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MP/M II
DOS 5
USER'S GUIDE

MP/M II DOS 5
User's Guide
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DOS 5
USER'S GUIDE

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1.0 INTRODUCTION

1.1 DOS 5 Features

DOS 5 is Dynabyte's new multi-user, multi-tasking operating system. DOS 5, based on the Digital Research MP/M II operating system, allows up to seven consoles (16 consoles when special re-entrant programs are run) and up to 16 printers to be attached to a single Dynabyte computer. Any Dynabyte computer with a minimum of 64K of memory can run DOS 5. This includes our 5.25" floppy disk drive system all the way up to our 45 megabyte Winchester hard disk system.

DOS 5 also allows multi-tasking. Multi-tasking permits a single operator, from a single console, to perform up to seven separate tasks on one computer.

Dynabyte has enhanced the Digital Research MP/M II operating system with several unique features. We've also completely interfaced it with all of our hardware. Expanding the system to include more printers, memory, disks or terminals requires only a simple installation step.

We have not altered the MP/M II operating system in any way. You can use every facility available in the Digital Research MP/M II manuals. But we have enhanced the XIOS and added features that go beyond the normal capabilities of MP/M II.

- Complete hardware interface and support

We have interfaced DOS 5 to a wide range of peripheral devices, such as our 8-port serial board, our CPU serial and parallel ports, all of our floppy disk drives (5.25" and 8"), and all of our Winchester hard disk systems (5.25" and 8").

- DYNASYS -- the system installation program

DYNASYS, with menu selection for system features, makes system generation and configuration a lot easier. You can select individual menu items, or the DYNASYS program can automatically guide you through the entire process of defining a system.

1.2 Scope of this Manual

This manual is your guide to using all the features of the DOS 5 operating system. It is not intended to be a replacement for the Digital Research MP/M II manuals. You are strongly urged to read the MP/M II manuals BEFORE using DOS 5.

To help the new user get started, Section 2 of this manual offers a cookbook approach to copying and installing DOS 5. The remaining sections of the manual provide detailed descriptions of the utilities provided by DOS 5. Note that these Dynabyte utilities enhance, but do not replace, the MP/M II software.

The manual consists of nine sections and three appendices as follows:

1. Introduction
2. Getting Started: Copying and Installing DOS 5
3. System Definition and Configuration
4. The Boot ROM
5. Formatting and Configuring Disks
6. Cartridge Tape Systems
7. Copying Data: BACKUP
8. Printer and Console Connections
9. Advanced Features

Appendix A. Memory Board Switch Settings

Appendix B. Utility Summary

Appendix C. User's Comments Form

The following paragraphs describe the general purpose and content of these sections.

Introduction

This section contains general information about DOS 5, including its features and options. It also describes the manual's overall scope and documentation conventions used.

Getting Started: Copying and Installing DOS 5

The second section contains procedures that are specially written to get you started with your new Dynabyte operating system, DOS 5. This section tells you how to copy the DOS 5 distribution media (i.e., floppy disks or cartridge tape) — a task you should do immediately to protect your masters. The section further explains how to install DOS 5 for the first time on your system.

System Definition and Configuration

The third section provides procedures to define your system and tailor the system to your requirements.

The Boot ROM

The fourth section describes the relationship of Dynabyte's ROM series to the system start-up.

Formatting and Configuring Disks

Section 5 describes how to format and configure the various disk drives supported by DOS 5.

Cartridge Tape Systems

Section 6 contains instructions for using cartridge tape media. It also contains procedures for transferring files from the Winchester drive to a cartridge tape.

Copying Data: BACKUP

Section 7 details the BACKUP program which copies volumes of data to and from disk drives.

Printer and Console Connections

The eighth section tells you how to install printers and terminals with your Dynabyte computer. These instructions include information for choosing a Dynabyte input/output (I/O) port for the printer and terminal.

Advanced Features

This last section provides information and instructions for advanced Dynabyte users to program their own user I/O modules. It lists interrupt vectors and flags used by DOS 5 as well as additional information for advanced users.

Appendix A

Appendix A illustrates for systems with one to seven memory boards: the correct responses to DYNASYS and the correct setting of the switches on the memory boards. These switches define memory placement within the DOS 5 system. Appendix A also provides a memory map for each system.

Appendix B

Summarized in Appendix B are all DOS 5 utility programs and the function of each.

Appendix C

Dynabyte created the reader comment form at the back of this manual because we want to hear from you. If you have any suggestions for improving this User's Guide, please let us know. When filling out the form, please be as specific as possible.

1.3 Documentation Conventions

The terms in this manual are consistent with those used in the microcomputer industry. If you are new to microcomputers, we recommend you read Dynabyte's Getting Started Guide. You may also acquire one of the many good texts on basic computer concepts and terms. These texts are widely available at computer and electronic hobbyist stores.

Most conventions used in this manual are also consistent with those used throughout the industry. This manual does, however, use several conventions unique to Dynabyte. The following paragraphs describe these conventions.

Screen Displays

This manual contains many illustrations of console screen displays. These displays are shown in bold type and capital letters.

User Entries

In these illustrations, entries you make at your console keyboard are underlined and are in bold face. For example, a typical screen display with your keyboard entry would appear as:

```
DYNABYTE DOS 5
```

```
0A>DIR<CR>
```

Typing the carriage return key is represented as <CR>.

2.0 COPYING AND INSTALLING DOS 5

This section describes how to duplicate the original floppy disks or cartridge tape containing DOS 5, and how to install DOS 5 on your Dynabyte computer. If DOS 5 resides on a cartridge tape, you should skip to Section 2.6 for complete instructions. The following discussion pertains only to operating systems shipped on floppy disks.

When the Dynabyte computer arrives, it contains no installed software; DOS 5 is shipped on floppy disks (or cartridge tape). The Dynabyte DOS 5 distribution disks contain the complete operating system, and you can boot from any disk. See Section 4, THE BOOT ROM, for more information on booting.

When DOS 5 is first booted from one of the distribution disks, Drives A through D are assigned as floppy drives, Drives E and F are assigned to the Mini Winchester, and Drives G and H are assigned to the Fujitsu Winchester. This can be seen from the following list of disk drive assignments, as it would appear using the DYNASTAT command:

DISK DRIVE	ASSIGN
A:	F1
B:	F2
C:	F3
D:	F4
E:	MINI1
F:	MINI2
G:	FUJ1
H:	FUJ2

It is very important that you do not make any changes to any of the distribution disks. IMMEDIATELY MAKE A COPY OF ALL DISTRIBUTION DISKS, AND STORE THE ORIGINALS IN A SAFE PLACE. Should you incorrectly describe your operating system while reconfiguring it, you would not be able to boot from the disk on which you ran the DYNASYS. The only way to recover would be to start over, using the unaltered distribution disks.

These installation procedures include formatting the disk drives. When a hard disk drive or a floppy disk is formatted, any data that was stored on it is erased. Therefore, do not use these installation instructions if you already have data on your hard disk. You should first copy any data you want to save onto backup floppy disks. Then you can format the hard disk without losing information.

Memory Boards

If you have one or more memory boards installed in your computer, you should read Appendix A BEFORE you continue. Appendix A shows the required hardware settings and recommended memory segments for systems with one to seven memory boards.

When you use the Create System Disk (CD) option in DYNASYS, you cannot accept the GENSYs defaults. Type "N" at the prompt "Do You Want to Accept All the Default Parameters in Gensys (Y/N)?" and you will enter into the GENSYs program. Use the appropriate responses given in Appendix A to enter Memory Segment table values.

Complete instructions for duplicating and installing DOS 5 are presented separately for each of the following computer system types:

<u>METHOD</u>	<u>DESCRIPTION OF COMPUTER SYSTEM</u>	<u>DYNABYTE MODELS</u>
1	Two 5.25" floppy drives See Section 2.1	5200
2	Two 8" floppy drives See Section 2.2	5300 5305 5400
3	5.25" Mini Winchester with one 5.25" floppy drive See Section 2.3	5505
4	5.25" Mini Winchester with one 8" floppy drive See Section 2.4	5605
5	8" Fujitsu Winchester with one 8" floppy drive See Section 2.5	5615
6	Winchester hard disk with cartridge tape drive See Section 2.6	5013 5700 5710

2.1 Model 5200

Two 5.25" floppy drives
Dynabyte Model 5200

METHOD 1 OVERVIEW

- Boot DOS 5 from Distribution Disk #2. (Disk #2 contains the FORMAT and BACKUP utilities which you will use.)
 - Format three floppy disks.
 - Copy the DOS 5 distribution disks.
 - Reboot DOS 5 from one of the new copies of the distribution disks.
-

Boot DOS 5 from Distribution Disk #2.

1. Turn on the computer.
2. Insert Distribution Disk #2.

Insert Distribution Disk #2 into the left floppy drive, drive "A", and close the door. (Insert a 5.25" floppy disk so that its label faces the computer power switch.)

3. Press and release the reset button.

DOS 5 will automatically be read into the computer. The system will then sign on with the following message:

```
DYNABYTE DOS 5.XX  
0A>
```

The "0A>" prompt indicates that DOS 5 is "logged" onto logical drive "A", and is ready for additional commands.

At this point, the loading process, also known as "booting", is complete.

 Format three floppy disks.

1. Use FFORMAT to format three floppy disks.

GA>FFORMAT<CR>

Enter "FFORMAT" followed by a carriage return. FFORMAT will sign on with the following prompt:

 DYNABYTE FLOPPY DISK FORMAT UTILITY

VERSION X.X FOR DOS 5.XX

ENTER 1 - TO USE FIRST FLOPPY DRIVE
 2 - TO USE SECOND FLOPPY DRIVE
 3 - TO USE THIRD FLOPPY DRIVE
 4 - TO USE FOURTH FLOPPY DRIVE

FLOPPY DISK DRIVE TO USE (1,2,3 OR 4) ? **2<CR>**

Enter "2" followed by a carriage return to specify the second floppy drive. Depending on your computer system's drive type, you will then receive one of the following messages:

DRIVE 2 IS A SINGLE SIDED 5 1/4 INCH DRIVE
 DRIVE 2 IS A DOUBLE SIDED 5 1/4 INCH DRIVE

FFORMAT will then ask what function you would like to perform:

DO YOU WANT TO:

F - FORMAT
 C - CHECK
 Q - QUIT

YOUR SELECTION ? **F<CR>**

Enter "F" followed by a carriage return to indicate FORMAT.

If the drive is double-sided, FFORMAT will then ask whether you want one or both sides formatted:

SIDE FORMAT SELECTION

1 - FOR SINGLE SIDED
 2 - FOR DOUBLE SIDED
 RETURN - FOR SINGLE SIDED

SIDE FORMAT ? 1<CR>

Enter "1" followed by a carriage return to indicate single-sided.

All 5.25" floppy drives are automatically formatted double-density.

FFORMAT will now ask you to enter the number of directory entries to reserve space for on the floppy disk:

NUMBER OF DIRECTORY ENTRIES

- 1 - FOR 64 ENTRIES
- 2 - FOR 128 ENTRIES
- 3 - FOR 256 ENTRIES

RETURN - FOR 64 ENTRIES.

OF DIRECTORY ENTRIES ? 2<CR>

Enter "2" followed by a carriage return to reserve space for 128 directory entries.

FFORMAT will then tell you to insert the floppy disk you want to format into the floppy drive:

INSERT DISK. HIT ESCAPE TO ABORT OR ANY OTHER KEY TO BEGIN ...

Insert a floppy disk into the right-hand floppy drive, drive "B", and close the door.

CAUTION: FFORMAT will erase any data that exists on the floppy disk.

Also, be sure the floppy disk is not write-protected. You can write on a 5.25" floppy disk if the notch is uncovered.

<CR>

Enter a carriage return to start the actual formatting process. FFORMAT then tells you it is working and asks you to wait:

.... FORMATTING IS NOW BEING DONE PLEASE WAIT

If, during the formatting process, FFORMAT finds a bad sector on the floppy disk and is unable to format it, the error will be reported as follows:

HARD ERROR AT TRACK=XX SECTOR=XX
!!! BAD DISKETTE REPLACE WITH A NEW ONE !!!

A damaged floppy disk should be removed and discarded. Start the format process on another floppy disk.

After the floppy disk has been formatted, FFORMAT will confirm its completion and then ask if you want to format another floppy disk:

***** FORMAT COMPLETED O.K. *****

REPEAT SAME OPERATION ON A NEW DISK (Y/N) ?

Remove the newly formatted floppy disk from floppy drive "B".

Y<CR>

Enter "Y" followed by a carriage return. FFORMAT will then tell you to insert a floppy disk into the drive:

INSERT DISK. HIT ESCAPE TO ABORT OR ANY OTHER KEY TO BEGIN ...

Insert another floppy disk into floppy drive "B", and close the door.

<CR>

Enter a carriage return to start the formatting process. FFORMAT tells you it is working and asks you to wait:

.... FORMATTING IS NOW BEING DONE PLEASE WAIT

Again, if FFORMAT reports a bad sector, the damaged floppy disk should be discarded and the format process tried on another floppy disk.

After the floppy disk has been formatted, FFORMAT will confirm its completion and then ask if you want to format another floppy disk:

***** FORMAT COMPLETED O.K. *****

REPEAT SAME OPERATION ON A NEW DISK (Y/N) ? Y<CR>

Remove the newly formatted floppy disk from floppy drive "B". Enter "Y" followed by a carriage return. Insert the third floppy disk into drive "B". Enter a carriage return to start the formatting process.

***** FORMAT COMPLETED O.K. *****

REPEAT SAME OPERATION ON A NEW DISK (Y/N) ? N<CR>

After the third disk has been formatted, enter "N" followed by a carriage return. FFORMAT will then return to its main menu:

DO YOU WANT TO:

F - FORMAT
C - CHECK
Q - QUIT

YOUR SELECTION ? Q<CR>

Enter "Q" followed by a carriage return to exit FFORMAT and return to the operating system.

Leave the newly formatted floppy disk in floppy drive "B".

2. Leave Distribution Disk #2 in floppy drive "A".

 Copy the DOS 5 Distribution Disks.

1. Invoke BACKUP.

A>BACKUP<CR>

Enter "BACKUP" followed by a carriage return. BACKUP will then sign on with the following menu and prompt:

*** DYNABYTE BACKUP UTILITY VER. X.X RUNNING UNDER MP/M ***

F = FILE BY FILE COPY
 T = TRACK BY TRACK COPY
 X = EXIT TO OPERATING SYSTEM

WHICH BACKUP MODE ?

2. Remove Distribution Disk #2 from floppy drive "A".
3. Insert Distribution Disk #1 into floppy drive "A", and close the door.
4. Copy Distribution Disk #1.

WHICH BACKUP MODE ? T<CR>

Enter "T" followed by a carriage return to indicate a track-by-track transfer from floppy-to-floppy. BACKUP will then ask you to identify the source drive:

SOURCE DRIVE (A - P) ? A<CR>

Enter "A" followed by a carriage return to specify the left floppy drive as the source drive. BACKUP will then prompt for the destination drive:

DESTINATION DRIVE (A - P) ? B<CR>

Enter "B" followed by a carriage return to specify the right-hand floppy drive as the destination drive.

BACKUP will confirm your instructions for the data transfer, and then instruct you to insert the formatted floppy disk into floppy drive "B".

SOURCE = 5" SS DD FLOPPY DIR ENTRIES = 0128
 DESTINATION = 5" SS DD FLOPPY DIR ENTRIES = 0128

INTERNAL RAM MEMORY BUFFER SIZE = 21240 BYTES
 # OF SOURCE DISK TRACKS BUFFERED = 05

INSERT FLOPPY DISK #01 IN DRIVE B

HIT RETURN TO CONTINUE.... <CR>

Enter a carriage return to start the actual data transfer. The screen will display a single line of incrementing numbers as BACKUP reads groups of tracks from the source disk and writes groups of tracks onto the formatted destination disk:

BACKUP IN PROGRESS

READING TRACK # 00000 WRITING TRACK # 00000

When all of the tracks have been copied, BACKUP will report its completion and prompt you to enter a carriage return:

BACKUP COMPLETE

HIT RETURN TO CONTINUE.... <CR>

Enter a carriage return. BACKUP will then return to its main menu:

*** DYNABYTE BACKUP UTILITY VER. X.X RUNNING UNDER MP/M ***

F = FILE BY FILE COPY

T = TRACK BY TRACK COPY

X = EXIT TO OPERATING SYSTEM

WHICH BACKUP MODE ?

5. Remove Distribution Disk #1 from floppy drive "A".
6. Remove the new copy of Distribution Disk #1 from floppy drive "B" and label it "Copy -- DOS 5.XX Distribution Disk #1 of 3".
7. Insert Distribution Disk #2 into floppy drive "A", and close the door.
8. Insert one of the remaining formatted floppy disk into floppy drive "B", and close the door.
9. Copy Distribution Disk #2.

WHICH BACKUP MODE ? <T><CR>

Enter a "T" followed by a carriage return to once again indicate a track-by-track transfer from floppy-to-floppy. BACKUP will then ask you to identify the source drive:

SOURCE DRIVE (A - P) ? A<CR> Enter "A" followed by a carriage return to specify the left floppy drive as the source drive. BACKUP will then prompt for the destination drive:

DESTINATION DRIVE (A - P) ? B<CR> Enter "B" followed by a carriage return to specify the right-hand floppy drive as the destination drive.

BACKUP will confirm your instructions for the data transfer, and then instruct you to insert the formatted floppy disk:

SOURCE = 5" SS DD FLOPPY DIR ENTRIES = 0128
DESTINATION = 5" SS DD FLOPPY DIR ENTRIES = 0128

INTERNAL RAM MEMORY BUFFER SIZE = 21240 BYTES
OF SOURCE DISK TRACKS BUFFERED = 05

INSERT FLOPPY DISK #01 IN DRIVE B

HIT RETURN TO CONTINUE.... <CR> Enter a carriage return to start the actual data transfer. The screen will display a single line of incrementing numbers as BACKUP reads groups of tracks from the source disk and writes groups of tracks onto the formatted destination disk:

BACKUP IN PROGRESS

READING TRACK # 00000 WRITING TRACK # 00000

When all of the tracks have been copied, BACKUP will report its completion and prompt you to enter a carriage return:

BACKUP COMPLETE

HIT RETURN TO CONTINUE.... <CR> Enter a carriage return. BACKUP will then return to its main menu:

*** DYNABYTE BACKUP UTILITY VER. X.X RUNNING UNDER MP/M ***

F = FILE BY FILE COPY
T = TRACK BY TRACK COPY
X = EXIT TO OPERATING SYSTEM

10. Remove Distribution Disk #2 from floppy drive "A".

11. Remove the new copy of Distribution Disk #2 from floppy drive "B" and

label it "Copy -- DOS 5.XX Distribution Disk #2 of 3".

12. Copy Distribution Disk #3 in the same manner as you did for Distribution Disk #2.

BACKUP COMPLETE

When BACKUP has finished copying Disk #3, enter a carriage return to return to the main menu:

HIT RETURN TO CONTINUE....<CR>

*** DYNABYTE BACKUP UTILITY VER. X.X RUNNING UNDER MP/M ***

F = FILE BY FILE COPY
T = TRACK BY TRACK COPY
X = EXIT TO OPERATING SYSTEM

WHICH BACKUP MODE ? X<CR>

Enter "X" followed by a carriage return to exit BACKUP and return to the operating system.

13. Remove Distribution Disk #3 from floppy drive "A".

14. Remove the new copy of Distribution Disk #3 from floppy drive "B" and label it "Copy -- DOS 5.XX Distribution Disk #3 of 3".

YOU NOW HAVE COPIES OF THE THREE DOS 5 DISTRIBUTION DISKS THAT WERE SHIPPED WITH YOUR COMPUTER. REBOOT DOS 5 FROM ANY OF THESE NEW COPIES.

2.2 Model 5305

Two 8" floppy drives
Dynabyte Models 5300, 5305, 5400

METHOD 2 OVERVIEW

- Boot DOS 5 from Distribution Disk #1.
 - Format two floppy disks.
 - Copy the DOS 5 distribution disks.
 - Reboot DOS 5 from one of the new copies of the distribution disks.
-

Boot DOS 5 from Distribution Disk #1.

1. Turn on the computer.
2. Insert Distribution Disk #1.

Insert Distribution Disk #1 into the left (or top) floppy drive, drive "A", and close the door. (Insert an 8" floppy disk with its label face up.)

3. Press and release the reset button.

DOS 5 will automatically be read into the computer. The system will then sign on with the following message:

```
DYNABYTE DOS 5.XX  
ØA>
```

The "ØA>" prompt indicates that DOS 5 is "logged" onto logical drive "A", and is ready for additional commands.

At this point, the loading process, also known as "booting", is complete.

 Format two floppy disks.

1. Use FFORMAT to format two floppy disks.

0A>FFORMAT<CR>

Enter "FFORMAT" followed by a carriage return. FFORMAT will sign on with the following prompt:

 DYNABYTE FLOPPY DISK FORMAT UTILITY

VERSION X.X FOR DOS 5.XX

ENTER 1 - TO USE FIRST FLOPPY DRIVE
 2 - TO USE SECOND FLOPPY DRIVE
 3 - TO USE THIRD FLOPPY DRIVE
 4 - TO USE FOURTH FLOPPY DRIVE

FLOPPY DISK DRIVE TO USE (1,2,3 OR 4) ? 2<CR>

Enter "2" followed by a carriage return to specify the second floppy drive. Depending on your computer system's drive type, you will then receive one of the following messages:

DRIVE 2 IS A SINGLE SIDED 8 INCH DRIVE
 DRIVE 2 IS A DOUBLE SIDED 8 INCH DRIVE

FFORMAT will then ask what function you would like to perform:

DO YOU WANT TO:

F - FORMAT
 C - CHECK
 Q - QUIT

YOUR SELECTION ? F<CR>

Enter "F" followed by a carriage return to indicate FORMAT.

If the drive is double-sided, FFORMAT will then ask whether you want one or both sides formatted:

SIDE FORMAT SELECTION

1 - FOR SINGLE SIDED
 2 - FOR DOUBLE SIDED
 RETURN - FOR SINGLE SIDED

SIDE FORMAT ? 1<CR>

Enter "1" followed by a carriage return to indicate single-sided.

FFORMAT will then prompt for single- or double-density:

DENSITY FORMAT SELECTION

1 - FOR SINGLE DENSITY
2 - FOR DOUBLE DENSITY
RETURN - FOR DOUBLE DENSITY

DENSITY FORMAT ? <CR>

Enter a carriage return to indicate double-density.

FFORMAT will now ask you to enter the number of directory entries to reserve space for on the floppy disk:

NUMBER OF DIRECTORY ENTRIES

1 - FOR 64 ENTRIES
2 - FOR 128 ENTRIES
3 - FOR 256 ENTRIES
RETURN - FOR 64 ENTRIES

OF DIRECTORY ENTRIES ? 2<CR>

Enter "2" followed by a carriage return to reserve space for 128 directory entries.

FFORMAT will then tell you to insert the floppy disk you want to format into the floppy drive:

INSERT DISK. HIT ESCAPE TO ABORT OR ANY OTHER KEY TO BEGIN ...

Insert a floppy disk into the right-hand floppy drive, drive "B", and close the door.

CAUTION: FFORMAT will erase any data that exists on the floppy disk.

Also, be sure the floppy disk is not write-protected. You can write on an 8" floppy disk if the write-protect notch is covered up.

<CR>

Enter a carriage return to start the actual formatting process. FFORMAT then tells you it is working and asks you to wait:

.... FORMATTING IS NOW BEING DONE PLEASE WAIT

If, during the formatting process, FFORMAT finds a bad sector on the floppy disk and is unable to format it, the error will be reported as follows:

HARD ERROR AT TRACK=XX SECTOR=XX
!!! BAD DISKETTE REPLACE WITH A NEW ONE !!!

A damaged floppy disk should be removed and discarded. Start the format process on another floppy disk.

After the floppy disk has been formatted, FFORMAT will confirm its completion and then ask if you want to format another floppy disk:

***** FORMAT COMPLETED O.K. *****

REPEAT SAME OPERATION ON A NEW DISK (Y/N) ?

Remove the newly formatted floppy disk from floppy drive "B".

Y<CR>

Enter "Y" followed by a carriage return. FFORMAT will then tell you to insert a floppy disk into the drive:

INSERT DISK. HIT ESCAPE TO ABORT OR ANY OTHER KEY TO BEGIN ...

Insert another floppy disk into floppy drive "B", and close the door.

<CR>

Enter a carriage return to start the formatting process. FFORMAT tells you it is working and asks you to wait:

.... FORMATTING IS NOW BEING DONE PLEASE WAIT

Again, if FFORMAT reports a bad sector, the damaged floppy disk should be discarded and the format process tried on another floppy disk.

After the floppy disk has been formatted, FFORMAT will confirm its completion and then ask if you want to format another floppy disk:

***** FORMAT COMPLETED O.K. *****

REPEAT SAME OPERATION ON A NEW DISK (Y/N) ? N<CR>

Enter "N" followed by a carriage return. FFORMAT will then return to its main menu:

DO YOU WANT TO:

F - FORMAT
C - CHECK
Q - QUIT

YOUR SELECTION ? Q<CR>

Enter "Q" followed by a carriage return to exit FFORMAT and return to the operating system.

Leave the newly formatted floppy disk in floppy drive "B".

2. Remove Distribution Disk #1 from floppy drive "A".

 Copy the DOS 5 Distribution Disks.

1. Insert Distribution Disk #2 into floppy drive "A", and close the door.
2. Invoke BACKUP.

0A>BACKUP<CR>

Enter "BACKUP" followed by a carriage return. BACKUP will then sign on with the following menu and prompt:

***** DYNABYTE BACKUP UTILITY VER. X.X RUNNING UNDER MP/M *****

**F = FILE BY FILE COPY
T = TRACK BY TRACK COPY
X = EXIT TO OPERATING SYSTEM**

WHICH BACKUP MODE ?

3. Remove Distribution Disk #2 from floppy drive "A".
4. Insert Distribution Disk #1 into floppy drive "A", and close the door.
5. Copy Distribution Disk #1.

WHICH BACKUP MODE ? T<CR>

Enter "T" followed by a carriage return to indicate a track-by-track transfer from floppy-to-floppy. BACKUP will then ask you to identify the source drive:

SOURCE DRIVE (A - P) ? A<CR>

Enter "A" followed by a carriage return to specify the left floppy drive as the source drive. BACKUP will then prompt for the destination drive:

DESTINATION DRIVE (A - P) ? B<CR>

Enter "B" followed by a carriage return to specify the right-hand floppy drive as the destination drive.

BACKUP will confirm your instructions for the data transfer, and then instruct you to insert the formatted floppy disk:

SOURCE = 8" SS DD FLOPPY DIR ENTRIES = 0128
 DESTINATION = 8" SS DD FLOPPY DIR ENTRIES = 0128

INTERNAL RAM MEMORY BUFFER SIZE = 21426 BYTES
 # OF SOURCE DISK TRACKS BUFFERED = 03

INSERT FLOPPY DISK #01 IN DRIVE B

HIT RETURN TO CONTINUE.... <CR>

Enter a carriage return to start the actual data transfer. The screen will display a single line of incrementing numbers as BACKUP reads groups of tracks from the source disk and writes groups of tracks onto the formatted destination disk:

BACKUP IN PROGRESS
 READING TRACK #00000 WRITING TRACK #00000

When all of the tracks have been copied, BACKUP will report its completion and prompt you to enter a carriage return:

BACKUP COMPLETE

HIT RETURN TO CONTINUE.... <CR>

Enter a carriage return. BACKUP will then return to its main menu:

*** DYNABYTE BACKUP UTILITY VER. X.X RUNNING UNDER MP/M ***

F = FILE BY FILE COPY
 T = TRACK BY TRACK COPY
 X = EXIT TO OPERATING SYSTEM

WHICH BACKUP MODE ?

6. Remove Distribution Disk #1 from floppy drive "A".
7. Remove the new copy of Distribution Disk #1 from floppy drive "B" and label it "Copy -- DOS 5.XX Distribution Disk #1 of 2".
8. Insert Distribution Disk #2 into floppy drive "A", and close the door.
9. Insert the remaining formatted floppy disk into floppy drive "B", and close the door.

10. Copy Distribution Disk #2.

WHICH BACKUP MODE ? T<CR>

Enter a "T" followed by a carriage return to once again indicate a track-by-track transfer from floppy-to-floppy. BACKUP will then ask you to identify the source drive:

SOURCE DRIVE (A - P) ? A<CR>

Enter "A" followed by a carriage return to specify the left floppy drive as the source drive. BACKUP will then prompt for the destination drive:

DESTINATION DRIVE (A - P) ? B<CR>

Enter "B" followed by a carriage return to specify the right-hand floppy drive as the destination drive.

BACKUP will confirm your instructions for the data transfer, and then instruct you to insert the formatted floppy disk:

SOURCE = X" SS DD FLOPPY DIR ENTRIES = 0128
 DESTINATION = X" SS DD FLOPPY DIR ENTRIES = 0128

INTERNAL RAM MEMORY BUFFER SIZE = 21426 BYTES
 # OF SOURCE DISK TRACKS BUFFERED = 03

INSERT FLOPPY DISK #01 IN DRIVE B

HIT RETURN TO CONTINUE.... <CR>

Enter a carriage return to start the actual data transfer. The screen will display a single line of incrementing numbers as BACKUP reads groups of tracks from the source disk and writes groups of tracks onto the formatted destination disk:

BACKUP IN PROGRESS
 READING TRACK #00000 WRITING TRACK #00000

When all of the tracks have been copied, BACKUP will report its completion and prompt you to enter a carriage return:

BACKUP COMPLETE

HIT RETURN TO CONTINUE.... <CR>

Enter a carriage return. BACKUP will then return to its main menu:

*** DYNABYTE BACKUP UTILITY VER. X.X RUNNING UNDER MP/M ***

F = FILE BY FILE COPY
T = TRACK BY TRACK COPY
X = EXIT TO OPERATING SYSTEM

WHICH BACKUP MODE ? X<<CR>

Enter "X" followed by a carriage return to exit BACKUP and return to the operating system.

11. Remove Distribution Disk #2 from floppy drive "A".
12. Remove the new copy of Distribution Disk #2 from floppy drive "B" and label it "Copy — DOS 5.XX Distribution Disk #2 of 2".

YOU NOW HAVE COPIES OF THE TWO DOS 5 DISTRIBUTION DISKS THAT WERE SHIPPED WITH YOUR COMPUTER. REBOOT DOS 5 FROM EITHER OF THESE NEW COPIES.

2.3 Model 5505

5.25" Mini Winchester with one 5.25" floppy drive Dynabyte Model 5505

When the 5505 computer arrives, the Mini Winchester contains no installed software; DOS 5 is shipped on three floppy disks. You must, therefore, initially boot DOS 5 from one of the floppy disks. The 5505 can, however, easily be configured to boot DOS 5 from the Mini Winchester, and normally DOS 5 is transferred to the Mini Winchester and run from there. Booting DOS 5 from the Mini Winchester is faster and more convenient than booting from floppy disks.

The procedure below describes how to copy the DOS 5 software, and how to configure DOS 5 to boot from the Mini Winchester. This procedure will configure the computer into six logical drives (you may have use of only three, depending on your model type): The Mini Winchester will be assigned to logical drives "A" and "B", and the floppy drives will be assigned to logical drives "C" through "F". Even though Model 5505 has only one floppy disk drive, we recommend assigning four drives as floppy drives -- one for the current system and three more to make it easy for you to add more floppy drives to your system. Drives "A" and "B" will be of equal capacity. You may wish to later reconfigure DOS 5 in some other manner. This procedure only describes a standard first-time installation.

METHOD 3 OVERVIEW

- Boot DOS 5 from Distribution Disk #2. (Disk #2 contains the WINFMT5 utility which you will use.)
 - Format the Mini Winchester.
 - Copy the DOS 5 files from the distribution disks onto the Mini Winchester.
 - Format three floppy disks.
 - Copy the DOS 5 loading files to the formatted floppy disks.
 - Copy the DOS 5 files from the Mini Winchester to the "bootable" floppy disks.
 - Install DOS 5 onto the Mini Winchester.
 - Reboot DOS 5 from the Mini Winchester.
-

Boot DOS 5 from Distribution Disk #2.

1. Turn on the computer.
2. Insert Distribution Disk #2.

Insert Distribution Disk #2 into the floppy drive, and close the door. (Insert a 5.25" floppy disk so that its label faces the computer power switch.)

3. Press and release the reset button.

DOS 5 will automatically be read into the computer. The system will then print the load map and sign on with the following message:

```
DYNABYTE DOS 5.XX  
0A>
```

The "0A>" prompt indicates that DOS 5 is "logged" onto logical drive "A", user number 0, and is ready for additional commands.

At this point, the loading process, also known as "booting", is complete.

Format the Mini Winchester.

1. Use WINFMT5 to format and check the 5.25" Mini Winchester.

0A>WINFMT5<CR>

Enter "WINFMT5" followed by a carriage return. WINFMT5 will then sign on with the following menu and prompt:

***** DYNABYTE 5.25" HARD DISK FORMAT VERSION X.XX FOR DOS 5.XX *****

- CO) CHECK ONLY
- FC) FORMAT AND CHECK
- EX) RETURN TO OPERATING SYSTEM

YOUR SELECTION: **FC<CR>**

Enter "FC" followed by a carriage return. WINFMT5 will tell you that it has begun the formatting process, and then slowly display several rows of dots on the screen:

BEGIN FORMAT-ENTER ESC TO ABORT

When WINFMT5 has finished formatting the Mini Winchester, it will confirm its completion and then prompt you to choose a drive configuration:

FORMAT COMPLETE--00H BAD TRACKS WERE FOUND

CONFIGURATION OPTIONS

16MB HARD DISK DRIVE

- A) 1 DRIVE : 8.33 MB : 1024 DIRECTORY ENTRIES
- 1 DRIVE : 4.49 MB : 512 DIRECTORY ENTRIES

- B) 2 DRIVES : 6.4 MB : 512 DIRECTORY ENTRIES

- C) 4 DRIVES : 3.2 MB : 256 DIRECTORY ENTRIES

SELECT OPTION OR <RETURN> FOR DEFAULT (OPTION B): **B<CR>**

Enter a "B" followed by a carriage return to select drive configuration "B". Note that if you later change this configuration, you must reformat the hard disk, which erases all data stored on it.

WINFMT5 will tell you that it has begun the checking process, and then slowly display several more rows of dots on the screen:

```
BEGIN CHECK-ENTER ESC TO ABORT
.....
.....
.....
.....
```

After the drive has been formatted and checked, the bad track table will be displayed. Do not be alarmed; this display requires no action. The WINFMT5 program automatically scans the Mini Winchester for bad tracks, places these in tables, reports them to DOS 5, and substitutes good tracks in their place.

BAD TRACK TABLE				
1)	2)	3)	4)	5)
6)	7)	8)	9)	10)
11)	12)	13)	14)	15)
16)	17)	18)	19)	20)
21)	22)	23)	24)	25)
26)	27)	28)	29)	30)
31)	32)	33)	34)	35)
36)	37)	38)	39)	40)
41)	42)	43)	44)	45)
46)	47)	48)	49)	50)
51)	52)	53)	54)	55)
56)	57)	58)	59)	60)

"T*****" (LOGICAL BAD TRACK NUMBER)
 "H*,C****" (HEAD, CYLINDER NUMBER)

ENTER ONE OF THE ABOVE OPTIONS OR <RETURN> TO ACCEPT: <CR>

Enter a carriage return. If your drive size is not 16MB, a different number of tracks will be displayed than shown above.

WINFMT5 will confirm its completion of the check process and then prompt you to enter a carriage return:

CHECK COMPLETED O.K.
PRESS <RETURN> TO DISPLAY MENU. <CR>

Enter a carriage return. WINFMT5 will then return to its main menu:

***** DYNABYTE 5.25" HARD DISK FORMAT VERSION X.XX FOR DOS 5.XX *****

- CO) CHECK ONLY
- FC) FORMAT AND CHECK
- EX) RETURN TO OPERATING SYSTEM

YOUR SELECTION: EX<CR>

Enter "EX" followed by a carriage return to exit WINFMT5 and return to the operating system.

Copy the DOS 5 files from the distribution disks onto the Mini Winchester.

1. Use PIP to copy the files from Distribution Disk #2 to the Mini Winchester.

0A>PIP E:=A:*. *[OV]<CR>

Enter "PIP E:=A:*. *[OV]" followed by a carriage return. PIP will display the name of each DOS 5 file as it is copied from Distribution Disk #2 to the Mini Winchester, and then automatically return you to the operating system.

2. Remove Distribution Disk #2 from the floppy drive. Insert Distribution Disk #1 into the floppy drive, and close the door. Reset the floppy drive.

0A>DSKRESET<CR>

Enter "DSKRESET" followed by a carriage return to inform the operating system that you have changed floppy disks.

3. Use PIP to copy the files from Distribution Disk #1 to the Mini Winchester.

0A>PIP E:=A:*. *[OV]<CR>

Enter "PIP E:=A:*. *[OV]" followed by a carriage return. PIP will display the name of each DOS 5 file as it is copied from Distribution Disk #1 to the Mini Winchester, and then automatically return you to the operating system.

4. Remove Distribution Disk #1 from the floppy drive. Insert Distribution Disk #3 into the floppy drive, and close the door. Reset the floppy drive:

0A>DSKRESET<CR>

5. Use PIP to copy the files from Distribution Disk #3 to the Mini Winchester.

0A>PIP E:=A:*. *[OV]<CR>

6. Remove Distribution Disk #3 from the floppy drive.

Format three floppy disks.

1. Log onto the Mini Winchester.

0A>E:<CR>

Enter "E:" followed by a carriage return to log onto the Mini Winchester.

0E>

The "0E>" prompt signifies that drive "E" is the current drive, and that DOS 5 is ready for additional commands.

2. Use FFORMAT to format three floppy disks.

0E>FFORMAT<CR>

Enter "FFORMAT" followed by a carriage return. FFORMAT will sign on with the following prompt:

DYNABYTE FLOPPY DISK FORMAT UTILITY

VERSION X.X FOR DOS 5.XX

**ENTER 1 - TO USE FIRST FLOPPY DRIVE
 2 - TO USE SECOND FLOPPY DRIVE
 3 - TO USE THIRD FLOPPY DRIVE
 4 - TO USE FOURTH FLOPPY DRIVE**

FLOPPY DISK DRIVE TO USE (1,2,3 OR 4) ? 1<CR>

Enter "1" followed by a carriage return to specify the floppy drive. Depending on your computer system's drive type, you will then receive one of the following messages:

**DRIVE 1 IS A SINGLE SIDED 5 1/4 INCH DRIVE
DRIVE 1 IS A DOUBLE SIDED 5 1/4 INCH DRIVE**

FFORMAT will then ask what function you would like to perform:

DO YOU WANT TO:

**F - FORMAT
C - CHECK
Q - QUIT**

YOUR SELECTION ? F<CR>

Enter "F" followed by a carriage return to indicate FORMAT.

If the drive is double-sided, FFORMAT will then ask whether you want one or both sides formatted:

SIDE FORMAT SELECTION

- 1 - FOR SINGLE SIDED
- 2 - FOR DOUBLE SIDED
- RETURN - FOR SINGLE SIDED

SIDE FORMAT ? 1<CR>

Enter "1" followed by a carriage return to indicate single-sided.

All 5.25" floppy drives are automatically formatted double-density.

FFORMAT will now ask you to enter the number of directory entries to reserve space for on the floppy disk:

NUMBER OF DIRECTORY ENTRIES

- 1 - FOR 64 ENTRIES
- 2 - FOR 128 ENTRIES
- 3 - FOR 256 ENTRIES
- RETURN - FOR 64 ENTRIES

OF DIRECTORY ENTRIES ? 2<CR>

Enter "2" followed by a carriage return to reserve space for 128 directory entries.

FFORMAT will then tell you to insert the floppy disk you want to format into the floppy drive:

INSERT DISK. HIT ESCAPE TO ABORT OR ANY OTHER KEY TO BEGIN ...

Insert a floppy disk into the floppy drive, and close the door.

CAUTION: FFORMAT will erase any data that exists on the floppy disk.

Be sure the floppy disk is not write-protected. You can write on a 5.25" floppy disk if the notch is uncovered.

<CR>

Enter a carriage return to start the actual formatting process. FFORMAT then tells you it is working and asks you to wait:

.... FORMATTING IS NOW BEING DONE PLEASE WAIT

If, during the formatting process, FFORMAT finds a bad sector on the floppy disk and is unable to format it, the error will be reported as follows:

HARD ERROR AT TRACK=XX SECTOR=XX
!!! BAD DISKETTE REPLACE WITH A NEW ONE !!!

A damaged floppy disk should be removed and discarded. Start the format process on another floppy disk.

After the floppy disk has been formatted, FFORMAT will confirm its completion and then ask if you want to format another floppy disk:

***** FORMAT COMPLETED O.K. *****

REPEAT SAME OPERATION ON A NEW DISK (Y/N) ? Y<CR>

Remove the newly formatted floppy disk from the floppy drive.

Enter "Y" followed by a carriage return. FFORMAT will then tell you to insert a floppy disk into the drive:

INSERT DISK. HIT ESCAPE TO ABORT OR ANY OTHER KEY TO BEGIN ... <CR>

Insert another floppy disk into the floppy drive, and close the door.

Enter a carriage return to start the formatting process. FFORMAT tells you it is working and asks you to wait:

.... FORMATTING IS NOW BEING DONE PLEASE WAIT

Again, if FFORMAT reports a bad sector, the damaged floppy disk should be discarded and the format process tried on a another disk.

After the floppy disk has been formatted, FFORMAT will confirm its completion and then ask if you want to format another floppy disk:

***** FORMAT COMPLETED O.K. *****

REPEAT SAME OPERATION ON A NEW DISK (Y/N) ? Y<CR>

Insert another floppy disk and enter a

carriage return to repeat the
formatting process.

***** FORMAT COMPLETED O.K. *****

REPEAT SAME OPERATION ON A NEW DISK (Y/N) ? N<CR>

Enter "N" followed by a carriage
return. FFORMAT will then return to
its main menu:

DO YOU WANT TO:

F - FORMAT
C - CHECK
Q - QUIT

YOUR SELECTION ? Q<CR>

Enter "Q" followed by a carriage
return to exit FFORMAT and return to
the operating system:

0E>

Copy the DOS 5 loading files to the formatted floppy disks.

1. Use DYNAGEN to copy the DOS 5 loading files to the outer two tracks of the newly formatted floppy disks.

E>DYNAGEN<CR>

Enter "DYNAGEN" followed by a carriage return. (You are still logged onto the Mini Winchester on drive "E".) DYNAGEN will then sign on with the following menu and prompt:

DYNAGEN VERSION X.XX FOR DYNABYTE DOS 5.XX

GENERATE SYSTEM DISK

```

| TR) TRANSFER SYSTEM FROM ONE DISK TO ANOTHER |
| CT) TRANSFER SYSTEM USING ".COM" BOOT FILE   |
| EX) EXIT DYNAGEN                             |

```

YOUR SELECTION ? **CT<CR>**

Enter "CT" followed by a carriage return. DYNAGEN will then ask you to identify the source drive:

(CT) SYSTEM FILES LOCATED ON DISK DRIVE (A-P) ? E<CR>

Enter "E" followed by a carriage return to specify the Mini Winchester as the source drive. DYNAGEN will then prompt for the destination drive:

WRITE SYSTEM TO DISK DRIVE (A-P) ? A<CR>

Enter "A" followed by a carriage return to specify the floppy drive as the destination drive. DYNAGEN will then prompt you to insert the floppy disk:

PLEASE PLACE PROPER DISKS IN DRIVES, THEN PRESS <RETURN> TO CONTINUE.

Insert one of the formatted floppy disks into the floppy drive, and close the door.

<CR>

Enter a carriage return to start the actual copying process. DYNAGEN then tells you it is working and asks you to wait:

PLEASE WAIT. WRITING SYSTEM TO FLOPPY DRIVE A.

When DYNAGEN has finished writing the loading instructions, it will prompt you to enter a carriage return:

PRESS <RETURN> TO DISPLAY MENU. <CR>

Enter a carriage return. DYNAGEN will then return to its main menu:

DYNAGEN VERSION X.XX FOR DYNABYTE DOS 5.XX

GENERATE SYSTEM DISK

```
| (R) TRANSFER SYSTEM FROM ONE DISK TO ANOTHER |
| (T) TRANSFER SYSTEM USING ".COM" BOOT FILE   |
| (X) EXIT DYNAGEN                             |
```

Repeat the above steps for each of the two remaining floppy disks.

When you have transferred the system to the last disk, enter a carriage return to return to the DYNASYS main menu:

PRESS <RETURN> TO DISPLAY MENU. <CR>

DYNAGEN VERSION X.XX FOR DYNABYTE DOS 5.XX

GENERATE SYSTEM DISK

```
| (R) TRANSFER SYSTEM FROM ONE DISK TO ANOTHER |
| (T) TRANSFER SYSTEM USING ".COM" BOOT FILE   |
| (X) EXIT DYNAGEN                             |
```

YOUR SELECTION ? EX<CR>

Enter "EX" followed by a carriage return to exit DYNAGEN and return to the operating system.

Each of the formatted floppy disks are now "bootable"; that is, DOS 5 can now be booted from any of them.

Leave a new "bootable" floppy disk in
the floppy drive.

Copy the DOS 5 files from the Mini Winchester to the "bootable" floppy disks.

1. Copy the Distribution Disk #1 files from the Mini Winchester to the floppy disk that was left in the floppy drive.

0E>SUBMIT COPY5A E A<CR>

Enter "SUBMIT COPY5A E A" followed by a carriage return. Enter this command exactly as shown; the spaces are very important.

"COPY5A" is the name of a SUBMIT file shipped with DOS 5 that contains file copying instructions for Distribution Disk #1. The appropriate files will automatically be copied from source drive "E" to destination drive "A".

When all the files have been copied, the following message will be displayed on the screen:

0E>; DISTRIBUTION TRANSFER FOR DISK #1 COMPLETE

2. Remove the new copy of Distribution Disk #1 from the floppy drive and label it "Copy -- DOS 5.XX Distribution Disk #1 of 3".
3. Insert another "bootable" floppy disk into the floppy drive, and close the door.
4. Reset the floppy drive.

0E>DSKRESET<CR>

Enter "DSKRESET" followed by a carriage return to inform the operating system that you have changed floppy disks.

5. Copy the Distribution Disk #2 files from the Mini Winchester to the floppy drive.

0E>SUBMIT COPY5B E A<CR>

Enter "SUBMIT COPY5B E A" followed by a carriage return. Enter this command exactly as shown; the spaces are very important.

"COPY5B" is the name of a SUBMIT file shipped with DOS 5 that contains file transfer instructions for Distribution

Disk #2. The appropriate files will automatically be copied from source drive "E" to destination drive "A".

When all the files have been copied, the following message will be displayed on the screen:

0E> DISTRIBUTION DISK #2 TRANSFER COMPLETE

6. Remove the new copy of Distribution Disk #2 from the floppy drive and label it "Copy — DOS 5.XX Distribution Disk #2 of 3".
7. Insert the remaining "bootable" floppy disk into the floppy drive, and close the door.
8. Reset the floppy drive.

0E> DSKRESET<CR>

9. Copy the Distribution Disk #3 files from the Mini Winchester to the floppy drive.

0E> SUBMIT COPY5C E A<CR>

"COPY5C" is the name of a submit file shipped with DOS 5 that contains file transfer instructions for Distribution Disk #3.

When all the files have been copied the following message will be displayed on the screen:

0E> DISTRIBUTION DISK #3 TRANSFER COMPLETE

10. Remove the new copy of Distribution Disk #3 from the floppy drive and label it "Copy — DOS 5.XX Distribution Disk #3 of 3."

YOU NOW HAVE COPIES OF THE THREE DOS 5 DISTRIBUTION DISKS THAT WERE SHIPPED WITH YOUR COMPUTER.

Install DOS 5 onto the Mini Winchester.

1. Use DYNASYS to define the new system.

0E>DYNASYS<CR>

Enter "DYNASYS" followed by a carriage return. DYNASYS will sign-on with the following message and prompt:

DYNASYS VERSION X.XX - FOR DYNABYTE DOS 5
MP/M 2.1 SYSTEM REGENERATION UTILITY

MAIN MENU OPTIONS

AL)	ASSIGN / SETUP ALL PARAMETERS
SC)	SET CLEAR SCREEN SEQUENCE
CA)	CHARACTER I/O ASSIGNMENTS
CS)	CHARACTER I/O SETUP
DA)	DISK DRIVE ASSIGNMENTS
LS)	LOAD / SAVE PARAMETER FILE
DC)	DISPLAY CURRENT CONFIGURATION
CD)	CREATE SYSTEM DISK
EK)	EXIT TO OPERATING SYSTEM

ENTER MENU ITEM ? **DA<CR>**

Type "DA" and a carriage return to assign drive letters to your logical drives.

DYNASYS VERSION X.XX - FOR DYNABYTE DOS 5.XX
MP/M 2.1 SYSTEM REGENERATION UTILITY

LOGICAL DISK DRIVE ASSIGNMENTS

LOGICAL DISKS

A:	=	F1
B:	=	F2
C:	=	F3
D:	=	F4
E:	=	MINI1
F:	=	MINI2
G:	=	FUJ1
H:	=	FUJ2
I:	=	
J:	=	
K:	=	
L:	=	
M:	=	
N:	=	
O:	=	
P:	=	

F1 - F4 = FLOPPY DISK DRIVES

MINI1 - MINI8 = 5 1/4" WINCHESTER LOGICAL DRIVES

FUJ1 - FUJ8 = FUJITSU WINCHESTER LOGICAL DRIVES

MW1 - MW5 = MICROPOLIS WINCHESTER DRIVES

DRIVE TO CHANGE A - P (<RETURN> TO LEAVE AS IS) ? A<CR>

Type "A" and a carriage return to reassign the drives.

A: = ? <RETURN> TO SET NULL MINI1<CR>
 B: = ? MINI2<CR>
 C: = ? F1<CR>
 D: = ? F2<CR>
 E: = ? F3<CR>
 F: = ? F4<CR>
 G: = ? <CR>

In response to the prompt for a drive assignment to drive A, type "MINI1" and a carriage return. Then assign drive B by typing "MINI2" and a carriage return. Assign drive C as the floppy disk drive by typing "F1" and a carriage return. In the same manner, assign drive E as "F3" and drive F as "F4". Type another carriage return in response to the drive G prompt. DYNASYS will then display all current drive assignments.

LOGICAL DISK DRIVE ASSIGNMENTS

LOGICAL DISKS

A: =	MINI1	F1 - F4	= FLOPPY DISK DRIVES
B: =	MINI2	MINI1 - MINI8	= 5 1/4" WINCHESTER LOGICAL DRIVES
C: =	F1	FUJ1 - FUJ8	= FUJITSU WINCHESTER LOGICAL DRIVES
D: =	F2	MW1 - MW5	= MICROPOLIS WINCHESTER DRIVES
E: =	F3		
F: =	F4		
G: =	FUJ1		
H: =	FUJ2		
I: =			
J: =			
K: =			
L: =			
M: =			
N: =			
O: =			
P: =			

DRIVE TO CHANGE A - P (<RETURN> TO LEAVE AS IS) ? G<CR>
 G: = ? <RETURN> TO SET TO NULL <CR>

Type a "G" and a carriage return to clear the G drive assignment. Type another carriage return to set the value to null. DYNASYS will then display the current assignments.

LOGICAL DISK DRIVE ASSIGNMENTS

LOGICAL DISKS

A: =	MINI1	F1 - F4	= FLOPPY DISK DRIVES
B: =	MINI2	MINI1 - MINI8	= 5 1/4" WINCHESTER LOGICAL DRIVES
C: =	F1	FUJ1 - FUJ8	= FUJITSU WINCHESTER LOGICAL DRIVES
D: =	F2	MW1 - MW5	= MICROPOLIS WINCHESTER DRIVES
E: =	F3		
F: =	F4		
G: =			
H: =	FUJ2		
I: =			
J: =			
K: =			
L: =			
M: =			
N: =			
O: =			
P: =			

DRIVE TO CHANGE A - P (<RETURN> TO LEAVE AS IS) ? H<CR>
H: = ? <RETURN> TO SET TO NULL <CR>

Clear the drive assignment for drive H in the manner shown above. Type the drive letter "H" and a carriage return. Then press another carriage return to the "<RETURN> TO SET TO NULL" prompt. The final screen display should look like this:

LOGICAL DISK DRIVE ASSIGNMENTS

LOGICAL DISKS

A: =	MINI1	F1 - F4	= FLOPPY DISK DRIVES
B: =	MINI2	MINI1 - MINI8	= 5 1/4" WINCHESTER LOGICAL DRIVES
C: =	F1	FUJ1 - FUJ8	= FUJITSU WINCHESTER LOGICAL DRIVES
D: =	F2	MW1 - MW5	= MICROPOLIS WINCHESTER DRIVES
E: =	F3		
F: =	F4		
G: =			
H: =			
I: =			
J: =			
K: =			
L: =			
M: =			
N: =			
O: =			
P: =			

DRIVE TO CHANGE A - P (<RETURN> TO LEAVE AS IS) ? <CR>

A final carriage return confirms the drive assignments and puts you back at the DYNASYS menu.

DYNASYS VERSION X.XX - FOR DYNABYTE DOS 5
MP/M 2.1 SYSTEM REGENERATION UTILITY

MAIN MENU OPTIONS

AL)	ASSIGN / SETUP ALL PARAMETERS
SC)	SET CLEAR SCREEN SEQUENCE
CA)	CHARACTER I/O ASSIGNMENTS
CS)	CHARACTER I/O SETUP
DA)	DISK DRIVE ASSIGNMENTS
LS)	LOAD / SAVE PARAMETER FILE
DC)	DISPLAY CURRENT CONFIGURATION
CD)	CREATE SYSTEM DISK
EX)	EXIT TO OPERATING SYSTEM

ENTER MENU ITEM ? CD<CR>

Now that you've assigned the logical drives in your system, type "CD" and a carriage return to select the CREATE SYSTEM DISK option. The following CD menu will be displayed.

DYNASYS VERSION X.X - FOR DYNABYTE DOS 5.XX
 MP/M 2.1 SYSTEM REGENERATION UTILITY

GENERATE SYSTEM DISK

```

| WR) WRITE SYSTEM TO DISK |
| TR) TRANSFER SYSTEM FROM ONE DISK TO ANOTHER |
| EX) EXIT TO MAIN MENU |
  
```

YOUR SELECTION ? WR<CR>

Type "WR" and a carriage return. This option will write your newly defined system onto the Mini Winchester.

(WR) SYSTEM FILES LOCATED ON DISK DRIVE (A-P) ? E<CR>

WRITE SYSTEM TO DISK DRIVE (A-P) ? E<CR>

Type "E" and a carriage return to the above two prompts that ask for the source and destination drives.

DO YOU WANT TO ACCEPT ALL THE DEFAULT PARAMETERS IN GENSYS (Y/N) ? Y<CR>

Type "Y" to accept the default parameters in GENSYS.

Type "N" if you have one or more memory boards. You must change the GENSYS memory segment table. Recommended values are given in Appendix A. See Section 3.1.8.1 for more information on GENSYS parameters.

PLEASE PLACE PROPER DISKS IN DRIVES, THEN PRESS <RETURN> TO CONTINUE. <CR>

Press a carriage return to continue.

PLEASE WAIT. WRITING SYSTEM TO MINI WINCHESTER DRIVE E.

MP/M II V2.1 System Generation
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.
 .
 .

** GENSYS DONE **

PRESS <RETURN> TO DISPLAY MENU. <CR>

The screen will rapidly scroll during

the GENSYS process. You don't have to do anything until GENSYS is finished. Then press a carriage return. The CD menu will be displayed again.

**DYNASYS VERSION X.X - FOR DYNABYTE DOS 5.XX
MP/M 2.1 SYSTEM REGENERATION UTILITY**

GENERATE SYSTEM DISK

- | | |
|-----|--|
| WR) | WRITE SYSTEM TO DISK |
| TR) | TRANSFER SYSTEM FROM ONE DISK TO ANOTHER |
| EX) | EXIT TO MAIN MENU |

YOUR SELECTION ? EX<<CR>

Type "EX" and a carriage return to exit the CD option. You will be returned to the DYNASYS main menu.

**DYNASYS VERSION X.XX - FOR DYNABYTE DOS 5
MP/M 2.1 SYSTEM REGENERATION UTILITY**

MAIN MENU OPTIONS

- | | |
|-----|-------------------------------|
| AL) | ASSIGN / SETUP ALL PARAMETERS |
| SC) | SET CLEAR SCREEN SEQUENCE |
| CA) | CHARACTER I/O ASSIGNMENTS |
| CS) | CHARACTER I/O SETUP |
| DA) | DISK DRIVE ASSIGNMENTS |
| LS) | LOAD / SAVE PARAMETER FILE |
| DC) | DISPLAY CURRENT CONFIGURATION |
| CD) | CREATE SYSTEM DISK |
| EX) | EXIT TO OPERATING SYSTEM |

ENTER MENU ITEM ? EX<<CR>

Type another "EX" and a carriage return to exit DYNASYS.

**DYNASYS VERSION X.XX - FOR DYNABYTE DOS 5
MP/M 2.1 SYSTEM REGENERATION UTILITY**

You have now installed your newly configured operating system on the Mini Winchester. Your Mini Winchester is now "bootable." You will next reboot the computer to load this new system.

Reboot DOS 5 from the Mini Winchester.

Make sure that no floppy disk is in the floppy disk drive. Press and release the reset button. The computer will now boot DOS 5 from the Mini Winchester.

The computer is now configured as a six drive system. Drives "A" and "B" are on the Mini Winchester, and Drives "C" through "F" are the floppy drives. This can be seen from the following list of disk drive assignments, as it would appear using DYNASTAT:

DISK DRIVE
ASSIGN
A:MINI1
B:MINI2
C:F1
D:F2
E:F3
F:F4
G:
H:

2.4 Model 5605

5.25" Mini Winchester with one 8" floppy drive Dynabyte Model 5605

When the 5605 computer arrives, the Mini Winchester contains no installed software; DOS 5 is shipped on two floppy disks. You must, therefore, initially boot DOS 5 from one of the floppy disks. The 5605 can, however, easily be configured to boot DOS 5 from the Mini Winchester, and normally DOS 5 is transferred to the Mini Winchester and run from there. Booting DOS 5 from the Mini Winchester is faster and more convenient.

The procedure below describes how to copy the DOS 5 software, and how to configure DOS 5 to boot from the Mini Winchester. This procedure will configure the computer into six logical drives (you may have use of only three, depending on your model type): The Mini Winchester will be assigned to logical drives "A" and "B", and the floppy drives will be assigned to logical drives "C" through "F". Even though Models 5605 has only one floppy disk drive, we recommend assigning four drives as floppy drives -- one for the current system and three more to make it easy for you to add more floppy drives to your system. Drives "A" and "B" will be of equal capacity; their actual size depends on the particular 5605 model. You may wish to later reconfigure DOS 5 in some other manner. This procedure only describes a standard first-time installation.

METHOD 4 OVERVIEW

- Boot DOS 5 from Distribution Disk #1.
 - Format the Mini Winchester.
 - Copy the DOS 5 files from both distribution disks onto the Mini Winchester.
 - Format two floppy disks.
 - Copy the DOS 5 loading files to the formatted floppy disks.
 - Copy the DOS 5 files from the Mini Winchester to the "bootable" floppy disks.
 - Install DOS 5 onto the Mini Winchester.
 - Reboot DOS 5 from the Mini Winchester.
-

Boot DOS 5 from Distribution Disk #1.

1. Turn on the computer.
2. Insert Distribution Disk #1.

Insert Distribution Disk #1 into the floppy drive, and close the door. Insert the floppy disk with its label face up.

3. Press and release the reset button.

DOS 5 will automatically be read into the computer. The system will print the load map and sign on with the following message:

```
DYNABYTE DOS 5.XX  
0A>
```

The "0A>" prompt indicates that DOS 5 is "logged" onto logical drive "A", user number 0, and is ready for additional commands.

At this point, the loading process, also known as "booting", is complete.

Format the Mini Winchester.

1. Use WINFMT5 to format and check the 5.25" Mini Winchester.

~~0A>~~WINFMT5<CR>

Enter "WINFMT5" followed by a carriage return. WINFMT5 will then sign on with the following menu and prompt:

***** DYNABYTE 5.25" HARD DISK FORMAT VERSION X.XX FOR DOS 5.XX *****

- CO) CHECK ONLY
- FC) FORMAT AND CHECK
- EX) RETURN TO OPERATING SYSTEM

YOUR SELECTION: FC<CR>

Enter "FC" followed by a carriage return. WINFMT5 will tell you that it has begun the formatting process, and then slowly display several rows of dots on the screen:

BEGIN FORMAT-ENTER ESC TO ABORT

.....
.....
.....
.....

When WINFMT5 has finished formatting the Mini Winchester, it will confirm its completion and then prompt you to choose a drive configuration:

FORMAT COMPLETE-0/0H BAD TRACKS WERE FOUND

CONFIGURATION OPTIONS

16MB HARD DISK DRIVE

- A) 1 DRIVE : 8.33 MB : 1024 DIRECTORY ENTRIES
1 DRIVE : 4.49 MB : 512 DIRECTORY ENTRIES
- B) 2 DRIVES : 6.4 MB : 512 DIRECTORY ENTRIES
- C) 4 DRIVES : 3.2 MB : 256 DIRECTORY ENTRIES

SELECT OPTION OR <RETURN> FOR DEFAULT (OPTION B): B<CR>

Enter a "B" followed by a carriage return to select drive configuration "B". Depending on your drive size, you may have different configuration options than listed above, but enter "B" in all cases. Note that if you later change this configuration, you must reformat the hard disk, which erases all data stored on it.

WINFMT5 will tell you that it has begun the checking process, and then slowly display several more rows of dots on the screen:

```
BEGIN CHECK-ENTER ESC TO ABORT
.....
.....
.....
.....
```

After the drive has been formatted and checked, the bad track table will be displayed. Do not be alarmed; this display requires no action. The WINFMT5 program automatically scans the Mini Winchester for bad tracks, places these in tables, reports them to DOS 5, and substitutes good tracks in their place.

BAD TRACK TABLE				
1)	2)	3)	4)	5)
6)	7)	8)	9)	10)
11)	12)	13)	14)	15)
16)	17)	18)	19)	20)
21)	22)	23)	24)	25)
26)	27)	28)	29)	30)
31)	32)	33)	34)	35)
36)	37)	38)	39)	40)
41)	42)	43)	44)	45)
46)	47)	48)	49)	50)
51)	52)	53)	54)	55)
56)	57)	58)	59)	60)

"P*****" (LOGICAL BAD TRACK NUMBER)
 "H*,C***" (HEAD, CYLINDER NUMBER)

ENTER ONE OF THE ABOVE OPTIONS OR <RETURN> TO ACCEPT: <CR>

Enter a carriage return. If your drive size is not 16MB, a different number of tracks will be displayed

than shown above.

WINFMT5 will confirm its completion of the check process and then prompt you to enter a carriage return:

CHECK COMPLETED O.K.
PRESS <RETURN> TO DISPLAY MENU. <CR>

Enter a carriage return. WINFMT5 will then return to its main menu:

***** DYNABYTE 5.25" HARD DISK FORMAT VERSION X.XX FOR DOS 5.XX *****

- CO) CHECK ONLY
- FC) FORMAT AND CHECK
- EX) RETURN TO OPERATING SYSTEM

YOUR SELECTION: EX<CR>

Enter "EX" followed by a carriage return to exit WINFMT5 and return to the operating system.

Copy the DOS 5 files from both distribution disks onto the Mini Winchester.

1. Use PIP to copy the files from Distribution Disk #1 to the Mini Winchester.

0A>PIP E:=A:*. *[OV]<CR>

Enter "PIP E:=A:*. *[OV]" followed by a carriage return. PIP will display the name of each DOS 5 file as it is copied from Distribution Disk #1 to the Mini Winchester, and then automatically return you to the operating system.

2. Remove Distribution Disk #1 from the floppy drive.
3. Insert Distribution Disk #2 into the floppy drive, and close the door.
4. Reset the floppy drive.

0A>DSKRESET<CR>

Enter "DSKRESET" followed by a carriage return to inform the operating system that you have changed floppy disks.

5. Use PIP to copy the files from Distribution Disk #2 to the Mini Winchester.

0A>PIP E:=A:*. *[OV]<CR>

Enter "PIP E:=A:*. *[OV]" followed by a carriage return. PIP will display the name of each DOS 5 file as it is copied from Distribution Disk #2 to the Mini Winchester, and then automatically return you to the operating system.

6. Remove Distribution Disk #2 from the floppy drive.

 Format two floppy disks.

1. Log onto the Mini Winchester.

0A>E:<CR>

Enter "E:" followed by a carriage return to log onto the Mini Winchester.

0E>

The "0E>" prompt signifies that drive "E" is the current drive, and that DOS 5 is ready for additional commands.

2. Use FFORMAT to format two floppy disks.

0E>FFORMAT<CR>

Enter "FFORMAT" followed by a carriage return. FFORMAT will sign on with the following prompt:

 DYNABYTE FLOPPY DISK FORMAT UTILITY

VERSION X.X FOR DOS 5.XX

ENTER 1 - TO USE FIRST FLOPPY DRIVE
 2 - TO USE SECOND FLOPPY DRIVE
 3 - TO USE THIRD FLOPPY DRIVE
 4 - TO USE FOURTH FLOPPY DRIVE

FLOPPY DISK DRIVE TO USE (1,2,3 OR 4) ? **1<CR>**

Enter "1" followed by a carriage return to specify the floppy drive. Depending on your computer system's drive type, you will then receive one of the following messages:

DRIVE 1 IS A SINGLE SIDED 8 INCH DRIVE
 DRIVE 1 IS A DOUBLE SIDED 8 INCH DRIVE

FFORMAT will then ask what function you would like to perform:

DO YOU WANT TO:

F - FORMAT
 C - CHECK
 Q - QUIT

YOUR SELECTION ? **F<CR>**

Enter "F" followed by a carriage return to indicate FORMAT.

If the drive is double-sided, FFORMAT will then ask whether you want one or both sides formatted:

SIDE FORMAT SELECTION

- 1 - FOR SINGLE SIDED
- 2 - FOR DOUBLE SIDED
- RETURN - FOR SINGLE SIDED

SIDE FORMAT ? 1<CR>

Enter "1" followed by a carriage return to indicate single-sided.

FFORMAT will then prompt for single- or double-density:

DENSITY FORMAT SELECTION

- 1 - FOR SINGLE DENSITY
- 2 - FOR DOUBLE DENSITY
- RETURN - FOR DOUBLE DENSITY

DENSITY FORMAT ? <CR>

Enter a carriage return to indicate double-density.

FFORMAT will now ask you to enter the number of directory entries to reserve space for on the floppy disk:

NUMBER OF DIRECTORY ENTRIES

- 1 - FOR 64 ENTRIES
- 2 - FOR 128 ENTRIES
- 3 - FOR 256 ENTRIES
- RETURN - FOR 64 ENTRIES

OF DIRECTORY ENTRIES ? 2<CR>

Enter "2" followed by a carriage return to reserve space for 128 directory entries.

FFORMAT will then tell you to insert the floppy disk you want to format into the floppy drive:

INSERT DISK. HIT ESCAPE TO ABORT OR ANY OTHER KEY TO BEGIN ...

Insert a floppy disk into the floppy drive, and close the door.

CAUTION: FFORMAT will erase any data that exists on the floppy disk.

Also, be sure the floppy disk is not write-protected. You can write on an 8" floppy disk if the write-protect notch is covered up.

<CR>

Enter a carriage return to start the actual formatting process. FFORMAT then tells you it is working and asks you to wait:

.... FORMATTING IS NOW BEING DONE PLEASE WAIT

If, during the formatting process, FFORMAT finds a bad sector on the floppy disk and is unable to format it, the error will be reported as follows:

HARD ERROR AT TRACK=XX SECTOR=XX
!!! BAD DISKETTE REPLACE WITH A NEW ONE !!!

A damaged floppy disk should be removed and discarded. Start the format process on another floppy disk.

After the floppy disk has been formatted, FFORMAT will confirm its completion and then ask if you want to format another floppy disk:

***** FORMAT COMPLETED O.K. *****

REPEAT SAME OPERATION ON A NEW DISK (Y/N) ? Y<CR>

Remove the newly formatted floppy disk from the floppy drive.

Enter "Y" followed by a carriage return. FFORMAT will then tell you to insert a floppy disk into the drive:

INSERT DISK. HIT ESCAPE TO ABORT OR ANY OTHER KEY TO BEGIN ... <CR>

Insert another floppy disk into the floppy drive, and close the door.

Enter a carriage return to start the formatting process. FFORMAT tells you it is working and asks you to wait:

.... FORMATTING IS NOW BEING DONE PLEASE WAIT

Again, if FFORMAT reports a bad sector, the damaged floppy disk should

be discarded and the format process tried on a another disk.

After the floppy disk has been formatted, FFORMAT will confirm its completion and then ask if you want to format another floppy disk:

***** FORMAT COMPLETED O.K. *****

REPEAT SAME OPERATION ON A NEW DISK (Y/N) ? N<CR>

Enter "N" followed by a carriage return. FFORMAT will then return to its main menu:

DO YOU WANT TO:

F - FORMAT
C - CHECK
Q - QUIT

YOUR SELECTION ? Q<CR>

Enter "Q" followed by a carriage return to exit FFORMAT and return to the operating system:

0E>

Copy the DOS 5 loading files to the formatted floppy disks.

1. Use DYNAGEN to copy the DOS 5 loading files to the outer two tracks of the newly formatted floppy disks.

E>DYNAGEN<CR>

Enter "DYNAGEN" followed by a carriage return. (You are still logged onto the Mini Winchester on drive "E".) DYNAGEN will then sign on with the following menu and prompt:

DYNAGEN VERSION X.XX FOR DYNABYTE DOS 5.XX

GENERATE SYSTEM DISK

TR)	TRANSFER SYSTEM FROM ONE DISK TO ANOTHER
CT)	TRANSFER SYSTEM USING ".COM" BOOT FILE
EX)	EXIT DYNAGEN

YOUR SELECTION ? CT<CR>

Enter "CT" followed by a carriage return. DYNAGEN will then ask you to identify the source drive:

(CT) SYSTEM FILES LOCATED ON DISK DRIVE (A-P) ? E<CR>

Enter "E" followed by a carriage return to specify the Mini Winchester as the source drive. DYNAGEN will then prompt for the destination drive:

WRITE SYSTEM TO DISK DRIVE (A-P) ? A<CR>

Enter "A" followed by a carriage return to specify the floppy drive as the destination drive. DYNAGEN will then prompt you to insert the floppy disk:

PLEASE PLACE PROPER DISKS IN DRIVERS, THEN PRESS <RETURN> TO CONTINUE.

Insert one of the formatted floppy disks into the floppy drive, and close the door.

<CR>

Enter a carriage return to start the actual copying process. DYNAGEN then tells you it is working and asks you to wait:

PLEASE WAIT. WRITING SYSTEM TO FLOPPY DRIVE A.

When DYNAGEN has finished writing the loading instructions, it will prompt you to enter a carriage return:

PRESS <RETURN> TO DISPLAY MENU. <CR>

Enter a carriage return. DYNAGEN will then return to its main menu:

DYNAGEN VERSION X.XX FOR DYNABYTE DOS 5.XX

GENERATE SYSTEM DISK

|	TR)	TRANSFER SYSTEM FROM ONE DISK TO ANOTHER	|
|	CT)	TRANSFER SYSTEM USING ".COM" BOOT FILE	|
|	EX)	EXIT DYNAGEN	|

YOUR SELECTION ? CT<CR>

Enter "CT" followed by a carriage return to copy the DOS 5 loading instructions to the other formatted floppy disk. DYNAGEN will then ask you to identify the source drive:

(CT) SYSTEM FILES LOCATED ON DISK DRIVE (A-P) ? E<CR>

Enter "E" followed by a carriage return to specify the Mini Winchester as the source drive. DYNAGEN will then prompt for the destination drive:

WRITE SYSTEM TO DISK DRIVE (A-P) ? A<CR>

Enter "A" followed by a carriage return to specify the floppy drive as the destination drive. DYNAGEN will then prompt you to insert the floppy disk:

PLEASE PLACE PROPER DISKS IN DRIVES, THEN PRESS <RETURN> TO CONTINUE.

Remove the first floppy disk from the floppy drive, insert the remaining formatted floppy disk in its place, and close the door.

<CR>

Enter a carriage return to start the actual copying process. DYNAGEN then tells you it is working and asks you to wait:

PLEASE WAIT. WRITING SYSTEM TO FLOPPY DRIVE A.

When DYNAGEN has finished writing the loading instructions, it will prompt you to enter a carriage return:

PRESS <RETURN> TO DISPLAY MENU. <CR>

Enter a carriage return. DYNAGEN will then return to its main menu:

DYNAGEN VERSION X.XX FOR DYNABYTE DOS 5.XX

GENERATE SYSTEM DISK

|	TR)	TRANSFER SYSTEM FROM ONE DISK TO ANOTHER	|
|	CT)	TRANSFER SYSTEM USING ".COM" BOOT FILE	|
|	EX)	EXIT DYNAGEN	|

YOUR SELECTION ? EX<CR>

Enter "EX" followed by a carriage return to exit DYNAGEN and return to the operating system.

Both of the formatted floppy disks are now "bootable"; that is, DOS 5 can now be booted from either of them.

Leave the new "bootable" floppy disk in the floppy drive.

Copy the DOS 5 files from the Mini Winchester to the "bootable" floppy disks.

1. Copy the Distribution Disk #1 files from the Mini Winchester to the floppy disk that was left in the floppy drive.

0E>SUBMIT COPY8A E A<CR>

Enter "SUBMIT COPY8A E A" followed by a carriage return. Enter this command exactly as shown; the spaces are very important.

"COPY8A" is the name of a SUBMIT file shipped with DOS 5 that contains file copying instructions for Distribution Disk #1. The appropriate files will automatically be copied from source drive "E" to destination drive "A".

When all the files have been copied, the following message will be displayed on the screen:

0E> DISTRIBUTION TRANSFER FOR DISK #1 COMPLETE

2. Remove the new copy of Distribution Disk #1 from the floppy drive and label it "Copy — DOS 5.XX Distribution Disk #1 of 2".
3. Insert the remaining "bootable" floppy disk into the floppy drive, and close the door.
4. Reset the floppy drive.

0E>DSKRESET<CR>

Enter "DSKRESET" followed by a carriage return to inform the operating system that you have changed floppy disks.

5. Copy the Distribution Disk #2 files from the Mini Winchester to the floppy drive.

0E>SUBMIT COPY8B E A<CR>

Enter "SUBMIT COPY8B E A" followed by a carriage return. Enter this command exactly as shown; the spaces are very important.

"COPY8B" is the name of a SUBMIT file shipped with DOS 5 that contains file transfer instructions for Distribution

Disk #2. The appropriate files will automatically be copied from source drive "E" to destination drive "A".

When all the files have been copied, the following message will be displayed on the screen:

0E> DISTRIBUTION DISK #2 TRANSFER COMPLETE

6. Remove the new copy of Distribution Disk #2 from the floppy drive and label it "Copy -- DOS 5.XX Distribution Disk #2 of 2".

YOU NOW HAVE COPIES OF THE TWO DOS 5 DISTRIBUTION DISKS THAT WERE SHIPPED WITH YOUR COMPUTER.

Install DOS 5 onto the Mini Winchester.

1. Use DYNASYS to define the new system.

BE>DYNASYS<CR>

Enter "DYNASYS" followed by a carriage return. DYNASYS will sign-on with the following message and prompt:

**DYNASYS VERSION X.XX -- FOR DYNABYTE DOS 5
MP/M 2.1 SYSTEM REGENERATION UTILITY**

MAIN MENU OPTIONS

AL)	ASSIGN / SETUP ALL PARAMETERS
SC)	SET CLEAR SCREEN SEQUENCE
CA)	CHARACTER I/O ASSIGNMENTS
CS)	CHARACTER I/O SETUP
DA)	DISK DRIVE ASSIGNMENTS
LS)	LOAD / SAVE PARAMETER FILE
DC)	DISPLAY CURRENT CONFIGURATION
CD)	CREATE SYSTEM DISK
EK)	EXIT TO OPERATING SYSTEM

ENTER MENU ITEM ? DA<CR>

Type "DA" and a carriage return to assign drive letters to your logical drives.

DYNASYS VERSION X.XX - FOR DYNABYTE DOS 5.XX
MP/M 2.1 SYSTEM REGENERATION UTILITY

LOGICAL DISK DRIVE ASSIGNMENTS

LOGICAL DISKS

A: = F1	F1 - F4 = FLOPPY DISK DRIVES
B: = F2	
C: = F3	MINI1 - MINI8 = 5 1/4" WINCHESTER LOGICAL DRIVES
D: = F4	
E: = MINI1	FUJ1 - FUJ8 = FUJITSU WINCHESTER LOGICAL DRIVES
F: = MINI2	
G: = FUJ1	MW1 - MW5 = MICROPOLIS WINCHESTER DRIVES
H: = FUJ2	
I: =	
J: =	
K: =	
L: =	
M: =	
N: =	
O: =	
P: =	

DRIVE TO CHANGE A - P (<RETURN> TO LEAVE AS IS) ? A<CR>

Type "A" and a carriage return to reassign the drives.

A: = ? <RETURN> TO SET NULL MINI1<CR>
 B: = ? MINI2<CR>
 C: = ? F1<CR>
 D: = ? F2<CR>
 E: = ? F3<CR>
 F: = ? F4<CR>
 G: = ? <CR>

In response to the prompt for a drive assignment to drive A, type "MINI1" and a carriage return. Then assign drive B by typing "MINI2" and a carriage return. Assign drive C as the floppy disk drive by typing "F1" and a carriage return. In the same manner, assign drive E as "F3" and drive F as "F4". Type another carriage return in response to the drive G prompt. DYNASYS will then display all current drive assignments.

LOGICAL DISK DRIVE ASSIGNMENTS

LOGICAL DISKS

A: =	MINI1
B: =	MINI2
C: =	F1
D: =	F2
E: =	F3
F: =	F4
G: =	FUJ1
H: =	FUJ2
I: =	
J: =	
K: =	
L: =	
M: =	
N: =	
O: =	
P: =	

F1 - F4 = FLOPPY DISK DRIVES

MINI1 - MINI8 = 5 1/4" WINCHESTER LOGICAL DRIVES

FUJ1 - FUJ8 = FUJITSU WINCHESTER LOGICAL DRIVES

MW1 - MW5 = MICROPOLIS WINCHESTER DRIVES

DRIVE TO CHANGE A - P (<RETURN> TO LEAVE AS IS) ? G<CR>

G: = ? <RETURN> TO SET TO NULL <CR>

Type a "G" and a carriage return to clear the G drive assignment. Type another carriage return to set the value to null. DYNASYS will then display the current assignments.

LOGICAL DISK DRIVE ASSIGNMENTS

LOGICAL DISKS

A: =	MINI1	F1 - F4	= FLOPPY DISK DRIVES
B: =	MINI2	MINI1 - MINI8	= 5 1/4" WINCHESTER LOGICAL DRIVES
C: =	F1	FUJ1 - FUJ8	= FUJITSU WINCHESTER LOGICAL DRIVES
D: =	F2	MW1 - MW5	= MICROPOLIS WINCHESTER DRIVES
E: =	F3		
F: =	F4		
G: =			
H: =	FUJ2		
I: =			
J: =			
K: =			
L: =			
M: =			
N: =			
O: =			
P: =			

DRIVE TO CHANGE A - P (<RETURN> TO LEAVE AS IS) ? H<CR>
 H: = ? <RETURN> TO SET TO NULL <CR>

Clear the drive assignment for drive H in the manner shown above. Type the drive letter "H" and a carriage return. Then press another carriage return to the "<RETURN> TO SET TO NULL" prompt. The final screen display should look like this:

LOGICAL DISK DRIVE ASSIGNMENTS

LOGICAL DISKS

A: =	MINI1	F1 - F4	= FLOPPY DISK DRIVES
B: =	MINI2	MINI1 - MINI8	= 5 1/4" WINCHESTER LOGICAL DRIVES
C: =	F1	FUJ1 - FUJ8	= FUJITSU WINCHESTER LOGICAL DRIVES
D: =	F2	MW1 - MW5	= MICROPOLIS WINCHESTER DRIVES
E: =	F3		
F: =	F4		
G: =			
H: =			
I: =			
J: =			
K: =			
L: =			
M: =			
N: =			
O: =			
P: =			

DRIVE TO CHANGE A - P (<RETURN> TO LEAVE AS IS) ? <CR>

A final carriage return confirms the drive assignments and puts you back at the DYNASYS menu.

DYNASYS VERSION X.XX - FOR DYNABYTE DOS 5
MP/M 2.1 SYSTEM REGENERATION UTILITY

MAIN MENU OPTIONS

AL)	ASSIGN / SETUP ALL PARAMETERS
SC)	SET CLEAR SCREEN SEQUENCE
CA)	CHARACTER I/O ASSIGNMENTS
CS)	CHARACTER I/O SETUP
DA)	DISK DRIVE ASSIGNMENTS
LS)	LOAD / SAVE PARAMETER FILE
DC)	DISPLAY CURRENT CONFIGURATION
CD)	CREATE SYSTEM DISK
EK)	EXIT TO OPERATING SYSTEM

ENTER MENU ITEM ? <CD><CR>

Now that you've assigned the logical drives in your system, type "CD" and a carriage return to select the CREATE SYSTEM DISK option. The following CD menu will be displayed.

DYNASYS VERSION X.X - FOR DYNABYTE DOS 5.XX
MP/M 2.1 SYSTEM REGENERATION UTILITY

GENERATE SYSTEM DISK

```

| WR) WRITE SYSTEM TO DISK |
| TR) TRANSFER SYSTEM FROM ONE DISK TO ANOTHER |
| EX) EXIT TO MAIN MENU |

```

YOUR SELECTION ? WR<CR>

Type "WR" and a carriage return. This option will write your newly defined system onto the Mini Winchester.

(WR) SYSTEM FILES LOCATED ON DISK DRIVE (A-P) ? E<CR>

WRITE SYSTEM TO DISK DRIVE (A-P) ? E<CR>

Type "E" and a carriage return to the above two prompts that ask for the source and destination drives.

DO YOU WANT TO ACCEPT ALL THE DEFAULT PARAMETERS IN GENSYS (Y/N) ? Y<CR>

Type "Y" to accept the default parameters in GENSYS.

Type "N" if you have one or more memory boards. You must change the GENSYS memory segment table. Recommended values are given in Appendix A. See Section 3.1.8.1 for more information on GENSYS.

PLEASE PLACE PROPER DISKS IN DRIVES, THEN PRESS <RETURN> TO CONTINUE. <CR>

Press a carriage return to continue.

PLEASE WAIT. WRITING SYSTEM TO MINI WINCHESTER DRIVE E.

MP/M II V2.1 System Generation
Copyright (C) 1981, Digital Research

.
.

** GENSYS DONE **

PRESS <RETURN> TO DISPLAY MENU. <CR>

The screen will rapidly scroll during the GENSYS process. You don't have to

do anything until GENSYS is finished. Then press a carriage return. The CD menu will be displayed again.

**DYNASYS VERSION X.X - FOR DYNABYTE DOS 5.XX
MP/M 2.1 SYSTEM REGENERATION UTILITY**

GENERATE SYSTEM DISK

- | | |
|-----|--|
| WR) | WRITE SYSTEM TO DISK |
| TR) | TRANSFER SYSTEM FROM ONE DISK TO ANOTHER |
| EX) | EXIT TO MAIN MENU |

YOUR SELECTION ? EX<CR>

Type "EX" and a carriage return to exit the CD option. You will be returned to the DYNASYS main menu.

**DYNASYS VERSION X.XX - FOR DYNABYTE DOS 5
MP/M 2.1 SYSTEM REGENERATION UTILITY**

MAIN MENU OPTIONS

- | | |
|-----|-------------------------------|
| AL) | ASSIGN / SETUP ALL PARAMETERS |
| SC) | SET CLEAR SCREEN SEQUENCE |
| CA) | CHARACTER I/O ASSIGNMENTS |
| CS) | CHARACTER I/O SETUP |
| DA) | DISK DRIVE ASSIGNMENTS |
| LS) | LOAD / SAVE PARAMETER FILE |
| DC) | DISPLAY CURRENT CONFIGURATION |
| CD) | CREATE SYSTEM DISK |
| EX) | EXIT TO OPERATING SYSTEM |

ENTER MENU ITEM ? EX<CR>

Type another "EX" and a carriage return to exit DYNASYS.

**DYNASYS VERSION X.XX - FOR DYNABYTE DOS 5
MP/M 2.1 SYSTEM REGENERATION UTILITY**

You have now installed your newly configured operating system on the Mini Winchester. Your Mini Winchester is now "bootable." You will next reboot the computer to load this new system.

Reboot DOS 5 from the Mini Winchester.

Make sure that no floppy disk is in the floppy disk drive. Press and release the reset button. The computer will now boot DOS 5 from the Mini Winchester.

The computer is now configured as a six drive system. Drives "A" and "B" are on the Mini Winchester, and Drives "C" through "F" are the floppy drives. This can be seen from the following list of disk drive assignments, as it would appear using DYNASTAT:

DISK DRIVE
ASSIGN
A:MINI1
B:MINI2
C:F1
D:F2
E:F3
F:F4
G:
H:

2.5 Model 5615

8" Fujitsu Winchester with one 8" floppy drive Dynabyte Model 5615

When the 5615 computer arrives, the Fujitsu contains no installed software; DOS 5 is shipped on two 8" floppy disks. You must, therefore, initially boot DOS 5 from one of the floppy disks. If you have a tape controller board, the 5615 can, however, easily be configured to boot DOS 5 from the Fujitsu. Booting DOS 5 from the Fujitsu is faster and more convenient.

The procedure below describes how to copy the DOS 5 software, and, if you have the tape controller board, how to configure the operating system to cold boot from the Fujitsu.

If you have a 23 megabyte drive, this procedure will configure the 5615 into eight logical drives (you may have use of only five of these, depending on your model). The Fujitsu will be assigned to logical drives "A" through "D", and the floppy drives will be assigned to logical drives "E" through "H". Drives "A" through "D" will be of equal capacity; their actual size will be 4.7 megabytes each.

If you have an 11 megabyte drive, this procedure will instead configure the 5615 into six logical drives (you may have use of only three of these, depending on your model). The Fujitsu will be assigned to logical drives "A" and "B", and the floppy drives will be assigned to logical drives "C" through "F". Drives "A" and "B" will be of equal capacity; their actual size will be 4.7 megabytes each.

You may wish to later reconfigure DOS 5 in some other manner. This procedure only describes a standard first-time installation.

METHOD 5 OVERVIEW

- Boot DOS 5 from Distribution Disk #1.
 - Format the Fujitsu.
 - Copy the DOS 5 files from both distribution disks onto the Fujitsu.
 - Format two floppy disks.
 - Copy the DOS 5 loading instructions to the formatted floppy disks.
 - Copy the DOS 5 files from the Fujitsu to the "bootable" floppy disks.
 - Install DOS 5.
 - Reboot DOS 5.
-

Boot DOS 5 from Distribution Disk #1.

1. Turn on the computer.
2. Insert Distribution Disk #1.

Insert Distribution Disk #1 into the floppy drive and close the door. (Insert the 8" floppy disk with its label face up.)

3. Press and release the reset button.

DOS 5 will automatically be read into the computer, and will then sign on with the following message:

DYNABYTE DOS 5.XX
ØA>

The "ØA>" prompt indicates that DOS 5 is "logged" onto logical drive "A", and is ready for additional commands.

At this point, the loading process, also known as "booting", is complete.

Format the Fujitsu.

1. Use FUJFMT to format the 8" Fujitsu hard disk drive.

0A>FUJFMT<CR>

Enter "FUJFMT" followed by a carriage return. FUJFMT will then sign on with the following menu and prompt:

DYNABYTE FUJITSU WINCHESTER FORMAT UTILITY

VERSION X.X FOR DOS 5.XX

ENTER F - FORMAT
 C - CHECK
 <RETURN> - RETURN TO OPERATING SYSTEM

YOUR SELECTION ? F<CR>

Enter "F" followed by a carriage return. FUJFMT will then prompt for the size of the Fujitsu you are formatting (11 or 23 megabyte):

SELECT THE DRIVE TYPE:

0 - 11 MEGABYTE DRIVE.
 1 - 23 MEGABYTE DRIVE.

ENTER DRIVE TYPE (0 OR 1) ? 0<CR> or 1<CR>

You should enter either "0" for an 11 megabyte drive or "1" for a 23 megabyte drive, depending on your drive size.

FUJFMT will then prompt you to choose a configuration:

DRIVE CONFIGURATION

A		B		C
FUJ1 - 8.3 MB	:	FUJ1 - 4.7 MB	:	FUJ1 - 2.3 MB
FUJ2 - 1.2 MB	:	FUJ2 - 4.7 MB	:	FUJ2 - 2.3 MB
FUJ3 - 8.3 MB	:	FUJ3 - 4.7 MB	:	FUJ3 - 2.3 MB
FUJ4 - 1.2 MB	:	FUJ4 - 4.7 MB	:	FUJ4 - 2.3 MB
				FUJ5 - 2.3 MB
				FUJ6 - 2.3 MB
				FUJ7 - 2.3 MB
				FUJ8 - 2.3 MB

PLEASE ENTER DRIVE CONFIGURATION OR <RETURN> FOR B ? B<CR>

Enter "B" followed by a carriage return to select drive configuration "B". Only half of the drives listed above will be displayed if you have an 11 megabyte drive.

FUJFMT will tell you that it has begun the formatting process, and then slowly display several rows of periods on the screen:

FORMAT IN PROGRESS.

```
.....
.....
.....
....
```

When FUJFMT has finished formatting the Fujitsu, the bad track table will be displayed.

BAD TRACK TABLE

<u>FIRST 10 MEGABYTES</u>					<u>SECOND 10 MEGABYTES</u>			
<u>BAD TRACK</u>		-	<u>GOOD TRACK</u>	:	<u>BAD TRACK</u>		-	<u>GOOD TRACK</u>
0 -	0000H	-	0001H	:	9 -	0000H	-	0001H
1 -	0000H	-	0002H	:	10-	0000H	-	0002H
2 -	0000H	-	0003H	:	11-	0000H	-	0003H
3 -	0000H	-	0004H	:	12-	0000H	-	0004H
4 -	0000H	-	0005H	:	13-	0000H	-	0005H
5 -	0000H	-	0006H	:	14-	0000H	-	0006H
6 -	0000H	-	0007H	:	15-	0000H	-	0007H
7 -	0000H	-	0008H	:	16-	0000H	-	0008H
8 -	0000H	-	0009H	:	17-	0000H	-	0009H

ENTER ITEM TO CHANGE OR <RETURN> TO ACCEPT ? <CR>

Enter a carriage return. FUJFMT will automatically return you to the operating system:

FORMAT COMPLETE.

0A>

After the disk is formatted, you must enter FUJFMT a second time to check for bad tracks.

0A>FUJFMT<CR>

FUJFMT will then sign on with the following menu and prompt:

DYNABYTE FUJITSU WINCHESTER FORMAT UTILITY

VERSION X.X FOR DOS 5.XX

ENTER F - FORMAT
 C - CHECK
 <RETURN> - RETURN TO OPERATING SYSTEM

YOUR SELECTION ? C<CR>

Enter "C" followed by a carriage return. FUJFMT will then prompt for the size of the Fujitsu you are checking (11 or 23 megabyte):

SELECT THE DRIVE TYPE:

- 0 - 11 MEGABYTE DRIVE.
- 1 - 23 MEGABYTE DRIVE.

ENTER DRIVE TYPE (0 OR 1) ? 0<CR> or 1<CR>

You should enter either "0" for an 11 megabyte drive or "1" for a 23 megabyte drive, depending on your drive size.

FUJFMT will then display your chosen configuration and the bad track table:

CURRENT DISK CONFIGURATION

FUJ1 - 4.7 MB : FUJ2 - 4.7 MB : FUJ3 - 4.7 MB : FUJ4 - 4.7 MB

BAD TRACK TABLE

<u>FIRST 10 MEGABYTES</u>				<u>SECOND 10 MEGABYTES</u>				
<u>BAD TRACK</u>		<u>- GOOD TRACK</u>		:	<u>BAD TRACK</u>		<u>- GOOD TRACK</u>	
0 -	0000H	-	0001H	:	9 -	0000H	-	0001H
1 -	0000H	-	0002H	:	10-	0000H	-	0002H
2 -	0000H	-	0003H	:	11-	0000H	-	0003H
3 -	0000H	-	0004H	:	12-	0000H	-	0004H
4 -	0000H	-	0005H	:	13-	0000H	-	0005H
5 -	0000H	-	0006H	:	14-	0000H	-	0006H
6 -	0000H	-	0007H	:	15-	0000H	-	0007H
7 -	0000H	-	0008H	:	16-	0000H	-	0008H
8 -	0000H	-	0009H	:	17-	0000H	-	0009H

PLEASE PRESS <RETURN> TO CONTINUE TEST ? <CR>

If a bad track is reported, make a note of it so that you can enter that value during your next pass through FUJFMT. A bad track will be displayed as:

```
.....
.....
READ ERROR AT TRACK 40H ON FIRST TEN MEGABYTES.....
.....
```

Track 40 is reported as bad in the message above. When FUJFMT has finished checking, it will display the following and return to the operating system:

```
CHECK COMPLETE
0A>
```

Then enter FUJFMT again and select the F-FORMAT option to enter the bad tracks in the Bad Track Table.

```
0A>FUJFMT<CR>
```

DYNABYTE FUJITSU WINCHSTER FORMAT UTILITY

VERSION X.X FOR DOS 5.XX

```
ENTER      F - FORMAT
           C - CHECK
           <RETURN> - RETURN TO OPERATING SYSTEM
```

```
YOUR SELECTION ? F<CR>
```

Enter "F" followed by a carriage return. FUJFMT will then prompt for the size of the Fujitsu you are formatting (11 or 23 megabyte):

```
SELECT THE DRIVE TYPE:
```

```
0 - 11 MEGABYTE DRIVE.
1 - 23 MEGABYTE DRIVE.
```

```
ENTER DRIVE TYPE (0 OR 1) ? 0<CR> or 1<CR>
```

You should enter either "0" for an 11 megabyte drive or "1" for a 23 megabyte drive, depending on your drive size. FUJFMT will then prompt you to choose a configuration:

DRIVE CONFIGURATION

<u>A</u>	<u>B</u>	<u>C</u>
FUJ1 - 8.3 MB	FUJ1 - 4.7 MB	FUJ1 - 2.3 MB
FUJ2 - 1.2 MB	FUJ2 - 4.7 MB	FUJ2 - 2.3 MB
FUJ3 - 8.3 MB	FUJ3 - 4.7 MB	FUJ3 - 2.3 MB
FUJ4 - 1.2 MB	FUJ4 - 4.7 MB	FUJ4 - 2.3 MB
		FUJ5 - 2.3 MB
		FUJ6 - 2.3 MB
		FUJ7 - 2.3 MB
		FUJ8 - 2.3 MB

PLEASE ENTER DRIVE CONFIGURATION OR <RETURN> FOR B ? B<CR>

Enter "B" followed by a carriage return to select drive configuration "B". Only half of the drives listed above will be displayed if you have an 11 megabyte drive.

FUJFMT will tell you that it has begun the formatting process, and then slowly display several rows of periods on the screen:

FORMAT IN PROGRESS.

```
.....
.....
.....
....
```

When FUJFMT has finished formatting the Fujitsu, the bad track table will be displayed.

BAD TRACK TABLE

<u>FIRST 10 MEGABYTES</u>				<u>SECOND 10 MEGABYTES</u>				
<u>BAD TRACK</u>		<u>- GOOD TRACK</u>		:	<u>BAD TRACK</u>		<u>- GOOD TRACK</u>	
0 -	0000H	-	0001H	:	9 -	0000H	-	0001H
1 -	0000H	-	0002H	:	10-	0000H	-	0002H
2 -	0000H	-	0003H	:	11-	0000H	-	0003H
3 -	0000H	-	0004H	:	12-	0000H	-	0004H
4 -	0000H	-	0005H	:	13-	0000H	-	0005H
5 -	0000H	-	0006H	:	14-	0000H	-	0006H
6 -	0000H	-	0007H	:	15-	0000H	-	0007H
7 -	0000H	-	0008H	:	16-	0000H	-	0008H
8 -	0000H	-	0009H	:	17-	0000H	-	0009H

ENTER ITEM TO CHANGE OR <RETURN> TO ACCEPT ? 0<CR>

Enter a 0 to specify that item #0 is to be changed.

ENTER BAD TRACK (IN HEX) ? 40<CR>

Type the value of any reported bad tracks ("40" in our example). Press the carriage return.

The Bad Track Table is displayed with the new entry.

BAD TRACK TABLE

<u>FIRST 10 MEGABYTES</u>				<u>SECOND 10 MEGABYTES</u>				
<u>BAD TRACK</u>		<u>- GOOD TRACK</u>		:	<u>BAD TRACK</u>		<u>- GOOD TRACK</u>	
0 -	0040H	-	0001H	:	9 -	0000H	-	0001H
1 -	0000H	-	0002H	:	10-	0000H	-	0002H
2 -	0000H	-	0003H	:	11-	0000H	-	0003H
3 -	0000H	-	0004H	:	12-	0000H	-	0004H
4 -	0000H	-	0005H	:	13-	0000H	-	0005H
5 -	0000H	-	0006H	:	14-	0000H	-	0006H
6 -	0000H	-	0007H	:	15-	0000H	-	0007H
7 -	0000H	-	0008H	:	16-	0000H	-	0008H
8 -	0000H	-	0009H	:	17-	0000H	-	0009H

ENTER ITEM TO CHANGE OR <RETURN> TO ACCEPT ? <CR>

You may continue entering any bad tracks found by the check performed earlier or enter a <CR> when all of the bad tracks have been found.

FORMAT COMPLETE.

0A>

Copy the DOS 5 files from both distribution disks onto the Fujitsu.

1. Use PIP to copy the files from Distribution Disk #1 to the Fujitsu.

QA>PIP G:=A:*. *[OV]<CR>

Enter "PIP G:=A:*. *[OV]" followed by a carriage return. PIP will display the name of each DOS 5 file as it is copied from Distribution Disk #1 to the Fujitsu, and then automatically return you to the operating system.

2. Remove Distribution Disk #1 from the floppy drive.
3. Insert Distribution Disk #2 into the floppy drive, and close the door.
4. Reset the floppy drive.

QA>DSKRESET<CR>

Type "DSKRESET" followed by a carriage return to inform the operating system you have changed floppy disks.

5. Use PIP to copy the files from Distribution Disk #2 to the Fujitsu.

QA>PIP G:=A:*. *[OV]<CR>

Enter "PIP G:=A:*. *[OV]" followed by a carriage return. PIP will display the name of each DOS 5 file as it is copied from Distribution Disk #2 to the Fujitsu, and then automatically return you to the operating system.

6. Remove Distribution Disk #2 from the floppy drive.

 Format two floppy disks.

1. Log onto the Fujitsu.

@A>G:<CR>

Enter "G:" followed by a carriage return to log onto the Fujitsu.

@G>

The "@G>" prompt signifies that logical drive "G" is the current drive, and DOS 5 is ready for additional commands.

2. Use FFORMAT to format two floppy disks.

@G>FFORMAT<CR>

Enter "FFORMAT" followed by a carriage return. FFORMAT will sign on with the following prompt:

 DYNABYTE FLOPPY DISK FORMAT UTILITY

VERSION X.X FOR DOS 5.XX

ENTER 1 - TO USE FIRST FLOPPY DRIVE
 2 - TO USE SECOND FLOPPY DRIVE
 3 - TO USE THIRD FLOPPY DRIVE
 4 - TO USE FOURTH FLOPPY DRIVE

FLOPPY DISK DRIVE TO USE (1,2,3 OR 4) ? **1<CR>**

Enter a "1" followed by a carriage return to specify the floppy drive. Depending on your computer system's drive type, you will then receive one of the following messages:

DRIVE 1 IS A SINGLE SIDED 8 INCH DRIVE
 DRIVE 1 IS A DOUBLE SIDED 8 INCH DRIVE
 CANNOT RECOGNIZE DRIVE TYPE
 NO ATTACHED DRIVE

FFORMAT will then ask what function you would like to perform:

DO YOU WANT TO:

F - FORMAT
 C - CHECK
 Q - QUIT

YOUR SELECTION ? F<CR>

Enter "F" followed by a carriage return to indicate FORMAT.

If the drive is double-sided, FFORMAT will then ask whether you want one or both sides formatted:

SIDE FORMAT SELECTION

- 1 - FOR SINGLE SIDED
- 2 - FOR DOUBLE SIDED
- RETURN - FOR SINGLE SIDED

SIDE FORMAT ? 1<CR>

Enter "1" followed by a carriage return to indicate single-sided.

FFORMAT will then prompt for single- or double-density:

DENSITY FORMAT SELECTION

- 1 - FOR SINGLE DENSITY
- 2 - FOR DOUBLE DENSITY
- RETURN - FOR DOUBLE DENSITY

DENSITY FORMAT ? <CR>

Enter a carriage return to indicate double-density.

FFORMAT will now ask you to enter the number of directory entries to reserve space for on the floppy disk:

NUMBER OF DIRECTORY ENTRIES

- 1 - FOR 64 ENTRIES
- 2 - FOR 128 ENTRIES
- 3 - FOR 256 ENTRIES
- RETURN - FOR 64 ENTRIES

OF DIRECTORY ENTRIES ? 2<CR>

Enter "2" followed by a carriage return to reserve space for 128 directory entries.

FFORMAT will then tell you to insert the floppy disk you want to format into the floppy drive:

INSERT DISK. HIT ESCAPE TO ABORT OR ANY OTHER KEY TO BEGIN ...

Insert a floppy disk into the floppy drive, and close the door.

CAUTION: FFORMAT will erase any data that exists on the floppy disk.

Also, be sure the floppy disk is not write-protected. You can write on an 8" floppy disk if the write-protect notch is covered up.

<CR>

Enter a carriage return to start the actual formatting process. FFORMAT then tells you it is working and asks you to wait:

.... FORMATTING IS NOW BEING DONE PLEASE WAIT

If, during the formatting process, FFORMAT finds a bad sector on the floppy disk and is unable to format it, the error will be reported as follows:

HARD ERROR AT TRACK=XX SECTOR=XX
***!!! BAD DISKETTE REPLACE WITH A NEW ONE !!!**

A damaged floppy disk should be removed and discarded or returned to your supplier. Insert another floppy disk and press return to start the process again.

After the floppy disk has been formatted, FFORMAT will confirm its completion and then ask if you want to format another floppy disk:

***** FORMAT COMPLETED O.K. *****

REPEAT SAME OPERATION ON A NEW DISK (Y/N) ?

Remove the newly formatted floppy disk from the floppy drive.

Y<CR>

Enter "Y" followed by a carriage return. FFORMAT will then tell you to insert a floppy disk into the drive:

INSERT DISK. HIT ESCAPE TO ABORT OR ANY OTHER KEY TO BEGIN ...

Insert another floppy disk into the floppy drive, and close the door.

<CR>

Enter a carriage return to start the formatting process. FFORMAT tells you it is working and asks you to wait:

.... FORMATTING IS NOW BEING DONE PLEASE WAIT

Again, if FFORMAT reports a bad

sector, the damaged floppy disk should be discarded and the format process tried on another disk.

After the floppy disk has been formatted, FFORMAT will confirm its completion and then ask if you want to format another floppy disk:

***** FORMAT COMPLETED O.K. *****

REPEAT SAME OPERATION ON A NEW DISK (Y/N) ? N<CR>

Enter "N" followed by a carriage return. FFORMAT will then return to its main menu:

DO YOU WANT TO:

F - FORMAT
C - CHECK
Q - QUIT

YOUR SELECTION ?

3. Exit FFORMAT.

YOUR SELECTION ? Q<CR>

Enter "Q" followed by a carriage return to exit FFORMAT and return to the operating system:

0G>

Copy the DOS 5 loading instructions to the formatted floppy disks.

1. Use DYNAGEN to copy the DOS 5 loading instructions to the outer two tracks of the newly formatted floppy disks.

@G>DYNAGEN<CR>

Enter "DYNAGEN" followed by a carriage return. (You are still logged onto the Fujitsu on drive "G".) DYNAGEN will then sign on with the following menu and prompt:

DYNAGEN VERSION X.XX FOR DYNABYTE DOS 5.XX

GENERATE SYSTEM DISK

|	TR)	TRANSFER SYSTEM FROM ONE DISK TO ANOTHER	|
|	CT)	TRANSFER SYSTEM USING ".COM" BOOT FILE	|
|	EK)	EXIT DYNAGEN	|

YOUR SELECTION ? CT<CR>

Enter "CT" followed by a carriage return. DYNAGEN will then ask you to identify the source drive:

(CT) SYSTEM FILES LOCATED ON DISK DRIVE (A-P) ? G<CR>

Enter "G" followed by a carriage return to specify the Fujitsu as the source drive. DYNAGEN will then prompt for the destination drive:

WRITE SYSTEM TO DISK DRIVE (A-P) ? A<CR>

Enter "A" followed by a carriage return to specify the floppy drive as the destination drive. DYNAGEN will then prompt you to insert the floppy disk:

PLEASE PLACE PROPER DISKS IN DRIVES, THEN PRESS <RETURN> TO CONTINUE. <CR>

Since you still have a formatted disk in the floppy drive, just enter a carriage return to start the actual copying process. DYNAGEN then tells you it is working and asks you to wait:

PLEASE WAIT. WRITING SYSTEM TO FLOPPY DRIVE A.

When DYNAGEN has finished writing the loading instructions, it will prompt you to enter a carriage return:

PRESS <RETURN> TO DISPLAY MENU. <CR> Enter a carriage return. DYNAGEN will then return to its main menu:

DYNAGEN VERSION X.XX FOR DYNABYTE DOS 5.XX

GENERATE SYSTEM DISK

|	TR)	TRANSFER SYSTEM FROM ONE DISK TO ANOTHER	|
|	CT)	TRANSFER SYSTEM USING ".COM" BOOT FILE	|
|	EK)	EXIT DYNAGEN	|

ENTER MENU ITEM (RETURN TO EXIT TO MAIN MENU) ? CR<CR>

Enter "CT" followed by a carriage return to write the DOS 5 loading instructions to the other formatted floppy disk. DYNAGEN will then ask you to identify the source drive:

(CT) SYSTEM FILES LOCATED ON DISK DRIVE (A-P) ? G<CR>

Enter "G" followed by a carriage return to specify the Fujitsu as the source drive. DYNAGEN will then prompt for the destination drive:

WRITE SYSTEM TO DISK DRIVE (A-P) ? A<CR>

Enter "A" followed by a carriage return to specify the floppy drive as the destination drive. DYNAGEN will then prompt you to insert the floppy disk:

PLEASE PLACE PROPER DISKS IN DRIVES, THEN PRESS <RETURN> TO CONTINUE.

Remove the first floppy disk from the floppy drive, insert the remaining formatted floppy disk in its place, and close the door.

<CR>

Enter a carriage return to start the actual copying process. DYNAGEN then tells you it is working and asks you to wait:

PLEASE WAIT. WRITING SYSTEM TO FLOPPY DRIVE A.

When DYNAGEN has finished writing the loading instructions, it will prompt you to enter a carriage return:

PRESS <RETURN> TO DISPLAY MENU. <CR>

Enter a carriage return. DYNAGEN will then return to its main menu:

DYNAGEN VERSION X.XX FOR DYNABYTE DOS 5.XX

GENERATE SYSTEM DISK

```
| TR) TRANSFER SYSTEM FROM ONE DISK TO ANOTHER |
| CT) TRANSFER SYSTEM USING ".COM" BOOT FILE   |
| EX) EXIT DYNAGEN                             |
```

ENTER MENU ITEM (RETURN TO EXIT TO MAIN MENU) ? EX<CR>

Enter "EX" followed by a carriage return to exit DYNAGEN and return to the operating system.

Both of the formatted floppy disks are now "bootable"; that is, DOS 5 can now be booted from either of them.

Leave the new "bootable" floppy disk in the floppy drive.

Copy the DOS 5 files from the Fujitsu to the "bootable" floppy disks.

1. Copy the Distribution Disk #1 files from the Fujitsu to the floppy disk that was left in the floppy drive.

0G>SUBMIT COPY8A G A<CR>

Enter "SUBMIT COPY8A G A" followed by a carriage return. Enter this command exactly as shown; the spaces are very important.

"COPY8A" is the name of a SUBMIT file stored with DOS 5 that contains file copying instructions for Distribution Disk #1. The appropriate files will automatically be copied from source drive "G" to destination drive "A".

When all the files have been copied, the following message will be displayed on the screen:

0G> DISTRIBUTION TRANSFER FOR DISK #1 COMPLETE

0G>

2. Remove the new copy of Distribution Disk #1 from the floppy drive and label it "Copy — DOS 5.XX Distribution Disk #1 of 2".
3. Insert the remaining "bootable" floppy disk into the floppy drive, and close the door.

0G>DSKRESET<CR>

Type "DSKRESET" followed by a carriage return to inform the operating system that you have changed floppy disks.

4. Copy the Distribution Disk #2 files from the Fujitsu to the remaining floppy disk.

0G>SUBMIT COPY8B G A<CR>

Enter "SUBMIT COPY8B G A" followed by a carriage return. Enter this command exactly as shown; the spaces are very important.

"COPY8B" is the name of a SUBMIT file shipped with DOS 5 that contains file transfer instructions for Distribution Disk #2. The appropriate files will automatically be copied from source drive "G" to destination drive "A".

When all the files have been copied,
the following message will be
displayed on the screen:

RG> DISTRIBUTION DISK #2 TRANSFER COMPLETE

5. Remove the new copy of Distribution Disk #2 from the floppy drive and label it "Copy — DOS 5.XX Distribution Disk #2 of 2".

YOU NOW HAVE COPIES OF THE TWO DOS 5 DISTRIBUTION DISKS THAT WERE SHIPPED WITH YOUR COMPUTER.

Install DOS 5 on the Fujitsu Hard Disk.

1. Use DYNASYS to change the disk drive assignments on the Fujitsu.

CG>DYNASYS<CR>

Enter "DYNASYS" followed by a carriage return. DYNASYS will sign-on with the following message and prompt:

**DYNASYS VERSION X.XX - FOR DYNABYTE DOS 5
MP/M 2.1 SYSTEM REGENERATION UTILITY**

MAIN MENU OPTIONS

AL)	ASSIGN / SETUP ALL PARAMETERS
SC)	SET CLEAR SCREEN SEQUENCE
CA)	CHARACTER I/O ASSIGNMENTS
CS)	CHARACTER I/O SETUP
DA)	DISK DRIVE ASSIGNMENTS
LS)	LOAD / SAVE PARAMETER FILE
DC)	DISPLAY CURRENT CONFIGURATION
CD)	CREATE SYSTEM DISK
EX)	EXIT TO OPERATING SYSTEM

ENTER MENU ITEM ? DA<CR>

Type "DA" and a carriage return to assign drive letters to your logical drives.

DYNASYS VERSION X.XX - FOR DYNABYTE DOS 5.XX
MP/M 2.1 SYSTEM REGENERATION UTILITY

LOGICAL DISK DRIVE ASSIGNMENTS

LOGICAL DISKS

A: = F1	F1 - F4 = FLOPPY DISK DRIVES
B: = F2	
C: = F3	MINI1 - MINI8 = 5 1/4" WINCHESTER LOGICAL DRIVES
D: = F4	
E: = MINI1	FUJ1 - FUJ8 = FUJITSU WINCHESTER LOGICAL DRIVES
F: = MINI2	
G: = FUJ1	MW1 - MW5 = MICROPOLIS WINCHESTER DRIVES
H: = FUJ2	
I: =	
J: =	
K: =	
L: =	
M: =	
N: =	
O: =	
P: =	

DRIVE TO CHANGE A - P (<RETURN> TO LEAVE AS IS) ? A<CR>

Type "A" and a carriage return to reassign drives A and B as the two Fujitsu logical drives.

A: = ? <RETURN> TO SET NULL FUJ1<CR>
B: = ? FUJ2<CR>
C: = ?

In response to the prompt for a drive assignment to drive A, type "FUJ1" and a carriage return. Then assign drive B by typing "FUJ2" and a carriage return. The other assignments for Model 5615 depend upon the size of hard disk drive you have. In both cases, you should assign Drive A to be disk FUJ1 and Drive B to be FUJ2, as shown.

For 23 MB Hard Disk Drive

If you have a 23 Megabyte hard disk drive, use the drive assignments for Drives C-H as shown at left. Press a carriage return when asked for Drive I.

DRIVE C: FUJ3<CR>
 DRIVE D: FUJ4<CR>
 DRIVE E: F1<CR>
 DRIVE F: F2<CR>
 DRIVE G: F3<CR>
 DRIVE H: F4<CR>
 DRIVE I: <CR>

Type another carriage return in response to the drive I prompt. DYNASYS will then display all current drive assignments.

LOGICAL DISK DRIVE ASSIGNMENTS

LOGICAL DISKS

A: = FUJ1 B: = FUJ2 C: = FUJ3 D: = FUJ4 E: = F1 F: = F2 G: = F3 H: = F4 I: = J: = K: = L: = M: = N: = O: = P: =	F1 - F4 = FLOPPY DISK DRIVES MINI1 - MINI8 = 5 1/4" WINCHESTER LOGICAL DRIVES FUJ1 - FUJ8 = FUJITSU WINCHESTER LOGICAL DRIVES MW1 - MW5 = MICROPOLIS WINCHESTER DRIVES
--	---

DRIVE TO CHANGE A - P (<RETURN> TO LEAVE AS IS) ? <CR>

Type a final carriage return to confirm the drive assignments. DYNASYS will then ask which size Fujitsu you have.

SELECT THE FUJITSU DRIVE TYPE:

0 - 11 MEGABYTE DRIVE
 1 - 23 MEGABYTE DRIVE

ENTER DRIVE TYPE (0 OR 1) ? 1<CR>

Type "1" and a carriage return. The DYNASYS main menu then will be displayed.

For 11 MB Hard Disk Drive

If you are using an 11 Megabyte hard disk drive, use the drive assignments for Drives C-F shown at left. Press a carriage return when asked for Drive G.

DRIVE C: F1<CR>
DRIVE D: F2<CR>
DRIVE E: F3<CR>
DRIVE F: F4<CR>
DRIVE G: <CR>

The system will now ask you which size Fujitsu hard disk drive you are using.

SELECT THE FUJITSU DRIVE TYPE:

0 - 11 MEGABYTE DRIVE
1 - 23 MEGABYTE DRIVE

ENTER DRIVE TYPE (0 OR 1) ? 0<CR>

Respond with a "0" followed by a carriage return. DYNASYS will then display all current drive assignments.

LOGICAL DISK DRIVE ASSIGNMENTS

LOGICAL DISKS

A:	= FUJ11
B:	= FUJ2
C:	= F1
D:	= F2
E:	= F3
F:	= F4
G:	= FUJ1
H:	= FUJ2
I:	=
J:	=
K:	=
L:	=
M:	=
N:	=
O:	=
P:	=

F1 - F4 = FLOPPY DISK DRIVES

MIN11 - MIN18 = 5 1/4" WINCHESTER LOGICAL DRIVES

FUJ1 - FUJ8 = FUJITSU WINCHESTER LOGICAL DRIVES

MW1 - MW5 = MICROPOLIS WINCHESTER DRIVES

DRIVE TO CHANGE A - P (<RETURN> TO LEAVE AS IS) ? G<CR>
 G: = ? <RETURN> TO SET TO NULL <CR>
 DRIVE TO CHANGE A - P (<RETURN> TO LEAVE AS IS) ? H<CR>
 H: = ? <RETURN> TO SET TO NULL <CR>

Proceed to clear the drive assignments for drives G and H in the manner shown above. Type the drive letter ("G") and a carriage return. Then press another carriage return to the "<RETURN> TO SET TO NULL" prompt. Do the same for H so that drives G and H are set to null. The final screen display should look like this:

LOGICAL DISK DRIVE ASSIGNMENTS

LOGICAL DISKS

A: = FUJ1	F1 - F4 = FLOPPY DISK DRIVES
B: = FUJ2	MINI1 - MINI8 = 5 1/4" WINCHESTER LOGICAL DRIVES
C: = F1	FUJ1 - FUJ8 = FUJITSU WINCHESTER LOGICAL DRIVES
D: = F2	MW1 - MW5 = MICROPOLIS WINCHESTER DRIVES
E: = F3	
F: = F4	
G: =	
H: =	
I: =	
J: =	
K: =	
L: =	
M: =	
N: =	
O: =	
P: =	

DRIVE TO CHANGE A - P (<RETURN> TO LEAVE AS IS) ? <CR>

A final carriage return confirms the drive assignments and puts you back at the DYNASYS menu.

DYNASYS VERSION X.XX - FOR DYNABYTE DOS 5
MP/M 2.1 SYSTEM REGENERATION UTILITY

MAIN MENU OPTIONS

AL)	ASSIGN / SETUP ALL PARAMETERS
SC)	SET CLEAR SCREEN SEQUENCE
CA)	CHARACTER I/O ASSIGNMENTS
CS)	CHARACTER I/O SETUP
DA)	DISK DRIVE ASSIGNMENTS
LS)	LOAD / SAVE PARAMETER FILE
DC)	DISPLAY CURRENT CONFIGURATION
CD)	CREATE SYSTEM DISK
EX)	EXIT TO OPERATING SYSTEM

ENTER MENU ITEM ? CD<CR>

Now that the system is defined, type "CD" and a carriage return to select the CREATE SYSTEM DISK option. The following CD menu will be displayed.

DYNASYS VERSION X.X - FOR DYNABYTE DOS 5.XX
MP/M 2.1 SYSTEM REGENERATION UTILITY

GENERATE SYSTEM DISK

WR)	WRITE SYSTEM TO DISK
TR)	TRANSFER SYSTEM FROM ONE DISK TO ANOTHER
EX)	EXIT TO MAIN MENU

YOUR SELECTION ? WR<CR>

Type "WR" and a carriage return. This option will write your newly defined system on the Fujitsu drive.

(WR) SYSTEM FILES LOCATED ON DISK DRIVE (A-P) ? G<CR>

WRITE SYSTEM TO DISK DRIVE (A-P) ? G<CR>

Type "G" and a carriage return to the next two prompts that ask for the source and destination drives.

DO YOU WANT TO ACCEPT ALL THE DEFAULT PARAMETERS IN GENSYS (Y/N) ? Y<CR>

Type "Y" to accept the default parameters in GENSYS.

Type "N" if you have one or more memory boards. You must change the GENSYS memory segment table. Recommended values are given in Appendix A. See Section 3.1.8.1 for more information on GENSYS parameters.

PLEASE PLACE PROPER DISKS IN DRIVES, THEN PRESS <RETURN> TO CONTINUE. <CR>

Press a carriage return to continue.

PLEASE WAIT. WRITING SYSTEM TO FUJITSU DRIVE G.

MP/M II V2.1 System Generation
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.
.
.

** GENSYS DONE **

PRESS <RETURN> TO DISPLAY MENU. <CR>

The screen will rapidly scroll the GENSYS process. You don't have to do

anything until GENSYS is finished. Then press a carriage return. The CD menu will be displayed again.

**DYNASYS VERSION X.X - FOR DYNABYTE DOS 5.XX
MP/M 2.1 SYSTEM REGENERATION UTILITY**

GENERATE SYSTEM DISK

WR)	WRITE SYSTEM TO DISK
TR)	TRANSFER SYSTEM FROM ONE DISK TO ANOTHER
EX)	EXIT TO MAIN MENU

YOUR SELECTION ? EX<<CR>

Type "EX" and a carriage return to exit the CD option. You will be returned to the DYNASYS menu.

**DYNASYS VERSION X.XX - FOR DYNABYTE DOS 5
MP/M 2.1 SYSTEM REGENERATION UTILITY**

MAIN MENU OPTIONS

AL)	ASSIGN / SETUP ALL PARAMETERS
SC)	SET CLEAR SCREEN SEQUENCE
CA)	CHARACTER I/O ASSIGNMENTS
CS)	CHARACTER I/O SETUP
DA)	DISK DRIVE ASSIGNMENTS
LS)	LOAD / SAVE PARAMETER FILE
DC)	DISPLAY CURRENT CONFIGURATION
CD)	CREATE SYSTEM DISK
EX)	EXIT TO OPERATING SYSTEM

ENTER MENU ITEM ? EX<<CR>

Type another "EX" and a carriage return to exit DYNASYS.

**DYNASYS VERSION X.XX - FOR DYNABYTE DOS 5
MP/M 2.1 SYSTEM REGENERATION UTILITY**

You have now installed your newly configured operating system on the Fujitsu drive. Your Fujitsu is now "bootable." You will next reboot the computer to load this new system.

 Reboot DOS 5.

If you have the tape controller board:

Make sure that no floppy disk is in the floppy disk drive. Press and release the reset button. The computer will now boot DOS 5 from the Fujitsu.

If you don't have the tape controller board:

Insert one of the new DOS 5 disks into the floppy drive, and close the door. Press and release the reset button. The computer will boot DOS 5 from the floppy drive, but with the new system configuration.

The computer is now configured as either an eight or a six drive computer. If you have a 23 megabyte drive, the computer is now configured as an eight drive system. Drives "A" through "D" are on the Fujitsu, and Drives "E" through "H" are the floppy drives. This can be seen from the following list of disk drive assignments, as it would appear using DYNASTAT:

DISK DRIVE	ASSIGN
A:	FUJ1
B:	FUJ2
C:	FUJ3
D:	FUJ4
E:	F1
F:	F2
G:	F3
H:	F4

If you have an 11 megabyte drive, the computer is now configured as a six drive system. Drives "A" and "B" are on the Fujitsu, and Drives "C" through "F" are the floppy drives. This can be seen from the following list of disk drive assignments, as it would appear using DYNASTAT:

DISK DRIVE	ASSIGN
A:	FUJ1
B:	FUJ2
C:	F1
D:	F2
E:	F3
F:	F4
G:	
H:	

2.6 Models 5013, 5700, 5710

Winchester hard disk with cartridge tape drive
Dynabyte models 5013, 5700, 5710

When a 5013, 5700, or 5710 model computer arrives, neither the computer nor the Winchester disk contains any installed system software. DOS 5 is shipped on a tape cartridge. To get started, you must boot DOS 5 into the computer's memory from the tape.

The procedure below describes how to boot DOS 5 from the cartridge tape and copy the operating system to the hard disk on the system. When DOS 5 is on the hard disk, booting becomes a very fast and easy procedure. The procedure is the same regardless of the size of the disk on your system; however, some of the menu displays will vary depending on the size of the disk. The places where the actual menu differs will be noted.

METHOD 6 OVERVIEW

- Boot DOS 5 from the cartridge tape.
 - Format the hard disk.
 - Generate the system on the hard disk.
 - Boot DOS 5 from the hard disk.
 - Use DTIP to copy the cartridge tape to disk.
-

 Boot DOS 5 from the cartridge tape

1. Turn on the computer.
2. Insert cartridge tape.

Set the PROTECT switch on the tape cartridge to the SAFE position. The SAFE position prevents the data on the system tape from being accidentally erased. Insert the cartridge, label side up, all the way into the cartridge slot. The system will rewind the tape automatically.

3. Press and release the reset button.

The computer will execute the boot ROM. The following message appears on the screen:

```
DYNABYTE CPM/MPM/OASIS BOOT ROM
VERSION X.X
```

```
H-BOOT FROM HARD DISK
F-BOOT FROM FLOPPY
T-BOOT FROM TAPE
```

```
BOOT FROM ? T
```

4. Boot from tape.

Enter a T. The system rewinds the cassette tape, reads in the first file and then displays the following:

```
DYNABYTE TAPE BOOT
VERSION X.X
```

```
TAPE BOOT OPTIONS
```

```
| FUJ)  FORMAT FUJITSU WINCHESTER |
| MIC)  FORMAT MICROPOLIS WINCHESTER |
| CMD)  FORMAT CMD |
| MIN)  FORMAT MINI WINCHESTER |
| HDS)  HDSYSGEN HARD DISK |
```

```
ENTER MENU ITEM ? MIN<CR>
```

Enter "MIN" or the mnemonic that describes your hard disk. For instance, if you have a Fujitsu hard disk, then type "FUJ" followed by a carriage return.

Format the hard disk.

1. Format the disk (the example shows how to format the Mini Winchester disk). Refer to Section 5 if you need assistance in using the other hard disk format programs.

The screen displays the menu.

***** DYNABYTE 5.25" HARD DISK FORMAT VERSION 5.XX FOR TAPE BOOT *****

CO) CHECK ONLY
FC) FORMAT AND CHECK
EX) RETURN TO TAPE BOOT MENU

YOUR SELECTION: FC<CR>

Enter FC<CR> to FORMAT and CHECK the disk.

A series of dots will appear on the screen while the disk is being formatted. When the formatting operation is complete, a count of the number of bad tracks is displayed.

BEGIN FORMAT-ENTER ESC TO ABORT

.....
.....
.....
.....

FORMAT COMPLETE-00H BAD TRACKS WERE FOUND

Generate DOS 5 on the hard disk.

1. Configure the disk.

The configuration options are displayed in the CONFIGURATION OPTIONS menu. The configuration options will vary with the size of the hard disk being used.

CONFIGURATION OPTIONS

6MB HARD DISK DRIVE

- A) 1 DRIVE | 4.9 MB | 1024 DIRECTORY ENTRIES
B) 2 DRIVES | 2.48 MB | 512 DIRECTORY ENTRIES

SELECT OPTION OR <RETURN> FOR DEFAULT (OPTION B): B<CR>

Select option B by typing "B" or by simply pressing a carriage return. This choice does not refer to the number of disks or spindles on the system. TWO DRIVES indicates the disk is to be configured as two logical drives. The BAD TRACK TABLE shows which tracks are to be marked as bad by the operator. This display will vary with the size of the hard disk being used.

BAD TRACK TABLE				
1)	2)	3)	5)	5)
6)	7)	8)	9)	10)
11)	12)	13)	14)	15)
16)	17)	18)	19)	20)
21)	22)	23)	24)	25)
26)	27)	28)	29)	30)
31)	32)	33)	34)	35)
36)	37)	38)	39)	40)
41)	42)	43)	44)	45)
46)	47)	48)	49)	50)
51)	52)	53)	54)	55)
56)	57)	58)	59)	60)

"T*****" (LOGICAL BAD TRACK NUMBER)
 "H*,C****" (HEAD, CYLINDER NUMBER)

ENTER ONE OF THE ABOVE OPTIONS OR <RETURN> TO ACCEPT: CR

Normally, enter a carriage return to accept the system's substitute track assignments for bad tracks. The system will then display the Tape Boot Options menu:

DYNABYTE TAPE BOOT
 VERSION 5.X

TAPE BOOT OPTIONS

FUJ)	FORMAT FUJITSU WINCHESTER
MIC)	FORMAT MICROPOLIS WINCHESTER
CMD)	FORMAT CMD
MIN)	FORMAT MINI WINCHESTER
HDS)	HDSYSGEN HARD DISK

ENTER MENU ITEM ? HDS<CR>

2. SYSGEN the hard disk.

Enter an HDS followed by a carriage return to start the hard disk system generation. The system displays the following menu:

***** HARD DISK SYSTEM GENERATION FROM TAPE -- VERSION 5.XX *****

```
| CF) WRITE CP/M SYSTEM TO FUJITSU HARD DISK  
| CM) WRITE CP/M SYSTEM TO MICROPOLIS HARD DISK  
| CC) WRITE CP/M SYSTEM TO CMD FIXED DISK  
| CW) WRITE CP/M SYSTEM TO MINIWINI HARD DISK  
  
| MF) WRITE MP/M SYSTEM TO FUJITSU HARD DISK  
| MM) WRITE MP/M SYSTEM TO MICROPOLIS HARD DISK  
| MC) WRITE MP/M SYSTEM TO CMD FIXED DISK  
| MW) WRITE MP/M SYSTEM TO MINIWINI HARD DISK  
  
| EX) EXIT TO OPERATING SYSTEM
```

YOUR SELECTION ? MW<CR>

Enter an MW (or the mnemonic that describes your system) to write MP/M to the Mini Winchester hard disk. For instance, enter MF if you have a Fujitsu hard disk.

PLEASE WAIT. WRITING SYSTEM TO MINIWINI DRIVE.

The system reads the MP/M operating system from the tape onto the disk and prompts the operator when the system has been completely written to disk.

PRESS <RETURN> TO DISPLAY MENU. <CR>

Enter <CR> to display the system generation menu again.

Boot DOS 5 from the hard disk.

1. Press and release the reset button to boot the system.

The system will display the Dynabyte
Boot ROM menu.

DYNABYTE CPM/MPM/OASIS BOOT ROM
VERSION X.X

H-BOOT FROM HARD DISK
F-BOOT FROM FLOPPY
T-BOOT FROM TAPE

BOOT FROM ? H

Press H to boot MP/M from the hard
disk. The system will display the ØA>
prompt to indicate the operating
system has loaded.

ØA>

Use DTIP to copy the tape to disk.

1. Use DTIP to copy the remaining files from the cartridge tape.

0A) DTIP<CR>

Enter DTIP<CR> to run the Dynabyte Tape Interchange Program. The system displays the following warning:

***** WARNING *****

**THIS PROGRAM AFFECTS CPU CLOCK AND OTHER USERS.
TYPE CNTRL-C TO ABORT OR <CR> TO CONTINUE: <CR>**

Press the carriage return. The system will display the DTIP menu:

CODE:	ACTION:
I	INITIALIZE TAPE
B	DISK TO TAPE BACKUP
R	TAPE TO DISK RESTORATION
A	DISK TO TAPE APPEND
D	TAPE DIRECTORY
V	FILE VERIFICATION
C	TAPE TO TAPE COPY
T	RETENTION TAPE
(ESC)	ESCAPE TO MONITOR

ACTION DESIRED: R<CR>

Enter "R" to copy the tape to the disk. Enter a <CR> in response to the SAVE SET inquiry. Enter a *.* for the file entry. This copies all of the files from the tape to the disk.

**TAPE TO DISK RESTORATION
ENTER SAVE SET CODE (CR FOR DEFAULT): <CR>**

FILE NAME (CR = DONE): *.*<CR>

SEARCH FROM START OF DATA (Y/N) ? Y

IGNORE SOURCE DEVICE CODE AS WRITTEN ON TAPE (Y/N) ? Y

Enter a "Y" (a carriage return is not needed) for both the SEARCH FROM START OF DATA query and the IGNORE SOURCE DEVICE CODE AS WRITTEN ON TAPE query.

The system will list the file names as

it copies them as shown below:

COPYING:

NAME	TYPE	DRIVE	USER	SS
DYNABYTE.TAP		A	0	00
LOADER .TAP		A	0	00
WFORMAT .TAP		A	0	00
HFORMAT .TAP		A	0	00
...				
...				
...				
CPMLDR .TAP		A	0	00

FILE NAME (CR = DONE): <CR>

This is a partial sample listing. Yours will show more and perhaps different file names. Press return when the list of files copied ends and you are asked for the next file name. You will be returned to the DTIP menu.

DYNABYTE TAPE INTERCHANGE PROGRAM - VERSION 5.XX

CODE:	ACTION:
I	INITIALIZE TAPE
B	DISK TO TAPE BACKUP
R	TAPE TO DISK RESTORATION
A	DISK TO TAPE APPEND
D	TAPE DIRECTORY
V	FILE VERIFICATION
C	TAPE TO TAPE COPY
T	RETENTION TAPE
(ESC)	ESCAPE TO MONITOR

ACTION DESIRED: <ESC>

Press the ESC key to exit the DTIP program.

The system will indicate DTIP is complete and return to the operating system.

0A>

Notes

3.0 SYSTEM GENERATION AND CONFIGURATION

3.1 DYNASYS

The DYNASYS configuration program is used to create what is referred to as a system disk. A system disk is used to load, or boot, the DOS 5 operating system when the computer is first turned on or reset. All the information your computer needs to load the operating system into memory is contained on the system disk. Through the DYNASYS program, you are given the opportunity to describe the parameters of your system's configuration.

The computer boots the DOS 5 operating system by reading selected portions of a system disk into the computer's memory. The boot information is contained in the first outermost track on a hard disk or in the outer two tracks on a floppy disk, and in a series of files from the data area of the system disk. The outer boot track(s) and the data areas are configured with the appropriate information by the DYNASYS configuration program.

DYNASYS is a menu-driven program. You simply answer questions about the devices connected to the computer and DYNASYS constructs an operating system using only the appropriate modules. Thus, DOS 5 can be as extensive or as streamlined as you want. You may choose to use a very basic operating system to save memory space. At any time, you can change or remove any of the parameters that set up your DOS 5 operating system by entering DYNASYS and using the options displayed in the main menu. You simply enter the two-letter code that represents the selected menu option and answer the subsequent questions. Any DYNASYS assignments you make, however, are not operative until you run the CD option, creating a new system disk, and reboot your computer from that disk. Any component of a new system configuration that is established with DYNASYS is not reflected until your computer is booted under that system.

DYNASYS may be used to create any number of system disks, each configured for a particular application. It is important to remember, however, that DYNASYS constructs a system disk for a specific hardware configuration. A new hardware configuration may require the creation of a new system disk.

When the DYNASYS program is first invoked by typing DYNASYS and a carriage return, the main menu is displayed:

DYNASYS VERSION X.XX - FOR DYNABYTE DOS 5
MP/M 2.1 SYSTEM REGENERATION UTILITY

MAIN MENU OPTIONS

AL)	ASSIGN / SETUP ALL PARAMETERS
SC)	SET CLEAR SCREEN SEQUENCE
CA)	CHARACTER I/O ASSIGNMENTS
CS)	CHARACTER I/O SETUP
DA)	DISK DRIVE ASSIGNMENTS
LS)	LOAD / SAVE PARAMETER FILE
DC)	DISPLAY CURRENT CONFIGURATION
CD)	CREATE SYSTEM DISK
EX)	EXIT TO OPERATING SYSTEM

ENTER MENU ITEM?

DYNASYS is now prompting you to select one of the displayed menu options. To execute a menu option, enter in capital letters the two-letter combination of the option you want and a carriage return. You must use capital letters in DYNASYS! Once you are in a menu option, you will be prompted to set values to various system parameters.

Study carefully the function of each option before running DYNASYS. An incorrect configuration could prevent the new system disk from booting. Each of the menu items will be discussed in detail later in this section. But first, the function of each option is briefly described.

AL) Assign / Setup All Parameter

The AL option successively invokes each of the other menu options, starting with the SC option and progressing to the CD option. AL should be used when you are configuring a system for the first time, as it will automatically guide you through the configuration process.

SC) Set Clear Screen Sequence

The SC option allows you to set a clear screen sequence to be used during the DYNASYS process. Setting this option causes the screen display to roll down from the top instead of up from the bottom. The names of some common terminals are displayed to make the selection of the proper sequence easy. Or, you can manually enter each character in the sequence.

CA) Character I/O Assignment

The CA option allows you to assign the physical ports to the CONSOLE and LIST logical devices. The option displays any default or previously established values. Physical ports may be assigned to as many as sixteen CONSOLE and sixteen LIST logical devices.

CS) Character I/O Setup

The CS option is used to set up parameters for the character I/O devices. Options include baud rates, stop bits, password, word length, and parity.

DA) Disk Drive Assignment

The DA option allows you to assign each of the 16 logical disk drives connected to the system. You may assign any floppy drive (5.25" or 8"), any Fujitsu Winchester drive (11 or 23 megabytes), any Micropolis Winchester drive (9, 27, or 45 megabytes), or any Mini Winchester drive (6, 10, 12, 16, or 19 megabytes). Default or assigned drives are displayed.

LS) Load / Save Parameter File

The LS option allows you to save, as a file on the disk, all of the parameters you have specified in the current DYNASYS program. Alternately, LS allows you to load a previously created disk file from which the parameters for the current DYNASYS program are taken. The LS option also allows you to clear all parameters to empty values.

DC) Display Current Configuration

On a single screen, 80 by 24 characters in size, the DC option summarizes all of the DYNASYS parameters and their current values. This allows you to verify that the parameters you have entered during the current DYNASYS program accurately reflect your wishes. You still have the opportunity to change any values before you exit DYNASYS.

CD) Create System Disk

The CD option creates a system disk in one of two ways. You can direct it to create a system disk which will store the parameters you've just specified during the current DYNASYS program. Or, you can copy the boot portion, including all of its DYNASYS parameters, from one disk to another. The new system disk can then be used to boot DOS 5 into the computer with the parameters set by another DYNASYS program. Part of the CD option will load and run the Digital Research GENSYS utility to complete the configurations of DOS 5. See the MP/M II manuals for more information.

EX) Exit to Operating System

When you are finished with the DYNASYS operation, use the EX option to return to the operating system level. If you have changed any parameters without using either the CD or LS option to save them, you will be asked if you intentionally want to exit without saving the parameters.

The following table gives you an overview of the DYNASYS parameters and their default values. The DC option produces a table in this format which summarizes all current DYNASYS values.

**DYNASYS VERSION X.XX - FOR DYNABYTE DOS 5.XX
MP/M 2.1 SYSTEM REGENERATION UTILITY**

***** DYNABYTE DOS 5 STATUS UTILITY *****			
CONSOLE ASSIGNMENT	PRINTER ASSIGNMENT	DISK DRIVE ASSIGNMENT	MEMORY SEGMENTS # BASE SIZE ATTR BANK
0= CPU2	0= CPU1	A:=F1	0= 80 - 80 - 80 - 00
1=	1=	B:=F2	1= 00 - 80 - 00 - 00
2=	2=	C:=F3	
3=	3=	D:=F4	
4=	4=	E:=MINI1	
5=	5=	F:=MINI2	
6=	6=	G:=FUJ1	
7=	7=	H:=FUJ2	
8=	8=	I:=	
9=	9=	J:=	
A=	A=	K:=	CPU1 = 9600 BAUD
B=	B=	L:=	CPU2 = 9600 BAUD
C=	C=	M:=	LINE FREQUENCY= 60 HERTZ
D=	D=	N:=	# OF CONSOLES = 1
E=	E=	O:=	# OF DISKS = 8
F=	F=	P:=	

Next, each of the following menu options is discussed in detail.

MAIN MENU OPTIONS

AL)	ASSIGN / SETUP ALL PARAMETERS
SC)	SET CLEAR SCREEN SEQUENCE
CA)	CHARACTER I/O ASSIGNMENTS
CS)	CHARACTER I/O SETUP
DA)	DISK DRIVE ASSIGNMENTS
LS)	LOAD / SAVE PARAMETER FILE
DC)	DISPLAY CURRENT CONFIGURATION
CD)	CREATE SYSTEM DISK
EX)	EXIT TO OPERATING SYSTEM

ENTER MENU ITEM ?

3.1.1 The AL Option: Assign / Setup All Parameters

Typing AL in response to the main menu query, ENTER MENU ITEM?, successively invokes each of the other menu options (except EX which terminates DYNASYS). The SC (Set Clear screen sequence) option is called first, the CA option second, and so on until CD is called.

AL should be used when you are configuring a system for the first time. It prompts you for responses to each menu item without your having to return to the main menu after completing each option. By automatically guiding you through the steps, AL also ensures that you don't overlook an important part of the configuration process.

If you are using DYNASYS to reconfigure several parameters on an existing system disk, you may prefer not to use the AL option. It may be more efficient for you to select only those options affecting parameters you wish to modify.

If the AL option is not used, you are returned to the main menu display after completing each option and given an opportunity to select another until exiting DYNASYS.

3.1.2 The SC Option: Set Clear Screen Sequence

Setting the SC option causes the screen display to roll down from the top instead of up from the bottom during the DYNASYS process. This enhances the appearance and the speed with which the screen is displayed while not affecting the performance of the rest of the system. However, for you to take advantage of this option your console must have the internal capability to receive a clear screen sequence. Consult your console's manual to determine if your console has this capability.

The SC option will display the following menu of common terminals:

DYNASYS VERSION X.XX - FOR DYNABYTE DOS 5

MP/M 2.1 SYSTEM REGENERATION UTILITY

- 0 - DYNABYTE 5022
- 1 - SOROC IQ-120 OR IQ-140
- 2 - INFOION I-100
- 3 - TELEVIDEO 912 OR 920
- 4 - BEEHIVE
- 5 - HEATH H-19
- 6 - ADDS REGENT
- 7 - ZENTEC ZEPHYR
- 8 - HAZELTINE 1500
- 9 - NONE OF THE ABOVE

ENTER TERMINAL TYPE TO BE USED (0 - 9) ?

If your console brand is listed in options 0 - 8 and you want to take advantage of this option, then enter the appropriate number and the CLEAR SCREEN sequence will be set up for you automatically. If you do not want the CLEAR SCREEN sequence, press a carriage return. If you do want the CLEAR SCREEN SEQUENCE and your particular console device is NOT listed, then select option 9. Consult your terminal manual for information on its clear screen capability. The following prompt will be displayed:

DOES YOUR TERMINAL HAVE A CLEAR SCREEN SEQUENCE (Y-YES,N-NO) ?

If your terminal does not have a clear screen capability, then answer the question N for NO. A negative response will put you at the next main menu option (CA) if the AL option is in effect. If AL was not specified earlier in the DYNASYS process and a negative response was entered, you will be returned to the main menu display.

If your terminal does have a clear screen capability which you would like implemented, look in your terminal's manual to find what the character sequence is in HEX notation. Then answer the question Y for YES and the following prompt will be displayed:

HOW MANY CHARACTERS MAKE UP THE CLEAR SCREEN SEQUENCE ?

You may now enter a number from 1 to 3 that represents the number of characters that are to be sent to the console device to perform a CLEAR SCREEN function. The following prompt will appear:

FIRST NUMBER IN CLEAR SCREEN SEQUENCE (IN HEX) ?

You may now enter the first character in the sequence, in hexadecimal form, as specified in your console manual. You will similarly be prompted for the second and third characters if you have indicated that those characters exist.

3.1.3 The CA Option: Character I/O Assignments

The CA option will allow you to set the physical ports on a Dynabyte computer to any CONSOLE, PRINTER (alias LIST), READER or PUNCH logical device. Up to four ports may be assigned to each of the four types of character I/O devices, but only one CONSOLE, PRINTER, READER or PUNCH may be active at a time. DOS 5 provides internal utilities which allow you to easily transfer control among any of the assigned consoles or printers.

You may also assign any physical port that your system supports to any logical device. We do recommend, however, that you retain the C1 = CPU2 default assignment since the LOAD MAP DISPLAY is programmed for the CPU2 port. We recommend that before starting the DYNASYS program, you plan and keep records on your port assignments.

The menu provided by the CA option displays any default or previously established values. Following is the menu showing the default assignments.

DYNASYS VERSION X.XX - FOR DYNABYTE DOS 5.XX
MP/M 2.1 SYSTEM REGENERATION UTILITY

CHARACTER I/O DEVICE ASSIGNMENTS

CONSOLES	LIST DEVICES	
C1) = CPU2	L1) = CPU1	CPU1 - CPU2 = CPU SERIAL PORTS
C2) =	L2) =	
C3) =	L3) =	CPUP = PARALLEL PORT
C4) =	L4) =	
C5) =	L5) =	OCT1 - OCT16 = OCTAPORT PORTS
C6) =	L6) =	
C7) =	L7) =	
C8) =	L8) =	
C9) =	L9) =	
C10) =	L10) =	
C11) =	L11) =	
C12) =	L12) =	
C13) =	L13) =	
C14) =	L14) =	
C15) =	L15) =	
C16) =	L16) =	

ENTER MENU ITEM TO CHANGE (<RETURN> TO LEAVE AS IS)

Ports CPU1, CPU2, and CPUP are supported by even the smallest system, as they reside on the CPU card in the system. CPU1 and CPU2 are serial ports and CPUP is a parallel port. To use any of the other ports requires that at least one quadraport or octaport board be installed in your system.

Ports OCT1 through OCT4 require one Dynabyte 4-port serial I/O quadraport board. Ports OCT1 through OCT8 require an 8-port serial I/O octaport board. A second octaport board provides eight more ports, OCT9 through OCT16.

Any port can be assigned to any device, as long as the assigned ports are supported by the installation of the appropriate boards. Ports may be assigned in any order and you do not have to assign every available port if you don't want to. For instance, you may choose to use CPU serial port #2 (CPU2) and to ignore CPU serial port #1 (CPU1). The system will then not recognize any input or output from the unused port.

To make a device assignment, enter the code for the logical device you want to assign to a port. For example, to assign OCT1 as Console 2, you would do the following in response to the prompt:

ENTER MENU ITEM TO CHANGE (<RETURN> TO LEAVE AS IS) ? C2<CR>

C2) = ? <RETURN> TO SET TO NULL OCT1<CR>

NOTE: If you only typed a carriage return (the null option), then any port

previously assigned to C2 would be de-assigned and the menu, when displayed, would show no assignment for C2. If, as shown above, you enter OCT1 or any other physical port (in either case followed by a carriage return), then you will be asked for the next logical device assignment (here, C3), and so on through L16, until you press a carriage return in response to the prompt. (You will only be given the null option with the first logical device in the sequence.) When you type a carriage return in response to the device equals question, the device assignment table will be displayed, reflecting any new assignments.

In the above example, after typing OCT1 and a carriage return,

C3 = ?

would appear on the screen. Suppose we wanted to make one other assignment--OCT2 to C3. Then we would enter OCT2 (followed by a carriage return).

C3 = ? OCT2<CR>
C4 = ?

In response to C4 = ?, we would simply press the escape key or a carriage return, and the following table of device assignments would be displayed:

DYNASYS VERSION X.XX - FOR DYNABYTE DOS 5.XX
MP/M 2.1 SYSTEM REGENERATION UTILITY

CHARACTER I/O DEVICE ASSIGNMENTS

CONSOLES	LIST DEVICES	
C1) = CPU2	L1) = CPU1	CPU1 - CPU2 = CPU SERIAL PORTS
C2) = OCT1	L2) =	
C3) = OCT2	L3) =	CPUP = PARALLEL PORT
C4) =	L4) =	
C5) =	L5) =	OCT1 - OCT16 = OCTAPORT PORTS
C6) =	L6) =	
C7) =	L7) =	
C8) =	L8) =	
C9) =	L9) =	
C10) =	L10) =	
C11) =	L11) =	
C12) =	L12) =	
C13) =	L13) =	
C14) =	L14) =	
C15) =	L15) =	
C16) =	L16) =	

ENTER MENU ITEM TO CHANGE (<RETURN> TO LEAVE AS IS)

Note that the new menu display reflects the assignments that were just made. Assignments of the other logical devices may be made in a similar manner.

When you have made all the assignments that you desire to make, enter only a carriage return in response to the above question; if the AL option is in effect, you will move on to the CS option. If the AL option is not in effect, you will return to the DYNASYS main menu.

If in the above example we had continued making character I/O assignments, assigning OCT3 to C4, CPUP to L2, and OCT4 to L3, the table would look like this:

CONSOLES	LIST DEVICES	
C1) = CPU2	L1) = CPU1	CPU1 - CPU2 = CPU SERIAL PORTS
C2) = OCT1	L2) = CPUP	CPUP = PARALLEL PORT
C3) = OCT2	L3) = OCT4	OCT1 - OCT16 = OCTAFORT PORTS
C4) = OCT3	L4) =	
C5) =	L5) =	
C6) =	L6) =	
C7) =	L7) =	
C8) =	L8) =	
C9) =	L9) =	
C10) =	L10) =	
C11) =	L11) =	
C12) =	L12) =	
C13) =	L13) =	
C14) =	L14) =	
C15) =	L15) =	
C16) =	L16) =	

NOTE: You may, as you enter the console assignments, set the console channel to a "network" channel by entering a ",NET" after the console assignment. The network channel may then be used as a communication channel for CP/NET systems with the DOS 5 system functioning as the master in the network. Consult a CP/NET manual for more information on network channels. For example, to enter OCT2 as a network channel in our example above, we would enter:

C3 = ? OCT2,NET<CR>

3.1.4 The CS Option: Character I/O Setup

The CS option is used to set up parameters for the CPUIO module: the power supply line frequency, baud rates, and stop bits.

The CS menu displaying the default values is shown below:

DYNASYS VERSION X.XX - FOR DYNABYTE DOS 5.XX
MP/M 2.1 SYSTEM REGENERATION UTILITY

CHARACTER I/O SETUP

| B1)	CPU1 BAUD RATE	= 9600	|
| B2)	CPU2 BAUD RATE	= 9600	|
| S1)	CPU1 STOP BITS	= 2	|
| S2)	CPU2 STOP BITS	= 2	|
| LF)	LINE FREQUENCY	= 60	|

ENTER MENU ITEM TO CHANGE (<RETURN> TO LEAVE AS IS) ?

We recommend that you always use 2 stop bits for CPU1 and CPU2. If the receiving terminal is configured for only 1 stop bit, then using 2 will still permit communication with the device. If, however, you assign 1 and a device is configured for 2, then you will not be able to communicate. Therefore, you will typically just type a carriage return in response to the stop bit query.

Line frequency is the line frequency of the power supply. This varies from country to country. 60 Hertz is standard in the U.S. If you are operating your Dynabyte computer in another country, you should check what power supply line frequency is used in that country.

Suppose we want the CPU2 baud rate equal to 1200 and we want a line frequency of 50 Hertz. We would enter "B2" in response to the prompt.

ENTER MENU ITEM TO CHANGE (<RETURN> TO LEAVE AS IS) ? **B2**

The following would display and we would enter "1200."

BAUD RATE = 110 150 300 1200 2400 4800 9600 19200 38400 76800

B2) ENTER CPU2 BAUD RATE (SEE TABLE ABOVE) ? **1200**

Upon entering a carriage return, the following would be displayed

S1) ENTER CPU1 STOP BITS (1 or 2) ?

Since we don't want to change the number of stop bits, we would enter a return and this would get us back to character I/O setup menu. We would then select the LF option, entering 50 for LF when asked. The final display of the character I/O setup menu would then appear like this:

| B1)	CPU1 BAUD RATE	= 9600	|
| B2)	CPU2 BAUD RATE	= 1200	|
| S1)	CPU1 STOP BITS	= 2	|
| S2)	CPU2 STOP BITS	= 2	|
| LF)	LINE FREQUENCY	= 50	|

NOTE: In the above example, if we had wanted to change the value of S2, we could have done so. Sequencing through the parameters occurs until a carriage return is entered, at which point the character I/O setup menu is displayed.

3.1.5 The DA Option: Disk Drive Assignments

The DA option allows you to assign each of the 16 logical disk drives that may be connected to the system. Depending on your system, you may choose from any floppy disk drive (5.25" or 8") or any of the following Winchester systems:

Mini Winchester (6, 10, 12, 16, or 19 megabytes)
 Fujitsu Winchester (11 or 23 megabytes)
 Micropolis Winchester (9, 27, 94 45 megabytes)

DYNASYS VERSION X.XX - FOR DYNABYTE DOS 5.XX
 MP/M 2.1 SYSTEM REGENERATION UTILITY

LOGICAL DISK DRIVE ASSIGNMENTS

LOGICAL DISKS

A: = F1	F1 - F4 = FLOPPY DISK DRIVES
B: = F2	
C: = F3	MINI1 - MINI8 = 5 1/4" WINCHESTER LOGICAL DRIVES
D: = F4	
E: = MINI1	FUJ1 - FUJ8 = FUJITSU WINCHESTER LOGICAL DRIVES
F: = MINI2	
G: = FUJ1	MW1 - MW5 = MICROPOLIS WINCHESTER DRIVES
H: = FUJ2	
I: =	
J: =	
K: =	
L: =	
M: =	
N: =	
O: =	
P: =	

DRIVE TO CHANGE A - P (<RETURN> TO LEAVE AS IS) ?

To assign a physical drive to a logical drive, type in response to the above prompt the letter of the logical drive you want to assign. For example, if you want to assign drive I to the Micropolis Winchester drive MW1, enter I in response to the above question. The following will then be displayed:

I: = ? <RETURN> TO SET TO NULL

Enter MW1 (and a carriage return). You will then be prompted to enter J:

J: = ?

Enter a carriage return only and the assignment table will be displayed, showing your new entry.

A: = F1
B: = F2
C: = F3
D: = F4
E: = MINI1
F: = MINI2
G: = FUJ1
H: = FUJ2
I: = MW1
J: =
K: =
L: =
M: =
N: =
O: =
P: =

NOTE: If you had wanted to make other entries beginning at J, you could have done so. Automatic sequencing through the logical drives occurs until you type only a carriage return in response to the prompt for a drive assignment (at which point the current assignments are displayed). Note also that the null option only applies to the first item in a sequence.

In response to the logical drive prompt, you may enter any of the following mnemonics that apply to your system:

F1	FUJ1	FUJ5	MW1	MINI1	MINI5
F2	FUJ2	FUJ6	MW2	MINI2	MINI6
F3	FUJ3	FUJ7	MW3	MINI3	MINI7
F4	FUJ4	FUJ8	MW4	MINI4	MINI8
			MW5		

3.1.5.1 Floppy Drives

F1 through F4 are the four floppy disk drives that can be connected to your system. F1 will always be the floppy disk on which you boot the system. If you have one, F2 will always be the floppy drive next to F1. F3 and F4 will be the second set of drives if your system has them. If booting from a hard disk, F1 will be the 8" floppy drive. If there isn't an 8" floppy drive on the system, then F1 will be the 5.25" floppy drive. See Section 5.1 for more information on configuring floppy drives.

3.1.5.2 Fujitsu Winchester Drives

The Fujitsu Winchester system is available in two sizes — 11 megabytes and 23 megabytes.

The Fujitsu system can be configured by the user in one of three different ways:

11 MEGABYTE FUJITSU

Configuration A	Configuration B	Configuration C
FUJ1 - 8.3 MB	FUJ1 - 4.7 MB	FUJ1 2.3 MB
FUJ2 - 1.2 MB	FUJ2 - 4.7 MB	FUJ2 2.3 MB
		FUJ3 2.3 MB
		FUJ4 2.3 MB

23 MEGABYTE FUJITSU

Configuration A	Configuration B	Configuration C
FUJ1 - 8.3 MB	FUJ1 - 4.7 MB	FUJ1 2.3 MB
FUJ2 - 1.2 MB	FUJ2 - 4.7 MB	FUJ2 2.3 MB
FUJ3 - 8.3 MB	FUJ3 - 4.7 MB	FUJ3 2.3 MB
FUJ4 - 1.2 MB	FUJ4 - 4.7 MB	FUJ4 2.3 MB
		FUJ5 2.3 MB
		FUJ6 2.3 MB
		FUJ7 2.3 MB
		FUJ8 2.3 MB

Note that with the 23 megabyte Fujitsu drive, you have exactly twice the number of available logical drives than with the 11 megabyte. Which configuration you choose depends largely on the type and size of your applications. Read the discussion on FUJFMT in Section 5.4.2 for more information.

If you assign at least one Fujitsu logical drive to your system, DYNASYS will automatically invoke the next main menu option -- DS -- which will ask the size of your Fujitsu unit (i.e., 11 or 23 megabytes).

The configuration is set at the time you format the Fujitsu system with the FUJFMT utility program. See Section 5.3.2 for more information about FUJFMT.

3.1.5.3 Mini (5.25") Winchester Drives

5.25" Winchester drives (Mini Winchesters) are available in five sizes: 6MB, 10MB, 12MB, 16MB, or 19MB of unformatted storage. Drives are formatted at the factory, but we strongly recommend reformatting them. WINFMT5 will automatically determine which size Mini Winchester you have and will display the available options for your drive. The following table summarizes the logical drives, their sizes, the possible configurations, and the maximum number of directory entries (DIR) allowed for each configuration.

6 MB MINI WINCHESTER

Configuration A	Configuration B
MINI1 - 4.9 MB	MINI1 - 2.48 MB MINI2 - 2.48 MB

10 MB MINI WINCHESTER

Configuration A	Configuration B	Configuration C
MINI1 - 8.3 MB	MINI1 - 4.2 MB MINI2 - 4.2 MB	MINI1 - 2.1 MB MINI2 - 2.1 MB MINI3 - 2.1 MB MINI4 - 2.1 MB

12 MB MINI WINCHESTER

Configuration A	Configuration B	Configuration C
MINI1 - 8.33 MB MINI2 - 1.96 MB	MINI1 - 5.14 MB MINI2 - 5.14 MB	MINI1 - 2.57 MB MINI2 - 2.57 MB MINI3 - 2.57 MB MINI4 - 2.57 MB

16 MB MINI WINCHESTER

Configuration A	Configuration B	Configuration C
MINI1 - 8.33 MB MINI2 - 4.49 MB	MINI1 - 6.4 MB MINI2 - 6.4 MB	MINI1 - 3.2 MB MINI2 - 3.2 MB MINI3 - 3.2 MB MINI4 - 3.2 MB

19 MB MINI WINCHESTER

Configuration A	Configuration B	Configuration C
MINI1 - 8.33 MB MINI2 - 7.11 MB	MINI1 - 7.22 MB MINI2 - 7.22 MB	MINI1 - 3.86 MB MINI2 - 3.86 MB MINI3 - 3.86 MB MINI4 - 3.86 MB

Your configuration choice will depend largely on the type and size of your applications.

3.1.5.4 Micropolis Winchester Drives

Dynabyte's Micropolis Winchester system is available in three different sizes — 9, 27, and 45 megabytes.

The 9-megabyte system contains one disk and uses only one surface for data storage. The 27-megabyte system contains two disks and uses only three surfaces for data storage. The 45-megabyte system contains three disks and uses five surfaces for data storage.

Each surface represents one drive in a Micropolis system. The mnemonics MW1-MW5 are used to represent these drives. For a 9-megabyte system, only MW1 is used; for a 27-megabyte system, MW1-MW3 are used; and for a 45-megabyte system, MW1-MW5 are used.

A Micropolis Winchester system is formatted with the WFORMAT utility program. For information about how to run this program, see Section 5.2.2.

3.1.6 The LS Option: Load / Save Parameter File

The LS option allows you to save, as a file on the disk, all of the parameters you have specified in the current DYNASYS program. This disk file can be reconfigured at a later time to any other values, including the default ones. Alternately, LS allows you to load a previously created disk file from which the parameters for the current DYNASYS program are to be taken. The LS option also allows you to clear all parameters to empty values.

We recommend using LS to save your parameters in a file so that the file can be later recalled with DYNASYS and the values easily reset. Saving your parameter file with LS saves you from having to reset all the DYNASYS parameters when there are, perhaps, only a few parameters that you want to change.

An LS menu that is called up by a previous AL option will be displayed after, not before, the DC option (contrary to the sequence of options listed in the main menu display). This allows you to check your parameter values before you save them.

DYNASYS VERSION X.XX - FOR DYNABYTE DOS 5.XX
MP/M 2.1 SYSTEM REGENERATION UTILITY

LOAD / SAVE PARAMETER FILE

```
| LP) LOAD PARAMETER AREA FROM A FILE |  
| SP) SAVE PARAMETER AREA TO A FILE  |  
| CP) CLEAR PARAMETER AREA           |
```

ENTER MENU ITEM (ENTER RETURN TO EXIT TO MAIN MENU) ?

Below are shown the 3 possible responses to the LS menu (i.e., LP, SP, and CP) and the subsequent queries from DYNASYS.

3.1.6.1 The Load (LP) Option

As you can see in the following example, typing a nonexistent file name to the LP option (LOAD PARAMETER AREA FROM A FILE) generates an error message. The named file must have been previously created with DYNASYS. Notice that DYNASYS does find and accept the file named PARAMTR.SYS (previously created with DYNASYS).

Example

ENTER MENU ITEM (ENTER RETURN TO EXIT TO MAIN MENU) ? LP

FILENAME: ? WINDM.UP

A:WINDM .UP FILE NOT FOUND

FILENAME: ? PARAMR.SYS

DYNASYS VERSION X.XX - FOR DYNABYTE DOS 5.XX
MP/M 2.0 SYSTEM REGENERATION UTILITY

LOAD / SAVE PARAMETER FILE

| LP)	LOAD PARAMETER AREA FROM A FILE	|
| SP)	SAVE PARAMETER AREA TO A FILE	|
| CP)	CLEAR PARAMETER AREA	|

ENTER MENU ITEM (ENTER RETURN TO EXIT TO MAIN MENU) ?

Note that DYNASYS gives you another opportunity to use the LS option after completing one of its branches. The LS menu is again displayed, offering the three LOAD/SAVE choices.

3.1.6.2 The Save (SP) Option

The name of the file that you designate to receive the DYNASYS parameters need not exist prior to using the SP option (SAVE PARAMETER AREA TO A FILE). DYNASYS will create a new file with the name you give it at the FILENAME: ? prompt. This file will contain the values you've specified (and the values you've left unchanged) in the current DYNASYS program.

Example

ENTER MENU ITEM (ENTER RETURN TO EXIT TO MAIN MENU) ? SP

FILENAME: ? VALUES.SAV

DYNASYS VERSION X.XX - FOR DYNABYTE DOS 5.XX
MP/M 2.1 SYSTEM REGENERATION UTILITY

LOAD / SAVE PARAMETER FILE

| LP)	LOAD PARAMETER AREA FROM A FILE	|
| SP)	SAVE PARAMETER AREA TO A FILE	|
| CP)	CLEAR PARAMETER AREA	|

ENTER MENU ITEM (ENTER RETURN TO EXIT TO MAIN MENU) ?

Again, DYNASYS gives you the opportunity to use the LS option after completing one of its branches.

3.1.6.3 The Clear (CP) Option

CP (CLEAR PARAMETER AREA) allows you to clear all parameters, including the default ones, to empty values. CP will leave NO assignments in the following areas: Character I/O; Disk Drives; Modules Included; and Warm Logon Drive. This option is useful if you want to change the values of many DYNASYS parameters; CP would save you having to individually clear all existing values.

Note that CP protects you from inadvertently clearing values by issuing a warning. CP executes only if a "Y" is typed in response to its query. Typing either "Y" or "N" puts you back at the LS menu.

Example

ENTER MENU ITEM (ENTER RETURN TO EXIT TO MAIN MENU) ? CP

*** WARNING ***

THIS OPTION WILL RESET ALL PARAMETERS TO BLANKS,
AND DESTROY ANY PARAMETERS ALREADY ENTERED.

VERIFY CLEAR ALL PARAMETERS (Y-YES/N-NO) ? Y

3.1.7 The DC Option: Display Current Configuration

On a single screen, 80 by 24 characters in size, the DC option summarizes all of the DYNASYS parameters and their current values. At this point, you can verify that the parameters you have entered during the current DYNASYS program reflect your wishes. If you want to change any values, you may simply recall the previous menu branches by entering the appropriate two-letter combination.

The following initial DC display summarizes all the default DYNASYS parameters.

DYNASYS VERSION X.XX - FOR DYNABYTE DOS 5.XX

MP/M 2.1 SYSTEM REGENERATION UTILITY

***** DYNABYTE DOS 5 STATUS UTILITY *****

CONSOLE ASSIGNMENT	PRINTER ASSIGNMENT	DISK DRIVE ASSIGNMENT	MEMORY SEGMENTS # BASE SIZE ATIR BANK
0= CPU2	0= CPU1	A:=F1	0= 80 - 80 - 80 - 00
1=	1=	B:=F2	1= 00 - 80 - 00 - 00
2=	2=	C:=F3	
3=	3=	D:=F4	
4=	4=	E:=MINI1	
5=	5=	F:=MINI2	
6=	6=	G:=FUJ1	
7=	7=	H:=FUJ2	
8=	8=	I:=	
9=	9=	J:=	
A=	A=	K:=	CPU1 = 9600 BAUD
B=	B=	L:=	CPU2 = 9600 BAUD
C=	C=	M:=	LINE FREQUENCY= 60 HERTZ
D=	D=	N:=	# OF CONSOLES = 1
E=	E=	O:=	# OF DISKS = 8
F=	F=	P:=	

3.1.8 The CD Option: Create System Disk

You can create a system disk with the CD option in one of two ways. You can create a system disk which incorporates the parameters you've specified during the current DYNASYS program, or you can copy the boot portion, including all of its DYNASYS parameters, from one disk to another. The CD option will ask for the source disk drive that contains all of the modules needed to create a system. You are also asked to name the destination drive that contains the disk designated to be a system disk. The new system disk can then be used to boot DOS 5 into the computer with the parameters set by the DYNASYS program.

Typing CD will invoke the following menu:

DYNASYS VERSION X.XX - FOR DYNABYTE DOS 5.XX
MP/M 2.1 SYSTEM REGENERATION UTILITY

CREATE SYSTEM DISK

| WR)	| WRITE SYSTEM TO DISK	|
| TR)	| TRANSFER SYSTEM FROM ONE DISK TO ANOTHER	|
| EX)	| EXIT TO MAIN MENU	|

YOUR SELECTION ?

Below are shown the three possible responses to the CD menu and the subsequent responses from DYNASYS.

3.1.8.1 The Write (WR) Option

Use the WR option when either the source or destination disk drive is a hard disk. To run the WR option, you must have one of the following files on the system file disk (disk A in the example below):

- BXIOS1 - system with only floppy disks
- BXIOS2 - system with a Mini Winchester drive
- BXIOS3 - system with an 11MB Fujitsu drive
- BXIOS4 - system with a 23MB Fujitsu drive
- BXIOS5 - system with a Micropolis Winchester drive
- BXIOS6 - system with a Mini Winchester drive and an 11MB Fujitsu drive
- BXIOS7 - system with a Mini Winchester drive and a 23MB Fujitsu drive
- BXIOS8 - system with a Mini Winchester drive and a Micropolis
- BXIOS9 - system with a Micropolis Winchester drive and an 11MB Fujitsu
Winchester drive
- BXIOS10 - system with a Micropolis Winchester drive and a 23MB Fujitsu
Winchester drive

Note: Any of the systems mentioned above may contain floppy disks.

Depending on the type of disk to which you are writing the system (disk B in the example below), you must have one of the following files on your system file disk:

FLY2LDR.COM - if you are writing to a floppy disk
MINI2LDR.COM - if you are writing to a Mini Winchester drive
FUJ2LDR.COM - if you are writing to a Fujitsu Winchester drive
MW2LDR.COM - if you are writing to a Micropolis Winchester drive

If WR tells you that a required file is missing, copy (PIP) that file onto the source disk drive from the original distribution media. Then the WR option will execute successfully.

The following interaction shows how to use the WR option.

YOUR SELECTION ? **WR**

(WR) SYSTEM FILES LOCATED ON DISK DRIVE (AP) ? **A**

This is only an example. You could have answered with any of the logical drives A-P that contain the appropriate files.

WRITE SYSTEM TO DISK DRIVE (AP) ? **B**

The destination drive must be a logical drive from which you can boot.

DO YOU WANT TO ACCEPT ALL THE DEFAULT PARAMETERS IN GENSYS (Y/N) ? **N**

GENSYS is the MP/M II system generation program. If you answer Y for yes to this question, you will accept all the default parameters set up in GENSYS. If you answer N for no, then you will have the opportunity shortly to specify these parameters yourself.

PLEASE PLACE PROPER DISKS IN DRIVES, THEN PRESS <RETURN> TO CONTINUE.

If logical drive is a Mini Winchester system, then the following message appears.

PLEASE WAIT. WRITING SYSTEM TO MINI WINCHESTER DRIVE A.

The GENSYS program now begins execution. If you answered "N" to the prompt DO YOU WANT TO ACCEPT ALL THE DEFAULT PARAMETERS IN GENSYS, then you will be asked a number of questions. See the MP/M II System Guide for information on how to answer these

questions, but note the following:

1. The TOP PAGE OF OPERATING SYSTEM question should always be answered "FF" for your Dynabyte computer (or with a carriage return if "FF" is listed as the default value).
2. The BREAKPOINT question should always be answered "7".
3. ADD SYSTEM CALL USER STACKS should be answered yes.
4. Z80 CPU should be answered yes.
5. TICKS/SECOND should be #60.
6. BANK SWITCHED MEMORY should be yes.
7. COMMON MEMORY BASE PAGE should be "C0".

The final question that GENSYs will ask you concerns memory segments. You can describe up to seven segments. For each you must enter the base, the size, the attribute, and the bank number. For more information about memory segments, see the section in this manual called MEMORY CONFIGURATIONS. You may also consult Appendix A which summarizes the correct DYNASYS responses for systems with varying numbers of memory boards. After you have entered all of your memory segments, they will be displayed for you and you can accept them or not. If you accept them, the following will be displayed on the screen:

**** GENSYs DONE ****

PRESS <RETURN> TO DISPLAY MENU.

Press the carriage return and the original CD option menu will be displayed.

3.1.8.2 The Transfer (TR) Option

Use the TR option when both the source and destination drives are floppy disk drives.

ENTER MENU ITEM (RETURN TO EXIT TO MAIN MENU) ? TR

(TR) TRANSFER SYSTEM FROM DISK DRIVE (A-P) ? A

TO DISK DRIVE (A-P) ? B

PLEASE PLACE PROPER DISKS IN DRIVES, THEN PRESS <RETURN> TO CONTINUE.

NOW TRANSFERRING SYSTEM. PLEASE WAIT.

PRESS <RETURN> TO DISPLAY MENU.

Note that "A" and "B" above are just used in this example. You can enter any available logical drives in answer to the two drive questions.

A final carriage return will put you at the CD menu.

Entering an EX will get you back to the main DYNASYS menu.

3.1.9 The EX Option: Exit to Operating System

When you are finished running DYNASYS, the EX option returns you to the operating system. If you have changed any parameters without saving them with either the CD or LS option, you will be asked if you intentionally want to exit without saving the parameters.

You will receive one of the following messages upon typing EX and a carriage return.

- 1) If you have NOT saved your changes using either the CD or LS option:

DYNASYS VERSION X.XX - FOR DYNABYTE DOS 5.XX
MP/M 2.1 SYSTEM REGENERATION UTILITY

YOU HAVE NOT SAVED YOUR LATEST CHANGES. ARE YOU SURE YOU WANT TO EXIT
WITHOUT SAVING THESE CHANGES (Y=YES, N=NO) ?

Typing "Y" will display the following message and will exit DYNASYS:

DYNASYS VERSION X.XX - FOR DYNABYTE DOS 5.XX
MP/M 2.1 SYSTEM REGENERATION UTILITY

DYNASYS COMPLETE

Typing "N" will return you to the main DYNASYS menu.

2) If you have saved your changes using either the CD or LS option:

**DYNASYS VERSION X.XX - FOR DYNABYTE DOS 5
CP/M 2.2 SYSTEM REGENERATION UTILITY**

DYNASYS COMPLETE

3.2 DYNAGEN

The DYNAGEN utility creates a boot disk, or system disk, by copying the DOS 5 loader and all booting files from one disk to another.

The outer tracks of a system disk contain the loader, which is a start-up program. When DOS 5 is booted, the computer reads this loader off the system disk, stores it into the RAM memory of the computer, and then begins executing it. When the loader executes, it reads booting files off the disk and loads DOS 5. To boot DOS 5, therefore, you must have the loader on the outer tracks of the system disk, and the disk must contain the related boot files.

DYNAGEN can be used to copy the boot data from the original distribution disk or any system disk that you have created, so long as the source disk contains the loader and the file MPM.SYS.

The DYNAGEN utility allows you to transfer the boot information from any disk onto any other disk. This can even be from an 8" disk onto a 5.25" disk, from floppy to hard disk, or from hard disk to floppy. This transfer must be performed to create a DOS 5 system disk that is going to be used to boot the system.

In addition, if you are copying from floppy to hard disk or hard disk to floppy disk, you need the loader files that correspond to the destination disk. These loader files are listed in Section 3.2.2, THE CT OPTION.

The destination disk must be formatted before you run DYNAGEN. This can be accomplished using the various utility programs described in Section 5.

DYNAGEN should always be run off-line. This means that there should be no other users on the system. A good way to ensure this is to boot the system with a disk configured for only one terminal. You can then run DYNAGEN from this single terminal and be assured that no other user will interfere. DYNAGEN will run while other users are on-line, but erratic performance may result.

After you have run DYNAGEN, other files you need may be copied to the same destination disk with PIP.

You access DYNAGEN by typing DYNAGEN at the system level prompt:

E>DYNAGEN<CR>

DYNAGEN presents three menu choices:

- TR - to copy a system from floppy disk to floppy disk
- CT - to copy a system from floppy disk to hard disk, or
hard disk to floppy disk
- EX - to return to the operating system

3.2.1 The TR Option (Floppy to Floppy)

If you want to copy a system from one floppy to another, you respond with the option TR. You can copy between like-size drives (8" to 8" or 5.25" to 5.25") or between different size floppies (8" to 5.25" or 5.25" to 8"). In the TR mode, DYNAGEN first copies the outer two tracks (the loader) to the destination. It then copies MPM.SYS. When it is done, it asks you to return to the menu display, at which point you can exit to the operating system or run the program again.

You do not have to be logged onto the drive from which you are copying. In the following example, the user is logged onto drive E. The copy is done from one floppy disk drive (in this case A) to another floppy disk drive (B).

E>DYNAGEN<CR>

***** DYNAGEN VERSION X.X FOR DYNABYTE DOS 5.XX *****

GENERATE SYSTEM DISK

```

| TR) TRANSFER SYSTEM FROM ONE DISK TO ANOTHER |
| CT) TRANSFER SYSTEM USING ".COM" BOOT FILE   |
| EX) EXIT DYNAGEN                             |

```

YOUR SELECTION ? TR<CR>

(TR) TRANSFER SYSTEM FROM DISK DRIVE (A-P) ? A<CR>

TO DISK DRIVE (A-P) ? B<CR>

PLEASE PLACE PROPER DISKS IN DRIVES, THEN PRESS RETURN TO CONTINUE. <CR>

PLEASE WAIT. WRITING SYSTEM TO FLOPPY DRIVE B.

PRESS RETURN TO DISPLAY MENU.

3.2.2 The CT Option (Hard Disk to Floppy or Floppy to Hard Disk)

The procedure for copying between unlike disks is different in only one respect. Since the loader on floppy disks is on the two outer tracks and the loader on hard disks resides on the one outer track, a direct copy of the loader from one to the other is not possible. DYNAGEN, therefore, picks up the loader information from one of five loader files. The information in

these files is identical to the information in a loader, but it is stored in a file rather than the outer tracks. There are five different loader files, corresponding to the five types of disks available on a Dynabyte computer system:

FPY2LDR.COM	Floppy disk loader, both 8" and 5.25"
FUJ2LDR.COM	Fujitsu hard disk loader
MINI2LDR.COM	Mini Winchester loader
MW2LDR.COM	Micropolis Winchester loader

You must have the appropriate loader file on your source disk to run DYNAGEN with the CT option.

To copy from hard disk to floppy or floppy disk to hard, you must use the CT option, since this option uses the loader file instead of the loader itself. DYNAGEN checks the destination disk, determines which kind of disk it is, and copies the appropriate loader file onto the outer track (or tracks). In the following example, the user is logged onto drive E, and is copying from hard disk drive B to floppy disk drive A.

E>DYNAGEN<CR>

***** DYNAGEN VERSION X.X FOR DYNABYTE DOS 5.XX *****

GENERATE SYSTEM DISK

|	TR)	TRANSFER SYSTEM FROM ONE DISK TO ANOTHER	|
|	CT)	TRANSFER SYSTEM USING ".COM" BOOT FILE	|
|	EX)	EXIT DYNAGEN	|

YOUR SELECTION ? CT<CR>

(CT) SYSTEM FILES LOCATED ON DISK DRIVE (A-P) ? B<CR>

WRITE SYSTEM TO DISK DRIVE (A-P) ? A<CR>

PLEASE PLACE PROPER DISKS IN DRIVES, THEN PRESS RETURN TO CONTINUE. <CR>

PLEASE WAIT. WRITING SYSTEM TO FLOPPY DRIVE A.

PRESS RETURN TO DISPLAY MENU.

3.3 Memory Configurations

DOS 5 can address up to 400K of RAM memory. There are two ways to refer to this RAM memory. One is by the physical configuration; the other is by the logical definition. This section will explain both ways and give examples for configuring your memory boards in a DOS 5 system.

First we should explain about RAM memory in a Dynabyte computer. Any 280

computer can only address 64K of memory at one time. This is a very limiting amount of memory in a multi-user system. To get around this problem, Dynabyte uses a bank switching scheme to bank in and out more memory than 64K. It does this banking by writing to an I/O port (ports 40 and 41 hex) to tell the memory boards which bank should be on and which banks should be off. In this way, the operating system can bank in and out the appropriate segments as each user is given CPU time to run programs.

DOS 5 can address up to 400K of memory, the maximum amount that can be used. You may have as little as 64K. For discussion in this section we will refer to the maximum system of 400K.

The 400K in a DOS 5 system is organized as:

BANK 0 (64K)	= 16K = COMMON MEMORY FOR THE OPERATING SYSTEM
	16K = BANKED MEMORY FOR THE OPERATING SYSTEM
	32K = USER MEMORY
BANK 1 (48K)	= 48K = USER MEMORY
BANK 2 (48K)	= 48K = USER MEMORY
BANK 3 (48K)	= 48K = USER MEMORY
BANK 4 (48K)	= 48K = USER MEMORY
BANK 5 (48K)	= 48K = USER MEMORY
BANK 6 (48K)	= 48K = USER MEMORY
BANK 7 (48K)	= 48K = USER MEMORY
<hr/>	
	400K = TOTAL MEMORY

The 400K is actually accessed as 8 banks numbered 0 through 7. The operating system takes the upper 32K in bank 0. The bottom 32K of bank 0 is user memory. You may have up to 48K in each bank 1-7.

To better understand this organization, study the memory map on the next page. Look at each bank individually and try to understand what is contained in each of the banks.

DOS 5 views the memory as a series of 16K blocks or pieces. There can be up to 25 of these 16K blocks. Bank 0 contains up to 4 blocks and the other seven banks contain up to 3 blocks.

DOS 5 SYSTEM MEMORY MAP

	BANK 0	BANK 1	BANK 2	BANK 3	BANK 4	BANK 5	BANK 6	BANK 7
FFFF		....	....	....	....	....	....	....
C000	SYSTEM 16 K	....	....	....	....	....	....	....
BFFF	BANKED SYSTEM 16 K	16 K	16 K	16 K	16 K	16 K	16 K	16 K
8000								
7FFF	16 K	16 K	16 K	16 K	16 K	16 K	16 K	16 K
4000								
3FFF	16 K	16 K	16 K	16 K	16 K	16 K	16 K	16 K
0								

DOS 5 PORT AND BIT SETTINGS

	BANK 0	BANK 1	BANK 2	BANK 3	BANK 4	BANK 5	BANK 6	BANK 7
FFFF		....	....	....	....	....	....	....
C000	40/0	....	....	....	....	....	....	....
BFFF	40/1	40/3	40/4	40/5	40/6	40/7	41/0	41/1
8000								
7FFF	40/1	40/3	40/4	40/5	40/6	40/7	41/0	41/1
4000								
3FFF	40/1	40/2 or 40/3	40/4	40/5	40/6	40/7	41/0	41/1
0								

Let's look at each bank individually and describe what each contains. Look at the map and study the first column of blocks. This is bank 0. It can contain up to 4 blocks or 64K of memory. You MUST have the top 32K of memory in this block. This is the portion of memory in which the DOS 5 operating system resides.

The operating system is actually divided into two distinct parts. One part is simply called the SYSTEM. This portion resides in what we call common memory. This means that this 16K of memory MUST always be selected in the system. It can NEVER be deselected! This can be accomplished by using, as the top 16K of bank 0, a memory board that is not bank-switched. Then, this 16K will never be deselected. If you do not have a 16K board to devote to the top of bank 0, then you may use a banked piece of 16K memory. This piece can come from any memory board in your system. You should set up this piece for port 40 hex and bit position 0. (We'll talk more about the actual port and bit settings a little later.)

Since this top 16K of bank 0 must always be selected, then no other bank can contain a top 16K. Only bank 0 can contain a top 16K block! When one of the other banks is selected, DOS 5 will turn-on the three bottom pieces of that particular bank and also select the top piece of bank 0.

The second portion of the operating system is called the BANKED SYSTEM. This portion is also 16K in size. However, this part of the operating system is different from the one above. This portion can be bank-switched in and out. It does not have to be in common memory. This allows a user program in some other bank to use up to 3 pieces of memory in its bank and then, when it calls the operating system, DOS 5 switches on the banked portion of the operating system and executes the routines to handle the call. If this portion of the operating system were not bank-switched and had to be in common memory, then each of the other banks could only be 32K in size (2 pieces). This is the case when you use 32K user memory segments with DOS 5 (Mode 2). The modes that a user may configure will be discussed a little later in this section. This BANKEDSYSTEM allows the other seven banks to be up to 48K in size (3 pieces).

So, now you can see that the top 32K of bank 0 (piece 3 and piece 4) are used by the operating system. The top piece is common memory and the piece below it is banked memory. You may then fill out the rest of bank 0 with up to 32K of user memory. You do not have to put any memory in the bottom 32K of bank 0. However, if you do not put at least the bottom piece in bank 0, then you must follow certain rules.

Piece 1 of bank 1 has two different switch settings. The setting you use will depend on whether or not you have a piece 1 in bank 0. If you do have a piece 1 bank 0, then you must use bit 3 for piece 1 bank 1. If you DO NOT have a piece 1 bank 0, then you must use bit 2 for piece 1 bank 1. The bottom piece of bank 1 will still function properly for bank 1 with either switch setting. The reason for the dual setting is to provide bank 0 with a bottom piece of memory when the banked portion of the operating system is used. This bottom piece is where all of the interrupt vectors are placed. Every bank that is used MUST have a bottom piece to provide these interrupt vectors. Thus, when bank 0 is selected to get to the BANKED SYSTEM it must have a bottom piece. If you do not have a bottom piece to bank 0, then you must use the bottom piece of bank 1. This bottom piece of bank 1 will be selected when either

bank 1 or bank 0 is selected. But, if you use a bottom piece in bank 0, then you must shut off this mechanism or there will be a memory conflict between these two pieces.

If you do not have a piece 1 of bank 0, then you must also describe a fictitious memory segment descriptor to DYNASYS to tell it where the BANKED SYSTEM is (bank 0). This fictitious descriptor will be explained later, when we talk about the logical definition of memory in a DOS 5 system.

So, you can see that bank 0 is a very special bank in DOS 5. The upper 32K is used to house the operating system in two portions. The bottom 32K can be used for user memory or simply left out of the system.

Now let's look at bank 1. This bank may contain up to 48K of user memory. It can NEVER have a top piece! If bank 1 contains any memory at all, then that memory MUST start from the bottom and work up. In other words, you could never have piece 2 of bank 1 without also having a piece 1! Once again, this is because the interrupt vectors are contained in the bottom piece of every bank that is used, so there must always be a bottom piece in any bank that you install memory.

Bank 1 has one special restriction. The bottom piece of bank 1 (piece 1) has two different switch settings depending on the condition of piece 1 of bank 0 as explained above.

All other banks (2-7) can also have up to 48K of user memory. They must NEVER have a top piece, and, if they have any memory at all, they must also have a bottom piece.

Now let's talk about the actual port and bit switch settings for all of the blocks in a DOS 5 system. If you look at the second map labeled DOS 5 PORT AND BIT SETTINGS, you can see the port and bit values for each block of memory that can be used in a DOS 5 system. There is a block in this second map for each block in the map above it. Inside each block is the port and bit value for selection of that block by the operating system. Each 16K block of memory in a bank-switched system MUST be configured for a specific I/O port and a specific bit value setting within that port. Below are the mnemonics printed inside each of the blocks on the second map and what each means:

40/0 =	PORT 40 HEX / BIT POSITION 0
40/1 =	PORT 40 HEX / BIT POSITION 1
40/2 =	PORT 40 HEX / BIT POSITION 2
40/3 =	PORT 40 HEX / BIT POSITION 3
40/4 =	PORT 40 HEX / BIT POSITION 4
40/5 =	PORT 40 HEX / BIT POSITION 5
40/6 =	PORT 40 HEX / BIT POSITION 6
40/7 =	PORT 40 HEX / BIT POSITION 7
41/0 =	PORT 41 HEX / BIT POSITION 0
41/1 =	PORT 41 HEX / BIT POSITION 1

Every memory board that can be bank-switched in a Dynabyte computer needs three values to be defined. One of these values is the port number used to communicate with the operating system. This is an I/O port. We have reserved ports 40 and 41 hex for use by bank-switched memory boards in a DOS 5 system. This port value can usually be set by a switch block on the memory board, and

there is usually only one port value to assign for the entire board, even if the board contains up to 4 separate pieces (64K).

Because a port value is fixed for an entire board, each piece on a board MUST have the same port value. This prevents you, for instance, from assigning three pieces on one board to bank 5 and the fourth piece to bank 6, since this would require the board to have two different port addresses. Please keep this restriction in mind whenever you cross the bank 5/bank 6 boundary line.

The second value that every memory board in a DOS 5 system must have is the bit position within the I/O port. There are 8 bit positions in each port (0-7). Each bit position is usually set up to select one bank of memory. There are a couple of exceptions (bank 0 piece 4 and bank 1 piece 1). Thus, each bit position within each port has a specific use:

PORT 40 HEX

BIT POSITION 0 = Used to select "common" memory
1 = Used to select bank 0 and banked system
2 = Used to select a bottom to bank 0 and bank 1
3 = Used to select bank 1
4 = Used to select bank 2
5 = Used to select bank 3
6 = Used to select bank 4
7 = Used to select bank 5

PORT 41 HEX

BIT POSITION 0 = Used to select bank 6
1 = Used to select bank 7

On most memory boards you can select the bit position for each 16K block of memory on the board. A 64K memory board will contain 4 of these blocks. You can put each of these 4 pieces in any of the blocks in a DOS 5 system (as long as you do not cross port value boundaries as described above). Thus, you may have 3 of the 4 pieces as the three pieces in bank 3 and the fourth piece as the bottom 16K of bank 4.

The third value that each memory block needs defined is the piece number of that block. There are four possible piece numbers in a DOS 5 system. These are usually labeled, "0", "4", "8" and "C". These correspond to the hex values of the base of each piece. As mentioned above, any Z80 computer can only address 64K of memory directly. This is equivalent to 4 pieces. Each piece in the system MUST be told which of these 4 possible pieces it is going to be.

There is one more setting that must be made to memory boards in a DOS 5 system. This is the power-on or restart setting. DOS 5 must have 64K selected to boot the operating system. When the computer is first turned on, the memory boards do not know which pieces are to be deselected or selected. Thus, each piece is deselected when the computer is reset or first turned on. You MUST set the appropriate switches on the memory board to tell the board which pieces are to remain selected during this power-on phase of operation. You must have a full 64K of memory selected. This means that you must select 4 pieces of memory to be on. Each of these pieces must be one from the 64K available as mentioned in the paragraph above. One of the pieces must be 0,

the second must be 4, the third must be 8, and the last one must be C. These four pieces can be selected from any bank or any board, but there can only be 4 pieces selected during this power-on phase. You can not have more than four pieces selected.

Now that you understand what each block of memory must be told in order to be installed in a DOS 5 system, we can discuss the physical placement of each block.

First, let's mention that we will be dealing here with bank-switched memories only. If you do not have bank-switched memories in your computer, then you will not have to worry so much about the proper port and bit settings. We will be basing our discussion on the switch settings for a Dynabyte 64K dynamic memory board. If you do not have a Dynabyte 64K dynamic memory board, then you must make the assignments for your board. We will deal here only with the 64K dynamic board from Dynabyte.

To physically put a block of memory at a location in the DOS 5 memory map you must select the proper I/O port setting, the proper bit position setting, and the proper piece value setting. Each of these values has a switch block to set its value.

Let's look at each value that must be set and the switch location and settings for that value.

The first value that must be set is the I/O port value. Usually, the I/O port value has only one setting for the entire board. This means that you may have up to 4 pieces on the board (as in the case of a 64K board), but all 4 pieces must be put on the same I/O port. The I/O port value is set by a switch block located in the middle of the 64K dynamic memory board. The location will be different with memory boards other than the Dynabyte 64K dynamic memory board.

To orient yourself correctly, take the 64K memory board out of the computer. BE SURE TO TURN THE POWER OFF BEFORE REMOVING ANY BOARD FROM THE COMPUTER! Place the memory board in front of you with the components facing up and the 100 pin edge connector facing down or towards you. In this orientation, the regulator heat sinks should be on the lower left hand corner of the board. The ICs on the board are labeled in columns and rows. Each column is numbered from the left to the right as 1 to 18. Each row is labeled from the top to the bottom as A to D. When we refer to a location on the board, we will give the row letter and the column number. For example, location A-1 is in the upper left hand corner and location D-18 is in the lower right hand corner. If this orientation is still not clear to you, then study the silk screen lettering that is printed on the memory board.

The I/O port switch block on the 64K dynamic memory board is located at position C-8. This switch block has 8 switches on it. The switch block is mounted vertically, so the switches run from top to bottom. Each switch corresponds to a bit value for the port:

TOP SWITCH = PORT ADDRESS BIT 0
 NEXT TO TOP SWITCH = PORT ADDRESS BIT 1
 NEXT SWITCH = PORT ADDRESS BIT 2
 NEXT SWITCH = PORT ADDRESS BIT 3
 NEXT SWITCH = PORT ADDRESS BIT 4
 NEXT SWITCH = PORT ADDRESS BIT 5
 NEXT TO BOTTOM SWITCH = PORT ADDRESS BIT 6
 BOTTOM SWITCH = PORT ADDRESS BIT 7

There are ONLY two port values that are supported by DOS 5. These are ports 40 and 41 hex. To find out which port you should use, you must look at the "PORT AND BIT SETTINGS" map. Inside each block is the port value for that block. You must make sure that every block you are using on a board is using the same I/O port value. Any blocks in banks 0-5 will use port 40 hex. Any blocks in banks 6-7 will use port 41 hex.

To set one or the other port value you must set the appropriate switches on the switch block either on or off. These are several types of switches that are used by Dynabyte. Most of the switches are labeled open or closed. Some of the switches may have printing on the side or bottom of the switch block that says on or off. If the switches are labeled open or closed, then the correspondence is:

OPEN = OFF
 CLOSED = ON

To set the correct port value on the port value switch block, you must set each of the switches either ON or OFF.

The exact switch settings are:

	PORT 40 HEX	PORT 41 HEX
BIT 0	ON	OFF
BIT 1	ON	ON
BIT 2	ON	ON
BIT 3	ON	ON
BIT 4	ON	ON
BIT 5	ON	ON
BIT 6	OFF	OFF
BIT 7	ON	ON

Check each of the switches in the switch block and make sure that each switch is firmly set to either on or off according to the chart above.

The next value that must be set on the memory board is the bit position within the I/O port. Each block on the board will have a separate switch block for setting the bit position. This means that you may set any of the blocks on the board to any bit position within the I/O port assigned above. The blocks do not have to be in the same bank of memory and they do not have to be set one right after the other. Each block may be individually assigned to any bit position within the I/O port. This only pertains to the Dynabyte 64K dynamic memory boards. Other boards may not allow this freedom of interchangeability.

The bit position switch blocks are located in column 17 on the 64K dynamic memory board. There should be four of them - one on top of the other. If you do not have a 64K memory board (you may have a 48K board), then you may be missing one of the switch blocks. Remember that the order of the pieces you set up is not important. The top switch block can be piece 0 or piece C in the system. We will explain how to set up one of these switch blocks. The same setting will apply to the other four switch blocks, so you can simply repeat the patterns for the other blocks.

The bit position switch blocks will contain 9 switches. At this point we must warn you NOT to follow the markings on the switches themselves. You MUST follow the white silk screen markings next to the switches, directly on the board. The switches from top to bottom correspond to:

```

TOP SWITCH = BIT POSITION 0
NEXT TO TOP SWITCH = BIT POSITION 1
NEXT SWITCH = BIT POSITION 2
NEXT SWITCH = BIT POSITION 3
NEXT SWITCH = BIT POSITION 4
NEXT SWITCH = BIT POSITION 5
NEXT SWITCH = BIT POSITION 6
NEXT SWITCH = BIT POSITION 7
BOTTOM SWITCH = POWERON RESTART ON OR OFF

```

A bit position is turned ON to use that bit position or turned OFF to not use that bit position. For example, to set up a 16K piece for bit position 0:

```

TOP SWITCH = ON
NEXT TO TOP SWITCH = OFF
NEXT SWITCH = OFF
NEXT SWITCH = OFF
NEXT SWITCH = OFF
NEXT SWITCH = OFF
NEXT SWITCH = OFF
NEXT SWITCH = OFF
NEXT SWITCH = OFF
BOTTOM SWITCH WILL BE EXPLAINED LATER

```

To determine which setting to use for a switch block you should once again look at the PORT AND BIT SETTINGS map. This map will tell you the bit position for each block you wish to assign. Each block in the map has a port and a bit value, e.g.,

```

40/0 = PORT 40 HEX    BIT POSITION 0

```

First, make sure the block to which you are assigning a bit position is set up for the correct I/O port as described above. Next, take each block, one at a time, and set the correct bit position either ON or OFF. NO BLOCK SHOULD HAVE MORE THAN ONE BIT POSITION ON AT A TIME! Since the 64K board has 4 blocks on it, you will have to set up 4 of these bit position switch blocks. Look at the PORT AND BIT SETTINGS map to determine the bit position you want to assign for each of the 4 blocks.

The last switch in the 9-position switch block is used to select or deselect the piece during power on. The switch should be ON to select the piece during power on or OFF to deselect the piece. Remember that ONLY four pieces should

be selected during power on and those pieces must include a piece 0, a piece 4, a piece 8, and a piece C. (How to set the piece values for one of these four will be explained next.)

The last switch block to deal with will set the piece address value. These switch blocks are located in column 18 of the 64K dynamic memory board. Once again there are 4 of these blocks, one for each piece on the board. These switch blocks will only have 4 switches on them. And once again, let us remind you to follow the white legends printed on the silk screen of the board and NOT to follow the numbers engraved on the switches themselves!

Each of the 4 switches in the switch block should be set to either ON or OFF to locate that particular piece as one of the four in the memory map. There are four pieces in bank 0 and three pieces in every other bank. The pieces start at the bottom with 0 and continue up. We refer to each of these pieces by its base address. The bottom piece has a base of 0, so we call it piece 0. The next piece up has a base address of 4000 hex, so we call it piece 4. The third piece from the bottom has a base address of 8000 hex, so it is referred to as piece 8. And the top piece starts at C000 hex and is called piece C.

The 4-position switch has one switch for each of the four possible pieces:

TOP SWITCH = PIECE 0
NEXT TO TOP SWITCH = PIECE 4
NEXT SWITCH = PIECE 8
BOTTOM SWITCH = PIECE C

By setting the switch block of each piece to one and only one of the settings you can assign any piece on the board to any vertical location (0, 4, 8, or C) in the memory map.

Now that you understand each of the switch blocks on the 64K dynamic memory board, let's follow through a few examples to reemphasize the proper switch settings.

If you have a minimum memory system, you will have 64K of RAM memory. If we assume that this 64K of memory is a single 64K dynamic memory board, then there are several ways that this memory can be configured in your system. The most practical configuration is to place the entire 64K in bank 0.

The 64K board will contain 4 pieces of memory. The first piece will be configured as the top piece (piece C). This piece will contain the SYSTEM. The second piece will be piece 8 and contain the BANKED SYSTEM. The third piece will be piece 4, and the last piece will be piece 0.

This configuration will give 32K of memory to the operating system (pieces C and 8) and 32K of memory to the user (pieces 4 and 0). We'll describe later how to tell the operating system how you would like to divide up the 32K of user memory.

Remember from the discussion above that each piece of memory in the system MUST have three values described -- the I/O port value, the bit position, and the piece value. Each of these values for our 64K system is:

	I/O PORT	BIT POSITION	PIECE VALUE	
FIRST PIECE	40 HEX	BIT 0	PIECE C	(top)
SECOND PIECE	40 HEX	BIT 1	PIECE 8	
THIRD PIECE	40 HEX	BIT 1	PIECE 4	
FOURTH PIECE	40 HEX	BIT 1	PIECE 0	(bottom)

There is also the power-on setting that must be set. You must select 4 pieces of memory. Since we have only 4 pieces in our 64K system, each of the pieces MUST be selected during power-on.

You can see from the chart above that each piece on the 64K dynamic memory board is going to reside in port 40 hex. The top piece will use bit position 0 and the other three pieces will use bit position 1. Each piece will use one of the four possible piece values, 0-C.

To make this physical placement more clear, study the diagram below. This is a memory map of our 64K system:

	BNK 0	BNK 1	BNK 2	BNK 3	BNK 4	BNK 5	BNK 6	BNK 7
FFFF	40/0	....	....	....	....	....	....	....
C000		....	....	....	....	....	....	....
BFFF	40/1	....	....	....	....	....	....	....
8000		....	....	....	....	....	....	....
7FFF	40/1	....	....	....	....	....	....	....
4000		....	....	....	....	....	....	....
3FFF	40/1	....	....	....	....	....	....	....
0		....	....	....	....	....	....	....

You can see that we have NO memory in banks 1-7. We only have memory in bank 0. Each of our 4 pieces of memory is represented by a block in the memory map. The top block is designated 40/0. This represents the I/O port value and bit position of this piece. This piece is based at address C000 hex, so it is piece C.

Each of the three pieces below the top one has the same value inside the block. This is because each of these pieces uses the same I/O port and bit position. They are all 40/1, using I/O port 40 hex and bit position 1. The bottom piece is based at 0000 hex and is piece 0. The piece above it, based at address 4000 hex, is piece 4, and the third piece, based at address 8000 hex, is piece 8.

Now that you understand where we are going to position our 64K of memory and each of the values we need to assign to each piece, we can discuss the

physical switch settings for the 64K dynamic memory board.

The first switch block we need to set is the I/O port address switch block. As we mentioned above, this switch block is located at position C-8 on the memory board. Each of the pieces in bank 0, where we are placing all of our memory, uses port 40 hex. So, we must set this switch block for port address 40 hex.

The second set of switch blocks to set up is the set of bit position blocks. As we discussed earlier, there are four switch blocks on the 64K dynamic memory board, one for each block of memory on the board. There are actually two switch blocks for each block of memory. One is a nine-position block used to set the bit position and power-on setting, and the other is a four-position block used to set the piece value.

For each block, you must set the appropriate bit position to ON and the other bit positions to OFF. The power-on switch should be set to ON for all four pieces. The piece value should be set by setting the appropriate switch on the four-position switch block to ON. Follow the discussions and charts above to determine which switches to set ON and which to set OFF.

Once all the switch settings have been made for the entire board, the board can be placed back in the computer and DOS 5 can then be booted up.

It should be mentioned that to boot the distribution disk you MUST have 64K of memory in bank 0 as described above. If you do not have 64K in bank 0, you CAN NOT boot the distribution disk! You should configure your memories for 64K in bank 0, boot the distribution disk, run DYNASYS to describe the memory configuration you want, and then reconfigure your memory boards for the new memory configuration.

Now that we have gone over the minimum 64K system, let's take a look at another system. If we have two 64K dynamic memory boards, there are several ways we can configure this memory. The exact way you choose will depend largely on the applications for which you are using DOS 5. One way in which to configure two 64K boards is to place 32K in the upper portion of bank 0 for the operating system and then configure two banks of 48K each in banks 1 and 2.

	BNK 0	BNK 1	BNK 2	BNK 3	BNK 4	BNK 5	BNK 6	BNK 7
FFFF	40/0	....	....	....	....	....	....	....
C000	/	....	....	....	....	....	....	....
BFFF	40/1	40/3	40/4	....	....	....	....	....
8000	/			....	....	....	....	....
7FFF	....	40/3	40/4	....	....	....	....	....
4000	....	/		....	....	....	....	....
3FFF	....	40/2	40/4	....	....	....	....	....
0	....	/		....	....	....	....	....

If we look at the memory map above, we can see the placement of the two 64K memory boards. The two boards will have 8 blocks of memory between them. We MUST use two of these blocks for the operating system in the top of bank 0. You can see that we have no memory in the bottom two pieces of bank 0.

In bank 1 we have three pieces to form 48K of user memory. We also have three pieces in bank 2 to form 48K of user memory.

In the bottom right hand corner of four of the blocks is a slash character, "/". This represents the four blocks of memory that we are going to select during power on. Remember from the above discussion that we MUST have four and only four pieces of memory selected during power-on and that the four pieces MUST include one each of the possible four piece values, 0-C.

Now, let's look at each bank individually and examine the switch settings for each block. In bank 0 we need to set up two pieces of memory. One piece is in the top, piece C, and the other is below it, piece 8. We have no memory in the bottom 32K of bank 0. The top piece has a port and bit value of 40/0. As discussed above, this represents I/O port 40 hex and bit position 0. The piece below it has a port and bit value of 40/1.

In bank 1 we have placed three pieces of memory. One piece is in the bottom, piece 0, another piece is based at 4000 hex, piece 4, and the third is based at 8000 hex, piece 8. The top two pieces have the same port and bit value, 40/3 (port 40 hex/bit position 3). The bottom piece of bank 1 has a different value, 40/2. This is because there is no memory in the bottom of bank 0. The value 40/2 allows this bottom piece of memory to be used to fill in the bottom of bank 0 when the banked system is selected. This piece will also be selected when bank 1 is turned on.

Bank 2 also has three pieces of memory, each with the same port and bit value, 40/4.

This equals a total of eight pieces of memory. The eight individual pieces can come from either of the boards and be mixed in any order or position.

Now that we have explained the physical placement of memory, we will go on to explain modes. The user can run DOS 5 in one of two modes. These are the 32K mode and the 48K mode.

The difference between the two modes is in the size of the largest user memory segment in the system. If the user NEVER needs to run a program that requires over 32K, then he should use Mode 1 (32K user-memory segments). However, many application programs, such as Dynabyte's WordStar and Business Manager packages, require at least 48K. In that case, you would have to use Mode 2 (48K user-memory segments).

There are good and bad points to each of the two modes. Let's look at Mode 1 first and see what we gain and lose by using it.

Mode 1 is the 32K user-memory segment mode. All of the memory maps that we have shown so far have been for Mode 2, or 48K user-memory segments. If we go to Mode 1, then the entire top 32K of bank 0 will be common memory. In Mode 2 ONLY the top 16K is common. When in Mode 1 there will be 32K of common memory. This means that NO bank can have a user memory segment that is larger than 32K in size.

	BNK 0	BNK 1	BNK 2	BNK 3	BNK 4	BNK 5	BNK 6	BNK 7
FFFF	40/0	....	....	....	....	....	....	....
C000		....	....	....	....	....	....	....
BFFF	40/1	....	....	....	....	....	....	....
8000		....	....	....	....	....	....	....
7FFF	40/1	40/3	40/4	40/5	40/6	40/7	41/0	41/1
4000		/						
3FFF	40/1	40/2	40/4	40/5	40/6	40/7	41/0	41/1
0		or 40/3						

You can see in the memory map above that no bank, other than bank 0, has any memory in the top 32K. Each bank 1-7 has only up to 32K of memory. (Note: The port and bit values for each block have not changed; only the third piece in each bank has been affected.)

When you are using Mode 1, you will have much more common memory available. There will be approximately 40 pages of system memory. Mode 2 will only have 12 pages of system memory. Certain features of DOS 5 require system memory to run. See the section called SYSTEM GENERATION AND CONFIGURATION for more details about what features require system memory and how much they use.

So, you can clearly see that if you need the features that require a lot of system memory, then it would be useful to use Mode 1, or 32K user-memory segments. However, as we mentioned above, many programs will NOT run in 32K of memory. If you are going to run programs requiring larger amounts of memory, then you will have to use Mode 2.

Mode 2 is the mode that we have been showing all along. It reserves 48K of memory in all of the banks 1-7. The top 32K in bank 0 is actually divided into two parts, a common memory part and a bank-switched memory part. Since only 16K of common memory is available, the user will have only 12 pages of system memory available for consoles, user stacks, and RSPs.

So, the user can see that Mode 2 is much more restrictive about space than Mode 1 is. But, you MUST use Mode 2 to run most of the application programs. It is up to the user to decide which mode he would like to use with his system.

Now that we've looked at the physical placement of memory and some examples for the 64K dynamic memory board, let's look at the logical definition of that memory.

As we've mentioned before, DOS 5 can address up to 400K of memory. Actually, only 368K of that is definable by the user, since 32K is used automatically by the operating system. The user memory that is available can be defined by the user in a series of segments. Before we discuss these segments, the user must understand how much memory he has to work with and the exact physical placement of that memory.

If you use the first example described above for a minimum 64K of memory, then you will have 32K of user memory available in bank 0. If you use the second example, then the user will have 96K of user memory, 48K in bank 1 and 48K in bank 2.

The operating system will ALWAYS consume 32K of memory. This 32K will ALWAYS be the top 32K in bank 0. You do not have to describe this system memory to DOS 5. The operating system will ALWAYS assume that this memory is present, and will NOT run if this memory is not in the system!

The remaining memory in the system can be defined by the user in a variety of ways. The user MUST tell DOS 5 exactly how he wants the user memory partitioned. This partitioning process is very critical. The efficiency of the application programs that will be run on the system will depend greatly on how you partition this user memory. So, to help you better understand how DOS 5 uses this memory, let's discuss this partitioning process.

DOS 5 can have up to 7 segments of memory. You may have as few as 1 segment or as many as 7. It is totally up to you. Each segment can be from 256 bytes in size all the way up to 48K bytes in size. So, if we look at the first example described above, we will have 32K of user memory to work with. We can describe this user memory to DOS 5 as a single 32K segment of memory, or we can break it up into several segments. If we break it up, we could have, for example, two segments 16K in size; or 4 segments 8K in size; or 3 segments, 1 segment of 16K and 2 segments of 8K. The choice is totally up to you. You must decide how to partition your memory for the best possible use.

Each segment that is described to DOS 5 must have three values defined:

1. The base address
2. The size
3. The bank number

The base address is any 256 byte boundary. For instance, if we described the 32K of user memory in bank 0 as one large segment, then the base address would be 0. If we choose to divide it into 2 segments, then one segment would have a base of 0 and the second would have a base of 4000 hex.

The size is the number of bytes the segment will contain. Again, if we take the 32K in bank 0 as one large segment, then the size would be 8000 hex. If we divide it into two segments, then each segment would be 4000 hex in size.

The bank number is the logical bank number that the segment resides in. You may have more than one segment in any bank. For instance, the 32K in bank 0 can be divided into two segments, one with a base address of 0 and a size of 4000 hex, the other with a base address of 4000 hex and a size of 4000 hex.

Now that you understand the three values used to describe each memory segment, we can talk about the different kinds of memory segments used in DOS 5 and what each type can and can not do.

There are two types of memory segments that DOS 5 uses:

ABSOLUTE SEGMENTS
RELOCATABLE SEGMENTS

An absolute segment is a segment of memory that has a base address of 0. A relocatable segment is a segment of memory that has a base address other than 0.

There are two types of programs that can be run in a DOS 5 system:

- "COM" - COMMAND FILE PROGRAMS
- "PRL" - PAGE RELOCATABLE PROGRAMS

A COM file program is a command file program. It MUST be run in an absolute segment of memory. It CAN NOT run in a relocatable segment!

A PRL file program is a relocatable command program. It can be relocated by DOS 5 as it is loaded into a segment. A PRL file program can run in either an absolute segment or a relocatable segment.

If you look at the directory on the distribution disk, you will find several PRL type files and several COM type files. Some of the more common utility programs have been supplied in PRL form to allow you to use relocatable segments:

DIR.PRL	- Directory utility
PIP.PRL	- File copy utility
STAT.PRL	- File status utility
RDT.PRL	- Relocatable debugger
ASM.PRL	- 8080 assembler
ED.PRL	- Editor
TYPE.PRL	- File display utility
REN.PRL	- File renaming utility
TOD.PRL	- Time of day utility
ABORT.PRL	- Program abort utility
ERA.PRL	- File erase utility
ERAQ.PRL	- Conditional file erase utility
MPMSTAT.PRL	- System status utility
DSKRESET.PRL	- Disk drive reset utility
SUBMIT.PRL	- Batch command processing utility
SCHED.PRL	- File execution scheduler
TSPOOL.PRL	- Transient print spooling utility
STOPSPLR.PRL	- Print spooling abort utility
USER.PRL	- User number utility
CONSOLE.PRL	- Console number utility
PRLCOM.PRL	- PRL to COM file conversion utility

There are also several utility programs that are NOT supplied in PRL form and require an absolute segment for execution:

FFORMAT.COM	- Floppy disk format utility
DYNAGEN.COM	- Floppy disk loader transfer utility
DYNASYS.COM	- DOS 5 system regeneration utility
DYNASTAT.COM	- DOS 5 system status display utility
GENSYS.COM	- MP/M 2.1 system regeneration utility
MEMTEST.COM	- DOS 5 memory testing utility
WFORMAT.COM	- Micropolis Winchester format utility
FUJFMT.COM	- Fujitsu Winchester format utility
LOAD.COM	- HEX to COM file conversion utility
DDT.COM	- Absolute debugger
ED.COM	- Absolute editor
GENMOD.COM	- HEX to PRL file conversion utility
GENHEX.COM	- COM to HEX file conversion utility

Since all of the COM files listed above MUST be run in an absolute segment, it is always a good idea to have at least one absolute segment of memory in a DOS 5 system. If you were to describe all of your memory segments as relocatable, then you could not run any of the COM files above. That includes DYNASYS, which means you could never regenerate another system to get additional memory segments. You would have locked yourself out! So, it is ALWAYS recommended to describe at least one absolute memory segment!

DOS 5 loads PRL and COM files differently. When you enter a command on the command line after the "0A>" prompt, DOS 5 will first search for a queue to write the command line to (consult the Digital Research MP/M II manuals for

more information on queues). If DOS 5 can not find a queue with your command's name, then it will search the disk for a file with your command's name. It will first search for a PRL type of file. If it finds a file with your command's name and a file type of PRL, then it will look for an available memory segment to load it into.

DOS 5 will search through each memory segment that you have told it to use and try to find one that is not already running a program. If all memory segments are being used, then a message, NO SEGMENTS FREE, will be sent back to you.

After it has located all the available memory segments, DOS 5 will attempt to "best fit" the PRL file into one of the memory segments. By "best fit", we mean find the smallest relocatable memory segment that can be used by the PRL file. If no relocatable segments can fit the PRL file, then an available absolute segment will be used.

However, if no PRL type of file can be found with your command's name, then a search will be made for a COM type of file. If a COM file is found, DOS 5 will load it into the first available absolute memory segment it can find. It will not load a COM file into a relocatable segment. No "best fit" is performed on COM files; they are simply put into the first available absolute segment.

Because of this first-come first-serve policy for COM type files, it is recommended that ALL absolute memory segments in your system be the exact same size. For instance, if you have one 64K dynamic memory board set up in bank 0 and one 48K dynamic memory board set up in bank 1, then you would have 32K available memory in bank 0 and 48K available memory in bank 1. If you described this memory as one absolute segment of 32K in bank 0 and one absolute segment of 48K in bank 1, then you would have two absolute segments of different size. When DOS 5 loaded a COM file into memory, it would choose either segment indiscriminately. Therefore, a program that needs 48K in which to run might still be loaded into the 32K absolute segment, which would then abort the program.

A better way to use this memory would be to describe the 32K in bank 0 as two relocatable segments of 16K each and the 48K in bank 1 as one absolute segment.

BASE	SIZE	BANK	
0100	3F00	0000	A RELOCATABLE SEGMENT
4000	4000	0000	A RELOCATABLE SEGMENT
0000	C000	0001	AN ABSOLUTE SEGMENT

This way, all COM files would load into the absolute segment in bank 1, while all PRL files would load into one of the relocatable segments in bank 0. In this way, there would be fewer conflicts and problems than presented by a configuration involving two different sizes of absolute memory segments.

However, this second scheme allows you to run only one COM type file at a time! The first scheme allows you to run two COM type files at a time. So, you can see that there are certain trade-offs and considerations involved in configuring your memory in different ways. You may even consider generating several different system disks with different configurations so that you can

reboot your system to switch configurations to meet different programming needs. The choices are totally up to you.

We've explained how to physically set up your memory and how to logically partition it for use by the operating system. Next we'll discuss how to actually define our memory segments to DOS 5.

The memory segment definition is done with the DYNASYS utility program. (Read the section called SYSTEM GENERATION AND CONFIGURATION for detailed information on DYNASYS.)

When DYNASYS prompts you for the memory segments, it displays:

```
ENTER MEMORY SEGMENT TABLE: (FF TERMINATES LIST)
BASE,SIZE,ATTRIB,BANK =
```

DYNASYS is asking for the three values that define a memory segment. It is also asking for an ATTRIB, which is the attribute of the segment. Simply enter a 0 for the attribute for all segments.

DYNASYS expects only two digits for each value. These two digits represent the upper two hex digits of a 4 digit hex value. For instance, the value 4000 hex would be entered as 40, the value C000 hex would be entered as C0, and the value 3F00 would be entered as 3F.

As stated earlier, you may describe up to 7 segments of memory. For each segment simply enter the four values separated by commas. For instance, for a single 32K segment in the bottom of bank 0:

```
BASE,SIZE,ATTRIB,BANK = 0,80,0,0,<CR>
```

This describes an absolute segment residing in bank 0 that has a base of 0000 hex, a size of 8000 hex, and attribute 0.

If we wanted to instead describe that same 32K of memory as two relocatable segments of 16K each, we would enter:

```
BASE,SIZE,ATTRIB,BANK = 1,3F,0,0,<CR>
BASE,SIZE,ATTRIB,BANK = 40,40,0,0,<CR>
```

This describes one segment that begins at 0100 hex and has a size of 3F000 hex bytes (approximately 16K). It also describes another segment directly on top of it that begins at 4000 hex and is 4000 hex bytes in size. Both of the relocatable segments reside in bank 0.

After you have entered all of the memory segments that you want, then simply enter an FF as the answer to a descriptor entry. If you have entered all eight descriptor entries, then the inquiry will automatically end.

So, that's all there is to RAM memory in a DOS 5 system. As you can see, the versatility of memory in a DOS 5 system tends to make it complicated. Read through this section several times until you understand the physical and logical sides to memory configuration. After that, try running DYNASYS on a few copies of the distribution disk (DO NOT RUN DYNASYS ON THE DISTRIBUTION DISK ITSELF - SAVE THE ORIGINAL INTACT!). Change the memory configuration and

try moving your memory around in the system.

There really is no easy way to understand memory segments. The best way to understand them is to play with them and through experimenting find out what you can and can not do.

3.4 MEMTEST

MEMTEST is the DOS 5 memory test program. It tests all of the RAM memory in your computer and then displays, on CPU2, a map of the memory. This map will tell you what segments of memory are good or bad, what segments you have described in DYNASYS, and whether or not they are all present. The map will also guide you with memory board switch setting.

***** WARNING *****

The memory test program, MEMTEST, will abort the operating system! It will completely destroy any RAM memory contents in the computer. THIS PROGRAM MUST BE RUN OFF-LINE! You should not run MEMTEST with any other users on the system. A good way to insure this is to create a system disk configured for only a single console and to then boot up with this disk. This will insure that you are the only operator on the system.

To run MEMTEST type:

```
0A>MEMTEST<CR>
```

MEMTEST will then sign-on:

```
MEMORY MAP AND TEST PROGRAM  
*****WARNING*****  
YOU HAVE LOADED A MEMORY MAP AND  
TEST PROGRAM THAT WILL ABORT ALL  
PROGRAMS NOW RUNNING INCLUDING  
THE OPERATING SYSTEM.  
*****WARNING*****  
  
THIS PROGRAM WILL MAP AND TEST  
ALL SYSTEM MEMORY AND VERIFY  
MP/M II BANK DESCRIPTIONS.  
  
SERIAL 2 IS USED, SO BE SURE  
AN OUTPUT DEVICE IS NOW CON-  
NECTED TO SERIAL 2.  
  
HIT CONTROL K TO CONTINUE OR  
RETURN TO RETURN TO THE SYSTEM.
```

You may now enter a control-K to continue with the MEMTEST program or hit a return to abort.

You must have a console on CPU2 to read the display of MEMTEST. The program may be invoked from any console, but the memory map display will only appear

MP/M MEMORY TEST
MEMIST V1.0

SYSTEM
MEMORY MAP

	BANK 0	BANK 1	BANK 2	BANK 3	BANK 4	BANK 5	BANK 6	BANK 7	ERROR
PCE 4	SYS TEM								
PCE 3	PPP								
PCE 2	G D PPP								
PCE 1	G D PPP								

D-DESCRIPTOR ENTRY G-GOOD PIECE (NO OVERLAP)
P-PASS MEMORY TEST F-FAIL MEMORY TEST
OL-OVERLAP OR BAD OR MISSING MEMORY

MEMORY MAP
LOGICAL BANK TO PORT/BIT

	BANK 0	BANK 1	BANK 2	BANK 3	BANK 4	BANK 5	BANK 6	BANK 7
PCE 4	40/ 0	XXX XXX	XXX XXX	XXX XXX	XXX XXX	XXX XXX	XXX XXX	XXX XXX
PCE 3	40/ 1	40/ 3	40/ 4	40/ 5	40/ 6	40/ 7	41/ 0	41/ 1
PCE 2	40/ 1	40/ 3	40/ 4	40/ 5	40/ 6	40/ 7	41/ 0	41/ 1
PCE 1	40/ 1	40/ 2-3	40/ 4	40/ 5	40/ 6	40/ 7	41/ 0	41/ 1

+BIT 2 IF NO BNK 0-PCE 1 OR
BIT 3 OTHERWISE

D = Descriptor entry from DYNASYS
G = Good piece—good RAM and no overlapping
PPP = Passed memory test (good RAM)
FFF = Failed memory test (bad RAM)
OL = OverLapping memory segments

Except for piece number 4 in bank 0, one or more of these mnemonics will appear in every block for which MEMTEST can find memory. PIECE 4 in bank 0 is a special block. This block will contain the DOS 5 operating system when it is run. It also contains the MEMTEST program as it is running. This PIECE is tested thoroughly before the MEMTEST program is moved into it. MEMTEST will simply write SYSTEM in this block to signify that this block is functional.

PIECE 3 in bank 0 (the one right under piece 4) will contain the banked portions of DOS 5. This is an extension of the operating system. Therefore, you can never describe a memory segment in this block. So, no D will ever be printed in this block on the map (no descriptor should exist for it).

Every other piece that MEMTEST can find in the computer will be tested and compared to the descriptor entries in DYNASYS. The appropriate mnemonics will then appear inside the blocks to inform you of their condition.

If a PPP appears in a block, this means that the piece was found and tested successfully. The piece was actually tested by two different memory tests and had its location verified with respect to all other pieces in the system.

If a D appears in a block, this means that there is a DYNASYS memory segment descriptor that uses this block of memory. For instance, if you had entered a memory segment descriptor in DYNASYS for one 32K block of memory in bank 0, i.e.,

BASE,SIZE,ATTRIB,BANK = 0,00,0,0<CR>

then you should see a D entered in the bottom two blocks of bank 0. If you look at the map on the previous page, you can see that there is a D in each of these two blocks.

If there is an FFF inside a block, then that piece of memory has failed the memory test. You should remove this block of memory from the computer and repair the faulty card. If the block with the FFF does not have a D in it also, then DOS 5 is not presently set up to use this block. In this case you could still run DOS 5 and simply ignore the bad block. If the bad block DOES have a D in it, then DOS 5 will not run properly, and you should substitute some unused block for the bad block or repair it.

If an OL appears in a block, then this piece has overlapped into another bank. This is usually caused by faulty switch settings. You should remove the board containing the overlapped piece and examine the switch settings. You can compare the switches with the second map to determine the accurate settings. This comparing procedure will be explained a little later.

Listed below are all the possible combinations that can be printed in a block on the memory map. After each combination is an explanation.

```

+-----+
|SYS|
|TEM|
+-----+

```

This is the SYSTEM block. It will house the DOS 5 operating system and the

MEMTEST program as it is running. There should only be one block that has this mnemonic—PIECE 4 in bank 0. If any other block has this mnemonic, then you have incorrectly set your memory switches. Read the section called MEMORY CONFIGURATIONS for more information.

```

+---+
|G |
|PPP|
+---+

```

This represents a good block of memory that has not been described to DOS 5. The PPP means that there is some memory at this location and it has passed the memory tests. The G means that this block has no overlap with any other block. The absence of a D means that it is not being used by DOS 5. (This pattern may appear in PIECE 3 of bank 0. It will not have a D in it if it does. This does not mean that this PIECE is not being used, but that it is being used by the operating system.)

If you have blocks with this pattern in them, then you can run DYNASYS and describe the additional memory to DOS 5. Otherwise, the operating system will never use these good pieces of memory. (You may keep some spare blocks in your system to substitute for blocks that become bad in the future.)

```

+---+
|G D|
|PPP|
+---+

```

This block is good and is also being used by DOS 5. The D means that a DYNASYS memory segment, using all or part of this block, has been described.

```

+---+
|OL |
|PPP|
+---+

```

This block contains good RAM (the PPP tells us that), but it has been addressed incorrectly or another block has been addressed incorrectly and is overlapping with this block (you can tell this by the OL mnemonic). If any of the blocks in your memory map appears like this, then you should remove all of the memory boards in your system and go over the switch settings to find the overlapping blocks.

The absence of a D means that this block is not being used by the operating system, so DOS 5 may still run properly with a block like this. But, the overlapping may cause this block to affect another block that does have a D in it and prevent DOS 5 from functioning properly.

```

+---+
|OLD|
|PPP|
+---+

```

This block is similar to the one above -- it is good RAM (PPP) that is overlapping another block (OL). The only difference is that this block IS being

used by the operating system. The D tells us that all or part of this block was described as one or more memory segments in DYNASYS. You should remove ALL the memory boards in your system and check the switch settings to find the overlapping block. The operating system will not run properly with an overlapping (OL) block that has a D in it.

```

+-----+
|       |
| PFF   |
+-----+

```

This block has failed the memory tests. MEMTFST found RAM memory at this location, but it has one or more bad bits in it that will cause errors in programs loaded into it. The absence of a D means that this block is not being used by the operating system, so you can probably run DOS 5 with no problems. But, if you later tell DYNASYS to use this block, you may have problems running DOS 5. The best solution is to find the faulty memory board and fix or replace it.

```

+-----+
| G D   |
| PFF   |
+-----+

```

This block is very similar to the two above (FFF means it failed the memory test; G means there is no overlap), but it has one critical difference. This block is being accessed by the operating system (D). This block MUST be fixed or replaced before DOS 5 will run properly. (You may substitute for this block another block that is not being used elsewhere in the system.)

```

+-----+
| OL    |
| PFF   |
+-----+

```

This block has been tested bad, i.e., one or more of the bits in this block is bad. It is also addressed incorrectly, i.e., it is overlapping another block in the system (OL). You should remove all the memory boards in your system and check the switch settings on each board to find the overlapping block. You should also determine the cause of this block failing the memory test and correct it. Note: Since this block is not being used by the operating system (no D), you could probably run DOS 5. But to prevent any future problems when reconfiguring you memory, you should still correct the problems with this block.

```

+-----+
| OLD   |
| PFF   |
+-----+

```

This is a very dangerous block! It has failed every test that MEMTEST has run on it and it is being used by the operating system (D)! You should replace or fix this block and check the switch settings on all the memory boards in your system.

If you run MEMTEST and find any bad blocks in your memory map, you should try to determine why these blocks are bad and correct the problem; or if you have some spare blocks that you are not using for the operating system (no D mnemonic printed in the block), you can substitute good blocks for bad ones and simply ignore the bad blocks.

The second map that is displayed by MEMTEST is always fixed. This map represents the proper switch settings for any block of memory that DOS 5 can address. Each block in this second map is identical to the block in the map above it. The numbers inside the block represent the memory bank port and the bit position within that port. For instance:

```

+-----+
| 40/ |   =   PORT 40 HEX AND BIT 0
|  0  |
+-----+

+-----+
| 40/ |   =   PORT 40 HEX AND BIT 1
|  1  |
+-----+

+-----+
| 40/ |   =   PORT 40 HEX AND BIT 5
|  5  |
+-----+

+-----+
| 41/ |   =   PORT 41 HEX AND BIT 0
|  0  |
+-----+

+-----+
| XXX |   =   NO MEMORY SHOULD BE ADDRESSED IN THIS BLOCK!
| XXX |
+-----+

```

Each block of memory that is configured under DOS 5 has a bank value and a bit value. The bank value is the I/O port address that the operating system uses to switch this bank in and out. DOS 5 only addresses two ports, 40 hex and 41 hex. The I/O port used by a particular memory board is usually configured by a switch setting on the board. See the section MEMORY CONFIGURATIONS for more information on the exact switch patterns. Under DOS 5, banks 0-5 are all set up to use port 40 hex. Only banks 6 and 7 use port 41 hex. Usually, a 64K memory board may contain four PIECES (or blocks) of memory. But, the entire four PIECES can be set to only one port; each piece can use a different bit on that port, but all four pieces must use the same port. This precludes splitting a 64K board between banks 0-5 and banks 6-7. In other words, you could put the four pieces from the 64K board in any block in banks 0-5 or in any block in bank 6 or 7, but you could not put three PIECES in banks 0-5 and the other PIECE in either bank 6 or 7.

Each block of memory also has a bit setting. Again, you should read the section on MEMORY CONFIGURATIONS for more information on the bit settings. Except for PIECE 1 in bank 1, each block has only one bit setting. PIECE 1

in bank 1 is a special case. It has two possible bit settings.

If PIECE 1 of bank 0 has been installed in your computer, then you should use bit 3 for PIECE 1 of bank 1. If PIECE 1 of bank 0 has NOT been installed in your computer, then you should use bit 2 for PIECE 1 of bank 1.

There are 8 different bit settings for each port (0-7). Only 0 and 1 are used for port 41 hex. For banks 2-7 each piece in a bank has the same bit setting. PIECES 1-3 in bank 0 also have the same bit setting. Bank 1 is a special case, with PIECE 1 being set as described above. Bank 0 is also special in that the SYSTEM uses the top PIECE (#4), which is identified by a different bit number (0) than the bit number (1) of the other three pieces in the bank.

Now that you understand each of the two maps that MEMTEST displays, you should be able to compare them and diagnose any RAM problems in a DOS 5 system.

3.5 DYNASTAT

DYNASTAT is the utility used to display the current system parameters. DYNASTAT will display the current console assignments, printer assignments, disk drive assignments, memory segment parameters, and other system variables. DYNASTAT is useful in examining the current setup of the system after a new system has been generated or checking the status of the current system if the parameters are unknown.

DYNASTAT is invoked by typing:

A>DYNASTAT<CR>

The following display will then appear on the terminal.

DYNASYS VERSION X.X - FOR DYNABYTE DOS 5.XX
MP/M 2.1 SYSTEM REGENERATION UTILITY

```
*****      DYNABYTE DOS 5 STATUS UTILITY      *****
```

CONSOLE ASSIGNMENT	PRINTER ASSIGNMENT	DISK DRIVE ASSIGNMENT	MEMORY SEGMENTS # BASE SIZE ATTR BANK
0= CPU2	0= CPU1	A:=F1	0= 80 - 80 - 80 - 00
1=	1=	B:=F2	1= 00 - 80 - 00 - 00
2=	2=	C:=F3	
3=	3=	D:=F4	
4=	4=	E:=MINI1	
5=	5=	F:=MINI2	
6=	6=	G:=FUJ1	
7=	7=	H:=FUJ2	
8=	8=	I:=	
9=	9=	J:=	
A=	A=	K:=	CPUI = 9600 BAUD
B=	B=	L:=	CPU2 = 9600 BAUD
C=	C=	M:=	LINE FREQUENCY= 60 HERTZ
D=	D=	N:=	# OF CONSOLES = 1
E=	E=	O:=	# OF DISKS = 8
F=	F=	P:=	

Note: Exact assignments in the above display will depend on entries made while running the DYNASYS program.

There are five main blocks of data displayed by the DYNASTAT utility. They are:

1. Console assignments
2. Printer assignments
3. Disk drive assignments
4. Memory segment parameters
5. System variables

3.5.1 Console Assignments

The Console Assignments are displayed in the left-most column of the DYNASTAT display. There are 16 lines of data, one for each console that can be assigned in a DOS 5 system. These are represented by the console numbers 0-F. After each console number will appear the current assignment for that console. These assignments take the form of the port mnemonics used during the DYNASYS system generation process. (It is assumed that for each assignment, the desired console would be connected to the assigned port.) These mnemonics represent:

```
OCT1 - OCT16      =      Octaport ports
CPU1 - CPU2       =      CPU serial pots
CPUP              =      CPU parallel port
```


3.5.2 Printer Assignments

The Printer Assignments are displayed in the next column. There are 16 lines of data displayed, one for each of the 16 possible printers that can be installed in a DOS 5 system. After each printer number (0-F) is the port mnemonic for the port assigned during the DYNASYS process. (It is assumed that the desired printer would then be connected to that port.) The mnemonics are the same as the ones shown above.

3.5.3 Disk Drive Assignments

In the third column, the Disk Drive Assignments are displayed. There are 16 lines of data, one for each of the 16 disks that can be installed in a DOS 5 system. After each drive letter (A-P), the mnemonic for the physical disk drive is shown. These are the same mnemonics used to make the assignment in the DYNASYS program. They may be any of the following:

F1 - F4	-	Floppy disk drives
FUJ1 - FUJ8	-	Fujitsu Winchester drives
MIN1 - MIN8	-	Mini Winchester drives
MW1 - MW5	-	Micropolis Winchester drives

3.5.4 Memory Segment Parameters

The Memory Segment Parameters are displayed in the upper corner of the right-hand column. There are 8 possible lines of data, one for each of the 8 segments of memory that can be described in a DOS 5 system. Each segment has its segment number displayed, followed by the base, size, attribute, and bank number. The first segment displayed is always the DOS 5 operating system itself -- not a user memory segment. Therefore, there are 7 lines of data left to describe the 7 possible user memory segments.

3.5.5 System Parameters

In the bottom corner of the last column is displayed data for various system parameters. The baud rates for CPU1 and CPU2 are shown first. Next is shown the line frequency (either 50 or 60 Hertz). After line frequency are shown the number of consoles and the number of disk drives. The number of consoles will be the Number of System Consoles as defined in the GENSY program. The number of disk drives should always be the exact number of disk drives defined.

4.0 THE BOOT ROM

The boot ROM chip in your Dynabyte computer can be compared to the starter in your car; it triggers the machine into action. The ROM is the only part of your computer that contains software when it is shipped to you. That software performs the booting procedure, which then takes over and loads the software that represents the operating system you have chosen to use in your computer.

Each time you turn on the computer, or push the reset button, you are "booting the computer." Booting consists of copying the operating system into memory. The operating system is stored on a system disk, either the distribution disk that was supplied by Dynabyte or one you have subsequently created by running the DYNAGEN and DYNASYS programs.

Your initial boot, of course, must come from the medium — floppy disk or tape — on which Dynabyte supplied your operating system. This initial boot is discussed in Section 2. The medium for subsequent boots can be any supported by your boot ROM — floppy disk or hard disk.

During day-to-day operation, you need not concern yourself at all about the ROM chip or its supporting circuitry and switches. However, three circumstances will require your attention.

1. If you upgrade or change your disk configuration, you may have to change the ROM chip, as different disk (and tape) combinations operate with different ROMs.
2. Older Dynabyte ROM chips (the RB series) were designed to support only the CP/M and MP/M operating systems. The ROM chips now available (the UR series) can boot MP/M II and OASIS as well. If you want to include OASIS as an optional operating system, your system needs a UR ROM. If it does not have one, you must order and install a UR ROM chip.
3. Systems that have tape drives offer several options for booting procedures and for drive configurations. These options require a special ROM chip and special switch settings on two of the computer boards.

Dynabyte ROMs come in three sizes: 256-byte, 512-byte, and 2-kilobyte. The 256-byte ROM supports up to four floppy disk drives for booting. The 512-byte ROMs support both floppy and 5.25" Mini Winchester drives for booting. The 2-kilobyte (2K) ROMs support floppy disk, hard disk, and tape drives, as well as a number of additional features that will be discussed later.

This section describes each of these ROMs and the steps the ROMs take when you boot your system. The discussion on the 2K ROM also covers relevant switch settings on the CPU and floppy disk controller (Main) boards.

The last discussion in this section contains a detailed description of each of the UR ROMs and includes a table showing which ROM chip is shipped as standard for each current Dynabyte computer model.

Note that the information in this section applies only after you have installed your system, gone through the initial booting procedure described in

Section 2, and have created one or more system disks. The booting medium -- floppy disk, hard disk, or tape -- is determined by your choice when you create (or copy) a system disk. See Section 3 for a complete discussion of the procedure for creating one or more system disks and storing them on disk or tape.

4.1 256-Byte ROM

If your system boots from floppy drives only, the ROM chip in your system is a 256-byte ROM. This ROM allows you to boot from any of the floppy drives. When you turn on the computer, if your system is configured for both 8" and 5.25" drives, the ROM first attempts to boot from the first 8" drive. If that drive does not exist or contains no disk, the ROM goes to the first 5.25" drive. If neither of these drives contain disks, the ROM goes back to the first 8" drive, and again cycles through both drives. It continues to cycle until you insert a disk in a drive with a select indicator light flashing.

If your system is configured for four 8" drives, the ROM cycles to the first drive of the first pair of 8" drives, then to the first drive of the second pair, and continues to cycle until you insert a disk.

The ROM attempts to boot from the first floppy disk that it encounters. If you insert any disk other than a system disk, the system will fail to boot and you will have to reset the computer and begin the boot procedure again. When the boot is successful, the system prints a load map, a sign-on message, and a prompt. You can then enter any DOS 5 command.

The 256-byte ROMs and the drives they support for booting are listed in the following table. See Section 4.4 for a detailed description of each ROM.

<u>Part No.</u>	<u>ROM</u>	<u>Disk Drives Supported</u>
808082	UR1	Two 5.25" SS Micropolis and two 8" Shugart
808083	UR2	Two 5.25" SS Micropolis and two 8" Remex
808084	UR3	Two 5.25" SS Micropolis and two 8" DS Shugart or Remex
808085	UR4	Four 8" DS Shugart or Remex (two Aux/4 cards)
808086	UR5	Four 8" SS Remex (two Aux/4 cards)
808087	UR6	Four 8" SS Shugart (two Aux/4 cards)

The 256-byte ROM is installed on the main controller board in your computer, at position K3, with the notch up.

4.2 512-Byte ROM

Systems configured for both floppy and 5.25" Mini Winchester hard disk drives can be booted from any of the drives if they have a 512-byte ROM. This allows Dynabyte computer systems to function without any floppy disk drives.

When you turn on the computer, the 512-byte ROM first goes to the floppy drive or drives, then to the Mini Winchester (hard disk) drive. It continues to cycle in this order until it finds a floppy to boot from or until the hard disk has spun up to speed.

When the computer is first turned on, it takes approximately 30 to 60 seconds for the hard disk to spin up to speed. If you want to boot from a system that is stored on the hard disk, ensure there is no disk in any floppy drive. The ROM will cycle continuously for 30 to 60 seconds, then boot from the hard disk as soon as it is up to speed. The hard disk must have been previously DYNAGENed properly (see Section 3.1).

This sequence makes it possible for you to store one system on the hard disk, and one or more different systems on floppy disks. During the initial 30 to 60 second period, if you insert a floppy in any drive, then the ROM will boot from that drive. The distribution on the hard disk remains, but is not used for the current session.

The following conditions prevent a boot from the hard disk:

- The disk is not yet up to speed. Be sure to wait a full 60 seconds.
- The hard disk does not contain an operating system.
- Hardware error.

CAUTION: If you have been using the computer and hit the reset key to re-boot from hard disk, remove all floppy disks that you have been using. The system will attempt to boot from the first floppy it encounters, whether it is a system disk or not.

The 512-byte ROMs and the drives they support for booting are listed in the following table. See Section 4.4 for a detailed description of each ROM.

<u>Part No.</u>	<u>ROM</u>	<u>Disk Drives Supported</u>
808088	UR10	Two 5.25" SS Tandon, two 8" SS Shugart, one Mini Winchester
808089	UR11	Two 5.25" DS Tandon, two 8" SS Shugart, one Mini Winchester
808090	UR12	Two 5.25" SS Tandon, two 8" SS Remex, one Mini Winchester
808091	UR13	Two 5.25" DS Tandon, two 8" SS Remex, one Mini Winchester
808092	UR14	Two 5.25" SS Tandon, two 8" DS Shugart or Remex, one Mini Winchester
808093	UR15	Two 5.25" DS Tandon, two 8" DS Shugart or Remex, one Mini Winchester
808102	UR16	Four 8" SS Slimline Tandon and one Mini Winchester
808103	UR17	Four 8" DS Slimline Tandon and one Mini Winchester

The 512-byte ROM is installed on the main controller board in your computer at position K3, with the notch up.

4.3 2K ROM

If your system has tape drives, it uses a more sophisticated ROM called the 2K ROM. This 2K ROM allows considerable flexibility in your decision to include or exclude certain types of drives. If a hard disk drive is installed, the boot procedure can be completed entirely from the hard disk. The system can function without any floppy disk drives. The 2K ROM also allows you to boot the computer from a cartridge tape unit. This allows systems that do not have floppy disks to recover from a failure of the hard disk unit or be initially configured from the tape.

Another feature of the 2K ROM is that you can choose one of three procedures for booting. The first procedure presents a menu and allows you to choose whether to boot from hard disk, floppy disk, or tape. Procedure 2 immediately attempts to boot from hard disk; if this fails, it presents the same menu as procedure 1. Procedure 3 also attempts to boot from hard disk; if that fails, it then attempts to boot from floppy disks. The boot procedure is specified by setting the CPU switches (see Section 4.3.5).

The 2K ROM also contains routines necessary to "check" itself. When you turn on or reset the computer, a small red light (LED) on the tape controller board is turned on. The 2K ROM immediately checks itself to be sure that it is functioning properly. It does this by performing a checksum on its own code and comparing that checksum with the value stored in the ROM itself. If the checksums are equal, the ROM turns off the LED.

If you do not get the boot menu, or if booting does not begin after 60 seconds, you should check the LED on the tape controller board. If the light is on, something is wrong either in the ROM or in the supporting circuitry on the board. Both should be checked by your Dynabyte dealer.

The 2K ROMs and the drives they support for booting are listed in the following table. See Section 4.4 for a detailed description of each ROM.

<u>Part No.</u>	<u>ROM</u>	<u>Disk and Tape Drives Supported</u>
808094	UR40	All the configurations supported by UR1, UR2, UR3, UR4, and UR5 ROMs, plus 8" Fujitsu Winchester, 8" Micropolis Winchester, CDC Phoenix, Mini Winchester, and tape
808095	UR50	All the configurations supported by the UR10, UR11, UR13, UR14, and UR15 ROMs, plus 8" Fujitsu Winchester, 8" Micropolis Winchester, CDC Phoenix, Mini Winchester, and tape
808109	UR60	All the configurations supported by the UR6, UR12, UR16, and UR17, plus 8" Fujitsu Winchester, 8" Micropolis Winchester, CDC Phoenix, Mini Winchester, and tape.

Since the 2K ROM supports tape drives, it is installed on the tape controller board instead of the main controller board. This 2K ROM takes precedence over the ROM on the main board, and that ROM must be turned off (see discussion in Section 4.3.1).

When you install a 2K ROM, you also must change some switch settings on the CPU board. These switches control two aspects of the booting operation: the floppy drive configuration, and the booting procedure you choose.

The 2K ROM has "tables" for all possible floppy disk configurations; even if you are booting from a hard disk system, the floppy disks are automatically recognized by the 2K ROM. This allows you to access all the floppy disk drives that are on your system, even if they are not used for booting. However, the ROM must be told which particular configuration your system has. This is done by setting the switches on the CPU board to inform the ROM which table is appropriate for your system.

In summary, the steps required when a 2K ROM is installed are as follows:

1. Install the 2K ROM on the tape controller board.
2. Disable the main board ROM.
3. Determine booting procedure.
4. Determine floppy drive configuration.
5. Set CPU switches.

Each step is described in detail below.

4.3.1 Installing the 2K ROM

The 2K ROM may already be installed in the tape controller board of your computer. If it is, you will still have to concern yourself with the CPU switch settings to make your computer system operate correctly. These settings are detailed below.

If the ROM is not installed in your computer, then you must install it before you can access tape drives. Be sure the machine is turned off. The ROM is inserted into a 28-pin socket in the tape controller board. The 28-pin socket is in the middle of the board at position A-5. The ROM is inserted with pin 1 facing the upper left-hand corner of the board. (Complete installation instructions are shipped with the 2K ROM.)

4.3.2 Disabling the Main Board ROM

There is always a ROM chip on the main (floppy disk) controller board. When you install a 2K ROM chip on the tape controller board, your system has two ROMs. Two ROMs cannot both be operational at the same time; hence, when your system has a 2K ROM on a tape controller board, the ROM on the main controller board must be disabled. This is done by flipping the top switch on the main controller board open (off).

The other five switch settings on the main controller board set I/O port addresses. These switches are set at the factory, and should never be changed. The correct settings are:

Switch 2	closed
Switch 3	closed
Switch 4	open
Switch 5	closed
Switch 6	closed

To disable the tape drives, remove the tape controller board from your system, and change the setting of the top switch on the main controller board back to closed (on), re-enabling the ROM on the main board.

4.3.3 Booting Procedures

The three booting procedures allowed by the 2K ROM are described below. Since the procedures are controlled by CPU switch settings, you must choose the procedure you want to use before the 2K ROM is installed.

4.3.3.1 Procedure 1

Procedure 1 initializes CPU serial port 2 for 9600 baud and sends a menu to the device connected to that port and OCTAPORT 1. The menu allows you to enter a command to boot the computer from either a floppy disk, a hard disk, or a tape unit connected to the computer:

```
DYNABYTE CPM/MFM/OASIS BOOT ROM  
VERSION XX
```

```
H = BOOT FROM HARD DISK  
F = BOOT FROM FLOPPY  
T = BOOT FROM TAPE
```

```
BOOT FROM ?
```

You can then enter a single letter command, "H", "F", or "T", to make the ROM boot from any one of the devices listed.

If you are booting from the hard disk, remember that it takes up to 60 seconds for the hard disk to spin up to the proper speed for access. The 2K ROM waits until the disk is up to speed before it attempts to boot.

4.3.3.2 Procedure 2

Procedure 2 first attempts to boot the operating system from a hard disk attached to the system. The ROM scans the system for all four types of Dynabyte hard disks:

1. Micropolis Winchester (45 megabytes)
2. Mini Winchester (6, 10, 12, 16, or 19 megabytes)
3. Fujitsu Winchester (11 or 23 megabytes)
4. CMD Cartridge Module (32, 64, or 96 megabytes)

If more than one hard disk has been installed in the system, then the priority is as listed above. The Micropolis is attempted first, then the Mini Winchester, then the Fujitsu, and finally the CMD.

If the ROM finds any hard disk attached to the system, it attempts to boot the operating system from that hard disk. The boot from the hard disk could fail for one of several reasons:

1. The hard disk does not contain a system.
2. The hard disk contains an improper system.
3. The hard disk has a hardware error.

If one of these errors occurs, the ROM prints the message "HARD DISK ERROR" and displays the menu shown above for Procedure 1.

4.3.3.3 Procedure 3

Procedure 3 is similar to procedure 2 in that the ROM first tries to boot the operating system from a hard disk attached to the system. It scans the disks in the same order, but if the hard disk scan fails to find a system, the floppy disks are tried.

The ROM first attempts to boot from an 8" floppy disk drive. If there is no 8" drive or if there is no floppy in the drive, the ROM attempts to boot from a 5.25" floppy disk drive, or from a second pair of 8" floppies if there are no 5.25" drives attached.

After each type of floppy disk drive is tried once, the hard disks are tried again. If the hard disks fail once more, the floppy disks are tried again. This cycle continues until a floppy system disk is inserted, or a hard disk containing a system spins up to speed.

4.3.4 Determining the Floppy Disk Configuration

The other parameter that affects the CPU switches is the drive configuration. The 2K ROM contains a set of tables that reflect every possible drive configuration. For example, there is a table that supports single-sided 8" Shugart drives with any single-sided 5.25" drives. Another table supports single-sided 8" Remex and any single-sided 5.25" drives, and so forth (the complete set of tables is shown later). Since the ROM chip is designed to cover any possible configuration, it is necessary for you to tell the ROM chip which configuration your system has.

Novice users may have some difficulty determining the exact floppy configuration on their system. If you have been using a 256 or 512 byte ROM on the main controller board, the old ROM may provide the information. The label on the ROM corresponds to the drive configuration of your old system.

The tables below, which show switch settings for the UR40, UR50, and UR60 ROM, also include the designation of the smaller ROMs that support comparable floppy configurations.

If the designation on the old ROM is not legible, your Dynabyte dealer can tell you the configuration of your system.

As a last resort, you can determine the correct switch settings by trial and error. Start with the most likely switch settings and try to boot your computer. If that does not work, try another combination and boot again, etc. Be sure you have a copy of the distribution disk you are using, as the trial and error process may damage the disk.

4.3.5 Setting the CPU Switches

The CPU switches are located in the switch block at the top of the CPU board.

The following tables show the correct switch settings for each configuration and boot procedure mode. An asterisk in the bottom row represents a closed switch (on). An asterisk in the top row represents an open switch (off). Note that the floppy configuration and the boot procedure interact to determine the CPU switch settings.

In the tables, the column labeled "Comparable ROM" shows which other ROMs support the same floppy configuration. If you are upgrading to a 2K ROM, match the label on your old ROM to the designation in this column to find your floppy configuration.

SWITCH SETTINGS FOR UR40 ROM CHIP

<u>Floppy Disk Configuration</u>	<u>Comparable ROM</u>	<u>Procedure</u>	<u>Switch Settings</u>
			P A A A A 0 1 1 1 1 J 5 4 3 2
Two single-sided 8" Shugart and two 5.25" Micropolis	URL or RBL	1	* * * * *
		2	* * * * *
		3	* * * * *

Two single-sided 8" Remex and two 5.25" Micropolis	UR2 or RB2	1	<pre> | * | * * * * |</pre>
		2	<pre> | * * | * * * |</pre>
		3	<pre> | * * * | * * |</pre>
Two double-sided 8" Shugart or Remex and two 5.25" Micropolis	UR3 or RB3	1	<pre> | * | * * * * |</pre>
		2	<pre> | * * * | * * |</pre>
		3	<pre> | * * | * * * |</pre>
Four double-sided 8" Shugart or Remex	UR4 or RB4	1	<pre> | * * | * * * |</pre>
		2	<pre> | * * | * * * |</pre>
		3	<pre> | * * * | * * |</pre>
Four single-sided 8" Remex	UR5 or RB5	1	<pre> | * | * * * * |</pre>
		2	<pre> | * * | * * * |</pre>
		3	<pre> | * * * | * * |</pre>

SWITCH SETTINGS FOR UR50 ROM CHIP

<u>Floppy Disk Configuration</u>	<u>Comparable ROM</u>	<u>Procedure</u>	<u>Switch Settings</u>	
			P A A A A 0 1 1 1 1 J 5 4 3 2	
Two 5.25" single-sided Tandon and two 8" single-sided Shugart	UR10 or RB10	1	<table border="1"> <tr><td>* * * * *</td></tr> </table>	* * * * *
		* * * * *		
		2	<table border="1"> <tr><td>* * * *</td></tr> </table>	* * * *
* * * *				
3	<table border="1"> <tr><td>* * * *</td></tr> </table>	* * * *		
* * * *				
Two 5.25" double-sided Tandon and two 8" single-sided Shugart	UR11 or RB11	1	<table border="1"> <tr><td>* * * * *</td></tr> </table>	* * * * *
		* * * * *		
		2	<table border="1"> <tr><td>* * * *</td></tr> </table>	* * * *
* * * *				
3	<table border="1"> <tr><td>* * * *</td></tr> </table>	* * * *		
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Two 5.25" double-sided Tandon and two 8" single-sided Remex	UR13 or RB13	1	<table border="1"> <tr><td>* * * *</td></tr> </table>	* * * *
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Two 5.25" single-sided Tandon two 8" single-sided Shugart or Remex	URL4 or RB14	1	<table border="1"> <tr><td></td><td></td><td></td><td>*</td><td>*</td></tr> <tr><td>*</td><td>*</td><td>*</td><td></td><td></td></tr> </table>				*	*	*	*	*		
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Two 5.25" double-sided Tandon and 8" double-sided Shugart or Remex	URL5 or RB15	1	<table border="1"> <tr><td></td><td></td><td></td><td>*</td><td></td></tr> <tr><td>*</td><td>*</td><td></td><td>*</td><td>*</td></tr> </table>				*		*	*		*	*
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SWITCH SETTINGS FOR UR60 ROM CHIP

<u>Floppy Disk Configuration</u>	<u>Comparable ROM</u>	<u>Procedure</u>	<u>Switch Settings</u>
			P A A A A 0 1 1 1 1 J 5 4 3 2
Four 8" single-sided Shugart	UR6 or RB6	1	* * * * *
		2	* * * *
		3	* * * *
Two 5.25" single-sided Tandon, two 8" single-sided Remex, one Mini Winchester	UR12 or RB12	1	* * * * *
		2	* * * *
		3	* * * *
Four 8" single-sided Slimline Tandon	UR16	1	* * * * *
		2	* * * *
		3	* * * *

Four 8" single-sided Slimline Tandon	UR17	1	<table border="1"><tr><td></td><td></td><td></td><td>*</td><td>*</td></tr><tr><td>*</td><td>*</td><td>*</td><td></td><td></td></tr></table>				*	*	*	*	*		
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4.4 Detailed Description of the ROMs

The following paragraphs describe in detail each of the UR ROMs available, the configurations that they support, and the boards on which they are located.

UR1 is a 256-byte ROM that resides on the 5200/5010 floppy disk controller board. It supports two 5.25" single-sided Micropolis floppies and two 8" single-sided Shugart floppies. This ROM should only be installed in systems that have Micropolis 5.25" floppies. For Tandon 5.25" floppies, use UR10 or UR11.

UR2 is a 256-byte ROM that resides on the 5200/5010 floppy disk controller board. It supports two 5.25" single-sided Micropolis floppies and two 8" single-sided Remex floppies. This ROM should only be installed in systems that have Micropolis 5.25" floppies. For Tandon 5.25" floppies, use UR12 or UR13.

UR3 is a 256-byte ROM that resides on the 5200/5010 floppy disk controller board. It supports two 5.25" single-sided Micropolis floppies and two 8" double-sided Shugart or Remex floppies. This ROM should only be installed in systems that have Micropolis 5.25" floppies. For Tandon 5.25" floppies, use UR14 or UR15.

UR4 is a 256-byte ROM that resides on the 5010 floppy disk controller board. It supports four 8" double-sided Shugart or Remex floppies. The four drives are treated as two pairs. Each pair must be driven with a separate AUX/4 card that is daisy-chained from one main card. This is a non-standard configuration, and the UR4 ROM must be special ordered from Dynabyte Customer Services.

UR5 is a 256-byte ROM that resides on the 5010 floppy disk controller board. It supports four 8" single-sided Remex floppies. The four drives are treated as two pairs. Each pair must be driven with a separate AUX/4 card that is daisy-chained from one main card. This is a non-standard configuration, and the UR5 ROM must be special ordered from Dynabyte Customer Services.

UR6 is a 256-byte ROM that resides on the 5010 floppy disk controller board. It supports four 8" single-sided Shugart floppies. The four drives are treated as two pairs. Each pair must be driven with a separate AUX/4 card that is daisy-chained from one main card. This is a non-standard configuration, and the UR6 ROM must be special ordered from Dynabyte Customer Services.

UR10 is a 512-byte ROM that resides on the 5505 floppy disk controller board. It supports two 5.25" single-sided Tandon floppies and two 8" single-sided Shugart floppies. This ROM should only be installed in systems that have Tandon 5.25" floppies; it does not function correctly with Micropolis 5.25" floppies. This ROM also has the ability to boot from the Mini Winchester hard disk. It first attempts to boot from the 5.25" floppies, then from the 8" floppies, and finally from the Mini Winchester.

URL1 is a 512-byte ROM that resides on the 5505 floppy disk controller board. It supports two 5.25" double-sided Tandon floppies and two 8" single-sided Shugart floppies. This ROM should only be installed in systems that have Tandon 5.25" floppies; it does not function correctly with Micropolis 5.25" floppies. This ROM also has the ability to boot from the Mini Winchester hard disk. The ROM first attempts to boot from the 5.25" floppies, then from the 8" floppies, and finally from the Mini Winchester.

URL2 is a 512-byte ROM that resides on the 5505 floppy disk controller board. It supports two 5.25" single-sided Tandon floppies and two 8" single-sided Remex floppies. This ROM should only be installed in systems that have Tandon 5.25" floppies; it does not function correctly with Micropolis 5.25" floppies. This ROM also has the ability to boot from the Mini Winchester hard disk. It first attempts to boot from the 5.25" floppies, then from the 8" floppies, and finally from the Mini Winchester. This is a non-standard configuration, and the URL2 ROM must be special ordered from Dynabyte Customer Services.

URL3 is a 512-byte ROM that resides on the 5505 floppy disk controller board. It supports two 5.25" double-sided Tandon floppies and two 8" single-sided Remex floppies. This ROM should only be installed in systems that have Tandon 5.25" floppies; it does not function correctly with Micropolis 5.25" floppies. This ROM also has the ability to boot from the Mini Winchester hard disk. It first attempts to boot from the 5.25" floppies, then from the 8" floppies, and finally from the Mini Winchester. This is a non-standard configuration, and the URL3 ROM must be special ordered from Dynabyte Customer Services.

URL4 is a 512-byte ROM that resides on the 5505 floppy disk controller board. It supports two 5.25" single-sided Tandon floppies and two 8" double-sided Shugart or Remex floppies. This ROM should only be installed in systems that have Tandon 5.25" floppies; it does not function correctly with Micropolis 5.25" floppies. This ROM also has the ability to boot from the Mini Winchester hard disk. The ROM first attempts to boot from the 5.25" floppies, then from the 8" floppies, and finally from the Mini Winchester. This is a non-standard configuration, and the URL4 ROM must be special ordered from Dynabyte Customer Services.

URL5 is a 512-byte ROM that resides on the 5505 floppy disk controller board. It supports two 5.25" double-sided Tandon floppies and two 8" double-sided Shugart or Remex floppies. This ROM should only be installed in systems that have Tandon 5.25" floppies; it does not function correctly with Micropolis 5.25" floppies. This ROM also has the ability to boot from the Mini Winchester hard disk. The ROM first attempts to boot from the 5.25" floppies, then from the 8" floppies, and finally from the Mini Winchester.

URL6 is a 512-byte ROM that resides on the 5605/5305 floppy disk controller board. It supports four 8" single-sided Tandon Slimline floppies. This ROM also has the ability to boot from the Mini Winchester hard disk. It first attempts to boot from the 8" floppies, and then from the hard disk.

URL7 is a 512-byte ROM that resides on the 5605/5305 floppy disk controller board. It supports four 8" double-sided Slimline Tandon floppies. This ROM also has the ability to boot from the Mini Winchester hard disk. It first attempts to boot from the 8" floppies, and then from the hard disk.

UR40 is a 2K ROM that resides on the 5013/5700/5710 tape controller board. It supports the same drives as UR1, UR2, UR3, UR4, and UR5. This ROM also has the ability to boot from either an 8" Micropolis Winchester, an 8" Fujitsu Winchester, a Mini Winchester, a CDC Phoenix hard disk, or a cartridge tape drive. If this ROM is in a system, it takes priority. The ROM on the main board must be disabled. This ROM only works properly with 5.25" Micropolis floppies. Use UR50 for Tandon 5.25" floppies.

UR50 is a 2K ROM that resides on the 5013/5700/5710 tape controller board. It supports the same drives as UR10, UR11, UR13, UR14, and UR15. This ROM also has the ability to boot from either an 8" Micropolis Winchester, an 8" Fujitsu Winchester, a Mini Winchester, a CDC Phoenix hard disk, or a cartridge tape drive. If this ROM is in a system, it takes priority. The ROM on the main board must be disabled. This ROM only works properly with 5.25" Tandon floppies. Use UR40 for Micropolis 5.25" floppies.

UR60 is a 2K ROM that resides on the 5305, 5605 and 5013 add-on tape controller board. It supports the same drives as UR6, UR12, UR16, and UR17. This ROM also has the ability to boot from either an 8" Micropolis Winchester, an 8" Fujitsu Winchester, a Mini Winchester, a CDC Phoenix hard disk, or a cartridge tape drive. If this ROM is in a system, it takes priority. The ROM on the controller board must be disabled.

The following table summarizes all current Dynabyte computer models, the ROM that is shipped as standard, and the location of the ROM chip.

<u>MODEL #</u>	<u>ROM SHIPPED AS STANDARD</u>	<u>INSTALLATION LOCATION</u> (In order of preference)
5100	None	
5200	UR1	5200 Controller
5300-A2	UR1 (Shugart) or UR2 (Remex)	5505/5010 Controller
5300-B2	UR3	5505/5010 Controller
5305-A2	UR16	5305 Controller
5305-B2	UR17	5305 Controller
5400-A2	UR1 (Shugart) or UR2 (Remex)	5200 Controller
5400-B2	UR3	5200 Controller
5505-A1	UR10	5505 Controller
5505-B1	UR11	5505 Controller
5505-C1	UR11	5505 Controller
5500-A1	UR1	5200 Controller
5500-B1	UR1	5200 Controller
5500-C1	UR1	5200 Controller

5600-A1	UR1 (Shugart) or UR2 (Remex)	5505/5010 Controller
5600-B1	UR3	5505/5010 Controller
5600-C1	UR1 (Shugart) or UR2 (Remex)	5505/5010 Controller
5600-D1	UR3	5505/5010 Controller
5600-E1	UR1 (Shugart) or UR2 (Remex)	5505/5010 Controller
5600-F1	UR3	5505/5010 Controller
5605-A2	UR16	5605 Controller
5605-B2	UR16	5605 Controller
5605-C2	UR17	5605 Controller
5615-A1	UR3	5505/5200/5615 Controller
5615-B1	UR3	5505/5200/5615 Controller
5615-C1	UR3	5505/5200/5615 Controller
5700-A2	UR40	Tape Controller
5700-B2	UR40	Tape Controller
5700-C2	UR40	Tape Controller
5710-A1	UR40	Tape Controller
5710-B1	UR40	Tape Controller
5010-01	UR1 (Shugart) or UR2 (Remex)	5505/5200/5010 Controller
5010-02	UR3	5505/5200/5010 Controller
5011-01	None	
5011-02	None	
5011-03	None	
5013-02	UR40	Tape Controller
5013-04	UR40	Tape Controller
5013-06	UR40	Tape Controller
5015-01	UR3	5505/5200/5010 Controller
5015-02	UR3	5505/5200/5010 Controller
5015-03	UR3	5505/5200/5010 Controller

Notes

5.0 FORMATTING AND CONFIGURING DISKS

DOS 5 supports a variety of disk and tape mass storage systems. Section 5 describes how to format and configure disks for data storage. Section 6, CARTRIDGE TAPE SYSTEMS, discusses using tape for data storage. Following are the types of disks that DOS 5 supports and their corresponding format program.

<u>TYPE OF DISK</u>	<u>FORMAT PROGRAM</u>
1. Floppy Disks	FFORMAT
2. Micropolis Winchester Hard Disks	WFORMAT
9 Megabytes	
27 Megabytes	
45 Megabytes	
3. Fujitsu Winchester Hard Disks	FUFMT
11 Megabytes	
23 Megabytes	
4. Mini Winchester Hard Disks	WINFMT5
6 Megabytes	
10 Megabytes	
12 Megabytes	
16 Megabytes	
19 Megabytes	

Disk drives write data on a disk and read information from them. The two most common types of disks are floppy disks and Winchester hard disks. The term Winchester drive refers to a technology where the disk read/write heads "fly" over the disk to retrieve data.

The advantage of hard disks over floppy disks is their much faster data access time (the time it takes to read or write data) and increased storage capacity. Disk size refers to the maximum number of bytes that can be stored on the disk. A byte is equal to a single character, such as a digit, letter, or special character. A 200-word report takes up approximately 1K bytes of space.

Floppy disk systems cost less than hard disk systems, and the floppy disks are easily transportable.

When you use a disk for the first time it must be formatted. This entails writing onto the disk some initial data to identify each sector and track on the disk. This way, when the disk is actually written to, the operating system can check the disk to make absolutely certain that it is writing at the correct place on the disk. Formatting a disk also erases any old data that may have been on the disk. This formatting procedure must be done for both hard and floppy disks used by the system. It must be performed only once when you first use a disk. Each section below includes a discussion of the formatting program used for a specific type of disk. Each type of disk is configured differently under DOS 5, and you have many options to choose from

for each type. This section explains those options. If you do not know which type of hard disk drive your computer has, check the summary of supported disk drives at the beginning of this section. You can determine which type your drive is by its corresponding storage capacity. You can also consult the technical manual for your computer.

If you are simply going to use a disk as a data disk and never boot from it, then all you need to do is format it. If, however, you are going to boot from the floppy or hard disk, then you must make it a system disk. This is accomplished by first formatting it and then using DYNAGEN to transfer the loader from the distribution disk onto the freshly formatted disk. You must then copy (PIP) the appropriate files onto your new system disk. (See Section 2, GETTING STARTED: COPYING AND INSTALLING DOS 5.)

5.1 Floppy Disks

5.1.1 Description

A floppy disk is made of materials similar to cassette tape but is magnetically coated on both sides and is shaped similar to a 45 RPM record. The disk is encased in a flexible plastic envelope, the jacket. The jacket has a slot through which the drive's read/write head can reach the magnetic surface. The drive engages and moves the magnetic medium through a hole in the jacket.

Two sizes of floppy disk systems are available with Dynabyte computers: 8" systems and 5.25" systems. The notch on the jacket indicates whether or not the disk can be written on. If the notch is covered on an 8" floppy, the disk can be written on; if the notch is not covered, the disk cannot be written to. On a 5.25" floppy disk, however, the reverse is true. If the notch is covered on a 5.25" floppy, the disk cannot be written on; if the notch is uncovered, the disk can be written on.

The 8" systems may be either double or single-sided, and they may be either double density or single density. The 5.25" systems may be either single or double-sided. They are always double density.

For the space on a floppy disk to be useable, it is "formatted"; that is, it must be partitioned in such a way that its space is addressable. Formatting divides the disk into tracks and sectors.

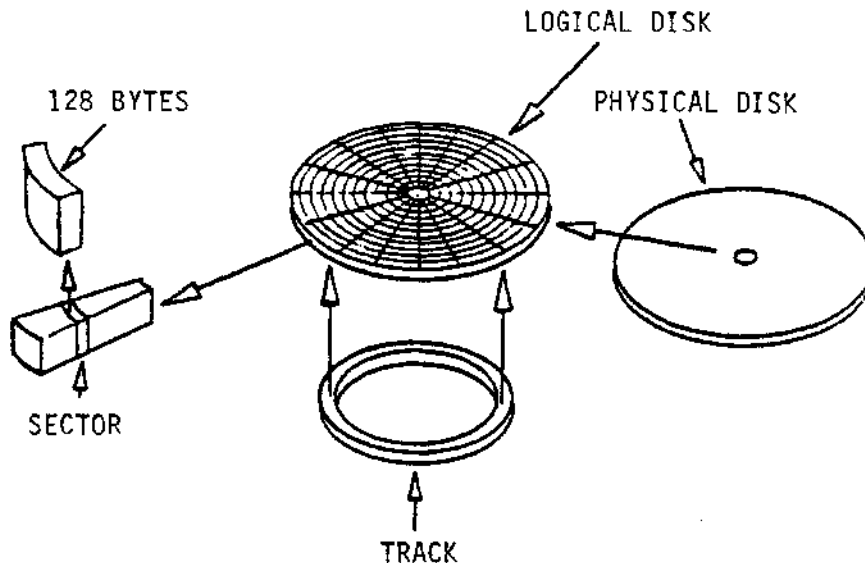


Figure 5.1 Physical Disk and Logical (Formatted) Disk

Furthermore, each sector on a formatted disk has a "header", which is really a preliminary space into which an address for the track and the sector is written. This makes information stored on the floppy disk locatable.

Formatting a floppy disk with a Dynabyte computer is accomplished with the program called FFORMAT (see below). Formatting provides options for disk size (8" or 5.25"), whether the drive is single or double-sided, whether you want single or double density, and the number of directories (potential number of storage files) the disk is to contain. The directory is similar to a table of contents of a book. It tells DOS 5 where files are located. Sections 5.1.1.1 and 5.1.1.2 list the options for 8" and 5.25" floppy disks and the resulting formatted capacity of the system.

One of the differences between Dynabyte's single-user operating system (DOS 3) and this multi-user operating system (DOS 5) is a difference in skew factors on the floppy disks. DOS 3 disks can be read under DOS 5 but their access will be very slow because of different skew factors. If you are reading CP/M disks (DOS 3) under MP/M II (DOS 5), we recommend that you format a blank disk and move the files from the CP/M disk onto the formatted MP/M II disk. This will speed up the access to the disk.

5.1.1.1 8" Floppy Disk Systems

The storage capacity for each 8" floppy disk configuration is:

- a) Single-sided, single density:
 $77 \text{ tracks} \times 26 \text{ sectors/track} \times 128 \text{ bytes/sector} = 250\text{K bytes formatted capacity}$
- b) Single-sided, double density:
 In this system, tracks 0 and 1 are formatted single density (26 sectors/track), while the remaining 75 tracks (tracks 2-76) are formatted double density
 $2 \times 26 \times 128 + 75 \times 54 \times 128 =$

512K bytes formatted capacity

- c) Double-sided, single density:
 $154 \text{ tracks} \times 26 \text{ sectors/track} \times 128 \text{ bytes/sector} =$
 500K bytes formatted capacity
- d) Double-sided, double density:
 Here, the first two tracks are formatted single-density
 (26 sectors/track), while the remaining 152 tracks are
 formatted double density
 $2 \times 26 \times 128 + 152 \times 54 \times 128 =$
 1032K bytes formatted capacity

5.1.1.2 5.25" Floppy Disk Systems

All 5.25" floppy disk systems are formatted double density, so there are only two configuration options:

- a) Single-sided, double density:
 $77 \text{ tracks} \times 32 \text{ sectors/track} \times 128 \text{ bytes/sector} =$
 315K bytes formatted capacity
- b) Double-sided, double density:
 $154 \text{ tracks} \times 32 \text{ sectors/track} \times 128 \text{ bytes/sector} =$
 630K bytes formatted capacity

In a Dynabyte computer, track usage on a floppy disk is as follows:

- Tracks 0-1 reserved for operating system
- Tracks 2-76 (single-sided) for floppy disk directory and file storage
- Tracks 77-153 (double-sided) file storage

Formatting of the floppy disk is accomplished via the FFORMAT utility program. Section 5.1.2 discusses FFORMAT: format (F) and check (C). As already mentioned, formatting partitions physical space on the floppy disk and writes headers, so that the space is addressable and therefore useable.

If the formatting task is selected, FFORMAT prompts the user to enter the number of sides, the density, and the maximum number of directory entries.

The number of directory entries you choose depends on the number and type of files that will be on the disk. If you will be using many short files, increase the number of directory entries. If you be will using a relatively small number of large files, choose a small directory size.

FFORMAT will not ask the first question unless the drive is double-sided. The maximum number of directory entries may be 64, 128, or 256. These numbers correspond to the number of files that a disk may contain. The number of directory entries depends on the number and types of files that will be on the disk. If you will use many short files, increase the directory size; if you will use a relatively small number of large files, select a small number of

directory entries. We recommend for single-sided, single density, 8" floppy disks that the number of directories be 64, thus making them compatible with single-sided double-density systems of other manufacturers.

Formatting also reports bad sectors by track and sector number.

The checking operation first reports to the user the type of disk, i.e., number of sides, single or double density, and number of directory entries. After reporting the type of disk, the actual checking operation begins, and any errors found are reported to the user by track and sector.

5.1.2 FFORMAT

FFORMAT is the utility used to format a floppy disk. FFORMAT allows you to perform two tasks: format (F) a disk and check (C) a disk's format. The FORMAT option prepares a new disk (or erases an old disk) for use by DOS 5. The CHECK option verifies the existing format on a disk to confirm that DOS 5 can use it. The density of a floppy disk and the maximum number of directory entries are also set by the FFORMAT program.

FFORMAT should always be run off-line. No other users on the system should be doing anything! A good way to insure this is to reboot the system with a disk configured for only one terminal. You can then run FFORMAT from this single terminal and be assured that no other user will interfere. This is very important. FFORMAT allows you to format a disk while other users are on-line, but erratic performance may result.

To run FFORMAT simply type its name, followed by a carriage return:

```
QA>FFORMAT<CR>
```

FFORMAT signs on with the following prompt:

DYNABYTE FLOPPY DISK FORMAT UTILITY

VERSION X.X FOR DOS 5.XX

```
ENTER      1 - TO USE FIRST FLOPPY DRIVE
           2 - TO USE SECOND FLOPPY DRIVE
           3 - TO USE THIRD FLOPPY DRIVE
           4 - TO USE FOURTH FLOPPY DRIVE
```

FLOPPY DISK DRIVE TO USE (1, 2, 3 OR 4) ?

FFORMAT is now asking for the floppy disk drive on which you would like to perform the format procedure. The numbering of the floppy drives depends on which floppy was used to boot the system. If you have two 8" drives and two 5.25" drives on your system, then DOS 5 allows you to boot the system on the first 8" drive or the first 5.25" drive. The flashing light on the drive front panel alternately flashes between the 8" and 5.25" drive to tell you that you may boot on either one. If you only have 8" drives or only 5.25" drives, then you do not have a choice and must boot on the first (left-hand or

top) drive on your system.

The drive with which you boot the system becomes floppy drive #1. The drive next to it becomes floppy drive #2. This numbering scheme is independent of the ABCDEFGH drive assignment in DYNASYS. The 1234 numbering scheme is only used for FFORMAT.

If you have four floppy drives on your system, the second pair (the ones not used for booting) become floppy drives 3 and 4.

You must remember which drive you booted the system on to run FFORMAT. You must then tell FFORMAT on which drive (by its number) you would like to perform the format.

After you enter the drive number, FFORMAT selects the drive and prints the type of drive. There are several types of drives that may be connected to a Dynabyte computer. Listed below are the types that may be reported back:

SINGLE-SIDED 8 INCH DRIVE
 DOUBLE-SIDED 8 INCH DRIVE
 SINGLE-SIDED 5 1/4 INCH DRIVE
 DOUBLE-SIDED 5 1/4 INCH DRIVE

FFORMAT may also print one of two error messages, which are caused by trying to use a drive that is not attached to the system or using the wrong type of drive.

CANNOT RECOGNIZE DRIVE TYPE
 NO ATTACHED DRIVE

After FFORMAT reports the type of drive you have selected, it asks you what function you would like to perform:

DO YOU WANT TO:

F - FORMAT
 C - CHECK
 Q - QUIT

YOUR SELECTION ?

You may now select any of the three options. If you would like to format a new floppy disk, then type "F". If you would like to check the format on an existing disk then type "C". If you are finished with the FFORMAT program and would like to return to the operating system, then type "Q".

5.1.2.1 The Format (F) Option

If you select the F option to format a blank or recycled disk, FFORMAT asks you some questions about how you would like to format the disk.

5.1.2.1.1 Side Format

One question is asked about single or double-sided formatting. If you are not

using a double-sided drive, then this question will not be asked. If you are using a double-sided drive, then this question is asked to determine how you would like the floppy to be formatted. A double-sided drive can format either a single-sided floppy or a double-sided floppy. If you select a double-sided format option, then make sure that you are using a double-sided disk in the drive.

If the drive is double-sided, then FFORMAT asks:

SIDE FORMAT SELECTION

- 1 - FOR SINGLE-SIDED
- 2 - FOR DOUBLE-SIDED
- RETURN - FOR SINGLE-SIDED

SIDE FORMAT ?

You may enter either "1" or "2" to select single-sided or double-sided format. A carriage return selects single-sided format.

5.1.2.1.2 Density

FFORMAT may next ask you about the density you would like to use on the disk. All 8" drives on Dynabyte computers are capable of either single or double density capacity. All 5.25" drives are automatically double density, so the density question is not asked for 5.25" drives.

If you format an 8" disk for single density and 64 directory entries, the disk is in the IBM standard 8" floppy disk format. Most other 8" systems from other manufacturers can read a Dynabyte single density disk.

If you format an 8" disk for double density, the disk is in a non-standard format. No other manufacturer's system can read a Dynabyte double density disk. However, it provides you with more than twice the storage capacity on the same disk; so if the disk is going to be used exclusively on a Dynabyte computer, it is a good idea to format it for double density and gain the extra storage space. If you are going to use the disk on another manufacturer's system, you should use single density for compatibility.

If you select an 8" drive to format on, FFORMAT prompts you:

DENSITY FORMAT SELECTION

- 1 - FOR SINGLE DENSITY
- 2 - FOR DOUBLE DENSITY
- RETURN - FOR DOUBLE DENSITY

DENSITY FORMAT ?

You may enter "1" or "2" to select the density you wish to use, or press the carriage return key to select double density.

5.1.2.1.3 Directory Entries

FFORMAT now asks you to enter the number of directory entries to reserve on the disk. You have a choice of 64, 128, or 256 directory entries. It is recommended that you always use 64 directory entries with single-sided single density 8 inch disks. This makes them compatible with other single density systems from other manufacturers. The greater the number of directory entries, the less disk space is available for files. Do not make the directory larger than necessary.

Besides the restriction of single-sided single-density 8" disks, you are free to use up to 256 entries as required. We recommend the following number of directory entries for each configuration:

<u>Configuration</u>	<u>No. of Directory Entries</u>
Single-sided, single-density	64
Single-sided, double-density	128
Double-sided, single-density	128
Double-sided, double density	256

FFORMAT prompts:

NUMBER OF DIRECTORY ENTRIES

1 - FOR 64 ENTRIES

2 - FOR 128 ENTRIES

3 - FOR 256 ENTRIES

RETURN - FOR 64 ENTRIES

OF DIRECTORY ENTRIES ?

You may now select the number of entries to format the disk for or simply hit the return key to select 64 entries.

FFORMAT then asks you to insert the disk you wish to format into the proper drive and hit the return key to start:

INSERT DISK. HIT ESCAPE TO ABORT OR ANY OTHER KEY TO BEGIN ...

You should now place the disk to format into the drive that you have chosen to perform the format with (1, 2, 3 or 4) and hit the return key to start the actual format process. FFORMAT tells you that it is working and asks you to wait:

.... FORMATING IS NOW BEING DONE PLEASE WAIT ...

If, during the format process, FFORMAT finds a bad sector on the disk and is unable to format it, the error is reported as follows:

***** HARD ERROR *****
 HARD ERROR AT TRACK=00 SECTOR=00

FFORMAT tries several times to reformat that sector, but gives up eventually

and reports the above message. This usually indicates a damaged disk. The damaged disk should be removed and the format process tried on a new disk.

After the format process completes and there are no errors, then FFORMAT reports the completion:

******* FORMAT COMPLETED O.K. *******

REPEAT SAME OPERATION ON A NEW DISK (Y/N) ?

FFORMAT has completed formatting the disk you selected and is now asking if you would like to create another disk in that same drive with the same density and directory characteristics.

You may enter "Y" if you would like to create an identical disk. Remove the disk that was formatted and insert another blank or recycled disk into the same drive. FFORMAT asks you to hit return when ready to begin.

If you are finished with the FFORMAT utility or would like to format another disk, but with a different density or drive selection, you should answer the above question "N". FFORMAT then goes back to its original option prompt:

DO YOU WANT TO:

**F - FORMAT
C - CHECK
Q - QUIT**

YOUR SELECTION ?

If you are through with the FFORMAT utility, simply enter "Q" to the question above and FFORMAT returns to the operating system.

5.1.2.2 The Check (C) Option

If you would like to check the disk you just formatted or another disk you suspect to be bad, then enter "C". The check option reads each sector on the disk and verifies that the disk is formatted correctly. Any errors on the disk are reported as shown above.

The check operation does not write on the disk. You may use the check option to verify a disk that has data on it. The integrity of the disk is maintained and you do not lose any existing data. (Be careful though. The "F - FORMAT" option does erase any existing data!).

If you select the "C" option, FFORMAT asks you to insert the disk to be checked into the drive you selected above and hit the return key:

INSERT DISK. HIT ESCAPE TO ABORT OR ANY OTHER KEY TO BEGIN ...

After the return key is hit, the check option reads what type of disk is in the drive and reports it. For example, if you check a disk that has previously been formatted as a single-sided, double density disk, the check option reports:

**DISK IS: SINGLE-SIDED
 DOUBLE DENSITY
 WITH 128 DIR ENTRIES**

After reporting the disk type, FFORMAT begins checking. Any errors found are reported in the hard error format described above. You may attempt to re-format the bad disk. Physically damaged disks can sometimes be recovered in this manner.

If the check operation completes with no errors, then an appropriate message is displayed and the original option prompt returns:

******* CHECK COMPLETED O.K. *******

DO YOU WANT TO:

**F - FORMAT
C - CHECK
Q - QUIT**

YOUR SELECTION ?

If you would like to check another disk, then simply enter "C" again. If you are finished with the FFORMAT utility, then enter "Q" and FFORMAT will return to the operating system.

5.2 Micropolis Winchester Hard Disks

5.2.1 Description

Dynabyte's Micropolis Winchester is available in three different sizes: 9 megabytes, 27 megabytes, and 45 megabytes. It contains from 1 to 3 platters: one platter in the 9 megabyte unit, two platters in the 27 megabyte unit, and three platters in the 45 megabyte unit.

Each platter has two surfaces. Each surface appears to DOS 5 as a single logical drive. One surface on the first platter, however, is used as a servo surface by the drive to perform accurate head positioning.

The 9 megabyte unit therefore appears to DOS 5 as one logical drive. The 27 megabyte unit appears as three logical drives and the 45 megabyte unit appears as five logical drives. Each physical surface can hold approximately 7.5 megabytes of formatted storage.

The DYNASYS generation utility configures these logical drives. See Section 3.1 for more details on running DYNASYS. During the DYNASYS process in the DA option, you are asked for the disk drive assignments for each logical drive on the system. For the Micropolis Winchester unit, you may use the following mnemonics:

MW1 is the logical (physical) drive from a 9 megabyte unit. On the Micropolis Winchester, each physical surface appears to DOS 5 as one logical drive.

MW2 and MW3 are the two logical drives for the second and third surfaces in a

27 or 45 megabyte unit. The 27 and 45 megabyte units also have an MW1 drive as described above.

MW4 and MW5 are the two logical drives for the fourth and fifth surfaces in a 45 megabyte unit. The 45 megabyte unit also has the MW1, MW2 and MW3 drives described above.

You should ascertain the size of Micropolis Winchester unit installed on your system before running the DYNASYS program. When DYNASYS prompts for the disk drive assignments, use only the mnemonics listed above that pertain to the size of Micropolis Winchester unit that is installed on your system. If you use one of the mnemonics above and your Winchester unit does not support it, then the system will crash the first time that drive is accessed.

5.2.2 WFORMAT

WFORMAT is used to format a Micropolis Winchester drive. Before any hard disk surface may be used by the operating system, it must be formatted. Even though the surfaces are formatted at the factory, we highly recommend that you format all of your surfaces when you first receive your hard disk drive.

WFORMAT should always be run off-line. This means that no other users on the system should be doing anything! A good way to insure this is to reboot the system with a disk configured for only one terminal. You can then run WFORMAT from this single terminal and be assured that no other user will interfere. This is very important.

To run WFORMAT type:

0A>WFORMAT<CR>

WFORMAT then signs on:

DYNABYTE WINCHESTER FORMAT UTILITY

VERSION X.X - FOR DOS 5.XX

**ENTER MW1 - FOR HEAD 1
 MW2 - FOR HEAD 2
 MW3 - FOR HEAD 3
 MW4 - FOR HEAD 4
 MW5 - FOR HEAD 5
 ALL - FOR ALL HEADS**

HEAD TO FORMAT ?

You may now select either "MW1", "MW2", "MW3", "MW4", "MW5", or "ALL" to format either a single surface or all of the surfaces. Each surface contains one logical drive for the operating system to use. The 9 megabyte Winchester thus appears to DOS 5 as a single drive with approximately 7 megabytes of formatted storage; the 27 megabyte drive appears as three logical drives, each with about 7 megabytes of storage; and the 45 megabyte Winchester appears as five logical drives.

After you select the surface to format, WFORMAT asks you:

DO YOU WANT TO FORMAT OR QUIT (F OR Q) ?

If you respond with "Q", you are returned to the operating system. "F" causes WFORMAT to begin the format process:

FORMATTING DISK

It takes approximately 50 seconds to format each surface. After the format is complete, WFORMAT prints:

FORMAT COMPLETE

After the formatting process is complete, WFORMAT automatically returns to the operating system.

If you selected a surface that is not contained in the Winchester model you have, an illegal head message is displayed and WFORMAT aborts to the operating system.

ILLEGAL HEAD

If you selected "ALL", WFORMAT attempts to format all five surfaces. If you do not have all five surfaces in your Winchester model, then WFORMAT formats the first surface, then the others. When it finds a nonexistent surface, the format procedure ends and the following message is displayed:

**x HEADS FORMATTED.
FORMAT COMPLETE.**

The number of heads should correspond to the number of surfaces in your drive. Should a different number appear here, you should reformat the disk.

Any errors are reported at the console as:

HARD DISK ERROR CODE x. PLEASE REFER TO YOUR MANUAL.

The Winchester manual gives more details on each of the error codes. Below are the error codes with a short description of possible causes:

Error codes 1 and 2 - incorrect data
3 - drive is not ready
4 - drive fault
6 - sector not found
7 - data reliability error
8 - verify error

After WFORMAT has formatted the appropriate surface(s), your Winchester drive is ready for use by the operating system.

You may also run WFORMAT any time you wish to erase an entire surface.

5.3 Fujitsu Winchester Hard Disks

5.3.1 Description

Dynabyte's Fujitsu Winchester is available in two sizes: 11 megabytes and 23 megabytes. The 11 megabyte unit contains 2 platters, and the 23 megabyte unit contains 4 platters.

The Fujitsu Winchester is configured during the format process, in one of three different ways. None of the choices — A, B or C — has an exact logical to physical platter correspondence. The three configurations are:

11 MEGABYTE FUJITSU

Configuration A	Configuration B	Configuration C
FUJ1 - 8.3 MB	FUJ1 - 4.7 MB	FUJ1 - 2.3 MB
FUJ2 - 1.2 MB	FUJ2 - 4.7 MB	FUJ2 - 2.3 MB
		FUJ3 - 2.3 MB
		FUJ4 - 2.3 MB

23 MEGABYTE FUJITSU

Configuration A	Configuration B	Configuration C
FUJ1 - 8.3 MB	FUJ1 - 4.7 MB	FUJ1 - 2.3 MB
FUJ2 - 1.2 MB	FUJ2 - 4.7 MB	FUJ2 - 2.3 MB
FUJ3 - 8.3 MB	FUJ3 - 4.7 MB	FUJ3 - 2.3 MB
FUJ4 - 1.2 MB	FUJ4 - 4.7 MB	FUJ4 - 2.3 MB
		FUJ5 - 2.3 MB
		FUJ6 - 2.3 MB
		FUJ7 - 2.3 MB
		FUJ8 - 2.3 MB

Note that with the 23 megabyte Fujitsu drive, you have exactly twice the number of available logical drives than with the 11 megabyte. Which configuration you choose depends largely on the type and size of your applications. The configuration is set at the time you format the Fujitsu Winchester with the FUJFMT program (see below).

The "FUJ1" - "FUJ8" mnemonics are the drive mnemonics that can be used in the DYNASYS program (the DA option) to assign the logical drives after a configuration has been chosen. See Section 3.1.5.

You can see that each configuration divides the Winchester into different logical drive sizes. In configuration A there are two logical drives on each 11 megabytes of the unit. The first logical drive is 8.3 megabytes in size, FUJ1. This is the largest drive size allowed in an MP/M II system. The second logical drive is 1.2 megabytes, FUJ2, which is the amount of remaining storage after the 8.3 megabyte drive has been specified. The second 11 megabytes are divided exactly like the first 11 with one logical drive of 8.3

megabytes, FUJ3, and one logical drive of 1.2 megabytes, FUJ4.

However, you may not want one large drive and one small one, but drives of equal size. Configuration B divides each 11 megabytes into two equal logical drives of 4.7 megabytes in size. The first 11 megabytes contain two logical drives, FUJ1 and FUJ2, and the second 11 megabytes contain two logical drives, FUJ3 and FUJ4.

There may be some situations in which you would want the Winchester divided into several smaller logical drive sizes. Configuration C divides the first 11 megabytes into 4 logical drives of 2.3 megabytes in size -- FUJ1, FUJ2, FUJ3 and FUJ4. The second 11 megabytes are also divided into 4 logical drives of 2.3 megabytes in size -- FUJ5, FUJ6, FUJ7, FUJ8.

The FUJFMT program asks you which of the three configurations you would like to use before it formats the Winchester. You must then decide which configuration best suits the applications that will be run. If you are unsure, we recommend that you use configuration B. This is the best compromise between drive size and logical disk usage.

After the configuration has been chosen and the Fujitsu Winchester has been formatted, you can install the drive using the DYNASYS utility (see Sections 2 and 3).

DYNASYS will prompt you to enter the logical drive assignments:

```

      F1 - F4      = FLOPPY DISK DRIVES
      FUJ1 - FUJ8 = FUJITSU WINCHESTER DRIVES
      MIN11 - MIN18 = MINI WINCHESTER (5 1/4")
      MW1 - MW5   = MICROPOLIS WINCHESTER DRIVES
    
```

DRIVE A: ?

In the prompt table the Fujitsu Winchester is listed as FUJ1 - FUJ8. This prompt message is designed to display the maximum number of logical drives available. If you have a 23 MB Fujitsu and have chosen configuration C during FUJFMT, then you have all eight logical drives available -- FUJ1 - FUJ8.

During DYNASYS, you must only assign the logical drives that are available to your size Fujitsu and the configuration chosen. Do not use any "FUJ" mnemonics for logical drives that are not supported by you system.

Any of the Fujitsu mnemonics can be used for any of the logical drives in the system, A-P.

5.3.2 FUJFMT

FUJFMT is the utility used to format and configure a Fujitsu Winchester hard disk drive. For an example of FUJFMT see Section 2.3.

FUJFMT should always be run off-line. This means that no other users on the system should be doing anything! A good way to insure this is to reboot the system with a disk configured for only one terminal. You can then run FUJFMT from this single terminal and be assured that no other use will interfere.

To run FUJFMT simply type:

0A>FUJFMT<CR>

FUJFMT then signs on:

DYNABYTE FUJITSU WINCHESTER FORMAT UTILITY

VERSION X.X FOR DOS 5.XX

**ENTER F - FORMAT
 C - CHECK
 <RETURN> - RETURN TO OPERATING SYSTEM**

YOUR SELECTION ?

You may now use FUJFMT to either FORMAT or CHECK a Fujitsu Winchester disk drive. Select the option you want and hit the return key.

FUJFMT asks you which size drive you have:

SELECT THE DRIVE TYPE:

**0 - 11 MEGABYTE DRIVE
1 - 23 MEGABYTE DRIVE**

ENTER DRIVE TYPE (0 OR 1) ?

You should now enter the number corresponding to the size of Fujitsu drive you have. Enter a 0 for an 11 megabyte drive or enter a 1 for a 23 megabyte drive. You may use the 0 selection to format or check only the first 11 megabytes of a 23 megabyte drive.

If you select the FORMAT option. FUJFMT next prompts you to select a configuration that divides the disk into logical drives of various sizes:

DRIVE CONFIGURATION

<u>A</u>		<u>B</u>		<u>C</u>
FUJ1 - 8.3 MB	:	FUJ1 - 4.7 MB	:	FUJ1 - 2.3 MB
FUJ2 - 1.2 MB	:	FUJ2 - 4.7 MB	:	FUJ2 - 2.3 MB
FUJ3 - 8.3 MB	:	FUJ3 - 4.7 MB	:	FUJ3 - 2.3 MB
FUJ4 - 1.2 MB	:	FUJ4 - 4.7 MB	:	FUJ4 - 2.3 MB
			:	FUJ5 - 2.3 MB
			:	FUJ6 - 2.3 MB
			:	FUJ7 - 2.3 MB
			:	FUJ8 - 2.3 MB

PLEASE ENTER DRIVE CONFIGURATION OR <RETURN> FOR B ?

You should now enter the letter of the drive configuration you wish to use with the Fujitsu drive. If you have an 11 megabyte drive, then your Winchester drive has only half of the drives listed above.

Next, the FUJFMT utility will begin to format the drive:

FORMAT IN PROGRESS.

.....

After the drive has completed formatting, the bad track table is displayed.

BAD TRACK TABLE

<u>FIRST 10 MEGABYTES</u>				<u>SECOND 10 MEGABYTES</u>			
<u>BAD TRACK</u>	-	<u>GOOD TRACK</u>	:	<u>BAD TRACK</u>	-	<u>GOOD TRACK</u>	
0 -	0000H	-	:	9-	0000H	-	0001H
1 -	0000H	-	:	10-	0000H	-	0002H
2 -	0000H	-	:	11-	0000H	-	0003H
3 -	0000H	-	:	12-	0000H	-	0004H
4 -	0000H	-	:	13-	0000H	-	0005H
5 -	0000H	-	:	14-	0000H	-	0006H
6 -	0000H	-	:	15-	0000H	-	0007H
7 -	0000H	-	:	16-	0000H	-	0008H
8 -	0000H	-	:	17-	0000H	-	0009H

ENTER ITEM TO CHANGE OR <RETURN> TO ACCEPT ?

Every Fujitsu Winchester may have some bad tracks on the disk. This is a natural occurrence and not all drives will have bad tracks on the disk. The drive manufacturer tests each drive under high heat conditions and determines the number and location of bad tracks. These are printed on a card attached to the Fujitsu Winchester drive.

To accommodate these bad tracks on the Winchester, the FUJFMT program writes a bad track table on the Winchester when it formats the drive. There are actually two bad track tables, one for the first 11 megabytes and one for the second 11 megabytes. The bad track table has 9 entries for each 11 megabytes.

The FUJFMT program prompts you to enter any additional bad tracks with the table shown above.

There are nine tracks reserved on each 11 megabytes of the Fujitsu Winchester for bad track substitution. These are tracks 1-9. In the table each bad track is listed next to its good replacement (1-9).

The bad tracks found by the factory and listed on the card attached to the Winchester will have already been entered into the bad track table before the drive left Dynabyte.

You may enter additional bad tracks if they are found later in the life of the drive. You should never change the bad tracks that have already been entered. When you use the "C - CHECK" option in the FUJFMT utility, it reports back any bad tracks that it finds and which 11 megabytes the bad track is on (the first or second 11 megabytes). You may then enter this bad track into the bad track

table if it is not already there.

The CHECK option reports bad tracks in logical hex notation. This is the form that the bad track table requests the entries to be made. Enter bad tracks reported from this option just as it was displayed on the screen.

However, the bad tracks reported from the drive manufacturer are not reported in this logical track manner; they are reported in "cylinder and head" notation. You do not normally need to concern yourself with this notation, since these bad tracks have already been entered into the bad track table before the drive leaves Dynabyte. If the bad track table is damaged or is inadvertently altered, however, it has to be recreated.

To enter a bad track from the "cylinder - head" notation, first determine whether the bad track resides on the first 11 megabytes or the second. Since there are two bad track tables for the 23 megabyte drive -- one for the first 11 megabytes and one for the second 11 megabytes -- you must decide which table to place the bad track in. The head value determines which bad track table to use. There are 8 heads on a 23 megabyte drive (0-7). The first 4 heads (0-3) reside on the first 11 megabytes and the second 4 heads (4-7) reside on the second 11 megabytes. If you look at the head value listed on the card attached to the drive, you will find a number from 0 to 7. If this head value is less than 4 (0-3), then use the first bad track table for the first 11 megabytes. If the head value is greater than 3 (4-7), then use the second bad track table for the second 11 megabytes.

The head value should then be converted into the range 0 to 3. If the head value is already 0-3, just leave it as it is. If the head value is in the range 4-7, then you must subtract 4 from it to place it in the range 0-3.

To compute the logical bad track simply take the value listed on the card attached to the drive, multiply it by 4 and add the adjusted head number:

$$\text{LOGICAL BAD TRACK} = (\text{CYLINDER} * 4) + (\text{ADJUSTED HEAD VALUE})$$

This logical bad track value can then be entered into the appropriate bad track table. Remember to enter the value into the proper table for the first or second 11 megabytes.

Under normal circumstances you need not concern yourself with the above discussion about bad track computations. As mentioned before, these computations have already been made at Dynabyte before the drive was shipped. If you encounter any additional bad tracks from the CHECK option in the FUJFMT program, they are already reported in the logical bad track notation and are simply entered "as is" in the bad track table.

The bad track table and drive configuration are read off of the drive before it is formatted by the FUJFMT program. When the bad track table is listed on the console, the existing bad tracks are listed as they were entered before. You do not need to re-enter these bad tracks. You may simply hit the return key to keep the bad track table as it is. This allows you to enter the bad track table only once and not have to re-enter it each time the drive is formatted.

This applies to the drive configuration also. If you set the drive up for

configuration A, you can simply enter a return when the configuration question is asked the next time you format the drive. This will tell the FUJFMT program to keep the same configuration.

After the bad track table has been set to include all of the bad tracks necessary, then hit return to write the table onto the disk. FUJFMT then completes and returns to the operating system.

FORMAT COMPLETE.

(A)

After the drive has been formatted, you should run the CHECK option to find any bad tracks on the drive. If the CHECK option does find some bad tracks and they are not already in the bad track table, then run the FORMAT option again and reformat the drive. After the drive finishes reformatting, you can enter the new values into the bad track tables.

Section 2.3 provides an example of how to find and enter bad tracks with FUJFMT.

5.4 Mini Winchester Hard Disks

5.4.1 Description

A Mini Winchester disk system is a 5.25" Winchester disk system (a hermetically sealed system with low flying heads that rest on the surface of the disks when the disks are not in motion).

Dynabyte offers Mini Winchester systems in five different storage capacities: 6MB, 10MB, 12MB, 16MB, and 19MB.

The 6MB system, containing 2 disk platters, has four recording surfaces. Each surface has 153 tracks; each track is divided into 17 sectors; and each sector on a track contains 512 bytes. Thus, the total formatted storage capacity is $4 \times 153 \times 17 \times 512 = 5.32\text{MB}$.

The 10MB system, containing two disk platters, also has four recording surfaces. For this system, however, each surface has 256 tracks. The number of sectors (17) and the number of bytes in a sector (512) are the same as for the 6MB system. Thus, the total formatted capacity of this system is $4 \times 256 \times 17 \times 512 = 8.91\text{MB}$.

The 12MB system contains two disk platters -- four recording surfaces. This system, however, provides an increased storage capacity of 306 tracks per surface. Like the 6MB and 10MB systems, the 12MB system contains 17 sectors per track and 512 bytes per sector. The total formatted capacity of this system is therefore $4 \times 306 \times 17 \times 512 = 10.65\text{MB}$.

The 16MB system contains three disk platters and thus six recording surfaces. Each surface has 256 tracks; the number of sectors is 17; and the number of bytes per sector is 512. Thus, the total formatted capacity of this system is $6 \times 256 \times 17 \times 512 = 12\text{MB}$.

The 19MB system contains three disk platters, thus six recording surfaces.

This system, however, provides an increased storage capacity of 306 tracks per surface. Having 17 sectors per track and 512 bytes per sector, the total formatted capacity of this system is $6 \times 306 \times 17 \times 512 = 15.98\text{MB}$.

The first track of a Mini Winchester system is reserved for the operating system; the remaining tracks are used for bad track substitution, directories, and for file storage.

A single Mini Winchester system in a Dynabyte computer contains either two or three physical hard disk platters (two for the 6MB, 10MB, and 12MB systems; three for the 16MB and 19MB system). The space on these disks may be divided in such a way as to yield one or more logical drives, i.e., one or more separate physical drives from the point of view of the Dynabyte computer (CPU). This process of dividing the space on a single disk system is referred to as configuring the system. A Mini Winchester is formatted and configured via the WINFMT5 program, which is described below. Section 5.4.2 lists the possible configurations for each system size.

The various configurations are designed to give you a range of choices suitable to your application. For instance, with a 16MB system, you may choose one large and one small logical drive, two medium size logical drives, or four small logical drives. The choice depends on how many users will be on the system and how much storage capacity each user needs. You should pick the configuration most fitted to the application.

Make a note of which configuration you choose during WINFMT5 because you will need this information during DYNASYS, the DA option. DYNASYS allows you to name your logical drives with a letter from A to P. You must, however, remember how many logical drives your Mini Winchester has. This number depends on the size of the Mini Winchester and the configuration you choose during the FC option of WINFMT5. For instance, a 6 MB Mini Winchester configured with option A has only one logical drive: MIN1. A 19 MB Mini Winchester drive configured with option C has four logical drives: mnemonics MIN1, MIN2, MIN3 and MIN4 (see the tables in Section 5.4.2.2). In DYNASYS, do not assign drive letters to mnemonics that your system does not support or your system may not reboot. See Section 3.1.5 for more information.

Formatting a system partitions the space on the disks into tracks and sectors and writes a "header" at the beginning of every sector on every track. This makes space on the disks addressable. (See Figure 5.1). Both formatting and configuring a Mini Winchester system are accomplished with the WINFMT5 utility program.

5.4.2 WINFMT5

WINFMT5 is a utility program used for formatting and checking Mini Winchester disk systems.

To run this program, enter "WINFMT5" to the system prompt:

```
GA>WINFMT5<CR>
```

The following menu is then displayed:

***** DYNABYTE 5.25" HARD DISK FORMAT VERSION X.XX FOR DOS 5.XX *****

- CO) CHECK ONLY
- FC) FORMAT AND CHECK
- EK) RETURN TO OPERATING SYSTEM

YOUR SELECTION:

Enter the code for the desired menu selection (and a carriage return).

5.4.2.1 The Check Only (CO) Option

If you choose the CO option by typing "CO," WINFMT5 checks only for hard errors and displays the bad track table as described below.

5.4.2.2 The Format and Check (FC) Option

If the FC option is chosen, WINFMT5 formats the Mini Winchester drive. When it has completed the formatting process, it prints one of the following messages, depending on the size of your Mini Winchester:

6MB HARD DISK DRIVE

- A) 1 DRIVE : 4.9MB : 1024 DIRECTORY ENTRIES
- B) 2 DRIVES : 2.48MB : 512 DIRECTORY ENTRIES

10MB HARD DISK DRIVE

- A) 1 DRIVE : 8.3MB : 1024 DIRECTORY ENTRIES
- B) 2 DRIVES : 4.2MB : 512 DIRECTORY ENTRIES
- C) 4 DRIVES : 2.1MB : 256 DIRECTORY ENTRIES

12MB HARD DISK DRIVE

- A) 1 DRIVE : 8.33MB : 1024 DIRECTORY ENTRIES
- 1 DRIVE : 1.96MB : 256 DIRECTORY ENTRIES
- B) 2 DRIVES : 5.14MB : 512 DIRECTORY ENTRIES
- C) 4 DRIVES : 2.57MB : 256 DIRECTORY ENTRIES

16MB HARD DISK DRIVE

- A) 1 DRIVE : 8.33MB : 1024 DIRECTORY ENTRIES
- 1 DRIVE : 4.49MB : 512 DIRECTORY ENTRIES
- B) 2 DRIVES : 6.4MB : 512 DIRECTORY ENTRIES
- C) 4 DRIVES : 3.2MB : 256 DIRECTORY ENTRIES

19MB HARD DISK DRIVE

- A) 1 DRIVE : 8.33MB : 1024 DIRECTORY ENTRIES
- 1 DRIVE : 7.11MB : 512 DIRECTORY ENTRIES
- B) 2 DRIVES : 7.22MB : 512 DIRECTORY ENTRIES
- C) 4 DRIVES : 3.86MB : 256 DIRECTORY ENTRIES

Enter an "A", "B" or "C" to select a configuration. WINFMT5 configures the drive accordingly and then checks for hard errors. It prints the message:

BEGIN CHECK-ESC TO ABORT

After the checking process is complete, the bad track table is displayed. The table shown below is an example.

```

:-----:
:                BAD TRACK TABLE                :
:-----:
: : 1)           : 2)           : 3)           : 4)           : 5)           :
: : 11)          : 12)          : 13)          : 14)          : 15)          :
: : 16)          : 17)          : 18)          : 19)          : 20)          :
: : 21)          : 22)          : 23)          : 24)          : 25)          :
: : 26)          : 27)          : 28)          : 29)          : 30)          :
: : 31)          : 32)          : 33)          : 34)          : 35)          :
: : 36)          : 37)          : 38)          : 39)          : 40)          :
:-----:
    
```

"T*****" (LOGICAL BAD TRACK NUMBER)
 "H*,C****" (HEAD, CYLINDER NUMBER)

ENTER ONE OF THE ABOVE OPTIONS OR <RETURN> TO ACCEPT: <CR>

The numbers preceding the right parentheses (1-40) are reserved tracks; that is, they are known to be good and may be substituted for bad tracks. To make such a substitution for a bad track identified by a track number, enter "T" followed by the bad track number and a carriage return. To make such a substitution for a track identified by a head and cylinder number, enter "H" followed by the head number; then enter "C" followed by the cylinder number. For example, if a bad track is identified by head 2, cylinder 41, then enter "H2, C41":

ENTER ONE OF THE ABOVE OPTIONS OR <RETURN> TO ACCEPT: H2, C41<CR>

and press carriage return. A reserved track is then automatically substituted for the bad track in the bad track table.

If a bad track is identified by track 68, then enter "T68" and a carriage return:

ENTER ONE OF THE ABOVE OPTIONS OR <RETURN> TO ACCEPT: T68

Then "68" will appear next to "1)" in the subsequent display of the bad track table, i.e.,

1) 68

When you have finished with the bad track table and have typed a return to accept it, the following message appears:

CHECK COMPLETED O.K.

PRESS <RETURN> TO DISPLAY MENU.

Enter a carriage return to get back to the WINFMT5 menu.

When you are done, enter EX as your menu selection to return to the operating system.

6.0 CARTRIDGE TAPE SYSTEMS

6.1 Description

Cartridge tapes facilitate data base storage and shipping. They also provide an easy and inexpensive means of storing backup copies of data, or storing files that are infrequently used.

The DTIP utility transfers data to and from cartridge tapes. DTIP allows you to back up or restore a single file or an entire disk with equal ease, at a rate of 2 minutes per megabyte of data.

DTIP's features include:

- Easy to use menu-driven command format
- Tape Directory display option
- Tape file to disk file Verify option
- Self-testing Initialize option
- Backup and restore from any Dynabyte disk drive:

- 5.25" Floppy Disks

- 8" Single-Sided Floppy Disks

- 8" Double-Sided Floppy Disks

- 11 Megabyte Winchester Hard Disks

- 23 Megabyte Winchester Hard Disks

- 45 Megabyte Winchester Hard Disks

- 32 Megabyte Cartridge Module Hard Disks

- 64 Megabyte Cartridge Module Hard Disks

- 96 Megabyte Cartridge Module Hard Disks

- 6 Megabyte Mini Winchester Disks

- 10 Megabyte Mini Winchester Disks

- 12 Megabyte Mini Winchester Disks

- 16 Megabyte Mini Winchester Disks

- 19 Megabyte Mini Winchester Disks

Data is organized on cartridge tape much as it is on a disk. An important difference, however, is that tape is a sequential access media. This means that you must access tape files in the order that they are stored on the tape medium. If the file you want has already passed the tape drive's read/write mechanism, the tape will need to be rewound before the file can be located by the DTIP utility. This is explained in the Tape to Disk Restoration option in Section 6.2.1. Like disk, tape allows you to refer to a file by name or by using wildcards (* and ?). See Section 6.7 for technical information on the tape data format.

6.1.1 Cartridge Tape Media

The tape media is sealed within a rectangular cartridge case. The tape feeds along one of the long edges of the cartridge. Insert the cartridge into the

tape drive slot with this side toward the drive and with the cartridge label facing up.

DTIP uses cartridge tapes with a formatted capacity of up to 13.4 megabytes. Always use certified media. As of this printing, the only cartridge tapes certified for use with the 6400 BPI technology drives are:

Verbatim TC-8450 (450')
3M-Scotch DC-300A (300')
3M-Scotch DC-300XL (450') (Lot numbers 087-XXX, 089-XXX and
8105/0505 known to perform poorly and
should not be used.)

You may write-protect a tape to prevent someone from inadvertently overwriting its data. To write-protect a tape, turn the write-protect arrow to the safe position. Before you initialize a tape, make sure it is not write-protected.

6.1.2 Testing the Cartridge Tape System

The Initialize option (described in Section 6.2) performs a system self-test.

When you first use the DTIP utility you should select this option before anything else.

We suggest that you experiment with the various DTIP operations and perform initial testing with non-critical data. Some of the DTIP commands are potentially dangerous unless you thoroughly understand their behavior. Experiment with a blank tape and a backup floppy disk. We recommend that you follow the example sessions provided in Section 6.3.

6.1.3 Invoking DTIP

Before you use the DTIP utility, insert your tape cartridge into the tape drive slot. DTIP is invoked by one of two calling methods:

DTIP or DTIP d:filename

Where:

d is an optional drive specification, and
filename is the name of a DTIP submission file.

The first method is used to invoke DTIP in its standard form. The second invokes DTIP with an executable instruction file. This is explained in Section 6.4.

When invoked in its standard form, DTIP displays a menu of the possible options, prompts for your selection, performs the task and returns to the menu. To abort execution of an option and return to the main menu, type <ESC>. If the program is aborted during a backup or restore, the data written is not necessarily valid and should be rewritten.

The following **DTIP COMMAND MENU** appears at the console:

CODE:	ACTION:
I	Initialize Tape
T	Retension Tape
B	Disk to Tape Backup
R	Tape to Disk Restoration
A	Disk to Tape Append
V	File Verification
D	Tape Directory
C	Tape to Tape Copy
<ESC>	Return to Monitor

Note that you should not enter a carriage return after you type one of the options.

6.2.1 DTIP Options

I - Initialize Tape

You must use the I option to initialize a tape before writing data to it. The Initialize Tape routine erases any data that was on the cartridge tape. In this respect, the Initialize option is like the FORMAT utility for disks.

The Initialize option also performs a series of tests on both the tape medium and the tape drive. If any errors occur during this procedure, DTIP provides you with Disk Status and Interface Status error codes. These errors are defined in Section 6.5.

T - Retension Tape

The Retension Tape command rewinds the tape, does a high speed search to the end of the tape, and again rewinds the tape. This procedure restores tension to a worn tape. Processing a tape with this command can often alleviate read/write errors.

B - Disk To Tape Backup

You must initialize a tape with the I option before using Disk To Tape Backup. Disk To Tape Backup rewinds the tape and accepts a file name to process, either from the console (under standard operation) or from an executable instruction file. You may specify the source disk drive (A-P) and the user number (0-15), otherwise the current drive and user numbers are assumed.

Disk To Tape Backup then searches for this file on the disk and copies it to the tape. Once it has completed this action, it will prompt you again for a file name. The tape is not rewound between file name inputs; the previously backed up data is not lost by specifying another file to backup. If the file you specify cannot be found on the disk, this condition is reported and the routine prompts you for another file name. When a carriage return is typed at the file name prompt, an end of data flag is written onto the tape. The program returns to the menu display while the tape is rewound.

If a tape is filled during a backup operation, a message appears requesting a new tape. The backup continues when a new tape is inserted.

WARNING

Backup should be run off-line -- no other user should be accessing any of the disk drives on the system.

R - Tape To Disk Restoration

The Tape To Disk Restoration is similar to the Backup routine, except that files are read from the tape and written to the disk. This procedure gives two additional prompts. After you enter a filename, you are asked whether the search for the specified file should be conducted from the beginning of data on the tape. If you respond Y, the tape is rewound and the search commences from the beginning of the tape. If you respond N, the search is conducted from the current tape position to the end of data flag. You may also search for multiple files using a wildcard (* or ?) in the filename. However, the search always stops at the end of data flag. Any subsequent file search requires that the tape be rewound first.

You are asked if the source device should be ignored. When the data was originally written from disk to tape, the source drive (A-P) was stored as part of the tape header information (see Section 6.7.1). If you respond N, then only those tape files with a device code matching the current disk drive in use, whether by default or specification, are considered. If you respond Y, then all tape files will be considered, regardless of their device code.

You may also restore the entire contents of a cartridge tape. If ALL is specified, the routine copies all files from the tape to the disk. These files are restored to the user and device specified with the Backup option.

A - Disk To Tape Append

The Disk To Tape Append searches for the end of the data flag on the tape, and starts backup procedures at this point. The Append function also increments the Save Set code by one, unless you specify otherwise. See Section 6.2.2 for an explanation of the Save Set feature. In all other respects this routine is the same as the Backup routine.

The Append function searches for the last track in use, starting with track 4. This reduces the average time required to locate the end of data flag on the tape.

A tape must be initialized (I) and at least one Disk to Tape Backup (B) must be done before Append can be used.

V - File Verification

The File Verification routine verifies a disk file against its counterpart on tape. You are prompted for the name of the file to verify. Your response can be a specific file name, or a name containing wildcards. We recommend that you precede the file name by a Control-P to allow any displayed errors to be sent to the printer.

The procedure then searches for this file on the tape, and opens it on the disk. If the file is not present on either media, an appropriate error message is reported and the routine restarts. Once both files have been found, their contents are compared on a byte by byte basis. If any discrepancies are found, the extent, record number and byte number within the disk record (0 thru 7F hexadecimal) are displayed along with the byte value present in both the tape file and the disk file. If one file ends before the other, then the screen will display the number of remaining bytes in the longer file and the ending byte value in the terminated file. After all bytes have been compared, you are prompted for another file name. The routine is terminated by entering a carriage return.

D - Tape Directory

The Tape Directory lists the name, type, source drive, user number and Save Set code for each file on the tape. This routine confirms that every block of data on the tape is readable.

C - Tape To Tape Copy

The Tape To Tape Copy option copies data from the one tape drive to another. Dynabyte does not support this option.

6.2.2 Save Set Feature

The Save Set feature allows you to save (and restore) multiple copies of a file with the same name on one tape cartridge. For example, suppose you wanted to keep backup copies of the inventory balance file -- INV.DAT -- at the end of every month. Normally, you can't have more than one file with the name INV.DAT on a single tape. To avoid having to use a different tape for each month, you can use the Save Set feature.

Save Set numbers are like user numbers -- you can assign a different Save Set number to each file. In order to access the file you want, you also have to designate the corresponding Save Set number. Save Sets are referred to by a two-digit hexadecimal number between 00 and 7F.

If you have no reason for using the Save Set feature, don't use it. The DTIP options Backup and Restore default to the 00 Save Set number if you don't designate otherwise. The Append function, however, automatically increments the Save Set number whenever you use it.

6.3 Examples

The two following examples show how DTIP responds to input. The first example shows how to invoke DTIP, initialize a tape, and copy a file from disk to tape. The second example shows how to append files from disk to tape, obtain a tape directory, and restore a file from tape to disk.

First, boot your system. If you are booting from the Distribution Diskettes, boot from Diskette 2. Make sure a blank cartridge tape is not write-protected and insert it into the cartridge drive.

Example 1

In this example, we will put a backup copy of the DTIP.COM file from your system drive (Drive A) onto the tape cartridge. Insert the tape cartridge into the tape drive. At the system prompt, type DTIP:

```
A>DTIP<CR>
```

The screen will display the following warning. Type <CR> to bring up the TAPE menu.

```
***** WARNING! *****
This Program Affects CPU Clock And Other Users
Type Cntrl C To Abort Or CR To Continue:<CR>
```

You will then see the main menu. Enter I to initialize the tape:

DYNABYTE Tape Interchange Program - Version N.n

CODE:	ACTION:
I	Initialize Tape
T	Retention Tape
B	Disk to Tape Backup
R	Tape to Disk Restoration
A	Disk to Tape Append
V	File Verification
D	Tape Directory
C	Tape to Tape Copy
<ESC>	Return to Monitor

Action desired:I

Do not hit a carriage return after entering the option. You should see the following warning. Type <CR> to begin initialization:

```
*** Warning - Tape Initialization Is Destructive ***
Type CR To Continue Or (ESC) To Abort:<CR>
```

When initialization is completed, you will see the main menu display again.

Now type B for the Disk to Tape Backup option.

DYNABYTE Tape Interchange Program - Version N.n

CODE:	ACTION:
I	Initialize Tape
T	Retension Tape
B	Disk to Tape Backup
R	Tape to Disk Restoration
A	Disk to Tape Append
V	File Verification
D	Tape Directory
C	Tape to Tape Copy
<ESC>	Return to Monitor

Action desired:B

The following warning appears on the screen. Enter <CR> to continue.

```
*** Warning - Tape Backup Is Destructive ***
Type CR To Continue Or (ESC) To Abort:<CR>
```

You will be prompted for the Save Set code. Enter <CR> for the default value, 00.

Enter Save Set Code (CR For Default):<CR>

Now, enter the name of your disk file. In this example we will copy the DTIP command file DTIP.COM from the system disk onto the tape.

```
File Name (CR=Done):DTIP.COM<CR>
Copying from drive A, user 0 to Save Set 00:
DTIP .COM
```

When the file is copied onto tape, you will be prompted for another file name. Enter <CR> to return to the DTIP command menu.

File Name (CR=Done):<CR>

DYNABYTE Tape Interchange Program - Version N.n

CODE:	ACTION:
I	Initialize Tape
T	Retension Tape
B	Disk to Tape Backup
R	Tape to Disk Restoration
A	Disk to Tape Append
V	File Verification
D	Tape Directory
C	Tape to Tape Copy
<ESC>	Return to Monitor

Action desired:

Press <ESC> to exit back to the operating system.

0A>

Example 2

In this example, we will APPEND files from the system disk onto tape, obtain a tape directory and restore a file from tape to disk. Make sure that your tape cartridge is in the tape drive. At the system prompt, type DTIP.

A>DTIP<CR>

The following warning appears on the screen. Type <CR> to continue:

```
***** WARNING! *****
This Program Affects CPU Clock And Other Users
Type CNTRL C To Abort Or CR To Continue:<CR>
```

You will then see the main menu. Enter A to append files:
DYNABYTE Tape Interchange Program - Version N.n

CODE:	ACTION:
I	Initialize Tape
T	Retension Tape
B	Disk to Tape Backup
R	Tape to Disk Restoration
A	Disk to Tape Append
V	File Verification
D	Tape Directory
C	Tape to Tape Copy
<ESC>	Return to Monitor

Action desired:A

The program searches the tape to find the end of the last file. It will then display a new default Save Set code. You will be prompted for the Save Set code — you could specify a different Save Set. In this example, enter <CR> for the default:

```
Searching For End Of Data
Tape Positioned At End Of Data
New Save Set Default Is 01H
Enter Save Set Code (CR For Default):<CR>
```

In this example, we will append those files with the name "DUMP", regardless of type.

File Name (CR=Done):DUMP.*<CR>

```
Copying from drive A, user 0 to save set 01:
DUMP.PRL
DUMP.ASM
```

When the system prompts you for another file name, type <CR>.

File Name (CR=Done):<CR>

To view a directory of the files on tape, type D at the menu prompt.

DYNABYTE Tape Interchange Program - Version N.n

CODE:	ACTION:
I	Initialize Tape
T	Retention Tape
B	Disk to Tape Backup
R	Tape to Disk Restoration
A	Disk to Tape Append
V	File Verification
D	Tape Directory
C	Tape to Tape Copy
<ESC>	Return to Monitor

Action desired:D

You should see:

Tape Directory Name	Type	Drive	User	SS
TAPE	.COM	A	0	00
DUMP	.PRL	A	0	01
DUMP	.ASM	A	0	01

Strike Return To Restart:

Notice that although we used the default Save Set number for both the backup and append operations, the append option automatically incremented the Save Set code for the appended files. Type <CR> to return to the main menu. At the menu prompt, type R.

DYNABYTE Tape Interchange Program - Version N.n

CODE:	ACTION:
I	Initialize Tape
T	Retention Tape
B	Disk to Tape Backup
R	Tape to Disk Restoration
A	Disk to Tape Append
V	File Verification
D	Tape Directory
C	Tape to Tape Copy
<ESC>	Return to Monitor

Action desired:R

The system prompts you for the Save Set code. In this example, we will restore the file DUMP.PRL. As you saw in the tape directory display, this file has a Save Set code of 01. When prompted for the Save Set code, you must enter 01. Otherwise the system will not be able to locate the file.

Tape To Disk Restoration
 Enter Save Set Code (CR For Default):01<CR>

At the file name prompt, enter DUMP.PRL

File Name (CR=Done):DUMP.PRL
 Search From Start Of Data (Y/N)?Y
 Ignore Source Code Device As It Is Written On Tape (Y/N)?Y
 Copying:

Name	Type	Drive	User	SS
DUMP	.PRL	A	0	01

At the file name prompt, type <CR> to return to the main menu:

File Name (CR=Done):<CR>

DYNABYTE Tape Interchange Program - Version N.n

CODE:	ACTION:
I	Initialize Tape
T	Retension Tape
B	Disk to Tape Backup
R	Tape to Disk Restoration
A	Disk to Tape Append
V	File Verification
D	Tape Directory
C	Tape to Tape Copy
<ESC>	Return to Monitor

Action desired:

At the menu prompt, press <ESC> to return to the system prompt.

6.4 Executable Instruction File

If you use the DTIP utility to backup your files on a regular basis, you may want to create an executable instruction file. Using a text editor, you can create a file that contains the DTIP commands and responses that you would normally enter. DTIP processes these commands as if you were entering them from the keyboard. DTIP instruction files must have the file type '.TIP' (for Tape Interchange Program).

The following example demonstrates how to make a DTIP instruction file with the standard MP/M II editor, ED. This file "SAVEALL.TIP" initializes your tape cartridge and performs a Disk to Tape Backup of the file(s) you specify. At the end of each day you can insert a tape and issue the command "TAPE SAVEALL<CR>". This is how to make that file.

At the system prompt, enter:

```

0A>ED SAVEALL.TIP<CR>      (create file with MP/M II editor)
*I<CR>                    (enter ED "input" mode)
1:<CR>                    (bring up DTIP menu)
2:I<CR>                    (Initialize Tape + <CR> to continue)
3:B<CR>                    (Backup + <CR> to continue)
4:<CR>                    (for default Save Set of 00)
5:d1:file name1<CR>      (source drive and name of files to be
6:d2:file name2<CR>      backed up; user number may be specified;
                           wildcards may be used in file name)

```

etc.

```

n:<CR>                    (end file name input)
n:<ESC>Control-Z          (end DTIP utility; end ED "input" mode)
*E<CR>                    (exit MP/M II editor)

```

0A>

You can create an instruction file to do any DTIP routine. However, as you see by the above example, you need to make sure that you account for all the DTIP prompts that may appear.

If the first line in an instruction file is AUTO, then DTIP will bypass all menu questions and proceed into the Append option. In executing this instruction, DTIP will increment the Save Set code by one, Append the specified files and then exit back to the operating system (if no errors are encountered). If you use this instruction file, be sure to read Section 6.2.2 on the Save Set feature. This is how to make the AUTO file:

```

0A>ED ADDALL.TIP          (create file with MP/M II editor)
*I<CR>                    (enter ED "input" mode)
1:AUTO<CR>               (AUTO as first instruction)
2:d1:file name1<CR>      (source drive and name of files to be
3:d2:file name2<CR>      backed up; user number may be specified)
                           wildcards may be used in file name)

```

etc.

```

n:<CR>                    (end file name input)
n:Control-Z              (end ED "input" mode)
*E<CR>                    (exit MP/M II editor)

```

0A>

Before executing a DTIP instruction file, make sure you have a tape cartridge inserted in your tape drive. A DTIP instruction file is executed by entering DTIP with the instruction file name at the system prompt:

```
0A>DTIP d:filename<CR>
```

Where:

d is an optional drive specification, and
filename is the name of a DTIP instruction file.

Although the instruction file must have file type 'TIP', this need not be

specified on invocation. However, the file must be stored under the current user number. If 'd' is omitted, the currently selected drive is assumed. This way of specifying files is standard in MP/M II.

6.5 Error Messages

If you enter an illegal file name or menu choice, DTIP displays an explanatory error message, and allows you to re-enter the information.

DTIP has three interfaces -- to the operator; to the operating system (for file operations) and to the hardware (tape drive, cartridge). Errors can occur at each of these interfaces. This section displays each type of error. At any error you can return to the operating system by pressing <CR>.

6.5.1 DTIP Error Messages

FILE NAME BAD, REENTER

UNEXPECTED END OF DATA

TAPE COMMUNICATIONS, SYNTAX REJECT WITHIN TAPE

TAPE ABORT WITH ATTEMPT

TAPE ABORT WITHOUT ATTEMPT

TAPE IS WRITE PROTECTED

FILE NOT FOUND

DISK FULL

6.5.2 Tape Abort Errors

If the error received was an 'ABORT' from the tape drive, DTIP also displays the tape sub-error code. These codes and their meanings are as follows. There are no codes 04 and 05.

NOTE: Be sure to keep the tape head clean. This will eliminate many needless errors. See also the discussion on PREVENTIVE MAINTENANCE below.

Code	Meaning and Suggested Solution
00	Selected drive has executed auto-rewind since previous initialization or rewind command. Return to master menu or restart tape to clear error.
01	Write operation request to a write protected drive.

	Replace tape with an unprotected tape or remove write protection from present tape and reissue command.
02	Command issued to non-present drive or a drive with the cartridge removed. Be sure that the cartridge is properly seated in the drive and reissue the command. If this error persists, it is a hardware problem.
03	Drive failed to respond to the requested command. This is probably a hardware error.
06	File mark verification error after writing it. Reinitialize the tape and try again. If problem persists, try a different tape.
07	Transport abort prior to command completion. Probable hardware problem.
08	Read fail - missing data or FMK. Probable bad tape or hardware error.
09	Read fail - short record error. See code 08.
10	Read fail - short record error. See code 08.
11	Read fail - parity error. See code 08.
12	Write fail - R-A-W verify error. See code 08.
13	Write fail - read data not detected prior to record write operation completed. See code 08.
14	Read fail - file mark detected. Probable hardware, software, or tape error.

6.6 Preventive Maintenance

Follow these few simple rules while handling the magnetic tape media:

1. Be certain that no tape cartridge is in the drive while turning the computer on or off.
2. Never remove the tape cartridge while any kind of tape transfer is

underway.

3. Store your cartridges in a cool dry place when not in operation. Permanent damage may be done to the capstan if a tape is left in the unit!
4. When cartridge tapes are not in use, return them to their protective plastic containers. Store tapes on edge. This prevents the tape from slipping down on its spool and contacting the sides of the cartridge.

Three components of the tape unit require periodic maintenance to insure overall system reliability. The cleaning removes contaminants from the tape unit which come in direct contact with the tape. The cleaning assures that there will be adequate contact between the tape head and the tape.

A dirty tape head can cause data dropouts and error conditions during read and write operations. Spray type head cleaners are not recommended. Never clean the tape head with a hard object -- this will result in head damage. It is recommended that you clean your tape head frequently with a non-corrosive, non-residue cleaning agent such as isopropyl alcohol. Apply the alcohol with a cotton swab and be sure to wipe off any excess and allow the head to dry before using the unit.

The tape cleaner removes loose foreign material from the tape before it comes in contact with the tape head. This foreign material accumulates in and around the tape. The tape cleaner should be cleaned with the same frequency as the tape head.

To clean the tape cleaner, insert a folded piece of paper in the bottom of the cleaner and lift up. This will lift out all foreign material. Compressed air or a brush may be used. It is also recommended that occasionally you use the same cotton swab and alcohol method suggested in the tape head cleaning section.

WARNING

Never clean the tape cleaner or tape head with a hard object. This can result in tape head damage.

The recommended method for cleaning the capstan is the same one recommended for the tape head: alcohol and a cotton swab.

WARNING

Be careful not to permit cleaning solvent to contaminate the drive motor bearing.

6.7 Technical Data

6.7.1 Tape Record Format

Data is written to tape in 8208-byte blocks, allowing a full 8K data record (8192 bytes) with a 16-byte file control block (FCB) header. This configuration allows 17 megabytes (unformatted), 13.4 megabytes (formatted), of storage on a 450-foot tape. Data is written sequentially on each of four tracks. As each track is filled, the tape is rewound and the next track selected. This is transparent to the user. If a tape is filled during a backup operation, a message requesting a new tape is issued. The backup continues when a new tape is inserted.

On the cartridge tape system, written data is dynamically reread and corrected automatically by the tape subroutines, reducing restore errors to 5 in 10^{10} . It is normal for the cartridge tape unit to rewrite 5 to 10 blocks per track.

The FCB header on tape takes the following format:

```

|US|F1|F2|/ /|F8|T1|T2|T3|SS|LB|SD|RC|

```

```

00 01 02 ... 08 09 10 11 12 13 14 15

```

where:

US	Contains the user number, 00 - 0F hexadecimal
F1 - F8	Contain the file name in ASCII upper case, with the high bit equal to 0
T1, T2, T3	Contain the file type in ASCII upper case, with the high bit equal to 0
SS	Contains the Save Set number, 00 - 7F hexadecimal
LB	Contains the "LAST BLOCK" flag. This is true for the last tape block of a file only
SD	Contains the source device code 00 - 0F hexadecimal (corresponding to drives A - P)
RC	Contains the number of 128 byte records in this tape block that contain active data.

6.7.2 Cartridge Drive Data Format

Storage Details

Data is stored bit/byte serial sequentially on 4 data tracks.

Record Format

PREAMBLE	Minimum 40 "zero" bits	
SEQUENCE	and a single "one" bit	
PRE-SYNC BITS	3 "zero" bits	
SYNC BYTE =	FFH	
RECORD TYPE BYTE	Data = 22H(cr) FMK = 55H	
ATA BYTE 1 ATA BYTE 2 ATA BYTE "n"	Omitted if "File Mark"	Calculation Basis for LROC byte
LROC BYTE	(even parity)	
RECORD TYPE =	22H	
POSTAMBLE	single "one" bit &	
SEQUENCE	minimum 40 "zero" bits	
INTER-RECORD-GAP	Minimum 1.2" Nominal 1.25"	

NOTE: All bytes consist of 8 data bits (LSB first) + 1 vertical parity bit (even)

6.7.3 DS-100, DZ-80B I/O Connections

PIN #	SIGNAL	FROM	COMMENTS
2	SLD-	Drive	Selected
4	RDY-	Drive	Ready
6	WND-	Drive	Write Enabled
8	FLG-	Drive	Flag
10	LPS-	Drive	Load Point Sensed
12	FUP-	Drive	File Unprotected
14	BSY-	Drive	Busy
16	EWS-	Drive	Early Warning Sensed
18	RWD-	Controller	Rewind
20	REV-	Controller	Reverse
22	FWD-	Controller	Forward
24	HSP-	Controller	High Speed
26	WEN-	Controller	Write Enable
28	SL1-	Controller	Unit Select bit 0
30	SL2-	Controller	Unit Select bit 1
32	SL4-	Controller	Unit Select bit 2
34	SLG-	Controller	Select Gate
36	RNZ-	Drive	Read NRZ Data
38	RDS-	Drive	Read Data Strobe
40	DAD-	Drive	Data Detected
42	WDE-	Controller	Write Data Enabled
44	WNZ-	Controller	Write NRZ Data
46	TR2-	Controller	Track Select bit 1
48	WDS-	Drive	Write Data Strobe
50	TRI-	Controller	Track Select bit 0

NOTE: 1) All odd numbered pins are returns.
 2) All signals are ACTIVE LOW.

Notes

7.0 COPYING DATA: BACKUP

Several of the DOS 5 and MP/M II utility programs are designed for copying data. Each program has specific capabilities that make it the appropriate program for use under a given set of circumstances. The following paragraphs will help you choose the utility to do a specific copying task.

PIP is the general-purpose MP/M II program for copying files from one disk to another or from disk to printer. It can copy one file, several files, or all the files in one user area. PIP cannot copy the loader from a system disk. DTIP must be used to transfer files to cartridge tape. See your Digital Research MP/M II manuals for a complete discussion of PIP.

DYNAGEN is a highly specialized DOS 5 program that copies the loader and boot files from a system disk to another disk. It thereby creates a new boot disk. After DYNAGEN is run, PIP can be used to transfer other files to the new disk. See Section 3.1 for a complete description of DYNAGEN.

DTIP is used to copy files from disk to cartridge tape and to restore from tape to disk. It is used primarily to create backup copies of data. It can copy or restore one file, many file types, or all files in a user area. DTIP is discussed in Section 6.2.

BACKUP is also used to create backup copies of data on disk only. Files copied from hard disk to floppy disk cannot be accessed until they are restored to hard disk. Additionally, BACKUP cannot append files; it clears the destination disk before beginning the copy. BACKUP can copy files of any size, and can copy files in all user areas of a disk. BACKUP is discussed in this section.

The BACKUP utility is used to create backup copies of data on hard or floppy disk. BACKUP can selectively copy one or more files in one user area (file by file mode) or can copy entire logical disks (track by track mode). You can use BACKUP to copy between the following pairs of devices:

- From hard disk to floppy disk set:
 track by track or file by file
- From floppy disk set to hard disk:
 track by track or file by file (this copy is allowed
 only to restore a hard to floppy backup)
- From floppy disk to floppy disk:
 track by track only
- From hard disk to hard disk:
 track by track only

When copying between like devices (floppy to floppy or hard to hard), the devices must be identical. The following drive types and sizes can currently be used by the BACKUP program.

Floppy Drives

8" SINGLE-SIDED SINGLE-DENSITY FLOPPY
8" SINGLE-SIDED DOUBLE-DENSITY FLOPPY
8" DOUBLE-SIDED SINGLE-DENSITY FLOPPY
8" DOUBLE-SIDED DOUBLE-DENSITY FLOPPY
5.25" SINGLE-SIDED DOUBLE-DENSITY FLOPPY
5.25" DOUBLE-SIDED DOUBLE-DENSITY FLOPPY

Hard Disk Drives

8.3 MB FUJITSU WINCHESTER
1.2 MB FUJITSU WINCHESTER
4.7 MB FUJITSU WINCHESTER
2.5 MB FUJITSU WINCHESTER
7.0 MB MICROPOLIS WINCHESTER
6.5 MB CARTRIDGE MODULE
8.3 MB COMPUTER MEMORIES, INC. WINCHESTER
4.4 MB COMPUTER MEMORIES, INC. WINCHESTER
6.4 MB COMPUTER MEMORIES, INC. WINCHESTER
3.2 MB COMPUTER MEMORIES, INC. WINCHESTER
4.2 MB COMPUTER MEMORIES, INC. WINCHESTER
2.1 MB COMPUTER MEMORIES, INC. WINCHESTER
4.9 MB COMPUTER MEMORIES, INC. WINCHESTER
2.4 MB COMPUTER MEMORIES, INC. WINCHESTER
5.1 MB COMPUTER MEMORIES, INC. WINCHESTER
2.6 MB COMPUTER MEMORIES, INC. WINCHESTER
2.0 MB COMPUTER MEMORIES, INC. WINCHESTER
7.1 MB COMPUTER MEMORIES, INC. WINCHESTER
7.2 MB COMPUTER MEMORIES, INC. WINCHESTER
3.9 MB COMPUTER MEMORIES, INC. WINCHESTER
4.9 MB TANDON WINCHESTER
2.4 MB TANDON WINCHESTER
7.4 MB TANDON WINCHESTER
3.7 MB TANDON WINCHESTER

BACKUP, as its name implies, was designed primarily for backing up large blocks of data so that a copy is available if the original data is somehow lost or damaged. Large files that are updated frequently can (and should) be backed up on a regular basis.

BACKUP can also be used to store data that is infrequently accessed. These files could be copied, using BACKUP, from the hard disk to floppies, and the originals on the hard disk erased. This could free up a great deal of storage space on the hard disk. When the backed up files are needed in the future, they could be restored onto the hard disk.

7.1 BACKUP versus PIP

The MP/M II utility PIP is also used to copy files. PIP and BACKUP differ in the following ways:

- PIP can copy files between any two drives on your system, regardless of size or type. BACKUP is restricted to certain combinations of devices.
- PIP creates an MP/M II standard floppy disk that can be accessed by any MP/M II utility. BACKUP, when used from hard disk to floppy, creates nonstandard floppy disks that can be accessed only by BACKUP to restore the data to hard disk.
- PIP cannot copy a file larger than 1 MB. BACKUP, on the other hand, can copy files of any size.
- PIP transfers a file to any empty space on the destination disk but does not affect other files on that disk. BACKUP erases the destination disk before it writes out the files. Thus, PIP can append files, but BACKUP cannot.
- PIP can only copy files in the current user's area, whereas BACKUP, in track by track mode, can copy all user areas on a disk.
- If PIP is used to copy a floppy system disk, it must be used with DYNAGEN since PIP cannot copy the loader (the outer two tracks). BACKUP, in track by track mode, copies the entire floppy system disk, including the loader.

This section first explains how to invoke BACKUP and transfer files from hard disk to floppy disk, since that is the most frequently used option. Then the two other BACKUP options, hard disk to hard disk and floppy disk to floppy disk, are explained. Last in this section is a list and description of error messages.

7.2 Invoking BACKUP

You access BACKUP by typing "BACKUP" at the system-level prompt. You may invoke BACKUP in one of two ways. Typing "BACKUP", followed by a carriage return, will put you in an interactive BACKUP mode that queries you for information to perform the backup. You may also perform BACKUP with a single command line, as described below.

The interactive BACKUP mode presents you with a list of three options and asks for your choice:

GA>BACKUP<CR>

***** DYNABYTE BACKUP UTILITY VER. X.X RUNNING UNDER MP/M *****

**F = FILE BY FILE COPY
T = TRACK BY TRACK COPY
X = EXIT TO OPERATING SYSTEM**

The file by file mode allows you to select some or all files in your current user area for backup. This mode can be used only for copying from hard disk to floppy disk, or restoring from floppy disk to hard disk.

The track by track mode copies an entire logical disk (all user areas and files) on a track by track basis, including all empty tracks. This mode can be used for copying from hard disk to a floppy disk set, from hard disk to hard disk, or from floppy disk to floppy disk.

The BACKUP program can also be invoked by a single command line that includes the options listed above. The form is

BACKUP /SD/FILENAME.TYP

where S is the source drive, D is the destination drive, and FILENAME.TYP is the name of the file to be copied. The slash before "S" is required. The element /FILENAME.TYP is optional. If it is included, BACKUP assumes file by file mode. If it is not included, BACKUP assumes track by track mode. Note that the slash is required if this element is included.

7.3 Copying from Hard Disk to a Floppy Disk Set

Copying from hard disk to a floppy disk set can be done in either file by file or track by track mode. The next subsection discusses the advantages of each.

When copying files from hard disk to floppy disk, you will usually be working with several floppy disks, called a floppy disk set, for one BACKUP job. Before you can back up files on to the floppy disks, the floppy disks must be formatted, and all floppies for one backup job must be formatted identically. Since BACKUP cannot be interrupted once it starts, we recommend that you format as many floppy disks as you will need to store all the data you plan to back up. You may use the same set of floppies each time you back up the same group of files — preferably on a regular schedule.

The floppy disks that are created by hard disk to floppy disk BACKUP are "nonstandard" disks in that they do not have a standard file directory. On a floppy disk created with track by track mode, the directory command displays the following information:

: DYNABYTE : BACKUP : 02/06/82 : DISK#01

This display tells you that the floppy disk is a DYNABYTE BACKUP disk. It gives you the archive date that you entered when you created the disk, and the number of this disk in the current backup set.

File by file mode prints the same information, plus one additional directory entry:

: FILEONLY

This entry tells you that the disk was created in file by file mode and must be restored in the same mode.

The floppy disks created by hard disk to floppy disk BACKUP are also write protected. They cannot be read by any utility or command except BACKUP. Therefore, the files thus copied cannot be accessed until they have been restored by BACKUP.

It is very important to keep all the floppy disks for one backup session together and properly numbered, because BACKUP must restore the disks in the exact order in which they were created. BACKUP does not allow you to begin a restore operation with any disk but the first, and must process each disk in numerical order. If one disk in a set is lost or misplaced, the others are useless.

7.3.1 Choosing Track or File Mode

Whether you select track by track or file by file mode to backup your data will depend on your situation. You should weigh the relative value to you of compacted data storage, the speed of copying and subsequent recovery, and number of files and user areas to be copied. Each mode offers some advantages.

If you are copying all the files, and if the source disk is close to full, track by track transfer takes less floppy disk space than file by file. File by file stores more information about the individual files than does track by track. Also, file by file transfer does not start a new file if close to the end of a track. Instead, it goes to the top of a new track, so all tracks may not be completely full. On the other hand, if there is considerable empty space on the source disk, file by file transfer will take less floppy space, as it does not copy any of the empty space.

Since track by track mode copies all user areas, it is much faster than file by file if you want to copy several user areas. To copy another user area in file by file mode, you must exit BACKUP and switch to the new user area at system level.

The primary advantage of file by file backup is that it allows you to restore one or more selected files without restoring the whole set. Track by track transfers must be restored in their entirety.

7.3.2 File by File Copy

If you select the file by file mode, BACKUP next asks you for the file name. Both "*" and "?" are allowed as wildcard characters so that you can transfer groups of files with common name elements. If you want to transfer all files in your user area, simply type "*.*".

WHICH BACKUP MODE ? F<CR>

FILENAME ("*" & "?" ARE ALLOWED) (FILENAME.TYP)?

BACKUP next asks you for the source drive. In file by file mode, the source must be a hard disk drive.

SOURCE DRIVE (A - P)?

BACKUP next asks for the destination which, in file by file mode, must be a floppy disk drive.

DESTINATION DRIVE (A - P)?

BACKUP then displays the type of hardware on each drive, and also the number of directory entries. For example:

```
SOURCE = 4.7 MB FUJITSU   DIR ENTRIES = 0512
DESTINATION = 8" SS DD FLOPPY   DIR ENTRIES = 0128
```

You are then prompted for the archive date. You can enter any date you want, and it will be stored as a directory entry on your backup floppies.

ARCHIVE DATE (MM/DD/YY)?

After you have entered the date, BACKUP tells you to insert the first floppy in your set and type the carriage return to continue. For example, if you had specified drive E as the destination drive, BACKUP would print

INSERT FLOPPY DISK #01 IN DRIVE E

HIT RETURN TO CONTINUE....

As the files are transferred, BACKUP displays one line for each file at the terminal, and continuously increments the number of records until the file is completely transferred. It then prints the new file name, again incrementing the number of records until the file is finished. The completed file list for one backup session might look like this:

```
FPYLR .COM   00075 RECORDS
FUJLR .COM   00046 RECORDS
MWLR .COM    00093 RECORDS
MINLR .COM   00017 RECORDS
```

If all the files to be transferred will not fit on one floppy disk, BACKUP fills the first floppy, then pauses and requests the second disk. For example:

INSERT FLOPPY DISK #02 IN DRIVE E

HIT RETURN TO CONTINUE....

After you insert the second disk and type the carriage return, BACKUP continues copying files as before, printing the name and record count for each file as it copies. If a third disk is needed, BACKUP again pauses and asks

you to change disks. It continues this way until all files have been transferred. BACKUP then tells you that the backup is complete and asks you to hit a carriage return.

BACKUP COMPLETE

HIT RETURN TO CONTINUE....

You are again presented with the three options that began the program, and you can continue to backup up files or exit as you choose.

Again, the backup disks created by this process are write protected. They cannot be read by any MP/M II or Dynabyte utility except BACKUP. Therefore, the files thus copied cannot be accessed until they are restored to hard disk by BACKUP.

7.3.3 Restoring File by File, Floppy Disk Set to Hard Disk

The same BACKUP program is used to restore the files to hard disk. You can restore all the files at once, or can select specific files. However, even if you are restoring just one file, the BACKUP program must process a set of floppy disks in numerical order.

After you call BACKUP, the same options are presented. For backup floppy disks created in file by file mode, you must select file by file mode, F, to restore to hard disk.

***** DYNABYTE BACKUP UTILITY VER. X.X RUNNING UNDER MP/M *****

**F = FILE BY FILE COPY
T = TRACK BY TRACK COPY
X = EXIT TO OPERATING SYSTEM**

WHICH BACKUP MODE ? F<CR>

You are again asked for file names, and again are allowed to use the wildcard characters "*" and "?" to select the file(s) to be restored.

FILENAME ("*" & "?" ARE ALLOWED) (FILENAME.TYP)?

When you are restoring files, the floppy disk must be specified as the source drive, and any hard disk can be specified as the destination drive. Again, BACKUP confirms your choices by displaying, for the two drives, their type and number of directory entries. For example, to restore files from drive E to drive D, the interaction would be:

SOURCE DRIVE (A - P) ? E<CR>

DESTINATION DRIVE (A - P) ? D<CR>

**SOURCE = 8" SS DD FLOPPY DIR ENTRIES = 0005
DESTINATION = 4.7 MB FUJITSU DIR ENTRIES = 0512**

When BACKUP restores files to hard disk, it does not overwrite any data on the hard disk. If the disk should contain a file having the same name and file type as one you are restoring, the file extension of the file already on the hard disk will be changed to "BAK".

BACKUP then asks you to insert the first floppy disk.

INSERT FLOPPY DISK #01 IN DRIVE E

HIT RETURN TO CONTINUE....

If you are restoring all files, BACKUP copies all the files from disk #01 back on to the hard disk, then requests the second floppy disk, and so on until all disks are restored.

If you are restoring selected files, BACKUP searches disk #01, copying all files that match the filename.typ you have specified, then requests the next disk. The disks are searched in numerical order until all requested files have been restored.

7.3.4 Track by Track Copy

Track by track backup from hard disk to floppy disks is very similar to the procedure just described for file by file backup. After you have formatted several floppy disks and called BACKUP, you are presented with the same list of options.

***** DYNABYTE BACKUP UTILITY VER. X.X RUNNING UNDER MP/M II *****

**F = FILE BY FILE COPY
T = TRACK BY TRACK COPY
X = EXIT TO OPERATING SYSTEM**

When you are asked

WHICH BACKUP MODE ?

you specify T for track to track copy. You are then asked for the source drive

SOURCE DRIVE (A - P) ?

and you specify the drive of the logical hard disk drive you want to back up. The next question

DESTINATION DRIVE (A - P) ?

should be answered with the floppy disk drive that will be used for your backup copies. BACKUP next asks for the archive date:

ARCHIVE DATE (MM/DD/YY) ?

You can enter any date you want, and it will be stored as a directory entry on your backup floppies.

After displaying the device types and number of directory entries, BACKUP tells you the size of the buffer in bytes, then how many tracks will fit into the buffer. The more tracks the buffer will accommodate, the faster the transfer will be. For example:

```

SOURCE = 4.7 MB FUJITSU      DIR ENTRIES = 0512
DESTINATION = 8" SS DD FLOPPY  DIR ENTRIES = 0128

INTERNAL RAM MEMORY BUFFER SIZE = 38182 BYTES
# OF SOURCE DISK TRACKS BUFFERED = 03

```

One line prints at the terminal.

```

READING TRACK # 0000      WRITING TRACK #0000

```

and the track numbers iterate until the floppy disk is full. BACKUP asks you to insert the second floppy disk and continues thus until the whole logical hard disk has been copied. When BACKUP is done, it prints the message

```

BACKUP COMPLETE

```

```

HIT RETURN TO CONTINUE....

```

After hitting the carriage return, you can begin another BACKUP job or exit.

7.3.5 Restoring Track by Track, Floppy Disk Set to Hard Disk

You can restore from floppy to any logical hard disk of the same size as the logical hard disk from which you originally did the backup. The backup mode must be T, the source must be your floppy drive, and the destination must be the hard disk. Note that all files on the hard disk are erased before the restore copying begins.

The following example assumes restore from floppies on drive E to hard disk D.

```

*** DYNABYTE BACKUP UTILITY VER. X.X RUNNING UNDER MP/M II ***

```

```

F = FILE BY FILE COPY
T = TRACK BY TRACK COPY
X = EXIT TO OPERATING SYSTEM

```

```

WHICH BACKUP MODE ? T<CR>

```

```

SOURCE DRIVE (A - P) ? E<CR>
DESTINATION DRIVE (A - P) ? D<CR>

```

```

SOURCE = 8" SS DD FLOPPY  DIR ENTRIES = 0004
DESTINATION = 4.7 MB FUJITSU  DIR ENTRIES = 0512

```

```

INTERNAL RAM MEMORY BUFFER SIZE = 38182 BYTES
# OF SOURCE DISK TRACKS BUFFERED = 03

```

```

READING TRACK # 00000      WRITING TRACK # 00000

```

As BACKUP reads the tracks, the numbers in the line above are iterated. The floppy disks are requested in sequence until all tracks are restored.

7.4 Copying Between Like Devices

Copying from hard disk to hard disk and from floppy disk to floppy disk can only be done in track by track mode.

Both modes transfer the entire contents of the source disk, including directory entries, creating an exact copy of the source disk. Therefore, the files on the backup disks can be accessed directly by file name, just as they can on the source disk.

7.4.1 Floppy Disk to Floppy Disk Copy

For floppy to floppy backup, the source and destination disks must be of the same type and size and must be formatted identically, with one exception. The number of directory entries need not be the same.

The following example assumes source drive A and destination drive B. Both are floppy disk drives.

*** DYNABYTE BACKUP UTILITY VER. X.X RUNNING UNDER MP/M ***

F = FILE BY FILE COPY
T = TRACK BY TRACK COPY
X = EXIT TO OPERATING SYSTEM

WHICH BACKUP MODE ? T<CR>

SOURCE DRIVE (A - P) ? A<CR>
DESTINATION DRIVE (A - P) ? B<CR>

SOURCE = 8" SS DD FLOPPY DIR ENTRIES = 0128
DESTINATION = 8" SS DD FLOPPY DIR ENTRIES = 0064

INTERNAL RAM MEMORY BUFFER SIZE = 38182 BYTES
OF SOURCE DISK TRACKS BUFFERED = 03

INSERT FLOPPY DISK #01 IN DRIVE B

HIT RETURN TO CONTINUE....
BACKUP IN PROGRESS.

READING TRACK # 00000 WRITING TRACK # 00000

BACKUP COMPLETE

HIT RETURN TO CONTINUE....

Since only one floppy disk is being backed up, the copy is complete when the destination disk is full. At this point, the destination disk is an exact

copy of the source disk, and a directory command on both disks will produce identical results. The files could be accessed from either floppy disk, with the same results.

7.4.2 Hard Disk to Hard Disk Copy

For hard disk to hard disk copies, the two hard disks must be identical, the logical drives must be the same size, and the number of directory entries must be the same.

Hard disk to hard disk backup generally is used if a set of files are to be extensively altered but it is likely that one or more of the files will be needed in its original condition. Programmers are likely to use this mode during program development, since recovery is much faster than from a floppy disk.

In the following example, the source drive is A and the destination drive is D.

```
*** DYNABYTE BACKUP UTILITY VER. X.X RUNNING UNDER MP/M ***
```

```
F = FILE BY FILE COPY  
T = TRACK BY TRACK COPY  
X = EXIT TO OPERATING SYSTEM
```

```
WHICH BACKUP MODE ? T<CR>
```

```
SOURCE DRIVE (A - P) ? A<CR>  
DESTINATION DRIVE (A - P) ? D<CR>
```

```
SOURCE = 4.7 MB FUJITSU    DIR ENTRIES = 0512  
DESTINATION = 4.7 MB FUJITSU  DIR ENTRIES = 0512
```

```
INTERNAL RAM MEMORY BUFFER SIZE = 38182 BYTES  
# OF SOURCE DISK TRACKS BUFFERED = 03
```

BACKUP prints one line at the terminal,

```
READING TRACK # 00000    WRITING TRACK # 00000
```

and iterates the track number as it reads and writes them. When completed, it prints the message

```
BACKUP COMPLETE
```

```
HIT RETURN TO CONTINUE.
```

At this point, disk A and disk D are identical, and the files can be accessed from either drive. To restore the data from drive D to drive A, the interaction would be identical to that above, except that the source drive would be D and the destination drive would be A.

7.5 Error Messages

BACKUP protects your data from damage if you incorrectly use the program. If you make a mistake, BACKUP will refuse your instruction and issue an error message. A summary and explanation of BACKUP error messages follow:

1. ***** BACKUP ABORTED, COPY NOT WRITTEN *****

An error occurred which caused backup to abort the copy process. The copy operation was NOT completed and must be restarted. Try to determine the cause of the abort and correct it before attempting to run the BACKUP utility again. This error message is usually accompanied by another error message to define the error in more detail.

2. ***** ERROR, WRONG OPERATING SYSTEM VERSION *****
BACKUP ONLY WORKS WITH CP/M 2.2, MP/M 1.1 OR MP/M II

The operating system you are using does not support BACKUP. Only CP/M version 2.2, MP/M version 1.1 or MP/M version 2.1 are supported by the current version of BACKUP. You could get this error by running BACKUP under CP/M 1.4 or on a non-Dynabyte computer system.

3. ***** ERROR, CANNOT OPEN DISK QUEUE *****
NO OTHER USERS MAY ACCESS THE DISK DRIVES WHILE RUNNING BACKUP.

When BACKUP is run in an MP/M II environment it MUST be run off-line. This means that no other users can be accessing any of the disk drives in the system. This error occurs when another user is attempting to access a disk drive in the system and BACKUP is running. Determine which user is accessing a disk drive and insure that BACKUP is the only process running on the MP/M II system.

4. ***** SELECT DISK ERROR *****
CURRENTLY CONFIGURED SYSTEM DOES NOT INCLUDE SPECIFIED DISK DRIVE

This error occurs if you instruct BACKUP to use a source or destination drive that does not exist or that has not been installed on the current system. Only drives A through P are valid drive designations in CP/M, MP/M and MP/M II. Determine which drives you will be using for the BACKUP operation. Then insure that these drives exist and are installed in the current operating system. Restart BACKUP and enter the proper drive designations.

5. ***** SPECIFIED FILE NOT ON SOURCE DISK*****

The source drive does not contain the specified file. This error is usually caused by misspelling the file name or by specifying the wrong source disk drive. Another possible cause for this error may be that the file has a "SYS" system attribute. Only "DIR" directory attribute files can be read with BACKUP in the file by file mode. Determine the problem that caused the error, correct it and restart BACKUP.

6. * BAD SECTOR FOUND ON SOURCE DRIVE *****

This error is caused by a physical media error on the source drive. If the source drive is a floppy disk, the disk is probably damaged in some way. There is no way to recover a floppy disk set if one of the disks is damaged. You should use the original floppy disk set to recover the data.

If the source drive is a hard disk, there is probably a defect on the hard disk media or in the hard disk hardware or controller. There is no way to recover a hard disk with a media defect. Use the PIP utility to move as much data as possible off of the hard disk and reformat the hard disk.

7. * BAD SECTOR FOUND ON DESTINATION DRIVE *****

This error is caused by a physical media error on the destination drive. If the destination drive is a floppy disk, the disk is probably damaged in some way. Insert a different, formatted diskette and try the backup operation again.

If the destination drive is a hard disk, there is probably a defect on the hard disk media or in the hard disk hardware or controller. Reformat the hard disk and make sure that the bad track table is properly configured. Then try the backup operation again.

8. * BACKUP ABORTED, CANNOT READ SOURCE DISK *****

This error results from the same conditions as error message #6. Follow the recovery actions described under error #6 above.

9. * BEGIN RETRY *****

BACKUP displays this message upon retrying a backup operation. When you substitute a new floppy disk for a damaged one, BACKUP informs you that it is attempting the operation again.

10. * INCORRECT DISK FORMAT ***
REPLACE OR REFORMAT DESTINATION DISK**

This error occurs when the formats do not match between the destination disk and the source disk during a track by track backup. The destination and source disks MUST be the same density and have the same number of sides. This error can also occur on a hard disk to floppy backup operation if one of the diskettes in the set of floppies is formatted differently from the others in the set. Format the destination floppy disk or floppy disk set to match the source set and restart the BACKUP operation.

11. * THIS DISK WAS NOT CREATED BY BACKUP PROGRAM *****

This error occurs when a restore operation is attempted on a floppy disk that was not created by BACKUP. To be restored by BACKUP, a disk must have been created by BACKUP. Locate the correct floppy disk or floppy disk set and restart the BACKUP operation.

12. * TWO DIFFERENT SIZE FLOPPIES ARE NOT ALLOWED FOR BACKUPS *****

This error occurs when you attempt a track by track BACKUP between floppy disks with different formats. The two disks MUST be formatted with the same number of sides (single or double) and the same density (single or double). The number of directory entries may differ between the floppy disks, however. If you receive this error message, format a floppy disk to match the source disk and restart the BACKUP operation.

13. * TWO DIFFERENT SIZE HARD DISKS ARE NOT ALLOWED FOR BACKUPS *****

This error occurs when you attempt a track by track backup between two unmatched logical hard disks. The two hard disks MUST be exactly the same size and type. If you want to perform track by track copies between two logical hard disk drives, always format your hard disk using a configuration option that divides the hard disk into equal size logical disks. You may also get this error by specifying the wrong source or destination drive.

14. * YOU HAVE INSERTED THE WRONG DISK # ***
YOU HAVE INSERTED DISK #XX IN DRIVE X**

This error occurs during a restore operation from a floppy disk set to the hard disk if you have inserted one of the disks in the wrong sequence. Each disk in the set MUST be inserted in the order that it was created. Insert the correct diskette in the drive and hit the return key.

15. * THERE ARE NO FILES ON THE SOURCE DISK THAT
MATCH THE SPECIFIED FILENAME *****

BACKUP displays this message when it cannot find a specified file on the source drive. You may have misspelled the file name or specified the wrong source disk drive. Another cause may be that the specified file has a "SYS" system attribute. Only "DIR" directory attribute files can be read with BACKUP in the file by file mode. Determine the problem that caused the error, correct it and restart BACKUP.

16. * DISK FULL *****

This error may occur during a file by file copy from a floppy disk set to a hard disk. BACKUP is informing you that the hard disk does not have enough storage space for the new file(s) and cannot restore any more files from the floppy disk set. Either erase some extraneous files from the hard disk and restart the BACKUP operation or restart the BACKUP operation and specify another hard disk drive as the destination drive.

17. * DISK DIRECTORY FULL *****

This error may occur during a file by file copy from a floppy disk set to a hard disk. BACKUP is informing you that the hard disk directory is full and cannot restore any more files from the floppy disk set.

Either erase some extraneous files from the hard disk and restart the BACKUP operation or restart the BACKUP operation and restore to another hard disk drive.

18. *** COMMAND ERROR ***

FILE BY FILE COPY IS ONLY ALLOWED FROM;

FLOPPY TO HARD DISK
OR
HARD DISK TO FLOPPY

This error is caused by attempting to use file by file backup mode from a floppy disk to another floppy disk or from a hard disk to another hard disk. As the message indicates, a file by file backup can only be performed from a floppy disk to a hard disk or from a hard disk to a floppy disk. Restart BACKUP and specify source and destination drives that follow these rules.

19. *** COMMAND ERROR ***

INVOKE BACKUP BY:

BACKUP /SD (S=SOURCE, D=DESTINATION) TRACK BY TRACK
BACKUP /SD/FILENAME.TYP FILE BY FILE

BACKUP has the capability of being interactive and asking the user questions to determine which mode, source drive and destination drive to use. It also has the capability of being used in a batch mode type of operation and having all of its operating parameters specified on the command line along with the "BACKUP" command itself. This error occurs when the command line parameters did not follow the correct convention that the BACKUP program is expecting. Restart BACKUP with the correct command line parameters or simply enter "BACKUP" alone on the command line and BACKUP will query you for the appropriate response.

Notes

8.0 PRINTER AND CONSOLE CONNECTIONS

The printers and consoles attached to your computer are communication devices for getting data in and out. This section explains how to connect them up, and the software that controls access to them. You are provided the pin assignments and configurations required by a number of different printers and consoles.

8.1 Introduction

DOS 5 allows a variety of terminals and printers to be connected to a Dynabyte computer. For the devices to talk to the computer they must be properly plugged into the back panel. For every port that is supported by DOS 5, there is either a connector on the back panel of the computer or on a cable that extends out of the computer.

There are several ways that a device can be supported by DOS 5. This section shows how to connect some standard devices to a Dynabyte computer. To boot the DOS 5 distribution disks, you MUST have a console on CPU2 (CPU serial port #2). (You may have a printer on CPU1, but it is not required.) You MUST also have the console configured for 9600 baud, inhibited parity, one start bit, and either one or two stop bits. If the terminal connected to CPU2 is configured any other way, you will not be able to boot DOS 5.

There are two connector patterns supported by Dynabyte. One is for serial RS232 (or current-loop) devices; the other is for parallel devices. Section 8.2 shows the pin assignments for each type. Make sure that the device you connect to a port has the proper pin connections.

The software I/O drivers for CPU1 and CPU2 use the CTS (clear to send) signal to insure that a data buffer in an output device is ready to accept data. CTS is monitored automatically in hardware on all of the octaport ports.

The CTS signal is an EIA (RS232) compatible signal that functions as follows. If the printer or output device is ready to receive data, then CTS must be held at the positive EIA level or open circuited (no connection). If the printer or output device is not ready to receive data, then CTS must be held at the negative EIA level. CTS is then used to synchronize transfers to the data buffer of the output device.

8.2 Pin Assignments

This section shows pin configurations for a number of devices.

8.2.1 Serial Ports

The following table summarizes the pin assignments for serial ports.

PIN #	FUNCTION
2	DATA IN (EIA)
3	DATA OUT (EIA)
5	TERMINAL READY (EIA)
7	GND (Ground)

8.2.2 Parallel Ports

The following table summarizes the pin assignments for parallel ports.

PIN #	FUNCTION
1	DATA IN 0
2	DATA IN 1
3	DATA IN 2
4	DATA IN 3
5	DATA IN 4
6	DATA IN 5
7	DATA IN 6
8	DATA IN 7
9	GND (Ground)
10	NOT IN READY
11	SENSE
12	NOT FLAG 1 OUT
13	NOT PORT INIT
14	DATA OUT 0
15	DATA OUT 1
16	DATA OUT 2
17	DATA OUT 3
18	DATA OUT 4
19	DATA OUT 5
20	DATA OUT 6
21	DATA OUT 7
22	GND (Ground)
23	NOT OUT BUSY
24	OUT STROBE
25	NOT FLAG 2 OUT

NOTE: All parallel connections are TTL level signals.

8.2.3 Standard Devices

The following tables show the required pin connections between the serial and parallel ports on a Dynabyte computer and a number of common printers and terminals. Some of the printers require jumpers on the DB25 pin connectors on the printer side. These are for Clear to Send and Carrier Detect signals that are not needed for connection to a Dynabyte computer. DO NOT jumper these pins together on the Dynabyte side of the connector — only jumper them on the printer side of the cable.

8.2.3.1 Consoles

The following two tables summarize the pin connections on the IBM 3101 and all other consoles.

1. IBM 3101

IBM Pin #	Dynabyte Pin #
2	2
3	3
+ 4	
5	
6 +	
7	7
+ 8	
20 +	

2. All Other Consoles

Terminal Pin #	Dynabyte Pin #
2	2
3	3
7	7

8.2.3.2 Printers

The following nine tables illustrate the pin connections for most standard printers.

1. Centronics 701, 719, 703, Epson MX-80

Centronics Pin #	Dynabyte Pin #
1	24
2	14
3	15
4	16
5	17
6	18
7	19
8	20
9	21
11	23
16	22

2. Centronics 737

Centronics Pin #	Dynabyte Pin #
1	24
3	14
5	15
7	16
9	17
11	18
13	19
15	20
17	21
21	23
31	22

3. Diablo 1600 Series, 630 Series

Diablo Pin #	Dynabyte Pin #
2	2
3	3
+ 4	
+ 6	
7	7
20	5

For Diablo 1600 Series Printers: Inside the printer, a black wire goes from pin 20 of I/O to the HBRO-4 board (controller) pin 3. This is CTS logic high. Remove this wire from pin 3 and plug it into pin 2 (logic low).

4. Diablo Hyterm

Diablo Pin #	Dynabyte Pin #
2	2
3	3
+ 5	
+ 6	
7	7
+20	

5. NEC Spinwriter Models 5510 and 7710

NEC Spinwriter Pin#	Dynabyte Pin #
3	3
+ 4	
+ 5	
+ 6	
7	7
8	
19	5
+20	

Inside the front panel of the NEC is a DIP switch assembly. Switch 5 should be disabled (down).

6. Qume, Sprint 9

Qume Pin #	Dynabyte Pin #
3	3
4	5
+ 6	
| 7	7
- 8	
+ 9	

7. Tally

Tally Pin #	Dynabyte Pin #
3	3
+ 11	
|	5
+ 19	
+ 7	
|	7
+ 14	

Note: Tally pin numbers 11 and 19 are connected to each other and to Dynabyte pin 5. Similarly, Tally pin numbers 7 and 14 are connected to each other and to Dynabyte pin 7.

8. **TI810**

TI810 Pin #	Dynabyte Pin #
3	3
+ 6	
7	7
- 8	
+ 9	
11	5

9. **TI820**

TI820 Pin #	Dynabyte Pin #
3	3
+ 6	
7	7
- 8	
11	5
+ 20	

9.0 ADVANCED FEATURES

9.1 Interrupts

Like DOS 4, DOS 5 uses interrupts to switch the processor between the different processes that need execution time and to signal ready conditions from devices. Because of this, a user may notice that his computer operates correctly under DOS 2.14 (CP/M 1.4) and DOS 3 (CP/M 2.2), which do not use interrupts, but will not operate correctly under DOS 5. The interrupts are usually responsible in these cases.

DOS 5 uses the vectored interrupt capability of the system. Different devices that are connected to the system will use different interrupt vectors to signal the processor that an interrupt condition exists. This vectoring ability creates a priority structure among pending interrupts in the system. However, DOS 5 treats all interrupts on an equal level, so that there really is no "priority" assignment within the system for interrupt devices, i.e., every interrupt device has equal status.

DOS 5 uses the 286 interrupt mode 0. This is the same mode that an 8080 type of processor would use. In this mode, the interrupting device places a RESTART instruction on the bus after the interrupt has been acknowledged. This restart instruction should be:

ADDRESS 0	=	RESTART 0	=	VECTOR 0
ADDRESS 8	=	RESTART 1	=	VECTOR 1
ADDRESS 10H	=	RESTART 2	=	VECTOR 2
ADDRESS 18H	=	RESTART 3	=	VECTOR 3
ADDRESS 20H	=	RESTART 4	=	VECTOR 4
ADDRESS 28H	=	RESTART 5	=	VECTOR 5
ADDRESS 30H	=	RESTART 6	=	VECTOR 6
ADDRESS 38H	=	RESTART 7	=	VECTOR 7

With the exceptions of vectors 1 and 5, which are reserved for future use, all of the interrupt vectors in the system are used by DOS 5.

The use of the interrupt vectors is:

VECTOR 0	=	COM FILE WARM BOOT
VECTOR 1	=	NOT USED - RESERVED
VECTOR 2	=	CPU RTC & "TICK" TIMERS FLOPPY DISK READ & WRITE
VECTOR 3	=	OCTAPORT CARD #1
VECTOR 4	=	OCTAPORT CARD #2 CPU SERIAL PORTS
VECTOR 5	=	NOT USED - RESERVED
VECTOR 6	=	OCTAPORT RTC & "TICK" TIMERS
VECTOR 7	=	DEBUGGER BREAKPOINT RESTART

Vector 0 is always used by COM type files to perform a warm start. This is actually a "left-over" from the CP/M environment that we must live with in an MP/M environment.

Vector 1 is actually not used in a DOS 5 system. We have reserved it for future use.

Vector 2 is the real work horse in the interrupt system. Vector 2 is used by the clocks from the CPU card. The real time clock (RTC) interrupts the system at a 60 hertz rate. The interrupt service routine breaks this into two types of clocks. The first is a one second clock and the second is the system "tick" clock. The CPU clocks are not active if an octaport card is being used in the system. Vector 2 is also used for the floppy disk read and write interrupt. When the floppy disk has finished with a read or write operation, it triggers this interrupt in the system to inform DOS 5 of the completion.

Vector 3 is used by the first octaport card in a system. There are actually 8 devices on the octaport card that use this vector. The octaport combines them into a single interrupt signal. The interrupt service routine then determines which of the 8 devices caused the interrupt and services that device accordingly. Only the Received Data Available (RDA) signal causes an interrupt in the system. Outputs to the octaport ports are still polled.

Vector 4 is used for two different devices. If no octaport card is in the system, then this vector is used for the two CPU serial ports (CPU1 & CPU2). If an octaport is being used in the system, then the two CPU serial ports are polled and this vector is used for the second octaport card that can be in the system. As in the vector above, only the Received Data Available (RDA) signals will generate an interrupt. The output signals are always polled.

Vector 5 is actually not used in a DOS 5 system. We have reserved it for future use.

Vector 6 is used by the clocks from the octaport card. If no octaport card is being used in the system, then this vector is not used. If an octaport card is being used, then two clocks are generated from it. One clock is the Real Time Clock (RTC) at a 60 hertz rate; the second is the one-second clock.

Vector 7 is really not an interrupt vector at all, but is used instead by the software debuggers with the system to set breakpoints in programs. They do this by placing a FF hex at the address of the breakpoint. This is a RESTART 7 instruction. When the user's program executes this instruction, it will vector control to the Vector 7 location. The debugger will place a jump instruction at that location that will jump back into the debugger to handle the breakpoint condition. So, even though this vector is not used by a device it must be reserved for use by the software debuggers with the system.

Each of the interrupts on the system will inform DOS 5, by setting a flag, that an interrupt condition has occurred. The Digital Research MP/M II manual will explain the use of these flags in more detail. There are 32 flags in MP/M II. The section in this manual called "FLAGS" will give specific details on which flags are used by which devices.

You have no control over the interrupt environment and should never try to alter or modify the interrupt structure of the system. This section is provided for information purposes only and is not intended to be used as a modification guide. Normally you will have no need to alter the interrupt structure anyway. If you do need some form of interrupts, vector 5 can be used.

You must also be careful, when writing programs, about the treatment of the interrupt flip-flop. You should never execute a DI (Disable Interrupts)

instruction. The system will be locked out if you do not perform a subsequent EI (Enable Interrupts) instruction. Also, if you leave the interrupts disabled too long, you risk the chance of failing to service a vital interrupt in the system. For instance, you could cause a disk read or write to fail. You should leave the interrupt flip-flop in the enabled state at all times.

9.2 Flags

Flags are used in DOS 5 to signal ready conditions from interrupt-driven devices to the processes that are waiting for the devices. More information about the exact nature of flags can be found in the Digital Research MP/M II manual.

There are 32 flags in a DOS 5 system. Most of these are reserved for use by devices that can be connected to a DOS 5 system:

FLAG	USE
0	RESERVED BY DIGITAL RESEARCH
1	SYSTEM "TICK" READY FLAG (60 HERTZ FREQUENCY)
2	SYSTEM RTC READY FLAG (1 SECOND FREQUENCY)
3	SYSTEM MINUTE TIMER READY (1 MINUTE FREQUENCY)
4	CPU SERIAL PORT #1 RECEIVED DATA AVAILABLE (RDA)
5	CPU SERIAL PORT #2 RECEIVED DATA AVAILABLE (RDA)
6	RESERVED FOR FUTURE EXPANSION
7	FLOPPY DISK READY (READ, WRITE COMPLETED)
8-23	OCTAPORT PORTS RECEIVED DATA AVAILABLE (RDA) 16 PORTS (OCT1-OCT16)
24-25	RESERVED FOR FUTURE EXPANSION
26-31	NOT USED (AVAILABLE FOR USER)

As you can see above, flags 0-25 are used or reserved by DOS 5. The user can use any of the flags 26-31. This provides the user with 6 flags for devices on the system. If the user requires more flags than this, then he will have to double-up some of the devices and create routines to filter the correct process with the correct device. The user could also create his own type of flag by reserving a memory location for storage of the flag and then having a process poll that location to check the condition of the flag.

Most users will have no cause to concern themselves with the nature or condition of any of the flags. As in the section on interrupts, this section is merely provided for information purposes and use by the advanced user who wishes to heavily modify the system.

If you do not use the ports or devices that are outlined above, then those flags will not be used by the system. However, it is NOT recommended that any user devices use these flags, even if they are not being used at the moment. If you later expand your system to use those devices and those flags, then you will have to rewrite all of your service routines. The user is encouraged to use only the last 6 flags (26-31) and leave the other flags in the system alone.

It is also highly recommended that you read the Digital Research MP/M II manual before attempting to use the flags.

Notes

APPENDIX A

MEMORY BOARD SWITCH/JUMPER SETTINGS

This section gives exact switch/jumper settings that you can use to assign memory board blocks to memory map blocks. All of the assignments given here are for 48K user memory segments.

Separate assignments are given for systems with one to seven memory boards. Note that the assignments given here are arbitrary. Others are possible; the ones shown here simply make the most efficient use of the available memory.

Note also that for two of the systems (the systems with two and three memory boards), two different patterns of settings are provided for the first board—1A and 1B. The 1A settings should be used for booting your system from the distribution disk. (This combination puts 64K of memory in bank 0, which the distribution disk requires.) You may then configure your system using the DYNASYS utility program for memory map B. After you have booted your system from the distribution disk, you should then change the jumper/switch settings on the first board to the settings shown for 1B.

Except for assignments for systems with two and three memory boards, all other assignments have 64K in bank 0, so switches/jumpers need only be set once. That is, you can boot the distribution disk with these settings and then run DYNASYS to reconfigure your system.

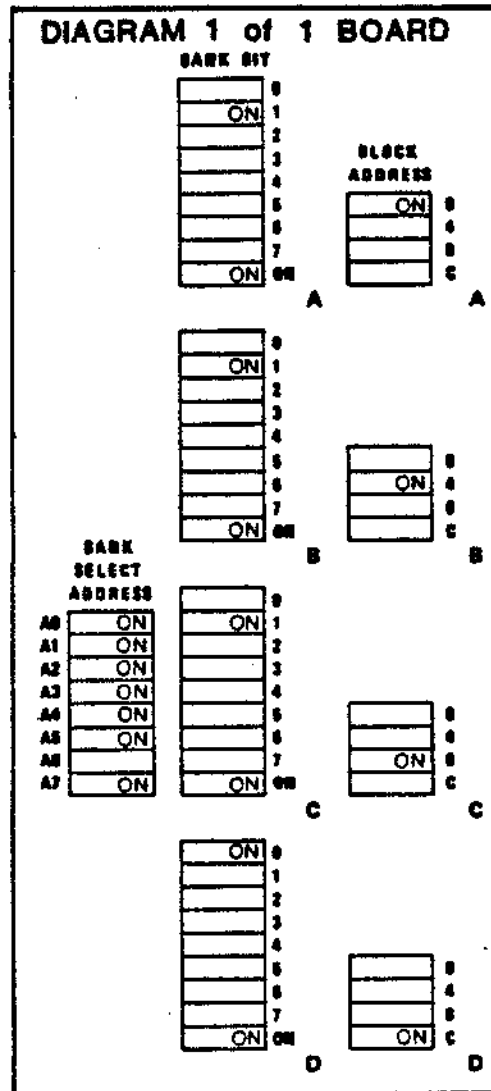
The following pages show for systems with one to seven memory boards:

- Exact switch/jumper settings (two sets for the first board, 1A and 1B, for systems with two and three memory boards)
- The responses that you should give to the DYNASYS Memory Segment Table question
- One or two memory maps of the memory space (maps A and B for systems with two and three memory boards)

64K DYNAMIC MEMORY

SETTINGS FOR 1 MEMORY BOARD SYSTEM

THIS IS THE WAY THE SINGLE BOARD COMES CONFIGURED FROM DYNABYTE



ON = Jumper cap on or RIGHT side of switch depressed (Closed)
 BLANK = OFF = Jumper cap off or LEFT side of switch depressed (Open)

1 MEMORY BOARD

DYNASYS RESPONSE

The following display shows you how to answer the DYNASYS Memory Segment Table question. This question asks you to enter your Memory Segment Table. Enter the responses exactly as shown underlined below - including the commas, and press return, symbolized by "<CR>", after each line.

ENTER MEMORY SEGMENT TABLE:

BASE,SIZE,ATTRIB,BANK= 82,7E,80,00<CR>

BASE,SIZE,ATTRIB,BANK= 00,80,00,00<CR>

I MEMORY BOARD

MEMTEST MAP

Compare the following with the Memory Maps that appear on your display screen when you run MEMTEST. Consult the appropriate MEMTEST instructions if there is a difference between these maps and your screen display map.

MEMTEST MEMORY MAP - FOR I MEMORY BOARD

	BNK	BNK	BNK	BNK	BNK	BNK	BNK	BNK
	0	1	2	3	4	5	6	7
PCE 4	|SYS|	|...|	|...|	|...|	|...|	|...|	|...|	|...|
	|TEM|	|...|	|...|	|...|	|...|	|...|	|...|	|...|
PCE 3	|G	|	|	|	|	|	|	|
	|PPP|	|	|	|	|	|	|	|
PCE 2	|G D|	|	|	|	|	|	|	|
	|PPP|	|	|	|	|	|	|	|
PCE 1	|G D|	|	|	|	|	|	|	|
	|PPP|	|	|	|	|	|	|	|

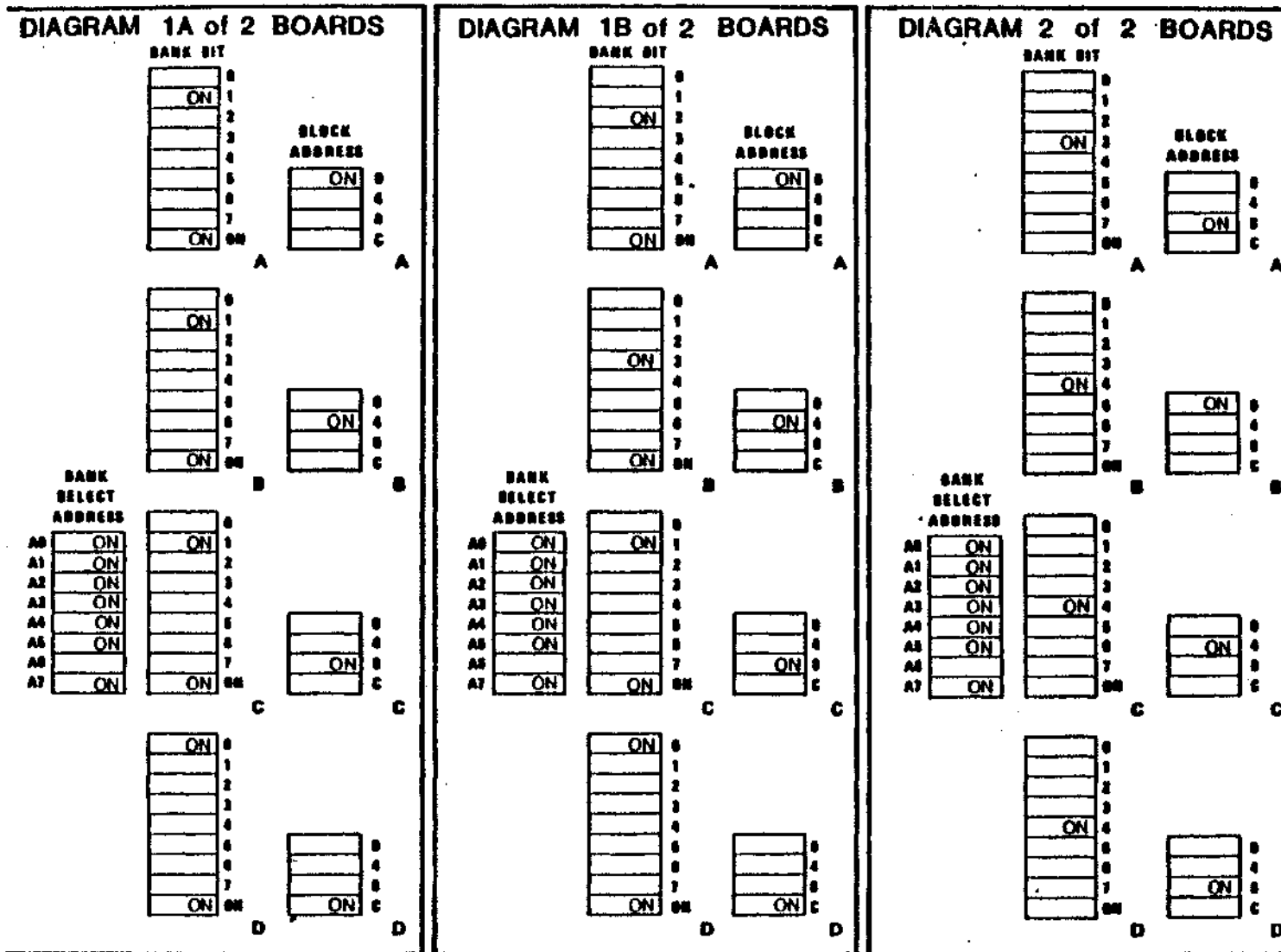
SPECIAL INSTRUCTIONS FOR 2 MEMORY BOARD SYSTEM

Follow the instructions below in setting your memory boards:

1. Leave Memory Board #1 set exactly as it comes in the computer (Diagram 1A).
2. Set Memory Board #2 as shown on Diagram 2 of 2 boards.
3. Place the board back into the computer.
4. Do the first MEMTEST and DYNASYS.
5. Remove Memory Board #1 before the second MEMTEST.
6. Change the settings on Memory Board #1 as shown on Memory Board Diagram 1B of 2 Boards.
7. Place the board back into the computer and replace the cover.

64K DYNAMIC MEMORY

SETTINGS FOR 2 MEMORY BOARD SYSTEM



ON = Jumper cap on or RIGHT side of switch depressed (Closed)
 BLANK = OFF = Jumper cap off or LEFT side of switch depressed (Open)

2 MEMORY BOARDS

DYNASYS RESPONSE
FOR TWO SEGMENTS

The following display shows you how to answer the DYNASYS Memory Segment Table question. This question asks you to enter your Memory Segment Table. Enter the responses exactly as shown underlined below - including the commas, and press return, symbolized by "<CR>", after each line.

ENTER MEMORY SEGMENT TABLE:
BASE,SIZE,ATTRIB,BANK= 82,7E,80,00<CR>
BASE,SIZE,ATTRIB,BANK= 0,C0,0,1<CR>
BASE,SIZE,ATTRIB,BANK= 0,C0,0,2<CR>

2 MEMORY BOARDS

MEMTEST MAPS

Compare the following with the Memory Maps that appear on your display screen when you run MEMTEST. Consult the appropriate MEMTEST instructions if there is a difference between these maps and your screen display map.

MEMTEST 1 MEMORY MAP - After switches have been set according to Diagram 1A and Diagram 2.

	BNK 0	BNK 1	BNK 2	BNK 3	BNK 4	BNK 5	BNK 6	BNK 7
PCE 4	|SYS|	|...|	|...|	|...|	|...|	|...|	|...|	|...|
	|TEM|	|...|	|...|	|...|	|...|	|...|	|...|	|...|
PCE 3	|G |	|G |	|G |	| |	| |	| |	| |	| |
	|PPP|	|PPP|	|PPP|	| |	| |	| |	| |	| |
PCE 2	|G D|	| |	|G |	| |	| |	| |	| |	| |
	|PPP|	| |	|PPP|	| |	| |	| |	| |	| |
PCE 1	|G D|	| |	|G |	| |	| |	| |	| |	| |
	|PPP|	| |	|PPP|	| |	| |	| |	| |	| |

MEMTEST 2 MEMORY MAP - After DYNASYS has been run and switches have been set to Diagram 1B and Diagram 2.

	BNK 0	BNK 1	BNK 2	BNK 3	BNK 4	BNK 5	BNK 6	BNK 7
PCE 4	|SYS|	|...|	|...|	|...|	|...|	|...|	|...|	|...|
	|TEM|	|...|	|...|	|...|	|...|	|...|	|...|	|...|
PCE 3	|G |	|G D|	|G D|	| |	| |	| |	| |	| |
	|PPP|	|PPP|	|PPP|	| |	| |	| |	| |	| |
PCE 2	| |	|G D|	|G D|	| |	| |	| |	| |	| |
	| |	|PPP|	|PPP|	| |	| |	| |	| |	| |
PCE 1	| |	|G D|	|G D|	| |	| |	| |	| |	| |
	| |	|PPP|	|PPP|	| |	| |	| |	| |	| |

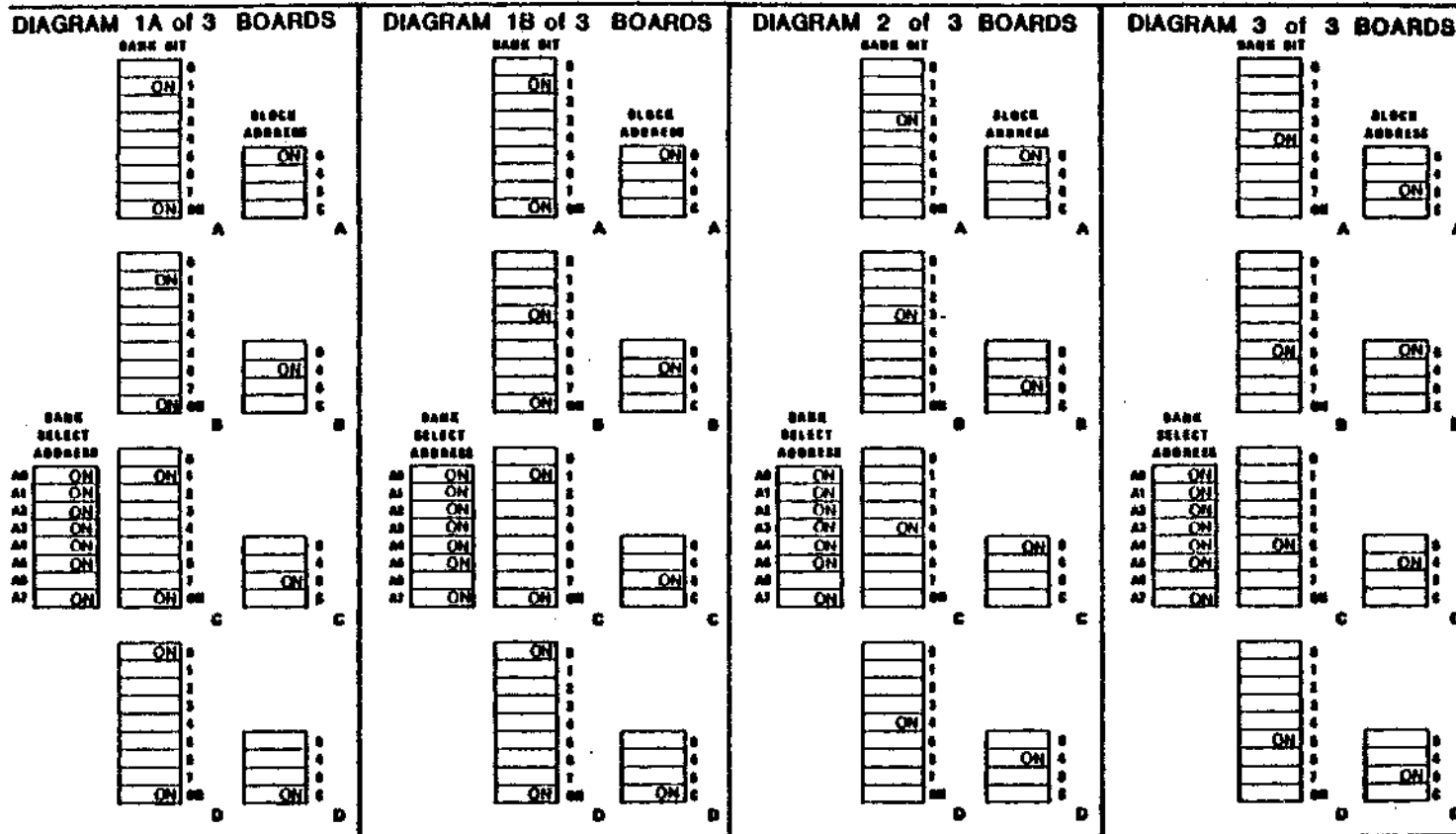
SPECIAL INSTRUCTIONS FOR 3 MEMORY BOARD SYSTEM

Follow the instructions below in setting your memory boards:

1. Leave Memory Board #1 set exactly as it comes in the computer (Diagram 1A).
2. Set Memory Boards #2 and #3 as shown on Diagrams 2 and 3.
3. Place the boards back into the computer.
4. Do the first MEMTEST and DYNASYS.
5. Remove Memory Board #1 before the second MEMTEST.
6. Change the settings on Memory Board #1 as shown on Memory Board Diagram 1B of 3 Boards.
7. Place the board back into the computer and replace the cover.

64K DYNAMIC MEMORY

SETTINGS FOR 3 MEMORY BOARD SYSTEM



ON = Jumper cap on or RIGHT side of switch depressed (Closed)
 BLANK = OFF = Jumper cap off or LEFT side of switch depressed (Open)

3 MEMORY BOARDS

DYNASYS RESPONSE
FOUR MEMORY SEGMENTS

The following display shows you how to answer the DYNASYS Memory Segment Table question. This question asks you to enter your Memory Segment Table. Enter the responses exactly as shown underlined below - including the commas, and press return, symbolized by "<CR>", after each line.

```
ENTER MEMORY SEGMENT TABLE:  
BASE,SIZE,ATTRIB,BANK= 81,7E,80,00<CR>  
BASE,SIZE,ATTRIB,BANK= 1,3E,0,0<CR>  
BASE,SIZE,ATTRIB,BANK= 0,00,0,1<CR>  
BASE,SIZE,ATTRIB,BANK= 0,00,0,2<CR>  
BASE,SIZE,ATTRIB,BANK= 0,00,0,3<CR>
```

3 MEMORY BOARDS

MEMTEST MAPS

Compare the following with the Memory Maps that appear on your display screen when you run MEMTEST. Consult the appropriate MEMTEST instructions if there is a difference between these maps and your screen display map.

MEMTEST 1 MEMORY MAP - After switches have been set according to Diagram 1A and Diagram 2.

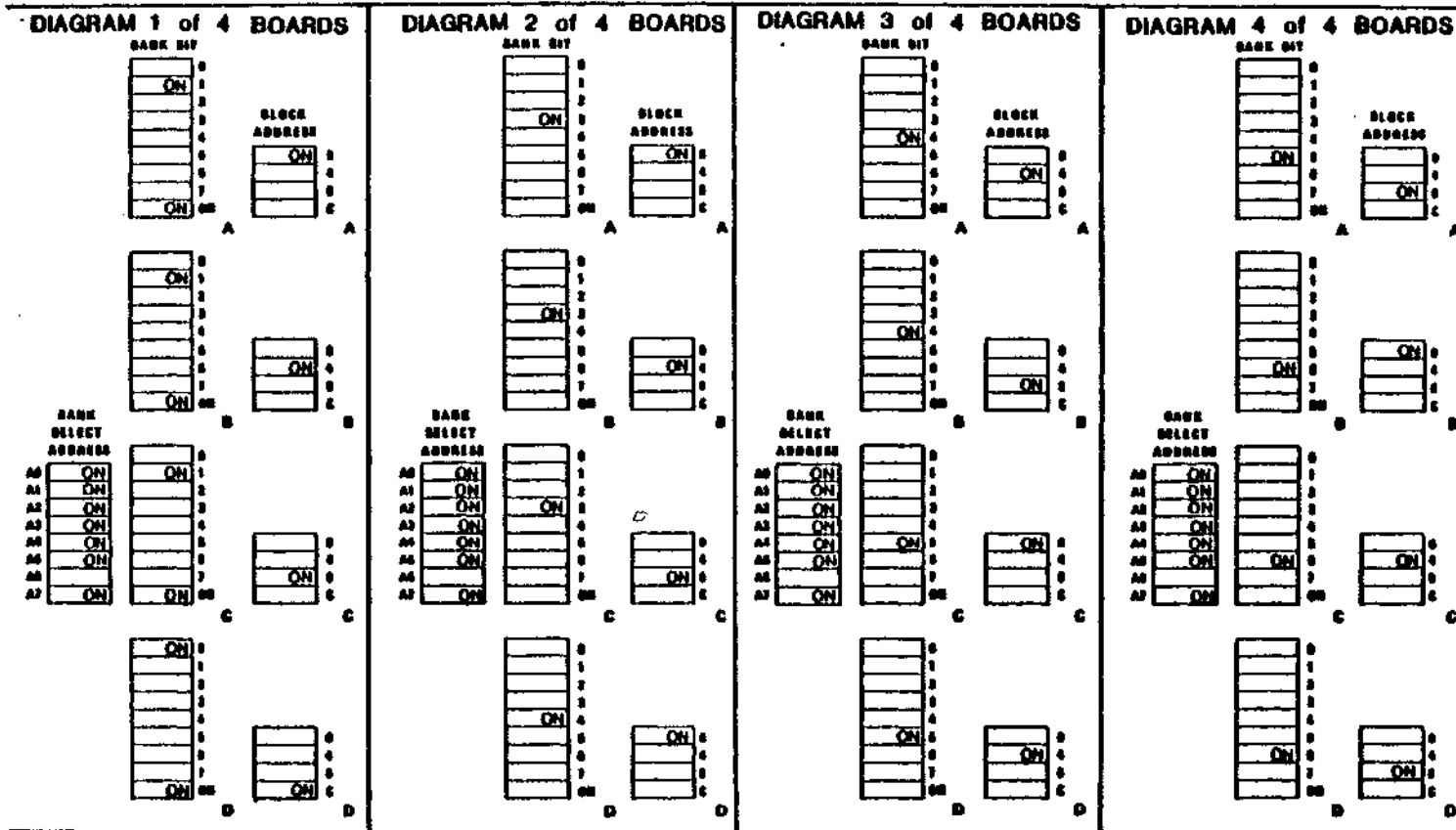
	BNK 0	BNK 1	BNK 2	BNK 3	BNK 4	BNK 5	BNK 6	BNK 7
PCE 4	|SYS|	|...|	|...|	|...|	|...|	|...|	|...|	|...|
	|TEM|	|...|	|...|	|...|	|...|	|...|	|...|	|...|
PCE 3	|G |G |G |G |	|	|	|	|	|	|	|
	|PPP|	|PPP|	|PPP|	|PPP|	|	|	|	|
PCE 2	|G D|	|G |G |	|	|	|	|	|	|
	|PPP|	|PPP|	|PPP|	|PPP|	|	|	|	|
PCE 1	|G D|G |G |G |	|	|	|	|	|	|	|
	|PPP|	|PPP|	|PPP|	|PPP|	|	|	|	|

MEMTEST 2 MEMORY MAP - After DYNASYS has been run and switches have been set to Diagram 1B and Diagram 2.

	BNK 0	BNK 1	BNK 2	BNK 3	BNK 4	BNK 5	BNK 6	BNK 7
PCE 4	|SYS|	|...|	|...|	|...|	|...|	|...|	|...|	|...|
	|TEM|	|...|	|...|	|...|	|...|	|...|	|...|	|...|
PCE 3	|G |G D|G D|G D|	|	|	|	|	|	|	|
	|PPP|	|PPP|	|PPP|	|PPP|	|	|	|	|
PCE 2	|	|G D|G D|G D|	|	|	|	|	|	|
	|	|PPP|	|PPP|	|PPP|	|	|	|	|
PCE 1	|G D|G D|G D|G D|	|	|	|	|	|	|	|
	|PPP|	|PPP|	|PPP|	|PPP|	|	|	|	|

64K DYNAMIC MEMORY

SETTINGS FOR 4 MEMORY BOARD SYSTEM



ON = Jumper cap on or RIGHT side of switch depressed (Closed)
 BLANK = OFF = Jumper cap off or LEFT side of switch depressed (Open)

4 MEMORY BOARDS

DYNASYS RESPONSE

The following display shows you how to answer the DYNASYS Memory Segment Table question. This question asks you to enter your Memory Segment Table. Enter the responses exactly as shown underlined below - including the commas, and press return, symbolized by "<CR>", after each line.

ENTER MEMORY SEGMENT TABLE:

6 SEGMENTS:

BASE,SIZE,ATTRIB,BANK= 81,7F,80,00
BASE,SIZE,ATTRIB,BANK= 01,3F,00,00
BASE,SIZE,ATTRIB,BANK= 40,40,00,00
BASE,SIZE,ATTRIB,BANK= 00,C0,00,01
BASE,SIZE,ATTRIB,BANK= 00,C0,00,02
BASE,SIZE,ATTRIB,BANK= 00,C0,00,03
BASE,SIZE,ATTRIB,BANK= 00,C0,00,04

5 SEGMENTS:

BASE,SIZE,ATTRIB,BANK= 7C,84,80,00
BASE,SIZE,ATTRIB,BANK= 01,7B,00,00
BASE,SIZE,ATTRIB,BANK= 00,C0,00,01
BASE,SIZE,ATTRIB,BANK= 00,C0,00,02
BASE,SIZE,ATTRIB,BANK= 00,C0,00,03
BASE,SIZE,ATTRIB,BANK= 00,C0,00,04

4 MEMORY BOARDS

MEMTEST MAPS

Compare the following with the Memory Maps that appear on your display screen when you run MEMTEST. Consult the appropriate MEMTEST instructions if there is a difference between these maps and your screen display map.

MEMTEST 1 MEMORY MAP - After switch settings have been changed

	BNK 0	BNK 1	BNK 2	BNK 3	BNK 4	BNK 5	BNK 6	BNK 7
PCE 4	|SYS|	|...|	|...|	|...|	|...|	|...|	|...|	|...|
	|TEM|	|...|	|...|	|...|	|...|	|...|	|...|	|...|
PCE 3	|G |	|G |	|G |	|G |	|G |	| |	| |	| |
	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	| |	| |	| |
PCE 2	|G D|	|G |	|G |	|G |	|G |	| |	| |	| |
	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	| |	| |	| |
PCE 1	|G D|	|G |	|G |	|G |	|G |	| |	| |	| |
	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	| |	| |	| |

MEMTEST 2 MEMORY MAP - After DYNASYS has been run.

	BNK 0	BNK 1	BNK 2	BNK 3	BNK 4	BNK 5	BNK 6	BNK 7
PCE 4	|SYS|	|...|	|...|	|...|	|...|	|...|	|...|	|...|
	|TEM|	|...|	|...|	|...|	|...|	|...|	|...|	|...|
PCE 3	|G |	|G D|	|G D|	|G D|	|G D|	| |	| |	| |
	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	| |	| |	| |
PCE 2	|G D|	|G D|	|G D|	|G D|	|G D|	| |	| |	| |
	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	| |	| |	| |
PCE 1	|G D|	|G D|	|G D|	|G D|	|G D|	| |	| |	| |
	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	| |	| |	| |

64K DYNAMIC MEMORY

SETTINGS FOR 5 MEMORY BOARD SYSTEM

DIAGRAM 1 of 5 BOARDS

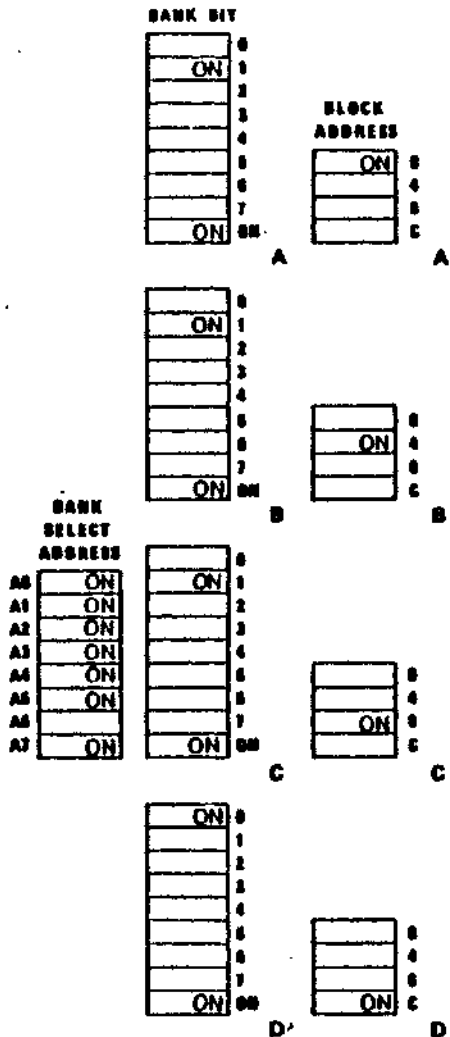


DIAGRAM 2 of 5 BOARDS

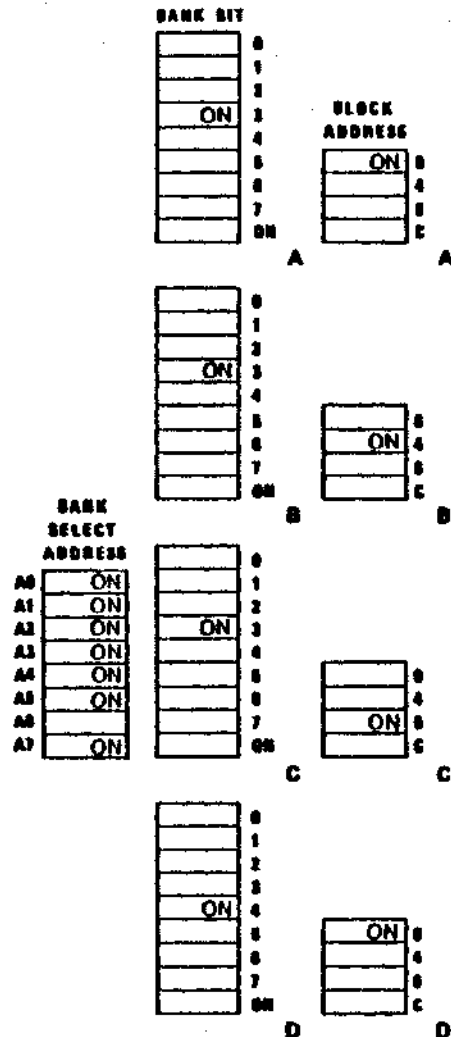
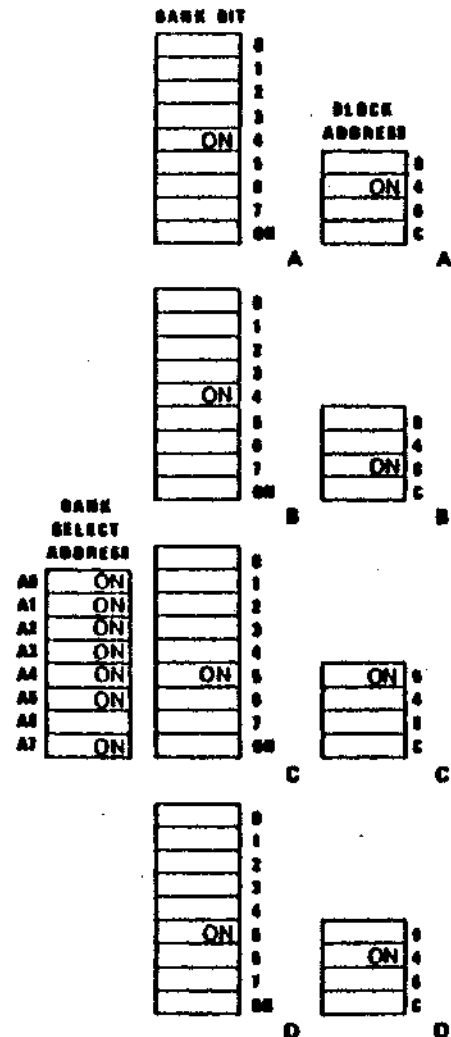
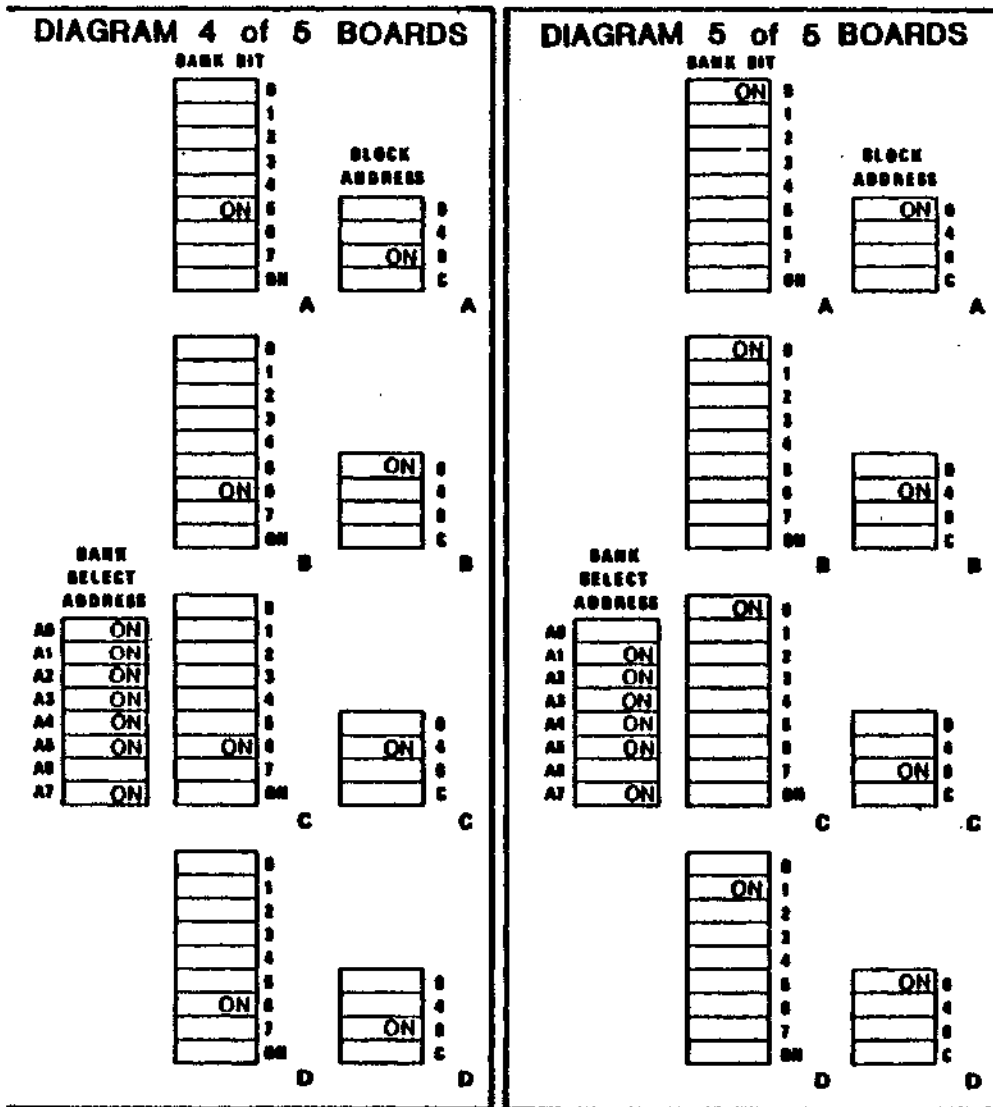


DIAGRAM 3 of 5 BOARDS



ON = Jumper cap on or RIGHT side of switch depressed (Closed)
 BLANK = OFF = Jumper cap off or LEFT side of switch depressed (Open)

SETTINGS FOR 5 MEMORY BOARD SYSTEM - CON'T



5 MEMORY BOARDS

DYNASYS RESPONSE

The following display shows you how to answer the DYNASYS Memory Segment Table question. This question asks you to enter your Memory Segment Table. Enter the responses exactly as shown underlined below - including the commas, and press return, symbolized by "<CR>", after each line.

```
ENTER MEMORY SEGMENT TABLE: (FF TERMINATES LIST)
BASE,SIZE,ATTRIB,BANK= 1,3F,0,0<CR>
BASE,SIZE,ATTRIB,BANK= 40,40,0,0<CR>
BASE,SIZE,ATTRIB,BANK= 0,C0,0,1<CR>
BASE,SIZE,ATTRIB,BANK= 0,C0,0,2<CR>
BASE,SIZE,ATTRIB,BANK= 0,C0,0,3<CR>
BASE,SIZE,ATTRIB,BANK= 0,C0,0,4<CR>
BASE,SIZE,ATTRIB,BANK= 0,C0,0,6<CR>
BASE,SIZE,ATTRIB,BANK= 1,3F,0,7<CR>
```

NOTE: After 8 descriptors are entered, the computer will automatically advance to the next question.

5 MEMORY BOARDS

MEMTEST MAPS

Compare the following with the Memory Maps that appear on your display screen when you run MEMTEST. Consult the appropriate MEMTEST instructions if there is a difference between these maps and your screen display map.

MEMTEST 1 MEMORY MAP - After switch settings have been changed

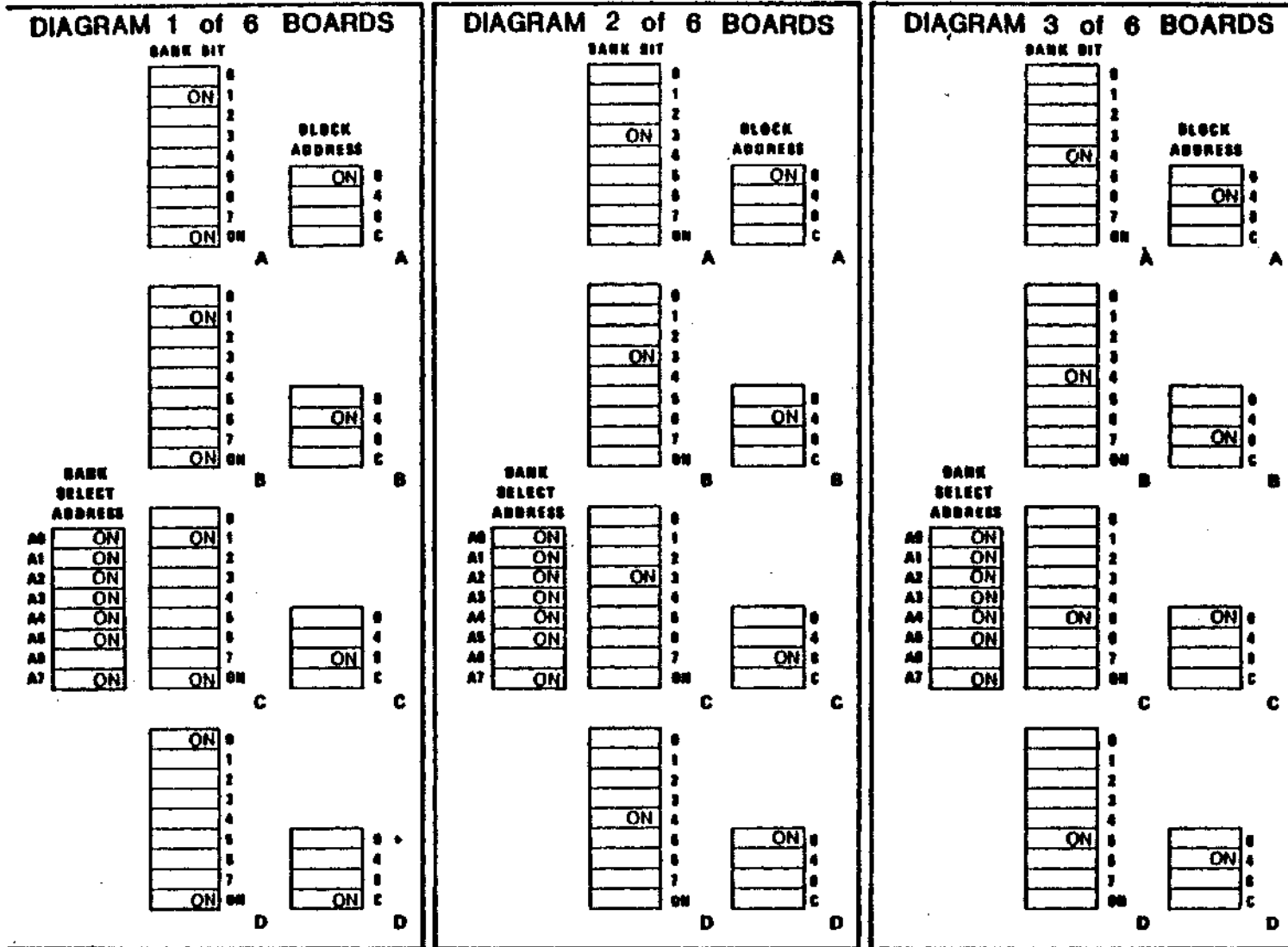
	BNK 0	BNK 1	BNK 2	BNK 3	BNK 4	BNK 5	BNK 6	BNK 7
PCE 4	|SYS|	|...|	|...|	|...|	|...|	|...|	|...|	|...|
	|TEM|	|...|	|...|	|...|	|...|	|...|	|...|	|...|
PCE 3	|G |G |	|G |G |	|G |G |	|G |G |	|G |G |	|G |G |	|G |G |	|G |G |
	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|
PCE 2	|G D|G |	|G |G |	|G |G |	|G |G |	|G |G |	|G |G |	|G |G |	|G |G |
	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|
PCE 1	|G D|G |	|G |G |	|G |G |	|G |G |	|G |G |	|G |G |	|G |G |	|G |G |
	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|

MEMTEST 2 MEMORY MAP - After DYNASYS has been run.

	BNK 0	BNK 1	BNK 2	BNK 3	BNK 4	BNK 5	BNK 6	BNK 7
PCE 4	|SYS|	|...|	|...|	|...|	|...|	|...|	|...|	|...|
	|TEM|	|...|	|...|	|...|	|...|	|...|	|...|	|...|
PCE 3	|G |G D|	|G D|G D|	|G D|G D|	|G D|G D|	|G D|G D|	|G D|G D|	|G D|G D|	|G D|G D|
	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|
PCE 2	|G D|G D|	|G D|G D|	|G D|G D|	|G D|G D|	|G D|G D|	|G D|G D|	|G D|G D|	|G D|G D|
	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|
PCE 1	|G D|G D|	|G D|G D|	|G D|G D|	|G D|G D|	|G D|G D|	|G D|G D|	|G D|G D|	|G D|G D|
	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|

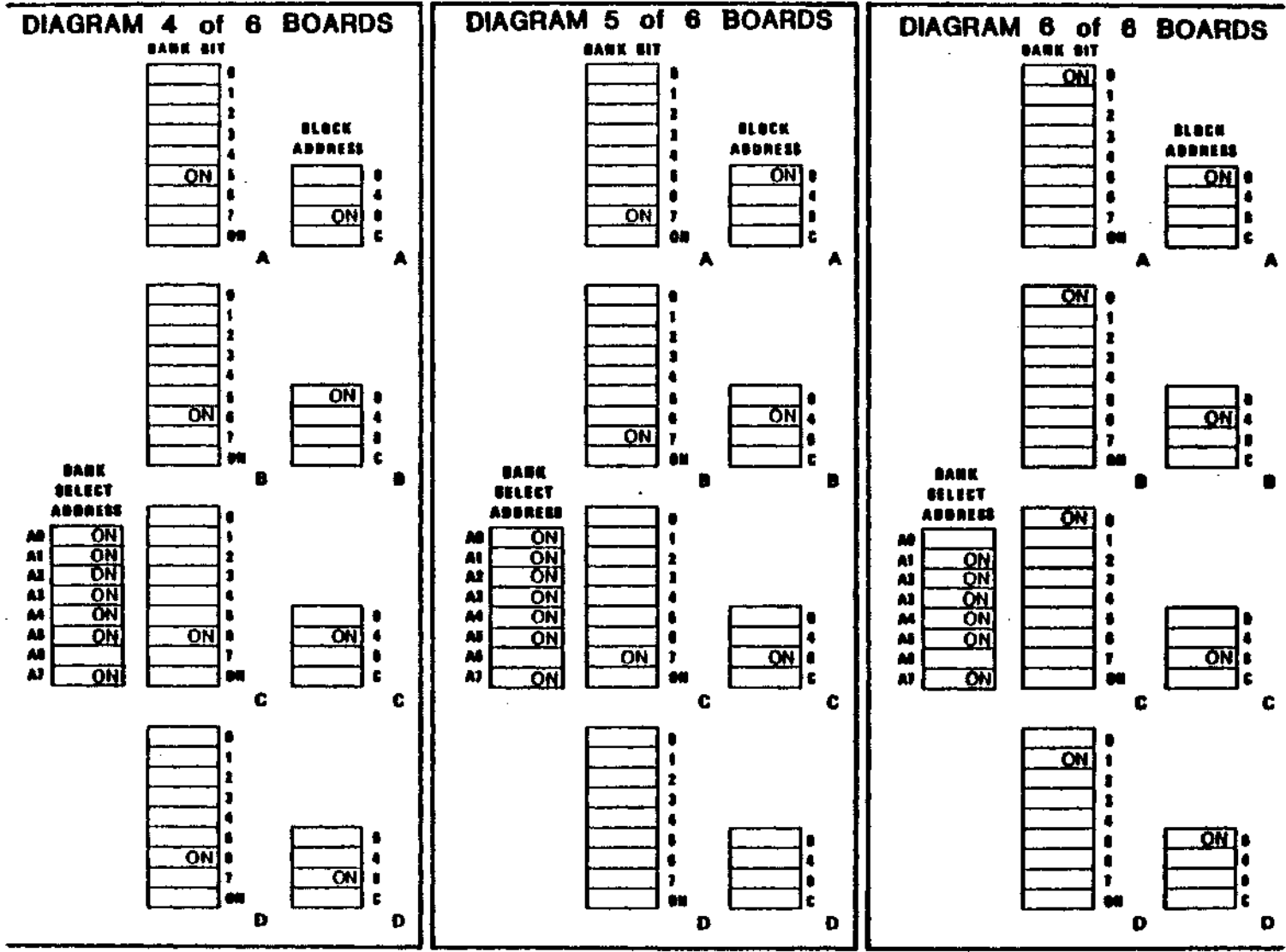
64K DYNAMIC MEMORY

SETTINGS FOR 6 MEMORY BOARD SYSTEM



ON = Jumper cap on or RIGHT side of switch depressed (Closed)
 BLANK = OFF = Jumper cap off or LEFT side of switch depressed (Open)

SETTINGS FOR 6 MEMORY BOARD SYSTEM - CON'T



6 MEMORY BOARDS

DYNASYS RESPONSE

The following display shows you how to answer the DYNASYS Memory Segment Table question. This question asks you to enter your Memory Segment Table. Enter the responses exactly as shown underlined below - including the commas, and press return, symbolized by "<CR>", after each line.

```
ENTER MEMORY SEGMENT TABLE: (FF TERMINATES LIST)
BASE,SIZE,ATTRIB,BANK= 1,7F,0,0<CR>
BASE,SIZE,ATTRIB,BANK= 0,00,0,1<CR>
BASE,SIZE,ATTRIB,BANK= 0,00,0,2<CR>
BASE,SIZE,ATTRIB,BANK= 0,00,0,3<CR>
BASE,SIZE,ATTRIB,BANK= 0,00,0,4<CR>
BASE,SIZE,ATTRIB,BANK= 0,00,0,5<CR>
BASE,SIZE,ATTRIB,BANK= 0,00,0,6<CR>
BASE,SIZE,ATTRIB,BANK= 1,3F,0,7<CR>
```

NOTE: After 8 descriptors are entered, the computer will automatically advance to the next question.

6 MEMORY BOARDS

MEMTEST MAPS

Compare the following with the Memory Maps that appear on your display screen when you run MEMTEST. Consult the appropriate MEMTEST instructions if there is a difference between these maps and your screen display map.

MEMTEST 1 MEMORY MAP - After switch settings have been changed

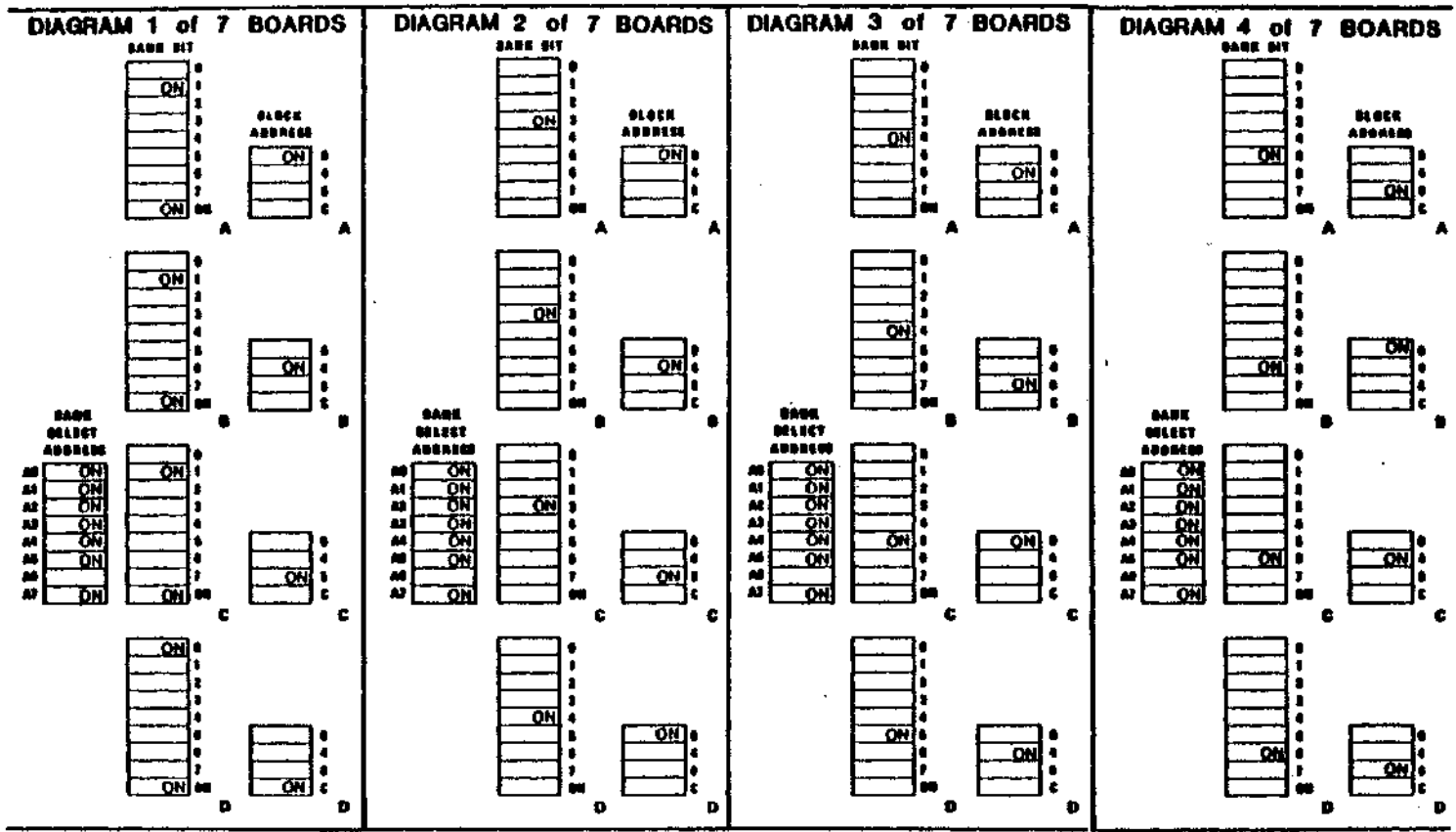
	BNK	BNK	BNK	BNK	BNK	BNK	BNK	BNK
	0	1	2	3	4	5	6	7
PCE	|SYS|	|...|	|...|	|...|	|...|	|...|	|...|	|...|
4	|TEM|	|...|	|...|	|...|	|...|	|...|	|...|	|...|
PCE	|G	|G	|G	|G	|G	|G	|G	|
3	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	|
PCE	|G D|	|G	|G	|G	|G	|G	|G	|
2	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	|
PCE	|G D|	|G	|G	|G	|G	|G	|G	|
1	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|

MEMTEST 2 MEMORY MAP - After DYNASYS has been run.

	BNK	BNK	BNK	BNK	BNK	BNK	BNK	BNK
	0	1	2	3	4	5	6	7
PCE	|SYS|	|...|	|...|	|...|	|...|	|...|	|...|	|...|
4	|TEM|	|...|	|...|	|...|	|...|	|...|	|...|	|...|
PCE	|G	|G D|	|G D|	|G D|	|G D|	|G D|	|G D|	|
3	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	|
PCE	|G D|	|G D|	|G D|	|G D|	|G D|	|G D|	|G D|	|
2	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	|
PCE	|G D|	|G D|	|G D|	|G D|	|G D|	|G D|	|G D|	|
1	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|

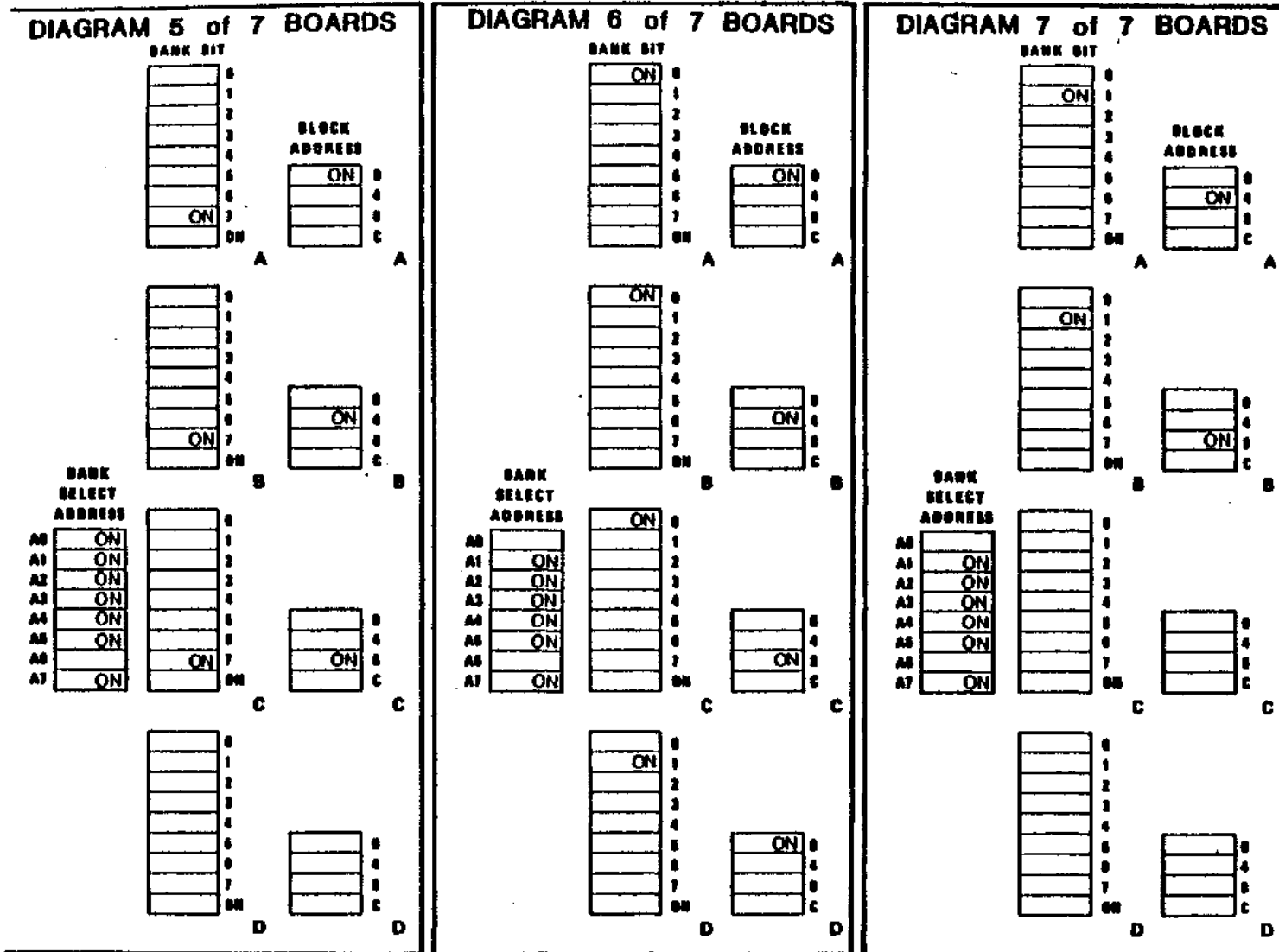
64K DYNAMIC MEMORY

SETTINGS FOR 7 MEMORY BOARD SYSTEM



ON = Jumper cap on or RIGHT side of switch depressed (Closed)
 BLANK = OFF = Jumper cap off or LEFT side of switch depressed (Open)

SETTINGS FOR 7 MEMORY BOARD SYSTEM - CON'T



7 MEMORY BOARDS

DYNASYS RESPONSE

The following display shows you how to answer the DYNASYS Memory Segment Table question. This question asks you to enter your Memory Segment Table. Enter the responses exactly as shown underlined below - including the commas, and press return, symbolized by "<CR>", after each line.

```
ENTER MEMORY SEGMENT TABLE: (FF TERMINATES LIST)
BASE,SIZE,ATTRIB,BANK= 1,7F,0,0<CR>
BASE,SIZE,ATTRIB,BANK= 0,C0,0,1<CR>
BASE,SIZE,ATTRIB,BANK= 0,C0,0,2<CR>
BASE,SIZE,ATTRIB,BANK= 0,C0,0,3<CR>
BASE,SIZE,ATTRIB,BANK= 0,C0,0,4<CR>
BASE,SIZE,ATTRIB,BANK= 0,C0,0,5<CR>
BASE,SIZE,ATTRIB,BANK= 0,C0,0,6<CR>
BASE,SIZE,ATTRIB,BANK= 0,C0,0,7<CR>
```

NOTE: After 8 descriptors are entered, the computer will automatically advance to the next question.

7 MEMORY BOARDS

MEMTEST MAPS

Compare the following with the Memory Maps that appear on your display screen when you run MEMTEST. Consult the appropriate MEMTEST instructions if there is a difference between these maps and your screen display map.

MEMTEST 1 MEMORY MAP - After switch settings have been changed

	BANK	BANK	BANK	BANK	BANK	BANK	BANK	BANK
	0	1	2	3	4	5	6	7
PCE 4	|SYS|	|...|	|...|	|...|	|...|	|...|	|...|	|...|
	|TEM|	|...|	|...|	|...|	|...|	|...|	|...|	|...|
PCE 3	|G|	|G|	|G|	|G|	|G|	|G|	|G|	|G|
	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|
PCE 2	|G D|	|G|	|G|	|G|	|G|	|G|	|G|	|G|
	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|
PCE 1	|G D|	|G|	|G|	|G|	|G|	|G|	|G|	|G|
	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|

MEMTEST 2 MEMORY MAP - After DYNASYS has been run.

	BANK	BANK	BANK	BANK	BANK	BANK	BANK	BANK
	0	1	2	3	4	5	6	7
PCE 4	|SYS|	|...|	|...|	|...|	|...|	|...|	|...|	|...|
	|TEM|	|...|	|...|	|...|	|...|	|...|	|...|	|...|
PCE 3	|G|	|G D|	|G D|	|G D|	|G D|	|G D|	|G D|	|G D|
	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|
PCE 2	|G D|	|G D|	|G D|	|G D|	|G D|	|G D|	|G D|	|G D|
	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|
PCE 1	|G D|	|G D|	|G D|	|G D|	|G D|	|G D|	|G D|	|G D|
	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|	|PPP|

Notes

APPENDIX B

UTILITY SUMMARY

Below is a summary of all utility programs provided by DOS 5. Each utility can be invoked by typing its name at the DOS 5 level prompt. Read the appropriate discussions in the manual for more information on each utility.

BACKUP	creates backup copies of data. BACKUP can selectively copy one or more files or it can copy an entire disk. See Section 7 for more information.
DTIP	transfers files between disk and cartridge tape systems. See Section 6 for more information.
DYNAGEN	creates a DOS 5 system disk. DYNAGEN writes the loader on the outer tracks and the boot files in the directory. See Section 3.2 for more information.
DYNASTAT	displays the current status and assignments of consoles, printers, disks, memory, and system parameters in a DOS 5 system. See Section 3.5 for more information.
DYNASYS	generates a newly configured DOS 5 system disk. See Section 3.1 for more information.
FFORMAT	formats a floppy disk (5.25" or 8") for use by DOS 5. See Section 5.1.2 for more information.
FUJFMT	formats or checks a Fujitsu Winchester drive (11 or 23 megabytes). See Section 5.3.2 for more information.
MEMTEST	diagnoses memory configuration problems. See Section 3.4 for more information. This utility will abort the operating system and MUST be run off-line. It will display a memory map of all RAM memory on the console attached to CPU2.
WFORMAT	formats a Micropolis Winchester disk system. See Section 5.2.2 for more information.
WINFMT5	formats and checks a Mini Winchester drive (6, 10, 12, 16, or 19 megabytes). See Section 5.4.2 for more information.

Notes



USER'S COMMENTS FORM

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