

The home of the turntable

# THE VINYL **ENGINE**®

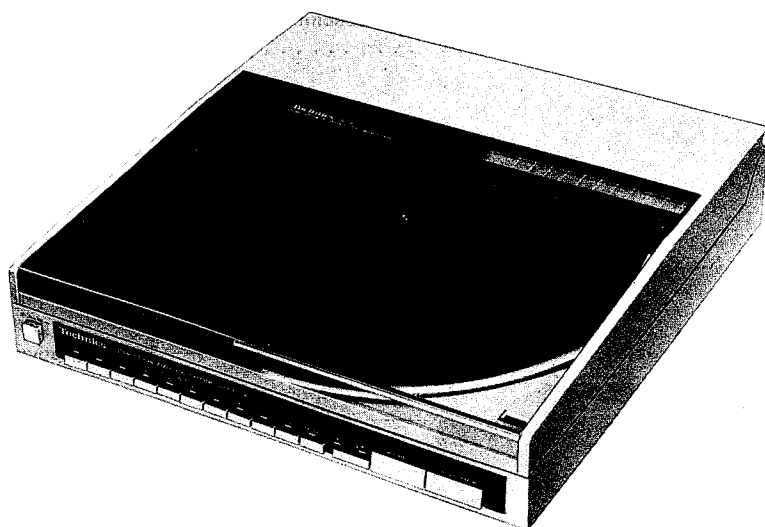
For more turntable manuals and setup information  
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# Service Manual

Direct Drive Automatic Turntable System

## SL-6

[M], [MC]



\* The cartridge shown here is an option.

### 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

<b>Power supply:</b>	120 V AC, 60 Hz
<b>Power consumption:</b>	12 W
<b>Dimensions:</b> (W×H×D)	31.5 × 8.8 × 31.5 cm (12-1/2" × 3-1/2" × 12-1/2") 31.5 × 39 × 31.5 cm (12-1/2" × 15-23/64" × 12-1/2") (Maximum height when top (dust cover) is open.)
<b>Weight:</b>	4.7 kg (10.4 lb.)

### ■ Turntable section

<b>Type:</b>	Direct drive Fully automatic turntable
<b>Features:</b>	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
<b>Drive method:</b>	Direct drive
<b>Motor:</b>	Brushless DC motor

<b>Drive control method:</b>	F-G servo control
<b>Turntable platter:</b>	Aluminum die-cast Diameter 30 cm (12")
<b>Turntable speeds:</b>	33-1/3 rpm and 45 rpm Auto speed select (Manual selection possible)
<b>Wow and flutter:</b>	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.

<b>Rumble:</b>	-56 dB (IEC 98A Unweighted) -78 dB (IEC 98A Weighted)
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### ■ Tonearm section

<b>Type:</b>	Dynamic balanced type Linear tracking tonearm 4-pivot gimbal suspension
<b>Effective length:</b>	10.5 cm (4-1/8")
<b>Tracking error angle:</b>	Within ±0.1°
<b>Effective mass:</b>	9 g (including cartridge)
<b>Resonance frequency:</b>	12 Hz
<b>Tonearm drive motor:</b>	DC motor
<b>Phono cable capacitance:</b>	150 pF

# Technics

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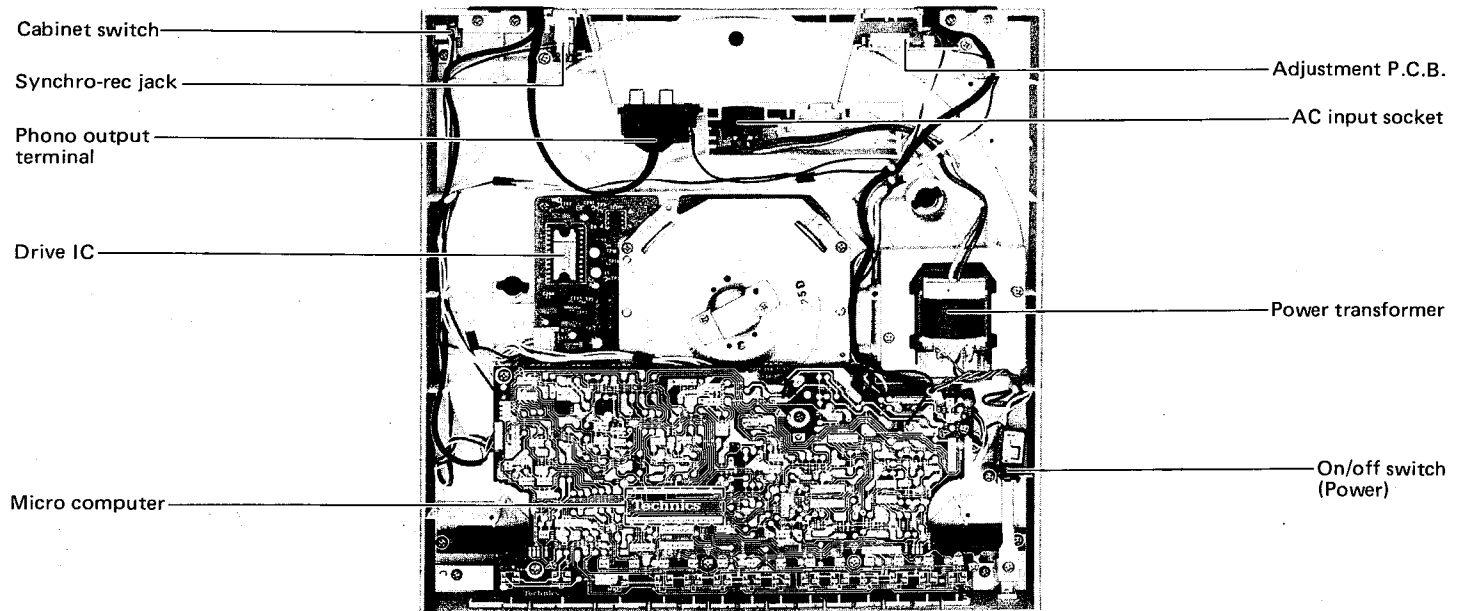
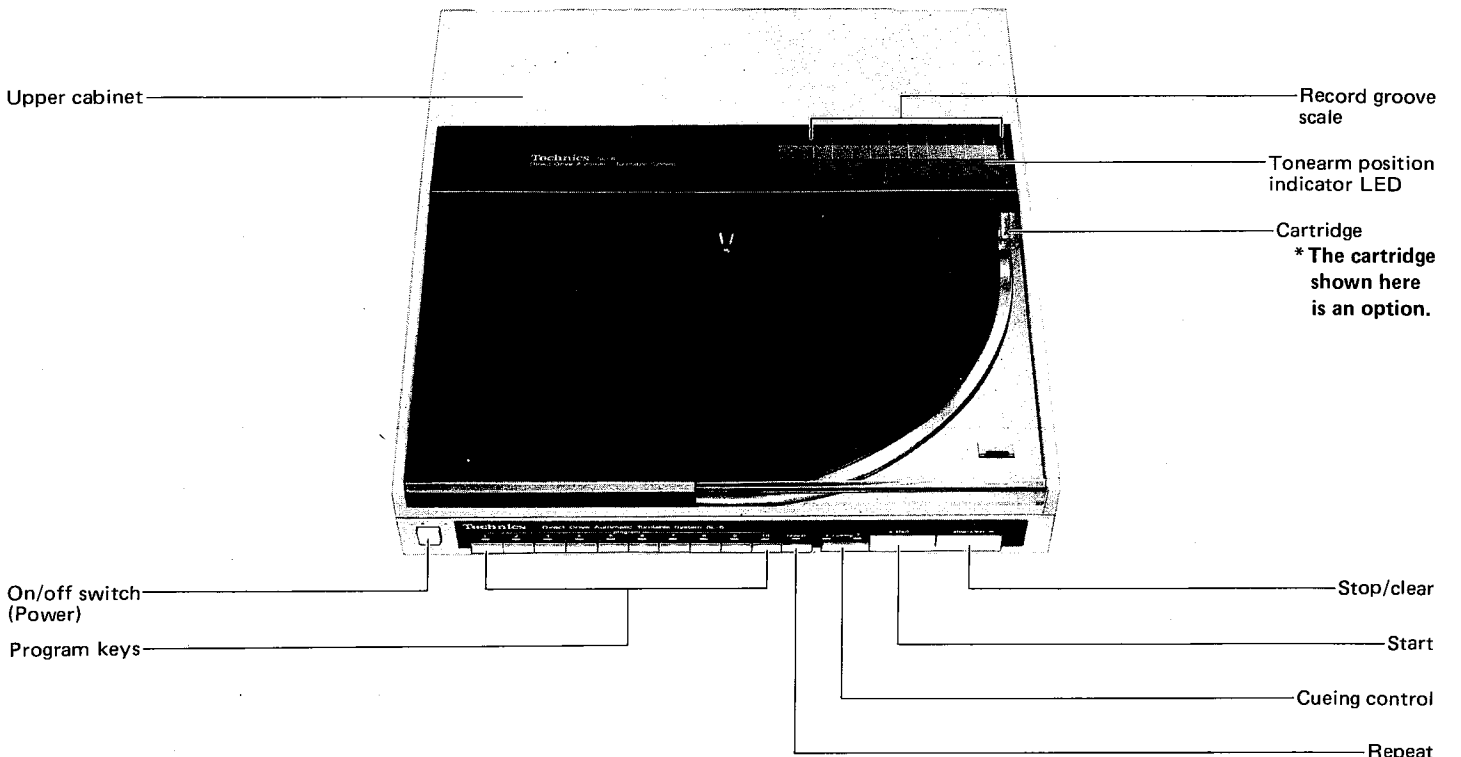
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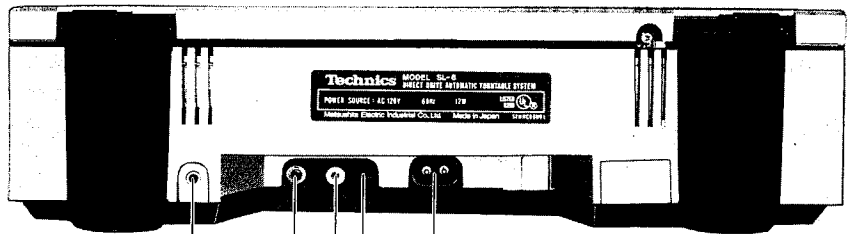
Panasonic Canada  
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5770 Ambler Drive, Mississauga,  
Ontario L4W 2T2

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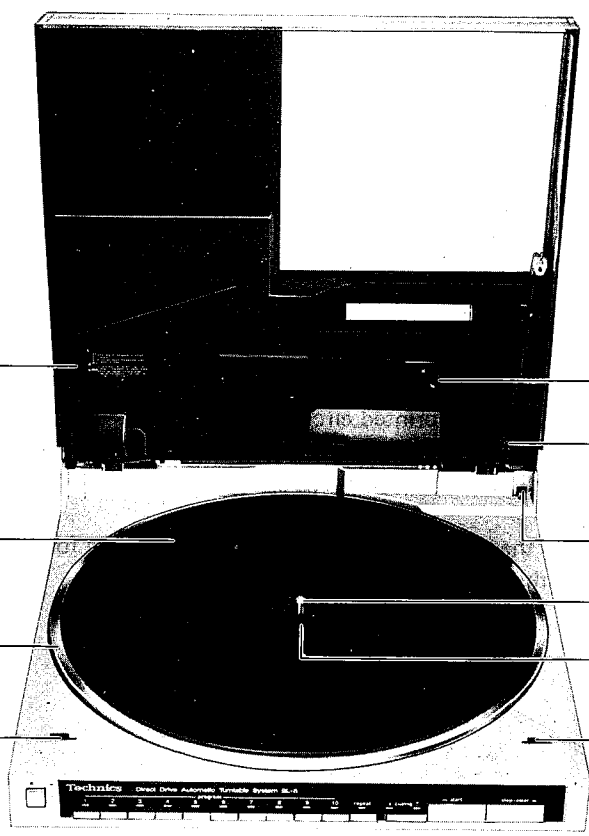
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## ■ LOCATION OF CONTROLS

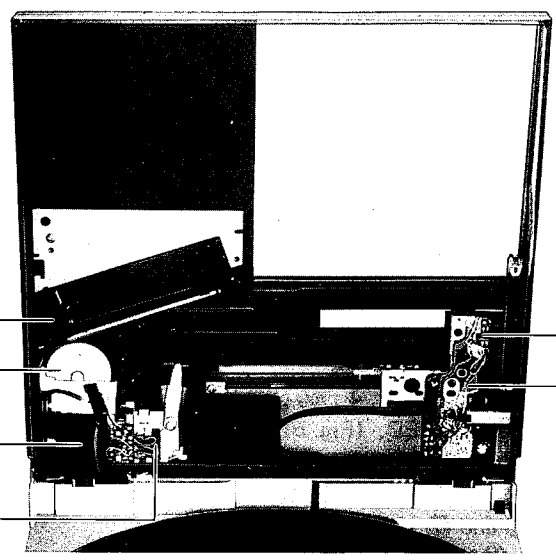




Synchro-rec jack  
Phono output terminals (R) (L)  
AC input socket  
Ground



Shutter switch  
Turntable mat  
Turntable platter  
Optical sensor sensitivity selector  
Stylus cue-down position adjustment screw  
Stylus pressure adjustment screw  
Cabinet switch  
Center spindle  
45-rpm adaptor  
Speed selector



Blank detecting sensor  
Drive gear  
Arm motor  
Rest switch  
Offset sensor  
Phono output P.C.B.

## DISASSEMBLY INSTRUCTIONS

### How to remove the turntable platter

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

#### 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 onto the center spindle. When removing the turntable platter, take care not to give damage to the upper cabinet, arm motor cover and tonearm cover.

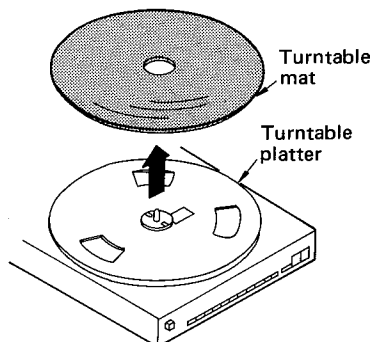


Fig. 1

### How to remove the bottom board

1. Remove the turntable platter.
2. Remove the 4 screws. (Fig. 2 : ① ~ ④)

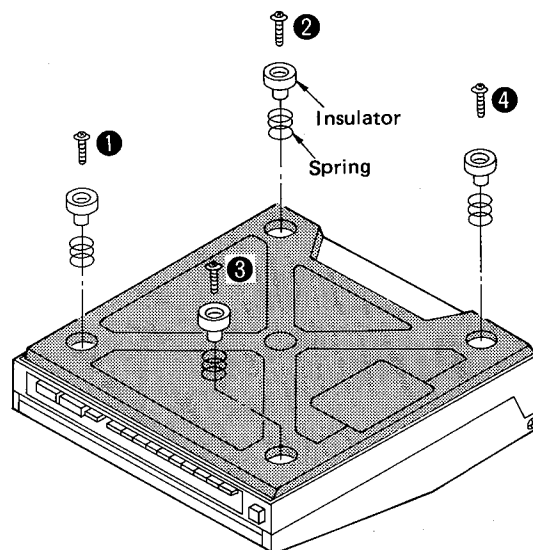


Fig. 2

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

1. Remove the bottom board.
2. Remove the 7 setscrews (Fig. 3 : ⑤ ~ ⑪) of the printed circuit board.
3. Remove the optical sensor sensitivity selector switch and speed selector switch from the knob. (Fig. 3-A)
4. Remove the printed circuit board in the direction to the arrow (A).

#### Note:

The printed circuit board is grounded to the chassis by screw ⑩. When checking for conduction removing the screw ⑩, connect the earth terminal of P.C.B. to the chassis (stator frame).

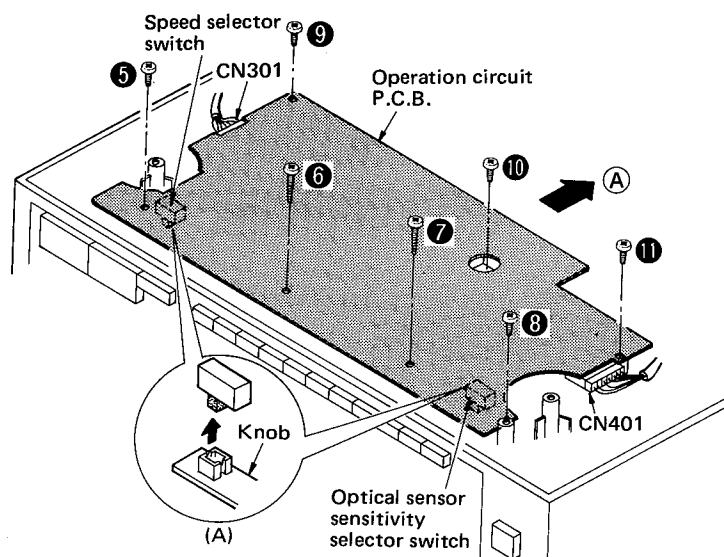


Fig. 3

### How to remove the switch (S301 ~ S312)

(Program keys, repeat and cueing control switches)

1. Remove the operation circuit P.C.B.
2. When removing S301 ~ S305, cut off the 2 claws (Fig. 4 : ⑫, ⑬) of LED holder. (Fig. 4-A)
3. Remove the LED from the holder, and raise the LED. (Fig. 5)
4. Release the claw (A) of LED holder and remove the LED holder from the printed circuit board. (Fig. 4)
5. Unsolder to remove the switch terminals.
6. To remove S306 ~ S310, cut off claws ⑭ and ⑮.
7. To remove S311 and S312, cut off claws ⑯ and ⑰.

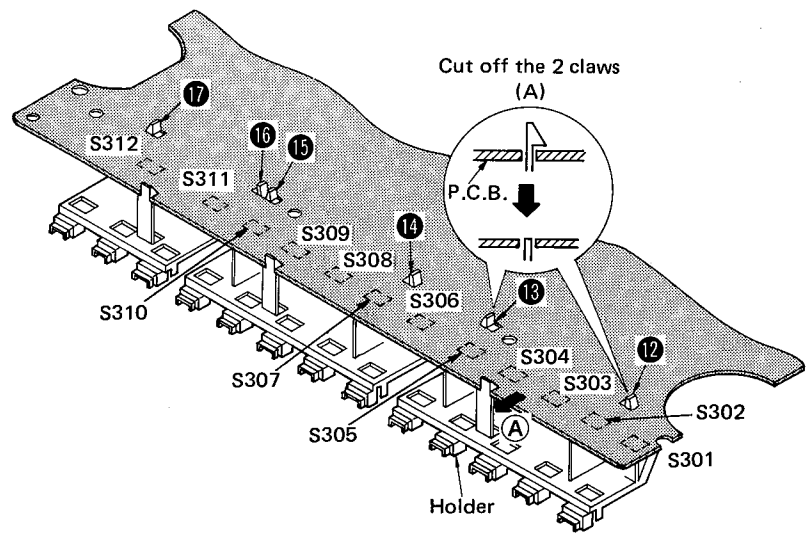


Fig. 4

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

1. Remove the operation circuit P.C.B.
2. Remove the 5 setscrews (Fig. 6 : 18 ~ 22) of the drive circuit P.C.B. and stator frame.
3. Pull out the connector. Then the drive circuit P.C.B. and stator frame can be removed.
4. Remove the 4 setscrews (Fig. 7 : 23 ~ 26) to separate the drive circuit P.C.B. and stator frame.

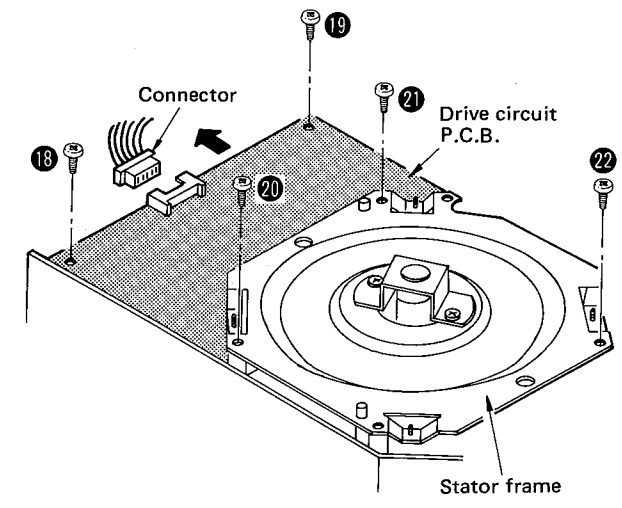


Fig. 6

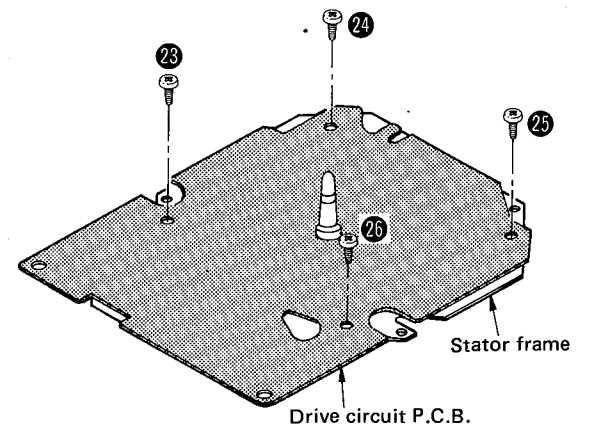


Fig. 7

● How to remove the arm motor cover

1. Open the upper cabinet.
2. Remove the 4 screws of the arm motor cover (Fig. 8 : 27 ~ 30) and detach the arm motor cover in the direction of the arrow.

● How to remove the tonearm cover

1. Open the upper cabinet.
2. Remove the 3 screws of the tonearm cover (Fig. 8 : 31 ~ 33) and detach the tonearm cover in the direction of the arrow.

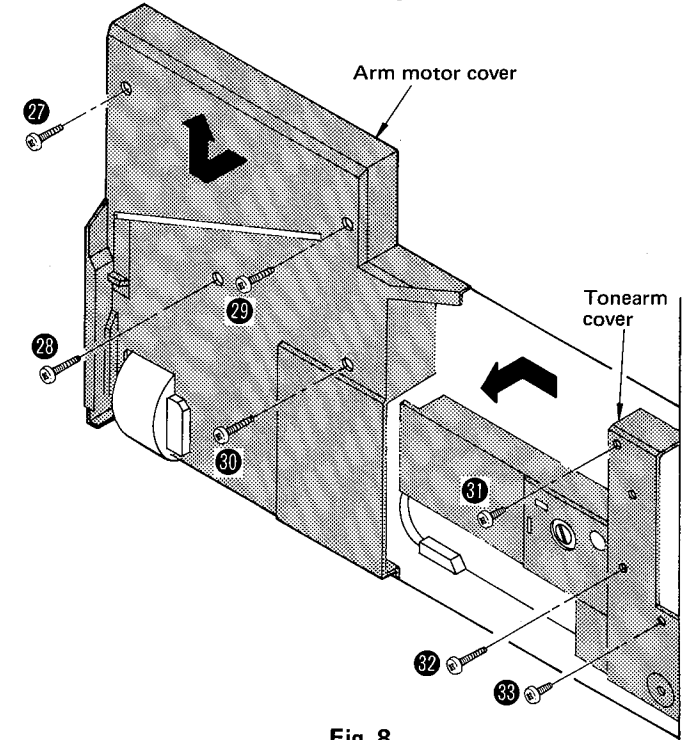


Fig. 8

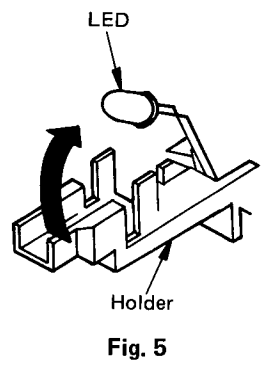


Fig. 5

● How to remove the dust cover

1. Open the upper cabinet and arm motor cover.
2. Turn the worm gear by hand to shift the tonearm a little inward.
3. Remove the 3 screws (Fig. 9 : 34 ~ 36) of the dust cover.
4. Remove the 2 setscrews (Fig. 10 : 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. 9 : 39)
4. Remove the rope fixture of the sensor. (Fig. 9)
5. Remove the guide rod fitting clip 40 and remove the guide rod. (Fig. 9)
6. Pull out the sensor in the direction of the arrow (A). (Fig. 9)

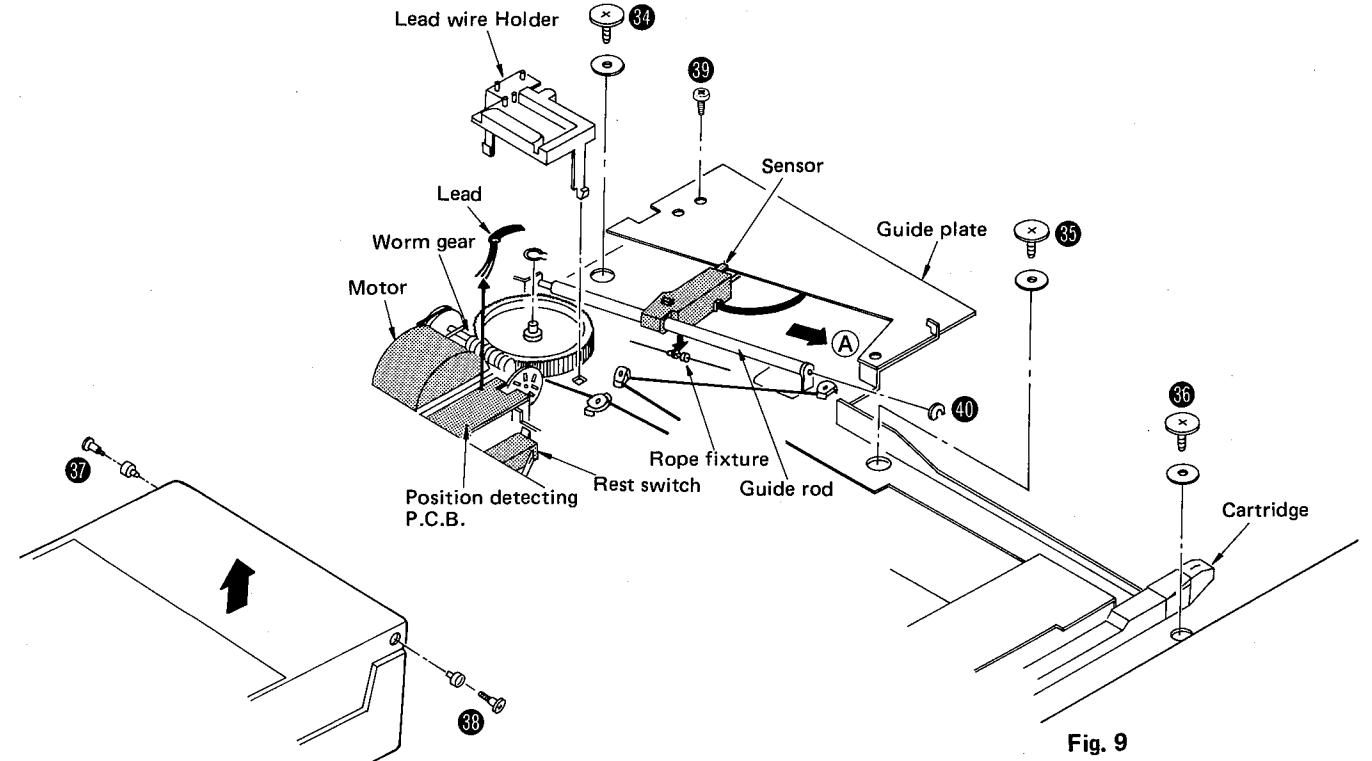


Fig. 9

● How to remove the upper cabinet (Separation of upper cabinet and lower cabinet)

1. Remove the bottom board.
2. Unsolder the lead wires of output terminal and remove the output terminal from the lower cabinet.
3. Pull out the 2 connectors (CN301, CN401) of the operation circuit P.C.B.
4. Remove the 4 screws (Fig. 11, 12 : 41 ~ 44) of the hinge.
5. The hinge claws are engaged with the lower cabinet. Release the claws and slowly lift the lower cabinet to separate it from the upper cabinet.

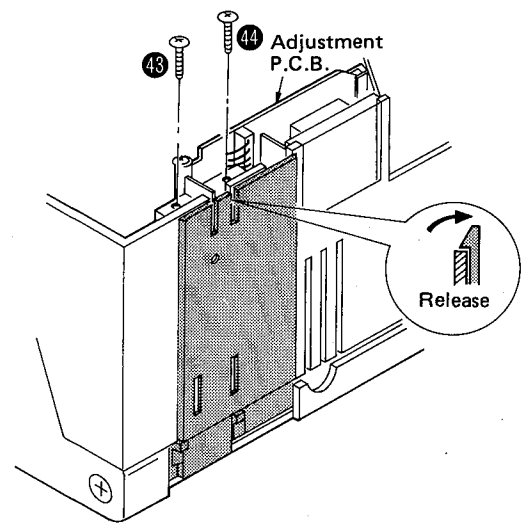


Fig. 10

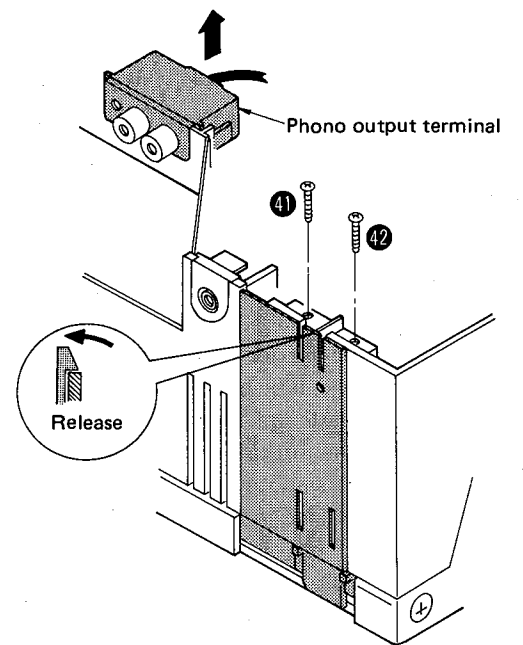


Fig. 11

● How to remove the tonearm

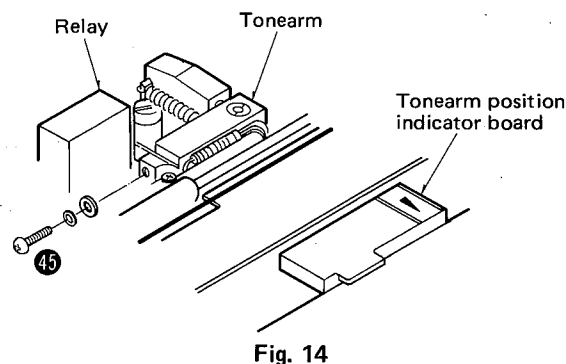
1. Remove the dust cover and tonearm cover.
2. Turn the worm gear by hand to move the tonearm inwards.
3. Unsolder the 5 lead wires of the cartridge. (Fig. 13)
4. Remove the screw of the tonearm. (Fig. 14 : 45)

● How to remove the cueing control ass'y

1. Remove the tonearm cover.
2. Unsolder the 2 lead wires of the cueing plunger. (Fig. 13)
3. Remove the 2 screws (Fig. 13 : 46, 47) of the cueing control ass'y, and remove the ass'y in the direction of the arrow A.

● How to remove the tonearm position indicator board

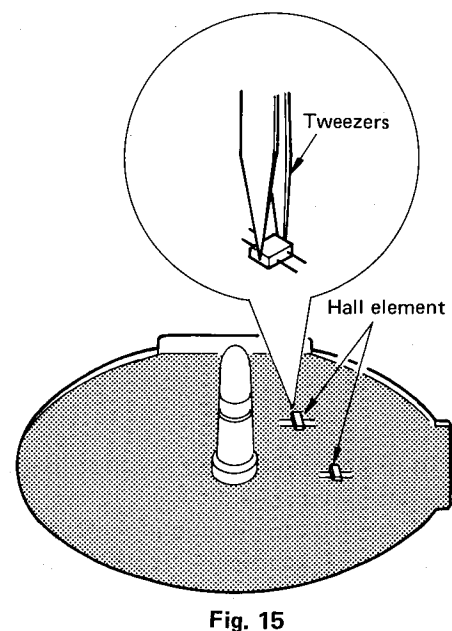
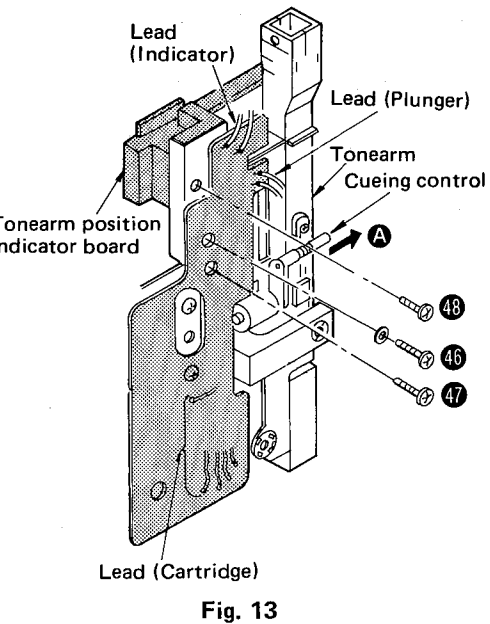
1. Remove the tonearm cover.
2. Unsolder the 2 lead wires of the indicator. (Fig. 13)
3. Remove the screw of the tonearm position indicator board. (Fig. 13 : 48)



● 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. 15)

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.



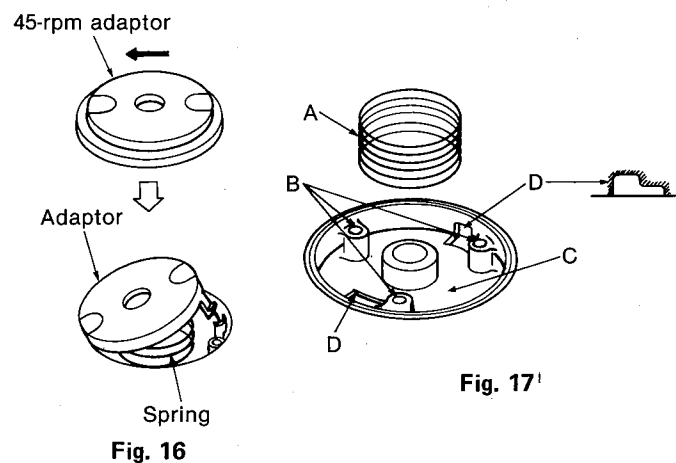
● How to remove the 45 rpm adaptor

1. Remove the turntable platter.
2. The adaptor claw catches the turntable platter. Remove the adaptor by pushing it in the direction of the arrow. (Fig. 16)

Note: When removing the adaptor, be sure to remove the turntable platter beforehand. Otherwise, the adaptor claw will be broken.

\* The turntable platter of this unit is greased. (Fig. 17) After replacing the turntable platter or when the adaptor operation is not smooth, apply grease to the platter. (It is recommended to use Grease 3 of Kit No. SZZE1003C.)

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

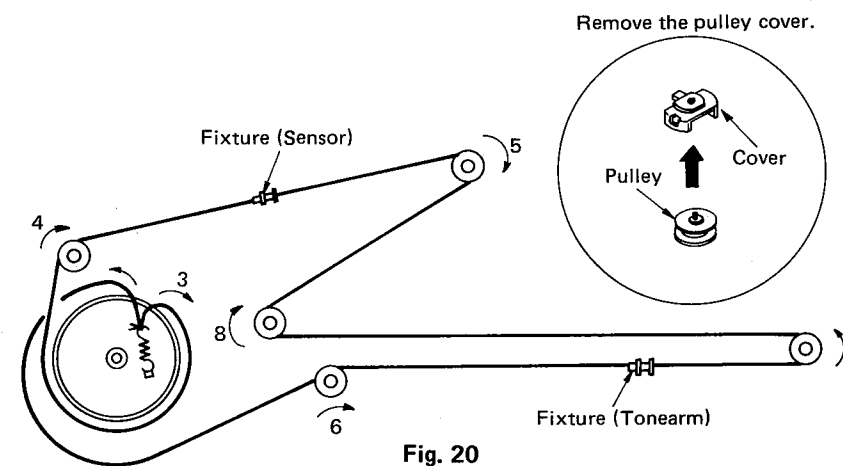
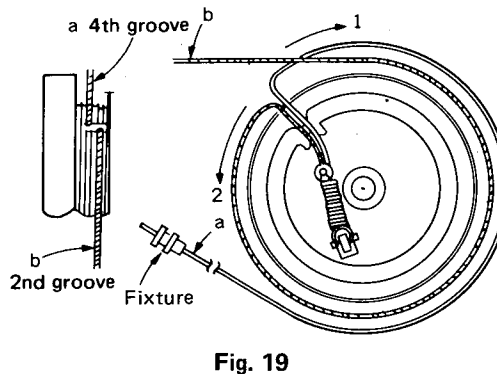
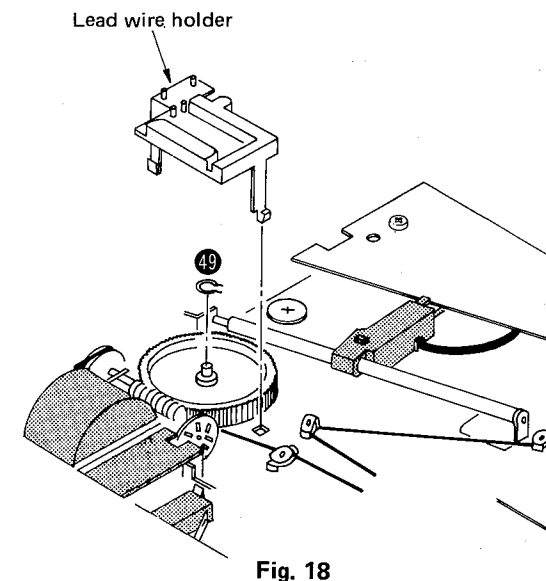


A: Side of spring  
B: Bosses (3 portions) of turntable platter  
C: Bottom of turntable platter  
D: Notches (2 portions) of turntable platter

■ HOW TO SET THE TONEARM DRIVE ROPE

Set 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. (See Fig. 18)
3. Remove the C-ring of the arm drive wheel and remove the drive wheel. (See Fig. 18 : 49)
4. Turn over the arm drive wheel, and set the rope in the order of 1 ~ 2. (Fig. 19)
5. Holding the rope with the hand, set the drive wheel and rope in the order of 3 ~ 8 of Fig. 20.
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 hand to see that the tonearm and sensor move, then set the C-ring.



■ HOW TO REPLACE CHIPS (RESISTOR)

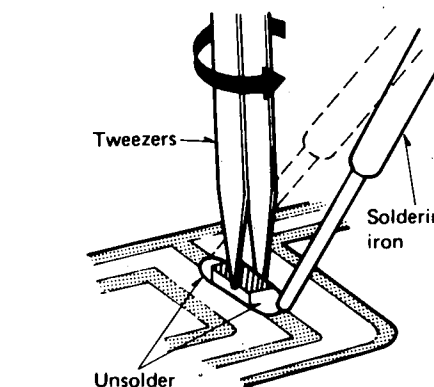
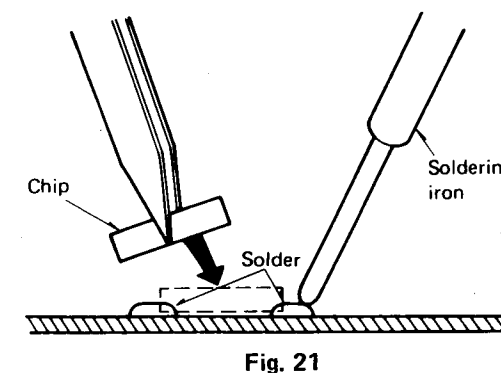
1. Unsolder from chip by using solder sucker.
2. Remove chip with tweezers by rotating it while removing solder as shown in Fig. 21.
3. Solder circuit board first and then solder chip in the direction of the arrow as shown in Fig. 22.

Notes:

1. Do not use chip again which is removed from printed circuit board.
2. Use lead wire with insulator for replacement instead of chip jumper.

● Note for replacing chips

1. Do not heat chips more than three (3) seconds.
2. Be careful not to damage the electrode of chips.
3. Use soldering iron (less than 60W) and tweezers for replacing chips.



## ■ CHECKING METHOD OF THE UNIT

### 1. How to use the repair table (Fig. 23)

- ① Remove the bottom board.
- ② Remove the operation circuit P.C.B. and connect the P.C.B. earth terminal to the chassis (Stator frame).
- ③ Put the set 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 set.

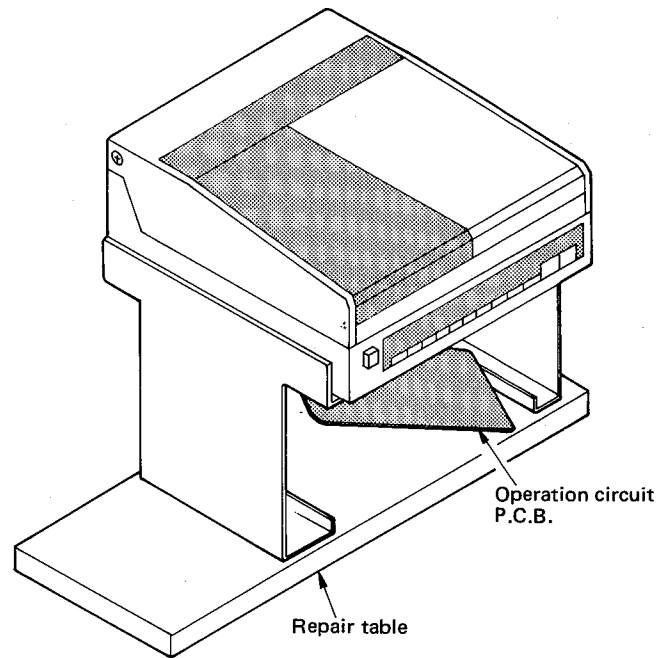


Fig. 23

### 2. How to raise the set (Fig. 24)

**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 switch with tape.
- ④ Fit the turntable platter.
- ⑤ Raise the set and check the circuits.

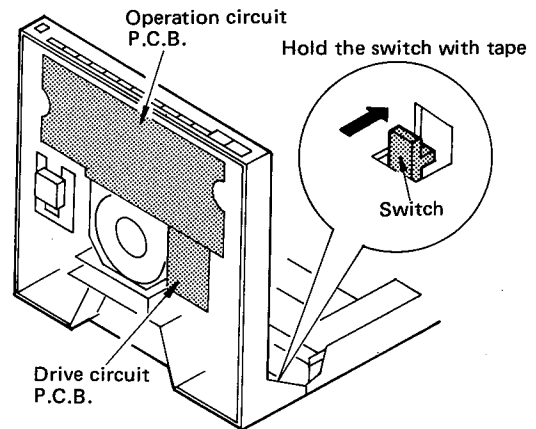


Fig. 24

### 3. How to turn over the set (Fig. 25)

**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 set.
- ② Remove the bottom board.
- ③ Turn the power switch "on" and check the voltage.

**Note:** Do not push other switches.

[If the unit is operated under no-load condition (with turntable removed) for a long period of time, the drive IC will be damaged.]

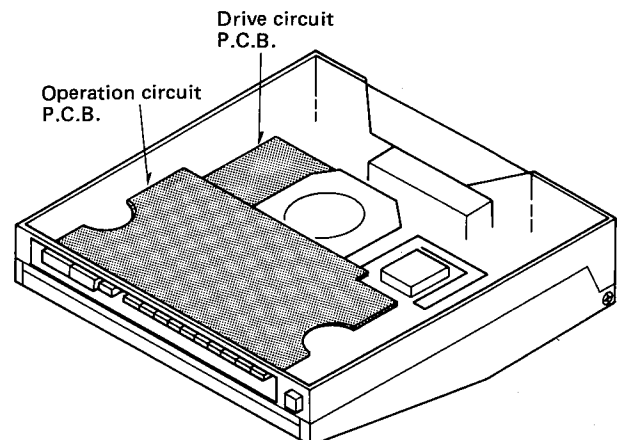


Fig. 25



# MEASUREMENTS AND ADJUSTMENT

## Adjustment points

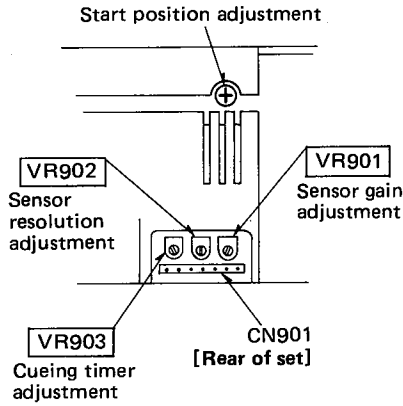


Fig. 26

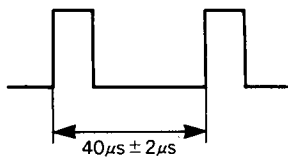


Fig. 28

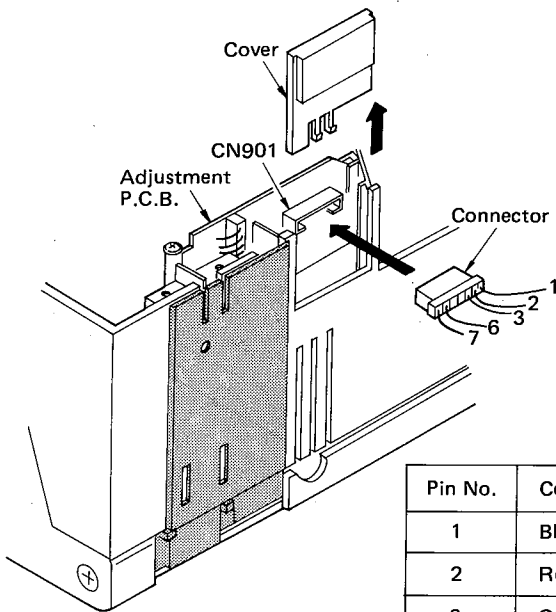


Fig. 29

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

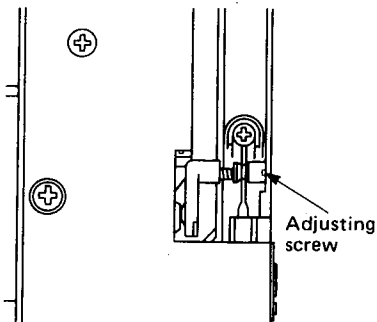
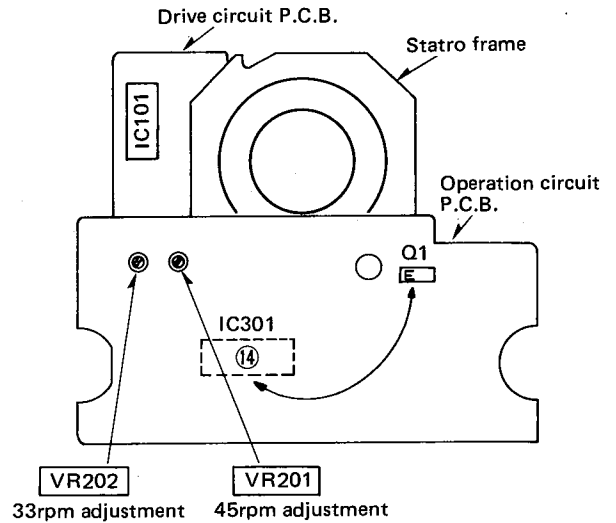


Fig. 33



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

Fig. 27

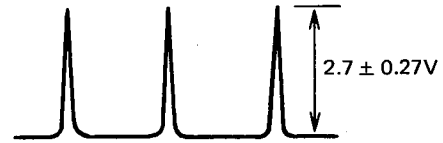


Fig. 30

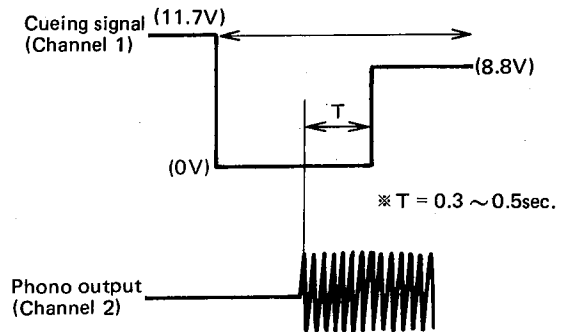


Fig. 31

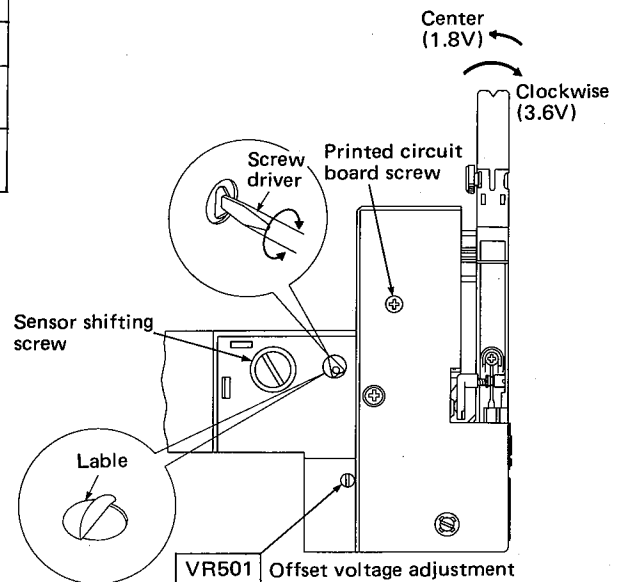


Fig. 32

● Equipment used and condition of the set

1. Oscilloscope (two channels)
2. DC voltmeter.
3. Record (SFTR007) for adjustment.
4. Connector 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	<ol style="list-style-type: none"> <li>1. Open the upper cabinet and put on the record.</li> <li>2. Turn the power switch on.</li> <li>3. Push the "Start" switch.</li> </ol>	Descending position adjusting screw. (Fig. 26)	<ol style="list-style-type: none"> <li>1. Turn the descending position adjusting screw. If it descends between tunes, turn the screw clockwise. If it descends outside the disc, turn the screw counterclockwise.</li> </ol>
2	Clock frequency	<ol style="list-style-type: none"> <li>1. Connect Q1 emitter to IC301 14-pin. (Fig. 27)</li> <li>2. Connect the oscilloscope to IC301 13-pin.</li> </ol>	VR301	<ol style="list-style-type: none"> <li>1. Turn the power switch on.</li> <li>2. Adjust VR301 so that the cycle of output waveform is <math>40\mu\text{s} \pm 2\mu\text{s}</math>. (Fig. 28)</li> </ol>
3	Sensor gain	<ol style="list-style-type: none"> <li>1. Remove the cover and insert the connector for adjustment into terminal CN901. (Fig. 29)</li> <li>2. Connect the oscilloscope to 6-pin (+) and 1-pin (-).</li> <li>3. Put on the record for adjustment with side A up.</li> </ol>	VR901 (Fig. 26)	<ol style="list-style-type: none"> <li>1. Turn the power switch on and move the tonearm to the blank area of the record.</li> <li>2. Adjust VR901 so that the output voltage is <math>4\text{V} \pm 0.4\text{V}</math>.</li> </ol>
4	Sensor resolution	<ol style="list-style-type: none"> <li>1. Remove the cover and insert the connector for adjustment into terminal CN901. (Fig. 29)</li> <li>2. Connect the oscilloscope to 7-pin (+) and 1-pin (-).</li> <li>3. Put on the record for adjustment with side A up.</li> </ol>	(VR902) (Fig. 26)	<ol style="list-style-type: none"> <li>1. Turn the power switch on.</li> <li>2. Push the program key to let it search the tonearm. (Output is delivered between the tunes.)</li> <li>3. Adjust VR902 so that the peak output between tunes is <math>2.7\text{V} \pm 0.27\text{V}</math>. (Fig. 30)</li> </ol>
5	Cueing timer	<ol style="list-style-type: none"> <li>1. Remove the cover and insert the connector for adjustment into terminal CN901. (Fig. 29)</li> <li>2. Connect the unit to the amplifier. (Phono output)</li> <li>3. Connect 3-pin (+) and 1-pin (-) to the channel (1) of two channel oscilloscope.</li> <li>4. Connect the speaker terminal of amplifier to the channel (2) of two channel oscilloscope.</li> <li>5. Connect the 2-pin and 1-pin. (Muting operation stops.)</li> <li>6. Put on the record for adjustment with side B up.</li> </ol>	VR903 (Fig. 26)	<ol style="list-style-type: none"> <li>1. Turn the power switch on.</li> <li>2. Move the tonearm to a recorded (groove) part of the record, and push the cueing switch for cueing down.</li> <li>3. Check the time until completion of cueing (rise of cueing signal) after the stylus touches the record surface.</li> <li>4. Adjust VR903 so that the time until completion of cueing is <math>0.3 \sim 0.5</math> sec. (Fig. 31)</li> </ol> <p>Note: Set the sweep time of oscilloscope to <math>0.2</math> sec/cm or <math>0.5</math> sec/cm. For example, in the case of <math>0.2</math> sec/cm range, adjust it so that the cueing completion signal is delivered 2 scale (<math>0.4</math> sec) later than delivery of phono output signal.</p>
6	Descending between tunes	<ol style="list-style-type: none"> <li>1. Open the upper cabinet and hold the cabinet switch with tape.</li> <li>2. Put on the record for adjustment with side B up.</li> <li>3. Close the upper cabinet.</li> <li>4. Connect the unit to the amplifier. (Connect the speakers to speaker terminals.)</li> </ol>	Sensor shifting screw (Fig. 32)	<ol style="list-style-type: none"> <li>1. Turn the power switch on.</li> <li>2. Push the program key 2, followed by start switch.</li> <li>3. After completion of cueing down, push the program key 2 for the purpose of skipping.</li> <li>4. Make sure that descending position is at count "20 ~ 21".</li> <li>5. If the descending position is wrong, open the upper cabinet and turn the sensor shifting screw.</li> <li>6. Close the upper cabinet and push the program key 2.</li> <li>7. Adjust so that the descending position is at count "20 ~ 21". Repeat steps 4 ~ 7.</li> </ol>
7	Tonearm offset angle	<ol style="list-style-type: none"> <li>1. Open the upper cabinet and hold the cabinet switch with tape.</li> <li>2. Close the upper cabinet.</li> </ol>	Adjusting screw (Fig. 33)	<ol style="list-style-type: none"> <li>1. Turn the power switch on and push the start switch to shift the tonearm inward.</li> <li>2. Open the upper cabinet.</li> <li>3. Turn the adjusting screw so that the arm center matches the V-groove of the lift bar.</li> </ol>

Step	Item	Preparations for adjustment	Adjusting portion	Adjusting method
8	Servo gain and offset voltage	<ol style="list-style-type: none"> <li>Open the upper cabinet and hold the cabinet switch with the tape.</li> <li>Close the upper cabinet.</li> <li>Connect the DC voltmeter to CN301 terminal 3 and ground terminal.</li> <li>Remove the label of the tonearm cover.</li> </ol>	VR501 (Servo gain)  P.C.B. (Offset voltage) (Fig. 32)	<ol style="list-style-type: none"> <li>Turn the power switch on and push the start switch to shift the tonearm inward.</li> <li>Open the upper cabinet.</li> <li>Completely shift the tonearm to the right. Then, adjust VR501 so that the voltage is 3.6V. (<b>Servo gain</b>)</li> <li>Set the tonearm to the center and make sure that the output voltage is 1.8V.</li> <li>If the voltage is not 1.8V, loosen the printed circuit board screw and move the board to the right or left with a screwdriver so that the output voltage becomes 1.8V. After the adjustment, tighten the printed circuit board screw. (<b>Offset adjustment</b>)</li> </ol>
9	Rotation speed	<ol style="list-style-type: none"> <li>Open the upper cabinet and put on the record.</li> </ol>	VR201 (45 rpm)  VR202 (33 rpm)	<ol style="list-style-type: none"> <li>Turn the power switch on.</li> <li>Set the speed selector switch to 45 rpm.</li> <li>Turn VR201 to adjust the speed to the speed to the rated speed (45 rpm).</li> <li>Set the speed selector switch to 33 rpm.</li> <li>Turn VR202 to adjust the speed to the rated speed (33-1/3 rpm). <b>Note: Be sure to adjust 45 rpm. first.</b></li> </ol>

## REPLACEMENT PARTS LIST... Electric Parts

- Notes:**
- Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
  - Important safety notice: Components identified by  $\Delta$  mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
  - This "S" mark is service standard parts and may differ from production parts.
  - Unless otherwise specified.  
All resistors are in OHMS ( $\Omega$ ) K = 1000 $\Omega$ , M = 1000k $\Omega$   
All capacitors are in MICROFARADS ( $\mu$ F) P =  $\mu$  $\mu$ F
  - 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.	Description
<b>INTEGRATED CIRCUITS</b>		
IC1 IC101 IC201	AN7812 AN6636 AN6552	Regulator Drive FG Amplifier & Constant Voltage (Hall Element)
IC301 IC401	MN1425FPE AN6562	Micro Computer Arm Motor Control
IC801	AN6562	DC amplifier & Band Pass Filter
IC802	AN6912	Comparator
<b>TRANSISTORS</b>		
Q1 Q301 Q302	S 2SC1383Q 2SD636 2SD636	Regulator Speed Select Muting Relay Drive
Q303 Q304 Q305 Q306 Q308, 309	2SD636 2SD892 2SB641 2SD636 2SB641	Cueing Drive Cueing Drive Switching Converter Waveform
Q310 Q311	2SB641 2SD636	Shaping Speed Select Start/Stop Select

Ref. No.	Part No.	Description
Q312 Q401, 402	2SD636 2SD592	Switching Arm Motor Control
Q403, 404	2SD638	Arm Motor Control
Q801	2SB641	Biass
<b>DIODES</b>		
D1 D2 D301 ~ 311	$\Delta$ SVDS1RBA20F S MA1056 SVDPR5704SF	Rectifier 5.6V Zener Light Emitting Diode
D312 ~ 317 D319 D320	MA162A S RVDPR7R5FB SVDPR5704SF	Switching 7.5V, Zener Light Emitting Diode
D321	SVDPG5724SYF	Light Emitting Diode
D501 D502 D503	MA162A MA162A SVDPR3432S	Light Emitting Diode
D801, 802 D803 D804, 805 D806	MA162A MA1047TA MA162A S RVDPR7R5FB	Slide & Integration 4.7V, Zener Biass 7.5V, Zener

Ref. No.	Part No.	Description
<b>SWITCHES</b>		
S1 S301 ~ 314	$\Delta$ SFDSC05N08 EVQQSH03B	Power Program, Reset, Cueing, Start & Stop
S315 S601 S701 S801	SFDSHSW0699 SFDS2M5L-C SFDSC05N01 SFDSHSW0699	Speed Selector Rest Cabinet Gain Selector
<b>VARIABLE RESISTORS</b>		
VR201, 202	EVTS3MA00B54	Speed Adj., 50k $\Omega$ (B)
VR301	EVNK6AA00B24	Clock Frequency Adj., 20k $\Omega$ (B)
VR501	EVNK6AA00B54	Servo Gain Adj., 50k $\Omega$ (B)
VR901	EVNK6AA00B15	Gain Adj., 100k $\Omega$ (B)
VR902	EVNK6AA00B15	Detecting Sensitivity Adj., 100k $\Omega$ (B)
VR903	EVNK6AA00B24	Cueing Timer Adj., 20k $\Omega$ (B)

Ref. No.	Part No.	Description
<b>COMPONENT COMBINATION</b>		
Z301	EXBT44471K	470Ω x 4
Z302	EXBRB7471K	470Ω x 7
Z303	EXBP84333K	33kΩ x 4
Z304	EXBP84103K	10kΩ x 4
Z305	EXBP84332K	3.3kΩ x 4

Ref. No.	Part No.	Description
<b>PHOTO INTERRUPTERS</b>		
PC501	ON1186	Arm Position Offset Angle Blank Groove
PC601	ON1161	
PC701	ON2159	
<b>RELAY</b>		
RL501	SFDYQ11N01	Muting

Ref. No.	Part No.	Description
<b>HALL ELEMENT</b>		
H1, 2	OH-002	Turntable Posistor Detector
<b>POWER TRANSFORMER</b>		
T1 [M]	Δ SLT48DTL3A	Power Source
T1 [MC]	Δ SLT48DT11C	Power Source
<b>FUSE</b>		
F1 [MC] only	Δ XBA2F08NU100	800mA, 250V

Ref. No.	Part No.	Value
<b>RESISTORS</b>		
R1	S ERD25FJ471	470
R2	S ERD25FJ101	100
R3	S ERX1ANJ270	27
R4	S ERD25FJ102	1K
R101	ERD10TLJ270U	27
R102	S ERX1ANJ2R7	2.7
R105	ERD10TLJ153U	15K
R106	ERD10TLJ223U	22K
R201	ERD10TLJ102U	1K
R202	ERD10TLJ153U	15K
R203	ERD10TLJ333U	33K
R204	ERD10TLJ104U	100K
R205	ERD10TLJ683U	68K
R206	ERO10MKG1913	191K
R207	ERO10MKG5622	56.2K
R221	ERD10TLJ102U	1K
R222	ERD10TLJ153U	15K
R320	S ERD25TJ333	33K
R321	S ERD25FJ471	470
R322	S ERD25FJ102	1K
R323	S ERD25FJ103	10K
R324, 325	S ERD25FJ472	4.7K
R326, 327	S ERD25FJ152	1.5K
R328	S ERD25FJ472	4.7K
R329	S ERD25FJ392	3.9K
R330	S ERD25FJ103	10K
R331	S ERD25FJ472	4.7K
R334, 335	S ERD25FJ331	330
R336	S ERD25FJ103	10K
R337	S ERD25TJ223	22K

Ref. No.	Part No.	Value
R338	S ERD25FJ272	2.7K
R341	S ERD25TJ563	56K
R343	S ERD25FJ103	10K
R345	S ERD25FJ472	4.7K
R346	S ERD25TJ333	33K
R347	S ERD25TJ563	56K
R348	S ERD25FJ103	10K
R349	S ERD25FJ471	470
R350	S ERD25FJ472	4.7
R351	S ERD25FJ471	470
R352, 353	S ERD25FJ222	2.2K
R354	S ERD25TJ223	22K
R355	S ERD25FJ103	10K
R356	S ERD25FJ152	1.5K
R357	S ERD25TJ223	22K
R358	S ERD25TJ333	33K
R359	S ERD25FJ561	560
R401	S ERD25TJ683	68K
R402	S ERD25FJ152	1.5K
R403	S ERD25FJ102	1K
R404	S ERD25TJ224	220K
R405	S ERD25TJ683	68K
R406	S ERD25FJ152	1.5K
R407	S ERD25FJ102	1K
R408	S ERD25TJ224	220K
R409	S ERD25TJ273	27K
R410	S ERD25FJ103	10K
R413	Δ ERD2FCG180	18
R501	S ERD25FJ561	560
R502	S ERD25FJ391	390
R601	S ERD25FJ681	680
R801	S ERD25TJ154	150

Ref. No.	Part No.	Value
R802	S ERD25FJ472	4.7K
R803	S ERD25TJ154	150K
R805	S ERD25FJ222	2.2K
R806	S ERD25FJ472	4.7K
R807	S ERD25FJ332	3.3K
R808	S ERD25FJ682	6.8K
R809	S ERD25FJ102	1K
R810	S ERD25FJ103	10K
R811	S ERD25TJ684	680K
R812	S ERD25TJ223	22K
R813	S ERD25TJ104	100K
R814	S ERD25TJ684	680K
R815	S ERD25TJ224	220K
R816	S ERD25FJ221	220
R817	S ERD25TJ104	100K
R818	S ERD25FJ102	1K
R820	S ERD25FJ222	2.2K
R821	S ERD25FJ272	2.7K
R822	S ERD25FJ220	22
R823	S ERD25FJ103	10K
R825	S ERD25FJ101	100
R826	S ERD25TJ223	22K
R828	S ERD25TJ223	22K
R829	S ERD25FJ682	6.8K
<b>CAPACITORS</b>		
C1	Δ S ECQM1223KZ	0.022
C2, 3	Δ S ECKD1H223PF	0.022
C4	S ECEB1V5222	2200
C5	S ECEA1CS330	33
C101	ECUV1E333KBM	0.033

Ref. No.	Part No.	Value
C102, 103	Δ S ECEA1CN470S	47
C104	S ECEA1CS101	100
C105	S ECEA1CS330	33
C201	S ECEA1HS3R3	3.3
C202	S ECQM1H104KV	0.1
C203	S ECQM1H333KV	0.033
C205	ECUV1E473KBM	0.047
C206	S ECQM1H104JV	0.1
C207	S ECQM1H104KV	0.1
C208	S ECEA1ES4R7	4.7
C209	S ECQM1H104KV	0.1
C210	S ECEA1HSR22	0.22
C212, 213	ECUV1H102MBM	0.001
C301	S ECCD1H680K	68P
C302	S ECQM1H104KV	0.1
C303	S ECKF1E104ZVD	0.1
C304	S ECEA0JS330	33
C305	S ECKD1H223PF	0.022
C306	S ECKD1H102KB	0.001
C401, 402	S ECQM1H223KZ	0.022
C501	S ECEA1CS101	100
C801	S ECFB1B104ZRM	0.1
C801	S ECQM1H103KV	0.01
C802, 803	S ECQM1H104KV	0.1
C804	S ECEA1CS220	22
C805	S ECEA1CS470	47
C806	S ECQM1H473KV	0.047

**Numbering System of Resistor**

Example

ERD	25	F	J	101
Type	Wattage	Shape	Tolerance	Value
ERX	2	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	10 : 1/8W	J : ± 5%
ERX : Metal Film	25 : 1/4W	G : ± 2%
ERO : Metal Film	1 : 1W	

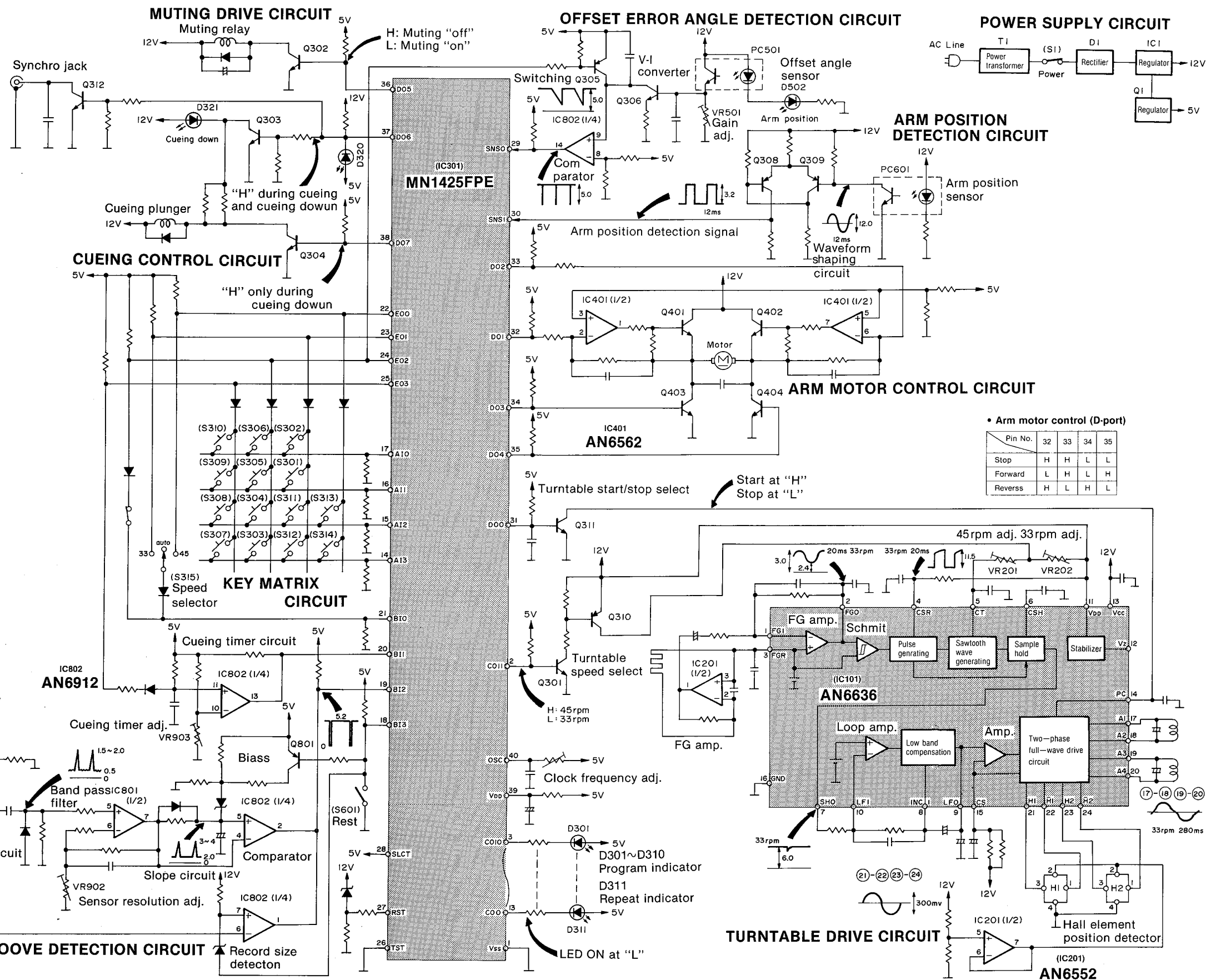
ERD10TLJ□□□ → Chip type carbon  
 ERO10MKG□□□ → Chip type metal film  
 ECUV1H□□□ → Chip type ceramic

Capacitor Type	Voltage		Tolerance
	ECEA Type	Others	
ECEA : Electrolytic	0J : 6.3V	1H : 50V DC	J : ± 5%
ECEA...N : Non Polar Electrolytic	1A : 10V	2H : 500V DC	K : ± 10%
ECKD : Ceramic	1C : 16V		Z : +80%, -20%
ECQM : Polyester	1E : 25V		P : +100%, -0%
ECEB : Electrolytic	1H : 50V		M : ± 20%
ECUV : Ceramic	1J : 63V		
ECKF : Ceramic	50 : 50V		
	25 : 25V		

**BLOCK DIAGRAM**

• Description of each terminal of MN1425FPE

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	E00	Key scan output terminal (Each key is read in through key scan with A-port.)
23	E01	
24	E02	
25	E03	
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

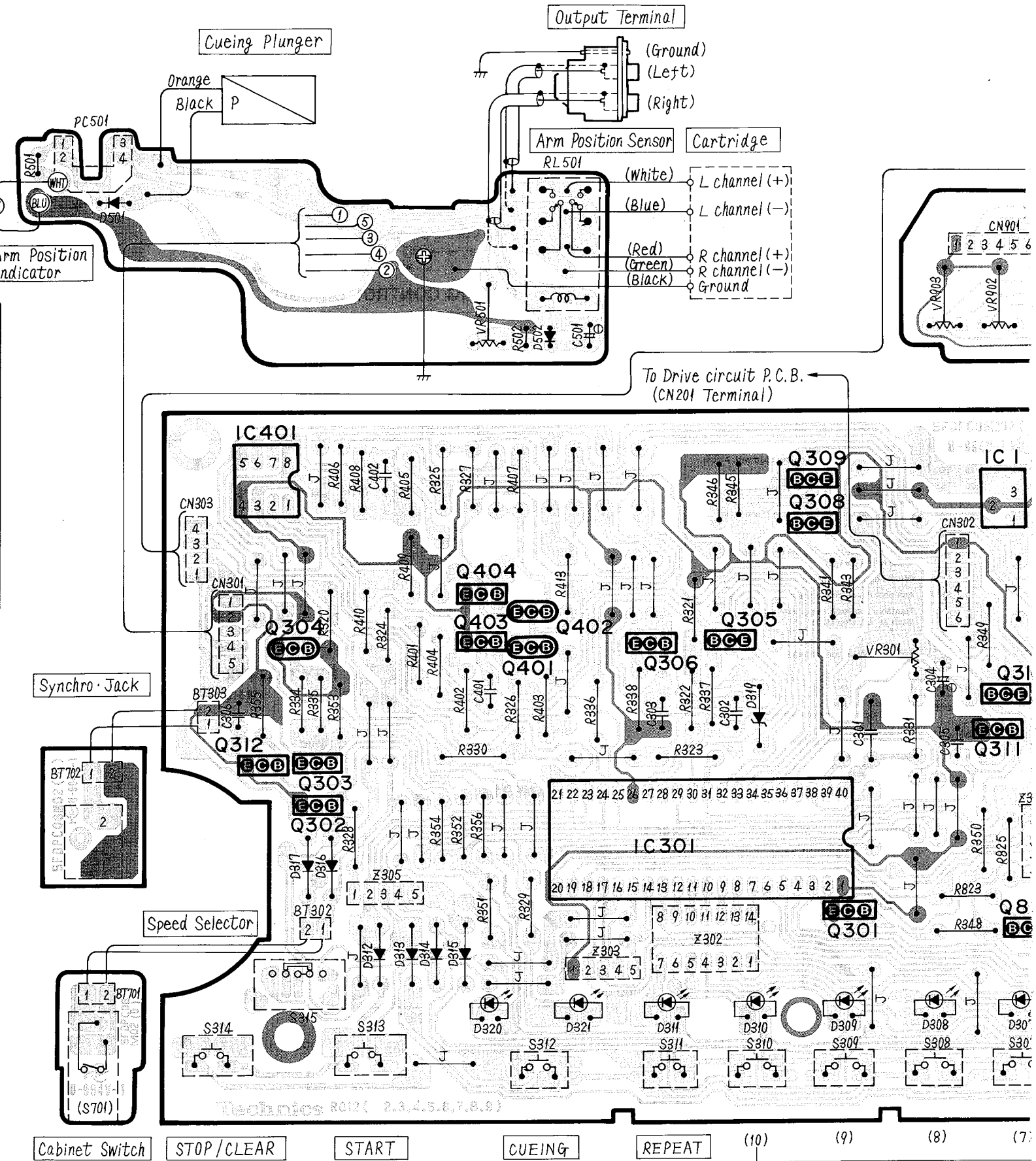
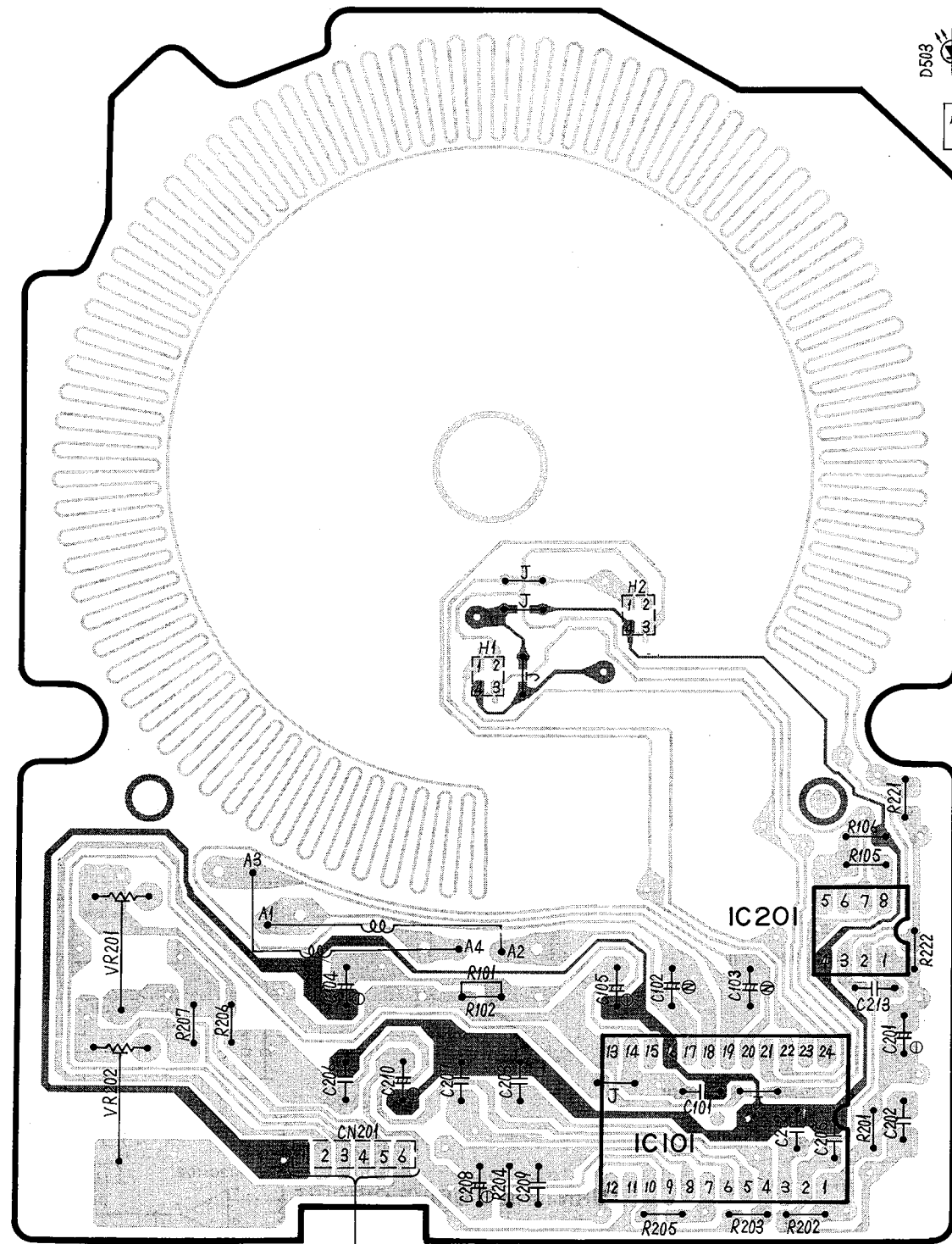


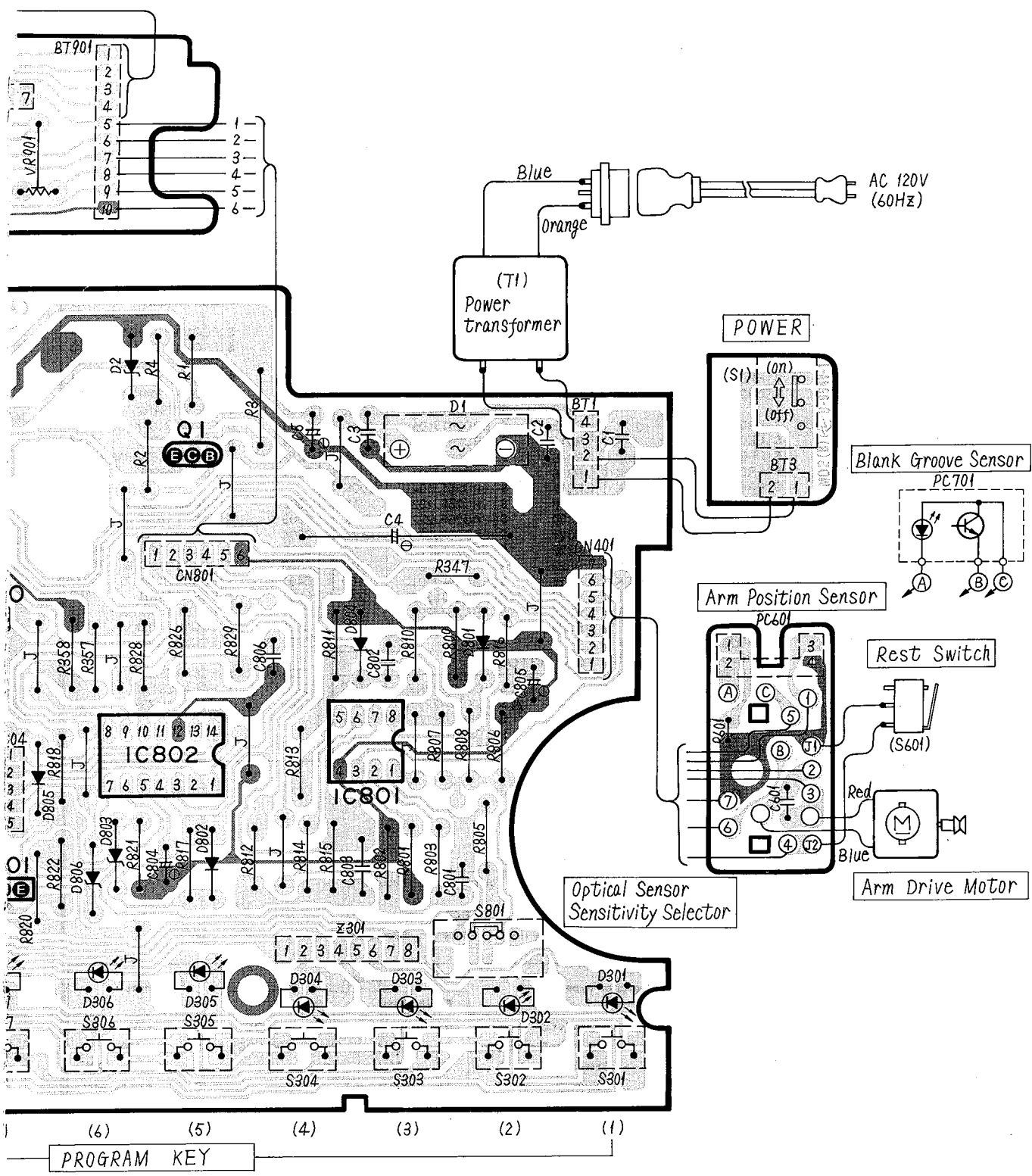
• Arm motor control (D-port)

Pin No.	32	33	34	35
Stop	H	H	L	L
Forward	L	H	L	H
Reverss	H	L	H	L

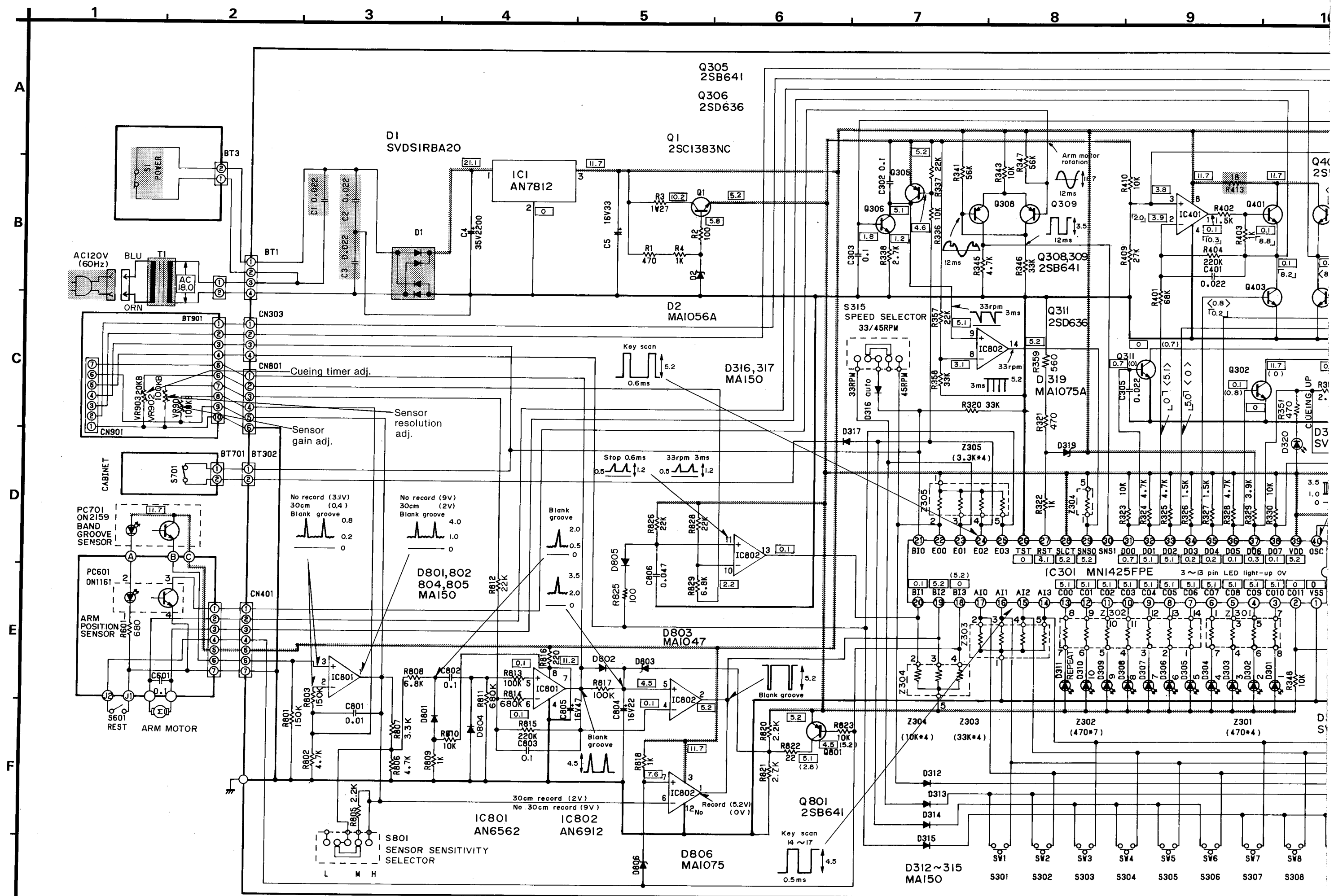
CIRCUIT BOARD AND WIRING CONNECTION DIAGRAM

Ground (Earth) lines









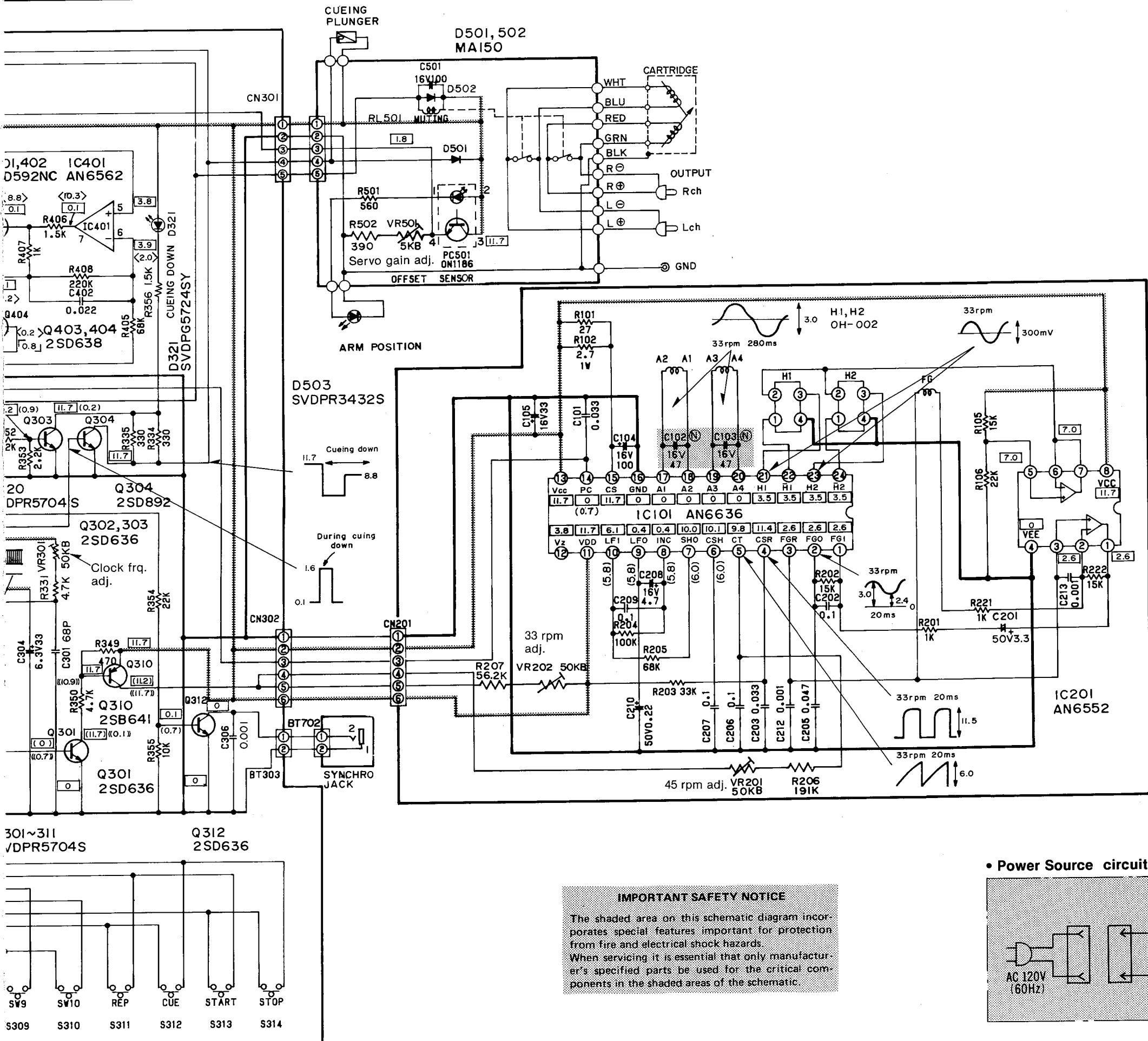


**■ SCHEMATIC DIAGRAM**

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

**Notes:**

1. **S1** : 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 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 basis of chassis. Therefore, the voltage value and waveform may include some error 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.



**• Product for MC only**

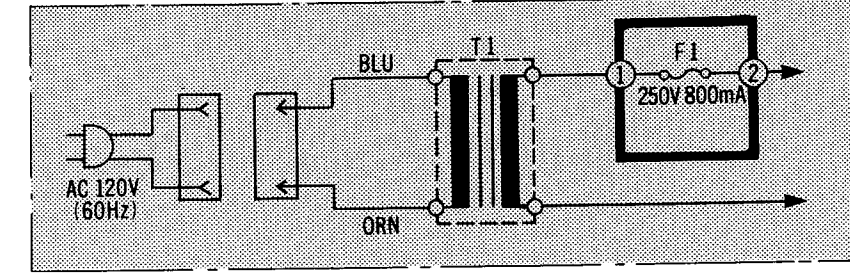
**FUSE REPLACEMENT**

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.

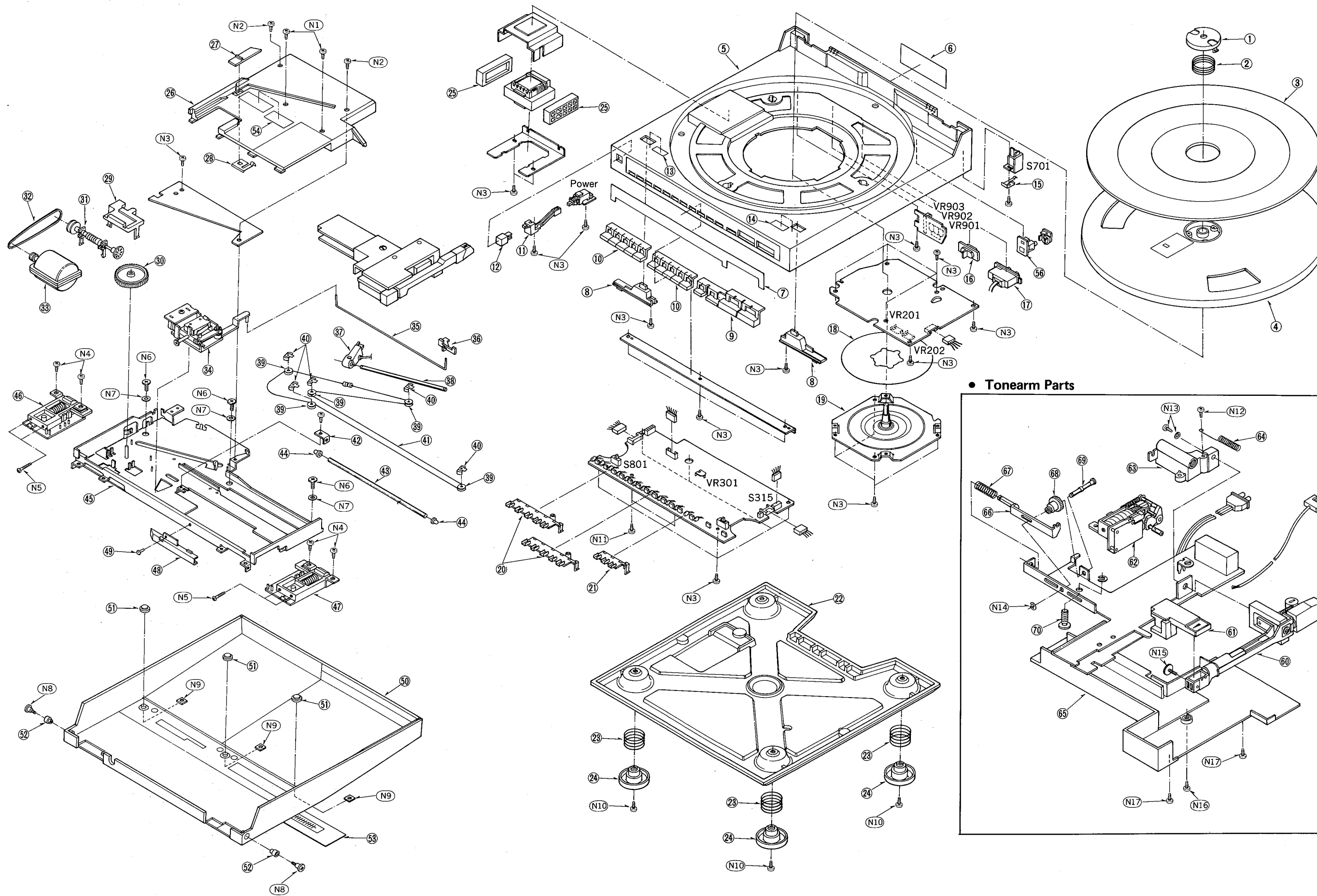
**• Power Source circuit for [MC] only.**



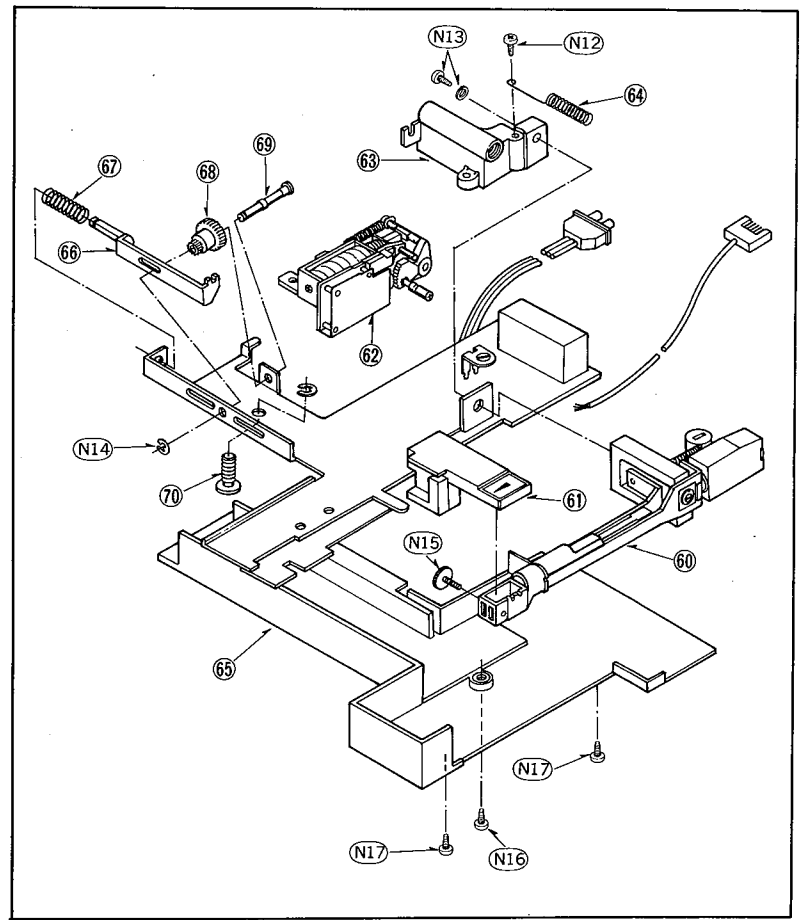
**IMPORTANT SAFETY NOTICE**

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.

EXPLODED VIEW



• Tonearm Parts



REPLACEMENT PARTS LIST...Cabinet & Chassis Parts

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

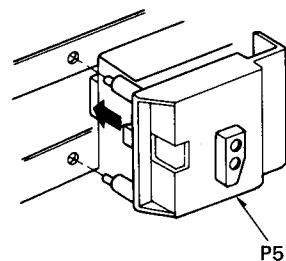
4. The "S" mark is service standard parts and may differ from production parts.
5. The parenthesized numbers in the column of description stand for the quantity per set.

Areas

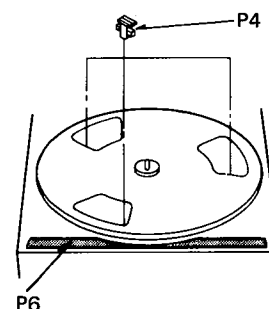
- \* [M] is available in U.S.A.
- \* [MC] is available in Canada.

PACKINGS

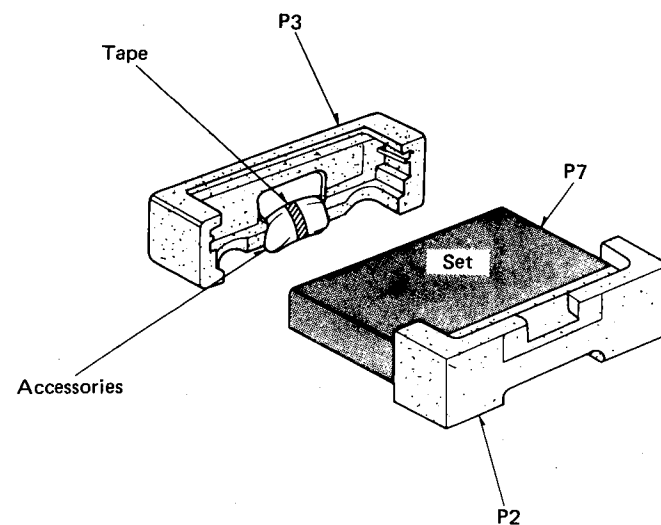
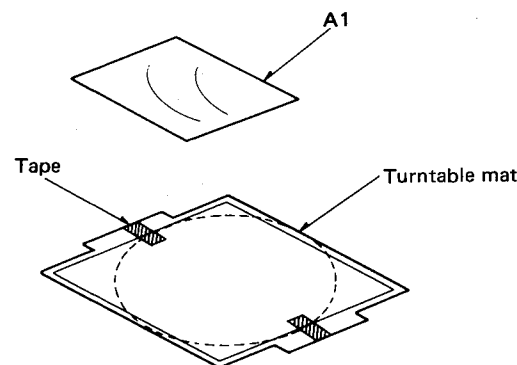
1. Set the tonearm to the start position.
2. Attach the arm spacer.



3. Attach the clumper and dust cover spacer.
4. Stick the protection sheet on the top of dust cover.



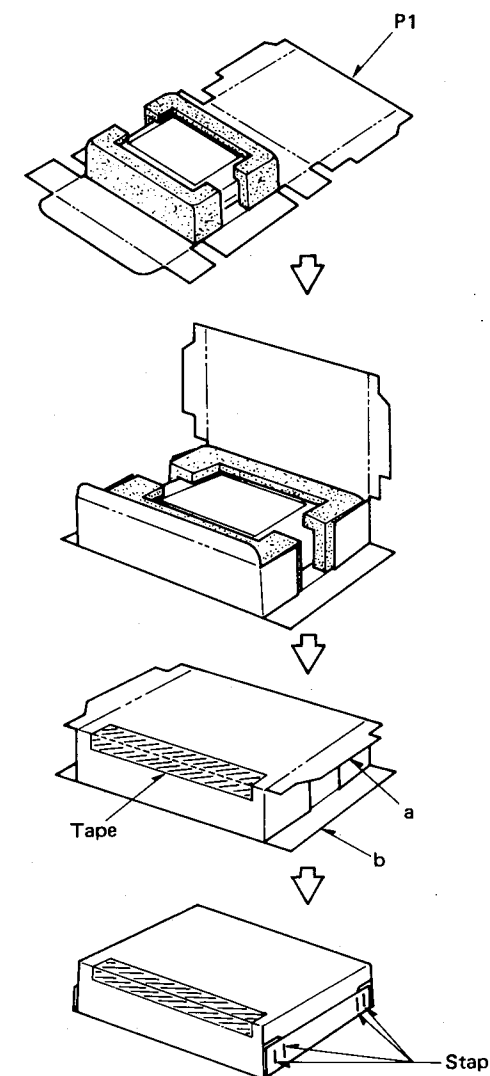
5. Put the set into the polyethylene bag and then pack it as illustrated.



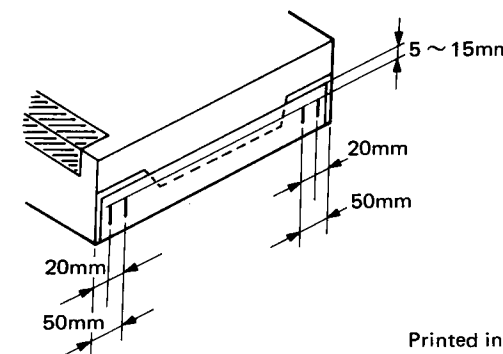
6. Place the unit (with cushions attached) as illustrated.
7. Fold the flaps according to the line marks.
8. Seal the top with adhesive tape.

\* Use gum tape or adhesive cloth tape of 50mm wide at least.

9. 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.



Ref. No.	Part No.	Description	Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
<b>CABINET and CHASSIS PARTS</b>								
1	SFWEC06N01	45r.p.m. Adaptor (1)	47	SFATC05N01A	Hinge, (Right) (1)	A1 [M]	SFNUC06M01	Instruction Book (1)
2	SFQAC06N01	Spring (1)	48	SFUMC05N20	Guide, Lead Wire (1)	A1 [MC]	SFNUC06C01E	Instruction Book (1)
3	SFTGC06N01	Turntable Mat (1)	49	SFUZC05N03	Latch (1)	A2	SFDHC05N01	Phono Cord (1)
4	SFTEC06N01A	Turntable (1)	50	SFADC06N01E	Dust Cover (1)	A3	SFDLC05N01	Ground Wire (1)
5	SFACC06N01	Cabinet (1)	51	SFGCC05N03	Cushion Rubber (3)	A4	RJA22Y	AC Cord (1)
6 [M]	SFNNC06M01	Name Plate (1)	52	SFGCC05N06	Cushion Cover (2)	A5	SFNZC06N01	Caution Sheet (1)
6 [MC]	SFNNC06C01	Name Plate (1)	53	SFKKC06N03	Surface Plate (1)			
7	SFKKC06N02	Plate, Front (1)	54	SFNZC06M02	Label, Shutter (1)			
8	SFKTC06N03	Knob, Speed Selector (1)	55	SFUPC06N04	Felt, Front Panel (4)			
9	SFKTC06N02	Knob, Start and Stop (1)	56	SFDJC06N02	Jack, Synchro-Rec (1)			
10	SFKTC06N01	Knob, Music Selector (1)	<b>SCREWS, WASHERS and NUT</b>					
11	SFUMC06N01	Rod, Power Switch (1)	N1	XTN3+20JFZ	Screw (2)			
12	SFKTC06N04	Knob, Power Switch (1)	N2	XTN3+10JFZ	Screw (2)			
13	SFKKC06N01	Label, Sensitivity Selector (1)	N3	XTV3+10G	Screw (3)			
14	SFKKC05N02	Label, Speed Selector (1)	N4	XTV3+6JFZ	Screw (4)			
15	SFQPC05N01	Spring (1)	N5	XTV3+20G	Screw (4)			
16	Δ SFDJHSC0491	Socket, AC (1)	N6	SFXGC05N02	Screw (3)			
17	SFDHC05N02E	Socket, Input (1)	N7	SFXGC05N04	Washer (3)			
18	SFMGQ34N01	Film, Stator Frame Ass'y (1)	N8	SFXGC05N03	Screw (2)			
19	SFMZC06N01R	Stator Frame Ass'y (1)	N9	XNC3HS	Nut, φ3 (3)			
20	SFUMC06N06	Holder, L.E.D. (2)	N10	XTW3+14QFYR	Screw (4)			
21	SFUMC06N07	Holder, L.E.D. (1)	N11	XTV3+20G	Screw (2)			
22	SFAUC06N01	Bottom Board (1)	N12	XTV3+8BFZ	Screw (1)			
23	SFQCC05N01	Spring, Audio Insulator (4)	N13	XSN3+5S	Screw (1)			
24	SFGAC05N02	Audio Insulator (1)	N14	XUC3FT	Washer (1)			
25	SFGCC06N01	Cushion Rubber, Power Transformer (2)	N15	SFPEV00502	Screw (1)			
26	SFUMC06N04E	Cover (1)	N16	XTV3+10BFZ	Screw (1)			
27	SFUMC06N10	Shutter (1)	N17	XSN26+10BV	Screw (1)			
28	SFUPC15N11	Bracket, Shutter (1)						
29	SFUMC06N08	Holder, Lead Wire (1)						
30	SFUMC05N17	Arm Drive Wheel (1)						
31	SFUMC05N16A	Worm Ass'y (1)						
32	SFGBC10-01	Belt, Arm Drive (1)						
33	SFMHC05N01E	Arm Drive Motor (with Pulley) (1)						
34	SFUMC05N02E	Plate, Rest Switch (1)						
35	SFUZC05N01	Rod, Rest Switch (1)						
36	SFUMC05N06	Guide, Rod Rest Switch (1)						
37	SFUMC06N05E	Sensor Ass'y (1)						
38	SFXJC06N01	Guide Rail, Sensor Ass'y (1)						
39	SFUMC05N22	Pulley (5)						
40	SFUMC05N23	Cap, Pulley (5)						
41	SFUZC06N01E	Arm Drive Lope Ass'y (1)						
42	SFUPC05N03	Bracket, Guide Rail (1)						
43	SFXJC05N01	Guide Rail, Arm Drive (1)						
44	SFGCC05N05	Cushion Rubber, Guide Rail (2)						
45	SFUKC06N01A	Plate Ass'y (1)						
46	SFATC05N02A	Hinge, (Left) (1)						
<b>ACCESSORIES</b>								
<b>PACKING PARTS</b>								