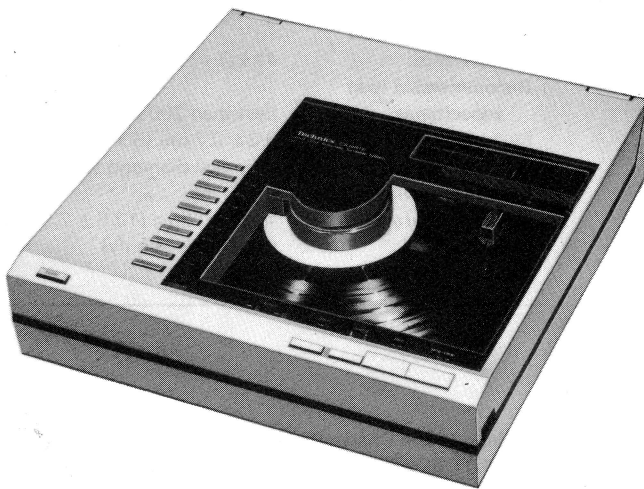


Service Manual

QUARTZ Direct Drive Automatic Turntable System

SL-15

[M], [MC]



Areas

- * [M] is available in U.S.A.
- * [MC] is available in Canada.

Specifications

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

■ General

Power supply: 120 V, 60 Hz
DC 12 V (DC input jack)

Power consumption: 18 W (AC)
6 W (DC)

Dimensions: 31.5 x 8.8 x 31.5 cm
(12-1/2" x 3-1/2" x 12-1/2")
With the cabinet top open to
maximum position:
31.5 x 38.5 x 31.5 cm,
(12-1/2" x 15-5/32" x 12-1/2")

Weight: 6.6 kg (14.3 lb.)

■ Turntable section

Type: Quartz-phase-locked control
direct-drive automatic turntable

- Automatic operation
- Programmable band selection
- Repeat play
- Program repeat
- 2-speed inward/outward search
- Program skip
- Program in-band repeat
- Auto start/Auto lead-in
- Auto return
- Auto stop
- Repeat play
- Auto speed select
- Auto size select
- Record presence detection

Drive method: Direct drive

Motor: Brushless DC motor

Drive control method: Quartz-phase-locked control

Turntable platter: Aluminum diecast
Diameter 30 cm (12 inches)

Turntable speeds: 33-1/3 rpm and 45 rpm
Auto speed select
(Manual selection possible)

Speed deviation: Within $\pm 0.002\%$

Wow and flutter: 0.012% WRMS*
0.025% WRMS (JIS C5521)
 $\pm 0.035\%$ peak
(IEC 98A weighted)

Rumble: -56 dB (IEC 98A Unweighted)
-78 dB (IEC 98A Weighted)

* This rating refers to turntable assembly alone, excluding effects of
record, cartridge or tonearm, but including platter.
Measured by obtaining signal from built-in frequency generator of
motor assembly.

■ Tonearm section

Type: Dynamic balanced type
Linear tracking tonearm
4-pivot gimbal suspension

Effective mass: 9 g (including cartridge)

Tracking error angle: Within $\pm 0.1^\circ$

Resonance frequency: 12 Hz

Tonearm drive motor: Coreless DC motor

■ Cartridge section

Model No.: EPC-P205CMK3

Type: Moving magnet stereo cartridge
Disc-shaped magnet
One point suspension system

Magnet circuit: All "HPF" core, precision ground finish

Cantilever: Pure boron pipe

Damper: TTDD (Technics Temperature
Defense Damper)

Magnet: Samarium-cobalt (Sm-Co)
(BH) max. = 30 MC-Oe

Technics

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Division of Matsushita Electric
Corporation of America
One Panasonic Way, Secaucus,
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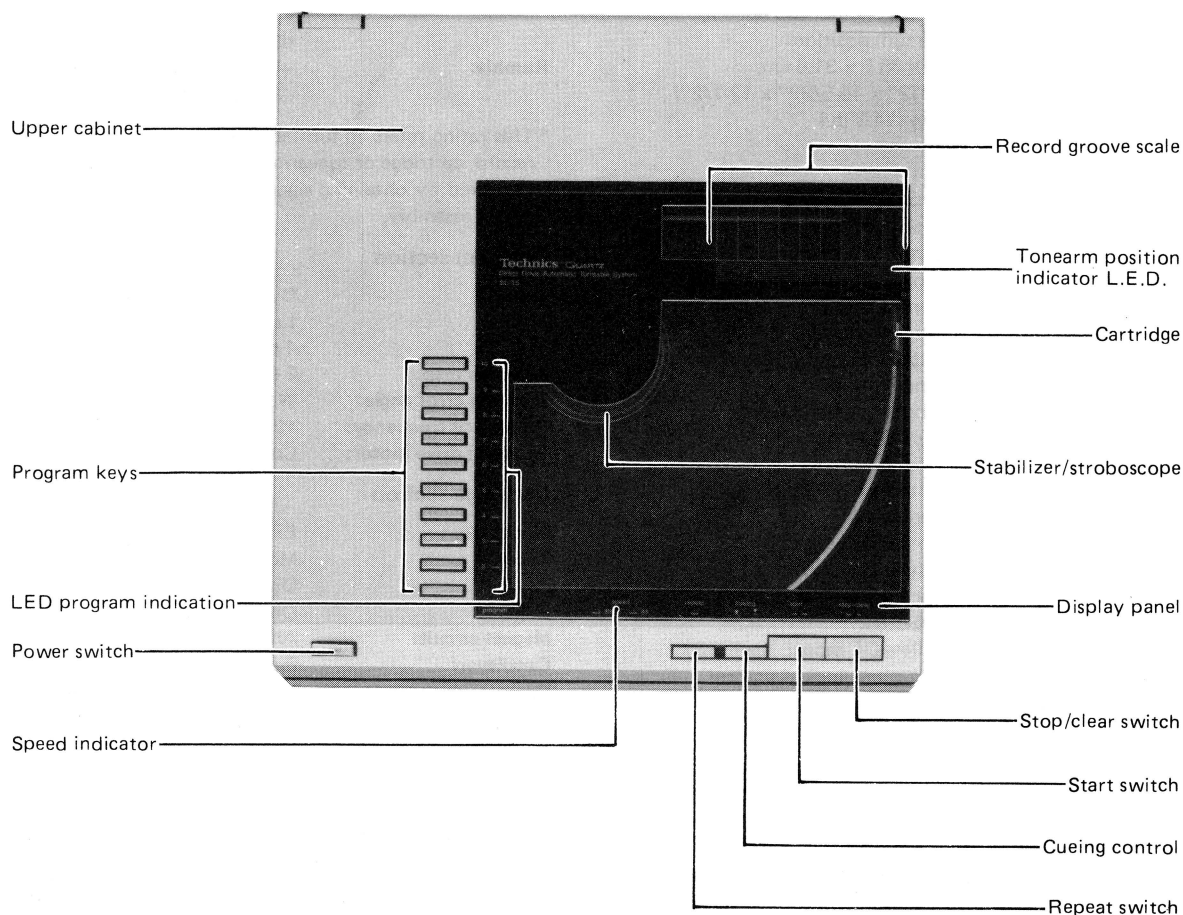
Panasonic Sales Company,
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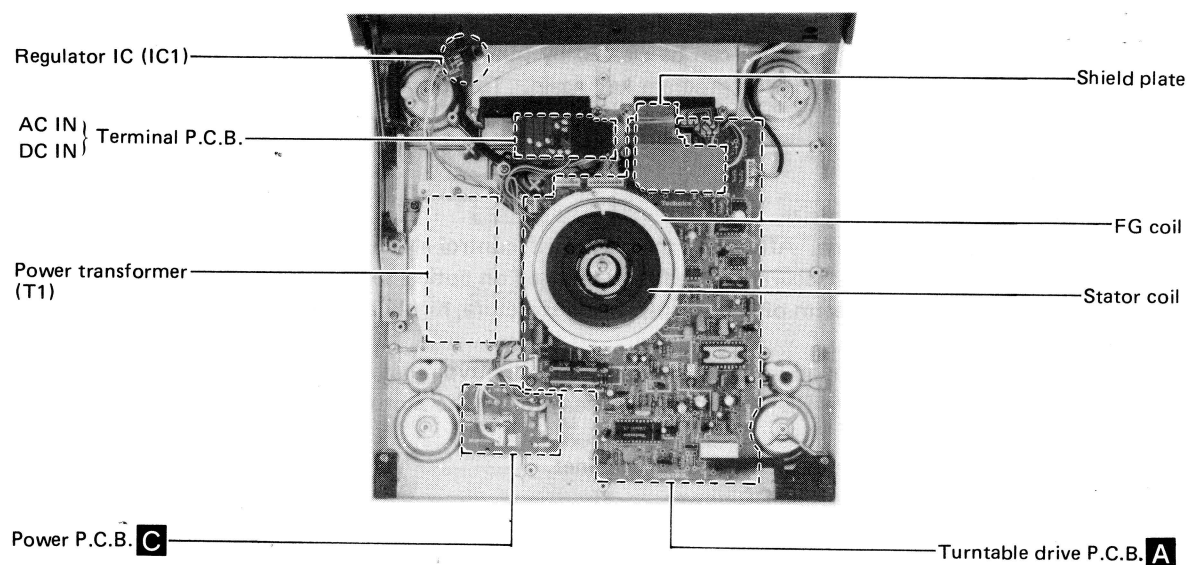
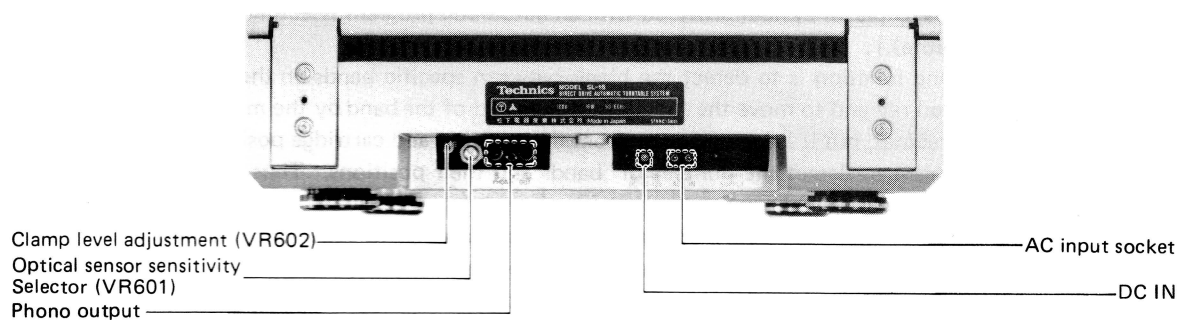
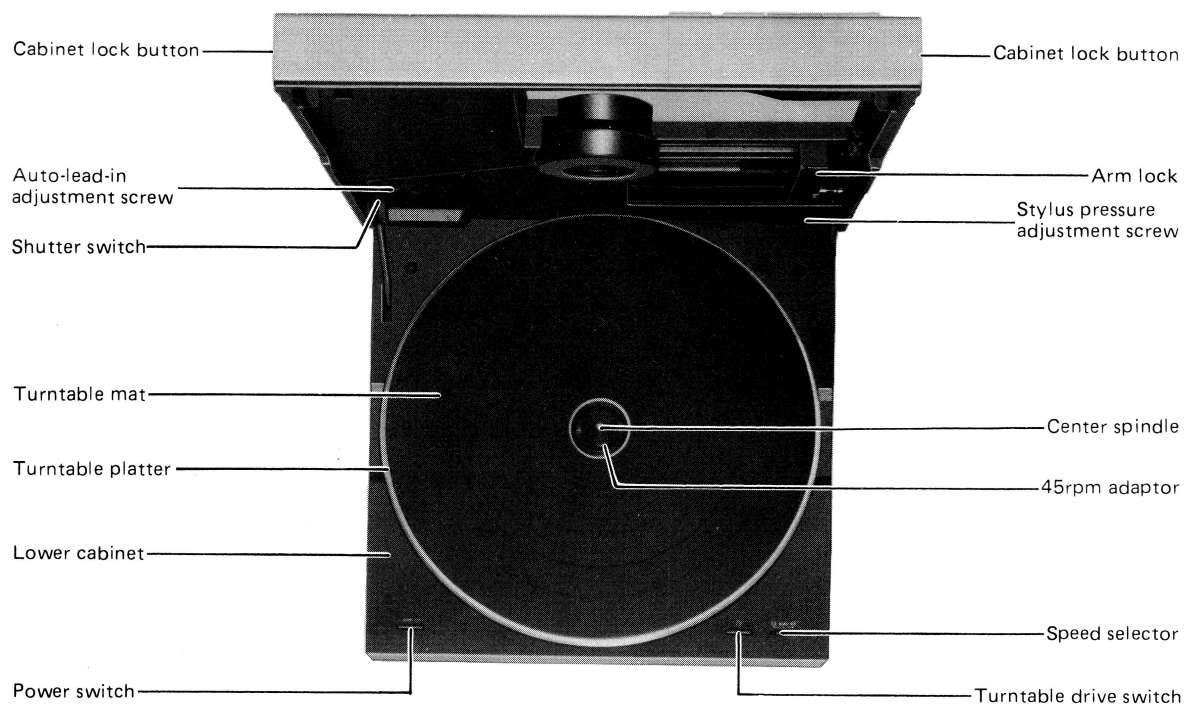
Frequency response:	5 Hz ~ 80 kHz 15 Hz ~ 60 kHz $\pm$ 3 dB 20 Hz ~ 15 kHz $\pm$ 0.5 dB	Compliance:	12×10^{-6} cm/dyne (100 Hz, dynamic)
Temperature characteristics: (5°C–35°C)	$\pm$ 0.5 dB (10 kHz) (0 dB at 1 kHz, 20°C) $\pm$ 2 dB (20 kHz) (0 dB at 1 kHz, 20°C)	Vertical tracking angle:	20°
Output voltage:	2.0 mV (1 kHz), 5 cm/s. zero to peak, lateral velocity. (5.7 mV 1 kHz 10 cm/s. zero to peak, 45° velocity, DIN 45 500)	DC resistance:	500 Ω
Channel separation:	More than 25 dB (1 kHz) More than 20 dB (10 kHz)	Inductance:	240 mH
Channel balance:	Within 0.7 dB (1 kHz)	Impedance:	1.6 k Ω (1 kHz)
		Recommended load resistance:	47 k Ω – 100k Ω
		Recommended load capacitance:	Less than 200 pF
		Stylus tip:	0.2 x 0.7 mil (5 x 18 μ m) Elliptical diamond stylus
		Effective moving mass:	0.149 mg
		Stylus pressure range:	1.25 $\pm$ 0.25 g (12.5 $\pm$ 2.5 mN)
		Weight:	6 g (cartridge only)
		Replacement stylus:	EPS-P205ED3

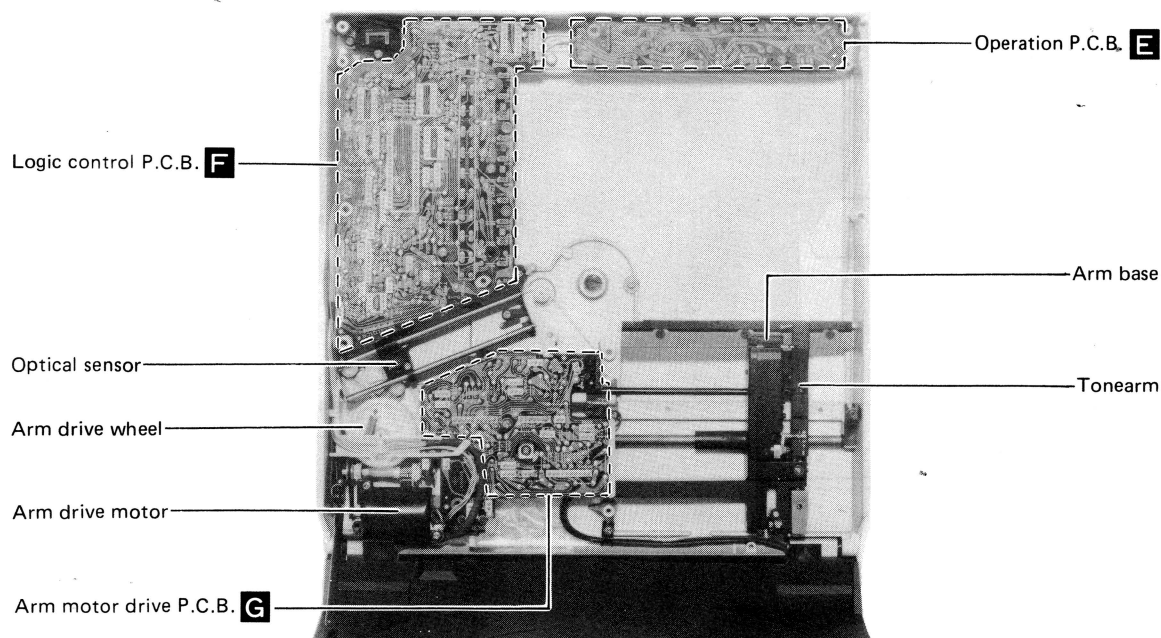
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LOCATION OF CONTROLS







■ GENERAL

This is a high efficiency quartz DD player system provided with an automatic program selecting function, taking over the size and functions of SL-10 [See (Note).].

The automatic program selecting function is to detect the blank between specific bands on the record disc by the reflection type optical sensor using infrared ray and to move the tonearm to the head of the band by the microcomputer. This detecting sensor is built into the upper cabinet, but it is located away from the tonearm and cartridge positions, and is interlocked with the tonearm operating mechanism to detect the number of bands and their positions. Thus, the detection system is very unique.

Normal operation of this unit without touching the program keys brings about the same functions as those of SL-10. When the program keys are touched, the tonearm once moves to the inner periphery of the record, while the reflection type optical sensor reads the number of bands and their positions on the record; then, pushing start key causes the tonearm to play the programmed bands in order.

For example, when the start key is pushed after setting the program keys 2, 5, 3, 1 and 4 in order, the 2nd, 5th, 3rd, 1st and 4th programs are played in order. During the play, the program LED blinks indicating the position of band being played. Also, with it interlocked with the repeat key, the programs can be continuously played in the order of 2nd, 5th, 3rd, 1st and 4th bands. When desired to repeat only the 3rd band, the purpose can be achieved by pushing the program key 3 and interlocking it with the repeat key. All the programs can be cleared by pushing the stop key. Before pressing the start key, the selected program can be canceled by pushing the program key again. This player system is really full of enjoyment having multiple functions such as skipping and selecting of the programs.

Note: Features of SL-10

1. Quartz DD compacted to record jacket size.
Set the record and push the start switch. After that, the player will control all the functions.
2. Linear tracking tonearm having highly accurate servo function based on optical sensor (optical non-contact detection).
Because of the dynamic balance tonearm of gimbal suspension structure, highly accurate tracking is attainable irrespective of the player positions.
3. The basic control is very simple, and in addition, it is of multi-function type that is favorably accepted by enthusiasts.
4. The Technics' unique single structure DD, incorporating the rotor of the motor into the turntable, and the entire periphery detection FG are employed.
5. Precision aluminum die-cast two-layer (upper and lower) cabinet.
6. Two-power source system, capable of using DC power.
7. Strobe-attached stabilizer for holding the record.
8. Adapter (45 r.p.m) built-in.
9. Dial scale to check the tonearm position.

• Automatic program selection (See Fig. A)

The optical sensor unit in the upper cabinet is interlocked with the tonearm. The infrared ray radiated from the infrared LED of the Sensor is cast on the record disc, and the reflected ray is received by the photo transistor. The reflection factor is higher at the blank groove causing the amount of light entering the photo transistor to increase. At the sound groove, the amount of light entering the photo transistor decreases due to diffused reflection. The blank between bands is found by detecting the difference in reflection factor between the blank and sound grooves. The reflected signal is then processed by the microcomputer to control the tonearm operation.

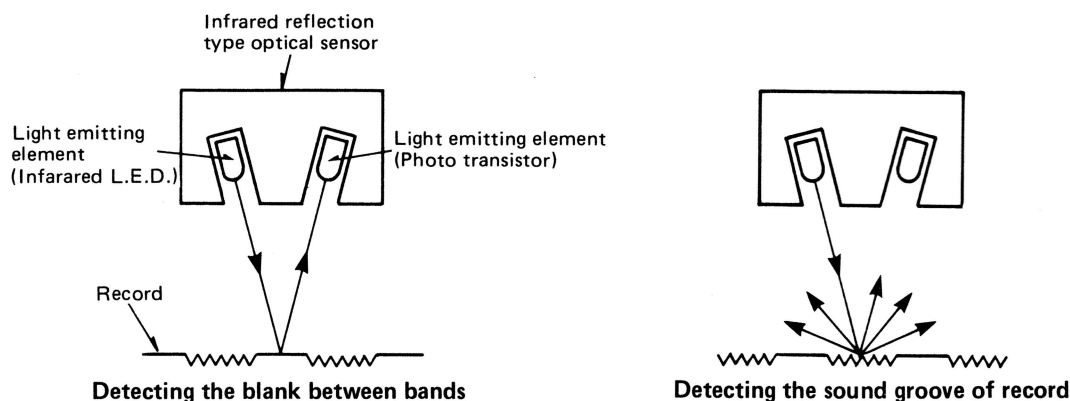
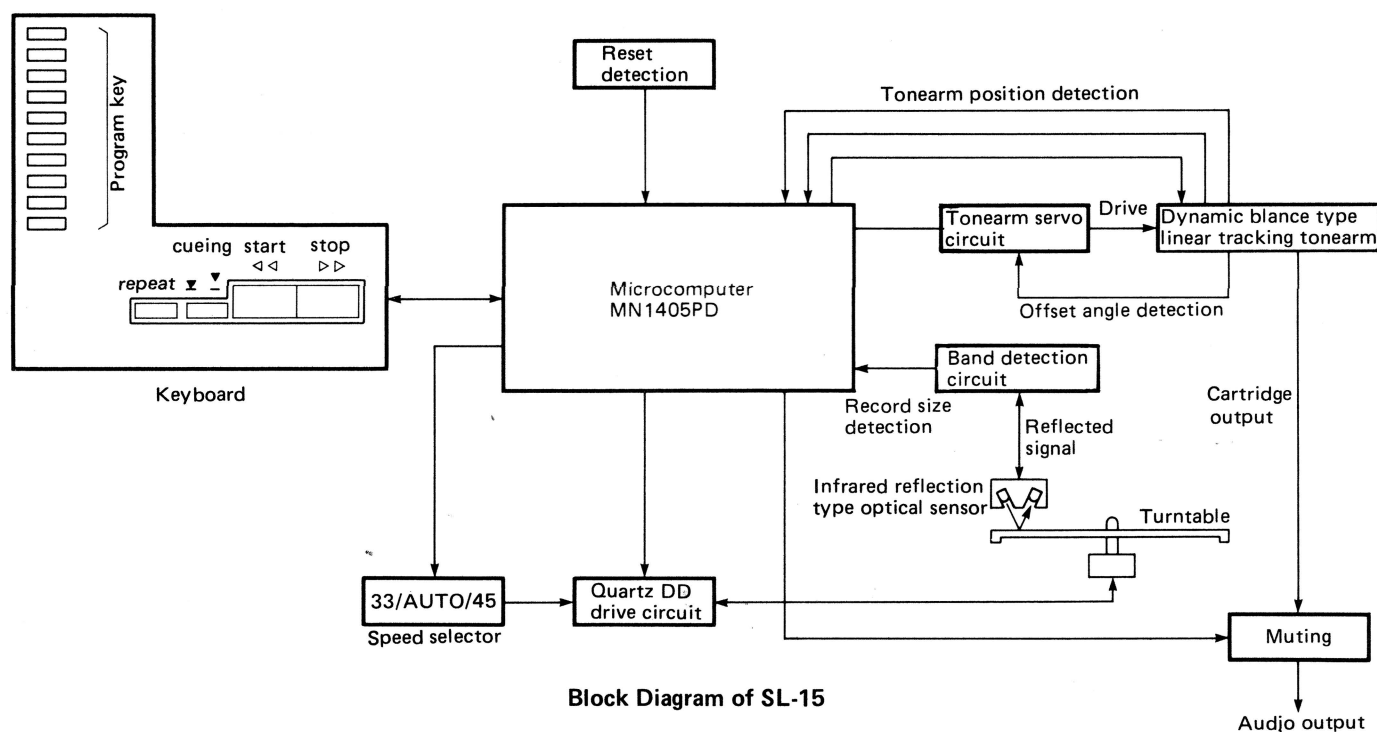


Fig. A



Block Diagram of SL-15

DISASSEMBLY INSTRUCTIONS

How to remove the cartridge

1. Push the lock button and slowly open the upper cabinet.
2. Lock the tonearm by sliding the arm lock. (See Fig. 1)
3. Loosen the cartridge setscrew with the screwdriver (large). (Loosen the screw until it is freed as illustrated.) (Fig. 2)
4. Pull out the cartridge taking care not to touch the stylus tip. (See Fig. 3)
5. When installing the cartridge, match the cartridge pin with the tonearm connector, completely insert the pin and then tighten the setscrew.

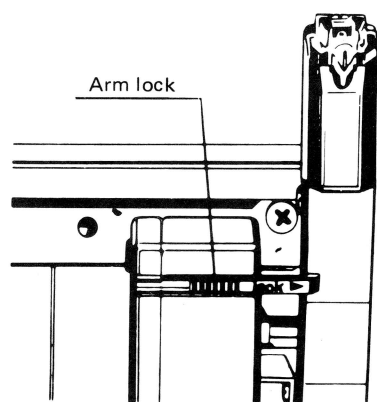


Fig. 1

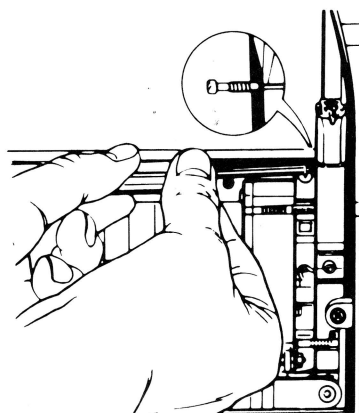


Fig. 2

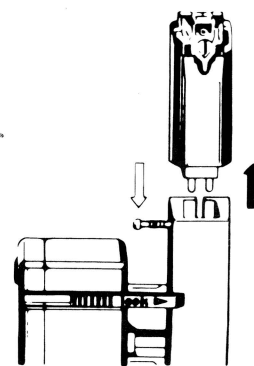


Fig. 3

How to remove the turntable

1. Holding the turntable with the hand, turn the adapter (45 r.p.m) counterclockwise to remove. (See Fig. 4)
2. Remove the nut ① and washers ②, ③ which secure the turntable. (See Fig. 5)
3. Fit two M3 screws (over 30mm in length) into the two holes provided near the center spindle of the turntable. Thus, the turntable can be removed by pulling up the screws with both hands.

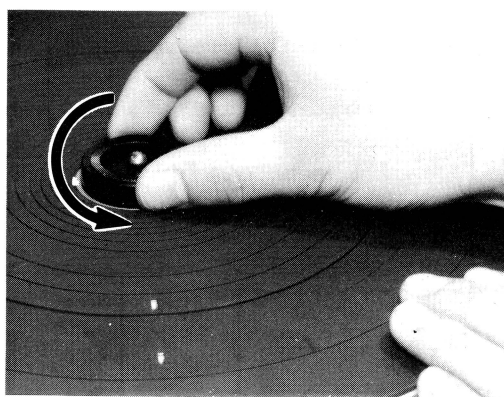


Fig. 4

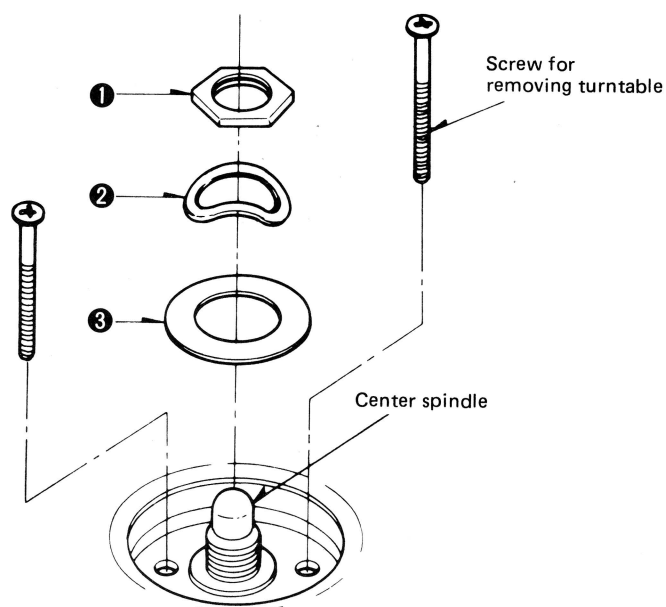


Fig. 5

• How to remove the body cover

1. Completely open the upper cabinet, pull the stay toward you and remove it from the damper. (See Fig. 6)
2. Remove the turntable. (Refer to "How to remove the turntable".)
3. Remove the cover of the power source P.C.B. and detach the connectors ④ and ⑤ from the connector ⑥ of the drive P.C.B. (See Fig. 7)
4. Remove the 4 rubber caps of the body cover; remove the body cover setscrews ⑦ ~ ⑮ then the body cover can be removed. (See Fig. 7)

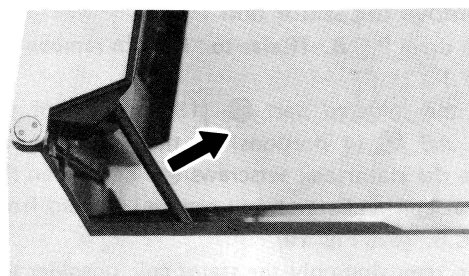


Fig. 6

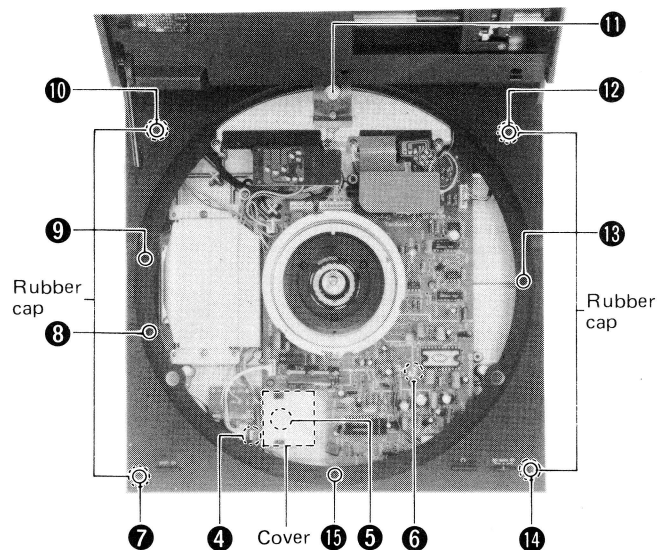


Fig. 7

• How to remove the drive P.C.B.

1. Remove the body cover. (Refer to "How to remove the body cover".)
2. Remove the shield cover setscrew ⑮ and drive circuit board setscrews ⑮ ~ ⑳. (See Fig. 8)
3. Remove the 6 connectors ㉒ ~ ㉗ and stator cover setscrews ㉘ ~ ㉚. (See Fig. 9)
4. Remove the IC1 setscrew ㉛; then the drive P.C.B. can be removed. (See Fig. 9)

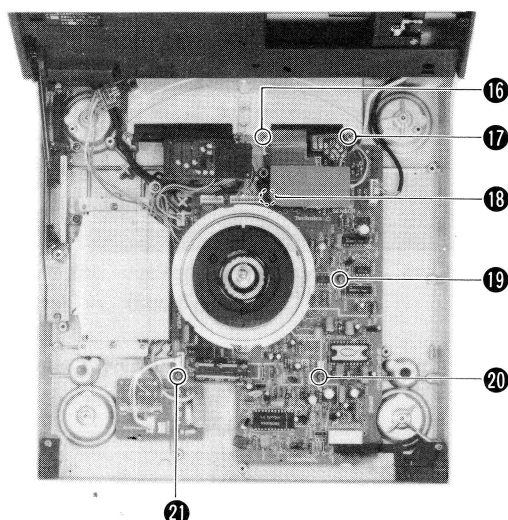


Fig. 8

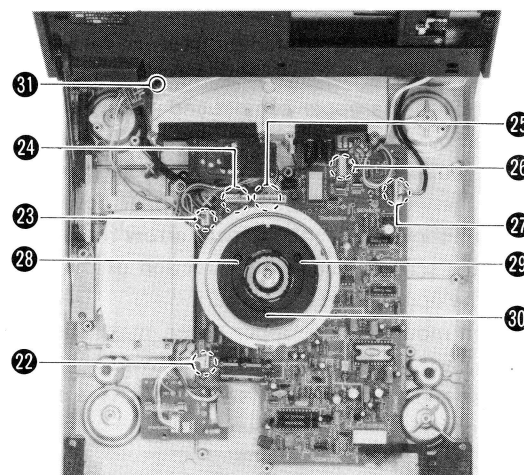


Fig. 9

• **How to remove the logic control P.C.B., arm motor drive P.C.B. and operation P.C.B.**

1. Remove the upper cover. (Refer to "How to remove the upper cover".)
2. Remove the logic control P.C.B. setscrews 51 ~ 55. (See Fig. 15)
3. Remove the connector 56 (CN204) and 57 (CN401) of the logic control P.C.B.; remove the setscrews 58 ~ 60 of the operation P.C.B. then the operation P.C.B. can be removed. (See Fig. 15)

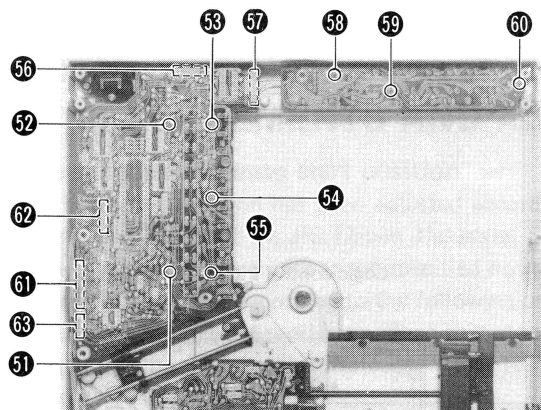


Fig. 15

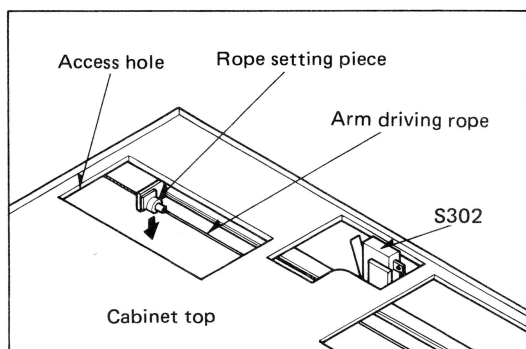


Fig. 16

• **How to remove the tonearm unit**

1. Remove the body cover and upper cover. (Refer to "How to remove the body cover" and "How to remove the upper cover".)
2. Remove the tonearm drive plate assembly. (Refer to "How to remove the logic control P.C.B., arm motor drive P.C.B. and operation P.C.B.")
3. Remove the two connectors 71 (PHONO IN) and 72 (CN204) of the drive P.C.B.; remove the bushing 73 and lead clamper setscrew 74 of the upper cabinet. (See Fig. 18)
4. Remove the guide rail setscrew 75 of the tonearm; then the tonearm unit can be removed. (See Fig. 18)

4. Remove the dust cover and detach the tonearm driving rope out of the access hole. (See Fig. 16)
5. Remove the connectors 61 (CN404), 62 (CN405) and 63 (CN403) of the logic control P.C.B. (See Fig. 15)
6. Remove the setscrews 64 ~ 66 of the tonearm drive plate assembly, and disconnect the lead wires from the clamper. (See Fig. 17)
7. Remove the setscrew 67 of the arm motor drive P.C.B. the connector 68 (CN303) and 69 (CN301); then the arm motor drive P.C.B. can be removed. (See Fig. 17)
8. When removing the logic control P.C.B. completely, remove the body cover and two connectors (CN201, CN202) of the drive P.C.B.; detach the bushing 70 of the upper cabinet; then the logic control P.C.B. can be removed. (See Fig. 17)

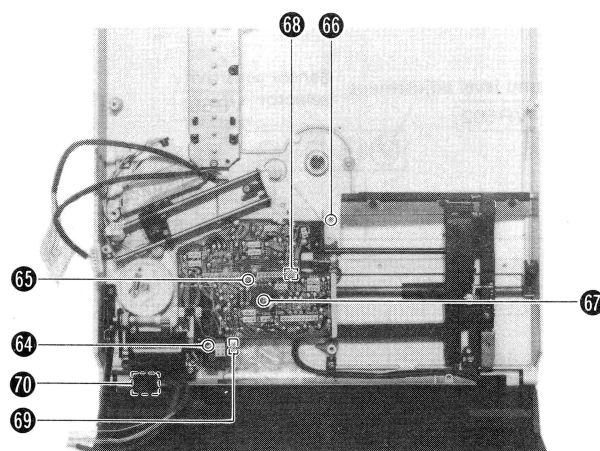


Fig. 17

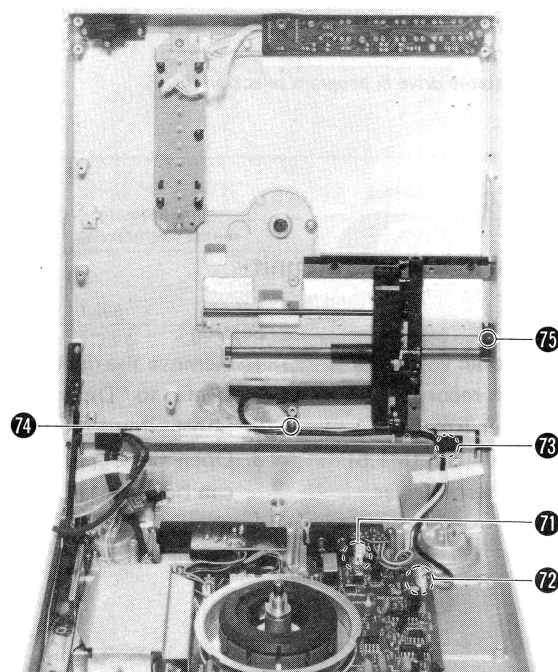


Fig. 18

• How to remove the lift rod assembly

1. Remove the tonearm unit. (Refer to "How to remove the tonearm unit".)
2. Remove the setscrew 76 of the lift rod assembly. (See Fig. 19)
3. Press the outer periphery of the lift rod with a screwdriver as shown in Fig. 19.

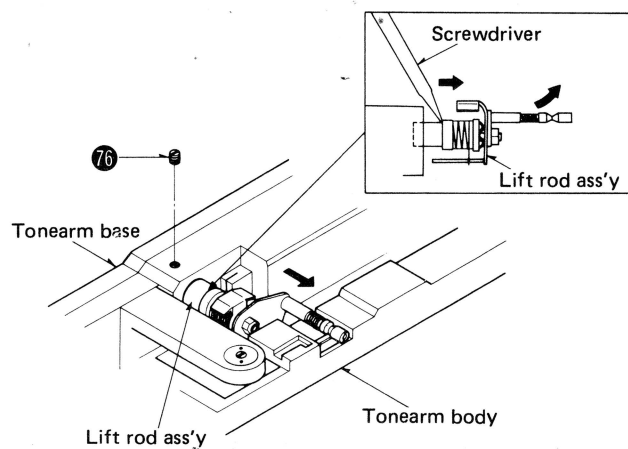


Fig. 19

• How to set the tonearm drive rope

If the rope is disengaged or when setting a new rope, follow the procedure given below.

1. Remove the tonearm drive plate assembly from the upper cabinet. (Refer to "How to remove the logic control P.C.B., arm motor drive P.C.B. and operation P.C.B.")
2. Remove E-ring 77 and washer 78 of the tonearm drive wheel. (See Fig. 20)
3. Set the rope over the arm drive wheel in order (1 ~ 3) as shown in Fig. 21.
4. Holding the rope set on the arm drive wheel, set it over the drive wheels (4 ~ 7) in order as shown in Fig. 22.
5. Slide the tonearm and the record band sensor; secure the parts to the rope clamp. (See Fig. 21)
6. Turn the worm gear by hand to make sure that the tonearm and the record band sensor move smoothly.
7. Fit the arm drive wheel with E-ring 77 and washer 78.

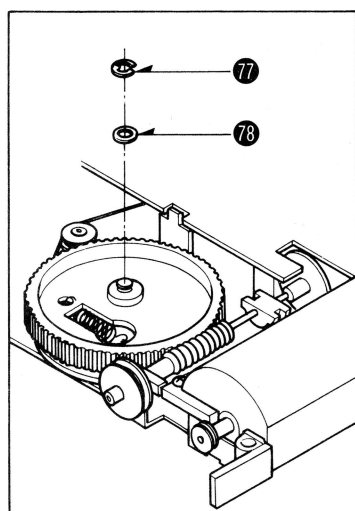


Fig. 20

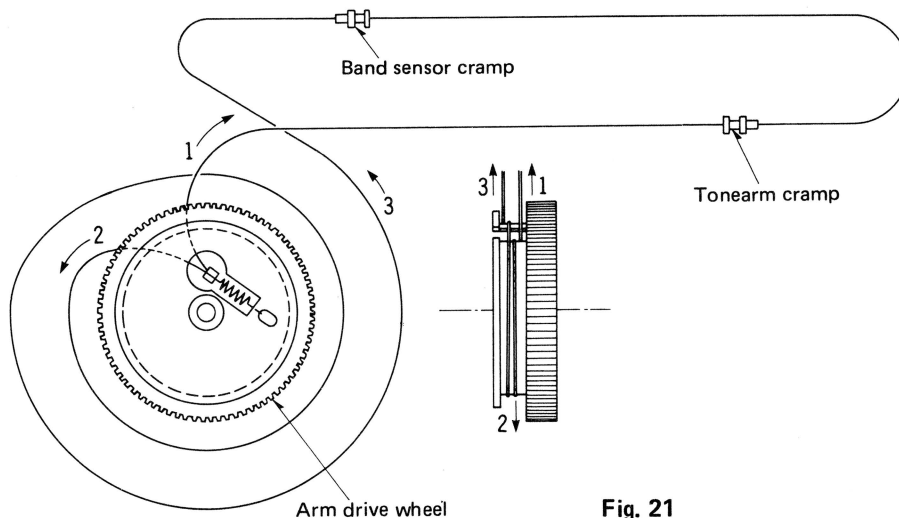


Fig. 21

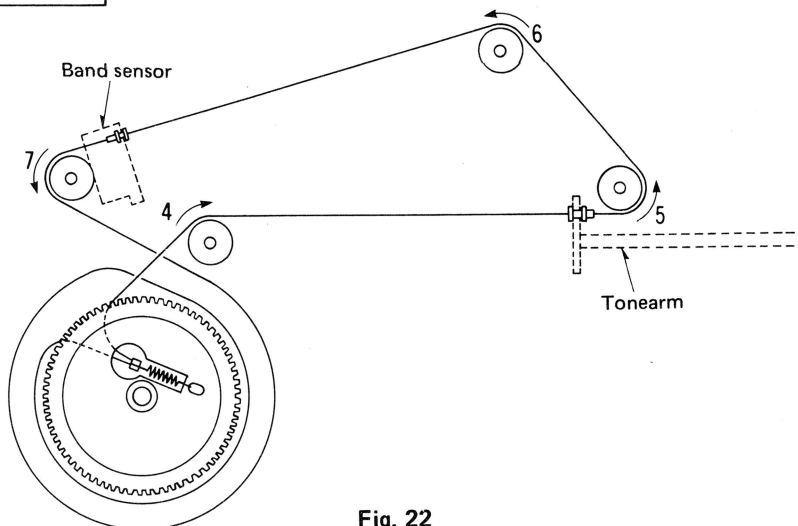


Fig. 22

DESCRIPTION OF CONNECTOR

Two types of connectors are used for this unit: one is directly soldered to the printed circuit board, and the other is insertion type.

The insertion type is represented by "CN", while the direct soldering type is by "BT". (See Fig. 23)

Note: Soldered connectors (indicated by BT) cannot be pulled out.

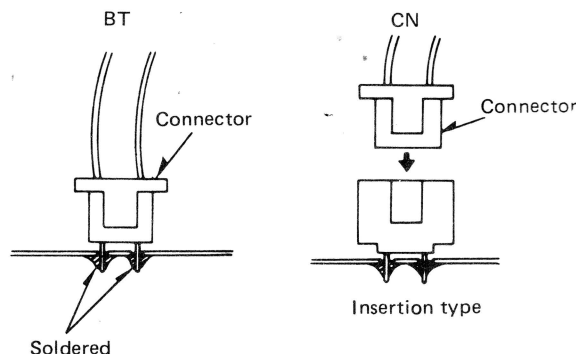


Fig. 23

MEASUREMENTS AND ADJUSTMENTS

• Adjustment of auto start position

The auto start position has been adjusted according to the record size specified by JIS (Japan Industrial Standards). If the stylus fails to operate at the specified position on the record disc, adjust it according to the following procedure.

* When adjusting, be sure to use a 30cm record disc.

1. Remove the dust cover. (Refer to "How to remove the dust cover".)
2. Make sure that the tonearm is at the start position (on the rest).
3. Adjust by turning the auto start position adjusting screw. (See Fig. 24)

If the position is deflected inside.

turn the screw clockwise.

If the position is deflected outside.

turn the screw counterclockwise.

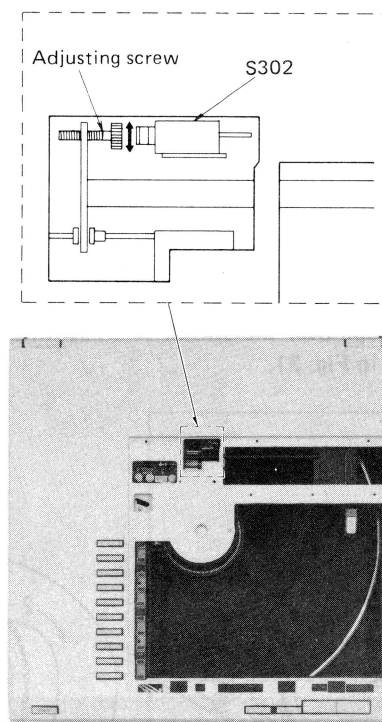


Fig. 24

• Adjustment of stylus pressure

Stylus pressure is normally set to 1.25 grams but may be raised or lowered by ± 0.25 grams.

It may be necessary to increase stylus pressure when playing records cut at high levels, or when room temperature is low, or when the unit easily picks up external vibrations. This will help prevent distortion and groove-skipping.

In such cases, turn the screw clockwise (+) so that dial scale shows the desired stylus pressure, as indicated in the illustration. (See Fig. 25)

Note:

Do not turn the stylus-pressure adjustment screw further than the set limits (1.5 g $\sim$ 1.0 g).

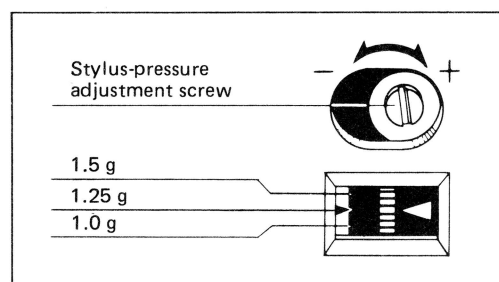


Fig. 25

• Adjustment of stylus cue-down position

Stylus cue-down position for programmed play has been correctly aligned at the factory. However, should realignment become necessary, follow the directions below.

The adjustment screw is above the shutter switch (on the underside of the cabinet top).

- During programmed play, if the stylus tends to come down too far out, turn the screw clockwise. (Fig. 26)
- If it comes down too far in, turn the screw counter-clockwise. Adjustment is only possible for bands 2 through 10. The first bands position cannot be changed.
- * For the adjustment of the stylus cue-down position for the 1st band, adjust the auto start position.

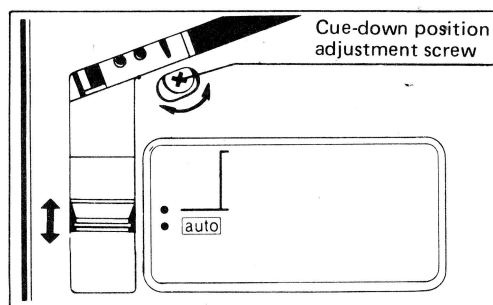
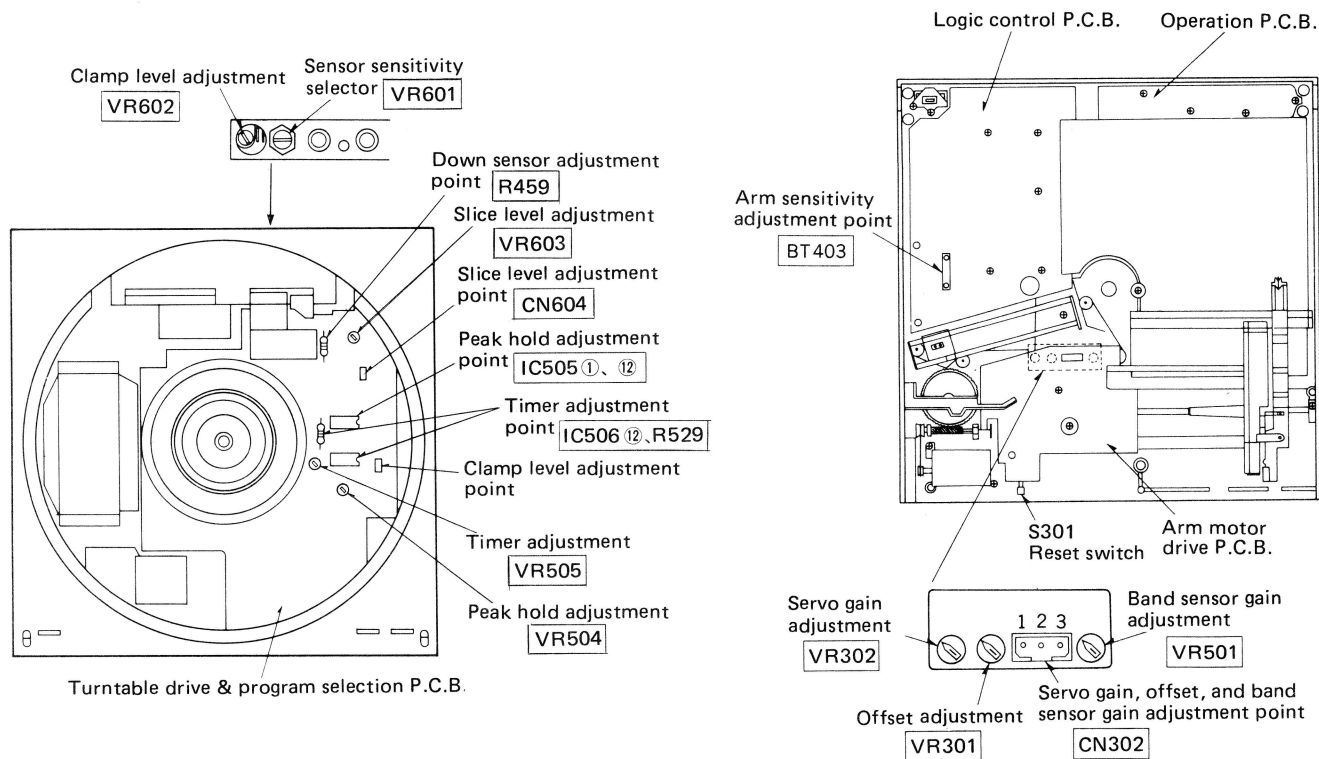


Fig. 26

• Adjustment points



• Adjustment of tonearm unit

Tools used

1. DC electronic voltmeter
2. 1mm pitch record
3. Screwdriver (small)
4. Hexagon wrench (M1.5)
5. Adjusting screwdriver

Setting

1. Remove the dust cover and top cover. (Refer to "Disassembly Instructions".)
2. Short-circuit the reset switch (S301), (See Fig. 29)
3. Open the upper cabinet and make sure that the tonearm can be operated by switch.

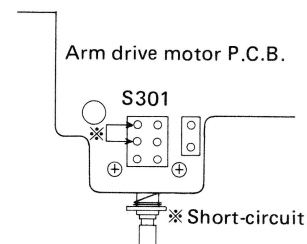
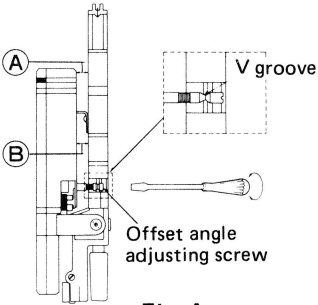
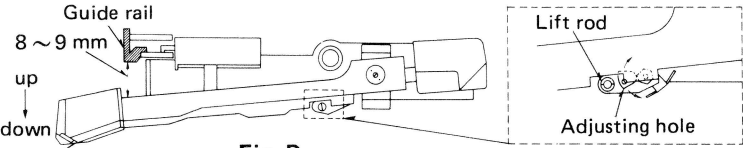
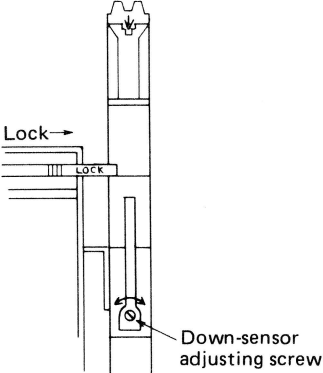
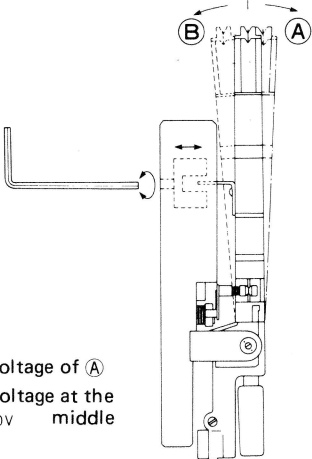
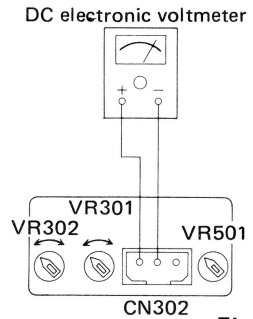


Fig. 29

Step	Item	Adjustment procedure
1	Adjustment of tonearm offset angle. [Repair of tonearm unit; assembly and replacement of lift rod.]	- Put on the record and push the start button to move the arm inward and turn off the power switch. - Open the upper cabinet and make sure that tonearm center matches the V groove of the lift rod. (See Fig. A) - Make sure that the tonearm is parallel with the arm base. (Check the spaces (A) and (B) in Fig. A.) - If the parallelism is not obtained adjust it by turning the offset angle adjusting screw.  Fig. A
2	Adjustment of arm lift height. [Repair of tonearm unit; assembly and replacement of lift rod.]	- Open the upper cabinet. Move the tonearm by pushing the start button. - Lower the tonearm by pushing the cueing button. - Make sure that the distance between arm and guide rail is 8 ~ 9 mm. (See Fig. B) - If the distance is wrong, adjust it by turning the lift adjusting hole with a screwdriver. (See Fig. B)  Fig. B
3	Sensitivity adjustment of down-sensor. [Repair of down-sensor; assembly and replacement of tonearm unit.]	- Remove the turntable and connect the DC electronic voltmeter the both ends of R459. (See Fig. 27) - Lock the tonearm by sliding the arm lock. - Push the cueing button and make sure that the lift rod moves down. (Only the lift rod descends since the tonearm is locked.) - Read the voltage values indicated when the lift rod moves down and up. Down 3.5V or over Up 0.5V or less - If the DC electronic voltmeter does not indicate these voltage values, adjust it by turning the down-sensor adjusting screw. (See Fig. C)  Fig. C
4	Adjustment of tonearm sensitivity. [Repair of arm base unit; replacement of PC402.]	- Connect the DC electronic voltmeter to the terminals ① (+) and ⑨ (–) of BT403 of the logic control P.C.B. (See Fig. 28) - Push the start button to move the tonearm. - Push the cueing button to move the arm down. - Read the voltage values indicated when the arm is completely moved in the directions (A) and (B). (See Fig. D) - Calculate the voltage at the central point from the difference between the voltage values. For example, when the voltage is 7.6V in the direction of (A), and 0.4V in the direction of (B), then the calculation is as follows. $(7.6 - 0.4) \div 2 + 0.4 = 4.0V$  Fig. D - Match the arm center with the V groove of the lift rod, and adjust by turning the adjusting screw of the arm base with a hexagon wrench.

Step	Item	Adjustment procedure
5	Adjustment of servo gain and offset. [Replacement of VR301, 302, PC402; repair of servo and offset circuit.]	① Connect the DC electronic voltmeter to the terminals ① and ② of connector (CN301) in the adjusting hold. (See Fig. E) ② Push the cueing button to move the arm down. ③ Completely turn VR301 clockwise, and then turn VR301 so that the DC electronic voltmeter indicates 0.72V. (See Fig. E) Servo gain adjustment. ④ Put a 1 mm pitch record on the turntable and play it. ⑤ Turn VR301 so that the DC electronic voltmeter indicates 0.6V. (See Fig. E) Offset adjustment.


Fig. E

• Adjustment of program selection circuit

Tools used

1. Oscilloscope (two channel type)
2. Adjusting screwdriver
3. 30 cm record
4. DC electronic voltmeter

Setting

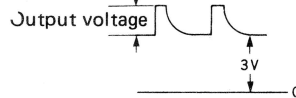
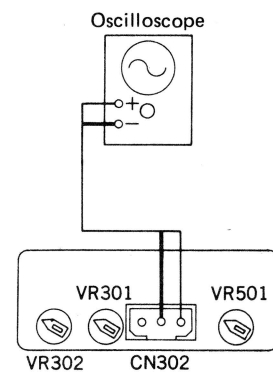
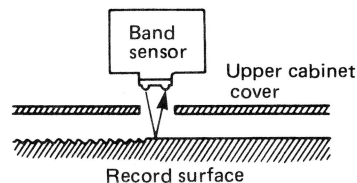
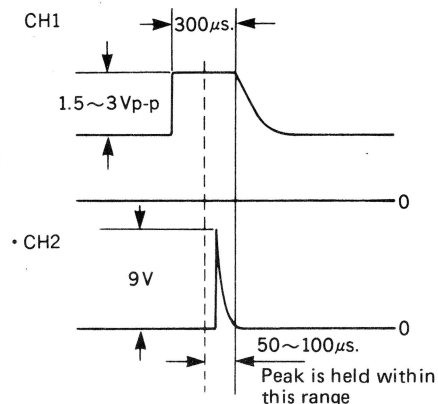
1. Remove the dust cover.

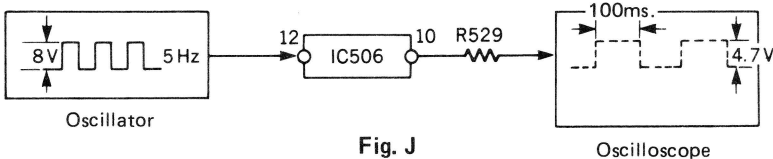
(Refer to "Disassembly instructions".)

2. Short-circuit reset switch (S301).

*For the adjustment of the program selection circuit, follow the procedure in the table below.

Step	Item	Adjusting procedure
1	Band sensor gain adjustment. [Repair of program selection circuit; replacement of band sensor and VR501.]	① Connect the oscilloscope to CN302 [terminals ②, ③] in the access hole of the upper cabinet. (See Fig. F) ② Place the record on the turntable and move the tone-arm toward the center of the disc where there is no sound groove. ③ Stop the turntable by hand and adjust VR501 so that the output voltage is $1.7 \pm 0.1V$. (See Fig. G) Note: Be sure to stop the turntable because the output waveform changes if the turntable is rotating.
2	Peak hold adjustment [Repair of program selection circuit; replacement of VR504, IC506.]	① Remove the turntable. (See "Disassembly Procedure".) ② Connect CH1 of the oscilloscope (two channel type) to IC505 terminal ①, and CH2 to terminal ⑫. (See Fig. 27) ③ Bring the no-sound groove (around the disc center) of the record disc close to the band sensor of the upper cabinet and secure it with tape. (See Fig. H) ④ Adjust VR504 so that the peak wave phase of CH2 is as shown in Fig. I. The output of CH1 varies in peak value depending on the interval between the record disc and sensor or the reflection factor of record surface.

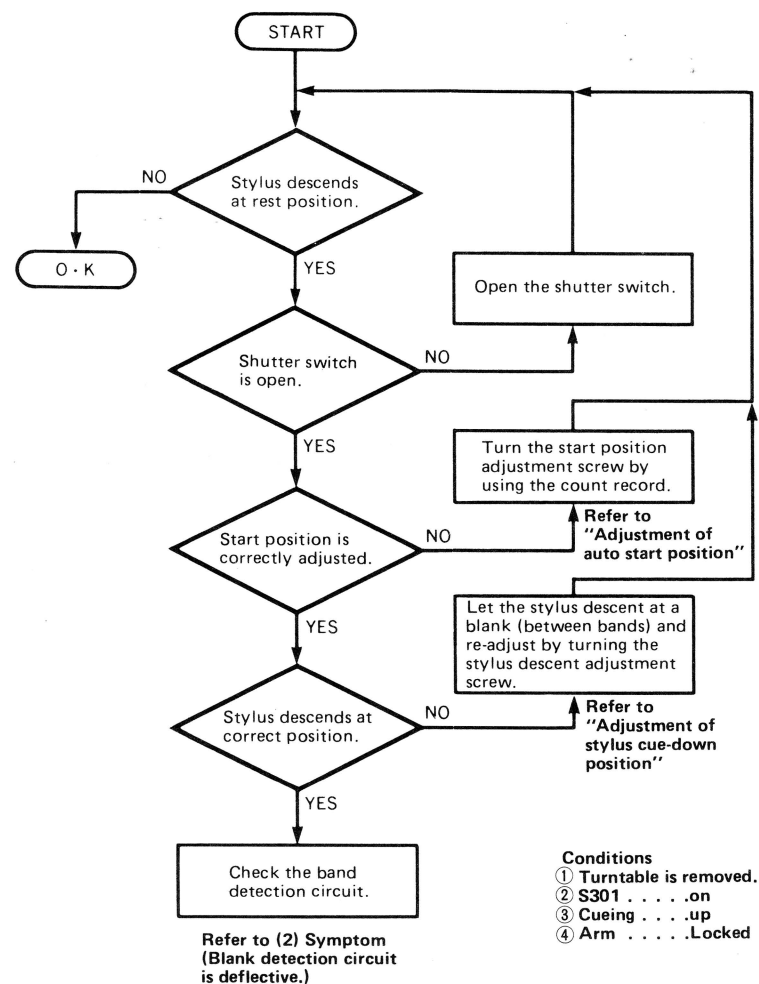

Fig. G

Fig. F

Fig. H

Fig. I

Step	Item	Adjusting procedure
3	Slice level adjustment [Repair of program selection circuit; replacement of VR603.]	① Connect the DC voltmeter to CN604. (See Fig. 27) ② Lock the tonearm and push the cueing button to lower the lift. (Then, make sure the illuminating lamp goes out.) ③ Adjust VR603 so that the voltage value is $0.5 \pm 0.02V$.
4	Clamp level adjustment [Repair of program selection circuit; replacement of VR602.]	① Connect the DC electronic voltmeter to CN603 [terminals ①, ③]. (See Fig. 27) ② Lock the tonearm and push the cueing button to lower the lift. (Then make sure the illuminating lamp goes out.) ③ Adjust VR602 so that the voltage value is 1.0 to 1.3V .
5	Timer adjustment [Replacement of IC506, VR505.]	① Remove the turntable and connect the oscillator to IC506 terminal ⑫. (See Fig. 27) ② Connect the oscilloscope to IC506 terminal ⑩ through R529. (See Fig. J) ③ Apply the output pulse (8V) at 5 Hz from the oscilloscope and then adjust VR505 so that the output pulse width at R529 is 100ms $\pm$ 10ms .  Fig. J
6	Descend-at-blank position adjustment [Repair of program selection circuit; replacement of band sensor.]	① After completing the adjustment above, let the tonearm descend between the 1st and 2nd bands. (To play the program.) ② If the position is incorrect, adjust it according to the same procedure as in "Adjustment of stylus cue-down position".

■ TROUBLE SHOOTING (Program selection circuit)

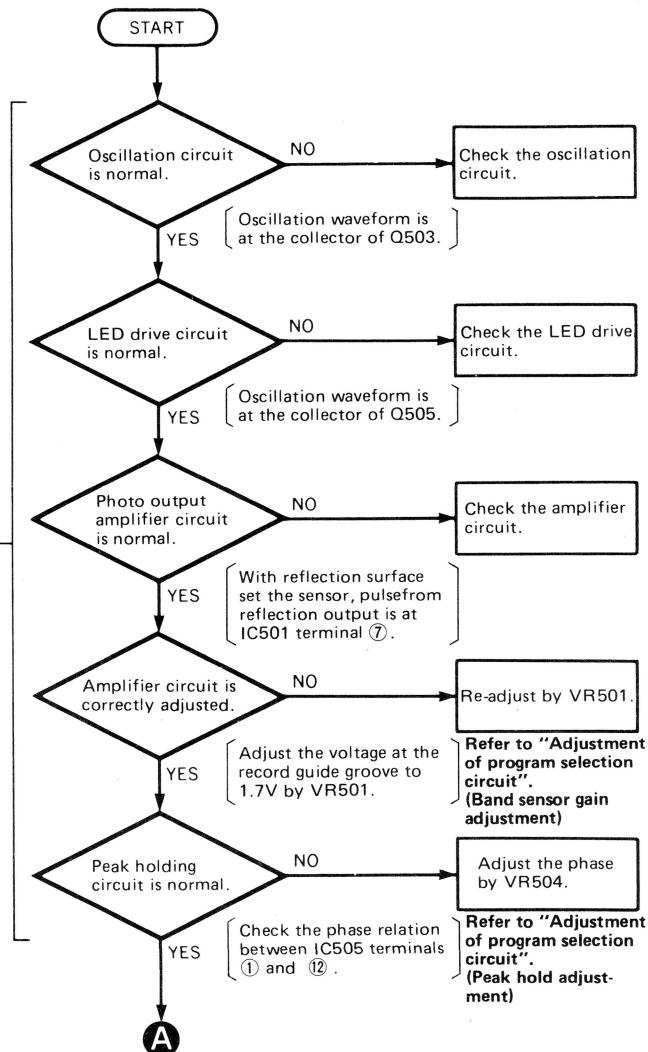
(1) Symptom

The stylus descends at the rest position when the start button or cueing button is pressed with the 17cm or 25cm record or without record placed.
(Size selection is defective.)



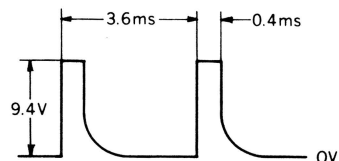
(2) Symptom

No play is possible in program mode. (Band detection circuit is defective.)

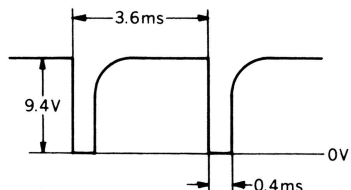


● Reference waveform for check points

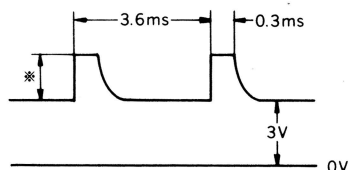
Q503 collector



Q505 collector

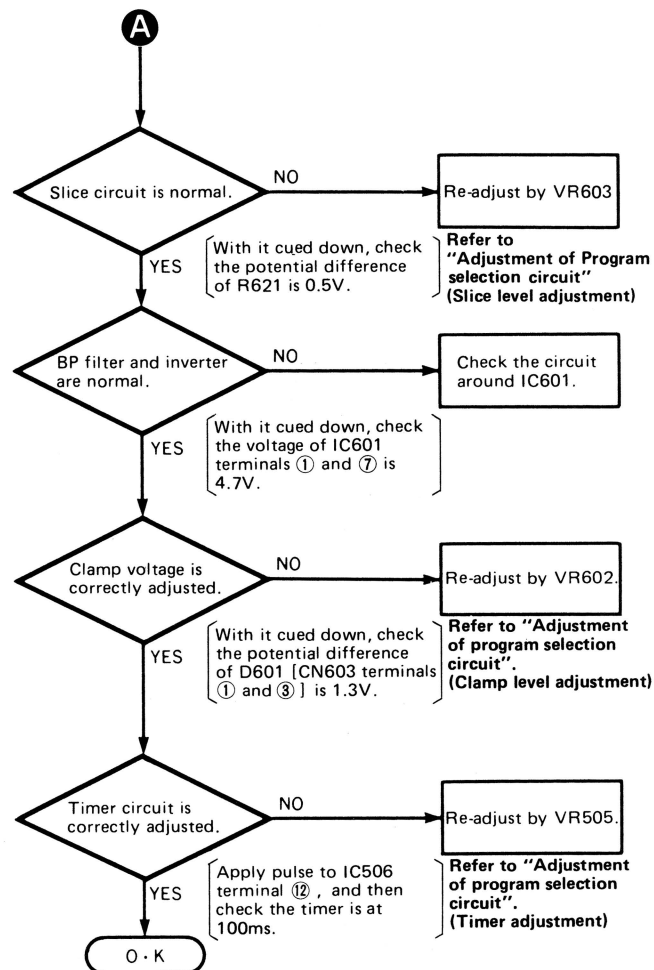
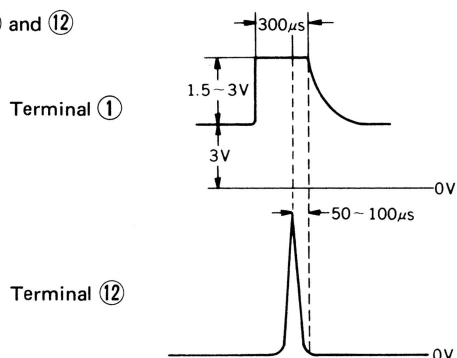


IC501 terminal ⑦



* Output voltage varies depending on the reflection surface.

IC505 terminal ① and ⑫



■ ABOUT THE OPTICAL SENSOR SENSITIVITY (GAIN) SELECTOR

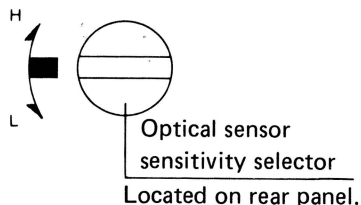
The sensitivity of the optical sensor which detects the number of bands on the record and their positions has been factory adjusted for optimum performance. However, by switching the sensitivity selector to the H or L position, programmed play of some special records is possible. Always return the selector to the center position to play ordinary records.

* For programmed play of records having very narrow lead-in grooves between bands:

Turn the selector all the way to the H position.

* To play records having very wide groove pitch:

Turn the selector all the way to the L position.



REPLACEMENT PARTS LIST...Electric 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 make 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.
- Areas**
- * [M] is available in U.S.A.
 - * [MC] is available in Canada.

Ref. No.	Part No.	Part Name & Description
INTEGRATED CIRCUITS		
IC1	SVIUPC7812H	IC, Regulator
IC101	AN6675	IC, Drive
IC201	AN6680	IC, Control
IC301	SVIBA6109FC	IC, Arm Motor Drive
IC401	MA1405PD	IC, Micro-Computer
IC402, 403	SVIM53204P	IC, Inverter
IC404	SVIM53217P	IC, Buffer
IC405	SVIM53216P	IC, Inverter
IC406	SVITC4069	IC, Inverter
IC407	SVIUPC78M05H	IC, Regulator
IC501, 502, 610	AN6552F	IC, Operation Amp.
602		
IC505	SVIUPD4066C	IC, Quad Bilateral Switch
IC506	SVITC4528BP	IC, Dial Monostable Multivibrator
TRANSISTORS		
Q201, 303, 305	2SD638	Transistor, Regulator Buffer Cueing
405, 406, 505		Relay Driver and L.E.D Driver
Q202, 204, 301	2SD636	Transistor, Switching Buffer Offset
304, 306 ~ 308		Amp. Muting Relay Driver and
401, 404, 407		L.E.D Driver
410, 411, 504		
Q203	2SC1328-T	Transistor, FG Amp.
Q302, 408, 409	2SB641	Transistor, Switching and T.T Detector
601, 602,		
Q402, 403, 503	2SB643	Transistor, Switching
Q461	PN120S	Photo Transistor, Cueing Detector
Q501, 502	2SD889	Transistor, Oscillator
DIODES		
D1	SVDSIRBA20Z	Diode, Rectifier
D201, 202, 301	MA162A	Diode
302, 411 ~ 414		
416, 417, 425,		
426, 461, 502		
D205	RVDRD7R5FB	Diode, 7.5V Zener
D401 ~ 410	SVDPDR5531K	Light Emitting Diode, Red
418 ~ 424		
D415	SVDDGD4205ALC	Light Emitting Diode, Strobe
D463	LN62S	Light Emitting Diode, Cueing Detection
D501, 503, 607	MA1047A	Diode, 4.7V Zener
D610 ~ 606, 608,	MA162A	Diode
609		
PHOTO INTERRUPTERS		
PC401	ON1161	Photo Interrupter, Arm Position Detector
PC402	ON1108	Photo Interrupter, Offset Angle Detector
CRYSTAL		
X201	SVQU306115	Crystal, 4.1932MHz Counter Oscillator
RELAY		
RL401	SFDZC07-01E	Plunger, Cueing
RL402	SFDYQ11N01	Relay, Muting
SWITCHES		
S1-1	Δ SFDSS55GL	Switch, Power Source
S1-2	Δ SFDSTWM9901	Switch, Power Source
S201	ESB6247	Switch, Turntable Drive
S202	SFDSC10-01	Switch, Speed Selector
S301	ESB6247	Switch, Reset Switch
S302	SFDS22MSL-C	Switch, Rest Position, Detector
S401 ~ 410	SVQQJR02K	Switch, Program Keys (1 ~ 10)
S411 ~ 416	EVQQXR04K	Switch, Operation Switch

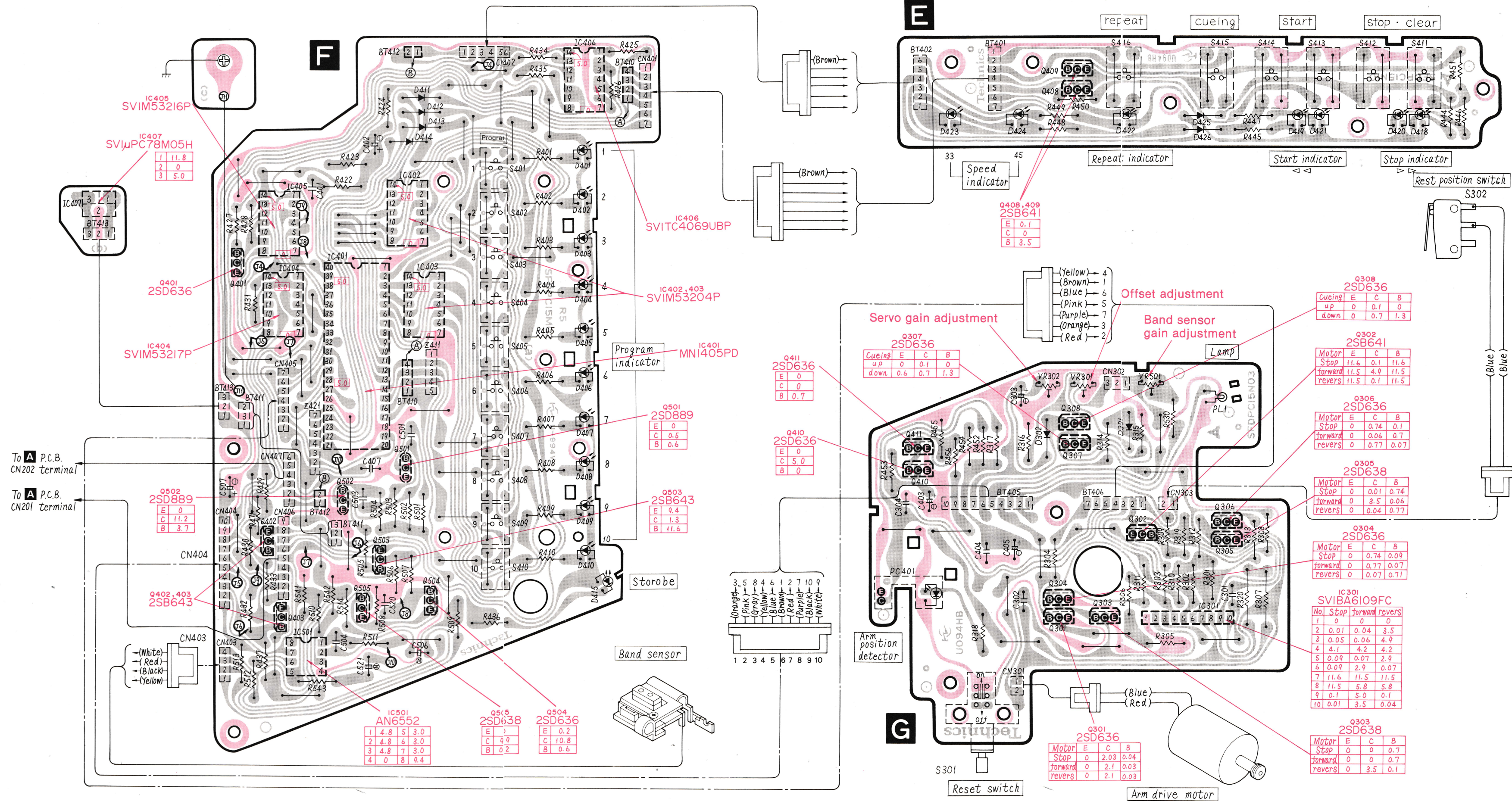
Ref. No.	Part No.	Part Name & Description
VARIABLE RESISTORS		
VR301	EVN38CA00B14	Offset Adjustment, 10k Ω (B)
VR302, 603	EVN38CA00B13	Servo Gain & Slice Level
		Adjustment, 1k Ω (B)
VR501	EVN38CA00B25	Sensor Gain Adjustment, 200k Ω (B)
VR504, 505	EVNM0AA00B14	Peak Hold & Timer Adjustment, 10k Ω (B)
VR601	EVJL3A207C53	Sensor Gain Selector, 5k Ω (C)
VR602	EVNM0AA00B13	Clamp Level Adjustment, 1k Ω (B)
COMPONENT COMBINATIONS		
Z411	EXBEQ4473J	Component Combination, 47k Ω (x 4)
Z421	EXBEQ6472J	Component Combination, 4.7k Ω (x 6)
LAMP		
PL1	SFDNC10-02	Lamp, Stylus Illuminator
FUSES		
F1	Δ XBA2F10NU100	Fuse, Power Source, 1A (250V)
F2 [MC] only	Δ XBA1F12NU14	Fuse, Power Source, 1.2A (125V)
TRANSFORMER		
T1 [M]	Δ SLT66PL3A	Transformer, Power Source
T1 [MC]	Δ SLT66PS4C	Transformer, Power Source
RESISTORS		
R1	Δ ERD50FJ47	Carbon, 1/2W, 4.7 Ω , $\pm$ 5%
R101	ERD25FJ103	Carbon, 1/4W, 10k Ω , $\pm$ 5%
R102	ERX1ANJ3R3	Metallic, 1W, 3.3 Ω , $\pm$ 5%
R103	ERD25FJ472	Carbon, 1/4W, 4.7k Ω , $\pm$ 5%
R104	ERD25TJ473	Carbon, 1/4W, 47k Ω , $\pm$ 5%
R105	ERD25FJ103	Carbon, 1/4W, 10k Ω , $\pm$ 5%
R106	ERD25FJ150	Carbon, 1/4W, 15 Ω , $\pm$ 5%
R107	ERD25FJ562	Carbon, 1/4W, 5.6k Ω , $\pm$ 5%
R201	ERD25FJ331	Carbon, 1/4W, 330 Ω , $\pm$ 5%
R202	ERD25FJ471	Carbon, 1/4W, 470 Ω , $\pm$ 5%
R203	ERD25FJ272	Carbon, 1/4W, 47 Ω , $\pm$ 5%
R204	ERD25FJ470	Carbon, 1/4W, 2.7k Ω , $\pm$ 5%
R205	ERD25TJ124	Carbon, 1/4W, 120k Ω , $\pm$ 5%
R206	ERD25TJ183	Carbon, 1/4W, 18k Ω , $\pm$ 5%
R207	ERD25TJ563	Carbon, 1/4W, 56k Ω , $\pm$ 5%
R208	ERD25TJ224	Carbon, 1/4W, 220k Ω , $\pm$ 5%
R209	ERD25TJ154	Carbon, 1/4W, 150k Ω , $\pm$ 5%
R210	ERD25TJ223	Carbon, 1/4W, 22k Ω , $\pm$ 5%
R211	ERD25FJ103	Carbon, 1/4W, 10k Ω , $\pm$ 5%
R212, 213	ERD25TJ223	Carbon, 1/4W, 22k Ω , $\pm$ 5%
R214	ERD25FJ471	Carbon, 1/4W, 470 Ω , $\pm$ 5%
R215	ERD25FJ221	Carbon, 1/4W, 220 Ω , $\pm$ 5%
R216	ERD25TJ154	Carbon, 1/4W, 150k Ω , $\pm$ 5%
R217	ERD25TJ223	Carbon, 1/4W, 22k Ω , $\pm$ 5%
R218	ERD25FJ102	Carbon, 1/4W, 1k Ω , $\pm$ 5%
R219	ERD25FJ332	Carbon, 1/4W, 3.3k Ω , $\pm$ 5%
R220, 221	ERD25FJ103	Carbon, 1/4W, 10k Ω , $\pm$ 5%
R222	ERD25FJ391	Carbon, 1/4W, 390 Ω , $\pm$ 5%
R224	ERD25TJ273	Carbon, 1/4W, 27k Ω , $\pm$ 5%
R301, 302	ERD25FJ472	Carbon, 1/4W, 4.7k Ω , $\pm$ 5%
R303	ERD25FJ821	Carbon, 1/4W, 820 Ω , $\pm$ 5%
R304	ERD25TJ223	Carbon, 1/4W, 22k Ω , $\pm$ 5%
R305, 306	ERD25FJ221	Carbon, 1/4W, 220 Ω , $\pm$ 5%
R307	ERG1ANJ220	Metal Oxide, 1W, 22 Ω , $\pm$ 5%
R308	ERD25FJ102	Carbon, 1/4W, 1k Ω , $\pm$ 5%
R309	ERD25FJ472	Carbon, 1/4W, 4.7k Ω , $\pm$ 5%
R310	ERD25FJ681	Carbon, 1/4W, 680 Ω , $\pm$ 5%
R311	ERD25TJ123	Carbon, 1/4W, 12k Ω , $\pm$ 5%
R312	ERD25FJ681	Carbon, 1/4W, 680 Ω , $\pm$ 5%
R313	ERD25TJ123	Carbon, 1/4W, 12k Ω , $\pm$ 5%
R314	ERD25TJ473	Carbon, 1/4W, 47k Ω , $\pm$ 5%

Ref. No.	Part No.	Part Name & Description			
R315	ERD25FJ121	Carbon,	1/4W,	120Ω,	± 5%
R316	ERD25FJ181	Carbon,	1/4W,	180Ω,	± 5%
R317	ERD25FJ103	Carbon,	1/4W,	10kΩ,	± 5%
R318	ERD25FJ681	Carbon,	1/4W,	680Ω,	± 5%
R319	ERD25FJ272	Carbon,	1/4W,	2.7kΩ,	± 5%
R320	ERG1ANJ220	Metal Oxide,	1W,	22Ω,	± 5%
R401, 402	ERD25FJ471	Carbon,	1/4W,	470Ω,	± 5%
R403, 404	ERD25FJ471	Carbon,	1/4W,	470Ω,	± 5%
R405, 406	ERD25FJ471	Carbon,	1/4W,	470Ω,	± 5%
R407, 408	ERD25FJ471	Carbon,	1/4W,	470Ω,	± 5%
R409, 410	ERD25FJ471	Carbon,	1/4W,	470Ω,	± 5%
R422	ERD25TJ223	Carbon,	1/4W,	22kΩ,	± 5%
R423	ERD25TJ473	Carbon,	1/4W,	47kΩ,	± 5%
R424	ERD25FJ101	Carbon,	1/4W,	100Ω,	± 5%
R425, 426	ERD25FJ472	Carbon,	1/4W,	4.7kΩ,	± 5%
R427	ERD25TJ223	Carbon,	1/4W,	22kΩ,	± 5%
R428, 429	ERD25FJ472	Carbon,	1/4W,	4.7kΩ,	± 5%
R430	ERD25FJ102	Carbon,	1/4W,	1kΩ,	± 5%
R431	ERD25FJ103	Carbon,	1/4W,	10kΩ,	± 5%
R432	ERD25FJ472	Carbon,	1/4W,	4.7kΩ,	± 5%
R433	ERD25FJ681	Carbon,	1/4W,	680Ω,	± 5%
R434, 435	ERD25FJ472	Carbon,	1/4W,	4.7kΩ,	± 5%
R436	ERD25FJ181	Carbon,	1/4W,	180Ω,	± 5%
R437	ERD25FJ272	Carbon,	1/4W,	2.7kΩ,	± 5%
R438, 439	ERD25FJ103	Carbon,	1/4W,	10kΩ,	± 5%
R440	ERD25TJ393	Carbon,	1/4W,	39kΩ,	± 5%
R441	ERG1ANJ151	Metal Oxide,	1W,	150Ω,	± 5%
R443	ERD25FJ222	Carbon,	1/4W,	2.2kΩ,	± 5%
R444, 445	ERD25FJ471	Carbon,	1/4W,	470Ω,	± 5%
R446, 447	ERD25FJ471	Carbon,	1/4W,	470Ω,	± 5%
R448, 449	ERD25FJ471	Carbon,	1/4W,	470Ω,	± 5%
R450, 451	ERD25TJ104	Carbon,	1/4W,	100kΩ,	± 5%
R452	ERD25FJ102	Carbon,	1/4W,	1kΩ,	± 5%
R453	ERD25FJ150	Carbon,	1/4W,	15Ω,	± 5%
R454	ERD25FJ222	Carbon,	1/4W,	2.2kΩ,	± 5%
R455	ERD25FJ102	Carbon,	1/4W,	1kΩ,	± 5%
R456	ERD25FJ682	Carbon,	1/4W,	6.8kΩ,	± 5%
R457	ERD25FJ222	Carbon,	1/4W,	2.2kΩ,	± 5%
R458	ERD25TJ104	Carbon,	1/4W,	100kΩ,	± 5%
R459	ERD25TJ563	Carbon,	1/4W,	56kΩ,	± 5%
R460	ERD25FJ222	Carbon,	1/4W,	2.2kΩ,	± 5%
R461	ERD25FJ221	Carbon,	1/4W,	220Ω,	± 5%
R462	ERD25FJ471	Carbon,	1/4W,	470Ω,	± 5%
R463	ERD25FJ102	Carbon,	1/4W,	1kΩ,	± 5%
R471	ERD25FJ272	Carbon,	1/4W,	2.7kΩ,	± 5%
R501	ERD25FJ472	Carbon,	1/4W,	4.7kΩ,	± 5%
R502, 503	ERD25TJ474	Carbon,	1/4W,	470kΩ,	± 5%
R504	ERD25FJ472	Carbon,	1/4W,	4.7kΩ,	± 5%
R505	ERD25FJ103	Carbon,	1/4W,	10kΩ,	± 5%
R506	ERD25FJ333	Carbon,	1/4W,	33kΩ,	± 5%
R507	ERD25FJ472	Carbon,	1/4W,	4.7kΩ,	± 5%
R508	ERD25TJ153	Carbon,	1/4W,	15kΩ,	± 5%
R509	ERD25FJ820	Carbon,	1/4W,	82Ω,	± 5%
R510, 511	ERD25FJ103	Carbon,	1/4W,	10kΩ,	± 5%
R512	ERD25TJ223	Carbon,	1/4W,	22kΩ,	± 5%
R513	ERD25FJ103	Carbon,	1/4W,	10kΩ,	± 5%
R514	ERD25FJ102	Carbon,	1/4W,	1kΩ,	± 5%
R515	ERD25TJ105	Carbon,	1/4W,	1MΩ,	± 5%
R516	ERD25FJ103	Carbon,	1/4W,	10kΩ,	± 5%
R523	ERD25TJ153	Carbon,	1/4W,	15kΩ,	± 5%
R526	ERD25FJ272	Carbon,	1/4W,	2.7kΩ,	± 5%
R529	ERD25FJ472	Carbon,	1/4W,	4.7kΩ,	± 5%
R530	ERD25TJ183	Carbon,	1/4W,	18kΩ,	± 5%
R541, 542	ERD25FJ103	Carbon,	1/4W,	10kΩ,	± 5%
R543	ERD25TJ564	Carbon,	1/4W,	560kΩ,	± 5%
R601	ERD25TJ393	Carbon,	1/4W,	39kΩ,	± 5%
R602	ERD25TJ333	Carbon,	1/4W,	33kΩ,	± 5%
R603	ERD25TJ474	Carbon,	1/4W,	470kΩ,	± 5%
R604, 605	ERD25FJ103	Carbon,	1/4W,	10kΩ,	± 5%
R606	ERD25TJ224	Carbon,	1/4W,	220kΩ,	± 5%
R607	ERD25FJ102	Carbon,	1/4W,	1kΩ,	± 5%
R608, 609	ERD25TJ224	Carbon,	1/4W,	220kΩ,	± 5%
R610	ERD25FJ102	Carbon,	1/4W,	1kΩ,	± 5%
R611	ERD25TJ224	Carbon,	1/4W,	220kΩ,	± 5%
R612	ERD25FJ682	Carbon,	1/4W,	6.8kΩ,	± 5%
R613	ERD25FJ472	Carbon,	1/4W,	4.7kΩ,	± 5%
R614	ERD25FJ102	Carbon,	1/4W,	1kΩ,	± 5%

Ref. No.	Part No.	Part Name & Description			
R615	ERD25FJ222	Carbon,	1/4W,	2.2kΩ,	± 5%
R616	ERD25FJ682	Carbon,	1/4W,	6.8kΩ,	± 5%
R617	ERD25FJ103	Carbon,	1/4W,	10kΩ,	± 5%
R618	ERD25FJ681	Carbon,	1/4W,	680Ω,	± 5%
R619	ERD25FJ102	Carbon,	1/4W,	1kΩ,	± 5%
R620	ERD25FJ561	Carbon,	1/4W,	560Ω,	± 5%
R621	ERD25FJ332	Carbon,	1/4W,	3.3kΩ,	± 5%
CAPACITORS					
C1, 2	Δ ECQM1H223KZ	Polyester,	50V,	0.022μF,	± 10%
C3	ECEB1VS222	Electrolytic,	35V	2200μF	
C4, 5	ECQM1H104KZ	Polyester,	50V,	0.1μF,	± 10%
C6 [M]	Δ ECQF1A473MD	Polyester,	125VAC,	0.047μF,	± 20%
C6 [MC]	Δ ECQU1A473ME	Polyester,	125VAC,	0.047μF,	± 20%
C101, 102	ECEA1CS330	Electrolytic,	16V	33μF	
C103	ECEA1CS330	Electrolytic,	16V	33μF	
C104, 105	ECQM1H104KZ	Polyester,	50V,	0.1μF,	± 10%
C106, 107	ECQM1H104KZ	Polyester,	50V,	0.1μF,	± 10%
C108	ECEA1ES101	Electrolytic,	25V	100μF	
C109, 110	ECQM1H104KZ	Polyester,	50V,	0.1μF,	± 10%
C111	ECQM1H562KZ	Polyester,	50V,	0.0056μF,	± 10%
C112	ECEA1HS100	Electrolytic,	50V	10μF	
C201	ECEA50Z1	Electrolytic,	50V	1μF	
C203	ECEA50Z1	Electrolytic,	50V	1μF	
C204	ECQM1H473KZ	Polyester,	50V,	0.047μF,	± 10%
C205	ECEA0JS471	Electrolytic,	16V	470μF	
C206	ECEA50Z1	Electrolytic,	50V	1μF	
C207	ECCD1H151K	Ceramic,	50V,	150pF,	± 10%
C208	ECCD1H330K	Ceramic,	50V,	33pF,	± 10%
C209	ECEA1ES470	Electrolytic,	25V	47μF	
C210	ECQV05224JZ	TF,	50V,	0.22μF,	± 5%
C211	ECQM1H473KZ	Polyester,	50V,	0.047μF,	± 10%
C212	ECEA50Z3R3	Electrolytic,	50V	3.3μF	
C213	ECCD1H471KB	Ceramic,	50V,	470pF,	± 10%
C214	ECEA1ES101	Electrolytic,	25V	100μF	
C215	ECEA50Z1	Electrolytic,	50V	1μF	
C216	ECEA1ES470	Electrolytic,	25V	47μF	
C217	ECKF1E104ZV	Ceramic,	25V	0.1μF,	± 8%
C218	ECEA50Z1	Electrolytic,	50V	1μF	
C219	ECEA1CS330	Electrolytic,	16V	33μF	
C220	ECKF1E104ZV	Ceramic,	25V,	0.1μF,	± 8%
C221	ECEA1CS330	Electrolytic,	16V	33μF	
C230	ECQM1H473KZ	Polyester,	50V,	0.047μF,	± 10%
C231	ECEA1ES101	Electrolytic,	25V,	100μF	
C301	ECQM1H103KZ	Polyester,	50V,	0.01μF,	± 10%
C302	ECQM1H104KZ	Polyester,	50V,	0.1μF,	± 10%
C303	ECEA25Z4R7	Electrolytic,	25V,	4.7μF	
C304	ECQM1H102KZ	Polyester,	50V,	0.001μF,	± 10%
C401	ECCD1H101KB	Ceramic,	50V,	100pF,	± 10%
C402	ECEA25Z4R7	Electrolytic,	25V	4.7μF	
C403	ECEA1CS330	Electrolytic,	16V	33μF	
C404	ECQM1H473KZ	Polyester,	50V,	0.047μF,	± 10%
C405	ECEA1CS330	Electrolytic,	16V	33μF	
C406	ECEA1CS330	Electrolytic,	16V,	33μF	
C450	ECEA1ES101	Electrolytic,	25V	100μF	
C501	ECQM1H103KZ	Polyester,	50V,	0.01μF,	± 10%
C503	ECQM1H102KZ	Polyester,	50V,	0.001μF,	± 10%
C504	ECCD1H221K	Ceramic,	50V,	220pF,	± 10%
C506	Δ ECEA1HN3R3S	Non-Polar Electrolytic,	50V,	33μF	
C507	ECEA1ES101	Electrolytic,	25V,	100μF	
C509	ECEA1ES100	Electrolytic,	25V,	10μF	
C513	ECQV05224JZ	TF,	50V,	0.22μF,	± 5%
C514	ECEA1CS101	Electrolytic,	16V,	100μF	
C515	ECQM1H473KZ	Polyester,	50V,	0.047μF,	± 10%
C517	ECKD1H102KB	Ceramic,	50V,	0.001μF,	± 10%
C520	ECQM1H223KZ	Polyester,	50V,	0.022μF,	± 10%
C521	Δ ECEA1HN010S	Non-Polar Electrolytic,	50V,	1μF	
C522, 523	ECKF1E104ZV	Ceramic,	25V,	0.1μF,	± 8%
C601	ECQV05224JZ	TF,	50V,	0.22μF,	± 5%
C602	ECCD1H331KB	Ceramic,	50V,	330pF,	± 10%
C603, 604	Δ ECEA1CN100S	Non-Polar Electrolytic,	16V,	10μF	
C605	ECEA1AS470	Electrolytic,	10V,	47μF	
C606	ECEA1AS221	Electrolytic,	10V,	220μF	
C607, 608	ECKD1H471KB	Ceramic,	50V,	470pF,	± 10%
C609	ECQM1H183KZ	Polyester,	50V,	0.018μF,	± 10%
C610, 611	ECKF1E104ZV	Ceramic,	25V,	0.1μF,	± 8%

■ CIRCUIT BOARD AND WIRING CONNECTION DIAGRAM ⑧

Ground (Earth) lines



REPLACEMENT PARTS LIST.....Cabinet & Chassis Parts

- Notes:** 1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders. 3. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.
2. Important safety notice:
Components identified by Δ make have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.

Areas

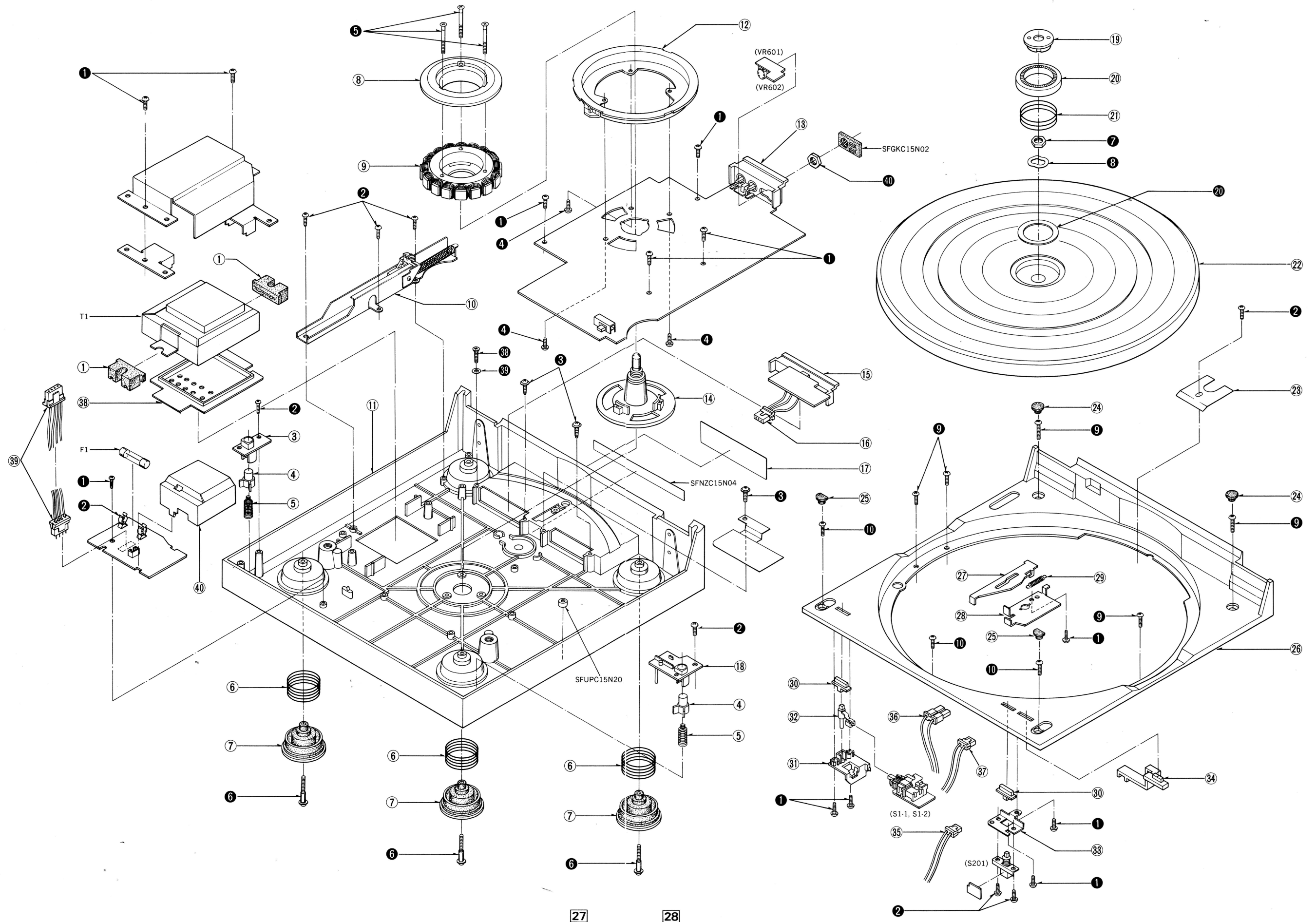
- * [M] is available in U.S.A.
- * [MC] is available in Canada.

Ref. No.	Part No.	Part Name & Description
MAIN CABINET PARTS		
1	SFGCC15N02	Cushion, Power Transformer
2	SJT345	Terminal, Fuse
3	SFUMC10-42	Plate, Power Switch
4	SFUMC10-36	Shuter
5	SFQAC10-05	Spring, Shuter
6	SFQC320-01	Spring, Insulator
7	SFGAC10-02E	Insulator
8	SFMGQ20-01	Cover, Stater Frame Ass'y
9	SFMG520-31A	Stater Frame Coil
10	SFASC10-01A	Dumper
11	SFACC15N02	Main Cabinet
12	SFMZ172-01E	FG Detector Coil Ass'y
13	SFDJC15N17	Terminal Plate, Output
	SFGKC15N02	Cap
14	SFMZC10-01A	Stater Frame Ass'y
15	SFUMC10-26R	Terminal Plate, Power
16	SFDJC15N16E	Connector Ass'y (3P)
17 [M]	SFNNC15M01	Name Plate
17 [MC]	SFNNC15C01	Name Plate
18	SFUMC10-41	Plate, Speed Selector Switch
19	SFUMC10-02	Supporter, 45 Adaptor
20	SFUMC10-01	45 Adaptor
21	SFQAC10-01	Spring, 45 Adaptor
22	SFTEC15N01A	Turntable
23	SFUPC10-19	Supporter, Cabinet
24	SFGKC10-01	Cap (B)
25	SFGKC10-02	Cap (A)
26	SFUMC10-12	Cover, Unit
27	SFUMC10-47	Shuter
28	SFUPC10-14	Supporter, Shuter
29	SFQH910-11	Spring, Shuter
30	SFKTC10-04	Knob, Power Switch
31	SFUMC15N14	Plate, Power Switch
32	SFUMC15N04E	Shaft, Power Switch
33	SFUPC10-20	Plate, Cleaner Switch
	SFNZC15N04	Plate, Input Voltage
34	SFKTC10-07	Knob, Speed Select
35	SFDJC10-03E	Connector Ass'y (2P)
36	SFDLC15N02E	Connector Ass'y (2P)
37	SFDLC07-03E	Connector Ass'y (2P)
38	SFUPC15N10	Cover, Power Transformer
39	SFDJC15N05E	Connector Ass'y (4P)
40	SFUMC15N18	Cover
UPPER CABINET PARTS		
41	SFKDC10-01E	Supporter, Record
42	SFUMC15N01	Cover, Lid
43	SFUMC15N06	Knob, Lock
44	SFQA829-2	Spring, Lock Khob
45	SFUMC15N07	Guide, Lock
46	SFQAC10-02	Spring, Record Supporter
47	SFUMC10-08E	Supporter, Record
48	SFUMC10-44	Spacer, L.E.D (B)
49	SFUMC10-23	Plate, Operation Knob
50	SFUMC10-43	Spacer, L.E.D (A)
51	SFUMC10-10E	Plate, Operation Knob
52	SFXJC07-01	Guide Rail (A)
53	SFGCC07-05	Cushion, Guide Rail (B)
54	SFGCC07-04	Cushion, Guide Rail (A)
55	SFUPC15N16	Supporter, Guide Rail (A)
56	SFUMC15N16	Shutter
57	SFUPC15N11	Bracket, Shutter
58	SFUMC10-17	Cover, Lamp
59	SFDJC15N09E	Connector Ass'y (7P)
60	SFDJC15N10E	Connector Ass'y (6P)

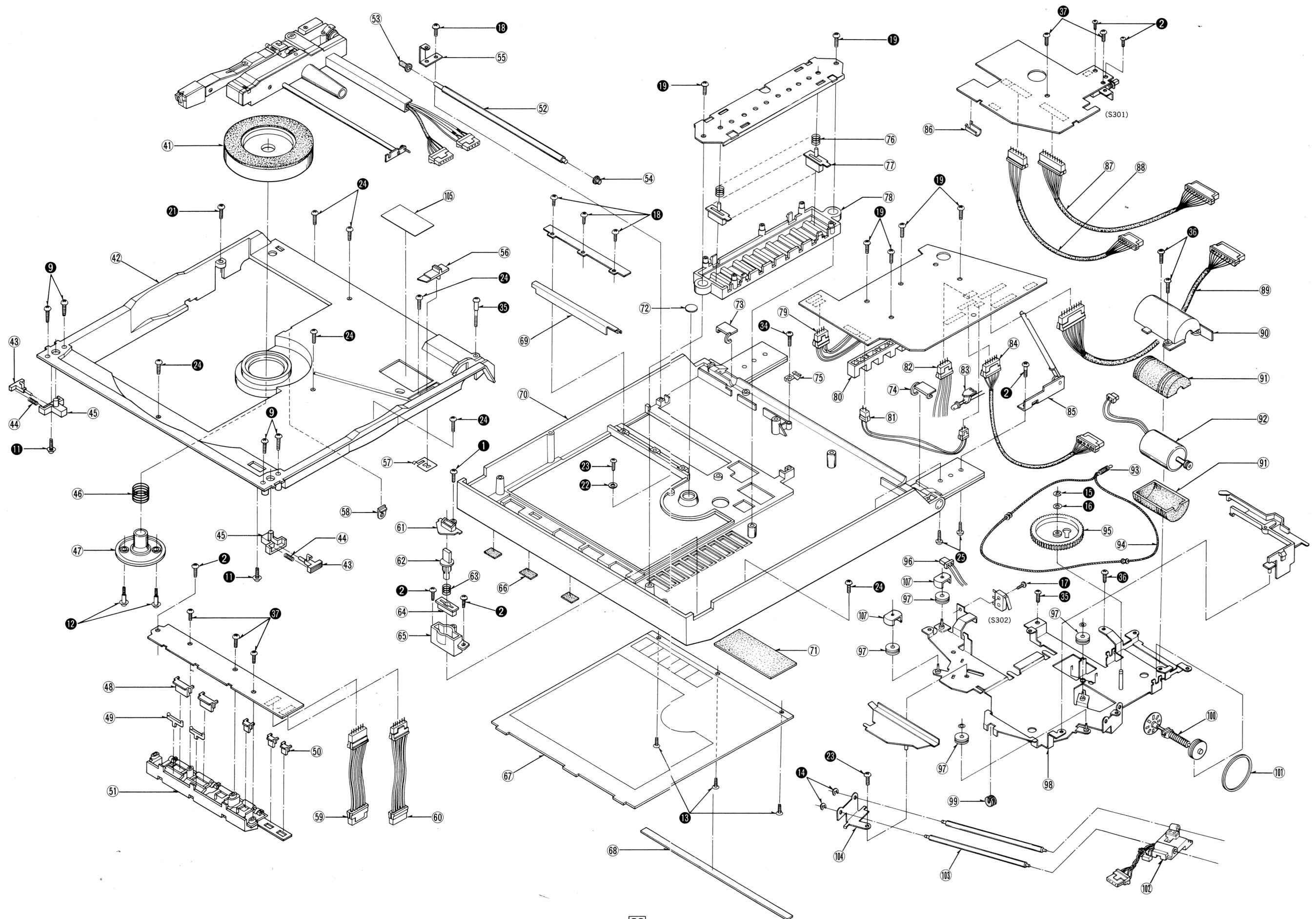
Ref. No.	Part No.	Part Name & Description
61	SFUMC10-31	Supporter, Power Switch
62	SFUMC10-24	Plate, Power Switch
63	SFQAC10-06	Spring, Power Switch
64	SFKTC15N02	Knob, Power Switch
65	SFUMC10-09	Supporter, Power Switch
66	SFGCC10-03	Cushion, Dust Cover (A)
67	SFADC15N01	Dust Cover
68	SFKKC15N01	Supporter, Dust Cover
69	SFUMC10-30	Cover, Guide Rail (B)
70	SFACC15N01E	Cabinet, Lid
71	SFGCC15N01	Cushion, Dust Cover (B)
72	SFXWC10-03	Cap
73	SFUMC10-40	Bushing (R)
74	SFUMC10-33	Bushing (L)
75	SFUPC07-07	Clamper
76	SFQA132-01	Spring, Music Selector Knob
77	SFKTC15N01E	Knob, Music Selector
78	SFUMC15N02	Supporter, Music Selector
79	SFDJC15N13E	Connector Ass'y (4P)
80	SFUMC15N03	Holder, L.E.D
81	SFDJC15N15E	Connector Ass'y (2P)
82	SFDJC15N14E	Connector Ass'y (3P)
83	SFUMC10-48	Spacer, Strobe L.E.D
84	SFDJC15N08E	Connector Ass'y (6P)
85	SFASC15N02A	Stay, Ass'y
86	SFUMC10-39	Holder, Lamp
87	SFDJC15N11E	Connector Ass'y (10P)
88	SFDJC15N12E	Connector Ass'y (7P)
89	SFDJC15N07E	Connector Ass'y (9P)
90	SFUMC10-06	Cover, Motor
91	SFGCC10-01	Rubber, Motor
92	SFMHC10-01E	Motor, Arm Drive
93	SFQHC10-02	Spring
94	SFUZC15N01E	Lope Ass'y
95	SFUMC10-05	Drum, Arm Drive
96	SFDJC15N02E	Connector Ass'y (2P)
97	SFUMC07-23	Pulley
98	SFUPC15N01E	Plate, Arm Drive
99	SFGZC15N01	Clamper
100	SFUMC10-13R	Worm Ass'y
101	SFGBC10-01	Belt, Arm Drive
102	SFUMC15N10A	Sensor Base Ass'y
103	SFXJC15N02	Guide, Sensor Base
104	SFUPC15N08	Plate, Sensor Base
105	SFNZC15M02	Lable, Shutter
106	RNW150-2	Bracket
107	SFUMC07-22	Bracket
ONEARM PARTS		
110	SFPAM01501A	Tone Arm
111	EPCP205C3K	Cartridge
	EPS-P205ED3	Stylus
112	SFDNC10-01	Pointer
113	SFPKD01501E	Arm Base
114	SFPJL01501A	Lift Ass'y
115	SFPSP01505	Spring, Lift
116	SFKTC10-08	Knob, Lock
117	SFQPC10-02	Spacer, Lock Knob
118	SFUMC10-38	Supporter, Lock Knob
119	SFPSP00701	Spring, Adjustment
120	SFPCS01502	Cover, Arm Base
121	SFDJC15N04E	Connector Ass'y (6P)
122	SFDJC15N06E	Connector Ass'y (5P)
123	SFDZC07-01E	Plunge Ass'y
124	SFPSP01506	Spring.

Continued on page 31

■ EXPLODED VIEW.....Main Cabinet



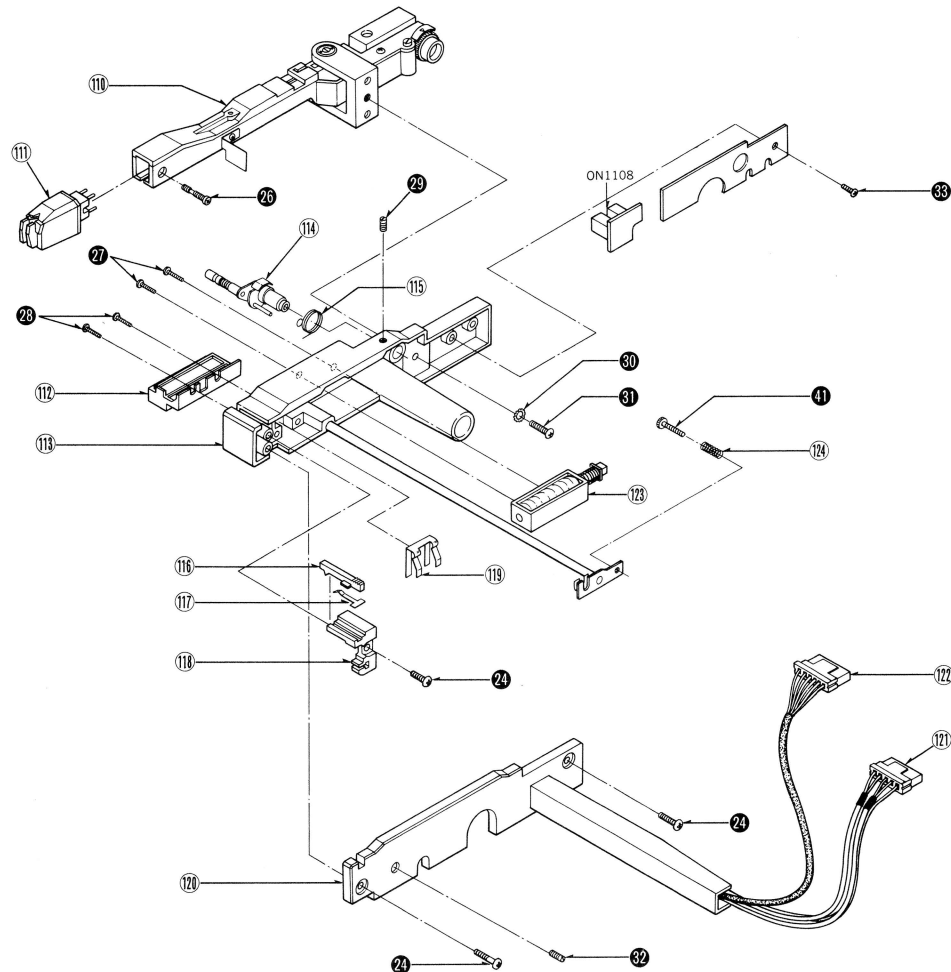
■ EXPLODED VIEW.....Upper Cabinent



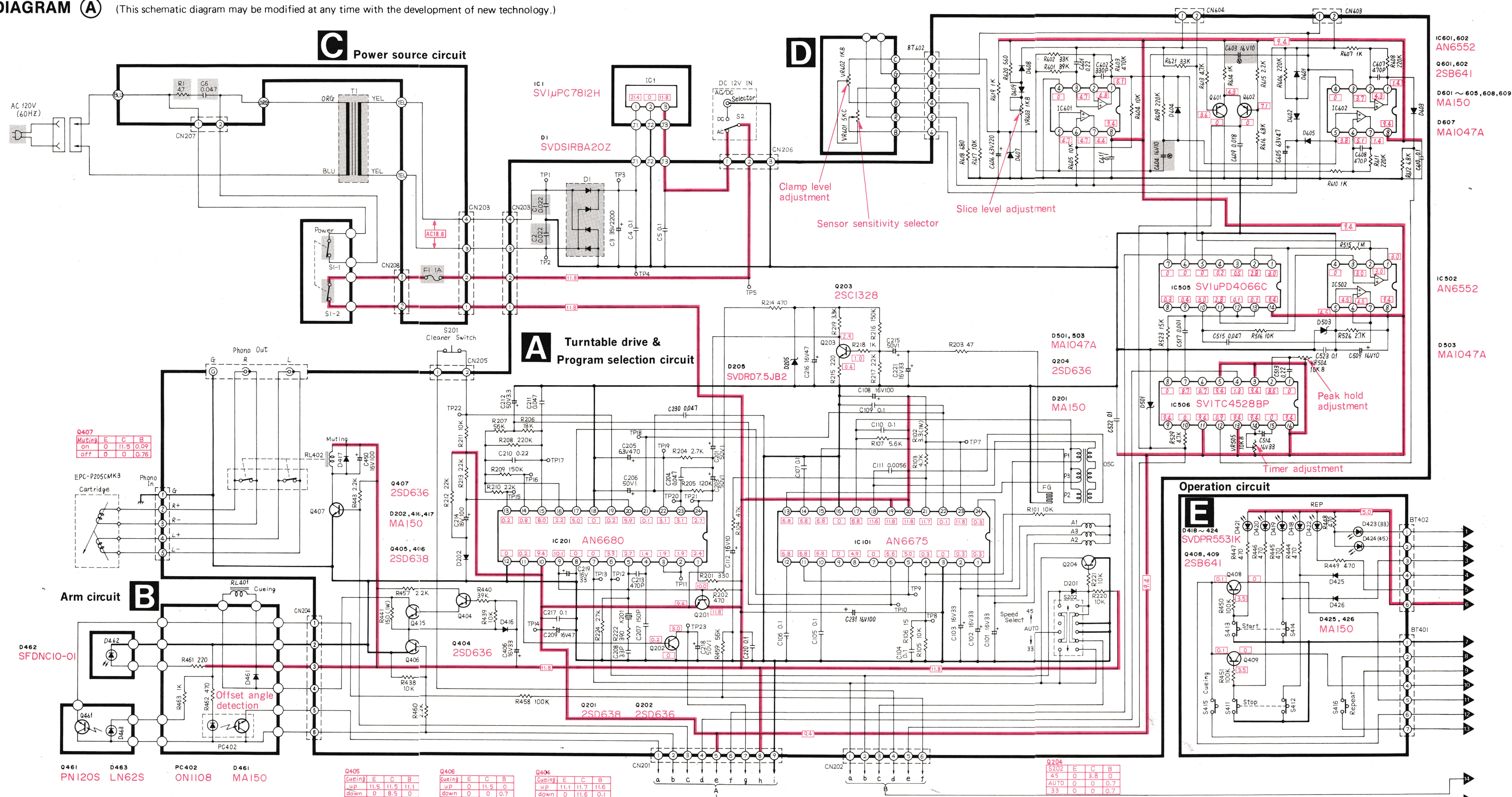
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Ref. No.	Part No.	Part Name & Description	Ref. No.	Part No.	Part Name & Description
SCREWS, WASHERS and NUTS					
1	XTV3+8BFN	Screw, Tapping, $\oplus$ 3 x 8	35	XTN3+25JFZ	Screw, Tapping, $\oplus$ 3 x 25
2	XTN3+6B	Screw, Tapping, $\oplus$ 3 x 6	36	XTV3+6BFN	Screw, Tapping, $\oplus$ 3 x 6
3	SFPEV17202	Screw	37	XTN3+12J	Screw, Tapping, $\oplus$ 3 x 12
4	XTN26+6B	Screw, Tapping, $\oplus$ 2.6 x 6	38	XTS3+8JFZ	Screw, Tapping, $\oplus$ 3 x 8
5	SFXGC10-03	Screw	39	SFXWC10-06	Washer
6	SFXGQ20-01	Screw, Insulator	40	XNG7E	Nut, ϕ 7
7	XNS12	Nut, ϕ 12	41	SFXGC10-06	Screw
8	SFXWC10-01	Washer	ACCESSORIES		
9	XTN3+20JFZ	Screw, Tapping, $\oplus$ 3 x 20	A1 [M]	SFNUC15M01	Instructions Book, Printed Matter
10	XTN3+10BFZ	Screw, Tapping, $\oplus$ 3 x 10	A1 [MC]	SFNUC15C01	Instructions Book, Printed Matter
11	SFXGC10-05	Screw	A2	SFCZB30001	Brush
12	SFXGC10-02	Screw	A3	SFWTC07-01	Screw, Driver
13	XSS26+5BN	Screw, Tapping, $\oplus$ 2.6 x 5	A4	SFCFB10101	Screw, Driver
14	XUC2FT	Washer	A5	RJA22Y	AC Cord
15	XUC3FT	Washer	A6	SFDHC10-02	Phono Cord
16	SFXW551D2	Washer	A7 [M]	SFNZC15M05	Caution Sheet
17	XYN23+C10BN	Screw, Tapping, $\oplus$ 2.3 x 10	A7 [MC]	SFNZC15C05	Caution Sheet
18	XTS26+6JFZ	Screw, Tapping, $\oplus$ 2.6 x 6	PACKING PARTS		
19	XTN3+8B	Screw, Tapping, $\oplus$ 3 x 8	P1 [M]	SFHPC15M01	Carton Box
20	SFXWC10-05	Washer	P1 [MC]	SFHPC15C01	Carton Box
21	XYN3+C6FZ	Screw, Tapping, $\oplus$ 3 x 6	P2	SFHHC15N01	Pad, Unit
22	SFXWC10-04	Washer	P3	SFHSC10-03	Spacer, Corner (A)
23	XTN3+5J	Screw, Tapping, $\oplus$ 3 x 5	P4	SFHSC10-04	Spacer, Corner (B)
24	XTN3+8BFZ	Screw, Tapping, $\oplus$ 3 x 8	P5	SFHSC15N01E	Spacer, Arm
25	XTB3+8JFC	Screw, Tapping, $\oplus$ 3 x 8	P6	SFHSC10-01	Spacer, Turntable
26	SFPEV00701	Screw Cartridge	P7	XSN4D20FYBS	Screw
27	XYN2+C4FZ	Screw, Tapping, $\oplus$ 2 x 4	P8	SFYH45X60	Polyethylene Bag, Unit
28	XTN23+4JFZ	Screw, Tapping, $\oplus$ 2.3 x 4	P9	SFYF10A30	Polyethylene Bag, Cord
29	SFPTN00702	Screw	P10	SFYF09A15	Polyethylene Bag, Accessory
30	XWC3B	Washer, ϕ 3			
31	XNS3+6S	Screw, Tapping, $\oplus$ 3 x 6			
32	XXE3D4FZS	Screw, Tapping, $\oplus$ 3 x 4			
33	XTN23+6JFZ	Screw, Tapping, $\oplus$ 2.3 x 6			
34	XTW3+6J	Screw, Tapping, $\oplus$ 3 x 6			

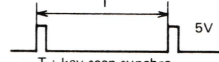
EXPLODED VIEW.....Tonearm

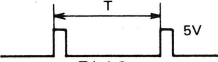


(A) (This schematic diagram may be modified at any time with the development of new technology.)



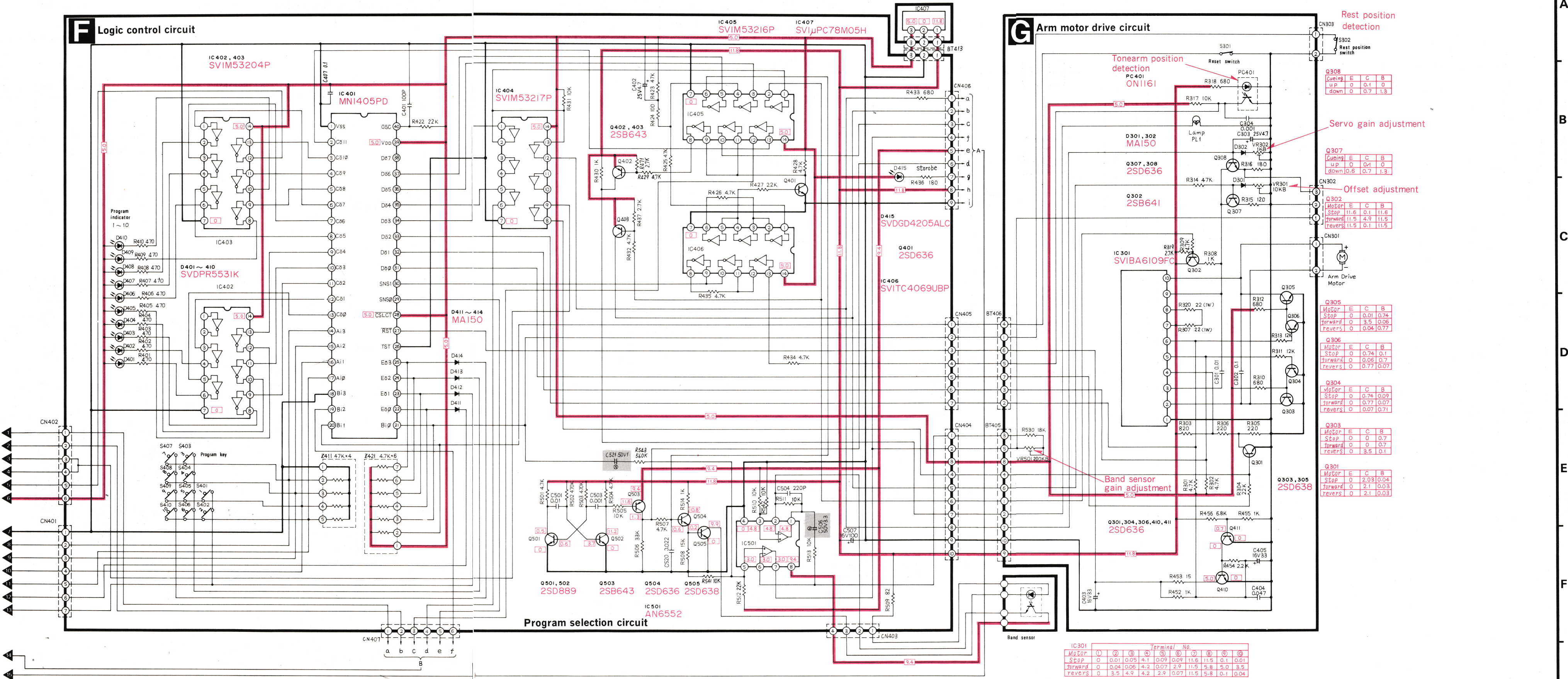
■ DESCRIPTION OF EACH TERMINAL OF MN1405PD

Terminal	Description	Remarks
① (Vss)	Ground terminal 0V	
② (Co11)	Turntable speed select output terminal 33 1/3 r.p.m. "L" 45 r.p.m. "H"	When microcomputer is reset (power supply is "on" or upper cabinet is open), the level changes to "L".
③ (Co10)	Repeat display output terminal It is reversed each time the repeat key is pushed. Repeat LED ON "H" Repeat LED OFF "L"	If the upper cabinet is kept open, microcomputer is reset. Therefore, pushing the key does not reverse the output and the level remains "L".
④ (Co9) ⑬ (Co0)	Program LED display output terminal Each LED turns ON and OFF each time the program key is pushed. Program LED ON "H" Program LED OFF "L"	When tonearm is on the rest, pushing the key causes the output to reverse, but it depends on the mode during play.
⑭ (Ai3) ⑰ (Ai0)	Key scan input terminal In the key matrix of 4 x 4, "H" pulse is entered when the key is pushed. The pulses is "L" when the key is not pushed.	 T somewhat varies depending on the mode, but it is about 1.2 ms when the arm is on the rest.
⑱ (Bi3)	Not used	
⑲ (Bi2)	Arm-down sensor input terminal Arm UP "L" Arm DOWN "H"	
⑳ (Bi1)	Cabinet opening/closing detection input terminal. Reset switch (S301) attached to the cabinet: Upper cabinet is open. "H" Upper cabinet is closed. "L"	

Terminal	Description	Remarks
㉑ (Bi0)	Rest position detection input terminal. Limit switch (S302) on the rest is "on" when the tonearm is on the rest, and "off" when it isn't. Tonearm is on the rest "L" Tonearm is not on the rest. "H"	
㉒ (Eo0) ㉓ (Eo3)	Key scan output terminal Pulse is applied to the key matrix of 4 x 4. The interval is about 1.2 ms on the rest.  T ≈ 1.2ms	When the upper cabinet is open (S301 . . . "off"), all is at "L" because there is no key scan output.
㉔ (TST)	Test terminal. Not used	
㉕ (RST)	Reset terminal The microcomputer is reset at "L" level, and is not reset at "H".	When power supply is "on" microcomputer is once reset, and after that, it is kept at "H".
㉖ (CSLCT)	Select terminal The level is set to "H" by the select terminal of the inside counter.	
㉗ (SNS0)	Blank detection input terminal When the blank is detected by the reflection type optical sensor for blank detection, the level changes to "H".	
㉘ (SNS1)	Position detection Pulse is delivered to this terminal from photo coupler (PC401) for position detection according to the movement of the arm. Pulse intervals { High speed: about 7 ms Low speed: about 14 ms	

Terminal	Description	Remarks																																								
① (Do0) ③④ (Do3)	Arm drive control terminal The arm drive is controlled in the modes mentioned below. <table><tr><th>Terminal Mode</th><th>③④</th><th>③③</th><th>③②</th><th>③①</th></tr><tr><td>Stop</td><td>L</td><td>L</td><td>L</td><td>L</td></tr><tr><td>Forward (High)</td><td>L</td><td>H</td><td>L</td><td>L</td></tr><tr><td>Reverse (High)</td><td>L</td><td>L</td><td>H</td><td>L</td></tr><tr><td>Forward (Low)</td><td>L</td><td>H</td><td>L</td><td>H</td></tr><tr><td>Reverse (Low)</td><td>L</td><td>L</td><td>H</td><td>H</td></tr><tr><td>Cueing down</td><td>H</td><td>L</td><td>L</td><td>L</td></tr><tr><td>Offset servo ON</td><td>H</td><td>H</td><td>L</td><td>L</td></tr></table>	Terminal Mode	③④	③③	③②	③①	Stop	L	L	L	L	Forward (High)	L	H	L	L	Reverse (High)	L	L	H	L	Forward (Low)	L	H	L	H	Reverse (Low)	L	L	H	H	Cueing down	H	L	L	L	Offset servo ON	H	H	L	L	
	Terminal Mode	③④	③③	③②	③①																																					
	Stop	L	L	L	L																																					
	Forward (High)	L	H	L	L																																					
	Reverse (High)	L	L	H	L																																					
	Forward (Low)	L	H	L	H																																					
	Reverse (Low)	L	L	H	H																																					
	Cueing down	H	L	L	L																																					
	Offset servo ON	H	H	L	L																																					
	③⑤ (Do4)	Turntable start/stop select terminal Start "H" Stop "L"																																								
③⑥ (Do5)	Muting control terminal "H" changes to "L" when the arm-down sensor input is "H" after the arm finishes cueing-down.	Timing chart Down screw output Terminal ③⑥ 																																								
③⑦ (Co6)	Band detection sensor control terminal. The sensor is in operation when the arm is cueing-up, but it is stopped when the arm is cueing-down. Cueing-up "L" Cueing-down. "H"																																									
③⑧ (Do7)	Not used																																									
③⑨ (VDD)	Power supply terminal +5V																																									
④① (OSC)	Oscillation terminal In case of C401 and R442, the clock of micro-computer is set by constant.	When probe is connected to this terminal, the oscillation synchro changes making it impossible to measure correct values. Clock must be measured from the synchro of the key scan output terminal.																																								

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



SVIUPC7812H SVIUPC78M05H 	AN6675 	AN6680 	SVITC45528BP 	
SVITC4069UBP SVIM53204P SVIM53216P SVIUPD4066C SVIM53217P 	AN6553 	MN1405PD 		
SVIBA6109FC 	2SB641, 2SD636 2SB643, 2SD638 	2SC1328 	2SD889 	SVDPR5531K
SVDGD4205ALC 	ON1108 	ON1161 		

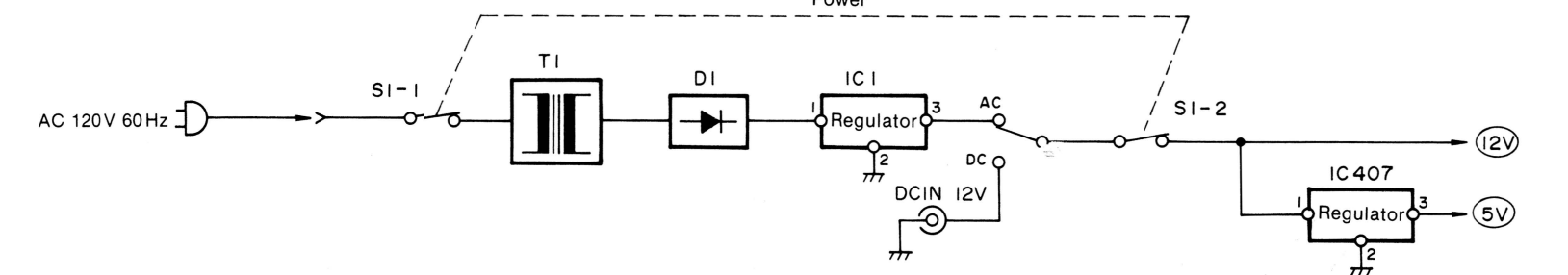
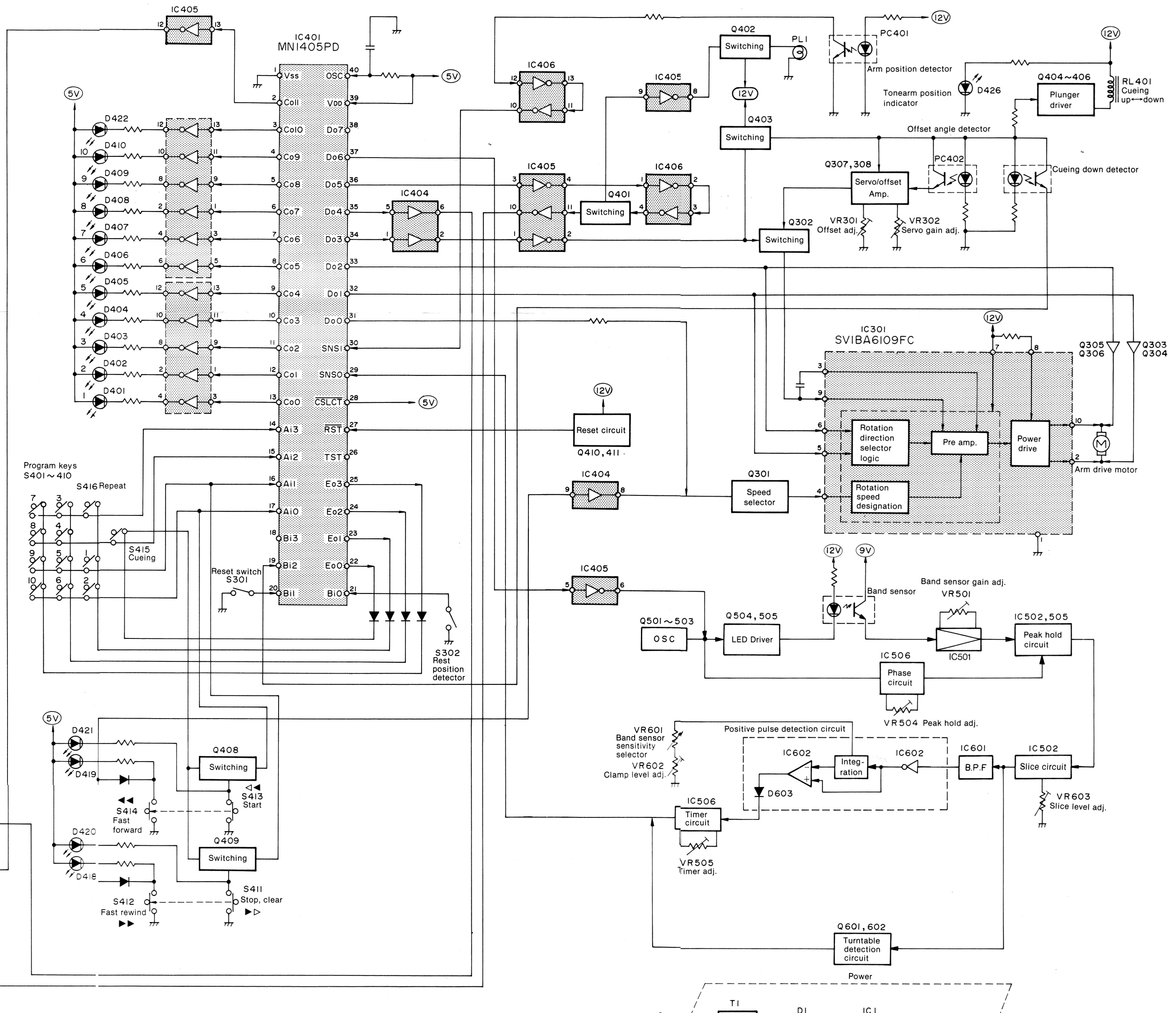
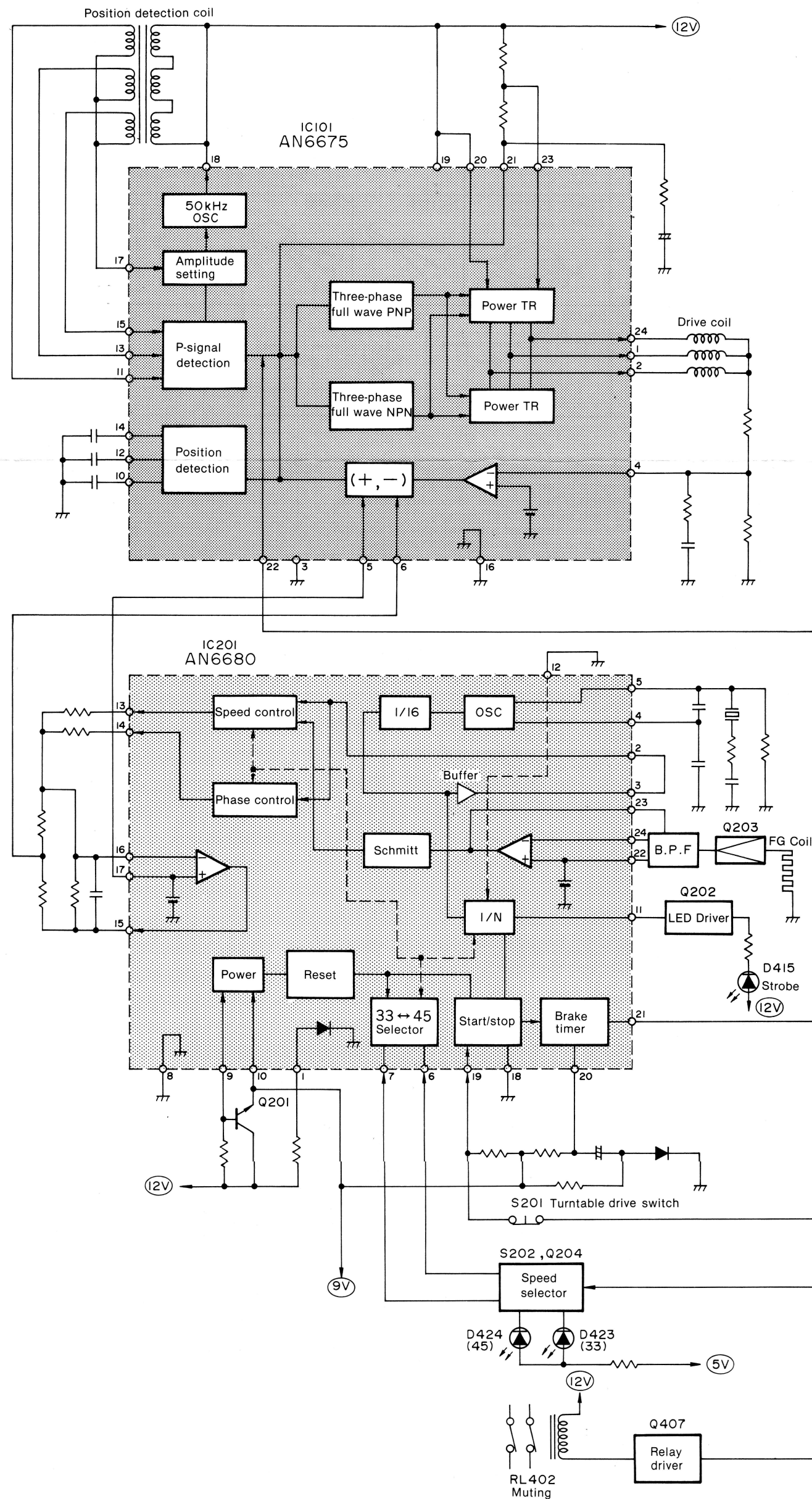
1. **S1-1** : Power switch in "on" position. (Primary side)
2. **S1-2** : Power switch in "on" position. (Secondary side)
3. **S2** : AC/DC select switch in "AC" position.
(AC/DC input terminal built-in switch — AC priority)
4. **S201** : Turntable drive (cleaner) switch in "off" position.
5. **S202** : Speed select switch in "auto" position. (**33↔auto↔45**)
6. **S301** : Reset switch in "on" position.
7. **S302** : Rest detecting switch in "on" position.
8. **S401 ~ 410** : Program switch (Program key 1 ~ 10) in "off" position.
(not push condition)
9. **S411** : Stop/clear switch (▶▶) in "off" position. (not push condition)
10. **S412** : Fast rewind switch (▶▶) in "off" position. (not push condition)
11. **S413** : Start switch (◀◀) in "off" position. (not push condition)
12. **S414** : Fast forward switch (◀◀) in "off" position. (not push condition)
13. **S415** : Cueing switch in "off" position. (not push condition)
14. **S416** : Repeat switch in "off" position. (not push condition)
15. The value in is the reference voltage at stop of the turntable, measured by DC electronic circuit tester (high-impedance) on the basis of chassis.
Therefore, the measured value may include some error depending on the internal impedance of the DC circuit tester and other conditions.
16. + ⊕ voltage line.

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.

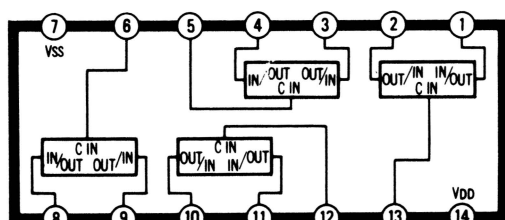
[illegible]

 Le symbole qui se trouve près du fusible signifie un fusible à action rapide. Pour une protection continue contre les risques d'incendie, n'utiliser que des fusibles du même type. Se rapporter au symbole pour la valeur des fusibles.

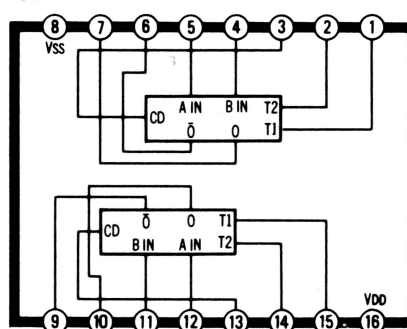
■ BLOCK DIAGRAM



• Black diagram of IC's



IC505 (SVITC4069)

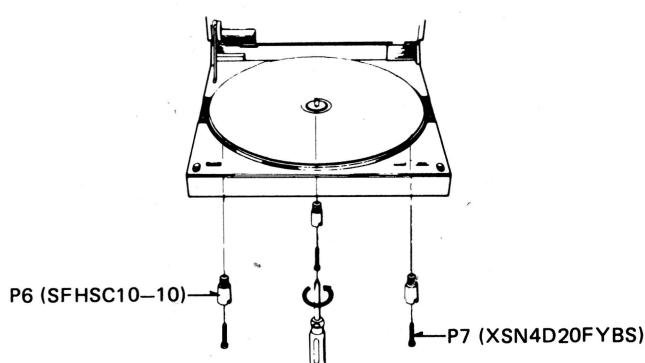
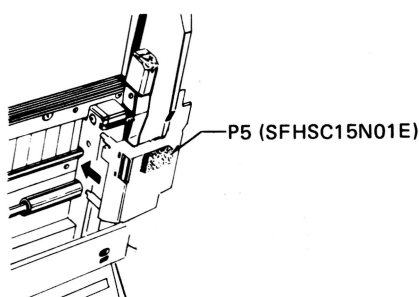


IC506 (SVITC4528BP)

SL-15

PACKING

1. Make sure the tonearm is in the rest position (the outermost periphery of turntable).
2. Attach the spacer for tonearm protection. (Do not lock the arm.)
3. To secure the turntable, adjust the positions of the 3 screw-holes provided in the back of the player body by slowly rotating the turntable.



4. Pack the components as illustrated below.

