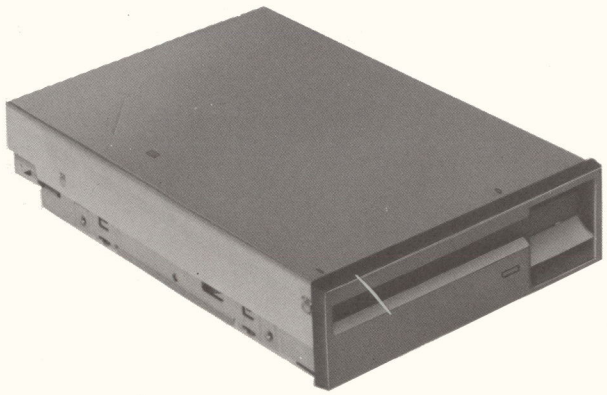
MICRO FLOPPYDISK DRIVE

MP-F63W



SONY®

SERVICE MANUAL

RECORD OF REVISIONS	
REVISION	NOTES
	ORIGINAL ISSUE November, 1986

[Serial number table]

Model	Serial Numbers
MP-F63W-00D MP-F63W-01D	10,000,001 – 11,000,000 15,000,001 – 16,000,000

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SECTION 1
INTRODUCTION

This manual is a maintenance guide for model MP-F63W series.

SECTION 2 describes disks and tools necessary for maintenance.

SECTION 3 provides fault diagnostic procedures that may require spare parts or some adjustments.

The overall check after removals and adjustments will be included in this section.

SECTION 4 and 5 cover parts replacements and adjustments, respectively.

SECTION 6 and 7 consist of circuit diagrams, ass'y drawings, and parts lists.

The cassette dummy (4-606-804-01) should be inserted in the MP-F63W series when it is transported. Otherwise, its heads may be damaged.

SECTION 2
TOOLS AND MEASURING INSTRUMENTS

2-1 GENERAL AND SPECIAL TOOL LIST

The tools and measuring instruments for performing maintenance on the MP-F63W series are listed below.

a. General Tools

	SONY parts No.
+ driver 2mm	(7-700-749-01)
+ driver 2.6mm	(7-700-749-03)
Tweezers	(7-700-753-02)
Round nose plier	(7-700-757-01)
Adj. rod	(7-700-733-01)
Cutter	(7-700-758-02)
CP/M (SMW-7002)	
Soldering iron (20W)	
Desoldering metal braid	
DC power supplier	
+5VDC±5%, 0.8A min., +12VDC±5%, 1.5A min.	
Tester	

b. Special Tools

MFD Function Checker	(J-623-905-0A)
IF Board 52/53	(J-623-904-0A)
Fixture-63	(J-623-906-0A)

SMC System

For AC 110V	For AC 220V
SMI-7011/SMI-7011A/ SMI-7012/SMI-7012A SMC-70	SMC-70GP
KX-13HG1	PVM-1371QM
SMK-0001	SMK-0002
SMI-7016	SMI-7016

Digitizer	(J-623-022-0A)
Conversion Cable II	(J-623-021-0A)
Radial Alignment Adj. Driver	(J-623-810-0A)
TRK00 Sensor Adj. Driver	(J-623-808-0A)
Pad Weight	(J-609-158-0A)
Conversion Cable (01) (only for MP-F63W-01)	(J-623-907-0A)
Torque Driver with two bits	(J-623-807-0A)
Power Cable	(J-609-130-0A)
Interface Cable	(J-609-201-0A)

c. Measuring Equipment

Oscilloscope Dual Trace 20MHz

Universal Counter Resolution 0.1msec.

d. Disks

R/E System Disk-63 (OR-D174VA) (8-969-920-52)

Cleaning Disk (OR-D29WA) (8-960-009-39)

This disk can be used for head clean.

Level Disk (OR-D46WA) (8-960-009-40)

This disk is used to check and adjust the read amplifier gain and offset. The self-read/write operation can be checked with this disk and the SMC System.

Dynamic Inspection Disk +30 (OR-D51WA) (8-960-009-44)

Dynamic Inspection Disk -30 (OR-D52WA) (8-960-009-45)

These disks can be used in the final check for a drive with the SMC System.

Note: (+) indicates that data has been recorded in the inner side of tracks.

(-) indicates that data has been recorded in the outer side of tracks.

	OR-D51WA	OR-D52WA
SIDE 0/1	Offset of +30µm for all formatted tracks	Offset of -30µm for all formatted tracks

Content of Dynamic Inspection Disk

50 Auto Disk (OR-D157WA) (8-960-010-60)

This disk has prerecorded data such as Cat's eye pattern and INDEX signal to check and adjust the off-tracking and index position.

	Signal	Tracks
Side 0/1	Index Burst Cat's Eye Pattern	40
Side 0	Cat's Eye Pattern	00, 22, 27 31, 36, 45 49, 54, 58 63, 79
	2F	04
Side 1	2F(+30µm off track)	76

Content of 50 Auto Disk

e. Expendable and Chemical Supplies

Nut Lock	(7-432-114-11)
Sony Oil	(7-661-018-01)
Molykote Grease	(7-662-001-81)
Bamboo Stick	

2-2 SPECIAL TOOLS

2-2-1 MFD Function Checker

Junctions J1/J2/J3 on the checker must be confirmed they are set as follows, before the preparation.

MODEL NAME	MP-F63W-00D	MP-F63W-01D
J1	shorted	open
J2	open	shorted
J3	shorted	open

(1) MFD Function Checker configuration (Refer to Fig.2-1)

Main Checker Board

34P Flat Cable

Power Cable (2 pieces)

(2) MFD Function Checker function

(2)-1 Switches

❶ SW16... Set this switch to the "250Kbps" for the MP-F63W series.

❷ STEP OUT (IN)... Steps the head outwards (inwards).

The head continuously moves if STEP IN and OUT switches are kept pressed.

❸ WDSEL... Selects such write data as "2F", "1F", "M", "W" or "DC".

❹ WRITE... Records, data specified by the WDSEL switch, onto one track.

❺ CHGRST... Resets the DSKCHG signal. (for eject motor installed version, eject the disk)

❻ INUSE... This switch is used to light the INUSE lamp.

❼ HDSL... Selects one of two heads (side 0 or side 1) for a double sided. (This switch is invalid for single sided version.)

❽ MON... This is used to operate the Disk Motor.

❾ DRIVE SELECT... Selects the disk drive. The number of this DRIVE SELECT must agree with the DRIVE SELECT number of the drive under test. The number embossed on the component itself (1,2,3,4) is not that assigned for the drive select.

❿ RESET... Resets the CPU.

⓫ STEP RATE... Set this switch to "3ms" for the MP-F63W series.

⓬ TRACK 00 ADJUST... This starts the measurement of the TRK 00 sensor level.

⓭ RECALIBRATE... This is used to recalibrate the head carriage ass'y.

⓮ SW1... Set this switch to "34+4" side for the MP-F63W series.

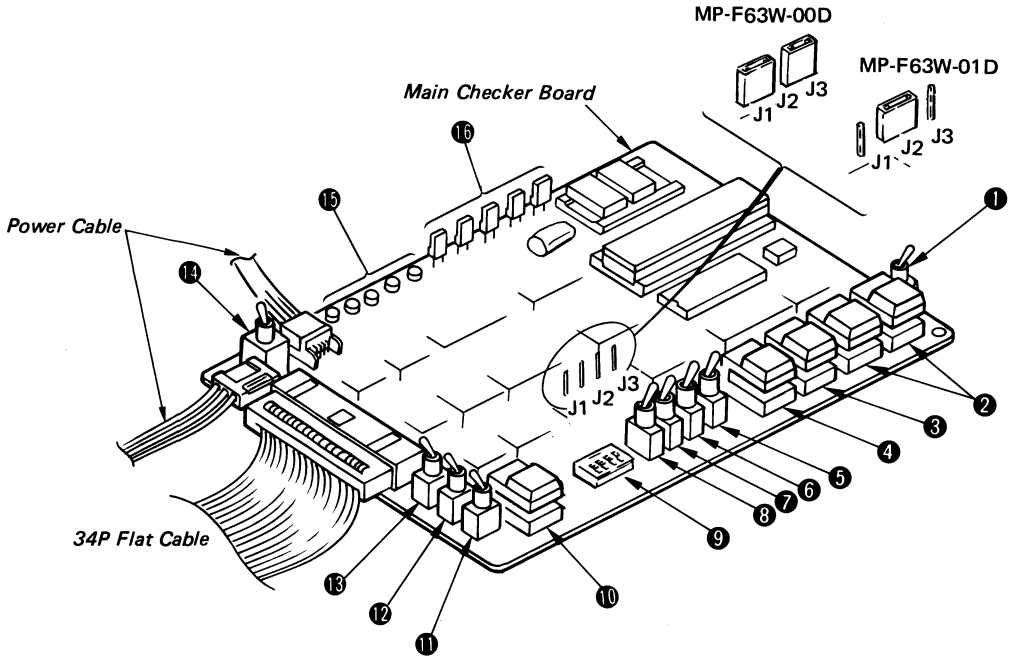


Fig. 2-1 MFD Function Checker Configuration

(2)-2 Indicators

⑮ WDSEL... They indicate the selected position on the WDSL switch.

⑯ I/F signals... They indicate the states of TRK 00, READY, DSKCHG, WRTPRT, and INDEX, respectively.

The TRK 00, WRTPRT, RDY, and DSKCHG indicators are lit when the respective I/F signals are low (true). The INDEX indicator blinks when the INDEX signal is applied to the board.

Track Position... Indicates the current track position.

(2)-3 Test Points

TP-1, TP-8, TP-9; GND

TP-2; MON

TP-3; INDEX

TP-4; RDDATA

TP-5; WRTGT

TP-6; WRTDT

TP-7; STEP

TP-10; EXT

(3) Part Layout and Circuit Diagram on MFD Function Checker. (Refer to Fig. 2-2, 2-3)

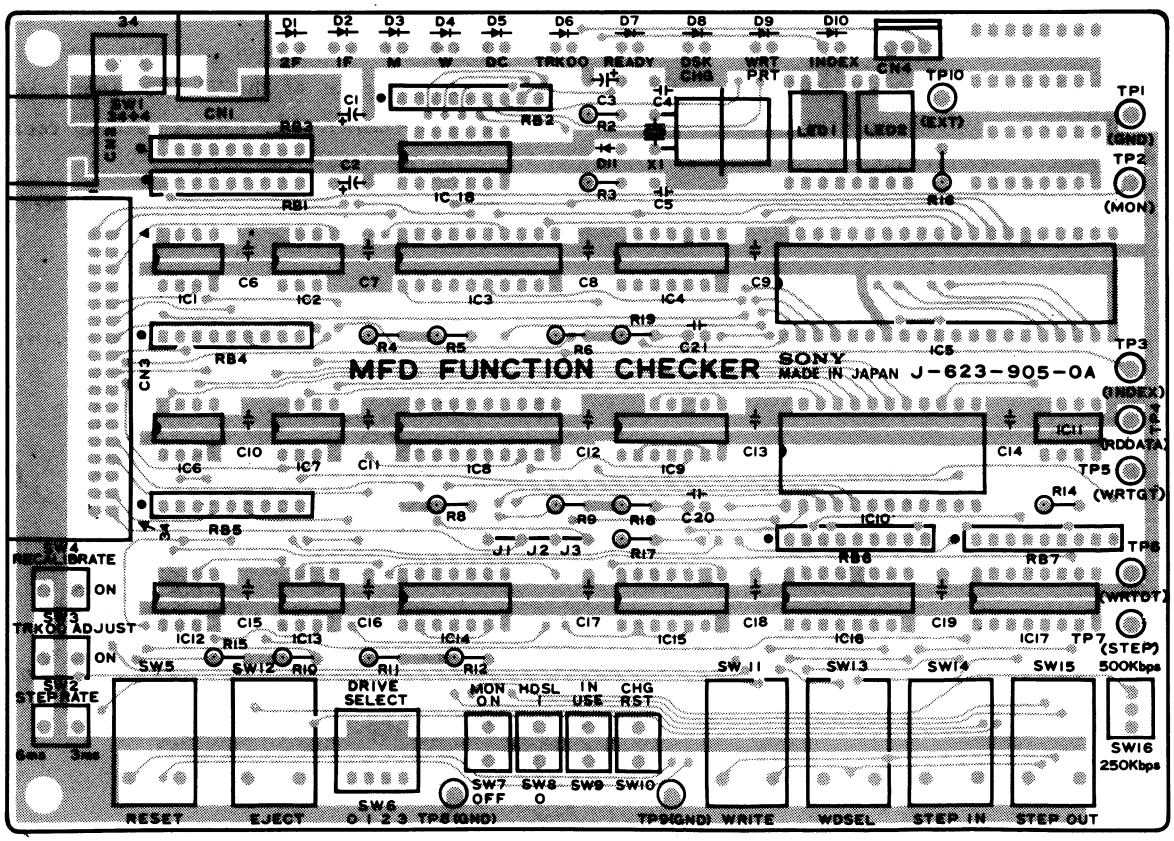


Fig. 2-2 Part Layout on MFD Function Checker

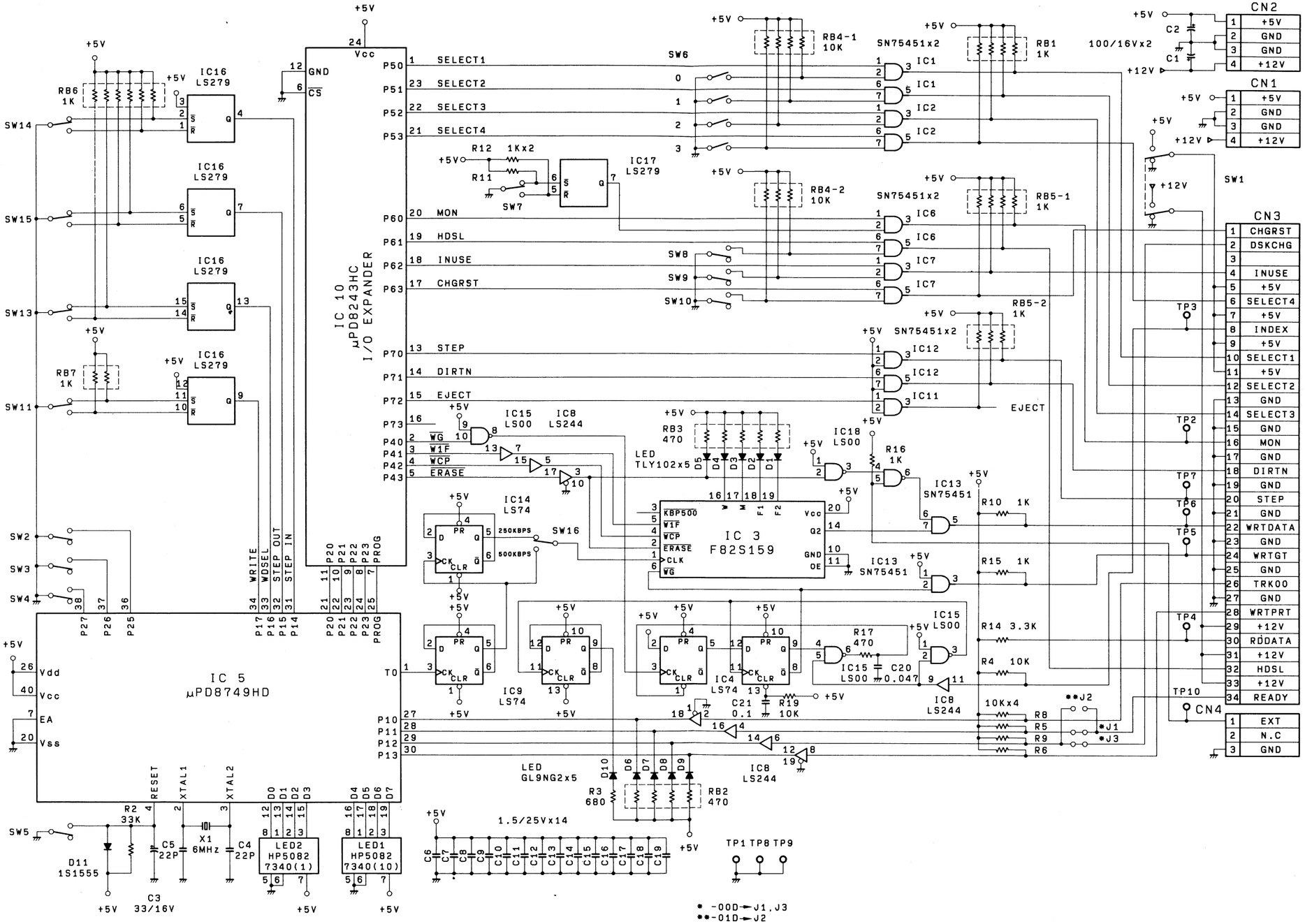


Fig. 2-3 MFD Function Checker Circuit Diagram

2-2-2 IF Board 52/53

(1) IF Board 52/53 configuration (Refer to Fig. 2-4)

Main IF Board

RF Cable

IF Cable (34pin)

(2) IF Board 52/53 function

(2)-1 Switches

❶ MOTOR ON..... Sets the motor of the unit to rotate.

❷ POWER SEL (CN1)..... Set the this switch to "off" for MP-F63W series. Feeds power supply voltage of +5V and +12V to CN1 (34pin connector).

(2)-2 Indicators

❸ D1/D2..... These indicators are lit, during the actual power supply of +5V and +12V to 34pin connector.

❹ D3/D4..... These indicators are lit, during actual power supply of +5V and +12V to IF board 52/53.

(2)-3 Test Points

❺ RF out/TRK00/GND..... These test terminals are used for radial alignment adjustment.

(3) Part Layout and Circuit Diagram on IF Board 52/53. (Refer to Fig. 2-5, 2-6)

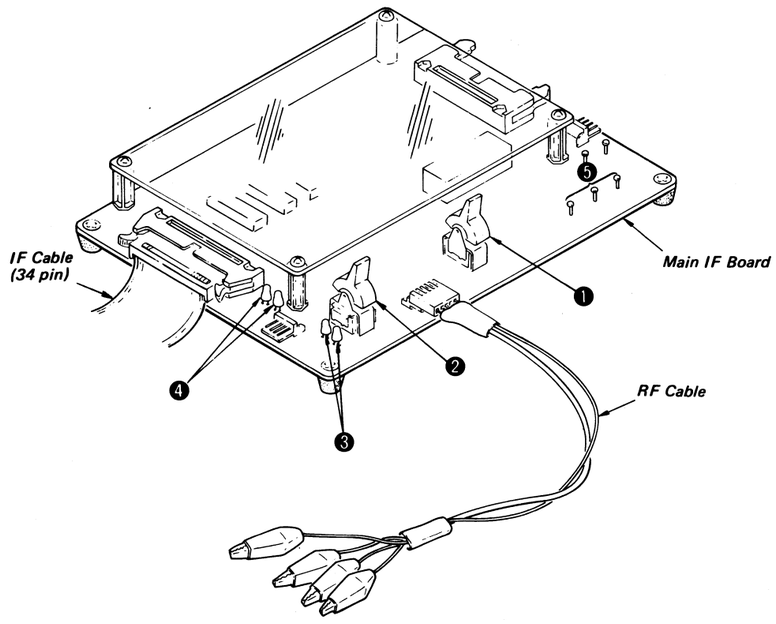


Fig. 2-4 IF Board 52/53 Configuration

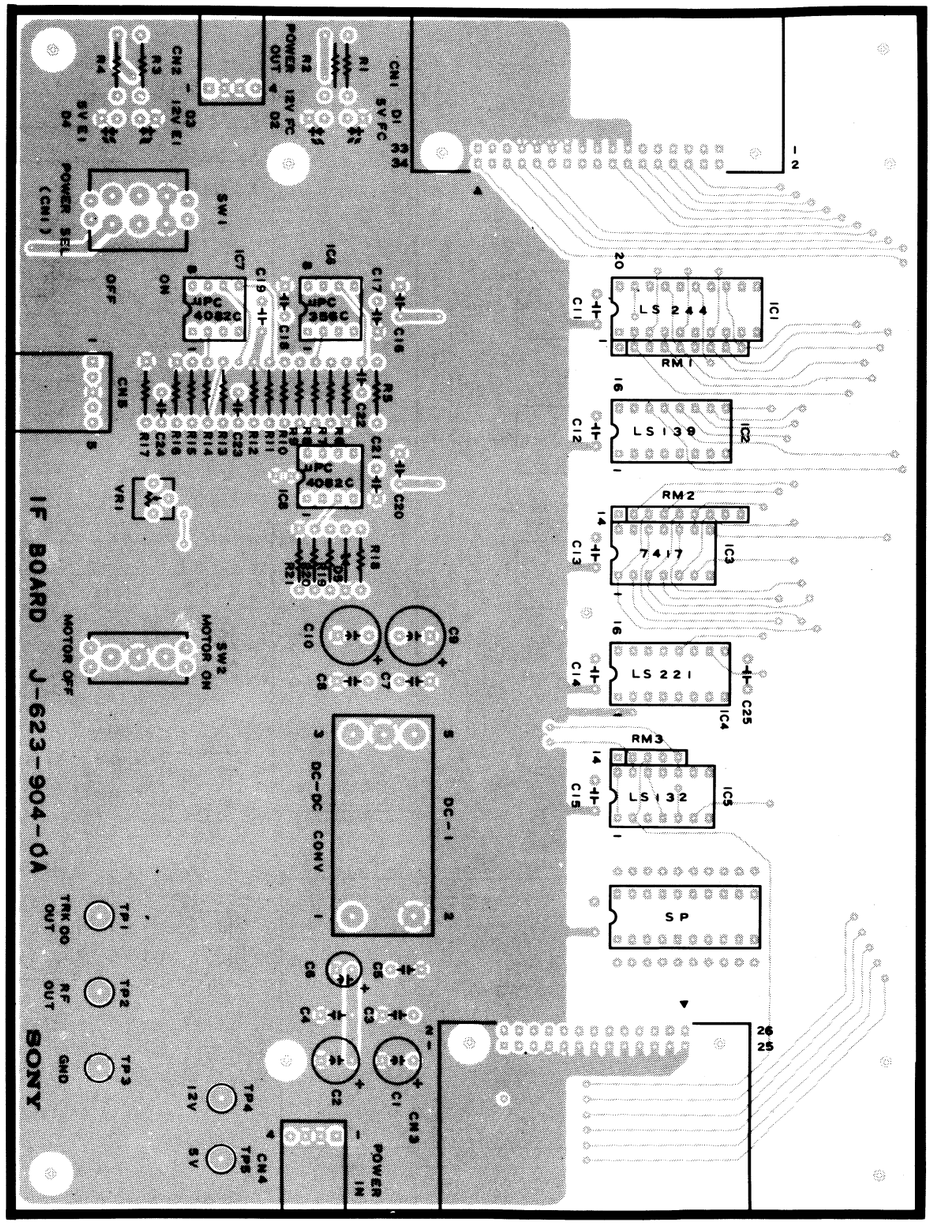


Fig. 2-5 Part Layout on IF Board 52/53

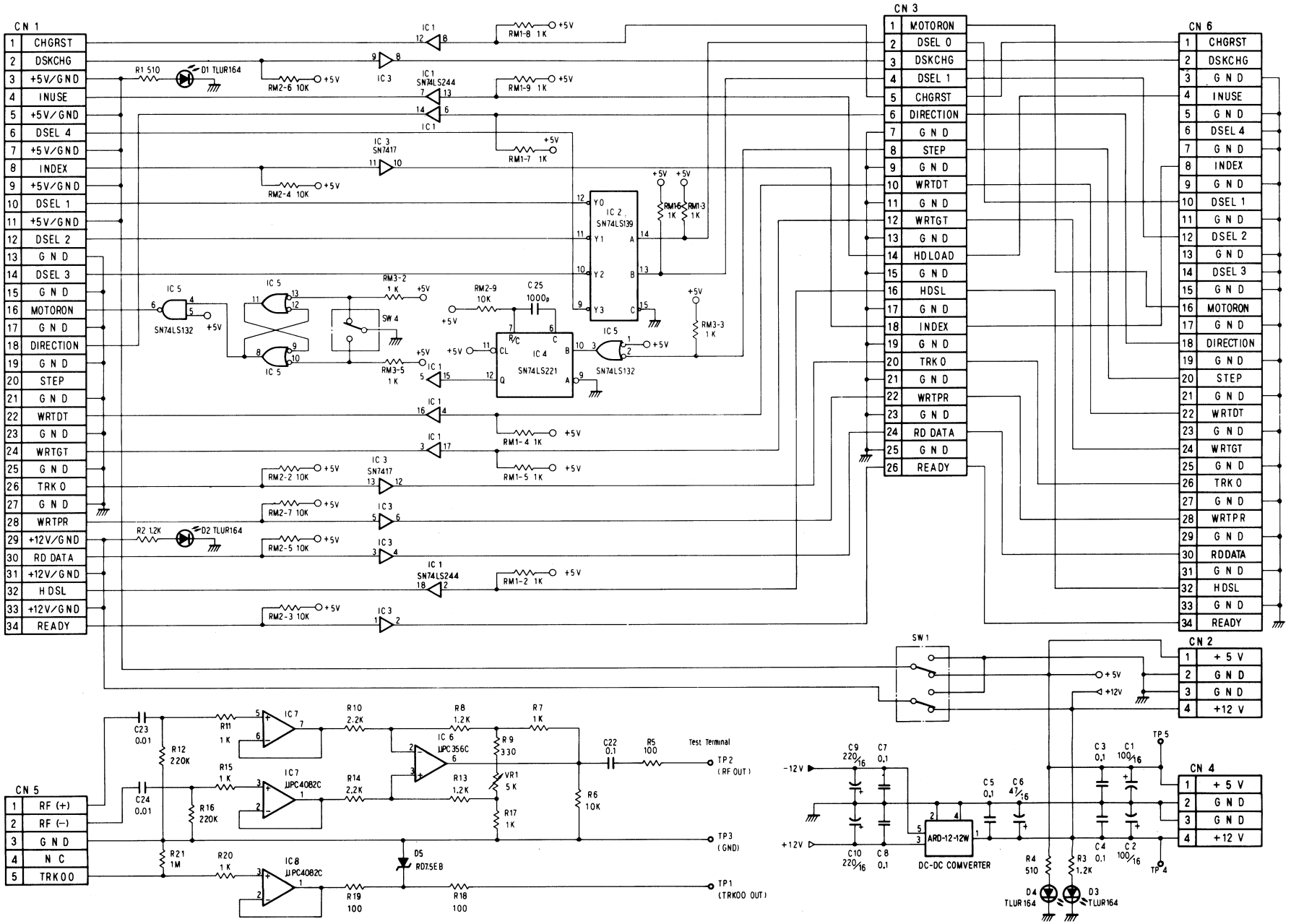


Fig. 2-6 IF Board Circuit Diagram

2-2-3 Digitizer

Digitizer is used for Radial Alignment and TRK 00 Sensor measurment/adjustment.

(1) Digitizer configuration (Refer to Fig. 2-7)
    Digitizer Board
    IF Cable
    A/D Harness

(2) Part Layout and Circuit Diagram on Digitizer. (Refer to Fig. 2-8, 2-9)

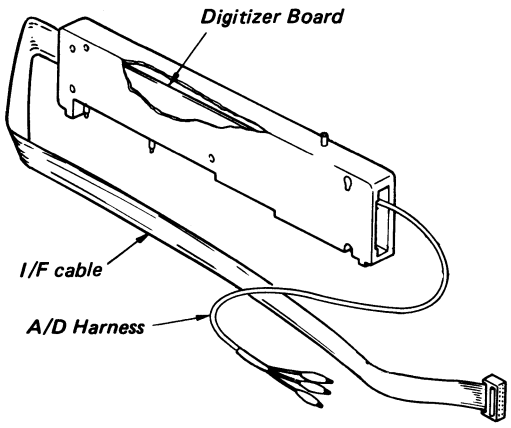


Fig. 2-7 Confirguration

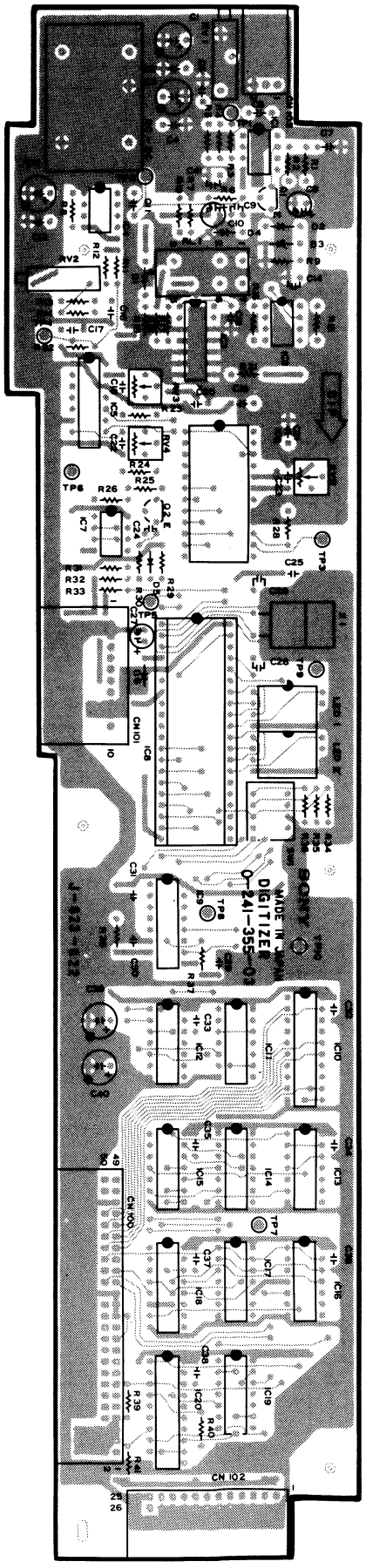


Fig. 2-8 Part Layout on Digitizer

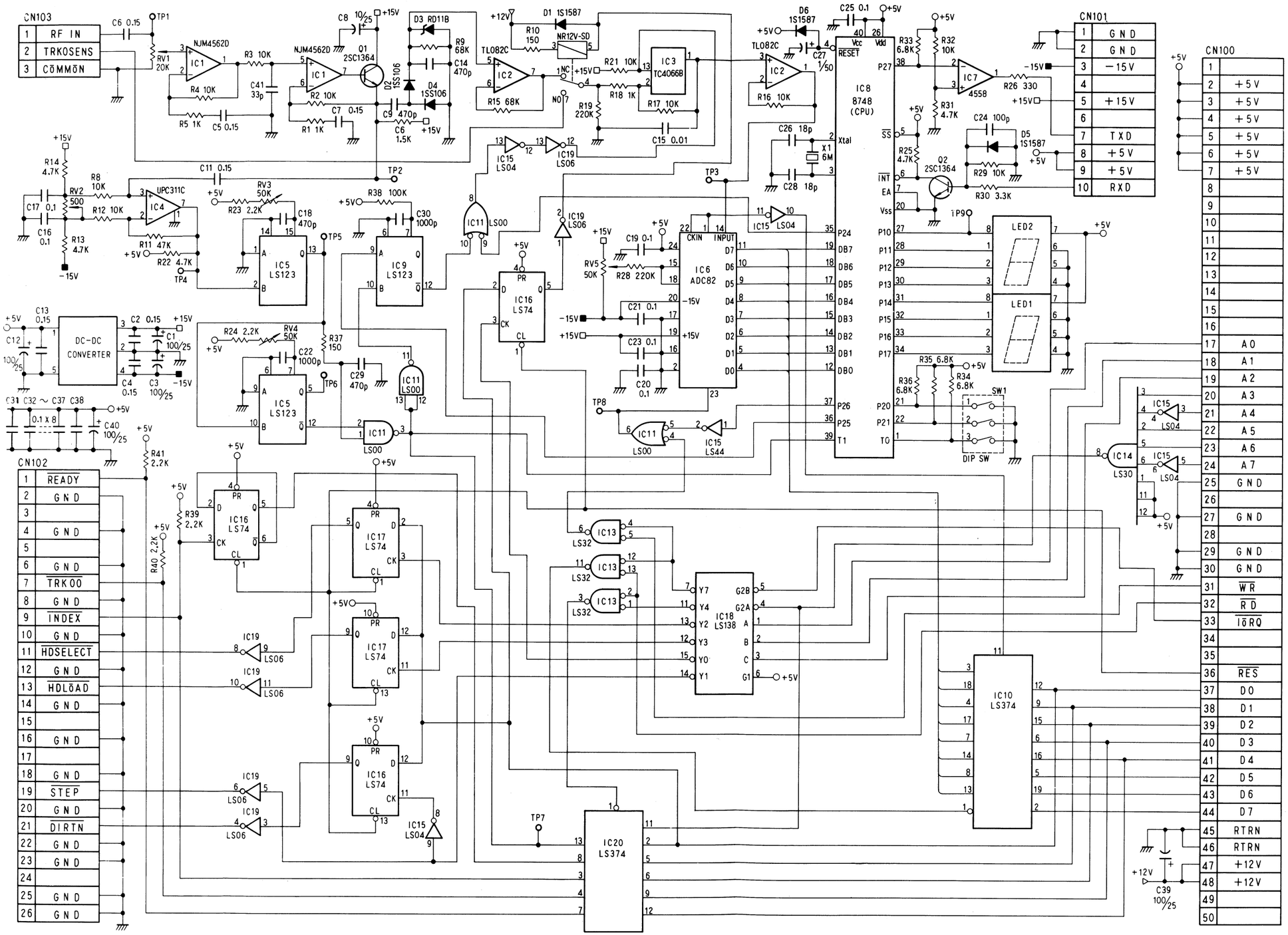


Fig. 2-9 Digitizer Circuit Diagram

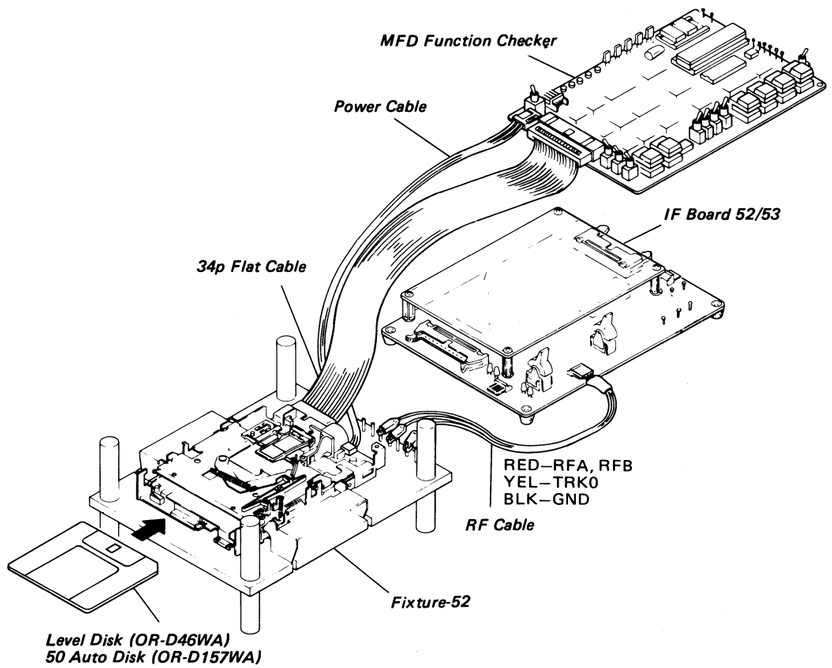


Fig. 2-10 Configuration for Function Check

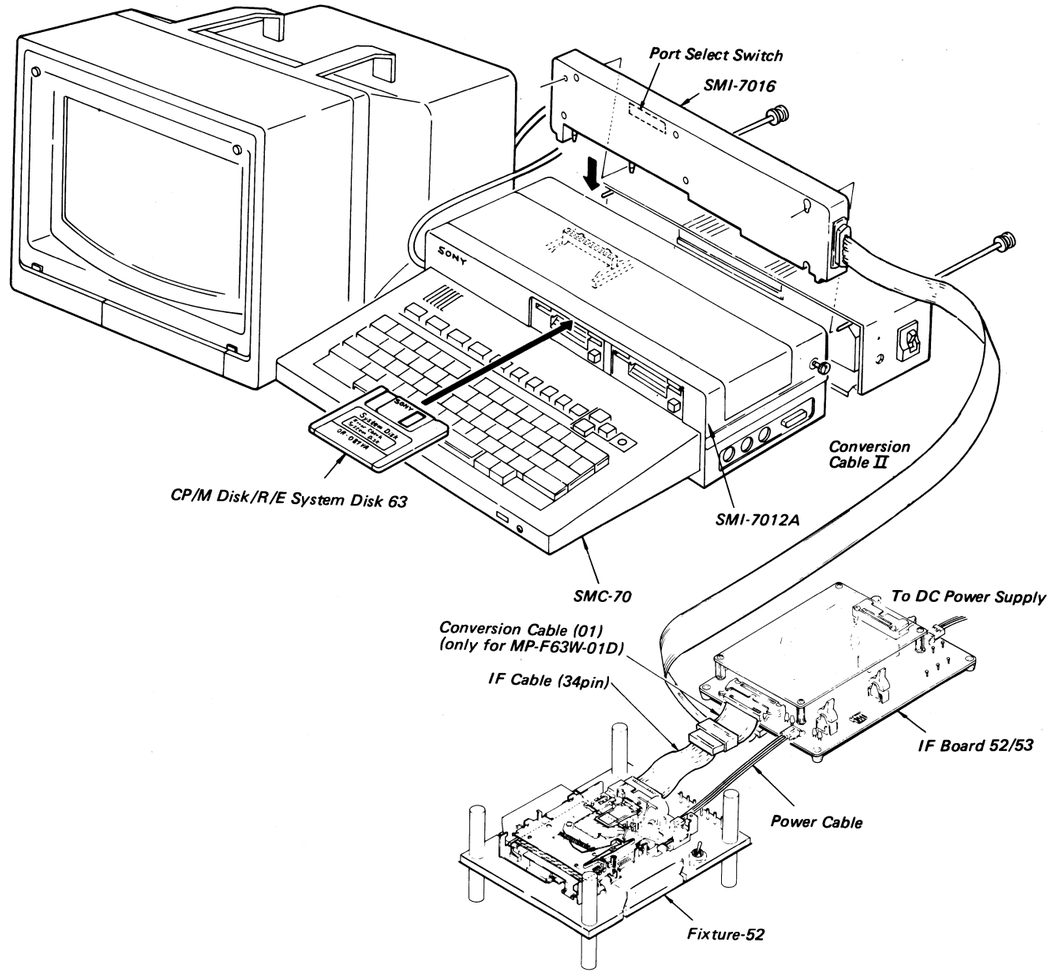


Fig. 2-11 System Configuration for Drive Test

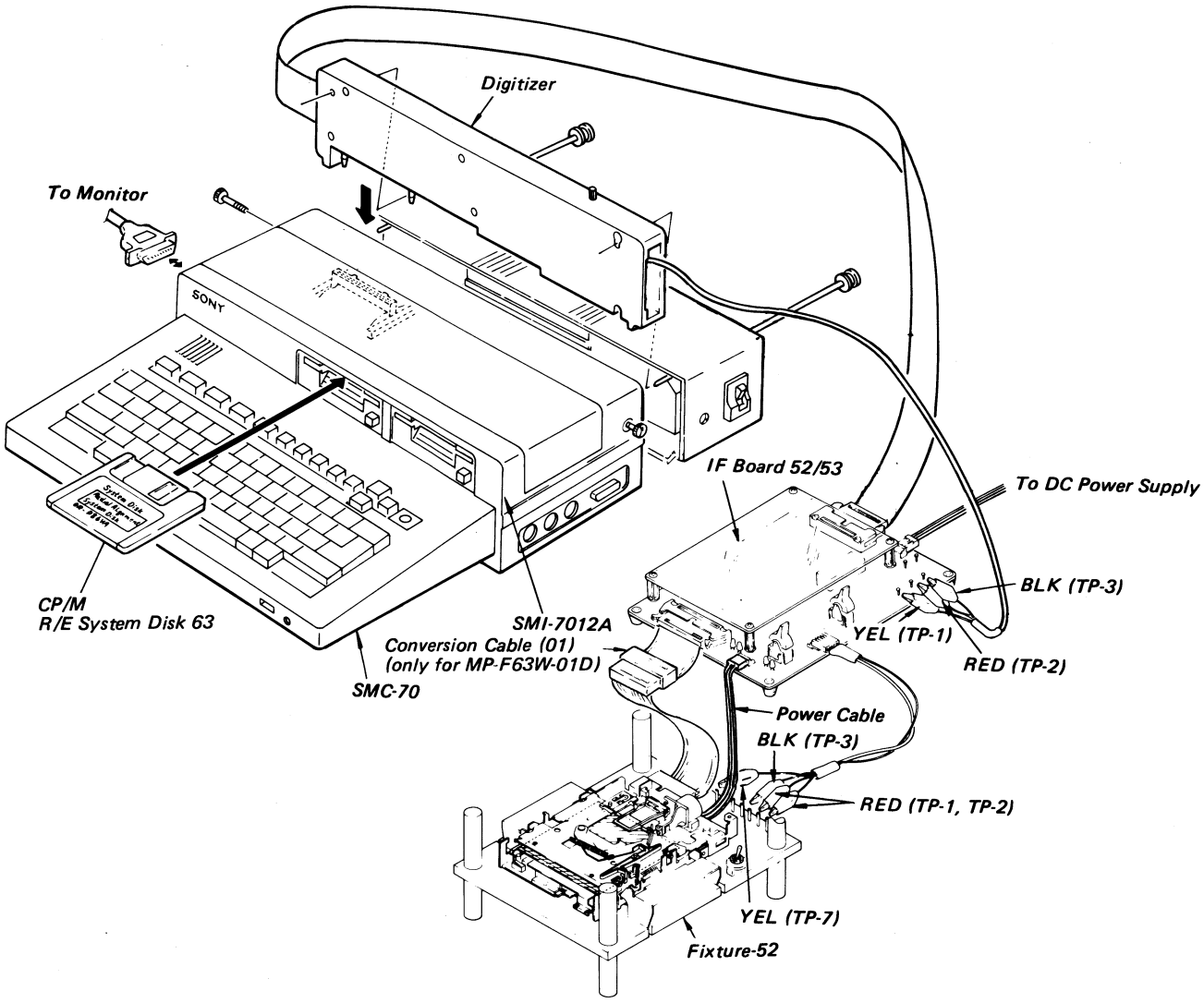


Fig. 2-12 System Configuration for Radial Alignment

SECTION 3
TROUBLESHOOTING

SECTION 3 describes the methods of troubleshooting. 3-2 refers to several errors specified in a system level. 3-3 describes normal operations and the check points for abnormal operations. These descriptions define the Error Spot under operating conditions.

3-1 BEFORE TROUBLESHOOTING

The following procedures are recommended to see if the drive is really faulty or not:

1) Incorrect operational procedure
2) program error of host system
3) Poor connection with host system (esp. GND-related connection, frame GND, etc.)
4) Defective disk. Check that same trouble occurs with other disks.
5) Environmental conditions (where electrical noise easily jumps into signal)
6) Influence of strong magnetic field
7) Wrong supply voltage
8) Wrong drive selection

3-2 TYPES OF ERROR ON A SYSTEM LEVEL

3-2-1 Soft Error

Soft error are caused by:

1) Dirty head
2) Electrical noise
3) Tracking error
4) Poor connection with system (GND-related connection)
5) Incorrect motor speed
6) Incorrect head compliance

Clean the head first by cleaning disk. Check for index pulse interval and head compliance and then read error spot more than several times. If not readable, move the head to the adjacent track in the same direction as before, then return to the desired track, and read. If readable this time, check radial alignment. (Refer to 5-1) If not readable yet, the error is not recoverable.

3-2-2 Write Error

To determine which of the disk or the drive fails the disk should be replaced by other disks and check that there still exists write error.
If write error does not exist any more, remove the old one. If write error exists with use of any disk, drive might cause write error.

3-2-3 Seek Error

Seek error comes from:

1) Head movement is incorrect because electrical noise jumps into signal.
2) Head driving system might be at fault. If it is not readable after re-calibration, drive might be at fault.

3-2-4 Interchange Error

If data written on one drive is readable correctly on another drive, but not by other drives, interchange error exists.
Interchange errors are caused by:

1) Head is not properly positioned.
2) Motor speed is not correct.
3) Optimum head output level and head compliance are not obtained.
4) Chucking mechanism does not work.

3-3 FAULT DIAGNOSIS BY MFD FUNCTION CHECKER

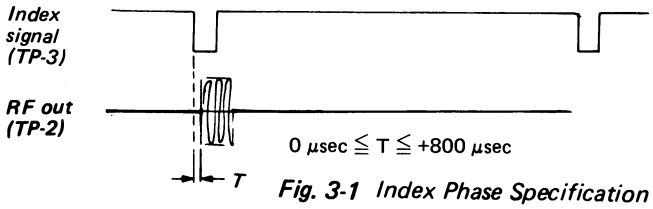
3-3-1 describes check method for normal operations in accordance with the predetermined procedures.
3-3-2 describes check points for abnormal operations which come out in accordance with the above procedures.

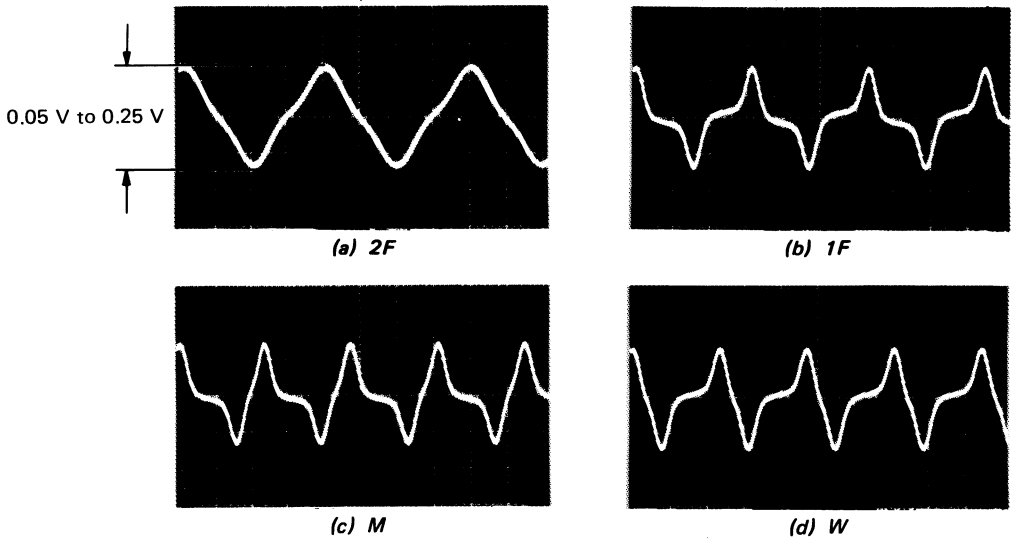
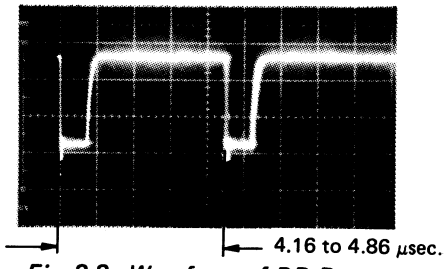
3-3-1 Normal Operation

Pre-setting:

1) Refering to Fig. 2-10 (Micro Floppydisk Drive Connection), connect the drive to MFD Function Checker.
2) Set the DRIVE SELECT switch (S101) on the disk drive to "0" (most right side).
3) Set the XADJ switch on the Fixture-63 to "OFF".
4) Set SW1 switch on the MFD Function Checker to "34+4".
5) Set the STEP RATE, TRK 00 ADJUST and RECALIBRATE switchs to "3ms", "off" and "on" side respectively.
6) Set the MON, HDSL and INUSE switchs to "off", "0" and "upper" sides respectively.
7) Slide all digit switch (0,1,2,3) of the DRIVE SELECT to the "lower" side.
8) Set the SW16 switch to 250Kbps side.

<table>
<tr><th>Procedure</th><th>Step</th><th>Operation</th></tr>
<tr><td>1</td><td>Power On</td><td>1. The disk motor remains stopped.</td></tr>
<tr><td>2</td><td>Drive Select</td><td>1. The head automatically returns to TRK00 and stops there and the WRTPRT, DSKCHG and TRK00 indicators light only when the DRIVE SELECT switch on the MFD Function Checker and the DRIVE SELECT switch (S101) on the disk drive are set as follows:
<table>
<tr><th>Function Checker</th><th>Disk drive (S101)</th></tr>
<tr><td>3</td><td>3</td></tr>
<tr><td>2</td><td>2</td></tr>
<tr><td>1</td><td>1</td></tr>
<tr><td>0</td><td>0</td></tr>
</table>
Otherwise, these indicators go out.</td></tr>
<tr><td>3</td><td>Stepping</td><td>1. When the STEP IN switch is pressed, the head is continuously stepped in until it arrives at TRK79.
2. When the STEP OUT switch is pressed, the head is continuously stepped out until it arrives at TRK00.
When the head is located on TRK00, the TRK00 indicator lights.</td></tr>
<tr><td>4</td><td>Motor Rotation</td><td>1. Insert the 50 Auto disk and then MOTOR ON switch on.
2. The motor rotates. (The INDEX indicator on the MFD Function Checker blinks.)
3. The TRK00, WRTPRT, READY and DSKCHG indicators light. (The READY indicator however, lights in about 1.5 seconds after the disk is inserted.)</td></tr>
</table>

Procedure	Step	Operation
5	CHGRST	1. The DSKCHG indicator goes out when the CHGRST switch is pressed.
6	Motor speed	1. The Motor speed can be measured at TRK35, on TP-3 of MFD Function Checker with an universal counter. It should be 200msec±3.0msec.
7	Index position	1. Connect the CH-1 and CH-2 probes of oscilloscope to TP-2 of IF Board 52/53 and TP-3 of MFD Function Checker. The oscilloscope is triggered by CH-2. 2. Set the HDSL switch to side 0. 3. The following waveform can be obtained on TRK40. **Note:** The holizontal range is 100 µsec/div. The trigger phase is minus.  *Fig. 3-1 Index Phase Specification* 4. Set the HDSL switch to side 1. 5. The waveform in Fig. 3-1 can be obtained on TRK40.
8	Cassette out	1. The DSKCHG indicator lights when the 50 Auto disk is ejected.
9	Write	1. Insert the Level disk. 2. Move head until it arrives at TRK79. 3. When the WRITE switch is pressed and "2F", "1F", "M" or "W" are written, the corresponding waveform can be obtained at TP-2 on IF Board 52/53. (Refer to Fig. 3-2) 4. Set the HDSL switch to side 1, and "2F", "1F", "M" or "W" are written, the corresponding waveform can be obtained at TP-2 on IF Board 52/53. (Refer to Fig. 3-2)

Procedure	Step	Operation
		 *Fig. 3-2 2F, 1F, M, W Signal Waveforms*
10	Output level	1. Set the HDSL switch to side 0. 2. Write "2F". The output signal level is 0.05 to 0.25Vp-p. (Refer to Fig. 3-2 (a)) 3. Set the HDSL switch to side 1. Write "2F". The output signal level is 0.05 to 0.25Vp-p. (Refer to Fig. 3-2 (a))
11	Peak Shift	1. Set the oscilloscope to only "CH-2" mode. 2. Change the CH-2 probe location of the oscilloscope from TP-3 on MFD Function Checker to TP-4. 3. Set the HDSL switch to side 0. 4. Write "M" or "W" onto TRK79. Such waveform as shown in Fig. 3-3 can be obtained at TP-4 on MFD Function Checker. The waveform in Fig. 3-3 shows the read data.  *Fig. 3-3 Waveform of RD Data* 5. Set the HDSL switch to side 1. 6. Repeat operation 4.

Procedure	Step	Operation
12	Track positioning	1. Eject the Level disk and then insert the 50 Auto disk. 2. Return the CH-2 probe location of the TP-4 (RDDATA) on MFD Function Checker to TP-3 (INDEX). 3. Set the HDSL switch to side 0. 4. Such a Cat's eye pattern signal as shown in Fig. 3-4 (a) can be obtained when the head accesses TRK00, 22, 27, 31, 36, 40, 45, 49, 54, 58, 63 or 79. The oscilloscope is triggered by CH-2. **Note:** Such a signal as shown in Fig. 3-4 (b) can be obtained when the head accesses TRK40. 5. Set the HDSL switch to side 1. Such a Cat's eye pattern signal as shown Fig. 3-4 (b) can be obtained. When the head accesses TRK40. 6. Set the HDSL switch to side 0 again. 7. Move the head onto TRK40. 8. Set amplitude L in Fig. 3-4 (b) to 4 divisions, and then read amplitude R in Fig. 3-4 (b). Calculate the OFF TRACK value, refering to Table 3-1, in accordance with R in Fig. 3-4 (b). Then, obtain the humidity-compensated OFF TRACK value from the following expression: The compensated OFF TRACK value = OFF TRACK value+0.2(50-H)(32-1.5S)/33.5 ....(1) **Where;** H: Relative humidity (%) S: Side Side0= 0 Side1= 1 The compensated OFF TRACK value should meet the following formula. $-26 \leqq$ compensated OFF TRACK value $\leqq +26$...(2)

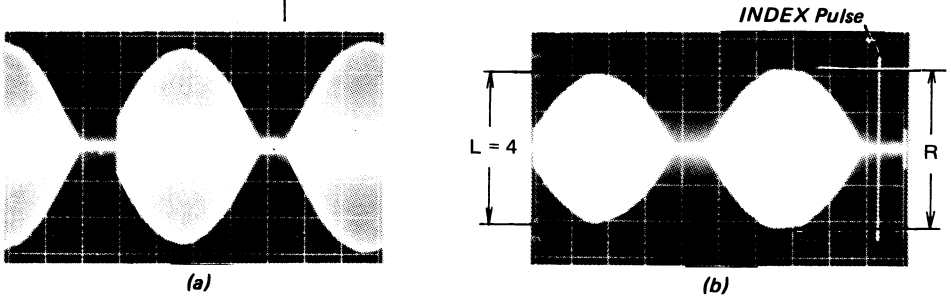


Fig. 3-4 Cat's eye Pattern Signal

(EX) For R = 3.6 in the MP-F63W, the apparent OFF TRACK value is as shown in table 3-1. Assuming the apparent OFF TRACK = 4.5, H = 60%, and S = 0, we can obtain the compensated OFF TRACK value as 2.589 from expression (1). This satisfy the formula.

Procedure	Step	Operation

	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
2:	28.7	26.8	25.0	23.2	21.5	19.8	18.2	16.7	15.2	13.7
3:	12.3	10.9	9.6	8.2	7.0	5.7	4.5	3.4	2.2	1.1
4:	0.0	-1.1	-2.1	-3.1	-4.1	-5.1	-6.0	-6.9	-7.8	-8.7
5:	-9.6	-10.4	-11.2	-12.0	-12.8	-13.6	-14.3	-15.1	-15.8	-16.5
6:	-17.2	-17.9	-18.5	-19.2	-19.8	-20.5	-21.1	-21.7	-22.3	-22.9
7:	-23.5	-24.0	-24.6	-25.1	-25.6	-26.2	-26.7	-27.2	-27.7	-28.2
8:	-28.7	-29.1	-29.6	-30.1	-30.5	-31.0	-31.4	-31.8	-32.2	-32.7
9:	-33.1	-33.5	-33.9	-34.3	-34.7	-35.0	-35.4	-35.8	-36.1	-36.5

Table 3-1

9. Set the HDSL switch to the side 1.
10. Repeat operation 8.

13 TRK00 sensor level

1. Connect the CH-1 probe of oscilloscope to TP-1 (TRK 0) on IF Board 52/53 and CH-2 probe to TP-7 (STEP) on MFD Function Checker.
2. The oscilloscope is triggered by CH-2 (STEP).
3. Move the head onto TRK01.
4. Set the TRACK 00 ADJUST switch to on.
5. At 2.6msec after triggered point, the voltage of the rising waveform must be more than 2.6V and that of the falling waveform must be less than 0.6V, as shown in Fig. 3-5.

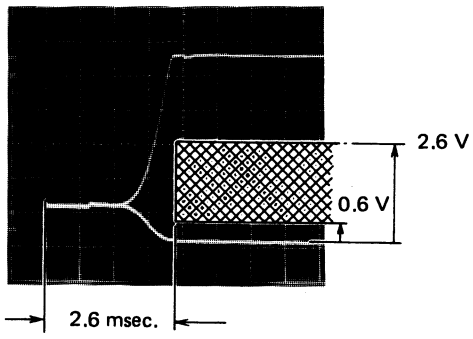


Fig. 3-5 TRK00 Sensor Level

3-3-2 Check Points to Abnormal Operation

Step	Abnormal Operation for each step	Check Point (defective place)	Normal Status
Power On	1. The Disk Motor rotates.	1. Disk Motor system.	The both signals of IC101-3 (CSTIN) and IC101-28 (MOTORON) are High level.
Drive Select	1. TRK00 indicator does not light, When the head is located on TRK00.	1. TRK00 sensing circuit.	IC101-35 is Low level, when the head is set to TRK00.
	2. The I/F indicators are put out for the selected combination, or they are lit for the unselected combination.	1. Drive Select circuit system.	The signal of IC101-37 (SELECT) is Low level.
Stepping	1. The Step operation does not function at all, or it is not smoothly functioned.	1. Stepping motor drive system or stepping motor itself. 2. IC103	The signal of IC103-7 is Low level during step operation. The both signals of CN102-1 and CN102-2 are High or Low level.
Motor Rotation	1. The disk motor does not rotate.	1. Disk motor drive system.	Q107-B and Q105-E are supplied +12V. The signal of IC105-7 is not Low level.
	2. The I/F indicators do not light.	1. If some I/F indicators are lit, the I/F signal circuit is defective.	
CHGRST	1. The DSKCHG indicator does not go out.	1. IC101	The signal of IC101-27 is Low level.
Motor Speed	1. Motor speed does not meet the specification.	1. X101	
	2. Motor speed is abnormally fast.	1. Disk motor drive system.	The pulse signal can be obtained at IC105-3.
Index Position	1. When the disk is inserted twice or more, positions on each track is varied 40μsec or more.	1. The chucking mechanism of the disk motor is defective.	
	2. When the disk is inserted twice or more, positions on each track is varied 40μsec or less. The shifted positions however do not meet the specification.	1. The index phase is mis-adjusted. (Refer to 5-3)	

Step	Abnormal Operation for each step	Check Point (defective place)	Normal Status
Cassette out	1. When the disk is ejected, the DSKCHG indicator does not light.	1. IC101 or S103	The both signals of IC101-3 and IC101-27 are Low level, respectively.
Write	1. The waveform signal can not be re-written at both sides.	1. Write Circuit	During write operation, the both signals of IC101-17 and IC102-29 are Low level.
	2. The waveform signal can not be re-written at side 0 or side 1.	1. Write Circuit	During write operation at side 0, the signal of CN105-4 is 12V. During write operation at side 1, the signal of CN106-2 is 12V.
Output level	1. The output signal level does not meet the specification at both sides.	1. IC102	
	2. The output signal level does not meet the specification at side 0 or side 1.	1. Head Carriage Ass'y (Refer to 4-7)	
Peak Shift	1. The shifted peak value does not meet the specification.	1. Head Carriage Ass'y (Refer to 4-7)	
Track Positioning	1. The ratio of the left to right signals does not meet the specification or signal does not appear.	1. Radial alignment is incomplete. (Refer to 5-1) 2. A seek error has occurred.	
TRK00 Sensor level	1. The output signal does not meet the specification.	1. The TRK00 sensor positioning is improper. (Refer to 5-1)	

3-4 FINAL CHECK

3-4-1 Setting of SMC System

a. Refering to Fig. 2-11, connect the drive to SMC system.

b. Set the PORT SELECT switch of SMI-7016 to "ON". (Refer to Operating Instructions)

c. Set the XADJ switch on the Fixture-63 to "OFF".

d. Place auto start switch located on the left side panel to "DISK".

e. Set the DRIVE SELECT switch (S101) of the unit to "3" (most left side).

f. Insert the CP/M Disk and Dynamic Inspection disk into drive A and test drive, respectively.

g. Turn on the power switch of SMC system. "A>" is displayed on screen.

h. Set the MOTOR ON switch on IF Board 52/53 to "ON" and POWER SEL switch to "OFF".

i. Eject the CP/M Disk and then insert the R/E System Disk-63.

j. Perform keying [E][C][K] and [RETURN].

3-4-2 Set the Check Area

Description	Keying	Display
To display original test condition of the disk.	[E][C][K] [RETURN]	***** Floppy Disk Analysis v3.0 ***** ***** Copyright (C) 1981.Sep. ***** [Test condition] drive C Minimum track 0 Maximum track 79 Minimum sector 1 Maximum sector 16 Sector size 256 Single or Double side? S Read & Write retry 1 Seek & Home retry 0 #Do you want to change these test conditions? (Y,N) =
To change any of test conditions.	[Y]	
Type the minimum track to be tested. (EX) In case it is TRK00.	[0] [RETURN]	+Minimum track 0 (track) ==>
Type the maximum track to be tested. (EX) In case it is TRK79.	[7][9] [RETURN]	+Maximum track 79 (track) ==>
Type the minimum sector to be tested. (EX) In case it is 1 sector.	[1] [RETURN]	+Minimum sector 1 (sector) ==> +Maximum sector 16 (sector) ==>

Description	Keying	Display
Type the maximum sector to be tested. (EX) In case it is 16 sector.	1 6 RETURN	+Sector size 256 (bytes) ==>
Type the number of byte size per a sector, to be tested. (EX) In case it is 256 bytes.	2 5 6 RETURN	+Single side or Double side? (S,D) ==>
Type D (initial name letter of double sided) of disk surface to be tested.	D RETURN	+Read P Write retry 1 (times) ==>
Type the number of how many retry must be conducted when read error or write error occurs. (EX) In case it is once.	1 RETURN	+Seek P Home retry 0 (times) ==>
Type the number of how many seek retry must be conducted when the error occurs. (EX) In case no retry is desired.	0 RETURN	*** Command table *** r := read test w := write test l := show disk condition s := set test condition h := help e := finish P exit to CP/M

3-4-3 Check the Drive Unit

The test item from command table must be chosen.

Description	Keying	Display
1. To read dynamic inspection disk or pre-recorded data disk. Type the number of pass-count for reading tracks and sectors pre-set in item 3-4-2. (EX) In case it is once.	R RETURN 1 RETURN RETURN	*** Read Test *** # Enter pass-count = # Test disk ready ? yes --> hit (Return) <<Pass-count = 1>> In-ward (trkmin --> trkmax) +Track=
Read test starts under the test condition pre-set in item 3-4-2. The test ends.		Out-ward (trkmax--> trkmin) +Track= *** Read Test End *** (1) Total of Seek error : 0 times during 00160 times seek. + Seek CRC error : 0 times + Seek error : 0 times (2) Total of Read error : 0 times during 02560 times read. + ID,DATA ADM missing : 0 times + ID CRC error : 0 times + DATA CRC error : 0 times + Lost data error : 0 times + Byte data verify Err : 0 times (3) Total of Write error: 0 times during 00000 times write. + ID, ADM missing : 0 times + ID CRC error : 0 times + Lost data error : 0 times + Write Protect error : 0 times + Write Fault error : 0 times
2. To write the data on a level disk. Note: Before writing data pattern on a level disk, formatting (initialization) can be mode automatically. If the some error occurs during the processing, the error will be displayed under title of "Initialize Test End".	W RETURN	*** Write Test *** *** Write data pattern *** Pattern No.1---Random data (all data random) Pattern No.2---Random data (1st byte-0AAh) Pattern No.3---Worst pattern (DBh, 6Dh, B6h) Pattern No.4---User definable # Select pattern number : (1,2,3,4)=

Description	Keying	Display
To select the data pattern.		
(EX)		
In case it is worst pattern.	[3]	
	[RETURN]	# Now, You select pattern No: 3
		# Test disk ready? yes--> hit (Return)
	[RETURN]	*** Write Test Start ***
		+Track=End
The test ends.		*** Write Test End ***
(EX)		
In case it is random data.	[1]	
(all data random.)	[RETURN]	# Now, You select pattern No: 1
		# Hit any key after few seconds ==>
Type any key.	[A]	# Test disk ready? yes--> hit (Return)
	[RETURN]	*** Write Test Start ***
		+Track=End
The test ends.		*** Write Test End ***
(EX)		
In case it is random data.	[2]	
(1st byte = 0AAh)	[RETURN]	# Now, You select pattern No: 2
		# Hit any key after few seconds ==>
Type any key.	[A]	# Test disk ready? yes--> hit (Return)
	[RETURN]	*** Write Test Start ***
		+Track=End
The test ends.		*** Write Test End ***
(EX)		
In case it is user definable.	[4]	
	[RETURN]	# Now, You select pattern No: 4
		+Enter hex data (1st Bytes)==>
Type the data of written it.		
(EX)		
In case it is "DA".	[D][A]	
Note: Only 2 characters can be assigned for each byte; the character of more than two is disregarded. The key [RETURN] must be depressed at the end of each byte. Maximum twenty(20) characters (ten kind of byte-10th bytes) can be assigned.	[RETURN]	+Enter hex data (2nd Bytes)==>
	[RETURN]	# Test disk ready? --> hit (Return)
	[RETURN]	*** Write Test Start ***
		+Track=End
The test ends.		*** Write Test End ***

Description	Keying	Display
3. To display the test condition.	[L] [RETURN]	[Test condition] drive C Minimum track 0 Maximum track 79 Minimum sector 1 Maximum sector 16 Sector size 256 Single or Double side? S Read & Write retry 1 Seek & Home retry 0
4. To change any of test condition. (Refer to item 3-4-2)	[S] [RETURN]	# Do you want to change these test conditions? (Y,N) =
5. To display the command table.	[H] [RETURN]	*** Command table *** r := read test w := write test l := show disk condition s := set test condition h := help e := finish P exit to CP/M
6. To end the test or retest from the first step.	[E] [RETURN]	A>

3-4-4 Error Message

KIND OF ERROR	ERROR MESSAGE	CONSIDERABLE CAUSE	COUNTERMEASURE (CONFIRMATION/ADJUSTMETNT)
SEEK ERROR	Seek CRC error Seek error	Stepping motor circuit or itself is out of order.	Confirm the function of stepping motor circuit or stepping motor itself.
READ ERROR	ID, data, ADM missing	Read circuit is out of order.	Confirm the read circuit. (at first check RF output)
	ID, data CRC error	Off track, chucking trouble, wrong head compliance.	Confirm head compliance, (Refer to 5-2) chucking mechanism or radial alignment and TRK00 sensor (Refer to 5-1).
WRITE ERROR	ID ADM missing	No write function. (write circuit is out of order, no formatting)	Confirm the waveform of RF output.
	ID CRC error	Off track, wrong head compliance, chucking trouble, or disk.	Confirm the radial alignment and TRK00 sensor (Refer to 5-1), head compliance (Refer to 5-2), or chucking mechanism.
	Write protect error	Condition is set to write protect.	Confirm Media, write protect circuit or write protect mechanism.
CONNECTION ERROR	Disk not ready	Disk is not inserted, or the insertion is not detected.	Confirm disk detect circuit.
	Drive not connected	DC power is not supplied, or a drive is not selected.	Confirm DC power supplier, drive select switch position and drive select circuit.

SECTION 4
PART REPLACEMENT

4-1 FRONT PANEL ASS'Y REPLACEMENT

4-1-1 Removal

a. Eject the dummy cassette if it is in a drive.

b. Push slightly the plastic hinge located in the center on either of right or left sides, and pull slowly its side toward you. (Refer to Fig. 4-1) The Front Panel Ass'y is taken away.

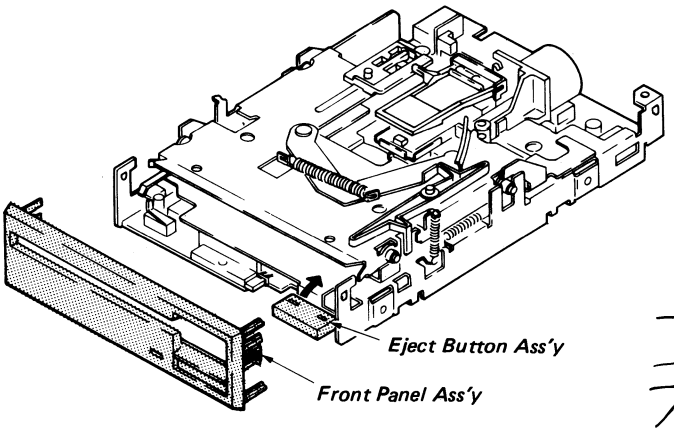


Fig. 4-1 Front Panel Ass'y Replacement

c. Take out the Eject Button Ass'y while twisting it to the right side or the left side alternately, as shown in the Fig 4-1.

Note: The Eject Button Ass'y should not be reused because of the deterioration of the securement.

4-1-2 Installation

a. Install the new Eject Button Ass'y by twisting it once into the hinge of slide plate ass'y.

Note: The Eject Button Ass'y should not be located with large play.

b. Install the Front Panel Ass'y by sliding the plastic hinge on either of right or left sides, into the metal frame.

c. Make sure that the protuberance of LED is properly located in the recess of the Front Panel Ass'y. If not, dislocate the Front Panel Ass'y and instal it again with the proper location of LED.

4-2 SHIELD COVER REPLACEMENT

4-2-1 Removal

a. Insert your finger into the rear right side portion of the Shield Cover as shown in Fig. 4-2, and dislocate the cover from the hook while applying some force to the direction marked with arrow. Dislocate the rear left side portion of the cover from the hook and the whole Shield Cover can be taken out.

4-2-2 Installation

a. Match the cutting edge with the emboss located in the front side of the drive and then put the rear of the Shield Cover into the proper position. (Refer to Fig. 4-2)

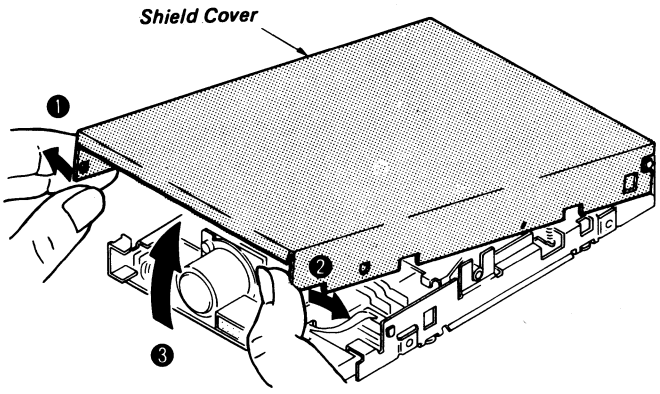


Fig. 4-2 Shield Cover Replacement

4-3 FC MOUNTED BOARD REPLACEMENT

4-3-1 Removal

a. Remove the shield cover. (Refer to 4-2)

b. Disconnect the all connectors. (CN102 for Stepping Motor, CN104 for TRK00 Sensor, CN105 and CN106 for Head Carriage Ass'y)

c. Remove the screw (K2x2) securing the Rotor Yoke from rotor boss and then remove the Rotor Yoke. (Refer to Fig. 4-3)

d. Remove the four screws (P2.6x6) securing the Stator Yoke and then remove the Stator Yoke and Rotor Spacer. (Refer to Fig. 4-3)

e. Remove the two screws (P2.6x6) and a toothed lock washer securing the Mounted Board from the chassis ass'y and then remove the Mounted Board. (Refer to Fig. 4-3)

4-3-2 Installation

Note: check if the switch lever of write protection is not damaged before installation.

a. Install the Mounted Board with two screws (P2.6x6) (One screw with a toothed lock washer).

b. Install the Stator Yoke and Rotor Spacer with four screws (P2.6x6). (Refer to Fig. 4-3)

c. Be careful not to damage to six disk motor coils for disk motor, while installing the Rotor Yoke with a screw (K2x2). (Refer to Fig. 4-3)

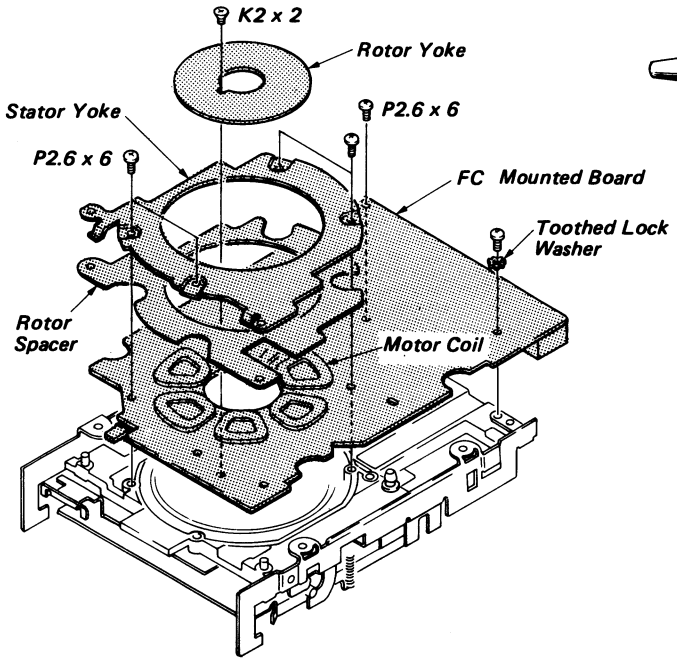


Fig. 4-3 FC Mounted Board Replacement

d. Connect the all connectors.

e. Perform the Index Phase. (Refer to 5-3)

f. Install the shield cover. (Refer to 4-2)

e'. Perform the radial alignment and TRK00 sensor adjustment. (Refer to 5-1)

4-4 CASSETTE HOLDER AND HEAD LIFTER REPLACEMENT

4-4-1 Removal

a. Remove the shield cover. (Refer to 4-2)

b. Set a piece of paper between both heads with tweezers, and then manually set the Disk-in mode. (Refer to Fig. 4-4 (a))

c. While lifting the tab of the Head Lifter as shown in Fig. 4-4 (b), take it out toward the rear of the drive carefully. Don't apply excessive force to the head carriage ass'y.

d. Push the eject lever to set the Disk-out mode.

e. Remove the one end of compression springs on the both sides plate of the drive.

f. While pushing the eject lever, take the Cassette Holder. (Refe to Fig. 4-4 (b))

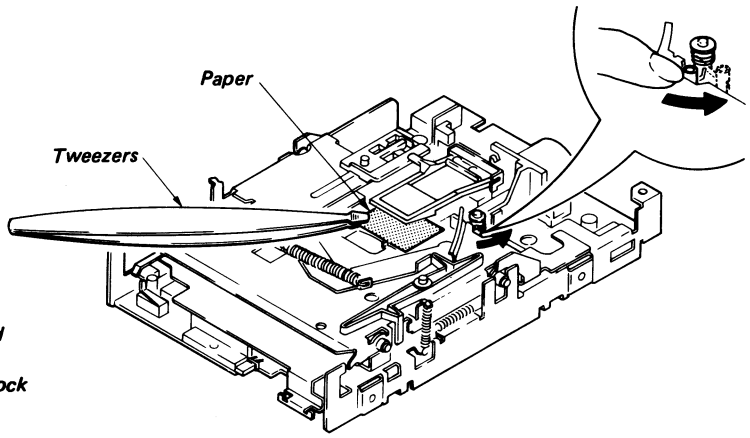


Fig. 4-4 (a) Setting to Disk-In Mode

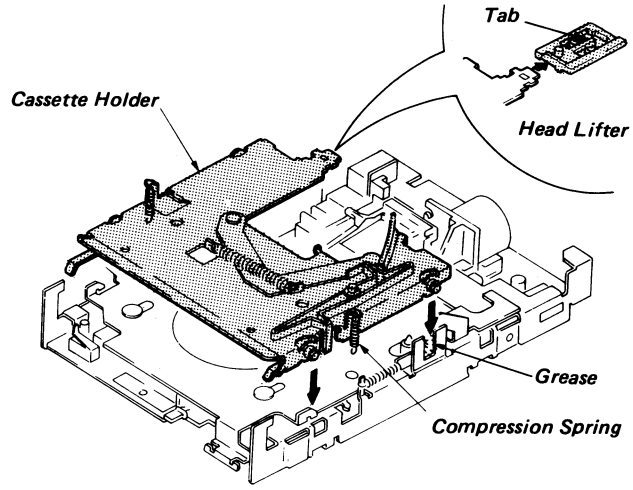


Fig. 4-4 (b) Cassette Holder and Head Lifter Replacement

4-4-2 Installation

Note: Apply Molykote Grease (EM10L) to the specified area of both side plates as shown in Fig. 4-4 (b).

a. While pushing the eject lever, set the Cassette Holder into the location shown by the arrow and then hang a compression spring on each side of the drive as shown in Fig. 4-4 (b).

b. Manually set the Disk-In mode.

c. Set the Head Lifter into the Cassette Holder. Don't apply any excessive force to the head carriage ass'y.

d. Push the eject lever and then take out a piece of paper between heads.

e. Install the shield ass'y. (Refer to 4-2)

4-5 ZERO PHOTO SENSOR ASS'Y REPLACEMENT

4-5-1 Removal

a. Remove the shield cover. (Refer to 4-2)

b. Connect the drive to the MFD Function Checker as shown in Fig. 2-10, move the head to TRK79 and then disconnect the drive from the MFD Function Checker.

c. Disconnect the connector CN104 (Zero Photo Sensor Ass'y) from the Mounted Board.

d. Remove the screw (PSW2.6x6) securing the Zero Photo Sensor Ass'y. Pull it out carefully toward the rear of drive. Don't apply any excessive force to the head carriage ass'y and flexible boards, during the removal. (Refer to Fig. 4-5)

4-5-2 Installation

a. Be careful to put the Zero Photo Sensor Ass'y underneath the arm of the head carriage ass'y as shown in Fig. 4-5, and install the Zero Photo Sensor Ass'y.

b. Connect the connector CN104 to the Mounted Board.

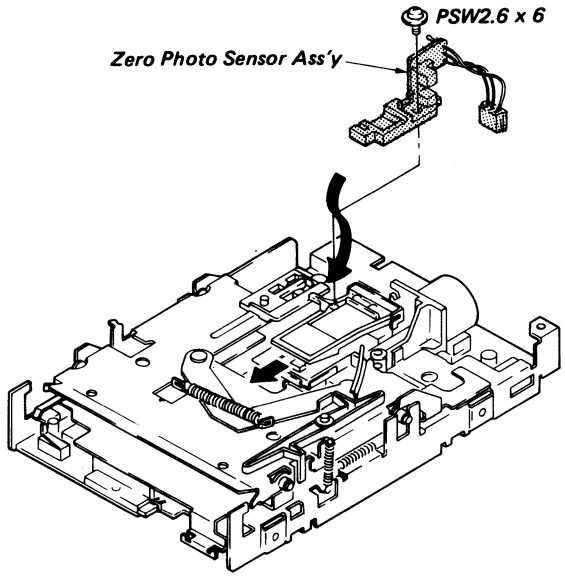


Fig. 4-5 Zero Photo Sensor Ass'y Replacement

c. Perform the radial alignment and TRK00 senser adjustment. (Refer to 5-1)

d. Install the shield cover. (Refer to 4-2)

4-6 SLIDE PLATE AND LEFT / RIGHT SIDE PLATES REPLACEMENT

4-6-1 Removal

a. Remove the front panel ass'y. (Refer to 4-1)

b. Remove the shield cover. (Refer to 4-2)

c. Remove the cassette holder and head lifter. (Refer to 4-4)

d. Remove the screw (P2.6x6) securing the mounted board. (Refer to Fig. 4-6 (a))

e. Remove the one end of compression spring on the right side plate ass'y.

f. Remove the four spacers securing the Slide Plate and then remove the Slide Plate.

g. Remove the four screws (P2.6x4) securing the both side plates and then remove the both side plates.

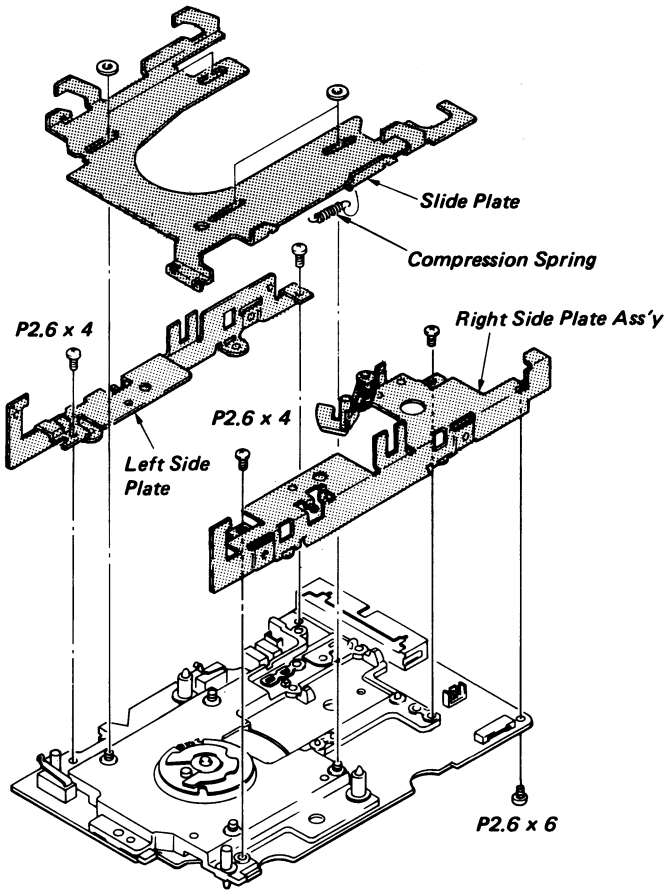


Fig. 4-6 (a) Slide Plate and Left/Right Side Plate Replacement

4-6-2 Installation

a. Install the both side plates with four screws (P2.6x4). (Refer to Fig. 4-6 (a))

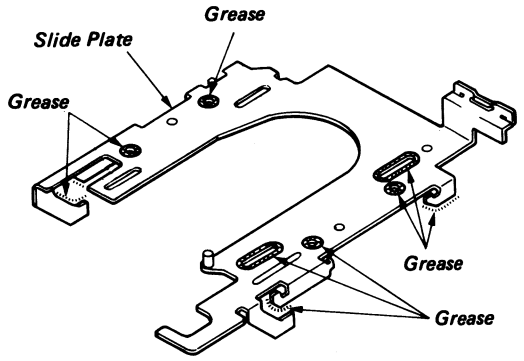
b. Apply Molykote Grease (EM10L) to the specified area of Slide Plate before the installation as shown in Fig. 4-6 (b). Put a Slide Plate on the chassis ass'y while pushing eject lever and then install the four spacers.

c. Install the cassette holder and head lifter. (Refer to 4-4)

d. Install the shield cover. (Refer to 4-2)

e. Install the front panel ass'y. (Refer to Fig. 4-1)

f. Make the head clean. (Refer to 5-4)



other side of Slide Plate

(b) Grease Application Location

4-7 HEAD CARRIAGE ASS'Y REPLACEMENT

4-7-1 Removal

a. Remove the shield cover. (Refer to 4-2)

b. Set a piece of paper between both heads and then manually set the disk in mode. (Refer to Fig. 4-4 (a))

c. Disconnect the connectors CN105 and CN106 (flexible boards).

d. Remove the head lifter. (Refer to 4-4)

e. Remove the two screws (K2.6x6) securing the Head Carriage Ass'y and then remove the Head Carriage Ass'y and slide guide shaft. (Refer to Fig. 4-7 (a))

4-7-2 Installation

Note: Apply Sony oil to the guide shaft before installation. Apply Sony oil to the openings of Head Carriage Ass'y using the bamboo stick.

a. Set the +Bit to the torque driver.

b. Pass the guide shaft through the opening of Head Carriage Ass'y.

c. Install the Head Carriage Ass'y and the guide shaft in place. (Refer to Fig. 4-7 (a))

d. Fasten the two screws (K2.6x6) securing the slide guide shaft to the chassis with a torque driver (with a 4Kg-cm).

e. Connect the flexible boards to CN105 and CN106 on the FC mounted board.

f. Insert the level disk and check if the clearance between head arm and head lifter is kept as shown in Fig. 4-7 (b).

g. Perform the radial alignment and TRK00 sensor adjustment. (Refer to 5-1)

h. Perform the head compliance. (Refer to 5-2)

i. Perform the Index Phase. (Refer to 5-3)

j. Install the shield cover. (Refer to 4-2)

k. Make the head clean. (Refer to 5-4)

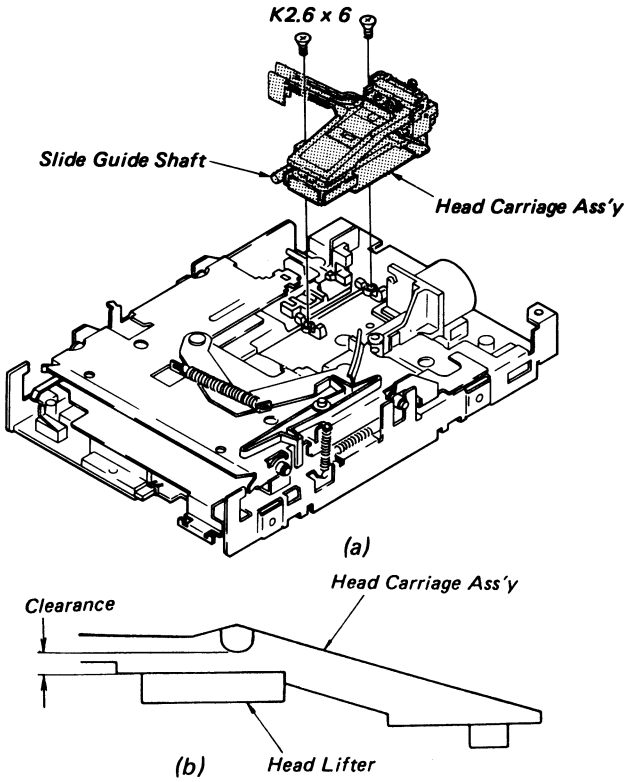


Fig. 4-7 Head Carriage Ass'y Replacement

4-8 STEPPING MOTOR REPLACEMENT

4-8-1 Removal

a. Remove the shield cover. (Refer to 4-2)

b. Connect the drive to the MFD Function Checker as shown in Fig. 2-10, move the head to TRK79 and then disconnect the drive from the MFD Function Checker

c. Set a piece of paper between both heads and then manually set the Disk-in mode. (Refer to Fig. 4-4 (a))

d. Remove the head lifter. (Refer to 4-4)

e. Disconnect the connector CN102 (Stepping Motor) from the mounted board.

f. Remove the two screws (P2.6x6) securing the Stepping Motor. While lifting the head carriage ass'y a little, twist the Stepping Motor a little and separate the needle pin of head carriage ass'y from the lead screw of the Stepping Motor, as shown in Fig. 4-8. Don't apply any excessive force to the needle pin of head carriage ass'y.

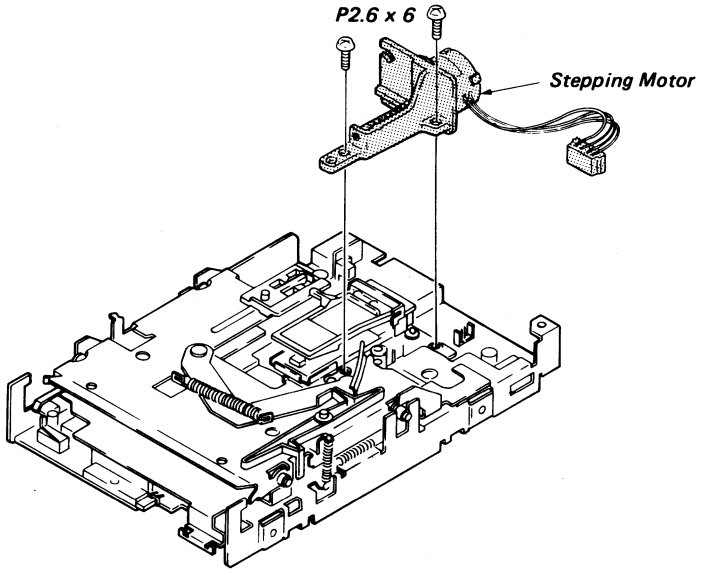


Fig. 4-8 Stepping Motor Replacement

4-8-2 Installation

Note: Apply Molykote Grease (EM10L) (same quantity of match tip) on whole area of lead screw before the installation.

a. While lifting the head carriage ass'y a little, insert the lead screw between the needle and plate spring of head carriage ass'y, and install the Stepping Motor with two screws (P2.6x6).

b. Connect the connector CN102 (Stepping Motor).

c. Push the eject lever and then take out a piece of paper between heads.

d. Perform the radial alignment and TRK00 sensor adjustment. (Refer to 5-1)

e. Install the shield cover. (Refer to 4-2)

f. Make the head clean. (Refer to 5-4)

SECTION 5
CHECK AND ADJUSTMENT

5-1 RADIAL ALIGNMENT AND TRK00 SENSOR

Disassemble the following parts and then perform the measurement and adjustment.

a. Shield Cover (Refer to 4-2)

5-1-1 Tools and Measuring Equipment

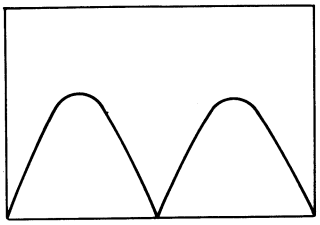
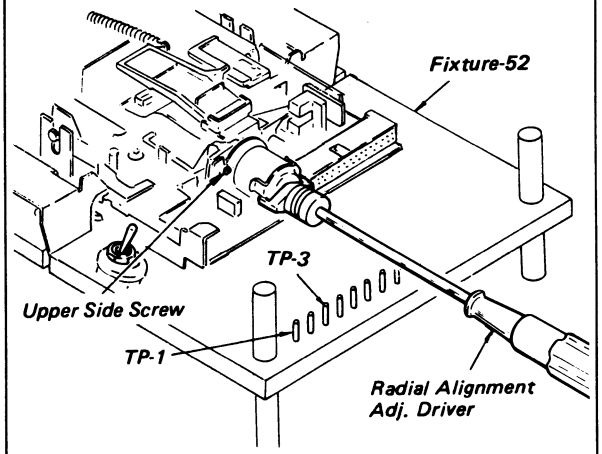
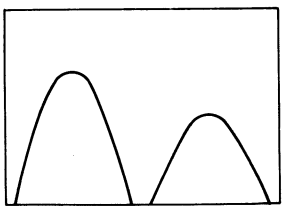
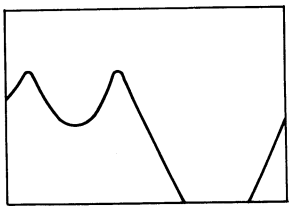
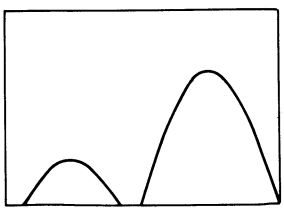
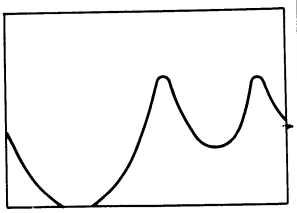
a. SMC System
b. R/E System Disk-63 (OR-D174VA)
c. 50 Auto Disk (OR-D157WA)
d. CP/M Disk
e. TRK00 Sensor Adj. Driver
f. Radial Alignment Adj. Driver
g. Torque Driver
h. Digitizer
i. Fixture-63
j. IF Board 52/53
k. Conversion Cable (01) (only for MP-F63W-01D)

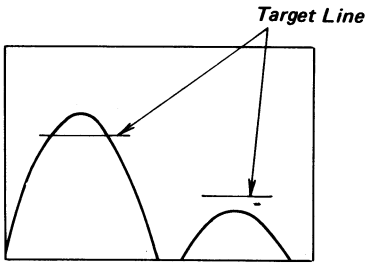
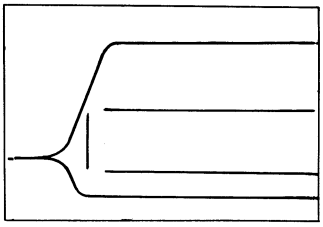
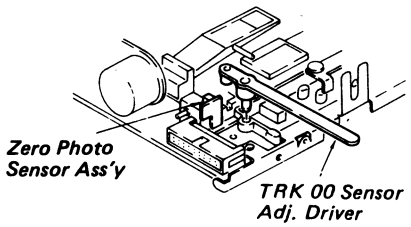
5-1-2 Initial Setting

a. Connect the system as shown in Fig. 2-12.
b. Insert the CP/M Disk into the SMC System.
c. Turn on the power switch. "A>" is displayed on screen.
d. Eject the CP/M Disk and then insert the R/E system disk-63.
e. Perform keying [A][D][6][3] and [RETURN].
f. Connect the disk drive (under test) to the cable which leads to the IF board 52/53, insert the 50 Auto Disk, and set the DRIVE SELECT switch (S101) to 0 (most right side). (Refer to Fig. 2-12)
g. The set-up command is automatically setted.

Note: For resuming the state of SMC system to the initial state (that appears immediately after power goes on) press the reset button.

Function	Keying	Display
		=== SET UP MENU === [1] HUMIDITY ..... : 50 [%] [2] OFF TRACK ..... : 26 [μm] [3] Exit
1. The initial value for the humidity is to be set it at 50%. (EX) In case the humidity of 60% is keyed in,	[1] [6][0] [RETURN]	(1) HUMIDITY..... :
2. The initial value for the specified off track is to be set at 26μm. (EX) In case an off track of 30μm is keyed in,	[2] [3][0] [RETURN]	(2) OFF TRACK ..... :
3. After the SET UP ends, the drive under test is set in the Fixture-52 and 34 pin connector and power connector is connected to the drive, hit the [3] key. **Note:** This will start the adjustment.	[3]	Turn on the power of IF board.
4. Set POWER SEL switch to "OFF" side. (D1/D2 indicators do not light.)	[RETURN]	Set XADJ SW to OFF.
5. Set XADJ SW to "OFF" side.	[RETURN]	Set MOTOR ON SW to ON and insert Alignment Disk.

Function	Keying	Display
6. Turn the MOTOR ON switch of IF Board-52/53 off and then on, and insert a 50 Auto disk.		Set XADJ SW to ON.
7. Set XADJ switch to "ON" side.	RETURN	=== PRE ADJSTMENT ===
8. Loose the upper side screw securing the stepping motor. Turn the stepping motor with the Radial Alignment Adj. driver as shown in Fig. 5-1 (b) until the amplitude ratio of left and right peaks becomes equal. (Refer to Fig. 5-1 (a))		 Fig. 5-1 (a)
Note: When the ratio of left and right peaks is within the specification, wave lines become red color.		 Fig. 5-1 (b) Radial Alignment Adjustment
9. When the adjustment does not satisfy the specification (wave lines do not become red color), move the head innerwards or outerwards by pushing the arrow key [->] or [<-]. **Note:** [<-] move the head innerward. [->] move the head outerward. **Note:** If adjustment of the stepping motor cannot be conducted, first find the appropriate position in accordance with the followings, and perform the adjustment again. (1) When the cat's eye pattern is similar to Fig. 5-1 (c) or (d), turn the Radial Alignment adj. driver clockwise. (2) When the cat's eye pattern is similar to Fig. 5-1 (e) or (f), turn the Radial Alignment Adj. driver counterclockwise.		 Fig. 5-1 (c)  Fig. 5-1 (d)
10. Hit [RETURN] key. **Note:** Unless the wave line become pink color, the next step cannot be executed even if [RETURN] key is depressed.	RETURN	 Fig. 5-1 (e)  Fig. 5-1 (f)

Function	Keying	Display
11. The off track value of TRK00 to TRK79 is being measured, and then the calculation is completed. The maximum and minimum off track values are displayed. 12. The RF signals on adjustment tracks and two target lines are simultaneously displayed on screen. Turn the stepping motor with the Radial Alignment Adj. driver until the peak points of the cat's eye pattern reach the target line. (Refer to Fig. 5-1 (g)) **Note:** At the point of correct adjustment, the color of target lines becomes red. **Note:** Unless the stepping motor is located at the point of the correct adjustment, the next step cannot be executed even if RETURN key is depressed. 13. Tighten the upper-side screw securing the stepping motor by the torque driver with the torque force of 3 to 3.5Kg-cm. 14. Apply the nut lock paint to the upper side screw. 15. The adjustment of TRK00 sensor level is executed. 16. The TRK00 sensor level is displayed. Loose the screw securing the Photo Zero Sensor Ass'y, and move the board by the TRK00 Sensor adj. driver so that the upper or lower lines does not cross the red lines marked. (Refer to Fig. 5-1 (h), (i)) Tighten the screw by the torque driver with the torque force of 4Kg-cm.	RETURN	Max=x.x Min=x.x  *Fig. 5-1 (g)*  *Fig. 5-1 (h) TRK00 Sensor Level*  *Fig. 5-1 (i) TRK00 Sensor Level Adjustment*

Function	Keying	Display
17. Hit [RETURN] key. **Note:** Unless the location of the photo zero sensor ass'y is properly settled, the next step cannot be executed even if [RETURN] key is depressed.	[RETURN]	Set XADJ SW to OFF.
18. Set the XADJ switch of Fixture-52 to "OFF" side.	[RETURN]	
19. The off track value of TRK00 to TRK79 is being measured, and then the calculation is completed. The maximum and minimum off track values are displayed.		Max=x.x Min=x.x
20. If the adjustment is within the specification, the CRT screen is changed to green color and message may be displayed. or If not, the CRT screen is changed to red color.		Change IC Link (PS101) condition. a) None --> Mount or b) Mounted --> Remove
21. To retry the adjustment, hit [RETURN] key. or To ternimate the adjustment, hit the key of [E].	[RETURN] or [E]	Turn on the power of IF board. A>
22. When the message of step 20 is displayed on the screen, de-solder IC link (PS101) from the FC board if it is located or solder it to the designated place if it is not located.		

5-2 HEAD COMPLEANCE

Disassemble the following parts and then perform the measurement and adjustment.

a. Shield Cover (Refer to 4-2)

5-2-1 Tools and Measuring Equipment

a. Oscilloscope
b. Fixture-63
c. MFD Function Checker
d. IF Board 52/53
e. Pad Weight
f. Level Disk (OR-D46WA)
g. Conversion Cable (01) (only for MP-F63W-01)

5-2-2 Measurement

a. Connect the drive to the MFD Function Checker. (Refer to Fig. 2-10) Insert the level disk in place.
b. Connect the CH-1 and CH-2 probes of oscilloscope to TP-2 of IF Board 52/53 and TP-3 of MFD Function Checker. The oscilloscope is triggered by CH-2.
c. Move the head until it arrives at TRK79, and then pad weight is loaded on head carriage ass'y as shown in Fig. 5-2.
d. Write "2F" on TRK79.
e. Observe the waveform of out-put signal by setting the timing knob of oscilloscope to 20msec.
f. Take the Pad Weight, and check if the out-put signal level variation at between unloading and loading of the Pad Weight is 5% or less of that obtained by item "e".

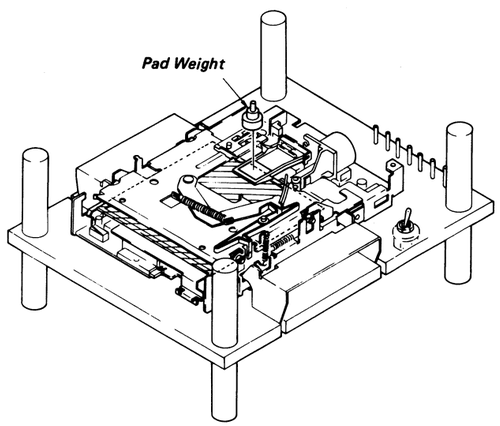


Fig. 5-2 Head Compliance Measurement

5-2-3 Adjustment

a. If the out-put signal level does not meet item 5-2-2 "f", replace the head carriage ass'y. (Refer to 4-7)

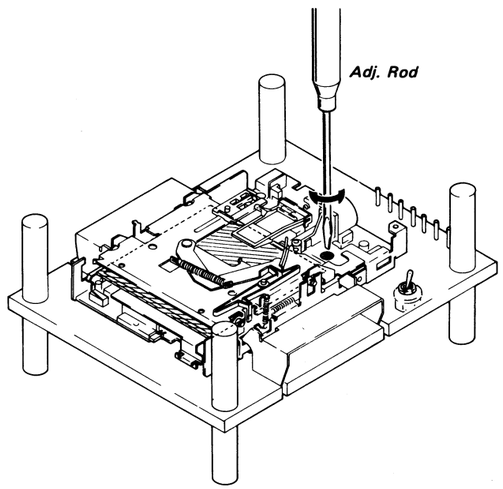
5-3 INDEX PHASE

Disassemble the following parts and then perform the measurement and adjustment.

a. Shield Cover (Refer to 4-2)

5-3-1 Tools and Measurement Equipment

a. Oscilloscope
b. MFD Function Checker
c. IF Board 52/53
d. 50 Auto Disk (OR-D157WA)
e. Adj. Rod
f. Fixture-63
g. Conversion Cable (01) (only for MP-F63W-01D)



(a)

Fig. 5-3 Index Phase Adjustment

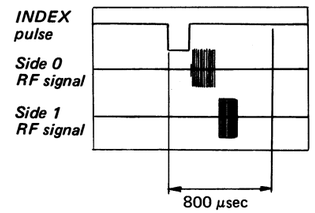
5-3-2 Measurement

a. Connect the drive to the MFD Function Checker. (Refer to Fig. 2-10)
b. Insert the 50 Auto Disk in place.
c. Connect the CH-1 and CH-2 probes of oscilloscope to TP-2 of IF Board 52/53 and TP-3 of MFD Function Checker. The osciloscope is triggered by CH-2.
d. Move the head to TRK40.
e. Check if the phase relation at both sides between the INDEX signal and output signal meets the specification as shown in Fig. 5-3 (a).

5-3-3 Adjustment

a. If the phase relation described above does not meet the specification, adjust RV101 so that INDEX pulse on both sides are within 0 to +800μsec as Fig. 5-3 (b) with an adj. rod tool.

Note: If adjustment of RV101 does not satisfy the specification, the disk drive motor may be damaged.



(b)

Fig. 5-3 Index Phase Adjustment

5-4 HEAD CLEANING

5-4-1 Tools and Measuring Equipment

a. Cleaning Disk (OR-D29WA)
b. MFD Function Checker
c. IF Board 52/53
d. Fixture-63
e. Conversion Cable (01) (only for MP-F63W-01D)

5-4-2 Cleaning with Cleaning Disk

a. Connect the drive to the MFD Function Checker. (Refer to Fig. 2-10)
b. Move the head until it arrives at an unused track of the cleaning disk.
c. Set the cleaning disk in place and hold it for about 10 seconds. Thereafter, eject the cleaning disk.

Note: Do not use any scratched cleaning disk. Do not reuse any used track because reuse of the track weakens the cleaning effect on the head.

Note: Cross out numbers of the used tracks on a cleaning disk label, as shown in the example for avoiding reusage.

Cleaning Disk

Check Column

~~00~~	~~01~~	~~02~~	03	04	05	06	07	08	09
10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29
30	31	32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47	48	49
50	51	52	53	54	55	56	57	58	59
60	61	62	63	64	65	66	67	68	69
70	71	72	73	74	75	76	77	78	79

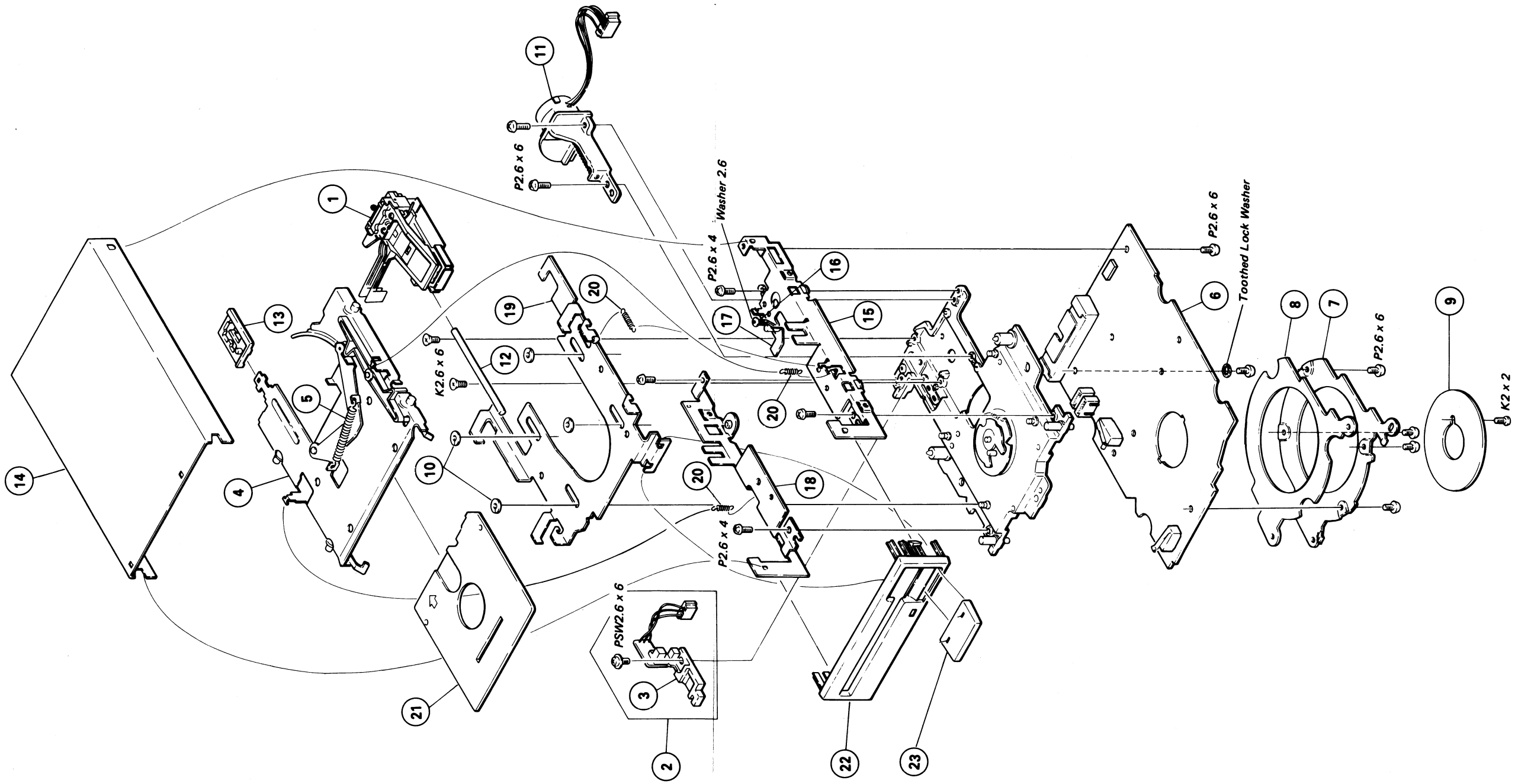
OR-D29WA

SECTION 6

PARTS LOCATION AND LIST

(Serial No. 10,000,001 thru 11,000,000)

6-1. PARTS ASS'Y LOCATION



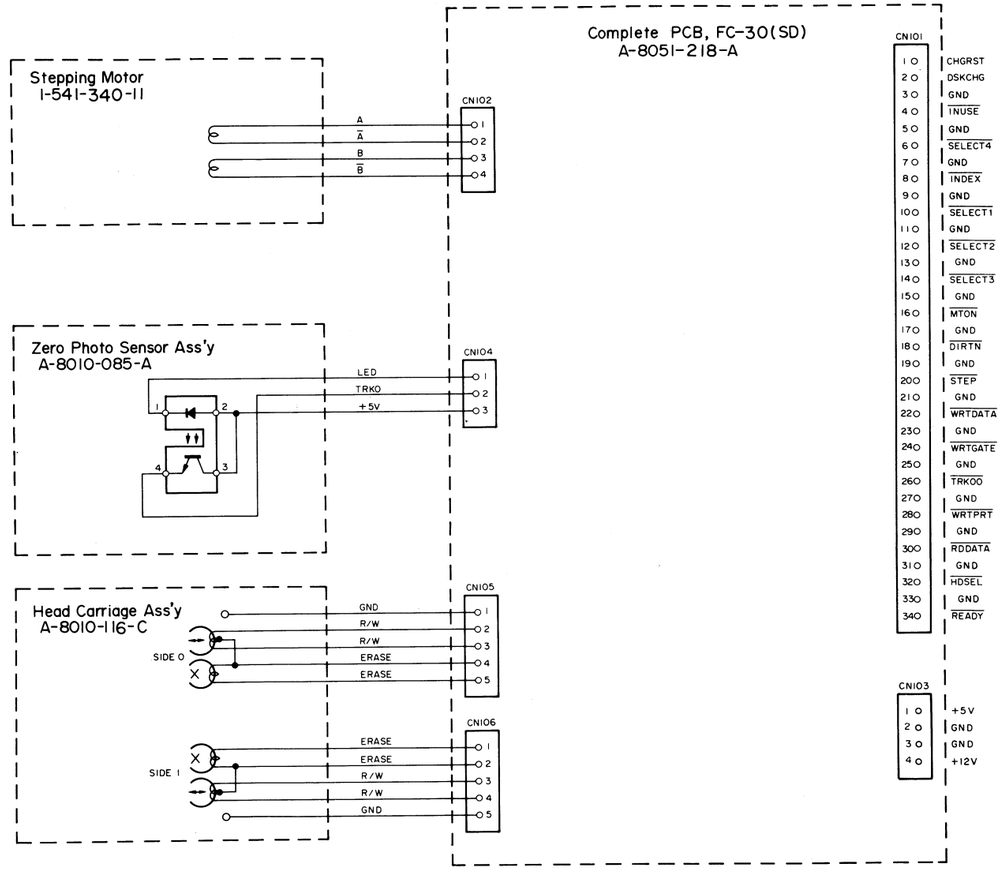
6-2. MECHANICAL PARTS LIST

Note: 1. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this list are not normally required for routine service work. Orders for parts not shown in **Bold-Face type** will be processed, but allow for additional delivery time.

No.	Parts No.	Description
1	**A-8010-116-C**	**Head Carriage Ass'y**
2	**A-8010-188-A**	**Zero Photo Sensor Ass'y**
3	**8-719-938-51**	**SPI-222-A**
4	**A-8010-097-E**	**Cassette Holder Ass'y**
5	**3-571-822-00**	**Tension Spring**
6	A-8051-218-A	FC-30 (SD) Mounted Board
7	4-606-075-03	Stator Yoke
8	4-609-221-02	Stator Spacer
9	4-606-076-01	Rotor Yoke
10	**4-606-077-11**	**Spacer**
11	**1-541-340-11**	**Stepping Motor**
12	4-606-001-01	Slide Guide Shaft
13	**4-606-821-01**	**Head Lifter**
14	**4-606-097-01**	**Shield cover**
15	A-8010-151-A	Right Side Plate Ass'y
16	4-606-073-01	Spring
17	4-606-086-04	Trigger Arm
18	4-610-506-01	Left Side Plate
19	X-4606-025-1	Slide Plate Ass'y
20	**4-606-803-01**	**Tension Spring**
21	4-606-804-01	Transport Dummy Cassette
22	**A-8030-403-A**	**Front Panel Ass'y**
23	X-4609-201-1	Eject Button Ass'y
	7-621-259-25	Screw +P 2.6x4
	7-621-259-45	Screw +P 2.6x6
	7-621-592-00	Screw +K 2.6x6
	7-621-759-45	Screw +PSW 2.6x6
	7-627-452-08	Precision Screw +K 2x2
	7-623-923-11	Nylone Washer 2.6
	7-623-421-07	Toothed Lock Washer 2.6

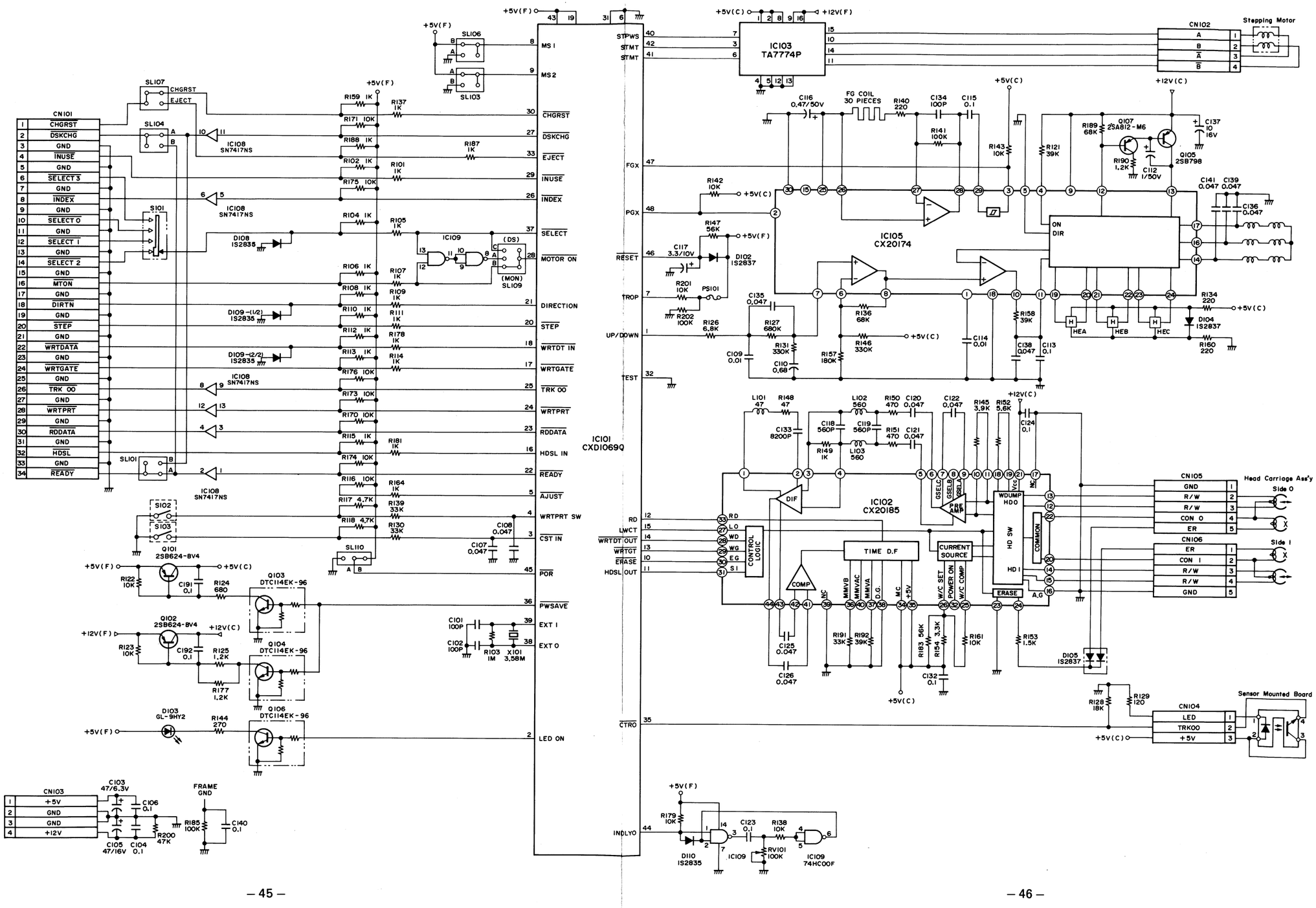
6-3. OVER ALL DIAGRAM

6-3-1. Interconnection Diagram



6-4. CIRCUIT DIAGRAM

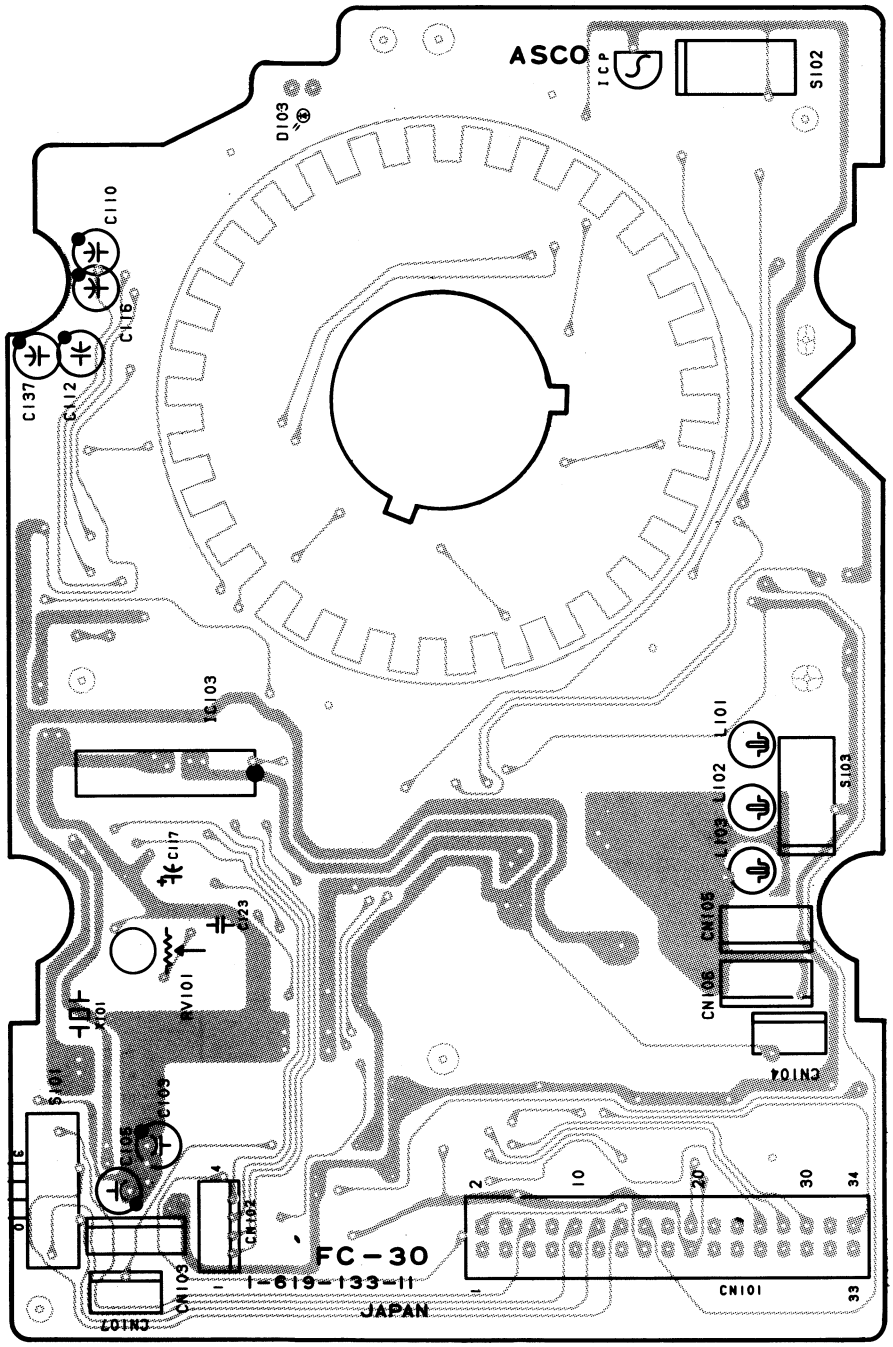
6-4-1. Circuit Diagram on FC-30 (SD)



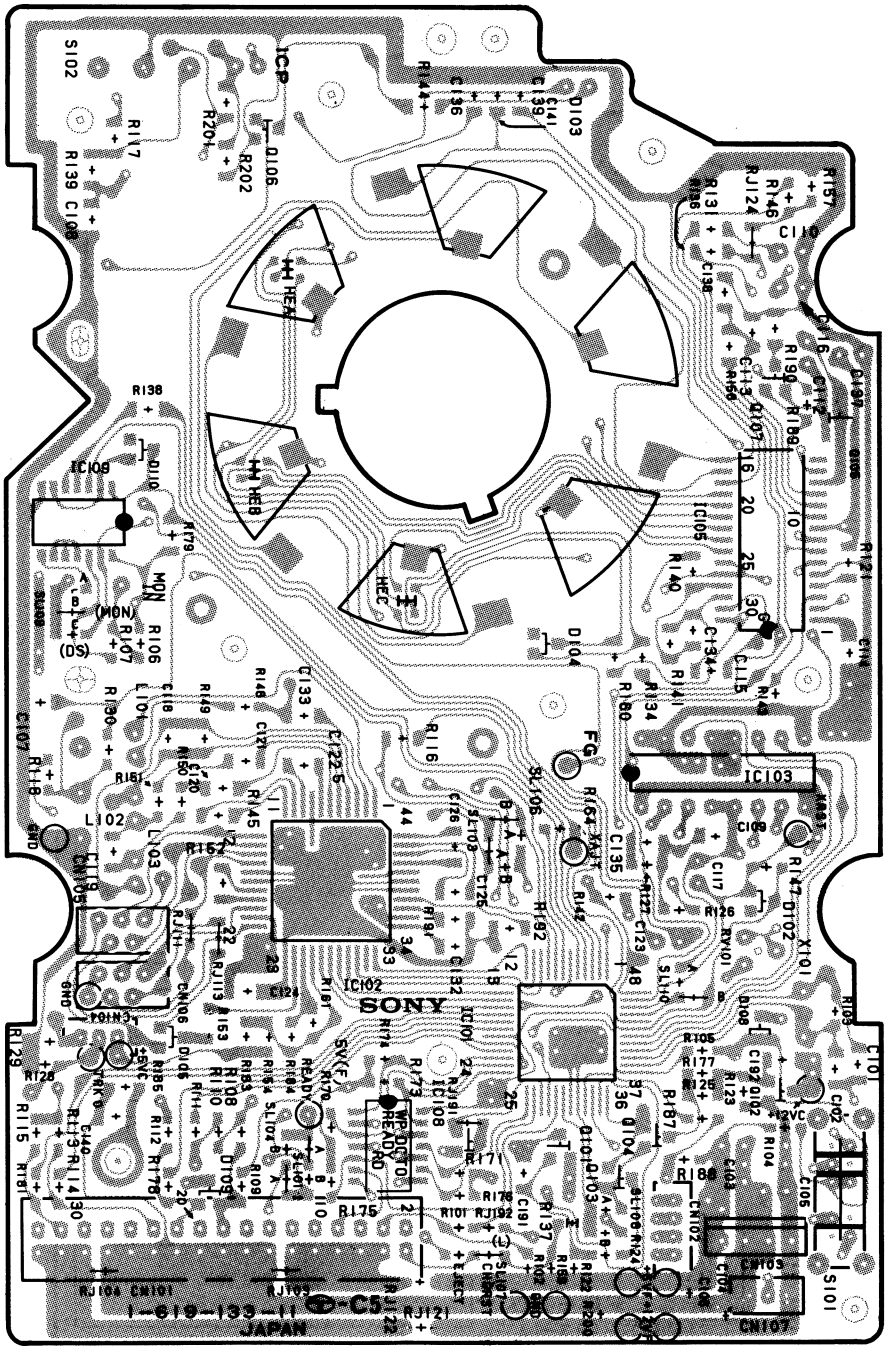
6-5. PARTS LAYOUT

6-5-1. Parts Layout on FC-30 (SD) (Serial No. 10,000,001 thru 10,057,100)

- Component Side -



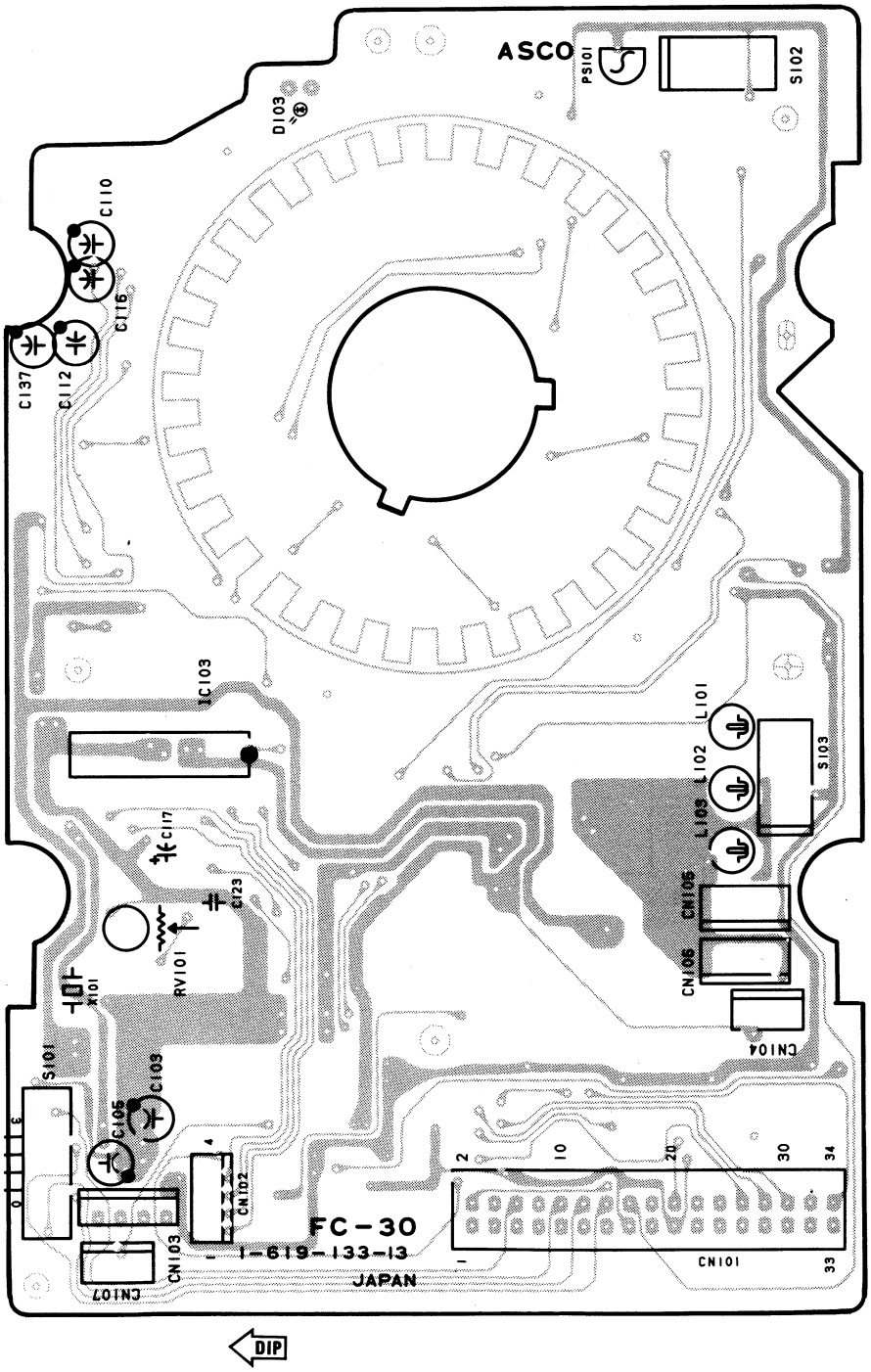
- Pattern Side -



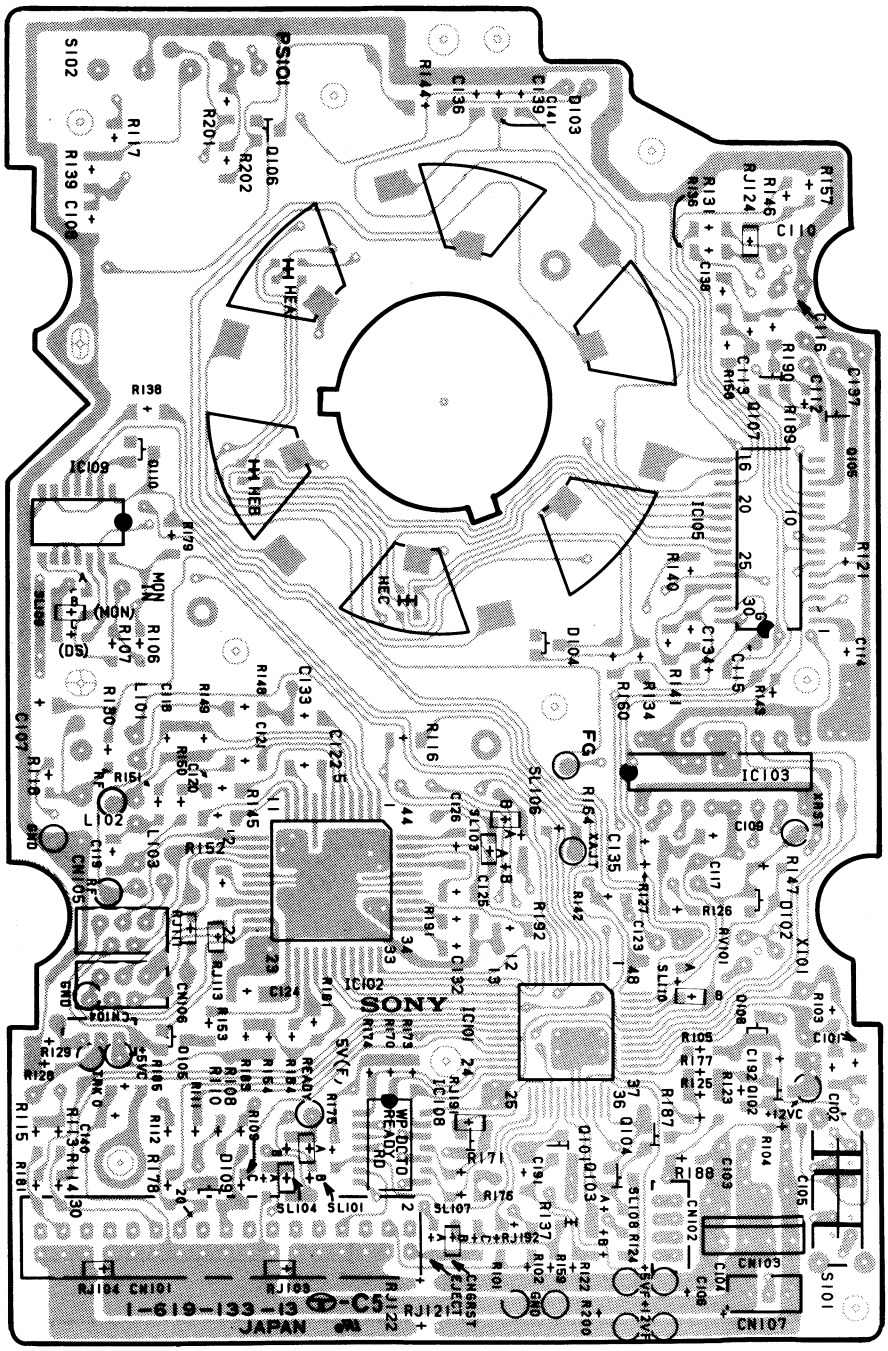
6-5-2. Parts Layout on FC-30 (SD)

(Serial No. 10,057,101 and higher)

- Component Side -



- Pattern Side -



6-6. ELECTRIC PARTS

6-6-1. ELECTRIC PARTS LIST

Note: 1. All capacitors are in micro farads unless otherwise specified.
2. All inductors are in micro henries unless otherwise specified.
3. All resistors are in ohms.
4. "CHIP" stands for chip component.
5. The M/C means in this list that identified components are MELF's (metal electrode faced-bonding) at the production though the chip components are prepared for the repair purpose. The part number appearing in the reference number shows chip component's. For the replacement, refer to Sections 6-6-2 and 6-6-3.
The M/M means in this list that identified components are MELF's (metal electrode faced-bonding) either at the production and for repairing. For the replacement, refer to Sections 6-6-3.

FC-30 (SD) MOUNTED BOARD

CAPACITORS

Ref. No.	Parts No.	Description			
C101	1-163-311-11	CERAMIC CHIP	100PF	5%	50V
C102	1-163-311-11	CERAMIC CHIP	100PF	5%	50V
C103	1-124-224-00	ELECT	47	20%	6.3V
C104	1-163-077-00	CERAMIC CHIP	0.1		50V
C105	1-124-236-00	ELECT	47	20%	16V
C106	1-163-077-00	CERAMIC CHIP	0.1		50V
C107	1-163-080-00	CERAMIC CHIP	0.047	10%	25V
C108	1-163-080-00	CERAMIC CHIP	0.047	10%	25V
C109	1-163-059-00	CERAMIC CHIP	0.01	10%	50V
C110	1-131-346-00	TANTALUM	0.68	10%	35V
C112	1-124-255-00	ELECT	1	20%	50V
C113	1-163-077-00	CERAMIC CHIP	0.1		50V
C114	1-163-059-00	CERAMIC CHIP	0.01	10%	50V
C115	1-163-077-00	CERAMIC CHIP	0.1		50V
C116	1-124-253-00	ELECT	0.47	20%	50V
C117	1-131-501-00	TANTALUM	3.3	10%	10V
C118	1-163-199-00	CERAMIC CHIP	560PF	5%	50V
C119	1-163-199-00	CERAMIC CHIP	560PF	5%	50V
C120	1-163-080-00	CERAMIC CHIP	0.047	10%	25V
C121	1-163-080-00	CERAMIC CHIP	0.047	10%	25V
C122	1-163-080-00	CERAMIC CHIP	0.047	10%	25V
C123	1-136-366-00	FILM	0.1	5%	50V
C124	1-163-077-00	CERAMIC CHIP	0.1		50V
C125	1-163-080-00	CERAMIC CHIP	0.047	10%	25V
C126	1-163-080-00	CERAMIC CHIP	0.047	10%	25V
C132	1-163-077-00	CERAMIC CHIP	0.1		50V
C133	1-163-058-00	CERAMIC CHIP	0.0082	10%	50V
C134	1-163-181-00	CERAMIC CHIP	100PF	5%	50V
C135	1-163-080-00	CERAMIC CHIP	0.047	10%	25V
C136	1-163-080-00	CERAMIC CHIP	0.047	10%	25V
C137	1-124-233-00	ELECT	10	20%	16V
C138	1-163-080-00	CERAMIC CHIP	0.047	10%	25V
C139	1-163-080-00	CERAMIC CHIP	0.047	10%	25V
C140	1-163-077-00	CERAMIC CHIP	0.1		50V
C141	1-163-080-00	CERAMIC CHIP	0.047	10%	25V
C191	1-163-077-00	CERAMIC CHIP	0.1		50V
C192	1-163-077-00	CERAMIC CHIP	0.1		50V

CONNECTORS

Ref. No.	Parts No.	Description
CN101	1-564-941-11	HEADER, CONNECTOR 34P
CN102	1-564-003-00	PIN, CONNECTOR 4P
CN103	1-560-542-00	POST HEADER, EI CONNECTOR 4P
CN104	1-564-002-00	PIN, CONNECTOR 3P
CN105	1-562-787-21	CONNECTOR, FLEXIBLE 5P
CN106	1-562-787-21	CONNECTOR, FLEXIBLE 5P

DIODES

D102	8-719-100-05	1S2837 (CHIP)
D103	8-719-904-92	GL-9HY2
D104	8-719-100-05	1S2837 (CHIP)
D105	8-719-100-05	1S2837 (CHIP)
D108	8-719-100-03	1S2835 (CHIP)
D109	8-719-100-03	1S2835 (CHIP)
D110	8-719-100-03	1S2835 (CHIP)

ICS

IC101	8-759-929-30	CXD1069Q
IC102	8-752-018-50	CX20185
IC103	8-759-206-34	TA7774P
IC105	8-752-017-40	CX20174
IC108	8-759-925-00	SN7417NS
IC109	8-759-204-94	TC74HC00F

COILS

L101	1-408-978-21	MICRO INDUCTOR 47
L102	1-410-255-41	MICRO INDUCTOR 560
L103	1-410-255-41	MICRO INDUCTOR 560

TRANSISTORS

Q101	8-729-162-44	2SB624-BV4 (CHIP)
Q102	8-729-162-44	2SB624-BV4 (CHIP)
Q103	8-729-900-53	DTC114EK-96 (CHIP)
Q104	8-729-900-53	DTC114EK-96 (CHIP)
Q105	8-729-101-07	2SB798
Q106	8-729-900-53	DTC114EK-96 (CHIP)
Q107	8-729-100-76	2SA812-M6 (CHIP)

RESISTORS

R101	*1-216-198-00	(M/C) CHIP	1K	5%	1/8W
R102	*1-216-198-00	(M/C) CHIP	1K	5%	1/8W
R103	*1-216-270-00	(M/C) CHIP	1M	5%	1/8W
R104	*1-216-198-00	(M/C) CHIP	1K	5%	1/8W

Ref. No.	Parts No.	Description			
R105	*1-216-198-00	(M/C) CHIP	1K	5%	1/8W
R106	*1-216-198-00	(M/C) CHIP	1K	5%	1/8W
R107	*1-216-198-00	(M/C) CHIP	1K	5%	1/8W
R108	*1-216-198-00	(M/C) CHIP	1K	5%	1/8W
R109	*1-216-198-00	(M/C) CHIP	1K	5%	1/8W
R110	*1-216-198-00	(M/C) CHIP	1K	5%	1/8W
R111	*1-216-198-00	(M/C) CHIP	1K	5%	1/8W
R112	*1-216-198-00	(M/C) CHIP	1K	5%	1/8W
R113	*1-216-198-00	(M/C) CHIP	1K	5%	1/8W
R114	*1-216-198-00	(M/C) CHIP	1K	5%	1/8W
R115	*1-216-198-00	(M/C) CHIP	1K	5%	1/8W
R116	1-216-222-00	METAL CHIP	10K	5%	1/8W
R117	1-216-214-00	METAL CHIP	4.7K	5%	1/8W
R118	*1-216-214-00	(M/C) CHIP	4.7K	5%	1/8W
R121	1-216-236-00	METAL CHIP	39K	5%	1/8W
R122	*1-216-222-00	(M/C) CHIP	10K	5%	1/8W
R123	*1-216-222-00	(M/C) CHIP	10K	5%	1/8W
R124	*1-216-194-00	(M/C) CHIP	680	5%	1/8W
R125	*1-249-038-00	(M/M) MELF	1.2K	5%	1/5W
R126	*1-216-218-00	(M/C) CHIP	6.8K	5%	1/8W
R127	*1-216-266-00	(M/C) CHIP	680K	5%	1/8W
R128	*1-216-228-00	(M/C) CHIP	18K	5%	1/8W
R129	*1-216-176-00	(M/C) CHIP	120	5%	1/8W
R130	*1-216-234-00	(M/C) CHIP	33K	5%	1/8W
R131	1-216-258-00	METAL CHIP	330K	5%	1/8W
R134	1-216-182-00	METAL CHIP	220	5%	1/8W
R136	1-216-242-00	METAL CHIP	68K	5%	1/8W
R137	*1-216-198-00	(M/C) CHIP	1K	5%	1/8W
R138	1-216-222-00	METAL CHIP	10K	5%	1/8W
R139	1-216-234-00	METAL CHIP	33K	5%	1/8W
R140	1-216-182-00	METAL CHIP	220	5%	1/8W
R141	1-216-246-00	METAL CHIP	100K	5%	1/8W
R142	*1-216-222-00	(M/C) CHIP	10K	5%	1/8W
R143	*1-216-222-00	(M/C) CHIP	10K	5%	1/8W
R144	1-216-184-00	METAL CHIP	270	5%	1/8W
R145	1-216-212-00	METAL CHIP	3.9K	5%	1/8W
R146	*1-216-258-00	(M/C) CHIP	330K	5%	1/8W
R147	*1-216-240-00	(M/C) CHIP	56K	5%	1/8W
R148	1-216-166-00	METAL CHIP	47	5%	1/8W
R149	*1-216-198-00	(M/C) CHIP	1K	5%	1/8W
R150	*1-216-190-00	(M/C) CHIP	470	5%	1/8W
R151	*1-216-190-00	(M/C) CHIP	470	5%	1/8W
R152	1-216-216-00	METAL CHIP	5.6K	5%	1/8W
R153	*1-216-202-00	(M/C) CHIP	1.5K	5%	1/8W
R154	*1-216-210-00	(M/C) CHIP	3.3K	5%	1/8W
R157	*1-216-252-00	(M/C) CHIP	180K	5%	1/8W
R158	1-216-236-00	METAL CHIP	39K	5%	1/8W
R159	*1-216-198-00	(M/C) CHIP	1K	5%	1/8W
R160	1-216-182-00	METAL CHIP	220	5%	1/8W
R161	*1-216-222-00	(M/C) CHIP	10K	5%	1/8W
R164	*1-216-198-00	(M/C) CHIP	1K	5%	1/8W
R170	*1-216-222-00	(M/C) CHIP	10K	5%	1/8W
R171	*1-216-222-00	(M/C) CHIP	10K	5%	1/8W
R173	*1-216-222-00	(M/C) CHIP	10K	5%	1/8W
R174	*1-216-222-00	(M/C) CHIP	10K	5%	1/8W
R175	*1-216-222-00	(M/C) CHIP	10K	5%	1/8W
R176	*1-216-222-00	(M/C) CHIP	10K	5%	1/8W
R177	*1-249-038-00	(M/M) MELF	1.2K	5%	1/5W
R178	*1-216-198-00	(M/C) CHIP	1K	5%	1/8W
R179	1-216-222-00	METAL CHIP	10K	5%	1/8W

Ref. No.	Parts No.	Description			
R181	*1-216-198-00	(M/C) CHIP	1K	5%	1/8W
R183	*1-216-240-00	(M/C) CHIP	56K	5%	1/8W
R185	*1-216-246-00	(M/C) CHIP	100K	5%	1/8W
R187	*1-216-198-00	(M/C) CHIP	1K	5%	1/8W
R188	*1-216-198-00	(M/C) CHIP	1K	5%	1/8W
R189	*1-216-242-00	(M/C) CHIP	68K	5%	1/8W
R190	1-216-200-00	METAL CHIP	1.2K	5%	1/8W
R191	1-216-234-00	METAL CHIP	33K	5%	1/8W
R192	1-216-236-00	METAL CHIP	39K	5%	1/8W
R200	*1-216-238-00	(M/C) CHIP	47K	5%	1/8W
R201	1-216-222-00	METAL CHIP	10K	5%	1/8W
R202	1-216-246-00	METAL CHIP	100K	5%	1/8W
	(Serial No. 10,000,001 thru 10,067,059)				
R202	1-216-222-00	METAL CHIP	10K	5%	1/8W
	(Serial No. 10,067,060 and higher)				
RJ103	*1-216-296-00	(M/C) CHIP	0	5%	1/8W
RJ104	*1-216-296-00	(M/C) CHIP	0	5%	1/8W
RJ111	*1-216-296-00	(M/C) CHIP	0	5%	1/8W
RJ113	*1-216-296-00	(M/C) CHIP	0	5%	1/8W
RJ124	1-216-296-00	METAL CHIP	0	5%	1/8W
RJ191	*1-216-296-00	(M/C) CHIP	0	5%	1/8W
SL101A	*1-216-296-00	(M/C) CHIP	0	5%	1/8W
SL103A	*1-216-296-00	(M/C) CHIP	0	5%	1/8W
SL104A	*1-216-296-00	(M/C) CHIP	0	5%	1/8W
SL106B	*1-216-296-00	(M/C) CHIP	0	5%	1/8W
SL107B	*1-216-296-00	(M/C) CHIP	0	5%	1/8W
SL109B	*1-216-296-00	(M/C) CHIP	0	5%	1/8W
SL110B	*1-216-296-00	(M/C) CHIP	0	5%	1/8W

VARIABLE RESISTOR

RV101	1-230-527-11	RES, ADJ, METAL GLAZE 100K

SWITCHES

S101	1-554-644-00	SWITCH, SLIDE
S102	1-570-245-11	SWITCH, MICRO
S103	1-570-245-11	SWITCH, MICRO

OSCILLATOR

X101	1-567-263-11	OSCILLATOR, CERAMIC (3.58M)

IC LINK

PS101	1-532-727-11	IC LINK

6-6-2 Chip parts replacement procedure

This unit uses chip components such as carbon resistor, ceramic capacitor, transistor and diode in some circuits. It also uses IC's of flat-pack type. As the appearance of carbon resistor and ceramic capacitor are identical, destinguishment of each can be possible by visual check of reference address of silk-screen print on the printed circuit board. As the shape of transistor and diode are same, they also are distinguished by the reference address of silk-screen print.

Tools:

Soldering iron: 20W
(If possible, use soldering tip with heat-controller of 270±10°C)
Desoldering metal braid ("SOLDER TAUL" or equivalent)
Solder (of 0.6mm dia. is recommended.)
Tweezers

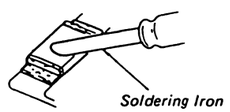
Soldering Conditions:

Tip temperature; 270±10°C
Solder within 2sec. per an electrode
Higher temperature or longer tip application than specified may be damaged to the chip component.

(1) Resistor and capacitor

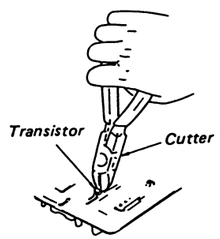
1) Add heat onto the chip-part by the top of soldering iron tip and slide the chip-part aside when the solder is melted.
2) Confirm visually with care that there is no pattern peeling, damage, and/or bridge where the part was removed or its surrounding.
3) Presolder the pattern into thin where the part was removed.
4) Place a new chip-part onto the pattern and solder both sides.

CAUTION: Do not use the chip-part again once used.



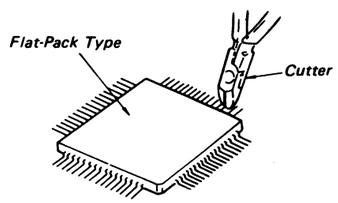
(2) Transistor and diode

1) Cut the leads of the semiconductor part to be removed with a cutter.
2) Remove the each pin of semiconductor from the pattern by tweezers while heating the pin by soldering iron.
3) Confirm visually with care that there is no pattern peeling, damage, and/or bridge where the part was removed or its surrounding.
4) Presolder the pattern into thin where the part was removed.
5) Place a new semiconductor onto the pattern and solder the leads.



(3) IC (Flat-pack type)

1) Cut the leads of the IC to be removed with a cutter.
2) Remove the each pin of IC from the pattern by tweezers while heating the pin by soldering iron.
3) Confirm visually with care that there is no pattern peeling, damage, and/or bridge where the part was removed or its surrounding.



4) Presolder the pattern into thin where the part was removed.
5) Place a new IC onto the pattern and solder it.
6) Confirm by a tester that each conduction between IC's terminal and cupper pattern is surely made.
7) If not, resolder the portion.

6-6-3 MELF parts replacement procedure

This unit uses MELF (Metal Electrode Face-bonding) such as carbon resistor, ceramic capacitor in some circuit.

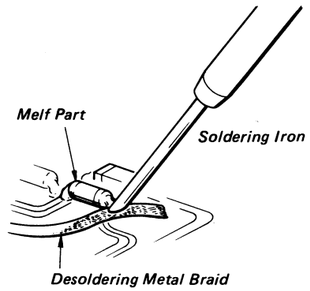
Tools:

Soldering iron: 20W
Desoldering metal braid ("SOLDER TAUL" or equivalent)
Solder (of 0.6mm dia. is recommended.)
Tweezers

Soldering Conditions:

Tip temperature; 270±10°C
Solder within 4sec. per an electrode

1) Add heat onto each electrode of a MELF-part through desoldering-metal-braid applied, by the top of soldering iron, as shown below.



2) After the solderings of both sides are melted, apply some force to the MELF-part with the toe and the heel of the soldering iron alternately. At confirmation that soldering is removed, pick-up the component with a tweezers.
3) Confirm visually with care that there is no pattern peeling, damage, and/or bridge where the part was removed or its surrounding.
4) Presolder the pattern into this where the component was removed.
5) Place a new MELF-part onto the pattern and solder both sides.

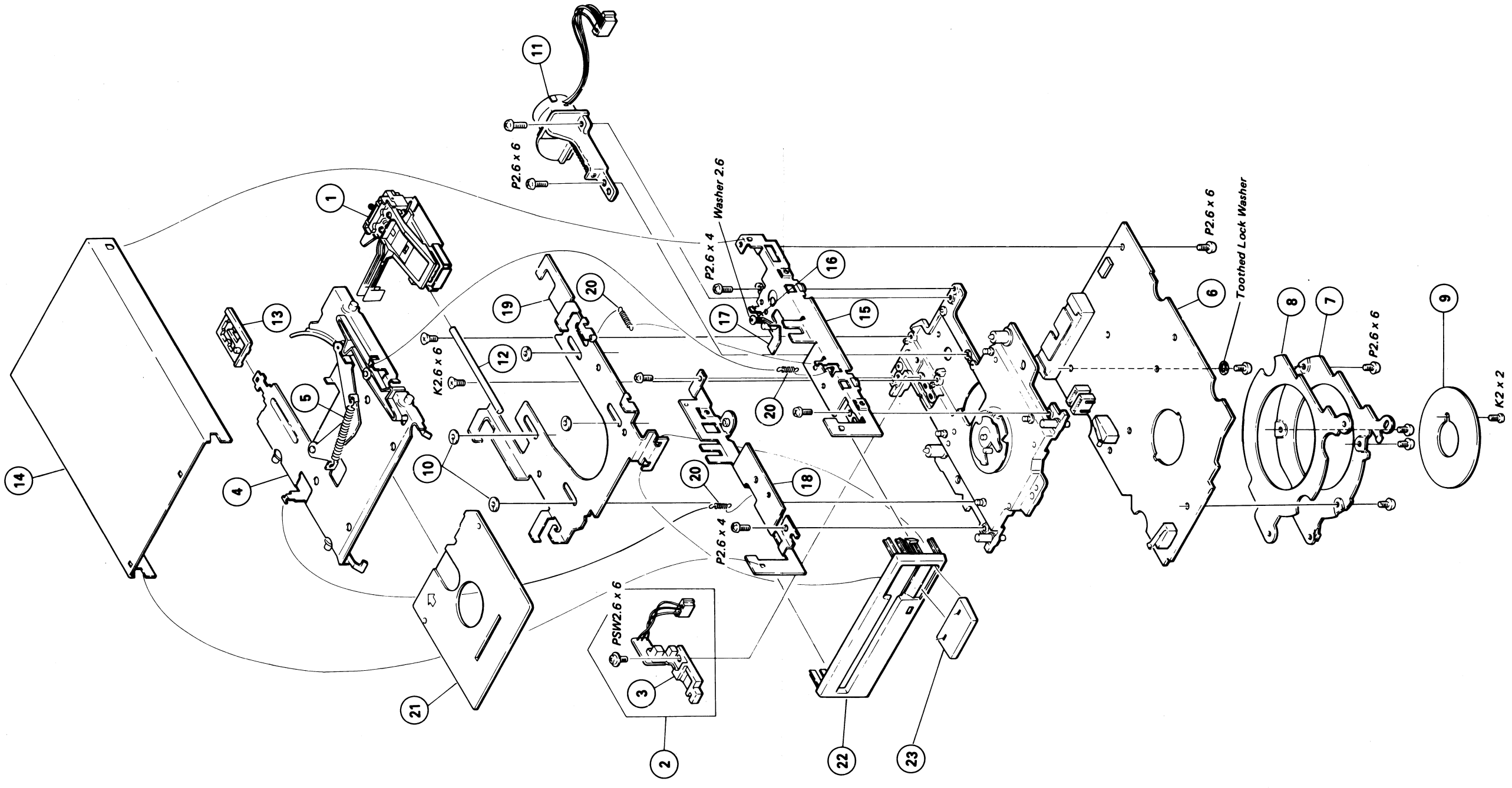
CAUTION: Don't use a MELF component again once used. If the MELF-part is forcibly taken away from the board using a cutter or the like, the copper pattern is apt to peel off. Follow the procedure for the safe removal.

SECTION 7

PARTS LOCATION AND LIST

(Serial No. 15,000,001 thru 16,000,001)

7-1. PARTS ASS'Y LOCATION



7-2. MECHANICAL PARTS LIST

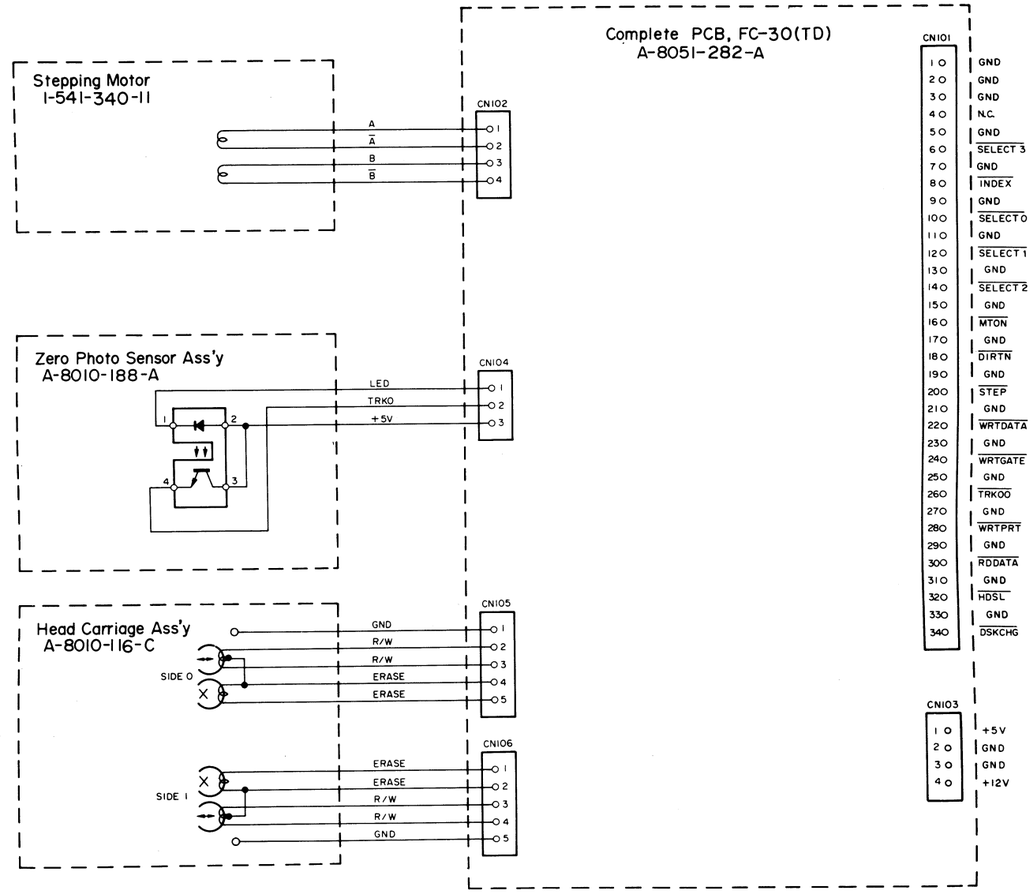
Note: 1. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this list are not normally required for routine service work. Orders for parts not shown in **Bold-Face type** will be processed, but allow for additional delivery time.

No.	Parts No.	Description
1	**A-8010-116-C**	**Head Carriage Ass'y**
2	**A-8010-188-A**	**Zero Photo Sensor Ass'y**
3	**8-719-938-51**	**SPI-222-A**
4	**A-8010-097-E**	**Cassette Holder Ass'y**
5	**3-571-822-00**	**Tension Spring**
6	A-8051-282-A	FC-30 (TD) Mounted Board
7	4-606-075-03	Stator Yoke
8	4-609-221-02	Stator Spacer
9	4-606-076-01	Rotor Yoke
10	**4-606-077-11**	**Spacer**
11	**1-541-340-11**	**Stepping Motor**
12	4-606-001-01	Slide Guide Shaft
13	**4-606-821-01**	**Head Lifter**
14	**4-606-097-01**	**Shield cover**
15	A-8010-151-A	Right Side Plate Ass'y
16	4-606-073-01	Spring
17	4-606-086-04	Trigger Arm
18	4-610-506-01	Left Side Plate
19	X-4606-025-1	Slide Plate Ass'y
20	**4-606-803-01**	**Tension Spring**
21	4-606-804-01	Transport Dummy Cassette
22	**A-8030-403-A**	**Front Panel Ass'y**
23	X-4609-201-1	Eject Button Ass'y

7-621-259-25	Screw +P 2.6x4
7-621-259-45	Screw +P 2.6x6
7-621-592-00	Screw +K 2.6x6
7-621-759-45	Screw +PSW 2.6x6
7-627-452-08	Precision Screw +K 2x2
7-623-923-11	Nylone Washer 2.6
7-623-421-07	Toothed Lock Washer 2.6

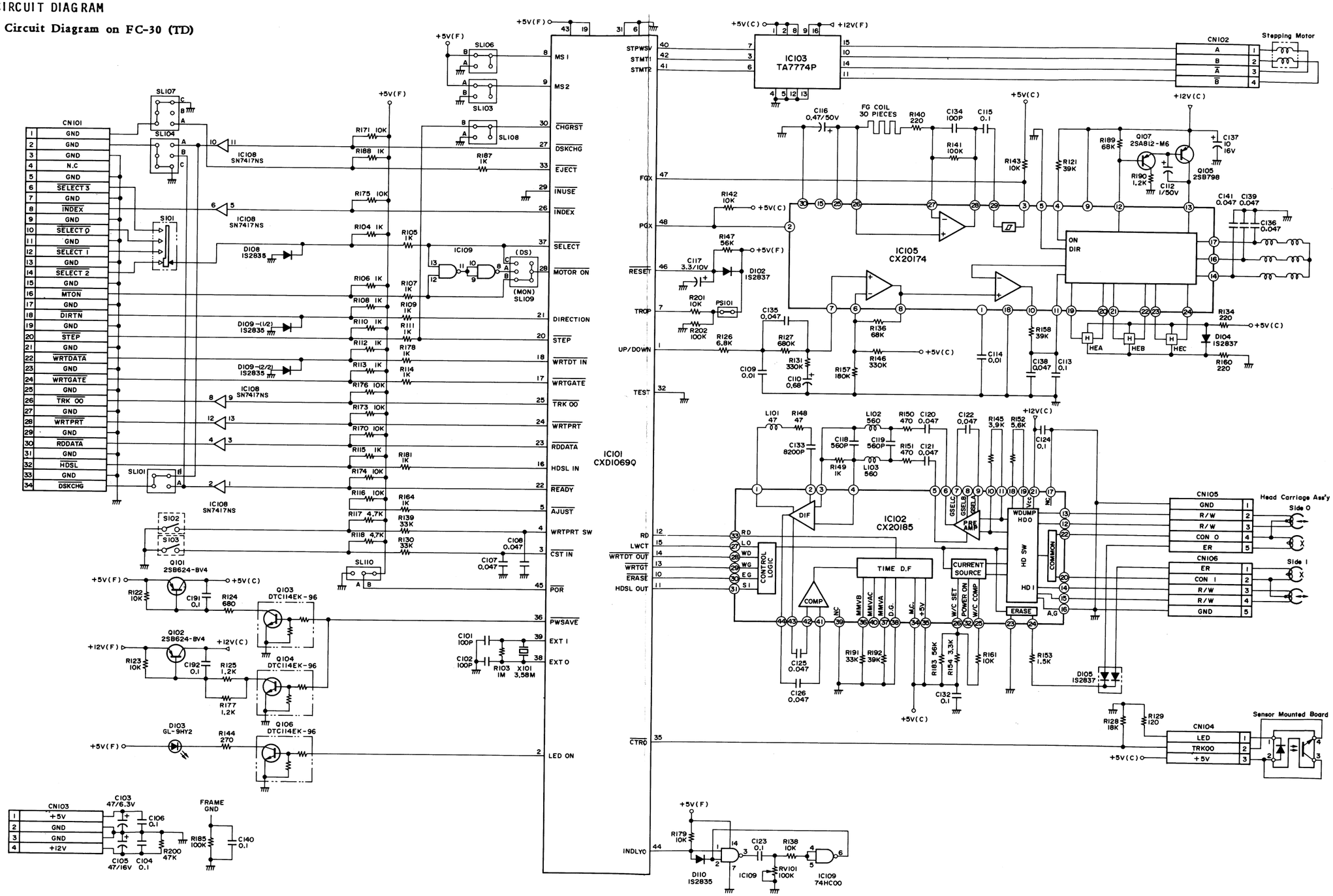
7-3. OVER ALL DIAGRAM

7-3-1. Interconnection Diagram



7-4. CIRCUIT DIAGRAM

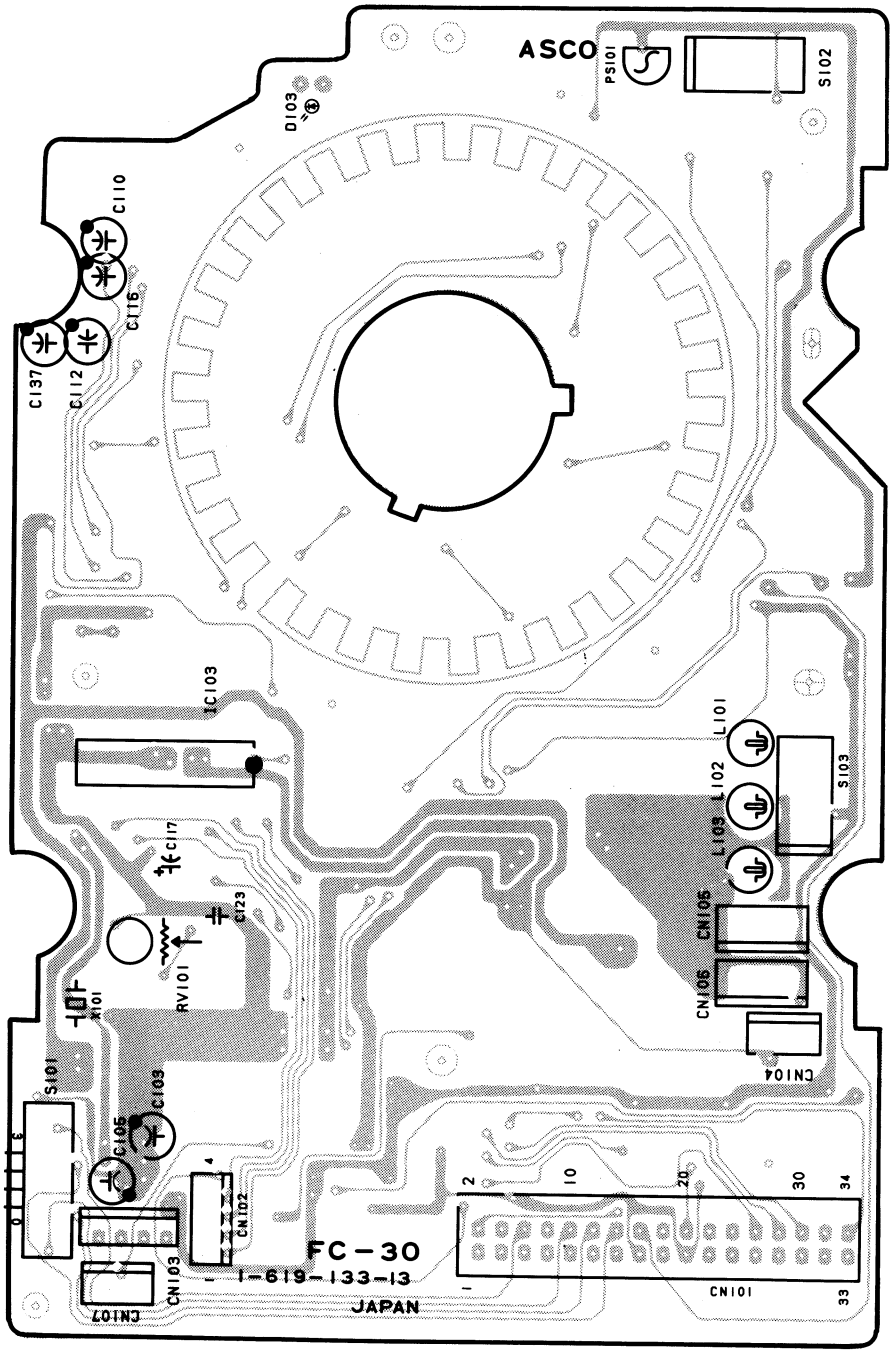
7-4-1. Circuit Diagram on FC-30 (TD)



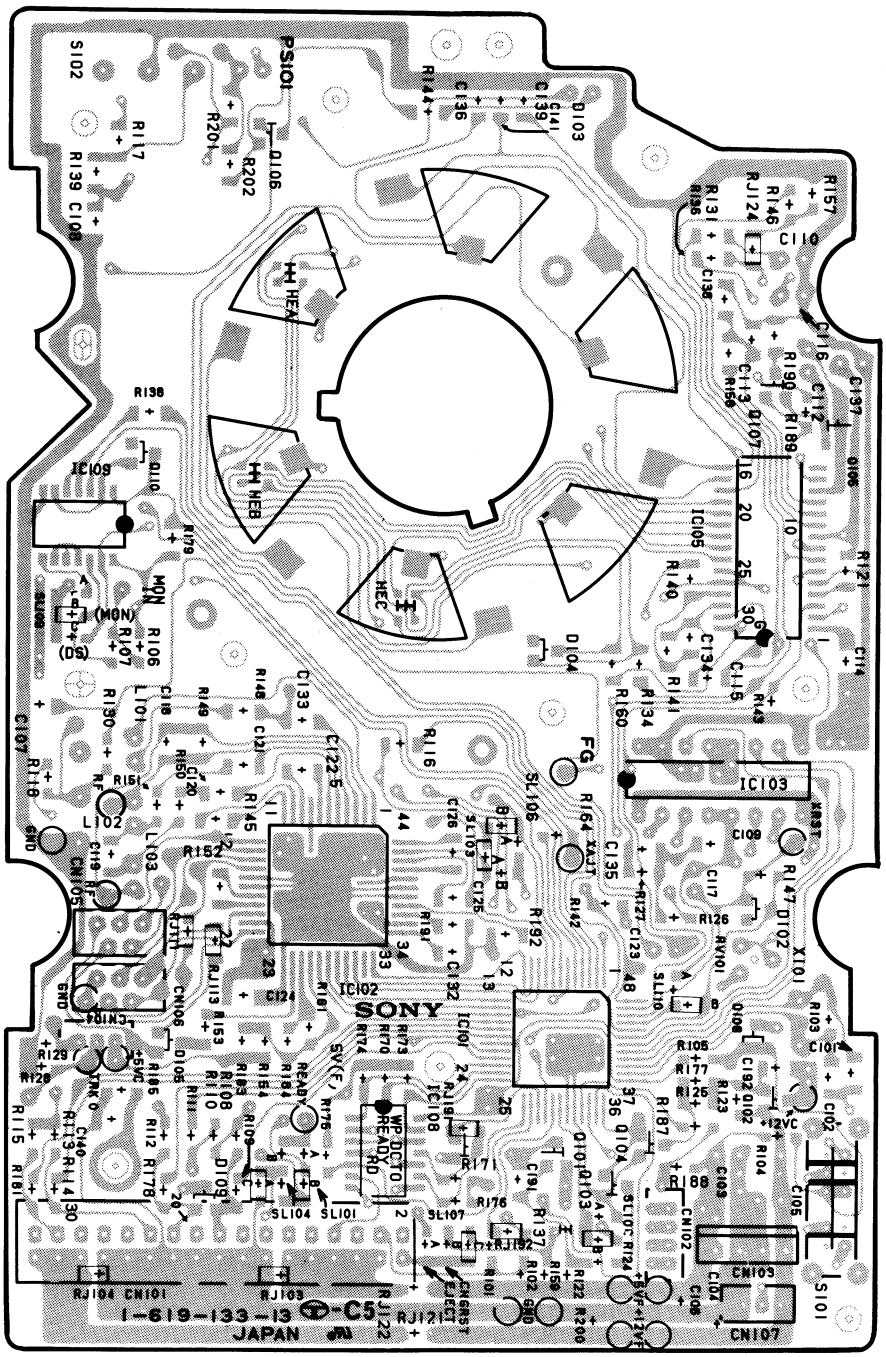
7-5. PARTS LAYOUT

7-5-1. Parts Layout on FC-30 (TD)

- Component Side -



- Pattern Side -



7-6. ELECTRIC PARTS

7-6-1. ELECTRIC PARTS LIST

Note: 1. All capacitors are in micro farads unless otherwise specified.

2. All inductors are in micro henries unless otherwise specified.

3. All resistors are in ohms.

4. "CHIP" stands for chip component.

5. The M/C means in this list that identified components are MELF's (metal electrode faced-bonding) at the production though the chip components are prepared for the repair purpose. The part number appearing in the reference number shows chip component's. For the replacement, refer to Sections 7-6-2 and 7-6-3.

The M/M means in this list that identified components are MELF's (metal electrode faced-bonding) either at the production and for repairing. For the replacement, refer to Sections 7-6-3.

FC-30 (TD) MOUNTED BOARD

CAPACITORS

Ref. No.	Parts No.	Description			
C101	1-163-311-11	CERAMIC CHIP	100PF	5%	50V
C102	1-163-311-11	CERAMIC CHIP	100PF	5%	50V
C103	1-124-224-00	ELECT	47	20%	6.3V
C104	1-163-077-00	CERAMIC CHIP	0.1		50V
C105	1-124-236-00	ELECT	47	20%	16V
C106	1-163-077-00	CERAMIC CHIP	0.1		50V
C107	1-163-080-00	CERAMIC CHIP	0.047	10%	25V
C108	1-163-080-00	CERAMIC CHIP	0.047	10%	25V
C109	1-163-059-00	CERAMIC CHIP	0.01	10%	50V
C110	1-131-346-00	TANTALUM	0.68	10%	35V
C112	1-124-255-00	ELECT	1	20%	50V
C113	1-163-077-00	CERAMIC CHIP	0.1		50V
C114	1-163-059-00	CERAMIC CHIP	0.01	10%	50V
C115	1-163-077-00	CERAMIC CHIP	0.1		50V
C116	1-124-253-00	ELECT	0.47	20%	50V
C117	1-131-501-00	TANTALUM	3.3	10%	10V
C118	1-163-199-00	CERAMIC CHIP	560PF	5%	50V
C119	1-163-199-00	CERAMIC CHIP	560PF	5%	50V
C120	1-163-080-00	CERAMIC CHIP	0.047	10%	25V
C121	1-163-080-00	CERAMIC CHIP	0.047	10%	25V
C122	1-163-080-00	CERAMIC CHIP	0.047	10%	25V
C123	1-136-366-00	FILM	0.1	5%	50V
C124	1-163-077-00	CERAMIC CHIP	0.1		50V
C125	1-163-080-00	CERAMIC CHIP	0.047	10%	25V
C126	1-163-080-00	CERAMIC CHIP	0.047	10%	25V
C132	1-163-077-00	CERAMIC CHIP	0.1		50V
C133	1-163-058-00	CERAMIC CHIP	0.0082	10%	50V
C134	1-163-181-00	CERAMIC CHIP	100PF	5%	50V
C135	1-163-080-00	CERAMIC CHIP	0.047	10%	25V
C136	1-163-080-00	CERAMIC CHIP	0.047	10%	25V
C137	1-124-233-00	ELECT	10	20%	16V
C138	1-163-080-00	CERAMIC CHIP	0.047	10%	25V
C139	1-163-080-00	CERAMIC CHIP	0.047	10%	25V
C140	1-163-077-00	CERAMIC CHIP	0.1		50V
C141	1-163-080-00	CERAMIC CHIP	0.047	10%	25V
C191	1-163-077-00	CERAMIC CHIP	0.1		50V
C192	1-163-077-00	CERAMIC CHIP	0.1		50V

CONNECTORS

Ref. No.	Parts No.	Description
CN101	1-564-941-11	HEADER, CONNECTOR 34P
CN102	1-564-003-00	PIN, CONNECTOR 4P
CN103	1-560-542-00	POST HEADER, EI CONNECTOR 4P
CN104	1-564-002-00	PIN, CONNECTOR 3P
CN105	1-562-787-21	CONNECTOR, FLEXIBLE 5P
CN106	1-562-787-21	CONNECTOR, FLEXIBLE 5P

DIODES

D102	8-719-100-05	1S2837 (CHIP)
D103	8-719-904-92	GL-9HY2
D104	8-719-100-05	1S2837 (CHIP)
D105	8-719-100-05	1S2837 (CHIP)
D108	8-719-100-03	1S2835 (CHIP)
D109	8-719-100-03	1S2835 (CHIP)
D110	8-719-100-03	1S2835 (CHIP)

ICS

IC101	8-759-929-30	CXD1069Q
IC102	8-752-018-50	CX20185
IC103	8-759-206-34	TA7774P
IC105	8-752-017-40	CX20174
IC108	8-759-925-00	SN7417NS
IC109	8-759-204-94	TC74HC00F

COILS

L101	1-408-978-21	MICRO INDUCTOR 47
L102	1-410-255-41	MICRO INDUCTOR 560
L103	1-410-255-41	MICRO INDUCTOR 560

TRANSISTORS

Q101	8-729-162-44	2SB624-BV4 (CHIP)
Q102	8-729-162-44	2SB624-BV4 (CHIP)
Q103	8-729-900-53	DTC114EK-96 (CHIP)
Q104	8-729-900-53	DTC114EK-96 (CHIP)
Q105	8-729-101-07	2SB798
Q106	8-729-900-53	DTC114EK-96 (CHIP)
Q107	8-729-100-76	2SA812-M6 (CHIP)

RESISTORS

R103	*1-216-270-00	(M/C) CHIP	1M	5%	1/8W
R104	*1-216-198-00	(M/C) CHIP	1K	5%	1/8W
R105	*1-216-198-00	(M/C) CHIP	1K	5%	1/8W

Ref. No.	Parts No.	Description			
R106	*1-216-198-00	(M/C) CHIP	1K	5%	1/8W
R107	*1-216-198-00	(M/C) CHIP	1K	5%	1/8W
R108	*1-216-198-00	(M/C) CHIP	1K	5%	1/8W
R109	*1-216-198-00	(M/C) CHIP	1K	5%	1/8W
R110	*1-216-198-00	(M/C) CHIP	1K	5%	1/8W
R111	*1-216-198-00	(M/C) CHIP	1K	5%	1/8W
R112	*1-216-198-00	(M/C) CHIP	1K	5%	1/8W
R113	*1-216-198-00	(M/C) CHIP	1K	5%	1/8W
R114	*1-216-198-00	(M/C) CHIP	1K	5%	1/8W
R115	*1-216-198-00	(M/C) CHIP	1K	5%	1/8W
R116	1-216-222-00	METAL CHIP	10K	5%	1/8W
R117	1-216-214-00	METAL CHIP	4.7K	5%	1/8W
R118	*1-216-214-00	(M/C) CHIP	4.7K	5%	1/8W
R121	1-216-236-00	METAL CHIP	39K	5%	1/8W
R122	*1-216-222-00	(M/C) CHIP	10K	5%	1/8W
R123	*1-216-222-00	(M/C) CHIP	10K	5%	1/8W
R124	*1-216-194-00	(M/C) CHIP	680	5%	1/8W
R125	*1-249-038-00	(M/M) MELF	1.2K	5%	1/5W
R126	*1-216-218-00	(M/C) CHIP	6.8K	5%	1/8W
R127	*1-216-266-00	(M/C) CHIP	680K	5%	1/8W
R128	*1-216-228-00	(M/C) CHIP	18K	5%	1/8W
R129	*1-216-176-00	(M/C) CHIP	120	5%	1/8W
R130	*1-216-234-00	(M/C) CHIP	33K	5%	1/8W
R131	1-216-258-00	METAL CHIP	330K	5%	1/8W
R134	1-216-182-00	METAL CHIP	220	5%	1/8W
R136	1-216-242-00	METAL CHIP	68K	5%	1/8W
R138	1-216-222-00	METAL CHIP	10K	5%	1/8W
R139	1-216-234-00	METAL CHIP	33K	5%	1/8W
R140	1-216-182-00	METAL CHIP	220	5%	1/8W
R141	1-216-246-00	METAL CHIP	100K	5%	1/8W
R142	*1-216-222-00	(M/C) CHIP	10K	5%	1/8W
R143	*1-216-222-00	(M/C) CHIP	10K	5%	1/8W
R144	1-216-184-00	METAL CHIP	270	5%	1/8W
R145	1-216-212-00	METAL CHIP	3.9K	5%	1/8W
R146	*1-216-258-00	(M/C) CHIP	330K	5%	1/8W
R147	*1-216-240-00	(M/C) CHIP	56K	5%	1/8W
R148	1-216-166-00	METAL CHIP	47	5%	1/8W
R149	*1-216-198-00	(M/C) CHIP	1K	5%	1/8W
R150	*1-216-190-00	(M/C) CHIP	470	5%	1/8W
R151	*1-216-190-00	(M/C) CHIP	470	5%	1/8W
R152	1-216-216-00	METAL CHIP	5.6K	5%	1/8W
R153	*1-216-202-00	(M/C) CHIP	1.5K	5%	1/8W
R154	*1-216-210-00	(M/C) CHIP	3.3K	5%	1/8W
R157	*1-216-252-00	(M/C) CHIP	180K	5%	1/8W
R158	1-216-236-00	METAL CHIP	39K	5%	1/8W
R160	1-216-182-00	METAL CHIP	220	5%	1/8W
R161	*1-216-222-00	(M/C) CHIP	10K	5%	1/8W
R164	*1-216-198-00	(M/C) CHIP	1K	5%	1/8W
R170	*1-216-222-00	(M/C) CHIP	10K	5%	1/8W
R171	*1-216-222-00	(M/C) CHIP	10K	5%	1/8W
R173	*1-216-222-00	(M/C) CHIP	10K	5%	1/8W
R174	*1-216-222-00	(M/C) CHIP	10K	5%	1/8W
R175	*1-216-222-00	(M/C) CHIP	10K	5%	1/8W
R176	*1-216-222-00	(M/C) CHIP	10K	5%	1/8W
R177	*1-249-038-00	(M/M) MELF	1.2K	5%	1/5W
R178	*1-216-198-00	(M/C) CHIP	1K	5%	1/8W
R179	1-216-222-00	METAL CHIP	10K	5%	1/8W
R181	*1-216-198-00	(M/C) CHIP	1K	5%	1/8W
R183	*1-216-240-00	(M/C) CHIP	56K	5%	1/8W
R185	*1-216-246-00	(M/C) CHIP	100K	5%	1/8W
R187	*1-216-198-00	(M/C) CHIP	1K	5%	1/8W

Ref. No.	Parts No.	Description			
R188	*1-216-198-00	(M/C) CHIP	1K	5%	1/8W
R189	*1-216-242-00	(M/C) CHIP	68K	5%	1/8W
R190	1-216-200-00	METAL CHIP	1.2K	5%	1/8W
R191	1-216-234-00	METAL CHIP	33K	5%	1/8W
R192	1-216-236-00	METAL CHIP	39K	5%	1/8W
R200	*1-216-238-00	(M/C) CHIP	47K	5%	1/8W
R201	1-216-222-00	METAL CHIP	10K	5%	1/8W
R202	1-216-246-00	METAL CHIP	100K	5%	1/8W
	(Serial No. 15,000,001 thru 15,001,200)				
R202	1-216-222-00	METAL CHIP	10K	5%	1/8W
	(Serial No. 15,001,201 and higher)				
RJ103	*1-216-296-00	(M/C) CHIP	0	5%	1/8W
RJ104	*1-216-296-00	(M/C) CHIP	0	5%	1/8W
RJ111	*1-216-296-00	(M/C) CHIP	0	5%	1/8W
RJ113	*1-216-296-00	(M/C) CHIP	0	5%	1/8W
RJ124	1-216-296-00	METAL CHIP	0	5%	1/8W
RJ191	*1-216-296-00	(M/C) CHIP	0	5%	1/8W
RJ192	*1-216-296-00	(M/C) CHIP	0	5%	1/8W
SL101B	*1-216-296-00	(M/C) CHIP	0	5%	1/8W
SL103A	*1-216-296-00	(M/C) CHIP	0	5%	1/8W
SL104C	*1-216-296-00	(M/C) CHIP	0	5%	1/8W
SL106B	*1-216-296-00	(M/C) CHIP	0	5%	1/8W
SL107C	*1-216-296-00	(M/C) CHIP	0	5%	1/8W
SL108B	*1-216-296-00	(M/C) CHIP	0	5%	1/8W
SL109B	*1-216-296-00	(M/C) CHIP	0	5%	1/8W
SL110B	*1-216-296-00	(M/C) CHIP	0	5%	1/8W

VARIABLE RESISTOR

RV101	1-230-527-11	RES, ADJ, METAL GLAZE 100K

SWITCHES

S101	1-554-644-00	SWITCH, SLIDE
S102	1-570-245-11	SWITCH, MICRO
S103	1-570-245-11	SWITCH, MICRO

OSCILLATOR

X101	1-567-263-11	OSCILLATOR, CERAMIC (3.58M)

IC LINK

PS101	1-532-727-11	IC LINK

7-6-2 Chip parts replacement procedure

This unit uses chip components such as carbon resistor, ceramic capacitor, transistor and diode in some circuits. It also uses IC's of flat-pack type. As the appearance of carbon resistor and ceramic capacitor are identical, destinguishment of each can be possible by visual check of reference address of silk-screen print on the printed circuit board. As the shape of transistor and diode are same, they also are distinguished by the reference address of silk-screen print.

Tools:

Soldering iron: 20W
(If possible, use soldering tip with heat-controller of 270±10°C)
Desoldering metal braid ("SOLDER TAUL" or equivalent)
Solder (of 0.6mm dia. is recommended.)
Tweezers

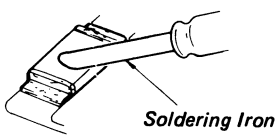
Soldering Conditions:

Tip temperature; 270±10°C
Solder within 2sec. per an electrode
Higher temperature or longer tip application than specified may be damaged to the chip component.

(1) Resistor and capacitor

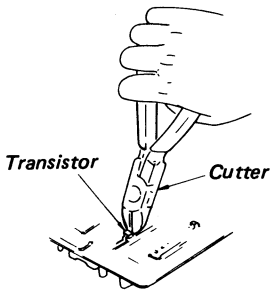
1) Add heat onto the chip-part by the top of soldering iron tip and slide the chip-part aside when the solder is melted.
2) Confirm visually with care that there is no pattern peeling, damage, and/or bridge where the part was removed or its surrounding.
3) Presolder the pattern into thin where the part was removed.
4) Place a new chip-part onto the pattern and solder both sides.

CAUTION: Do not use the chip-part again once used.



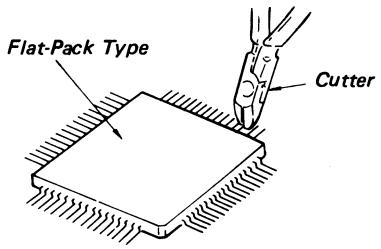
(2) Transistor and diode

1) Cut the leads of the semiconductor part to be removed with a cutter.
2) Remove the each pin of semiconductor from the pattern by tweezers while heating the pin by soldering iron.
3) Confirm visually with care that there is no pattern peeling, damage, and/or bridge where the part was removed or its surrounding.
4) Presolder the pattern into thin where the part was removed.
5) Place a new semiconductor onto the pattern and solder the leads.



(3) IC (Flat-pack type)

1) Cut the leads of the IC to be removed with a cutter.
2) Remove the each pin of IC from the pattern by tweezers while heating the pin by soldering iron.
3) Confirm visually with care that there is no pattern peeling, damage, and/or bridge where the part was removed or its surrounding.



4) Presolder the pattern into thin where the part was removed.
5) Place a new IC onto the pattern and solder it.
6) Confirm by a tester that each conduction between IC's terminal and cupper pattern is surely made.
7) If not, resolder the portion.

7-6-3 MELF parts replacement procedure

This unit uses MELF (Metal Electrode Face-bonding) such as carbon resistor, ceramic capacitor in some circuit.

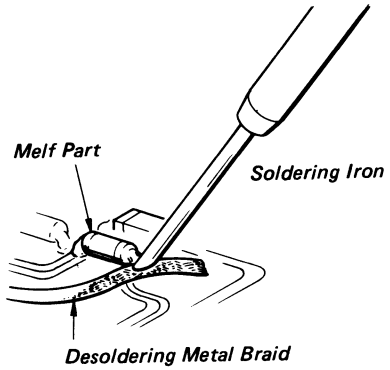
Tools:

Soldering iron: 20W
Desoldering metal braid ("SOLDER TAUL" or equivalent)
Solder (of 0.6mm dia. is recommended.)
Tweezers

Soldering Conditions:

Tip temperature; 270±10°C
Solder within 4sec. per an electrode

1) Add heat onto each electrode of a MELF-part through desoldering-metal-braid applied, by the top of soldering iron, as shown below.

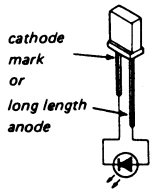


2) After the solderings of both sides are melted, apply some force to the MELF-part with the toe and the heel of the soldering iron alternately. At confirmation that soldering is removed, pick-up the component with a tweezers.
3) Confirm visually with care that there is no pattern peeling, damage, and/or bridge where the part was removed or its surrounding.
4) Presolder the pattern into this where the component was removed.
5) Place a new MELF-part onto the pattern and solder both sides.

CAUTION: Don't use a MELF component again once used. If the MELF-part is forcibly taken away from the board using a cutter or the like, the copper pattern is apt to peel off. Follow the procedure for the safe removal.

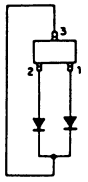
SECTION 8
TRANSISTORS / DIODES / ICS PIN ARRANGEMENT

GL-9HY2

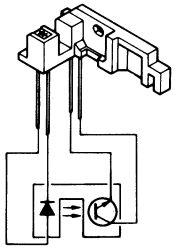


1S2837

–TOP VIEW–

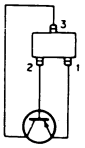


SPI-222A



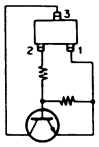
2SA812
2SB624-BV4

–TOP VIEW–



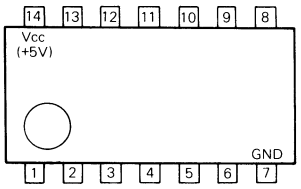
DTC114EK

–TOP VIEW–



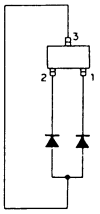
SN7417NS (TI)
HEX BUFFERS/DRIVERS WITH OPEN-COLLECTOR

– TOP VIEW –



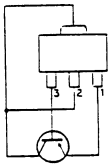
1S2835

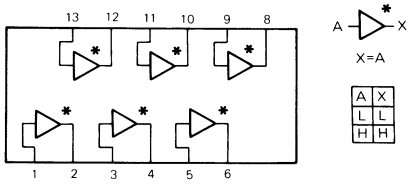
–TOP VIEW–



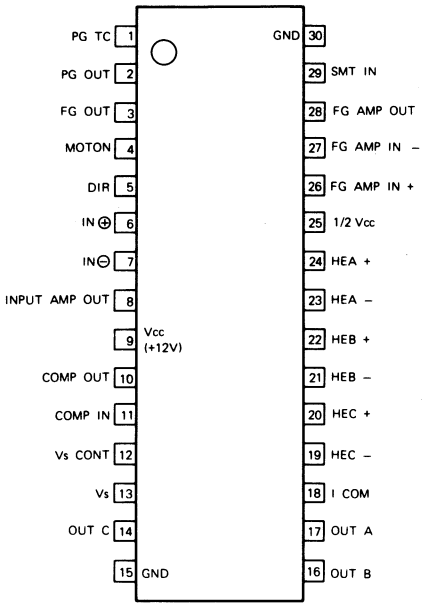
2SB798

–TOP VIEW–

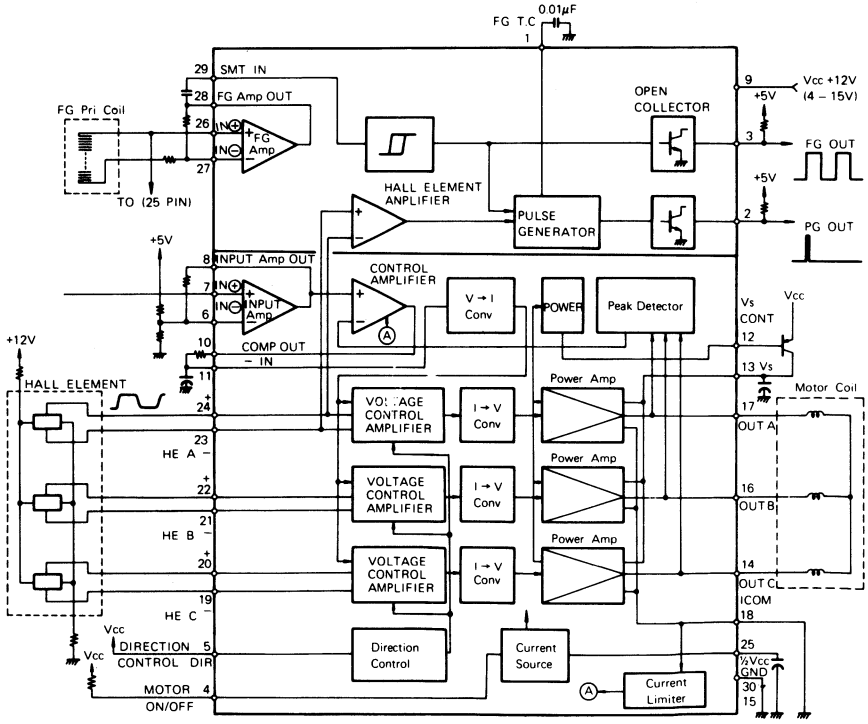




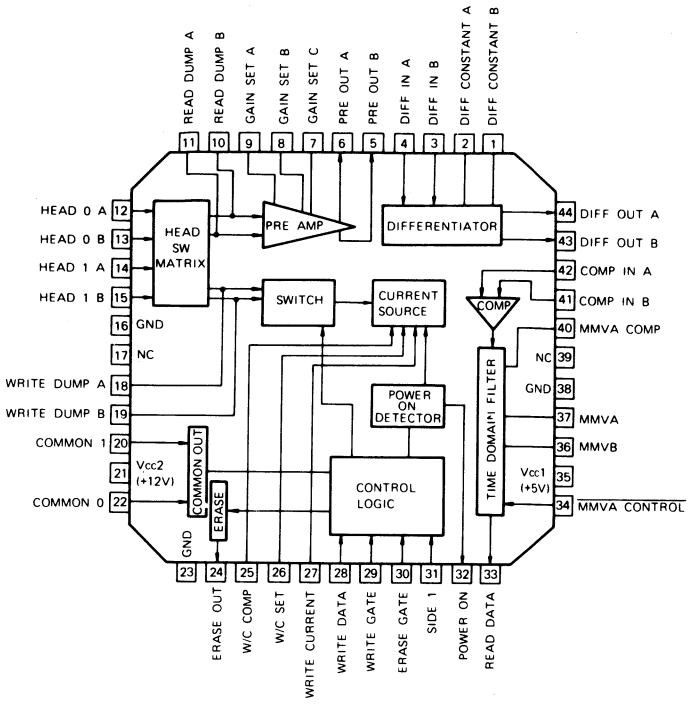
CX20174 (SONY)
DISK MOTOR DRIVER
– TOP VIEW –



PG TC	:	PULSE GENERATOR TIME CONSTANT	I COM	:	COMMON CURRENT OUT
PG OUT	:	PULSE GENERATOR OUTPUT	HE C –	:	HALL ELEMENT C PHASE ⊖
FG OUT	:	FREQUENCY GENERATOR OUTPUT	HE C +	:	HALL ELEMENT C PHASE ⊕
MOTON	:	MOTOR ON	HE B –	:	HALL ELEMENT B PHASE ⊖
DIR	:	DIRECTION	HE B +	:	HALL ELEMENT B PHASE ⊕
IN ⊕	:	CONTROL VOLTAGE INPUT ⊕	HE A –	:	HALL ELEMENT A PHASE ⊖
IN ⊖	:	CONTROL VOLTAGE INPUT ⊖	HE A +	:	HALL ELEMENT A PHASE ⊕
INPUT AMP OUT	:	INPUT AMPLIFIER OUTPUT	FG AMP IN +	:	FG AMPLIFIER INPUT ⊕
COMP OUT	:	COMPARATOR OUTPUT	FG AMP IN –	:	FG AMPLIFIER INPUT ⊖
COMP IN	:	COMPARATOR INPUT	FG AMP OUT	:	FG AMPLIFIER OUTPUT
Vs CONT	:	SERVO VOLTAGE CONTROL	SMT IN	:	SCHMITT INPUT
Vs	:	SERVO VOLTAGE			
OUT C	:	OUTPUT C PHASE			
OUT B	:	OUTPUT B PHASE			
OUT A	:	OUTPUT A PHASE			



CX20185 (SONY)
READ/WRITE AMPLIFIER
– TOP VIEW –



HEAD 0 A
HEAD 0 B : Input and output terminals for Read/Write head on Side 0

COMMON 0 : Connect the center tap of Read/Write head on Side 0

HEAD 1 A
HEAD 1 B : Input and output terminals for Read/Write head on Side 1

COMMON 1 : Connect the center tap of Read/Write head on Side 1.

READ DUMP A
READ DUMP B : Connect the head dumping resistor for Read.

GAIN SEL A, B, C : The voltage gain of Pre-Amplifier can be set to 100 or 200 by connecting a capacitor between these pins.

PRE OUT A
PRE OUT B : Pre-Amplifier output

DIFF IN A
DIFF IN B : Differentiator input

DIFF CONSTANT A
DIFF CONSTANT B : Connect external components to set the differential constant.

DIFF OUT A
DIFF OUT B : Differentiator output

COMP IN A
COMP IN B : Comparator input

MMVA COMP : Connect a resistor for the pulse width compensation of Time Domain Filter's mono-multi.

MMVA : Connect a resistor to determine the pulse width of Time Domain Filter's mono-multi.

MMVB : Connect a resistor to determine the pulse width of Read Data output.

$\overline{\text{MMVA CONT}}$: Digital input pin. When $\overline{\text{MMVA CONT}}$ is set to "L", the pulse width of Time Domain Filter's mono-multi is descreased.

READ DATA : Read Data output (Totem-Pole output)

POWER ON : Open Collector output. When Power Monitor circuit detects the power supply voltage drop, POWER ON output is ON.

$\overline{\text{SIDE 1}}$: Digital input pin. When $\overline{\text{SIDE 1}}$ is set to "L", Read/Write head on Side 1 becomes Active.

$\overline{\text{ERASE GATE}}$: Digital input pin. When $\overline{\text{ERASE GATE}}$ is set to "L", Erase circuit becomes Active, causing Erase current to be ON.

$\overline{\text{WRITE GATE}}$: Digital input pin. When $\overline{\text{WRITE GATE}}$ is set to "L", Write circuit block becomes Active, causing Write current to be ON.

$\overline{\text{WRITE DATA}}$: Digital input pin with Schmitt-Trigged function. When $\overline{\text{WRITE DATA}}$ is set from "H" to "L", Write current is switched.

$\overline{\text{WRITE CURRENT}}$: Digital input pin. When $\overline{\text{WRITE CURRENT}}$ is set to "L", Write current in increased.

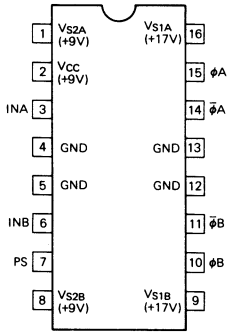
W/C SET : Connect a resistor to determine Write current.

W/C COMP : Connect a resistor for Write current compensation.

ERASE OUTPUT : Open Collector Erase current output.

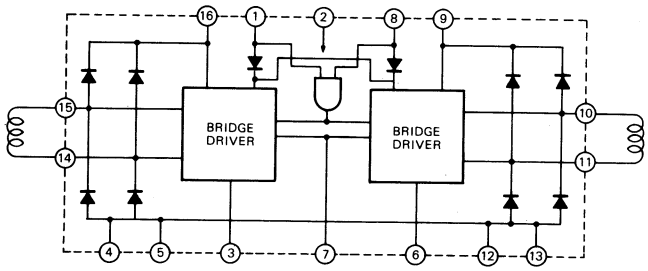
WRITE DUMP A
WRITE DUMP B : Connect the head dumping resistor for Write.

TA7774P
– TOP VIEW –

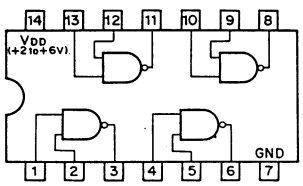


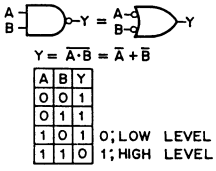
INPUT		OUTPUT		
PS	IN	ϕ	$\bar{\phi}$	Comment
L	L	L	H	Enable V_{S1}
L	H	H	L	Enable V_{S1}
H	L	L	H	Enable V_{S2}
H	H	H	L	Enable V_{S2}

V_{S2a}	V_{S2b}	
L	*	Power Off
*	L	Power Off
H	H	Operation



TC74HC00F (TOSHIBA) FLAT PACKGE
–TOP VIEW–

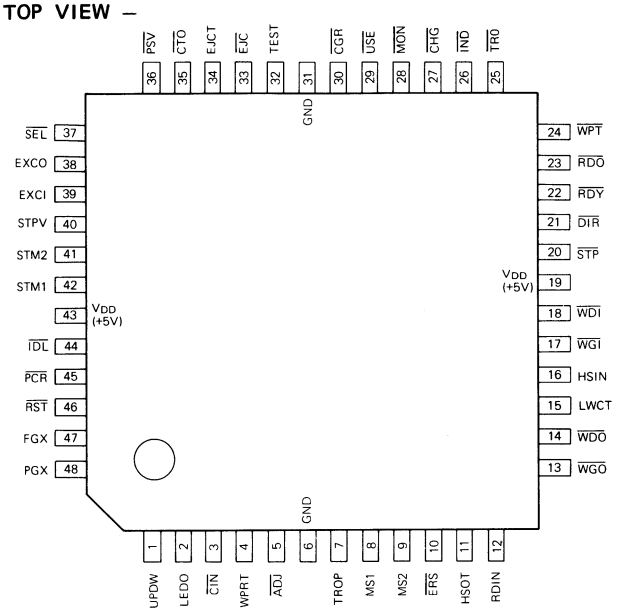




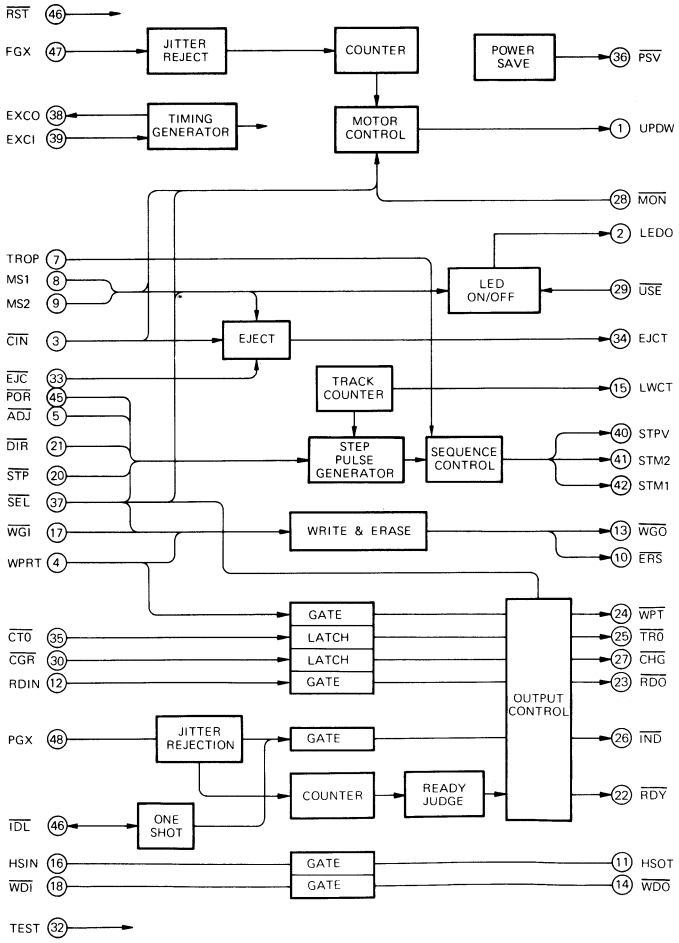
A	B	Y
0	0	1
0	1	1
1	0	1
1	1	0

0; LOW LEVEL
1; HIGH LEVEL

CXD1069Q
– TOP VIEW –



PIN No.	SYMBOL	I/O	DESCRIPTION
1	UPDW	O	UP DOWN
2	LEDO	O	LED OUTPUT
3	$\overline{CIN}$	I	CASSETTE IN
4	WPRT	I	WRITE PROTECT SW
5	$\overline{ADJ}$	I	ADJUST
7	TROP	I	TRACK 00 PHASE
8	MS1	I	MODE SELECT 1
9	MS2	I	MODE SELECT 2
10	$\overline{ERS}$	O	ERASE
11	HSOT	O	HEAD SELECT OUTPUT
12	RDIN	I	READ DATA INPUT
13	$\overline{WGO}$	O	WRITE GATE OUTPUT
14	$\overline{WDO}$	O	WRITE DATA OUTPUT
15	LWCT	O	LOW CURRENT
16	HSIN	O	HEAD SELECT INPUT
17	$\overline{WGI}$	I	WRITE GATE INPUT
18	$\overline{WDI}$	I	WRITE DATA INPUT
20	$\overline{STP}$	I	STEP
21	$\overline{DIR}$	I	DIRECTION
22	$\overline{RDY}$	O	READY
23	$\overline{RDO}$	O	READ DATA OUTPUT
24	$\overline{WPT}$	O	WRITE PROTECT
25	$\overline{TRO}$	O	TRACK 00
26	$\overline{IND}$	O	INDEX
27	$\overline{CHG}$	O	DISK CHANGE
28	$\overline{MON}$	I	MOTOR ON
29	$\overline{USE}$	I	IN USE
30	$\overline{CGR}$	I	DISK CHANGE RESET
32	TEST	I	TEST
33	$\overline{EJC}$	I	EJECT
34	EJCT	O	EJECT MOTOR CONTROLLER
35	$\overline{CTO}$	I	TRACK 00 SENSOR
36	$\overline{PSV}$	O	POWER SAVE OUTPUT
37	$\overline{SEL}$	I	SELECT
38	EXCO	O	OSCILLATOR OUTPUT
39	EXCI	I	OSCILLATOR INPUT
40	STPV	O	POWER SAVE FOR STEPPING MOTOR
41	STM2	O	STEPPING MOTOR CONTROLLER 1
42	STM1	O	STEPPING MOTOR CONTROLLER 2
44	$\overline{IDL}$	I/O	ONE SHOT FOR PHASE ADJUST
45	$\overline{PCR}$	I	POWER ON RECALIBRATION
46	$\overline{RST}$	I	POWER ON RESET
47	$\overline{FGX}$	I	FG INPUT
48	$\overline{PGX}$	I	INDEX INPUT



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