17 FLEXIBLE DISC CONTROL UNIT P6849 (F1MB, F1MBY, F1MB/06)

LIST OF ILLUSTRATIONS

LIST OF TABLES

17.1 FLEXIBLE DISC CONTROL UNIT (F1MB) - IDENTIFICATIONS

Type Number : P6849 -001, -002, -501 (F1MB)
Testprogram : TFIMZ (Floppy/CU test)
Channel : IOP/MIOP only. Break connection :3A43
Devices : Flexible Disc Drive CDC 9404 with or without doorlock option.
CDC 9406 with doorlock option (max. 2).
CDC 9406 without doorlock option (max. 4)
Philips X-3114 (max. 2) in FDU 6532

Board Identifications:

P-6849-001: F1MB with added PCB: 12NC: 5131 194 25700
F1MB without added PCB, 12NC: 5111 199 67420
P-6849-002: F1MBY, 12NC: 5111 199 58740
P-6849-501: F1MBØ6, without added PCB, 12NC: 5111 199 53720
F1MBØ6, with added PCB, 12NC: 5131 194 90600

Power Consumption: +5 Volt, 3 Amp.

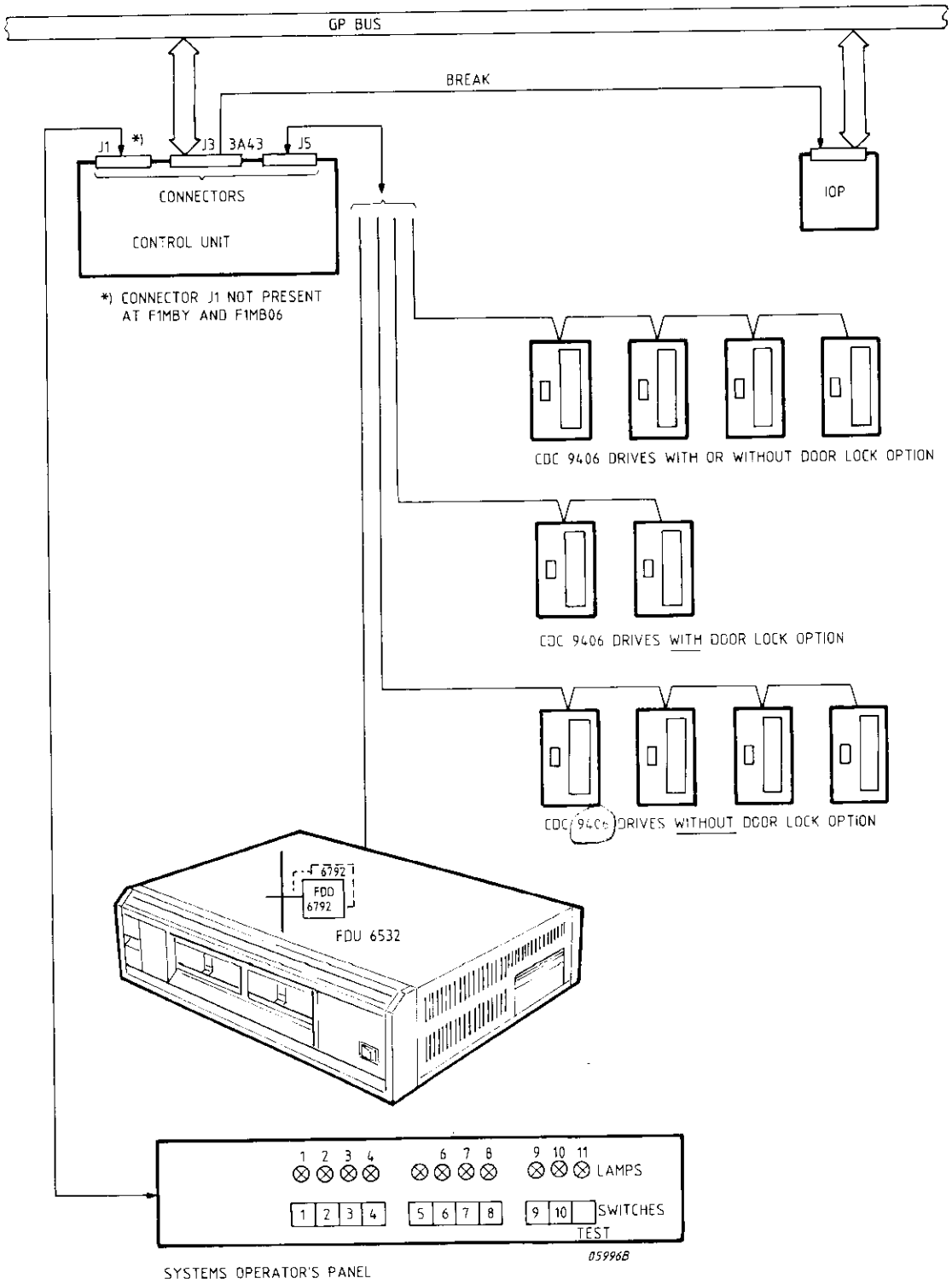


Figure 17.1 POSITION OF F1MB IN SYSTEM

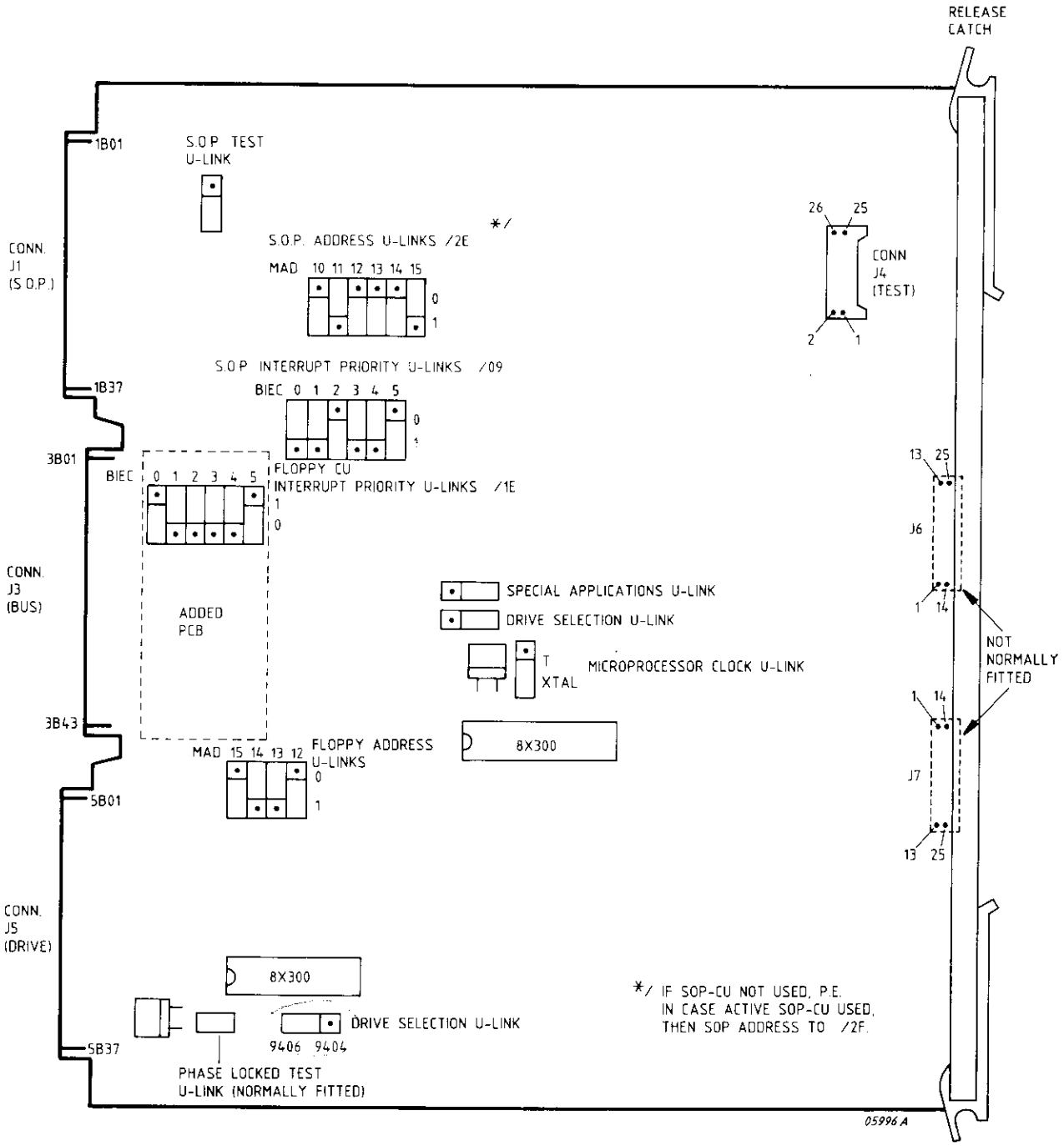


Figure 17.2 LAYOUT OF F1MB CARD WITH ADDED PCB

Note: SOP Test U-link: In position for normal operation.
SOP address U-links: Strapped for SOP address /2E. If SOP CU at this PCB is not used, the SOP address must be strapped to /2F.
SOP Interrupt Priority U-links: Strapped for interrupt level /09.
Floppy CU Interrupt Priority U-links (At added pcb): Strapped to interrupt level /1E.

Floppy Address U-links: Strapped to CU address /09.
Special Applications U-link:In position for normal operation.
Drive Selection U-links (2 links): Strapped for use with type 9406 (1M) drive (s).
Micro Processor Clock U-link: Strapped for normal operation.
Phase Locked Loop Test U-link: Must be fitted.

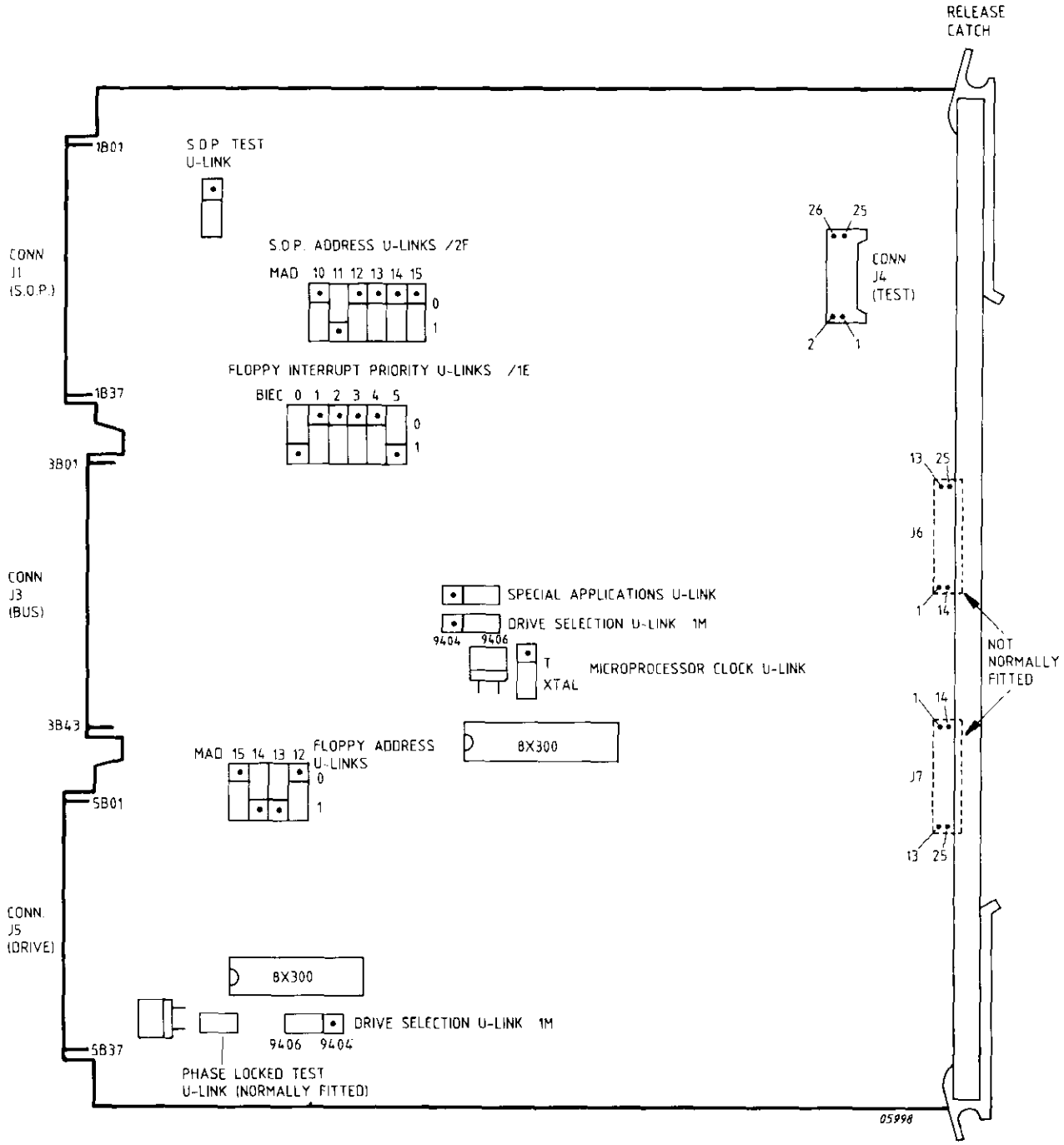


Figure 17.3 LAYOUT OF F1MB CARD WITHOUT ADDED PCB

Note: SOP Test U-link: Shown in position for normal use.
SOP address U-links: SOP CU at this PCB not used: SOP address to /2F (not used CU address).
Floppy Interrupt Priority U-links: Strapped for interrupt level /1E.
Floppy Address U-links: Strapped for address /09.
Special Applications U-link: Strapped for normal operation.
Drive Selection U-links (2 links): Strapped for operation with type 9406 (1M) drives(s).
Micro Processor Clock U-link: Strapped for normal operation.
Phase Locked Loop Test U-link: Must be fitted.

17.2.1 CONNECTION OF FDU 6532 TO P-6824.

INTRODUCTION:

The Flexible Disc Unit FDU 6532 is unintelligent and contains one or two 5.25 inch flexible disc drives. The FDU 6532 is designed primarly as an aid to copy programs used in PTS-6000 systems from 8 inch to the 5.25 inch discs used by WSC 6910 controllers.
The flexible disk drives used in the FDU are of the type FDD 6792 (X-3114) with a maximum capacity of 1MByte each.
See for detailed description of FDU 6532 Field Support Manual Flexible Disc Unit PTS-6532, 12NC: 5122 991 33921, d.d. May 1984.

CONNECTION TO TC 6824.

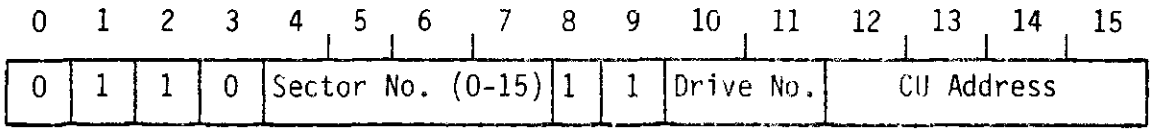
- Disconnect the TC Mains cable.
- Install Channel Unit 6849-501. Slot 9 is recommended.
- Install the connector adaptor to the J5 connector of the channel unit and secure it with the two screws included in the installation kit.

- Remove one of the cover plates from the cable entries at the lower front end of the TC and pass the FDU cable through the opening until the cable fastener is through.
- Remove the nut from the cable fastener. Place provided cover plate on the fastener as shown in the figure and secure it with the nut.
- Fasten the cover plate of the FDU cable at the cable entry.
- Connect the FDU cable to the connector adaptor.
- Install a break wire as indicated in the figure.
- Connect the TC mains cable and test the installation.
- Replace all covers and close the front door.

The Connector Adaptor (12NC: 5131 194 79900) and other mounting parts are in the TC Installation Kit (12NC: 5131 195 17200).

INITIAL PROGRAM LOADING

The IPL can be loaded from floppy disc using the standard P800 bootstrap (P843-053) sequential and disc bootstrap. The control panel data switches must be positioned as follows:



With this bootstrap the IPL is loaded from cylinder 0, head 0. This track is always formatted with format 0 (single density, 26 sectors/track and 128 bytes/sector).

Note: This IPL procedure is not applicable to the SOP. Via SOP, IPL is possible from drive 0 (switch 7) or drive 1 (switch 8).

POWER FAILURE AUTOMATIC RESTART

The CU and disc drive will be restarted after a power failure without operator action. Information on the disc will not be destroyed but a sector of the disc being written when a power failure occurs must be completely rewritten after the CU is restarted.

DRIVE CONTROL

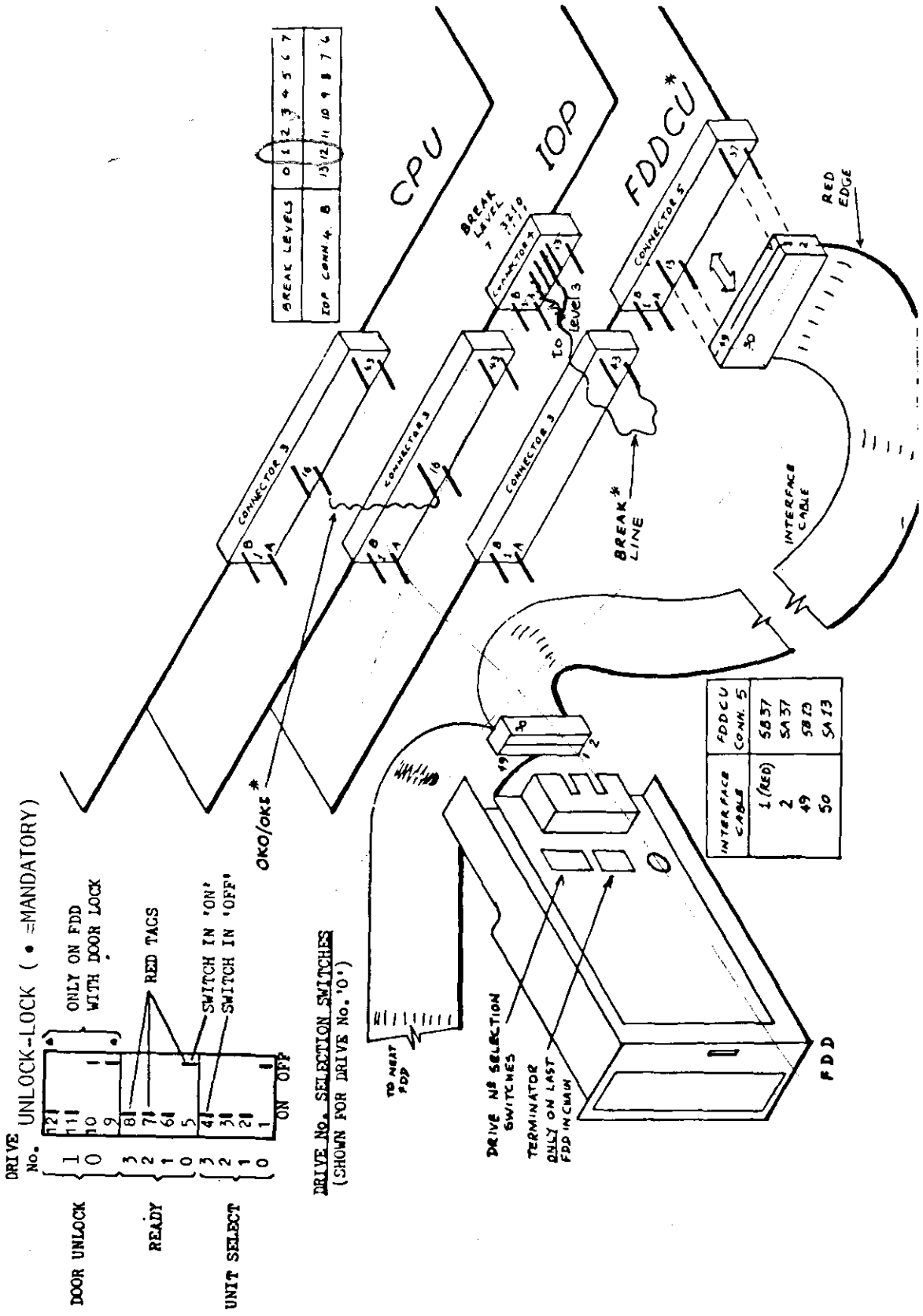
Up to four drives may be controlled from a single CU but the drives must all be of the same type. The drives cannot operate simultaneously, a command for one drive must be finished before the CU will accept a command for another drive.

STRAP SETTINGS (refer to figure 17.2)

U-Links on the card are used to select

- Floppy CU address
- SOP interface address
- Interrupt Priority for both Floppy CU and SOP interface.(see note)
- Drive type selection
- Special Applications
  These U-links are set at system installation time. Three other U-links are provided for test purposes.
- Phase locked loop test link for testing the floppy disc controller chip fitted during normal operation of the card, removed for test.
- Microprocessor clock input selection, set at position XAL for normal operation of the card, set at 'T' for test.
- SOP test U-link, shown in figure 17.3 in its position for normal operation, set at the lower position for test.

Note: Floppy disc interrupt priority U-links are on a separate small printed-circuit board. (near connector J3).
When this board is not mounted, the U-links of the SOP-interrupt priority are used for selection of Floppy interrupt priority.



Note: P6814/24: OKO/OKI and BREAK connected to MIOP (channel 1).

Figure 17.3 INSTALLATION DETAILS

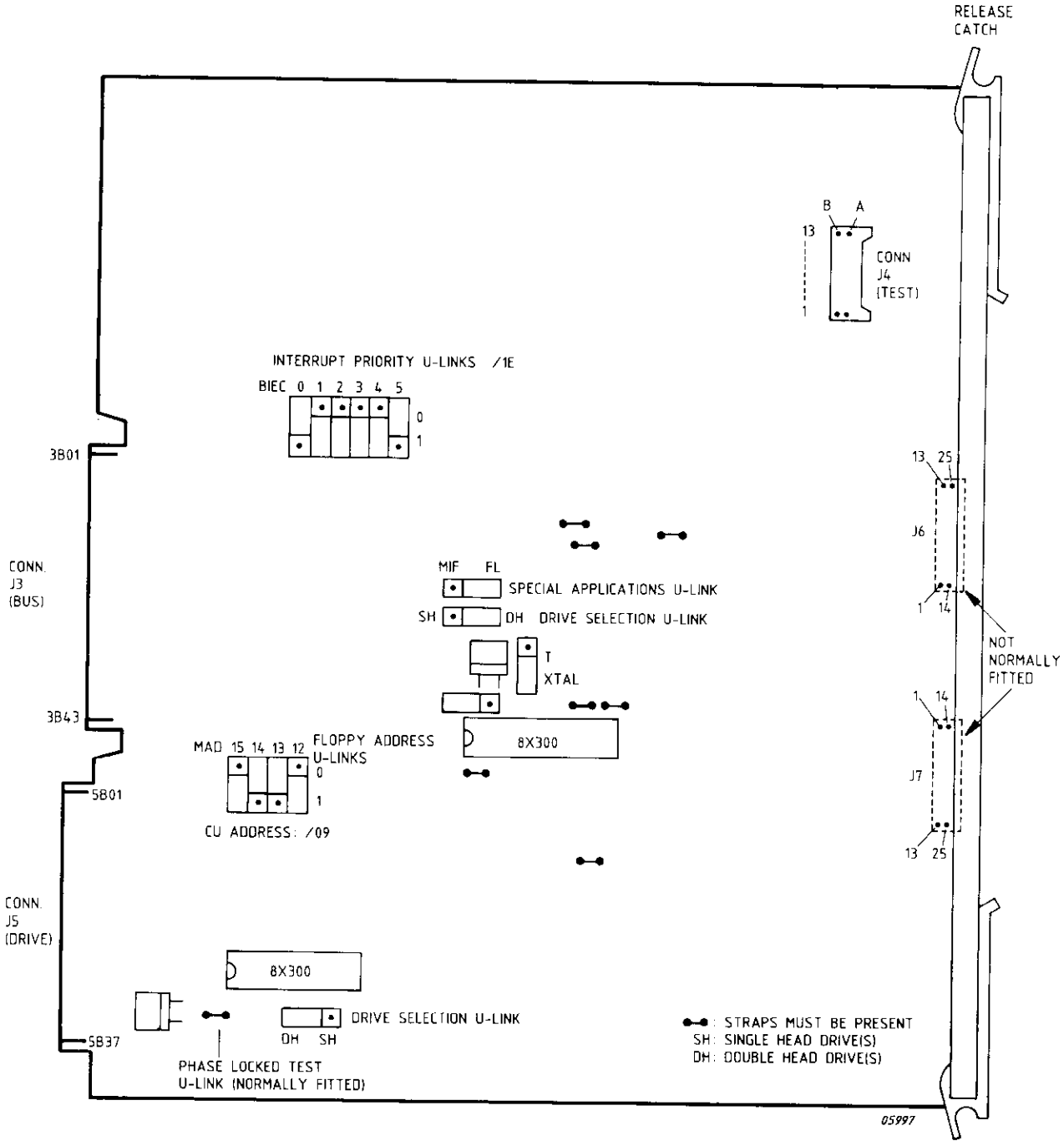


Figure 17.4 LAYOUT OF F1MBY CARD

Note: Interrupt priority U-links: Interrupt level /1E.
Control Unit Address U-links: Address /09.
Special Applications U-link: Normal operation: FL.
Drive Selection U-links (2 links): Shown for use with type 9406 drive(s).
Micro Processor Clock U-links (2 links): In position normal operation.
Seven small U-links must be present.

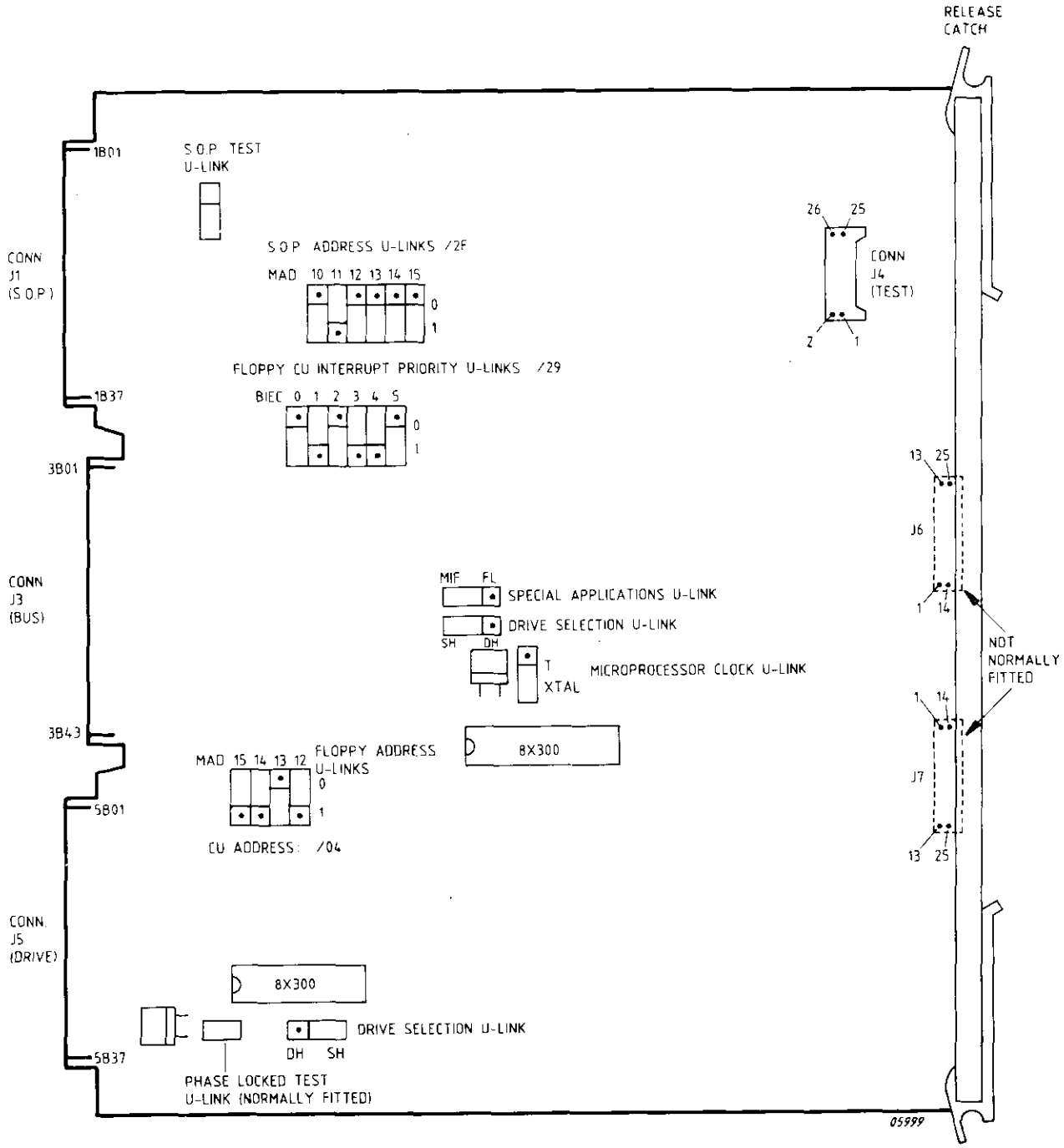
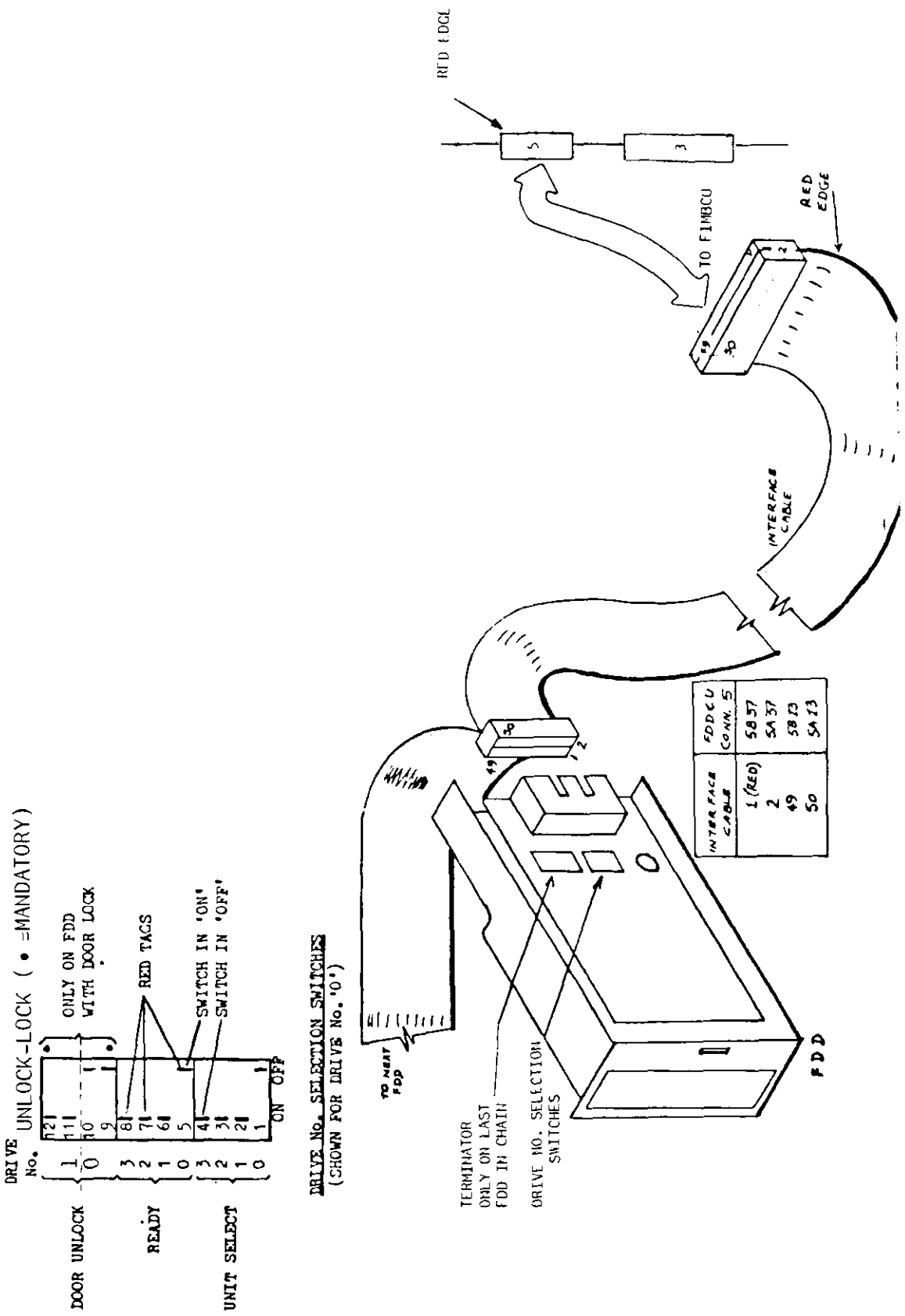


Figure 17.5 LAYOUT OF F1MBØ6 CARD

Note: This board is used with FDU 6532 (X-3114 drives) to 'translate' files at 0.25M and/or 1M, 8 inch discettes to 5.25 inch, P-6911 format discettes.
See next pages for connection FDU 6532.
SOP Test U-link : Strapped for normal operation.
SOP address U-links: Strapped to /2F: Not used CU address.
Floppy CU Interrupt Priority U-links: Strapped to level /29 (dec. 41)
Special Application U-link: Strap position not important.
Drive Selection U-links (2 times): Strapped for use with FDU 6532.
Micro Processor Clock U-link: Strapped for normal operation. (XAL)
Floppy CU Address U-links: Strapped for address /04.
Phase Locked Loop U-link: Must be fitted for normal operation.



Note: P6814/24: OKO/OKI and BREAK connected to MIOP (channel 1).

Figure 17.6 INSTALLATION DETAILS

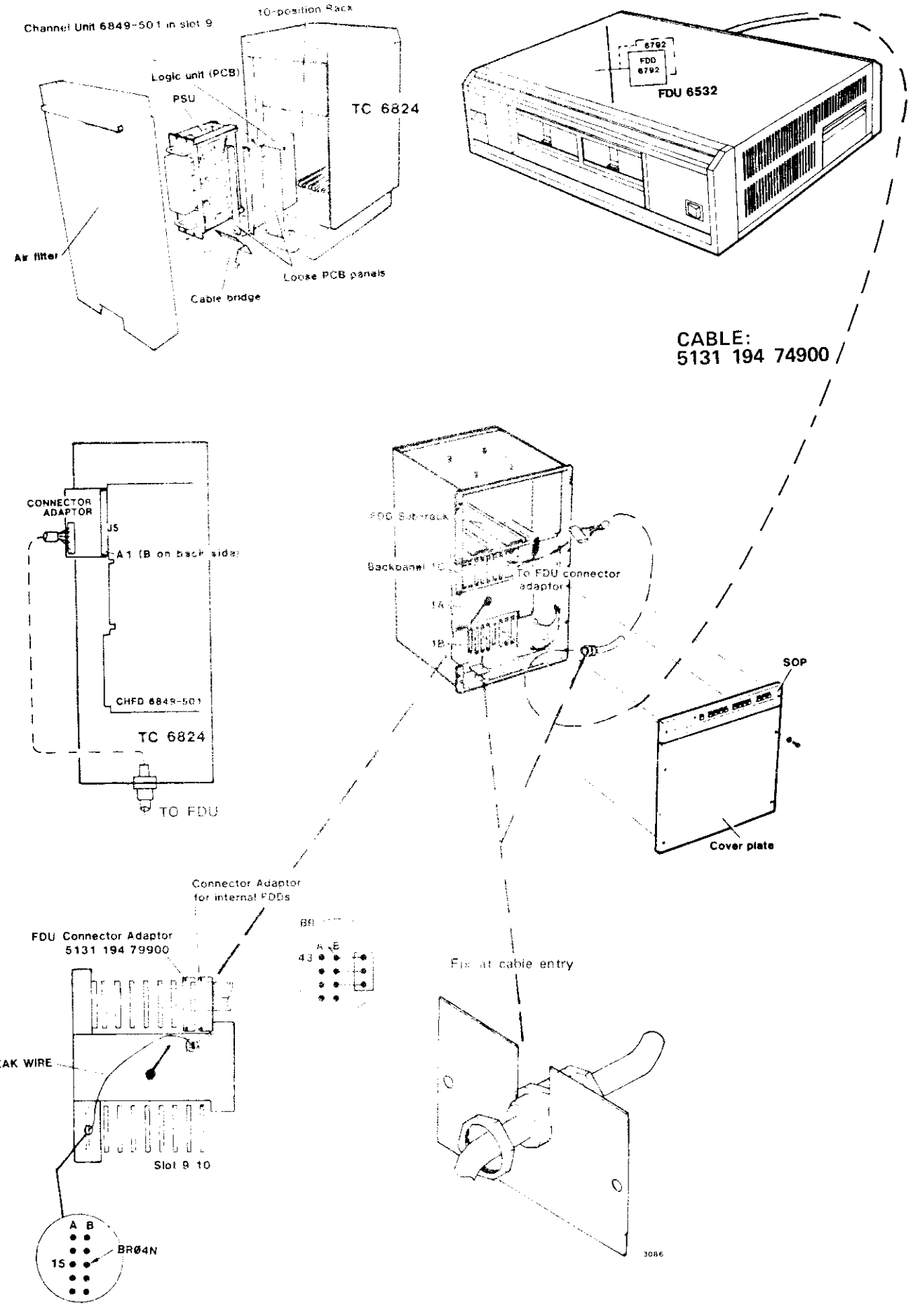


Figure 17.7 CONNECTION FDU 6532/6849-501

Pin No.	Signal Mnemonic	Signal Function	
5A01	DC5ØN	Disc Type (9406)	Unit 4 door lock (9404)
5A02	DC48N	Unit 2 door lock (9406)	Unit 3 door lock 9404)
5A03,4	--	Not used	
5A05	DC42N	Unit 1 door lock (9406)	Unit 2 door lock (9404)
5A06	DC4ØN	Head Select (9406)	Unit 1 door lock (9404)
5A07	RDYØN	Drive unit 1 ready signal	
5A08	WRPN	Write protected disc	
5A09	RDY3N	Drive unit 4 ready signal	
5A10	RDY2N	Drive unit 3 ready signal	
5A11	RDY1N	Drive unit 2 ready signal	
5A12-24	--	Not used	
5A25	SEL3N	Drive unit 4 selection signal	
5A26	SEL2N	Drive unit 3 selection signal	
5A27	SEL1N	Drive unit 2 selection signal	
5A28	SELØN	Drive unit 1 selection signal	
5A29	WDN	Write data signal	
5A30	WEN	Write enable signal	
5A31	DIRN	Each pulse of STEPN moves the head one track	
5A32	STEPN	in the direction specified by DIRN	
5A33	LWCN	Low write current select	
5A34	INDN	Index pulse	
5A35	TRØN	Track zero detect	
5A36	HLN	Head load signal	
5A37	RDLN	Read data/clock composite signal	
5B01	OV	Ground	
5B02	DC47N	Special applications (9406)	Not used (9404)
5B03	DC45N	(see table 17.2)	Not used (9404)
5B04-11	OV	Ground	
5B12-24	--	Not used	
5B25-37	OV	Ground	

Table 17.1 CONNECTIONS TO FLOPPY DISC DRIVES (connector J5)

CU signal name	Pin No.	CU function with 9404	9404 drive signal name	CU function with 9406	9406 drive signal name
DC40N	5A06	Lock unit 0	Lock unit 1	Head select	Head select
DC42N	5A05	Lock unit 1	Lock unit 2	Lock unit 0	Lock unit 1
DC45N	5B03	--	Ground	Lock unit 2	Ground
DC47N	5B02	--	Ground	Lock unit 3	Ground
DC48N	5A02	Lock unit 2	Lock unit 3	Lock unit 1	Lock unit 2
DC50N	5A01	Lock unit 3	Lock unit 4	Disc type	Disc type

Table 17.2 FUNCTIONS OF DCXXN SIGNALS

Pin No.	Signal Mnemonic	Signal Function
1A10	DS06N	Panel switch 1 operated
1A08	DS07N	2
1B01	DS08N	3
1A01	DS09N	4
1B02	DS10N	5 — DSW
1A02	DS11N	6
1A03	DS12N	7
1A05	DS13N	8
1A06	DS14N	9
1A07	DS15N	10
1B11	DL05N	Illuminate panel lamp 1
1A11	DL06N	2
1A12	DL07N	3
1A13	DL08N	4
1A14	DL09N	5 — LED
1A18,1B18	DL10N	6
1A15,1B15	DL11N	7
1A16	DL12N	8
1B20	DL13N	9
1A17,1B17	DL14N	10
1A19	DL15N	11
1A04	0V	Power supply return
1A09	CHAEND	Switch operated detect
1A20	+5V	Power supply
1A21-37	--	Not used
1B03-6,8-10,12-14,16	0V	Power supply return
1B07	CHABEGN	Activate switch chain on panel
1B19	+5V	Power supply
1B21-37	--	Not used

Table 17.3 SYSTEM'S OPERATOR PANEL CONNECTIONS (connector J1)

Pin No.	Signal Mnemonic	Signal Function
4J01,3 4J02-16	+5V	Power supply
(even nos.)	IVB7N-ON	CU internal bus lines
4J25,23, 5-21 (odd nos.)	RAD02-12	PROM address lines
4J18	CX1TEST	Test input for microprocessor clock
4J20	CX2TEST	
4J22,24	0V	Power supply

Table 17.4 TEST CONNECTIONS (connector J4)

SIGNAL	FUNCTION	PIN NO ADAPT. CHFD	WIRE COLOUR IN CABLE	PIN NO CONN. FDU
HLN	Head Load	36A	Yw/Pk	04
DUN1N	Door 1 Unlock	03B	Yw/Gy	8
RDYN	Ready	13A	Yw/Bu	28
INDN	Index Pulse	34A	Yw	08
USØN	Unit Select Ø	05A	Bu/Rd	20
US1N	Unit Select 1	02A	Vt	22
MTRØN	(Conn. to ground)	--	--	--
MTR1N	(Conn. to ground)	--	--	--
DIRN	Head Direction In	31A	Gy/Bn	14
STEPN	Head Movement 1 track	32A	Wt	12
WDN	Write Data	29A	Bn/Gn	18
WEN	Write Enable	30A	Yw/Bn	16
TRØN	Track Ø detected	35A	Pk	06
WRPN	Write Protected Disc	08A	Bn/Bu	36
RDN	Read Data/Clock	37A	Rd	02
HDSN	Head 1 Select	06A	Br/Bk	40
DUNØN	Door Ø Unlock	01A	Yw/Rd	42
GROUND		01B,/4-11B, 25-37B	--	ODD NO'S

Identification cable: 5131 194 74900

Table 17.5 SIGNAL/PIN RELATION F1MBØ6/FDU 6532

Format 0	Format 1	Format 2
1 sided discette single density 1 head	2 sided discette double density 2 heads	2 sided discette double density 2 heads
77 tracks total (0 - 76) track 0 - Index 1 - 73 or 74 - Data tracks 75,76 - Spare	77 cylinders total (0 - 76) cylinder 0 - Index 1 - 74 - Data cyl 75,76 - Spare	77 cylinders total (0 - 76) cylinder 0 - Index 1 - 74 - Data cyl 75,76 - Spare
26 sectors/track 128 bytes/sector	26 sectors/track * 256 bytes/sector	8 sectors/track * 1024 bytes/sector
total 'data' capacity 246,272 bytes	total 'data' capacity 985,088 bytes	total 'data' capacity 1,212,416 bytes
drive types CDC 9404 or CDC 9406	drive type CDC 9406	drive type CDC 9406
discette type - 8" IBM, 1-sided, PARTN 2305830 (or equiv.)	discette type - 8" IBM, 2-sided, PARTN 1766872 (or equiv.)	discette type - 8" IBM, 2-sided, PARTN 1669045 (or equiv.)
IBM systems using this format - IBM 3740, IBM 5320, IBM 1, all systems using IBM "Standard Data Interchange"	IBM systems using this format - IBM 34-2	IBM systems using this format - IBM 34-2

Table 17.6 FORMATS AND DISCETTES

* Note: Format 1 - Cyl. 0, head 0 is formatted as for format 0
(i.e. 26 sectors/track, 128 bytes/sector)
Format 2 - Cyl. 0, head 0 as for format 0
Cyl. 0, head 1 as for format 1

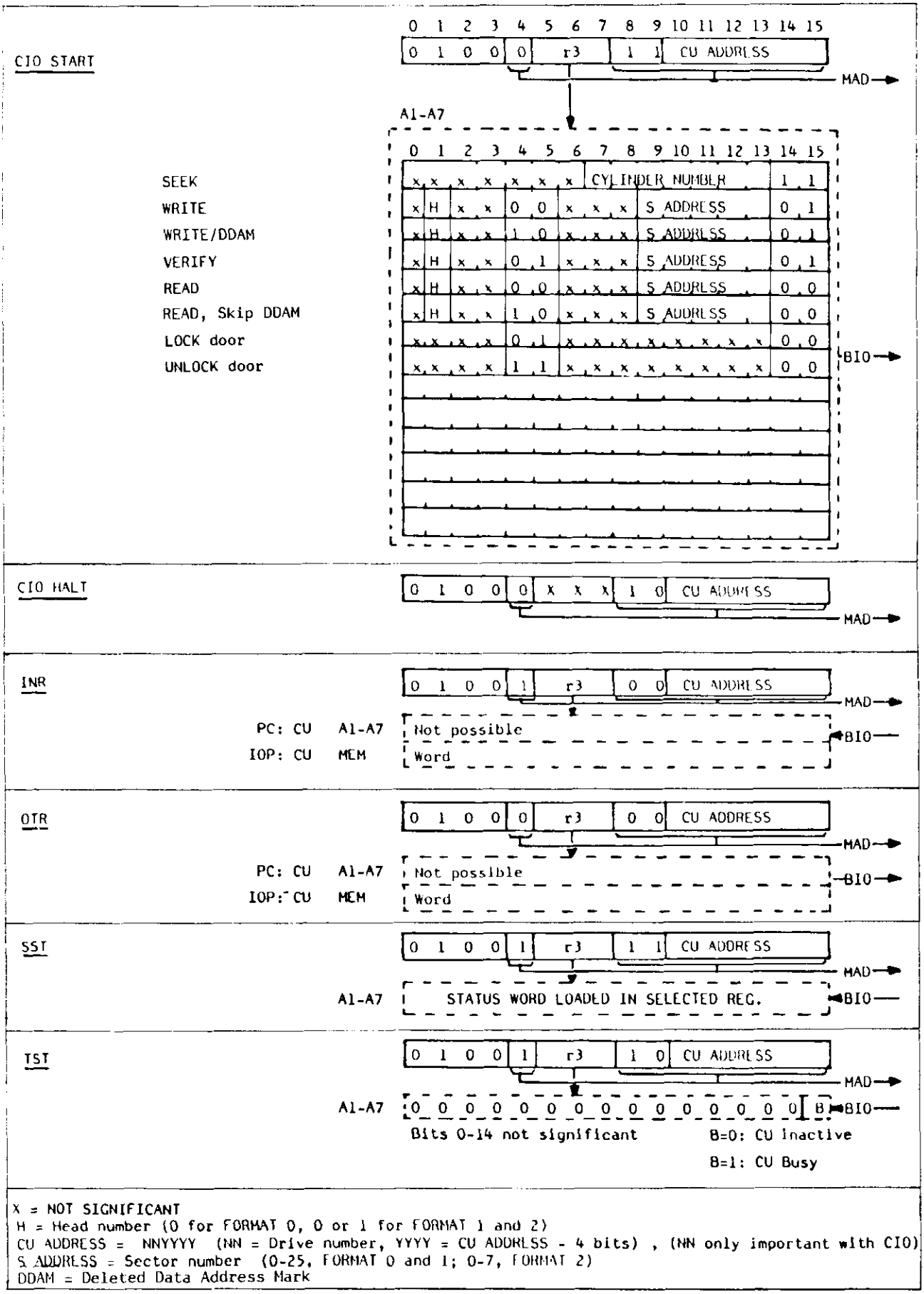


Figure 17.8 INSTRUCTION / COMMAND-WORD FORMATS

17.4.1 INITIAL PROGRAM LOADING

The High/Low Core Loader can be loaded from floppy disc using the standard IPL ROM.
With the bootstrap the High/Low Core Loader is loaded from cylinder 0, head 0. This TRACK is always formatted with Format 0 (single density, 26 sectors/track and 128 bytes/sector).

From SOP loading is possible with SOP switch 7 from drive 0 and with SOP switch 8 from drive 1.

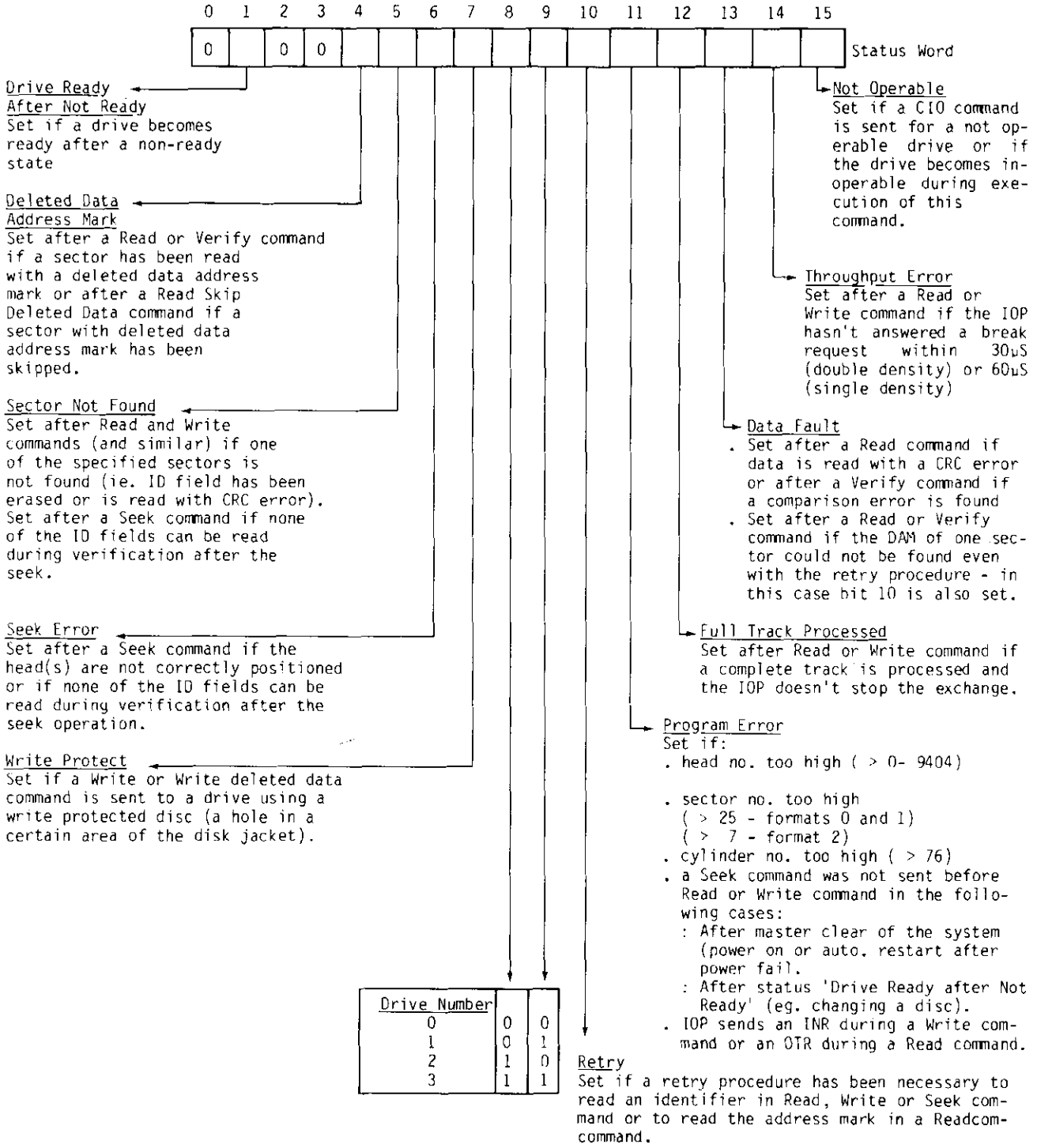


Figure 17.9 EXPLANATION OF STATUS WORD

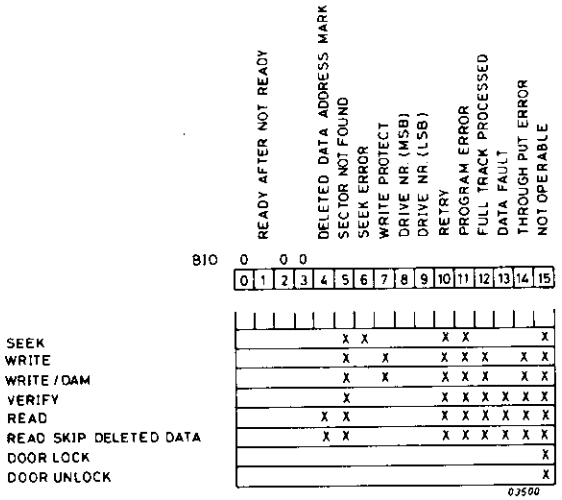


Figure 17.10 STATUS WORD - POSSIBLE CONFIGURATIONS

17.5 SHORT DESCRIPTION OF TESTPROGRAMS

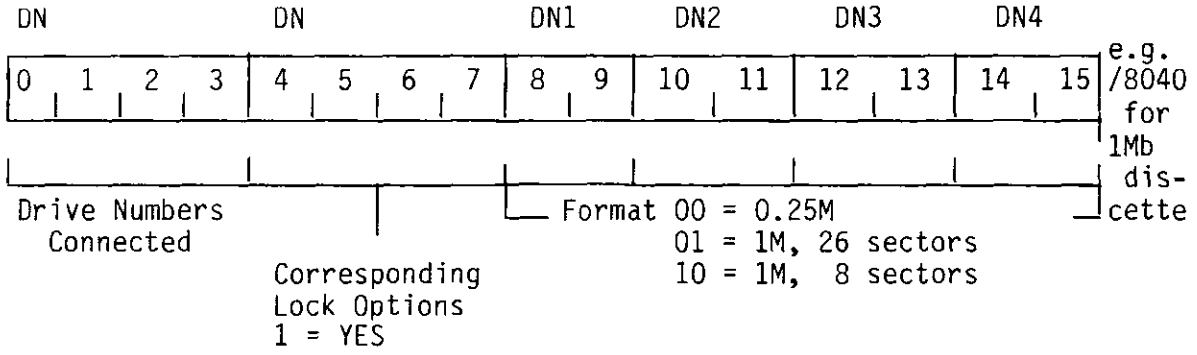
TESTPROGRAM TF1MZ (SEE LOAD PROCEDURE TF TESTPROGRAMS)
MINIMAL REQUIRED: HAND HOLD PANEL OR TERMINAL

1) IPL
   Program simulates stops at /700 = (SOP indicators 2,3,4 on).

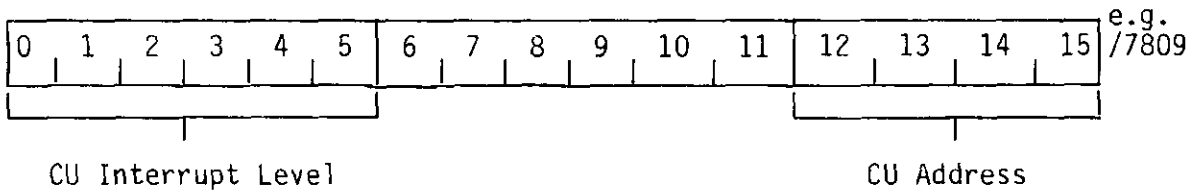
2) SWITCH ON RTC
   Load scratch discette

3) Press SOP switch 10 if the registers A7, 8, 9, 10 have to be modified.

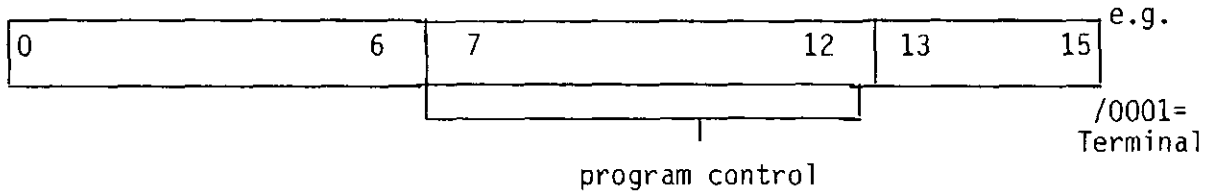
A7



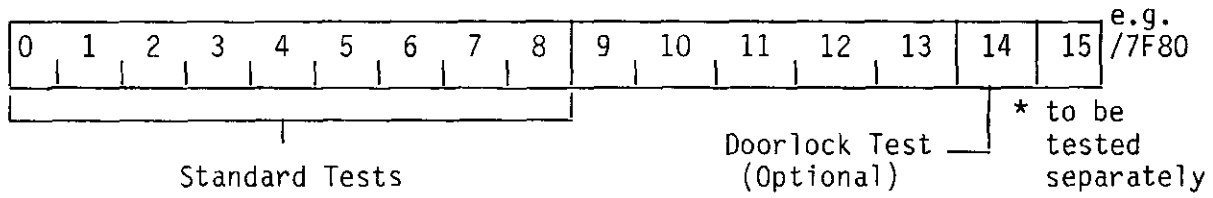
A8



A9



A10



4) Program starts after modification of the registers or after depressing SOP switch 9.
   Error stop: /5F0 is simulated on SOP.

   Interrupts return: /700 is simulated on SOP.
   Information stop: /5E0 is simulated on SOP.

For more information, see detailed description of test-program.

17.6 SHORT ROUTINES

```
                        IDENT    F1SEEK
                      * SEEK TEST FOR F1M-Z (FLOPPY CU 1MB)
                      * SEEKS BETWEEN CYL 00 AND 32
                      * DRIVE 0 ONLY. STATUS IN A5
                      * IF SEEKING, YOU HEAR THE REGULAR MOVEMENT
                      *
                      * REG A4 IS PRESET BIT 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
                      *              /0003   0 0 0 0 0 0 0 0 0  0  0  0  0  1  1
                      *                                        ----------------
                      *                                         SEEK CYLINDER NUMBER
      0009      DA        EQU      9
0000                      RES      /40
0080  FFFF      DATA      DATA     /FFFF
0082  0000                DATA     0
0084  0403      START     LDK      A4,3
0086  207F                HLT
0088  20BF                INH
008A  44C9      RET       CIO      A4,1,DA              SEEK
008C  5C04                RB(4)    *-2
008E  4DC9                SST      A5,DA                STATUS
0090  5C04                RB(4)    *-2
0092  8514                LDR      A5,A5                SET CR ACCORDING STATUS
0094  5104                RF(1)    ST
0096  3480                XRK      A4,/80               CHANGE CYL 00 - 32, ETC
0098  5F10                RB       RET
009A  207F      ST        HLT
                          END      START
```

```
                IDENT    F1LOOP
               *
               * PROGRAM TO WRITE AND READ A SECTOR CONTINUOUSLY (CU 1MB)
               * WRITE BUFFER /200 UP UNTIL /27E
               * READ BUFFER /300 UP UNTIL /37E
               * DRIVE 0 ONLY.  REG A5 CONTAINS STATUS
               *
               *    PRESET A1: BIT 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
               *             /0001  0 0 0 0 0 0 0 0 0  0  0  0  0  0  1
               *              =CIO    -                I-----------I     -
               *                     HEAD              SECTORNO.         WRITE
               *
               *           A2: BIT 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
               *            /C040  1 1 0 0 0 0 0 0 1  0  0  0  0  0  0
               *             =WER1   -              I--------------------I
               *                    WRITE              BLOCK LENGTH
               *
               *           A3: BIT 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
               *            /0200  0 0 0 0 0 0 1 0 0 0  0  0  0  0  0  0
               *             =WER2 I-----------------------------------I
               *                          BUFFER  ADDRESS
               *
               *           A4: BIT 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
               *            /0003  0 0 0 0 0 0 0 0 0 0  0  0  0  0  1  1
               *            =SEEK                  I--------------I
               *                                    CYL NUMBER
               *
               * CHECK CORRECT RUNNING:STOP PROGRAM , COMPARE IF /200 AND ON
               * EQUALS /300 AND ON.
               *    NOTE: DISCETTE FORMAT 0,SS,SD  26 SECTORS,64 WORDS/SECTOR
               * ERROR: STATUS STOP AT /BC (/00BE AT HHP);A5 CONTAINS STATUS WORD
               *
     0009      DA       EQU      9
0000                    RES      /40
0080  FFFF     DATA     DATA     /FFFF
0082  0000              DATA     0
0084  0101     START    LDK      A1,1                PRESET REG
0086  8220              LDKL     A2,/C040
0088  C040
008A  8320              LDKL     A3,/200
008C  0200
008E  0403              LDK      A4,3
0090  207F              HLT
0092  20BF              INH
0094  44C9              CIO      A4,1,9              SEEK
0096  5C04              RB(4)    *-2
0098  4DC9              SST      A5,9                STATUS
009A  5C04              RB(4)    *-2
009C  8514              LDR      A5,A5
009E  511C              RF(1)    ST                  STATUS FAULT
00A0  7212     RET      WER      A2,/12
00A2  7313              WER      A3,/13
00A4  41C9              CIO      A1,1,9              PREPARE WRITE (OR READ)
00A6  5C04              RB(4)    *-2
00A8  4DC9              SST      A5,9                STATUS
00AA  5C04              RB(4)    *-2
00AC  8514              LDR      A5,A5
00AE  510C              RF(1)    ST                  STATUS FAULT
00B0  3101              XRK      A1,1
00B2  8220              XRKL     A2,/4000            CHANGE WRITE TO READ,VICE VERSA
00B4  4000
00B6  8320              XRKL     A3,/0100
00B8  0100
00BA  5F1C              RB       RET
00BC  207F     ST       HLT
                        END      START
```

```
00000                           IDENT    ADJF1M
00001                         *PROGRAM TO ADJUST 1M FLOPPY PTS SYSTEMS
00002                         *
00003                         * AFTER IPL ALL SOP INDICATORS ARE ON
00004                         *
00005                         * LOAD ALIGNMENT FLOPPY IN DRIVE 0
00006                         *
00007                         * PROGRAM SELECTION:
00008                         *   SOP SWITCH 1: ALIGNMENT HEAD 0 (CYLINDER 38)
00009                         *                 2:           HEAD 1
00010                         *                 3: INDEX TO BURST ADJUSTM. HEAD 0 (CYL. 1)
00011                         *                 4:                        HEAD 1
00012                         *              BEFORE NEXT STEP, LOAD A SCRATCH FLOPPY
00013                         *                 5: CYLINDER ZERO ADJUSTMENT (CONT. SEEK BETWEEN CYL 0 AND 1)
00014                         *              BEFORE NEXT STEP, LOAD ALIGNMENT FLOPPY AGAIN
00015                         *                 6: CHECK ALIGNMENT HEAD 0
00016                         *                 7:                 HEAD 1
00017                         *
00018                         *    8, 9 AND 10: STOP, UNLOAD THE HEADS
00019                         *
00020                         * FLASHING SOP INDICATOR WHEN TEST RUNS
00021                         *
00022                         ************************************************************
00023  0000                             RES      /40
00024  0080  FFFF                       DATA     /FFFF,0
       0082  0000
00025        0009              ADR      EQU      9
00026  0084  208F              START    INH
00027  0086  41EE                       CIO      A1,1,/2E                 START SOP CU
00028  0088  8320                       LDKL     A3,/7FF
       008A  07FF
00029  008C  432E                       OTR      A3,0,/2E                 ALL SOP INDIC. ON
00030  008E  492E              INPUT    INR      A1,0,/2E                 INPUT SWITCH FROM SOP
00031  0090  5C04                       RB(NA)   *-2
00032  0092  4FC9                       SST      A7,ADR                   RESET READY INT JUST IN CASE
00033  0094  3962                       SRL      A1,2
00034  0096  21FE                       ANK      A1,/FE                   MASK SOP SW 1-7
00035  0098  580C                       RB(Z)    INPUT                    WRONG SWITCH
00036  009A  217E                       ANK      A1,/7E                   SW1 ?
00037  009C  5018                       RF(Z)    PROG1
00038  009E  218E                       ANK      A1,/8E                   SW2 ?
00039  00A0  5026                       RF(Z)    PROG2
00040  00A2  210E                       ANK      A1,/DE                   SW3 ?
00041  00A4  502C                       RF(Z)    PROG3
00042  00A6  21EE                       ANK      A1,/EE                   SW4 ?
00043  00A8  503A                       RF(Z)    PROG4
00044  00AA  21F6                       ANK      A1,/F6                   SW5 ?
00045  00AC  503E                       RF(Z)    PROG5
00046  00AE  21FA                       ANK      A1,/FA                   SW6 ?
00047  00B0  5050                       RF(Z)    PROG6
00048                         *
00049                         *****HEAD 1 ALIGNMENT CHECK*****
00050                         *
00051  0082  0110              PROG7    LDK      A1,/10                   SOP INDIC. 7
00052  0084  5716                       RF       PROG2+4
00053                         *
00054                         *****HEAD 0 ALIGNMENT*****
00055                         *
00056  0086  8120              PROG1    LDKL     A1,/400                  SOP INDIC. 1
       0088  0400
00057  00BA  0200                       LDK      A2,0                     READ HEAD 0
00058  00BC  049B                       LDK      A4,/9B                   SEEK CYL 38
00059  00BE  44C9                       CIO      A4,1,ADR                 EXEC SEEK COMM
00060  00C0  4FC9                       SST      A7,ADR
00061  00C2  5C04                       RB(NA)   *-2
00062  00C4  42C9                       CIO      A2,1,ADR                 EXEC READ COMM
00063  00C6  573E                       RF       SOP
00064                         *
00065                         *****HEAD 1 ALIGNMENT*****
00066                         *
00067  00C8  8120              PROG2    LDKL     A1,/200                  SOP INDIC 2
       00CA  0200
00068  00CC  8220                       LDKL     A2,/4000                 READ HEAD 1
       00CE  4000
00069  00D0  5F16                       RB       PROG1+6
00070                         *
00071                         *****INDEX TO BURST HEAD 0 ADJUST*****
00072                         *
00073  00D2  8120              PROG3    LDKL     A1,/100                  SOP INDIC 3
       00D4  0100
00074  00D6  0200                       LDK      A2,0                     READ HEAD 0
00075  00D8  0407                       LDK      A4,7                     SEEK CYL 1
00076  00DA  44C9                       CIO      A4,1,ADR
00077  00DC  4FC9                       SST      A7,ADR
00078  00DE  5C04                       RB(NA)   *-2
00079  00E0  42C9                       CIO      A2,1,ADR                 READ
00080  00E2  5722                       RF       SOP
00081
```

```
00082                   *****INDEX TO BURST CHECK HEAD 1*****
00083                   *
00084  00E4  0180      PROG4    LDK       A1,/80              SOP INDIC 4
00085  00E6  8220               LDKL      A2,/4000            READ HEAD 1
       00E8  4000
00086  00EA  5F14               RB        PROG3+6
00087                   *
00088                   *****CYLINDER 0 ADJUSTMENT*****
00089                   *
00090  00EC  0240      PROG5    LDK       A2,/40              SOP INDIC 5
00091  00EE  0403               LDK       A4,3                SEEK CYL 0
00092  00F0  44C9               CIO       A4,1,ADR
00093  00F2  4FC9               SST       A7,ADR
00094  00F4  5C04               RB(NA)    *-2
00095  00F6  340C               XRK       A4,/C               SEEK CYL 3, 0, 3, ETC.
00096  00F8  422E               OTR       A2,0,/2E
00097  00FA  3240               XRK       A2,/40              FLASHING SOP INDIC 5
00098  00FC  492E               INR       A1,0,/2E            SOP SW PRESSED?
00099  00FE  5C10               RB(NA)    PROG5+4             IF NOT DO NEXT SEEK
00100  0100  5F70               RB        INPUT+4             NEXT STEP
00101                   *
00102                   *****HEAD 0 ALIGNMENT CHECK*****
00103                   *
00104  0102  0120      PROG6    LDK       A1,/20              SOP INDIC 6
00105  0104  5F4C               RB        PROG1+4
00106                   *
00107                   *****SOP CONTROL SUBROUTINE*****
00108                   *
00109  0106  0680      SOP      LDK       A6,/80              DELAY
00110  0108  8304               LDR       A3,A1
00111  010A  820C               XRR       A2,A3               INVERT PROG. NO INDICATION
00112  010C  422E               OTR       A2,0,/2E
00113  010E  E718               ECR       A7,A6               PREPAIR DELAY
00114  0110  1F01               SUK       A7,1
00115  0112  5E04               RB(6)     *-2                 DELAY LOOP
00116  0114  492E               INR       A1,0,/2E            ANY SOP SW PRESSED?
00117  0116  5C0E               RB(NA)    SOP+4               IF NOT CHANGE INDICATOR AND WAIT
00118  0118  5F88               RB        INPUT+4
00119                           END       START
```

```
00000                          IDENT    COPYF1                (PTS  10-10-85)
00001                  *
00002                  *  COPY PROGR FROM DRIVE  0 TO 1 ON 1M-CU
00003                  *   0.25 DISCETTES ONLY
00004                  *
00005        0003      DA       EQU      3
00006  0000            RES      /40
00007  0080  FFFF      DATA     /FFFF,0
       0082  0000
00008  0084  20BF      START    INH
00009  0086  207F               HLT
00010  0088  87A0               LDKL     A15,/180              STACK
       008A  0180
00011  008C  0700               LDK      A7,0                  RESET DDAM FLAG
00012  008E  0100               LDK      A1,0                  SELECT HEAD 0
00013                  *********SEEK**********
00014  0090  0403      HEAD     LDK      A4,3                  CYL 0
00015  0092  44C3      NXTCY    CIO      A4,1,DA               SEEK
00016  0094  F7A1               CF       A15,STATUS
       0096  00E4  R
00017  0098  4403               CIO      A4,1,DA+/10
00018  009A  F7A1      CF       CF       A15,STATUS
       009C  00E4  R
00019                  **********READ**********
00020  009E  8220               LDKL     A2,/8340
       00A0  8340
00021  00A2  7206               WER      A2,DA+DA
00022  00A4  8320               LDKL     A3,/200               DATA BUF ADDR
       00A6  0200
00023  00A8  7307               WER      A3,DA+DA+1
00024  00AA  41C3               CIO      A1,1,DA               READ FROM DRIVE 0
00025  00AC  F7A1               CF       A15,STATUS
       00AE  00E4  R
00026                  **********WRITE*********
00027  00B0  8220               LDKL     A2,/C340
       00B2  C340
00028  00B4  7206               WER      A2,DA+DA
00029  00B6  7307               WER      A3,DA+DA+1
00030  00B8  1101               ADK      A1,1                  CHANGE READ TO WRITE
00031  00BA  4103               CIO      A1,1,DA+/10
00032  00BC  F7A1               CF       A15,STATUS
       00BE  00E4  R
00033                  *********VERIFY**********
00034  00C0  7206               WER      A2,DA+DA
00035  00C2  7307               WER      A3,DA+DA+1
00036  00C4  B120               XRKL     A1,/400
       00C6  0400
00037  00C8  4103               CIO      A1,1,DA+/10
00038  00CA  F7A1               CF       A15,STATUS
       00CC  00E4  R
00039                  *******
00040  00CE  B120               XRKL     A1,/401               RESET FOR READ
       00D0  0401
00041  00D2  1401               ADK      A4,1
00042  00D4  EC20               CWK      A4,/133               CYL 76?
       00D6  0133
00043  00D8  5A48               RB(2)    NXTCY
00044  00DA  9120               ADKL     A1,/4000              HEAD 1
       00DC  4000
00045  00DE  5950               RB(1)    HEAD
00046  00E0  207F               HLT
00047  00E2  5F5E               RB       START+2
00048                  *
00049                  *
00050  00E4  4DC3      STATUS   SST      A5,DA
00051  00E6  5C04               RB(4)    *-2
00052  00E8  A520               ANKL     A5,/0F07
       00EA  0F07
00053  00EC  5002               RF(0)    RTN
00054  00EE  207F               HLT                            BIT 4=DDAM OTHER BITS MEAN ERROR
00055                  *     IN CASA OF DDAM CONTINUE IS POSSIBLE, BUT DDAM SIGN IS NOT COPIED
00056  00F0  F03E      RTN      RTN      A15
00057                  END      END
```

```
00000                          IDENT    READF1                (PTS  10-10-85)
00001                  *
00002                  *  READ CHECK ON IDENTIFIERS AND DATA
00003                  *   0.25 DISCETTES AND 1M (26 SECTORS)
00004                  *
00005          0009    DA       EQU      9
00006                  *
00007                  *  START BY SOP SWITCH
00008                  *  STATUS BITS DISPLAYED ON SOP:
00009                  *
00010                  *   SOP IND.NO     MEANING
00011                  *         1        SECTOR NOT FOUND
00012                  *         2        SEEK ERROR
00013                  *         3        -
00014                  *         4        -
00015                  *         5        -
00016                  *         6        RETRY
00017                  *         7        -
00018                  *         8        -
00019                  *         9        DATA ERROR
00020                  *        10        THROUGHPUT ERROR
00021                  *        11        NOT OPERABLE
00022                  *  NO INDICATOR MEANS DDAM FOUND: CONTINUE
00023                  *
00024                  *
00025  0000                    RES      /40
00026  0080  FFFF              DATA     /FFFF,0
       0082  0000
00027  0084  20BF       CIOS   INH
00028  0086  47EE              CIO      A7,1,/2E              START SOP
00029  0088  4F2E              INR      A7,0,/2E              WAIT FOR SOP INTERRUPT
00030  008A  5C04              RB(4)    *-2
00031  008C  87A0              LDKL     A15,/180              STACK
       008E  0180
00032  0090  4DC9              SST      A5,DA
00033  0092  0100              LDK      A1,0                  SELECT HEAD 0
00034                  *********SEEK**********
00035  0094  0403       HEAD   LDK      A4,3                  CYL 0
00036  0096  44C9       NXTCY  CIO      A4,1,DA               SEEK
00037  0098  F7A1              CF       A15,STATUS
       009A  00BE  R
00038                  *********READ**********
00039  009C  8220              LDKL     A2,/8DDD
       009E  8DDD
00040  00A0  7212              WER      A2,DA+0A
00041  00A2  8320              LDKL     A3,/200               DATA BUF ADDR
       00A4  0200
00042  00A6  7313              WER      A3,DA+DA+1
00043  00A8  41C9              CIO      A1,1,DA               READ FROM DRIVE 0
00044  00AA  F7A1              CF       A15,STATUS
       00AC  00BE  R
00045  00AE  1404       ON     ADK      A4,4                  NEXT CYL
00046  00B0  EC20              CWK      A4,/133               CYL 76?
       00B2  0133
00047  00B4  5A20              RB(2)    NXTCY
00048  00B6  9120              ADKL     A1,/4000              HEAD 1
       00B8  4000
00049  00BA  5928              RB(1)    HEAD
00050  00BC  5F38              RB       CIOS+2                READ FINISHED
00051                  *
00052  00BE  4DC9       STATUS SST      A5,DA
00053  00C0  5C04              RB(4)    *-2
00054  00C2  A520              ANKL     A5,/0E27
       00C4  0E27
00055  00C6  500C              RF(D)    RTN
00056  00C8  452E              OTR      A5,0,/2E              STATUS TO SOP (/000=DDAM,CONTINUE!)
00057  00CA  4F2E              INR      A7,0,/2E              WAIT FOR SOP INTERRUPT
00058  00CC  5C04              RB(4)    *-2
00059  00CE  8720              LDKL     A7,/780               CLEAR SOP OUTPUT TO/FDD
       00D0  0780
00060  00D2  472E              OTR      A7,0,/2E
00061                  * CONTINUE AFTER DDAM (A5=/800) MEANS DDAM IS NOT COPIED
00062  00D4  F03E       RTN    RTN      A15
00063                          END      CIOS
```