

Service Manual

COMPACT
disc
DIGITAL AUDIO

DIGITAL

Compact Disc Player

SL-PJ22

Color

(K)Black Type



Area

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

SPECIFICATIONS

■ Audio

Number of channels: 2 (left and right, stereo)
 Frequency response: 2 ~ 20,000 Hz (EIAJ)
 Dynamic range: 96dB
 S/N ratio: 96dB (EIAJ)
 Harmonic distortion: 0.003% (1kHz, 0dB)
 Total harmonic distortion: 0.004% (1kHz, 0dB) (EIAJ)
 Channel separation: 90dB (EIAJ)
 Wow and flutter: Below measurable limit
 Low-pass filter: High-resolution digital filter

■ Signal Format

Sampling frequency: 44.1kHz
 Correction system: Technics Super Decoding Algorithm
 D-A conversion: 16-bit linear

■ Pickup

Access time: 1 second
 (access to the last track)
 Light source: Semiconductor laser
 Wavelength: 780nm
 Traverse system: High-speed linear access system

■ Functions

Automatic play: All tracks
 Direct access play: Track number
 Repeat play: Entire disc or programmed tracks
 Search: Forward/backward track skip
 Forward/backward manual search
 Program play: For up to 20 selections
 CD edit recording
 Display: Total tracks (up to 99)
 Programmed track
 Current track
 Time display (min., sec.)
 Time modes display
 Indicators: Music matrix (15)
 Overflow indicator
 Disc indicator
 Edit indicator
 Tape side A/B indicator
 Repeat indicator
 Play indicator
 Pause indicator
 Motor-driven horizontal type
 Disc loading: 1/8 inch
 Synchro recording terminal:

Technics

Matsushita Electric Trading Co., Ltd.
 P.O. Box 288, Central Osaka Japan

Panasonic Tokyo Office
 Matsushita Electric Trading Co., Ltd.
 6th Floor, World Trade Center Bldg.,
 No. 4-1, Hamamatsu-cho 2-Chome, Minato-ku,
 Tokyo 105, Japan

■ General

Power supply:

For United Kingdom and Australia:
AC240V,50Hz
For Continental Europe:
AC220V,50Hz
For Others:
AC110~127V/220~240V,50/60Hz

Power consumption:

10W

Output voltage:

2V (at 0dB) (EIAJ)

Output impedance:

Approx. 600Ω

Load impedance:

More than 10kΩ

Dimensions (W×D×H):

36 X 28 X 7.7 cm
< When disc holder is opened:
42 cm (D) >
3.3kg

Weight:

Specifications are subject to change without notice.
Weight and dimensions are approximate.
Measured by EIAJ (CP-307).

■ CONTENTS

	Page		Page
PRECAUTION OF LASER DIODE	2	RESISTORS AND CAPACITORS	21
LOCATION OF CONTROLS	3	TERMINAL GUIDE OF IC'S, TRANSISTORS AND DIODES	22
HANDLING PRECAUTIONS FOR OPTICAL PICKUP	6	BLOCK DIAGRAM	23
BEFORE USING THIS UNIT	6	PRINTED CIRCUIT BOARD AND WIRING CONNECTION DIAGRAM	26
DISASSEMBLY INSTRUCTIONS	7	SCHEMATIC DIAGRAM	29
MEASUREMENTS AND ADJUSTMENTS	11	TERMINAL FUNCTION OF LSI	33
EXPLODED VIEW	17		
REPLACEMENT PARTS LIST	19		

■ PRECAUTION OF LASER DIODE

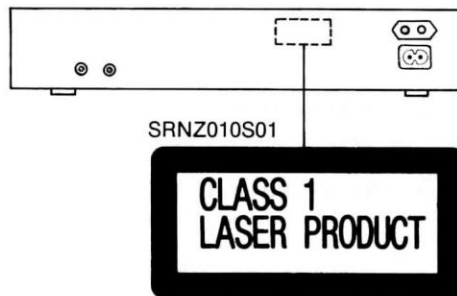
Caution: This product utilizes a laser diode.

ADVARSEL: I dette a apparat anvendes laser.

• Use of caution labels

Note: ○ Mark is used, × Mark is not used.

Areas	SRNZ010S01	SRNZ010S02	SQWD48	SQWD47
[E]	○	○	○	○
[EK], [XL], [EG], [EB], [EH], [EF], [Ei], [XA], [XB]	○	○	×	○



Obs:

Apparaten innehåller laser
Komponent av höger laserklass
än klass 1.

SQWD48

ADVARSEL - Usynligt
laserlys udstråles ved
åbning. UNDGÅ DIREKTE
BESTRÅLING.

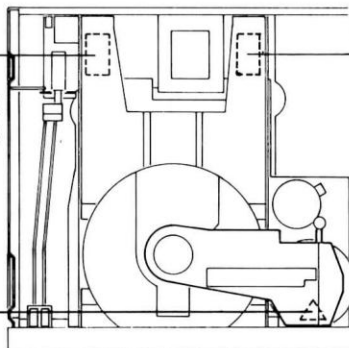
VAROITUS! Laite sisältää
laserdiodin, joka lähettää
näkymätöntä silmille
vaarallista lasersäteilyä



SRNZ010S02

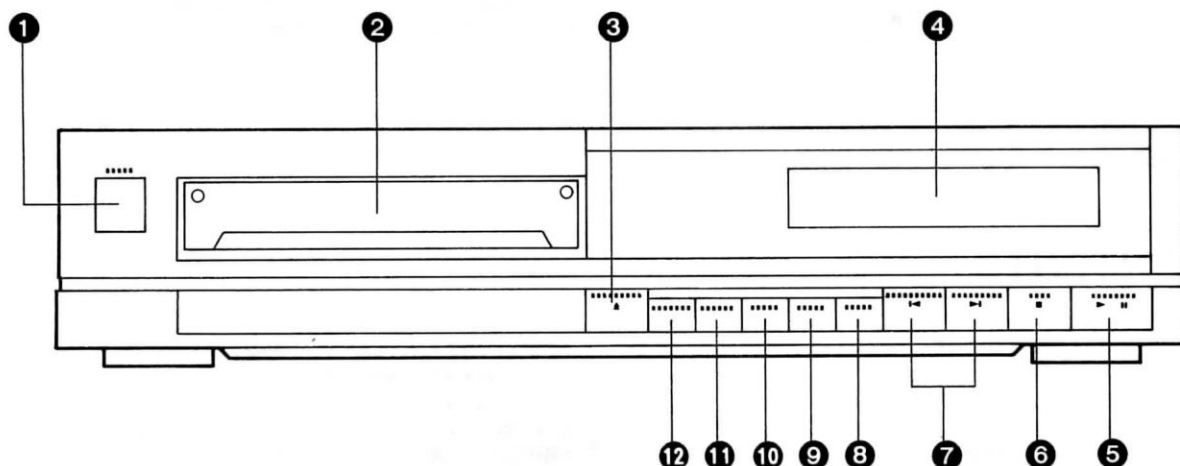
SQWD47

DANGER-Invisible laser
radiation when open.
AVOID DIRECT EX-
POSURE TO BEAM.



■ LOCATION OF CONTROLS

Front Panel



1 Power (mains) switch

Press (I) to switch power (mains) on.
Press again (II) to switch power (mains) off.

2 Disc holder

The disc is inserted in this holder with the label side up.

3 Open/close button

Press this button to open and close the disc holder.

4 Display panel

(Please refer to items (4A) to (4F).)

5 Play/pause button

This button is used for the following three operations.

1. If the button is pressed while the unit is in the stop mode or in the pause mode, play begins and the play indicator illuminates.
2. If the button is pressed during play, the unit goes to the pause mode, and the pause indicator illuminates.
3. If the synchro-recording cord is properly connected, pressing this button when the unit is in the stop or pause modes causes the amplifier's input selector to switch to "CD" automatically.

Pickup:

The pickup is a laser device that reads the information on the disc surface. The pickup moves across the disc as the disc is played, but it is not visible from outside the cabinet.

Pause mode:

Play is stopped, but the pickup remains where it was at the time when the play/pause button was pressed. The disc rotates while the unit is in the pause mode.

6 Stop button

Press this button to stop disc play and cancel all previous settings.

Note:

When this button is pressed, the unit returns to the stop mode.

Stop mode:

In the stop mode, the pickup is at the beginning of the first track and the display shows the total number of tracks and total playing time of the disc. (The disc does not rotate.)

7 Forward and backward skip/search buttons

These buttons are used for the following five operations.

1. To program track numbers before starting play (program play).

Press either button before starting play.

2. To start play from a specific track (direct access play).

Press either button before starting play.

3. To skip to the beginning of a specific track (skip play).

Press either button for an instant (less than one second) during play or the pause mode.

(The number of tracks skipped is the same as the number of times one of these buttons is pressed.)

4. To move the pickup forward or backward to a desired point (manual search play).

Keep either button pressed and release it when it reaches the desired point.

The pickup moves slowly at first and then rapidly if one of the skip/search buttons is held down for more than about 3 seconds.

5. To specify playing time (min.) (preset edit play).

8 Repeat button

Press this button to activate the repeat mode. (The repeat indicator illuminates.)

Press again to cancel the repeat mode.

9 Recall button

Press this button to display the program play sequence in the memory.

When this button is pressed, the tracks stored in the memory for program play are shown one by one.

10 Clear button

Press this button to cancel the programmed track when the unit is in the stop mode.

Each time this button is pressed, the previous entry is cancelled.

11 Memory button

Press this button to enter track numbers before starting play (program play).

(A maximum of 20 selections can be programmed.)

•The letter "F" (FULL) will be displayed if more than 20 memory selection are attempted.

12 Time mode select button

Use this button to select the desired time display mode.

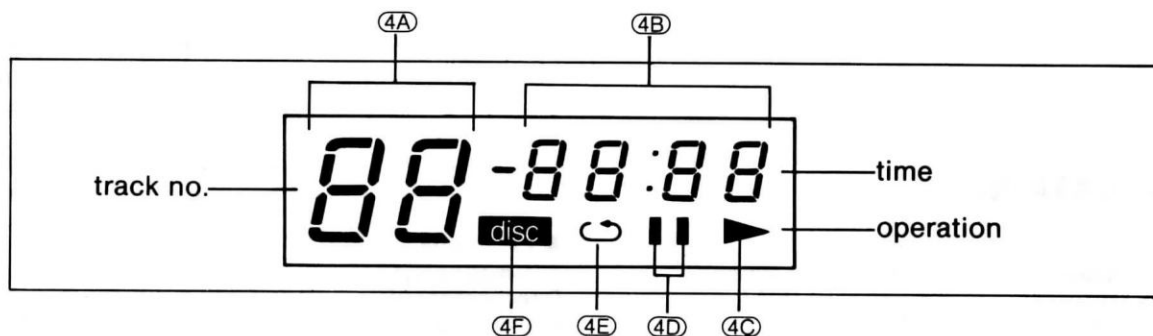
① Disc remaining playing time.

② Track number and remaining playing time of the current track.

③ Playing time from the beginning of the first track.

④ Track number and elapsed playing time from the beginning of the current track.

Display panel



4A Track number display (track)

Track numbers (up to 99) are shown here.

4B Time display

This display shows four time modes and programmed order

4C Play indicator (▶)

Illuminates when the play mode is activated and goes out when the play is stopped.

4D Pause indicator (||)

Illuminates when the pause mode is activated and goes out when the pause mode is cancelled.

4E Repeat indicator (↺)

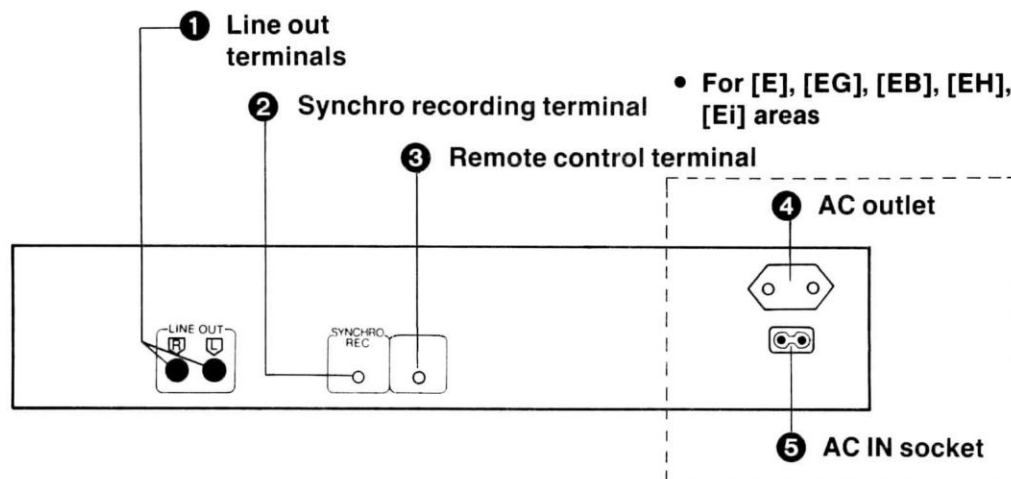
Illuminates when the repeat mode is activated and goes out when the repeat mode is cancelled.

4F Disc indicator (disc)

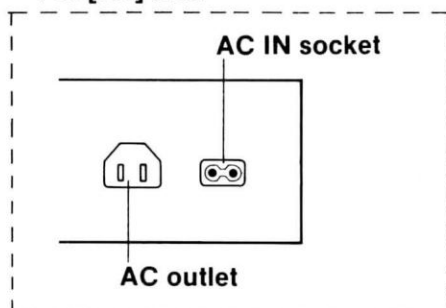
Flashes on and off when the disc holder is opening or closing.

Illuminates when a disc is in the holder (if power is on) and the disc holder is closed.

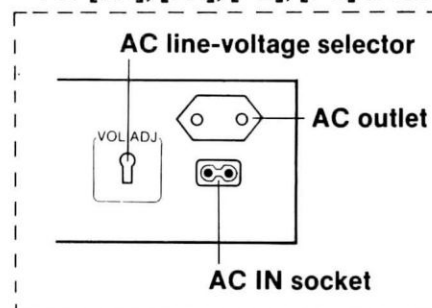
Rear panel



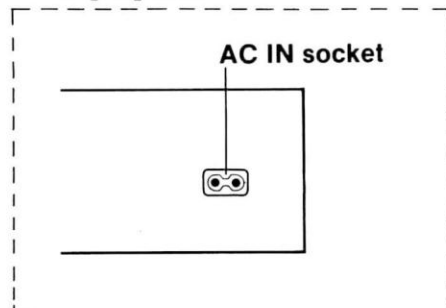
• For [EK] area



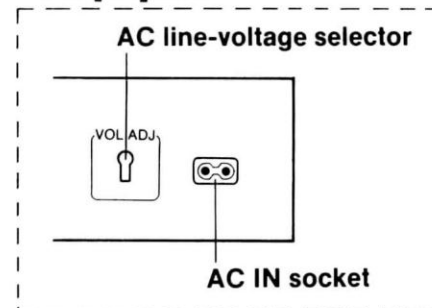
• For [XA], [PA], [PE], [PC] areas



• For [XL] area



• For [XB] area



1 Line out terminals (LINE OUT)

These are the audio output terminals.

- Connect the line out terminals to the CD or AUX terminals on your amplifier or receiver.
- Do not connect the line out terminals to the PHONO terminals of your amplifier or receiver.

2 Synchro recording terminal (SYNCHRO REC)

- Connect the synchro recording cord to the CD synchro recording terminal of your amplifier.

■ Synchro recording function

Recording can be synchronized with the beginning and end of disc play and pause operation.

Note:

This terminal can be used only with Technics amplifiers or cassette decks having a synchro recording terminal for a CD player. (Contact your dealer for details.)

3 Remote control terminal (REMOTE)

***Note:** This terminal can be used only with Technics amplifiers or cassette decks (or graphic equalizers) having a remote control terminal for a CD player. (Contact your dealer for details.)

4 AC outlet

■ "SWITCHED" outlet

Power (mains) is connected by power (mains) switch of the amplifier or tuner. Audio equipment rated up to 50 W can be connected.

5 AC IN socket (~ AC IN)

Connect this socket to a wall socket or an AC outlet using the power (mains) cord.

[The configuration of AC power (mains) plug may differ according to the area.]

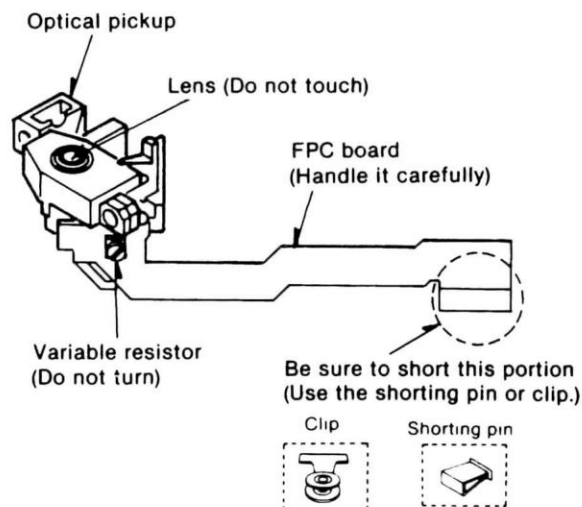
■ HANDLING PRECAUTIONS FOR OPTICAL PICKUP

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.

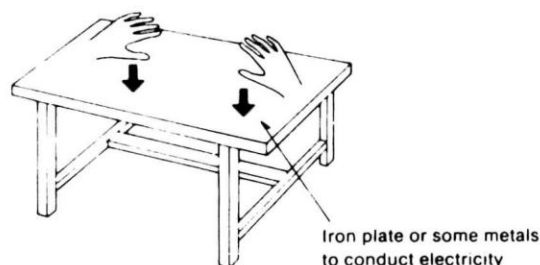
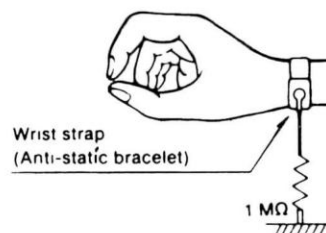


• Grounding for electrostatic breakdown prevention

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.

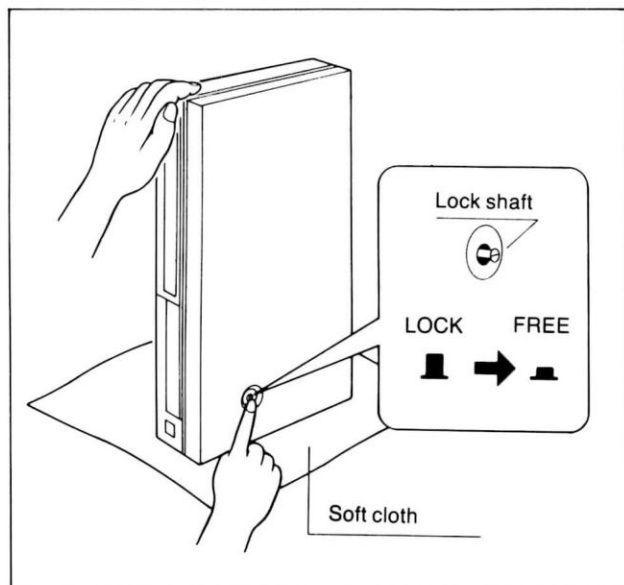
Caution:

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.



■ BEFORE USING THIS UNIT

1. Place a soft cloth under the unit to protect it from scratches.
2. Press the lock shaft on the bottom panel to the in (FREE) position (■ → ■).



NOTE:

IF THE UNIT IS TRANSPORTED AGAIN, PERFORM THE FOLLOWING STEPS:

- 1) Remove the disc from the holder.
- 2) Pull the lock shaft to the out (LOCK) position (■ → ■).

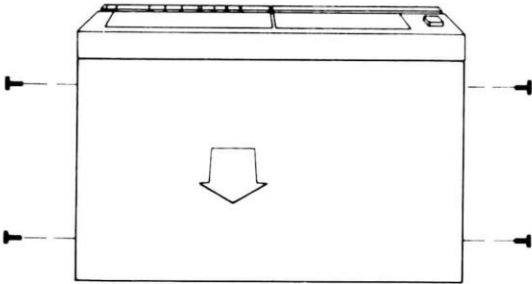
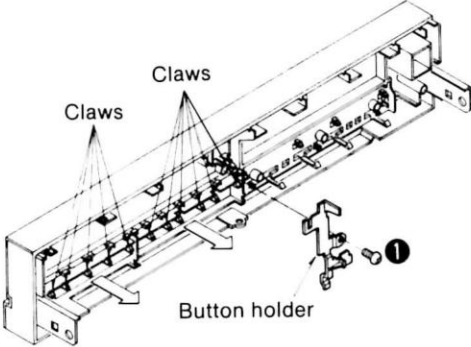
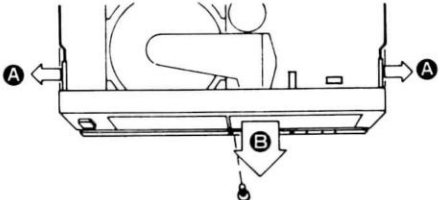
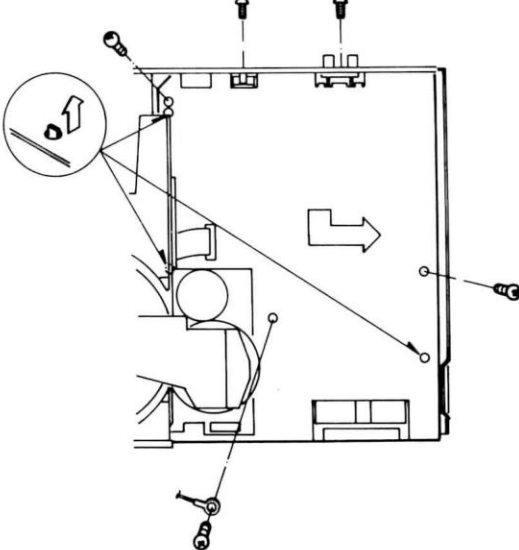
CAUTION:

Do not transport the unit without locking the lock shaft. SEVERE DAMAGE WILL RESULT.

■ DISASSEMBLY INSTRUCTIONS

CAUTION:

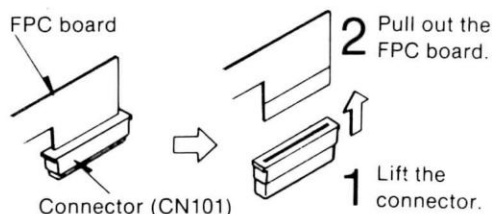
- It is very dangerous to look at or touch laser radiation. (Laser radiation is invisible.)
- With the unit turned "on", laser radiation is emitted from the pickup lens.
- When doing the job, removing the cabinet and disc clumper of this unit, be sure to turn the power supply off.

Ref. No. 1	How to remove the cabinet	Ref. No. 3	How to remove the operation buttons
Procedure 1	• Remove the 4 setscrews.  Note: When doing the job, Lock the lock shaft at the bottom of the unit. (See page 6.)	Procedure 1 ▶ 2 ▶ 3	• How to remove the operation buttons 1. Remove the screw ❶ and remove the holder. 2. Release the 11 claws. 
Ref. No. 2	How to remove the front panel	Ref. No. 4	How to remove the main P.C.B.
Procedure 1 ▶ 2	1. Remove the screw. 2. Slightly pull the tabs outward (arrows ❶). 3. Remove in the direction of arrow ❷. 	Procedure 1 ▶ 2 ▶ 4	1. Remove the 5 screws. 2. Lift up the P.C.B. to remove it from the chassis tabs. 3. Remove in the direction of the arrow. 

How to check the main P.C.B.

- When checking the soldered surface of the main P.C.B. and replacing the parts, do as shown.

1. Remove the main P.C.B.
2. Remove the FPC board (CN101).



Caution: Insert the short pin into the FPC board in order to prevent breakdown of laser diode. (See page 6.)

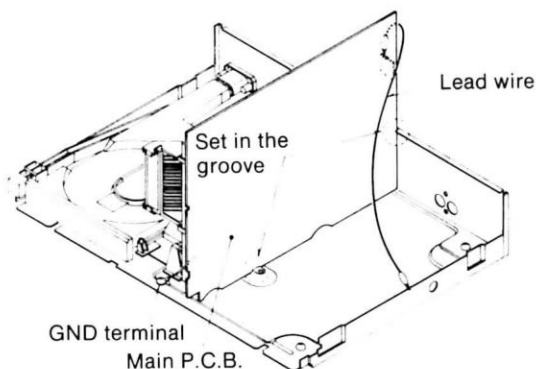
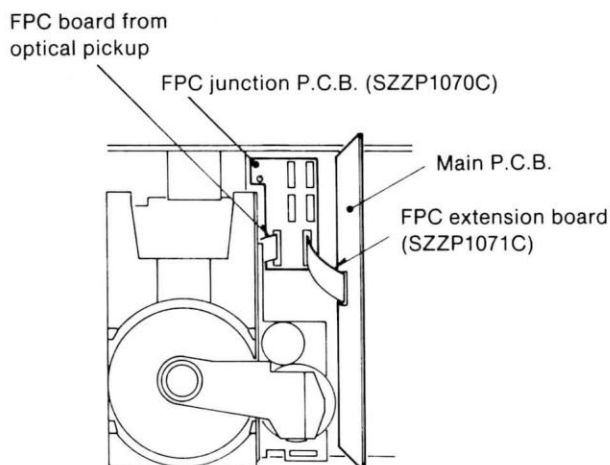
3. Connect FPC board from optical pickup to FPC junction P.C.B. (SZZP1070C).

Caution: Cover the foil of the FPC junction P.C.B. with friction tape to prevent a short-circuit between the foil and the chassis.

4. Connect FPC extension board (SZZP1071C) to FPC junction P.C.B. and CN101 of main P.C.B.
5. Place the main P.C.B. as shown in the figure.

Cautions:

- Be sure to connect the P.C.B. ground terminal (line out terminal) and chassis with a lead wire.
- Connect the ground wire of loading base to the chassis.

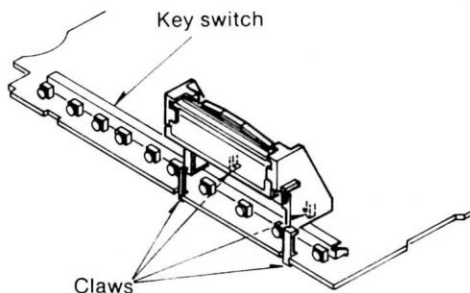


Ref. No.
5

How to remove the FL (display)

Procedure
1 → 2 → 4 → 5

1. Unsolder the terminals of FL.
2. Remove FL from the P.C.B.
3. Release the claws of FL holder and remove it to remove the switches.

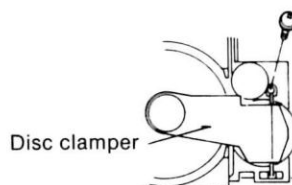


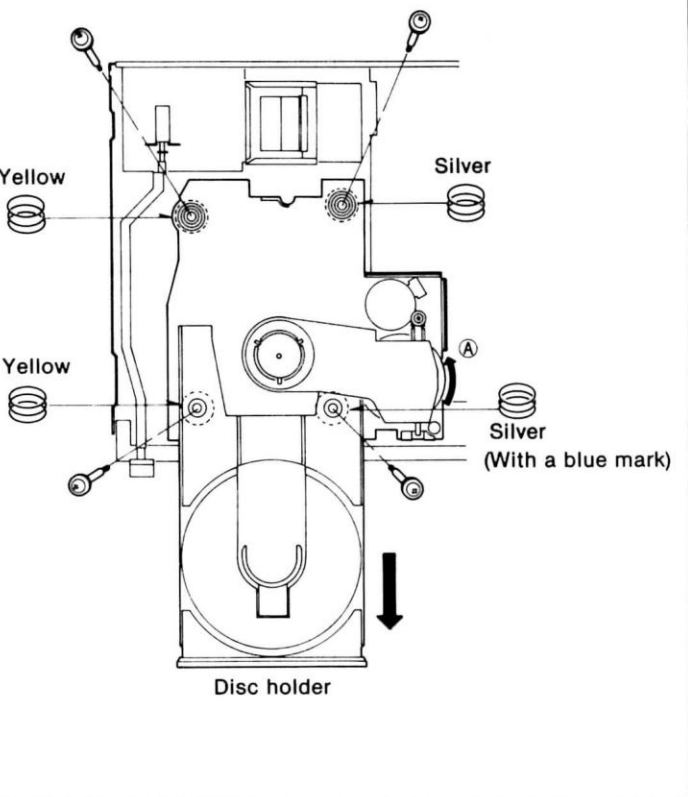
Ref. No.
6

How to remove the disc clamber

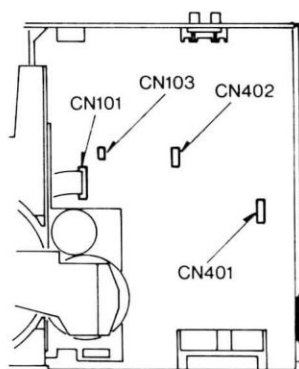
Procedure
1 → 6

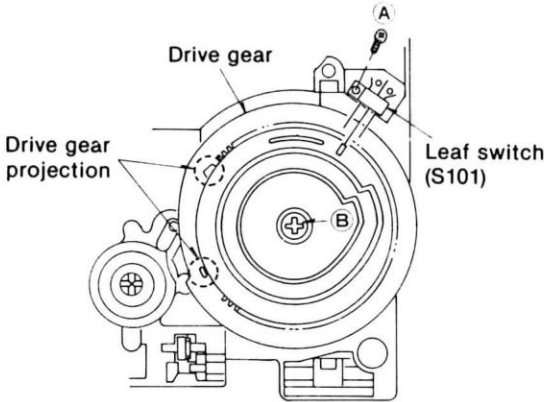
- Remove the screw.

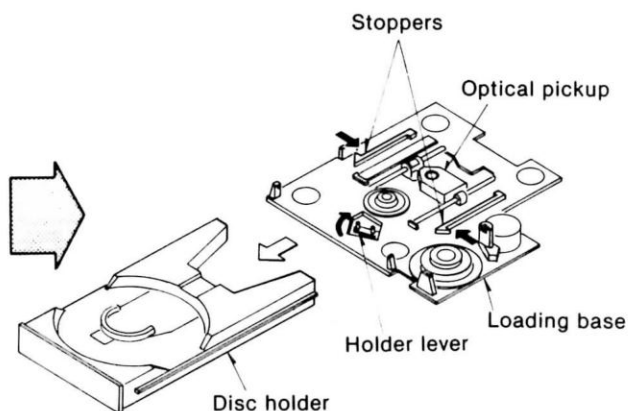


Ref. No. 7	How to remove the loading base	
Procedure 1 → 2 → 7	Refer to the optical pickup handling precautions (See page 6).	

1. Turn the drive gear in the direction of arrow ①, and shift the disc holder forward.
 2. Remove the 4 setscrews.
- Caution:** Note the color of each spring, they must be reinstalled in their original positions.
3. Pull out the 3 connectors (CN103, CN401, CN402).
 4. Remove the FPC board (CN101).



Ref. No. 8	How to remove the disc holder (disc tray)	1. Push the holder lever backward, (From underneath the loading base.) 2. Pull the disc holder and bend the 2 claws of the disc holder stopper of the loading base toward the optical pickup. 3. Further pull out the disc holder to remove it.
Procedure 1 → 2 → 6 → 8	• Set the drive gear as shown below. (Turn it completely to the right, then turn it to the left by about 20° so that the drive gear teeth or projection will not touch the rack of the disc holder.)  • To remove the drive gear Remove the screw ① of the leaf switch (S101), then remove the drive gear setscrew ②.	



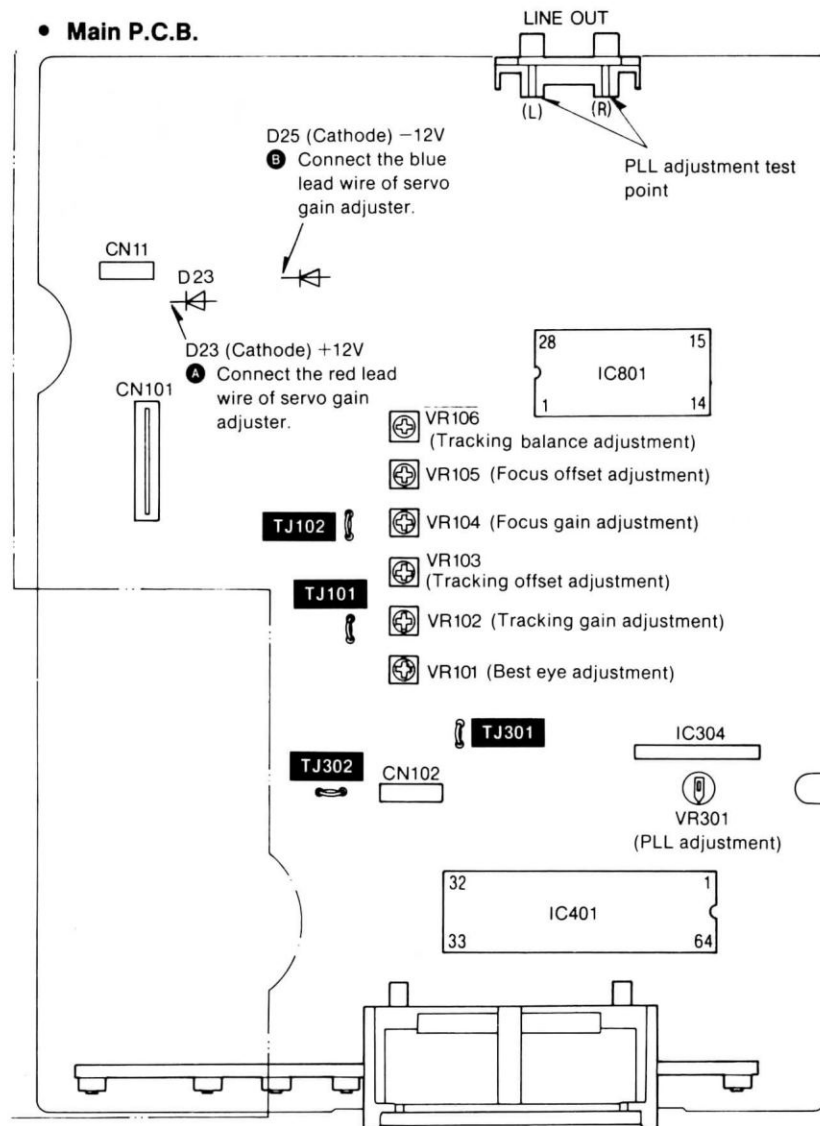
• **Caution for fitting**

When fitting the disc holder, make the drive gear as shown on the left, and then insert the disc holder along the guide of the loading base. After inserting the disc holder completely, turn the drive gear to the right completely.

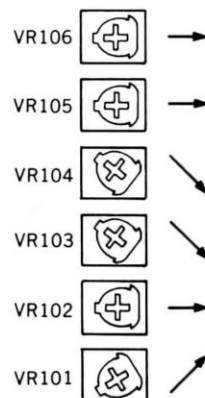
Ref. No. 9	How to remove the optical pick up	Refer to the optical pickup handling precautions (See page 6).	
Procedure 1 ➡ 2 ➡ 7 ➡ 8 ➡ 9	Remove in the numerical order shown. Note: Lock the lock shaft at the bottom of the unit. (See page 6.)	1 Remove the screw. Resistance unit (Speed sensor) 2 Remove the resistance unit. 3 Unsolder the 2 terminals. 4 Remove the 2 screws ②. (Underneath) 5 Remove the 3 setscrews ①. 6 Pull out the optical pickup from the 2 guide shafts.	
Ref. No. 10	How to remove the drive motor		
Procedure 1 ➡ 2 ➡ 7 ➡ 10 ➡	Remove in the numerical order shown.	2 Remove the 2 screws. Drive belt 1 Remove the drive belt. 3 Remove the screw. 4 Release the 2 Tabs in the direction of the arrows. 5 Lift up the drive motor.	
Ref. No. 11	How to remove the power transformer		
Procedure 1 ➡ 11		Caution for fitting: Fit the P.C.B. to the groove of the chassis. - Remove the connector (CN11). - Remove the 2 screws. - Unsolder the 2 terminals from the AC outlet. - Lift the power transformer to remove it from the chassis tab. (arrow A) - Remove the power source P.C.B. in the direction of the arrow B. How to remove the AC outlet - Unsolder the 2 terminals from the AC outlet. - Release the 2 claws. - Remove in the direction of the arrow C. How to remove the power switch rod - Set the power switch in "OFF" position. - Remove the power switch rod by using a screwdriver.	

MEASUREMENTS AND ADJUSTMENTS

ADJUSTMENT POINTS



• Temporary setting of each VR



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:Remove the cabinet.
(Refer to page 7.)

Step 2:Make the temporary setting of each VR. (Refer to page 11.)

Step 3:Best eye (PD balance) adjustment.
(Refer to page 13.)

Step 4:Connect the servo gain adjuster.
(Refer to page 12.)

Step 5:Focus gain adjustment.
(Refer to page 13.)

Step 6:Tracking gain adjustment.
(Refer to page 13.)

Step 7:Temporary adjustment of focus and tracking offset. (Refer to page 14.)

Step 8:Focus offset adjustment.
(Refer to page 14.)

Step 9:Tracking offset adjustment.
(Refer to page 14.)

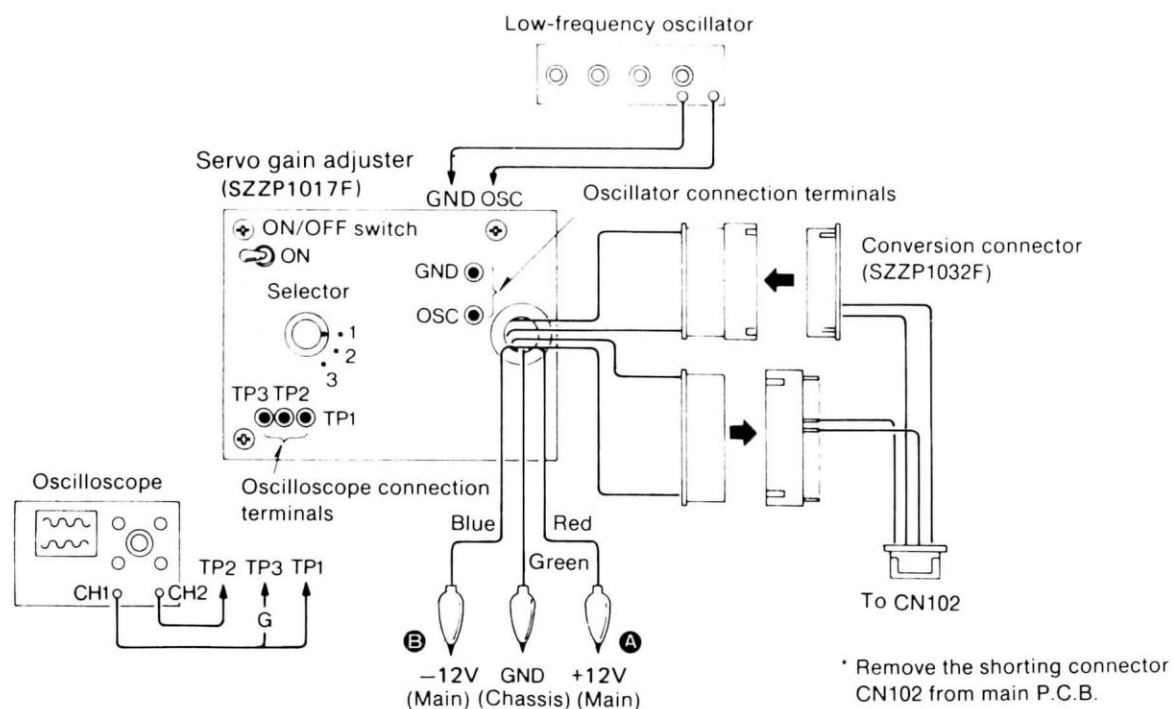
Step 10:Connect the servo gain adjuster.
(Refer to page 12.)

Step 11:Tracking offset balance adjustment. (Refer to page 14.)

Step 12:PLL adjustment.
(Refer to page 15.)

Step 13:Check of operation after adjustment. (Refer to page 15.)

Connection of Servo Gain Adjuster

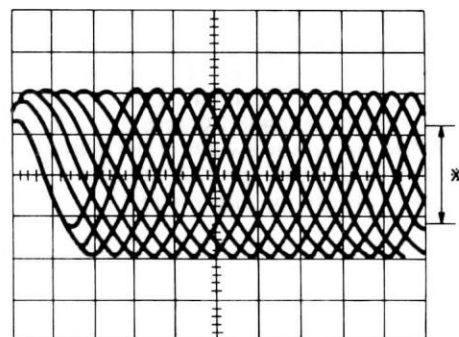


BEST EYE(PD BALANCE) ADJUSTMENT

1. Connect CH1 of the oscilloscope to **TJ301 (+)** and **TJ302 (-)** of the main P.C.B.

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

2. Turn **ON** the power switch of the player and insert the test disc (SZZP1014F or SZZP1054C).
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

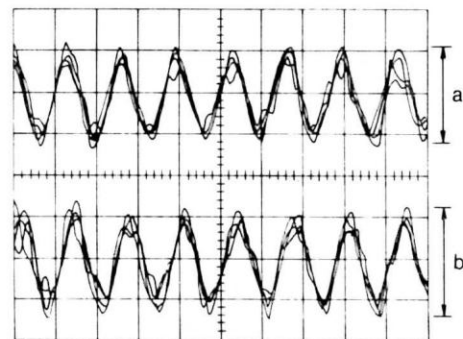
FOCUS GAIN ADJUSTMENT

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 **750Hz** 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.....200mV(both channels)
SWEEP.....1msec.
INPUT.....DC

5. Turn **ON** the power switch of the player and insert the test disc (SZZP1014F or SZZP1054C).
6. Set the player to the play mode.
7. Set the selector switch of the servo gain adjuster from **"2" to "3"**.
8. **750Hz** 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"**.
10. Turn **OFF** the power switch of the player.



*Make a=b

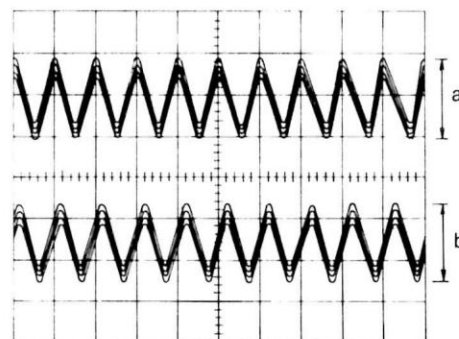
TRACKING GAIN ADJUSTMENT

1. Set the low frequency oscillator to a frequency of **1.0kHz** and an output voltage of **100mVp-p**. Then connect the oscillator to **OSC (+)** and **GND (-)** terminals of the servo gain adjuster.

2. Connect CH1 and CH2 of the oscilloscope to **TP1** and **TP2** of the servo gain adjuster. (TP3 is the ground terminal.)

Oscilloscope setting: VOLT.....200mV(both channels)
SWEEP.....1msec.
INPUT.....DC

3. Turn **ON** the power switch of the player and insert the test disc (SZZP1014F or SZZP1054C).
4. Set the player to the play mode.
5. Set the selector switch of the servo gain adjuster from **"2" to "1"**.
6. **1.0kHz** signals will be displayed on the oscilloscope. Adjust **VR102** until the waveform amplitudes of both channels are equal.
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, and insert the shorting connector of CN102 to the original position.



*Make a=b

TEMPORARY ADJUSTMENT OF FOCUS AND TRACKING OFFSET

(Temporary adjustment of focus offset)

1. Connect CH1 of the oscilloscope to **TJ102 (+)** and **TJ302 (-)** of the main P.C.B.

Oscilloscope setting: VOLT.....100mV
SWEEP.....5msec.
INPUT.....DC

2. Turn **ON** the power switch of the player and insert the test disc (SZZP1057C).
3. After the player read TOC, adjust **VR105** so that the voltage waveform center on the oscilloscope is **0mV**.

(Temporary adjustment of tracking offset)

1. Connect CH1 of the oscilloscope to **TJ101 (+)** and **TJ302 (-)** of the main P.C.B.

Oscilloscope setting: VOLT.....100mV
SWEEP.....5msec.
INPUT.....DC

2. Turn **ON** the power switch of the player and insert the test disc (SZZP1057C).
3. After the player read TOC, adjust **VR103** so that the voltage waveform center on the oscilloscope is **0mV**.

FOCUS OFFSET ADJUSTMENT

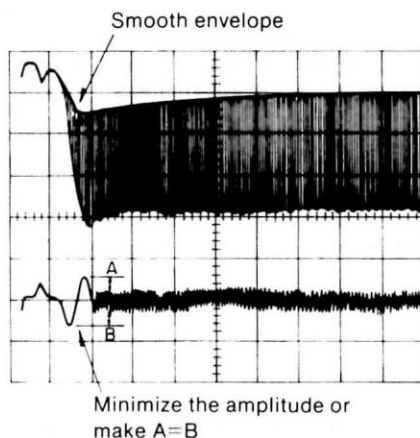
1. Connect CH1 of the oscilloscope to **TJ301 (+)** and **TJ302 (-)** of the main P.C.B.

Connect CH2 of the oscilloscope to **TJ102 (+)** and **TJ302 (-)** of the main P.C.B.

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

(Triggering via CH1)

2. Turn **ON** the power switch of the player and insert the test disc (SZZP1057C).
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.



TRACKING OFFSET ADJUSTMENT

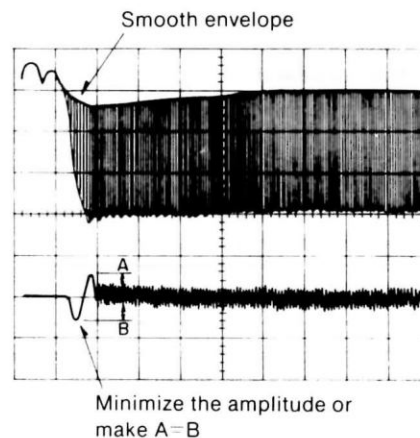
1. Connect CH1 of the oscilloscope to **TJ301 (+)** and **TJ302 (-)** of the main P.C.B.

Connect CH2 of the oscilloscope to **TJ101 (+)** and **TJ302 (-)** of the main P.C.B.

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

(Triggering via CH1)

2. Turn **ON** the power switch of the player and insert the test disc (SZZP1057C).
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.



TRACKING OFFSET BALANCE 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 **1kHz** and an output voltage of **200mVp-p**. Then connect the oscillator to **OSC (+)** and **GND (-)** terminals of the servo gain adjuster.
4. Connect CH1 of the oscilloscope to **TJ301 (+)** and **TJ302 (-)** of the main P.C.B.

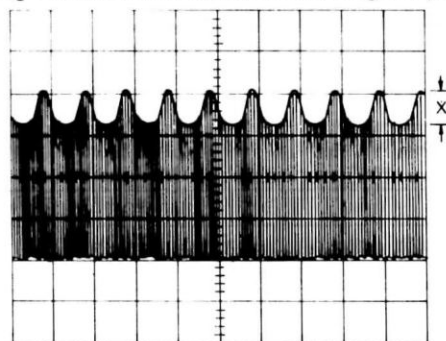
Oscilloscope setting: VOLT.....200mV
SWEEP.....0.5msec.
INPUT.....AC

5. Turn **ON** the power switch of the player and insert the test disc (SZZP1014F or SZZP1054C).
6. Set the player to the play mode.
7. Set the selector switch of the servo gain adjuster from **"2"** to **"1"**.
8. Adjust **VR106** so that the output waveform is as shown (jitter is minimized).

9. Shift the selector switch of the servo gain adjuster from **"1"** to **"2"**.

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

11. Disconnect the servo gain adjuster, and insert the shorting connector of CN102 to the original position.



*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. Turn **ON** the power switch of the player and insert the test disc(SZZP1054C).

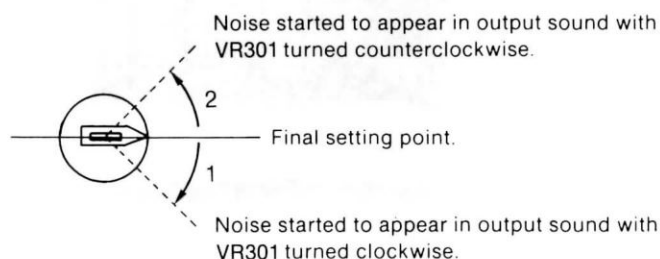
3. Play track No.6 (wedge 0.7 mm) of the test disc.

4. Check the waveform displayed on the oscilloscope and adjust **VR301** in the following steps.

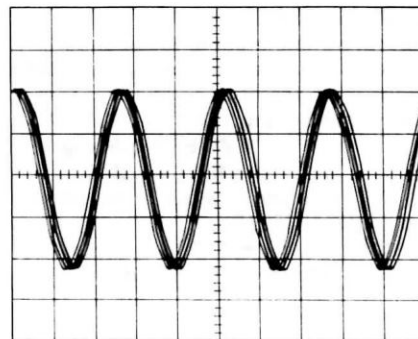
Step 1. Turn **VR301** clockwise slowly and observe the point at which the waveform on the oscilloscope begins to be disturbed.

Step 2. Turn **VR301** counterclockwise slowly and observe the point at which the waveform on the oscilloscope begins to be disturbed.

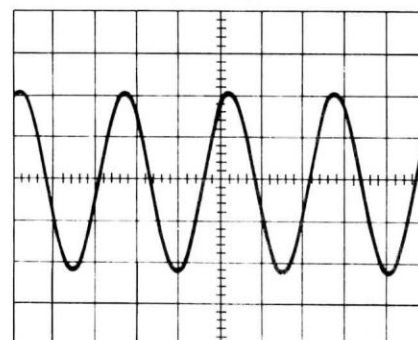
Step 3. Set **VR301** in the middle between the points observed in the above steps " 1 " and " 2 " .



• NG



• OK



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 0.7 mm) and verify that there is no skip sound or noise.

3. Play the track No.13 (black dot 0.7 mm) 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 (SZZP1044C....1.5mm)

● Screw lock paint (RZZ0L01)

Adjustment Procedure

● If the optical pickup is replaced , adjust it according to the following procedure.

Step 1: Assemble the set to make it ready for power ON check.

Step 2: Make the temporary setting of each VR. (Refer to page 11.)

Step 3: Turntable height adjustment. (Refer to page 16.)

Step 4: Mechanical adjustment. (Refer to page 16.)

Step 5: Electrical adjustment. (Refer to page 12.)

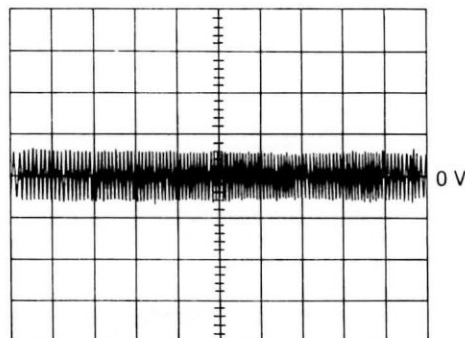
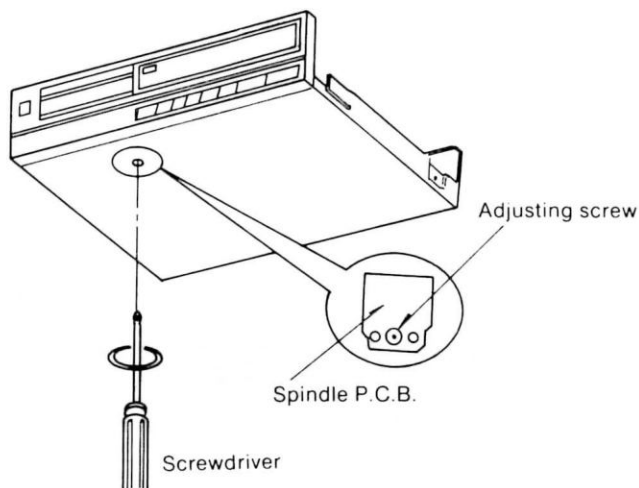
TURNTABLE HEIGHT ADJUSTMENT

1. Connect CH1 of the oscilloscope to **TJ102 (+)** and **TJ302 (-)** of the main P.C.B.

Oscilloscope setting: VOLT.....100mV
SWEEP.....5msec.
INPUT.....DC

2. Set the oscilloscope to DC zero balance.
3. Turn **ON** the power switch of the player and insert the test disc (SZZP1014F or SZZP1054C).
4. Set the player to the play mode.

5. Turn the **adjusting screw** at the bottom of the spindle motor drive P.C.B. with a flat screwdriver so that the waveform is balanced at $0 \pm 50\text{mV}$.
6. Turn **OFF** the power switch of the player.
7. After the adjustment, apply **screw lock paint(RZZ0L01)** to the adjusting screw.



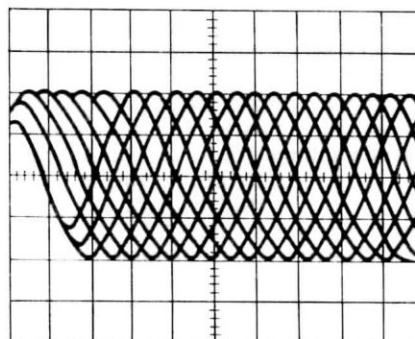
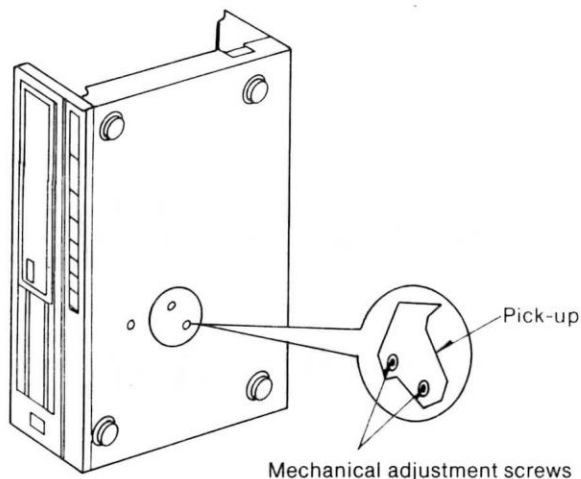
MECHANICAL ADJUSTMENT

1. Connect CH1 of the oscilloscope to **TJ301 (+)** and **TJ302 (-)** of the main P.C.B.

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

2. Turn **ON** the power switch of the player and insert the test disc (SZZP1056C).
3. Play track No.9 of the test disc.

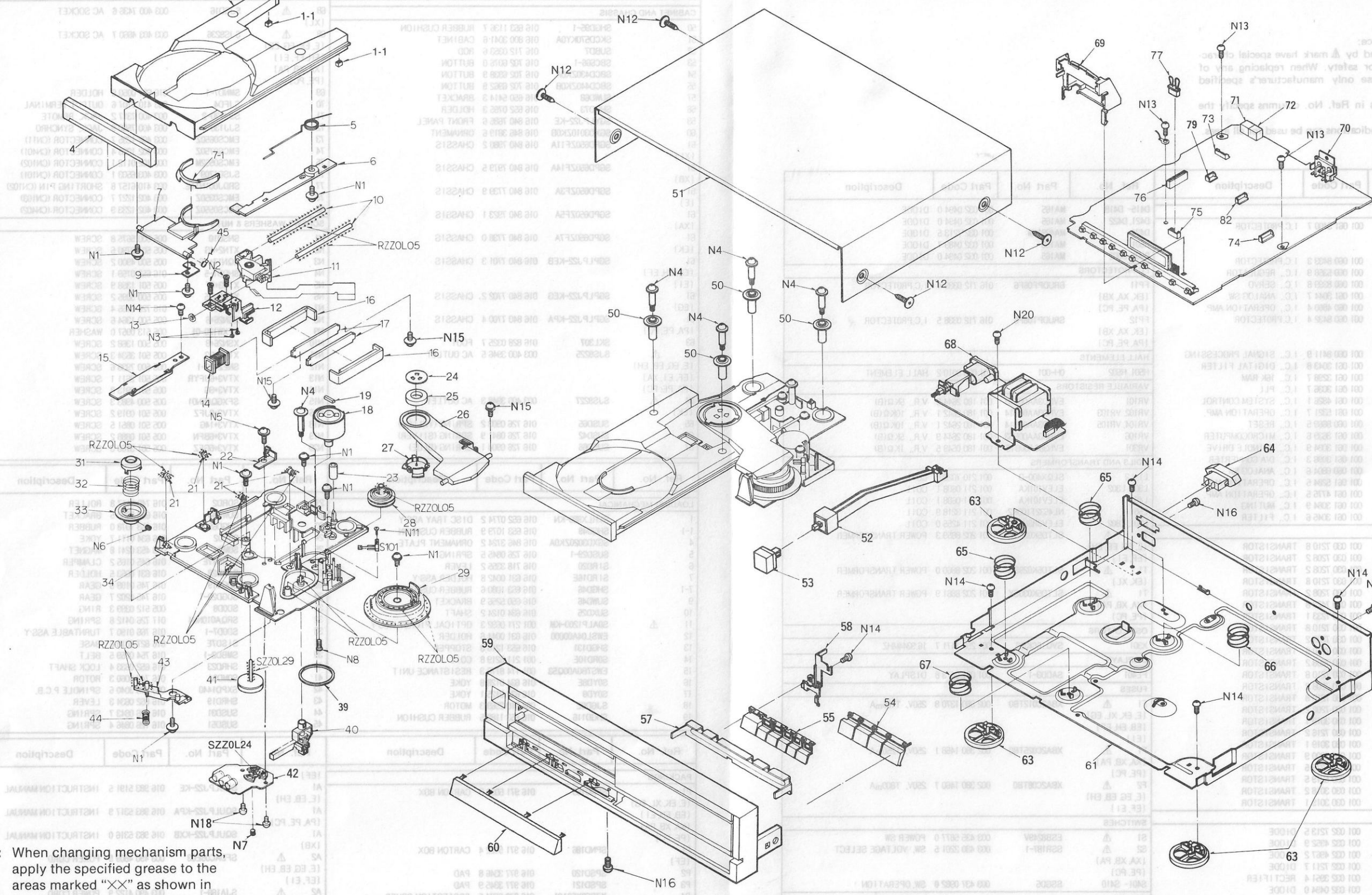
4. Monitoring RF signal on the oscilloscope, adjust the **two adjusting screws** alternately so that the vertical fluctuation of RF signal is minimized and the eye pattern is most stretched.
5. Turn **OFF** the power switch of the player.
6. After the adjustment, apply **screw lock paint(RZZ0L01)** to 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.

EXPLODED VIEW

REPLACEMENT PARTS LIST



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

1 ~ 30	4 N1 N6	9 N14 N3	7 N18 N7-1	1 N5 N2	1-1 N12	11 N1 N8	19 N1 N6	1-1 N10 N17	16 N1 N25	24 N1 N26	29 N15	N12	N4	N4	N4	N4	N12	N12	N12	N13	N13	N13	N14	N16
31 ~ 60	31 N1 N32	34 N1 N44	43 N1	45 N1	42 N15	39 N1	40 N1	59 N1	60 N1	50 N1	57 N1	51 N1	50 N1	50 N1	50 N1	53 N1	55 N1	58 N1	52 N1	54 N1	67 N1	68 N1	65 N1	63 N1
61 ~ 82																								

■ REPLACEMENT PARTS LIST

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.

Parts without these indications can be used for all areas.

Ref. No.	Part No.	Part Code	Description	Ref. No.	Part No.	Part Code	Description
INTEGRATED CIRCUITS				D415- D418	MA165	001 032 0494 0	DIODE
IC1, IC2 Δ	SV1FU38	001 061 3400 7	I.C.PROTECTOR	D421, D422	MA165	001 032 0494 0	DIODE
(EK, XA, XB)				D424	MA4091-M	001 032 7213 5	DIODE
(PA, PE, PC)				D501	MA153	001 032 0489 7	DIODE
IC11, IC12	SV1FU15	001 060 8433 3	I.C.PROTECTOR	D801, D802	MA165	001 032 0494 0	DIODE
IC13	M5236L	001 060 5358 9	I.C., REGULATOR	I.C.PROTECTORS			
IC101	AN8370S	001 060 8399 8	I.C., SERVO	FP11	SRUDPF06F6	016 712 0339 4	I.C.PROTECTOR
IC102	MN6636S	001 061 3044 7	I.C., ANALOG SW.	(EK, XA, XB)			
IC103, IC104	AN6554NS	001 060 4860 4	I.C., OPERATION AMP.	(PA, PE, PC)			
IC105	SV1FU10	001 060 8432 4	I.C.PROTECTOR	FP12	SRUDPT08F6	016 712 0338 5	I.C.PROTECTOR
(EK, XA, XB)				(EK, XA, XB)			
(PA, PE, PC)				(PA, PE, PC)			
IC301	MN6617	001 060 8411 9	I.C., SIGNAL PROCESSING	HALL ELEMENTS			
IC302	MN6618A	001 061 3043 8	I.C., DIGITAL FILTER	H501, H502	QH-001	001 036 0010 2	HALL ELEMENT
IC303	SV1CXK5816M	001 061 3298 7	I.C., 16K RAM	VARIABLE RESISTORS			
IC304	EHDGA1243	001 061 3036 7	I.C., PLL	VR101	EVND3AA00B53	001 180 2644 9	V.R., 5K Ω (B)
IC401	MN15261PDW	001 061 4826 1	I.C., SYSTEM CONTROL	VR102, VR103	EVND3AA00B14	001 180 2642 1	V.R., 10K Ω (B)
IC402	SV1M5218FP	001 061 5321 7	I.C., OPERATION AMP.	VR104, VR105	EVND3AA00B14	001 180 2642 1	V.R., 10K Ω (B)
IC403	MN1280-R	001 060 8669 5	I.C., RESET	VR106	EVND3AA00B53	001 180 2644 9	V.R., 5K Ω (B)
IC404	MN1550PDT	001 061 3639 6	I.C., MICROCOMPUTER	VR301	EVN38CA00B13	001 180 0549 5	V.R., 1K Ω (B)
IC501	AN8290S	001 061 3034 9	I.C., SPINDLE DRIVE	COILS AND TRANSFORMERS			
IC801	SV1PCMS4HP-1	001 061 3098 3	I.C., D/A CONVERTER	L1, L2 Δ	SLQX400-D	001 210 7020 0	COIL
IC802	SV1UPD4053G1	001 060 8804 6	I.C., ANALOG SW.	L301, L302	ELEV101KA	001 211 0608 1	COIL
IC803	SV1M5238FP	001 061 5284 5	I.C., OPERATION AMP.	L401	ELEV101KA	001 211 0608 1	COIL
IC804	SV1NJMS532M	001 061 4775 5	I.C., OPERATION AMP.	L501	NL4532T100K2	001 211 3218 9	COIL
IC806	MN1280-S	001 061 3084 9	I.C., MUTING	L801, L802	ELEV3R3KA	001 211 4255 0	COIL
IC809, IC810	SV1GA011	001 061 3045 6	I.C., FILTER	T1 Δ	SLTD5K028SE	001 202 8859 3	POWER TRANSFORMER
TRANSISTORS				(E, EG, EB, EH)			
Q11	2SD1862QR	001 030 7210 8	TRANSISTOR	(EF, E1)			
Q12, Q13	2SB1240QR	001 030 7208 2	TRANSISTOR	T1 Δ	SLTD5K029SG	001 202 8860 0	POWER TRANSFORMER
Q14	2SB1240QR	001 030 7208 2	TRANSISTOR	(EK, XL)			
Q15	2SD1862QR	001 030 7210 8	TRANSISTOR	T1 Δ	SLTD5K030SX	001 202 8861 9	POWER TRANSFORMER
Q16	2SB1240QR	001 030 7208 2	TRANSISTOR	(XA, XB, PA)			
Q17	2SA154QR	001 030 7422 8	TRANSISTOR	(PE, PC)			
Q101	2SC4010Q	001 030 7233 1	TRANSISTOR	OSCILLATORS			
Q141	2SD1862QR	001 030 7210 8	TRANSISTOR	X301	SVQ16CKSS	001 250 1471 7	16.9344MHZ
Q142	2SB1240QR	001 030 7208 2	TRANSISTOR	DISPLAYS			
Q161	2SD1862QR	001 030 7210 8	TRANSISTOR	FL401	SADD3-1	001 001 0473 8	DISPLAY
Q162	2SB1240QR	001 030 7208 2	TRANSISTOR	FUSES			
Q181	2SD1862QR	001 030 7210 8	TRANSISTOR	F1 Δ	XBA2C012TB0	002 380 1370 8	250V, T125mA
Q182	2SB1240QR	001 030 7208 2	TRANSISTOR	(E, EK, XL, EG)			
Q402	2SD1862QR	001 030 7210 8	TRANSISTOR	(EB, EH, EF)			
Q403	2SB1240QR	001 030 7208 2	TRANSISTOR	(E1)			
Q405, Q406	UN4212	001 030 3019 1	TRANSISTOR	F1 Δ	XBA2C025TB0	002 380 1458 1	250V, T250mA
Q408	UN4119	001 030 7216 2	TRANSISTOR	(XA, XB, PA)			
Q409, Q801	UN4212	001 030 3019 1	TRANSISTOR	(PE, PC)			
Q802	UN4113	001 030 2900 9	TRANSISTOR	F2 Δ	XBA2C08TB0	002 380 1460 7	250V, T800mA
Q803, Q804	2SC3311A-Q	001 030 5279 5	TRANSISTOR	(E, EG, EB, EH)			
Q805	2SC3311A-Q	001 030 5279 5	TRANSISTOR	(EF, E1)			
Q809	UN4112	001 030 3018 2	TRANSISTOR	SWITCHES			
Q810	UN4212	001 030 3019 1	TRANSISTOR	S1 Δ	ESB8249V	003 435 5877 0	POWER SW
DIODES				S2 Δ	SSR187-1	003 430 2201 5	SW, VOLTAGE SELECT
D11, D12	MA4091-M	001 032 7213 5	DIODE	(XA, XB, PA)			
D15, D16	MA4068H	001 032 4952 9	DIODE	(PE, PC)			
D17	MA4330M	001 032 4967 2	DIODE	SA01- SA10	SSGD5	003 437 0982 0	SW, OPERATION
D18	MA4062-M	001 032 7211 7	DIODE	RELAYS			
D19- D26 Δ	SVDI5SR3200A	001 032 3951 4	RECTIFIER	RL801	SSYD2	003 450 2734 9	RELAY
D181, D182	MA165	001 032 0494 0	DIODE				
D401- D406	MA165	001 032 0494 0	DIODE				
D412, D413	MA165	001 032 0494 0	DIODE				

Ref. No.	Part No.	Part Code	Description	Ref. No.	Part No.	Part Code	Description
CABINET AND CHASSIS				68	△	SJSD16	003 400 7436 6 AC SOCKET
50	SHGD95-1	016 653 1136 7	RUBBER CUSHION	(XL)			
51	SKCD570KY0A	016 800 3041 6	CABINET	68	△	SJS9236	003 403 4660 7 AC SOCKET
52	SUBD7	016 712 0353 6	ROD	(E, EK, EG, EB)			
53	SBC666-1	016 702 6076 0	BUTTON	(EH, EF, EI)			
54	SBCD430ZK0A	016 702 6338 9	BUTTON	(XA, XB, PA)			
55	SBCD440ZK0B	016 702 6362 9	BUTTON	(PE, PC)			
57	SUWD68	016 650 5414 3	BRACKET	69		SMND7-1	016 631 0050 8 HOLDER
58	SHRD73	016 652 0765 3	HOLDER	70		SJFD4	003 410 7707 6 OUTPUT TERMINAL
59	SGYLPJ22-KE	016 840 7685 6	FRONT PANEL	71		SJJ130-2	003 400 7317 2 JACK, REMOTE
60	SGXD3010ZK0B	016 846 3819 6	ORNAMENT	72		SJJ130-3	003 400 7580 9 JACK, SYNCHRO
61	SGPD650ZF11A	016 840 7980 2	CHASSIS	73		EMCS0650Z	003 402 1235 7 CONNECTOR (CN11)
(XL)				74		EMCS0750Z	003 402 1238 4 CONNECTOR (CN401)
61	SGPD650ZF14A	016 840 7979 5	CHASSIS	75		EMCS0552M	003 402 0112 1 CONNECTOR (CN102)
(XB)				76		SJSD1709	003 403 6503 1 CONNECTOR (CN101)
61	SGPD650ZF3A	016 840 7739 9	CHASSIS	77		SRDJ001N14E	003 410 6157 8 SHORTING PIN (CN102)
(E)				79		EMCS0350Z	003 402 1227 7 CONNECTOR (CN103)
61	SGPD650ZF5A	016 840 7923 1	CHASSIS	82		EMCS0550Z	003 402 1233 9 CONNECTOR (CN402)
(XA)				SCREWS, WASHERS & NUTS			
61	SGPD650ZF7A	016 840 7738 0	CHASSIS	N1		SNSD10	005 500 5675 8 SCREW
(EK)				N2		XTN2+4G	005 501 2780 5 SCREW
61	SGPLPJ22-KEB	016 840 7701 3	CHASSIS	N3		XQN17+A6	005 500 4900 2 SCREW
(EB, EH, EF)				N4		SHDD1-5	016 652 0759 1 SCREW
(EI)				N5		XTW3+8T	005 501 1358 9 SCREW
61	SGPLPJ22-KEG	016 840 7702 2	CHASSIS	N6		XXE26D5	005 500 5095 2 SCREW
(EG)				N7		SNSD9	016 726 0765 4 SCREW
61	SGPLPJ22-KPA	016 840 7700 4	CHASSIS	N8		XSN26+6	005 500 1364 6 SCREW
(PA, PE, PC)				N9		SFXW120-01	005 513 0957 0 WASHER
63	SKL307	016 828 0325 7	FOOT	N10		XSN26+8	005 500 1368 2 SCREW
64	△	SJS9225	003 400 3946 5 AC OUTLET	N11		XTN2+5G	005 501 3534 3 SCREW
(E, EG, EB, EH)				N12		SNE2129-1	005 500 7938 6 SCREW
(EF, EI, XA)				N13		XTV3+6JFYR	005 501 2611 1 SCREW
(PA, PE, PC)				N14		XTV3+8G	005 501 0913 8 SCREW
64	△	SJS9227	003 400 3948 3 AC OUTLET	N15		SFXGQ06N01	005 500 4983 3 SCREW
(EK)				N16		XTV3+8JFZ	005 501 0919 2 SCREW
65	SUSD65	016 726 0903 2	SPRING (YELLOW)	N18		XTV3+14G	005 501 0851 5 SCREW
66	SUSD42	016 726 0841 9	SPRING (SILVER)	N19		XTV3+6BFN	005 501 0888 2 SCREW
67	SUSD66	016 726 0904 1	SPRING (BLUE)	N20		XTV3+6GFZ	005 501 3160 3 SCREW
Ref. No.	Part No.	Part Code	Description	Ref. No.	Part No.	Part Code	Description
LOADING MECHANICAL				21		SDRD2	016 740 0117 8 ROLLER
1	SIRLX880-KN	016 652 0774 2	DISC TRAY ASS'Y	22		SUWD44	016 650 5250 5 BRACKET
1-1	SHGD49	016 653 1079 9	RUBBER CUSHION	23		SHGD69	016 653 1078 0 RUBBER
4	SGXD3020ZK0A	016 846 3724 2	ORNAMENT PLATE	24		SOYD2	016 634 0111 7 YOKE
5	SUSD29-1	016 726 0845 5	SPRING	25		SOMD4	003 453 0241 8 MAGNET
6	SIRD20	016 718 3355 2	LEVER	26		SIRD17E	016 645 0165 2 CLAMPER
7	SIRD16E	016 631 0042 8	HOLDER ASS'Y	27		SIRD28	016 631 0053 5 HOLDER
7-1	SHGD46	016 653 1080 6	RUBBER CUSHION	28		SDGD19	016 745 0199 5 GEAR
9	SUWD46	016 650 5256 9	BRACKET	29		SDGD20-1	016 745 0202 7 GEAR
10	SUXD25	016 634 0124 2	SHAFT	31		SDOD8	005 512 0399 3 RING
11	△	SQALP1200-KM	001 271 0632 3 OPTICAL PICKUP ASS'Y	32		SRQA010N04	017 726 0412 8 SPRING
12	EWSL04A00000	016 631 0044 6	HOLDER	33		SDOD7-1	016 766 0190 7 TURNTABLE ASS'Y
13	SHGD131	016 653 1216 8	STOPPER	34		SISD7E	016 827 0313 6 BASE
14	SORD10E	001 211 3219 8	COIL	39		SMBD2-1	016 754 0059 5 BELT
15	EWS7B0A00Q53	001 174 8773 3	RESISTANCE UNIT	40		SHRD23	016 652 0633 4 LOCK SHAFT
16	SOYD8E	016 634 0128 8	YOKE	41		SOMD9A	016 743 0060 3 ROTOR
17	SOYD9	016 634 0125 1	YOKE	42		SXPD1440	003 483 3040 5 SPINDLE P.C.B.
18	SJGD8E	002 310 2569 3	MOTOR	43		SHRD19	016 652 0634 3 LEVER
19	SHGD116	016 653 1188 5	RUBBER CUSHION	44		SUSD31	016 726 0843 7 SPRING
				45		SUSD51	016 726 0846 4 SPRING
Ref. No.	Part No.	Part Code	Description	Ref. No.	Part No.	Part Code	Description
PACKINGS				(EF)			
P1	SPND185	016 971 5050 3	CARTON BOX	A1		SQULPJ22-KE	016 983 5191 5 INSTRUCTION MANUAL
(E, EK, XL, EG)				(E, EB, EH)			
(EB, EH, EI)				A1		SQULPJ22-KPA	016 983 5317 9 INSTRUCTION MANUAL
(XA, XB, PA)				(PA, PE, PC)			
(PE, PC)				A1		SQULPJ22-KXB	016 983 5316 0 INSTRUCTION MANUAL
P1	SPND186	016 971 5122 4	CARTON BOX	(XB)			
(EF)				A2	△	SFDAC05E03	003 490 4809 5 POWER CORD
P2	SPSD120	016 977 3346 8	PAD	(E, EG, EB, EH)			
P3	SPSD121	016 977 3345 9	PAD	(EF, EI)			
P4	XZB50X50A01	016 978 0524 5	PROTECTION COVER	A2	△	SJA168-1	003 490 4122 9 POWER CORD
P5	SPSD68	016 977 3081 4	SHEET	(XA, PA, PE)			
P6	XZB23X20C03	016 978 0480 0	POLYETHYLENE BAG	(PC)			
P7	SPSD101	016 977 3232 7	SHEET	A2	△	SJA173	003 490 4161 2 POWER CORD
ACCESSORIES				(XL)			
A1	SQUID176	016 983 5178 2	INSTRUCTION MANUAL	A2	△	SJA183	003 490 4873 7 POWER CORD
(XL, XA)				(XB)			
A1	SQUID177	016 983 5176 4	INSTRUCTION MANUAL	A2	△	SJA188	003 490 5443 1 POWER CORD
(EK)				(EK)			
A1	SQUID178	016 983 5319 7	INSTRUCTION MANUAL	A3		SJP2249-1	003 492 6446 4 OUTPUT CORD
(EI)				A4	△	SJP9215	003 402 1437 9 AC PLUG ADAPTOR
A1	SQUID232	016 983 5288 7	INSTRUCTION MANUAL	(XA, XB, PA)			
(EG)				(PE, PC)			
A1	SQUID233	016 983 5318 8	INSTRUCTION MANUAL	A5		SJP2257	003 492 4915 4 CORD, SYNCHRO-REC

■ RESISTORS AND CAPACITORS

Notes: * Important safety notice:

Components identified by  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.

Parts without these indications can be used for all areas.

Numbering System of Resistor

Example

ERD	25	F	J	102
Type	Wattage	Shape	Tolerance	Value
ERX	2	AN	J	471
Type	Wattage	Shape	Tolerance	Value

47x10¹ (ohm)

Numbering System of Capacitor

Example

ECKD	1H	102	Z	F
Type	Voltage	Value	Tolerance	Peculiarity
ECEA	50		M	330
Type	Voltage		Peculiarity	Value (33×10 ⁰ microfarad)

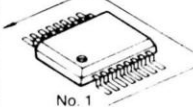
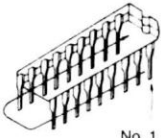
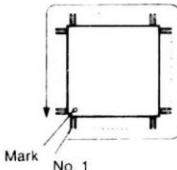
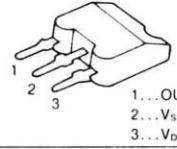
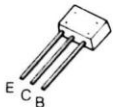
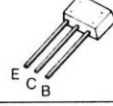
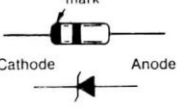
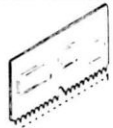
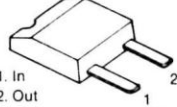
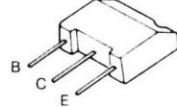
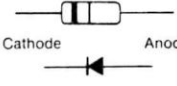
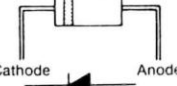
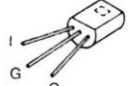
Resistor Type	Wattage	Tolerance
ERD : Carbon	10 : 1/8W	J : ±5%
ERG : Metal Oxide	12 : 1/2W	F : ±1%
ERX : Metal Film	25 : 1/4W	G : ±2%
ERQ : Fuse Type Metal	1A : 1W	K : ±10%
ERD [] L : Carbon (chip)	18 : 1/8W	
ERO [] K : Metal Film (chip)	S2 : 1/4W	
ERC : Solid	S1 : 1/2W	
	2F : 1/4W	
	50 : 1/2W	
	2A : 2W	

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

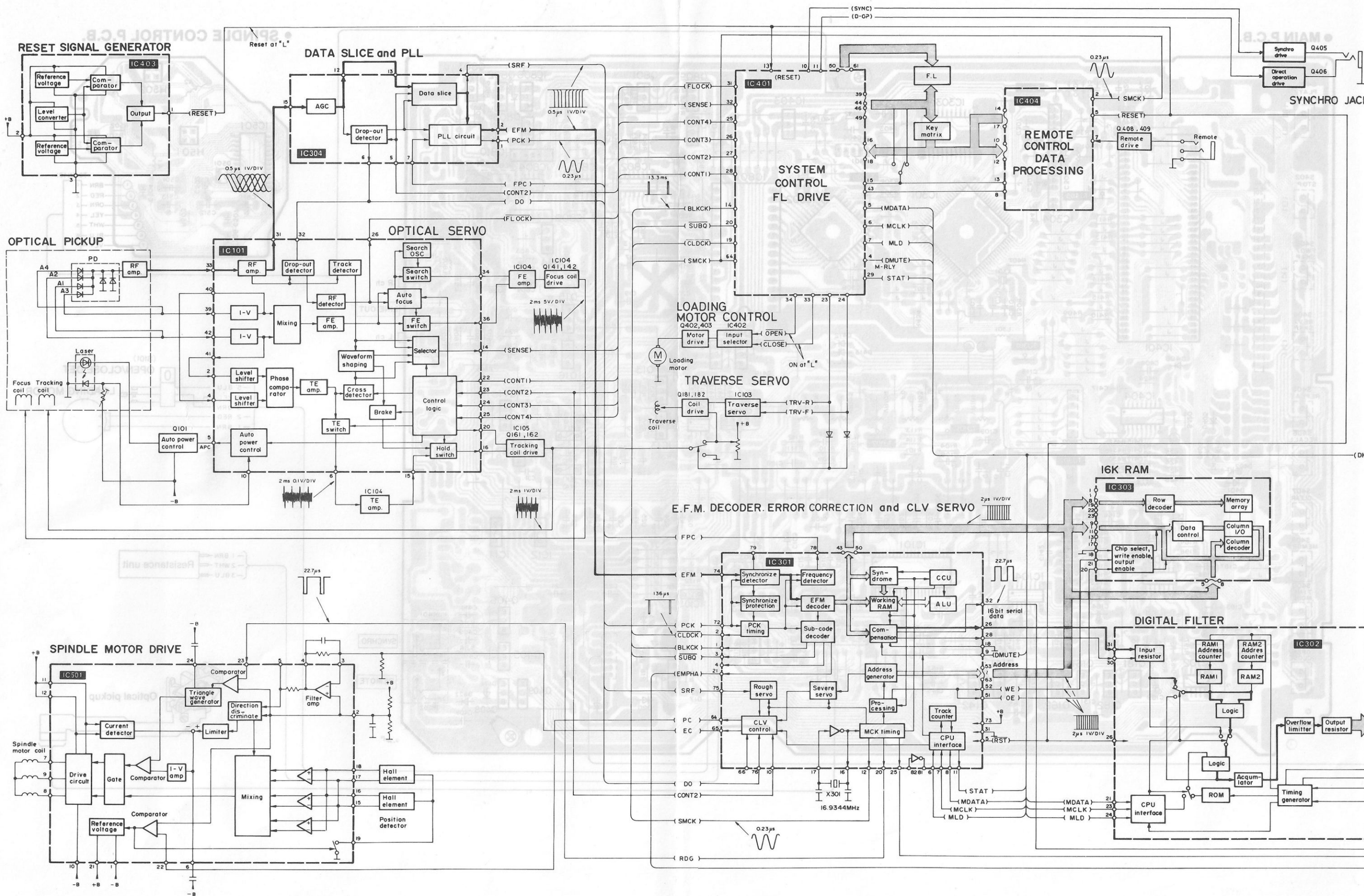
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RESISTORS			R152	ERDS2TJ153	001 152 2351 7	R415	ERDS2TJ472	001 152 2362 4	
R11, R12	ERDS2TJ681	001 152 2449 8	R153	ERDS2TJ270	001 152 2434 5	R416	ERDS2TJ913	001 152 3708 4	
R13	ERDS2TJ221	001 152 2431 8	R154	ERDS2TJ3R3	001 152 3152 8	R417	ERDS2TJ124	001 152 2425 6	
R14	ERDS2TJ101	001 152 2421 0	R161	ERDS2TJ333	001 152 2358 0	R418	ERDS2TJ913	001 152 3708 4	
R15, R16	ERDS2TJ561	001 152 2364 2	R162	ERDS2TJ222	001 152 2353 5	R419	ERDS2TJ124	001 152 2425 6	
R17	ERDS2TJ222	001 152 2353 5	R163	ERDS2TJ333	001 152 2358 0	R420	ERDS2TJ101	001 152 2421 0	
R18	ERDS2TJ392	001 152 2439 0	R164	ERDS2TJ153	001 152 2351 7	R423	ERDS2TJ103	001 152 2347 3	
R19	ERDS2TJ103	001 152 2347 3	R165	ERDS2TJ122	001 152 2423 8	R424	ERDS2TJ473	001 152 2363 3	
R20	ERDS2TJ332	001 152 2357 1	R166	ERDS2TJ102	001 152 2346 4	R425, R426	ERDS2TJ103	001 152 2347 3	
R21	ERDS2TJ153	001 152 2351 7	R167	ERDS2TJ681	001 152 2449 8	R427, R428	ERDS2TJ103	001 152 2347 3	
R22, R23	ERDS2TJ682	001 152 2365 1	R168	ERDS2TJ272	001 152 2354 4	R429, R430	ERDS2TJ222	001 152 2353 5	
R24, R25	ERDS2TJ471	001 152 2361 5	R169	ERDS2TJ392	001 152 2439 0	R431, R432	ERDS2TJ222	001 152 2353 5	
R26	ERDS2TJ471	001 152 2361 5	R170	ERDS2TJ101	001 152 2421 0	R434	ERDS2TJ472	001 152 2362 4	
R27	ERDS2TJ392	001 152 2439 0	R171	ERDS2TJ270	001 152 2434 5	R501, R502	ERJ8GEYK1R5	001 151 6260 8	
R30	ERDS1FJ330	001 152 2604 5	R172	ERDS2TJ3R3	001 152 3152 8	R503	ERJ8GEYJ223	001 151 5630 6	
R101	ERDS2TJ154	001 152 2427 4	R180	ERDS2TJ474	001 152 2443 4	R801, R802	ERDS2TJ222	001 152 2353 5	
R102, R103	ERDS2TJ472	001 152 2362 4	R181	ERDS2TJ471	001 152 2361 5	R803, R804	ERDS2TJ272	001 152 2354 4	
R104	ERDS2TJ223	001 152 2432 7	R182, R183	ERDS2TJ564	001 152 2447 0	R805, R806	ERDS2TJ221	001 152 2431 8	
R105	ERDS2TJ334	001 152 2438 1	R184	ERDS2TJ223	001 152 2432 7	R807, R808	ERDS2TJ391	001 152 2360 6	
R107	ERDS2TJ683	001 152 2450 5	R185	ERDS2TJ433	001 152 2575 3	R809, R810	ERDS2TJ473	001 152 2363 3	
R108	ERDS2TJ332	001 152 2357 1	R186, R187	ERDS2TKF4702	001 151 5723 2	R821, R822	ERDS2TJ472	001 152 2362 4	
R109	ERDS2TJ822	001 152 2455 0	R188	ERDS2TKF4702	001 151 5723 2	R823	ERDS2TJ104	001 152 2348 2	
R110, R111	ERDS2TJ682	001 152 2365 1	R189, R190	ERDS2TJ123	001 152 2424 7	R825, R826	ERDS2TJ102	001 152 2346 4	
R112	ERDS2TJ822	001 152 2455 0	R191	ERDS2TJ154	001 152 2427 4	R827	ERDS2TJ103	001 152 2347 3	
R113, R114	ERDS2TJ182	001 152 2352 6	R192	ERDS2TJ824	001 152 2457 8	R828, R829	ERDS2TJ102	001 152 2346 4	
R115	ERDS2TJ102	001 152 2346 4	R193	ERDS2TJ101	001 152 2421 0	R843	ERDS2TJ473	001 152 2363 3	
R116, R117	ERDS2TJ182	001 152 2352 6	R194	ERDS2TJ683	001 152 2450 5	CAPACITORS			
R118	ERDS2TJ102	001 152 2346 4	R195, R196	ERDS2TJ103	001 152 2347 3	C1	Δ	ECKDKC103PF2	001 103 3734 7
R119	ERDS2TJ471	001 152 2361 5	R197	ERDS2TJ473	001 152 2363 3	C2	Δ	RXAF103Z22EY	001 230 0547 0
R120	ERDS2TJ120	001 152 3146 6	R198	ERDS2TJ393	001 152 2440 7	C11, C12		ECFD1H104ZF	001 108 0906 2
R122	ERDS2TJ471	001 152 2361 5	R301	ERDS2TJ102	001 152 2346 4	C13		ECEA1CU470	001 120 2835 0
R141	ERDS2TJ102	001 152 2346 4	R302	ERDS2TJ472	001 152 2362 4	C14		ECFD1H104ZF	001 108 0906 2
R142	ERDS2TJ333	001 152 2358 0	R305	ERDS2TJ104	001 152 2348 2	C15, C16		ECEA1CU221	001 120 2833 2
R143	ERDS2TJ224	001 152 2433 6	R307	ERDS2TJ471	001 152 2361 5	C17, C18		ECFD1H104ZF	001 108 0906 2
R144	ERDS2TJ333	001 152 2358 0	R308	ERDS2TJ121	001 152 2349 1	C19, C20		ECFD1H104ZF	001 108 0906 2
R145	ERDS2TJ153	001 152 2351 7	R309	ERDS2TJ472	001 152 2362 4	C21, C22		ECEA1CU222	001 120 3074 3
R146	ERDS2TJ122	001 152 2423 8	R401, R402	ERDS2TJ223	001 152 2432 7	C23, C24		ECEA1CU331	001 120 3200 5
R147	ERDS2TJ682	001 152 2365 1	R403	ERDS2TJ472	001 152 2362 4	C25, C26		ECEA1VU101	001 120 2929 5
R148	ERDS2TJ104	001 152 2348 2	R404, R406	ERDS2TJ394	001 152 2441 6	C27, C28		ECEA0JS331	001 120 2975 9
R149	ERDS2TJ152	001 152 2350 8	R407	ERDS2TJ152	001 152 2350 8	C29		RECIA101MOT	001 120 5628 3
R150	ERDS2TJ103	001 152 2347 3	R409, R410	ERDS2TJ472	001 152 2362 4	C30		ECFD1H104ZF	001 108 0906 2
R151	ERDS2TJ101	001 152 2421 0	R411, R412	ERDS2TJ472	001 152 2362 4	C31		RCBS1C103MY	001 103 8060 6
			R413, R414	ERDS2TJ472	001 152 2362 4				

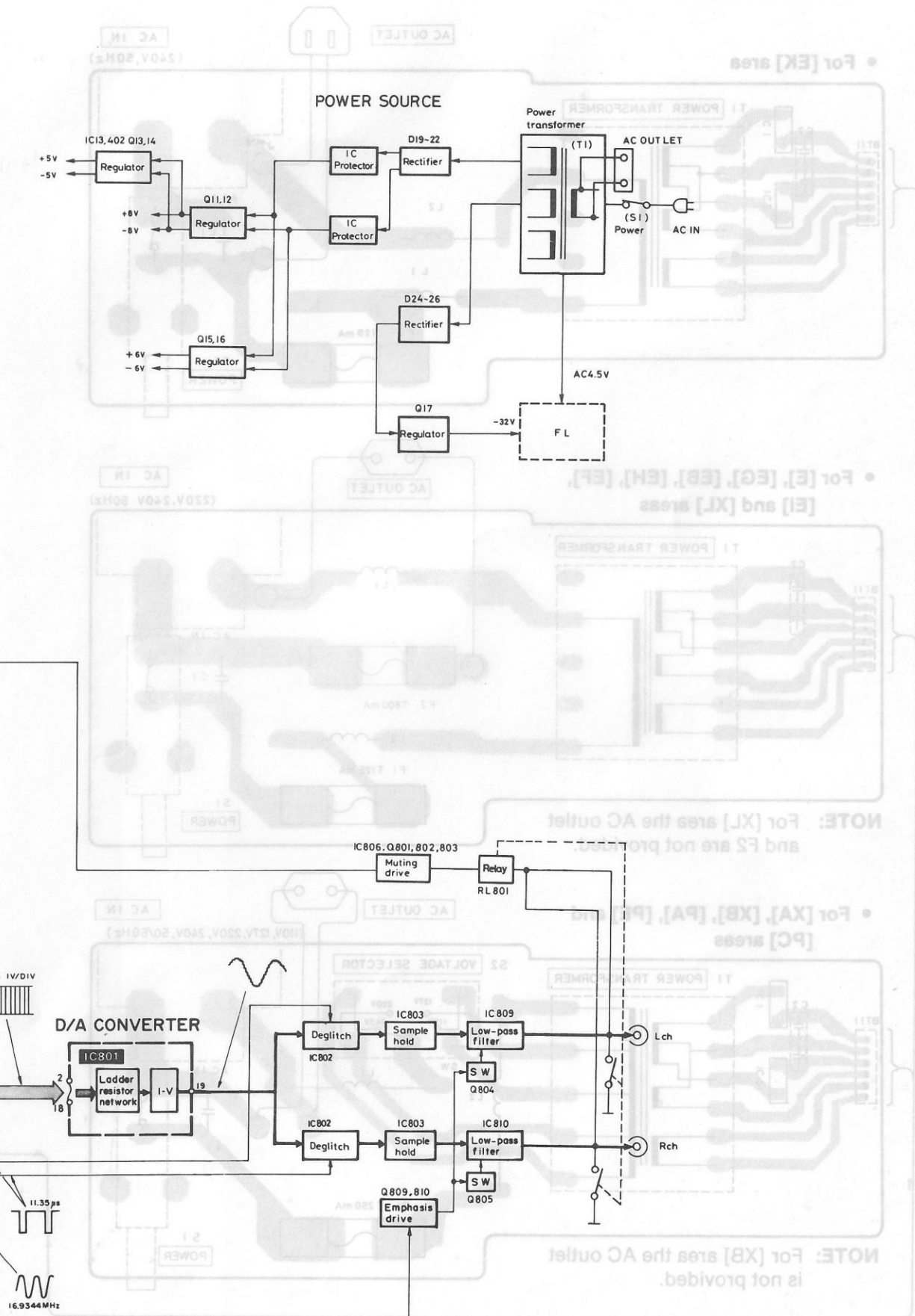
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C32	ECFF1H103KR	001 108 1049 4	C141	ECQM1H153JZ	001 106 0704 0	C309	ECCD1H070CC	001 103 0271 9
C101	ECFD1H104ZF	001 108 0906 2	C142	ECQM1H122JZ	001 106 0683 8	C310	ECFF1H103KR	001 108 1049 4
C102, C103	ECKD1H102KB	001 103 1414 8	C143	ECQM1H473JZ	001 106 0810 9	C311, C401	ECFD1H104ZF	001 108 0906 2
C104	ECKD1H681K	001 103 1580 5	C144	ECEA1VSN2R2	001 120 5070 9	C402	ECEA0JU470	001 120 3125 9
C105, C106	ECKD1H471KB	001 103 1551 0	C145	ECEA1HSNR22	001 120 4836 1	C403	ECFF1H103KR	001 108 1049 4
C107	ECCD1H220K	001 103 0493 7	C161	ECQM1H153JZ	001 106 0704 0	C404, C405	ECFD1H104ZF	001 108 0906 2
C108	ECEA1HSOR1	001 120 3250 5	C162	RCBS1H681KBY	001 103 5642 2	C406	ECCD1H220K	001 103 0493 7
C109	ECEA1HU010	001 120 2842 1	C163	ECQM1H103JZ	001 106 0667 8	C408, C409	ECFF1H103KR	001 108 1049 4
C110	ECQV1H104JZ	001 106 2571 7	C164	ECEA1ESN3R3	001 120 5060 1	C414, C416	ECFF1H103KR	001 108 1049 4
C111, C112	ECEA1HU100	001 120 3251 4	C165	ECEA1HSNR1	001 120 4837 0	C417	ECFD1H104ZF	001 108 0906 2
C113	ECEA1HKNR33	001 120 3230 9	C181	ECQM1H474JZ	001 106 2709 7	C418, C419	ECCD1H101KB	001 103 5369 0
C114	RCBS1C182MXY	001 103 8660 8	C182	RCBS1H221KBY	001 103 5603 9	C420	ECEA0JU101	001 120 2829 8
C115	RCBS1C682MXY	001 103 7092 2	C183	ECQM1H682JZ	001 106 0832 3	C421, C422	ECKD1H101KB	001 103 1412 0
C116	ECQM1H333JZ	001 106 0779 1	C184	ECEA1HSN010	001 120 3237 2	C423	ECKD1H101KB	001 103 1412 0
C117	ECKD1H221KB	001 103 1487 1	C186	ECQM1H224JZ	001 106 0746 0	C501	ECEV1EV300	001 120 5624 7
C118	ECEA1HU010	001 120 2842 1	C187	ECEA1VSN2R2	001 120 5070 9	C502	ECEV1HV010	001 120 5625 6
C119	ECEA0JU220	001 120 4670 5	C189	RCBS1H101KBY	001 103 5569 4	C504	GR426B273K50	001 103 9113 6
C120	ECKD1H681K	001 103 1580 5	C190	ECKD1H101KB	001 103 1412 0	C506	GR426B152K25	001 103 9112 7
C121	ECFF1H103KR	001 108 1049 4	C301	ECCD1H220K	001 103 0493 7	C507	GR426B104Z25	001 103 9270 4
C122, C123	ECCD1H101KB	001 103 5369 0	C302	ECCD1H070CC	001 103 0271 9	C511, C512	ECEA1EN470S	001 120 2394 4
C124	ECKD1H222KB	001 103 1494 2	C303	ECEA1VSN2R2	001 120 5070 9	C513	ECEA1EN470S	001 120 2394 4
C125	ECEA0JU220	001 120 4670 5	C304, C305	ECFD1H104ZF	001 108 0906 2	C801, C802	ECCD1H181KB	001 103 0467 9
C126	ECEA0JU470	001 120 3125 9	C306	ECFF1H103KR	001 108 1049 4	C803, C804	RBP1CN220CT	001 120 5015 6
C127, C128	ECKD1H102KB	001 103 1414 8	C307	ECKD1H471KB	001 103 1551 0	C805, C806	ECKD1H102KB	001 103 1414 8
C129	ECKD1H681K	001 103 1580 5	C308	ECFD1H104ZF	001 108 0906 2	C813, C816	ECFD1H104ZF	001 108 0906 2
						C818	ECEA1VSN2R2	001 120 5070 9

■ TERMINAL GUIDE OF IC'S, TRANSISTORS AND DIODES

AN8370S 42 pin AN6554NS 14 pin MN6636S 10 pin AN8290S 24 pin MN1550PDT 18 pin SVICXK5816M 24 pin SVIUPD4053 14 pin SVINJM5532 8 pin SVIM5238 8 pin SVIM5218P 8 pin AN6558 8 pin 	SVIPCM54HP-1 28 pin MN1526PDW 64 pin 	MN6617S 84 pin MN6618A 42 pin 	MN1280-R, MN1280S 	2SC3311 2SD1450 	UN4112 UN4113 UN4212 
			MA4068, MA4056, MA4330, MA4091 	EHDGA1243 15 pin SVIGA011 5 pin 	SVIFU15 SVIF38 SVIF10 
	2SC4010 2SB1240 2SD1862	MA165 	SVISR35200A 	SVIM5236L 	

■ BLOCK DIAGRAM

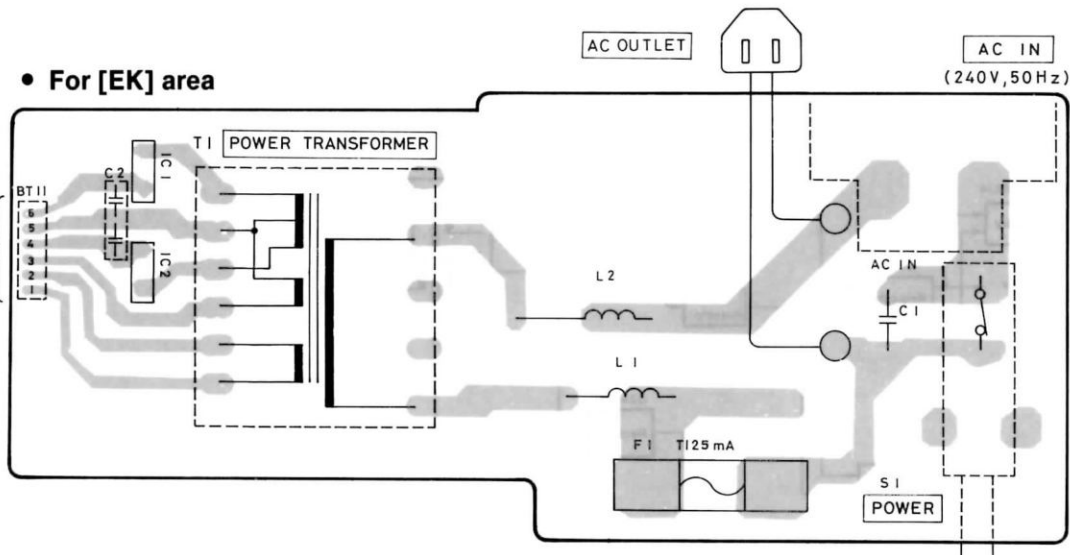




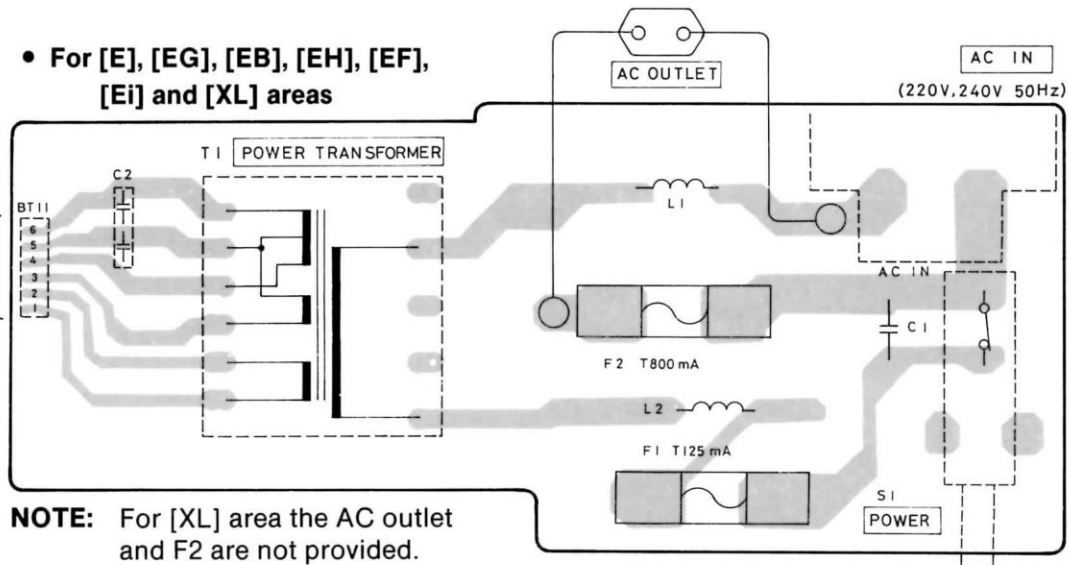
■ CIRCUIT BOARD AND WIRING CONNECTION DIAGRAM

• POWER SOURCE P.C.B.

• For [EK] area

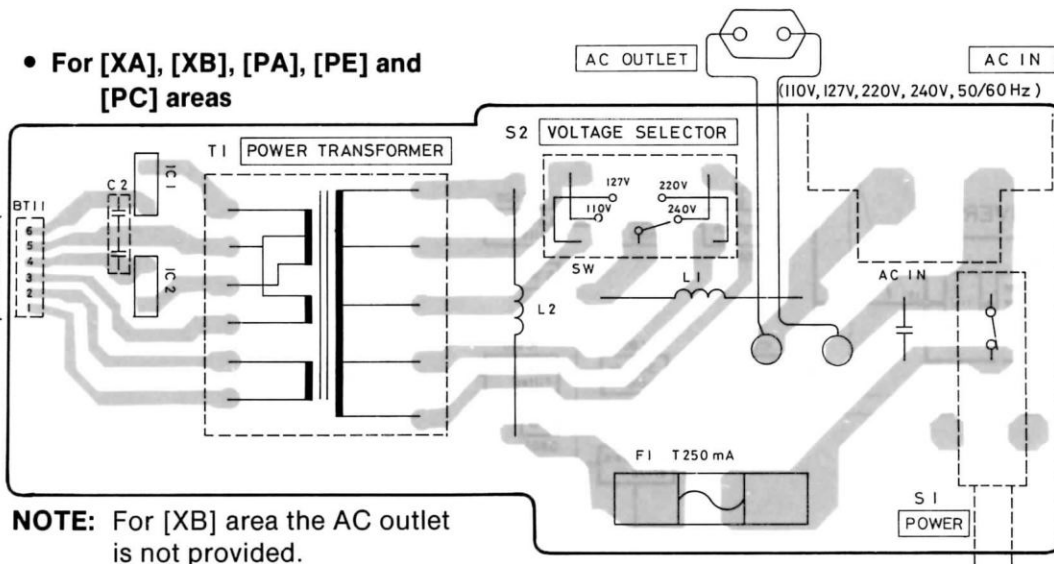


• For [E], [EG], [EB], [EH], [EF], [Ei] and [XL] areas



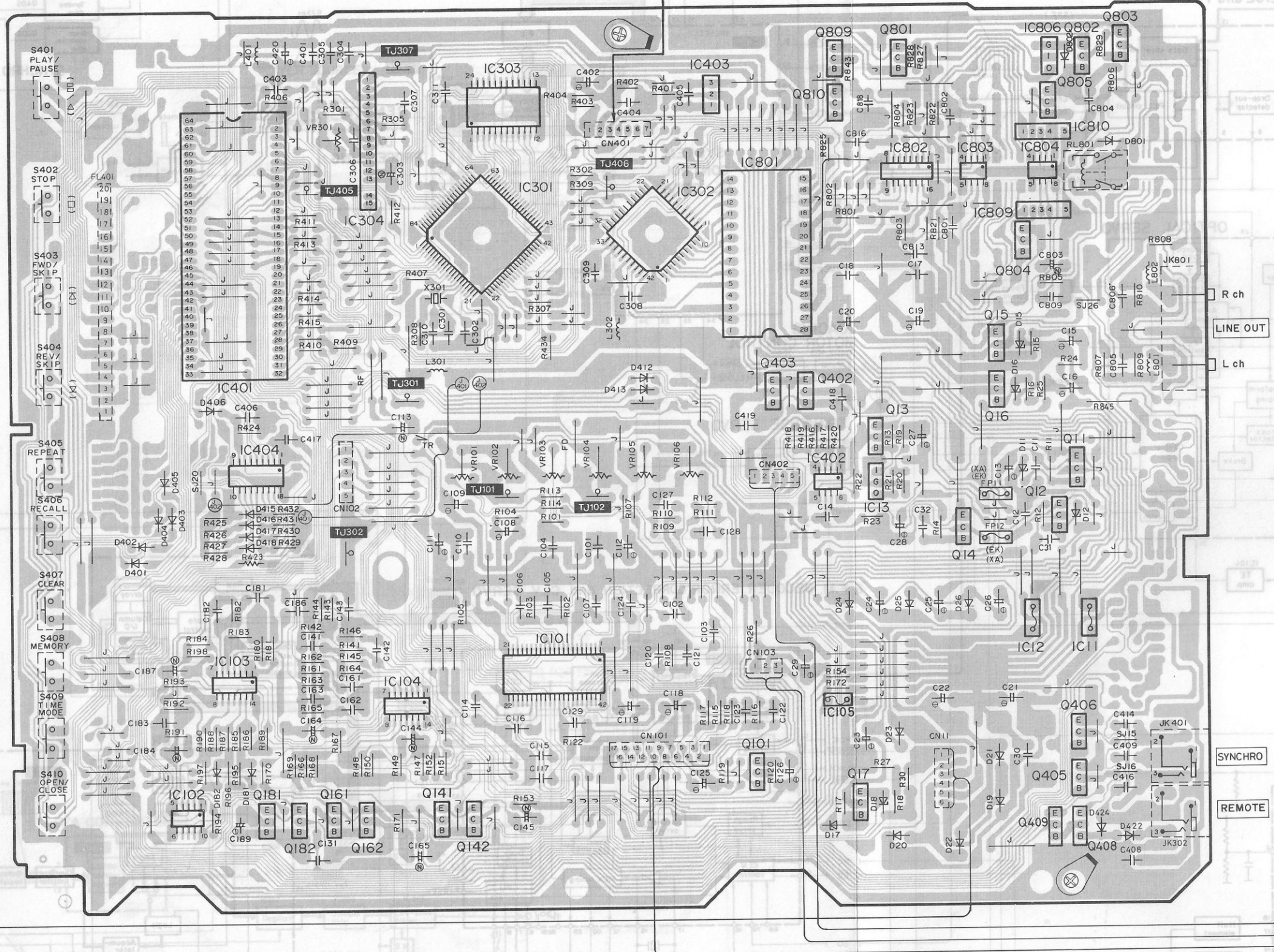
NOTE: For [XL] area the AC outlet and F2 are not provided.

• For [XA], [XB], [PA], [PE] and [PC] areas

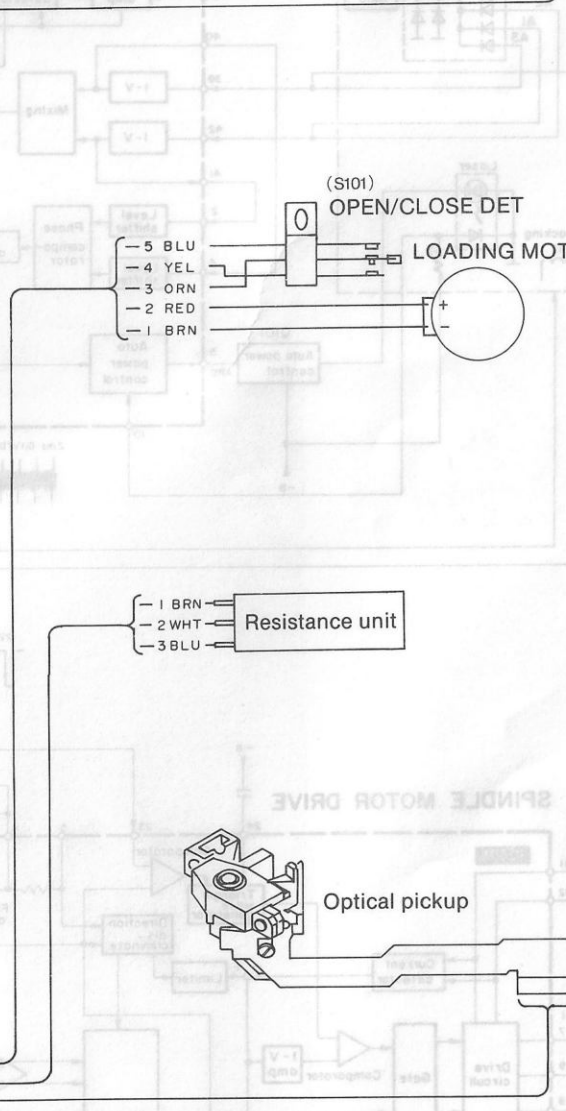
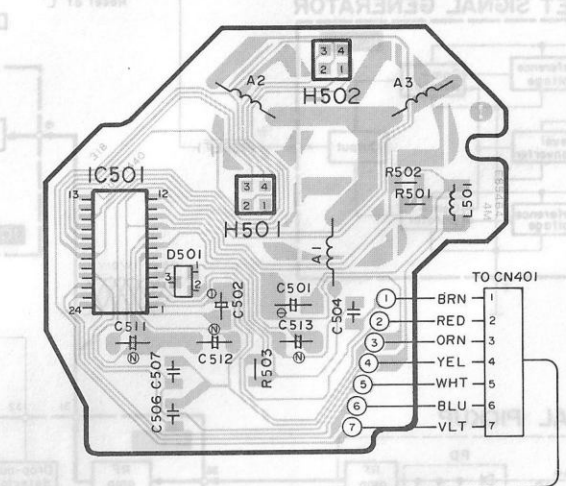


NOTE: For [XB] area the AC outlet is not provided.

● MAIN P.C.B.



● SPINDLE CONTROL P.C.B.



■ SCHEMATIC DIAGRAM

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

Notes:

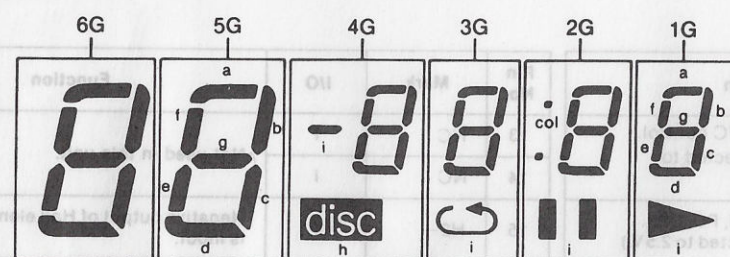
- S1** : Power switch in "on" position.
- S101** : Disc holder open/close detection switch.
- S401** : Play/pause switch.
- S402** : Stop switch.
- S403** : Forward skip/search switch.
- S404** : Backward skip/search switch.
- S405** : Repeat switch.
- S406** : Recall switch.
- S407** : Clear switch.
- S408** : Memory switch.
- S409** : Time mode switch.
- S410** : Open/close switch.
- The voltage value and waveform 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 legs of IC or LSI with the fingers directly.

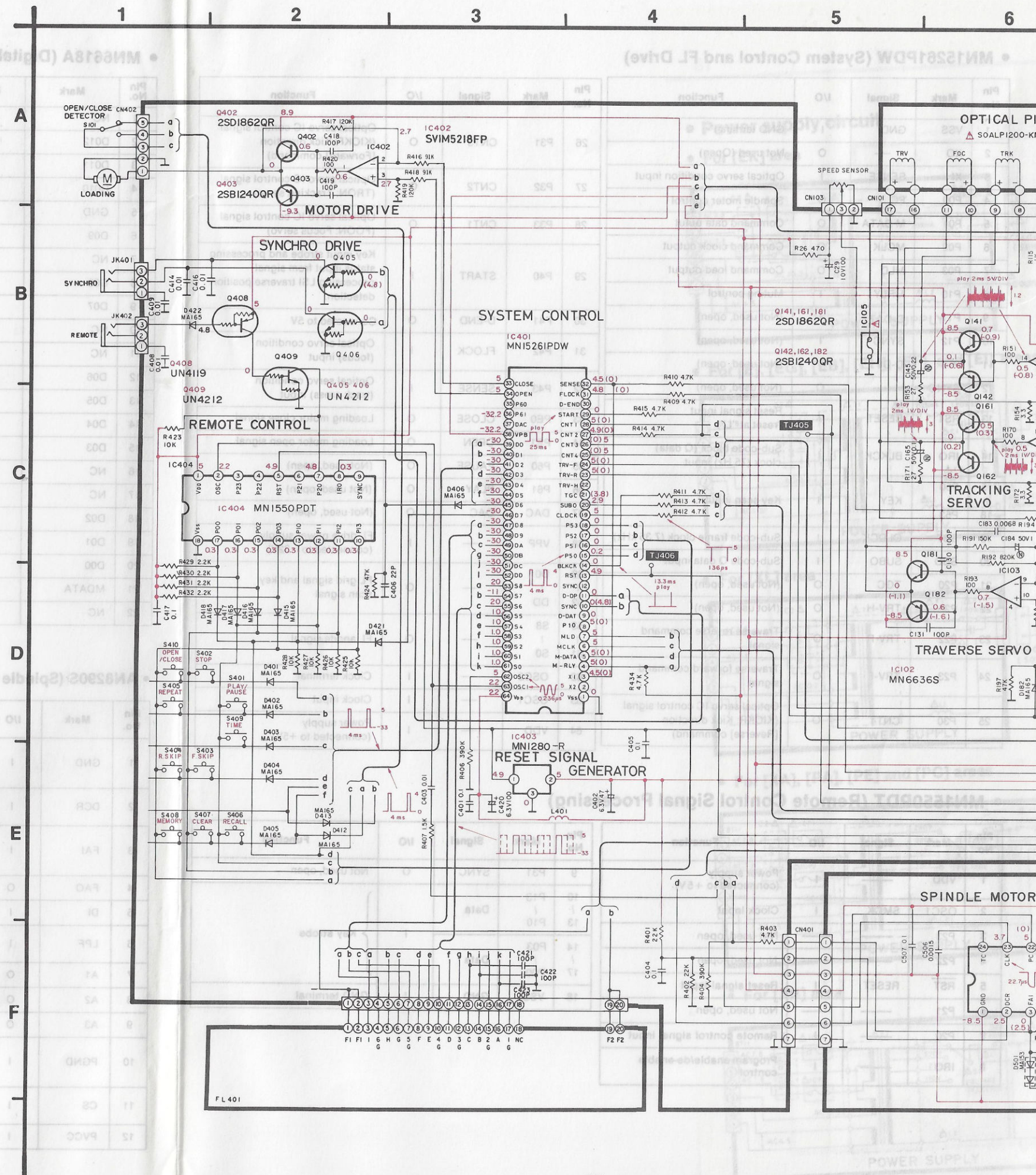
■ Internal connection of FL

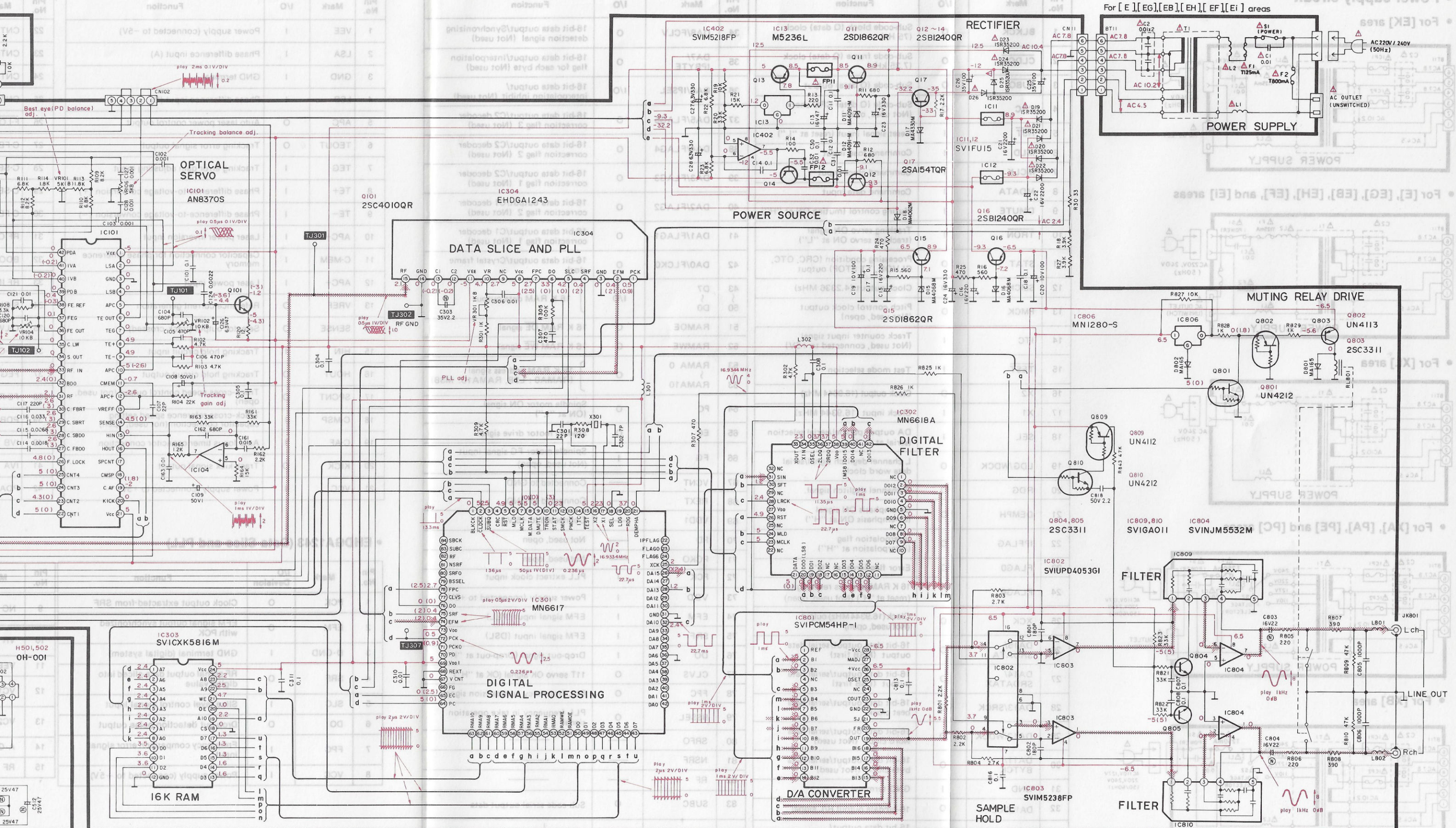
• Grid connection diagram



• Anode connection table

	6G	5G	4G	3G	2G	1G
a	a	a	a	a	a	a
b	b	b	b	b	b	b
c	c	c	c	c	c	c
d	d	d	d	d	d	d
e	e	e	e	e	e	e
f	f	f	f	f	f	f
g	g	g	g	g	g	g
h	-	-	disc	-	col	-
i	-	-	-	↺		▶





• AN8370S (Optical Servo Control)

Pin No.	Mark	I/O	Function
1	VEE	I	Power supply (connected to -5V)
2	LSA	I	Phase difference input (A)
3	GND	I	GND terminal
4	LSB	I	Phase difference input (B)
5	APC	O	Auto laser power control output
6	TEOUT	O	Tracking error signal output
7	TEG	I	Tracking error gain adjusting input
8	TE+	I	Phase difference-to-voltage conversion (+)
9	TE-	I	Phase difference-to-voltage conversion (-)
10	APC-	I	Laser power inversion input
11	C-MEM	I	Capacitor connection for phase difference memory
12	APC+	I	Laser power input
13	VREF	O	Reference current generation
14	SENSE	O	Selector output (track-crossed)
15	HIN	I	Tracking hold circuit input
16	HOUT	O	Tracking hold circuit output
17	SPCNT	O	Track-cross speed control output (not used, open)
18	C-MSP	I	Track-cross reference speed setting capacitor connection (not used, open)
19	C-AF	I	Auto focus timer capacitor connection
20	KICK	O	Track kick signal output
21	VCC	I	Power supply (connected to +5V)

Pin No.	Mark	I/O	Function
22	CNT1	I	Control input (FOON: Focus servo ON signal)
23	CNT2	I	Control input (TRON: Tracking servo ON signal)
24	CNT3	I	Control input (KICKF: Kick direction [Forward] command)
25	CNT4	I	Control input (KICKR: Kick direction [Reverse] command)
26	F-LOCK	O	Focus lock signal output
27	C-FBDO	O	Capacitor connection for inversion RF high speed detection
28	C-SBDO	O	Capacitor connection for inversion RF low speed detection
29	C-SBRT	O	Capacitor connection for non-inversion RF low speed detection
30	C-FBRT	O	Capacitor connection for non-inversion RF high speed detection
31	RF OUT	O	RF signal output
32	BDO	O	Drop-out detection output
33	RF IN	I	RF signal input
34	S-OUT	O	Focus search signal output
35	C-LW	I	Capacitor connection for triangular wave generation
36	FE-OUT	O	Focus error signal output
37	FEG	I	Focus error gain adjusting input
38	FE-REF	I	Focus error comparison voltage generation
39	PDB	I	Photo detector current input (B)
40	IVB	O	Current to voltage conversion (B)
41	IVA	O	Current to voltage conversion (A)
42	PDA	I	Photo detector current input (A)

• EHDGA1243 (Data Slice and PLL)

Pin No.	Mark	I/O Devision	Function
1	PCK	O	Clock output extracted from SRF
2	EFM	O	EFM signal output synchronized with PCK
3	D-GND	I	GND terminal (digital system)
4	SRF	O	RF signal output data-sliced into digital value
5	SLC	I	Slice level control signal input
6	DO	O	Drop-out detection pulse output
7	FPC	I	Frequency comparison error signal input.
8	VCC	I	Power supply (connected to +5V)

Pin No.	Mark	I/O Devision	Function
9	NC	I	VCO free ran frequency adjusting current input (not connected)
10	VR	I	Resistor connection for VCO oscillation frequency
11	VEE	I	Power supply (connected to -5V)
12	VC1	I	Capacitor connection for VCO oscillator frequency
13	VC2	I	Capacitor connection for VCO oscillator frequency
14	A-GND	I	GND terminal (analog system)
15	RF	I	RF signal input

• MN15261PDW (System Control and FL Drive)

Pin No.	Mark	Signal	I/O	Function
1	VSS	GND	I	GND terminal
2	XO	—	O	Not used (Open)
3	XI	SENSE	I	Optical servo condition input
4	P00	PC	O	Spindle moter control
5	P01	M DATA	O	Command data outut
6	P02	MCLK	O	Command clock output
7	P03	MLD	O	Command load output
8	P10	MRLY	I	Muting control
9	P11	D-DAT	I	(Not used, open)
10	P12	SYNC	I	(Not used, open)
11	P13	D-DP	I	(Not used, open)
12	SYNC	—	O	(Not used, open)
13	RST	RESET	I	Reset signal input (reset at "L")
14	IRQ	BLKCK	I	Sub-code block (Q data) clock (75 Hz) input
15 18	P50 P53	KEY	I	Key scan input
19	SBT	CLDCK	I	Sub-code frame clock (7.35 kHz)
20	SBD	SUBQ	I	Sub-code Q data input
21	P20	TGC	O	(Not used, open)
22	P21	TRV-H	O	(Not used, open)
23	P22	TRV-R	O	Traverse reverse command signal
24	P23	TRV-F	O	Traverse forward command signal
25	P30	CNT4	O	Optical servo IC control signal (KICKR: Kick direction [Reverse] command)

Pin No.	Mark	Signal	I/O	Function
26	P31	CNT3	O	Optical servo IC control signal (KICKF: Kick direction [Forward] command)
27	P32	CNT2	O	Optical servo IC control signal (TRON: Tracking servo)
28	P33	CNT1	O	Optical servo IC control signal (FOON: Focus servo)
29	P40	START	I	Key input strobe and processing status input from signal processing LSI traverse position detection.
30	P41	D-END	O	Connected to 5V
31	P42	FLOCK	I	Optical servo condition (focus) input
32	P43	SENSE	I	Optical servo condition (track cross) input
33	PE0	CLOSE	O	Loading motor close signal
34	PE1	OPEN	O	Loading motor open signal
35	P60	PAUSE	O	(Not used, open)
36	P61	PLAY	O	(Not used, open)
37	DAC	DAC	O	(Not used, open)
38	VPP	—	I	FL drive power supply (connected to -32V)
39 52	D0 DD	—	O	FL grid signal and key scan signal
53 61	S8 S0	—	O	FL anode signal
62	OSC2	—	I	Clock terminal
63	OSC1	—	I	Clock input
64	VDD	—	I	Power supply (connected to +5V)

• MN1550PDT (Remote Control Signal Processing)

Pin No.	Mark	Signal	I/O	Function
1	VDD	—	I	Power supply (connected to +5V)
2	OSC1	SMCK	I	Clock input
3	P23	—	—	Not used, open
4	P22	—	—	Not used, open
5	RST	RESET	I	Reset signal input
6	P21	—	—	Not used, open
7	P20	—	I	Remote control signal input
8	IRQ	—	I	Program enable/de-enable control

Pin No.	Mark	Signal	I/O	Function
9	P31	SYNC	O	Not used, open
10 13	P13 P10	Data	I	} Key strobe
14 17	P03 P00	Data		
18	VSS	GND	I	GND terminal

• MN6618A (Digital Filter)

Pin No.	Mark	I/O	Function
1	NC	—	Not connected
2	D012	O	16-bit data output
3	D011	O	16-bit data output
4	D010	O	16-bit data output
5	GND	I	GND terminal
6	D09	O	16-bit data output
7	NC	—	Not connected
8	D08	O	16-bit data output
9	D07	O	16-bit data output
10	NC	—	Not connected
11	NC	—	Not connected
12	D06	O	16-bit data output
13	D05	O	16-bit data output
14	D04	O	16-bit data output
15	D03	O	16-bit data output
16	NC	—	Not connected
17	NC	—	Not connected
18	D02	O	16-bit data output
19	D01	O	16-bit data output
20	D00	O	16-bit data output
21	MDATA	I	Command data input
22	NC	—	Not connected

Pin No.	Mark	I/O	Function
23	MCLK	I	Command clock input
24	MLD	I	Command load input
25	NC	—	Not connected
26	RST	I	Reset signal input (reset at "L")
27	—	—	—
28	R/L	I	L/R channel changeover signal
29	NC	—	Not connected
30	SFT	I	Serial data input clock
31	SIN	I	Serial data input
32	NC	—	Not connected
33	X OUT	O	Clock output (Not used, open)
34	X IN	I	Clock input (16.9244 MHz)
35	OSEL	I	DA output parallel/serial changeover (Parallel at "L")
36	LDGL	O	L channel deglitch signal
37	RDGL	O	R channel deglitch signal
38	VDD	I	Power supply (connected to +5V)
39	D015	O	16-bit data output (MSB)
40	D014	O	16-bit data output
41	NC	—	Not connected
42	D013	O	16-bit data output

• AN8290S (Spindle Motor Drive)

Pin No.	Mark	I/O	Function
1	GND	I	Minimum potential of IC control. (In this unit, it is connected to VEE [-8.0V])
2	DCR	I	Standard voltage of FAI, PC, CLK. (In this unit, it is connected to 2.5V.)
3	FAI	I	Torque command filter amp. input. (Normal rotation command when FAI < DCR.)
4	FAO	O	Filter amp. output.
5	DI	I	Absolute value circuit input.
6	LPF	I	Capacitor terminal for low pass filter of current feedback loop.
7	A1	O	Drive signal output.
8	A2	O	
9	A3	O	
10	PGND	I	Minimum potential of IC power. (In this unit, it is connected to VEE [-8.0V])
11	CS	I	Drive current detection resistor terminal.
12	PVCC	I	Power input for IC power.

Pin No.	Mark	I/O	Function
13	NC	I	Not used in this unit.
14	NC	I	
15	H2-	I	Negative output of Hall element is input.
16	H2+	I	Positive output of Hall element is input.
17	H1-	I	Negative output of Hall element is input.
18	H1+	I	Positive output of Hall element is input.
19	HSW	I	Bias switch of Hall element. (OFF when PC > DCR)
20	HB	I	Bias power of Hall element.
21	VCC	I	Power input for IC control.
22	PC	I	Power control. (Power down mode when PC > DCR)
23	CLK	I	Clock input. (DCR standard, operated at the edge of rise.)
24	TC	I	Triangular wave generation capacitor terminal.