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SERVICE MANUAL

SANYO

STEREO TURNTABLE

PLUS Q50

(U.S.A.)

SPECIFICATIONS

Drive system	Full auto (2 Motor)/Quartz Direct drive	Tone arm	Static-balance straight type (Carbon Fiber Head shell)
Motor		Usable cartridge weight	4–10 g
Turntable Platter	PLL brushless servo motor	Tracking error	±1.5°
Tone arm	DC Motor	Stylus pressure force range	0–3 gr.
Speeds	33-1/3 and 45 rpm	Overhang	15 mm
Wow & Flutter	0.025% WRMS	Power source	120V AC, 60Hz
Rumble	–73dB DIN B spec.	Power consumption	8 watts
Friction	7 mg	Dimensions (Approx.)	17–7/16" x 14–7/8" x 6–1/8" (443 x 380 x 155 mm)
Turntable platter	Aluminum die cast 3.3 lbs (1.5kg)		
Platter Diameter	12–1/4" (312 mm)	Weight (Approx.)	8.8 kg

*Specifications and design are subject to change without notice.

BRIEF DESCRIPTION OF CONTROL SWITCHES

This unit is provided with soft-touch control switches, and is composed of digital circuits. The control switches are nine all-together: start/stop, repeat, disc size (12", 10" and 7"), rotational speed (33 rpm and 45 rpm), quartz-lock and cue.

The start/stop switch changes over alternately, the cue, repeat and quartz-lock switches are on and off alternately, and the disc size switches and the rotational speed switches are, when pushed, set to the settings that correspond to labels shown on them. Tuning on the power switch (S10) closes the play switch (S14), starting the main motor.

INITIALIZATION

Energizing the unit actuates the INITIALIZE circuit at once, setting the initial action of every switch. The INITIALIZE circuit is composed of C9, R13 and IC8, and its output goes high only during a period of time that is equal to CR time constant. The high-level output clears (CL) repeat and cue functions, set disc size to 12" and rotational speed to 33 rpm, and locks the quartz circuit.

1. The output of the INITIALIZE circuit enters the cue flip-flop IC7 (trigger flip-flop) by its CL (clear) terminal (pin no. 4), which clears the IC7 to depress its output Q to low, making the subsequent circuits inactive.
2. The above-mentioned high-level ouput also enters the quartz-lock flip-flop IC6 (trigger flip-flop) by its PR (preset) terminal (pin no. 6), and presets the IC-6. This raises its ouput Q to high, triggering the LED driver Q7 to light the LED D8. By contrast, another output $\overline{Q}$ goes low, which makes the IC10 (relay driver) and therefore the relay (RL-1) inactive. This keeps the relay terminal in NC (normal close) state, causing short circuit between the quartz PLL of motor PCB and the common terminal to put the unit in the quartz-look state.
3. The said output, high in level, is impressed on the S terminal (pin no. 12) of disc size 12" flip-flop IC5 (R-S flip-flop) by way of or gate IC3 to set the IC5, thereby raising its output Q to high. This triggers the LED driver Q3, lighting the LED D4. Besides, the output of the INITIALIZE circuit is impressed by way of the or gate IC3 on R terminals (pin nos. 7 and 15) of disc size 10" and 7" flip-flop IC5s to reset them. As a result, outputs Q of the both IC5s go low to make the following circuits inactive, setting disc size to 12" in terms of mechanism.
4. The output of the INITIALIZE circuit enters the repeat flip-flop IC6 (trigger flip-flop) by the CL (clear) terminal (pin no. 11) to clear the IC6. This leads to depression of its output to low, making the following circuit inoperative.
5. Besides, the output of the INITIALIZE circuit enters the rotational speed selection flip-flop IC5 (R-S flip-flop) by its R terminal (pin no. 4) via diode D12 (or gate) to reset the IC5. Output Q delivered from the IC5, low in level, triggers the LED driver Q2 to light the LED D2.
   In addition, the low-level output Q sets the 33/45 rpm terminal of main-motor PCB to the "33 rpm" position.

START/STOP

The push of the start/stop switch after completion of initialization drives the sub-motor, starting the arm. If record playing comes to an end, both the play (S13) and remain (S12) switches open, stopping the sub-motor.

1. The push of the start/stop switch permits a signal to enter the monostable multivibrator (one-shot) circuit IC1 via the or gate D9. The output delivered from that circuit is held high for about two seconds after the push of the above switch. The sub-motor drivers Q1 and Q2 are kept on only for that period of time, and the resulting current flow from the Q2 starts the sub-motor. The play and main switches close then, permitting current flow to reach the sub-motor about two seconds later by way of the both switches S12 and S13.

CUE

The push of the "cue" switch during playing a record lifts the arm up, and one more push resumes the operation at the same phase as before cue is given, permitting the arm to descend on the record surface for playing.

1. The push of the "cue" switch causes a signal to enter the monostable multivibrator (one-shot) circuit IC2, and an output delivered from that circuit is held high for 10 msec after the above-mentioned switch has been pushed. The high-level output enters the IC7 by its clock terminal (pin no. 3) to reset it. Output Q of the IC7 goes then high, triggering the plunger driver IC10 to drive the cue plunger of MG-3, and at that very instant the LED D1 lights up as well. Meanwhile, another IC7 output $\overline{Q}$ goes low, and triggers the plunger drivers Q8 and Q9 (Darlington circuit) by way of the time constant circuit composed of C12, R17 and IC2 – which holds input conditions for 8 to 9 seconds, thus driving the plunger of MG-3.

* The Q side supplies plunger driving current for initial driving, while the Q side does hold current necessary after plunger driving.

ROTATIONAL SPEED CHANGING-OVER

The rotational speed of turntable platter is initially set to 33 rpm owing to initialization, but can be changed over to 45 rpm with the push of the 45 rpm switch.

1. Pushing the 45 rpm switch permits a signal to enter the IC5 by its S terminal (pin no. 4), setting the IC5. Its output goes then high, causing the LED D2 to go out and the 33/45 rpm terminal of main PCBto be set to 45 rpm. Besides, that output triggers the relay driver IC10 to drive the relay RL-2.
   As a result, the relay terminal is brought to the NO (normal open) side, thereby providing rotational speed adjustment to 45 rpm unless the quartz-lock is in action. The LED D3 lights up as soon as the above relay is driven.
2. The push of the 33 rpm switch permits a signal to enter the IC5 by its R terminal (pin no. 3) via diode D11 for resetting it. The subsequent behaviors are quite the same as in "Initialization".

DISC SIZE CHANGING-OVER

The disc size setting is initially adjust to 12" owing to initialization, but can be changed to 10" or 7" with the push of the 10" or 7" switch.

1. By pushing any one of three disc size change-over switches, 12", 10" and 7", the IC5 is set through the selective circuit inside the IC3, which resets any other switches than the pushed one. In detail, if the 10" switch is pressed, for example, the IC5 is set, raising its output Q to high. This triggers the LED driver Q4, lighting the LED D5. The above output arrives just then at the input terminal (pin no. 13) of nand gate IC8, and IC5 output Q goes low at pin nos. 1 and 10, putting out the D4 and D6. Furthermore, the output delivered from pin no. 1 of the IC5 enters the IC8 by its input terminal (pin no. 12). Under this condition the cathode sides of both the D17 and the D18 go high, which triggers the plunger driver IC10 to drive the plunger of MG-2. Thus, disc size is set to 10".

* Diodes D17 thru D20 make up a circuit that is responsible for preventing faulty operation. The circuit is so designed as to set disc size to 12" as soon as IC8 inputs are simultaneously high.

REPEAT

1. Pushing the "repeat" switch during playing permits output to enter the monostable multivibrator (one-shot) circuit IC4. The output is kept high about 10 msec long after the push of the said switch. The output enters the IC6 by its CK (clock) terminal (pin no. 11) to set it. Output Q of the IC6 goes then high, which triggers the LED driver Q6 to make the LED D7 come on. When playing comes to an end, output $\overline{Q}$ goes low, filling the requirements at the nor gate IC2. As a result, the output causes the same operation as on starting through the diode D10, resulting in repeat operation.

* When the "repeat" switch is pushed before start, pushing the switch once more about two seconds later fills the requirements at the and gate composed of diodes D13 and D14. As a result, the output enters the "repeat" flip-flop IC6 through its CL (clear) terminal (pin no. 11) to reset it, causing the LED D7 to go out. If the "repeat" switch is further pushed in about two seconds after that, the IC7 is held, and therefore, the repeat operation is made after termination of playing.

QUARTZ LOCKING

The "quartz-lock" switch is initially set with initialization, but can be reset with the push of that switch, enabling rotational speed adjustment.

1. The output signal is, when the quartz-lock switch is pushed, fed to the monostable multivibrator (one-shot) circuit IC4, and is held high in about 10 msec after the push.
   This output enters then the IC6 by its $\overline{CK}$ (clock) terminal (pin no. 3) to reset it, which raises its output $\overline{Q}$ to high and thereby triggers the relay driver IC10 to drive the relay RL-1. Thus, the relay terminal is put in NO (normal open) state, opening the quatz PLL terminal and the common terminal of main-motor PCB. This cancels the lock and causes short circuit at the relay terminal of relay RL-2, enabling the adjustment of VR1 (45 rpm) and VR2 (33 rpm).

STROBING

Turning on the "power" switch (S10), whenever the "play" switch (S14) is closed, impresses +B voltage on the motor PCB, driving the direct-dirve motor. At that very instant, the 4-stage binary counter inside the IC02 of motor PCB acts as well, and its output enters the monostable multivibrator (one-shot) circuit IC9 to switch on and off the Q11 of LED driver, flickering the D41 thru D43.

MONOSTABLE MULTIVIBRATOR (ONE-SHOT) CIRCUIT

This circuit, a circuit responsible for producing a signal of required pulse width by picking rise and fall edges of logical signs, produces a positive output pulse at the rise edge of input pulse when TC4001 is built in. Output pulse width is represented by tw = 0.69 CR. The resistor shown in Fig. 1 is intended to protect a gate input of (2) from a positive overvoltage developed at point A at the very moment when the said multivibrator circuit is inversed.
The use of four 2-input gates probably ensures more stable output. These two kinds of monostable multivibrators cannot be triggered immediately after the output rises from semi-stable state to perfect stable state again. They require little time lapse (recovery time) before triggered next.

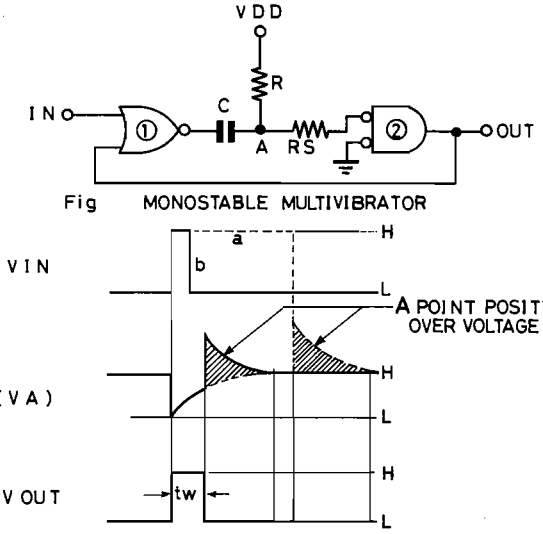
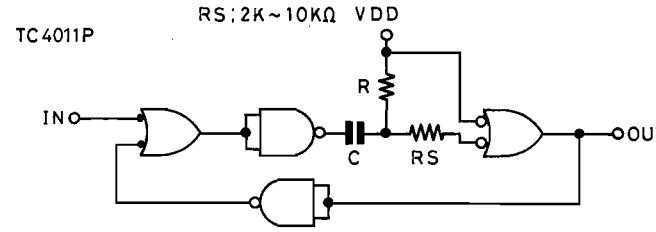


Fig MONOSTABLE MULTIVIBRATOR



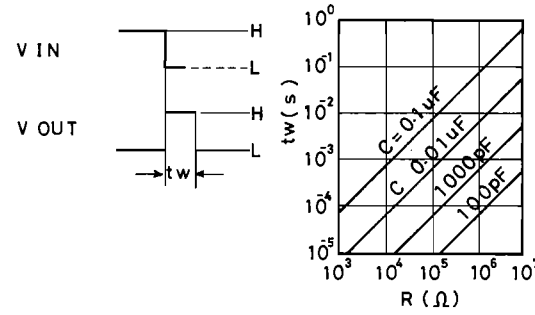
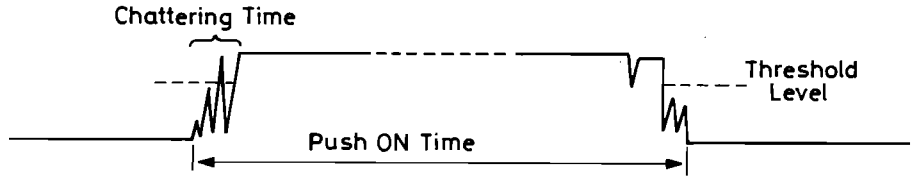


Fig. 1

- As seen from Fig. 2, the push of the switch causes chattering. To prevent this, switching time must be fixed at a certain time. This serves this purpose.

MANUAL SWITCHING WAVEFORM



MONOSTABLE MULTIVIBRATOR OUTPUT

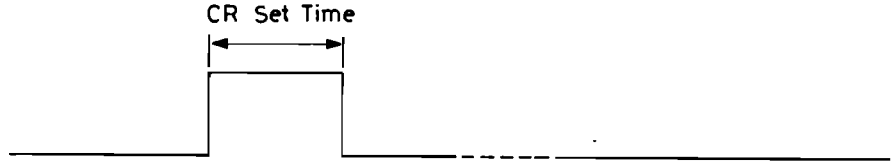
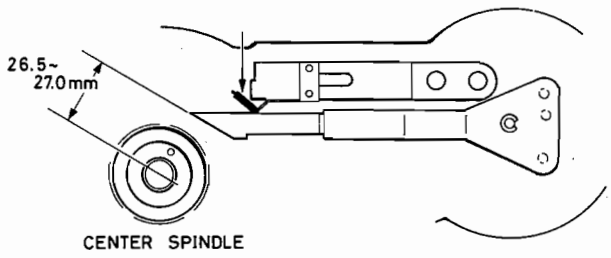


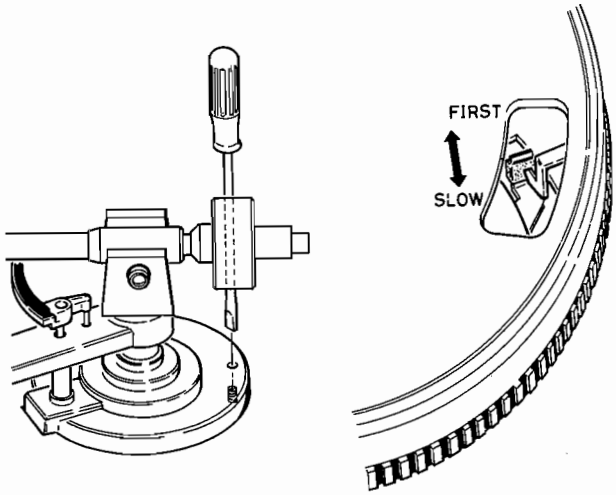
Fig. 2

ADJUSTMENT OF AUTO-RETURN

1. Adjust the stopper (45) so that the shortest distance from the center of the center spindle to the lever (M2) becomes 26.5 – 27.0mm.

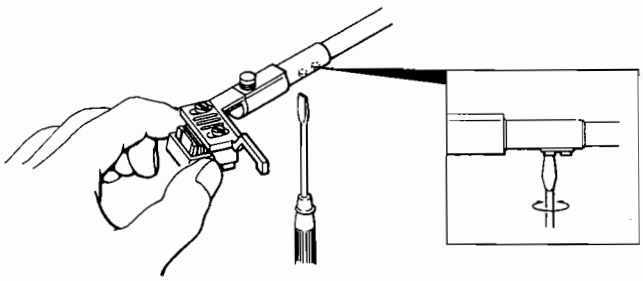


2. There is a shaft which is accessible with an ordinary screwdriver through the hole below the tonearm. (See illustration at right.) When the stylus has reached a point approximately 55mm from the turntable center, turn the shaft clockwise or counterclockwise and select a position where it actuates the auto-return.



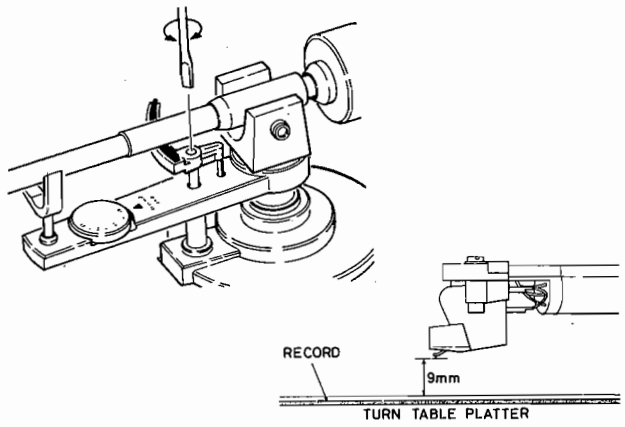
ADJUSTMENT OF HEADSHELL

The headshell attached to the tonearm should not be inclined either to the right or to the left. If necessary, loosen the two screws on the bottom of the tubular arm and adjust the headshell. Be sure that the stylus is normal to the record surface.



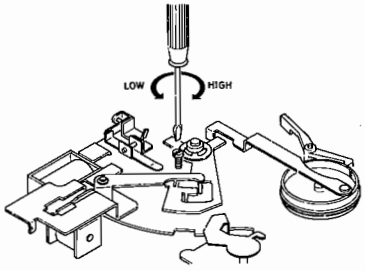
ADJUSTMENT OF TONEARM LIFTER

Depress the cueing button, and turn the screw (Y4) of the arm lifter (P) to adjust so that the distance between the stylus and the record surface becomes 9mm when the stylus of the arm moves up near the outer circumference of the record.



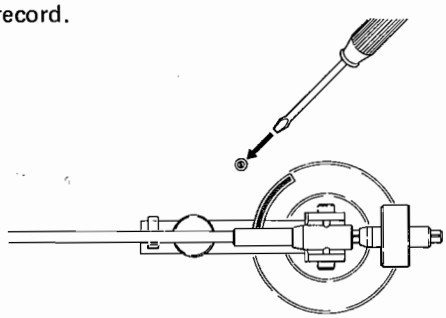
ADJUSTMENT OF LIFT-UP LEVER SPRING

Switch off power when the auto-return has worked and adjust spring tension to provide a clearance of 11mm between the stylus and the record. In this adjustment, the lift-up lever will go up if the screw (M6) is turned clockwise.



ADJUSTMENT OF STYLUS SET DOWN

Adjust the position the needle comes down in an auto play. Adjust the lever (M43) shaft so that the needle comes down at the position of 147mm apart from the center of a 12" record.

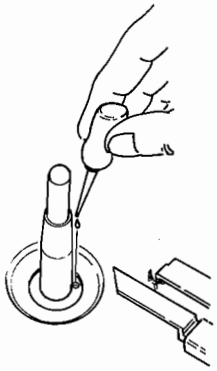


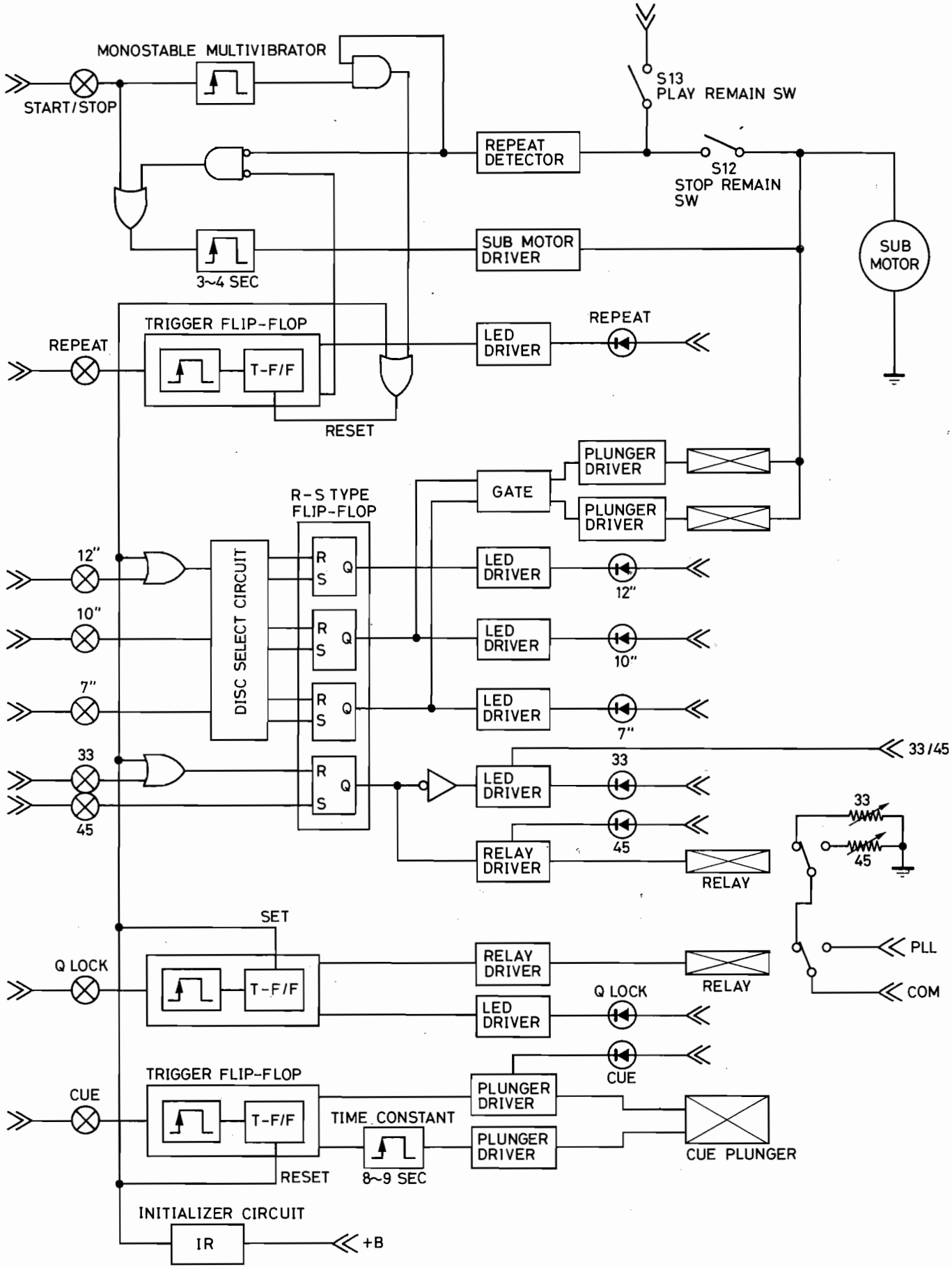
REPAIR

Dismount the turntable platter and supply two to three drops of oil into the D.D. motor through the hole in the motor housing.

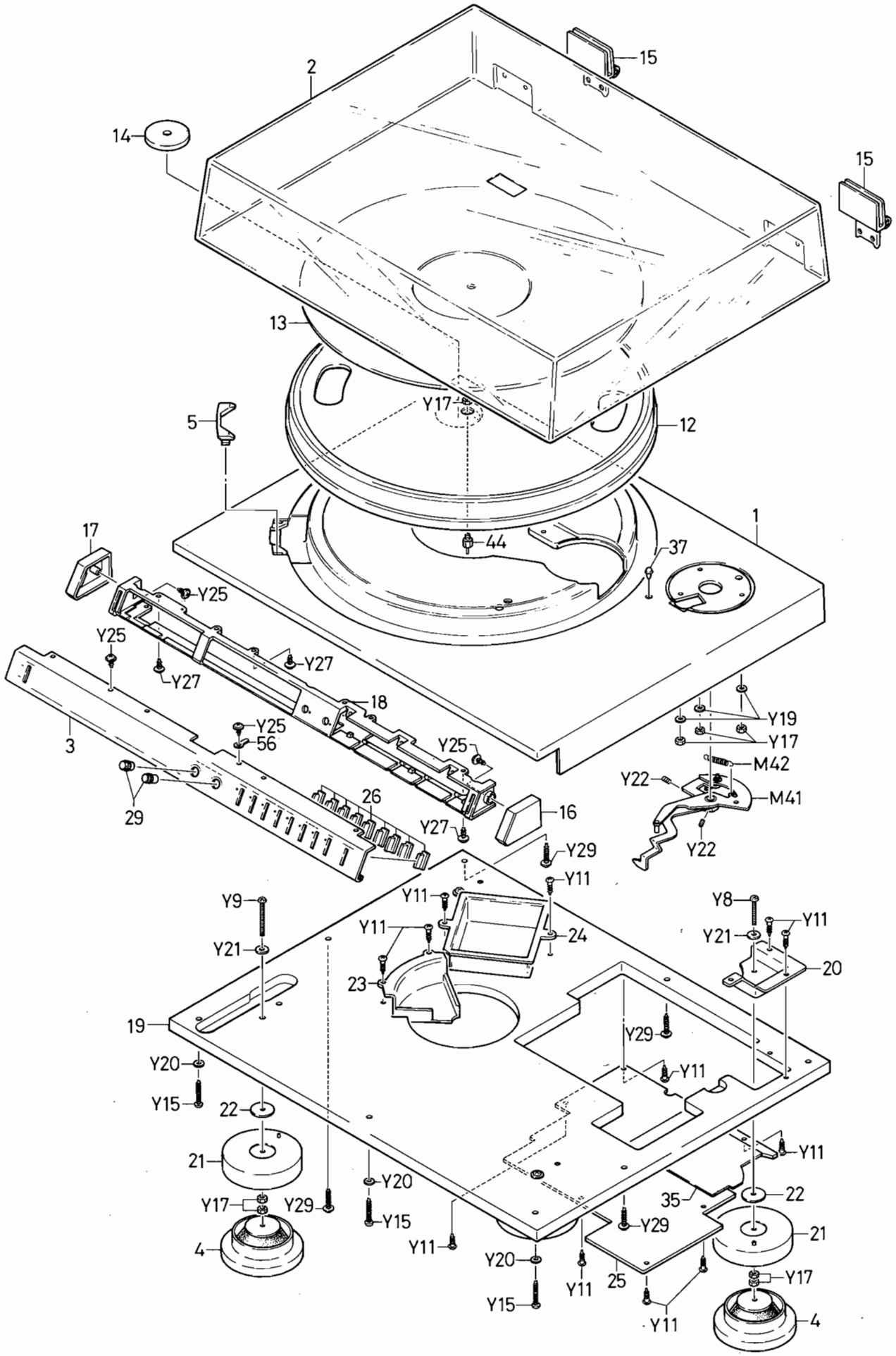
Be careful not to stain any exposed part with oil.

This caution is necessary to prevent operating trouble.




MONOSTABLE MULTIVIBRATOR
START/STOP
S13
PLAY REMAIN SW
REPEAT DETECTOR
S12
STOP REMAIN SW
SUB MOTOR DRIVER
SUB MOTOR
3~4 SEC
TRIGGER FLIP-FLOP
REPEAT
T-F/F
LED DRIVER
RESET
PLUNGER DRIVER
GATE
R-S TYPE FLIP-FLOP
12"
10"
7"
33
45
DISC SELECT CIRCUIT
R
S
Q
33/45
RELAY DRIVER
RELAY
SET
Q LOCK
CUE
TIME CONSTANT
8~9 SEC
CUE PLUNGER
INITIALIZER CIRCUIT
IR
+B
PLL
COM

CABINET EXPLODED VIEW

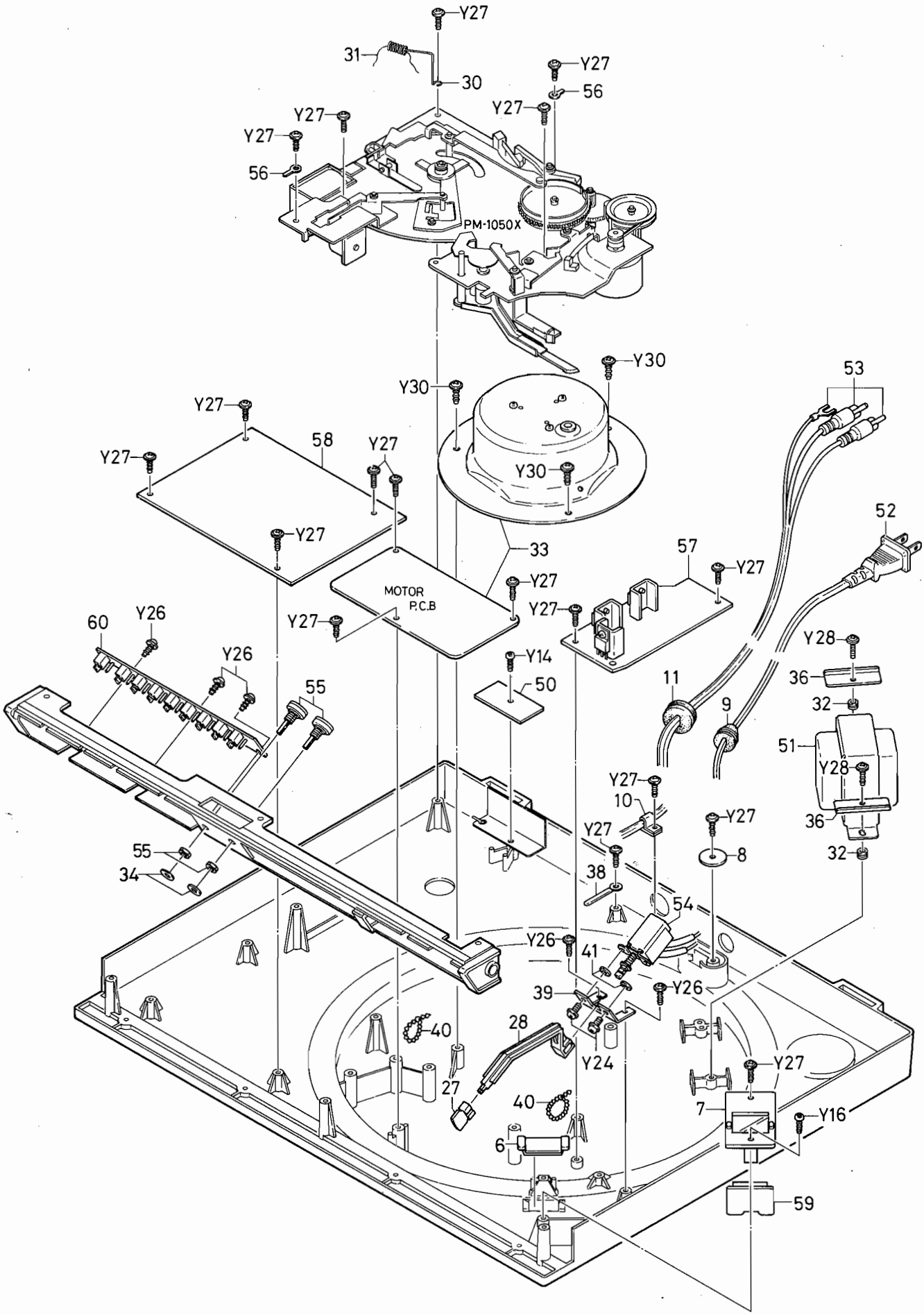


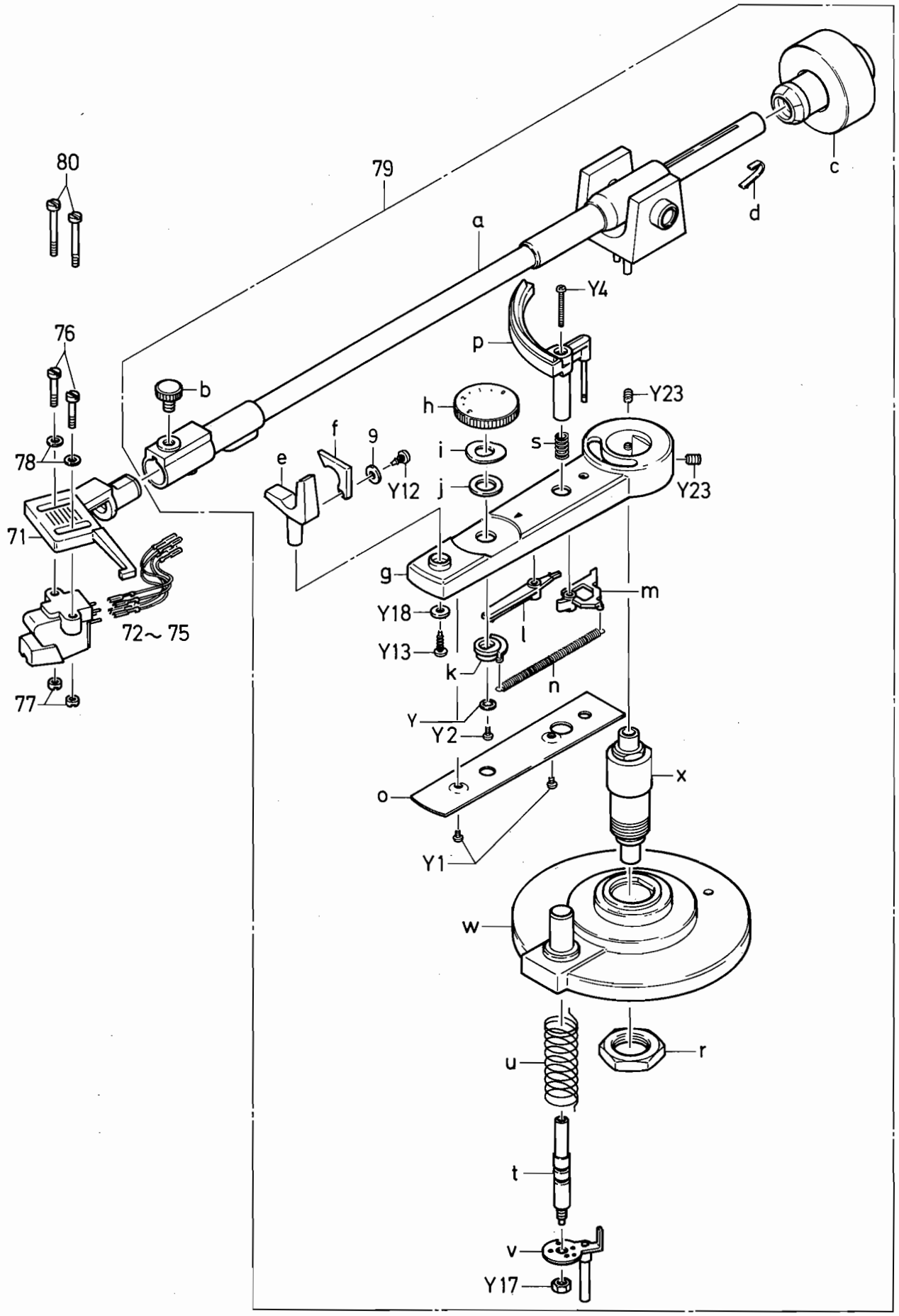
PARTS LIST

Key No.	Part No.	Description	Q'ty
PACKING			
	141-6-133T-06700	Individual Carton	1
	141-6-144T-58600	Form Plastic Case	2
	141-6-317T-18500	Pad, Top	1
	141-6-410T-38600	Instruction Manual	1
	141-6-231T-10200	Inner Polye Cover, Cord	2
	141-6-231T-10100	Inner Polye Cover, Cartridge	7
	141-6-231T-35402	Inner Polye Cover, Turntable Sheet	1
	141-6-231T-25352	Inner Polye Cover, Inst. M.	1
	141-6-231T-50702	Inner Polye Cover, Set	1
	141-6-231T-50602	Inner Polye Cover, Dust Cover	1
	141-6-317T-19600	Pad Paper, Dust Cover	1
	141-6-440T-07100	Hang Tag	1
	141-2-337T-10400	Ribon, Arm	1
	141-6-472T-06200	Cuation Label, Back Lid	1
	141-6-317T-06700	Pad, Turntable Sheet	1
	141-6-472T-17000	Caution Label, Turntable	1
CABINET			
1	141-0-121T-15900	Deck Panel Ass'y	1
2	141-0-194T-01400	Dust Cover Ass'y	1
3	141-0-122T-30501	Front Panel Ass'y	1
4	141-0-174T-09002	Stand Ass'y	4
5	141-2-151T-16800	Decorative Panel	1
6	141-2-131T-22700	Clear Window	1
7	141-2-210T-13300	Bracket, Storobo	1
8	123-2-453R-10500	Plastic Washer, AC Cord	1
9	141-2-445T-16200	Rubber Cushion, AC Cord	1
10	141-2-464T-30000	Fixer	1
11	141-2-445T-16000	Rubber Cushion, Output Cord	1
12	141-2-118T-01000	Turntable	1
13	141-2-246T-41800	Sheet, Turntable	1
14	141-2-352T-19900	Spacer, 45 rpm Adaptor	1
15	141-2-251T-07000	Hinge	2
16	141-2-153T-52300	Escutcheon, R	1
17	141-2-153T-52400	Escutcheon, L	1
18	141-2-210T-16100	Bracket	1
19	141-2-126T-31500	Back Lid	1
20	141-2-274T-01500	Bracket, Stand	1
21	141-2-174T-08900	Stand	4
22	141-2-246T-60400	Sheet	4
23	141-2-135T-63500	Cover, Motor	1
24	141-2-135T-63600	Cover, Power Trans	1
25	141-2-135T-63900	Cover, Mechanism	1
26	141-2-161T-69200	Push Button	9
27	141-2-161T-72200	Push Button, Power Switch	1
28	141-2-253T-20700	Joint, Power Switch	1
29	141-0-163T-67800	Rotary Knob Ass'y, Speed Fine Adjust	2
30	141-2-852T-59700	Spring Wire	1
31	141-2-340T-00200	Rope	1
32	141-2-445T-05000	Rubber Cushion, Power Trans.	2
33	4-527T-11700	Motor	1
34	141-2-241T-22800	Veil	2
35	141-2-322T-58600	Shield Plate	1
36	141-2-411T-12100	Plate Nut, Power Trans.	2
37	141-2-135T-65600	Cover	1
38	141-2-472T-01201	Lug	1
39	141-2-365T-50900	Bracket, Power Switch	1
40	141-2-464T-08700	Fixer	3
41	141-2-447T-32001	Cushion	2
42	141-2-453T-61300	Wahser	2
43	141-2-457T-23000	Special Washer	1
44	141-0-462T-59300	Boss Ass'y	1
45	141-0-465T-17100	Stopper Ass'y	1
46	141-2-490T-02700	Tube	7
SCREW MOUNTING			
Y1		Pan Head Screw 2x3mm	2
Y2		Pan Head Screw 2x4mm	1
Y3		Pan Head Screw 2x6mm	3
Y4		Pan Head Screw 2x14mm	1
Y5		Pan Head Screw 2.6x6mm	1
Y6		Pan Head Screw 3x4mm	13
Y7		Pan Head Screw 3x6mm	5
Y8		Pan Head Screw 3x25mm	1
Y9		Pan Head Screw 3x35mm	3
Y10		Flat Head Screw 3x5mm	2
Y11		Round Head Wood Screw 3.1x13mm	12
Y12		Tapping Screw 2.6x6mm	1
Y13		Tapping Screw 2.6x8mm	1

Key No.	Part No.	Description	Q'ty
SCREW MOUNTING			
Y14		Tapping Screw 3x10mm	1
Y15		Tapping Screw 3x25mm	3
Y16		Binding Head Tapping Screw 3x10mm	1
Y17		Regular Hexagon Nut 3mm	12
Y18		Washer 2.6x6x0.5mm	1
Y19		Washer 3x8x0.5mm	5
Y20		Washer 3x8x1mm	3
Y21		Washer 3x10x1mm	4
Y22		Headless Screw with Hexagon Hole 3x4mm	2
Y23		Headless Screw with Hexagon Hole 3x6mm	2
Y24		Pan Head Screw with Washer 3x6mm	2
Y25		Tapping Screw with Washer 3x6mm	4
Y26		Tapping Screw with Washer 3x8mm	5
Y27		Tapping Screw with Washer 3x10mm	21
Y28		Tapping Screw with Washer 3x12mm	2
Y29		Tapping Screw with Washer 3x20mm	5
Y30		Tapping Screw with Washer 4x12mm	3
ELECTRICAL PARTS			
50	4-230T-82100	P.C. Board, Output Power	1
51	4-300T-05900	Power Trans.	1
52	4-243T-81271	Power Cord	1
53	4-243T-15171	Lead Cord	1
54	4-238T-01371	Power Switch	1
55	4-222T-80600	Variable Resistor, Speed Adjust	2
56	123-2-472R-00401	Lug	3
POWER SUPPLY PCB ASS'Y			
57	141-4-233T-25000	P.C. Board Ass'y, Power Supply	1
	141-2-368T-18700	Heat Sink Q21,23	3
		Pan Head Tapping Screw 3x8mm	3
D34,35 36		Diode W02	3
D31		Zener Diode UZ-10U or XZ100	1
D32		Zener Diode WZ192	1
D33		Zener Diode XZ215	1
Q21,22 23		Transistor 2SD330	3
	CAPACITORS		
C21		Electrolytic 100μF 16V	1
C27		Electrolytic 100μF 25V	1
C22		Electrolytic 10μF 16V	1
C25,28		Electrolytic 10μF 25V	2
C23		Electrolytic 220μF 25V	1
C26		Electrolytic 1000μF 35V	1
C29		Electrolytic 220μF 35V	1
C24		Electrolytic 330μF 25V	1
C30,31 32		Ceramic 0.01μF 50V +80—20%	3
C34		Cermaic 0.001μF 50V ± 10%	1
C33	4-223T-04900	Capacitor 0.047μF	1
	RESISTORS		
R61		Solid 820 ohm ±10% ½W	1
R62		Solid 1.2K ohm ±10% ½w	1
R63		Solid 1.5K ohm ±10% ½W	1
CONTROL PCB ASS'Y			
58	141-4-233T-25100	P.C. Board Ass'y, Control	1
RL1,2	4-232T-05500	Relay	2
RA1,2	4-221T-02900	Resistor 100K X 5	2
	4-235T-69471	Socket	3
IC1,2,4		I.C TC4001BP	3
IC8,9		I.C TC4011 BP	2
IC6,7		I.C TC4013BP	2
IC5		CMOS I.C TC4043BP	1
IC3		CMOS I.C TC4071BP	1
IC10		I.C LB1287	1
D9,10 11,12 13,14 15,16		Diode DS442X	8

CHASSIS EXPLODED VIEW




80
79
a
c
d
Y4
p
76
b
h
Y23
f
9
i
s
78
e
Y12
j
Y23
71
g
m
Y18
l
72~75
Y13
k
n
77
Y
Y2
x
o
Y1
w
u
r
t
v
Y17

PARTS LIST

Key No.	Part No.	Description	Q'ty
CONTROL PCB ASS'Y			
D23,24, 25,26 27		Diode 1N4003	5
D22		Zener Diode WZ069	1
D21		Diode 1N60 FM	1
D17,18 19,20		Diode DS442X	4
Q1,2,3,4 5,6,7,8		Transistor 2SC536 AUD	8
Q11		Transistor 2SC1175	1
Q9		Transistor 2SD545	1
Q10		Transistor 2SB598	1
	RESISTORS		
R35,36 37,38 39,40		Carbon 820 ohm ±5% ¼W	6
R42		Carbon 470 ohm ±5% ¼W	1
R19,24 25,26 27,28 29,30		Carbon 2.2K ohm ±5% ¼W	8
R46		Carbon 4.7K ohm ±5% ¼W	1
R32,33		Carbon 5.6K ohm ±5% ¼W	2
R2,4,6 9,11, 12,14 15,16		Carbon 10K ohm ±5% ¼W	9
R7,31		Carbon 100K ohm ±5% ¼W	2
R43		Carbon 180K ohm ±5% ¼W	1
R13		Carbon 1M ohm ±5% ¼W	1
R17,1,5 8,10		Carbon 1.5M ohm ±5% ¼W	5
R3		Carbon 2.2M ohm ±10% ¼W	1
R18,44		Carbon 10K ohm ±5% ¼W	2
R20,21		Carbon 3.3K ohm ±5% ¼W	2
R45		Carbon 2.2K ohm ±5% ¼W	1
R47		FP-Carbon 10 ohm ±5% ½W	1
R48		Metal 100 ohm ±5% 2W	1
R22,23		Carbon 47K ohm ±5% ¼W	2
R51,52		Carbon 30K ohm ±5% ¼W	2
R49,50		FP-Carbon 10 ohm ±5% ¼W	2
	CAPACITORS		
C2,9		Electrolytic 1μF 50V	2
C12,14		Electrolytic 4.7μF 25V	2
C10		Electrolytic 10μF 16V	1
C1,3,5 7,13		Mylar 0.01μF 50V ±20%	5
C4,6,8 15		Ceramic 0.001μF 50V ±5%	4
C11		Ceramic 0.001μF 50V ±5%	1
C20,37		Ceramic 0.047μF 50V +80–20%	2
C35,36,38 39,40,41		Ceramic 0.01μF 50V +80–20%	6
STOROBO PCB ASS'Y			
59	141-4-233T-23200	P.C. Board Ass'y, Storobo	1
D41-43		LED SLR53U Red	3
	141-2-329T-06400	Reflector	1
SWITCH PCB ASS'Y			
60	141-4-233T-24800	P.C. Board Ass'y, Switch	1
	4-238T-08800	Switch	9
D1-8		LED SLP135B Red	8
R34		Carbon Res 820 ohm ±10% 1/8W	1
C16,17 18,19		Ceramic Cap 0.001μF 50V ±10%	4
C42,43 44		Ceramic Cap 0.01μF 50V +80–20%	3
ARM			
71	141-0-286T-01100	Head Shell Ass'y	1
72	4-243T-18100	Lead Cord	1
73	4-243T-18171	Lead Cord	1
74	4-243T-18172	Lead Cord	1
75	4-243T-18173	Lead Cord	1
76	141-2-421T-23700	Special Screw	2
80	141-2-421T-23701	Special Screw	2
77	141-2-417T-18100	Stud Nut	2
78	141-2-453T-32200	Washer	2

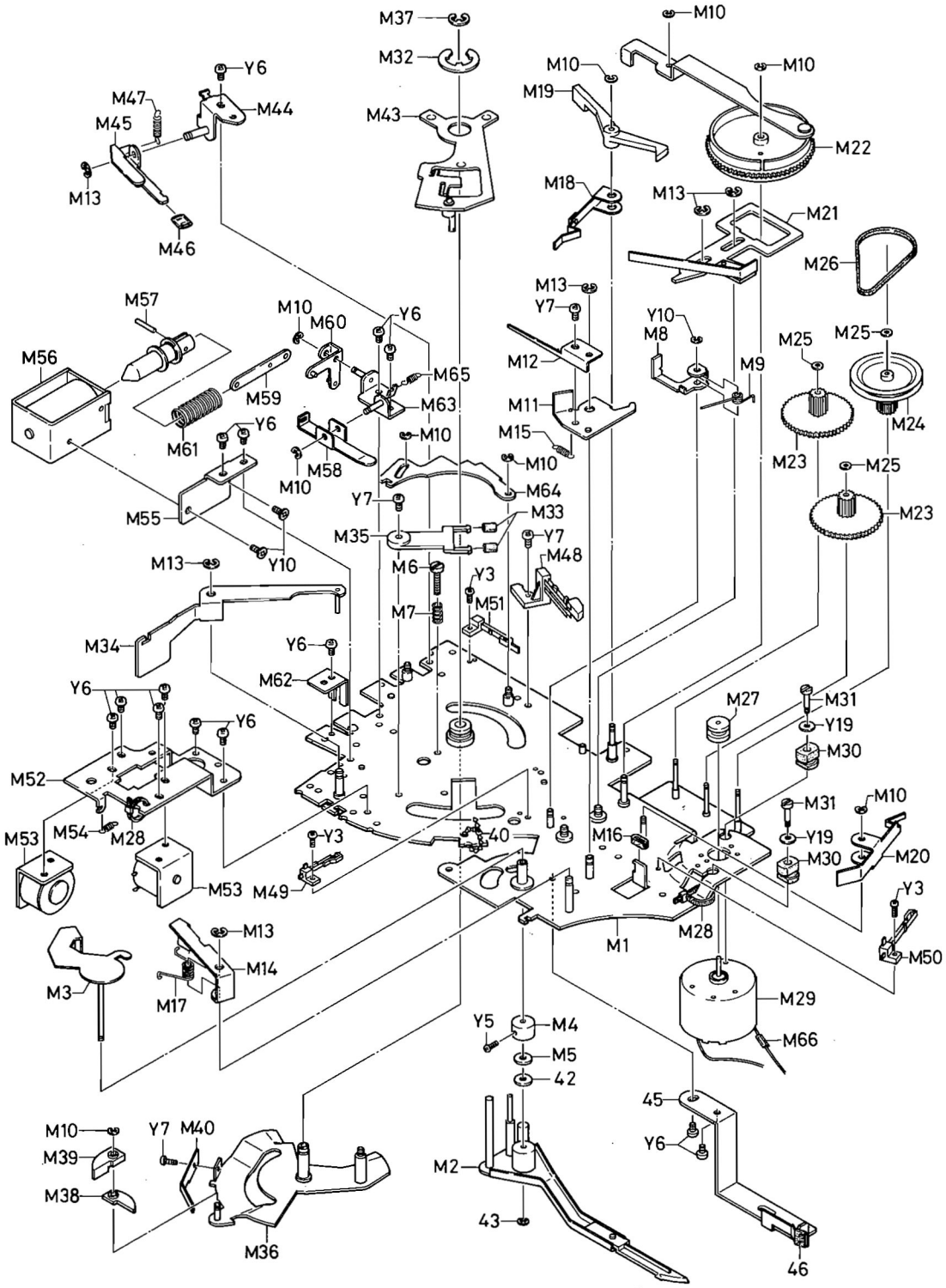
Key No.	Part No.	Description	Q'ty
ARM			
79	141-0-743T-06920	Arm Complete	1
a	141-0-743T-06900	Arm Ass'y	1
b	141-2-155T-05700	Ring Knob	1
c	141-0-687T-02000	Weight Ass'y	1
d	141-0-853T-65700	Spring Plate Ass'y	1
e	141-2-873T-00600	Rest	1
f	141-2-873T-00700	Rest	1
g	141-2-243T-11000	Base	1
h	141-2-155T-05800	Ring Knob	1
i	141-2-457T-14600	Special Washer	1
j	141-2-453T-20800	Washer 6.2x10x0.5	1
k	141-2-661T-30400	Pulley	1
l	141-2-742T-45100	Lever	1
m	141-2-742T-45200	Lever	1
n	141-2-855T-48500	Spring Coil	1
o	141-2-135T-64000	Cover	1
p	141-0-872T-00520	Lifter Ass'y	1
q	141-2-453T-32300	Washer	1
r	141-2-415T-01900	Hexagon Nut	1
s	141-2-855T-48600	Spring Coil	1
t	141-2-753T-80900	Shaft	1
u	141-2-855T-48700	Spring Coil	1
v	141-0-742T-45300	Lever Ass'y	1
w	141-0-174T-09100	Stand Ass'y	1
x	141-0-573T-11800	Bearing Ass'y	1
y		Washer 2x4.8x0.3	1
MECHANISM			
M1	141-0-311T-28701	Chassis Ass'y	1
M2	141-0-742T-15801	Lever Ass'y	1
M3	141-0-742T-43300	Lever Ass'y	1
M4	141-2-683T-36000	Ring	1
M5	141-2-453T-30202	Washer 2.6x4.7x0.5 Nylon	1
M6	141-2-421T-26500	Special Screw	1
M7	141-2-855T-30900	Spring Coil	1
M8	141-2-742T-25500	Lever	1
M9	141-2-855T-31000	Spring Coil	1
M10	141-2-457T-23000	Special Washer	10
M11	141-2-742T-16000	Lever	1
M12	141-2-853T-55900	Spring Plate	1
M13	141-2-457T-23100	Special Washer	6
M14	141-2-742T-16100	Lever	1
M15	141-2-851T-56100	Spring Coil	1
M16	141-2-712T-02500	Brake Shoe	1
M17	141-2-852T-55600	Spring Wire	1
M18	141-2-853T-56100	Spring Plate	1
M19	141-2-742T-17200	Lever	1
M20	141-2-853T-56001	Spring Plate	1
M21	141-0-731T-59700	Slide Ass'y	1
M22	141-0-581T-11201	Gear Ass'y	1
M23	141-2-581T-11300	Gear	2
M24	141-2-661T-26700	Pulley	1
M25	141-2-457T-04100	Special Washer	3
M26	141-2-564T-18600	Square Belt	1
M27	141-2-661T-72201	Pulley Motor	1
M28	141-2-464T-20600	Fixer	5
M29	4-527T-12500	Motor	1
M30	141-2-445T-11801	Rubber Cushion	2
M31	141-2-421T-16000	Special Screw	2
M32	141-2-457T-23900	Special Washer	1
M33	141-2-445T-22100	Rubber Cushion	2
M34	141-0-742T-43600	Lever Ass'y	1
M35	141-2-465T-17200	Stopper	1
M36	141-0-742T-43400	Lever Ass'y	1
M37	141-2-457T-23200	Special Washer	1
M38	141-2-742T-17300	Lever	1
M39	141-2-742T-17400	Lever	1
M40	141-2-853T-56400	Spring Plate	1
M41	141-0-742T-16601	Lever Ass'y	1
M42	141-2-851T-73500	Spring Coil	1
M43	141-0-742T-43500	Lever Ass'y	1
M44	141-0-747T-19000	Bracket Lever Ass'y	1
M45	141-2-742T-43700	Lever	1
M46	141-2-490T-02300	Tube	1
M47	141-2-855T-31100	Spring Coil	1
M48	4-231T-83100	Switch, Muting	1
M49	4-231T-83200	Switch, Start	1
M50	4-231T-83300	Switch, Cat Lock	1
M51	4-238T-09600	Switch, Motor	1
M52	141-2-310T-32100	Bracket	1
M53	4-264T-08300	Magnetic Coil	2
M54	141-2-855T-47500	Spring Coil	1
M55	141-2-310T-32200	Bracket	1

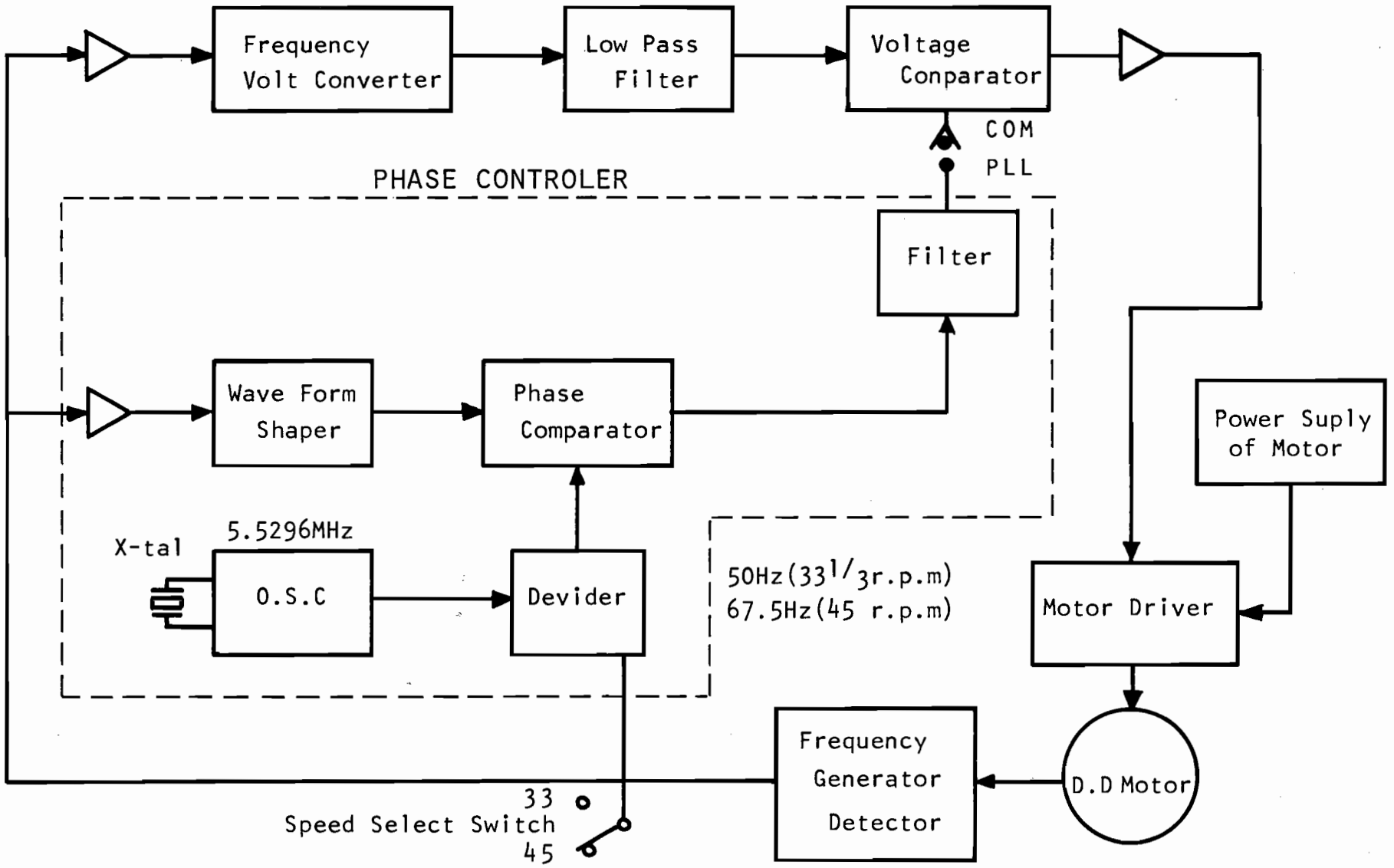
PARTS LIST

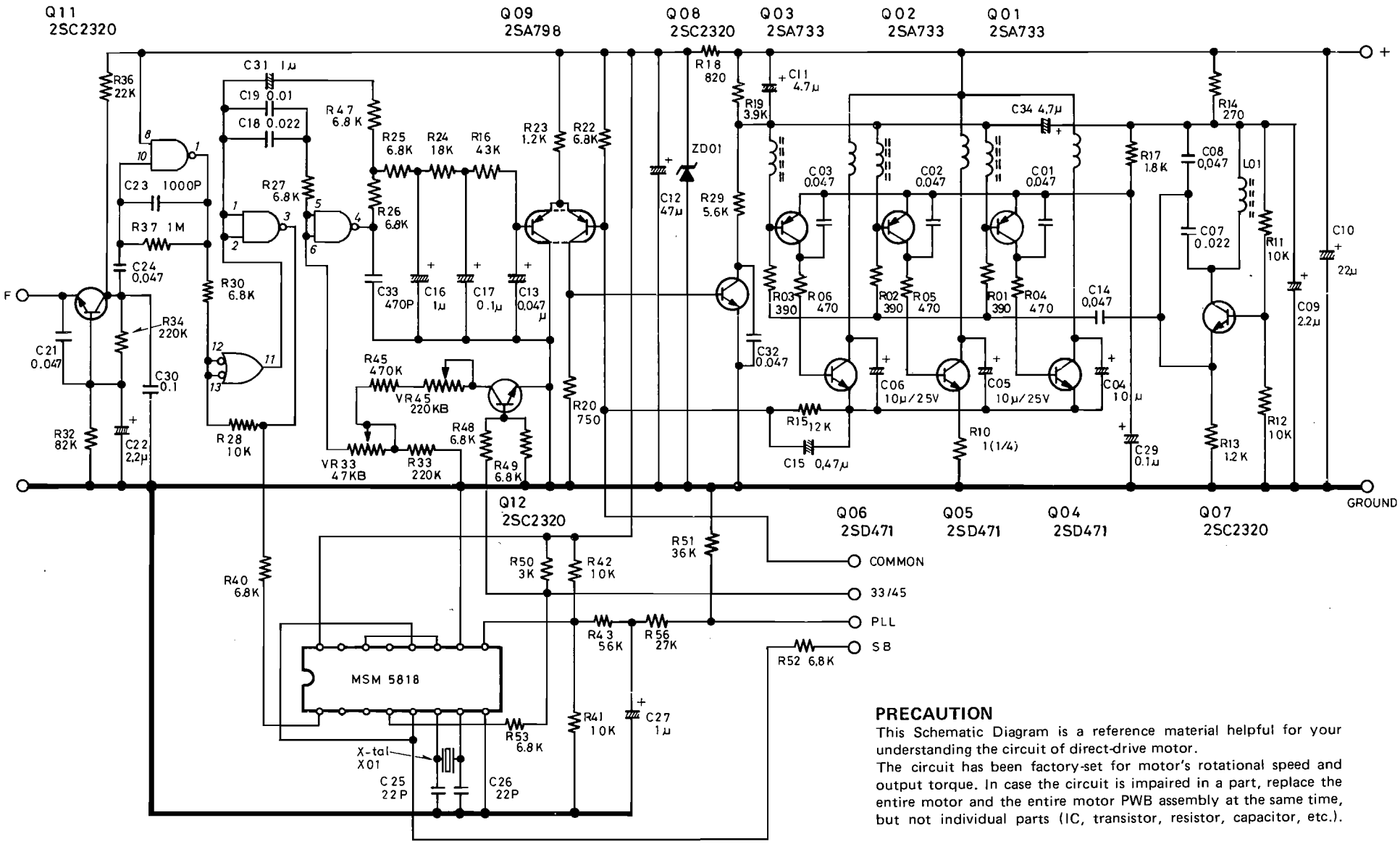
Key No.	Part No.	Description	Q'ty
MECHANISM			
M56	4-264T-08400	Magnetic Coil	1
M57	141-2-488T-01302	Pin	1
M58	141-2-742T-43800	Lever	1
M59	141-2-742T-43900	Lever	1
M60	141-0-742T-44000	Lever Ass'y	1
M61	141-2-855T-47600	Spring Coil	1

Key No.	Part No.	Description	Q'ty
MECHANISM			
M62	141-2-465T-17300	Stopper	1
M63	141-0-747T-19100	Bracket Lever Ass'y	1
M64	141-2-742T-45400	Lever	1
M65	141-2-855T-47700	Spring Coil	1
M66		Diode 1N4003 (D28)	1

MECHANISM EXPLODED VIEW




Frequency
Volt Converter
Low Pass
Filter
Voltage
Conparator
COM
PLL
PHASE CONTROLER
Filter
Wave Form
Shaper
Phase
Comparator
Power Suply
of Motor
X-tal
5.5296MHz
O.S.C
Devider
50Hz(33 1/3r.p.m)
67.5Hz(45 r.p.m)
Motor Driver
Frequency
Generator
Detector
D.D Motor
33
Speed Select Switch
45



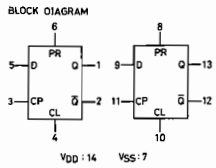
PRECAUTION

This Schematic Diagram is a reference material helpful for your understanding the circuit of direct-drive motor.

The circuit has been factory-set for motor's rotational speed and output torque. In case the circuit is impaired in a part, replace the entire motor and the entire motor PWB assembly at the same time, but not individual parts (IC, transistor, resistor, capacitor, etc.).

TC4013 (DUAL D-TYPE FLIP FLOP)

BLOCK DIAGRAM

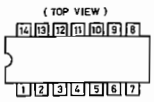


TRUTH TABLE

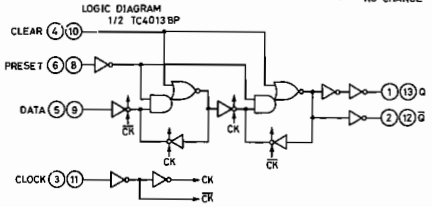
INPUTS				OUTPUTS	
CL	PR	D	CP	Qn+1	$\overline{Qn+1}$
L	H	※	※	H	L
H	L	※	※	L	H
H	H	※	※	L	H
L	L	L	↑	L	H
L	L	H	↑	H	L
L	L	※	↓	Qn *	$\overline{Qn}$ *

※ : DON'T CARE
▲ : LEVEL CHANGE
* : NO CHANGE

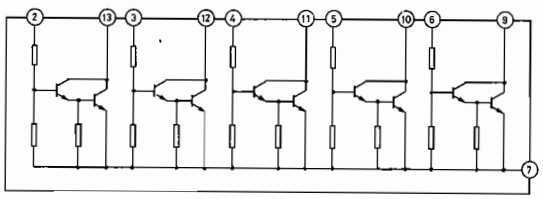
(TOP VIEW)



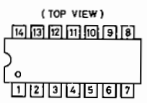
LOGIC DIAGRAM
1/2 TC4013BP

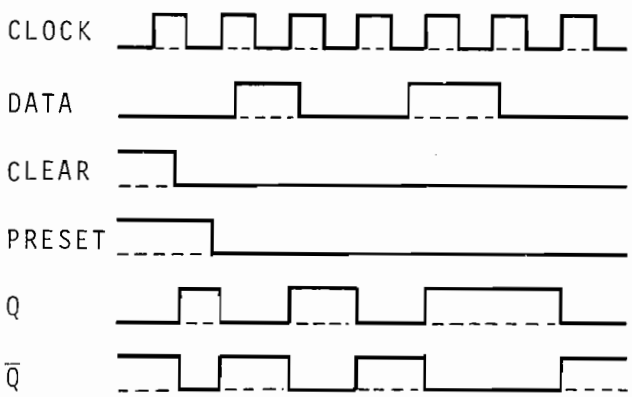


LB1287, LB1288 (MONOLITHIC DIGITAL IC DARLINGTON TRANSISTOR ARRAY)



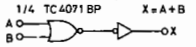
(TOP VIEW)



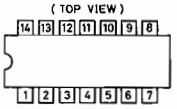


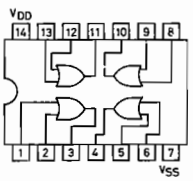
TC4071BP (QUAD 2-INPUT POSITIVE OR GATE)

LOGIC DIAGRAM
1/4 TC4071BP
X = A + B



(TOP VIEW)

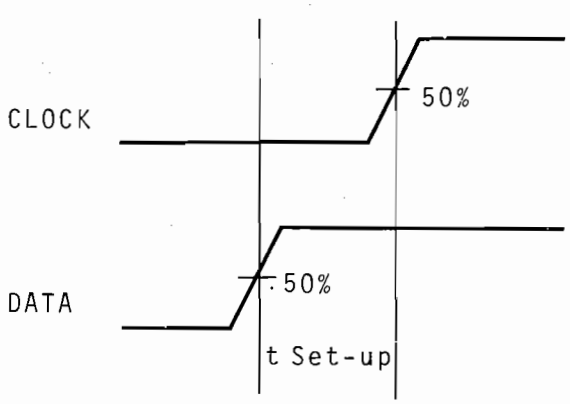




TC4013 (DUAL D-TYPE FLIP-FLOP)

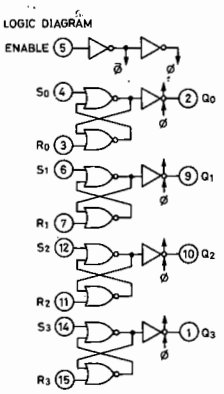
Description of operation

1. Clearing
   Impressing a high-level signal on its clear input depresses output Q to low irrespective of input.
2. Presetting
   Raising preset input to high raises output Q to high as well, if clear input is low.
3. Clocking
   Output changes with the rise of clock input. Data input and clock input require t setup time as shown below.

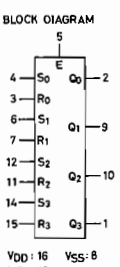


TC4043BP (QUAD POSITIVE NOR R/S LATCH)

LOGIC DIAGRAM



BLOCK DIAGRAM

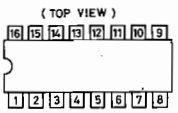


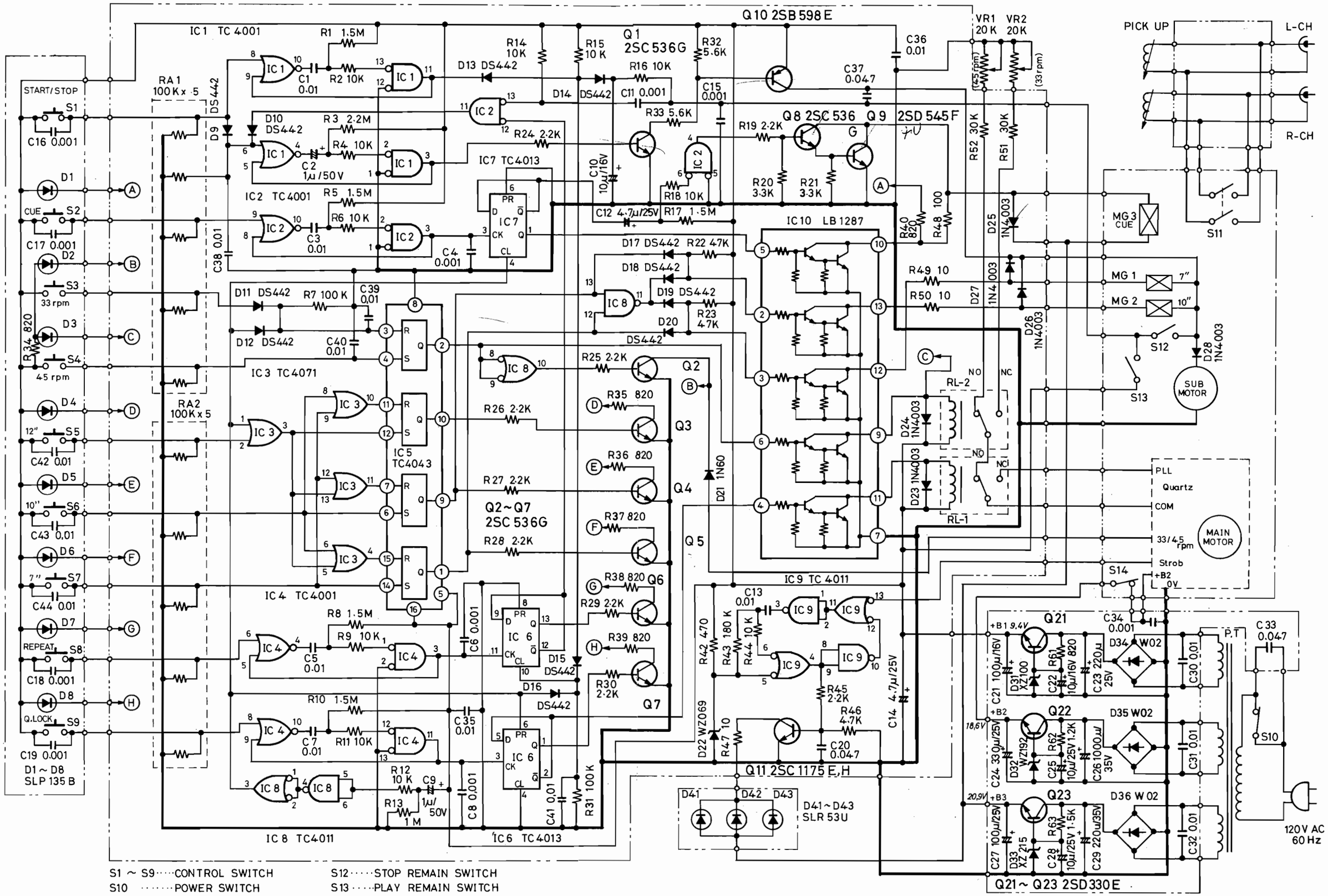
TRUTH TABLE

S	R	E	Q
※	※	L	HZ
L	L	H	NO CHANGE
L	H	H	L
H	L	H	H
H	H	H	H

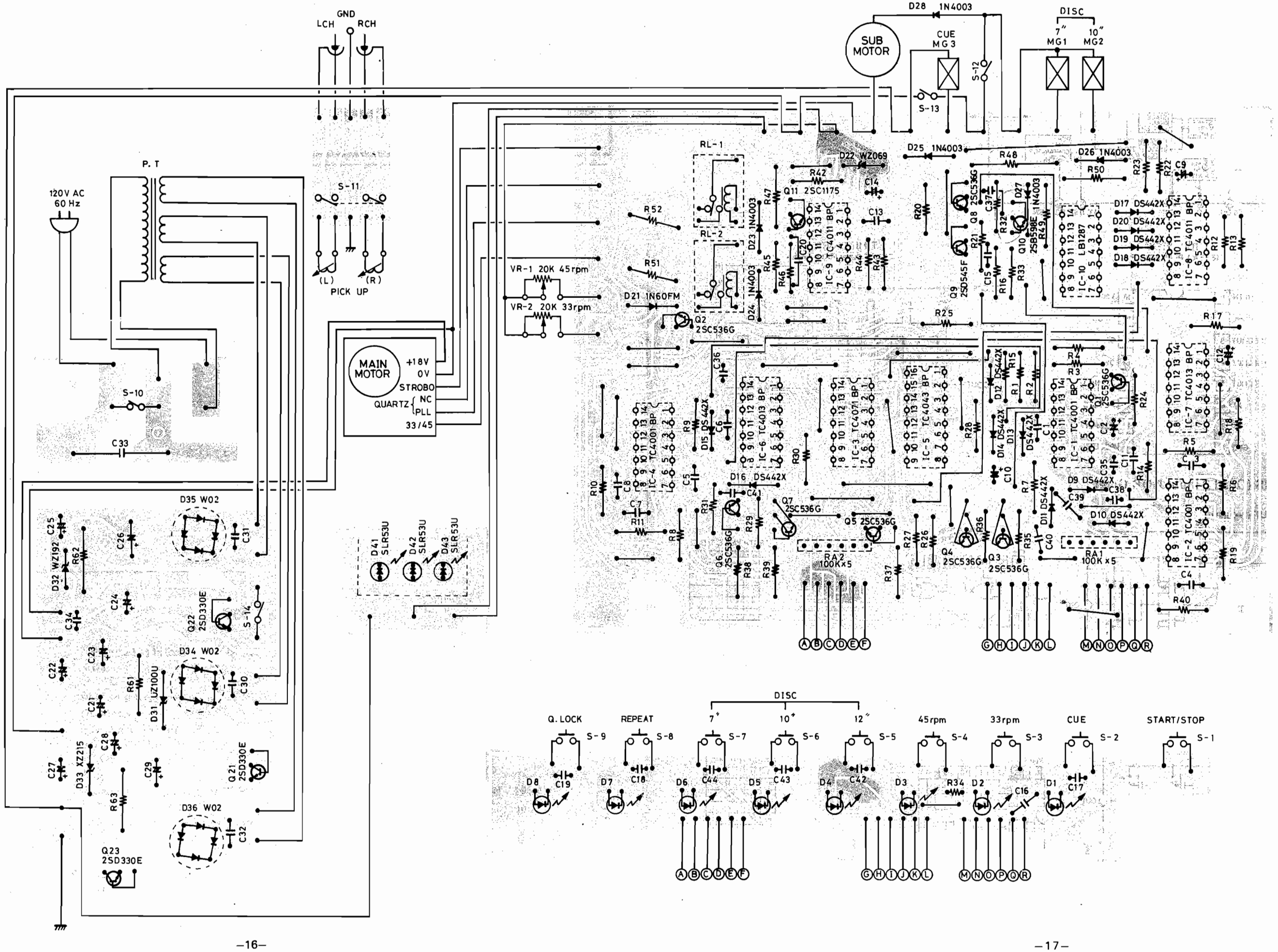
※ : DON'T CARE
HZ : HIGH IMPEDANCE

(TOP VIEW)

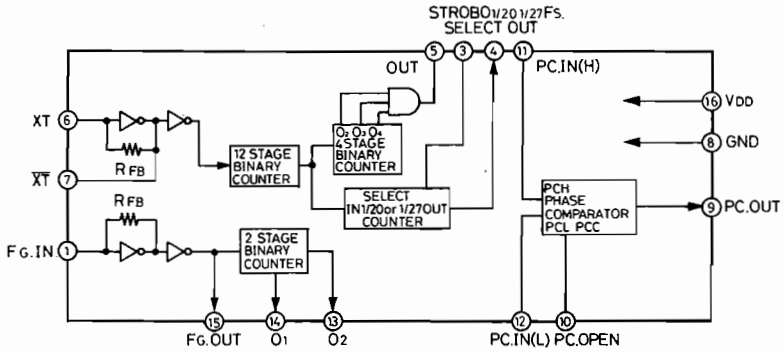


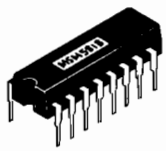


S1 ~ S9·····CONTROL SWITCH
S10 ·····POWER SWITCH
S11 ·····MUTING SWITCH
S12·····STOP REMAIN SWITCH
S13·····PLAY REMAIN SWITCH
S14·····PLAY SWITCH

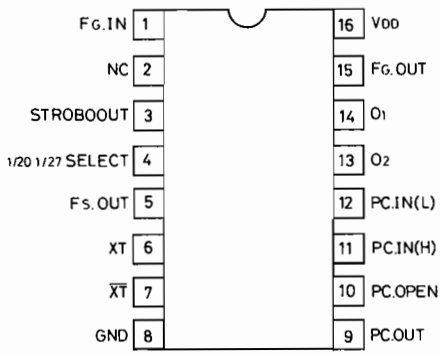

GND
LCH
RCH
P. T
120V AC
60 Hz
S-11
(L)
(R)
PICK UP
S-10
C33
MAIN MOTOR
+18V
0V
STROBO
QUARTZ { NC / PLL
33/45
SUB MOTOR
D28 1N4003
CUE MG3
S-12
S-13
DISC
7" MG1
10" MG2
RL-1
RL-2
VR-1 20K 45rpm
VR-2 20K 33rpm
R52
R51
D21 1N60FM
Q2 2SC536G
D22 WZ069
D25 1N4003
D26 1N4003
R48
R50
R42
Q11 2SC1175
C14
C13
R47
D23 1N4003
D24 1N4003
R45
R46
R44
R43
R20
R21
R32
R49
R25
R17
R4
R3
R24
R5
R18
R19
R6
R40
C9
C12
C36
C6
C5
C8
C7
R11
R8
R10
R9
R30
R28
R31
R29
R38
R39
R37
R27
R26
R36
R35
R7
C10
C11
C35
C38
C39
C40
C4
C1
C2
C3
D9 DS442X
D10 DS442X
D11 DS442X
D12 DS442X
D13
D14 DS442X
D15 DS442X
D16 DS442X
D17 DS442X
D18 DS442X
D19 DS442X
D20 DS442X
Q8 2SC536G
Q9 2SD545F
Q10 2SB598E
Q7 2SC536G
Q5 2SC536G
Q6 2SC536G
Q4 2SC536G
Q3 2SC536G
RA2 100K x5
RA1 100K x5
IC-1 TC4001 BP
IC-2 TC4001 BP
IC-3 TC4071 BP
IC-4 TC4001 BP
IC-5 TC4043 BP
IC-6 TC4013 BP
IC-7 TC4013 BP
IC-8 TC4011 BP
IC-9 TC4011 BP
IC-10 LB1287
D35 W02
D34 W02
D36 W02
D31 UZ100U
D32 WZ192
D33 XZ215
Q22 2SD330E
Q21 2SD330E
Q23 2SD330E
S-14
D41 SLR53U
D42 SLR53U
D43 SLR53U
Q. LOCK
REPEAT
DISC
7"
10"
12"
45rpm
33rpm
CUE
START/STOP
S-9
S-8
S-7
S-6
S-5
S-4
S-3
S-2
S-1
D8
D7
D6
D5
D4
D3
D2
D1
C19
C18
C44
C43
C42
C16
C17
R34
A B C D E F
G H I J K L
M N O P Q R

MSM5818RS (MOTOR CONTROL PLL LSI)

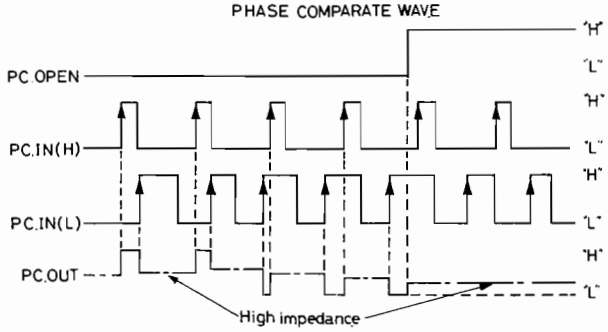




TOP VIEW
16 LEAD PLASTIC DIP

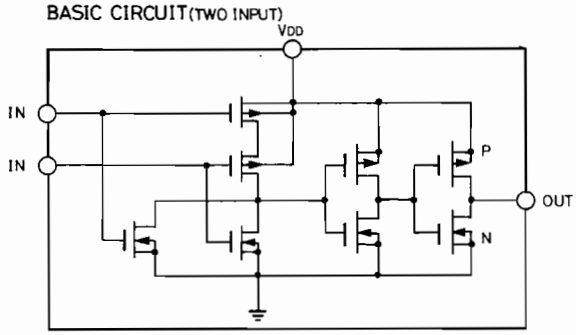


TIME CHART
PHASE COMPARATE WAVE

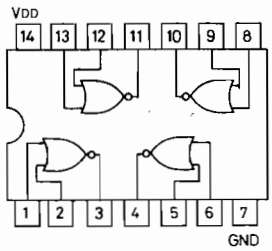


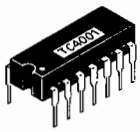
MSM 4001 RS (Quad 2-input NOR Gate)

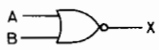
BASIC CIRCUIT (TWO INPUT)



TOP VIEW
14 LEAD PLASTIC DIP





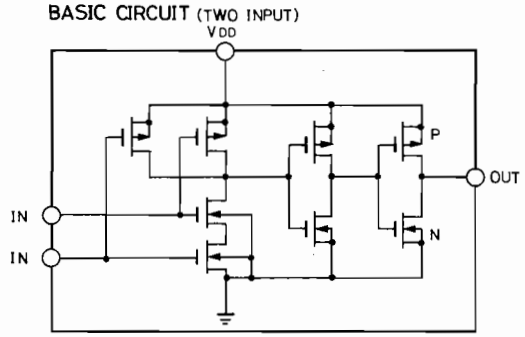


TRUTH VALUE TABLE

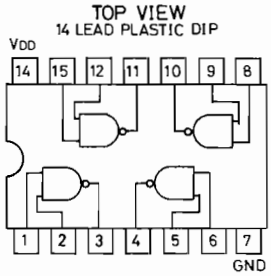
INPUT		OUTPUT
A	B	X
L	L	H
L	H	L
H	L	L
H	H	L

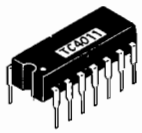
MSM 4011 RS (Quad 2-input NAND Gate)

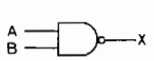
BASIC CIRCUIT (TWO INPUT)



TOP VIEW
14 LEAD PLASTIC DIP







TRUTH VALUE TABLE

INPUT		OUTPUT
A	B	X
L	L	H
L	H	H
H	L	H
H	H	L

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