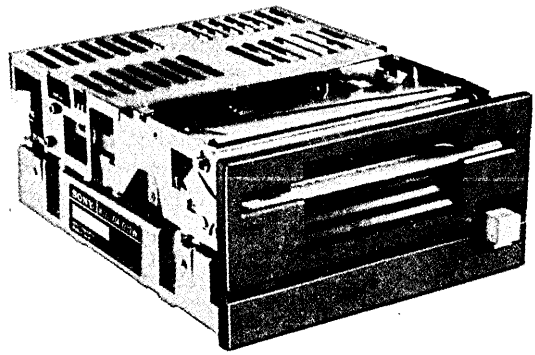
# MICRO FLOPPYDISK DRIVE

# OA-D32W
# OA-D32V

OA-D32W-90



SONY

SERVICE MANUAL

**Specifications**

| | OA-D32W | | OA-D32V | |
|---|---|---|---|---|
| | SINGLE DENSITY | DOUBLE DENSITY | SINGLE DENSITY | DOUBLE DENSITY |
| **Capacity** | | | | |
| Unformatted Per Disk | 500 Kbytes | 1.0 Mbytes | 250 Kbytes | 500 Kbytes |
| Unformatted Per Track | 3.125 Kbytes | 6.25 Kbytes | 3.125 Kbytes | 6.25 Kbytes |
| Burst TRANSFER RATE | 250 Kbits/sec | 500 Kbits/sec | 250 Kbits/sec | 500 Kbits/sec |
| **Access Time** | | | | |
| Track to Track | 12 msec. | | 12 msec. | |
| Average* | 350 msec. | | 350 msec. | |
| Settling Time | 30 msec. | | 30 msec. | |
| Head Load Time | 60 msec. | | 60 msec. | |
| Average Latency | 50 msec. | | 50 msec. | |
| **Functional** | | | | |
| Rotational Speed | 600 RPM | | 600 RPM | |
| Recording Density (inside track) | 4359 bpi | 8717 bpi | 4094 bpi | 8187 bpi |
| Track density | approx. 135 TPI | | approx. 135 TPI | |
| Cylinders | 80 | | 80 | |
| Tracks | 160 | | 80 | |
| R/W Heads | 2 | | 1 | |
| Encoding Method | FM, MFM | | FM, MFM | |
| **Heat Dissipation** | | | | |
| Operating Mode (Head Load) | 6.0 W | | 6.0 W | |
| Standby mode (Head Unload) | 3.9 W | | 3.9 W | |
| **Media Requirements** 3.5" x 3.7" (90 mm x 94 mm) | SONY OM-D4440 | | SONY OM-D3440 | |

*Average access time = 1/3 x (Track Nos.) x (Track to track time) + (Settling Time)

**Environmental Considerations**

**Reliability and Maintainability**

| | |
|---|---|
| Preventive Maintenance (PM) | Not required |
| Meantime Between Failures (MTBF) | 8000 POH (Power On Hourtime) |
| Meantime to Repair (MTTR) | 30 min. |
| Component Life | 5 years or 15,000 POH |
| Media Life | $3.0 \times 10^6$ passes/track |
| Disk Interchange | 20,000 times |
| Soft Read Error | 1 per $10^9$ bits read |
| Hard Read Error | 1 per $10^{12}$ bits read |
| Seek Error | 1 per $10^6$ seeks |

**Environmental Limits**

| | |
|---|---|
| Temperature (Operating) | 40°F to 115°F (5°C to 45°C) |
| Humidity (Operating) | 20 % to 80 % relative humidity, with a wet bulb temperature of 85°F (29°C) and no condensation. |
| Vibration (Operating) | The unit shall perform all read/write operations (no seek) according to specifications, with continuous vibration of less than 0.5 G (±10 %) from 5 Hz to 100 Hz (along the x, y, z plane). |

**Dimensional Data**

| | | |
|---|---|---|
| Height | 2.0 in. | (51 mm) |
| Width | 4.0 in. | (102 mm) |
| Depth | 5.1 in. | (130 mm) |
| Weight | 1.5 lbs | (650 g) |

**DC Power Requirements**

| | | | |
|---|---|---|---|
| Reading | +12.0 V | ±5 % | 0.30 A (typical) |
| (Operating) | +5.0 V | ±5 % | 0.48 A (typical) |

| RECORD OF REVISIONS | | |
|---|---|---|
| REVISION | NOTES | |
| 1 | ORIGINAL ISSUE | November, 1983 |
| | | |
| | | |

## TABLE OF CONTENTS

# SECTION 1
# INTRODUCTION

This manual is a maintenance guide for OA-D32W (Double sided) and OA-D32V (Single sided).

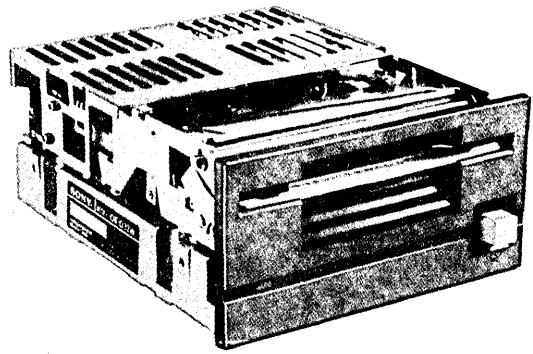
SECTION 2 describes disks and tools necessary for maintenance.

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 (4-603-929-00) should be inserted in the OA-D32W when it is transported. Otherwise, its heads may be damaged.

Perform maintenance in accordance with the procedure specified in this manual as follows:

(Example)

e. Fasten the guide shaft with the two screws (PSW2.6 x 6).

32V f. Fasten the head board to the chassis on the bottom surface, and apply nut lock paint to the screw.

32V g. Connect the head board to the head harness (by four points) with a soldering iron. (Refer to Fig. 4-14 (c) )

32W h. Connect the head board to the head harness (by six points) with a soldering iron. (Refer to Fig. 4-14 (d) )

32W i. Fasten head board and terminal shield plate with a screw (PSW2.6 x 8) on the chassis bottm, and then apply nut lock paint onto it.

32V j. Perform the stepping motor load torque adjustment. (Refer to 5-5)

k. Install the cassette-up ass'y in place. (Refer to 4-9)

Steps e, h, i, and k should be carried out in sequence for the OA-D32W.
Steps e, f, g, j and k should be carried out in sequence for the OA-D32V.

# SECTION 2
# TOOLS AND MEASURING INSTRUMENTS

## 2-1. GENERAL AND SPECIAL TOOL LIST

The tools, and measuring instruments for performing maintenance on the OA-D32W/OA-D32V are listed below.

**a. General Tools**

| | SONY Parts No. |
|---|---|
| TOTSU Screw Driver (M2.6) | (7-721-050-62) |
| ⊕ Driver 2 mm | (7-700-749-01) |
| ⊖ Driver 2 mm | (7-700-750-01) |
| ⊖ Driver 4 mm | (7-700-750-04) |
| Tweezers | (7-700-753-02) |
| Round Nose Plier | (7-700-757-01) |
| Adj Rod | (7-700-733-01) |
| Cutter | (7-700-758-02) |
| Soldering Iron (20W) | |
| Desoldering Metal Braid | |
| DC Power Supplier (+5 V DC ±5 %, 0.8 A max., +12 V DC ±5 %, 1.5 A max.) | |
| Tester | |

**b. Special Tools**

| | |
|---|---|
| MFD Checker II | (J-609-182-0A) |
| SMC-70 System | |
| SMI-7011 / SMI-7011A / SMI-7012 / SMI-7012A | |
| SMC-70 | |
| KX-13G1 | |
| A/D Converter | (J-623-002-0A) |
| 25P/26P Conversion Cable | (J-623-001-0A) |
| Radial Alignment System Disk (OR-D86VA) | (8-960-009-74) |
| Error Check System Disk (OR-D87VA) | (8-960-009-75) |
| Rotatory Knob (for Stepping Motor) | (J-609-011-0A) |
| Lead Screw Eccentricity Inspection Tool | (J-609-136-0A) |
| Standard Disk Dummy (for Cassette-Up Ass'y Installation) | (J-609-120-0A) |
| Geared Driver | (J-609-017-0A) |
| Pad Weight | (J-609-124-0A) |
| Hexagon Wrench Torque Driver | (J-609-125-0A) |
| Power Cable | (J-609-130-0A) |
| Interface Cable | (J-609-200-0A) |

**c. Measuring Equipment**

| | |
|---|---|
| Oscilloscope Dual Trace 20 MHz | |
| Universal Counter Resolution 0.1 msec. | |
| Tension Gauge (Max. 200 g) | (J-604-163-0A) |
| Tension Gauge (Max. 20 g) | (7-732-050-10) |

**d. Disks**

| | |
|---|---|
| Level Disk | |
| 32V OR-D46VA | (8-960-009-31) |
| 32W OR-D46WA | (8-960-009-40) |
| Alignment Disk | |
| 32V OR-D47VA | (8-960-009-32) |
| 32W OR-D47WA | (8-960-009-41) |
| Dynamic Inspection Disk +30 | |
| 32V OR-D51VA | (8-960-009-35) |
| 32W OR-D51WA | (8-960-009-44) |
| Dynamic Inspection Disk −30 | |
| 32V OR-D52VA | (8-960-009-36) |
| 32W OR-D52WA | (8-960-009-45) |
| Cleaning Disk | |
| 32V OR-D29VA | (8-960-009-15) |
| 32W OR-D29WA | (8-960-009-39) |

**e. Expendable and Chemical Supplies**

| | |
|---|---|
| Nut Lock Paint | |
| Alcohol | |
| Sony Oil | (7-611-018-01) |
| Sony Grease | (7-622-001-52) |
| Bamboo Stick | |
| Applicator | |

## 2-2. SPECIAL TOOLS

### 2-2-1. MFD Checker II

(1) MFD Checker II configuration
Main Checker Board
I/F Cable (26pin and 34pin)
Power Cable (2 pieces)
Conversion Board (26pins-to-34pins)

**NOTE:** The Conversion Board and 34pin I/F Cable are required for the OA-D33W/OA-D33V.

(2) Micro Floppydisk Drive Connection (Refer to Fig. 2-1)

(3) MFD Checker II function switches
STEP IN . . . . . Steps the head inwards.
STEP OUT . . . . . Steps the head outwards. The head continously moves if the switch is kept pressed.
SIDE SELECT . . . . Selects one of two heads (side 0 or side 1) for a double sided. (This switch is invalid for single sided versions.)
WRITE . . . . . Records, data specified by the OSC SEL switch, onto one track.
OSC SEL . . . . . Selects such write data as "2F", "1F", "WCP" (worst case pattern), or EXT.
WCP W/M . . . . . Selects upper and lower patterns when the OSC SEL switch is set to WCP. (Refer to Fig. 3-3 (c), (d) )
HD LOAD . . . . . This is used to set the plunger solenoid active.
MOTOR ON . . . . . This is used to operate the Disk Motor.
DRIVE SELECT . . . Selects the disk drive. The DRIVE SELECT switch on the disk drive relates to the DRIVE SELECT switch on the checker as follows:

| Drive (S101) | Checker | |
|---|---|---|
| | 1 | 2 |
| 1 | OFF | OFF |
| 2 | ON | OFF |
| 3 | OFF | ON |
| 4 | ON | ON |

CHGRST . . . . . Resets the DSKCHG signal.
600/300 SELECT (Located in the middle of the board) . . . . . Set the 600/300 SELECT switch at "600" for the OA-D32W/OA-D32V.
80/70 SELECT (Located in the middle of the board) . . . . . Set the 80/70 SELECT switch to "80" for the OA-D32W/OA-D32V.

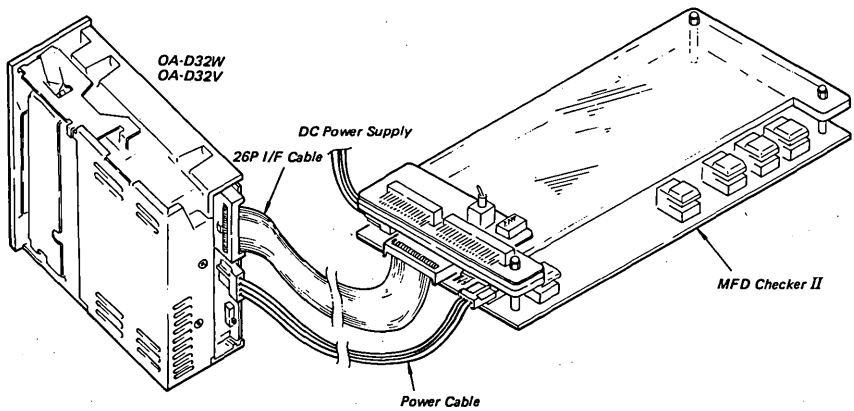



*Fig. 2-1 Drawing of Connection Between Disk Drive and MFD Checker II*

(4) INDICATOR

OSC SEL (Four LEDs in the left of the board) . . . . . They indicate the selected position on the OSC SEL switch.

I/F signals (Five LEDs in the middle of the board) . . . . . They indicate at the states of TRK 00, WRTPRT, RDY, DSKCHG, and INDEX, respectively.

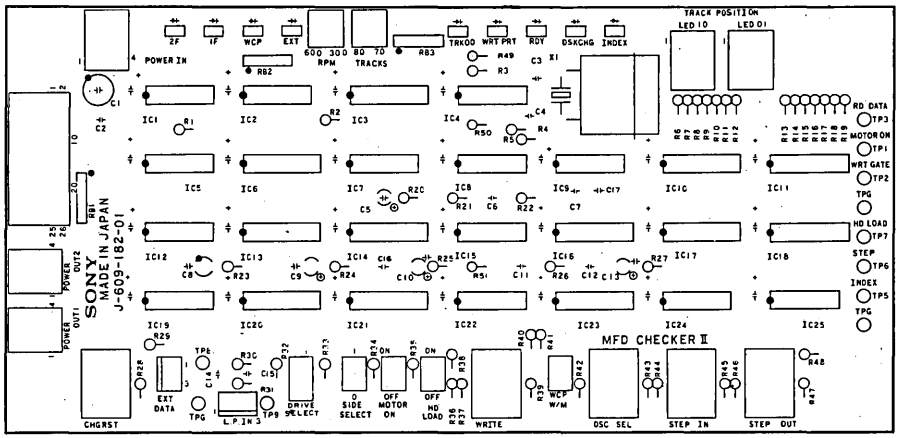
The TRK 00, WRTPRT, RDY, and DSKCHG indicators are lit when the respective I/F signals are low (true). The INDEX indicator blinks when the INDEX signal is applied to the board.

TRACK POSITION (Seven segment LED indicator in the right of the board) . . . . . Indicates the current track position.

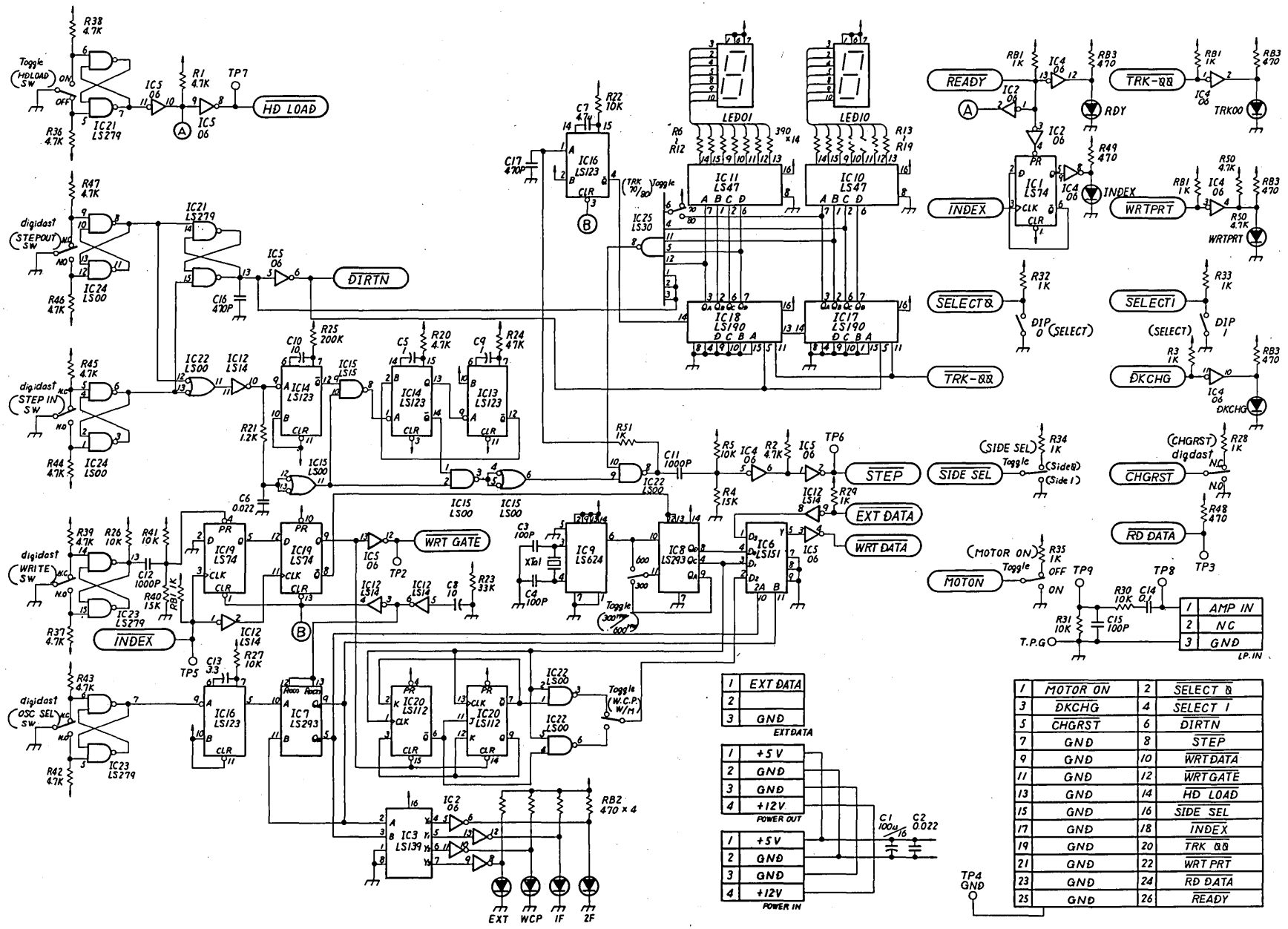
(5) Test Points

TP-1; $\overline{\text{MOTOR ON}}$
TP-2; $\overline{\text{WRT GATE}}$
TP-3; $\overline{\text{RD DATA}}$
TP-5; $\overline{\text{INDEX}}$
TP-6; $\overline{\text{STEP}}$
TP-7; $\overline{\text{HD LOAD}}$

The GND terminal is marked by "GND".




*MFD Checker II Block Diagram*




| | | | |
|---|---|---|---|
| 1 | MOTOR ON | 2 | SELECT 0 |
| 3 | DKCHG | 4 | SELECT 1 |
| 5 | CHGRST | 6 | DIRTN |
| 7 | GND | 8 | STEP |
| 9 | GND | 10 | WRTDATA |
| 11 | GND | 12 | WRTGATE |
| 13 | GND | 14 | HD LOAD |
| 15 | GND | 16 | SIDE SEL |
| 17 | GND | 18 | INDEX |
| 19 | GND | 20 | TRK 00 |
| 21 | GND | 22 | WRT PRT |
| 23 | GND | 24 | RD DATA |
| 25 | GND | 26 | READY |

*MFD Checker II Circuit Diagram*

### 2-2-2. Configuration of SMC-70 Drive Test System

System configuration for Radial Alignment and TRK 00 Sencer measurement, adjustment, and error check with SMC-70 System is shown in Fig. 2-2 (a), (b).

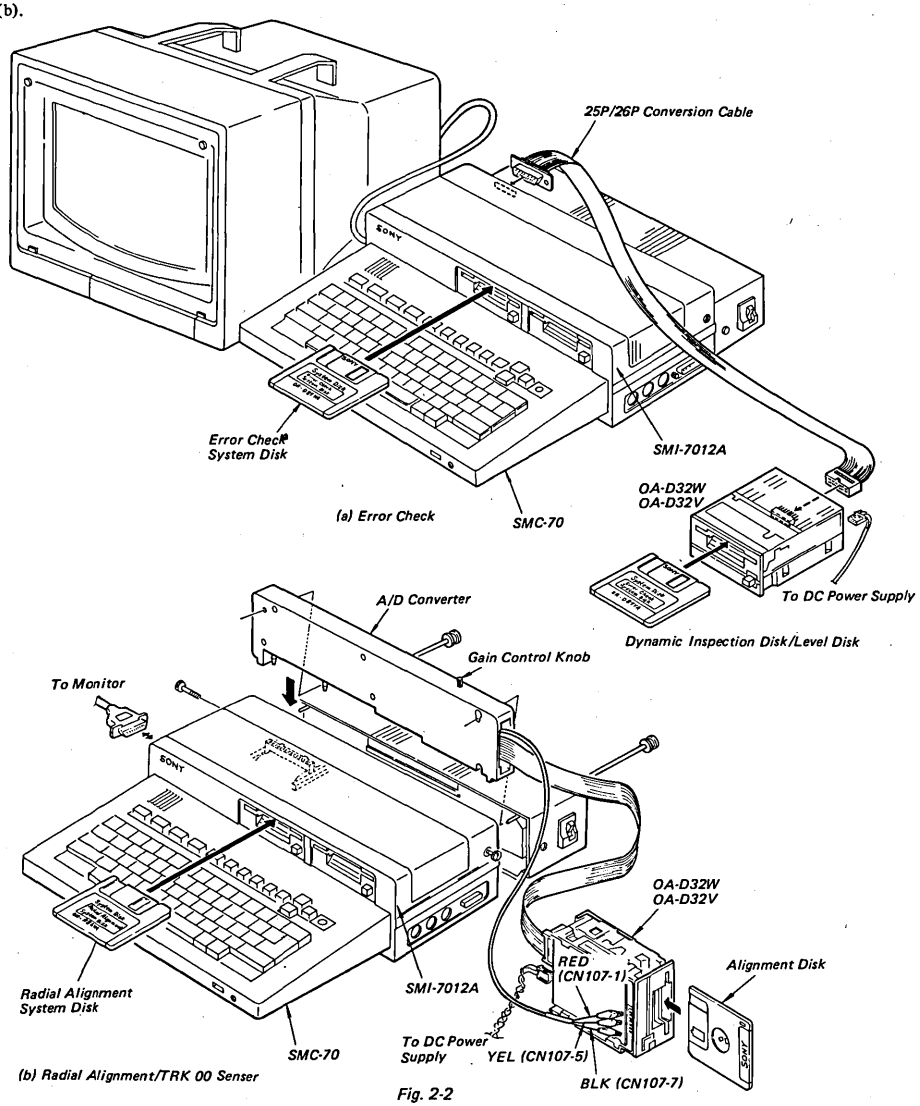



Fig. 2-2



### 2-2-3. Disks

(a) Level disk
- 32V OR-D46VA
- 32W OR-D46WA

These disks are used to check and adjust the read amplifier gain and off set. The self-read/write operation can be checked with both of these disks and the SMC-70 System.

(b) Alignment disk
- 32V OR-D47VA
- 32W OR-D47WA

These disks have prerecorded data such as Cat's eye pattern and INDEX signal to check and adjust the off-tracking and index position.

| | OR-D47VA | | OR-D47WA | |
|---|---|---|---|---|
| | SIGNAL | TRACK | SIGNAL | TRACK |
| SIDE 0 | CAT'S EYE PATTERN | 00, 20, 25, 30, 35, 40, 45, 50, 55, 79 | CAT'S EYE PATTERN | 00, 20, 25, 30, 35, 40, 45, 50, 55, 79 |
| | INDEX | 40 | INDEX | 40 |
| SIDE 1 | not applicable | | CAT'S EYE PATTERN | 40 |
| | | | INDEX | 40 |

(c) DYNAMIC INSPECTION DISK +30
- 32V OR-D51VA
- 32W OR-D51WA

DYNAMIC INSPECTION DISK –30
- 32V OR-D52VA
- 32W OR-D52WA

These disks can be used in the final check for a drive with the SMC-70 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.

(d) CLEANING DISK
- 32V OR-D29VA
- 32W OR-D29WA

This type of disk can be used for cleaning the head.

**Contents**

| | OR-D51VA | OR-D52VA | OR-D51WA | OR-D52WA |
|---|---|---|---|---|
| SIDE 0 | Offset of +30 μm for all formatted tracks | Offset of –30 μm for all formatted tracks | Offset of +30 μm for all formatted tracks | Offset of –30 μm for all formatted tracks |
| SIDE 1 | not applicable | not applicable | Offset of +30 μm for all formatted tracks | Offset of –30 μm for all formatted tracks |

# SECTION 3
# TROUBLESHOOTING

SECTION 3 describes the methods of trouble-shooting. 3-2 refers to several errors specfied 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 TROUBLE SHOOTING

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

## 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. 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 5-4) If not readable yet, the error is not recoverable.

### 3-2-2. Write Error

To determine whether the disk or the drive is failing, 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 ellectrical noise jumps into signal.
2) Head driving system might be at fault. If it is not re-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 offset and head compliance are not obtained.
4) Chucking mechanism does not work.

## 3-3. FAULT DIAGNOSIS BY MFD CHECKER II

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.

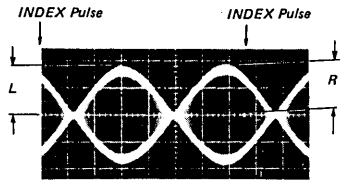
### 3-3-1. Normal Operation

Pre-setting:

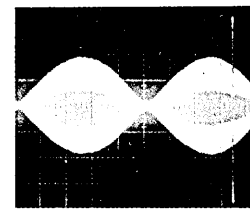
1) Refering to Fig. 2-1 (Micro Floppydisk Drive Connection), connect the drive to MFD Checker II.
2) Set the slide switch (S101) on the disk drive to "1".
3) Set all switches in the MFD Checker II to "OFF".

<table>
<tr><th>Procedure</th><th>Step</th><th>Operation</th></tr>
<tr><td>1</td><td>Power On</td><td>1. The head automatically returns to TRK 00 and stops there.<br>2. The disk motor remains stopped.</td></tr>
<tr><td>2</td><td>Drive Select Check after checked, the disk drive is to be kept selected.</td><td>1. The TRK 00, WP, and DSKCHG indicators light only when the DRIVE SELECT switch on the MFD Checker II and the slide switch (S101) on the disk drive are set as follows:<br><table><tr><th colspan="2">MFD Checker II</th><th rowspan="2">Disk drive (S101)</th></tr><tr><th>1</th><th>2</th></tr><tr><td>OFF</td><td>OFF</td><td>1</td></tr><tr><td>ON</td><td>OFF</td><td>2</td></tr><tr><td>OFF</td><td>ON</td><td>3</td></tr><tr><td>ON</td><td>ON</td><td>4</td></tr></table>Otherwise, these indicators go out.</td></tr>
<tr><td>3</td><td>Operation during CASSETTE IN (Alignment disk is to be inserted.)</td><td>1. When the cassette is inserted, the motor is rotating and the plunger is pulled out. The head is loaded and unloaded in sequence. The motor then stops operation.</td></tr>
<tr><td>4</td><td>MOTOR ON switch on</td><td>1. The motor rotates. (The INDEX indicator on the MFD Checker II blinks.)<br>2. The TRK 00, WRTPRT, RDY, and DSKCHG indicators light. (The RDY indicator, however, lights in about 1.5 seconds after the disk is inserted.)</td></tr>
<tr><td>5</td><td>CHGRST switch on</td><td>1. The DSKCHG indicator goes out at the moment when the CHGRST switch is pressed.</td></tr>
<tr><td>6</td><td>HD LOAD switch on</td><td>32V 1. The plunger Solenoid is set on, and the pad lifts down.<br>32W 2. The plunger Solenoid is set active and the head lifts down.<br>3. The clearance between the HL arm and pad arm is set as shown in Fig. 5-9.</td></tr>
<tr><td>7</td><td>Stepping</td><td>1. When the STEP IN switch is pressed, the head is continuously stepped in until it arrives at TRK 79.<br>When the STEP OUT switch is pressed, the head is continuously stepped out until it arrives at TRK 00.<br>2. When the head is set to any track other than TRK 00, the TRK 00 indicator does not light.</td></tr>
<tr><td>8</td><td>Track positioning</td><td>1. Such a Cat's eye pattern signal as shown in Fig. 3-1 (a) can be obtained at CN107-1 on the disk drive when the head accesses TRK 20, TRK 30 or TRK 50. The oscilloscope is triggered by the signal at TP-5 of the MFD Checker II.<br>Note: Such a signal as shown in Fig. 3-1 (b) can be obtained when the head accesses TRK 40.<br>32W 2. SIDE SELECT switch to side 1. such a Cat's eye pattern signal as shown Fig. 3-1 (b) can be obtained at CN107-1 on the disk drive. When the head accesses TRK 40.<br>3. Set amplitude L in Fig. 3-1 (a) to 5 divisions, and then read amplitude R in Fig. 3-1 (a).<br>Calculate the OFF TRACK value, refering to Table 3-1</td></tr>
</table>

| Procedure | Step | Operation |
|---|---|---|
| | | (c) and (d), in accordance with R in Fig. 3-1 (a).<br>Then, obtain the humidity-compensated OFF TRACK value from the following expression:<br>The compensated OFF TRACK value = OFF TRACK value + 0.2 (50 – H) (39.5 – 0.1875N – 1.5S)/33.5 ...(1)<br>**Where;**<br>H: Relative humidity (%)<br>N: Track number<br>S: Side ID number<br>Side 0: 0 Side 1 : 1<br>The compensated OFF TRACK value should meet the following formula.<br>$-20 \leqq$ Compensated OFF TRACK value $\leqq +20$ ... (2)<br>[EX] For R = 4.5 in the OA-D32V, the apparent OFF TRACK value is as shown in table 3-1 (d).<br>Assuming = 4.5,<br>H = 60 %, N = 40, and S = 1, we can obtain the compensated OFF TRACK value as 2.6 from expression (1). This satisfy the formula. |




(a)



(b)

*Fig. 3-1 Cat's Eye Pattern Signal*

| | 0.0 | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 2: | 34.5 | 32.9 | 31.3 | 29.8 | 28.3 | 26.8 | 25.4 | 24.0 | 22.7 | 21.4 |
| 3: | 20.1 | 18.9 | 17.7 | 16.5 | 15.3 | 14.2 | 13.1 | 12.0 | 11.0 | 9.9 |
| 4: | 8.9 | 8.0 | 7.0 | 6.1 | 5.1 | 4.2 | 3.4 | 2.5 | 1.6 | 0.8 |
| 5: | 0.0 | −0.8 | −1.6 | −2.3 | −3.1 | −3.8 | −4.6 | −5.3 | −6.0 | −6.6 |
| 6: | −7.3 | −8.0 | −8.6 | −9.3 | −9.9 | −10.5 | −11.1 | −11.7 | −12.3 | −12.9 |
| 7: | −13.4 | −14.0 | −14.5 | −15.1 | −15.6 | −16.1 | −16.6 | −17.1 | −17.6 | −18.1 |
| 8: | −18.6 | −19.0 | −19.5 | −20.0 | −20.4 | −20.9 | −21.3 | −21.7 | −22.2 | −22.6 |
| 9: | −23.0 | −23.4 | −23.8 | −24.2 | −24.6 | −25.0 | −25.4 | −25.7 | −26.1 | −26.5 |

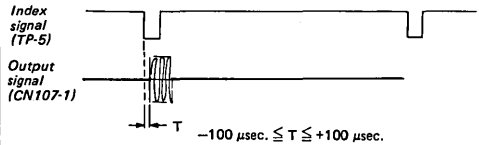
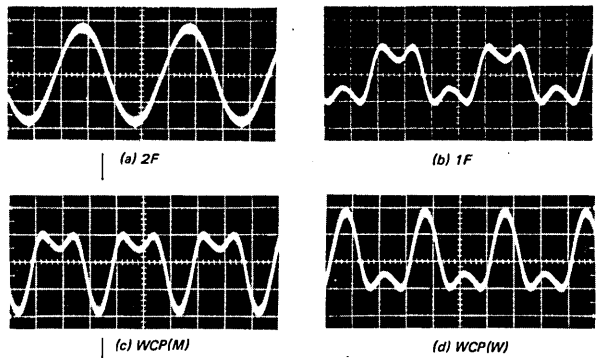
*(c) OA-D32W*

| | 0.0 | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 2: | 36.9 | 35.1 | 33.4 | 31.8 | 30.2 | 28.7 | 27.2 | 25.7 | 24.3 | 22.9 |
| 3: | 21.5 | 20.2 | 18.9 | 17.6 | 16.4 | 15.2 | 14.0 | 12.9 | 11.7 | 10.6 |
| 4: | 9.6 | 8.5 | 7.5 | 6.5 | 5.5 | 4.5 | 3.6 | 2.7 | 1.8 | 0.9 |
| 5: | 0.0 | −0.9 | −1.7 | −2.5 | −3.3 | −4.1 | −4.9 | −5.6 | −6.4 | −7.1 |
| 6: | −7.8 | −8.5 | −9.2 | −9.9 | −10.6 | −11.2 | −11.9 | −12.5 | −13.1 | −13.7 |
| 7: | −14.3 | −14.9 | −15.5 | −16.1 | −16.6 | −17.2 | −17.7 | −18.3 | −18.8 | −19.3 |
| 8: | −19.8 | −20.4 | −20.8 | −21.3 | −21.8 | −22.3 | −22.8 | −23.2 | −23.7 | −24.1 |
| 9: | −24.6 | −25.0 | −25.4 | −25.9 | −26.3 | −26.7 | −27.1 | −27.5 | −27.9 | −28.3 |

*(d) OA-D32V*

*Table 3-1. Apparent off Track*

| | | |
|---|---|---|
| 9 | Motor speed | 1. The Motor speed can be measured at TRK35, in TP-5 on MFD Checker II with an universal counter.<br>It should be 100 msec ±1.5 msec. |

| Procedure | Step | Operation |
|---|---|---|
| 10 | Index position | 1. The following waveform can be obtained on TRK 40.<br>  <br><br>*Fig. 3-2 Index Phase Specification* |
| 11 | TRK 00 sensor level | 1. Move the head until it arrives at TRK 01. (Do not move the head passing TRK 01. If the head arrives at TRK 00, through the Cat's eye pattern signal is to be rechecked and then the head is to be set on the TRK 01.)<br>The output signal level of CN107-5 is 3 V or more.<br>2. Move the head until it arrives at TRK 00.<br>The output signal level of CN107-5 is 0.7 V or less. |
| 12 | Cassette out (When the alignment disk is ejected.) | 1. The DSKCHG indicator lights. |
| 13 | Write (When the level disk is inserted) | 1. When the WRITE switch is pressed and "2F", "1F", or "WCP (M/W)" are written, the corresponding waveform can be obtained at CN107-1. (Refer to Fig. 3-3)<br>  <br>*(a) 2F* *(b) 1F* *(c) WCP(M)* *(d) WCP(W)*<br>*Fig. 3-3 2F, 1F and WCP Waveforms*<br>32W 2. Set the SIDE SELECT switch to side 1, and "2F", "1F", or "WCP (M/W)" are written, the corresponding waveform can be obtained at CN107-1. (Refer to Fig. 3-3) |

| Procedure | Step | Operation |
|---|---|---|
| 14 | Output level | 1. Move the head until it arrives at TRK 79, and then write "2F".<br>The output signal level of CN107-1 is 0.4 to 0.8 Vp-p ( 32W 0.2 to 0.5 Vp-p).<br>The following read data can be obtained at TP-3 on the checker. (Refer to Fig. 3-4 (a) (b) )<br>32W 2. Set the SIDE SELECT switch to side 1.<br>Move the head until it arrives at TRK 79, and then write "2F".<br>The output signal level of CN107-1 is 0.2 to 0.5 Vp-p.<br>The following read data can be obtained at TP-3 on the checker. (Refer to Fig. 3-4 (a) ) |

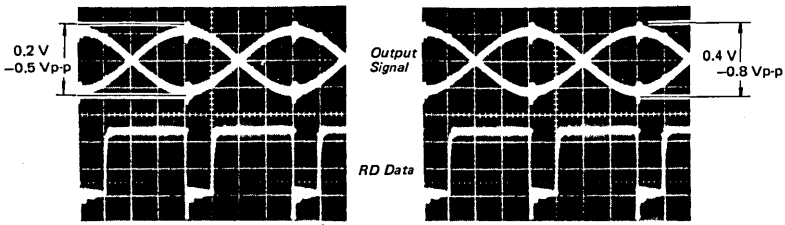



*Fig. 3-4 Output Signal and RD Data Waveforms*

| | | |
|---|---|---|
| 15 | Peak Shift | 1. Write "WCP (W/M)" onto TRK 79.<br>Such waveforms as shown in Fig. 3-5 (a) (b) can be obtained at CN107-1 and TP-3, respectively.<br>The waveform in Fig. 3-5 (a) (b) shows the read data at TP-3. |

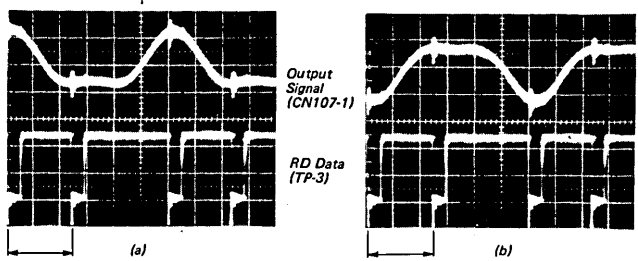
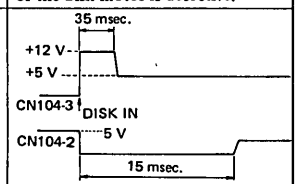



*Fig. 3-5 Waveforms of Output Signal and RD Data at TRK 79*

32W 2. Set the SIDE SELECT switch to side 1. Write "WCP (W/M)" onto TRK 79.
Such waveforms as shown in Fig. 3-5 (a) (b) can be obtained at CN107-1 and TP-3, respectively.
The waveform in Fig. 3-5 (a) (b) shows the read data at TP-3.

### 3-3-2. Check Points to Abnormal Operation

| Step | Abnormal Operation for Each Step | Check Point (defective place) | Remarks |
|---|---|---|---|
| Power On | 1. The head moves toward the center of the Drive. | 1. TRK 00 sensing circuit. | The signal of CN103-2 is Low level. |
| | 2. The head is stepped out, but it is idling around the outmost track. | 1. TRK 00 sensing circuit.<br>2. Check if the TRK 00 Sensor Mounted Board is installed a little bit outside. | The signal of CN103-2 is High level. |
| | 3. The head moves uncertainly. (The head movement is not constant.) | 1. Stepping motor drive system.<br>**NOTE:** If no TRK 00 is detected in several seconds after power is turned on, the CPU automatically stops the stepping motor and thereafter accepts no instruction. | A voltage of +12 V appears at CN105-2 during normal operation. Voltages at 3 pin through 6 pin of of CN105 are switched in 10 ± 0.1 msec intervals. |
| | 4. The disk motor rotates. | 1. Disk motor drive system. | The signal CN101-5 and CN101-7 are Low level. |
| Drive Select Check after checked, the disk drive is to be kept selected. | 1. 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 IC108-3 for the selected combination is High level during normal operation. The signal of IC108-3 is Low level for unselected combination. |
| Operation during CASSETTE IN (Alignment disk is to be inserted.) | 1. After the cassette is inserted, the head is not loaded and the motor does not rotate. | 1. The CSTIN signal does not appear at CN101-5, and it is not sent from the motor.<br>2. The cassette is not properly placed. | Refer to 5-8. |
| | 2. The head is loaded, but the motor does not rotate. | 1. The disk motor. | Refer to 5-8. |
| | 3. The disk motor rotates, but the head is not loaded. | 1. Plunger solenoid or its drive system.<br>2. Plunger stroke.<br>3. Head Clearance.<br>4. HL arm height. | The signal waveforms shown below appear of CN104-2, 3. During normal operation. (Refer to Fig. 3-6)<br>Refer to 5-10.<br>Refer to 5-9. |
| MOTOR ON switch on | 1. The disk motor does not rotate. | 1. Disk motor drive system. | The signal of CN101-7 is High level, or the disk motor is defective. |
| | 2. The I/F indicators do not light. | 1. If no I/F indicators is lit, the drive select is not conducted.<br>2. If some I/F indicators are lit, the I/F signal circuit is defective. |  *Fig. 3-6* |

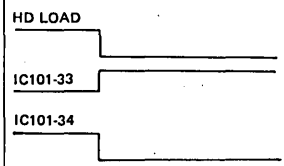
<table>
<tr><th>Step</th><th>Abnormal Operation for Each Step</th><th>Check Point (defective place)</th><th>Remarks</th></tr>
<tr><td>CHGRST switch on</td><td>1. The DSKCHG indicator does not go out.</td><td>1. The CHGRST signal (CN109-3) is not sent to the CPU (IC101-9).</td><td></td></tr>
<tr><td>HD LOAD switch on</td><td>1. The plunger solenoid is not energized.</td><td>1. The HD LOAD signal (at CN109-14) is not sent to the CPU (IC101-6).<br><br>2. IC 111<br>3. IC 101</td><td>Waveforms of normal operation are;<br> 

Fig. 3-7</td></tr>
<tr><td>Stepping</td><td>1. The step operation does not function at all, or it is not smoothly functioned.</td><td>1. Stepping motor drive system or stepping motor itself.<br><br>2. The harness (i, e, the TRK 00 sensor) is internally attached to other mounting parts.<br>3. Obstacles are attached to the slide guide shaft.</td><td>In normal condition, the signal of IC101-40 is High level for about 1 msec after the STEP signal enters. During this time, a DC voltage of +12 V is applied to the stepping motor.<br><br>
<table>
<tr><th>TRACK</th><th>P0(IC106-5)</th><th>P1(IC106-9)</th><th>P2(IC106-11)</th><th>P3(IC106-13)</th></tr>
<tr><td>0, 4, 8, . . . 72, 76.</td><td>H</td><td>H</td><td>L</td><td>L</td></tr>
<tr><td>1, 5, 9, . . . 73, 77.</td><td>L</td><td>H</td><td>H</td><td>L</td></tr>
<tr><td>2, 6, 10, . . . 74, 78.</td><td>L</td><td>L</td><td>H</td><td>H</td></tr>
<tr><td>3, 7, 11, . . . 75, 79.</td><td>H</td><td>L</td><td>L</td><td>H</td></tr>
</table></td></tr>
<tr><td rowspan="2">Track positioning</td><td>1. The ratio of the left to right signals does not meet the specification.</td><td>1. A voltage of +5 V is not applied to the stepping motor. (CN105-1, 2)<br>2. Radial alignment is incomplete.</td><td><br>Refer to 5-4.</td></tr>
<tr><td>2. No signal appears.</td><td>1. Read amplifier circuit.<br><br>2. A seek error has occurred.</td><td>Signal appeance must be confirmed with the sequence of CN107-1, IC103-16, IC103-17, IC103-1, IC103-2, IC104-7, IC104-8.<br>Refer to 3-2-3.</td></tr>
</table>

# Check Points to Abnormal Operation

| Step | Abnormal Operation for Each Step | Check Point (defective place) | Remarks |
|---|---|---|---|
| Motor speed | 1. The motor speed does not meet the specification. | 1. The disk motor<br>2. The pad pressure | Refer to 5-8.<br>Refer to 5-2. |
| Index position | 1. When the cassette is inserted twice or more, positions on each track is varied ±40 μsec or more. | 1. The chucking mechanism of the disk moter is defective. | Refer to 4-11. |
| | 2. When the cassette is set twice or more, positions on each track is varied ±40 μsec or less. The shifted positions, however, do not meet the specification. | 1. The INDEX phase is mis-adjusted. | Refer to 5-6. |
| TRK 00 sensor level | 1. The head returned from inside track does not stop at TRK 01 and it goes to TRK 00 where re-calibration is to be carried out. | 1. The TRK 00 sensor positioning is improper. | The signal level of CN107-5 is 3 V or more at TRK 01 during normal operation. (Refer to 5-4.) |
| Cassette out (When the alignment disk is ejected.) | 1. When the casette is ejected, the DSKCHG indicator does not light. | 1. Signal has not been detected cassette ejection. Check if the D-detected arm moves properly.<br>2. Check if the disk motor circuit board operates properly.<br>3. Signal appearance must be confirmed with the sequence of IC101-3, IC112-1, IC112-3, CN109-3. | The signal of CN101-5 remains Low level. |
| Write (When the level disk is inserted.) | 1. The waveform signal cannot be re-written. | 1. Write circuit<br>2. Check whether write data is applied or not. | 32W Change the SIDE SELECT SWITCH to side 1 and then conduct the operation specified in item 13-1 of NORMAL OPERATION.<br>In normal condition of write gate circuit, terminal voltage of CN109 -12 is Low level, terminal voltage of IC101-46 is High level, terminal voltage of IC115-4 is High level and<br>32V Collector voltage of Q106 is approx. +12 V.<br>32W When SIDE SELECT switch is set to side 0, collector voltage of Q107 is approx. +12 V. When it is set to side 1, collector voltage of Q106 is approx. +12 V. |

| Step | Abnormal Operation for Each Step | Check Point (defective place) | Remarks |
|---|---|---|---|
| Output level | 1. The output signal level does not meet the specification. | 1. Read amplifier gain adjustment is incomplete. | Refer to 5-7. |
| | 2. Read data does not appear. | 1. IC103 (MC3470AP) | |
| Peak Shift | 1. The shifted peak value does not meet the specification. | 1. When the value in both "WCP W" and "WCP M" do not meet the specification, the head is defective. | Refer to 4-14. |
| | | 2. When difference in value between "WCP W" and "WCP M" is remarkably Big, off set adjustment is incomplete. | Refer to 5-7. |

## 3-4. FINAL CHECK

### 3-4-1. Setting of SMC-70

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

b. A conversion cable for I/F (25 pin to 26 pin) is connected to rear panel of SMI-7012A (Drive Unit).

c. Connect the drive under test to the conversion cable and set the DRIVE SELECT switch (S101) of the unit to "2".

d. Error check system disk is inserted into drive A of SMI-7012A and power is turned on.

e. After word "A>" appears on CRT display, drive check program will start.

### 3-4-2. Set The Check Area

| Description | Keying | Display |
|---|---|---|
| To display original test condition of the disk. | [W][N][E][W][I][C] [RETURN] | ***** Floppy Disk Analysis v3.0 *****<br>***** Copyright (C) 1981, Sep. *****<br>[Test condition] drive C<br>Minimum track 0<br>Maximum track 79<br>Minimum Sector 1<br>Maximum sector 16<br>Sector size 256<br>Single or Double side? S<br>Read & Write retry 1<br>Seek & Home retry 0<br><br>#Do you want to change these test conditions? (Y, N) = |
| To change any of test conditions.<br>Type the minimum track to be tested.<br>[EX]<br>In case it is TRK 00. | [Y] [RETURN]<br><br><br>[0] [RETURN] | +Minimum track 0 [track]=⇒<br><br><br>+Maximum track 79 [track]=⇒ |

| Description | Keying | Display |
|---|---|---|
| Type the maximum track to be tested.<br>[EX]<br>In case it is TRK 79. | 7 9 RETURN | +Minimum sector 1 [sector]=⇒ |
| Type the minimum sector to be tested.<br>[EX]<br>In case it is 1 sector. | 1 RETURN | +Maximum sector 16 [sector]=⇒ |
| Type the maximum sector to be tested.<br>[EX]<br>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.<br>[EX]<br>In case it is 256 bytes. | 2 5 6 RETURN | +Single side or Double side?<br><S, D>=⇒ |
| Type the initial name letter (S-single sided, D-double sided) of disk surface to be tested.<br>[EX]<br>In case it is double side. | D RETURN | +Read & Write retry 1 [times]=⇒ |
| Type the number of how many retry must be conducted when read error or write error occurs.<br>[EX]<br>In case it is once. | 1 RETURN | +Seek + Home retry 0 [times]=⇒ |
| Type the number of how many seek retry must be conducted when the error occurs.<br>[EX]<br>In case no retry is desired. | 0 RETURN | *** Command table ***<br>r : = read test<br>w : = write test<br>l : = show disk condition<br>s : = set test condition<br>h : = help<br>e : = finish & 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.<br><br>Type the number of pass-count for reading tracks and sectors pre-set in item 3-4-2.<br><br>[EX]<br>In case it is once. | R RETURN<br><br>1 RETURN | *** Read Test ***<br>#Enter pass-count = 1<br><br>#Test disk ready? yes --→ hit [Return] |
| Insert the disk to be tested. | RETURN | <<Pass-count = 1>><br>In-ward (trkmin--→trkmax)<br>+Track = |
| Read test starts under the test condition pre-set in item 3-4-2. | | Out-ward (trkmax--→trkmin)<br>+Track = |
| The test ends. | | *** Read Test End ***<br>[1] Total of Seek error:<br>0 times during 00160 times seek.<br>+Seek CRC error: 0 times<br>+Seek error: 0 times<br><br>[2] Total of Read error:<br>0 times during 02560 times read.<br>+ID, DATA ADM missing: 0 times<br>+ID CRC error: 0 times<br>+DATA CRC error: 0 times<br>+Lost data error: 0 times<br>+Byte data verify Err: 0 times<br><br>[3] Total of Write error:<br>0 times during 00000 times write.<br>+ID, ADM missing: 0 times<br>+ID CRC error: 0 times<br>+Lost data error: 0 times<br>+Write Protect error: 0 times<br>+Write Fault error: 0 times |
| 2. To write the data on a level disk.<br>**NOTE:** Before writing data pattern on a level disk, formatting (initialization) can be mode automaticaly. If the some error occurs during the processing, the error will be displayed under title of "Initialize Test End". | W RETURN | *** Write Test ***<br>*** Write data pattern ***<br>Pattern No. 1 . . . Random data (all data random)<br>Pattern No. 2 . . . Random data (1st byte–0AAh)<br>Pattern No. 3 . . . Worst pattern (DBh, 6Dh, B6h)<br>Pattern No. 4 . . . User definable<br>#Select pattern number: [1, 2, 3, 4] = |
| To select the data pattern.<br><br>[EX]<br>In case it is worst pattern. | 3 RETURN<br><br>RETURN | #Now, You select pattern No: 3<br>#Test disk ready? yes --→ hit [Return]<br>*** Write Test Start ***<br>+Track = End |
| The test ends. | | *** Write Test End *** |

| Description | Keying | Display |
|---|---|---|
| [EX]<br>In case it is random data. (all data random.) | 1 RETURN | #Now, You select pattern No: 1<br>#Hit any key after few seconds =⇒ |
| Type any key. | A<br>RETURN | #Test disk ready? yes —→ hit [Return]<br>*** Write Test Start ***<br>+ Track = End |
| The test ends. | | *** Write Test End *** |
| [EX]<br>In case it is random data. (1st byte = 0AAh) | 2 RETURN | #Now, You select pattern No: 2<br>#Hit any key after few seconds =⇒ |
| Type any key. | A<br>RETURN | #Test disk ready? yes —→ hit [Return]<br>*** Write Test Start ***<br>+Track = End |
| The test ends. | | *** Write Test End *** |
| [EX]<br>In case it is user definable. | 4 RETURN | #Now, You select pattern NO: 4<br>+Enter hex data [1st Bytes] =⇒ |
| Type the data to be written it.<br>[EX]<br>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<br>RETURN<br>RETURN | +Enter hex data [2nd Bytes] =⇒<br>#Test disk ready?—+hit [Return]<br>*** Write Test Start ***<br>+Track = End |
| The test ends. | | *** Write Test End *** |
| 3. To display the test condition. | L RETURN | [Test condition] \| drive C<br>Minimum track \| 0<br>Maximum track \| 79<br>Minimum sector \| 1<br>Maximum sector \| 16<br>Sector size \| 256<br>Single or Double side? \| S<br>Read & Write retry \| 1<br>Seek & Home retry \| 0 |
| 4. To change any of test condition. (Refer to item 3-4-2) | S RETURN | +Minimum track 0 [track] =⇒ |
| 5. To display the command table. | H RETURN | *** Command table ***<br>r : = read test<br>w : = write test<br>l : = show disk condition<br>s : = set test condition<br>h : = help<br>e : = finish & 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 / Adjustment) |
|---|---|---|---|
| SEEK ERROR | Seek CRC error<br>Seek error | Stepping motor load torque is too high.<br>Stepping motor circuit is out of order. | Confirm stepping motor load torque. (Refer to 5-5.)<br>Confirm the function of stepping motor circuit. |
| READ ERROR | ID, data, ADM missing. | Read circuit is out of order. | Confirm the read circuit. (at first check RF out put) |
| | ID, data CRC error | Off track, chucking trouble, wrong head compliance. | Confirm head compliance, (Refer to 5-3.) chucking mechanism or radial alignment and TRK 00 sensor (Refer to 5-4). |
| WRITE ERROR | ID ADM missing | No write function. (write circuit is out of order, no formatting) | Confirm the waveform of RF output. (CN107-1) |
| | ID CRC error | Off track wrong head compliance, chucking trouble, or disk. | Confirm the radial alignment and TRK 00 sensor (Refer to 5-4.), head compliance (Refer to 5-3.), or chucking mechanism. |
| | Write protect error | Condition is set to write protect. | Confirm Media, write protect circuit or write protect mechanism. |

MEMO

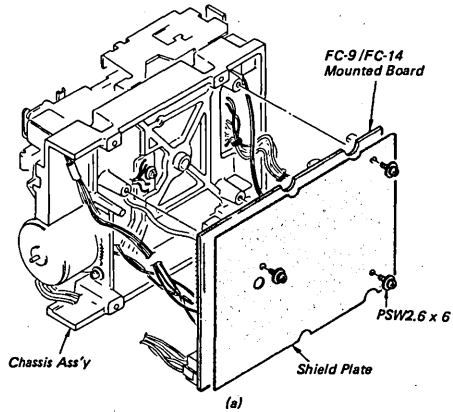
# SECTION 4
# PART REPLACEMENT

## 4-1. FC-9/FC-14 MOUNTED BOARD REPLACEMENT

### 4-1-1. Removal

a. Remove the three screws (PSW2.6 x 6) which fasten both the FC-9/FC-14 Mounted Board and shield plate to the chassis ass'y. (Refer to Fig. 4-1 (a) )

b. Remove all the connectors. Do not apply any excessive force to the head harness (CN106). (Refer to Fig. 4-1 (b) )



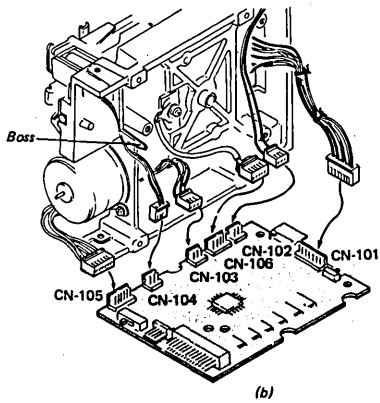




*Fig. 4-1 FC-9 / FC-14 Mounted Board*

### 4-1-2. Installation and Adjustment

a. Set the respective connectors to the FC-9/FC-14 Mounted Board.

| Harness | FC-9/FC-14 Mounted Board |
|---|---|
| 7p (To the disk motor) | CN101 |
| 6p (To the stepping motor) | CN105 |
| (V) 5p (To the head) | CN106 |
| (W) 6p (To the head) | CN106 |
| 3p (To the plunger) | CN104 |
| 3p (To LED) | CN102 |
| 3p (To the TRK 00 sensor) | CN103 |

b. Insert the harness between the chassis ass'y and FC-9/FC-14 Mounted Board and fasten the FC-9/FC-14 Mounted Board and shield plate with the three screws (PSW2.6 x 6). (Refer to Fig. 4-1)

c. Read amplifier gain and offset adjustment. (Refer to 5-7)

d. Index phase adjustment. (Refer to 5-6)

## 4-2. FRONT PANEL ASS'Y REPLACEMENT

### 4-2-1. Removal

a. Remove the two screws (PS2.6 x 10) from the bottom of the chassis ass'y and then remove the front panel ass'y. (Refer to Fig. 4-2)

### 4-2-2. Installation

a. Install the eject button and compression spring onto the front panel ass'y.

b. Install the LED into the square opening within the front panel ass'y, and then press the front panel ass'y to the chassis ass'y.

c. Fasten the chassis ass'y to the front panel ass'y on the bottom surface with the two screws (PS2.6 x 10). (Refer to Fig. 4-2)

**NOTE 1:** Install both the chassis ass'y and front panel ass'y in place so that these assemblies closely contact.

**NOTE 2:** Do not pintch the harness, (especially head harness), during the installation i.e, the head harness gap between these assemblies.

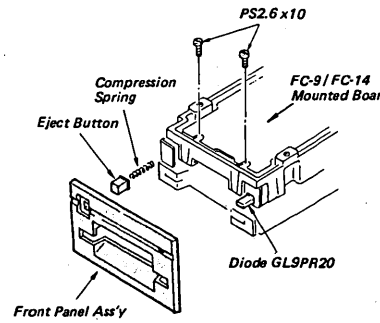



*Fig. 4-2 Front Panel Ass'y Replacement*

## 4-3. BLIND PANEL REPLACEMENT

### 4-3-1. Removal

a. Remove the front panel ass'y. (Refer to 4-2)

b. Remove the blind panel by twisting it into the arrow while pressing its both edges. (Refer to Fig. 4-3)

### 4-3-2. Installation

a. Press the blind panel toward the cassette-up ass'y and latch the two tabs onto the disk holder. (Refer to Fig. 4-3)

b. Install the front panel ass'y. (Refer to 4-2)

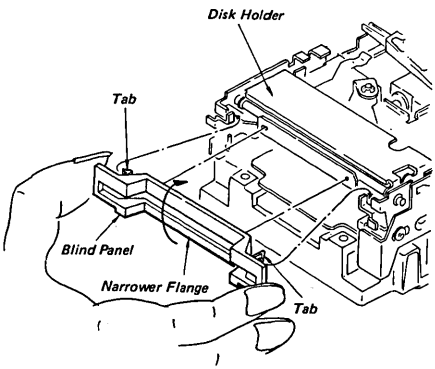



*Fig. 4-3 Blind Panel Replacement*

## 4-4. LED MOUNTED BOARD ASS'Y REPLACEMENT

### 4-4-1. Removal

a. Remove both the FC-9/FC-14 Mounted Board and shield plate. Disconnect CN 102 connector. (Refer to Fig. 4-4 (a) )

b. Remove the front panel ass'y. (Refer to 4-2)

c. Remove the LED Mounted Board ass'y from the chassis ass'y.

### 4-4-2. Installation

a. Peel off remover from the cushion and set the LED Mounted Board as shown in Fig. 4-4 (b).

b. Install both the FC-9/FC-14 Mounted Board and shield plate. (Refer to 4-1)

c. Install the front panel ass'y. (Refer to 4-2)

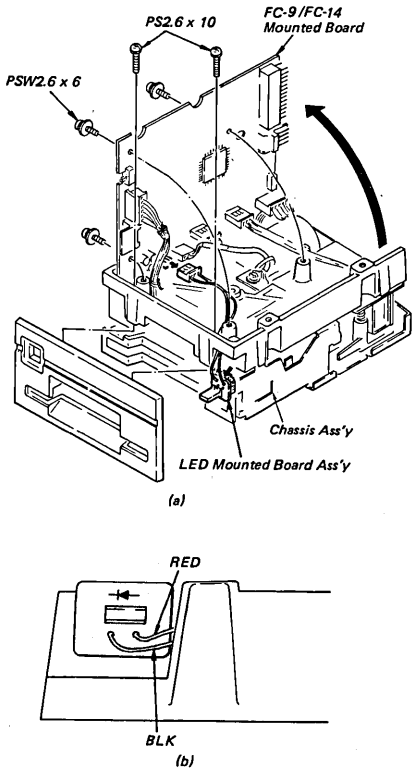



*Fig. 4-4 LED Mounted Board Ass'y Replacement*

## 4-5. MAIN COVER REPLACEMENT

### 4-5-1. Removal

a. Remove the screw (B2.6 x 5) which fastens the main cover from the chassis ass'y, and then remove the main cover. (Refer to Fig. 4-5 )

### 4-5-2. Installation

a. Install the main cover so that the position marked is set in accordance with the arrow, and then install the main cover with the screw (B2.6 x 5). (Refer to Fig. 4-5)

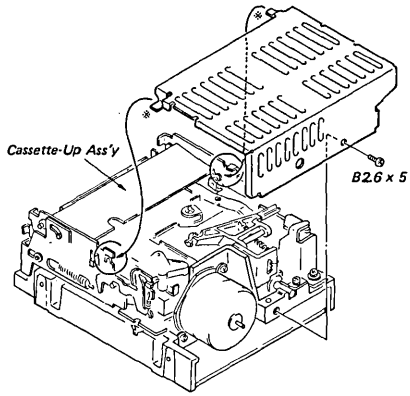



*Fig. 4-5 Main Cover Replacement*

## 32V 4-6. PAD ASS'Y REPLACEMENT

### 4-6-1. Removal

a. Remove the main cover. (Refer to 4-5)

b. Lifting the pad arm tip so that any excessive force may not be applied to the pad arm ass'y, remove the pad ass'y by pressing its rear part. (Refer to Fig. 4-6 (a) )

### 4-6-2. Installation and Adjustment

a. Pick up pad holder (not pad itself) of pad ass'y lightly and insert pad ass'y into the location on pad arm ass'y. (Refer to Fig. 4-6 (a) )

b. Pull down the pad arm ass'y, and check if the pad is arranged in parallel with the head as shown in Fig. 4-6 (b).

c. Perform the pad pressure adjustment. (Refer to 5-2)

d. Perform the head clearance adjustment. (Refer to 5-10)

e. Perform the HL arm height adjustment. (Refer to 5-9)

f. Make the head clean. (Refer to 5-11)

g. Perform the head compliance adjustment. (Refer to 5-3)

h. Install the main cover. (Refer to 4-5)

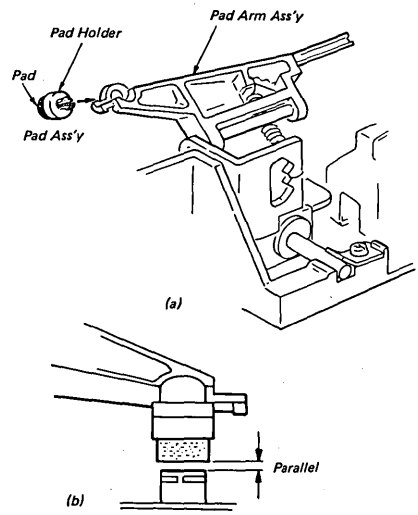



*Fig. 4-6 Pad Ass'y Replacement*

## 32W 4-7. DAMPER REPLACEMENT

### 4-7-1. Removal

a. Remove the main cover. (Refer to 4-5)

b. Manually set the machine into the Disk-In mode. (Refer to Fig. 4-9 (a) )

c. Remove the screw (PS2.6 x 6) which fastens the damper to the head load ass'y, and then remove the damper. (Refer to Fig. 4-7)

### 4-7-2. Installation

a. Insert the damper arm tip into between the cassette holder and HL arm, and set the damper to the head load ass'y. (Refer to Fig. 4-7)

b. Install the main cover. (Refer to 4-5)

c. Make the head clean. (Refer to 5-11)

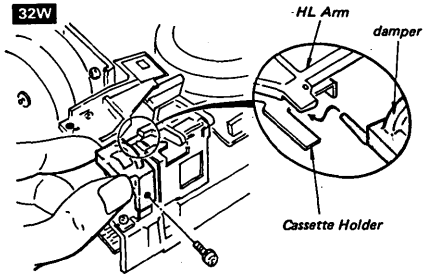



*Fig. 4-7 Damper Replacement*

## 4-8. HEAD LOAD ASS'Y REPLACEMENT

### 4-8-1. Removal

a. Remove both the FC-9/FC-14 Mounted Baord and shield plate. (Refer to 4-1)

b. Remove the main cover. (Refer to 4-5)

c. Manually set the machine into the Disk-In mode. (Refer to Fig. 4-9 (a) )

32W d. Remove the damper. (Refer to 4-7)

e. Remove the two screws (PS2.6 x 6) which fasten the head load ass'y to the chassis so that an excessive force is not applied to the head arm, and then remove the head load ass'y, (Refer to Fig. 4-8 (a) (b) )

### 4-8-2. Installation and Adjustment

a. Manually set the machine into the Disk-In mode. (Refer to Fig. 4-9 (a) )

b. Pass the harness of the head load ass'y through the opening of the chassis. (Refer to Fig. 4-8 (a) (b) )

c. Fasten both the head load ass'y and lug terminal to the chassis with the two screws (PS2.6 x 6). (Refer to Fig. 4-8 (a) (b) )

d. Bend one tip of the lug terminal by 90° ±10°. (Refer to Fig. 4-8 (c) )

32W e. Install the damper in place. (Refer to 4-7)

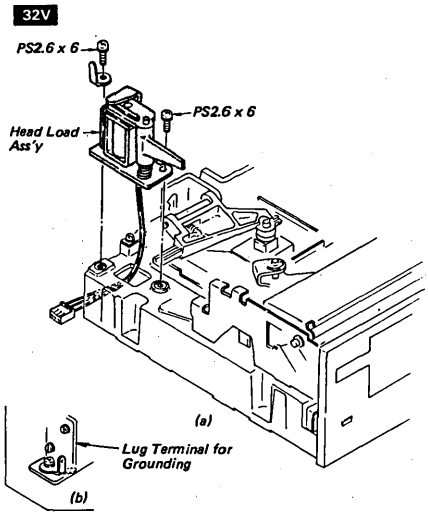
f. Install both the FC-9/FC-14 Mounted Board and shield plate in place. (Refer to 4-1)

g. Perform the head clearance adjustment. (Refer to 5-10)

h. Perform the HL arm height adjustment. (Refer to 5-9)

i. Install the main cover in place. (Refer to 4-5)

j. Make the head clean. (Refer to 5-11)



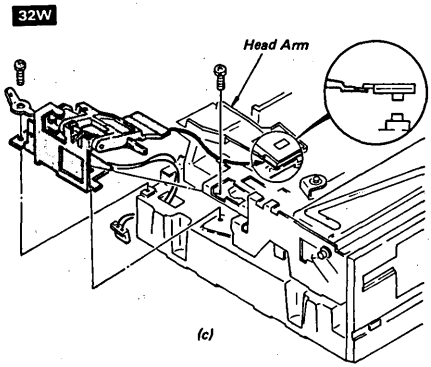




*Fig. 4-8 Head Load Ass'y Replacement*

## 4-9. CASSETTE-UP ASS'Y REPLACEMENT

### 4-9-1. Removal

32W a. Remove both the FC-9 Mounted Board and shield plate. (Refer to 4-1)

b. Remove the front panel ass'y. (Refer to 4-2)

c. Remove the blind panel. (Refer to 4-3)

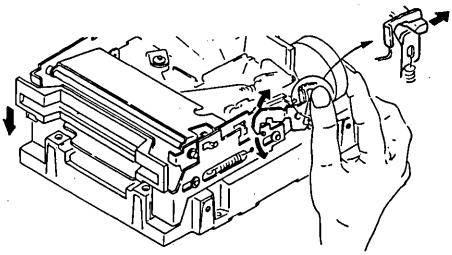
d. Remove the main cover. (Refer to 4-5)

e. Manually set the machine into the Disk-In mode. (Refer to Fig. 4-9 (a) )

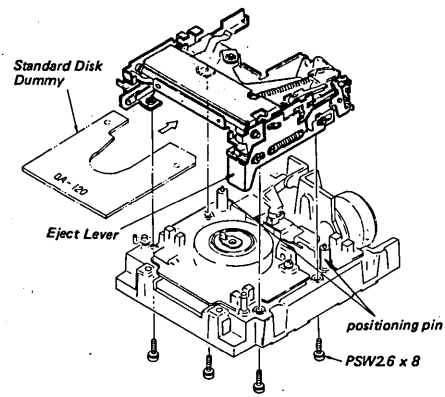
32W f. Remove the damper. (Refer to 4-7)

32W g. Remove the head load ass'y. (Refer to 4-8)

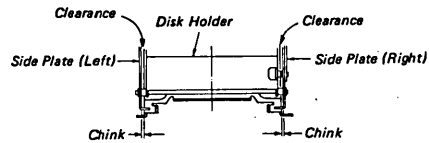
h. Remove the four screws (PSW2.6 x 8) from the bottom of the chassis, and then remove the cassette-up ass'y. (Refer to Fig. 4-9 (b) )



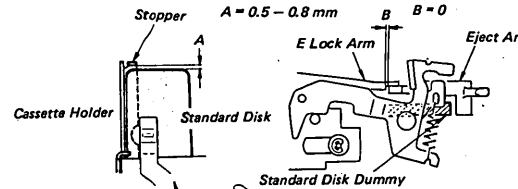
(a) Steeling to Disk-In Mode

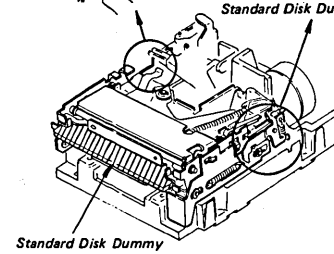



(b)

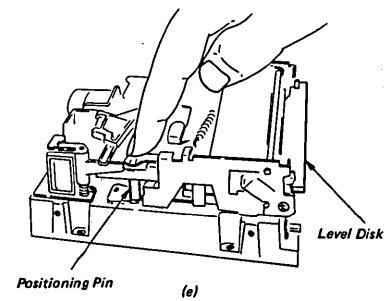



(c)




(d) TOP VIEW of Cassette-Up Ass'y




(e)

Fig. 4-9 Cassette-Up Ass'y Replacement

### 4-9-2. Installation and Adjustment

a. Place the cassette-up ass'y onto the chassis ass'y and fasten the bottom of the chassis ass'y lightly with the four screws (PSW2.6 x 8). (Refer to Fig. 4-9 (b) )

b. Insert the standard disk dummy (OA-120) into the cassette-up ass'y. Check if the standard disk dummy positioning hole aligns with the positioning pin on the chassis, and if the clearance shown in Fig. 4-9 (c) (d) are kept assured, and then fasten the four screws firmly.

32W c. Install the head load ass'y. (Refer to 4-8)

32W d. Install the damper in place. (Refer to 4-7)

e. Insert the level disk into the cassette-up ass'y. Check if disk positioning is properly located while touching the forefinger at the positioning holes in the left and right of the disk. (Refer to Fig. 4-9 (e) ) Check if disk positioning is properly located even while placing each side of the disk drive downwards.

f. If any displacement is found during positioning test in item (e), repeat the operations defined in 4-9-2.

g. Press the eject lever and check if the level disk can smoothly be shifted up and down.

32W h. Install the both FC-9 Mounted Board and shield plate in place. (Refer to 4-1)

i. Make the head clean. (Refer to 5-11)

j. Install the main cover in place. (Refer to 4-5)

k. Install blind panel in place. (Refer to 4-3)

l. Install the front panel ass'y in place. (Refer to 4-2)

## 4-10. WP ARM/D-DETECTION ARM/COMPRESSION SPRING (3-659-609-00) REPLACEMENT

### 4-10-1. Removal

32W a. Remove both the FC-9 Mounted Board and shield plate. (Refer to 4-1)

b. Remove the front panel ass'y. (Refer to 4-2)

c. Remove the main cover. (Refer to 4-5)

d. Manually set the machine into the Disk-In mode. (Refer to Fig. 4-9 (a) )

32W e. Remove the damper. (Refer to 4-7)

32W f. Remove the head load ass'y. (Refer to 4-8)

g. Remove the cassette-up ass'y. (Refer to 4-9)

h. Remove the E ring (E2.3), pull out both the WP and D-Detection arms, and remove the compression spring (3-659-609-00) from the chassis ass'y. (Refer to Fig. 4-10)

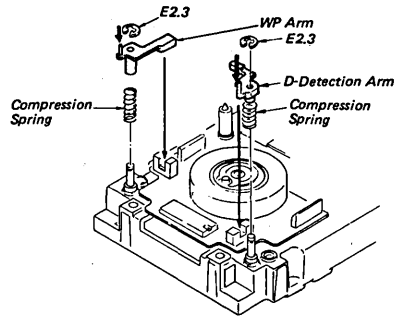



*Fig. 4-10 WP Arm/D-Detection Arm/Compression Spring Replacement*

### 4-10-2. Installation and Adjustment

a. Pass the compression spring (3-659-609-00) and WP arm or the compression spring (3-659-609-00) and D-Detection arm through the shaft in sequence. Then, clamp them with the E ring (E2.3). (Refer to Fig. 4-10)

b. Pressing with the fingers the portion indicated by arrow on the WP or D-Detection arm, check if the WP or D-Detection arm smoothly returns to home position by spring force.

32W c. Install both the FC-9 Mounted Board and shield plate in place. (Refer to 4-1)

d. Install the cassette-up ass'y in place. (Refer to 4-9)

32W e. Install the head load ass'y in place. (Refer to 4-8)

32W f. Install the damper in place. (Refer to 4-7)

g. Make the head clean. (Refer to 5-11)

h. Install the main cover in place. (Refer to 4-5)

i. Install the front panel ass'y in place. (Refer to 4-2)

## 4-11. DC DISK DRIVE MOTOR (BHC-2101A) REPLACEMENT

### 4-11-1. Removal

a. Connect the MFD Checker II, and then turn off the power switch. (Refer to Fig. 2-1)

b. Remove both the FC-9/FC-14 Mounted Board and shield plate. (Refer to 4-1)

c. Remove the front panel ass'y. (Refer to 4-2)

d. Remove the main cover. (Refer to 4-5)

e. Manually set the machine into the Disk-In mode. (Refer to Fig. 4-9 (a) )

32W e. Remove the damper. (Refer to 4-7)

32W f. Remove the head load ass'y. (Refer to 4-8)

g. Remove the cassette-up ass'y. (Refer to 4-9)

h. Remove the WP arm, D-Detection arm and these compression springs. (Refer to 4-10)

i. Remove the two screws (PS2.6 x 8) which fasten the disk motor, and then remove the disk motor. (Refer to Fig. 4-11)

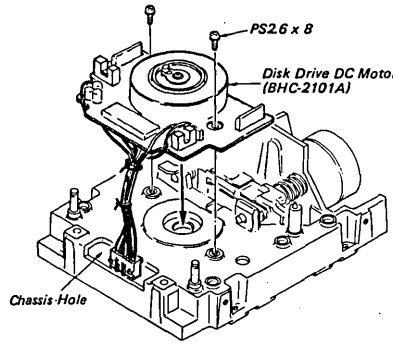



*Fig. 4-11 Disk Drive DC Motor (BHC-2101A) Replacement*

**4-11-2. Installation and Adjustment**

a. Pass the DC Disk motor harness through the opening in front of the chassis ass'y, and then fasten the DC Disk motor with the two screws (PS2.6 x 8). (Refer to Fig. 4-11)

b. Install the WP arm, D-Detection arm, and these compression springs in place. (Refer to 4-10)

c. Install the cassette-up ass'y in place. (Refer to 4-9)

32W d. Install the head load ass'y in place. (Refer to 4-8)

32W e. Install the damper in place. (Refer to 4-7)

f. Install both the FC-9/FC-14 Mounted Board and shield plate. (Refer to 4-1)

g. Make the head clean. (Refer to 5-11)

h. Perform the radial alignment and TRK 00 sensor adjustment. (Refer to 5-4)

i. Perform the index phase adjustment. (Refer to 5-6)

j. Install the main cover in place. (Refer to 4-5)

k. Install the front panel ass'y in place. (Refer to 4-2)

## 4-12. SENSOR MOUNTED BOARD REPLACEMENT

**4-12-1. Removal**

a. Connect the MFD Checker II, move the head until it arrives at TRK 79, and then turn off the power switch. (Refer to Fig. 2-1)

b. Remove both the FC-9/FC14 Mounted Board and shield plate. (Refer to 4-1)

c. Remove the front panel ass'y. (Refer to 4-2)

d. Manually set the machine into the Disk-In mode. (Refer to Fig. 4-9 (a) )

32W e. Remove the damper (Refer to 4-7)

32W f. Remove the head load ass'y. (Refer to 4-8)

g. Remove the cassette-up ass'y. (Refer to 4-9)

h. Remove the screw (PSW2.6 x 6) which fastens the Sensor Mounted Board and remove the Sensor Mounted Board. (Refer to Fig. 4-12)

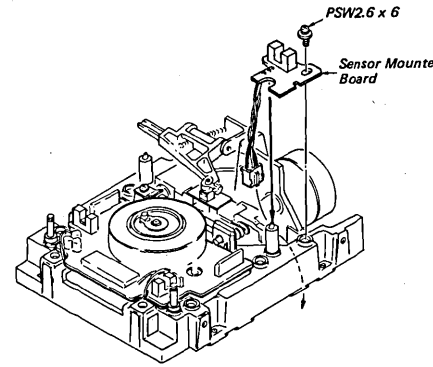



*Fig. 4-12 Sensor Mounted Board Replacement*

**4-12-2. Installation and Adjustment**

a. Feed the harness of Sensor Mounted Board as shown by the arrow, set the Sensor Mounted Board onto the chassis along the positioning pin, and fasten lightly it with the screw (PSW2.6 x 6). (Refer to Fig. 4-12)

**NOTE:** The sensor board should be placed near the disk motor as far as possible.

b. Install the cassette-up ass'y in place. (Refer to 4-9)

32W c. Install the head load ass'y in place. (Refer to 4-8)

32W d. Install the damper in place. (Refer to 4-7)

e. Install both the FC-9/FC-14 Mounted Board and shield plate. (Refer to 4-1)

f. Make the head clean. (Refer to 5-11)

g. Perform the radial alignment and TRK 00 sensor adjustment. (Refer to 5-4)

h. Install the front panel ass'y in place. (Refer to 4-2)

i. Install the main cover in place. (Refer to 4-5)

## 4-13. LEAD SCREW ASS'Y (STEPPING MOTOR/ LEAD SCREW/COUPLING ASS'Y/COMPRESSION SPRING (4-601-083-00) ) REPLACEMENT

### 4-13.1. Removal

a. Remove both the FC-9/FC-14 Mounted Board and shield plate. (Refer to 4-1)

b. Remove the front panel ass'y. (Refer to 4-2)

c. Remove the main cover. (Refer to 4-5)

d. Attach the rotary knob to the rear shaft of the stepping motor with hexagon wrench torque driver. (Refer to Fig. 4-13 (a))
Check if the gap between the motor bearing metal and rotary knob is approximately 0.5 mm.

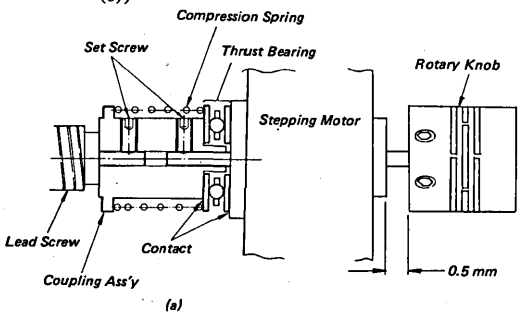
e. Manually set the machine into the Disk-In mode. (Refer to Fig. 4-9 (a))

32W f. Remove the damper. (Refer to 4-7)

32W g. Remove the head load ass'y. (Refer to 4-8)

h. Remove the cassette-up ass'y. (Refer to 4-9)

i. Remove the two screws (PSW2.6 x 6) which fasten the stepping motor. (Refer to Fig. 4-13 (b))



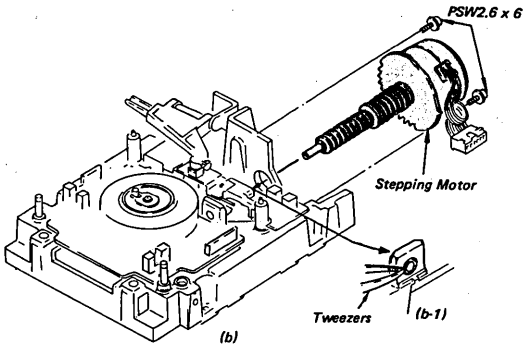




*Fig. 4-13 Stepping Motor (SNS-1100A), Coupling Ass'y and Compression Spring Replacement*

j. Turning the rotary knob, remove the lead screw ass'y. During removal, hold with the tweezers the ball bearing which hold the lead screw, as shown in Fig. 4-13 (b)-1.

### 4-13-2. Installation and Adjustment

**NOTE:** If the replacement can be made with lead screw ass'y, steps a up to g should be skipped.

**NOTE:** Apply Sony grease (same quantity of watch tip) on whole area of lead screw before replacing it.

a. Stepping motor, lead screw, coupling ass'y and thrust bearing must be roughly assembled.

b. Pressing the coupling ass'y to the lead screw, fasten the setscrew near the lead screw with a hexagon wrench torque driver. (Refer to Fig. 4-13 (a) )

c. Pressing the coupling ass'y to the stepping motor, fasten the setscrew near the stepping motor with a hexagon wrench torque dirver. (Refer to Fig. 4-13 (a) )

d. Turning the rotary knob, pass the lead screw through the opening of the ball bearing along the path indicated by arrow. (Refer to Fig. 4-13 (b) )

e. Fasten loosely the stepping motor with the two screws (PSW2.6 x 6).

f. Loosen the setscrew near the stepping motor so that the lead screw touches the ball bearing by the force of the compression spring.

g. Pulling the rotary knob lightly, fasten the setscrew near the stepping motor with a hexagon wrench torque driver.

h. Perform the lead screw eccentricity adjustment. (Refer to 5-1)

32V i. Perform the stepping motor load torque adjustment. (Refer to 5-5)

j. Install the cassette-up ass'y in place. (Refer to 4-9)

32W k. Install the head load ass'y in place. (Refer to 4-8)

32W l. Install the damper in place. (Refer to 4-7)

m. Install both the FC-9/FC14 Mounted Board and shield plate. (Refer to 4-1)

n. Make the head clean. (Refer to 5-11)

o. Remove the rotary knob from the stepping motor shaft.

p. Perform the radial alignment and TRK 00 sensor adjustment. (Refer to 5-4)

q. Install the main cover in place. (Refer to 4-5)

r. Install the front panel ass'y in place. (Refer to 4-2)

## 4-14. (32V) HEAD ARM ASS'Y REPLACEMENT (32W) HEAD CARRIAGE ASS'Y REPLACEMENT

**NOTE:** Do not disassemble or adjust the head arm ass'y or head carriage ass'y because these ass'y have precisely been adjusted in factory.

### 4-14-1. Removal

a. Remove both the FC-9/FC14 Mounted Board and shield plate. (Refer to 4-1)

b. Remove the front panel ass'y. (Refer to 4-2)

c. Remove the main cover. (Refer to 4-5)

d. Manually set the machine into the Disk-In mode. (Refer to Fig. 4-9 (a) )

32W e. Remove the damper. (Refer to 4-7)

32W f. Remove the head load ass'y. (Refer to 4-8)

g. Remove the cassette-up ass'y. (Refer to 4-9)

32V h. Remove the screw (PSW2.6 x 6) which fastens the head harness to the chassis on the bottom surface. (Refer to Fig. 4-14 (a) )

32W i. Remove the screw (PSW2.6 x 8) which fastens the head harness to the shield plate on the bottom surface of the chassis, and remove the head harness that is adhesive to the chassis. (Refer to Fig. 4-14 (b) )

**NOTE:** The head harness is contacted to the chassis via the adhesive tape with its both surface coated with adhesive agent.

j. Remove the two screws (PSW2.6 x 6) which fasten the guide shaft. (Refer to Fig. 4-14 (a) (b) )

32V k. Smoothly pull out the head arm ass'y together with the guide shaft. (Refer to Fig. 4-14 (a) )

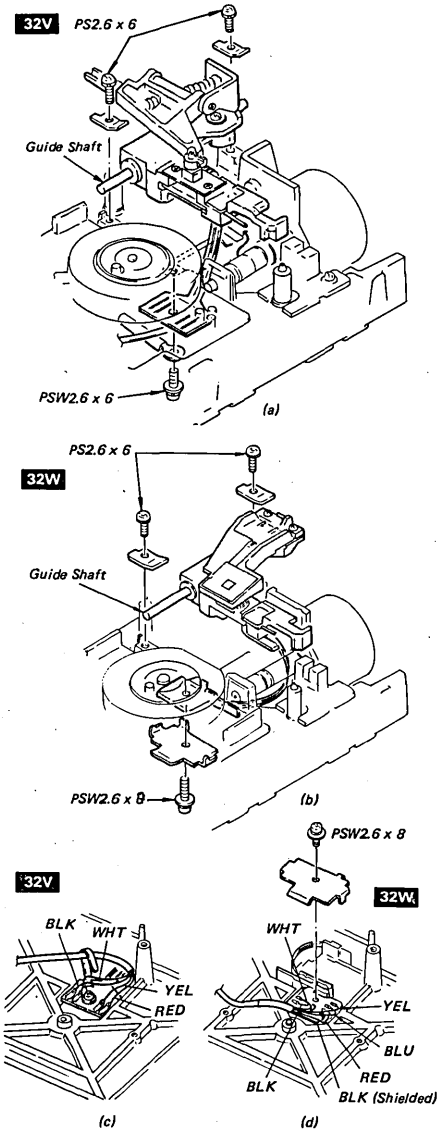



*Fig. 4-14 Head Arm Ass'y Replacement*
*Head Carriage Ass'y Replacement*

# (32V) Head Arm Ass'y Replacement
# (32W) Head Carriage Ass'y Replacement

32W l. Smoothly pull out the head carriage ass'y together with the guide shaft. (Refer to Fig. 4-14 (b))

32V m. Disconnect the head board from the head harness (by four points) with a soldering iron. (Refer to Fig. 4-14 (c))

32W n. Disconnect the head board from the head harness (by six points) with a soldering iron. (Refer to Fig. 4-14 (d))

### 4-14-2. Installation and Adjustment

**NOTE:** Apply Sony oil to the guide shaft before installing. Apply Sony oil to the openings of both the head arm ass'y and head carriage ass'y using the bamboo stick.

32V a. Pass the guide shaft through the opening of the head arm ass'y.

32W b. Pass the guide shaft through the opening of the head carriage ass'y.

32V c. Carefully install the head arm ass'y in place. (Refer to Fig. 4-14 (a))

32W d. Carefully install the head carriage ass'y in place. (Refer to Fig. 4-14 (b))

e. Fasten the guide shaft with the two screws (PSW2.6 x 6).

32V f. Fasten the head board to the chassis on the bottom surface, and apply nut lock paint to the screw.

32V g. Connect the head board to the head harness (by four points) with a soldering iron. (Refer to Fig. 4-14 (c))

32W h. Connect the head board to the head harness (by six points) with a soldering iron. (Refer to Fig. 4-14 (d))

32W i. Fasten head board and terminal shield plate with a screw (PSW2.6 x 8) on the chassis bottom, and then apply nut lock paint onto it.

**NOTE:** The screw must not be tighten too hard. It may produce electrical short or crack of head board.

32V j. Perform the stepping motor load torque adjustment. (Refer to 5-5)

k. Install the cassette-up ass'y in place. (Refer to 4-9)

32W l. Install the head load ass'y in place. (Refer to 4-8)

32W m. Install the damper in place. (Refer to 4-7)

n. Install both the FC-9/FC-14 Mounted Board and shield plate. (Refer to 4-1)

o. Perform the HL arm height adjustment. (Refer to 5-9)

p. Perform the head clearance adjustment. (Refer to 5-10)

q. Make the head clean. (Refer to 5-11)

r. Perform the radial alignment and TRK 00 sensor adjustment. (Refer to 5-4)

s. Perform the read amplifier gain and offset adjustment. (Refer to 5-7)

t. Perform the index phase adjustment. (Refer to 5-6)

u. Install the main cover in place. (Refer to 4-5)

v. Install the front panel ass'y in place. (Refer to 4-1)

# SECTION 5
# CHECK AND ADJUSTMENT

After measurement and adjustment in accordance with SECTION 5, please surely clean the head.

## 5-1. LEAD SCREW ECCENTRICITY

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

a. Main Cover (Refer to 4-5)

b. Front Panel Ass'y (Refer to 4-2)

32W c. Damper (Refer to 4-7)

32W d. Head Load Ass'y (Refer to 4-8)

e. Cassette-up Ass'y (Refer to 4-9)

### 5-1-1. Tools and Measuring Equipment

a. Lead Screw Eccentricity Inspection Tool

b. Hexagon Wrench Torque Driver

c. Rotary Knob

d. MFD Checker II

### 5-1-2. Measurement

a. Connect the MFD Checker II to the disk drive. (Refer to Fig. 2-1) and step in the head until it arrives at TRK 79.

b. Turn off the power.

c. Attach the rotary knob onto the rear shaft of the stepping motor shaft with hexagon wrench torque driver. (Refer to Fig. 4-13 (a)) Check if the gap between the motor bearing metal and rotary knob is approximately 0.5 mm.

d. Revolve the rotary knob 3 to 4 turns counterclockwise by hand.

e. Aligning the positioning hole of the lead screw eccentricity tool to the positioning pin on the chassis ass'y, set the lead screw eccentricity inspection tool in place. (Refer to Fig. 5-1)

f. Turn the rotary knob clockwise or counterclockwise by hand. Check if the gap measures 50 μm (5 scales on the meter of the lead screw eccentricity inspection tool) or less.

### 5-1-3. Adjustment

a. Attach the rotary knob onto the stepping motor shaft. (Refer to Fig. 4-13 (a))

b. Loosen with a hexagon wrench torque driver the two screws which fasten the coupling ass'y.

c. Pressing the coupling ass'y to the lead screw, fasten the setscrew for the lead screw with a hexagon wrench torque driver. (with a torque of 0.7 kg-cm)

d. Pulling the stepping motor shaft, fasten the setscrew for the stepping motor. (With a torque of 0.7 kg-cm)

e. Measure the lead screw eccentricity in accordance with 5-1-2.
Unless the result meets the specification, measurement should be carried out again starting with item "a".

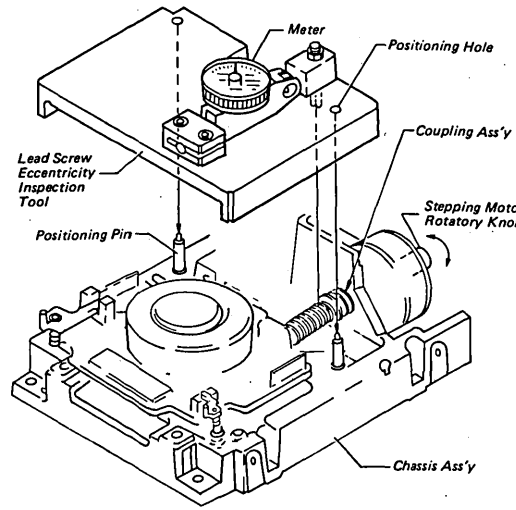



*Fig. 5-1 Lead Screw Eccentricity Adjustment*

## 32V 5-2. PAD PRESSURE

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

a. Main Cover (Refer to 4-5)

### 5-2-1. Tools and Measuring Equipment

a. Tension Gauge

### 5-2-2. Measurement

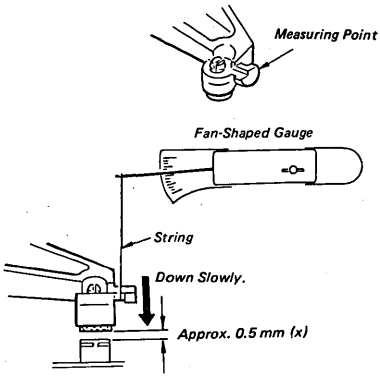
a. Manually set the machine into the Disk-In mode. (Refer to Fig. 4-9 (a))

b. Install a string to the tension gauge at one end and tie the other end to the measuring point. (Refer to Fig. 5-2 (a))

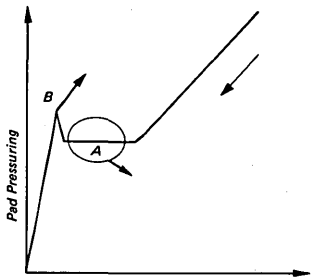
c. Manually put down the HL arm, and then set the machine into the Head Load mode.

d. Lift the pad arm with the tension gauge, and then slowly put down the pad arm until the gauge reading becomes unchanged.

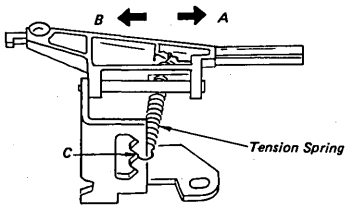
Identify as "A" the position where the stable reading can be obtained. (Refer to Fig. 5-2 (b) )




(a) Pad Pressure Measuring Method




(b)




(c)

*Fig. 5-2 Pad Pressure Adjustment*

e. Put down the pad arm below point "A" until the point just before the pad arm touches the head, and then read the rising peak value at point "B". (Refer to Fig. 5-2 (b) )

f. Check if the reading is within 11 ±1.5 g specified for adjustment.

**5-2-3. Adjustment**

a. Unless the reading is out of 11 ± 1.5 g, change the spring set-position.

b. If the reading is in excess of 12.5 g, move the position toward "A". If the reading is less than 9.5 g, move the position toward "B". Do not change position "C" where the string is set. (Refer to Fig. 5-2 (c) )

## 5-3. HEAD COMPLIANCE

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

a. Main Cover (Refer to 4-5)

**5-3-1. Tools and Measuring Equipment**

a. Oscilloscope

b. MFD Checker II

32V c. Level Disk (OR-D46VA)

32W d. Level Disk (OR-D46WA)

e. Pad weight

32V f. ⊖2 mm Driver

g. Rotary Knob

h. Hexagon Wrench Torque Driver

**5-3-2. Measurement**

a. Connect the disk drive to the MFD Checker II. (Refer to Fig. 2-1)

b. Insert the level disk in place, and move the head onto TRK 79.

c. Set the HD LOAD switch on the MFD Checker II to "ON".

d. Attach the rotary knob onto the stepping motor shaft and fix it with a hexagon wrench torque driver. (Refer to Fig. 4-13 (a) )

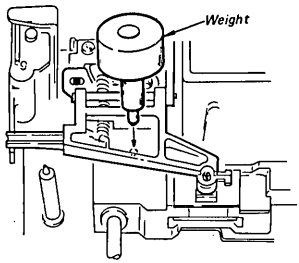
e. Write "2F" into the disk and check if the amplifier output waveform at CN107-1 is satisfactory.

f. When a pad weight is loaded as shown in Fig. 5-3 (a), (b);

1) The output signal level at that time should not be greater than that obtained when no pad weight is loaded.

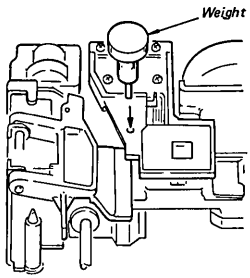
2) The output signal level at that time should not be 95 % or less of that obtained when no pad weight is loaded.

32V



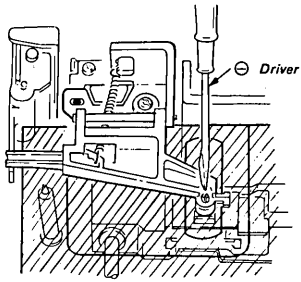

*(a) Weight Positioning*

32W




*(b) Weight Positioning*

32V




*(c) Pad Ass'y Rotation*

*Fig. 5-3 Head Complience*

g. Take the pad weight, and move the head to TRK 03.

h. Write "1F" into the disk.

i. Turn the rotary knob clockwise until it arrives at the clicking point, move the head to TRK 04, and write "EXT" in to the disk.

32V j. Fully turn the rotary knob counterclockwise, move the head back to TRK 03, and check if the output signal level at that time is 5 % or less of that obtained by item "h".

32W k. Fully turn the rotary knob counterclockwise, move the head back to TRK 03, and check if the output signal level at that time is 10 % or less of that obtained by item "e".

l. Write "1F" into the disk.

m. Turn the rotary knob counterclockwise until it arrives at the clicking point, move the head to TRK 02, and write "EXT" into the disk.

32V n. Turn the rotary knob clockwise until it arrives at the clicking point, move the head back to TRK 03, and check if the output signal level at that time is 5 % or less of that obtained by item "l".

32W o. Turn the rotary knob clockwise until it arrives at the clicking point, move the head back to TRK 03, and check if the output signal level at that time is 10 % or less of that obtained by item "l".

### 5-3-3. Adjustment

32V a. If the output signal level does not meet item 5-3-2 "f", perform adjustment by turning the pad ass'y as shown in Fig. 5-3 (c).

32W b. If the output signal level does not meet item 5-3-2 "f", replace the head carriage ass'y. (Refer to 4-14)

32V c. If the output signal level doesnot meet item 5-3-2 "n", perform adjustment by turning the pad ass'y as shown in Fig. 5-3 (c).

**NOTE:** Check if the head compliance is satisfactory after this adjustment.

32W d. If the output signal level doesnot meet item 5-3-2 "o", replace the head carriage ass'y. (Refer to 4-14)

## 5-4. RADIAL ALIGNMENT AND TRK 00 SENSOR

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

a. Main Cover (Refer to 4-5)

### 5-4-1. Tools and Measuring Equipment

a. SMC-70 System

b. Radial Alignment System Disk

32V c. Alignment Disk (OR-D47VA)

32W d. Alignment Disk (OR-D47WA)

e. Rotary Knob

f. Geared Driver

g. TOTSU Screw Driver (M2.6)

h. ⊖4 mm Driver

i. Hexagon Wrench Torque Driver

### 5-4-2. Measurement

a. Insert the Radial Alignment system disk into the SMI-7012A drive A.

b. Turn on the power switch. After approximately 15 seconds, "off set measurement/ adjustment ver 1.0" is displayed.

c. Connect the disk drive (under test) to the cable which leads to the A/D converter, insert the alignment disk, and set the DRIVE SELECT switch (S101) to 4. (Refer to Fig. 2-2)

d. Execute the Set Up command. (Refer to 5-4-4)

e. Execute the Measurement command. (Refer to 5-4-5)

f. If adjustment is necessary, the Adjustment command is to be executed. (Refer to 5-4-6)

### 5-4-3. Adjustment

a. Perform adjustment in accordance with 5-4-2 (a) up to (d).

b. Attach the rotary knob to the stepping motor shaft and fix it with a hexagon wrench torque driver. (Refer to Fig. 4-13 (a) )

c. Execute the Adjustment command. (Refer to 5-4-6)

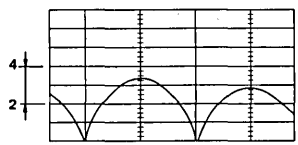
**NOTE:** For resuming the state of SMC-70 System to the initial state (that apprears immediately after power goes on), press the reset button.

### 5-4-4. Set Up Command

| Function | Keying | Display |
|---|---|---|
| 1. Select the Set Up command. | [1] | COMMAND NUMBER?<br>1. HUMIDITY 20 – 80 % : 50.0 [%]<br>2. SPECIFICATION : 26.0 [micrometer]<br>3. TIME/4DIVISIONS : 100 [ns]<br>4. R/W CORE WIDTH : 120 [micrometer]<br>5. QUIT |
| 2. Asks for the command number at display center. | | COMMAND NUMBER? |
| 3. The initial value for the relative humidity is to be set at 50 %. | [1] | HUMIDITY [%]? |
| [EX]<br>In case a relative humidity of 60 % is keyed in, | [6][0][RETURN] | COMMAND NUMBER? |
| 4. The initial value for the specified off track is to be set at 26 μm. | [2] | SPECIFICATION? |
| [EX]<br>In case an off track of 30 μm is keyed in, | [3][0][RETURN] | COMMAND NUMBER? |

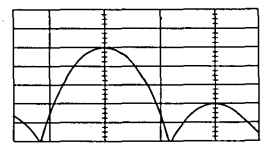
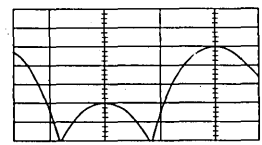
| Function | Keying | Display |
|---|---|---|
| 5. The initial value for the INDEX signal period is to be set at 100 msec.<br><br>[EX]<br>In case an INDEX signal period of 100 msec is keyed in, | 3<br><br>1 0 0 RETURN | TIME/4 DIVISIONS?<br><br>COMMAND NUMBER? |
| 6. The initial value for the R/W core width is to be set at 120 μm.<br><br>[EX]<br>In case a R/W core width of 131 μm for the OA-32V is keyed in. (Specify a R/W core width of 120 μm for the OA-32W.) | 4<br><br>1 3 1 RETURN<br>1 2 0 RETURN | R/W CORE WIDTH?<br><br>COMMAND NUMBER? |
| 7. When the Set Up command execution ends, (control to the main menu.) | 5 | MAIN MENU<br>[1] SET UP<br>[2] MEASUREMENT<br>[3] ADJUSTMENT |

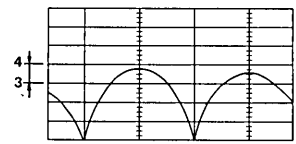
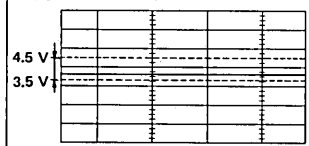
**5-4-5. Measurement Command**

| Function | Keying | Display |
|---|---|---|
| 1. Select the Measurement command.<br><br>Insert the Alignment disk. | 2<br><br>RETURN | SET DRIVE SELECT 4<br>INSERT ALIGNMENT DISK<br>HIT [RETURN] KEY<br><br>ADJUST CAT'S EYE SIGNAL LEVEL<br>[MIN (L, R) > 2 div] AND<br>[MAX(L, R) < 4 div] AND<br>[MAX(L/R, R/L) < 1.5]<br>HIT [RETURN] KEY |
| 2. Set the A/D converter gain by adjustment so that the peak values at both edges of the Cat's eye pattern signal may range from 2 to 4 divisions. (Refer to Fig. 5-4 (a) )<br>**NOTE:** If gain adjustment cannot be done, key in 0 to execute step 9. Thereafter, perform the radial alignment adjustment. (Refer to 5-4-6.) | RETURN |  <br>*(a)* |
| 3. Measure the off track. | | MEASURING |
| 4. Calculate the off track.<br>**NOTE:** When "NO GOOD" is indicated on the CRT, key 0 to execute step 9. Thereafter, perform adjustment in accordance with 5-4-6. | | CALCULATING<br>ADJUST 00 SENSOR<br>HIT [RETURN] KEY |

| Function | Keying | Display |
|---|---|---|
| 5. Check if the TRK 00 sensor output is set at a value between broken lines 3.5 V and 4.5 V. (Refer to Fig. 5-4 (e) )<br>**NOTE:** If not, key in [0] to execute step 9. Thereafter, perform adjustment in accordance with 5-4-6. | [RETURN] | TRACK 3 : XXX VOLT<br>TRACK 00>01<br>(Spec : 3.5–4.5) : XXX VOLT OK<br>TRACK 02>01<br>(Spec : 3.5–4.5) : XXX VOLT OK<br>TRACK 01>00<br>(Spec : MAX 0.5): XXX VOLT |
| 6. Check if the TRK 00 sensor output is satisfactory. (When "NO GOOD" is displayed on the CRT, repeat step 5.) | | |
| 7. Measure the off track | | MEASURING |
| 8. Calculate and check the off track.<br>**NOTE:** When "NO GOOD" is displayed on the CRT, key in [0] to execute step 9. Thereafter, perform adjustment in accordance with 5-4-6. | [RETURN] | CALCULATING<br>GOOD !<br>HIT [RETURN] KEY |
| 9. End the execution in the Measurement mode. | [E][N][D] [RETURN] | SET DRIVE SELECT 4<br>INSERT ALIGNMENT DISK<br>HIT [RETURN] KEY |

### 5-4-6. Adjustment Command

| Function | Keying | Display |
|---|---|---|
| 1. Select the Adjustment command. | [3] | COMMAND NUMBER ?<br>SET DRIVE SELECT 4<br>INSERT ALIGNMENT DISK<br>HIT [RETURN] KEY |
| Insert the Alignment disk. | [RETURN] | ADJUST CAT'S EYE<br>[MIN(L, R) > 3 div] AND<br>[MAX(L, R < 4 div] AND<br>[MAX(L/R, R/L) < 1.2]<br>HIT [ RETURN ] KEY |
| 2. Turn the rotary knob clockwise until the head arrives at the outmost position. Thereafter, turn the rotary knob counter clockwise while stopping and starting at each clicking point until the Cat's eye pattern signal appears. Turning the stepping motor with the geared driver within the range that the screw fastening the stepping motor is not dropped from the stepping moter flange, set the amplitude ratio of the peak signals on the Cat's eye pattern signal at 1 : 1.2 or less.<br>**NOTE:** A ratio of 1 : 1.2 is defined by identifying the smaller one as unity.<br>**NOTE:** If adjustment of the stepping motor cannot be conducted by using the geared driver, first find the appropriate position in accordance with the | |  <br>*(b)*<br>  <br>*(c)*<br>*Fig. 5-4* |

| Function | Keying | Display |
|---|---|---|
| following procedure, and perform adjustment again.<br>(1) When the waveform is as shown in Fig. 5-4 (b), turn the rotary knob clockwise.<br>(2) When the waveform is as shown in Fig. 5-4 (c), turn the rotary knob counterclockwise. | | |
| 3. Set the A/D converter gain by adjustment so that the peak values of the Cat's eye pattern signal may range from 3 to 4 divisions. (Refer Fig. 5-4 (d) ) | | |
| **NOTE:** If the amplitude ratio is set at any value other than utmost 1 : 1.2 during initializing, control does not advance the step to the next even if the RETURN key is pressed. | RETURN | |
| 4. Measure the off track. | | MEASURING |
| 5. Calculate the off track. | | CALCULATING<br>ADJUST RADIAL ALIGNMENT<br>[MAX (L/R, R/L) < 1.05]<br>TIGHT FIRMLY<br>HIT [RETURN] KEY |
| 6. Turning the stepping motor with the geared driver, set the amplitude ratio of the peak signals on the Cat's eye pattern signal utmost at 1 : 1.05, fasten the setscrew and then apply nut lock paint to it.<br>**NOTE:** A ratio of 1 : 1.05 is defined by identifying the smaller one as unity.<br>**NOTE:** Unless the amplitude ratio is utmost 1 : 1.05, control does not advance the next step. | RETURN | MOVE 00 SENSOR BOARD TO OUT SIDE<br>HIT [RETURN] KEY<br>  <br><br>(d) Fig. 5-4 |
| 7. Move the TRK 00 sensor board outside (toward the stepping motor). | RETURN | ADJUST 00 SENSOR<br>HIT [RETURN] KEY |
| 8. Check if the TRK 00 sensor output level is within the range of broken lines 3.5 V to 4.5 V.<br>If not, set the level nearlest to the center between these broken lines by adjustment, and fasten the setscrew with nut lock paint.<br>(Refer to Fig. 5-4 (e) )<br>**NOTE:** When "NO GOOD" is displayed on the CRT, repeat step 8. | RETURN | TRACK 3 : XXX VOLT<br>TRACK 00>01<br>(Spec : 3.5–4.5) : XXX VOLT OK<br>TRACK 02>01<br>(Spec : 3.5–4.5) : XXX VOLT OK<br>TRACK 01>00<br>(Spec : MAX 0.5): XXX VOLT<br>  <br><br>(e)<br>*Fig. 5-4 Radial Alignment, TRK 00 Adjustment* |

| Function | Keying | Display |
|---|---|---|
| 9. Measure the off track. | | MEASURING |
| 10. Calculate and check the off track. | | CALCURATING<br>GOOD !<br>HIT [RETURN] KEY |
| | RETURN | SET DRIVE SELECT 4<br>INSERT ALIGNMENT DISK<br>HIT [RETURN] KEY |
| | END RETURN | |

### 5-4-7. Error Message

One of the following errors can occur during measurement, adjustment, or setting of the machine for radial alignment:

a) Not Ready ... Indicates that READY signal is not issued. Check for disk drive connection or check for the DRIVE SELECT switch position.

b) Not Index Pulse ... Indicates that INDEX signal is not issued. Check for disk drive connection.

c) Cat's Eye Error ... Indicates that the Cat's eye pattern signal is abnormal. Check for the alignment disk.

In addition to these messages in above, one of the following statements is also displayed.

Statement 1:

[0] CONTINUE / [1] RETRY

Statement 2:

[RETURN] FIRST STEP / [1] RETRY

Key in [0] when statement [1] is displayed, and then control advances the step to the next, disregarding the error which has occurred.

Thereafter, key in [1] and then the same measurement item is executed again.

Key in [RETURN] when statement 2 is displayed, and then control performs the radial alignment measurement and returns to the initial step in the Adjustment mode. Thereafter, key in [1] and then the same measurement item is executed again.

**NOTE:** Check for the disk drive in accordance with confirmation items to the message displayed before retrying the key-in [1] operation.

## 32V 5-5. STEPPING MOTOR LOAD TORQUE

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

a. FC-9/FC-14 Mounted Board. (Refer to 4-1)

### 5-5-1. Tools and Measurement Equipment

a. Oscilloscope

b. MFD Checker II

32V c. Alignment Disk (OR-D47VA)

d. Tention Gauge

e. ⊕Driver 2 mm

### 5-5-2. Measurement

a. Push up the steel plate near the lead screw with a spring balance. (Refer to Fig. 5-5)

b. Check if the spring balance indicates a value in the range of 50 g to 80 g at the point where the head arm is just separated from the lead screw.

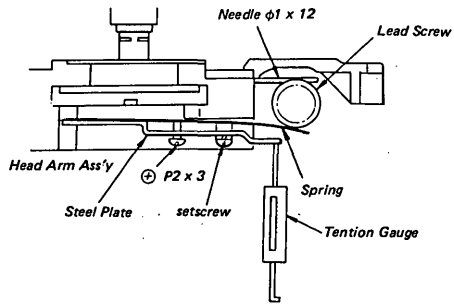



*Fig. 5-5 Stepping Motor Load Torque*

### 5-5-3. Adjustment

a. If the spring balance indicates a force of 50 g or less, fasten the setscrew (+P2x3). If it indicates 80 g or more, loosen the setscrew. (Refer to Fig. 5-5)

b. Fix the setscrew (+P2x3) for the steel plate with nut lock paint.

c. Perform the radial alignment and TRK 00 sensor adjustment. (Refer to 5-4)

## 5-6. INDEX PHASE

### 5-6-1. Tools and Measurement Equipment

a. Oscilloscope

b. MFD Checker II

32V c. Alignment Disk (OR-D47VA)

32W d. Alignment Disk (OR-D47WA)

e. Adj rod.

### 5-6-2. Measurement

a. Connect the disk drive to the MFD Checker II. (Refer to Fig. 2-1)

b. Insert the alignment disk in place.

c. Connect the oscilloscope probe tip to CN107-1 and trigger the oscilloscope at TP-5 of the MFD Checker II.

d. Move the head to TRK 40.

e. Check if the phase relation between the INDEX signal and output signal meets the specification shown in Fig. 5-6 (a).

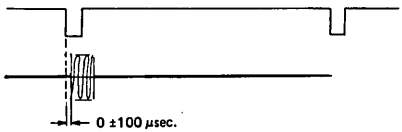



*Fig. 5-6 (a) Index Phase Specification*

### 5-6-3. Adjustment

a. If the phase relation described above does not meet the specification, adjust RV101 on the FC-9/FC-14 Mounted Board with an adj rod tool.

**NOTE:** If adjustment of RV101 does not satisfy the specification, the disk drive motor may be damaged. For the replacement, please refer to 5-8.

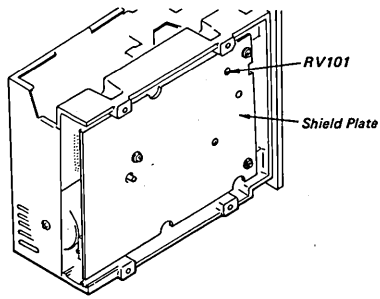



*Fig. 5-6 (b) Index Phase Adjustment*

## 5-7. READ AMPLIFIER GAIN AND READ AMPLIFIER OFF SET

### 5-7-1. Tools and Measuring Equipment

a. Oscilloscope

b. MFD Checker II

32V c. Level Disk (OR-D46VA)

32W d. Level Disk (OR-D46WA)

e. Adj rod

### 5-7-2. Measurement

a. Connect the disk drive to the MFD Checker II. (Refer to Fig. 2-1)

b. Connect the oscilloscope probe tip (CH-1) to CN107-1 built in the disk drive and other tip (CH-2) to TP-5 of the MFD Checker II.

**NOTE:** The vertical sensitivities are set at 0.2 V/div on CH-1 and at 2 V/div on CH-2 with a timing range of 10 ms/div. The oscilloscope is triggered by the signal on CH-2.

c. Select display only for CH-1.

d. Insert the level disk in place and move the head to TRK 79.

32W e. Set the SIDE SELECT switch on the MFD Checker II to side 0.

f. Press the WRITE switch, and then "2F" is written into the disk.

g. Check if the peak-to-peak value of the output waveform for "2F" is 0.6 ± 0.2 V ( 32W 0.35 ± 0.15 V). (Refer to Fig. 5-7 (a) )

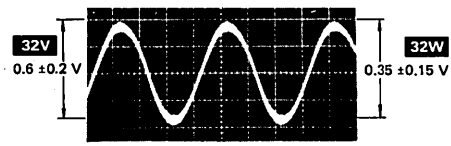
32W h. Set the SIDE SELECT switch on the MFD Checker II to side 1.

32W i. Press the WRITE switch, and then "2F" is written into the disk.

32W j. Check if the peak-to-peak value of the output waveform for "2F" is 0.35±0.15V (Refer to Fig. 5-7 (a) )

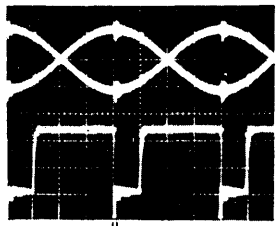
k. Connect the oscilloscope probe tip (CH-2) to TP-3 on the MFD Checker II.

l. Operate the oscilloscope in the chop mode with a timing range of 0.5 μsec/div.



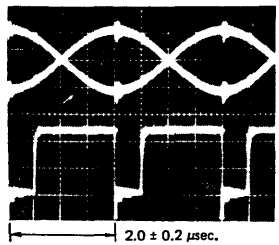

*(a)*

32V




(b)

32W




(c)

*Fig.5-7*

m. Select "Uncal" on the timing axis of the oscilloscope and then such a waveform as shown in Fig. 5-7 (b) can be obtaind.

32V n. Check if no jittery pulse follows the triggered one. (Refer to Fig. 5-7 (b) )

32W o. Check if the pulses are issued from side 0 or 1 every 2.0 ± 0.2 μsec. (Refer to Fig. 5-7 (c) )

### 5-7-3. Adjustment

**Read amplifier gain adjustment**

a. If the peak-to-peak value of the "2F" Read signal output is other than 0.6 ± 0.2 V ( 32W 0.35 ± 0.15 V), set the output signal at 0.6 ± 0.05 V ( 32W 0.35 ± 0.15 V) by adjusting RV102 on the FC-9/FC-14 Mounted Board with an adj rod tool.

32W b. If the peak-to-peak value of output waveform for "2F" in item j of the above is not 0.35±0.15V, replace the head carriage ass'y. (Refer to 4-14)

c. Perform the Head compliance adjustment. (Refer to 5-3)

**Read amplifier off set adjustment**

32V a. If any jittery pulses follow the triggered one, stop jittering at the pulse edge as far as possible by adjusting RV103 on the FC-14 Mounted Board with an adj rod tool.

32W b. If the pulses are issued from side 0 or 1 at any interval other than 2.0 ± 0.2 μsec, set the pulse interval on both sides 0 and 1 at 2.0 ± 0.2 μsec by adjusting RV103 on the FC-9 Mounted Board with an adj rod tool.

c. If adjstment of a and b above does not satisfy the spec, FC-9/FC-14 Mounted Baord must be replaced. (Refer to 4-1)

**NOTE:** After completion of the read amplifier gain adjustment, perform the read amplifier offset adjustment.

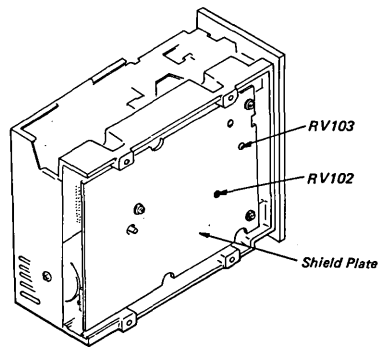



*Fig. 5-7 (d) Read Amplifier Gain and Off set Adjustment*

## 5-8. DISK DRIVE DC MOTOR SPEED

### 5-8-1. Tools and Measuring Equipment

a. MFD Checker II

32V b. Level Disk (OR-D46VA)

32W c. Level Disk (OR-D46WA)

d. Universal Counter

### 5-8-2. Measurement

a. Connect the disk drive to the MFD Checker II. (Refer to Fig. 5-8 (a) )

b. Insert the level disk in place.

c. Move the head until it arrives at TRK 35.

d. Connect the universal counter probe tip to TP-5 on the MFD Checker II.

e. Check if the pulses are generated every 100 ± 1.5 msec.

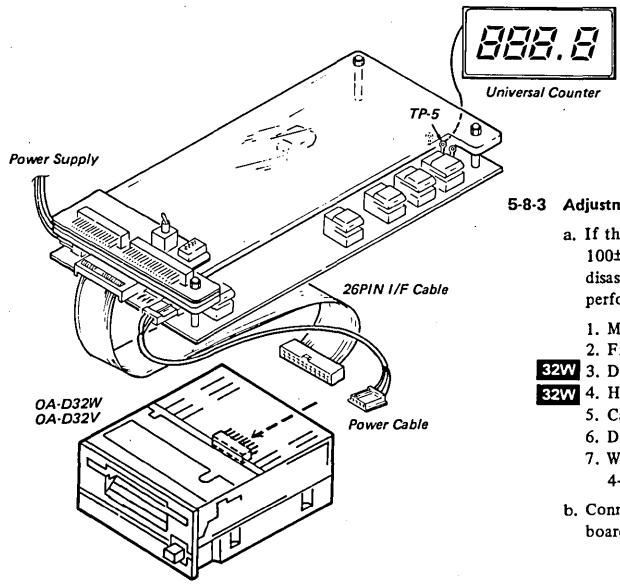



Fig. 5-8 (a) Motor Speed Measurement

**5-8-3 Adjustment**

a. If the pulses are generated other than every 100±1.5 msec in the measurement (5-8-2), disassemble the following parts and then perform the adjustment.

1. Main cover (Refer to 4-5)
2. Front panel ass'y (Refer to 4-2)
3. (32W) Damper (Refer to 4-7)
4. (32W) Head load ass'y (Refer to 4-8)
5. Cassette-up ass'y (Refer to 4-9)
6. Disk motor (Refer to 4-11)
7. WP arm, D-Detection arm (Refer to 4-10)

b. Connect the disassembled disk motor board as shown in Fig. 5-8 (b).

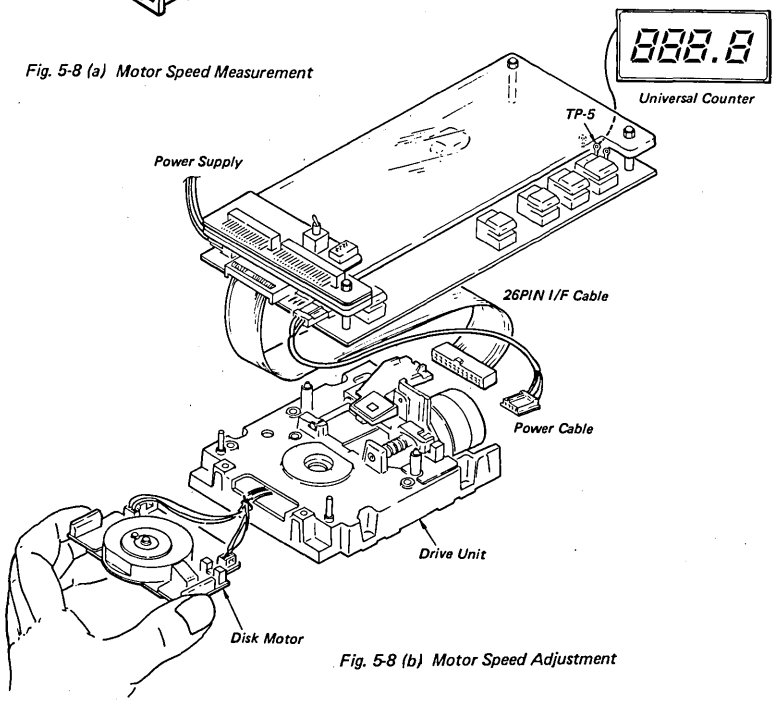



Fig. 5-8 (b) Motor Speed Adjustment

c. Set disk motor control switch (S102) located on FC-9/FC-14 Mounted Board, to side "A".

d. Turn on the unit. Read the value of the universal counter.

e. The value may be falled in one of the followings.

1. 0 (Not rotate)
2. 100±10 msec
3. 90 msec or less

Replace the parts in accordance with the flowchart or expression below:

i) When the disk motor does not rotate: (Refer to flowchart 5-8 (a) )

ii) When the pulses are generated every 100 ±10 msec:

Change the value of R9 and R8 in the following manner:

- PULSE INTERVAL − 100 < 0
  R9 (kΩ) = 1.5 x [100 − PULSEINTERVAL (msec)]
  R8 = 150 kΩ
- PULSE INTERVAL − 100 > 0
  R8 (kΩ) = 150 − 1.5 x [PULSEINTERVAL (msec) − 100]
  R9 = 0Ω

**NOTE:** Figures marked with # are for a disk motor having the lot number of XXXX2. For detail, refer to the circuit diagram and electrical parts list.

- PULSE INTERVAL −100 < 0
  R9 (kΩ) = 1.5 x [100 − PULSEINTERVAL (msec)]
  #R8 = 160 kΩ
- PULSE INTERVAL − 100 > 0
  #R8 (kΩ) = 160 −1.5 [PULSEINTERVAL (msec) − 100]
  R9 = 0Ω

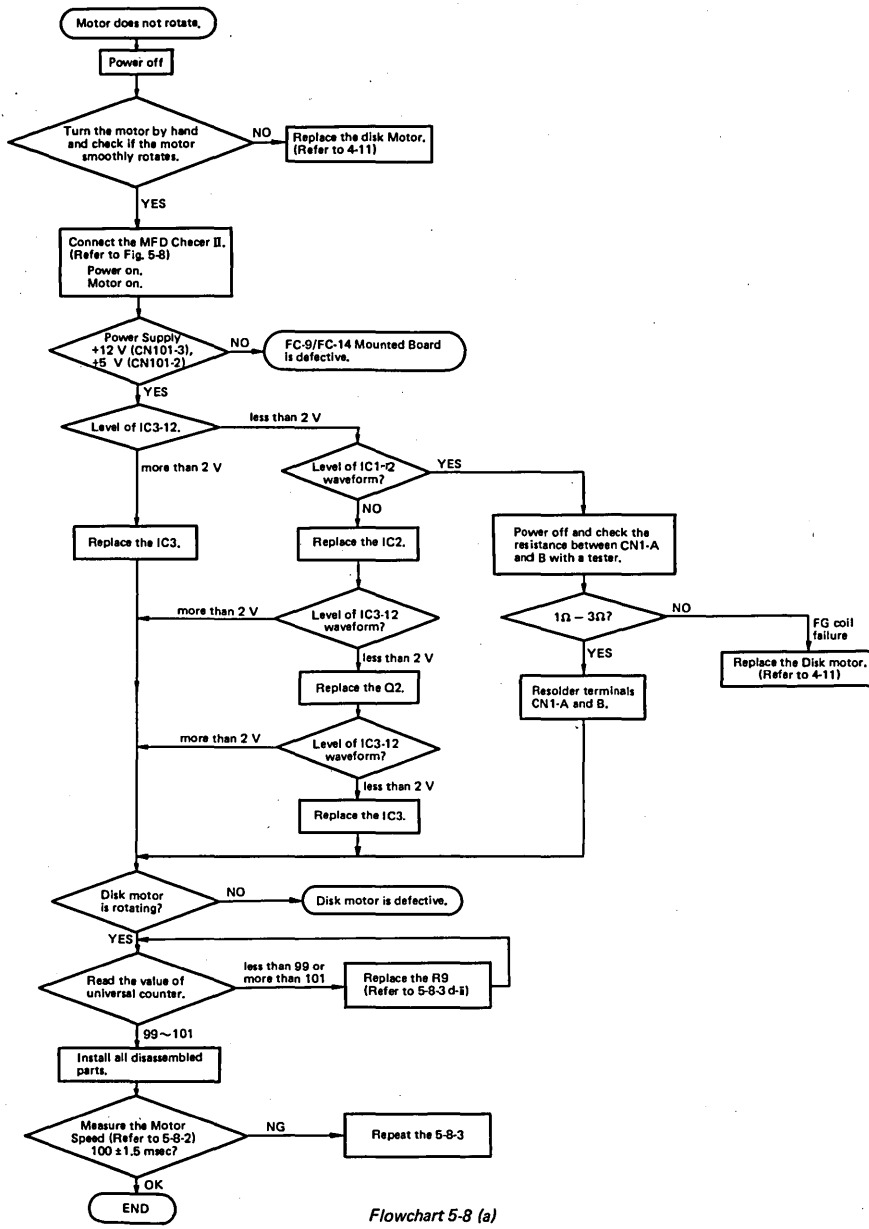
iii) When the motor speed is abnormally high: (Refer to flowchart 5-8 (b) )

f. Install all the assembled parts.

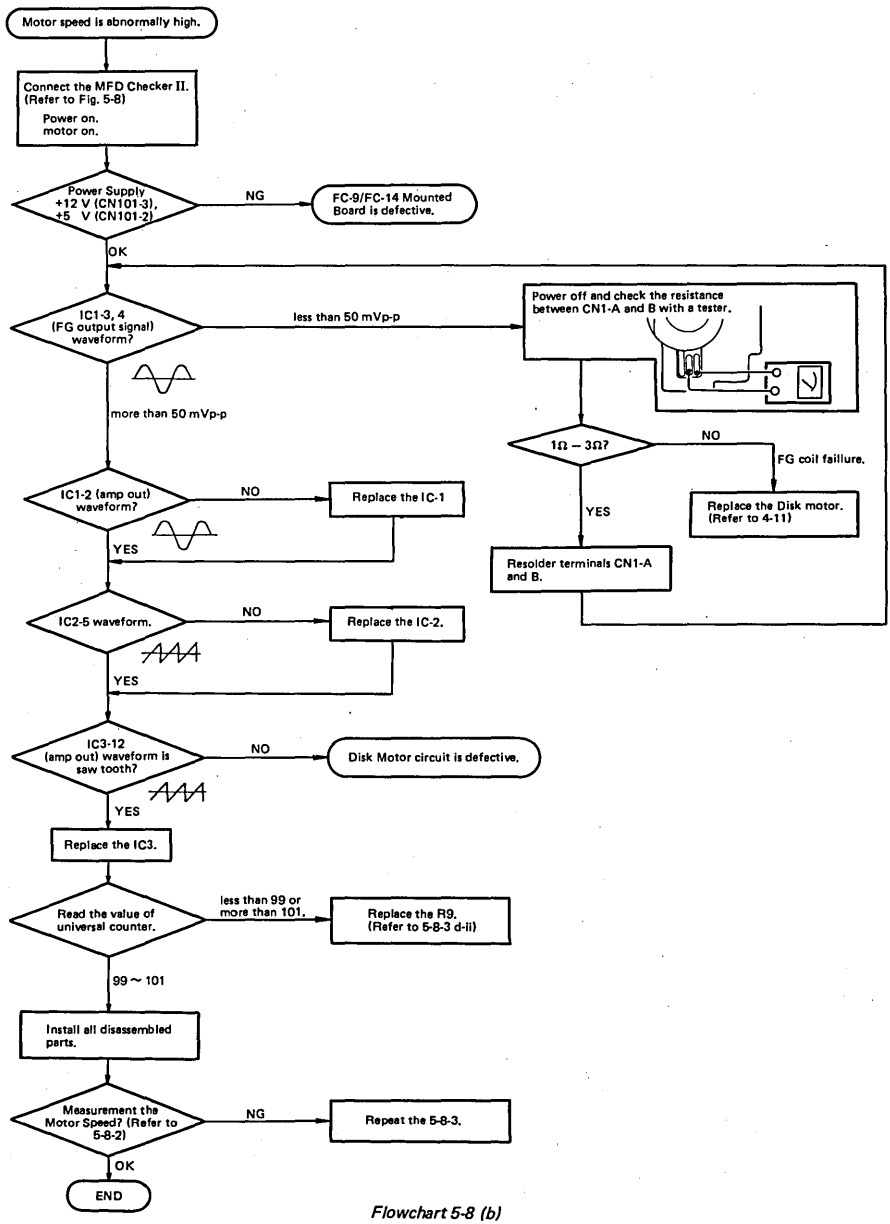
g. Remeasure the motor speed interval and confirm that it is 100±1.5 msec.

h. If it is not 100±1.5 msec, repeat the steps from the beginning of 5-8-3. Adjustment.

**NOTE:** Don't forget to put disk motor control switch (S102) located on FC-9/FC-14 Mounted Board, back to original position.




*Flowchart 5-8 (a)*




*Flowchart 5-8 (b)*

## 32V 5-9. HL ARM HEIGHT

Disassemble the following parts and then perform the adjustment.

a. Main Cover (Refer to 4-5)

### 5-9-1. Tools and Measuring Equipment

a. MFD Checker II

b. ⊕2 mm Driver

c. ⊖2 mm Driver

### 5-9-2. Measurement

a. Connect the disk drive to the MFD Checker II. (Refer to Fig. 2-1)

b. Move the head until it arrives at TRK 79.

c. Manually set the machine into the Disk-In mode. (Refer to Fig. 4-9 (a) )

d. Push down the plunger core of the head load ass'y at point A. (Refer to Fig. 5-9)

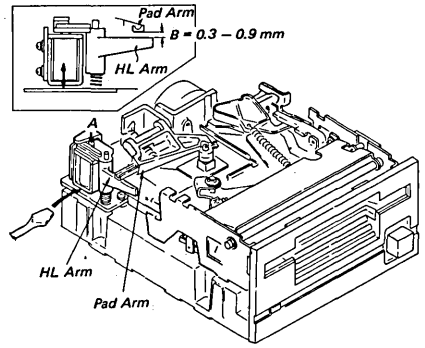



*Fig. 5-9 HL Arm Height Adjustment*

e. Check if clearance B between the HL Arm and pad arm is set at a value within the range of 0.3 to 0.9 mm. (Refer to Fig. 5-9)

### 5-9-3. Adjustment

a. If the gap is not within 0.3 to 0.9 mm, loosen the screw which fastens the plunger solenoid and once push down the plunger solenoid.

b. Insert a ⊖ driver beneath the plunger solenoid and slowly push up the plunger solenoid until clearance B becomes the specified value. (Refer to Fig. 5-9)

c. Fasten the screw and check again if clearance B meets the specification.

## 5-10. HEAD CLEARANCE

Disassemble the following parts and then perform the adjustment.

a. Main Cover (Refer to 4-5)

### 5-10-1. Tools and Measuring Equipment

a. MFD Checker II

b. Round Nose Plier

c. Hexagon Wrench Torque Driver

### 5-10-2. Measurement

a. Connect the disk drive to the MFD Checker II. (Refer to Fig. 2-1)

b. Move the head until it arrives at TRK 79.

c. Manually set the machine into the Disk-In mode. (Refer to Fig. 4-9 (a) )

32V d. After pressing the HL Arm twice or more, visually check if the clearance between the head and pad is within 0.1 to 0.4 mm. (Refer to Fig. 5-10 (a) )

32W e. After pressing the HL Arm twice or more, visually check if the clearance between both heads is within 0.1 to 0.4 mm. (Refer to Fig. 5-10 (b) )

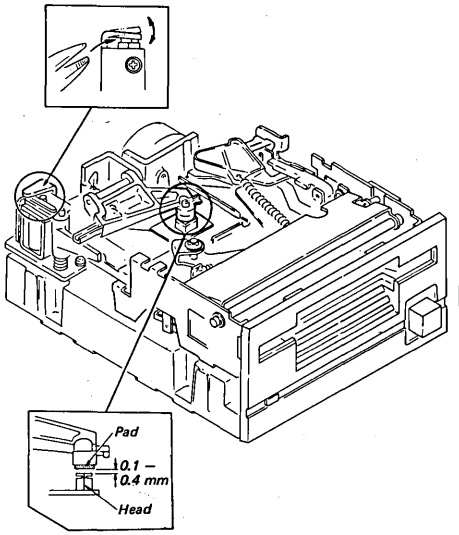
### 5-10-3. Adjustment

32V a. If the clearance is greater than 0.4 mm, bend the HL Arm mounting plate downwards. (Refer to 5-10 (a) )

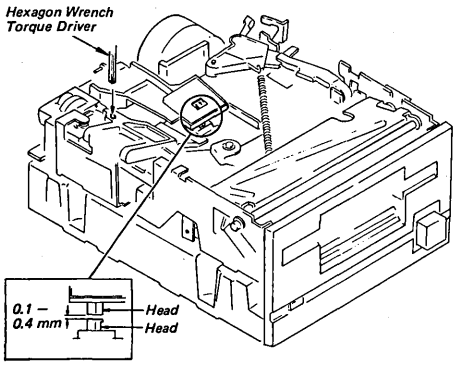
32V b. If the clearance is less than 0.1 mm, bend the HL Arm mounting plate upwards. (Refer to Fig. 5-10 (a) )

32W c. If the clearance is out of the specified range, turn the HL Arm adjusting screw until the clearance is in the specification. (Refer to 5-10 (b) )

32W d. After completion of the adjustment, fix the adjusting screw with nut lock paint. (Refer to Fig. 5-10 (b) )




*(a) OA-D32V*




*(b) OA-D32W*

*Fig. 5-10 HL Arm Height Adjustment*

## 5-11. HEAD CLEANING

Disassemble the following parts and then make the head clean.

a. Main Cover (Refer to 4-5)

### 5-11-1. Tools and Measuring Equipment

32V a. Applicator

32V b. Alcohol

32V c. Cleaning Disk (OR-D29VA)

32W d. Cleaning Disk (OR-D29WA)

e. MFD Checker II

### 32V 5-11-2. Cleaning with Applicator

a. Manually lifting the pad arm, scrub the head surface lightly with an applicator containing alcohol.

b. Scrub the head surface with a dry applicator. Do not leave fine cotton fibers on the head surface.

### 5-11-3. Cleaning with Cleaning Disk

a. Connect the disk drive to MFD Checker II. (Refer to Fig. 2-1)

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, shown in the example, for avoiding reusage.

**Cleaning Disk**

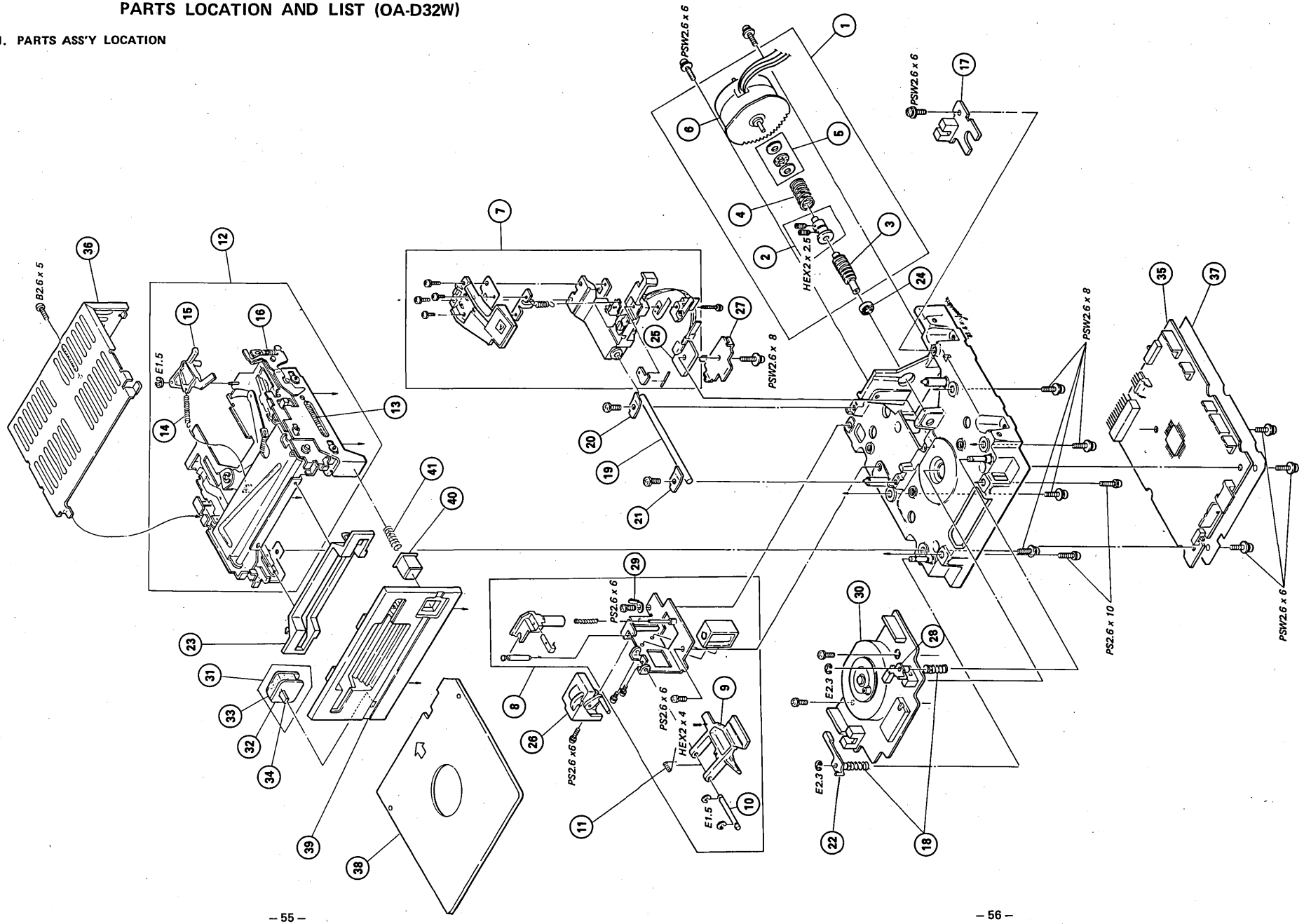
Check Column

| ~~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-D29VA

# SECTION 6
# PARTS LOCATION AND LIST (OA-D32W)

## 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.

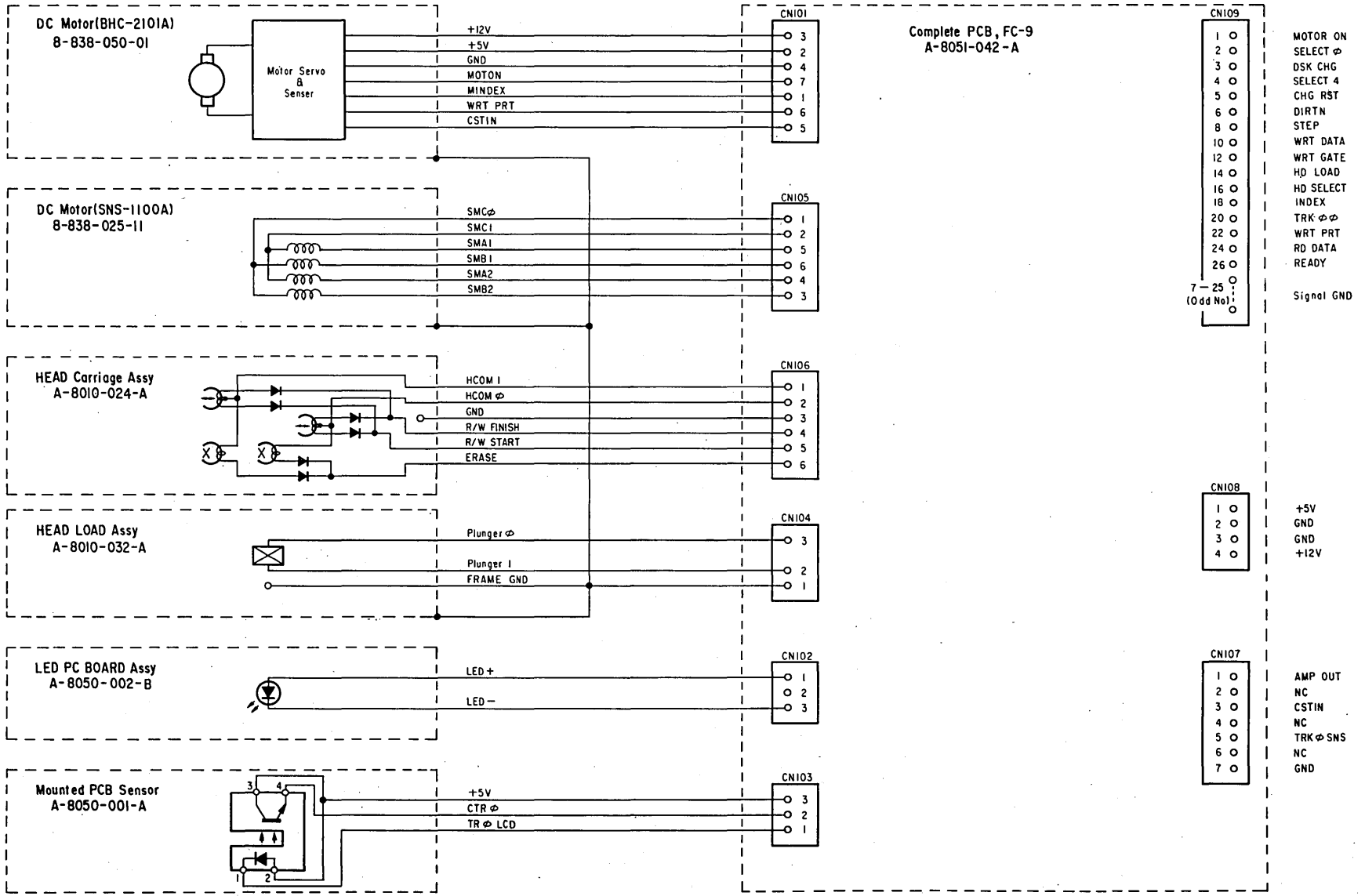
| *No.* | *Parts No.* | *Description* |
|---|---|---|
| 1 | **A-8010-049-A** | **Lead Screw Ass'y** |
| 2 | **A-8010-014-B** | **Coupling Ass'y** |
| 3 | 4-601-076-00 | Lead Screw |
| 4 | 4-601-083-00 | Compression Spring |
| 5 | 4-601-097-00 | Thrust Bearing |
| 6 | **8-838-025-11** | **Stepping Motor (SNS-1100A)** |
| | **8-838-061-01** | **Stepping Motor (SNS-1500A)** |
| 7 | **A-8010-024-A** | **Head Carriage Ass'y** |
| 8 | **A-8010-025-A** | **Head Load Ass'y** |
| 9 | **4-603-921-00** | **HL Arm** |
| 10 | **4-603-922-00** | **HL Arm Shaft** |
| 11 | **4-603-923-00** | **Torsion Spring** |
| 12 | **A-8010-026-A** | **Cassette-up Ass'y** |
| 13 | 4-601-096-00 | Tention Spring |
| 14 | **4-603-901-00** | **Tension Spring** |
| 15 | **4-604-062-00** | **Eject Arm** |
| 16 | **4-847-057-00** | **Tension Spring** |
| 17 | A-8050-001-A | Sensor Mounted Board |
| 18 | **3-659-609-00** | **Compression Spring** |
| 19 | 4-601-003-00 | Slide Guide Shaft |
| 20 | 4-601-008-03 | Guide Retainer (A) |
| 21 | 4-603-926-00 | Guide Retainer (C) |
| 22 | 4-601-009-03 | WP Arm |
| 23 | 4-601-050-04 | Blind Panel |
| 24 | **4-601-098-00** | **Ball Bearing (No Flange)** |
| 25 | 4-603-916-00 | HC-Harness Holder |
| 26 | 4-603-924-00 | Damper |
| 27 | 4-603-925-02 | Terminal Shield Plate |
| 28 | 4-603-927-00 | D-Detection Arm |
| 29 | **7-623-520-01** | **Lug, 3** |
| 30 | **8-838-050-01** | **Disk Drive Motor (BHC-2101A)** |
| 31 | A-8050-002-B | LED Mountcd Board Ass'y |
| 32 | 1-605-400-00 | LED Mounted Board |
| 33 | 4-601-027-00 | Cushion |
| 34 | **8-719-900-92** | **GL-9PR20** |
| 35 | A-8051-042-A | FC-9 Complete PCB |
| 36 | 4-601-026-11 | Main Cover |
| 37 | 4-603-928-00 | Shield Plate |
| 38 | 4-603-929-00 | Transport Cassette Dummy |
| 39 | X-4601-029-1 | Front Panel Ass'y (OA-D32W) |
| | X-4601-043-1 | Front Panel Ass'y (OA-D32W-10) |
| 40 | **4-601-052-12** | **Eject Button** |
| 41 | **4-601-060-00** | **Compression Spring** |

| *Parts No.* | *Description* |
|---|---|
| 7-621-972-25 | SCREW, TOTSU PS2.6 x 6 |
| 7-621-972-45 | SCREW, TOTSU PS2.6 x 10 |
| 7-621-981-15 | SCREW, TOTSU PSW2.6 x 6 |
| 7-621-981-25 | SCREW, TOTSU PSW2.6 x 8 |
| 7-621-912-20 | SCREW, TOTSU B2.6 x 5 |
| 7-621-731-08 | SET-SCT, HEX. 2 x 2.5, FLAT POINT |
| 7-621-733-08 | SET-SCT, HEX. 2 x 4 FLAT POINT |
| 7-624-102-04 | STOP RING 1.5, TYPE-E |
| 7-624-105-04 | STOP RING 2.3, TYPE-E |

**MEMO**

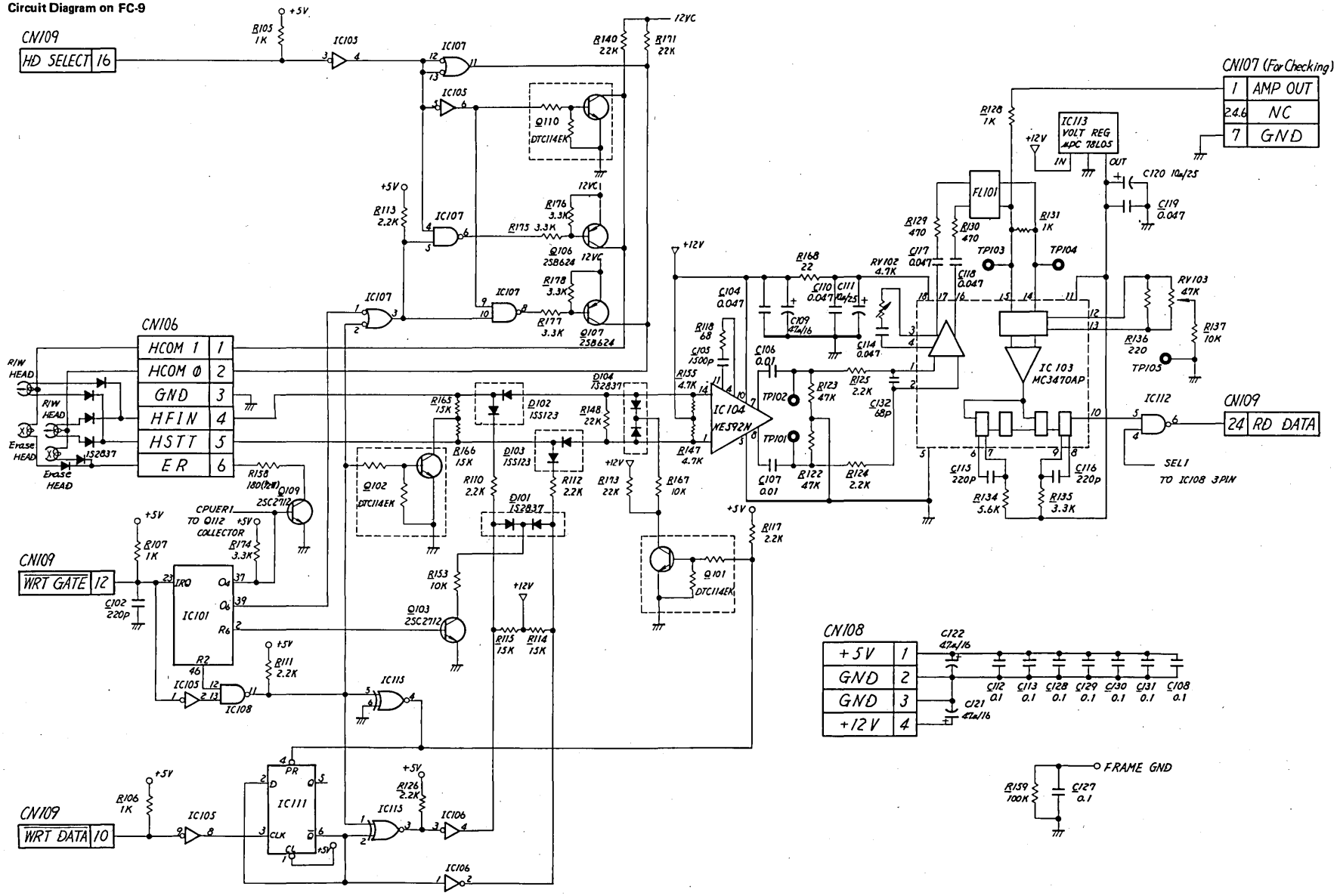
## 6-3. OVER ALL DIAGRAM

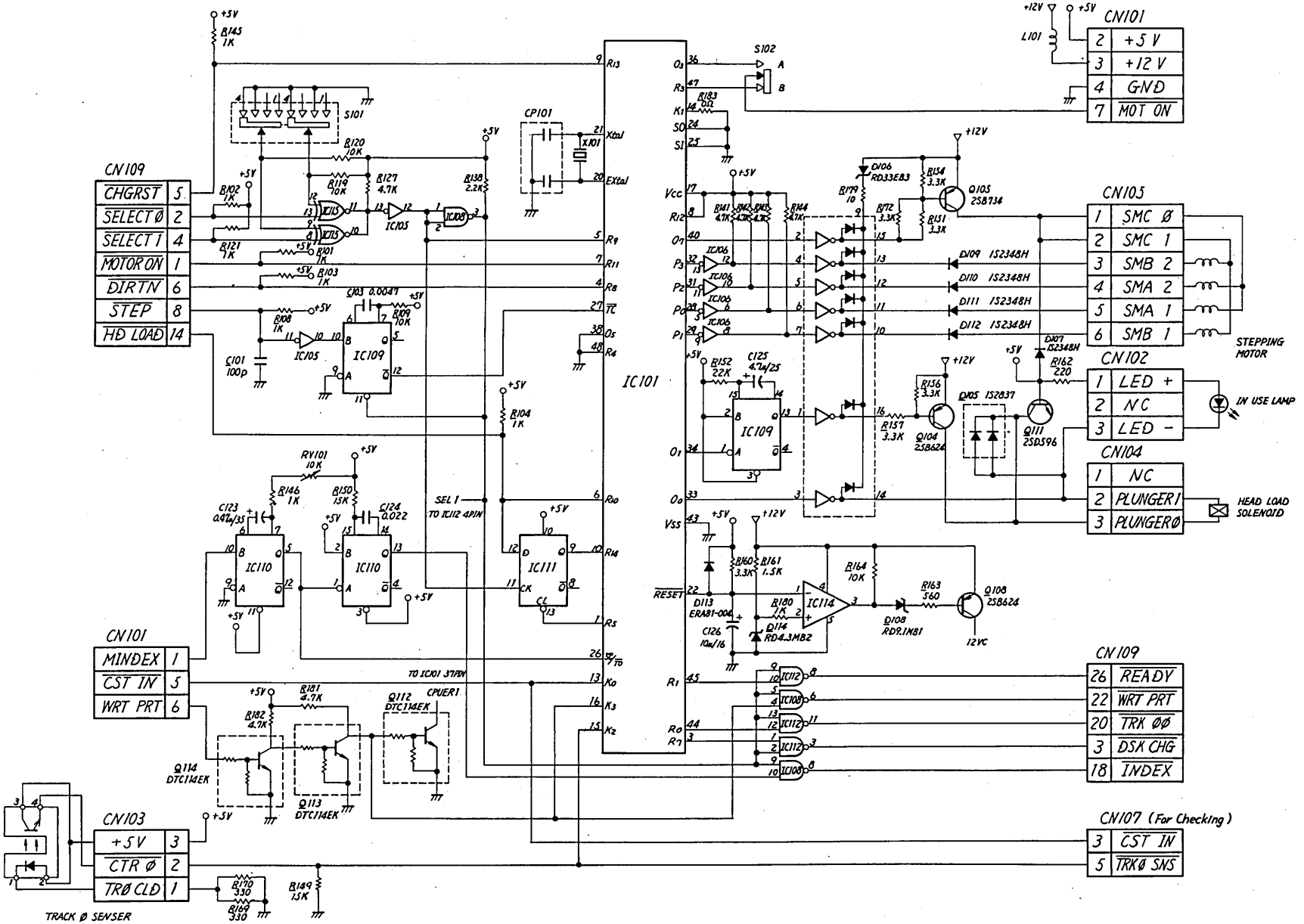
### 6-3-1. Interconnection Diagram



## 6-4. CIRCUIT DIAGRAM

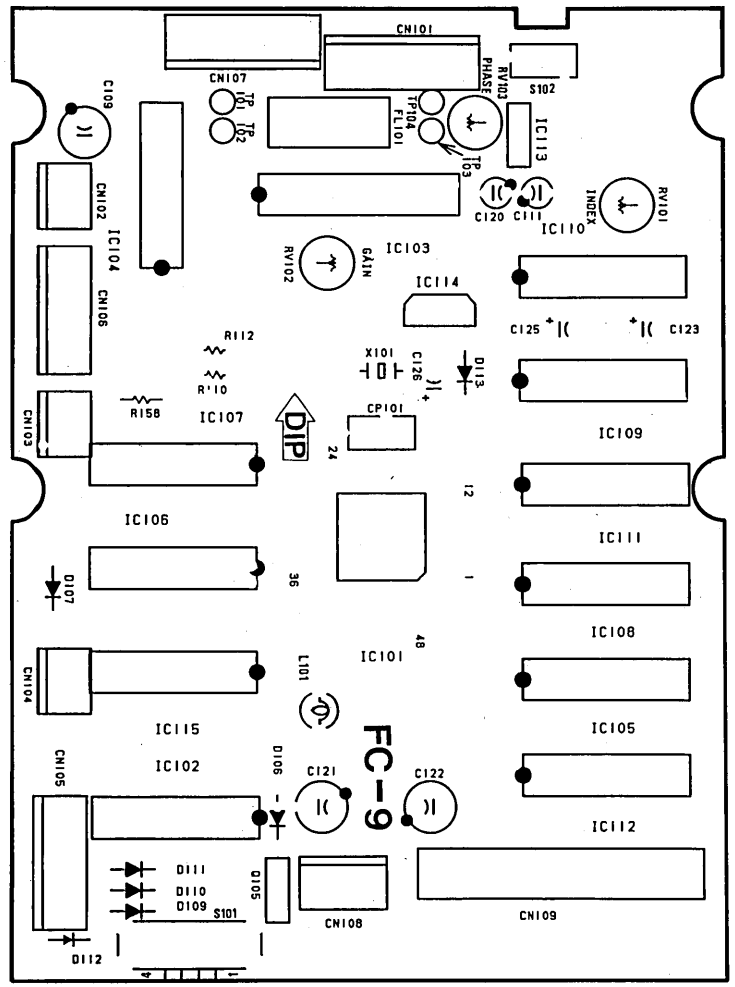
### 6-4-1. Circuit Diagram on FC-9



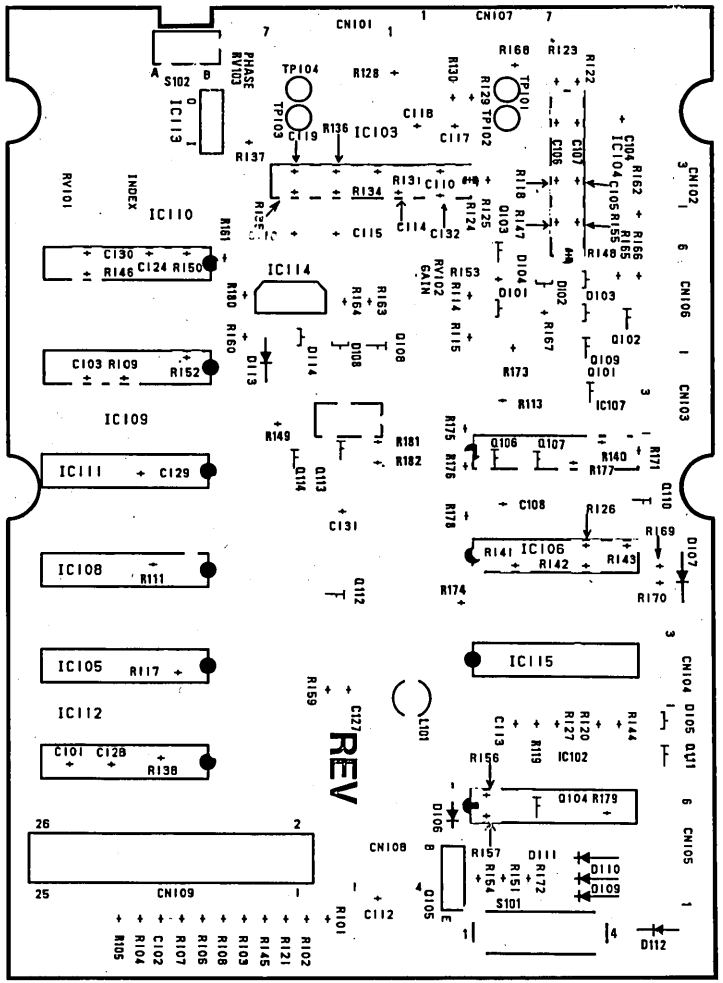

CN109
CHGRST 5
SELECT Ø 2
SELECT 1 4
MOTOR ON 1
DIRTN 6
STEP 8
HD LOAD 14
CN101
MINDEX 1
CST IN 5
WRT PRT 6
CN103
+5V 3
CTR Ø 2
TRØ CLD 1
TRACK Ø SENSER
CN101
2 +5 V
3 +12 V
4 GND
7 MOT ON
CN105
1 SMC Ø
2 SMC 1
3 SMB 2
4 SMA 2
5 SMA 1
6 SMB 1
STEPPING MOTOR
CN102
1 LED +
2 NC
3 LED -
IN USE LAMP
CN104
1 NC
2 PLUNGER1
3 PLUNGERØ
HEAD LOAD SOLENOID
CN109
26 READY
22 WRT PRT
20 TRK ØØ
3 DSK CHG
18 INDEX
CN107 (For Checking)
3 CST IN
5 TRKØ SNS
IC101
S101
S102
CP101
X101
IC105
IC106
IC108
IC109
IC110
IC111
IC112
IC114
Q101 2SB734
Q104 2SB624
Q105 2SB37
Q111 2SD596
Q108 2SB624
Q112 DTC114EK
Q113 DTC114EK
Q114 DTC114EK
D106 RD33EB3
D107 1S2348H
D109 1S2348H
D110 1S2348H
D111 1S2348H
D112 1S2348H
D113 ERA81-004
D114 RD4.3MB2
D108 RD9.1NB1
L101
TO IC112 4PIN
TO IC101 37PIN
SEL 1
RESET
12VC

6-4-2. Parts Layout on FC-9

— Component Side —



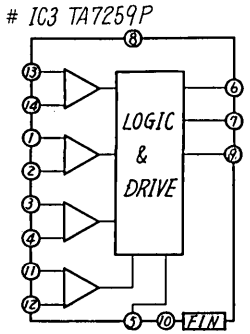

— Pattern Side —

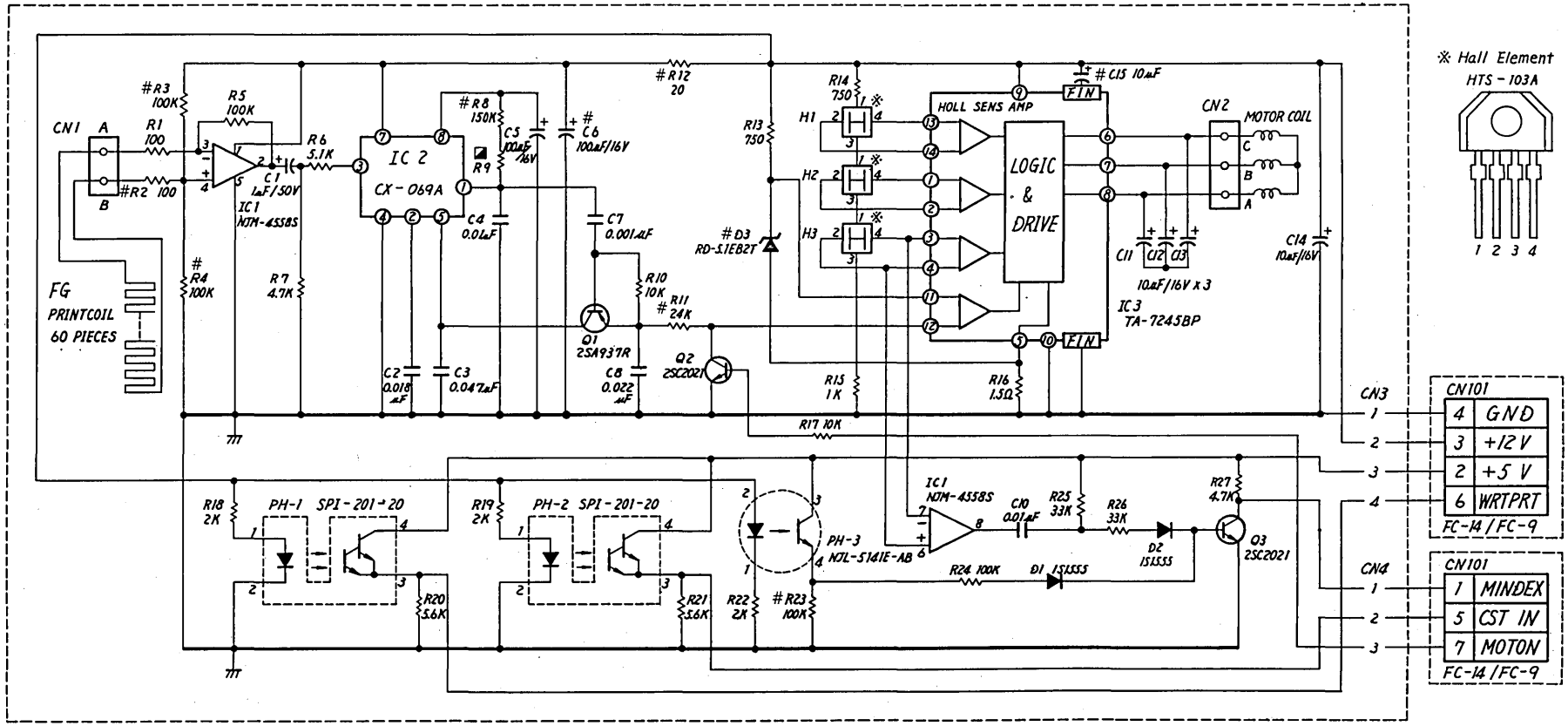


### 6-4-3. Disk Motor Circuit Diagram

**Remark:**

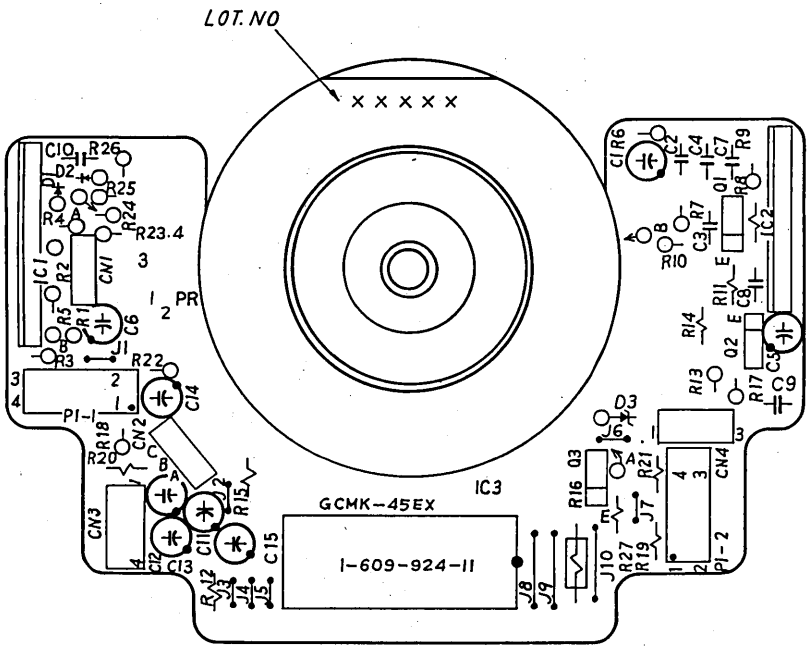
1. Numbers between FC-14/FC-9 and Disk Motor Circuit Board indicate the color of the cable.
2. A part marked with ◪ in the diagram is factory selected. For the replacement, please refer to 5-8.
3. Part name or part's value of part reference no marked with # may be differed from this diagram for a disk motor having the lot number of XXXX2, that is rubber-stampped on the metal cover. As to the actual part name and part's value for these parts, please refer to electrical parts list.




※ Hall Element
HTS-103A

### 6-4-4. Parts Layout on Disk Motor Circuit Board




## 6-5. ELECTRIC PARTS

### 6-5-1. 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; 20 W
  (If possible, use soldering tip with heat-controller of 270 ± 10°C)
- Desoldering metal braid ("SOLDER TAUL" or equivalent)
- Solder (of 0.6 mm dia. is recommended.)
- Tweezers

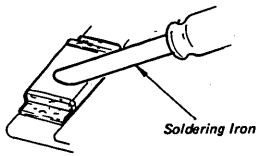
**Soldering Conditions:**

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**

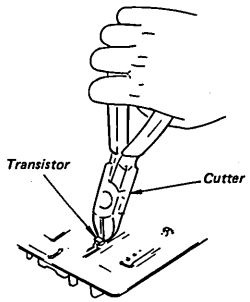
1) Add heat onto the chip-part by the top of soldering iron tip and slide the chip-part aside when the solder is melted.
2) Confirm visually with care that there is no pattern peeling, damage, and/or bridge where the part was removed or its surrounding.
3) Presolder the pattern into thin where the part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



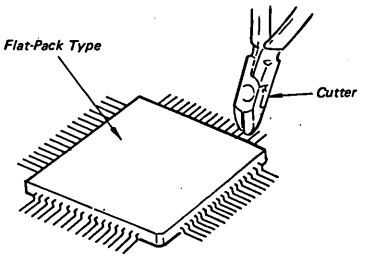

**(2) Transistor and Diode**

1) Cut the leads of the semiconductor part to be removed with a cutter.
2) Remove the leads cut as the above, and confirm visually that there is no pattern peeling, any 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 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) Place a new IC onto the pattern and solder it.
5) Confirm by tester that each conduction between IC's terminal and upper port is surely made.
6) If not, resolder the portion.



### 6-5-2. 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.

**FC-9 BOARD**

| *Ref. No.* | *Parts No.* | *Description* | | | |
|---|---|---|---|---|---|
| | | **CAPACITORS** | | | |
| C101 | 1-163-251-00 | CERAMIC (CHIP) | 100PF | 5% | 50V |
| C102 | 1-163-259-00 | CERAMIC (CHIP) | 220PF | 5% | 50V |
| C103 | 1-163-017-00 | CERAMIC (CHIP) | 0.0047 | 10% | 50V |
| C104 | 1-163-035-00 | CERAMIC (CHIP) | 0.047 | | 50V |
| C105 | 1-163-011-00 | CERAMIC (CHIP) | 0.0015 | 10% | 50V |
| C106 | 1-163-021-00 | CERAMIC (CHIP) | 0.01 | 10% | 50V |
| C107 | 1-163-021-00 | CERAMIC (CHIP) | 0.01 | 10% | 50V |
| C108 | 1-163-038-00 | CERAMIC (CHIP) | 0.1 | | 25V |
| C109 | 1-123-821-00 | ELECT | 47 | 20% | 16V |
| C110 | 1-163-035-00 | CERAMIC (CHIP) | 0.047 | | 50V |
| C111 | 1-123-621-41 | ELECT | 10 | 20% | 25V |
| C112 | 1-163-038-00 | CERAMIC (CHIP) | 0.1 | | 25V |
| C113 | 1-163-038-00 | CERAMIC (CHIP) | 0.1 | | 25V |
| C114 | 1-163-035-00 | CERAMIC (CHIP) | 0.047 | | 50V |
| C115 | 1-163-259-00 | CERAMIC (CHIP) | 220PF | 5% | 50V |
| C116 | 1-163-259-00 | CERAMIC (CHIP) | 220PF | 5% | 50V |
| C117 | 1-163-035-00 | CERAMIC (CHIP) | 0.047 | | 50V |
| C118 | 1-163-035-00 | CERAMIC (CHIP) | 0.047 | | 50V |
| C119 | 1-163-035-00 | CERAMIC (CHIP) | 0.047 | | 50V |
| C120 | 1-123-621-41 | ELECT | 10 | 20% | 25V |
| C121 | 1-123-821-00 | ELECT | 47 | 20% | 16V |
| C122 | 1-123-821-00 | ELECT | 47 | 20% | 16V |
| C123 | 1-131-345-00 | TANTALUM | 0.47 | 10% | 35V |
| C124 | 1-163-037-00 | CERAMIC (CHIP) | 0.022 | 10% | 25V |
| C125 | 1-131-357-00 | TANTALUM | 4.7 | 10% | 25V |
| C126 | 1-131-371-00 | TANTALUM | 10 | 10% | 16V |
| C127 | 1-163-038-00 | CERAMIC (CHIP) | 0.1 | | 25V |
| C128 | 1-163-038-00 | CERAMIC (CHIP) | 0.1 | | 25V |
| C129 | 1-163-038-00 | CERAMIC (CHIP) | 0.1 | | 25V |
| C130 | 1-163-038-00 | CERAMIC (CHIP) | 0.1 | | 25V |
| C131 | 1-163-038-00 | CERAMIC (CHIP) | 0.1 | | 25V |
| C132 | 1-163-247-00 | CERAMIC (CHIP) | 68PF | 5% | 50V |

| *Ref. No.* | *Parts No.* | *Description* |
|---|---|---|
| | | **CONNECTORS** |
| CN101 | 1-560-618-00 | CONNECTOR POST HEADER, ILG 7P |
| CN102 | 1-560-357-00 | CONNECTOR POST HEADER, ILG (3P) |
| CN103 | 1-560-357-00 | CONNECTOR POST HEADER, ILG (3P) |
| CN104 | 1-560-357-00 | CONNECTOR POST HEADER, ILG (3P) |
| CN105 | 1-560-360-00 | CONNECTOR POST HEADER, ILG (6P) |
| CN106 | 1-560-360-00 | CONNECTOR POST HEADER, ILG (6P) |
| CN107 | 1-560-619-00 | CONNECTOR POST HEADER, ILG 7P |
| CN108 | 1-560-542-00 | POST HEADER, EI CONNECTOR 4P |
| CN109 | 1-564-244-00 | CONNECTOR (M) 26P |
| | | **DIODES** |
| D101 | 8-719-100-05 | 1S2837 (CHIP) |
| D102 | 8-719-101-23 | 1SS123 (CHIP) |
| D103 | 8-719-101-23 | 1SS123 (CHIP) |
| D104 | 8-719-100-05 | 1S2837 (CHIP) |
| D105 | 8-719-100-05 | 1S2837 (CHIP) |
| D106 | 8-719-101-07 | RD33EB3 |
| D107 | 8-719-912-25 | 1S2348HTD |
| D108 | 8-719-106-43 | RD9.1M-B1 (CHIP) |
| D109 | 8-719-912-25 | 1S2348HTD |
| D110 | 8-719-912-25 | 1S2348HTD |
| D111 | 8-719-912-25 | 1S2348HTD |
| D112 | 8-719-912-25 | 1S2348HTD |
| D113 | 8-719-981-01 | ERA81-004 |
| D114 | 8-719-105-64 | RD4.3M-B2 (CHIP) |
| | | **ICS** |
| IC101 | 8-759-908-30 | IC MB8847-1199M |
| IC102 | 8-759-120-03 | IC μPA2003C |
| IC103 | 8-759-000-07 | IC MC3470AP |
| IC104 | 8-759-005-92 | IC NE592N |
| IC105 | 8-759-900-14 | IC SN74LS14N |
| IC106 | 8-759-974-06 | IC SN7406N |
| IC107 | 8-759-900-26 | IC SN74LS26N |
| IC108 | 8-759-974-38 | IC SN7438N |
| IC109 | 8-759-902-74 | IC SN74LS423N |
| IC110 | 8-759-902-21 | IC SN74LS221N |
| IC111 | 8-759-900-74 | IC SN74LS74AN |
| IC112 | 8-759-974-38 | IC SN7438N |
| IC113 | 8-759-178-05 | IC μPC78L05 |
| IC114 | 8-759-612-04 | IC M51204L |
| IC115 | 8-759-902-66 | IC SN74LS266N |

| Ref. No. | Parts No. | Description |
|---|---|---|
| | | **COILS** |
| L101 | 1-408-442-21 | MICRO INDUCTOR 10μH |
| | | **TRANSISTORS** |
| Q101 | 8-729-900-53 | DTC114EK (CHIP) |
| Q102 | 8-729-900-53 | DTC114EK (CHIP) |
| Q103 | 8-729-271-23 | 2SC2712G (CHIP) |
| Q104 | 8-729-162-45 | 2SB624-BV5 (CHIP) |
| Q105 | 8-729-103-43 | 2SB734-2 |
| Q106 | 8-729-162-45 | 2SB624-BV5 (CHIP) |
| Q107 | 8-729-162-45 | 2SB624-BV5 (CHIP) |
| Q108 | 8-729-162-45 | 2SB624-BV5 (CHIP) |
| Q109 | 8-729-271-23 | 2SC2712G (CHIP) |
| Q110 | 8-729-900-53 | DTC114EK (CHIP) |
| Q111 | 8-729-159-64 | 2SD596-DV5 (CHIP) |
| Q112 | 8-729-900-53 | DTC114EK (CHIP) |
| Q113 | 8-729-900-53 | DTC114EK (CHIP) |
| Q114 | 8-729-900-53 | DTC114EK (CHIP) |
| | | **RESITORS** |
| R101 | 1-216-049-00 | METAL (CHIP) 1K 5% 1/10W |
| R102 | 1-216-049-00 | METAL (CHIP) 1K 5% 1/10W |
| R103 | 1-216-049-00 | METAL (CHIP) 1K 5% 1/10W |
| R104 | 1-216-049-00 | METAL (CHIP) 1K 5% 1/10W |
| R105 | 1-216-049-00 | METAL (CHIP) 1K 5% 1/10W |
| R106 | 1-216-049-00 | METAL (CHIP) 1K 5% 1/10W |
| R107 | 1-216-049-00 | METAL (CHIP) 1K 5% 1/10W |
| R108 | 1-216-049-00 | METAL (CHIP) 1K 5% 1/10W |
| R109 | 1-216-073-00 | METAL (CHIP) 10K 5% 1/10W |
| R110 | 1-214-140-00 | METAL 2.2K 1% 1/4W |
| R111 | 1-216-057-00 | METAL (CHIP) 2.2K 5% 1/10W |
| R112 | 1-214-140-00 | METAL 2.2K 1% 1/4W |
| R113 | 1-216-057-00 | METAL (CHIP) 2.2K 5% 1/10W |
| R114 | 1-216-077-00 | METAL (CHIP) 15K 5% 1/10W |
| R115 | 1-216-077-00 | METAL (CHIP) 15K 5% 1/10W |
| R117 | 1-216-057-00 | METAL (CHIP) 2.2K 5% 1/10W |
| R118 | 1-216-021-00 | METAL (CHIP) 68 5% 1/10W |
| R119 | 1-216-073-00 | METAL (CHIP) 10K 5% 1/10W |
| R120 | 1-216-073-00 | METAL (CHIP) 10K 5% 1/10W |
| R121 | 1-216-049-00 | METAL (CHIP) 1K 5% 1/10W |
| R122 | 1-216-089-00 | METAL (CHIP) 47K 5% 1/10W |
| R123 | 1-216-089-00 | METAL (CHIP) 47K 5% 1/10W |
| R124 | 1-216-057-00 | METAL (CHIP) 2.2K 5% 1/10W |
| R125 | 1-216-057-00 | METAL (CHIP) 2.2K 5% 1/10W |
| R126 | 1-216-057-00 | METAL (CHIP) 2.2K 5% 1/10W |

| Ref. No. | Parts No. | Description |
|---|---|---|
| R127 | 1-216-065-00 | METAL (CHIP) 4.7K 5% 1/10W |
| R128 | 1-216-049-00 | METAL (CHIP) 1K 5% 1/10W |
| R129 | 1-216-041-00 | METAL (CHIP) 470 5% 1/10W |
| R130 | 1-216-041-00 | METAL (CHIP) 470 5% 1/10W |
| R131 | 1-216-049-00 | METAL (CHIP) 1K 5% 1/10W |
| R134 | 1-216-067-00 | METAL (CHIP) 5.6K 5% 1/10W |
| R135 | 1-216-061-00 | METAL (CHIP) 3.3K 5% 1/10W |
| R136 | 1-216-033-00 | METAL (CHIP) 220 5% 1/10W |
| R137 | 1-216-073-00 | METAL (CHIP) 10K 5% 1/10W |
| R138 | 1-216-057-00 | METAL (CHIP) 2.2K 5% 1/10W |
| R140 | 1-216-081-00 | METAL (CHIP) 22K 5% 1/10W |
| R141 | 1-216-065-00 | METAL (CHIP) 4.7K 5% 1/10W |
| R142 | 1-216-065-00 | METAL (CHIP) 4.7K 5% 1/10W |
| R143 | 1-216-065-00 | METAL (CHIP) 4.7K 5% 1/10W |
| R144 | 1-216-065-00 | METAL (CHIP) 4.7K 5% 1/10W |
| R145 | 1-216-049-00 | METAL (CHIP) 1K 5% 1/10W |
| R146 | 1-216-049-00 | METAL (CHIP) 1K 5% 1/10W |
| R147 | 1-216-083-00 | METAL (CHIP) 27K 5% 1/10W |
| R148 | 1-216-081-00 | METAL (CHIP) 22K 5% 1/10W |
| R149 | 1-216-077-00 | METAL (CHIP) 15K 5% 1/10W |
| R150 | 1-216-077-00 | METAL (CHIP) 15K 5% 1/10W |
| R151 | 1-216-061-00 | METAL (CHIP) 3.3K 5% 1/10W |
| R152 | 1-216-081-00 | METAL (CHIP) 22K 5% 1/10W |
| R153 | 1-216-073-00 | METAL (CHIP) 10K 5% 1/10W |
| R154 | 1-216-061-00 | METAL (CHIP) 3.3K 5% 1/10W |
| R155 | 1-216-083-00 | METAL (CHIP) 27K 5% 1/10W |
| R156 | 1-216-061-00 | METAL (CHIP) 3.3K 5% 1/10W |
| R157 | 1-216-061-00 | METAL (CHIP) 3.3K 5% 1/10W |
| R158 | 1-212-515-00 | METAL 180 1% 1/2W |
| R159 | 1-216-097-00 | METAL (CHIP) 100K 5% 1/10W |
| R160 | 1-216-085-00 | METAL (CHIP) 33K 5% 1/10W |
| R161 | 1-216-053-00 | METAL (CHIP) 1.5K 5% 1/10W |
| R162 | 1-216-033-00 | METAL (CHIP) 220 5% 1/10W |
| R163 | 1-216-043-00 | METAL (CHIP) 560 5% 1/10W |
| R164 | 1-216-073-00 | METAL (CHIP) 10K 5% 1/10W |
| R165 | 1-216-077-00 | METAL (CHIP) 15K 5% 1/10W |
| R166 | 1-216-077-00 | METAL (CHIP) 15K 5% 1/10W |
| R167 | 1-216-073-00 | METAL (CHIP) 10K 5% 1/10W |
| R168 | 1-216-009-00 | METAL (CHIP) 22 5% 1/10W |
| R169 | 1-216-037-00 | METAL (CHIP) 330 5% 1/10W |
| R170 | 1-216-037-00 | METAL (CHIP) 330 5% 1/10W |
| R171 | 1-216-081-00 | METAL (CHIP) 22K 5% 1/10W |
| R172 | 1-216-061-00 | METAL (CHIP) 3.3K 5% 1/10W |
| R173 | 1-216-081-00 | METAL (CHIP) 22K 5% 1/10W |
| R174 | 1-216-061-00 | METAL (CHIP) 3.3K 5% 1/10W |

| Ref. No. | Parts No. | Description | | | |
|---|---|---|---|---|---|
| R175 | 1-216-061-00 | METAL (CHIP) | 3.3K | 5% | 1/10W |
| R176 | 1-216-061-00 | METAL (CHIP) | 3.3K | 5% | 1/10W |
| R177 | 1-216-061-00 | METAL (CHIP) | 3.3K | 5% | 1/10W |
| R178 | 1-216-061-00 | METAL (CHIP) | 3.3K | 5% | 1/10W |
| R179 | 1-216-001-00 | METAL (CHIP) | 10 | 5% | 1/10W |
| R180 | 1-216-049-00 | METAL (CHIP) | 1K | 5% | 1/10W |
| R181 | 1-216-065-00 | METAL (CHIP) | 4.7K | 5% | 1/10W |
| R182 | 1-216-065-00 | METAL (CHIP) | 4.7K | 5% | 1/10W |
| | | **VARIABLE RESISTORS** | | | |
| RV101 | 1-226-703-00 | RES, ADJ, METAL GLAZE 10K | | | |
| RV102 | 1-226-772-00 | RES, ADJ, METAL GLAZE 4.7K | | | |
| RV103 | 1-226-774-00 | RES, ADJ, METAL GLAZE 47K | | | |
| | | **SWITCHES** | | | |
| S101 | 1-554-644-00 | SWITCH, SLIDE | | | |
| S102 | 1-553-510-00 | SWITCH, SLIDE | | | |
| | | **OSCILLATOR** | | | |
| X101 | 1-527-838-00 | OSCILLATOR, CERAMIC (WITH CAP) | | | |
| | | **FILTER** | | | |
| FL101 | 1-235-269-00 | FILTER, LOW PASS | | | |

**DISK DRIVE DC MOTOR BOARD (BHC-2101A)**

The reference no. marked with # is used only for a disk motor having the lot number of XXXX2, that is rubber-stampped on the metal cover.

| | | | | | |
|---|---|---|---|---|---|
| | | **CAPACITORS** | | | |
| C1 | 1-123-611-00 | ELECT | 1 | 20% | 50V |
| C2 | 1-161-054-00 | CERAMIC | 0.018 | 10% | 50V |
| C3 | 1-130-491-00 | MYLAR | 0.047 | 5% | 50V |
| C4 | 1-136-213-00 | FILM | 0.01 | 5% | 100V |
| C5 | 1-123-617-00 | ELECT | 10 | 20% | 16V |
| C6 | 1-123-617-00 | ELECT | 10 | 20% | 16V |
| #C6 | ——— | ——— | — | ——— | |
| C7 | 1-161-039-00 | CERAMIC | 0.001 | 10% | 50V |
| C8 | 1-130-487-00 | MYLAR | 0.022 | 5% | 50V |
| C10 | 1-161-051-00 | CERAMIC | 0.01 | 10% | 50V |
| C11 | 1-123-617-00 | ELECT | 10 | 20% | 16V |
| C12 | 1-123-617-00 | ELECT | 10 | 20% | 16V |
| C13 | 1-123-617-00 | ELECT | 10 | 20% | 16V |
| C14 | 1-123-617-00 | ELECT | 10 | 20% | 16V |
| C15 | 1-131-371-00 | TANTALUM | 10 | 10% | 16V |
| #C15 | ——— | ——— | — | ——— | |

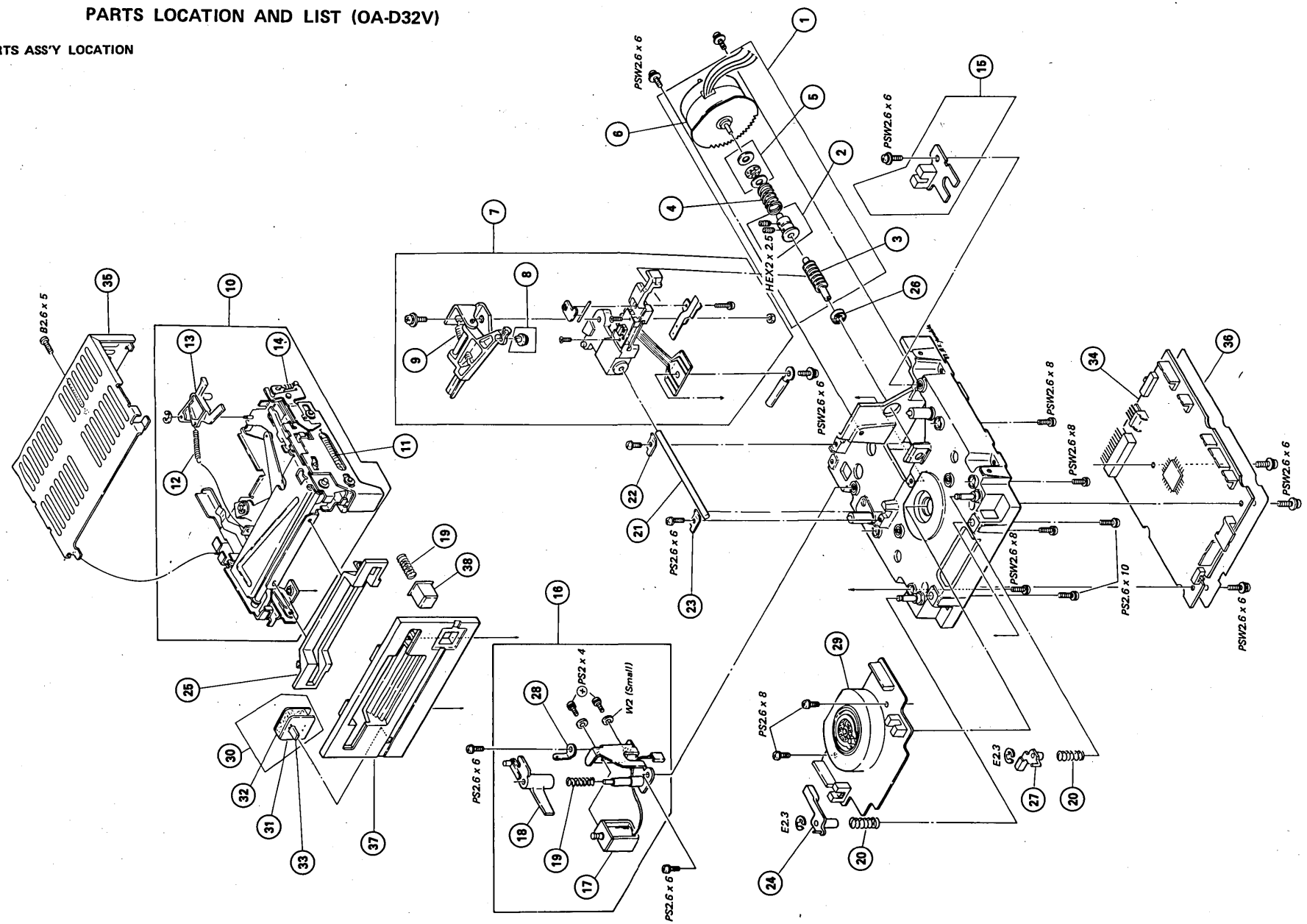
| Ref. No. | Parts No. | Description | | | |
|---|---|---|---|---|---|
| | | **DIODES** | | | |
| D1 | 8-719-815-55 | 1S1555TP | | | |
| D2 | 8-719-815-55 | 1S1555TP | | | |
| D3 | 8-719-150-23 | RD5.1EB2T | | | |
| #D3 | 8-719-150-21 | RD4.7EB3T | | | |
| PH1 | 8-719-902-90 | PHOTO INTERRUPTOR SPI201-20 | | | |
| PH2 | 8-719-902-90 | PHOTO INTERRUPTOR SPI201-20 | | | |
| | | **ICS** | | | |
| IC1 | 8-759-700-08 | IC NJM4558S | | | |
| IC2 | 8-750-690-00 | IC CX-069 | | | |
| IC3 | 8-759-201-54 | IC TA7245BP | | | |
| #IC3 | 8-759-202-02 | IC TA7259P | | | |
| | | **TRANSISTORS** | | | |
| Q1 | 8-729-993-72 | 2SA937-R | | | |
| Q2 | 8-729-902-11 | 2SC2021-R | | | |
| Q3 | 8-729-902-11 | 2SC2021-R | | | |
| | | **RESISTORS** | | | |
| R1 | 1-247-807-00 | CARBON | 100 | 5% | 1/6W |
| R2 | 1-247-807-00 | CARBON | 100 | 5% | 1/6W |
| #R2 | 1-247-890-00 | CARBON | 300K | 5% | 1/6W |
| R3 | 1-247-879-00 | CARBON | 100K | 5% | 1/6W |
| #R3 | 1-247-849-00 | CARBON | 5.6K | 5% | 1/6W |
| R4 | 1-247-879-00 | CARBON | 100K | 5% | 1/6W |
| #R4 | 1-247-849-00 | CARBON | 5.6K | 5% | 1/6W |
| R5 | 1-247-879-00 | CARBON | 100K | 5% | 1/6W |
| R6 | 1-247-848-00 | CARBON | 5.1K | 5% | 1/6W |
| R7 | 1-247-847-00 | CARBON | 4.7K | 5% | 1/6W |
| R8 | 1-247-883-00 | CARBON | 150K | 5% | 1/6W |
| #R8 | 1-247-884-00 | CARBON | 160K | 5% | 1/6W |
| R10 | 1-247-855-00 | CARBON | 10K | 5% | 1/6W |
| R11 | 1-247-864-00 | CARBON | 24K | 5% | 1/6W |
| #R11 | 1-247-879-00 | CARBON | 100K | 5% | 1/6W |
| R12 | 1-247-790-00 | CARBON | 20 | 5% | 1/6W |
| #R12 | ——— | ——— | — | ——— | |
| R13 | 1-247-828-00 | CARBON | 750 | 5% | 1/6W |
| R14 | 1-247-828-00 | CARBON | 750 | 5% | 1/6W |
| R15 | 1-247-831-00 | CARBON | 1K | 5% | 1/6W |
| R16 | 1-246-405-00 | CARBON | 1.5 | 5% | 1/4W |
| R17 | 1-247-855-00 | CARBON | 10K | 5% | 1/6W |
| R18 | 1-247-838-00 | CARBON | 2K | 5% | 1/6W |
| R19 | 1-247-838-00 | CARBON | 2K | 5% | 1/6W |
| R20 | 1-247-849-00 | CARBON | 5.6K | 5% | 1/6W |
| R21 | 1-247-849-00 | CARBON | 5.6K | 5% | 1/6W |
| R22 | 1-247-838-00 | CARBON | 2K | 5% | 1/6W |
| R23 | 1-247-879-00 | CARBON | 100K | 5% | 1/6W |
| #R23 | 1-247-873-00 | CARBON | 56K | 5% | 1/6W |
| R24 | 1-247-879-00 | CARBON | 100K | 5% | 1/6W |
| R25 | 1-247-867-00 | CARBON | 33K | 5% | 1/6W |
| R26 | 1-247-867-00 | CARBON | 33K | 5% | 1/6W |
| R27 | 1-247-847-00 | CARBON | 4.7K | 5% | 1/6W |



MEMO

# SECTION 7
# PARTS LOCATION AND LIST (OA-D32V)

## 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.

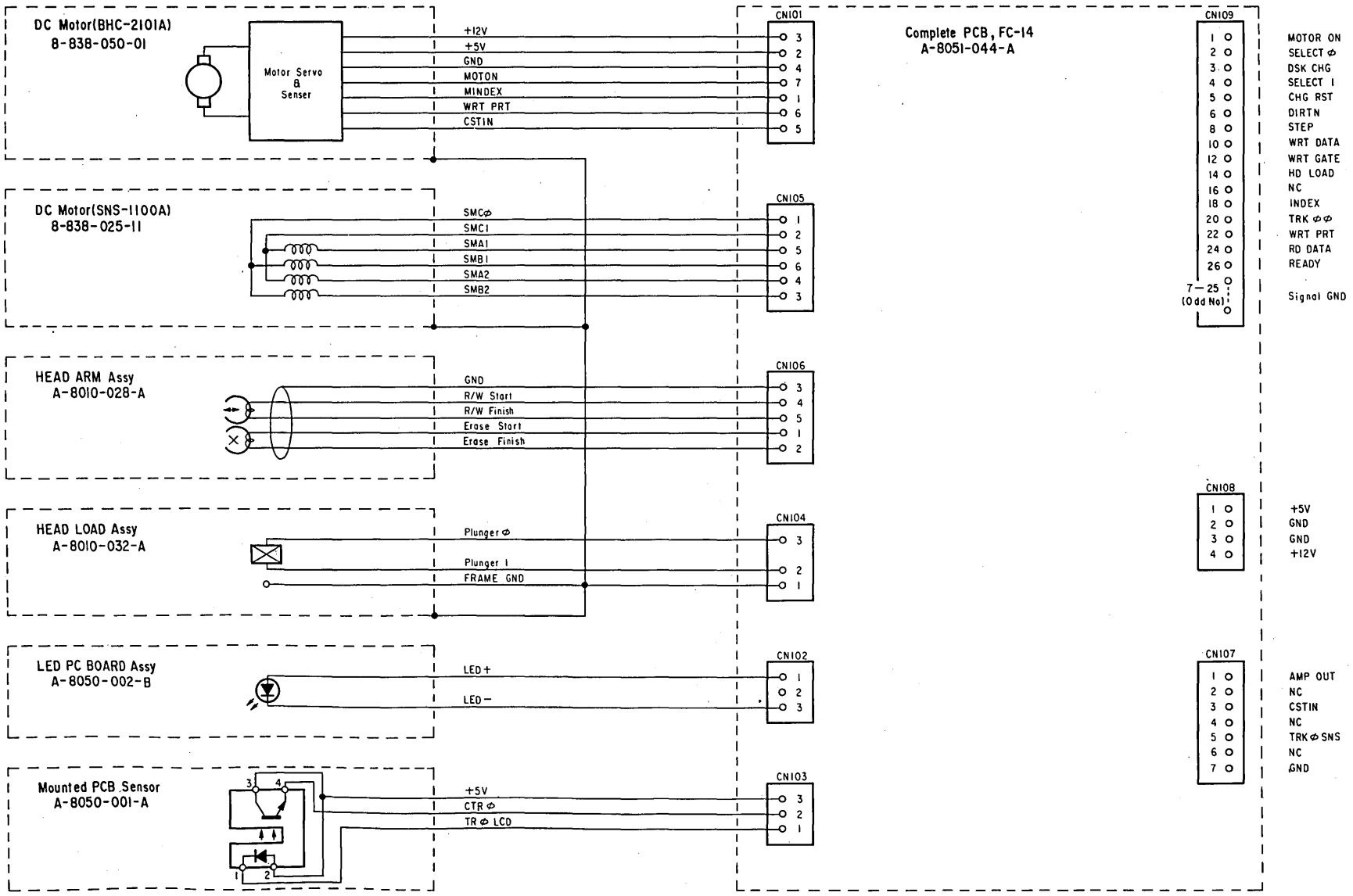
| *No.* | *Parts No.* | *Description* |
|---|---|---|
| 1 | **A-8010-049-A** | **Lead Screw Ass'y** |
| 2 | **A-8010-014-B** | **Coupling Ass'y** |
| 3 | 4-601-076-00 | Lead Screw |
| 4 | 4-601-083-00 | Compression Spring |
| 5 | 4-601-097-00 | Thrust Bearing |
| 6 | **8-838-025-11** | **Stepping Motor (SNS-1100A)** |
| | **8-838-061-01** | **Stepping Motor (SNS-1500A)** |
| 7 | **A-8010-028-A** | **Head Arm Ass'y** |
| 8 | **A-8010-020-A** | **Pad Ass'y** |
| 9 | **4-603-936-00** | **Tension Spring** |
| 10 | **A-8010-030-A** | **Cassette-up Ass'y** |
| 11 | 4-601-096-00 | Tension Spring |
| 12 | **4-603-901-00** | **Tension Spring** |
| 13 | **4-604-062-00** | **Eject Arm** |
| 14 | **4-847-057-00** | **Tension Spring** |
| 15 | A-8050-001-A | Sensor Mounted Board |
| 16 | **A-8010-032-A** | **Head Load Ass'y** |
| 17 | 1-454-289-21 | Plunger Solenoid |
| 18 | 4-601-017-00 | HL Arm |
| 19 | **4-601-060-00** | **Compression Spring** |
| 20 | **3-659-609-00** | **Compression Spring** |
| 21 | 4-601-003-00 | Slide Guide Shaft |
| 22 | 4-6-1-008-03 | Guide Retainer (A) |
| 23 | 4-603-926-00 | Guide Retainer (C) |
| 24 | 4-601-009-03 | WP Arm |
| 25 | 4-601-050-04 | Blind Panel |
| 26 | **4-601-098-00** | **Ball Bearing (No Flange)** |
| 27 | 4-603-927-00 | D-Detection Arm |
| 28 | **7-623-507-01** | **Lug, 2.6** |
| 29 | **8-838-050-01** | **Disk Drive Motor, (BHC-2101A)** |
| 30 | A-8050-002-B | LED Mounted Board Ass'y |
| 31 | 1-605-400-00 | LED Mounted Board |
| 32 | 4-601-027-00 | Cushion |
| 33 | **8-719-900-92** | **GL-9PR20** |
| 34 | A-8051-044-A | FC-14 Complete PCB |
| 35 | 4-601-026-11 | Main Cover |
| 36 | 4-603-928-00 | Shield Plate |
| 37 | X-4601-029-0 | Front Panel Ass'y |
| 38 | **4-601-052-12** | **Eject Button** |

| *Parts No.* | *Description* |
|---|---|
| 7-621-972-25 | SCREW, TOTSU PS2.6 x 6 |
| 7-621-972-45 | SCREW, TOTSU PS2.6 x 10 |
| 7-621-981-15 | SCREW, TOTSU PSW2.6 x 6 |
| 7-621-981-25 | SCREW, TOTSU PSW2.6 x 8 |
| 7-621-912-20 | SCREW, TOTSU B2.6 x 5 |
| 7-628-253-05 | SCREW +PS2 x 4 |
| 7-621-731-08 | SET-SCT. HEX. 2 x 2.5, FLAT POINT |
| 7-624-105-04 | STOP RING 2.3, TYPE-E |
| 7-688-001-01 | W2, SMALL |

MEMO

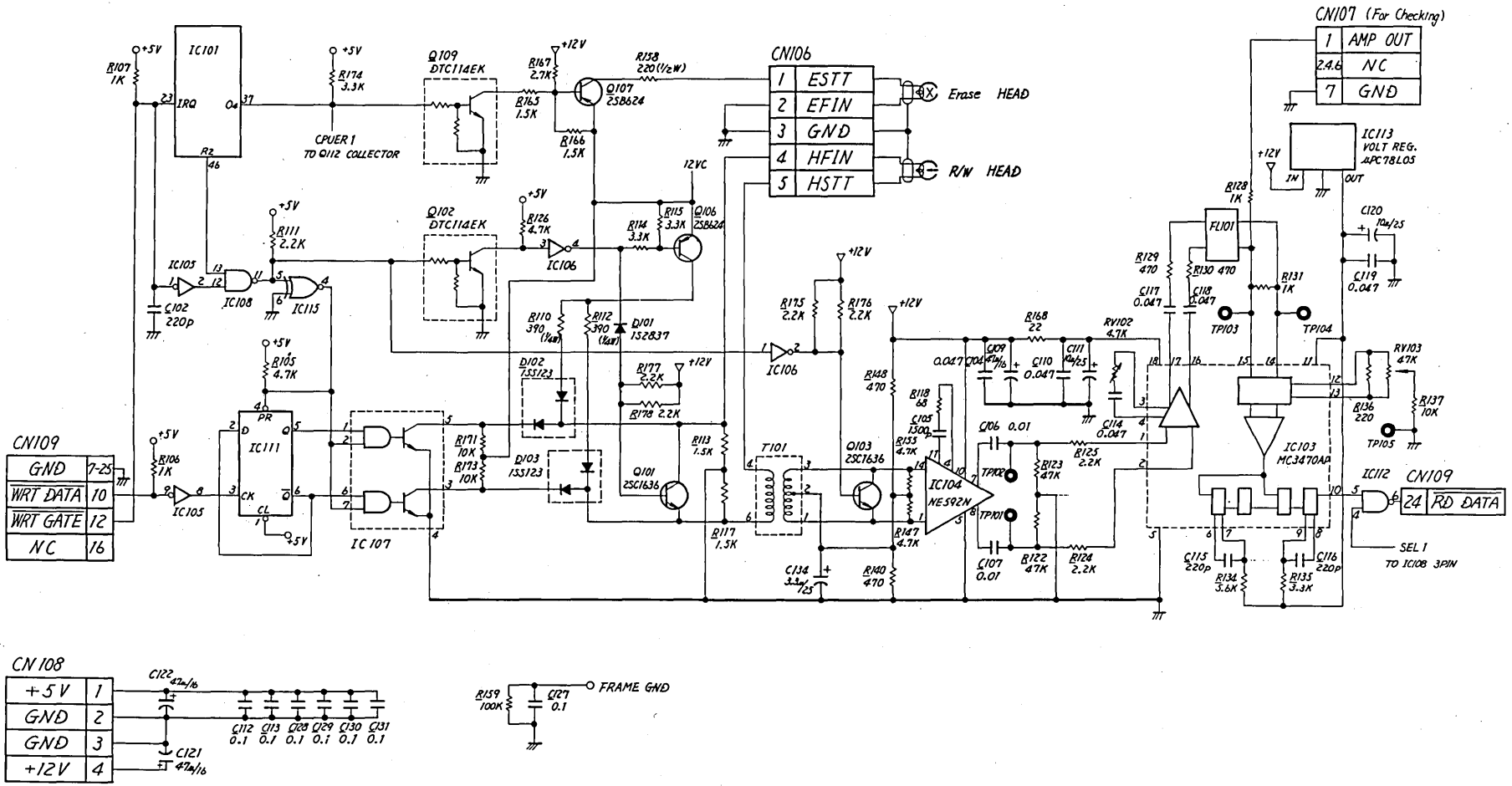
## 7-3. OVER ALL DIAGRAM

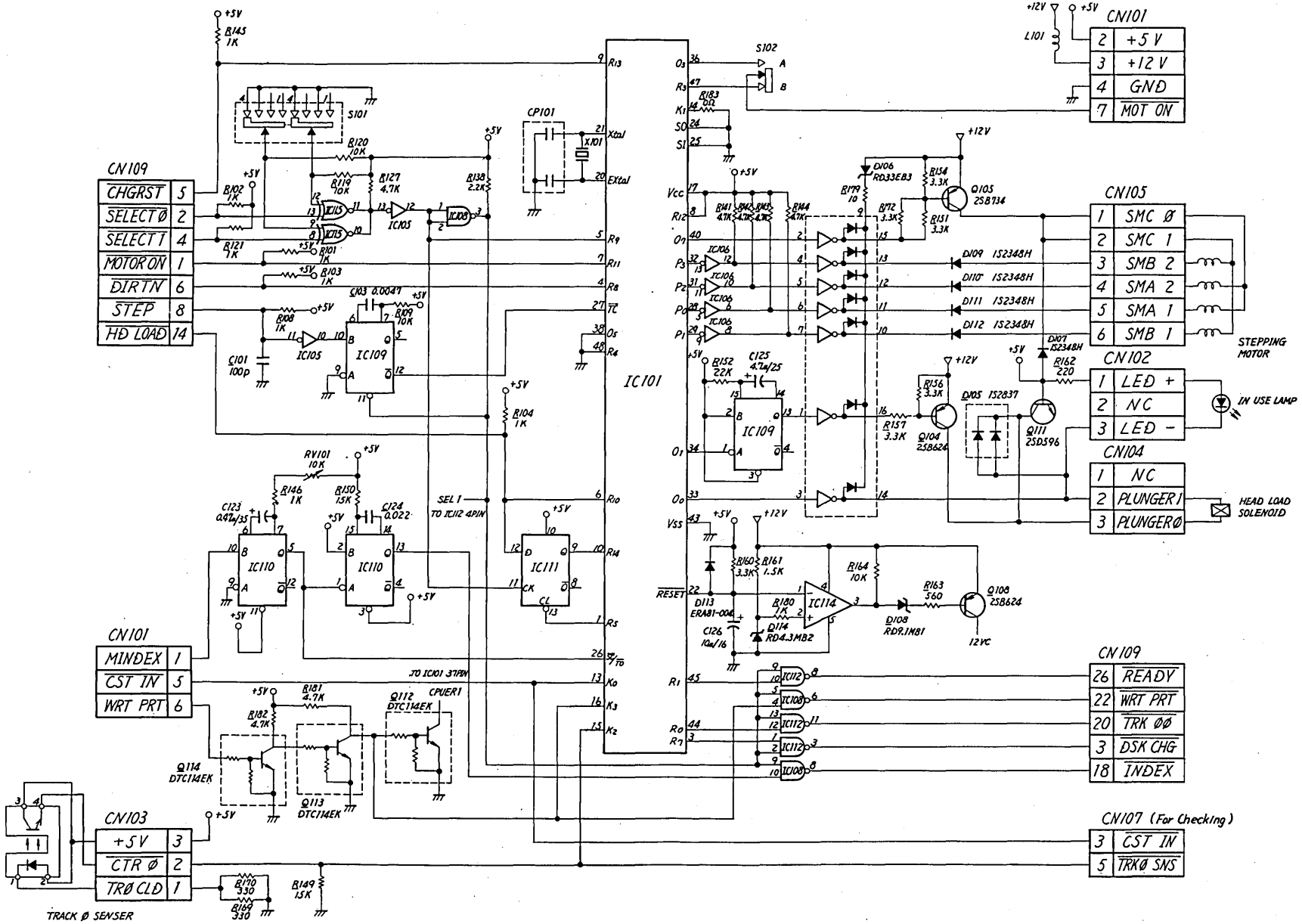
### 7-3-1. Interconnection Diagram



## 7-4. CIRCUIT DIAGRAM

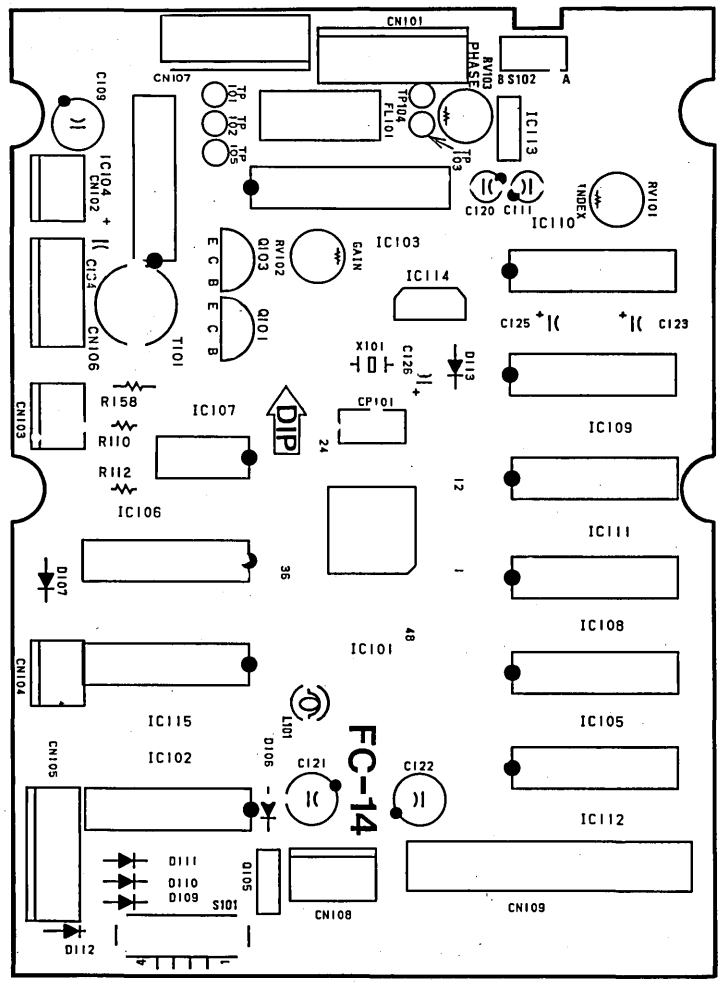
### 7-4-1. Circuit Diagram on FC-14



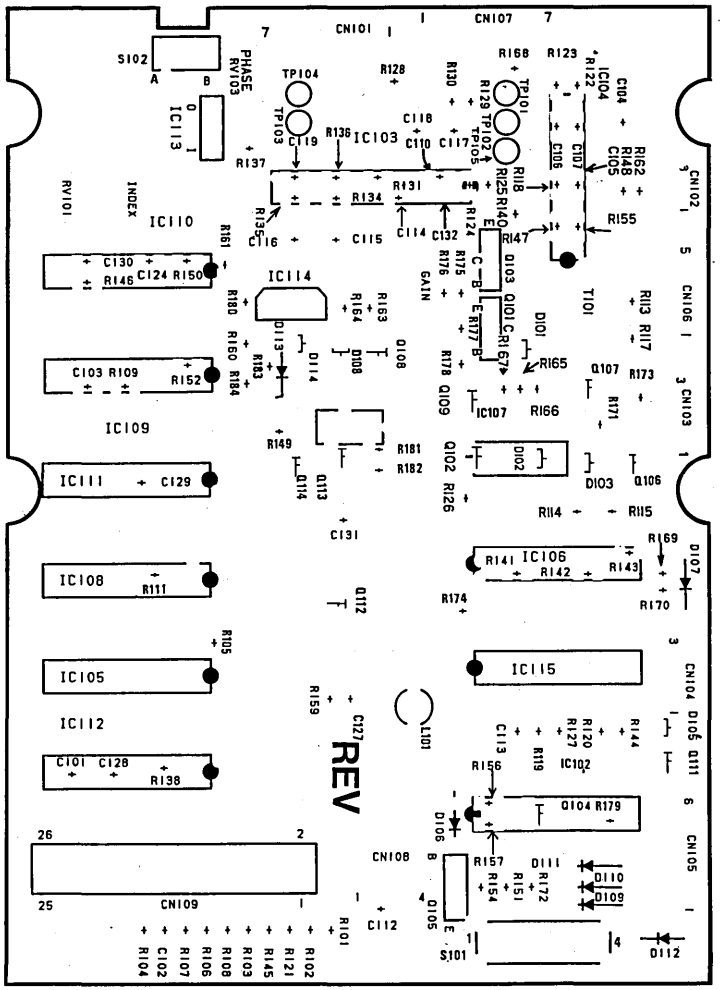

CN101
+5 V
+12 V
GND
MOT ON
CN105
SMC Ø
SMC 1
SMB 2
SMA 2
SMA 1
SMB 1
STEPPING MOTOR
CN102
LED +
NC
LED -
IN USE LAMP
CN104
NC
PLUNGER1
PLUNGERØ
HEAD LOAD SOLENOID
CN109
CHGRST
SELECTØ
SELECT1
MOTORON
DIRTN
STEP
HD LOAD
CN101
MINDEX
CST IN
WRT PRT
CN103
+5V
CTR Ø
TRØ CLD
TRACK Ø SENSER
CN109
READY
WRT PRT
TRK ØØ
DSK CHG
INDEX
CN107 (For Checking)
CST IN
TRKØ SNS
IC101
IC105
IC106
IC108
IC109
IC110
IC111
IC112
IC114
Q105 2SB734
Q104 2SB624
Q111 2SD596
Q108 2SB624
Q112 DTC114EK
Q114 DTC114EK
Q113 DTC114EK
D106 RD33EB3
D109 1S2348H
D110 1S2348H
D111 1S2348H
D112 1S2348H
D107 1S2348H
D105 1S2837
D113 ERA81-004
D114 RD4.3MB2
D108 RD9.1M81
S101
S102
CP101
X101
L101
SEL 1 TO IC112 4PIN
TO IC101 37PIN
CPUER1
RESET
12VC

### 7-4-2. Parts Layout on FC-14

— Components Side —



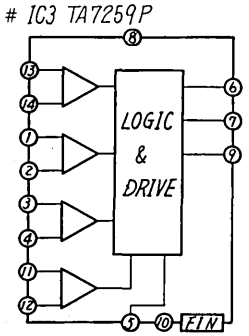

— Pattern Side —

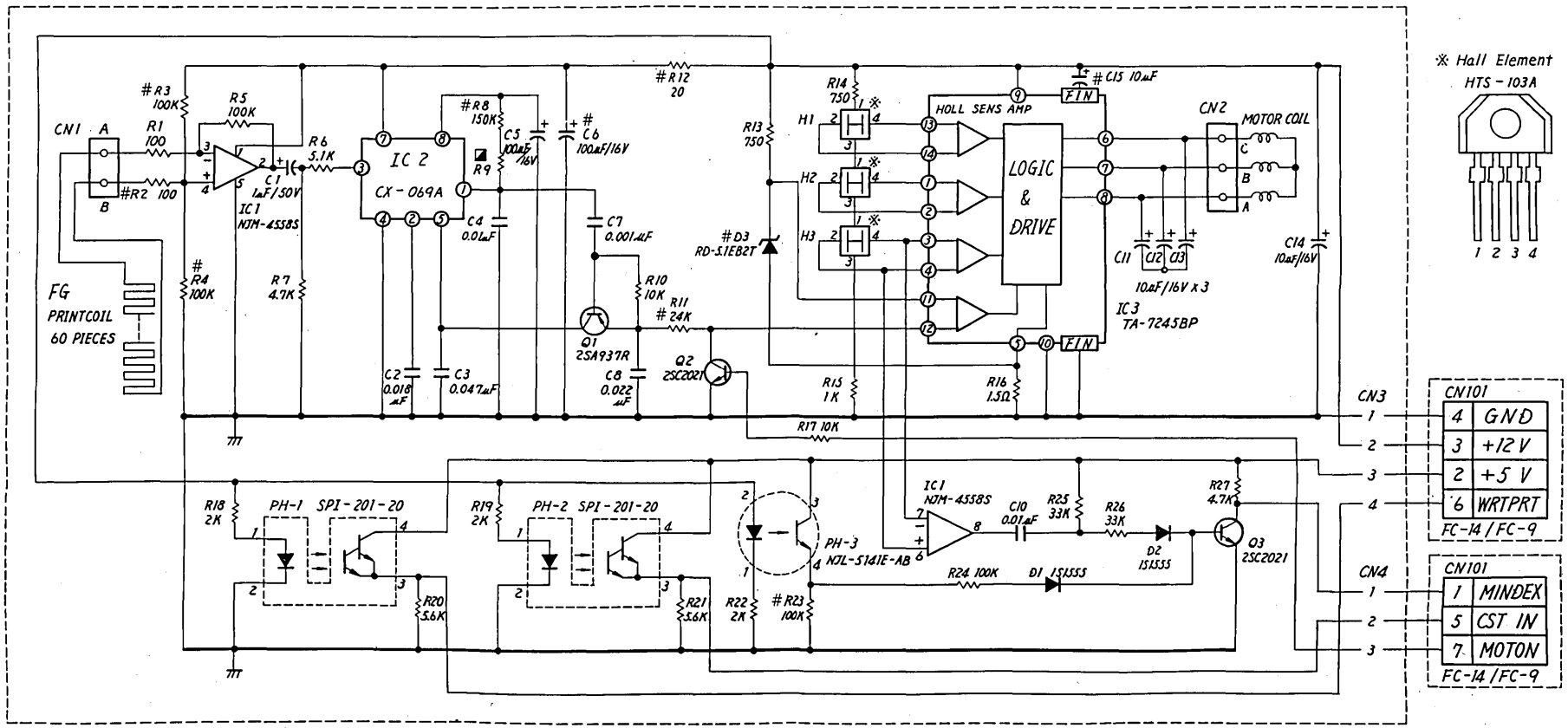


### 7-4-3. Disk Motor Circuit Diagram

**Remark:**

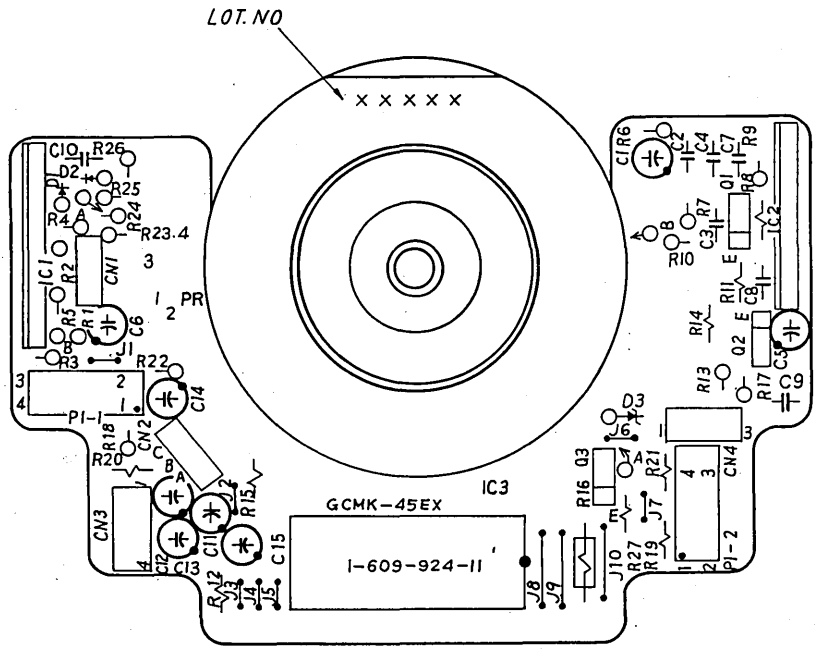
1. Numbers between FC-14/FC-9 and Disk Motor Circuit Board indicate the color of the cable.
2. A part marked with ◪ in the diagram is factory selected. For the replacement, please refer to 5-8.
3. Part name or part's value of part reference no marked with # may be differed from this diagram for a disk motor having the lot number of XXXX2, that is rubber-stampped on the metal cover. As to the actual part name and part's value for these parts, please refer to electrical parts list.




※ Hall Element
HTS-103A

### 7-4-4. Parts Layout on Disk Motor Circuit Board




## 7-5. ELECTRIC PARTS

### 7-5-1. 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; 20 W
  (If possible, use soldering tip with heat-controller of 270 ± 10°C)
- Desoldering metal braid ("SOLDER TAUL" or equivalent)
- Solder (of 0.6 mm dia. is recommended.)
- Tweezers

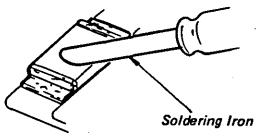
**Soldering Conditions:**

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**

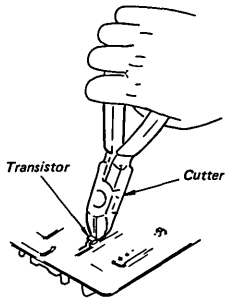
1) Add heat onto the chip-part by the top of soldering iron tip and slide the chip-part aside when the solder is melted.
2) Confirm visually with care that there is no pattern peeling, damage, and/or bridge where the part was removed or its surrounding.
3) Presolder the pattern into thin where the part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



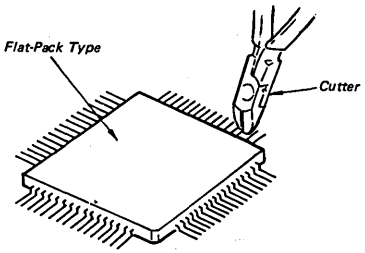

**(2) Transistor and Diode**

1) Cut the leads of the semiconductor part to be removed with a cutter.
2) Remove the leads cut as the above, and confirm visually that there is no pattern peeling, any 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 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) Place a new IC onto the pattern and solder it.
5) Confirm by tester that each conduction between IC's terminal and upper port is surely made.
6) If not, resolder the portion.



### 7-5-2. 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.

**FC-14 BOARD**

| *Ref. No.* | *Parts No.* | *Description* | | | |
|---|---|---|---|---|---|
| | | **CAPACITORS** | | | |
| C101 | 1-163-251-00 | CERAMIC (CHIP) | 100PF | 5% | 50V |
| C102 | 1-163-259-00 | CERAMIC (CHIP) | 220PF | 5% | 50V |
| C103 | 1-163-017-00 | CERAMIC (CHIP) | 0.0047 | 10% | 50V |
| C104 | 1-163-035-00 | CERAMIC (CHIP) | 0.047 | | 50V |
| C105 | 1-163-011-00 | CERAMIC (CHIP) | 0.0015 | 10% | 50V |
| C106 | 1-163-021-00 | CERAMIC (CHIP) | 0.01 | 10% | 50V |
| C107 | 1-163-021-00 | CERAMIC (CHIP) | 0.01 | 10% | 50V |
| C109 | 1-123-821-00 | ELECT | 47 | 20% | 16V |
| C110 | 1-163-035-00 | CERAMIC (CHIP) | 0.047 | | 50V |
| C111 | 1-123-621-41 | ELECT | 10 | 20% | 25V |
| C112 | 1-163-038-00 | CERAMIC (CHIP) | 0.1 | | 25V |
| C113 | 1-163-038-00 | CERAMIC (CHIP) | 0.1 | | 25V |
| C114 | 1-163-035-00 | CERAMIC (CHIP) | 0.047 | | 50V |
| C115 | 1-163-259-00 | CERAMIC (CHIP) | 220PF | 5% | 50V |
| C116 | 1-163-259-00 | CERAMIC (CHIP) | 220PF | 5% | 50V |
| C117 | 1-163-035-00 | CERAMIC (CHIP) | 0.047 | | 50V |
| C118 | 1-163-035-00 | CERAMIC (CHIP) | 0.047 | | 50V |
| C119 | 1-163-035-00 | CERAMIC (CHIP) | 0.047 | | 50V |
| C120 | 1-123-621-41 | ELECT | 10 | 20% | 25V |
| C121 | 1-123-821-00 | ELECT | 47 | 20% | 16V |
| C122 | 1-123-821-00 | ELECT | 47 | 20% | 16V |
| C123 | 1-131-345-00 | TANTALUM | 0.47 | 10% | 35V |
| C124 | 1-163-037-00 | CERAMIC (CHIP) | 0.022 | 10% | 25V |
| C125 | 1-131-357-00 | TANTALUM | 4.7 | 10% | 25V |
| C126 | 1-131-371-00 | TANTALUM | 10 | 10% | 16V |
| C127 | 1-163-038-00 | CERAMIC (CHIP) | 0.1 | | 25V |
| C128 | 1-163-038-00 | CERAMIC (CHIP) | 0.1 | | 25V |
| C129 | 1-163-038-00 | CERAMIC (CHIP) | 0.1 | | 25V |
| C130 | 1-163-038-00 | CERAMIC (CHIP) | 0.1 | | 25V |
| C131 | 1-163-038-00 | CERAMIC (CHIP) | 0.1 | | 25V |
| C134 | 1-131-356-00 | TANTALUM | 3.3 | 10% | 25V |

| *Ref. No.* | *Parts No.* | *Description* |
|---|---|---|
| | | **CONNECTORS** |
| CN101 | 1-560-618-00 | CONNECTOR POST HEADER, ILG 7P |
| CN102 | 1-560-357-00 | CONNECTOR POST HEADER, ILG (3P) |
| CN103 | 1-560-357-00 | CONNECTOR POST HEADER, ILG (3P) |
| CN104 | 1-560-357-00 | CONNECTOR POST HEADER, ILG (3P) |
| CN105 | 1-560-360-00 | CONNECTOR POST HEADER, ILG (6P) |
| CN106 | 1-560-359-00 | CONNECTOR POST HEADER, ILG (5P) |
| CN107 | 1-560-619-00 | CONNECTOR POST HEADER, ILG 7P |
| CN108 | 1-560-542-00 | POST HEADER, EI CONNECTOR 4P |
| CN109 | 1-564-244-00 | CONNECTOR (M) 26P |
| | | **DIODES** |
| D101 | 8-719-100-05 | 1S2837 (CHIP) |
| D102 | 8-719-101-23 | 1SS123 (CHIP) |
| D103 | 8-719-101-23 | 1SS123 (CHIP) |
| D105 | 8-719-100-05 | 1S2837 (CHIP) |
| D106 | 8-719-101-07 | RD33EB3 |
| D107 | 8-719-912-25 | 1S2348HTD |
| D108 | 8-719-106-43 | RD9.1M-B1 (CHIP) |
| D109 | 8-719-912-25 | 1S2348HTD |
| D110 | 8-719-912-25 | 1S2348HTD |
| D111 | 8-719-912-25 | 1S2348HTD |
| D112 | 8-719-912-25 | 1S2348HTD |
| D113 | 8-719-981-01 | ERA81-004 |
| D114 | 8-719-105-64 | RD4.3M-B2 (CHIP) |
| | | **FILTER** |
| FL101 | 1-235-269-00 | FILTER, LOW PASS |
| | | **ICS** |
| IC101 | 8-759-908-30 | IC MB8847-1199M |
| IC102 | 8-759-120-03 | IC μPA2003C |
| IC103 | 8-759-000-07 | IC MC3470AP |
| IC104 | 8-759-005-92 | IC NE592N |
| IC105 | 8-759-900-14 | IC SN74LS14N |
| IC106 | 8-759-974-06 | IC SN7406N |
| IC107 | 8-759-954-52 | IC SN75452BP |
| IC108 | 8-759-974-38 | IC SN7438N |
| IC109 | 8-759-902-74 | IC SN74LS423N |
| IC110 | 8-759-902-21 | IC SN74LS221N |
| IC111 | 8-759-900-74 | IC SN74LS74AN |
| IC112 | 8-759-974-38 | IC SN7438N |
| IC113 | 8-759-178-05 | IC μPC78L05 |
| IC114 | 8-759-612-04 | IC M51204L |
| IC115 | 8-759-902-66 | IC SN74LS266N |

# Electric Parts List

| Ref. No. | Parts No. | Description |
|---|---|---|
| | | **COIL** |
| L101 | 1-408-442-21 | MICRO INDUCTOR 10μH |
| | | **TRANSISTORS** |
| Q101 | 8-761-621-00 | 2SC1636-21 |
| Q102 | 8-729-900-53 | DTC114EK (CHIP) |
| Q103 | 8-761-621-00 | 2SC1636-21 |
| Q104 | 8-729-162-45 | 2SB624-BV5 (CHIP) |
| Q105 | 8-729-103-43 | 2SB734-2 |
| Q106 | 8-729-162-45 | 2SB624-BV5 (CHIP) |
| Q107 | 8-729-162-45 | 2SB624-BV5 (CHIP) |
| Q108 | 8-729-162-45 | 2SB624-BV5 (CHIP) |
| Q109 | 8-729-900-53 | DTC114EK (CHIP) |
| Q111 | 8-729-159-64 | 2SD596-DV5 (CHIP) |
| Q112 | 8-729-900-53 | DTC114EK (CHIP) |
| Q113 | 8-729-900-53 | DTC114EK (CHIP) |
| Q114 | 8-729-900-53 | DTC114EK (CHIP) |
| | | **RESISTORS** |
| R101 | 1-216-049-00 | METAL (CHIP) 1K 5% 1/10W |
| R102 | 1-216-049-00 | METAL (CHIP) 1K 5% 1/10W |
| R103 | 1-216-049-00 | METAL (CHIP) 1K 5% 1/10W |
| R104 | 1-216-049-00 | METAL (CHIP) 1K 5% 1/10W |
| R105 | 1-216-065-00 | METAL (CHIP) 4.7K 5% 1/10W |
| R106 | 1-216-049-00 | METAL (CHIP) 1K 5% 1/10W |
| R107 | 1-216-049-00 | METAL (CHIP) 1K 5% 1/10W |
| R108 | 1-216-049-00 | METAL (CHIP) 1K 5% 1/10W |
| R109 | 1-216-073-00 | METAL (CHIP) 10K 5% 1/10W |
| R110 | 1-214-122-00 | METAL (CHIP) 390 1% 1/4W |
| R111 | 1-216-057-00 | METAL (CHIP) 2.2K 5% 1/10W |
| R112 | 1-214-122-00 | METAL (CHIP) 390 1% 1/4W |
| R113 | 1-216-053-00 | METAL (CHIP) 1.5K 5% 1/10W |
| R114 | 1-216-061-00 | METAL (CHIP) 3.3K 5% 1/10W |
| R115 | 1-216-061-00 | METAL (CHIP) 3.3K 5% 1/10W |
| R117 | 1-216-053-00 | METAL (CHIP) 1.5K 5% 1/10W |
| R118 | 1-216-021-00 | METAL (CHIP) 68 5% 1/10W |
| R119 | 1-216-073-00 | METAL (CHIP) 10K 5% 1/10W |
| R120 | 1-216-073-00 | METAL (CHIP) 10K 5% 1/10W |
| R121 | 1-216-049-00 | METAL (CHIP) 1K 5% 1/10W |
| R122 | 1-216-089-00 | METAL (CHIP) 47K 5% 1/10W |
| R123 | 1-216-089-00 | METAL (CHIP) 47K 5% 1/10W |
| R124 | 1-216-057-00 | METAL (CHIP) 2.2K 5% 1/10W |
| R125 | 1-216-057-00 | METAL (CHIP) 2.2K 5% 1/10W |
| R126 | 1-216-065-00 | METAL (CHIP) 4.7K 5% 1/10W |

| Ref. No. | Parts No. | Description |
|---|---|---|
| R127 | 1-216-065-00 | METAL (CHIP) 4.7K 5% 1/10W |
| R128 | 1-216-049-00 | METAL (CHIP) 1K 5% 1/10W |
| R129 | 1-216-041-00 | METAL (CHIP) 470 5% 1/10W |
| R130 | 1-216-041-00 | METAL (CHIP) 470 5% 1/10W |
| R131 | 1-216-049-00 | METAL (CHIP) 1K 5% 1/10W |
| R134 | 1-216-067-00 | METAL (CHIP) 5.6K 5% 1/10W |
| R135 | 1-216-061-00 | METAL (CHIP) 3.3K 5% 1/10W |
| R136 | 1-216-033-00 | METAL (CHIP) 220 5% 1/10W |
| R137 | 1-216-073-00 | METAL (CHIP) 10K 5% 1/10W |
| R138 | 1-216-057-00 | METAL (CHIP) 2.2K 5% 1/10W |
| R140 | 1-216-041-00 | METAL (CHIP) 470 5% 1/10W |
| R141 | 1-216-065-00 | METAL (CHIP) 4.7K 5% 1/10W |
| R142 | 1-216-065-00 | METAL (CHIP) 4.7K 5% 1/10W |
| R143 | 1-216-065-00 | METAL (CHIP) 4.7K 5% 1/10W |
| R144 | 1-216-065-00 | METAL (CHIP) 4.7K 5% 1/10W |
| R145 | 1-216-049-00 | METAL (CHIP) 1K 5% 1/10W |
| R146 | 1-216-049-00 | METAL (CHIP) 1K 5% 1/10W |
| R147 | 1-216-065-00 | METAL (CHIP) 4.7K 5% 1/10W |
| R148 | 1-216-041-00 | METAL (CHIP) 470 5% 1/10W |
| R149 | 1-216-077-00 | METAL (CHIP) 15K 5% 1/10W |
| R150 | 1-216-077-00 | METAL (CHIP) 15K 5% 1/10W |
| R151 | 1-216-061-00 | METAL (CHIP) 3.3K 5% 1/10W |
| R152 | 1-216-081-00 | METAL (CHIP) 22K 5% 1/10W |
| R154 | 1-216-061-00 | METAL (CHIP) 3.3K 5% 1/10W |
| R155 | 1-216-065-00 | METAL (CHIP) 4.7K 5% 1/10W |
| R156 | 1-216-061-00 | METAL (CHIP) 3.3K 5% 1/10W |
| R157 | 1-216-061-00 | METAL (CHIP) 3.3K 5% 1/10W |
| R158 | 1-212-517-00 | METAL (CHIP) 220 10% 1/2W |
| R159 | 1-216-097-00 | METAL (CHIP) 100K 5% 1/10W |
| R160 | 1-216-085-00 | METAL (CHIP) 33K 5% 1/10W |
| R161 | 1-216-053-00 | METAL (CHIP) 1.5K 5% 1/10W |
| R162 | 1-216-033-00 | METAL (CHIP) 220 5% 1/10W |
| R163 | 1-216-043-00 | METAL (CHIP) 560 5% 1/10W |
| R164 | 1-216-073-00 | METAL (CHIP) 10K 5% 1/10W |
| R165 | 1-216-053-00 | METAL (CHIP) 1.5K 5% 1/10W |
| R166 | 1-216-053-00 | METAL (CHIP) 1.5K 5% 1/10W |
| R167 | 1-216-059-00 | METAL (CHIP) 2.7K 5% 1/10W |
| R168 | 1-216-009-00 | METAL (CHIP) 22 5% 1/10W |
| R169 | 1-216-037-00 | METAL (CHIP) 330 5% 1/10W |
| R170 | 1-216-037-00 | METAL (CHIP) 330 5% 1/10W |
| R171 | 1-216-073-00 | METAL (CHIP) 10K 5% 1/10W |
| R172 | 1-216-061-00 | METAL (CHIP) 3.3K 5% 1/10W |
| R173 | 1-216-073-00 | METAL (CHIP) 10K 5% 1/10W |
| R174 | 1-216-061-00 | METAL (CHIP) 3.3K 5% 1/10W |
| R175 | 1-216-057-00 | METAL (CHIP) 2.2K 5% 1/10W |
| R176 | 1-216-057-00 | METAL (CHIP) 2.2K 5% 1/10W |

| Ref. No. | Parts No. | Description | | | |
|---|---|---|---|---|---|
| R177 | 1-216-057-00 | METAL (CHIP) | 2.2K | 5% | 1/10W |
| R178 | 1-216-057-00 | METAL (CHIP) | 2.2K | 5% | 1/10W |
| R179 | 1-216-001-00 | METAL (CHIP) | 10 | 5% | 1/10W |
| R180 | 1-216-049-00 | METAL (CHIP) | 1K | 5% | 1/10W |
| R181 | 1-216-065-00 | METAL (CHIP) | 4.7K | 5% | 1/10W |
| R182 | 1-216-065-00 | METAL (CHIP) | 4.7K | 5% | 1/10W |
| R183 | 1-216-295-00 | METAL (CHIP) | 0 | 5% | 1/10W |
| | | **VARIABLE RESITORS** | | | |
| RV101 | 1-226-703-00 | RES, ADJ, METAL GLAZE 10K | | | |
| RV102 | 1-226-772-00 | RES, ADJ, METAL GLAZE 4.7K | | | |
| RV103 | 1-226-774-00 | RES, ADJ, METAL GLAZE 47K | | | |
| | | **SWITCHES** | | | |
| S101 | 1-554-644-00 | SWITCH, SLIDE | | | |
| S102 | 1-553-510-00 | SWITCH, SLIDE | | | |
| | | **TRANSFORMER** | | | |
| T101 | 1-426-073-00 | TRANSFORMER, RF | | | |
| | | **OSCILLATOR** | | | |
| X101 | 1-527-838-00 | OSCILLATOR, CERAMIC (WITH CAP) | | | |

**DISK DRIVE DC MOTOR BOARD (BHC-2101A)**

The reference no. marked with # is used only for a disk motor having the lot number of XXXX2, that is rubber-stampped on the metal cover.

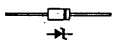
| | | **CAPACITORS** | | | |
|---|---|---|---|---|---|
| C1 | 1-123-611-00 | ELECT | 1 | 20% | 50V |
| C2 | 1-161-054-00 | CERAMIC | 0.018 | 10% | 50V |
| C3 | 1-130-491-00 | MYLAR | 0.047 | 5% | 50V |
| C4 | 1-136-213-00 | FILM | 0.01 | 5% | 100V |
| C5 | 1-123-617-00 | ELECT | 10 | 20% | 16V |
| C6 | 1-123-617-00 | ELECT | 10 | 20% | 16V |
| #C6 | ——— | ——— | — | ——— | |
| C7 | 1-161-039-00 | CERAMIC | 0.001 | 10% | 50V |
| C8 | 1-130-487-00 | MYLAR | 0.022 | 5% | 50V |
| C10 | 1-161-051-00 | CERAMIC | 0.01 | 10% | 50V |
| C11 | 1-123-617-00 | ELECT | 10 | 20% | 16V |
| C12 | 1-123-617-00 | ELECT | 10 | 20% | 16V |
| C13 | 1-123-617-00 | ELECT | 10 | 20% | 16V |
| C14 | 1-123-617-00 | ELECT | 10 | 20% | 16V |
| C15 | 1-131-371-00 | TANTALUM | 10 | 10% | 16V |
| #C15 | ——— | ——— | — | ——— | |

| Ref. No. | Parts No. | Description | | | |
|---|---|---|---|---|---|
| | | **DIODES** | | | |
| D1 | 8-719-815-55 | 1S1555TP | | | |
| D2 | 8-719-815-55 | 1S1555TP | | | |
| D3 | 8-719-150-23 | RD5.1EB2T | | | |
| #D3 | 8-719-150-21 | RD4.7EB3T | | | |
| PH1 | 8-719-902-90 | PHOTO INTERRUPTOR SPI201-20 | | | |
| PH2 | 8-719-902-90 | PHOTO INTERRUPTOR SPI201-20 | | | |
| | | **ICS** | | | |
| IC1 | 8-759-700-08 | IC NJM4558S | | | |
| IC2 | 8-750-690-00 | IC CX-069 | | | |
| IC3 | 8-759-201-54 | IC TA7245BP | | | |
| #IC3 | 8-759-202-02 | IC TA7259P | | | |
| | | **TRANSISTORS** | | | |
| Q1 | 8-729-993-72 | 2SA937-R | | | |
| Q2 | 8-729-902-11 | 2SC2021-R | | | |
| Q3 | 8-729-902-11 | 2SC2021-R | | | |
| | | **RESISTORS** | | | |
| R1 | 1-247-807-00 | CARBON | 100 | 5% | 1/6W |
| R2 | 1-247-807-00 | CARBON | 100 | 5% | 1/6W |
| #R2 | 1-247-890-00 | CARBON | 300K | 5% | 1/6W |
| R3 | 1-247-879-00 | CARBON | 100K | 5% | 1/6W |
| #R3 | 1-247-849-00 | CARBON | 5.6K | 5% | 1/6W |
| R4 | 1-247-879-00 | CARBON | 100K | 5% | 1/6W |
| #R4 | 1-247-879-00 | CARBON | 100K | 5% | 1/6W |
| R5 | 1-247-879-00 | CARBON | 100K | 5% | 1/6W |
| R6 | 1-247-848-00 | CARBON | 5.1K | 5% | 1/6W |
| R7 | 1-247-847-00 | CARBON | 4.7K | 5% | 1/6W |
| R8 | 1-247-883-00 | CARBON | 150K | 5% | 1/6W |
| #R8 | 1-247-884-00 | CARBON | 160K | 5% | 1/6W |
| R10 | 1-247-855-00 | CARBON | 10K | 5% | 1/6W |
| R11 | 1-247-864-00 | CARBON | 24K | 5% | 1/6W |
| #R11 | 1-247-879-00 | CARBON | 100K | 5% | 1/6W |
| R12 | 1-247-790-00 | CARBON | 20 | 5% | 1/6W |
| #R12 | ——— | ——— | — | ——— | |
| R13 | 1-247-828-00 | CARBON | 750 | 5% | 1/6W |
| R14 | 1-247-828-00 | CARBON | 750 | 5% | 1/6W |
| R15 | 1-247-831-00 | CARBON | 1K | 5% | 1/6W |
| R16 | 1-246-405-00 | CARBON | 1.5 | 5% | 1/4W |
| R17 | 1-247-855-00 | CARBON | 10K | 5% | 1/6W |
| R18 | 1-247-838-00 | CARBON | 2K | 5% | 1/6W |
| R19 | 1-247-838-00 | CARBON | 2K | 5% | 1/6W |
| R20 | 1-247-849-00 | CARBON | 5.6K | 5% | 1/6W |
| R21 | 1-247-849-00 | CARBON | 5.6K | 5% | 1/6W |
| R22 | 1-247-838-00 | CARBON | 2K | 5% | 1/6W |
| R23 | 1-247-879-00 | CARBON | 100K | 5% | 1/6W |
| #R23 | 1-247-873-00 | CARBON | 56K | 5% | 1/6W |
| R24 | 1-247-879-00 | CARBON | 100K | 5% | 1/6W |
| R25 | 1-247-867-00 | CARBON | 33K | 5% | 1/6W |
| R26 | 1-247-867-00 | CARBON | 33K | 5% | 1/6W |
| R27 | 1-247-847-00 | CARBON | 4.7K | 5% | 1/6W |

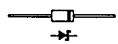
# SECTION 8

# TRANSISTORS / DIODES / ICS PIN ARRANGEMENT

RD5.1EB2T
RD33EB3

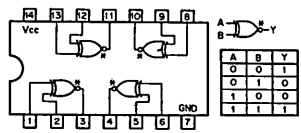


ERA81-004



1S1555TP
1S2348HTD

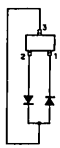
SN74LS266N (TI)
TTL 2-INPUT EXCLUSIVE – NOR GATE
WITH OPEN – COLLECTOR OUTPUT
– TOP VIEW –



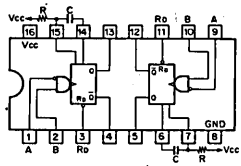

| A | B | Y |
|---|---|---|
| 0 | 0 | 1 |
| 0 | 1 | 0 |
| 1 | 0 | 0 |
| 1 | 1 | 1 |

1SS123

TOP VIEW (SCALE 4/1)



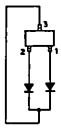
SN74LS423N (TI)
TTL RETRIGGERABLE MONOSTABLE MULTIVIBRATOR WITH DIRECT RESET
– TOP VIEW –



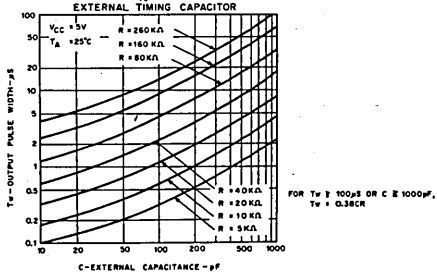

| INPUTS | | | OUTPUTS | |
|---|---|---|---|---|
| Ro | A | B | Q | Q̄ |
| 0 | X | X | 0 | 1 |
| X | 1 | X | 0 | 1 |
| X | X | 0 | 0 | 1 |
| 1 | 0 | ↑ | ⊓ | ⊔ |
| 1 | ↓ | 1 | ⊓ | ⊔ |

0:LOW LEVEL
1:HIGH LEVEL
X:DON'T CARE

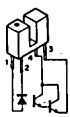
1S2837
TOP VIEW (SCALE 4/1)



OUTPUT PULSE WIDTH
vs
EXTERNAL TIMING CAPACITOR

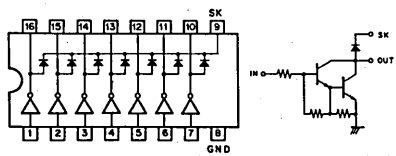



SPI201-20

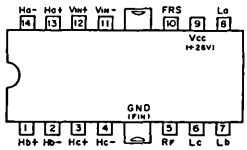


RD??M
TOP VIEW (SCALE 4/1)

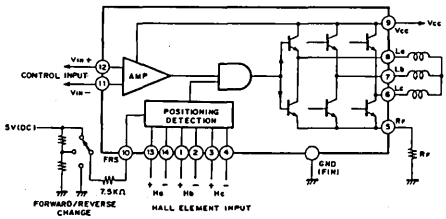
μPA2003C (NEC)
HIGH GAIN AMPLIFIER
– TOP VIEW –



TA7245BP
••••••••••
TA7245BP (TOSHIBA)
MOTOR DRIVER
–TOP VIEW–

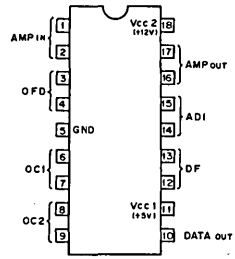



La,Lb,Lc ; COIL TERMINAL
Ha,Hb,Hc ; HALL ELEMENT INPUT
FRS ; FORWARD REVERSE SELECT

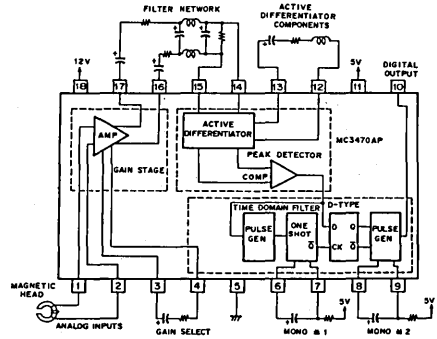



FRS ; FORWARD REVERSE SELECT

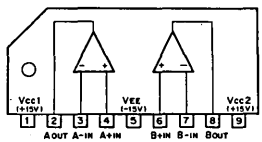
MC3470AP (MOTOROLA)
– TOP VIEW –



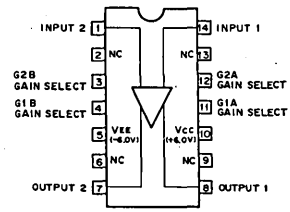

AMP IN ; AMPLIFIER INPUTS
OFD ; OFFSET DECOUPLING
OC ; ONE-SHOT COMPONENTS
AMP OUT ; AMPLIFIER OUTPUTS
ADI ; ACTIVE DIFFERENTIATOR INPUTS
DF ; DIFFERENTIATOR COMPONENTS



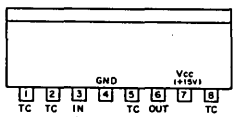

NJM4558S
••••••••••
NJM4558S (JRC)
HIGH PERFORMANCE DUAL OPERATIONAL AMPLIFIER
– SIDE VIEW –



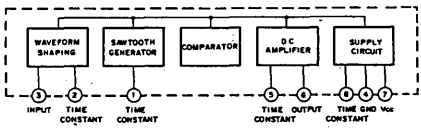

NE592N (MOTOROLA)
– TOP VIEW –




CX069
••••••
CX069 (SONY)
–SIDE VIEW–

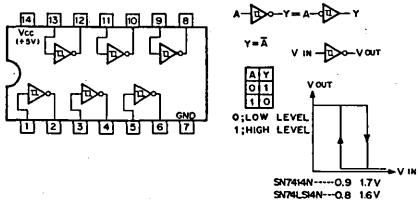



TC ; TIME CONSTANT

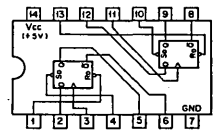


# Transistors/Diodes/ICs Pin Arrangement

SN74LS14N (TI)
– TOP VIEW –



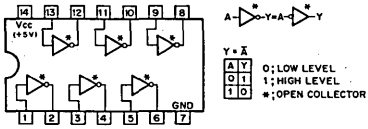

SN74LS74AN (TI)
– TOP VIEW –



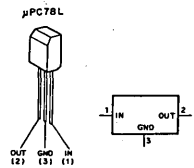

| INPUTS | | | | OUTPUTS | |
|---|---|---|---|---|---|
| S̄D | R̄D | CK | D | Qn+1 | Q̄n+1 |
| 0 | 1 | X | X | 1 | 0 |
| 1 | 0 | X | X | 0 | 1 |
| 0 | 0 | X | X | 1* | 1* |
| 1 | 1 | ↑ | 1 | 1 | 0 |
| 1 | 1 | ↑ | 0 | 0 | 1 |
| 1 | 1 | 0 | X | Qn | Q̄n |

0;LOW LEVEL
1;HIGH LEVEL
X;DON'T CARE
↑;NONSTABLE
*;NONSTABLE

SN7406N (TI)
– TOP VIEW –

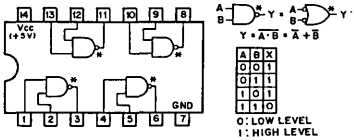



μPC78L05A (NEC)
POSITIVE VOLTAGE REGULATOR (100 mA)

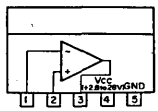



5 V μPC78L05 (A)

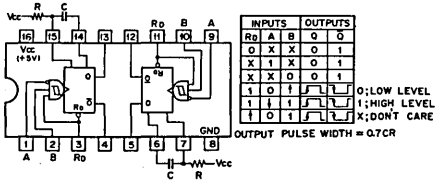
SN74LS26N (TI)
– TOP VIEW –




M51204L (MITSUBISHI)
VOLTAGE COMPARATOR
– SIDE VIEW –



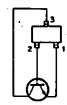

SN74LS221N (TI)
– TOP VIEW –



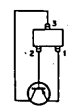

| INPUTS | | | OUTPUTS | |
|---|---|---|---|---|
| RD | A | B | Q | Q̄ |
| 0 | X | X | 0 | 1 |
| X | 1 | X | 0 | 1 |
| X | X | 0 | 0 | 1 |
| 1 | 0 | ↓ | ⊓ | ⊓ |
| 1 | ↓ | 1 | ⊓ | ⊓ |
| 1 | 0 | 1 | ⊓ | ⊓ |

0;LOW LEVEL
1;HIGH LEVEL
X;DON'T CARE
OUTPUT PULSE WIDTH = 0.7CR

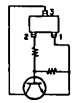
2SC2712
2SD596
TOP VIEW (SCALE 4/1)



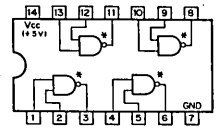
2SB624
TOP VIEW (SCALE 4/1)

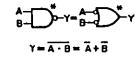


DTC114EK
TOP VIEW (SCALE 4/1)



SN7438N (TI)
– TOP VIEW –



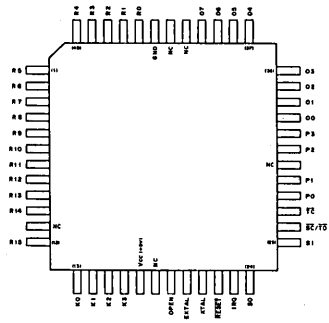




| A | B | Y |
|---|---|---|
| 0 | 0 | 1 |
| 0 | 1 | 1 |
| 1 | 0 | 1 |
| 1 | 1 | 0 |

0 ; LOW LEVEL
1 ; HIGH LEVEL
* ; OPEN COLLECTOR

2SB734

MB8847 (FUJITSU) (FLAT PACKAGE)
4-BIT ONE-CHIP MICROCOMPUTER
– TOP VIEW –



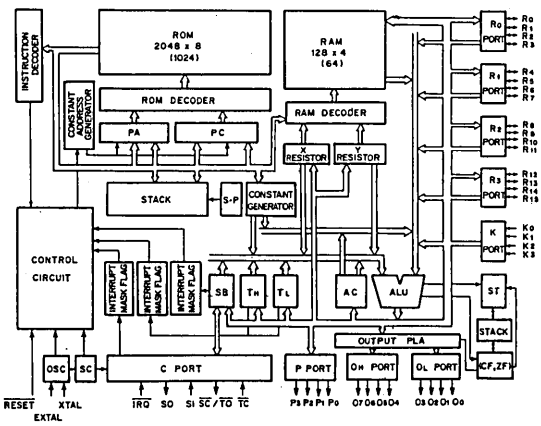
2SA937-R

R0 ~ R3 : R0 PORT
R4 ~ R7 : R1 PORT
R8 ~ R11 : R2 PORT
R12 ~ R15 : R3 PORT
K0 ~ K3 : K PORT
O0 ~ O3 : OL PORT
O4 ~ O7 : OH PORT
P0 ~ P3 : P PORT

$\overline{TC}$ : TIMER COUNTER
$\overline{SC}$ / $\overline{TO}$ : SERIAL SHIFT CLOCK / TIMING OUTPUT
SI : SERIAL BUFF
SO : SERIAL BUFFER OUTPUT
$\overline{IRQ}$ : INTERRUPT
EXTAL / XTAL : FOR X'TAL OR CLOCK INPUT
$\overline{RESET}$ : RESET INPUT

2SC2021-R

2SC1636-21



MEMO

9-975-131-01

Sony Corporation



83K0510-1

# MICRO FLOPPYDISK DRIVE

# OA-D32W
# OA-D32V

# SUPPLEMENT 1

This supplement covers some change of reference disks for servicing of models OA-D32W/OA-D32V.

We have changed signal composit method and phase relationship for alignment disk, in order to increase the accuracy of the adjustments to be required in the field service.

In addition to the above, system disks to be employed for both radial alignment adjustment/ measurement and final error check are modified in each content, to utilize the field available soft-wares CP/M (SONY model name SMW-7002) and SONY BASIC (SONY model name SMW-7011). The new system disk, we prepare, is named as R/E systm disk (OR-D114VA, P/N 8-960-010-18).

In the actual procedure, the following disks must be prepared for necessary adjustment and final check.

1. As for radial alignment adjustment/measurement, a SONY BASIC and our new system disk OR-D114VA are required.
2. As for final check, a CP/M disk, a CP/M disk and our new system disk OR-D114VA are required.

The change of P/N for applicable disks are as follows.

| Item | P/N of original disk | P/N of new disk |
|---|---|---|
| a) Alignment disk | OR-D47VA<br>8-960-009-32 | OR-D123VA<br>8-960-010-26 |
| b) Radial alignment system disk | OR-D86VA<br>8-960-009-74 | none |
| c) Error check system disk | OR-D87VA<br>8-960-009-75 | none |
| d) CP/M disk | none | SMW-7002 |
| e) SONY BASIC | none | SMW-7011 |
| f) R/E system disk | none | OR-D114VA<br>8-960-010-18 |

The following sections (pages on original service manual) should be replaced with attached revised pages.

Section 2-1 General and special tool (page 8)
Section 3-3-1 Procudure Ttack positioning (pages 16 - 17)
Section 3-4 Final check (pages 23 - 27)
Section 5-4 Radial alignment (pages 42 - 46)

SONY®
SERVICE MANUAL

## 2-1 GENERAL AND SPECIAL TOOL LIST

The tools and measuring instruments for perform maintenance on the OA-D32W/OA-D32V are listed below.

### a. General Tools

| | SONY parts No. |
|---|---|
| TOTSU screw driver(M2.6) | (7-721-050-62) |
| + driver 2mm | (7-700-749-01) |
| - driver 2mm | (7-700-750-01) |
| - driver 4mm | (7-700-750-04) |
| 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) | |
| SONY DISK BASIC (SMW-7011) | |
| Soldering iron (20W) | |
| Desoldering Metal Braid | |
| DC power supplier | |
| +5VDC±5%, 0.8A min., | |
| +12VDC±5%, 1.5A min. | |
| Tester | |

### b. Special Tools

| | |
|---|---|
| MFD Checker II | (J-609-182-0A) |
| SMC-70 System | |
| SMI-7011/SMI-7011A/SMI7012/SMI7012A | |
| SMC-70 | |
| KX-13HG1 | |
| A/D Converter | (J-623-002-0A) |
| 25P/26P Conversion Cable | (J-623-001-0A) |
| R/E System Disk (OR-D114VA) | (8-960-010-18) |
| Rotatory Knob (for stepping motor) | (J-609-011-0A) |
| Lead Screw Eccentricity Inspection Tool | (J-609-136-0A) |
| Standard Disk Dummy (for Cassette-Up Ass'y Installation) | (J-609-120-0A) |
| Geared Driver | (J-609-017-0A) |
| Pad Weight | (J-609-124-0A) |
| Hexagon Wrench Torque Driver | (J-609-125-0A) |
| Power Cable | (J-609-130-0A) |
| Interface Cable | (J-609-200-0A) |

### c. Measuring Equipment

| | |
|---|---|
| Oscilloscope Dual Trace 20MHz | |
| Universal Counter Resolution 0.1msec. | |
| Tension Gauge (Max. 200g) | (J-604-163-0A) |
| Tension Gauge (Max. 20g) | (7-732-050-10) |

### d. Disks

| | | |
|---|---|---|
| Level Disk | | |
| 32V | OR-D46VA | (8-960-009-31) |
| 32W | OR-D46WA | (8-960-009-40) |
| Alignment Disk | | |
| 32V | OR-D123VA | (8-960-010-26) |
| 32W | OR-D47WA | (8-960-009-41) |
| Dynamic Inspection Disk +30 | | |
| 32V | OR-D51VA | (8-960-009-35) |
| 32W | OR-D51WA | (8-960-009-44) |
| Dynamic Inspection Disk -30 | | |
| 32V | OR-D52VA | (8-960-009-36) |
| 32W | OR-D52WA | (8-960-009-45) |
| Cleaning Disk | | |
| 32V | OR-D29VA | (8-960-009-15) |
| 32W | OR-D29WA | (8-960-009-39) |

### e. Expendable and Chemical Supplies

| | |
|---|---|
| Nut Lock | |
| Alcohol | |
| Sony Oil | (7-611-018-01) |
| Sony Grease | (7-622-001-52) |
| Bamboo Stick | |
| Applicator | |

| Procedure | Step | Operation |
|---|---|---|
| 8 | Track positioning | 1. Such a Cat's eye pattern signal as shown in Fig. 3-1 (a) can be obtained at CN107-1 on the disk drive when the head accesses TRK 20, TRK 30, TRK 40 or TRK 50.<br>The oscilloscope is triggered by the signal at TP-5 of the MFD checker II.<br>Note: Such a signal as shown in Fig. 3-1 (b) can be obtained when the head accesses TRK 40.<br>32W 2. SIDE SELECT switch to side 1. such a Cat's eye pattern signal as shown Fig. 3-1 (b) can be obtained at CN107-1 on the disk drive. When the head accesses TRK 40.<br>3. Move the head onto TRK 40.<br>4. Set amplitude L in Fig. 3-1 (b) to 4 divisions, and then read amplitude R in Fig. 3-1 (b).<br>Calculate the OFF TRACK value, refering to Table 3-1 (c) and (d), in accordance with R in Fig. 3-1 (b).<br>Then, obtain the humidity-compensated OFF TRACK value from the following expression:<br>The compensated OFF TRACK value<br>= OFF TRACK value + 0.2(50-H)(32-1.5S)/33.5.....(1)<br>Where;<br>H: Relative humidity (%)<br>S: Side ID number<br>Side 0 : 0 Side 1 : 1<br>The compensated OFF TRACK value should meet the following formula.<br>$-26 \leq$ Compensated OFF TRACK value $\leq +26$.....(2)<br>[EX] For R = 3.6 in the OA-D32V, the apparent OFF TRACK value is as shown in table 3-1 (c).<br>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. |

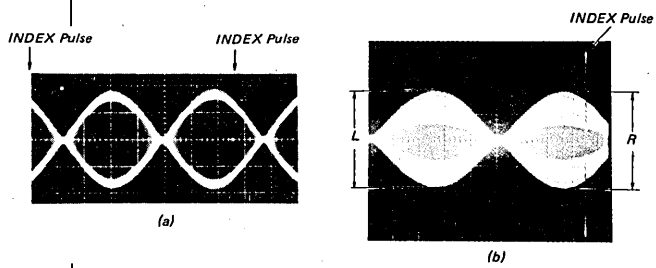



*Fig. 3-1 Cat's Eye Pattern Signal*

| 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 |

(c) OA-D32V

| | 0.0 | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 2: | 26.8 | 25.1 | 23.4 | 21.7 | 20.1 | 18.6 | 17.1 | 15.6 | 14.2 | 12.8 |
| 3: | 11.5 | 10.2 | 8.9 | 7.7 | 6.5 | 5.4 | 4.2 | 3.1 | 2.1 | 1.0 |
| 4: | 0.0 | -1.0 | -2.0 | -2.9 | -3.8 | -4.7 | -5.6 | -6.5 | -7.3 | -8.1 |
| 5: | -8.9 | -9.7 | -10.5 | -11.3 | -12.0 | -12.7 | -13.4 | -14.1 | -14.8 | -15.4 |
| 6: | -16.1 | -16.7 | -17.4 | -18.0 | -18.6 | -19.2 | -19.7 | -20.3 | -20.9 | -21.4 |
| 7: | -22.0 | -22.5 | -23.0 | -23.5 | -24.0 | -24.5 | -25.0 | -25.5 | -25.9 | -26.4 |
| 8: | -26.8 | -27.3 | -27.7 | -28.1 | -28.6 | -29.0 | -29.4 | -29.8 | -30.2 | -30.6 |
| 9: | -31.0 | -31.3 | -31.7 | -32.1 | -32.4 | -32.8 | -33.1 | -33.5 | -33.8 | -34.2 |

(d) OA-D32W

## 3-4 FINAL CHECK

### 3-4-1 Setting of SMC-70

a. Refering to Fig. 2-2 (a), connect the drive to SMC-70 system.

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

c. Set the DRIVE SELECT switch (S101) of the unit to "2".

### 3-4-2 Set the Check Area

d. Insert the CP/M Disk into drive A of SMI-7012A.

e. Turn on the power switch. "A" is displayed on screen.

f. Eject the CP/M Disk and then insert the R/E system disk.

g. Perform keying W,N,E,W,I,C and RETURN.

| Description | Keying | Display |
|---|---|---|
| To display original test condition of the disk. | W N E W I C<br>RETURN | ***** Floppy Disk Analysis v3.0 *****<br>***** Copyright (C) 1981.Sep. *****<br>[ Test condition ] \| drive C<br>Minimum track \| 0<br>Maximum track \| 79<br>Minimum sector \| 1<br>Maximum sector \| 16<br>Sector size \| 256<br>Single or Double side? \| S<br>Read & Write retry \| 1<br>Seek & Home retry \| 0<br>#Do you want to change these test conditions? (Y,N) = |
| To change any of test conditions Type the minimum track to be tested. [EX] | Y RETURN | +Minimum track 0 [track] =⇒ |
| In case it is TRK 00. | 0 RETURN | +Maximum track 79 [track] =⇒ |
| Type the maximum track to be tested. [EX] | | |
| In case it is TRK 79. | 7 9<br>RETURN | +Minimum sector 1 [sector] =⇒ |
| Type the minimum sector to be tested. [EX] | | |
| In case it is 1 sector. | 1 RETURN | +Maximum sector 16 [sector] =⇒ |
| Type the maximum sector to be tested. [EX] | | |
| In case it is 16 sector. | 1 6<br>RETURN | +Sector size 256 [bytes ] =⇒ |

| Description | Keying | Display |
|---|---|---|
| Type the number of byte size per a sector, to be tested.<br>[EX]<br>In case it is 256 bytes. | 2 5 6<br>RETURN | +Single side or Double side? ( S,D ) =⇒ |
| Type the initial name letter (S-single sided, D-double sided) of disk surface to be tested.<br>[EX]<br>In case it is double side. | D RETURN | +Read & Write retry 1 [times] =⇒ |
| Type the number of how many retry must be conducted when read error or write error occurs.<br>[EX]<br>In case it is once. | 1 RETURN | +Seek + Home retry 0 [times] =⇒ |
| Type the number of how many seek retry must be conducted when the error occurs.<br><br>[EX]<br>In case no retry is desired. | 0 RETURN | *** Command table ***<br>r := read test<br>w := write test<br>l := show disk condition<br>s := set test condition<br>h := help<br>e := finish & 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.<br>Type the number of pass count for reading tracks and sectors pre-set in item 3-4-2.<br>[EX] | R RETURN | *** Read Test ***<br># Enter pass-count = |
| In case it is once.<br>Insert the disk to be tested. | 1 RETURN<br>RETURN | # Test disk ready ? yes -> hit [Return]<br>Pass-count = 1<br>In-ward (trkmin -> trkmax)<br>+Track= |
| Read test starts under the test condition pre-set in item 3-4-2.<br>The test ends. | | Out-ward (trkmax-> trkmin)<br>+Track=<br>*** Read Test End ***<br>[1] Total of Seek error :<br>0 times during 00160 times seek.<br>+ Seek CRC error : 0 times<br>+ Seek error : 0 times<br><br>[2] Total of Read error :<br>0 times during 02560 times read.<br>+ ID,DATA ADM missing : 0 times<br>+ ID CRC error : 0 times<br>+ DATA CRC error : 0 times<br>+ Lost data error : 0 times<br>+ Byte data verify Err: 0 times<br><br>[3] Total of Write error:<br>0 times during 00000 times write.<br>+ ID, ADM missing : 0 times<br>+ ID CRC error : 0 times<br>+ Lost data error : 0 times<br>+ Write Protect error : 0 times<br>+ Write Fault error : 0 times |
| 2. To write the data on a level disk<br>**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 ***<br>*** Write data pattern ***<br>Pattern No.1 --- Random data (all data random)<br>Pattern No.2 --- Random data (1st byte-0AAh)<br>Pattern No.3 --- Worst pattern (DBh, 6Dh, B6h)<br>Pattern No.4 --- User definable<br># 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 RETURN | # Now, You select pattern No: 1 |
| (all data random.) | | # 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 RETURN | # Now, You select pattern No: 2 |
| (1st byte = 0AAh) | | # 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 as- | | |
| signed for each byte; the character | RETURN | +Enter hex data [2nd Bytes]=>> |
| of more than two is disregarded. | | |
| The key RETURN must be depressed at | RETURN | # Test disk ready? --> hit [Return] |
| the end of each byte. Maximum | | |
| twenty(20) characters (ten kind of | RETURN | *** Write Test Start *** |
| byte-10th bytes) can be assigned. | | +Track=End |
| The test ends. | | *** Write Test End *** |
| 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 |

| Description | Keying | Display |
|---|---|---|
| 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 ***<br>r := read test<br>w := write test<br>l := show disk condition<br>s := set test condition<br>h := help<br>e := finish & 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<br>Seek error | Stepping motor load torque is too high.<br>Stepping motor circuit is out of order. | Confirm stepping motor load torque. (Refer to 5-5)<br>Confirm the function of stepping motor circuit. |
| 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 5-3) chucking mechanism or radial alignment and TRK 00 sensor (Refer to 5-4). |
| WRITE ERROR | ID ADM missing | No write function. (write circuit is out of order, no formatting) | Confirm the waveform of RF output. (CN107-1) |
| | ID CRC error | Off track wrong head compliance, chucking trouble, or disk. | Confirm the radial alignment and TRK 00 sensor (Refer to 5-4), head compliance (Refer to 5-3), 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. |

## 5-4 RADIAL ALIGNMENT AND TRK 00 SENSOR

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

a. Main Cover (Refer to 4-5)

### 5-4-1 Tools and Measuring Equipment

a. SMC-70 System
b. R/E System Disk (OR-D114VA)
32V c. Alignment Disk (OR-D123VA)
32W d. Alignment Disk (OR-D47WA)
e. CP/M Disk
f. SONY Disk Basic
g. Rotary Knob
h. Geared Driver
i. TOTSU Screw Driver (M2.6)
j. - Driver 4mm
k. Hexagon Wrench Torque Driver
l. A/D Converter

### 5-4-2 Measurement and adjustment

a. Insert the CP/M Disk into the drive "A" of SMI-7012A.
b. Turn on the power switch. "A" is displayed on screen.
c. Eject the CP/M Disk and then insert the SONY Disk Basic.
d. Perform keying [B], [A], [S], [I], [C] and [RETURN].
e. Eject the SONY Disk Basic and then insert TSE R/E system disk.
f. Perform keying [R], [U], [N], ["], [I], ["], and [RETURN].
g. Connect the disk drive (under test) to the cable which leads to the A/D converter, insert the alignment disk, and set the DRIVE SELECT switch (S101) to 4. (Refer to Fig. 2-2)
h. Execute the Set Up command. (Refer to 5-4-3)
i. Execute the Measurement command. (Refer to 5-4-4)
j. Execute the Adjustment command. (Refer to 5-4-5)

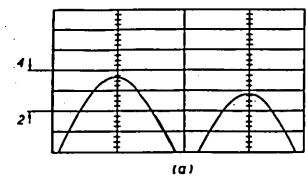
Note: For resuming the state of SMC-70 system to the initial state (that appears immediately after power goes on) press the reset button.

### 5-4-3 Set Up Command

| Function | Keying | Display |
|---|---|---|
| | | Main Menu<br>[1] Set Up<br>[2] Measurement<br>[3] Adjustment<br>COMMAND NUMBER? |
| 1. Select the Set Up command. | [1] | 1. HUMIDITY 20 - 80%: 50.0[%]<br>2. SPECIFICATION : 26.0[micrometer]<br>3. TIME/4DIVISIONS : 100[ms]<br>4. R/W CORE WIDTH : 120[micrometer]<br>5. QUIT |
| Asks for the command number at display center. | | COMMAND NUMBER? |
| 2. The initial value for the relative humidity is to be set at 50%. | [1] | HUMIDITY[%]? |
| [EX]<br>In case a relative humidity of 60% is keyed in, | [6] [0] [RETURN] | COMMAND NUMBER? |

| Function | Keying | Display |
|---|---|---|
| 3. The initial value for the specified off track is to be set at 26um. | 2 | SPECIFICATION? |
| [EX] | | |
| In case an off track of 30um is keyed in, | 3 0<br>RETURN | COMMAND NUMBER? |
| 4. The initial value for the INDEX signal period is to be set at 100msec. | 3 | TIME/4 DIVISIONS? |
| [EX] | | |
| In case an INDEX signal period of 100msec is keyed in, | 1 0 0<br>RETURN | COMMAND NUMBER? |
| 5. The initial value for the R/W core width is to be set at 120um. | 4 | R/W CORE WIDTH? |
| [EX] | | |
| In case a R/W core width of 131um for the OA-D32V is keyed in. | 1 3 1<br>RETURN | COMMAND NUMBER? |
| (Specify a R/W core width of 120um for the OA-D32W.) | 1 2 0<br>RETURN | |
| 6. When the Set Up command execution ends. (This control returns to the main menu.) | 5 | MAIN MENU<br>[1] SET UP<br>[2] MEASUREMENT<br>[3] ADJUSTMENT |

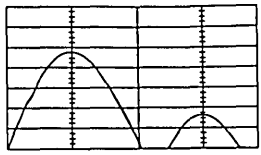
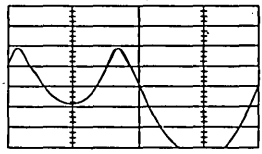
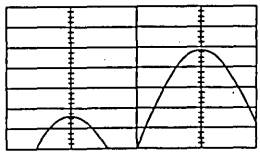
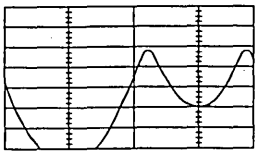
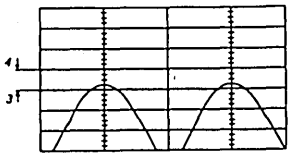
5-4-4 Measurement Command

| Function | Keying | Display |
|---|---|---|
| 1. Select the Measurement command. | 2 | SET DRIVE SELECT 4<br>INSERT ALIGNMENT DISK<br>HIT [RETURN] KEY |
| Insert the Alignment disk. | RETURN | ADJUST CAT'S EYE SIGNAL LEVEL<br>[MIN (L,R) 2div] AND<br>[MAX (L,R) 4div] AND<br>[MAX (L/R, R/L) 1.5]<br>HIT [RETURN] KEY |
| 2. Set the A/D converter gain by adjustment so that the peak values at both edges of the Cat's eye pattern signal may range from 2 to 4 divisions. (Refer to Fig. 5-4 (a)) | RETURN |  <br>(a) |
| Note: If gain adjustment cannot be done, key in 0 to execute step 9. Thereafter, perform the radial alignment adjustment. (Refer to 5-4-5) | | |

| Function | Keying | Display |
|---|---|---|
| 3. Measure the off track. | | MEASURING |
| 4. Calculate the off track. | | CALCULATING |
| Note: When "NO GOOD" is indicated on the CRT,key 0 to execute step 9. Thereafter, perform adjustment in accordance with 5-4-5. | | ADJUST 00 SENSOR<br>HIT [RETURN] KEY |
| 5. Check if the TRK 00 sensor output is set at a value between broken lines 3.5V and 4.5V. (Refer to (Refer to Fig. 5-4 (e)) | RETURN | TRACK 3 : XXX VOLT<br>TRACK 00>01 (Spec:3.5-4.5) : XXX VOLT OK<br>TRACK 02>01 (Spec:3.5-4.5) : XXX VOLT OK<br>TRACK 01>00 (Spec:MAX 0.5) : XXX VOLT |
| Note: If not, key in 0 to execute step 9. Thereafter, perform adjustment in accordance with 5-4-5. | | |
| 6. Check if the TRK 00 sensor output is satisfactory. When "NO GOOD" is displayed on the CRT, repeat step 5. | | |
| 7. Measure the off track. | | MEASURING |
| 8. Calculate and check the off track. | | CALCULATING<br>GOOD! |
| Note: When "NO GOOD" is displayed on the CRT, key in 0 to execute step 9. Thereafter, perform adjustment in accordance with 5-4-5. | | HIT [RETURN] KEY |
| | RETURN | SET DRIVE SELECT 4<br>INSERT ALIGNMENT DISK<br>HIT [RETURN] KEY |
| | E N D | |
| 9. End the execution in the Measurement mode. | RETURN | |

5-4-5 Adjustment Command

| Function | Keying | Display |
|---|---|---|
| 1. Select the Adjustment command. | 3 | COMMAND NUMBER? |
| | | SET DRIVE SELECT 4 |
| | | INSERT ALIGNMENT DISK |
| | | HIT [RETURN] KEY |
| Insert the Alignment disk. | RETURN | ADJUST CAT'S EYE SIGNAL LEVEL<br>[MIN (L,R) 3div] AND<br>[MAX (L,R) 4div] AND<br>[MAX (L/R, R/L) 1.2]<br>HIT [RETURN] KEY |

| Function | Keying | Display |
|---|---|---|
| 2. Turn the rotary knob clockwise until the head arrives at the outmost position. Thereafter, turn the rotary knob counterclockwise while stopping and starting at each clicking point until the Cat's eye pattern signal appears. Turning the stepping motor with the geared driver within the range that the screw fastening the stepping motor is not dropped from the stepping motor flange, set the amplitude ratio of the peak signals on the Cat's eye pattern signal at 1:1.2 or less.<br>**Note:** A ratio of 1:1.2 is defined by identifying the smaller one as unity.<br>**Note:** If adjustment of the stepping motor cannot be conducted by using the geared driver, first find the appropriate position in accordance with the following procedure, and perform adjustment again.<br>(1) When the waveform is as shown in Fig. 5-4 (b)-1 and (b)-2, turn the geared driver clockwise.<br>(2) When the waveform is as shown in Fig. 5-4 (c)-1 and (c)-2, turn the geared driver counterclockwise.<br>3. Set the A/D converter gain by adjustment so that the peak values of the Cat's eye pattern signal may range from 3 to 4 divisions. (Refer to Fig. 5-4 (d))<br>**Note:** If the amplitude ratio is set at any value other than utmost 1:1.2 during initializing, control does not advance the step to the next even if the RETURN key is pressed. | RETURN |  <br>(b)-1<br>  <br>(b)-2<br>  <br>(c)-1<br>  <br>(c)-2<br>  <br>(d)<br>Fig. 5-4 |

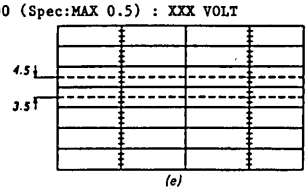
| Function | Keying | Display |
|---|---|---|
| 4. Measure the off track. | | MEASURING |
| 5. Calculate the off track. | | CALCULATING |
| | | ADJUST RADIAL ALIGNMENT |
| | | [MAX (L/R,R/L)<1.05] |
| | | TIGHT FIRMLY |
| | | HIT [RETURN] KEY |
| 6. Turning the stepping motor with the geared driver, set the amplitude ratio of the peak signals on the Cat's eye pattern signal utmost at 1:1.05, fasten the setscrew and then apply nut lock paint to it.<br>**Note:** A ratio of 1:1.05 is defined by identifying the smaller one as unity.<br>**Note:** Unless the amplitude ratio is utmost 1:1.05, control does not advance the next step. | [RETURN] | MOVE 00 SENSOR BOARD TO OUTSIDE<br>HIT [RETURN] KEY |
| 7. Move the TRK 00 sensor board outside (toward the stepping motor). | [RETURN] | ADJUST 00 SENSOR<br>HIT [RETURN] KEY |
| 8. Check if the TRK 00 sensor output level is within the range of broken lines 3.5V to 4.5V. If not, set the level nearlest to the center between these broken lines by adjustment, and fasten the setscrew with nut lock paint. (Refer to Fig. 5-4 (e))<br>**Note:** When "NO GOOD" is displayed on the CRT, repeat step 8. | [RETURN] | TRACK 3 : XXX VOLT<br>TRACK 00>01 (Spec:3.5-4.5) : XXX VOLT OK<br>TRACK 02>01 (Spec:3.5-4.5) : XXX VOLT OK<br>TRACK 01>00 (Spec:MAX 0.5) : XXX VOLT<br>  <br><br>(e) |
| 9. Measure the off track.<br>10. Calculate and check the off track. | | MEASURING<br>CALCULATING<br>GOOD!<br>HIT [RETURN] KEY |
| | [RETURN] | SET DRIVE SELECT 4<br>INSERT ALIGNMENT DISK<br>HIT [RETURN] KEY |
| 11. End the execution in the adjustment mode. (This control returns to the main menu.) | [E][N][D]<br>[RETURN] | |

*Fig. 5-4 Radial Alignment, TRK 00 Adjustment*

### 5-4-6 Error Message

One of the following errors can occur during measurement, adjustment, or setting of the machine for radial alignment:

a) Not Ready...Indicates that READY signal is not issued. Check for disk drive connection or check for the DRIVE SELECT switch position.

b) No Index Pulse.....Indicates that INDEX signal is not issued. Check for disk drive connection.

c) Cat's Eye Error.....Indicates that the Cat's eye pattern signal is abnormal. Check for the alignment disk.

In addition to these messages in above, one of the following statements is also displayed.

Statement 1: [0] CONTINUE/[1] RETRY

Statement 2: [RETURN] FIRST STEP/[1] RETRY

Key in [0] when statement [1] is displayed, and then control advances the step to the next, disregarding the error which has occurred.

Thereafter, key in [1] and then the same measurement item is executed again.

Key in [RETURN] when statement 2 is displayed, and then control performs the radial alignment measurement and returns to the initial step in the Adjustment mode. Thereafter, key in [1] and then the same measurement item is executed again.

**Note:** Check for the disk drive in accordance with confirmation items to the message displayed before retrying the key-in [1] operation.

Sony Corporation
9-975-131-51
84F0510-1