# N O T I C E

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FLOPPY DISK UTILITY
USER'S GUIDE

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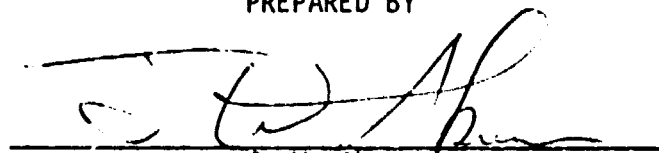
For

AVIONICS SYSTEMS DIVISION

# FLOPPY DISK UTILITY
## USER'S GUIDE

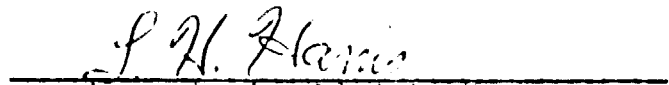Job Order 34-109

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15. Supplementary Notes

16. Abstract

The Floppy Disk Utility Program will transfer programs between files on the hard disk
and floppy disk. It will also copy the data on one floppy disk onto another floppy disk
and compare the data. The program operates on the Data General NOVA-4X under the Real
Time Disk Operating System (RDOS).

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## CONTENTS

# 1. INTRODUCTION

The Floppy Disk Utility controls the transfer of programs from the hard disk to the floppy disk and vice versa. It will also copy the data on a floppy disk to another floppy disk and compare the data of two floppy disks.

The program operates under the Data General NOVA-4X Real Time Disk Operating System (RDOS).

# 2. OPERATOR INTERFACE

The operator controls the transfer of data via inputs from the Cathode Ray
Tube (CRT) keyboard. (Or any system console device.)

The programs request operator input by displaying an exclamation mark (!).
The operator responds with a string of control characters which direct the
programs to perform an operation. Additional input, necessary to perform
the operation, is requested via displays on the CRT.

If an error occurs during an operation, the following message is displayed:

STATUS SSSS U TTTT

Where:  SSSS is the status in octal (see Appendix E for the format of
        the status register).
        U is the unit number.
        TTTT is the track number in octal.

One of the more common operator errors involving an operation on the floppy
disk is specifying a floppy operation to a unit that does not contain a
diskette. The above message will be displayed. However, the error bit
(bit 15) will be zero.

The operations and the operator interface are described below. Operator in-
put is underlined.

## 2.1 DISPLAY MENU

!M

The commands and their functions are displayed. (See Appendix A for a sample
of the display.)

## 2.2 UNIT

!U

UNIT (0-1)      u U

The current floppy unit is u. The operator may change units by typing a 0 or 1. If the operator responds with a carriage return and no unit value, the unit remains the same.

Also, these operations cause the floppy unit u updated program directories to be copied onto unit u, if necessary. The unit need not be changed to cause the copy. (See Appendix B for a description of the program directories.)

## 2.3 DISPLAY PROGRAM DIRECTORY

!P

The program directories for the current floppy are displayed one directory at a time, beginning with program directory 0. Pressing carriage return terminates the display. Pressing any other key causes the next directory to be displayed. If there are no more directories, the display is terminated. (See Appendix B for a description of the directories.)

## 2.4 READ FLOPPY PROGRAM FILE

!RF

PROGRAM NUMBER      p P

Where: p is the current program number.
       P is the operator response.
       Carriage return will cause program file p to be read.
           A numeric response (1-9) will cause the specified
           file to be read. Any other response will cause a

question mark (?) to be displayed and the operation
terminated.

If the program file is not defined on the floppy, the message

UNDEFINED PROGRAM

is displayed.  The operation will be terminated.

If a status error is detected, the message, STATUS, the floppy status, the
unit number, and the track number are displayed (octal format).  The opera-
tion is terminated.

## 2.5  WRITE FLOPPY PROGRAM FILE

!WF

PROGRAM NUMBER          p P
FLOPPY PROGRAM NAME     xxxxx↓
START ADDRESS           s S
END ADDRESS             e E

Where:  p is the current program number.

P is a carriage return if the program file to be written
   is p or a digit (1-9) if another program is to be written.

xxxxx is the program name terminated by a carriage return or
   the input of 12 alphanumeric characters.

s is the start (low) address of the program.  If the program
   was read from hard disk, s is zero (0).  If the program was
   read from the floppy disk, s is taken from the program
   directory.

S is a carriage return if s is the start address.  Otherwise
   it is an octal value terminated by a carriage return.

e is the end (high) address.  It is taken from word $404_8$ (NMAX)
   of the file if the program was read from the hard disk.  If
   the program was read from the floppy disk, the end address is

taken from the program directory.

E is a carriage return if e is the end address. Otherwise, to set another end address, E is an octal number terminated by a carriage return.

If no program is in core, the message

NO PROGRAM

is displayed when the "W" of the command is input.

If the preceding program file number has not been defined in the current floppy unit's directory, the message

NONCONTIGUOUS FILE

will be displayed and the operation terminated.

If during the write operation an error is detected, the message, STATUS, the floppy status, the unit number, and the track number are displayed (octal format). WARNING: All higher numbered files will be deleted after a WF command!

## 2.6 READ HARD DISK FILE

!RD

DISK FILE NAME xxxxx

Where: xxxxx is blank or the previous hard disk file name processed.

Appropriate operator response is a return to read file xxxxx or a file name terminated by a carriage return. (The file name must be compatible with RDOS conventions.) If an error occurs during the read operation, a question mark and the RDOS error code are displayed. (See Appendix C for the RDOS error codes.)

## 2.7 WRITE HARD DISK FILE

**!WD**

DISK FILE NAME  xxxxx

    Where:  xxxxx is blank or the name of the previous hard disk
           file processed.

Appropriate operator response is a return if the file to be written is xxxxx
or a file name terminated by a return.  To be written, the file must not be
defined when this command is given.  To delete a file see DELETE HARD DISK
FILE (section 2.10).  If an error is detected, a question mark and the RDOS
error code are displayed.  (See Appendix C for the RDOS error codes.)

If no program is in core, the message

<div align="center">

NO PROGRAM

</div>

is displayed when the character "W" is input by the user.

## 2.8 FORMAT AND WRITE BOOTSTRAP LOADER

**!FO**

The floppy on unit u is formatted.  If a status error occurs during formatting,
the process is terminated, the message STATUS, the unit number, and the status
are displayed.

If formatting is successful, the name of the hard disk bootstrap loader file
is requested by

<div align="center">

DISK FILE NAME  xxxxx

</div>

    Where:  xxxxx is blank or the previous program request.

The appropriate operator response is a return if xxxxx is the name of the bootstrap loader file. If it is not the name of the file, the operator should respond with the name followed by a return.

If the file cannot be read from the hard disk, a question mark and the RDOS error code are displayed. (See Appendix C for the RDOS error codes.) If an error occurs during the floppy write operation, the message, STATUS, the floppy status, the unit number, and the track number are displayed (octal format).

Any programs read into core from a floppy or hard disk before the format operation are not available for transfer to the floppy or hard disk.

## 2.9  EXIT

!X

This command copies the updated directory, if necessary, onto the current unit and exits to RDOS.

A floppy disk should not be removed from the drive until this command is executed because of the potential for losing the updated directory.

## 2.10  DELETE HARD DISK FILE

!D

DISK FILE NAME  xxxxx

Where:  xxxxx is blank or the name of the previous hard
        disk file processed.

Appropriate response is a return if xxxxx is the file to be deleted or the name of the file name terminated by a return.

If the file cannot be deleted, a question mark and the RDOS error code are

displayed. (See Appendix C for the RDOS error codes.)

## 2.11 COPY

!C

INPUT
UNIT (0-1)     u U

Where:  u is the current unit.
        U is either a carriage return or a 0 or 1. If U is a
          carriage return, u will be the input unit. If U is
          a 0 or 1 then U is the input unit. The other unit
          is the output unit. Any other response from the
          operator will cause a question mark to be displayed
          and the operation terminated.

The output unit is formatted and the data on the input unit is copied from
the input unit onto the output unit. All 76 tracks are copied. If an error
is detected, the message, STATUS, the number of the offending unit, and the
unit status are displayed. The operation is terminated.

Since all 76 tracks are copied, the data need not be in Data Systems Labora-
tory Floppy (DSLF) Format.

## 2.12 VERIFY

!V

VERIFY ALL TRACKS - YES (Y), NO (N)     Y

or

!V

```
VERIFY ALL TRACKS - YES (Y), NO (N)        N
UNIT 0
PROGRAM NUMBER                            P0 P0
UNIT 1
PROGRAM NUMBER                            P1 P1
```

In the first case, all 76 tra.s of unit 0 are compared with all 76 tracks of unit 1. Therefore, the floppy disk need not be in DSLF format.

In the second case, the specified program data on unit 0 is compared with the specified program of unit 1. The data of both floppy disks must be in DSLF format. If the two programs do not occupy the same number of tracks the error message

PROGRAM LENGTH

is displayed and the operation is terminated.

In both cases if an error is detected during the compare, the format of the error message is as follows:

$$T_0 \ W_0 \ D_0 \ T_1 \ D_1$$

Where:  $T_0$ is the unit 0 track number.

$W_0$ is the unit 0 word number with the track (0-3177).

$D_0$ is the unit 0 data word in error.

$T_1$ is the unit 1 track number.

$D_1$ is the unit 1 data word in error.

All displays are in octal.

When an error is displayed, the verification process is halted awaiting an operator response. Appropriate responses are:

Carriage return terminates verification.

Line feed causes the verification to be continued with the next track.

Any other character causes verification to be continued with the next word.

If a status error occurs, the message STATUS, the floppy status, the unit number and track number are displayed (octal format). The operation is terminated.

## 2.13  WRITE BOOTSTRAP LOADER ON THE FLOPPY

!L

DISK FILE NAME       xxxxx

Where:  xxxxx is blank or the hard disk file name of the previous program read from hard disk.

Appropriate operator response is a return if xxxxx is the hard disk file name of the bootstrap loader or the file name of the bootstrap loader terminated by a return.

If the file cannot be read, a question mark and the RDOS error code are displayed. (See Appendix C for the RDOS error codes.) If an error occurs during the floppy write operation, the message, STATUS, the floppy status, the unit number and track number are displayed (octal format).

## 2.14  TRANSFER DISK TO FLOPPY

!TF

DISK FILE NAME        wwwww  xxxxx
PROGRAM NUMBER        p P
FLOPPY PROGRAM NAME   yyyyy

Where:  wwwww is either blank or the previous hard disk file name

processed.

xxxxx is the file name to be processed terminated by a carriage
return. If file wwwww is to be transferred, then the
appropriate response is a carriage return.

p is the current program number.

P is a carriage return if the program file to be written is p
or a digit (1-9) if another program is to be written.

yyyyy is the program name terminated by a carriage return or
the input of 12 alpha-numeric characters.

This command is used normally to transfer non-save files to the floppy or
large save files (greater than 20,000 words) to the floppy.

The Transfer Disk to the Floppy sets the START ADDRESS in the directory to 0.
The END ADDRESS in the directory is

$$256_{10}*B$$

Where: B is the number of 256 word blocks in the hard disk file.

The hard disk file is not saved in memory and therefore a TF command followed
by a write floppy (WF) or write disk (WD) will result in the following error
message

NO PROGRAM

Since the TF command causes the hard disk to be read, potential error messages
include a question mark followed by the RDOS error code (see Appendix C for
the RDOS error codes). If the preceding floppy program file is not defined,
the message

NONCONTIGUOUS FILE

will be displayed and the operation terminated. If an error occurs during

the floppy write operation, the message, STATUS, the floppy status, the unit
number and track number are displayed.

## 2.15  TRANSFER FLOPPY TO DISK

!TD

PROGRAM NUMBER      p P
DISK FILE NAME      wwwww  xxxxx⟩

Where:  p is the current program number.

P is a carriage return if the program file to be transferred is
p or a digit (1-9) if another program is to be transferred.

wwwww is either blank or the previous hard disk file name
processed.

xxxxx is the file name of the hard disk file to which the floppy
program is to be transferred.  To be written, the file must
not be defined when this command is given.  To delete a file,
see DELETE HARD DISK FILE (section 2.10).

This command is a companion to the Transfer Disk to Floppy (TF) command.  It
is used to transfer non-save or very large save files (greater than 20,000
words) from floppy to the disk.

The floppy file is not saved in memory and therefore a TD command followed by
a write floppy (WF) or write disk (WD) will result in the following error
message.

NO PROGRAM

If the floppy file to be transferred has not been defined, the following
error message is displayed.

NO PROGRAM

2-11

Since the TD command causes the hard disk to be written, potential error messages include a question mark followed by the RDOS error code (see Appendix C for the RDOS error codes).  If an error occurs during the floppy read operation the message, STATUS, the floppy status, the unit number and track number are displayed (octal format).

# 3. OPERATING INSTRUCTIONS

The Floppy Disk Utility is in directory DPOF:AKERSOF.  The name of the program is FLOPM.

Samples of common operations are illustrated in Appendix E.

# APPENDIX A
## FLOPPY DISK UTILITY COMMANDS

# APPENDIX A

## FLOPPY DISK UTILITY COMMANDS

```
MENU . . . . . . . . . . . . . . . . . .  M
UNIT . . . . . . . . . . . . . . . . . .  U
DISPLAY DIRECTORY. . . . . . . . . . . .  P
READ FLOPPY. . . . . . . . . . . . . . .  RF
WRITE FLOPPY . . . . . . . . . . . . . .  WF
READ DISK. . . . . . . . . . . . . . . .  RD
WRITE DISK . . . . . . . . . . . . . . .  WD
FORMAT FLOPPY. . . . . . . . . . . . . .  FO
EXIT . . . . . . . . . . . . . . . . . .  X
DELETE DISK FILE . . . . . . . . . . . .  D
COPY . . . . . . . . . . . . . . . . . .  C
VERIFY . . . . . . . . . . . . . . . . .  V
LOADER . . . . . . . . . . . . . . . . .  L
DISK TO FLOPPY . . . . . . . . . . . . .  TF
FLOPPY TO DISK . . . . . . . . . . . . .  TD
```

# APPENDIX B

## DATA SYSTEMS LABORATORY FLOPPY (DSLF) FORMAT

# APPENDIX B

## DATA SYSTEMS LABORATORY FLOPPY (DSLF) FORMAT

The program data stored on the disk will consist of a bootstrap load program, the program directories, and the program data.

The bootstrap loader occupies track 0, sector 1 through track 1, sector $15_8$.

The program directories occupy track 1, sector $16_8$ through track 1, sector $27_8$. The directories define each program, its location on the floppy, and its core memory starting (low) address and stop (high) address. Each directory occupies one sector. The format of the directories is as follows.

### WORD

| | |
|---|---|
| 0 - 11 | Program file name - one character per word right justified |
| 12 | start (low) address |
| 13 | stop (high) address |
| 14 - 21 | date - one character per word right justified. The format of the date is as follows. MM/DD/YY Where: MM is the number of the month, DD is the day of the month, YY is the year. |
| 22 | start track of the program file |
| 23 | number of the tracks in the file |
| 24 | last track of the program file |
| 25 | next available track (last track + 1) |
| 26 - 64 | Zero |

Program files begin at track 2, sector 1. Each file begins at the track boundary, i.e., sector 1.

# APPENDIX C

# RDOS ERROR CODES

# APPENDIX C

## RDOS ERROR CODES

The following describes the RDOS error codes that may occur during operation of the Floppy Disk Utility program. A more complete description of the errors is in the Data General document, Real Time Disk Operation System (RDOS) Reference Manual.

| ERROR CODE | DESCRIPTION |
|---|---|
| 1 | Illegal file name (only alphanumeric or $ characters are permitted) |
| 7 | The file is read protected |
| 10 | The file is write protected |
| 11 | The file already exists |
| 12 | The file does not exist |
| 13 | The file cannot be deleted because it has the permanent attribute |
| 52 | Illegal directory specifier |
| 101 | Disk timeout occurred |

# APPENDIX D
# FLOPPY STATUS REGISTER

# FLOPPY STATUS REGISTER

| DONE | SEEK DONE | | | | | | | UN-SAFE | UNIT RDY | SEEK ERR | END ERR | ADDR ERR | CHK ERR | DATA LATE | ERR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UNIT 0  1 | 0 | 0 | D | 0 | 0 | | | | | | | | | |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |

| BITS | NAME | MEANING WHEN 1 |
|---|---|---|
| 0 | DC Done | The subsystem has completed a Read or a Write Operation. |
| 1-2 | Seek Done | Drive 0-1, respectively, has completed a Seek or Recalibrate operation. More than one of these bits can be set at any time. |
| 3-4 | --- | Reserved for future use. |
| 5 | Diskette (D) | Indicates that selected unit is a diskette if D=1. |
| 6-7 | --- | Reserved for future use. |
| 8 | Unsafe | The selected drive is in an unsafe condition. The unsafe flag can be reset with a CLR, IOPLS, IORST, or STRT. |
| 9 | Unit Ready | The selected drive is not performing any head movements and is ready to carry out a command (Read, Write, or another Seek). |
| 10 | Seek Error | The selected drive was not able to carry out a Seek or Recalibrate operation issued. |

| BITS | NAME | MEANING WHEN 1 |
|------|------|----------------|
| 11 | End of Diskette | The selected drive attempted to start Read or Write operation beyond the 76th track of a diskette. |
| 12 | Address Error | Starting sector (SS) does not fall within the following range: $1 \leq SS \leq 32_8$. |
| 13 | Checkword Error | The checkword read from the diskette at the end of a sector does not match the checkword calculated by the controller. |
| 14 | Data Late | Data transfer error internal to DFDD controller. |
| 15 | Error | One or more of the bits 8, 10, 11, 12, 13, or 14 in the Status Register is set to 1. |

APPENDIX E

SAMPLE OPERATIONS

# APPENDIX E

## SAMPLE OPERATIONS

Below are given two examples that illustrate the major uses of the floppy disk utility. Operator input is underlined, and carriage return is represented by $)$.

Copy hard disk file, MONIT.SV onto the floppy disk unit 1, program file 1.

```
!U
 UNIT (0 - 1)          0 1
!RD
 DISK FILE NAME
 MONIT.SV)
!WF
 PROGRAM NUMBER        1 )
 FLOPPY PROGRAM NAME    MONITOR )
 START ADDRESS 000000 )
 STOP ADDRESS 012517 )
!X
R
```

Copy floppy disk unit 1, program number 1 onto unit 0, program number 3.
Verify the transfer.


```
!U
 UNIT (0 - 1)              0 1
!RF
 PROGRAM NUMBER            1 1
!U
 UNIT (0 - 1)              1 0
!WF
 PROGRAM NUMBER            1 3
 FLOPPY PROGRAM NAME       MONITOR ⏎
 START ADDRESS 000000 ⏎
 STOP ADDRESS 012517 ⏎
!V
 VERIFY ALL TRACKS  YES (Y), NO (N)      N
 UNIT 0
 PROGRAM NUMBER           3 ⏎
 UNIT 1
 PROGRAM NUMBER           3 1
!X
R
```