

# HBD-30W

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## SERVICE MANUAL

MICRO FLOPPYDISK DRIVE UNIT  
**SONY**<sup>®</sup>

*Scanned and converted to PDF by HansO, 2001*

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# CHAPTER 1 OPERATION

## PRECAUTIONS

### ON SAFETY

- Before connecting the unit to the power source, check that the operating voltage of your unit is the same as the local power line voltage.  
The model available in Continental European countries operates only on 220 V ac, 50 Hz.  
The model available in the United Kingdom operates only on 240 V ac, 50 Hz.
- The nameplate indicating operating voltage, power consumption, etc. is located on the back.
- The caution labels are located on the top of the unit and the mains switch is located on the rear.
- Should any liquid or solid object fall into the cabinet, unplug the unit and have it checked by qualified personnel before operating it any further.
- Unplug the unit from the wall outlet if it is not to be used for an extended period of time.
- To disconnect the power cord, pull it out by the plug.  
Never pull the cord itself.

### ON INSTALLATION

- Do not install the unit near heat sources such as radiators or air ducts, or in a place subject to direct sunlight, excessive dust, mechanical vibration or moisture.
- Do not place electric equipment which incorporates an electromagnet, such as a TV set or a speaker, near this unit. If affected by an electromagnetic field, it may malfunction.
- Good air circulation is essential to prevent internal heat buildup in the unit. Place the unit in a location with sufficient air circulation. Do not block the ventilation slots.

### ON OPERATION

- The unit consists of high-precision electronic parts. Do not drop it or bump it against other objects.
- Should connection be made while the host computer's power is turned on, permanent damage may result. Be sure to turn off the power of your entire system before making any connection.

### ON CLEANING

- Clean the cabinet with a soft, dry cloth, or a soft cloth lightly moistened with a mild detergent solution. Do not use any type of solvent, such as alcohol or benzene, which might damage the finish.

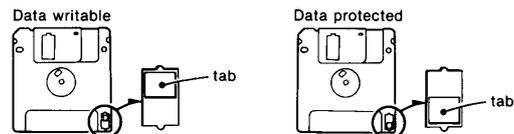
### DISK CARE

#### Disk handling

- For a single-sided micro floppydisk, use Sony OM-D3440 which contains 10 single-sided micro floppydisks.  
For a double-sided micro floppydisk, use Sony OM-D4440 which contains 10 double-sided micro floppydisks.
- Before using a new (unused) disk, be sure to "format" the disk. See "Formatting a blank disk" on page 14.
- Never touch the exposed surface of the disk. Even minor dirt or dust may adversely affect contact with the head or cause a disk read/write error.
- Keep disks away from equipment with magnets, such as speakers or amplifiers, because their magnets could cause erasure or dropouts of stored data.
- Do not expose disks to direct sunlight, extremely cold temperature, or moisture.
- Protect disks from dust by storing them in their case or a box.

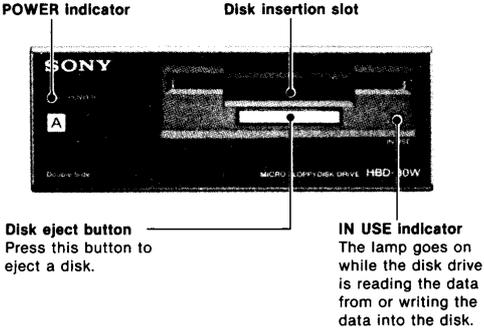
#### Write protect tab

To protect the recorded data from accidental erasure, the disk is equipped with a write-protect tab. Slide the tab downward until it clicks so that an opening appears to protect the recorded data. To release the protection, slide the tab upward until it clicks so that the opening closes.

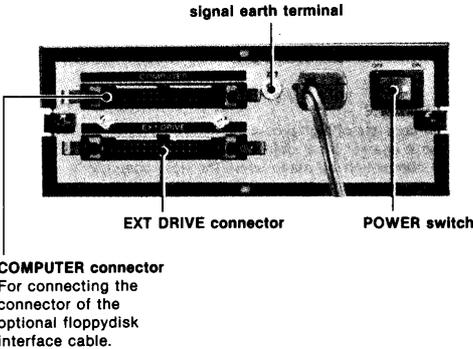


**PARTS IDENTIFICATION**

- Label**
- Use the specified labels.
  - If there is no space to write on a label, peel the label off, and attach a new label. Do not attach a new label over the old one, because the cumulative thickness may cause a read/write error or trouble with the micro floppydisk unit.



**Note:** While the IN USE indicator is on, do not set the POWER switch to OFF, press the RESET button of the computer, disconnect the connector of the optional floppydisk interface cable, or remove the disk. Such actions may erase the contents of your disk.

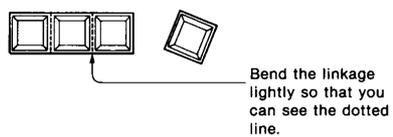


## PLACING THE UNIT

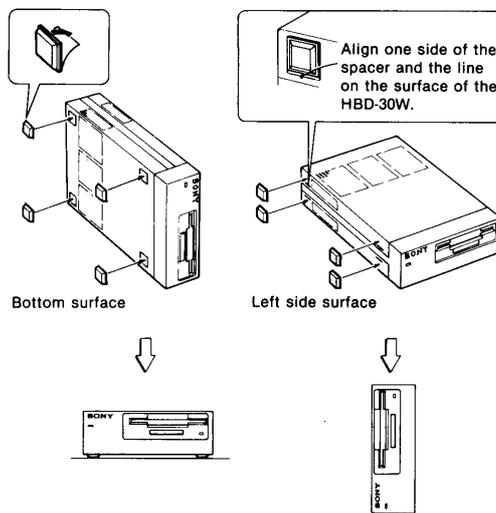
The HBD-30W can be placed either breadthwise or sidewise.  
Adhere the supplied spacers to the squares on the bottom surface if you are placing the unit breadthwise.  
Adhere the supplied spacers along the lines on the left side surface if you are placing the unit sidewise.

### Adhering the spacers

- 1 Separate the spacers by cutting along the dotted lines.



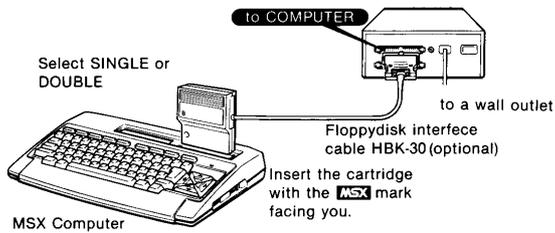
- 2 Remove the paper and adhere the gummed surface of the spacer to the square or the line exactly.



## CONNECTING THE UNIT

### Notes on connection

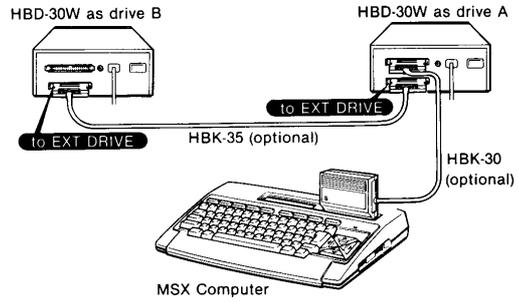
- Be sure to turn off the power of the devices to be connected.
- When disconnecting the connector or the cartridge, be sure to hold the plug or the cartridge. Pulling the cord may break the wires.
- As a safety precaution, do not connect the power cord until all other connections are completed.



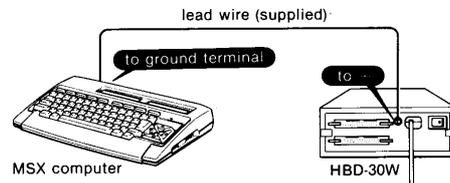
**Note:** When using a single-sided micro floppydisk, set the switch on the optional floppydisk interface cable HBK-30 to SINGLE. When using a double-sided micro floppydisk, set the switch to DOUBLE.

### Connecting two HBD-30Ws

When using second HBD-30W, connect it as follows using the optional HBK-35.

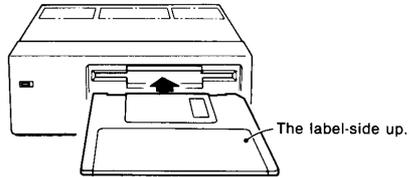


### Earth wire connection

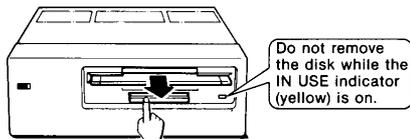


## INSERTING A DISK

Without opening the metal disk guard, insert the floppydisk and gently push it in until you hear a click. Insert the disk in this way whether you are using a double-sided micro floppydisk or a single-sided micro floppydisk.



### Removing the disk



Press this button.

## STARTING UP MSX DISK-BASIC

MSX-Disk BASIC is stored in the ROM (read-only memory) placed in the cartridge of the optional floppydisk interface cable HBK-30.

### STARTING UP PROCEDURE

After all the necessary connections are made, turn on the power of the drive unit and then the computer. (If the computer has been turned on first, press the RESET button of the computer or turn the power of the computer off and turn it on again.)

**In case of an MSX version 2.0 computer**  
The following message appears to indicate that the Disk-BASIC has been activated.

```
MSX BASIC version 2.0
Copyright 1985 by Microsoft
XXXXX Bytes free
Disk BASIC version 1.0
```

**In case of an MSX version 1.0 computer**  
The following message appears.

```
Enter date (D-M-Y):
```

Hit the **RETURN** key.\*

The following message appears to indicate that the Disk-BASIC has been activated.

```
MSX BASIC version 1.0
Copyright 1983 by Microsoft
XXXXX Bytes free
Disk BASIC version 1.0
```

## FORMATTING A BLANK DISK

If you are going to use a new disk, you must first "format" it. "Formatting" means writing special data on the new disk in advance which will provide the computer with information necessary for reading and writing the data. Unformatted disks or disks which have been initialized with a different format cannot be used with MSX-Disk BASIC. Be aware that formatting disk erases all previously stored data and/or programs on that disk.

### FORMATTING PROCEDURE

#### When formatting a double-sided disk

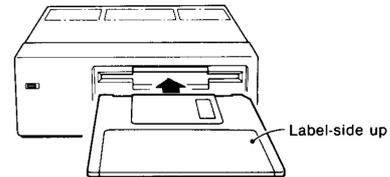
- 1 Set the switch on the floppydisk interface cable to DOUBLE.
- 2 Start up MSX-Disk BASIC.
- 3 Type in CALL FORMAT (or \_\_FORMAT) and hit the **RETURN** key. The following message appears:  

```
Drive name? (A,B)
```
- 4 Specify the drive into which the disk you wish to format is to be inserted. When there is only one drive unit, press **A**. The following message appears:  

```
1 - Single sided, 9 sectors  
2 - Double sided, 9 sectors
```
- 5 Since you are formatting a double-sided disk, specify 2. The following message appears:  

```
Strike a key when ready
```

- 6 Insert the disk which you are going to format into the drive specified in step 4.



- 7 Press any single key on the keyboard to start the formatting operation.

When formatting is completed, the following message will appear on the screen.

```
Format complete
```

This indicates that the computer is ready for entry of an MSX-Disk BASIC command.

#### When formatting a single-sided disk

Set the switch on the floppydisk interface cable to SINGLE. The formatting procedure is the same as that of the double-sided disk except that when you specify the drive name in step 4, the message of step 5 immediately appears.

## SPECIFICATIONS

### Drive section

**Disk used** 3 1/2-inch micro floppydisk  
**Disk type** Single-sided/double-sided  
**Recording capacity** Unformatted: 500K bytes for a single-sided disk  
 1M bytes for a double-sided disk  
 Formatted: 360K bytes for single-sided  
 720K bytes for double-sided

	Single-sided	Double-sided
Bytes/sector	512	512
Sectors/track	9	9
Tracks/cylinder	1	2
Tracks/disk	80	160

**Recording density** 8717 bits/inch  
**Track density** 135 tracks/inch  
**Total no. of cylinders** 80 cylinders  
**Recording method** MFM (Modified-Frequency Modulation)  
**Disk rotation speed** 300 rpm  
**Data transfer rate** 250K bits/sec  
**Average latency time** 100 msec  
**Access time** Average: 350 msec  
 Between tracks: 12 msec  
 Settling time: 30 msec

### General

**Power requirements** United Kingdom model 240 V ac, 50 Hz  
 European model 220 V ac, 50 Hz  
**Power consumption** United Kingdom model 12W  
 European model 12W  
**Operating temperature** 10°C - 35°C (50°F - 95°F)  
**Dimensions** 160 × 60 × 268 mm (w/h/d)  
 (3 1/4 × 2 3/8 × 10 5/8 inches)  
 (not including the projecting parts)  
**Weight** 2.4 kg (5 lb 5 oz) (not including the disk)  
**Accessories** MSX-DOS system disk (1)  
 Lead wire (1)  
 Spacers (4)  
 Label for drive B (1)

While the information given is true at the time of printing, small production changes in the course of our company's policy of improvement through research and design might not necessarily be indicated in the specifications.

We would ask you to check with your appointed Sony dealer if clarification on any point is required.

### Note

Appliance conforms with EEC Directive 76/889 regarding interference suppression.

### Pin Assignment of the Connectors

COMPUTER connector and EXT DRIVE connector (34 pins)

33	31	29	27	25	23	21	19	17	15	13	11	9	7	5	3	1
○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
34	32	30	28	26	24	22	20	18	16	14	12	10	8	6	4	2

Pin No.	Signal	Pin No.	Signal	Pin No.	Signal
1		13	RETURN	25	RETURN
2		14		26	TRACK 00
3	RETURN	15	RETURN	27	RETURN
4	IN USE	16	MOTOR ON	28	WRITE PROTECT
5	RETURN	17	RETURN	29	RETURN
6		18	DIRECTION	30	READ DATA
7	RETURN	19	RETURN	31	RETURN
8	INDEX	20	STEP	32	HEAD SELECT
9	RETURN	21	RETURN	33	RETURN
10	DRIVE SELECT 0	22	WRITE DATA	34	READY
11	RETURN	23	RETURN		
12	DRIVE SELECT 1	24	WRITE GATE		

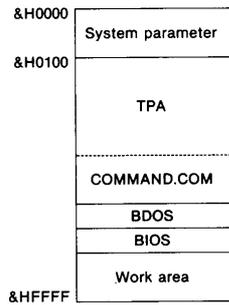
## MSX-DOS COMMANDS

### INTRODUCTION

MSX-DOS is a disk operating system (DOS) for MSX computers, which enables you to manage files, load and execute programs, and access information from peripheral devices such as disk drives and keyboards. Some programs have their own execution functions, but there are two advantages to separating functions from programs. One advantage is that by using a DOS to execute programs, we do not have to waste space on a programs to list functions. A DOS can list functions separately, which are applicable to any program. Another advantage is that a DOS is an interface which affords compatibility between various computers and various programs. MSX-DOS consists of the following files.

File name	File function
COMMAND.COM	MSX-DOS command processor
MSXDOS.SYS	MSX-DOS system program

Once MSX-DOS has been loaded, it sets the memory as follows.



- MSX-DOS system needs at least 64K bytes RAM.

### HOW TO START UP MSX-DOS

- 1 Insert the system disk into the disk drive.
  - 2 Turn ON the disk drive's power, if your drive is an external one.
  - 3 Turn ON the power for the computer and the display.
- If you use an MSX (version 1.0) computer, the following message will appear:

```
MSX-DOS version x.xx  
Copyright 1984 by Microsoft
```

```
COMMAND version x.xx
```

```
Current date is xxx .xx-xx-xx  
Enter new date:
```

If you do not want to change the date in the message, press the **[RETURN]** key. To change the date, enter month-date-year (For example, 9-25-1985) and press the **[RETURN]** key.

- On an MSX2 computer, the following message will appear:

```
MSX-DOS version x.xx  
Copyright 1984 by Microsoft
```

```
COMMAND version x.xx
```

The MSX-DOS prompt A> will appear. It indicates that the MSX-DOS has started up and is waiting for your command.

## BACK-UP THE SYSTEM DISK

You should make a back-up copy of the MSX-DOS system disk, in case a disk becomes damaged or files are accidentally erased.

### 1 Start up MSX-DOS.

### 2 Format a blank disk.

① Type **FORMAT** and press the **RETURN** key. The following message will appear:

```
Drive name? (A,B)
```

② Select the drive for formatting and press key **A** or **B**. (When you use only one drive, press the **A** key.)

If you use a disk drive for a single-sided disk, the following message will appear:

```
Strike a key when ready
```

If you use a disk drive for a double-sided disk, the following message will appear when you enter the drive name, A or B.

```
1 - Single sided, 9 sectors  
2 - Double sided, 9 sectors
```

Select 1 or 2 according to your disk type. Then the following message will appear:

```
Strike a key when ready
```

③ Insert the disk you want to format into the drive, and press any key on the keyboard.

When the formatting is finished, the following message will appear:

```
Format complete
```

### 3 Copy the MSXDOS.SYS file.

If you use two disk drives, insert the system disk into drive A and insert the formatted blank disk into drive B. Then type **COPY A:MSXDOS.SYS B:** and press the **RETURN** key.

If you use only one disk drive, type **COPY A:MSXDOS.SYS B:** and press the **RETURN** key before changing the disk in the drive. Then eject the system disk and insert the formatted blank disk into the drive following the message on the display.

```
Insert diskette for drive B:  
and strike a key when ready
```

When the copying is finished, the following message will appear:

```
1 File copied.  
A>
```

### 4 Copy the COMMAND.COM file.

Copy the COMMAND.COM file by following the process in step 3, except type **COPY A:COMMAND.COM B:** instead of **COPY A:MSXDOS.SYS B:**

● You can substitute the **COPY A:\* B:** command for steps 3 and 4. This command copies all files on the disk. (See the command summary of the "COPY" command.)

## DISK ERRORS

If an error occurs, the following message will appear:

```
xxx error xxxxx drive x  
Abort, Retry, Ignore?
```

(for example, Disk error reading drive A  
Abort, Retry, Ignore?)

Press **A**, **R**, or **I** to response this message. Usually, you will want to attempt recovery by entering **R** (to try again) or **A** (to terminate the program and try a new disk). If you enter **I**, the program will ignore the error.

## HOW TO TURN THE SYSTEM OFF

- 1 Remove the disks from the disk drives.
- 2 Turn OFF the power for the computer and peripheral devices.

## CHAPTER 2 SERVICE INFORMATION

### 2-1. DISASSEMBLY

#### 2-1-1. Removal of Cabinet and Front Panel

- ① Remove the two screws.
- ② Remove the top cabinet by sliding it in the direction indicated by the arrow.
- ③ Remove the bottom by sliding it in the direction indicated by the arrow.
- ④ Remove the front panel by lift up the claw.

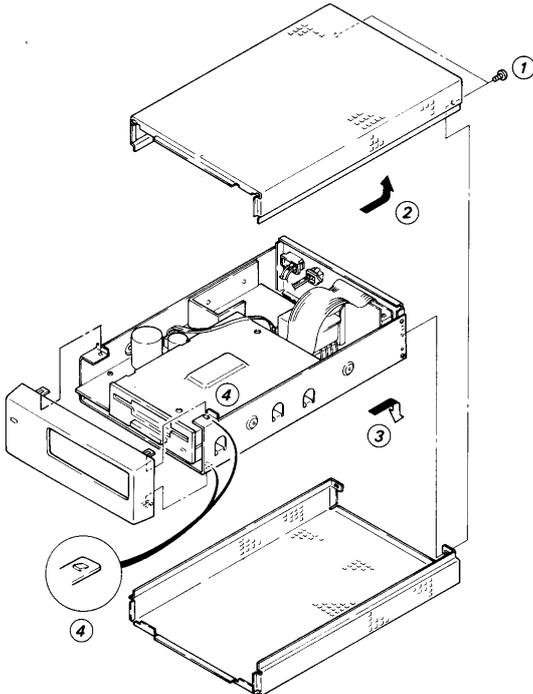


Fig. 1

#### 2-1-2. Removal of MFD Unit

- ① Remove the four screws.
- ② Disconnect the 34P flat cable and 4P cable of POWER.

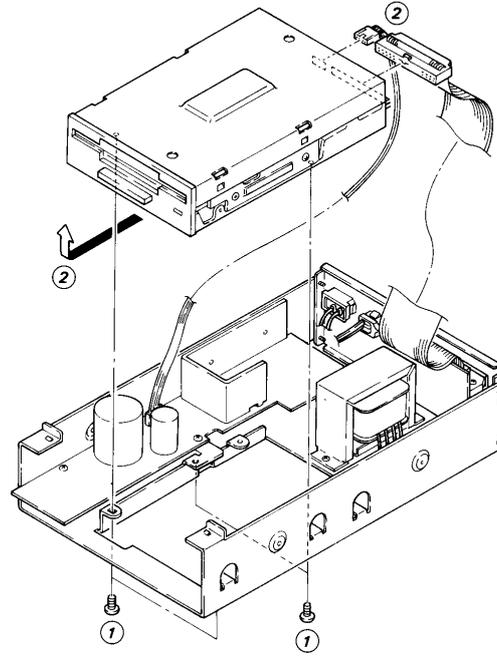


Fig. 2

## 2-2. REPLACING THE CARRIAGE ASSEMBLY

### 2-2-1. Removal

- ① Remove the MFD cover.
- ② Remove the 00 shutter.
- ③ Remove belt clumper (B).
- ④ Remove the carriage spring and steel belt.
- ⑤ Disconnect connector CN4 and remove the FPC holder.
- ⑥ Extract the guide bar and remove the carriage assembly.

### 2-2-2. Attaching and Check

- ① Attach a guide bar to the carriage assembly.
- ② Clamp the guide bar using guide bar clumper (D) and fix it using screws.
- ③ Fix the FPC holder and connect connector CN4.
- ④ As shown in the figure, attach one end of the steel belt to the carriage and connect the other end to the carriage spring to fix it.  
**Note:** The mounting hole of a belt clumper should coincide with the screw hole of a stepping motor pulley. Be careful not to hold or bend the steel belt.
- ⑤ Attach belt clumper (B) to the stepping motor pulley; be careful not to tilt belt clumper (B).
- ⑥ Attach the 00 shutter to the stepping motor pulley.
- ⑦ Move the carriage lightly by hand and check to see if the steel belt is distorted or slips off.
- ⑧ Attach the disk holder assembly.
- ⑨ Check the CE, azimuth, 00 sensor, and index burst.
- ⑩ Attach the MFD cover.

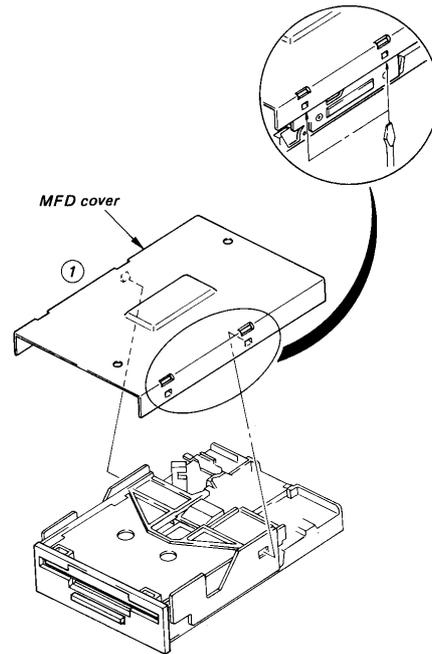


Fig. 3

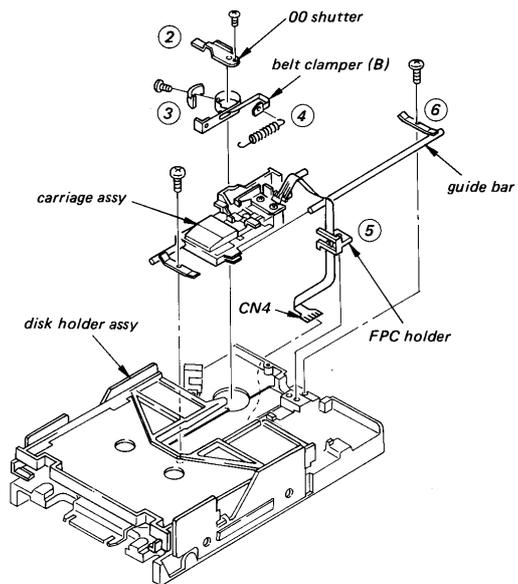


Fig. 4

### 2-3. REPLACING THE 00 SENSOR ASSEMBLY

- ① Remove the MFD cover (refer to Fig. 3).
- ② Disconnect connector CN3 and remove the 00 sensor assembly.
- ③ Attach the 00 sensor assembly and connect connector CN3.
- ④ Attach the MFD cover.

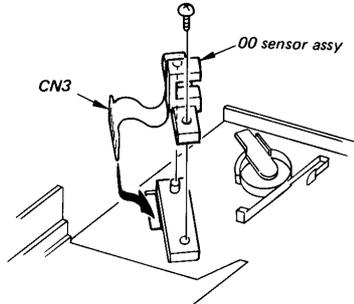


Fig. 5

### 2-4. REPLACING THE STEPPING MOTOR

#### 2-4-1. Removal (Refer to Fig. 3, Fig. 4)

- ① Remove the MFD cover.
- ② Remove the 00 shutter.
- ③ Remove belt clumper (B).
- ④ Remove the steel belt and carriage spring.
- ⑤ Disconnect connector CN2 and remove the stepping motor (remove hexagon socket head bolts with flat washers).

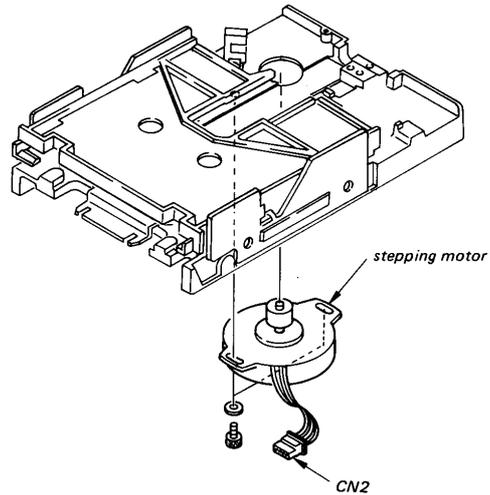


Fig. 6

#### 2-4-2. Attaching and Check

- ① Attach the stepping motor to the frame and lightly tighten the two mounting screws (hexagon socket head bolts with flat washers).
- ② Connect connector CN2 and attach the steel belt and carriage spring.
- ③ Attach belt clumper (B).
- ④ Attach the 00 sensor.
- ⑤ Check the 00 sensor, CE, azimuth, and index burst.
- ⑥ After the adjustment in Step 10 is completed, tighten the two mounting screws.

## 2-5. SERVICE PARTS

1. **Safety Related Components Warning.**  
Components identified by shading marked with **A** on the schematic diagrams, exploded views and electrical spare parts list are critical to safe operation. Replace these components with Sony parts whose part numbers appear in this manual or in service bulletins and service manual supplements published by Sony.
2. **Replacement Parts** supplied from Sony Parts Center will sometimes have a different shape from the original parts. This is due to "accommodating the improved parts and/or engineering changes" or "standardization of genuine parts". This manual's exploded views and electrical spare parts list indicate the parts numbers of "the standardized genuine parts at present".  
Regarding engineering parts changes in our engineering department, refer to Sony service bulletins and service manual supplements.
3. **Printed Components in Bold-Face type** on the exploded views and electrical spare parts list are normally stocked for replacement purposes. The remaining parts 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.
4. **Abbreviations**

Ref. No.	Description
C□□, CV□□	CAPACITOR
CN□□	CONNECTOR
CP□□	COMBINATION PARTS
D□□	DIODE
DL□□	DELAY LINE
F□□	FUSE
FL□□	FILTER
IC□□	IC
L□□, LV□□	INDUCTOR
M□□	MOTOR
ME□□	METER
PL□□	LAMP
Q□□	TRANSISTOR
R□□, RV□□	RESISTOR
RY□□	RELAY
S□□	SWITCH
T□□	TRANSFORMER
TH□□	THERMISTOR
X□□	CRYSTAL

5. **Units for Capacitors, Inductors and Resistors**  
The following units are assumed in schematic diagrams, electrical parts list and exploded views unless otherwise specified:  
Capacitors:  $\mu\text{F}$   
Inductors:  $\mu\text{H}$   
Resistors: ohm

## CHAPTER 3 CIRCUIT DESCRIPTION

### 3-1. OUTLINE OF MECHANICAL BLOCKS

The mechanical blocks of the micro floppy disk (MFD) consist of an overall chassis containing the cassette component block, disk chucking and drive blocks, head and head loading block, head positioning block and the various detector pins.

The various components listed above are made up of very sophisticated parts that are assembled with high precision, so handle the unit carefully and do not subject it to impact or drop it.

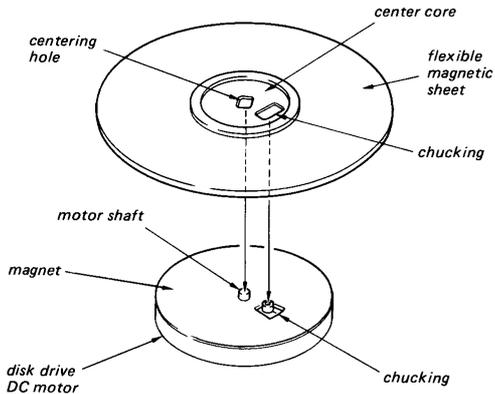
#### 3-1-1. Cassette Component Block

This block holds the cassette which contains a flexible data recording disk. It retains the cassette that is loaded into the chassis in a one-touch motion, by utilizing the appropriate spring pressure to hold the cassette.

For cassette eject operations, this block ejects the cassette using the correct amount of pressure. It features an easy-to-remove structure.

#### 3-1-2. Disk Chucking and Disk Mechanical Blocks

The disk chucking block is built into the top part of a thin, direct drive DC motor. The structure is designed so that, as a cassette is properly loaded into the cassette component block, the magnetic positioning pin installed on the top part of the disk drive motor very precisely positions the disk and rotates and drives the motor.



#### 3-1-3. Head and Head Arm

This head differs from existing heads. It is designed to minimize wear to the disk caused by the head surface, while maintaining maximum signal reproduction level. A special long life type head is used to minimize wear to the head itself.

The head consists of a read/write gap for data read and write operations, and an erase gap for erasing recorded track edges, immediately after recording new data.

#### 3-1-4. Head Positioning Block

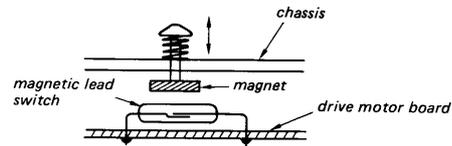
This block is composed of a stepping motor and guide shaft. The head arm (carriage assembly) is held by the guide shaft and guide clamper and is moved by a steel belt, which converts stepping motor rotation to bidirectional movement.

The stepping motor rotates one step ( $1.8^\circ$ ) to move the head arm by one track, resulting in a 135TPI track density.

### 3-1-5. Detection Mechanisms

#### (a) Write Protect

A magnetic switch is installed on the chassis to detect the file protect tab position on the cassette. If the magnetic switch is not pressed, because a write protected cassette has been inserted, recording and erasing currents are not supplied to the disk drive, thereby protecting the disk data from erroneous recording commands.



#### (b) Track 00 Sensor

This unit uses the following method to detect the head's outermost position (track 00).

- (1) The stepping motor's excited phase is fixed at track 00.
- (2) The photointerrupter mounted on the chassis is focused on the shutter 00.
- (3) The "AND" of (1) and (2) is used to detect track 00.

#### (c) Index

This MFD is a mechanism that continuously maintains the DC disk drive motor and disk in the same phase. It is designed so that electromagnetic conversion switch IC detects the DC disk drive motor's speed by detecting the magnet installed at the outer circumference and generating an index pulse.

#### (d) Cassette In

The presence of a cassette (Cassette In) is detected by a magnetic switch mounted on the chassis. Structurally it is the same as the write protect sensor, but the magnetic switch's contacts are mounted on the PC assembly.

## 3-2. OUTLINE OF ELECTRICAL BLOCKS

Almost all of this unit's functions are controlled by LSIs.

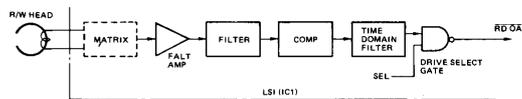
The LSI is reset approximately 300 msec after a 5 V power supply is applied. All output pins are high prior to reset.

This means that the following phenomenon occurs during reset.

- (1) The stepping motor is held by current flowing to all phases.
- (2) The IN USE lamp indicator lights up.
- (3) The DRIVE SELECT signal becomes active and if a drive is selected, its TRK 00, READY and WRT PRT signals all become active.

As reset operation is completed, the LSI deactivates the READY signal and positions the head at track 00.

### 3-2-1. Read Circuit



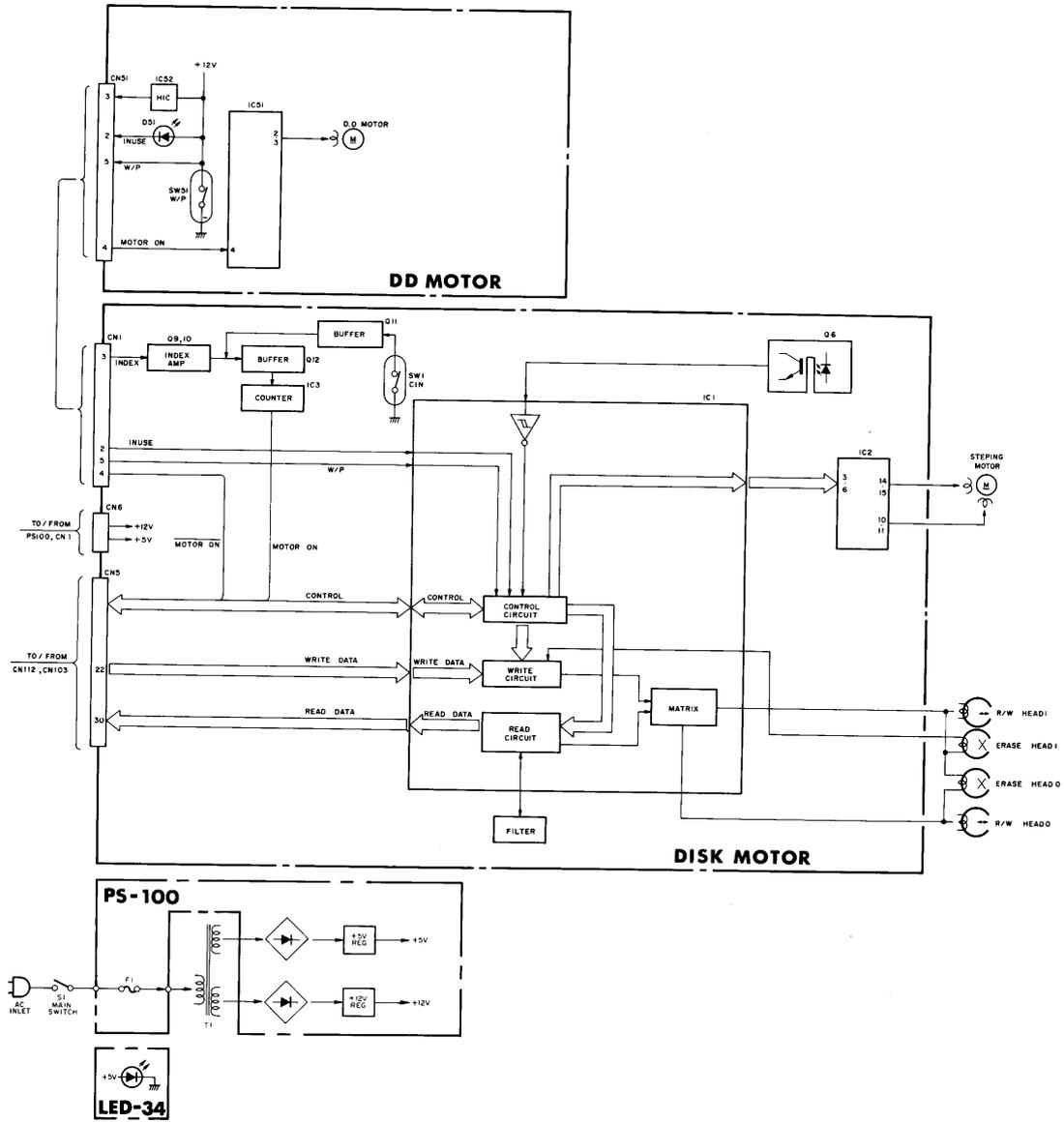
The read circuit is composed of a read/write head, matrix, flat amplifier, low-pass filter, comparator, time-domain filter and drive select gate.

All components except the read/write head are mounted onto an LSI (IC1).

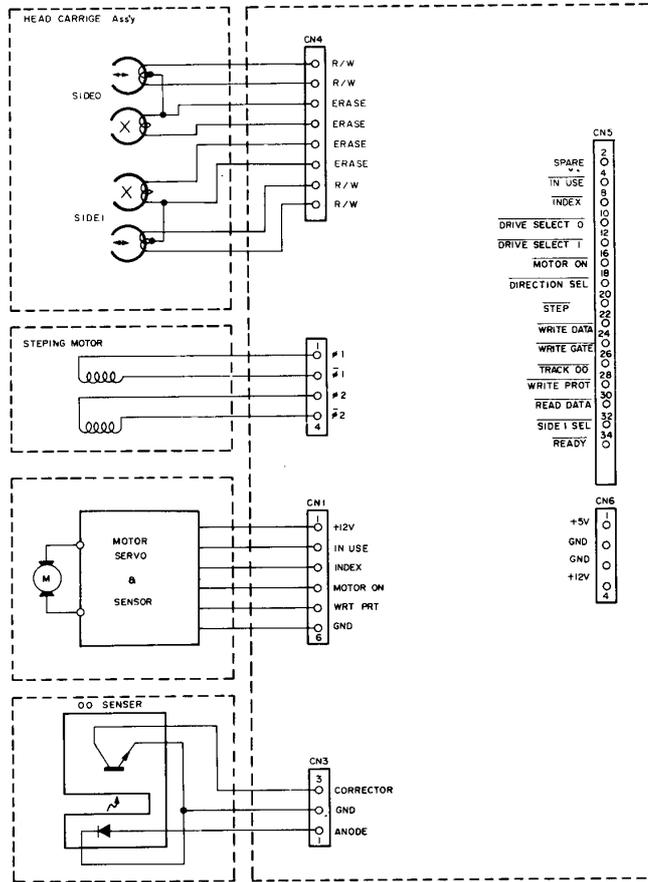


# CHAPTER 4 BLOCK DIAGRAM

## 4.1. OVERALL



# OVERALL



HEAD 1  
SE HEAD 1  
SE HEAD 0  
/ HEAD 0

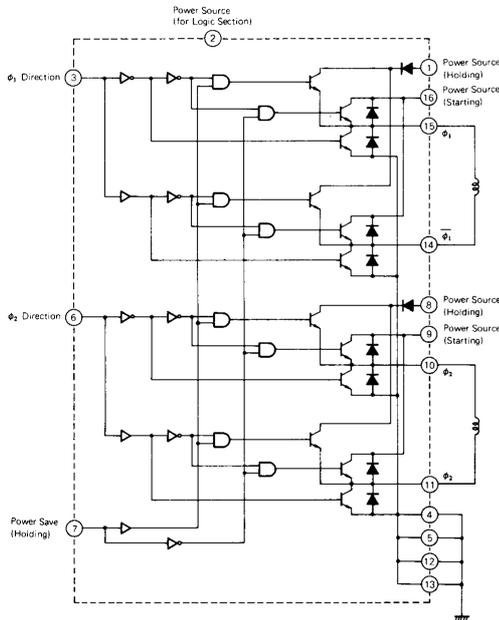
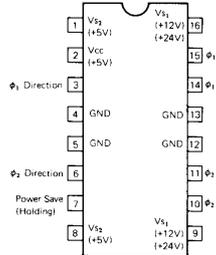
## CHAPTER 5

### SCHEMATIC DIAGRAM AND PRINTED CIRCUIT BOARD

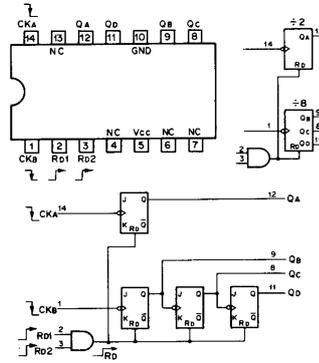
#### 5-1. SEMICONDUCTOR PIN ASSIGNMENTS

TYPE	PAGE
2SC2021LN	5-3
2SC2412K	5-3
DTC124EK	5-3
DTC144EK	5-3
GL-9NG24	5-3
HA13421	5-2
M51017P	5-3
MA151WK	5-3
S2VB20	5-3
SN74LS93N	5-2
SVC203	5-3
$\mu$ PC7805H	5-2
$\mu$ PC7812H	5-2

HA13421 (HITACHI)  
STEP MOTOR DRIVER  
- TOP VIEW -



SN74LS93N (TI)  
TTL 1-BIT AND 3-BIT BINARY COUNTER  
- TOP VIEW -



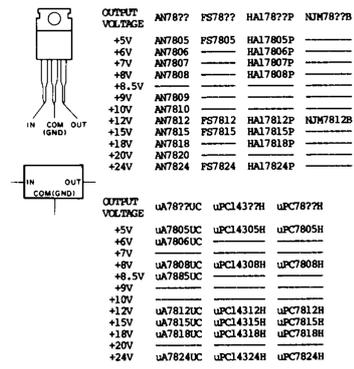
COUNT SEQUENCE

COUNT	Q<sub>A</sub>
0	0
1	1

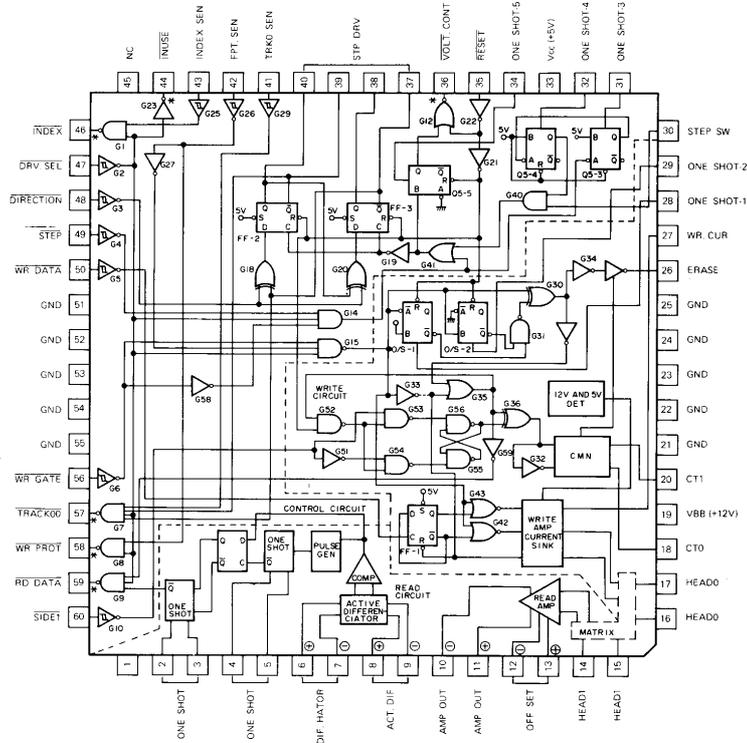
RESET / COUNT FUNCTION

COUNT	÷ 8 SECTION			RESET / COUNT FUNCTION					
	Q<sub>D</sub>	Q<sub>C</sub>	Q<sub>B</sub>	R<sub>D1</sub>	R<sub>D2</sub>	Q<sub>D</sub>	Q<sub>C</sub>	Q<sub>B</sub>	Q<sub>A</sub>
0	0	0	0	1	1	0	0	0	0
1	0	0	1	X	0	X	X	X	COUNT
2	0	1	0	0	X	X	X	X	COUNT
3	0	1	1	0	X	X	X	X	COUNT
4	1	0	0	0	X	X	X	X	COUNT
5	1	0	1	0	X	X	X	X	COUNT
6	1	1	0	0	X	X	X	X	COUNT
7	1	1	1	0	X	X	X	X	COUNT

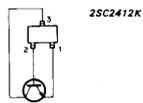
uPC78 7 7H (NEC)  
POSITIVE VOLTAGE REGULATOR (1A)



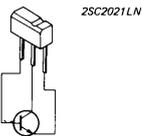
M51017AP (MISTUBISHI)  
FLOPPYDISK DRIVE READ/WRITE AMP & CONTROL



TOP VIEW (SCALE 4/1)



(SCALE 2/1)



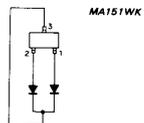
TOP VIEW (SCALE 4/1)



GL-9NG24; YELLOWISH GREEN



TOP VIEW (SCALE 4/1)



BOTTOM VIEW



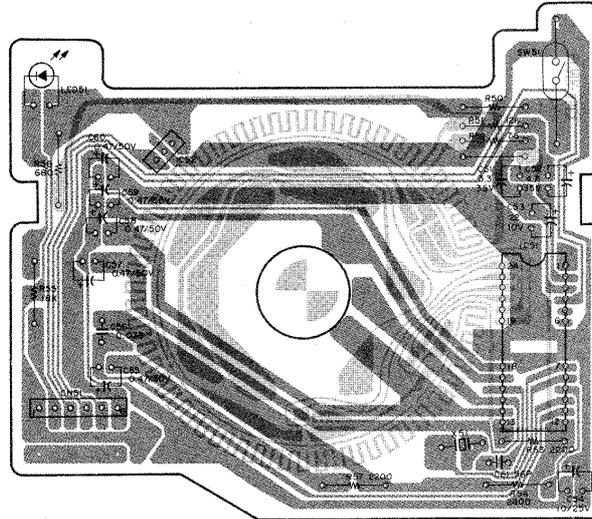
S2V820

SVC203

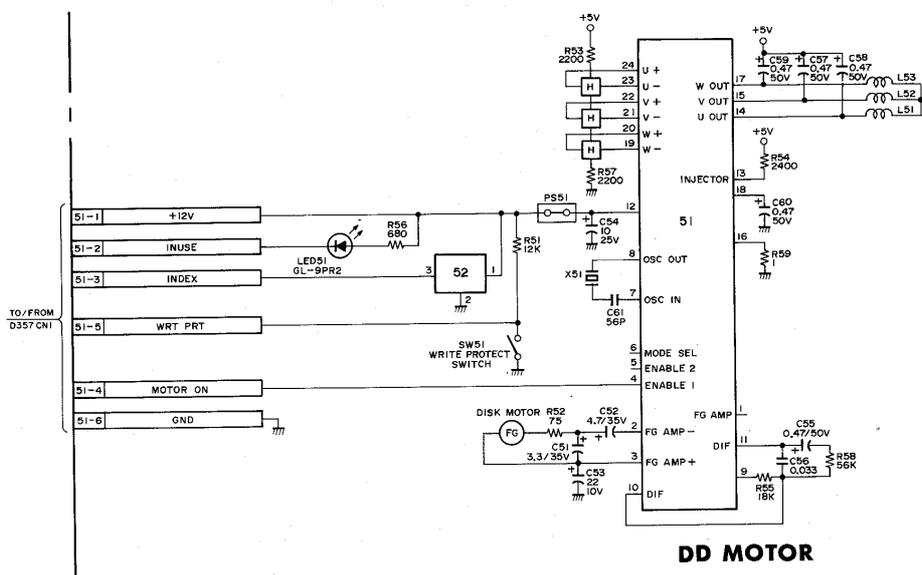


**DD MOTOR**

**5-2. DD MOTOR BOARD**

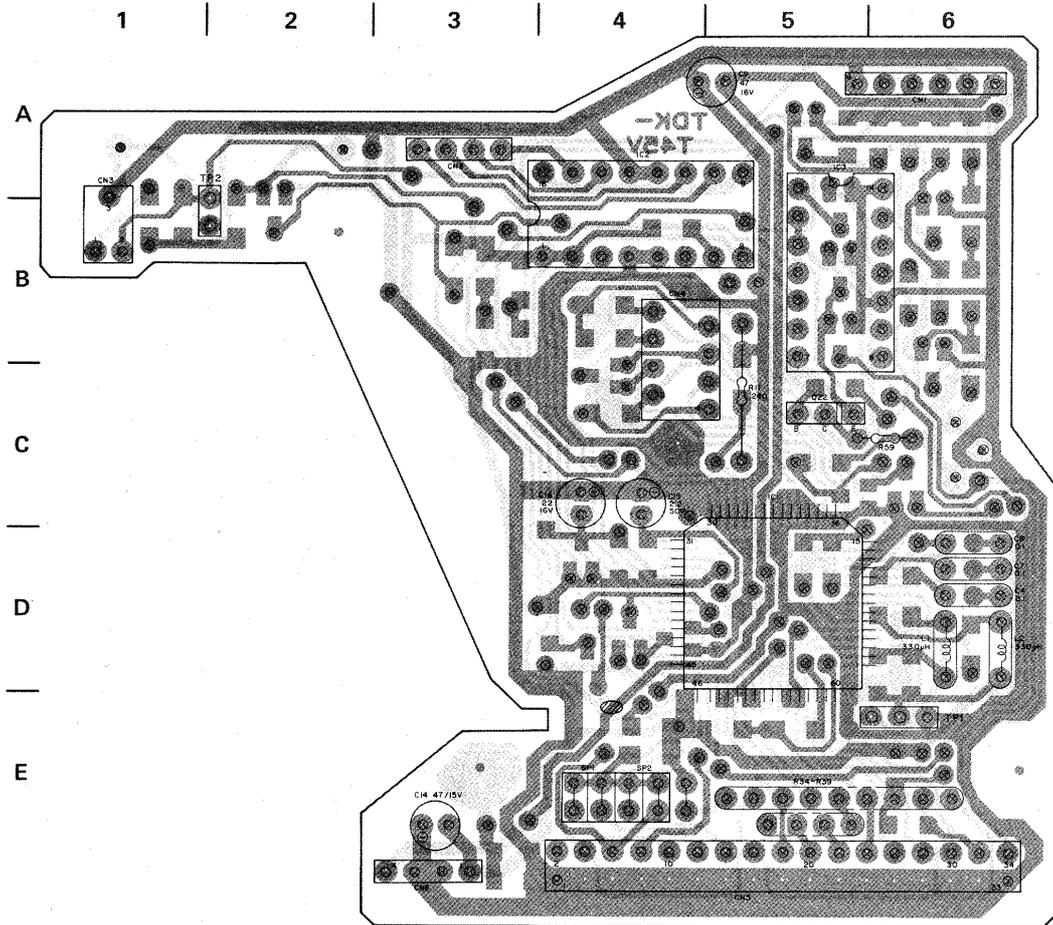


**DD MOTOR**  
**SOLDERING SIDE**  
 HBD-30W (AE/UK)  
 HBD-30W (J)



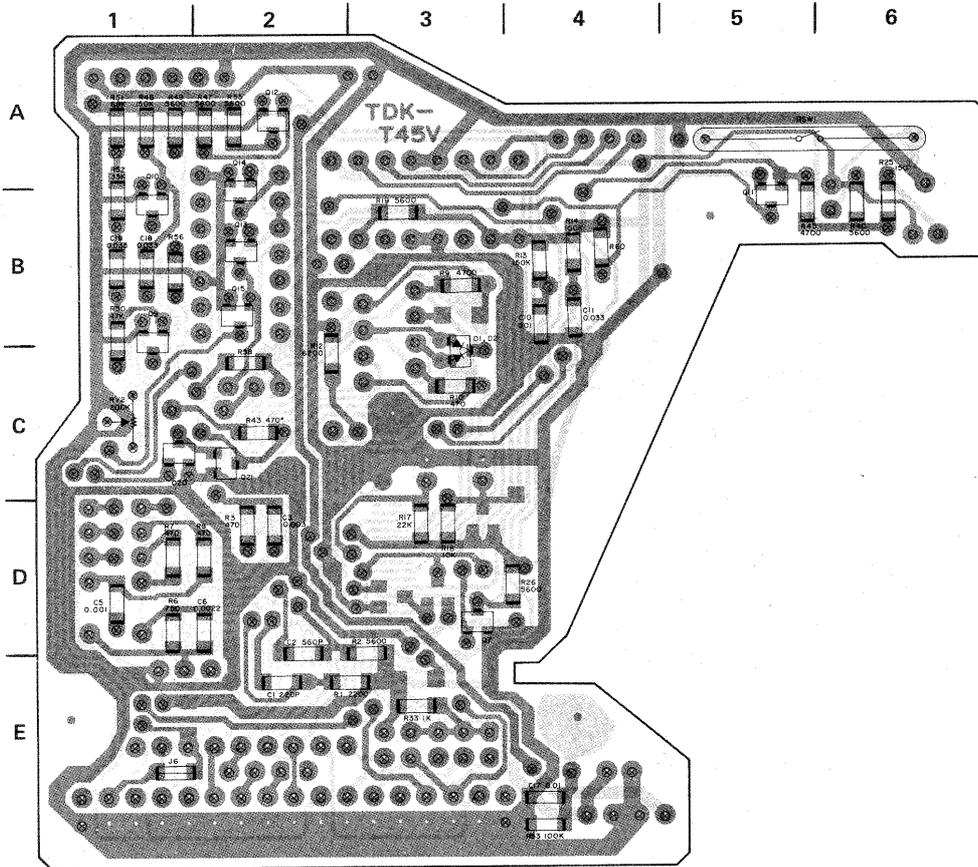
**DD MOTOR**

5-3. D357 BOARD



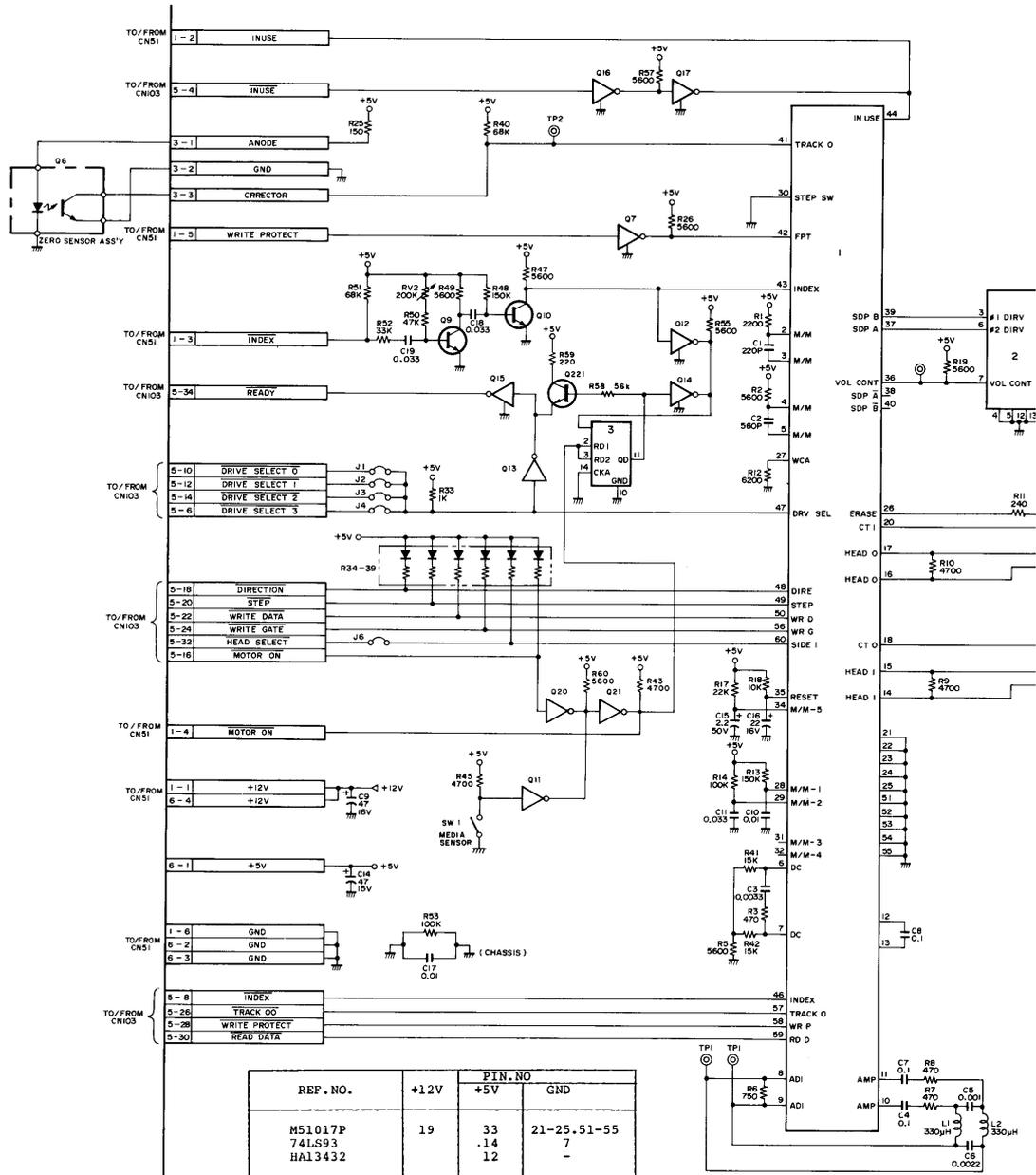
**D357**  
**COMPONENT SIDE**  
 9-989-201-01  
 HBD-30W (AE/UK)  
 HBD-30W (J)

C4	D-6	CN1	A-6	IC1	D-5	Q22	C-5
C7	D-6	CN2	A-3	IC2	B-4	R11	C-5
C8	D-6	CN3	B-1	IC3	B-5	R59	C-6
C9	A-5	CN4	B-4	L1	D-6	SP1	E-4
C14	E-3	CN5	E-5	L2	D-6	SP2	E-4
C15	C-4	CN6	E-3				
C16	C-4						

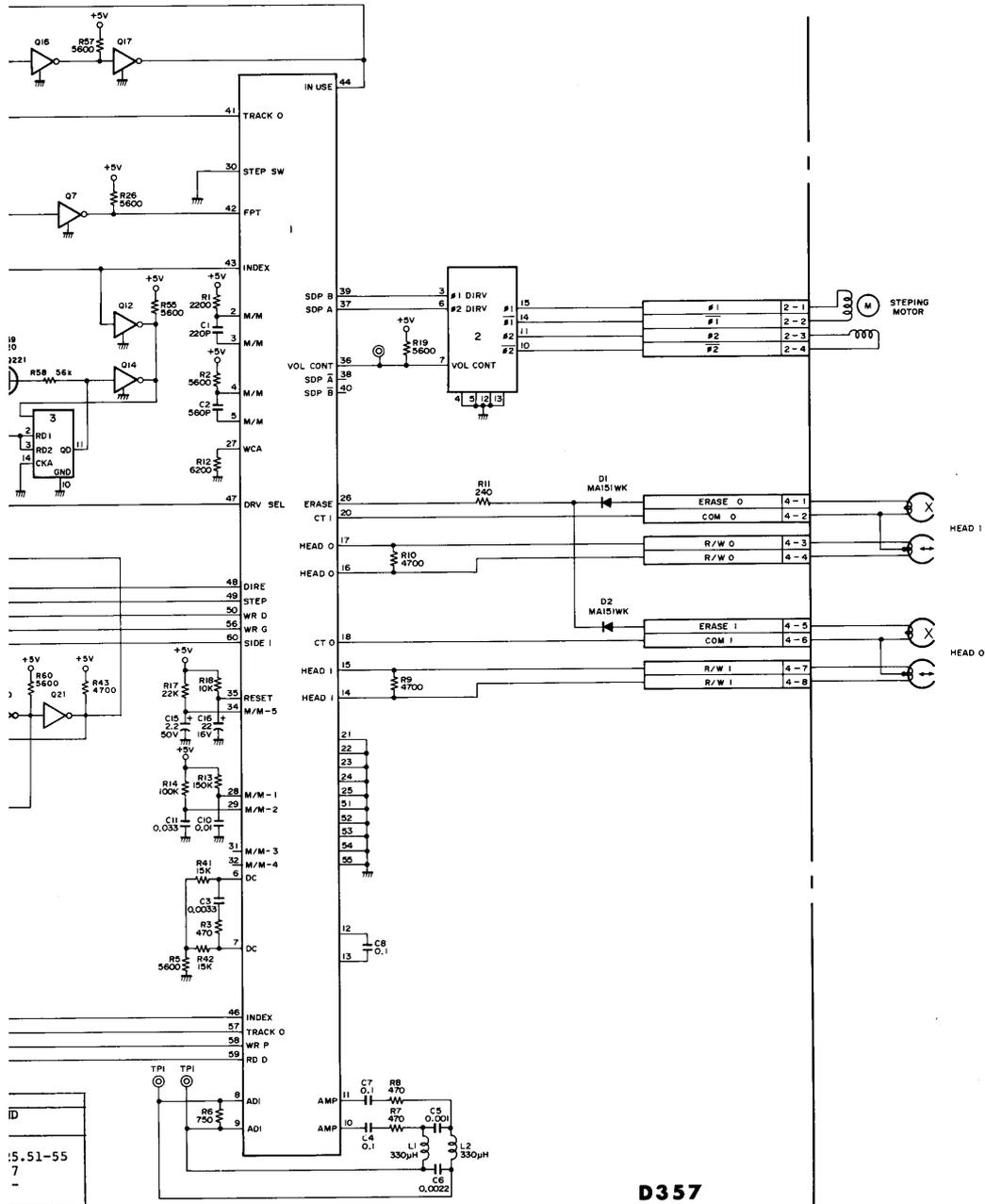


**D357**  
**SOLDERING SIDE**  
 9-989-201-01  
 HBD-30W (AE/UK)  
 HBD-30W (J)

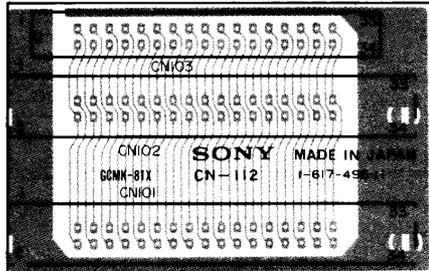
C1	E-2	Q7	D-3	R1	E-2	R18	D-3	R51	A-1
C2	D-2	Q9	B-1	R2	D-3	R19	B-3	R52	B-1
C3	D-2	Q11	B-5	R3	D-2	R25	B-6	R53	E-4
C5	D-1	Q12	A-2	R6	D-1	R26	D-4	R55	A-2
C6	D-2	Q13	B-2	R7	D-1	R33	E-3	R56	B-1
C10	B-4	Q14	A-2	R8	D-2	R40	B-6	R60	B-4
C11	B-4	Q15	B-2	R9	B-3	R43	C-2		
C18	B-1	Q20	C-1	R10	C-3	R45	B-5	RSW	A-5
C19	B-1	Q21	C-2	R12	C-2	R47	A-2		
				R13	B-4	R48	A-1		
D1	C-3			R14	B-4	R49	A-1		
D2	C-3			R17	D-3	R50	B-1		
				R18	D-3				



D357 D357

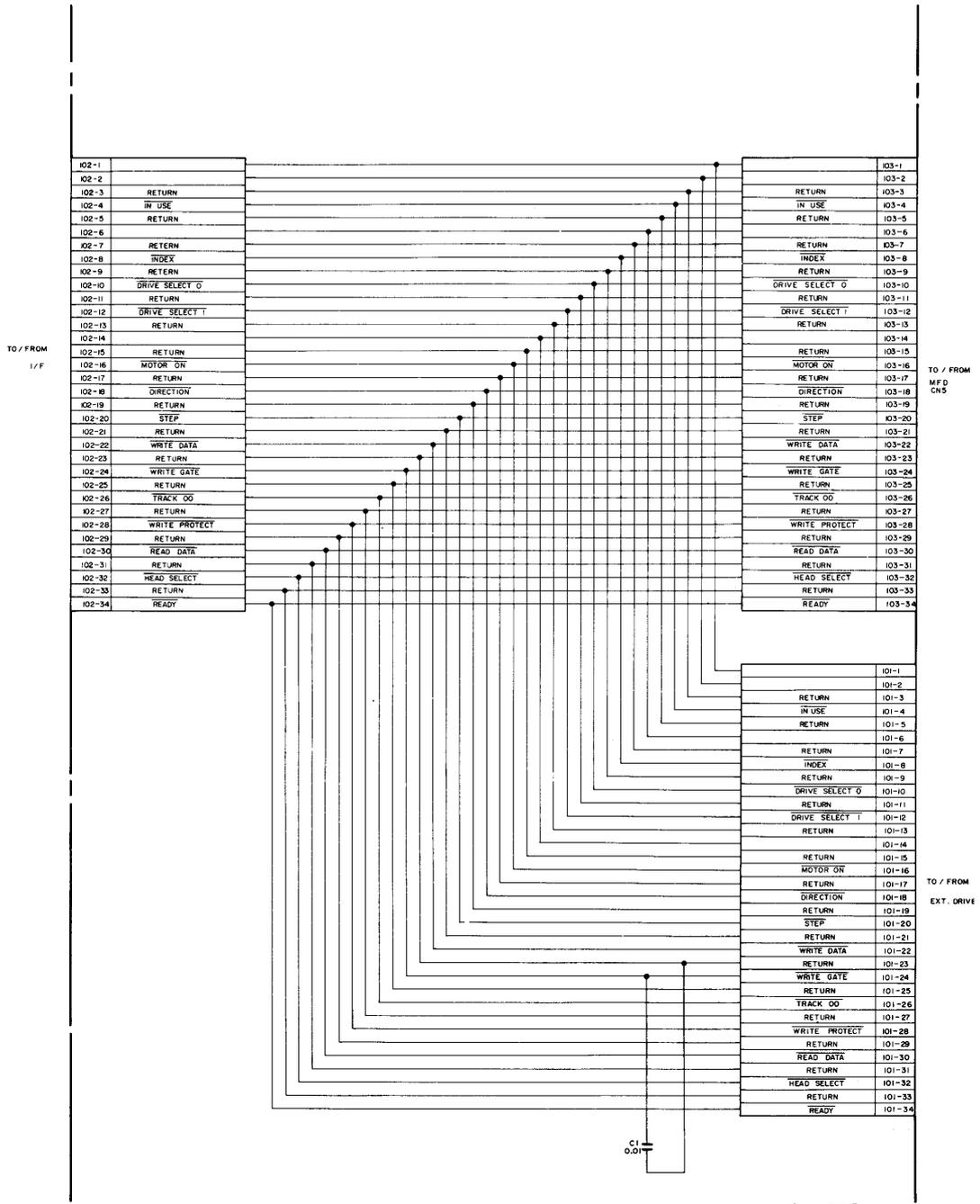


5-4. CN-112 BOARD



**CN-112**  
**SOLDERING SIDE**  
1-617-495-11  
HBD-30W (AE/UK)  
HBD-30W (J)





CN-112

## CHAPTER 6 TOOLS AND MEASURING INSTRUMENTS

### 6-1. GENERAL AND SPECIAL TOOL LIST

The tools and measuring instruments for performing maintenance.

- a. General Tools
  - + driver 2 mm
  - + driver 2.6 mm
  - Tester
  - DC POWER SUPPLY
    - +5 V DC  $\pm 5\%$ , 0.8 A min.
    - +12 V DC  $\pm 5\%$ , 1.5 A min.
- b. Special Tools
  - MFD checker II
- c. Measuring Equipment
  - Oscilloscope Dual Trace (20 MHz)
  - Universal Counter Resolution (0.1 msec)
- d. Disk
  - 50-AUTO-S DISK (OR-D162WA)
  - (8-960-010-70)

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

### 6-2. SYSTEM CONFIGURATIONS

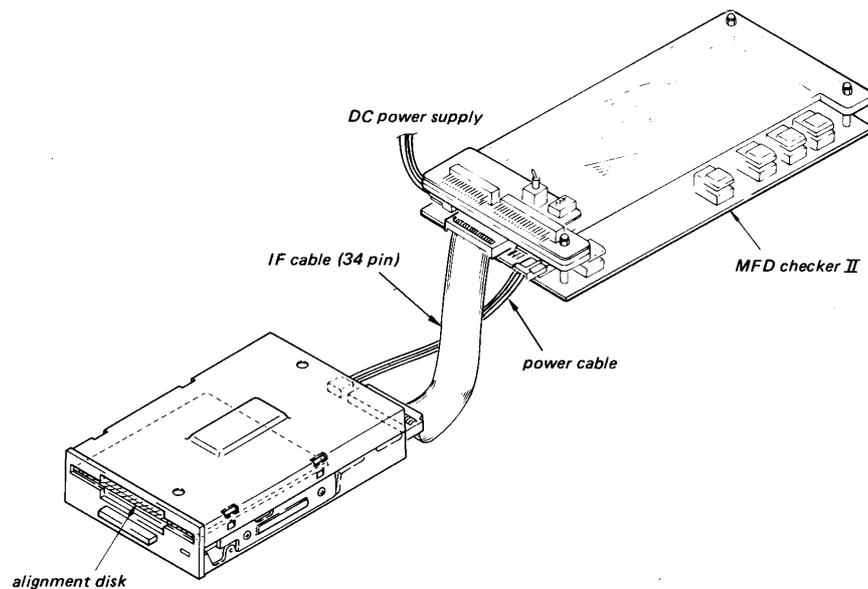


Fig. 6-1 Configuration of Function Check

# CHAPTER 7 TROUBLESHOOTING

## 7-1. PRIOR TO TROUBLESHOOTING

Before you determine that the drive unit is damaged, check the followings.

1. Operation error
2. Program error in the host system
3. Proper connection with the host system
4. Floppy disk damage
5. Environmental conditions (subject to electrical noise)
6. Influence by strong magnetic field
7. Supply voltage error
8. Software error
  - 8-1. Dirty head
  - 8-2. Electrical noise
  - 8-3. Tracking error
  - 8-4. Defective motor speed

## 7-1-1. Specific Errors

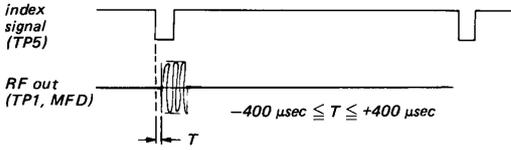
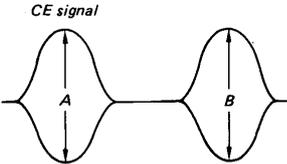
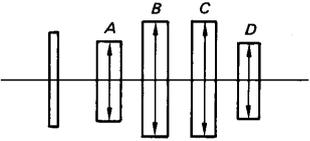
1. Read/write error  
Replace the floppy disk used with a new one to check whether an error is caused by the floppy disk or drive unit. If no read/write error occurs after the disk is replaced, the error is caused by the defective disk.
2. Compatibility error  
If there is a compatibility error, one drive unit cannot read the data recorded using other drive units, or some drive units can read the data and some cannot. The compatibility error is caused by the following: CE and index positioning defects, defective drive motor speed, or improper disk insertion.
3. Software error  
Read the location on the track where an error occurs about 10 times. If reading is impossible, move the head to the adjacent track in the same direction as the track was moved to the present track. Then move the head to the former track and read the error location on the track. After reading of error location is completed, adjust the track position. If reading is still impossible, this error cannot be restored.

## 7-2. NORMAL OPERATION

### Pre-setting:

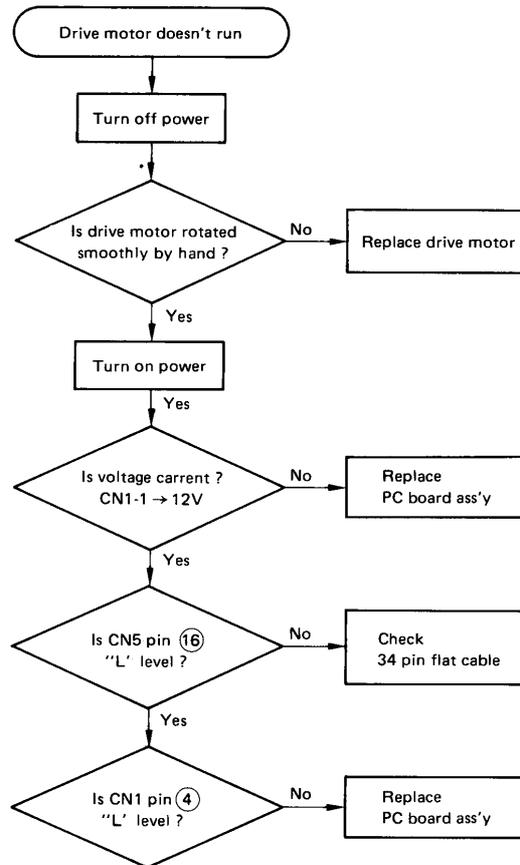
1. Referring to Fig. 6-1 (Micro Floppydisk Drive Connection), connect the drive to MFD checker II.
2. Set the DRIVE SELECT switch on the disk drive to "1".

Procedure	Step	Operation																	
1	Power On	<ol style="list-style-type: none"> <li>1. The head stops.</li> <li>2. The disk motor remains stopped.</li> </ol>																	
2	Drive Select Check (After it is checked, the drive select switch is to be kept selected.)	<ol style="list-style-type: none"> <li>1. The WP and DSKCHG or WP DSKCHG and TRK00 indicators light only when the DRIVE SELECT switch (S101) on the disk drive are set as follows:               <table border="1" style="margin: 10px auto;"> <thead> <tr> <th colspan="2">MFD Checker II</th> <th rowspan="2">Disk drive (S101)</th> </tr> <tr> <th>1</th> <th>2</th> </tr> </thead> <tbody> <tr> <td>OFF</td> <td>OFF</td> <td>4</td> </tr> <tr> <td>ON</td> <td>OFF</td> <td>3</td> </tr> <tr> <td>OFF</td> <td>ON</td> <td>2</td> </tr> <tr> <td>ON</td> <td>ON</td> <td>1</td> </tr> </tbody> </table> <p>Otherwise, these indicators go out.</p> </li> </ol>	MFD Checker II		Disk drive (S101)	1	2	OFF	OFF	4	ON	OFF	3	OFF	ON	2	ON	ON	1
MFD Checker II		Disk drive (S101)																	
1	2																		
OFF	OFF	4																	
ON	OFF	3																	
OFF	ON	2																	
ON	ON	1																	
3	Stepping	<ol style="list-style-type: none"> <li>1. When the STEP OUT switch is ressed, the head is continuously stepped out until it arrives at TRK00. When the head is located on TRK00, the TRK00 indicator lights.</li> <li>2. When the STEP IN switch is pressed, the head is continuously stepped in until it arrives at TRK79.</li> </ol>																	
4	50 Auto-S Disk is inserted and MOTOR ON switch on	<ol style="list-style-type: none"> <li>1. The motor rotates. (The INDEX indicator on the MFD checker II blinks.)</li> <li>2. The TRK00, WRTprt RDY and indicators light. (The RDY indicator however, lights in about 1.5 seconds after the disk is inserted.)</li> </ol>																	
5	Motor speed	<ol style="list-style-type: none"> <li>1. The Motor speed can be measured at TRK35 on TP5 of MFD Checker II with an universal counter. It should be 200 msec <math>\pm</math> 3.0 msec.</li> </ol>																	

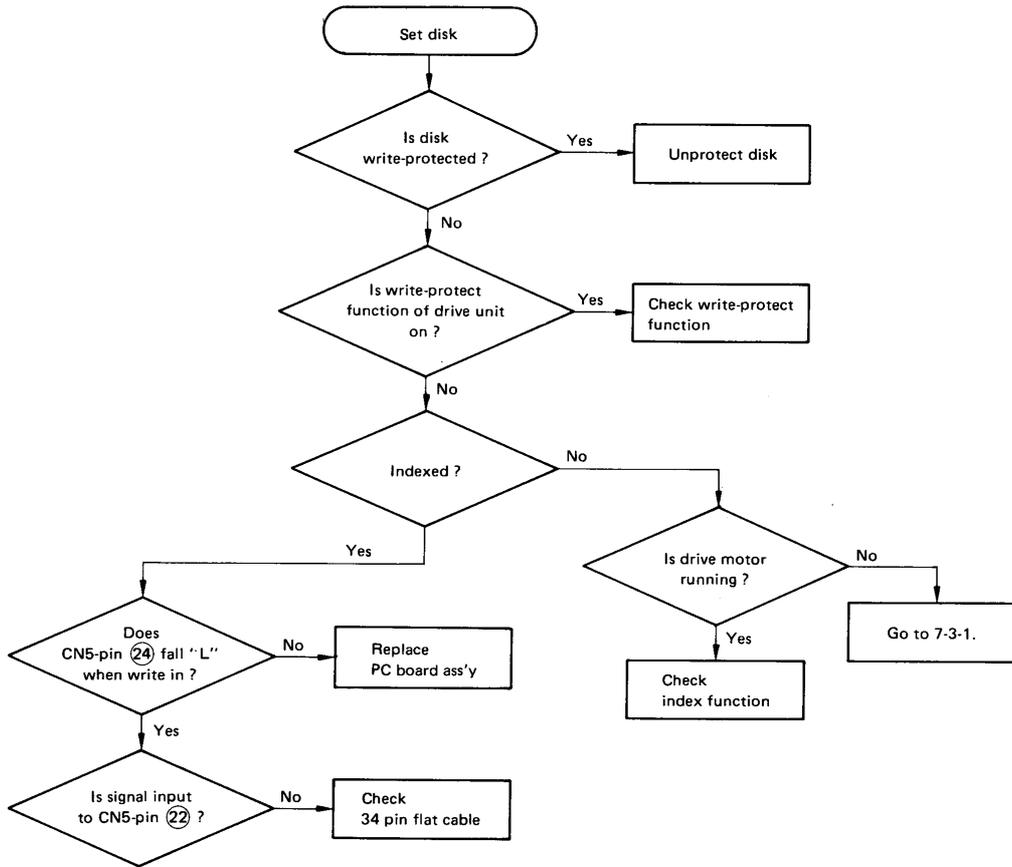
Procedure	Step	Operation
6	Index position	<ol style="list-style-type: none"> <li>1. Connect the CH1 and CH2 probes of oscilloscope to TP1 on MFD and TP5 on MFD checker. The oscilloscope is triggered by CH2.</li> <li>2. Set the SIDE SELECT switch to side 0.</li> <li>3. The following waveform can be obtained on TRK40.</li> </ol>  <p style="text-align: center;">Fig. 7-1 Index Phase Specification</p>
7	Cat's Eye	<ol style="list-style-type: none"> <li>1. Set the carriage to track 40.</li> <li>2. Set the carriage to tracks 00 to 40 and check that the ratio of A to B (B to A) in the CE signal is more than 10 : 6.</li> <li>3. Set the carriage to tracks 79 to 40 and check that the ratio of A to B (B to A) in the CE signal is more than 10 : 6 as in Step 2.</li> <li>4. Position the side select switch to check adjustments in Step 2 and 3.</li> </ol> 
8	00 sensor	<ol style="list-style-type: none"> <li>1. Connect the CH1 probe of an oscilloscope to TP2 (MFD).</li> <li>2. Step the system to track 00, track 01, track 02, and track 03. Adjust the 00 sensor assembly so that tracks 00 and 01 are high, track 02 is high or low, and track 03 is low.</li> <li>3. Step the system out in the order track 03, track 02, track 01, and track 00 and check that the above specifications are satisfied.</li> </ol>
9	INDEX and WRITE PROTECT	<ol style="list-style-type: none"> <li>1. Press the INDEX and WRITE PROTECT switches.</li> <li>2. Check that the WRITE PROTECT and INDEX display lamps of the floppy disk checker go off.</li> </ol>
10	Azimuth	<ol style="list-style-type: none"> <li>1. Insert the alignment disk.</li> <li>2. Adjust the CE signal. For connection of an oscilloscope to the floppy disk checker, see the "C-E". (Measured at track 40.)</li> <li>3. Using an oscilloscope, read the value of voltages A, B, C, and D from the azimuth waveform, then calculate the azimuth using the following equation: For A&gt;D. Azimuth = <math>21 \times (C-B)/(C-A)</math> For A&lt;D. Azimuth = <math>21 \times (C-B)/(B-D)</math> Spec: <math>0 \pm 30 (^{\circ})</math></li> </ol>  <ol style="list-style-type: none"> <li>4. Remove the alignment disk.</li> </ol> <p><b>Note:</b> Be careful not to remove or insert the alignment disk at track 40.</p>

### 7-3. FLOWCHART

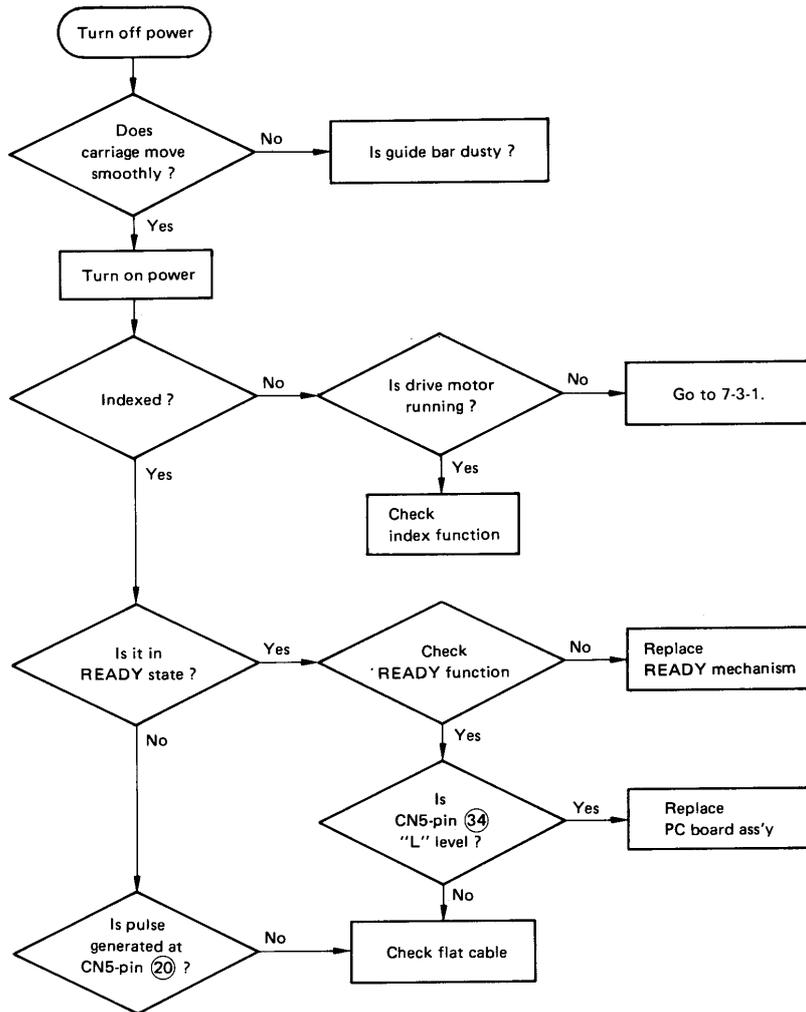
#### 7-3-1. Drive Motor doesn't Run



7-3-2. Can not Write



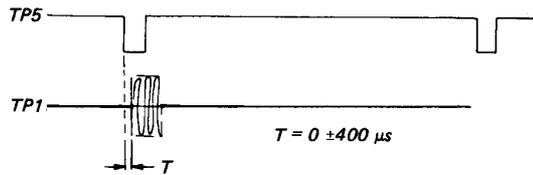
7-3-3. Does not Perform Stepping Operation



## CHAPTER 8 ALIGNMENT

### 8-1. INDEX BURST ADJUSTMENT

1. Connect the MFD to the MFD checker II (refer to Fig. 6-1).
2. Connect the CH1 and CH2 probes of oscilloscope to TP1 on MFD and TP5 on MFD checker.  
The oscilloscope is triggered by CH2.
3. Set the SIDE SELECT switch to side 0.
4. The following waveform can be obtained on TRK40.

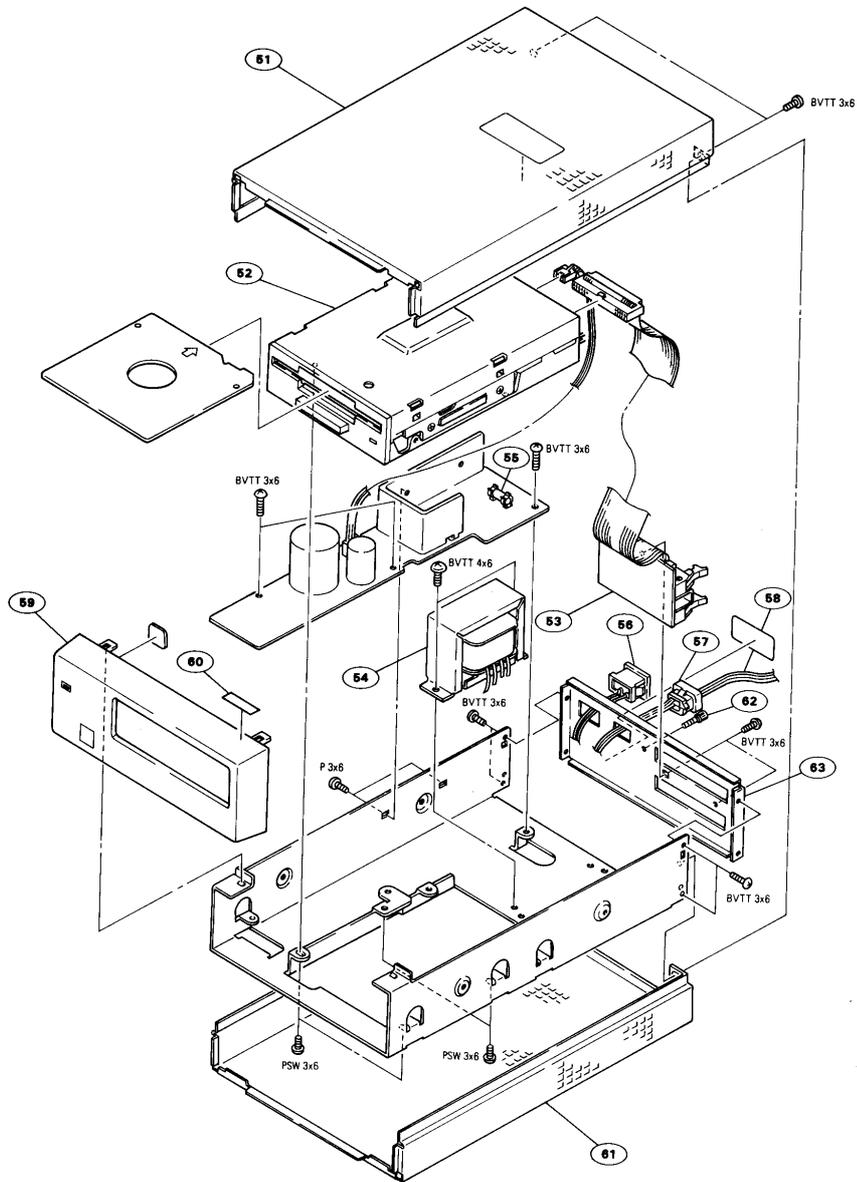


5. Adjust RV1 so that the T point is  $0 \pm 400 \mu sec$ .

# CHAPTER 9 REPAIR PARTS AND FIXTURE

## 9-1. EXPLODED VIEWS

### 9-1-1. MAIN Assembly



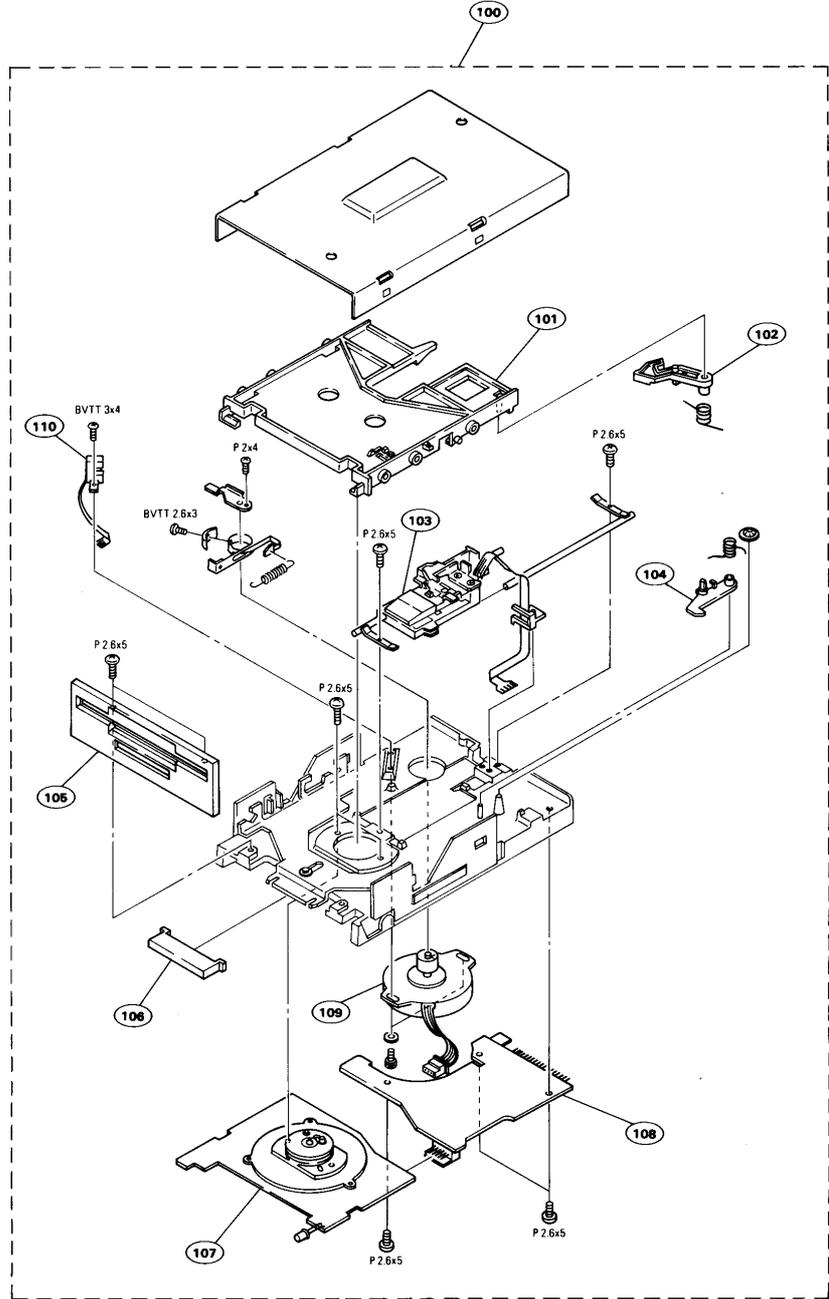
## MAIN

No.	Parts No.	Description
51	<b>4-608-663-01</b>	<b>CASE (UPPER)</b>
52	1-550-222-21	MFD UNIT
53	1-617-495-11	CH-112 BOARD
<b>△ 54</b>	<b>1-448-337-11</b> <b>1-448-336-11</b>	<b>TRANSFORMER, POWER (For AE model)</b> <b>TRANSFORMER, POWER (For UK model)</b>
<b>△ 55</b>	<b>1-532-611-11</b>	<b>FUSE, TIME LAG T125mA/250V</b>
<b>△ 56</b>	<b>1-570-455-11</b>	<b>SWITCH, AC POWER SEESAW</b>
<b>△ 57</b>	<b>3-703-244-01</b>	<b>BUSHING (2104), CORD</b>
<b>△ 58</b>	<b>1-558-245-11</b> <b>1-555-727-12</b>	<b>CORD, POWER (For AE model)</b> <b>CORD, POWER (For UK model)</b>
59	<b>4-608-660-02</b>	<b>PANEL</b>
60	<b>4-605-440-01</b>	<b>SEAL, HITBIT</b>
61	<b>4-608-662-01</b>	<b>CASE (LOWER)</b>
62	3-706-165-00	SCREW
63	<b>4-608-658-01</b>	<b>PLATE, JACK</b>

### NOTE:

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- Item with no part number and/or no description are not stocked because they are seldom required for routine service.

9-1-2. DISK DRIVE Assembly



## DISK DRIVE

No.	Parts No.	Description
100	1-550-222-21	MFD UNIT
<b>101</b>	<b>9-989-199-01</b>	<b>DISK HOLDER ASSY</b>
<b>102</b>	<b>9-989-200-01</b>	<b>LEVER, EJECT</b>
<b>103</b>	<b>9-989-202-01</b>	<b>D357 CARRIAGE ASSY</b>
<b>104</b>	<b>9-989-206-01</b>	<b>HOOK, EJECT</b>
<b>105</b>	<b>9-989-204-01</b>	<b>FRONT BEZEL</b>
<b>106</b>	<b>9-989-203-01</b>	<b>BUTTON</b>
<b>107</b>	<b>9-989-208-01</b>	<b>D357 DD MOTOR ASSY</b>
108	9-989-201-01	D357 PCB ASSY
<b>109</b>	<b>9-989-207-01</b>	<b>D357 STEP MOTOR</b>
<b>110</b>	<b>9-989-205-01</b>	<b>00 SENSOR ASSY</b>

### NOTE:

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9-2. ELECTRICAL PARTS LIST

Ref. No.	Parts No.	Description	Ref. No.	Parts No.	Description
<b>9-2-1. CN-112 Board</b>			CN1	1-535-117-00	TERMINAL
	1-617-495-11	CN-112 BOARD	CN2	1-562-249-00	SOCKET CONNECTOR 4P
	<b>1-506-572-11</b>	<b>PIN, CONNECTOR 34P</b>			
	<b>1-558-246-11</b>	<b>CORD, CONNECTOR (34 CORD)</b>	D21	<b>8-719-502-20</b>	<b>S2VB20</b>
			D31	<b>8-719-505-20</b>	<b>S2VB20</b>
C1	1-101-004-00	CERAMIC 0.01 50V			
			<b>△ F1</b>	<b>1-532-611-11</b>	FUSE, TIME LAG T125mA/250V
<b>9-2-2. PS-100 Board</b>			IC21	<b>8-759-700-06</b>	<b>NJM7812B</b>
	1-553-183-11	HOLDER, FUSE	IC31	<b>8-759-171-05</b>	<b>μPC7805H</b>
	1-564-505-11	PLUG CONNECTOR 2P			
	<b>2-371-561-00</b>	<b>BUSHING (P), INSULATING</b>			
	<b>4-875-726-00</b>	<b>SHEET, INSULATING</b>	<b>△ L1</b>	<b>1-421-764-11</b>	COIL
<b>△ C11</b>	<b>1-161-742-00</b>	CERAMIC 0.0022 20% 400V	R31	1-247-706-11	CARBON 330 5% 1/4W
<b>△ C12</b>	<b>1-161-742-00</b>	CERAMIC 0.0022 20% 400V			
<b>△ C13</b>	<b>1-130-456-00</b>	FILM 0.022 20% 250V			
<b>△ C14</b>	<b>1-130-456-00</b>	FILM 0.022 20% 250V	<b>9-2-3. LED-34 Board</b>		
C21	1-101-002-00	CERAMIC 0.0022 50V	D32	<b>8-719-903-07</b>	<b>GL-9NG24</b>
C22	1-101-002-00	CERAMIC 0.0022 50V			
C23	1-101-002-00	CERAMIC 0.0022 50V			
C24	1-101-002-00	CERAMIC 0.0022 50V			
C25	1-125-377-11	ELECT (BLOCK) 6800 20% 25V			
C26	1-136-165-00	FILM 0.1 5% 50V	<b>9-2-4. D357 Board</b>		
C27	<b>1-136-165-00</b>	<b>FILM 0.1 5% 50V</b>		9-989-201-01	MOUNTED PCB, D357
C28	1-123-333-00	ELECT 100 20% 16V			
C31	1-101-002-00	CERAMIC 0.0022 50V	C1	<b>1-163-189-11</b>	<b>CHIP 220PF 50V</b>
C32	1-101-002-00	CERAMIC 0.0022 50V	C2	<b>1-163-199-11</b>	<b>CHIP 560PF 50V</b>
C33	1-101-002-00	CERAMIC 0.0022 50V	C3	<b>1-163-053-11</b>	<b>CHIP 3300PF 50V</b>
C34	1-101-002-00	CERAMIC 0.0022 50V	C4	<b>9-989-169-01</b>	<b>CERAMIC 0.1</b>
C35	1-124-594-11	ELECT 4700 20% 16V	C5	<b>1-163-047-11</b>	<b>CHIP 1000PF 50V</b>
C36	1-136-165-00	FILM 0.1 5% 50V			
C37	1-136-165-00	FILM 0.1 5% 50V			
C38	1-123-320-00	ELECT 100 20% 16V			

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Ref. No.	Parts No.	Description	Ref. No.	Parts No.	Description
<b>C6</b>	<b>1-163-213-00</b>	<b>CHIP 2200PF 50V</b>	<b>R1</b>	<b>1-216-214-11</b>	<b>CHIP 4.7K 1/8W</b>
<b>C7</b>	<b>9-989-169-01</b>	<b>CERAMIC 0.1</b>	<b>R2</b>	<b>1-216-216-11</b>	<b>CHIP 5.6K 1/8W</b>
<b>C8</b>	<b>9-989-169-01</b>	<b>CERAMIC 0.1</b>	<b>R3</b>	<b>1-216-166-11</b>	<b>CHIP 47 1/8W</b>
<b>C9</b>	<b>9-989-170-01</b>	<b>ELECT 47 10V</b>	<b>R6</b>	<b>1-216-195-11</b>	<b>CHIP 750 1/8W</b>
<b>C10</b>	<b>1-163-059-11</b>	<b>CHIP 0.01 50V</b>	<b>R7</b>	<b>1-216-190-11</b>	<b>CHIP 470 1/8W</b>
<b>C11</b>	<b>1-163-074-11</b>	<b>CHIP 0.033 50V</b>	<b>R8</b>	<b>1-216-190-11</b>	<b>CHIP 470 1/8W</b>
<b>C14</b>	<b>9-989-170-01</b>	<b>ELECT 47 16V</b>	<b>R9</b>	<b>1-216-214-11</b>	<b>CHIP 4.7K 1/8W</b>
<b>C15</b>	<b>9-989-171-01</b>	<b>ELECT 2.2 50V</b>	<b>R10</b>	<b>1-216-222-11</b>	<b>CHIP 10K 1/8W</b>
<b>C16</b>	<b>9-989-172-01</b>	<b>ELECT 22 16V</b>	<b>R11</b>	<b>9-989-175-01</b>	<b>CARBON 240</b>
<b>C17</b>	<b>1-163-059-11</b>	<b>CHIP 0.01</b>	<b>R12</b>	<b>1-216-219-11</b>	<b>CHIP 7.5K 1/8W</b>
<b>C18</b>	<b>1-163-074-11</b>	<b>CHIP 0.033</b>	<b>R13</b>	<b>1-216-240-11</b>	<b>CHIP 56K 1/8W</b>
<b>C19</b>	<b>1-163-074-11</b>	<b>CHIP 0.033</b>	<b>R14</b>	<b>1-216-236-11</b>	<b>CHIP 39K 1/8W</b>
			<b>R17</b>	<b>1-216-230-11</b>	<b>CHIP 22K 1/8W</b>
			<b>R18</b>	<b>1-216-059-11</b>	<b>CHIP 10K 1/8W</b>
			<b>R19</b>	<b>1-216-216-11</b>	<b>CHIP 5.6K 1/8W</b>
<b>CN1</b>	<b>9-989-182-01</b>	<b>CONNECTOR M</b>	<b>R25</b>	<b>1-216-178-11</b>	<b>CHIP 150 1/8W</b>
<b>CN2</b>	<b>9-989-183-01</b>	<b>CONNECTOR C</b>	<b>R26</b>	<b>1-216-216-11</b>	<b>CHIP 5.6K 1/8W</b>
<b>CN3</b>	<b>9-989-184-01</b>	<b>FPC CONNECTOR</b>	<b>R33</b>	<b>1-216-198-11</b>	<b>CHIP 1K 1/8W</b>
<b>CN4</b>	<b>9-989-185-01</b>	<b>FPC CONNECTOR</b>	<b>R40</b>	<b>1-216-242-11</b>	<b>CHIP 68K 1/8W</b>
<b>CN5</b>	<b>9-989-186-01</b>	<b>CONNECTOR B</b>	<b>R43</b>	<b>1-216-214-11</b>	<b>CHIP 4.7K 1/8W</b>
<b>CN6</b>	<b>9-989-187-01</b>	<b>CONNECTOR A</b>	<b>R45</b>	<b>1-216-214-11</b>	<b>CHIP 4.7K 1/8W</b>
			<b>R47</b>	<b>1-216-216-11</b>	<b>CHIP 5.6K 1/8W</b>
			<b>R48</b>	<b>1-216-250-11</b>	<b>CHIP 150K 1/8W</b>
<b>D1</b>	<b>8-719-100-05</b>	<b>CHIP 1S2837</b>	<b>R49</b>	<b>1-216-216-11</b>	<b>CHIP 5.6K 1/8W</b>
<b>D2</b>	<b>8-719-100-05</b>	<b>CHIP 1S2837</b>	<b>R50</b>	<b>1-216-238-11</b>	<b>CHIP 47K 1/8W</b>
			<b>R51</b>	<b>1-216-242-11</b>	<b>CHIP 68K 1/8W</b>
<b>IC1</b>	<b>9-989-165-01</b>	<b>M51017P</b>	<b>R52</b>	<b>1-216-234-11</b>	<b>CHIP 33K 1/8W</b>
<b>IC2</b>	<b>8-759-303-01</b>	<b>HA13421</b>	<b>R53</b>	<b>1-216-246-11</b>	<b>CHIP 1K 1/8W</b>
<b>IC3</b>	<b>8-759-900-93</b>	<b>SN74LS93N</b>	<b>R55</b>	<b>1-216-216-11</b>	<b>CHIP 5.6K 1/8W</b>
			<b>R56</b>	<b>1-216-216-11</b>	<b>CHIP 5.6K 1/8W</b>
			<b>R58</b>	<b>1-216-216-11</b>	<b>CHIP 5.6K 1/8W</b>
<b>L1</b>	<b>9-989-168-01</b>	<b>COIL 330μH</b>	<b>R59</b>	<b>9-989-174-01</b>	<b>METAL OXIDE 220</b>
<b>L2</b>	<b>9-989-168-01</b>	<b>COIL 330μH</b>	<b>R60</b>	<b>1-216-216-11</b>	<b>CHIP 5.6K 1/8W</b>
			<b>RB1</b>	<b>9-989-173-01</b>	<b>COMPOSITION CIRCUIT BLOCOK</b>
<b>Q7</b>	<b>8-729-901-00</b>	<b>CHIP DTC124EK</b>			
<b>Q9</b>	<b>9-989-161-01</b>	<b>CHIP 2SC2412K</b>			
<b>Q10</b>	<b>9-989-161-01</b>	<b>CHIP 2SC2412K</b>			
<b>Q11</b>	<b>8-729-901-00</b>	<b>CHIP DTC124EK</b>	<b>RV2</b>	<b>9-989-176-01</b>	<b>VARIABLE RESISTOR 200K</b>
<b>Q12</b>	<b>8-729-901-00</b>	<b>CHIP DTC124EK</b>			
<b>Q13</b>	<b>8-729-901-00</b>	<b>CHIP DTC124EK</b>			
<b>Q14</b>	<b>8-729-901-00</b>	<b>CHIP DTC124EK</b>	<b>SW1</b>	<b>9-989-177-01</b>	<b>LEAD SWITCH</b>
<b>Q15</b>	<b>8-729-900-98</b>	<b>CHIP DTC143TK</b>	<b>SW2</b>	<b>9-989-177-01</b>	<b>LEAD SWITCH</b>
<b>Q20</b>	<b>8-729-901-00</b>	<b>CHIP DTC124EK</b>			
<b>Q21</b>	<b>8-729-901-00</b>	<b>CHIP DTC124EK</b>			
<b>Q22</b>	<b>9-989-167-01</b>	<b>2SC2021NL</b>			

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**9-3. PACKING MATERIAL AND ACCESSORY**

No.	Parts No.	Description
	3-760-989-11	MANUAL, INSTRUCTION (ENGLISH)
	3-760-989-41	MANUAL, INSTRUCTION (FRENCH, GERMAN, SPANISH)
	3-760-989-51	MANUAL, INSTRUCTION (DUTCH, SWEDISH, ITALIAN)
	4-608-603-01	LABEL, B DRIVE
	3 701-619-00	BAG, POLYETHYLEN, STANDARD
	4-609-350-01	CUSHION
	4-609-355-11	INDIVIDUAL CARTON
	4-609-357 01	SHEET, PROTECTION

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# SERVICE MANUAL

*AEP Model*  
*UK Model*

No. 1

## CORRECTION

File this Correction with the Service Manual.

—: corrected portion

- Service Manual Page 9-4.

No.	Parts No.	Description
105	9-989-204-01	FRONT BEZEL
	↓	
105	9-989- <u>589</u> -01	FRONT BEZEL

**INTERFACE CABLE/  
MICRO FLOPPYDISK DRIVE UNIT**

**SONY**<sup>®</sup>

Sony Corporation  
Audio Group

English  
87H0536-1  
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9-975-601-91