

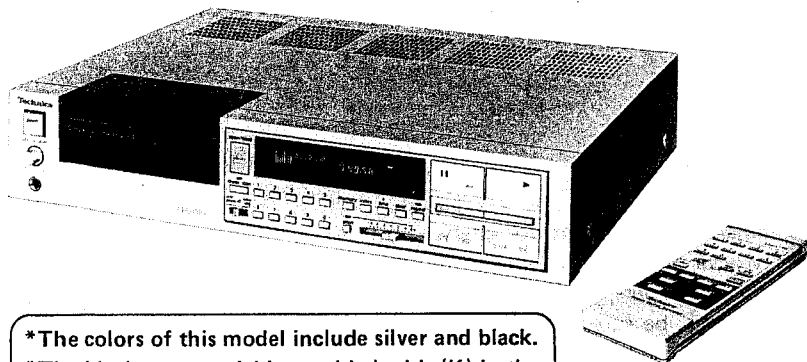
Service Manual

DIGITAL

Compact Disc Player

SL-P8/(K)

[E], [EK], [XL], [EG],
[EB], [EH], [EF], [Ei],
[XA], [PA], [PE], [PC]



*The colors of this model include silver and black.
*The black type model is provided with (K) in the Service Manual.

Areas

- *[E] is available in Switzerland and Scandinavia.
- *[EK] is available in United Kingdom.
- *[XL] is available in Australia.
- *[EG] is available in F.R Germany.
- *[EB] is available in Belgium.
- *[EH] is available in Holland.
- *[EF] is available in France.
- *[Ei] is available in Italy.
- *[XA] is available in Southeast Asia, Oceania, Africa, Middle Near East and Central South America.
- *[PA] is available in far East PX.
- *[PE] is available in European Military.
- *[PC] is available in European Audio Club.

Specifications

Specifications are subject to change without notice for further improvement.
Weight and dimensions shown are approximate.

Audio

- No. of channels: 2 (left and right stereo)
- Frequency response: 4 ~ 20,000 Hz \pm 0.5 dB
- Dynamic range: more than 96 dB
- S/N ratio: more than 96 dB
- Total harm. distortion: less than 0.003% (1 kHz, 0 dB)
- Channel separation: more than 90 dB
- Wow and flutter: below measurable limit

Signal Format

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

Pickup

- Type: Astigma 3-beam
- Light source: Semiconductor laser
- Wavelength: 800 nm

Functions

- Search modes: Manual search, Index search, Track skip, Index skip, Music scan
- Program functions: Max. of 32 steps
Location of beginning of tracks, Selection of starting and ending positions (by track no., index no. or time)
- Display functions: Digital display—No. of tracks, Total playing time (min., sec.), Track being played, Elapsed playing time, Index no., Remaining playing time
Segment display—No., of tracks, Track being played, Programmed tracks

Operation buttons:

- Basic buttons—7
- Program buttons—14
- Music scan button—1
- Repeat button—1
- Pitch control slider—1
- Motor-driven horizontal type
- Max. 200mW (adjustable), 32 Ω

Disc loading:

Headphone output level:

General

- Power supply: \sim 110–120/220–240V, 50/60Hz
- Power consumption: 35 watts
- Output voltage: 2 volts (at 0 dB)
- Output impedance: 330 Ω
- Load impedance: more than 5k Ω
- Dimensions: 43 x 32.5 x 8.8 cm
(16 ¹⁵/₁₆" x 12 ¹³/₁₆" x 3 ¹⁵/₃₂")
(When disc holder is opened)
43 x 45.1 x 8.8 cm
(16 ¹⁵/₁₆" x 17 ³/₄" x 3 ¹⁵/₃₂")

Weight:

6.1 kg (13.4 lbs)

Infrared Remote Control Unit

Remote control functions:

- Basic buttons—6
- Program buttons—14
- Music scan button—1
- Repeat button—1
- 6.4 x 15.5 x 1.4 cm

Dimensions: (W x H x D)

Weight:

100 grams (with batteries)

Batteries:

UM-4 "AAA" batteries or IEC R03 or equivalent (1.5Vx2)

Technics

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

Panasonic Tokyo
Matsushita Electric Industrial Co., Ltd.
1-2, 1-chome, Shibakoen, Minato-ku, Tokyo 105 Japan

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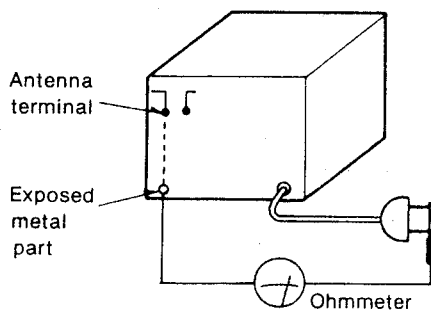
SAFETY PRECAUTION

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

INSULATION RESISTANCE TEST

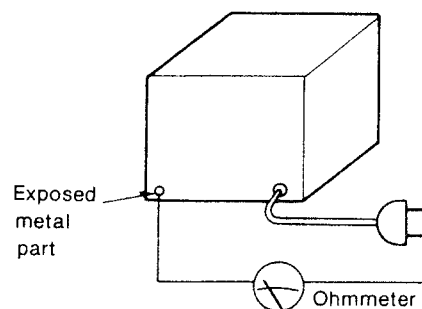
1. Unplug the power cord and short the two prongs of the plug with a jumper wire.
2. Turn on the power switch.
3. Measure the resistance value with ohmmeter between the jumpered AC plug and each exposed metal cabinet part, such as screwheads antenna, control shafts, handle brackets, etc. Equipment with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

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



(Fig. A)

Resistance = $3M\Omega - 5.2M\Omega$



(Fig. B)

Resistance = Approx ∞

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

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



• Use of caution labels

	U.S.A.	Canada	Europe	Others
SRNZ010S01	X	X	○	○
SRNZ007S02	○	X	○	○
SRNZ007C01	X	○	X	X
SRNZ010S02	X	X	○	○

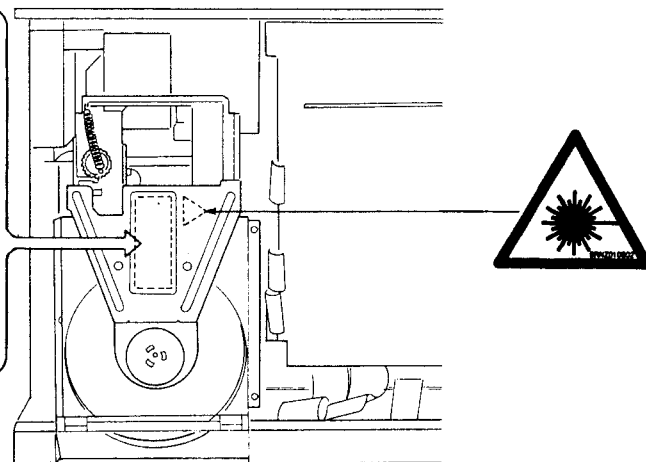
Note: ○ Mark Label is used, X Mark Label is not used.

ADVARSEL-Usynligt laserlys udstråles ved åbning.
Undgå direkte bestråling.

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

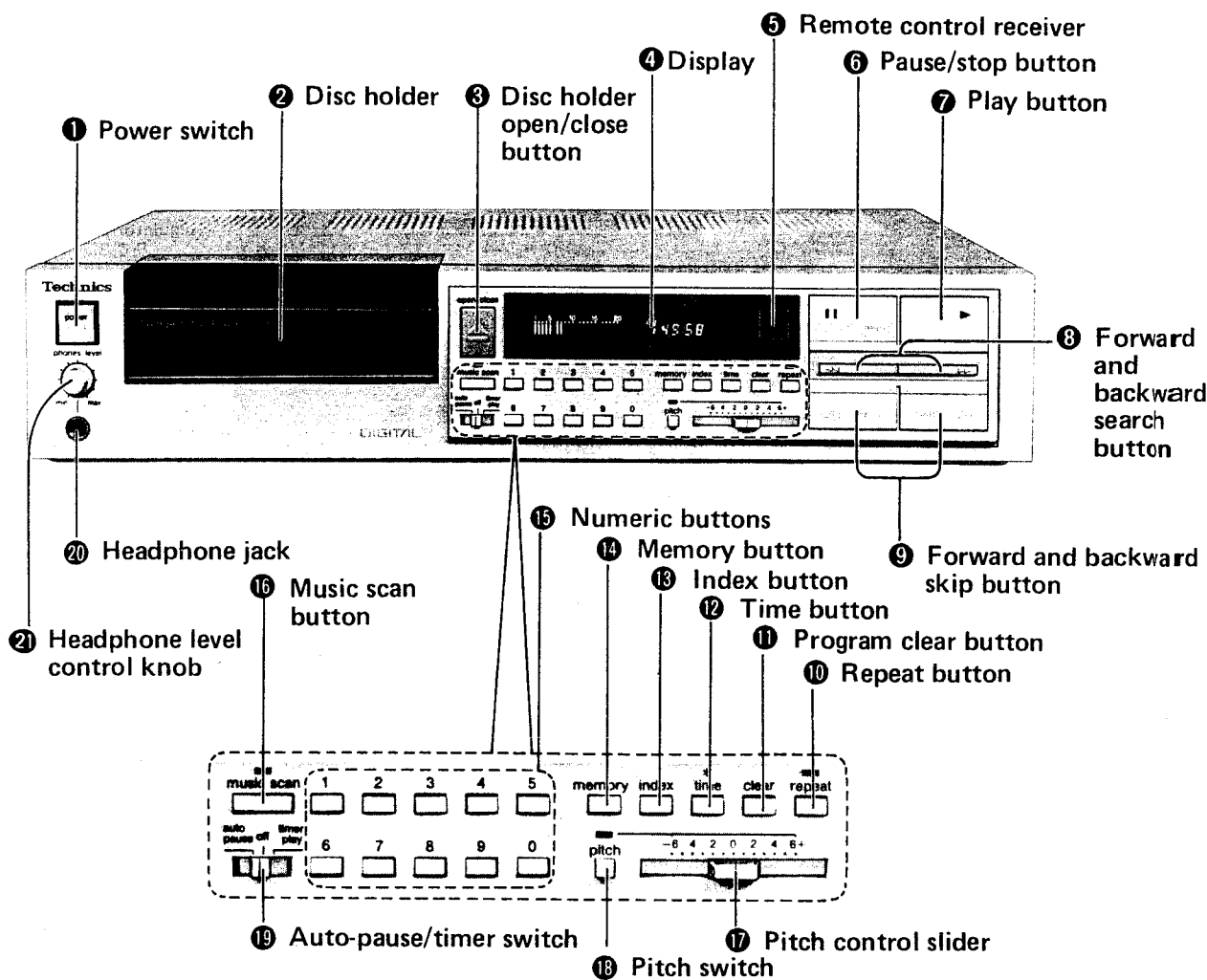
"CAUTION-HAZARDOUS LASER, AND ELECTROMAGNETIC RADIATION WHEN OPEN"
"ATTENTION-RAYONNEMENT LASER ET ELECTROMAGNETIQUE DANGEREUX SI OUVERT"

SRNZ007C01

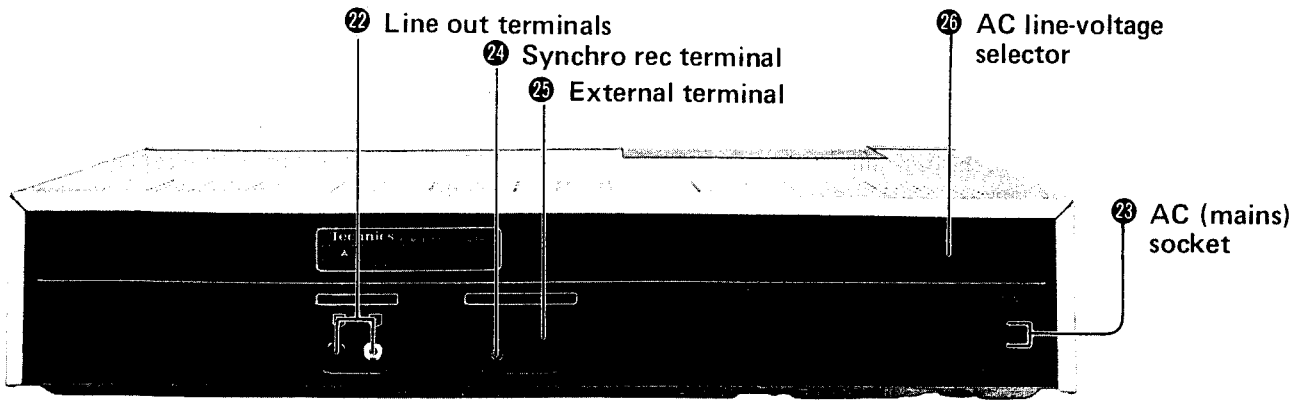


■ LOCATION OF CONTROLS

• Front panel view



• Rear panel view



Functions

1 Power switch

- Press once to turn power on and again to turn power off.
- When power is turned on, the display will read (0) for the track number and (0.00) for the time.
- When the auto-pause/timer switch is set to auto pause, the indicator in the play button (►) will light for only about 5 seconds if no disc is inserted.

2 Disc holder

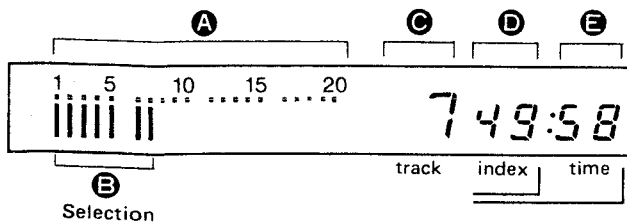
- The disc is inserted in this holder with label side up.

3 Disc holder open/close button

- Press this button to insert or remove a disc. When this button is pressed, the disc holder opens.
- Press this button again to close the holder.

4 Display Section

- A Segment display scale**
Shows the track number of each segment from 1 to 20.
- B Track number segment display**
 - Displays up to 20 tracks. For track numbers higher than 20, the overrun indicator (►) to the right of this display lights.
 - The segment of the track currently being played flashes on and off.
 - Once a track has been played, its segment goes out.
 - Programmed tracks are also shown by the segment display.
- C Digital track number display**
- D Elapsed/remaining playing time display (minutes)**
 - The index number is displayed here when the index button is pressed.
- E Elapsed/remaining playing time display (seconds)**



The information displayed differs according to the present operating mode. Refer to the Playing a disc section for details.

- The unit switches to the standby mode when a disc is inserted in the holder. In the standby mode, the pickup is located at the beginning of the first track and the display is showing the total number of tracks on the disc and the total playing time.
- The display shown above is for a disc containing a total of 7 tracks having a total playing time of 49 minutes and 58 seconds. However, if the play button is pressed while the disc holder is still open, the holder will close and the disc will be played from the beginning without the track numbers or playing time being displayed.

Note:
The pickup uses a laser to read the information on the disc surface. The pickup is not visible from the outside of the player.

5 Remote control receiver

- The infrared signal from the remote control unit included with this player is received here.
- Before pressing one of the remote control unit buttons, the unit should be aimed at this receiver. The remote control indicator will light while the button is held down to confirm that a command is being received.



6 Pause/stop button

- This button activates both the pause and stop (standby) modes.
- When this button is pressed while a disc is being played, the || indicator lights to show that the pause mode has been activated. Press the play button to cancel the pause mode and resume disc play.
- If the pause/stop button is held down for more than about one second, the stop (standby) mode is activated (the || indicator goes out) and the pickup returns to the beginning of the first track on the disc.
- The disc continues to rotate for about 20 seconds after the stop mode is activated so that the player can quickly switch to the play or skip function if one of those buttons is pressed. If these buttons are not pressed during the 20 second period, the disc will stop rotating.



7 Play button

- Press this button to begin disc play. The play indicator (▶) lights up to show when this button has been pressed.
- When this button is pressed during disc play, the pickup returns to the starting position and disc play starts again from the beginning. During program disc play, disc play starts again from the beginning of the program.
- When this button is pressed while the pause mode is activated, pause is cancelled and the player returns to the play mode.

8 Forward and backward search buttons

- Use these buttons to move the pickup forward and backward. The buttons are used in the following manner.
 1. Use the search buttons when the player is in the pause mode or during disc play to move the pickup to a specific point on the disc.
 2. Use the digital track number display and playing time display to locate the desired point on the disc.
 - During disc play, search can be performed while listening to the signal from the disc to aid in locating a specific point. The output level is -12 dB compared with the level during standard disc play.
 - Press the  button to move the pickup forward.
 - Press the  button to move the pickup backward.
- When either of these buttons is pressed, the pickup will move slowly at first and then rapidly if the button is held down for more than about three seconds.

9 Forward and backward skip buttons

1. During the pause mode or disc play, press one of the skip buttons to perform forward or backward skip operation.
2. During program disc play, the pickup either moves ahead to the beginning of the next programmed track or back to the beginning of the previous programmed track.
 - Press the  button to move the pickup forward.
 - Press the  button to move the pickup backward.
 - When either of these buttons is held down, tracks are skipped continuously. (Quick skip)

10 Repeat button

- Press this button to activate the repeat play mode. The repeat indicator lights to show when the repeat mode is activated.
- If the repeat mode is activated during program disc play, the program will be played repeatedly.
- Press this button again to cancel the repeat mode (repeat indicator goes out).

11 Program clear button

- Press this button to erase the program in the memory. This button is also used to cancel the index and remaining playing time display modes.

12 Time button

The time button is used for the following functions:

1. To start disc play after a track number or time has been input using the numeric buttons.
2. To start disc play after a track number or time has been programmed.
3. To switch the display to the remaining playing time mode. (not possible during program disc play)
4. To return the display from the remaining playing time mode to the elapsed time mode.
5. To return the index number display (activated by pressing the index button) to the elapsed playing time mode.
6. To display the number of tracks on a disc and the playing time of each track one by one when the player is in the standby mode.

13 Index button

The index button is used for the following functions:

1. When an index number is specified for direct access disc play.
2. To start disc play at a specific index number.
3. To display the index number currently being played.
4. To switch the display from the remaining playing time mode to the index number mode.
5. To perform index skip operation.

14 Memory button

- Press to store a track number, index number or playing time in the memory for program disc play.
- Up to 32 steps can be programmed in any order.

15 Numeric buttons

The numeric buttons are used for the following functions:

1. To specify track and index numbers.
2. To specify playing times in minutes and seconds.

16 Music scan button

- When this button is pressed, the music scan indicator lights and the first 10 seconds of each track on the disc or each track in the program is played. Once scanning has ended, the indicator goes out and the disc is played from the beginning or from the first programmed track if the player is in the program disc play mode.
- Press the play button during one of the 10 second disc play periods to cancel music scan and begin disc play from that point (indicator goes out).
- Music scan can also be cancelled by pressing the pause/stop button.

17 Pitch control slider

- Use this slider to adjust the speed at which the disc rotates. This control can only be used after the pitch switch has been pressed to light the pitch indicator.
- Pitch is displayed by an approximate percentage. Pitch is adjustable $\pm 6\%$.
- Press the pitch switch again to return to standard disc play.

18 Pitch switch

- Press to activate the pitch control function (pitch indicator lights). Press again to return to standard disc play (indicator goes out).

19 Auto-pause/timer switch

- When this switch is set to auto-pause, the player switches to the pause mode at the end of each track during standard disc play and program disc play.
- Press the play button to continue disc play. This function is very useful when singing along with discs.
- Set this switch to timer to use the player for timer play.
- Set to the center off position to cancel the auto-pause or timer mode.
- The auto-pause function will not operate on discs that do not contain a pause signal in each between-tracks gap.

20 Headphone jack

21 Headphone level control knob

- Use to control the output level to the headphones.

22 Line out terminals (LINE OUT)

- These are the audio output terminals.
- Connect the line out terminals to the AUX/CD/VIDEO or TAPE PLAYBACK terminals on your amplifier or receiver.
- Do not connect to the amplifier PHONO terminals as you would with a conventional turntable.

23 AC (mains) socket (AC IN)

Connect this socket to a wall socket using the power cord.

• Top view

24 Synchro rec terminal

The following functions are possible when this terminal is used:

Synchro recording function

Recording can be synchronized with the beginning and end of disc play and pause operation. Note that this is only possible when using Technics cassette decks which are equipped with a CD-SYNCHRO REC terminal and Technics amplifiers which are equipped with a synchro rec terminal compatible with Compact Disc players.

Use the MINI-PHONE cord (option) for the synchro rec connection. (SJP2257)

Direct operation function

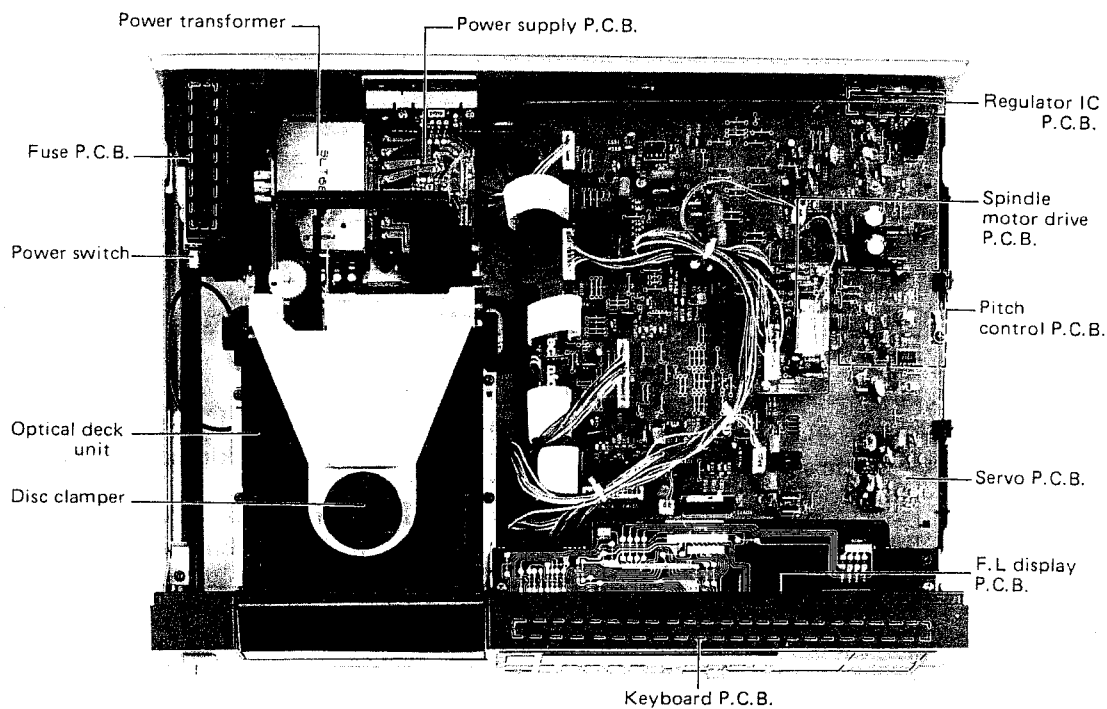
The amplifier input source can be automatically switched to aux/CD/video when the play button is pressed. It is also possible to automatically start disc play when the amplifier input source selector is switched to aux/CD/video.

Note that this is only possible when using Technics amplifiers which have a direct operation function.

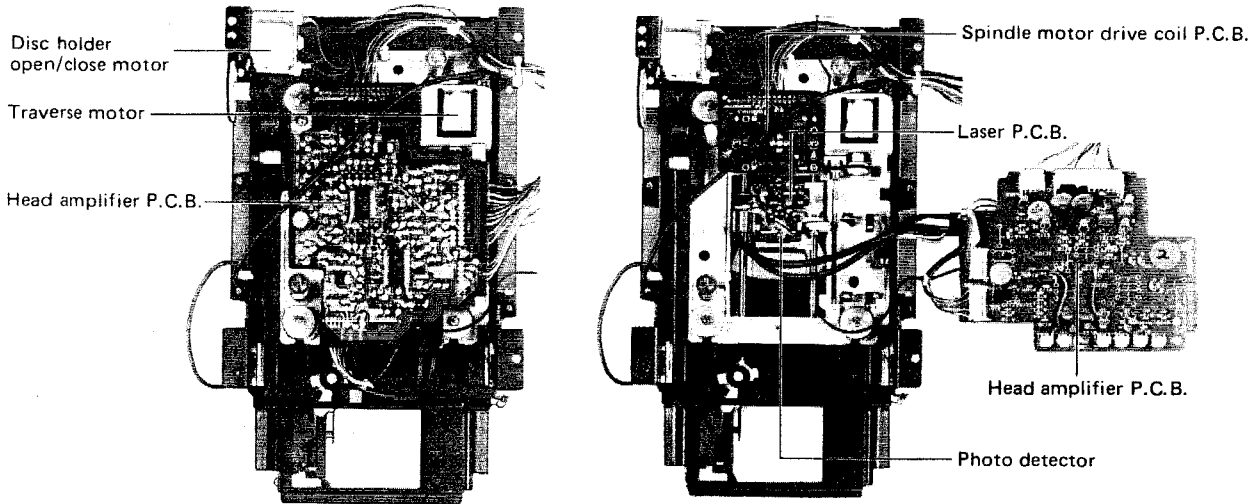
25 External terminal

- This terminal is provided for system connections with future components.
- Do not connect any other components to this terminal.

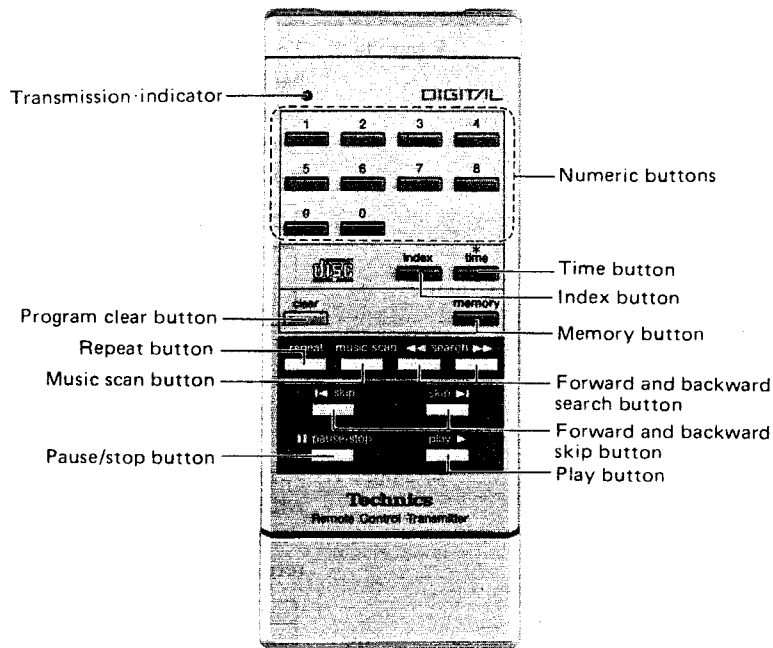
26 AC line-voltage selector



• Optical deck unit (Bottom view)



• Remote control unit



• Remote control unit functions

All operations except those listed below can be performed with the remote control unit in the same manner as with the front panel controls.

1. Power on/off
2. Headphones level control
3. Disc holder open/close button operation
4. Auto-pause/timer play settings
5. Pitch control adjustment
6. Pitch switch on/off

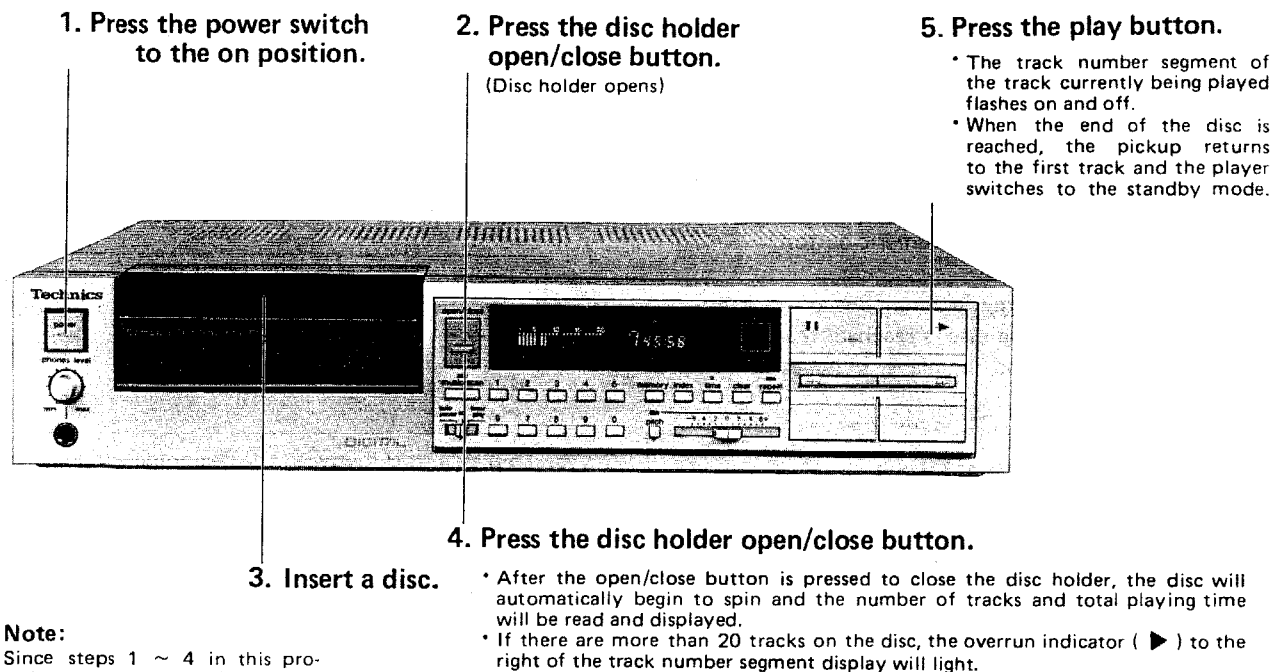
• Notes

- Always aim the remote control unit at the front panel receiver.
- The remote control unit can be used at an angle of up to 60° from the direction in which the front panel faces.
- The remote control unit can not be used from a distance of more than 7 meters.

■ PLAYING A DISC

1. Automatic Play

(To play a disc from beginning to end)



● To briefly interrupt disc play

Press the pause/stop button to activate the pause mode (II indicator lights). Be careful not to hold the pause/stop button down more than about one second since this will switch the player to the stop mode. Press the play button to resume disc play.

● To stop disc play

Hold the pause/stop button down for about one second until the II indicator lights off. The pickup will return to the beginning of the first track and the player will switch to the standby mode. Turn the power switch off if the player is not going to be used for a while.

● The remaining playing time display

Press the time button to switch the time display to the remaining playing time mode. To return to the elapsed playing time mode, press the time button again. Remember that the remaining time can only be displayed during standard disc play and random access play (when disc play is started from a specific track, index or time).

2. To Play A Disc From A Specific Track (track random access)

(For example, to start disc play from track 3)

Procedure

1. Press the number 3 of the numeric button.
2. Press the play button.
3. Disc play begins from track 3 and the track 3 segment flashes on and off.
4. When the end of the disc is reached, the pickup returns to the first track and the player switches to the standby mode.

3. To Play A Disc From A Specific Index (index random access)

- When specifying an index number obtained from the disc's liner note.
(For example, to start disc play from track 3, index 2.)

Procedure:

1. Press the number 3 of the numeric button.
2. Press the index button.
3. Press the number 2 of the numeric button.
4. Press the play button.
5. Disc play begins from index 2 of track 3 and the track 3 segment flashes on and off.
6. When the end of the disc is reached, the pickup returns to the first track and the player switches to the standby mode.

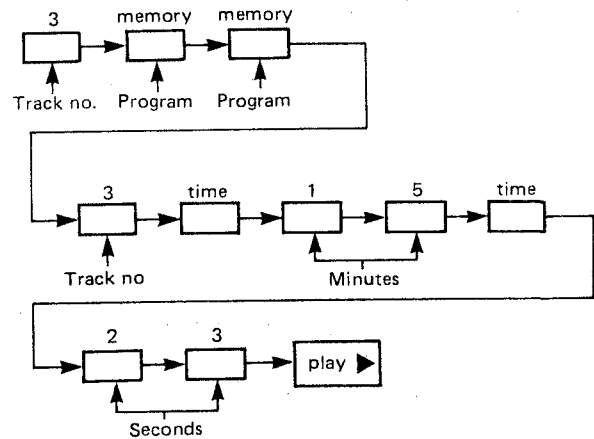
4. To Play A Disc From A Specific Point Within A Track (time random access)

(For example, to start disc play from the 2 min. 38s. point of track 5.)

Procedure:

1. Press the number 5 of the numeric button.
2. Press the time button.
3. Press the number 2 of the numeric button.
4. Press the time button.
5. Press the number 3 of the numeric button.
6. Press the number 8 of the numeric button.
7. Press the play button.
8. Disc play begins from the 2 min, 38s. of track 5.
9. When the end of the disc is reached, the pickup returns to the first track and the player switches to the standby mode.

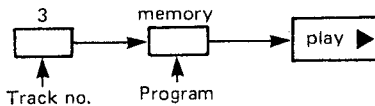
4. To play a track from the beginning to the middle.
(Example: To play track 3 from the beginning to the 15 min. 23s. point.)



5. Program Disc Play

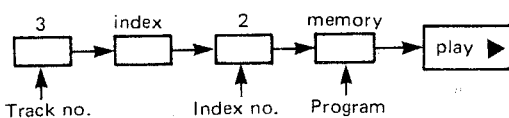
• **To program only one track (single program)**

1. To play one track from beginning to end.
(Example: To play track 3 from beginning to end.)

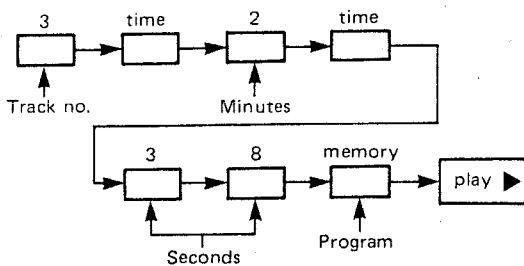


- Only the track number segment of the programmed track will light and then flash on and off while the track is being played.
- The player switches to the standby mode after track 3 has been played.

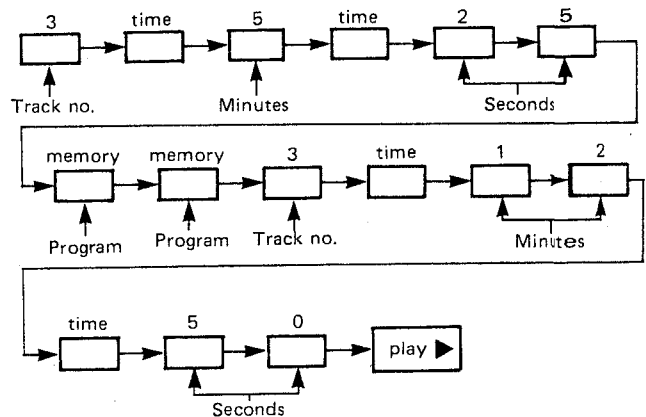
2. To play an index
(Example: To play track 3, index 2.)



3. To play a track from the middle to the end.
(Example: To play track 3 from the 2 min. 38s. point to the end.)

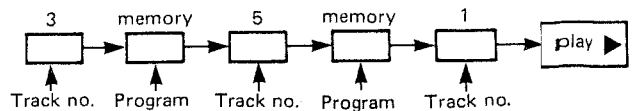


5. To play a track between the beginning and end.
(Example: To play track 3 from the 5 min. 25s. point to the 12 min. 50s. point.)



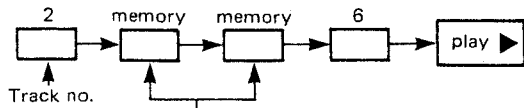
• **To program more than one track (multi-program)**

1. To play several tracks out of order
(Example: To play track 3, track 5 and track 1 in that other.)



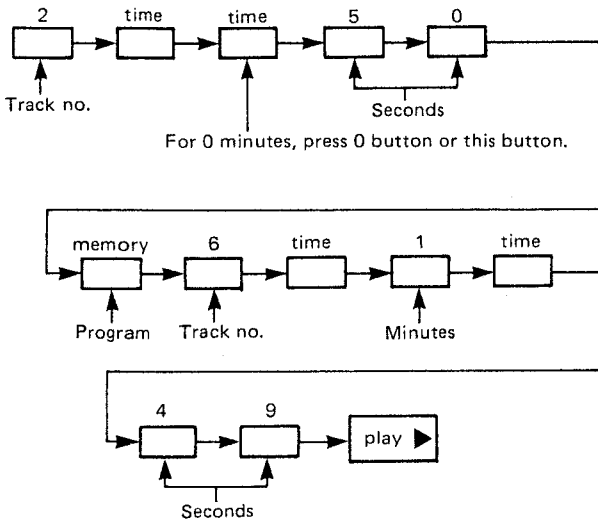
- Only the segments of the programmed tracks light; all other segments remain out.
- The segment of the track currently being played flashes on and off.
- To change a program entry, press the program clear button before the memory button is pressed. The program is now cancelled from that point onward.

2. To play several consecutive tracks.
(Example: To play a disc from track 2 through track 6.)



For continuous play, press the memory button twice. It is not necessary to enter each track. This abbreviated procedure is not possible when programming disc play from track 6 back to track 2, however.

3. To play one track from the middle to the end and then a second track from the middle to the end.
(Example: To play the second track from the 50s. point the end and then the sixth track from the 1 min. 49s. point to the end.)



• To enter a program during disc play

A new program can be entered while a disc is being played even if the program clear button is not pressed. When the new program is entered, the previous programs will still be erased and disc play based on the new program will begin.

Note:

- When entering a program during disc play, the program buttons must be operated without interruption. If there is a gap of more than 20 seconds between the time two program buttons are pressed, the new program will not be entered and disc play will continue in the normal manner.

• To cancel a program

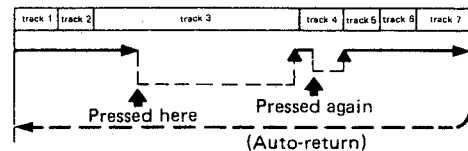
Press the program clear button. The program will be cleared from the memory and disc play will continue in the normal manner.

6. Skip Play

Skip play can be performed when the player is in the play or pause mode.

- To move to the beginning or the next track or several tracks ahead (forward skip)

Example 1: When the forward skip button is pressed while listening to the third track to advance to the beginning of the fourth track and then again to advance to the beginning of the fifth track.

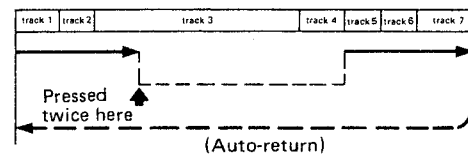


During program disc play, the pickup moves to the beginning of the next programmed track when the forward skip button is pressed.

The pickup moves to the next track (or programmed track) each time this button is pressed.

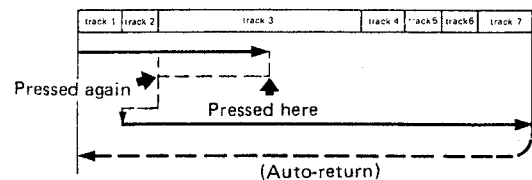
Example 2: To skip directly from the third track to the beginning of the fifth track, press the forward skip button twice in a row.

(Skips to the beginning of the next programmed track during program disc play.)



- To return to the beginning of the present track or any previous track (backward skip)

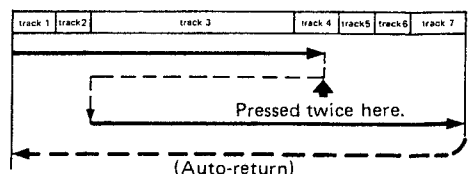
Example 1: When the backward skip button is pressed while listening to the third track to return to the beginning of that track and then again to return to the beginning of the second track.



During program disc play, the pickup moves to the beginning of the previous programmed track when the backward skip button is pressed.

The pickup returns to the previous track (or programmed track) each time this button is pressed.

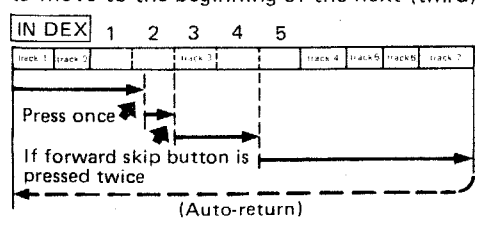
Example 2: To return to the beginning of track 3 when track 4 is being played.



● **To move to the beginning of a specific index**

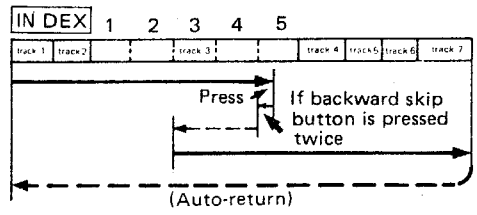
This function is only possible with discs having index numbers. For example, while playing index 2 of track 3 which contains a total of 5 indexes on a disc that has seven tracks:

Press the index button and then the forward skip button once to move to the beginning of the next (third) index.



● **To return to the beginning of a specific index**

Press the index button and then the backward skip button once to return to the beginning of the previous index.



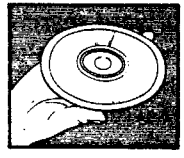
■ **HANDLING COMPACT DISCS**

● **Handling precautions**

Only compact discs identified with this mark can be used with this player.

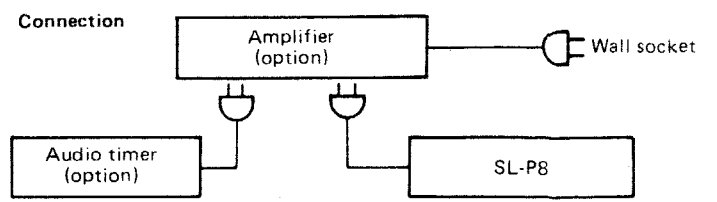


● Hold compact discs by the edges so the surface is not soiled with fingerprints.



- Be careful not to scratch the surface with fingernails or other sharp objects, particularly when inserting and removing discs in their cases.
- Do not bend the disc.
- Do not use record cleaning sprays or static electricity prevention liquids.
- Do not wipe with benzene, thinner or any other solvent. If the surface is soiled, wipe gently with a soft damp (water only) cloth.

7. Timer Play



Operations

1. Turn on the power switches of all components in the timer play chain.

Note:
The audio timer should be off at this time.

2. Set the auto-pause/timer switch to the timer play position.
3. Insert a disc in the holder.
4. Confirm the present time and set the audio timer to the desired start and stop times.
5. Turn the audio timer on. The audio timer will now turn power off to all components in the time play chain.
6. The disc will now be played from track one at the preset time.

- If the disc is brought from a cold environment into a warm room, dew may form on the disc. Wipe this off with a soft, dry cloth before using the disc.
- Do not write on the label with a ball-point pen, hard pencil or other hard writing utensil.
- Always remove the disc from the disc compartment when you have finished listening to it.

● **Storage precautions**

- Be sure to store discs in their cases to protect them from dust, scratches and warping.
- Do not place or store discs in the following places:
 - 1) Locations exposed to direct sunlight.
 - 2) Locations with high humidity or a lot of dust.
 - 3) Locations directly exposed to a heat outlet or heating appliance.
 - 4) In the glove compartment or rear ledge of an automobile.

DISASSEMBLY INSTRUCTIONS

How to remove the cabinet

1. Remove the 4 setscrews [Fig. 1: ① ~ ④] of cabinet.
2. Remove the cabinet in the direction of the arrow. [Fig 1]

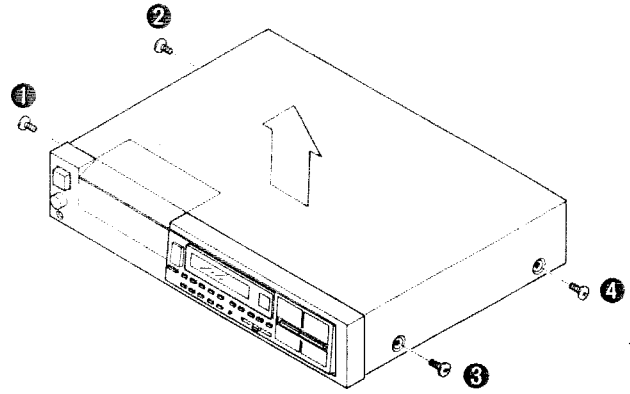


Fig. 1

How to remove the servo P.C.B.

1. Remove the cabinet.
2. Release the 2 claws of the holder. [Fig. 2]
3. Hold the stopper with pincers or the like and raise the P.C.B. in the direction of arrow A. [Fig. 2]
4. When the servo circuit, digital circuit and pitch control circuit boards are checked, they should be in positions as in Fig. 3.
5. Release the 3 claws of the holder, then the servo circuit P.C.B. can be removed. Fig. 3]

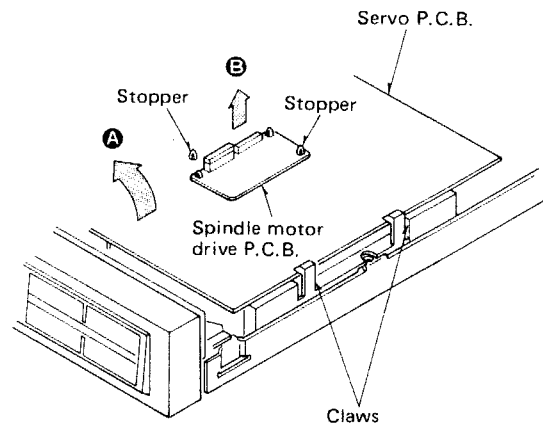


Fig. 2

How to remove the pitch control P.C.B. and reset P.C.B.

1. Remove the cabinet.
2. Raise the servo P.C.B. as shown in Fig. 3.
3. Remove the P.C.B. setscrew [Fig. 3: ⑤].

Note:

Digital P.C.B. is grounded to chassis with ground terminal fastened with screw ⑤. Connect ground terminal to chassis before power supply.

How to remove the regulator IC (IC81, IC82)

1. Remove the cabinet.
2. Raise the servo P.C.B. as shown in Fig. 3.
3. Remove the radiator setscrew [Fig. 3: ⑥] of regulator IC.
4. Completely remove solder from IC terminal.
5. Remove the IC setscrew [Fig. 3: ⑦].
6. When fitting the IC, be sure to set the insulator seat and bushing in place.

[Insulator seat: SFDCC07-01; Bushing: SFDBC07-01]

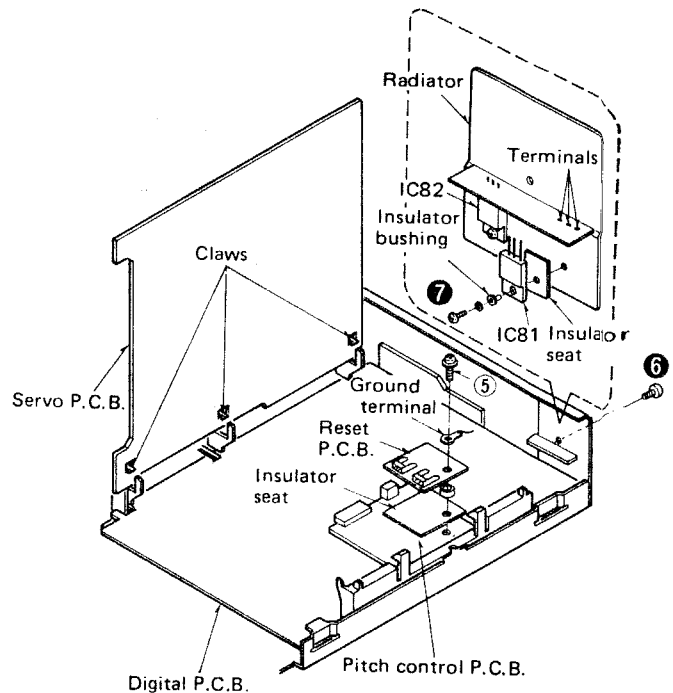


Fig. 3

How to remove the spindle motor drive P.C.B.

1. Remove the cabinet.
2. Hold the stoppers of P.C.B. with pincers or the like, then remove the P.C.B. in the direction of arrow B. [Fig. 2]

● **How to remove the front panel**

1. Remove the cabinet.
2. Pull out the power switch rod in the direction of arrow **A**. [Fig. 4]
3. Remove the 4 setscrews [Fig. 4: ⑧ ~ ⑪] of front panel.
4. Remove the front panel in the direction of arrow **E** with care not to scratch the disc holder. [Fig. 4]
5. Raise the servo P.C.B. as in Fig. 3.
6. Remove the 8 connectors (CN208, CN216, CN209, CN211, CN206, CN207, CN213) of digital P.C.B. and the 2 pin connector of the reset P.C.B., then the front panel can be removed.

Cautions:

1. When installing the power switch rod, set it through the lead wire as in Fig. 4-1.
2. When installing the cabinet, take care not to squeeze the lead wire.

● **How to remove the headphone jack and headphone level control volume**

1. Remove the front panel.
2. Pull out the level control knob.
3. Remove the 2 headphone jack fitting setscrews [Fig. 5: ⑫, ⑬]
4. Remove the 2 nuts [Fig. 5: ⑭, ⑮] of headphone jack and level control volume.

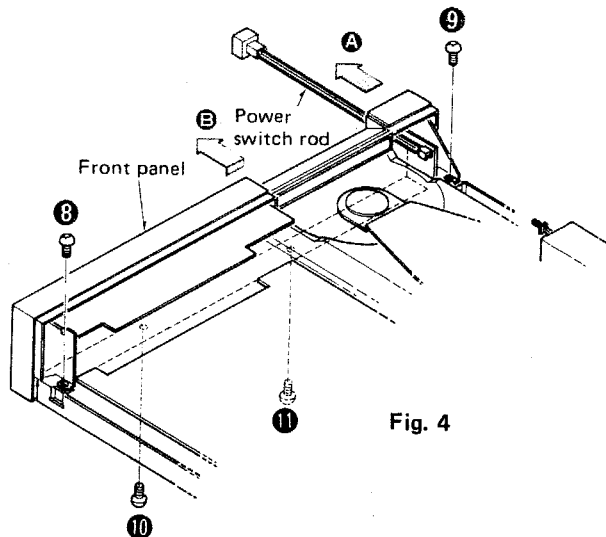
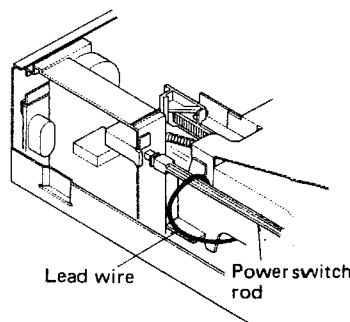


Fig. 4



[Fig. 4-1]

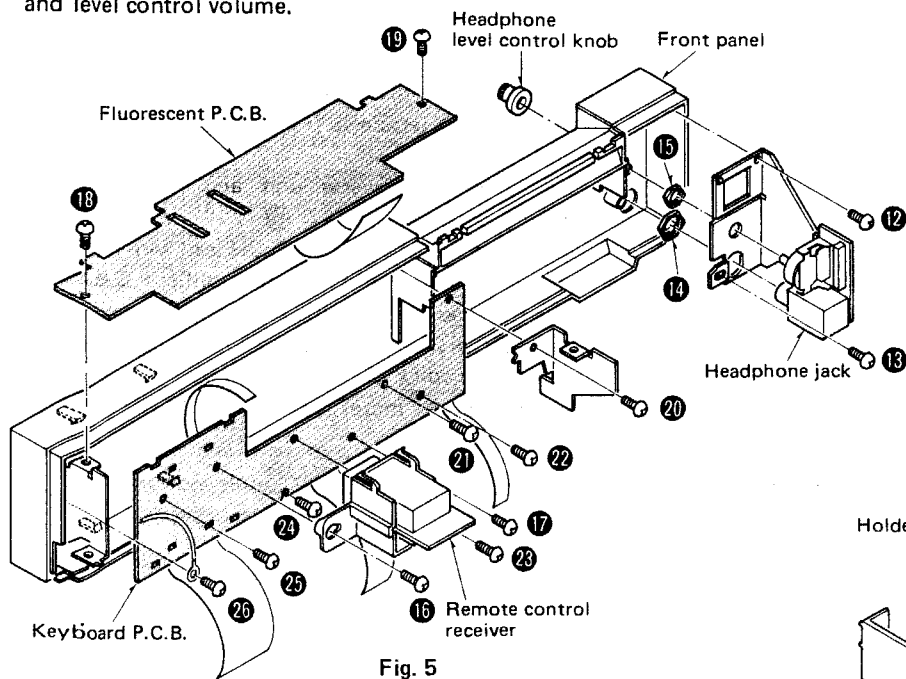


Fig. 5

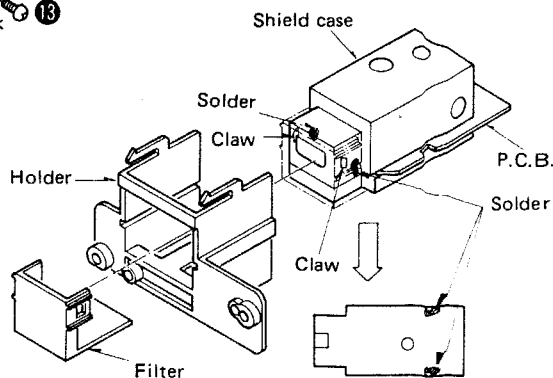


Fig. 6

● **How to remove the remote control receiver**

1. Remove the front panel.
2. Remove the 2 setscrews [Fig. 5: ⑯, ⑰] of receiver.
3. To remove the parts on P.C.B. . . . [Fig. 6]
 - ① Hold the 2 claws of shield case, then remove the filter.
 - ② Pull the holder out of the P.C.B.
 - ③ Remove solder at 4 portions of the shield case.

● **How to remove the fluorescent P.C.B.**

1. Remove the front panel.
2. Remove the remote control receiver.
3. Remove the 2 setscrews [Fig. 5: ⑱, ⑲] of fluorescent P.C.B., then the fluorescent P.C.B. can be removed.

● **How to remove the keyboard P.C.B.**

1. Remove the front panel.
2. Remove the remote control receiver.
3. Remove the fluorescent P.C.B.
4. Remove the 7 setscrews [Fig. 5: ⑳ ~ ㉑] of P.C.B. and release the 4 claws, then the keyboard P.C.B. can be removed.

● **How to remove the digital P.C.B.**

1. Remove the front panel.
2. Pull out the connector CN201 (from constant voltage P.C.B.) and CN214 (from regulator IC's P.C.B.) of digital P.C.B.
3. Pull out the connector CN107 (from constant voltage P.C.B.) and CN101 ~ CN106, CN109, CN552 (from optical deck unit) of servo P.C.B.
4. Remove the 3 setscrews [Fig. 7: 27 ~ 29] of P.C.B. holder.
5. Remove the digital P.C.B. in the direction of the arrow. [Fig. 7]

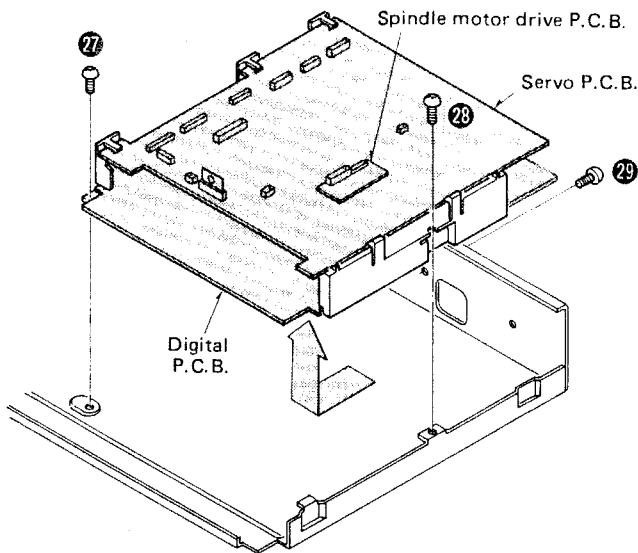


Fig. 7

***Precautions for removal of MN6616 and MN6806**

MN6616 and MN6806 attached to the digital P.C.B. are radiated by the radiator column. When fitting LSI, apply silicone compound (or equivalent head diffusing agent) to the radiator column. [Fig. 8]

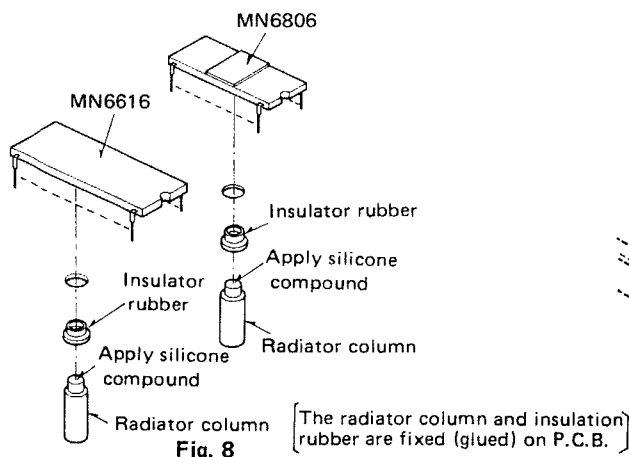


Fig. 8

● **How to remove the disc clamber**

1. Remove the cabinet.
2. Shift the disc holder forward.
3. Remove the disc clamber setscrew [Fig. 9: 30]
4. Remove the spring in the direction of arrow A. [Fig. 9]
5. Remove the disc clamber in the direction of arrow (B, C).

Note:

Shift the disc holder forward to remove the disc clamber.

6. To remove the magnet of disc clamber, hold the magnet fixing plate with pliers and turn it clockwise.

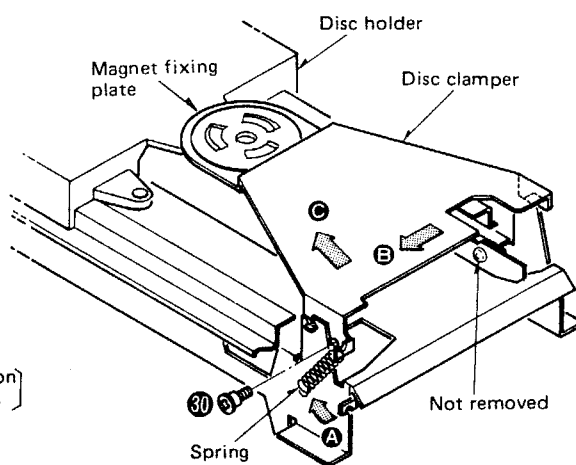


Fig. 9

● **How to remove the power transformer**

1. Remove the cabinet.
2. Shift the disc holder forward.
3. Remove the switch rod from the power switch.
4. Remove the 2 setscrews [Fig. 10: 31, 32] of power transformer.
5. Remove the radiator setscrew [Fig. 10: 33] and take the power transformer block out of the chassis.
6. Remove the 2 setscrews [Fig. 10: 34, 35] of constant voltage P.C.B.
7. Remove solder at 8 portions of constant voltage P.C.B.
8. Remove the 2 setscrews [Fig. 10: 36, 37] of fuse P.C.B. holder.
9. Remove solder on the fuse P.C.B. to detach the P.C.B., and then the power transformer can be removed.

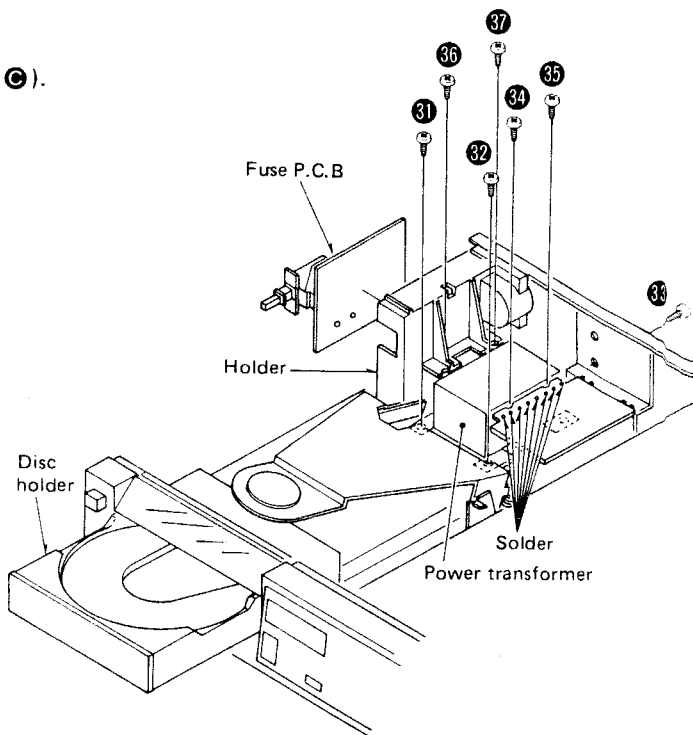


Fig. 10

● **How to remove the disc holder**

1. Remove the front panel.
 2. Remove the disc clasper.
 3. Remove the disc holder setscrews [Fig. 11: 38, 39].
 4. Disconnect the lead wire from the lead wire holder.
[Take care not break the lead wire.]
 5. Push the disc holder in the direction of arrow A and release the 2 claws from the bottom, then remove the disc holder by lifting it in the direction of arrow B.
- *Fit the disc holder with the drive rack pressed in the direction of arrow C.

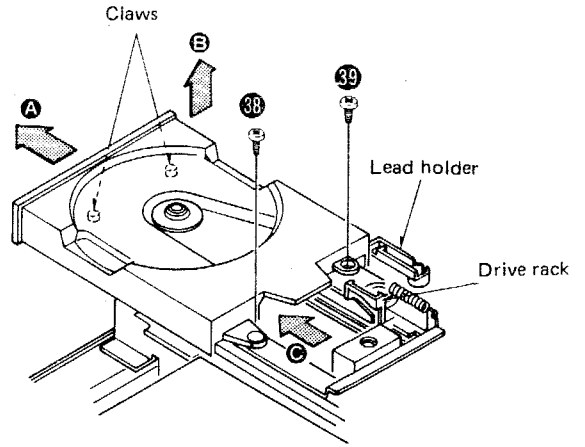


Fig. 11

● **How to remove and set the disc tray**

1. Remove the disc holder.
 2. Release the 2 claws from the bottom of disc holder and then remove the disc tray.
[In this case, be careful not to lose the 3 ball bearings.]
 3. When setting the disc tray, accurately fit the lever onto the boss as illustrated.
- *It can be easily set by pushing the lever in the direction of the arrow. [Fig. 12]

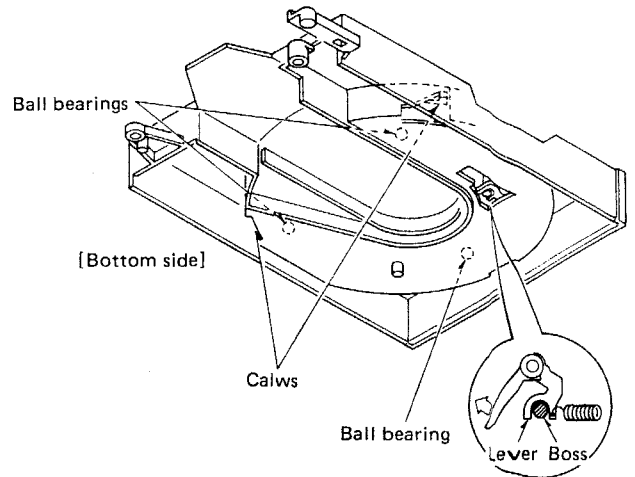


Fig. 12

● **How to remove the loading guide**

1. Remove the disc holder.
2. Release the 2 claws of close switch cover to release the switch [Fig. 13]
3. Remove the 6 setscrews [Fig. 11: 40 ~ 45] on the right and left sides of loading guide holder.
Then the loading guide can be removed.

*When fitting the close switch and return gear again, push the drive rack in the direction of the arrow and set them so that the return gear spring is set on the left side. [See Fig. 14] (The - marked gear of return gear is engaged between the 2nd and 3rd from top of the drive rack gears.)

● **How to remove the drive rack**

1. Remove the loading guide.
2. Release the return gear claw to remove the return gear. [Fig. 13]
3. Push the drive rack in the direction of arrow A, and release the drive rack claw, then the drive rack can be removed downward. [Fig. 13]

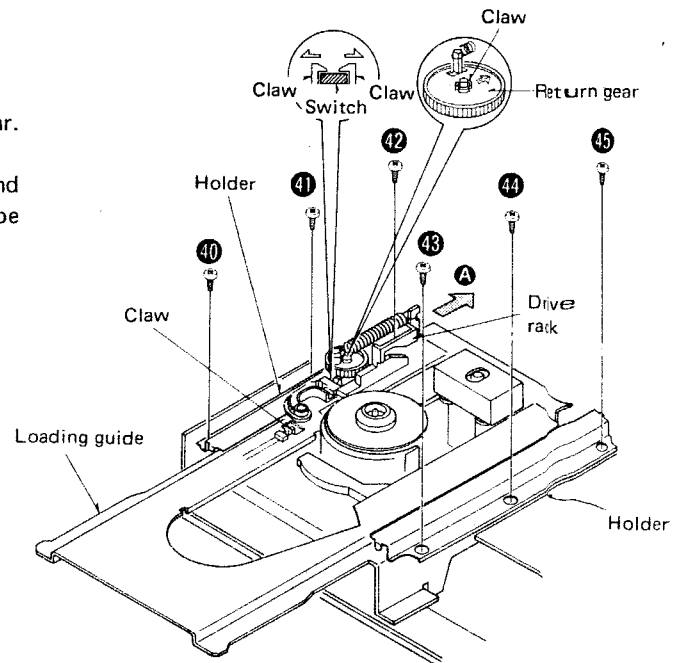


Fig. 13

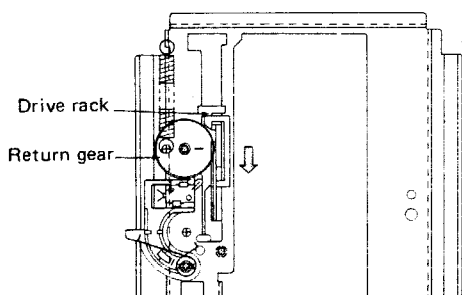


Fig. 14

● **How to remove the traverse unit ass'y (optical deck unit)**

1. Remove the front panel.
2. Remove the 4 setscrews [Fig. 15: 46 ~ 49] of traverse unit. Screws 46 ~ 49 are red.
3. Pull out the connectors (CN101 ~ CN106, CN109, CN552) connected from traverse unit to servo P.C.B.
4. Pull out the earth terminal connected from traverse unit to chassis.
5. Turn over the traverse unit and remove the nuts [Fig. 16: 50 ~ 53], then the traverse unit ass'y can be removed.
Note that the front and rear springs are different in color.

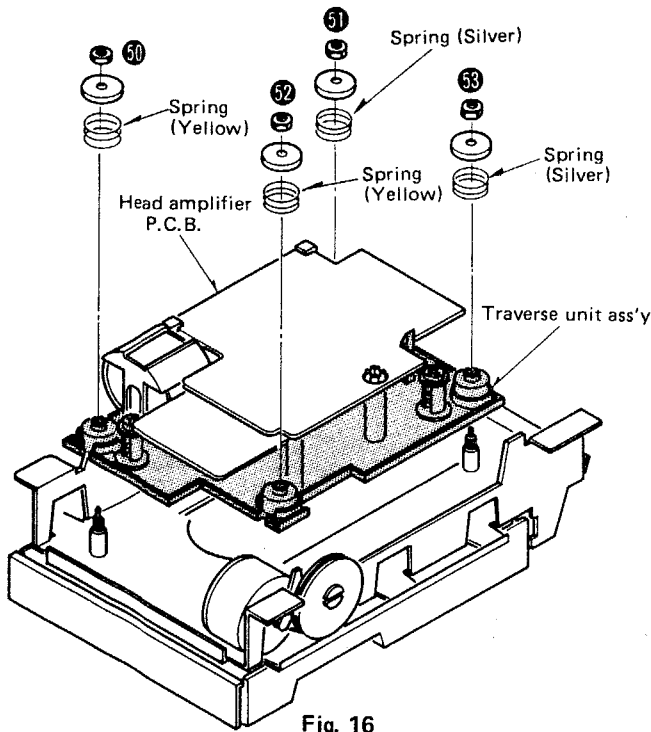


Fig. 16

Replacement parts are supplied in the form of traverse unit ass'y (optical deck unit) for the time being. So, do not remove the limit switch, motor, turntable and pickup.
Refer to "How to remove the limit switch, turntable, and laser pickup" given in the next paragraph only after switchover from ass'y supply to individual unit supply of traverse units.

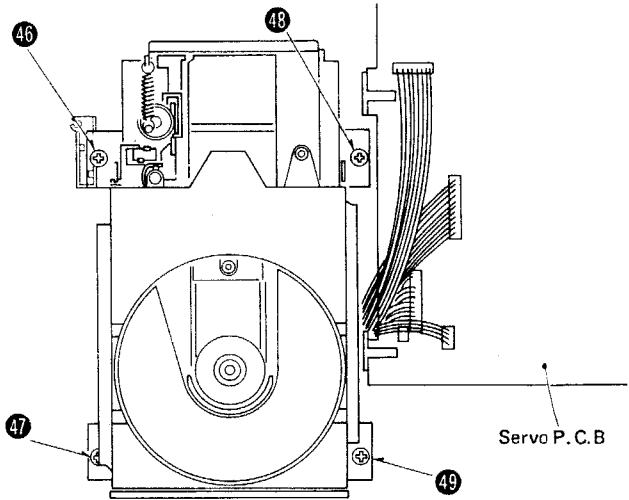


Fig. 15

● **How to remove the head amplifier P.C.B. and spindle motor drive coil P.C.B.**

1. Remove the 4 setscrews [Fig. 15: 46 ~ 49] of traverse unit.
2. Turn over the traverse unit and remove the head amplifier setscrew [Fig. 17: 54].
3. Disconnect the lead wire from the lead wire holder.
4. Release the claw from the head amplifier P.C.B.
Then the head amplifier P.C.B. can be removed.
5. Remove the 2 setscrews [Fig. 17: 55, 56] of spindle motor drive coil P.C.B.
Then the spindle motor drive coil P.C.B. can be removed.

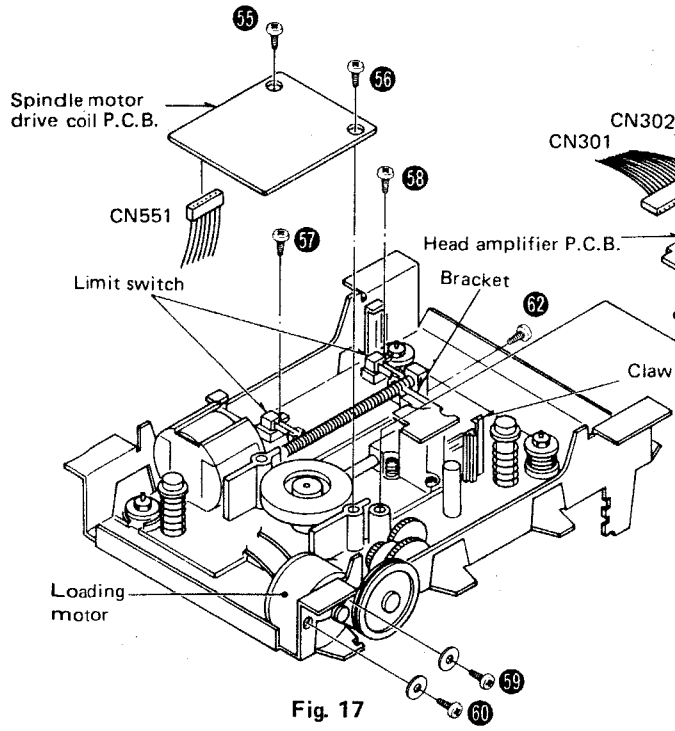


Fig. 17

● **How to remove the limit switch [Rest and end detecting switch]**

1. Remove the head amplifier P.C.B.
2. Remove the 2 setscrews [Fig. 17: 57, 58] of limit switch, and unsolder the limit switch.
*After fitting the limit switch [rest: disc's innermost position detection] again, it is necessary to re-adjust the position.

● **How to remove the loading motor**

1. Remove the head amplifier P.C.B.
2. Remove the belt from the loading motor pulley.
3. Remove the 2 setscrews [Fig. 17: 59 , 60] of loading motor, and unsolder the motor leads.

* Connect the brown lead to the (+) terminal of motor, and red lead to (-) terminal. (The (-) terminal is indicated by arrow on the motor.)

● **How to remove the turntable**

1. Remove the traverse unit.
2. Remove the spindle motor drive coil P.C.B.
3. Remove the C ring which fastens the magnet shaft of spindle motor. [Fig. 18]
4. Remove the screw [Fig. 18: 61] by use of a hexagonal wrench, then the turntable can be removed.

*If the turntable is removed, it is necessary to re-adjust the height of turntable.

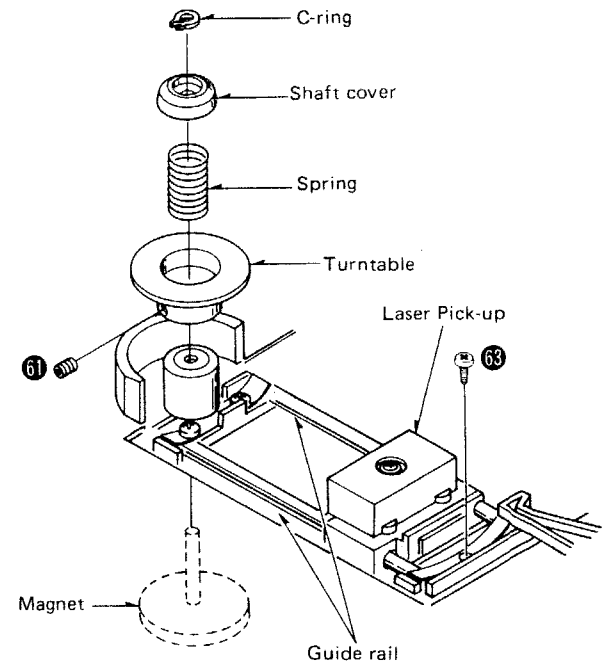


Fig. 18

● **How to remove the laser pickup**

1. Remove the traverse unit.
2. Remove the head amplifier P.C.B.
3. Pull out the connectors (CN304, CN305) of head amplifier P.C.B.
4. Remove the bracket setscrew [Fig. 17: 62] of pickup to remove the bracket.
5. Remove the guide rail retainer setscrew [Fig. 18: 63] and pull out the laser pickup from the two guide rails.

*The pickup must be re-adjusted when it is replaced or fitted after removal.

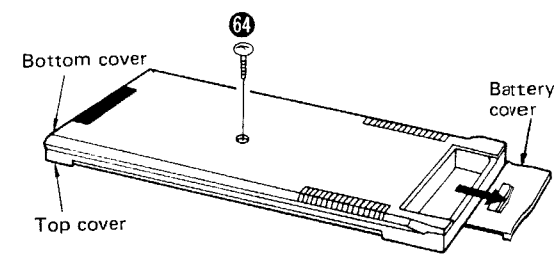


Fig. 19

● **How to remove the remote control (transmitter) P.C.B.**

1. Remove the battery cover in the direction of the arrow [Fig. 19].
2. Remove the battery and battery cover setscrew [Fig. 19: 64].
3. Insert a screwdriver between the top and bottom covers inside the battery compartment and gradually loosen the bottom cover. [Fig. 20]
4. Similarly loosening the cover along the periphery, remove the bottom cover.
5. Pressing the whole body of P.C.B. in the direction of arrow (A), push the 3 claws on the opposite side in the direction of arrow (B) to remove the P.C.B. from the top cover. [Fig. 21]

Caution: Be sure to remove the P.C.B. with the top cover positioned as in Fig. 21. If the top cover is up, the button will be removed.

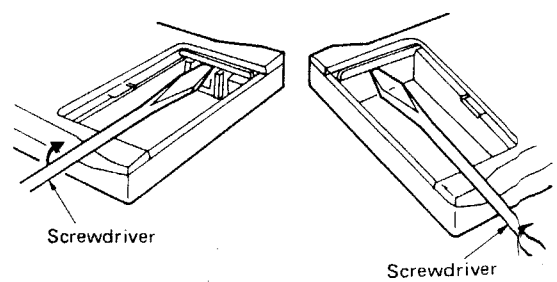


Fig. 20

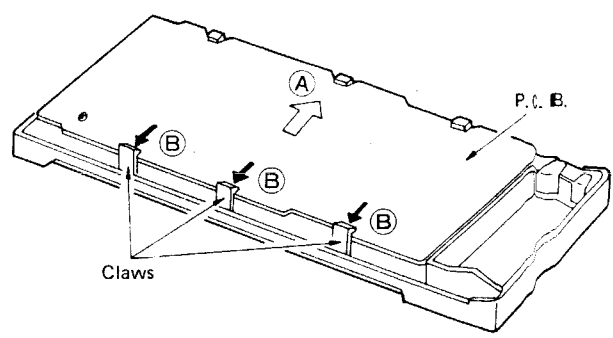


Fig. 21

■ HOW TO REPLACE CHIPS

(Resistor, capacitor and jumper)

● Removing procedure

1. Completely remove the solder from both ends of the chip by use of solder sucker.
2. Touch the soldering iron to the end of the chip as shown in Fig. 22, then turn the tweezers in the direction of the arrow.

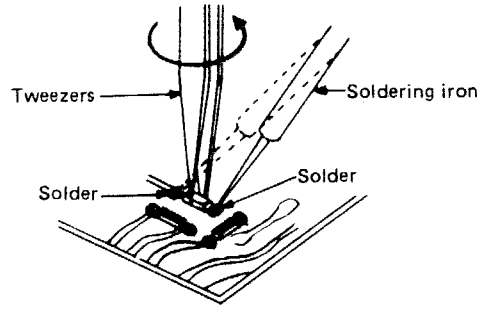
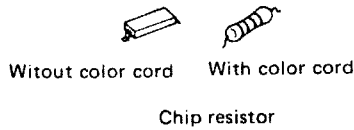


Fig. 22

Do not re-use chip resistor or capacitor without color cord.

● Replacing procedure

1. Place solder on the foil where the chip is fitted. Then solder the chip by holding the soldering iron as shown in Fig. 23.

Note:

1. If the chip jumper is removed, connect a coated lead wire to the part. (See Fig. 24). Chip jumper is marked with "J" on the printed circuit board.

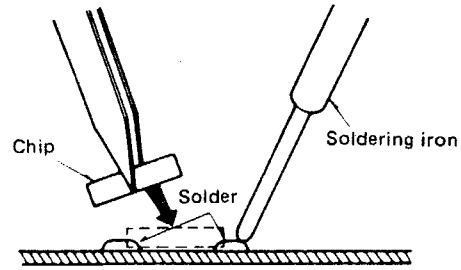


Fig. 23

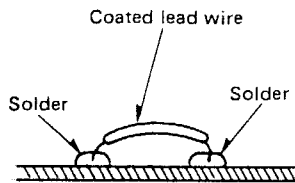
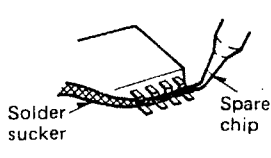
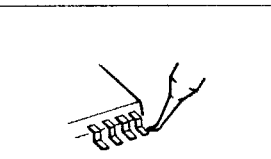
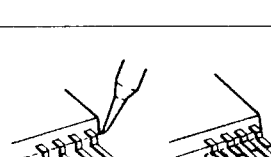
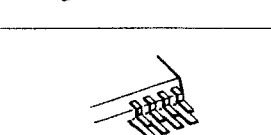


Fig. 24

● Note for replacing chips

1. Do not heat the chip more than 3 seconds.
2. Do not rub the electrode against the chip.
3. Use the tweezers with care not to damage the surface of the chip.
4. It is desirable to use a pencil type soldering iron. And use soldering iron less than 60W.

■ HOW TO REPLACE IC'S (Small outline type)

Replacing procedure		Cautions	
1	Reduce the amount of solder on each pin of the integrated circuit by use of a solder sucker.		<ul style="list-style-type: none"> ● Recommended tool Special soldering iron (with spare chip) HM-354 ● Do not touch the soldering iron to the area for a long time. It may otherwise cause removal of the print foil. ● When shifting the pin upward, do the job quickly while the solder is melting. If the solder is hard, it may cause removal or breakage of the print foil. ● When using a pencil type soldering iron. <ol style="list-style-type: none"> 1. Completely remove the solder from each IC pin by use of solder sucker. 2. Raise each pin by means of an eyeleteer, hold the pliers then remove IC package from P.C.B.
2	Melt the solder on the pin (one electrode) with the soldering iron.		
3	While the solder is melting, shift the pin upward by the soldering iron to remove it from the foil.		
4	Remove each pin from the foil according to the above-mentioned procedure.		

RESISTOR AND CAPACITORS

- Notes:**
- Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
 - 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.
 - This "S" mark is service standard parts and may differ from production parts.

- Unless otherwise specified.
All resistors are in OHMS (Ω) K = 1000 Ω , M = 1000k Ω
All capacitors are in MICROFARADS (μ F) P = 10⁻⁶ μ F.

Numbering System of Resistor

Example

ERD	25	F	J	101
Type	Wattage	Shape	Tolerance	Value
ERG	1	AN	J	2R2
Type	Wattage	Shape	Tolerance	Value

Numbering System of Capacitor

Example

ECKD	1H	102	Z	F
Type	Voltage	Value	Tolerance	Peculiarity
ECEA	50	M	R47	R
Type	Voltage	Peculiarity use	Value	Special use

Resistor Type	Wattage	Tolerance
ERD : Carbon	25 : 1/4W	F : \pm 1%
ERG : Metal Oxide	1 : 1W	J : \pm 5%
ERX : Metal Film		G : \pm 2%

Capacitor Type	Voltage		Tolerance
	ECEA Type	Others	
ECEA : Electrolytic	1A : 10V	1H : 50V DC	J : \pm 5%
ECKD : Ceramic	1C : 16V	2H : 500V DC	K : \pm 10%
EQM : Polyester	1E : 25V	1 : 100V	Z : +80%, -20%
ECCD : Ceramic	1V : 35V	AL : 125V AC	P : +100%, -0%
ECKF : Ceramic	1H : 50V	MY : 125V AC	M : \pm 20%
	1J : 63V	KC : 400V AC	
	50 : 50V	HS : 400V AC	

- ERD10TLJ $\square\square\square$ \longrightarrow Chip type carbon (1/8W)
 ECUV1H $\square\square\square$ \longrightarrow Chip type ceramic
 ERDS2TJ $\square\square\square$ \longrightarrow Small type carbon (1/4W)
 EROS2TKF $\square\square\square$ \longrightarrow Small type metal film (1/4W)

Ref. No.	Part No.	Value	Ref. No.	Part No.	Value	Ref. No.	Part No.	Value	Ref. No.	Part No.	Value
R1,2	ERD25FJ100	10	R201	ERDS2TJ563	56K	R247	ERDS2TJ273	27K	R403	ERDS2TJ333	33K
R81	ERDS2TJ222	2.2K	R202	ERDS2TJ153	15K	R248	ERDS2TJ103	10K	R404	ERDS2TJ102	1K
R82,83	ERDS2TJ472	4.7K	R203	ERDS2TJ334	330K	R249,250	ERDS2TJ273	27K	R405,406	ERDS2TJ103	10K
R84A	ERDS2TJ152	1.5K	R204	ERDS2TJ183	18K				R407	ERDS2TJ103	10K
R84B	ERD25FJ100	10	R205	ERDS2TJ393	39K	R251	ERDS2TJ823	82K	R408	ERDS2TJ222	2.2K
R85	ERDS2TJ561	560	R206	ERDS2TJ123	12K	R252	ERDS2TJ822	8.2K	R409	ERDS2TJ223	22K
R101	ERDS2TJ103	10K	R207	ERDS2TJ101	100	R253	ERDS2TJ154	150K	R410	ERDS2TJ392	3.9K
R102	ERDS2TJ682	6.8K	R208	ERDS2TJ102	1K	R254	ERDS2TJ103	10K	R411	ERDS2TJ103	10K
R103	ERDS2TJ472	4.7K				R255	ERD25FJ2R2	2.2	R412	ERDS2TJ821	820
R104	ERDS2TJ103	10K	R209	ERDS2TJ223	22K	R256	ERDS2TJ124	120K	R413	ERDS2TJ273	27K
			R210	ERDS2TJ680	68	R257	ERDS2TJ473	47K			
R105	ERDS2TJ102	1K	R211	ERD25FJ1R0	1	R258,259	ERDS2TJ333	33K	R414	ERDS2TJ473	47K
R106	ERDS2TJ220	22	R212	ERDS2TJ563	56K	R260	ERDS2TJ103	10K	R415	ERDS2TJ123	12K
R107	ERDS2TJ474	470K	R213	ERDS2TJ153	15K	R261	ERDS2TJ333	33K	R416	ERDS2TJ561	560
R108	ERDS2TJ220	22	R214	ERDS2TJ334	330K				R417	ERDS2TJ222	2.2K
R109,110	ERDS2TJ473	47K	R215	ERDS2TJ183	18K	R262	ERDS2TJ103	10K	R418	ERDS2TJ564	560K
R111	ERDS2TJ271	270	R216	ERDS2TJ393	39K	R263	ERDS2TJ473	47K	R419	ERDS2TJ103	10K
R112	ERDS2TJ101	100	R217	ERDS2TJ123	12K	R264	ERDS2TJ472	4.7K	R420	ERDS2TJ471	470
R113	ERDS2TJ104	100K	R218	ERDS2TJ101	100	R265	ERDS2TJ124	120K	R421	ERDS2TJ561	560
R114	ERDS2TJ682	6.8K				R266	ERDS2TJ473	47K	R423	ERDS2TJ104	100K
R115,116	ERDS2TJ471	470	R219	ERDS2TJ102	1K	R267,268	ERDS2TJ472	4.7K			
			R220	ERDS2TJ223	22K	R269,270	ERDS2TJ472	4.7K	R425	ERDS2TJ103	10K
R117	ERDS2TJ682	6.8K	R221	ERDS2TJ560	56	R291	ERDS2TJ562	5.6K	R426	ERDS2TJ221	220
R118	ERDS2TJ473	47K	R222	ERD25FJ1R0	1	R292	ERDS2TJ682	6.8K	R427	ERDS2TJ332	3.3K
R119	ERDS2TJ392	3.9K	R223	ERDS2TJ222	2.2K	R293	ERDS2TJ224	220K	R431,432	ERDS2TJ103	10K
R120	ERDS2TJ102	1K	R224	ERDS2TJ104	100K				R433	ERDS2TJ392	3.9K
R121	ERDS2TJ472	4.7K	R225	ERDS2TJ103	10K	R294	ERDS2TJ102	1K	R434	ERDS2TJ103	10K
R122	ERDS2TJ334	330K	R226	ERDS2TJ473	47K	R301	ERDS2TJ223	22K	R435	ERD25FJ332	3.3K
R123	ERDS2TJ102	1K	R227,228	ERDS2TJ223	22K	R302	ERDS2TJ153	15K	R436	ERD25FJ392	3.9K
R124,125	ERDS2TJ183	18K	R229	ERDS2TJ223	22K	R303,304	ERDS2TJ472	4.7K	R437	ERD25FJ121	120
R126	ERDS2TJ682	6.8K				R305	ERDS2TJ222	2.2K	R438,439	ERD25FJ101	100
R127	ERDS2TJ822	8.2K	R230	ERDS2TJ103	10K	R306	ERDS2TJ392	3.9K			
			R231	ERDS2TJ104	100K	R307	ERDS2TJ823	82K	R440	ERD25FJ182	1.8K
R128	ERDS2TJ152	1.5K	R232	ERDS2TJ103	10K	R308	ERDS2TJ123	12K	R441	ERDS2TJ561	560
R129	ERDS2TJ101	100	R233	ERDS2TJ273	27K	R309	ERDS2TJ472	4.7K	R442	ERDS2TJ821	820
R130,131	ERDS2TJ102	1K	R234	ERDS2TJ473	47K	R310,311	ERDS2TJ103	10K	R443	ERDS2TJ152	1.5K
R132	ERDS2TJ392	3.9K	R235	ERDS2TJ823	82K				R444	ERDS2TJ101	100
R133	ERDS2TJ222	2.2K	R236	ERDS2TJ154	150K	R312	ERDS2TJ104	100K	R445,446	ERDS2TJ103	10K
R134	ERDS2TJ183	18K	R237	ERDS2TJ103	10K	R313	ERDS2TJ332	3.3K	R447	ERDS2TJ104	100K
R135	ERDS2TJ152	1.5K	R238	ERDS2TJ123	12K	R314	ERDS2TJ682	6.8K	R448	ERDS2TJ153	15K
R136	ERDS2TJ183	18K	R239	ERDS2TJ562	5.6K	R315,316	ERDS2TJ472	4.7K	R449	ERDS2TJ104	100K
R137	ERDS2TJ822	8.2K	R240	ERDS2TJ822	8.2K	R317,318	ERDS2TJ123	12K	R450	ERDS2TJ222	2.2K
R138,139	ERDS2TJ102	1K	R241	ERDS2TJ103	10K	R319	ERD25FJ560	56	R451	ERG1ANJ101	100
			R242	ERDS2TJ472	4.7K						
R140	ERDS2TJ472	4.7K	R243	ERDS2TJ823	82K	R320	ERDS2TJ103	10K			
R141	ERDS2TJ101	100	R244	ERDS2TJ473	47K	R322	ERDS2TJ123	12K	R452,453	ERDS2TJ221	220
R142	ERDS2TJ102	1K	R245	ERDS2TJ101	100	R401	ERDS2TJ103	10K	R454,455	ERDS2TJ822	8.2K
R143	ERDS2TJ822	8.2K	R246	ERDS2TJ102	1K	R402	ERDS2TJ392	3.9K	R456	ERDS2TJ103	10K
									R457	ERDS2TJ102	1K

Table 1			Table 2			Table 3			Table 4		
Ref No	Part No	Value	Ref No	Part No	Value	Ref No	Part No	Value	Ref No	Part No	Value
R458	ERDS2TJ103	10K	R859	ERDS2TJ822	8.2K	C207	§ △ ECEA1HN010S	1	C558	ECQM1H152KV	0.0015
R460.461	§ ERD25FJ103	10K	R861	ERO25TKG2401	2.4K	C208	§ ECCD1H181K	180P	C559	ECQM1H274KV	0.27
R462	§ ERD25FJ103	10K	R862	ERO25TKG4701	4.7K	C209	§ ECKD1H103MD	0.01	C561	§ ECEA50M2R2R	2.2
R501	§ ERX1ANJ1R5	1.5	R863.864	ERDS2TJ472	4.7K	C210	§ ECQM1H823KV	0.082	C562	ECQM1H392KV	0.0039
R502	§ ERD25TJ333	33K	R865	ERDS2TJ682	6.8K	C211.212	§ ECKD1H223PF	0.022	C563.564	§ ECEA50MR22R	0.22
R503.504	§ ERD25FJ330	33	R867.868	ERDS2TJ183	18K	C213	§ ECKD1H223PF	0.022	C566	§ △ ECEA1HNR47S	0.47
R551	ERDS2TJ153	15K	R871	ERO25TKG2401	2.4K	C215	§ ECCD1H390K	39P	C567	ECQM1H184KV	0.18
R552	ERDS2TJ392	3.9K	R872	ERO25TKG4701	4.7K	C216	§ ECQM1H153KV	0.015	C569	ECQM1H103KV	0.01
R554	ERDS2TJ824	820K	R873	ERDS2TJ682	6.8K	C217	§ ECKD1H103MD	0.01	C570	§ ECEA1EU220	22
R555	ERDS2TJ333	33K	R881.882	ERDS2TJ472	4.7K	C218	§ ECQM1H333KV	0.033	C571	ECDD1H181J	180P
R556	ERDS2TJ392	3.9K	R883.884	ERDS2TJ123	12K	C219	§ ECKD1H103MD	0.01	C573	§ ECEA1HU100	10
R557	ERDS2TJ124	120K	R885.886	ERDS2TJ123	12K	C220	§ △ ECEA1CN100S	10	C574	ECQM1H224KV	0.22
R558.559	ERDS2TJ104	100K	R887.888	ERDS2TJ472	4.7K	C221	§ ECKD1H471KB	470P	C575	§ ECEA1HU100	10
R560.561	ERDS2TJ104	100K	R889.890	ERDS2TJ472	4.7K	C222	§ ECKD1H103MD	0.01	C576	§ ECQM1H332KV	0.0033
R562	ERDS2TJ104	100K	R891.892	ERDS2TJ820	82	C223	§ ECQM1H102KV	0.001	C577	§ △ ECEA1CN100S	10
R563	ERDS2TJ103	10K	R893.894	ERDS2TJ820	82	C224	§ ECQM1H103KV	0.01	C603.604	ECCKD1H473ZV	0.047
R564	ERDS2TJ332	3.3K	R1001	ERDS2TJ332	3.3K	C225	§ ECEA1HUR33	0.33	C610	ECCKD1H102KB	0.001
R565	ERDS2TJ333	33K	R1002	ERDS2TJ223	22K	C226	§ ECKD1H222KB	0.0022	C631	ECCKD1H102KB	0.001
R566.567	ERDS2TJ103	10K	R1003	ERDS2TJ470	4.7	C227	§ ECKD1H103MD	0.01	C633	ECCEA1HU010	1
R568	EROS2TKF1002	10K	R1004.1005	ERDS2TJ1R8	1.8	C228.229	§ ECKD1H223PF	0.022	C634.635	ECCEA1AU470	47
R569	ERDS2TJ334	330K	R1006	ERDS2TJ332	3.3K	C231	§ ECQM1H472KV	0.0047	C636.637	ECCEA1AU470	47
R570	ERDS2TJ394	390K	R1007	ERDS2TJ101	100	C233	ECDD1H680KS	68P	C638	ECCEA1HU4R7	4.7
R571	ERDS2TJ153	15K	R1101	ERD10TLJ154	150K	C234	§ △ ECEA1HN010S	1	C661	§ ECKD1H101KB	100P
R572	ERDS2TJ124	120K	R1102	ERD10TLJ221	220	C301	§ △ ECEA1CN100S	10	C663	§ ECCEA1EU470	47
R573	ERDS2TJ561	560	R1104	ERD10TLJ103	10K	C302	ECQM1H104KV	0.1	C671	ECCKD1H103ZF	0.01
R574	ERDS2TJ332	3.3K	R1105	ERD10TLJ681	680	C303	ECQM1H333KV	0.033	C801	ECCEA1EU470	47
R575	ERDS2TJ333	33K	R1106	ERD10TLJ151	150	C304	ECQM1H102KV	0.001	C802	ECCKD1H150K	15P
R576	ERDS2TJ101	100	R1107	ERD10TLJ681	680	C305	ECQM1H103KV	0.01	C803.804	ECDD1H471J	470P
R577	ERDS2TJ563	56K	R1108	ERD10TLJ272	2.7K	C306	△ ECEA0JN220	22	C805.806	ECQP1103GZ	0.01
R578	ERDS2TJ103	10K	R1109	ERD10TLJ334	330K	C307	§ ECEA1HU100	10	C807.808	§ △ ECEA1CN101S	100
R579	ERDS2TJ101	100	R1110	ERD10TLJ330	33	C308	ECDD1H100KS	10P	C809.810	§ ECQM1H332JZ	0.0033
R580	ERDS2TJ104	100K	CAPACITORS			C401	§ △ ECEA25N4R7	4.7	C820.821	§ ECKD1H103MD	0.01
R581	ERDS2TJ103	10K	C1	△ ECKDKC103PF	0.01	C402	ECQM1H682KV	0.0068	C851.862	ECQP1102GZ	0.001
R584	ERDS2TJ122	1.2K	C4.5	△ ECKDKC103PF	0.01	C403	ECQM1H272KV	0.0027	C871	ECQP1102GZ	0.001
R585	EROS2TKF3901	3.9K	C15	ECEA1CSS472	4700	C404	ECQM1H333KV	0.033	C873.874	ECCKD1H104ZF	0.1
R586	EROS2TKF2201	2.2K	C16	§ ECEA1CU102	1000	C405	§ ECEA1HU100	10	C881.882	§ ECEA1EU470	47
R587	ERDS2TJ684	680K	C17.18	§ ECEA1VU102	1000	C407	ECQM1H122KV	0.0012	C883	ECCKD1H104ZF	0.1
R589	ERDS2TJ103	10K	C19	§ ECEA50Z4R7	4.7	C408	ECDD1H270KC	27P	C884.885	ECCKD1H472ZV	0.0047
R590	ERDS2TJ103	10K	C20	§ ECEA1AU101	100	C409	ECQM1H822KV	0.0082	C1001	ECKF1H471KB	470P
R591	ERDS2TJ273	27K	C23.24	§ ECEA1HU100	10	C410	§ ECCD1H561K	560P	C1002	ECKF1H121KB	120P
R592	ERDS2TJ683	68K	C25.26	§ ECEA1HU100	10	C411	§ ECKD1H103MD	0.01	C1003	ECSF0GE107	100
R609	ERDS2TJ333	33K	C27.28	§ ECKD1H223PF	0.022	C413	ECDD1H150KU	15P	C1101	§ ECKD1H681KB	680P
R613	△ ERD25FJ3R3	3.3	C29.30	§ △ ECKD1H223PF	0.022	C415	§ ECKD1H103MD	0.01	C1102.1103	§ ECQM1H223JZ	0.022
R614	ERDS2TJ333	33K	C31	§ ECEA1CU4R7	4.7	C417.418	ECQM1H224KV	0.22	C1104	ECCEA1CK100	10
R615.616	ERDS2TJ273	27K	C81.82	§ ECKD1H103MD	0.01	C419	ECQM1H822KV	0.0082	C1105	ECQM1H102KV	0.001
R631	ERDS2TJ471	470	C83.84	§ ECEA1VU102	1000	C431	§ ECQM1H122JZ	0.0012	C1106	§ ECEA50ZR33	0.33
R632	ERDS2TJ223	22K	C85.86	§ ECEA1HU010	1	C432	ECQM1H102KV	0.001	C1107	ECQP1392JZ	0.0039
R633	ERDS2TJ104	100K	C87.88	§ ECEA1EU101	100	C433	ECCKD1H103MD	0.01	C1108	ECEA1HHR22	0.22
R634	ERDS2TJ102	1K	C89	§ ECEA1AU470	47	C434	ECDD1H150KU	15P	C1109	ECCEA1HK2R2	2.2
R635	ERDS2TJ222	2.2K	C90.91	§ ECEA1EU470	47	C435	ECQM1H102JZ	0.001	C1110	ECCEA1CK330	33
R636	ERDS2TJ472	4.7K	C92.93	§ ECEA1AU101	100	C436	ECQK1153JZ	0.015			
R637.638	ERDS2TJ332	3.3K	C102	§ ECKD1H473ZF	0.047	C437	§ ECKD1H103MD	0.01			
R639.640	ERDS2TJ332	3.3K	C103	ECCEA1CK100	10	C438.439	§ ECCD1H220KC	22P			
R641	ERDS2TJ103	10K	C111	§ ECKD1H681KB	680P	C440	§ ECEA1AU101	100			
R642	ERDS2TJ102	1K	C112	§ ECKD1H331KB	330P	C441	ECQM1H103KV	0.01			
R644	ERDS2TJ331	330	C113.114	ECCEA1HK2R2	2.2	C442	§ ECCD1H330KC	33P			
R651	ERDS2TJ391	390	C115	§ △ ECEA1CN100S	10	C443	ECQM1H102KV	0.001			
R661	ERDS2TJ473	47K	C116	§ ECKD1H103ZF	0.01	C444	§ ECKD1H103MD	0.01			
R663.664	ERDS2TJ821	820	C117	§ ECEA50Z3R3	3.3	C445	§ ECEA1CU220	22			
R665.666	ERDS2TJ152	1.5K	C118	§ ECKD1H102KB	0.001	C446	§ ECEA1CU330	33			
R671	§ ERD25FJ332	3.3K	C119	§ ECKD1H104ZF	0.1	C447	§ ECEA1EU470	47			
R672	§ ERD25FJ151	150	C120	ECCEA1CK220	22	C448.449	§ ECEA1HU100	10			
R673	§ ERD25FJ681	680	C121	ECQM1H223KV	0.022	C450	§ ECEA1CU221	220			
R674	§ ERD25TJ223	22K	C123.124	§ ECKD1H102KB	0.001	C451	§ ECEA1EU470	47			
R675	§ ERD25TJ124	120K	C125	§ ECCD1H101K	100P	C452	§ ECEA1AU101	100			
R676	§ ERD25TJ153	15K	C126	ECQM1H562KV	0.0056	C453	§ ECEA1EU470	47			
R677	§ ERD25FJ103	10K	C127	ECQM1H223KV	0.022	C455	§ ECEA1EU470	47			
R801.802	EROS2TKG7501	7.5K	C129	ECEA0JK330	33	C501	§ ECEA1EU101	100			
R803.804	EROS2TKG4301	4.3K	C130	§ ECKD1H473ZF	0.047	C502	§ ECEA1HUR22	0.22			
R805.806	ERDS2TJ474	470K	C131	ECCEA0JK330	33	C503.504	§ △ ECEA25N4R7	4.7			
R807.808	EROS2TKG3300	330				C505	ECCKD1H333ZF	0.033			
R809.810	ERDS2TJ473	47K									
R811.812	ERDS2TJ473	47K	C132	§ ECKD1H473ZF	0.047	C506	§ ECKD1H102KB	0.001			
R821.822	ERDS2TJ223	22K	C133	ECQM1H102KV	0.001	C551	§ ECKD1H331KB	330P			
R851	ERDS2TJ183	18K	C134	ECDD1H681K	680P	C552	ECQM1H333KV	0.033			
R852	ERDS2TJ102	1K	C135	§ ECKD1H104ZF	0.1	C553	ECQM1H392KV	0.0039			
R853	ERDS2TJ682	6.8K	C201	§ ECQM1H104KV	0.1	C554	ECCKD1H473ZV	0.047			
R854.855	ERDS2TJ472	4.7K	C202	§ △ ECEA1HN010S	1	C555	§ ECEA50M2R2R	2.2			
R857	ERDS2TJ102	1K	C203	§ ECCD1H221K	220P	C556	ECQM1H124KV	0.12			
R858	ERDS2TJ471	470	C204	§ ECKD1H103MD	0.01	C557	§ ECEA1HU010	1			
			C205.206	ECQM1H104KV	0.1						

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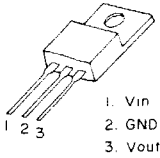
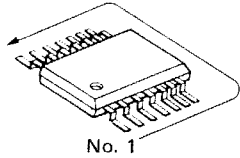
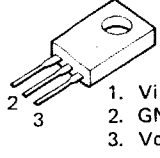
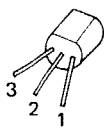
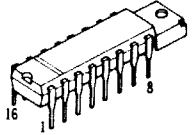
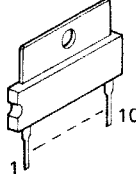
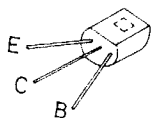
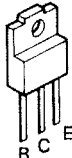
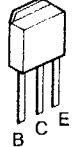
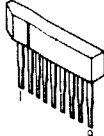
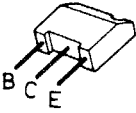
- Notes:**
1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
 2. Important safety notice:
Components identified by Δ mark have special characteristics important for safety.
 3. The $\text{\textcircled{S}}$ mark is service standard parts and may differ from production parts.
 4. The parenthesized numbers in the column of description stand for the quantity per set.
 5. Bracketed indications in Ref. No. columns specify the areas. Parts without these indications can be used for all areas.

Ref. No.	Part No.	Description
INTEGRATED CIRCUITS		
IC1	AN7805	Regulator
IC2,4,5,81	AN78M15	Regulator
IC3,82	AN79M15	Regulator
IC101	AN7677S	Focus Servo Control
IC102	AN7678S	Tracking Servo Control
IC103	AN6556S	Focus and Tracking Error Amplifier
IC104	AN1358S	Laser Power Control
IC105	AN78L05	Regulator
IC106	AN79N05	Regulator
IC201,251	AN6554NS	Focus and Tracking Error Amplifier
IC202,402,415	AN6552F	Operational Amplifier
IC204,209	MN4011BS	NAND Gate
IC205,253	MN4053BS	Analog Switch
IC207	MN4001BS	NOR Gate
IC208,552	SVITL082CP	Operational Amplifier
IC255	MN4030BS	Exclusive OR Gate
IC301,554	AN6912S	Comparator
IC401,413	SVITC40H004P	Waveform Shaping
IC403	SVIUPD4053BC	Analog Switch
IC404	MN4066B	Analog Switch
IC405	DN74LS123	Monostable Multivibrator
IC406	SVITC40H386P	Exclusive OR Gate
IC407	DN74LS107	JK Flip Flop
IC408,414,416	DN74LS74AN	D Flip Flop
IC409,411	SVISN74LS628	Voltage Controlled Oscillator
IC410	AN78M05	Regulator
IC412	SVITC40H000P	NAND Gate
IC417	SVISN74LS393	Monostable Multivibrator
IC418	AN6682	Pitch Control
IC419	SVITC40H386P	Exclusive OR Gate
IC501	AN6637	Spindle Motor Drive
IC551	AN7679S	CLV Control
IC553	MN4066BS	Analog Switch
IC604	SVIBA6209	Loading Motor Drive
IC611	MN1421PCM	Remote Control Decoder
IC612	MN1564PCL	Operation Control
IC613	SVIM53207P	Buffer
IC614	DN74LS04	Inverter
IC615,702	MN2114-2	Random Access Memory
IC651	MN1430PCG	Display Drive
IC701	MN6614	EFM Demodulator
IC703	MN6616	Error Correction
IC704	MN4216-20	Random Access Memory
IC705	MN6615	CIRC Control
IC801	AN6806	D/A Converter
IC802,803,804,807	SVILM833NA	Operational Amplifier
IC805,806	SVIUPD4053BC	Analog Switch
IC881,882	SVINJM4556S	Operational Amplifier
IC1001	MN6030B	Remote Control Signal Processing
IC1101	AN5020	Remote Control Signal Amplifier

Ref. No.	Part No.	Description
TRANSISTORS		
Q81,403,601,671,672	2SD636	Regulator and Switching
Q82,401,402,611,612	2SB641	Relay Drive, CLV Control and Switching
Q101	2SD638	Laser Power Control
Q201,205	2SD1266-P	Actuator Drive and Traverse Motor Drive
Q202,206	2SB941	Actuator Drive and Traverse Motor Drive
Q203	2SD1252	Actuator Drive
Q204	2SB929	Actuator Drive
Q207,302,303,304,305,306,602	2SC828AR	Switching and Dropout Detector
Q301	2SA722-S	RF Amplifier and CLV Control
Q404,551	2SC1047-C	CLV Control
Q552	2SC1328-T	CLV Control
Q1001,1003,1101	2SD636	Remote Signal Amplifier and OSC
Q1002	2SD638	Remote Signal Amplifier
DIODES		
D1	Δ SVDS2VB20	Rectifier
D2,81	Δ SVDS1WB40	Rectifier
D82,84,304,404,554,609	MA4056	Zener, 5.6V
D83,101,201~206,302,303,401~402,405,551,631~635	MA165	Switching
D85	MA4100	Zener, 10V
D86	MA1091	Zener, 9.1V
D636	MA4120	Zener, 12V
D651,652,655	LN28RCPP	LED, Music Scan, Repeat and Pitch
D653	LN48YCP	LED, Pause/Stop
D654	LN38GCPP	LED, Play
D661	SVDPR5553KF	LED, Sensor
D1001,1003	MA154WK	Switching
D1005,1006	MA154WA	Switching
D1007,1008	LN66	LED(Transmitter)
D1009	LN26RP	LED(Remote Control)
D1101	PH302	Photo Diode
D1102	MA165	Switching
VARIABLE RESISTORS		
VR102,106,107	EVN32CA00B14	Focus gain, Tracking Offset and Focus Offset Adj., 10k Ω B
VR103,104,105	EVN32CA00B53	Focus Balance Tracking Balance and Tracking Gain Adj., 5k Ω B
VR201	EVN38CA00B53	Traverse Offset Adj., 5k Ω B
VR401	EVN38CA00B13	11T Speed Adj., 1k Ω B
VR402,403	EVN38CA00B53	Reference frequency Adj., 5k Ω B
VR651	EWANFOX05A24	Pitch Control
VR801	EWCSNAF15AF5	Phones Level, 100k Ω A
VR851	EVM38GA00B24	MSB Adj., 20k Ω B
R1103	EVNJ0AA00B13	Sensor OSC Adj., 1k Ω B
COMPONENT COMBINATIONS		
R643	EXBP88223K	22k Ω \times 8
R667~669	EXBP88104K	100k Ω \times 8

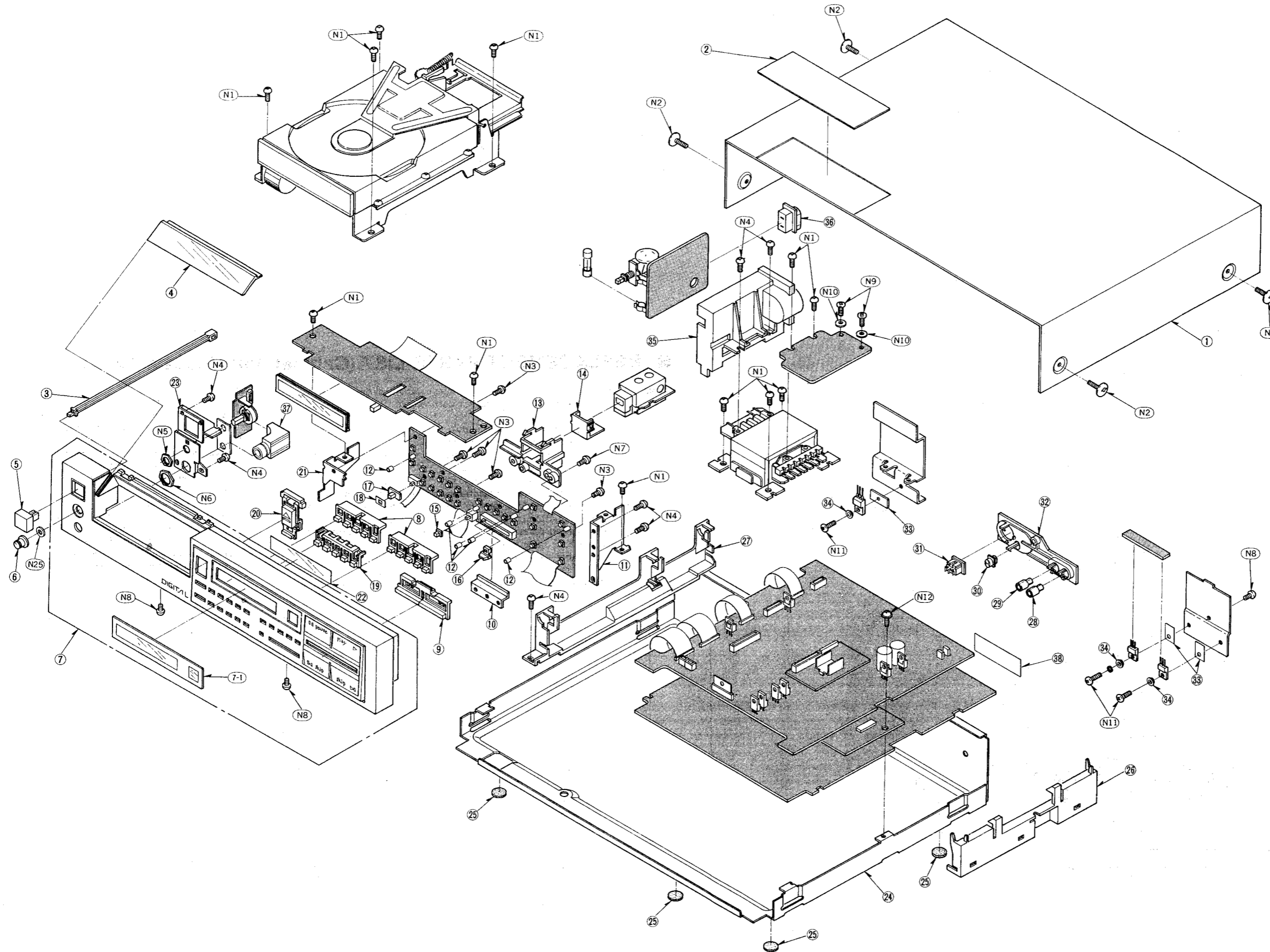
Ref. No.	Part No.	Description
COMPONENT COMBINATIONS		
R670	EXBP86472K	4.7k Ω \times 6
C11~14,17,18	Δ EXRFS203ZS	0.01 μ FX2
CRYSTAL		
X401	SVQNR8643	8.643MHz
CERAMIC OSCILLATOR		
X1001	CSB420PB1	420kHz
SWITCHES		
S1	Δ ESB823V	Power
S2	Δ SRDSHXW0251	Voltage Selector
S603,608	SRDSBSW97-2	Close and Open
S604,605	SRDSBSW-180	Rest and End
S607	SRDSMLS-1	Close
S651	SRDSHSW0963	Auto Pause/Timer Selector
S652	ESB6471	Pitch
S653~675	EVOQS405K	Operation Keys
LOW PASS FILTER		
LPF801,802	SVIAL012	Filter
RELAY		
RLY801	SFDYG5A237P	Muting
FLUORESCENT DISPLAY TUBE		
FL601	SRDQBG191Z	Display
THERMISTOR		
TH1101	ERTD2ZH104S	100k Ω
HALL ELEMENTS		
H501,502	OH-001	Spindle Motor Position Detecting
COILS		
L1	Δ UF1922C102Y	Line Filter
T1101	ELM-7Q206A	OSC
POWER TRANSFORMER		
T1	Δ SLT68PE7E	Power Source
FUSES		
F1	Δ XBA2C04TR0	250V, T400mA
F2	Δ XBA2C02TR0	250V, T200mA

• Terminal guide of transistors, and IC's

<p>AN7805, AN78M15 AN79M15, AN78M05</p>  <p>1. Vin 2. GND 3. Vout</p>	<table border="1"> <tr> <td>AN7677S</td> <td>28 Pin</td> </tr> <tr> <td>AN7679S</td> <td></td> </tr> <tr> <td>AN7678S</td> <td>22 Pin</td> </tr> <tr> <td>AN6556S</td> <td></td> </tr> <tr> <td>AN6552S</td> <td>8 Pin</td> </tr> <tr> <td>AN1358S</td> <td></td> </tr> <tr> <td>AN6554NS</td> <td></td> </tr> <tr> <td>MN4030BS</td> <td></td> </tr> <tr> <td>AN6912S</td> <td></td> </tr> <tr> <td>MN4066BS</td> <td>14 Pin</td> </tr> <tr> <td>MN4001BS</td> <td></td> </tr> <tr> <td>DN74LS74AS</td> <td></td> </tr> <tr> <td>MN4011BS</td> <td></td> </tr> <tr> <td>MN4053BS</td> <td></td> </tr> <tr> <td>DN74LS123S</td> <td>16 Pin</td> </tr> </table>	AN7677S	28 Pin	AN7679S		AN7678S	22 Pin	AN6556S		AN6552S	8 Pin	AN1358S		AN6554NS		MN4030BS		AN6912S		MN4066BS	14 Pin	MN4001BS		DN74LS74AS		MN4011BS		MN4053BS		DN74LS123S	16 Pin	 <p>No. 1</p>	<table border="1"> <tr> <td>DN74LS04</td> <td></td> <td></td> </tr> <tr> <td>SVIM53207P</td> <td></td> <td></td> </tr> <tr> <td>SVISN74LS628</td> <td>14 Pin</td> <td></td> </tr> <tr> <td>SVITC40H004</td> <td></td> <td></td> </tr> <tr> <td>SVITC40H386</td> <td></td> <td></td> </tr> <tr> <td>SVITL082CP</td> <td></td> <td></td> </tr> <tr> <td>SVILM833NA</td> <td></td> <td>8 Pin</td> </tr> <tr> <td>AN6552</td> <td></td> <td></td> </tr> <tr> <td>MN1544PCH</td> <td>40 Pin</td> <td></td> </tr> <tr> <td>MN1430PCG</td> <td></td> <td></td> </tr> <tr> <td>MN6614</td> <td></td> <td>42 Pin</td> </tr> <tr> <td>MN6616</td> <td></td> <td></td> </tr> <tr> <td>MN2114-2</td> <td>18 Pin</td> <td></td> </tr> <tr> <td>MN4216-20</td> <td>24 Pin</td> <td></td> </tr> <tr> <td>DN74LS123</td> <td>16 Pin</td> <td></td> </tr> <tr> <td>MN6030</td> <td></td> <td>22 Pin</td> </tr> </table>	DN74LS04			SVIM53207P			SVISN74LS628	14 Pin		SVITC40H004			SVITC40H386			SVITL082CP			SVILM833NA		8 Pin	AN6552			MN1544PCH	40 Pin		MN1430PCG			MN6614		42 Pin	MN6616			MN2114-2	18 Pin		MN4216-20	24 Pin		DN74LS123	16 Pin		MN6030		22 Pin	<table border="1"> <tr> <td>SVIUPD4053BC</td> <td>16 Pin</td> </tr> <tr> <td>MN1421PCM</td> <td></td> </tr> <tr> <td>AN6806</td> <td>28 Pin</td> </tr> <tr> <td>MN1564PCL</td> <td></td> </tr> <tr> <td>MN6615</td> <td>64 Pin</td> </tr> <tr> <td>MN4066B</td> <td></td> </tr> <tr> <td>SVITC40H000</td> <td>14 Pin</td> </tr> <tr> <td>DN74LS74A</td> <td></td> </tr> <tr> <td>DN74LS107</td> <td></td> </tr> </table>	SVIUPD4053BC	16 Pin	MN1421PCM		AN6806	28 Pin	MN1564PCL		MN6615	64 Pin	MN4066B		SVITC40H000	14 Pin	DN74LS74A		DN74LS107	
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<p>AN6682, SVINJM4556S</p>  <p>9</p>	<p>2SD638, 2SB641</p>  <p>B C E</p>																																																																																																			

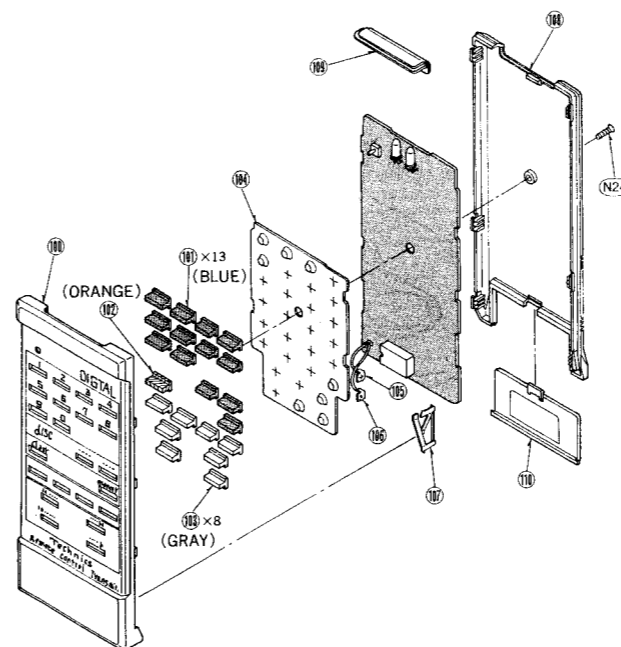
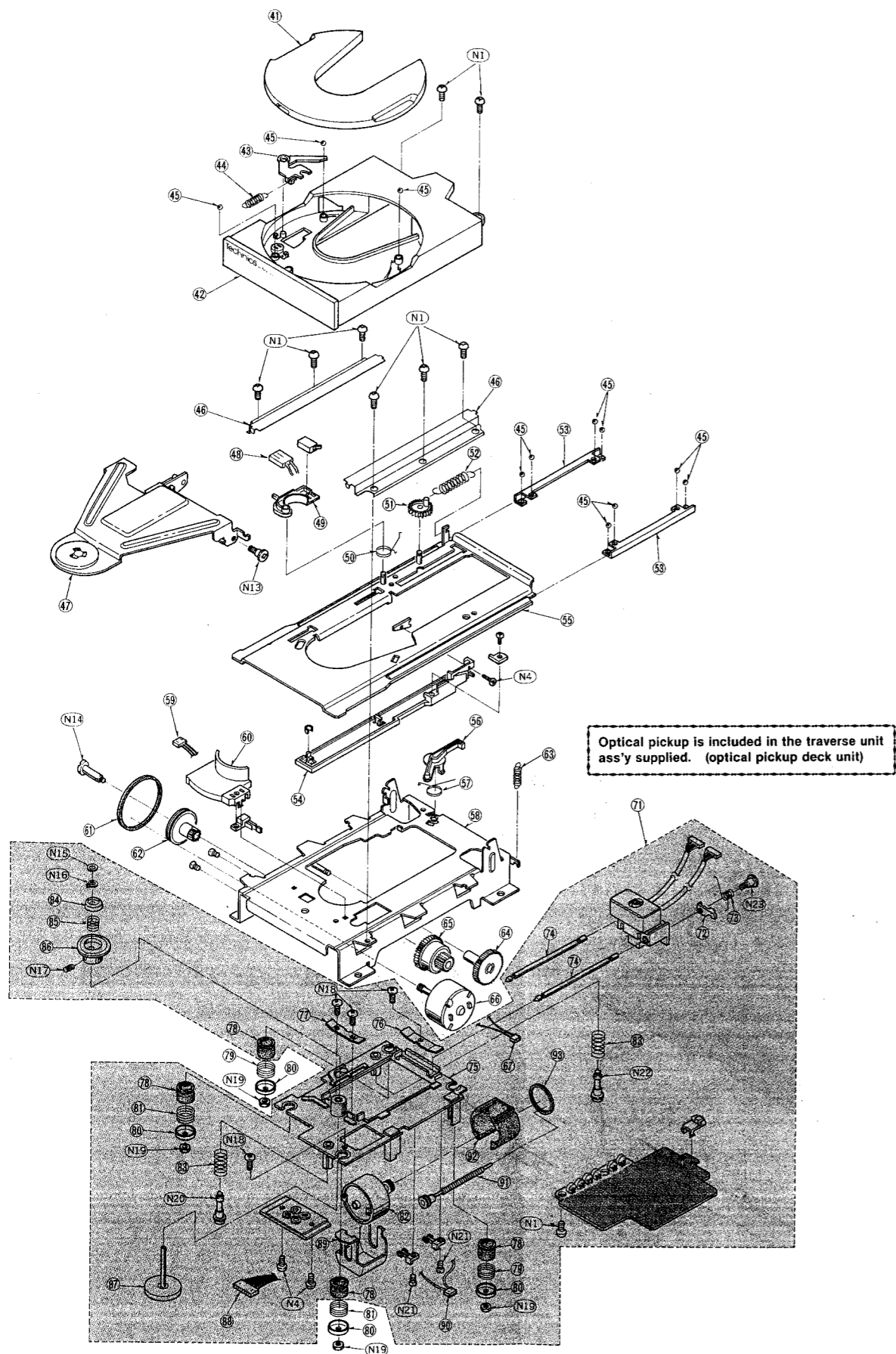
EXPLODED VIEWS

- Cabinet and chassis parts



• Loading drive mechanism and optical deck unit parts

• Remote control unit parts



■ REPLACEMENT PARTS LIST (Cabinet and Chassis Parts)

- Notes:**
1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
 2. 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.
 3. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.
 4. The "S" mark is service standard parts and may differ from production parts.
 5. (K)-marked parts are used for black only, while (O)-marked parts are for silver type only.
 6. Parts other than (K)- and (O)-marked are used for both black and silver types.
 7. The parenthesized numbers in the columns of description stand for the quantity per set.

Areas

- * [E] is available in Switzerland and Scandinavia.
- * [EK] is available in United Kingdom.
- * [XL] is available in Australia.
- * [EG] is available in F.R. Germany.
- * [EB] is available in Belgium.
- * [EH] is available in Holland.
- * [EF] is available in France.
- * [Ei] is available in Italy.
- * [XA] is available in Southeast Asia, Oceania, Africa, Middle Near East and Central South America.
- * [PA] is available in far East PX.
- * [PE] is available in European Military.
- * [PC] is available in European Audio Club.

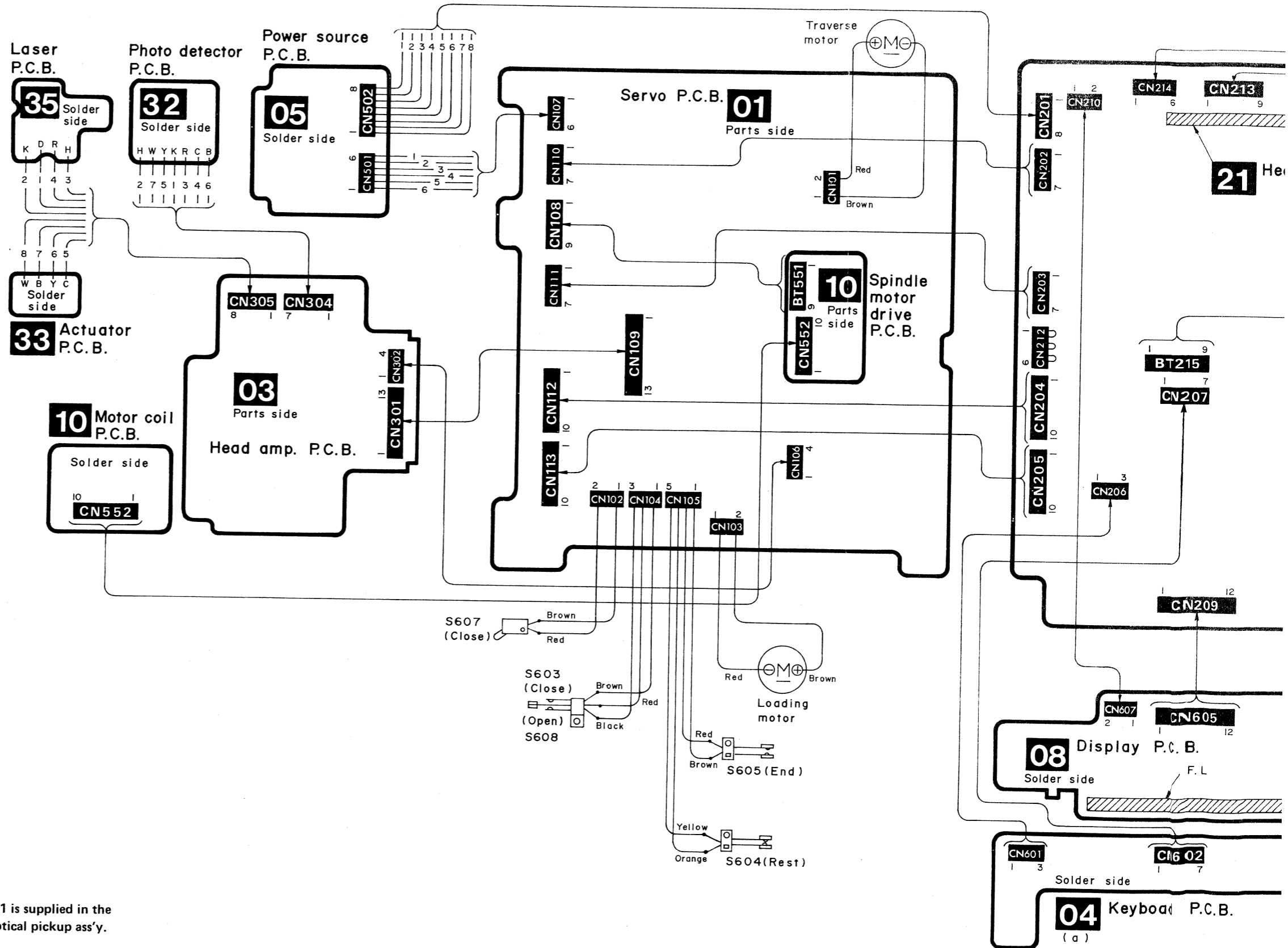
Black type model No.: SL-P8 (K)

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
1	SRAC008N04	Cabinet(Silver) (1)	20	SRKT008N03	Button,open/close (1)	38[E]	SRNN008S01	Name Plate (1)
1	SRAC008N53	Cabinet(Black) (1)	21	SRUP008N03	Guide (1)	38[EK, XL]	SRNN008G01	Name Plate (1)
2	SRKK008N02	Ornament,Cabinet (1)	22	SRKK008N04	Front Panel (1)	38[XA, XM]	SRNN008X01	Name Plate (1)
3	SRUM007N10	Shaft,Power Switch (1)	23	SRUP008N01	Guide,Head Phone Terminal (1)	38[PA, PE]	SRNN008P01	Name Plate (1)
4	SRKK007N01	Ornament,Front Panel (1)	24	SRAC008N03	Rear Panel (1)	38[PC]	SRNN008P02	Name Plate (1)
5	SRKT008N10	Knob,Power (1)	25	SRGA008N01	Foot,Set (4)	38[Other]	SRNN008R01	Name Plate (1)
6	SRKT008N08E	Knob,Head Phone (1)	26	SRUM007N16	Guide,Right Side (1)	[Areas]		
7	SRAC008N01R	Front Panel(Silver) (1)	27	SRUM007N14	Guide,Left Side (1)	LOADING DRIVE MECHANISM AND OPTICAL PICK-UP DECK UNIT PARTS		
7	SRAC008N51R	Front Panel(Black) (1)	28	SRDJ007N05	Jack,(Red)Lineout (1)	41	SRUM007N05E	Disc Tray Ass'y (1)
7-1	SRKK008N01	Ornament Plate (1)	29	SRDJ007N06	Jack,(White)Lineout (1)	42	SRUM008N04R	Disc Holder Ass'y (Silver) (1)
8	SRKT008N01	Button,Program(A) (2)	30	SRDJ007N03	Jack, Synchro rec (1)	42	SRUM008N51R	Disc Holder Ass'y (Black) (1)
9	SRKT007N02	Button,Search (1)	31	SRDJ007N04	Jack,External (1)	43	SRUM007N07	Cam,Disc Tray (1)
10	SRUM008N02	Base(Silver) (1)	32	SRUM007N11	Guide,Jack (1)	44	SRQH007N02	Spring,Disc Tray (1)
10	SRUM008N51	Base(Black) (1)	33	SRDCC07-01	Insulation Plate,Regulator IC (3)	45	SFYB-5-32	Still Ball (3)
11	SRUP008N02	Guide,Front Panel (1)	34	SRDBC07-01	Bushing,Regulator IC (3)	46	SRUP007N07	Bracket (2)
12	SRUM007N21	Holder,L,E,D (5)	35	SRUM007N13	Holder,Power Printed Base (1)	47	SRUP007N05A	Disc Clamp Plate (1)
13	SRUM008N01	Holder,Remote Control receiver (1)	36[EK] Δ	SFDJHSC0498	AC Socket (1)	48	SRDJ007N12E	Connector Ass'y 2P (1)
14	UR37FT29	Filter,Remote Control receiver (1)	36[XL, XA] PE, XM	SFDJHSC0509	AC Socket (1)	49	SRUM007N18	Cover,Switch (1)
15	SRKT008N06	Knob,Pitch Control Selector (1)	36[PA, PC] Δ			50	SRQS007N02	Spring (1)
16	SRKT008N04	Knob,Pitch Control (1)	36[Other] [Areas] Δ	SFDJHSC0505	AC Socket (1)	51	SRUG007N04	Gear,Return (1)
17	SRKT008N05	Knob,Time (1)				52	SRQH007N01	Spring (1)
18 [Black type only]	SRUZ008N01	Spacer (1)				53	SRUM007N15	Guide (1)
19	SRKT008N02	Button,Program(B) (1)	37	SSDJ3317020	Jack,Head Phone (1)	54	SRUM007N09	Rack,Drive (1)
						55	SRUP007N10E	Loading Guide Ass'y (1)

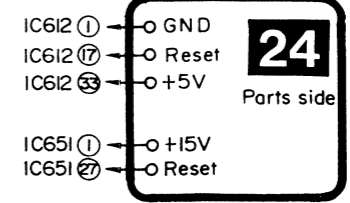
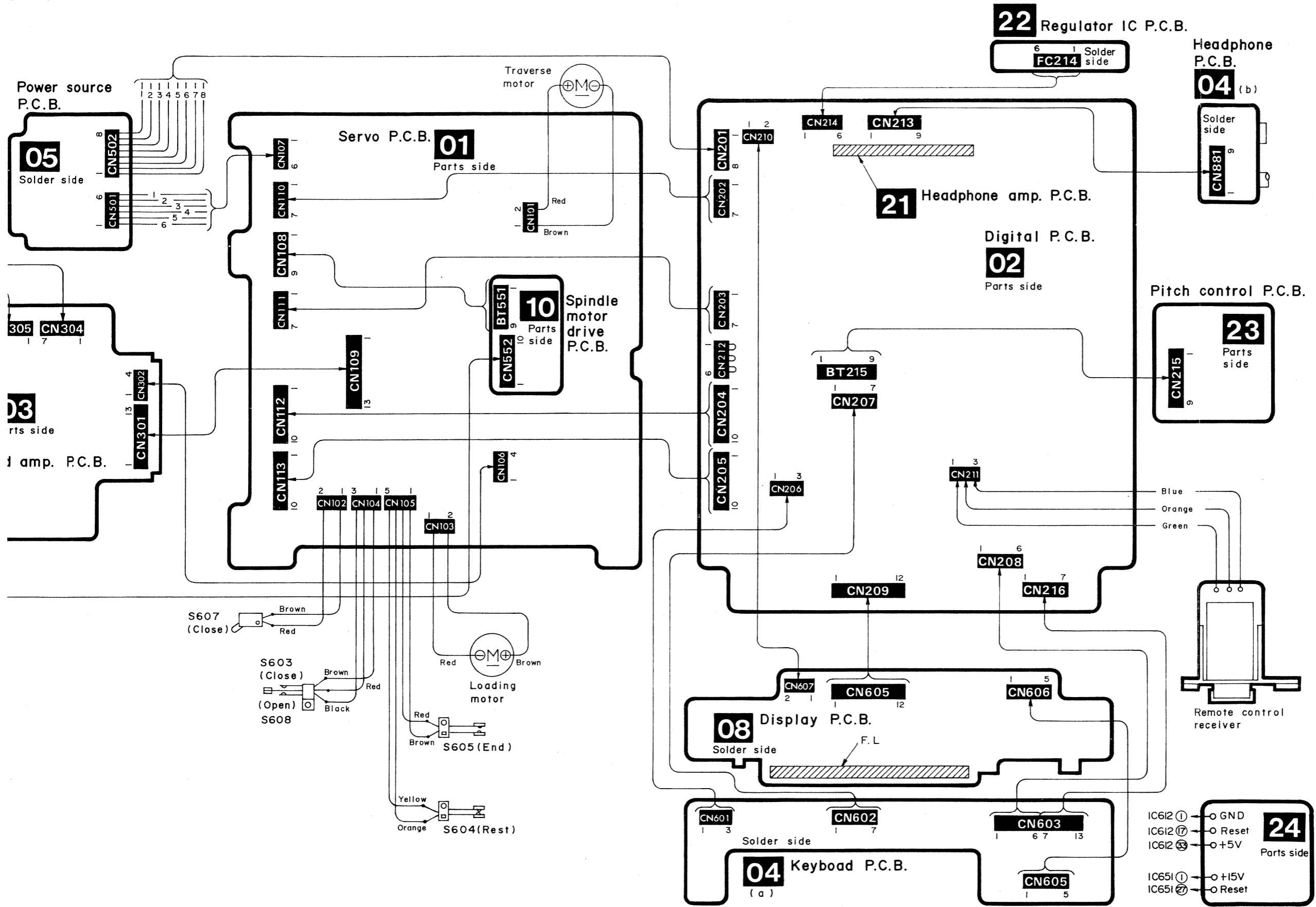
PRINTED CIRCUIT BOARD AND WIRING CONNECTION DIAGRAM

Ref. No.	Part No.	Description	(1)
56	SRUM007N06	Lock Arm	(1)
57	SRQS007N03	Spring,Lock Arm	(1)
58	SRUP007N03R	Loading Base Ass'y	(1)
59	SRDJ007N13E	Connector Ass'y	(1)
60	SRUM007N17	Cover,Switch	(1)
61	SRGB007N02	Belt,Loading Motor	(1)
62	SRUG007N01	Pully,Gear	(1)
63	SRQH007N03	Spring,Clamp plate	(1)
64	SRUG007N02	Gear,Center	(1)
65	SRUG007N03	Gear Drive	(1)
66	SRMH007N01A	Motor,Loading Mechanism	(1)
67	SRDJ007N10E	Connector Ass'y	(1)
OPTICAL PICK-UP DECK UNIT PARTS			
71	SRUK007N02R	Optical Pick-up Ass'y	(1)
72	SRUM007N22	Bracket,Optical Pick-up Ass'y	(1)
73	SRQS007N01	Spring,Bracket	(1)
74	SRXJ007N01	Shaft,Optical Pick-up Bracket	(2)
75	SRUK007N02E	Optical Deck Unit Base Ass'y	(1)
76	SRUP007N09	Bracket	(1)
77	SRXJ007N01	Bracket	(1)
78	SRGC007N02	Rubber Cushion	(4)
79	SRQA007N02	Spring,Insulator(A)	(2)
80	SRUP007N12	Holder,Spring	(4)
81	SRQA007N01	Spring,Insulator(B)	(2)
82	SRMH007N02A	Motor,Optical Pick-up Drive	(1)
83	SRQA007N03	Spring	(2)
84	SRTE007N02	Holder	(1)
85	SRQA010N04	Spring	(1)
86	SRTE007N01	Turntable Platter	(1)
87	SRTM007N01A	Magnet Ass'y	(1)
88	SRDJ007N03E	Connector Ass'y 8P	(1)
89	SRUM007N19	Holder,Motor	(1)
90	SRDJ007N14E	Connector Ass'y	(1)
91	SRXG007N01E	Pully Screw	(1)
92	SRGC007N01	Rubber Cushion,Motor	(1)
93	SRGB007N03	Belt	(1)
REMOTE CONTROL PARTS			
100	UR51VCS95	Case,Cover(Silver)	(1)
100	UR51VCS101	Case,Cover(Black)	(1)
101	UR51BT5B	Button,(Blue)	(13)
102	UR51BT5F	Button,(Orange)	(1)
103	UR51BT5	Button,(Grey)	(8)
104	UR51CT11D	Rubber,Point	(1)
105	URC180TD8	Battery Terminal	(1)
106	URC180TD9	Battery Terminal	(1)
107	URC180TD10A	Battery Terminal	(1)
108	UR51VCS100	Case,Bottom(Silver)	(1)
108	UR51VCS102	Case,Bottom(Black)	(1)
109	UR51SB4	Cover	(1)
110	UR51VEC99	Battery Cover(Silver)	(1)
110	UR51VEC103	Battery Cover(Black)	(1)
SCREWS,NUTS AND WASHERS			
N1	XTV3+6BFN	Screw,φ3×6	(16)
N2	SNE2095-2	Screw,(Silver)	(4)
N2	SNE2095-3	Screw,(Black)	(4)
N3	XTV3+10BFN	Screw,φ3×10	(2)
N4	XTV3+8BFN	Screw,φ3×8	(8)
N5	XNSS8	NUT, φ 8	(1)
N6	XNSS12	NUT, φ 12	(1)
N7	XTV3+14BFN	Screw,φ3×14	(2)
N8	XTV3+8BFZ	Screw,φ3×8	(2)
N9	XTN3+6B	Screw,φ3×6	(2)
N10	XWE3	Washer, φ 3	(2)
N11	XYN3+C8S	Screw,φ3×8	(3)
N12	XTW3+8Q	Screw,φ3×8	(1)
N13	SFXGV05N03	Screw	(1)
N14	SRXG007N04	Screw	(1)
N15	SRXW007N03	Washer	(1)
N16	GTW-3	Washer	(1)
N17	XXE26D5FZ	Screw	(1)
N18	XTN3+6B	Screw,φ3×6	(4)
N19	XNG26EBW	Nut, φ 2.6	(4)
N20	SRXG007N07	Screw	(1)
N21	XTN2+6B	Screw,φ2×6	(1)
N22	SRXG007N06	Screw	(1)
N23	SRXG007N02	Screw	(1)
N24	XSS26+10BN	Screw,φ2.6×10	(1)

Note: Ref. No. 71 is supplied in the from of optical pickup ass'y.

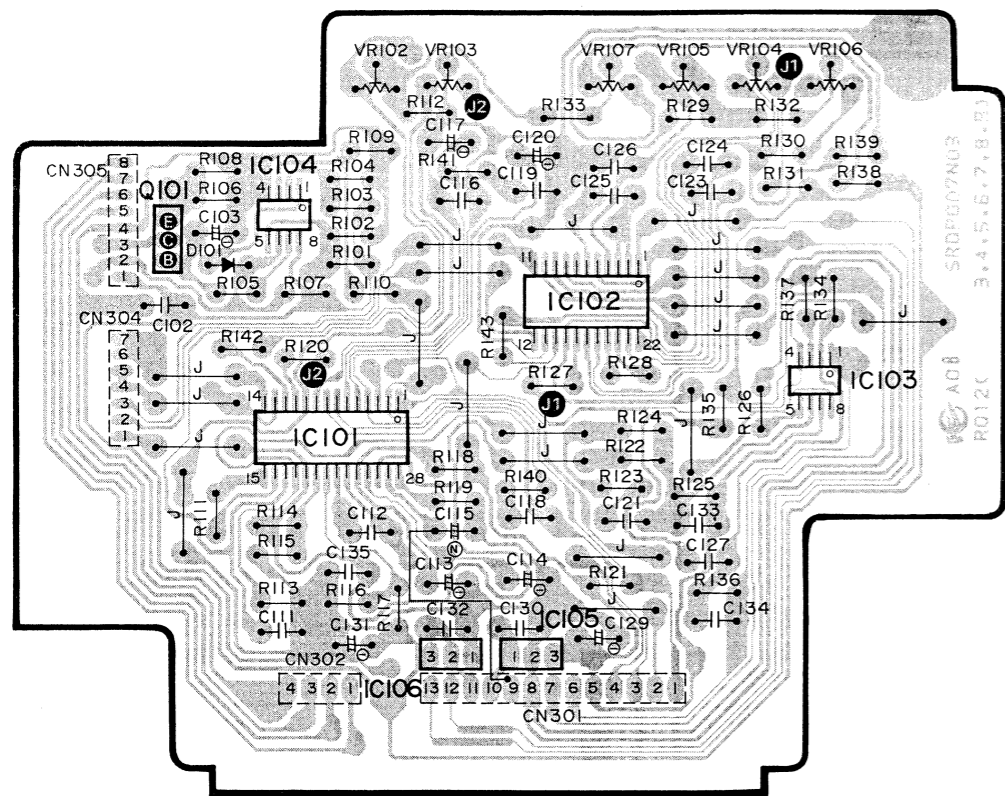


BOARD AND
DIAGRAM

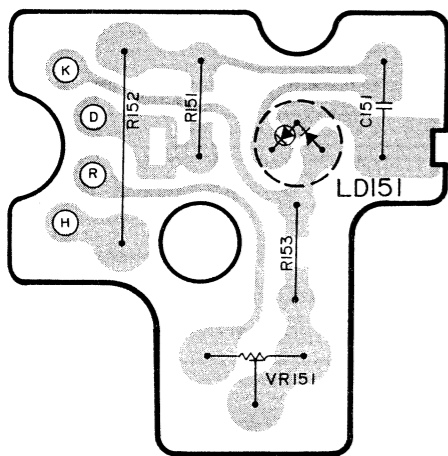


PRINTED CIRCUIT BOARDS

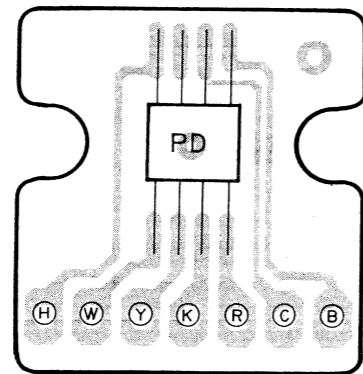
03 (Head amplifier P.C.B.)



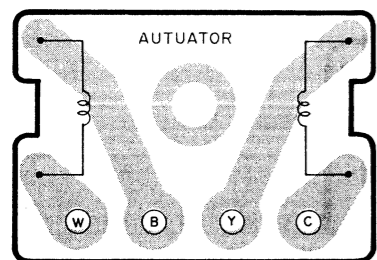
35 (Laser P.C.B.)



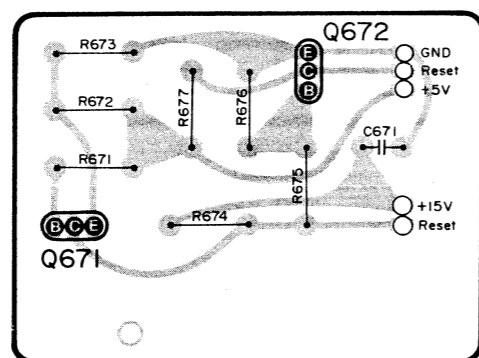
32 (Photo detector P.C.B.)



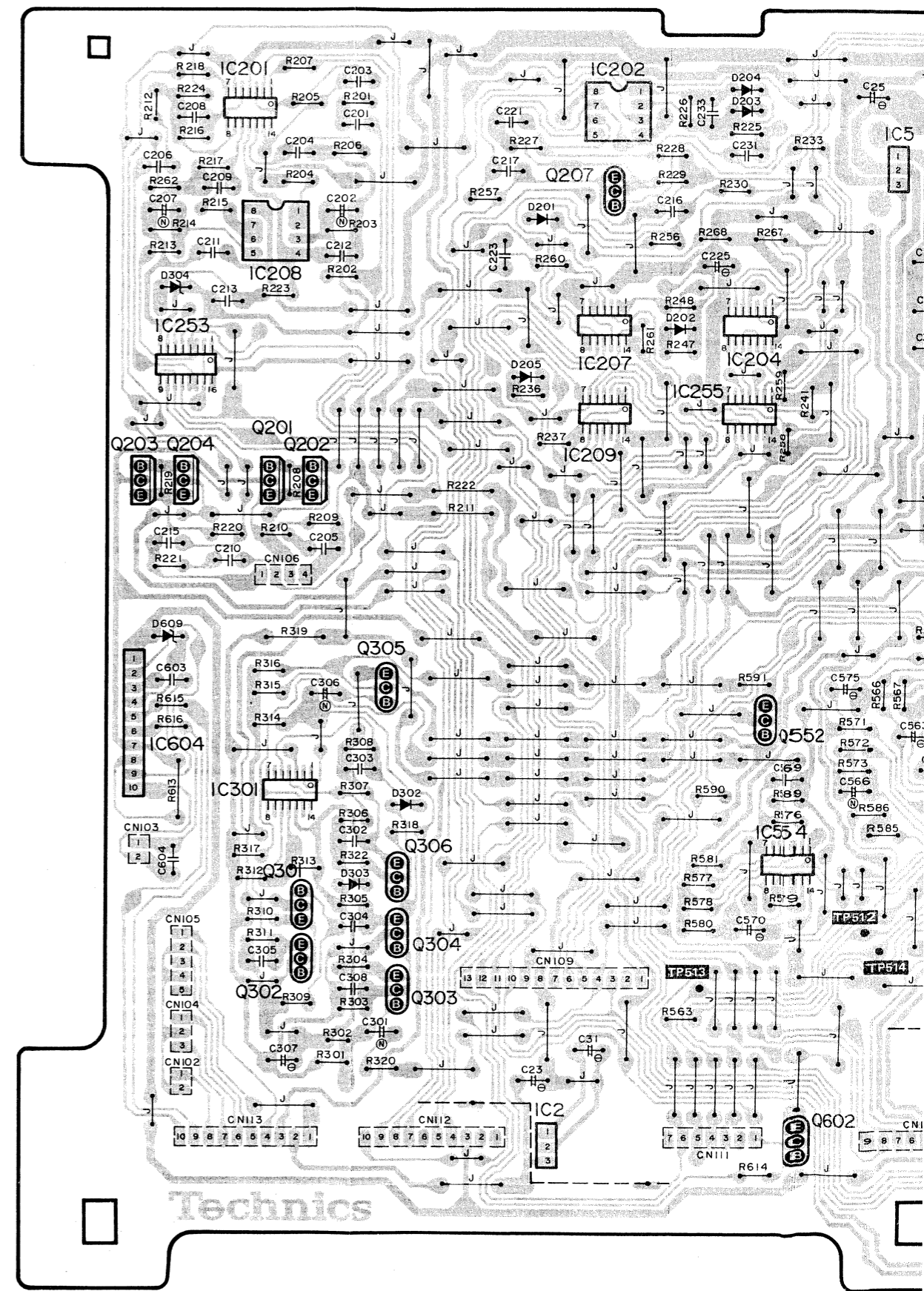
33 (Actuator coil P.C.B.)

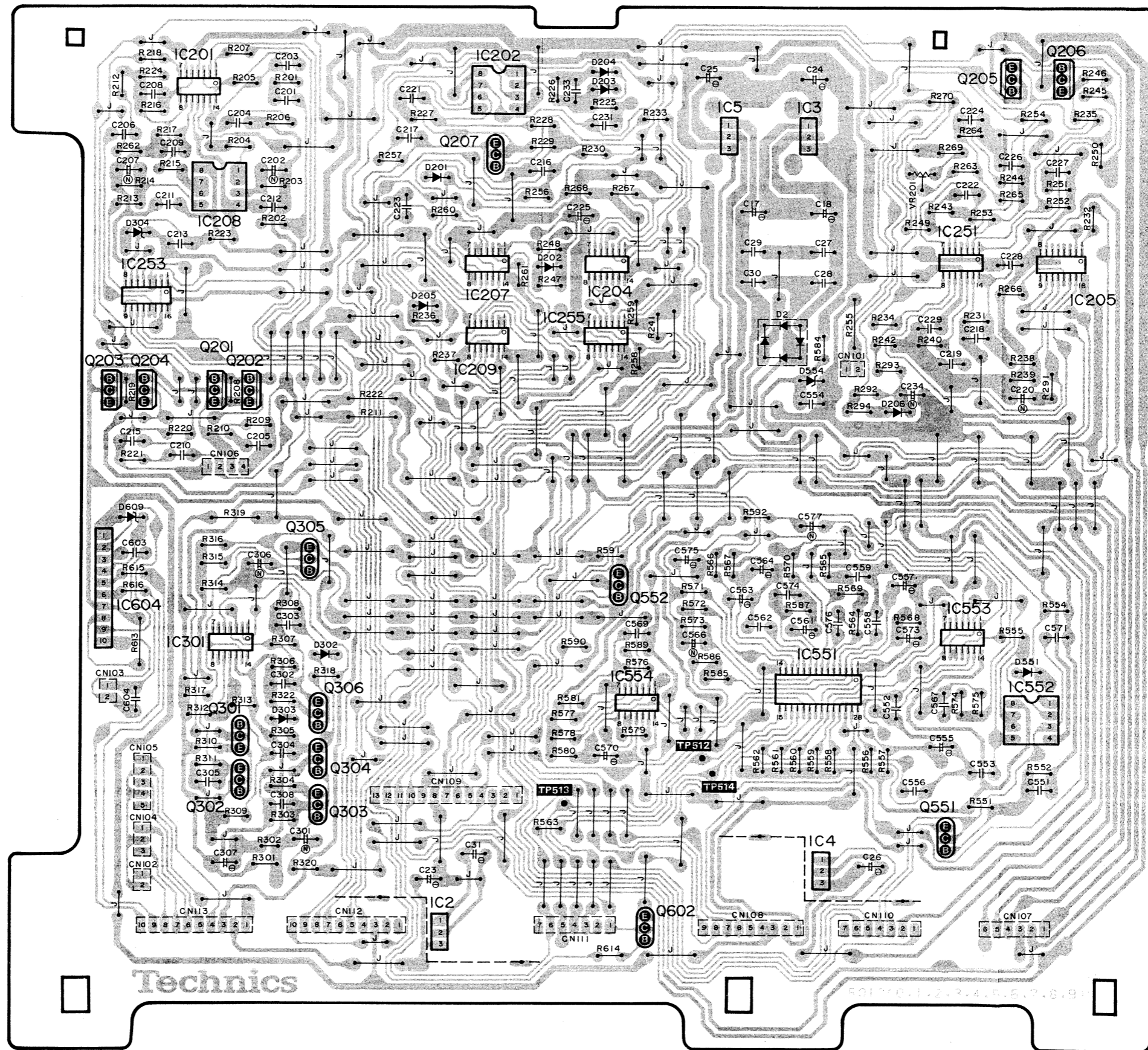


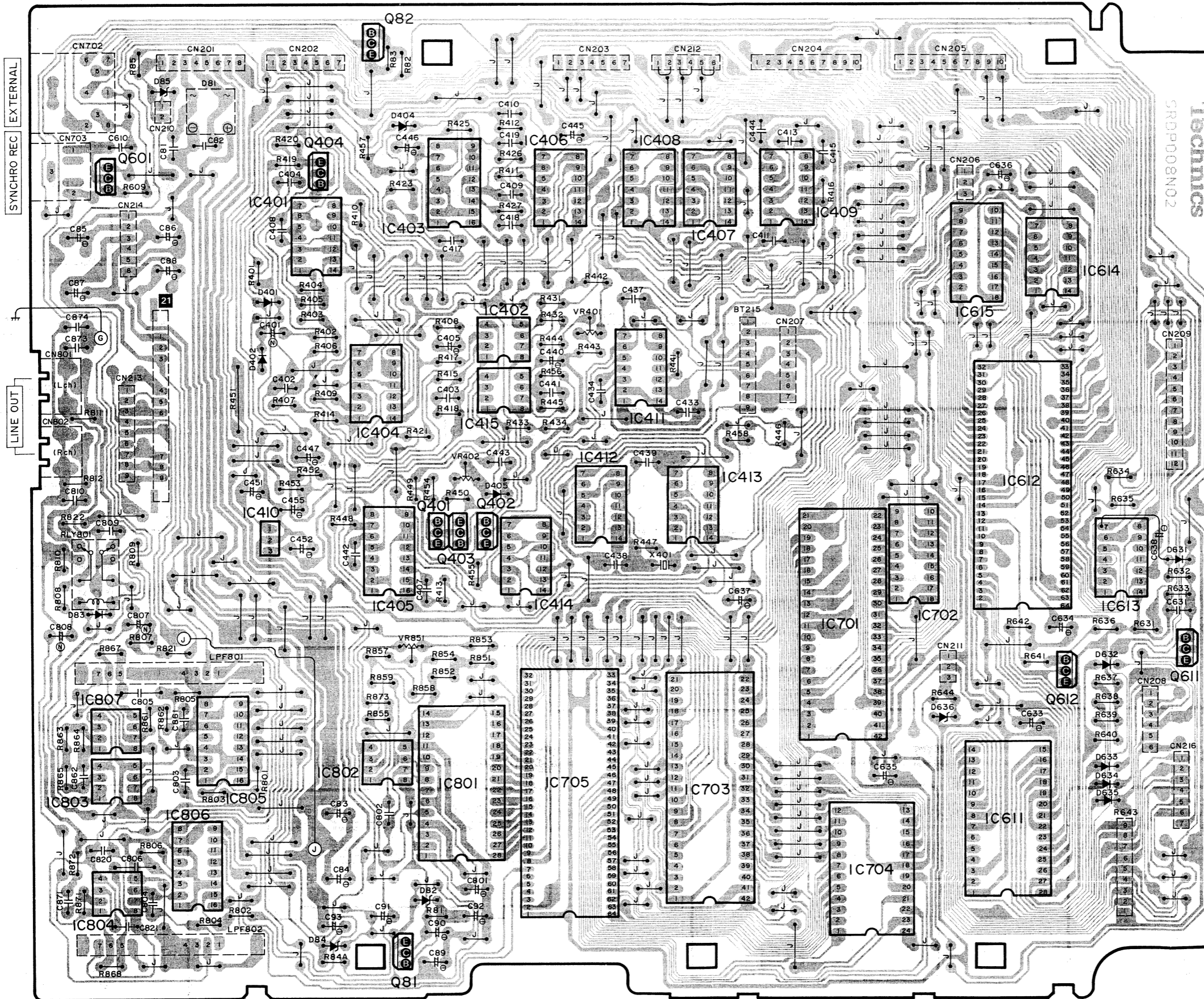
24 (Reset P.C.B.)



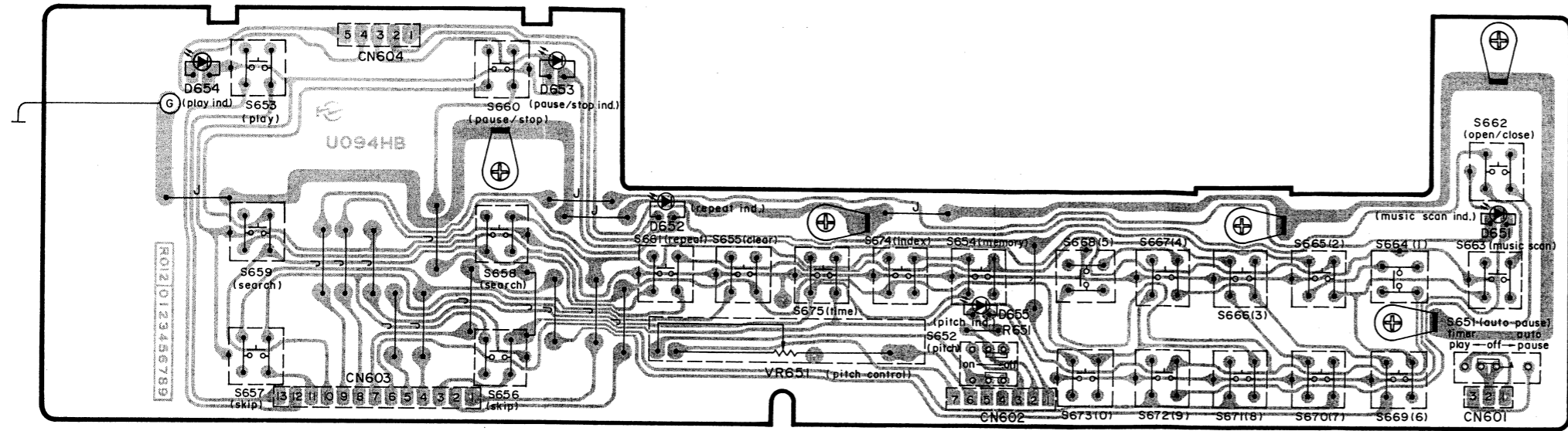
01 (Servo P.C.B.)



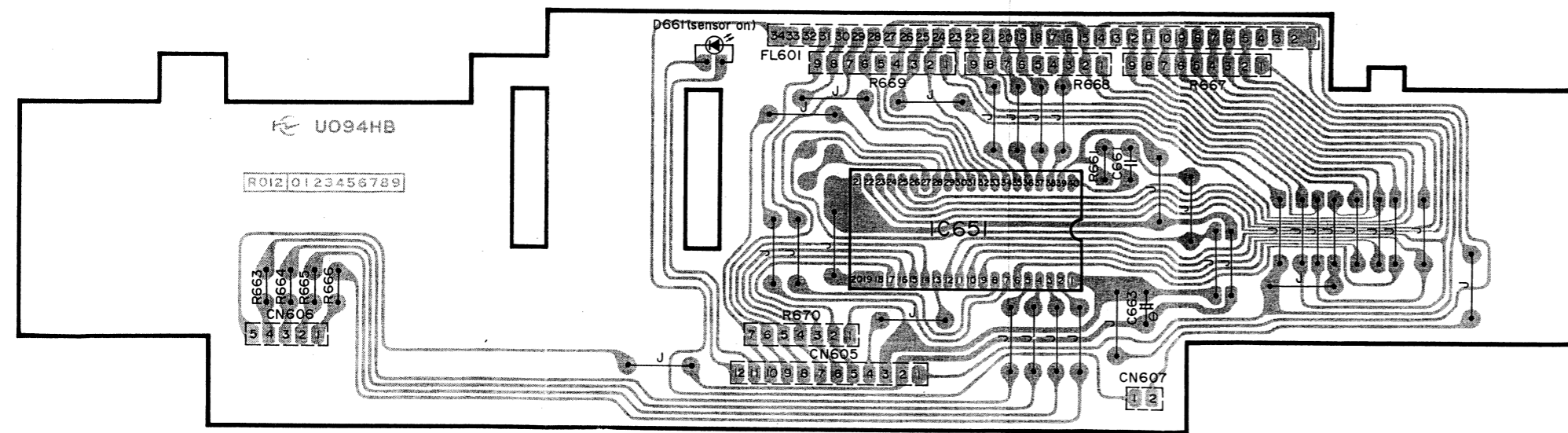




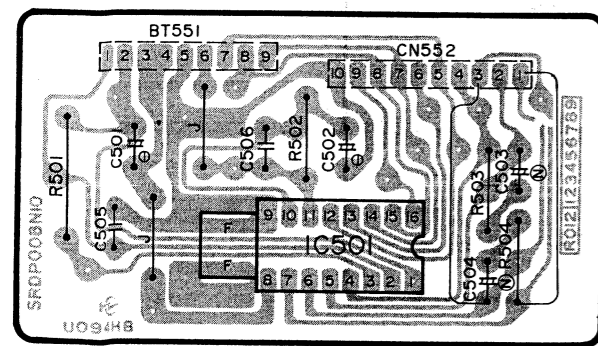
07 (Keyboard P.C.B.)



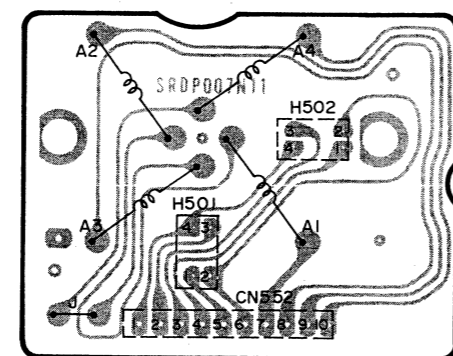
08 (FL display P.C.B.)



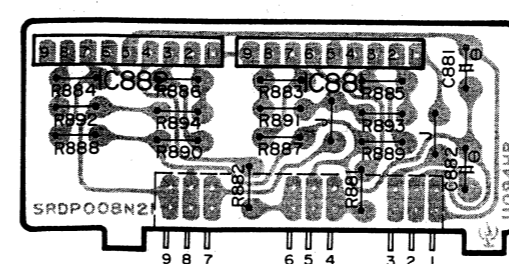
10 (Spindle motor drive P.C.B.)



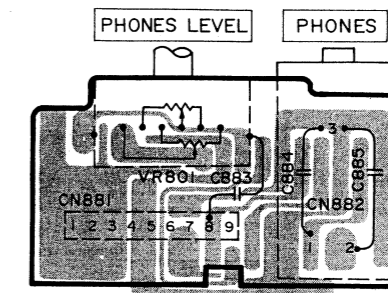
11 (Spindle motor drive coil P.C.B.)



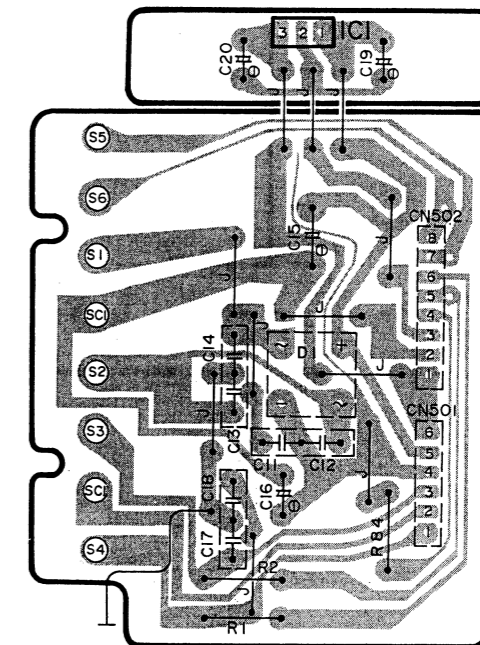
21 (Headphone amplifier P.C.B.)



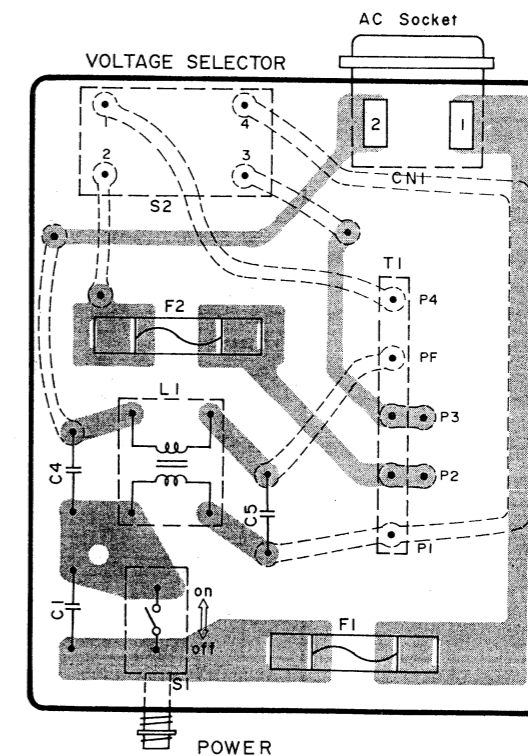
(Headphones terminal)



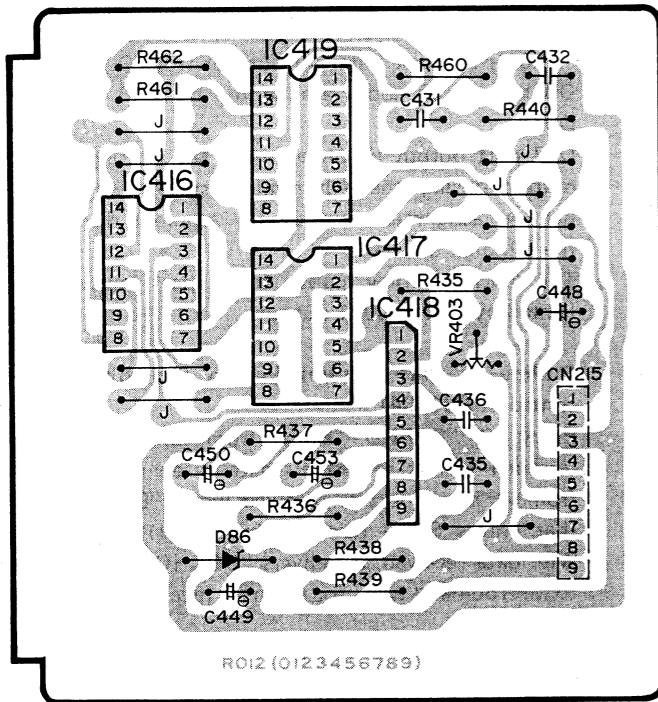
05 (Power supply P.C.B.)



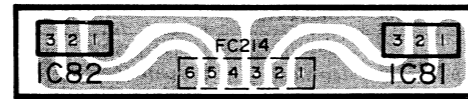
07 (Fuse P.C.B.)



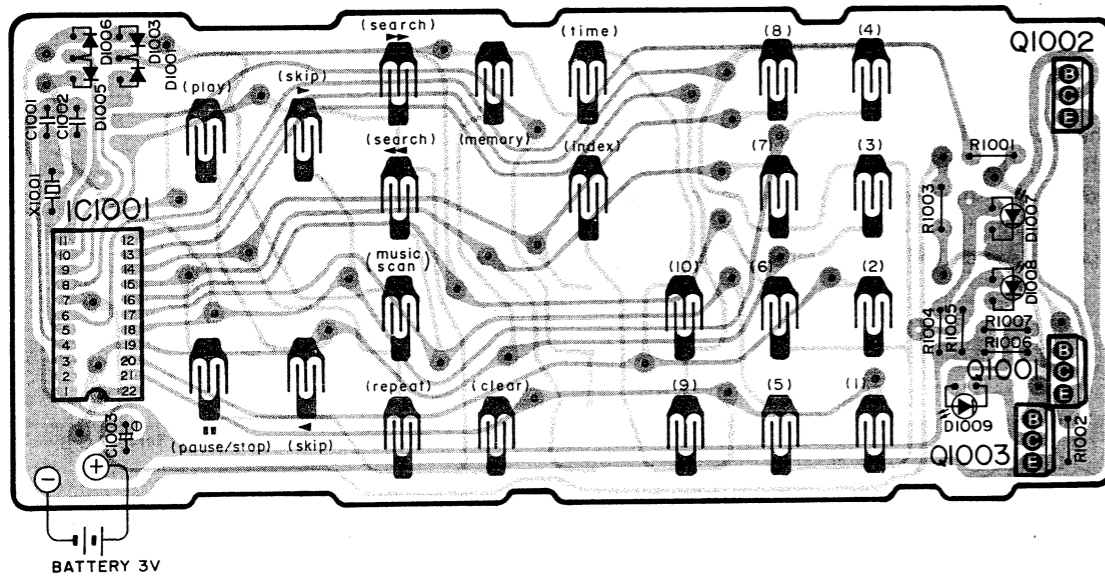
23 (Pitch control P.C.B.)



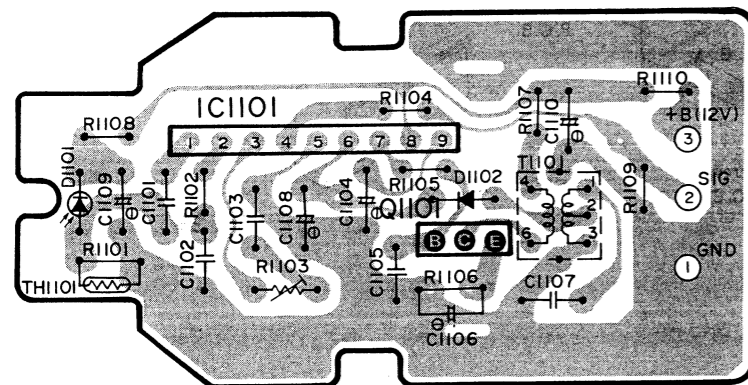
22 (Regulator IC P.C.B.)



(Remote control transmitter P.C.B.)



(Remote control receiver P.C.B.)



■ TERMINAL DESCRIPTION OF MICRO COMPUTER

● IC612 Operation control (MN1564PCL)

No.	Symbol	Block Name	Function	No.	Symbol	Block Name	Function
1	VSS	Power supply input terminal	Grounded (0V)	33	VDD	Power supply input terminal	5V
2	P00	P port	Data input terminals (from MN1421)	34	VMM	P port	5V
3	P01			35	HLDM		Emphasis control output terminal
4	P02			36	P53		
5	P03	37	P60	Track jump control output terminal			
6	ST0	---	Not used in this unit	38	P61	P port	Not used in this unit
7	P10	Data input terminal (from MN1421)	39	P62	TR ON signal output terminal		
8	P11	RF delay signal input	40	P63	P port	Loading motor "closed" assignment output terminal	
9	P12	Timer play select terminal (Timer play at "L")	41	P70		Loading motor "open" assignment output terminal	
10	P13	Auto pause select terminal (Auto pause at "L")	42	P71	P port	Track jump control output terminal	
11	ST1	---	Not used in this unit.	43		P72	TT ON signal output terminal
12	SYNC	---	Oscillation frequency for MN1421	44	P73	P port	Muting signal output terminal
13	SIRQ	---	Not used in this unit.	45	P80		Attenuation function control signal output terminal
14	IRQ	---	Sub-code block clock input terminal	46	P81	P port	Synchro record control signal output terminal
15	SBT	---	Input terminal of frame clock generated by PCK	47	P82		Rest position detection signal
16	SBD	---	Sub-code Q data input terminal	48	P83	P port	Outermost disc periphery detection terminal
17	RST	Reset terminal	Reset with input at "L"	49	P90		Disc holder "closed" detection terminal
18	P20	P port	4K RAM address output terminal	50	P91	P port	Disc holder "open" detection terminal
19	P21			51	P92		DECHO signal input from FL drive (MN1430)
20	P22			52	P93	FL drive (MN1430) data signal output terminal	
21	P23			53	PA0		
22	P30			54	PA1		
23	P31			55	PA2		
24	P32			56	PA3		
25	P33			57	PB0		
26	P40			58	PB1		
27	P41			59	PB2		
28	P42	60	PB3				
29	P43	61	OSC2	Oscillation circuit	Not used in this unit		
30	P50	4K RAM data input/output terminal	62	OSC1	System's reference clock (4.3218 MHz) input terminal		
31	P51	4K RAM address output terminal	63	TC1	Track counter terminal		
32	P52	4K RAM WE signal terminal	64	TC0	Not used in this unit		

● IC611 Remote control decode (MN1421PCM)

No.	Symbol	Block Name	Function
1	VSS	Power supply input terminal	Grounded (0V)
2	C09	C output port	"Sensor" indicator lights up with output at "L" during remote control mode.
3	C08		Data output (It allows local key operation and decodes it into operation control code.)
4	C07		Not used in this unit.
5	C06		Not used in this unit.
6	C05	Not used in this unit.	
7	A13	A input port	Key scan input
8	A12		
9	A11		
10	A10		
11	B13	B input port	Key scan input
12	B12		
13	B11		
14	B10		
15	E00	E output port	Key scan output
16	E01		
17	E02		
18	E03		
19	TST	Test input terminal	Terminal for test. (Grounded)
20	RST	Reset input terminal	All outputs are cleared or reset with input at "L".
21	SNS0	Sens. input terminal	It receives serial data from remote control.
22	SNS1	Sens. input terminal	Not used in this unit. (Grounded)
23	D00	D output port	Data output (It allows local key operation and decodes it into operation control code.)
24	D01		
25	D02		
26	D03		
27	VDD	Power supply input terminal	5V
28	OSC	Oscillation input terminal	Synchronizing signal input from operation control.

● IC651 FL display (MN1430PCG)

No.	Symbol	Block Name	Function	
1	VSS	Power supply input terminal	15V	
2	C011	C output port	"music scan" indicator lights up with output at "H"	
3	C010		"repeat" indicator lights up with output at "H".	
4	C09		"pause/stop" indicator lights up with output at "H".	
5	C08		"play" indicator lights up with output at "H"	
6	C07		FL segment-code (5th one) lighting assignment output.	
7	C06		FL display digit lighting assignment output	
8	C05			
9	C04			
10	C03			
11	C02		DECHO signal output to operation control (MN1564)	
12	C01			
13	C00			
14	A13	A input port		Data input from operation control (MN1564)
15	A12			
16	A11			
17	A10	B input port	Not used in this unit. (Grounded)	
18	B13			
19	B12			
20	B11			
21	B10	E output port	FL segment-code (1st one) lighting assignment output.	
22	E00			
23	E01			FL segment-code (2nd one) lighting assignment output.
24	E02			FL segment-code (3rd one) lighting assignment output.
25	E03	FL segment-code (4th one) lighting assignment output.		
26	TST	Test input terminal	Test terminal (Connected to 15V.)	
27	RST	Reset input terminal	Reset with input at "L"	
28	CSLCT	—	Connected to 15V.	

No.	Symbol	Block Name	Function
29	SNS0	Sens. input terminal	"DC LOCK" signal input from Operation control (MN1564)
30	SNS1	Sens. input terminal	"DSEND" signal input from Operation control (MN1564)
31	D00	D output port	"a" segment display output
32	D01		"b" segment display output
33	D02		"c" segment display output
34	D03		"d" segment display output
35	D04		"e" segment display output
36	D05		"f" segment display output
37	D06		"g" segment display output
38	D07	Colon (:) and over (▶) lighting assignment outputs	
39	VDD	Power supply input terminal	Grounded (0V)
40	OSC	Oscillation input terminal	Clock signal

■ HOW TO CHECK P.C.B.

*For removal of each part, refer to pages 10 ~ 15.

● Servo P.C.B.

1. Remove the cabinet. [Fig. 25]
2. Check each part. [Fig. 26]
3. When checking the soldered parts on the servo P.C.B., raise the P.C.B. as in Fig. 27. (Tie the power switch rod to the servo P.C.B. with a string.)

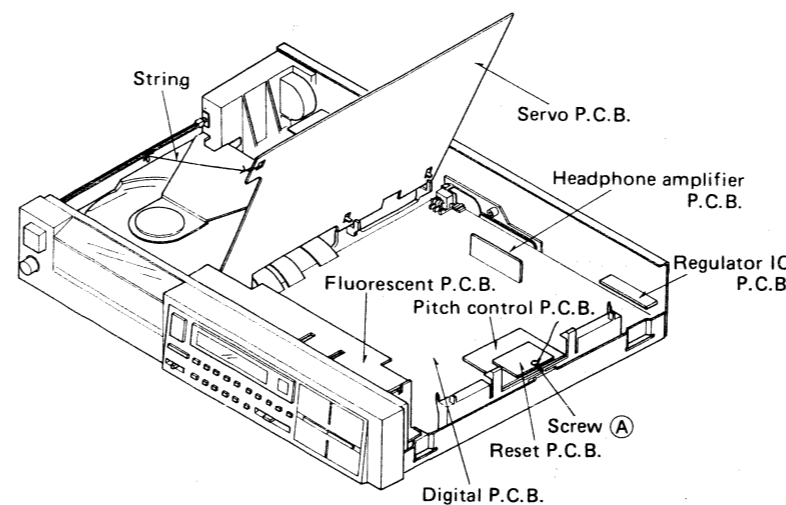


Fig. 27

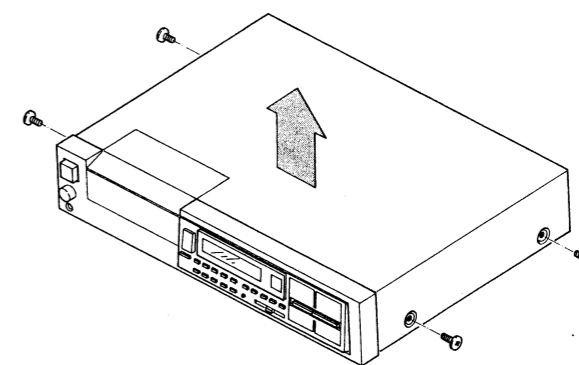


Fig. 25

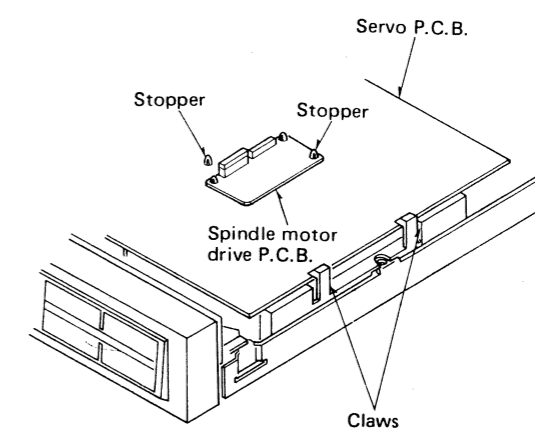


Fig. 26

★Outline of FL ON operation

Display digits are determined by C output ports (C01 – C06); segment data are put out from D ports (D00 – D06); and bar codes are lighted by E00 – E03, C07, D07.

D07 port output becomes over (▶) lighting assignment output during the 4th digits display, and colon (:) lighting assignment output for segment display during the 5th digit display.

The 4 LED's (play, pause/stop, repeat, music scan) are lighted by C08 – C011 outputs.

★Outline of data transmission to and from operation control (MN1564)

Entry of "DSEND" signal from MN1564 into SNS1 terminal results in display data receiving. Display data from A input port is received while "DCLOCK" signal that enters SNS0 terminal from MN1564 is checked. With data received, it delivers "DECHO" signal from C00 to MN1564 and waits for the next receiving timing.

● Microcomputer reset P.C.B.

1. Remove the cabinet.
2. Remove the servo P.C.B. to shift it as in Fig. 27.
3. Check each part. To check soldered parts, remove screw (A) and turn over the P.C.B.

Caution: When supplying power wire screw (A) removed, connect the earth terminal fastened with screw (A) to the chassis.

● Pitch control P.C.B.

1. Remove the cabinet.
2. Remove the servo P.C.B. to shift it as in Fig. 27.
3. Remove screw (A) and microcomputer reset circuit and pitch control P.C.B.
4. Again tighten screw (A) to fit the microcomputer reset P.C.B.
5. Check such part with care so that the soldered parts of pitch control P.C.B. do not touch the other parts.

● Fluorescent P.C.B. and keyboard P.C.B.

1. Remove the cabinet.
2. Remove the front panel.
3. Remove the remote-control receiver. [Fig. 28]
4. Remove the P.C.B. setscrews. [Fig. 28]
5. Shift it as in Fig. 29 and check.

Cautions:

- (1) Take care not to damage FL.
- (2) Take care not to allow the soldered parts of P.C.B. to touch the other parts.

● Digital P.C.B.

1. Remove the cabinet.
2. Remove the servo P.C.B. to shift it as in Fig. 27, and check each part.
3. How to check soldered parts:
 - (1) Remove the front panel, FL P.C.B. and keyboard P.C.B.
 - (2) Remove the P.C.B. holder setscrew. [Fig. 30]
 - (3) Shift it as in Fig. 29 and check.

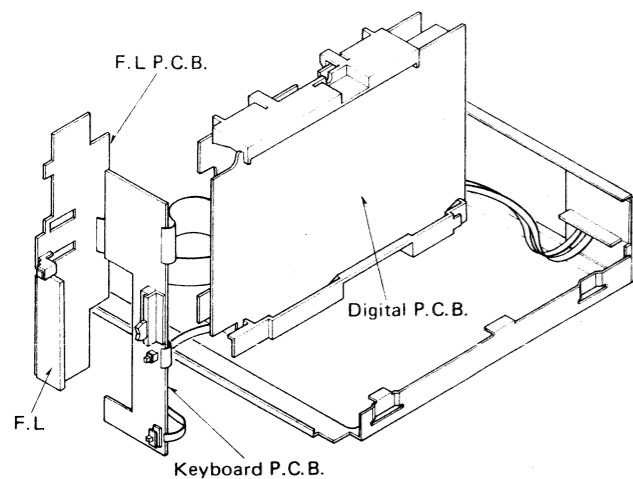


Fig. 29

● Spindle motor drive P.C.B.

1. Remove the cabinet.
2. Check each part.
3. To check soldered parts, remove stopper and turn over the P.C.B. [Fig. 26]

● Regulator IC P.C.B.

1. Remove the cabinet.
2. Remove the servo P.C.B. to shift it as in Fig. 27.
3. Check soldered parts.

● Headphone amplifier P.C.B.

1. Remove the cabinet.
2. Remove the servo P.C.B. to shift it as in Fig. 27.
3. Check each part.

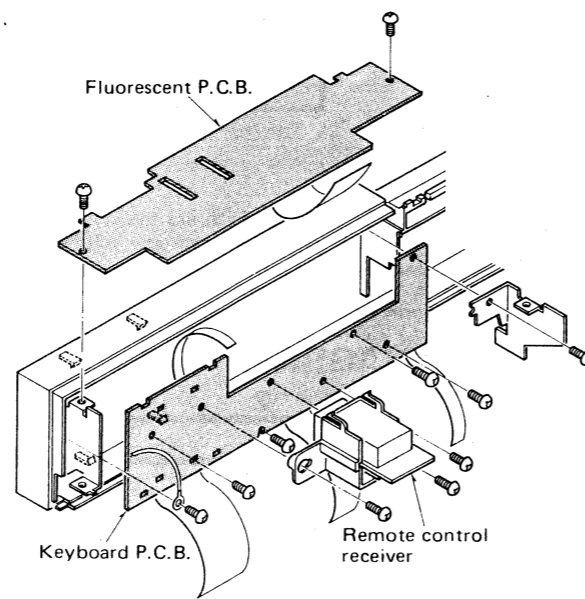


Fig. 28

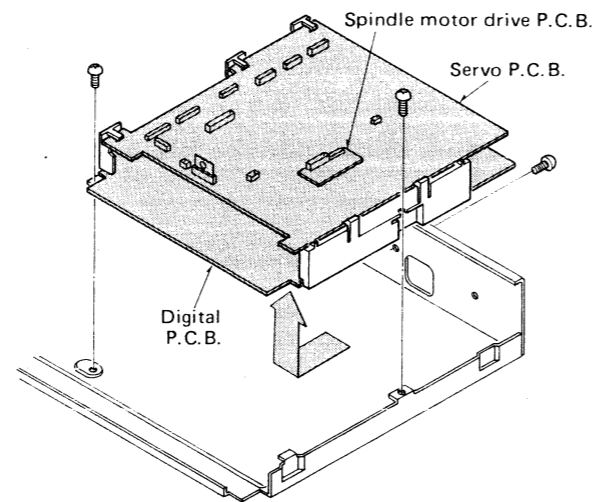


Fig. 30

● Head amplifier P.C.B.

1. Remove the cabinet.
2. Remove the front panel, and FL P.C.B. and keyboard P.C.B.
3. Remove the 4 traverse unit setscrews. [Fig. 31]
4. Turn over the traverse unit, then remove the nut [Fig. 32] and traverse unit.
5. Fix the traverse unit on the jig (traverse unit mount). [Fig. 33]
6. Remove the head amp P.C.B. to check each part. (*For the details, refer to the section of adjustment.)

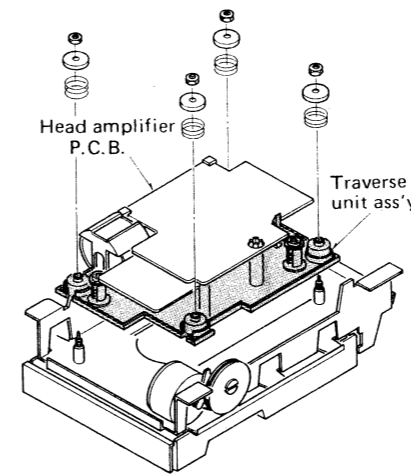


Fig. 32

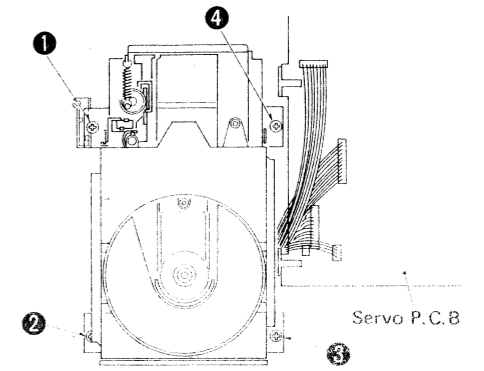


Fig. 31

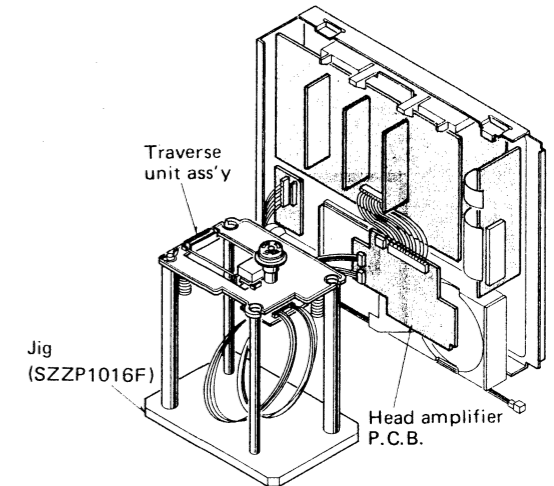
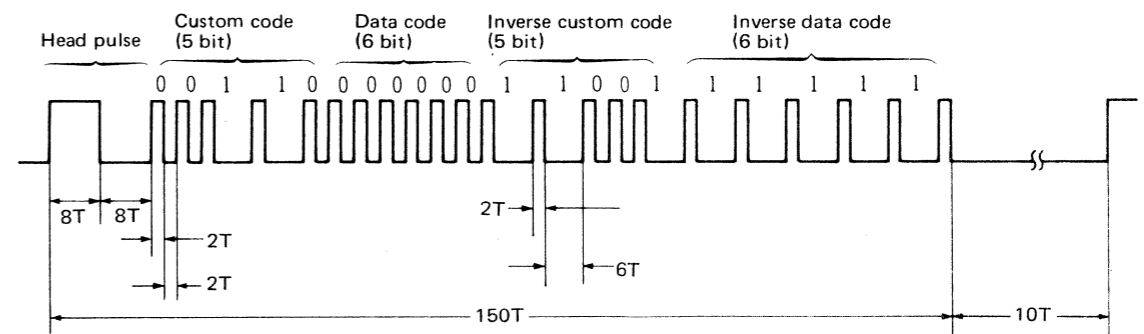
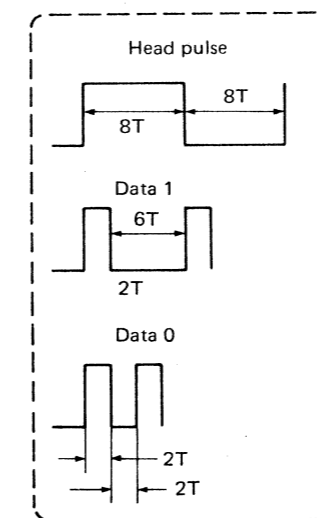


Fig. 33

● Remote control transmitter data code (MN6030).



*1T = 0.420ms~0.424ms (U.S.A. and Canada)
1T = 0.454ms~0.460ms (Europe and Others)

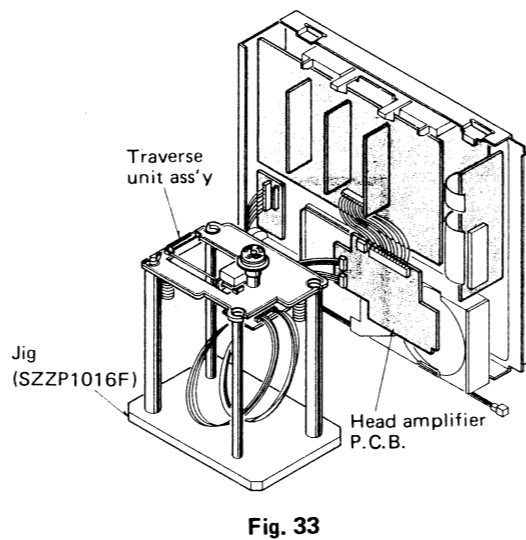
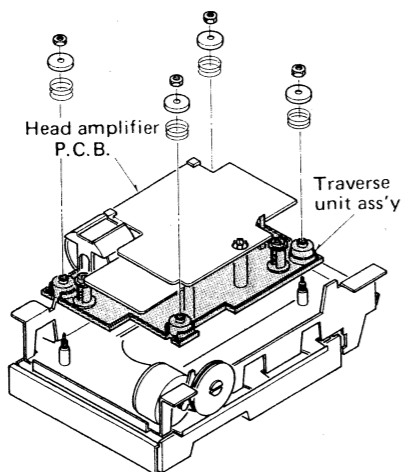
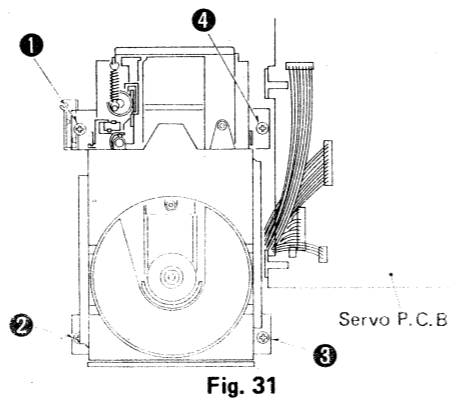


Button	Data code
1	0 0 0 0 1 0
2	1 0 0 0 1 0
3	0 1 0 0 1 0
4	1 1 0 0 1 0
5	0 0 1 0 1 0
6	1 0 1 0 1 0
7	0 1 1 0 1 0
8	1 1 1 0 1 0
9	0 0 0 1 1 0
0	1 0 0 1 1 0
index	0 0 0 1 0 1

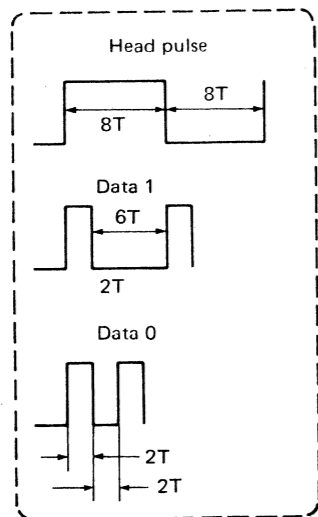
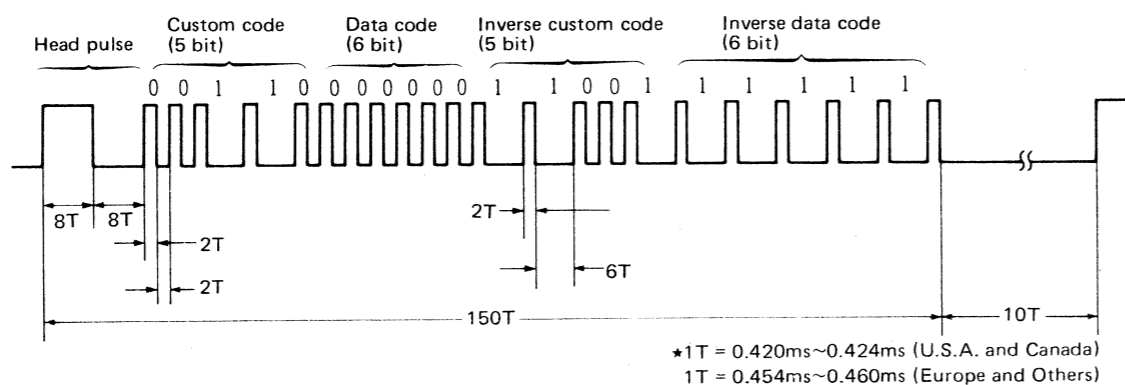
Button	Data code
time	1 0 0 1 0 1
clear	0 0 0 0 0 0
memory	0 1 0 1 0 1
music scan	1 1 1 1 0 0
◀ search	0 0 1 0 0 0
search ▶	1 0 1 0 0 0
◀ skip	0 1 0 0 0 0
skip ▶	1 1 0 0 0 0
pause/stop	0 1 1 0 0 0
play ▶	0 1 0 1 0 0

● Head amplifier P.C.B.

1. Remove the cabinet.
2. Remove the front panel, and FL P.C.B. and keyboard P.C.B.
3. Remove the 4 traverse unit setscrews. [Fig. 31]
4. Turn over the traverse unit, then remove the nut [Fig. 32] and traverse unit.
5. Fix the traverse unit on the jig (traverse unit mount). [Fig. 33]
6. Remove the head amp P.C.B. to check each part. (* For the details, refer to the section of adjustment.)



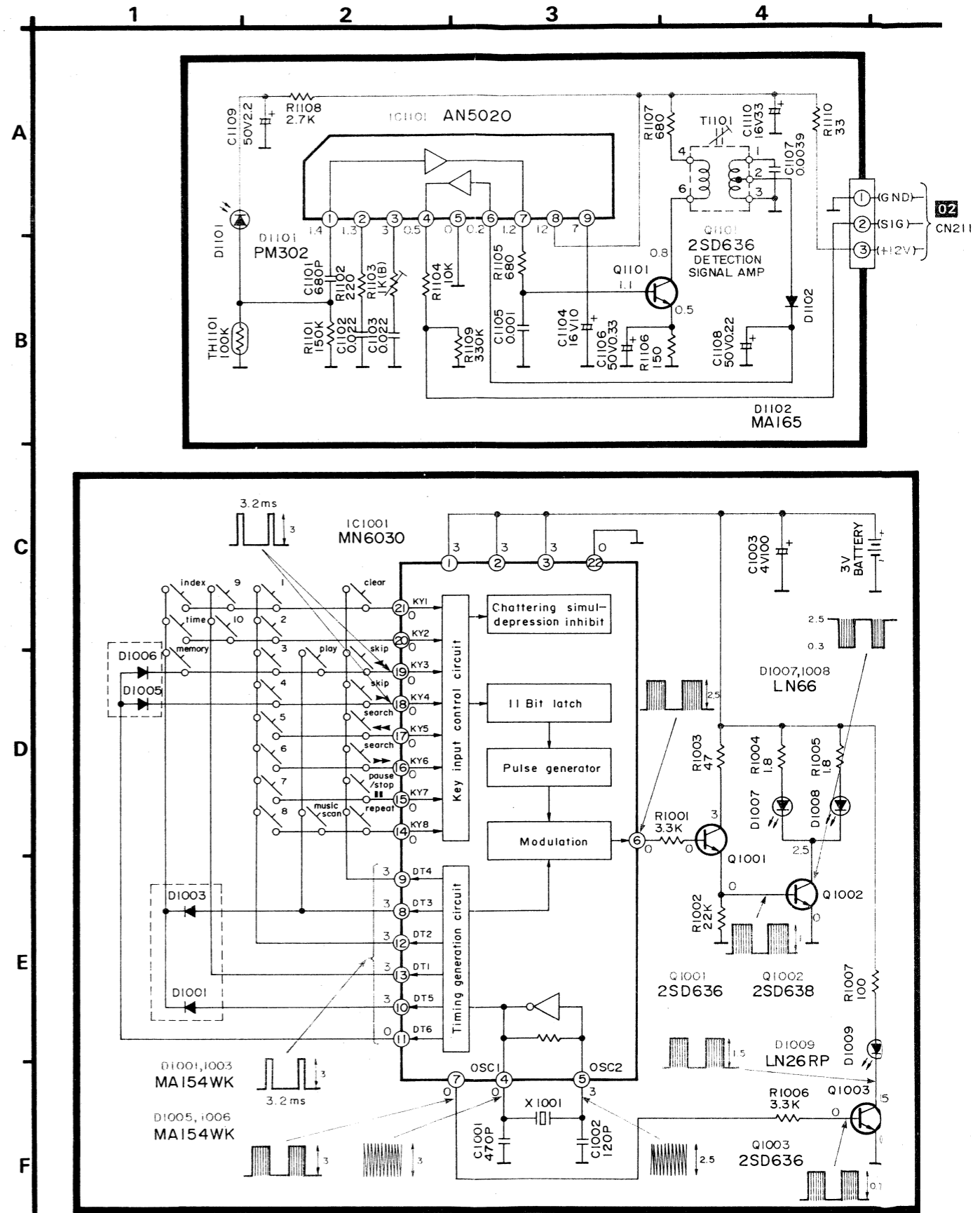
● Remote control transmitter data code (MN6030).



Button	Data code
1	0 0 0 0 1 0
2	1 0 0 0 1 0
3	0 1 0 0 1 0
4	1 1 0 0 1 0
5	0 0 1 0 1 0
6	1 0 1 0 1 0
7	0 1 1 0 1 0
8	1 1 1 0 1 0
9	0 0 0 1 1 0
0	1 0 0 1 1 0
index	0 0 0 1 0 1

Button	Data code
time	1 0 0 1 0 1
clear	0 0 0 0 0 0
memory	0 1 0 1 0 1
music scan	1 1 1 1 0 0
◀ search	0 0 1 0 0 0
search ▶	1 0 1 0 0 0
◀ skip	0 1 0 0 0 0
skip ▶	1 1 0 0 0 0
pause/stop	0 1 1 0 0 0
▶ play	0 1 0 1 0 0

■ SCHEMATIC DIAGRAM (A) (Remote control circuit)

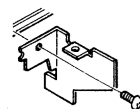


- Note:**
1. The voltage value is the standards of this unit measured by DC electronic voltmeter (high impedance).
 2. The waveform are those generated during signal transmission. ("play" button depressed for signal transmission.)
 3. This schematic diagram may be modified at any time with the development of new technology.
 4. —: +B voltage line.

er and turn over

Fig. 27.

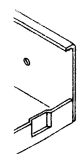
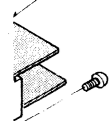
Fig. 27.



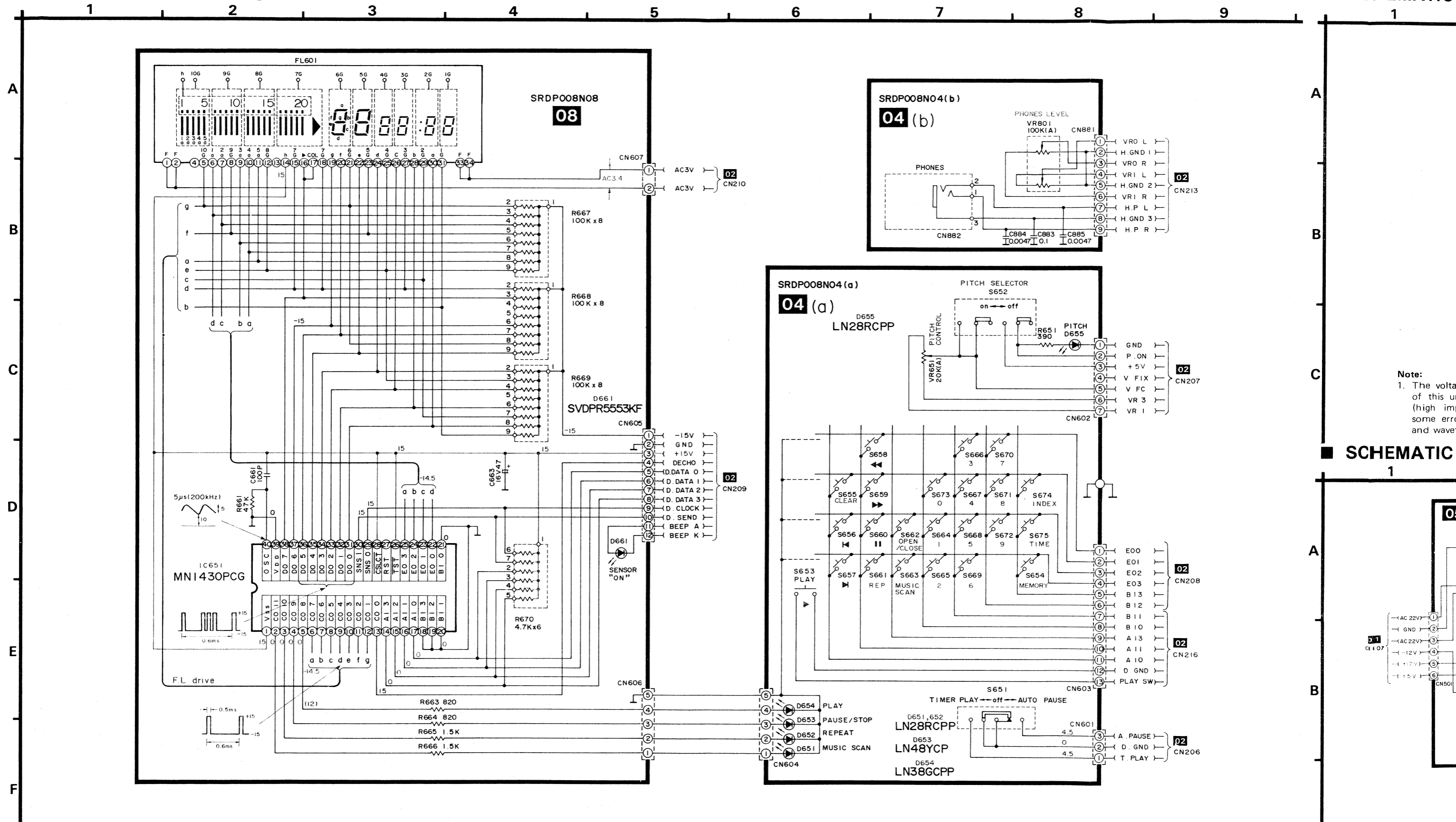
rol

or drive P.C.B.

ervo P.C.B.

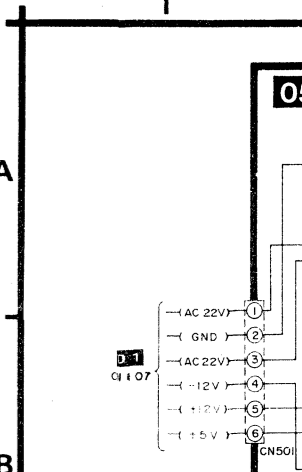


SCHEMATIC DIAGRAM (B) (Display, keyboard and Headphones circuit)

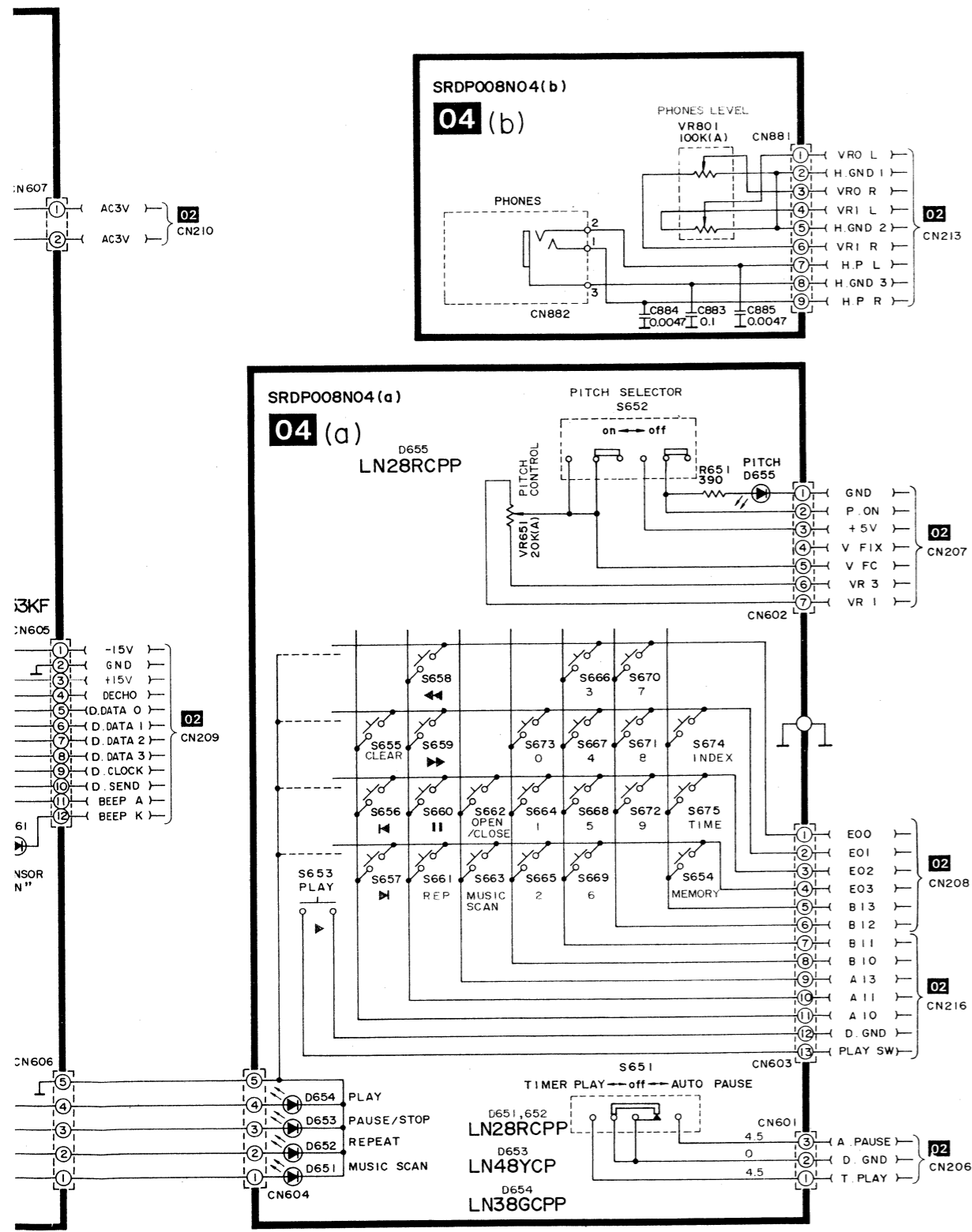


Note:
1. The voltage of this unit (high impedance) and waveform (some error and waveform)

SCHEMATIC 1

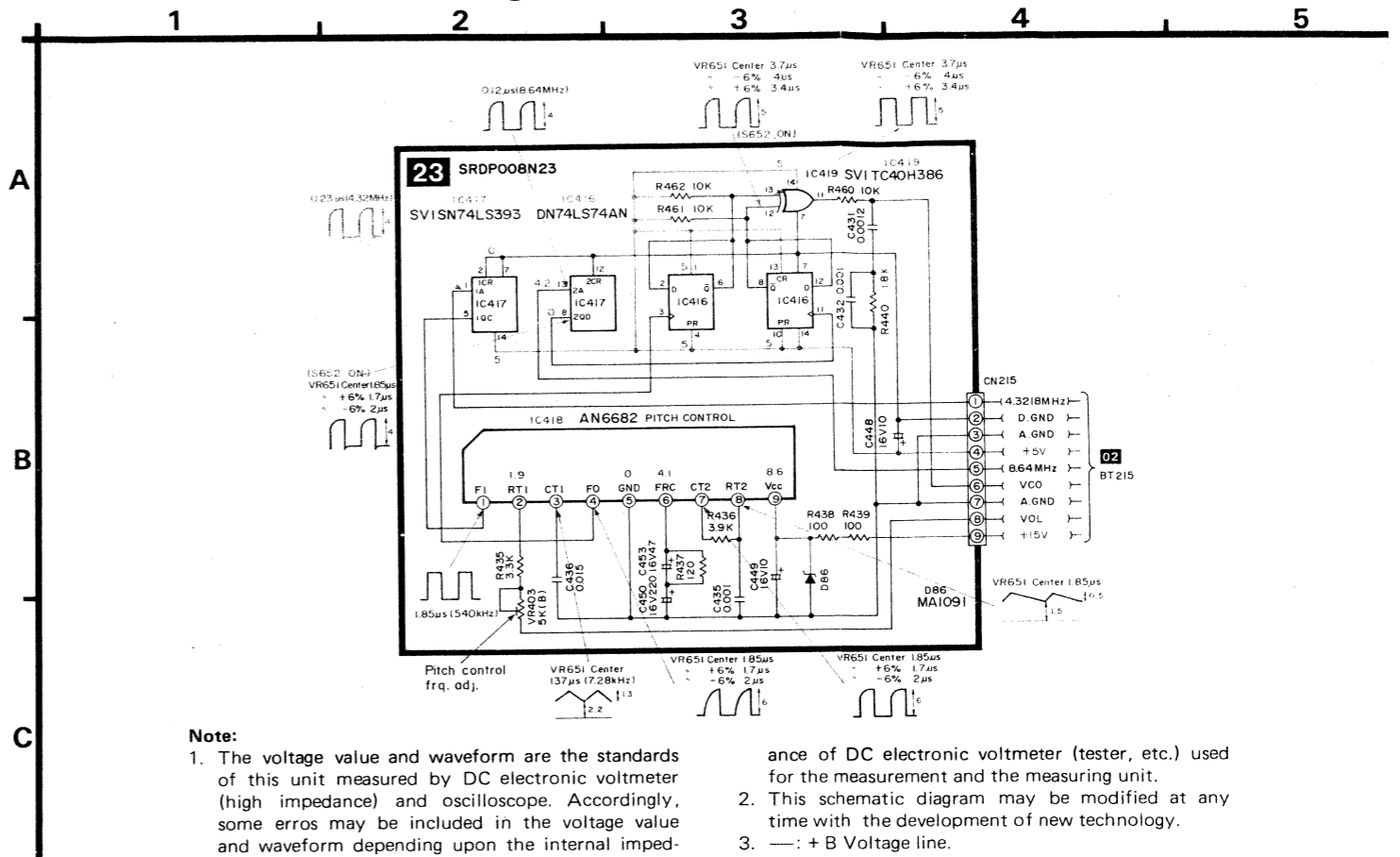


Note:
1. The voltage of this unit (high impedance) and waveform (some error and waveform) etc.) used for the measurement and the measuring unit.
2. The waveform is that obtained without disc in the disc holder.
3. This schematic diagram may be modified at any time with the development of new technology.
4. —: +B Voltage line.



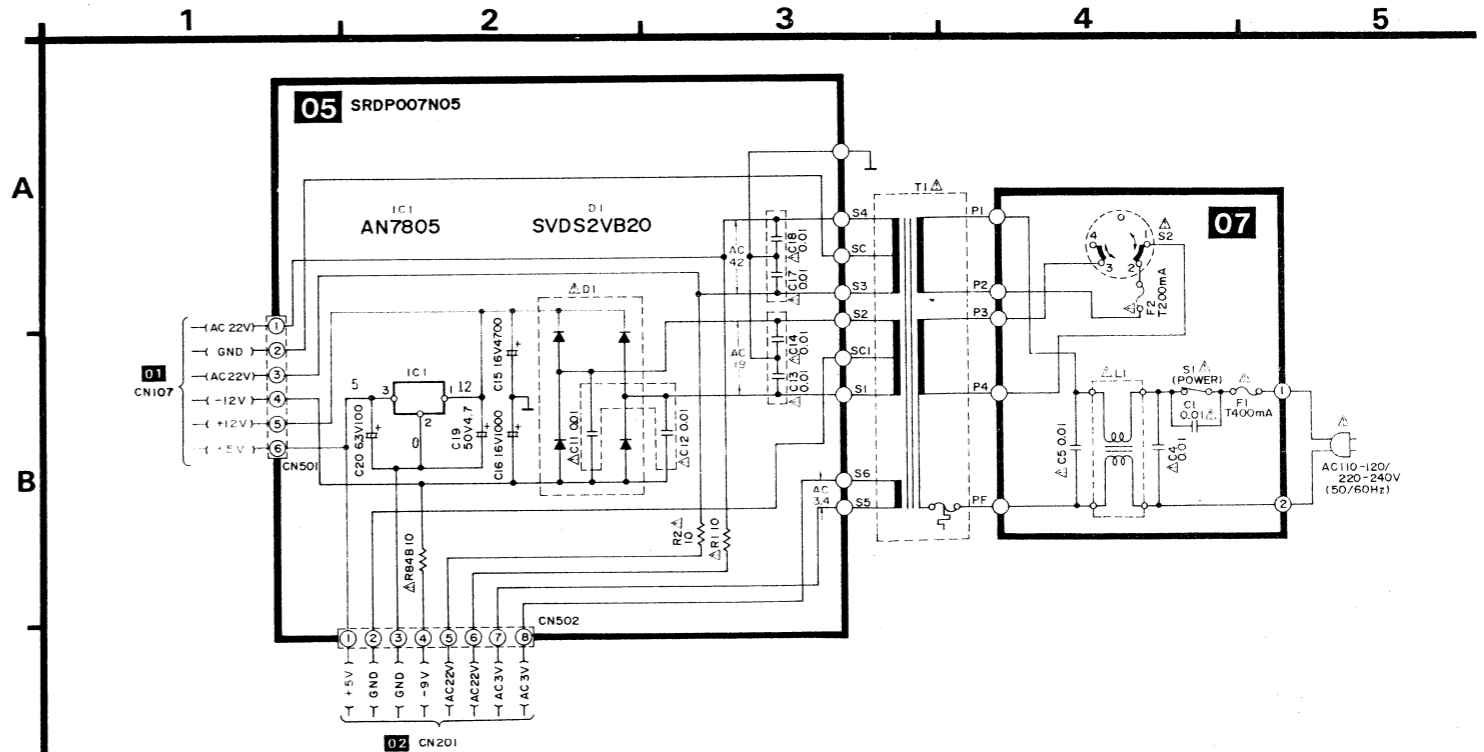
Note:
 1. The voltage value and waveform are the standards of this unit measured by DC electronic voltmeter (high impedance) and oscilloscope. Accordingly, some errors may be included in the voltage value and waveform depending upon the internal impedance of DC electronic voltmeter (tester, etc.) used for the measurement and the measuring unit.
 2. The waveform is that obtained without disc in the disc holder.
 3. This schematic diagram may be modified at any time with the development of new technology.
 4. —: +B Voltage line.

■ SCHEMATIC DIAGRAM © (Pitch control circuit)



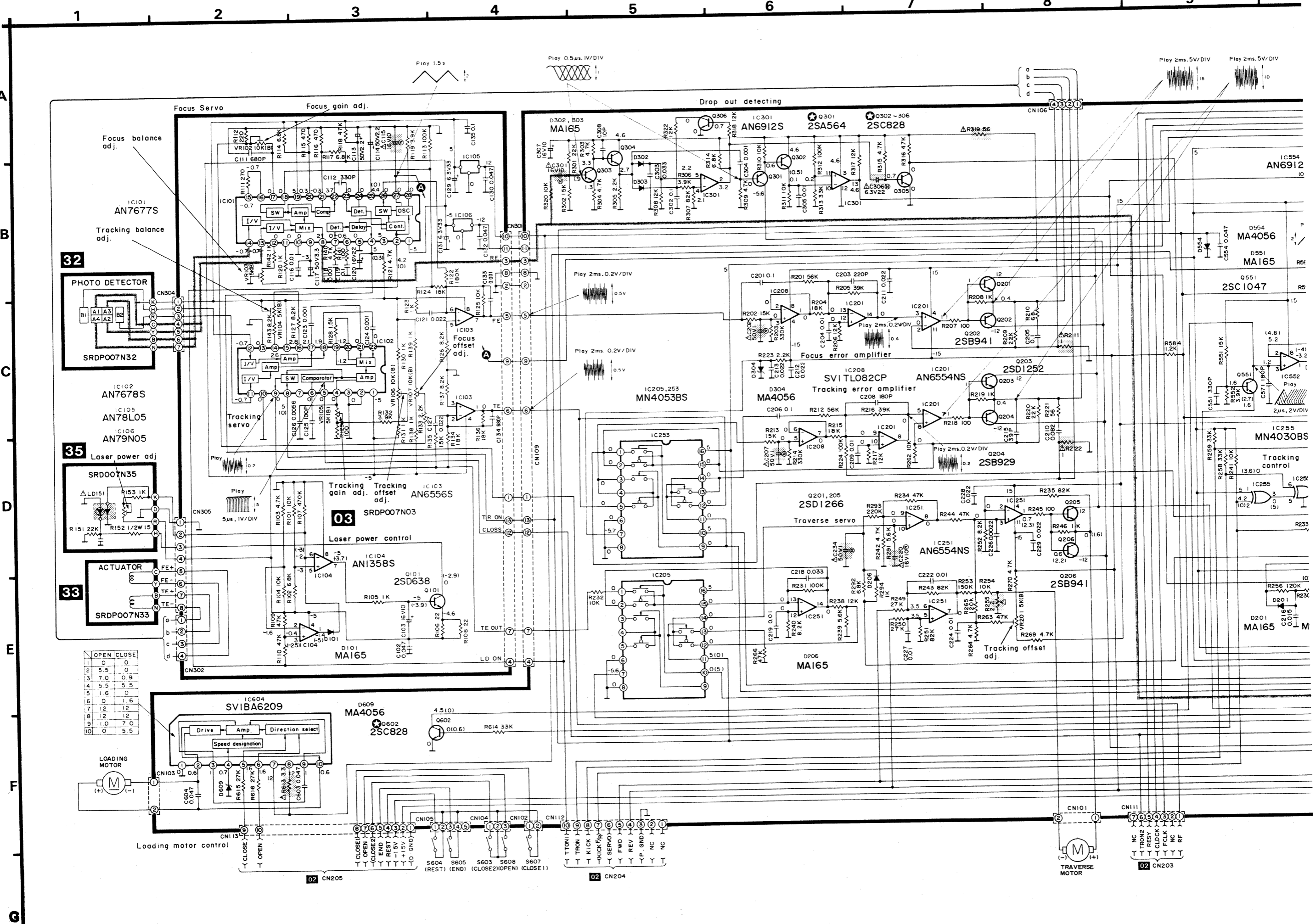
Note:
 1. The voltage value and waveform are the standards of this unit measured by DC electronic voltmeter (high impedance) and oscilloscope. Accordingly, some errors may be included in the voltage value and waveform depending upon the internal impedance of DC electronic voltmeter (tester, etc.) used for the measurement and the measuring unit.
 2. This schematic diagram may be modified at any time with the development of new technology.
 3. —: +B Voltage line.

■ SCHEMATIC DIAGRAM ① (Power supply circuit)

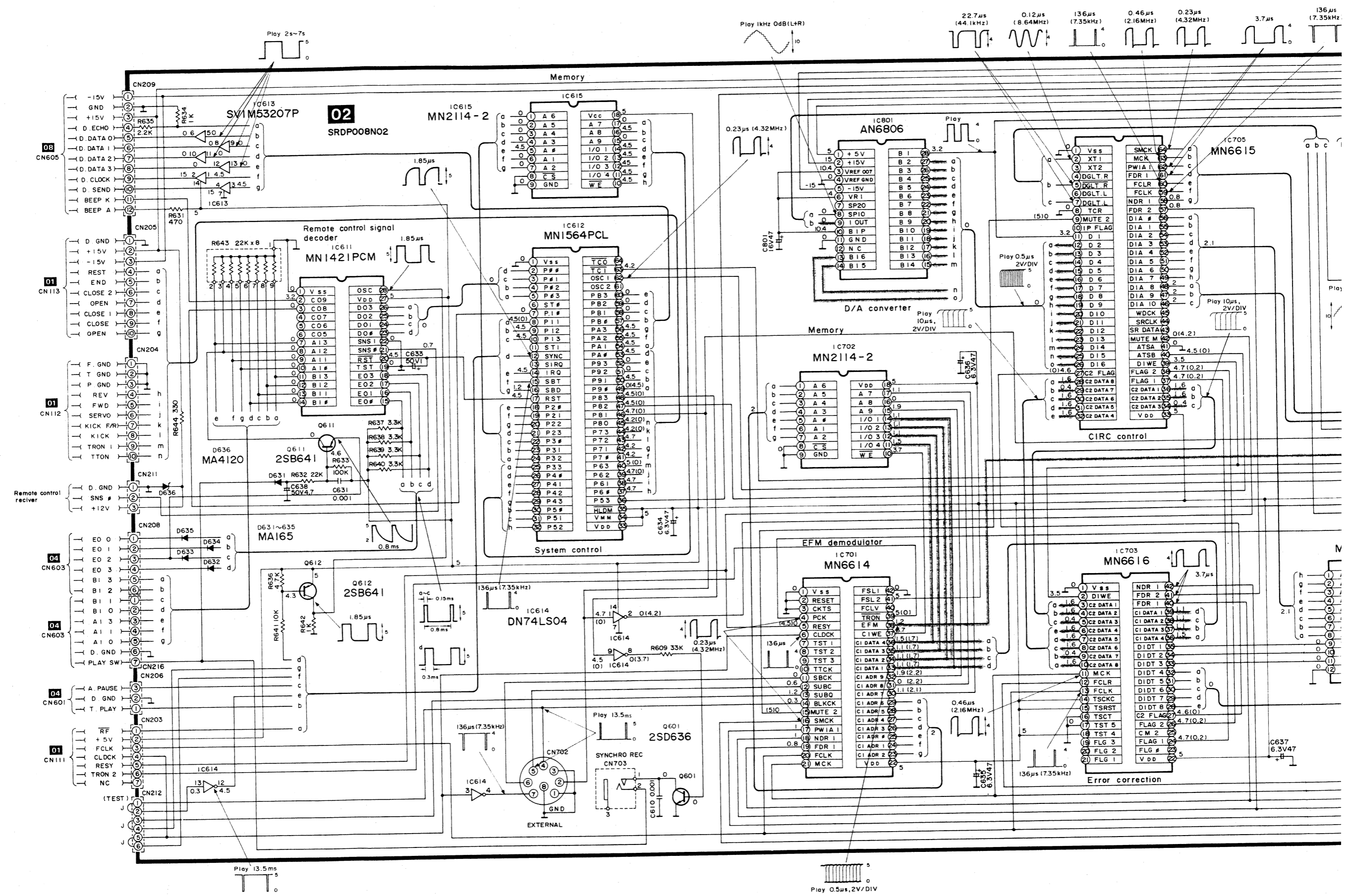


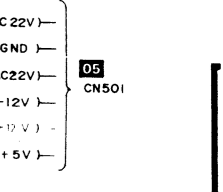
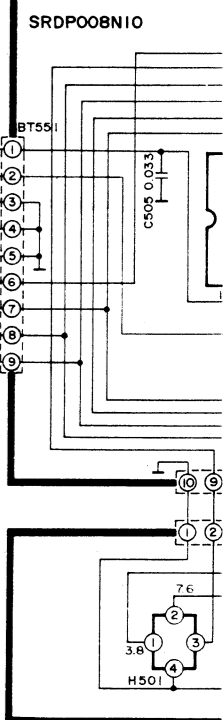
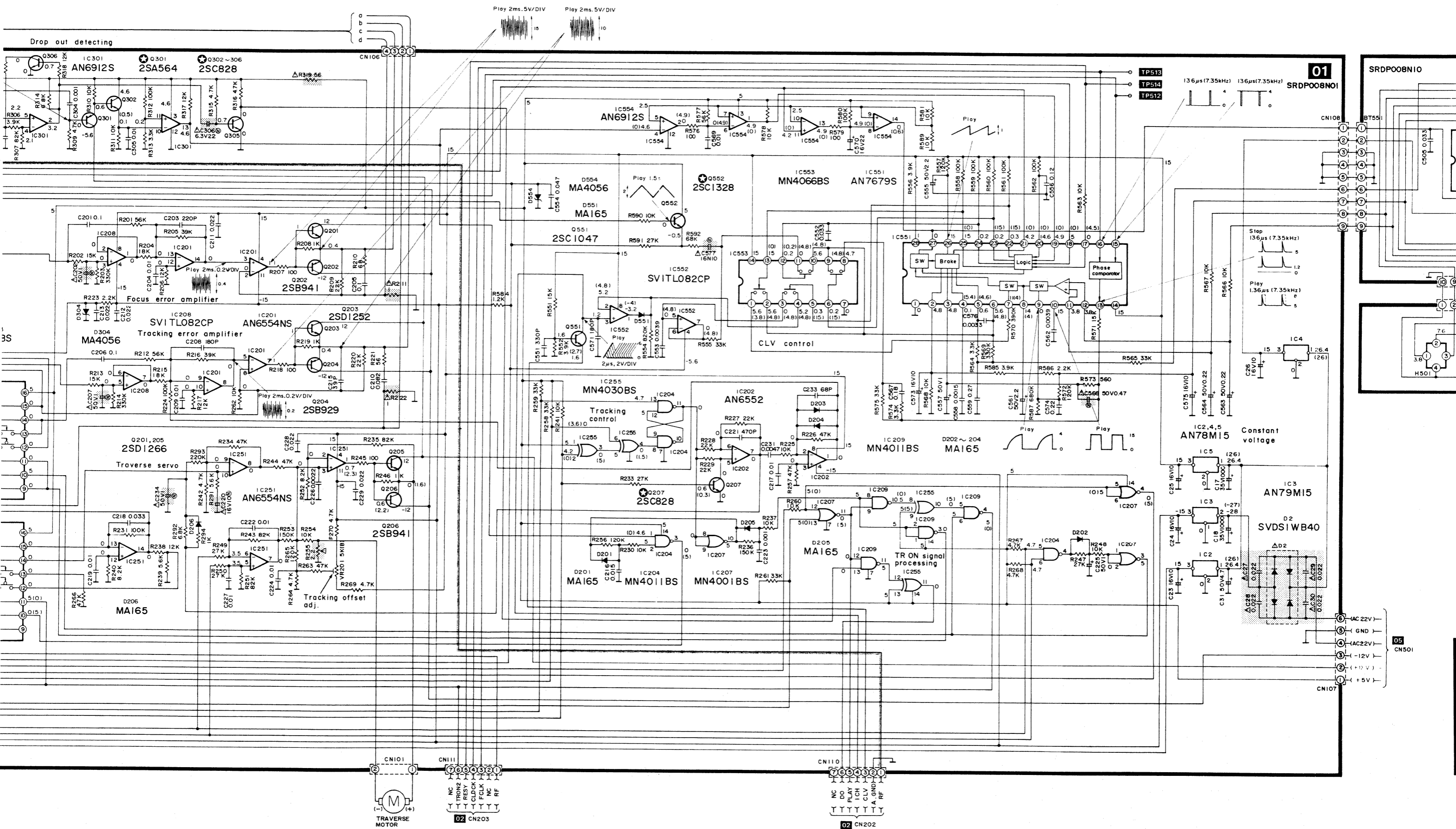
Note:
 1. The voltage value and waveform are the standards of this unit measured by DC electronic voltmeter (high impedance) and oscilloscope. Accordingly, some errors may be included in the voltage value and waveform depending upon the internal impedance of DC electronic voltmeter (tester, etc.) used for the measurement and the measuring unit.
 2. This schematic diagram may be modified at any time with the development of new technology.
 3. Important safety notice: Components identifier by Δ make have special characteristics important for safety.
 4. —: +B Voltage line.

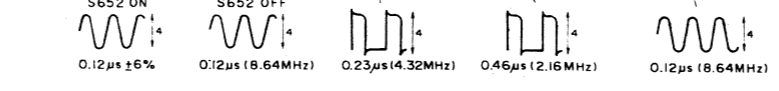
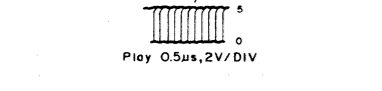
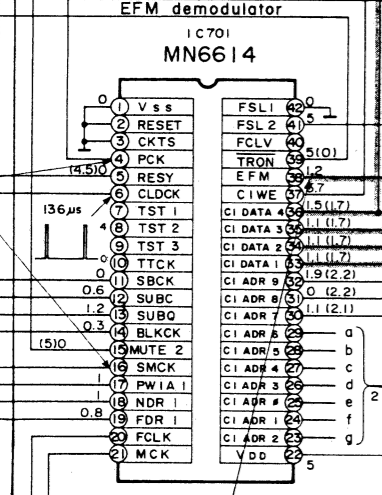
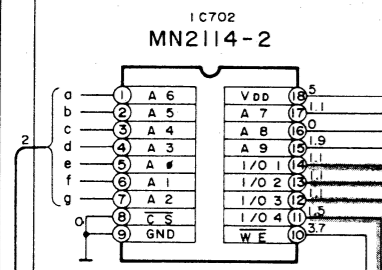
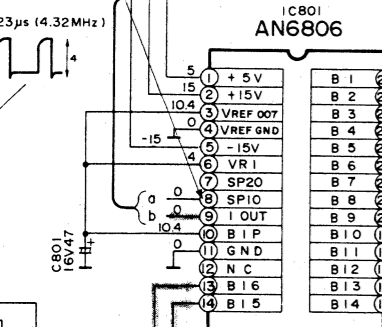
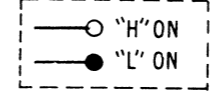
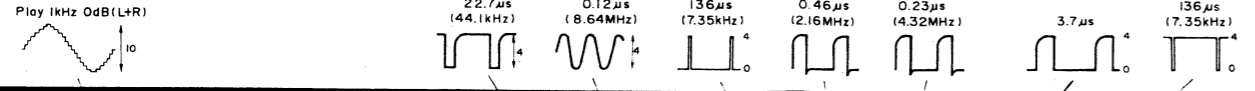
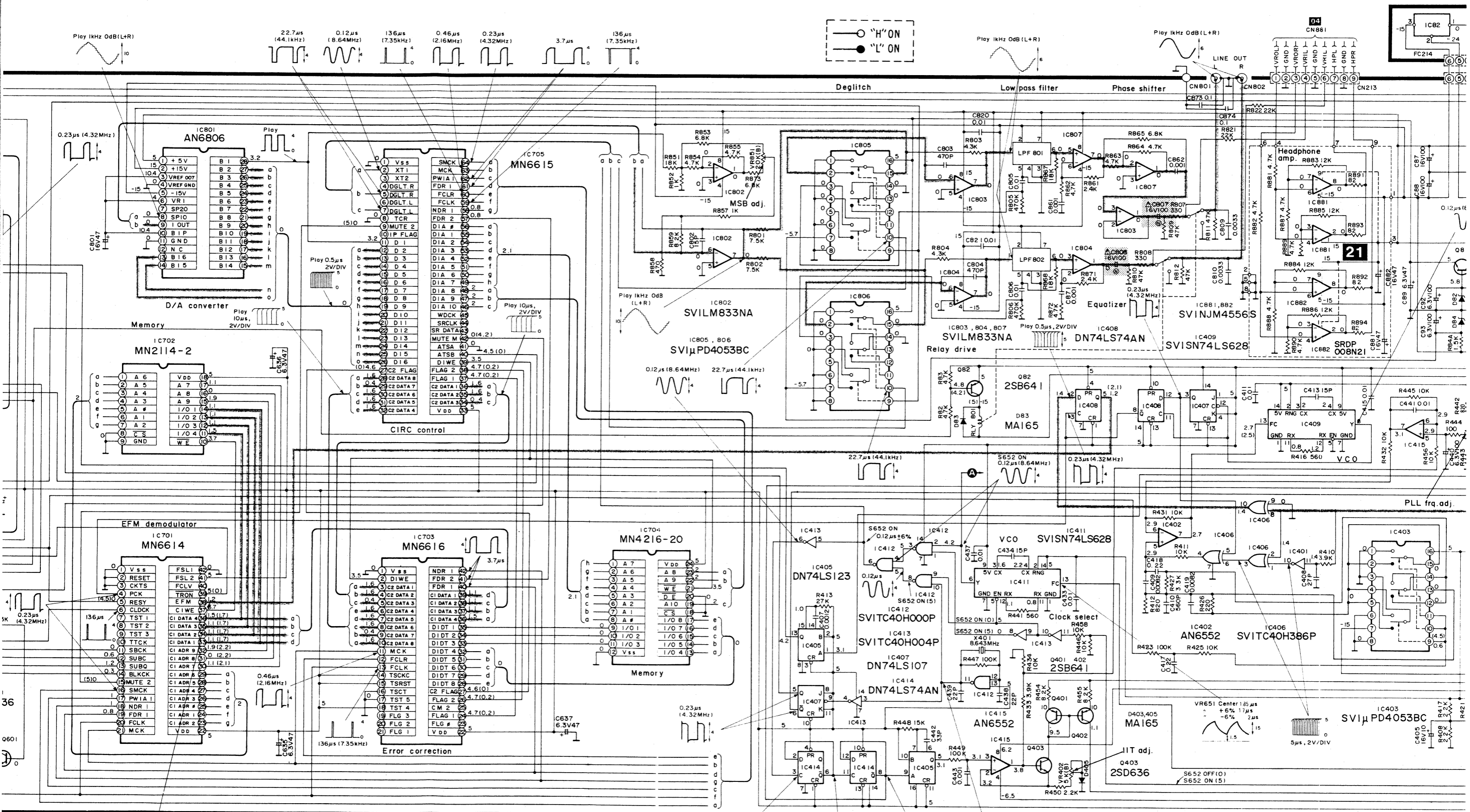
■ SCHEMATIC DIAGRAM (E) (This schematic diagram may be modified at any time the development of new technology.)

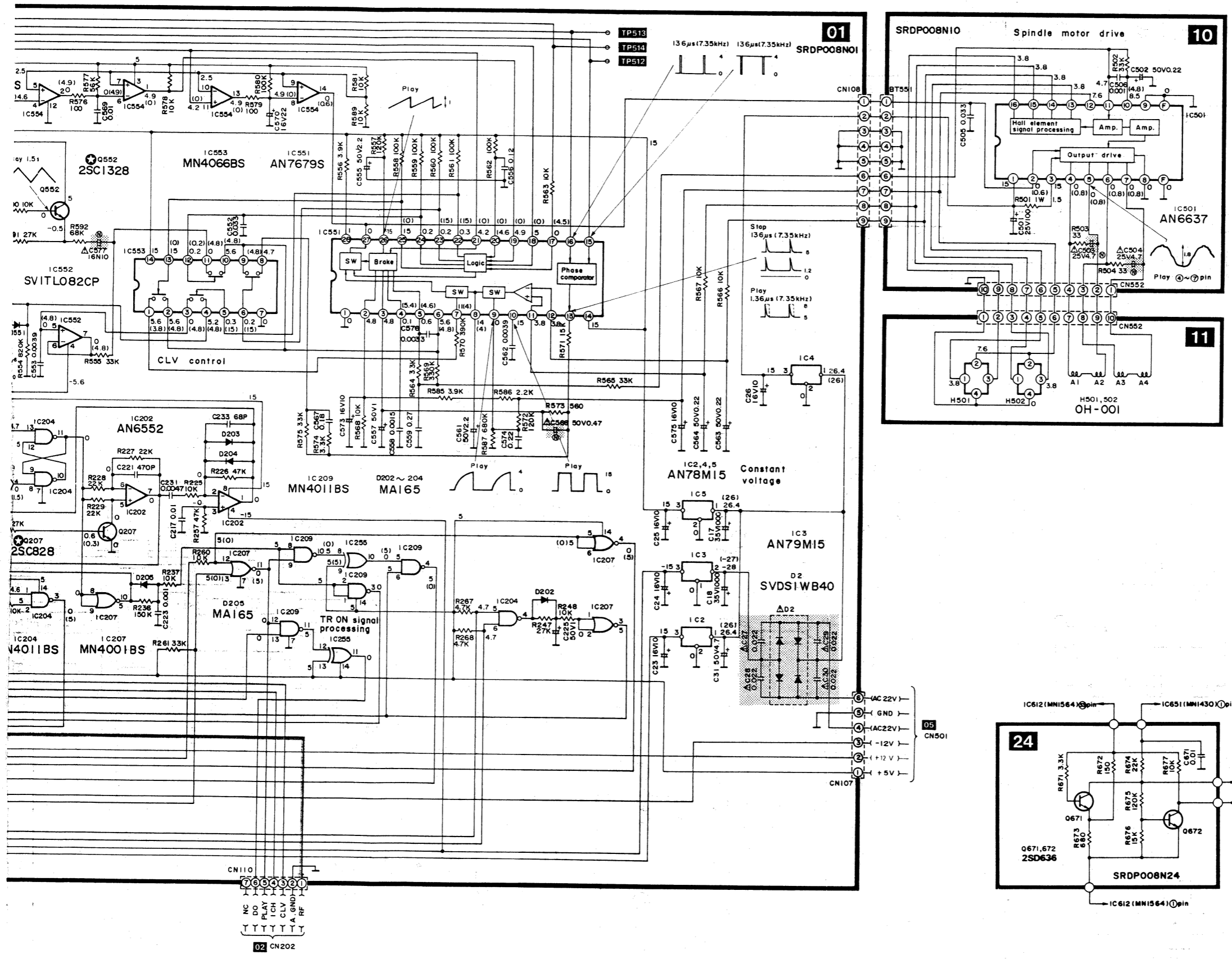


	OPEN	CLOSE
1	0	0
2	5.5	0
3	7.0	0.9
4	5.5	5.5
5	1.6	0
6	0	1.6
7	1.2	1.2
8	1.2	1.2
9	1.0	7.0
10	0	5.5

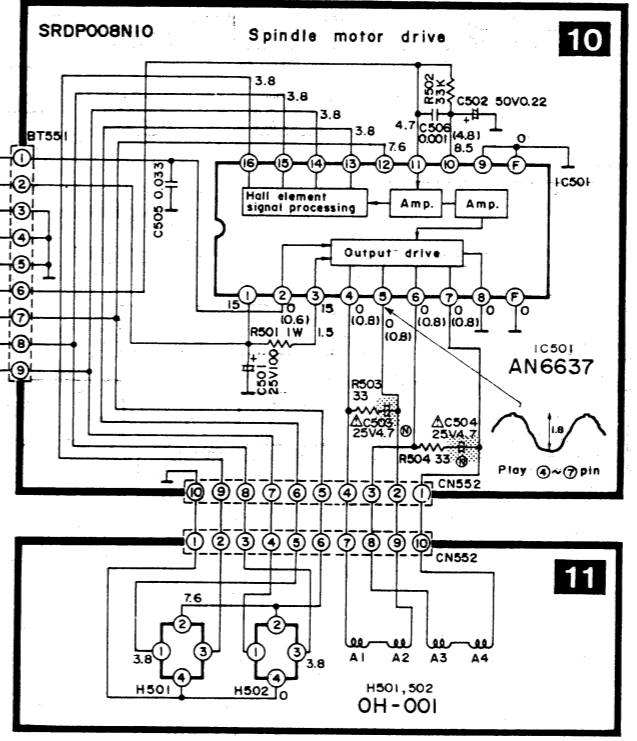






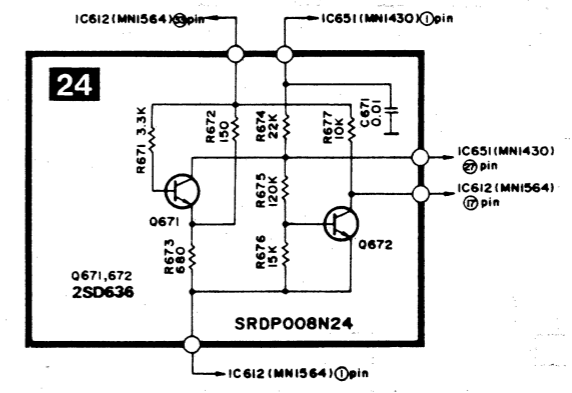


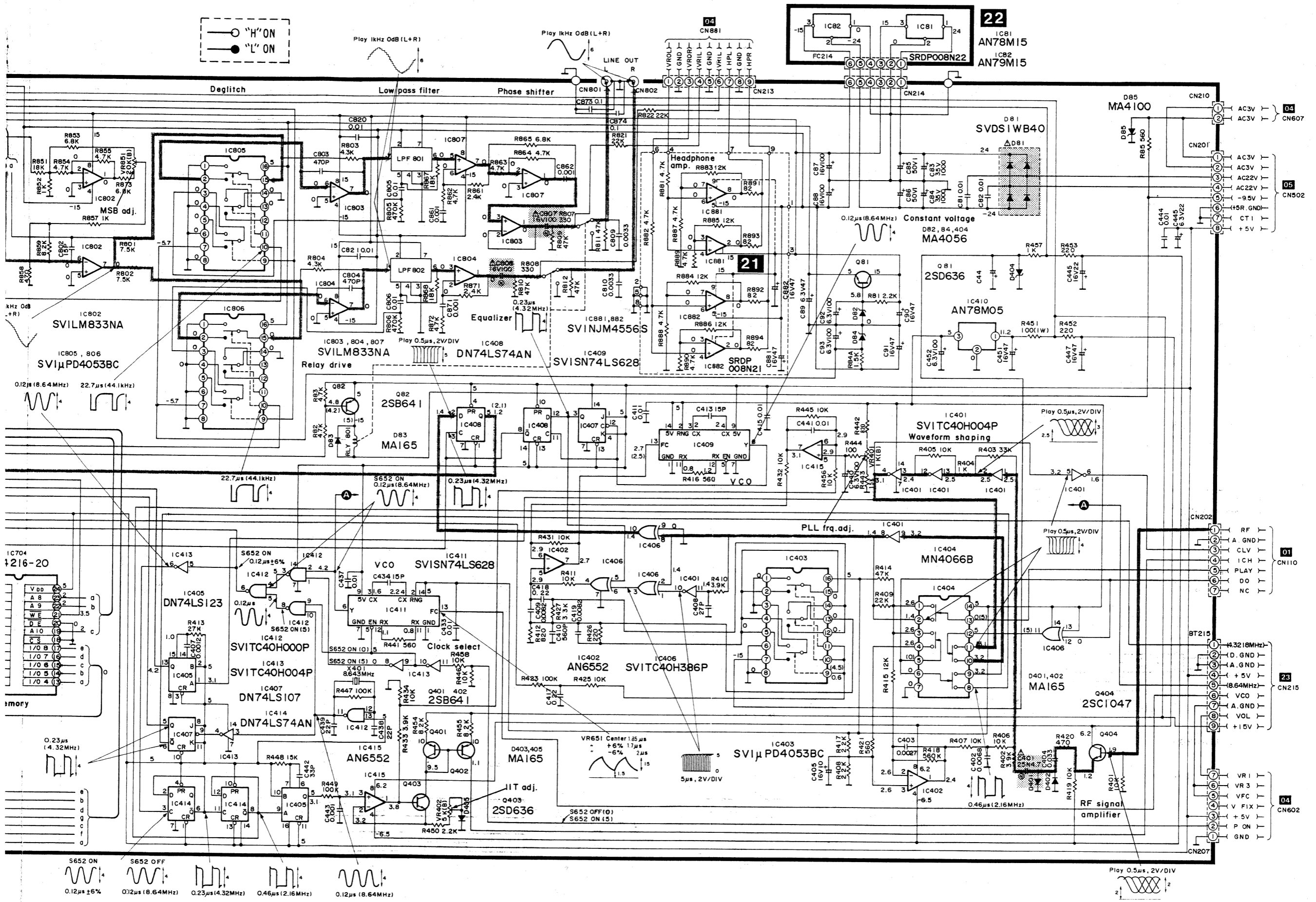
- Notes:**
- S1** : Power switch.
 - S2** : Voltage selector switch.
 - S603** : Disc holder close detection switch.
 - S604** : Rest switch. (Disc innermost position detection)
 - S605** : End switch. (Disc outside detection)
 - S607** : Disc holder close detection switch.
 - S608** : Disc holder open detection switch.
 - S651** : Auto-pause/timer switch.
 - S652** : Pitch on/off switch.
 - S653** : Play switch.
 - S654** : Memory switch.
 - S655** : Program clear switch.
 - S656** : Backward skip switch.
 - S657** : Forward skip switch.
 - S658** : Backward search switch.
 - S659** : Forward search switch.
 - S660** : Pause/stop switch.
 - S661** : Repeat switch.
 - S662** : Disc holder open/close switch.
 - S663** : Music scan switch.
 - S664 ~ S673** : Nemic switch.
 - S674** : Index switch.
 - S675** : Time 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 the 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. Others are the voltage values in stop mode.
 - Part No. with Δ mark are not identical between regular part No. and repair part No. supplied. So, when placing an order for repair parts, use the part No. in the replacement part list of repair parts.
 - : +B voltage lines. --- : Audio signal lines.
 - : -B voltage lines.
 - This schematic diagram may be modified at any time with the development of new technology.
 - Important safety notice: Components identifier by Δ make have special characteristics important for safety.



IMPORTANT SAFETY NOTICE

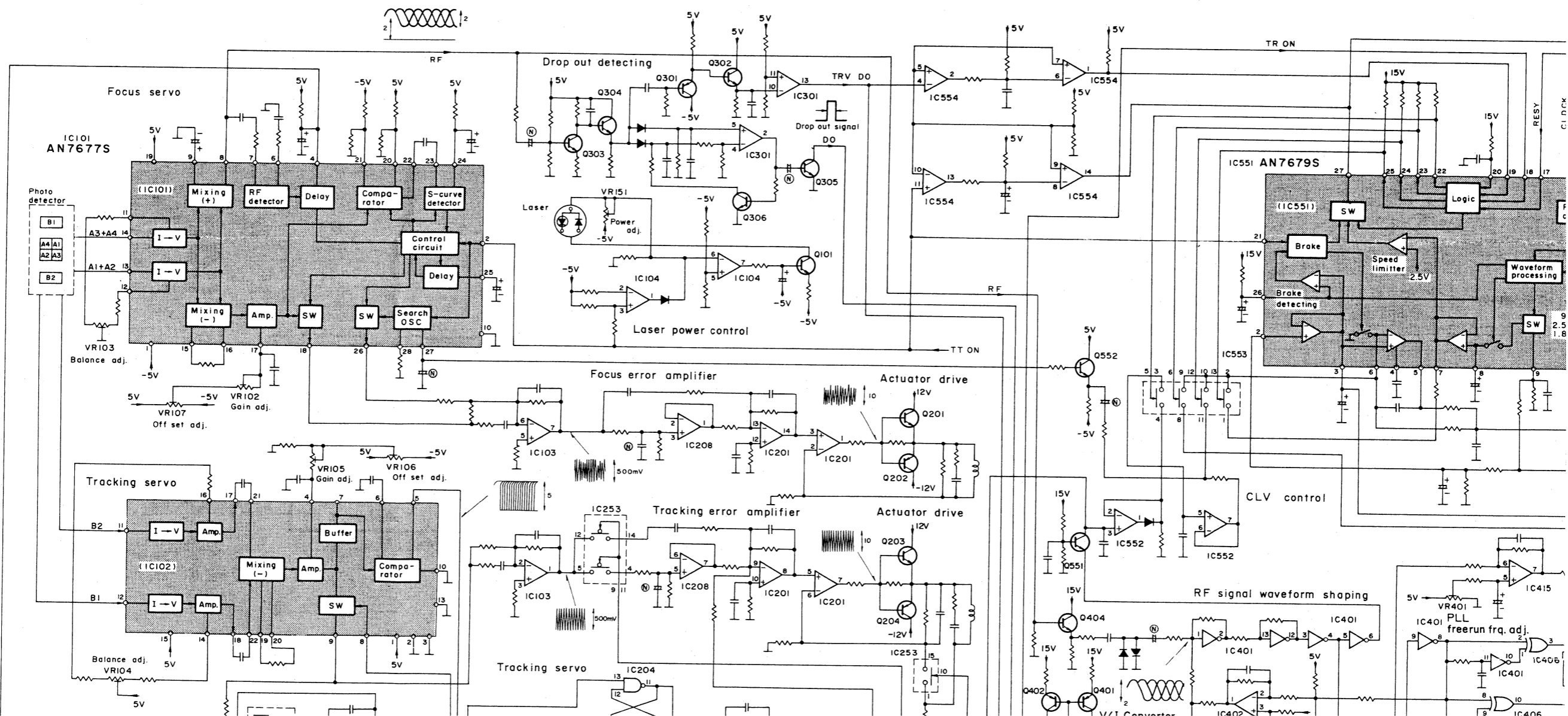
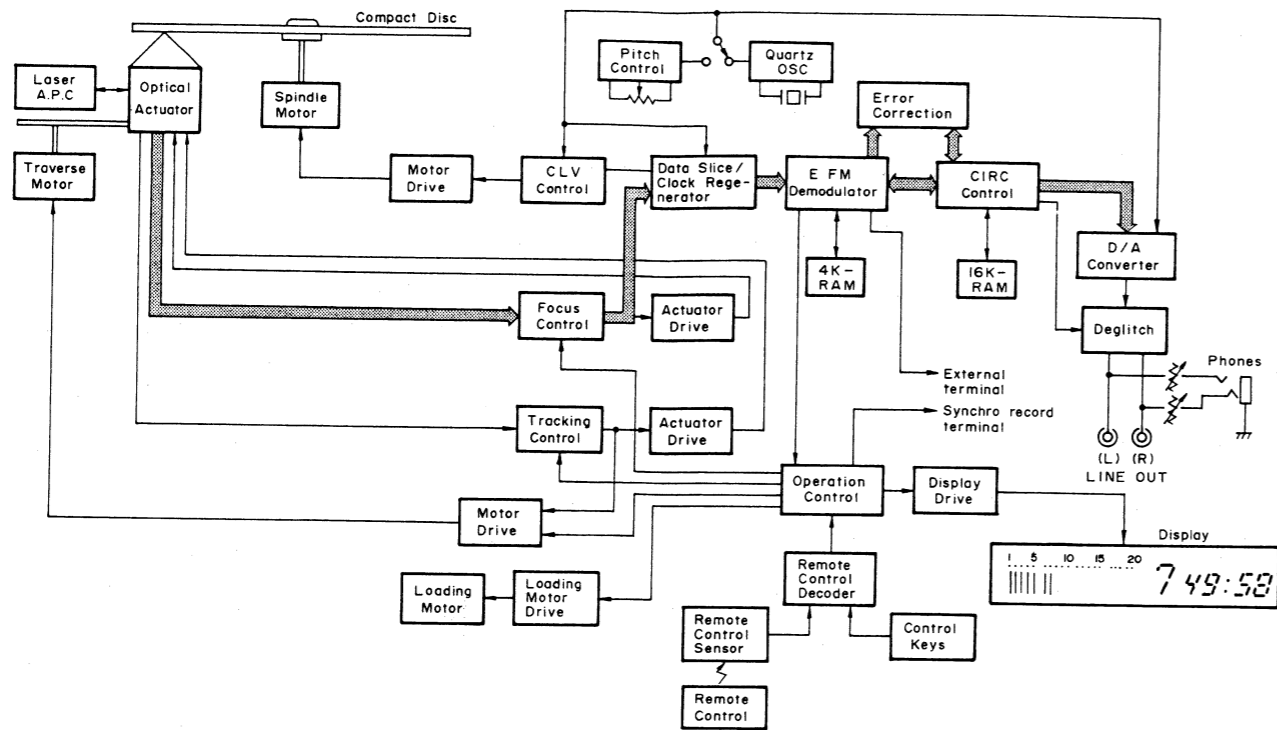
The shaded area on this schematic diagram incorporates special features important for protection from fire and electrical shock hazards. When servicing it is essential that only manufacturer's specified parts be used for the critical components in the shaded areas of the schematic.

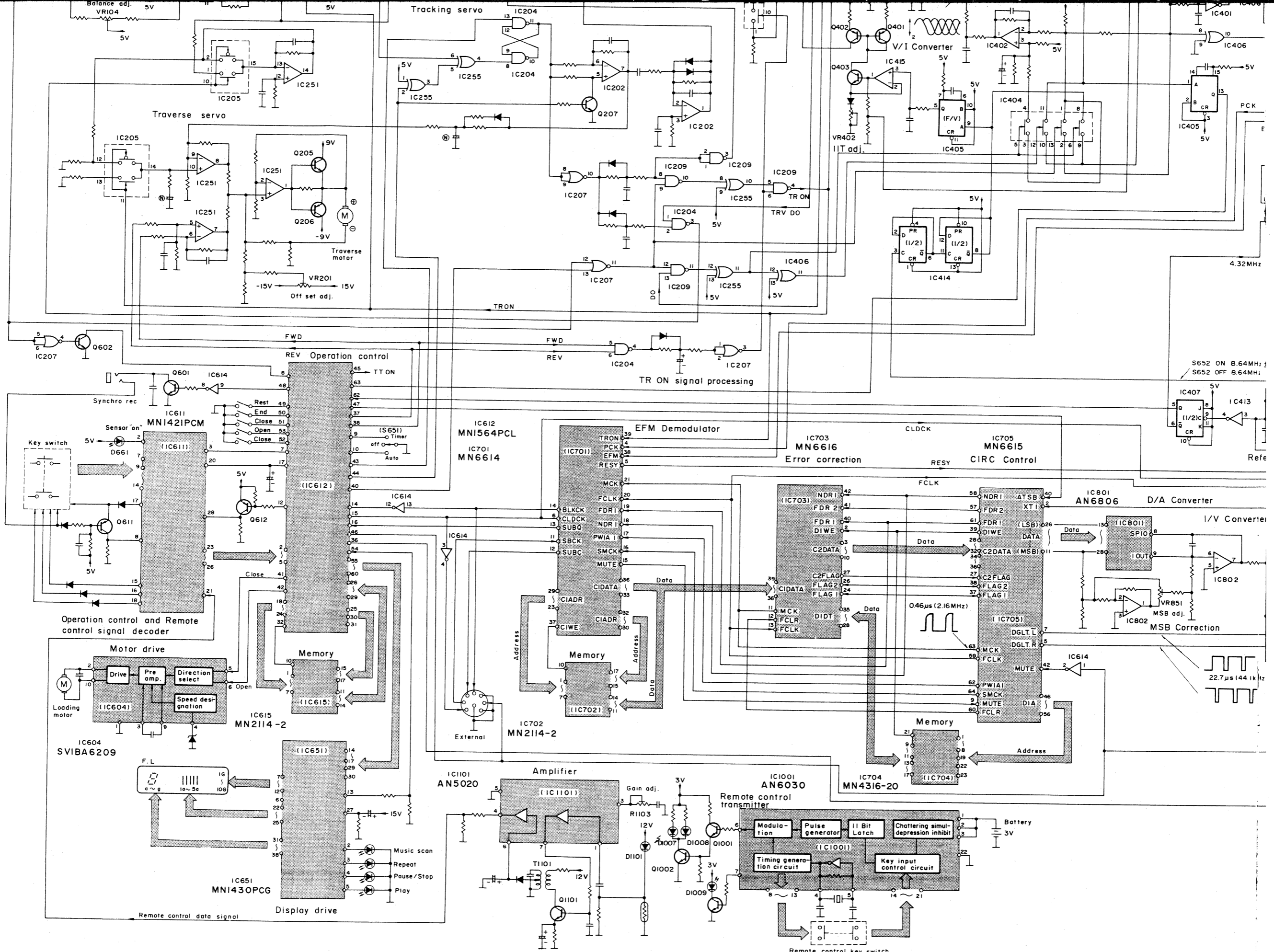


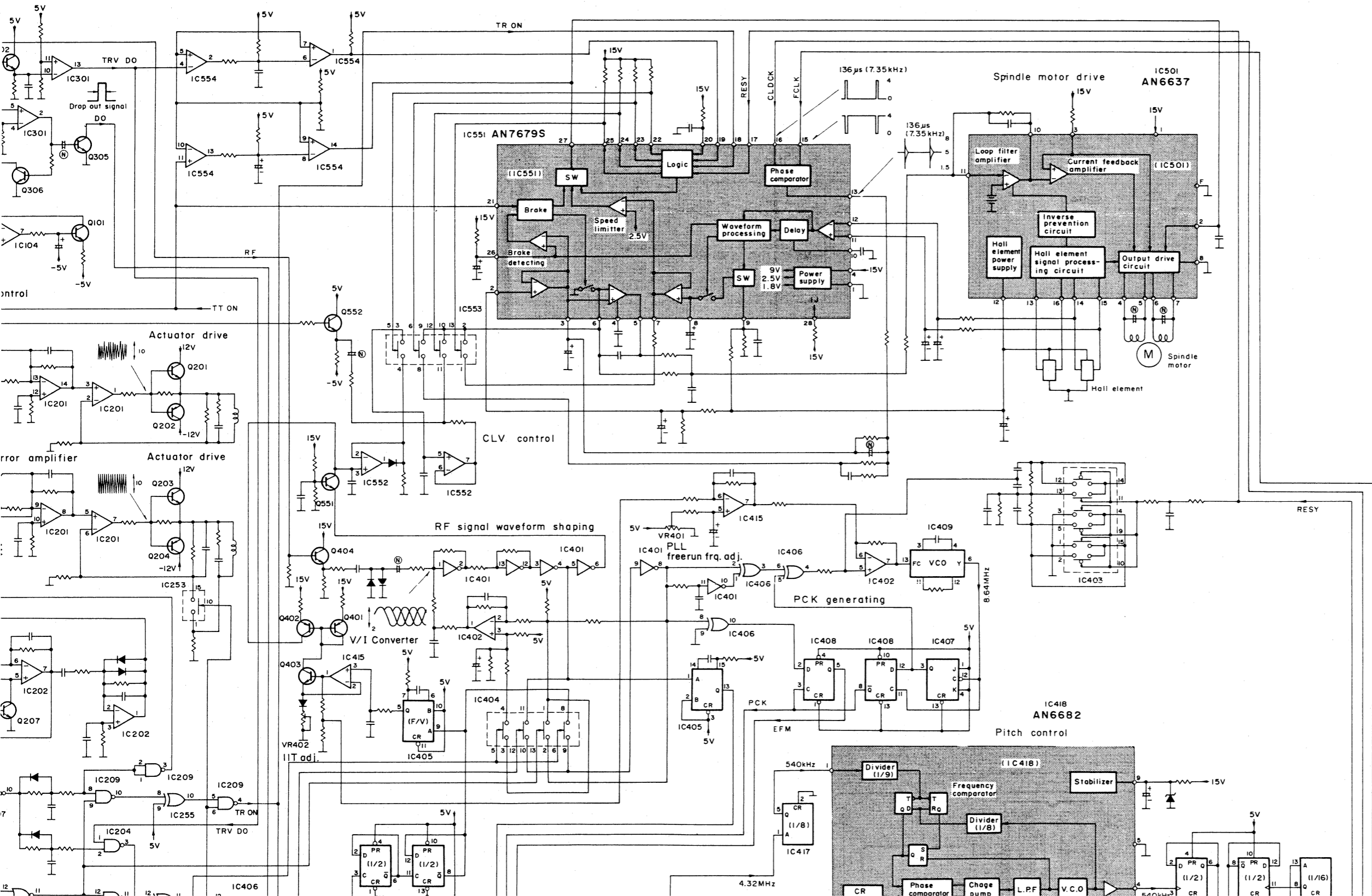


○ "H" ON
● "L" ON

■ BLOCK DIAGRAM



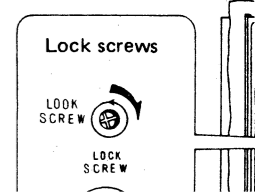


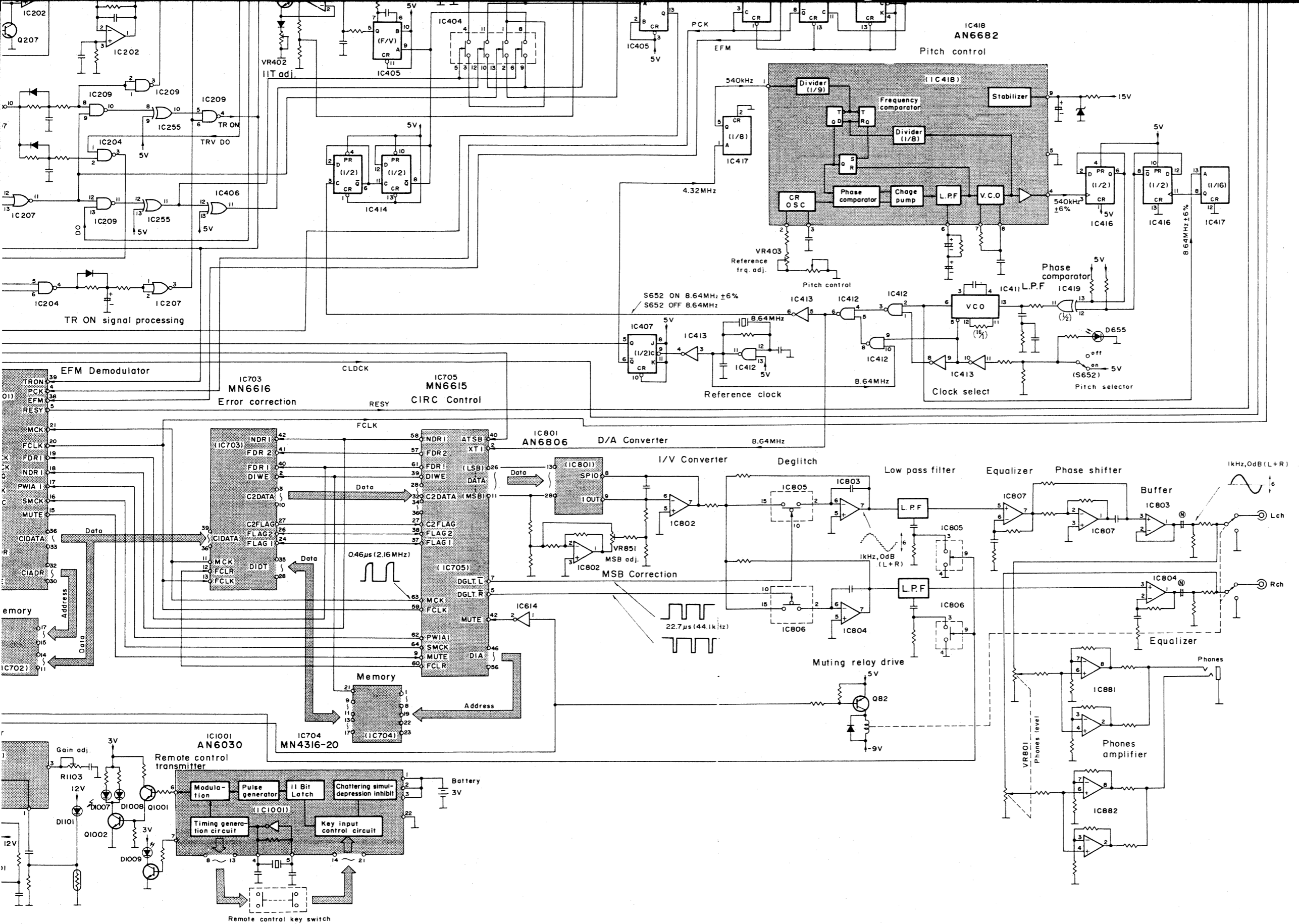


SL-P8

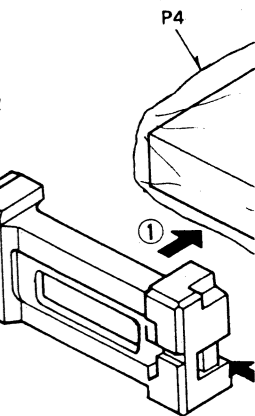
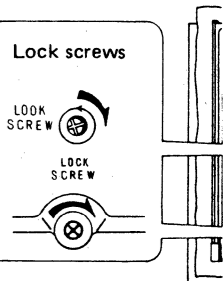
PACKING

1. Put a soft cloth under it from scratches.
2. Turn the lock shaft
3. Turn the lock screw clockwise.

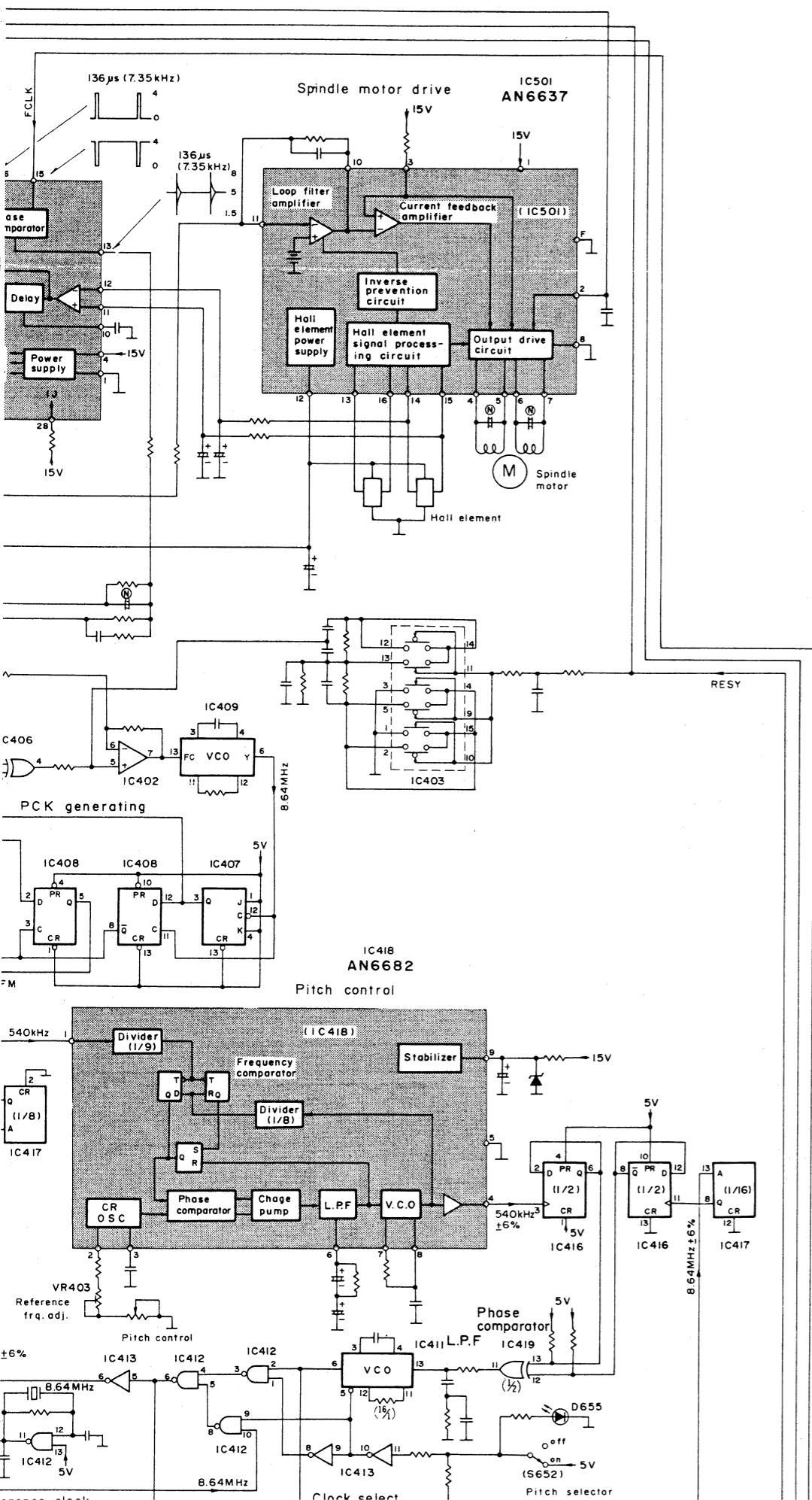




1. Put a soft cloth under the unit from scratches.
2. Turn the lock shaft clockwise.
3. Turn the lock screw clockwise.



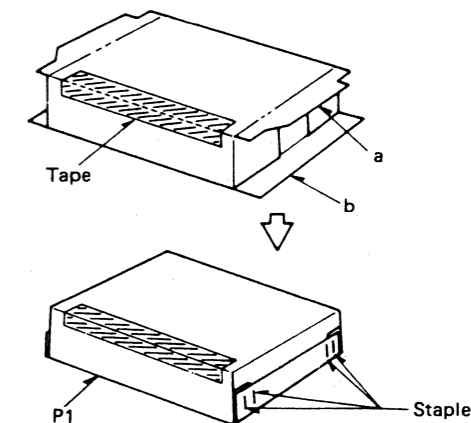
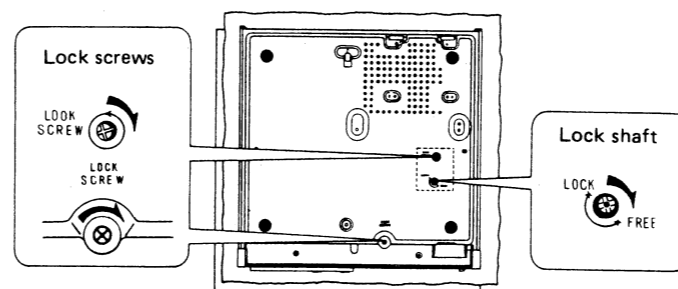
4. Place the unit (with the casing) as illustrated.
5. Fold the flaps across the top.
6. Seal the top with gum tape. * Use gum tape 50mm wide at the top.
7. For the edges, first fold flap "b", then flap "a", and staple only flap "a".



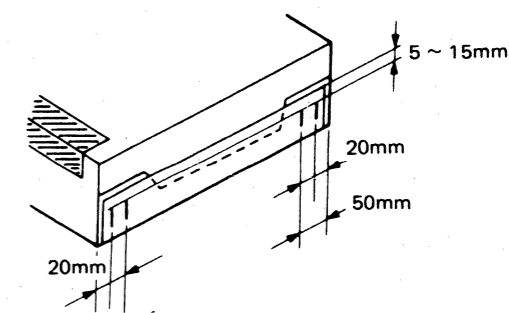
SL-P8

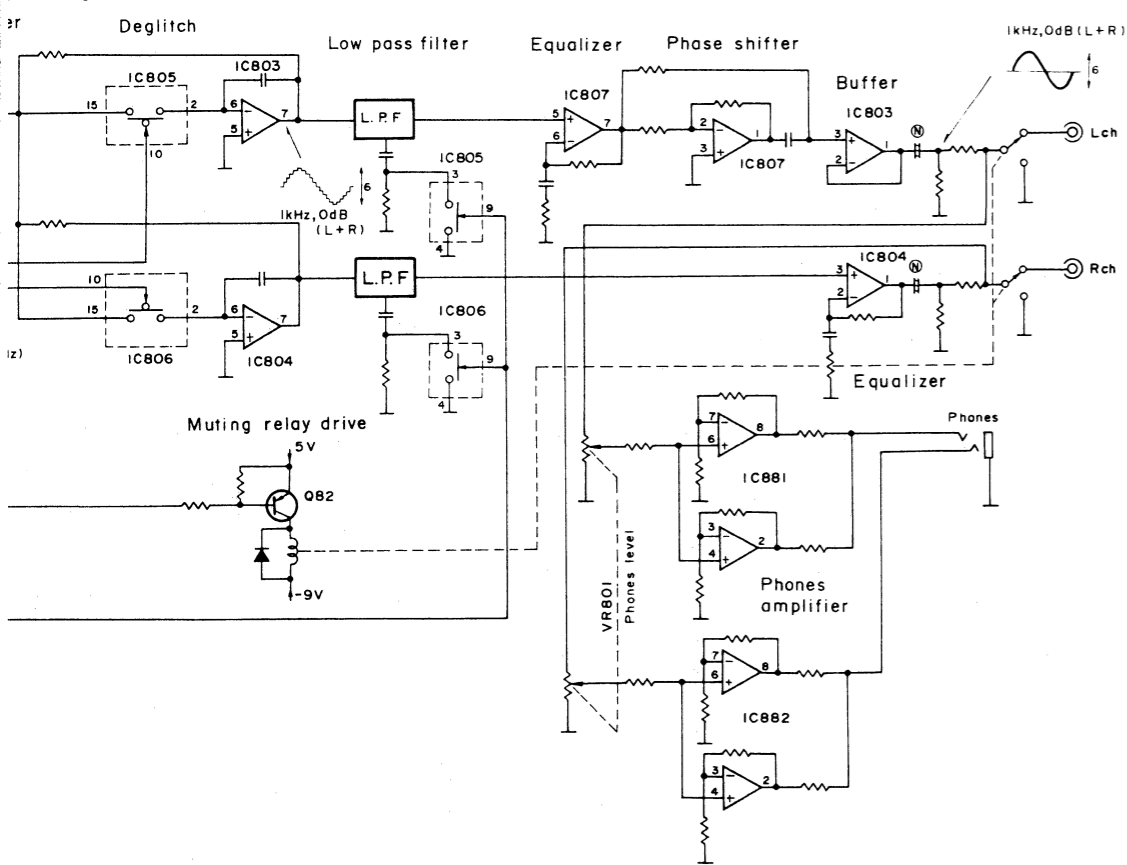
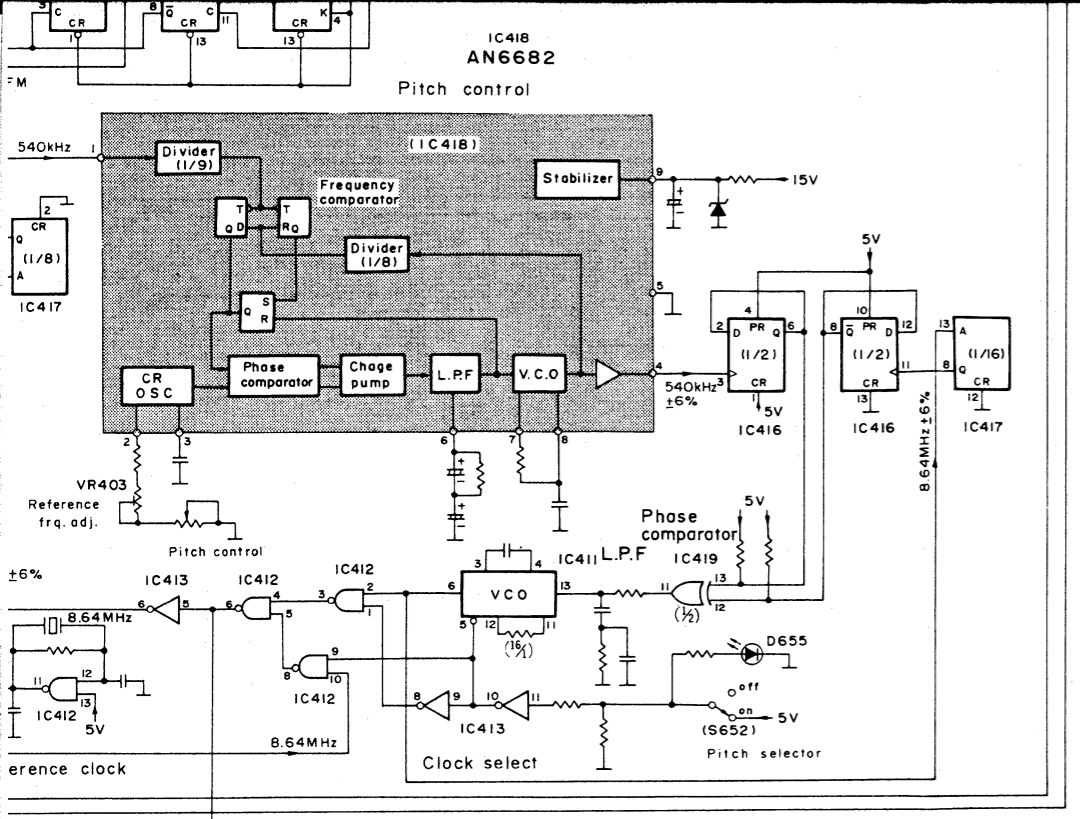
PACKING

1. Put a soft cloth under the unit to protect it from scratches.
2. Turn the lock shaft 180° clockwise.
3. Turn the lock screws (about 5 to 6 times) clockwise.

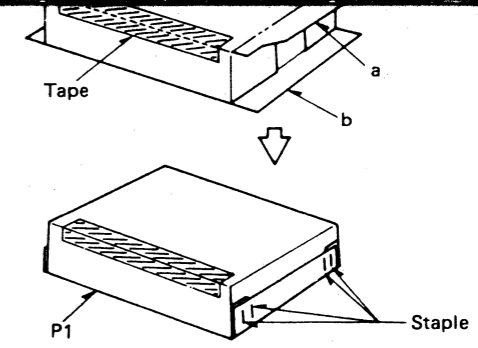
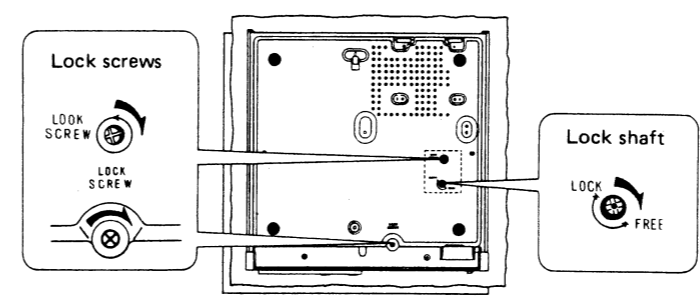


* Stapling positions are shown below.

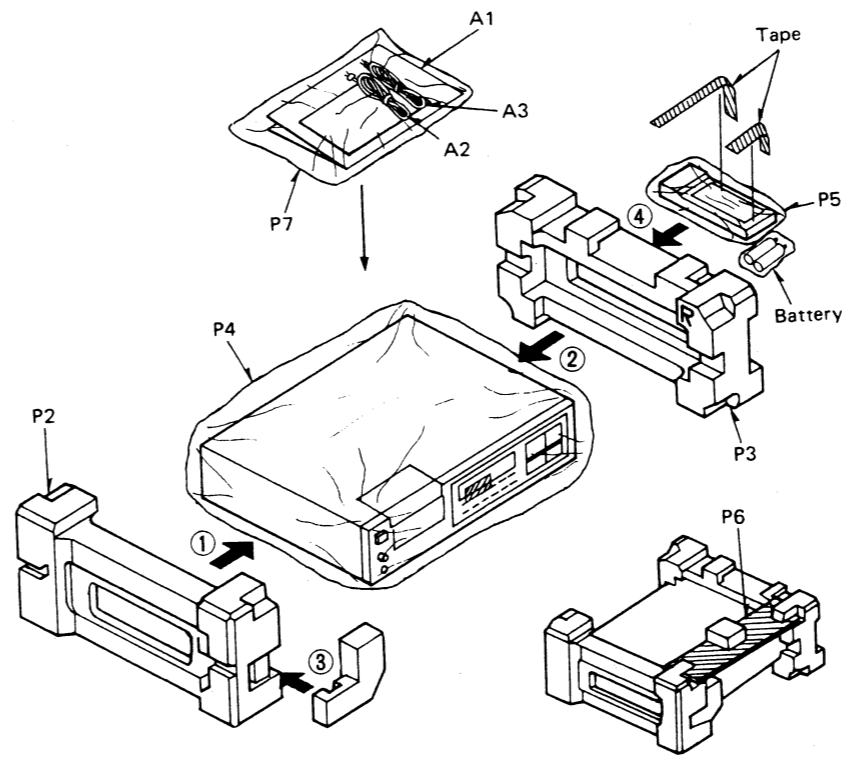
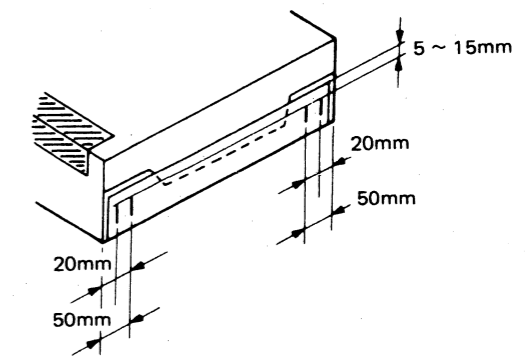




1. Put a soft cloth under the unit to protect it from scratches.
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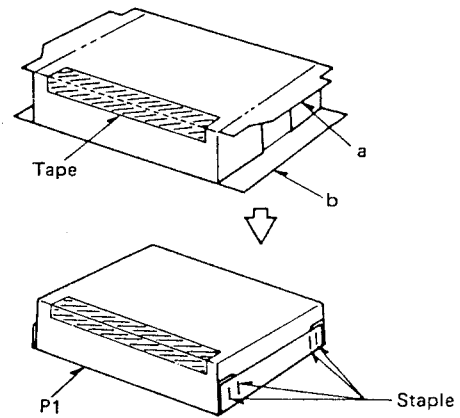
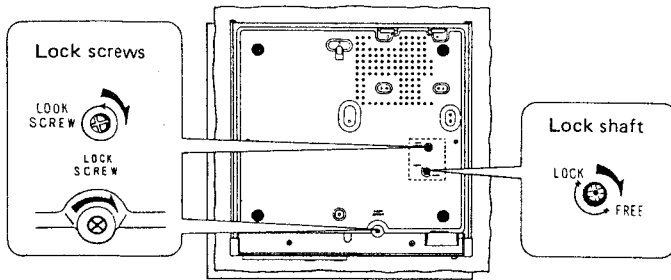


4. Place the unit (with cushions attached, as illustrated).
5. Fold the flaps according to the line marks.
6. Seal the top with adhesive tape.
 - * Use gum tape or adhesive cloth tape of 50mm wide at least.
7. For the edges, first fold the flap "a" and then flap "b", and staple. Remember to staple only flap "b". (Use 15 or 16mm staple)

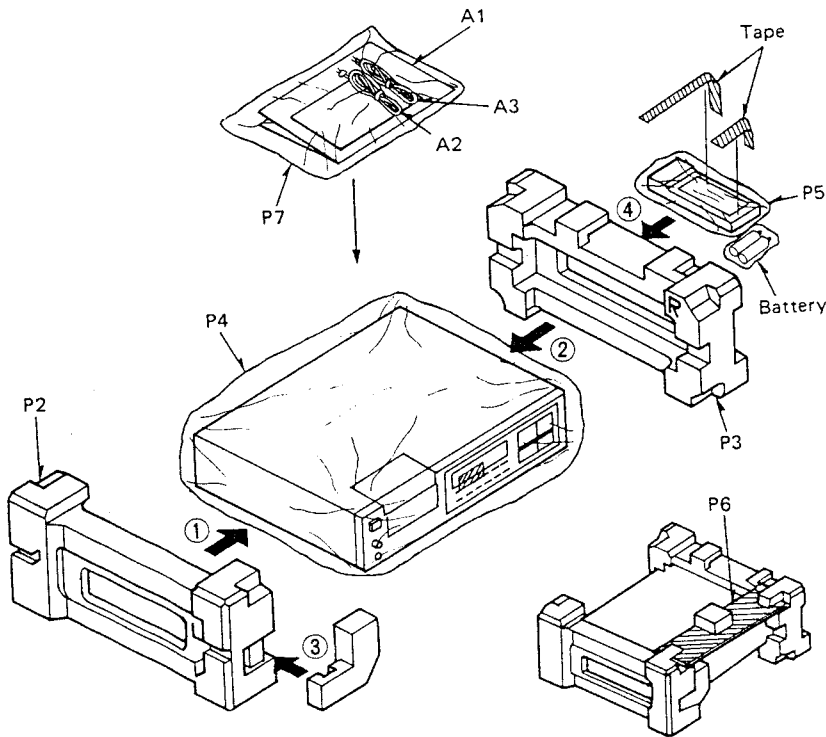
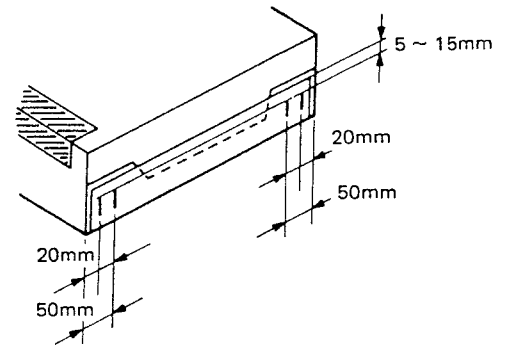
Ref. No.	Part No.	Description	
ACCESSORIES			
A1 (EK)	SRNU008G01	Instruction Book	(1)
A1 (EI)	SRNU008I01	Instruction Book	(1)
A1 (EG, EF, XA, XL, XM)	SRNU008X01	Instruction Book	(1)
A1 (E, EB, EH, EC)	SRNU008S01	Instruction Book	(1)
A1 (PA, PE, PC)	SRNU008P01	Instruction Book	(1)
A2 (EK) △	SFDAC05G02	AC Cord	(1)
A2 (XL) △	SFDAC05L01	AC Cord	(1)
A2 (XA, XM) △	SFDAC05X01	AC Cord	(1)
A2 (PA, PE) △	SFDAC05N01	AC Cord	(1)
A2 (Other) △ (Areas)	SFDAC05E02	AC Cord	(1)
A3	SFDHC05N01	Pin Plug Cord	(1)
A4 (XA, XM) △	SFDK119118	2Pin Plug	(1)
A5 (PA, PE) △ (PC)	QJP0603S	Plug	(1)
A6	UM-4NE-2P	Battery	(2)
PACKING PARTS			
P1 (EF) ○	SRHP008C01	Carton Box (Silver)	(1)
P1 (EF) ⊗	SRHP008C51	Carton Box (Black)	(1)
P1 (Other) (Areas)	SRHP008M01	Carton Box (Silver)	(1)
P1 (Other) (Areas)	SRHP008M51	Carton Box (Black)	(1)
P2	SRHH008N01	Pad, Left Side	(1)
P3	SRHH008N02	Pad, Right Side	(1)
P4	SFYH60X60	Polyethlene Bag	(1)
P5	SFYF09A21	Polyethlene Bag	(1)
P6	SRHD008N01	Pad, Cabinet	(1)
P7	SFYF23A35	Polyethlene Bag, Accessories	(1)

PACKING

- Put a soft cloth under the unit to protect it from scratches.
- Turn the lock shaft 180° clockwise.
- Turn the lock screws (about 5 to 6 times) clockwise.



* Stapling positions are shown below.



- Place the unit (with cushions attached, as illustrated).
- Fold the flaps according to the line marks.
- Seal the top with adhesive tape.
* Use gum tape or adhesive cloth tape of 50mm wide at least.
- For the edges, first fold the flap "a" and then flap "b", and staple. Remember to staple only flap "b". (Use 15 or 16mm staple)

Ref. No.	Part No.	Description	
ACCESSORIES			
A1 (EK)	SRNU008G01	Instruction Book	(1)
A1 (EI)	SRNU008I01	Instruction Book	(1)
A1 (EG, EF XA, XL XM)	SRNU008X01	Instruction Book	(1)
A1 (E, EB EH, EC)	SRNU008S01	Instruction Book	(1)
A1 (PA, PE PC)	SRNU008P01	Instruction Book	(1)
A2 (EK) △	SFDAC05G02	AC Cord	(1)
A2 (XL) △	SFDAC05L01	AC Cord	(1)
A2 (XA, XM) △	SFDAC05X01	AC Cord	(1)
A2 (PA, PE PC) △	SFDAC05N01	AC Cord	(1)
A2 (Other Areas) △	SFDAC05E02	AC Cord	(1)
A3	SFDHC05N01	Pin Plug Cord	(1)
A4 (XA, XM) △	SFDKI19118	2Pin Plug	(1)
A5 (PA, PE PC) △	QJP0603S	Plug	(1)
A6	UM-4NE-2P	Battery	(2)
PACKING PARTS			
P1 (EF) ○	SRHP008C01	Carton Box (Silver)	(1)
P1 (EF) ⊗	SRHP008C51	Carton Box (Black)	(1)
P1 (Other Areas) ○	SRHP008M01	Carton Box (Silver)	(1)
P1 (Other Areas) ⊗	SRHP008M51	Carton Box (Black)	(1)
P2	SRHH008N01	Pad, Left Side	(1)
P3	SRHH008N02	Pad, Right Side	(1)
P4	SFYH60×60	Polyethylene Bag	(1)
P5	SFYF09A21	Polyethylene Bag	(1)
P6	SRHD008N01	Pad, Cabinet	(1)
P7	SFYF23A35	Polyethylene Bag, Accessories	(1)

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ORDER NO. DAD8311001

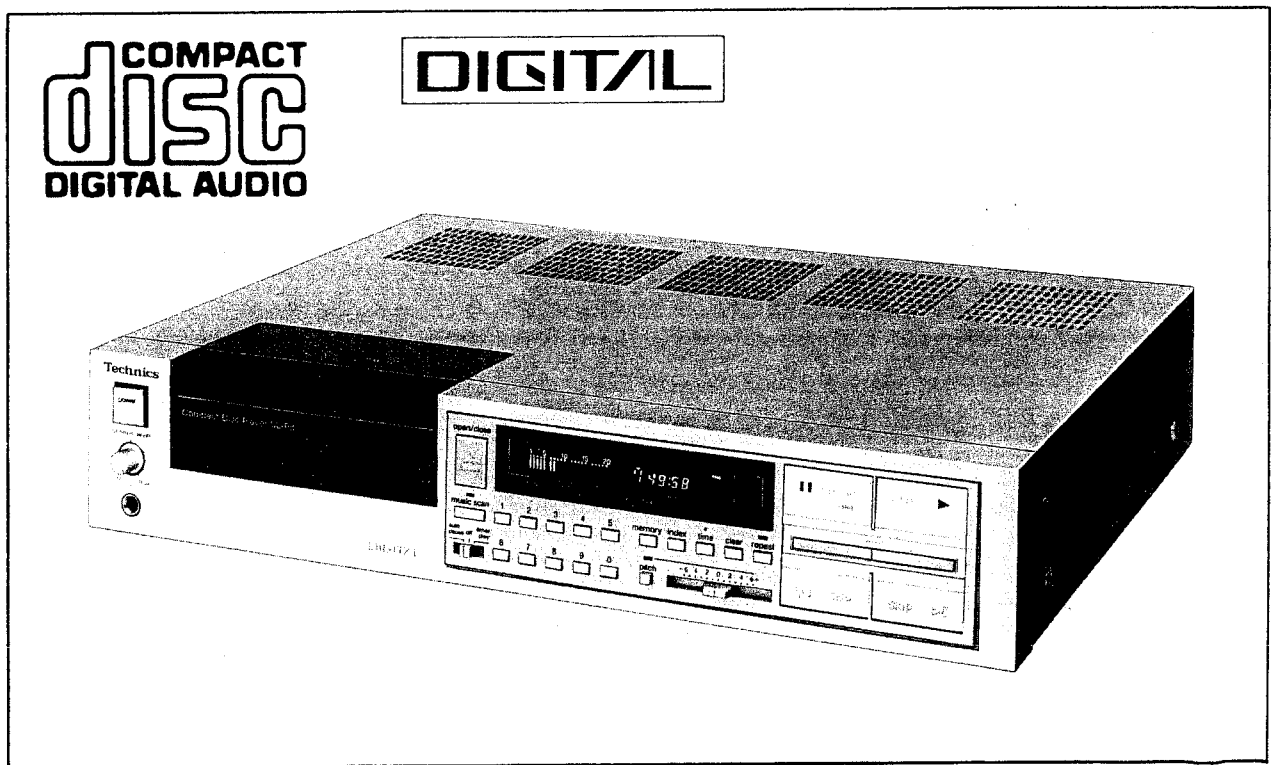
Technical Guide

VOL. 1

CIRCUIT DESCRIPTIONS

Compact Disc Player

SL-P8



Technics

MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.
DISCPLAYER DIVISION, SERVICE GROUP.

FOREWORD

This textbook is intended to be used for seminars and self-studies in combination with the textbook of SL-P7. Therefore, those common to SL-P7 are omitted:

Accordingly, main differences from SL-P7 are involved.

1. Remote control system.
2. Expanded function of operation control.
3. Pitch control.
4. Expansion of display function.

These circuits are described in 4 chapters, and other related circuits are omitted. So, refer to the textbooks of SL-P7 circuit.

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1. Remote-control System

In SL-P8, PLAY, STOP and other operations can be controlled by use of an infrared remote controller. However, remote control is not possible for power ON/OFF, disc tray OPEN/CLOSE, pitch ON/OFF, AUTO PAUSE and TIMER PLAY.

The transmitter/receiver unit of this remote-control system is nearly the same as for SH-R800, and so is the receiver lamp of the receiver unit.

1-1. Remote-control transmission and reception

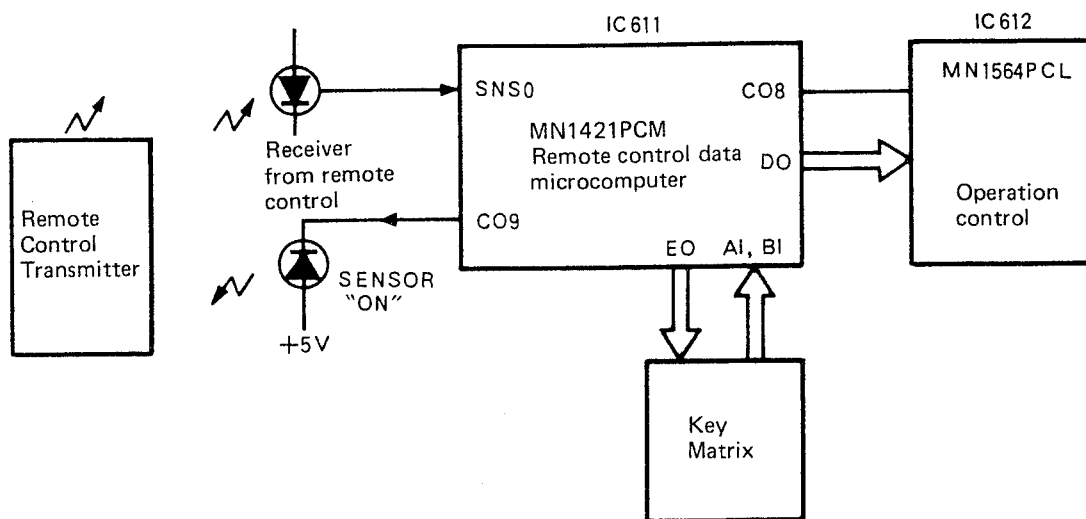


Fig. 1 Block diagram

1-2. Remote-control transmitter/receiver

The quartz oscillator generates 400 kHz frequency in X001, and performs AM demodulation of 36.7 kHz.

Output signal is a serial signal shown below. With a button switch of the remote-control system continuously depressed, a serial signal is generated for 65.5 ms, followed by an interval of 39.3 ms, and again a serial signal is generated.

Therefore, the indicator of remote control system blinks in the order of signal and interval.

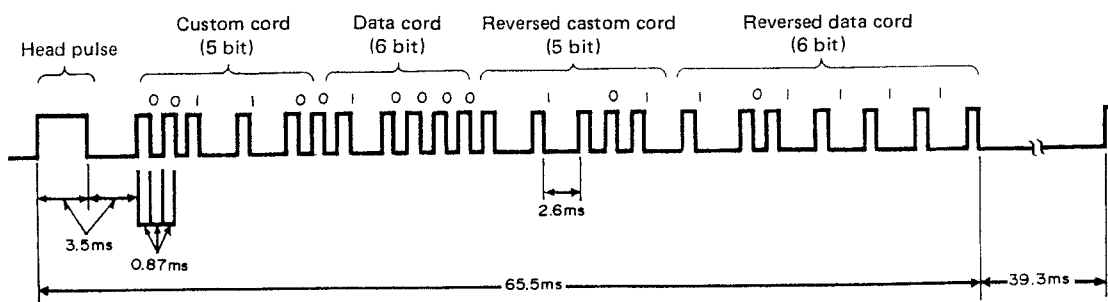


Fig. 2 Serial signal ▶ SKIP

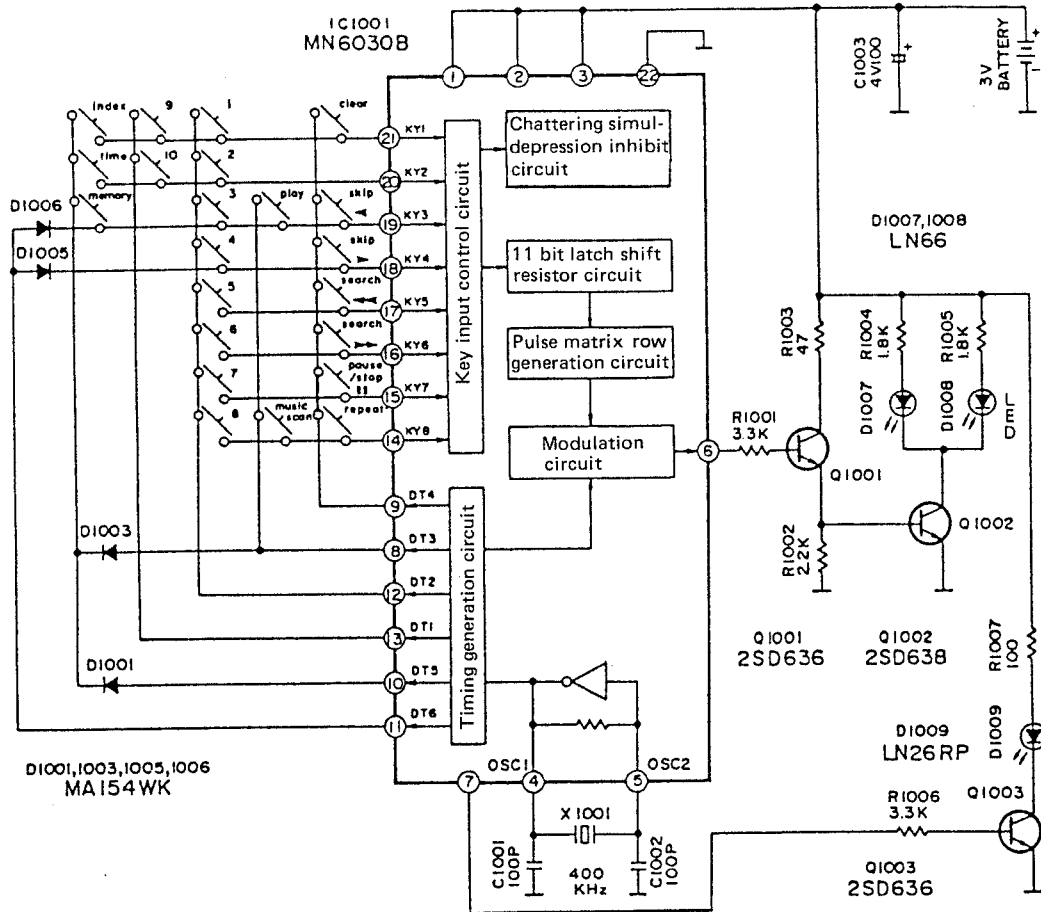


Fig. 3 Transmitter circuit diagram

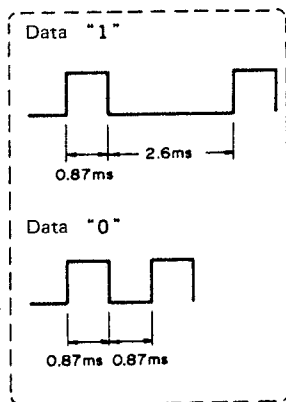


Fig. 4 "1" and "0" of serial signal

Control button	Data cord	Control button	Data cord
Clear	0 0 0 0 0 0	4	1 1 0 0 1 0
▶	1 1 0 0 0 0	5	0 0 1 0 1 0
◀◀	0 0 1 0 0 0	6	1 0 1 0 1 0
▶▶	1 0 1 0 0 0	7	0 1 1 0 1 0
	0 1 1 0 0 0	8	1 1 1 0 1 0
Repeat	1 1 1 0 0 0	9	0 0 0 1 1 0
▶ Play	0 1 0 1 0 0	0	1 0 0 1 1 0
SCAN	1 1 1 1 0 0	INDEX	0 0 0 1 0 1
1	0 0 0 0 1 0	TIME	1 0 0 1 0 1
2	1 0 0 0 1 0	MEMORY	0 1 0 1 0 1
3	0 1 0 0 1 0	◀ SKIP	0 1 0 0 0 0

Table 1 Serial signal data

(In transmitter, oscilloscope can be checked by Q1001 emitter and IC611 terminal 21 of the set.)

1-3. Remote-control receiver amplifier

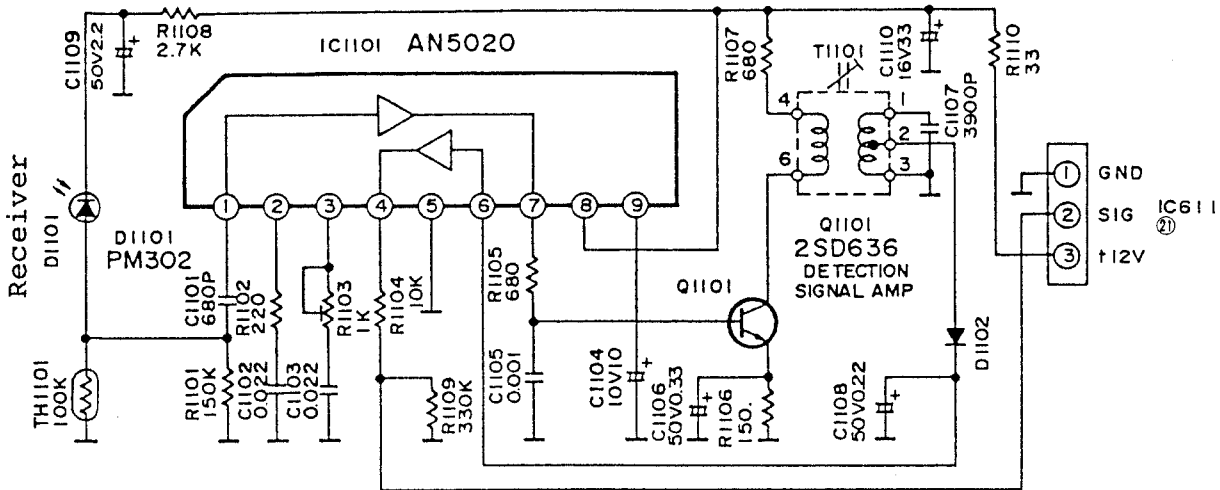


Fig. 5 Receiver amp circuit

This circuit eliminates AM from the optical signal converted into AM of the remote controller, and puts only serial signal into IC611 terminal 21 of microcomputer.

Operation

1. Optical signal of remote controller is converted into electrical signal by photo diode D1101 (1). It is put in IC1101 (1) of receiver amp, and put out to terminal (7).
2. It is then amplified by Q1101; tuned to 36.7 kHz by T1101; subjected to AM detection at D1102; and amplified by optical amplifier. Then the output is put into IC611 (21) as serial signal.
3. The serial signal is same in phase as the emitter waveform (with AM) of Q1001 of remote-control transmitter.

1-4. Operation of microcomputer for remot-control decode

(MN1421PCM)

Name of port	Function	Name of port	Function
A1 port	Key scan input	DO port	Data output to operation } opecon control
B1 port	" "	CO port	
EO port	Key scan output	CO8	Light up the sensor during redeiving from remote control
Sensor input SNS0	Remote control signal input	CO9	

MN1421 PCM terminal diagram

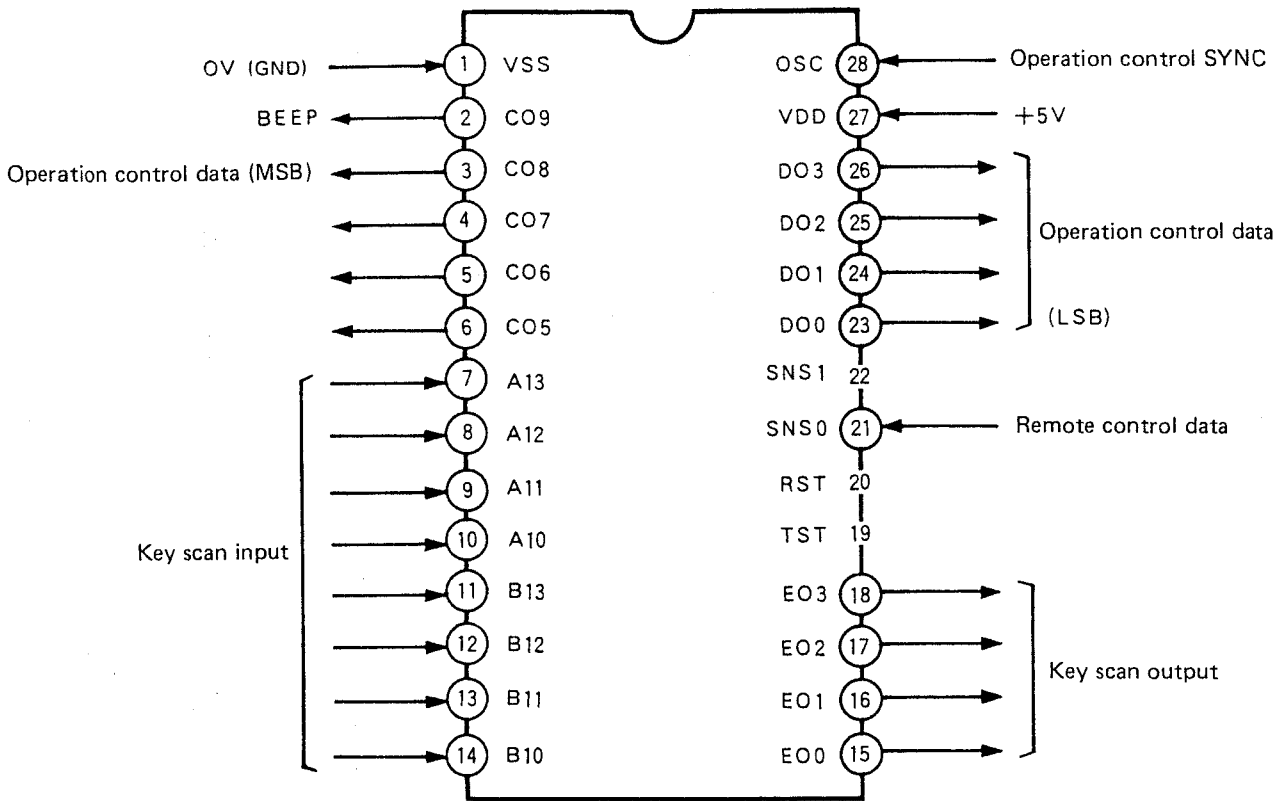


Fig. 6 MN1421 PCM terminal diagram

Output of MN1421 PCM

When each of remote control and key matrix is depressed, 5-bit output obtained from EO port C08 is obtained as follows. Then it is put in P01 - P03, PIO of operation controller.

Table 2 Key matrix remote control outputs

Function	CO8	DO3	DO2	DO1	DO0	Function	CO8	DO3	DO2	DO1	DO0
Clear	0	0	0	0	1	2	1	0	0	1	1
◀ Skip	0	0	0	1	0	3	1	0	1	0	0
▶ Skip	0	0	0	1	1	4	1	0	1	0	1
◀◀ Search	0	0	1	0	0	5	1	0	1	1	0
▶▶ Search	0	0	1	0	1	6	1	0	1	1	1
Pause/Stop	0	0	1	1	0	7	1	1	0	0	0
Repeat	0	0	1	1	1	8	1	1	0	0	1
▶ Play	0	1	0	1	0	9	1	1	0	1	0
Open/Close	0	1	1	1	0	Index	1	1	1	0	1
Music scan	0	1	1	1	1	Timer	1	1	1	1	0
0	0	0	0	0	1	Memory	1	1	1	1	1
1	1	0	0	1	0						

L or H while key is depressed

1-5. Key matrix circuit

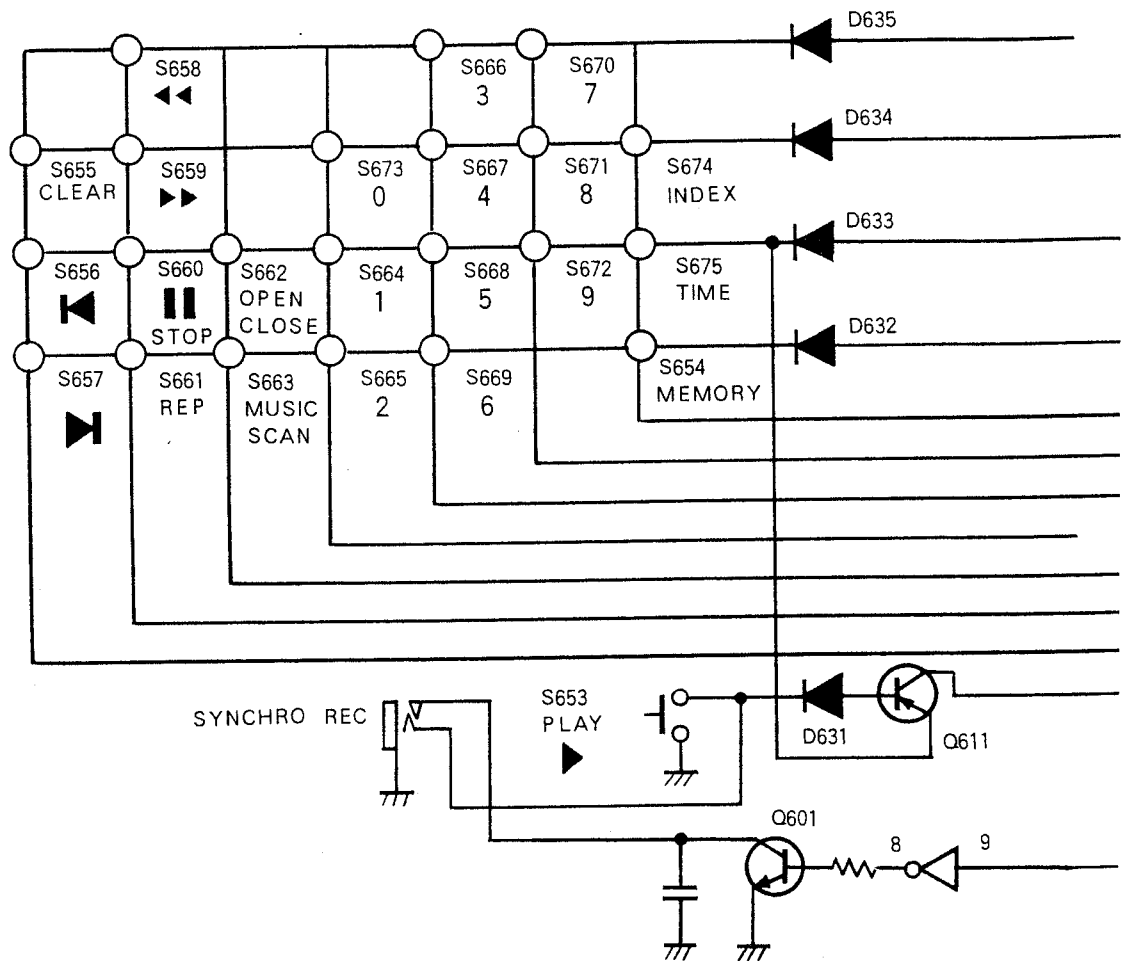
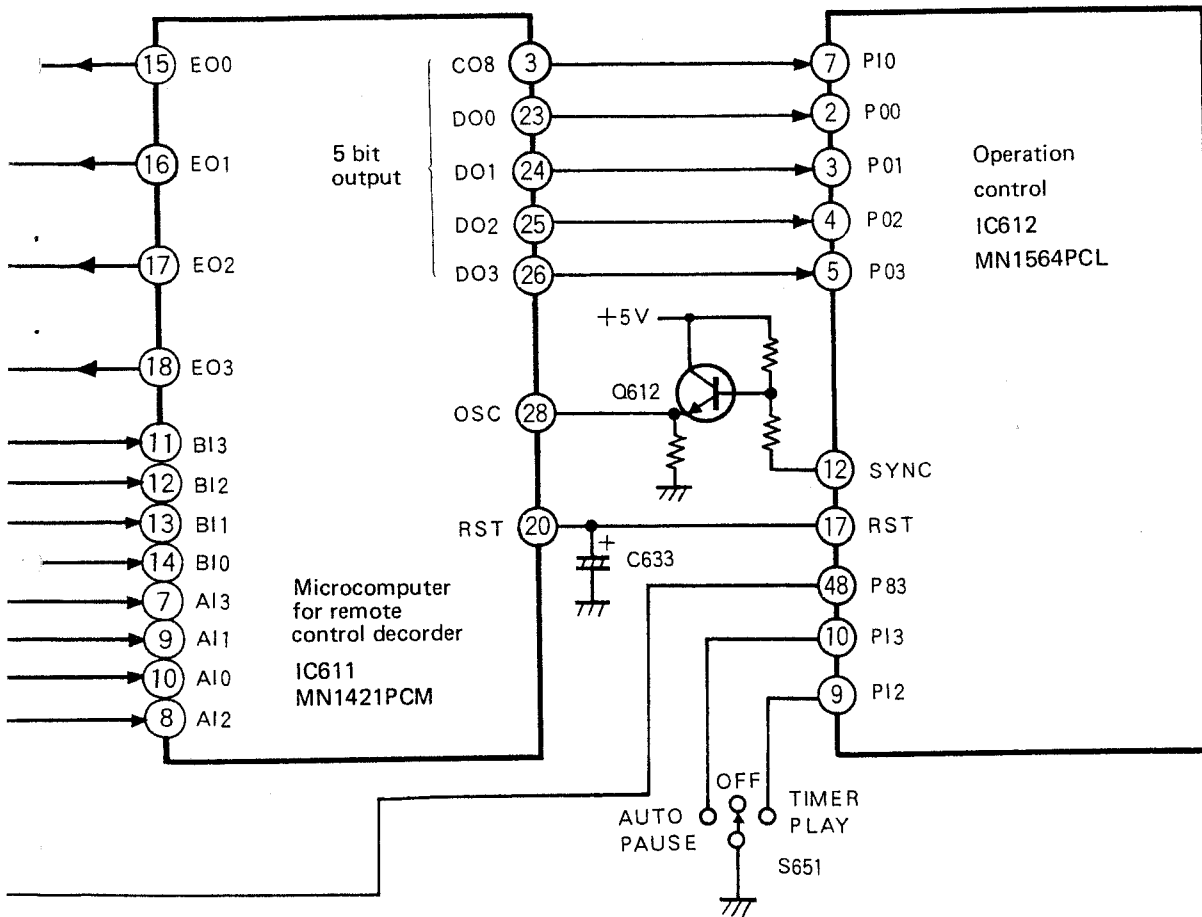


Fig. 7 Key matrix circuit

Configuration of the circuit

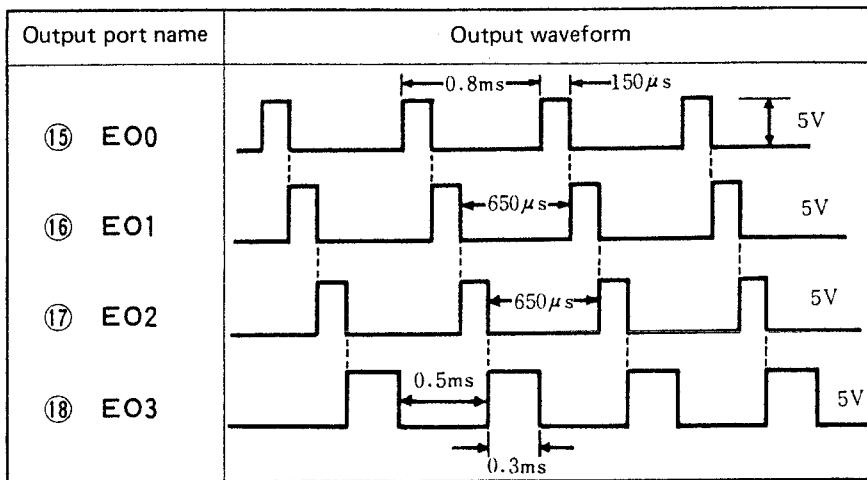
Microcomputer for remote-control decode is inserted between OP CON and key matrix so that only outputs with various switches of key matrix turned ON are put in P00 - P03 and P10 of OP CON.

Similarly, REMO CON signal is put in OP CON through micro-computer for remote-control decode.



Output waveforms:

with power ON and all switches OFF
Remote-control decode microcomputer



2. Operation control circuit

Functions of Operation Controller MN1564PCL

Pin No.	Pin Name	Symbol	I/O	Function
2	P 00	DO 0	I	Data input terminal From microcomputer for MN1421 remote-control decoder
3	P 01	DO 1	∕	
4	P 02	DO 2	∕	
5	P 03	DO 3	∕	
7	P 10	DO 4	∕	
9	P 12	TIMER	∕	Timer play select "L" Timer play
10	P 13	AUTO P	∕	Auto pause select "L" Auto pause
14	IRQ	BLKCK	∕	Sub cord record input from MN6614
15	SBT	CLDCK	∕	
16	SBD	SUBQ	∕	
62	OSC1	TTCK	∕	Standard clock of system 4.32MHz
18	P 20	A 0	O	Address output of 4K RAM (In/Output from MN2114)
19	P 21	A 1	∕	
20	P 22	A 2	∕	
21	P 23	A 3	∕	
22	P 30	A 4	∕	
23	P 31	A 5	∕	
24	P 32	A 6	∕	
25	P 33	A 7	∕	
30	P 50	A 8	∕	
31	P 51	A 9	∕	
26	P 40	I/O 1	I/O	Data in/out of 4K RAM
27	P 41	I/O 2	∕	
28	P 42	I/O 3	∕	
29	P 43	I/O 4	∕	
32	P 52	WE	O	WE signal of 4K RAM
41	P 70	DCLOSE	∕	Disc holder control
42	P 71	D OPEN	∕	
49	P 90	REST	I	Reset position detector "L" ON
50	P 91	END	∕	Disc outermost detector terminal "L" . . . ON
51	P 92	CLOSE 2	∕	Disc holder "open close" detector "L" . . . ON
52	P 93	CLOSE 1	∕	
53	P 94	OPEN	∕	
8	P 11	RF	∕	RF signal detection "L" RF signal
63	IC1	TCNT	∕	Track counter input
43	P 72	KICK	O	Kick pulse
44	P 73	KICK F/R	∕	Kick pulse "L" reverse
45	P 80	LDON	∕	TT ON signal
40	P 63	TRON	∕	TR ON signal

Table 3 Function of operation controller MN1564PCL

Pin No.	Pin Name	Symbol	I/O	Function															
37	P 60	REV	0	Traverse servo control <table border="1"> <thead> <tr> <th></th> <th>FWD</th> <th>REV</th> <th>PLAY</th> <th>STOP</th> </tr> </thead> <tbody> <tr> <td>P 60</td> <td>1</td> <td>0</td> <td>1</td> <td>0</td> </tr> <tr> <td>P 61</td> <td>0</td> <td>1</td> <td>1</td> <td>0</td> </tr> </tbody> </table>		FWD	REV	PLAY	STOP	P 60	1	0	1	0	P 61	0	1	1	0
	FWD	REV	PLAY		STOP														
P 60	1	0	1		0														
P 61	0	1	1	0															
38	P 61	FWD	0																
36	P 53	EMPH	0	Emphasis, "H"ON															
46	P 81	MUTE	0	Muting "L"Muting															
47	P 82	ATSB	0	Attenuation ON/OFF output															
48	P 83	SYNCH	0	Synchro REC control "L" Synchro REC.															
54	PA1	DECHO	I	In/Out pin of micon (MN1430) for FL driver															
55	PA2	DCLOCK	0																
56	PA3	DSEND	0																
57	PB0	DDATA 0	0																
58	PB1	1	0																
59	PB2	2	0																
60	PB3	3	0																

2-1. Function of the operation control circuit

The important feature of compact disc is that it is capable of random access not only to tune number but also to minutes and seconds by use of control signal recorded on the disc. SL-P7 is able to store minutes and seconds up to 20 tunes in the memory.

In SL-8, with 4-bit RAM connected, all TOC of minutes and seconds up to 32 tunes can be stored in the memory. Accordingly, the range of random access is greatly expanded. Also, CD player system is equipped with optical servo circuit in order to take out the signal by correctly applying the laser spot to the pit since the system uses laser light to read signals, which therefore requires various servo timings.

The operation control circuit serves as a control center for the entire system.

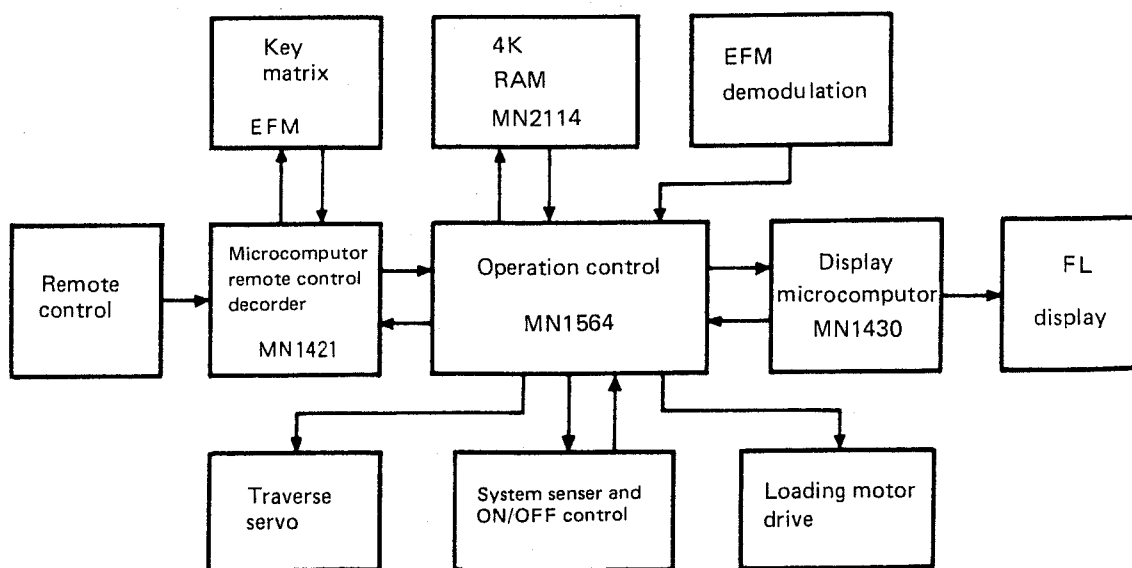


Fig. 8 Block diagram of operation control circuit

The operation control circuit involves operation controller (MN1564PCL) as the main component. LSI MN6614 (IC701) demodulates the control information from EFM data and transfers it to the operation controller.

The operation controller controls the traverse motor and display microcomputer with those signals for the purposes of play time display, track No. display and bar graph display.

In addition, there are sensors and timing ON/OFF signals such as follows:

Sensors

- 1) Innermost periphery detection (REST):
To check if PU is at the innermost periphery of disc.
- 2) Outermost periphery detection (END):
To check if PU is unable to go beyond the outermost periphery of disc (60 mm in radius).
- 3) Disc holder open/close detection (OPEN, CLOSE 1, 2):
To check if disc holder is open or closed.

Timing ON/OFF signals

- 1) Laser ON/Turntable and focus servo ON command: (LD/TT/Fo ON)
- 2) Tracking servo ON command: (TR ON)
- 3) Muting relay ON/OFF command: (MUTE)
- 4) Emphasis ON/OFF command: (EMPHA)
- 5) Traverse REV/FWD command: (REV/FWD)
- 6) Kick timing command: (KICK)
- 7) Kick direction command: (KICK F/R)
- 8) Attenuation ON/OFF command: (ATSB)

There are also timer play selection, auto pause selection, synchro record control signal output, key matrix remote-control decoder, and various display functions.

2-2. Circuit around operation controller

1. Loading motor drive circuit

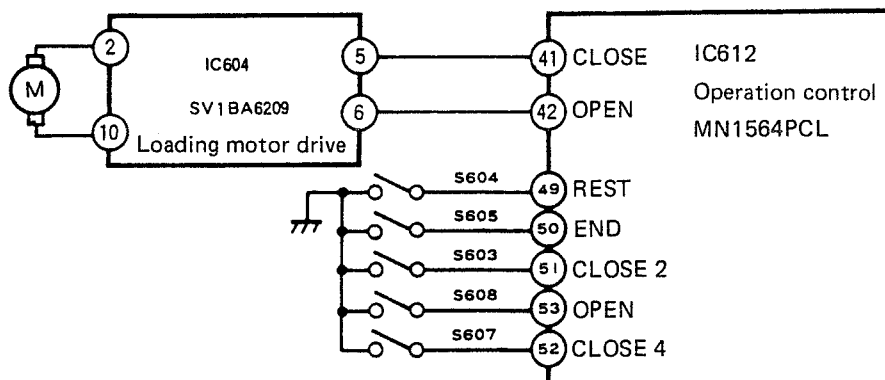


Fig. 9 Loading motor drive circuit

The loading motor circuit is the same as that of SL-P7. REST, END, CLOSE 2, CLOSE 1, and OPEN sensor switches are located in the loading mechanism, but in SL-P7, they are built into the key matrix circuit. In SL-P8, sensor detection signal is directly put into operation controller. The operation is the same as in SL-P7.

2. RAM circuit

RAM is provided for TOC memory up to 99 tunes and for random access of 32 sets. SL-P8 displays only up to 20 tunes, and gives "over" display "▶" for more than that, but it is capable of TOC memory of track No., minutes and seconds up to 99 tunes. Also, random access up to 32 sets is possible by use of numeric key, memory key, index key, and time key, with the assignment of start and stop time of a certain tune being 1 set.

3. Data transfer of operation controller from EFM demodulation

Data transfer from EFM demodulator (MN6614) to operation controller (MN1564PCL) are control Q data demodulated from EFM data.

The control Q data (96 pcs) are put into operation controller 12 times by 8 pcs each (8 x 12 = 96 + 1 block) according to the timing of CLDCK and BLKCK. This is repeated to put control Q data signal into operation controller.

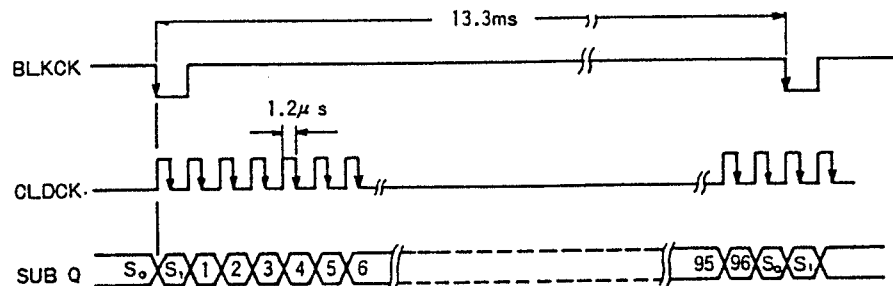


Fig. 10 Data transfer timing from MN6614 to MN1564PCL

Control Q data transferred from MN6614 are stored in the memory of operation controller. The stored data are taken out of the memory as needed as put out from each output terminal.

Use of Q channel

Details of tunes recorded on the lead-in track, program track and lead-out track of disc are recorded and used for display and control.

Lead-in track

Music No.	Point (Tune No.)	Lapse of tune time (Min. Sec. Frame)	Zero	Total lapse of time (Min. Sec. Frame)
-----------	------------------	--------------------------------------	------	---------------------------------------

Program track and lead-out track

Control emphasis YES/NO	Descri No.	Music No.	Index of music No.	Lapse of tune time	Zero	Total lapse of time
-------------------------	------------	-----------	--------------------	--------------------	------	---------------------

Data taken out of Q data are as follows:

- 1) Display (music No. and its index, lapse of time, bar graph) outputs are delivered as 4-bit parallel data. (Output terminals 57 - 60)
- 2) Emphasis YES/NO
It reads whether emphasis is given or not and turns ON/OFF the de-emphasis circuit. (Output terminal 36)

Other functions

° Traverse direction command (Output terminals 33, 38)
Direction command pulse is put out in skip mode.

	FWD	REV	PLAY	STOP
③⑦	H	L	H	L
③⑧	L	H	H	L

° Kick timing and kick direction command (Output terminals 43, 44)

Kick timing and direction command pulses are put out after skip mode and Cue/Rev mode.

° Attenuation ON/OFF (Output terminal 47)

It is given to level down the output in Cue/Rev mode by 12 dB, and is effective at "H" level.

3. Pitch control circuit

3-1. Features of SL-P8 pitch control

In an ordinary system, pitch control has been performed by changing only the motor speed.

In SL-P8, timing clock for music signal demodulation is changed as well so that it can be varied continuously in a range of $\pm 6\%$.

Usually, it is used with pitch control OFF, and then correct pitch is assured.

3-2. Principle of pitch control

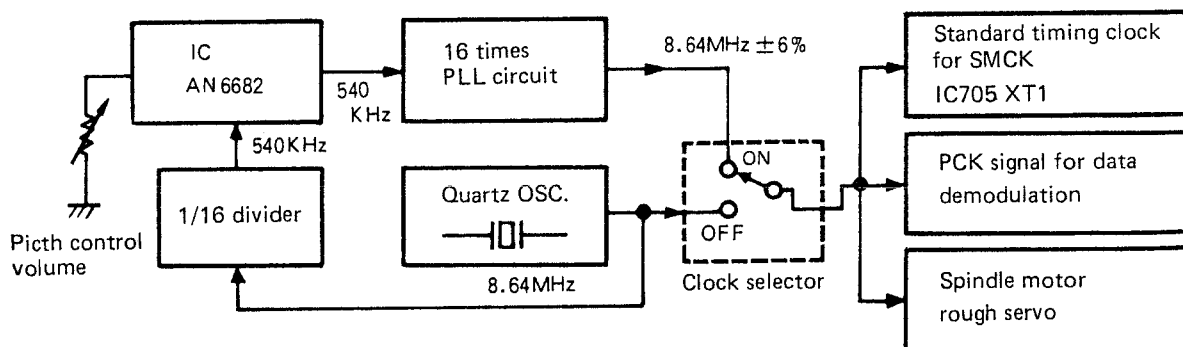


Fig. 11 Block diagram of pitch control (SL-P8)

The pitch control of SL-P8 uses the master clock of the whole system as a fixed output, and takes out +6% variable output by putting the output into the frequency variable circuit.

The clock selector is usually OFF and maintains a constant speed with the quartz oscillation output of master clock. With pitch control ON, +6% variable output is applied to SMCK reference timing clock, data demodulation PCK signal and spindle motor rough servo circuits, thereby performing smooth pitch control.

3-3. Frequency variable circuit

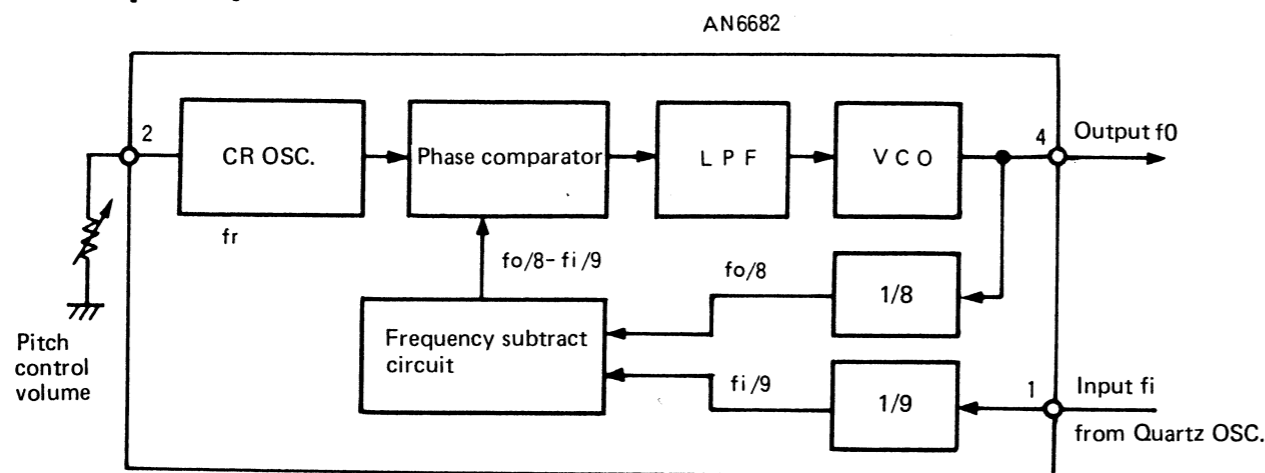


Fig. 12 Frequency variable circuit

Pitch control IC AN6682 is able to change the frequency of CR oscillator by pitch control volume, and the output frequency can be stabilized by setting up an PLL configuration in combination with the frequency from external quartz oscillator.

With input frequency f_i , output frequency f_o , and CR oscillator frequency f_r , the following equations can be obtained.

$$f_r = \frac{f_o}{8} - \frac{f_i}{9} \quad f_o = 8 \left(f_r + \frac{f_i}{9} \right)$$

Here, suppose the quartz oscillator frequency is 540 kHz, then $f_i/9 = 60$ Hz. If $f_o = 540$ kHz, f_r is lower (actually, 3 - 20 kHz) so that stable variable output can be obtained.

3-4. Frequency multiplication circuit

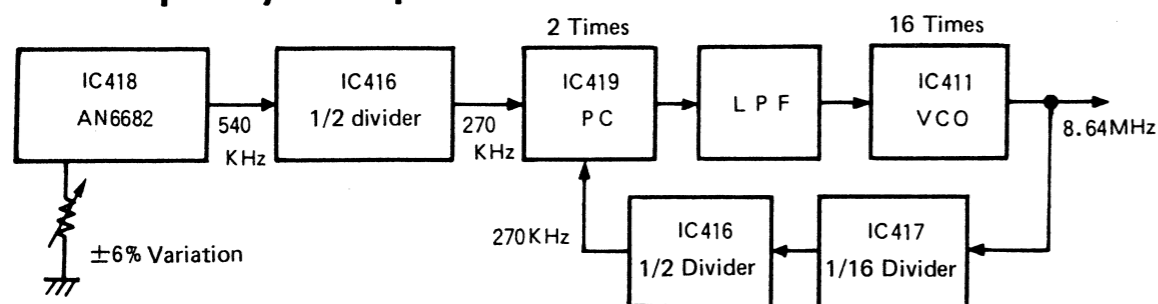
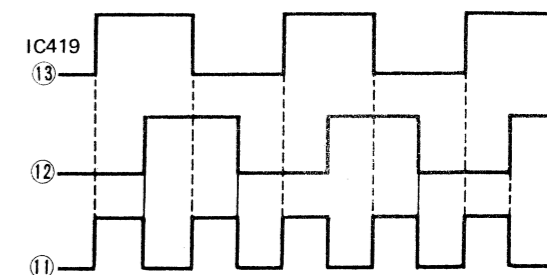


Fig. 13 Frequency multiplication circuit

This circuit multiplies the output frequency 540 kHz of AN6682 up to 8.64 MHz.

IC416 performs 1/2 frequency division so that the output of AN6682 is 50% duty.

Also, IC411 oscillates 8.64 MHz, and it is subjected to 1/32 frequency division and phase comparison at IC419 in order to operate VCO of IC411 ----- PLL circuit.



Input/output waveform of IC419

Since the input phase of IC419 terminals 12 and 13 is deflected 90°, the output at terminal 11 is 1/2 of the input.

3-5. Clock selector circuit

This circuit selects quartz oscillation frequency in pitch control OFF mode, and variable frequency from AN6682 in pitch control ON mode.

Pitch control OFF

Pitch selector switch S652 is OFF, IC413 (11) at "L", (10) at "H", IC411 (5) at "H", and IC411 output stops. On the other hand, IC412 (9) is at "H", but the output of quartz oscillator is applied to IC412 (10) and the output is delivered to IC412 (8), and goes from (5) to (6).

Pitch control ON

Pitch selector switch S652 is ON, IC413 (11) at "H", (10) at "L", then IC411 operates and the output is delivered from IC411 (6) to IC412 (2), (3) and (6).

On the other hand, IC412 (9) is at "L", and quartz oscillator output is not applied to IC412 (8).

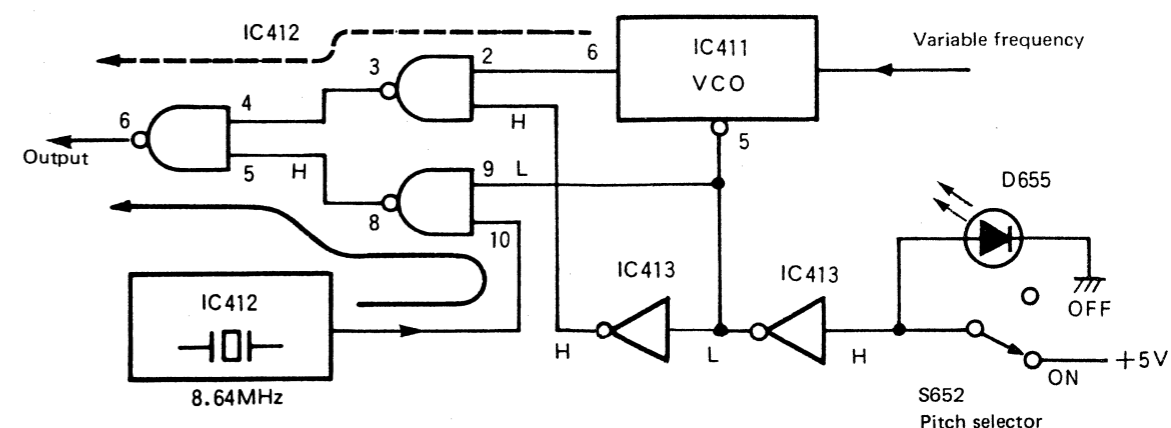


Fig. 14 Clock selector circuit

Block Diagram

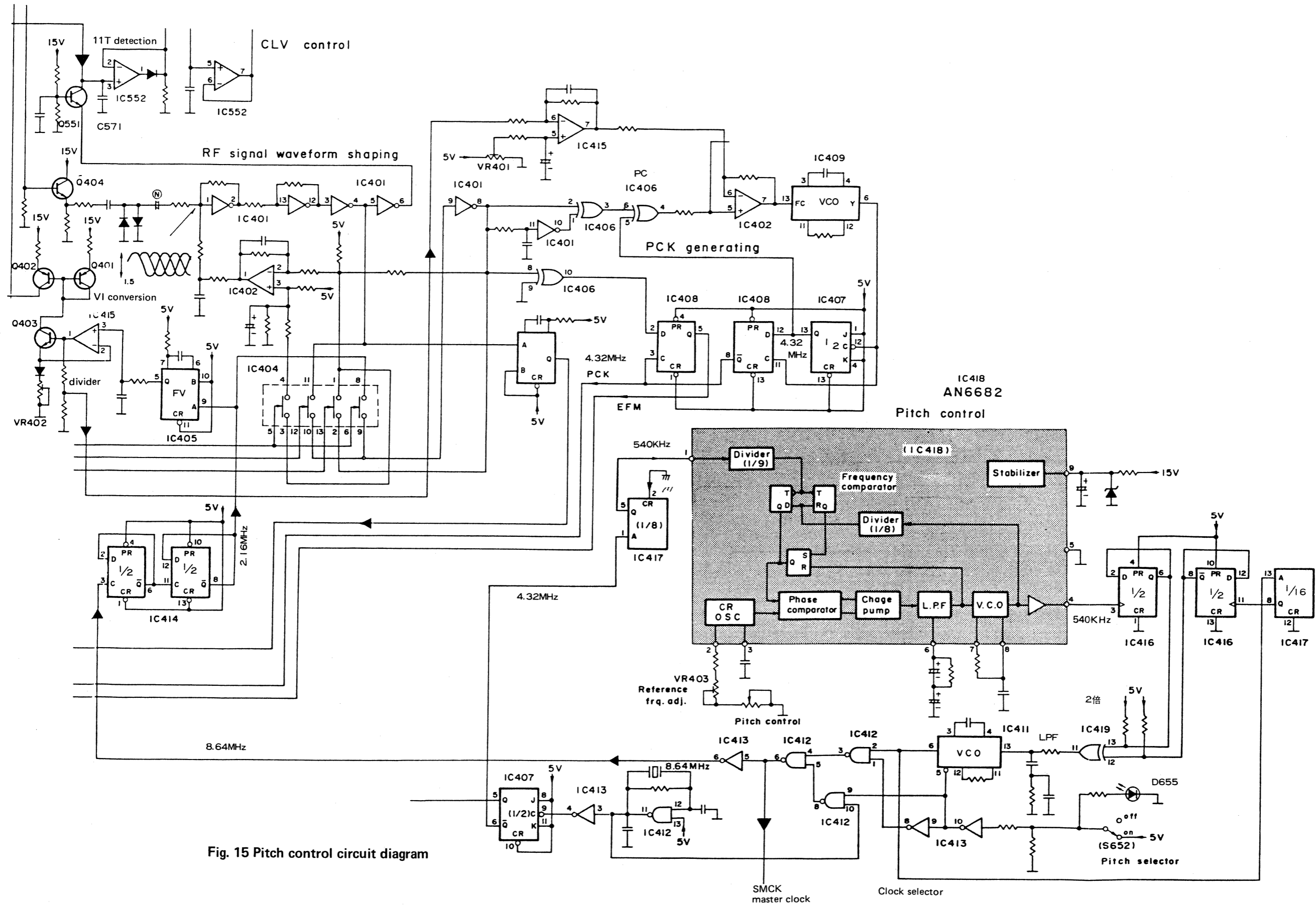


Fig. 15 Pitch control circuit diagram

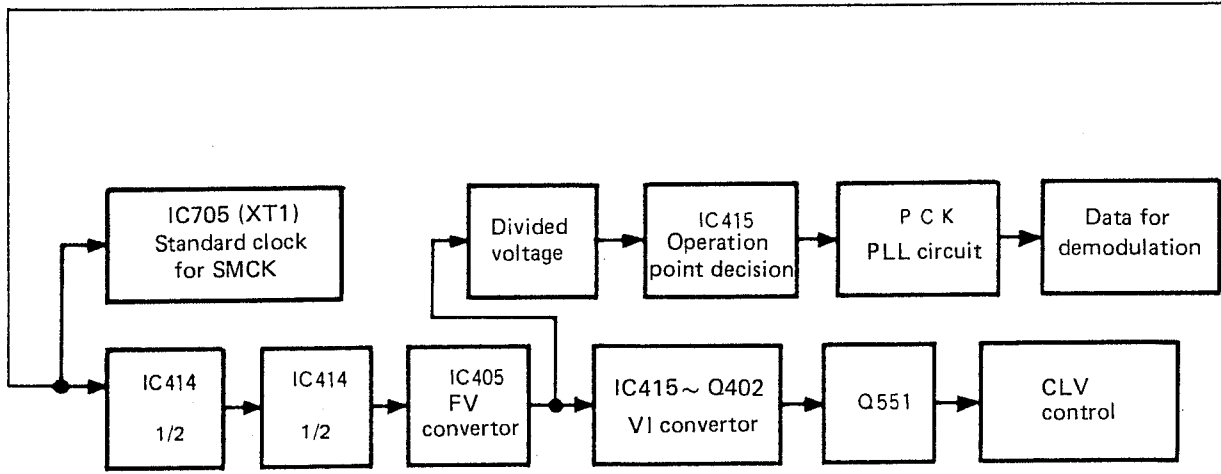
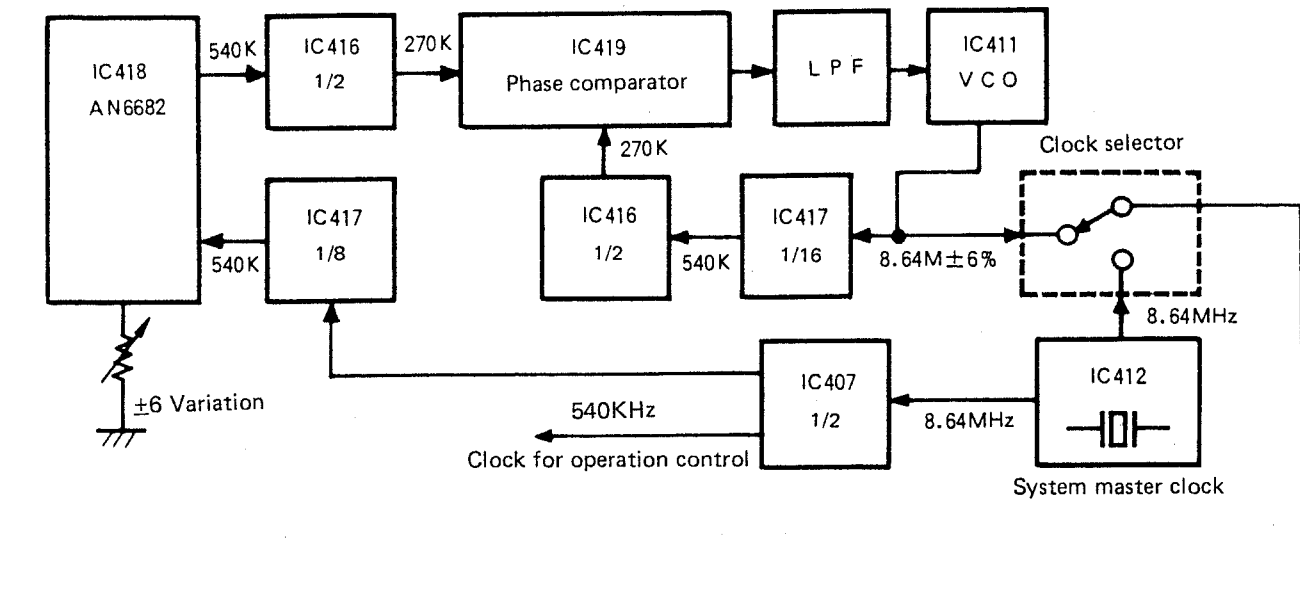


Fig. 16 Block diagram of pitch control

3-6. CLV control circuit

1. 8.64 MHz from IC413 is subjected to 1/4 frequency division at IC414 in order to make F-V conversion easier.
2. The frequency is subjected to F-V conversion at IC405, and becomes DC voltage through R449 and C443 filter, and is applied to IC415 (3) of V-I conversion circuit. The output is applied to the base of Q403. Q401 and Q402 set up a current mirror, and the output current is applied to the O551 collector from Q402 collector.
3. Q551 collector current is much when pitch control is +6%, and voltage charged into C571 is greater, causing the triangular output wave of IC552 to become larger. With pitch control set at -6%, the triangular output wave of IC552 becomes smaller. In this way, CLV control is performed by changing the output of 11T detection circuit.

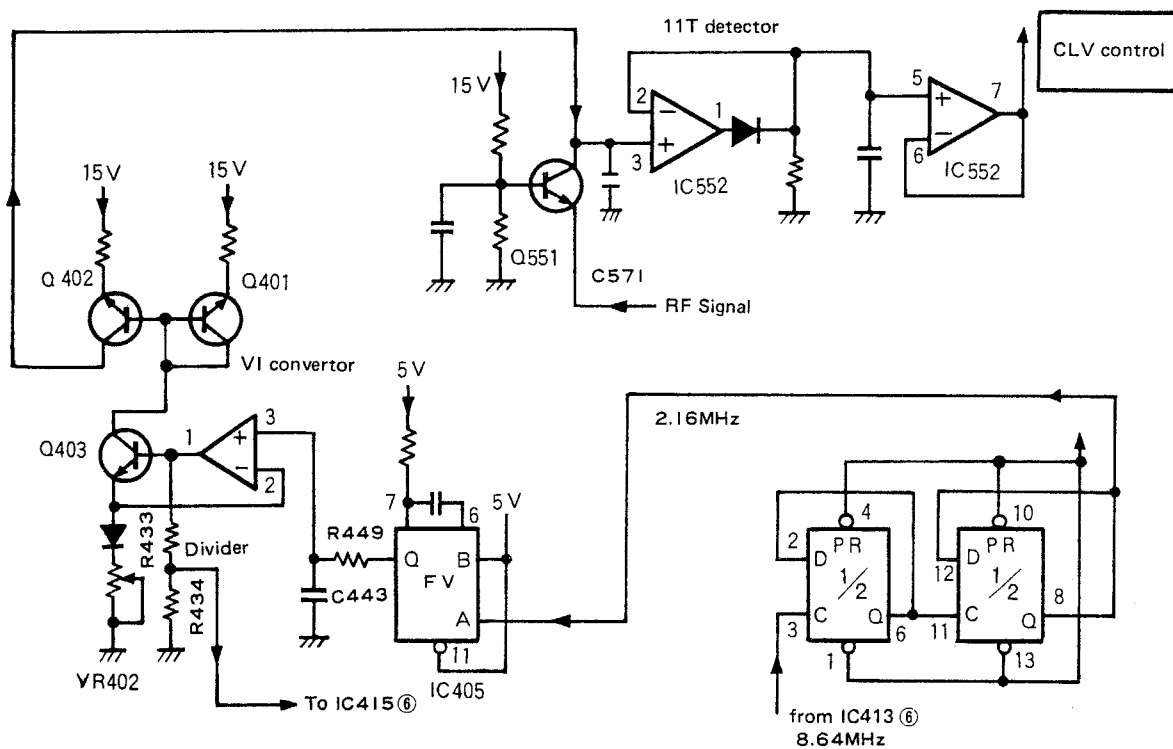
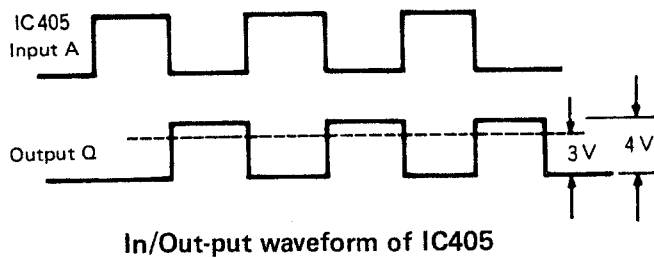


Fig. 17 CLV control circuit

3-7. PCK clock signal

The PCK signal generation circuit consists of IC409, IC407, IC406 and IC402 which set up PLL circuit.

1. Output voltage is V-I conversion circuit IC415 is divided by R433 and R434, and the output is applied to IC415 (6), and to IC409 (13) through IC402.
2. Voltage applied to IC409 (13) serves to change the operation point of VCO of IC409. When pitch control is OFF, the operation point of IC409 is at 0, then the frequency is stabilized in the capture range. With pitch control at +6%, the voltage from IC415 and IC402 causes the operation point of IC409 to be shifted toward higher frequency, making it stabilized in the capture range. With pitch control at -6%, the operation point is shifted toward lower frequency but in any case the alteration occurs in the lock range of PLL circuit, resulting in stabilizing the frequency.

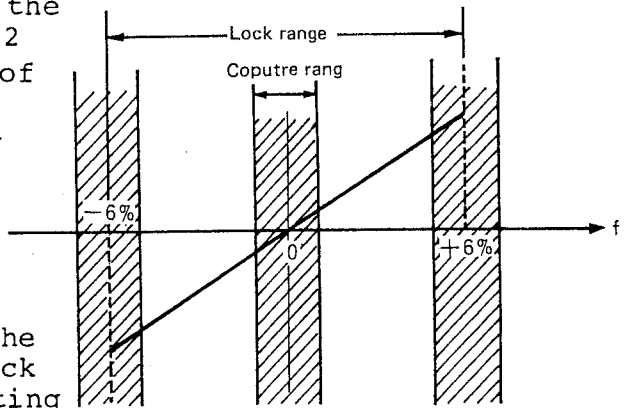


Fig. 18 Operation point of IC409

3. The output of PLL circuit enters IC408 terminal (11) from IC409 terminal (6) and is put out as PCK signal from terminal (8).

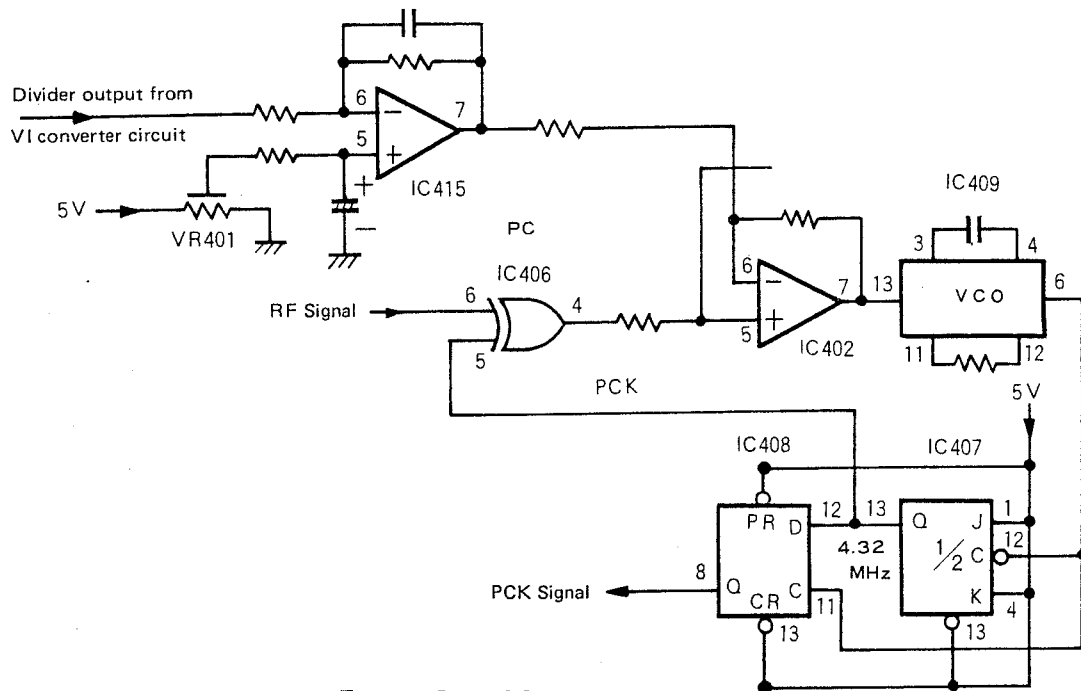


Fig. 19 PCK OSC circuit

4. Display circuit

4-1. Function of display

Display microcomputer MN1430G operates according to the data of operation controller for display purposes.

1. Music No. scale:
Displays up to 20 tunes. Keeps lighting with power ON.
2. Music No. display bar:
20 tunes max.; if it exceeds 20 tunes, "over" mark "▶" lights up on the right-hand side of bar.
Music No. display bar blinks during play mode. Play END bar goes out. Programed music No. display bar is shown.
3. Track display:
Displays the number of tunes.
4. Time display:
Displays total play time (reading TOC), play and remaining time.
With index key depressed, index No. is displayed.

Differences in display function between SL-P7 and SL-P8

1. Display tube of SL-P7 is provided only for the track and time, and not for music number scale and music No. display bar.
2. In terms of circuit, B port of display microcomputer MN1430G is for model selection, and the inside program can be selected by setting the level to H (15 V) in SL-P7 and L (0 V) in SL-P8.
In SL-P7, bar code is not used, therefore nothing is connected to E port, while it is used for bar code in the case of SL-P8.

4-2. Configuration of display circuit

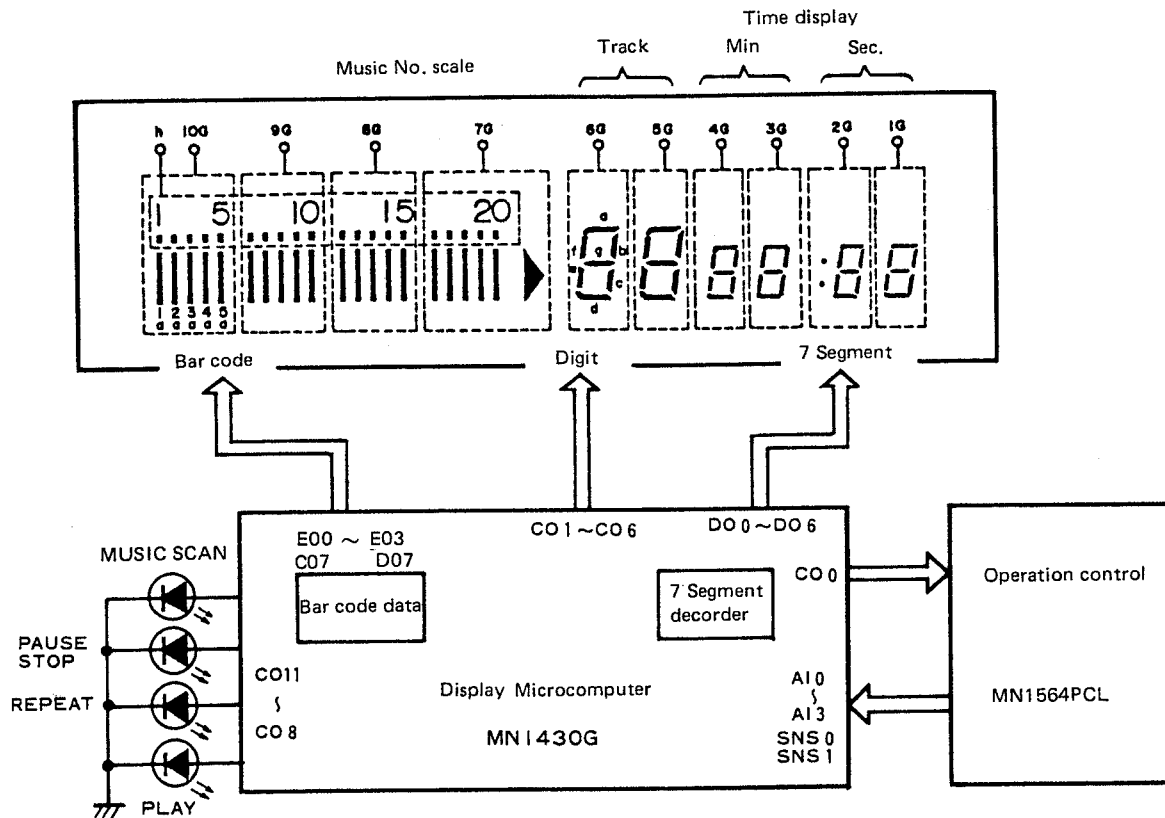


Fig. 20 Display circuit

FL lighting operation

Display digit is decided from C output port of display microcomputer, and 7-segment display data is delivered from D port for the purpose of track and time display. The music No. bar code is lighted by E00 - E03, C07 and D07. The output of D07 becomes the "over" mark command (over 21 tunes) during the 4th digit display, and the colon lighting command of segment display during the 5th digit display.

Also, 4 LED's are lighted by the output of C08 - C011.

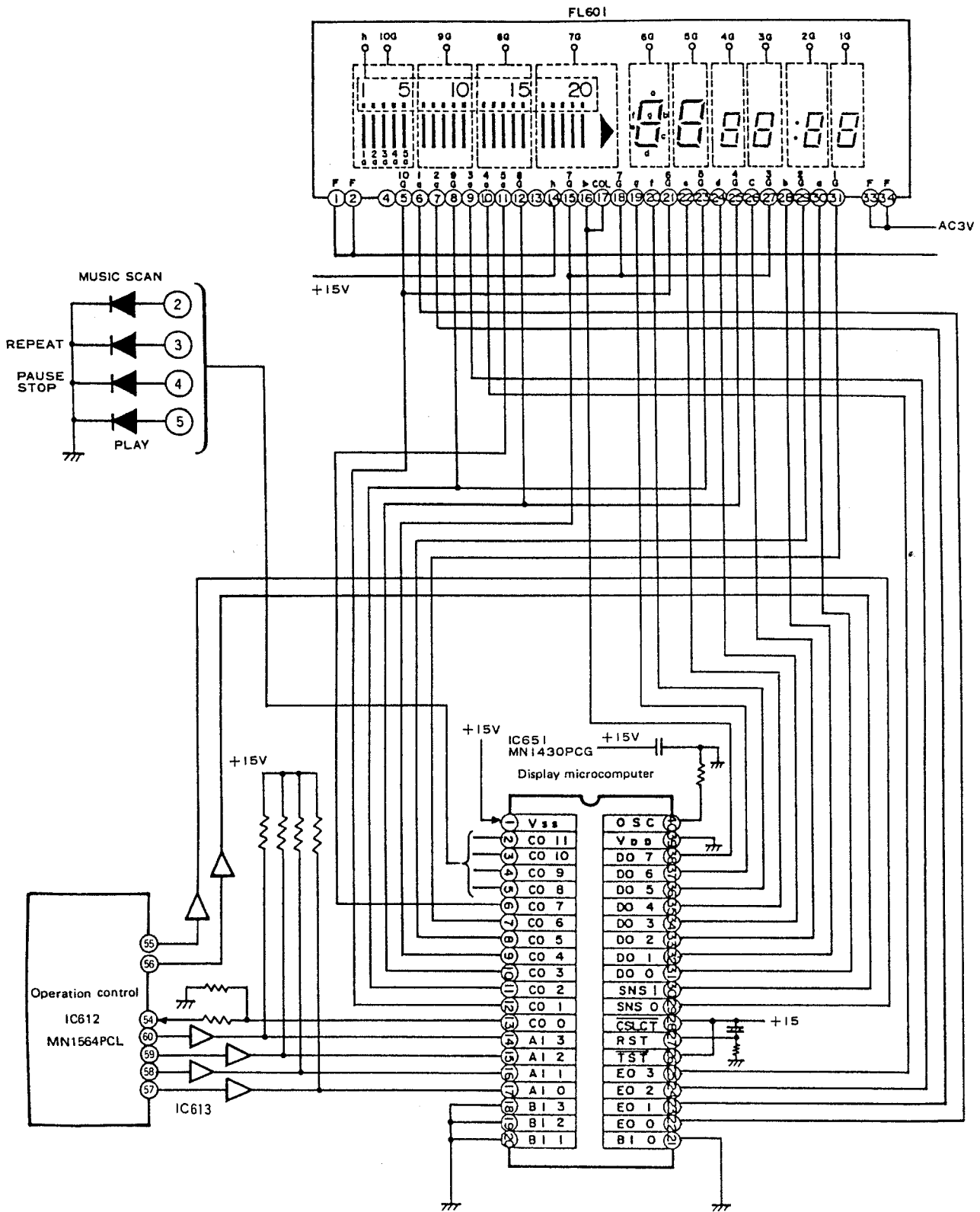


Fig. 21 Circuit diagram of display

4-3. Operation of display microcomputer

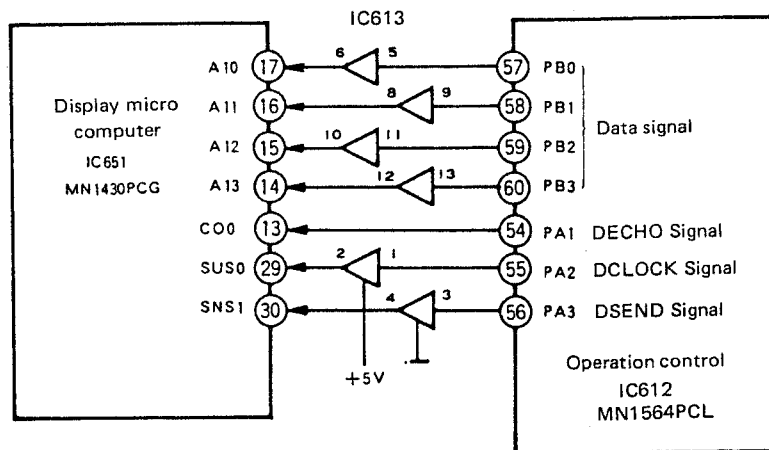


Fig. 22 Connection chart of microcomputer

1. When DSEND signal is applied to IC651 (30) SNS1 from operation control circuit, it is ready to receive the display data.
2. DCLOCK signal is delivered from operation control circuit, and 4-bit display data signal is delivered to IC651 A port. A variety of display are given by the data.
3. IC651, receiving data signal, delivers DECHO signal from CO0, and waits for the next data receiving timing.

Display Microcomputer operation

Terminal No.	Name of block	Symbol	Operation
14~17	A Input port	AI0 ~ AI3	Data in from opecon.
18~21	B Input port	BI0 ~ BI3	For model change SL-7 "H" (+15V) SL-P8 "L" (GND)
29	Sens input	SNS 0	DCLOCK from Opecon.
30		SNS 1	DSEND In from opecon.
13	C output port	CO 0	DECHO Out to opecon.
7 ~ 12		CO 1 ~ CO 6	Digit on of FL out
6		CO 7	FL bar code on (5th bar) Output
2 ~ 5		CO 8 ~ CO 11	LED ON output
31~37	D output port	DO 0 ~ DO 6	7 segment display out
38		DO 7	Colon over lights up out
22~25	E output port	EO 0 ~ EO 3	Bar code ON out (1st - 4th)
1	Power input	VSS	+15V
39	"	VDD	0 V
40	OSC. input	OSC	200KHz
27	RESET	RST	Reset at "L"
26	Test input	TST	Connect to +15V
28		CSLCT	"

Table 4 Display microcomputer operation

4-4. Display ON-timing

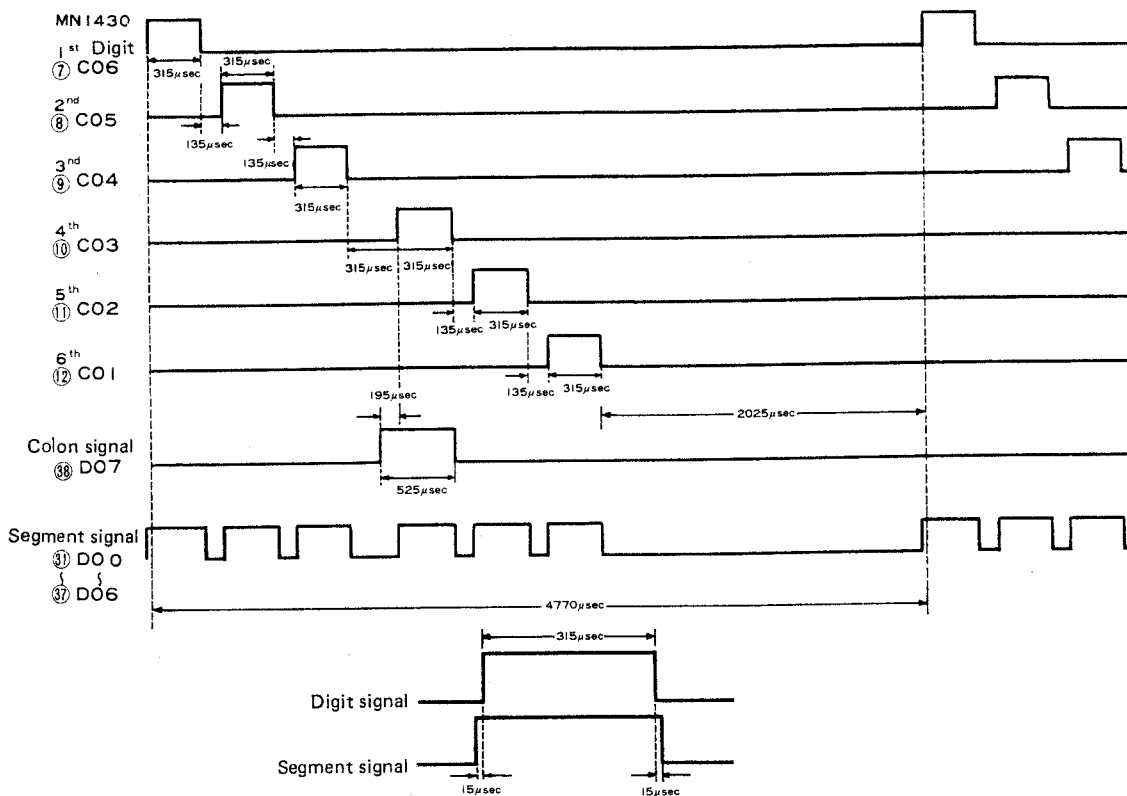


Fig. 23 Display ON-Timing

4-5. Display command to display microcomputer

Various display command from operation control are put in A port of display microcomputer as shown in the following.

MN1430PCG Input Port	Input data	FL display					
A port ⑰ AI 0 ⑯ AI 1 ⑮ AI 2 ⑭ AI 3	0	For LED ON	<table border="1"> <tr> <td>SCAN</td> <td>REPEAT</td> <td>PAUSE</td> <td>PLAY</td> </tr> </table> 0101.....PLAY and REPEAT ON	SCAN	REPEAT	PAUSE	PLAY
	SCAN	REPEAT	PAUSE	PLAY			
	1	Without colon segment ON	1B4BB15 --- 4 15				
	2	With colon Segment ON	210B314 --- 10 3:14 B means blank				
	3	Bar code all off	Rest				
	A	Bar code all ON	A 0812... 8th - 12th bars lighted				
	B	Bar code flash ON	B 04..... 4th bar flashes				
	C	Bar code ON	C 03..... Light up the 3rd bar				
D	Bar code off	D 03..... Light off the 3rd bar.					

Service Manual

Compact Disc Player
SL-P8/(K)

COMPACT
disc

DIGITAL

Supplement-2

Please use this manual together with the service manual for Model No. SL-P8.

- Notes:**
- ★ The replacement parts for optical pickup have been supplied as traverse unit ass'y (optical pick-up deck unit), but they are individually supplied as optical pick-up since May 21, 1984.
 - ★ This supplement includes the parts list and exploded view of loading drive mechanical and optical pick-up deck.
 - ★ This supplement should be filed with the service manual for Model No. SL-P8.

REPLACEMENT PARTS LIST

Ref. No.	Part No.	Part Name & Description	Ref. No.	Part No.	Part Name & Description
LOADING MECHANICAL PARTS			OPTICAL PICK-UP DECK UNIT PARTS		
41	SRUM007N05E	Tray Ass'y, Disc (1)	71	△ SRLP007N01A	Optical Pick-up (1)
42	SRUM008N04R	Disc Case Ass'y (1)	72	SRUM007N22	Bracket, Optical Pick-up (1)
42-1	SRKK008N03	Ornament Plate, Disc Case (1)	73	SRQS007N01	Spring, Bracket (1)
43	SRUM007N07	Cam, Disc Case (1)	74	SRXJ007N01	Shaft, Optical Pick-up Guide (2)
44	SRQH007N02	Spring (1)	75	SRUK007N02E	Optical Deck Unit Base Ass'y (1)
45	SFYB-5-32-P	Nylon Ball (11)	76	SRUP007N09	Holder (A), Shaft (2)
46	SRUP007N07	Holder (2)	77	SRUP007N08	Holder (B), Shaft (1)
47	SRUP007N05A	Holder, Disc Clamper (1)	78	SRGC007N02	Cushion Rubber (4)
48	SRDJ007N12E	Connector Ass'y (1)	79	SRQA007N02	Spring(A), Cushion Rubber (2)
49	SRUM007N18	Cover, Switch (1)	80	SRUP007N12	Holder, Spring (4)
50	SRQS007N02	Spring (1)	81	SRQA007N01	Spring (B), Cushion Rubber (2)
51	SRUG007N04	Gear, Return (1)	82	SRMH007N02A	Motor, Optical Pick-up Drive (1)
52	SRQH007N01	Spring, Return (1)	83	SRQA007N03	Spring (2)
53	SRUM007N15	Guide Plate (2)	84	SRTE007N03	Holder, Turntable (1)
54	SRUM007N09	Rack Gear, Loading (1)	85	SRQA010N04	Spring (1)
55	SRUP007N10E	Loading Guide Ass'y (1)	86	SRTE007N11E	Turntable (1)
56	SRUM007N06	Lock Arm (1)	87	SRTM007N01A	Rotary Magnet Ass'y (1)
57	SRQS007N03	Spring, Lock Arm (1)	88	SRDJ007N20E	Connector Ass'y (1)
58	SRUP007N03R	Loading Base Ass'y (1)	89	SRUM007N19	Holder, Motor (1)
59	SRDJ007N13E	Connector Ass'y (1)	90	SRDJ007N10E	Connector Ass'y (1)
60	SRUM007N17	Cover, Switch (1)	91	SRXG007N01E	Wrom Gear Ass'y (1)
61	SRGB007N02	Belt, Loading Motor (1)	92	SRGC007N01	Cushion Rubber (1)
62	SRUG007N01	Pulley, Loading Motor (1)	93	SRGB007N03	Belt (1)
63	SRQH007N03	Spring, Disc Clamper (1)	94	SRLH007N08	Clamper, Lead Wires (1)
64	SRUG007N03	Gear, Loading (1)	95	SRLC007N03	Cover, P.C. Board (1)
65	SRUG007N02	Gear, Transmission (1)			
66	SRMH007N01A	Motor, Loading (1)			
67	SRDJ007N16E	Connector Ass'y (1)			
68	SRUP007N15	Spacer (1)			
69	SRUM007N24	Spacer, Disc Clamper (1)			
70	SRGC007N07	Cushion Rubber, Disc Clamper (1)			

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

Matsushita Engineering and
Service Company
50 Meadowland Parkway
Secaucus, New Jersey 07094

Panasonic Hawaii, Inc.
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P.O. Box 774, Honolulu
Hawaii 96808-0074

Panasonic Sales Company
Division of Matsushita Electric
of Puerto Rico, Inc.
Ave. 65 de Interoferencia, KM 9.7
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Carolina, Puerto Rico 00630

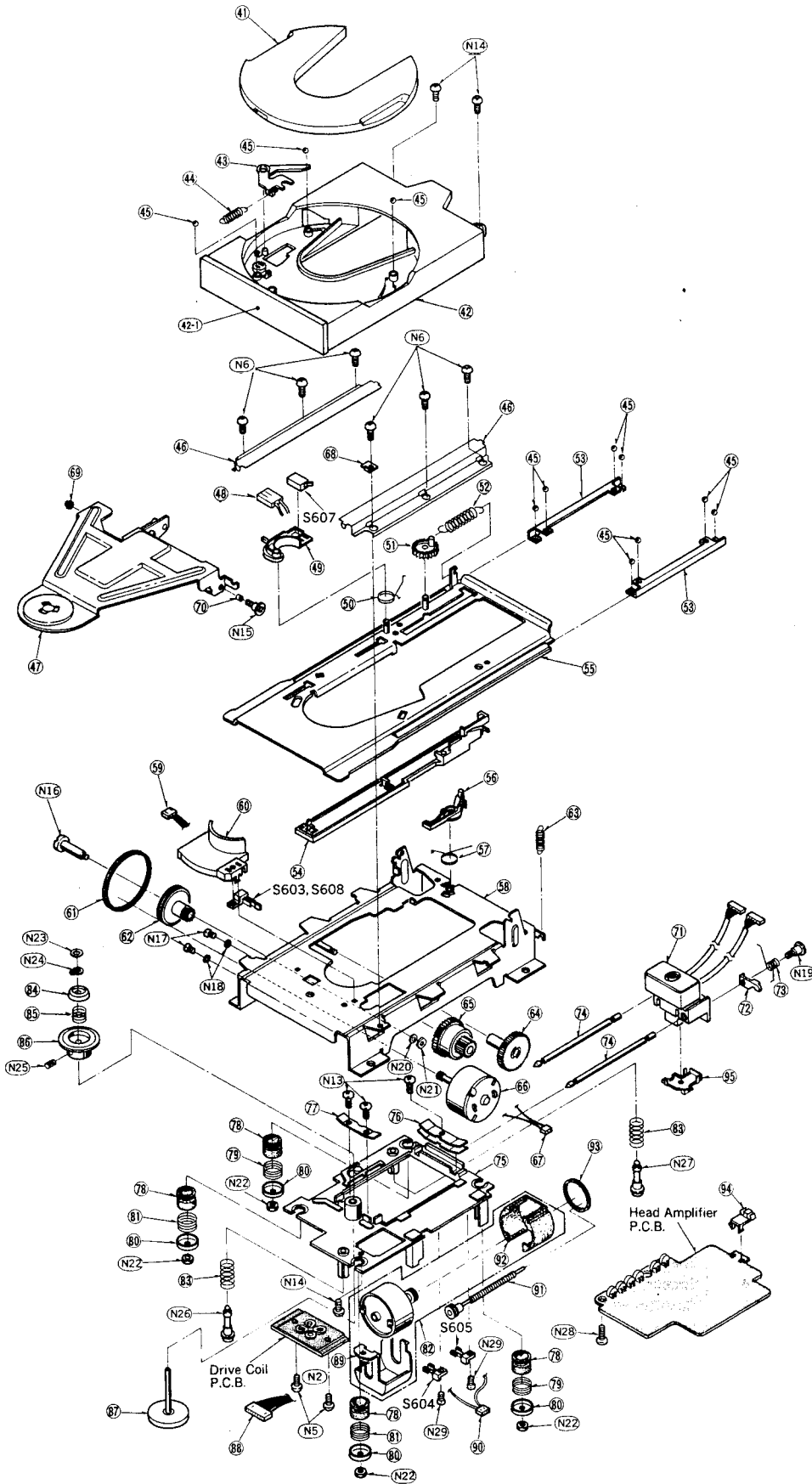
Technics

Panasonic Tokyo Matsushita
Electric Industrial Co., Ltd.
1-2, 1-chome, Shibakoen
Minato-ku, Tokyo 105 Japan

Matsushita Electric of
Canada Limited
5770 Ambler Drive
Mississauga, Ontario, L4W 2T3

EXPLODED VIEW

- Loading drive mechanism and optical deck unit parts

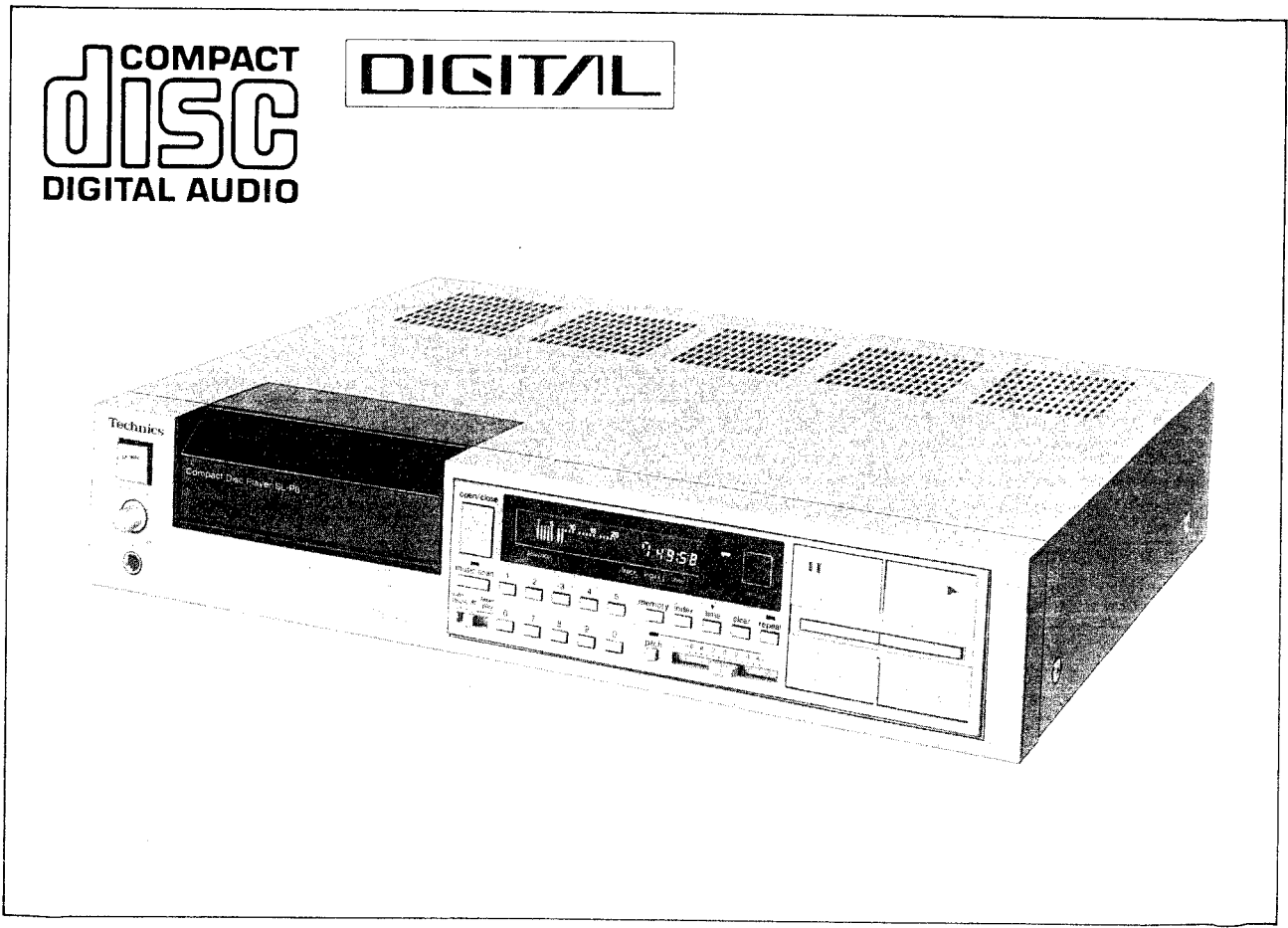


Technical Guide

VOL. 2

TROUBLE SHOOTING

Compact Disc Player
SL-P8



Technics

MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.
DISC AUDIO DIVISION



FOREWORD

This trouble shooting is intended to be used for seminars and selfstudies in Combination with the trouble shooting of SL-7. Therefore those Common to SL-P7 are omitted.

Accordingly, main differences from SL-P7 are involved.

1. Remote Control system and Expanded function of Operation Control.
2. Pitch Control.
3. Expansion of Display function.

These trouble shooting are described in 3 chapters, and other related circuit are omitted, So refer to the trouble shooting of SL-P7 and adjustment manual of SL-P8.

CONTENTS

	Page
[1] Outlines of Trouble Shooting	1
[2] Circuit Configuration	2
[3] Block Diagram of Signal Line and Main roles	4
[4] How to check Power Supply Circuit (Firstable check the Power supply circuit before check the other circuit)	6
[5] How to Check Remote and Operation Control System	9
[6] How to Check Pitch Control Circuit	15
[7] How to Check Display Circuit	23

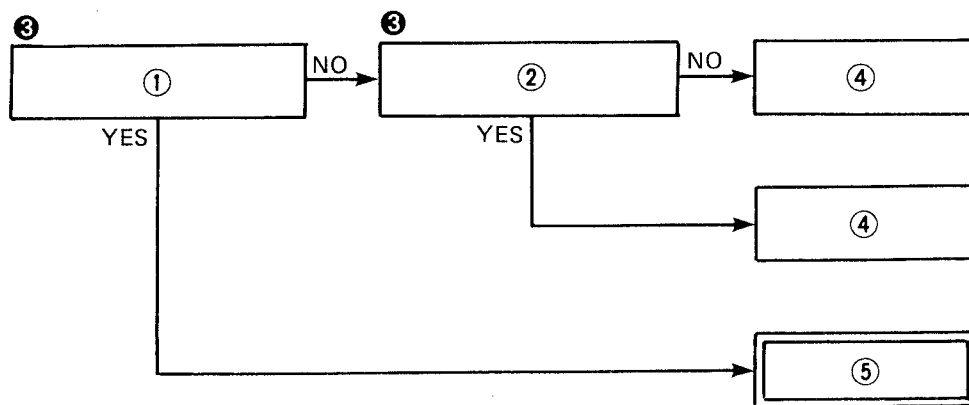
[1] Outlines of Trouble Shooting

1-1. Block Diagram

1-2. Signal line and Main roles of each circuit.

1-3. How to use the trouble shooting manual.

- Main roles.
- Main sympton.
- Block diagram
- Items to be confirmed before checking.
 - * Input Signal
 - * Control Signal
 - * Output Signal
- Checking method of each part.



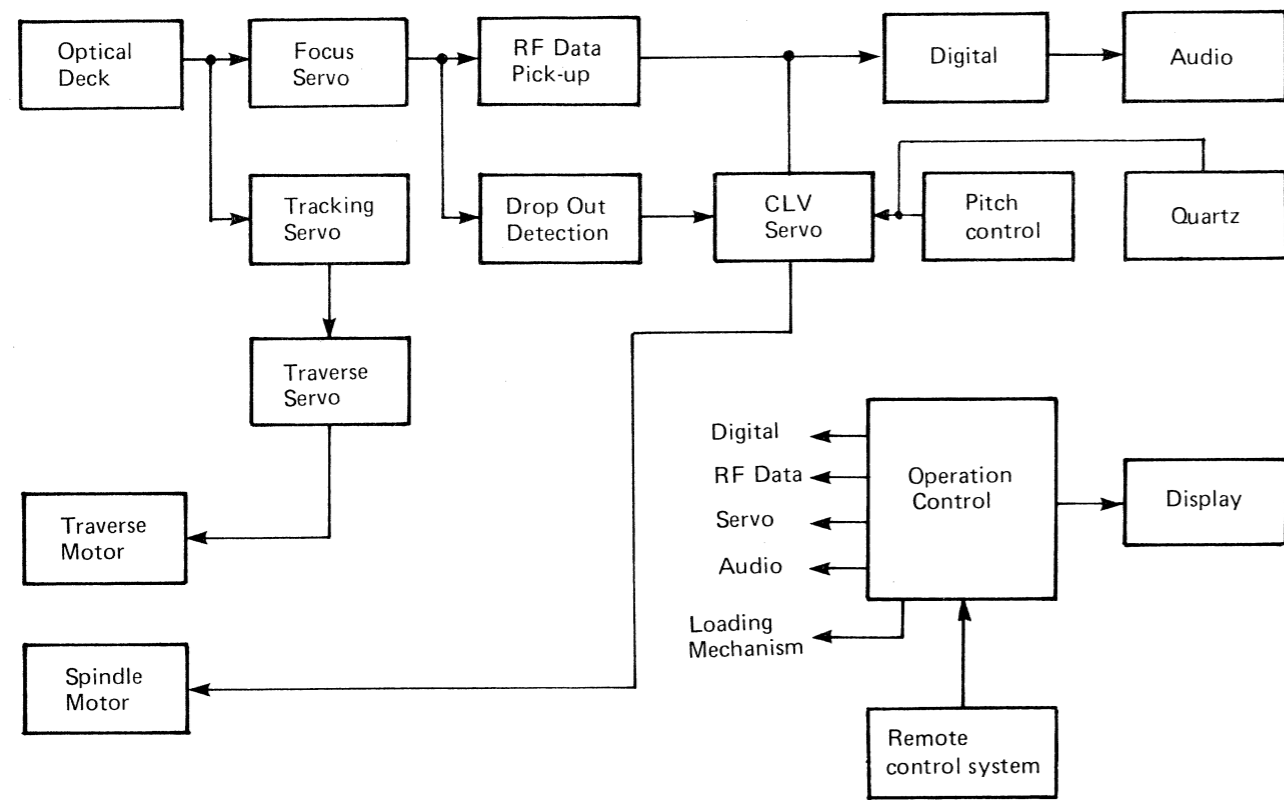
- ① : Circuti block is checked as a rule.
- ② : Defective parts which are so predicted are determined.
- ③ : Waveform and voltage in normal operation are shown.
- ④ : Defective parts so predicted are written.
P.D. = Possible Defects
A.A.C. = And Associated Components.
- ⑤ : No problem of this circuit But Re-check the adjustment manual.

1-4. Table of Contents for Trouble Shooting

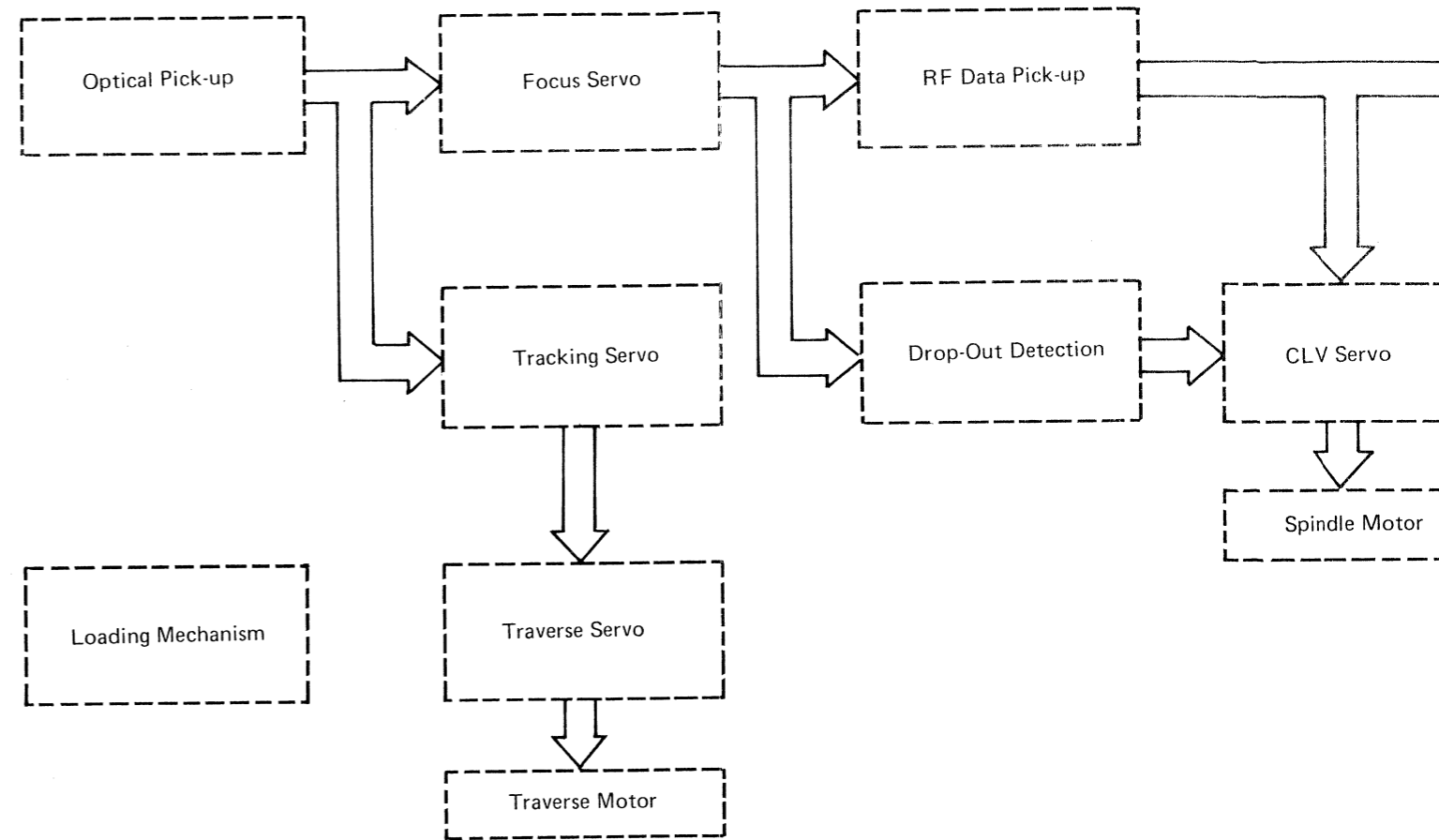
(Judge the defected circuit from the Phenomenon of defect)

	Operation	Defective Circuit	Refer No.
①	Insert a disc	① Operation Control ② Traverse Circuit ③ Loading Mechanism	

[2] Circuit Configuration



[3] Block Diagram of Signal Line and Main roles



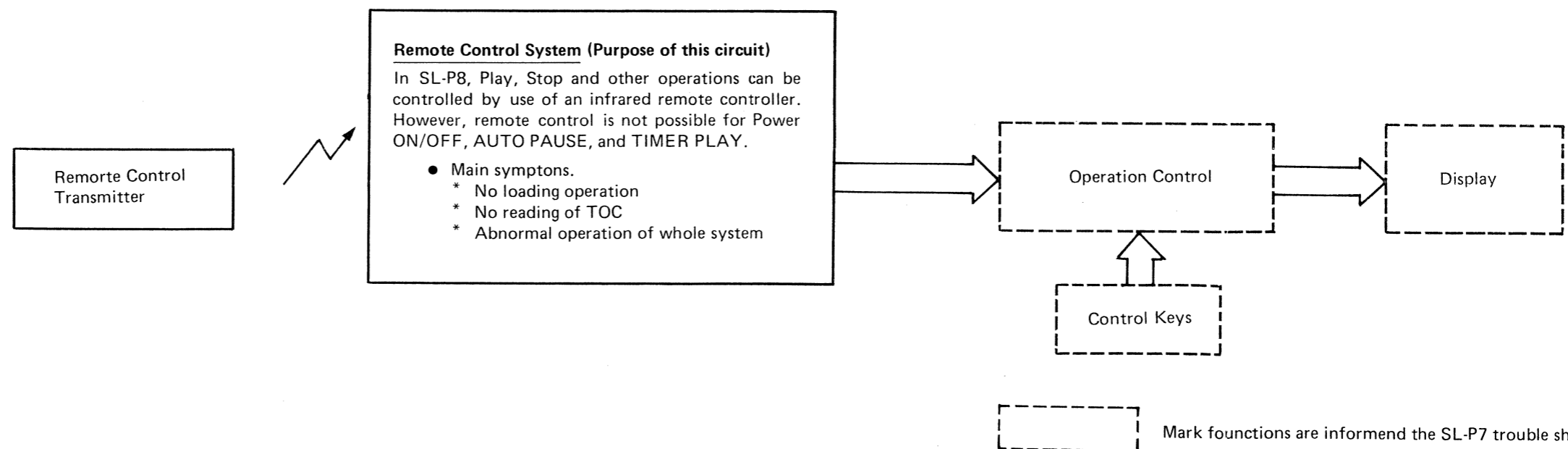
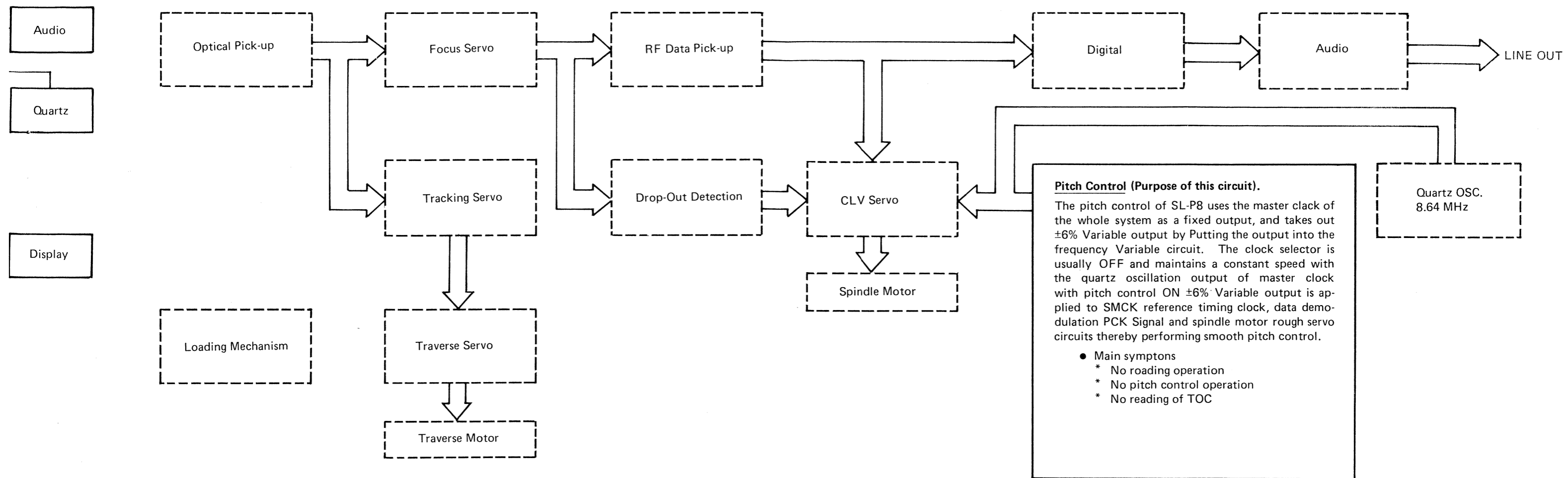
Remote Control Transmitter

Remote Control System (Purpose of this circuit)

In SL-P8, Play, Stop and other operations can be controlled by use of an infrared remote controller. However, remote control is not possible for Power ON/OFF, AUTO PAUSE, and TIMER PLAY.

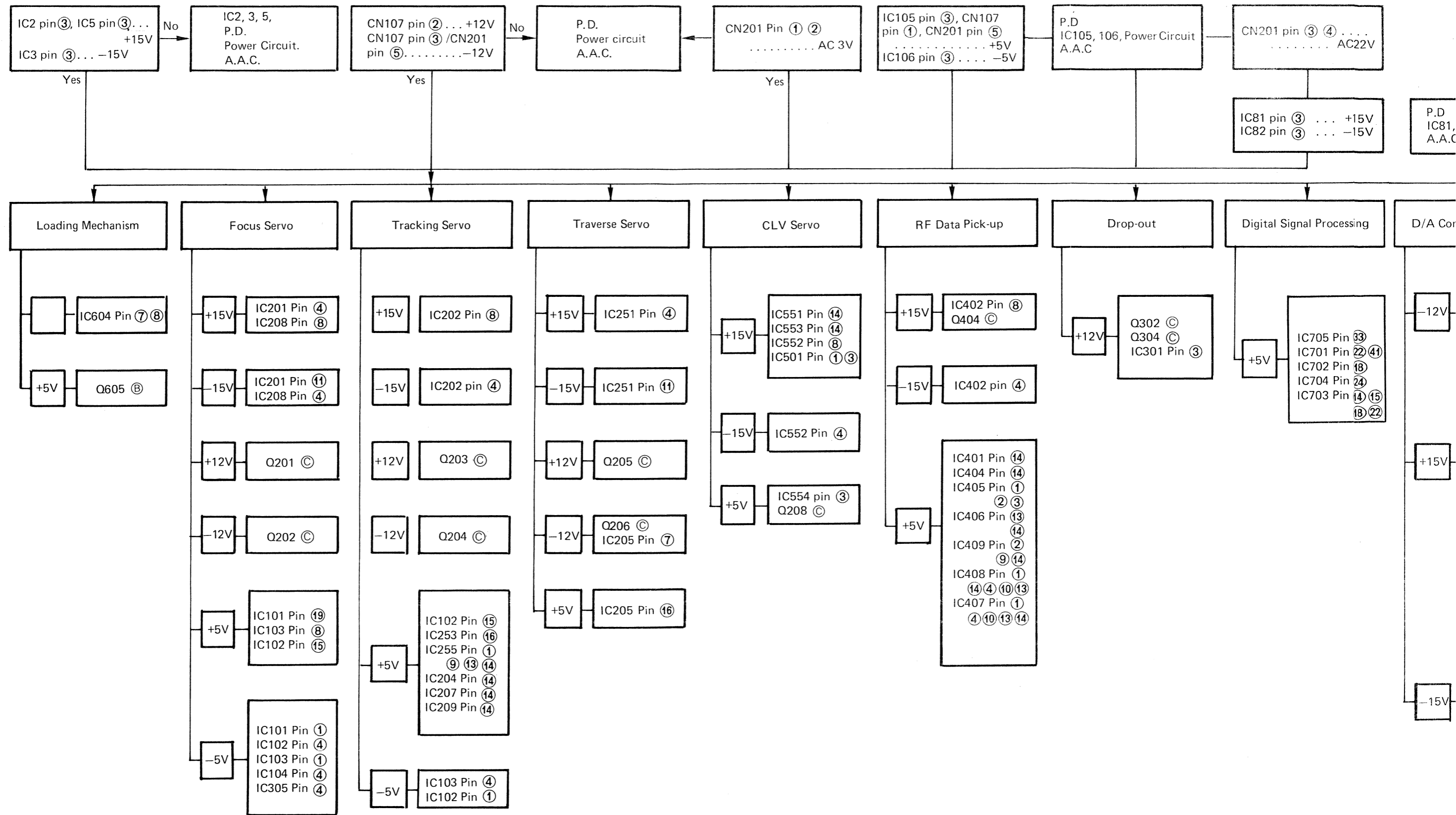
- Main symptoms.
 - * No loading operation
 - * No reading of TOC
 - * Abnormal operation of whole system

[3] Block Diagram of Signal Line and Main roles

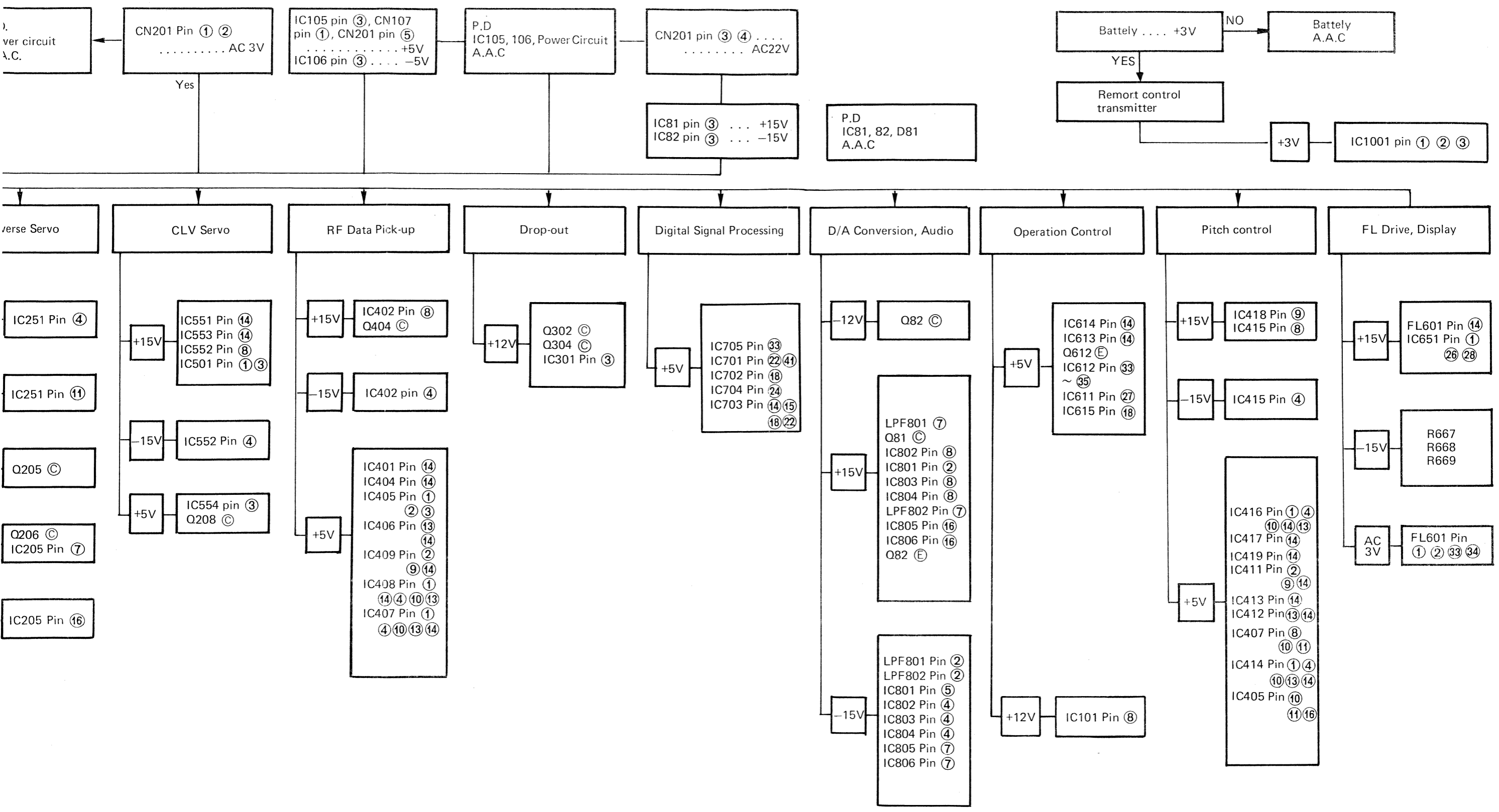


Mark founctions are informend the SL-P7 trouble shooting manuals.

[4] How to check Power Supply Circuit (First stable check the Power supply circuit before check the other circuit)



Check the Power supply circuit before check the other circuit)



[5] How to Check Remote and Operation Control System

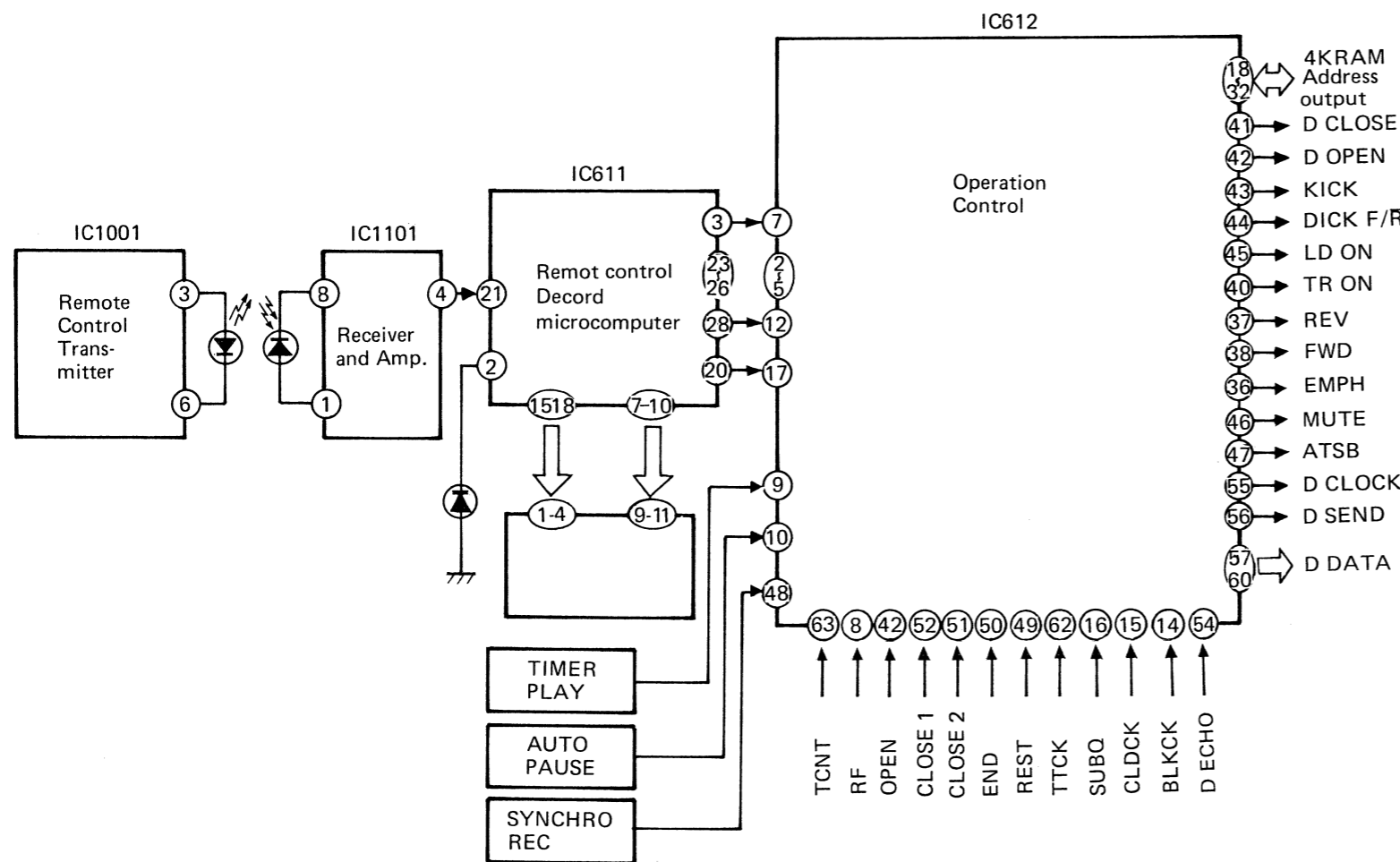
(1) Main roles of remote and operation control circuit

- Setting of each mode
- Remote control of each mode
- Control of whole system

(2) Main symptoms

- No TOC reading
- No loading operation
- Abnormal operation of whole system

(3) Block Diagram




(4) Items to be confirmed before checking

(Input signal)

- ① • D1007 (D1008) Check infrared LED ON.

(Control signal)

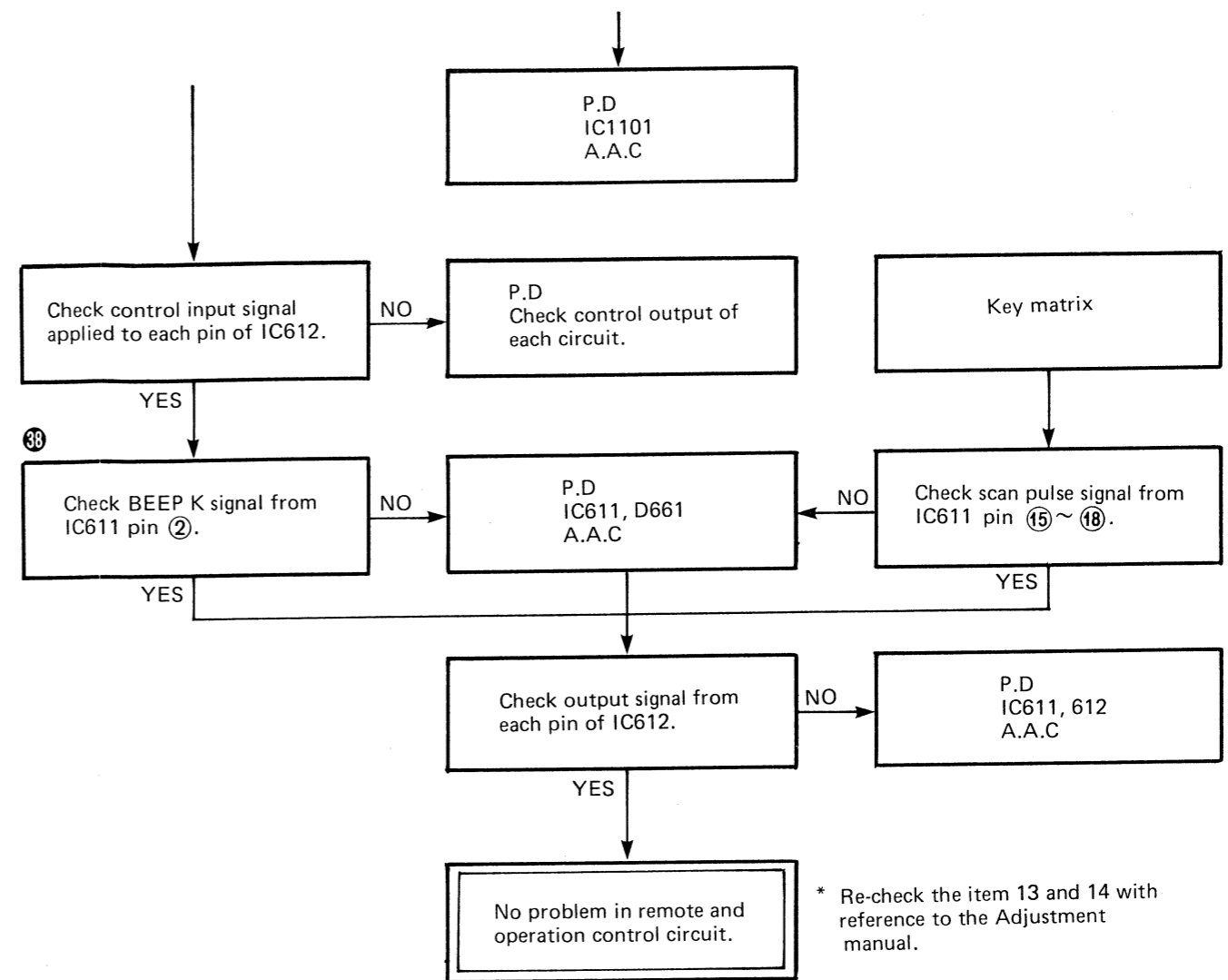
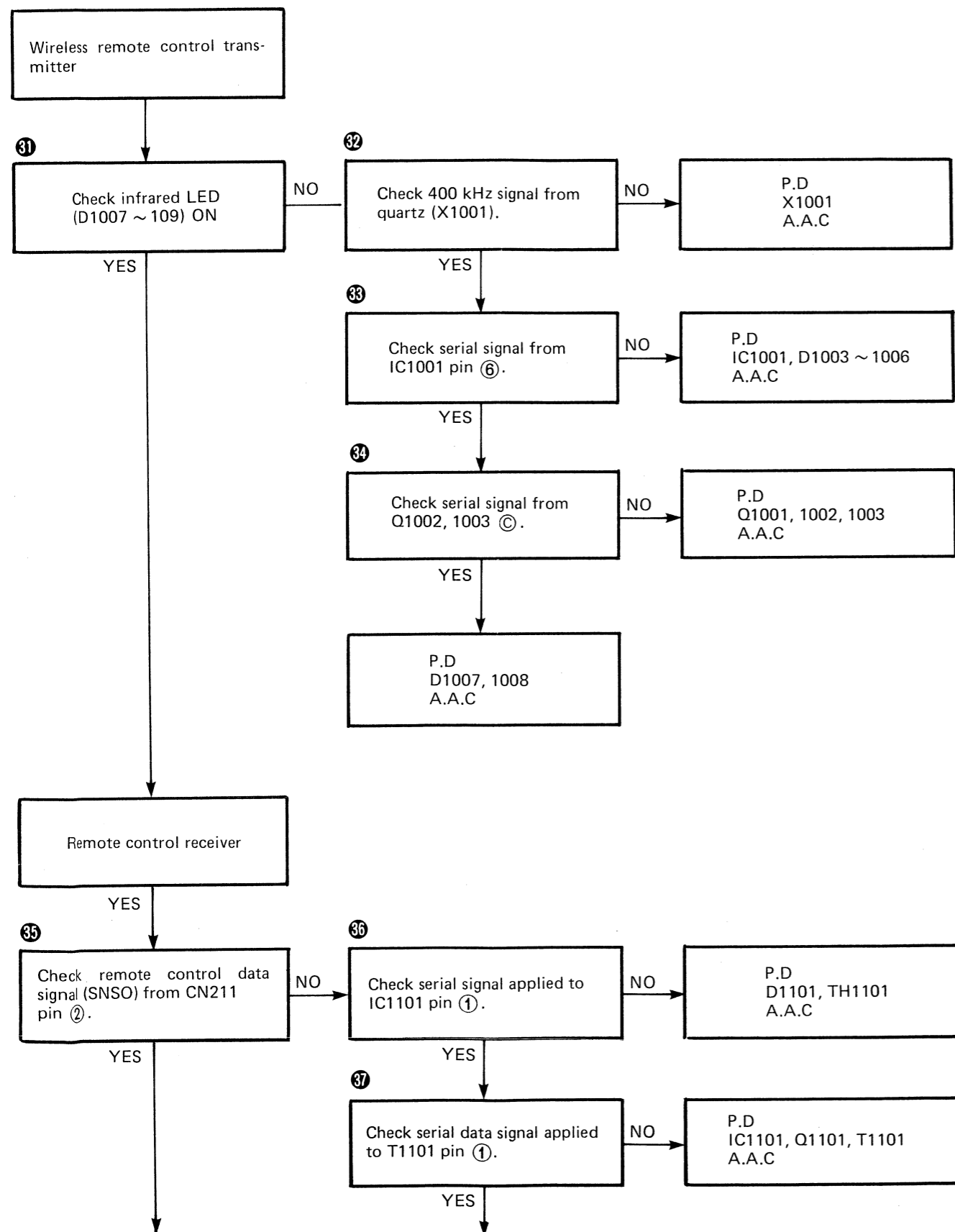
- ① • IC611 Pin ⑮ – ⑰ Scan pulse “  ”
- ② • IC612 Pin ⑤④ (DECHO) Check by display circuit.
- ③ • IC612 Pin ⑭ (BLKCK)
- ④ • IC612 Pin ⑮ (CLDCK)
- ⑤ • IC612 Pin ⑰ (SUBQ)
- ⑥ • IC612 Pin ⑥② (TTCK) Check by pitch control circuit.
- ⑦ • IC612 Pin ④⑨ (REST)
- ⑧ • IC612 Pin ⑤① (END)
- ⑨ • IC612 Pin ⑤① (CLOSE2) Check by Loading mechanism.
- ⑩ • IC612 Pin ⑤② (CLOSE1)
- ⑪ • IC612 Pin ⑤③ (OPEN)
- ⑫ • IC612 Pin ⑧ (RF) Check by focus servo circuit.
- ⑬ • IC612 Pin ⑥③ (TCNT) Check by RF data pick-out circuit.
- ⑭ • IC612 Pin ⑨ (TIMER PLAY). “L” (Switch ON)
- ⑮ • IC612 Pin ⑩ (AUTO PAUSE). “L” (Switch ON)
- ⑯ • IC612 Pin ④⑧ (SYNCHRR REC). “L” (Synchro Rec mode)

(Output signal)

- ⑰ • IC612 Pin ④① (D CLOSE)
- ⑱ • IC612 Pin ④② (D OPEN) Check by loading mechanism.
- ⑲ • IC612 Pin ④③ (KICK)
- ⑳ • IC612 Pin ④④ (KICK F/R)
- ㉑ • IC612 Pin ④⑤ (LD ON) Check tracking servo circuit.
- ㉒ • IC612 Pin ④⑥ (TR ON)
- ㉓ • IC612 Pin ④⑦ (REV) Check by focus servo circuit.
- ㉔ • IC612 Pin ④⑧ (FWD) Check by traverse servo circuit.
- ㉕ • IC612 Pin ④⑨ (EMPH) Check by D/A converter/audio circuit.
- ㉖ • IC612 Pin ④⑩ (MUTE)
- ㉗ • IC612 Pin ④⑪ (ATSB) Check by digital signal processing circuit.
- ㉘ • IC612 Pin ⑤⑤ (DCLOCK)
- ㉙ • IC612 Pin ⑤⑥ (D SEND) Check by display microcomputer circuit.
- ㉚ • IC612 Pin ④⑫ (SYNC)

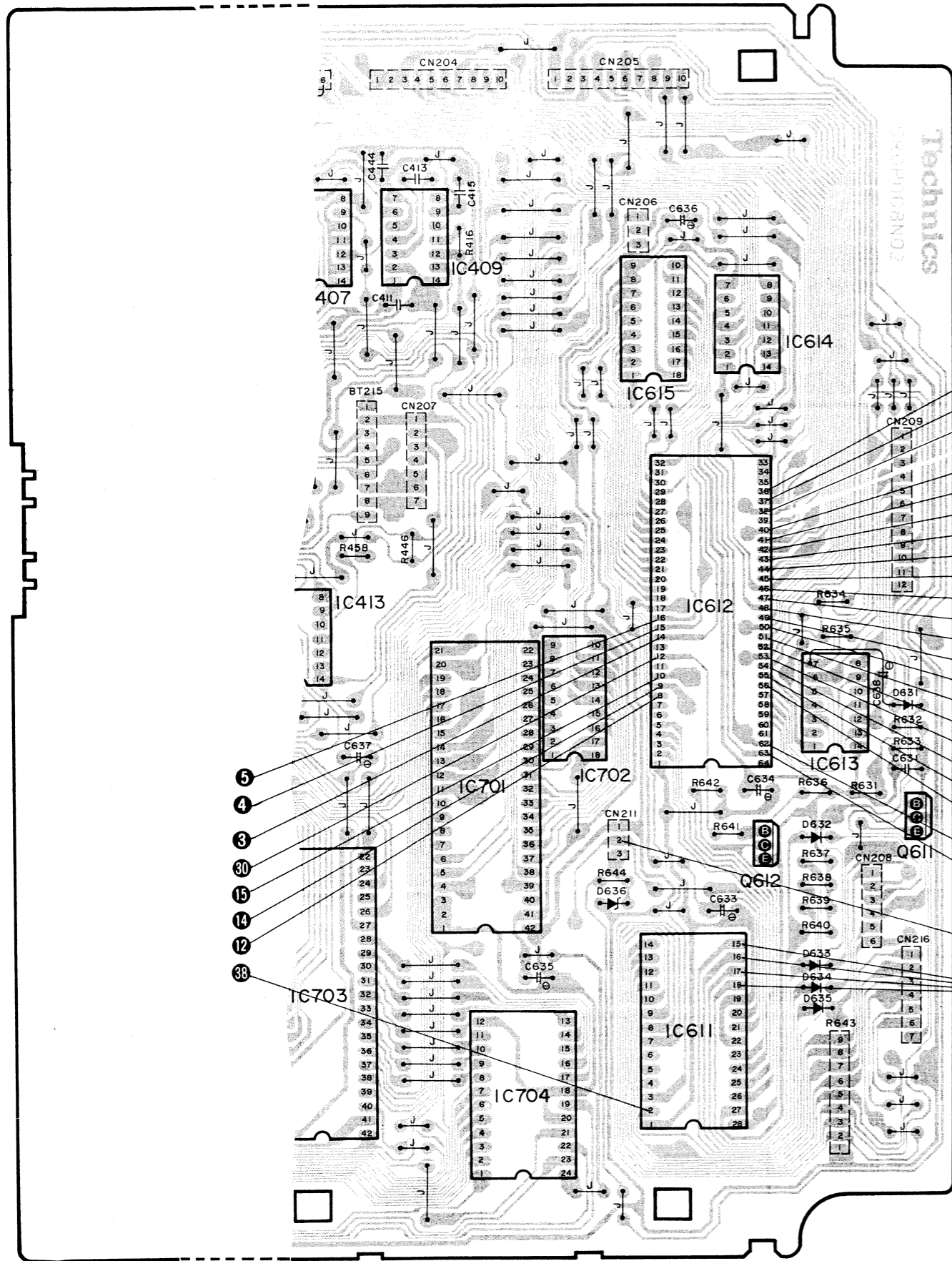


If all the items mentioned above are satisfied, there is no problem in remote/operation control circuit. If not, you must go to the following procedure.

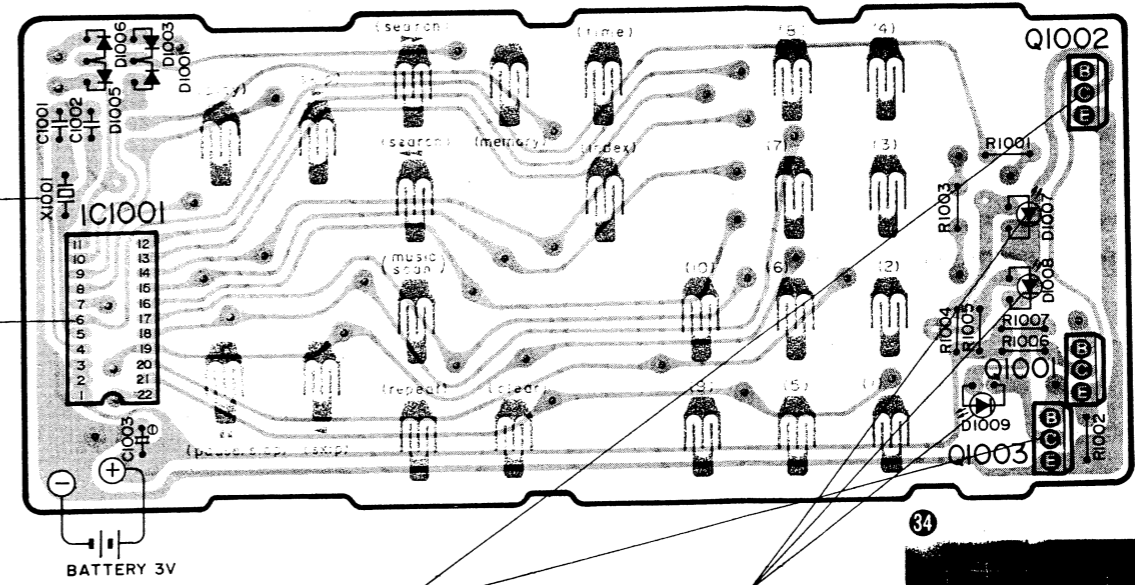


* Re-check the item 13 and 14 with reference to the Adjustment manual.

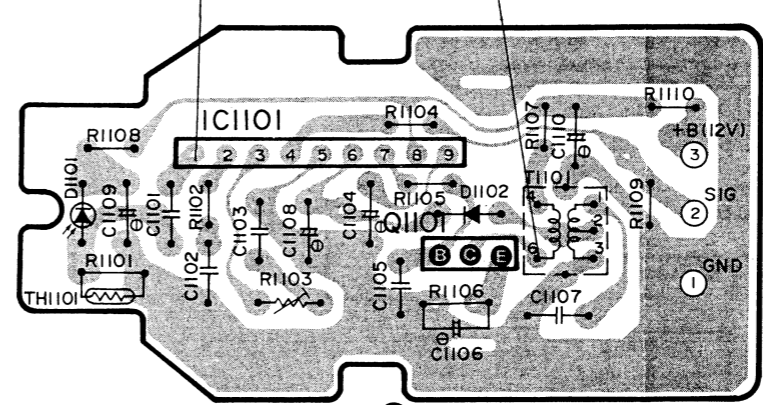
If it is basically not understandable, refer to items 1 ~ 2 in Circuit description.



- 5
- 4
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- 22
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- 27
- 16
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- 8
- 9
- 10
- 11
- 2
- 28
- 29
- 13
- 35
- 1



- 32
- 33
- 34
- 31



- 1
 - 30
 - 31
 - 37
 - 35
 - 36
 - 37
- IC601 pin ②
2V/0.1msec. Div. AC
- X1001 (IC1001 pin ④) Quartz
1V/1msec. Div. AC
- IC612 pin ⑫
2V/0.5msec. Div. AC
- IC1001 pin ⑥
1V/0.5msec. Div. AC
- Q1002 ① / Q1003 ①
1V/0.5m sec. Div. AC
- CN211 ②
2V/0.5msec. Div. AC
- IC1101 pin ①
0.5V/0.5msec. Div. AC
- T1101 pin ⑥
5V/0.5msec. Div. AC

[6] How to Check Pitch Control Circuit

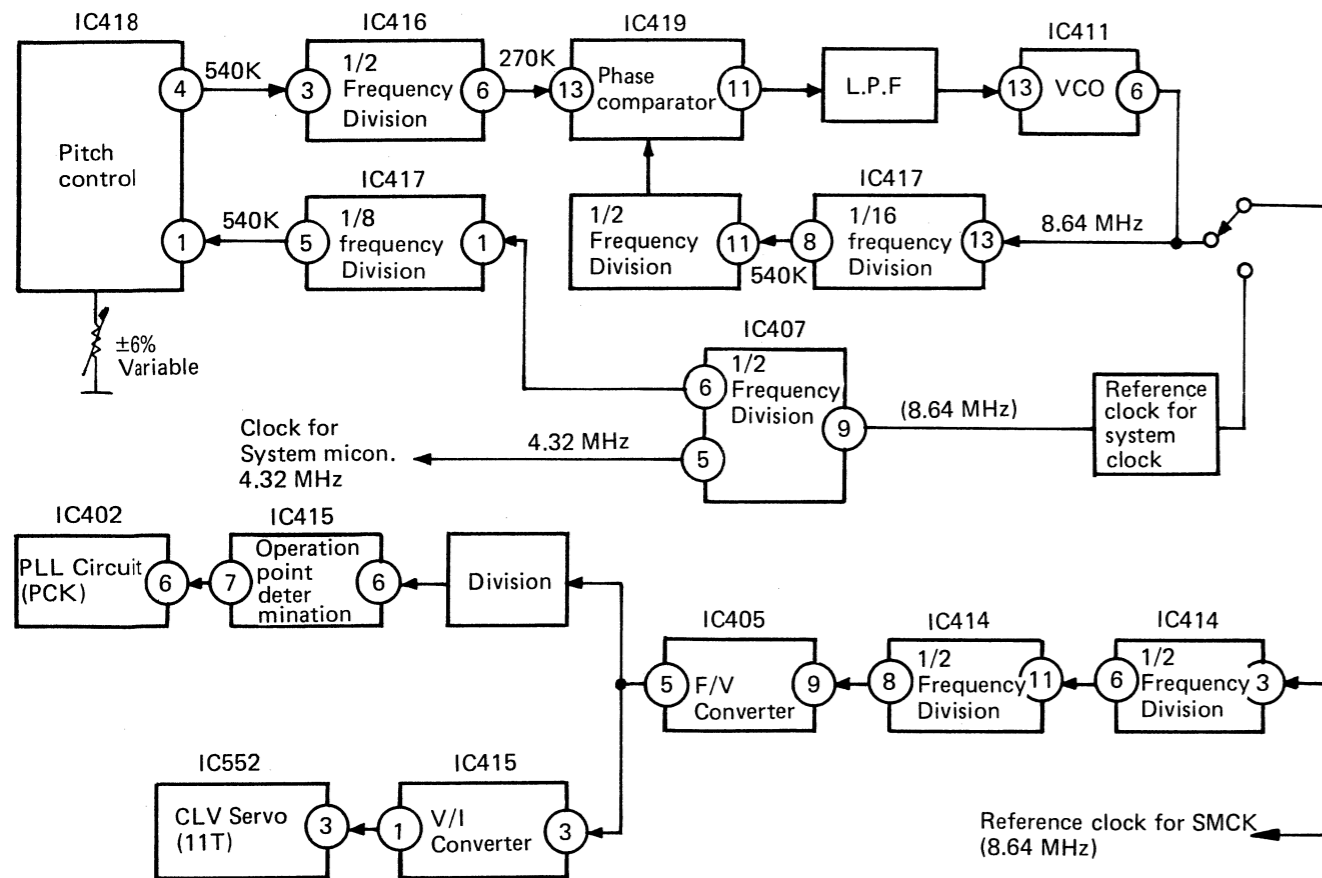
(1) Main roles of pitch control circuit

- It delivers clock (4.32 MHz) output for system control (OSC1).
- It delivers reference timing clock for SMCK.
- It controls data demodulating PCK signal and CLV servo (11T circuit).

(2) Main symptoms

- No TOC reading
- No loading operation

(3) Block diagram



(4) Items to be confirmed before checking

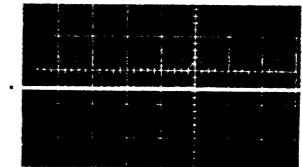
Input signal

- IC412 pin ⑪ (system clock) 8.64 MHz.

Output signal

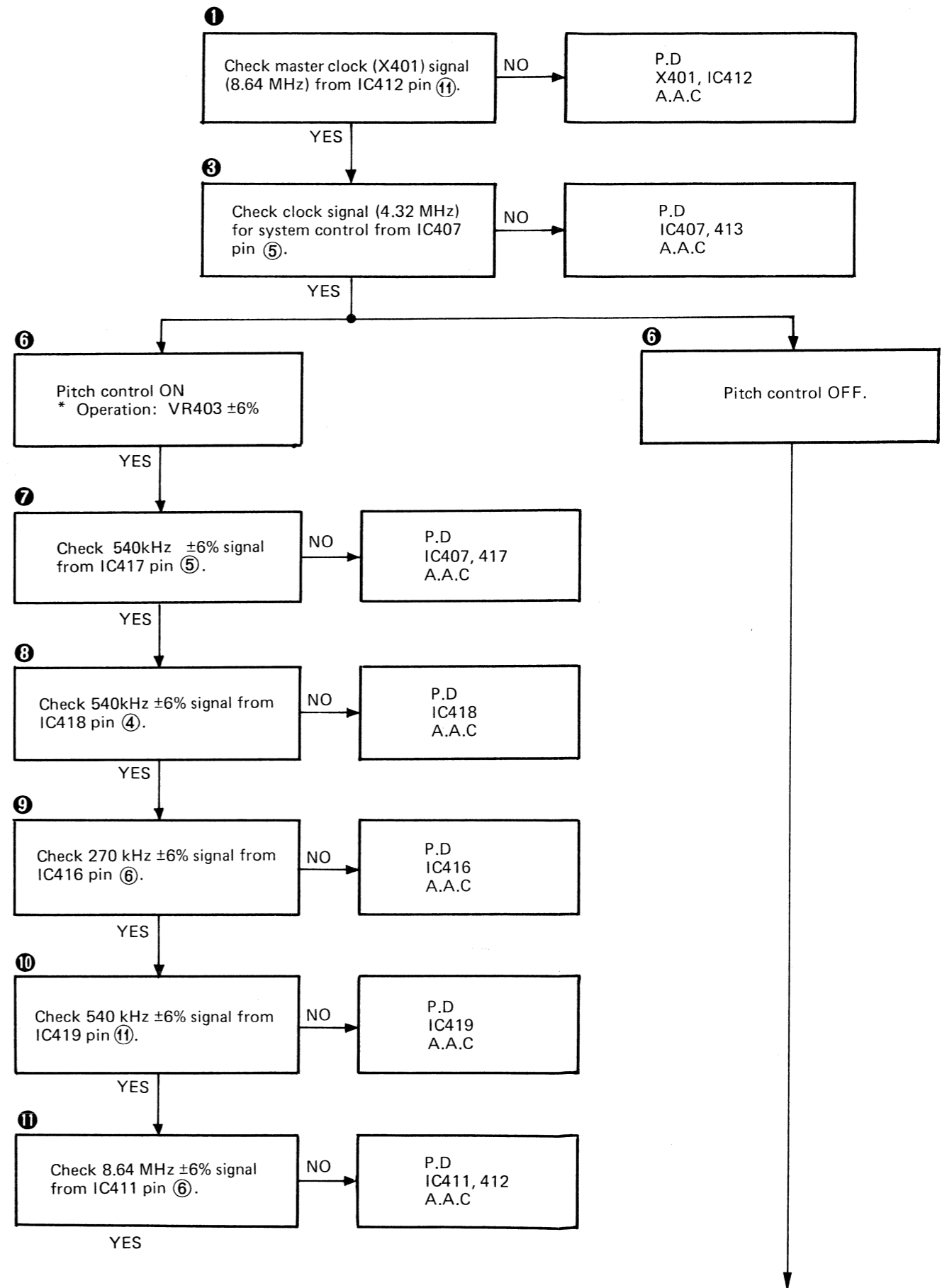
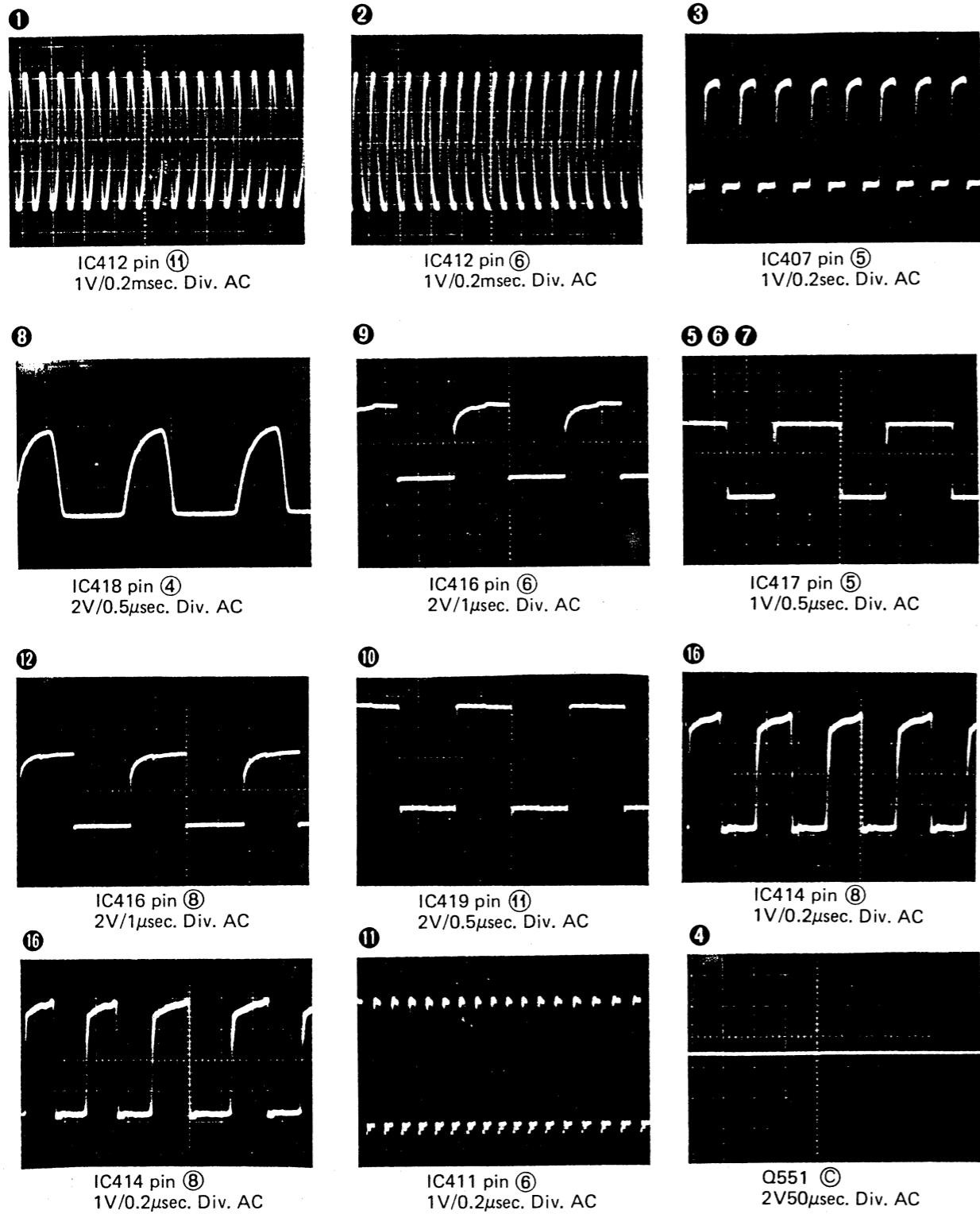
- IC412 pin ⑥ (master colck for SMCK) 8.64 MHz
- IC407 pin ⑤ (clock for system control) 4.32 MHz

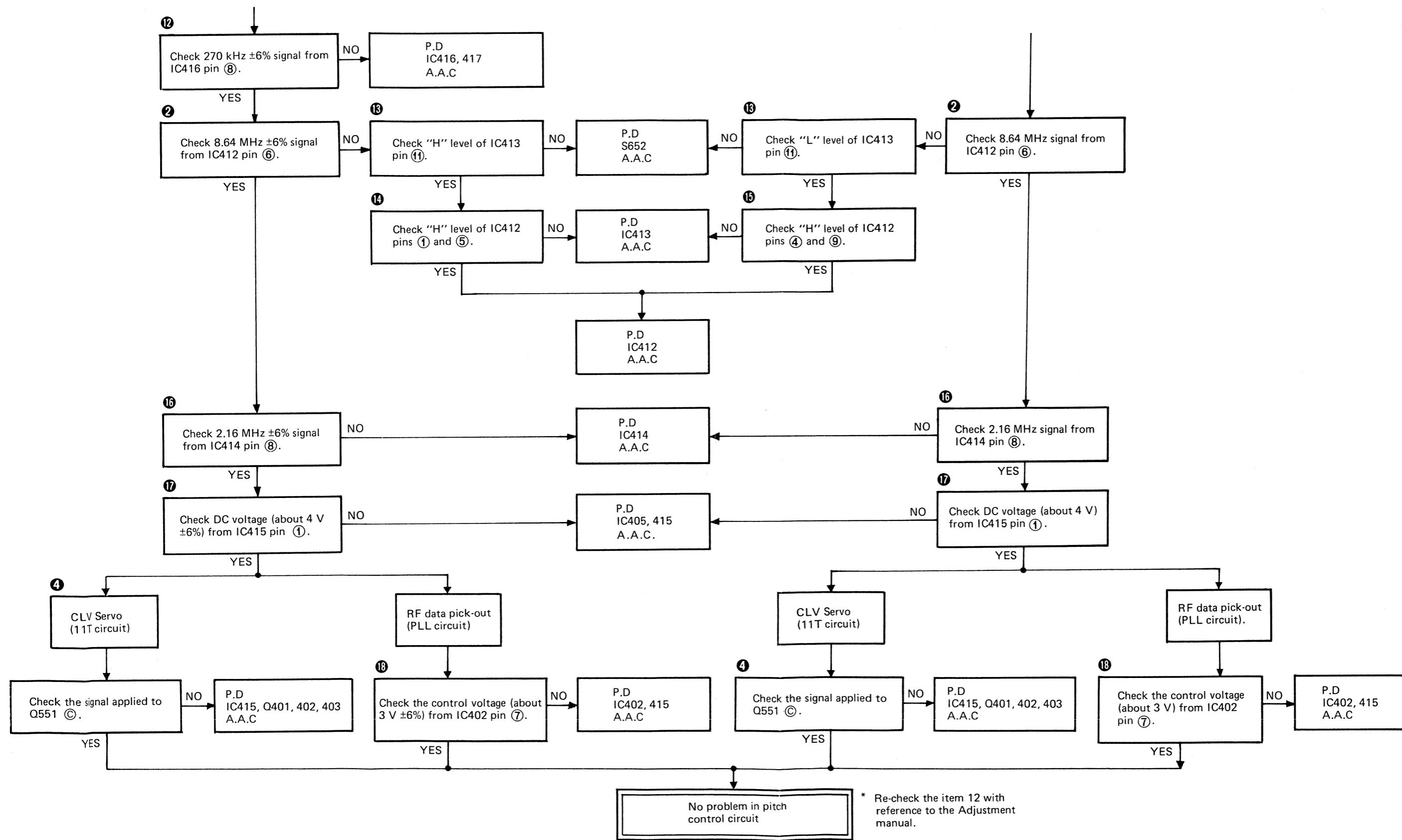
- Q551 ③ (CLV servo (11T circuit) control signal)



- IC402 pin ⑥ (PLL circuit, PCK generation) control signal About DC 3 V

If all the above-mentioned items are satisfied, there is no problem in pitch control circuit. If not, you must go to the following procedure.



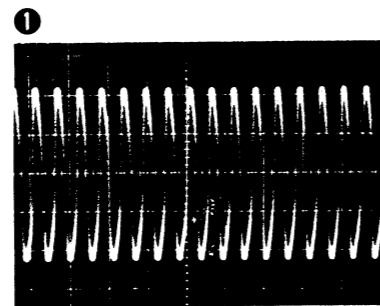
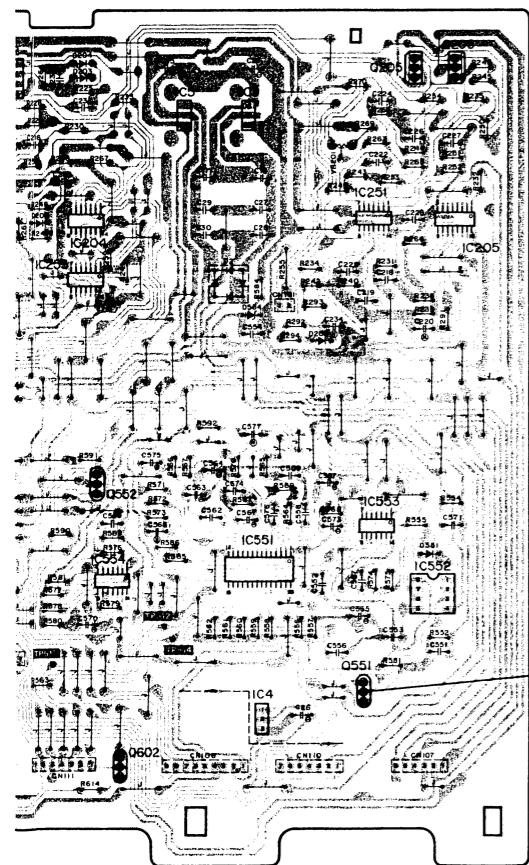
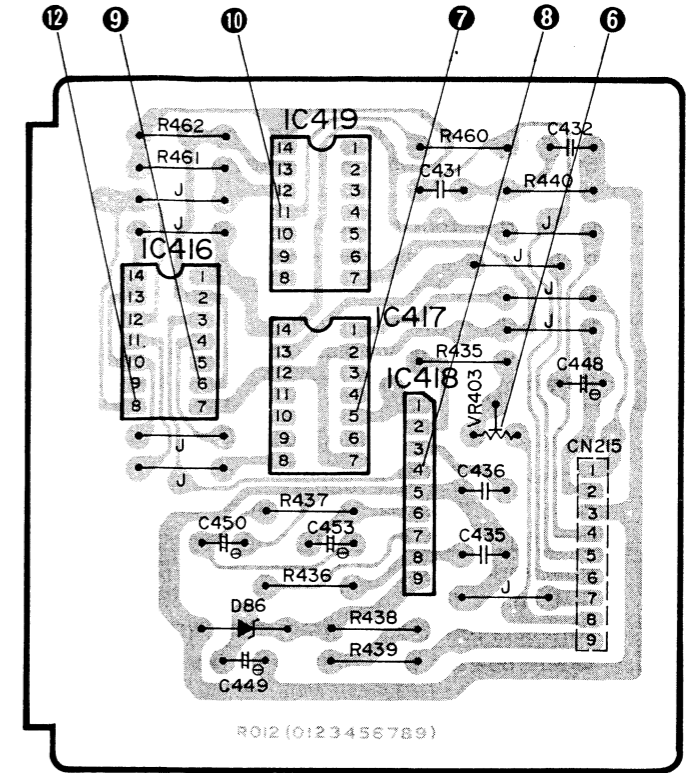
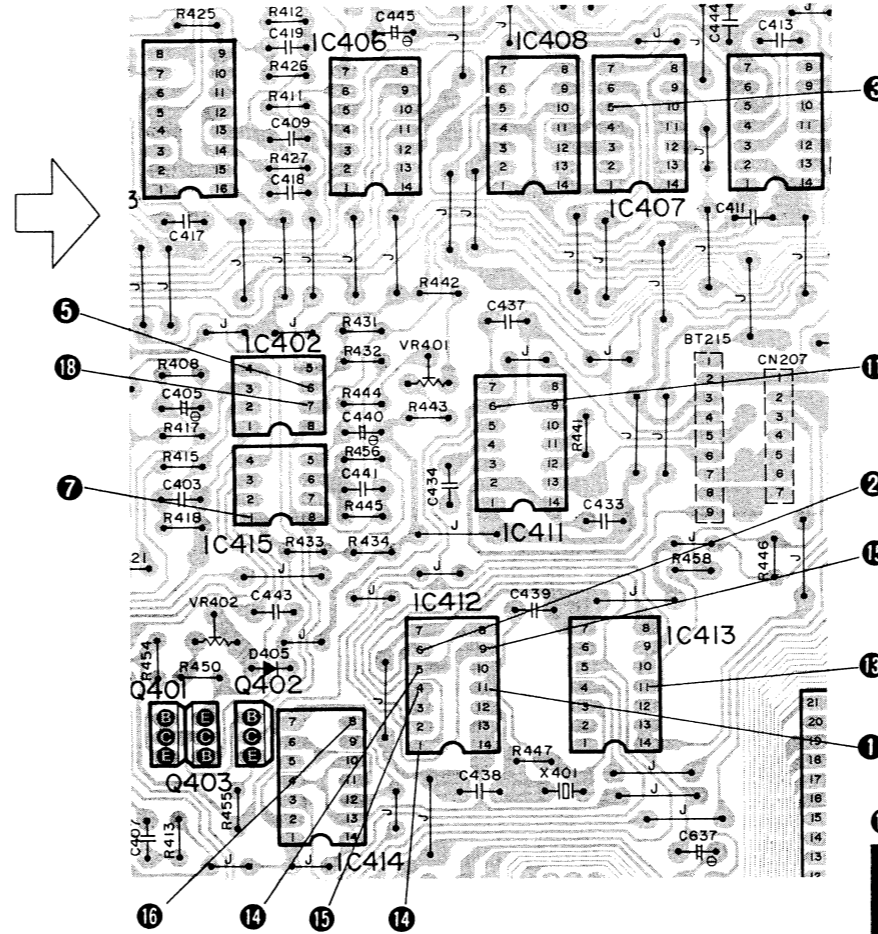
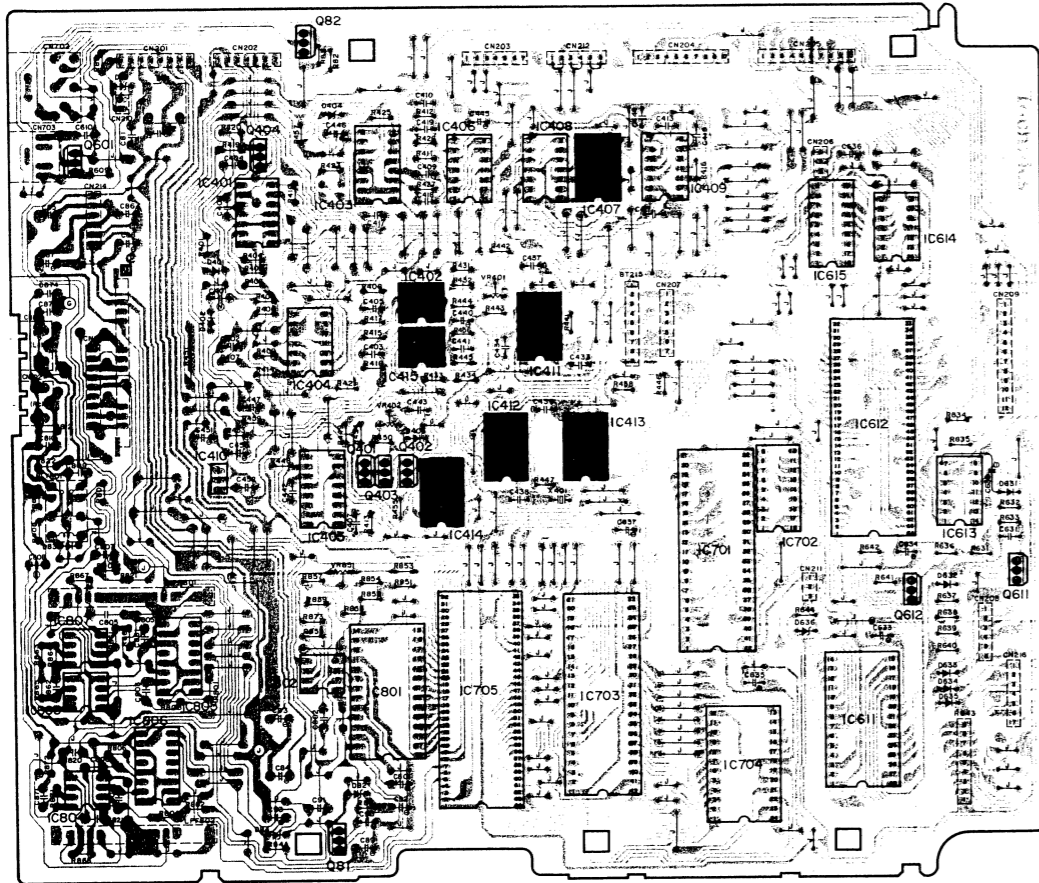


No problem in pitch control circuit

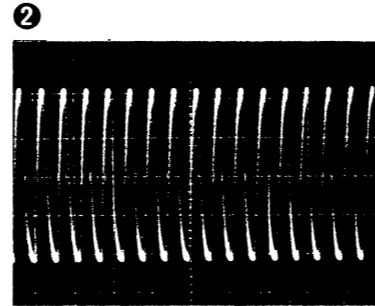
* Re-check the item 12 with reference to the Adjustment manual.

If it is basically not understandable, refer to item 3 in circuit description.

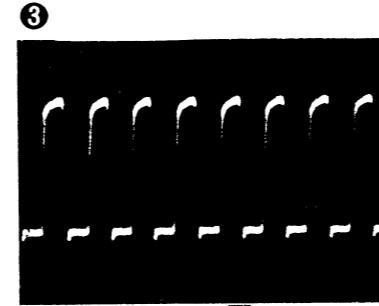
02 P.C.B.



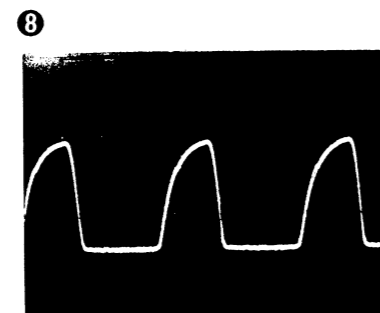
IC412 pin ⑪
1V/0.2msec. Div. AC



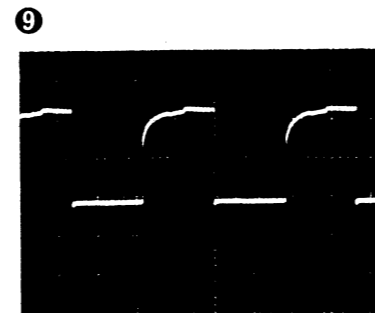
IC412 pin ⑥
1V/0.2msec. Div. AC



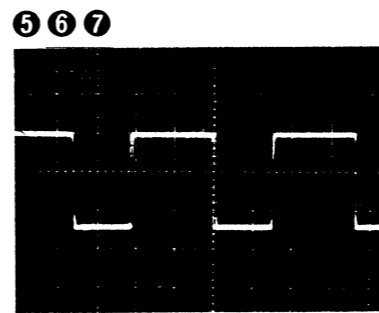
IC407 pin ⑤
1V/0.2sec. Div. AC



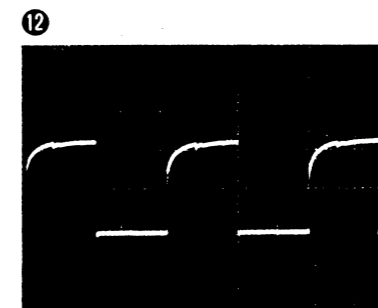
IC418 pin ④
2V/0.5μsec. Div. AC



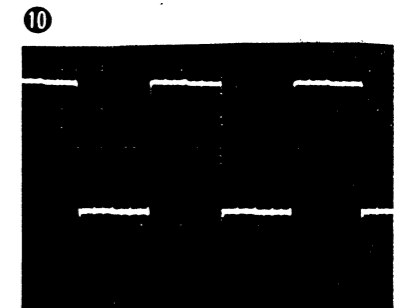
IC416 pin ⑥
2V/1μsec. Div. AC



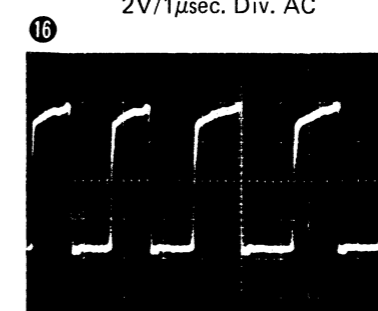
IC417 pin ⑤
1V/0.5μsec. Div. AC



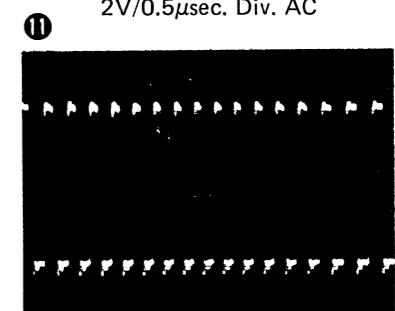
IC416 pin ⑧
2V/1μsec. Div. AC



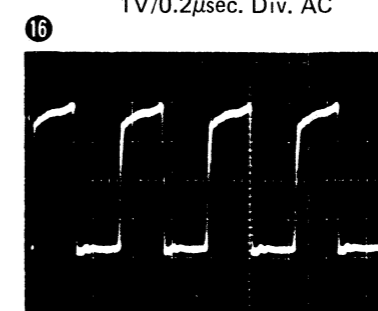
IC419 pin ⑪
2V/0.5μsec. Div. AC



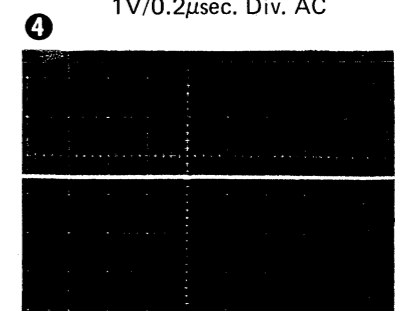
IC414 pin ⑧
1V/0.2μsec. Div. AC



IC411 pin ⑥
1V/0.2μsec. Div. AC



IC414 pin ⑧
1V/0.2μsec. Div. AC



Q551 ④
2V50μsec. Div. AC

[7] How to Check Display Circuit

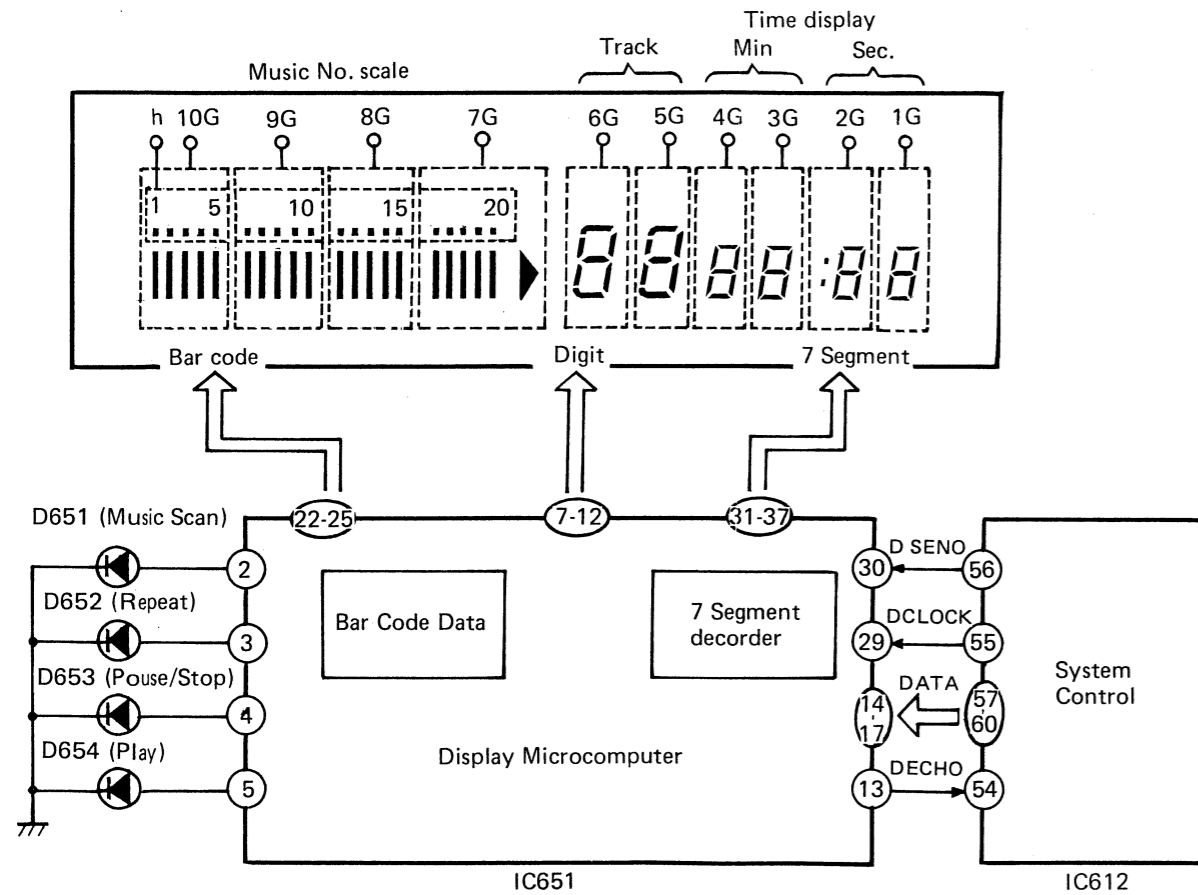
(1) Main roles of display circuit

- It serves to display music No., track, and time.

(2) Main symptoms

- No display at all.
- Abnormal display.

(3) Block diagram



(4) Items to be confirmed before checking

(Input signal)

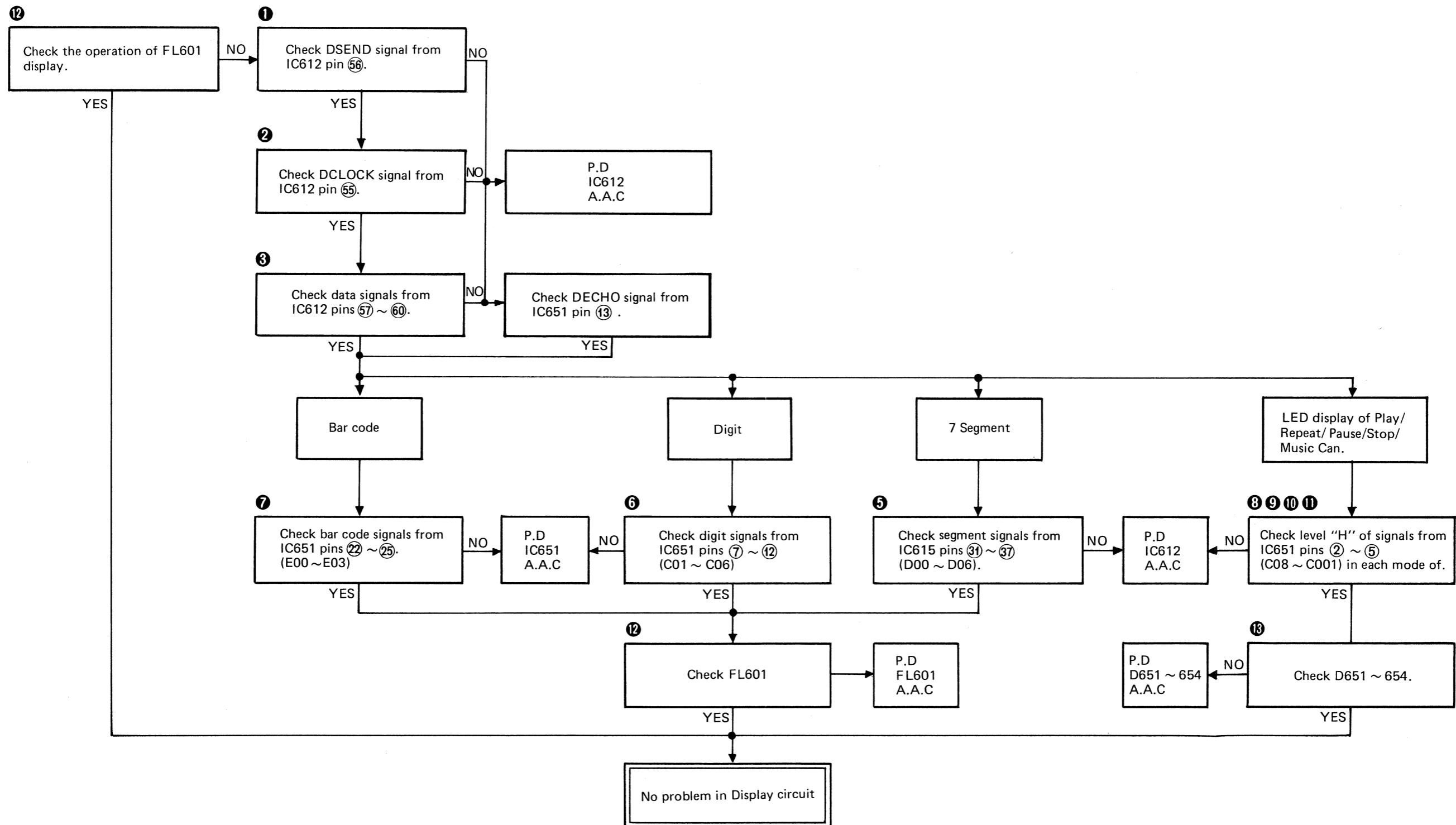
- ① • IC612 Pin ⑤⑥ (D SEND)
- ② • IC612 Pin ⑤⑤ (D CLOCK)
- ③ • IC612 Pin ⑤⑦ - ⑥① (PB0 - PB3)

(Output signal)

- ④ • IC651 Pin ⑬ (DECHO)
- ⑤ • IC651 Pin ③① - ③⑦
- ⑥ • IC651 Pin ⑦ - ⑩
- ⑦ • IC651 Pin ②② - ②⑤

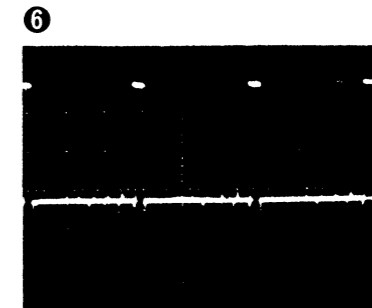
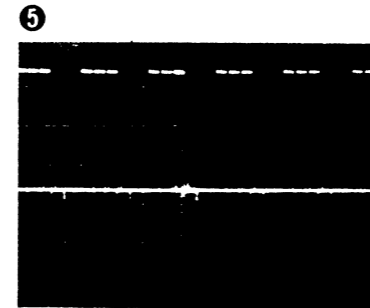
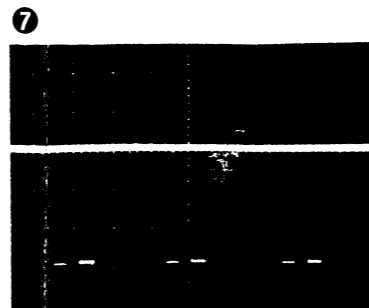
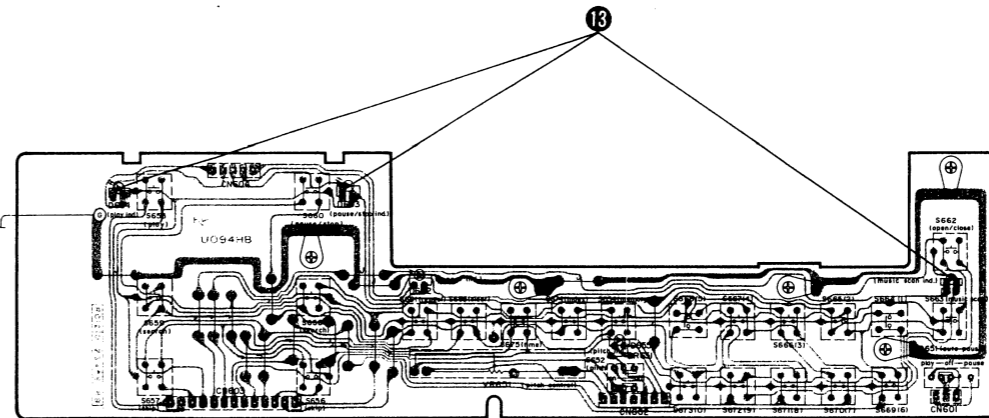
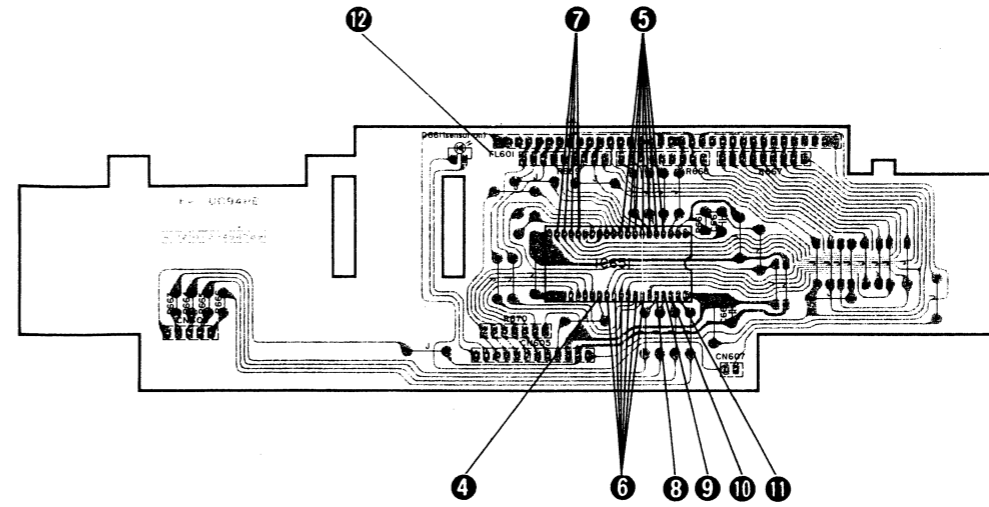
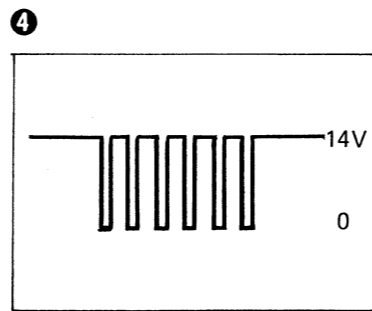
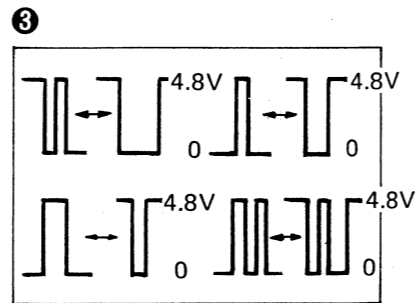
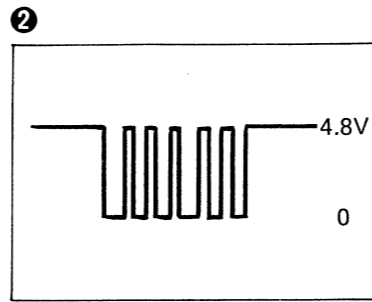
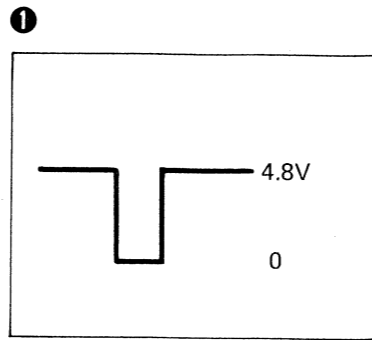
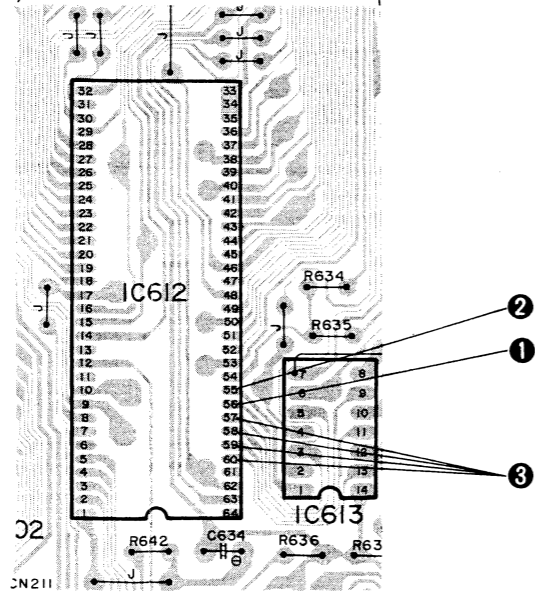
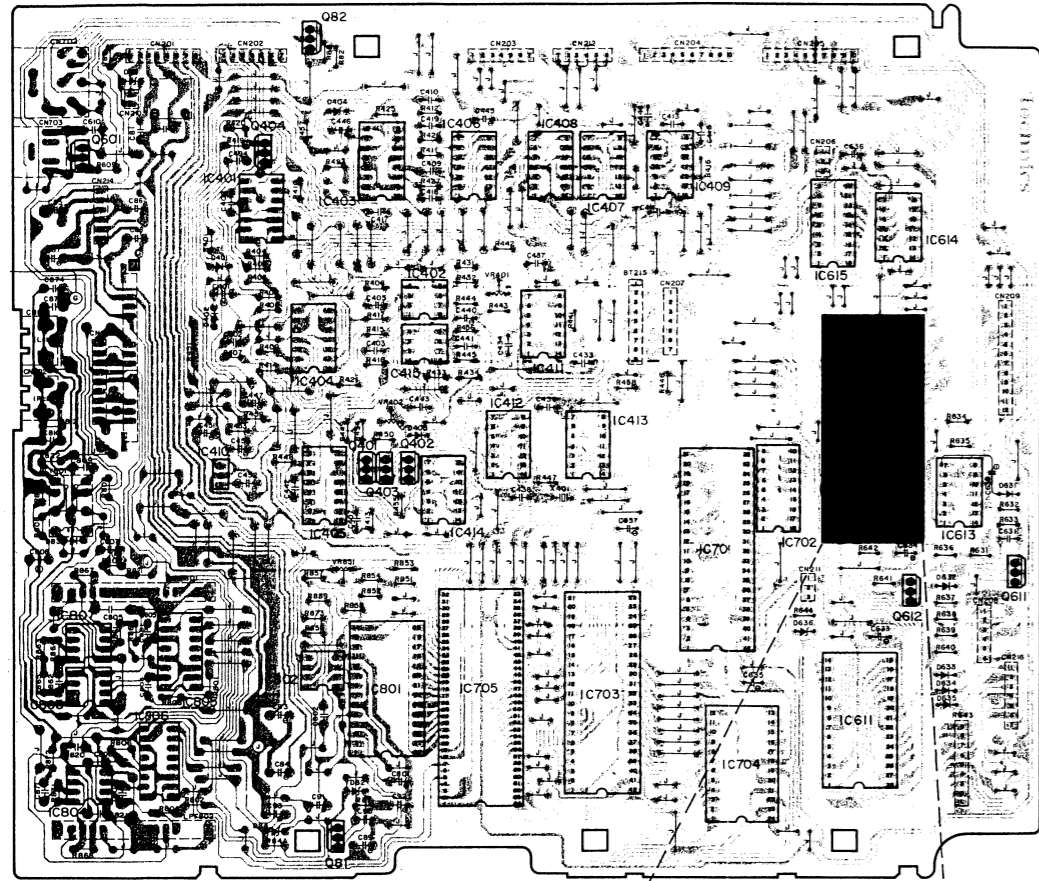
- ⑧ • IC651 Pin ⑤ H (Play Mode)
- ⑨ • IC651 Pin ④ H (Pause/stop Mode)
- ⑩ • IC651 Pin ③ H (Repeat Mode)
- ⑪ • IC651 Pin ② H (Music Scan Mode)

If all the above-mentioned items are satisfied, there is no Problem in Display circuit.
If not, you must go to the following procedure.



If it is basically not understandable, refer to item 4 in circuit Description.

02 P.C.B.



IC651 pin ②
10V/2msec Div. AC

IC651 pin ③
10V/1msec Div.

IC651 pin ⑦
10V/2msec. Div. AC

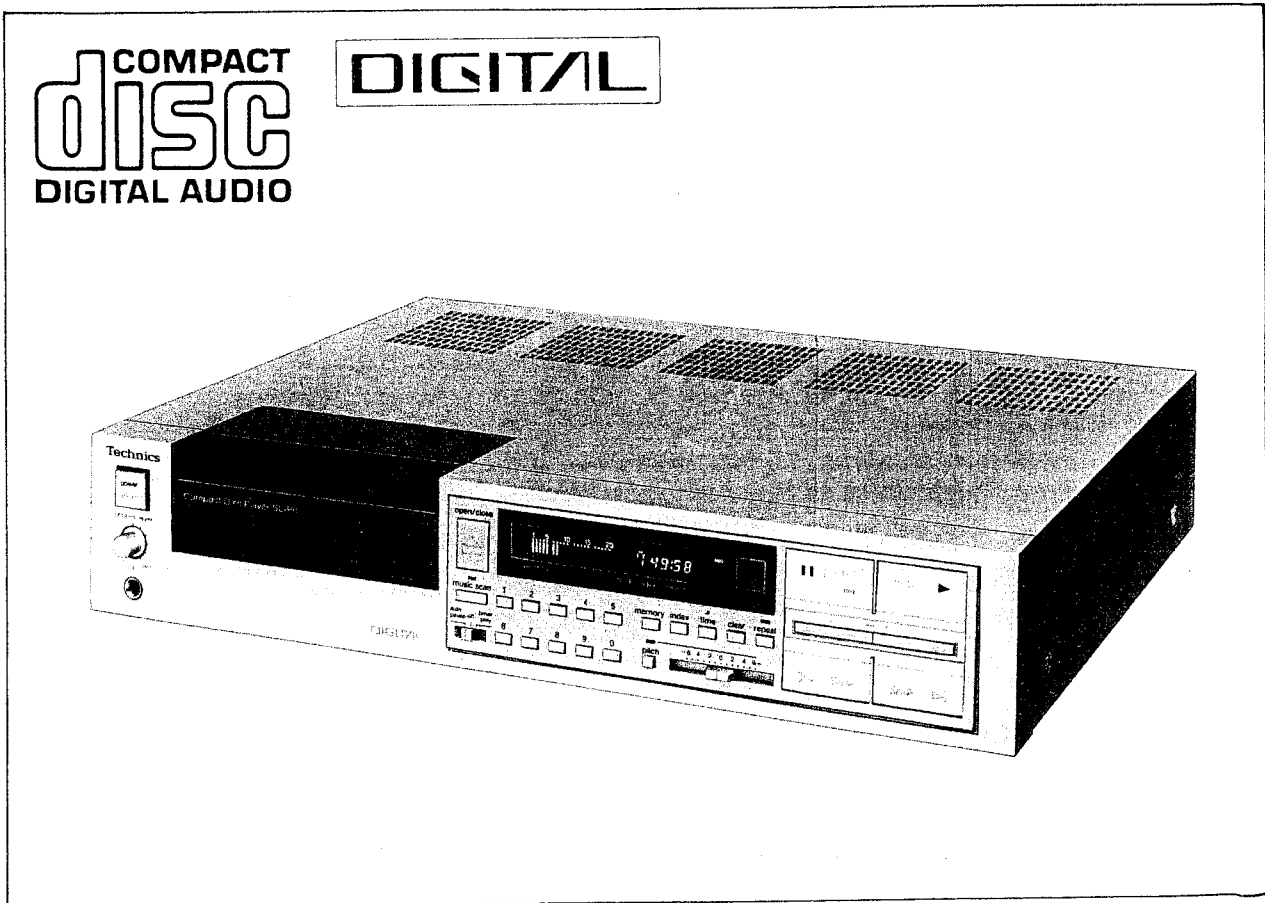
Service Manual

VOL. 3

Supplement

ADJUSTMENT MANUAL

Compact Disc Player
SL-P8



Technics

MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.
DISC AUDIO DIVISION.

● Traverse Unit Servicing Method

(1) Remove the cabinet.

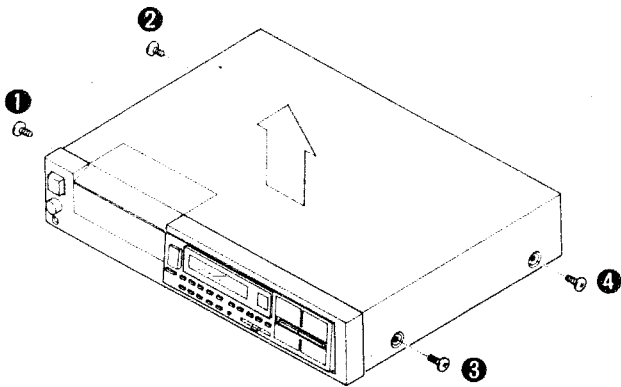


Fig. 1

- Remove screws ① ~ ④ and lift the cabinet in the direction of the arrow.

(2) Remove the front panel, and separate the front panel from the FL P.C.B.

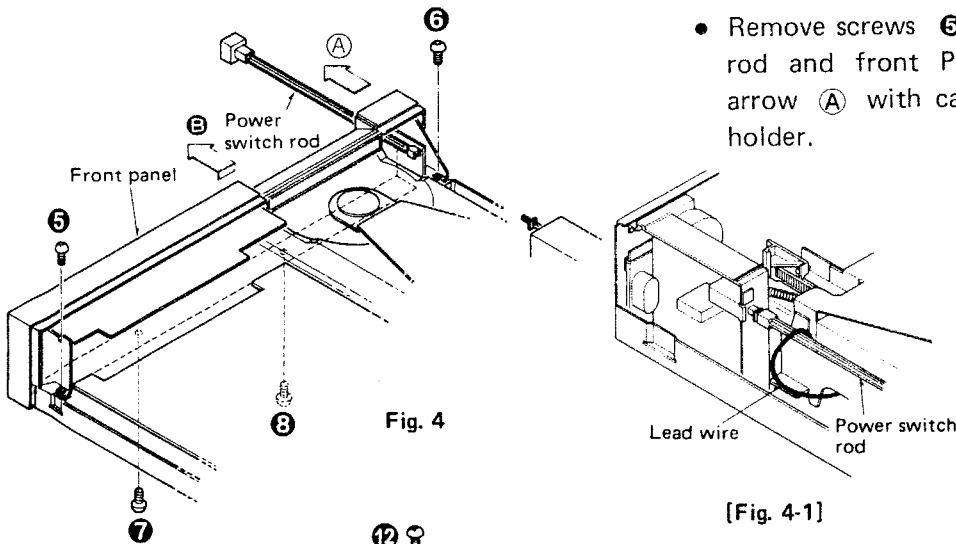


Fig. 4

- Remove screws ⑤ ~ ⑦, and power switch rod and front Panel in the direction of arrow A with care not to scratch the disc holder.

Caution:
When installing the power switch rod, set it through the lead wire.

[Fig. 4-1]

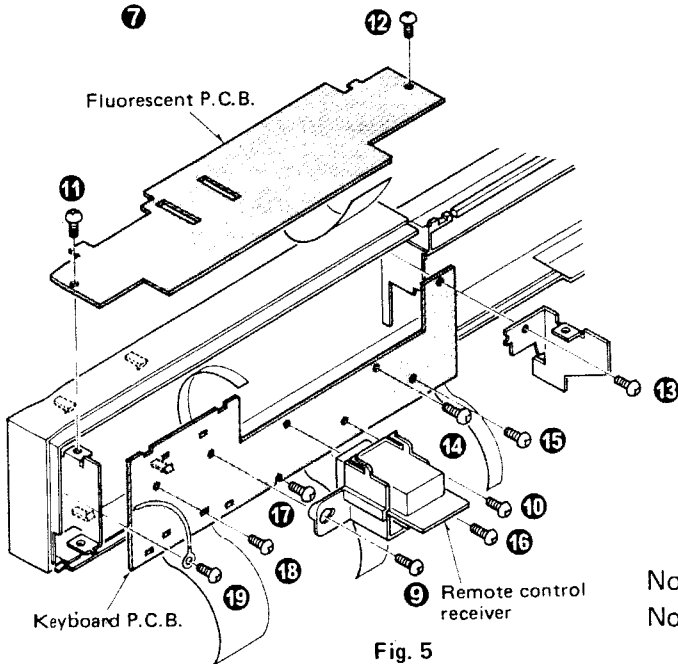


Fig. 5

- Remove screws ⑨ ~ ⑱ and release the P.C.B. fixing claws to separate the panel from FL P.C.B. and keyboard P.C.B.

Note 1: Keep the front panel separately.

Note 2: Make sure the lead wires between FL P.C.B. and digital P.C.B. are not disconnected.

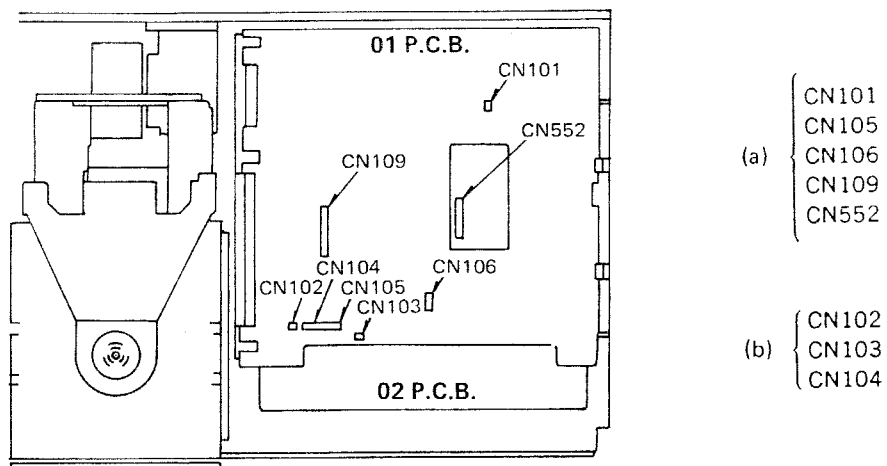
Perform these adjustments by use of a traverse unit base in accordance with the traverse unit servicing method to improve the workability.

CONTENTS

	Page
1. Focus gain adjustment	6
2. Focus balance adjustment	7
3. Focus offset adjustment	7
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5. Tracking offset temporary adjustment	8
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13. Amp. Gain adjustment	13
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15. Audio distortion adjustment	14
16. Check of play operation after adjustment	14

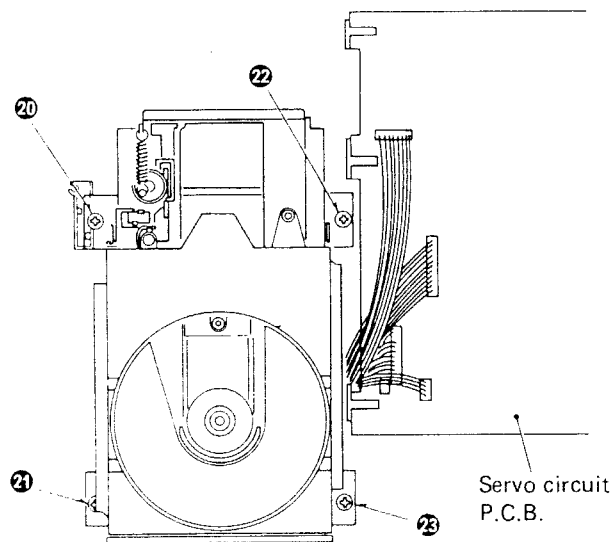
Caution: In case the optical PU is individually replaced, it is necessary to perform mechanism adjustment before these adjustment.

(3) Pull out the connectors shown below.



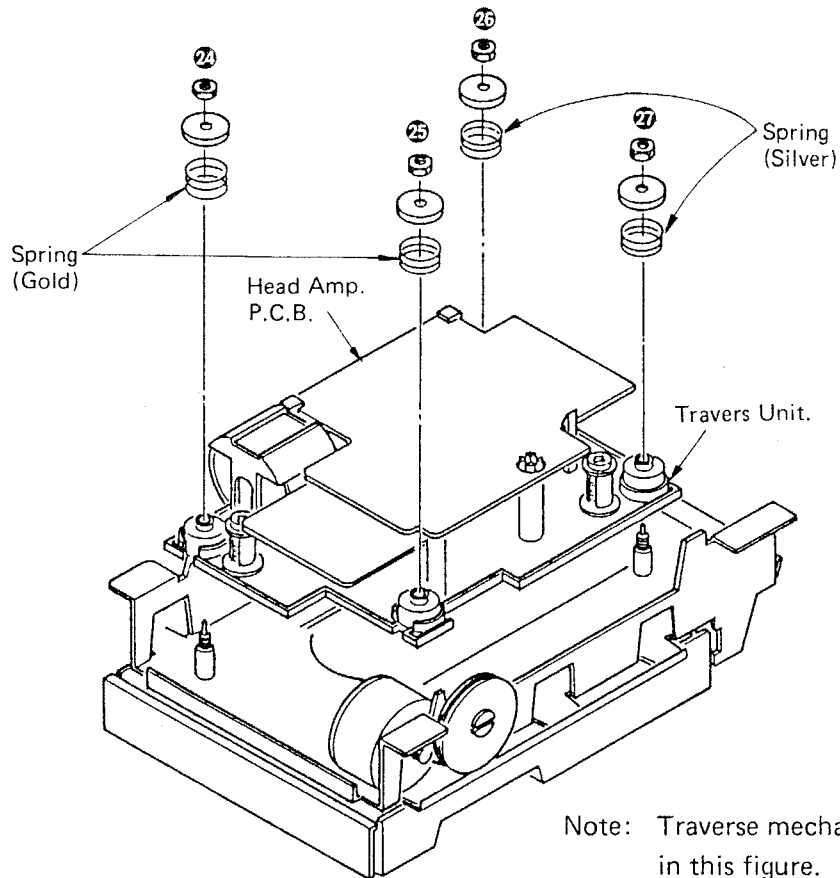
(4) Remove the traverse mechanism.

- Remove screws 20 ~ 23.
- Then the entire traverse mechanism can be removed from the set.



(5) Separate the tray from the traverse unit.

Separate the traverse mechanism [removed in step (4)] into tray and unit.



Note: Traverse mechanism is turned over in this figure.

- Remove nuts 24 ~ 27.

- After that, remove the holder and spring.

Note: Take care not to confuse 2 types of springs (different in color Gold and Silver).

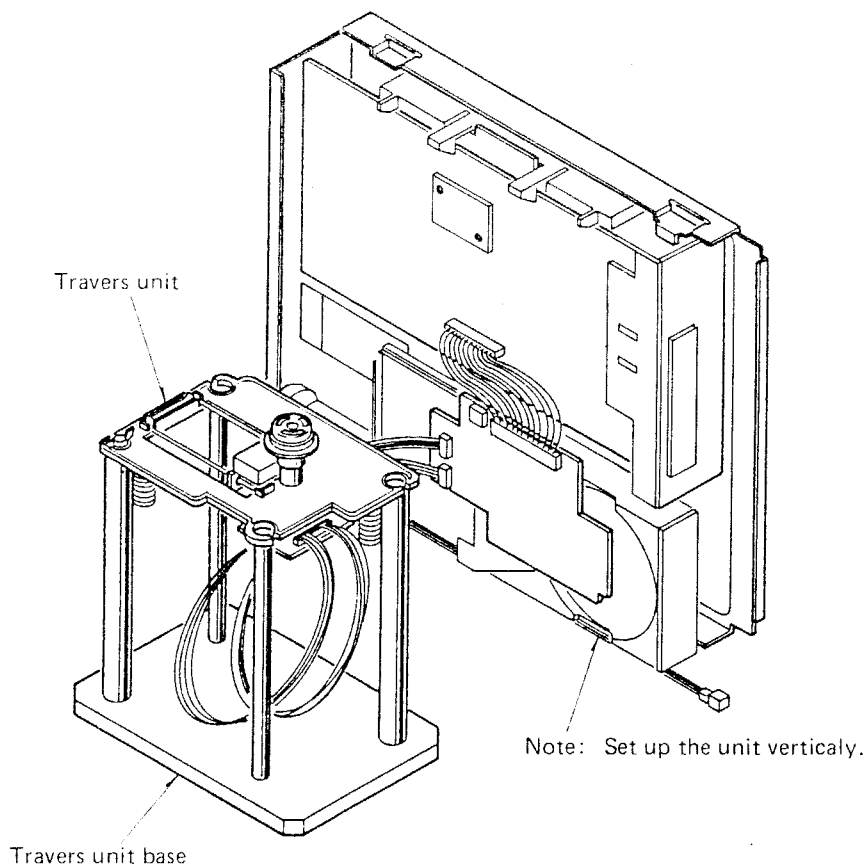
- With the above-mentioned procedure completed, the traverse mechanism is separated from tray and unit.

Note: Cut off the lead wire clumper by use of nippers.

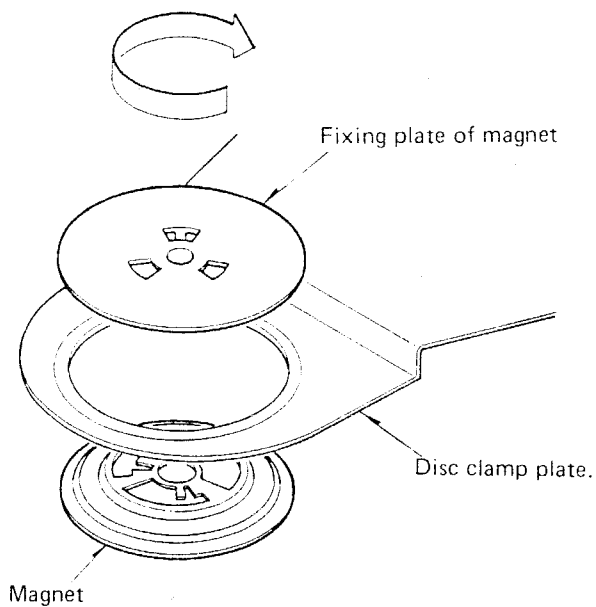
(6) Temporarily fasten the tray.

- Diagonally tighten the 2 screws removed in step (4).
- After that, connect only the connector (6) removed in step (3).

(7) Fix the traverse unit on traverse base.



- Remove the insulator rubber of traverse unit and fix the unit on the base (using thumb screw).
 - Keep the holder to EJECT position.
 - Hold the magnet with a hand and turn the fixing plate of magnet to clockwise.
Note: If the fixing plate of magnet doesn't turn enough, please use a pliers to turn it.
 - Use the magnet for holding the disc.



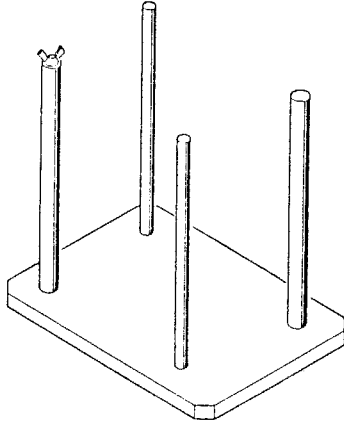
● Testers and Jigs for Adjustments

Testers

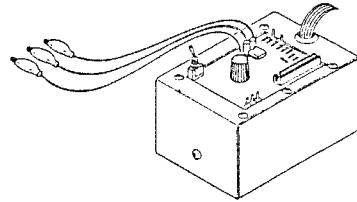
- 1) Two-channel oscilloscope (with trigger) of 30 MHz or over.
- 2) Low frequency oscillator.
- 3) Digital voltmeter.
- 4) Distortion meter.

Jigs

- 1) Traverse unit base (SZZP1016F)



- 2) Servo gain adjuster (SZZP1017F)



- 3) Short leads with clip (2 pcs.)

- 4) Test disc
Part No. SZZP1014F



- 5) Ordinary disc



1. Focus gain adjustment

1) Connect the gain adjusting jig to the set.

(Red) Jumper above IC651 on
08 P.C.B. (+15V)

(Blue) Jumper beside IC651 on
08 P.C.B. (-15V)

(Green) Chassis

Connector Pull out CN109 on 01 P.C.B. and connect it to the connector of the jig.
And connect the connector from jig to CN109.

Refer to the drawing given at the end of the manual. (Page 15.)

2) Adjust the low frequency oscillator to **750Hz** frequency and 150mVp-p output voltage, and connect it to TEST pin OSC IN and GND of the jig.

3) Connect CH1 and CH2 of oscilloscope to TP1 and TP2 of the Jig. (TP3 is GND.)

Oscilloscope setting:

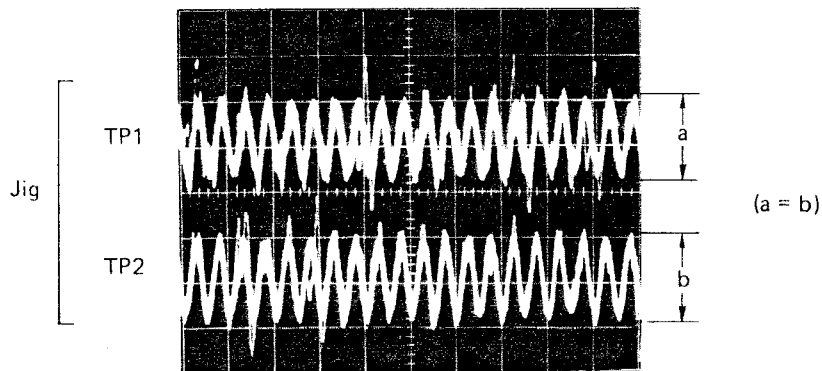
VOLT 100 mV (both channels)

SWEEP 2 ms

Input AC

4) Set the power SW "on" of jig and the rotary switch of jig to "1" and place the disc.

5) Turn power switch ON. When turntable begins to rotate, **750Hz** signal appears on the oscilloscope. Then adjust VR102 so that the waveforms of both channels are equal to each other.



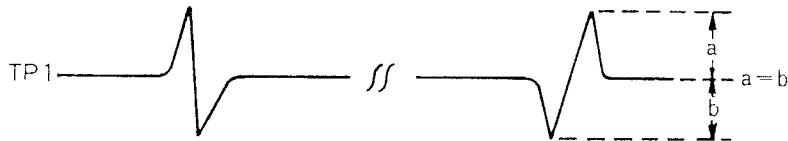
2. Focus balance adjustment

- 1) Set the power SW "on" of jig and the rotary switch of jig to "2" and disconnect the input from the oscillator.
- 2) Ground the pin 23 of IC101 (AN7677) on 03 P.C.B. (Head Amp.)
Note: Using a lead with clip to catch C112 (near the leg of C115) makes the job easier.
- 3) Pull out connector CN 108 on 01 P.C.B.
- 4) Connect the oscilloscope to TP1 on 03 P.C.B. and place the disc.
Note: TP1 is located between VR102 and VR103.

Oscilloscope setting:

VOLT 200 mV
SWEEP 5 ms
Input AC

- 5) Turn power switch ON. When the laser lights up, S-shaped waveform appears on the oscilloscope. Then adjust VR103 so that the top and bottom peak values are equal to each other.



Note: The above-mentioned S-shaped waveform will disappear in 5 or 6 sec. So, ground the pin ① of CN109 while LD is lighted, and the waveform will last for about 20 seconds.

3. Focus offset adjustment

- 1) Keep the power SW "on" of jig and the rotary switch of jig at "2".
- 2) Put in connector CN108 to correct position.
- 3) Shift the set to EJECT mode.
- 4) Connect a variable voltmeter to TP1 on 03 P.C.B.
- 5) Turn power switch ON, and adjust VR107 so that DC voltage of the voltmeter is 0 ± 10 mV.

4. Tracking gain adjustment

- 1) Set the power SW "on" of jig and the rotary switch of the jig to "3".
- 2) Adjust the low frequency oscillator to 1.5 kHz and 150 mVp-p output. And connect it to TEST pin OSC IN and GND of the jig.
- 3) Connect CH1 and CH2 of oscilloscope to TEST pin TP1 and TP2 of the jig. (TP3 is GND.)

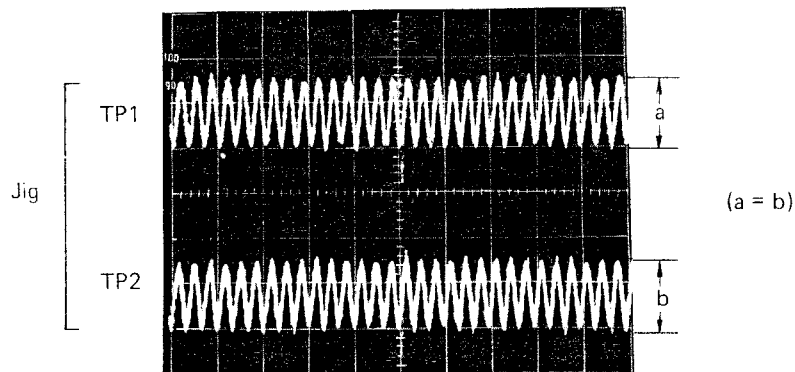
Oscilloscope setting:

VOLT 100 mV (both channels)

SWEEP 0.5ms

Input AC

- 4) Turn power switch ON. When turntable begins to rotate, 1.5 kHz signal appears on the oscilloscope, Then adjust VR105 so that the waveform amplitudes of both channels, are equal to each other.



5. Tracking offset temporary adjustment

- 1) Set the power SW "on" of jig and the rotary switch of jig to "2", and disconnect the input from oscillator.
- 2) Shift the set to EJECT mode.
- 3) Connect a variable voltmeter to TP2 on 03 P.C.B.
Note: TP2 is located between VR107 and VR105.
- 4) Turn power switch ON, and adjust VR106 so that DC voltage of the voltmeter is $0 \pm 3\text{mV}$.

6. Tracking balance adjustment

- 1) Keep the power SW "on" of jig and the rotary switch of jig at "2".
- 2) Connect the oscilloscope to TP2 on 03 P.C.B. and then place the disc.

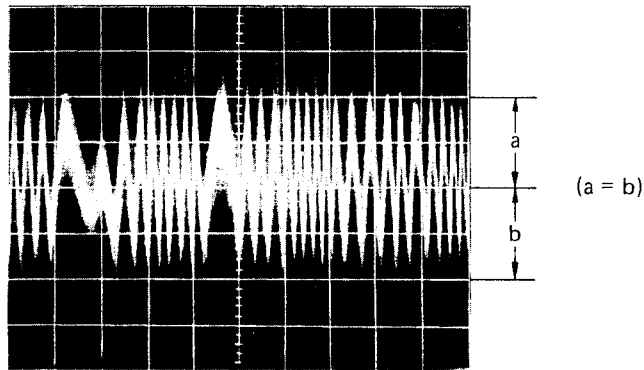
Oscilloscope setting:

VOLT 50 mV

SWEEP 5 ms

Input DC

- 3) Turn power switch ON. When turntable begins to rotate and the tracking servo switch of jig is turned OFF, TE (tracking error) signal appears on the oscilloscope.
Then adjust VR104 so that the top and bottom peak values are equal to each other.



7. Tracking offset adjustment

- 1) Keep the power SW "on" of jig and the rotary switch of jig at "2".
- 2) Shift the set to EJECT mode.
- 3) Connect a variable voltmeter to TP2 on 03 P.C.B.
- 4) Turn power switch ON, and adjust VR106 so that the DC voltage of voltmeter is 0 ± 3 mV.

Note: After the above-mentioned adjustment, remove the gain adjusting jig and connect CN109 to restore the original state of the unit.

8. Offset adjustment in drop-out

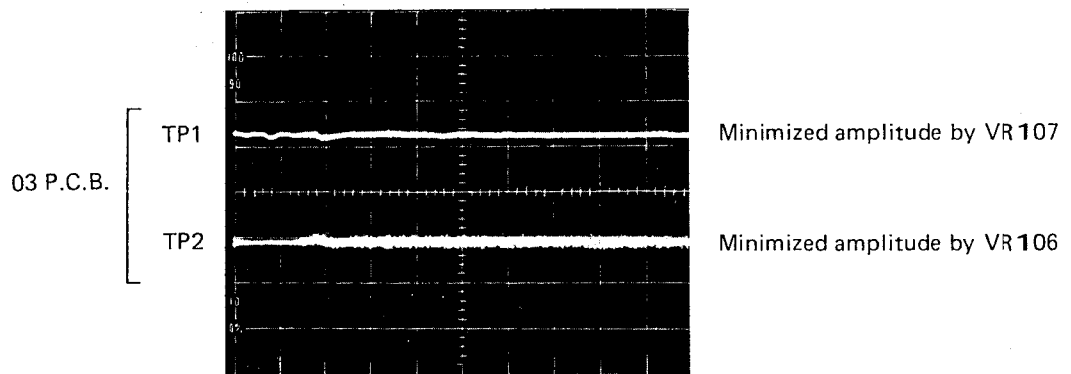
- 1) Connect the oscilloscope to the points mentioned below.

CH1TP1 (03 P.C.B.)
CH2TP2 (03 P.C.B.)
EXTQ305 collector on 01 (A) P.C.B.

Oscilloscope setting.

VOLT 0.5V (both channel)
SWEEP 0.5 ms
Input AC
Trigger EXT. NORM

- 2) Play the band 13 (0.5 mm black spot) of the test disc.
- 3) Watching the waveform of CH1 of the oscilloscope, adjust VR107 so that the waveform amplitude near the trigger point is minimized.
If not minimized, adjust so that the waveform top and bottom are nearly symmetrical.
- 4) Watching the waveform of CH2 of the oscilloscope, adjust VR106 so that the waveform amplitude near the trigger point is minimized. If not minimized adjust so that the waveform top and bottom are nearly symmetrical.



EXT 

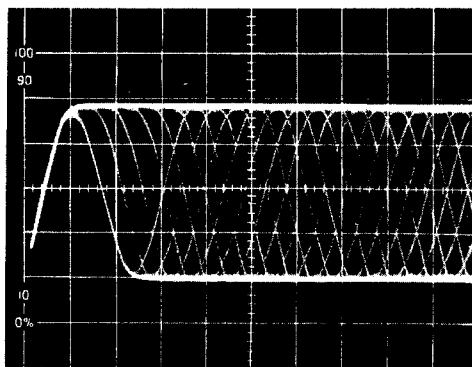
9. Best eye adjustment

- 1) Monitor RF signal on oscilloscope.
- 2) Connect CH1 of oscilloscope to the points CN109 pin ③ (OLD P.C.B.) or RF pin (NEW P.C.B.) on 01 P.C.B.

Oscilloscope setting:

Volt 500 mV
SWEEP 0.5 μ s
Input AC

- 3) Adjust VR103 so that the eye pattern of RF signal is widest open.



10. Traverse offset adjustment

- 1) Connect the DC voltmeter to the points Q205 emitter (OLD P.C.B.) or TVS pin (NEW P.C.B.) on 01 P.C.B.
- 2) Shift the set to EJECT mode.
- 3) Turn power supply ON, and adjust VR201 so that DC voltage of the voltmeter is 0 ± 10 mV.

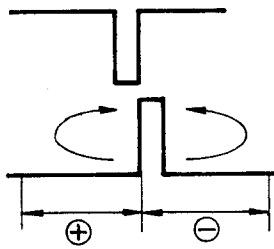
11. PLL and CLV Adjustment

- 1) Shift the set to play mode. (An ordinary disc can be used. Play it near the channel part.)
- 2) Connect CH1 and CH2 of the oscilloscope to test pins TP512 (FCLK) and TP513 (CLDCK) on 01 P.C.B.

Oscilloscope setting

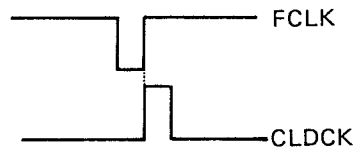
Volt 2V (both channels)
Sweep 20 μ s
Input select AC
Trigger CH1 + CH2 (NORM) \oplus
Mode ALT

- 3) Ground the both test pins MWB and TP514 (RESY) on 01 P.C.B.
- 4) The same operation as shown below is obtained when VR402 on 02 P.C.B. is moved. So, make the fine adjustment of VR401 on 02 P.C.B. so that the conditions shown below are satisfied.



Control the values of \oplus and \ominus outside the lock range (more than 8 μ s both \oplus and \ominus)

- 5) Adjust VR402 so that the conditions in the photo are satisfied.



12. Pitch Control Adjustment

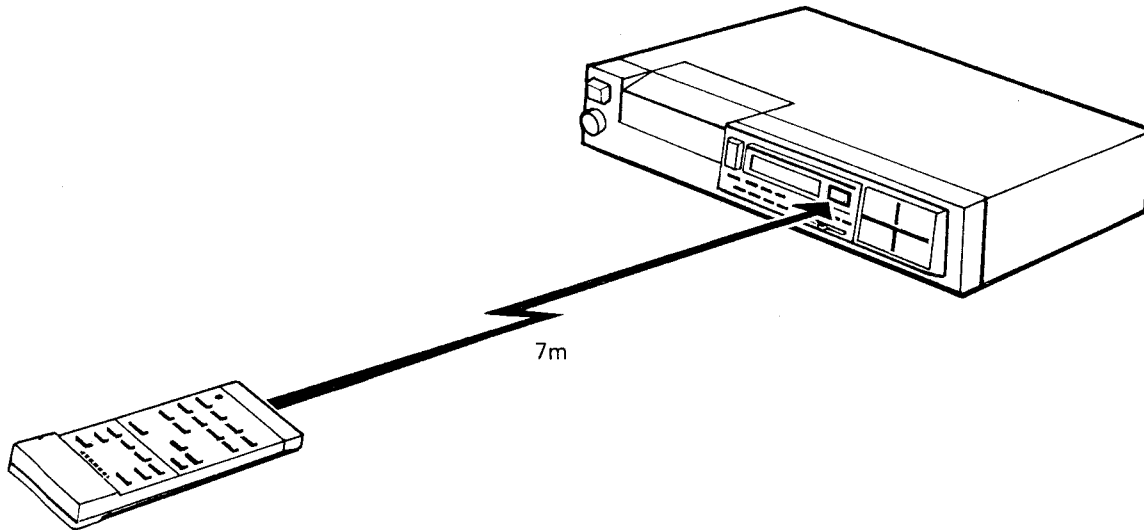
- 1) Shift the slide VR of front panel to the center and turn ON the pitch switch.
- 2) Connect the frequency counter to TP512 (FCLK).
- 3) Adjust VR403 (02 P.C.B.) so that the frequency counter indicates 7.35 ± 0.03 kHz.

Note: If frequency counter is not available, adjust VR403 so that the frequencies of TP512 nearly agree when pitch switch is turned ON/OFF.

13. Amp. Gain Adjustment

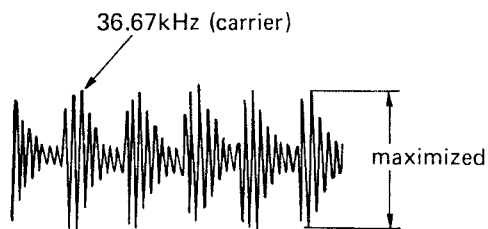
(Visual check)

- 1) Push the power switch "ON" of the set.
- 2) When push any key of the transmitter, and confirm a sensor LED on the front panel of the set to light. and then keep a distance about 7m between transmitter and receiver in a straight line.
- 3) And confirm a sensor LED whether it lights or is doesn't.
If it doesn't light adjust R1103, so that the sensor LED will be lighted.



14. Tune Voltage Adjustment

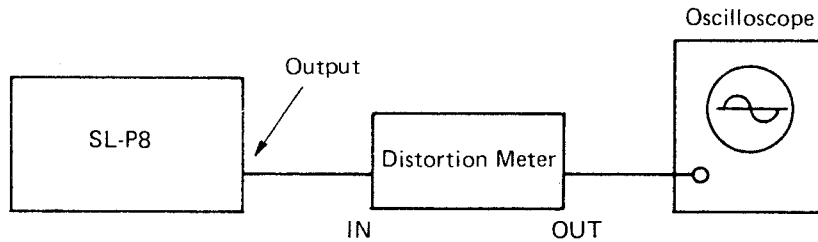
- 1) Push the power switch "ON" of the set.
- 2) Connect the oscilloscope to the anode of D1102.
- 3) Press any button of the transmitter about 7m distance between each other.
(Receiving the signal from the transmitter).
- 4) Adjust the T1101 so that the waveform of oscilloscope is maximized as below.



15. Audio distortion adjustment

- 1) Connect the output terminal of the set to a distortion meter, and monitor the output of the distortion meter by oscilloscope.

- (1) Set
- (2) Output terminal
- (3) Distortion meter
- (4) Oscilloscope



- 2) Play the band 3 (1 kHz, 0 dB) of test disc.
- 3) After adjusting the filter of distortion meter to 1 kHz, adjust VR851 on 02 P.C.B. so that the distortion is minimized.

16. Check of play operation after adjustment

Check of skip search

- 1) Play an ordinary disc.
- 2) Press the skip button and check to see that skip search is given. (Forward and reverse)

Check of manual search

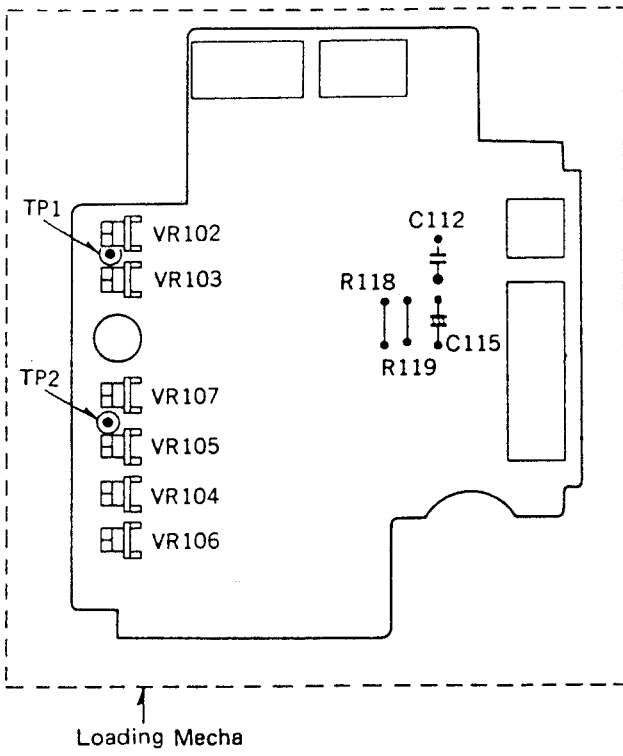
- 1) Play an ordinary disc.
- 2) Press the manual search button and check to see that smooth manual search can be done at low and high speeds. (Forward and reverse)

Check for defects

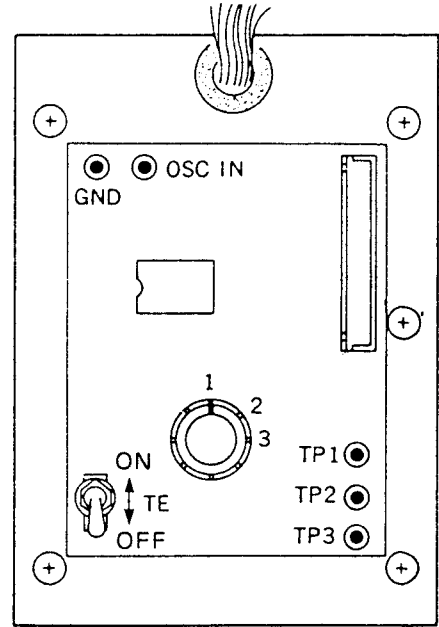
- 1) Play the band 12 of test disc, and check to see that there is no sound skip or noise. (Black spot)
- 2) Play the band 14 of test disc, and check to see that there is no sound skip or noise. (Finger print)

Test point

- 03 P.C.B. Under traverse.

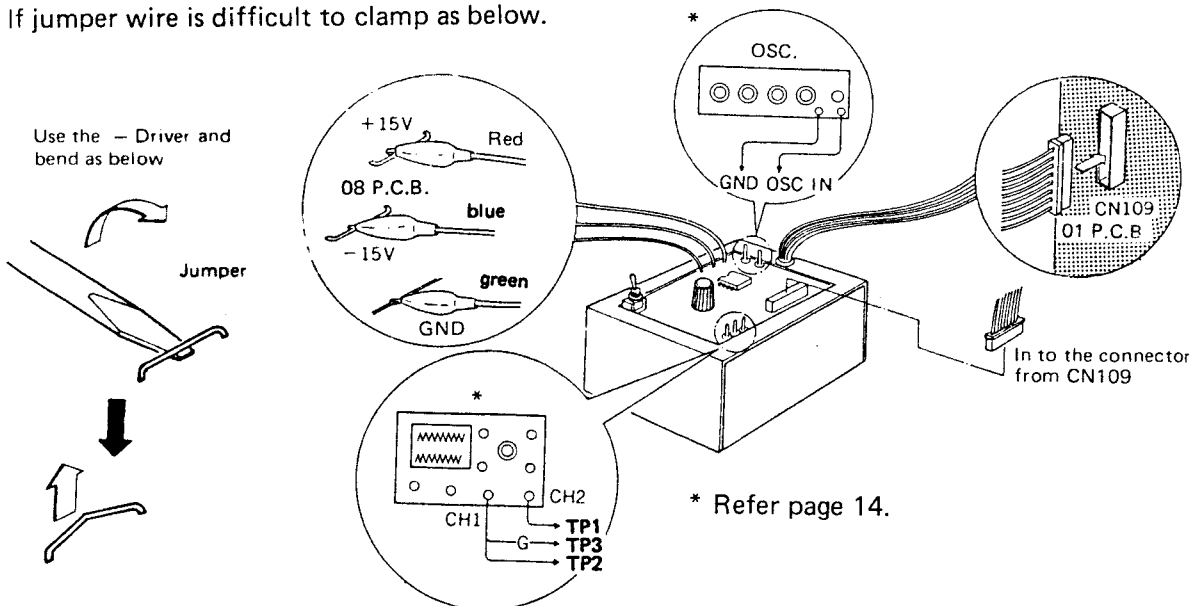


- Servo Gain Adjuster

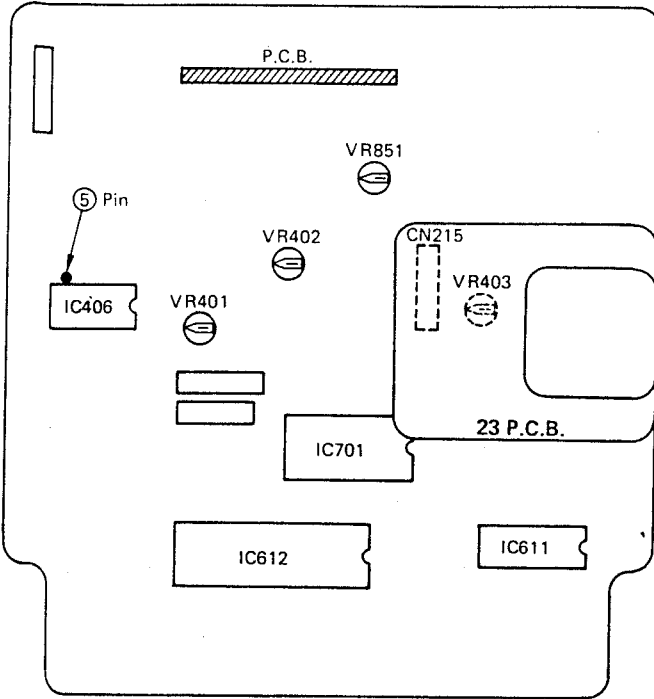


- Servo Gain Adjuster and its Connection

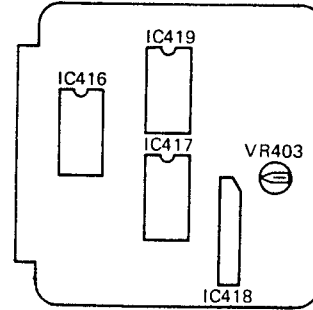
If jumper wire is difficult to clamp as below.



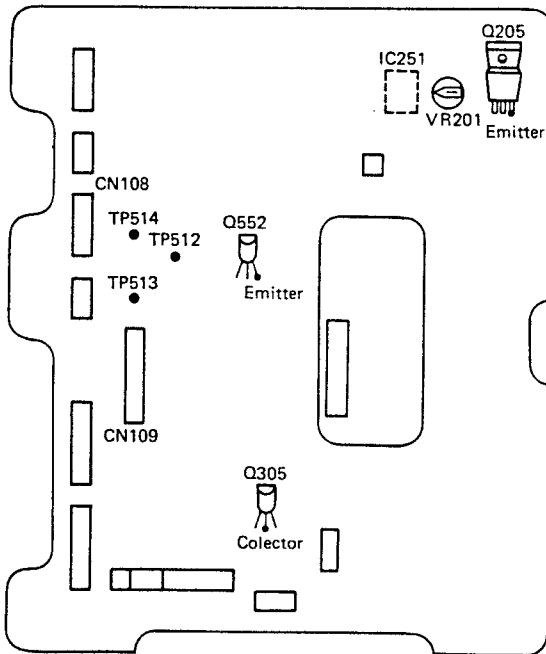
• 02 P.C.B.



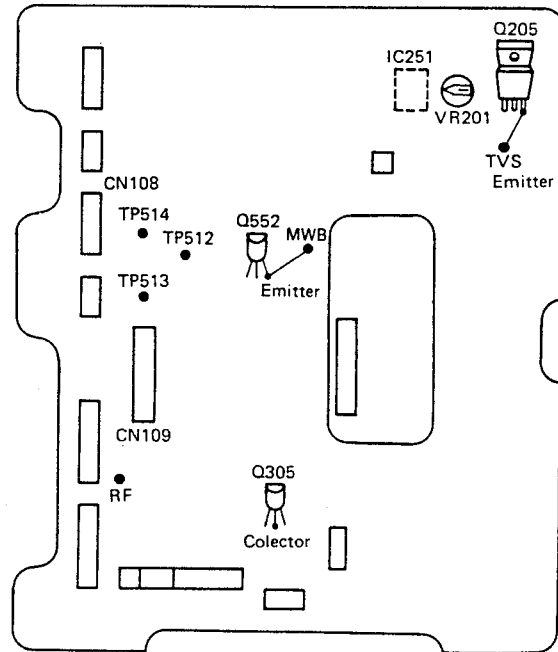
• 23 P.C.B.



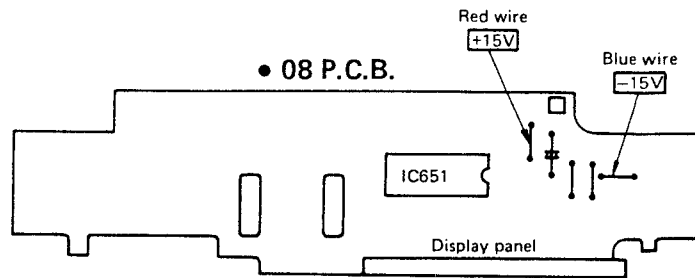
• 01 P.C.B. (OLD)



• 01 P.C.B. (NEW)



• 08 P.C.B.



Service Manual

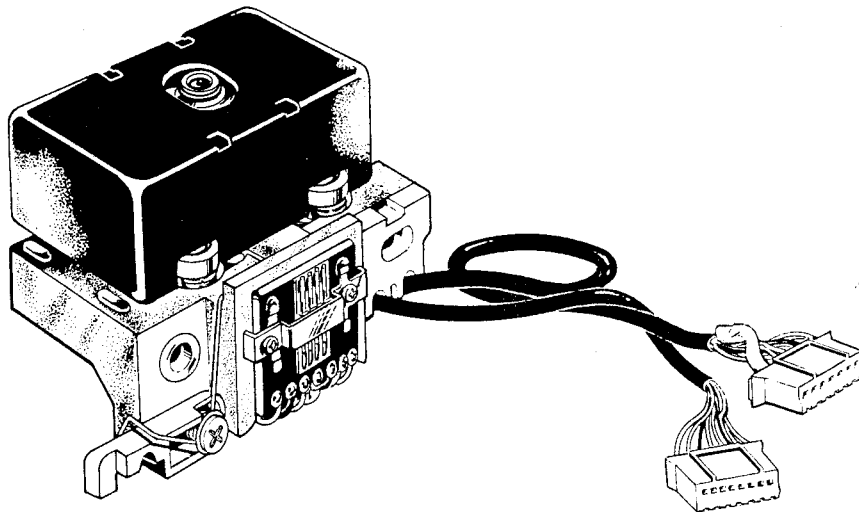
VOL.4

ADJUSTMENT MANUAL

for optical pick-up

Compact Disc Player

SL-P7/P75/P78/P8



Optical pick-up Parts No. SRLP007N01A

Technics

MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.
DISC AUDIO DIVISION

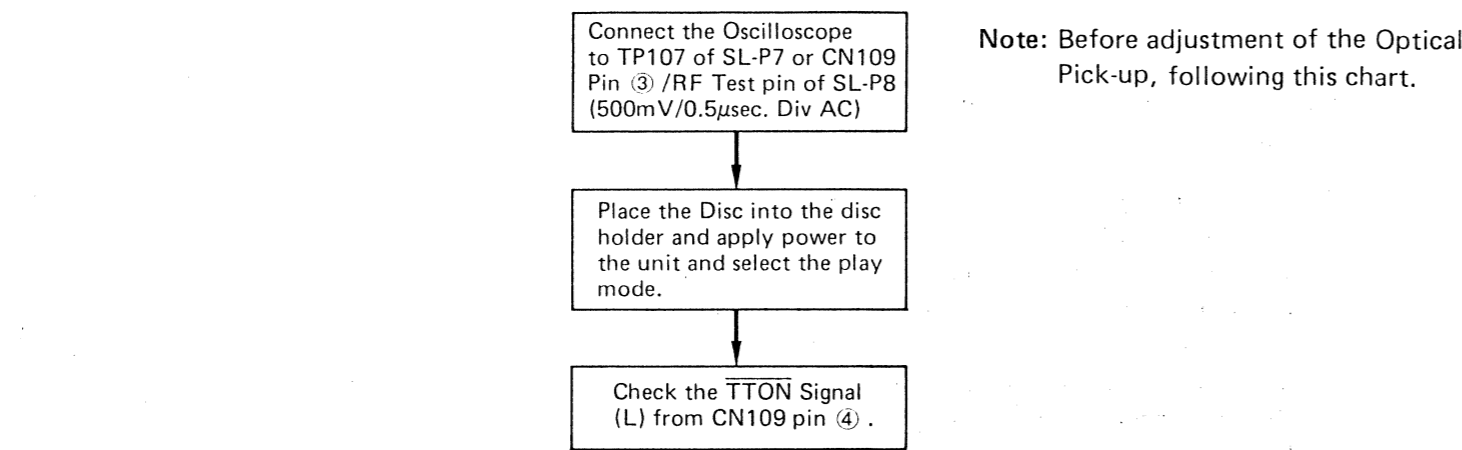
A optical pick-up is supplied individually. This adjustment manual is mentioned about how to find a pick-up defect and its adjustment procedure when it is occurred to change the optical pick-up itself.

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1. Approval judgement of defect for optical pick-up (SRLP007N01A) (Trouble shooting) ..	1
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3. Testers and gauge kits for adjustment	4
4. How to align the optical pick-up of the traverse deck	5
A. Rest position adjustment	
B. Turntable height adjustment	
C. Mechanical adjustment	
D. Grating adjustment	
5. Electrical alignment of main unit (vol. 3)	9
6. Others	9

1. Approval judgement of defect for optical pick-up (SRLP007N01A)

VOL 4



Test Points

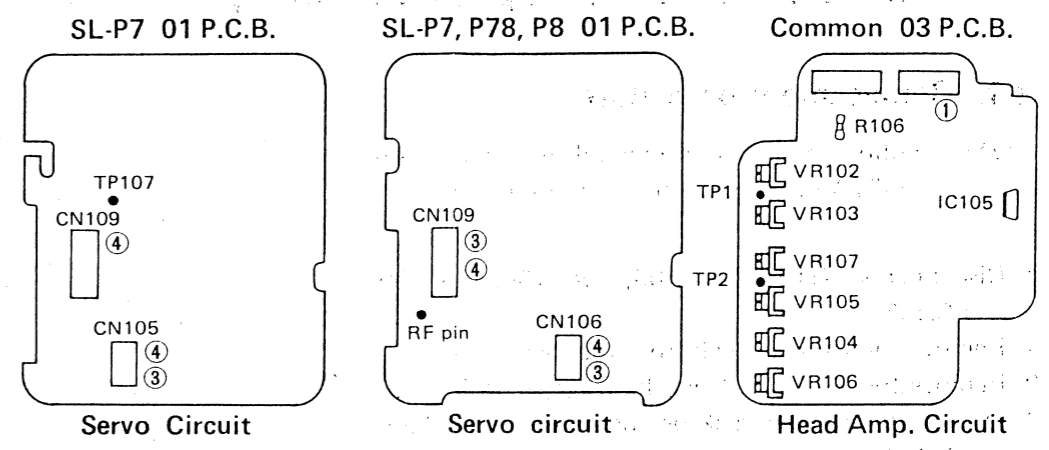
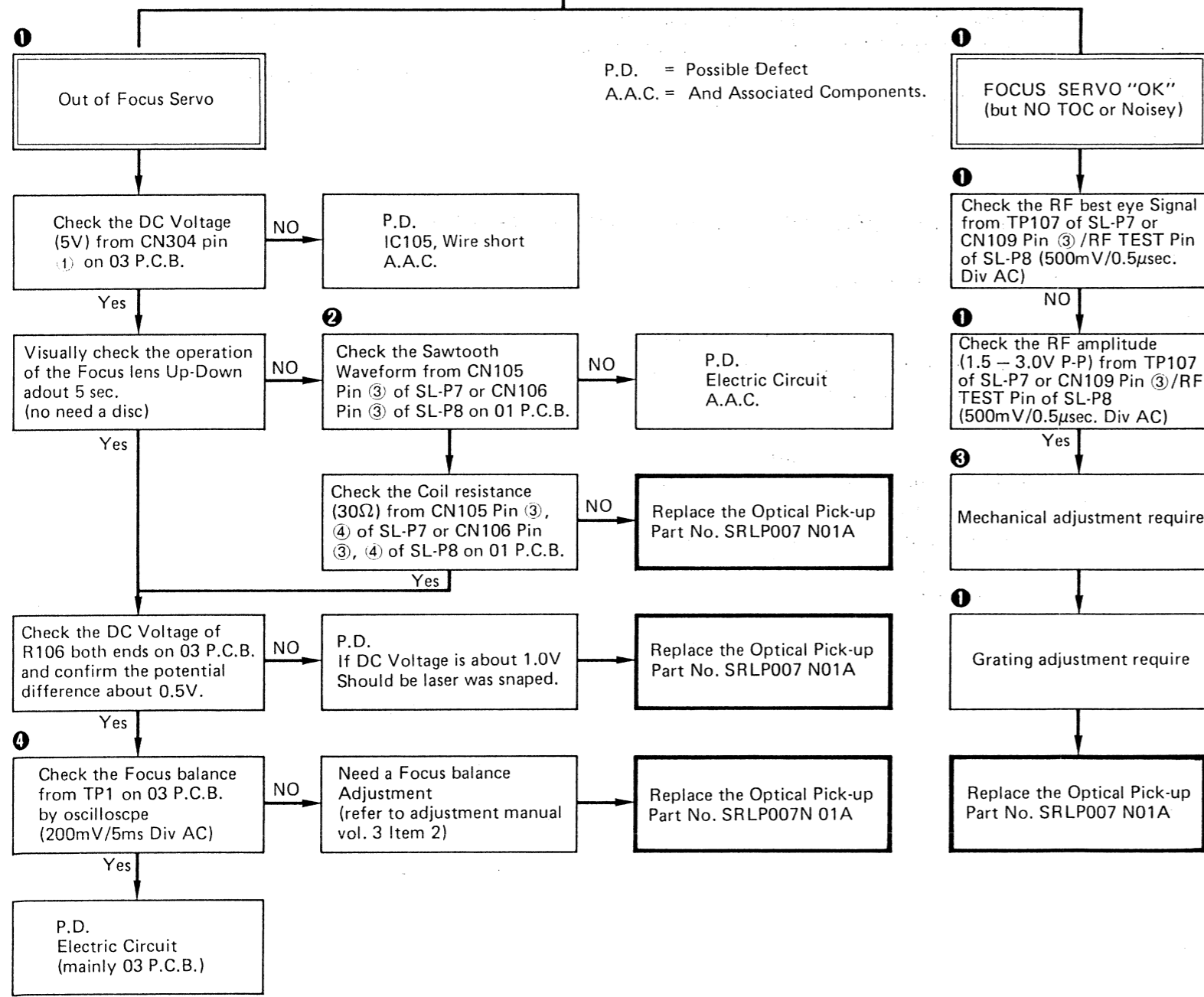


Fig: 1-1. Connection view of the each P.C.B.



Pre adjustment

Before judgement of optical pick-up, confirm the position of each volume as shown in figure 1-2.

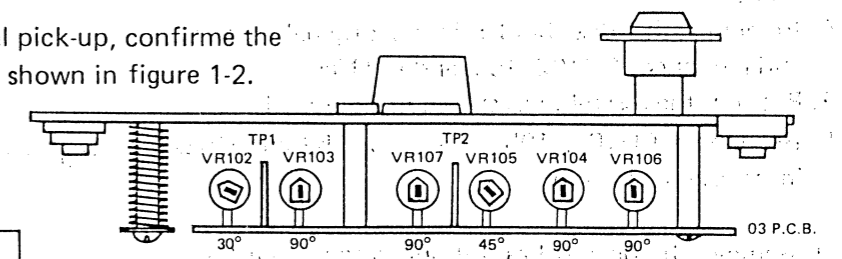
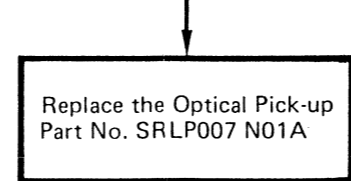
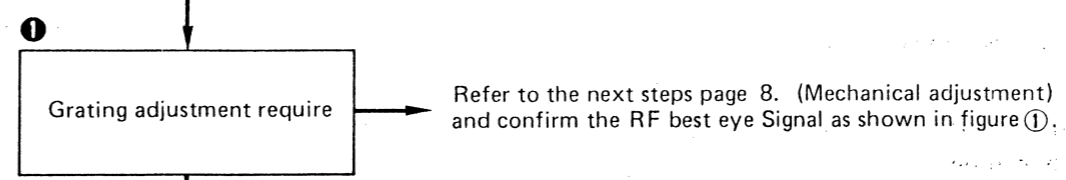
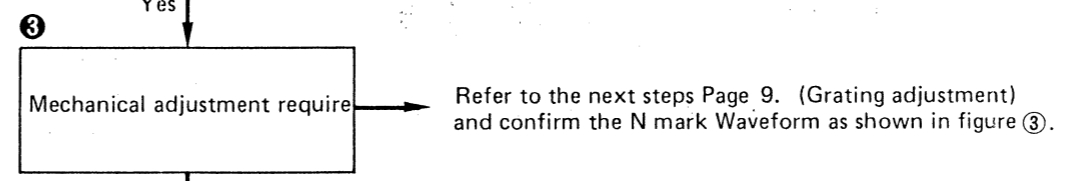
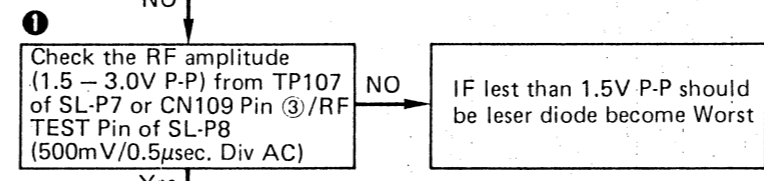
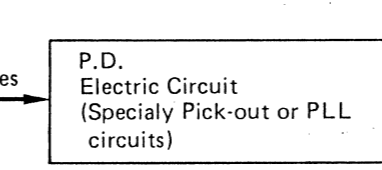


Fig: 1-2 Confirm the position of each volume



Waveform

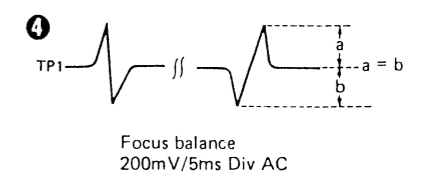
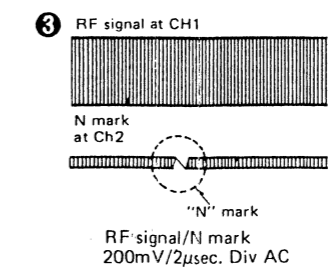
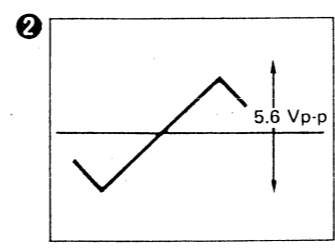
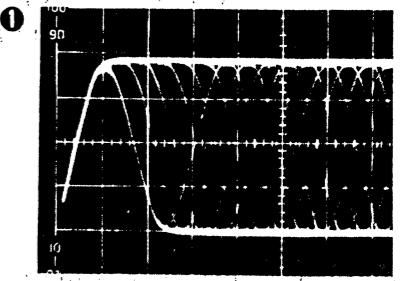


Fig: 1-3 Confirm the each waveform

2. How to replace the optical pick-up of the traverse deck

2-1. Replacement procedure

NOTE: Follow adjustment manual instruction on SL-P7 Vol. 3 for connectors orientation.

1. Disconnects CN101, 102, 103, 104, 105, 106, 109 and CN552.
2. Remove the traverse deck from the disc holder.
3. Remove the 03 P.C.B. from the traverse deck.
4. Mount the traverse deck on the traverse unit base (SZZP1016F), and make sure the mounting screw is tightened.
5. Remove the disc clamper magnet from the disc holder.
6. Remount the disc holder in its original location and reconnect CN102, 103, and CN104.
7. Position the assembly as shown in figure 2-1.
8. Reconnect CN101, 105, 106, 109, 552 and GND in its original location.

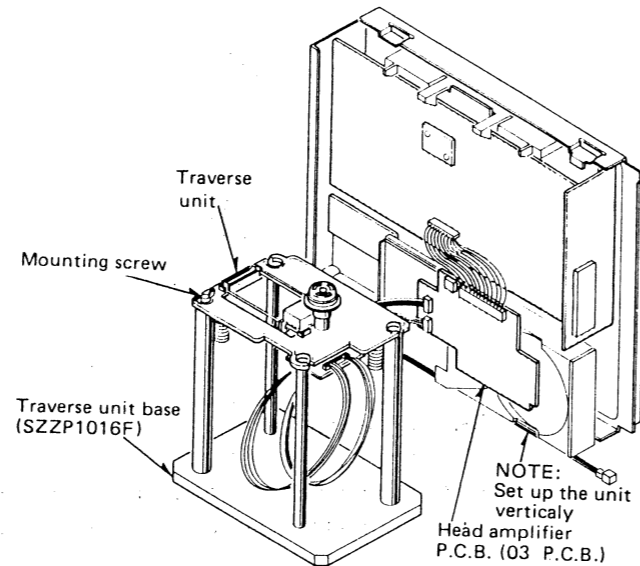


Fig: 2-1. Positioning view of the traverse deck and unit.

9. Remove the optical bracket and screw from the optical pick-up body as shown in figure 2-2.

NOTE: A) Be careful when removing the screw, the spring can snap out very fast and be lost.
B) Also note the position of the spring so that when ready to re-assembly it, you will remember its position.

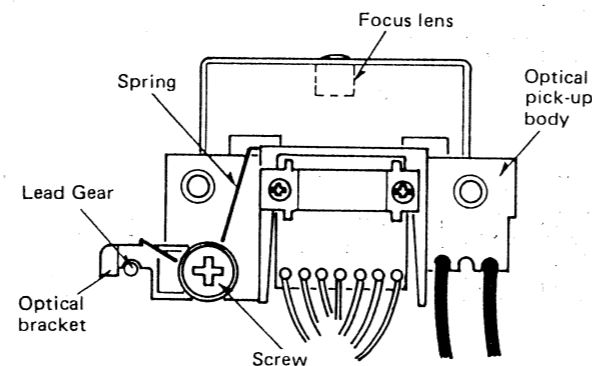


Fig: 2-2. Rear view of optical pick-up body

10. Remove the shaft clamp mounting screw as shown in figure 2-3.
11. Remove the two suspension shafts by lifting and pulling to the left. Optical pick-up body can be separated from the deck as shown in figure 2-3.

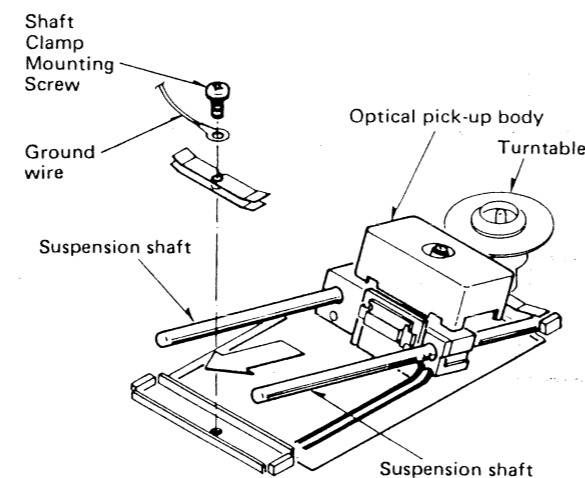


Fig: 2-3. Top view of traverse deck

12. Before proceeding to replace the optical pick-up, observe the following precautions:

- A) The laser diode can be destroyed if P305 remains open too long (about 20 seconds). Do not remove the shorting pin from P305 until you are ready to connect it to 03 P.C.B. CN305 as shown in figure 2-4.
- B) Be certain that rest detection switch (S101) and end detection switch (S102) have not been bent. If they have, traverse motor will remain on.

13. Reassemble the optical pick-up to the traverse deck by following step 12 through 1 in reverse procedurs.

NOTE: Be sure to reconnect the ground wire.

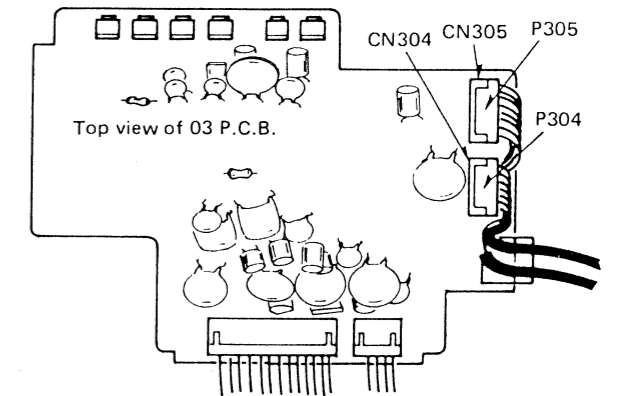


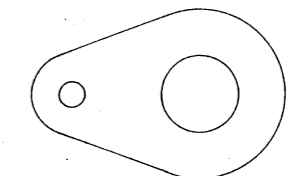
Fig: 2-4. Top view of 03 P.C.B.

3. Testers and gauge kits for adjustment.

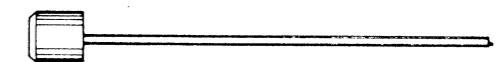
1. Two-channel oscilloscope (with trigger) of 30 MHz or over.
2. Ordinary disc and Test Disc (SZZP1014F).
3. Hexagonal wrench (1.75mm and 2.0mm).
4. Gauge ket (SZZP1022F).

Caution

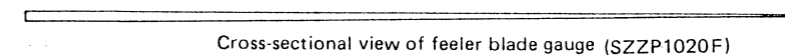
It is very dangerous to look at or touch the laser radiation. (Laser radiation is invisible). With the unit turned "on", laser radiation is emitted from the pick-up lens. Be careful during adjustment in particular.



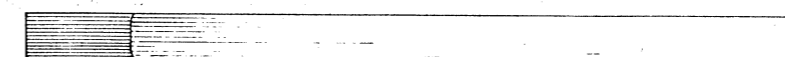
Rest position gauge (SZZP1019F)



Grating adjustment tool (SZZP1018F)



Cross-sectional view of feeler blade gauge (SZZP1020F)



Top view of feeler blade gauge (SZZP1020F)

Fig: 3-1. Gauge kits (SZZP1022F)

4. How to align the optical pick-up of the traverse deck

4-1. Adjustment procedure

Caution:

- 1) Do not look into the lens when power is applied to the unit, since there is laser radiation (H.H.S./D.H.W./etc., regulation).
- 2) These steps must be followed in order.

A. Rest position adjustment (optical pick-up)

1. Assure that leaf switches S101 (rest switch) and S102 (end switch) have not been mashed during reassembly and therefore set to "ON". If they are, carefully separate the contacts about 2mm.
2. Apply power to the unit. This will cause the traverse motor to wind the optical pick-up to the rest position.
3. Turn the power switch "OFF".
4. Place the REST POSITION GAUGE (SZZP1019F) on the turntable as shown in figure 4-1.
5. Assure that the lens is concentric within the hole of the REST POSITION GAUGE (SZZP1019F) as shown in figure 4-2.

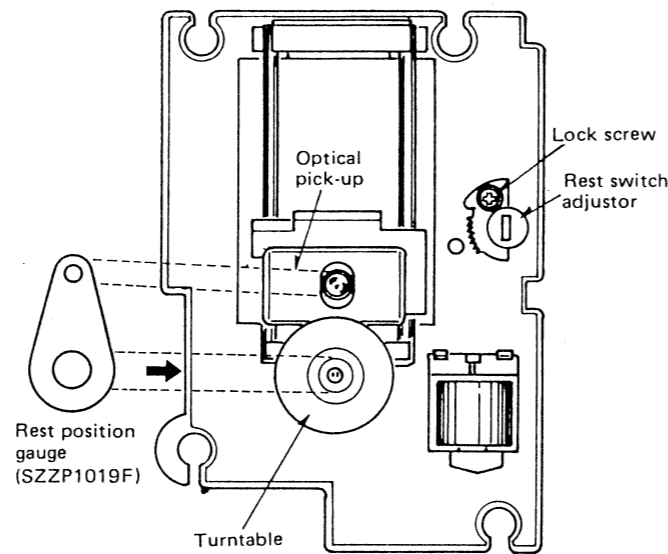


Fig: 4-1. Top view of traverse deck

- Optical pick-up is too close to the turntable.

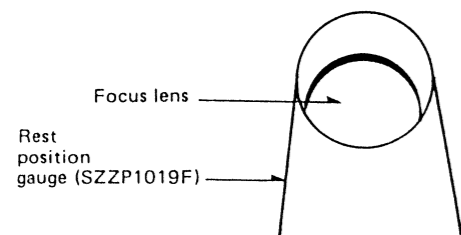


Fig: 4-2. "NG" (Too close)

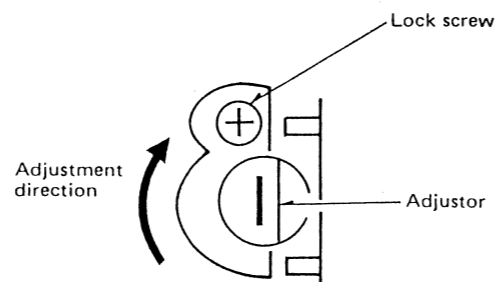


Fig: 4-3. Adjustment direction

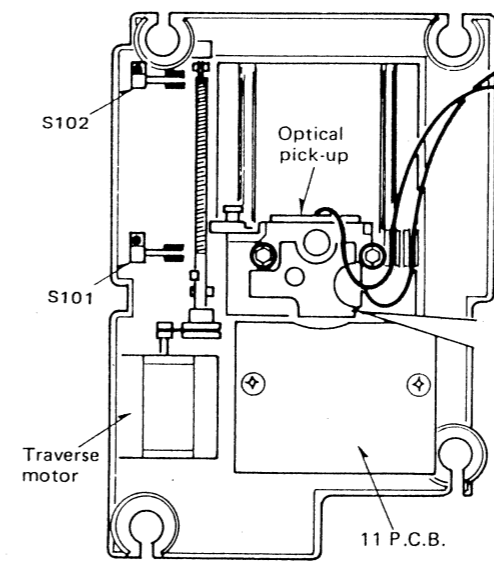


Fig: 4-4. Bottom view of traverse unit

- No adjustment required.

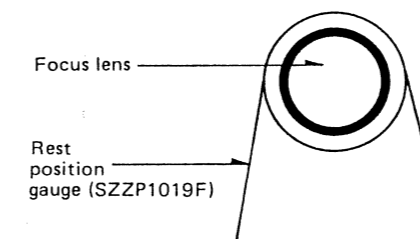


Fig: 4-5. "OK"

- Optical pick-up is too far from the turntable.

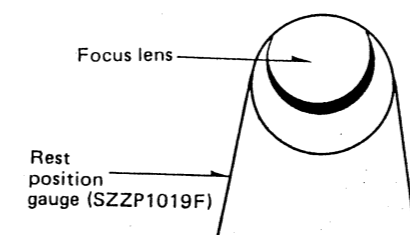


Fig: 4-6. "NG" (Too far)

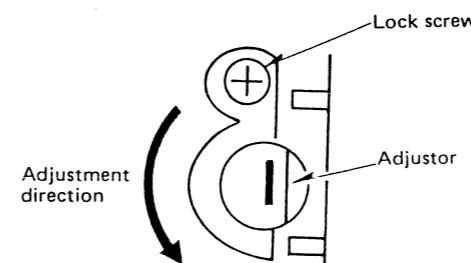


Fig: 4-7. Adjustment direction

TO ADJUST:

- 1) Loosen the lock screw and turn REST switch adjuster in the detection as shown figure 4-3.
2. Note that if the REST detection switch (S101) is too much toward S102, then the pick-up will REST too far away from the turntable at REST position. If so apply power and repeat step 1 above until REST detection is detected when the lens is concentric with the hole of the REST POSITION GAUGE.

TO ADJUST:

Loosen the lock screw and turn the REST switch adjuster in the direction as shown in figure 4-7.

To verify correct adjustment, place the disc on the turntable and apply power to the unit. This will auto cycle the optical pick-up. Re-check alignment with the REST POSITION GAUGE (SZZP1019F) as shown in figure 4-5.

B. Turntable height adjustment

NOTE: Necessary after Direct Drive spindle motor is replaced or RF signal is not obtained.

1. Disable focus search by opening R122 (180k) on O3 P.C.B. as shown in figure 4-8.

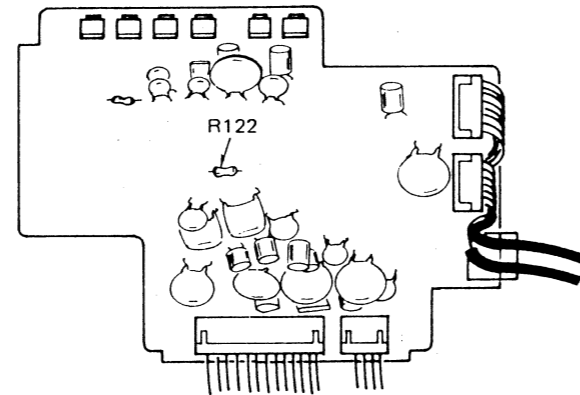


Fig: 4-8. Top view of O3 P.C.B. (Head Amp.)

2. Insert the thin end of FEELER BLADE GAUGE (SZZP1020F) between the turntable and the shaft bearing as shown in figure 4-9.

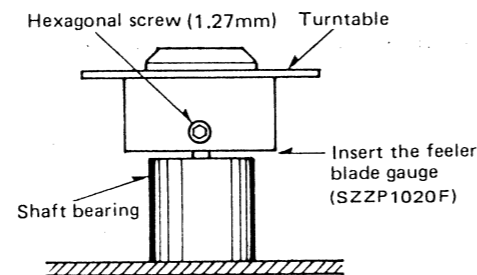


Fig: 4-9. Front view of traverse deck

3. Slide the FEELER BLADE GAUGE (SZZP1020F) toward the thick end and mark the gauge with a pencil, where it and the turntable touch and until the blade can not be fed anymore then remove the gauge.
4. Connect the oscilloscope to TP107 of SL-P7 or CN109 pin ③ / RF test pin of SL-P8.
5. Place a disc on the turntable and clamp it with the magnet.
6. Apply power to the unit.
7. Press eject "OUT" and eject "IN".
8. Confirm if RF signal is present as shown in figure 4-10. If not, proceed to the next step.

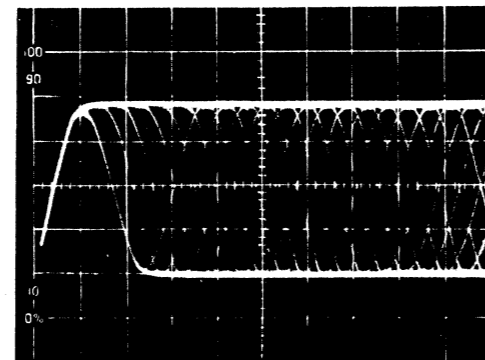


Fig: 4-10. RF signal

9. To confirm:

Gently tap the disc at point "A". If RF signal appears, the turntable is too low. If RF signal does not appear, tap the disc at point "B". RF signal should appear indicating that the turntable is too high.

10. To adjust:

- 1) Insert the FEELER BLADE GAUGE between the turntable and the shaft bearing to the previously marked point.
- 2) Loosen the hex 1.75mm turntable set screw.
- 3) If the turntable is too low, slide FEELER BLADE GAUGE about 4mm towards the thick end and Remove the FEELER BLADE GAUGE. Reapply power and check for RF signal. (This is a "trial and error" adjustment, several attempts may be required to obtain RF signal).
- 4) If the turntable is too high, insert the FEELER BLADE GAUGE and move about 4mm towards the thin end, using the same method as in step 3.
- 5) Reconnect R122 to enable focus search.

C. Mechanical adjustment

1. Place the TEST DISC (SZZP1014F) on the turntable with clamping magnet.
2. Connect the oscilloscope to TP107 of SL-P7 or CN109 pin ③ / RF test pin of SL-P8.
3. Apply power to the unit and select the play mode.
4. Confirm that the RF signal is as shown in Figure 4-12. If it is not present, proceed to next step. If RF signal is as shown, skip step 5.

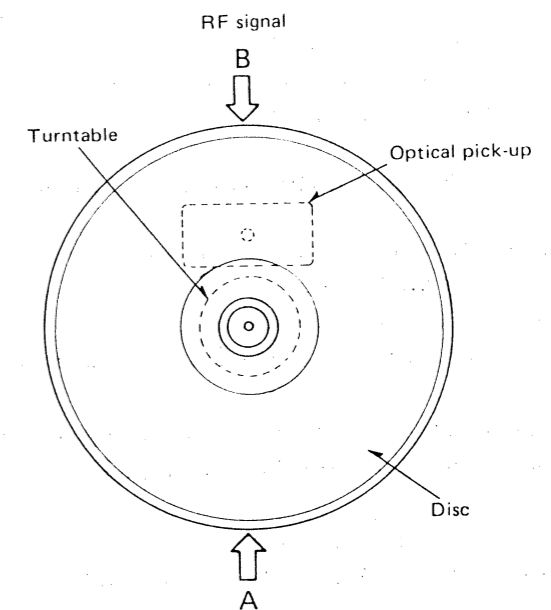


Fig: 4-11. Top view of disc set up

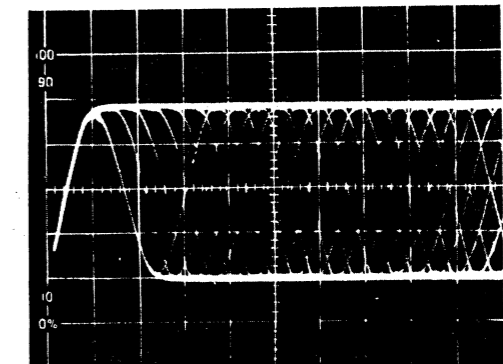


Fig: 4-12. RF Signal

5. To adjust hex 2.0mm screw to the right or left to obtain the RF signal (Visual check) as shown in figure 4-13.

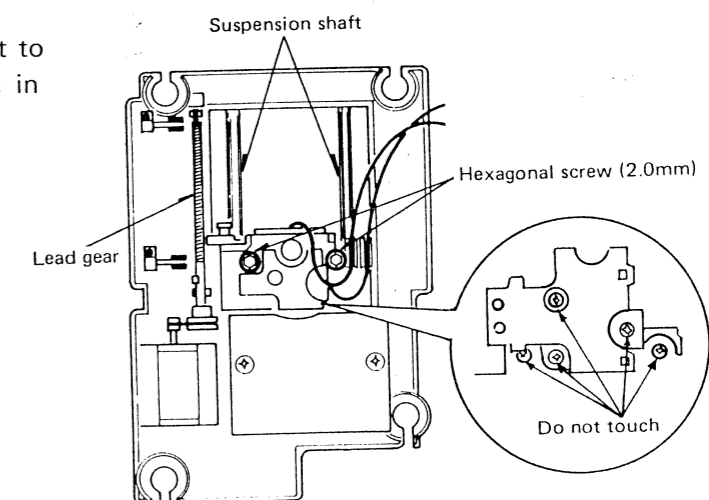


Fig: 4-13. Bottom view of traverse unit

D. Grating adjustment

1. Place the TEST DISC (SZZP1014F) on the turntable and clamp it with the magnet.
2. Connect the oscilloscope as follows.
 - ** Sweep speed . . .200mV/2 μ sec. DIV AC.
 - SH-1TP107 of SL-P7 or CN109 pin
 - ③/RF test pin of SL-P8.
 - CH-2R131 end of C123 on 03 P.C.B.
3. Apply power to the unit and select play mode.
4. If RF signal and "N" mark are present no adjustment is required as shown in figure 4-14. If RF signal and "N" mark are not present, perform step 5.
5. Insert the GRATING ADJUSTMENT TOOL (SZZP1018F) into the hole on the left side of the optical pick-up body as shown in figure 4-15.

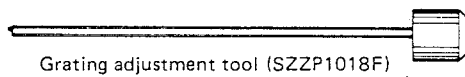


Fig: 4-15. Left side view of traverse unit

6. Rotate the GRATING ADJUSTMENT TOOL (SZZP1018F) toward right or left until the "N" mark is sharpest and maximum RF signal is obtained as shown in figure 4-16.

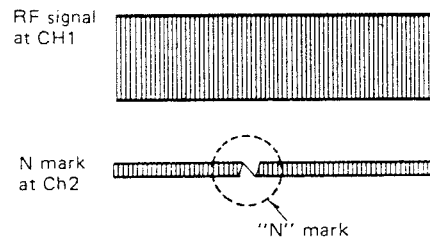


Fig: 4-14. RF signal and N mark

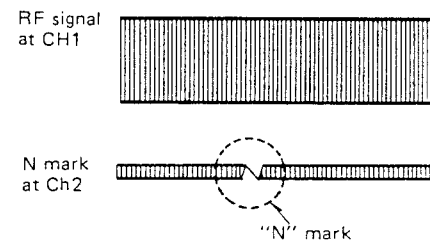
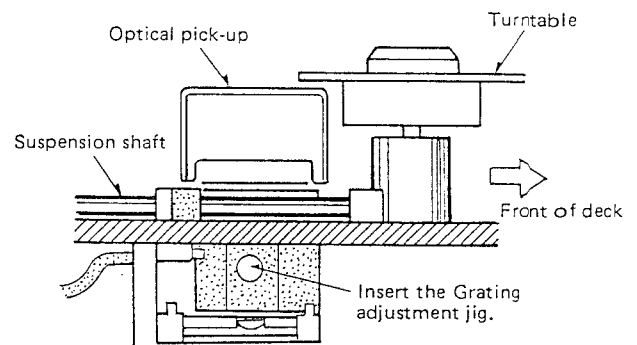


Fig: 4-16. RF signal and N mark

5. Electrical alignment of main unit (Vol. 3)

Electrical alignment of main unit follow the adjustment manual Vol. 3 step by step.

6. Others

After adjustment dress all components to lay flat on 03 P.C.B. as shown in figure 6-1, and reassembly on the traverse deck.

ONCE THE P.C.B. IS MOUNTED, ASSURE THAT THE BOTTOM OF THE PICK-UP DOSE NOT INTERFERE WITH ANY OF THE COMPONENTS THEREFORE MAKE SURE THAT THE TRACKS IN THE OUTER PREIFERY OF THE DISC ARE ACCESSABLE.

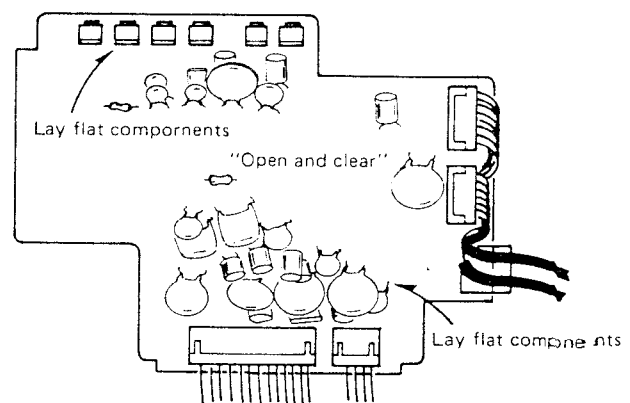


Fig: 6-1. Top view of 03 P.C.B. (Head Amp)