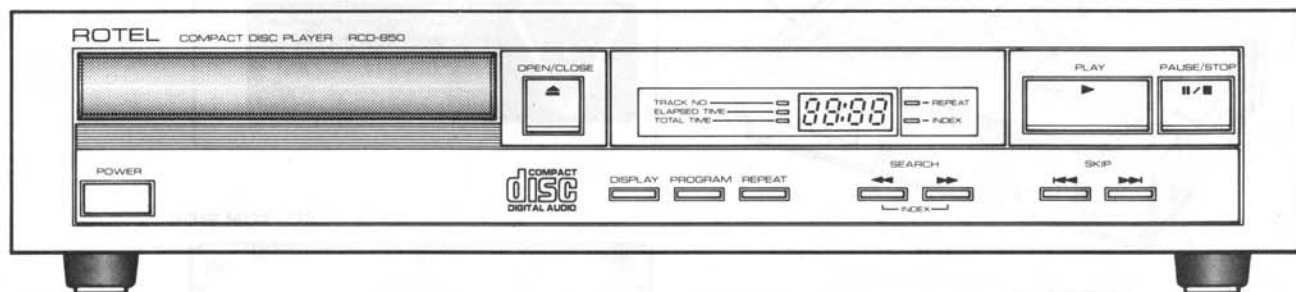


COMPACT DISC PLAYER

RCD-850


SERVICE MANUAL

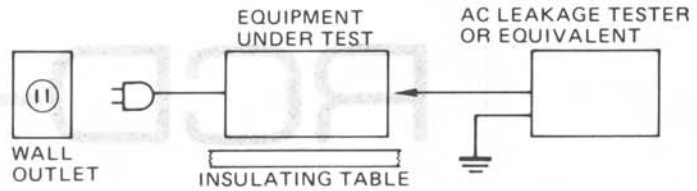


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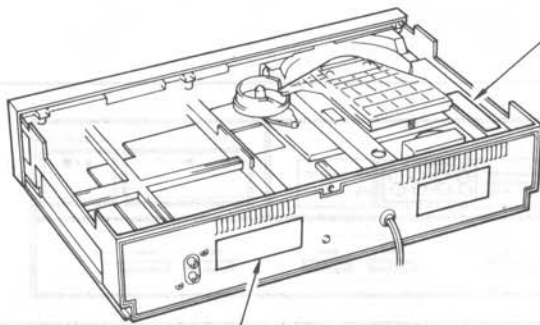
TO SERVICE PERSONNEL

- Critical Components Information.**
Components having special characteristics are marked  and must be replaced with parts having specifications equal to those originally installed.
- Leakage Current Measurement (For 120V Model Only).**
When service has been completed, it is imperative that you verify that all exposed conductive surfaces are properly insulated from supply circuits.
 - Meter impedance should be equivalent to 1500 ohm shunted by 0.15 μ F
 - Leakage current must not exceed 0.5mA.
 - Be sure to test for leakage with the AC plug in both polarities.



CAUTION – USE OF CONTROLS, ADJUSTMENTS, OR PERFORMANCE OF PROCEDURES OTHER THAN THOSE SPECIFIED HEREIN, MAY RESULT IN HAZARDOUS RADIATION EXPOSURE.

THE COMPACT DISC PLAYER SHOULD NOT BE ADJUSTED OR REPAIRED BY ANYONE EXCEPT PROPERLY QUALIFIED SERVICE PERSONNEL.



U.S.A. model

DANGER—Invisible laser radiation when open and interlock failed or defeated.
AVOID DIRECT EXPOSURE TO BEAM. (CA07626 1)

Canadian model

CAUTION—HAZARDOUS LASER AND ELECTROMAGNETIC RADIATION WHEN OPEN AND INTERLOCK DEFEATED
ATTENTION—RAYONNEMENT LASER ET ELECTROMAGNETIQUE DANGEREUX SI OUVERT AVEC L'ENCLICHEMENT DE SECURITE ANNULE (CB67478)

CAUTION

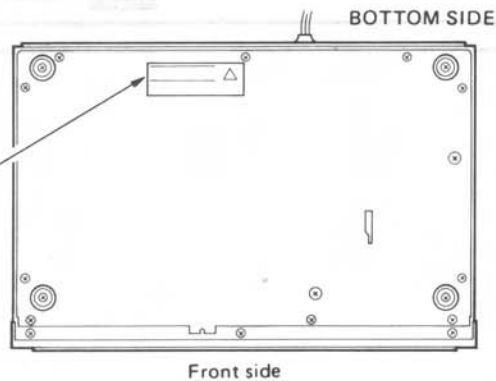
RISK OF ELECTRIC SHOCK
DO NOT OPEN

ATTENTION—RISQUE DE CHOC ELECTRIQUE NE PAS OUVRIR
WARNING—TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

LISTED
AUDIO EQUIPMENT
6072

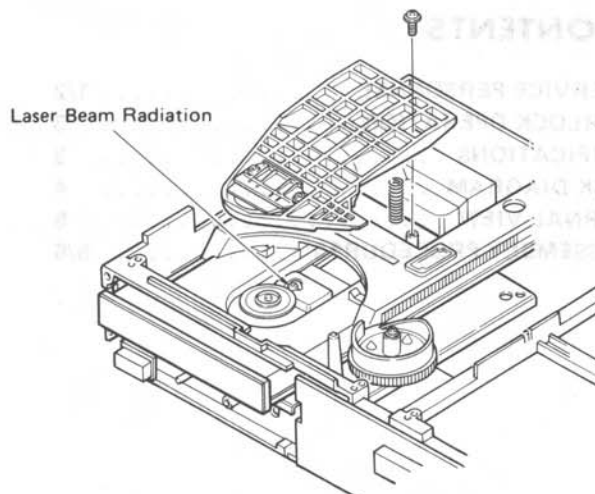
THIS PRODUCT COMPLIES WITH
DHS RULES 21 CFR SUBCHAPTER
J PART 1040.10 AT DATE OF
MANUFACTURE.

MANUFACTURED: NSKK
(date code)

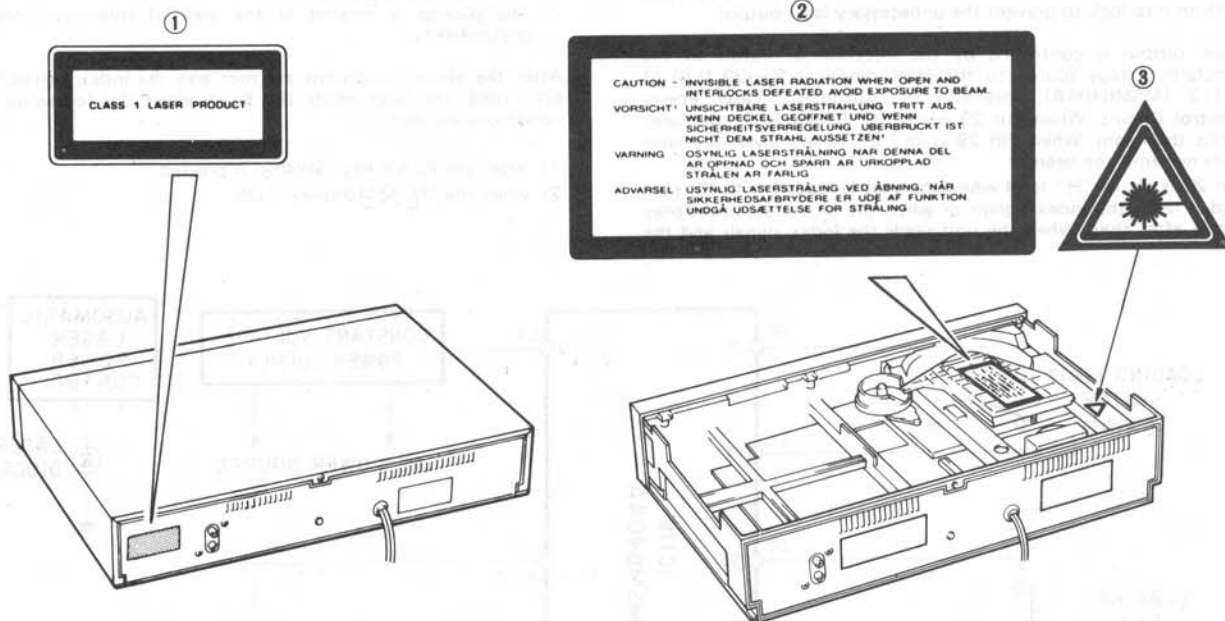


LASER BEAM RADIATION SPOT

Laser Diode Properties
Material: Ga-Al-As
Wavelength: 755 – 805 nm (25°C)
Laser Output: Continuous Wave max. 5 mW



European model



English

- ① THIS LABEL IS ATTACHED AT THE PLACE ILLUSTRATED TO INFORM THAT THE APPARATUS CONTAINS A LASER COMPONENT.
- ② THIS LABEL IS ATTACHED IN THE POSITION SHOWN IN THE ILLUSTRATION TO WARN THAT ANY FURTHER PROCEDURE WILL BRING THE USER INTO EXPOSURE WITH THE LASER BEAM.

- ③ THE WARNING LABEL INFORMING OF RADIATION IS PLACED INSIDE THE UNIT AS SHOWN IN THE ILLUSTRATION, TO WARN AGAINST FURTHER MEASURES ON THE UNIT. THE EQUIPMENT CONTAINS A LASER COMPONENT RADIATING LASER RAYS EXCEEDING THE LIMIT OF LASER PRODUCTS OF CLASS 1.

CAUTION—USE OF CONTROLS, ADJUSTMENTS OR PERFORMANCE OF PROCEDURES OTHER THAN THOSE SPECIFIED HEREIN, MAY RESULT IN HAZARDOUS RADIATION EXPOSURE.

Swedish

- ① PÅSKRIFTEN SITTER PÅ APPARATEM SOM VISAS SOM EN UPPMANING OM ATT APPARATEN OMFATTAR EN INBYGGD LASERKOMPONENT.
- ② TEXTSKYLTEN FÖR LASERN ÄR PLACERAD PÅ APPARATEN SOM EN UPPMANING OM ATT APPARATEN INNEHÅLLER EN LASERKOMPONENT.
- ③ VARNINGSSKYLTEN FÖR STRÅLNING HAR PLACERATS I APPARATEN, SOM BILDEN VISAR, SOM EN VARNING OM YTTERLIGARE INGREPP I APPARATEN. MATERIELEN INNEHÅLLER EN LASERKOMPONENT SOM AVGER LASERSTRÅLNING ÖVERSTIGANDE GRÄNSEN FÖR LASERKLASS 1.

VARNING—INGREPP I APPARATEN BÖR ENDAST FÖRETAS AV FACKMAN MED KUNSKAP OM ATT RISK FÖRELIGGER FÖR RADIOAKTIV STRÅLNING.

Danish

- ① DETTE MÆRKAT ER ANBRAGT SOM VIST I ILLUSTRATIONEN FOR AT ADVARE BRUGEREN OM AT APPARATET INDEHOLDER EN LASERKOMPONENT.
- ② DETTE MÆRKAT OM LASEREN ER ANBRAGT PÅ APPARATET SOM EN OPLYSNING OM AT APPARATET INDEHOLDER ET LASERKOMPONENT.
- ③ ADVARSELSKILTET OM STRÅLING ER PLACERET INDENI APPARATET, SOM VIST I ILLUSTRATIONEN, SOM EN ADVARSEL OM YDERLIGERE INDGREB I APPARATET. APPARATET INDEHOLDER ET LASERKOMPONENT SOM AVGIVER LASERSTRÅLING DER OVERSTIGER GÆNSEVERDIEN FOR LASERKLASSE 1.

ADVARSEL! INDGREB BØR KUN FORETAGES AF EN FAGMAND DA DER ER RISIKO FOR RADIOAKTIV STRÅLING.

Finnish

- ③ "VAROITUS! LAITE SISÄLTÄÄ LASERDIODIN, JOKA LÄHETTÄÄ (NÄKYMÄTÖNTÄ) SILMILLE VAARALLISTA LASERSÄTEILYÄ:"

INTERLOCK OPERATION

The Digital Compact Disc Player reads the disc signals by laser beam detection. It must be avoided for the human body to be directly exposed to the laser beam. Human eyes are especially badly affected by the laser beam. This unit is therefore equipped with an interlock to prevent the unnecessary laser output.

Laser output is controlled by the injection or cutoff of the constant voltage source to the laser diode at Pin 29 (LS) of IC112 (MSM6404A), and also by Automatic Laser Power Control Circuit. When Pin 29 is in "H" (High) level, the laser emits the beam. When Pin 29 is in "L" (Low) level, the laser does not emit the beam.

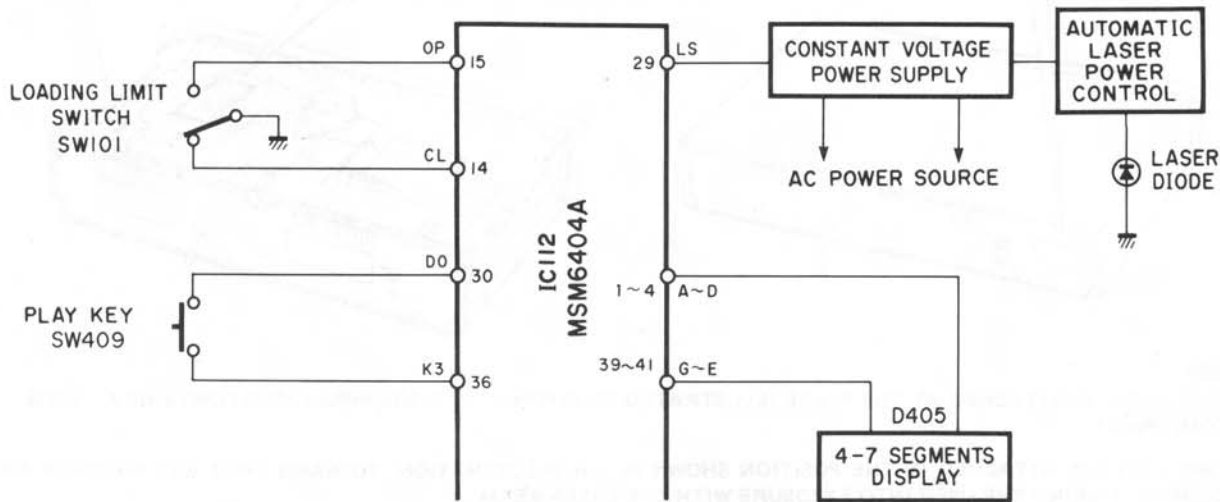
Pin 29 is set in "H" level when the unit is loaded with the disc and it reads the index signals or when the unit is set in the play mode after that. When the unit reads the index signals and the

following two conditions are met, the laser emits the beam.

- 1) When the Loading Limit Switch (SW101) is set in "CL" side. (The disc tray is closed.)
- 2) The pickup is located at the area of minimum internal circumference.

After the above conditions are met and the index signals have been read, the laser emits the beam when the following two conditions are met.

- 1) when the PLAY key (SW409) is pressed.
- 2) when the **PLAY** display is ON.



SPECIFICATIONS

Format	Compact disc digital audio system	
AUDIO SECTION		
Frequency response	5 Hz -20 kHz +0.5/-1.0 dB	
Harmonic distortion (20Hz - 20 kHz)	Less than 0.003% (1 kHz) (IEC-A network)	
Harmonic distortion + noise (20Hz - 20 kHz)	Less than 0.004% (1 kHz) (IEC-A network)	
S/N ratio	IEC FLAT 98 dB	
Dynamic range	Better than 95 dB	
Wow & Flutter	Unmeasurable	
Channel separation	Better than 90 dB (1 kHz)	
Output voltage/impedance	2V/1 k ohm (at full scale : 0 dB)	
Headphone output (Headphone: 8 ohms)	0.15V (at -20 dB)	
INTERNAL SYSTEMS		
Optical pick-up	3-beam laser	
Error correction system	CIRC dual error correction system	
D/A conversion	16 bit linear	
Filter	Digital filter + third order active filter	

FUNCTIONS

Music search	"+" and "-" keys ordered program search
Index search	Search key (STOP mode only)
Fast forward/rewind	Dual speed automatic switching
Total music time display	DISPLAY key
Program function	9 selections, random
Repeat	Repeat of all selections or all program selections
Disc loading	Motor driven, horizontal loading

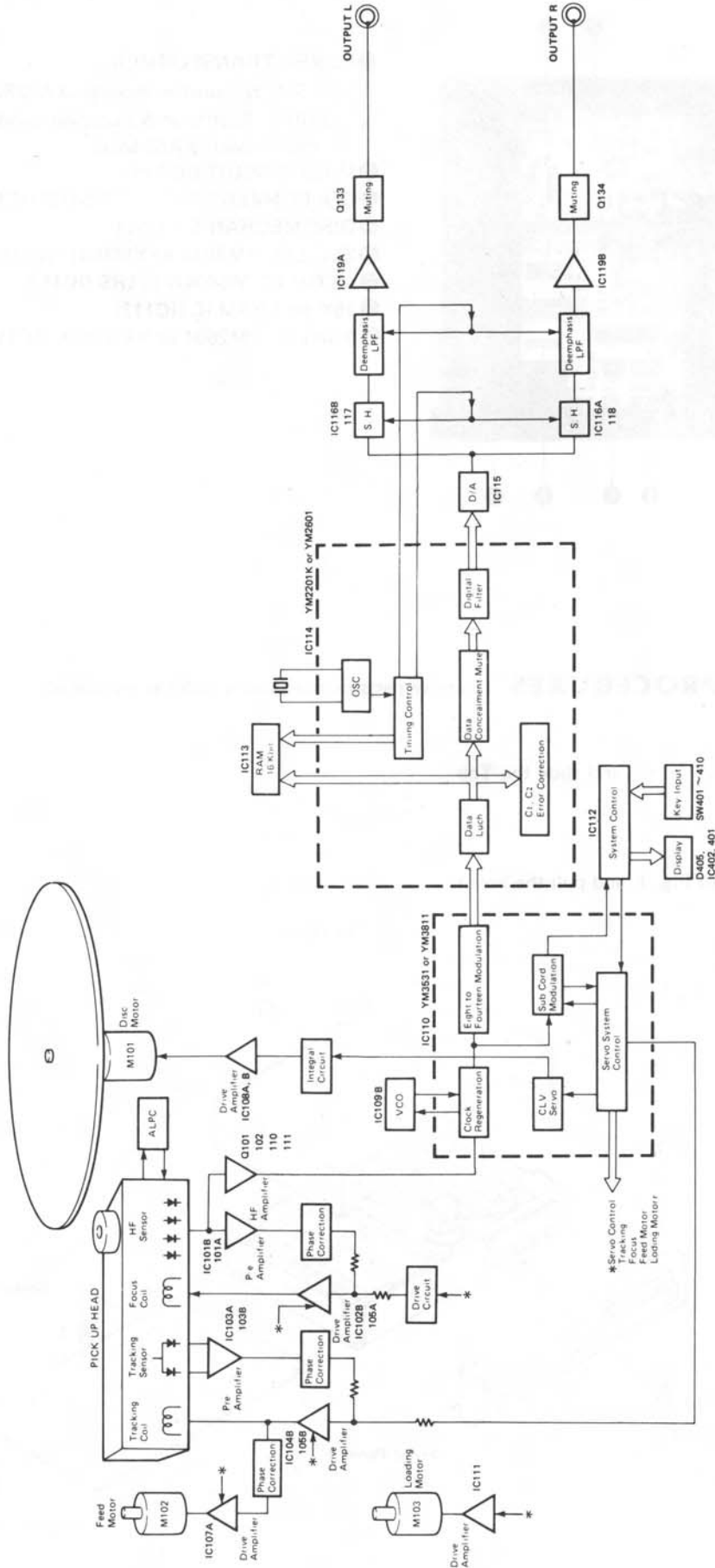
GENERAL

Power requirements	
U.S. & Canadian Models	120V AC, 60Hz
European, British & Australian Models	240V · 220V AC, 50Hz
Other Model	110V ~ 130V/220V ~ 240V AC, 50/60Hz
Power consumption	20 W
Dimensions (W x H x D)	435 x 94 x 290 mm (17-1/8 x 3-11/16 x 11-7/16")
Weight	4.2 kg (9 lbs 4 oz.)
Accessories	Pin plug cord

* Specifications subject to change without notice.

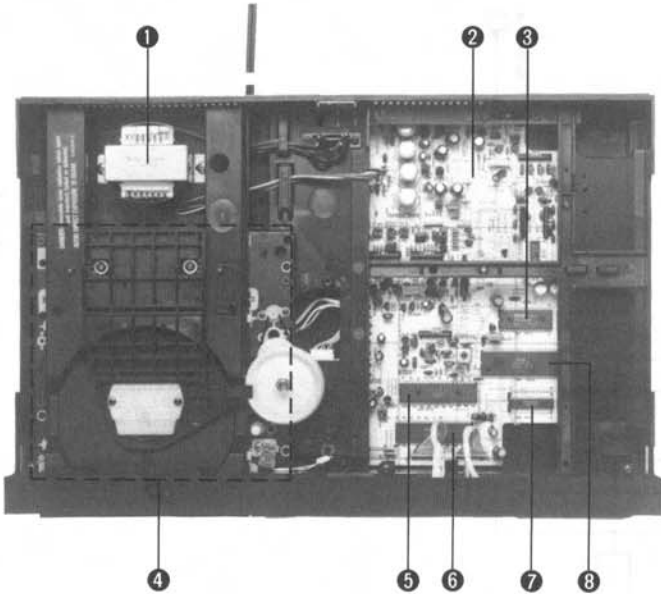
- (U) U.S.A. model
- (C) Canadian model
- (B) British model
- (A) Australian model
- (G) European model
- (R) Other model

BLOCK DIAGRAM



INTERNAL VIEW

BLOCK DIAGRAM



① POWER TRANSFORMER

U.S.A. & Canadian models: XA625A00

British, Australian & European models: XA626A00

Other model: XA624A00

② MAIN CIRCUIT BOARD

③ D/A CONVERTER IC: PCM54HP (IC115)

④ DISC MECHANISM UNIT

⑤ SVC LSI: YM3811 or YM3531 (IC110)

⑥ μ -COM IC: M6404A-124RS (IC112)

⑦ 16K bit SRAM IC (IC113)

⑧ SGP LSI: YM2601 or YM2201K (IC114)

DISASSEMBLY PROCEDURES (Remove parts in disassembly order as numbered)

1. Removal of Top Cover

Remove 5 screws (①) in fig. 1, and slide the Top Cover to the back.

2. Removal of Front Panel

Remove 7 screws (②) in Fig. 1, and pull the Front Panel forward.

3. Removal of Bottom Cover

Remove 6 screws (③) in fig. 1.

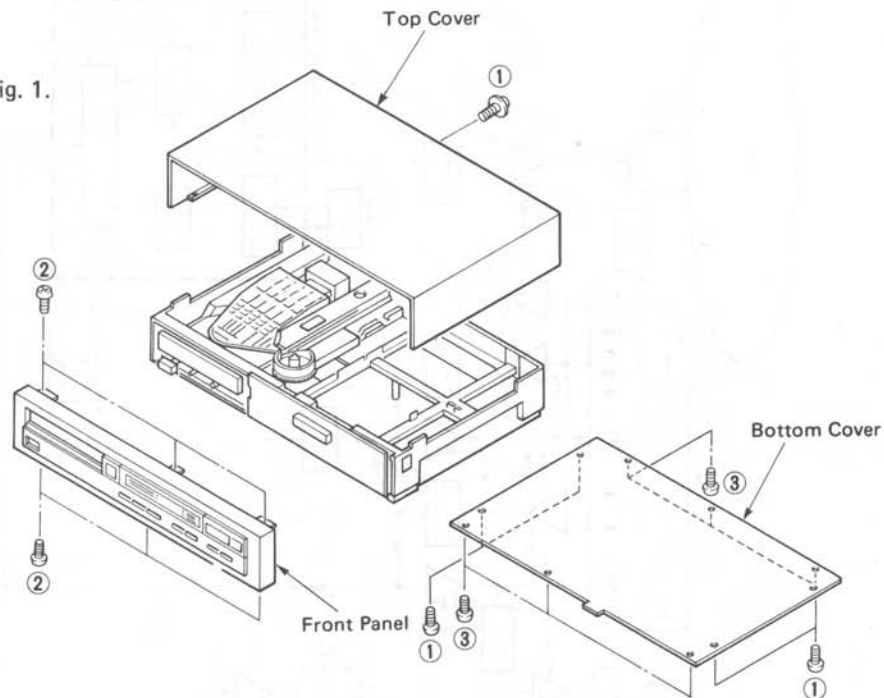


Fig. 1

4. Removal of DISC Tray Ass'y

Lift Flapper as shown in fig. 2, and pull Disc Tray Ass'y forward.

Then pull off Disc Tray Ass'y by pressing the hook (A) in fig. 3. Now, the azimuth can be adjusted.

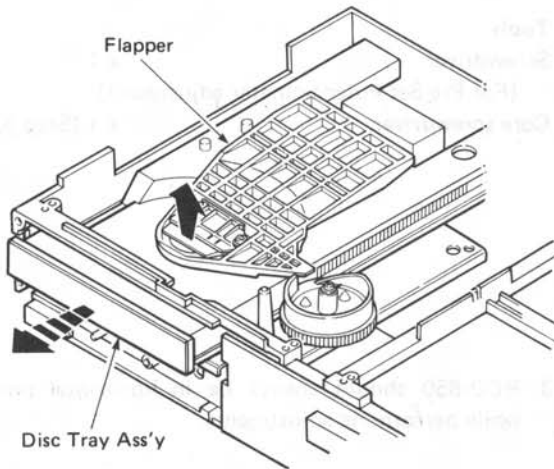


Fig. 2

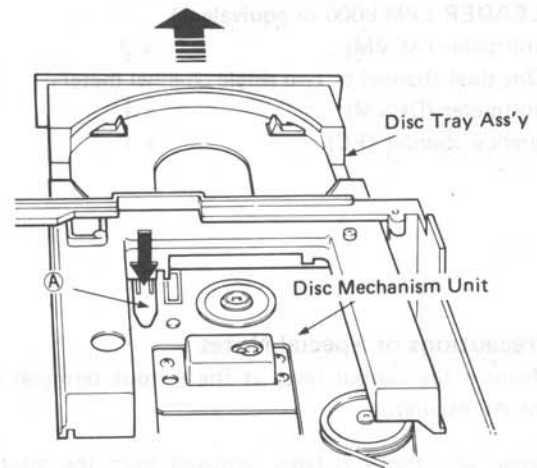


Fig. 3

5. Removal of DISC Mechanism Unit

Remove 4 screws (4) in fig. 4.

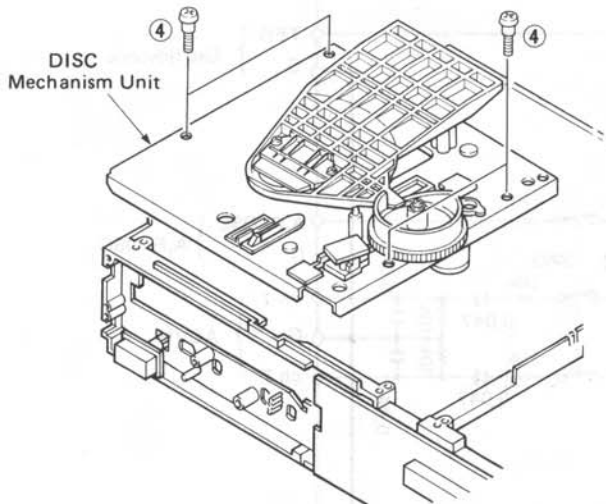


Fig. 4

6. Removal of Flapper

Loosen screw (5) fixing Flapper in fig. 5 and then remove the Flapper.

7. Removal of Cam

Remove screw (6) in fig. 5 and then pull up the Cam.

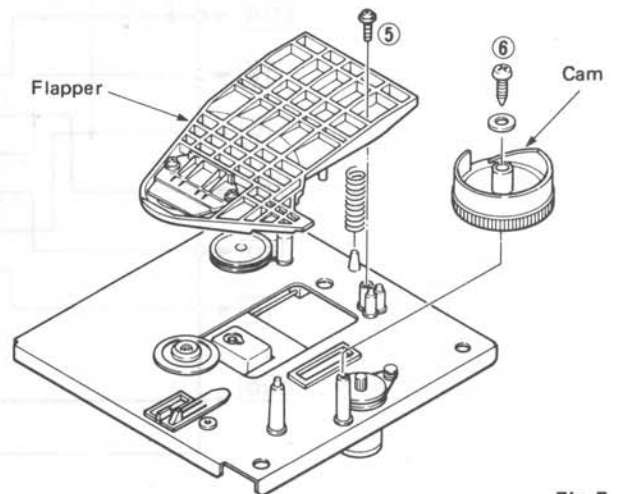


Fig. 5

ADJUSTMENTS

Necessary items

Measuring instruments

Oscilloscope	: x 2
(At least one shall have a bandwidth of 50 MHz or more)	
Audio frequency oscillator (A.F.OSC)	: x 1
Laser power meter	: x 1
(LEADER LPM-8000 or equivalent)	
AC voltmeter (ACVM)	: x 2
(One dual channel or two single channel meters)	
DC voltmeter (DCVM)	: x 1
Frequency counter (FC)	: x 1

Jigs

Filter (See Fig. A)	: x 1
Shorting cord	: x 1 (Step 3, P10)
MLP-3 Special tool (See Pg. 14)	: x 1 (Step 5, P12)

Tools

Screwdriver	: x 1
(For Pre-Set Potentiometer adjustment)	
Core screwdriver	: x 1 (Step 3)

Precautions or Special Notes

1. Measure the output level at the output terminal of the AF oscillator.
2. When disc tray has been removed from the mechanism, make sure the position of the loading cam and the leaf switch are correct.

3. RCD-850 should always be in horizontal position while performing adjustments.

Adjustment jig (with internal filter)

Connect the filter in Fig. A before measurement.

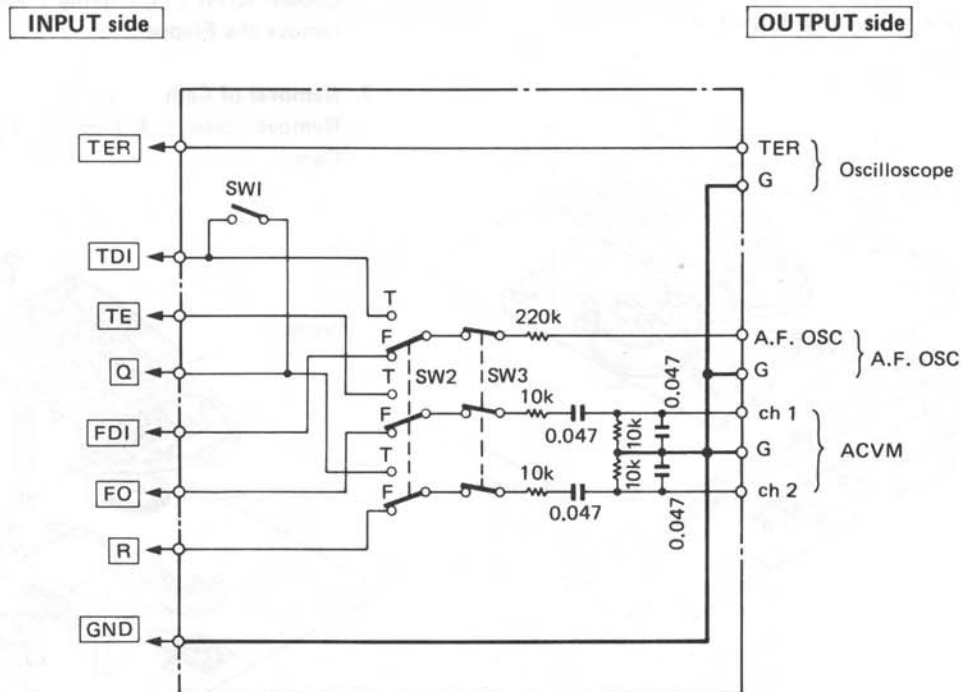
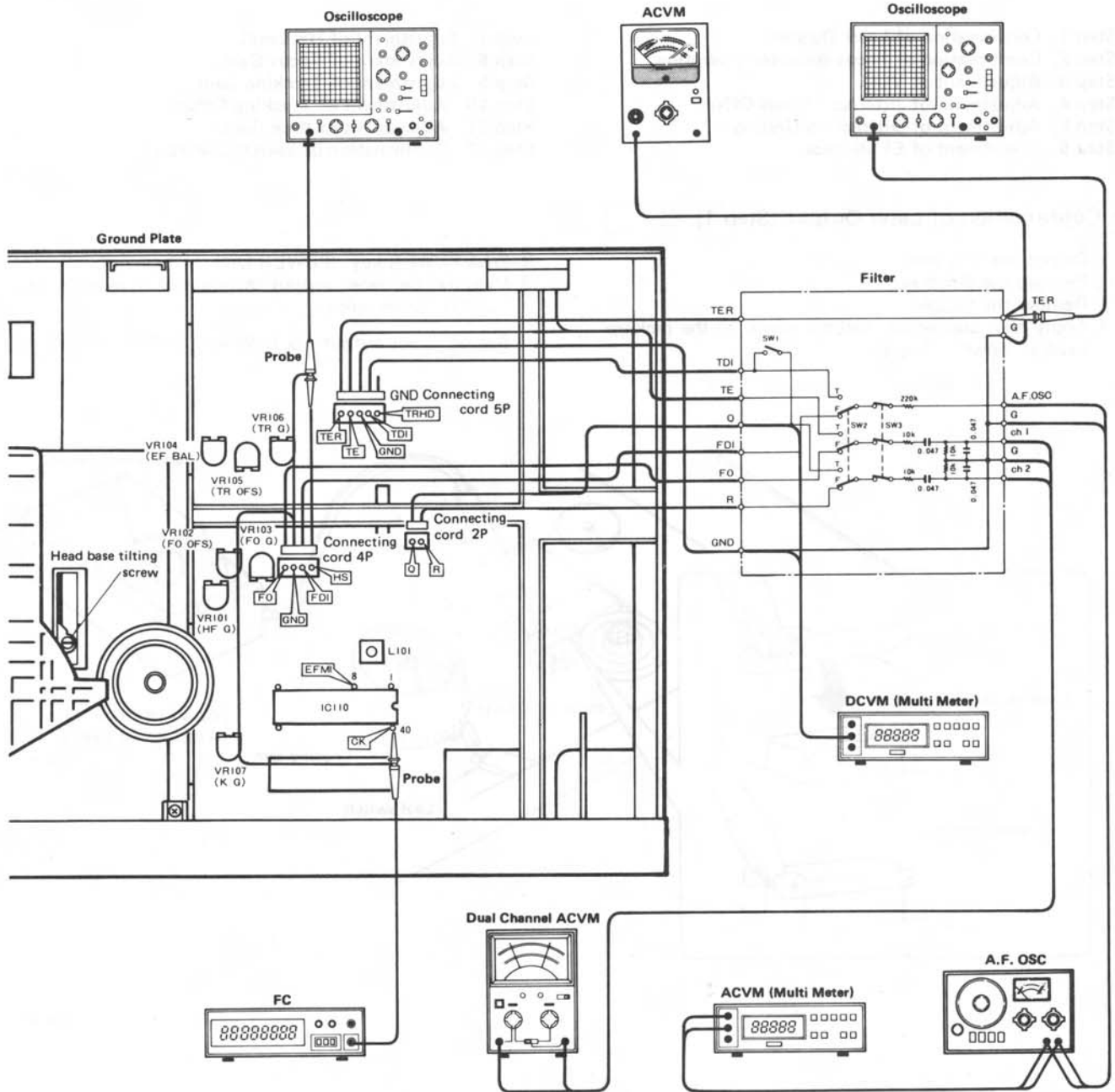


Fig. A

- SW1:** For diffraction grating and EF balance adjustments
SW2: FOCUS gain and TRACKING gain switching
SW3: BPF ON/OFF switch

● Test Points



★Carry out following adjustments in the order as numbered.

- Step 1. Confirmation of Laser Output.
- Step 2. Confirmation of Focus Actuator Operation.
- Step 3. Adjustment of VCO.
- Step 4. Adjustment of Jitter and Focus Offset.
- Step 5. Adjustment of Diffraction Grating.
- Step 6. Adjustment of EF Balance.

- Step 7. Adjustment of HF Level.
- Step 8. Adjustment of Focus Gain.
- Step 9. Adjustment of Tracking Gain.
- Step 10. Adjustment of Tracking Offset.
- Step 11. Adjustment of Kick Gain.
- Step 12. Confirmation of Search Operation.

Confirmation of Laser Output (Step 1)

- ① Do not load the disc.
- ② Remove the disc tray.
- ③ Remove the flapper.
- ④ Apply the laser power meter's sensor to the pick-up head as shown in Fig. B.

- ⑤ Press POWER key. (POWER ON)
- ⑥ Measure the laser output during the 5 seconds of FOCUS search mode.

Rating: Laser output = 0.1mW to 0.3mW

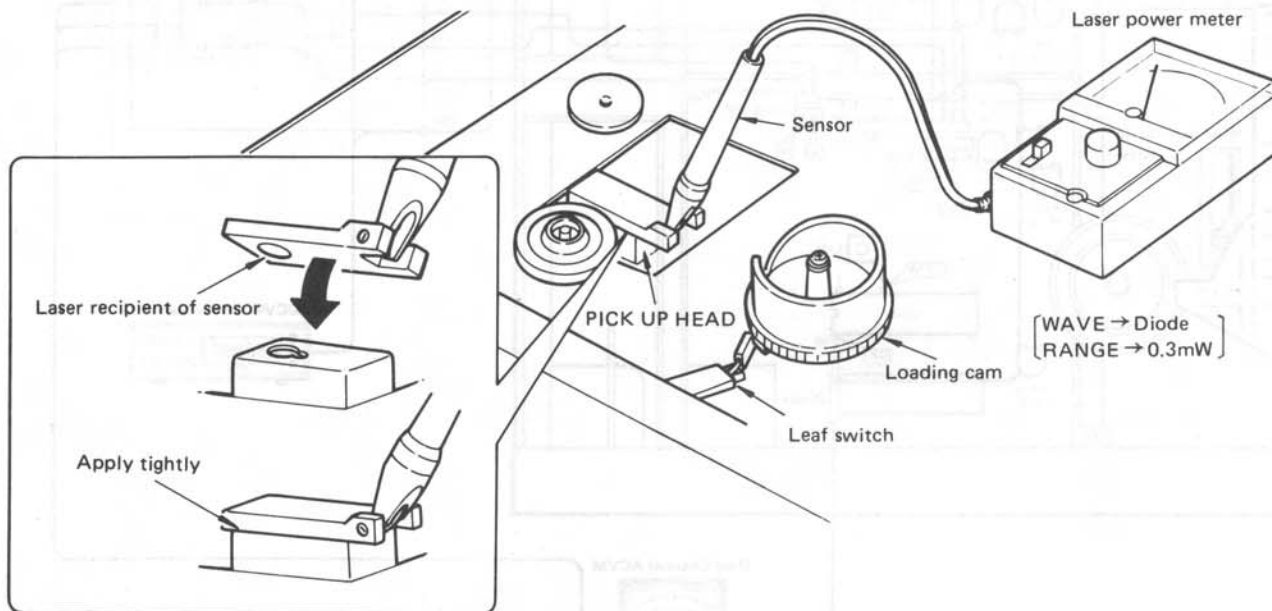


Fig. B

Precautions in handling pick-up head

- (1) No soldering necessary for RCD-850.
- (2) Since laser light is near-infrared, visual confirmation is difficult. While light is emitted, for safety, make sure your eyes are at least 30 cm away from the objective lens.
- (3) Do not disassemble it.
- (4) Do not drop or apply shock to it.
- (5) Do not leave it under high temperature or humidity.
- (6) Do not touch the objective lens. Should there be dirt on the lens, clean using a blower for cameras.

Confirmation of Focus Actuator Operation (Step 2)

Oscilloscope (1) settings

- DC coupling
- 1V/div range (Vertical)
(0.1V/div when 10:1 probe is used)
- 0.5 sec/div or 1 msec/div time (Horizontal)

- ① Do not load a disc.
- ② Connect the oscilloscope (1) to **R** and **GND** terminals on the input side of the filter.
- ③ Press POWER key. (POWER ON)
- ④ After confirming that loading cam position is correct press OPEN/CLOSE key for CLOSE operation.
- ⑤ During 5 seconds of FOCUS search, confirm that the waveform is as shown in Fig. C.
- ⑥ Confirm that the pick-up head's objective lens moves smoothly between the lowest and highest points.

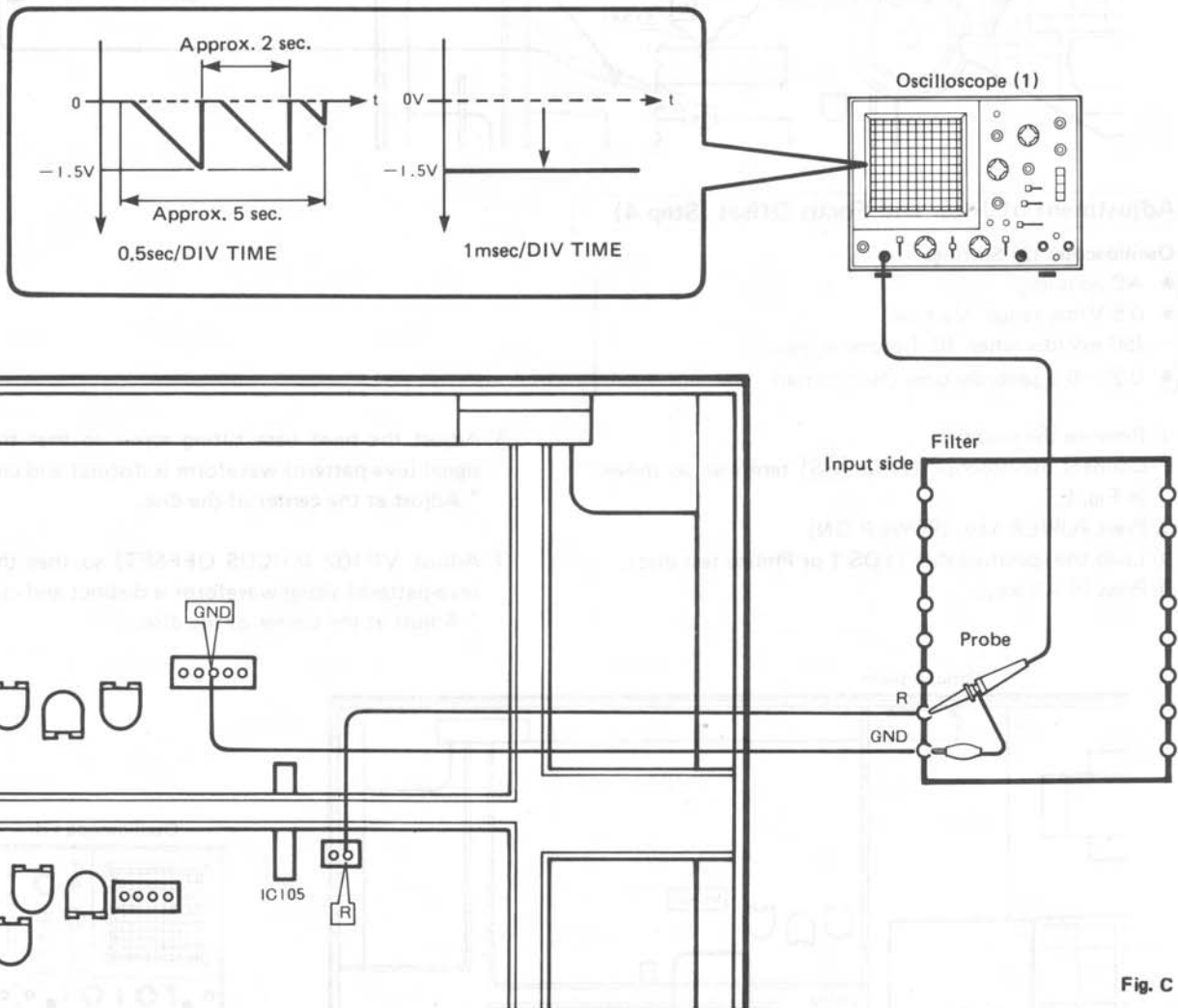


Fig. C

Adjustment of VCO (Step 3)

- ① Connect the shorting cord and measuring instruments, as shown in Fig. D.
 - ② Do not load a disc.
 - ③ Press POWER key. (POWER ON)
 - ④ While observing the frequency counter indication (FVCO), adjust L101 so that it satisfies the rating.
- Rating: FVCO = 4.3218 MHz ± 10 kHz

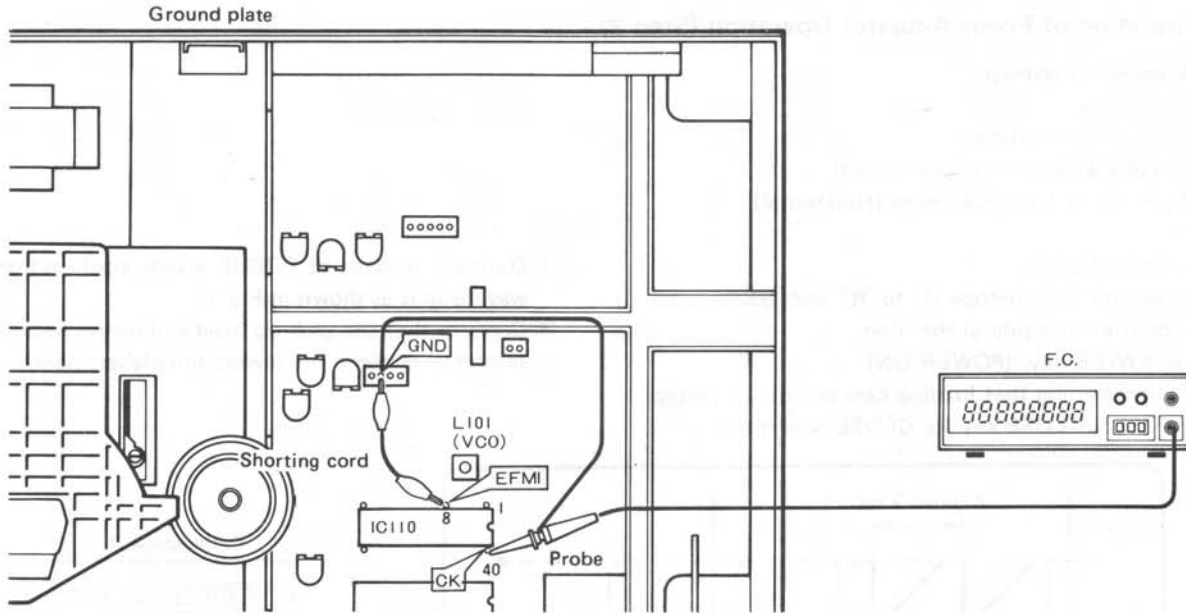


Fig. D

Adjustment of Jitter and Focus Offset (Step 4)

Oscilloscope (2) Settings

- AC coupling
- 0.5 V/div range (Vertical)
(50 mV/div when 10:1 probe is used)
- 0.2 ~ 0.5 μ sec/div time (Horizontal).

- ① Remove the disc tray.
- ② Connect oscilloscope (2) to **[HS]** terminal, as shown in Fig. E.
- ③ Press POWER key. (POWER ON)
- ④ Load the specified disc (YDS-1 or Philips test disc).
- ⑤ Press PLAY key.
- ⑥ Adjust the head base tilting screw so that the **[HS]** signal (eye-pattern) waveform is distinct and clear.
* Adjust at the center of the disc.
- ⑦ Adjust VR102 (FOCUS OFFSET) so that the **[HS]** (eye-pattern) signal waveform is distinct and clear.
* Adjust at the center of the disc.

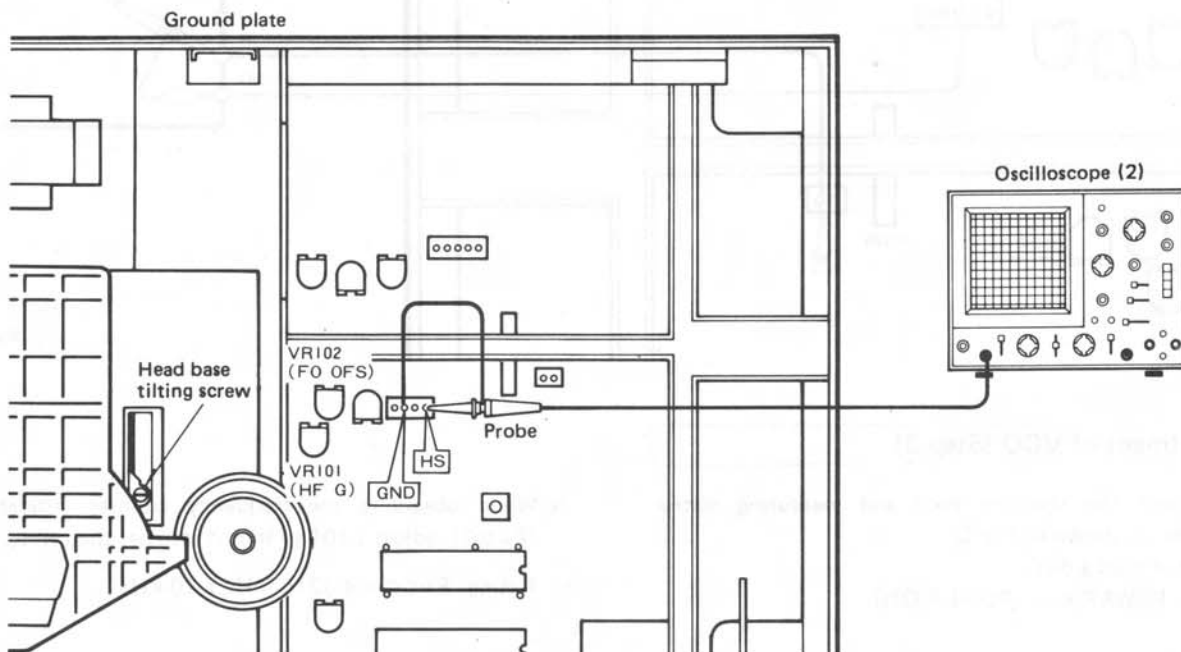
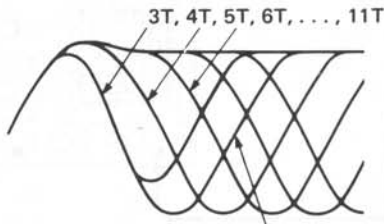


Fig. E

Waveforms 3T-11T.



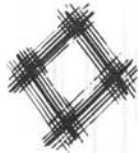
This portion is referred to as the eye pattern.

The abnormal eye pattern has less distinct lines and smaller amplitude than that of the good waveform.

Good waveform



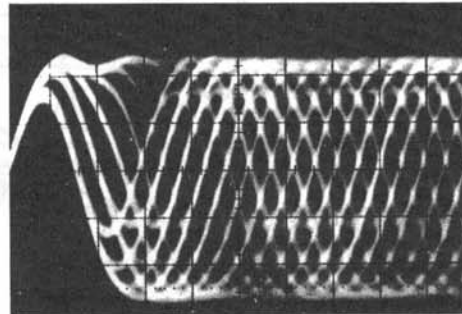
Abnormal waveform



Adjust so that the good waveform is obtained.

Oscilloscope (2)

Eye pattern



2.5Vp-p

0.5μsec/div time (Horizontal)
0.5V/div (Vertical)

Adjustment of Diffraction Grating (Step 5)

* This adjustment requires use of 2 oscilloscopes.

* Power should not be turned OFF during steps ② through ⑨.

Oscilloscope (1) setting conditions

- DC coupling
- 0.1V/div range (Vertical)
(10mV/div when 10:1 probe is used)
- 5 to 20 msec/div time (Horizontal)

- ① Connect the filter and measuring instruments, as shown in Fig. F.
 - 1) Connect oscilloscope (1) to **TER** terminal.
 - 2) Connect oscilloscope (2) to the **HS** terminal.
- ② Press POWER key. (POWER ON)
- ③ Load Philips test disc. (Have lead-in data read.)
- ④ Press PLAY key then Pause.
- ⑤ Set SW1 in the filter to ON.
(Short-circuit **TDI** terminal and **Q** terminal: TRACKING SERVO to open)
- ⑥ Observe waveform on oscilloscope (1).

Oscilloscope (2) setting conditions

- AC coupling
- 0.5 V/div range (Vertical)
(50mV/div when 10:1 probe is used)
- 0.2 ~ 0.5 μsec/div time (Horizontal)

- ⑦ Using the special tool (See Pg. 14) adjust diffraction grating for maximum signal amplitude **TER** at oscilloscope (1).

Rating: $E_{TER} \geq 150mVp-p$

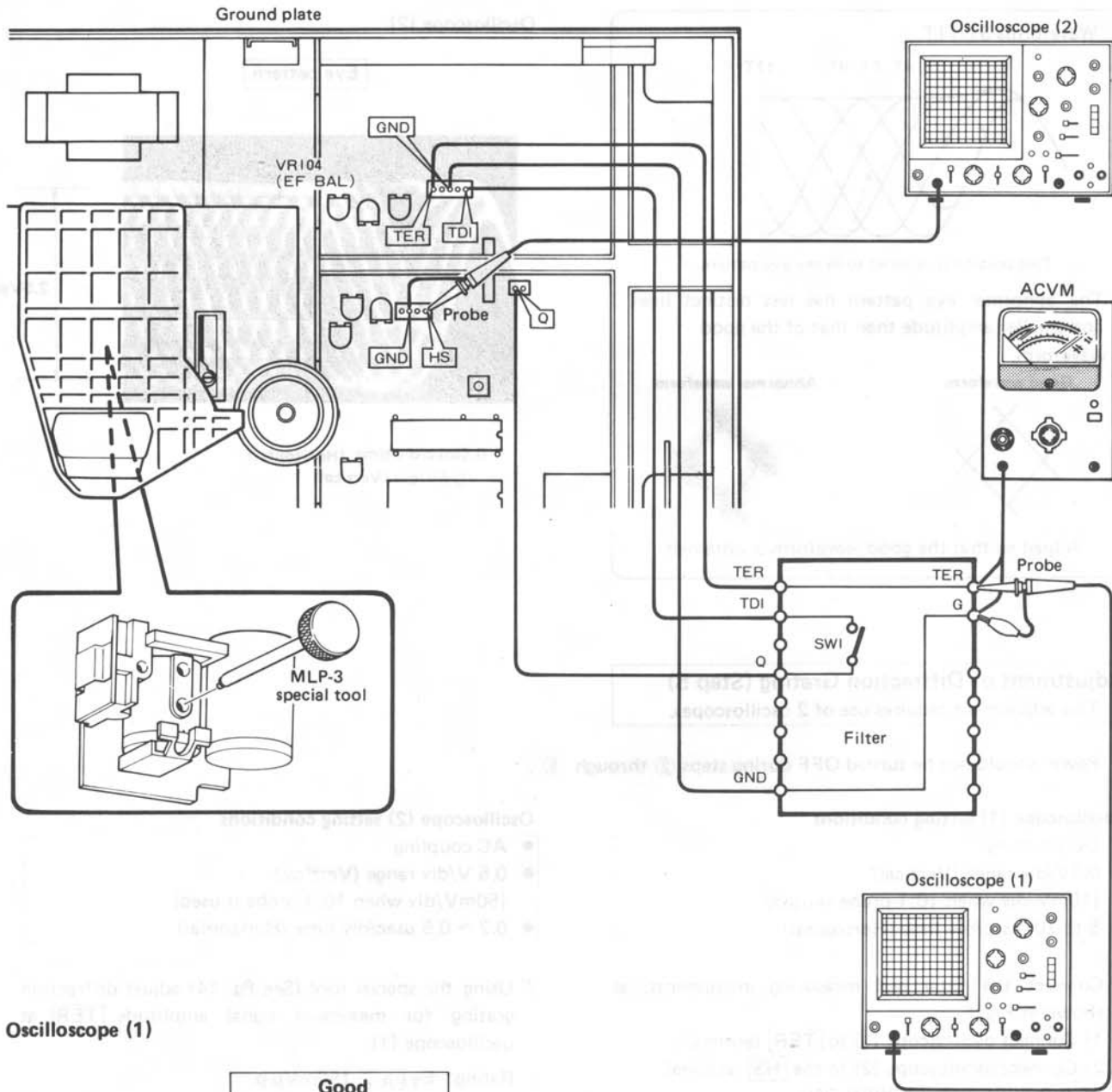
* When disc has stopped rotating, press PLAY key again and make adjustment.

* Adjust at the inner circumference of the disc.

- ⑧ Set SW1 of the filter to OFF.
(Open the **TDI** and **Q** terminals: TRACKING SERVO → closed)
- ⑨ Confirm that **HS** (eye-pattern) signal appears on oscilloscope (2).

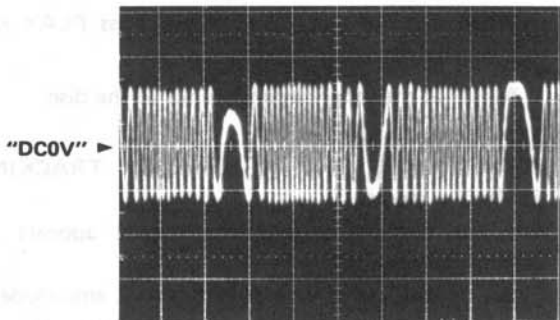
* Set to the point where **TER** signal amplitude is maximum and **HS** (eye-pattern) signal can be observed finely and clearly.

* Oscilloscope (2), should have frequency response of 50 MHz or greater.



Oscilloscope (1)

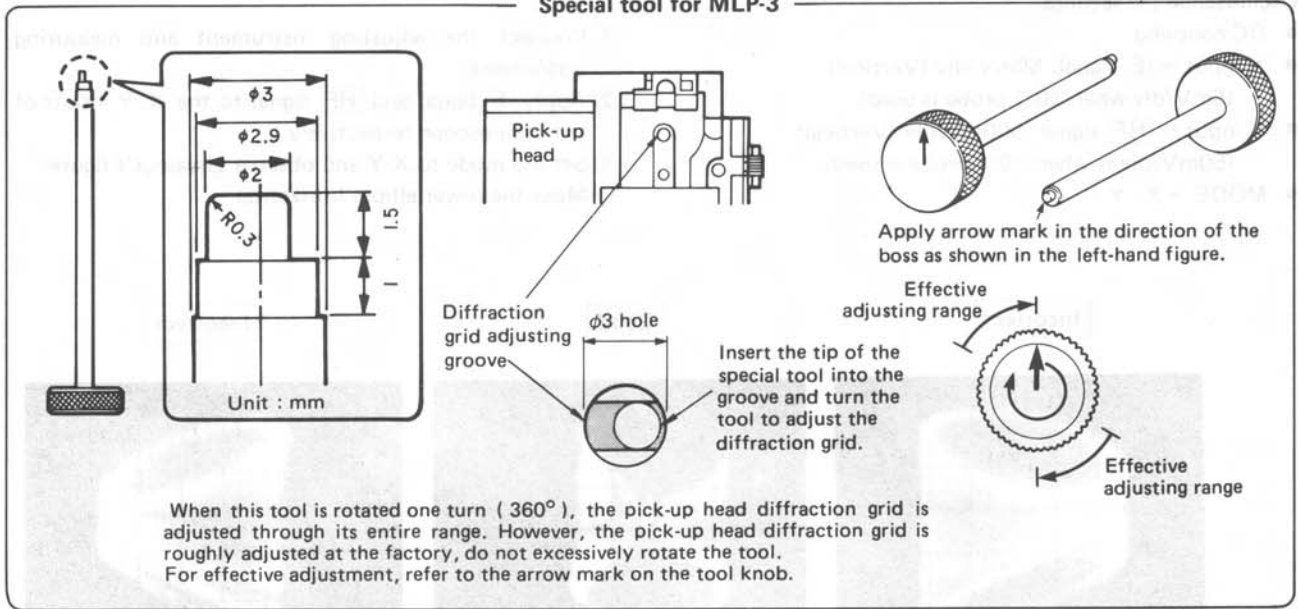
Good



TER signal amplitude in this state is 250m Vp-p.

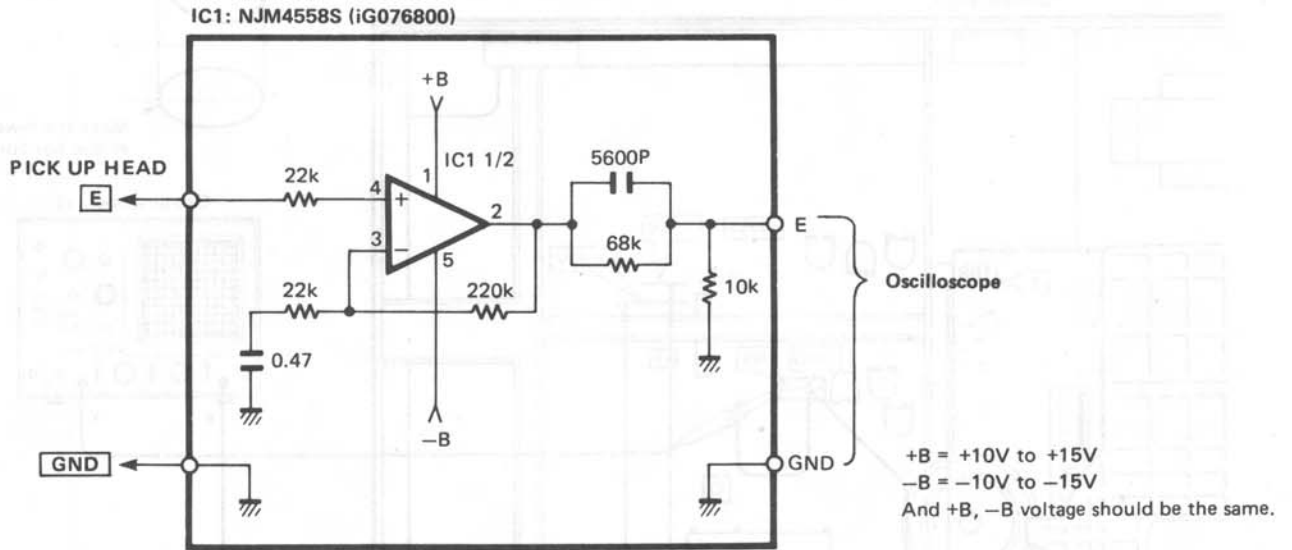
Fig. F

Special tool for MLP-3



● SUPPLEMENT

For adjustment by Lissajous's figure use the following adjustment instrument (buffer amplifier).



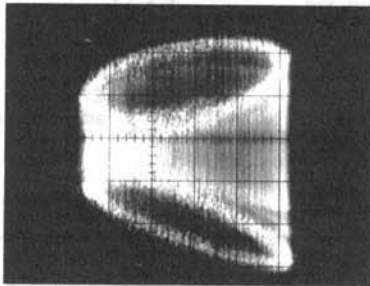
* The buffer amplifier is used only for this adjustment. Don't leave it connected in other adjustments. (Continued on P. 15)

Oscilloscope (1) settings

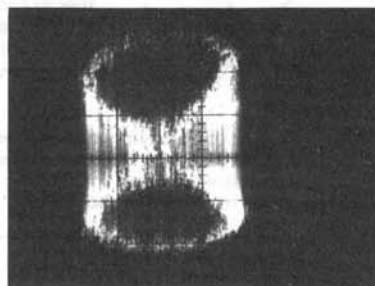
- DC coupling
- X input → **E** signal: 50mV/div (Vertical)
(5mV/div when 10:1 probe is used)
- Y input → **HF** signal: 500mV/div (Vertical)
(50mV/div is when 10:1 probe is used)
- MODE → X-Y

- ① Connect the adjusting instrument and measuring instrument.
- ② Apply **E** signal and **HF** signal to the X, Y inputs of the oscilloscope respectively.
- ③ Set the mode to X-Y and observe Lissajous's figure. Make the lower ellipse horizontal.

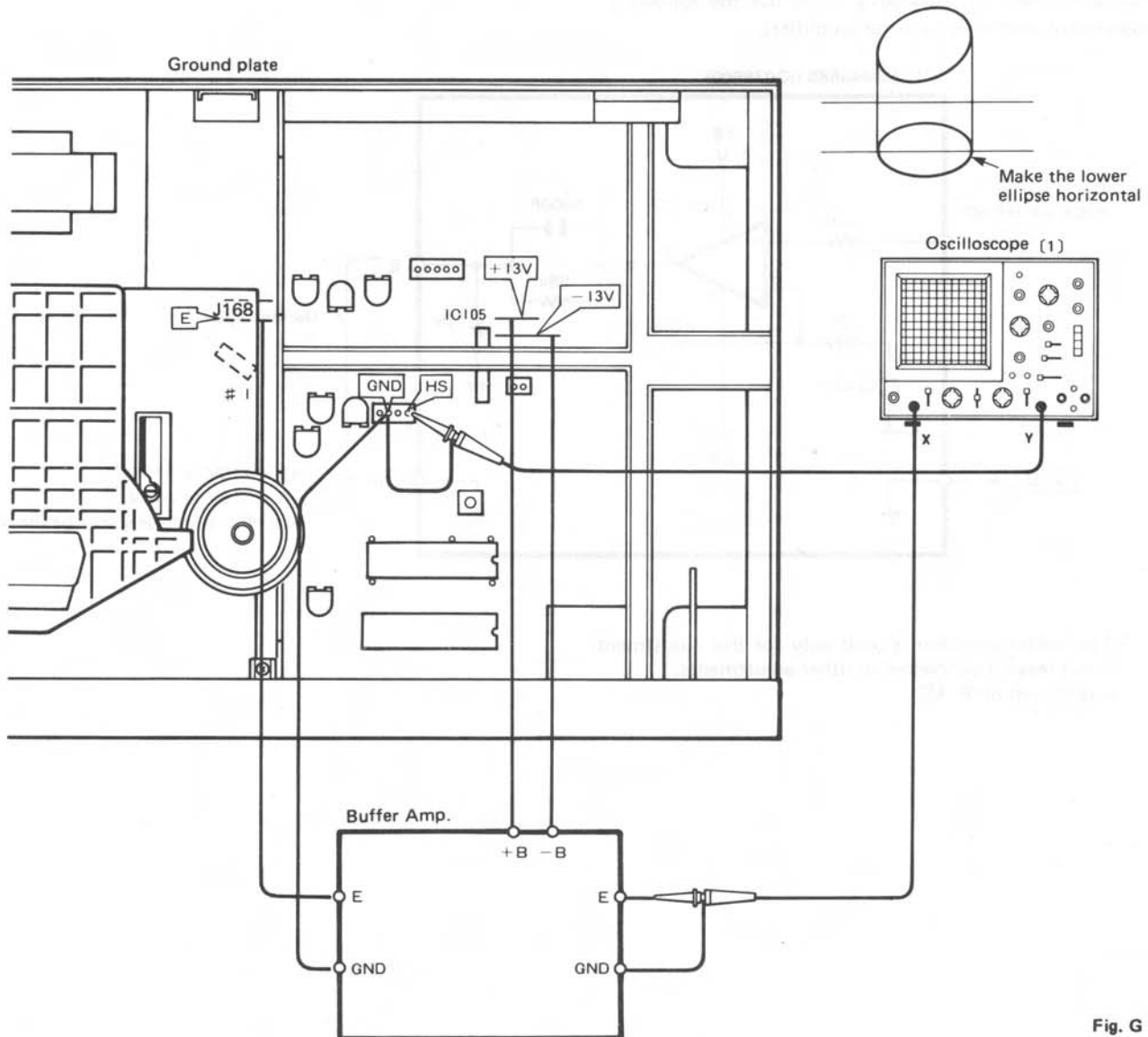
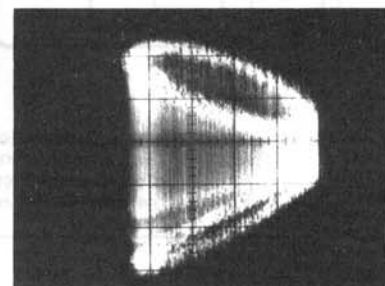
Incorrect



Good



Incorrect



Adjustment of EF Balance (Step 6)

* Power should not be turned OFF during steps ② through ⑦

Oscilloscope (1) settings

- DC coupling
- 0.1 V/div range (Vertical)
(10 mV/div when 10:1 probe is used)
- 1 to 20 msec/div time (Horizontal)

- ① Connect the filter and measuring instruments as in Step 5.
 - ② Press POWER key. (POWER ON)
 - ③ Load Philips test disc. (Have lead-in data read.)
 - ④ Press PLAY key then Pause.
 - ⑤ Set SW1 in the filter to ON.
(Short [TDI] terminal to [Q] terminal:
TRACKING SERVO is OPEN)
 - ⑥ Observe the waveform on oscilloscope (1).
 - ⑦ Adjust VR104 (EF BALANCE) so that the amplitude of [TER] signal becomes equal above and below DC 0V position.
- * Adjust at the inner circumference of the disc.

Adjustment of HF Level (Step 7)

Oscilloscope (2) settings

- AC coupling
- 0.5 V/div range (Vertical)
(50 mV/div when 10:1 probe is used)
- 0.2 ~ 0.5 μ sec/div time (Horizontal)

- ① Connect oscilloscope (2) to [HS] terminal (Same as in Step 4).
- ② Press POWER key. (POWER ON)
- ③ Load Philips test disc.

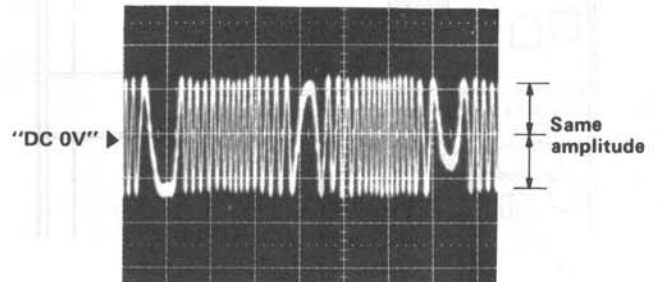
Adjustment of Focus Gain (Step 8)

* This confirmation requires two single channel voltmeter or one dual channel AC voltmeter.

- ① Connect the filter and measuring instruments, as shown in Fig. H. (Pg. 17)
Apply an 800 Hz, 4.5 Vrms signal from the AF oscillator to [FDI] terminal via the resistor (220 kilohms) in the filter.
- ② Set SW3 to OFF.
- ③ Set SW2 to F (FOCUS).
- ④ Press POWER key. (POWER ON)
- ⑤ Load Philips test disc.
- ⑥ Press PLAY key.

Good

Rating DC offset \rightarrow Less than ± 15 mV.



This shows DC 0V state.

- ④ Press PLAY key.
 - ⑤ Adjust VR101 (HF GAIN) so that the [HS] signal waveform is 2.5Vp-p.
- * Adjust at the center of the disc.

- ⑦ Set SW3 to ON.
- ⑧ Read the indications of the AC voltmeters (CH1: E_{FO} , CH2: E_R), adjust VR103 (FOCUS GAIN) so that they satisfy the rating.

Rating: $E_R = E_{FO} + 14$ dB

Example [0dBV = 1V]
 $E_{FO} = -32$ dBV (19.5mV)
 $E_R = -18$ dBV (130mV)

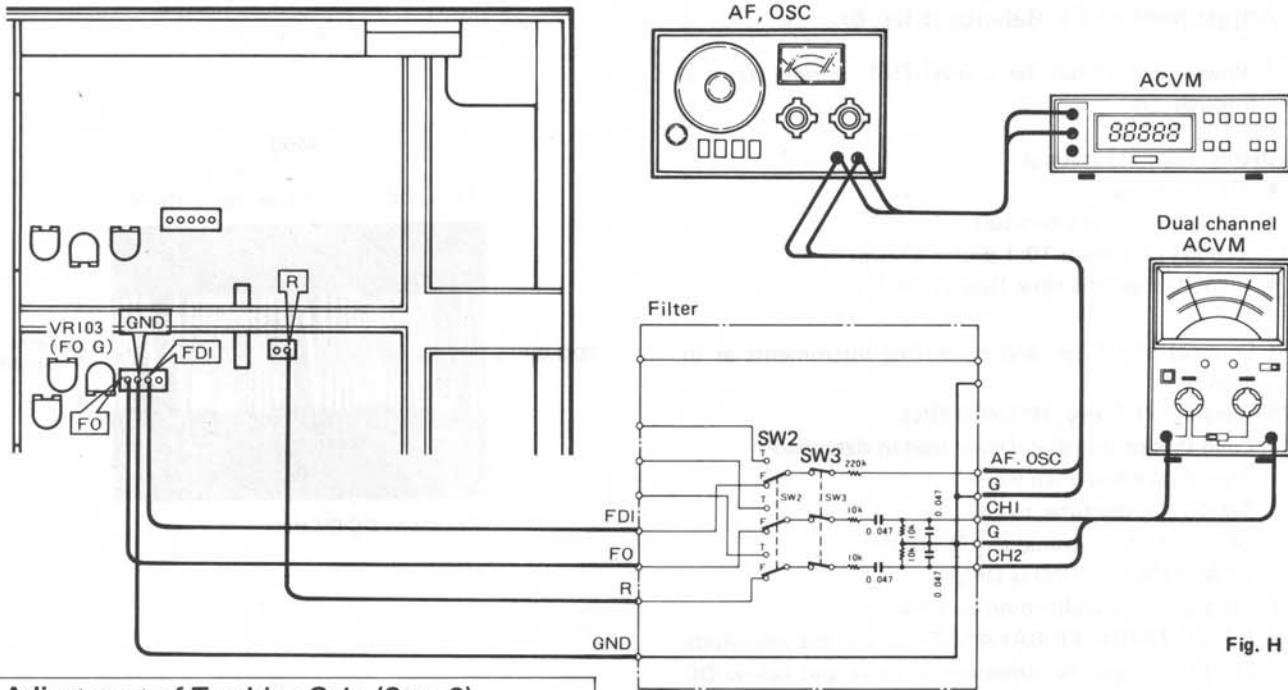


Fig. H

Adjustment of Tracking Gain (Step 9)

*This adjustment requires use of two single channel AC voltmeters or one dual channel AC voltmeter.

- ① Connect the filter and measuring instruments, as shown in Fig. I.
- Apply a 800 Hz, 100 mVrms signal from the AF oscillator to **TDI** terminal via the resistor (220 kilohms) in the filter.
- ② Set SW3 to OFF.
- ③ Set SW2 to T (TRACKING).
- ④ Press POWER key. (POWER ON)
- ⑤ Load Philips test disc.
- ⑥ Press PLAY key.

- ⑦ Set SW3 to ON.
- ⑧ While observing the indications of the AC voltmeters (CH1: E_{TE} , CH2: E_Q), adjust VR106 (TRACKING GAIN) so that they satisfy the rating.

$$\text{Rating: } E_{TE} = E_Q + 9\text{dB}$$

Example [0dBV = 1V]
 $E_Q = -19\text{dBV}$ (110mV)
 $E_{TE} = -10\text{dBV}$ (250mV)

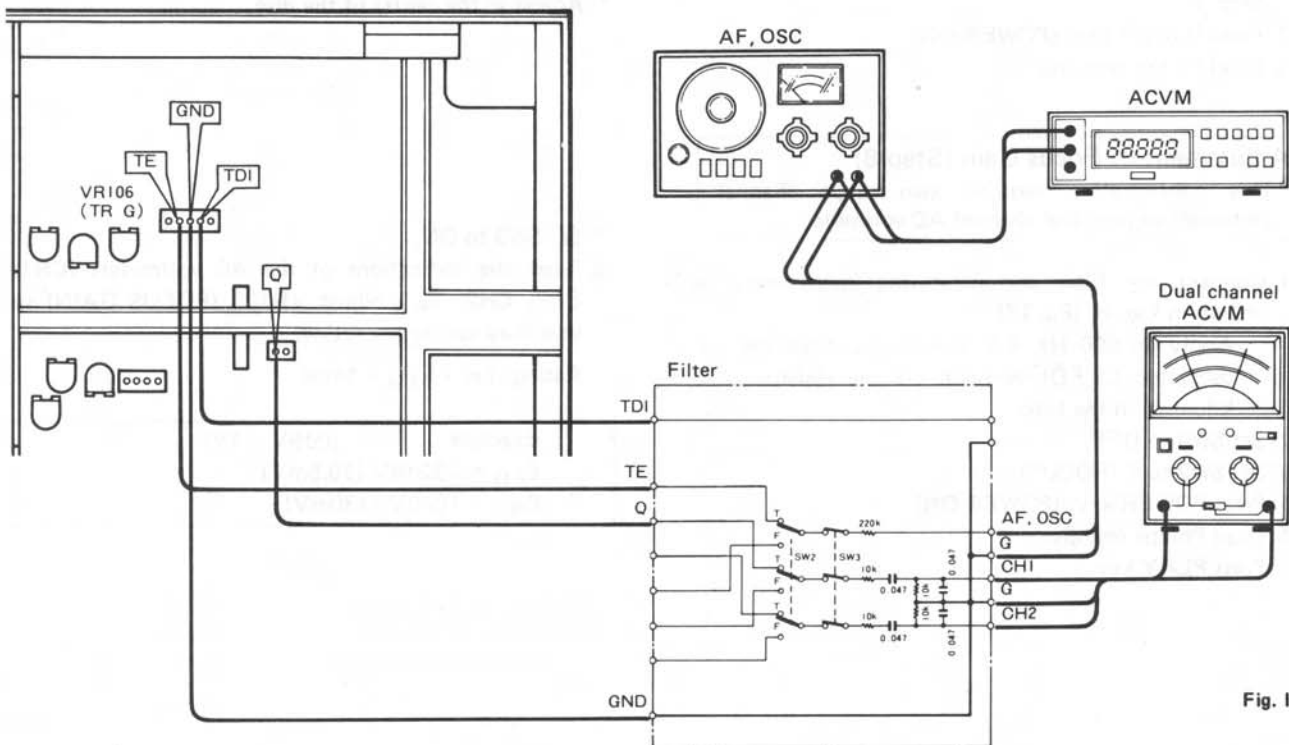


Fig. I

Adjustment of Tracking Offset (Step 10)

- ① Connect a DC voltmeter to **Q** and **GND** terminals on the Input side of the filter.
- ② Press POWER key. (POWER ON)
- ③ Load Philips test disc.
- ④ Press STOP key. (STOP mode: Display " :00")

- ⑤ While observing the indication (E_Q) of the DC voltmeter, adjust VR105 (TRACKING GAIN) so that it satisfies the rating.

Rating: $E_Q = 0 \text{ V DC} \pm 50 \text{ mV DC}$

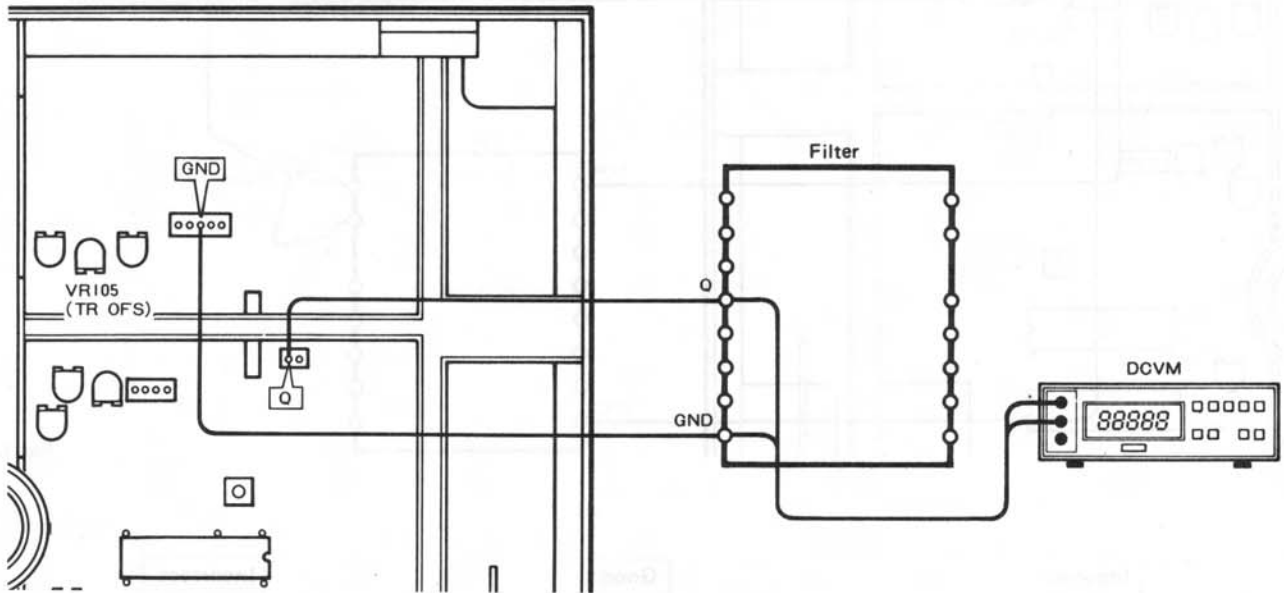


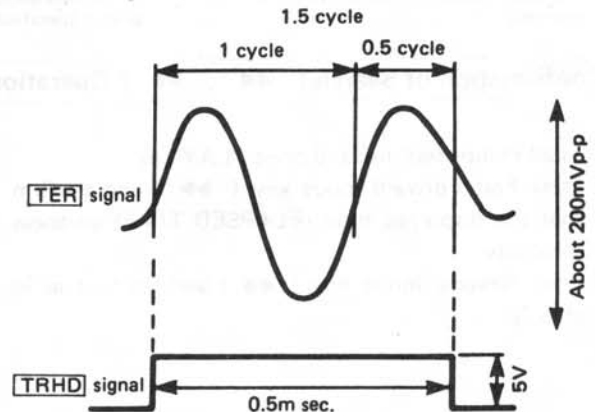
Fig. J

Adjustment of Kick Gain (Step 11)

Oscilloscope (1) (2-ch oscilloscope) Settings

- DC coupling
- CH1 → **TER** terminal (IC102, 2 pin): 0.1 V/div (Vertical) (10 mV/div when 10:1 probe is used)
- CH2 → **TRHD** terminal (IC207, 21 pin): 5 V/div (Vertical) (0.5 V/div when 10:1 probe is used)
- TRIGGER MODE: 2 CH
- 0.2 msec/div time (Horizontal)

- ① Connect the filter and measuring instruments, as shown in Fig. K.
 - ② Press POWER key. (POWER ON)
 - ③ Load Philips test disc.
 - ④ Press PLAY key.
 - ⑤ Observe waveform while pressing Fast Forward mode key (**▶▶**) for 3 seconds.
 - ⑥ Adjust VR107 (KICK GAIN) so that the **TER** signal cycle is 1.5 ± 0.5 when **TRHD** signal level is High.
- * Adjust at the inner circumference of the disc.
- ⑦ Press Reverse mode key (**◀◀**) for 3 seconds and confirm that **TER** signal cycle is within the above specification but in reverse phase.



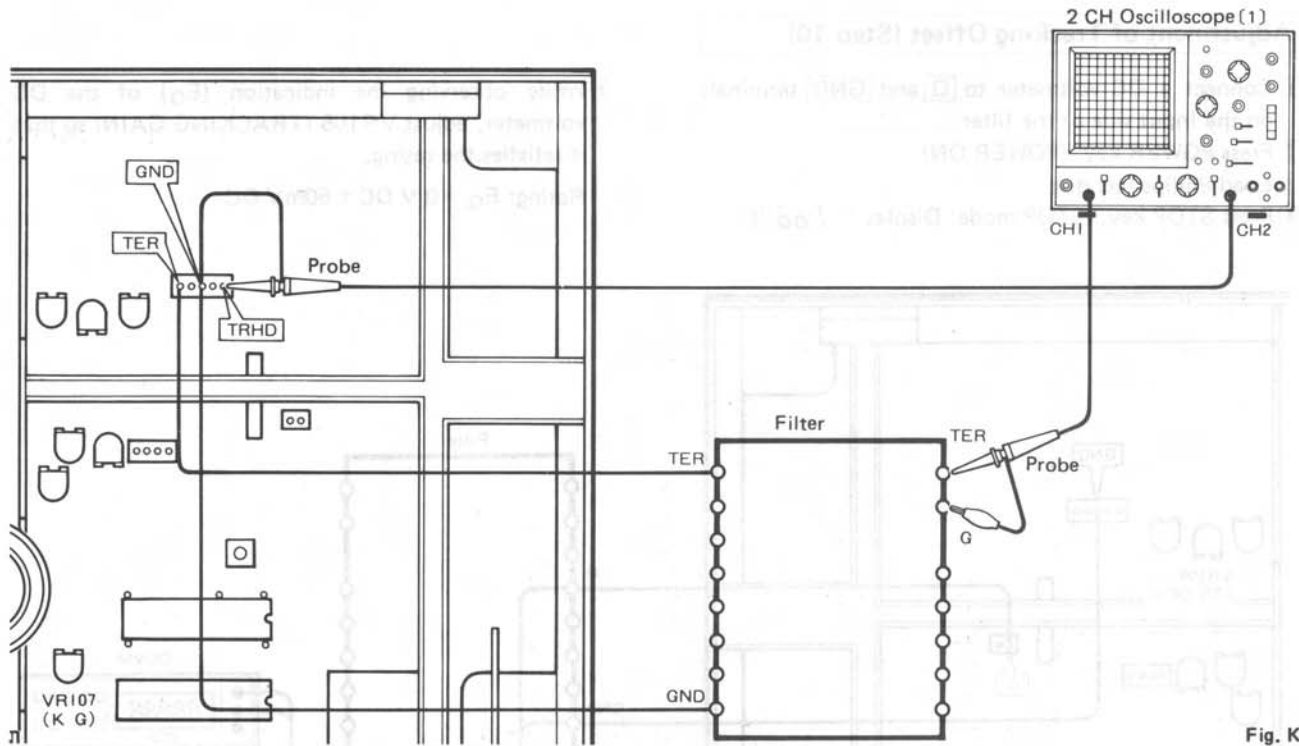
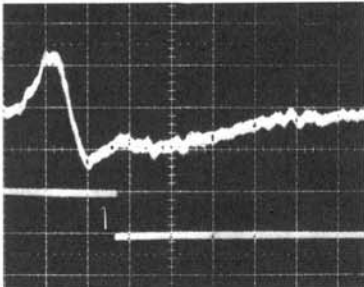


Fig. K

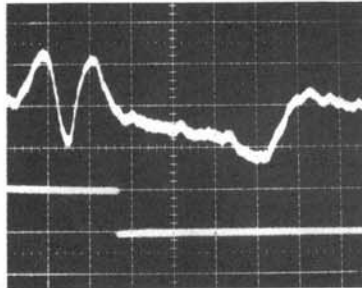
Incorrect

Good

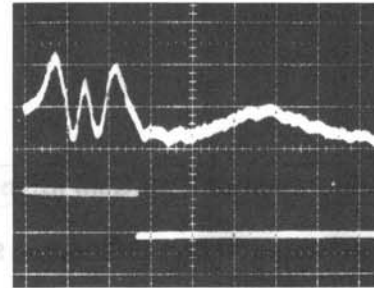
Incorrect



This shows about 0.9 cycle which is incorrect.



This shows about 1.7 cycle which is within specification.



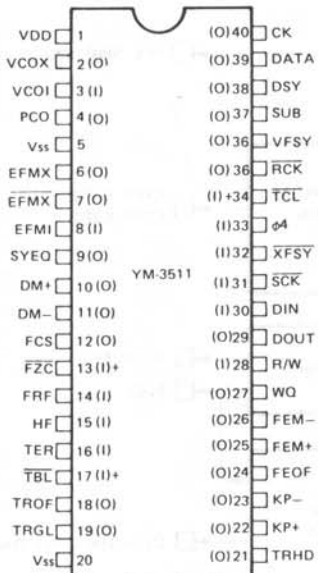
This shows about 2.5 cycle which is incorrect.

Confirmation of Search (◀◀ , ▶▶) Operation (Step 12)

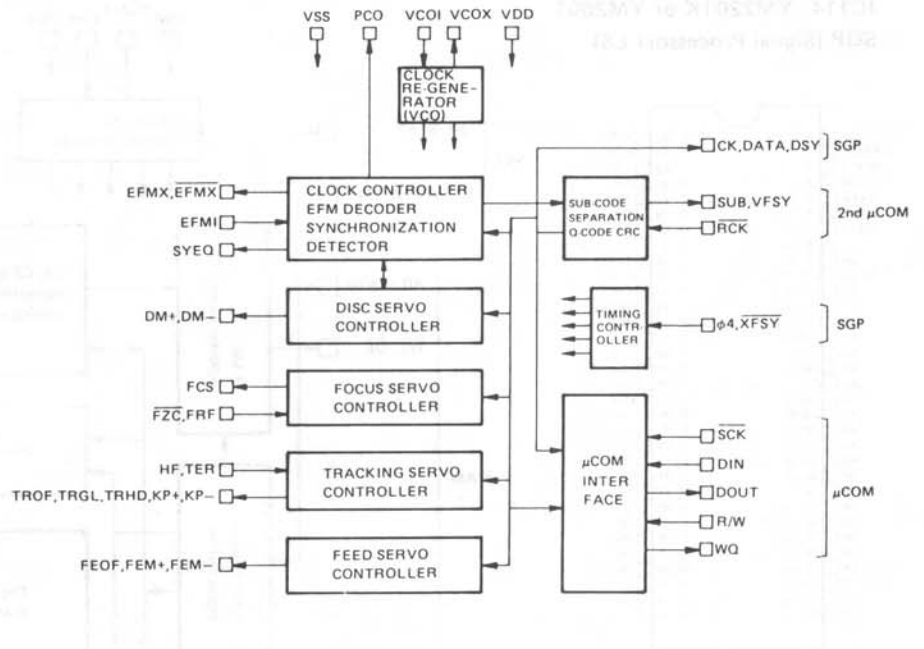
- ① Load Philips test disc and press PLAY key.
- ② Press Fast Forward mode key (▶▶) and confirm that the displayed time (ELAPSED TIME) advances smoothly.
- ③ Press Reverse mode key (◀◀) and confirm as in step ②

IC BLOCK

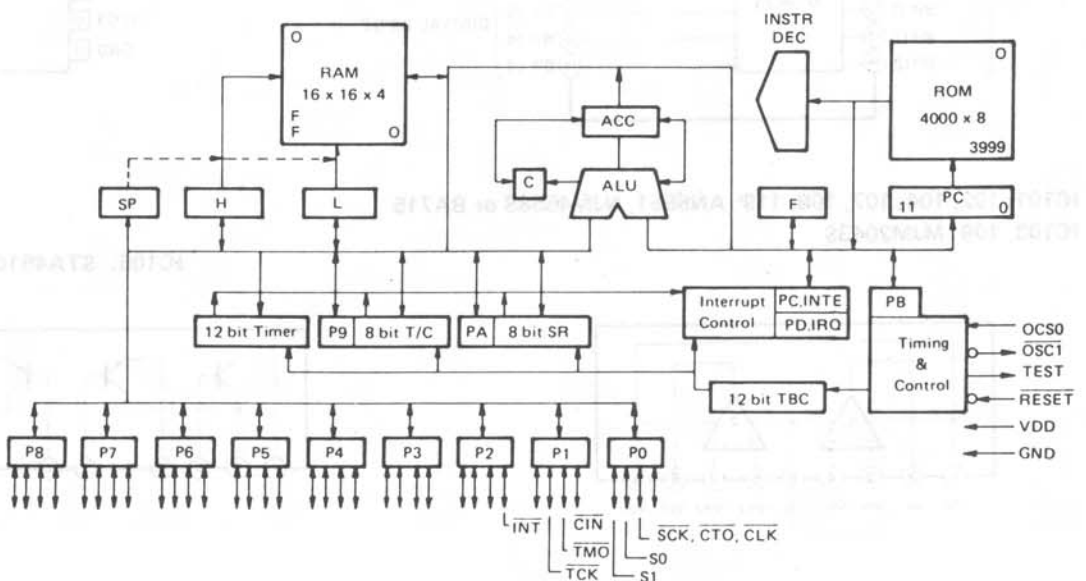
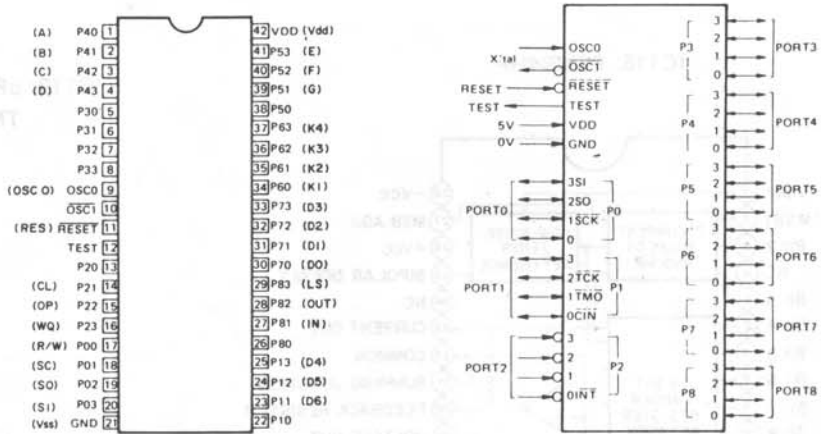
**IC110: YM3531 or YM3811
SVC (Servo Controller) LSI**



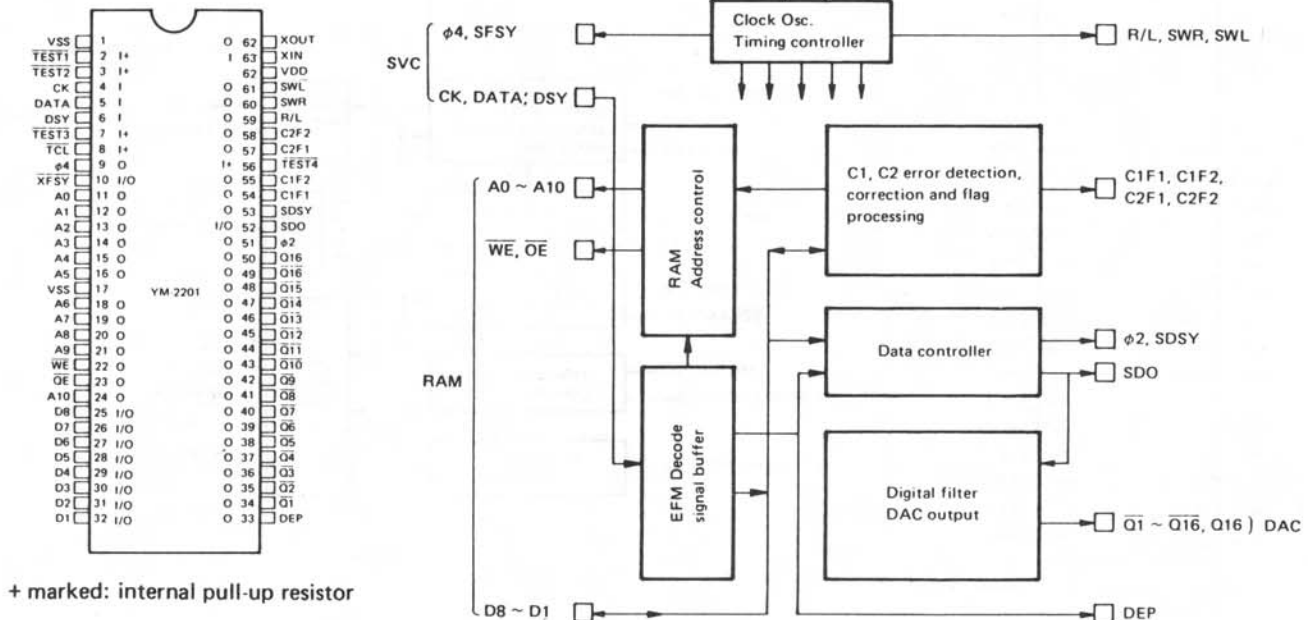
+ marked: internal pull up resistor



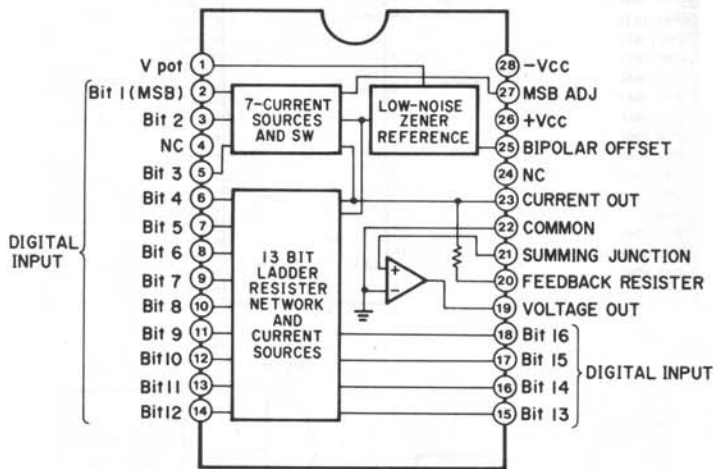
IC112: MSM6404A-124RS



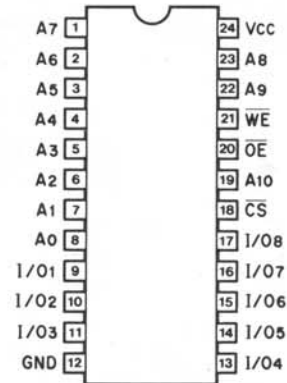
IC114: YM2201K or YM2601
SGP (Signal Processor) LSI



IC115: PCM54HP

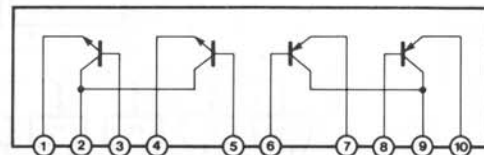
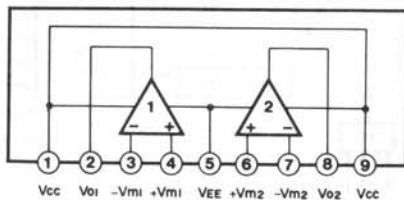


IC113: μ PD4016CX, HM6116ASP-20 or TMM2115AT-15

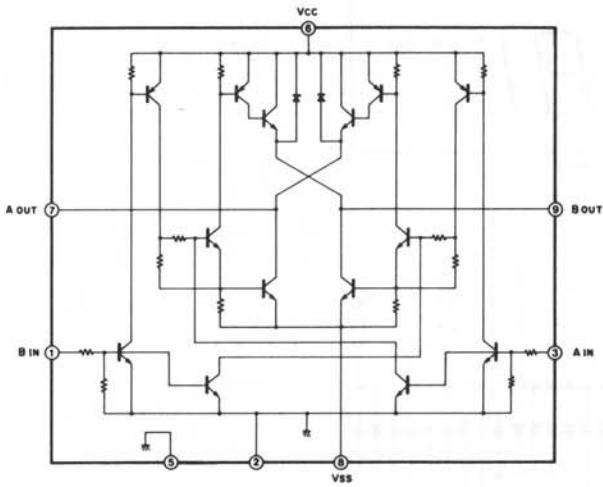


IC101, 102, 104, 107, 108, 119: AN6551, NJM4558S or BA715
IC103, 109: MJM2043S

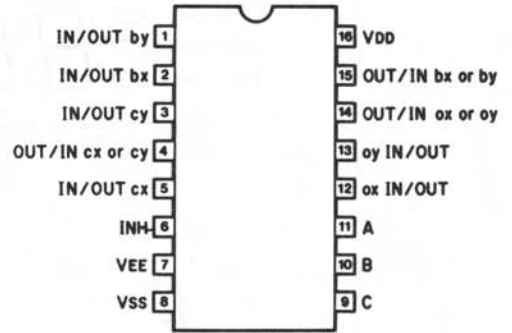
IC105: STA451C



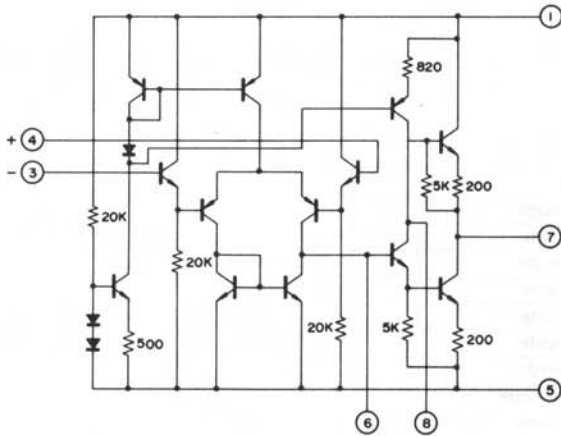
IC111: BA6218



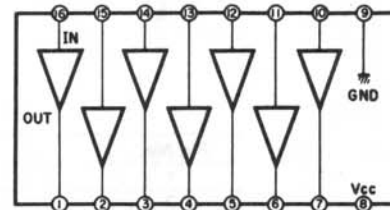
IC116: TC4053BP or HD14053BP



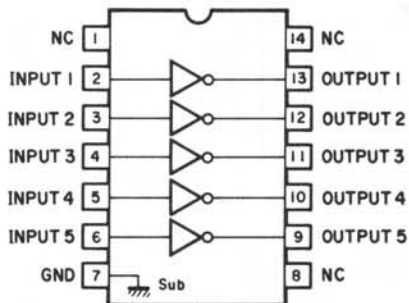
IC117, 118: LA3170



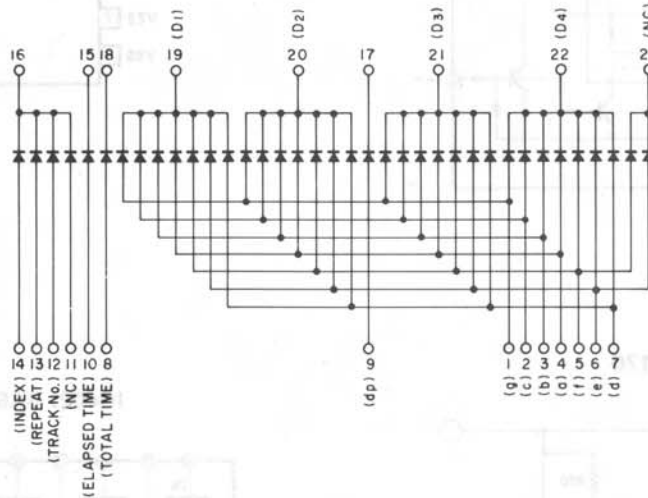
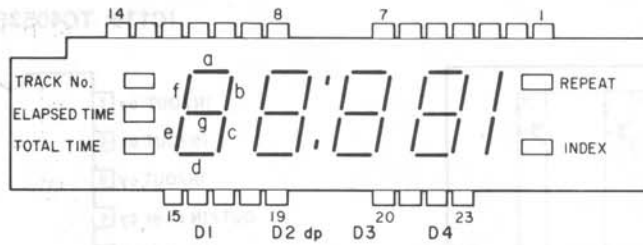
IC402: BA618



IC403: M54516P or BA612



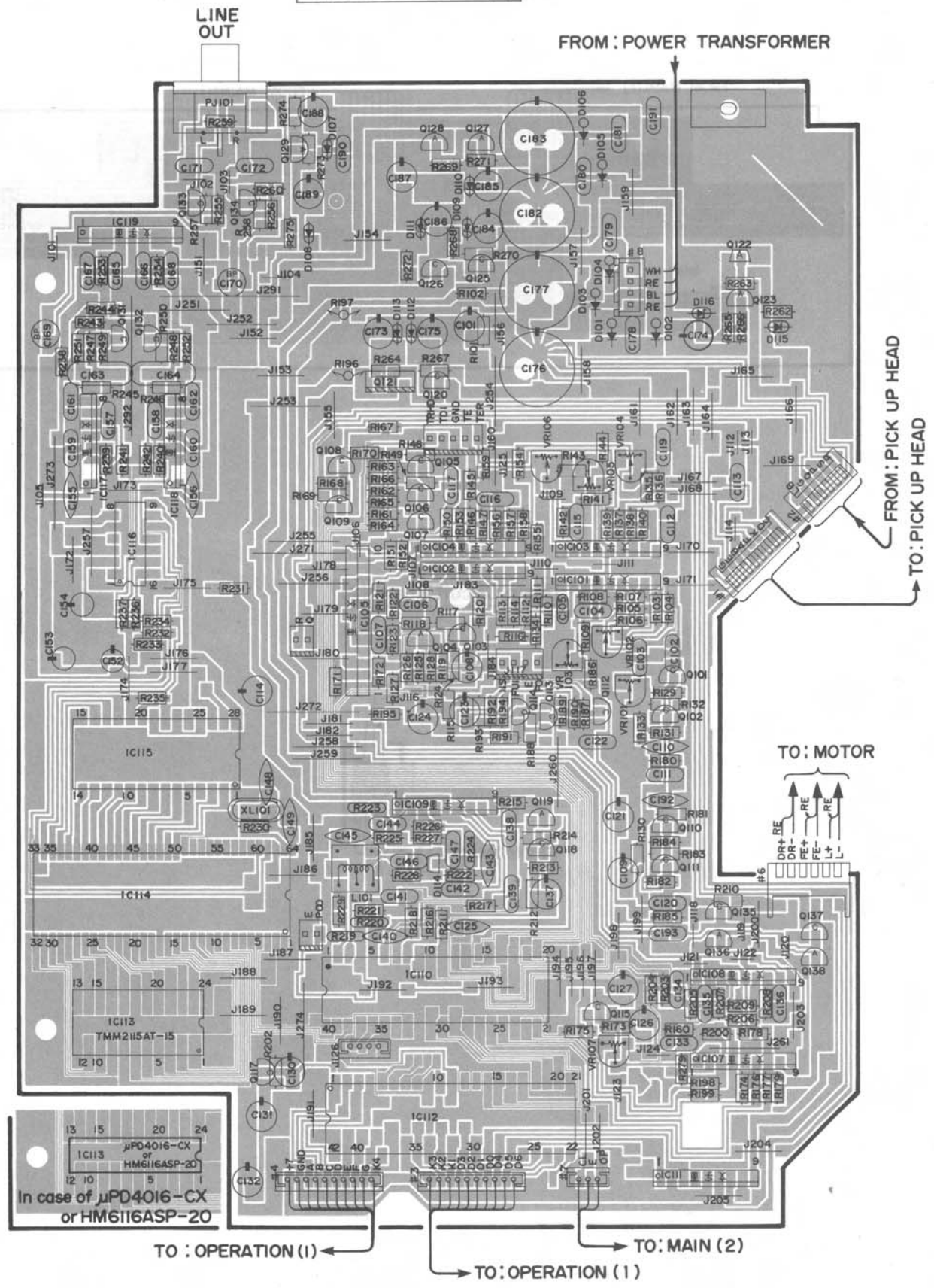
D405 (Display Unit)



Pin No.	Function
1	segment "g" Anode
2	segment "c" Anode
3	segment "b" Anode
4	segment "a" Anode
5	segment "f" Anode
6	segment "e" Anode
7	segment "d" Anode
8	"TOTAL TIME" Anode
9	decimal point Anode
10	"ELAPSED TIME" Anode
11	Not Used
12	"TRACK NO." Anode
13	"REPEAT" Anode
14	"INDEX" Anode
15	"ELAPSED TIME" Cathode
16	"INDEX" "REPEAT" "TRACK NO." Cathode
17	decimal point Cathode
18	"TOTAL TIME" Cathode
19	digit "D1" Cathode
20	digit "D2" Cathode
21	digit "D3" Cathode
22	digit "D4" Cathode
23	Not Used

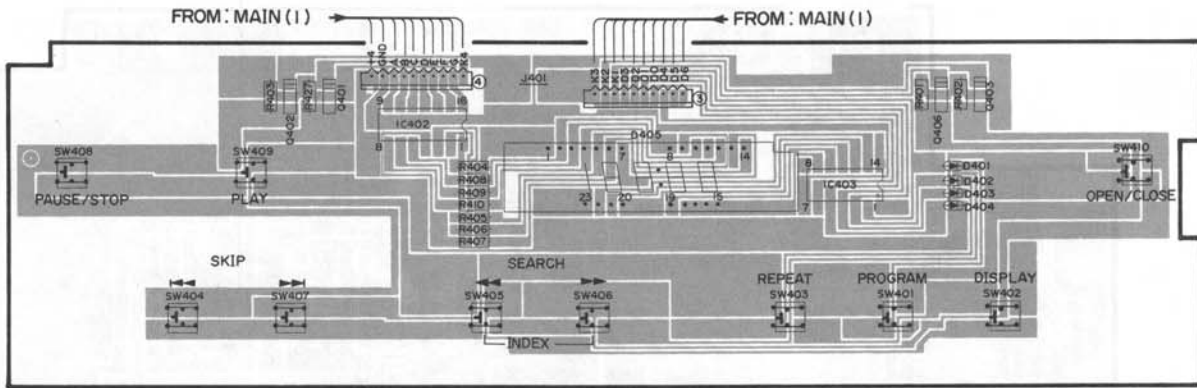
PRINTED CIRCUIT BOARD (Pattern side)

Main Circuit Board (1)

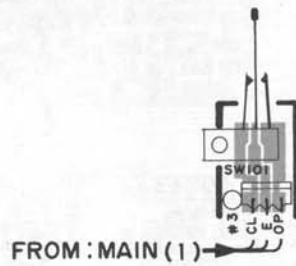


PRINTED CIRCUIT BOARD (Pattern side)

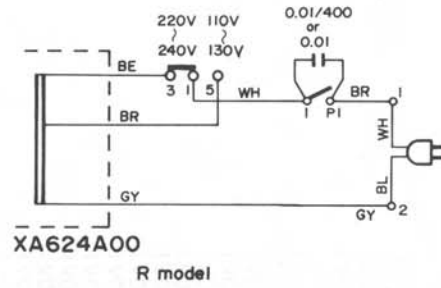
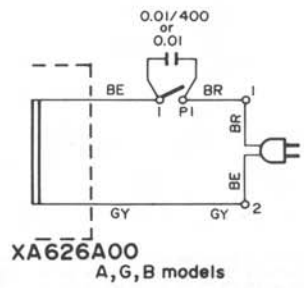
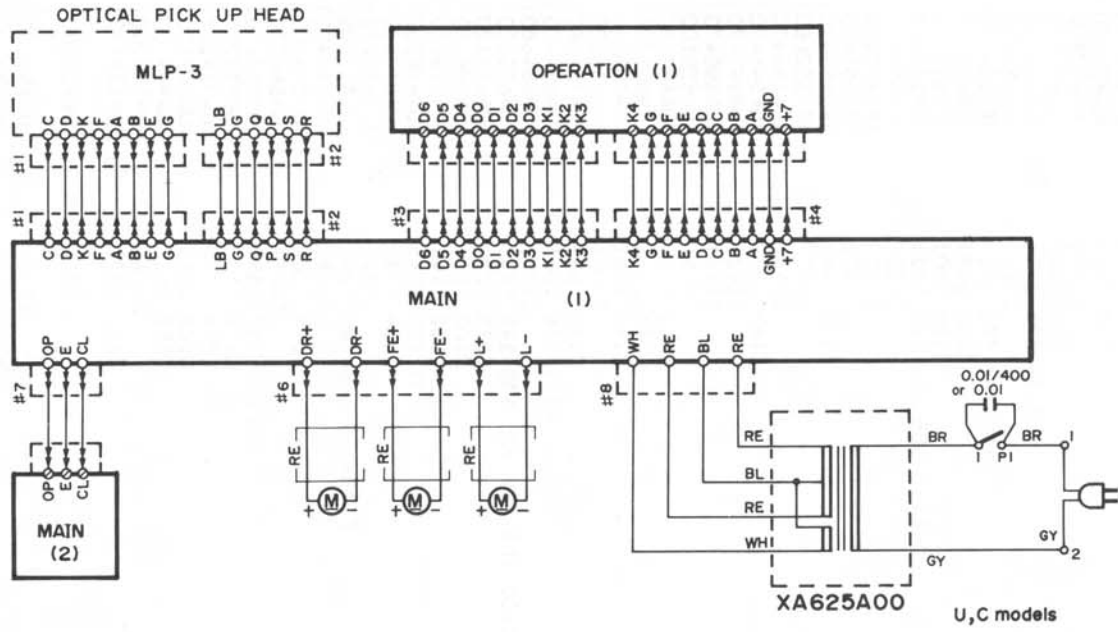
Operation Circuit Board



Main Circuit Board (2)



WIRING



PARTS LIST

ELECTRICAL PARTS

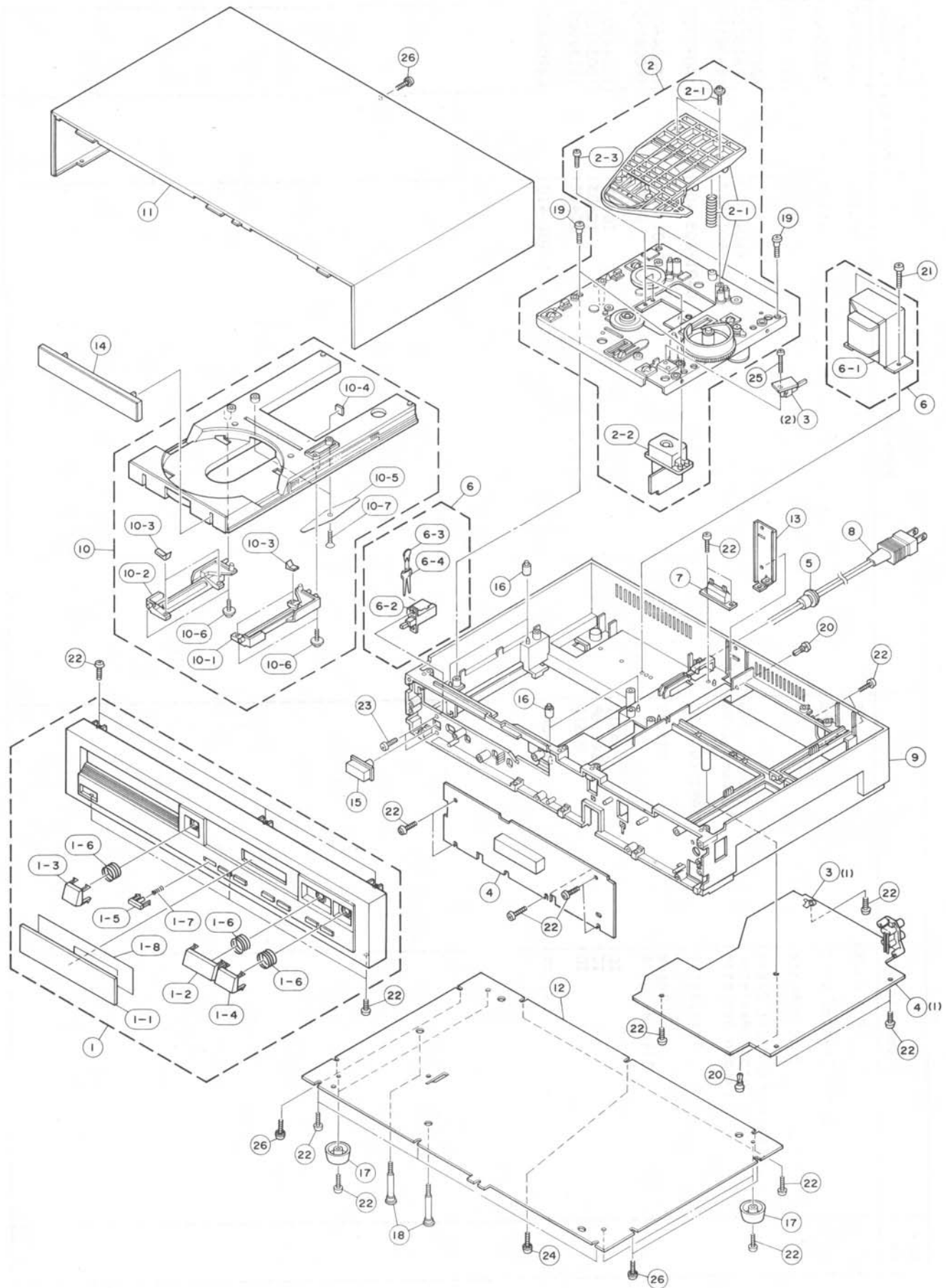
Ref No.	Description	Remarks	Markets	Common Model
	Main Circuit Board			
	Mylar Cap	0.068uF 50V	C163 164	NA089150
	Mylar Cap	1000pF 50V	C147	UA654680
	Mylar Cap	3300pF 50V	C144	UA653100
	Mylar Cap	3300pF 50V	C139 171 172	UA653330
	Mylar Cap	0.01uF 50V	C146	UA654100
	Ceramic Cap	0.01uF 50V	C178-181 190 191	F1554100
	Ceramic Cap	27pF 50V	C148 149	VA761100
	Ceramic Cap	10pF 50V	C159 160	F1551100
	Ceramic Cap	22pF 50V	C140 155 156 161 162	F1551220
	Ceramic Cap	47pF 50V	C125	F1551470
	Ceramic Cap	220pF 50V	C143	F1552220
	Ceramic Cap	470pF 50V	C192	F1552470
	Ceramic Cap	470pF 50V	C157 158	F1552470
	Ceramic Cap	680pF 50V	C110	F1552680
	Ceramic Cap	0.047uF 50V	C145	F1554470
	Electrolytic Cap	4.7uF 25V	C169 170	UK546470
	Mylar Cap	470pF 50V	C142	UA252470
	Mylar Cap	0.47uF 50V	C116	UA555470
	Mylar Cap	0.1uF 50V	C105	UA555100
	Mylar Cap	1800pF 50V	C112 113	UA653180
	Mylar Cap	2200pF 50V	C133 134	FA653220
	Mylar Cap	2400pF 50V	C165 166	UA353240
	Mylar Cap	6800pF 50V	C104	UA653680
	Mylar Cap	0.016uF 50V	C167 168	UA354160
	Mylar Cap	0.047uF 50V	C111 136 106	UA654470
	Mylar Cap	0.068uF 50V	C135	UA654680
	Mylar Cap	0.1uF 50V	C102 103 119 120 138 141 193	UA655100
	Mylar Cap	0.12uF 50V	C115 122	UA655120
	Mylar Cap	0.18uF 50V	C107 117	UA655180
	Mylar Cap	470uF 6.3V	C124 132 114	U1818470
	Electrolytic Cap	100uF 10V	C101 108 126	U1828100
	Electrolytic Cap	33uF 16V	C184 185	U1837330
	Electrolytic Cap	47uF 16V	C121	U1837470
	Electrolytic Cap	220uF 16V	C173-175 186 187 189	U1838220
	Electrolytic Cap	4.7uF 25V	C109	U1846470
	Electrolytic Cap	1uF 50V	C123 130	U18466100
	Electrolytic Cap	2.2uF 50V	C127	U1866220
	Electrolytic Cap	10uF 50V	C131 137 188	U1867100
	Electrolytic Cap	2200uF 16V	C176 177	UW839220 *
	Electrolytic Cap	2200uF 16V	C176 177	UW939220
	Electrolytic Cap	1000uF 25V	C182 183	UW849100 *
	Electrolytic Cap	1000uF 25V	C182 183	UW949100
	Electrolytic Cap	1000uF 6.3V	C154	UH119100
	Electrolytic Cap	470uF 16V	C152 153	UH138470
	Coil	3uH	L101	GE901500
	Carbon Resistor	2.2ohm 1/6W	R210	HF453220
	Carbon Resistor	22ohm1/6W	R128 133	HF454220
	Carbon Resistor	100ohm1/6W	R169 195 231 265 280-285	HF455100
	Carbon Resistor	180ohm1/6W	R247 248	HF455180

Ref No.	Description	Remarks	Markets	Common Model
	Carbon Resistor	220ohm1/6W	R130 132 141 184 227	HF455220
	Carbon Resistor	330ohm1/6W	R117	HF455330
	Carbon Resistor	470ohm1/6W	R116 180 185 245 246 267	HF455470
	Carbon Resistor	680ohm1/6W	R121 152 181 266	HF455680
	Carbon Resistor	1Kohm1/6W	R178 235 251-254 257 258 264 272	HF456100
	Carbon Resistor	1.5Kohm1/6W	R103 104 229	HF456150
	Carbon Resistor	1.8Kohm1/6W	R131 183	HF456180
	Carbon Resistor	2.2Kohm1/6W	R107 126 156 173 221 268-271	HF456220
	Carbon Resistor	2.7Kohm1/6W	R102	HF456270
	Carbon Resistor	3.3Kohm1/6W	R112 115 159 186 187 189 190 222 241 242	HF456330
	Carbon Resistor	4.7Kohm1/6W	R171 225 232-234 236 237 239 240 262	HF456470
	Carbon Resistor	5.6Kohm1/6W	R144	HF456560
	Carbon Resistor	6.8Kohm1/6W	R142 193 217 218 243 244	HF456680
	Carbon Resistor	8.2Kohm1/6W	R118	HF456820
	Carbon Resistor	10Kohm1/6W	R101 110 149 113 114 124 129 145 147 154 157 158 164 165 166 168 175 182 202 216	HF457100
	Carbon Resistor	12Kohm1/6W	R194	HF457120
	Carbon Resistor	15Kohm1/6W	R174 179 172	HF457150
	Carbon Resistor	18Kohm1/6W	R177	HF457180
	Carbon Resistor	22Kohm1/6W	R108 208 109 122 137 138 170 206 211-214 228 259 260 274	HF457220
	Carbon Resistor	33Kohm1/6W	R120 188 191	HF457330
	Carbon Resistor	39Kohm1/6W	R146 148 150 279 153 200	HF457390
	Carbon Resistor	47Kohm1/6W	R105 125 127 167 263	HF457470
	Carbon Resistor	82Kohm1/6W	R155	HF457820
	Carbon Resistor	100Kohm1/6W	R106 134 198 199 226 238 255 256 273 275	HF458100
	Carbon Resistor	120Kohm1/6W	R111 209	HF458120
	Carbon Resistor	200Kohm1/6W	R139	HF458200
	Carbon Resistor	180Kohm1/6W	R119	HF458180
	Carbon Resistor	220Kohm1/6W	R123 135 136 140 161-163 192 207	HF458220
	Carbon Resistor	270Kohm1/6W	R151 176	HF458270
	Carbon Resistor	390Kohm1/6W	R203 204	HF458390
	Carbon Resistor	470Kohm1/6W	R160 205 249 250	HF458470
	Carbon Resistor	1Mohm1/6W	R215 230	HF459100
	Carbon Resistor	2.2Mohm1/6W	R143	HF459220
	Metal Film Resistor	22Kohm1/4W	R219 220 223 224	HU757220
	Flame Proof Carbon Resistor	6.8ohm1/4W	R196 197	HV753680
	Pre-Set Potentiometer	B10Kohm	VR101 105	VA788000
	Pre-Set Potentiometer	B47Kohm	VR104 106	VA788300
	Pre-Set Potentiometer	B100Kohm	VR102 103	VA788400
	Pre-Set Potentiometer	B470Kohm	VR107	VA788700
	Transistor	2SA1310(R,S,T)	Q104 119 122 129	1A131000 *
	Transistor	2SA933S(G,R)	Q104 119 122 129	1A093320
	Transistor	2SA1115(E,F)	Q104 119 122 129	1A111520
	Transistor	2SB544	Q136 138 123 127 128	1B054430 *
	Transistor	2SA934	Q136 138 123 127 128	1A093410
	Transistor	2SC535(A,B,C)	Q101 110	1C053540
	Transistor	2SC3312(R,S,T)	Q102 108 109 111-115 117 118	1C331200 *

Ref No.	Description	Remarks	Markets	Common Model
	Transistor	2SC1740S(S,R)	Q102 108 109 111-115 117 118	1C174020
	Transistor	2SC2603(E,F)	Q102 108 109 111-115 117 118	1C260320
	Transistor	2SD400	Q120 125 126 135 137	1D040040 *
	Transistor	2SC2060	Q120 125 126 135 137	1C206010 *
	Transistor	2SD880(O,Y)	Q121	1D088000
	Transistor	2SC1983	Q121	1C198300
	Transistor	2SD743(S,R,Q)	Q103 105-107	1D074300 *
	Transistor	2SC2878(A,B)	Q103 105-107	1C287820 *
	Transistor	2SC3068	Q103 105-107	1C306800
	Transistor	2SC3327	Q103 105-107	1C332700
	Transistor	2SD655(E,F)	Q103 105-107	1D065520 *
	Transistor	2SD1302(R,S)	Q103 105-107	1D130210 *
	Transistor	2SC2878(A,B)	Q133 134	1C287820 *
	Transistor	2SC3327	Q133 134	1C332700
	Transistor	2SC2878(A,B)	Q131 132	1C287820 *
	Transistor	2SC3068	Q131 132	1C306800
	Transistor	2SC3327	Q131 132	1C332700
	Diode	ISS 133	D107 108 115	1F004600
	Varactor Diode	SVC 211	D114	1F004920 *
	Varactor Diode	1SV 55	D114	1F004910
	Zener Diode	MTZ 13C T-77	D111	1F008900
	Zener Diode	MTZ108	D116	1F010890
	Zener Diode	MTZ5.68	D113	1F006290
	Zener Diode	MTZ7.58	D112	1F006300
	Zener Diode	MTZ15A	D109 110	1F006310
	Zener Diode	ISR35-100AT-93X	D101-106	1VA791900
	IC	NJM4558S	IC101 104 102 107 108 119	1G076800 *
	IC	AN6551	IC101 104 102 107 108 119	1G034700
	IC	TA75558S	IC101 104 102 107 108 119	1G131900
	IC	BA715	IC101 104 102 107 108 119	1G132200
	IC	LA3170	IC117 118	1G035410
	IC	TC4053BP	IC116	1G055100 *
	IC	UPD4053	IC116	1G105900
	IC	HD14053	IC116	1G119900
	IC	MN4053BP	IC116	1G126100
	IC	NJM2043S	IC103 109	1G080200
	IC	HM6116ASP-20	IC113	1G121300 *
	IC	UPD4016-CX	IC113	1G119200
	IC	TMM2115AP-15	IC113	1G131800
	IC	STA451C	IC105	1G119400
	IC	BA6218	IC111	1G153500
	IC	PCMS4HP	IC115	XA394400
	IC	MSM6404A-124RS	IC112	XA393800
	IC	YM2601	IC114	XA492A00 *
	IC	YM2201K	IC114	1T220120
	IC	YM3811	IC110	XA491A00 *
	IC	YM3531	IC110	1T353100
	Switch	MSW-1485	SW101	KA906370

Ref No.	Description	Remarks	Markets	Common Model
	Pin Jack	2P	PJ101	LB201960
	Quarz Crystal Unit	8.64MHz	XL101	QU005800
	Ground Plate			BB068370
	Operation Circuit Board			NA090520
	Carbon Resistor	100ohm 1/6W	R404-410	HF455100
	Carbon Resistor	100kohm 1/6W	R401-403.427	HF458100
	Transistor	2SA937(Q.R.S)	0401-403.406	1A093700
	Diode	1SS133	D401-404	1F004600
	Display Unit		D405	1F008340
	IC	BA612	IC403	1G144200
	IC	MS4516P	IC403	1G031100
	IC	BA618	IC402	1G132000
	Switch	EVO-QRB-04M	SW401-410	KA906380

EXPLODED VIEW



MECHANISM PARTS

Ref No.	Description	Remarks	Markets	Common Model
1	Panel Unit			NB635980
1-1	Window			VB351000
1-2	Button			VB110500
1-3	Button			VB199800
1-4	Button			VB199900
1-5	Button			VB110700
1-6	Spring			AA622530
1-7	Spring			AA622540
1-8	Sheet			VB351200
2	Adhesive			NB634840
2-1	Disc Mechanism Assy	DN-3		NB631420
2-2	Disc Mechanism Unit			VA757100
2-3	Optical Pick Up Head			NA089150
3	Binding Head Screw			NA090520
4	Main Circuit Board	2.6*4 FCM3-BL		U.C CB616810
5	Operation Circuit Board			A.G CB620190
5	Cord Stopper			U.C MZ093340
5	Cord Stopper	CM-22A		A.G MZ093350
6	Power Transformer Assy	CM-22B		U.C XA6225A00
6-1	Power Transformer			A.G XA6226A00
6-2	Power Transformer			KA803290
6-3	Power Switch	SDLC-1P		VA985300
6-4	Ceramic Cap	0.01uF 400V		FI504100
6-5	Ceramic Cap	0.01uF		U.C CB600810
6-6	Cover	HY-0102		A.G CB6644670
6-7	Cover	HY-0105		LA002950
7	Terminal Plate	2P		U.C MG000840
8	Power Cord	10A 125V 2m		U.C MG001240
8	Power Cord	10A 125V 2m		A MG000920
8	Power Cord	7.5A 250V 2.5m		A MG001490
8	Power Cord	7.5A 250V 2.5m		A MG002310
8	Power Cord	7.5A 250V 2m		G MG000960
8	Power Cord	7.5A 250V 2m		G MG001620
8	Power Cord	7.5A 250V 2m		G MG002320
8	Power Cord	7.5A 250V 2m		CB630450
9	Main Chassis			NB623740
10	Disc Tray Assy			CB623700
10-1	Lifter (R)			CB623710
10-2	Lifter (L)			CB628470
10-3	Disc Pad			CB627960
10-4	Cushion Rubber			AA619180
10-5	SP Lifter			AA622570
10-6	BW Head Tapping Screw	3x8(10mm)FCM3-3L(P-Tight)		AA622590
10-7	Flat Head Tapping Screw	3*8 ZMC2-Y		AA619420
11	Top Cover			CB6648330
12	Bottom Cover			VB110600
13	Ground Plate			CB628410
14	Lid			CB632190
15	Button			AA622640
16	FT Damper Rubber			
17	Leg			
18	Screw.Transport			

Ref No.	Description	Remarks	Markets	Common Model
19	Special Screw			AA621210
20	Plastic Rivet			CB068880
21	Binding Head Tapping Screw	4*12 FCM3-BL(P-Tight)		
22	Binding Head Tapping Screw	3*10 FCM3-BL(P-Tight)		
23	Binding Head Tapping Screw	3*8 FCM3-BL		
24	Bonding Head Tapping Screw	3*8 FCM3-BL(B-Tight)		
25	Bonding Head Tapping Screw	2.6*10 FCM3-BL(P-Tight)		
26	Bonding Head Tapping Screw	3*12 FCM3-BL(B-Tight)		
	Accessories			
	Pin Plug Cord	1m		M1091120



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EXPLODED VIEW(Disc Mechanism Unit)

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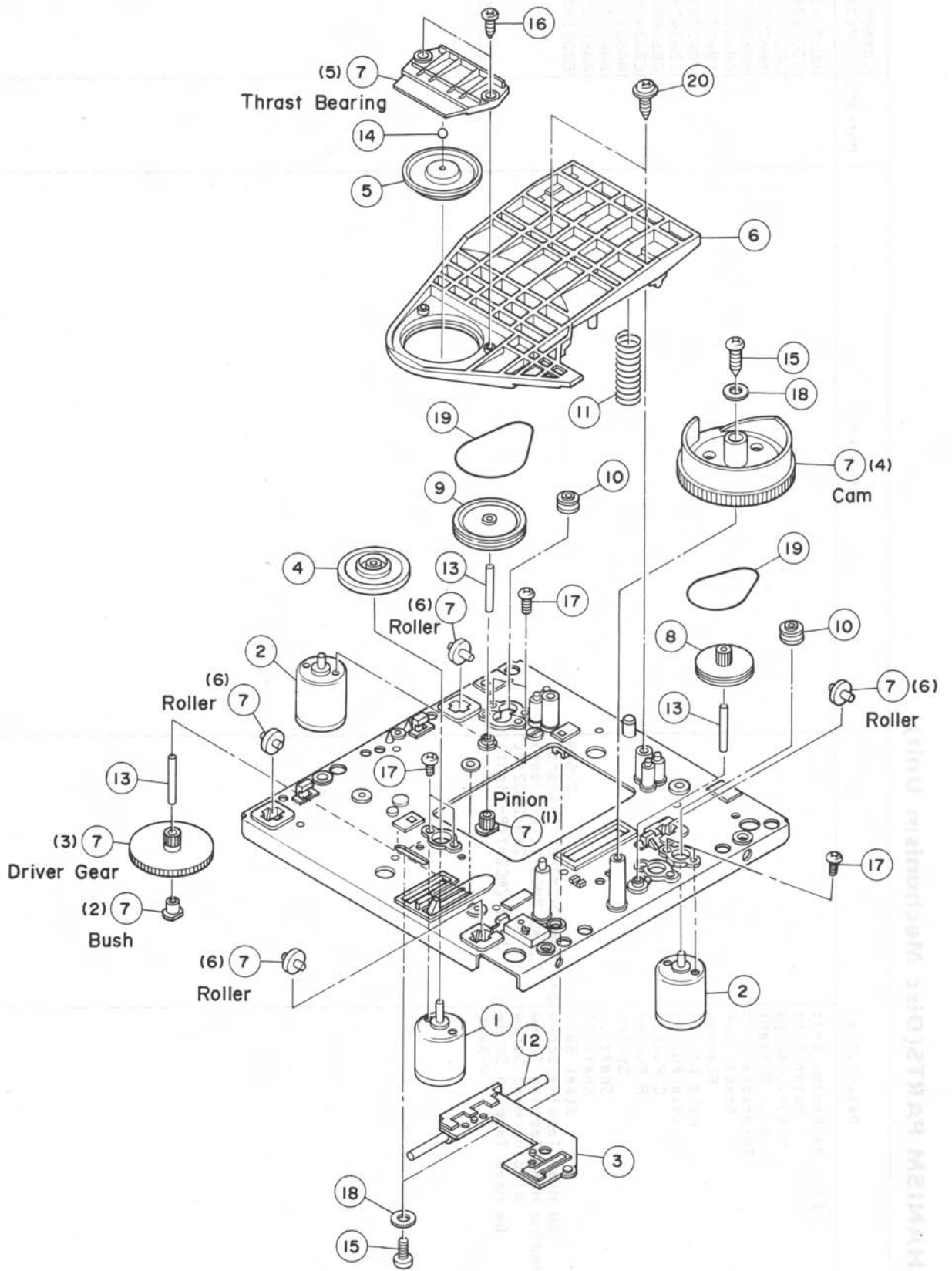
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MECHANISM PARTS(Disc Mechanism Unit)

Ref No.	Description	Remarks	Markets	Common Model
1	Disc Mechanism Unit			NB631420
2	Motor.Disc			JC001260
3	Motor.Loading			JC001270
4	S.L. Outsert			NB629980
5	Turntable Unit			NB629970
6	Stabilizer			CB642400
7	Flapper			CB623680
8	Mold Kit(2)			NB627920
9	Idle Pulley			CB634790
10	C Pulley			CB634800
11	P Pulley			CB634780
12	Spring			AA624350
13	Shaft(L)			AA619320
14	Shaft(S)			AA619330
15	Steel Ball			EZ001980
16	BW Head Tapping Screw	3*8(8mm) FCM3-BL(P-Tight)		
17	Binding Head Tapping Screw	2.6*5 ZMC2-BL(P-Tight)		
18	Binding Head Screw	2*5 ZMC2-BL		
19	BW Head Tapping Screw	3*12 ZMC2-Y(P-Tight)		
	V-Belt			CB637830

EXPLODED VIEW(Disc Mechanism Unit)