ORDER NO. DPD83070020C1

Service Manual

Quartz Direct Drive Automatic Turntable System

SL-QL15

[M], [MC]

*** The cartridge shown here is an option.**

T4P is the standard mark for plug-in-connector type. Products carrying this mark are interchangeable and adaptable among eath other.

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:	120V AC, 60 Hz
Power consumption:	12W
Dimensions: (WxHxD)	43 x 8.8 x 35 cm (16-59/64" x 3-1/2" x 13-25/32") 43 x 38.5 x 35 cm (16-59/64" x 15-23/64" x 13-25/32") (Maximum height when dust cover is open.)
Weight:	5.1 kg (11.2 lb.)

■ Turntable section

Type:	Direct drive Fully automatic turntable
Features:	Auto start/Auto lead-in Auto return Auto stop Programmable band selection Repeat play Auto speed select Manual speed selection possible Auto size select Record presence detection
Drive method:	Direct drive
Motor:	Brushless DC motor
Drive control method:	Quartz-phase-locked control
Turntable platter:	Aluminium die-cast Diameter 30 cm (12")
Turntable speeds:	33-1/3 rpm and 45 rpm Auto speed select (Manual selection possible)
Wow and flutter:	0.012% WRMS* 0.025% WRMS (JIS C5521) ±0.035% peak (IEC 98A Weighted)

* Measured by obtaining signal from built-in frequency generator of motor assembly.

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

■ Tonearm section

Type:	Dynamic balanced type Linear tracking tonearm 4-pivot gimbal suspension
Effective length:	10.5 cm (4-1/8")
Tracking error angle:	Within ±0.1°
Effective mass:	9 g (including cartridge)
Resonance frequency:	12 Hz
Toneram drive motor:	DC motor

Technics

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Secaucus, New Jersey 07094

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■ CONTENTS

	Page
SAFETY PRECAUTION	2
LOCATION OF CONTROLS	3,4
DISASSEMBLY INSTRUCTIONS	5~9
HOW TO REPLACE CHIPS	9
HOW TO SET THE TONEARM DRIVE ROPE	10
MEASUREMENTS AND ADJUSTMENTS	10~12
TROUBLE SHOOTING	13~15
REPLACEMENT PARTS LIST (Electric Parts)	16
RESISTOR AND CAPACITORS	17
BLOCK DIAGRAM	18,19
CIRCUIT BOARD AND WIRING CONNECTION DIAGRAM	20~22
SCHEMATIC DIAGRAM	23~26
EXPLODED VIEW	27,28
REPLACEMENT PARTS LIST (Cabinet and Chassis Parts)	29
PACKINGS	30

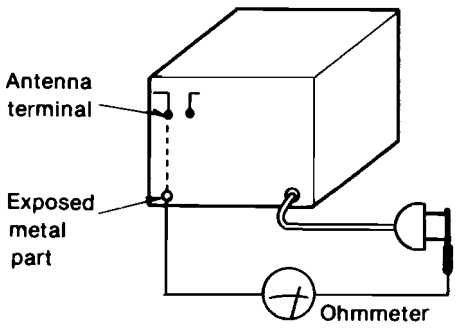
■ SAFETY PRECAUTION

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

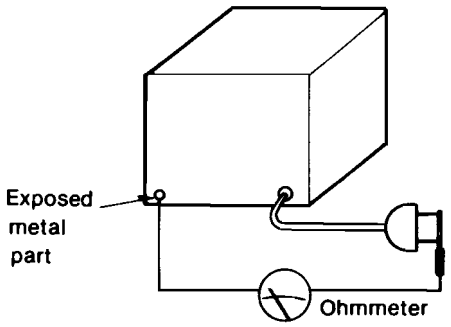
1. Unplug the power cord and short the two prongs of the plug with a jumper wire.
2. Turn on the power switch.
3. Measure the resistance value with ohmmeter between the jumpered AC plug and each exposed metal cabinet part, such as screwheads antenna, control shafts, handle brackets, etc. Equipment with antenna terminals should read between 3MΩ and 5.2MΩ 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 = 3MΩ—5.2MΩ

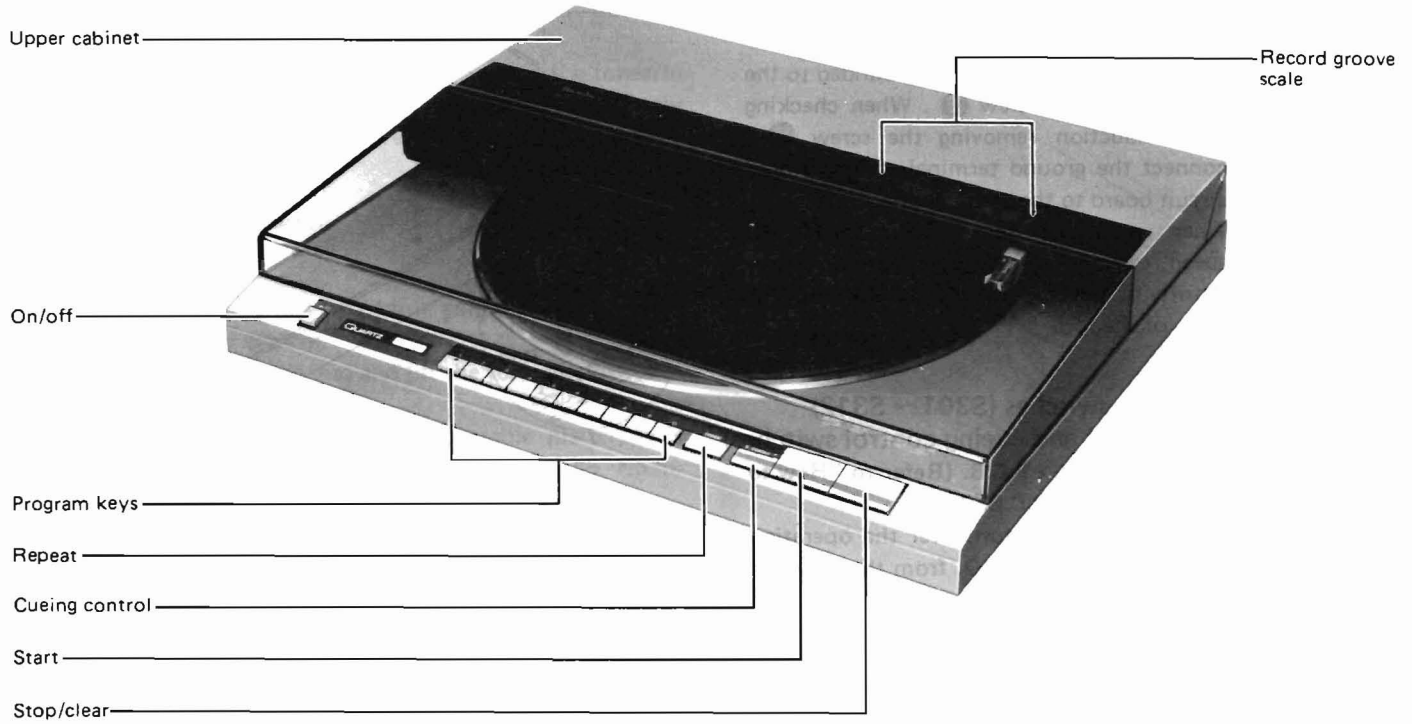


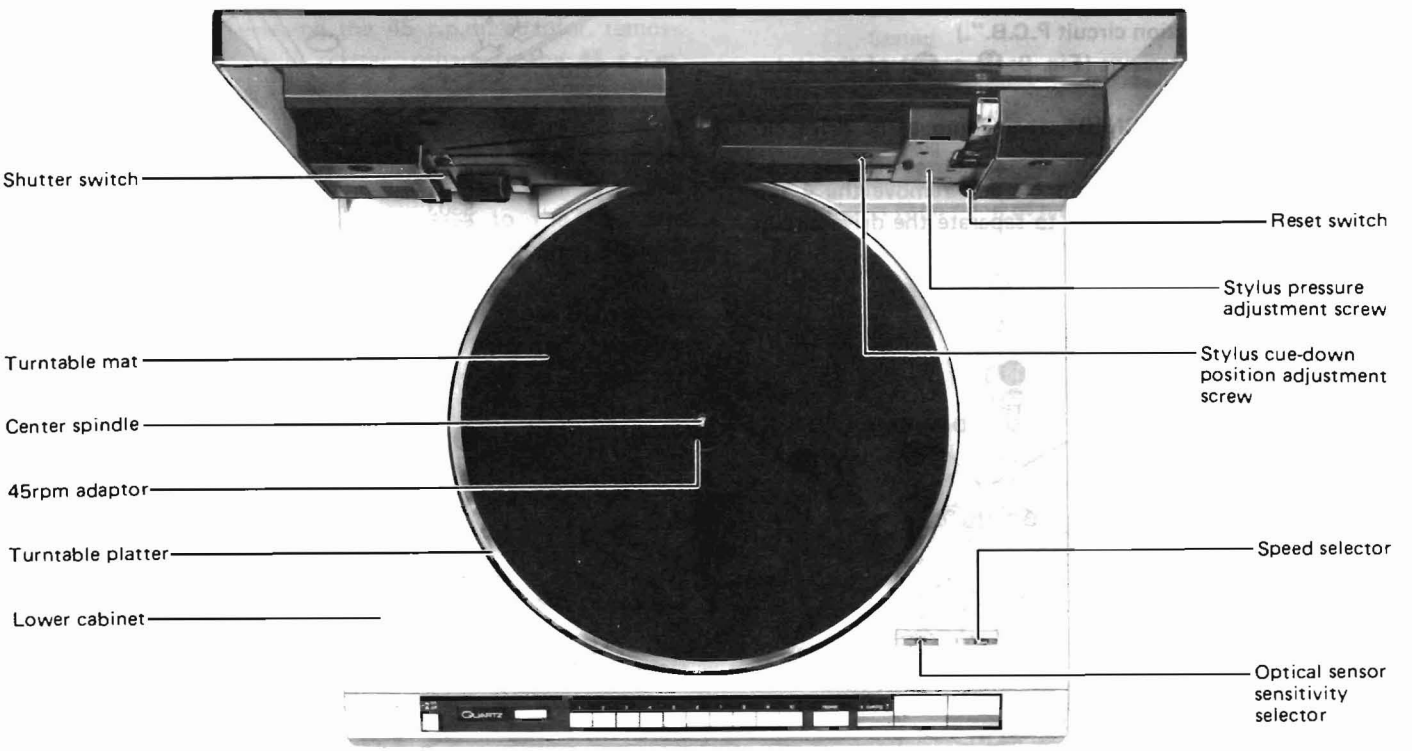
(Fig. B)

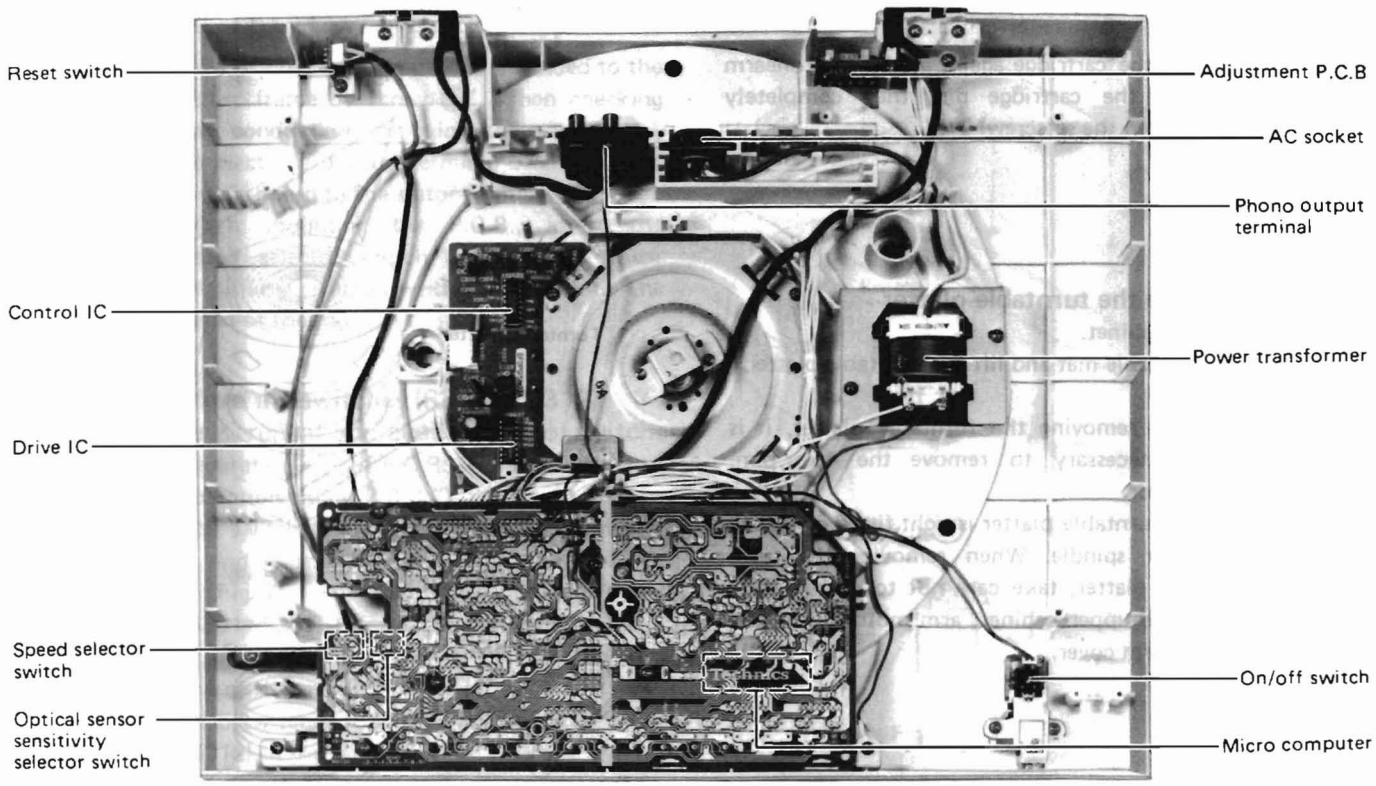
Resistance = Approx ∞

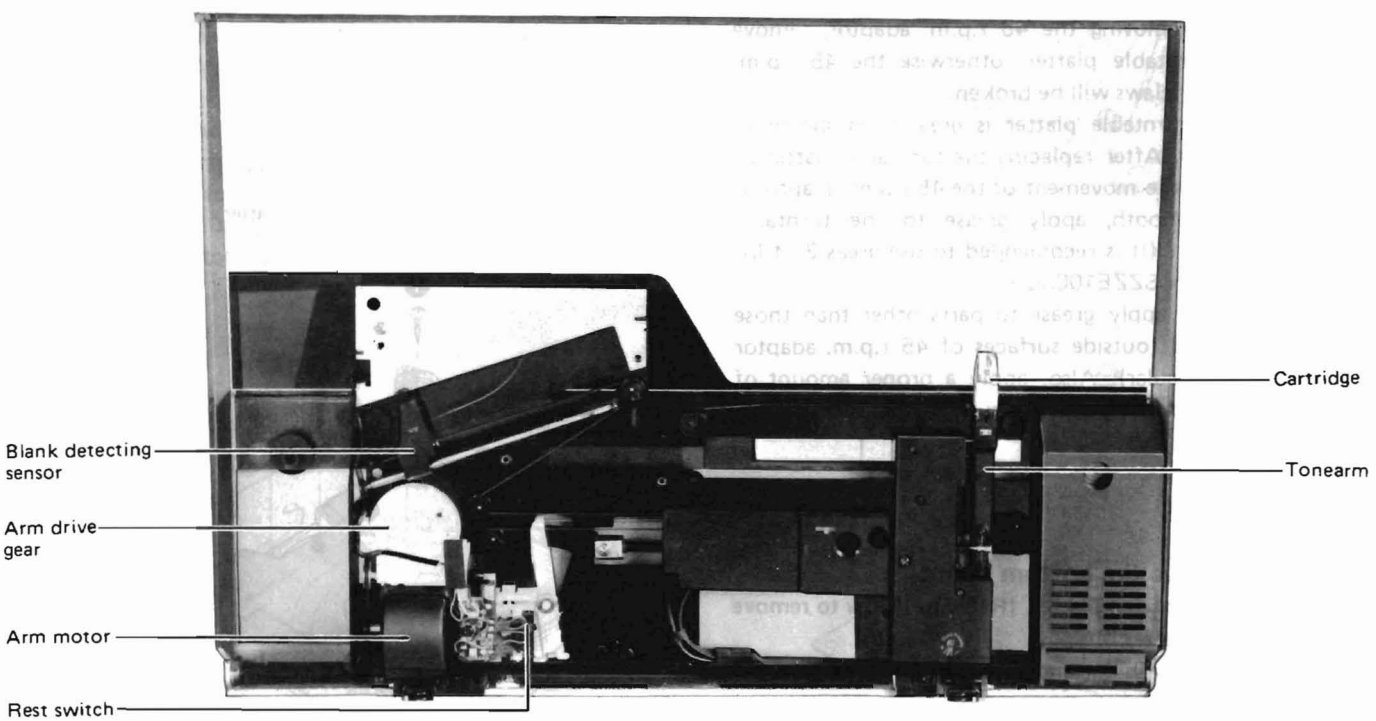
4. If the measurement is outside the specified limits, there is a possibility of a shock hazard. The equipment should be repaired and rechecked before it is returned to the customer.

■ LOCATION OF CONTROLS






Reset switch
Adjustment P.C.B
AC socket
Phono output terminal
Control IC
Power transformer
Drive IC
Speed selector switch
On/off switch
Optical sensor sensitivity selector switch
Micro computer


Cartridge
Blank detecting sensor
Tonearm
Arm drive gear
Arm motor
Rest switch

■ DISASSEMBLY INSTRUCTIONS

• How to remove the cartridge

1. Open the upper cabinet.
2. Completely loosen the setscrew and pull out the cartridge. (**Fig. 1**)
3. When attaching the cartridge again, match the tonearm connector with the cartridge pin, then completely insert it and tighten the setscrew.

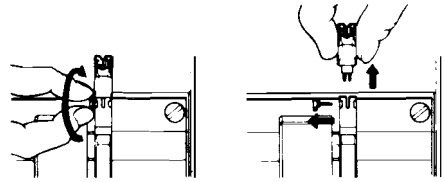


Fig. 1

• How to remove the turntable platter

1. Open the upper cabinet.
2. Remove the turntable mat and lift the turntable platter. (**Fig. 2**)

Note: (1) When removing the turntable platter, it is not necessary to remove the 45 r.p.m. adaptor.

(2) The turntable platter is tight fitted on to the center spindle. When removing the turntable platter, take care not to give damage to the upper cabinet, arm motor cover and tonearm cover.

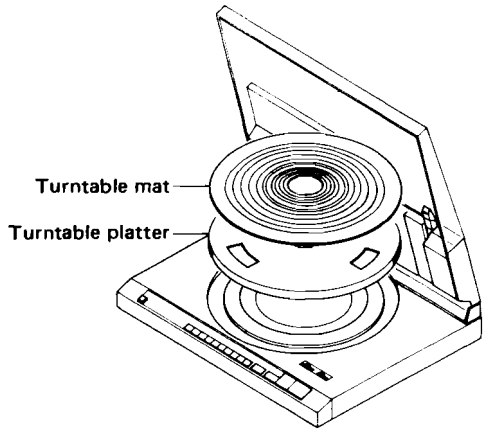


Fig. 2

• How to remove the 45 r.p.m. adaptor

1. Remove the turntable platter.
2. The 2 adaptor claws fit into the turntable platter, and so remove the 45 r.p.m. adaptor by pushing it in the direction of the arrow. (**Fig. 3**)

Note: When removing the 45 r.p.m. adaptor, remove the turntable platter, otherwise the 45 r.p.m. adaptor claws will be broken.

*The turntable platter is greased as shown in **Fig. 4**. After replacing the turntable platter or when the movement of the 45 r.p.m. adaptor is not smooth, apply grease to the turntable platter. (It is recomended to use greas 3 of kit number SZZE1003C.)

Note: Do not apply grease to parts other than those specified (outside surfaces of 45 r.p.m. adaptor in particular). Also, apply a proper amount of grease so that it will not run into the unit.

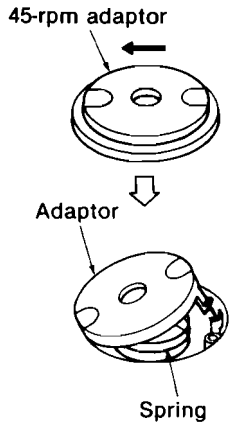


Fig. 3

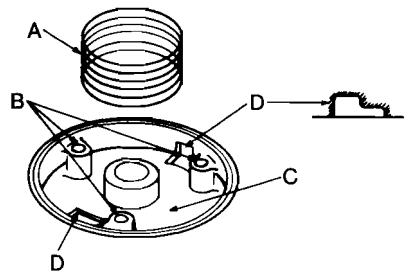


Fig. 4

A: Side of spring
B: Bosses (3 portions) of turntable platter
C: Bottom of turntable platter
D: Notches (2 portions) of turntable platter

• How to remove the bottom board

1. Remove the turntable platter. (**Refer to "How to remove the turntable platter."**)
2. Close the upper cabinet and turn over the unit on a soft cloth taking care not to damage the upper cabinet.
3. Remove the 6 setscrews (**Fig. 5** ❶ ~ ❻), 4 Insulators and 4 springs (**Fig. 5**)

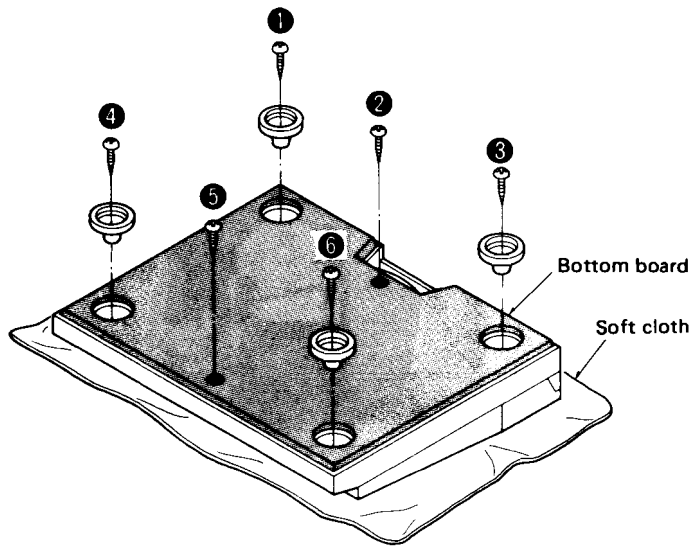


Fig. 5

• How to remove the operation circuit P.C.B.

1. Remove the bottom board. (**Refer to "How to remove the bottom board."**)
2. Remove the 7 setscrews (**Fig. 6:** ⑦ ~ ⑬) of the operation circuit P.C.B. and lead wired from the lead clamper.

   Note: (1) This printed circuit board is grounded to the stator frame by screw ⑬. When checking for conduction removing the screw ⑬, connect the ground terminal of the printed circuit board to the stator frame.

   (2) When mounting the P.C.B., insert the speed selector switch and optical sensor sensitivity selector switch knobs into the holes of the rod.

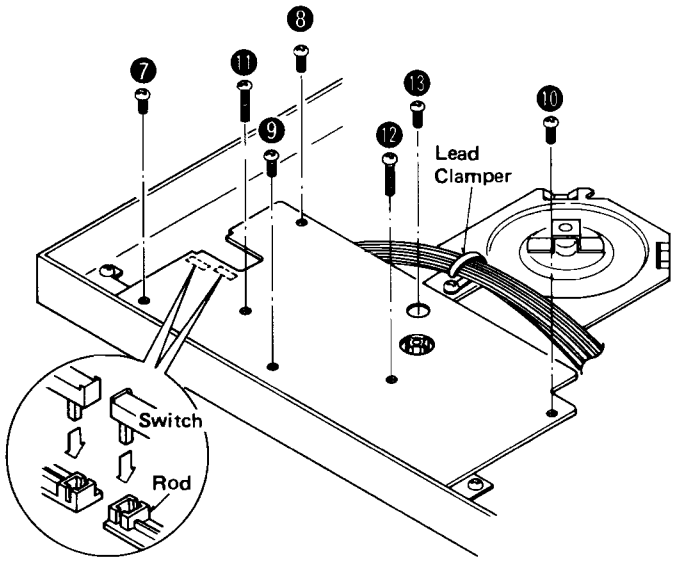


Fig. 6

• How to remove the switches (S301 ~ S312)
(Program keys, repeat and cueing control switches)

1. Remove the operation circuit P.C.B. (**Refer to "How to remove the operation circuit P.C.B."**)
2. To remove the switch holder, turn over the operation circuit P.C.B. and release the L.E.D. from the 2 switch holder's claw. (**Fig. 7**)
3. To remove S301~S305, release the 3 switch holder's claws (**Fig. 8:** ⑭ ~ ⑯) and remove the switch holder in the direction of the arrow.
   * Remove the 5 switches (S306~S310) and 2 switches (S311 and S312) in the same way.
4. Unsolder the 4 switch terminals and remove the switch. (**Fig. 8**)

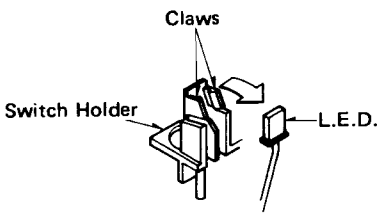


Fig. 7

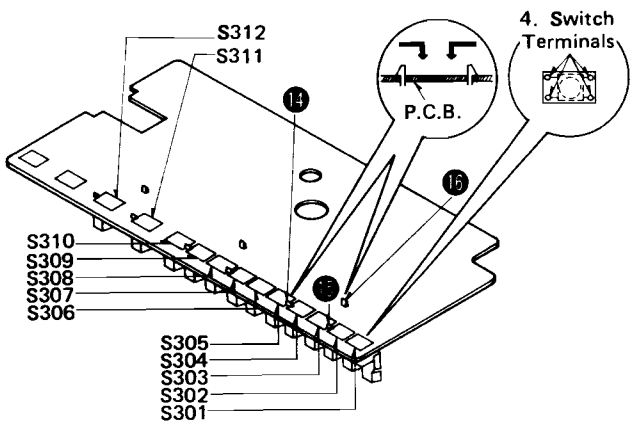


Fig. 8

• How to remove the drive circuit P.C.B. and stator frame

1. Remove the operation circuit P.C.B. (**Refer to "How to remove the operation circuit P.C.B.".**)
2. Remove the 4 setscrews (**Fig. 9:** ⑰ ~ ⑳) of the stator frame.
3. Pull out connector CN101, then remove the drive circuit P.C.B. with stator frame.
4. Cut off the stopper by nippers and remove the 4 setscrews (**Fig. 10:** ㉑ ~ ㉔) to separate the drive circuit P.C.B. and stator frame.

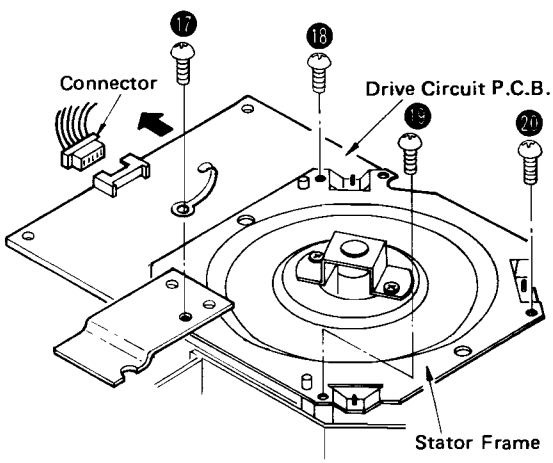


Fig. 9

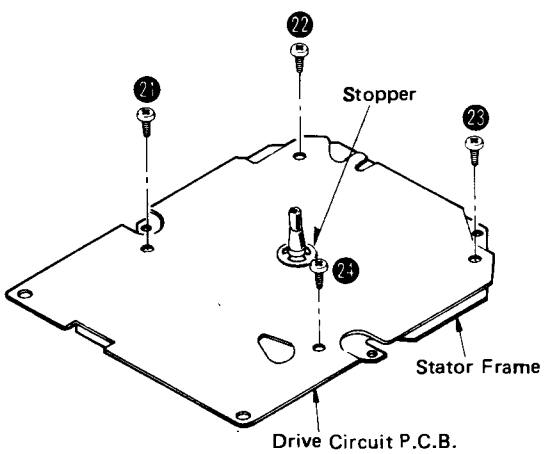


Fig. 10

• How to remove the arm moto cover

1. Open the upper cabinet.
2. Remove the 5 setscrews (**Fig. 11:** ㉕ ~ ㉙), and the arm motor cover can be removed in the direction of the arrow Ⓐ .

• How to remove the tonearm cover

1. Open the upper cabinet.
2. Remove the 3 setscrews (**Fig. 11:** ㉚ ~ ㉜), and the tonearm cover can be removed in the direction of the arrow Ⓑ .

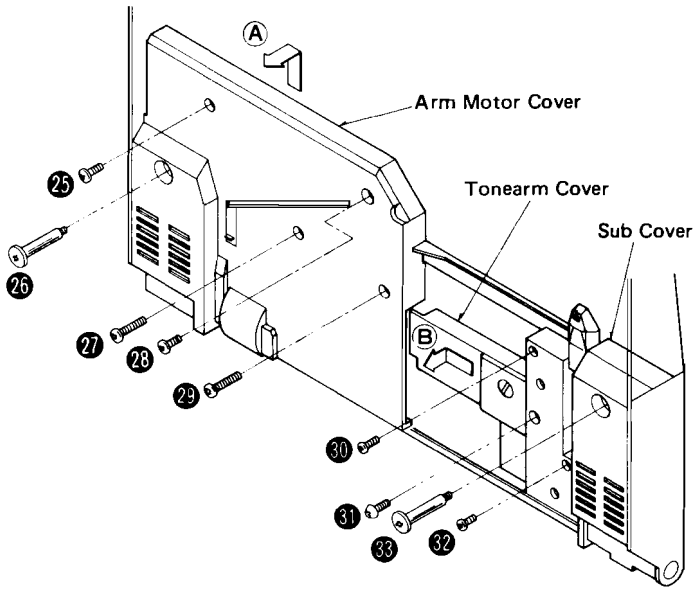


Fig. 11

• How to remove the dust cover

1. Open the upper cabinet.
2. Remove the arm motor cover. (**Refer to "How to remove the arm motor cover."**)
3. Remove the sub cover setscrew (**Fig. 11:** ㉝) and the sub cover.
4. Turn the worm gear pulley by finger to shift the tonearm inward.
5. Remove the 3 setscrews (**Fig. 12:** ㉞ ~㊱) of the dust cover.
6. Remove the 2 setscrews (**Fig. 13:** ㊲ , ㊳) of the dust cover. Then the dust cover can be removed.

• How to remove the blank detecting sensor

1. Open the upper cabinet and remove the arm motor cover.
2. Unsolder the lead wires of the blank detecting sensor.
3. Remove the screw of the guide plate. (**Fig. 12:** ㊴)
4. Remove the rope fixture of the sensor. (**Fig. 12**)
5. Remove the guide rod fitting clip ㊵ and remove the guide rod. (**Fig. 12**)
6. Pull out the sensor in the direction of the arrow Ⓐ . (**Fig. 12**)

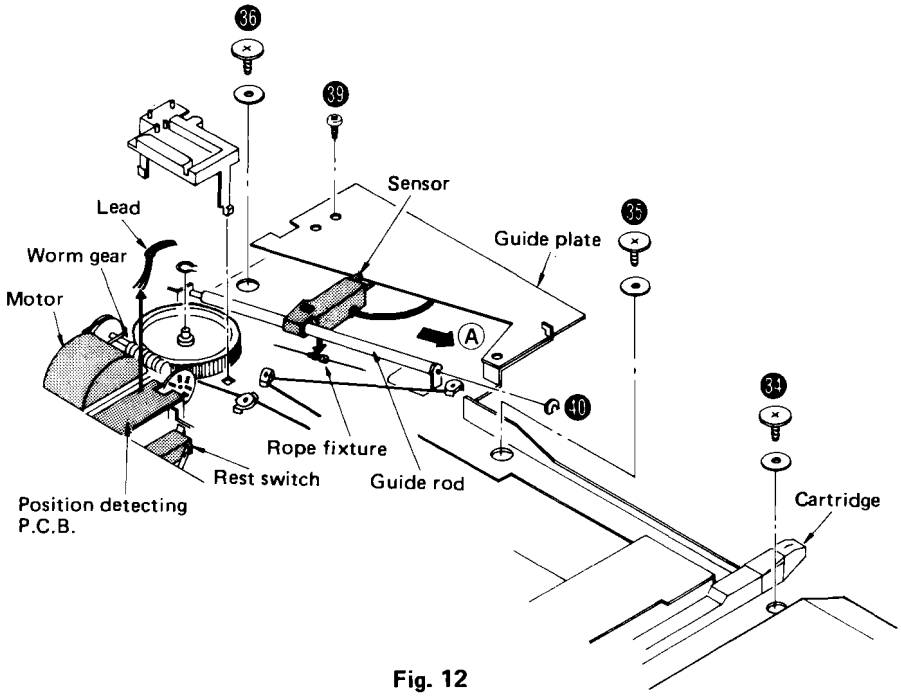


Fig. 12

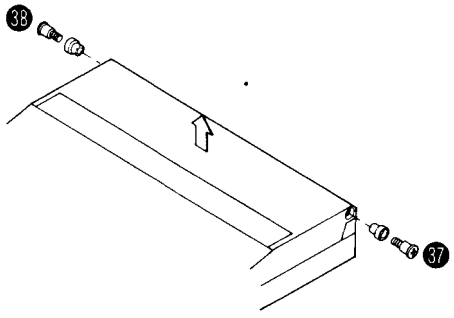


Fig. 13

• How to separate the upper cabinet and lower cabinet

1. Remove the bottom board. (**Refer to "How to remove the bottom board."**)
2. Unsolder the ground lead wire from the phono output jack, and remove the phono output jack from the lower cabinet.
3. Pull out the 2 connectors (**CN301, CN401**) from the operation circuit P.C.B. (**Fig. 14**)
4. Remove the P.C.B. holder setscrew (**Fig.** ㊶) and P.C.B. holder.
5. Remove the 4 hinge setscrews (**Fig. 15:** ㊷ ~ ㊺).
6. Release the claws and slowly lift the lower cabinet to separate it from the upper cabinet.

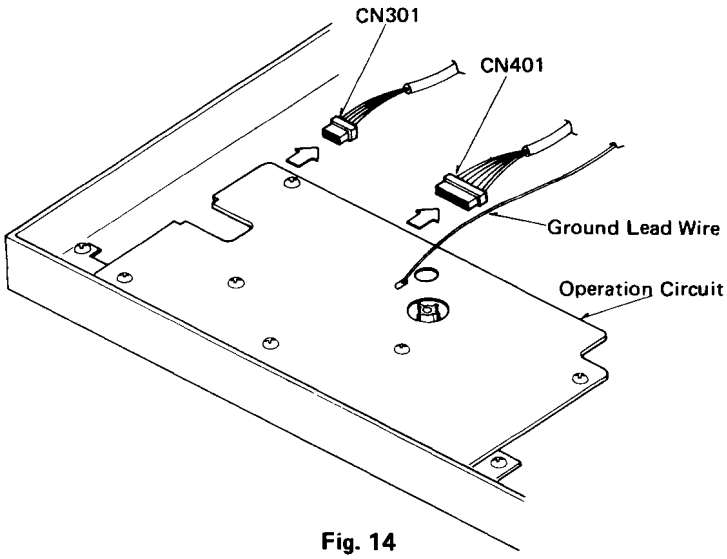


Fig. 14

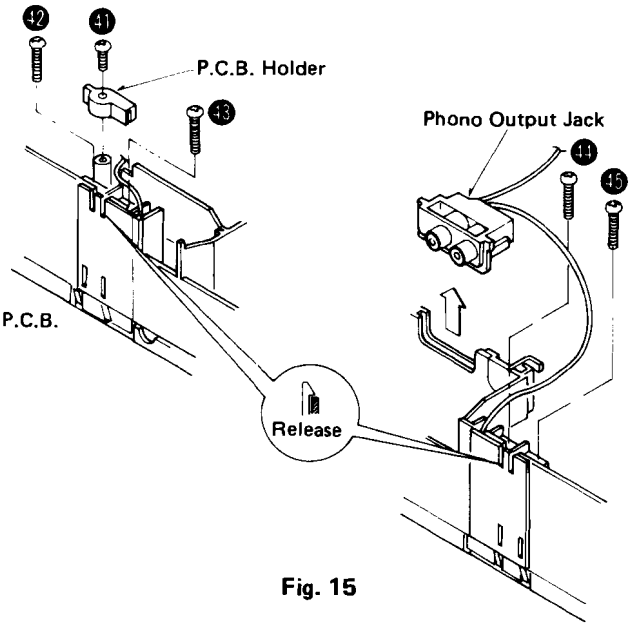


Fig. 15

• How to remove the tonearm

1. Remove the dust cover and tonearm cover. (**Refer to "How to remove the dust cover" and "How to remove the tonearm cover"**).
2. Unsolder the 5 lead wires from the cartridge (**Fig. 16**).
3. Remove the tonearm setscrew (**Fig. 17:** ㊺).

• How to remove the cueing control ass'y

1. Remove the tonearm cover. (**Refer to "How to remove the tonearm cover"**).
2. Unsolder the 2 lead wired from the cueing plunger (**Fig. 16**)
3. Remove the 2 cueing control ass'y setscrews (**Fig. 16:** ㊻, ㊼), and the cueing control ass'y can be removed in the direction of the arrow Ⓐ.

• How to remove the tonearm position indicator board

1. Remove the dust cover and tonearm cover. (**Refer to "How to remove the dust cover" and "How to remove the tonearm cover"**).
2. Unsolder the 2 lead wires from the indicator (**Fig. 16**).
3. Remove the tonearm position indicator board setscrew (**Fig. 16:** ㊽).

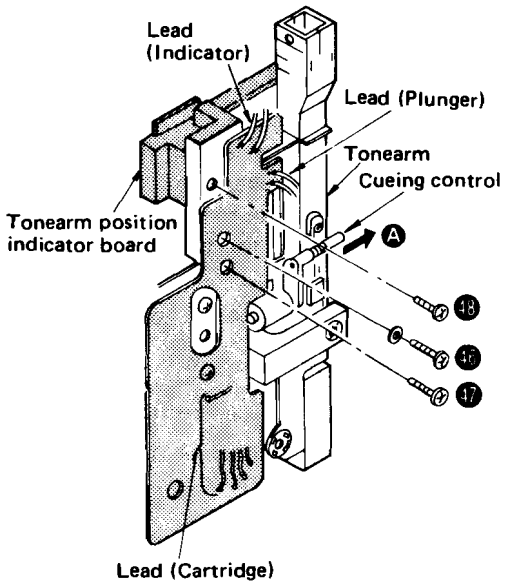


Fig. 16

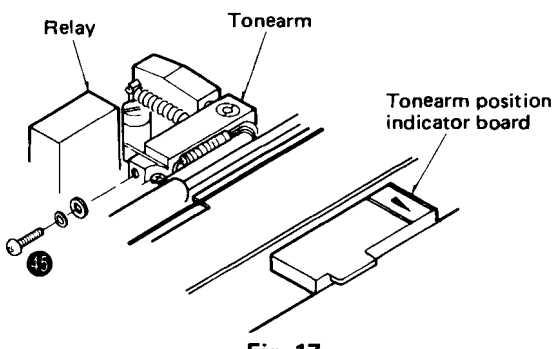


Fig. 17

- **How to remove the Hall element**

1. Remove the turntable platter.
2. Remove the terminal solder by use of solder sucker.
3. Hold the Hall element with a tweezers and remove it while touching the soldering iron to the terminal. **(Fig. 18)**

   Note: Fit the Hall element with the part No. print up. The reverse in terminal position is allowable provided that the printed side is up.

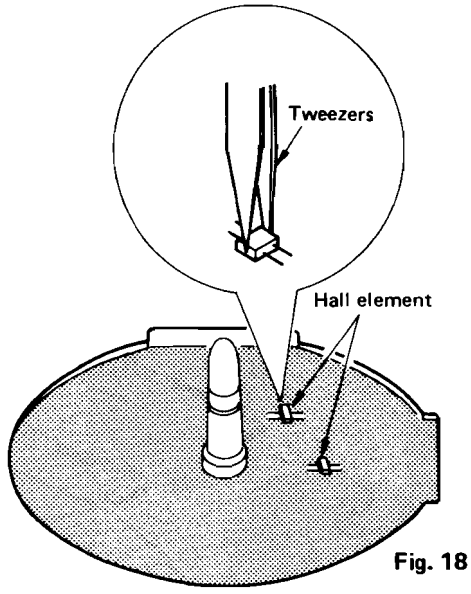


Fig. 18

- **How to remove the cabinet (Reset) switch**

1. Remove the bottom board (**Refer to "How to remove the bottom board."**)
2. Completely open the upper cabinet.
3. Remove the cabinet switch setscrew (**Fig. 19:** ⑲).

   Note: When fitting the cabinet switch, be sure to open the upper cabinet.

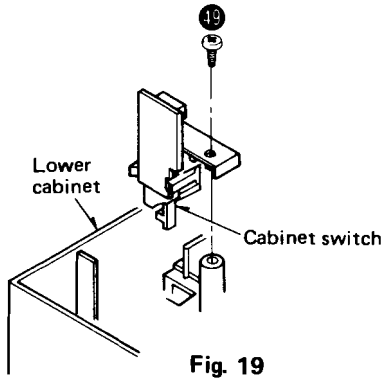


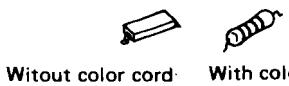
Fig. 19

■ 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 suker.
2. Touch the soldering iron to the end of the chip as shown in Fig. 20, then turn the tweezers in the direction of the arrow.



Chip resistor

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

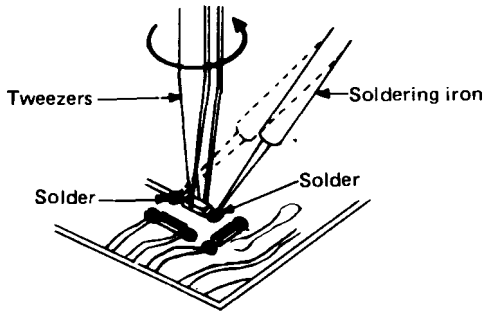


Fig. 20

- **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. 21.

Note:

1. If the chip jumper is removed, connect a coated lead wire to the part. (See Fig. 22). Chip jumper is marked with "J" on the printed circuit board.

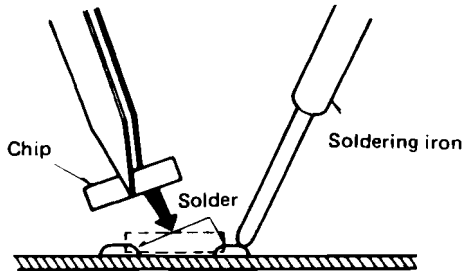


Fig. 21

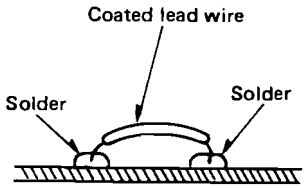


Fig. 22

- **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 SET THE TONEARM DRIVE ROPE

Unit the rope according the following procedure.

1. Remove the dust cover. **(Refer to "How to remove the dust cover".)**
2. Remove the lead wire holder. **(Fig. 23)**
3. Remove the C-ring of the arm drive wheel and remove the drive wheel. **(Fig. 23 : ⑤⓪)**
4. Turn over the arm drive wheel, and set the rope in the order of 1 ~ 2. **(Fig. 24)**
5. Holding the rope with the hand, set the drive wheel and rope in the order of 3 ~ 8 of **Fig. 25.**
6. After setting the rope, match in tonearm and sensor with the position of rope fixture, and secure the parts.
7. Turn the worm gear by finger to see that the tonearm and sensor move, then set the C-ring.

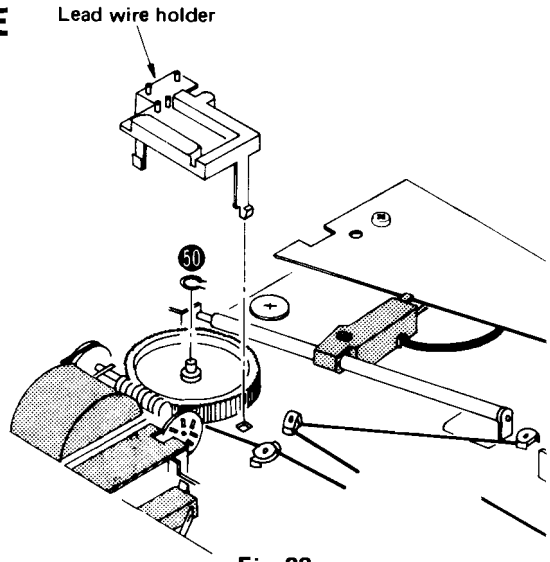


Fig. 23

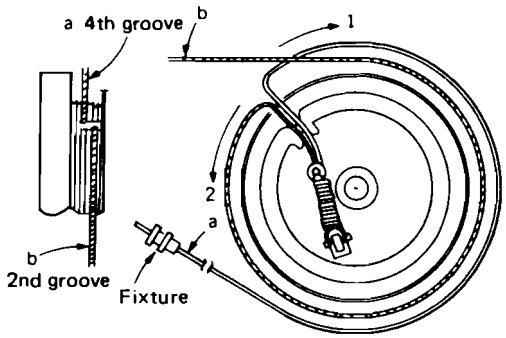


Fig. 24

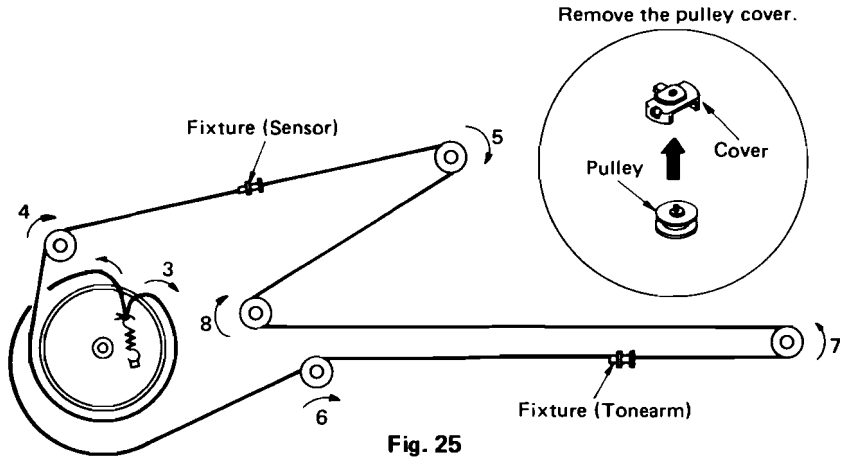


Fig. 25

■ MEASUREMENTS AND ADJUSTMENT

- **Equipment used and condition of the set**

1. Oscilloscope (two channels)
2. DC voltmeter.
3. Record (SFTR007) for adjustment.
4. Connector (SZZP1010F) for adjustment.
5. Remove the bottom board and remove the cover. **(Fig. 29)**
6. Set the optical sensor sensitivity selector to "M".

Step	Item	Preparations for adjustment	Adjusting portion	Adjusting method
1	**Start position**	1. Open the upper cabinet and put on the test record. 2. Turn the power switch on. 3. Push the "Start" switch.	Start position adjusting screw. (Fig. 26)	1. Turn the start position adjusting screw. If it descends between tunes, turn the screw clockwise. If it descends outside the disc, turn the screw counterclockwise.
2	**Clock frequency**	1. Connect Q1 emitter to IC301 14-pin. (Fig. 27) 2. Connect the oscilloscope to IC301 13-pin.	VR301 (Fig. 27)	1. Turn the power switch on. 2. Adjust VR301 so that the cycle of output waveform is 40μs ± 2μs. (Fig. 28)
3	**Sensor gain**	1. Remove the cover and insert the connector for adjustment into terminal CN901. (Fig. 29) 2. Connect the oscilloscope to 6-pin (+) and 1-pin (−). 3. Put on the record for adjustment with side A up.	VR901 (Fig. 26)	1. Turn the power switch on and move the tonearm to the blank area of the record. 2. Adjust VR901 so that the output voltage is 4V ± 0.4V.

Step	Item	Preparations for adjustment	Adjusting portion	Adjusting method
4	**Sensor resolution**	1. Remove the cover and insert the connector for adjustment into terminal CN901. (Fig. 29) 2. Connect the oscilloscope to 7-pin (+) and 1-pin (−). 3. Put on the record for adjustment with side A up.	VR902 (Fig. 26)	1. Turn the power switch on. 2. Push the program key to let it search the tonearm. (Output is delivered between the tunes.) 3. Adjust VR902 so that the peak output between tunes is 3V ± 0.3V. (Fig. 30)
5	**Cueing timer**	1. Remove the cover and insert the connector for adjustment into terminal CN901. (Fig. 29) 2. Connect the unit to the amplifier. (Phono output) 3. Connect 3-pin (+) and 1-pin (−) to the channel (1) of two channel oscilloscope. 4. Connect the speaker terminal of amplifier to the channel (2) of two channel oscilloscope. 5. Connect the 2-pin and 1-pin. (Muting operation stops.) 6. Put on the record for adjustment with side B up.	VR903 (Fig. 26)	1. Turn the power switch on. 2. Move the tonearm to a recorded (groove) part of the record, and push the cueing switch for cueing down. 3. Check the time until completion of cueing (rise of cueing signal) after the stylus touches the record surfase. 4. Adjust VR903 so that the time until completion of cueing is 0.3 ∼ 0.5 sec. (Fig. 31) Note: Set the sweep time of oscilloscope to 0.2 sec/cm or 0.5 sec/cm. For example, in the case of 0.2 sec/cm range, adjust it so that the cueing completion signal is delivered 2 scale (0.4 sec) later than delivery of phono output signal.
6	**Descending between tunes**	1. Open the upper cabinet and hold the cabinet switch with tape. 2. Put on the record for adjustment with side B up. 3. Close the upper cabinet. 4. Connect the unit to the amplifier. (Connect the speakers to the speaker terminals.)	Sensor shifting screw (Fig. 32)	1. Turn the power switch on. 2. Push the program key 2, followed by start switch. 3. After completion of cueing down, push the program key 2 for the purpose of skipping. 4. Make sure that descending position is at count "20 ∼ 21". 5. If the descending position is wrong, open the upper cabinet and turn the sensor shifting screw. 6. Close the upper cabinet and push the program key 2. 7. Adjust so that the descending position is at count "20 ∼ 21". Repeat steps 4 ∼ 7.
7	**Tonearm offset angle**	1. Open the upper cabinet and hold the cabinet switch with tape. 2. Close the upper cabinet.	Adjusting screw (Fig. 33)	1. Turn the power switch on and push the start switch to shift the tonearm inward. 2. Open the upper cabinet. 3. Turn the adjusting screw so that the arm center matches the V-groove of the lift bar.
8	**Servo gain and offset voltage**	1. Open the upper cabinet and hold the cabinet switch with the tape. 2. Close the upper cabinet. 3. Connect the DC voltmeter to CN301 terminal 3 and ground terminal. 4. Remove the Label of the tonearm cover.	VR501 (Servo gain) P.C.B. (Offset voltage) (Fig. 32)	1. Turn the power switch on and push the start switch to shift the tonearm inward. 2. Open the upper cabinet. 3. Completely shift the tonearm to the right. Then, adjust VR501 so than the voltage is 3.6V. **(Servo gain)** 4. Set the tonearm to the center and make sure that the output voltage is 1.8V. 5. If the voltage is not 1.8V, loosen the printed circuit board screw and move the board to the right or left with a screw-driver so that the output voltage becomes 1.8V. After the adjustment, tighten the printed circuit board screw. **(Offset adjustment)**

- **Adjustment points**

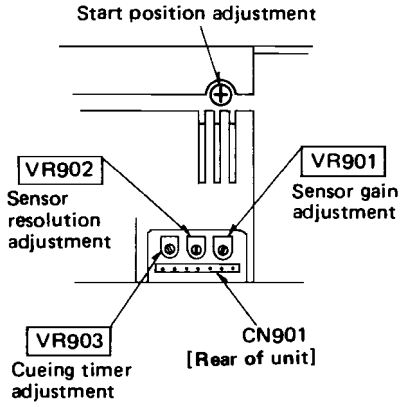


Fig. 26

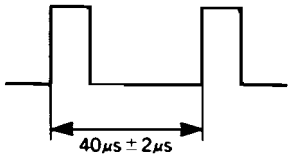
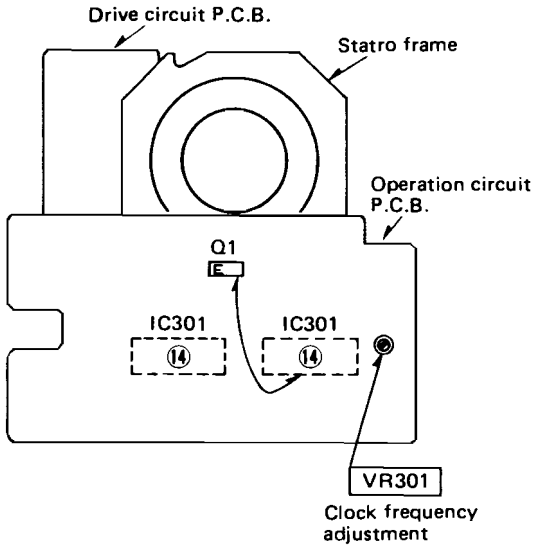


Fig. 28



* Connect between Q1 Ⓔ and IC301 ⑭ pin for clock frequency adjustments.

Fig. 27

Fig. 30

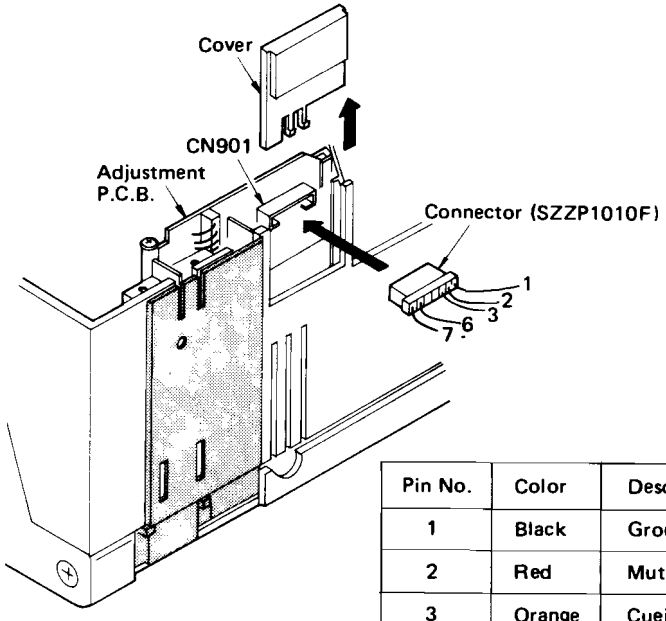


Fig. 29

Pin No.	Color	Description
1	Black	Ground
2	Red	Muting signal
3	Orange	Cueing signal
6	Blue	Sensor amp. output signal
7	Violet	Filter amp. output signal

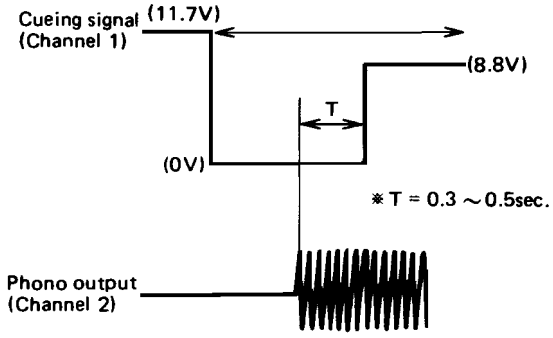


Fig. 31

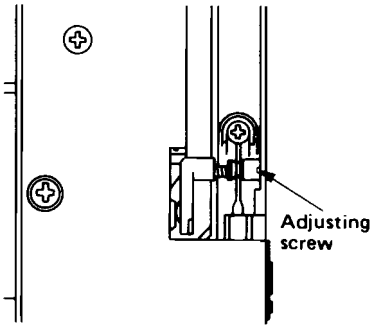


Fig. 33

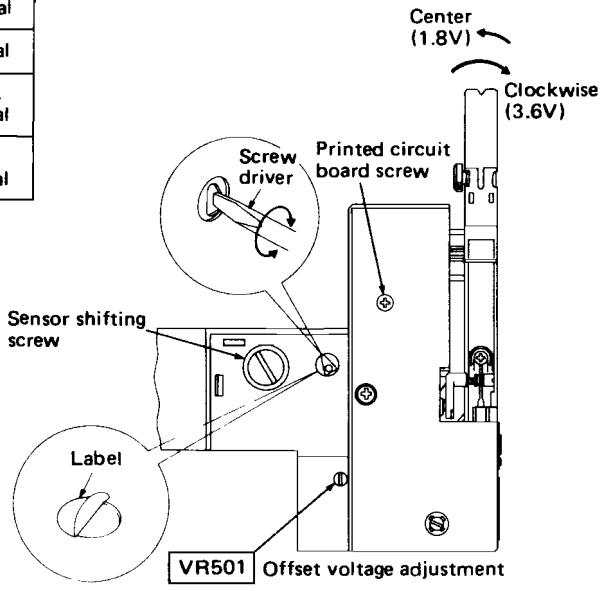


Fig. 32

■ TROUBLE SHOOTING

1. How to use the repair table (Fig. 34)

① Remove the bottom board.
② Remove the operation circuit P.C.B. and connect the P.C.B. ground terminal to the chassis (Stator frame).
③ Put the unit on the repair table.
④ Fit the turntable platter and put on the turntable mat.
⑤ Put on the record and check the circuits from under the unit.

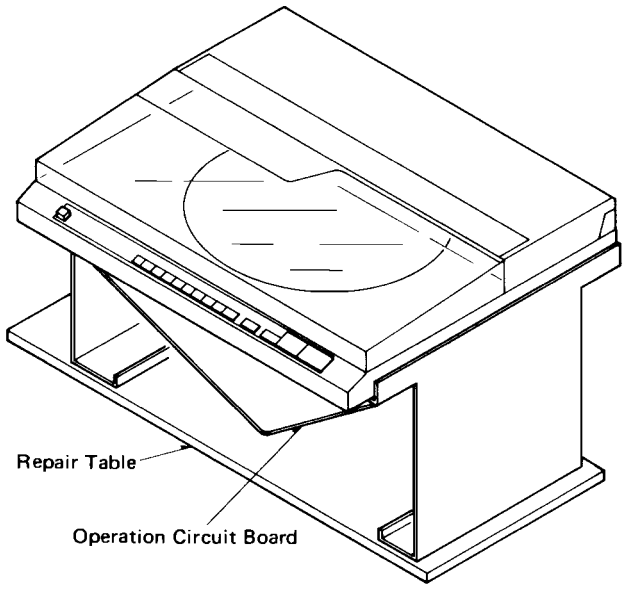


Fig. 34

2. How to raise the set (Fig. 35)

Note: Turntable platter is not fixed on the center spindle. Take care so that the turntable platter will not come loose. Also, take care allow the set to fall down.

① Remove the bottom board.
② Completely open the upper cabinet.
③ Hold the cabinet (Reset) switch with tape.
④ Fit the turntable platter.
⑤ Raise the unit and check the circuits.

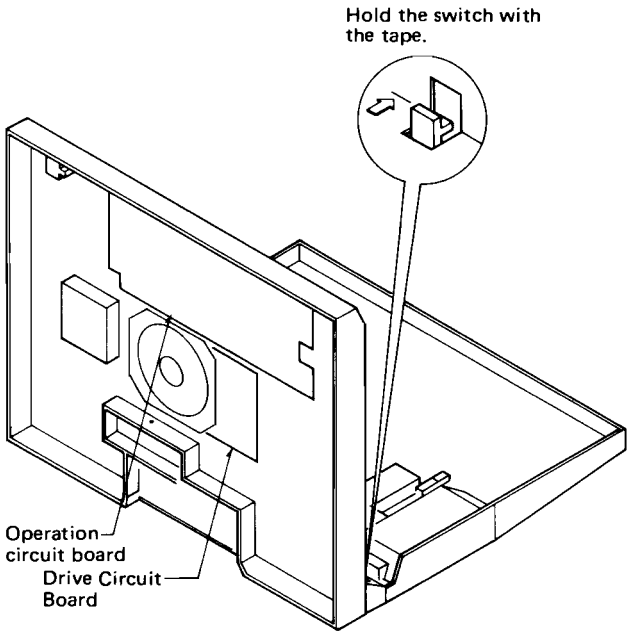


Fig. 35

3. How to turn over the set (Fig. 36)

Note: This purpose is to check the voltage of each circuit during stop of the turntable.

① Remove the turntable platter and turn over the unit.
② Remove the bottom board.
③ Turn the power switch "on" and check the voltage.

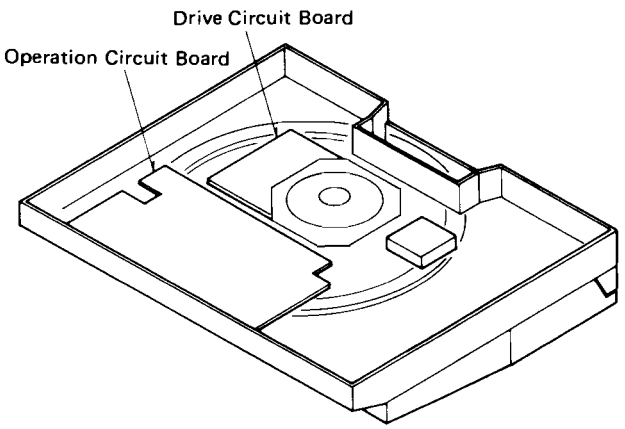


Fig. 36

Turntable dones not rotate

Ⓒ, Ⓑ, Ⓔ of transistor are as follows:
Ⓒ : Collector
Ⓑ : Base
Ⓔ : Emitter

*1
Check points in [ ] are common to all symptoms.

*2
IC301 terminals ⑭ ~ ⑰, ㉑ emit signals when key switch is pushed or speed selector is shifted.

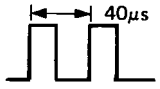
*1

Power source circuit
1. AC18V between BT1 terminals ③ and ④.
2. DC voltage of regulator IC (IC1)
   ① 22V, ② 0V, ③ 12V
3. DC voltage of regulator transistor (Q1)
   Ⓒ 10.2V Ⓑ 5.8V Ⓔ 5.2V

NO → AC cord, S1 T1, D1, IC1 Q1, C1 ~ C5 R1~R4, D2

YES

Clock frequency
1. Connect between Q1 Ⓔ and IC301 ⑭.
   Waveform of terminal ⑬ of IC301.



NO → IC301, VR301 R331, C301

YES

*2
Key scan signal
1. Waveform of terminals ⑭ ~ ⑰, ㉑ ~ ㉕ of IC301.

NO → IC301, D312~317, S301~316, S701

YES

Cabinet opening/closing detection
1. DC voltage at terminal ㉑ of IC301.
   • Close the upper cabinet 1V
   • Open the upper cabinet 0V

NO → S701, IC301

YES

Power supply input terminal
1. DC voltage at terminal ① of IC101. (12V)
2. DC voltage at terminal ⑱ of IC201. (8.5V)

NO → IC101, IC201 R204, R208

YES

Push start switch (S313).

Start/stop and brake circuit
1. DC voltage at terminal ㉛ of IC301. (0V)
2. DC voltage at terminal ⑩ of IC201. (0V)
3. DC voltage at terminal ⑫ of IC201. (0.6V)

NO → IC301, IC201 IC101, S313 C107

YES

Drive coil and Hall element
1. Conduction check of drive coils. (About 33Ω)
2. DC voltage of Hall elements.
   ① 3.8V, ② 7.6V, ③ 3.8V, ④ 0V

NO → Drive coil H101, H102 IC101

YES

Drive circuit (Stop)
1. DC voltage at each terminal of IC101.

	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪
Voltage	0V	12V	0V	0V	0V	0V	0V	0V	0V	6V

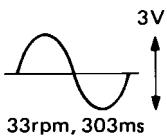
NO → IC101

YES

Drive circuit (Rotation)
1. DC voltage at each terminal of IC101.

	②	③	⑨	⑩	⑪
Voltage	0.6V	12V	4.9V	4.9V	4.7V

2. Waveform between terminal.
   ④ and ⑤ (⑥ and ⑦) of IC101.



NO → IC101

Turntable dones not rotate

Ⓒ, Ⓑ, Ⓔ of transistor are as follows:
Ⓒ : Collector
Ⓑ : Base
Ⓔ : Emitter

*1
Check points in [ ] are common to all symptoms.

*2
IC301 terminals ⑭ ~ ⑰, ㉑ emit signals when key switch is pushed or speed selector is shifted.

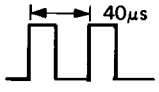
*1

Power source circuit
1. AC18V between BT1 terminals ③ and ④.
2. DC voltage of regulator IC (IC1)
   ① 22V, ② 0V, ③ 12V
3. DC voltage of regulator transistor (Q1)
   Ⓒ 10.2V Ⓑ 5.8V Ⓔ 5.2V

NO → AC cord, S1 T1, D1, IC1 Q1, C1 ~ C5 R1~R4, D2

YES

Clock frequency
1. Connect between Q1 Ⓔ and IC301 ⑭.
   Waveform of terminal ⑬ of IC301.



NO → IC301, VR301 R331, C301

YES

*2
Key scan signal
1. Waveform of terminals ⑭ ~ ⑰, ㉑ ~ ㉕ of IC301.

NO → IC301, D312~317, S301~316, S701

YES

Cabinet opening/closing detection
1. DC voltage at terminal ㉑ of IC301.
   • Close the upper cabinet 1V
   • Open the upper cabinet 0V

NO → S701, IC301

YES

Power supply input terminal
1. DC voltage at terminal ① of IC101. (12V)
2. DC voltage at terminal ⑱ of IC201. (8.5V)

NO → IC101, IC201 R204, R208

YES

Push start switch (S313).

Start/stop and brake circuit
1. DC voltage at terminal ㉛ of IC301. (0V)
2. DC voltage at terminal ⑩ of IC201. (0V)
3. DC voltage at terminal ⑫ of IC201. (0.6V)

NO → IC301, IC201 IC101, S313 C107

YES

Drive coil and Hall element
1. Conduction check of drive coils. (About 33Ω)
2. DC voltage of Hall elements.
   ① 3.8V, ② 7.6V, ③ 3.8V, ④ 0V

NO → Drive coil H101, H102 IC101

YES

Drive circuit (Stop)
1. DC voltage at each terminal of IC101.

	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪
Voltage	0V	12V	0V	0V	0V	0V	0V	0V	0V	6V

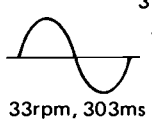
NO → IC101

YES

Drive circuit (Rotation)
1. DC voltage at each terminal of IC101.

	②	③	⑨	⑩	⑪
Voltage	0.6V	12V	4.9V	4.9V	4.7V

2. Waveform between terminal.
   ④ and ⑤ (⑥ and ⑦) of IC101.

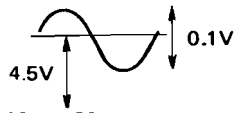


NO → IC101

Unsatable rotation

FG amplifier circuit

1. Conduction check of FG coil.
2. Waveform of terminal ⑮ of IC201.



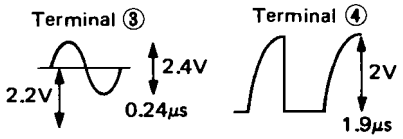
33rpm 20ms, 45rpm 14ms

NO → FG coil, IC201, R203, R205, C201~203

YES

Quartz oscillator circuit

1. Waveforms of terminals ③ and ④ of IC201.

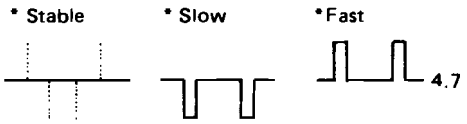


NO → X201, IC201, C204~206

YES

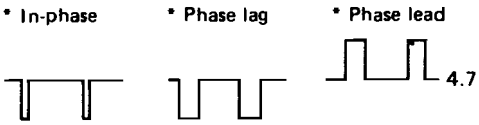
Speed and phase control circuit

1. Waveform of terminal ⑭ of IC201



33rpm 20ms (50.5 Hz)

2. Waveform of terminal ⑬ of IC201.



33rpm 10ms (101 Hz)

NO → IC201, IC101

Arm motor does not rotate

Motor control circuit

1. DC voltage at each terminal of IC301.

	㉜	㉝	㉞	㉟
Stop	5V	5V	0.2V	0.2V
Lead-in	0V	5V	0.2V	0.8V
Return	5V	0V	0.8V	0.2V

2. DC voltage at each terminal of IC401.

	①	②	③	⑤	⑥	⑦
Stop	0.1V	3.9V	3.8V	3.8V	3.9V	0.1V
Lead-in	10.3V	2V	3.8V	3.8V	3.9V	0.1V
Return	0.1V	3.9V	3.8V	3.8V	2V	10.3V

3. DC voltage at each terminal of Q401~404.

	Q401		Q403	
	Ⓑ	Ⓔ	Ⓑ	Ⓒ
Stop	0.1V	0.1V	0.2V	0.1V
Lead-in	8.8V	8.2V	0.8V	8.2V

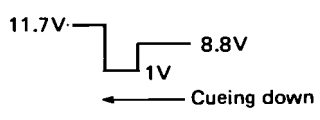
	Q402		Q404	
	Ⓑ	Ⓔ	Ⓑ	Ⓒ
Stop	0.1V	0.1V	0.2V	0.1V
Return	8.8V	8.2V	0.8V	8.2V

NO → IC301, IC401, Q401~404, RF1, Motor

Cueing down/ up dones not work

Cueing control circuit

1. DC voltage at terminals ㊲ and ㊳ of IC301.
   - Terminal ㊲ . . . . . During cueing and down (0.8V)
   - Terminal ㊳ . . . . . Only during cueing down (1.6V)
2. DC voltage of Q304 of collector.



NO → IC301, S312, Q303, Q304, Cueing plunger

■ 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 ⚠ 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 "Ⓢ" mark is service standard parts and may differ from production parts.

Areas

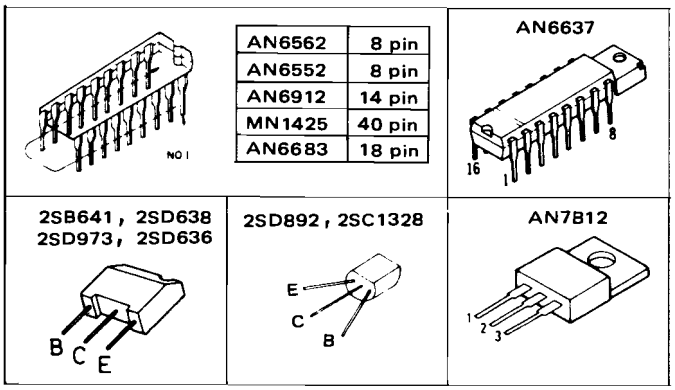
* [M] is available in U.S.A.
* [MC] is available in Canada.

Ref. No.	Part No.	Description
INTEGRATED CIRCUITS		
IC1	AN7812	Regulator
IC101	AN6637	Turntable Drive
IC201	AN6683	Turntable Control
IC301	MN1425FPF	System Control
IC401	AN6552	Arm Motor Control
IC801	AN6562	DC Amplifier & Band Pass Filter
IC802	AN6912	Comparator
TRANSISTORS		
Q1 Ⓢ	2SC1383Q	Regulator
Q302,303	2SD636	Muting Relay Drive,Cueing
306,802		Drive,V/I Converter & Biass
Q304	2SD892	Cueing Drive
Q305,308 309,801	2SB641	Switching, Waveform Shaping & Biass
Q401,402 Ⓢ	2SD973S	Arm Motor Control
Q403,404	2SD638	Arm Motor Control
DIODES		
D1 ⚠	SVDS1RBA20F	Rectifier
D2 Ⓢ	MA1056	5.6V Zener

Ref. No.	Part No.	Description
DIODES		
D301~311, 320	SVDGL-9PR2F1	Light Emitting Diode
D312~317, Ⓢ 801,802, 804,805	MA162A	Key Matrix
D319,806 Ⓢ	RVDRD7R5FB	7.5V Zener
D501,502 Ⓢ	MA162A	Relay Protection
D503	SVDPR3432S	Light Emitting Diode
D803	MA1047A	4.7V Zener
CRYSTAL		
X201	SVQSH41TR	4.193MHz
VARIABLE RESISTORS		
VR301	EVN61AA00B54	Clock Frequency Adj.,50KΩ(B)
VR501	EVNK6AA00B53	Servo Gain Adj.,5KΩ(B)
VR901,902	EVN61AA00B15	Sensor Gain & Resolution Adj.,100KΩ(B)
VR903	EVN61AA00B24	Cueing Timer Adj.,20KΩ(B)
PHOTO INTERRUPTERS		
PC501	ON1186	Arm Position Detection
PC601	ON1161	Offset Angle Detection
PC701	ON2159	Blank Groove Detection

Ref. No.	Part No.	Description
COMPONENT COMBINATIONS		
Z301,302, 307	EXBT44471K	470Ω×4
Z303	EXBP84333K	33KΩ×4
Z304	EXBP84103K	10KΩ×4
Z305	EXBP84332K	3.3KΩ×4
Z306	EXBP86122J	1.2KΩ×6
RELAY		
RL501	SFDYQ11N02	Muting
HALL ELEMENTS		
H101,102	OH-002	Turntable Position Detector
SWITCHES		
S1 ⚠	SFDSC05N08	Power
S301~314	EVQQJ104K	Program,Repeat, Cueing & Start/Clear
S315,801	SFDSHSW0699	Speed Selector & Sensor Gain Selector
S601	SFDSD2MSL-C	Rest
S701	SFDSC05N01	Cabinet
POWER TRANSFORMERS		
T1 [M] ⚠	SLT48DTL3A	Power Source
T1 [MC] ⚠	SLT48DT11C	Power Source
FUSE		
F1 [MC] only ⚠	XBA2F08NU100	800mA,250V

• Terminal guide of transistors, and IC's



■ RESISTOR AND CAPACITORS

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 ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
3. This "Ⓢ" mark is service standard parts and may differ from production parts.
4. Unless otherwise specified. All resistors are in OHMS (Ω) K = 1000Ω, M = 1000kΩ All capacitors are in MICROFARADS (μF) P = 10^{-6} μF

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	J : ±5%
ERX : Metal Film	1 : 1W	G : ±2%

ERD2FCG□□□ ⟶ Fuse type carbon (1/4W)
ERD10TLJ □□□ ⟶ Chip type carbon (1/8W)
ECUV1H □□□ ⟶ Chip type ceramic

Capacitor Type	Voltage		Tolerance
	ECEA Type	Others	
ECEA : Electrolytic	1A : 10V	1H : 50V DC	J : ±5%
ECEB : Electrolytic	1C : 16V	2H : 500V DC	K : ±10%
ECKD : Ceramic	1E : 25V	1 : 100V	Z : +80%, −20%
ECQM : Polyester	1V : 35V		P : +100%, −0%
	1H : 50V		M : ±20%
	50 : 50V		

Ref. No.	Part No	Value
RESISTORS		
R1 Ⓢ	ERD25FJ101	100
R2 Ⓢ	ERD25FJ221	220
R3 Ⓢ	ERG2SJ330	33
R4 Ⓢ	ERD25FJ221	220
R103 Ⓢ	ERD10TLJ104U	100K
R104 Ⓢ	ERXIANJ2R7	2.7
R105	ERD10TLJ270U	27
R201	ERD10TLJ393U	39K
R202	ERD10TLJ394U	390K
R203	ERD10TLJ680U	68
R204	ERD10TLJ151U	150
R205	ERD10TLJ223U	22K
R207	ERD10TLJ102U	1K
R208	ERD10TLJ680U	68
R320 Ⓢ	ERD25TJ333	33K
R321 Ⓢ	ERD25FJ471	470
R322 Ⓢ	ERD25FJ102	1K
R329 Ⓢ	ERD25FJ392	3.9K
R330 Ⓢ	ERD25FJ103	10K
R331 Ⓢ	ERD25FJ472	4.7K
R334,335 Ⓢ	ERD25FJ331	330
R336 Ⓢ	ERD25FJ103	10K
R337 Ⓢ	ERD25TJ223	22K
R338 Ⓢ	ERD25FJ272	2.7K
R341 Ⓢ	ERD25TJ563	56K
R343 Ⓢ	ERD25FJ103	10K
R345 Ⓢ	ERD25FJ472	4.7K
R346 Ⓢ	ERD25TJ333	33K
R347 Ⓢ	ERD25TJ563	56K

Ref. No.	Part No	Value
RESISTORS		
R348 Ⓢ	ERD25TJ333	33K
R351 Ⓢ	ERD25FJ471	470
R352,353 Ⓢ	ERD25FJ222	2.2K
R357 Ⓢ	ERD25TJ223	22K
R358 Ⓢ	ERD25TJ333	33K
R359 Ⓢ	ERD25FJ471	470
R360 Ⓢ	ERD25TJ683	68K
R361 Ⓢ	ERD25FJ470	47
R401 Ⓢ	ERD25TJ683	68K
R402 Ⓢ	ERD25FJ222	2.2K
R403 Ⓢ	ERD25FJ102	1K
R404 Ⓢ	ERD25TJ224	220K
R405 Ⓢ	ERD25TJ683	68K
R406 Ⓢ	ERD25FJ222	2.2K
R407 Ⓢ	ERD25FJ102	1K
R408 Ⓢ	ERD25TJ224	220K
R409 Ⓢ	ERD25TJ273	27K
R410 Ⓢ	ERD25FJ103	10K
R501 Ⓢ	ERD25FJ561	560
R502 Ⓢ	ERD25FJ391	390
R601 Ⓢ	ERD25FJ681	680
R801 Ⓢ	ERD25TJ124	120K
R802 Ⓢ	ERD25FJ472	4.7K
R803 Ⓢ	ERD25TJ124	120K
R804 Ⓢ	ERD25FJ332	3.3K
R805 Ⓢ	ERD25FJ222	2.2K
R806 Ⓢ	ERD25FJ472	4.7K
R807 Ⓢ	ERD25FJ332	3.3K
R808 Ⓢ	ERD25FJ682	6.8K

Ref. No	Part No	Value
RESISTORS		
R809 Ⓢ	ERD25FJ102	1K
R810 Ⓢ	ERD25FJ103	10K
R811 Ⓢ	ERD25TJ684	680K
R812 Ⓢ	ERD25TJ223	22K
R813 Ⓢ	ERD25TJ104	100K
R814 Ⓢ	ERD25TJ684	680K
R815 Ⓢ	ERD25TJ224	220K
R816 Ⓢ	ERD25FJ221	220
R817 Ⓢ	ERD25TJ104	100K
R818 Ⓢ	ERD25FJ102	1K
R819 Ⓢ	ERD25FJ822	8.2K
R820 Ⓢ	ERD25FJ222	2.2K
R821 Ⓢ	ERD25FJ272	2.7K
R822 Ⓢ	ERD25TJ220	22
R823 Ⓢ	ERD25FJ103	10K
R825 Ⓢ	ERD25FJ101	100
R826 Ⓢ	ERD25TJ223	22K
R828 Ⓢ	ERD25TJ223	22K
R829 Ⓢ	ERD25FJ682	6.8K
R840 Ⓢ	ERD25FJ102	1K
R841 Ⓢ	ERD25FJ272	2.7K
RF1 ⚠	ERD2FCG180	18
CAPACITORS		
C1,2 ⚠	ECQM1223KZ	0.022
C3 ⚠	ECQM1223KZ	0.022
C4	ECEB1EU222	2200
C5	ECEA1CU330	33

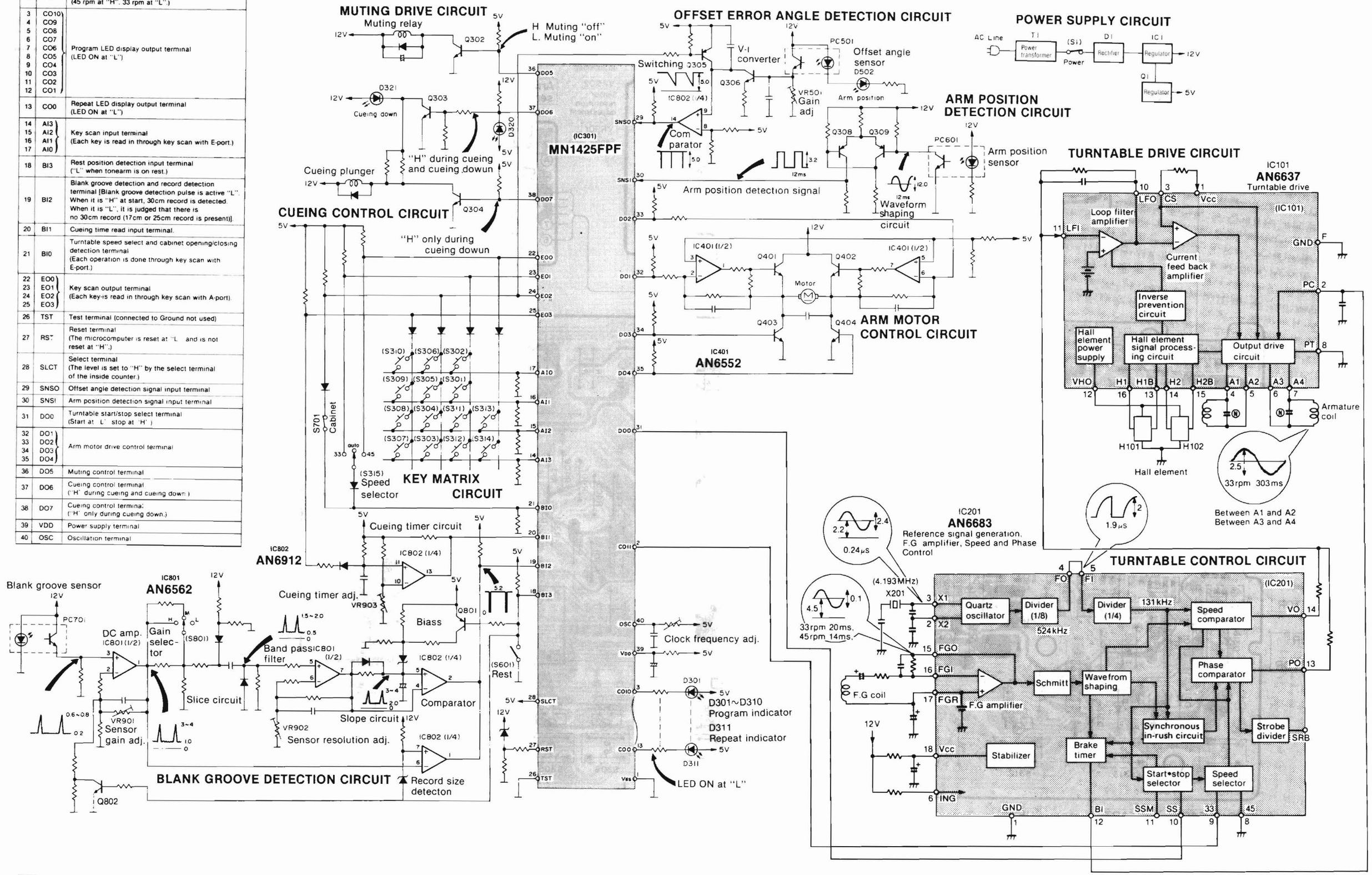
Ref. No.	Part No	Value
CAPACITORS		
C101	ECEA1CU330	33
C102	ECEA50ZR22	0.22
C103	ECQV05274JZ	0.27
C105,106 ⚠	ECEA1CN470S	47
C107	ECKD1H223ZF	0.022
C201	ECEA0JU470	47
C202	ECEA50ZR22	0.22
C203	ECQM1H683KV	0.068
C204	ECUV1H121JC	120
C205	ECUV1H330JC	33
C206	ECUV1H101JC	100
C207	ECEA0JU470	47
C208	ECEA1AU470	47
C301	ECCD1H470K	47P
C302	ECQM1H104KV	0.1
C303	ECKD1H104ZV	0.1
C304	ECEA0JSS330	33
C306	ECEA1EU4R7	4.7
C307	ECKD1H102KB	0.001
C308	ECKD1H104ZV	0.1
C401,402	ECQM1H223KV	0.022
C403	ECQV05224JZ	0.22
C501	ECEA1ES101	100
C601	ECFB1B104ZRM	0.1
C801	ECQM1H103KV	0.01
C802,803	ECQM1H104KV	0.1
C804	ECEA1CU220	22
C805	ECEA1CU470	47
C806	ECQM1H473KV	0.047

SL-QL15

■ BLOCK DIAGRAM

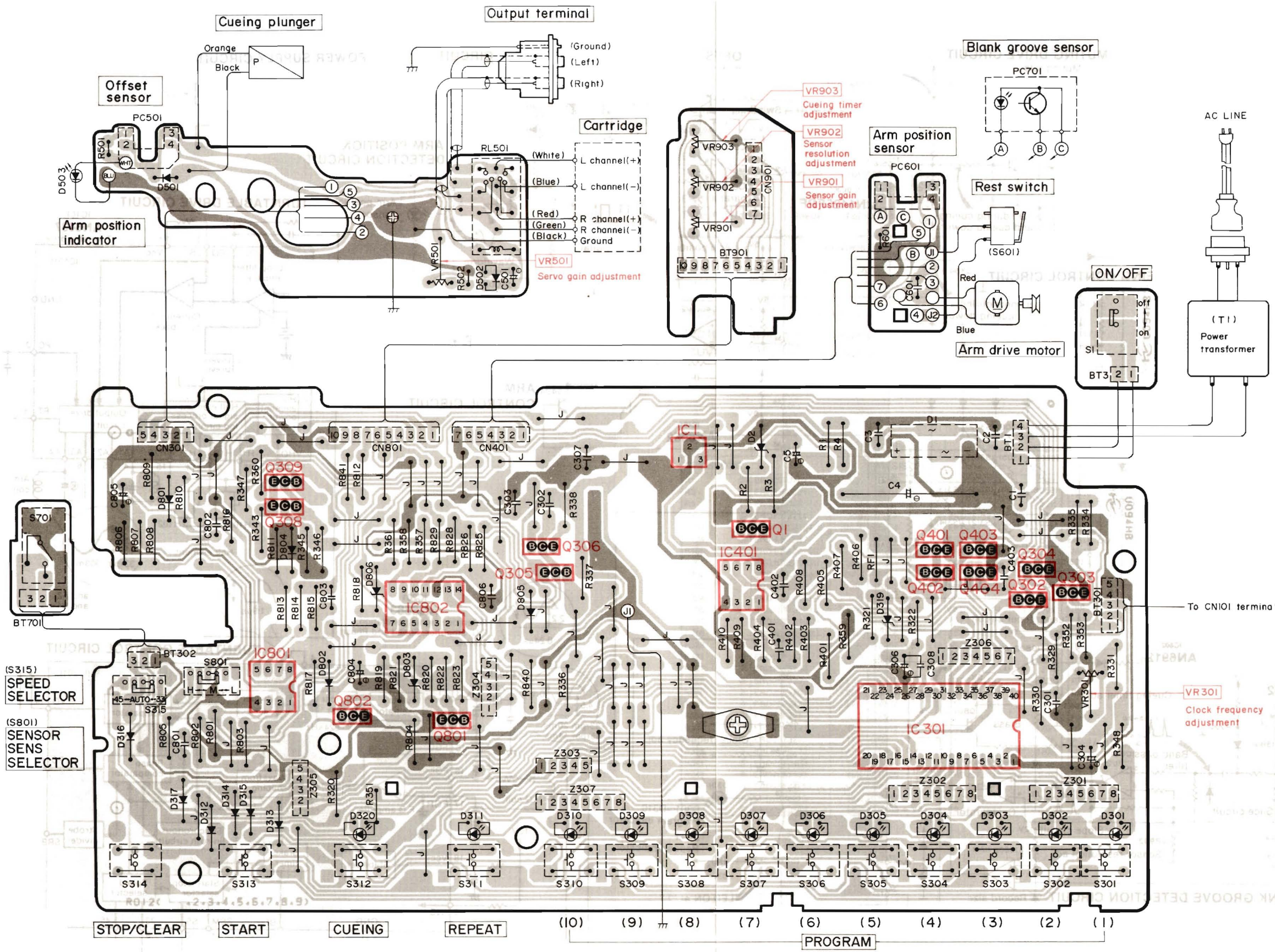
• Description of each terminal of MN1425FPF

Pin No.	Symbol	Description
1.	VSS	Ground terminal
2	CO11	Turntable speed select output terminal (45 rpm at "H", 33 rpm at "L".)
3	CO10	Program LED display output terminal (LED ON at "L")
4	CO9	
5	CO8	
6	CO7	
7	CO6	
8	CO5	
9	CO4	
10	CO3	
11	CO2	
12	CO1	
13	CO0	Repeat LED display output terminal (LED ON at "L")
14	AI3	Key scan input terminal (Each key is read in through key scan with E-port.)
15	AI2	
16	AI1	
17	AI0	
18	BI3	Rest position detection input terminal ("L" when tonearm is on rest.)
19	BI2	Blank groove detection and record detection terminal [Blank groove detection pulse is active "L". When it is "H" at start, 30cm record is detected. When it is "L", it is judged that there is no 30cm record (17cm or 25cm record is present)].
20	BI1	Cueing time read input terminal.
21	BI0	Turntable speed select and cabinet opening/closing detection terminal (Each operation is done through key scan with E-port.)
22	EO0	Key scan output terminal (Each key is read in through key scan with A-port).
23	EO1	
24	EO2	
25	EO3	
26	TST	Test terminal (connected to Ground not used)
27	RST	Reset terminal (The microcomputer is reset at "L" and is not reset at "H".)
28	SLCT	Select terminal (The level is set to "H" by the select terminal of the inside counter.)
29	SNSO	Offset angle detection signal input terminal
30	SNSI	Arm position detection signal input terminal
31	DO0	Turntable start/stop select terminal (Start at "L" stop at "H".)
32	DO1	Arm motor drive control terminal
33	DO2	
34	DO3	
35	DO4	
36	DO5	Muting control terminal
37	DO6	Cueing control terminal ("H" during cueing and cueing down.)
38	DO7	Cueing control terminal ("H" only during cueing down.)
39	VDD	Power supply terminal
40	OSC	Oscillation terminal

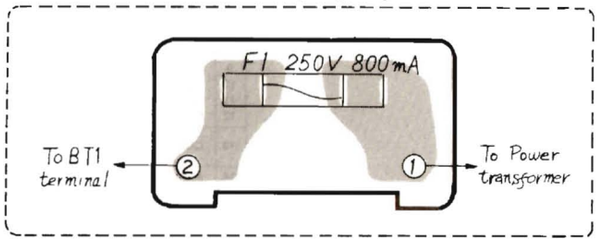


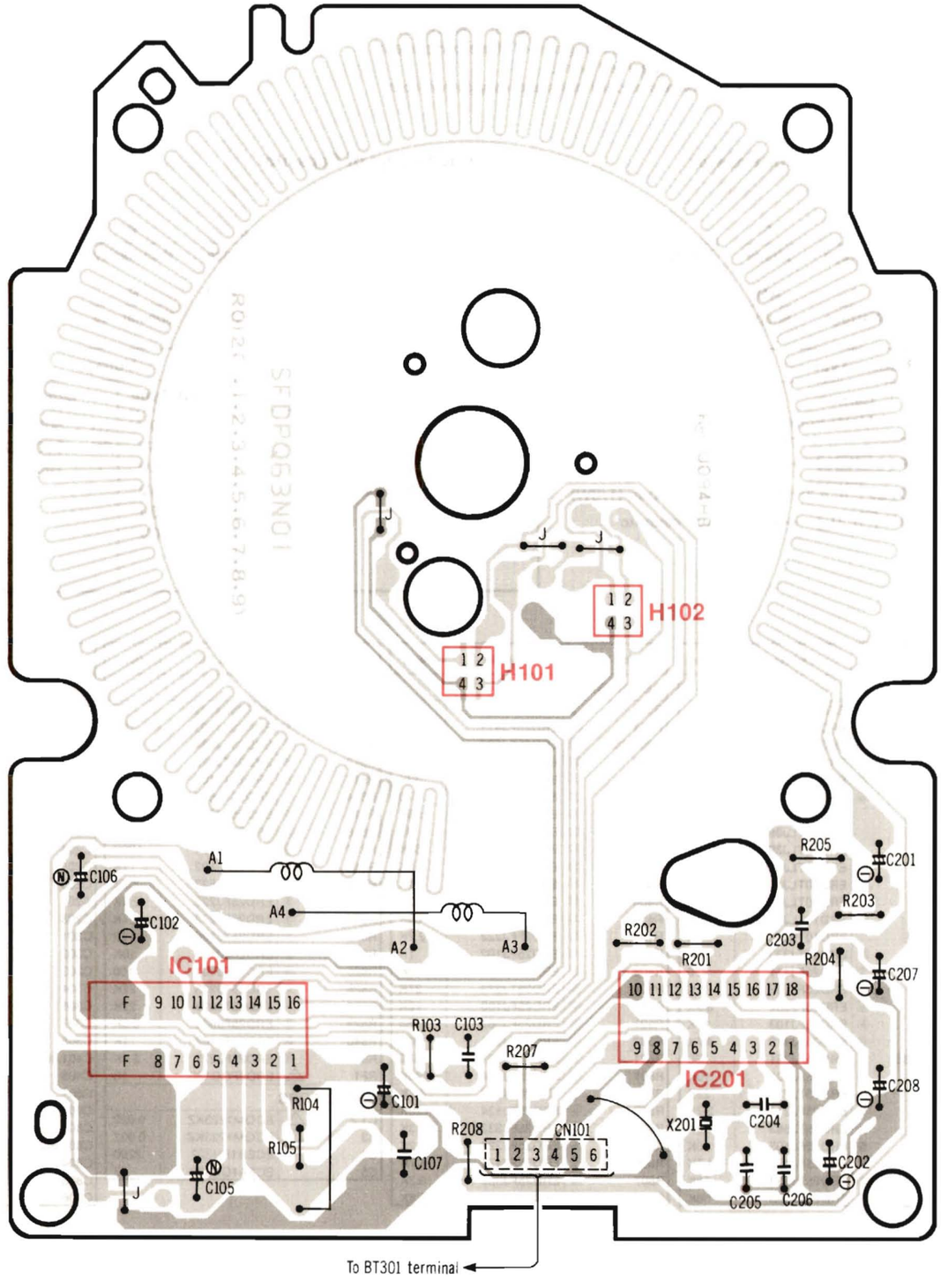
■ CIRCUIT BOARD AND WIRING CONNECTION DIAGRAM

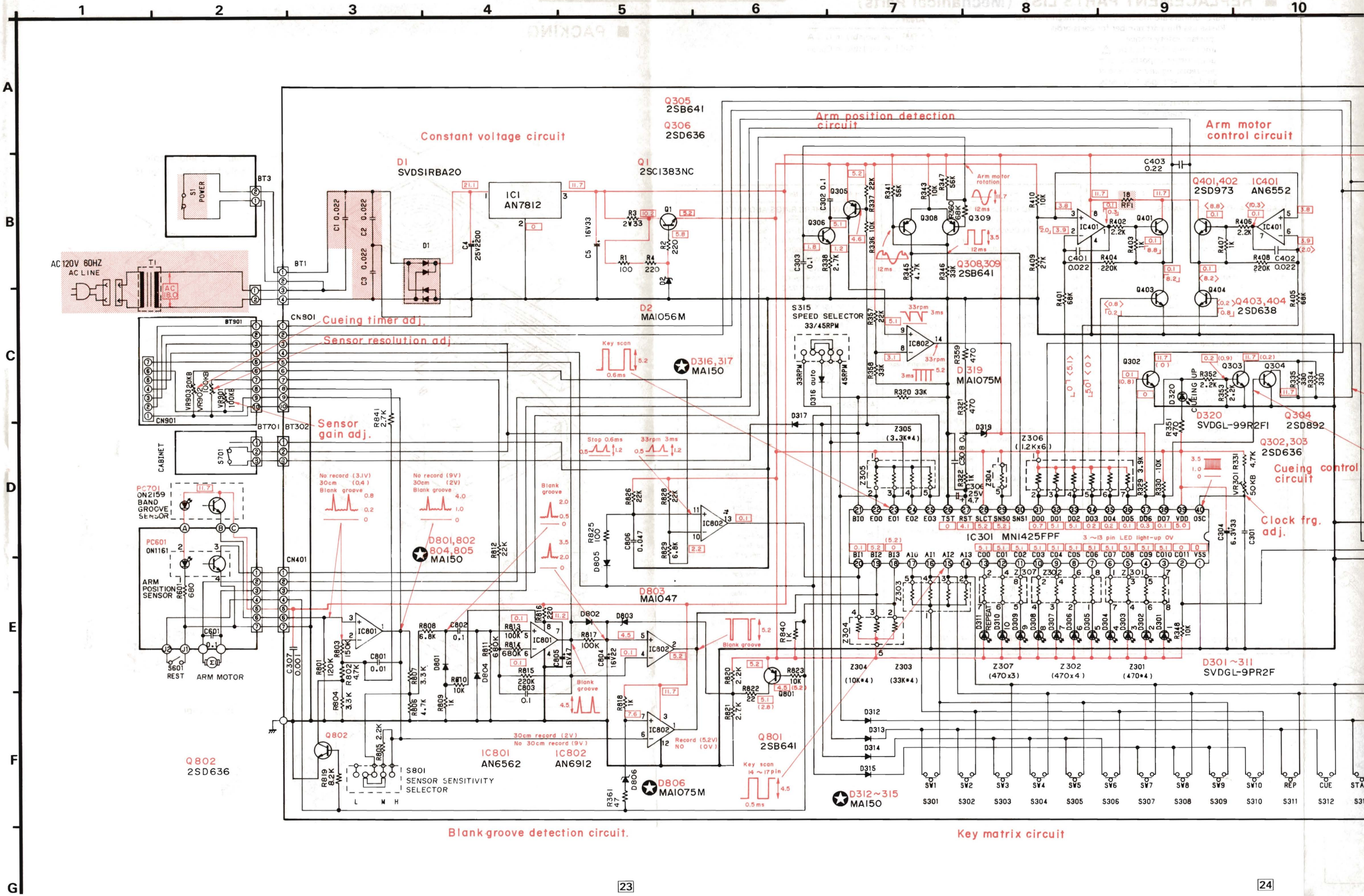
Ground (Earth) lines



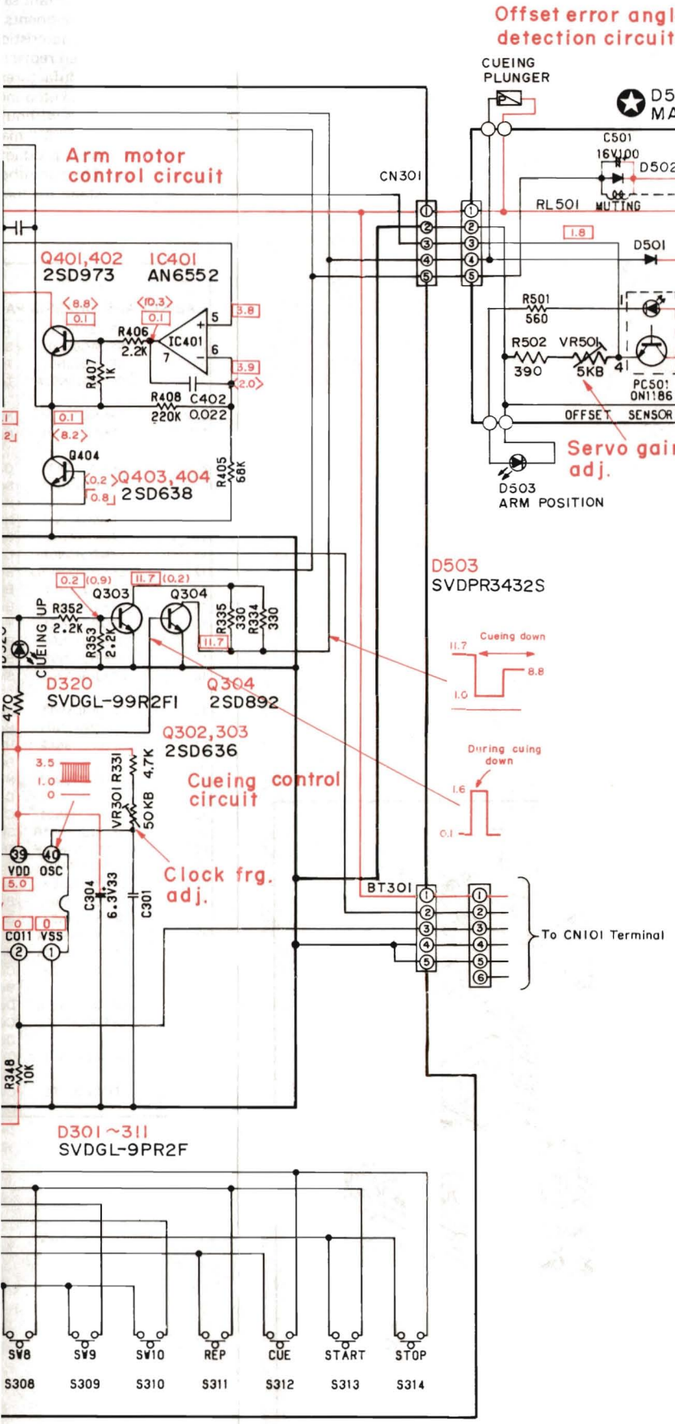
• Power Source circuit for [MC] only.






Constant voltage circuit
Arm position detection circuit
Arm motor control circuit
Cueing control circuit
Blank-groove detection circuit.
Key matrix circuit
AC 120V 60HZ
AC LINE
T1
S1 POWER
BT3
BT1
CN901
BT901
BT701
BT302
CABINET
S701
D1 SVDSIRBA20
IC1 AN7812
Q1 2SC1383NC
D2 MA1056M
Q305 2SB641
Q306 2SD636
Cueing timer adj.
Sensor resolution adj.
Sensor gain adj.
Key scan
D316,317 MA150
S315 SPEED SELECTOR 33/45RPM
D319 MA1075M
Arm motor rotation
Q308,309 2SB641
Q401,402 2SD973
IC401 AN6552
Q403,404 2SD638
Q302,303 2SD636
Q304 2SD892
D320 SVDGL-99R2FI
D301~311 SVDGL-9PR2F
IC301 MN1425FPF
3 ~13 pin LED light-up OV
Clock frg. adj.
PC701 ON2159 BAND GROOVE SENSOR
PC601 ON1161 ARM POSITION SENSOR
REST
ARM MOTOR
CN401
Q802 2SD636
S801 SENSOR SENSITIVITY SELECTOR
IC801 AN6562
IC802 AN6912
D801,802 804,805 MA150
D803 MA1047
D806 MA1075M
Q801 2SB641
D312~315 MA150
No record (3.1V) 30cm (0.4) Blank groove
No record (9V) 30cm (2V) Blank groove
Blank groove
Stop 0.6ms
33rpm 3ms
30cm record (2V) No 30cm record (9V)
Record (5.2V) NO (0V)
Key scan 14 ~ 17 pin
S301 S302 S303 S304 S305 S306 S307 S308 S309 S310 S311 S312

10 11 12 13 14 15 16 17 18 19

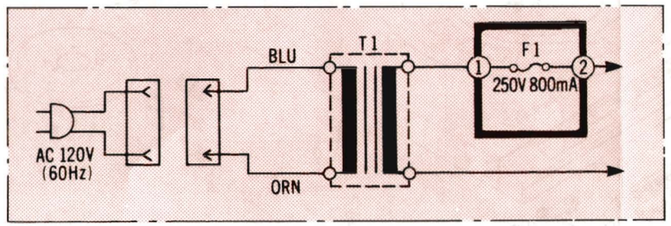


* The part No. of diodes mentioned in the schematic diagram stand for production part No. Regarding the part No. with ✪ mark the production part No. are different from the replacement part No. Therefore, when placing an order for replacement part, please use the part No. in the replacement parts list.

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.

• **Power Source circuit for [MC] only.**



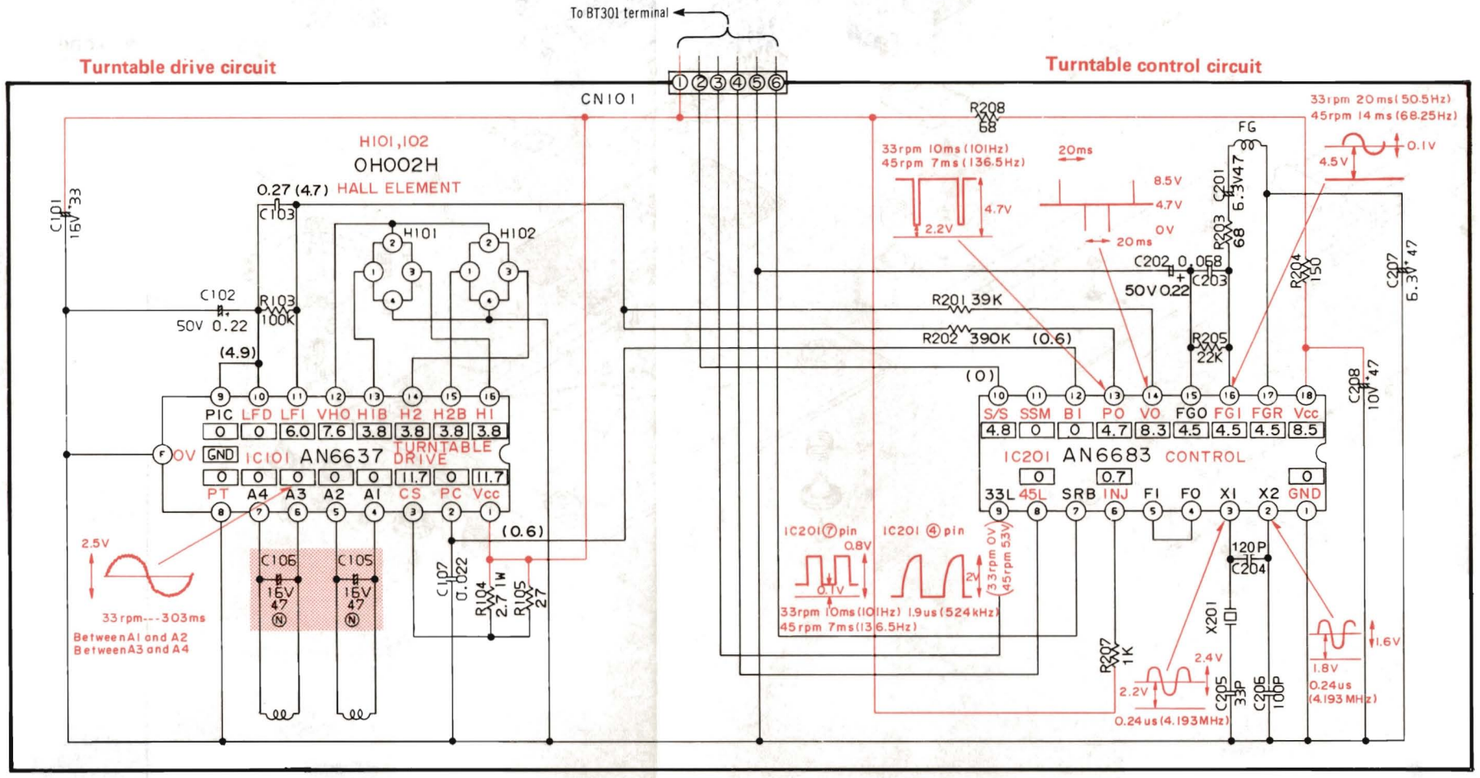
• **Product for MC only**

FUSE REPLACEMENT

Symbol located near the fuse indicates fast operating type. For continued protection against fire hazard, replace with same type fuse. Refer to the symbol for fuse rating.

FUSIBLE REMPLACEMENT

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



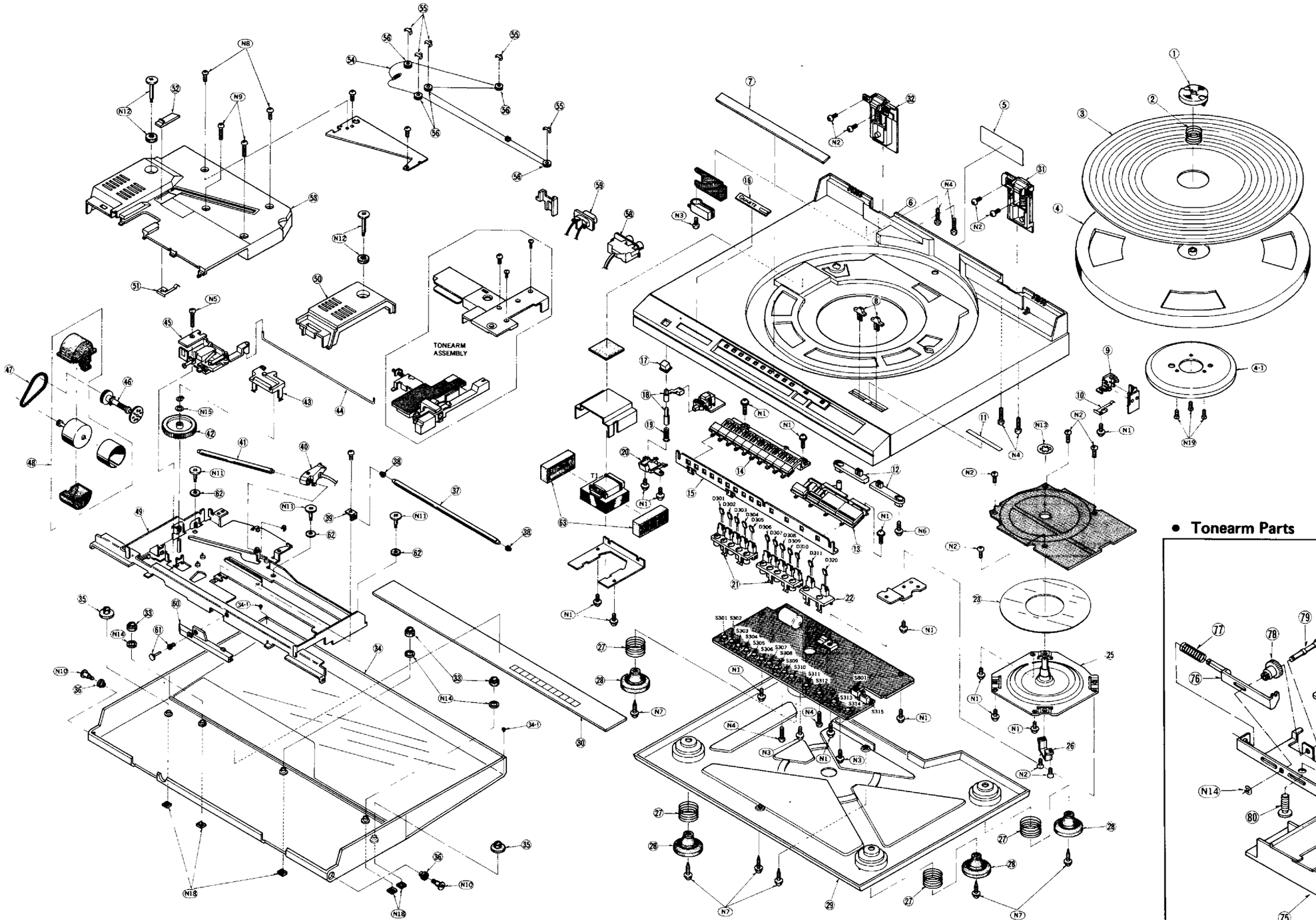
■ SCHEMATIC DIAGRAM

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

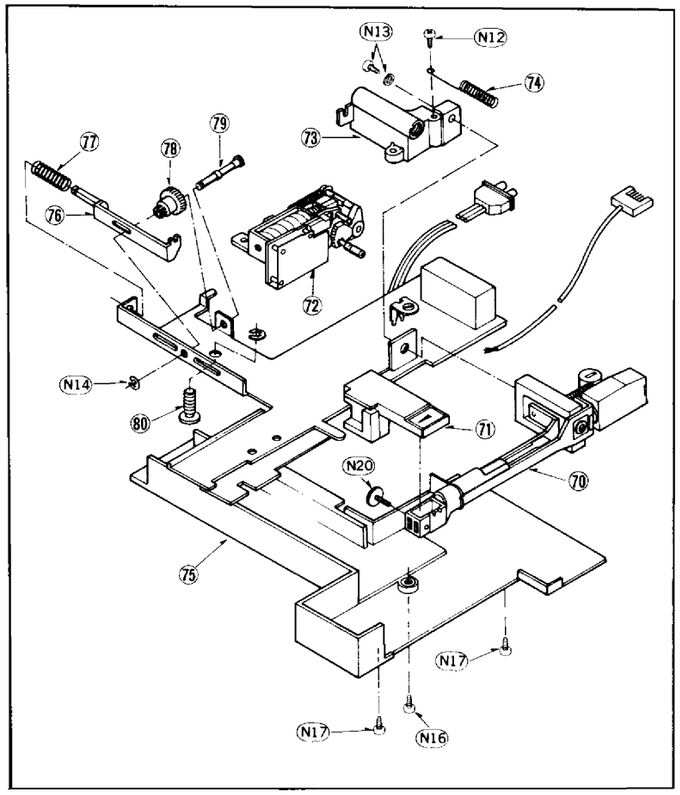
Notes:

1. **S1** On/off (power) switch in "**on**"position.
2. **S301 ~ S310** Program switch (Program key 1 ~ 10)
3. **S311** Repeat switch.
4. **S312** Cueing control switch.
5. **S313** Start switch.
6. **S314** Stop/clear switch
7. **S315** Speed selector switch in "**auto**" position
8. **S601** Rest switch in "**off**" position. (Tonearm is off the rest position.)
9. **S701** Cabinet (Reset) switch in "**on**" position. (Upper cabinet is closed.)
10. **S801** : Optical sensor sensitivity selector switch in "**M**" position.
11. The voltage value and waveform are the standard values of this measured by DC electronic voltmeter (high impedance) and oscilloscope on the bais of chassis. Therefore, the voltage value and waveform may include some erroe due to the internal impedance of the tester or the measuring set.
    - * [ ] is the voltage when turntable is in stop.
    - * ( ) is the voltage when turntable is in rotation. (at 33 rpm)
    - * ⌐ ⌙ is the voltage when tonearm is in lead-in mode.
    - * 〈 〉 is the voltage when tonearm is in return mode.
    - * (( )) is the voltage at 45 rpm.
12. —— Positive voltage lines.

■ EXPLODED VIEW



• **Tonearm Parts**



■ REPLACEMENT PARTS LIST (Mechanical 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 ⚠ 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 "Ⓢ" mark is service standard parts and may differ from production parts.
5. The parenthesized numbers in the columns of description stand for the quantity per set.

Areas

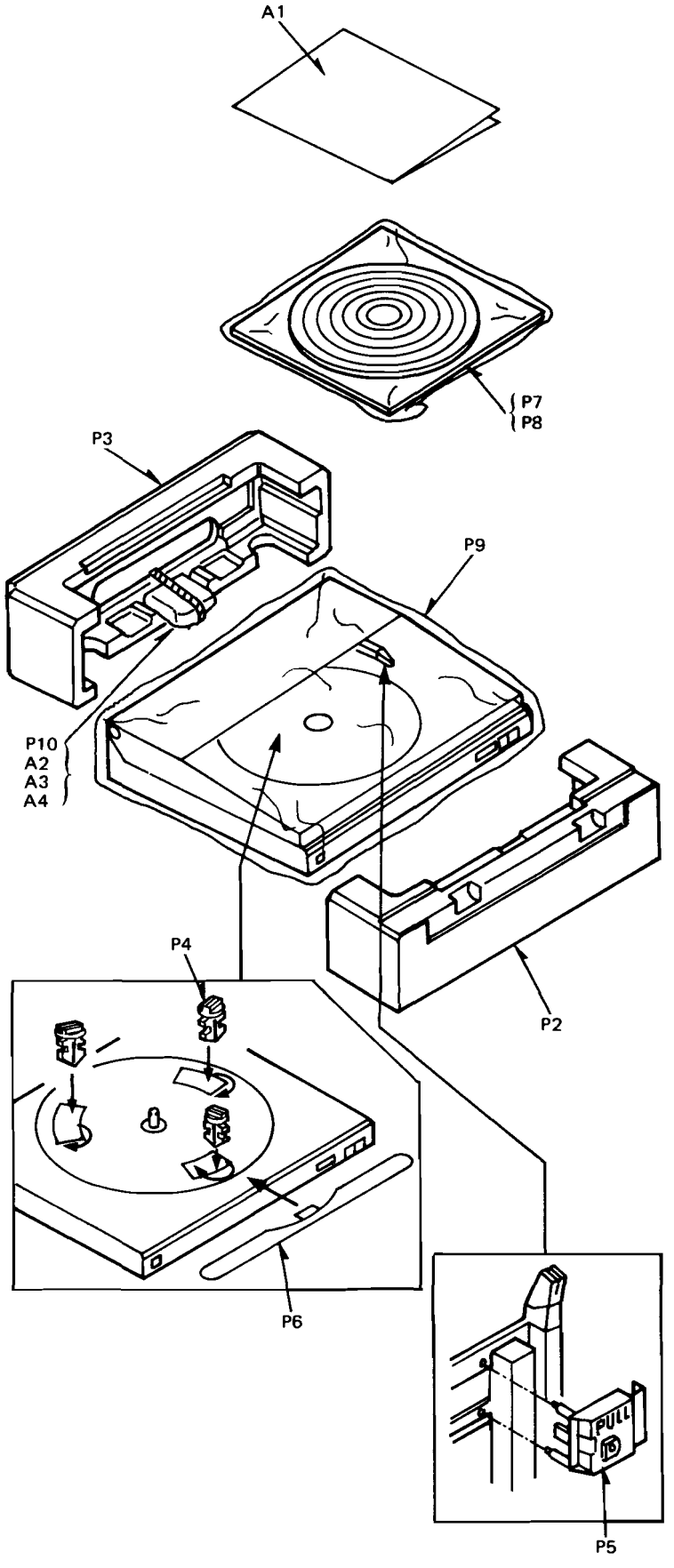
* [M] is available in U.S.A.
* [MC] is available in Canada.

Ref. No.	Part No	Description
CABINET AND CHASSIS PARTS		
1	SFWEC06N01	45r.p.m Adaptor (1)
2	SFQAC06N01	Spring,45r.p.m.Adaptor (1)
3	SFTGQ15N01	Turntable Mat (1)
4	SFTEQ15N01A	Turntable Platter (1)
5[M]	SFNNQ15M01	Name Plate (1)
5[MC]	SFNNQ15C01	Name Plate (1)
6	SFACQ15N01	Cabinet (1)
7	SFKKQ15N03	Surface Plate (1)
8	SFKTD05N02	Knob,Speed Select (2)
9	SFUMC05N15	Holder,Cabinet Switch (1)
10	SFQPC05N01	Spring,Cabinet Switch (1)
11	SFNZQ15N01	Label,Speed Select (1)
12	SFNUMD05N03	Rod,Speed Select Knob (2)
13	SFKTQ15N01	Button(A),Operation (1)
14	SFKTQ15N02	Button(B),Operation (1)
15	SFUPQ15N01	Holder,Operation Button (1)
16	SFKBQ15N01	Badge,Cabinet (1)
17	SFKTQ15N03	Button,On/Off Switch (1)
18	SFXJBL3N02E	Shaft Ass'y,On/Off Switch (1)
19	SFQABL3N02	Spring,On/Off Switch (1)
20	SFUMBL3N05	Holder,On/Off Switch (1)
21	SFUMQ15N02	Holder,Light Emitting Diodes (2)
22	SFUMQ15N03	Holder,Light Emitting Diodes (1)
23	SFMGQ34N01	Cover,Stator Coil (1)
25	SFMZC06N01R	Stator Frame Ass'y (1)
26	SFMZC05N01E	Thruster Ass'y (1)
27	SFQCC05N01	Spring,Audio Insulator (4)
28	SFGAC05N02	Audio Insulator (4)
29	SFAUL12M01	Bottom Case (1)
30	SFKKQ15N02	Graduated Plate (1)
31	SFATQ15N01A	Hinge(Right) (1)
32	SFATQ15N02A	Hinge(Left) (1)
33	SFGCC05N03	Cushion Rubber, Dust Cover (3)
34	SFADQ15N01E	Dust Cover (1)
34-1	SFADC06N02	Cushion Rubber, Dust Cover (2)
35	SFGCD05N01	Cushion Rubber, Dust Cover (2)
36	SFGCC05N06	Cushion Rubber, Dust Cover (2)

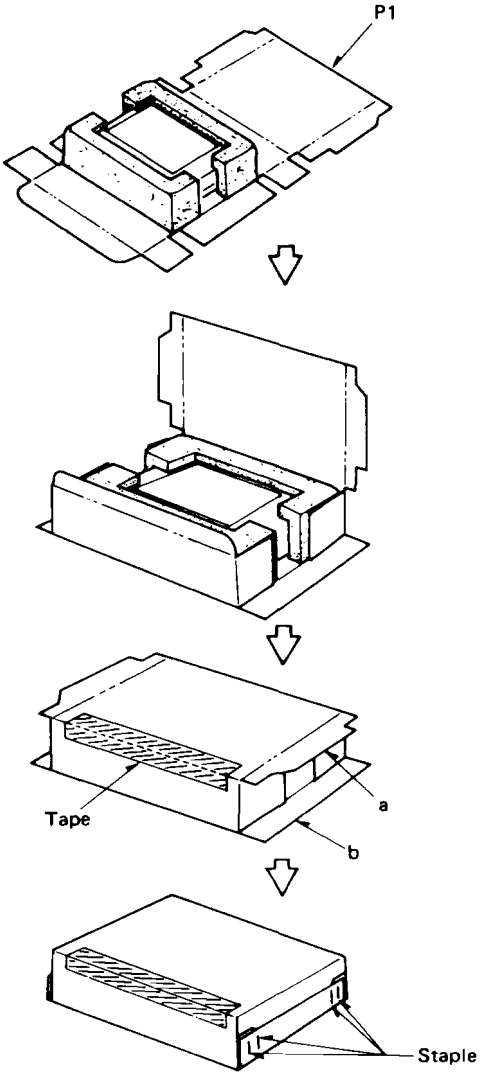
Ref No	Part No.	Description
CABINET AND CHASSIS PARTS		
37	SFXJC05N01	Guide Rail,Arm Drive (1)
38	SFGCC05N05	Cushion Rubber, Guide Rail (2)
39	SFUPC05N03	Bracket,Guide Rail (1)
40	SFUMC06N05E	Sensor Ass'y (1)
41	SFXJC06N01	Guide Rail,Sensor Ass'y (1)
42	SFUMC05N17	Arm Drive Wheel 1
43	SFUMC06N08	Holder,Lead Wires (1)
44	SFUZC05N01	Rod,Rest Switch (1)
45	SFUMC06N03A	Rest Switch Ass'y (1)
46	SFUMC05N16A	Worm Ass'y (1)
47	SFGBC10-01	Belt,Arm Drive (1)
48	SFMHC05N01E	Motor Ass'y(with Pulley), Arm Drive (1)
49	SFUKQ15M01Z	Tonearm Base Ass'y (1)
50	SFUMD05N02	Sub Cover,Tonearm Base (1)
51	SFUPC15N11	Stopper,Shutter (1)
52	SFUMC06N10	Shutter (1)
53	SFUMQ15N01	Cover,Arm Drive Motor (1)
54	SFUZC06N01E	Arm Drive Lope Ass'y (1)
55	SFUMC05N23	Cap,Pulley (5)
56	SFUMC05N22	Pulley 5
58	SFDHC06N01E	Jack,Phono Output (1)
59 ⚠	SFDJHSC0491	AC Socket (1)
60	SFUMC05N20	Holder,Lead Wires (1)
61	SFUZC05N03	Lutch (1)
62	SFGCC05N04	Cushion Rubber (3)
63	SFGCC05N02	Cushion Rubber,Power Transformer (2)
TONEARM PARTS		
70	SFPAM00501A	Tonearm (1)
71	SFPAB00501E	Tonearm Position Indicator (1)
72	SFPZB00601E	Lift Plate Ass'y (1)
73	SFPAB00502	Bracket,Tonearm (1)
74	SFPSP00503	Spring,Lead Wire (1)
75	SFPCS00601	Cover,Tonearm Base (1)
76	SFPZB00602	Cam,Adjustment (1)
77	SFPSP00602	Spring,Adjustment Cam (1)
78	SFPZB00603	Wheel,Adjustment Cam (1)
79	SFPJK00601	Shaft,Wheel (1)
80	SFPZB00604	Worm (1)
SCREWS,WASHERS,RINGS AND NUTS		
N1 Ⓢ	XTV3+10BFN	Screw 15

Ref. No.	Part No	Description
SCREW,WASHERS,RINGS AND NUTS		
N2 Ⓢ	XTV3+6BFN	Screw 6
N3 Ⓢ	XTV3+8BFN	Screw (2)
N4 Ⓢ	XTV3+20BFN	Screw (2)
N5 Ⓢ	XTV3+20BFN	Screw 1
N6	XTW3+10Q	Screw 1
N7	XTW3+14QFYR	Screw 6
N8	XTN3+12BFZ	Screw 2
N9	XTN3+20BFZ	Screw 2
N10	SFXGC05N03	Screw (2)
N11	SFXGC05N02	Screw 3
N12	SFXGD05N01E	Screw (2)
N13	SFXWC06N02	Washer (1)
N14	SFXWC05N07	Washer (3)
N15	SFXW551D2	Washer (1)
N16 Ⓢ	XUC4FT	Retaining Ring (1)
N17 Ⓢ	XUC2FT	Retaining Ring (1)
N18	XNC3HS	Nut (5)
N19	XTN3+5J	Screw (3)
N20	SFPEV00502	Screw (1)
ACCESSORIES		
A1[M]	SFNUQ15M01	Instruction Book (1)
A1[MC]	SFNUQ15C01E	Instruction Book (1)
A2	SFDHC05N01	Phono Output Cord (1)
A3	SFDLC05N01	Ground Wire (1)
A4 ⚠	SFDAC05M01	AC Cord
A5	SFNZC06M01	Caution sheet,Unusual Record (1)
PACKING PARTS		
P1[M]	SFHPQ15M01	Carton Box (1)
P1[MC]	SFHPQ15C01	Carton Box (1)
P2	SFHHL13R01	Pad,Front (1)
P3	SFHHL13R02	Pad,Rear (1)
P4	SFHKC05N01	Clamper,Turntable Platter (3)
P5	SFHKC05N02	Spacer,Tonearm (1)
P6	SFHSL13R01	Spacer,Dust Cover (1)
P7	SFHDC05M01	Pad,Turntable Mat 1
P8	SFYF33B35	Polyethylene Bag, Turntable Mat (1)
P9	SFYH60X60	Polyethylene Bag, Cabinet (1)
P10	SFYH17X16	Polyethylene Bag, Accessories 1

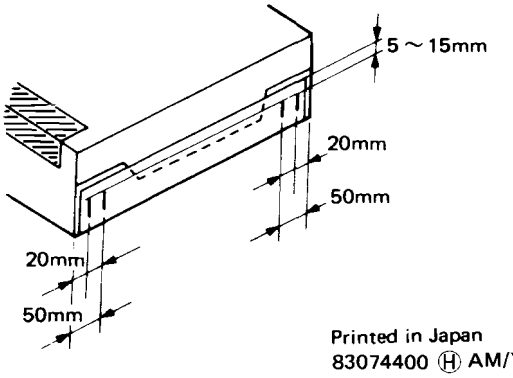
■ PACKING



1. Plase the unit (with cushions attached) as illustrated.
2. Fold the flaps according to the line marks.
3. Seal the top with adhesive tape.
   * Use gum tape or adhesive cloth tape of 50mm wide at least.
4. 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)



* Stapling positions are shown below.



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