

ORDER NO. AD8805083C9

Service Manual

COMPACT
disc
DIGITAL AUDIO

DIGITAL

Compact Disc Player

SL-PJ45

Color

(K)...Black Type



Area

Color	Area
(K)	(E).....Continental Europe.
(K)	(EK).....United Kingdom.
(K)	(XL).....Australia.
(K)	(EG).....F.R. Germany.
(K)	(EB).....Belgium.
(K)	(EH).....Holland.
(K)	(EF).....France.
(K)	(EI).....Italy.
(K)	(XA).....Asia, Latin America, Middle Near East, Africa and Oceania.
(K)	(XB).....Saudi Arabia.
(K)	(PC).....European Audio Club.

SPECIFICATIONS

■ Audio

No. of channels	2 (left and right stereo)
Frequency response	2~20,000 Hz \pm 0.5 dB
Output voltage	2 V (at 0 dB)
Dynamic range	94 dB
S/N ratio	96 dB
Harmonic distortion	0.003 % (1 kHz, 0 dB)
Total harmonic distortion	0.006 % (1 kHz, 0 dB)
Wow and flutter	Below measurable limit
Output impedance	Approx. 600 Ω
Load impedance	More than 10 k Ω
Headphone output level	15 mW, 32 Ω
D-A conversion system	2 DAC System with 16-bit Resolution

■ Signal Format

Sampling frequency	44.1 kHz
D-A conversion	16-bit linear

■ Pickup

Wavelength	780 nm
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■ Infrared remote-control transmitter

Dimensions (W \times H \times D)	61 \times 18 \times 165 mm
Batteries	UM-4 "AAA" batteries or IEC R03 or equivalent (1.5 V \times 2)
Weight	100 g (including batteries)

■ General

Power supply

For United Kingdom and Australia: AC 240 V, 50/60 Hz

For Continental Europe: AC 220 V, 50/60 Hz

For Others: AC 110 V/127 V/220 V/240 V, 50/60 Hz

Power consumption

16 W

Dimensions (W \times H \times D)

360 \times 90 \times 270 mm

Weight

3.6 kg

Specifications are subject to change without notice.

Weight and dimensions shown are approximate.

Technics

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SL-PJ45

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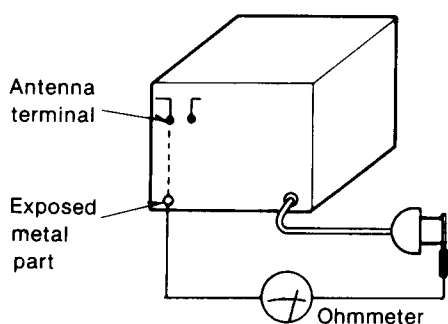
SAFETY PRECAUTION (This "safety precautions" is applied only in U.S.A.)

1. Before servicing, unplug the power cord to prevent an electric shock.
2. When replacing parts, use only manufacturer's recommended components for safety.
3. Check the condition of the power cord. Replace if wear or damage is evident.
4. After servicing, be sure to restore the lead dress, insulation barriers, insulation papers, shields, etc.
5. Before returning the serviced equipment to the customer, be sure to make the following insulation resistance test to prevent the customer from being exposed to a shock hazard.

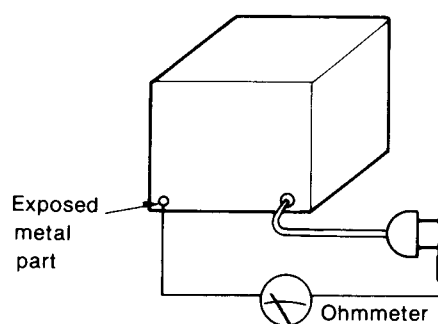
INSULATION RESISTANCE TEST

1. Unplug the power cord and short the two prongs of the plug with a jumper wire.
2. Turn on the power switch.
3. Measure the resistance value with ohmmeter between the jumpered AC plug and each exposed metal cabinet part, such as screwheads antenna, control shafts, handle brackets, etc. Equipment with antenna terminals should read between $3\text{M}\Omega$ and $5.2\text{M}\Omega$ to all exposed parts. (Fig. A) Equipment without antenna terminals should read approximately infinity to all exposed parts. (Fig. B)

Note: Some exposed parts may be isolated from the chassis by design. These will read infinity.



(Fig. A)

Resistance = $3\text{M}\Omega$ — $5.2\text{M}\Omega$ 

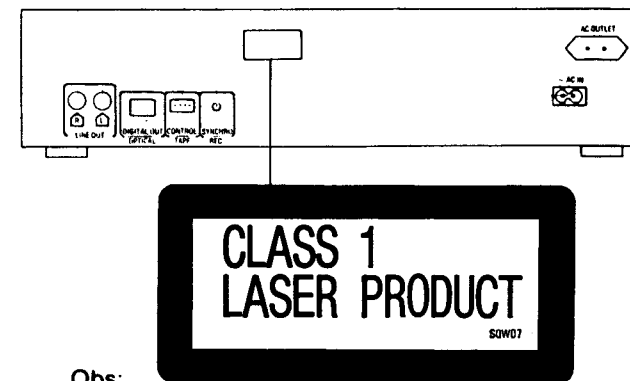
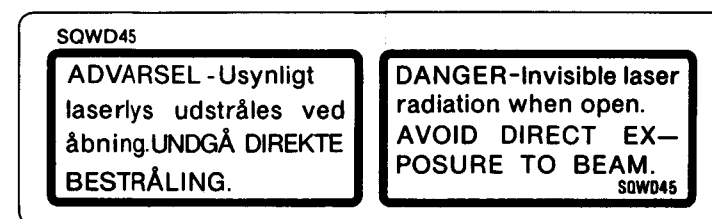
(Fig. B)

Resistance = Approx ∞

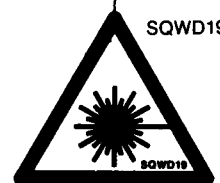
4. If the measurement is outside the specified limits, there is a possibility of a shock hazard. The equipment should be repaired and rechecked before it is returned to the customer.

■ PRECAUTION OF LASER DIODE

Caution: This product utilizes a laser diode.
ADVARSEL: I dette apparat anvendes laser.



Obs:
Apparaten innehåller laser
Komponent av höger laserklass
än klass 1.

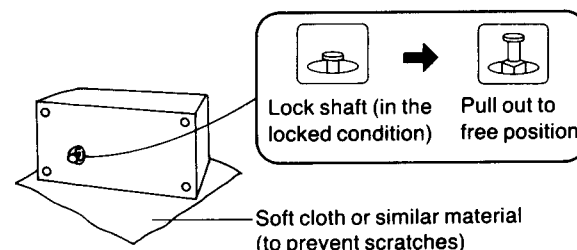


VAROITUS! Laite sisältää laserdiodin,
joka lähettää näkymätöntä silmille
vaarallista lasersäteilyä

■ BEFORE USING THIS UNIT

Before placement

The optical pick-up is secured to prevent damage during transport. Be sure to release it before use.



Caution:

Do not transport the unit without locking the lock shaft.
Severe damage will result.

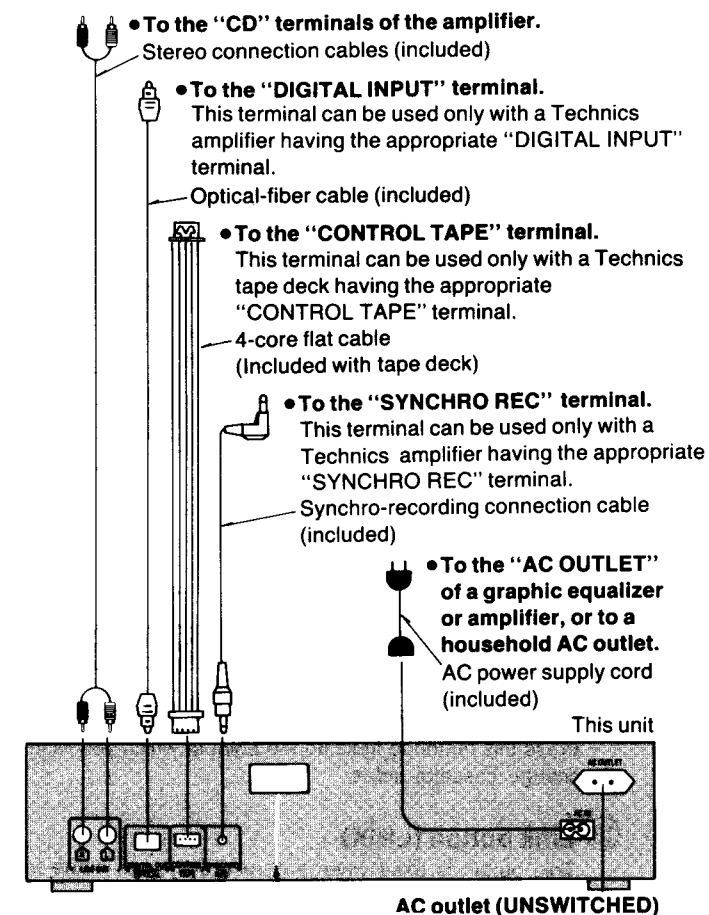
If the unit is transported again, perform the following steps:

- 1) Remove the disc from the tray and turn off the power.
- 2) Place the unit with the rear panel facing downward.
- 3) Push the lock shaft to the in (LOCK) position (■→■).

Notes for placement

- Place on a flat, level surface so that the front-rear inclination does not exceed 5°.
- Avoid places such as the following:
 - Near any equipment or device that generates strong magnetism.
 - On any heat-generating equipment or device, or in any place where the temperature is high (40°C or higher).
 - Extremely cold places (5°C or below).
 - Near a tuner or TV. (It may cause noise in the broadcast, or disturbance of the TV picture.)
- Do not place heavy objects, other than system components, on top of the unit.
- When carrying or storing the unit, handle it with care so it is not subjected to any strong bumps. Always remove the disc before storing the unit for any period of time.
- To avoid problems due to vibration.
 - Do not place a book or similar object under this unit.
 - Do not route the connection cables (of this or other units) across the operation panel, across the top, or under the unit.

■ CONNECTIONS



Notes:

1. See the operating instructions of the amplifier for details.
2. The configuration of the AC outlet and AC power supply cord differs according to area.

AC outlet (UNSWITCHED):

Power is always available, regardless of the unit's power switch setting.

This outlet is exclusively for the connection of other audio equipment, such as an amplifier. Be sure the power consumption does not exceed the wattage specified near the AC outlet.

Digital output terminal (DIGITAL OUT)

The output signals of this unit are output from this terminal as digital signals.

Optical terminal (OPTICAL)

This terminal can be used for connection with other equipment that has a digital input terminal, such as an amplifier, by using an optical-fiber cable (included).

A dust-protection cap is inserted in this terminal. Remove this cap only when a connection is to be made to this terminal.

CAUTION

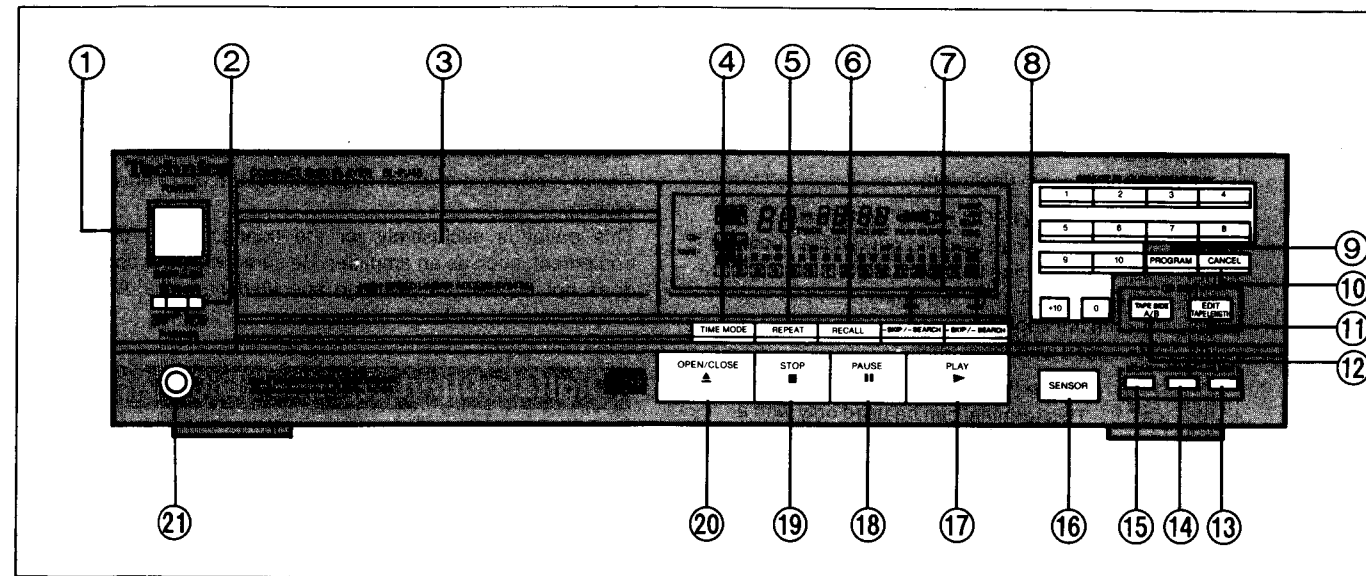
When using the optical-fiber cable, please keep the following points in mind:

1. The maximum length of optical cable to be used with this unit is 3 m (approx. 10 ft.).
2. Always make sure the plug is fully inserted. If the plug is not inserted all the way, an imperfect connection will result.
3. The optical-fiber cable must never be bent or coiled tightly. Doing so will permanently damage the optical-fiber in the cable and, therefore, prevent proper data transmission. If the cable must be coiled (for storage, etc.), the diameter of the loop should be at least 15 cm (approx. 6 inches).
4. Handle the optical cable's plug very carefully. Keep the plug free from dust or damage. Dust can be removed by wiping the plug with a soft cloth. Do not use any cleaners or solvents to clean the plug.

■ ACCESSORIES

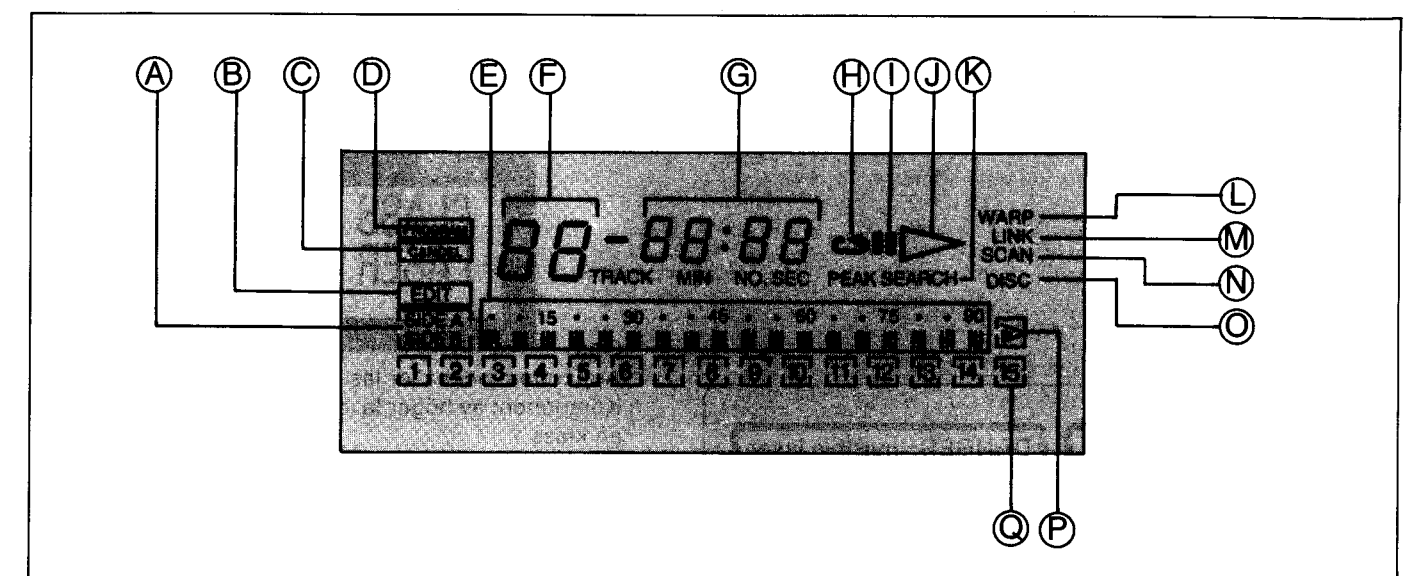
• AC power supply cord 1 SFDAC05E03 (E, EB, EH, EG, EF, EI) SJA173 (XL) SJA188 (EK) SJA168 (XA, PC) SJA183 (XB)	• Stereo connection cable 1 (SJP2249-1)	• Optical-fiber cable 1 (SJPD16)
• Remote-control transmitter 1 (EUR64790)	• Batteries 2 (UM-4NE)	• Synchro-recording connection cable 1 (SJP2257T)

FRONT PANEL CONTROLS AND FUNCTIONS



Control section

- ① **Power switch (POWER)**
- ② **Timer stand-by switch (TIMER)**
- ③ **Disc tray**
- ④ **Time-mode select button (TIME MODE)**
Use this button to select the desired time display mode.
- ⑤ **Repeat button (REPEAT)**
- ⑥ **Recall button (RECALL)**
Press this button to display the program play sequence in the memory.
- ⑦ **Skip/search buttons (SKIP/SEARCH)**
- ⑧ **Numeric buttons (+10, 0, 1~10)**
These buttons can be used to select the track numbers and the recording time.
- ⑨ **Programmed-play button (PROGRAM)**
- ⑩ **Cancel button (CANCEL)**
To cancel a track number from memory, first press the appropriate numeric button to display the number of the track you wish to cancel, then press this button.
- ⑪ **Compact-disc edit button (EDIT/TAPE LENGTH)**
This button is used when recording from a compact disc. When the button is pressed and the tape's length is specified, the tracks to be recorded will be automatically selected, and, at the same time, the peak level search will begin.
- ⑫ **Tape-side select button (TAPE SIDE A/B)**
Press this button to indicate the point at which you wish to change cassette sides.
- ⑬ **Link button (LINK)**
This button is used when edit-recordings are made from several compact discs.
- ⑭ **Warp button (WARP)**
This button is used to select (during edit recording from a compact disc) tracks of the appropriate length (from the tracks remaining on the compact disc) and to add those tracks to an as-yet unrecorded space on the cassette tape, and to replace tracks on the A side and B side of the tape with other tracks.
- ⑮ **Music scan button (SCAN)**
This button can be used to play the first part of each track in order.
This is convenient to find the title or the track number.
- ⑯ **Remote-control signal receptor (SENSOR)**
- ⑰ **Play button (PLAY/▶)**
- ⑱ **Pause button (PAUSE/⏸)**
- ⑲ **Stop button (STOP/■)**
This button can be used to stop the disc play, as well as to cancel the various play modes.
- ⑳ **Disc tray open/close button (OPEN/CLOSE/▲)**
- ㉑ **Headphones jack (PHONES)**

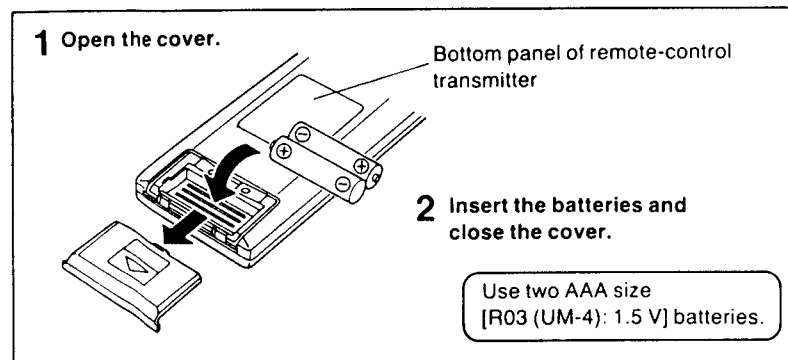


Indicators section

- A **Tape side indicator (SIDE A / SIDE B)**
This bracket indicator illuminates to show which cassette side, "A" or "B", has been selected with the tape side (A/B) select button.
- B **Edit indicator (EDIT)**
Illuminates when the edit button is pressed and goes out when the stop button is pressed.
- C **Cancel indicator (CANCEL)**
This indicator illuminates when the cancel button is used; a programmed track can be canceled during the time that this indicator is illuminated.
- D **Programmed-play indicator (PROGRAM)**
- E **Time scale**
The compact disc's play time, and the tape length for an edit-recording, are displayed by bars (in units of 5 minutes each).
In addition, the play-position is indicated by continuous bar flashing.
- F **Track number display (TRACK)**
- G **Time display (MIN/NO./SEC)**
- H **Repeat indicator (↺)**
- I **Pause indicator (⏸)**
- J **Play indicator (▶)**
- K **Peak-level search indicator (PEAK SEARCH)**
- L **Warp indicator (WARP)**
- M **Link indicator (LINK)**
- N **Scan indicator (SCAN)**
- O **Disc indicator (DISC)**
This indicator illuminates when a disc is loaded.
- P **Over mark (▶)**
The ▶ indicator illuminates if the total number of tracks on the disc is 16 tracks or more.
When the play reaches the 16th track and thereafter, the bracket indicator "[]" begins flashing.
- Q **Music matrix (1~15)**
The numbers of the tracks on the disc are displayed up to a maximum of 15.

REMOTE-CONTROL TRANSMITTER (EUR64790)

Insertion of remote-control transmitter batteries



To remove the batteries

Reverse procedure 2.

Battery life

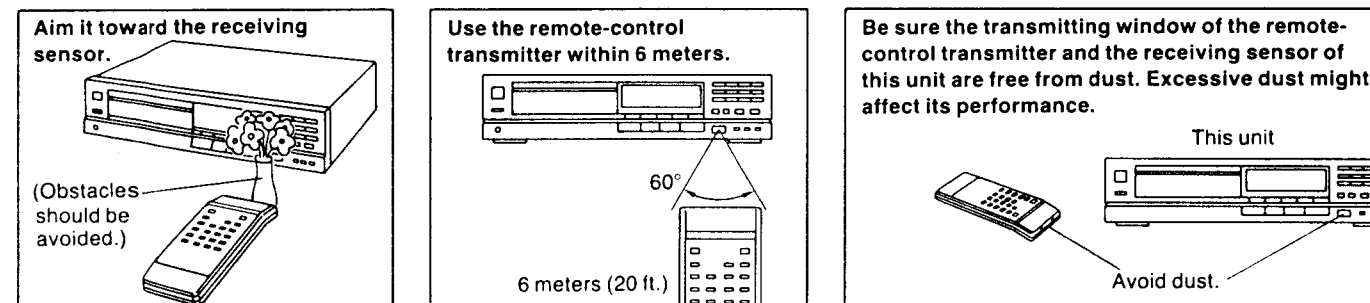
About 1 year.
(Depending on frequency of use.)

Notes concerning use of dry batteries

- Do not use chargeable batteries (Ni-Cd type).
- Be sure the batteries are inserted so that the positive (+) and negative (-) polarities are correct. Batteries installed with incorrect polarities may leak and damage the remote-control transmitter.
- Never subject the batteries to excessive heat or flame; do not attempt to disassemble them; and be sure they are not short-circuited.
- If the remote-control transmitter is not to be used for a long time, remove the batteries and store them in a cool dark place.
- Always remove old, weak or worn-out batteries promptly and dispose of them properly.
- Never mix old and new batteries, nor batteries of different types (carbon or alkaline).

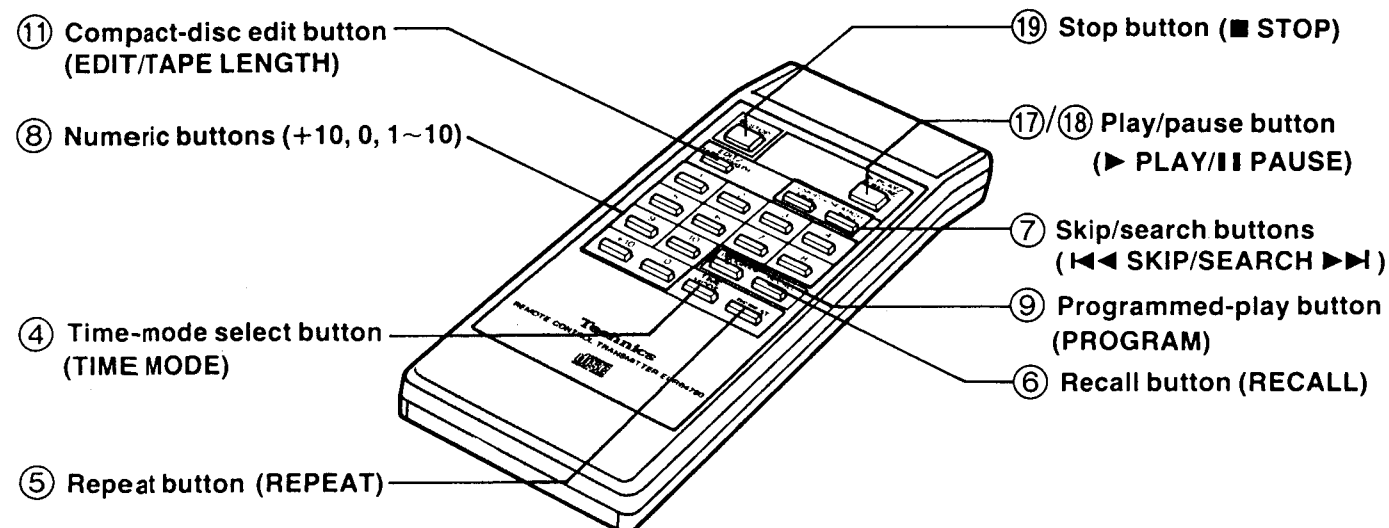
Operation notes

Note that operation may not be correct if direct sunlight or other strong light strikes the remote-control signal receptor part of this unit. If there is a problem, place the unit away from the direct sunlight or other strong light source.



Note: The control panel of the remote-control transmitter may be covered by a clear plastic protective sheet. This sheet may be removed if desired.

Control names

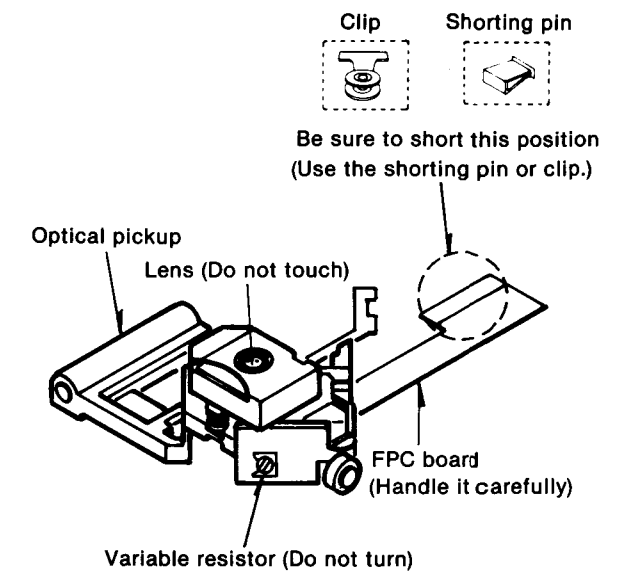


HANDLING PRECAUTIONS FOR OPTICAL PICKUP

The laser diode in the optical pickup may break down due to potential difference caused by static electricity of clothes or human body. So, be careful of electrostatic breakdown during repair of the optical pickup.

Handling of optical pickup

- Do not give excessive shock to the optical pickup because it is of extremely precise structure.
- To prevent the breakdown of the laser diode, an anti-static shorting pin is inserted into the flexible board. (FPC board)
When removing or connecting the short pin, finish the job in as short time as possible.
- Take care not to apply excessive stress to the flexible board. (FPC board)
- Do not turn the variable resistor (laser power adjustment). It has already been adjusted.

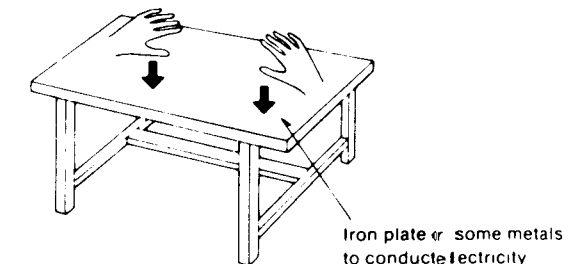
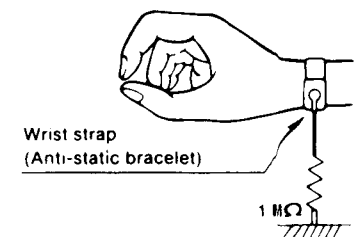


Grounding for electrostatic breakdown prevention

- Human body grounding
Use the anti-static wrist strap to relieve the static electricity from your body.
- Work table grounding
Put a conductive material (sheet) or steel sheet on the area where the optical pickup is placed, and ground the sheet.

Caution:

The static electricity of your clothes will not be grounded through the wrist strap. So, take care not to let your clothes touch the optical pickup.

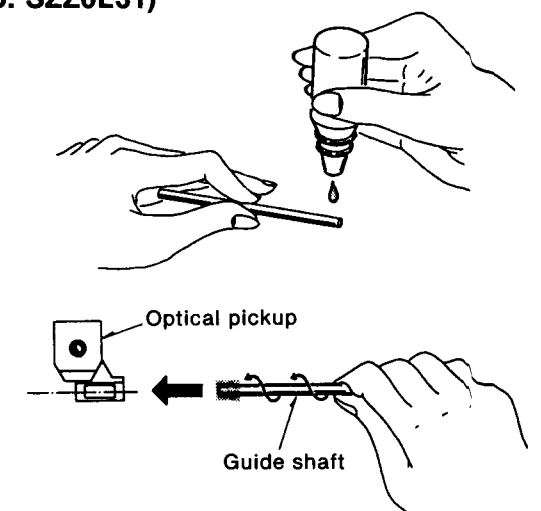


INSTRUCTIONS FOR THE OIL (Part No. SZZ0L31)

The container contains 6g (approx. 3ml) of oil. Since one application (one shaft) uses 0.05ml of oil.

How to Use

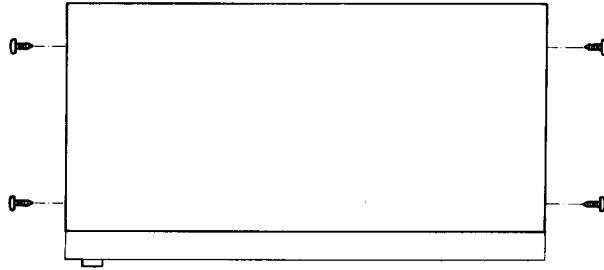
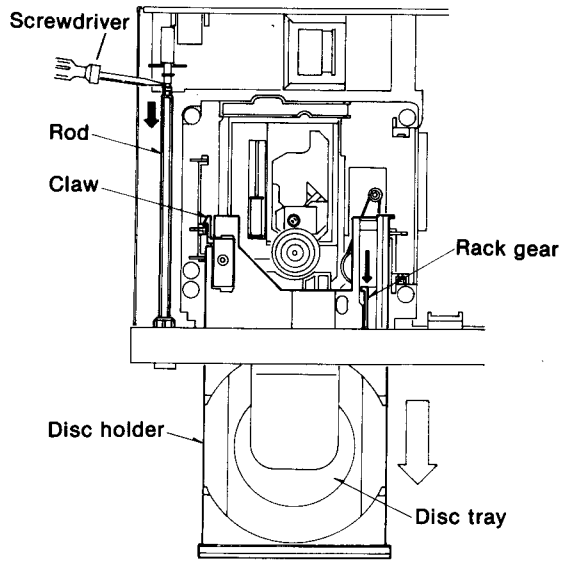
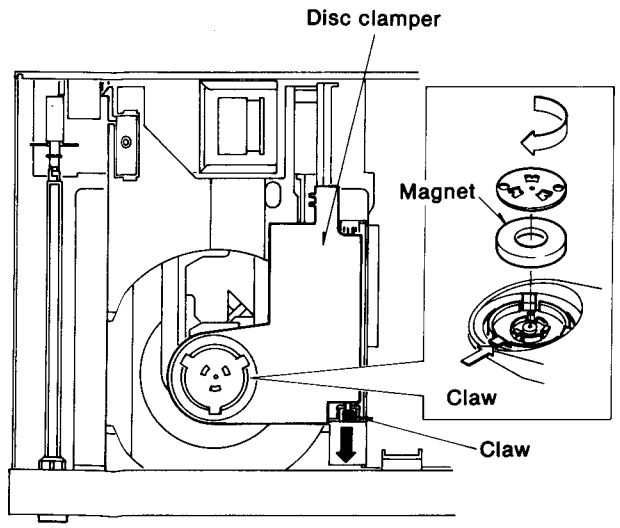
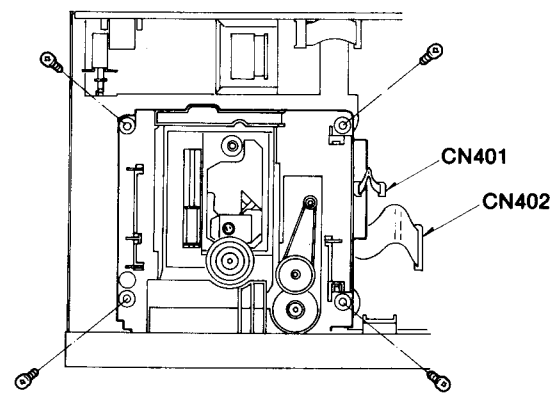
- Remove the guide shaft in the traverse deck from the optical pickup and clean off any dust from the guide shaft.
- Apply one drop of the SZZ0L31 to the tip of the guide shaft.
- Hold the guide shaft so that its oiled end touches the optical pickup and insert it into the bearing while rotating it slowly.
- After securing the guide shaft, move the optical pickup by hand several times to the left and right to distribute the oil on the guide shaft.

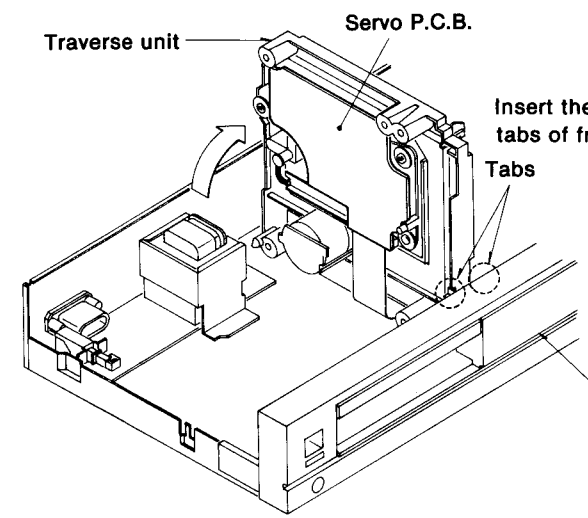
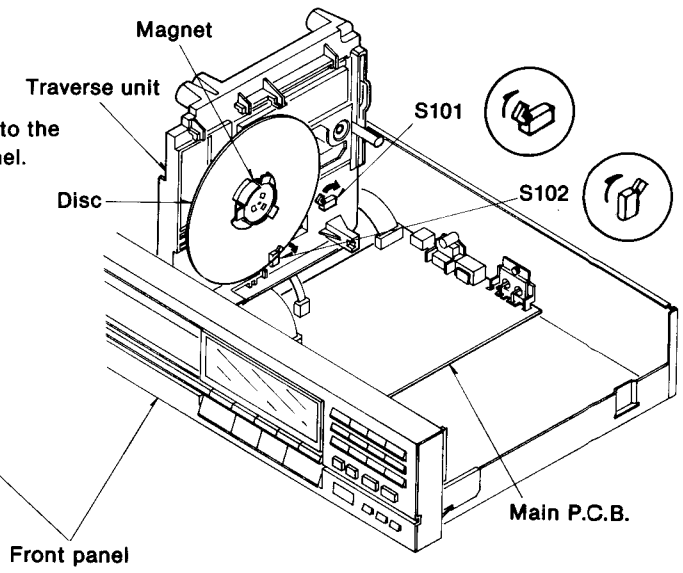
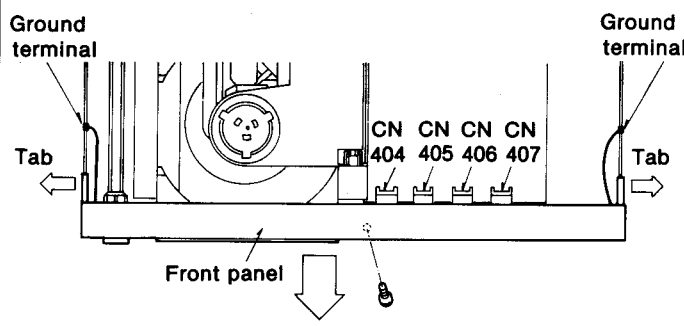
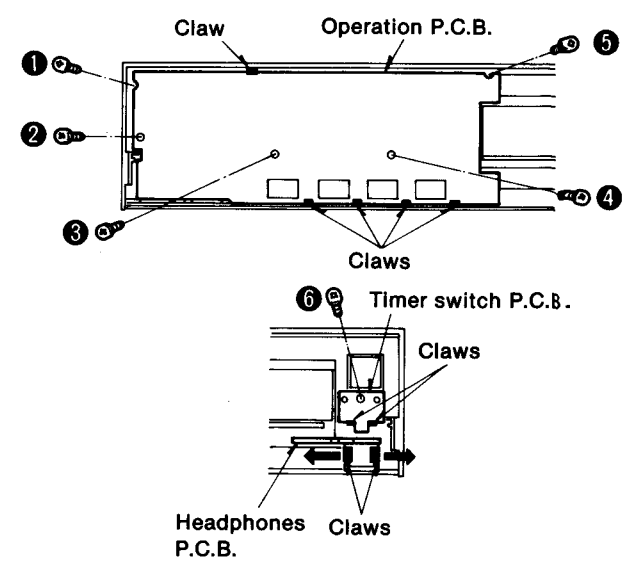


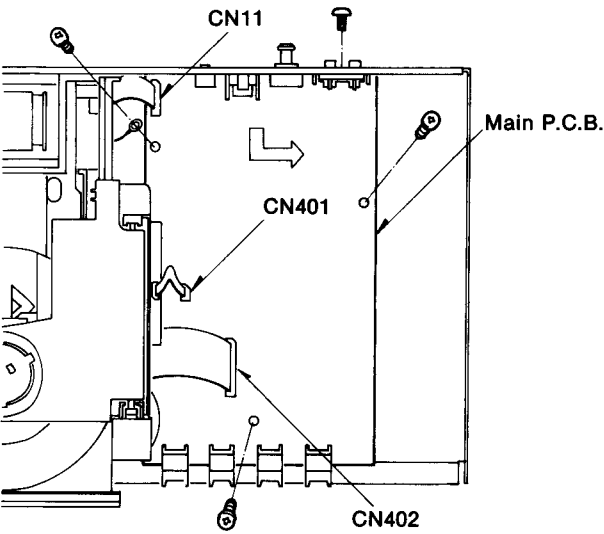
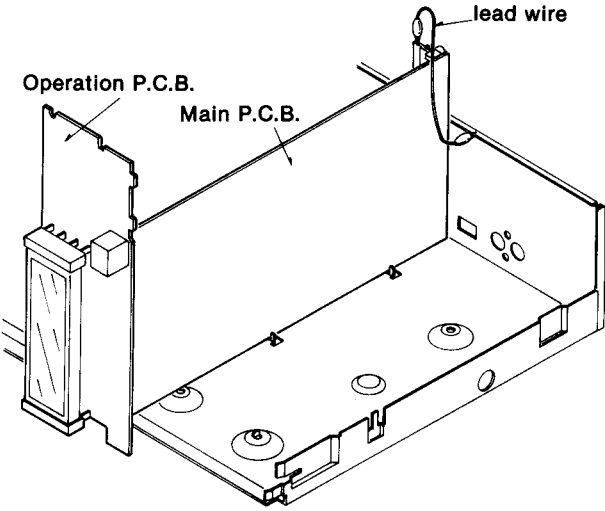
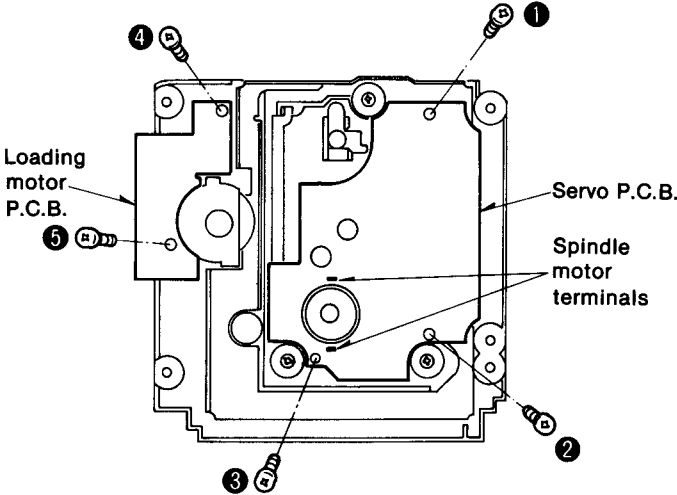
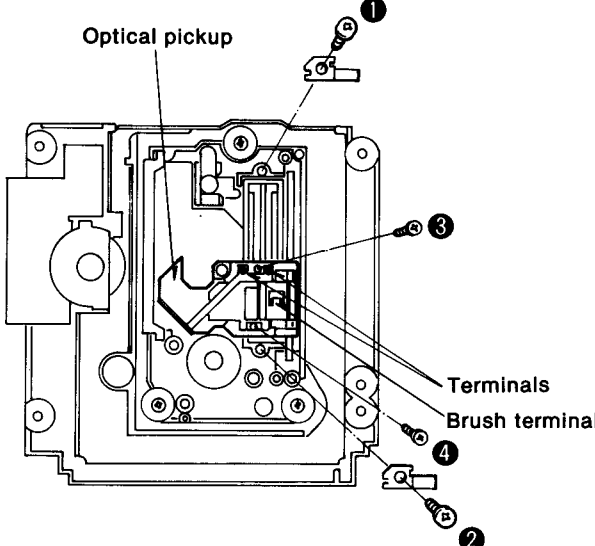
DISASSEMBLY INSTRUCTIONS

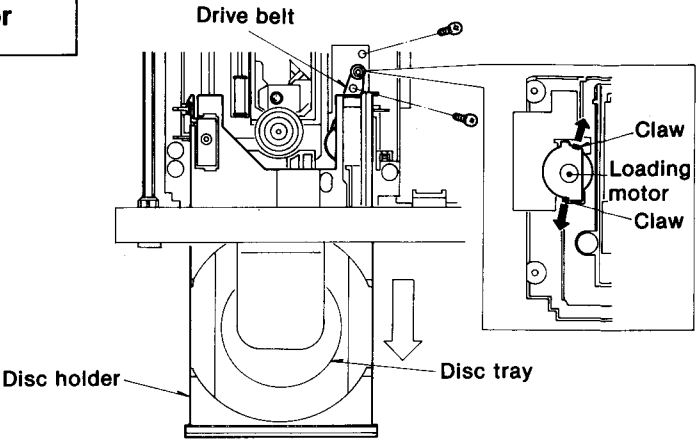
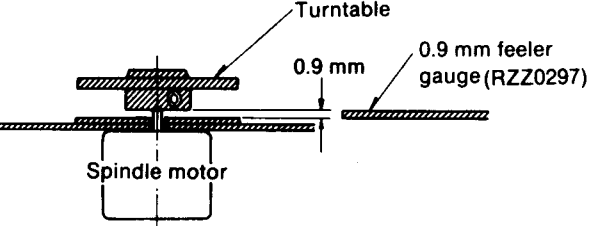
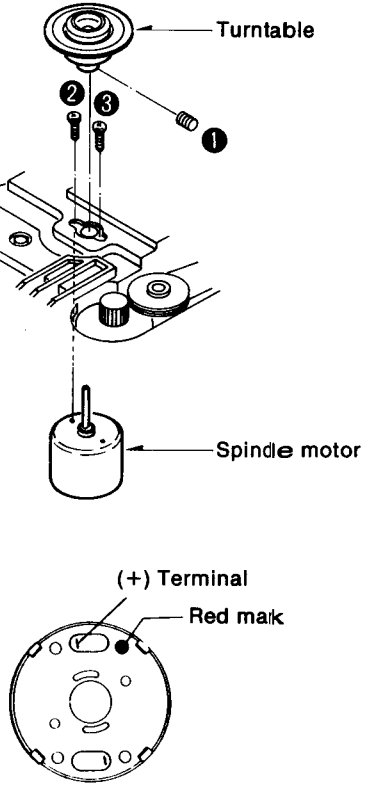
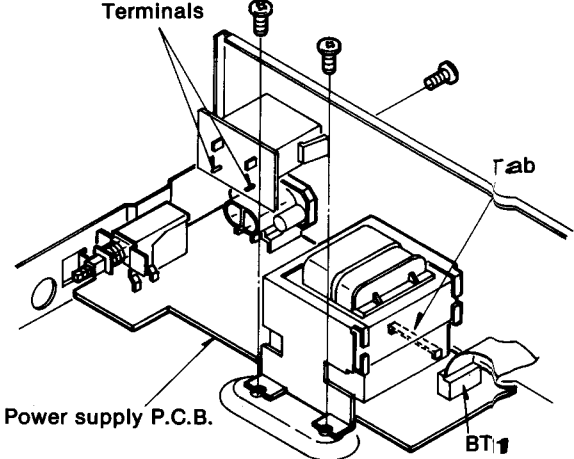
CAUTION:

- It is very dangerous to look at or touch laser radiation. (Laser radiation is invisible.)
- With the unit turned "on", laser radiation is emitted from the pickup lens.
- When removing the cabinet and disc clamber of this unit, be sure to turn the power supply off.

Ref. No. 1	How to remove the cabinet	Ref. No. 3	How to remove the disc holder and power switch rod
Procedure 1	1. Remove the 4 screws.	Procedure 1→2→3	A. Disc holder: 1. Push the rack gear slowly in the direction of the arrow until the disc tray comes up. 2. Pull the disc holder until it stops. 3. Release the claw. 4. Pull out the disc holder further to remove it. B. Power switch rod: 1. Set the power switch in the "OFF" position. 2. Remove the power switch rod by using a screwdriver.
			
Ref. No. 2	How to remove the disc clamber and magnet	Ref. No. 4	How to remove the traverse unit
Procedure 1→2	A. Disc clamber: • Release the claw. • Lift clamber and pull in the direction of the arrow. B. Magnet: • Turn the holder in the direction of the arrow to release the claw.	Procedure 1→2→3→4	• Remove the 4 screws.
			

Ref. No. 5	How to check the servo P.C.B.	(To play a disc) 1. Place the test disc and magnet. 2. Turn "ON" the power switch of the player while holding the levers of the switches (S101, S102) in the direction of the arrow.	
Procedure 1→2→3→4→5	• When checking the soldered surfaces of the servo P.C.B. and replacing the parts, do as shown.	 	
Ref. No. 6	How to remove the front panel	Ref. No. 7	How to remove the operation P.C.B., headphones P.C.B. and timer switch P.C.B.
Procedure 1→6	• Remove the 1 screw. • Release the ground terminals. • Slightly pull out the tabs and remove the front panel in the direction of the arrow.	Procedure 1→6→7	A. Operation P.C.B. 1. Remove the 5 screws (①~⑤). 2. Release the 5 claws. B. Headphones P.C.B. 1. Release the claws. C. Timer switch P.C.B. 1. Remove the 1 screw (⑥). 2. Release the claws.
			

Ref. No. 8	How to remove the main P.C.B.	How to check the main P.C.B.
Procedure 1→6→8	<ol style="list-style-type: none">1. Remove the 4 screws.2. Lift the P.C.B. remove it from the chassis tab.3. Remove the P.C.B. in the direction of the arrow. 	<p>•When checking the soldered surface of the main P.C.B. and replacing the parts, do as shown.</p> <p>Cautions:</p> <ul style="list-style-type: none">•Be sure to connect the P.C.B. ground terminal (line out terminal) and the chassis with a lead wire.•Be sure to connect the GND lead wire from the loading base to the chassis. 
Ref. No. 9	How to remove the servo P.C.B. and loading motor P.C.B.	Ref. No. 10
Procedure 1→2→3→4→9	<p>A. Servo P.C.B.</p> <ol style="list-style-type: none">1. Remove the 3 screws (①~③).2. Unsolder the 2 terminals of spindle motor.3. Remove the FPC cord from the optical pickup. <p>Caution:</p> <p>Be sure to short the FPC cord within 20 seconds after removal to prevent breakdown of the laser diode.</p> <p>B. Loading motor P.C.B.</p> <ol style="list-style-type: none">1. Remove the 2 screws (④, ⑤). 	<p>How to remove the optical pickup</p> <p>Refer to the optical pickup handling precautions and instructions for the oil (See page 8).</p> <ol style="list-style-type: none">1. Remove the 2 screws (①, ②).2. Unsolder the 2 terminals and the 2 screws (③, ④).  <p>Caution: Take care not to touch the brush terminal.</p>

Ref. No. 11	How to remove the loading motor	
Procedure 1→2→3→4→11	<ol style="list-style-type: none">1. Remove the drive belt.2. Remove the 2 screws.3. Turn traverse unit over.4. Release the claws.5. Unsolder the terminals.	
Ref. No. 12	How to remove the spindle motor	
Procedure 1→2→3→4→9→12	<ol style="list-style-type: none">1. Loosen the screw (①) by using a 1.27 mm hexagonal wrench and remove the turntable.2. Remove the 2 screws (②, ③). <p>Caution:</p> <ol style="list-style-type: none">1. Turntable height adjustment is necessary any time the turntable or spindle motor is replaced.2. The (+) terminal of the spindle motor is indicated by the red mark. <p>Adjustment of turntable height</p> <ol style="list-style-type: none">1. Insert a 0.9 mm feeler gauge (RZZ0297) between the turntable and loading base as shown below.  <ol style="list-style-type: none">2. Tighten the turntable set-screw by using a 1.27 mm hexagonal wrench. <p>Caution:</p> <p>Refer to turntable height adjustment (see page 18),</p> 	
Ref. No. 13	How to remove the power transformer	
Procedure 1→2→3→4→13	<ol style="list-style-type: none">1. Remove the connector (BT11).2. Remove the 3 screws.3. Release the Tab.4. Unsolder the terminals.	

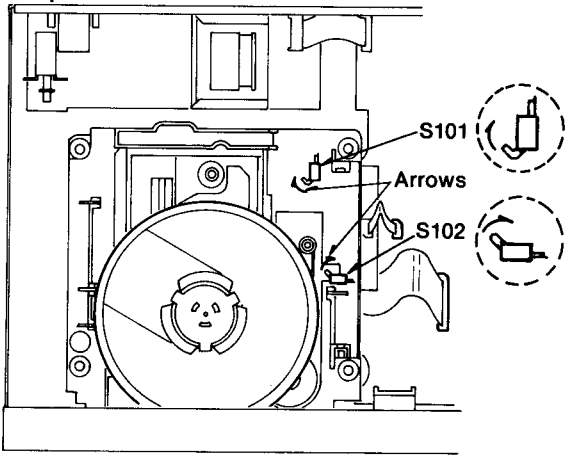
MEASUREMENTS AND ADJUSTMENTS

Caution:

- It is very dangerous to look at or touch the laser beam. (Laser radiation is invisible.)
With the unit turned "on", laser radiation is emitted from the pickup lens.
Avoid exposure to the laser beam, especially when performing adjustments.

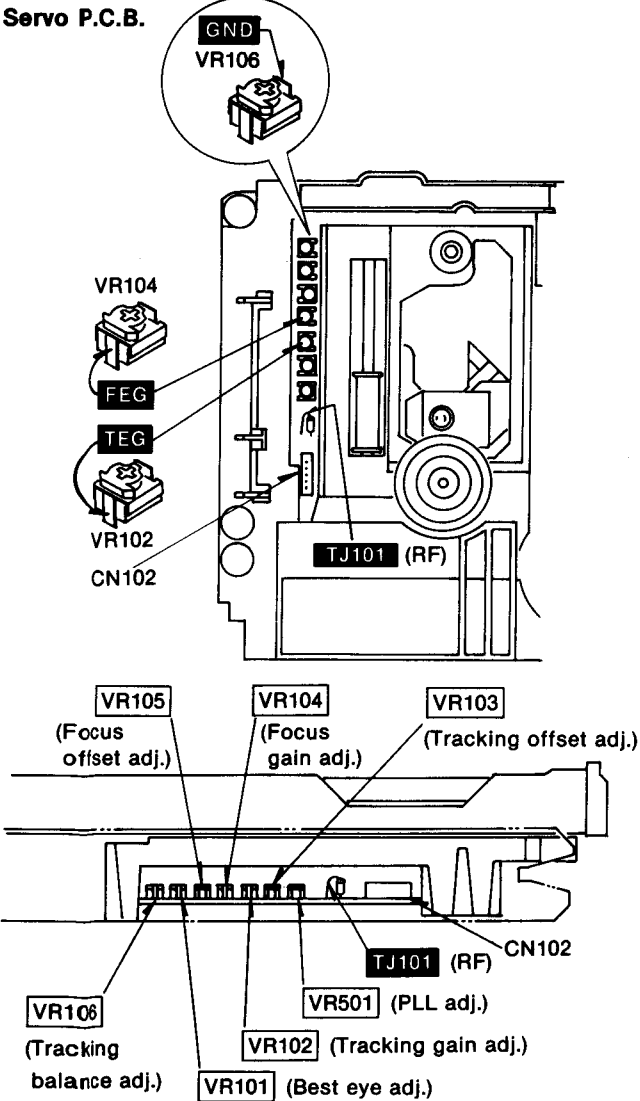
PREPARATION

- Remove the cabinet. (Refer to page 9.)
- Remove the disc clamber and magnet. (Refer to page 9.)
- Remove the disc holder and power switch rod. (Refer to page 9.)
- Place the test disc and magnet on the turntable.
- Turn "ON" the power switch of the player, while holding the levers of the switches (S101, S102) in the direction of the arrow.
- Release the levers of the switches (S101, S102) after the test disc starts rotating.

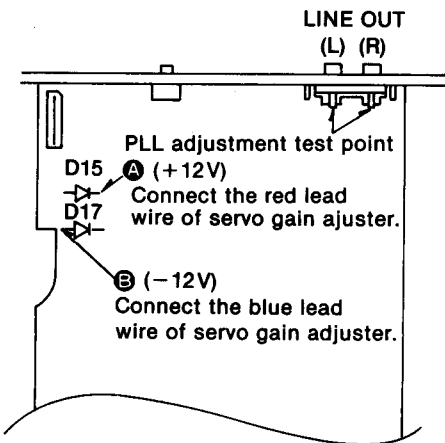


ADJUSTMENT POINTS

• Servo P.C.B.



• Main P.C.B.



ELECTRICAL ADJUSTMENT

Measuring Instruments and Special Tools

- Servo gain adjuster (SZZP1017F)
- Test discs
 - Test disc (SZZP1014F) old or new type
 - Inspection test disc (SZZP1054C)
 - Uneven disc (SZZP1056C)
 - Black band disc (SZZP1057C)
- Ordinary disc
- Two-channel oscilloscope (with trigger) of 30MHz or over
- Low frequency oscillator
- Conversion connector (SZZP1032F)

Adjustment Procedure

Step 1: Make the temporary setting of each VR. (Refer to page 15.)

Step 2: Best eye (PD balance) adjustment. (Refer to page 15.)

Step 3: Connect the servo gain adjuster. (Refer to page 14.)

Step 4: Focus gain adjustment. (Refer to page 15.)

Step 5: Tracking gain adjustment. (Refer to page 15.)

Step 6: Focus offset adjustment. (Refer to page 16.)

Step 7: Tracking offset adjustment. (Refer to page 16.)

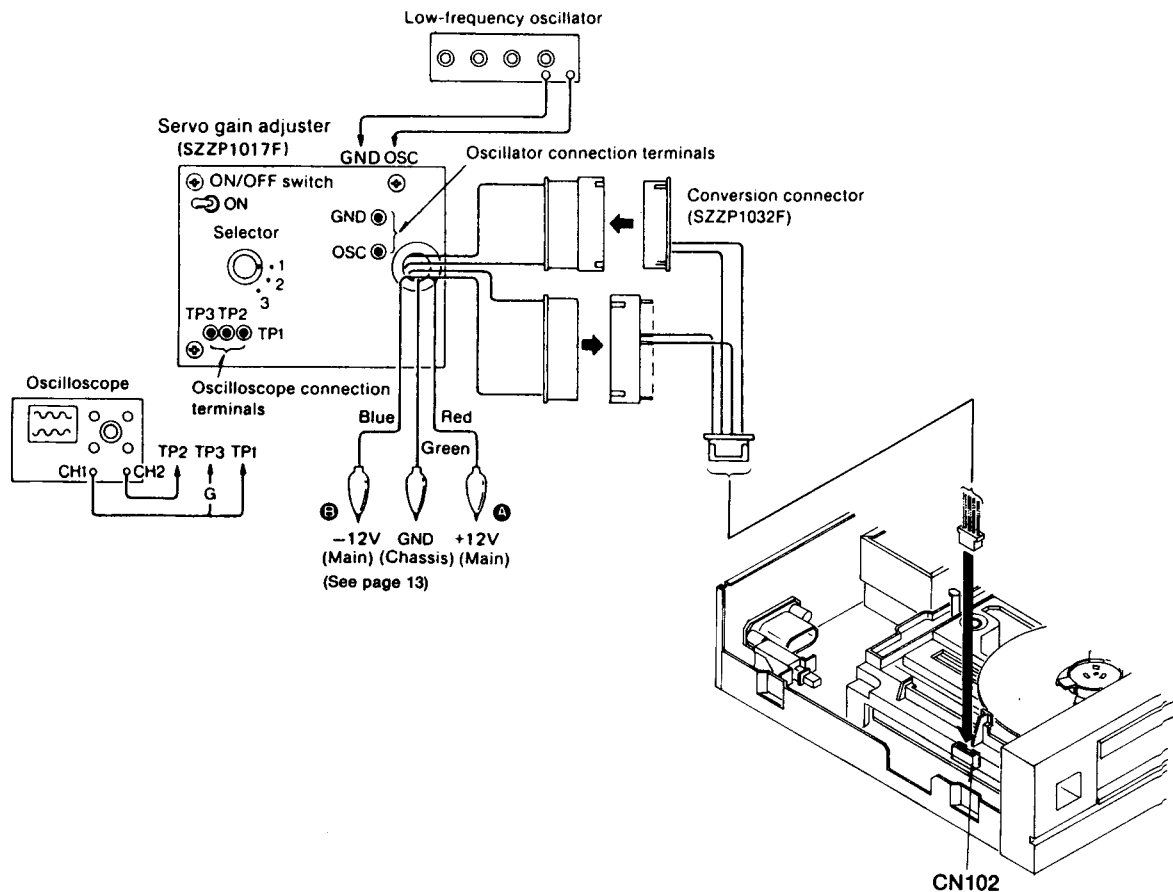
Step 8: Tracking offset balance adjustment. (Refer to page 16.)

Step 9: Disconnect the servo gain adjuster.

Step 10: PLL adjustment. (Refer to page 17.)

Step 11: Check of play operation after adjustment. (Refer to page 17.)

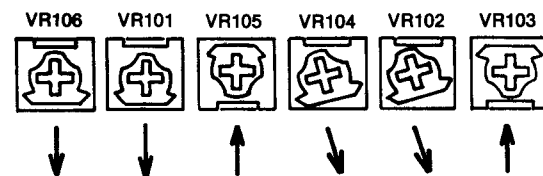
Connection of Servo Gain Adjuster



TEMPORARY SETTING OF EACH VR

Note :

If a disc skips or can not be played back, adjust each VR temporarily, as shown.

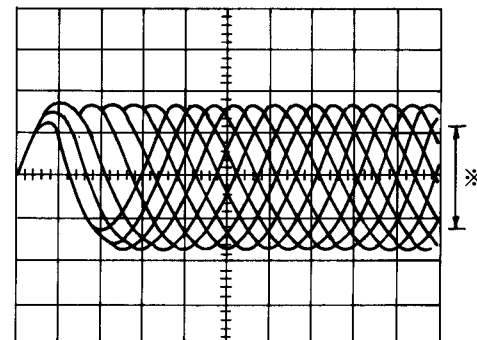


BEST EYE(PD BALANCE) ADJUSTMENT

1. Connect CH1 of the oscilloscope to TJ101 (+) and GND (-) of the servo P.C.B.

Oscilloscope setting: VOLT.....200mV
SWEEP.....0.5μsec.
INPUT.....AC

2. Set a test disc (SZZP1014F or SZZP1054C) and turn ON the power switch of the player. (Refer to page 13.)
3. Set the player to the play mode.
4. Adjust VR101 so that the eye pattern of RF signal is stretched to maximum.
5. Turn OFF the power switch of the player.

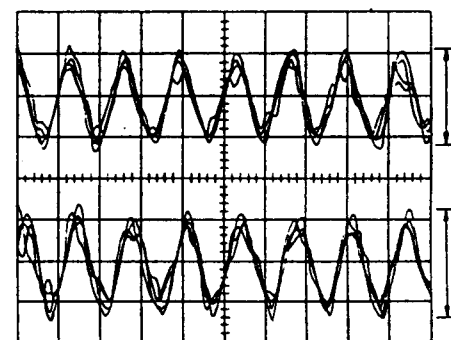


※ Most stretched eye pattern.

FOCUS GAIN ADJUSTMENT

1. Connect the servo gain adjuster. (Refer to page 12.)
 2. Set the selector switch of the servo gain adjuster to 2 and ON-OFF switch to ON.
 3. Set the low frequency oscillator to a frequency of 825Hz and an output voltage of 100mVp-p. Then connect the oscillator to OSC (+) and GND (-) terminals of the servo gain adjuster.
 4. Connect CH1 and CH2 of the oscilloscope to TP1 and TP2 of the servo gain adjuster. (TP3 is the ground terminal.)
- Oscilloscope setting: VOLT.....100mV(both channels)
SWEEP.....1msec.
INPUT.....DC

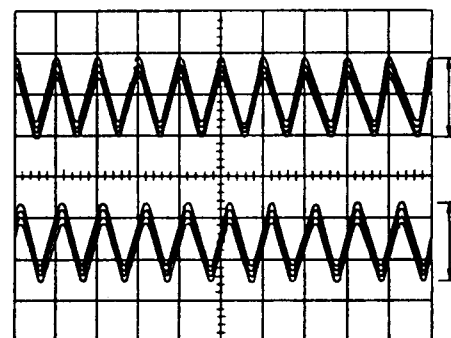
5. Set a test disc (SZZP1014F or SZZP1054C) and turn ON the power switch of the player. (Refer to page 13.)
6. Set the player to the play mode.
7. Set the selector switch of the servo gain adjuster from "2" to "3".
8. 825Hz signals will be displayed on the oscilloscope. Adjust VR104 until the waveform amplitudes of both channels are equal.
9. Shift the selector switch of the servo gain adjuster from "3" to "2".



* Make a=b

TRACKING GAIN ADJUSTMENT

1. Oscilloscope setting and connections are the same as above.
2. Set the low frequency oscillator to a frequency of 1.0kHz and an output voltage of 100mVp-p.
3. Set the selector switch of the servo gain adjuster from "2" to "1".
4. 1.0kHz signals will be displayed on the oscilloscope. Adjust VR102 until the waveform amplitudes of both channels are equal.
5. Shift the selector switch of the servo gain adjuster from "1" to "2".



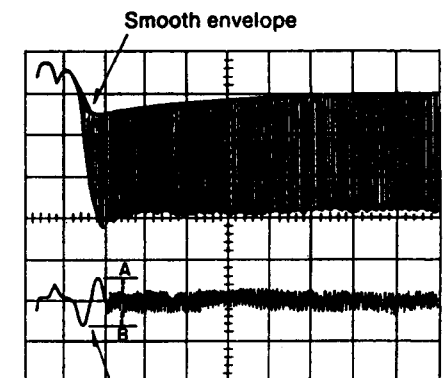
* Make a=b

FOCUS OFFSET ADJUSTMENT

1. Connect CH1 of the oscilloscope to TJ101 (+) and GND (-) of the servo P.C.B.
Connect CH2 of the oscilloscope to FEG (+) and GND (-) of the servo P.C.B.

Oscilloscope setting: VOLT.....200mV(CH1),
500mV(CH2)
SWEEP.....0.5msec.
INPUT.....AC(CH1),DC(CH2)
MODE.....NORM
(Triggering via CH1)

2. Set the test disc (SZZP1057C) and turn ON the power switch of the player. (Refer to page 13.)
3. Set the player to the play mode.
4. Check the waveform of CH1 and CH2 on the oscilloscope and adjust VR105, so that the waveform around the triggering point becomes as shown in the illustration.



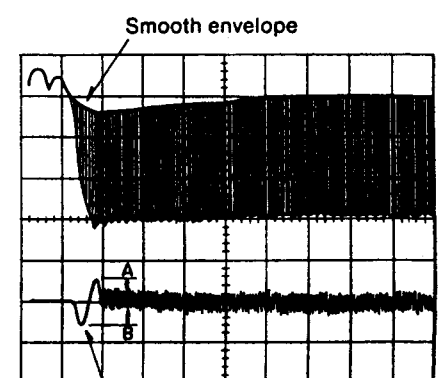
Minimize the amplitude or make A=B

TRACKING OFFSET ADJUSTMENT

1. Connect CH1 of the oscilloscope to TJ101 (+) and GND (-) of the servo P.C.B.
Connect CH2 of the oscilloscope to TEG (+) and GND (-) of the servo P.C.B.

Oscilloscope setting: VOLT.....200mV(CH1),
500mV(CH2)
SWEEP.....0.5msec.
INPUT.....AC(CH1),DC(CH2)
MODE.....NORM
(Triggering via CH1)

2. Set the test disc (SZZP1057C) and turn ON the power switch of the player. (Refer to page 13.)
3. Set the player to the play mode.
4. Check the waveform of CH1 and CH2 on the oscilloscope and adjust VR103, so that the waveform around the triggering point becomes as shown in the illustration.



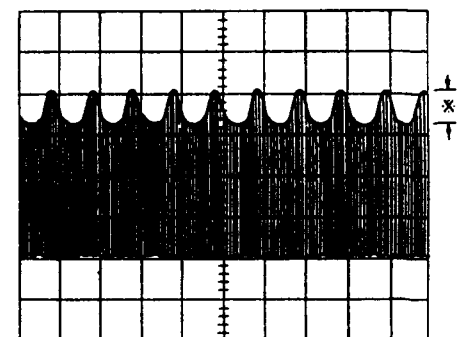
Minimize the amplitude or make A=B

TRACKING OFFSET BALANCE ADJUSTMENT

1. Set the low frequency oscillator to a frequency of 1kHz and an output voltage of 200mVp-p. Then connect the oscillator to OSC (+) and GND (-) terminals of the servo gain adjuster.
2. Connect CH1 of the oscilloscope to TJ101 (+) and GND (-) of the servo P.C.B.

Oscilloscope setting: VOLT.....500mV
SWEEP.....0.5msec.
INPUT.....AC

2. Set a test disc (SZZP1014F or SZZP1054C) and turn ON the power switch of the player. (Refer to page 13.)
4. Set the player to the play mode.
5. Set the selector switch of the servo gain adjuster from "2" to "1".
6. Adjust VR106, so that the output waveform is as shown (jitter is minimized).
7. Shift the selector switch of the servo gain adjuster from "1" to "2".
8. Turn OFF the power switch of the player.
9. Disconnect the servo gain adjuster.



*Jitter should be minimized.

PLL ADJUSTMENT

1. Connect CH1 of the oscilloscope to the **LINE OUT** terminal (either of Lch or Rch) and **ground**.

Oscilloscope setting: VOLT.....1V
SWEEP.....1msec.
INPUT.....DC

2. Set the test disc (SZZP1054C) and turn **ON** the power switch of the player. (Refer to page 13.)

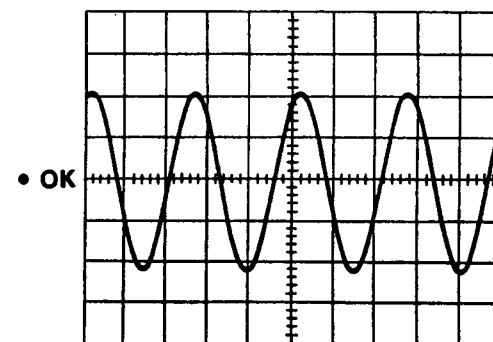
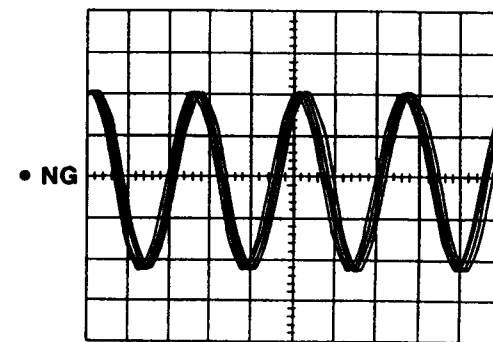
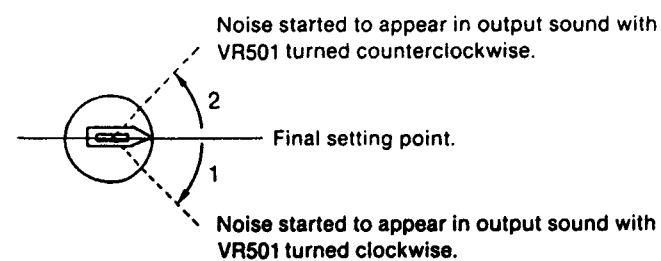
3. Play **Track No.6 (wedge 0.7mm)** of the test disc.

4. Check the waveform displayed on the oscilloscope and adjust **VR501** in the following steps.

Step 1. Turn **VR501** clockwise slowly and observe the point at which the waveform on the oscilloscope begins to be disturbed.

Step 2. Turn **VR501** counterclockwise slowly and observe the point at which the waveform on the oscilloscope begins to be disturbed.

Step 3. Set **VR501** in the middle between the points observed in the above steps "1" and "2".

**CHECK OF PLAY OPERATION AFTER ADJUSTMENT****Check of skip search**

1. Play an ordinary disc.
2. Press the skip button and verify skip search operation (forward and reverse).

Check of manual search

1. Play an ordinary disc.
2. Press the manual search button and verify that smooth manual search can be performed at low and high speeds (forward and reverse).

Check of playability

1. Play the test disc (SZZP1054C).
2. Play the track No.6 (wedge 0.7mm) and verify that there is no skip sound or noise.
3. Play the track No.13 (black dot 0.7mm) and verify that there is no skip sound or noise.

OPTICAL PICKUP ADJUSTMENT**Measuring Instruments and Special Tools**

- Two-channel oscilloscope (with trigger) of 30MHz or over
- Test discs
Test disc (SZZP1014F) old or new type
Inspection test disc (SZZP1054C)
Uneven disc (SZZP1056C)

- Hexagonal wrench (2.0mm)
- Screw lock paint (RZZ0L01)
- Hexagonal wrench (1.27mm)
- Feeler gauge (RZZ0297)
- Filter (Refer to page 18)

Adjustment Procedure

- If the optical pickup and spindle motor are replaced, adjust it according to the following procedure.

Step 1: Make the temporary of each VR. (Refer to page 15.)

Step 2: Turntable height adjustment. (Refer to page 18.)

Step 3: Mechanical adjustment. (Refer to page 18.)

Step 4: Electrical adjustment. (Refer to page 14.)

TURNTABLE HEIGHT ADJUSTMENT

1. Connect CH1 of the oscilloscope to **FEG (+)** and **GND (-)** of the servo P.C.B. through the filter as shown below.

Oscilloscope setting: VOLT.....50mV
SWEEP.....1msec.
INPUT.....DC

2. Set the oscilloscope to DC zero balance.

3. Set a test disc (SZZP1014F or SZZP1054C) and turn **ON** the power switch of the player. (Refer to page 11.)

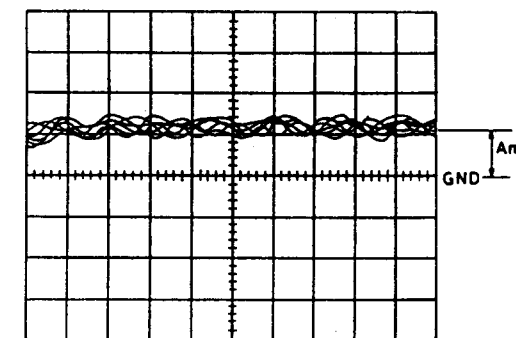
4. Set the player to the play mode.

5. Measure the DC level (AmV) displayed on the oscilloscope.

- If the value of A is within the range of $\pm 60\text{mV}$, the turntable height is correct. If it is not within this range, make the necessary adjustments using the 0.9mm feeler gauge (RZZ0297).

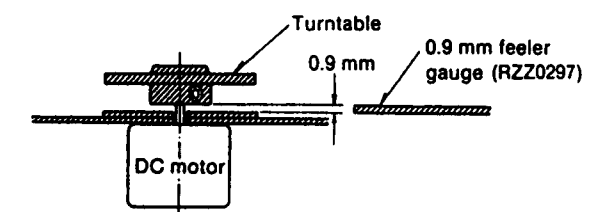
If A is more than $+60\text{mV}$, make the turntable lower.

If A is less than -60mV , make the turntable higher.



Adjust the turntable height as follow:

A. Insert the 0.9mm feeler gauge (RZZ0297) as shown below.



B. Loosen the turntable set-screw.

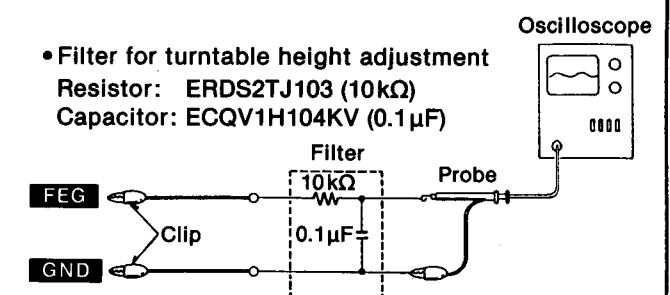
C. Adjust turntable height to 0.9mm with the feeler gauge as shown above.

D. Tighten the turntable set-screw by using the 1.27mm hexagonal wrench.

E. Check the turntable height adjustment by following steps 1 ~ 5 above.

● Filter for turntable height adjustment

Resistor: ERDS2TJ103 (10k Ω)
Capacitor: ECQV1H104KV (0.1 μF)

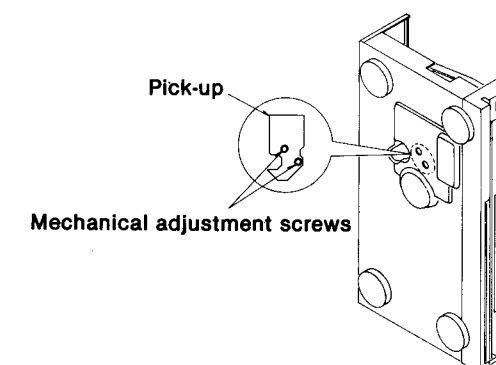
**MECHANICAL ADJUSTMENT**

1. Connect CH1 of the oscilloscope to **TJ101 (+)** and **GND (-)** of the servo P.C.B.

Oscilloscope setting: VOLT.....200mV
SWEEP.....0.5 μsec .
INPUT.....AC

2. Set the test disc (SZZP1056C) and turn **ON** the power switch of the player. (Refer to page 13.)

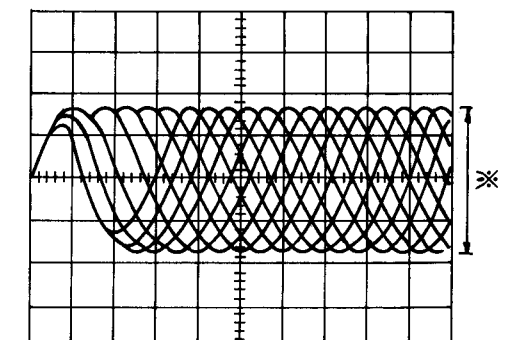
3. Using the manual search buttons, move the pickup so that the mechanical adjustment screws line up with the adjustment holes in the bottom panel.



4. Monitoring RF signal on the oscilloscope, adjust the two adjusting screws alternately with the 2.0mm hexagonal wrench so that the vertical fluctuation of RF signal is minimized and the eye pattern is most stretched.

5. Turn **OFF** the power switch of the player.

6. After the adjustment, apply **screw lock paint (RZZ0L01)** to the adjusting screws.



Note: The mechanical adjustment screws have been already locked with screw lock paint at the factory. It might be hard to turn them.

■ TERMINAL FUNCTION OF LSI

● MN6622 (Digital Signal Processing: EFM Decoder, Error Correction, CLV Servo)

Pin No.	Mark	I/O	Function	Pin No.	Mark	I/O	Function
1	MEMP	I	Emphasis signal input	33	TX	O	Digital output signal
2	PC	O	Spindle motor "ON" signal (ON at "L")	34	TSTR	I	Not used (connected to +5V)
3	EC	O	Spindle motor drive signal	35	TEST	I	Not used (connected to +5V)
4	FG	I	Not connected	36	VSS	I	GND terminal
5	TTF	I	Not used (connected to GND)	37	X2	O	Not connected
6	FLAG0	O	Not connected	38	X1	I	Clock input (16.9344 MHz)
7	IPFLAG	O	Not connected	39	SEL	I	Not used (connected to GND)
8	FLAG6	O	Not connected	40	LDG/WDCKS	O	Not connected
9	PCK	I	PLL extract clock input (4.2336 MHz)	41	RDG	O	Not connected
10	VDD	I	Power supply (connected to +5V)	42	DEMPH	O	Not connected
11	EFM	I	EFM signal input (PLL)	43	SMCK	O	Clock output (4.2336 MHz)
12	SRF	I	EFM signal input (DSL)	44	WS	O	Not connected
13	DO	I	Drop-out signal ("H" at drop-out)	45	SRCK	O	Not connected
14	CLVS	O	Not connected	46	XCK	O	Not connected
15	FPC	O	PLL frequency comparison signal	47	DA15/SRDATA	O	DA parallel output (MSB)/serial data output (MSB FIRST)
16	BSSEL	O	Not connected	48	DA14/SRDATA	O	Not connected
17	SRF0	I	Synchro rec control signal input	49	DA13/SCK	O	DA parallel output/serial data output bit clock
18	FSL	I	Not used (connected to GND)	50	DA12/WDCK	O	Not connected
19	SLEEP	I	Not used (connected to GND)	51	DA11/BYTCK	O	Not connected
20	SUBC	O	Not connected	52	VSS	I	GND terminal
21	SBCK	I	Not connected	53	DA10/R/L	O	DA parallel output/R/L signal (R at "H")
22	BLKCK	O	Sub-code block (Q-data) clock (75 Hz)	54 56	DA9 DA7	O	Not connected
23	CLDCK	O	Sub-code frame (Q-data) clock (7.35 kHz)	57	DA6	O	Not used (connected to GND)
24	SUBQ	O	Sub-code (Q-data) output	58 63	DA5 DA0	O	Not connected
25	CRC	O	Not connected	64 71	D7 D0	I/O	16K RAM DATA
26	RST	O	Reset signal input ("L" = Reset)	72	RAMOE	O	16K RAM OE signal
27	MLD	I	Data input (command load)	73	RAMWE	O	16K RAM WE signal
28	MCLK	I	Data clock input (command clock)	74 84	RAMA0 RAMA10	O	16K RAM address
29	MDATA	I	Data input (command data)				
30	DMUTE	I	Muting control (Not used, connected to GND)				
31	TRON	I	Tracking servo "ON" signal (ON at "L")				
32	STAT	O	Processing condition (CRC, OTC, CLVOK, TT, STOP) output				

● AN8370S (Optical Servo Control)

Pin No.	Mark	I/O Division	Function	Pin No.	Mark	I/O Division	Function
1	VEE	I	Power supply (connected to -5V)	23	CNT2	I	Control input (TRON Tracking servo ON signal)
2	LSA	I	Phase difference input (A)	24	CNT3	I	Control input (KICKF Kick direction [Forward] command)
3	GND	I	GND terminal	25	CNT4	I	Control input (KICKR Kick direction [Reverse] command)
4	LSB	I	Phase difference input (B)	26	F.LOCK	O	Focus lock signal output
5	APC	O	Auto laser power control output	27	C.FBDO	O	Capacitor connection for inversion RF high detection
6	TEOUT	O	Tracking error signal output	28	C.SBDO	O	Capacitor connection for inversion RF low detection
7	TEG	I	Tracking error gain adjusting input	29	C.SBRT	O	Capacitor connection for non-inversion RF slow detection
8	TE(+)	I	Phase difference to voltage conversion (+)	30	C.FBRT	O	Capacitor connection for non-inversion RF fast detection
9	TE(-)	I	Phase difference to voltage conversion (-)	31	RF OUT	O	RF signal output
10	APC(-)	I	Laser power inversion input	32	BDO	O	Drop-out detection output
11	C.MEM	I	Capacitor connection for phase difference memory	33	RF IN	I	RF signal input
12	APC(+)	I	Laser power non inversion input	34	S.OUT	O	Focus search signal output
13	VREFE	O	Reference current generation	35	C.LW	I	Capacitor connection for triangular wave generation
14	SENSE	O	Selector output (track-crossed)	36	FE.OUT	O	Focus error signal output
15	HIN	I	Tracking hold circuit input	37	FEG	I	Focus error gain adjusting input
16	HOUT	O	Tracking hold circuit output	38	FE.REF	I	Focus error comparison voltage generation
17	SPCNT	O	Trackcrossing speed control output (Not used, open)	39	PDB	I	Photo detection current input (B)
18	C.MSP	I	Trackcrossing reference speed setting capacitor connection (Not used, open)	40	IVB	O	Current/voltage conversion (B)
19	C.AF	I	Auto focus timer capacitor connection	41	IVA	O	Current/voltage conversion (A)
20	KICK	O	Track kick signal output	42	PDA	I	Photo detection current input (A)
21	VCC	I	Power supply (connected to +5V)				
22	CNT1	I	Control input (FOON Focus servo "ON" signal)				

● AN8371S (Data slice and PLL)

Pin No.	Mark	I/O Division	Function	Pin No.	Mark	I/O Division	Function
1	VEE	I	Power supply (connected to -5V)	13	PL2	I	PLL loop filter connection
2	SRF	O	RF signal output data-sliced into digital value	14	FPC	I	Frequency comparison error signal input
3	EFM	O	EFM signal output synchronized with PCK	15	RF	I	RF signal input
4	D.GND	I	GND terminal (digital system)	16	ARF	O	RF signal output with AGC output
5	PCK	O	Clock output extracted from SRF	17	AGC	I	ARF signal input for AGC drop-out detection input
6	VCC	I	Power supply (connected to +5V)	18	AC	I	Loop filter for AGC connection
7	VA	I	VCO free run frequency adjusting current input (not connected)	19	DO	O	Drop-out detection pulse output
8, 9	VC1, 2	I	Capacitor connection for VCO oscillator frequency	20	A.GND	I	GND terminal (analog system)
10	VR	I	Resistor connection for VCO oscillator frequency	21	DSL	I	RF signal input for data slicing
11	PD	I	Capacitor connection for PLL DO protection	22	SLC	I	Slicing level control signal input
12	PL1	I	PLL loop filter connection	23	FC1	I	Filter capacitor for data slicer connected
				24	FC2	I	Filter capacitor for data slicer connected

● MN1554PEP (System Control)

Pin No.	Mark	I/O Division	Function	Pin No.	Mark	I/O Division	Function
1	BRECV	—	(Not used, open)	29	CLOSE	I	Disc holder "Open" detection
2	BSEND	—	(Not used, open)	30	OPEN	I	Disc holder "Close" detection
3	SYNC	O	(Not used, open)	31	BCLK	I	(Not used, connected to GND)
4	SIRQ	I	Not used (connected to +5V)	32	BDATA	I	(Not used, connected to GND)
5	BLKCK	I	Sub-code block (Q data) clock input (75Hz)	33	STAT	I	Processing status input from signal processing LSI
6	CLDCK	I	Sub-code block (Q data) clock input (7.35kHz)	34	COMP	O	TOC reading control (ON at "L") (connected to GND)
7	SBO	I	(Not used, open)	35	FLOCK	I	Optical servo condition (focus) input
8	SUBQ	I	Sub-code (Q data) input	36	SENSE	I	Optical servo condition (track cross) input
9	RST	I	Reset signal input	37	RECV	I	Data receipt command signal
10 13	P20 P23	O	Not used (connected to +5V)	38	SEND	I	Data transmission command
14	CLOSE	O	Loading motor "Close" command	39	ACK	I	Data discrimination signal
15	OPEN	O	Loading motor "Open" command	40	CLK	I	Data lock signal
16	SLOW	O	(Not used, open)	41 44	DATA0 DATA3	I	Key scan signal
17	MUTE	O	Muting control	45 52	NC	I	Not connected
18	SEEK	O	Traverse servo control (Not used, open)	53	OSC2	I	Clock terminal
19	NC	—	Not connected	54	OSC1	I	Clock input
20	TRV.R	O	Traverse "Reverse" command signal	55	X1	I	Optical servo condition input
21	TRV.F	O	Traverse "Forward" command signal	56	X0	O	(Not used, open)
22	CNT4	O	Optical servo IC control signal (KICKR: Kick direction [reverse] command)	57	GND	I	GND terminal
23	CNT3	O	Optical servo IC control signal (KICKF: Kick direction [forward] command)	58	DMUTE	O	Muting control
24	CNT2	O	Optical servo IC control (TRON: Tracking servo)	59	MDATA	O	Command data output
25	VDD	I	Power supply (connected to +5V)	60	MCLK	O	Data clock output (command clock)
26	DOWN	O	(Not used, open)	61	MLD	O	Data output (command load)
27	UP	O	(Not used, open)	62	DOUTON	O	Optical output control signal (Not used, open)
28	CNT1	O	Optical servo IC control signal (FOON: Focus servo)	63	EMPH	O	Emphasis signal output
				64	NC	—	Not connected

● MN15283PEM (FL Drive and Timing Signal Generator)

Pin No.	Mark	I/O Division	Function	Pin No.	Mark	I/O Division	Function
1	VSS	I	GND terminal	21	P20 (CEM)	O	CD recording signal
2	X0	O	(Not used, open)	22	P21 (PLE)	O	CD play signal
3	X1	I	Optical servo condition input (Not used, open)	23 24	P22 P23	O	Synchro rec control signal
4	PO0 (RECV)	O	Data receipt command signal	25 28	P30 P33	—	(Not used, open)
5	PO1 (SEND)	O	Data transmission command signal	29 32	P40 P43	I	Key return signal
6	PO2 (ACK)	O	Data discrimination signal	33	P60	I	(Not used, connected to +5V)
7	PO3 (CLK)	O	Data lock signal	34 35	P61 DAC	—	(Not used, open)
8 11	P10 (D0) P13 (D3)	O	Key scan signal	36	VPP	I	FL drive power supply (connected to -33V)
12	SYNC	O	(Not used, open)	37 52	D0 D9 DA DF	O	FL grid signal
13	RST	I	Reset signal input (reset at "L")	53 61	S0 S8	O	FL anode signal
14	IRQ/TC1	I	Sub-code block (Q data) clock (75Hz) input (Not used, open)	62	VDD	I	Power supply (connected to +5V)
15 16	P50 P51	I	Key return signal	63	OSC2	I	Clock terminal
17	P52	I	Timer play control signal	64	OSC1	I	Clock input
18	P53 (EST)	I	End detection signal of CD editing recording.				
19	SBT	I	Sub-code frame clock (7.35kHz) (Not used, open)				
20	SBD	I	Sub-code Q data input (Not used, open)				

● MN6623 (Digital Filter and D/A Converter)

Pin No.	Mark	I/O Division	Function	Pin No.	Mark	I/O Division	Function
1	MLD	I	Command load input (load: L)	22	AVDD1	I	Power supply (connected to +5V)
2	RSTB	I	Reset signal input (reset at "L")	23	AVDD1	I	Power supply (connected to +5V)
3	IE	I	I ² S select terminal ("H"=I ² S)	24	DVSS1	I	GND terminal (digital system)
4	TP1	—	TEST terminal (Not connected)	25	X2	O	Clock output
5	TP2	—		26	X1	I	Clock input
6	TEST1	I	TEST terminal 1 (connected to GND)	27	NC	—	Not connected
7	TEST2	I	TEST terminal 2 (connected to GND)	28	DVDD2	I	Power supply (connected to +5V)
8	NC	—	Not connected	29	DVSS2	I	GND terminal (digital system)
9	NC	—	Not connected	30	NSUB	I	Not used (connected to GND)
10	AVDD4	I	Power supply (connected to +5V)	31	768fs	O	768 fs (Not used)
11	OUTR(−)	O	Rch data output, (−) terminal	32	192fs	O	192 fs (Not used)
12	AVSS4	I	GND terminal	33	LRPOL	I	LR clock selector (Not used)
13	AVSS3	I	GND terminal	34	LR	I	L/R clock
14	OUTR(+)	O	Rch data output, (+) terminal	35	SRCK	I	Serial data best clock
15	AVDD3	I	Power supply (connected to +5V)	36	SRDATA	I	Serial data input (MSB first)
16	NC	—	Not connected	37	DVSS 3	I	GND terminal (digital system)
17	AVDD2	I	Power supply (connected to +5V)	38	NC	—	Not connected
18	OUTL(−)	O	Lch data output, (−) terminal	39	384 fs	O	384 fs (16.9344 MHz) output
19	AVSS2	I	GND terminal (analog system)	40	PD	I	Power down terminal
20	AVSS1	I	GND terminal (analog system)	41	MDATA	I	Command data input
21	OUTL(+)	O	Lch data output, (+) terminal	42	MCLK	I	Command clock input

■ REPLACEMENT PARTS LIST (Electrical parts)

Notes : * Important safety notice :
Components identified by Δ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
* Bracketed indications in Ref. No. columns specify the area. (Refer to the first page for area.)
Parts without these indications can be used for all areas.

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
INTEGRATED CIRCUITS			Q854	DTC124ES	TRANSISTOR
IC11	LM2940T5	I.C. REGULATOR	Q855	DTA124EST	TRANSISTOR
IC13	SV1BA4558F	I.C. REGULATOR	Q856	DTA124EST	TRANSISTOR
IC101	AN8370S	I.C. OPTICAL SERVO	DIODES		
IC102	MN6636	I.C. ANALOG SW	D11	Δ SVD1SR35200A	RECTIFIER
IC103	AN6554NS	I.C. OPERATION AMP.	D12	Δ SVD1SR35200A	RECTIFIER
IC104	AN6552S	I.C. REGULATOR	D13	Δ SVD1SR35200A	RECTIFIER
IC105	AN6552S	I.C. REGULATOR	D14	Δ SVD1SR35200A	RECTIFIER
IC106	AN6552S	I.C. REGULATOR	D15	Δ SVD1SR35200A	RECTIFIER
IC201	LM2940T5	I.C. REGULATOR	D16	MA4300MHTA	DIODE
IC202	AN6552S	I.C. REGULATOR	D17	Δ SVD1SR35200A	RECTIFIER
IC301	MN6622	I.C. LSI	D19	MA4062HTA	DIODE
IC302	SV1CXK5816M	I.C. 16K RAM	D23	MA4056-M	DIODE
IC401	MN1554PEP	I.C. CONTROL	D24	MA4150MHTA	DIODE
IC402	SV1BA4558F	I.C. REGULATOR	D25	MA4150MHTA	DIODE
IC501	AN8371S	I.C. DATA SLICE PLL	D181	SVD1SS254	DIODE
IC601	MN15283PEM	I.C. OPERATION AMP.	D182	SVD1SS254	DIODE
IC602	HC-MD10E	I.C. REMOTE SENSOR	D183	SVD1SS254	DIODE
IC801	MN6623A	INTEGRATED CIRCUIT, DF DAC	D184	SVD1SS254	DIODE
IC803	LM833M	I.C. LPF	D201	MA4056-M	DIODE
IC804	NJM4560M	I.C. OPERATION AMP.	D410	MA4033	DIODE
IC805	SV1H8DN2175	I.C. LPF	D411	SVD1SS254	DIODE
IC806	SV1H8DN2175	I.C. LPF	D601	SVD1SS254	DIODE
IC809	SV1T0TX172	I.C.	D602	SVD1SS254	DIODE
TRANSISTORS			D603	SVD1SS254	DIODE
Q11	2SB1240QTV6	TRANSISTOR	D604	SVD1SS254	DIODE
Q12	2SB1240QTV6	TRANSISTOR	D605	SVD1SS254	DIODE
Q13	2SA1547QSTV3	TRANSISTOR	D851	SVD1SS254	DIODE
Q14	2SD1862-P	TRANSISTOR	D852	SVD1SS254	DIODE
Q15	2SB1240QTV6	TRANSISTOR	D853	SVD1SS254	DIODE
Q16	2SD1862-P	TRANSISTOR	D854	SVD1SS254	DIODE
Q101	2SA1547-Q	TRANSISTOR	D855	SVD1SS254	DIODE
Q141	2SD1862-P	TRANSISTOR	D856	SVD1SS254	DIODE
Q142	2SB1240-P	TRANSISTOR	D857	SVD1SS254	DIODE
Q161	2SD1862-P	TRANSISTOR	I.C. PROTECTORS		
Q162	2SB1240-P	TRANSISTOR	ICP1	Δ SRUF38	I.C. PROTECTOR
Q181	2SD1862-P	TRANSISTOR	(EK, XA, XB)		
Q182	2SB1240-P	TRANSISTOR	ICP2	Δ SRUF38	I.C. PROTECTOR
Q201	2SD1862-P	TRANSISTOR	(EK, XA, XB)		
Q203	2SD1862-P	TRANSISTOR	ICP11	Δ SRUN15	I.C. PROTECTOR
Q301	DTC124ES	TRANSISTOR	(EK)		
Q351	DTA124EST	TRANSISTOR	ICP12	Δ SRUN15	I.C. PROTECTOR
Q401	2SD1862-P	TRANSISTOR	(EK)		
Q402	2SB1240QTV6	TRANSISTOR	VARIABLE RESISTORS		
Q403	2SD1862-P	TRANSISTOR	VR101	EVND3AA00B53	V.R. BEST EYE ADJ.
Q404	2SB1240QTV6	TRANSISTOR	VR102	EVND3AA00B14	V.R. TR GAIN ADJ.
Q405	DTC124ES	TRANSISTOR	VR103	EVND3AA00B14	V.R. TR OFFSET ADJ.
Q406	DTC124ES	TRANSISTOR	VR104	EVND3AA00B14	V.R. FO GAIN ADJ.
Q407	DTC124ES	TRANSISTOR	VR105	EVND3AA00B14	V.R. FO OFFSET ADJ.
Q601	DTC124ES	TRANSISTOR	VR106	EVND3AA00B53	V.R. TR BALANCE ADJ.
Q602	DTC124ES	TRANSISTOR	VR501	EVND3AA00B13	V.R. PLL ADJ.
Q603	DTC124ES	TRANSISTOR	MAGNET RESISTOR ELEMENTS		
Q604	DTC124ES	TRANSISTOR	RA1	EWS7L0A00Q53	RESISTANCE UNIT
Q605	DTC124ES	TRANSISTOR	COILS AND TRANSFORMERS		
Q606	DTC124ES	TRANSISTOR	L1	Δ SLQX400-D	COIL
Q607	DTC124ES	TRANSISTOR	(E, EG, EB, EH)		
Q608	DTC124ES	TRANSISTOR	(EF, E1)		
Q609	DTC124ES	TRANSISTOR	L2	Δ SLQX400-D	COIL
Q610	DTC124ES	TRANSISTOR	(E, EG, EB, EH)		
Q611	DTC124ES	TRANSISTOR	(EF, E1)		
Q612	DTC124ES	TRANSISTOR	L404	ELEY3R3KA	COIL
Q801	2SC3311A-Q	TRANSISTOR	L901	ELEY3R3KA	COIL
Q802	2SC3311A-Q	TRANSISTOR	L902	ELEY3R3KA	COIL
Q803	2SD1330R	TRANSISTOR	L903	ELEY3R3KA	COIL
Q804	2SD1330R	TRANSISTOR	T1	Δ SLTD5V081E	POWER TRANSFORMER
Q805	2SC3311A-Q	TRANSISTOR	(E, EG, EB, EH)		
Q806	2SC3311A-Q	TRANSISTOR	(EF, E1)		
Q851	DTA124EST	TRANSISTOR	T1	Δ SLTD5V082G	POWER TRANSFORMER
Q852	DTC124ES	TRANSISTOR	(EK, XL)		
Q853	DTA114EST	TRANSISTOR			

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
T1	Δ SLTD5V083X	POWER TRANSFORMER (XA, XB, PC)	S603	EVQQS405K	SW, CH3
OSCILLATORS			S604	EVQQS405K	SW, CH4
X801	SVQ49U338S	OSCILLATOR	S605	EVQQS405K	SW, CH5
DISPLAYS			S606	EVQQS405K	SW, CH6
FL601	SADFV266G	DISPLAY TUBE	S607	EVQQS405K	SW, CH7
FUSES			S608	EVQQS405K	SW, CH8
F1	Δ XBA2C012TB0	FUSE, 250V, T125mA	S609	EVQQS405K	SW, CH9
(E, EG, EB, EH)			S610	EVQQS405K	SW, CH10
(EF, EI, EK)			S611	EVQQS405K	SW, PROGRAM
(XL)			S612	EVQQS405K	SW, CANCEL
F1	Δ XBA2C025TB0	FUSE, 250V, T250mA	S613	EVQQS405K	SW, TIME
(XB, XA, PC)			S614	EVQQS405K	SW, REPEAT
F2	Δ XBA2C08TB0	FUSES 250V, T800MA	S615	EVQQS405K	SW, RECALL
(E, EG, EB, EH)			S616	EVQQS405K	SW, SKI P(FOR)
(EF, EI)			S617	EVQQS405K	SW, SKI P(BACK)
SWITCHES			S618	EVQQS405K	SW, +10
S1	Δ ESB8249V	SW, POWER	S619	EVQQS405K	SW(O)
S2	Δ SSR187-1	SW, VOLTAGE SELECTOR	S620	EVQQS405K	SW, A/B
(XA, PC, XB)			S621	EVQQS405K	SW, EDIT
S101	SSPD17	SW, LOADING DET.	S622	EVQQS405K	SW, OPEN/CLOSE
S102	SSPD18	SW, LOADING DET.	S623	EVQQS405K	SW, STOP/CLEAR
S601	EVQQS405K	SW, CH1	S624	EVQQS405K	SW, PAUSE
S602	EVQQS405K	SW, CH2	S625	EVQQS405K	SW, PLAY
			S626	EVQQS405K	SW, SCAN
			S627	EVQQS405K	SW, WARP
			S628	EVQQS405K	SW, LINK
			S651	SSS148	SLIDE SWITCH, TIMER PLAY

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
PACKING MATERIAL			(XB)		
P1	SPND311	PACKING CASE	A1	Δ SJA188	POWER CORD
(E, EG, EB, EH)			(EK)		
(EI, EK, XL)			A2	SJP2249-1	OUTPUT CORD
(XA, XB, PC)			A3	SJP2257T	CORD, SYNCHRO REC
P1	SPND312	PACKING CASE	A4	SQUD324	INSTRUCTION MANUAL
(EF)			(XA, XL)		
P2	SPSD149	PAD(REAR)	A4	SQUD326	INSTRUCTION MANUAL
P3	SPSD148	PAD(FRONT)	(EK)		
P4	XZB50X50A01	PROTECTION BAG	A4	SQUD327	INSTRUCTION MANUAL
P5	SPSD101	PROTECTION SHEET	(EG)		
P6	XZB23X20C03	PROTECTION BAG	A4	SQUD328	INSTRUCTION MANUAL
P7	SPSD152	ACCESSORY BOX	(EF)		
ACCESSORIES			A4	SQUD329	INSTRUCTION MANUAL
A1	Δ SFDAC05E03	POWER CORD	(EI)		
(E, EB, EH, EG)			A4	SQUD330	INSTRUCTION MANUAL
(EF, EI)			(PC)		
A1	Δ SJA168	POWER CORD	A4	SQULPJ45-KB	INSTRUCTION MANUAL
(XA, PC)			(XB)		
A1	Δ SJA173	POWER CORD	A4	SQULPJ45-KE	INSTRUCTION MANUAL
(XL)			(E, EB, EH)		
A1	Δ SJA183	POWER CORD	A6	Δ RJP120ZBS-H	AC PLUG ADAPTOR
			(XA, PC, XB)		
			A7	UM-4NE-2P	PRIMARY BATTERY
			A8	SJPD16	OPTICAL OUTPUT CORD

RESISTORS AND CAPACITORS

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Numbering System of Resistor

Example:

ERD	25	F	J	102
Type	Wattage (1/4W)	Shape	Tolerance	Value (1KΩ)
ERX	2	AN	J	471
Type	Wattage (2W)	Shape	Tolerance	Value (470Ω)

Numbering System of Capacitor

Example:

ECKD	1H	102	Z	F
Type	Voltage (50V)	Value (0.001μF)	Tolerance	Peculiarity
ECEA	50	M	330	
Type	Voltage (50V)	Peculiarity	Value (33μF)	

- Capacity are in microfarads (μF) unless specified otherwise, P= Pico-farads (pF) F= Farads (F).
- Resistance are in ohms (Ω), unless specified otherwise, 1K= 1,000Ω, 1M= 1,000kΩ

Resistor Type	Wattage		Tolerance
ERD : Carbon	10: 1/8W	12: 1/2W	J: ±5%
ERG : Metal Oxide	14: 1/4W	25: 1/4W	F: ±1%
ERQ : Fuse Type Metal	1A: 1W	18: 1/8W	G: ±2%
ERX : Metal Film	S2: 1/4W	S1: 1/2W	J: ±5%
ERD L : Carbon (chip)	2F: 1/4W	50: 1/2W	K: ±10%
ERO K : Metal Film (chip)	2A: 2W	3A: 3W	M: ±20%
ERC : Solid	6G: 1/10W	8G: 1/8W	
ERF : Incombustible Box-Shaped			
ERM : Wire-Wound			
RRJ : Cip Resistor			
ERJ : Cip Resistor			

Capacitor Type	Voltage		Tolerance
ECE : Electrolytic	0J : 6.3V	1A : 10V	K : ±10%
ECCD : Ceramic	1C : 16V	1E : 25V	M : ±20%
ECKD : Ceramic Capacitor	1H : 50V	1V : 35V	Z : +80 % -20
ECQM : Polyester	50 : 50V	05 : 50V	J : ±5%
ECQP : Polypropylene	2H : 500V	2A : 100V	G : ±2%
ECG : Ceramic	1 : 100V	1J : 63V	F : ±1%
ECEA N : Non Polar Electrolytic	KC : 400V AC		C : ±0.25pF
OCU : Ceramic (Chip Type)	KC : 125V AC		D : ±0.5pF
ECUX : Ceramic (Chip Type)	(UL)		
ECF : Semiconductor			
EECW : Liquid electrolyte double layer capacitor			

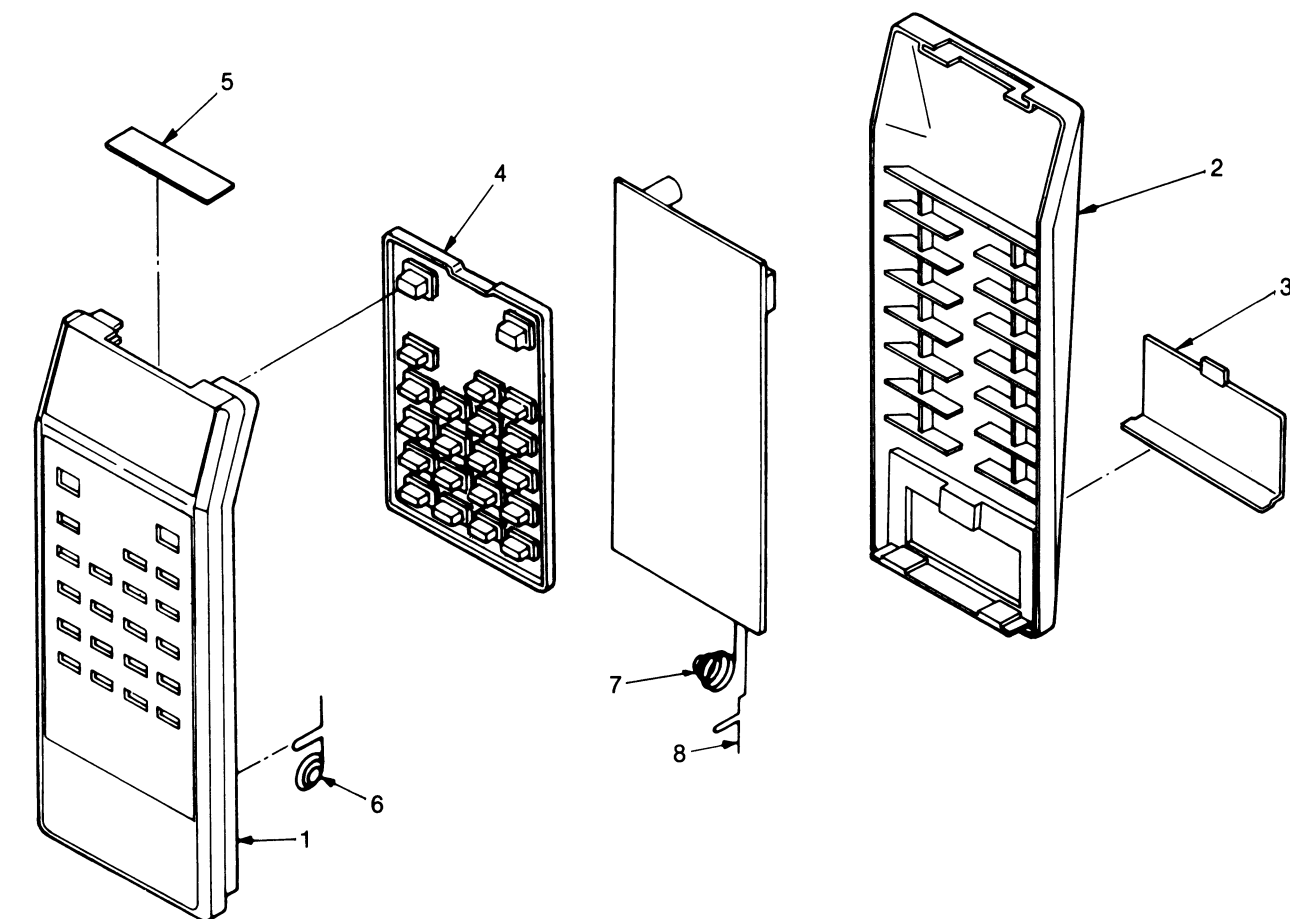
Ref. No.	Part No.	Value.	Ref. No.	Part No.	Value.	Ref. No.	Part No.	Value.
RESISTORS(VALUE, WATTAGE)								
R11	ERDS2TJ101	100 1/4	R148	ERJ6GEYJ104V	100K 1/10	R205	ERJ6GEYJ682V	6.8K 1/10
R12	ERDS2TJ331	330 1/4	R149	ERJ6GEYJ152V	1.5K 1/10	R207	ERJ6GEYJ474V	470K 1/10
R13	ERDS2TJ103	10K 1/4	R150	ERJ6GEYJ103V	10K 1/10	R208	ERJ6GEYJ680V	68 1/10
R14	ERDS2TJ103	10K 1/4	R151	ERJ6GEYJ101V	100 1/10	R214	ERJ6GEYJ471V	470 1/10
R16	ERDS2TJ102	1K 1/4	R152	ERJ6GEYJ153V	15K 1/10	R217	ERJ6GEYJ331V	330 1/10
R17	ERDS2TJ392	3.9K 1/4	R153	ERJ6GEYJ270V	27 1/10	R218	ERJ6GEYJ101V	100 1/10
R18	ERDS2TJ392	3.9K 1/4	R154	ERJ6GEYJ3R3V	3.3 1/8	R219	ERJ6GEYJ103V	10K 1/10
R19	ERDS2TJ332	3.3K 1/4	R161	ERJ6GEYJ333V	33K 1/10	R230	ERJ6GEYJ223V	22K 1/10
R20	ERDS2TJ332	3.3K 1/4	R162	ERJ6GEYJ222V	2.2K 1/10	R231	ERJ6GEYJ273V	27K 1/10
R21	ERD25FVJ221T	220 1/4	R163	ERJ6GEYJ333V	33K 1/10	R232	ERJ6GEYJ681V	680 1/10
R22	ERDS2TJ221	220 1/4	R164	ERJ6GEYJ153V	15K 1/10	R233	ERJ6GEYJ471V	470 1/10
R25	ERDS2TJ821	820 1/4	R165	ERJ6GEYJ122	1.2K 1/10	R301	ERDS2TJ472	4.7K 1/4
R101	ERJ6GEYJ154V	150K 1/10	R166	ERJ6GEYJ102V	1K 1/10	R302	ERDS2TJ472	4.7K 1/4
R102	ERJ6GEYJ472V	4.7K 1/10	R167	ERJ6GEYJ681V	680 1/10	R303	ERDS2TJ472	4.7K 1/4
R103	ERJ6GEYJ472V	4.7K 1/10	R168	ERJ6GEYJ272V	2.7K 1/10	R304	ERDS2TJ472	4.7K 1/4
R104	ERJ6GEYJ223V	22K 1/10	R169	ERJ6GEYJ392V	3.9K 1/10	R305	ERDS2TJ472	4.7K 1/4
R105	ERJ6GEYJ334V	330K 1/10	R170	ERJ6GEYJ101V	100 1/10	R307	ERDS2TJ104	100K 1/4
R107	ERJ6GEYJ473V	47K 1/10	R171	ERJ6GEYJ270V	27 1/10	R308	ERDS2TJ561	560 1/4
R108	ERJ6GEYJ332V	3.3K 1/10	R172	ERJ6GEYJ3R3V	3.3 1/8	R309	ERDS2TJ472	4.7K 1/4
R109	ERJ6GEYJ822V	8.2K 1/10	R180	ERJ6GEYJ474V	470K 1/10	R311	ERDS2TJ472	4.7K 1/4
R110	ERJ6GEYJ682V	6.8K 1/10	R181	ERJ6GEYJ471V	470 1/10	R312	ERDS2TJ100	10 1/4
R111	ERJ6GEYJ682V	6.8K 1/10	R182	ERJ6GEYJ564V	560K 1/10	R313	ERDS2TJ100	10 1/4
R112	ERJ6GEYJ822V	8.2K 1/10	R183	ERJ6GEYJ564V	560K 1/10	R320	ERDS2TJ331	330 1/4
R113	ERJ6GEYJ152V	1.5K 1/10	R184	ERJ6GEYJ223V	22K 1/10	R351	ERDS2TJ103	10K 1/4
R114	ERJ6GEYJ152V	1.5K 1/10	R185	ERJ6GEYJ473V	47K 1/10	R352	ERDS2TJ334	330K 1/4
R115	ERJ6GEYJ102V	1K 1/10	R186	ERJ6GEYJ473V	47K 1/10	R353	ERDS2TJ123	12K 1/4
R116	ERJ6GEYJ182V	1.8K 1/10	R187	ERJ6GEYJ473V	47K 1/10	R354	ERDS2TJ274	270K 1/4
R117	ERJ6GEYJ182V	1.8K 1/10	R188	ERJ6GEYJ473V	47K 1/10	R355	ERDS2TJ333	33K 1/4
R118	ERJ6GEYJ102V	1K 1/10	R189	ERJ6GEYJ123	12K 1/10	R356	ERDS2TJ333	33K 1/4
R119	ERJ6GEYJ471V	470 1/10	R190	ERJ6GEYJ123	12K 1/10	R357	ERDS2TJ8R2	8.2 1/4
R120	ERJ6GEYJ120V	12 1/10	R191	ERJ6GEYJ154V	150K 1/10	R401	ERDS2TJ221	220 1/4
R122	ERJ6GEYJ471V	470 1/10	R192	ERJ6GEYJ824V	820K 1/10	R402	ERDS2TJ221	220 1/4
R123	ERJ6GEYJ393V	39K 1/10	R193	ERJ6GEYJ101V	100 1/10	R403	ERDS2TJ221	220 1/4
R141	ERJ6GEYJ102V	1K 1/10	R194	ERJ6GEYJ683V	68K 1/10	R404	ERDS2TJ221	220 1/4
R142	ERJ6GEYJ333V	33K 1/10	R195	ERJ6GEYJ103V	10K 1/10	R405	ERDS2TJ221	220 1/4
R143	ERJ6GEYJ124V	120K 1/10	R196	ERJ6GEYJ103V	10K 1/10	R406	ERDS2TJ221	220 1/4
R144	ERJ6GEYJ333V	33K 1/10	R197	ERJ6GEYJ473V	47K 1/10	R407	ERDS2TJ221	220 1/4
R145	ERJ6GEYJ153V	15K 1/10	R198	ERJ6GEYJ393V	39K 1/10	R408	ERDS2TJ221	220 1/4
R146	ERJ6GEYJ122	1.2K 1/10	R199	ERJ6GEYJ473V	47K 1/10	R409	ERDS2TJ472	4.7K 1/4
R147	ERJ6GEYJ682V	6.8K 1/10	R201	ERJ6GEYJ102V	1K 1/10	R410	ERDS2TJ472	4.7K 1/4
			R202	ERJ6GEYJ103V	10K 1/10	R411	ERDS2TJ472	4.7K 1/4
			R204	ERJ6GEYJ682V	6.8K 1/10	R412	ERDS2TJ472	4.7K 1/4

Ref. No.	Part No.	Value.	Ref. No.	Part No.	Value.	Ref. No.	Part No.	Value.
R413	ERDS2TJ472	4.7K 1/4	R840	ERDS2TJ561	560 1/4	C227	RCUV1E104ZF	0.1 25
R414	ERDS2TJ472	4.7K 1/4	R841	ERDS2TJ105	1M 1/4	C228	ECUV1E823KB	0.082 25
R415	ERDS2TJ472	4.7K 1/4	R842	ERDS2TJ105	1M 1/4	C230	ECUV1E473KB	0.047 25
R416	ERDS2TJ472	4.7K 1/4	R843	ERDS2TJ331	330 1/4	C301	ECFR1E104ZF5	0.1 25
R417	ERDS2TJ472	4.7K 1/4	R850	ERDS2TJ822	8.2K 1/4	C302	ECBT1C103NS5	0.01 16
R418	ERDS2TJ472	4.7K 1/4	R851	ERDS2TJ102	1K 1/4	C303	ECFR1E104ZF5	0.1 25
R419	ERDS2TJ472	4.7K 1/4	R852	ERDS2TJ102	1K 1/4	C306	ECEA0JS331	330 6.3
R420	ERDS2TJ472	4.7K 1/4	R853	ERDS2TJ333	33K 1/4	C307	ECFR1E104ZF5	0.1 25
R421	ERDS2TJ913T	91K 1/4	R854	ERDS2TJ183	18K 1/4	C308	ECFR1E104ZF5	0.1 25
R422	ERDS2TJ913T	91K 1/4	R855	ERDS2TJ102	1K 1/4	C309	ECBT1C103NS5	0.01 16
R423	ERDS2TJ124	120K 1/4	R856	ERDS2TJ102	1K 1/4	C351	ECBT1H102KB5	0.001 50
R424	ERDS2TJ124	120K 1/4	R857	ERDS2TJ102	1K 1/4	C401	ECEA0JU470	47 6.3
R425	ERDS2TJ101	100 1/4	R858	ERDS2TJ102	1K 1/4	C402	ECFR1E104ZF5	0.1 25
R426	ERDS2TJ101	100 1/4	R862	ERDS2TJ102	1K 1/4	C403	ECFR1E104ZF5	0.1 25
R427	ERDS2TJ223	22K 1/4				C404	ECFR1E104ZF5	0.1 25
R429	ERDS2TJ472	4.7K 1/4				C405	ECBT1H102KB5	0.001 50
R431	ERDS2TJ472	4.7K 1/4				C406	ECBT1H102KB5	0.001 50
R432	ERDS2TJ101	100 1/4				C407	ECEA1HN010	1 50
R433	ERDS2TJ153	15K 1/4				C409	ECBT1H102KB5	0.001 50
R434	ERDS2TJ393	39K 1/4				C414	ECBT1C103NS5	0.01 16
R435	ERDS2TJ102	1K 1/4				C416	ECBT1C103NS5	0.01 16
R438	ERDS2TJ100	10 1/4				C420	ECBT1C103NS5	0.01 16
R440	ERDS2TJ102	1K 1/4				C421	ECBT1C103NS5	0.01 16
R442	ERDS2TJ102	1K 1/4				C422	ECBT1C103NS5	0.01 16
R443	ERDS2TJ102	1K 1/4				C501	ECUV1E104KB	0.1 25
R501	ERJ6GEYJ104V	100K 1/10				C502	ECQM1H104JZP	0.1 50
R502	ERJ6GEYJ562V	5.6K 1/10				C503	ECEA1AKK100	10 10
R503	ERJ6GEYJ474V	470K 1/10				C504	RCUV1E104ZF	0.1 25
R504	ERJ6GEYJ101V	100 1/10				C505	RCUV1E104ZF	0.1 25
R505	ERJ6GEYJ104V	100K 1/10				C506	RCUV1H150K	15P 50
R506	ERJ6GEYJ333V	33K 1/10				C507	RCUV1H102KB	0.001 50
R507	ERJ6GEYJ102V	1K 1/10				C508	ECEA1ASN100	10 10
R601	ERDS2TJ104	100K 1/4				C509	RCUV1H1000C	10P 50
R602	ERDS2TJ472	4.7K 1/4				C510	ECUV1E104KB	0.1 25
R603	ERDS2TJ472	4.7K 1/4				C511	ECEA1HKS47	0.47 50
R604	ERDS2TJ472	4.7K 1/4				C512	RCUV1H681KB	680P 50
R605	ERDS2TJ472	4.7K 1/4				C513	RCUV1H681KB	680P 50
R606	ERDS2TJ472	4.7K 1/4				C514	ECUV1C224KR	0.22 16
R607	ERDS2TJ472	4.7K 1/4				C515	RCUV1E153KB	0.015 25
R617	ERDS2TJ103	10K 1/4				C516	ECEA1VSN2R2	2.2 35
R801	ERDS2TJ103	10K 1/4				C517	RCUV1H471KB	470P 50
R802	ERDS2TJ103	10K 1/4				C519	ECUV1C224KR	0.22 16
R803	ERDS2TJ103	10K 1/4				C520	RCUV1H472KB	0.0047 50
R804	ERDS2TJ103	10K 1/4				C601	RCBC1H101KBY	100P 50
R805	ERDS2TJ223	22K 1/4				C602	RCBC1H101KBY	100P 50
R806	ERDS2TJ223	22K 1/4				C603	RCBC1H101KBY	100P 50
R807	ERDS2TJ223	22K 1/4				C604	RCBC1H101KBY	100P 50
R808	ERDS2TJ223	22K 1/4				C801	ECBT1H680K5	68P 50
R809	ERDS2TJ473	47K 1/4				C802	ECBT1H680K5	68P 50
R810	ERDS2TJ473	47K 1/4				C803	ECBT1H680K5	68P 50
R811	ERDS2TJ473	47K 1/4				C804	ECBT1H680K5	68P 50
R812	ERDS2TJ473	47K 1/4				C805	ECBT1H470J5	47P 50
R813	ERDS2TJ221	220 1/4				C806	ECBT1H470J5	47P 50
R814	ERDS2TJ221	220 1/4				C807	ECBT1H470J5	47P 50
R815	ERDS2TJ474	470K 1/4				C808	ECBT1H470J5	47P 50
R816	ERDS2TJ474	470K 1/4				C809	ECEA1EN3R3S	3.3 25
R817	ERDS2TJ104	100K 1/4				C810	ECEA1EN3R3S	3.3 25
R818	ERDS2TJ104	100K 1/4				C811	ECBT1H102KB5	0.001 50
R819	ERDS2TJ681	680 1/4				C812	ECBT1H102KB5	0.001 50
R820	ERDS2TJ681	680 1/4				C813	ECEA1CN220S	22 16
R821	ERDS2TJ473	47K 1/4				C814	ECEA1CN220S	22 16
R822	ERDS2TJ473	47K 1/4				C815	ECBT1H102KB5	0.001 50
R823	ERDS2TJ331	330 1/4				C816	ECBT1H102KB5	0.001 50
R825	ERDS2TJ273	27K 1/4				C817	ECEA1HN010	1 50
R826	ERDS2TJ273	27K 1/4				C818	ECEA1HN010	1 50
R827	ERDS2TJ223	22K 1/4				C819	ECBT1H470J5	47P 50
R828	ERDS2TJ223	22K 1/4				C820	ECBT1H470J5	47P 50
R829	ERDS2TJ124	120K 1/4				C822	ECBT1H5R6K5	5.6P 50
R830	ERDS2TJ124	120K 1/4				C824	ECBT1H5R6K5	5.6P 50
R831	ERDS2TJ472	4.7K 1/4				C840	ECFR1E104ZF5	0.1 25
R833	ERDS2TJ102	1K 1/4				C841	ECEA0JS331	330 6.3
R834	ERDS2TJ102	1K 1/4				C851	ECEA0JU471	470 6.3
R835	ERDS2TJ124	120K 1/4				C852	ECEA0JS331	330 6.3
R836	ERDS2TJ124	120K 1/4				C853	ECEA1CN100S	10 16
R837	ERDS2TJ560	56 1/4				C854	ECFR1E104ZF5	0.1 25
R838	ERDS2TJ560	56 1/4				C855	ECFR1E104ZF5	0.1 25
R839	ERDS2TJ561	560 1/4				C856	ECFR1E104ZF5	0.1 25

CAPACITORS(VALUE,VOLTAGE)

C1	ECKDKC103PF2	0.01 125
C10	ECEA1CU222	2200 16
C11	ECEA1CU222	2200 16
C13	ECEA1AU101	100 10
C14	ECEA1AU101	100 10
C15	ECEA0JU470	47 6.3
C16	ECEA1HU470	47 50
C17	ECEA1VU101	100 35
C19	ECBT1C103NS5	0.01 16
C20	ECEA1CU221	220 16
C30	ECBT1H102KB5	0.001 50
C31	ECBT1C103NS5	0.01 16
C32	ECBT1C103NS5	0.01 16
C101	RCUV1E104ZF	0.1 25
C102	RCUV1H102KB	0.001 50
C103	RCUV1H102KB	0.001 50
C104	RCUV1H681KB	680P 50
C105	RCUV1H471KB	470P 50
C106	RCUV1H471KB	470P 50
C107	RCUV1H220K	22P 50
C108	ECEA1HKK0R1	0.1 50
C109	ECEA1HKK010	1 50
C110	ECQM1H104JZP	0.1 50
C111	ECEA1AKK100	10 10
C112	ECEA1AKK100	10 10
C113	ECEA1HSN010	1 50
C114	RCUV1H182KB	0.0018 50
C115	RCUV1H682KB	0.0068 50
C116	RCUV1E333KB	0.033 25
C117	RCUV1H221KB	220P 50
C118	ECEA1HKK010	1 50
C119	ECEA0JKS220	22 6.3
C120	RCUV1H681KB	680P 50
C121	RCUV1E103KB	0.01 25
C122	RCUV1H101KC	100P 50
C123	RCUV1H101KC	100P 50
C125	ECEA0JKS220	22 6.3
C126	ECEA0JKS470	47 6.3
C127	RCUV1H102KB	0.001 50
C128	RCUV1H102KB	0.001 50
C129	RCUV1H681KB	680P 50
C141	RCUV1E153KB	0.015 25
C142	RCUV1H122KB	0.0012 50
C143	ECUV1E473KB	0.047 25
C144	ECEA1VSN2R2	2.2 35
C145	ECEA1HSNR22	0.22 50
C161	RCUV1E153KB	0.015 25
C162	RCUV1H681KB	680P 50
C163	RCUV1E103KB	0.01 25
C164	ECEA1ESN3R3	3.3 25
C165	ECEA1HSNR01	0.1 50
C181	ECQM1H474JZ	0.47 50
C182	RCUV1H221KB	220P 50
C183	RCUV1H682KB	0.0068 50
C184	ECEA1HSN010	1 50
C186	ECUV1C224KR	0.22 16
C201	RCUV1E103KB	0.01 25
C222	ECEA0JKA101	100 6.3
C223	ECEA0JKA101	100 6.3
C224	RCUV1E104ZF	0.1 25
C226	RCUV1E104ZF	0.1 25

REMOTE-CONTROL UNIT PARTS

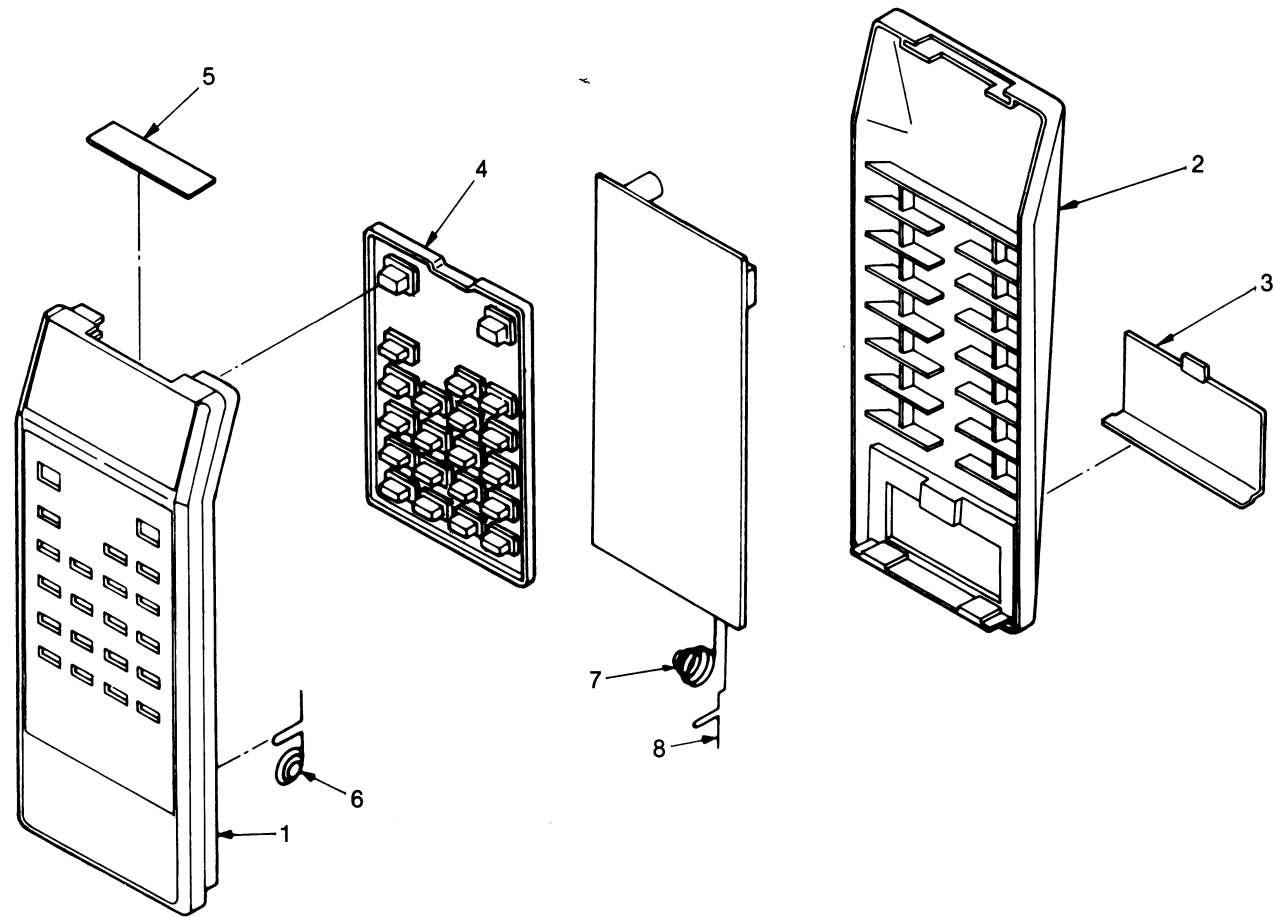


REPLACEMENT PARTS LIST

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
REMOTE CONTROL			RESISTORS		
INTEGRATED CIRCUITS			R1	ERDS2TJ1R0	CARBON, 1Ω, 1/4W
IC1	MN6030B	I.C.	CAPACITORS		
TRANSISTORS			C1	ECKD1H471KB	CERAMIC, 470PF, 50V
Q1	UN1231	TRANSISTOR	C2	ECKD1H121KB	CERAMIC, 120PF, 50V
DIODES			C3	ECEA0GK101	ELECTROLYTIC, 100μF, 4V
D1	LN66-S	L.E.D.	MECHANISM PARTS		
COIL			1	UR64VCS571	UPPER CABINET
D2, D3	MA154WK	DIODE	2	UR64CS803A	LOWER CABINET
D4, D5	MA154WK	DIODE	3	UR64EC804	BATTERY COVER
D6, D7	MA154WA	DIODE	4	UR64CT811F	BUTTON
OSCILLATOR			5	UR52SB327	PLATE
X1	CSB420PB1	OSCILLATOR	6	UR64TD374	BATTERY TERMINAL(COMMON)
			7	UR64TD813	BATTERY TERMINAL(-)
			8	UR64TD812	BATTERY TERMINAL(+)
			REMOTE CONTROL ASSY		
			RC1	EUR64790	REMOTE CONTROLLER

Ref. No.	Part No.	Value.	Ref. No.	Part No.	Value.	Ref. No.	Part No.	Value.
C857	ECFR1E104ZF5	0.1 25	C859	ECEA0JS331	330 6.3	C901	ECFTD103KXL	0.01 25
C858	ECFR1E104ZF5	0.1 25	C863	ECEA1HU3R3	3.3 50	C902	ECFTD103KXL	0.01 25
						C903	ECFTD103KXL	0.01 25
						C904	ECCD1H680KC	68P 50

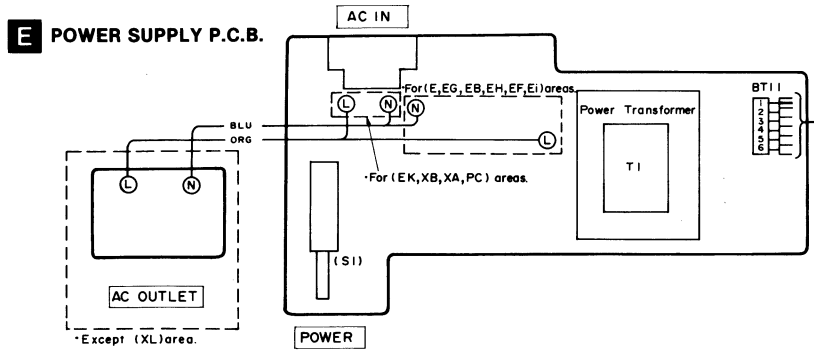
REMOTE-CONTROL UNIT PARTS



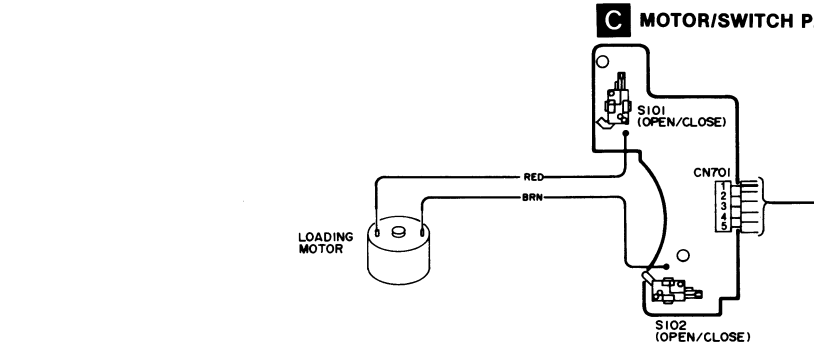
REPLACEMENT PARTS LIST

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
REMOTE CONTROL			RESISTORS		
INTEGRATED CIRCUITS			R1	ERDS2TJ1R0	CARBON, 1Ω, 1/4W
IC1	MN6030B	I.C.	CAPACITORS		
TRANSISTORS			C1	ECKD1H471KB	CERAMIC, 470PF, 50V
Q1	UN1231	TRANSISTOR	C2	ECKD1H121KB	CERAMIC, 120PF, 50V
DIODES			C3	ECEA0GK101	ELECTROLYTIC, 100μF, 4V
D1	LN66-S	L.E.D.	MECHANISM PARTS		
COIL			1	UR64VCS571	UPPER CABINET
D2, D3	MA154WK	DIODE	2	UR64CS803A	LOWER CABINET
D4, D5	MA154WK	DIODE	3	UR64EC804	BATTERY COVER
D6, D7	MA154WA	DIODE	4	UR64CT811F	BUTTON
OSCILLATOR			5	UR52SB327	PLATE
X1	CSB420PB1	OSCILLATOR	6	UR64TD374	BATTERY TERMINAL(COMMON)
			7	UR64TD813	BATTERY TERMINAL(-)
			8	UR64TD812	BATTERY TERMINAL(+)
REMOTE CONTROL ASS'Y			REMOTE CONTROL ASS'Y		
RC1	EUR64790	REMOTE CONTROLLER			

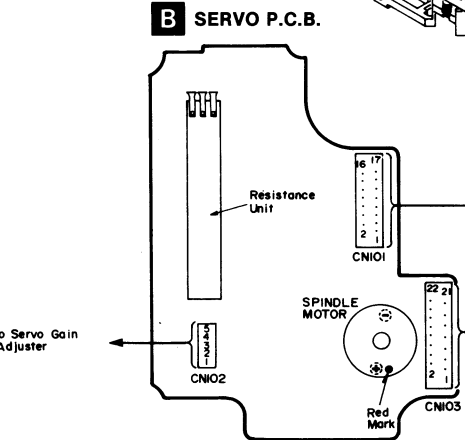
E POWER SUPPLY P.C.B.



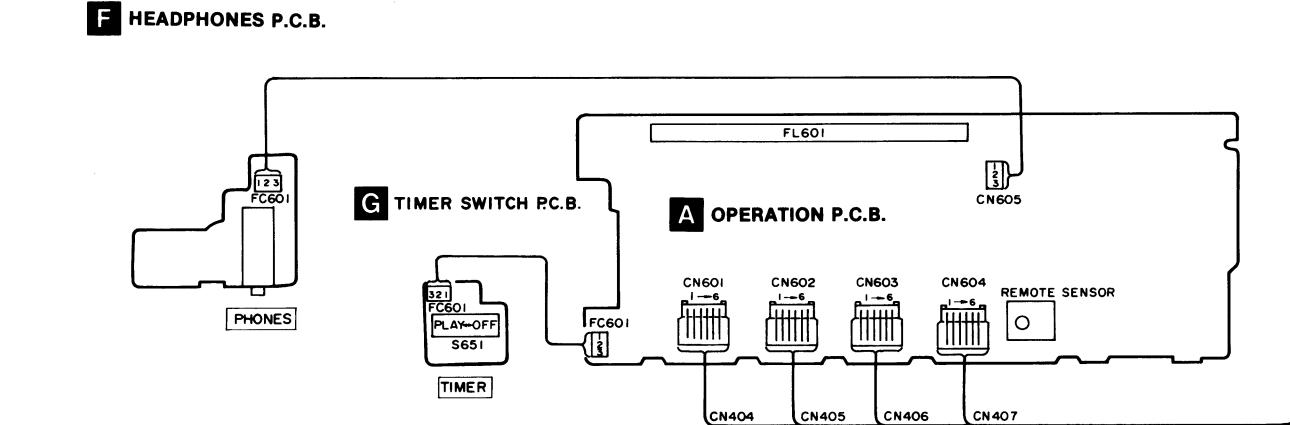
C MOTOR/SWITCH P.C.B.



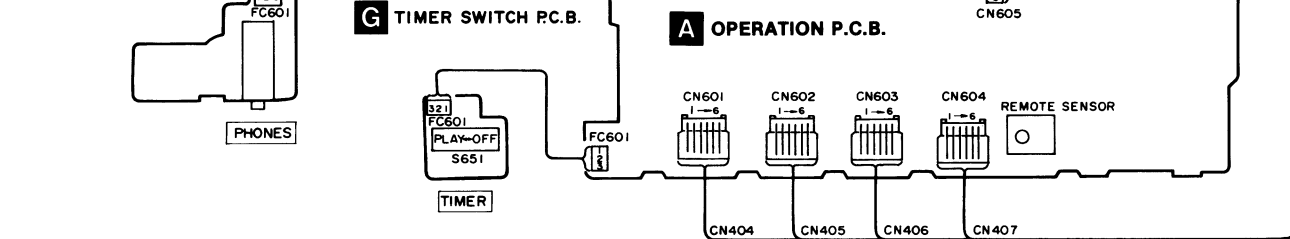
B SERVO P.C.B.



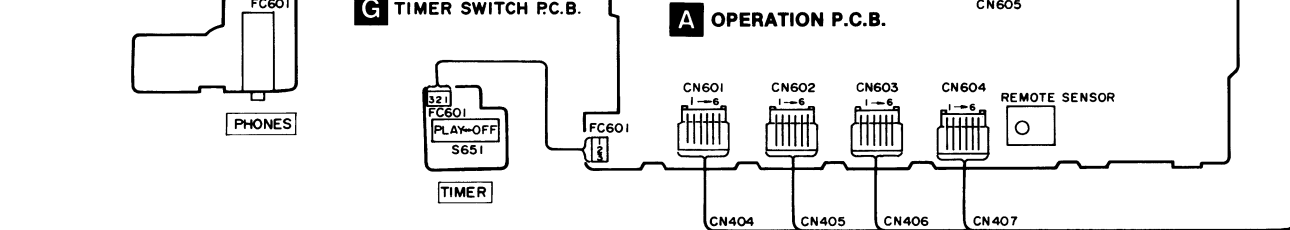
F HEADPHONES P.C.B.



G TIMER SWITCH P.C.B.

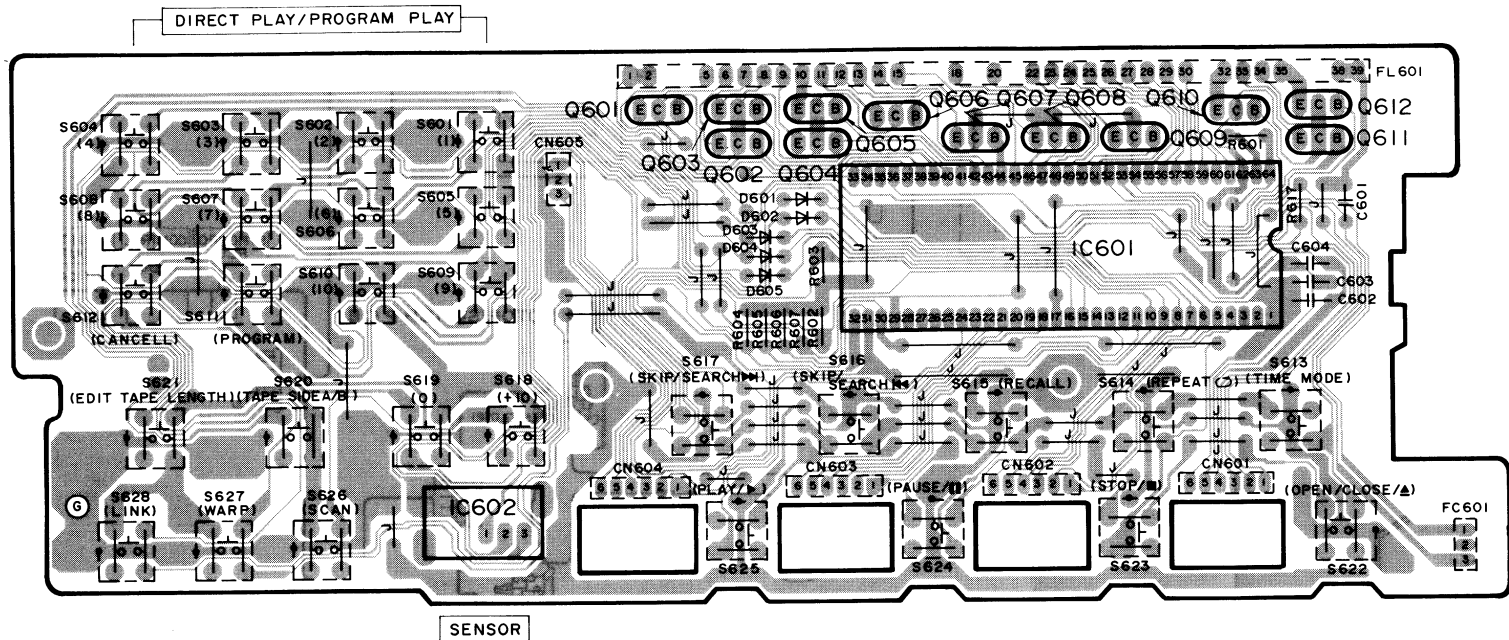


A OPERATION P.C.B.

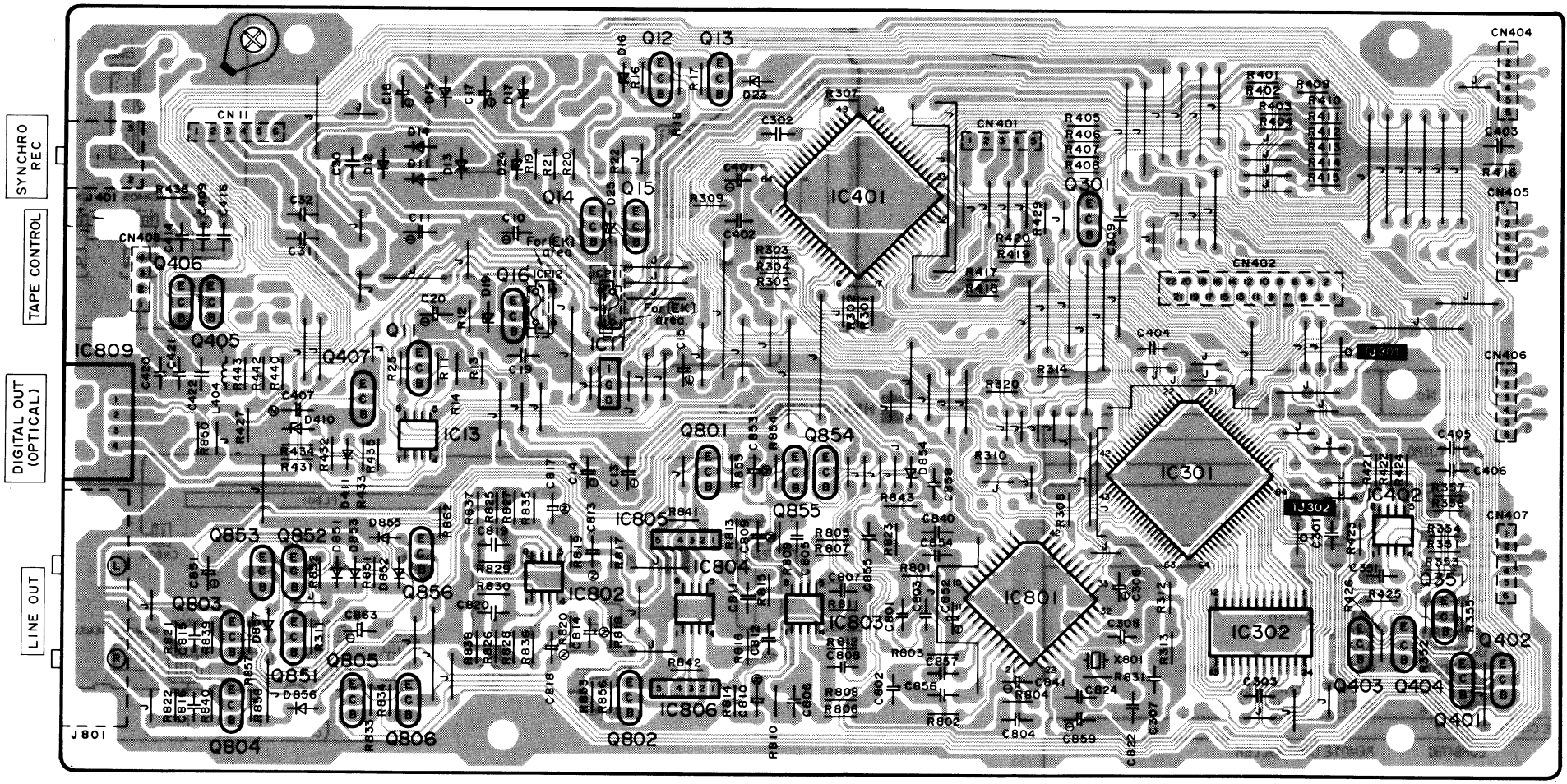


PRINTED CIRCUIT BOARDS

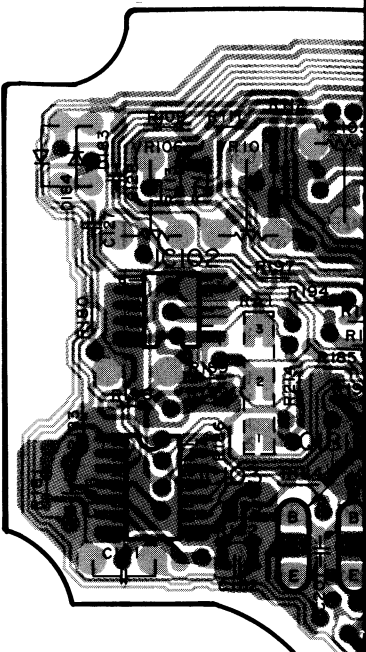
A OPERATION P.C.B.



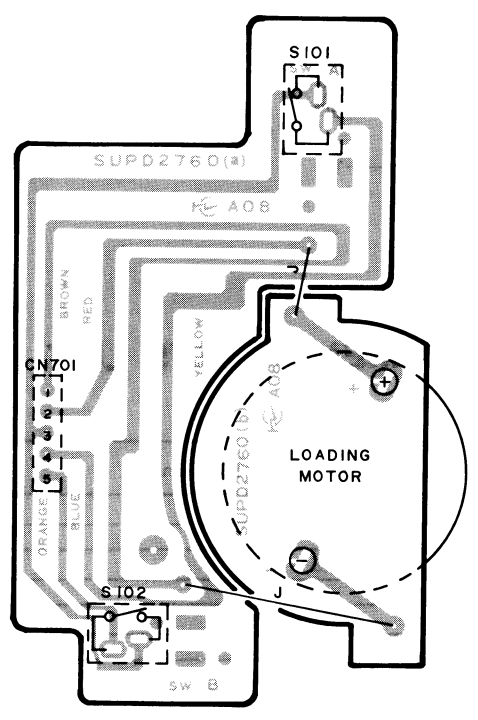
D D/A CONVERTER/AUDIO P.C.B.



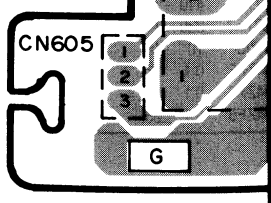
B SERVO P.C.B.

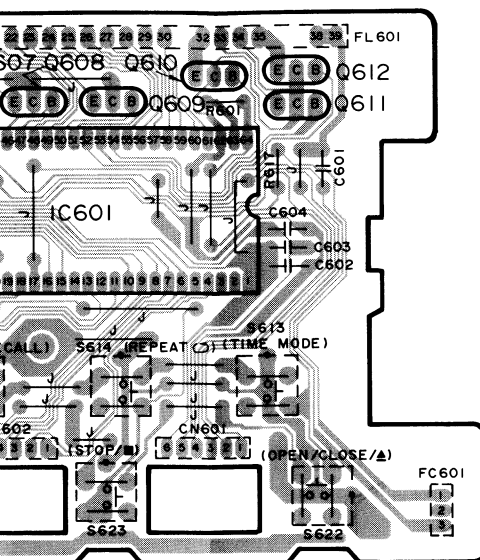


C MOTOR/SWITCH P.C.B.



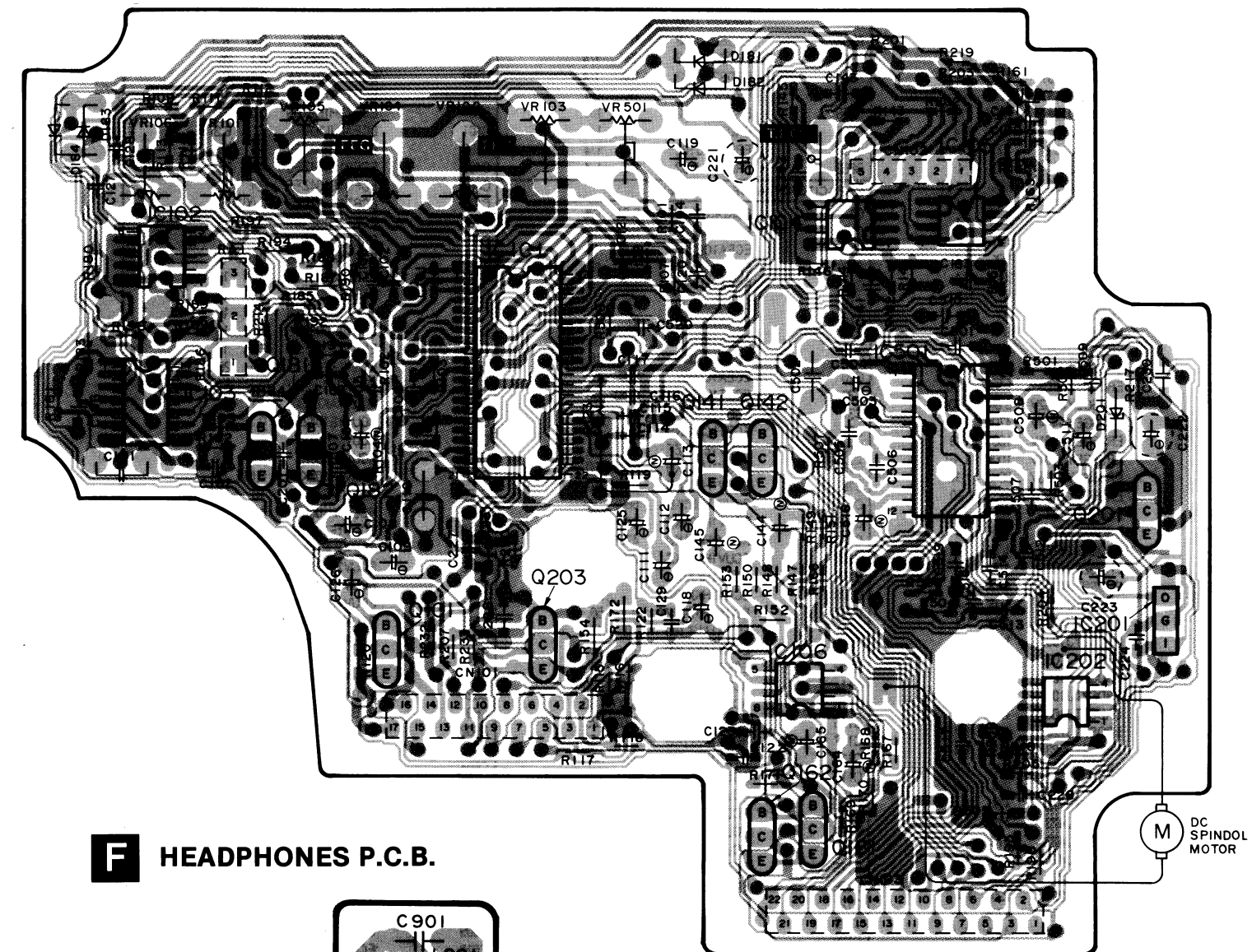
F HEADPHON



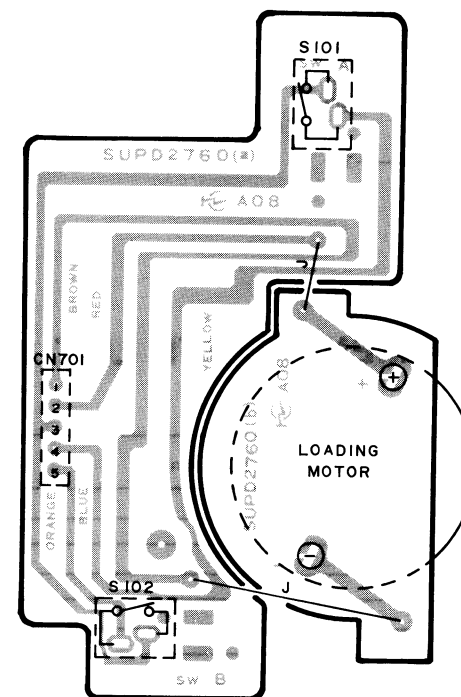


B SERVO P.C.B.

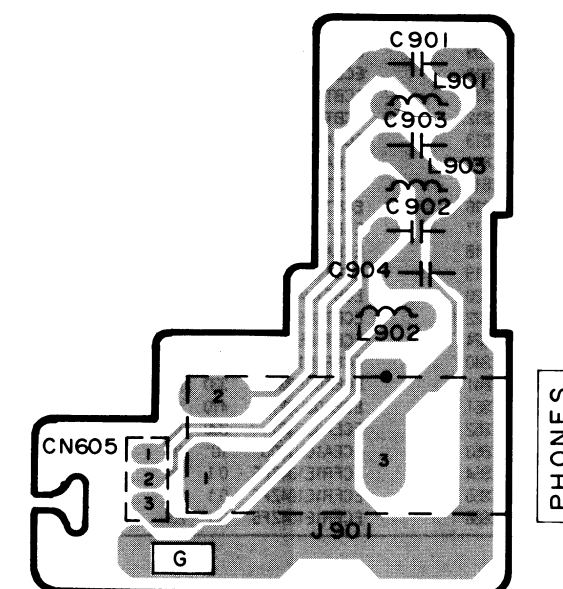
● Circuit view on top of P.C.B.



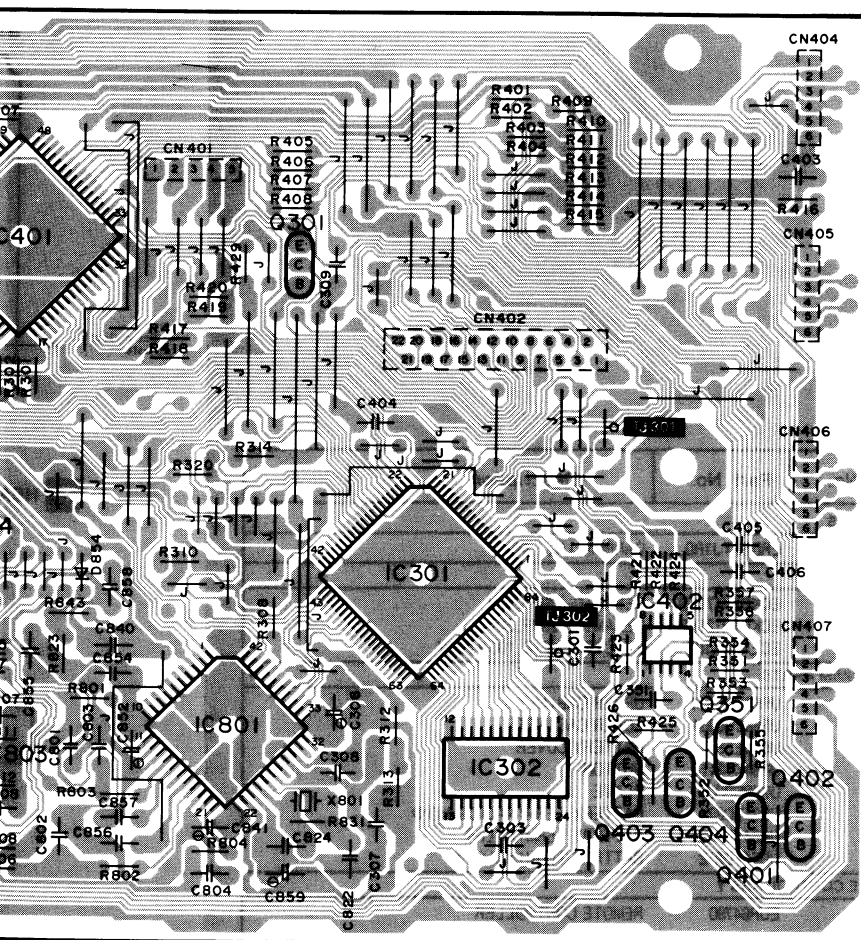
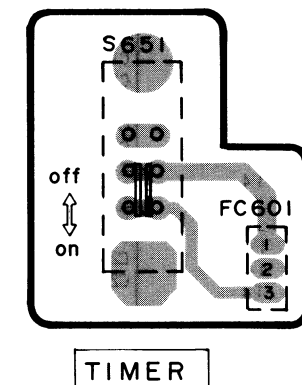
C MOTOR/SWITCH P.C.B.



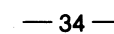
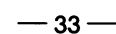
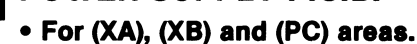
F HEADPHONES P.C.B.

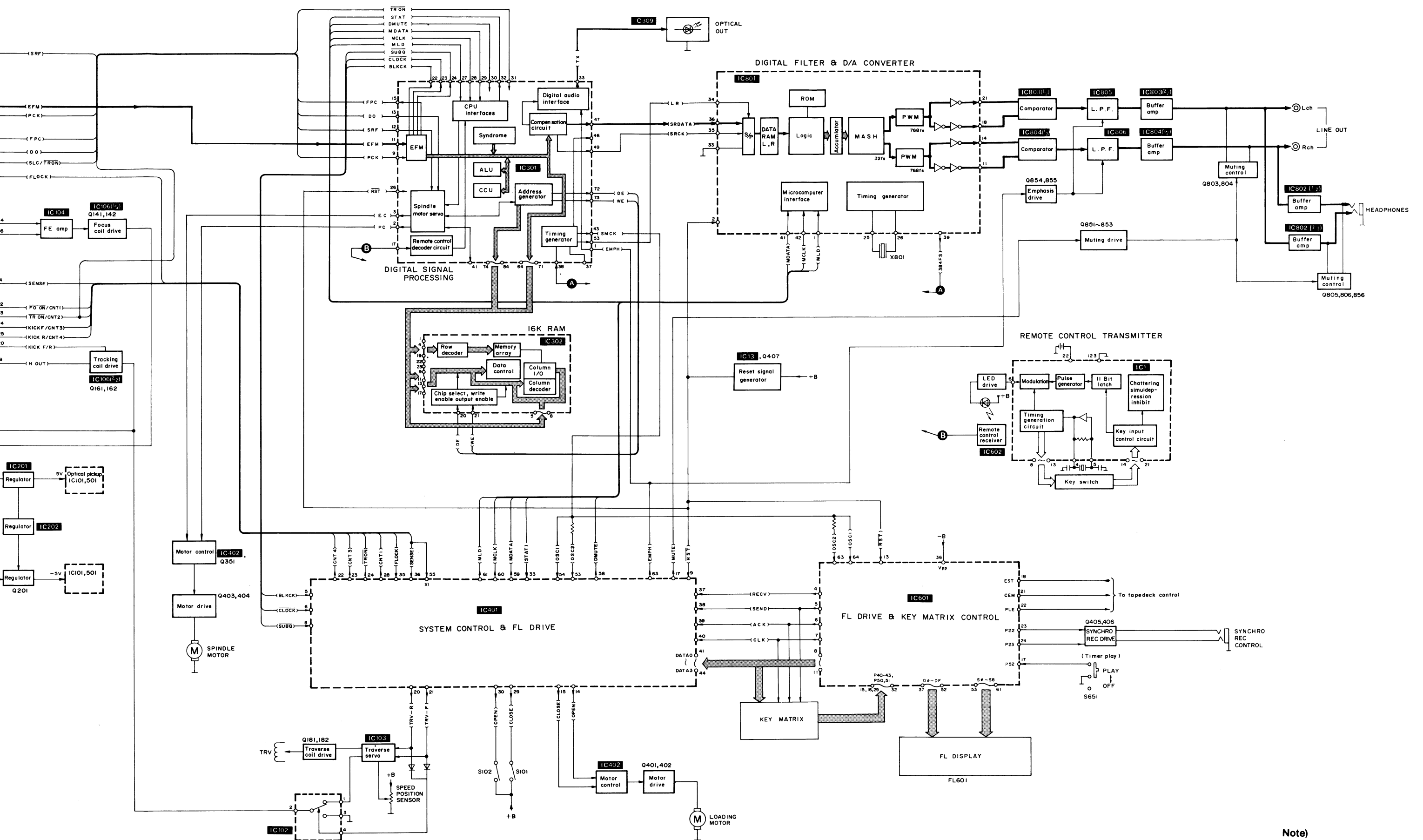


G TIMER SWITCH P.C.B.



- For (E), (EG), (EB), (EH), (EF), (Ei) and (XL) areas.

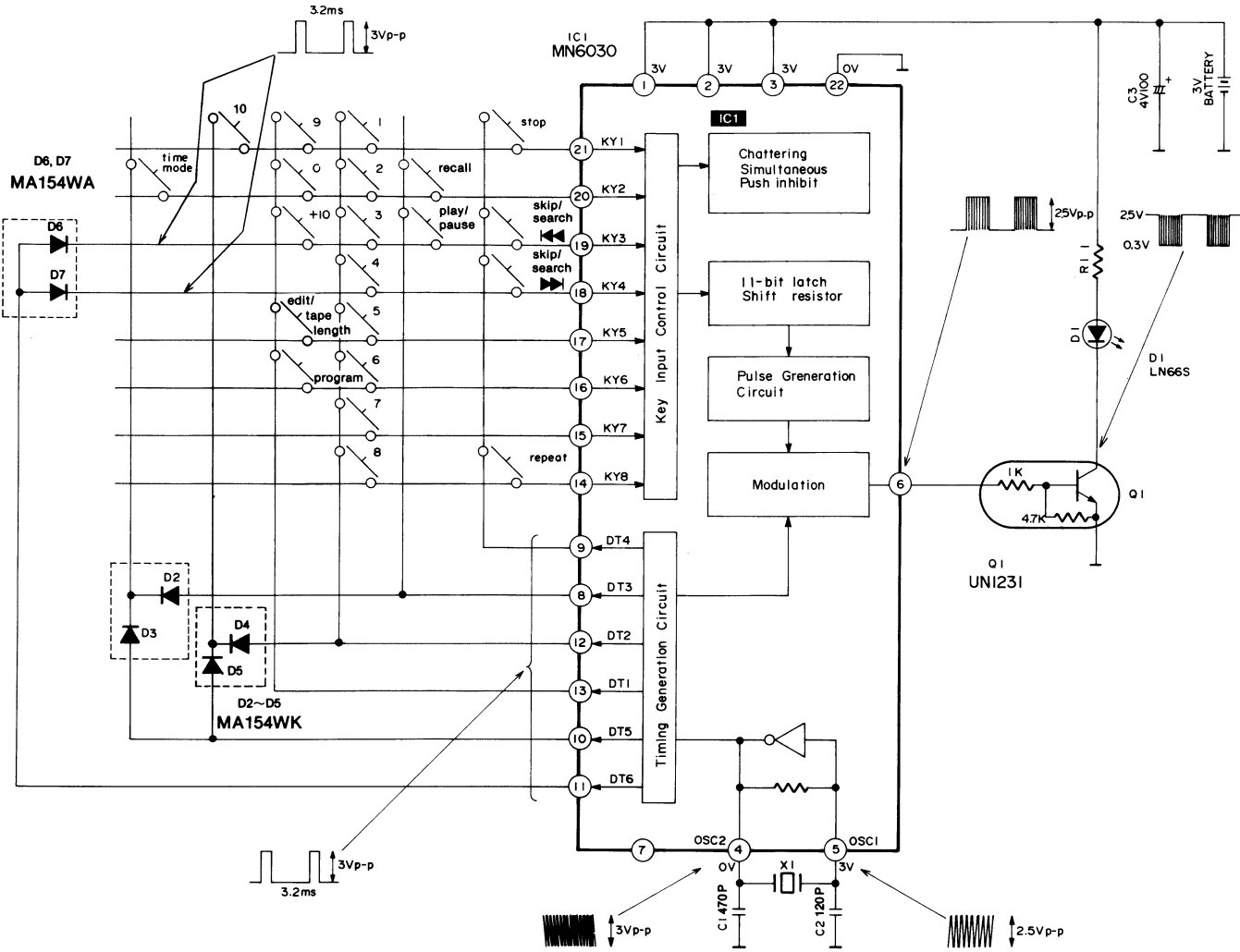




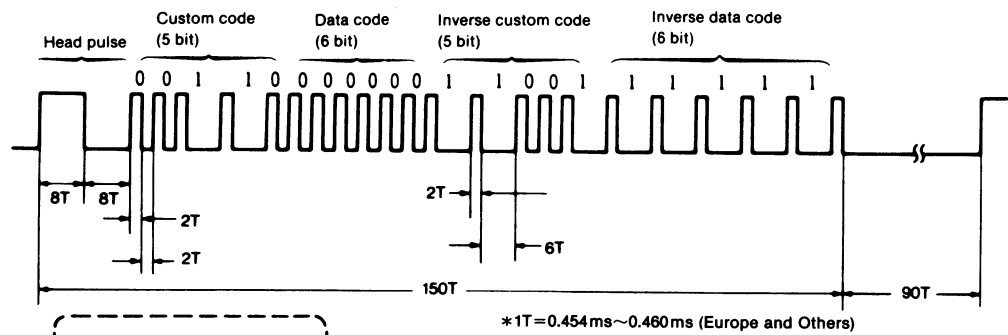
Note)

• → Audio signal

SCHEMATIC DIAGRAM OF REMOTE-CONTROL TRANSMITTER



Key number description and data code

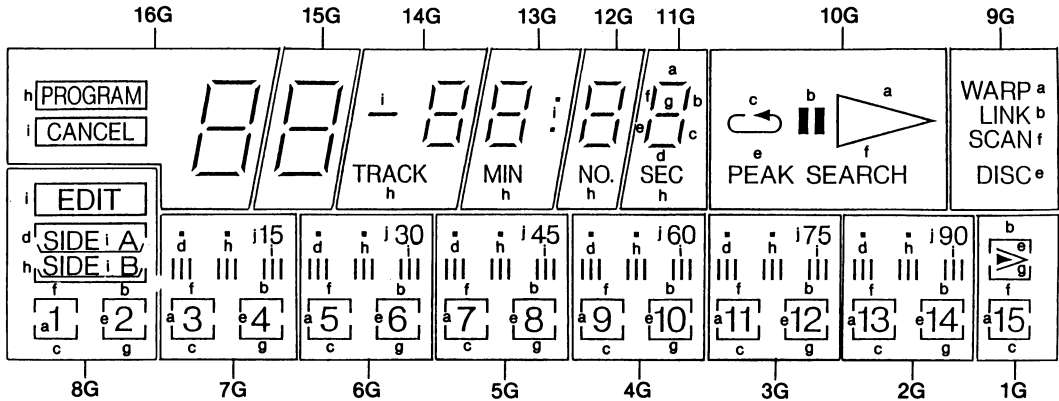


Function	Data Code	Function	Data Code	Function	Data Code
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skip/search	000010	2	010001	0	011001
skip/search	000011	3	010010	+10	011010
repeat	000111	4	010011	edit/tape length	011100
play/pause	001010	5	010100	program	011101
		6	010101	time mode	101001
		7	010110	10	110000
		8	010111		

*Custom Code: 01100

INTERNAL CONNECTION OF FL

Grid connection diagram

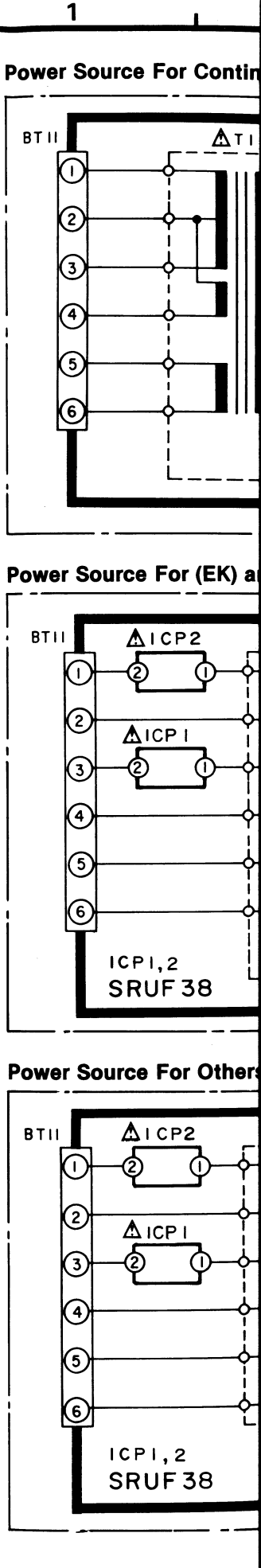


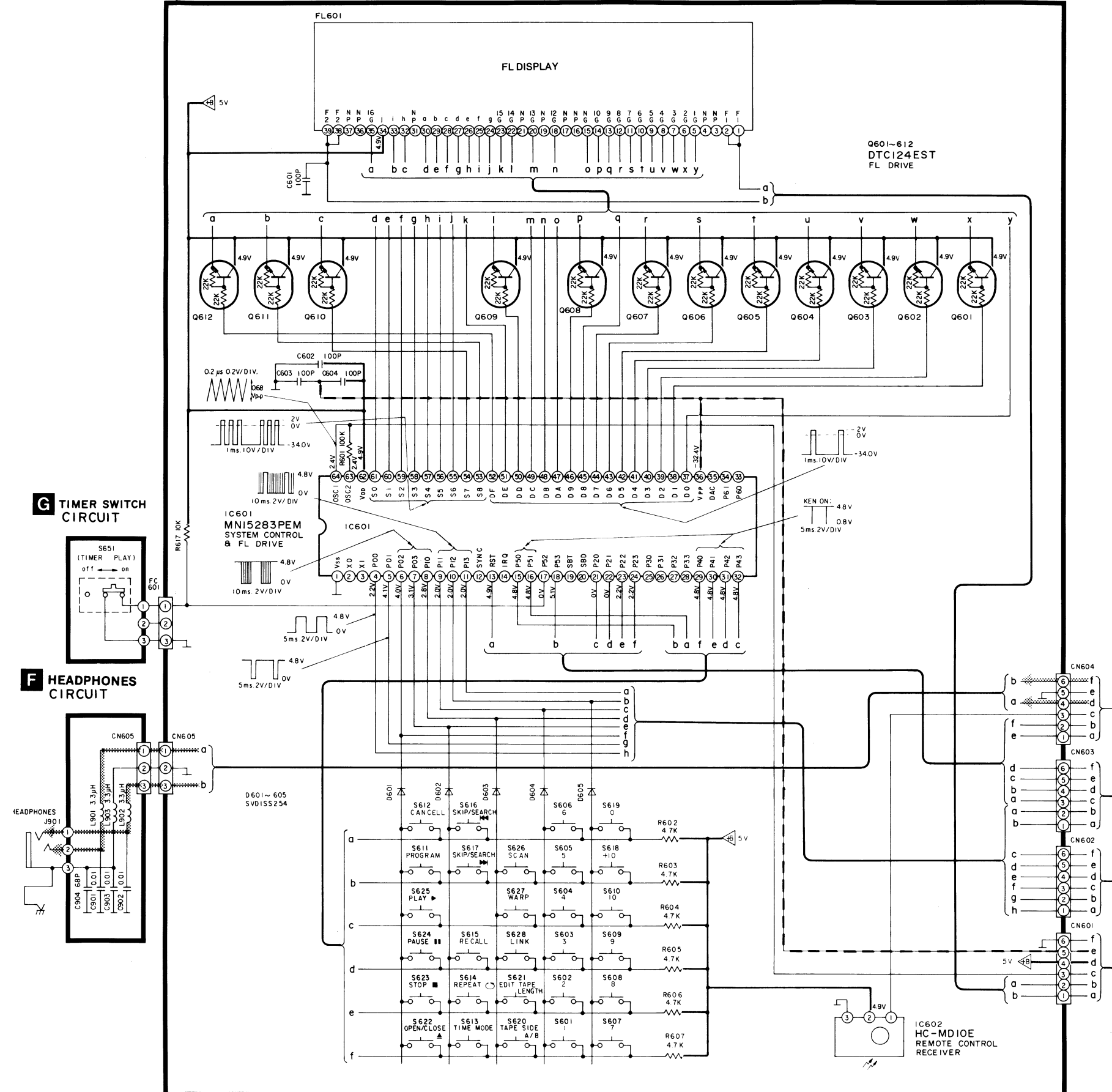
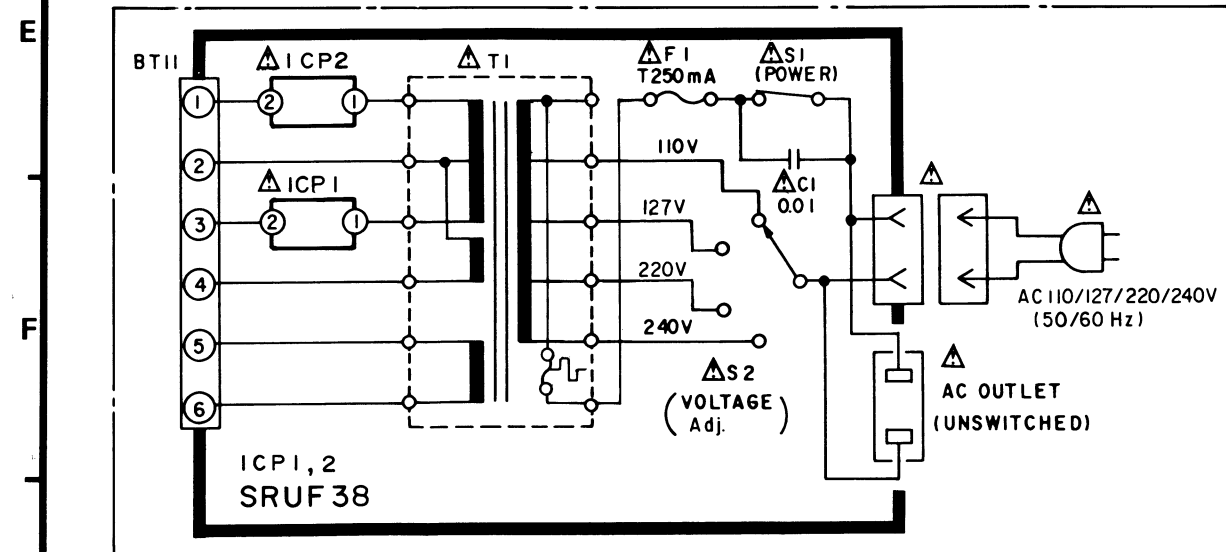
Anode connection table

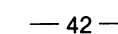
	16G	15G	14G	13G	12G	11G	10G	9G	8G	7G	6G	5G	4G	3G	2G	1G
a	a	a	a	a	a	a	WARP	1	3	5	7	9	11	13	15	
b	b	b	b	b	b	b	LINK									
c	c	c	c	c	c	c										
d	d	d	d	d	d	d										
e	e	e	e	e	e	e	PEAK	DISC	2	4	6	8	10	12	14	
f	f	f	f	f	f	f	SEARCH	SCAN								
g	g	g	g	g	g	g										
h	PROGRAM		TRACK	MIN	NO.	SEC										
i	CANCEL															
j																

TERMINAL GUIDE OF IC'S, TRANSISTORS AND DIODES

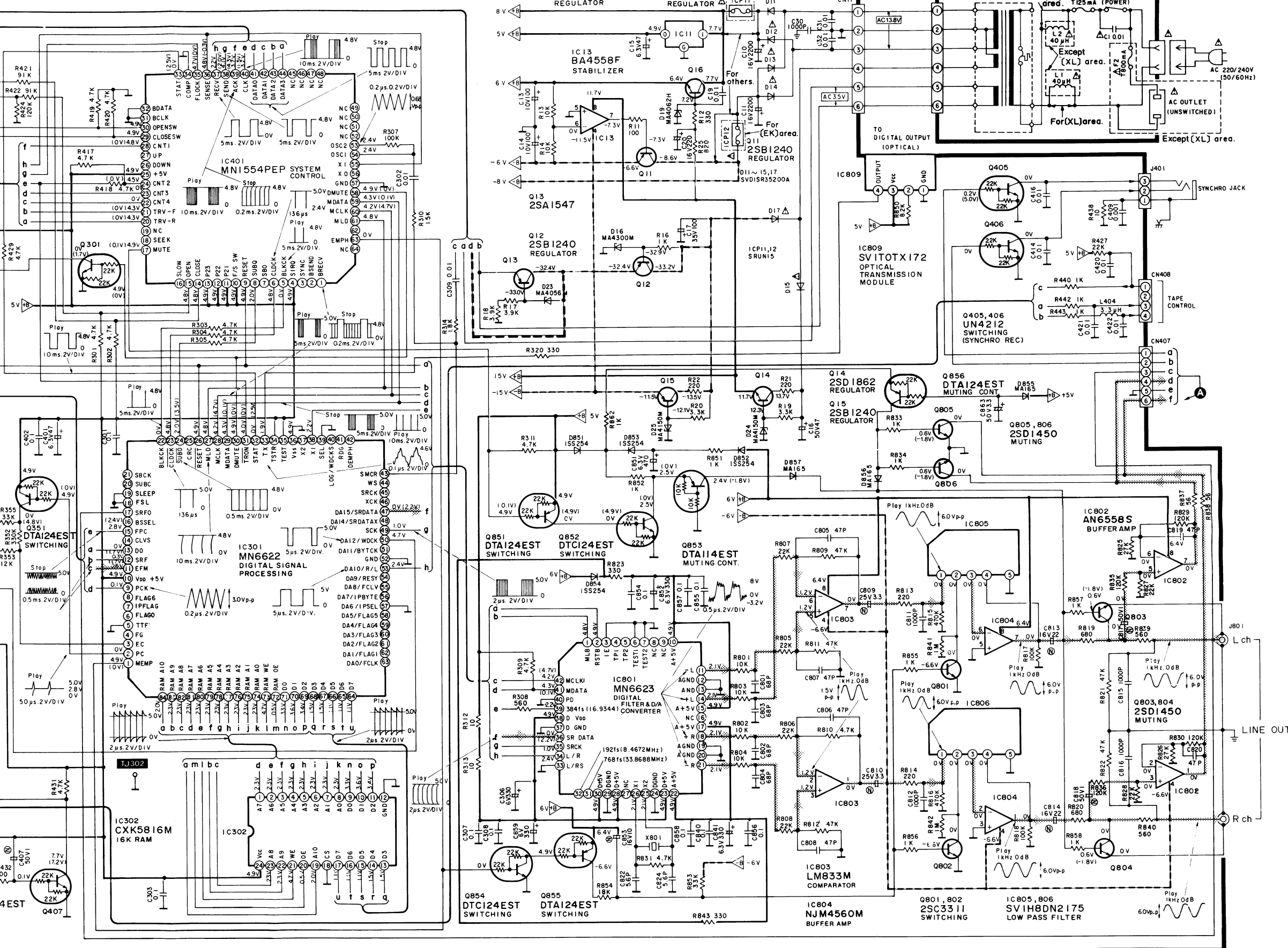
AN6552S AN6554NS AN8371S AN8370S MN6636	8 Pin 14 Pin 24 Pin 42 Pin 10 Pin	LM833M NJM4560M SVIBA4558F SVICXK5816M	8 Pin 24 Pin	MN1554PEP MN15283PEM	64 Pin
SVIH8DN2175	5 Pin	LM2940T5	MN6623 MN6622	42 Pin 84 Pin	
SRUF38 SRUN15	2 Pin	DTC124EST DTA124EST DTA114EST	2SC3311	2SA1547 2SD1330R 2SB1238 2SD1862 2SB1240	
SVD1SR35200A SVD1SS254		MA4330M MA4062 MA4033M MA4056M MA4150M			







D/A CONVERTER/AUDIO CIRCUIT



SCHEMATIC DIAGRAM

(This schematic diagram may be modified at any time with development of new technology.)

Notes:

- S1 : Power switch in "on" position.
 - S2 : Voltage selector switch.
 - S101 : Disc holder open/close detection switch.
 - S102 : Disc holder open/close detection switch.
 - S601~610 : Numeric switch.
 - S611 : Programmed-play switch.
 - S612 : Cancel switch.
 - S613 : Time-mode select switch.
 - S614 : Repeat switch.
 - S615 : Recall switch.
 - S616 : Forward skip/search switch.
 - S617 : Backward skip/search switch.
 - S620 : Tape-side select switch.
 - S621 : Compact-disc edit switch.
 - S622 : Disc tray open/close switch.
 - S623 : Stop switch.
 - S624 : Pause switch.
 - S625 : Play switch.
 - S626 : Music scan switch.
 - S627 : Warp switch.
 - S628 : Link switch.
 - S651 : Timer stand-by switch.
- The voltage value and waveforms are the reference voltage of this unit measured by DC electronic voltmeter (high impedance) and oscilloscope on the basis of chassis. Accordingly, there may arise some error in voltage values and waveforms depending upon the internal impedance of the tester or the measuring unit.
- * The parenthesized are the values of voltage generated during playing (Test disc 1kHz, L+R, 0dB), others are voltage values in stop mode.
- Important safety notice:
Components identified by Δ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
- / — : Positive voltage lines and negative voltage lines.
— : Audio signal lines.

Caution !

IC and LSI are sensitive to static electricity. Secondary trouble can be prevented by taking care during repair.

- Cover the parts boxes made of plastics with aluminum foil.
- Ground the soldering iron.
- Put a conductive mat on the work table.
- Do not touch the pins of IC or LSI with fingers directly.

REPLACEMENT PARTS LIST (Mechanical parts)

Notes : * Important safety notice :

Components identified by Δ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.

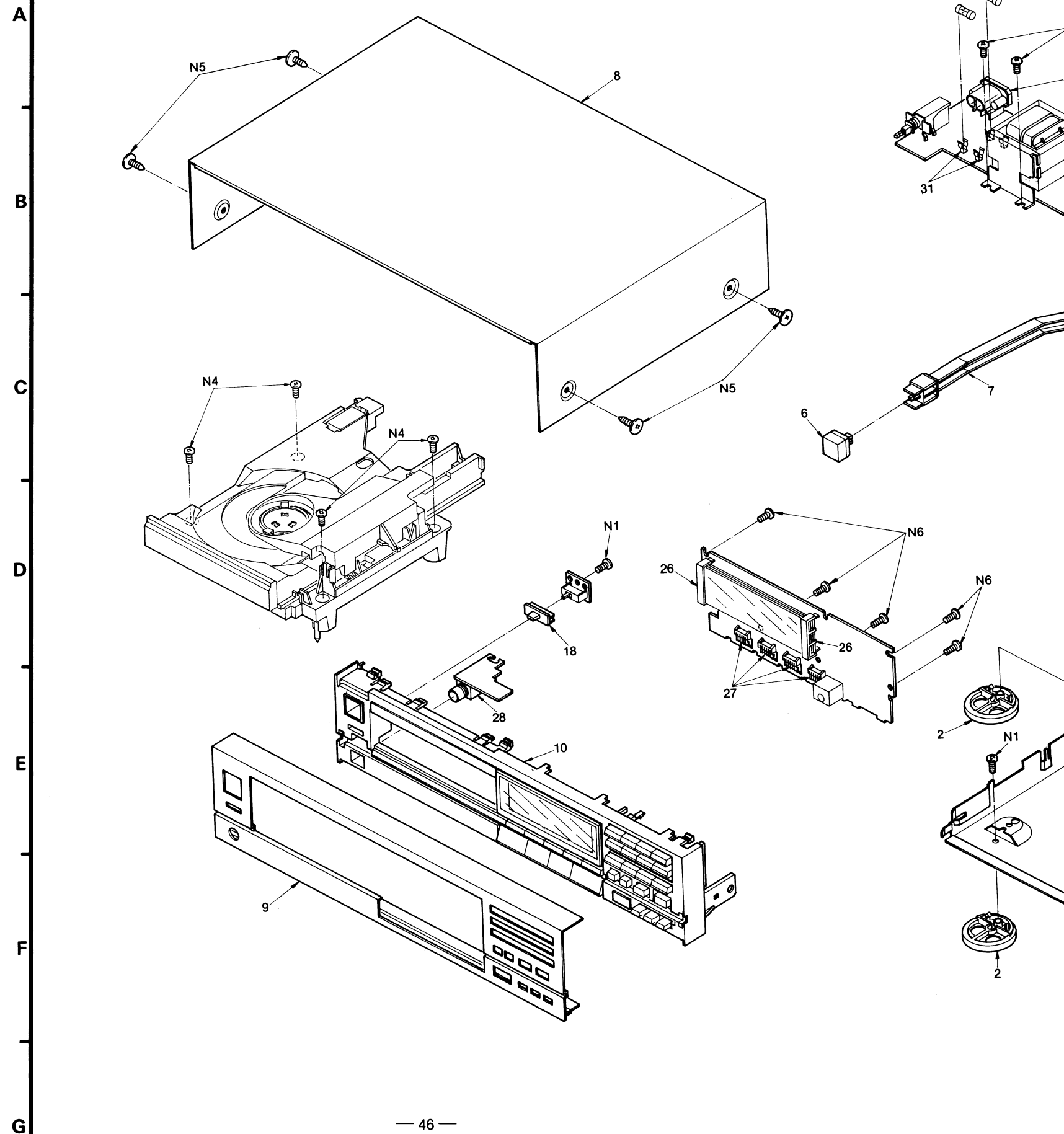
* Bracketed indications in Ref. No. columns specify the area. (Refer to the first page for area.)
Parts without these indications can be used for all areas.

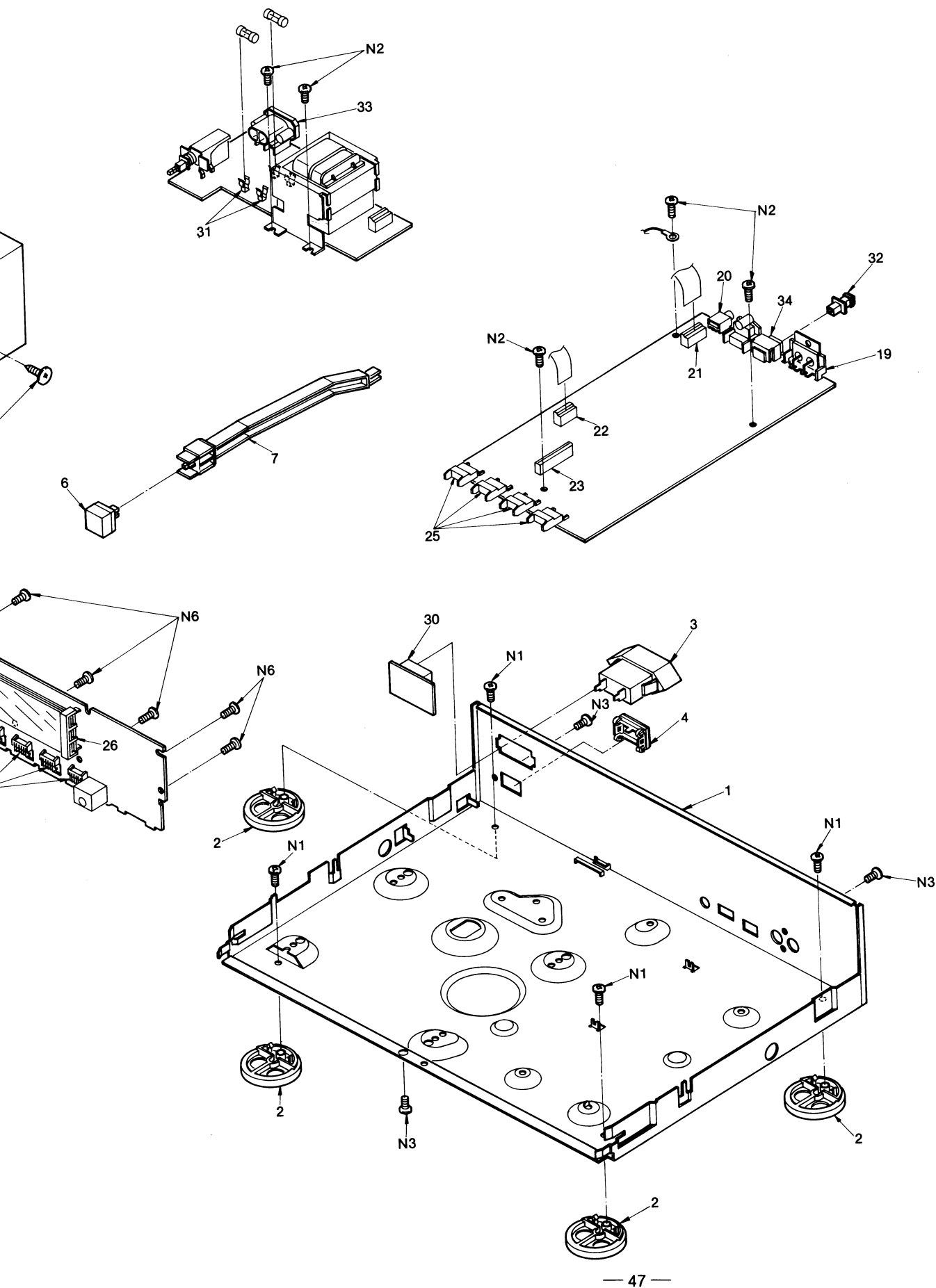
Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
CABINET AND CHASSIS					
1	SGPD750ZF0A	REAR PANEL	21	SJT30640LX-V	CONNECTOR(6P)
(E)			22	SJT30543-V	CONNECTOR(5P)
1	SGPD750ZF1A	REAR PANEL	23	SJSD2221	CONNECTOR
(EK)			24	SJS402	SOCKET(4P)
1	SGPD750ZF2A	REAR PANEL	25	SJS50680WL	CONNECTOR(6P)
(XL)			26	SHRD166	FL HOLDER
1	SGPD750ZF3A	REAR PANEL	27	SJT30647WL	CONNECTOR(6P)
(XB)			28	SJJ134B	JACK
1	SGPD750ZF4A	REAR PANEL	30	Δ SJS9225	AC OUTLET
(XA)			(E, EG, EB, EH)		
1	SGPLPJ45-KC	REAR PANEL	(EF, EI)		
(PC)			30	Δ SJS9232B	AC OUTLET
1	SGPLPJ45-KG	REAR PANEL	(XA, PC)		
(EG)			30	Δ SJS9332B	AC OUTLET
1	SGPLPJ45-KH	REAR PANEL	(EK)		
(EH, EB, EF)			31	SJT347	FUSE HOLDER
(EI)			32	VJA7135	CAP
2	SKL307	FOOT	33	Δ SJS16	AC INLET
4	SJS9330A	AC OUTLET COVER	(XL)		
(XA, PC)			33	Δ SJS9236	AC INLET
4	SJS9332A	AC OUTLET COVER	(E, EG, EB, EH)		
(EK)			(EF, EK, XB)		
6	SBC666-1	BUTTON	(XA, PC, EI)		
7	SUBD16	ROD	34	SUWD99	BRACKET
8	SKCD660KF	CABINET COVER	SCREWS, WASHERS AND NUTS		
9	SGWLPJ45-KE	FRONT PANEL ASS. Y	N1	XTB3+8G	SCREW
10	SGYLPJ45-KE	FRONT GRILLE ASS. Y	N2	XTB3+8J	SCREW
18	SBD143	KNOB	N3	XTB3+8JFZ	SCREW
19	SJFD4	OUTPUT TERMINAL(PHONO)	N4	XTB3+8F	SCREW
20	SJJ130-3	JACK	N5	SNE2129-1	SCREW
			N6	XTB3+8G	SCREW

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
LOADING MECHANICAL					
101	SGXD3130ZK0A	ORNAMENT	130	SURD13	ROLLER
102	S1SD22-1	TRAVERSE BASE	131	SDGD58	MAIN GEAR
103	SD0028-1E	TURNTABLE	132	SDGD59-2	GEAR
103-1	XXE2605	SCREW	133	S1RD94-E	LOADING MOTOR
104	SD0029-2	RING	134	XTB3+10G	SCREW
106	SRQA010N04	SPRING	135	SMBD7	BELT
107	SORD37	ROLLER	136	S1RD101-1	LOADING BASE SHAFT
108	SORD38-E	COIL	137	SFUMZ15R61	WASHER
109	SUXD123-1	GUIDE SHAFT	138	SDRD14	ROLLER
110	Δ S0AD70A	OPTICAL PICKUP	139	XTB3+8G	SCREW
111	SHRD176-E	COIL HOLDER	140	S1RD83E	ROD
112	SNSD35	SCREW	141	S1RD99	TRAY BASE
113	SHGD148	STOPPER	142	S1RD40-2	RACK GEAR
114	SOYD21-E	YOKE (AXA)	143	S1RD96	LOCK LEVER
115	SOYD22	YOKE (BXB)	144	SFUMZ15R61	WASHER
116	SHRD177-1	LOCK UNIT	145	S1RD98	DISC TRAY
117	SHWD33	WASHER	146	SUSD83	SPRING
118	SHWD34	WASHER	147	SFXGQ06N01	SCREW
119	SNSD31	SCREW	148	S1WD105	BRACKET
120	XTV2+5G	SCREW	149	SJGDRF310T-2	SPINDLE MOTOR
121	XYN2+C8	SCREW	150	S1RD51	HOLDER
122	XYN26+J6	SCREW	151	S1RD42-2	CLAMPER
123	SHGD153-1	CUSHION RUBBER	152	SOMD4	MAGNET
124	SUSD136-1	SPRING	153	SOYD2	YOKE
125	SUSD137-1	SPRING	154	S1KD150051	FLAT CABLE
126	SNSD33	SCREW	155	S1KD150221-1	FLAT CABLE
127	S1WLP150-KM	LOADING BASE	156	SHRD150	ROLLER HOLDER
128	SUSD145-1	SPRING	157	SJSD1722	CONNECTOR
129	SUWD112	GUIDE SHAFT HOLDER	158	SJSD2222	CONNECTOR(CN103)
			159	SJT30543-V	CONNECTOR(5P)
			160	SDRD12	ROLLER

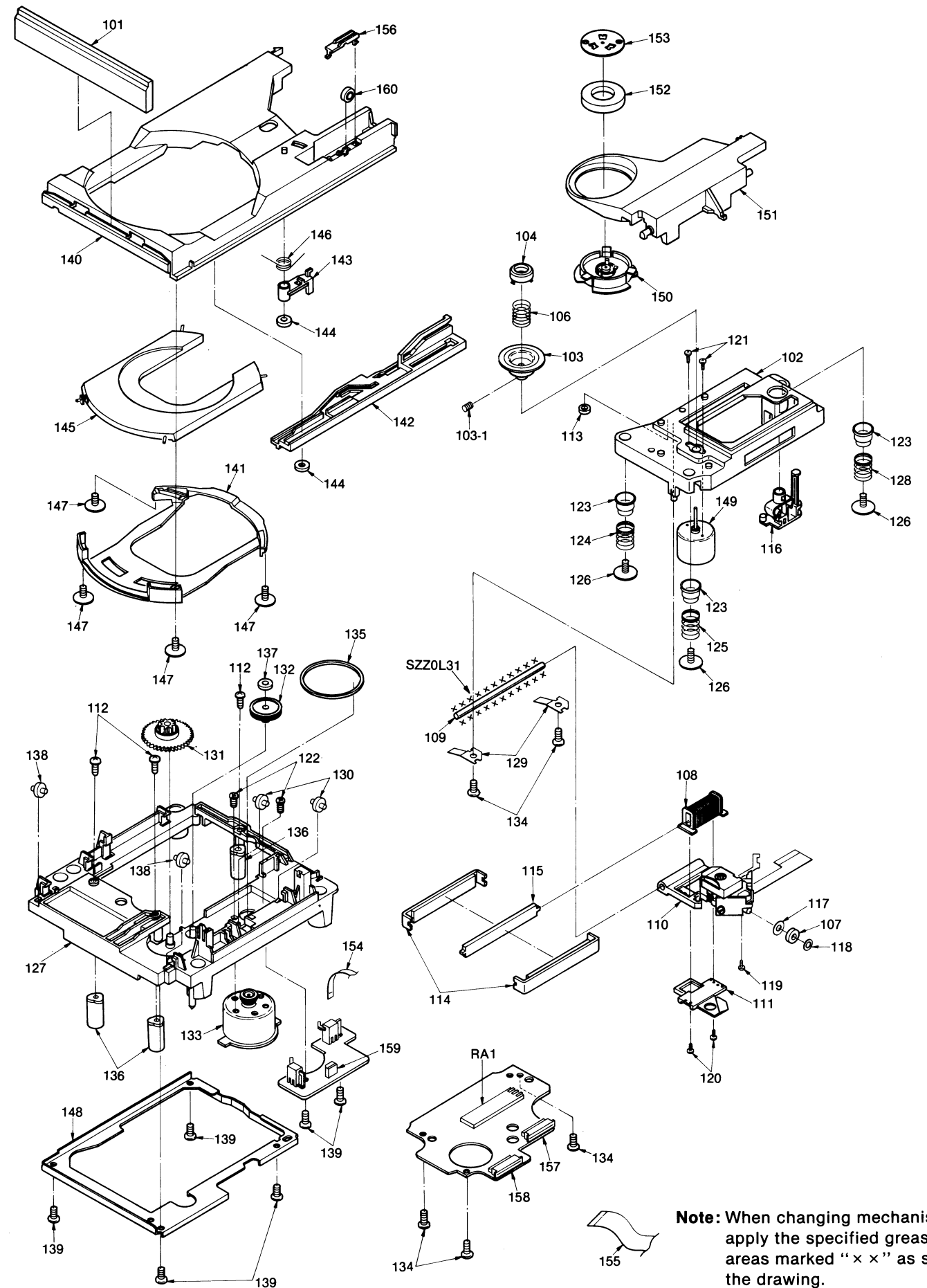
EXPLODED VIEWS

• Cabinet and chassis parts



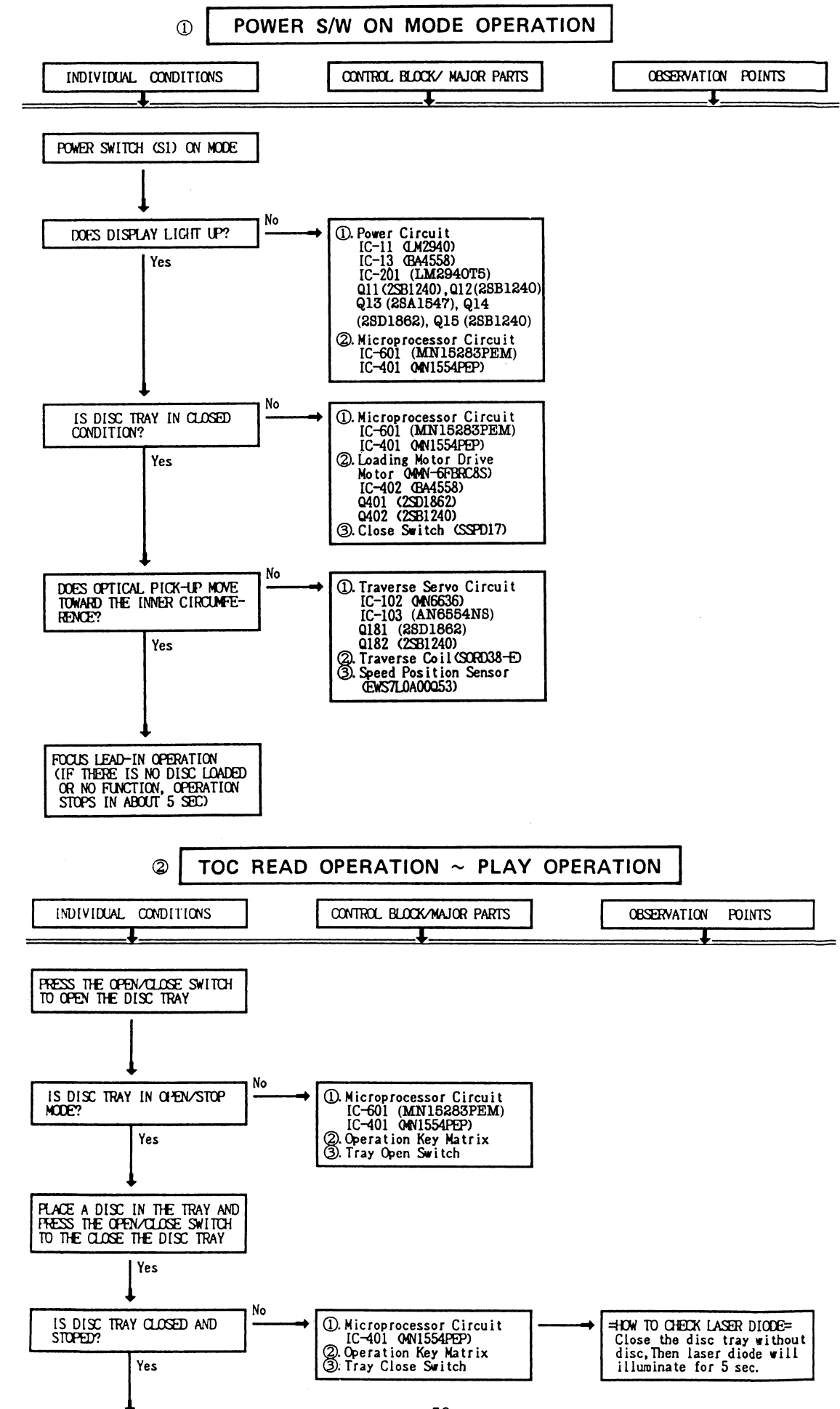
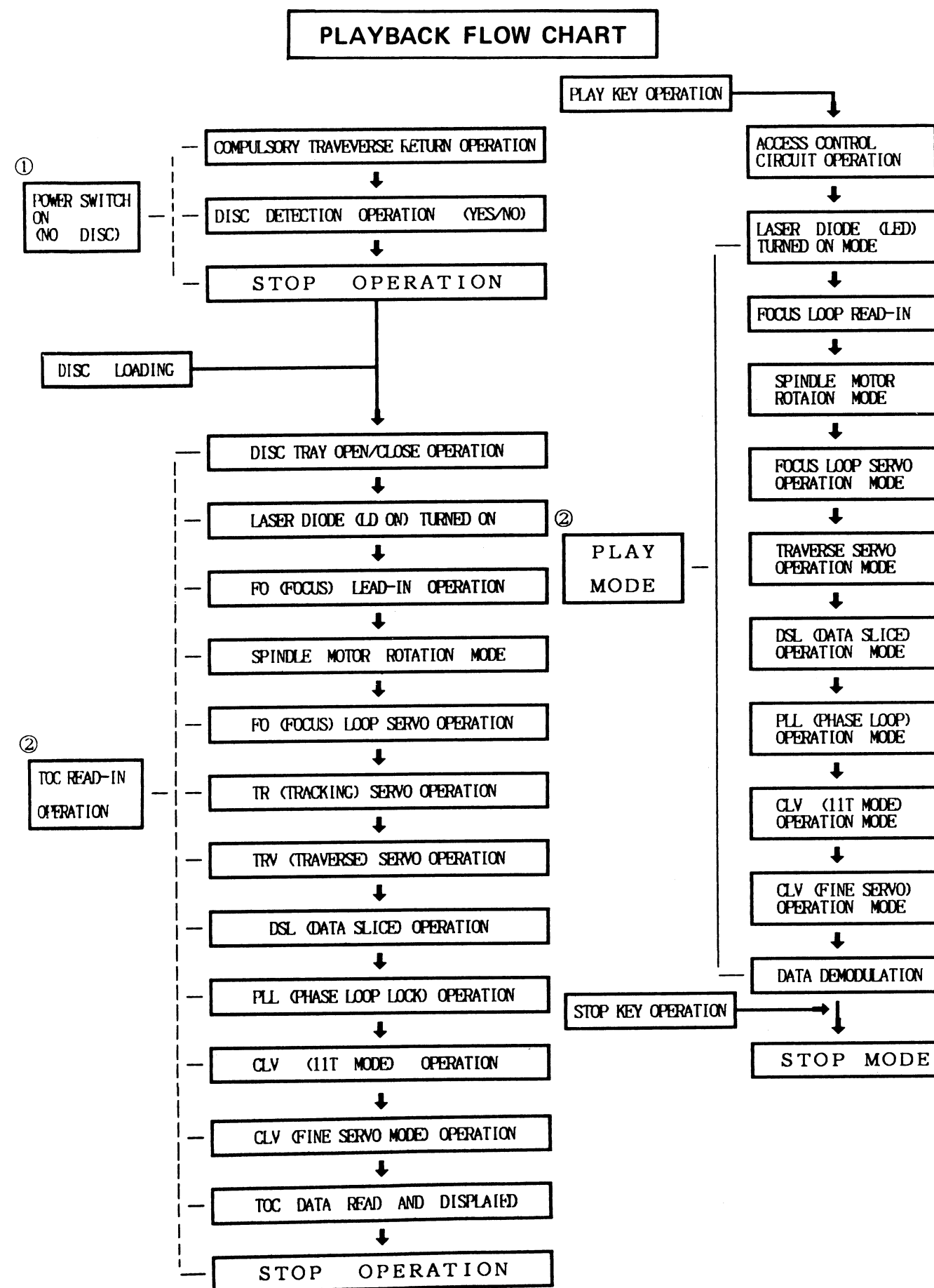


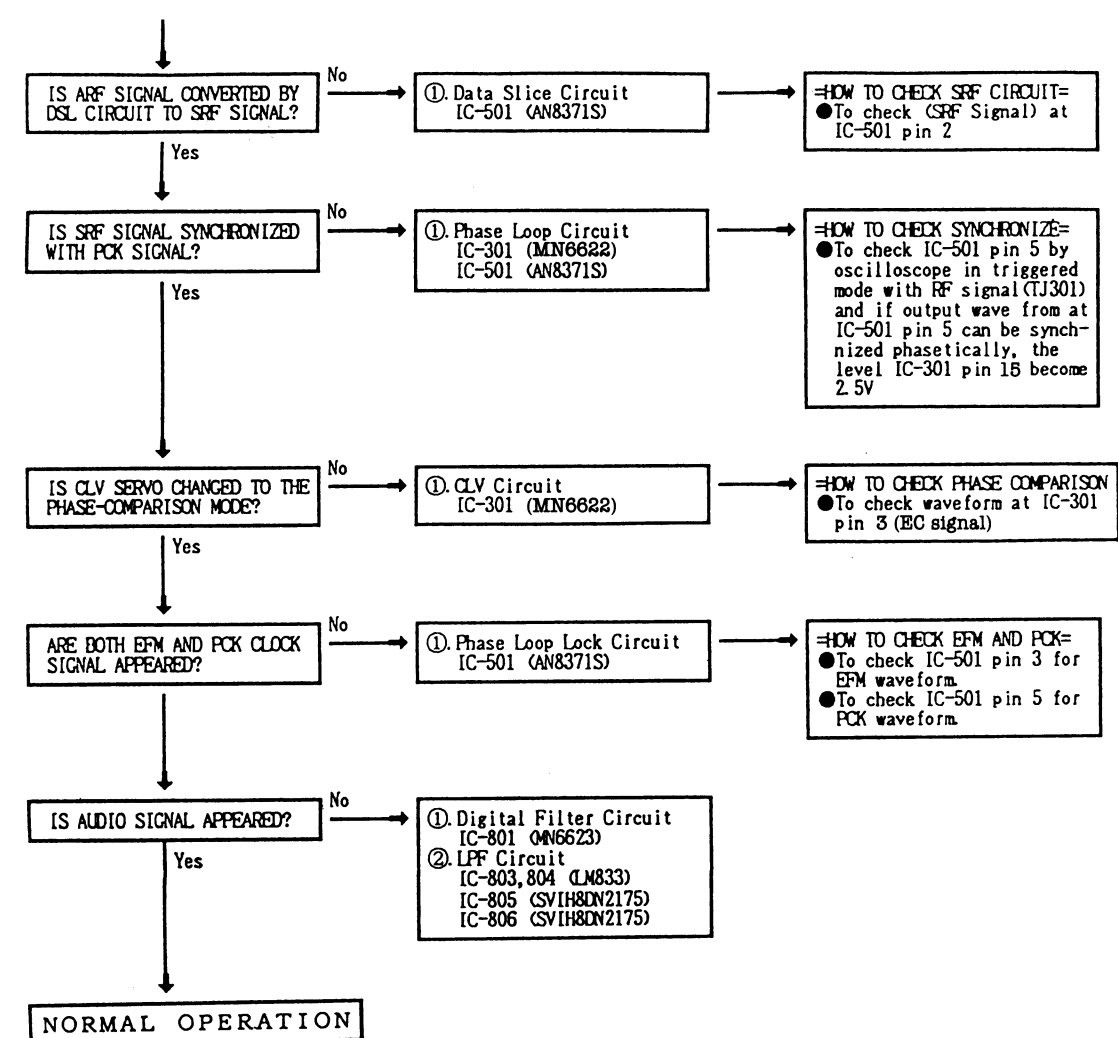
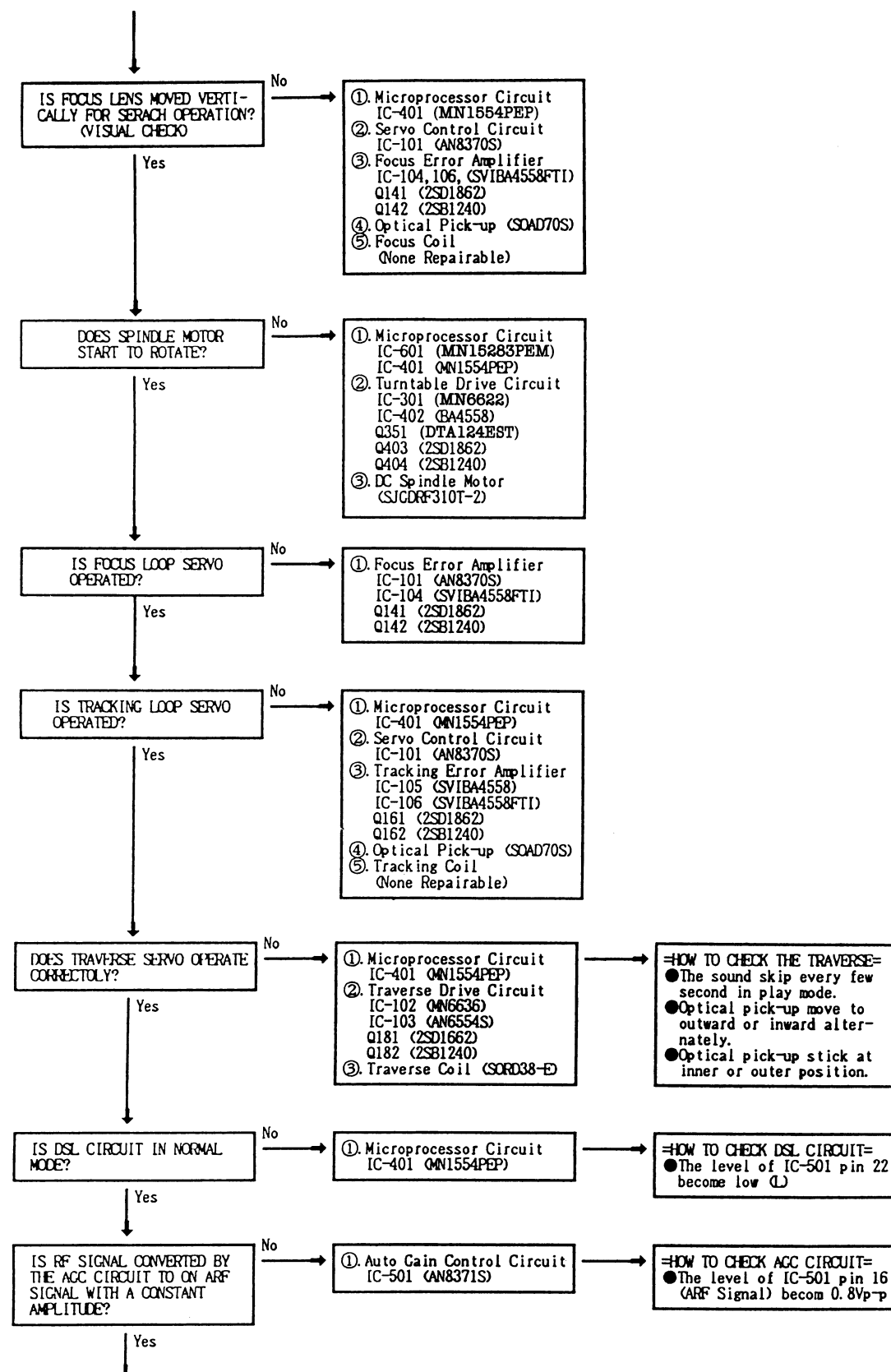
• Loading unit



Note: When changing mechanism parts, apply the specified grease to the areas marked "× ×" as shown in the drawing.

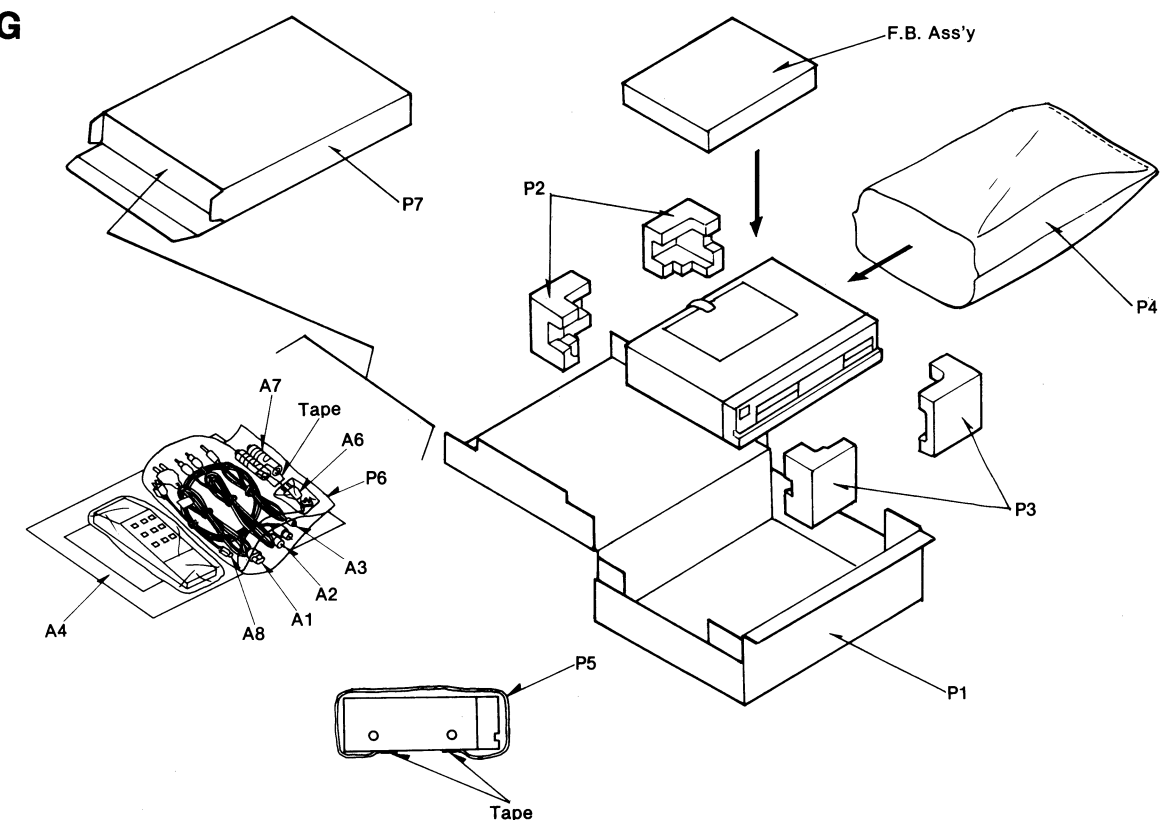
TROUBLESHOOTING GUIDE





PACKING

F.B. Ass'y



Service Manual

Compact Disc Player

SL-PJ45



DIGITAL

Color

(K) Black Type

Area

Color	Area
(K)	(E) Continental Europe.
(K)	(EK) . . United Kingdom.
(K)	(EG) . . F.R. Germany.

Please file and use this supplement manual together with the Service Manual for Model No. SL-PJ45, Order No. AD8805083C9.

■ CHANGE OF REPLACEMENT PARTS LIST

Ref. No.	Change of Part No.		Description	Pcs.	Remarks
	Made in Japan	➡ Made in Germany			
1	SGPLPJ45-KG	SGPLPJ45-KGM	Rear Panel <input checked="" type="checkbox"/>	1	for (EG) area
1	SGPD750ZF1A	SGPD750ZF1B	Rear Panel <input checked="" type="checkbox"/>	1	for (EK) area
1	SGPD750ZF0A	SGPLPJ45-KEG	Rear Panel <input checked="" type="checkbox"/>	1	for (E) area
P1	SPND311	SPND8H312	Carton Box <input checked="" type="checkbox"/>	1	

*☒: Indicates parts that are supplied by MBV.

MBV: MB Video G.m.b.H.

(Herzbergerstrasse 51, 3360 Osterode Harz, F.R. GERMANY)

Technics

Matsushita Electric Industrial Co., Ltd.
Central P.O. Box 288, Osaka 530-91, Japan

Printed in Japan
F880807450 TS/TW

ORDER NO. AD8809238S9

Service Manual

Compact Disc Player
SL-PJ45



Color
(K)...Black Type

Modification of the Servo Circuit

Note: The SL-PJ45's servo circuit has been modified during its production. Major changes in its ICs and transistors are listed in the following table (next page). The IC401's peripheral circuit on the **D** P.C.B. has also been partially modified. The Supplementary Service Manual outlines all the circuitry except for the operation circuit. (No modification has been made to the operation circuit. For a schematic, see page 40 of the original Service Manual.) Use the original Service Manual (Order No. AD8805083C9) together with this Supplementary Service Manual.

CHANGES

- Notes**
- (1) Reason for Modifications: To simplify the servo circuit while improving its performance.
 - (2) Modifications Effective: From July, 1988 and onward
 - (3) Identification of Modified Units:
 - 1): A serial number suffix of **C** or beyond indicates a modified unit.
 - 2): A "CAUTION" label (THE ORIGINAL DESIGN HAS BEEN CHANGED. REFER TO SERVICE MANUAL (SUPPLEMENT).) has been affixed inside the chassis.

Area

Color	Area
(K)	(E).....Continental Europe.
(K)	(EK)United Kingdom.
(K)	(XL).....Australia.
(K)	(EG).....F.R. Germany.
(K)	(EB)Belgium.
(K)	(EH)Holland.
(K)	(EF).....France.
(K)	(Ei)Italy.
(K)	(XA)Asia, Latin America, Middle Near East, Africa and Oceania.
(K)	(XB)Saudi Arabia.
(K)	(PC)European Audio Club.

SL-PJ45

MAJOR CHANGES IN SEMICONDUCTOR DEVICES

Ref. No.	Change of Part No.		Part Name & Description	Remarks
	Original	New		
IC101	AN8370S	AN8373S	SERVO AMP	
IC102	MN6636	AN8374S	SERVO PROCESSOR	
IC103	AN6554NS	AN8377	BTL DRIVE	
IC104	AN6552S	LM2940T5M	REGULATOR	
IC105~106	AN6552S	Deletion	_____	
IC201	LM2940T5	Deletion	_____	
IC202	AN6552S	Deletion	_____	
IC501	AN8371S	Deletion	_____	
IC401 *	MN1554PEP	MN1554PEW	SYSTEM CONTROL	
Q101	2SA1547-Q	2SA1547QSTV2	A.P.C.	
Q141	2SD1862-P	Deletion	_____	
Q142	2SB1240-P	Deletion	_____	
Q161	2SD1862-P	Deletion	_____	
Q162	2SB1240-P	Deletion	_____	
Q181	2SD1862-P	Deletion	_____	
Q182	2SB1240-P	Deletion	_____	
Q201, 203	2SD1862-P	Deletion	_____	

* IC401: System-controlling microprocessor on the **D** P.C.B. All other ICs and transistors listed in this table are used on the **B** Servo P.C.B.
* A comprehensive electrical parts list, regarding the servo circuit, appears on pages 21~23 of this Supplementary Service Manual.
(None of the mechanical parts have been affected by these modifications. Refer to the original Service Manual.)

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(IC101, 102, 103)	9~11	NEW SERVO GAIN ADJUSTER	
TROUBLESHOOTING GUIDE.....	12~14	(Servo Amp. Adjusting Fixture).....	24
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MEASUREMENTS AND ADJUSTMENTS

Caution:

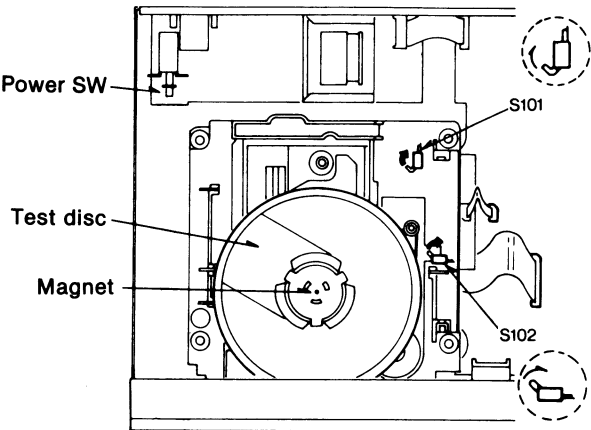
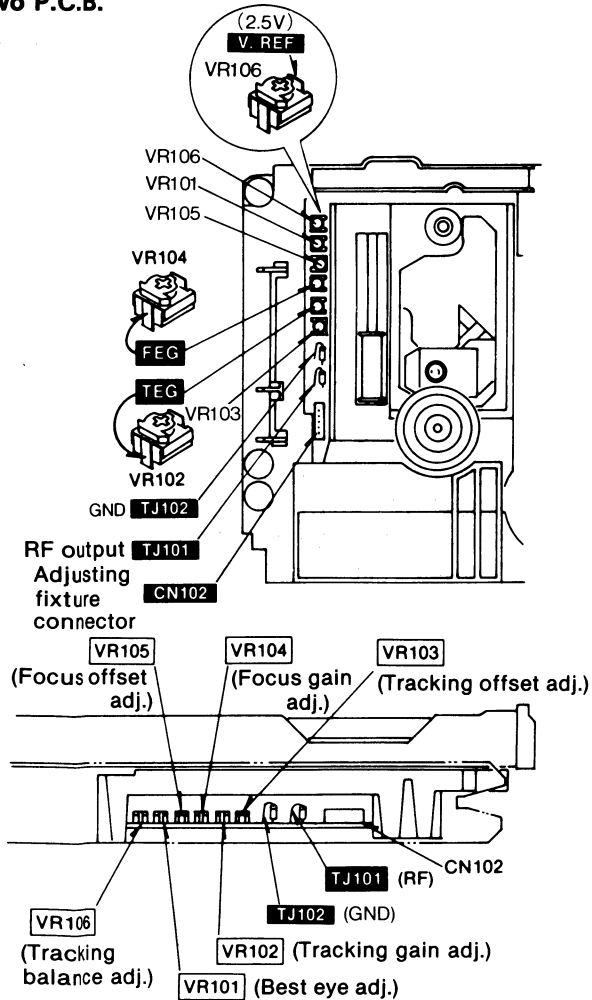
- It is very dangerous to look at or touch the laser beam. (Laser radiation is invisible.)
With the unit turned "on", laser radiation is emitted from the pickup lens.
Avoid exposure to the laser beam, especially when performing adjustments.

PREPARATION

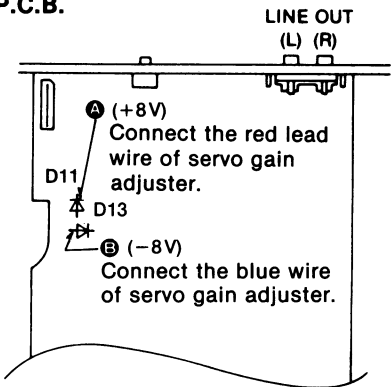
- Remove the cabinet (see Ref. No. 1 in the original Service Manual).
- Remove the disc clumper and magnet (see Ref. No. 2 of the same).
- Remove the disc holder and power switch rod (see Ref. No. 3 of the same).
- Place the test disc and magnet on the turntable.
- While holding the Open/Close switches (S101, S102) in the directions indicated by the arrows, switch the player power ON.
- After the test disc starts rotating, release the Open/Close switch (S101, S102).

ADJUSTMENT POINTS

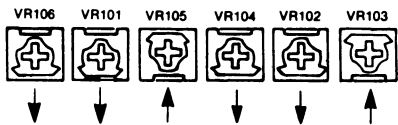
Servo P.C.B.



Main P.C.B.



Temporary setting of each VR



(Temporary VR setting if any of the trimmer VRs are replaced or require readjustment, temporarily set them to the following positions.)

Measuring Instruments and Special Tools

- Servo gain adjuster (SZZP1017F)
- Test discs
- 1. Playability test disc (SZZP1054C or SZZP1014F)
- 2. Uneven test disc (SZZP1056C)
- 3. Black band test disc (SZZP1057C)
- Normal disc
- Dual-beam oscilloscope with bandwidth of 30MHz or better (with EXT trigger and 1:1 probe).
- Audio frequency (AF) oscillator
- Conversion connector (SZZP1032F)

- Allen wrench (M2.0)
- Allen wrench (M1.27)
- 0.9mm clearance gauge (RZZ0297)

Perform adjustments depend on the part to be replaced according to followings:

- (1) Spindle motor Items 1, 3 to 8
- (2) Turntable Items 1, 3 to 8
- (3) Optical pickup Items 2 to 8

Adjusting Procedure

- If you have replaced the spindle motor or turntable, do the following adjustment:

(1) TURNTABLE HEIGHT ADJUSTMENT

- Insert the 0.9mm clearance gauge (RZZ0297) between the turntable and the loading base (see the figure at right).
- Tighten the turntable retention screw with the 1.27mm allen wrench.
- Connect the oscilloscope's CH. 1 probe across VR104's FEG (+) and VR106's V. REF (-) terminals via a filter.

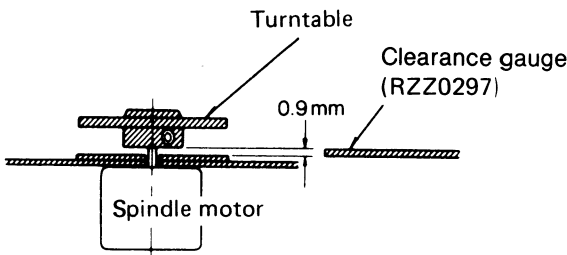
(Note: A voltage of 2.5V appears at the V. REF terminal. Take care not to short the player's chassis to the oscilloscope ground.)

Oscilloscope setting: VOLT 50 mV
SWEEP 1 ms.
Input coupling ... DC

- Adjust oscilloscope's DC zero balance.
- Switch the player power ON, and play the test disc (SZZP1014F or SZZP1054C).
- Measure the voltage amplitude of the signal on the oscilloscope.

Note 1. If the measured amplitude is within a range of ± 15 mV, the turntable height is correct. If it is outside this range, adjust the turntable height by using the clearance gauge as a pry.

If the amplitude exceeds +15 mV, lower turntable.
If the amplitude is below -15 mV, elevate the turntable.



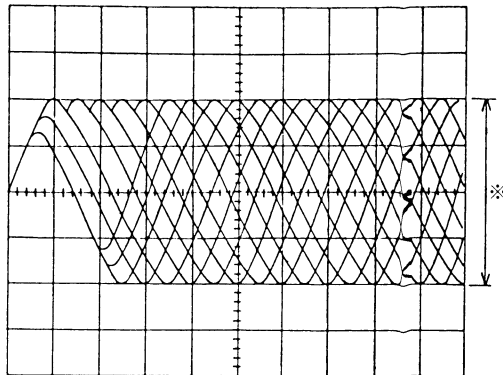
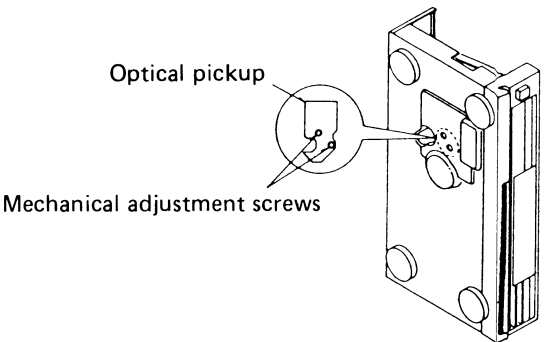
Note 2. If the measured amplitude greatly surpasses or falls short of the range above, set VR105 at or around the center, then try to adjust the height again. (Then be sure to adjust the focus offset as well.)

(2) MECHANICAL ADJUSTMENT

- Connect the oscilloscope's CH. 1 probe across TJ101 (+) and TJ102 (-) on the Servo P.C.B.

Oscilloscope setting: VOLT 100 mV
SWEEP 0.5 μ s.
Input coupling ... AC

- Switch the player power ON, and play track 9 on the test disc (SZZP1056C).
- Leave the player in Play mode, and place it on its right side as shown at right.
- Alternately adjust the two mechanical adjusting screws with the 2.0mm allen wrench until the RF signal amplitude variation on the oscilloscope is minimized.
- After completing the adjustment, lock the mechanical adjustments with lock paint (RZZOL01).



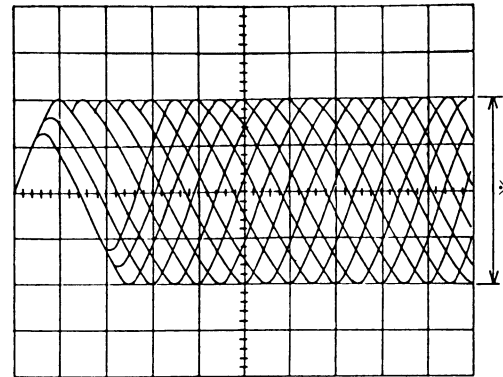
* Minimize the variation of amplitude.

(3) BEST EYE (PD BALANCE) ADJUSTMENT

1. Connect the oscilloscope's CH. 1 probe across **TJ101** (+) and **TJ102** (–) on the Servo P.C.B.

Oscilloscope setting: VOLT 100 mV
 SWEEP 0.5 μ s.
 Input coupling . . . AC

2. Switch the player power **ON**, and play the 0.5 mm black dot on the test disc (SZZP1014F or SZZP1054C).
3. Adjust **VR101** until the RF signal eye pattern amplitude is maximized.



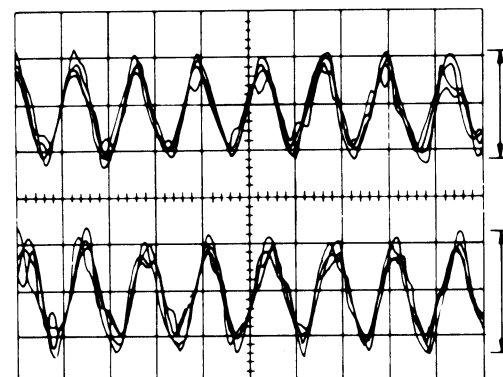
※ Maximize the amplitude.

(4) FOCUS GAIN ADJUSTMENT

1. Connect the servo gain adjuster to the player (see page 7).
2. Set the servo gain adjuster's gain switch to position "2" and the ON/OFF switch to **ON**.
3. Set up the AF oscillator output for **825Hz, 150 mVp-p**, and connect it across the OSC and GND terminals on the servo gain adjuster.
4. Connect oscilloscope's CH. 1 and CH. 2 probes to the servo gain adjuster's TP1 and TP2 terminals, respectively (TP3 is GND).

Oscilloscope setting: VOLT 100 mV
 (both channels)
 SWEEP 0.2 ms.
 Input coupling . . . AC

5. Play the test disc (SZZP1014F or SZZP1054C).
6. Set the servo gain adjuster's gain switch to position "3", and you will see a 825 Hz signal on the oscilloscope. Adjust **VR104** until the signal amplitudes on both channels become identical to each other.
7. Set the gain switch back to position "2".



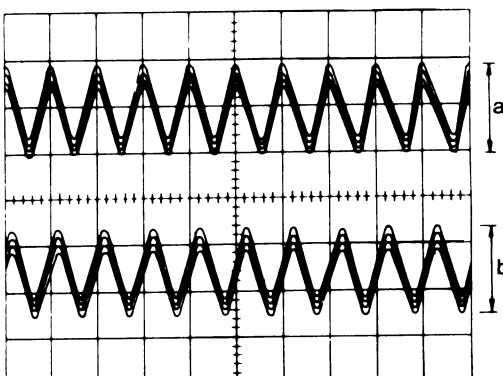
※ Adjust **VR104** until a equals b.

(5) TRACKING GAIN ADJUSTMENT

1. Set up the AF oscillator output for **1.1 kHz, 150 mVp-p**, and connect it across the OSC and GND terminals on the servo gain adjuster.
2. Connect oscilloscope's CH. 1 and CH. 2 probes to the servo gain adjuster's TP1 and TP2 terminals, respectively (TP3 is GND).

Oscilloscope setting: VOLT 100 mV
 (both channels)
 SWEEP 0.2 ms.
 Input coupling . . . AC

3. Switch the player power **ON**, and play the test disc (SZZP1014F or SZZP1054C).
4. Set the servo gain adjuster's gain switch to position "1", and you will see a 1.1 kHz signal on the oscilloscope. Adjust **VR102** until the signal amplitudes on both channels become identical to each other.
5. Set the gain switch back to position "2".



※ Adjust **VR102** until a equals b.

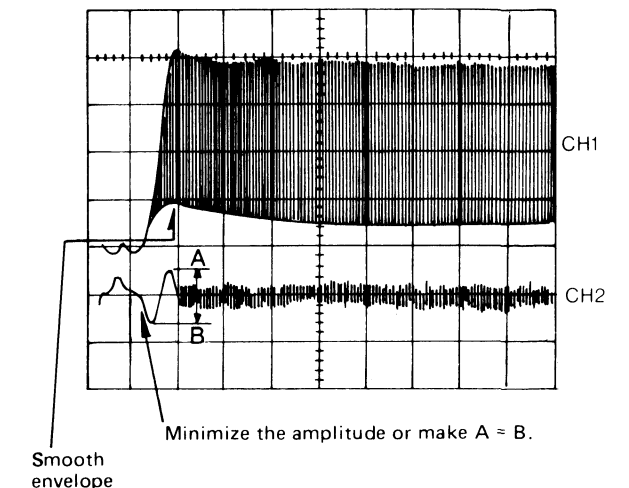
(6) FOCUS OFFSET ADJUSTMENT

Note: Make sure that the servo gain adjuster's gain switch is set to position "2".

1. Connect the oscilloscope's CH. 1 probe across **TJ101** (+) and **TJ102** (–) on the Servo P.C.B. and its CH. 2 probe (+) to VR104's **FEG** terminal.

Oscilloscope setting: VOLT 100 mV (CH. 1)
 100 mV (CH. 2)
 SWEEP 0.2 ms.
 Input coupling . . . AC (both CH. 1 and 2)
 Trigger mode . . . NORM (trigger CH. 1.)

2. Switch the player power **ON**, and play track 9 on the test disc (SZZP1057C).
3. Trigger the oscilloscope's CH. 1 so that the following waveforms are observed. Adjust **VR105** until the dip in the RF signal envelope on CH. 1 is smooth and the signal amplitude on CH. 2 is minimized, i.e. when amplitude A equals amplitude B.



Minimize the amplitude or make A = B.

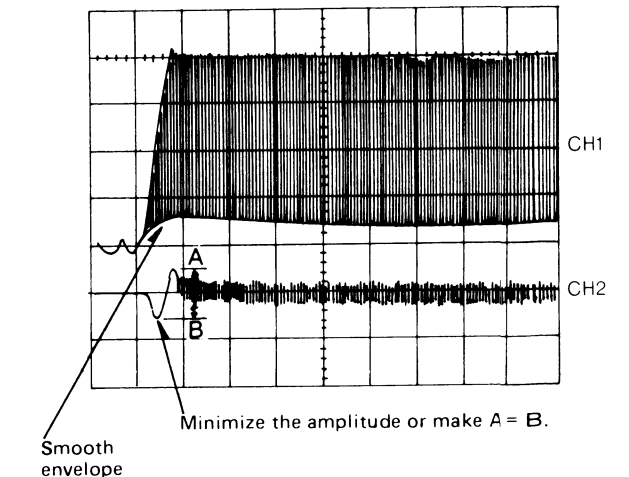
(7) TRACKING OFFSET ADJUSTMENT

Note: Make sure that the servo gain adjuster's gain switch is set to position "2".

1. Connect the oscilloscope's CH. 1 probe across **TJ101** (+) and **TJ102** (–) on the Servo P.C.B., and its CH. 2 probe (+) to VR102's **TEG** terminal.

Oscilloscope setting: VOLT 100 mV (CH. 1)
 100 mV (CH. 2)
 SWEEP 0.2 ms.
 Input coupling . . . AC (both CH. 1 and 2)
 Trigger mode . . . NORM (trigger CH. 1.)

2. Switch the player power **ON**, and play track 9 on the test disc (SZZP1057C).
3. Trigger the oscilloscope's CH. 1 so that the following waveforms are observed. Adjust **VR103** until the dip in the RF signal envelope on CH. 1 is smooth and the signal amplitude on CH. 2 is minimized, i.e. when amplitude A equals amplitude B.



Minimize the amplitude or make A = B.

(8) TRACKING BALANCE ADJUSTMENT

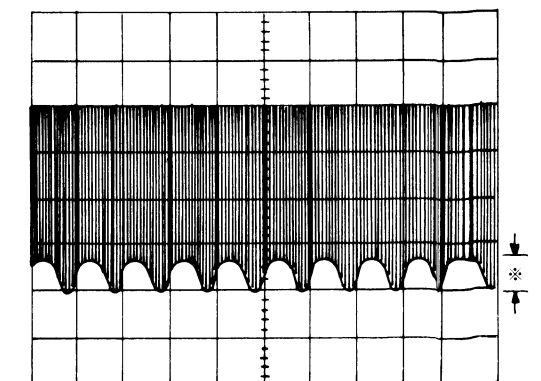
1. Make sure that servo gain adjuster's gain switch is set to position "2".
2. Set up the AF oscillator output for **1.1 kHz, 600 mVp-p**, and connect it across the OSC and GND terminals on the servo gain adjuster.

3. Connect oscilloscope's CH. 1 probe across **TJ101** (+) and **TJ102** (–) on the Servo P.C.B. and CH. 2 probe (+) to the OSC terminal on the servo gain adjuster.

Oscilloscope setting: VOLT 100 mV (CH. 1)
 200 mV (CH. 2)
 SWEEP 0.1 ms.
 Input coupling . . . AC (both CH. 1 and 2)
 Trigger mode . . . NORM (trigger CH. 2)

4. Switch the player power **ON**, and play the test disc (SZZP1014F or SZZP1054C).

5. Set the servo gain adjuster's gain switch to position "1", and adjust **VR106** until the jitter contained in the signal waveform on CH. 1 is minimized as shown below.
6. Disconnect the servo gain adjuster's leads from the player.



※ Jitter should be minimized.

SL-PJ45 SL-PJ45

(9) CHECK OF PLAY OPERATION AFTER ADJUSTMENT*** Checking Skip Search**

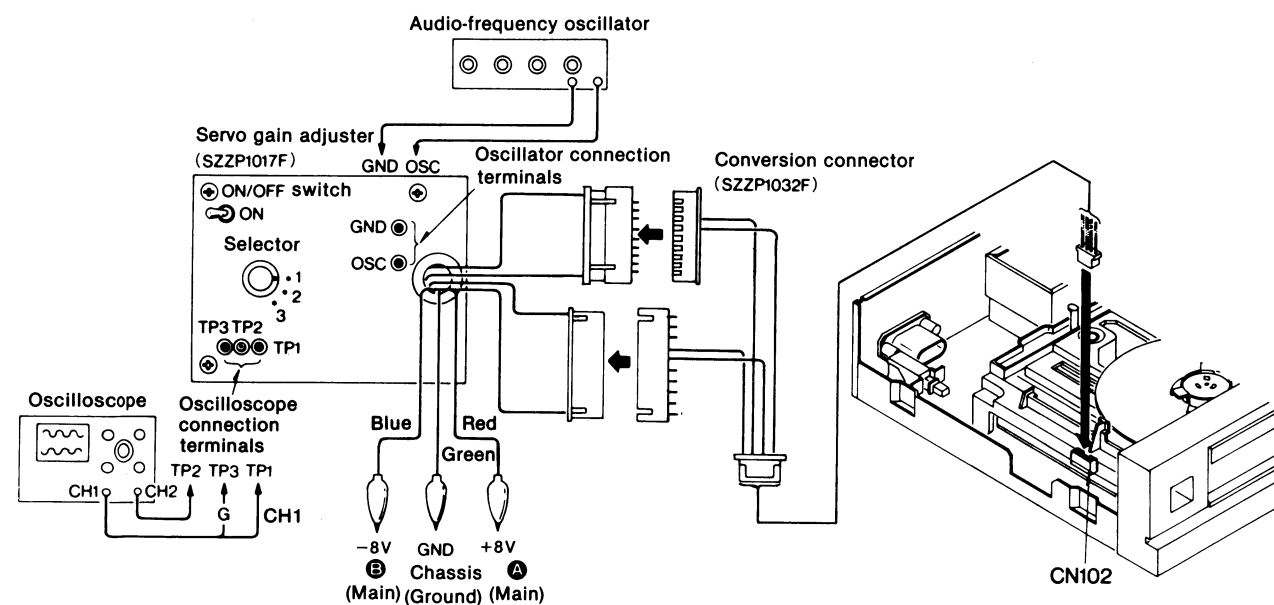
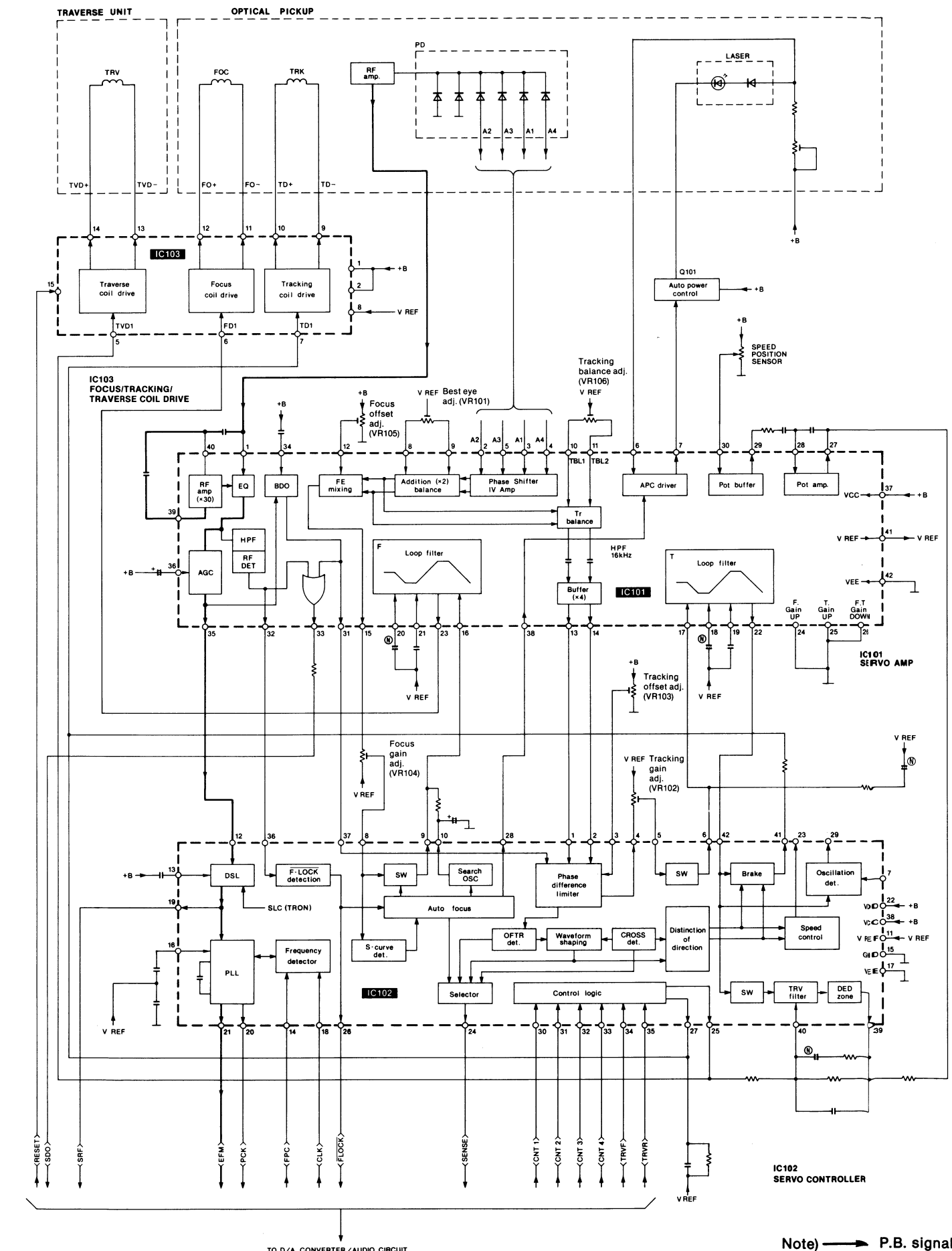
1. Play an ordinary musical program disc.
2. Press the skip button to check for normal skip search operation (in both the forward and reverse directions).

*** Checking Manual Search**

1. Play an ordinary musical program disc.
2. Press the manual search button to check for smooth manual search operations at either low or high speed (in both the forward and reverse directions).

*** Checking Using Defect Disc**

1. Play the 0.7mm black dot and the 0.7mm wedge on the defect test disc (SZZP1054C) and verify that no sound skip or noise occurs.
2. Play the middle tracks of the uneven test disc and verify that no sound skip or noise occurs.

• Connection of servo gain adjuster**BLOCK DIAGRAM OF SERVO CIRCUIT**

Note) → P.B. signal

■ TERMINAL FUNCTION OF ICs

● IC101 (AN8373S): Servo amp.

Pin No.	Mark	I/O Division	Function	Pin No.	Mark	I/O Division	Function
1	AMP1	I	RF signal input (X30 amp.)	22	TPO	O	Tracking error signal output
2	PDAD	I	Photo detector current input (A2)	23	FPO	O	Focus error signal output
3	PDA	I	Photo detector current input (A1)	24	FGC	I	Focus gain up signal input (Not used, connected to GND)
4	PDBD	I	Photo detector current input (A4)	25	TGC	I	Tracking gain up signal input (Not used, connected to GND)
5	PDB	I	Photo detector current input (A3)	26	GD	I	Focus/tracking down signal input (Not used, connected to GND)
6	LPD	I	Non-inverting laser power input	27	PTO	O	Position detecting amp. output
7	LD	O	Laser power auto control output	28	PTI	I	Position detecting amp. input
8	FBL1	I	PD balance adjustment	29	PBO	O	Position detecting buffer output
9	FBL2	I		30	POT	I	Position detecting buffer input
10	TBL1	I	Tracking balance adjustment	31	BDO	O	Dropout detection output
11	TBL2	I		32	RFDET	O	RF detection signal output
12	FOOFS	I	Focus offset adjustment	33	SDO	O	Dropout detection pulse output
13	IVA	O	Current/voltage conversion output (A)	34	C. SBDO	I	Dropout detecting capacitor input
14	IVB	O	Current/voltage conversion output (B)	35	ARF	O	RF signal output
15	FE	O	Focus gain adjustment output	36	C. AGC	I	AGC detecting capacitor input
16	FPI	I	Focus error signal input	37	VCC	I	Power supply (+5 V input)
17	TPI	I	Tracking error signal input	38	LDON	I	Laser power control input
18	C. TPL	I	Tracking error filter capacitor input	39	RF IN	I	RF signal input
19	C. TPH			40	AMPO	O	RF signal output
20	C. FPL	I	Focus error filter capacitor input	41	VREF	O	Reference voltage output
21	C. FPH			42	GND	I	Ground terminal

● IC102 (AN8374S): Servo processor

Pin No.	Mark	I/O Division	Function	Pin No.	Mark	I/O Division	Function
1	LSA	I	Phase difference input (A)	22	VDD	I	Power supply (+5 V input)
2	LSB	I	Phase difference input (B)	23	SPCNT	O	Track crossing speed control output (Not used, open)
3	TEOFS	I	Tracking offset adjustment	24	SENSE	O	Selector output (track crossing state)
4	TE	O	Tracking gain adjustment	25	TRV	O	Traverse servo control output
5	TEG	I		26	FLOCK	O	Focus lock signal output
6	TE OUT	O	Tracking error signal output	27	KICK	O	Track kick signal output
7	TE BPF	I	Tracking error gain detecting filter (Not used, open)	28	LDON	O	Laser power control output
8	FEG	I	Focus gain adjustment	29	VDET	O	Focus/tracking gain up output (Not used, open)
9	FE OUT	O	Focus error signal output	30	CNT1	I	Control input (FOON: Focus servo ON signal)
10	CLW	O	Triangular wave oscillator capacitor output	31	CNT2	I	Control input (TRON: Tracking servo ON signal)
11	VREF	I	Reference voltage input	32	CNT3	I	Control input (KICKF: Kick direction (forward) command)
12	ARF	I	RF signal input	33	CNT4	I	Control input (KICKR: Kick direction (reverse) command)
13	CDSL	I	Data slice filter capacitor input	34	TRVF	I	Traverse forward command signal
14	FPC	I	Frequency difference signal input	35	TRVR	I	Traverse backward command signal
15	GND	I	Ground terminal	36	RFDET	I	RF detection signal input
16	C. PLL	I	PLL loop filter constant	37	BDO	I	Dropout detection input
17	VSS	I	Ground terminal	38	VCC	I	Power supply (+5 V input)
18	CLK	I	Frequency pull-in clock signal (88.2 kHz) input	39	TVPO	O	Traverse position detecting resistor/capacitor inputs
19	SRF	O	Sliced and digitized RF signal output	40	TVPI	I	
20	PCK	O	Clock output extracted from SRF	41	BROUT	O	Tracking drive control output
21	EFM	O	EFM signal output synchronous with PCK	42	BRIN	I	Tracking error signal input

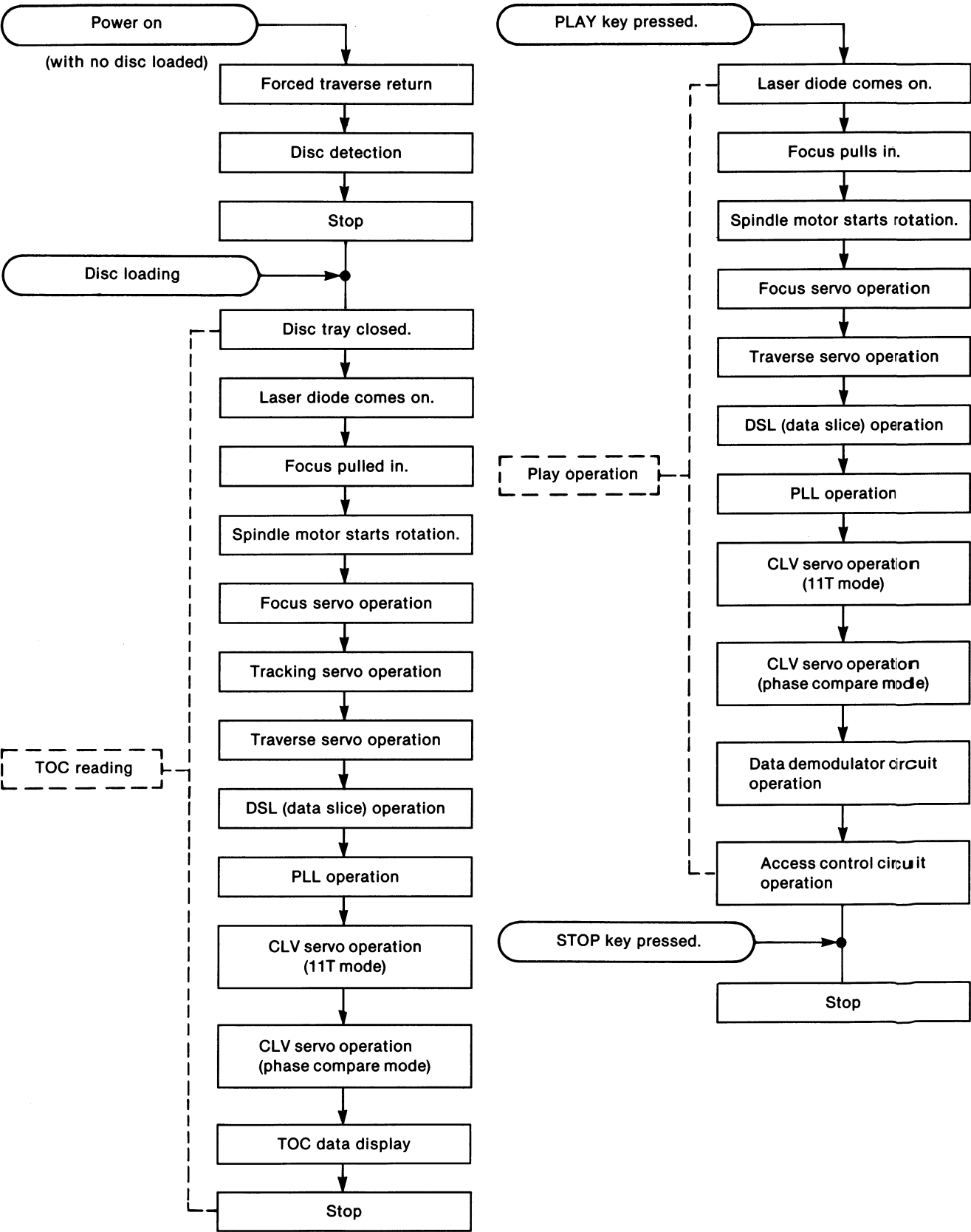
■ TROUBLESHOOTING GUIDE

SL-PJ45 Operation Sequence Check Sheet

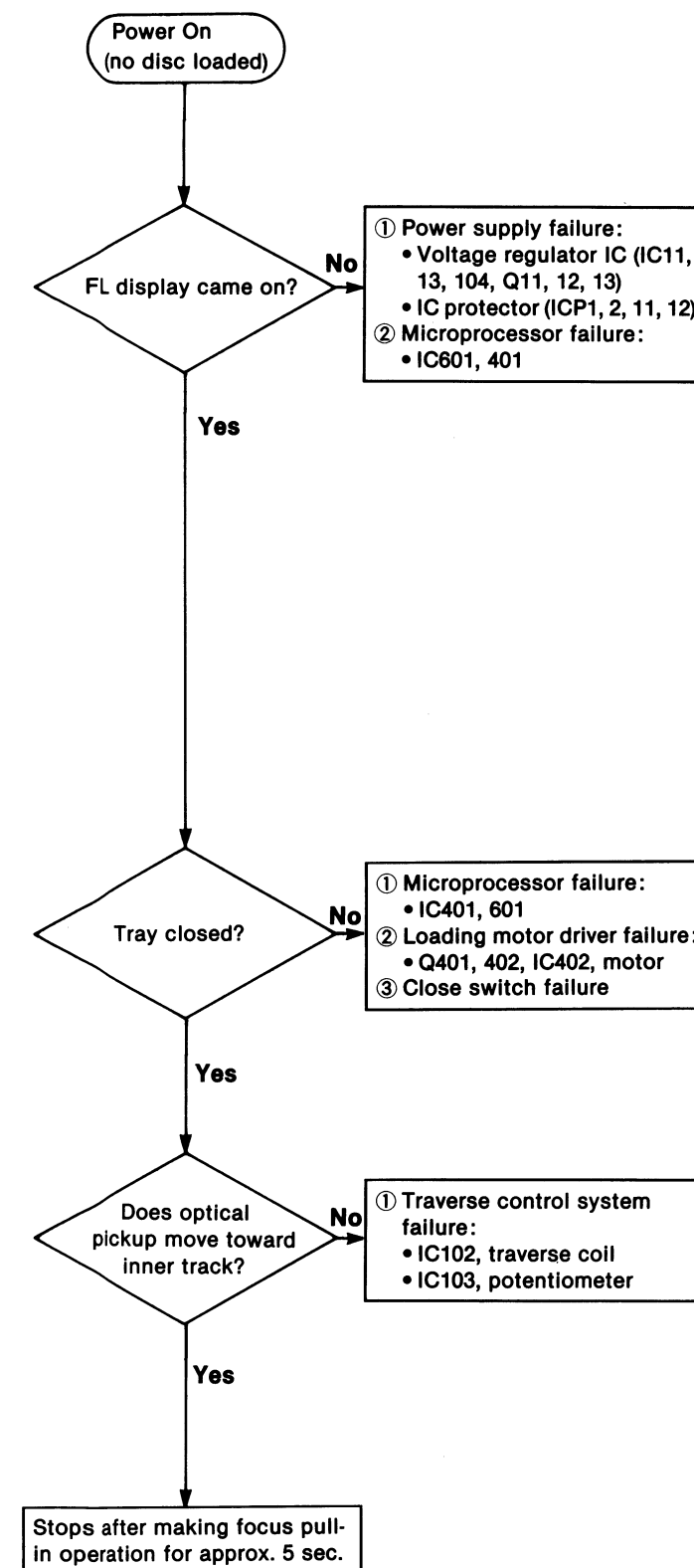
● IC103 (AN8377): BTL drive

Pin No.	Mark	I/O Division	Function	Pin No.	Mark	I/O Division	Function
1	PVCC	I	Driver power supply (+5 V input)	9	TD-	O	Inverting output of tracking driver
2	VCC	I	Power supply (+5 V input)	10	TD+	O	Non-inverting output of tracking driver
3	TB	O	External transistor base driving output	11	FD-	O	Inverting output of focus driver
4	VMON	O	Voltage (+5 V) output	12	FD+	O	Non-inverting output of focus driver
5	TVDI	I	Traverse error signal input	13	TVD-	O	Inverting output of traverse driver
6	FDI	I	Focus error signal input	14	TVD+	O	Non-inverting output of traverse driver
7	TDI	I	Tracking error signal input	15	RESET	O	Reset signal output
8	VREF	I	Reference voltage input	16	PC	I	PC input (connect to GND)

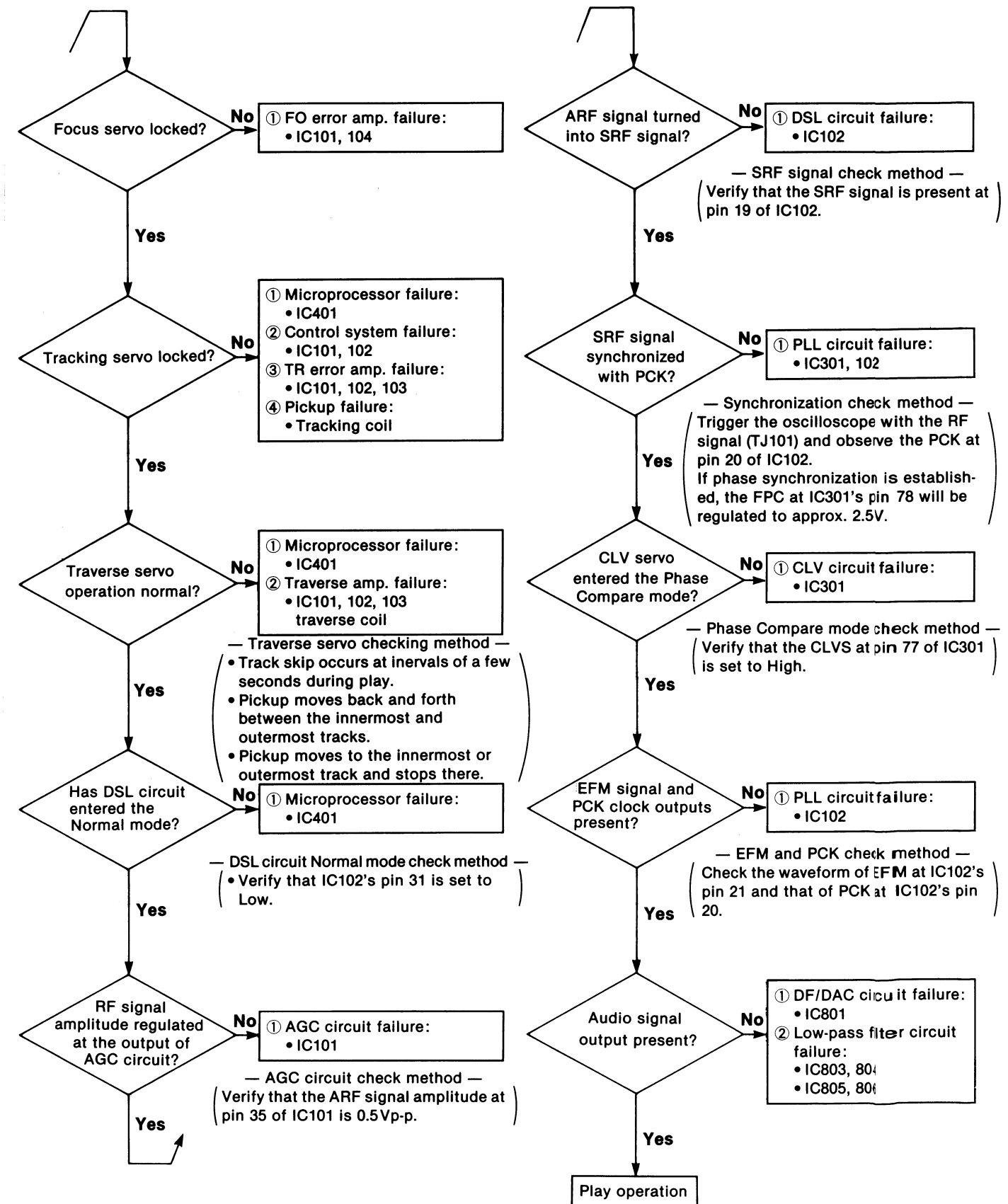
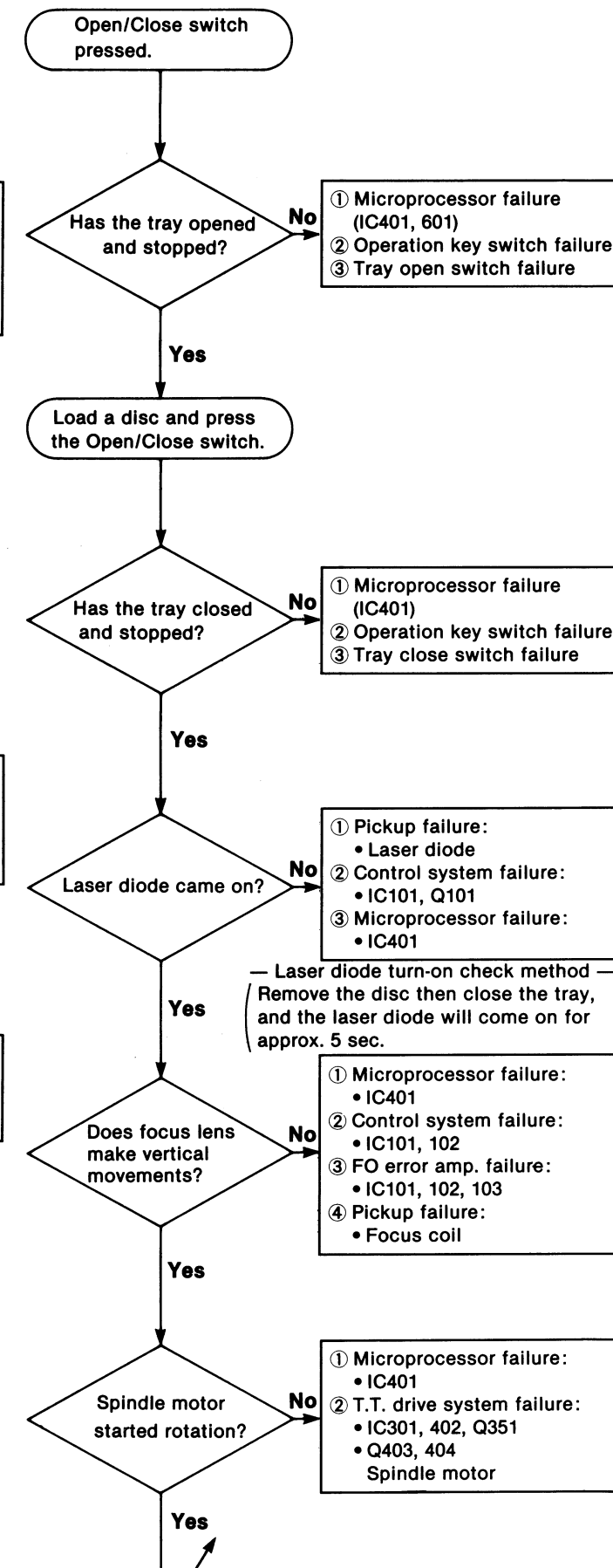
Play Operation Sequence



(Operation Sequence Just After Power On)

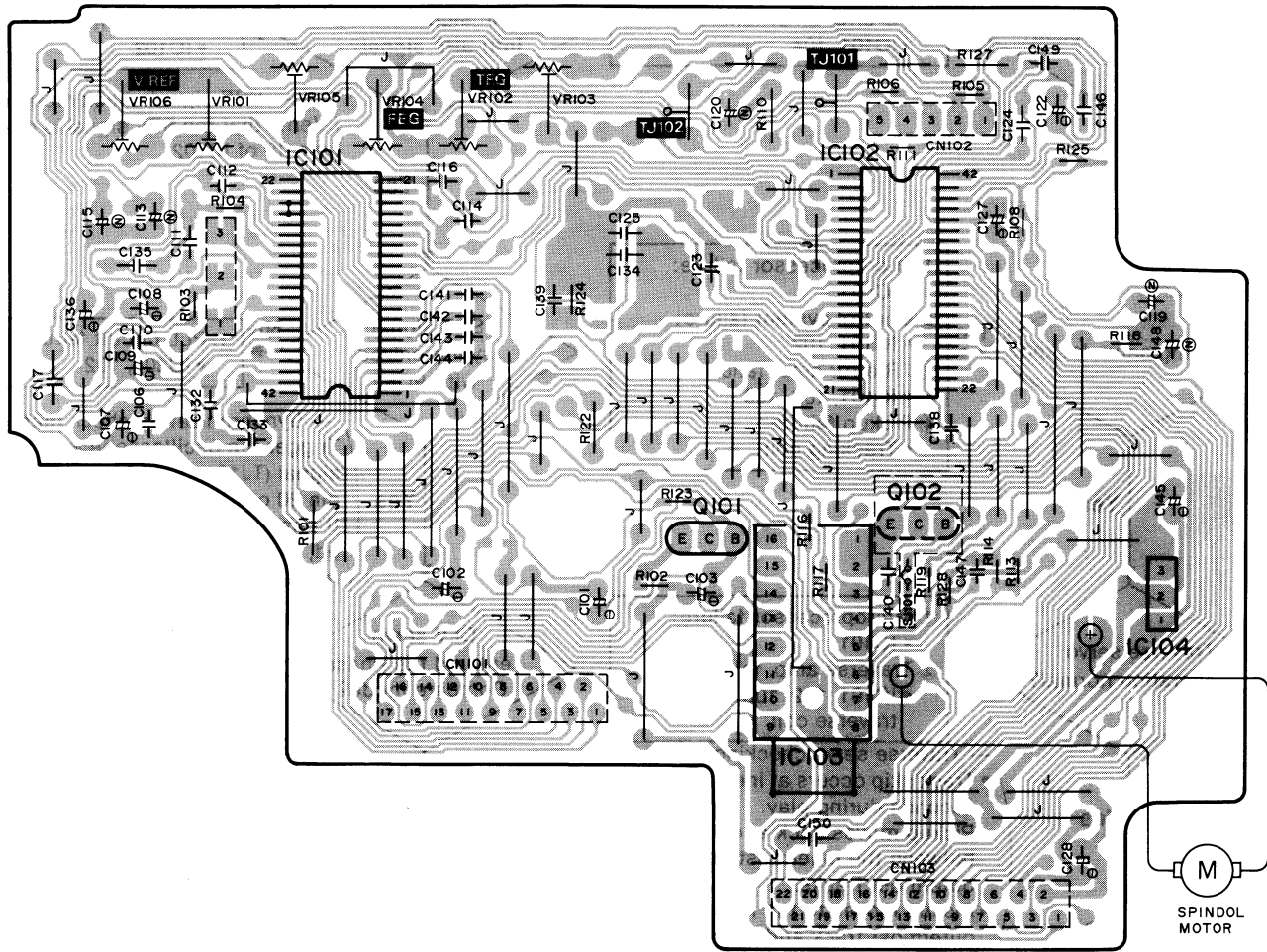


(TOC Read Operation-PLAY Operation)



PRINTED CIRCUIT BOARDS

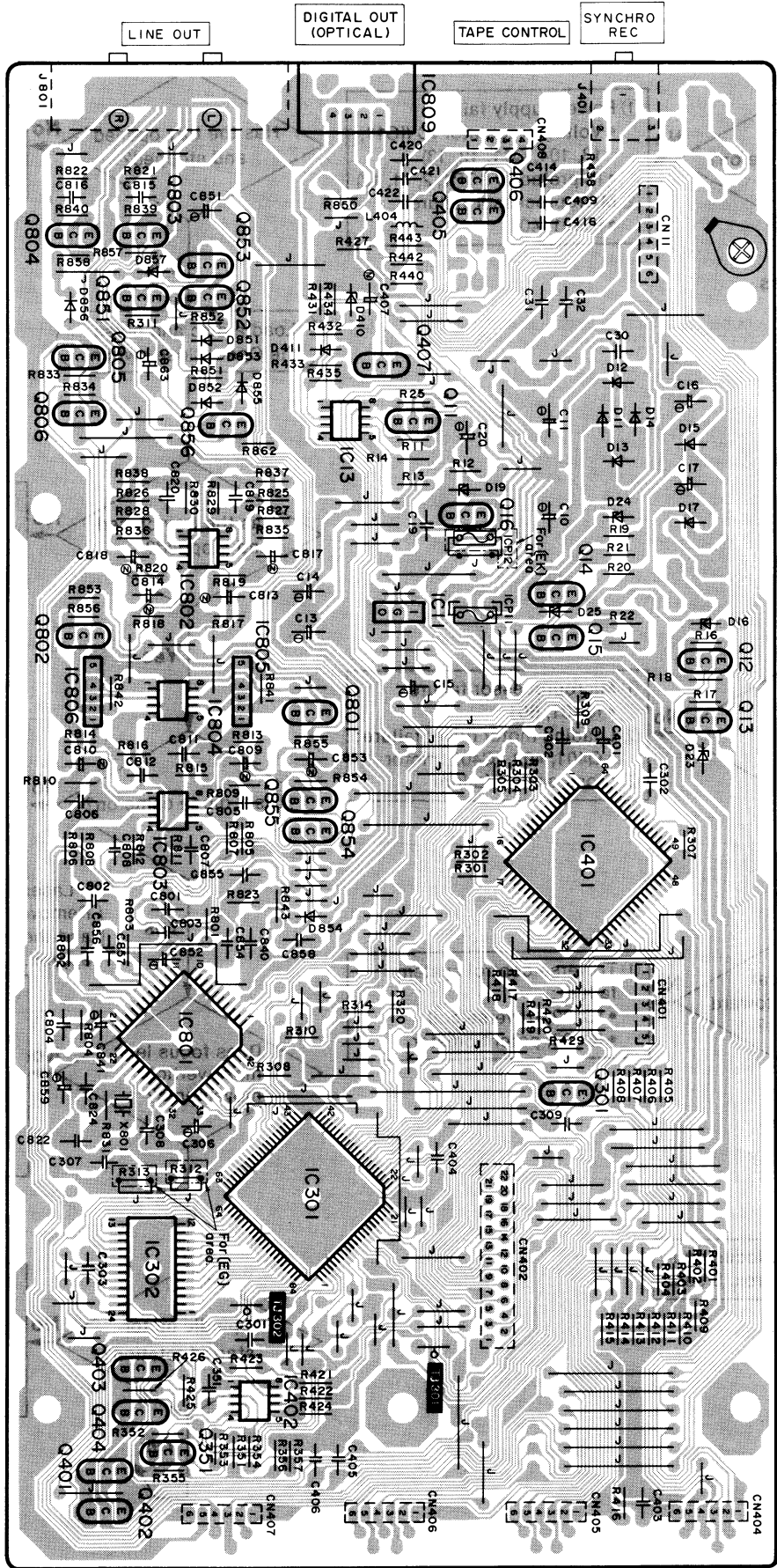
B SERVO P.C.B.



Note: Original circuit uses AN8377 for IC103 while the new circuit uses AN8377N for IC103. (Refer to the table below for other changes.)

IC103	AN8377	AN8377N
Modifications		
IC104	LM2940T5M	Removed
Q102	Removed	2SB1240QR Added
C140	0.01μF	Removed
C145	6V 100μF	Removed
Jumper SJ101	Removed	Shorted

D D/A CONVERTER/AUDIO P.C.B.





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SCHEMATIC DIAGRAM

(This schematic diagram may be modified at any time with development of new technology.)

Notes:

- S1 : Power switch in "on" position.
- S2 : Voltage selector switch.
(For [XA], [XB] and [PC] only.)
- S101 : Disc holder open/close detection switch.
- S102 : Disc holder open/close detection switch.
- S601~610 : Numeric switch. (0~10, +10)
- S611 : Programmed-play switch.
- S612 : Cancel switch.
- S613 : Time-mode select switch.
- S614 : Repeat switch.
- S615 : Recall switch.
- S616 : Forward skip/search switch.
- S617 : Backward skip/search switch.
- S620 : Tape-side select switch.
- S621 : Compact-disc edit switch.
- S622 : Disc tray open/close switch.
- S623 : Stop switch.
- S624 : Pause switch.
- S625 : Play switch.
- S626 : Music scan switch.
- S627 : Warp switch.
- S628 : Link switch.
- S651 : Timer stand-by switch.

• The voltage value and waveforms are the reference voltage of this unit measured by DC electronic voltmeter (high impedance) and oscilloscope on the basis of chassis.

Accordingly, there may arise some error in voltage values and waveforms depending upon the internal impedance of the tester or the measuring unit.

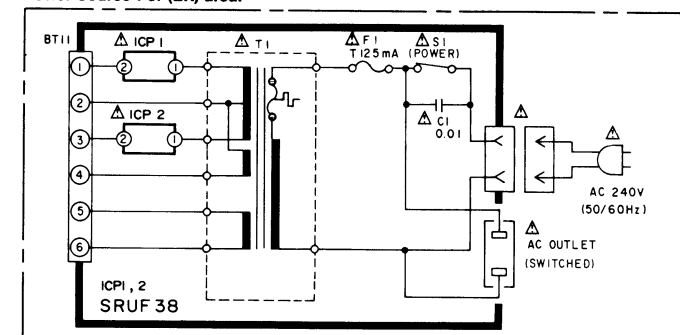
* The parenthesized are the values of voltage generated during playing (Test disc 1kHz, L+R, 0dB), others are voltage values in stop mode.

• Important safety notice:
Components identified by Δ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.

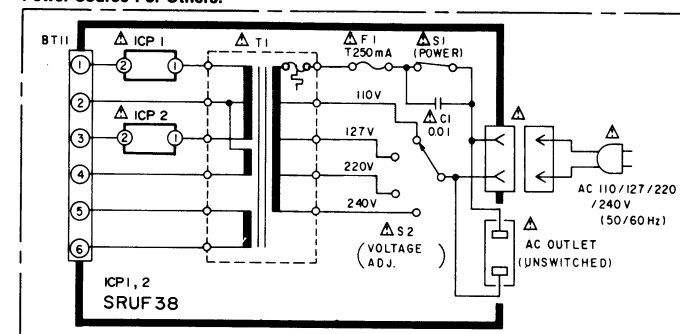
• \square / \square : Positive voltage lines and negative voltage lines.

\square : Audio signal lines.

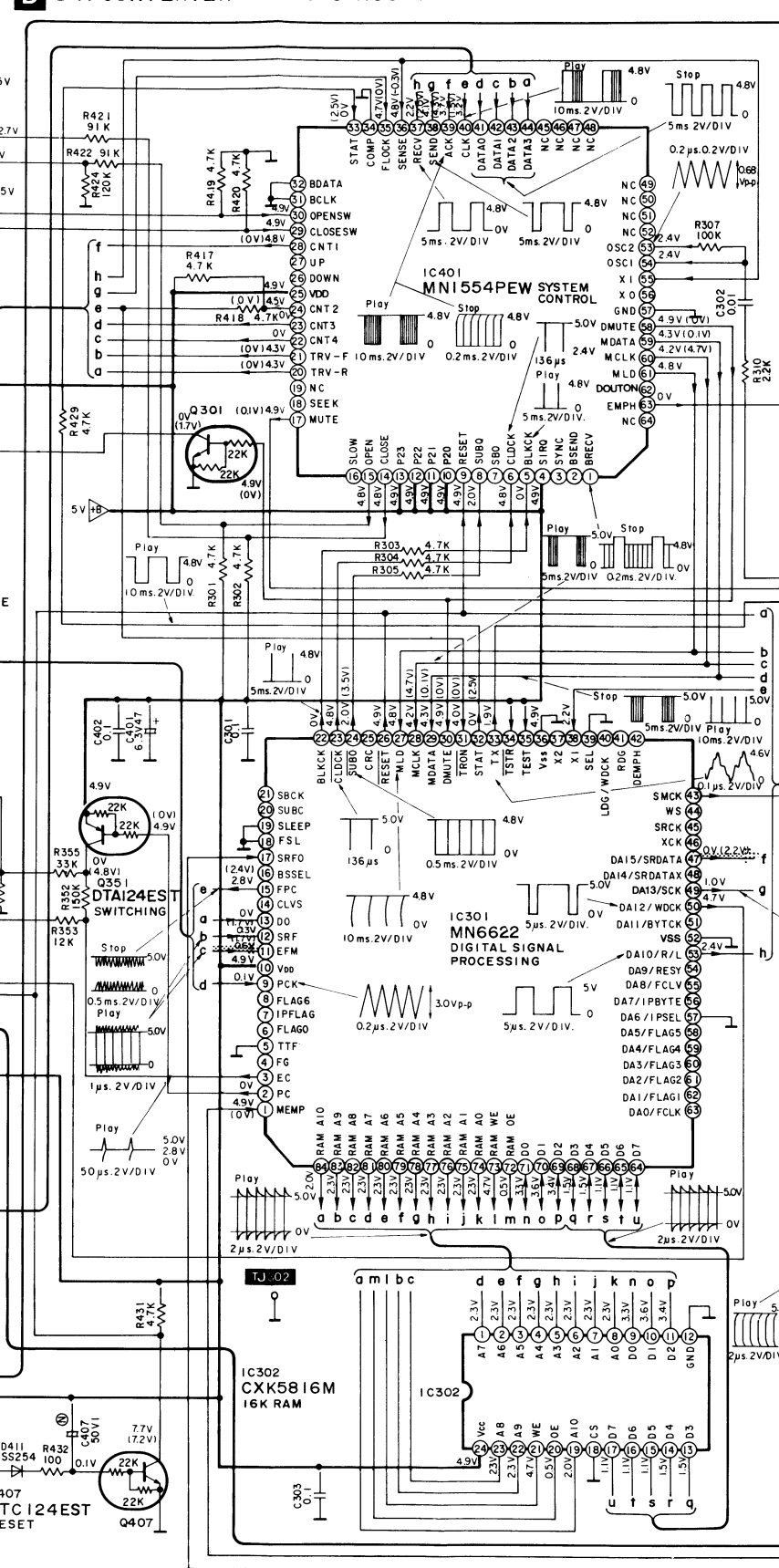
Power Source For (EK) area.



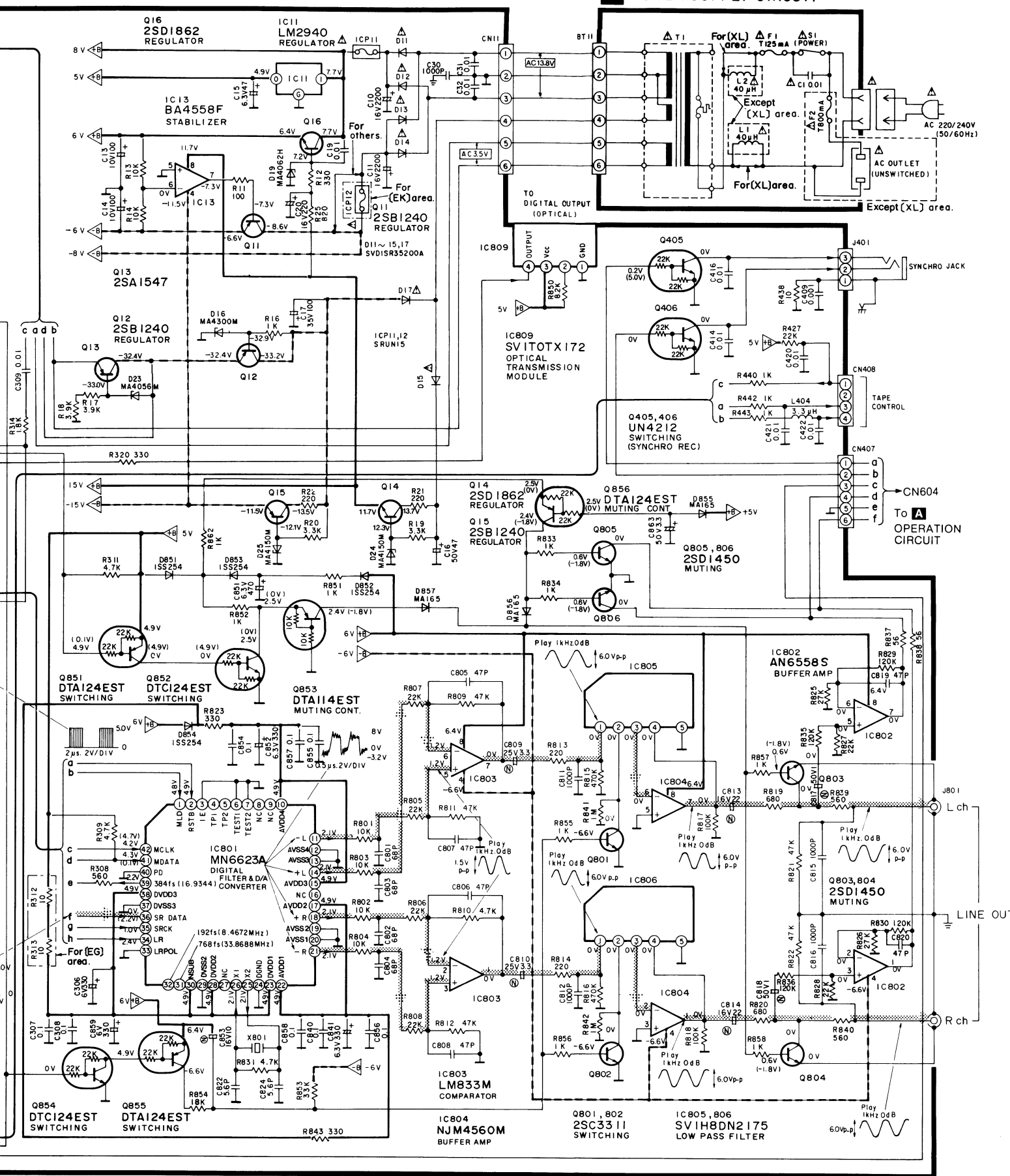
Power Source For Others.



D/D/A CONVERTER/AUDIO CIRCUIT



E POWER SUPPLY CIRCUIT



RESISTORS AND CAPACITORS

Notes : * Important safety notice : Components identified by Δ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts. * Bracketed indications in Ref. No. columns specify the area. (Refer to the first page for area.) Parts without these indications can be used for all areas.

Numbering System For Resistors

Example:

ERD	25	F	J	102
Type	Wattage (1/4W)	Shape	Tolerance	Value (1K Ω)
ERX	2	AN	J	471
Type	Wattage (2W)	Shape	Tolerance	Value (470 Ω)

Numbering System For Capacitors

Example:

ECKD	1H	102	Z	F
Type	Voltage (50V)	Value (0.001 μ F)	Tolerance	Unique
ECEA	50	M		330
Type	Voltage (50V)	Characteristics		Value (33 μ F)

- Capacity values are in microfarads (μ F) unless specified otherwise, P = Pico-farads (pF) F = Farads (F).
- Resistance values are in ohms (Ω), unless specified otherwise, 1K = 1,000 Ω , 1M = 1,000k Ω

Resistor Type	Wattage		Tolerance
ERD : Carbon	10 : 1/8W	12 : 1/2W	J : \pm 5%
ERG : Metal Oxide	14 : 1/4W	25 : 1/4W	F : \pm 1%
ERQ : Fuse Type Metal	1A : 1W	18 : 1/8W	G : \pm 2%
ERX : Metal Film	S2 : 1/4W	S1 : 1/2W	J : \pm 5%
ERD L : Carbon (chip)	2F : 1/4W	50 : 1/2W	K : \pm 10%
ERO K : Metal Film (chip)	2A : 2W	3A : 3W	M : \pm 20%
ERC : Solid	6G : 1/10W	8G : 1/8W	
ERF : Incombustible Box-Shaped			
ERM : Wire-Wound			
RRJ : Chip Resistor			
ERJ : Chip Resistor			

Capacitor Type	Voltage		Tolerance
ECE : Electrolytic	0J : 6.3V	1A : 10V	K : \pm 10%
ECCD : Ceramic	1C : 16V	1E : 25V	M : \pm 20%
ECKD : Ceramic Capacitor	1H : 50V	1V : 35V	Z : \pm 80 %
ECQM : Polyester	50 : 50V	05 : 50V	-20
ECQP : Polypropylene	2H : 500V	2A : 100V	J : \pm 5%
ECG : Ceramic	1 : 100V	1J : 63V	G : \pm 2%
ECEA N : Non Polar Electrolytic	KC : 400V AC		F : \pm 1%
OCU : Ceramic (Chip Type)	KC : 125V AC		C : \pm 0.25pF
ECUX : Ceramic (Chip Type)	(UL)		D : \pm 0.5pF
ECF : Semiconductor			
EECW : Liquid electrolyte double layer capacitor			

Ref. No.	Part No.	Value.	Ref. No.	Part No.	Value.	Ref. No.	Part No.	Value.
RESISTORS(VALUE, WATTAGE)								
R11	ERDS2TJ101	100 1/4	R409	ERDS2TJ472	4.7K 1/4	R806	ERDS2TJ223	22K 1/4
R12	ERDS2TJ331	330 1/4	R410	ERDS2TJ472	4.7K 1/4	R807	ERDS2TJ223	22K 1/4
R13	ERDS2TJ103	10K 1/4	R411	ERDS2TJ472	4.7K 1/4	R808	ERDS2TJ223	22K 1/4
R14	ERDS2TJ103	10K 1/4	R412	ERDS2TJ472	4.7K 1/4	R809	ERDS2TJ473	47K 1/4
R16	ERDS2TJ102	1K 1/4	R413	ERDS2TJ472	4.7K 1/4	R810	ERDS2TJ473	47K 1/4
R17	ERDS2TJ392	3.9K 1/4	R414	ERDS2TJ472	4.7K 1/4	R811	ERDS2TJ473	47K 1/4
R18	ERDS2TJ392	3.9K 1/4	R415	ERDS2TJ472	4.7K 1/4	R812	ERDS2TJ473	47K 1/4
R19	ERDS2TJ332	3.3K 1/4	R416	ERDS2TJ472	4.7K 1/4	R813	ERDS2TJ221	220 1/4
R20	ERDS2TJ332	3.3K 1/4	R417	ERDS2TJ472	4.7K 1/4	R814	ERDS2TJ221	220 1/4
R21	ERD25FVJ221T	220 1/4	R418	ERDS2TJ472	4.7K 1/4	R815	ERDS2TJ474	470K 1/4
R22	ERD25FVJ221T	220 1/4	R419	ERDS2TJ472	4.7K 1/4	R816	ERDS2TJ474	470K 1/4
R301	ERDS2TJ472	4.7K 1/4	R420	ERDS2TJ472	4.7K 1/4	R817	ERDS2TJ104	100K 1/4
R302	ERDS2TJ472	4.7K 1/4	R421	ERDS2TJ913T	91K 1/4	R818	ERDS2TJ104	100K 1/4
R303	ERDS2TJ472	4.7K 1/4	R422	ERDS2TJ913T	91K 1/4	R819	ERDS2TJ681	680 1/4
R304	ERDS2TJ472	4.7K 1/4	R423	ERDS2TJ124	120K 1/4	R820	ERDS2TJ681	680 1/4
R305	ERDS2TJ472	4.7K 1/4	R424	ERDS2TJ124	120K 1/4	R821	ERDS2TJ473	47K 1/4
R307	ERDS2TJ104	100K 1/4	R425	ERDS2TJ101	100 1/4	R822	ERDS2TJ473	47K 1/4
R308	ERDS2TJ561	560 1/4	R426	ERDS2TJ101	100 1/4	R823	ERDS2TJ331	330 1/4
R309	ERDS2TJ472	4.7K 1/4	R427	ERDS2TJ223	22K 1/4	R825	ERDS2TJ273	27K 1/4
R310	ERDS2TJ222	2.2K 1/4	R429	ERDS2TJ472	4.7K 1/4	R826	ERDS2TJ273	27K 1/4
R311	ERDS2TJ472	4.7K 1/4	R431	ERDS2TJ472	4.7K 1/4	R827	ERDS2TJ223	22K 1/4
R312	ERDS2TJ100	10 1/4	R432	ERDS2TJ101	100 1/4	R828	ERDS2TJ223	22K 1/4
(EG)			R433	ERDS2TJ153	15K 1/4	R829	ERDS2TJ124	120K 1/4
R313	ERDS2TJ100	10 1/4	R434	ERDS2TJ393	39K 1/4	R830	ERDS2TJ124	120K 1/4
(EG)			R435	ERDS2TJ102	1K 1/4	R831	ERDS2TJ472	4.7K 1/4
R314	ERDS2TJ182	1.8K 1/4	R438	ERDS2TJ100	10 1/4	R833	ERDS2TJ102	1K 1/4
R320	ERDS2TJ331	330 1/4	R440	ERDS2TJ102	1K 1/4	R834	ERDS2TJ102	1K 1/4
R351	ERDS2TJ103	10K 1/4	R442	ERDS2TJ102	1K 1/4	R835	ERDS2TJ124	120K 1/4
R352	ERDS2TJ154	150K 1/4	R443	ERDS2TJ102	1K 1/4	R836	ERDS2TJ124	120K 1/4
R353	ERDS2TJ123	12K 1/4	R601	ERDS2TJ104	100K 1/4	R837	ERDS2TJ560	56 1/4
R354	ERDS2TJ154	150K 1/4	R602	ERDS2TJ472	4.7K 1/4	R838	ERDS2TJ560	56 1/4
R357	ERDS2TJ8R2	8.2 1/4	R603	ERDS2TJ472	4.7K 1/4	R839	ERDS2TJ561	560 1/4
R401	ERDS2TJ221	220 1/4	R604	ERDS2TJ472	4.7K 1/4	R840	ERDS2TJ561	560 1/4
R402	ERDS2TJ221	220 1/4	R605	ERDS2TJ472	4.7K 1/4	R841	ERDS2TJ105	1M 1/4
R403	ERDS2TJ221	220 1/4	R606	ERDS2TJ472	4.7K 1/4	R842	ERDS2TJ105	1M 1/4
R404	ERDS2TJ221	220 1/4	R607	ERDS2TJ472	4.7K 1/4	R843	ERDS2TJ331	330 1/4
R405	ERDS2TJ221	220 1/4	R617	ERDS2TJ103	10K 1/4	R850	ERDS2TJ822	8.2K 1/4
R406	ERDS2TJ221	220 1/4	R801	ERDS2TJ103	10K 1/4	R851	ERDS2TJ102	1K 1/4
R407	ERDS2TJ221	220 1/4	R802	ERDS2TJ103	10K 1/4	R852	ERDS2TJ102	1K 1/4
R408	ERDS2TJ221	220 1/4	R803	ERDS2TJ103	10K 1/4	R853	ERDS2TJ333	33K 1/4
			R804	ERDS2TJ103	10K 1/4	R854	ERDS2TJ183	18K 1/4
			R805	ERDS2TJ223	22K 1/4	R855	ERDS2TJ102	1K 1/4

Ref. No.	Part No.	Value.	Ref. No.	Part No.	Value.	Ref. No.	Part No.	Value.
R856	ERDS2TJ102	1K 1/4	C806	ECBT1H470J5	47P 50	R118	ERJ6GEYJ333V	33K 1/10
R857	ERDS2TJ102	1K 1/4	C807	ECBT1H470J5	47P 50	R119	RRJ6GCJ223TE	22K 1/6
R858	ERDS2TJ102	1K 1/4	C808	ECBT1H470J5	47P 50	R122	ERDS2TJ104	100K 1/4
R862	ERDS2TJ102	1K 1/4	C809	ECEA1EN3R3S	3.3 25	R123	ERJ6GEYJ470V	47 1/10
CAPACITORS(VALUE,VOLTAGE)			C810	ECEA1EN3R3S	3.3 25	R124	RRJ6GCJ103TE	10K 1/6
C1	Δ ECKDKC103PF2	0.01 125	C811	ECBT1H102KB5	0.001 50	R125	RRJ6GCJ222TE	2.2K 1/6
C10	ECEA1CU222	2200 16	C812	ECBT1H102KB5	0.001 50	R127	ERDS2TJ681	680 1/4
C11	ECEA1CU222	2200 16	C813	ECEA1CN220S	22 16	R128	RRJ6GCJ103TE	10K 1/6
C13	ECEA1AU101	100 10	C814	ECEA1CN220S	22 16	CAPACITORS(VALUE,VOLTAGE)		
C14	ECEA1AU101	100 10	C815	ECBT1H102KB5	0.001 50	C101	ECEA1CKS220I	22 16
C15	ECEA0JU470	47 6.3	C816	ECBT1H102KB5	0.001 50	C102	ECEA1HKS010I	1 50
C16	ECEA1HU470	47 50	C817	ECEA1HN010S	1 50	C103	ECEA1CKS220I	22 16
C17	ECEA1VU101	100 35	C818	ECEA1HN010S	1 50	C106	RCUV1E104ZF	0.1 25
C19	ECBT1C103NS5	0.01 16	C819	ECBT1H470J5	47P 50	C107	ECEA0GKS101I	100 4
C20	ECEA1CU221	220 16	C820	ECBT1H470J5	47P 50	C108	ECEA0JKS470I	47 6.3
C30	ECBT1H102KB5	0.001 50	C822	ECBT1H5R6K5	5.6P 50	C109	ECEA1HKS010I	1 50
C31	ECBT1C103NS5	0.01 16	C824	ECBT1H5R6K5	5.6P 50	C110	RCUV1H681KB	680P 50
C32	ECBT1C103NS5	0.01 16	C840	ECFR1E104ZF5	0.1 25	C111	ECUV1C224KR	0.22 16
C301	ECFR1E104ZF5	0.1 25	C841	ECEA0JS331	330 6.3	C112	RCUV1H331KB	330P 50
C302	ECBT1C103NS5	0.01 16	C851	ECEA0JU471	470 6.3	C113	ECEA1HSN010I	1 50
C303	ECFR1E104ZF5	0.1 25	C852	ECEA0JS331	330 6.3	C114	RCUV1E333KB	0.033 25
C306	ECEA0JS331	330 6.3	C853	ECEA1CN100S	10 16	C115	ECEA1HSN010I	1 50
C307	ECFR1E104ZF5	0.1 25	C854	ECFR1E104ZF5	0.1 25	C116	RCUV1E333KB	0.033 25
C308	ECFR1E104ZF5	0.1 25	C855	ECFR1E104ZF5	0.1 25	C117	ECBT1H102KB5	0.001 50
C309	ECBT1C103NS5	0.01 16	C856	ECFR1E104ZF5	0.1 25	C119	ECEA1CKN4R7I	4.7 16
C351	ECBT1H102KB5	0.001 50	C857	ECFR1E104ZF5	0.1 25	C120	ECEA1CKN4R7I	4.7 16
C401	ECEA0JU470	47 6.3	C858	ECFR1E104ZF5	0.1 25	C122	ECEA0JKS220I	22 6.3
C402	ECFR1E104ZF5	0.1 25	C859	ECEA0JS331	330 6.3	C123	RCUV1E104ZF	0.1 25
C403	ECFR1E104ZF5	0.1 25	C863	ECEA1HU3R3	3.3 50	C124	ECUV1E823KB	0.082 25
C404	ECFR1E104ZF5	0.1 25	C901	ECFTD103KXL	0.01 25	C125	ECUV1C224KR	0.22 16
C405	ECBT1H102KB5	0.001 50	C902	ECFTD103KXL	0.01 25	C127	ECEA0JKF101I	100 6.3
C406	ECBT1H102KB5	0.001 50	C903	ECFTD103KXL	0.01 25	C128	ECEA1CKA101I	100 16
C407	ECEA1HN010S	1 50	C904	ECCD1H680KC	68P 50	C132	ECUV1E104KB	0.1 25
C409	ECBT1H102KB5	0.001 50	SERVO P.C.B.		C133	RCUV1H330KC	33P 50	
C414	ECBT1C103NS5	0.01 16	RESISTORS(VALUE,WATTAGE)		C134	ECUV1C224KR	0.22 16	
C416	ECBT1C103NS5	0.01 16	R101	ERDS2TJ471	470 1/4	C135	ECUV1C224KR	0.22 16
C420	ECBT1C103NS5	0.01 16	R102	ERJ6GEYJ120V	12 1/10	C136	ECEA0GKS101I	100 4
C421	ECBT1C103NS5	0.01 16	R103	ERJ6GEYJ122	1.2K 1/10	C138	RCUV1E104ZF	0.1 25
C422	ECBT1C103NS5	0.01 16	R104	ERJ6GEYJ471V	470 1/10	C139	RCUV1H470KC	47P 50
C601	RCBC1H101KBY	100P 50	R105	RRJ6GCJ102TE	1K 1/6	C140	RCUV1E103KB	0.01 25
C602	RCBC1H101KBY	100P 50	R106	RRJ6GCJ102TE	1K 1/6	C141	RCUV1H470KC	47P 50
C603	RCBC1H101KBY	100P 50	R108	ERJ6GEYJ224V	220K 1/10	C142	RCUV1H470KC	47P 50
C604	RCBC1H101KBY	100P 50	R110	ERDS2TJ222	2.2K 1/4	C143	RCUV1H470KC	47P 50
C801	ECBT1H680K5	68P 50	R111	ERJ6GEYJ154V	150K 1/10	C144	RCUV1H470KC	47P 50
C802	ECBT1H680K5	68P 50	R113	ERJ6GEYJ472V	4.7K 1/10	C145	ECEA0JKF101I	100 6.3
C803	ECBT1H680K5	68P 50	R114	ERJ6GEYJ683V	68K 1/10	C146	RCUV1H181KC	180P 50
C804	ECBT1H680K5	68P 50	R116	ERJ6GEYJ332V	3.3K 1/10	C147	RCUV1H472KB	0.0047 50
C805	ECBT1H470J5	47P 50	R117	ERJ6GEYJ123	12K 1/10	C148	ECEA1ESN4R7I	4.7 25
						C149	RCUV1E104ZF	0.1 25
						C150	RCUV1E103KB	0.01 25

REPLACEMENT

Notes : * Important safety notice : Components identified by Δ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts. * Bracketed indications in Ref. No. columns specify the area. (Refer to the first page for area.) Parts without these indications can be used for all areas.

Ref. No.	Part No.
INTEGRATED CIRCUITS	
IC11	LM2940T5
IC13	SV1BA4558F
IC301	MN6622
IC302	SV1CXK5816M
IC401	MN1554PEW
IC402	SV1BA4558F
IC601	MN15283PEM
IC602	HC-MD10E
IC801	MN6623A
IC802	AN6558S
IC803	LM833M
IC804	NJM4560M
IC805	SV1H8DN2175
IC806	SV1H8DN2175
IC809	SV1T0TX172
TRANSISTORS	
Q11	2SB1240-P
Q12	2SB1240-P
Q13	2SA1547-Q
Q14	2SD1862-P
Q15	2SB1240-P
Q16	2SD1862-P
Q301	DTC124EST
Q351	DTA124EST
Q401	2SD1862-P
Q402	2SB1240-P
Q403	2SD1862-P
Q404	2SB1240-P
Q405	DTC124EST
Q406	DTC124EST
Q407	DTC124EST
Q601	DTC124EST
Q602	DTC124EST
Q603	DTC124EST
Q604	DTC124EST
Q605	DTC124EST
Q606	DTC124EST
Q607	DTC124EST
Q608	DTC124EST
Q609	DTC124EST
Q610	DTC124EST
Q611	DTC124EST
Q612	DTC124EST
Q801	2SC3311A-Q
Q802	2SC3311A-Q
Q803	2SD1450RST
Q804	2SD1450RST
Q805	2SD1450RST
Q806	2SD1450RST
Q851	DTA124EST
Q852	DTC124EST
Q853	DTA114EST
Q854	DTC124EST
Q855	DTA124EST
Q856	DTA124EST
DIODES	
D11	△ SVD1SR35200A
D12	△ SVD1SR35200A
D13	△ SVD1SR35200A
D14	△ SVD1SR35200A
D15	△ SVD1SR35200A
D16	MA4300MHTA
D17	△ SVD1SR35200A
D19	MA4062-H
D23	MA4056-M
D24	MA4150MHTA
D25	MA4150MHTA
D410	MA4033M
D411	SVD1SS254

Value.	
33K	1/10
22K	1/6
100K	1/4
47	1/10
10K	1/6
2.2K	1/6
680	1/4
10K	1/6
22	16
1	50
22	16
0.1	25
100	4
47	6.3
1	50
680P	50
0.22	16
330P	50
1	50
0.033	25
1	50
0.033	25
0.001	50
4.7	16
4.7	16
22	6.3
0.1	25
0.062	25
0.22	16
100	6.3
100	16
0.1	25
33P	50
0.22	16
0.22	16
100	4
0.1	25
47P	50
0.01	25
47P	50
47P	50
47P	50
100	6.3
180P	50
0.0047	50
4.7	25
0.1	25
0.01	25

REPLACEMENT PARTS LIST (Electrical parts)

Notes : * Important safety notice :

Components identified by Δ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.

* Bracketed indications in Ref. No. columns specify the area. (Refer to the first page for area.)
Parts without these indications can be used for all areas.

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
INTEGRATED CIRCUITS			INTEGRATED CIRCUITS		
IC11	LM2940T5	I.C. REGULATOR	D601	SVD1SS254	DIODE
IC13	SV1BA4558F	I.C. REGULATOR	D602	SVD1SS254	DIODE
IC301	MN6622	I.C. SIGNAL PROCESSING	D603	SVD1SS254	DIODE
IC302	SV1CXK5816M	I.C. 16K RAM	D604	SVD1SS254	DIODE
IC401	MN1554PEW	I.C. SYSTEM CONTROL	D605	SVD1SS254	DIODE
IC402	SV1BA4558F	I.C. REGULATOR	D851	SVD1SS254	DIODE
IC601	MN15283PEM	I.C. FL DRIVE	D852	SVD1SS254	DIODE
IC602	HC-MD10E	I.C. REMOTE SENSOR	D853	SVD1SS254	DIODE
IC801	MN6623A	I.C. DF & DAC	D854	SVD1SS254	DIODE
IC802	AN6558S	I.C. BUFFER AMP	D855	SVD1SS254	DIODE
IC803	LM833M	I.C. OPERATION AMP	D856	SVD1SS254	DIODE
IC804	NJMA450M	I.C. OPERATION AMP.	D857	SVD1SS254	DIODE
IC805	SV1H8DN2175	I.C. LPF	I.C. PROTECTORS		
IC806	SV1H8DN2175	I.C. LPF	ICP11 Δ	SRUN15	I.C. PROTECTOR
IC809	SV1TOTX172	I.C. OP MODULE	ICP12 Δ	SRUN15	I.C. PROTECTOR
TRANSISTORS			(EK)		
Q11	2SB1240-P	TRANSISTOR	COILS AND TRANSFORMERS		
Q12	2SB1240-P	TRANSISTOR	L1	SLQX400-D	COIL
Q13	2SA1547-Q	TRANSISTOR	(E, EG, EB, EH)		
Q14	2SD1862-P	TRANSISTOR	(EF, E1)		
Q15	2SB1240-P	TRANSISTOR	L2	SLQX400-D	COIL
Q16	2SD1862-P	TRANSISTOR	(E, EG, EB, EH)		
Q301	DTC124EST	TRANSISTOR	(EF, E1)		
Q351	DTA124EST	TRANSISTOR	L404	ELEY3R3KA	COIL
Q401	2SD1862-P	TRANSISTOR	L901	ELEY3R3KA	COIL
Q402	2SB1240-P	TRANSISTOR	L902	ELEY3R3KA	COIL
Q403	2SD1862-P	TRANSISTOR	L903	ELEY3R3KA	COIL
Q404	2SB1240-P	TRANSISTOR	T1 Δ	SLTD5V081E	POWER TRANSFORMER
Q405	DTC124EST	TRANSISTOR	(E, EG, EB, EH)		
Q406	DTA124EST	TRANSISTOR	(EF, E1)		
Q407	DTC124EST	TRANSISTOR	T1 Δ	SLTD5V082G	POWER TRANSFORMER
Q601	DTC124EST	TRANSISTOR	(EK, XL)		
Q602	DTC124EST	TRANSISTOR	T1 Δ	SLTD5V083X	POWER TRANSFORMER
Q603	DTC124EST	TRANSISTOR	(XA, XB, PC)		
Q604	DTC124EST	TRANSISTOR	OSCILLATORS		
Q605	DTC124EST	TRANSISTOR	X801	SVQ49U338S	OSCILLATOR
Q606	DTC124EST	TRANSISTOR	DISPLAYS		
Q607	DTC124EST	TRANSISTOR	FL601	SADFV266G	DISPLAY TUBE
Q608	DTC124EST	TRANSISTOR	FUSES		
Q609	DTC124EST	TRANSISTOR	F1 Δ	XBA2C012TB0S	FUSE (250V, T125mA)
Q610	DTC124EST	TRANSISTOR	(E, EG, EB, EH)		
Q611	DTC124EST	TRANSISTOR	(EF, E1, EK)		
Q612	DTC124EST	TRANSISTOR	(XL)		
Q801	2SC3311A-Q	TRANSISTOR	F1 Δ	XBA2C025TB0	FUSE, 250V, T250mA
Q802	2SC3311A-Q	TRANSISTOR	(XB, XA, PC)		
Q803	2SD1450RST	TRANSISTOR	F2 Δ	XBA2C08TB0	FUSE 250V, T800MA
Q804	2SD1450RST	TRANSISTOR	(E, EG, EB, EH)		
Q805	2SD1450RST	TRANSISTOR	(EF, E1)		
Q806	2SD1450RST	TRANSISTOR	SWITCHES		
Q851	DTA124EST	TRANSISTOR	S1 Δ	ESB8249V	SW. POWER
Q852	DTC124EST	TRANSISTOR	S2 Δ	SSR187-1	SW. VOLTAGE SELECTOR
Q853	DTA114EST	TRANSISTOR	(XA, PC, XB)		
Q854	DTC124EST	TRANSISTOR	S101	SSPD17	SW. LOADING DET.
Q855	DTA124EST	TRANSISTOR	S102	SSPD18	SW. LOADING DET.
Q856	DTA124EST	TRANSISTOR	S601	EVQQS405K	SW. CH1
DIODES			S602	EVQQS405K	SW. CH2
D11 Δ	SVD1SR35200A	DIODE	S603	EVQQS405K	SW. CH3
D12 Δ	SVD1SR35200A	DIODE	S604	EVQQS405K	SW. CH4
D13 Δ	SVD1SR35200A	DIODE	S605	EVQQS405K	SW. CH5
D14 Δ	SVD1SR35200A	DIODE	S606	EVQQS405K	SW. CH6
D15 Δ	SVD1SR35200A	DIODE	S607	EVQQS405K	SW. CH7
D16	MA4300MHTA	DIODE	S608	EVQQS405K	SW. CH8
D17 Δ	SVD1SR35200A	DIODE	S609	EVQQS405K	SW. CH9
D19	MA4062-H	DIODE	S610	EVQQS405K	SW. CH10
D23	MA4056-M	DIODE	S611	EVQQS405K	SW. PROGRAM
D24	MA4150MHTA	DIODE	S612	EVQQS405K	SW. CANCELL
D25	MA4150MHTA	DIODE	S613	EVQQS405K	SW. TIME
D410	MA4033M	DIODE	S614	EVQQS405K	SW. REPEAT
D411	SVD1SS254	DIODE			

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
S615	EVQQS405K	SW. RECALL	INTEGRATED CIRCUITS		
S616	EVQQS405K	SW. SKIP (FOR)	IC101	AN8373S	I.C. SERVO AMP
S617	EVQQS405K	SW. SKIP (BACK)	IC102	AN8374S	I.C. SERVO PROCESSOR
S618	EVQQS405K	SW. +10	IC103	AN8377	I.C. B.T.L DRIVE
S619	EVQQS405K	SW(O)	IC104	LM2940T5M	I.C. RESET
S620	EVQQS405K	SW. A/B	TRANSISTORS		
S621	EVQQS405K	SW. EDIT	Q101	2SA1547QSTV2	TRANSISTOR
S622	EVQQS405K	SW. OPEN/CLOSE	VARIABLE RESISTORS		
S623	EVQQS405K	SW. STOP/CLEAR	VR101	EVND3AA00B14	V.R. BEST EYE ADJ.
S624	EVQQS405K	SW. PAUSE	VR102	EVND3AA00B14	V.R. TRACKING GAIN ADJ.
S625	EVQQS405K	SW. PLAY	VR103	EVND3AA00B14	V.R. TRACKING OFFSET ADJ.
S626	EVQQS405K	SW. SCAN	VR104	EVND3AA00B14	V.R. FOCUS GAIN ADJ.
S627	EVQQS405K	SW. WARP	VR105	EVND3AA00B14	V.R. FOCUS OFFSET ADJ.
S628	EVQQS405K	SW. LINK	VR106	EVND3AA00B24	V.R. TRACKING BALANCE ADJ.
S651	SSS148	SLIDE SWITCH, TIMER PLAY	MAGNET RESISTOR ELEMENTS		
SERVO P.C.B.			RA1	EWS7M0A00Q53	RESISTANCE UNIT

NEW SERVO GAIN ADJUSTER (Servo Amp. Adjusting Fixture)

The following introduces the improved version of the current servo gain adjuster (SZZP1017F):

Part number: SZZP1094C

Features:

- (1) Contains all oscillation frequencies and output adjustments needed for focus servo gain, tracking servo gain, and tracking balance adjustment (requires no external oscillator).
- (2) Panel indicators indicate the best points of focus and tracking servo gains (no oscilloscope needed).
- (3) Internal power supply eliminates the need for power supply from the CD player.

