

Service Manual

Compact Disc Player

SL-P470



DIGITAL

**Color**

(K) ... Black Type

(S) ... Silver Type

Area

Country Code	Area	Color
(E)	Continental Europe.	(K) (S)

SPECIFICATIONS

■ Audio

No. of channels	2 (left and right, stereo)
Frequency response	2–20,000 Hz, ± 0.5 dB
Output voltage	2 V (at 0 dB)
Dynamic range	96 dB
S/N ratio	96 dB
Total harmonic distortion	0.005% (1 kHz, 0 dB)
Harmonic distortion	0.003% (1 kHz, 0 dB)
Wow and flutter	Below measurable limit
DA converter	MASH* (4 DAC)
Output impedance	Approx. 600 Ω
Load impedance	More than 10 k Ω
Headphone output level	15 mW max. 32 Ω (adjustable)

■ Pickup

Wavelength	780 nm
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■ General

Power supply	AC 50/60 Hz, 220 V
Power consumption	11 W
Dimensions (W×H×D)	430×92×278 mm
Weight	3.6 kg

Specifications subject to change without notice.

Weight and dimensions shown are approximate.

***MASH**

- MASH (Multi-Stage Noise Shaping) is an effective over-sampling D/A conversion technique which realizes a high S/N ratio and needs no highly complex manufacturing processes such as a laser trimming.
- MASH is a trademark of NTT (Nippon Telegraph and Telephone Corporation).

CONTENTS

	Page
PLACEMENT	2
ACCESSORIES	2
CONNECTIONS	2
PRECAUTION OF LASER DIODE	3
LOCATION OF CONTROLS	4, 5
HANDLING PRECAUTIONS FOR OPTICAL PICKUP	6
INSTRUCTIONS FOR TRAVERSE OIL (Part No. SZZOL31)	6
DISASSEMBLY INSTRUCTIONS	7~10
MEASUREMENTS AND ADJUSTMENTS	11~15
NEW SERVO GAIN ADJUSTER (Servo Amp. Adjusting Fixture)	15
FUNCTIONS OF IC TERMINALS	16~21

	Page
DESCRIPTION OF FL PANEL	22
BLOCK DIAGRAM	23~25
TERMINAL GUIDE OF IC'S, TRANSISTORS AND DIODES	26
SCHEMATIC DIAGRAM	27~32
PRINTED CIRCUIT BOARDS	33~36
WIRING CONNECTION DIAGRAM	37
TROUBLESHOOTING GUIDE	38~40
REPLACEMENT PARTS LIST	41~44
EXPLODED VIEWS	45~47
RESISTORS AND CAPACITORS	48, 49
PACKING	50

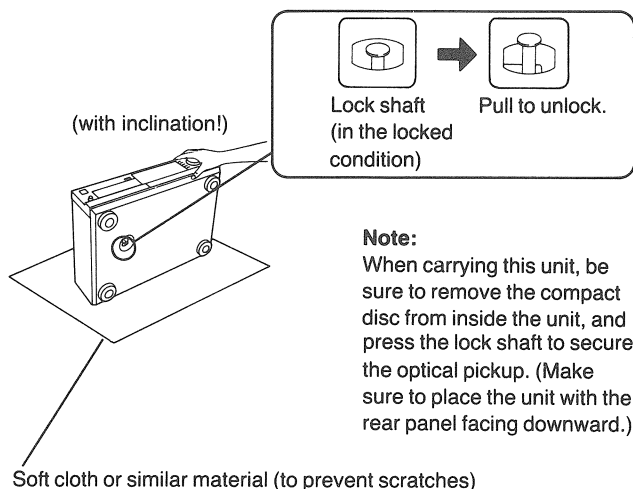
Technics

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

■ PLACEMENT

Before placement

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



Notes of placement

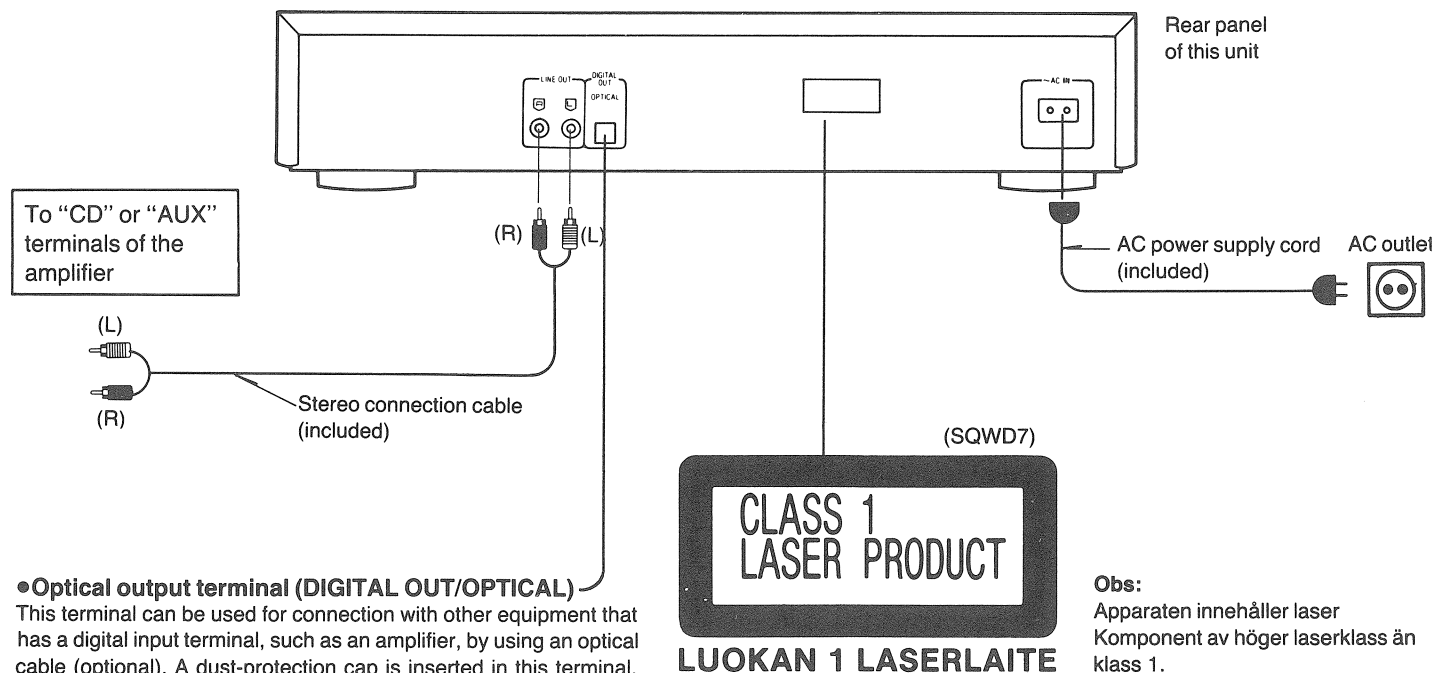
- **Place on a flat, level surface so that the front-rear inclination does not exceed 5°.**
- **Avoid places such as the following:**
 - Near any equipment or device that generates strong magnetism.
 - On any heat-generating equipment or device, or in any place where the temperature is high (40°C or 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.

■ ACCESSORIES

- AC power supply cord. 1 (SJA187)
- Remote control transmitter. 1 (EUR64779)
- Stereo connection cable. 1 (SJP2249-3)
- Batteries. 2 (UM-4NE/2S)

■ CONNECTIONS

Turn power off on all components before making connections.



•Optical output terminal (DIGITAL OUT/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 cable (optional). A dust-protection cap is inserted in this terminal. Remove this cap only when a connection is to be made to this terminal.

Note:

The configuration of the AC outlet and AC power supply cord differs according to area.

■ PRECAUTION OF LASER DIODE

CAUTION: This product utilizes a laser diode with the unit turned "on", invisible laser radiation is emitted from the pick up lens.
Wave length: 780 nm
Maximum output radiation power from pick up: 100 μ W/VDE

Laser radiation from the pick up lens is safety level, but be sure the followings:

1. Do not disassemble the optical pick up unit, since radiation from exposed laser diode is dangerous.
2. Do not adjust the variable resistor on the pickup unit. It was already adjusted.
3. Do not look at the focus lens using optical instruments.
4. Recommend not to look at pick up lens for a long time.

ACHTUNG: Dieses produkt enthält eine laserdioden. Im eingeschalteten zustand wird unsichtbare laserstrahlung von der lasereinheit abgestrahlt.

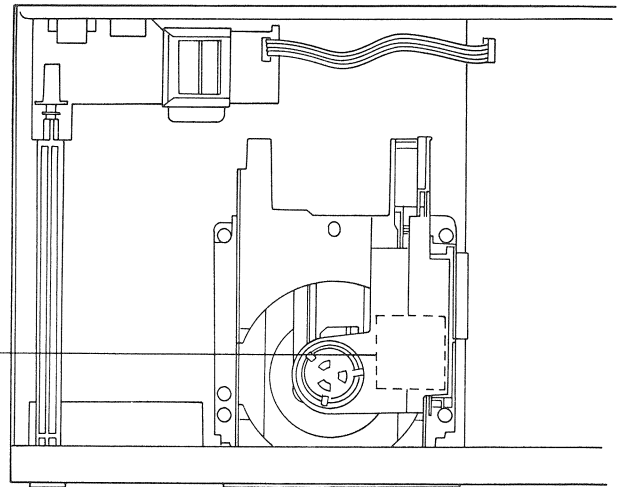
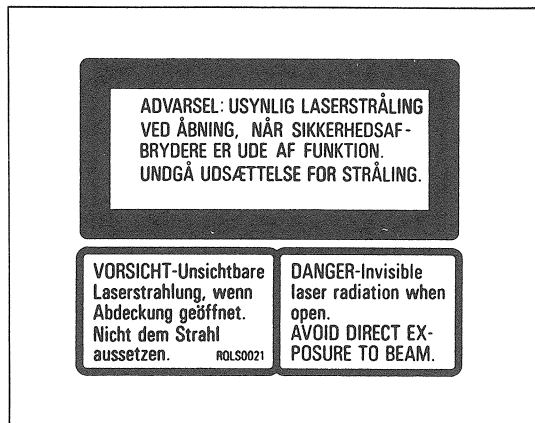
Wellenlänge: 780 nm
Maximale strehlungsleistung der lasereinheit: 100 μ W/VDE

Die strahlung an der lasereinheit ist ungefährlich, wenn folgende punkte beachtet werden:

1. Die lasereinheit nicht zerlegen, da die strahlung an der freigelegten laserdioden gefährlich ist.
2. Den werksseitig justierten einstellregler der lasereinheit nicht verstellen.
3. Nicht mit optischen instrumenten in die fokussierlinse blicken.
4. Nicht über längere zeit in die fokussierlinse blicken.

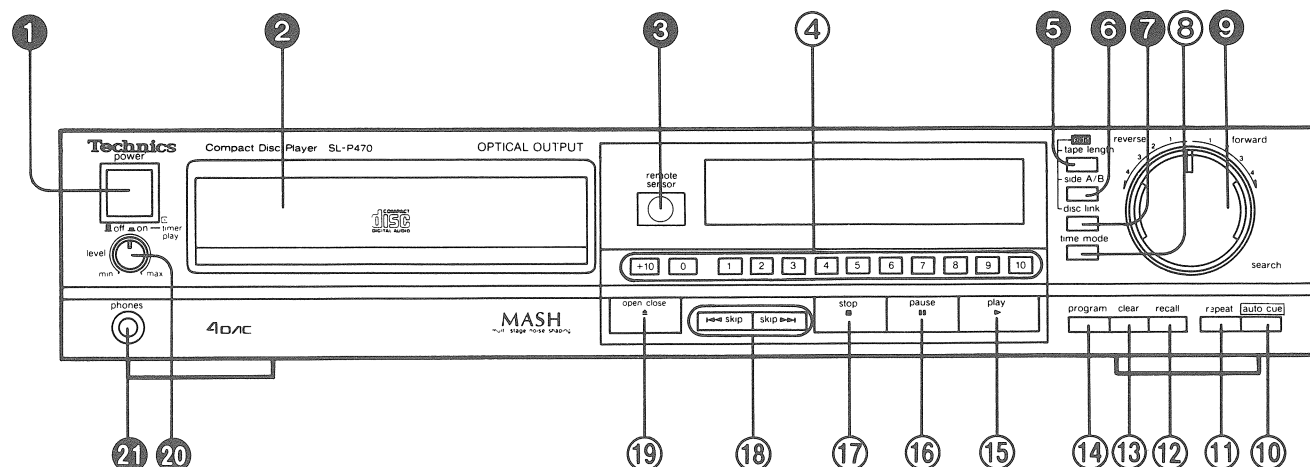
ADVARSEL: I dette a apparat anvendes laser.

RQLS0021



LOCATION OF CONTROLS

The functions indicated by the black numbers (with white background, ④ etc.) can also be activated using the remote control transmitter.



Control section

① Power switch (power)

If a disc has already been loaded, play will begin when the power is turned ON.

② Disc holder

③ Remote control signal sensor (remote sensor)

④ Numeric buttons (+10, 0, 1~10)

⑤ Edit tape length button (edit tape length)

When compact discs are to be recorded to tape, this button can be used to calculate the number of tracks that can be recorded on each side of the tape, depending on the length of the cassette tape used, so that as little tape as possible is wasted.

⑥ Tape-side select button (side A/B)

When recording compact discs to tape, this button can be used to check the number of tracks and amount of tape left over for side A or B.

⑦ Disc link button (disc link)

This button can be used for edit recording from several discs.

⑧ Time mode select button (time mode)

⑨ Search dial (search)

This dial can be used to locate specific places on the disc during play at high speed, either forward or reverse.

⑩ Auto cue button (auto cue)

Pressing this button causes the unit to skip automatically to the beginning of the next track on the disc and switch to the play standby mode.

⑪ Repeat button (repeat)

⑫ Recall button (recall)

This button can be used to display the contents of the programmed track sequence for confirmation.

⑬ Clear button (clear)

This button can be used to clear tracks from the programmed sequence one at a time.

⑭ Programmed-play button (program)

Pressing this button initiates the programmed play mode. You can then enter specific tracks using the numeric buttons.

⑮ Play button (▶ play)

⑯ Pause button (⏸ pause)

⑰ Stop button (■ stop)

This button can be used to stop disc play, as well as to cancel the various play modes.

⑱ Skip buttons (⏮ skip/skip ⏭)

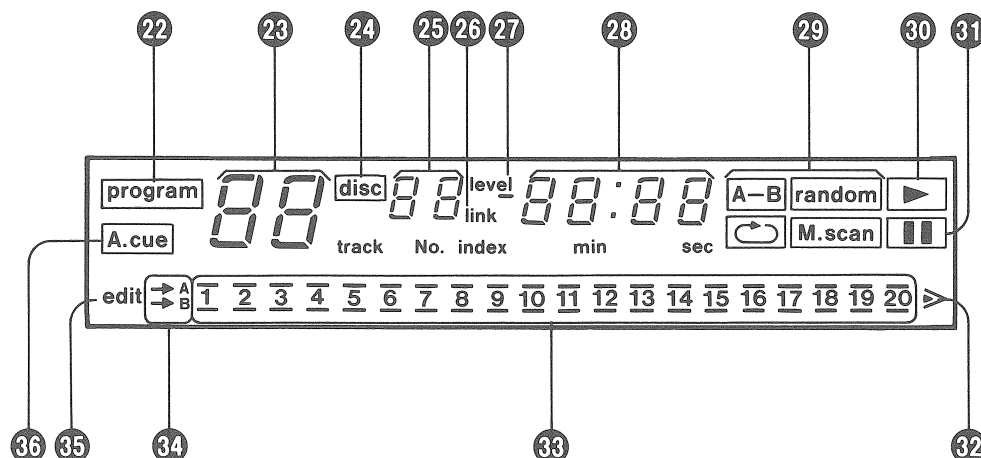
These buttons can be used to skip by track in the forward or reverse direction.

⑲ Disc holder open/close button (⏏ open/close)

⑳ Headphones volume control (level)

Avoid listening to music at high volume levels for extended periods of time.

㉑ Headphones jack (phones)



Indicators section

22 Programmed-play indicator (**program**)

23 Track number display (track)

24 Disc indicator (**disc**)

25 Index/program number display (index/No.)

The index number display indicates the number of the index when the discs which include index numbers (subdivisions within specific tracks) is played.

The program number display indicates the programmed order of tracks in the program mode.

26 Disc link indicator (link)

27 Level indicator (level)

This indicator lights when the output level is attenuated by the remote control.

28 Time display (min/sec)

29 Operation indicators

The following indicators light during their respective operations.

A-B: A-B repeat play (remote control operation)

random: Random play (remote control operation)

repeat: Repeat play

M. scan: Music scan (remote control operation)

30 Play indicator (**▶**)

31 Pause indicator (**⏸**)

32 "Over" mark (**⏮**)

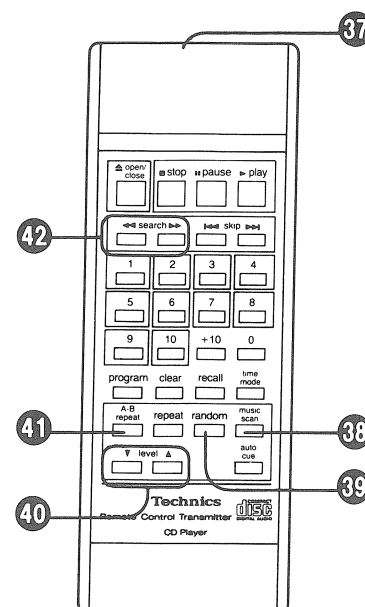
This indicator lights if the total number of tracks on the disc is 21 or more.

33 Track number indicator (**1-20**)

34 Tape side indicator (**→ A/B**)

35 Compact disc edit indicator (edit)

36 Auto cue indicator (**A. cue**)



Unnumbered buttons on the remote control transmitter function identically to their corresponding parts on the unit.

Remote control transmitter

37 Remote control signal transmission window

38 Music scan button (music scan)

This button can be used to play the first part of each track in order.

39 Random play button (random)

This button can be used to play the tracks on a disc in a random sequence.

40 Level buttons (**▼ level ▲**)

These buttons can be used to control output level (from 0 dB to -12 dB).

41 A-B repeat button (A-B repeat)

This button can be used to play the portion of a disc between two points (A and B) chosen by you.

42 Search buttons (**◀◀ search ▶▶**)

These buttons can be used to move rapidly forward or backward on the disc during play. The search speed is slow when the button is pressed at first and becomes faster if the button is pressed and held continuously.

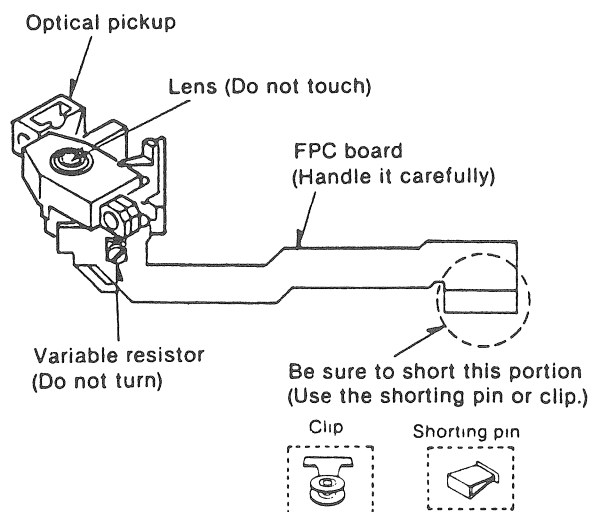
■ HANDLING PRECAUTIONS FOR OPTICAL PICKUP

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

1. Do not give excessive shock to the optical pickup because it is of extremely precise structure.
2. 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.
3. Take care not to apply excessive stress to the flexible board. (FPC board)
4. Do not turn the variable resistor (laser power adjustment). It has already been adjusted.

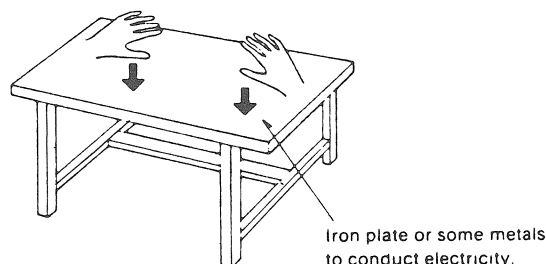
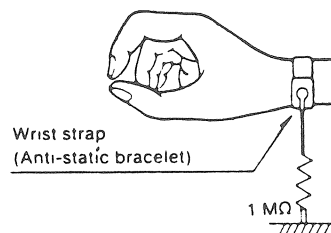


• Grounding for electrostatic breakdown prevention

1. Human body grounding
Use the anti-static wrist strap to relieve the static electricity from your body.
2. 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.

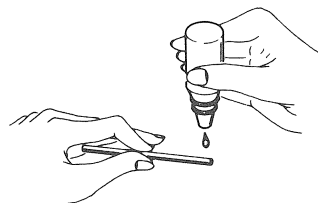


■ INSTRUCTIONS FOR TRAVERSE OIL (Part No. SZZ0L31)

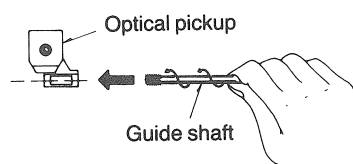
The container contains 6 g (approx. 3 ml) of oil, and one application (one shaft) requires 0.05 ml of oil.

How to Use

- (1) Remove the guide shaft in the traverse deck from the optical pickup, and clean off any dust from the guide shaft.
- (2) Apply one drop of the SZZ0L31 to the tip of the guide shaft.
- (3) Hold the guide shaft so that its oiled end touches the optical pickup and insert it into the bearing while rotating it slowly.
- (4) 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.



☒ (1)

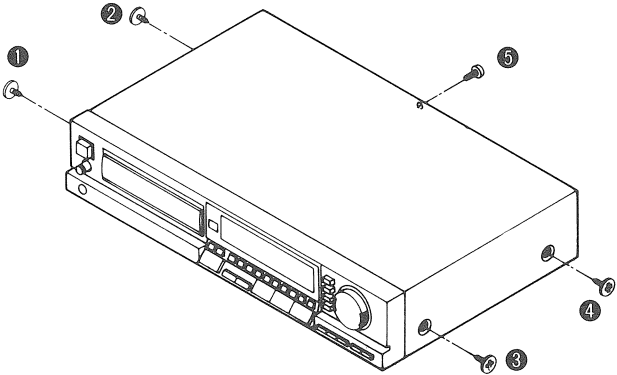
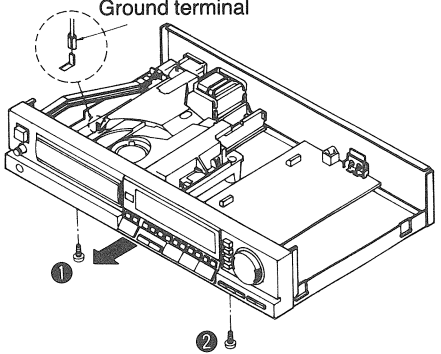
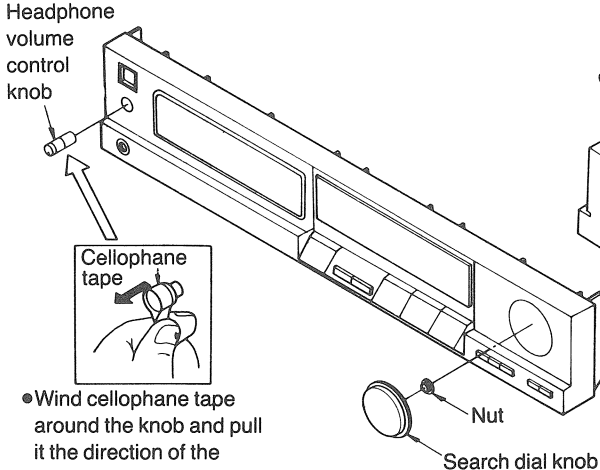
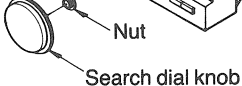
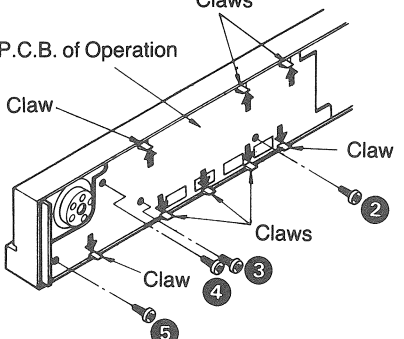
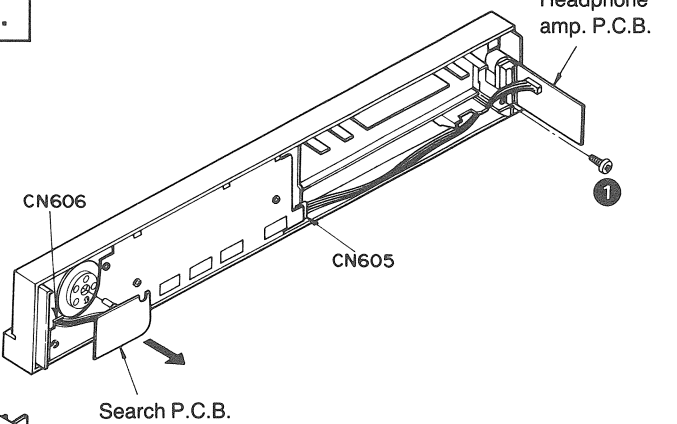


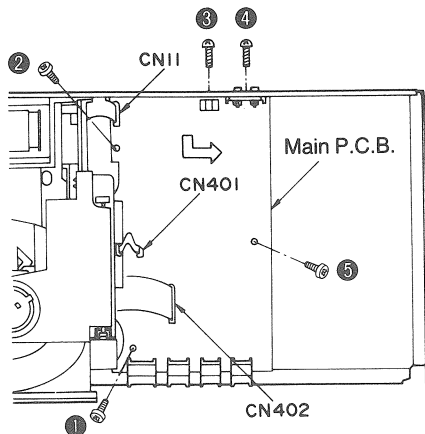
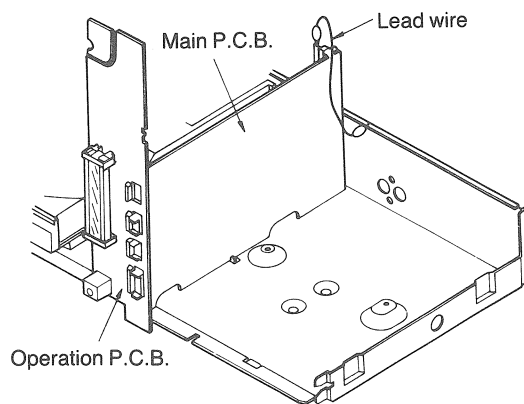
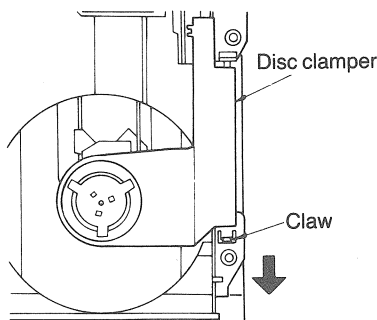
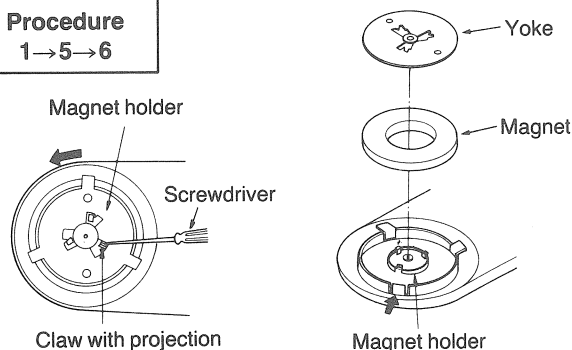
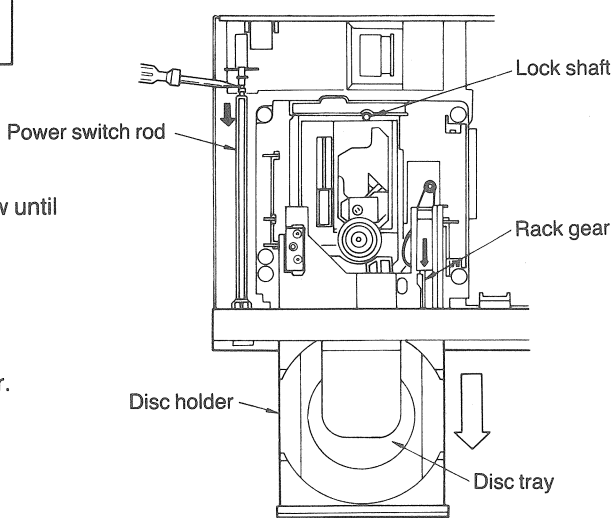
■ DISASSEMBLY INSTRUCTIONS

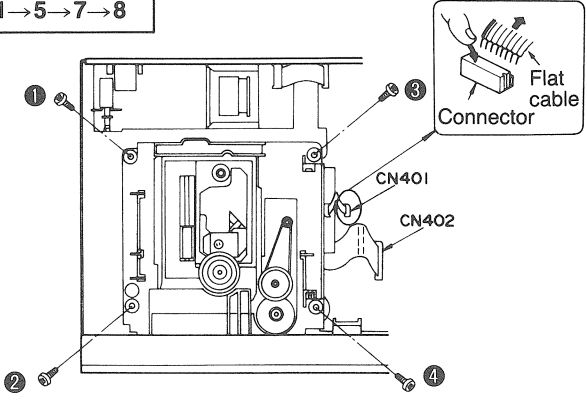
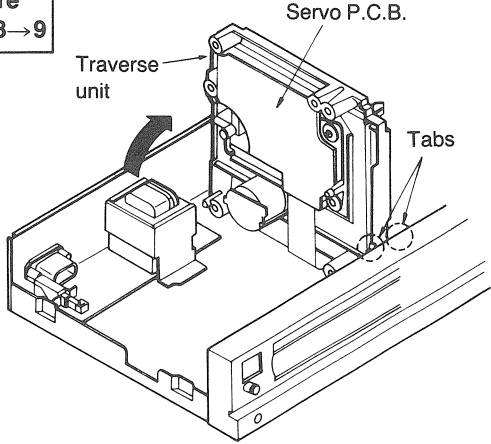
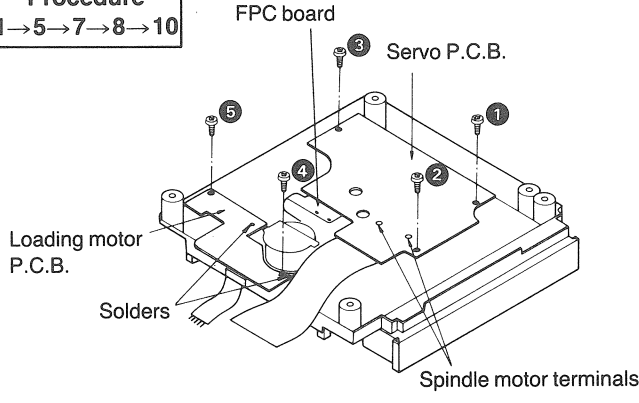
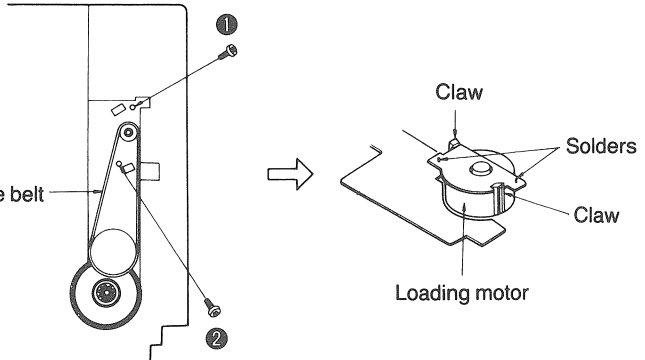
Warning: This product uses a laser diode. Refer to caution statements on page 3.

ACHTUNG:

- Die Lasereinheit nicht zerlegen.
- Die Lasereinheit darf nur gegen eine vom hersteller spezifizierte einheit ausgetauscht werden.

Ref. No. 1	Removal of the cabinet	Ref. No. 2	Removal of the front panel
Procedure 1		Procedure 1→2	
	 • Remove the 5 screws (①~⑤).		 1. Remove the 2 screws (①, ②). 2. Release the ground terminal. 3. Remove the front panel in the direction of the arrow.
Ref. No. 3	Removal of headphone amp. P.C.B., search P.C.B. and operation P.C.B.		
Procedure 1→2→3			
	 Headphone volume control knob Cellophane tape • Wind cellophane tape around the knob and pull it the direction of the arrow.  Nut Search dial knob  P.C.B. of Operation Claws Claw Claw Claws Claw Claws ② ③ ④ ⑤		 Headphone amp. P.C.B. ① CN606 CN605 Search P.C.B. • Removal of the headphone amp. P.C.B. 1. Remove the headphone volume control knob. 2. Remove the screw (①). 3. Remove the connector (CN605). • Removal of the search P.C.B. 1. Remove the search dial knob and its nut. 2. Remove the connector (CN606). • Removal of the operation P.C.B. 1. Remove the 4 screws (②~⑤). 2. Release the 8 claws in the direction of the arrows and remove the operation P.C.B. Note: To remove the search dial knob, push it with a screwdriver through the front panel's back opening.

Ref. No. 4	Removal of the main P.C.B.	How to check the main P.C.B.	
Procedure 1→2→3→4		- When checking the soldered surface of the main P.C.B. and replacing the parts, do as shown. 1. Connect the main P.C.B. ground terminal (LINE OUT terminal) to the chassis with a lead wire. 2. Connect the loading base grounding terminal to the chassis with a lead wire. 3. Connect the operation P.C.B. ground terminal to the chassis with a lead wire. 	
1. Remove the 5 screws (①~⑤). 2. Lift the main P.C.B. off the retention posts on the chassis. 3. Remove the main P.C.B. in the direction of the arrow.			
Ref. No. 5	Removal of the disc clamber	Ref. No. 6	Removal of the magnet and holder
Procedure 1→5		Procedure 1→5→6	
Push the claw in the direction of the arrow and remove the disc clamber. 1. While lifting the claw with a screwdriver, rotate magnet holder in the direction of the arrow and remove the yoke and magnet. 2. Release the claws of the magnet holder.			
Ref. No. 7	Removal of the disc holder and power switch rod		
Procedure 1→5→7	Removal of the disc holder 1. Push the rack gear slowly in the direction of the arrow until the disc tray comes up. 2. Pull out the disc holder further to remove it. Note: Make sure to release the lock shaft. Removal of the power switch rod. 1. Set the power switch to the “OFF” position. 2. Remove the power switch rod by using a screwdriver.		

Ref. No. 8	Removal of the loading base	Ref. No. 9	How to check the servo P.C.B.
Procedure 1→5→7→8	 1. Remove the 4 screws (①~④). 2. Remove the 2 flat cables (CN401, CN402).	Procedure 1→5→7→8→9	 •When checking the soldered surfaces of the servo P.C.B. and replacing the parts, do as shown. •Flat cables (CN401 and CN402) should be left connected.
Ref. No. 10	Removal of the servo P.C.B. and loading motor P.C.B.	To play a disc	
Procedure 1→5→7→8→10	 •Removal of the servo P.C.B. 1. Remove the 3 screws (①~③). 2. Unsolder the 2 terminals of spindle motor. 3. Remove the FPC board from the optical pickup. Caution: To prevent the breakdown of the laser diode, antistatic shorting pin is inserted into the FPC board. •Removal of the loading motor P.C.B. 1. Remove the 2 screws (④, ⑤). 2. Unsolder the 2 terminals of loading motor.	1. Place the test disc and magnet. 2. Switch the player on. 3. First push the Open/Close switch S102 in the direction of the arrow and then, within 4 seconds, push switch S101 in the direction of the arrow as shown in the figure.	
Ref. No. 11	Removal of the loading motor		
Procedure 1→5→7→8→11	1. Remove the drive belt. 2. Remove the 2 screws (①, ②). 3. Release the 2 claws. 4. Unsolder the 2 terminals of the lead wire of the loading motor.		

Ref. No. 12	Removal of the optical pickup	Ref. No. 13	Removal of the power supply P.C.B.
Procedure 1→5→7→8→ 10→12	Refer to the handling precautions for optical pickup and instructions for traverse oil (See page 6). 1. Remove the 2 screws (①, ②). 2. Unsolder the 2 terminals and the 2 screws (③, ④). Optical pickup ① ③ ④ ② Unsolder Brush terminal Caution: Take care not to touch the brush terminal.	Procedure 1→5→7→13	① ② ③ CN1 1. Remove the 3 screws (①~③). 2. Remove the flat cable (CN1).
Ref. No. 14	Removal of the spindle motor	Turntable ② ③ ① Spindle motor (+) Terminal Red mark Turntable 0.9 mm 0.9 mm clearance gauge (RZZ0297) Spindle motor	
Procedure 1→5→7→8→ 10→14	1. Loosen the screw (①) by using a 1.27 mm allen wrench and remove the turntable. 2. Remove the 2 screws (②, ③). Caution: 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. Adjustment of turntable height 1. Insert a 0.9 mm clearance gauge (RZZ0297) between the turntable and loading base as shown in the figure. 2. Tighten the turntable set-screw by using a 1.27 mm allen wrench. Caution: Refer to turntable height adjustment (See page 12).		

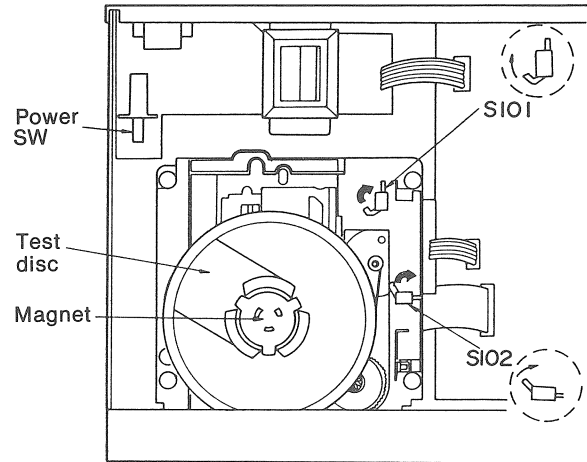
MEASUREMENTS AND ADJUSTMENTS

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.

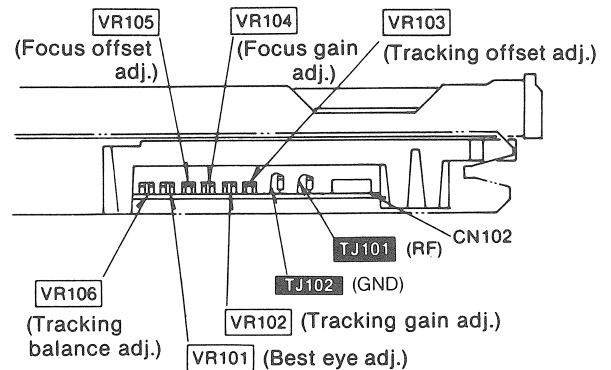
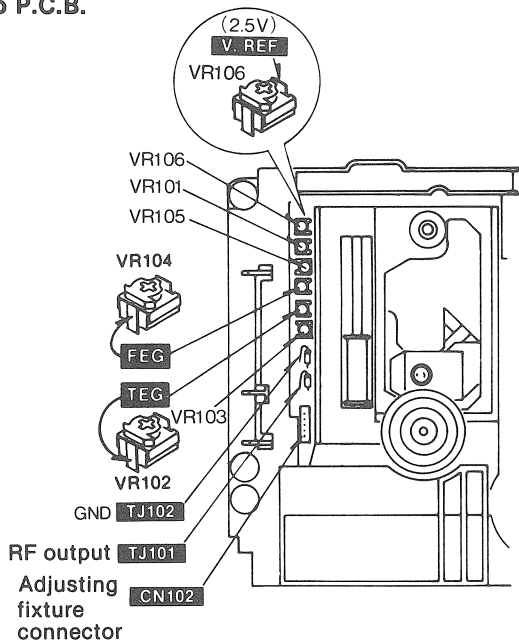
PREPARATION

- Remove the cabinet (see Ref. No. 1 of the disassembly instructions).
- Remove the disc clumper and magnet (see Ref. No. 6 of the same).
- Remove the disc holder and power switch rod (see Ref. No. 7 of the same).
- Place the test disc and magnet on the turntable.
- Switch the player on.
- First push the Open/Close switch S102 in the direction of the arrow and then, push switch S101 in the direction of the arrow as shown in the figure.

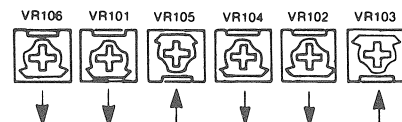


ADJUSTMENT POINTS

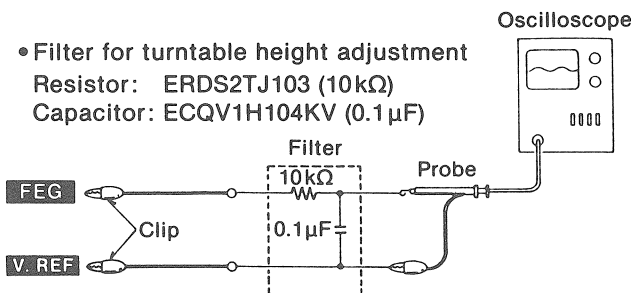
• Servo P.C.B.



• Temporary setting of each VR



- Filter for turntable height adjustment
Resistor: ERDS2TJ103 (10k Ω)
Capacitor: ECQV1H104KV (0.1 μ F)



(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 or SZZP1094C-1)
- 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 30 MHz or better (with EXT trigger and 1:1 probe).
- Audio frequency (AF) oscillator
- Conversion connector (SZZP1032F)

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

As to the replacement of the following parts, refer to the specified sections for adjustment.

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

Adjusting Procedure

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

(1) TURNTABLE HEIGHT ADJUSTMENT

1. Insert the 0.9 mm clearance gauge (RZZ0297) between the turntable and the loading base (see the figure at right).
2. Tighten the turntable retention screw with the 1.27 mm allen wrench.
3. Connect the oscilloscope's CH. 1 probe across VR104's **FEG** (+) and VR106's **V. REF** (-) terminals via a filter.
 (Note: A voltage of 2.5 V appears at the V. REF terminal. Take care not to short the player's chassis to the oscilloscope ground.)

Oscilloscope setting:

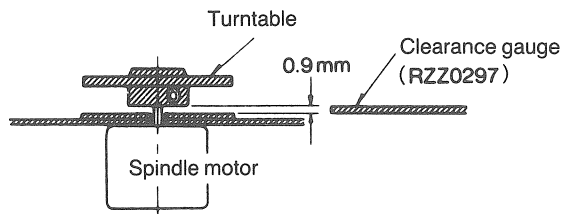
VOLT 50 mV
 SWEEP 1 ms.
 Input coupling DC

4. Adjust oscilloscope's DC zero balance.
5. Switch the player power **ON**, and play the test disc (SZZP1014F or SZZP1054C).
6. Measure the DC level displayed 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.)

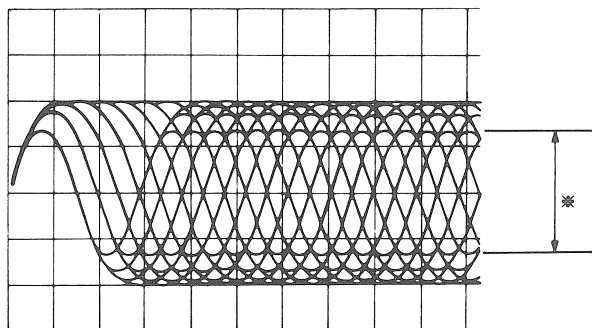
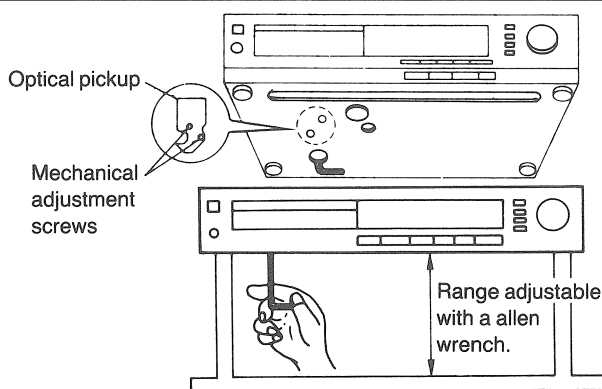
(2) MECHANICAL ADJUSTMENT

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 track 9 on the test disc (SZZP1056C).
3. Leave the player in Play mode and place it as shown in the figure on the right.
4. Alternately adjust the two mechanical adjusting screws with the 2.0 mm allen wrench until the RF signal amplitude variation on the oscilloscope is minimized.
5. After completing the adjustment, lock the **mechanical adjustments** with lock paint (RZZOL01).



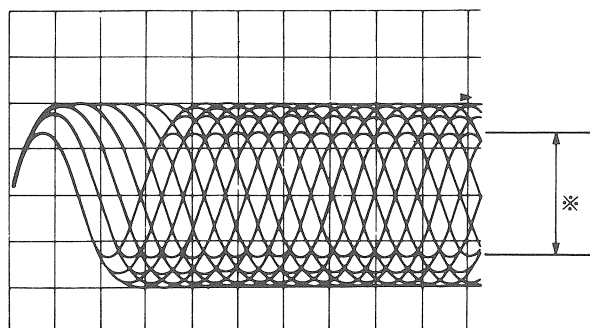
※ Most stretched eye pattern.

(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 1kHz (track 1) on the test disc (SZZP1054C).
3. Adjust **VR101** until the vertical fluctuation of RF signal is minimized and the eye pattern is most stretched.



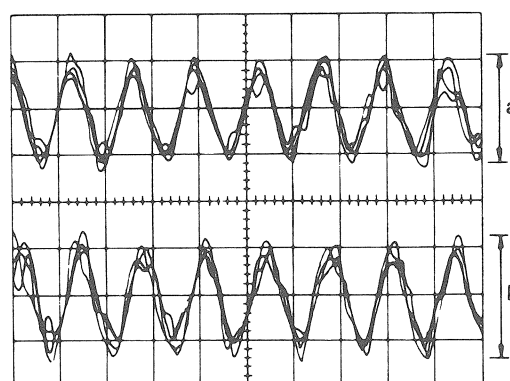
※ Most stretched eye pattern.

(4) FOCUS GAIN ADJUSTMENT

1. Connect the servo gain adjuster to the player (see page 15).
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".



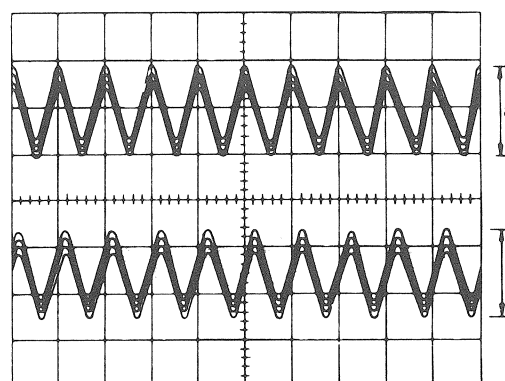
※ Adjust **VR104** until a equals b.

(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.

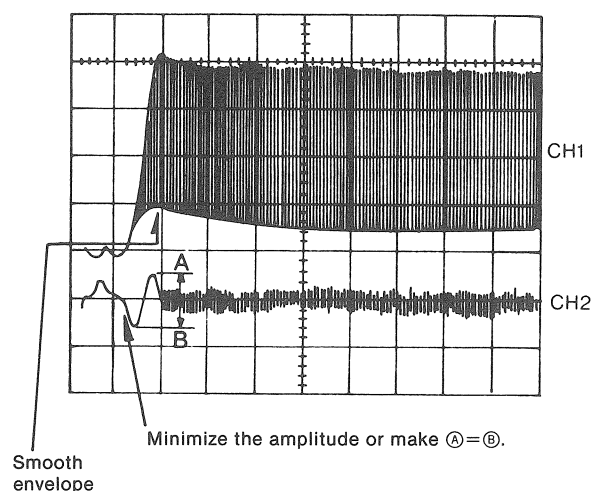
Oscilloscope setting: VOLT. 100 mV (CH. 1)
100 mV (CH. 2)

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.



(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.

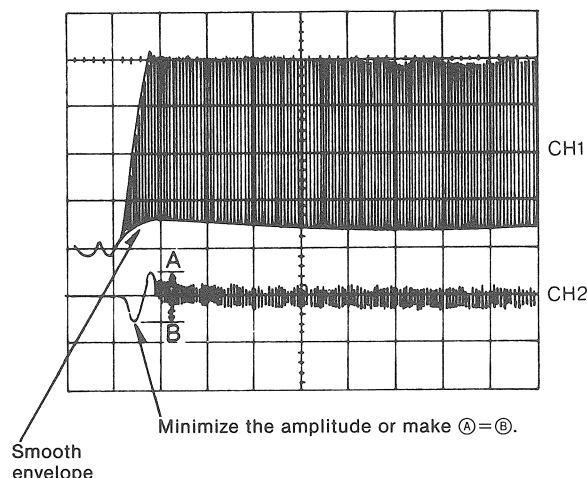
Oscilloscope setting: VOLT. 100 mV (CH. 1)
100 mV (CH. 2)

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.



(8) TRACKING BALANCE ADJUSTMENT

1. Make sure that the 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 the 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)

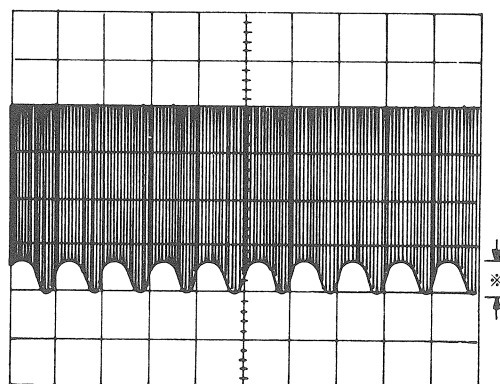
SWEEP. 0.1 ms.

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** so that the waveform of the output section marked with ✖ is balanced.
6. Disconnect the servo gain adjuster's leads from the player.



✖ This section of the waveform must be balanced.

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

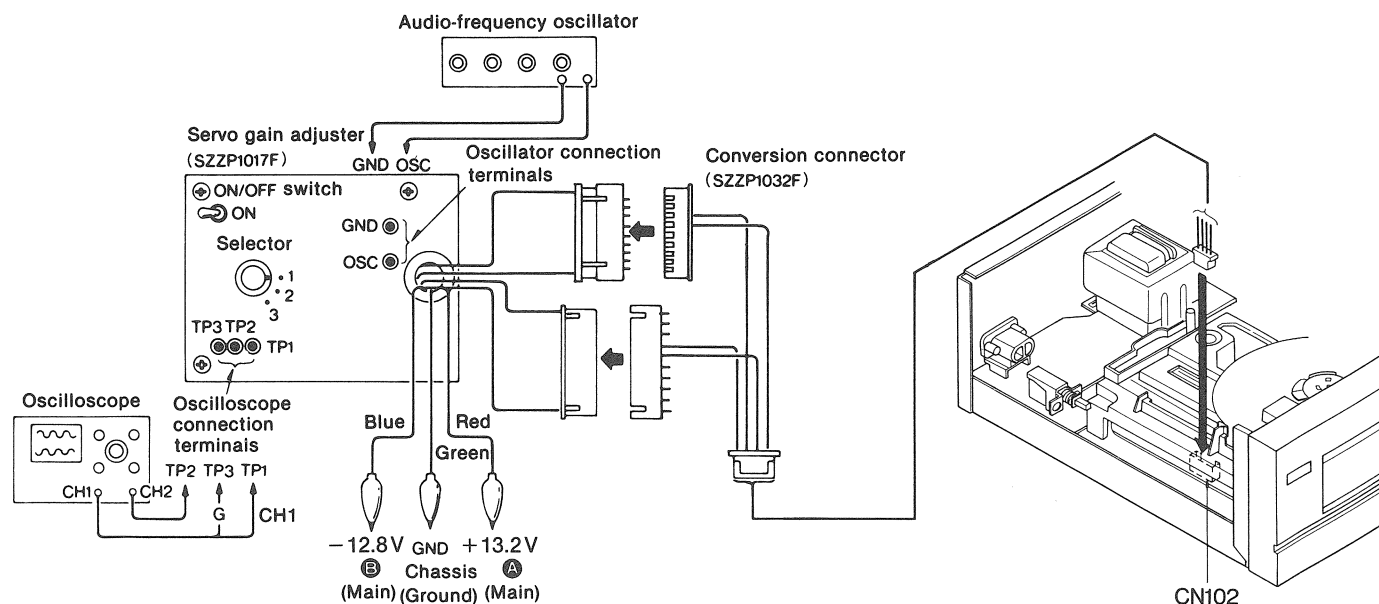
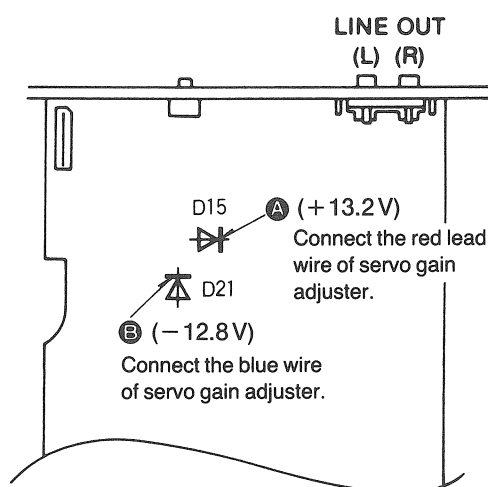
1. Play an ordinary musical program disc.
2. Press the skip button to check for normal skip search operation (in both the forward and reverse directions).

*** 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 0.7 mm black dot and the 0.7 mm 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**• Main P.C.B.****■ NEW SERVO GAIN ADJUSTER (Servo Amp. Adjusting Fixture)**

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

Part number: SZZP1094C-1

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.

■ FUNCTIONS OF IC TERMINALS

●IC101 (AN8373S): Servo amp.

Pin No.	Mark	I/O Division	Function
1	AMP1	I	RF signal input (×30 amp.)
2	PDAD	I	Photo detector current input (A2)
3	PDA	I	Photo detector current input (A1)
4	PDBD	I	Photo detector current input (A4)
5	PDB	I	Photo detector current input (A3)
6	LPD	I	Non-inverting laser power input
7	LD	O	Laser power auto control output
8	FBL1	I	PD balance adjustment
9	FBL2	I	
10	TBL1	I	Tracking balance adjustment
11	TBL2	I	
12	FOOFS	I	Focus offset adjustment
13	IVA	O	Current/voltage conversion output (A)
14	IVB	O	Current/voltage conversion output (B)
15	FE	O	Focus gain adjustment output
16	FPI	I	Focus error signal input
17	TPI	I	Tracking error signal input
18	C. TPL	I	Tracking error filter capacitor input
19	C. TPH		
20	C. FPL	I	Focus error filter capacitor input
21	C. FPH		

Pin No.	Mark	I/O Division	Function
22	TPO	O	Tracking error signal output
23	FPO	O	Focus error signal output
24	FGC	I	Focus gain up signal input (Not used, connected to GND)
25	TGC	I	Tracking gain up signal input (Not used, connected to GND)
26	GD	I	Focus/tracking gain down signal input (Not used, connected to GND)
27	PTO	O	Position detecting amp. output
28	PTI	I	Position detecting amp. input
29	PBO	O	Position detecting buffer output
30	POT	I	Position detecting buffer input
31	BDO	O	Dropout detection output
32	RFDET	O	RF detections signal output
33	SDO	O	Dropout detection pulse output
34	C. SBDO	I	Dropout detecting capacitor input
35	ARF	O	RF signal output
36	C AGC	I	AGC detecting capacitor input
37	VCC	I	Power supply (+4.9V input)
38	LDON	I	Laser power control input
39	RF IN	I	RF signal input
40	AMPO	O	RF signal output
41	VREF	O	Reference voltage output
42	GND	I	Ground terminal

•IC102 (AN8374S): Servo processor

Pin No.	Mark	I/O Division	Function
1	LSA	I	Phase difference input (A)
2	LSB	I	Phase difference input (B)
3	TEOFS	I	Tracking offset adjustment
4	TE	O	Tracking gain adjustment
5	TEG	I	
6	TE OUT	O	Tracking error signal output
7	TE BPF	I	Tracking error gain detecting filter (Not used, open)
8	FEG	I	Focus gain adjustment
9	FE OUT	O	Focus error signal output
10	CLW	O	Triangular wave oscillator capacitor input
11	VREF	I	Reference voltage input
12	ARF	I	RF signal input
13	CDSL	I	Data slice filter capacitor input
14	FPC	I	Frequency difference signal input
15	GND	I	Ground terminal
16	C. PLL	I	PLL loop filter constant
17	VSS	I	Ground terminal
18	CLK	I	Frequency pull-in clock signal (88.2 kHz) input
19	SRF	O	Sliced and digitized RF signal output
20	PCK	O	Clock output extracted from SRF
21	EFM	O	EFM signal output synchronous with PCK

Pin No.	Mark	I/O Division	Function
22	VDD	I	Power supply (+4.9V input)
23	SPCNT	O	Track crossing speed control output (Not used, open)
24	SENSE	O	Selector output (track crossing state)
25	TRV	O	Traverse servo control output
26	FLOCK	O	Focus lock signal output
27	KICK	O	Track kick signal output
28	LDON	O	Laser power control output
29	VDET	O	Focus/tracking gain up output (Not used, open)
30	CNT1	I	Control input (FOON: Focus servo ON signal)
31	CNT2	I	Control input (TRON: Tracking servo ON signal)
32	CNT3	I	Control input [KICKF: Kick direction (forward) command]
33	CNT4	I	Control input [KICKR: Kick direction (reverse) command]
34	TRVF	I	Traverse forward command signal
35	TRVR	I	Traverse backward command signal
36	RFDET	I	RF detection signal input
37	BDO	I	Dropout detection input
38	VCC	I	Power supply (+4.9V input)
39	TVPO	O	Traverse position detecting resistor/capacitor inputs
40	TVPI	O	
41	BROUT	I	Tracking drive control output
42	BRIN	I	Tracking error signal input

• IC103 (AN8377N): BTL drive

Pin No.	Mark	I/O Division	Function
1	PVCC	I	Driver power supply (+9.2V input)
2	VCC	I	Power supply (+9.2V input)
3	TB	O	External transistor base driving output
4	VMON	O	Voltage output
5	TVDI	I	Traverse error signal input
6	FDI	I	Focus error signal input
7	TDI	I	Tracking error signal input
8	VREF	I	Reference voltage input

Pin No.	Mark	I/O Division	Function
9	TD-	O	Inverting output of tracking driver
10	TD+	O	Non-inverting output of tracking driver
11	FD-	O	Inverting output of focus driver
12	FD+	O	Non-inverting output of focus driver
13	TVD-	O	Inverting output of traverse driver
14	TVD+	O	Non-inverting output of traverse driver
15	RESET	O	Reset signal output
16	PC	I	PC input (connect to GND)

• IC301 (MN6625): Digital signal processor

Pin No.	Mark	I/O Division	Function
1	BYTCK	O	Serial data byte clock (Not use, open)
2	LCLK	O	Crystal frame clock (Not use, open)
3	DEMPH	O	De-emphasis ON signal (de-emphasis ON at "H") (Not used, open)
4	SRDATA	O	Serial data output (MSB first)
5	SCK	O	Serial bit clock output
6	LRCK	O	LR discrimination signal output
7	WDCK	O	Serial data output word clock
8	LDG	O	L channel deglitch signal (Not used, open)
9	RDG	O	R channel deglitch signal (Not used, open)
10	IPFLAG	O	Interpolation flag (Interpolation at "H")
11	FLAG	O	Error flag terminal
12	XCK	O	Clock (16.9344 MHz) output (Not used, open)
13	TEST	I	Test mode selection (Not used, connected to +5 V)
14	TX	O	Digital signal output
15	SLEEP	I	Mode selector ("L": normal, "H": SLEEP mode)
16	CSEL	I	Test terminal ("L": normal)
17	X1	I	Clock input (16.9344 MHz)
18	X2	O	Clock output (16.9344 MHz) (Not used, open)
19	VSS	I	GND terminal
20	BLKCK	O	Sub-code block (Q data) clock (75 Hz)
21	CLDCK	O	Sub-code frame (Q data) clock (7.35 kHz)
22	SUBQ	O	Sub-code (Q data) output
23	RST	I	Reset signal input (reset at "L")
24	MLD	I	Command load signal input

Pin No.	Mark	I/O Division	Function
25	MCLK	I	Command clock signal input
26	MDATA	I	Command data input
27	DMUTE	I	Muting control
28	TRON	I	Tracking servo ON signal (tracking servo ON at "L")
29	STAT	O	Processing condition (CRC, CUE, CLVS, TT STOP, FCLV)
30	SUBC	O	Sub-code serial output data (Not used, open)
31	SBCK	I	Clock for sub-code serial output (Not used, open)
32	SMCK	O	Clock output (4.2336 MHz)
33	VDD	I	Power supply (connected to +5 V)
34	MEMP	I	Emphasis signal input
35	FG	I	Spindle motor FG signal input (Not used, open)
36	PC	O	Spindle motor ON signal (ON at "L")
37	EC	O	Spindle motor drive signal
38	RESY	O	Resynchronizing signal (Not used, open)
39	DO	I	Drop-out signal (Drop-out at "H")
40	SRF	I	EFM signal input (DSL)
41	EFM	I	EFM signal input (PLL)
42	PCK	I	PLL extract clock input (4.3218 MHz)
43	FPC	O	PLL frequency comparison signal
44 } 51	D7 } D0	I/O	16 K RAM data input/output
52	RAM/OE	O	16 K RAM OE signal
53	RAM/WE	O	16 K RAM WE signal
54 64	RAM/A0 RAM/A10	O	16 K RAM address signal (RAMA0: LSB, RAMA10: MSB)

●IC401 (MN1554PEZ-1): System control

Pin No.	MarK	I/O Division	Function
1	BRECV	—	(Not used, open)
2	BSEND	—	(Not used, open)
3	SYNC	O	(Not used, open)
4	SIRQ	I	Not used (connected to +5 V)
5	BLKCK	I	Sub-code block (Q data) clock input (75 Hz)
6	CLDCK	I	Sub-code block (Q data) clock input (7.35 kHz)
7	SBO	I	(Not used, open)
8	SUBQ	I	Sub-code (Q data) input
9	RST	I	Reset signal input
10 } 13	P20 } P23	O	Not used (connected to +5 V)
14	CLOSE	O	Loading motor "Close" command
15	OPEN	O	Loading motor "Open" command
16	SLOW	O	(Not used, open)
17	MUTE	O	Muting control
18	SEEK	O	Traverse servo control (Not used, open)
19	NC	—	Not connected
20	TRV. R	O	Traverse "Reverse" command signal
21	TRV. F	O	Traverse "Forward" command signal
22	CNT4	O	Optical servo IC control signal [KICKR: Kick direction (reverse) command]
23	CNT3	O	Optical servo IC control signal [KICKF: Kick direction (forward) command]
24	CNT2	O	Optical servo IC control (TRON: Tracking servo)
25	VDD	I	Power supply (connected to +5 V)
26	DOWN	O	(Not used, open)
27	UP	O	(Not used, open)
28	CNT1	O	Optical servo IC control signal (FOON: Focus servo)

Pin No.	MarK	I/O Division	Function
29	CLOSE	I	Disc holder "Open" detection
30	OPEN	I	Disc holder "Close" detection
31	BCLK	I	(Not used, connected to GND)
32	BDATA	I	(Not used, connected to GND)
33	STAT	I	Processing status input from signal processing LSI
34	COMP	O	TOC reading control (ON at "L") (connected to GND)
35	FLOCK	I	Optical servo condition (focus) input
36	SENSE	I	Optical servo condition (track cross) input
37	RECV	I	Data receipt command signal
38	SEND	I	Data transmission command signal
39	ACK	I	Data discrimination signal
40	CLK	I	Data lock signal
41 } 44	DATA0 } DATA3	I	Key scan signal
45 } 52	NC	I	Not connected
53	OSC2	I	Clock terminal
54	OSC1	I	Clock input
55	X1	I	Optical servo condition input
56	X0	O	(Not used, open)
57	GND	I	GND terminal
58	DMUTE	O	Muting control
59	MDATA	O	Command data output
60	MCLK	O	Data clock output (command clock signal)
61	MLD	O	Data output (command load signal)
62	DOUTON	O	Optical output control signal (Not used, open)
63	EMPH	O	Emphasis signal output
64	NC	—	Not connected

●IC601 (MN15283PEY-1): FL drive and Timing signal generator

Pin No.	Mark	Terminal Name	I/O Division	Function
1	VSS	GND	I	GND terminal
2	XO	—	O	(Not used, open)
3	XI	TRCNT	I	(Not used, open)
4	PO0	MRLY	O	Muting control terminal
5	PO1	MDATA	O	Command data output
6	PO2	MCLK	O	Data clock output (Command clock)
7	PO3	MLD	O	Data output (Command load)
8	P10	SLOW	O	Motor drive control
9	P11	FOW/REV	O	Motor drive control
10	P12	LOADING	O	Motor drive control
11	P13	HIGH	O	Motor drive control
12	$\overline{\text{SYNC}}$	—	O	(Not used, open)
13	$\overline{\text{RST}}$	$\overline{\text{RESET}}$	I	Reset signal input (Reset at "L")
14	$\overline{\text{IRQ}}$	$\overline{\text{BLKCK}}$	I	Sub-code (Q data) clock (75 kHz) input
15 } 18	P50 } P53	KEY	I	Key scan signal input
19	$\overline{\text{SBT}}$	$\overline{\text{CLDCK}}$	I	(Not used, open)
20	$\overline{\text{SBD}}$	$\overline{\text{SUBQ}}$	I	
21	P20	—	O	(Not used, open)
22	P21	—	O	
23	P22	$\overline{\text{REV}}$	O	Traverse "Reverse" Command signal

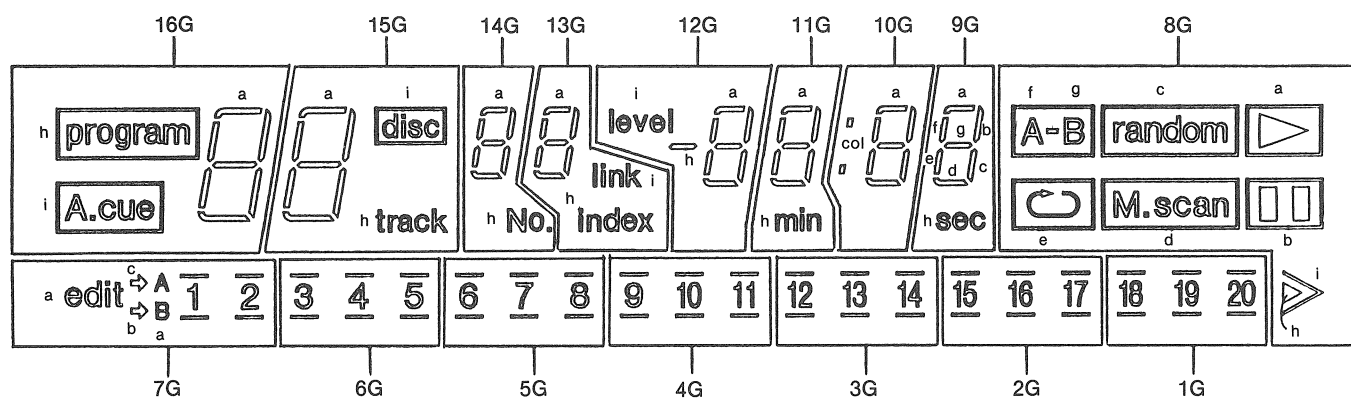
Pin No.	Mark	Terminal Name	I/O Division	Function
24	P23	$\overline{\text{FWD}}$	O	Traverse "Foward" Command signal
25	P30	CNT4	O	Optical servo IC control signal [KICKR: Kick direction (reverse) control]
26	P31	CNT3	O	Optical servo IC control signal [KICKF: Kick direction (forward) control]
27	P32	CNT2	O	Optical servo IC control signal (TRON: Tracking servo)
28	P33	CNT1	O	(Not used, open)
29	P40	STAT	I	Processing status input from signal processing LSI
30	P41	HIGHT	I	Elevator hight signal input
31	P42	$\overline{\text{FLOCK}}$	I	(Not used, open)
32	P43	SENSE	I	
33	P60	PAUSE	O	(Not used, open)
34	P61	PLAY	O	
35	DAC	DAC	O	
36	VPP	—	I	FL drive power supply
37 } 52	D0 } DF	—	O	FL grid signal and key scan signal
53 } 61	S8 } S0	—	O	FL anode signal
62	VDD	—	I	Power supply (connected to +5 V)
63	OSC2	—	I	Clock terminal
64	OSC1	—	I	Clock signal input

• IC801 (MN6474): Digital filter & 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)	23	DVDD1	I	Power supply
2	RSTB	I	Reset command	24	DVSS1	—	GND terminal (digital system)
3	IE	I	Not used, connected to GND	25	X2	O	Clock output
4	TP1	O	TEST terminal	26	X1	I	Clock input
5	TP2			27	NC	—	Connected to GND
6	TEST1	I	TEST terminal 1 (connected to GND)	28	DVDD2	I	Power supply
7	TEST2	I	TEST terminal 2 (connected to GND)	29	DVSS2	—	GND terminal (digital system)
8	NC	—	Not connected	30	NSUB	I	Sub-strate terminal (Not used, connected to power supply)
9				31	768 fs	O	768 fs (33.8688 MHz) (Not used, open)
10	AVDD4	I	Power supply	32	192 fs	O	192 fs (8.4672 MHz) (Not used, open)
11	L (—)	O	Lch data output, (—) terminal	33	LRPOL	—	LR clock selector (Not used, connected to power supply)
12	AVSS4	—	GND terminal	34	L/R	I	LR discrimination signal input
13	AVSS3			35	SRCK	I	Serial bit clock input
14	L (+)	O	Lch data output, (+) terminal	36	SRDATA	I	Serial data input (MSB first)
15	AVDD3	I	Power supply	37	DVSS3	—	GND terminal (digital system)
16	NC	—	Not connected	38	DVDD	I	Power supply
17	AVDD2	I	Power supply	39	384 fs	O	384 fs (16.9344 MHz) output
18	R (+)	O	Rch data output, (+) terminal	40	PD	I	Power down terminal (Not used, connected to GND)
19	AVSS2	—	GND terminal (analog system)	41	MDATA	I	Mode control data
20	AVSS1	—		42	MLCK	I	Data clock for MDATA
21	R (—)	O	Rch data output, (—) terminal				
22	AVDD1	I	Power supply				

DESCRIPTION OF FL PANEL

● GRID ASSIGNMENT



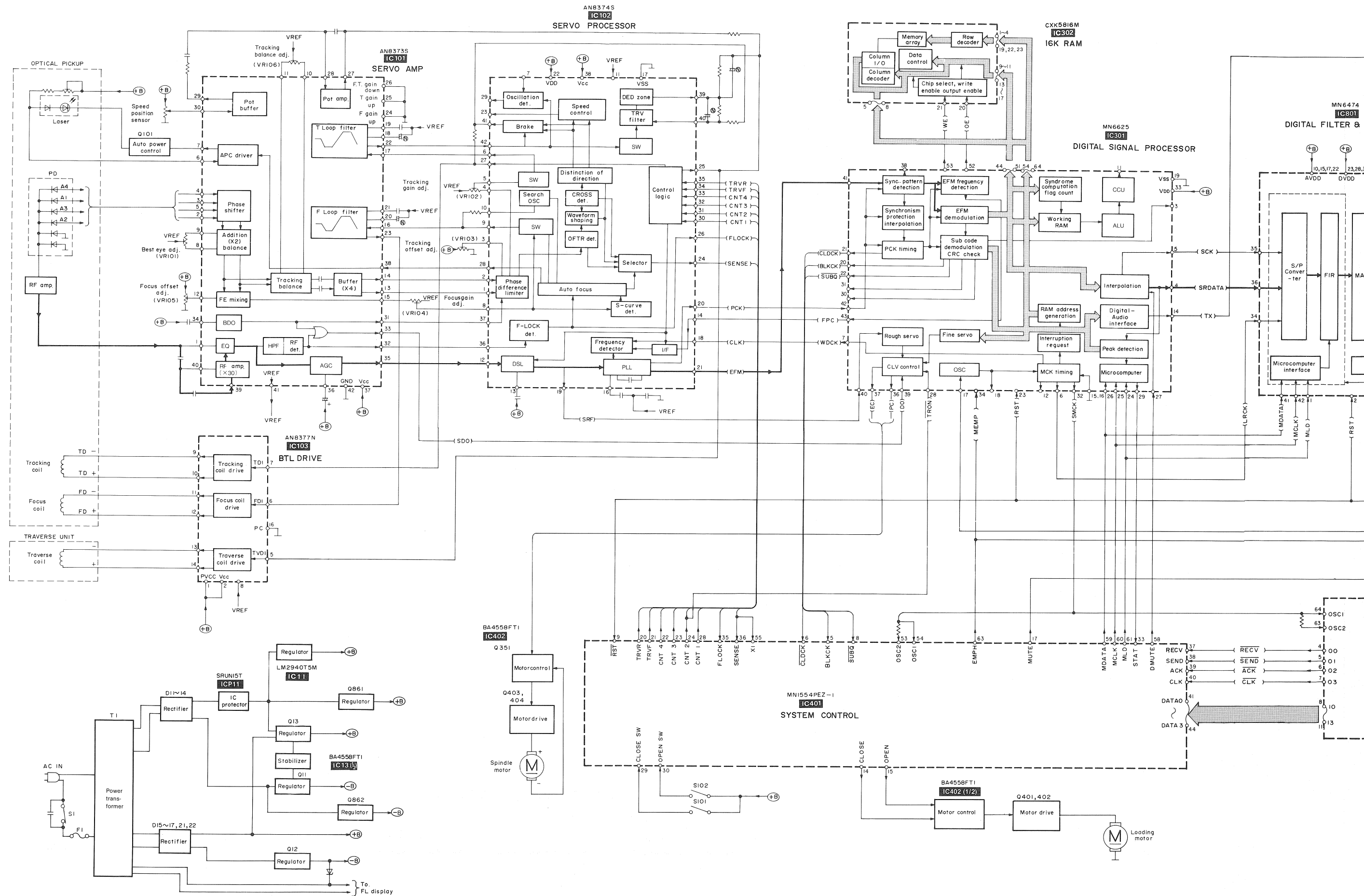
● PIN CONNECTION

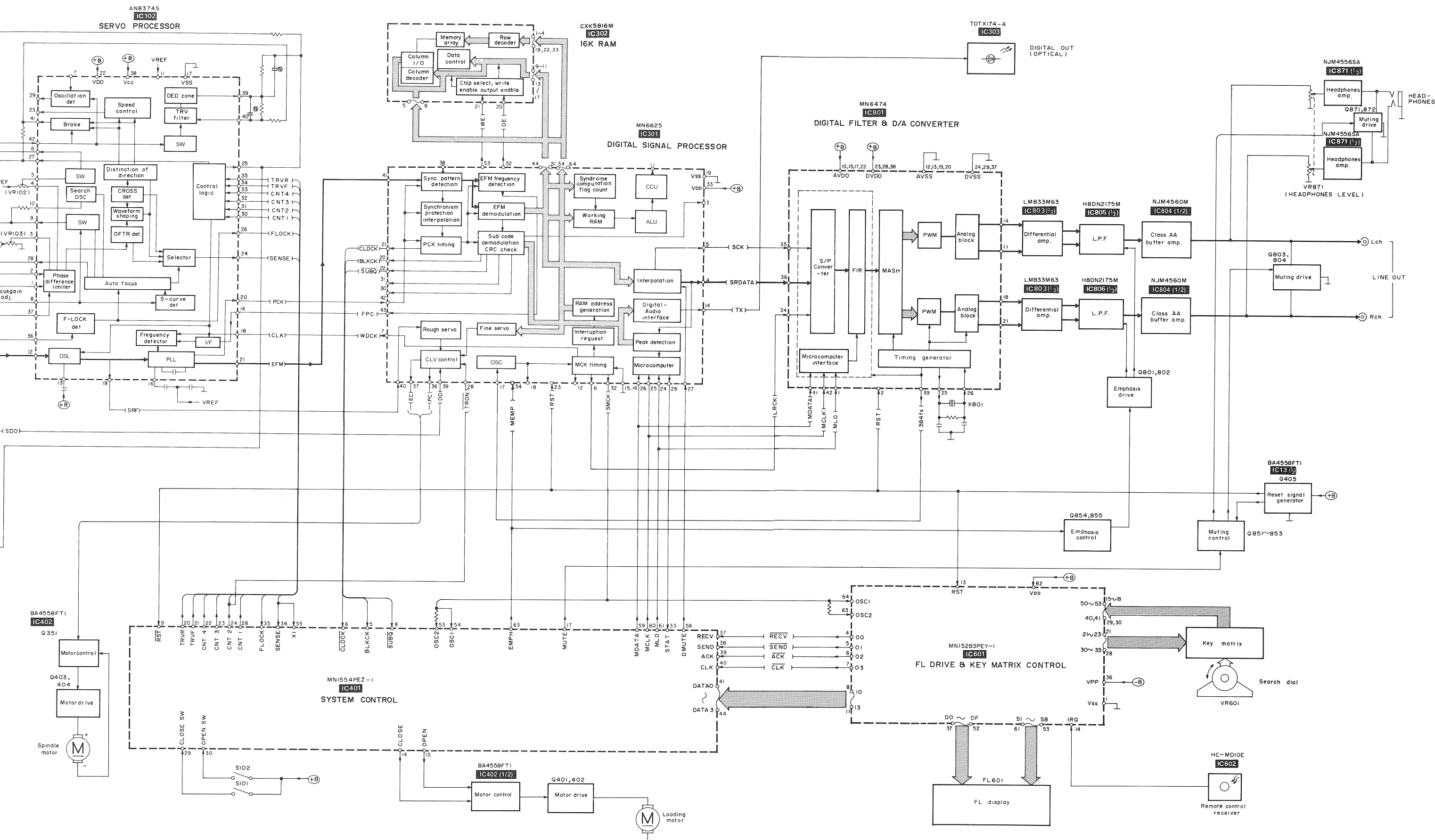
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F 2	F 2	N P	a	b	c	d	N P	N P	N P	e	f	g	h	i	16 G	15 G	14 G	13 G	N P	N P	N P	N P	12 G	11 G	10 G	9 G	8 G	7 G	6 G	5 G	4 G	N P	N P	N P	N P	3 G	2 G	1 G	N P	F 1	F 1

● ANODE CONNECTION

	16G	15G	14G	13G	12G	11G	10G	9G	8G	7G	6G	5G	4G	3G	2G	1G
a	a	a	a	a	a	a	a	a	▶	edit ^A / _B	3	6	9	12	15	18
b	b	b	b	b	b	b	b	b		⇒ (L)	3	6	9	12	15	18
c	c	c	c	c	c	c	c	c	random	⇒ (H)	3	6	9	12	15	18
d	d	d	d	d	d	d	d	d	M.scan	1	4	7	10	13	16	19
e	e	e	e	e	e	e	e	e	↺ (L)	1	4	7	10	13	16	19
f	f	f	f	f	f	f	f	f	Λ -	(H) 1	4	7	10	13	16	19
g	g	g	g	g	g	g	g	g	B	2	5	8	11	14	17	20
h	program	track	No.	index	—	min	col	sec	▶	(L) 2	5	8	11	14	17	20
i	A.cue	disc	-	link	level	-	-	-	>	(H) 2	5	8	11	14	17	20

BLOCK DIAGRAM

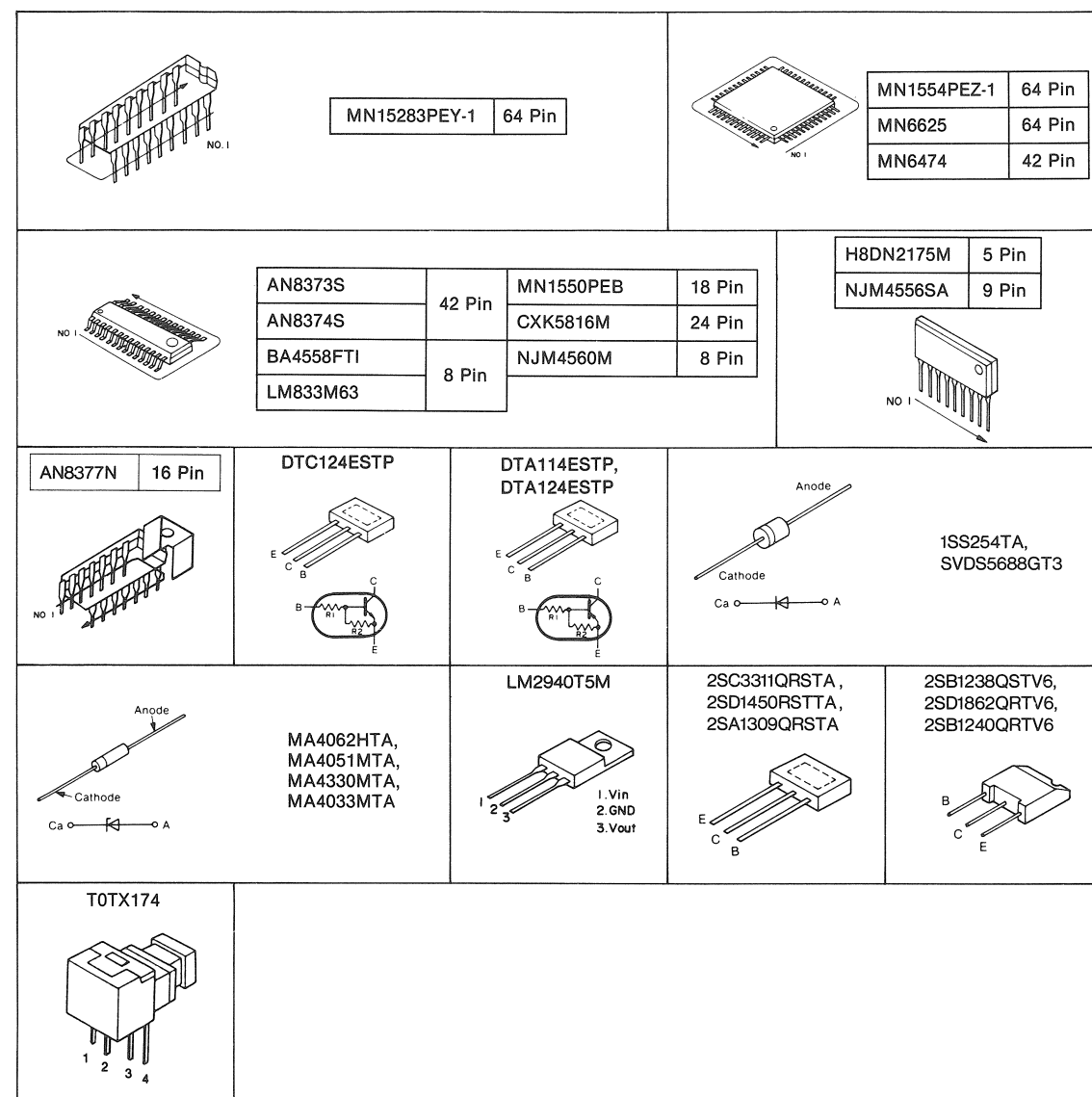




Note:

→ Audio signal

■ TERMINAL GUIDE OF IC'S, TRANSISTORS AND DIODES



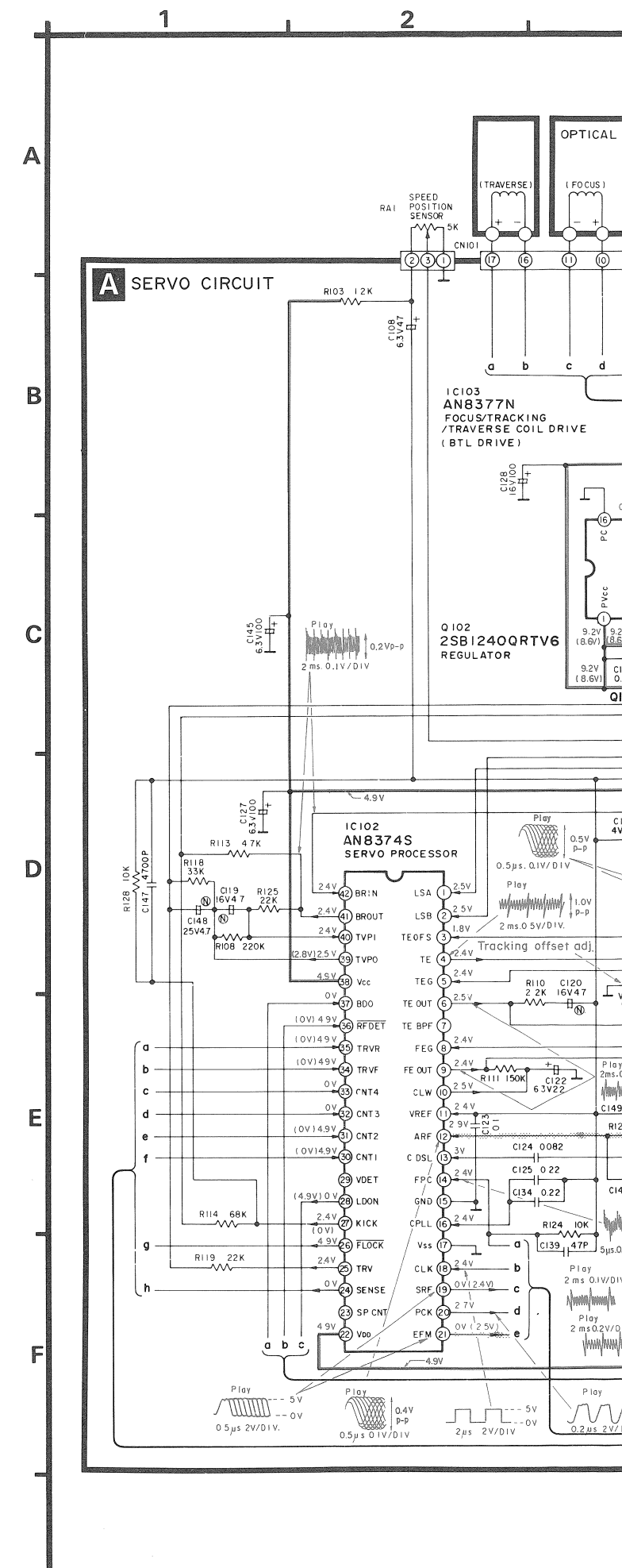
■ SCHEMATIC DIAGRAM (parts list on pages 41, 42, 48, 49.)

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

- S1: Power switch.
 - S101, S102: Disc holder open/close detection switches.
 - S601: Disc holder open/close switch.
 - S602, S603: Skip switches (S602; ◀◀, S603; ▶▶).
 - S604: Stop switch.
 - S605: Pause switch.
 - S606: Play switch.
 - S607~S618: Numeric switches.
(S607; +10, S608; 0, S609; 1, S610; 2, S611; 3, S612; 4, S613; 5, S614; 6, S615; 7, S616; 8, S617; 9, S618; 10)
 - S619: Edit tape length switch.
 - S620: Tape-side select switch.
 - S621: Disk link switch.
 - S622: Time mode select switch.
 - S623: Programmed-play switch.
 - S624: Clear switch.
 - S625: Recall switch.
 - S626: Repeat switch.
 - S627: Auto cue 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.



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(S607; +10, S608; 0, S609; 1, S610; 2, S611; 3, S612; 4, S613; 5, S614; 6, S615; 7, S616; 8, S617; 9, S618; 10)

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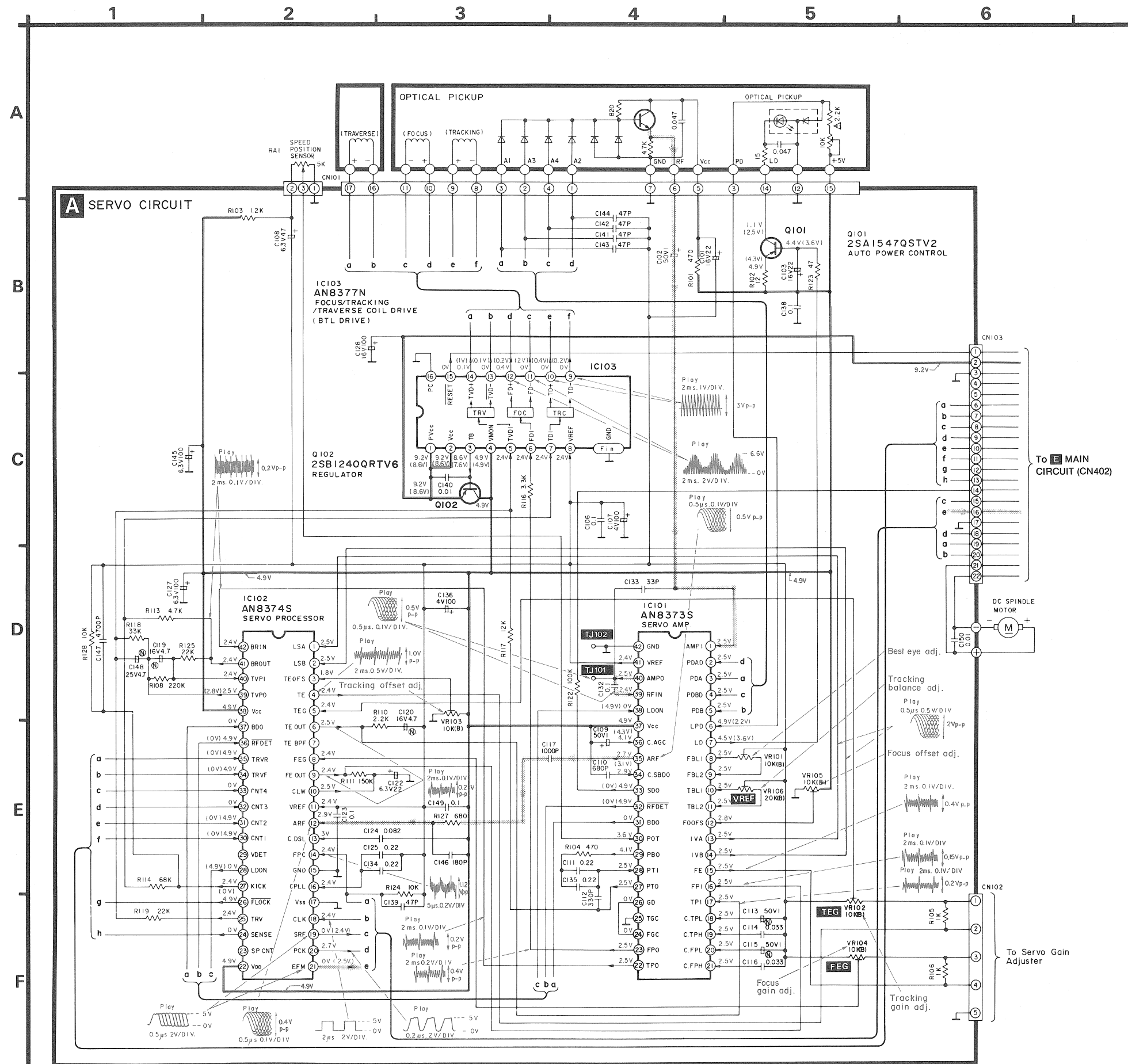
- $\text{---} \text{---} \text{---}$: audio signal lines.

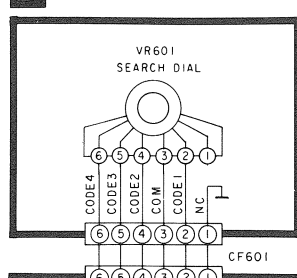
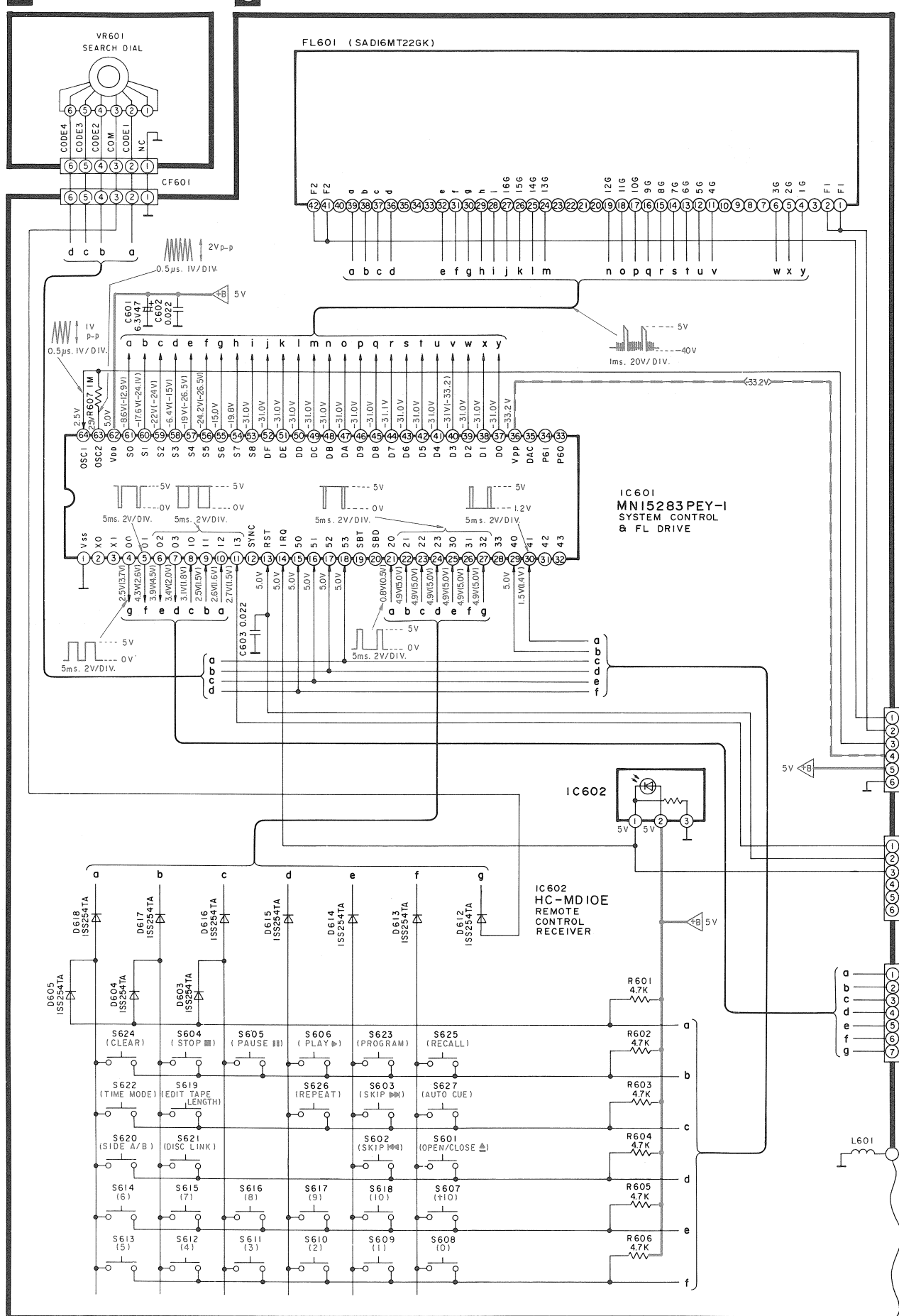
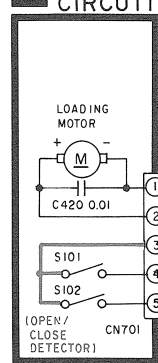
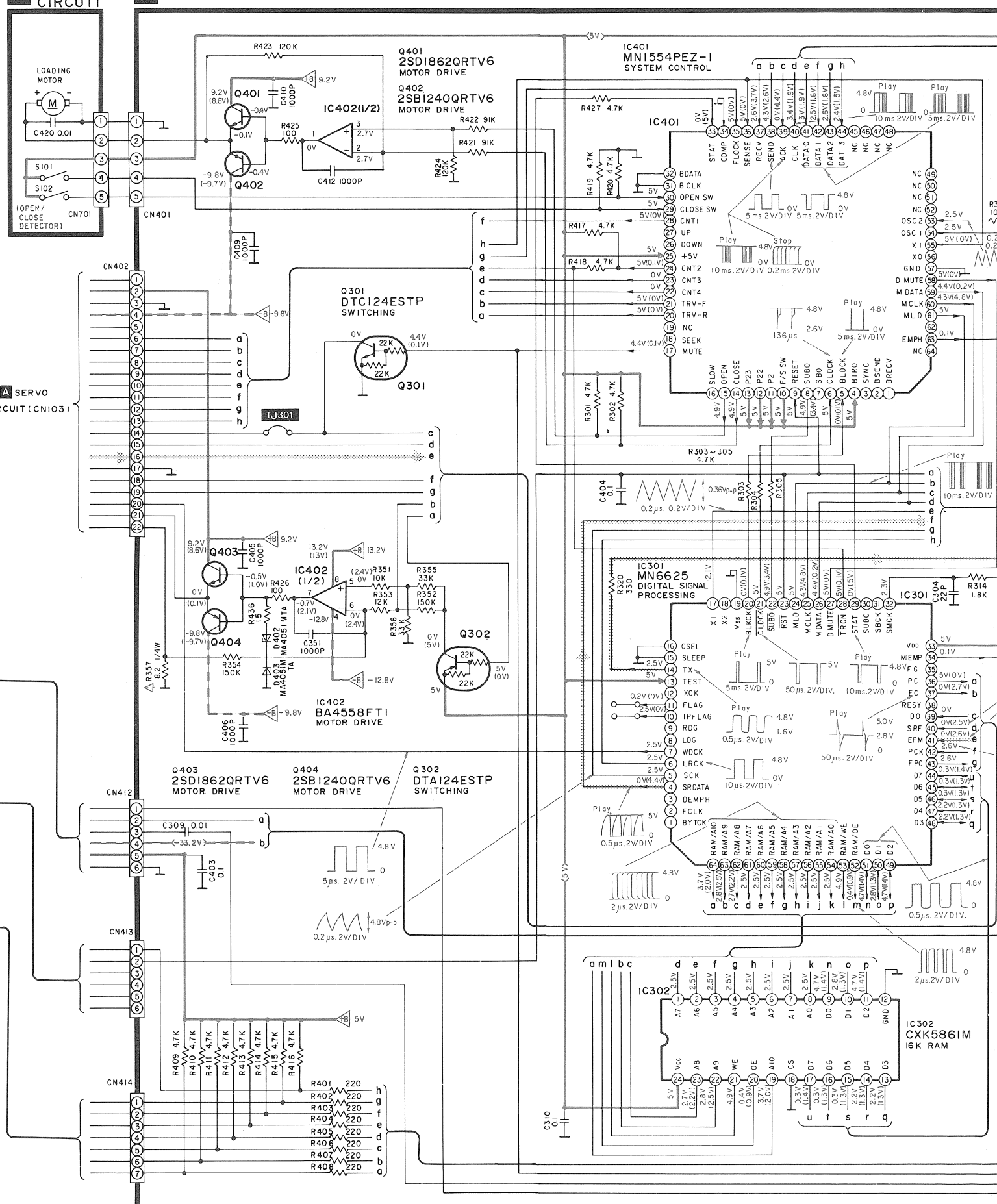
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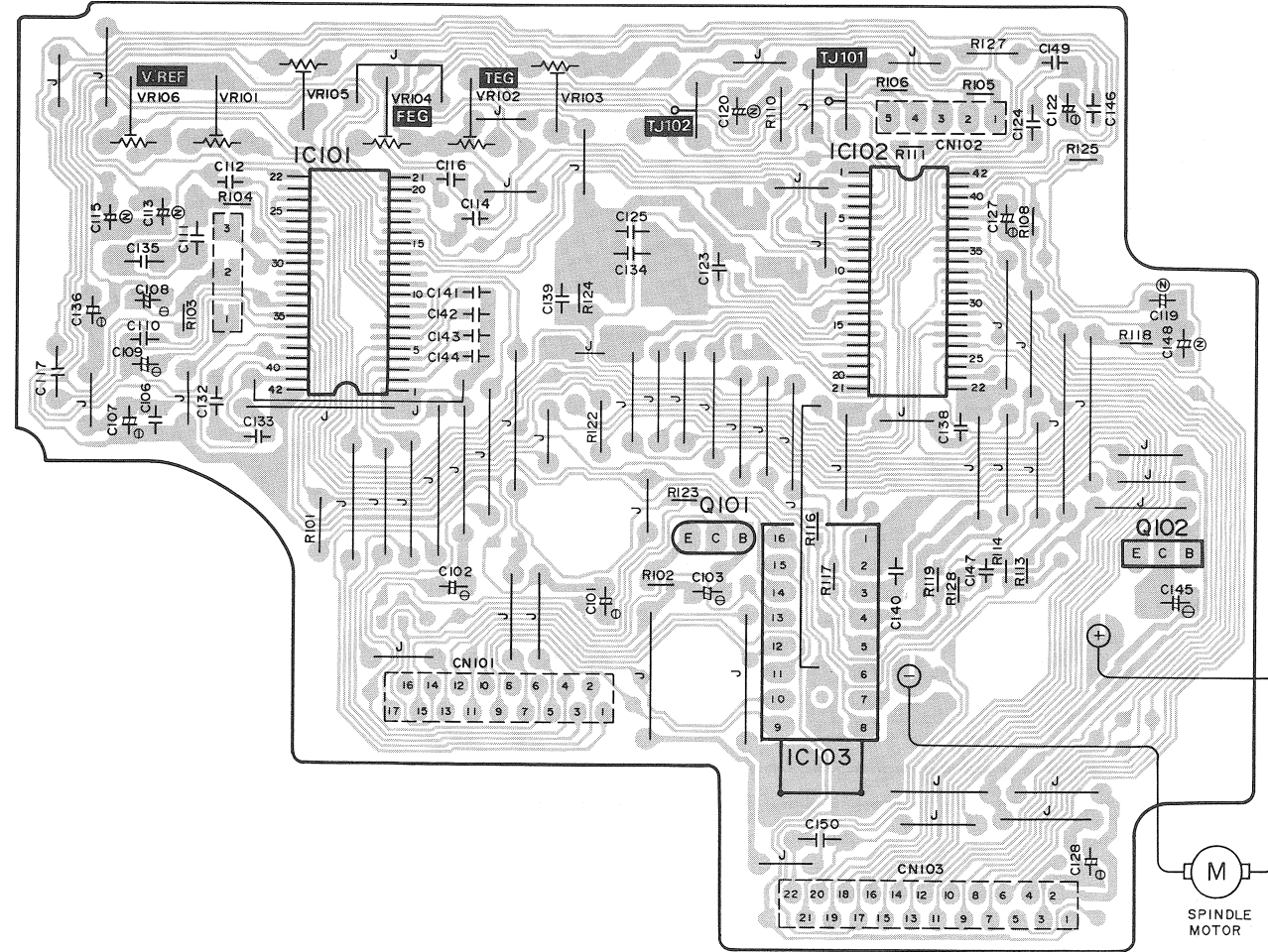
B SEARCH CIRCUIT**C** OPERATION CIRCUIT**D** MOTOR / SWITCH CIRCUIT**E** MAIN CIRCUIT



G HEADPHONES CIRCUIT

PRINTED CIRCUIT BOARDS

A

A SERVO P.C.B.

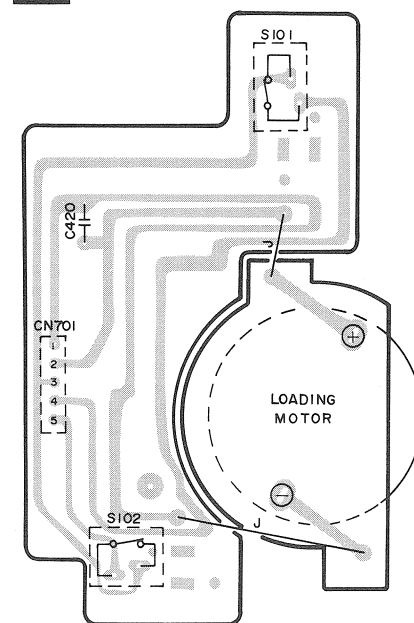
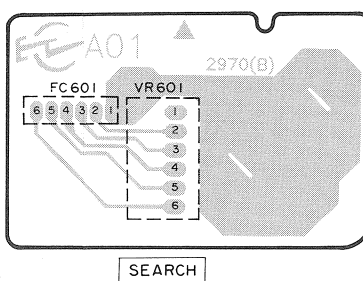
B

C

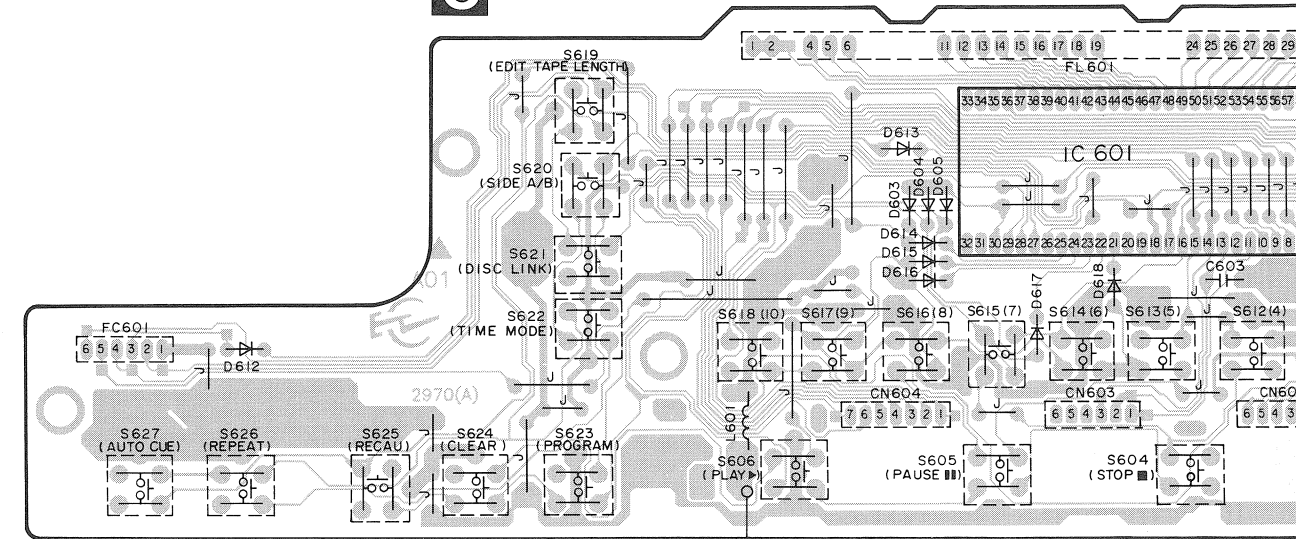
D

E

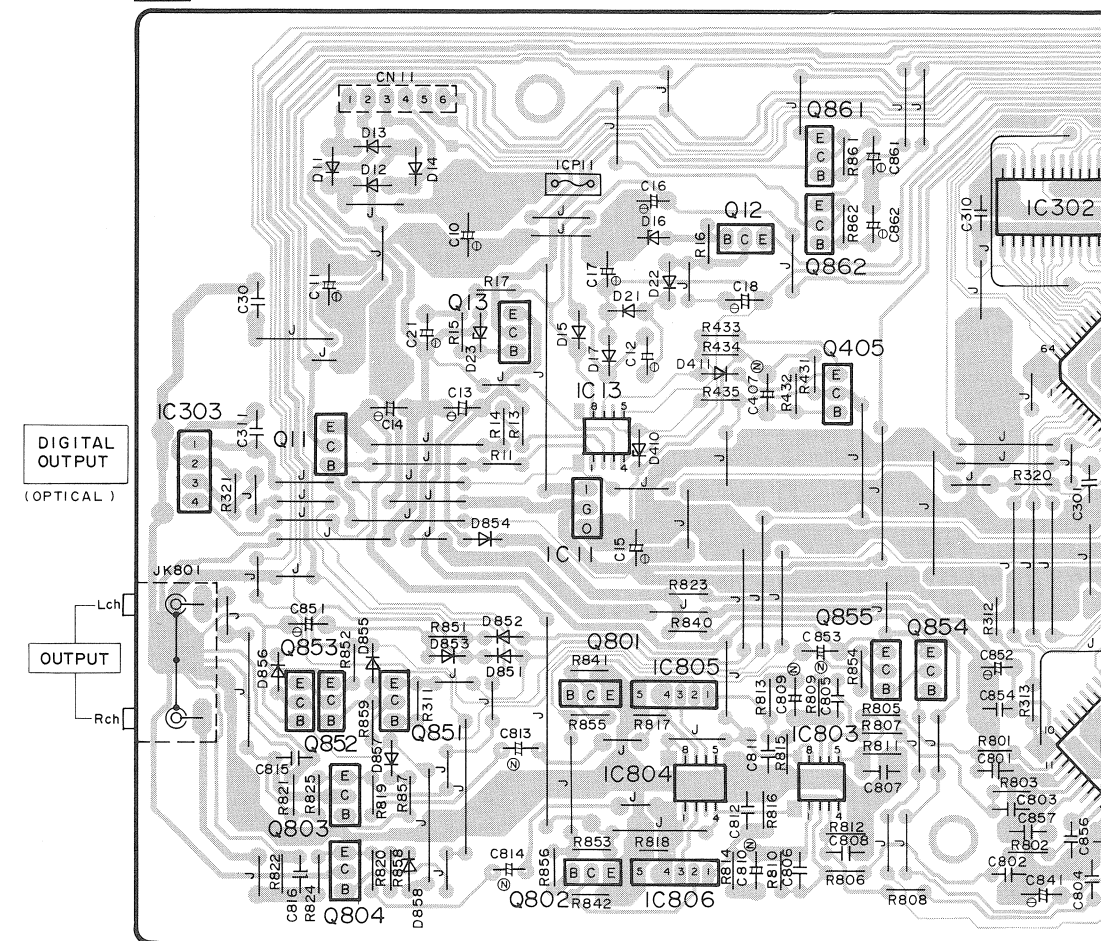
F

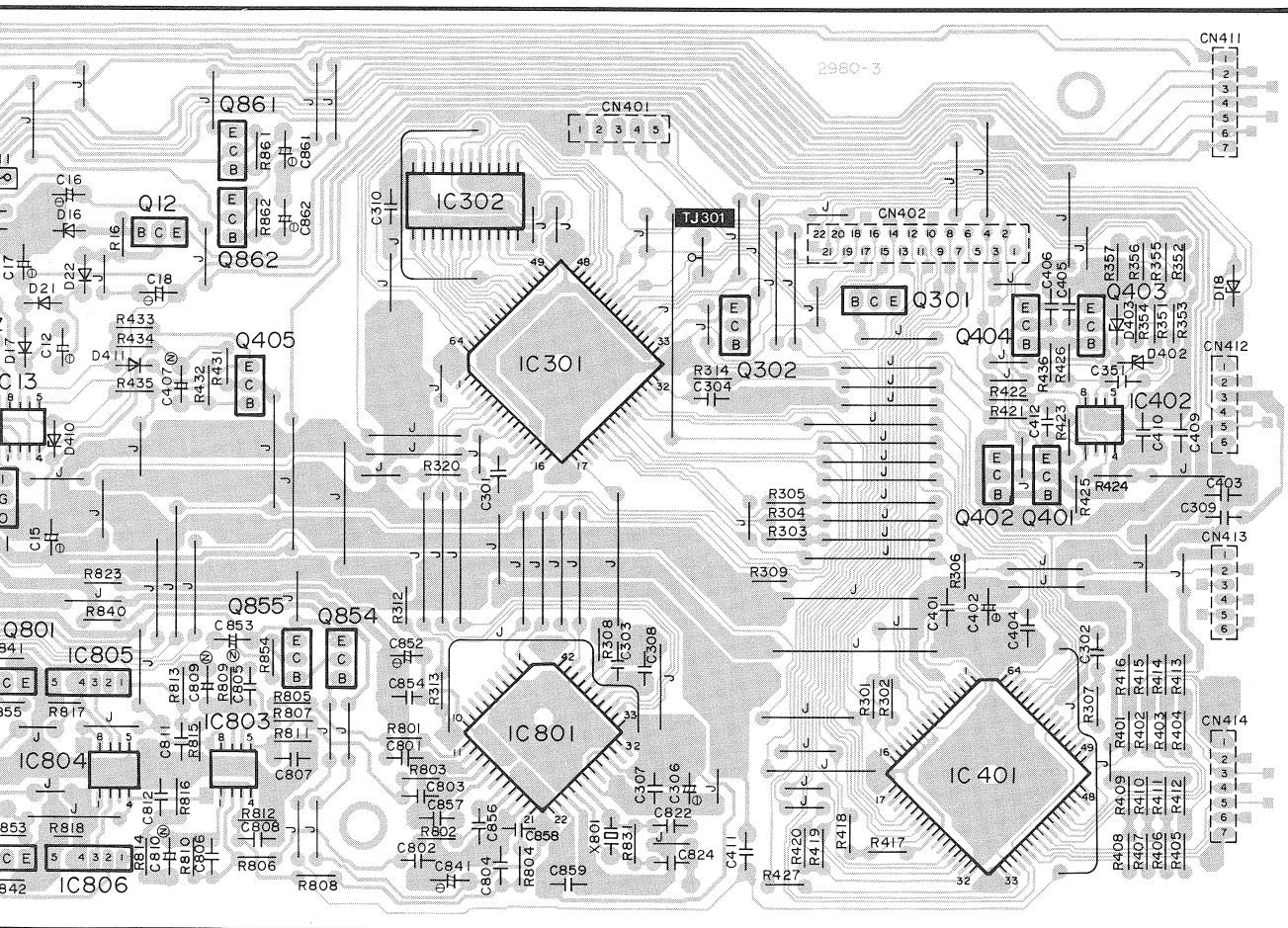
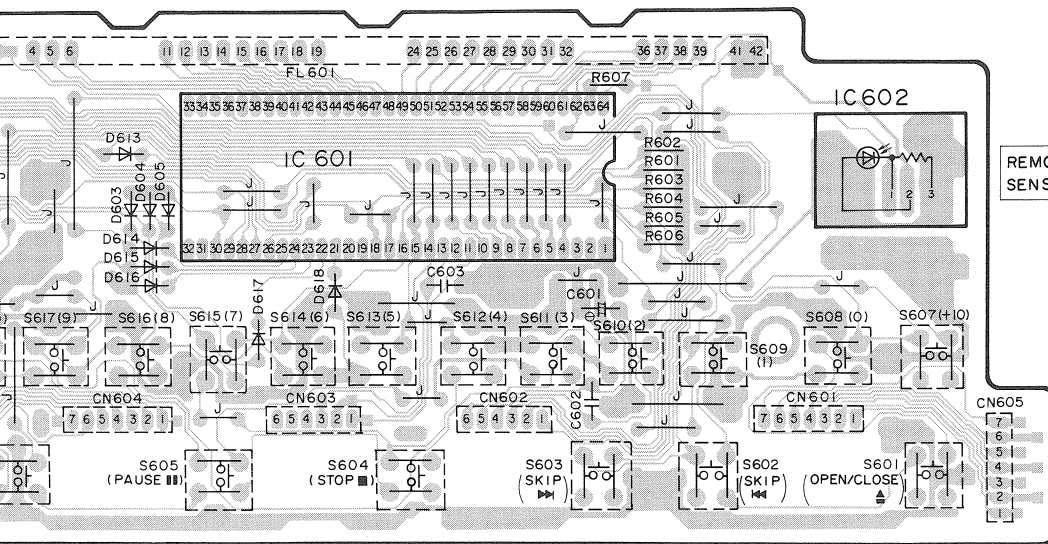
D MOTOR/SWITCH P.C.B.**B** SEARCH P.C.B.

C

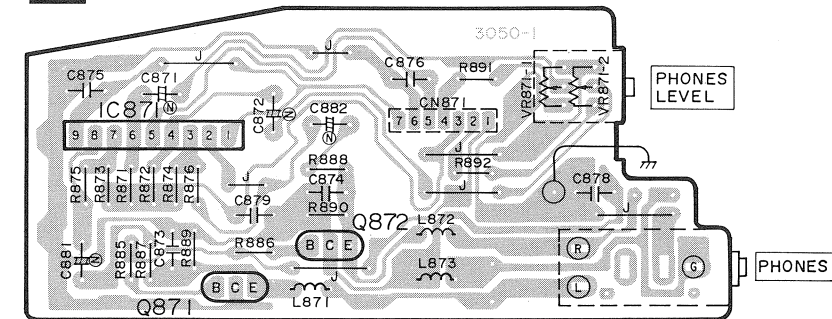
C OPERATION P.C.B.

E

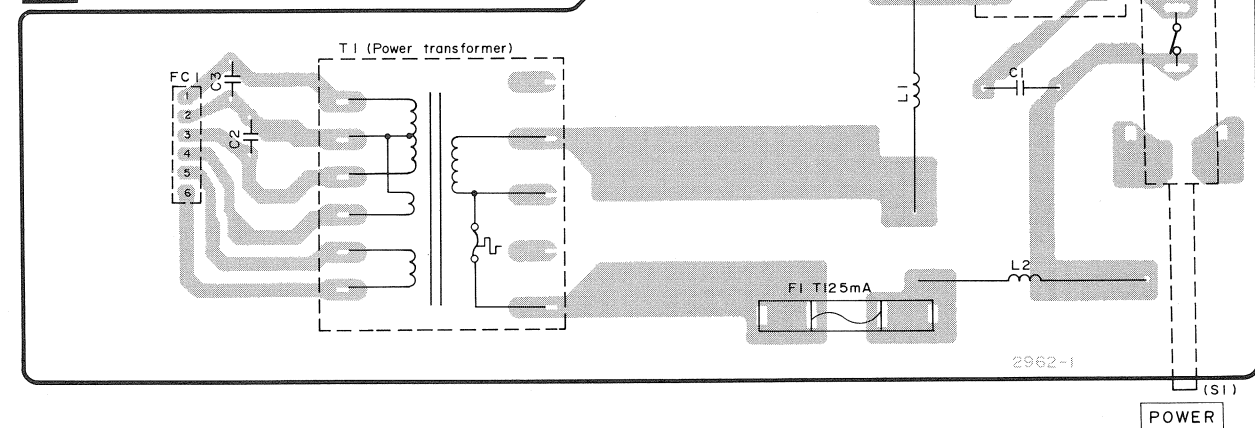
E MAIN P.C.B.



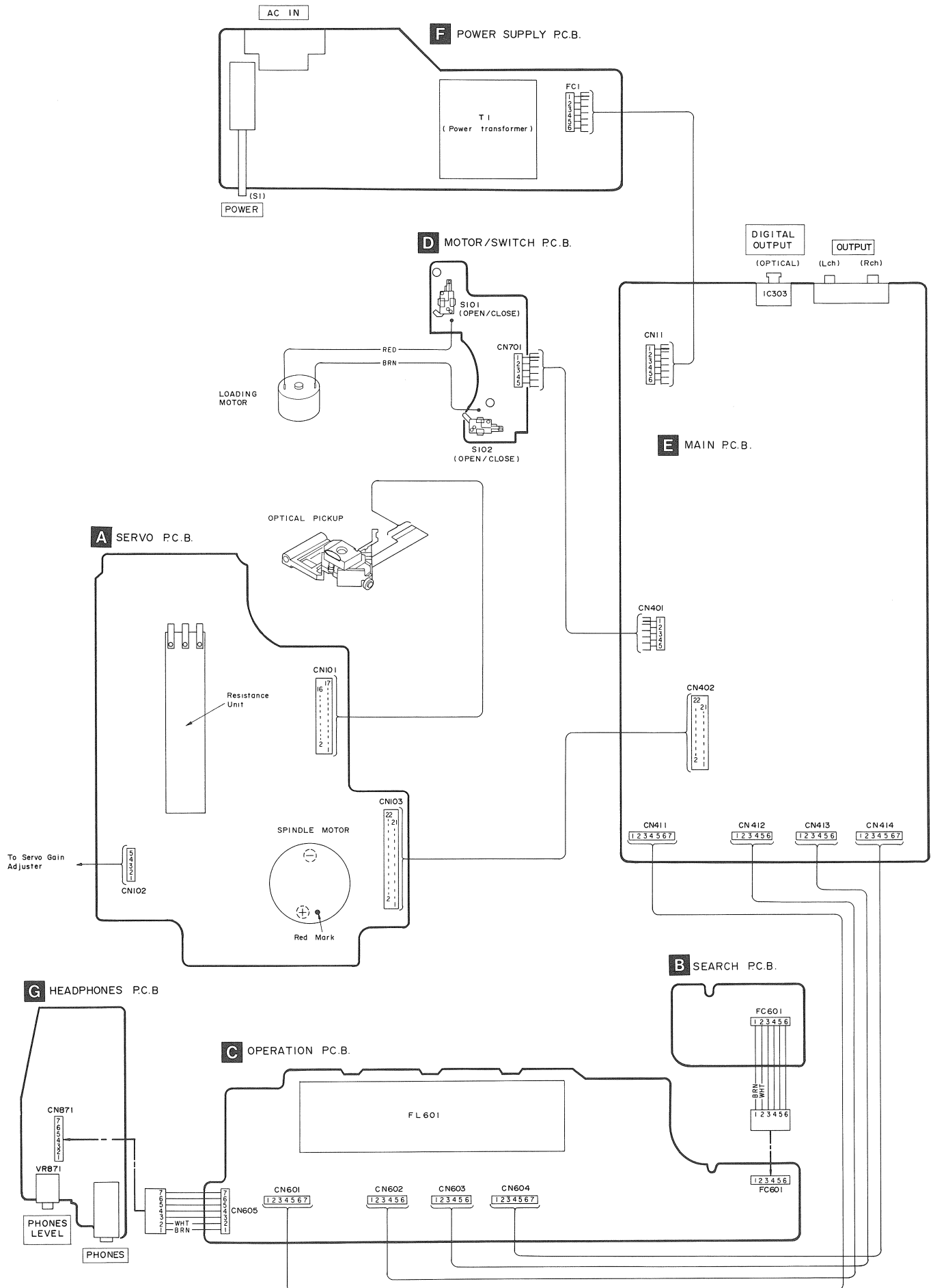
G HEADPHONES P.C.B.



F POWER SUPPLY P.C.B.



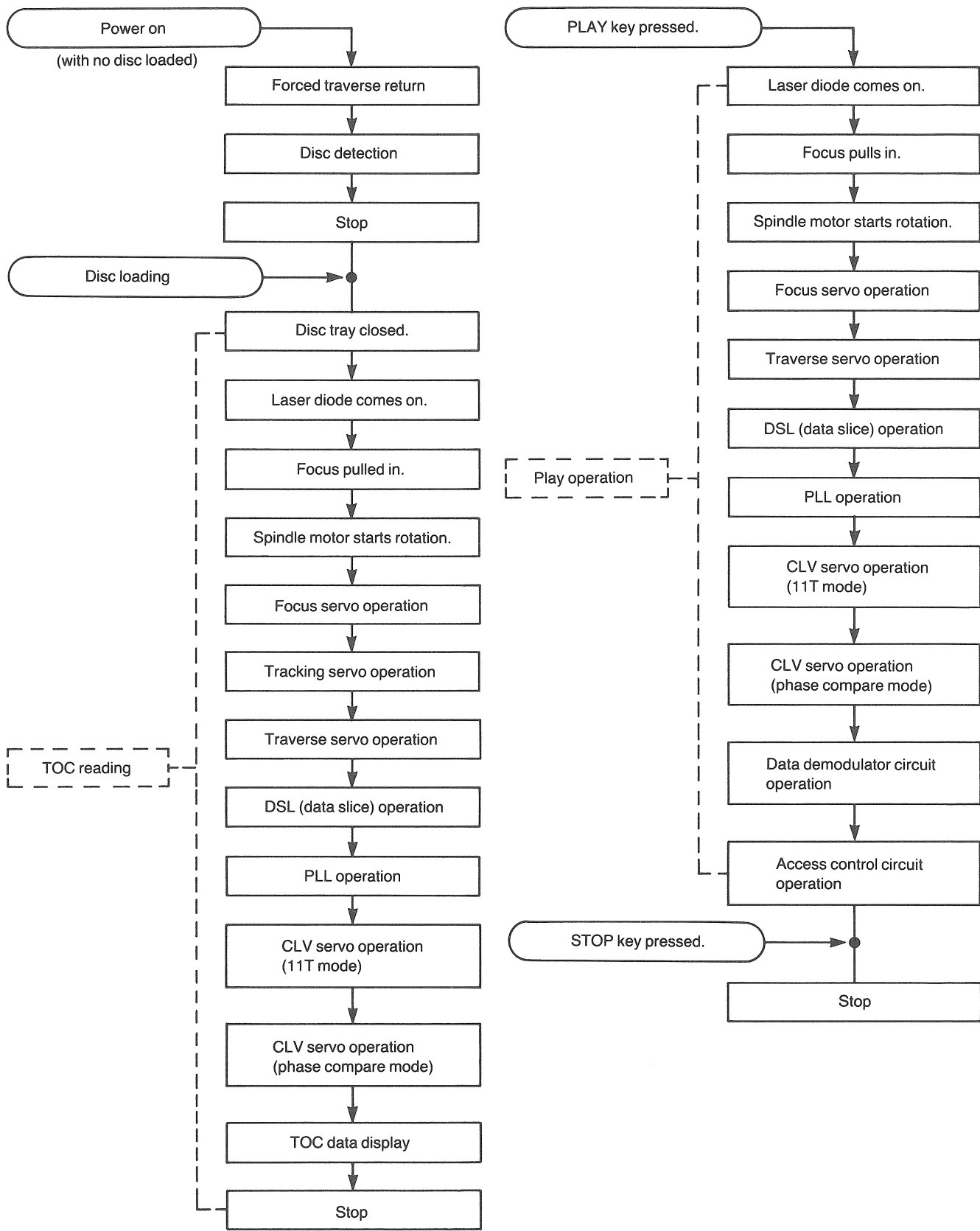
WIRING CONNECTION DIAGRAM



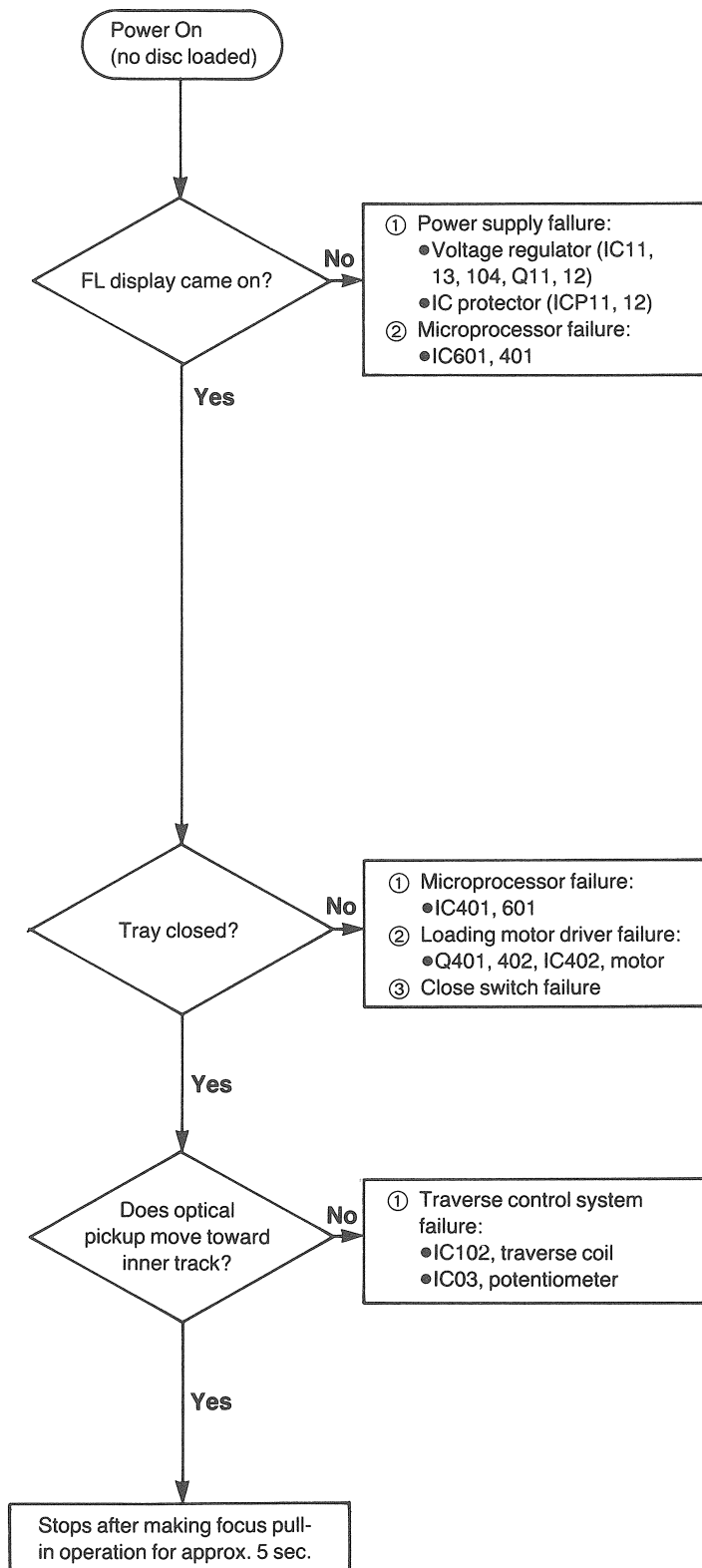
■ TROUBLESHOOTING GUIDE

SL-P470 Operation Sequence Check Sheet

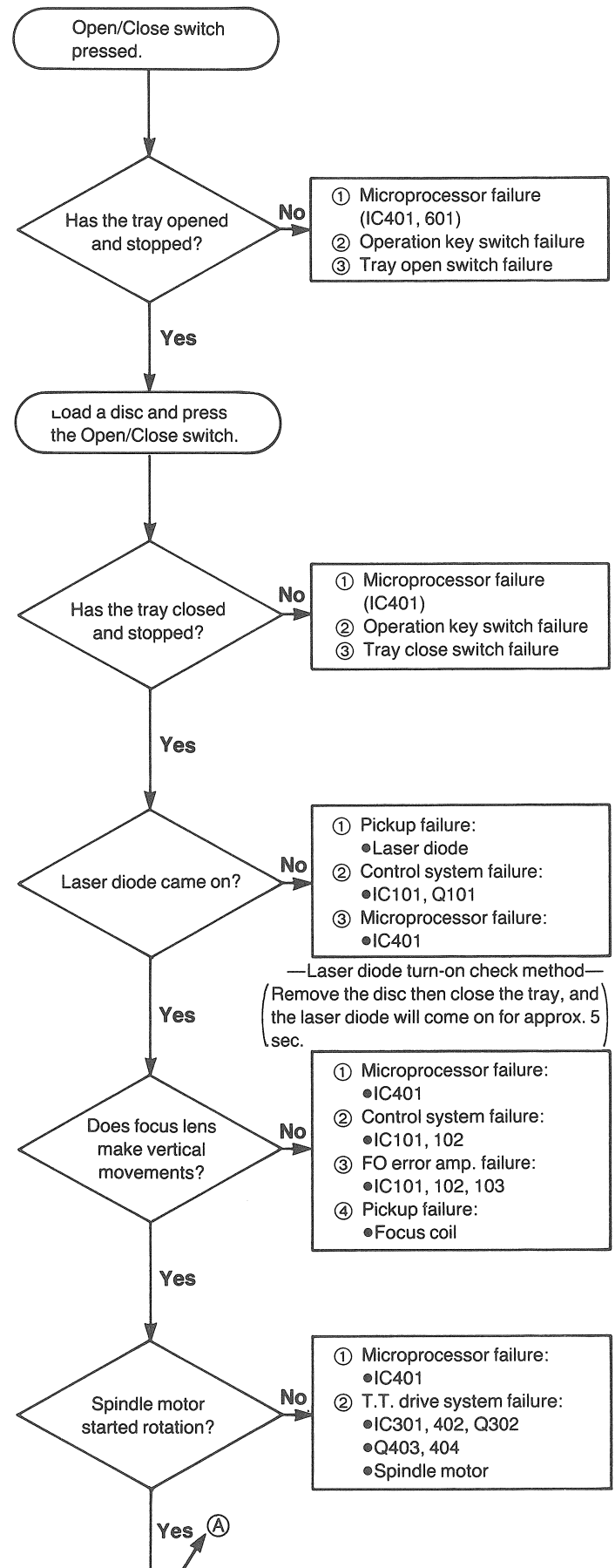
Play Operation Sequence

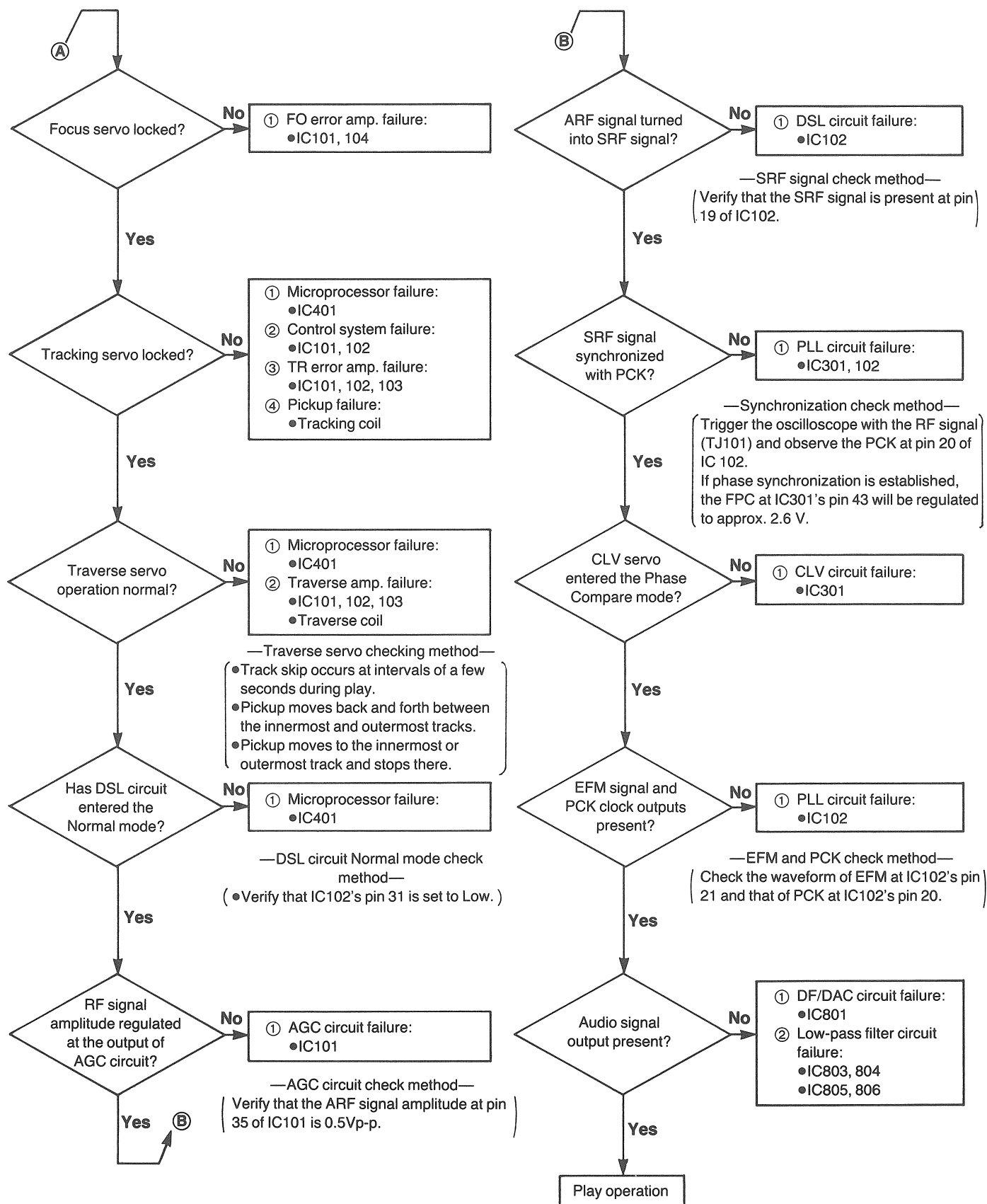


(Operation Sequence Just After Power On)



(TOC Read Operation-PLAY Operation)





REPLACEMENT PARTS LIST

Notes : * Important safety notice:

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

* The parenthesized indications in the Remarks columns specify the areas. (Refer to the cover page for area.)
Parts without these indications can be used for all areas.

Ref. No.	Part No.	Part Name & Description	Remarks	Ref. No.	Part No.	Part Name & Description	Remarks
		INTEGRATED CIRCUIT(S)		D18	MA4062HTA	DIODE	
				D21, 22	SVDS5688GT3	DIODE	
				D23	MA4062HTA	DIODE	
IC11	LM2940T5M	IC, REGULATOR		D402, 403	MA4051MTA	DIODE	
IC13	BA4558FT1	IC, RESET		D410	MA4033MTA	DIODE	
IC301	MN6625	IC, DIGITAL SIGNAL PROCESSOR		D411	1SS254TA	DIODE	
IC302	CXK5816M	IC, 16K RAM		D603-605	1SS254TA	DIODE	
IC303	TOTX174-A	IC, OPTICAL OUT		D612-618	1SS254TA	DIODE	
IC401	MN1554PEZ-1	IC, SYSTEM CONTROL		D851-858	1SS254TA	DIODE	
IC402	BA4558FT1	IC, MOTOR DRIVE				VARIABLE RESISTOR(S)	
IC601	MN15283PEY-1	IC, FL DRIVE					
IC602	HC-MD10E	IC, REMOTE SENSOR		VR601	EVQWVN00004E	V. R, SEARCH	
IC801	MN6474	IC, DIGITAL FILTER&D/A CONV.		VR871	EVU57A022A14	V. R, HEADPHONES VOLUME	
IC803	LM833M63	IC, BUFFER AMP					
IC804	NJM4560M	IC, BUFFER AMP				COIL(S)	
IC805, 806	H8DN2175M	IC, L. P. F					
IC871	NJM4556SA	IC, HEADPHONES AMP		L1, 2	SLQX400-D	COIL	$\triangle$
ICP11	SRUN15T	IC, PROTECTOR		L601	VLP0053	COIL	
		TRANSISTOR(S)		L871-873	ELEPK1R0KA	COIL	
						FUSE	
Q11	2SB1240QRTV6	TRANSISTOR		F1	XBA2C012TB0	FUSE	$\triangle$
Q12	2SB1238QSTV6	TRANSISTOR				TRANSFORMER	
Q13	2SD1862QRTV6	TRANSISTOR					
Q301	DTC124ESTP	TRANSISTOR		T1	SLTD5K097SE	POWER TRANSFORMER	$\triangle$
Q302	DTA124EST	TRANSISTOR				OSCILLATOR(S)	
Q401	2SD1862QRTV6	TRANSISTOR					
Q402	2SB1240QRTV6	TRANSISTOR		X801	SVQ49U338S	OSCILLATOR	
Q403	2SD1862QRTV6	TRANSISTOR				DISPLAY TUBE	
Q404	2SB1240QRTV6	TRANSISTOR		FL601	SAD16MT22GK	DISPLAY TUBE	
Q405	DTC124ESTP	TRANSISTOR				SWITCH(ES)	
Q801, 802	2SC3311QRSTA	TRANSISTOR		S1	ESB8249V	SW, POWER	$\triangle$
Q803, 804	2SD1450RSTTA	TRANSISTOR		S101	SSPD17-1	SW, LOADING DET.	
Q851	DTA124EST	TRANSISTOR		S102	SSPD18-1	SW, LOADING DET.	
Q852	DTC124ESTP	TRANSISTOR		S601	EVQQS705G	SW, OPEN/CLOSE	
Q853	DTA114ESTP	TRANSISTOR		S602	EVQQS705G	SW, SKIP (R)	
Q854	DTC124ESTP	TRANSISTOR		S603	EVQQS705G	SW, SKIP (F)	
Q855	DTA124EST	TRANSISTOR		S604	EVQQS705G	SW, STOP	
Q861	2SC3311QRSTA	TRANSISTOR		S605	EVQQS705G	SW, PAUSE	
Q862	2SA1309QRSTA	TRANSISTOR					
Q871, 872	2SD1450RSTTA	TRANSISTOR					
		DIODE(S)					
D11-15	SVDS5688GT3	DIODE					
D16	MA4330MTA	DIODE					
D17	SVDS5688GT3	DIODE					

Ref. No.	Part No.	Part Name & Description	Remarks	Ref. No.	Part No.	Part Name & Description	Remarks
S606	EVQQS705G	SW, PLAY		IC103	AN8377N	IC, B. T. L. DRIVE	
S607	EVQQS705G	SW, NUMERIC (+10)					
S608	EVQQS705G	SW, NUMERIC (0)				TRANSISTORS<SERVO P. C. B. >	
S609	EVQQS705G	SW, NUMERIC (1)					
S610	EVQQS705G	SW, NUMERIC (2)		Q101	2SA1547QSTV2	TRANSISTOR	
S611	EVQQS705G	SW, NUMERIC (3)		Q102	2SB1240QR	TRANSISTOR	
S612	EVQQS705G	SW, NUMERIC (4)					
S613	EVQQS705G	SW, NUMERIC (5)				<SERVO P. C. B>	
S614	EVQQS705G	SW, NUMERIC (6)				VARIABLE RESISTORS	
S615	EVQQS705G	SW, NUMERIC (7)					
S616	EVQQS705G	SW, NUMERIC (8)		VR101	EVND3AA00B14	V. R, BEST EYE ADJ.	
S617	EVQQS705G	SW, NUMERIC (9)		VR102	EVND3AA00B14	V. R, TRACKING GAIN ADJ.	
S618	EVQQS705G	SW, NUMERIC (10)		VR103	EVND3AA00B14	V. R, TRACKING OFFSET ADJ.	
S619	EVQQS705G	SW, EDIT TAPE LENGTH		VR104	EVND3AA00B14	V. R, FOCUS GAIN ADJ.	
S620	EVQQS705G	SW, SIDE A/B		VR105	EVND3AA00B14	V. R, FOCUS OFFSET ADJ.	
S621	EVQQS705G	SW, DISC LINK		VR106	EVND3AA00B24	V. R, TRACKING BALANCE ADJ.	
S622	EVQQS705G	SW, TIME MODE					
S623	EVQQS705G	SW, PROGRAM				<SERVO P. C. B>	
S624	EVQQS705G	SW, CLEAR				MAGNET RESISTOR ELEMENTS	
S625	EVQQS705G	SW, RECALL					
S626	EVQQS705G	SW, REPEAT		RA1	EWS7M0A00Q53	RESISTANCE UNIT	
S627	EVQQS705G	SW, AUTO CUE					
		SOCKET (S) & CONNECTOR (S)					
CN11	SJT30643-V	CONNECTOR (6P)					
CN401	SJT30543-V	CONNECTOR (5P)					
CN402	SJSD2221	CONNECTOR (22P)					
CN411	SJS50780WLM	SOCKET (7P)					
CN412, 413	SJS50680WLM	SOCKET (6P)					
CN414	SJS50780WLM	SOCKET (7P)					
CN601	SJT30747WL	CONNECTOR (7P)					
CN602, 603	SJT30647WL	CONNECTOR (6P)					
CN604	SJT30747WL	CONNECTOR (7P)					
CN605	EMCS0750ZL	CONNECTOR (7P)					
CN871	EMCS0750Z	CONNECTOR (7P)					
		FLAT CABLE (S)					
FC1	RWJ1806090KQ	FLAT CABLE					
FC601	SIKD552061	FLAT CABLE					
		JACK (S)					
JK801	RJH3201N	JACK, LINE OUT					
JK871	SJJ146B	JACK, HEADPHONE					
		<SERVO P. C. B>					
		INTEGRATED CIRCUITS					
IC101	AN8373S	IC, SERVO AMP					
IC102	AN8374S	IC, SERVO PROCESSOR					

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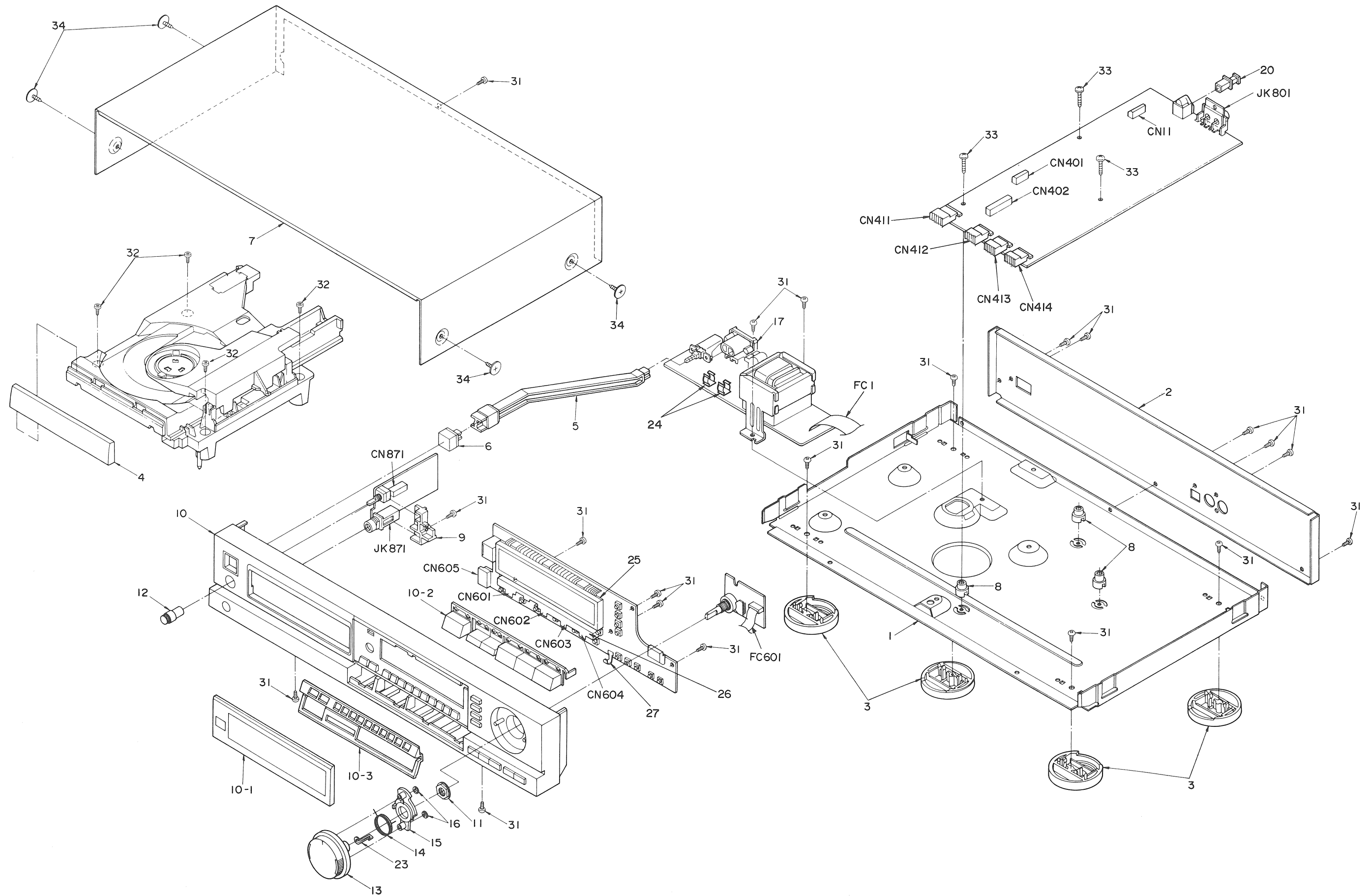
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Ref. No.	Part No.	Part Name & Description	Remarks	Ref. No.	Part No.	Part Name & Description	Remarks
		CABINET AND CHASSIS		P3	RPG0470	PACKING CASE	(K)
				P3	RPG0487	PACKING CASE	(S)
				P4	SPSD188	PAD (FL)	
1	SKUD250ZF0A	CHASSIS		P5	SPSD189	PAD (FR)	
2	RGR0055K-Q	REAR PANEL		P6	SPSD190	PAD (BL)	
3	SKLD8-E	FOOT		P7	SPSD191	PAD (BR)	
4	RGK0257-K	TRAY ORNAMENT	(K)	P8	XZB60X60A01	PROTECTION BAG (UNIT)	
4	SGXD3380MA0A	TRAY ORNAMENT	(S)			ACCESSORIES	
5	SUBD15-1	POWER SWITCH ROD					
6	SBC666-1	BUTTON, POWER	(K)	A1	EUR64779	REMOTE CONTROL TRANSMITTER	
6	SBC666	BUTTON, POWER	(S)	A2	RQA0013	WARRANTY CARD	
7	SKCD512KE1A	CABINET	(K)	A3	RQCB0169	SERVICENTER LIST	
7	SKCD512SW1A	CABINET	(S)	A4	RFKSLP470E-K	INST. MANUAL ASS'Y	
8	SHE185-2	P. C. B. SUPPORTOR		A5	SJA187	POWER CORD	
9	SHRD201	PLATE		A6	SJP2249-3	OUTPUT CORD	
10	RFKGLP470E-K	FRONT PANEL ASS'Y	(K)	A7	UM-4NE	BATTERY	
10	RFKGLP470E-S	FRONT PANEL ASS'Y	(S)	A8	UR64EC804	BATTERY COVER	
10-1	SGUD224	ORNAMENT				TRAVERSE DECK	
10-2	SBCD5291ZK0B	BUTTON, OPERATION	(K)				
10-2	SBCD5291MA0A	BUTTON, OPERATION	(S)	101	RFKNLP370PAK	DISC TRAY ASS'Y	
10-3	SGXD3371ZK0A	ORNAMENT	(K)	102	RMQ0044	PIN	
10-3	SGXD3371SW0A	ORNAMENT	(S)	103	SHRD150	ROLLER HOLDER	
11	SNE4021	NUT		104	SDRD12	ROLLER	
12	SBN1161-2	KNOB, HEADPHONE VOLUME	(K)	105	SUSD83	SPRING	
12	SBN1161-3	KNOB, HEADPHONE VOLUME	(S)	106	SIRD96-1	LOCK LEVER	
13	SBND120ZC0A	KNOB, SEARCH	(K)	107	SFUMZ15R61	WASHER	
13	SBND120MA0A	KNOB, SEARCH	(S)	108	SIRD98-3	DISC TRAY	
14	SUSD162-1	SPRING		109	SIRD107-1	TRAY BASE	
15	SHRD202	SPACER		110	SNSD36	SCREW	
16	CSTW-2	WASHER		111	SIRD40-2	RACK GEAR	
17	SJS9236	AC INLET		112	SIRD42-5	CLAMPER	
20	VJA1024	CAP		113	SOYD2	CLAMPER YOKE	
23	SHR9451	SPRING		114	SOMD4	CLAMPER MAGNET	
24	SJT390	FUSE HOLDER		115	SIRD51-1	CLAMPER HOLDER	
25	SUWD139-1	FL HOLDER		116	SDOD29-2	RING	
26	SUWD148	SHIELD PLATE		117	SRQA010N04	SPRING	
27	SUSD144	EARTH CONTACT		118	SDOD28-1E	TURNTABLE	
31	XTB3+8JFZ	SCREW		118-1	XXE26D5	SCREW	
32	XTB3+8F	SCREW		119	SISD22-1	TRAVERSE BASE	
33	XTB3+16JFZ	SCREW		120	SHGD148	STOPPER RUBBER	
34	SNE2129-1	SCREW	(K)	121	XYN2+C8	SCREW	
34	SNE2129	SCREW	(S)	122	SHGD153-1	CUSHION RUBBER	
		PACKING MATERIAL		123	SUSD137-1	SPRING (B)	
P1	SPSD152	ACCESSORIES BOX		124	SUSD136-1	SPRING (A)	
P2	XZB26X17C03	PROTECTION BAG (ACCESSORIES)		125	SUSD145-1	SPRING (C)	

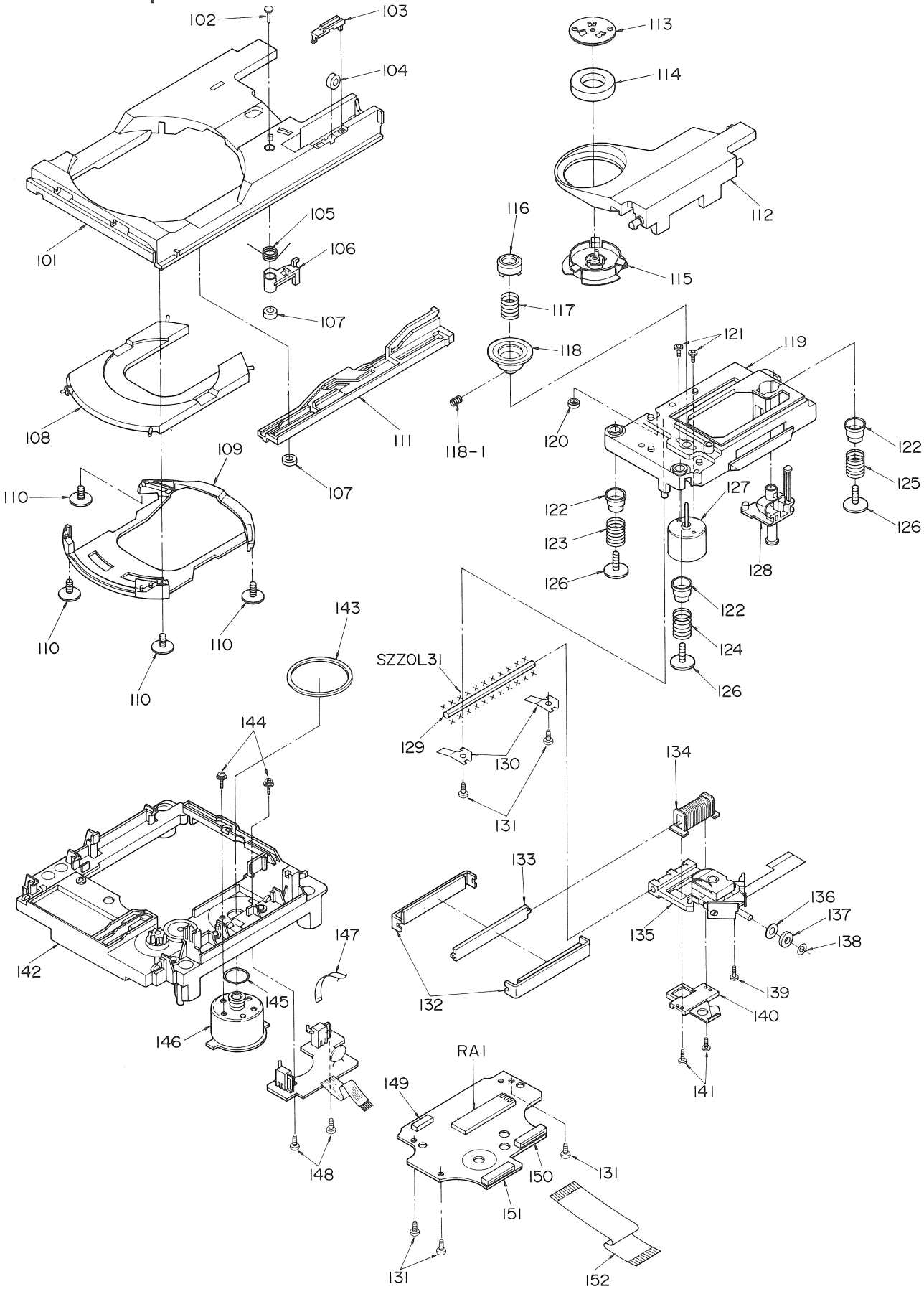
[illegible]

EXPLODED VIEWS

• Cabinet and chassis parts



• Traverse deck parts



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

■ RESISTORS AND CAPACITORS

Notes : * Capacity valuse are in microfarads (uF) unless specified otherwise, P=Pico-farads (pF) F=Farads (F)
* Resistance values are in ohms, unless specified otherwise, 1K=1, 000 (OHM) , 1M=1, 000k (OHM)

Ref. No.	Part No.	Values & Remarks	Ref. No.	Part No.	Values & Remarks	Ref. No.	Part No.	Values & Remarks
		RESISTORS						
R11	ERDS2TJ101T	1/4W 100	R851	ERDS2TJ102T	1/4W 1K	C809, 810	ECEA1EN3R3SB	25V 3.3U
R13, 14	ERDS2TJ103T	1/4W 10K	R852	ERDS2TJ471T	1/4W 470	C811, 812	ECBT1H102KB5	50V 1000P
R15	ERDS2TJ331T	1/4W 330	R853	ERDS2TJ333T	1/4W 33K	C813, 814	ECEA1CN220SB	16V 22U
R16	ERDS2TJ102T	1/4W 1K	R854	ERDS2TJ183T	1/4W 18K	C815, 816	ECBT1H102KB5	50V 1000P
R17	ERDS2TJ471T	1/4W 470	R855-859	ERDS2TJ102T	1/4W 1K	C822	ECBT1H5R6K5	50V 5.6P
R301-306	ERDS2TJ472T	1/4W 4.7K	R861, 862	ERDS2TJ102T	1/4W 1K	C824	ECBT1H5R6K5	50V 5.6P
R307	ERDS2TJ104T	1/4W 100K	R871, 872	ERDS2TJ103T	1/4W 10K	C841	ECEA0JU331B	6.3V 330U
R308	ERDS2TJ561T	1/4W 560	R873, 874	ERDS2TJ123T	1/4W 12K	C851	ECEA0JU471B	6.3V 470U
R309	ERDS2TJ472T	1/4W 4.7K	R875, 876	ERDS2TJ104T	1/4W 100K	C852	ECEA0JU331B	6.3V 330U
R311	ERDS2TJ472T	1/4W 4.7K	R885, 886	ERDS2TJ222T	1/4W 2.2K	C853	ECEA1CKN100B	16V 10U
R312, 313	ERDS2TJ100T	1/4W 10	R887, 888	ERDS2TJ680T	1/4W 68	C854	ECFR1E104ZF5	25V 0.1U
R314	ERDS2TJ182T	1/4W 1.8K	R889, 890	ERDS2TJ470T	1/4W 47	C856-859	ECFR1E104ZF5	25V 0.1U
R320	ERDS2TJ331T	1/4W 330	R891, 892	ERDS2TJ102T	1/4W 1K	C861, 862	ECEA1CU101B	16V 100U
R321	ERDS2TJ822T	1/4W 8.2K			CAPACITORS	C871, 872	ECEA1EKN3R3B	25V 3.3U
R351	ERDS2TJ103T	1/4W 10K	C1	ECKDKC103PF2	400V 0.01U Δ	C873, 874	ECQM1H103KF3	50V 0.01U
R352	ERDS2TJ154T	1/4W 150K	C2, 3	ECKM1H103ZFX	50V 0.01U Δ	C875, 876	ECFR1H103KB	50V 0.01U
R353	ERDS2TJ123T	1/4W 12K	C10	ECEA1CU332E	16V 3300U	C878, 879	ECFR1H103KB	50V 0.01U
R354	ERDS2TJ154T	1/4W 150K	C11	ECEA1CU222E	16V 2200U	C881, 882	ECEA1AN101XB	10V 100U
R355, 356	ERDS2TJ333T	1/4W 33K	C12	ECEA1VU101B	35V 100U			RESISTORS<SERVO P. C. B.>
R357	ERD25FVJ8R2T	1/4W 8.2 Δ	C13, 14	ECEA1AK101B	10V 100U	R101	ERDS2TJ471	1/4W 470
R401-408	ERDS2TJ221T	1/4W 220	C15	ECEA0JK470B	6.3V 47U	R102	ERJ6GEYJ120V	1/10W 12
R409-420	ERDS2TJ472T	1/4W 4.7K	C16, 17	ECEA1CU331B	16V 330U	R103	ERJ6GEYJ122	1/10W 1.2K
R421, 422	ERDS2TJ913T	1/4W 91K	C18	ECEA1VU101B	35V 100U	R104	ERJ6GEYJ471	1/10W 470
R423, 424	ERDS2TJ124T	1/4W 120K	C21	ECEA1CU221B	16V 220U	R105, 106	RRJ6GCJ102TE	1/6W 1K
R425, 426	ERDS2TJ101T	1/4W 100	C30	ECFR1E104ZF5	25V 0.1U	R108	ERJ6GEYJ224V	1/10W 220K
R427	ERDS2TJ472T	1/4W 4.7K	C301	ECFR1E104ZF5	25V 0.1U	R110	ERDS2TJ222	1/4W 2.2K
R431	ERDS2TJ472T	1/4W 4.7K	C302	ECBT1C103NS5	16V 0.01U	R111	ERJ6GEYJ154V	1/10W 150K
R432	ERDS2TJ101T	1/4W 100	C303	ECBT1H6R8K5	50V 6.8P	R113	ERJ6GEYJ472V	1/10W 4.7K
R433	ERDS2TJ153T	1/4W 15K	C304	ECBT1H220J5	50V 220P	R114	ERJ6GEYJ683V	1/10W 68K
R434	ERDS2TJ393T	1/4W 39K	C306	ECEA1AU101B	10V 100U	R116	ERJ6GEYJ332V	1/10W 3.3K
R435	ERDS2TJ102T	1/4W 1K	C307, 308	ECFR1E104ZF5	25V 0.1U	R117	ERJ6GEYJ123	1/10W 12K
R436	ERDS2TJ150T	1/4W 15	C309	ECBT1C103NS5	16V 0.01U	R118	ERJ6GEYJ333V	1/10W 33K
R601-606	ERDS2TJ472T	1/4W 4.7K	C310, 311	ECFR1E104ZF5	25V 0.1U	R119	RRJ6GCJ223TE	1/6W 22K
R607	ERDS2TJ105T	1/4W 1M	C351	ECBT1H102KB5	50V 1000P	R122	ERDS2TJ104	1/4W 100K
R801-804	ERDS2TJ103T	1/4W 10K	C401	ECFR1E104ZF5	25V 0.1U	R123	ERJ6GEYJ470V	1/10W 47
R805-808	ERDS2TJ273T	1/4W 27K	C402	ECEA0JK470B	6.3V 47U	R124	RRJ6GCJ103TE	1/6W 10K
R809-812	ERDS2TJ473T	1/4W 47K	C403, 404	ECFR1E104ZF5	25V 0.1U	R125	RRJ6GCJ222TE	1/6W 2.2K
R813, 814	ERDS2TJ221T	1/4W 220	C405, 406	ECBT1H102KB5	50V 1000P	R127	ERDS2TJ681	1/4W 680
R815, 816	ERDS2TJ474T	1/4W 470K	C407	ECEA1HK010B	50V 1U	R128	RRJ6GCJ103TE	1/6W 10K
R817, 818	ERDS2TJ103T	1/4W 10K	C409, 410	ECBT1H102KB5	50V 1000P			CAPACITORS<SERVO P. C. B.>
R819, 820	ERDS2TJ471T	1/4W 470	C411	ECFR1E104ZF5	25V 0.1U			
R821, 822	ERDS2TJ473T	1/4W 47K	C412	ECBT1H102KB5	50V 1000P			
R823-825	ERDS2TJ331T	1/4W 330	C420	ECKW1H103KB5	50V 0.01U	C101	ECEA1CKS220I	16V 22U
R831	ERDS2TJ472T	1/4W 4.7K	C601	ECEA0JK470B	6.3V 47U	C102	ECEA1HKS010I	50V 1U
R840	ERDS2TJ331T	1/4W 330	C602, 603	ECBT1E223ZF5	25V 0.022U	C103	ECEA1CKS220I	16V 22U
R841, 842	ERDS2TJ105T	1/4W 1M	C801-804	ECBT1H680J5	50V 680P	C106	RCUV1E104ZF	25V 0.1U
			C805-808	ECBT1H470J5	50V 47P	C107	ECEA0GKS101I	4V 100U

[illegible]

■ PACKING

