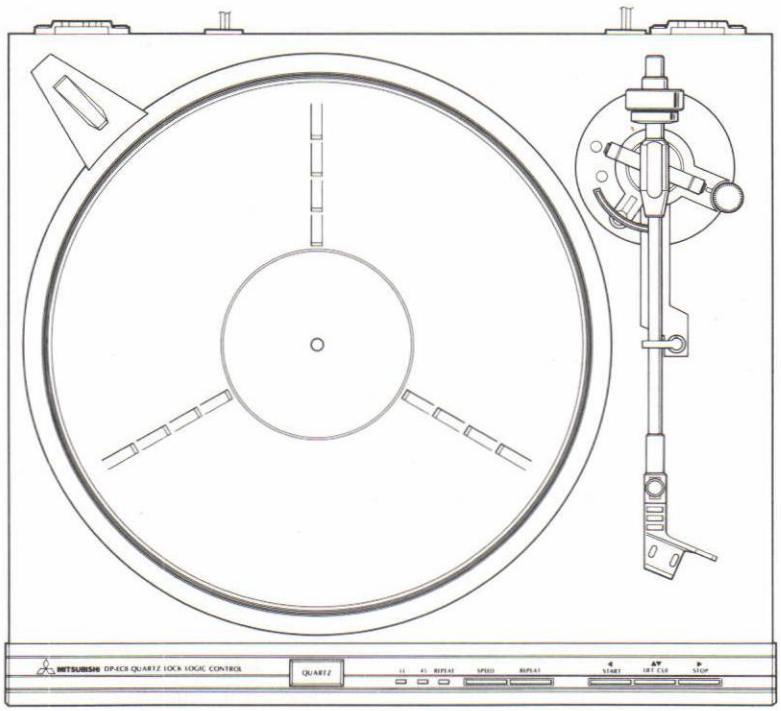
MITSUBISHI
AUDIO SYSTEMS

SERVICE MANUAL

TURNTABLE

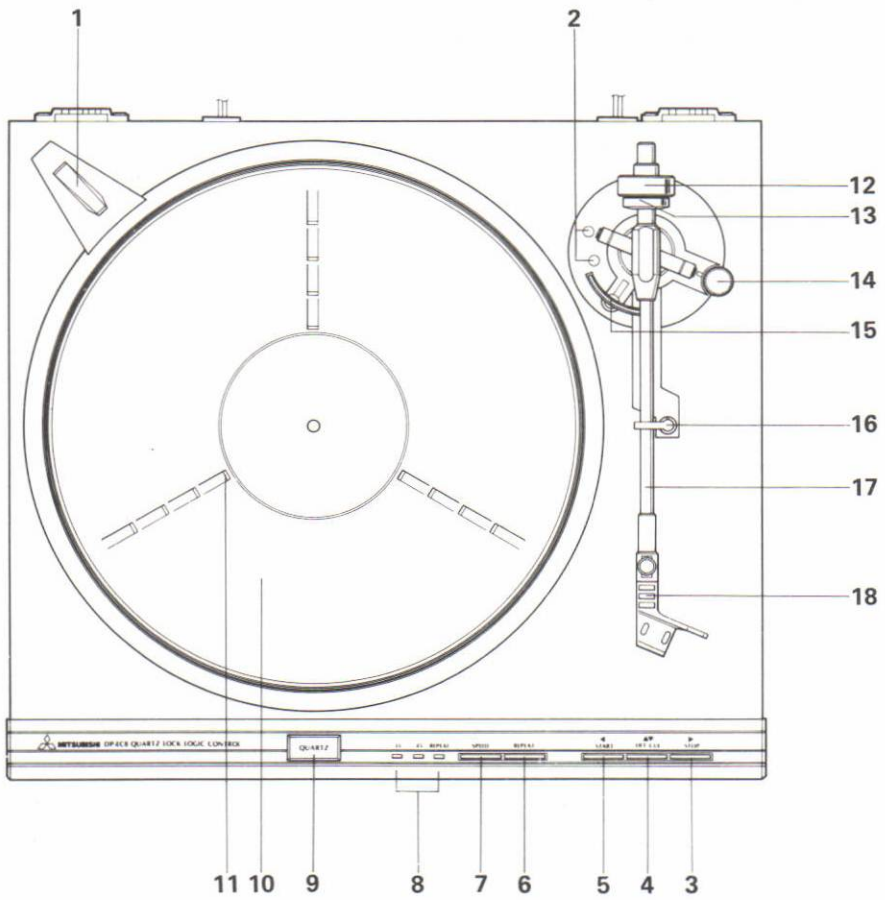
MODEL DP-EC8



CONTENTS:

MITSUBISHI ELECTRIC CORPORATION

NAMES OF PARTS / SPECIFICATIONS



1. LIGHT EMITTER
2. LEAD-IN AND REST POSITION ADJUSTMENT SCREW
3. STOP BUTTON (▶)
4. LIFT/CUE BUTTON (▲▼)
5. START BUTTON (◀)
6. REPEAT BUTTON
7. SPEED RESET BUTTON
8. INDICATOR
9. QUARTZ LOCK INDICATOR
10. PLATTER MAT
11. PRISM
12. COUNTER BALANCE WEIGHT
13. TRACKING FORCE ADJUSTMENT KNOB
14. ANTI-SKATING ADJUSTMENT KNOB
15. ARM LIFTER
16. ARM REST/POWER SWITCH
17. TONEARM
18. HEAD SHELL

SPECIFICATIONS:

1. PHONO MOTOR SECTION

Type		Electronically controlled fully automation operation
Drive mechanism		Direct drive
Motor		Quarz PLL DC servo
Platter	Diameter	30 cm (12")
	Weight	1.1 kg (2-7/16 lb)
	Material	Aluminum die-cast
Platter speed		33-1/3, 45 r.p.m
Wow and Flutter		0.025 % (Wrms) ± 0.04 % (DIN Wp-p)
Signal to noise ratio		60 dB (IEC-B) 75 dB (DIN-B)

2. TONEARM

Type	Static balance, straight arm
Overall length	290 mm (11-3/8")
Effective length	227 mm (8-15/16")
Overhang	14 mm (9/16")
Tracking error (30 cm LP)	$+3^\circ \sim -1^\circ$
Offset angle	22°
Head shell Material	GFRP
Weight	3.7 gr.
Possible cartridge weight	5 ~ 9 gr.
Tracking force adjustment	0 ~ 3 gr.
Output capacitance	200 pF

3. CARTRIDGE

Type	Dual MM
Stylus	0.6 mil Diamond
Tracking Force	2 gr.
Output level (1 kHz, 5cm/sec)	3 mV
Channel separation	20 dB

4. GENERAL

Power consumption	11 W
Dimension (W x H x D)	424 x 130 x 378 mm (16-11/16 x 14-7/8 x 5-1/8")
Weight	8 kg (17-5/8 lbs)

Disign and specifications are subject to change without notice for improvement.

ADJUSTMENT INSTRUCTIONS:

1. Stylus Tip Height Adjustment

1. Switch the power ON, and press the LIFT/CUE button to raise the tonearm.
2. Check that the stylus tip height is 6 mm above the record surface. If it is too high or too low, adjust the height by turning a hexagonal wrench (opposing sides 1.27:) in the M2.6 x hexagonal screw in the arm lifter as shown in the diagram.

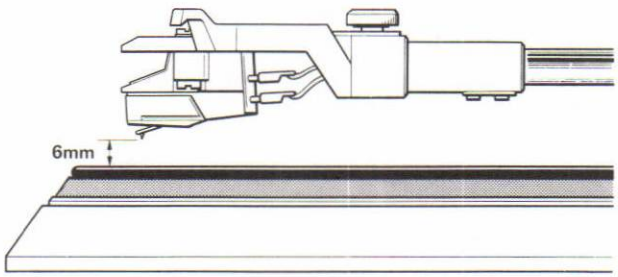


Fig. 1

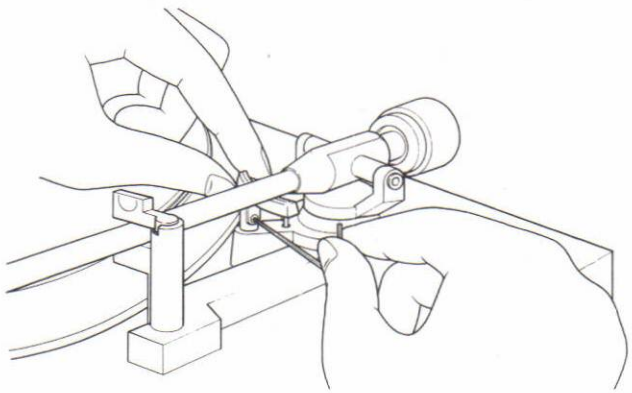


Fig. 2

2. Lead-In Position Adjustment

If the stylus fails to descend correctly into the lead-in groove of the record, adjust the position according to the following procedure.

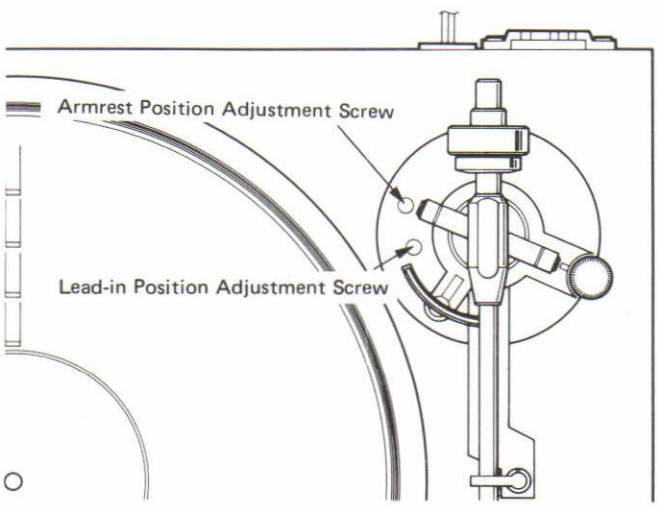


Fig. 3

1. Place a 30 cm record on the turntable platter and press the start button. Check to see whether the stylus lands too far in or too far out from the correct lead-in position.
2. Press the stop button to return the tonearm to the arm rest. Turn the lead-in position adjustment screw with a Philip's screwdriver if the stylus fails to descend correctly into the lead-in groove. Turn slightly either clockwise or counter clockwise. Note that since this screw is an eccentric pin, turning too far will return the screw to the former position.
3. Press the start button and again check the lead-in position. If the stylus still fails to descend in the correct position, repeat step 2) above.
4. After completing the adjustment for 30 cm records, also check the lead-in position for 17 cm records.

3. Arm Rest Lowering Position Adjustment

If the tonearm fails to lower correctly into the arm rest cup when the tonearm returns after end of play etc, adjust the lowering position according to the following procedure.

1. Press the start button for normal start of play.
2. Then press the stop button in order to return the tonearm to the arm rest. If the tonearm lowers into the arm rest cup as shown in A or C of Fig 4, adjust the arm rest lowering position with a Philip's screwdriver to obtain a lowering action like B in Fig. 4.

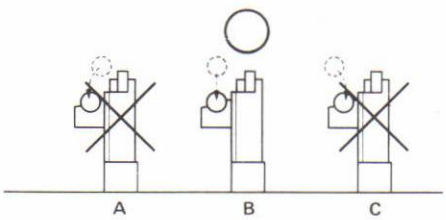


Fig. 4

Note: Failure to adjust correctly can result in the following conditions.

1. Tonearm fails to lower into arm rest after returning.
2. When the power is switched back ON again, the turntable starts rotating without pressing the start button.

These conditions are due to failure of the arm rest position detector circuit to function properly.

4. Arm Rest Position Detector Mechanism

The arm rest position detector mechanism is based on the operation of a photo-reflector (consisting of a light emitting diode and photo-transistor).

Light emitted from the light emitting stage (LED) is reflected by the shade plate and received by the light receiving stage (photo-transistor). The reception of this light results in the generation of an arm rest position signal which is subsequently passed to the control circuit to commence lowering of the tonearm and stopping of the turntable platter.

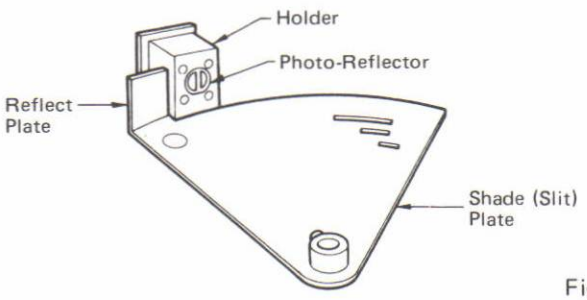
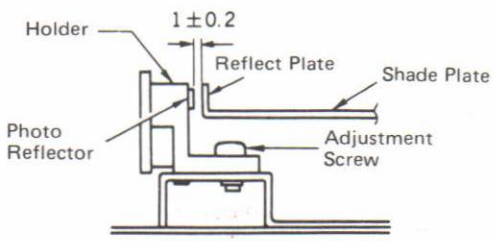


Fig. 5



Adjust gap clearance as shown above when replacing the photo reflector.

Fig. 6

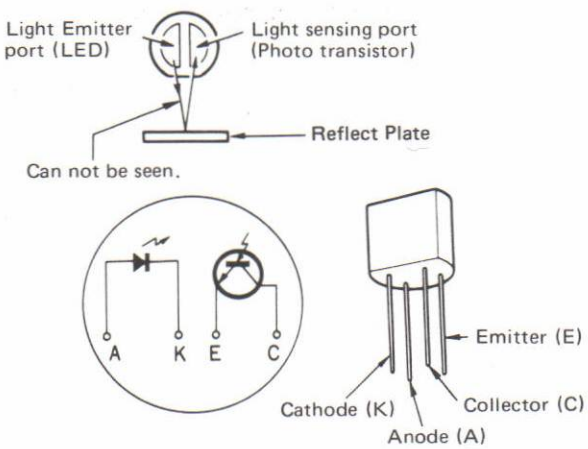


Fig. 7

TONEARM REMOVAL AND ADJUSTMENTS:

1. Removal of Tonearm

1. Remove the 7 screws fastening the base plate (1-3 x 14 tapping screws), and remove the base plate from the main cabinet.
2. Disconnect the soldering from the 6 tonearm output leads.
3. Loosen the screw securing the shade plate to the tonearm pivot to enable the shade plate to be removed.
4. Remove the 5 screws securing the tonearm (3 1-3 x 10 tapping screws and 2 washer-equipped 1-3 x 10 tapping screws). [See Fig. 9].
5. The tonearm may now be lifted out from the main cabinet.

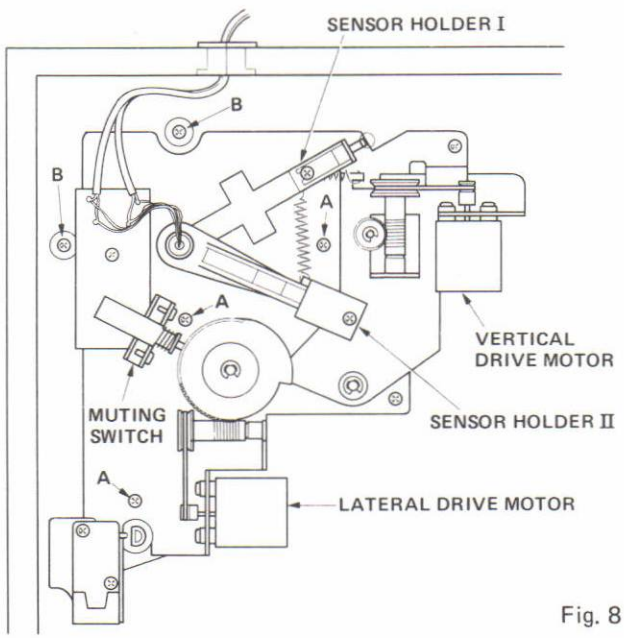


Fig. 8

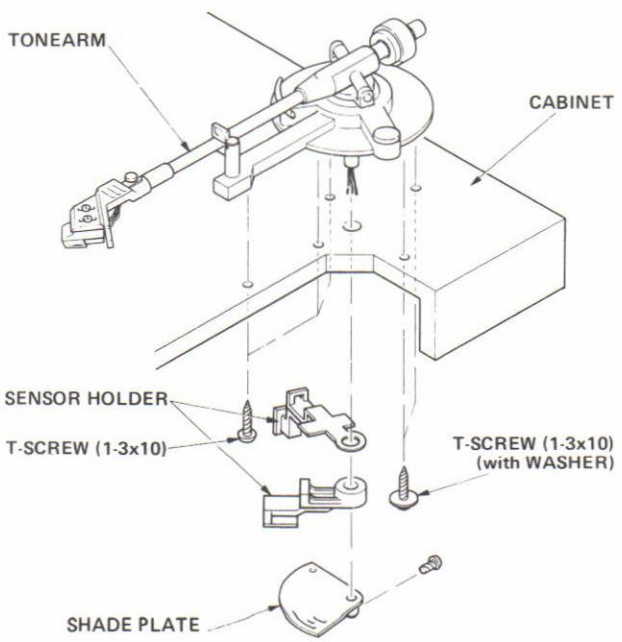


Fig. 9

2. Adjustment Procedure when Replacing the Tonearm

1. Attach the shade plate as shown in Figs. 10 and 11.
2. The dimension for the separation between the shade plate and the holder is pecified in Fig. 10.
3. With the tonearm in the arm rest, align the triangular mark on the shade plate with the center of gear A, and then secure into position. (Fig. 11).

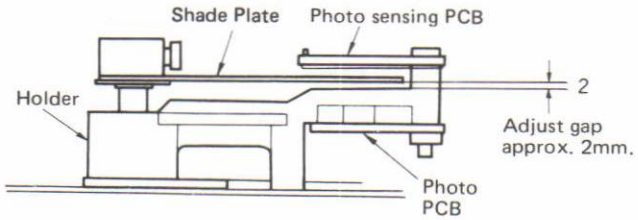


Fig. 10

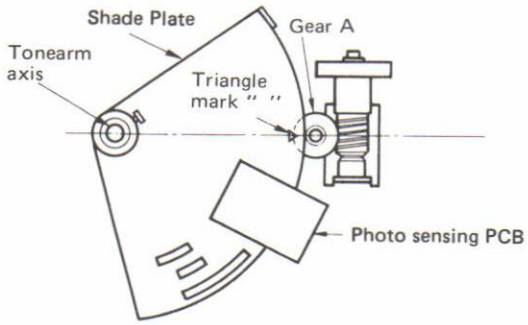


Fig. 11

3. Muting Switch Replacement

1. Remove the base plate.
2. Remove the E-ring, and disengage the up/down cam gear from the mounting ring.
3. Remove the 2 screws securing the muting switch (M3 x 6 binding screws).
4. Remove the screw securing the muting circuit board (an M3 x 6 tap-tight screw).
5. The circuit board may then be lifted out and the muting switch soldering disconnected.

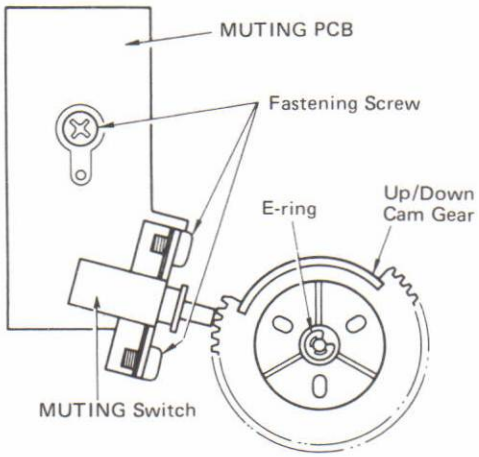
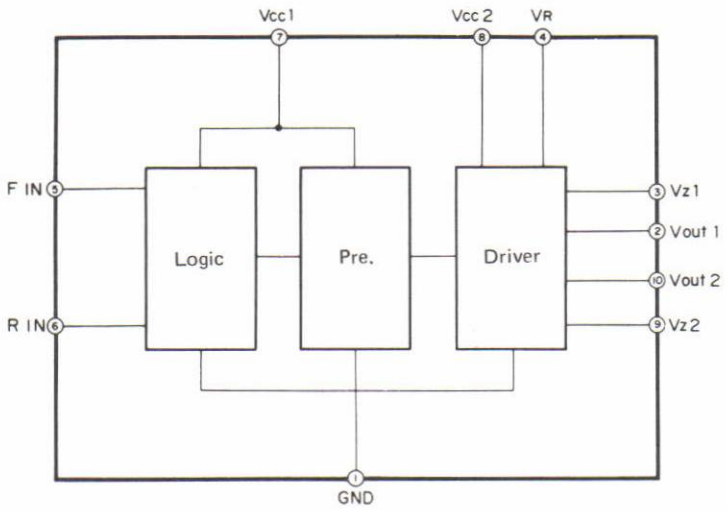


Fig. 12

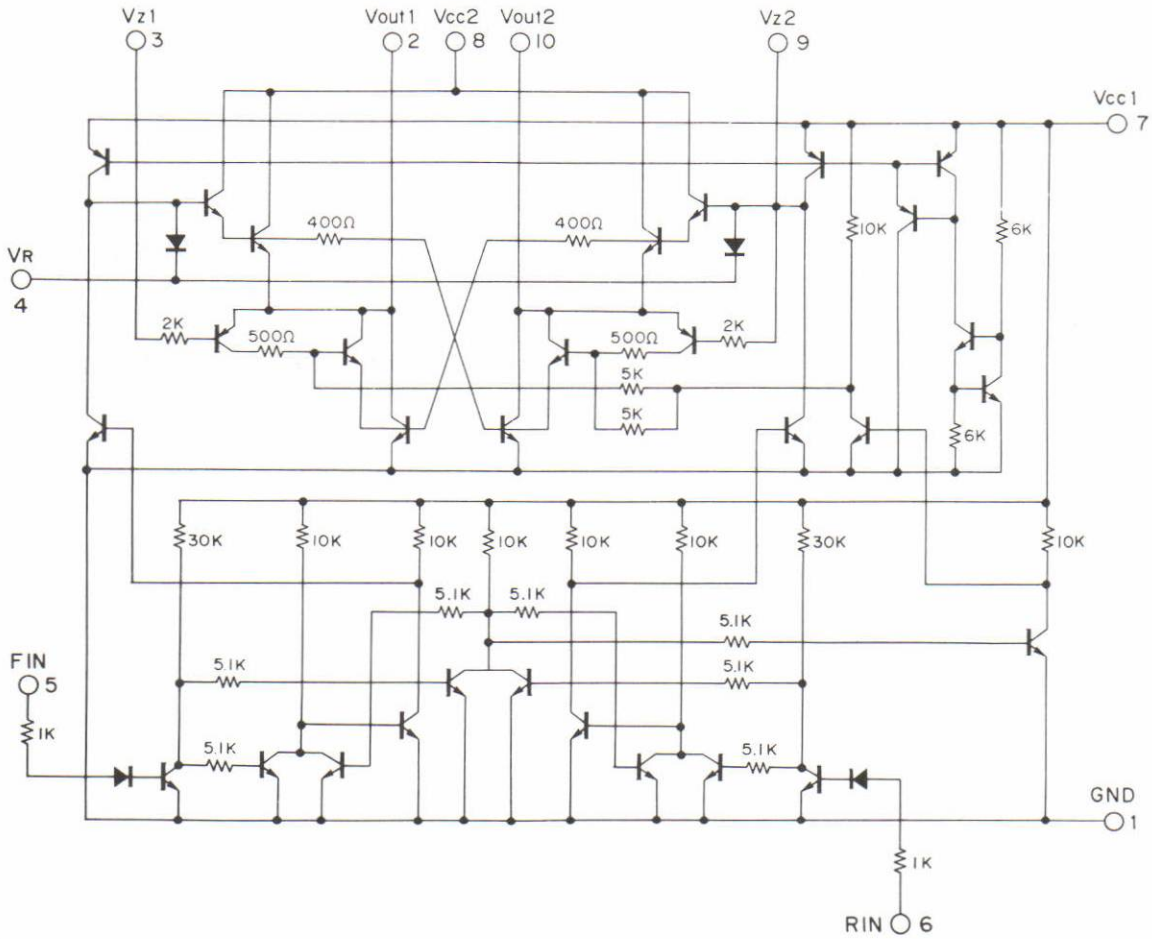
EQUIVALENT CIRCUIT AND PIN OUT OF ICs:

BA6109

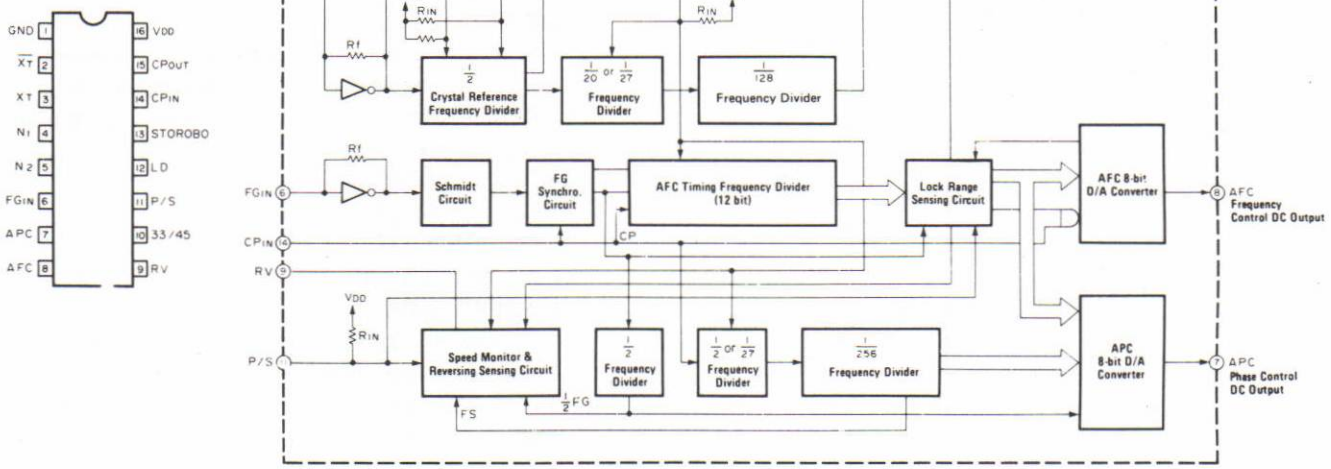


Input/Output Truth Table

F IN	R IN	Vout1	Vout 2
H	H	L	L
L	H	L	H
H	L	H	L
L	L	OPEN	OPEN

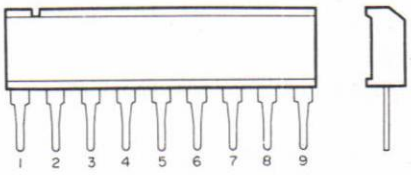


TC9142P



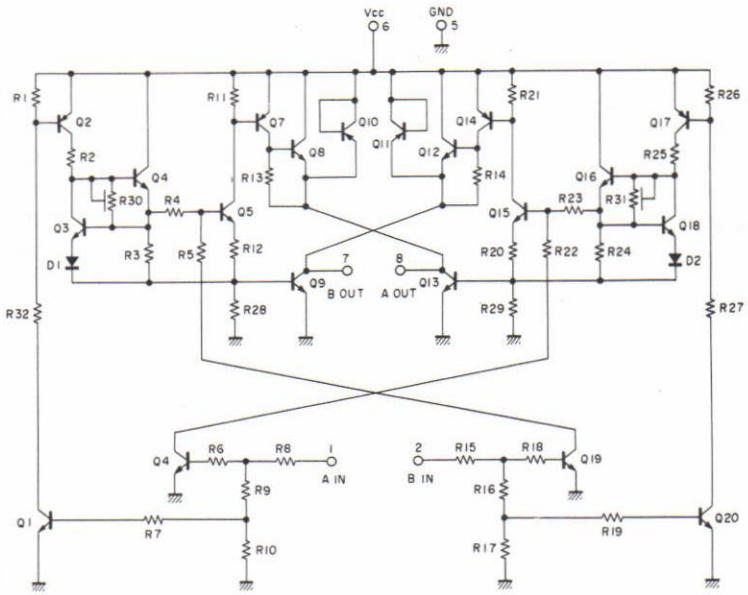
BA6208

PIN OUT

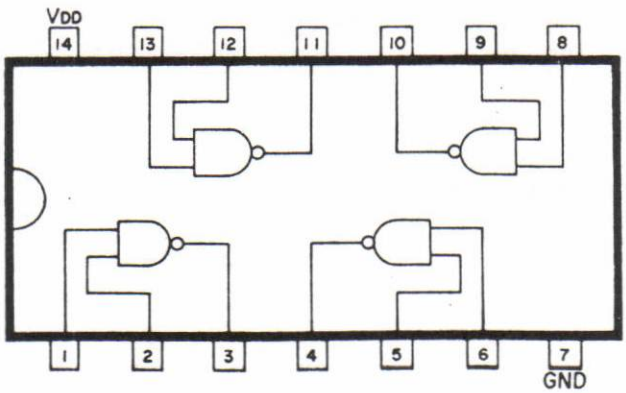


TRUTH TABLE

INPUT		OUTPUT		OUTPUT MODE
A	B	A	B	
1	1	L	L	SHORT CIRCUIT
1	0	H	L	FORWARD
0	1	L	H	REVERSE
0	0	—	—	OPEN CIRCUIT

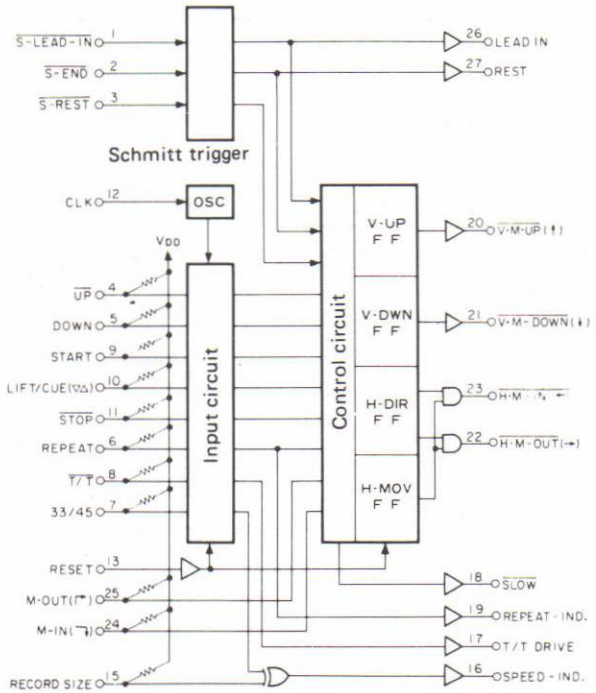


TC4011BP



INFORMATION ON LOGIC IC (MSM-5831RS)

1. Circuit Construction



2. Pin and Function

1 (S-LEAD-IN):
L when tonearm is on a record, otherwise H.

2 (S-END):
Becomes L when tonearm is moving inwards on a record and reaches the end groove, otherwise H.

3 (S-REST):
L when at arm rest, otherwise H.

4 (UP):
L when tonearm is being lifted or moving horizontally, otherwise H.

5 (DOWN):
L when tonearm is at arm rest or on a record, otherwise H.

6 (REPEAT):
Ordinarily H. When L is fed into this pin, the tonearm continues the repeat operation. To release, feed in L once more or make 11 (STOP) L.

7 (33/45):
Used when selecting platter speed manually. Making this pin L causes speed to change from 33-1/3 rpm to 45 rpm or vice versa.

9 (START), 10 (LIFT/CUE), 11 (STOP):
When START becomes L, the tonearm moves inwards; when STOP becomes L, the tonearm moves outwards. When LIFT/CUE becomes L, the tonearm is lifted or lowered. Note that, while the tonearm is being lifted, making this pin L produces no change, but if L is fed in during the lowering process, it changes back to upwards.

12 (CLK):
By connecting an external resistor/condensor combination to the input, a reference clock pulse is generated internally.

13 (RESET):
A resistor/condensor combination is connected to the input. Immediately after switching on the power, the RESET input becomes L, blocking automatic movement of the tonearm.

14 (Vss):
Connects to ground.

15 (RECORD SIZE):
L indicates 30 cm LP, H indicates 17 cm EP.

16 (SPEED-IND):
L indicates 33-1/3 rpm, H indicates 45 rpm. Can be changed freely by making 7 (33/45) L.

17 (T/T-DRIVE):
When 9 (START) becomes L, this pin becomes H and the platter rotates. When record play is finished and the returns to arm rest position, this pin becomes L and platter rotation stops.

18 (SLOW):
To move the tonearm horizontally while on a record, this output becomes L and the horizontal motion speed is low. At H level, the motion speed is high.

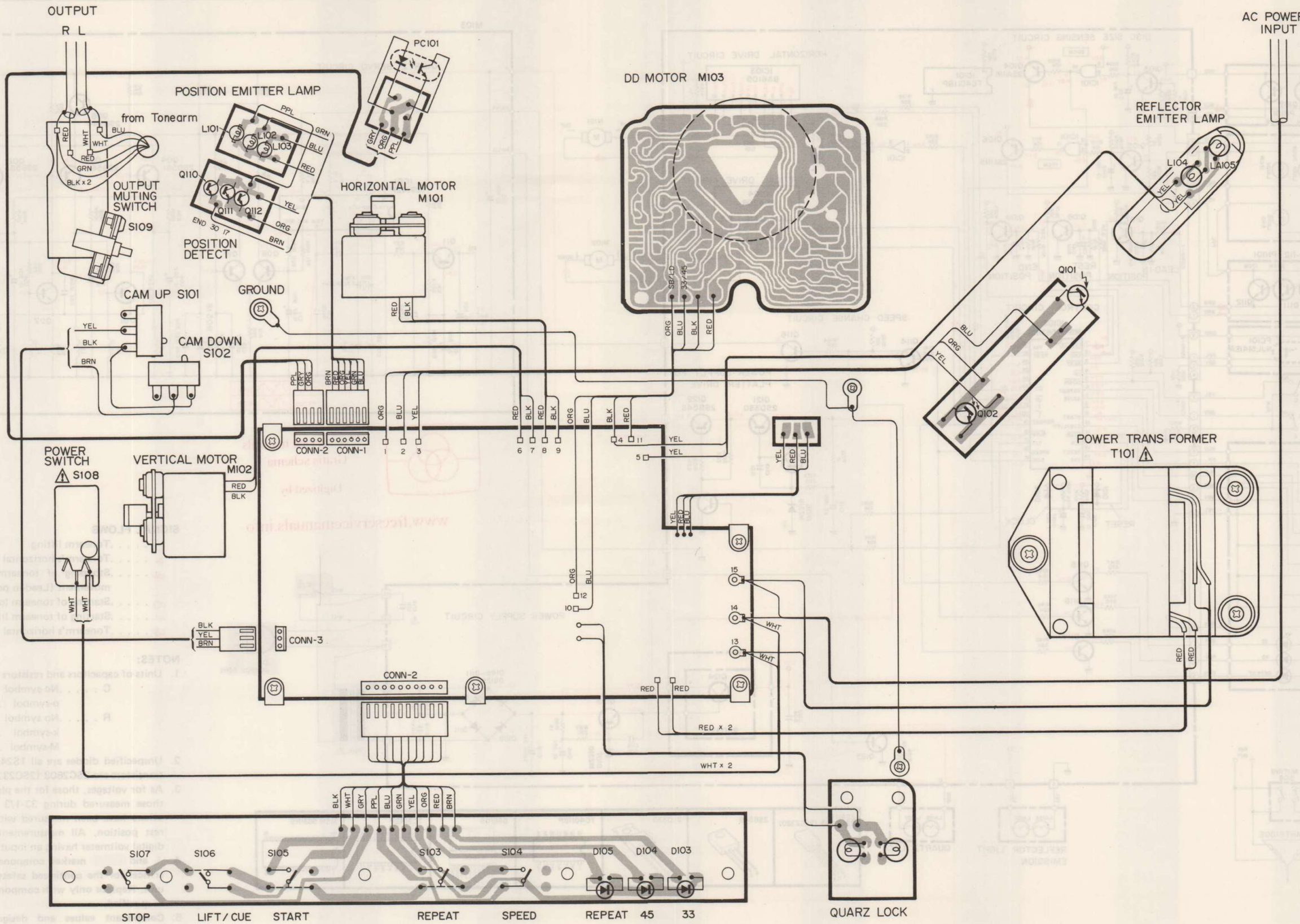
19 (REPEAT-IND):
When 6 (REPEAT) is L in the repeat mode, this pin becomes L.

20 (V.M-UP), 21 (V.M-DOWN), 22 (H.M-OUT), 23 (H.M-IN):
When the tonearm is at rest position or on a record and thus 5 (DOWN) is L, at first 20 (V.M-UP) becomes L and the tonearm moves up, causing 5 (DOWN) to become H. At that time 4 (UP) is L, and when the tonearm stops at the upper limit, the horizontal motion starts. When the tonearm moes inwards, 23 (H.M-IN) is L, when it moves outwards, 22 (H.M-OUT) is L. When the tonearm has moved to the pre-set horizontal position and is being lowered, 21 (V.M-DOWN) becomes L. Thus, of these 4 signals during tonearm movement, there is always one which becomes L, but never two or more simultaneously.

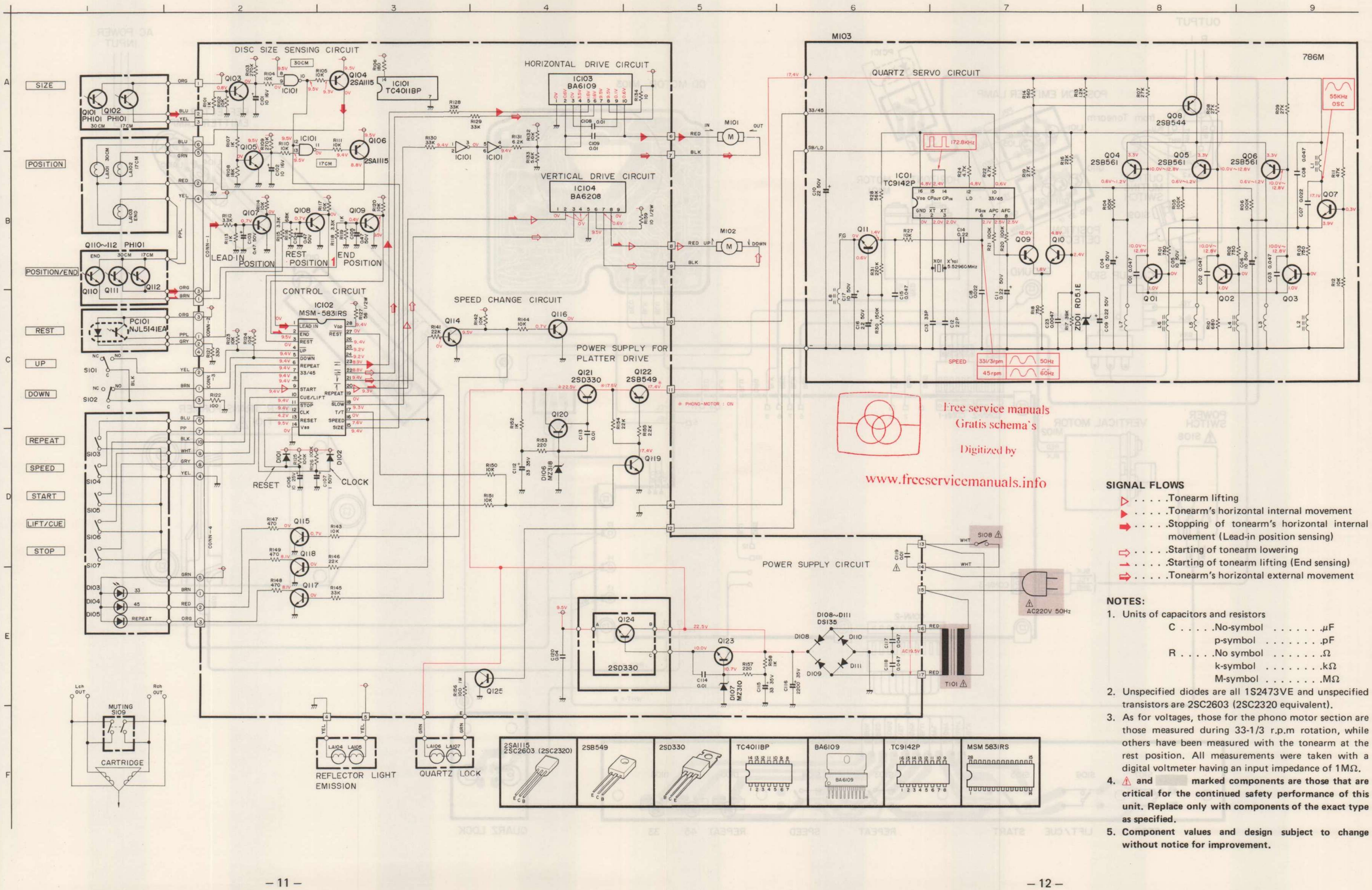
27 (REST):
Same as output of 3 (S-REST).

28 (Vpp):
Supply voltage INPUT.

WIRING DIAGRAM:



SCHEMATIC DIAGRAM:



SIGNAL FLOWS

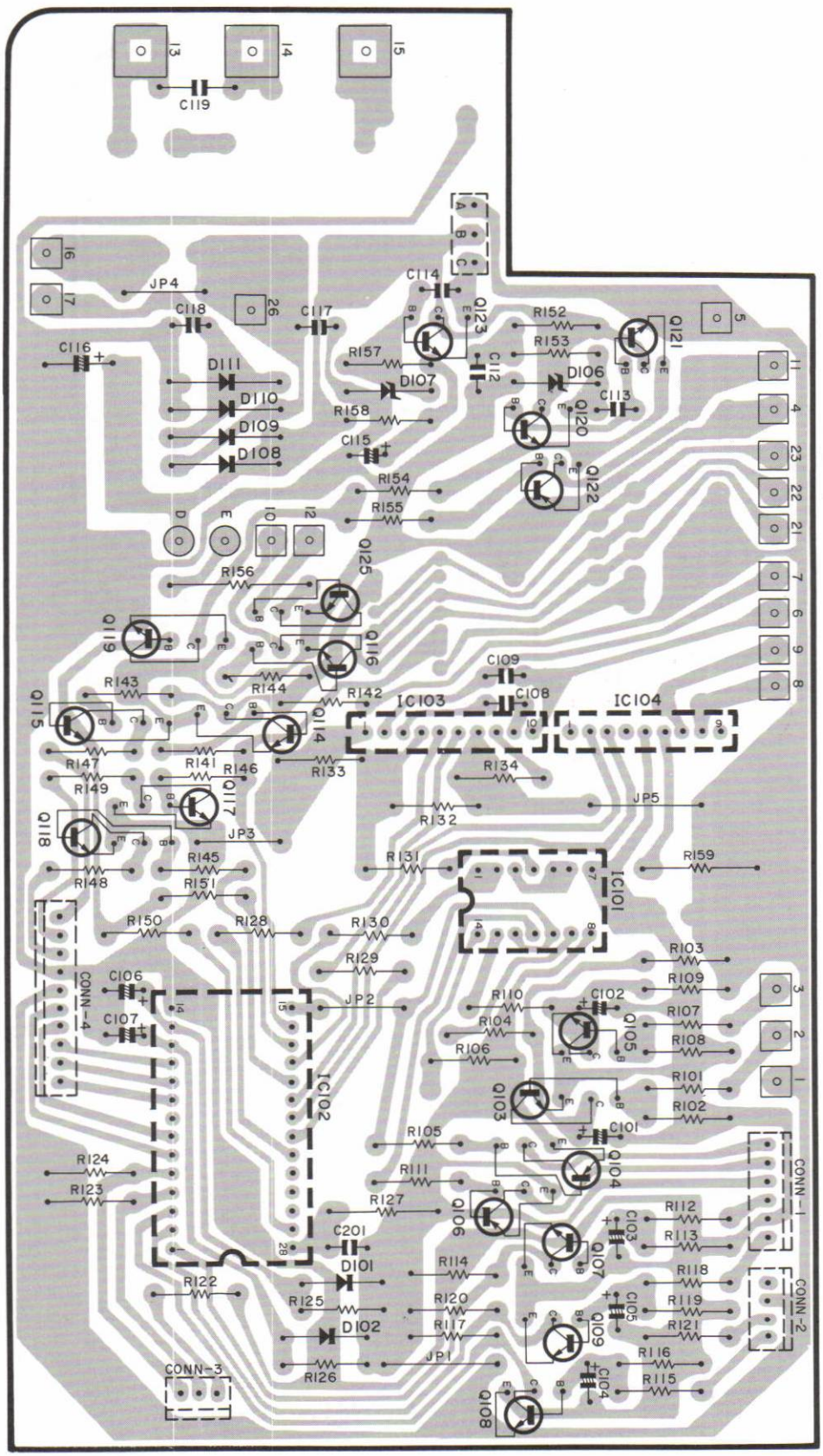
- ▷ . . . . Tonearm lifting
- ▶ . . . . Tonearm's horizontal internal movement
- ➡ . . . . Stopping of tonearm's horizontal internal movement (Lead-in position sensing)
- ⇨ . . . . Starting of tonearm lowering
- ⇀ . . . . Starting of tonearm lifting (End sensing)
- ⇒ . . . . Tonearm's horizontal external movement

NOTES:

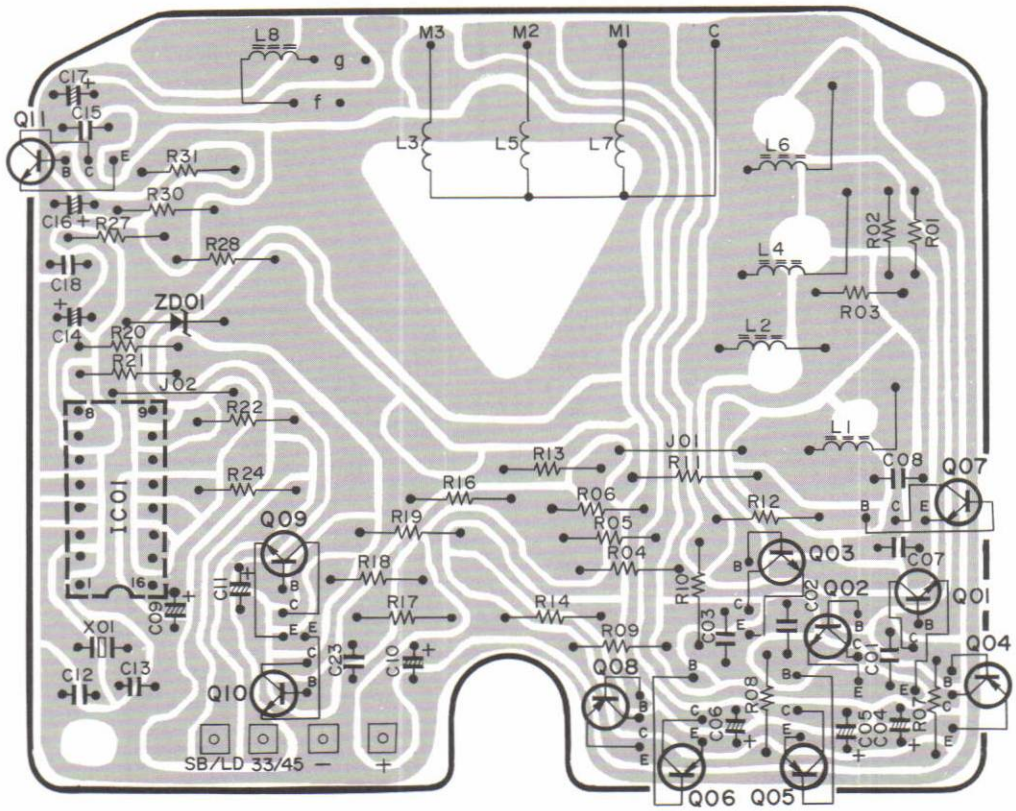
1. Units of capacitors and resistors
   - C . . . . No-symbol . . . . . μF
     p-symbol . . . . . pF
   - R . . . . No symbol . . . . . Ω
     k-symbol . . . . . kΩ
     M-symbol . . . . . MΩ
2. Unspecified diodes are all 1S2473VE and unspecified transistors are 2SC2603 (2SC2320 equivalent).
3. As for voltages, those for the phono motor section are those measured during 33-1/3 r.p.m rotation, while others have been measured with the tonearm at the rest position. All measurements were taken with a digital voltmeter having an input impedance of 1MΩ.
4. **⚠ and marked components are those that are critical for the continued safety performance of this unit. Replace only with components of the exact type as specified.**
5. **Component values and design subject to change without notice for improvement.**

PRINTED CIRCUIT BORADS:

Control P. C. Board



D. D. Motor P. C. Board

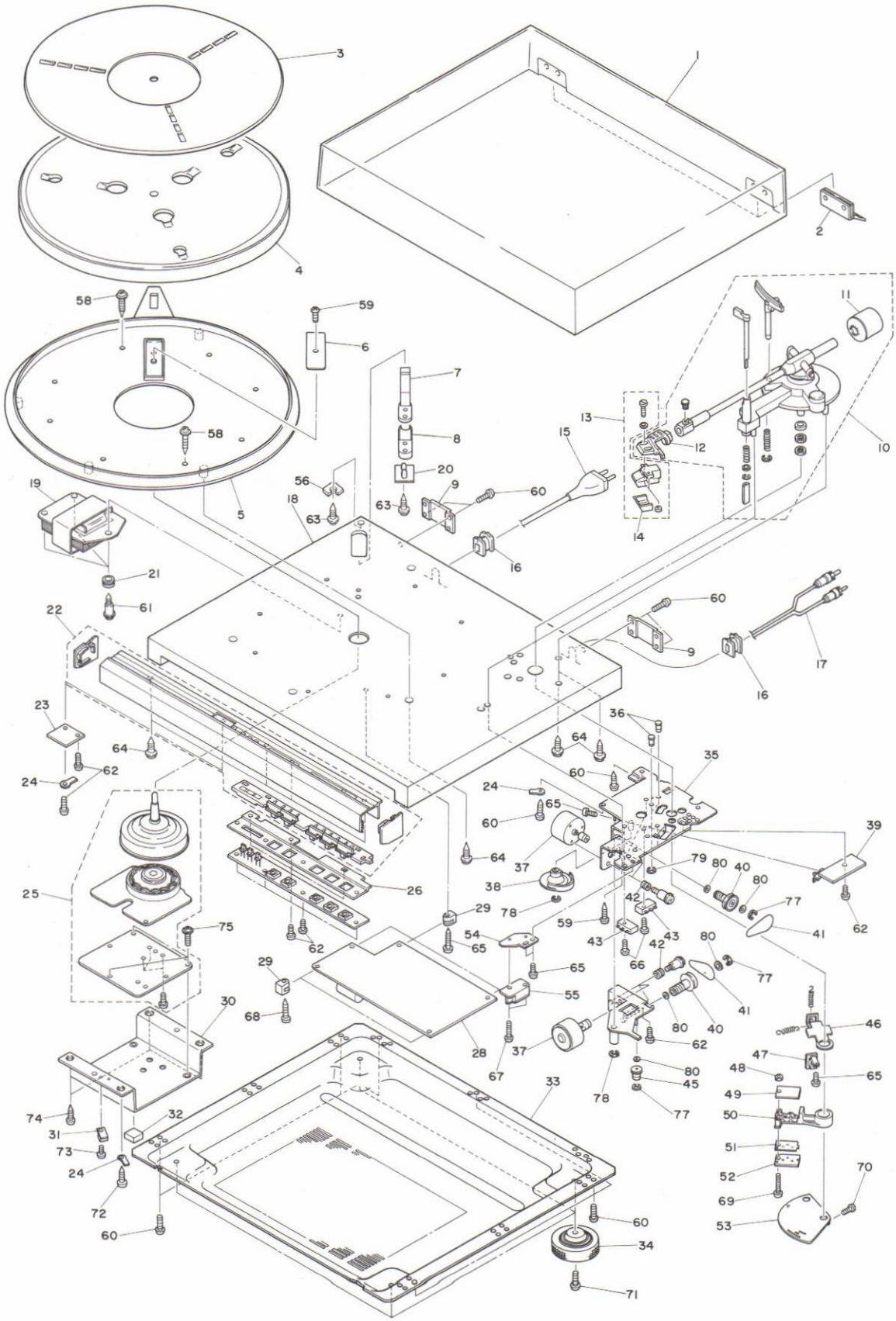


PARTS LIST:

NOTE: ⚠ and [ ] marks components on Parts list have special characteristics to maintain the safety performance of this unit. When replacing any of these parts, be sure to use only those specified parts.

Symbol No.	Part No.	Description
		Diodes
D101	M07060320	DIODE 1S2473VE
D102	M07060320	DIODE 1S2473VE
D103	M07568325	LE-DIODE GREEN
D104	M07568325	LE-DIODE GREEN
D105	M05157322	LE-DIODE RED
D106	M07504320	MZ318
D107	M07171322	MZ310
D108	M07568320	DS135-AT
D109	M07568320	DS135-AT
D110	M07568320	DS135-AT
D111	M07568320	DS135-AT
ZD01	M07452323	RD 5, 1E
		ICs
IC101	M07297343	TC4011BP
IC102	M07437343	MSM-5831RS
IC103	M07527343	BA6109
IC104	M07568310	BA6208
IC01	M07508310	TC9142P
		Transistors
Q01	M07390303	2SC2603 (2SC2320)
Q02	M07390303	2SC2603 (2SC2320)
Q03	M07390303	2SC2603 (2SC2320)
Q04	M07215304	2SB561
Q05	M07215304	2SB561
Q06	M07215304	2SB561
Q07	M07390303	2SC2603 (2SC2320)
Q08	M07390303	2SC2603 (2SC2320)
Q09	M07390303	2SC2603 (2SC2320)
Q10	M07390303	2SC2603 (2SC2320)
Q11	M07390303	2SC2603 (2SC2320)
Q101	M07137303	PH101
Q102	M07137303	PH101
Q103	M07543300	2SC2603 (2SC2320)
Q104	M07568300	2SA1115
Q105	M07543300	2SC2603 (2SC2320)
Q106	M07568300	2SA1115
Q107	M07543300	2SC2603 (2SC2320)
Q108	M07543300	2SC2603 (2SC2320)
Q109	M07543300	2SC2603 (2SC2320)
Q110	M07137303	PH101
Q111	M07137303	PH101
Q112	M07137303	PH101
Q114	M07543300	2SC2603 (2SC2320)
Q115	M07543300	2SC2603 (2SC2320)
Q116	M07543300	2SC2603 (2SC2320)
Q117	M07543300	2SC2603 (2SC2320)
Q118	M07543300	2SC2603 (2SC2320)
Q119	M07543300	2SC2603 (2SC2320)
Q120	M07543300	2SC2603 (2SC2320)
Q121	M07061304	2SD330
Q122	M07230307	2SB549
Q123	M07543300	2SC2603 (2SC2320)
Q124	M07061304	2SD330
Q125	M07543300	2SC2603 (2SC2320)
PC101	M07508303	PHOTO-REF NJL5141EA
		Electrical Parts
C119	M07554430	C-Ceramic 400V 0.01 ⚠
C116	M07568431	C-ELECT-35V2200
LA101	M07374251	LAMP 12V 0.05A
LA102	M07374251	LAMP 12V 0.05A
LA103	M07374251	LAMP 12V 0.05A
LA104	M07297250	LAMP 5V 0.06A
LA105	M07297250	LAMP 5V 0.06A
LA106	M07297250	LAMP 5V 0.06A
LA107	M07297250	LAMP 5V 0.06A
M101	M07508639	HORIZONTAL MOTOR
M102	M07508639	VERTICAL MOTOR
M103	M07568550	D.D MOTOR ASS'Y 786M1
S101	M07508450	SW-MICRO (CAM UP)
S102	M07508450	SW-MICRO (CAM DOWN)
S103	M07445660	SW-PUSH (REPEAT)
S104	M07445660	SW-PUSH (SPEED)
S105	M07445660	SW-PUSH (START)
S106	M07445660	SW-PUSH (LIFT/CUE)
S107	M07445660	SW-PUSH (STOP)
S108	M07459660	SW-MICRO (POWER) ⚠
S109	M07462661	SW-PUSH (MUTING)
T101	M07560500	TRANS-POWER ⚠
	M05209700	POWER CORD ⚠
		Package
201	M07569900	PACKING BOX
202	M07557910	CUSHION-MOLD
203	M07557920	PACKING BAG
204	M07557911	CUSHION (for Dust Cover)
205	M05768910	CUSHION (for Platter)
	M07191603	ADAPTOR 45 r.p.m
	M07569940	CARD-WARRANTY

EXPLODED VIEW:

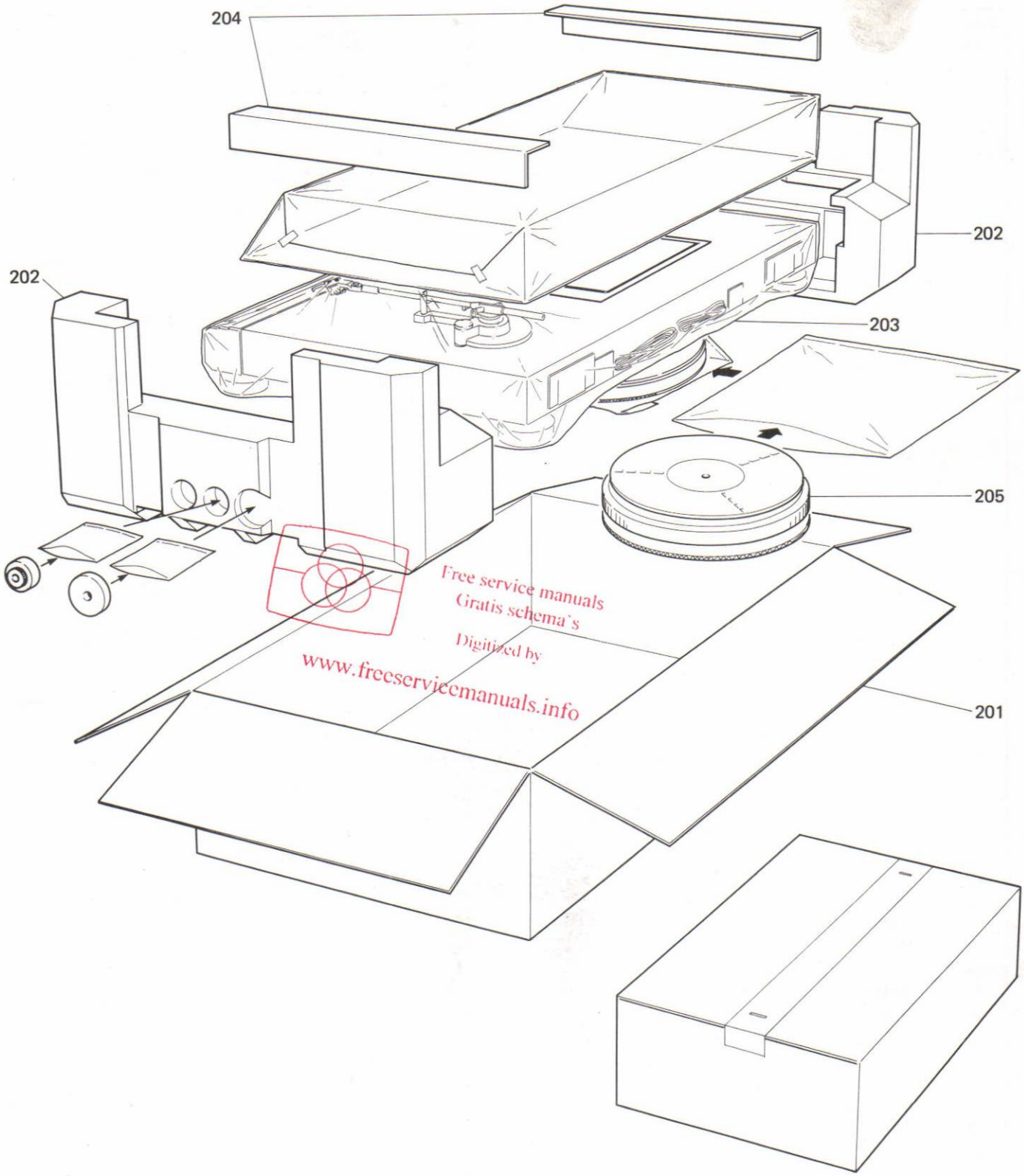


PARTS LIST OF EXPLODED VIEW:

Symbol No	Parts No.	Description
1	M07557130	Dust Cover
2	M07557140	Hing Ass'y
3	M07458757	Platter Mat Ass'y
4	M07568620	Platter
5	M07568225	Ornament
6		Disc Size Detect PCB
7	M07568640	Reflector
8		Rubber Holder
9	M07568145	Bracket
10	M07568600	Tonearm
11	M07568618	Main Weight
12	M07568616	Head Shell
13	M04168610	Cartridge (MAG-47)
14	M04168612	Stylus (3D-47M)
15	M05209700	Power Cord
16		Clamper
17	M07560495	Output Cord
18		Cabinet
19	M07560500	Power Transformer
20		Lamp PCB (Reflector)
21		
22	M07568100	Panel Ass'y
23		Lamp PCB (Quarz Indicator)
24		Lug Terminal
25	M07568550	Motor Ass'y (786M1)
26		Holder
27		Switch PCB
28		Control PCB
29		Holder
30		Holder (for Motor mount)
31		Transistor
32		Cushion
33		Bottom Cover
34		Leg
35		Base-Mechanism
36		Eccentric Screw
37	M07508639	Motor (Vertical, Horizontal drive)
38	M07508646	Gear (for Up/Down)
39		Muting PCB
40	M04165646	Gear (Warm type)
41	M07508629	Belt (for Vertical, Horizontal)
42		Rubber Bush
43	M07508450	Switch Micro (for Up/Down)
44		Motor Holder
45	M07508645	Gear (Arm Horizontal drive)
46		Holder
47		Photo Reflector Ass'y
48		Nut M2.6
49		Light Emitter PCB
50		Holder

Symbol No.	Parts No.	Description
51		Holder
52		Light Receiving PCB
53		Shade Plate
54		Holder
55	M07459660	Switch-Micro (Power)
56		Spacer-Paper
57		
58		T-Screw 1-3 x 16 (with washer)
59		T-Screw 1-3 x 10
60		T-Screw 1-3 x 14
61		T-Screw 1-3 x 23 (with sleeve)
62		T-Bind Screw 3-3 x 6
63		T-Screw 3 x 10
64		T-Screw 1-3 x 10 (with washer)
65		Bind Screw M3 x 6
66		Bind Screw M2.3 x 10
67		Bind Screw M3 x 16
68		T-Screw 1-3 x 20
69		Screw M2.6 x 20
70		Screw M3 x 6
71		Bind Screw M4 x 8
72		T-Screw 1-4 x 12
73		Screw-PL M3 x 6
74		T-Screw 1-4 x 12
75		P-Polywave Screw M3 x 6
76		
77		E-ring 2 ϕ
78		E-ring 3 ϕ
79		BE-ring 4 ϕ
80		Washer-PL 2 ϕ

PACKING INSTRUCTIONS:



MITSUBISHI ELECTRIC CORPORATION
HEAD OFFICE MITSUBISHI DENKI BLDG MARUNOUCHI TOKYO 100 TELEX J24532 CABLE MELCO TOKYO

DP-EC8-WG(E)
SM-1032
Printed in Japan