

**GENERALITIES** 1

**INSTALLATION** 2

**OPERATING PROCEDURES** 3

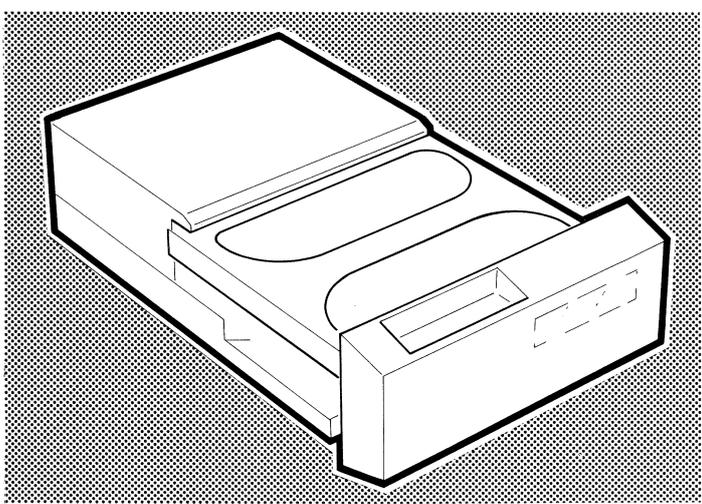
**FAULT DIAGNOSIS** 4

**MAINTENANCE PROCEDURES** 5

**PARTS CATALOG** 6

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**GENERALITIES** 1

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### 1.1 GENERAL DESCRIPTION

- The D 120 disk drive is a removable disk, moving head unit of 10 Megabytes storage capacity.
- Read and write operations are effected by 2 moving heads which ride on a air cushion over the surface of the disk.
- Head displacement is effected by a voice coil linear motor.
- Head position is monitored by servo information recorded on each track at the beginning of each sector, intermixed with the recorded data blocks.
- The disk rotates at 3600 rpm, using a brushless D.C. motor with electronic commutation provided by 2 hall effect chips. The disk angular origin is indicated by an index mark timing pulse, obtained, each revolution, from a magnetic index transducer.
- Each track is electrically divided in equal length sectors. The beginning of each sector is indicated by a sector mark timing pulse obtained from the prerecorded information in the servo zone on the disk and read by the read head.
- The disk drive contains clock and data recovery circuits allowing data exchange at the interface in NRZ code. Data recording mode is MFM.
- The removable disk is contained in a rigid, lightweight, dustproof cartridge. The cartridge is front loaded into the disk drive.
- Disk dust proofing is maintained, during operation, by a self generated filtered air circulation.
- Heads are loaded by action of a solenoid. Heads are immediately unloaded in the case of loss of rotation speed or power.
- The disk drive connects to the host system through two interface cables (to the controller) and one power cable (to the power supply).

### 1.2 PHYSICAL DESCRIPTION

See Section 6, Figure 6-1 - 6-2 - 6-3.

### 1.3 PHYSICAL CHARACTERISTICS (See Figure 1.1)

Size and weight :	Width	: 311 mm	12.25 in.
	Height	: 142 mm	5.60 in.
	Depth	: 534.5 mm	21.04 in.
	Weight	: 18 kg	39.6 lb.

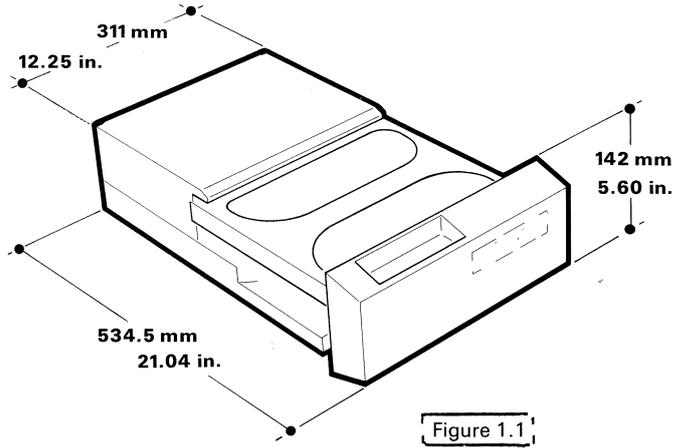


Figure 1.1

### 1.4 PERFORMANCE

- Access time
  - Average latency time : 8.3 millisecond
  - Head positioning
    - track to track : 15 millisecond
    - average : 65 millisecond
- Data storage capacity
  - The usable capacity is 10 Megabytes formatted data.

1.2

### 1.5 RECORDING PARAMETERS

Number of tracks per surface	: 392
Number of sectors per track	: 50
Data bytes per sector (formatted)	: 256
Recording density	: 4750 BPI
Track density	: 508 TPI
Transfer rate	: 920 Kbytes/sec.
Disk rotation speed	: 3600 rpm.
Disk rotation time	: 16.7 millisecond.

### 1.6 ENVIRONMENT

- The drive can operate in a normal office environment without air conditioning. The main environment parameters are given below :
  - Temperature range - dry bulb : 15° to 40° C (59° to 104° F)
  - Temperature gradient/hour : 5° C (9° F)
  - Relative humidity : 8% to 80%
  - Humidity gradient/hour : 20
  - Atmospheric pressure range : 562 to 780 mmHg

### 1.7 POWER REQUIREMENTS

+ 35 VDC + 10% -15%	: 1.4 A. nominal	} Motor supply
	: 6.5 A. surge during 20 sec.	
- 12 VDC ± 5%	: 1.0 A. nominal	} Analogic Supplies
+ 12 VDC ± 5%	: 1.0 A. nominal	
+ 5 VDC + 5% - 3%	: 4.35 A. nominal	} Logic supply

### 1.8 POWER CONSUMPTION

Average power consumption	: 100 W
During start up	: 280 W

### 1.9 CARTRIDGE DESCRIPTION (See Figure 1.2)

The D 120 disk drive uses a M 4120 cartridge or any qualified cartridge allowing the same performance. The cartridge contains one industry standard disk of 10.5 in. diameter, oxide coated on both sides. The disk is pre-recorded with head servo data, track address, address parity and a defective sector flag, and is supplied ready for use.

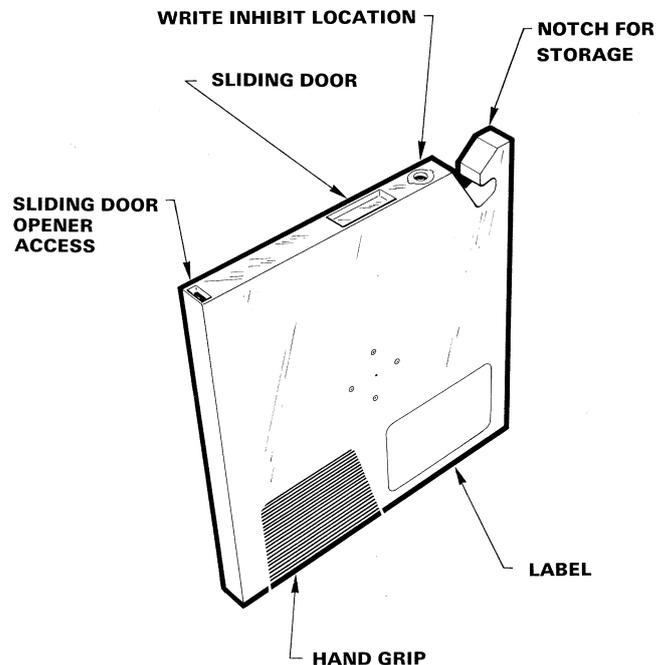
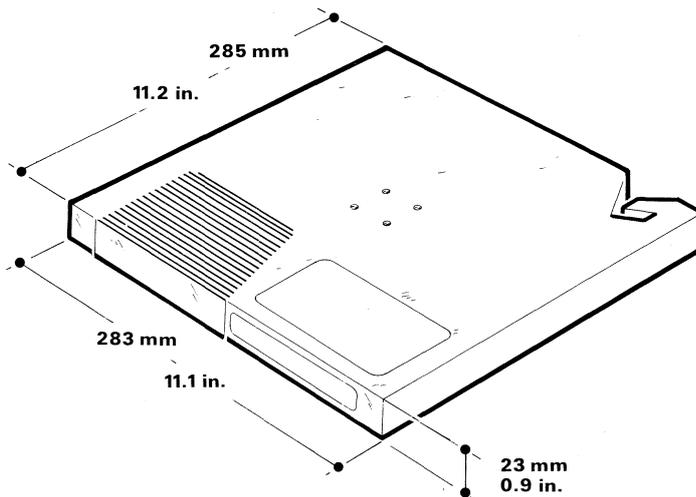


Figure 1.2

1.3

Physical characteristics (Figure 1.3) :

- Width : 283 mm 11.1 in.
- Depth : 285 mm 11.2 in.
- Thickness : 23 mm 0.9 in.
- Weight : 1.3 kg 2.8 lb



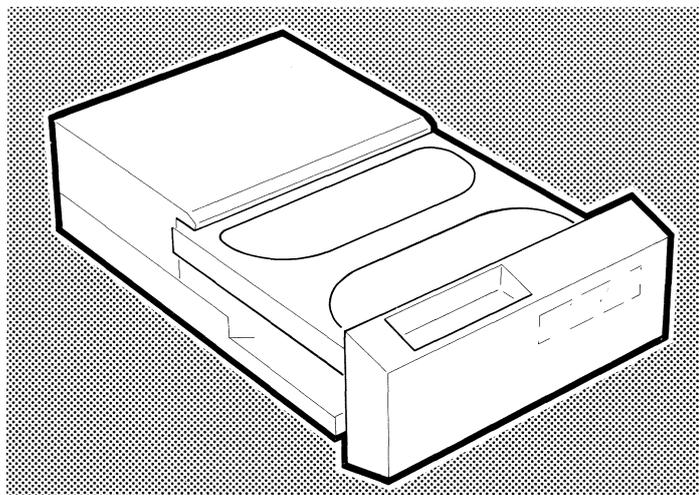
**WARNING**

*The cartridge must be kept away from dust, grease, shocks, and abrasive or sharp objects. In addition, proximity of a significant magnetic field can erase recorded data and make the cartridge unfit for use. Particular attention should be given to the cleanliness of the sliding door window, and of the circular opening. The metallic disk must be kept away from any shock.*

Figure 1.3

1.4

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**INSTALLATION**

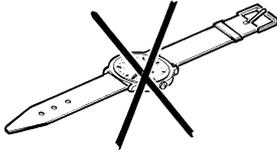
2

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2.1

### WARNING

Do not bring wrist watches near the voice coil magnet as they risk being damaged.



## 2.1 UNPACKING

— The drive unpacking is assumed to have been done according to the unpacking instruction sheet located in the pocket outside.

If external or internal damage is observed, tell the appropriate reserves to the transporter.

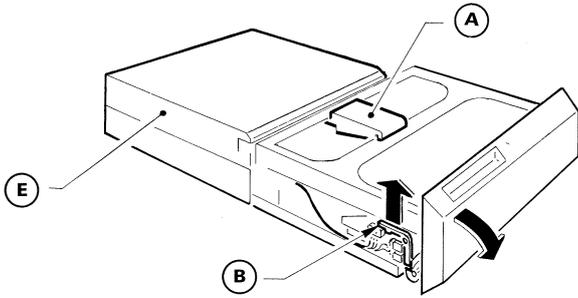


Figure 2.1.a

## 2.2 SHIPPING PARTS REMOVING

- Remove part A (Figure 2.1.a)
- Lift up latch B and open the front door (Figure 2.1.a)
- Remove cover E (2 screws)
- Remove the rubber bands (C) which maintain the carriage during transportation (Figure 2.1.b).

### NOTE

Conserve the shipping parts any for eventual use.

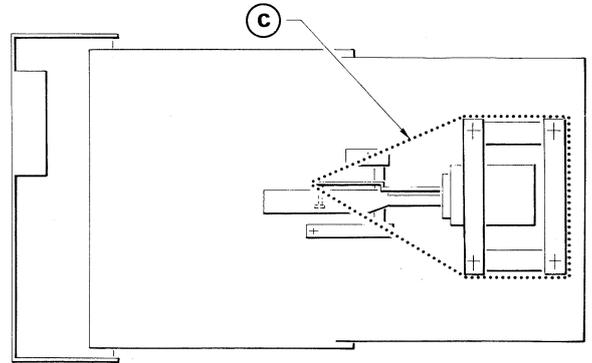


Figure 2.1.b

2.2

## 2.3 INSTALLATION

- Table top
- Rack :  
The rack mounting model may be installed in a 19 inch standard rack.  
It is possible to mount the drive either vertically (Figure 2.2.a) or horizontally (Figure 2.2.b and 2.2.c).

- ① ② ③ Fixing points for vertical mounting
- ④ ⑤ ⑥ Fixing points for horizontal mounting

### NOTE

The bracket 2 is supplied in a bag with the disk drive. Mounting as shown in figure 2.2.d.

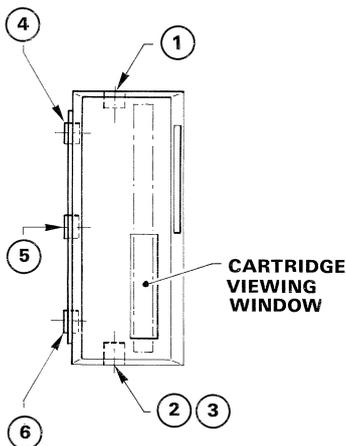


Figure 2.2.a

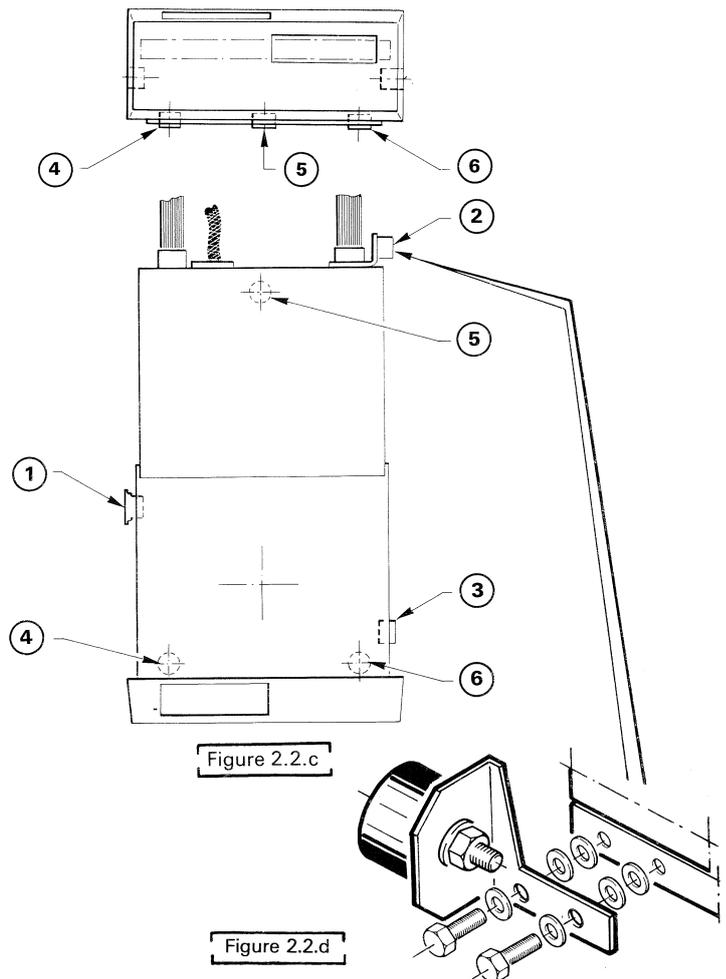


Figure 2.2.c

Figure 2.2.d

2.3

## 2.4 CONNECTION

The disk drive connects through three cables (Figure 2.3)

- One power connector J02
- Two logic interface connectors J01 and J04.

## 2.5 VISUAL INSPECTION

Front door locking : that the Front door is locked when the coil is de-energized.

- Cables : no folds, not cut or broken, connectors fully plugged in.
- Carriage : moves easily and noiselessly, rollers not jammed (front door closed).  
Moves backward when opening the front door.  
Moves forward when closing the front door.
- Motor : Rotate the motor by hand. It must turn freely.
- Boards : Check of any possible damage.

## 2.6 PRELIMINARY TEST

- Set the drive POWER ON (refer to system manual).
- Insure that the "CARTRIDGE ACCESS" is given by the system (refer to system manual).
- Insert a cartridge (refer to section 3 "Operating Procedures").
- Run the test according to the procedure detailed in the system manual.

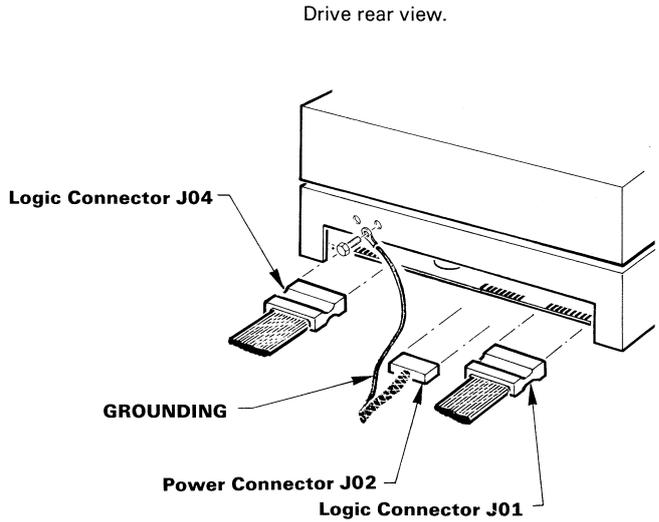
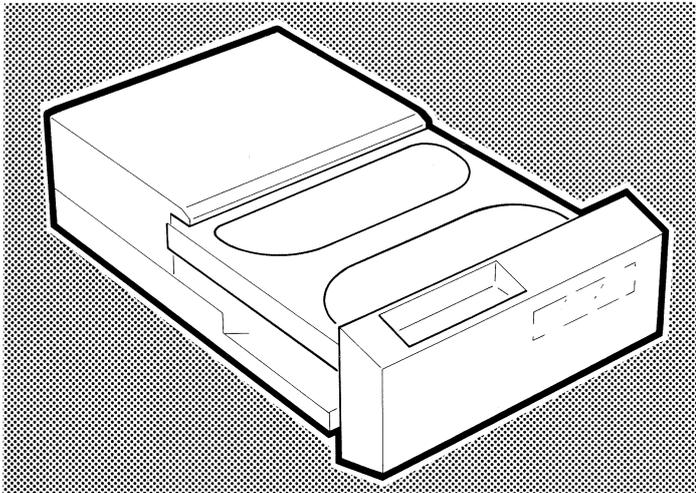


Figure 2.3

2.4

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OPERATING PROCEDURES

3

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3.1

### 3.1 GENERAL

No operator control or indicator exists on the disk drive, except the front door and the write protection tag on each cartridge.

Controls and indicators are located on the system, and are system specific (refer to system manual).

### 3.2 CARTRIDGE HANDLING

Cartridge must be handled carefully for both : operation on disk and storage.

Cartridge Description, see Section 1, Figure 1.2.

### 3.3 POWER UP/DOWN

No power command or indicator exists on the disk drive. Power is supplied either by the system, or by a separate power supply (refer to system manual). Note that the drive front panel cannot be opened if the drive is not powered up.

### 3.4 START THE DISK DRIVE

Use the start control or procedure defined at system level (refer to system manual).

Note that, once the start function has been initialized, it takes about 25 seconds for the disk drive to reach its READY state, after which data exchange can operate under the control of the processor.

### 3.5 STOP THE DISK DRIVE

Use the stop control or procedure defined at system level (refer to system manual).

Note that, once the stop function has been initialized data exchange with the processor is immediately interrupted and that it takes about 25 seconds for the disk drive to reach its steady state (disk no longer rotating).

This condition is mandatory for following access to the cartridge and is visible at system level.

#### WARNING

*The cartridge must be kept away from dust, grease, shocks and abrasive or sharp objects.*

*In addition, proximity of a significant magnetic field can erase recorded data and make the cartridge unfit for use.*

*Particular attention should be given to cleanliness of the cartridge, and of the circular window. The metallic disk must be kept away from any shock.*

#### WARNING

*In case of power loss, the disk rotation cannot be braked and the stop function can take up to seven minutes to be completed.*

*For that reason, NEVER try to open the disk front panel if not authorized by the "CARTRIDGE ACCESS" function explained in par. 3.6.*

3.2

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### 3.6 CARTRIDGE ACCESS

The possibility for the operator to access the cartridge is indicated by the system through a "CARTRIDGE ACCESS" indicator or procedure (refer to system manual).

When the "CARTRIDGE ACCESS" function is not present, the disk front door is mechanically locked and cannot be opened.

### 3.7 REMOVING THE CARTRIDGE

Check that the "CARTRIDGE ACCESS" function is fulfilled (refer to system manual).

Open the disk drive front door.

Pull out the cartridge from its receptacle (Figure 3.1) and place it in a safe environment.

### 3.8 INSERTING THE CARTRIDGE

The disk drive front door is assumed open. If not, use the procedure described above.

Insert and push the cartridge into its receptacle.

The metal ring must be placed underneath (if drive in horizontal position) or at left. (If drive in vertical position).

The cartridge hook must be placed at the forward right corner (or forward bottom corner if drive in vertical position).

Close the door in order to complete cartridge insertion. (Figure 3.2).

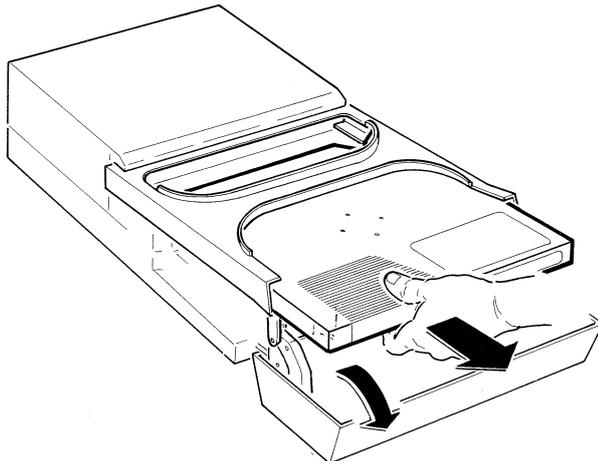


Figure 3.1

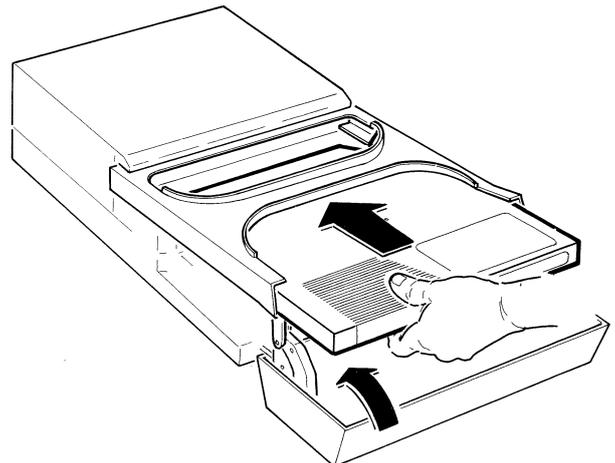


Figure 3.2

3.3

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3

### 3.9 WRITE PROTECTION

If the write protection option is installed on the disk drive, it can be used, at cartridge level, as indicated Figure 3.3.

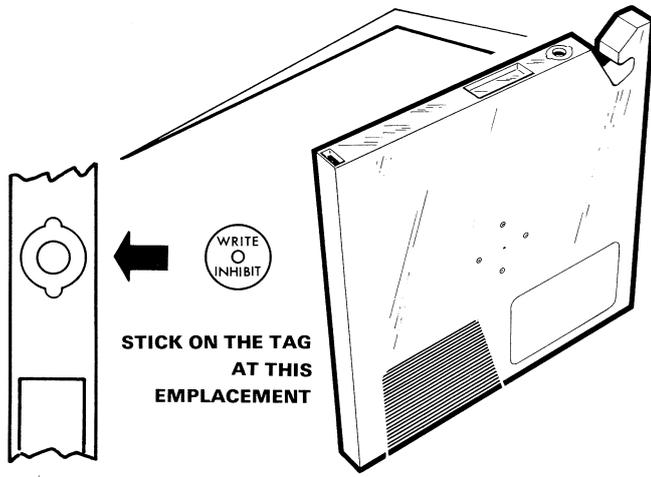
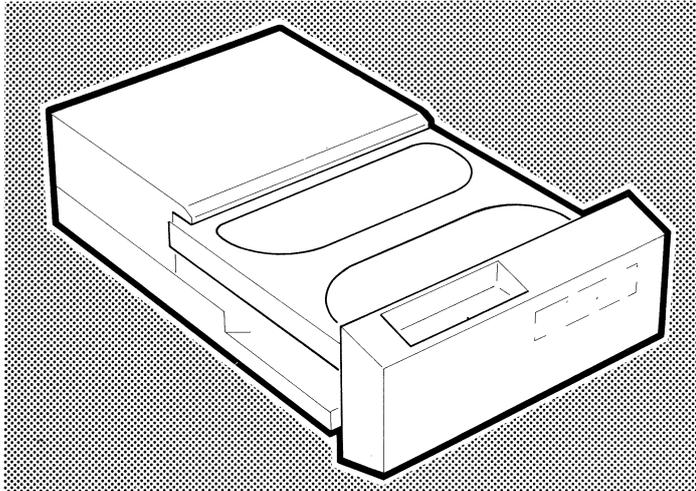


Figure 3.3

3.4

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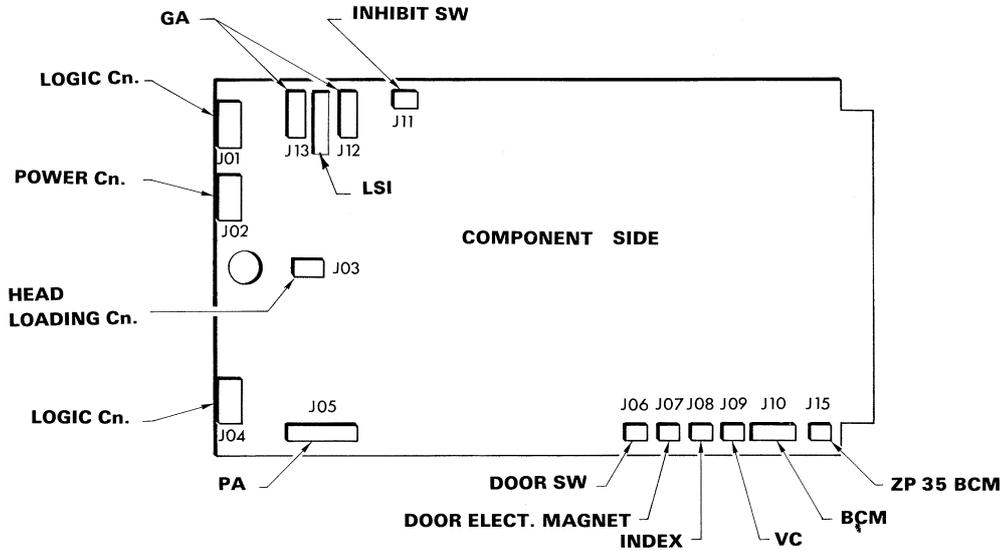
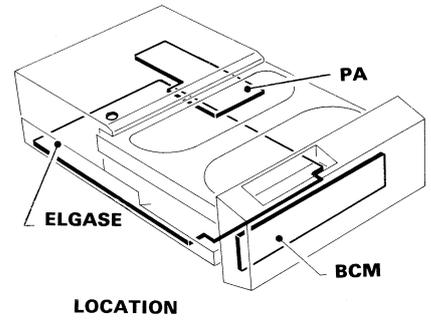


FAULT DIAGNOSIS

4

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4.1



4.2

### 4.1 FAULT DIAGNOSIS

#### Material required

- Multimeter
- Mini hook jump
- Staple

#### Definitions

- S = Statement
- Q = Question
- A = Action

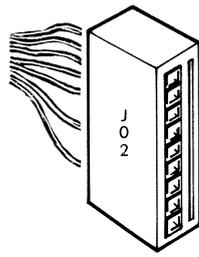
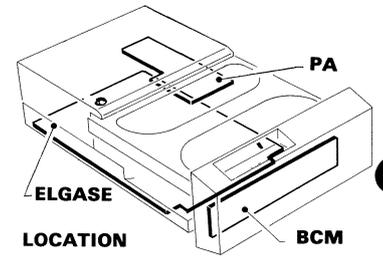
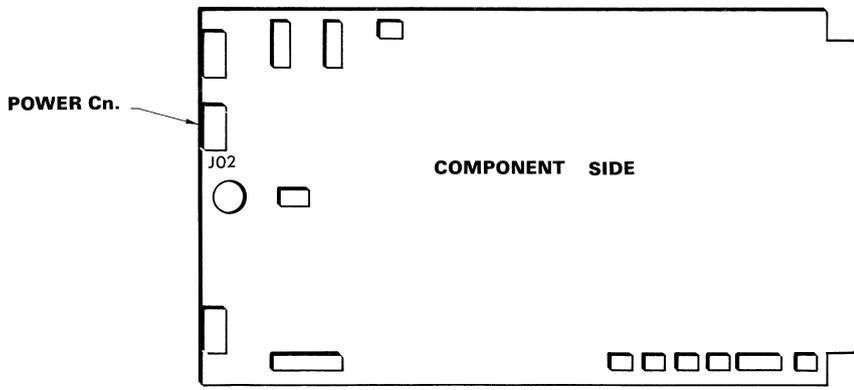
"0" = 0 to 0.4v  
 "1" = 2.8 to 5.25v

#### MAJOR DIAGNOSIS

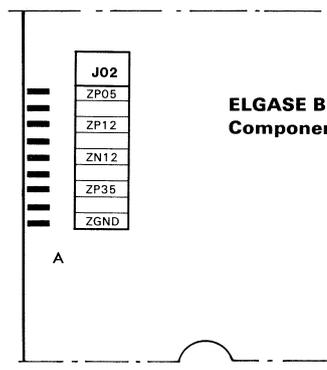
LABEL No	SYMBOL S/Q/A	MANIPULATION	IF YES GO TO	IF NO GO TO
10	A	Power up the drive (refer to system manual)		
20	Q	Is front door unlocked ?	30	GO TO routine 1000
30	A	Start the drive (refer to system manual)		
40	Q	Is front door locked ?	50	GO TO routine 2000
50	Q	Is motor running ?	60	GO TO routine 2000
60	Q	Do heads load, 20 sec. after start ?	70	GO TO routine 2000
70	Q	Does the carriage go to track zero, 3 sec. after head loading and does it stabilize on it ?	80	GO TO routine 3000
80	Q	Is the drive in ready state without FAULT ? (refer to system manual)	Ready for use	GO TO routine 3000 Label No 3160

Note : For other tests, refer to System Manual.

4.3



SIGNAL
ZP05
ACCESS
ZP12
RUN
ZN12
ZP35
ZGND
ZGND



**ELGASE BOARD  
Component Side**

4.4

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**INITIALIZATION TEST  
POWER TEST**

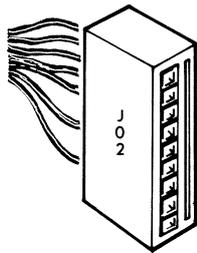
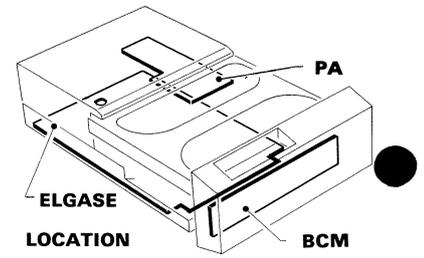
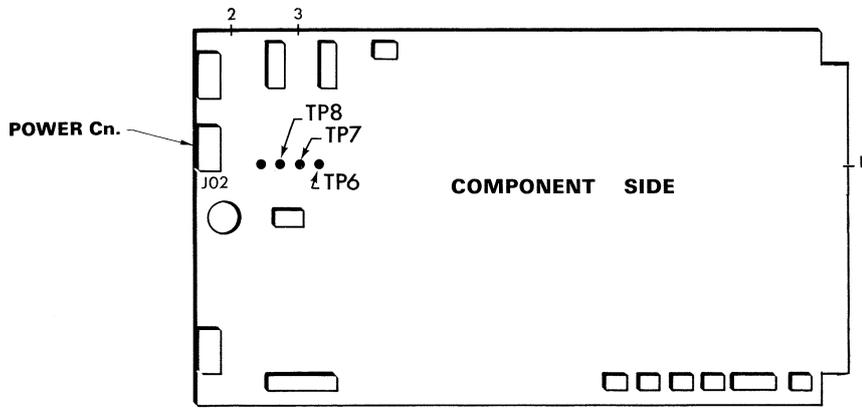
Routine 1000

LABEL No	SYMBOL S/Q/A	MANIPULATION	IF YES GO TO	IF NO GO TO
1000	A	Set drive power on, drive in stop state (RUN="at" 1")		
1010	A	Main power test	GO TO routine	1200
1020	S	Failure on voltage supply	GO TO routine	1200
1030	Q	Is front door unlocked ?	1050	1040
1040	S	Failure on front door solenoid or its command.	GO TO routine	1400
1050	Q	Is carriage free ?	2000	1060
1060	S	Failure on mechanism or Voice Coil command.	GO TO routine	1600

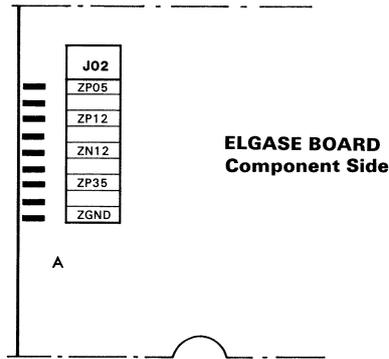
4.5

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4



SIGNAL
ZP05
ACCESS
ZP12
RUN
ZN12
ZP35
ZGND
ZGND



4.6

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MAIN POWER TEST

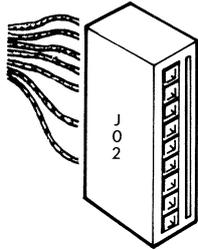
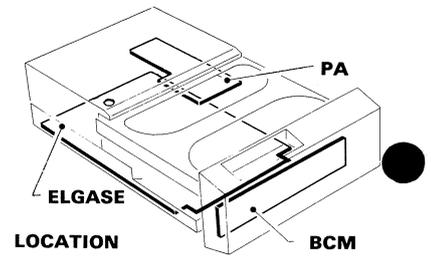
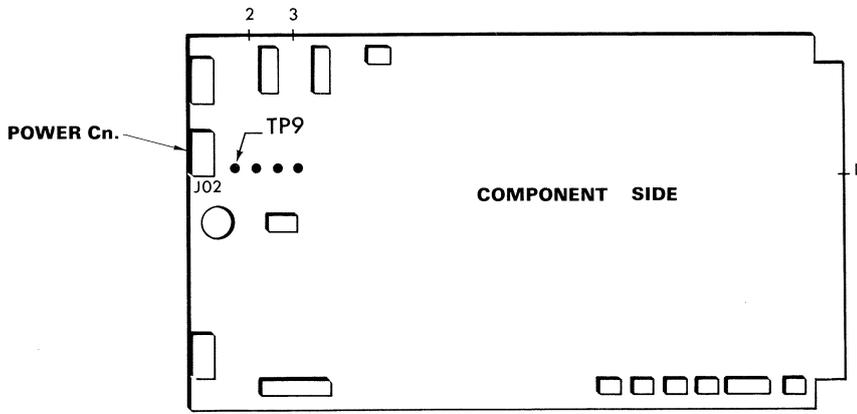
Routine 1200

LABEL No	SYMBOL S/Q/A	MANIPULATION	IF YES GO TO	IF NO GO TO
1200	Q	+4.85<V<+5.25 on J02-ZP05-TP07 ?	1250	1210
1210	A	Set drive power off		
	A	Disconnect J02		
1220	A	Check power supply (refer to system procedure)		
1230	Q	+5V on power supply ?	1240	1395
1240	S	Failure at drive level, short circuit on +5V		
1250	Q	+29.75<V<+38.5 on J02-ZP35-TP06 ?	1300	1260
1260	A	Set drive power off		
	A	Disconnect J02		
1270	A	Check power supply (refer to system procedure)		
1280	Q	+35V on power supply	1290	1395
1290	S	Failure at drive level, short circuit on +35V		
1300	Q	+11.4<V<+12.6 on J02-ZP12-TP08 ?	1350	1310

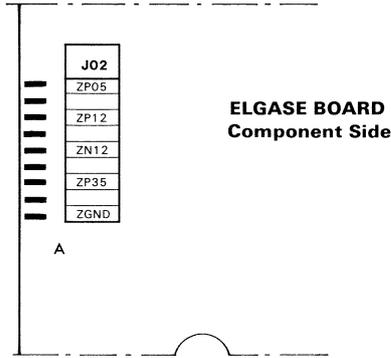
4.7

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4



SIGNAL
ZP05
ACCESS
ZP12
RUN
ZN12
ZP35
ZGND
ZGND



4.8

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MAIN POWER TEST (continued) Routine 1200

LABEL No	SYMBOL S/Q/A	MANIPULATION	IF YES GO TO	IF NO GO TO
1310	A A	Set drive power off Disconnect J02		
1320	A	Check power supply (refer to system procedure)		
1330	Q	+12V on power supply ?	1340	1395
1340	S	Failure at drive level, short circuit on +12 V		
1350	Q	-12.6<V<-11.4 on J02-ZN12-TP09 ?	1395	1360
1360	A A	Set drive power off Disconnect J02		
1370	A	Check power supply (refer to system procedure)		
1380	Q	-12V on power supply ?	1390	1395
1390	S	Failure at drive level, short circuit on -12V		
1395	S	Failure on power supply	END	1030

4.9

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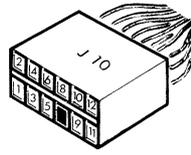
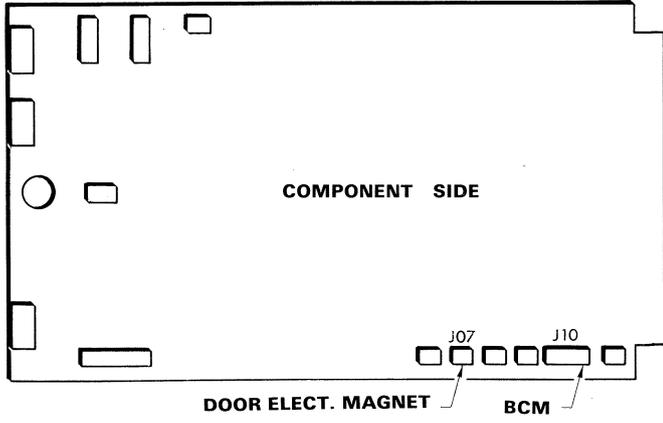
4

CARTRIDGE ACCESS

Routine 1400

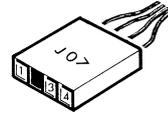
LABEL No	SYMBOL S/Q/A	MANIPULATION	IF YES GO TO	IF NO GO TO
1400	Q	UNLØCK* (J07-01) at "0" ?	1410	1420
1410	S	Failure on front door locking solenoid		END (See Section V)
1420	Q	RUNACT* (J10-08) at "1" ?	1430	1450
1430	Q	MØTMKA (J10-01) at "0" ?	1450	1440
1440	S	Failure on BCM board		END (See Section V)
1450	S	Failure on ELGASE board		END (See Section V)

4



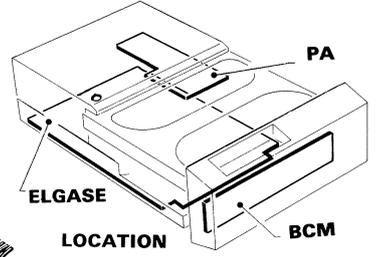
J10

Pin No	SIGNAL
01	MØTMKA
02	TRQCTR
03	ZGND
04	ZGND
05	ZGND
06	ZGND
07	
08	RUNACT*
09	ZP05
10	ZP05
11	ZP05
12	ZP05



J07

Pin No	SIGNAL
01	UNLØCK*
02	
03	
04	ZP05



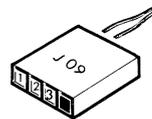
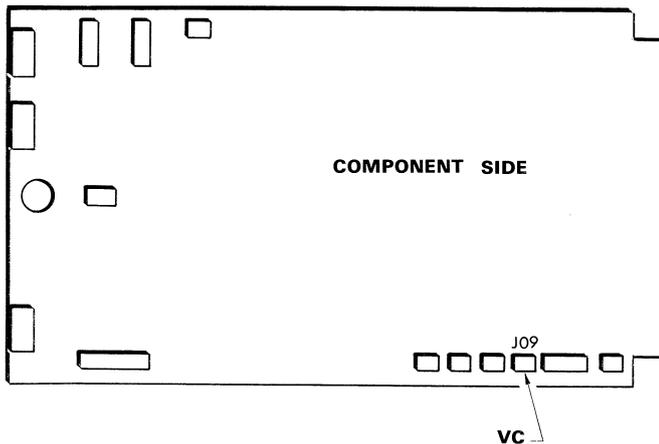
4.10

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VOICE COIL COMMAND

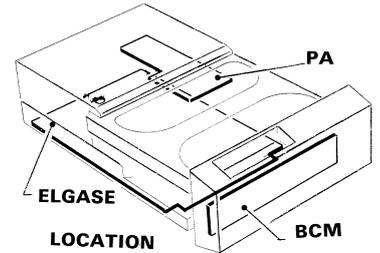
Routine 1600

LABEL No	SYMBOL S/Q/A	MANIPULATION	IF YES GO TO	IF NO GO TO
1600	A	Disconnect J09		
1610	Q	Is carriage free ?	1620	1630
1620	S	Failure on ELGASE board		END (See Section V)
1630	S	Mechanical failure on carriage		END (See Section V)



J09

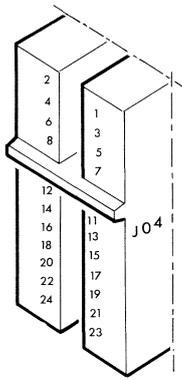
Pin No	SIGNAL
01	ACAFDB
02	ACAØUT
03	
04	



4

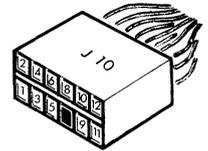
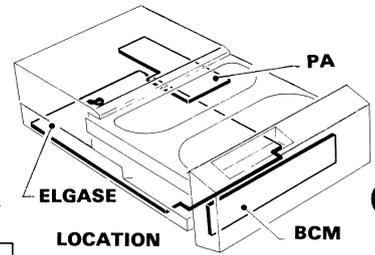
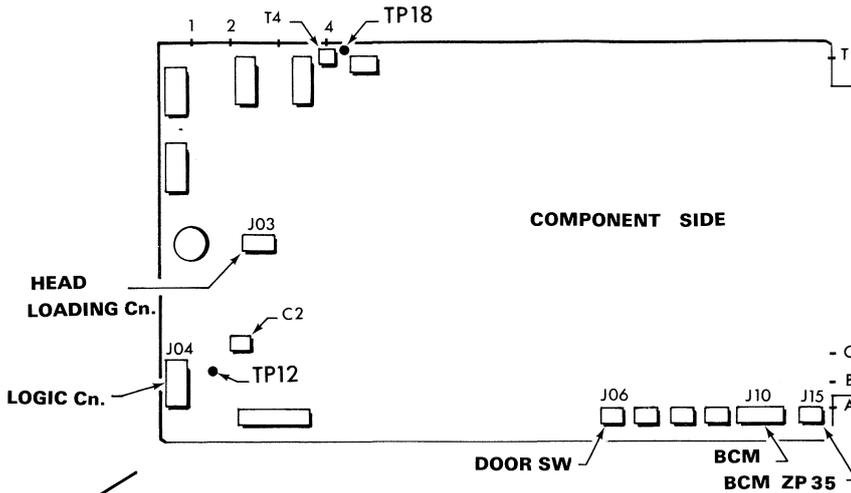
4.11

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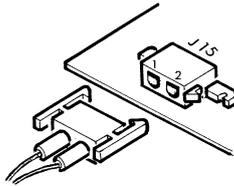
**J04**

Pin No	SIGNAL
01	ZGND
02	WRDATA*
03	ZGND
04	DATCLK*
05	ZGND
06	INDMRK*
07	ADPRTY*
08	SCTMRK*
09	
10	
11	ZGND
12	
13	RDYSRW*
14	RUN*
15	ZGND
16	VALSCT*
17	ZGND
18	FAULT
19	FLTRST*
20	RDENBL*
21	ZGND
22	RDDATA*
23	ZGND
24	WRENBL*



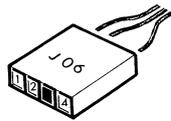
**J10**

Pin No	SIGNAL
01	MOTMKA
02	TRQCTR
03	ZGND
04	ZGND
05	ZGND
06	ZGND
07	
08	RUNACT*
09	ZP 05
10	ZP 05
11	ZP 05
12	ZP 05



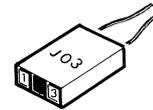
**J15**

Pin No	SIGNAL
01	ZP 35
02	OVP



**J06**

Pin No	SIGNAL
01	LOCKED*
02	ZGND
03	
04	LOCKED



**J03**

Pin No	SIGNAL
01	HDLNG
02	
03	ZGND

4.12

START SEQUENCE TEST

Routine 2000

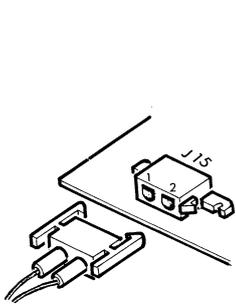
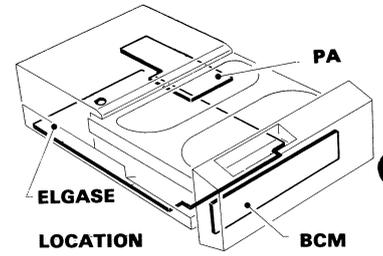
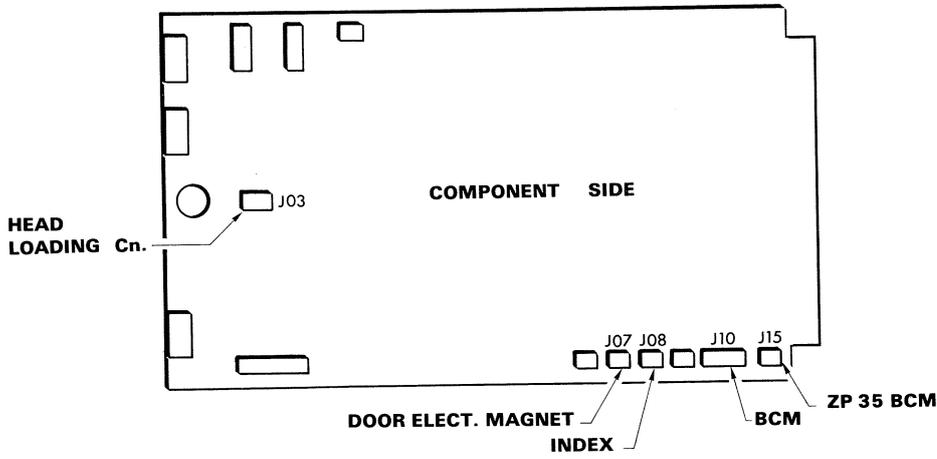
A cartridge is loaded  
Front Door is closed

LABEL No	SYMBOL S/Q/A	MANIPULATION	IF YES GO TO	IF NO GO TO
2000	A	Start the drive		
2010	Q	Is front door locked ?	2030	2020
2020	Q	Is RUN* (TP12) at "0" ?	2230	2040
2030	Q	Is motor running ?	2110	2070
2040	Q	Is RUN* at "0" on system side ?	2060	2050
2050	S	Failure on system		END
2060	S	Failure on J04 cable		END
2070	Q	Is RUNACT* (J10-08) at "0" ?	2090	2080
2080	Q	Is LØCKED (J06-04) at "1" and LØCKED* (J06-01) at "0" ?	2250	2290
2090	Q	Is TRQCTR (J10-02) at 12V ?	2100	2250
2100	Q	Is there + 35V between pins 01 and 02 of J15 (BCM side) ?	2400	2260
2110	Q	Do heads load, 25 sec. after start ?	3000	2120
2120	Q	Is SPDOK (TP18) at "1" ?	2130	2170
2130	A	Disconnect J03		

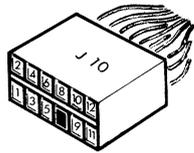
4.13

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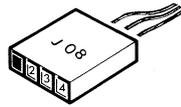
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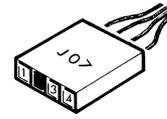
J15	
Pin No	SIGNAL
01	ZP 35
02	OVP



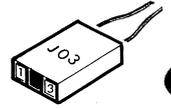
J10	
Pin No	SIGNAL
01	M0TMKA
02	TRQCTR
03	ZGND
04	ZGND
05	ZGND
06	ZGND
07	
08	RUNACT*
09	ZP 05
10	ZP 05
11	ZP 05
12	ZP 05



J08	
Pin No	SIGNAL
01	
02	INDR 2
03	ZGND
04	INDR 1



J07	
Pin No	SIGNAL
01	UNLØCK*
02	
03	
04	ZP 05



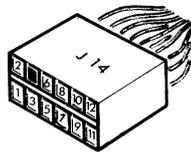
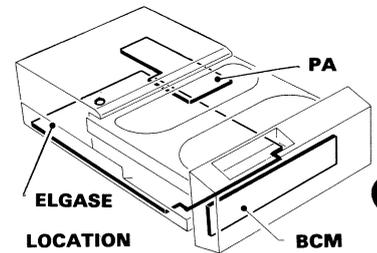
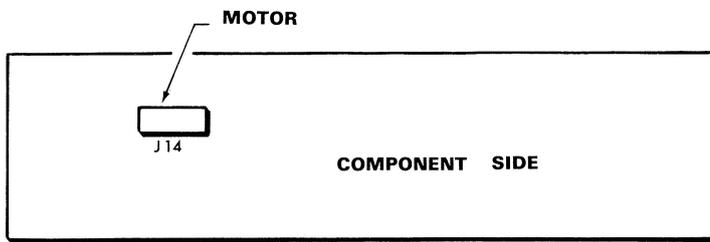
J03	
Pin No	SIGNAL
01	HDLNG
02	
03	ZGND

4.14

START SEQUENCE TEST (continued) Routine 2000

LABEL No	SYMBOL S/Q/A	MANIPULATION	IF YES GO TO	IF NO GO TO
2150	Q	Is resistance between J03-01 and J03-03 cable side about 20 ohms ?	2250	2160
2160	S	Failure on holding solenoid		END (See Section V)
2170	Q	Is TRQCTR (J10-02) about 12V ?	2180	2250
2180	A	Stop the drive, set it power off		
2190	A	Disconnect J08		
2200	Q	Is resistance between J08-04 and J08-02 about 160 ohms ?	2250	2220
2220	S	Failure on Index subassembly		END (See Section V)
2230	Q	Is UNLØCK* (J07-01) at +5V ?	2240	2250
2240	S	Failure on the front door locking solenoid		END (See Section V)
2250	S	Failure on ELGASE board		
2260	Q	Is there + 35V between pins 01 and 02 of J15 (ELGASE board side) ?	2270	2280
2270	S	Failure on J15 cable		END
2280	S	Failure on ELGASE board		END (See Section V)

4.15



J14

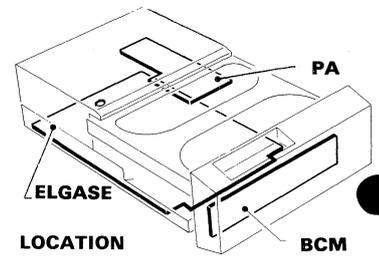
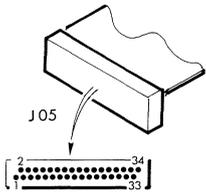
Pin No	SIGNAL
01	ZP 35
02	HLSPLY*
03	ZP 05
04	
05	HLGNB*
06	WNDNGB
07	HLGNB
08	WNDNGB*
09	HLGNA
10	WNDNGA
11	HLGNA*
12	WNDNGA*

4.16

START SEQUENCE TEST (continued) Routine 2000

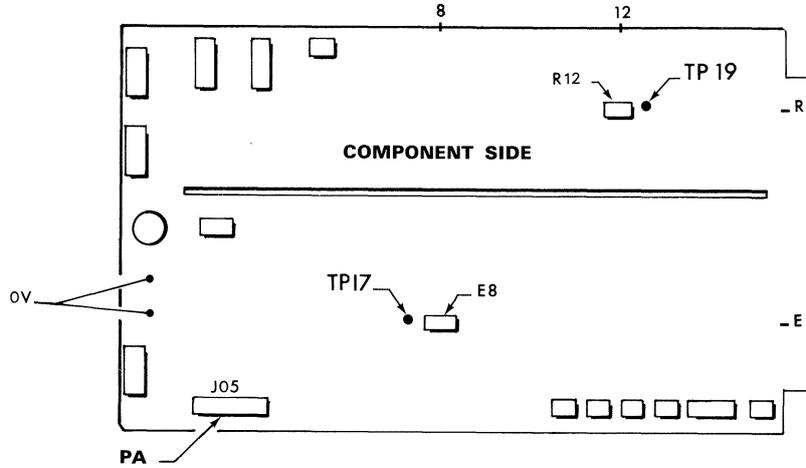
LABEL No	SYMBOL S/Q/A	MANIPULATION	IF YES GO TO	IF NO GO TO
2290	S	Failure on the front door switch		
2400	A	Stop the drive. Set it power off		END (See Section V)
2405	A	Disconnect J14 see par. 5.4*		
2410	Q	Are J14-03, J14-09, J14-05, and J14-04 insulated from the mechanical ground ?	2430	2450
2430	A	Connect a multimeter (cal : 250 mV) between J14-05 and J14-07 Rotate the motor by hand		
2440	Q	Are there 4 pulses of amplitude + or - 120mV per revolution ?	2460	2450
2450	S	Failure on spindle motor		END (See Section V)
2460	A	Connect a multimeter (cal : 250mV) between J14 -09 and J14-11 Rotate the motor by hand		
2470	Q	Are there 4 pulses of amplitude + or - 120mV per revolution ?	2480	2450
2480	S	Failure on BCM board		END (See Section V)

4.17



J05

Pin No	SIGNAL
01	ZGND
02	DATRD 1-1
03	ZGND
04	DATRD 2-1
05	ZGND
06	ZP05-1
07	LOWRCU
08	ZP05-1
09	MRKPK-1
10	ZP05-1
11	
12	ZP 12
13	ZP05-1
14	ZP 12
15	ZN 12
16	SRVRD
17	ZP 12
18	PASHRT
19	ZP 24F
20	ZN 12
21	ZN 12
22	
23	ZGND
24	HDSELO 1*
25	HDSELO*
26	ZGND
27	ZGND
28	P5 0K
29	WRCL0K*
30	WRTCMD*
31	WRTCMD
32	WRTRINS*
33	WRTPLS*
34	ZGND



4.18

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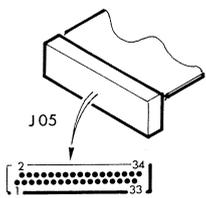
START SEQUENCE TEST (continued)

Routine 3000

LABEL No	SYMBOL S/Q/A	MANIPULATION	IF YES GO TO	IF NO GO TO
3000	Q	Does the carriage go to track zero, 3 sec. after head loading, and does it stabilize on it ?	3160	3010
3010	Q	Does the used cartridge work correctly on a good machine ?	3022	3020
3020	S	The cartridge is damaged		END
3022	A	Stop and power down the drive. Remove the plastic top cover		
3023	Q	Check by finger pressure that the carriage moves freely ?	3024	(See Section V)
3024	A	Power on the drive		
3025	Q	Is there +5V on J05-06, 08, 10 and 13 ?	3026	3220
3026	Q	Is there +24V on J05-19 ?	3028	3220
3028	A	Start the drive		
3030	Q	Is HDSELO* on J05-25 at "0" ? ELGASE side	3040	3220
3040	Q	Is HDSELO* on J05-25 at "0" ? P.A. side	3060	3050
3050	S	Failure on J05 cable		END
3060	A	Stop the drive, reverse head connectors, start the drive		
3070	Q	Does the carriage go to track zero ?	3080	3090
3080	S	Failure at upper head level		END (See Section V)
3090	A	Ground signals SRVCLS* (TP19) and PKENB* (TP17) at "0" on ELGASE board.		
3100	Q	Is MRKPK (J05-09) between 2 V and 4 V ?	3110	3230

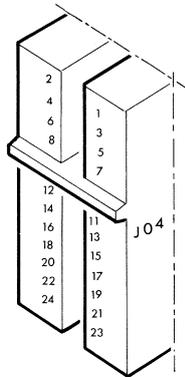
4.19

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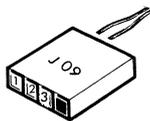
**J05**

Pin No	SIGNAL
01	ZGND
02	DATRD 1-1
03	ZGND
04	DATRD 2-1
05	ZGND
06	ZP 05-1
07	LOWRCU
08	ZP 05-1
09	MRKPK-1
10	ZP 05-1
11	
12	ZP 12
13	ZP 05-1
14	ZP 12
15	ZN 12
16	SRVRD
17	ZP 12
18	PASHRT
19	ZP 24F
20	ZN 12
21	ZN 12
22	
23	ZGND
24	HDSEL 1 *
25	HDSEL 0 *
26	ZGND
27	ZGND
28	P5 ØK
29	WRCUØK*
30	WRTCMD*
31	WRTCMD
32	WTRNS*
33	WRTPLS*
34	ZGND



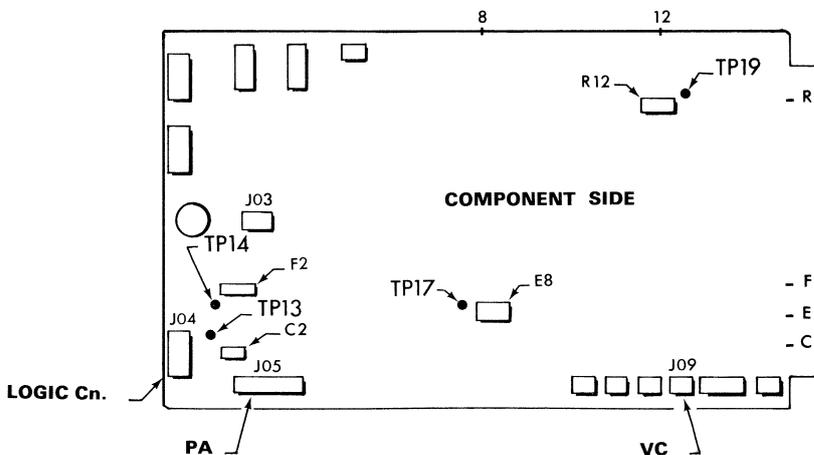
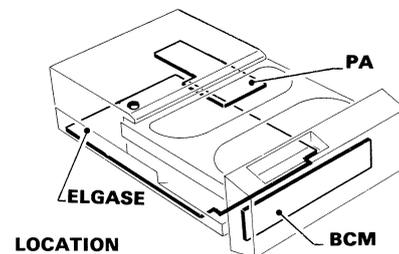
**J04**

Pin No	SIGNAL
01	ZGND
02	WRDATA*
03	ZGND
04	DATCLK*
05	ZGND
06	INDMRK*
07	ADPRTY*
08	SCTMRK*
09	
10	
11	ZGND
12	
13	RDYSRW*
14	RUN *
15	ZGND
16	VALSCT*
17	ZGND
18	FAULT
19	FLTRST *
20	RDENBL*
21	ZGND
22	RDDATA*
23	ZGND
24	WRENBL*



**J09**

Pin No	SIGNAL
01	ACAFDB
02	ACAØUT
03	
04	



4.20

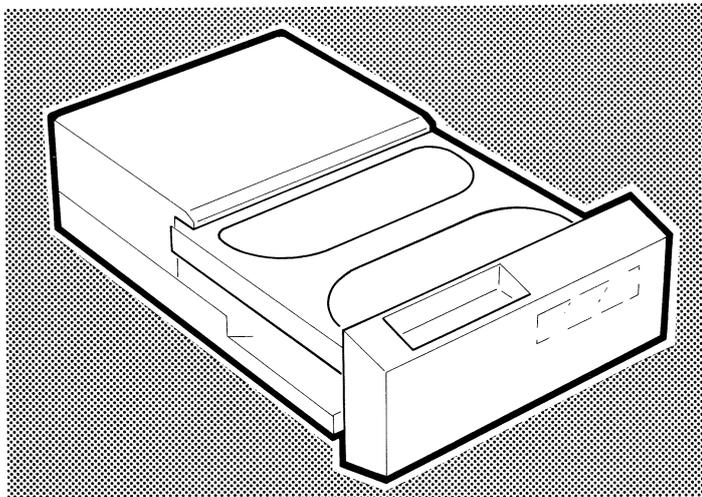
START SEQUENCE TEST (continued) Routine 3000

LABEL No	SYMBOL S/Q/A	MANIPULATION	IF YES GO TO	IF NO GO TO
3110	A	Remove grounding on PKENB* (TP17)		
3120	Q	Is MRKPK (J05-09) between 2 V and 4 V ? Then remove grounding on SRVCLS* (TP19)	3130	3230
3130	A	Power down the drive, disconnect J09		
3140	Q	Is resistance between J09-1 and J09-2 about 4 ohms ?	3220	3150
3150	S	Failure on voice coil		END (See Section V)
3160	Q	Is RDYSRW* (J04-13) at "0" ?	3170	3220
3170	Q	Is FAULT* (TP13) at "0" ?	END (Ready for use)	3180
3180	Q	Is WRENBL* (TP14) at "1" ?	3200	3190
3190	S	Failure on J04 cable		END
3200	Q	Is WRCUØK* (J05-29) at "1" ?	3220	3210
3210	S	Failure on PA board		END (See Section V)
3220	S	Failure on ELGASE board		END (See Section V)
3230	S	Failure on ELGASE or P.A. board.		

4.21

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**MAINTENANCE PROCEDURES**

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**5**

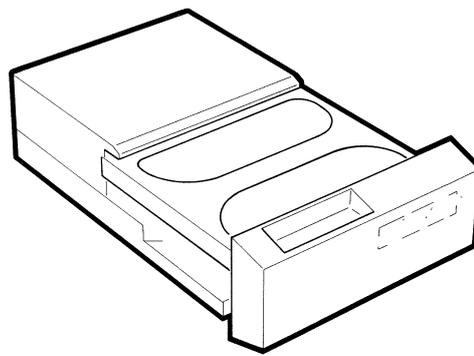
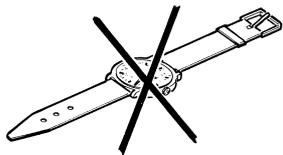
**SAFETY NOTES**

—Before opening the disk drive always ensure that small objects (paper, clips, ashtrays, paper cup, etc...) do not endanger disk cleanliness.

—After any operation requiring the removal of protective parts (covers, panel, collars, etc...) all such parts **MUST** be repositioned before the machine is handed over to the operator.

**WARNING**

Do not bring wrist watches near the voice coil magnet as they risk being damaged.



**5.1 PWA's Replacement**

**5.1a Main Logic Board Replacement (ELGASE)**

Material required

- Philips screwdriver.

Disassembly see Figure 5.1a

Disconnect connectors J15, J10, J09, J08, J07, J06, J05, J04, J02, J01, J03, J13, J12, J11. See page 4-2.

Unscrew seven screws 1 to 7.

Unscrew the rear shock absorber 8.

Remove the main logic board.

Remove the washer 9

Reassembly

Proceed in reverse order :

—It is mandatory that the insulating plate and the 7 screws are reassembled.

—The cable must be under the insulating plate.

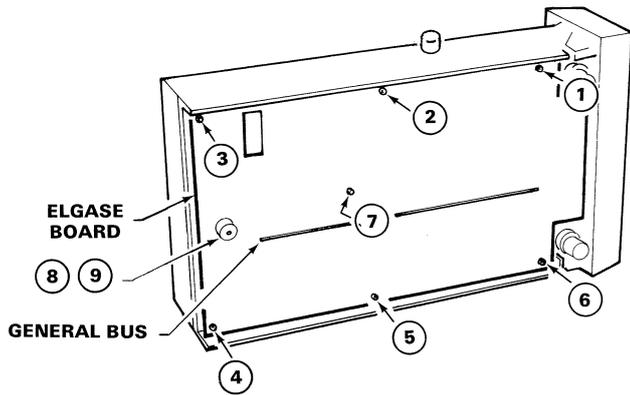


Figure 5.1a

**5.1b LSI Replacement**

Material required

- Small Screwdriver

Disassembly see Figure 5.1b

Set the machine on side. (See Figure 5.1a)

Insert the screwdriver between the LSI and its support.

Pull out the LSI.

Reassembly

Plug in the LSI. The groove on the LSI must be located as shown in Figure 5.1b.

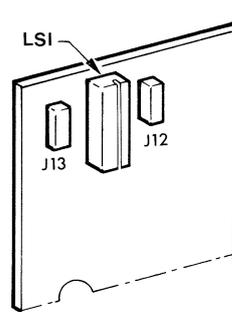


Figure 5.1b

### 5.1c Pre-Amplifier Board Replacement (P.A.)

#### Material Required

- . 5.5 mm wrench.

Disassembly see Figure 5.1c

If write protection option present remove it (See procedure 5.9)

Disconnect two head connectors A, B

Remove three nuts 1 to 3 and disengage the ground wire

Remove shield

Disconnect connector J05

Remove the nut 4

Remove the P.A. board

#### Reassembly

Proceed in reverse order.

Do not forget to fix ground wire with nut 1. (See Figure 5.1c).

**CAUTION :** Correct location of brass washer 5

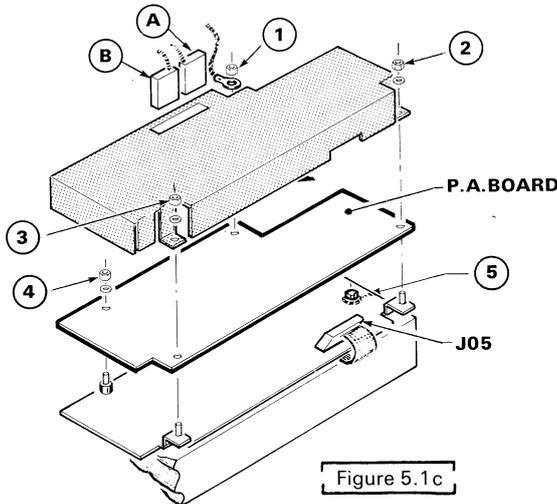


Figure 5.1c

### 5.1d Motor Control Board Replacement (B.C.M.)

#### Material required

- . Philips screwdriver
- . 10 mm wrench

Disassembly see Figure 5.1d

Remove cover A (unscrew four screws B) and disconnect J14.

Disconnect J10 and J15 on Main Logic board, see par.5.1a.

Unscrew three bolts 1 to 3 and disengage the motor control board.

#### Reassembly

Proceed in reverse order.

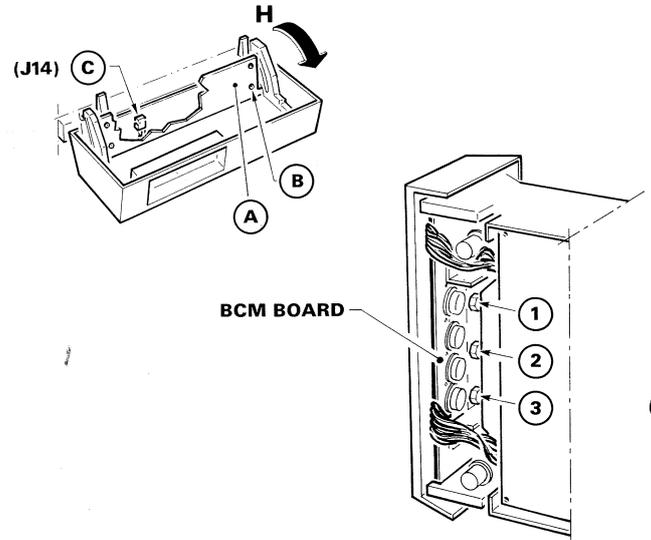


Figure 5.1d

5.4

### 5.2 Door Safety Latch Assembly Replacement

See location Figure 5.2

#### Material required

- . Allen key (3 and 4 mm)
- . Set of shims.

#### Preliminary operation

- Remove the main logic board
- Remove the plastic top cover
- Cut the cable clamps

#### Disassembly

Unscrew the two screws A and B. Figure 5.3.  
Remove the complete assembly.

#### Reassembly

Proceed in reverse order :

- Push on the latch C and open the front door.
- Displace the assembly so as to obtain an air gap F. (See Figure 5.4)
- Loosen screws A and B and displace the door safety latch assembly so as to obtain an air gap E. (See Figure 5.3).
- Front door closed.
- Tighten the screws.
- Displace the leaf spring G so as to obtain the microswitch (M) switches OFF with a safety margin.
- Check : that the air gap E has not changed.
- : that the micro switch M switches ON and OFF with a safety margin.

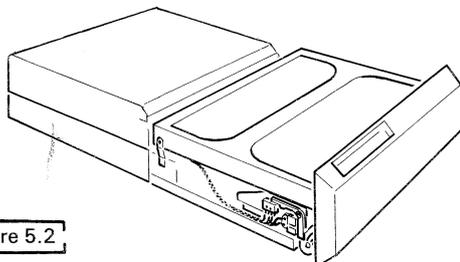


Figure 5.2

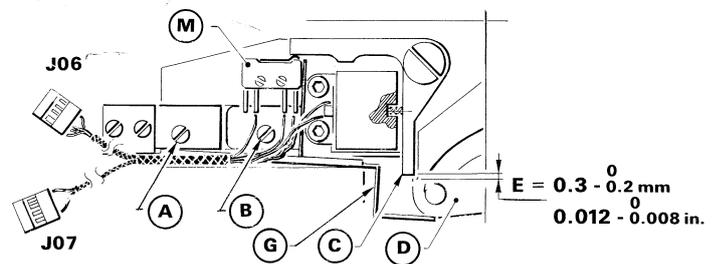


Figure 5.3

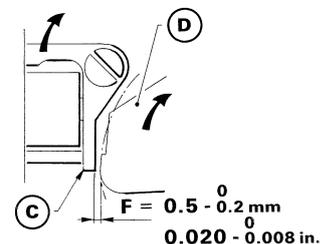


Figure 5.4

5.5

### 5.3 Head Loading Solenoid Assembly Replacement

See location Figure 5.5

#### Material required

- . Set of shims
- . Allen wrench

#### Preliminary operation

- Remove the Main Logic Board
- Remove the plastic top cover
- Unlock the cable clamps
- On the solenoid assy : remove the voice coil connector, its clamp and the ground wire.

#### Disassembly

Insert a cleaner between the two heads.  
Unscrews the two screws A and B. Figure 5.6.  
Remove the complete assembly.

#### Reassembly

Proceed in reverse order :

- Insert finger C in slot D. Figure 5.7
- Displace the assembly so as to obtain an air gap E (See Figure 5.6.) Minimum air gap from unloaded position to loaded position
- Tighten the screws.
- Check : that the air gap has not changed.  
that the air gap is constant for the overall carriage movement.

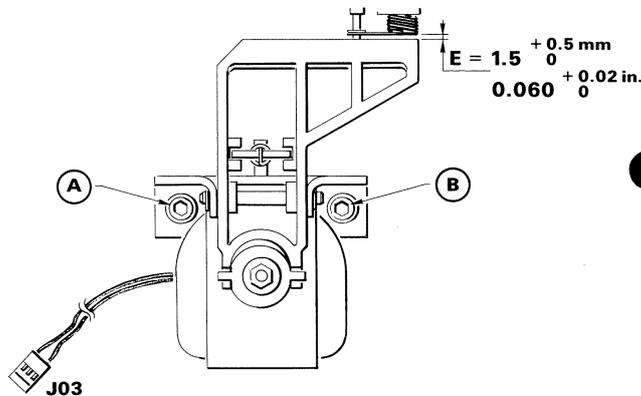


Figure 5.6

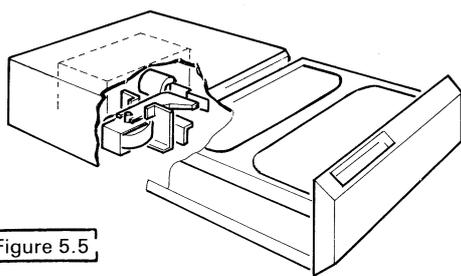


Figure 5.5

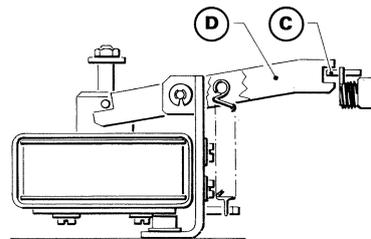


Figure 5.7

5.6

### 5.4 DC Motor Assembly Replacement, Air Filter Access

#### Material required

- . Screwdriver
- . Allen wrench
- . Set of shims

#### Preliminary operation

Remove the main logic board

\*Remove the carter A — Figure 5.8, by :

- Open the front door in H direction
- Unscrew the four screws B
- Disconnect C. (J14) on B.C.M. board

Remove the air filter cover

- Unscrew the four screws D — Figure 5.9

Remove the air filter. See note 1

Remove the magnetic index assembly (See par. 5.5)

Remove the plastic top cover

- Insert a cartridge, close but not completely the front door ; with a shim lay down the gap J between the cartridge edge and the two horns. Figure 5.12a

Remove the receptacle. Figure 5.11, by :

- Unscrew the two screws G
- Lift up the bearing
- Disengage the receptacle in G direction

**Note 1 :** If the air filter seal, or the air filter cover is damaged, parts must be changed.

#### Disassembly

2 possibilities :

- You have : . the screws E, Motor X — Motor in 1 part
- . the screws E and the nuts F Motor Y Motor in 2 parts.

#### A) Motor in 1 part

- Unscrew the three screws E — Figure 5.10
- Remove the motor in J direction — Figure 5.11

#### B) Motor in 2 parts

- Unscrew the three screws E — Figure 5.10
- Remove the first part M — Figure 5.11
- Unscrew the three nuts F — Figure 5.10
- Remove the second part N — Figure 5.11

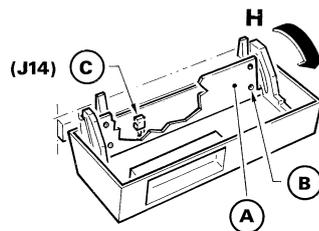


Figure 5.8

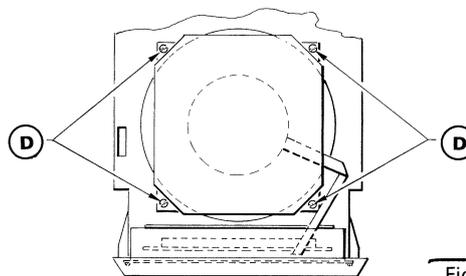


Figure 5.9

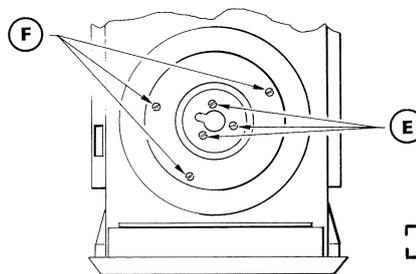


Figure 5.10

5.7

## Reassembly

a) Motor in 1 part proceed in reverse order

b) Motor in 2 parts

- Reassemble the N part (do not tighten the screws)
  - Reassemble very carefully part M
  - Adjust the motor at its lower part with the centering part
  - This centering part has to turn freely
  - Tighten screws E and nuts F
  - Check the centering part turns freely
- Proceed in reverse order for the other parts

### NOTE

*Motor cable. See its position in the air filter on Figure 5.12*  
*Before tightening the screws G at the receptacle, insert the same cartridge as before disassembling close but not completely the front door and adjust the air gap you previously laid down between the cartridge edge and the two horns. Figure 5.12a.*  
*The bearing must be referenced on the casting.*

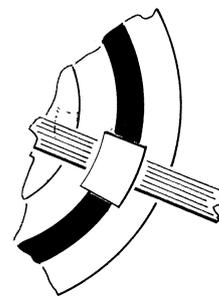


Figure 5.12

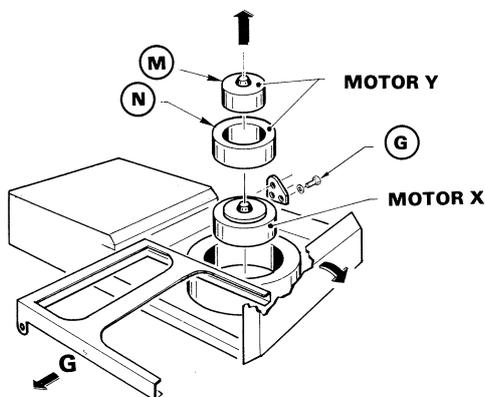
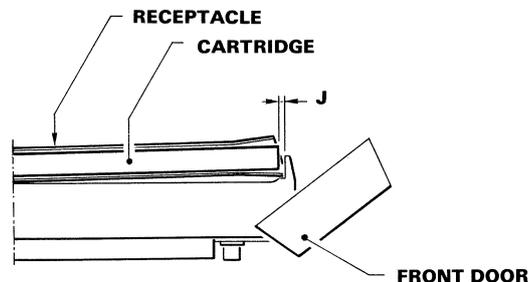


Figure 5.11



5.8

47224248-003

## MOTOR GROUND CONNECTION - COMPLEMENT OF PROCEDURE 5.4

Material required - Allen Wrench 1.5 mm, screwdriver, pliers

### Dismounting

Preliminary operation : carry out the operations par. 5.4 till "Remove air filter cover".

- Remove nut (K) which holds the contact leaf spring .
- Remove contact leaf spring (L). Take care not to damage the rubber seal (P)
- Extract the rubber seal
- Remove the contact point and its support (Q) (use pliers)

### Cleaning

Remove dust from the motor shaft casing, contact points and rubber seal

Replace defective parts

### Remounting

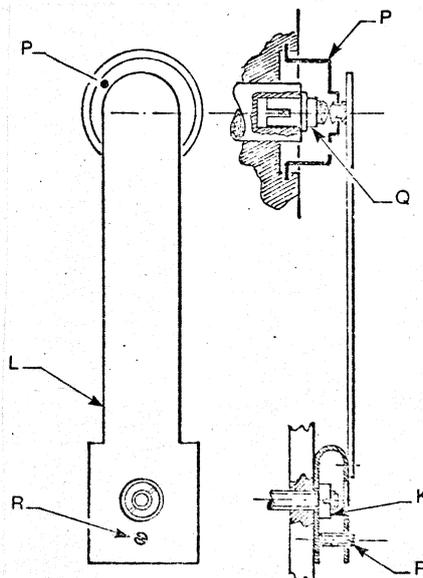
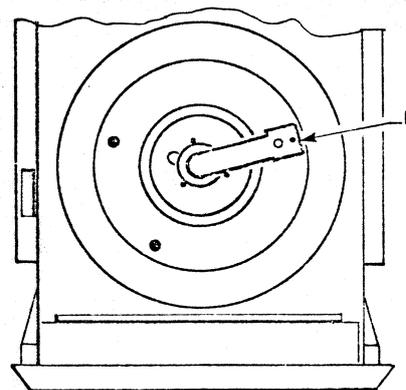
- Place the motor shaft contact (Q)
- Place rubber seal (P) on contact of leaf spring (L)
- Insert outside edge of rubber seal into the groove of the motor shaft casing to obtain correct tightness
- Position leaf spring support on screw (K) and fix the spring

### Adjustment

- Unscrew setscrew (R) so that the copper contact of the leaf spring does no longer make contact with the carbon brush
- Screw slowly till the copper contact makes contact with the carbon brush
- Screw 2.5 turns to be sure of correct pressure

### Bringing in working order

Remount the components in the reverse order



## 5.5 Magnetic Index Mark Assembly Replacement

See location Figure 5.13

### Material required

- . Allen wrench
- . Screwdriver

### Preliminary operation

— See par.5.4 Preliminary operation

Unscrew the two screws A and B - Figure 5.14. Take care to the two seal on the screws

Remove the assembly

Pass the index cable through the hole E

### Reassembly

Proceed in reverse order for the cable

Rotate the assembly on its axis in order to put screw C against the finger D - Figure 5.14

Tighten the screws A and B

Proceed in reverse order for the other parts

Do not forget to refit a new adhesive tape on the index cable.

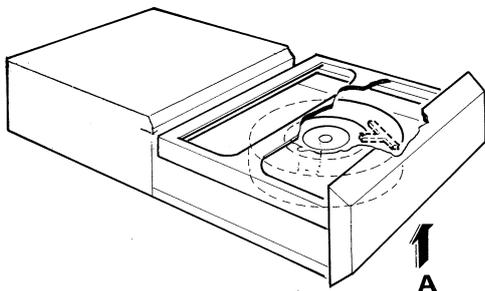


Figure 5.13

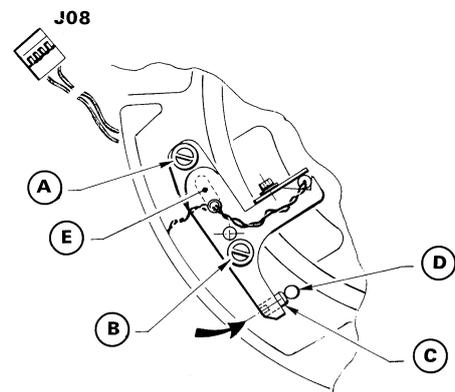


Figure 5.14

## 5.6 Head Replacement. 47224218-001 Lower - 002 Upper

### WARNING

*Do not put your fingers on the head pad*

#### Material required

- Allen wrench. 3/32 in.

#### Preliminary operation

- Remove the plastic top cover
- Unplug the connector corresponding to the head to be changed
- Insert a cartoline between the two heads

#### Disassembly

Unscrew the screw D - (Figure 5.15) and remove the head to be changed

#### Reassembly

- Engage part A of the head - Figure 5.15a
- Place the head on the loading lever B - Figure 5.15b
- Engage part C in the slot of the carriage, and push it in F then G direction - Figure 5.15c, and H direction - Figure 5.15a.
- Tighten the screw D
- Plug the connector on P.A. board - Figure 5.15d.

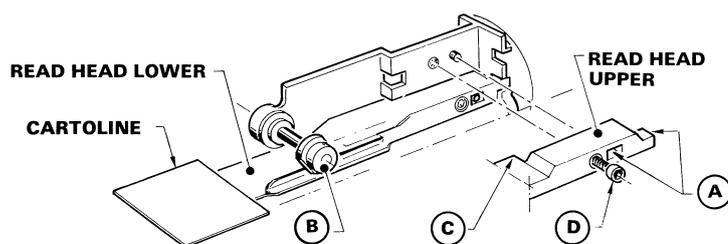


Figure 5.15

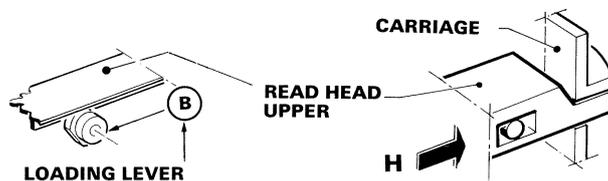


Figure 5.15a

Figure 5.15b

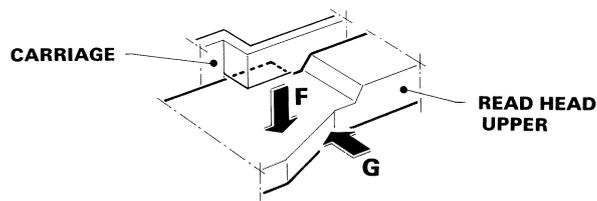


Figure 5.15c

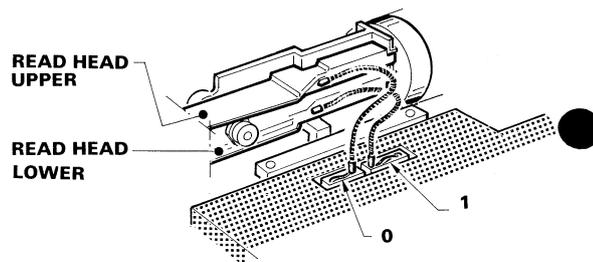


Figure 5.15d

5.10

## 5.7 Voice Coil and Carriage Assembly Replacement

### Material required

- Allen wrench
- Screwdriver
- Set of shims
- Special tool

### Preliminary operation

- Remove completely the plastic top cover
- Remove the heads see par.5.6
- Remove Main logic board
- Disconnect the voice coil connector
- Loosen ground wires by removing screw G and nut N (Figure 5.16)

### Disassembly

Unscrew the four screws A (magnetic pot) Figure 5.16 access holes under the table

Unscrew the screw B and remove the plate

Unscrew the screws C and D, (remove the screw C and turn the guide as shown Figure 5.16 - (G direction)

Push the carriage forward

Push the magnetic pot backward in order to disengage the coil of the magnetic pot

Extract carriage in H direction

- Voice Coil Disassembly (See Figure 5.17)

Unscrew screw E

Unscrew the three screws F inside the voice coil

### Reassembly

Before reassembly, clean the 6 ball bearings and the ball bearing guide. Proceed in reverse order

Do not forget :

- the finger C in the slot D. Figure 5.7 par.5.3
- the finger under the carriage has to be in the retract fork
- before tightening the four screws A, push the magnetic pot against its three stops S
  - After tightening check with a shim of 0.04 mm (0.001 in.) that the magnetic pot is close to its three stops
- Tighten the screw B
- After a carriage replacement, adjust the carriage thrust, see par.5.8
- After reassembly : check that the carriage moves freely

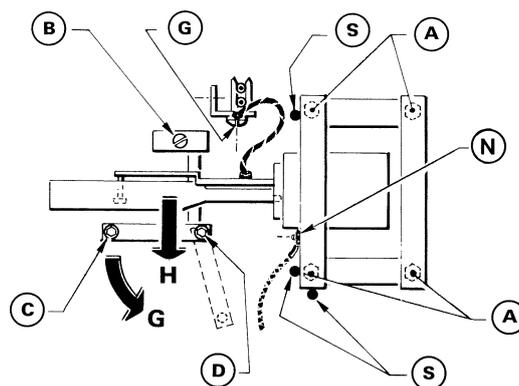


Figure 5.16

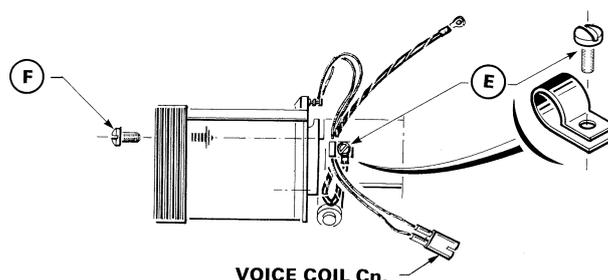


Figure 5.17

5.11

## 5.8 Carriage Thrust Adjustment

### Material required

- . Allen wrench
- . Screwdriver
- . Wrenches
- . Special tool

### Preliminary operation

- Remove screws A and B on the head loading assembly. See Figure 5.6 par.5.3
- Remove the two heads. See par.5.6

### Adjustment procedure

Set the hole of gauge on the spindle cone and the other extremity carriage side. See Figure 5.18a.

Unscrew screws 1 and 2, see Figure 5.19 and displace the carriage introducing finger A into the gauge slot. See Figure 5.18b.

Push B thrust in H direction so that retract fork C comes into contact with carriage finger D. Then tighten screws 1 and 2.

### Reassembly

Proceed in reverse order

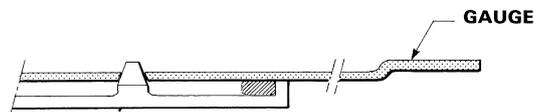


Figure 5.18a

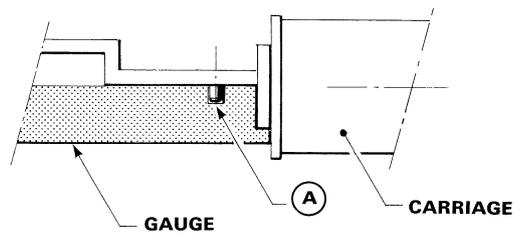


Figure 5.18b

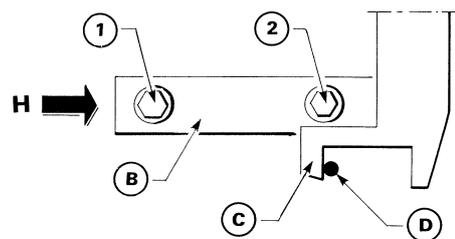


Figure 5.19

5.12

47224248-001

## RAMP LOADING CAM ADJUSTMENT

Complement of procedures 5.6 and 5.8.

Since mid-octob. 1979, the drive assys are provided with the head being loaded by means of Ramp Loading Cam.

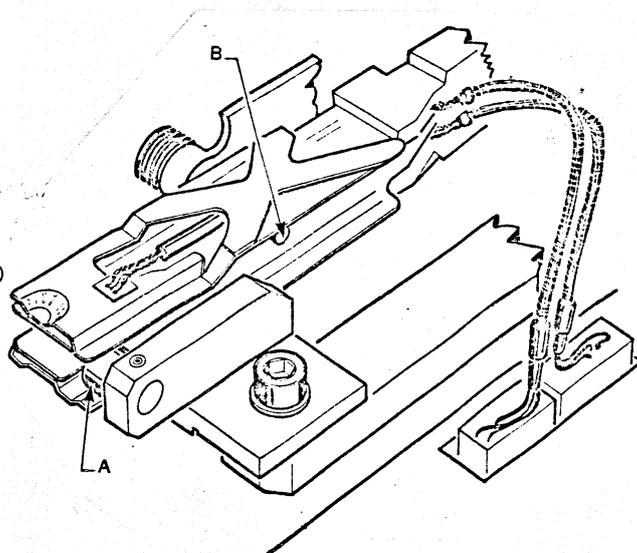
This has only impact on the loading of the read heads.

Heads unloading is always provided by the cam (B) as on the previous version.

### Adjustment

A bracket placed on the carriage adjusting gauge (47229211-002) allows to adjust the precise location of the support of roller (A)

Take care that the roller remains parallel with the read head support leaf springs.



## 5.9 Write Protection Option Installation

### Material required

- Screwdriver

### Preliminary operation

- Remove plastic top cover
- Remove main logic board, see par.5.1a.

### Installation

Proceed as indicated Figure 5.20

Insert a cartridge

Adjust the assembly so as to set the switch roller at the center of the cartridge write protection location

Check that the micro-switch switches ON and OFF with a safety margin with and without the write protection tag at the cartridge level. Tighten the screws.

Connect the connector on J11 at Main Logic board level.  
Remount Main Logic board and plastic top cover.

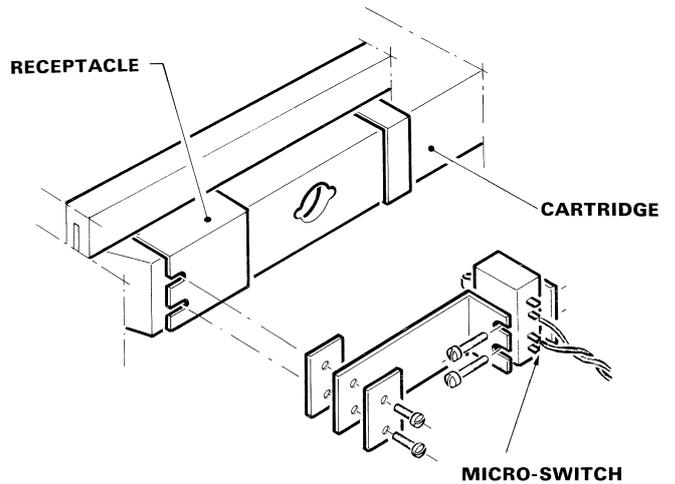


Figure 5.20

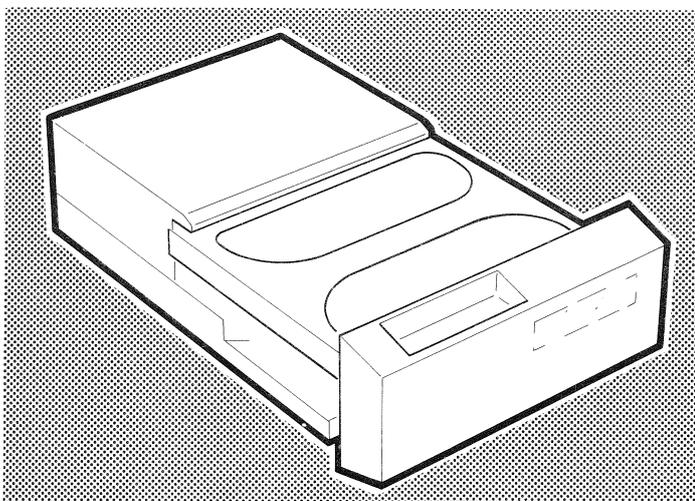


Table 6-1 MECHANISM

ITEM N°	DESCRIPTION	IDENTIFICATION N°
1	Read Head - Lower	47224218-001
2	Read Head - Upper	47224218-002
3	Head Loading Solenoid Assembly	47229011-001
4	Door Safety Latch Assembly	47229047-001
4a	Leaf Spring	47229222-001
5	Magnetic Index Mark Sensor	47224094-003
6	Voice Coil and Carriage Assembly	47227349-003
6a	Wired Voice Coil Assembly	47227338-001
7	Air Filter	47227422-001
7a	Air Filter Cover	47229043-001
8	DC Motor Assembly	47227423-003
9	Write Protection Option	PMSF 124 E
9a	Wired Write Protection Microsw. Assy	47224182-002
10	Write Protection Tag	PMSF 121 A

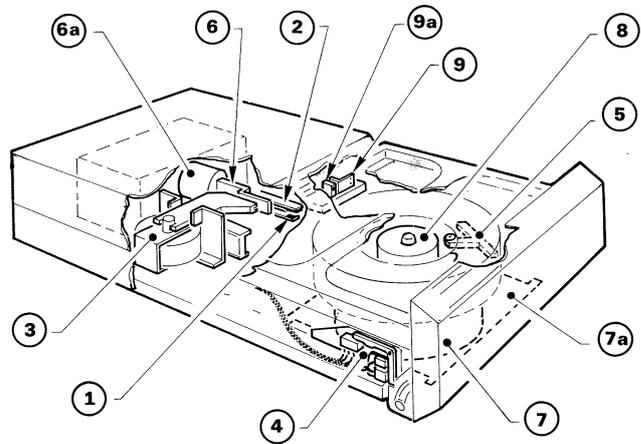


Figure 6.1

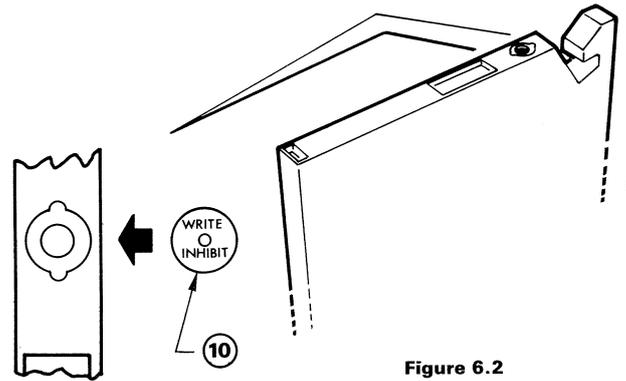


Figure 6.2

6.2

Table 6-2 PWAs LIST

ITEM N°	DESCRIPTION	IDENTIFICATION N°
1	Main Printed Circuit Logic Board { - ELGASE (A) - LSI (B)	47227498-003 76970037-001
2	Pre-Amplifier Printed Circuit Board (P.A.)	47227471-011
3	Motor Control Printed Circuit Board (B.C.M.)	47227486-005

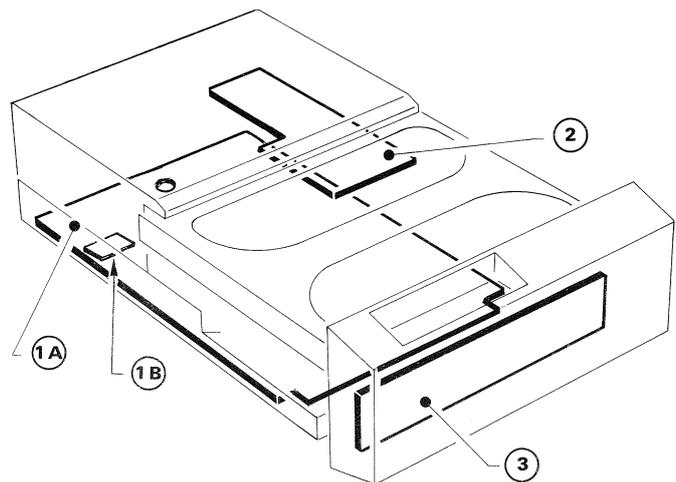


Figure 6.3

6.3

Table 6-3 ISK N° 1

ITEM N°	DESCRIPTION	IDENTIFICATION N°	Qty
	I.S.K. N° 1	PMSL021A	1
1	Read Head Lower	47224218-001	1
2	Read Head Upper	47224218-002	1
3	PWA P.A	47227471-011	1
4	PWA BCM	47227486-005	1
5	PWA ELGASE	47227498-003	1
6	LSI	76970037-001	1

Table 6-4 ISK N° 2

ITEM N°	DESCRIPTION	IDENTIFICATION N°	Qty
	I.S.K N° 2	PMSL022A	1
1*	Magnetic Index Assembly	47224094-003	1
2	Wired Voice Coil Assembly	47227338-001	1
3	Carriage Assembly	47227349-006	1
4	D.C. Motor Assembly	47227423-003	1
5	Head Loading Assembly	47229011-001	1
6	Door Safety Latch Assembly	47229047-001	1
6a	Leaf spring	47229222-001	2
8	P.A. Cable	47224187-002	1
9	Special screw on carriage guide	47227374-001	1
10	Spring on carriage guide	47227375-001	1
11	Base plate circular seal	47227421-005	1
12	Index fixing screw	47229027-002	1
13	Seal on index screw	76952731-001	4
14	Strut on P.A. board	47229181-001	1
15	Brass nut on P.A. board	76951121-490	2
16	Brass washer on P.A. board	76951127-490	2
17	Brass washer on P.A. board	76951127-580	1
18	Insulating washer on P.A. board	76951779-005	2
19	Delrin screw on P.A. board	76952000-593	1
20	Cable clamp	76952614-001	20
21	Adhesive tape for index cable	47229191-001	3
22	Staple on ELGASE board	76956151-001	5

*\*Note : When ordering Item 1 (Magnetic Index Assembly.) Item 21 must be ordered.*

Table 6-5 ISK N° 3

ITEM N°	DESCRIPTION	IDENTIFICATION N°	Qty
1	I.S.K N°3 Wired write protection Microswitch assembly	PMSL023A 47224182-003	1 1

Table 6-6 ISK N° 4

ITEM N°	DESCRIPTION	IDENTIFICATION N°	Qty
1	I.S.K N° 4 Air filter assembly Air filter cover	PMSL024A	1
2		47227422-001	1
		47229043-001	1

Table 6-7 ISK N° 5

ITEM N°	DESCRIPTION	IDENTIFICATION N°	Qty
1	I.S.K N° 5 Carriage adjusting gauge	PMSL025A	1
		47229211-002	1
3	Motor centering part	47229221-003	1