

remove the PC3278 BACKUP diskette from the diskette drive.

13. Insert the diskette labeled DOS 2.1/PC3278.

14. Press any key. The DOS prompt **A>** appears.

The DOS 2.1/PC3278 diskette now contains the DOS 2.1 files and the PC3278 files necessary to establish a host or dual computer session.

Go to Chapter 3.

Two Diskette Drive System—Single-Sided Diskette

Follow these instructions to make a copy of your DOS 2.1 diskette, back up your PC3278 Control Program diskette, and merge the two diskettes. You need two blank diskettes. For further information on the commands used in this procedure, refer to the IBM Personal Computer *Disk Operating System 2.1* manual.

Making Backup Diskettes

1. Insert the DOS 2.1 diskette you received with your DOS 2.1 manual into diskette drive A.
2. Switch **ON** your System Unit if you have not already done so. If the System Unit is already **ON**, press and hold Ctrl and Alt; then press Del (system reset). Release all three keys.
3. DOS asks for today's date; enter the date.
4. DOS asks for the time; enter the time.

The following message appears:

```
The IBM Personal Computer DOS  
Version 2.10 (C)Copyright IBM Corp 1981, 1982, 1983
```

```
A>
```

5. Type:

diskcopy a: b:

6. Press Enter (↵).

The following message appears:

Insert source diskette in drive A:

Insert target diskette in drive B:

Strike any key when ready

7. Leave your DOS 2.1 diskette in drive A.

8. Insert a blank diskette into drive B.

9. Press any key. The “in use” lights alternately come on while the diskette is being copied. When the copy is complete, the following message appears on your screen:

Copy complete

Copy another (Y/N)?

10. Type:

y

The following message appears:

Insert source diskette in drive A:

Insert target diskette in drive B:

Strike any key when ready

11. Remove the original DOS 2.1 diskette from drive A and store it in a safe place.
12. Remove the diskette from drive B. Use a felt-tip pen and label this diskette DOS 2.1/PC3278. You will merge the PC3278 files later.
13. Insert the PC3278 Control Program diskette into drive A.
14. Insert the second blank diskette into drive B.
15. Press any key. The “in use” lights alternately come on while the diskette is being copied. When the copy is complete, the following message appears on your screen:

Copy complete

Copy another (Y/N)?

16. Type:

n

The following message appears:

Insert COMMAND.COM disk in drive A
and strike any key when ready

17. Remove your PC3278 Control Program diskette from drive A and store it in a safe place.

18. Remove the diskette from drive B. Use a felt-tip pen and label this diskette PC3278 BACKUP.
19. Insert the diskette labeled DOS 2.1/PC3278 into drive A.
20. Press any key. The DOS prompt A> is displayed.

Continue with “Merging the PC3278 Control Program with DOS 2.1.”

Merging the PC3278 Control Program with DOS 2.1

A single-sided diskette cannot easily contain all the files on your DOS 2.1 diskette and your PC3278 Control Program diskette. The following instructions tell you how to merge your DOS 2.1 diskette with only the portion of the PC3278 Control Program diskette that allows you to set up a host or dual computer session. The SEND.COM and RECEIVE.COM files will not be included on the merged diskette. Use your PC3278 BACKUP diskette for transferring files.

1. Use the DOS CHKDSK command to check the amount of available space on the diskette labeled DOS 2.1/PC3278. To merge the PC3278 Control Program with DOS 2.1, you must have at least 23K bytes of available space. If you do not have sufficient space, use the DOS ERASE command and erase from the diskette labeled DOS 2.1/PC3278 those files you do not use. Do not erase COMMAND.COM.

If you want to include all of the PC3278 files on your diskette labeled DOS 2.1/PC3278, then you must have at least 63K bytes of available space. If you have 63K bytes available, go to “Merging the PC3278 Control Program with DOS 2.1” located in the section entitled “Two Diskette Drive System—Double-Sided Diskette” in this chapter.

For further information on DOS 2.1 commands, refer to the IBM Personal Computer *Disk Operating System 2.1* manual.

The DOS prompt A> should be displayed and the diskette labeled DOS 2.1/PC3278 should be in drive A.

2. Insert the PC3278 BACKUP diskette into drive B.

3. Type:

```
copy b:pc3278.com a:
```

4. Press Enter (←↵).

5. When the copy is complete, this message is displayed:

```
1 File(s) copied
```

```
A>
```

6. Type:

```
copy b:autoexec.p78 a:*.bat
```

7. Press Enter (←↵). The “in use” light comes on while the file is being written. When the copy is complete, the DOS prompt A> appears.

The DOS 2.1/PC3278 diskette now contains the DOS 2.1 files and the PC3278 files necessary to establish a host or dual computer session.

Go to Chapter 3.

One Diskette Drive System—Double-Sided Diskette

Follow these instructions to make a copy of your DOS 2.1 diskette, back up your PC3278 Control Program diskette, and merge the two diskettes. You need two blank diskettes. For further information on the commands used in this procedure, refer to the IBM Personal Computer *Disk Operating System 2.1* manual.

Making Backup Diskettes

1. Insert the DOS 2.1 diskette you received with your DOS 2.1 manual into the diskette drive.
2. Switch **ON** your System Unit if you have not already done so. If the System Unit is already **ON**, press and hold Ctrl and Alt; then press Del (system reset). Release all three keys.
3. DOS asks for today's date; enter the date.
4. DOS asks for the time; enter the time.

The following message appears:

```
The IBM Personal Computer DOS  
Version 2.10 (C)Copyright IBM Corp 1981, 1982, 1983
```

```
A>
```

5. Type:

```
format/s
```

6. Press Enter (↵).

The following message appears:

```
Insert new diskette for drive A:  
and strike any key when ready
```

7. Remove your DOS 2.1 diskette from the diskette drive and insert a blank diskette into the diskette drive.
8. Press any key. When the format is complete, the following message appears (the numbers may be different):

```
Formatting...Format complete  
System transferred
```

```
362496 bytes total disk space  
40960 bytes used by system  
321536 bytes available on disk
```

```
Format another (Y/N)?
```

9. Type:

```
y
```

The following message appears:

```
Insert new diskette for drive A:  
and strike any key when ready
```

10. Remove the formatted diskette.

11. Insert the second blank diskette.
12. Press any key.
13. When the formatting is complete, type:
n
14. Remove the formatted disk from the diskette drive and insert your DOS 2.1 diskette.
15. Press Enter (↵).
16. Use a felt-tip pen and label one of the formatted diskettes DOS 2.1/PC3278. Label the other formatted diskette PC3278 BACKUP.

The DOS prompt **A>** should be displayed.

17. Type:

```
copy a:*. * b:
```

Remember, with only one diskette drive, you must exchange diskettes often during the COPY procedure. A message appears on your screen when an exchange is needed.

COPY messages read as if you have two drives instead of one. Think of the messages as referring to diskettes instead of drives.

During this procedure, use your DOS 2.1 diskette as the drive A diskette and the diskette labeled DOS 2.1/PC3278 as the drive B diskette.

18. Press Enter (←). The “in use” light comes on while the DOS 2.1 files are read; this message is then displayed.

Insert diskette for drive B: and strike any key when ready

19. Remove your DOS 2.1 diskette and insert the diskette labeled DOS 2.1/PC3278.
20. Press any key. The “in use” light comes on while the files are being written. The screen continues to ask for the diskettes for drive A and drive B until the copy is complete. Follow the messages on your screen until the DOS prompt A> appears.
21. When the DOS prompt A> appears, remove your DOS 2.1 diskette and store it in a safe place.

22. Insert your PC3278 Control Program diskette into the diskette drive.

23. Type:

```
copy a:*. * b:
```

24. Press Enter (←). The “in use” light comes on while the PC3278 Control Program files are being read; this message is then displayed:

Insert diskette for drive B: and strike any key when ready

25. Remove your PC3278 Control Program diskette and insert the diskette labeled PC3278 BACKUP.
26. Press any key. The “in use” light comes on while the files are being written. The screen continues to ask for the diskettes for drive A and drive B until the copy is complete. For this procedure, use the PC3278 Control Program diskette as the drive A diskette and the diskette labeled PC3278 BACKUP as the drive B diskette.
27. Follow the messages on your screen until the DOS prompt A> appears.
28. When the DOS prompt A> appears, the PC3278 BACKUP diskette is complete. Remove your PC3278 Control Program diskette and store it in a safe place.

Continue with “Merging the PC3278 Control Program with DOS 2.1.”

Merging the PC3278 Control Program with DOS 2.1

1. Insert the diskette labeled DOS 2.1/PC3278 into the diskette drive.

2. Use the DOS CHKDSK command to check the amount of available space on the diskette labeled DOS 2.1/PC3278. To merge the PC3278 Control Program with DOS 2.1, you must have at least 63K bytes of available space. If you do not have sufficient space, use the DOS ERASE command and erase from the diskette labeled DOS 2.1/PC3278 those files you do not use. Do not erase **COMMAND.COM**. For further information on DOS 2.1 commands, refer to the IBM Personal Computer *Disk Operating System 2.1* manual.

The DOS prompt **A>** should be displayed.

3. Remove the diskette labeled DOS 2.1/PC3278 and insert your PC3278 BACKUP diskette into the diskette drive.
4. Type:

```
copy a:*.com b:
```

5. Press Enter (↵). The “in use” light comes on while the PC3278 files are being read; this message is then displayed:

```
Insert diskette for drive B: and strike  
any key when ready
```

6. Remove your PC3278 BACKUP diskette.

7. Insert the diskette labeled DOS 2.1/PC3278 into the diskette drive and press any key.

The “in use” light comes on while the file is being written. The screen continues to ask for the diskettes for drive A and drive B until the copy is complete. For this procedure, use the PC3278 BACKUP diskette as the drive A diskette and the diskette labeled DOS 2.1/PC3278 as the drive B diskette. Follow the messages on your screen until the DOS prompt **A>** appears.

8. Type:

```
copy a:autoexec.p78 b:* .bat
```

9. Press Enter (↵). The “in use” light comes on while the PC3278 file is being read; this message is then displayed:

```
Insert diskette for drive B: and strike  
any key when ready
```

10. Remove the PC3278 BACKUP diskette.
11. Insert the diskette labeled DOS 2.1/PC3278 into the diskette drive.
12. Press any key. The “in use” light comes on while the file is being written. When the copy is complete, the DOS prompt **A>** appears.

The DOS 2.1/PC3278 diskette now contains the DOS 2.1 files and the PC3278 Control Program files necessary to establish a host or dual computer session.

Go to Chapter 3.

Two Diskette Drive System—Double-Sided Diskette

Follow these instructions to make a copy of your DOS 2.1 diskette, back up your PC3278 Control Program diskette, and merge the two diskettes. You need two blank diskettes. For further information on the commands used in this procedure, refer to the IBM Personal Computer *Disk Operating System 2.1* manual.

Making Backup Diskettes

1. Insert the DOS 2.1 diskette that you received with your DOS 2.1 manual into diskette drive A.
2. Switch **ON** your System Unit if you have not already done so. If the System Unit is already **ON**, press and hold Ctrl and Alt; then press Del (system reset). Release all three keys.
3. DOS asks for today's date; enter the date.
4. DOS asks for the time; enter the time.

The following message appears:

```
The IBM Personal Computer DOS  
Version 2.10 (C)Copyright IBM Corp 1981, 1982, 1983
```

5. Type:

```
format b:/s
```

6. Press Enter (↵).

The following message appears:

```
Insert new diskette for drive B:  
and strike any key when ready
```

7. Insert a blank diskette into drive B.
8. Press any key. The following message appears (the numbers may be different):

```
Formatting...Format Complete  
System transferred  
  
362496 bytes total disk space  
40960 bytes used by system  
321536 bytes available on disk  
  
Format another (Y/N)?
```

9. Type:

```
y
```

The following message appears:

```
Insert new diskette for drive B  
and strike any key when ready
```

10. Remove the formatted diskette from drive B.
11. Insert the second blank diskette into drive B.

12. Press any key.

13. When the formatting is complete and DOS displays a message asking if you want to format another, type:

n

14. Press Enter (↵). The DOS prompt A> is displayed.

Your DOS 2.1 diskette should still be in drive A and the diskette you just formatted should be in drive B.

15. Type:

copy a:*. * b:

16. Press Enter (↵).

During the COPY procedure, the filenames of the files being copied appear on your screen. When the copy is complete, the DOS prompt A> appears.

17. When the DOS prompt appears, remove the diskette from drive B. Use a felt-tip pen and label this diskette DOS 2.1/PC3278. You will merge the PC3278 files later.

18. Remove your DOS 2.1 diskette from drive A and store it in a safe place.

19. Insert the PC3278 Control Program diskette into drive A.

20. Insert the remaining formatted diskette into drive B.

21. Type:

copy a:*. * b:

22. Press Enter (←↵).

During the COPY procedure, the filenames of the files being copied appear on your screen. When the copy is complete, the DOS prompt **A>** appears.

23. When the DOS prompt appears, remove the diskette from drive B. Use a felt-tip pen and label this diskette **PC3278 BACKUP**.

24. Remove your PC3278 Control Program diskette from drive A and store it in a safe place.

Continue with “Merging the PC3278 Control Program with DOS 2.1.”

Merging the PC3278 Control Program with DOS 2.1

1. Insert the diskette labeled DOS 2.1/PC3278 into diskette drive A.
2. Use the DOS CHKDSK command to check the amount of available space on the diskette labeled DOS 2.1/PC3278. To merge the PC3278 Control Program with DOS 2.1, you must have 63K bytes of available space. If you do not have sufficient space, use the DOS ERASE command and erase from the diskette labeled DOS 2.1/PC3278 those files you do not use. Do **not** erase **COMMAND.COM**. For further information on DOS 2.1 commands, refer to the IBM Personal Computer *Disk Operating System 2.1* manual.

3. Insert the PC3278 BACKUP diskette into drive B.

The DOS prompt A> should still be displayed.

4. Type:

```
copy b:*.* a:
```

5. Press Enter (↵).

During the COPY procedure, the filenames of the files being copied appear on your screen. When the copy is complete, the DOS prompt A> appears.

6. When the DOS prompt A> appears, type:

```
copy b:autoexec.p78 a:*.*bat
```

7. Press Enter (↵).

The “in use” light comes on while the file is being written. When the copy is complete, the DOS prompt A> appears.

The DOS 2.1/PC3278 diskette now contains the DOS 2.1 files and the PC3278 files necessary to establish a host or dual computer session.

Go to Chapter 3.

Fixed Disk Drive(s)

The following instructions tell you how to merge the PC3278 Control Program files with DOS 2.1 on your fixed disk. If you prefer to use this program on diskette, refer to the section with the diskette configuration that matches your system.

We assume that you have set up a DOS partition on your fixed disk and have copied DOS 2.1 into that partition.

You need at least 63K bytes of space on your fixed disk drive to continue. Use the DOS CHKDSK command to determine the amount of available space on your fixed disk. If you do not have sufficient space, use the DOS ERASE command and erase from the fixed disk any files you do not use. Do **not** erase **COMMAND.COM**. For further information on DOS 2.1 commands, refer to the IBM Personal Computer *Disk Operating System 2.1* manual.

To merge the PC3278 Control Program with DOS 2.1 for a fixed disk system, follow these steps:

1. Keep the door open on diskette drive A.
2. Switch **ON** your System Unit if you have not already done so. If the System Unit is already **ON**, press and hold Ctrl and Alt; then press Del (system reset). Release all three keys.

Note: Steps 1 through 4 bring up the DOS prompt. If your existing AUTOEXEC.BAT file causes your system to “boot” some program other than DOS, bring up the DOS prompt C> and continue with step 5.

3. DOS asks for today’s date; enter the date.
4. DOS asks for the time; enter the time.

The following message appears:

```
The IBM Personal Computer DOS  
Version 2.10 (C)Copyright IBM Corp 1981, 1982, 1983
```

```
C>
```

5. Insert the PC3278 Control Program diskette into drive A.
6. Type:

```
copy a:*. * c:
```

7. Press Enter (↵).

Four files from the PC3278 Control Program diskette are copied to your fixed disk. The following message appears:

```
A:PC3278.COM
A:SEND.COM
A:RECEIVE.COM
A:AUTOEXEC.P78
4 File(s) copied
```

8. Remove the PC3278 Control Program diskette and store it in a safe place.

If you have already made a backup copy of the PC3278 Control Program diskette, go to Chapter 3. If you have not, continue with the following steps.

9. Insert a blank diskette into drive A.

10. Type:

```
format a:
```

11. Press Enter (↵). The following message appears:

```
Insert new diskette for drive A:
and strike any key when ready
```

12. Press any key. The following message appears (the numbers may be different):

```
Formatting...Format Complete

362496 bytes total disk space
362496 bytes available on disk

Format another (Y/N)?
```

13. Type:

n

The DOS prompt C> is displayed. Your formatted diskette should still be in drive A.

14. Type:

copy pc3278.com a:

15. Press Enter (←↵).

When the copy is complete, the DOS prompt C> appears.

16. When the DOS prompt appears, type:

copy send.com a:

17. Press Enter (←↵).

18. When the DOS prompt appears, type:

copy receive.com a:

19. Press Enter (←↵).

20. Type:

```
copy autoexec.p78 a:
```

21. Press Enter (←↵). When the copy is complete, the DOS prompt **C>** appears.

22. Remove the PC3278 backup copy from the diskette drive. Use a felt-tip pen and label it PC3278 BACKUP.

Go to Chapter 3.

Chapter 3. Starting the PC3278 Control Program

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Introduction

This chapter explains how to:

- use an AUTOEXEC.BAT file
- start a dual computer session
- work in host computer mode without establishing a Personal Computer session.

If your PC3278 Control Program is on a diskette, continue with “AUTOEXEC.BAT File For Diskette.” If your PC3278 Control Program is on a fixed disk , go to “AUTOEXEC.BAT File For Fixed Disk” in this chapter.

AUTOEXEC.BAT File For Diskette

In Chapter 2, you copied a file named AUTOEXEC.P78 onto your DOS 2.1/PC3278 diskette and renamed the file AUTOEXEC.BAT. This AUTOEXEC.BAT file automatically loads the PC3278 Control Program every time you start your Personal Computer or perform a system reset with the DOS 2.1/PC3278 diskette in diskette drive A.

The PC3278 Control Program does not interfere with normal operation of your Personal Computer; however, it does take up approximately 23K bytes of memory. While the PC3278 Control Program is loaded, the following keystroke combinations are redefined:

- Alt + Esc
- Alt + R
- Alt + S

To establish a dual computer session, the PC3278 Control Program must be the first program loaded by DOS when the Personal Computer is turned on or you do a system reset. For this reason, an AUTOEXEC.BAT file has been included on your diskette. When you do not want the PC3278 Control Program in memory, you must perform a system reset using the DOS 2.1 diskette, not your DOS 2.1/PC3278 diskette.

If you do not have an existing AUTOEXEC.BAT file (one other than that contained on the DOS 2.1/PC3278 diskette), go to “Starting a Dual Session with a PC3278 AUTOEXEC.BAT File” in this chapter.

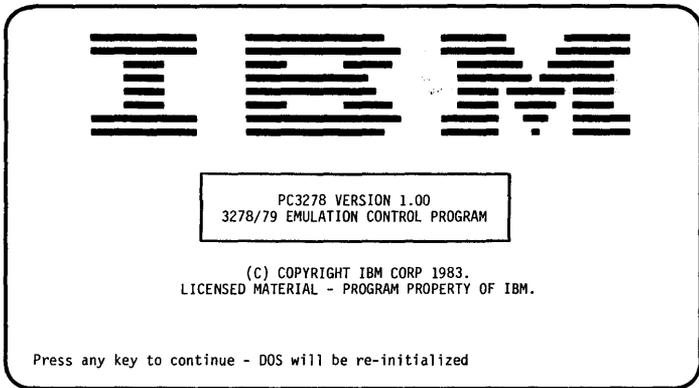
You can use your existing AUTOEXEC.BAT file and include the commands to automatically start the PC3278 Control Program, but conditions may exist where your existing AUTOEXEC.BAT file conflicts with the PC3278 Control Program. Refer to “Compatibility” in Chapter 1 for further information.

If you prefer to use your existing AUTOEXEC.BAT file and want to include the commands to automatically start the PC3278 Control Program, continue with “Modifying an Existing AUTOEXEC.BAT File For Diskette.”

Modifying an Existing AUTOEXEC.BAT File For Diskette

1. Switch **ON** your Personal Computer or do a system reset with the DOS 2.1/PC3278 diskette loaded in drive A.

The PC3278 logo appears:



2. Press any key to continue.
3. DOS asks for today's date; enter the date.
4. DOS asks for the time; enter the time.
5. When the DOS prompt A> appears, type:
`erase autoexec.bat`

6. Press Enter (←↵).
7. When the DOS prompt A> appears, remove the DOS 2.1/PC3278 diskette and insert the diskette that contains your AUTOEXEC.BAT file into drive A.
8. Insert the DOS 2.1/PC3278 diskette into drive B.

Note: If you have only one diskette drive, you must exchange diskettes during the COPY procedure. The DOS 2.1/PC3278 diskette is the diskette to use when prompted for drive B.

9. Type:

```
copy autoexec.bat b:
```

10. Press Enter (←↵).

To modify your existing AUTOEXEC.BAT file, make **echo off** the first line and **pc3278/a** the second line in your AUTOEXEC.BAT file. This can be done by using the EDLIN program on your DOS diskette. If the DOS 2.1/PC3278 diskette is not in drive A, insert it now.

11. Type:

```
edlin autoexec.bat
```

12. Press Enter (←↵).

When EDLIN is ready, the following appears on your screen:

```
End of input file
*
```

13. Type:

```
li
```

14. Press Enter (←↵).

15. When the EDLIN prompt * appears, type:

```
echo off
```

16. Press Enter (←↵).

17. When the EDLIN prompt * appears, type:

```
PC3278/a
```

18. Press Enter (←↵).

19. Press Ctrl + Break. The EDLIN prompt * is displayed.

20. Type:

```
e
```

21. Press Enter (↵).

Anytime you start your Personal Computer using the DOS 2.1/PC3278 diskette, the PC3278 Control Program loads automatically.

Note: If your AUTOEXEC.BAT file calls for programs other than those contained on your DOS 2.1/PC3278 diskette, a PAUSE command or drive indicator is required as the third line of AUTOEXEC.BAT file. Refer to “Batch Commands” in your *DOS 2.1* manual for further information.

Go to “Starting a Dual Session with a PC3278 AUTOEXEC.BAT File” in this chapter.

AUTOEXEC.BAT File For Fixed Disk

The PC3278 Control Program can be used with an AUTOEXEC.BAT file. This allows the PC3278 Control Program to start automatically every time you start your system using your fixed disk drive. The program does not interfere with the normal operation of your Personal Computer; however, it does take up approximately 23K bytes of memory. While the PC3278 Control Program is loaded, the following keystroke combinations are redefined:

- Alt + Esc
- Alt + R
- Alt + S

To establish a dual computer session, the PC3278 Control Program must be the first program loaded by DOS when the Personal Computer is turned on or you do a system reset.

If you do not have an AUTOEXEC.BAT file and you want to create one, go to “Creating an AUTOEXEC.BAT File For a Fixed Disk” in this chapter.

You can use your existing AUTOEXEC.BAT file and include the commands to automatically start the PC3278 Control Program, but conditions may exist where your existing AUTOEXEC.BAT file conflicts with the PC3278 Control Program. Refer to “Compatibility” in Chapter 1 for further information.

If you want to modify your existing AUTOEXEC.BAT file for use with the PC3278 Control Program, go to “Modifying an Existing AUTOEXEC.BAT File For a Fixed Disk” in this chapter.

If you do not want to modify your existing AUTOEXEC.BAT file, go to “Starting a Dual Session without a PC3278 AUTOEXEC.BAT File” in this chapter.

If you do not want to use an AUTOEXEC.BAT file, go to “Starting a Dual Session without a PC3278 AUTOEXEC.BAT File” in this chapter.

Creating an AUTOEXEC.BAT File For a Fixed Disk

The **AUTOEXEC.P78** file you copied onto your fixed disk in Chapter 2 must be renamed **AUTOEXEC.BAT**. This can be done by following these steps:

1. Open the door for diskette drive A.
2. Switch **ON** your Personal Computer if you have not already done so. If the System Unit is already **ON**, press and hold **Ctrl** and **Alt**; then press **Del** (system reset). Release all three keys.
3. DOS asks for today's date; enter the date.
4. DOS asks for the time; enter the time.

The following message appears:

```
The IBM Personal Computer DOS
Version 2.10 (C)Copyright IBM Corp 1981, 1982, 1983
C>
```

5. Type:

```
copy autoexec.p78 *.bat
```

6. Press Enter (↵).

Anytime you start your Personal Computer from drive C, the PC3278 Control Program loads automatically.

Go to "Starting a Dual Session with a PC3278 AUTOEXEC.BAT File" in this chapter.

Modifying an Existing AUTOEXEC.BAT File For a Fixed Disk

To modify your existing AUTOEXEC.BAT file, make **echo off** the first line and **pc3278/a** the second line in your AUTOEXEC.BAT file. This can be done using the EDLIN program as described here.

1. Open the door for diskette drive A.
2. Switch **ON** your Personal Computer if you have not already done so. If the System Unit is already **ON**, press and hold Ctrl and Alt; then press Del (system reset). Release all three keys.

Note: Steps 1 through 4 bring up the DOS prompt. If your existing AUTOEXEC.BAT file causes your system to “boot” some program other than DOS, bring up the DOS prompt **C>** and continue with step 5.

3. DOS asks for today’s date; enter the date.
4. DOS asks for the time; enter the time.

The following message appears:

```
The IBM Personal Computer DOS  
Version 2.10 (C)Copyright IBM Corp 1981, 1982, 1983
```

```
C>
```

5. Type:

```
edlin autoexec.bat
```

6. Press Enter (←↵).

When EDLIN is ready, the following message appears on your screen:

```
End of input file
*
```

7. Type:

```
li
```

8. Press Enter (←↵).

9. When the EDLIN prompt * appears, type:

```
echo off
```

10. Press Enter (←↵).

11. When the EDLIN prompt * appears, type:

```
pc3278/a
```

12. Press Enter (←↵).

13. Press Ctrl + Break.

14. When the EDLIN prompt * appears, type:

```
e
```

15. Press Enter (←↵).

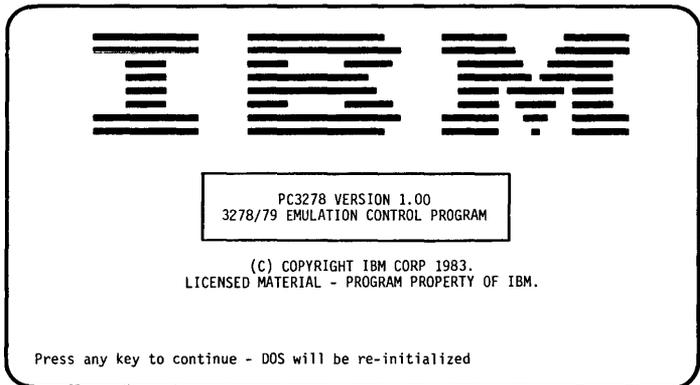
Anytime you start your Personal Computer from drive C, the PC3278 Control Program loads automatically. Continue with “Starting a Dual Session with a PC3278 AUTOEXEC.BAT File.”

Starting a Dual Session with a PC3278 AUTOEXEC.BAT File

The following procedure starts a dual computer session. This allows you to operate your Personal Computer in host computer mode and Personal Computer mode.

1. If you are using a diskette, insert your DOS 2.1/PC3278 diskette into drive A and close the drive door. If you are using a fixed disk, leave the drive A door open.
2. Switch **ON** your Personal Computer, if you have not already done so. If the System Unit is already **ON**, press and hold Ctrl and Alt; then press Del (system reset). Release all three keys.

The PC3278 logo appears:



3. Press any key to continue.

4. DOS asks for today's date; enter the date.
5. DOS asks for the time; enter the time.
6. When the AUTOEXEC.BAT file completes, press Alt + Esc; then release both keys.

If your host computer provides a logo, it appears on the screen at this time. Anytime a screen generated by your host computer appears on the display, you are in the "Host Computer Mode" and keyboard functions change. Pressing Alt + Esc again returns your display to the Personal Computer screen and your keyboard to the Personal Computer functions.

Once the host session is established, the host session remains active until you turn off the system unit, do a system reset, or reload the PC3278 program. Performing any one of these actions stops the current host session.

Go to Chapter 4.

Starting a Dual Session without a PC3278 AUTOEXEC.BAT File

This section describes how to load the PC3278 Control Program from a fixed disk without using an AUTOEXEC.BAT file.

The following procedure starts a dual computer session. This allows you to operate your Personal Computer in host computer mode and Personal Computer mode.

1. Insert a DOS 2.1 diskette that does not contain an AUTOEXEC.BAT file into drive A.

Note: If you do not have an AUTOEXEC.BAT file on drive C, you do not have to use your DOS 2.1 diskette you can load DOS from drive C.

2. Switch **ON** your Personal Computer, if you have not already done so. If the System Unit is already **ON**, press and hold Ctrl and Alt; then press Del (system reset). Release all three keys.

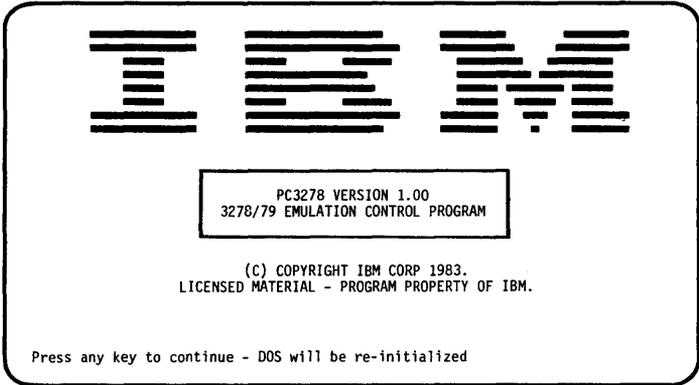
Note: While other methods for starting the PC3278 Control Program may exist, to guarantee the orderly start-up necessary for loading the PC3278 Control Program, step 2 must be completed before continuing.

3. DOS asks for today's date; press Enter (↵).
4. DOS asks for the time; press Enter (↵).
5. When the DOS prompt appears, type:

```
c:pc3278
```

6. Press Enter (↵).

The PC3278 logo appears:



7. Press any key to continue.

8. DOS asks for today's date; enter the date.

9. DOS asks for the time; enter the time.

10. When the DOS prompt appears, press Alt + Esc; then release both keys.

If your host computer provides a logo, it appears on the screen at this time. Anytime a screen generated by your host computer appears on your display, you are in the “Host Computer Mode” and the keyboard functions change. Pressing Alt + Esc again returns your display to the Personal Computer screen and your keyboard to the Personal Computer functions.

Once the host session is established, the host session remains active until you turn off the system unit, do a system reset, or reload the PC3278 program. Performing any one of these actions stops the current host session.

Go to Chapter 4.

Starting a Host Computer Session

To start a host computer session without starting a Personal Computer session:

1. Insert a DOS 2.1 diskette that does not contain an AUTOEXEC.BAT file into drive A. If you have a fixed disk without an AUTOEXEC.BAT file, leave the drive A door open.
2. Switch **ON** your Personal Computer, if you have not already done so. If the System Unit is already **ON**, press and hold Ctrl and Alt; then press Del (system reset). Release all three keys.

Note: While other methods for starting the PC3278 Control Program may exist, to guarantee the orderly start-up necessary for loading the PC3278 Control Program, step 2 must be completed before continuing.

3. DOS asks for today's date; enter the date.
4. DOS asks for the time; enter the time.

The DOS prompt appears.

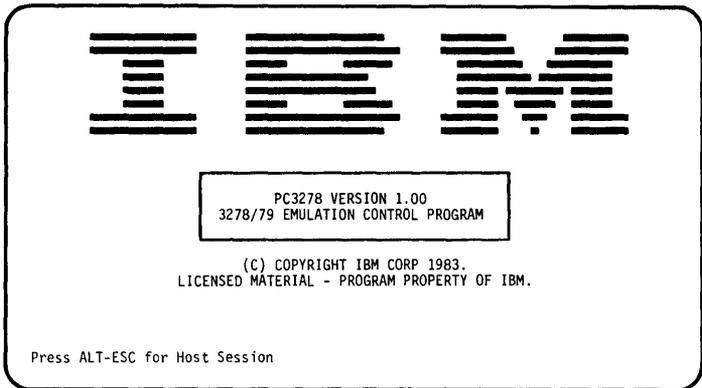
Note: If you are using a diskette, remove your DOS 2.1 diskette and insert the PC3278 BACKUP diskette.

5. Type:

PC3278/L

6. Press Enter (↵).

The PC3278 logo appears:



7. Press Alt + Esc.

Your Personal Computer is in host computer mode.
You have established a host computer session only.

Once the host session is established, the host session remains active until you turn off the system unit, do a system reset, or reload the PC3278 program. Performing any one of these actions stops the current host session.

If you decide while working in host computer mode, that you want to start a Personal Computer session:

1. Insert your DOS 2.1 diskette into drive A.
2. Press and hold Ctrl + Alt; press Num Lock. Release all three keys.

DOS is loaded and the Personal Computer session is established. The host computer session is still resident. Alt + Esc will “toggle” between sessions.

A Personal Computer session can be started or restarted at any time from host computer mode without restarting the host computer session by pressing and holding Ctrl and Alt, and then pressing Num Lock.

Go to Chapter 4.

Chapter 4. Using the Keyboard

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Introduction

The PC3278 Control Program lets your Personal Computer display a session in either the Personal Computer mode or the host computer mode. The mode you use determines whether your keyboard functions as a Personal Computer keyboard or emulates a 3278 keyboard.

This chapter explains the keys redefined by the PC3278 Control Program. A summary of the redefined keyboard used in the host computer mode is provided.

Switching Modes

If you have suspended a Personal Computer operation using the Ctrl + Num Lock key combination, press any character key to continue the Personal Computer operation before using the key combinations described in this section.

Alt + Esc

The key combination Alt + Esc is used to switch alternately between the Personal Computer mode and host computer mode. Alt + Esc can be used to switch modes at any time, whether you are using Personal Computer mode or host computer mode. If you are using host computer mode, Alt + Esc places your Personal Computer in Personal Computer mode. If you are using Personal Computer mode, Alt + Esc places your Personal Computer in host computer mode.

Alt + S

This key combination suspends Personal Computer operations when the host screen is active (host computer mode). This is the normal (default) condition when the PC3278 Control Program is first loaded and remains in effect until the Alt + R key combination is used. Alt + S can be entered from either host computer mode or Personal Computer mode. When entered from Personal Computer mode, it does not take effect until the host computer screen is active.

Alt + R

The Alt + R key combination resets the suspended Personal Computer application and allows the Personal Computer application to be performed concurrently with an active host session. This key combination can be entered from either host computer mode or Personal Computer mode. When entered from host computer mode, any suspended Personal Computer operations are resumed. When entered from Personal Computer mode, you can switch to the host computer mode without suspending the operation of the Personal Computer.

When the Personal Computer writes to the screen, the host computer screen is saved and a Personal Computer update screen is displayed (see “Update Screens” in this section).

Update Screens

When your Personal Computer and host system are processing simultaneously, update screens provide a method to track both systems.

Personal Computer Update Screens

Most Personal Computer routines use the Basic Input Output System (BIOS) to write to the screen. When the BIOS is used, the host computer screen is stored and the Personal Computer update screen is displayed.

Note: A Personal Computer routine that performs a direct memory write to the screen does not display an update screen. Personal Computer messages appear superimposed on the host computer screen. You retain the information from your host computer session, but lose the update screen. If Personal Computer messages appear superimposed on the host computer screen, you can suspend the Personal Computer session by using the Alt + S key combination.

When a Personal Computer update screen is displayed, this does not indicate a change in mode. The update screen is only a message sent by the Personal Computer to inform you of its progress. When the update screen appears, you have the following options:

- Continue typing. The host computer screen returns with all characters entered from the keyboard are displayed.
- Press any key. The host computer screen returns.

Note: Any keys you press will be entered in the host computer session.

- Press Alt + Esc. Exits host computer mode and allows you to respond to a Personal Computer update screen.

Host Computer Update Screens

While in Personal Computer mode, the host computer continues to process. The update screen is stored in a screen image buffer until you switch to host computer mode. At that time, the updated screen is displayed.

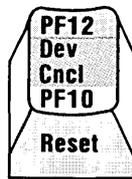
Keyboard

The PC3278 Control Program redefines the IBM Personal Computer keyboard in the host computer mode, to incorporate the functions of the IBM 3278 or 3279 typewriter keyboard (U.S. English).

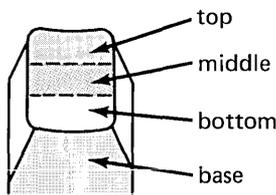
The Num Lock key provides the additional feature of a numeric key pad. Press Num Lock once and the numeric key pad is activated. Press it again and the numeric key pad is cancelled. If you press the shift key while Num Lock is activated, the numeric keypad keys have their unassisted functions. This feature operates the same in both Personal Computer and host computer modes. (Refer to the *Guide to Operations* manual for further information.)

Remove the keyboard aid from the back of this manual and place it on the ledge above your keyboard for reference. The color-coded aid shows the functions of your Personal Computer keyboard in host computer mode.

Your keyboard aid shows some keys that have multiple functions, such as the F10 key.

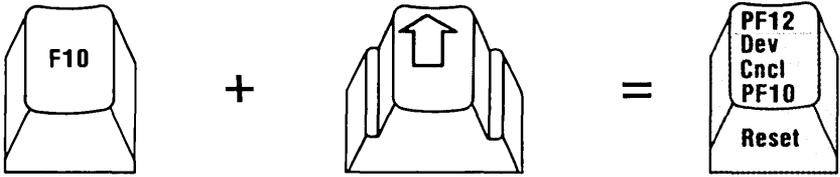


The keybutton is divided into four areas. We will define these areas as top, middle, bottom, and base.

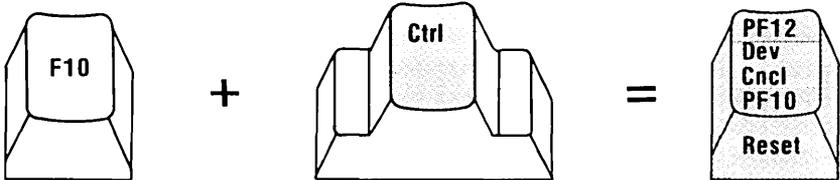


The location of each function designates how that key is used to obtain the desired function:

- Functions printed at the top are obtained by using the key with the **Shift** key (\triangle). For example:



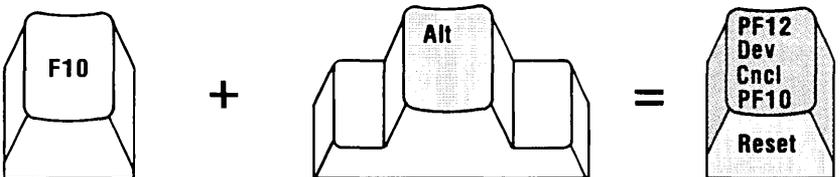
- Functions printed in the middle are obtained by using the key in conjunction with the **Ctrl** key. For example:



- Functions printed at the bottom are **unassisted** by any other key. For example:



- Functions printed on the base are obtained by using the key in conjunction with the **Alt** key. For example:



Additional Key Combinations

Ctrl + Alt + Del

The key combination Ctrl + Alt + Del results in the equivalent of a “system reset” or “reboot.” Memory is cleared and the Personal Computer is restarted. Host computer session is ended. This key combination is active only from the Personal Computer mode.

Ctrl + Alt + Num Lock

The key combination Ctrl + Alt + Num Lock results in restarting the Personal Computer and leaving the PC3278 program resident. The host computer session is not ended. This key combination provides this function only from the host computer mode.

IBM Personal Computer Keys with 3278 Typewriter Key Functions

3278 Summary of Functions

The following summary of 3278 functions helps you identify the Personal Computer keys that emulate 3278 keyboard functions in host computer mode. For complete information, see *IBM 3270 Information Display System: 3278 Display Operator's Guide*, GA27-2890.

- The first column describes the 3278 typewriter key function.
- The second column describes the keys you press to get the function.
- The third column summarizes the function.

Note: The Personal Computer Caps Lock key works slightly different than the 3278 Shiftlock key. Only alphabetic characters can be locked in uppercase with Caps Lock, regardless of which mode you are using. Any other character requires the assistance of the Shift key (⇧). If you press the shift key while in Caps Lock, the Alphabetic keys have their unassisted or lowercase functions.

3278 Function	Order of Keys You Press	What They Do
ATTN	 + 	Gets the program's attention only when B is displayed in the Operator Information Area. If you press this key when A is displayed in the Operator Information Area, the unavailable function (X-f) symbol appears in the Operator Information Area.
BACKSPACE		Moves the cursor one character to the left. This key operates exactly like the  key. With the 3274 Entry Assist functions, pressing Backspace deletes the character to the left of the cursor position, and the cursor moves left one position. All characters to the right of the deleted character on the same row within the same field shift left to close the gap, regardless of the right margin setting.
CHG FMT	 + 	Press these keys while in Entry Assist Mode with the keyboard in lowercase shift. You are now in Change Format mode and can change the current settings for the margins, tabs, and bell. Press these keys again to cancel this function (3274 Entry Assist function).
CLEAR	 + 	Erases the display and signals the host system that a clear action occurred.
CR POS	 + 	Press these keys while in Entry Assist Mode to see the current position of the cursor displayed in the Operator Information Area (3274 Entry Assist function).
CR SEL	 + 	Cursor Select chooses fields for processing. Cursor must be in a field that your application has designated for cursor selection.
DELETE 		Deletes the character occupying the position underlined by the cursor. It erases the character without leaving a blank. All characters in the field to the right of that position and on the same line are then shifted left one position.
DEV CNCL	 + 	Used to recover from a Do Not Enter condition caused by a Print key operation.
DOC ON/OFF	 + 	Allows you to begin or terminate the 3274 Entry Assist functions.

3278 Function	Order of Keys You Press	What They Do
DUP	 + 	Displays an asterisk (*) and the cursor advances to the first character location of the next input field. DUP then provides you with the ability to quickly fill in information that is the same for every document, such as the date.
ENTER		This is the enter key when you are in host computer mode. You can also use this key with the assistance of the other three keys,  ,  and  .
ENTER		For your convenience, this is another enter key when you are in host computer mode. Note: This ENTER function is not available with SHIFT, Alt, or Ctrl.
ERASE EOF	 + 	Erases the input field from the cursor to the end of the field. The cursor does not move.
ERASE INPUT	 + 	Erases all input fields and moves the cursor to the first input character position on the screen.
FIELD MARK		Displays a semicolon. This key is used when operating with an unformatted display to indicate the end of a field to the program.
HOME		Moves the cursor to the first character of the first input field on your screen.
INDENT	 + 	Signals that the next two numbers will be the selected printer ID code. The ID is displayed in the Operator Information Area. This key is also used to display the new ID when your printer assignment is changed.
INSERT CHARACTER ^		Inserts a character or characters into the middle of an input field with changing the characters already displayed there. Press RESET ( + ) to end Insert Mode.
PA1		Program Access key that provides a means of signaling the program or communicating with it.
PA2		Program Access key that provides a means of signaling the program or communicating with it.

3278 Function	Order of Keys You Press	What They Do
PRINT	 + 	Print key. Sends data from the display station to the 3274 printer.
RESET	 + 	Used to recover from Do Not Enter (X) conditions. This key restores the keyboard and turns off the Do Not Enter symbol for all Do Not Enter conditions except: <ul style="list-style-type: none"> • Printer Busy • Printer Very Busy • Printer Not Working • Wait It also ends an Insert Mode condition.
SYS REQ	 + 	When A is displayed in the Operator Information Area, this key sends a unique signal to the host system to tell the program that your display station may be failing. When B is displayed in the Operator Information Area, this key: <ol style="list-style-type: none"> 1. Causes your display screen to be cleared and 2. Switches your display station between host application and host control programs
TAB BACK	 + 	Moves the cursor back to the first character in an input field. <ul style="list-style-type: none"> • If the cursor is in a protected field, the cursor moves back to the first position of the previous input field. • If the cursor is already at the first character of an input field, the cursor moves to the first character of the previous input field.
TAB FORWARD		Moves the cursor forward to the right to the first character location of the next input field. If the screen is not formatted, it moves the cursor to the first location on line 1.
TEST	 + 	Used to run special problem determination functions.
WORD DELETE <i>aaa</i>	 + 	Press this key in Entry Assist Mode to delete the remainder of the word beginning with the character at the cursor position (3274 Entry Assist function).
WRAP	 + 	Word Wrap automatically moves the last word on a row to the next row if the word would otherwise overrun the right margin. This happens only if the entire next row from the left margin to the right margin contains nulls or spaces (3274 Entry Assist Function).

3278 Function	Order of Keys You Press	What They Do
¢		Displays the character ¢
		Displays the character
⌋	+	Displays the character ⌋
←←	+	Moves the cursor two characters to the left for each key stroke. With the 3274 Entry Assist function, it moves the cursor back to the first character of the current word. This function is named Previous Word.
→→	+	Moves the cursor two characters to the right for each key stroke. With the 3274 Entry Assist function, it moves the cursor to the first character of the next word. This function is named Next Word.
		New line key used to move the cursor one line to the last unprotected character of the next line.
PF1 - PF10	-	Program function keys.
PF11	+	Program function key.
PF12	+	Program function key.
	+	Print Key. Sends data from the display station to the 3274 - attached printer.

Keys Used For the 3274 Entry Assist Functions

Some installations may have entry assist functions for the IBM 3274 Control Unit. If your installation supports these functions, your display has:

- On-Demand Scale Line for establishing margins and tab stops
- Screen margins
- Tabbing
- Audible End-of-Line signal
- Word Wrap (Automatic New Line)
- Typematic Forward and Reverse Cursor Movement by Word (the cursor moves to the beginning of either the previous word or the next word)
- Word Delete
- Typematic Character Delete
- Typematic Error Correcting Backspace when in Insert mode
- On-Demand Cursor Position Indicator display

The following summary of the 3274 Entry Assist functions will help you identify Personal Computer key combinations that emulate the 3274 Entry Assist Function Keys when in the host computer mode.

For complete information, see *IBM 3270 Information Display System: Entry Assist IBM 3274 Control Unit, GA27-2890*.

Entry Assist Function	Order of Keys You Press	What They Do
DOC ON/OFF	 + 	Press these keys to begin using the Entry Assist Mode functions. Press these keys again to cancel this function.
WORD WRAP	 + 	Press these keys to automatically move the last word on a row to the next row if the word would otherwise overrun the right margin. This happens only if the entire next row from the left margin to the right margin contains nulls or spaces.
CHANGE FORMAT	 + 	Press these keys while in Entry Assist Mode with the keyboard in lowercase shift. You are now in Change Format mode and can change the current settings for the margins, tabs and bell. Press these keys again to cancel this function.
CURSOR POSITION	 + 	Press these keys while in Entry Assist Mode to see the current position of the cursor displayed in the Operator Information Area.
WORD DELETE	 + 	Press these keys while in Entry Assist Mode to delete the remainder of the word beginning with the character at the cursor position.
NEXT WORD	 + 	Press these keys while in Entry Assist Mode to move the cursor to the first character of the next word.
PREVIOUS WORD	 + 	Press these keys while in Entry Assist Mode to move the cursor to the first character of the current word.

Chapter 5. Printing

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Introduction

You can print information several ways, depending on what mode you are working in and where you want your information to print.

- From **Personal Computer mode**, you can print information on the printer attached to your Personal Computer as each line appears on the screen.

Application programs use the printer as they normally would in the DOS/Basic environment.

- From **Personal Computer mode** or **host computer mode**, you can print information on a printer attached to your Personal Computer one screen at a time.
- From **host computer mode**, you can print information on a printer attached to a 3274 Control Unit, one screen at a time.

Personal Computer Mode

You can print whenever you type a line or the computer displays a line. Make sure that the printer is on and ready to receive data (online). Put your Personal Computer in DOS command mode. This is the condition in Personal Computer mode where the DOS prompt is the only item or last item appearing on the screen. This print function can only be initiated from the Personal Computer DOS command mode, as follows:

1. Press and hold Ctrl.
2. Press PrtSc.
3. Release both keys.

When the Personal Computer generates data on the screen, the printer prints each line as it is displayed. Each line of data entered from the keyboard, prints when you press Enter (←↵).

To stop this print function:

1. Press and hold Ctrl.
2. Press PrtSc.
3. Release both keys.

Personal Computer and Host Computer Modes

You can print information, one screen at a time, on the Personal Computer printer. This function can be initiated from Personal Computer or host computer mode.

1. Press and hold the Shift key.
2. Press PrtSc.
3. Release both keys.

In Personal Computer mode, the contents of the screen are printed on your Personal Computer printer. In the host computer mode, lines 1–24 of the screen are printed.

Host Computer Mode

You can print one screen at a time on your 3274 Control Unit printer. This function can be initiated only from host computer mode, as follows:

1. Press and hold Alt.
2. Press F7.
3. Release both keys.

The information displayed on the screen is printed on your 3274 Control Unit printer.

Chapter 6. Transferring a File

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Introduction

File Transfer allows you use the SEND and RECEIVE commands to transfer files between your Personal Computer and the host computer VM/CMS (CMS) or MVS/TSO (TSO). You must have the IBM host-supported File Transfer Program #5664-281 for CMS or #5665-311 for TSO installed at your host site.

When you use SEND, you are sending a copy of a file from your Personal Computer to the host computer storage medium. When you use RECEIVE, you are receiving a copy of a file from the host on your Personal Computer diskette or fixed disk. The entire system (the Personal Computer and host computer sessions) is dedicated to file transfer when you use this program.

IMPORTANT:

Your Personal Computer must always be in Personal Computer DOS command mode to send files to the host or receive files from the host. The command must be typed after a DOS prompt is displayed. The host must be in CMS or TSO mode and ready to accept commands.

In CMS, the transferred file resides on the CMS minidisk specified in the command. In TSO, the transferred file resides in the data set specified in the command.

Command Format

Throughout this chapter, the following notation is used to show how the **SEND** and **RECEIVE** commands are formatted:

- *Capital Letters* indicate a *keyword* parameter. You must type the word, exactly as it is shown, in any combination of uppercase and lowercase letters.
- *Italic Letters* indicate a replaced word parameter. The italic word represents the *kind* of information, rather than the exact information, that must be supplied. The actual entry replaces the italic description. You must type the correct entry, using uppercase and/or lowercase letters.
- *Brackets, []*, indicate an optional parameter. If you want to include optional information, you do not type the brackets, only the information inside the brackets.
- *Bars, |*, indicate a choice of parameters. If a group of options is shown and the individual options are separated by bars, you must choose one of the options in the group. If none of these options is chosen, the default value is used. You do not type the bar.
- *Commas, Colons, and Parentheses* must be entered as shown. When they appear within brackets, they are optional and are used only if the accompanying option is used.

Transferring Files

To transfer files, you must establish both Personal Computer and host computer sessions. The host must be in CMS or TSO command mode prepared to accept CMS or TSO commands. The Personal Computer must be in DOS command mode. The command is entered from the Personal Computer DOS command mode.

- If your SEND.COM and RECEIVE.COM files are on your DOS 2.1/PC3278 diskette, then that diskette must be in a diskette drive.

If you are using a single-sided diskette drive and did not copy the SEND.COM and RECEIVE.COM files onto your DOS 2.1/PC3278 diskette, your PC3278 backup diskette must be in a diskette drive. The SEND.COM and RECEIVE.COM files are on this diskette.

- To transfer a file from the Personal Computer to the host, the Personal Computer must be in DOS Command mode. Enter either the CMS or TSO file transfer SEND command.
- To transfer a file from the host to the Personal Computer, the Personal Computer must be in DOS Command mode. Enter either the CMS or TSO file transfer RECEIVE command.
- Enter the command where the cursor appears on the screen (after the last prompt).

IMPORTANT:

File transfer uses both the Personal Computer session and the host session. Because the entire system is dedicated to file transfer, neither session can be used until file transfer completes.

You must not use the keyboard while file transfer is running, except in response to displayed messages or instructions in this manual. Attempts to enter data during file transfer, except in response to messages or instructions in this manual, may cause file transfer to fail.

We recommend using a temporary filename when replacing an existing file.

Unsolicited CMS messages stop the file transfer process until you respond to them. You can create a CMS EXEC that disables messages before starting file transfer then reenables them after completion. The EXEC would be named IND\$FILE and would contain the following CMS statements:

```
&CONTROL OFF
CP SET MSG OFF
CP SET SMSG OFF
CP SET WNG OFF
IND$FILE &1 &2 &3 &4 &5 &6 &7 &8 &9 &10 &11 &12
CP SET MSG ON
CP SET SMSG ON
CP SET WNG ON
```

In this EXEC, messages are left enabled after file transfer completes.

Unsolicited messages should not be a problem in a TSO environment.

It takes approximately 25 seconds from the time the file transfer command is entered for the system to complete the Personal Computer-to-host initialization required before the file transfer starts. Similarly, approximately 10 seconds are required for the system to “shutdown” after the file transfer has completed. These times vary depending on the response time of your CMS or TSO system at the time you run file transfer.

At the end of a file transfer, the host session screen is erased.

The SEND and RECEIVE commands are described on the following pages. An example of the commands follows the description of each.

SEND (CMS)

Command

Purpose:

The SEND command transfers files from your Personal Computer session to the host (CMS). Your host computer must be in CMS command mode, ready to accept commands. Your Personal Computer must be in Personal Computer DOS command mode to enter the command.

Format:

```
[d:]SEND [d:][path]filename[.ext] fn ft [fm] [(options)]
```

Note: Do not type spaces between the drive specifier, path, filename, and extension.

Remarks:

d:

is the Personal Computer drive specifier. When placed before the word SEND, *d:* is the drive where SEND.COM file resides. This parameter is required before SEND only if the default drive is not the drive where the SEND.COM file resides. If you omit this parameter, DOS uses the default drive.

SEND (CMS) Command

SEND

is the required command name that transfers a file from the Personal Computer to the host computer.

d:

is the Personal Computer drive specifier used to indicate the drive where the Personal Computer file to be transferred resides. If you omit this parameter, DOS uses the default drive. (Refer to “DOS Command Parameters,” in the IBM Personal Computer *Disk Operating System 2.1* manual for further information.)

path

is a list of directory names that define the location of the file to be sent to the host. (Refer to “DOS Command Parameters,” in the IBM Personal Computer *Disk Operating System 2.1* manual for further information.)

filename

is the name of the Personal Computer file to be sent to the host. The filename can be from 1–8 characters and may be followed by a filename extension. (Refer to “DOS Command Parameters,” in the IBM Personal Computer *Disk Operating System 2.1* manual for further information.)

SEND (CMS)

Command

.ext

is the Personal Computer file extension. It is required if the name of the file being sent has an extension. (Refer to “DOS Command Parameters,” in the IBM Personal Computer *Disk Operating System 2.1* manual for further information.)

An extension starts with a period, has 1–3 characters, and follows immediately after the filename. For example:

82PRICES.AUG

where **.AUG** is the extension.

fn

is the CMS file name. The filename can be from 1–8 characters.

ft

is the CMS file type.

fm

is the CMS file mode. If omitted, the default is A1.

SEND (CMS) Command

Options

(

a parenthesis is required before specifying the first option of the following parameters:

APPEND

allows you to attach a Personal Computer file to the end of a host file. The APPEND parameter overrides any specified values for LRECL and RECFM.

Warning: If APPEND is not specified when the filenames are the same as that of an existing CMS file, the Personal Computer file being transferred replaces the existing host file.

ASCII

specifies that the file stored on the Personal Computer storage medium in ASCII form is to be converted to EBCDIC during the transfer to the host. Usually, alphanumeric data is encoded in ASCII on the Personal Computer and EBCDIC on the host computer. We recommend that you specify the ASCII parameter when sending ASCII files to the host if you want to display the file in a readable form when it is on the host. (For further information, see Appendix C, "File Transfer ASCII to EBCDIC Translation.")

SEND (CMS) Command

CRLF

specifies that carriage return/line feed characters present in the file should be recognized and deleted before being stored on the host storage medium. Usually, alphanumeric data on the Personal Computer contains CRLF characters at the end of each line. If CRLF characters are contained in your file, we recommend that you specify the CRLF parameter when sending alphanumeric files to the host. This allows you to read the file when it is on the host.

LRECL *n*

specifies the logical record length of the host file, where *n* is the number of characters in each record. If LRECL is omitted, the default value is 80 for new files. If you are replacing a file, the default is the characteristics of the existing file. If you are appending, LRECL is ignored. When working with variable-length records, *n* is the maximum size the host accepts.

If, however, you don't send a record of the maximum size, the LRECL becomes the longest record actually sent.

SEND (CMS) Command

RECFM F | V

specifies the record format and characteristics of the host file. It is followed by one of the following characters:

F

specifies that the file contains fixed-length records. Fixed-length records are padded on the host with trailing space characters if the Personal Computer has sent a record shorter than the specified length.

V

specifies that the file contains variable-length records.

If you use the APPEND option, RECFM is ignored. If RECFM is not specified:

- For new files, the default is F when CRLF is not specified. When CRLF is specified, the default is V.
- For existing files, the default is the RECFM of that existing file.

If consecutive sets of carriage return/line feed characters are sent to the host with no data between the sets, the host program operates as follows:

SEND (CMS)

Command

- For variable-length records, the host program creates a one character record consisting of a space character for each occurrence.
- For fixed-length records, the host program creates a record of the specified length consisting of space characters.

Use of RECFM V without the CRLF option is recommended for transferring files when padding of host records or deletion of trailing spaces must not occur. This may occur if you send a .COM file to the host and store it in fixed record form (RECFM F). The last host record may be appended with space characters up to the logical record size. If you use the CRLF option, the host deletes space characters that appear at the end of a record.

If this file is subsequently received at the Personal Computer, the padded space characters at the end of the last record remain in the newly received Personal Computer file. The deleted space characters are lost. When compared with the original Personal Computer file, the newly received Personal Computer file is not equal. However, it is the functional equivalent of the original file.

SEND (CMS) Command

Example

Let us say that you want to transfer a file containing a list of prices for several paper vendors, called PRICELST.AUG, from your Personal Computer session to a host CMS session.

1. Make sure that the host computer is ready to receive commands and the Personal Computer is in DOS command mode.
2. From Personal Computer DOS command mode, enter the following command (all commands must be entered on one line):

```
send a:pricelst.aug pricelst august a1 (ascii crlf recfm f
```

Note: The PATH parameter is not specified in this example

A copy of **A:PRICELST.AUG**, on drive **A** of your Personal Computer, is sent to the host session (**SEND**), where it is renamed **PRICELST AUGUST A1**. The ASCII file is converted to EBCDIC for processing on the host (**ASCII**), the **carriage return/line feed characters (CRLF)** are deleted, and the file has a **fixed-length record format (RECFM F)**.

Remember, you can enter the command in any combination of uppercase and lowercase characters.

SEND (CMS)

Command

Additional Information

If you need additional information about CMS or DOS, refer to the following manuals:

- *VM/370 CMS User's Guide*, GC20-1819
- *IBM Virtual Machine Facility/370: CMS Command and Macro Reference*, GC20-1818
- *IBM Personal Computer Disk Operating System Version 2.1*, 6024001.

RECEIVE (CMS)

Command

Purpose:

The RECEIVE command transfers files from the host (CMS) to your Personal Computer diskette or fixed disk. Your host computer must be in CMS command mode, ready to accept commands. You must switch to Personal Computer DOS command mode and enter the command.

Format:

```
[d:] RECEIVE [d:][path]filename[.ext] fn ft [fm] [(options)]
```

Note: Do not type spaces between the drive specifier, path, filename, and extension.

Remarks:

d: is the Personal Computer drive specifier. When placed before the word RECEIVE, *d* is the drive where the RECEIVE.COM file resides. This parameter is required before RECEIVE only if the the default drive is not the drive where the RECEIVE.COM file resides. If you omit this parameter, DOS uses the default drive.

RECEIVE (CMS)

Command

RECEIVE

is the required command name that transfers a file from the host computer to the Personal Computer.

d:

is the Personal Computer drive specifier used to indicate the drive that receives the file being transferred from the host computer. If you omit this parameter, DOS uses the default drive. (Refer to “DOS Command Parameters,” in the IBM Personal Computer *Disk Operating System 2.1* manual for further information)

path

is a list of directory names. The path specifies the directory where the transferred file is to be placed. (Refer to “DOS Command Parameters,” in the IBM Personal Computer *Disk Operating System 2.1* manual for further information.)

filename

is the Personal Computer filename given to the file received by the Personal Computer. The filename can be from 1–8 characters and may be followed by a filename extension. The filename with its extension may or may not already exist. (Refer to “DOS Command Parameters,” in the IBM Personal Computer *Disk Operating System 2.1* manual for further information.)

RECEIVE (CMS)

Command

.ext

is required only if you want the file from the host to be stored under a filename with an extension. An extension starts with a period, has 1–3 characters, and follows immediately after the filename. For example:

```
82PRICES.AUG
```

where **.AUG** is the extension. (Refer to “DOS Command Parameters,” in the IBM Personal Computer *Disk Operating System 2.1* manual for further information.)

fn

is the CMS file name. The filename can be from 1–8 characters.

ft

is the CMS file type.

fm

is the CMS file mode. If omitted, the default is A1.

RECEIVE (CMS)

Command

Options

(

a parenthesis is required if you specify any of the following options:

APPEND

allows you to attach a host computer file to the end of a Personal Computer file.

Warning: If APPEND is not specified when the filename is the same as that of an existing Personal Computer file, the host file being transferred replaces the existing Personal Computer file.

ASCII

specifies that the file stored on the host computer storage medium in EBCDIC form is to be converted to ASCII during transfer to the Personal Computer. Usually, alphanumeric data is encoded in ASCII on the Personal Computer and EBCDIC on the host computer. We recommend that the file be stored on the Personal Computer storage medium in ASCII form if you want to display the file in a readable form on the Personal Computer. (For further information, see Appendix C, "File Transfer ASCII to EBCDIC Translation.")

RECEIVE (CMS) Command

CRLF

specifies that trailing spaces are deleted and carriage return/line feed characters are inserted as the last two characters of each line when a file is stored on the Personal Computer storage medium. This allows you to read the file when it is on the Personal Computer.

Example

Let's assume that you are finished working with PRICELST AUGUST in your host session and want to transfer a revised copy from the host computer to the Personal Computer.

1. Make sure that the host computer is ready to receive commands and the Personal Computer is in DOS command mode.
2. From Personal Computer DOS command mode, enter the following command (all commands must be entered on one line):

```
receive b:pricelst.aug pricelst august a1 (ascii crlf
```

Note: The PATH parameter is not specified in this example.

RECEIVE (CMS)

Command

A copy of **PRICELST AUGUST** is transferred from the host session to the diskette in drive **B** of your System Unit (**RECEIVE B:**), where it is renamed **PRICELST.AUG** and replaces any previous file named **PRICELST.AUG**

If you do not want to lose your original file, choose another name in place of **PRICELST.AUG**. The file is stored with **carriage return/line feed characters (CRLF)**. The file will be stored on the Personal Computer storage medium in **ASCII** form.

Remember, you can enter the command in any combination of uppercase and lowercase characters.

Additional Information

If you need additional information about VM/CMS or DOS, these books available for reference:

- *VM/370 CMS User's Guide*, GC20-1819
- *IBM Virtual Machine Facility/370: CMS Command and Macro Reference*, GC20-1818
- *IBM Personal Computer Disk Operating System*, Version 2.1, 6024001.

SEND (TSO) Command

Purpose:

The SEND command transfers data sets from your Personal Computer session to the host (TSO). Your host computer must be in TSO command mode, ready to accept commands. Your Personal Computer must be in Personal Computer DOS command mode to enter the command.

Format:

`[d:]SEND [d:][path] filename[,ext] data set name [(member name)][/password] [options]`

Note: Do not type spaces between the drive specifier, path, filename, and extension.

Remarks:

d:

is the Personal Computer drive specifier. When placed before the word SEND, *d*: is the drive where the SEND.COM file resides. This parameter is required before SEND only if the default drive is not the drive where the SEND.COM file resides. If you omit this parameter, DOS uses the default drive.

SEND (TSO) Command

SEND

is the required command name that transfers a data sent from the Personal Computer to a host computer.

d:

is the Personal Computer drive specifier used to indicate the drive where the Personal Computer file to be transferred resides. If you omit this parameter, DOS uses the default drive. (Refer to “DOS Command Parameters,” in the IBM Personal Computer *Disk Operating System 2.1* manual for further information.)

path

is a list of directory names that define the location of the file to be sent to the host. (Refer to “DOS Command Parameters,” in the IBM Personal Computer *Disk Operating System 2.1* manual for further information.)

filename

is the name of the Personal Computer file to be sent to the host. The filename can be from 1–8 characters and may be followed by a filename extension. (Refer to “DOS Command Parameters,” in the IBM Personal Computer *Disk Operating System 2.1* manual for further information.)

SEND (TSO) Command

.ext

is the Personal Computer file extension. It is required if the name of the file being sent has an extension. An extension starts with a period, has 1–3 characters, and follows immediately after the filename. For example:

```
82PRICES.AUG
```

where **.AUG** is the extension. (Refer to “DOS Command Parameters,” in the IBM Personal Computer *Disk Operating System 2.1* manual for further information.)

data set name

is the TSO data set name. You may type quotes around the combined data set name and the member name to show that the userid is not prefixed. (Refer to the IBM *OS/VS2 Command Language Reference*, GC28-0646, for further information.)

(member name)

is the name of one of the members in the directory of a partitioned data set. The data set must exist on the host.

SEND (TSO) Command

/password

is required if password protection has been specified for your TSO data set.

Options

APPEND

allows you to attach a Personal Computer file to the end of a host data set. The APPEND parameter overrides any specified values for LRECL, RECFM, and BLKSIZE.

Warning: If APPEND is not specified when data set names are the same as that of existing TSO data sets, the Personal Computer file being transferred replaces the existing host data set. APPEND may not be specified for members of a partitioned data set.

ASCII

specifies that the file stored on the Personal Computer storage medium in ASCII form is to be converted to EBCDIC during the transfer to the host. Usually alphanumeric data is encoded in ASCII on the Personal Computer and EBCDIC on the host computer. We recommend that you specify the ASCII parameter when sending ASCII files to the host if you want to display the file in a readable form when it is on the host. (For further information, see Appendix C, "File Transfer ASCII to EBCDIC Translation.")

SEND (TSO) Command

BLKSIZE(n)

specifies block size of the host data set, where *n* is the length in bytes of a data block. If **BLKSIZE** is omitted, the default is **LRECL** for new files. If appending or replacing a data set, **BLKSIZE** is ignored.

CRLF

specifies that carriage return/line feed characters should be recognized and deleted before being stored on the host storage medium. Usually, alphanumeric data on the Personal Computer contains **CRLF** characters at the end of each line. If **CRLF** characters are contained in your file, we recommend that you specify the **CRLF** parameter when sending alphanumeric files to the host. This allows you to read the file when it is on the host.

LRECL(n)

specifies the logical record length of the host data set where *n* is the number of characters in each record. If **LRECL** is omitted, the default value is 80 for new files. If you are either appending or replacing a data set, **LRECL** is ignored.

SEND (TSO) Command

RECFM(F|V|U)

specifies the record format and characteristics of the data set. It is followed by one of the following characters:

F

specifies that the data set contains fixed-length records. Fixed-length records are padded on the host with trailing space characters if the Personal Computer has sent a record shorter than the specified length.

V

specifies that the data set contains variable-length records.

U

specifies that the data set contains undefined-length records.

SEND (TSO) Command

If consecutive sets of carriage return/line feed characters are sent to the host with no data between the sets, the host program operates as follows:

- For variable- and undefined-length records, the host program creates a one character record consisting of a space character for each occurrence.
- For fixed-length records, the host program creates a record of the specified length consisting of space characters.

If you use the APPEND option or are replacing an existing data set, RECFM is ignored. If RECFM is not specified, the default is F for new files when CRLF is not specified. When CRLF is specified, the default is V.

Use of RECFM V without the CRLF option is recommended for transferring files when padding of host records or deletion of trailing spaces must not occur. This may occur if you send a .COM file to the host and store it in fixed-record form (RECFM F). The last host record may be appended with space characters up to the logical record size. If you use the CRLF option, the host deletes space characters that appear at the end of a record.

SEND (TSO) Command

If this file is subsequently received at the Personal Computer, the padded space characters at the end of the last record remain in the newly received Personal Computer file. The deleted space characters are lost. When compared with the original Personal Computer file, the newly received Personal Computer file is not equal. However, it is the functional equivalent of the original file.

```
SPACE(quantity[,increment]) [AVBLOCK(value)  
                               TRACKS  
                               CYLINDERS ]
```

Specifies the amount of space to be allocated for a new data set. If SPACE is used, you may use one of the three options, AVBLOCK(*value*), TRACKS, or CYLINDERS, to specify the units used for quantity and increment. If none of these options is specified, the system defaults to the value of BLKSIZE.

SEND (TSO) Command

Example

Suppose you want to transfer a physical-sequential data set called DATA.AUG from the Personal Computer session to a host TSO session.

1. Make sure that the host computer is ready to receive commands and the Personal Computer is in DOS command mode.
2. From Personal Computer DOS command mode, enter the following command (all commands must be entered on one line):

```
send b:data.aug data.august/protects lrecl (132) recfm(f) space (20,10) tracks
```

Note: The PATH parameter is not specified in this example.

A copy of **DATA.AUG**, on a diskette in drive **B** of your System Unit, is sent to the host session (**SEND**), where it is renamed **DATA.AUGUST**. The data set is password-protected on the host (**/PROTECTS**). The ASCII file on the Personal Computer is converted to an EBCDIC data set for processing on the host (**ASCII**). The **logical record length (LRECL)** has been set at **132**, rather than being allowed to default to 80. The data set has a **fixed-length record format (RECFM F)**, and **20 TRACKS**, incremented by **10**, have been allotted.

Note: Not every option has been specified.

SEND (TSO)

Command

If DATA.AUG is a partitioned data set, an example of the format of the send command is:

```
send b:data.aug data.august(tax1982)
```

Neither password nor options were specified in this example and a member name, **TAX1982**, is included.

Remember, you can enter the command in any combination of uppercase and lowercase characters.

Additional Information

If you need additional information about TSO or DOS, you can have these books available for reference:

- *IBM OS/VS2 TSO Terminal User's Guide*
GC28-0645
- *IBM OS/VS2 TSO Command Language Reference*, GC28-0646
- *IBM Personal Computer Disk Operating System*,
Version 2.1, 6024001.

RECEIVE (TSO) Command

Purpose:

The RECEIVE command transfers data sets from the host (TSO) to your Personal Computer diskette or fixed disk. Your host computer must be in TSO command mode, ready to accept commands. You must switch to Personal Computer DOS command mode and enter the command.

Format:

```
[d:] RECEIVE [d:][path] filename [,ext] data set name[(member name)][/password] [options]
```

Note: Do not type spaces between the drive specifier, path, filename, and extension.

Remarks:

d:

is the Personal Computer drive specifier. When placed before the word RECEIVE, *d*: is the drive where the RECEIVE.COM file resides. This parameter is required before RECEIVE only if the default drive is not the drive where the RECEIVE.COM file resides. If you omit this parameter, DOS uses the default drive.

RECEIVE (TSO)

Command

RECEIVE

is the required command name that transfers a data set from the host computer to the Personal Computer.

d:

is the Personal Computer drive specifier for the drive that receives the data being transferred from the host computer. If you omit this parameter, DOS uses the default drive. (Refer to “DOS Command Parameters,” in the IBM Personal Computer *Disk Operating System 2.1* manual for further information.)

path

is a list of directory names. The path specifies the directory where the transferred file is placed. (Refer to “DOS Command Parameters,” in the IBM Personal Computer *Disk Operating System 2.1* manual for further information.)

filename

is the Personal Computer filename given the file received. The filename can be from 1–8 characters and may be followed by a filename extension. The filename with its extension may or may not already exist. (Refer to “DOS Command Parameters,” in the IBM Personal Computer *Disk Operating System 2.1* manual for further information.)

RECEIVE (TSO) Command

.ext

is required only if you want the data from the host to be stored under a filename with an extension. An extension starts with a period, has 1–3 characters, and follows immediately after the filename. For example:

```
82PRICES.AUG
```

where **.AUG** is the extension.

data set name

is the TSO data set name. You may type quotes around the combined data set name and the member name to show that the userid is not prefixed. (Refer to the *IBM OS/VS2 Command Language Reference*, GC28-0646, for further information.)

(member name)

is the name of one of the members in the directory of a partitioned data set. The data set must exist on the host.

/password

is required if password protection has been specified.

RECEIVE (TSO)

Command

Options

APPEND

allows you to attach a host data set to the end of a Personal Computer file. The APPEND parameter overrides any other values for LRECL and RECFM.

Warning: If APPEND is not specified when filename is the same as that of an existing Personal Computer file, the host data set being transferred replaces the existing Personal Computer file. APPEND may not be specified for members of a partitioned data set.

ASCII

specifies that a data set stored on the host computer storage medium in EBCDIC form is to be converted to ASCII during transfer to the Personal Computer. Usually, alphanumeric data is encoded in ASCII on the Personal Computer and EBCDIC on the host computer. We recommend that the file be stored on the Personal Computer storage medium in ASCII form if you want to display the data in readable form on the Personal Computer. (For more information, see Appendix C, “File Transfer ASCII to EBCDIC Translation.”)

RECEIVE (TSO) Command

CRLF

deletes trailing spaces and inserts carriage return/line feed characters as the last two characters in each line when a file is stored on the Personal Computer storage medium. This allows you to read the file when it is on the Personal Computer.

Example

Let's assume that you have finished working with DATA.AUGUST, the physical-sequential data set containing password-protected information, and want to transfer a revised copy from the host TSO session to the Personal Computer.

1. Make sure that the host computer is ready to receive commands and the Personal Computer is in DOS command mode.
2. From Personal Computer DOS command mode, enter the following command (all commands must be entered on one line):

```
receive b:data.aug data.august/protects ascii
```

Note: The PATH parameter is not specified in this example.

RECEIVE (TSO)

Command

A copy of **DATA.AUGUST** is transferred from the host session to a diskette in diskette drive **B** of your System Unit (**RECEIVE B:**), where it is renamed **PRICELST.AUG** and replaces any previous file named **PRICELST.AUG**

If you do not want to lose your original file, choose another name in place of **PRICELST.AUG**. To access the host data set, the password is specified (**/PROTECTS**); the data set is no longer protected when on the Personal Computer. The data set is stored on the Personal Computer storage medium in **ASCII** form.

Note: Not every option has been specified.

If **DATA.AUGUST** is a partitioned data set, an example of the format of the receive command is:

```
receive b:data.aug data.august(tax1982)
```

Note: Neither password nor options were specified in this example and a member name, **TAX1982**, is included.

Remember, you can enter the command in any combination of uppercase and lowercase characters.

RECEIVE (TSO) Command

Additional Information

If you need additional information about the TSO and DOS parameters, you can have these books available for reference:

- *IBM OS/VS2 TSO Terminal Users Guide*, GC28-0645
- *IBM OS/VS2 TSO Command Language Reference*, GC28-0646
- *IBM Personal Computer Disk Operating System*, Version 2.1, 6024001.

Chapter 7. Some Problem Solving Tools

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General Information

The problem determination procedures in this chapter help you determine if a problem is hardware related, software related, or caused by operator error.

We assume you are familiar with the problem determination tools available for your host system. The information included here does not attempt to be host-specific or all-inclusive.

Be sure your host computer is available and the coaxial cable is connected.

Refer to *The IBM Personal Computer Guide to Operations* or *The IBM Personal Computer XT Guide to Operations* for hardware related problems.

See “Appendix A” of this manual for initialization messages and file transfer messages.

See “Appendix B” of this manual for messages appearing in the operator information area of your screen in host computer mode.

Technical Assistance

The IBM Personal Computing Assistance Center provides telephone assistance for usage questions to IBM customers obtaining 20 or more licenses of the PC 3278/79 Emulation Control Program. The customer must designate a technical coordinator who may call the Personal Computing Assistance Center (PCAC) during the Quantity Discount Agreement period.

Technical assistance questions for all customers may be submitted in writing directly to the PCAC at the following address:

IBM Personal Computing Assistance Center
IBM Corporation
93W/235-2
1000 NW 51st Street
Boca Raton, Florida 33432

Problem Determination

Start

Choose the section of this chapter that best describes the problem you are experiencing. If you are not sure which section to use, continue with “System Startup.”

System Startup

If you are using a color display, make sure your display is on and the brightness is turned fully clockwise. If you are using a monochrome display, make sure that your contrast and brightness controls are turned fully clockwise.

Every time the IBM Personal Computer or IBM Personal Computer XT is turned on, it performs a power-on self test (POST). POST completes in 13 to 90 seconds depending on the amount of memory in your system unit. There are normally three responses:

- With an IBM Personal Computer, the cursor appears on the screen in approximately 4 seconds. The IBM Personal Computer XT displays an indication of the memory test. The number increases until it equals the amount of memory installed in your system.
- One short “beep” is heard when the test is complete.

- The “IBM Personal Computer Basic” message appears. (If, at the end of POST, a diskette or an operating system from a fixed disk is automatically loaded, the initial screen from the diskette or the operating system appears).

Switch ON your Personal Computer if you have not already done so.

1. Did POST complete correctly and without any error messages the last time you turned your system on?

Yes

No



Refer to the IBM Personal Computer *Guide to Operations* or the IBM Personal Computer XT *Guide to Operations*.

2. The PC3278 Control Program must be the first program loaded by DOS when the Personal Computer is turned on or you perform a system reset.

Have you loaded any programs other than DOS 2.1 and the PC3278 Control Program?

Yes

No



Continue with step 3.

Restart your Personal Computer. Load the PC3278 Control Program immediately after loading DOS 2.1. Continue with step 3.

3. Do you have the PC3278 Control Program loaded?

Yes

No



Continue with step 4.

Go to step 7.

4. Load the PC3278 Control Program.

Did the program load successfully?

Yes

No



Go to step 5.

Go to step 7.

5. Load your DOS 2.1 diskette.

Did DOS load successfully?

Yes

No



Refer to the IBM Personal Computer
Guide to Operations or the IBM Personal
Computer XT *Guide to Operations*.

Continue with step 6.

6. Insert the Personal Computer 3278/79 Emulation Control Program diskette that you received with this manual into drive A. Type pc3278 and press Enter.

Did the program load successfully?

Yes

No



Contact the point of purchase of your PC3278 Control Program.

Refer to Chapters 2 and 3 of this manual. There is a problem with the diskette you created or the files copied to your fixed disk.

7. Are you having a problem transferring files between the Personal Computer and the host computer?

Yes

No



Continue with step 8.

Refer to the "File Transfer" section of this chapter.

8. Are you having a problem with the keyboard?

Yes

No



Continue with step 9.

Refer to the "Keyboard" section of this chapter.

9. Are you having a problem using the printer attached to your Personal Computer?

Yes

No



Continue with step 10.

Refer to the "Printer Attached to the Personal Computer" section of this chapter.

10. Are you having a problem with a Personal Computer application when the PC3278 Control Program is loaded?

Yes

No



Seek technical assistance.

Refer to the "Personal Computer Application" section in this chapter.

File Transfer

Make sure your Personal Computer is in Personal Computer DOS command mode and that the host computer is in either CMS or TSO mode and ready to receive commands.

1. Is the failure the result of the host being inoperative?

Yes

No



Continue with step 2.

Try the operation when the host is available.

2. Was the file transfer command typed into the Personal Computer after a DOS prompt was displayed?

Yes

No



Retry entering the command from Personal Computer DOS command mode.

Continue with step 3.

3. Does a problem exist with the file transferred, but file transfer completed without an error message?

Yes

No



Continue with step 4.

Check for the following:

- Error in source data set or incorrect options specified (ASCII or CRLF)
- APPEND not requested (default is REPLACE)
- If the host is TSO, there are potential problems with user catalogs.
- Error displayed in host mode. Press Alt + Esc to view host screen.

4. Did file transfer stop and display an error message?

Yes

No



Continue with step 5.

See Appendix A of this manual for further information.

5. Did file transfer stop without completing and without messages?

Yes

No



Seek technical assistance.

6. Switch to the host computer mode.

Are there any messages or status information displayed?

Yes

No



Seek technical assistance.

Correct the condition and retry.

Personal Computer Application

This section helps you determine the cause of a software application problem when the PC3278 Control Program is resident in memory.

1. Does the Personal Computer application work with DOS 2.1 alone?

Yes



No



The problem is with the Personal Computer application. Report the problem to point of purchase.

2. Does the application observe the restrictions imposed on applications by the PC3278 Control Program?

Note: Some applications function in a manner that prevent their use on a system with the PC3278 Control Program. For example, an application that: bypasses the normal DOS 2.1 interfaces, bypasses the BIOS interfaces, or uses the reserved key combinations. See “Compatibility” in Chapter 1 of this manual for further information.

Yes



No



The application cannot be run concurrently with the PC3278 Control Program.

Seek technical assistance.

Printer Attached to the Personal Computer

1. Did you receive a message indicating that the printer is not ready?

Yes

No



Go to step 3.

2. Ready the printer and retry.

Note: If the printer is powered off, not attached, offline, or there is no paper, an error condition will occur.

Is the printer operating correctly?

Yes

No



Refer to the IBM Personal Computer *Guide to Operations* or the IBM Personal Computer XT *Guide to Operations*.

Resume normal operations.

3. Press and hold the Shift key and then press the PrtSc key. Did the printer print the information from the screen correctly?

Yes

No



Seek technical assistance.

A vertical line with a downward-pointing arrowhead, indicating the path for the 'No' response.

Refer to the IBM Personal Computer *Guide to Operations* or the IBM Personal Computer XT *Guide to Operations*.

Keyboard

1. Can you switch modes (hold down the Alt key and press the Esc key)?

Yes

No



Continue with step 2.

Go to step 4.

2. Restart your system and load the PC3278 Control Program.

Can you switch modes?

Yes

No



Continue with step 3.

Resume normal operations.

- Restart your system and load DOS 2.1. Try entering characters.

Do the correct characters appear on your screen?

Yes

No



Refer to the *IBM Personal Computer Guide to Operations* or the *IBM Personal Computer XT Guide to Operations*.

Seek technical assistance.

- Do characters appear in the right case?

Yes

No



Continue with step 5.

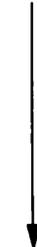
Go to step 6.

- Press and release the Caps Lock key.

Do characters appear in the right case?

Yes

No



Refer to the *IBM Personal Computer Guide to Operations* or the *IBM Personal Computer XT Guide to Operations*.

Resume normal operation.

6. Do numbers appear when you try to move the cursor?

Yes



Continue with step 7.

No



Go to step 8.

7. Press and release the Num Lock key.

Do numbers appear when you try to move the cursor?

Yes



Refer to the IBM Personal Computer *Guide to Operations* or the IBM Personal Computer XT *Guide to Operations*.

No



Resume normal operation.

8. Do numbers appear when you try to type a symbol?

Yes



Continue with step 9.

No



Seek technical assistance.

9. Be sure to use the shift key when typing the symbols above numbers even when the Caps Lock is active.

Are you using the Shift key to obtain symbols?

Yes

No



Resume normal operation.

Refer to the IBM Personal Computer *Guide to Operations* or the IBM Personal Computer XT *Guide to Operations*.

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Appendix A. Messages

Initialization Messages

Press any key to continue - DOS will be re-initialized

Explanation: The PC3278 Control Program logo is displayed with the above message. The PC3278 Control Program has been loaded into memory, DOS will now be reinitialized.

User Response: Press any key.

Press ALT-ESC for Host Session

Explanation: The PC3278 Control Program logo is displayed with the above message. The PC3278 Control Program is loaded into memory, overlaying the existing Disk Operating System. DOS will not be reinitialized unless you press Alt + Ctrl + Num Lock in the host session.

User Response: Press Alt + Esc to switch to the host session.

PC3278 has been reloaded

Explanation: Progress message. A new copy of the PC3278 Control Program has been loaded, overlaying the previous version. The host session has been restarted.

User Response: None.

Not enough memory to load PC3278

Explanation: Error message. There is not enough memory to load the PC3278 Control Program into its resident position at the top of memory. At least 23K bytes of memory are needed besides DOS and other resident programs.

User Response: Remove enough programs, **but not DOS** from memory to create about 23K bytes of space. Retry the operation.

PC3278 cannot be reloaded until the complete system is re-initialized using Alt + Ctrl + Del

Explanation: Error message. The PC3278 Control Program is already loaded, but cannot be overlaid without causing errors.

User Response: Reinitialize the complete system by either:

- Pressing Alt + Ctrl + Del
- Powering your system off and then powering on again.

Then, reload the PC3278 Control Program.

There is not enough memory to start DOS

Explanation: Error message. The control program logo is displayed with the preceding message. The PC3278 Control Program was loaded correctly into memory, but there is not enough memory left to reinitialize DOS. Although the PC3278 logo is displayed, you cannot establish a DOS session. The sequence Alt + Ctrl + Num Lock does not reinitialize DOS in this case.

User Response: If you want to run DOS concurrently with the PC3278 Control Program, remove enough programs from memory to create space. Retry the operation.

File Transfer Messages

TRANS01 File transfer command being processed

Explanation: This message appears when the file transfer command is entered and processing by the system has begun.

User Response: None.

TRANS02 Number of bytes of file transferred so far: ==> XXXX

Explanation: This is a progress message that tells you how many bytes of the Personal Computer file have been transferred to the host. The number is updated in increments of 4096 bytes. When the Personal Computer file size is not exactly divisible by 4096, the last update is less than 4096 and is followed by a completion message.

If the Personal Computer disk file being transferred is less than 4096 bytes, there is just one progress message for exactly the number of bytes in the file.

User Response: None.

TRANS03

File transfer complete

Explanation: The file transfer operation has completed successfully. There is now a file either at the host or Personal Computer whose name and characteristics are those you specified in the SEND or RECEIVE command.

User Response: None.

TRANS04

File transfer complete with records segmented

Explanation: The file transfer operation has completed. Any record greater than the set logical record length (LRECL) is divided into multiple records.

User Response: None.

TRANS05

Personal Computer filespec incorrect: file transfer canceled

Explanation: You have made an error in the Personal Computer DOS filespec, for example, diskette drive, path, filename, or extension.

User Response: Compare the Personal Computer DOS filespec in the file transfer command, which is still visible on the screen, with your manual to make sure that it conforms to the Personal Computer DOS requirements for a filespec.

If the filespec is correct, it is possible that the specified Personal Computer file does not exist on the Personal Computer disk. You should enter the DOS directory command, **DIR**, to check the Personal Computer filename and extension.

TRANS06

Command incomplete: file transfer canceled

Explanation: You did not enter any parameters after **SEND** or **RECEIVE**.

User Response: Read your manual on requirements for the **SEND** or **RECEIVE** commands and retry.

TRANS07

Cannot link to host: file transfer canceled

Explanation: This message indicates a program error.

User Response: If you see this message, file transfer is not working properly. Contact the designated IBM service organization.

TRANS08

Command transmit error: file transfer canceled

Explanation: This message occurs when there is a program error or if a key that produces an invalid code is pressed (for example, one that cannot be transmitted to the host).

User Response: Retry file transfer after carefully reading the instructions in this manual. Check the status of the host; there may be some information on the host session indicating the problem. If the message reappears when file transfer is retried, contact the designated IBM service organization.

TRANS09

Error reading file from damaged Personal Computer disk: file transfer canceled

Explanation: This message indicates that the Personal Computer diskette is probably damaged.

User Response: Replace the recording medium.

TRANS10

Host has not responded within timeout period: Refer to the user's guide for more information

Explanation: The host has not responded to the file transfer within 1-1/2 minutes.

User Response: Press Alt + Esc to look at the host screen.

If XSYSTEM OR X CLOCK appears in the host Operator Information Area, wait for it to clear. This indicates that the system is working slowly. Switch back to the Personal Computer screen (Alt + Esc) to continue file transfer.

If the host is HOLDING, see the "User Response" for TRANS11.

If you want to stop file transfer after several timeout messages:

Switch to the host screen.

Press Reset (Alt + F10) to clear to Operator Information Area.

Press F2, possibly several times, until the host becomes ready.

Press Enter.

Switch back to the Personal Computer screen (Alt + Esc). File transfer should be canceled.

TRANS11 Lost contact with host: file transfer canceled

Explanation: The host is inactive.

User Response: Press Alt + Esc to look at the host screen.

If the host is not ready (there may be a message), press Clear (Alt + F2), possibly several times. If the host becomes ready, press Enter and switch back to the Personal Computer screen (Alt + Esc). File transfer should continue.

If file transfer does not continue switch to the host screen and press F2, possibly several times, until the host becomes ready. Then press Enter and switch back to the Personal Computer screen (Alt + Esc). File transfer should be canceled.

If file transfer is not canceled, cancel both the host and Personal Computer sessions and retry.

TRANS12 Error writing to damaged or full Personal Computer disk: file transfer canceled

Explanation: This message indicates a damaged or full disk.

User Response: If disk is damaged, replace the recording medium. If disk is full, erase unwanted files or replace the recording medium.

TRANS13 Error writing file to host: file transfer canceled

Explanation: The file transfer has been canceled either by you or the program because of an error in SEND or RECEIVE.

User Response: See “User Response” for TRANS11.

TRANS14 Error reading file from host: file transfer canceled

Explanation: The file transfer has been canceled either by you or the program because of error in SEND or RECEIVE.

User Response: See “User Response” for TRANS11.

TRANS15 Required host storage unavailable: file transfer canceled

Explanation: You need more storage available on your host.

User Response: Contact your local host system support representative.

TRANS16 Incorrect request code: file transfer canceled

Explanation: You have entered an incorrect command.

User Response: Correct the command and retry.

TRANS17 (TSO version) Missing or incorrect TSO data set name: file transfer canceled

Explanation: TSO data set name is missing or not a sequential or partitioned data set.

User Response: Correct the TSO data set name in the command and retry.

TRANS17 (CMS version) Missing or incorrect CMS file name: file transfer canceled

Explanation: CMS file name is missing or incorrectly specified.

User Response: Correct the CMS file name in the command and retry.

TRANS18 Incorrect option specified: file transfer canceled

Explanation: You specified an invalid option.

User Response: Correct the command to specify an acceptable option and retry.

- TRANS19 Error while reading or writing to host disk: file transfer canceled
- Explanation:** There is not enough space available for data on the host.
- User Response:** Look at the host session message for indications and correct the problem.
-
- TRANS21 Not enough Personal Computer memory available: file transfer canceled
- Explanation:** Your system does not have enough memory to transfer a file.
- User Response:** Get additional memory.
-
- TRANS26 Unrecoverable system error: file transfer canceled
- Explanation:** This message indicates a program error.
- User Response:** Contact the designated IBM service organization.
-
- TRANS27 Communication sequence with host disrupted: file transfer canceled
- Explanation:** This indicates a program error.
- User Response:** Contact the designated IBM service organization.

TRANS28

Invalid option XXXXXXXXX: file transfer canceled

Explanation: XXXXXXXXX is replaced with the invalid option. The option is either not recognized, is specified as a positional keyword, or has an associated value which is incorrect.

User Response: Correct the option in the command and retry.

TRANS29

Invalid option XXXXXXXXX with RECEIVE: file transfer canceled

Explanation: XXXXXXXXX is replaced with the invalid option. The option is not valid with RECEIVE, but can be used with SEND.

User Response: Remove the option from the command and retry.

TRANS30

Invalid option XXXXXXXXX with APPEND: file transfer canceled

Explanation: XXXXXXXXX is replaced with the invalid option. The option is not valid with APPEND.

User Response: Remove the option from the command and retry.

- TRANS31 Invalid option XXXXXXXXX without SPACE: file transfer canceled
- Explanation:** XXXXXXXXX is replaced with the invalid option. The option can only be used if SPACE is also specified.
- User Response:** Remove the option from the command and retry.
-
- TRANS32 Invalid option XXXXXXXXX with PDS: file transfer canceled
- Explanation:** XXXXXXXXX is replaced with the invalid option. The option is invalid with a host partitioned data set.
- User Response:** Remove the option from the command and retry.
-
- TRANS33 Only one of TRACKS, CYLINDERS, AVBLOCK allowed: file transfer canceled
- Explanation:** SPACE can be specified in units of either TRACKS, CYLINDERS, or AVBLOCK. Only one of these parameters can be used.
- User Response:** Remove the unwanted option from the command and retry.

TRANS34 CMS file not found: file transfer canceled

Explanation: An existing CMS file must be specified for RECEIVE.

User Response: Correct the CMS file specification in the command and retry.

TRANS35 CMS disk is Read-Only: file transfer canceled

Explanation: The CMS file mode specified for SEND must allow Write access.

User Response: Correct the CMS file specification in the command and retry.

TRANS36 CMS disk is not accessed: file transfer canceled

Explanation: The CMS file mode is not in the CMS disk search order.

User Response: Access the required disk in CMS or correct the CMS file specification in the command. Retry the command.

TRANS37

CMS disk is full: file transfer canceled

Explanation: Either the CMS disk is full, the maximum number of files (3400) on the minidisk has been reached, or the maximum number of data blocks (16060) per file has been reached.

User Response: Use another disk with enough space, or remove unwanted files from the specified disk. If the Personal Computer file is very large (more than 1 megabyte), consider dividing it into several pieces. Retry the command.

TRANS98

PC program error code XX
XXXXXXXXXX: file transfer canceled

Explanation: This message indicates a program error.

User Response: Contact the designated IBM service organization.

TRANS99

Host program error code XX
XXXXXXXXXX: file transfer canceled

Explanation: This message indicates a program error.

User Response: Contact the designated IBM service organization.

Appendix B. Operator Information Area in Host Computer Mode

Status Indicators

In a host computer session, the bottom line of your screen becomes the **Operator Information Area (OIA)**, which shows operating and status messages. The messages are displayed as groups of symbols, words, and numbers, such as:

X meaning Do Not Enter

[] meaning time is required

○ representing a printer

The symbols, words, and numbers are combined to make messages. The messages are read from left to right. For example:

X [] meaning Do Not Enter because time is needed for the host system to perform a function.

X ○ — ∅ meaning Do Not Enter because the printer you are using (system printer) is not operating properly.

Operator Information Area

The operating and status messages are grouped into five categories. The messages are displayed in five different sections of the Operator Information Area, as shown here:

Operator Information Area Layout

Readiness and System Connection	Do Not Enter (Input Inhibited)	Reminders	Shifts and Modes	Printer Status
---------------------------------	--------------------------------	-----------	------------------	----------------

Status Indicators Reference Chart

The status indicators shown in the following table only appear while you are using host computer mode. The table lists the status indicators you may see in the Operator Information Area.

- The first column shows the message as it would appear on your screen while you are using the host computer mode.
- The second column is a brief description of the message that, when applicable, tells you what you should do when you see the message on your screen.
- The third column shows the message as it would appear on an IBM 3278 Display Station.

Remember, messages are composed of groups of symbols that you read from left to right.

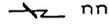
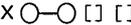
For further information on 3278 status indicators refer to *IBM 3270 Information Display System, 3278 Display Station Operator's Guide, GA27-2890*.

Readiness and System Connection Messages

What You See on Your Screen	What This Means	How it Appears on the 3278 Display Station
4	Ready The 3274 Control Unit is ready (working).	
A or B	Online The control unit is connected to the host system under rules A or B.	<u>A</u> or <u>B</u>
■	My Job Your display station is working with your job (application).	■
♀	System Operator Your display station is connected to the system operator (control program).	
?	Unowned Your display station is connected to the host system but is not connected to your application program or the control program.	
TEST	Test Your display station is in test mode.	TEST
4700	Ready The 4701 Control Unit is ready (working).	4700

Do Not Enter Messages

What You See on Your Screen	What this means	How it Appears on the 3278 Display Station
X []	Terminal Wait Time is required for the host system to perform a function. Wait.	X ⊙
X ?+	What ? The last operation was not accepted. Check to make sure the operation you want to perform is correct. Then press RESET ((Alt) + F10) and try again.	X ?+
X SYSTEM	System Lock The host system has locked your keyboard. Look for a message. Wait or press RESET ((Alt) + F10).	X SYSTEM
X ← ♀ →	Go Elsewhere You tried to enter, insert, erase, or delete a character when the cursor is in a protected area. Press RESET ((Alt) + F10) to remove the message and unlock the keyboard.	X ← ♀ →
X ♀ >	Too Much Entered You tried to insert more data than this field can hold. Press RESET ((Alt) + F10) and correct the entry.	X ♀ >
X ♀ NUM	Numeric Data Only You should enter only numbers in this field. Press RESET ((Alt) + F10) and then enter only numbers.	X ♀ NUM
X ♀ #?	What Number You entered an incorrect printer ID number. Press RESET ((Alt) + F10).	X ♀ #?
X -f	Minus Function The requested function is not available. Press RESET ((Alt) + F10).	X -f
X ♀ X	Operator Unauthorized You are not authorized to do that function. Press RESET ((Alt) + F10).	X ♀ X
X 0 ← ♀	Operator Message Not Accepted A message from the control operator was received and rejected. Press RESET ((Alt) + F10).	X 0 ← ♀
X ∅ nn or X ∅ nnn	Machine Check Your System Unit is not working properly. The error number, nn or 2nn, defines the type of Machine Check. Press RESET ((Alt) + F10) to restore your keyboard and continue. If the problem persists, refer to the Problem Determination Section of your <i>Guide to Operations</i> .	X ∅ nn

What You See on Your Screen	What This Means	How it Appears on the 3278 Display Station
<p>X -x -nn or X -x -nnn</p>	<p>Communication Check There is a problem with the communication line between the control unit and the host system. The error number nn or nnn, defines the type of Communication Check. Press RESET ( + ) to restore your keyboard and continue. If the problem persists, refer to the problem determination section of your <i>Guide to Operations</i>.</p>	<p>✕ </p>
<p>X PROG nn or X PROG 4nn</p>	<p>Program Check The control unit detected a programming error in the data it received from the host system. The error number, nn or 4nn, defines the type of Program Check. Press RESET ( + ) to restore your keyboard and continue. If the problem persists, refer to the problem determination section of your <i>Guide to Operations</i>.</p>	<p>✕ PROG nn or ✕ PROG4nn</p>
<p>X </p>	<p>Printer Busy The printer connected to your display is busy. If  is displayed on the right, the printer is busy with your work. Wait for the print operation to finish or press DEV CNCL ( + ) to cancel a pending print operation.</p>	<p>✕ </p>
<p>X </p>	<p>Printer Very Busy This message is the same as Printer Busy except more time is anticipated before your operation is accepted.</p>	<p>✕ </p>
<p>X </p>	<p>Printer Not Working The printer you are attached to is not operating properly. Press DEV CNCL ( + ). Then select another printer.</p>	<p>✕ </p>
<p>X-S</p>	<p>Minus Symbol The symbol key you pressed is not available. Press RESET ( + ).</p>	<p>✕ -S</p>
<p>X </p>	<p>Wrong Configuration Your keyboard is not configured for that selection.</p>	<p>✕ </p>

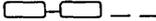
Reminder Messages

What You See on Your Screen	What This Means	How it Appears on the 3278 Display Station
-X 7-nn -X 7-nnn	Communication Error Reminder The communication link connecting your control unit to the host system is producing errors.	-X 7 nn or X -X 7 nnn

Shifts and Mode Messages

What You See on Your Screen	What This Means	How it Appears on the 3278 Display Station
^	Insert Mode Your display station is in Insert Mode. To turn off Insert Mode, press RESET (<input type="button" value="Alt"/> + <input type="button" value="F10"/>).	^
↑	Shift Mode Your display station is in Shift Mode.	↑
DOC↓	Document Mode Your display station is in Document Mode. To turn off document mode, press (<input type="button" value="Ctrl"/> + <input type="button" value="F5"/>).	DOC↓

Printer Status Messages

What You See on Your Screen	What This Means	How it Appears on the 3278 Display Station
○ ○ _ _	Assign Printer When you are changing the Printer ID/Printer Class, the two numbers you type are displayed in the underlined locations of the message.	
○ ○ nn	Printer Assignment You are authorized to use the printer with ID 'nn'.	
○ ☺ nn	Printer Printing The printer with ID 'nn' is printing your work.	
○ ∅ nn	Printer Failure The printer with ID 'nn' stopped while printing your work. Press DEV CNCL (Device Cancel) ( + ) to remove this indicator.	
○ ○ ??	What Printer Your printer assignment has changed. Press Ident ( + ) to display the new printer ID.	

Appendix C. File Transfer ASCII to EBCDIC Translation

When transferring a file between the Personal Computer and host, we recommend using the ASCII option to translate the file for processing. (See Chapter 6 for more information.) Alphanumeric data is usually encoded in ASCII on the Personal Computer and EBCDIC on the host.

The tables on the following pages show the translations between ASCII and EBCDIC that occur during file transfer.

1. ASCII to EBCDIC translation is *always* the reverse of EBCDIC to ASCII. In other words, if you translate any character from EBCDIC to ASCII (as in RECEIVE) then back to EBCDIC (SEND), there is no overall change.
2. The following characters are equivalent in EBCDIC and ASCII; they are typed using the same key, but are displayed differently.

EBCDIC	⌋	¢	
ASCII	^	[]

3. Apart from the exceptions in item 2, EBCDIC characters that may be typed directly in a host session (either alone or with the Shift key) are equivalent to the same ASCII characters as typed in a Personal Computer session. The host and Personal Computer sessions use the same key and display the same character.

Characters that cannot be entered directly are transferred according to the following tables. The EBCDIC and ASCII displays are not equivalent.

ASCII to EBCDIC Translation

	0	1	2	3	4	5	6	7
0	00	01	02	03	37	2D	2E	2F
1	10	11	12	13	3C	3D	32	26
2	40	5A	7F	7B	5B	6C	50	7D
3	F0	F1	F2	F3	F4	F5	F6	F7
4	7C	C1	C2	C3	C4	C5	C6	C7
5	D7	D8	D9	E2	E3	E4	E5	E6
6	79	81	82	83	84	85	86	87
7	97	98	99	A2	A3	A4	A5	A6
8	20	21	22	23	24	15	06	17
9	30	31	1A	33	34	35	36	08
A	41	42	43	44	45	46	47	48
B	58	59	62	63	64	65	66	67
C	76	77	78	80	8A	8B	8C	8D
D	9F	A0	AA	AB	AC	AD	AE	AF
E	B8	B9	BA	BB	BC	BD	BE	BF
F	DC	DD	DE	DF	EA	EB	EC	ED

	8	9	A	B	C	D	E	F
0	16	05	25	0B	0C	0D	0E	0F
1	18	19	3F	27	1C	1D	1E	1F
2	4D	5D	5C	4E	6B	60	4B	61
3	F8	F9	7A	5E	4C	7E	6E	6F
4	C8	C9	D1	D2	D3	D4	D5	D6
5	E7	E8	E9	4A	E0	4F	5F	6D
6	88	89	91	92	93	94	95	96
7	A7	A8	A9	C0	6A	D0	A1	07
8	28	29	2A	2B	2C	09	0A	1B
9	38	39	3A	3B	04	14	3E	E1
A	49	51	52	53	54	55	56	57
B	68	69	70	71	72	73	74	75
C	8E	8F	90	9A	9B	9C	9D	9E
D	B0	B1	B2	B3	B4	B5	B6	B7
E	CA	CB	CC	CD	CE	CF	DA	DB
F	EE	EF	FA	FB	FC	FD	FE	FF

EBCDIC to ASCII Translation

	0	1	2	3	4	5	6	7
0	00	01	02	03	9C	09	86	7F
1	10	11	12	13	9D	85	08	87
2	80	81	82	83	84	0A	17	1B
3	90	91	16	93	94	95	96	04
4	20	A0	A1	A2	A3	A4	A5	A6
5	26	A9	AA	AB	AC	AD	AE	AF
6	2D	2F	B2	B3	B4	B5	B6	B7
7	BA	BB	BC	BD	BE	BF	C0	C1
8	C3	61	62	63	64	65	66	67
9	CA	6A	6B	6C	6D	6E	6F	70
A	D1	7E	73	74	75	76	77	78
B	D8	D9	DA	DB	DC	DD	DE	DF
C	7B	41	42	43	44	45	46	47
D	7D	4A	4B	4C	4D	4E	4F	50
E	5C	9F	53	54	55	56	57	58
F	30	31	32	33	34	35	36	37

	7	8	A	B	C	D	E	F
0	97	8D	8E	0B	0C	0D	0E	0F
1	18	19	92	8F	1C	1D	1E	1F
2	88	89	8A	8B	8C	05	06	07
3	98	99	9A	9B	14	15	9E	1A
4	A7	A8	5B	2E	3C	28	2B	5D
5	B0	B1	21	24	2A	29	3B	5E
6	B8	B9	7C	2C	25	5F	3E	3F
7	C2	60	3A	23	40	27	3D	22
8	68	69	C4	C5	C6	C7	C8	C9
9	71	72	CB	CC	CD	CE	CF	D0
A	79	7A	D2	D3	D4	D5	D6	D7
B	E0	E1	E2	E3	E4	E5	E6	E7
C	48	49	E8	E9	EA	EB	EC	ED
D	51	52	EE	EF	F0	F1	F2	F3
E	59	5A	F4	F5	F6	F7	F8	F9
F	38	39	FA	FB	FC	FD	FE	FF

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GC28-0646

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Appendix E. Glossary

This glossary contains many words, acronyms, terms, and phrases found in this manual. Most of these terms and acronyms are used in the 3270 publications library.

adapter. An attachment that modifies a mechanism to operate in a particular way. In Personal Computer, often referred to as an *adapter card*.

American Standard Code for Information Interchange (ASCII). A standard code used for exchanging information among data processing systems and associated equipment.

ASCII. American Standard Code for Information Interchange.

backup. Duplicating data from a diskette or fixed disk to another diskette or fixed disk, to ensure availability of data in the event of loss of, or damage to the original; this is also a DOS 2.1 command (see the *Disk Operating System, Version 2.1*, 6024001).

Basic Input Output System (BIOS). Basic input output system for the Personal Computer.

BIOS. Basic Input Output System.

byte. A character of information. Eight bits.

control unit. A device that controls input/output operations of one or more devices.

data. All information entered into or used by a computer.

data set. A collection of data records. Data sets are stored either in the host computer's or on Personal Computer's storage medium. Data sets are also called files.

default. A value or option that is assumed when none has been specified.

directory. A table of identifiers and references to the corresponding items of data. For example, the directory for a diskette contains the names of files on the diskette (identifiers), along with information that tells DOS where to find the file on the diskette.

diskette. A Personal Computer storage device consisting of a flexible magnetic disk inside a protective plastic jacket.

diskette drive. A device that uses diskettes for storage and retrieval of data.

display. An output device used for the visual display of data.

disk operating system (DOS). A disk-resident operating system.

Do Not Enter. A symbol (X) in the operator information area of the display surface that indicates that data should not be entered at this time.

DOS. Disk operating system.

dual computer session. Personal computer session and host computer session

EBCDIC. Extended Binary Coded Decimal Interchange Code.

emulate. To simulate one system with another, so that the simulating computer system accepts the same data, executes the same programs, and achieves the same results.

execute. To perform an instruction or a computer program.

Extended Binary Coded Decimal Interchange Code (EBCDIC). A coded character set consisting of 8-bit coded characters. The standard code used by the IBM System 370 computers.

file. A collection of data records. This data can be programs, text, or computational information. Files are stored either in the host computer or on Personal Computer diskettes or fixed disk. Files are also called data sets.

file transfer. The function that allows you to send and receive files between a Personal Computer and a host.

fixed disk. One of two types of storage in the Personal Computer. This storage device is housed in either the System Unit or expansion unit of a Personal Computer.

A fixed disk is composed of rigid material with a magnetic coating, and is used for mass storage and retrieval of data.

hardware. The physical equipment used in data processing, as opposed to programs, procedures, and associated documentation. (Contrast with software.)

host computer. A large, central computer which provides services such as computation, data base access, special programs, or programming languages.

“in use” light. The light on the diskette or disk drive that comes on when the drive is active.

K-byte. Kilobyte. 1024 characters. See “byte.”

keyword. One of the predefined words of a programming language; a reserved word.

kilobyte. 1024 characters.

load. In programming, to enter data into storage or working registers.

logging on. The procedure by which you are linked to a multiple-user host computer system; the procedure requires a user identification (userid) and a password.

merge. To combine the items of two or more files (or data sets) into one.

operator information area (OIA). In the 3270 Information Display System, the area below the line near the bottom of your display area where you receive information about the status of your terminal or system.

PA key. Program access key.

parameter. A name in a procedure that is used to refer to an argument passed to that procedure.

Personal Computer printer. The desktop printer attached exclusively to your Personal Computer.

PF key. Program function key.

program access (PA) key. On a display device keyboard, a key that produces a call to a program that performs display operations.

program function (PF) key. A key that passes a signal to a program to call for a particular operation to be performed.

Receive. One of the two commands involved in file transfer. When you receive a file, a copy of the file is transferred from the host to the Personal Computer.

record. A collection of related information, treated as a unit.

screen. The surface of your display or monitor.

Send. One of the two commands involved in file transfer. When you send a file, a copy of the file is transferred from your Personal Computer to the host.

software. Programs that pertain to the operation of a computer system. (Contrast with hardware.)

system reset. Within the Personal Computer session, this is the function that produces a result similar to that of a Power On. It is accomplished by pressing and holding these three keys in succession: Ctrl, Alt, and Del.

3274 Control Unit Printer. The printer attached to the host computer by means of a 3274 Control Unit.

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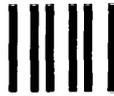
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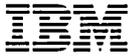
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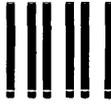
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