
FLAGSTAFF ENGINEERING

Utility/8 Software Documentation Manual

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FLAGSTAFF ENGINEERING
P.O. Box 1970
Flagstaff, Arizona 86002
(602) 779-3341
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FLAGSTAFF ENGINEERING

DISKETTE CONNECTION UTILITY/8

SOFTWARE DOCUMENTATION MANUAL

Copyright 1985
FLAGSTAFF ENGINEERING
Box 1970
Flagstaff, AZ 86002
(602) 774-5188
TELEX 705609

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INTRODUCTION

This manual provides program documentation for the diagnostics and utilities supplied with the Flagstaff Engineering Diskette Connection System. The Utilites/8 diskette contains the following files.

DEVICE DRIVERS AND RELATED FILES:

CONFIGD.SYS Config.sys file for Model D controller card.

CONFIGS.SYS Config.sys file for Model S controller card.

CONFIGX.SYS Config.sys file with sample DOS device driver parameters.

FLAGIOS.SYS Device Driver for Model S controller card.

FLAGIO.SYS Device driver for Model D controller card.

FLAGIOX.SYS Device driver to support external devices as DOS IDs.

INT13C.ASM 8088 ASM Source file for device driver access.

DEMO.C Source code in C for demo device driver access.

DIAGNOSTICS:

CHECK8 Check external drive read/write.

VERIFY8 Check external drive operations.

FILEGEN Build PC-DOS test data file.

ID8 Display diskette sector ID's.

UTILITIES:

CPY8T05 Copy external diskette data to PC-DOS files.

CPY5T08 Copy DOS files to external diskettes.

COPY8 Duplicate 8" diskettes.

DISPLAY8 Display and edit external diskette sectors.

DOSFMT8 Format external DOS diskettes.

Program descriptions are provided for each executable program. Program descriptions are composed of eight sections.

1. Program Name.
2. Use.
3. Miscellaneous notes.
4. Description.
5. Operation.
6. Defaults.
7. Destructive/Nondestructive.
8. Sample Program Run.

In the program operation sections of the manual, keyboard entries are indicated by bracketed characters:

[ENTER] equals the enter key.

[Y] equals the Y key.

[01001] equals the digits 0,1,0,0,
and 1 typed on the keyboard.

PROGRAM OPERATION

The programs may be copied to and executed from any DOS diskette or hard disk volume desired. Programs should be loaded using standard DOS syntax.

A> [PROGRAM NAME]

Program prompts for key entries are issued by the programs in the forms:

(DEFAULT/RANGE OF ENTRIES) and
(DEFAULT/OPTION1,OPTION2,OPTION3)

At the prompt, "ENTER DRIVE NUMBER (1/2-4)?", pressing the [ENTER] key will select the default entry of [1]. Optional values may be entered by pressing [2], [3], or [4] followed by the [ENTER] key.

EXTERNAL DEVICE TYPES

The Utility and diagnostic programs access several types of external devices through the Flagstaff Engineering diskette controller card. The programs will prompt the user for the device type being used. External device types are indicated by a single alpha-numeric character. Device types for diskettes and drives are:

8 = 8" diskette or drive.

5 = 5 1/4" 48 TPI 360K device or drive.

Q = 5 1/4" 96 TPI 720k Quad density.

H = 5 1/4" 96 TPI 1.2Meg. High density.

3 = 3 1/2" 135 TPI 300 RPM drive.
(3 1/2" Data General diskettes.)

EXTERNAL DEVICE NUMBERS

The Utility and diagnostic programs access up to four external diskette drives through the Flagstaff Engineering diskette controller card. The programs will prompt the user for the drive number being used. External drives are indicated by a single numeric character. External drive numbers are defined as:

1 = first external drive off rear of diskette controller card. (50 pin connector P3)

2 = second external drive off rear of diskette controller card. (50 pin connector P3)

3 = first external drive off front of
diskette controller card. (34 pin
connector P2)

4 = second external drive off front of
diskette controller card. (34 pin
connector P2)

DEVICE DRIVERS

A device driver module MUST be included in the DOS you boot into your computer to provide support for the external drives interfaced to the Flagstaff Engineering diskette controller card. Each volume of a diskette or hard disk that is used to boot from MUST contain a copy of the device driver module and a CONFIG.SYS file which specifies that the device driver is to be loaded into the system.

Two separate device drivers are included on the distribution diskette. The driver you should copy onto bootable volumes is defined by the type of diskette controller card installed in your computer.

If you have a Model S diskette controller card, you must use device driver

FLAGIOS.SYS.

If you have a Model D diskette controller card, you must use device driver

FLAGIO.SYS.

The device driver module and CONFIG.SYS file must be copied to the root directory of any bootable volumes. If these files are copied to sub-directories, they will not be loaded into the system when DOS is booted.

FLAGIOS.SYS (MODEL S CONTROLLER CARD)

To support a Model S diskette controller card, copy device driver, FLAGIOS.SYS from the distribution diskette onto bootable DOS volumes you will be using.

A CONFIG.SYS file must be created on bootable volumes to specify that module FLAGIOS.SYS should be loaded into the system when DOS is booted. If your system does not already use a CONFIG.SYS file, then create the file by copying CONFIGS.SYS from the distribution diskette onto your bootable volumes. After you have copied the file, rename the file CONFIG.SYS. If your system already uses CONFIG.SYS, then the following two statements must be added to the file:

```
DEVICE=FLAGIOS.SYS
BUFFERS=4
```

FLAGIO.SYS (MODEL D CONTROLLER CARD)

To support a Model D diskette controller card, copy device driver FLAGIO.SYS from the distribution diskette onto bootable DOS volumes you will be using.

A CONFIG.SYS file must be created on bootable volumes to specify that device driver FLAGIO.SYS should be loaded into the system when DOS is booted. If your system does not already use a CONFIG.SYS file, then create the file by copying CONFIGD.SYS from the distribution diskette onto your bootable volumes. After you have copied the file, rename the file CONFIG.SYS. If your system already uses CONFIG.SYS, then the following two statements must be added to the file:

DEVICE=FLAGIO.SYS

BUFFERS=4

If you are already using CONFIG.SYS with your system and loading more than one device driver, CONFIG.SYS may need to be changed. Some device drivers may need to be loaded in a certain order to operate properly. The BUFFERS parameter may also need to be changed for your system to operate. If you experience a problem with this, then give us a call at 602-774-5188.

With CONFIG.SYS and either FLAGIO.SYS or FLAGIOS.SYS installed on your bootable volumes, reload the DOS into your computer. If the bootable volume has been set up properly, then a message will appear on your screen verifying that the Flagstaff Engineering diskette device driver has been loaded. This message should appear BEFORE the system date and time message.

FLAGIO.SYS and FLAGIOS.SYS support the diskette controller card as an I/O device. These device drivers do not support the external drives as DOS devices. They are designed to support Flagstaff Engineering File Connection and Word Connection conversion programs. If you would like to use the external drives as DOS devices, the device driver, FLAGIOX.SYS, must also be included in your CONFIG.SYS file.

FLAGIOX.SYS (EXTERNAL DOS DEVICE)

FLAGIOX.SYS is a secondary device driver that defines the external diskette drives as DOS devices. It must be used with either FLAGIO.SYS or FLAGIOS.SYS.

A sample CONFIG.SYS file using FLAGIOX.SYS is included on the UTILITY/8 diskette under file name CONFIGX.SYS.

FLAGIOX.SYS *MUST* be followed by device parameters that specify the device type. The format is:

DEVICE=FLAGIOX.SYS (D=T,D=T,D=T)

D is the Drive Number 0 through 5, where:

- 0 = 1st internal 5 1/4" drive.
- 1 = 2nd internal 5 1/4" drive.
- 2 = 1st external drive (50 pin connector).
- 3 = 2nd external drive (50 pin connector).
- 4 = 3rd external drive (34 pin connector).
- 5 = 4th external drive (34 pin connector).

On Flagstaff Engineering Model D cards, devices 2 and 3 are normally 8" drives. Devices 4 and 5 are normally 5 1/4-3 1/2" drives. Devices 0 and 1 are 5 1/4" drives connected to the IBM controller card.

T is the diskette type ID 0 through 9

- 0 = 5" DSDD-512 80 Cylinders, 112 Files.
(96 TPI Quad Density 5 1/4" diskette or 3 1/2" Data General diskette.)
- 1 = 3 1/2" DSDD-512 80 Cylinders, 122 files. (HP format diskette.)
- 2 = 5" DSSD-512 40 Cylinders, 112 Files.
(standard 48 TPI 360K PC format)
- 3 = 5" DSDD-512 80 Cylinders, 224 Files.
(5 1/4" PC/AT High Density 1.2 Meg.)
- 4 = 8" SSSD-128 77 Cylinders, 68 Files.
(standard DOS interchange NEC format)

- 5 = 8" DSDD-256 77 Cylinders, 72 Files.
- 6 = 8" DSDD-512 77 Cylinders, 96 Files.
- 7 = 8" DSDD-512 77 Cylinders, 336 Files.
- 8 = UNDEFINED
- 9 = UNDEFINED

A maximum of 16 device letters can be defined by FLAGIOX.SYS

A sample CONFIG.SYS FILE would take the form:

```
DEVICE=FLAGIO.SYS  
DEVICE=FLAGIOX.SYS (2=4,2=6,4=0,5=3)  
BUFFERS=4
```

In the example above, device number 2 indicates the first 8" drive connected to the back of the Model D controller card through a 50 conductor cable.

Device number 4 indicates the first 5 1/4" drive (96 TPI drive) connected to the front of the controller card.

Device number 5 indicates the second 5 1/4" drive (high density drive) connected to the front of the controller card.

DOS will assign unused drive letters to the devices for each device type specified. Device letters are assigned sequentially starting with the next available unassigned letter.

If the CONFIG.SYS file shown above was used on a machine with two internal 5 1/4" drives as DOS devices A and B, a hard disk as DOS device C, one 8 inch external drive and 2 5 1/4" external drives, the device letters assigned by DOS would be:

Device D = 8" SSSD-128 48 TPI 68 FILES
E = 8" DSDD-512 48 TPI 96 FILES
F = 5" DSDD-512 96 TPI 112 FILES
G = 5" HIGH DENSITY 224 FILES

D and E are both the same physical drive (first 8" drive), but DOS will treat the drive letters as unique devices.

The first external 5 1/4 inch drive would have to be a 96 TPI drive for proper operation as device 'F' and the second external 5 1/4" drive would have to be a high density drive for operation as device 'G'. If the first external 5 1/4" drive is a 48 TPI 360K drive, a device ID of 'D' would be assigned to it by DOS, but it would not be able to physically read and write 96 TPI diskettes.

The FLAGIOX.SYS device driver is not required to run any Flagstaff Engineering transfer program such as CPY8T05.EXE or CPY5T08.EXE. Its purpose is to allow use of external drives as DOS devices. This allows interchange of DOS diskettes from other machines or extra storage on smaller systems. Diskettes used in the external drives must be formatted as DOS compatible diskettes when the drives are being used as DOS devices. The program DOSFMT8 may be used to format external DOS diskettes.

USER WRITTEN PROGRAM SUPPORT:

Advanced users of the Diskette Connection who need to design their own application programs will find two files of special interest on the distribution diskette. The files are DEMO.C and INT13C.ASM.

DEMO.C is a short demonstration program written in Microsoft/Lattice 'C'. The program reads the first two tracks of an 8 inch diskette and stores the data in a PC-DOS file.

The program calls assembler routines from a object module named INT13C.OBJ. The source code for the object module is provided in INT13C.ASM. This module will provide a user interface to external drives attached to the Flagstaff Engineering diskette controller card.

DEMO.C should be compiled with your own C compiler and tested on your machine before linking INT13C.OBJ with your own programs.

INT13C.ASM is a source file written in 8088 assembler language. This source file can be assembled into a linkable object module. Parameter passing structures will need to be modified to support calls from FORTRAN, BASIC, or other compilers that do not pass parameters in the same manner as Microsoft/Lattice C.

These programs are provided on an 'as-is' basis to be used as a starting point for user designed custom applications. Modified versions of these modules will not be supported by Flagstaff Engineering.

For those needing more information on parameter passing specifications for various compilers, "PROGRAMMERS GUIDE TO THE IBM PC" By Peter Norton, MICROSOFT PRESS, is recommended.

DEMO.C

DEMO.C is provided as a sample C program to access external drives through device drivers FLAGIO.SYS, and FLAGIOS.SYS.

The following routines are defined in the program. All of these routines pass back an integer return code of zero if successful and a -1 if unsuccessful with the exception of the FINDS routine which passes back the diskette format if it is found or a -1 if it is not found.

The following parameters are specified in the routine calls:

drive = the external drive number (2 - 5).
cylinder = the diskette cylinder (0 - 79).
head = the diskette head (0 or 1).
sector = the starting sector for the operation (1 to 26).
#secs = number of sectors to read/write.
buffer = the address of the buffer to read/write to/from.
fmt = diskette format.
 0 = 128 byte single density.
 1 = 256 byte single density.
 2 = 512 byte single density.
 3 = 1024 byte single density.
 4 = 256 byte double density.
 5 = 512 byte double density.
 6 = 1024 byte double density.
 7 = 2048 byte double density.

Drive, cylinder, head, sector, #secs, and fmt are processed as byte values but may be defined as integer. Buffer is the address of the buffer for the read, write or set format operation.

The following routine calls are defined.

A. rc = READ8 (drive,cylinder,head,
sector,#recs,buffer);

Read one or more sectors from the 8 inch
diskette.

B. rc = WRITES (drive,cylinder,head,
sector,#recs,buffer);

Write one or more sectors to the 8 inch
diskette.

C. rc = VERIFY8 (drive,cylinder,head,
sector,#recs,buffer);

Read-verify one or more sectors. This is
the same as read except the data is not
actually transferred.

D. rc = RDDELS (drive,cylinder,head,
sector,#recs,buffer);

Read deleted sectors. This is the same as
READ8 except that deleted sectors are also
read if encountered.

E. rc = WRTDELS (drive,cylinder,head,
sector,#recs,buffer);

Write deleted sectors. This will write
sectors out as deleted.

F. FORMATS (drive,cylinder,head,sector,
#recs,buffer);

Format sectors. This command is normally
issued for a complete track at a time.
The 'buffer' parameter must point to a
buffer formatted with 4 bytes for each
sector on the track.

The 4 byte entry for each sector is defined as follows:

- 0 - Cylinder number.
- 1 - Head number.
- 2 - Sector number (normally starts with sector 1 on a track).
- 3 - Sector size (0 = 128, 1 = 256, 2 = 512, 3 = 1024, 4 = 2048).

G. rc = RESET8 (drive);

This recalibrates the drive (seeks cylinder 0).

H. rc = SET8 (drive,fmt);
(or rc = SET8 (drive,8,buffer);)

This sets up the 8 inch drive logic to process the specified diskette format. This routine (or FIND8) MUST be used prior to using any of the functions to access the diskette. The 'fmt' parameter must be 0 to 7 as defined above or if specified as (8) then the user must supply a 12 byte buffer containing the diskette setup parameters.

I. fmt = FIND8 (drive,cylinder,head);

This routine will determine the format of the diskette on the requested track (cylinder & head). If the format is found a value of 0 to 7 will be returned. If the diskette is unreadable a value of -1 will be returned.

INT13C.ASM

INT 13H BIOS CALLS FOR DEVICE DRIVER

Register setup:

AH - Function number
AL - Number of sectors
BX - Address of buffer ES:BX)
CH - Cylinder number
CL - Sector number
DH -- Head number (0 or 1)
DL - Drive number (2, 3, 4, or 5)

Functions:

AH = 0 Reset drive
AH = 1 Read status of last
operation into AL
AH = 2 read sector(s) into memory
AH = 3 Write sector(s) from memory
AH = 4 Verify sectors(s)
AH = 5 Format track. Format buffer is
as follows:
Four bytes for each sector on the
track:
0 - Cylinder
1 - Head
2 - Record (sector) number
3 - Sector size. 0=128, 1=256,
2=512, 3=1024, 4=2048
AH = 6 Read deleted sector(s) into memory
AH = 7 Write deleted sector(s) from
memory
AH = Set format. The format code is
contained in AL. Sector size and
recording method for values of AL are:
0 - 128 FM 5 - 512 MFM
1 - 256 FM 6 - 1024 MFM
3 - 1024 FM 7 - 2048 MFM
4 - 256 FM 8 - User supplied format
parameters

Parameters for values of AL are in 12 bytes pointed to by SI (DS:SI). Default parameters for values of AL are:

AL +0 01 02 03 04 05 06 07 08 09 10 11

0 CF 02 7F 00 1A 07 80 1B F6 19 00 01
1 CF 02 7F 01 0F 0E FF 2A F6 19 00 01
2 CF 02 7F 02 08 1B FF 3A F6 19 00 01
3 CF 02 7F 03 04 47 FF 8A F6 19 00 01
4 CF 02 7F 01 1A 0E FF 36 F6 19 00 00
5 CF 02 7F 02 0F 1B FF 54 F6 19 00 00
6 CF 02 7F 03 08 35 FF 74 F6 19 00 00
7 CF 02 7F 04 04 99 FF FF F6 19 00 00

16 User supplied format parameters.

(Note* AL values 8-15 duplicate the same values as 0-1. 0-1 are for 8" diskettes, 8-15 are for 8" diskettes.)

The 12 byte format parameters are defined as follows:

- +0 - NEC parm byte 1
- +1 - NEC parm byte 2
- +2 - Motor turn off wait
- +3 - Sector size. 0=128, 1=256, 2=512,
3=1024, 4=2048
- +4 - Sectors per track
- +5 - Gap length
- +6 - DTL
- +7 - Gap length
- +8 - Format fill character
- +9 - Head settle time (ms)
- +10 - Motor wait
- +11 - 00 = MFM, 01 = FM

AH = 9 Read sector ID's (on currently selected track)

AH = A Acquire results of read sector ID (function 9). Buffer address is in BX. Issue once for each sector on the track. Returns 12 bytes formatted as follows:

- +0 - S0
- +1 - S1
- +2 - S2
- +3 - Cylinder
- +4 - Head
- +5 - Record (sector)
- +6 - Sector size. 0=128, 1=256,
2=512, 3=1024, 4=2048
- +7 - ?
- +8 - ?
- +9 - ?
- +10 - ?
- +11 - ?

For further information on registers and BIOS calls, see the IBM PC Technical Reference Manual.

DIAGNOSTIC PROGRAMS

Diagnostic programs are included on the distribution diskette for use in verifying correct diskette operation and diagnosing diskette problems.

To exit any diagnostic program while it is running, press [CTRL] [C]. On occasion, the Control C sequence may not terminate the program. If this occurs, press [CTRL] [BREAK] to end the program.

8 inch diagnostic PROGRAMS INCLUDE:

CHECK8.EXE	Check read/write operations of external diskette drives.
FILEGEN.EXE	Create PC-DOS test files.
ID8.EXE	Display sector ID's from external diskettes.
VERIFY8.EXE	Verify format of external diskettes and overall system operation.

CHECK8.EXE

USE:

Check and verify read/write operations of external diskette drive(s).

DESCRIPTION:

This program is used by Flagstaff Engineering to check and verify operation of each external drive received from the factory. The CHECK8 program is designed to verify correct read/write operations of the read/write heads.

CHECK8 will verify read/write operations of the drive by configuring the diskette with various sector sizes in both single and double density formats. Data is written to the diskette and then read back from each format to verify operation.

After the initial read/write test, the program will reformat the diskette as double density with 512 byte sectors. This diskette format is generally the most difficult format to write data to. If the program detects an error while formatting any track, the program will display a non-zero status code. The program will then try to reformat the track in question. The retry is usually successful. If the track formatting error still occurs after 5 retries, the program will issue a message to use a different blank diskette for the test.

After formatting is complete, the program will read selected sectors on the diskette. The read operation will begin with Cylinder 1, and the program will step forward 11 cylinders, reading a single sector from each cylinder. The program will then step backward 5 cylinders, again reading a single sector from each cylinder. This pattern of stepping forward 11 cylinders, and then stepping backward 5 cylinders will be repeated until Cylinder 76 is reached.

After the read sequence is complete, the program will repeat the read test using a pattern of 9 forward steps and 4 backward steps. The read test will continue using patterns of 7 forward and 3 backward steps, 5 forward and 2 backward steps, 3 forward and 1 backward steps, and end with 1 forward step and no backward steps.

CHECK8 should be run with a good quality double sided, double density diskette. The program will operate with a single sided diskette but will only verify operation of head 0 on the diskette drive.

CHECK8 will DESTROY ALL DATA on the test diskette in the external drive, so a blank diskette should be used with the program.

OPERATION:

Load CHECK8. On completion of the program load, a program description message will be displayed. The program will then prompt the user to enter a device type. Enter an [8], [5], [3], [Q], or [H] followed by [ENTER] to indicate device type being tested, or press [ENTER] by itself to select an 8" device.

The program will prompt the user to insert a blank diskette into the drive and then select the drive number to be tested.

Insert the diskette into the appropriate drive and then enter the drive number to be tested or press the [ENTER] key to select drive 1. The program will then begin testing the drive.

After the drive has been tested, the program will prompt the user to repeat or end the test. Select the appropriate option by entering a [Y] or [N], or end the program by pressing the [ENTER] key.

The number of temporary read errors displayed when running this program should not be greater than two. It is possible that a few temporary errors will occur while running CHECK8 due to the quality of the diskette used. If any permanent errors occur you should rerun the program with the same diskette to see if the errors occur at the same location. If the errors occur at the same location it is likely that the diskette has a bad spot on its surface. Use a different diskette and rerun the program to verify correct operation of the drive.

DEFAULTS:

Default entries for program prompts are:

Drive number: [ENTER] key equals drive 1.

Repeat Test: [ENTER] key equals End.

DESTRUCTIVE/NONDESTRUCTIVE:

CHECK8 WILL DESTROY ALL DATA ON THE TEST DISKETTE.

SAMPLE RUN:

A> [CHECK8] [ENTER]

8" DISKETTE SYSTEM DIAGNOSTIC PROGRAM
COPYRIGHT FLAGSTAFF ENGINEERING 5/10/83

DO YOU WANT TO USE AN 8",5",3 1/2,
5"-QD,OR 5"HD DRIVE (8/5,3,Q,H) [ENTER]

INSERT BLANK 8" DISKETTE -
ENTER DRIVE (1/2-4) WHEN READY.? [ENTER]

TEST 01 - VERIFY CARD AND CABLE OK
TEST 02 - FORMAT 128 BYTE SINGLE DENSITY
VERIFY 8" CYL=10 HEAD=0 SECTOR=01
GOOD OPERATION
TEST 02 - FORMAT 128 BYTE SINGLE DENSITY
VERIFY 8" CYL=10 HEAD=1 SECTOR=01
GOOD OPERATION
TEST 03 - FORMAT 256 BYTE SINGLE DENSITY
VERIFY 8" CYL=10 HEAD=0 SECTOR=01
GOOD OPERATION
TEST 03 - FORMAT 256 BYTE SINGLE DENSITY
VERIFY 8" CYL=10 HEAD=1 SECTOR=01
GOOD OPERATION
TEST 04 - FORMAT 512 BYTE SINGLE DENSITY
VERIFY 8" CYL=10 HEAD=0 SECTOR=01
GOOD OPERATION
TEST 04 - FORMAT 512 BYTE SINGLE DENSITY
VERIFY 8" CYL=10 HEAD=1 SECTOR=01
GOOD OPERATION
TEST 05 - FORMAT 1024 BYTE SINGLE DENSITY
VERIFY 8" CYL=10 HEAD=0 SECTOR=01
GOOD OPERATION
TEST 05 - FORMAT 1024 BYTE SINGLE DENSITY
VERIFY 8" CYL=10 HEAD=1 SECTOR=01
GOOD OPERATION
TEST 06 - FORMAT 256 BYTE DOUBLE DENSITY
VERIFY 8" CYL=10 HEAD=0 SECTOR=01
GOOD OPERATION

TEST 06 - FORMAT 256 BYTE DOUBLE DENSITY
VERIFY 8" CYL=10 HEAD=1 SECTOR=01
GOOD OPERATION
TEST 07 - FORMAT 512 BYTE DOUBLE DENSITY
VERIFY 8" CYL=10 HEAD=0 SECTOR=01
GOOD OPERATION
TEST 07 - FORMAT 512 BYTE DOUBLE DENSITY
VERIFY 8" CYL=10 HEAD=1 SECTOR=01
GOOD OPERATION
TEST 08 - FORMAT 1024 BYTE DOUBLE DENSITY
VERIFY 8" CYL=10 HEAD=0 SECTOR=01
GOOD OPERATION
TEST 08 - FORMAT 1024 BYTE DOUBLE DENSITY
VERIFY 8" CYL=10 HEAD=1 SECTOR=01
GOOD OPERATION
TEST 09 - FORMAT 2048 BYTE DOUBLE DENSITY
VERIFY 8" CYL=10 HEAD=0 SECTOR=01
GOOD OPERATION
TEST 09 - FORMAT 2048 BYTE DOUBLE DENSITY
VERIFY 8" CYL=10 HEAD=1 SECTOR=01
GOOD OPERATION
TEST 10 - FORMAT ENTIRE DISKETTE
TO 512 BYTE SECTORS
WRITING 8" CYL=XX HEAD=X SECTOR=XX
GOOD OPERATION
READING 8" CYL=XX HEAD=X SECTOR=X
GOOD OPERATION
DISKETTE DIAGNOSTIC IS COMPLETED -
00 TEMPORARY READ ERRORS

DO YOU WANT TO REPEAT TESTS (N/Y)?

[ENTER]

A>

FILEGEN.EXE

USE: Create test DOS file.

NOTES: FILEGEN.EXE is supplied on the distribution diskette as an aid to defining possible problems in transfer and conversion programs. A DOS test file created by FILEGEN can be transferred to an external diskette, and then transferred back to a DOS volume. The original file may then be compared with the transferred copy to insure data has not been added or lost.

DESCRIPTION: ID8.EXE is designed to create a DOS test file for diagnostic use. The program creates sequential fixed length records containing five byte fixed fields. The five byte fields contain a 5 digit record number. The first record of the file has fields containing the characters 00001. The second record contains fields with the characters 00002, etc.

Records lengths may be from one to 4096 bytes. Up to 60,000 records may be created.

Records may be created as either ASCII or EBCDIC data. Carriage return/line feeds may be added at the end of each record.

OPERATION:

Load FILEGEN. On completion of the program load, a program description message will be displayed. The program will then prompt the user to enter a DOS file name for the test data.

Enter a DOS file name and extension, and press [ENTER]. The program will prompt the user to enter the number of test data records to create.

Enter a number from one to 60,000, or press [ENTER] to select 100 test records. The program will prompt the user to enter the record size in bytes.

Enter a number from one to 4096, or press [ENTER] to select 128 byte records. The program will prompt the user to add a carriage return/line feed at the end of each record.

Enter a [Y] to add a CR/LF, or press [ENTER] to create records without CR/LF's. The program will prompt for EBCDIC or ASCII data.

Enter an [E] to select EBCDIC data, or press [ENTER] to select ASCII data.

The program will generate a file using the input parameters, and then display a message indicating the number of records created. The program will then prompt the user to create another file.

Enter a DOS file name and extension to create another test file, or press [ENTER] to exit the program.

DEFAULTS:

File name:	[ENTER] = Exit program.
Number of records:	[ENTER] = 100
Record size:	[ENTER] = 128
CR/LF in record:	[ENTER] = No
ASCII or EBCDIC:	[ENTER] = ASCII

SAMPLE RUN:

A> [FILEGEN] [ENTER]

GENERATE TEST DATA FILE PROGRAM
COPYRIGHT FLAGSTAFF ENGINEERING 9/6/85

ENTER DOS FILE NAME FOR TEST DATA - PRESS
ENTER FOR NONE? [DATATEST.DAT] [ENTER]

ENTER NUMBER OF TEST DATA RECORDS
(100/1-60000)? [ENTER]

ENTER RECORD SIZE IN
BYTES (128/1-4096)? [96] [ENTER]

DO YOU WANT A CR-FL AT THE END OF EACH
DATA RECORD (N/Y)? [ENTER]

DO YOU WANT DATA IN ASCII
OR EBCDIC (A/E)? [ENTER]

CREATION OF DATATEST.DAT IS COMPLETED -
100 RECORDS WERE CREATED

ENTER DOS FILE NAME FOR TEST DATA -PRESS
ENTER FOR NONE? [ENTER]

A>

ID8.EXE

USE: Display sector ID's from external diskettes.

NOTES: ID8.EXE is supplied on the distribution diskette as an aid to determining nonstandard diskette formats. The program would normally be used during over the phone technical support.

DESCRIPTION:

ID8.EXE is designed to find and display sector ID numbers on external diskettes. The program is used by Flagstaff Engineering to determine the formatting of nonstandard diskettes. The program is not designed as a standard diagnostic, and should only be run at the request of Flagstaff Engineering support staff.

OPERATION:

Load ID8. On completion of the program load, a program description message will be displayed. The program will then prompt the user to enter a device type.

Enter an [8], [5], [3], [Q], or [H] followed by [ENTER] to indicate device type being tested, or press [ENTER] to select an 8" device.

The program will then prompt the user to insert a diskette into the drive, and enter the drive number in use.

Insert the diskette into the appropriate drive and then enter the drive number to be tested or press the [ENTER] key to select drive 1.

The program will prompt the user for the format of the diskette being read.

Enter a number from 0 to 7 to indicate one of the following formats:

0 = 128 FM	4 = 256 MFM
1 = 256 FM	5 = 512 MFM
2 = 512 FM	6 = 1024 MFM
3 = 1024 FM	7 = 2048 MFM

The program will prompt the user to enter the cylinder and head to be identified. Enter the cylinder and head as CCH, where CC equals 0 through 79, and H = either 0 or 1.

The program will then attempt to read the cylinder selected. If the sector ID's can be read, the program will display 16 lines of status codes. These status codes can be used to determine the physical format of the diskette.

The status codes for two consecutive sectors appear on each status line. Status line are in the following format:

S0S1 S2CC HHRR NN00.. S0S1 S2CC HHRR NN00

S0 = Status Byte 0 of NEC controller chip.
S1 = Status Byte 1 of NEC controller chip.
S2 = Status Byte 2 of NEC controller chip.
CC = Cylinder number.
HH = Head number.
NN = Sector number (sector ID).

SAMPLE RUN:

A> [ID8]

DISKETTE SYSTEM READ SECTOR ID PROGRAM
COPYRIGHT FLAGSTAFF ENGINEERING XX/XX/XX

THIS PROGRAM WILL READ AND DISPLAY ALL THE
SECTOR ID ON A SPECIFIED DISKETTE TRACK.

DO YOU WANT TO TEST AN 8", 5", 3 1/2
5"-QD, OR 5"-HD DRIVE (8/5,3,Q,H)? [ENTER]

INSERT 8" DISKETTE - ENTER DRIVE (1/2-4)
WHEN READY? [ENTER]

ENTER DISKETTE FORMAT (0=128FM, 3=1024FM,
4=256MFM, 7=2048MFM)? [5] [ENTER]

ENTER CYLINDER AND HEAD FOR READ SECTOR ID
(CCH)? [010] [ENTER]

READING CYL=01 HEAD=0 SECTOR=01
GOOD OPERATION

S0S1	S2CC	HHRR	NN			
0100	0001	0001	0200	0000	0000	
0100	0001	0002	0200	0000	0000	
0100	0001	0003	0200	0000	0000	
0100	0001	0004	0200	0000	0000	
....	
....	
0100	0001	000E	0200	0000	0000	
0100	0001	000F	0200	0000	0000	
0100	0001	0001	0200	0000	0000	
0100	0001	0002	0200	0000	0000	

DO YOU WANT TO REPEAT
THESE TESTS (N/Y)? [ENTER]

A>

VERIFY8.EXE

JSE:

Verify format and and sector size of external diskettes. Verify read operations of external drive(s) and confirm correct head alignment.

DESCRIPTION:

VERIFY8 is designed to display the format and sector size of a formatted diskette, and identify possible head alignment problems with external diskette drives. VERIFY8 does a good job of identifying even marginal drive problems.

When the program is run, it will first examine cylinder 5 to determine the diskette formatting. After the format is identified and displayed, the program will measure the drive rotation speed and display the speed measurement in milliseconds. Nominal drive rotation speed is 166.7 milliseconds for 5 1/4" HD and 8" 360 RPM drives. 200 ms is nominal for 300 RPM 3 1/2" and 5 1/4" quad density drives. 100.0 ms is nominal for 3 1/2" 600 RPM drives.

The program will then perform a seek test to step the diskette drive heads forward and backward through all sectors on the diskette. The program will begin the seek test by reading cylinder 1, and then will step forward 7 cylinders, reading a single sector from each cylinder. The program will then step backward 3 cylinders, again reading a single sector from each cylinder.

The pattern of stepping forward 7 cylinders, and then stepping backward 3 cylinders will be repeated until Cylinder 76 is reached. After this read sequence is complete, the program will repeat the read operation using a pattern of 5 forward steps and 2 backward steps, then 3 forward and 1 backward steps, and end with 1 forward step and no backward steps. The number of temporary read errors should be zero on a good diskette.

After the seek test has been completed, the program will perform a read test which reads a complete track. The number of read errors should be zero.

The program will then perform a track loop test to verify head alignment. Cylinder 70, head 0, sector 01 will be read 100 times. The number of temporary read errors should be zero.

VERIFY8 may be run with any formatted high quality double sided diskette. The program will operate with a single sided diskette but will only verify operation of head 0 on the diskette drive.

VERIFY8 will not destroy data on the test diskette in the 8 inch drive.

OPERATION:

Load VERIFY8. On completion of the program load, a program description message will be displayed. The program will then prompt the user to enter a device type. Enter an [8], [5], [3], [Q], or [H] followed by [ENTER] to indicate device type being tested, or press [ENTER] by itself to select an 8" device.

The program will prompt the user to insert a blank diskette into the drive and then select the drive number to be tested.

Insert the diskette into the appropriate drive and then enter the drive number to be tested or press the [ENTER] key to select drive 1. The program will then begin testing the drive.

After completing the test, the program will prompt the user to repeat the test or end the program. Select the appropriate option by entering a [Y] or [N], or end the program by pressing the [ENTER] key.

It is possible that a few temporary errors will occur while running VERIFY8 due to the quality of the diskette used. If any permanent errors occur you should rerun the program with the same diskette to see if the errors occur at the same location.

If the errors occur at the same location it is likely that the diskette has a bad spot on its surface. Use a different diskette and rerun the program to verify correct operation of the drive.

DEFAULTS:

Default entries for program prompts are:

Device Type: [ENTER] equals 8".
Drive number: [ENTER] key equals drive 1.
Repeat Test: [ENTER] key equals No.

DESTRUCTIVE/NONDESTRUCTIVE:

VERIFY8 will not destroy data on the test diskette.

SAMPLE RUN:

A> [VERIFY8] [ENTER]

DISKETTE SYSTEM VERIFY PROGRAM
COPYRIGHT FLAGSTAFF ENGINEERING 3/15/85

DO YOU WANT TO TEST AN 8",5",3 1/2",5"-QD,
OR 5"-HD DRIVE (8/5,3,Q,H)? [ENTER]

INSERT 8" DISKETTE -
ENTER DRIVE (1/2) WHEN READY.? [ENTER]

READING 8" CYL=XX HEAD=X SECTOR=XX
GOOD OPERATION

TEST 01 - DISKETTE IS 128 BYTE SECTOR -
SINGLE DENSITY - SINGLE SIDE

TEST 02 - DRIVE ROTATION SPEED IS
165.8 MSEC. (NORMAL=166.7 OR 200.0 MSEC.)

TEST 03 - SEEK TEST STARTED
READING 8" CYL=76 HEAD=0
SECTOR=13 GOOD OPERATION
TEST 03 - SEEK TEST COMPLETED -
57.72 SECONDS - 00 TEMPORARY READ ERRORS

TEST 04 - READ DATA TRACK STARTED
READING 8" CYL=76 HEAD=0
SECTOR=01 GOOD OPERATION
TEST 04 - READ DATA TRACK COMPLETED -
00 TEMPORARY READ ERRORS

TEST 05 - TRACK LOOP STARTED
READING 8" CYL=70 HEAD = 0
SECTOR=01 GOOD OPERATION XXX
TEST 05 - TRACK LOOP COMPLETED -
00 TEMPORARY READ ERRORS
DO YOU WANT TO REPEAT TESTS (N/Y)?
[ENTER]

A>

UTILITY PROGRAMS

Utility programs are included on the distribution diskette for use in formatting, displaying, and copying data from DOS files to and from external diskettes. A single drive 8" diskette copy program is also provided.

To exit any utility program while it is running, press [CTRL] [C]. On occasion, the Control C sequence may not terminate the program. If this occurs, press [CTRL] [BREAK] to end the program.

The utility programs include:

- | | |
|--------------|--|
| CPY8TO5.EXE | Copy external diskette sectors to PC-DOS file. |
| CPY5TO8.EXE | Copy data from PC-DOS files to sectors on an external diskette. |
| COPY8.COM | Duplicate an 8 inch master diskette using a single or 8 inch drive system. |
| DISPLAY8.EXE | Display data from a specific sector of an external diskette. |
| DOSFMT8.EXE | Format a PC-DOS compatible external diskette. |

CPY8T05.EXE

USE:

Copy specific sectors from an external diskette to a PC-DOS file.

NOTES:

Use the DOS Copy command to copy files from a external DOS format diskettes to other PC-DOS files. CPY8T05 should only be used with NON-DOS external diskettes, or external diskettes with an erased or invalid file directory.

DESCRIPTION:

CPY8T05.EXE is designed to copy sectors from an external diskette with an erased or invalid file directory. The program copies the sectors onto a PC-DOS file on a 5 inch diskette or hard disk.

The program will identify the format of the external diskette to be copied from and display the format. The sector size of the external diskette will then be used for the size of the records written to the DOS file.

The data area to copy from the external diskette is defined by a starting and ending location. The starting and ending location of the data area to be copied must be specified as CCHSS where CC equals a 2 digit cylinder number from 00 through 79, H equals a 1 digit head number from 0 through 1, and SS equals a 2 digit sector number from 01 through 26 depending on the specific format of the diskette.

Normal sector values are:

- 01-26 128 byte sector, single density
 and 256 byte sector, double
 density diskettes.
- 01-15 256 byte sector, single density
 and 512 byte sector, double
 density diskettes.
- 01-08 512 byte sector, single density
 and 1024 byte sector, double
 density diskettes.
- 01-04 1024 byte sector, single density
 and 2048 byte sector, double
 density diskettes.

Sectors from the external diskette may be copied to any DOS drive and file name, including a hard disk drive.

The program will copy data from the source diskette to the destination file exactly as read.

The program supports EBCDIC to ASCII translation if needed. Most 8 inch IBM format diskettes are recorded in EBCDIC. The PC-DOS files are in ASCII.

OPERATION:

Load CPY8T05.EXE. On completion of the program load, a program description message will be displayed. The program will then prompt the user to enter a device type.

Enter an [8], [5], [3], [Q], or [H] followed by [ENTER] to indicate device type being tested, or press [ENTER] by itself to select an 8" device.

The program will then prompt the user to insert a diskette into the drive, and enter the drive number in use.

Insert the diskette into the appropriate drive and then enter the drive number to be tested or press the [ENTER] key to select drive 1.

A EBCDIC to ASCII prompt will be displayed.

Enter [Y] to select EBCDIC to ASCII conversion. Enter [N] or press the [ENTER] key to copy the data "as is".

The program then prompts the user to enter the starting cylinder, head, and sector number for the data area on the external diskette that will be copied to a DOS file. The entry format is CCHSS as explained in the program description section.

Enter the cylinder, head, and sector number as a 5 digit number with no blanks between the digits. If the [ENTER] key is pressed without entering the CCHSS, the program will exit the copy operation.

The program will then prompt the user to enter the ending cylinder, head and sector number of the data area to be copied.

Enter the cylinder, head, and sector number as a 5 digit number with no blanks between the digits. If the [ENTER] key is pressed without entering the CCHSS, the program will reprompt the user for CCHSS.

The program will read the first copy sector and display a sector information line with cylinder, head, and sector number followed by a format information line with bytes per sector, single or double density, and single or double sided.

If the external diskette format cannot be identified, the program will display an unknown format message and the end the copy operation.

After the sector and format information lines are displayed, the program will prompt the user to enter the DOS drive name and output file name.

Enter the drive number, file name and extension in standard DOS format (Drive:Name.Ext). If [ENTER] is pressed without entering the drive, name, and extension, the program will end the copy operation.

The program will display a sector read message and begin the copy operation. On completion of the copy operation, a message will be displayed indicating the total number of records copied to the DOS file. The user will then be prompted to enter a starting CCHSS number for another copy operation.

Enter a new starting CCHSS or press [ENTER] to exit the copy operation.

The program will prompt the user to copy from another diskette.

Enter a [Y] to continue , or enter a [N] or press [ENTER] to end the program.

DEFAULTS:

Device Type: [ENTER] equals 8"
diskette.
Drive number: [ENTER] equals drive 1
Starting CCHSS: [ENTER] equals exit
CCHSS prompt.
Ending CCHSS: [ENTER] equals
reprompt for CCHSS.
DOS File: [ENTER] equals exit
copy operation.
EBCDIC to ASCII [ENTER] equals No.
Another Copy [ENTER] equals No.

DESTRUCTIVE/NONDESTRUCTIVE:

CPY8T05 will not destroy data on the
external source diskette, however, ALL
EXISTING DATA IN THE PC-DOS DESTINATION
FILE WILL BE DESTROYED BY THE COPY
OPERATION.

SAMPLE RUN:

A> [CPY8T05] [ENTER]

COPY DISKETTE SECTORS TO
PC-DOS FILE PROGRAM
COPYRIGHT FLAGSTAFF ENGINEERING 7/29/83

DO YOU WANT TO TEST AN 8",5",3 1/2",5"-QD
OR 5"-HD DRIVE (8/5,3,Q,H) [ENTER]

INSERT 8" DISKETTE -
ENTER DRIVE (1/2-4) WHEN READY.? [ENTER]

DO YOU WANT EBCDIC TO ASCII CONVERSION
(N/Y)? [ENTER]

ENTER STARTING CYLINDER, HEAD,
AND SECTOR (CCHSS)? [01001] [ENTER]

ENTER ENDING CYLINDER, HEAD,
AND SECTOR (CCHSS)? [01002] [ENTER]

READING 8" CYL=01 HEAD=0 SECTOR=01
GOOD OPERATION
DISKETTE IS 256 BYTE/SECTOR -
DOUBLE DENSITY - DOUBLE SIDE

ENTER DOS DRIVE AND
FILE NAME A:NAME.EXT? [A:TST.DOC] [ENTER]
READING 8" CYL=01 HEAD=0 SECTOR=01
GOOD OPERATION
END OF COPY - 0002 RECORDS WERE COPIED

ENTER STARTING CYLINDER, HEAD,
AND SECTOR (CCHSS) [ENTER]

DO YOU WANT TO COPY FROM
ANOTHER DISKETTE (N/Y)? [ENTER]
A>

CPY5T08.EXE

USE:

Copy data from a PC-DOS file to specific SECTORS on an external diskette.

NOTES:

Use the DOS 'COPY' command to copy data from PC-DOS files to external DOS format diskettes. CPY5T08 should only be used with NON-DOS external diskettes, or external DOS formatted diskettes with an erased or invalid file directory.

DESCRIPTION:

CPY5T08.EXE is designed to copy DOS files to an external diskette with an erased or invalid file directory.

The program will identify the format of the external diskette to be copied to and display the format. The sector size of the external diskette will then be used for the size of the records copied from the DOS file. If the external diskette format cannot be recognized, the program will display a message and end the copy operation.

The DOS file will be copied to a specific area of the external diskette. The user must enter a starting location for the data area on the external diskette that will receive the copied file.

The starting location is expressed as CCHSS, where CC equals a 2 digit cylinder number from 00 through 79, H equals a 1 digit head number from 0 through 1, and SS equals a 2 digit sector number from 01 through 26 depending on the specific format of the diskette. Normal sector values are:

01-26	128 byte sector, single density and 256 byte sector, double density diskettes.
01-15	256 byte sector, single density and 512 byte sector, double density diskettes.
01-08	512 byte sector, single density and 1024 byte sector, double density diskettes.
01-04	1024 byte sector, single density and 2048 byte sector, double density diskettes.

Data may be copied from any DOS drive and file name. The source drive may be any valid DOS volume including a hard disk drive.

The program will copy data from the source file to the destination diskette exactly as read. The program also supports ASCII to EBCDIC translation if needed. Most 8 inch IBM format diskettes are recorded in EBCDIC. The PC-DOS files are in ASCII.

The ASCII to EBCDIC conversion translates an ASCII character to its EBCDIC equivalent, but no provision is made to exclude fields that contain binary or packed decimal numbers.

OPERATION:

Load CPY5T08.EXE. On completion of the program load, a program description message will be displayed. The program will then prompt the user to enter a device type.

Enter an [8], [5], [3], [Q], or [H] followed by [ENTER] to indicate device type being tested, or press [ENTER] by itself to select an 8" device.

The program will then prompt the user to insert a diskette into the drive, and enter the drive number in use.

Insert the diskette into the appropriate drive and then enter the drive number to be tested or press the [ENTER] key to select drive 1.

A ASCII to EBCDIC prompt will be displayed.

Enter [Y] to select ASCII to EBCDIC conversion. Enter [N] or press the [ENTER] key to copy the data as is.

The program then prompts the user to enter the starting cylinder, head, and sector number for the data area on the external diskette that will receive the copy data. The entry format is CCHSS as explained in the program description section.

Enter the cylinder, head, and sector number as a 5 digit number with no blanks between the digits. If the [ENTER] key is pressed without entering the CCHSS, the program will exit the copy operation.

The program will read the first copy sector of the external diskette and display cylinder, head, and sector number followed by a format information line with bytes per sector, single or double density, and single or double sided.

If the external diskette format cannot be identified, the program will display an unknown format message and the end the copy operation.

After the sector and format information lines are displayed, the program will prompt the user to enter the DOS drive name and output file name.

Enter the drive number, file name and extension in standard DOS format (Drive:Name.Ext). If [ENTER] is pressed without entering the drive, name, and extension, the program will end the copy operation.

The program will display a sector read message and begin the copy operation. On completion of the copy operation, a message will be displayed indicating the total number of records copied to the external diskette.

The user will be prompted to enter a starting CCHSS number for another copy operation.

Enter a new starting CCHSS or press [ENTER] to exit the copy operation.

The program will prompt the user to copy to another diskette.

Enter a [Y] to continue the program, or enter a [N] or press [ENTER] to end the program.

DEFAULTS:

Device Type: [ENTER] equals 8" diskette.
Drive number: [ENTER] equals drive 1
Starting CCHSS: [ENTER] equals exit CCHSS prompt.
DOS File: [ENTER] equals exit copy operation.
ASCII to EBCDIC: [ENTER] equals No.
Another Copy: [ENTER] equals No.

DESTRUCTIVE/NONDESTRUCTIVE:

CPY5T08 will not destroy data in the PC-DOS source file, however, ALL EXISTING DATA ON THE DESTINATION SECTORS OF THE EXTERNAL DISKETTE WILL BE DESTROYED BY THE COPY OPERATION.

SAMPLE RUN:

A> [CPY5T08] [ENTER]

COPY PC-DOS FILE TO DISKETTE SECTORS

DO YOU WANT TO TEST AN 8",5",3 1/2",5"-QD OR 5"-HD DRIVE (8/5,3,Q,H) [ENTER]

INSERT 8" DISKETTE -
ENTER DRIVE (1/2-4) WHEN READY.? [ENTER]

DO YOU WANT ASCII TO
EBCDIC CONVERSION (N/Y)? [Y]

ENTER STARTING CYLINDER, HEAD,
AND SECTOR (CCHSS)? [01001] [ENTER]

READING 8" CYL=01 HEAD=1 SECTOR=01
GOOD OPERATION
DISKETTE IS 256 BYTE/SECTOR-
DOUBLE DENSITY - DOUBLE SIDE

ENTER DOS DRIVE AND
FILE NAME A:NAME.EXT?
[A:TESTFILE.DOC] [ENTER]

WRITING 8 " CYL=01 HEAD =0 SECTOR=01
GOOD OPERATION

END OF COPY - 0004 RECORDS WERE COPIED

DO YOU WANT TO COPY
ANOTHER DISKETTE (N/Y)? [ENTER]
A>

COPY8.COM

USE:

Duplicate an 8 inch diskette using a single 8 inch drive system.

DESCRIPTION:

COPY8.COM is designed to duplicate an 8 inch master diskette onto a blank 8 inch diskette using a single 8 inch drive system.

The program will identify the format of the master 8 inch diskette. If the format cannot be identified, the program will end the copy operation. The program can duplicate most 8 inch diskettes that are single or double sided, and single or double density with sector sizes of 128, 256, 512, 1024, or 2048 bytes per sector.

The program will duplicate the format and data of the master diskette onto a blank diskette. The program writes data to the blank diskette by formatting a sector, and then writing data to the sector. If a sector cannot be formatted on the blank diskette, an error message will be displayed and the program will end the copy operation.

After data is written to the blank diskette, the program performs a write verify. If the blank diskette cannot be write verified, an error message will be displayed and the program will end the copy operation.

The program performs the copy operation by reading data from the master diskette and then storing the data in memory. After the data has been read into memory, the master diskette must be removed from the drive and then the blank diskette must be inserted into the drive. The stored data will then be written to the blank diskette. A maximum of 256 K bytes of machine memory is allocated for data storage during the copy operation.

OPERATION:

Load COPY8.COM. On completion of the program load, a program description message will be displayed.

The program will prompt the user to verify that the master diskette to be copied is in the 8 inch drive.

Insert the master diskette into the drive and press [ENTER].

The program will then read data from the master diskette and store the data in available memory. The program will prompt the user to remove the master diskette and then insert the copy diskette into the drive and press [ENTER].

Insert the blank diskette into the drive and press [ENTER]. The data stored in machine memory will be written onto the blank diskette.

The program will prompt the user through the read-from-master, write-to-blank copy routine until the copy operation is completed.

After the copy operation is complete, the program will prompt the user to copy another diskette.

Enter a [Y] to copy another diskette, or enter a [N] or press the [ENTER] key to end the program.

DEFAULTS:

Begin Copy: [ENTER] equals begin
Continue Copy: [ENTER] equals continue.
Another Copy [ENTER] equals No.

DESTRUCTIVE/NONDESTRUCTIVE:

COPY8.COM will not destroy any data on the master diskette, however, ALL DATA ON THE DISKETTE BEING COPIED TO WILL BE DESTROYED.

SAMPLE RUN:

A> [COPY8] [ENTER]

DUPLICATE 8" DISKETTE PROGRAM
COPYRIGHT FLAGSTAFF ENGINEERING 10-08-84

** MAKE SURE MASTER DISKETTE
IS IN DRIVE 1 **

PRESS ENTER KEY TO START COPY [ENTER]

READING 8" 128-SD CYL=00 HEAD=1
SECTOR=01 TRACK NOT FOUND
DISKETTE IS 128 BYTE SECTOR -
SINGLE DENSITY - SINGLE SIDE
READING 8" 128-SD CYL=XX HEAD=X
SECTOR=XX GOOD OPERATION
VERIFY 8" 128-SD CYL=XX HEAD=X
SECTOR=XX GOOD OPERATION

INSERT BLANK DISKETTE,
PRESS ANY KEY...

[ENTER]

READING 8" 128-SD CYL=XX HEAD=X
SECTOR=XX GOOD OPERATION
VERIFY 8" 128-SD CYL=XX HEAD=X
SECTOR=XX GOOD OPERATION

INSERT MASTER DISKETTE.
PRESS ANY KEY ...

[ENTER]

READING 8" 128-SD CYL=XX HEAD=X
SECTOR=XX GOOD OPERATION
VERIFY 8" 128-SD CYL=XX HEAD=X
SECTOR=XX GOOD OPERATION

DISKETTE COPY IS COMPLETED -
 7 SECTORS OR TRACKS WERE SKIPPED

DO YOU WANT TO COPY
ANOTHER DISKETTE (N/Y)? [ENTER]
A>

DISPLAY8.EXE

USE:

Display recorded data from a specific cylinder, head, and sector of an external diskette.

DESCRIPTION:

The DISPLAY8 program is designed to display data sectors of any 8", 5 1/4", or 3 1/2" external diskette.

The display format is 8 Lines of 16 bytes (128 characters) represented as 2 digit hexadecimal values. Each line is followed by an offset number, relative sector number, and CCHSS indicator. Below each hexadecimal value appears two alphanumeric characters. The first character is the ASCII character represented by the hexadecimal value. The second character is the EBCDIC character represented by the hexadecimal value as represented by the following example.

```
4B 4C.....5A OFF=0000 RSN=0000 CCHSS=01001
K. L<.....Z!
C1 C2.....C3 OFF=0016 RSN=0000 CCHSS=01001
AA BB.....CC
.. ..
A5 A6.....A7 OFF=0112 RSN=0000 CCHSS=01001
%v &w.....'x
```

In the first line of the display, 16 hexadecimal values will be displayed between value 4B and value 5A. Directly beneath value 5A is the characters "Z!". "Z" is the ASCII character represented by hexadecimal 5A.

"!" is the EBCDIC character represented by the hexadecimal value 5A.

The offset value (OFF=) indicates the byte position that the first value of the line occupies, in relation to the starting CCHSS. If the starting CCHSS is 01001 and a line of the display has an offset of 0016, then the first value of the line represents byte 16 of the sector being displayed.

The relative sector number (RSN=) indicates the position of the 128 byte record being displayed relative to the starting CCHSS. If the starting CCHSS is 01001 and the relative record number is 002, then the screen values represent the third 128 byte logical record of the display (the first record would be RSN=000).

The Cylinder, Head, and Sector identifier (CCHSS) is displayed at the end of each data line.

Directly below each hex value is a 2 character ASCII-EBCDIC code. The first character of this code is the ASCII character defined by the hex value. The second character below the hex value is the EBCDIC character defined by the hex value.

Any diskette sector may be displayed. After initial selection of cylinder, head, and sector, the program allows forward and backward movement through the data areas.

OPERATION:

Load DISPLAY8.EXE. On completion of the program load, a program description message will be displayed. The program will then prompt the user to enter a device type.

Enter an [8], [5], [3], [Q], or [H] followed by [ENTER] to indicate device type being tested, or press [ENTER] by itself to select an 8" device.

The program will prompt the user to insert a diskette into the external drive, and enter the drive number being used.

Insert the diskette to be displayed into the external drive and enter the drive number in use, or select drive 1 by pressing [ENTER].

The program then prompts the user to enter the starting cylinder, head, and sector number of the data area to be displayed. The entry format is CCHSS where CC equals a 2 digit cylinder number from 00 through 79, H equals a 1 digit head number from 0 through 1, and SS equals a 2 digit sector number from 00 through 26 depending on the specific format of the diskette.

Enter the cylinder, head, and sector number as a 5 digit number with no blanks between the digits. If the [ENTER] key is pressed without entering the CCHSS, the program will exit the CCHSS prompt.

The program will determine the format of the diskette and display an information line with bytes per sector, density type, and number of sides.

The program will then display 128 bytes as hexadecimal values starting from the first byte of the CCHSS selected.

The display may then be controlled by entering the following characters:

[ENTER] Display next 128 characters of data.
[SPACE] Display next sector starting from byte 00.
[B] Backup one sector and display from byte 00.
[C] Exit display
[R] Re-display current sector starting from byte 00

After viewing the desired data areas, press [C] to exit the display routine. The program will then issue a prompt to end the program or display another diskette.

Enter a [Y] to display another diskette, or enter [N] or press the [ENTER] key to end the program.

DEFAULTS:

Device type: [ENTER] equals 8" diskette.
Drive Number: [ENTER] key equals drive 1
CCHSS Number: [ENTER] key equals exit CCHSS prompt.
Display/End: [ENTER] key equals End.

DESTRUCTIVE/NONDESTRUCTIVE:

DISPLAY8.EXE will not destroy data on stored on the diskette.

SAMPLE RUN:

A> [DISPLAY8] [ENTER]

DISPLAY 8" DISKETTE DATA PROGRAM
COPYRIGHT FLAGSTAFF ENGINEERING 5/9/83

TO CONTROL THE DISPLAY, THESE CHARACTERS
MAY BE USED;

RETURN = DISPLAY NEXT 128 CHARACTERS

SPACE = SKIP REMAINING DISPLAY

OF THIS SECTOR

B = BACKUP AND REDISPLAY PREVIOUS SECTOR

R = REDISPLAY THE CURRENT SECTOR

DO YOU WANT TO TEST AN 8", 5", 3 1/2",
5"-QD, OR 5"-HD DRIVE (8/5,3,Q,H)? [ENTER]

INSERT 8" DISKETTE - ENTER
DRIVE (1/2) WHEN READY? [ENTER]

ENTER STARTING CYLINDER, HEAD AND
SECTOR (CCHSS)? [01001] [ENTER]

```
4C 4D ....4E OFF=0000 RSN=0000 CCHSS=01001
L< M( ....N+
C1 C2 ....C3 OFF=0016 RSN=0000 CCHSS=01001
AA BB ....CC
C1 C2 ....C3 OFF=0032 RSN=0000 CCHSS=01001
AA BB ....CC
4C 4D ....4E OFF=0048 RSN=0000 CCHSS=01001
L< M( ....N+
C1 C2 ....C3 OFF=0064 RSN=0000 CCHSS=01001
AA BB ....CC
4C 4D ....4E OFF=0080 RSN=0000 CCHSS=01001
L< M( ....N+
C1 C2 ....C3 OFF=0096 RSN=0000 CCHSS=01001
AA BB ....CC
A5 A6 ....A7 OFF=0112 RSN=0000 CCHSS=01001
%v &w ....'x
```

[C] [ENTER]

ENTER STARTING CYLINDER, HEAD,
AND SECTOR (CCHSS)? [ENTER]

DO YOU WANT TO DISPLAY
ANOTHER DISKETTE (N/Y)? [ENTER]

A>

DOSFMT8.EXE

USE:

Format a DOS compatible diskette in an external drive.

NOTES:

Use only high quality diskettes to avoid data errors.

DESCRIPTION:

DOSFMT8 will format a DOS diskette in an external drive interfaced to the Flagstaff Engineering diskette controller card.

The program can create nearly any DOS format desired using 8, 5 1/4, and 3 1/2" diskettes. The program initializes the MS-DOS fat tables and directory based on values input by the user. For standard DOS format diskettes, the following values should be used when the program is run.

S = Sides.

D = Density.

SS = Sector size

C = Number of cylinders.

F = Number of files.

SF = Sectors per FAT.

ST = Sectors per track.

M = Media ID.

T = Diskette type, where,

8 = 8" diskette or drive.

5 = 5 1/4" 48 TPI 360K drive.

Q = 5 1/4" 96 TPI 720k Quad density.
(also 3 1/2" Data General diskettes.)

H = 5 1/4" High Density (IBM AT).

3 = 3 1/2" diskette.

T	S/D/SS	C	F	M	SF	ST
Q	2 2	512	80	112	F9	5 9
H	2 2	512	80	224	F9	7 15
5	2 2	512	40	112	FD	2 9
3	2 2	512	80	112	FD	3 9
8	1 1	128	77	68	FD	6 26
8	2 2	512	77	224	FD	7 15

All of the above formats use one reserved DOS sector and two FATs (file allocation tables)

*Note to previous Diskette Connection users: The 8 inch parameters in the table above correspond to the DOS format diskettes generated by the programs, BIGIFMT and BIGFMT. Use the parameters shown to maintain compatibility between diskettes formatted with the older programs and diskettes formatted with DOSFMT8.

The program will format the diskette a track at a time. After each track is formatted, a read verify is performed. If an error occurs during the read verify operation, the program will reformat the track and perform another read verify. After 5 retries, a bad track message will be displayed and the program will end the formatting operation.

DOSFMT8 will not assign alternate tracks since a diskette that contains alternate tracks is of marginal reliability and should not be used.

OPERATION:

Load DOSFMT8. On completion of the program load, a program description message will be displayed.

The program will then prompt the user to enter a device type.

Enter an [8], [5], [3], [Q], or [H] followed by [ENTER] to indicate device type being tested, or press [ENTER] by itself to select an 8" device.

The program will prompt the user to enter the number of sides to format on the diskette.

Enter the number of sides to be formatted or select double sided formatting by pressing the [ENTER] key.

The program will prompt the user to select single or double density formatting.

Enter [S] for single density or [D] for double density formatting and press [ENTER].

The program will prompt the user to select the sector size.

Enter the required sector size or press [ENTER] to select 512 byte sectors.

The program will prompt the user to select the number of cylinders to format.

Enter the required number of cylinders to format on the diskette, or press [ENTER] to select 80 cylinders.

The program will prompt the user to select the number of reserved DOS sectors on the diskette.

Enter a number from 0 through 9, or press [ENTER] to select one reserved sector.

The program will prompt the user to select the number of FATs on the diskette.

Enter a number from 0 through 9, or press [ENTER] to create two FATs on the diskette.

The program will prompt the user to select the number of sectors per FAT to use on the diskette.

Enter a number from 1 through 99, or press [ENTER] to use 4 sectors per FAT.

The program will prompt the user to select the number of directory entries (Files) on the diskette.

Enter a number from 0 through 999, or press [ENTER] to create space for 112 directory entries.

The program will prompt the user to enter the media type code (ID) for the diskette.

Enter the required media type code, or press [ENTER] to select an ID of FD.

The program will then prompt the user to insert a diskette into the drive, and enter the drive number in use.

Insert the diskette into the appropriate drive and then enter the drive number being used or press the [ENTER] key to select drive 1.

The program will format the diskette. If formatting was successful, a diskette OK message will be displayed. If formatting was not successful, the program will display the bad track location.

After formatting is complete, the program will prompt the user to format more diskettes.

Enter a [Y] to continue to program, or an [N] to end the program.

DEFAULTS:

Device type: [ENTER] equals 8" diskette.
Number of Sides: [ENTER] equals 2.
Density: [ENTER] equals 2.
Sector size: [ENTER] equals 512.
Cylinders: [ENTER] = 80.
Reserved sectors: [ENTER] = 1.
Numbers of FATs: [ENTER] = 2.
Sectors per FAT: [ENTER] = 4.
Directory entries: [ENTER] = 112..
Media type: [ENTER] = FD.
Drive Number: [ENTER] equals drive 1.
Continue Format: [ENTER] equals No.

DESTRUCTIVE/NONDESTRUCTIVE:

DOSFMT8 WILL DESTROY ALL DATA ON THE DISKETTE BEING FORMATTED.

SAMPLE RUN:

A> [DOSFMT8] [ENTER]

UNIVERSAL MS-DOS FORMAT PROGRAM
COPYRIGHT FLAGSTAFF ENGINEERING XX/XX/XX

** MAKE SURE THE DISKETTE IS CORRECT
SINCE ALL DATA IS ERASED **

ENTER DRIVE TYPE (8=DEFAULT/8=8" OR 5"-HD,
5=5", 3=3 1/2")? [ENTER]

ENTER NUMBER OF SIDES YOU WANT TO FORMAT
(2=DEFAULT/1,2)? [ENTER]

ENTER SINGLE OR DOUBLE DENSITY
(D=DEFAULT/S,D)? [ENTER]

ENTER SECTOR SIZE (512=DEFAULT/128, 256,
512, 1024)? [ENTER]

ENTER NUMBER OF CYLINDERS TO FORMAT
(80=DEFAULT/40,77,80)? [77] [ENTER]

ENTER NUMBER OF RESERVED DOS SECTORS
(1=DEFAULT/0-9)? [ENTER]

ENTER NUMBER OF FATS (2=DEFAULT/0-9)?
[ENTER]

ENTER NUMBER OF SECTORS/FAT
(4=DEFAULT/1=99)? [7]

ENTER NUMBER OF DIRECTORY ENTRYS
(112=DEFAULT/0-999)? [224] [ENTER]

ENTER MEDIA TYPE CODE
(FD=DEFAULT)? [ENTER]

INSERT BLANK 8" DISKETTE -
ENTER DRIVE (1/2) WHEN READY.? [ENTER]

FORMAT 8" CYL=XX HEAD=X SECTOR=XX
GOOD OPERATION
VERIFY 8" CYL=XX HEAD=X SECTOR=XX
GOOD OPERATION
FORMATTING IS COMPLETED - 00 TEMPORARY
READ ERRORS - DISKETTE IS OK

DO YOU WANT TO FORMAT
ANOTHER DISKETTE (N/Y)? [ENTER]

A