



FLOPPY DISK I/O DRIVER

INTRODUCTION

The floppy disk I/O driver provides a convenient means of performing DMA I/O to the floppy disk. Detailed I/O programming tasks, normally required in an applications program, are handled by the driver. These tasks include: multiple cylinder transfers, verify after write, error retries, and device interrupt handling. The driver operates in either a sense driven mode without interrupts or as a fully interrupt driven device handler.

ENVIRONMENT

The driver is an external subroutine available on paper tape for both the LSI-2 and the LSI-3/05. Part numbers for the available paper tapes are:

96096-30	LSI-2
96096-31	LSI-3/05

The driver requires a controller responding to device address :11, and one to four drives with formatted diskettes.

REFERENCE DOCUMENTATION

Computer Automation Floppy Disk Interface Manual, Document No. 91-53566-00.

FUNCTIONAL DESCRIPTION

Two basic modes of operation are provided: auto wait and non-auto wait.

Auto wait mode transfers control to the driver for the entire I/O operation. It is easy to code this calling sequence and interrupts need not be enabled. A successful operation will return control to the FDISK: normal return point. All error conditions will take the FDISK: error return.

Non-auto wait calls should be made with interrupts enabled. If the parameters are valid and a controller is properly installed, the I/O operation is initiated and control is returned to the immediate return point. If the operation could not be initiated, control is returned to the FDISK: error return point. The calling program may now begin processing, and the driver will handle device interrupts in parallel with the calling program. When all interim processing is complete, a call is made to FWAIT:. The driver then completes any outstanding I/O, updates the user's I/O block, checks status, and returns to either the normal or error FWAIT: return point.



Calling Sequences

Auto Wait (Interrupts may be enabled or disabled)

```

EXTR      FDISK:

JST       FDISK:
DATA      IOLST
*         ERROR RETURN
*         NORMAL RETURN
  
```

Non Auto Wait (Interrupts should be enabled before the call)

```

EXTR      FDISK:,FWAIT:

EIN
JST       FDISK:
DATA      IOLST
*         ERROR RETURN
*         IMMEDIATE RETURN
  
```

Processing continues here while interrupt driven I/O completes.

```

JST       FWAIT:
*         ERROR RETURN
*         NORMAL RETURN
  
```

Where "IOLST" is the address of a 10 word I/O control block defined as follows.

I/O Control Block Format

```

Word 0:   Function:
          0 = Get status
          1 = Format
          2 = Write non-deleted data
          3 = Write deleted data
          4 = Read non-deleted data
          5 = Read deleted data
          6 = Read regardless
          7 = Read all data
          8 = Read verify
          9 = Seek only
         10 = Write and verify non-deleted data
         11 = Write and verify deleted data
  
```

Word 1: Unit Number (0-3)

Word 2: Starting Cylinder (0-76)

Word 3: Reserved (DO NOT ALTER)

Word 4: Starting Sector Number (1-26)

Word 5: Number of words to transfer



Word 6: Buffer Word address

Word 7: Indicates mode of operation:
0 = Auto Wait
1 = Non-Auto Wait

The next two words are set by the hardware/driver upon I/O termination.

Word 8: Number of words transferred.

Word 9: Status

NOTE

This reserved block of 10 words should not be modified until the entire operation has been completed.

Status

The status is set in word 9 of the I/O block. Bits on in the status word indicate the following conditions:

BIT	0	SELECTED UNIT NOT READY
BIT	1	DMA RATE ERROR
*BIT	2	END OF MEDIA
BIT	3	ATTEMPT TO WRITE ON WPT'D UNIT
BIT	4	NO ID COMPARE
BIT	5	ID CRC ERROR
BIT	6	DATA CRC ERROR
BIT	7	SYNC ERROR
+BIT	8	NON-DELETED DATA ENCOUNTERED
+BIT	9	DELETED DATA ENCOUNTERED
+BIT	10	DONE, OPERATIONS COMPLETE
+BIT	11	CYLINDER ZERO SENSED
BIT	12	ILLEGAL PARAMETER
BIT	13	CONTROLLER NOT PRESENT
BIT	14	HARDWARE ERROR (TIMEOUT)
+BIT	15	WRITE PROTECTED UNIT

* THIS BIT WILL OCCASIONALLY BE SET ON AN ERROR RETURN. IF THE RETURN WAS CAUSED BY HITTING END OF MEDIA THEN IT WILL BE THE ONLY BIT ON IN THE LOW ORDER BYTE (0-7).

+ THESE BITS DO NOT CAUSE AN ERROR RETURN BUT ARE FOR INFORMATION PURPOSES ONLY.



Termination

Auto wait mode

The FDISK: normal return is taken when all I/O has been completed successfully.

The FDISK: error return is taken on all error conditions.

Non-auto wait mode

THE FDISK: normal (immediate) return is taken when the I/O operation is successfully initiated.

The FDISK: error return is taken on controller not present and parameter error conditions.

The FWAIT: normal return is taken when all I/O has been completed successfully.

The FWAIT: error return is taken on all non-auto wait I/O errors.

Registers and CPU Status

The contents of the A and X registers, word/byte mode and overflow are preserved on all exits.

Error Handling

I/O errors are retried twice for a total of three attempts before an error return is taken. On ID miscompare errors an attempt is made to establish correct position by reading an IO from the disk and recomputing the relative seek required.

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MACRO? (A2) SI= FDISK R0=

```
0002 *
0003 NAM FDISK:FWAIT:
0004 C1H2
0005 REV: EQU 'A2' REVISION LEVEL
0006 RFL 0
0007 *****
0008 FLOPPY DISK DRIVER (96097-A1)
0009 COPYRIGHT 1975, COMPUTER AUTOMATION, INC.
0010 AVAILABLE FOR LSI 2 AS 96097-30
0011 AVAILABLE FOR LSI 3/05 AS 96097-31
0012 *****
0013 *
0014 *
0015 * THIS ROUTINE MAY BE CALLED AS FOLLOWS:
0016 *
0017 *
0018 *
0019 *
0020 *
0021 * JST FDISK:
0022 * DATA IOR
0023 * * ABNORMAL RETURN
0024 * * NORMAL RETURN (IMMEDIATE RETURN)
0025 *
0026 * IF AUTO WAIT MODE THE NORMAL RETURN MEANS DONE
0027 * IF NON AUTO WAIT THE FOLLOWING CALL MUST BE
0028 * ISSUED WHEN DONE WITH INTERIM PROCESSING.
0029 *
0030 * JST FWAIT:
0031 * * ABNORMAL RETURN
0032 * * NORMAL RETURN
0033 *
0034 *
0035 * "IOR" IS THE ADDRESS OF A 10 WORD IO CONTROL
0036 * BLOCK AS DEFINED ON THE FOLLOWING PAGE.
0037 *
```

```

0038 *WORD 0: FUNCTION:
0039 * 0= NO-OP
0040 * 1= FORMAT
0041 * 2= WRITE NON-DELETED DATA
0042 * 3= WRITE DELETED DATA
0043 * 4= READ NON-DELETED DATA
0044 * 5= READ DELETED DATA
0045 * 6= READ REGARDLESS
0046 * 7= READ ALL DATA
0047 * 8= READ VERIFY
0048 * 9= SEEK ONLY
0049 * 10= WRITE AND VERIFY NON-DELETED DATA
0050 * 11= WRITE AND VERIFY DELETED DATA
0051 *
0052 *WORD 1: UNIT
0053 *
0054 *WORD 2: CYLINDER
0055 *
0056 *WORD 3: RESERVED (DO NOT ALTER)
0057 *
0058 *WORD 4: SECTOR NUMBER
0059 *
0060 *WORD 5: WORD COUNT
0061 *
0062 *WORD 6: BUFFER ADDRESS
0063 *
0064 *WORD 7: 0= AUTO WAIT (NON ZERO) = NON AUTO WAIT
0065 *
0066 * THE NEXT 2 WORDS ARE SET BY HARDWARE/DRIVER
0067 *
0068 *WORD 8: NUMBER OF WORDS TRANSFERRED
0069 *
0070 *WORD 9: STATUS (AS DEFINED ON FOLLOWING PAGE)
0071 *
0072 * --- NOTE: THIS RESERVED BLOCK OF 10 WORDS -
0073 * --- SHOULD NOT BE MODIFIED UNTIL THE -

```

PAGE 0003 04/15/77 10:59:34 FLOPPY DISK I/O DRIVER (96097-A2)
MACK02 (A2) SI= FDISK H0= DESC

0074 * --- ENTIRE I/O OPERATION HAS BEEN -
0075 * --- COMPLETED -
0076 *

```

0078 *****
0079 *****
0080 *****
0081 *****
0082 *****
0083 *****
0084 *****
0085 *****
0086 *****
0087 *****
0088 *****
0089 *****
0090 *****
0091 *****
0092 *****
0093 *****
0094 *****
0095 *****
0096 *****
0097 *****
0098 *****
0099 *****
0100 *****
0101 *****
0102 *****
0103 *****
0104 *****
0105 *****
0106 *****
0107 *****
0108 *****
0109 *****
0110 *****
0111 *****
0112 *****
0113 *****

IF A STATUS ERROR OCCURS DURING I/O THE
DRIVER WILL RETRY THE FUNCTION TWICE
(THREE TIMES IN ALL) BEFORE RETURNING AN ERROR.
IF A SEEK ERROR OCCURS, THEN THE HEAD OF THE
SELECTED UNIT IS RESTORED TO 0 AND THE OPERATION
IS RETRIED.

IF A WRITE AND VERIFY OPERATION HITS END OF
CYLINDER, THE VERIFY PERFORMED BEFORE THE
CYLINDER IS INCREMENTED.

WHEN AN ERROR RETURN IS TAKEN, THE STATUS
WORD IN THE CALLING IO BLOCK
WILL CONTAIN ONE OR MORE OF THE FOLLOWING
BITS ON:

BIT 0 SELECTED UNIT NOT READY
BIT 1 DMA RATE ERROR
*BIT 2 END OF MEDIA
BIT 3 ATTEMPT TO WRITE ON WPT'D UNIT
BIT 4 NO IO COMPARE
BIT 5 IO CRC ERROR
BIT 6 DATA CRC ERROR
BIT 7 SYNC ERROR
*BIT 8 NON-DELETED DATA ENCOUNTERED
*BIT 9 DELETED DATA ENCOUNTERED
*BIT 10 DONE, OPERATIONS COMPLETE
*BIT 11 CYLINDER ZERO SENSED
BIT 12 ILLEGAL PARAMETER
BIT 13 CONTROLLER NOT PRESENT
BIT 14 HARDWARE ERROR (TIMEOUT)
  
```

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MACRO? (A2) SI= FDISK H0= DESC

0114 * * * * *
0115 * * * * *
0116 * * * * *
0117 * * * * *
0118 * * * * *
0119 * * * * *
0120 * * * * *
0121 * * * * *
0122 * * * * *
0123 * * * * *
0124 * * * * *

+BIT 15 WRITE PROTECTED UNIT

* * * * *
* * * * *
* * * * *
* * * * *
* * * * *
* * * * *
* * * * *

* * * * *
* * * * *
* * * * *
* * * * *

```

0126      *
0127      DA      EQU      :11
0128      EUT      EQU      1
0129      ENDUFC EQU      2
0130      NOIDCM EQU      4
0131      IDCRC  EQU      5
0132      IOTRYS EQU      3
0133      *
0134      * FUNCTION DEFINITIONS
0135      *
0136      NOOP      EQU      0
0137      FMT      EQU      1
0138      WND      EQU      2
0139      WDD      EQU      3
0140      RND      EQU      4
0141      RDD      EQU      5
0142      RDR      EQU      6
0143      RAD      EQU      7
0144      RDV      EQU      8
0145      SEEK      EQU      9
0146      WAVND    EQU      10
0147      WAVDD    EQU      11
0148      *
0149      * END OF FUNCTION DEFINITIONS
0150      *
0151      * ERROR DEFINITIONS
0152      *
0153      NRDY      EQU      0
0154      RATEM     EQU      1
0155      EUPMED    EQU      2
0156      ATTW      EQU      3
0157      BADPRM    EQU      12
0158      CNUT      EQU      13
0159      TIMOUT    EQU      14
0160      *
0161      * END OF ERROR DEFINITIONS
  
```

END OF CYLINDER ERROR CODE
 END OF CYLINDER WC NOT ZERO
 NO ID COMPARE
 ID CRC ERROR
 NUMBER OF RETRIES ALLOWED
 NO-OP
 FORMAT
 WRITE NON-DELETED DATA
 WRITE NON-DELETED DATA
 READ NON-DELETED DATA
 READ DELETED DATA
 READ REGARDLESS
 READ ALL DATA
 READ VERIFY
 WRITE AND VERIFY ND
 WRITE AND VERIFY DD
 NOT READY
 RATE ERROR
 END OF MEDIA ERROR
 ATTEMPT TO WRITE ON WPT UNIT
 BAD PARAMETER
 CONTROLLER NOT PRESENT
 TIMEOUT

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 MACRO2 (A2) SI= FDISK R0= MAINLINE

```

0176 *
0177 *
0178 * MAINLINE CODE:
0179 * CALL I/O SUBROUTINE AND PERFORM EXIT TASKS.
0180 *
0181 FDISK: ENT
0182 JMP $+2
0183 DATA REV:
0184 JST INIT
0185 LAM TOTRYS # OF RETRIES ALLOWED
0186 STA RETRYS
0187 JST TO
0188 JST IDLE RTN FROM INT/WAIT PROC
0189 JST UPDATE
0190 JMP DOIO DO MORE IO
0191 LDA @INIFR RUNNING UNDER INTERRUPTS?
0192 JAN EXIT YES, RETURN FROM INTS
0193 JMS FDISK: BUMP TO NORMAL EXIT
0194 JMP GDRIN DO GOOD RETURN PROCESSING
0195 *
0196 PARMER EQU $
0197 LDA =IXHADPRM ILLEGAL PARAMETER ERROR
0198 RADRTN EQU $
0199 IOR @STATUS CAUSE FOR ERROR IN A-REG
0200 STA @STATUS STORE COMPLETE STATUS
0201 GDRIN EQU $
0202 *
0203 * UPDATE SECTOR, CYLINDER AND WORDS TRANSFERRED
0204 * RESTORE: WORD COUNT, FUNCTION, BUFFER ADDR, AND
0205 * AUTO WAIT/NON AUTO WAIT CELL
0206 *
0207 LDA @FUNC
0208 STA @FUNC RESTORE CALLING FUNCTION
0209 LDA @BUF
0210 STA @BUFFAD RESTORE CALLING BUFF ADDR
0211 LDA @WRDTRN CONVERT WORDS

```

0212	0016	13D5	LPA	6	TO SECTORS
0213	0017	8C04 0004	ADD	SECTOR	A-REG CONTAINS NEXT SECTOR
0214	0018	C018	CAI	27	IF 27
0215	0019	DC02 0002	IMS	CYL	INCREMENT CYLINDER
0216	001A	C018	CAI	27	(IGNORE CYL>76)
0217	001B	0350	APP		AND SPT SECTOR = 1
0218	001C	9C04 0004	STA	SECTOR	STORE UPDATED SECTOR
0219	001D	B2A3 00C1	LDA	UCNT	NUMBER OF WORDS TO TRANSFER
0220	001E	9405 0005	SUB	WORDCNT	MINUS # OF WORDS UP TO LAST
0221	001F	AC08 0008	ADD	WORDTRN	IN CPR. PLUS # OF WORDS TRANS
0222	0020	9C08 0008	STA	WORDTRN	IN LAST IO, YIELD TOT TRANS
0223	0021	B29F 00C1	LDA	UCNT	
0224	0022	9C05 0005	STA	WORDCNT	RESTORE CALLING WORD COUNT

0225
0226
0227
0228
0229
0230
0236
0237
0238
0239
0240
0241
0242
0243
0244
0245
0246

0023	B299 000D	LDA	UNTR		RESTORE CALLING
0024	9C07 0007	STA	UNTR		AUTO WAIT / NON AUTO WAIT
0025	0025	FOU	8		
0025	F29C 00C2	LDX	USERX		RESTORE CALLING X-REG
0001	0001	IFT	LSI2		
0026	C603	LAP	3		RESTORE UV AND BYTE MODE
0027	B28C 0084	AND	PSTAT		
0028	13D0	LRA	1		
0029	6804	ENDC	3		FORCE WORD MODE
002A	2101 002C	SIN	5+2		
002B	0F00	JAZ			
002C	B291 00BF	SHM			RESTORE CALLING A-REG
002D	F72D 0000	LDA	USFRA		
000D	000D	PTN	FDISK:		
002E	1000	LPOOL			

002F
0030
0031
0032
0033

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MACR02 (A2) SI= FDISK H0= MAINLINE

0034
0035
0036
0037
0038
0039
003A

```

PAGE 0011 04/15/77 10:59:34 FLOPPY DISK I/O DRIVER (96097-A2)
MACRO2 (A2) SI= FDISK H0=
INITIALIZATION SUBROUTINE
0248
0249
0250
0251
0252
0253
0254
0255
0256
0257
0258
0259
0260
0261
0262
0263
0264
0265
0266
0267
0268
0269
0270
0271
0272
0273
0274
0275
0276
0277
0278
0279
0280
0281
0282
0283
*
*
*
*
*
INITIALIZATION SUBROUTINE. MESSAGE PARAMETER
LIST, SET & ENABLE INTERRUPTS (IF REQUIRED)
CHECK FOR CONTROLLER PRESENT, AND INITIALIZE.
*
INIT ENT
003B 0800 SIN
003C 6802 STA
003D 9A80 008E SIA
003E 5800 SWM
003F 0F00 STA
0040 9A73 0064 STX
0041 FA80 00C2 LDX
0042 E742 0000 STX
0043 FA77 0088 LMS
0044 DF44 0000 LDA
0045 B407 0007 STA
0046 9A76 008D LDA
0047 H405 0005 STA
0048 9A78 00C1 LDA
0049 H406 0006 STA
004A 9A75 00C0 ZAR
004B 0110 STA
004C 9C09 0009 LDA
004D H277 00C5 SEN
004E 498C JMP
004F F640 000F SEA
0050 446C LDA
0051 H401 0001 JAP
0052 3081 0054 JMP
0053 F645 000E SAI
0054 0D03 JAL
0055 2181 0057 JMP
0056 F648 000F LDA
0057 B400 0000 STA
0058 9A66 00BF CMS
0059 D26C 00C6
FORCE WORD MODE AND NO INTS
PRESERVE AX
SAVE STATUS
JOB POINTER
BUMP RETURN OVER DATA WORD
AUTO WAIT PRESERVED
SAVE CALLING WORD COUNT
SAVE CALLING BUFFER ADD
CLEAR STATUS WORD IN JOB
IF CONTROLLER NOT PRESENT
TAKE RAD FX11
INITIALIZE
CHECK FOR LEGAL UNIT 0-3
IF <0 ITS ILLEGAL
IF >3 ITS ILLEGAL
CHECK FOR LEGAL FUNCTION
0-12
WRITE & VERIFY DELETED DATA

```

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 MACH02 (A2) SI= FDISK H02 INITIALIZATION SUBROUTINE

0284	005A D26C 00C7	CMS	=NOP	AND NOP BOUND THE LEGAL
0285	005H F64D 000F	JMP	PARMER	FUNCTION CODES
0286	005C 0000	NOP		
0287	005D D26A 00C8	CMS	=WAVND	WRITE AND VERIFY NON-DELETED
0288	005E F203 0062	JMP	INIT4	
0289	005F 0000	NOP		
0290	0060 0D08	SAI	R	IF WRITE AND VERIFY
0291	0061 9A57 00B9	STA	VERIFY	SET FLAG AND RIAS VALUE
0292	0062 0062	EQU	R	
0293	0062 9C00 0000	STA	IFUNC	
0294	0063 9AD9 013D	STA	IFUNC	
0295	0064 B407 0007	LDA	WINTER	AUTO WAIT
0296	0065 2104 006A	JAZ	INIT6	YES
0297	0066 B262 00C9	LDA	=JNTRP	NO, SET INTERRUPT RETURN
0298	0067 9C07 0007	STA	WINTER	
0299	0068 DE68 0000	IMS	FDISK:	IMMEDIATE RETURN
0300	0069 0A00	FIN		
0301	006A 006A	EQU	R	
0302	006A F72F 003H	RTN	INIT	

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MACR02 (A2) SI= FDISK BO= IO AND IOLF SUBROUTINES

Address	Instruction	Comments
0304	IO	IO SUBROUTINE. POSITION HEAD ISSUE CALL.
0305	ON NON AUTO WAIT	RESTORE REGISTERS AND TAKE
0306	GOOD EXIT FROM DRIVER.	
0307	ON AUTO WAIT	RETURN FROM IO SUBROUTINE.
0308		
0309		
0310	IO	
0311	LDA 006H 0800	
0312	LDA 006C 8250	00CA
0313	ADD 006D 8C01	0001
0314	STA 006E 9A40	00HC
0315	LDA 006F 8402	0002
0316	SUB 0070 9348	00HC
0317	STA 0071 9C03	0003
0318	LDA 0072 8402	0002
0319	STA 0073 9848	00HC
0320	LDA 0074 8407	0007
0321	JAZ 0075 2108	0081
0322	LUX 0076 F248	00C2
0323	IFT 0001	
0324	LAP 0077 C603	
0325	AND 0078 8238	00E4
0326	LRA 0079 13D0	
0327	ENDC	
0328	SIN 007A 6807	
0329	JAZ 007B 2101	007D
0330	SPM 007C 0E00	
0331	LDA 007D 823D	00HH
0332	DTA 007E 6C88	
0333	LDA 007F 823E	00BE
0334	RIN 0080 F780	0000
0335	EQU 0081 0081	
0336	DTX 0081 6F88	
0337	RIN 0082 F717	006B
0338		
0339		
0340		
0341		
0342		
0343		
0344		

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 MACR02 (A2) SI= FDISK RU= IO AND IDLF SUBROUTINES

```

0345
0346
0347 0083 0800      IDLF  ENT
0348 0084 0350      ARP
0349 0085 9A34 008A STA
0350 0086 4988      IDLF4 SEN
0351 0087 F201 0089 JMP
0352 0088 F208 0091 JMP
0353 0089 0010      IDLE6 ARM
0354 008A 1355      IDLER LLA
0355 008B 0150      IDLER IAR
0356 008C 3141 008B JAN
0357 008D DA2C 008A IMS
0358 008E F608 0086 JMP
0359 008F B233 008B LDA
0360 0090 F681 000F JMP
0361      0091      IDLE10 EQU
0362 0091 F70E 0083 RTN
  
```

* IF IT TAKES MORE THAN 10SEC. TIMEOUT ERROR SET

* SET TIME CONSTANT

DA70 DONP?

IDLE6 NO

IDLF10 YFS

6 KILL

SOME

TIME (MAX 10 SECONDS)

IDLER

IDLE10

IDLE4

=1%TIMEOUT ERROR (TIMEOUT)

HARDTN

8

IDLE

PAGE 0015 04/15/77 10:59:34 FLOPPY DISK I/O DRIVER (96097-A2)
 MACRO2 (A2) SI= FDISK R0= UPDATE SUBROUTINE

```

0364 *
0365 * UPDATE SUBROUTINE. EXAMINE STATUS, HANDLE
0366 * RETRIES, HEAD RESTORES, AND CYLINDER UPDATES.
0367 *
0368 UPDATE ENT
0369     0092 0900
0370     0093 B409 0009
0371     0094 8237 00CC
0372     0095 2113 00A9
0373     0096 BA2C 00C3
0374     0097 3102 009A
0375     0098 HA2A 00C3
0376     0099 F68A 000F
0377     009A 009A
0378     009A BA28 00C3
0379     009B DA27 00C3
0380     009C F201 009F
0381     009D F68F 000F
0382     009E 13D4
0383     009F 3202 00A2
0384     00A0 FA74 0115
0385     00A1 F206 00A8
0386     00A2 B409 0009
0387     00A3 13D2
0388     00A4 3203 00A8
0389     00A5 FA52 00F8
0390     00A6 C703
0391     00A7 9A1B 00C3
0392     00A8 00A8
0393     00A8 F716 0092
0394     00A9 B20F 00B9
0395     00AA 2105 00B0
0396     00AB 0110
0397     00AC 9A0C 00B9
0398     00AD C608
0399     00AE 9C00 0000
0400     00AF F71D 0092
  
```

* STATUS ANY ERRORS?
 =:FF
 UPD10 NO
 RETRYS COULD BE ZERO
 UPD2 IF FWAIT: CALLED?
 RETRYS YES
 RADRTN NO-CONTINUE
 RETRYS
 RETRYS TOO MANY TRYS?
 UPD4
 RADRTN YES, TAKE RAD EXIT
 NOIDCM+1 IF NO ID COMPARE
 UPD6
 RESET DO HEAD RESTORE
 UPD8
 STATUS
 ENDUFC+1 IF END OF CYLINDER
 UPD8
 CAD DO UPDATE
 TOTRYS RESET RETRY COUNT
 RETRYS
 %
 UPDATE DO MORE I/O
 VERIFY IF STATUS WAS GOOD
 UPD12 AND NO VERIFY THEN DONE
 IF VERIFY
 VERIFY ZERO IT SO WE DON'T GET
 ADV CAUGHT NEXT TIME
 IFUNC SET UP VERIFY FUNCTION
 UPDATE DO I/O

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 MACRO2 (A2) SIZE FDISK H02 UPDATE SUBROUTINE

0400	0080	DELE	0092	UPD12	IMS	UPDATE	I/O FINISHED TAKE DONE EXIT
0401	0081	F71F	0092		RIN	UPDATE	EXIT
0402				*			
0403				*			
0404				*	DATA AREA		
0405				*			
0406	0082	0000		EOCFLG	DATA	0	END OF CYLINDER SERVICED FLAG
0407	0083	0000		PARML	DATA	0	STORAGE FOR PARAMETERS
0408	0084	0000		PSTAT	DATA	0	CALLING PROCESSOR STATUS SAVE
0409	0085	0000		COUNT	DATA	0	RETRY ERROR COUNT CELL
0410	0086	0000		LOOPC	DATA	0	LOOP CONTROL COUNTER FOR MOVE
0411	0087	0000		POINT	DATA	0	INDIRECT POINTER FOR MOVE ROUTINE
0412	0088	0000		SAVEF	DATA	0	TEMP CELL FOR SAVING PARAMETERS
0413	0089	0000		VERIFY	DATA	0	FLAG SET TO 1 WHEN VERIFY DESIRED
0414	008A	0000		IOITIM	DATA	0	IDLE TIMER CELL
0415	008B	0000		LSTPTR	DATA	0	PARAMETER (IOP) POINTER
0416	008C	0000		POSCFL	DATA	0	POINTER TO POSITION TABLE ENTRY
0417	008D	0000		UINTER	DATA	0	AUTO WAIT/NON WAIT SAVE CELL
0418	008E	0000		USERA	DATA	0	CALLING A-REG SAVE CELL
0419	008F	0000		UFUNC	DATA	0	CALLING FUNCTION CODE
0420	00C0	0000		UBUF	DATA	0	CALLING BUFFER ADDRESS
0421	00C1	0000		UCNT	DATA	0	CALLING WORD COUNT
0422	00C2	0000		USERX	DATA	0	CALLING X-REG SAVE CELL
0423	00C3	0000		RFTRYX	DATA	0	I/O RETRY COUNT CELL
0424	00C4	0000		IOIMP	DATA	0	TEMP INSTRUCTION
0425		0000			LPOOL		
	00C5	2000					
	00C6	0000					
	00C7	0000					
	00C8	000A					
	00C9	00D0					
	00CA	0140					
	00CB	4000					
	00CC	00FF					
	00CD						
	00CE						

```

00CF
0427 *
0428 * I/O INTERRUPT ENTRY POINT. SAVE REGISTERS
0429 * AND UPDATE RETURN ADDRESS.
0430 *
0431 INTR4 JST INTR4 GOOD RETURN
0432 NOP
0433 JST INTR4 ERROR RETURN
0434 INTR4 ENT
0435 STN 1 FORCE WORD MODE
0436 STX INTR4 SAVE X-REG
0437 SIX
0438 SWM
0439 STX INTR4 SAVE STATUS TEMPORARILY
0440 LDX LSTPTR POINT TO USERS PARAM LIST
0441 LDX INTR4 AUTO-WAIT?
0442 EIN
0443 JXN INTR4 NO, PROCESS INT
0444 LDX INTR4 YES, RESTORE CALLING X-REG
0445 RTN INTR4 AND RETURN
0446 LDX INTR4 TRANSFER CALLING X-REG TO
0447 STX USERX THE NORMAL X-REG SAVE CELL
0448 LDX INTR4 SAVE STATUS IN PROPER CELL
0449 SIX
0450 STA USERA SET NEW RETURN ADDR
0451 LDA INTR4
0452 STA FDISK:
0453 LDX LSTPTR INDEX REGISTER
0454 JMP INTR4
0455 *
0456 * FAILURE ENTRY POINT. SAVE REGS CLEAR AUTO-WAIT
0457 *
0458 FFAIL: ENT
0459 SIN 1
0460 STA USERA
0461 STA GET PROC STATUS
  
```


PAGE	0020	04/15/77	10:59:34	FLUPPY DISK I/O DRIVER (96097-A2)
MACRO2	(A2)	SI= FDISK	R0=	CYLINDER BOUNDARY SUBROUTINE

0512	0111	2082	0114	CADRTN	INITIAL NEW I/O REQUEST
0513	0112	B23D	0150	LDA	=1ZEOPMED END OF MEDIA ERROR
0514	0113	F33D	0151	JMP	RAUXTN IAMP HAD RETURN
0515	0114	F71C	00F8	CADRTN RTN	CAD EXIT

PAGE 0023 04/15/77 10:59:34 FLOPPY DISK I/O DRIVER (96097-A2)
 MACK02 (A2) SI= FDISK R0= RESET/RESTORE POSITIONING SUBROUTINE

0589	0141 0000	DATA	0	UNIT 1
0590	0142 0000	DATA	0	UNIT 2
0591	0143 0000	DATA	0	UNIT 3
0592	0144 0145	DATA	3+1	READ REGARDLESS
0593	0145 0006	DATA	RDR	CURRENT UNIT
0594	0146 0000	DATA	0	CYLINDER
0595	0147 0000	DATA	0	RELATIVE SEEK COUNT
0596	0148 0000	DATA	0	SECTOR
0597	0149 0001	DATA	1	ONE WORD (ID)
0598	014A 0001	DATA	1	BUFFER ADDRESS
0599	014B 014F	DATA	IDWRD	INTERUPT ENABLE/ADD
0600	014C 0000	DATA	0	WORDS TRAN
0601	014D 0000	DATA	0	STATUS
0602	014E 0000	DATA	0	ID WORD BUFFER
0603	014F 0000	DATA	0	
0604	0150	PGMEND EQU	4	
0605	0002	LPOOL		
	0150 0004			
	0151 000F			
0606		END		

0000 ERRORS
 0000 WARNING

0156	ATTW						
0157	HADPRM	0197					
0198	BADRTN	0273	0360	0375	0380	0514	
0170	BUFFAD	0210*	0267	0507	0509*		
0485	CAD	0388*	0515				
0495	CAD1	0487					
0500	CAD2	0489					
0515	CAURTN	0494	0512				
0158	CNOT	0271					
0409	COUNT						
0166	CYL	0215*	0314	0317	0501*	0510	
0127	DA	0272	0274	0336	0340	0350	0538 0566
0187	DOIO	0190					
0129	ENDNFC	0386					
0406	ENCFLG	0486	0491*	0499*			
0155	FORMED	0513					
0128	F01						
0229	EXIT	0192					
N 0181	FDISK:	0003	0193*	0245	0260	0262*	0299* 0338 0452*
		0466*					
0137	FMAT						
0164	FUNC	0208*	0281	0293*	0398*	0493*	0497* 0549* 0574*
0458	FWAIT:	0003	0465				
0201	GNRTN	0194					
0131	INCRG	0535					
0592	INJNHP	0537					
0347	IDLE	0188*	0362	0470*	0539*	0554*	0568* 0572*
0361	IDLE10	0352					
0350	IDLE4	0358					
0353	IDLE6	0351					
0355	IDLE8	0356					
0414	IDLTIM	0349*	0357*				
0602	IDSTAT	0540					
0594	IDUNIT	0531*					
0603	INWRD	0543	0599				
0253	INIT	0184*	0302				
0292	INIT4	0288					

0301	INIT6	0296			
0171	INTER	0191	0228*	0263	0295
		0552*	0576*		
0474	INTP	0439*	0448		
0434	INTR4	0431*	0433*	0445-	0451
0446	INTR6	0443			
0431	INTRTN	0297			
0473	INIX	0436*	0444	0446	
0310	IO	0187*	0341		
0339	IO4	0320			
0188	IORTN	0454	0471		
0424	INTMP				
0132	INTRYS	0185	0389		
0410	LOUPC				
0000	LSI2	0236	0327		
0000	LSI305	0231	0322		
0415	LSPTIR	0261*	0335	0440	0453
0130	NOIDCM	0341			0467
0136	NOOP	0284			
0153	NRDY				
0196	PARMER	0277	0280	0285	
0407	PARML				
0604	PGMFND				
0411	POINT				
0416	POSCCL	0313*	0315	0318*	0533*
0587	POSTAR	0311	0532		0545*
0404	PSTAT	0233	0238	0258*	0329
0143	RAD			0324	0449*
0154	RATFR				0463*
0141	RDD	0593			
0142	RDR	0397	0492		
0144	RDV	0316*	0565*		
0167	RELCNT	0383*	0546	0577	
0529	RFSFT	0186*	0372*	0374*	0377*
0423	RFTSYS			0378*	0390*
0004	REV:	0183			
0140	RND				

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0547	RSTOR	0536	0542	
0564	RSTOR2	0570		
0571	RSTOR3	0567		
0412	SAVFF	0550*	0573	
0582	SAVFI	0553*	0575	
0581	SAVFX			
0164	SFCTOR	0213	0218*	0503*
0145	SFEK	0548		
0173	STATUS	0199	0200*	0270* 0369 0385 0534
0580	TFUNC	0294*	0496	
0159	TIMOUT	0359		
0420	URUF	0209	0268*	
0421	UCNT	0219	0223	0266*
0419	UFUNC	0207	0282*	
0417	UNITER	0227	0264*	
0165	UNIT	0275	0312	0530
0393	UPD10	0371		
0400	UPD12	0394		
0376	UPD2	0373		
0381	UPD4	0379		
0385	UPD6	0382		
0391	UPD8	0384	0387	
0368	UPDATE	0189*	0392	0399 0400* 0401
0414	USFRA	0244	0255*	0337 0450* 0460*
0422	USFRX	0230	0259*	0321 0447* 0464*
0413	VERIFY	0291*	0393	0396* 0488
0147	WAVDD	0283		
0146	WAVND	0287		
0139	WDD			
0138	WND			
0169	WRDCNT	0220	0224*	0265 0504 0506*
0172	WRDTRN	0211	0221	0222* 0505 0508

0606 SOURCE LINES

