# SERVICE MANUAL

SANYO

# DC-SERVO BELT DRIVE ELECTRONIC CONTROL FULL-AUTOMATIC TURNTABLE

# TP M15
(EUROPE)

**NOTE:**
The photo on the cover shows the unit with a "SILVER" front panel. The "BLUE" version is identical in all respects.

## SPECIFICATIONS

| | |
|---|---|
| Motor | DC Servo |
| Drive System | Belt |
| Wow & Flutter (WRMS) | 0.05 % |
| Rumble (DIN 45539B) | –65 dB |
| Platter Diameter | 296 mm |
| Platter Weight | 0.8 kg |
| Record Speed Selector | 33/45 rpm |
| Auto Function | |
| Start | Yes |
| Stop | Yes |
| Reject | Yes |
| Cueing | Yes |
| Repeat | Yes |
| Automatic Tone Arm Return at End of Record | Yes |
| Manual Function | |
| Start | Yes |
| Stop | Yes |

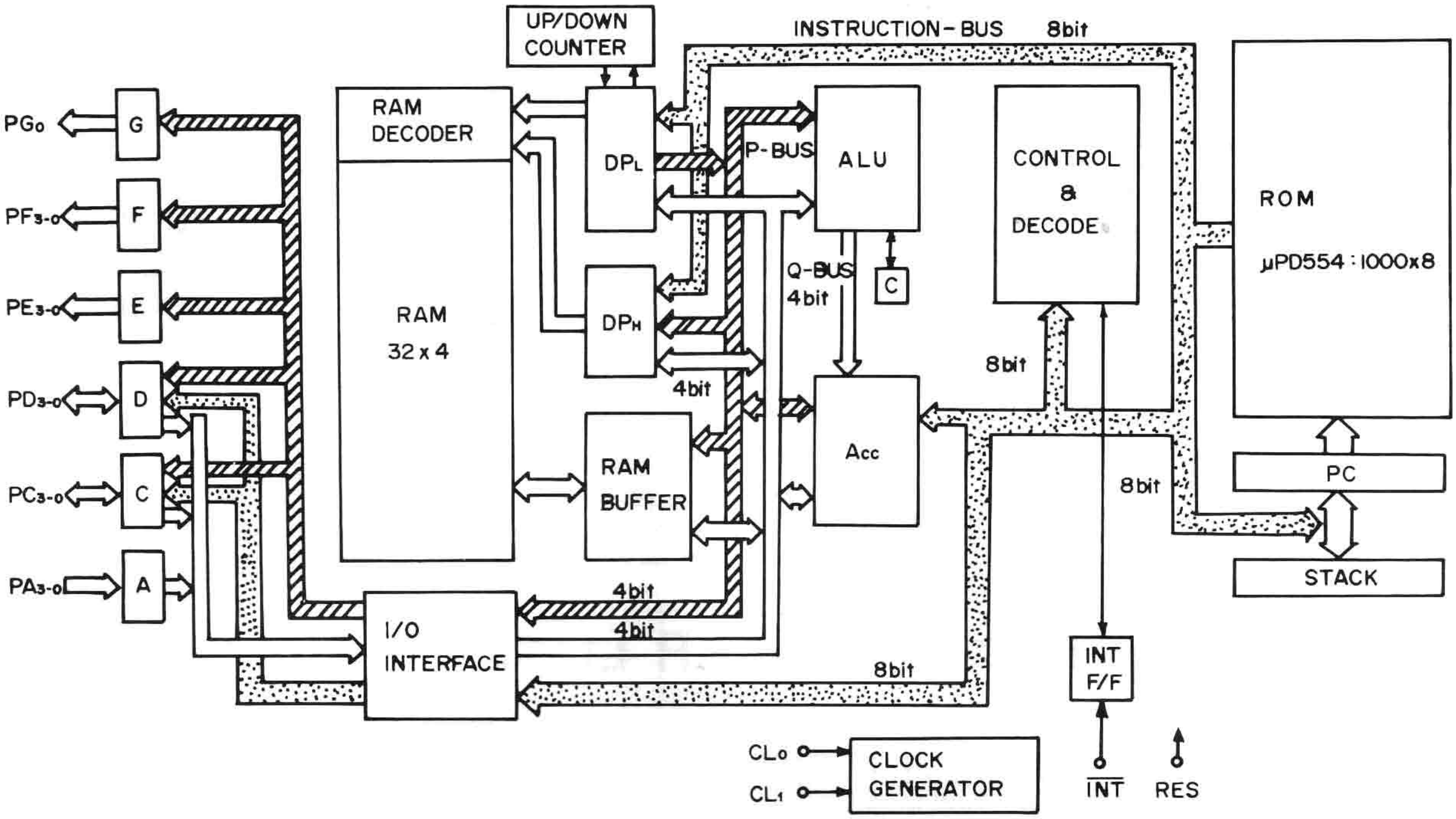
| | |
|---|---|
| Tone Arm Data | |
| Resonance | <10 Hz |
| Balance Adjustment | Weight |
| Effective Length | 210 mm |
| Shape | Straight |
| Bearing Type | |
| Horizontal | Thrust |
| Friction Sensitivity | 0.15 gram |
| Vertical | Pivot |
| Friction Sensitivity | 0.2 gram |
| Max. Tracking Error | +2.5° ~ –1.5° |
| Cartridge Supplied | Stereo Magnetic (MG-101S) |

**GENERAL**

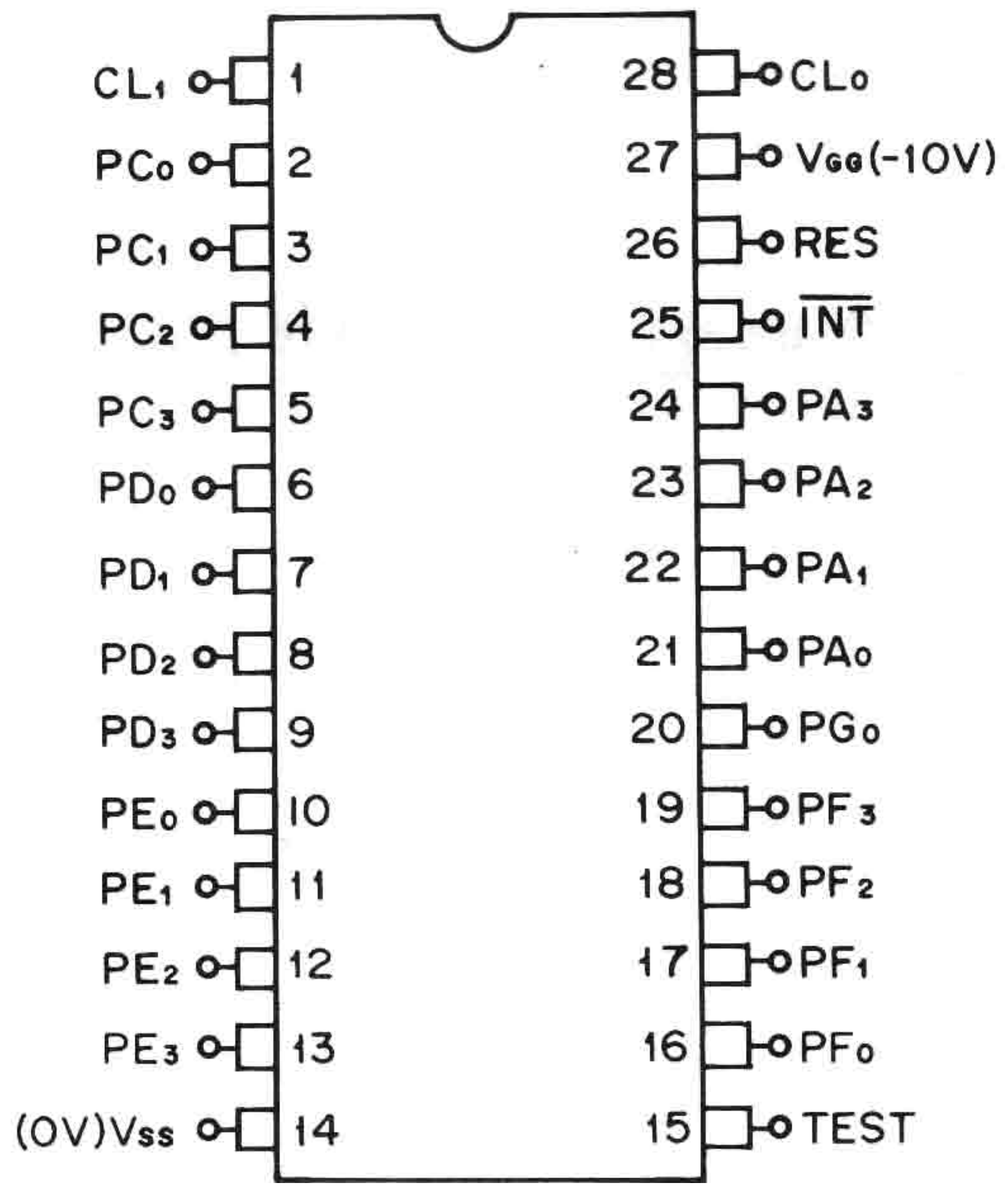
| | |
|---|---|
| Power Requirements | AC: 110/220 V, 50 Hz |
| Power Consumption | 20 Watts |
| Dimensions (W x D x H) | 335 x 100 x 335 mm |
| Weight (approx.) | 5 kg |

# MICROCOMPUTER IC μPD554-017 (μCOM45)

## SIGNAL FLOW

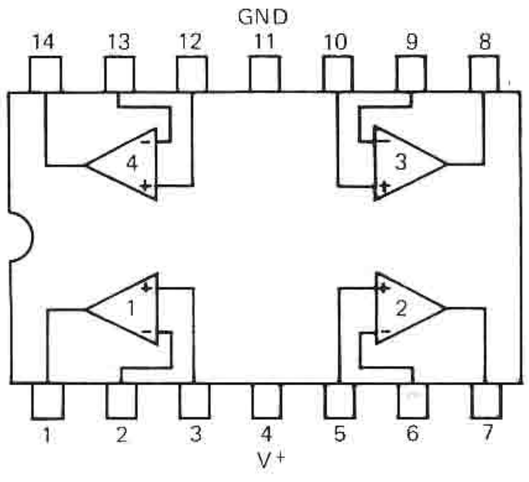



## TOP VIEW

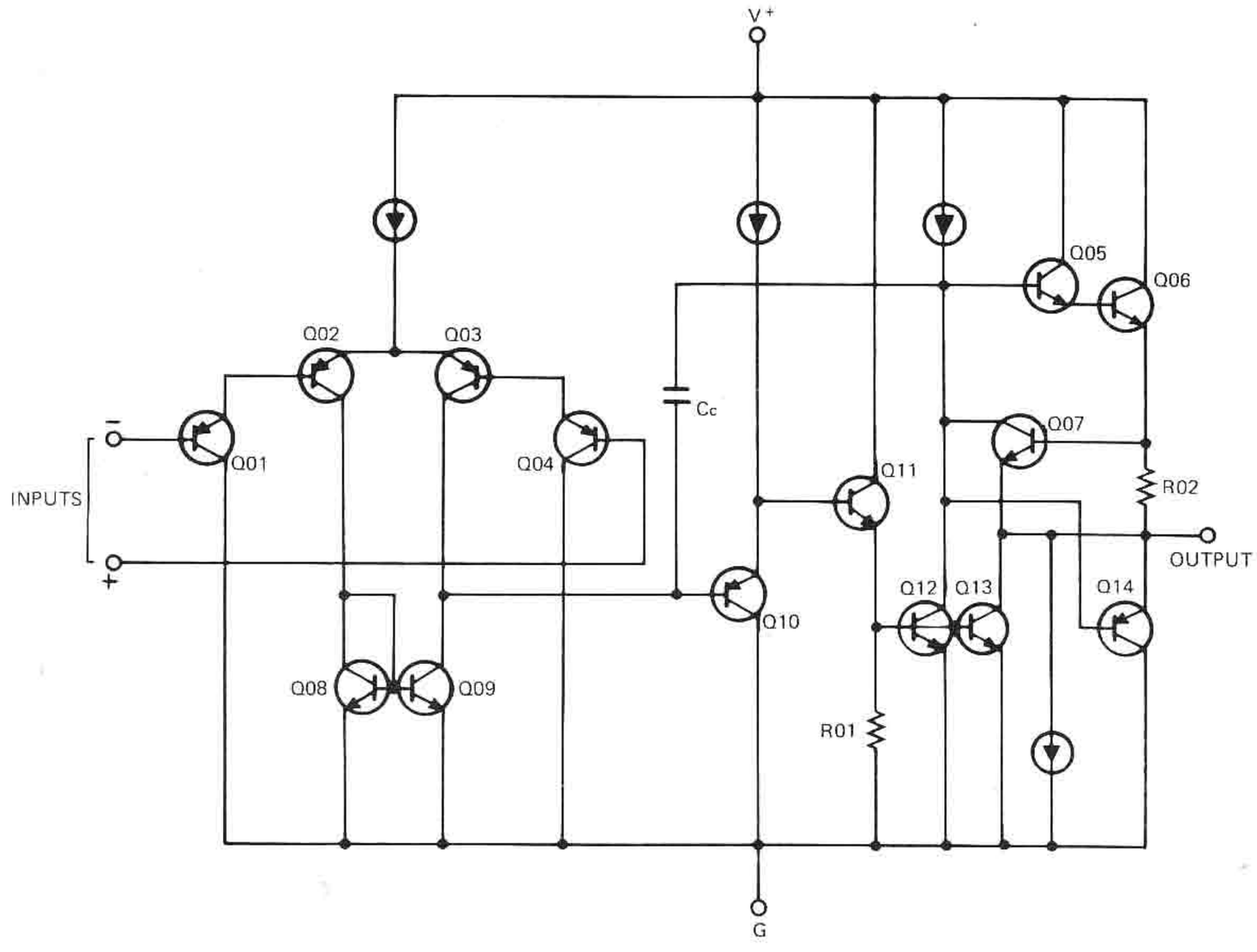


# OPERATIONAL AMPLIFIER LA6324

## TOP VIEW

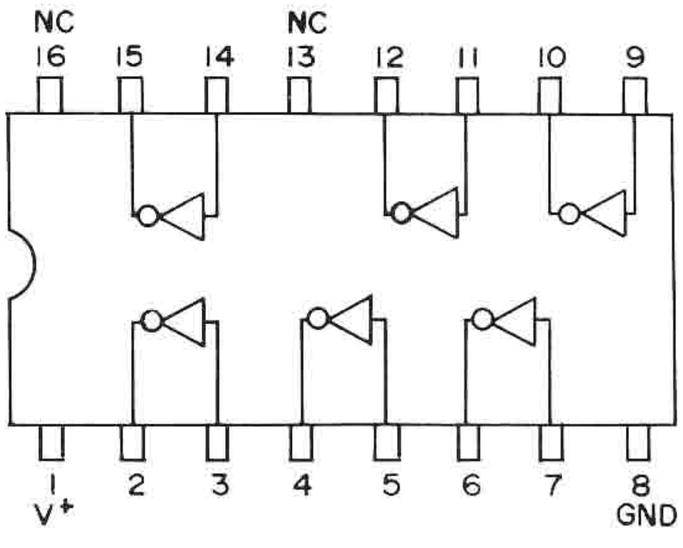



## EQUIVALENT CIRCUIT

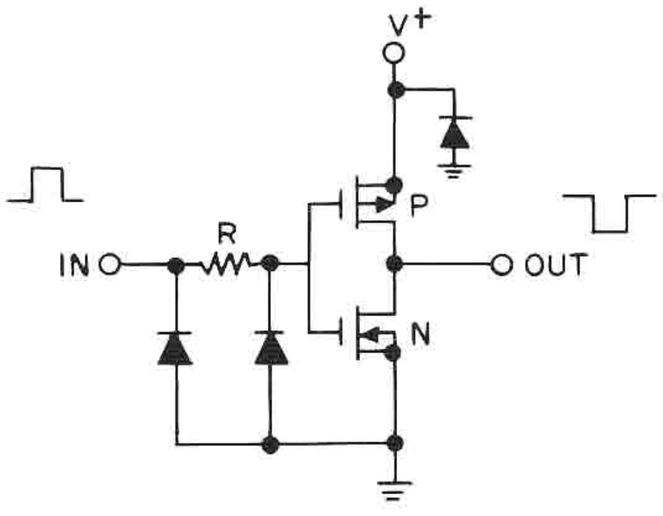



# HEX INVERTER LC4049

## TOP VIEW

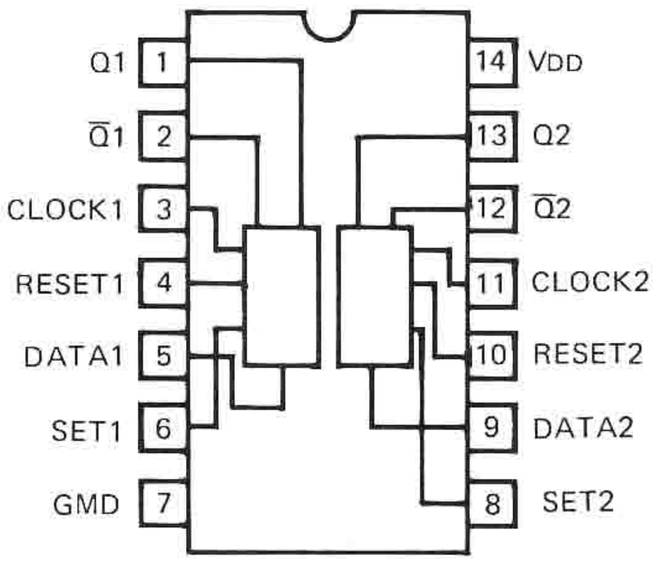



## EQUIVALENT CIRCUIT

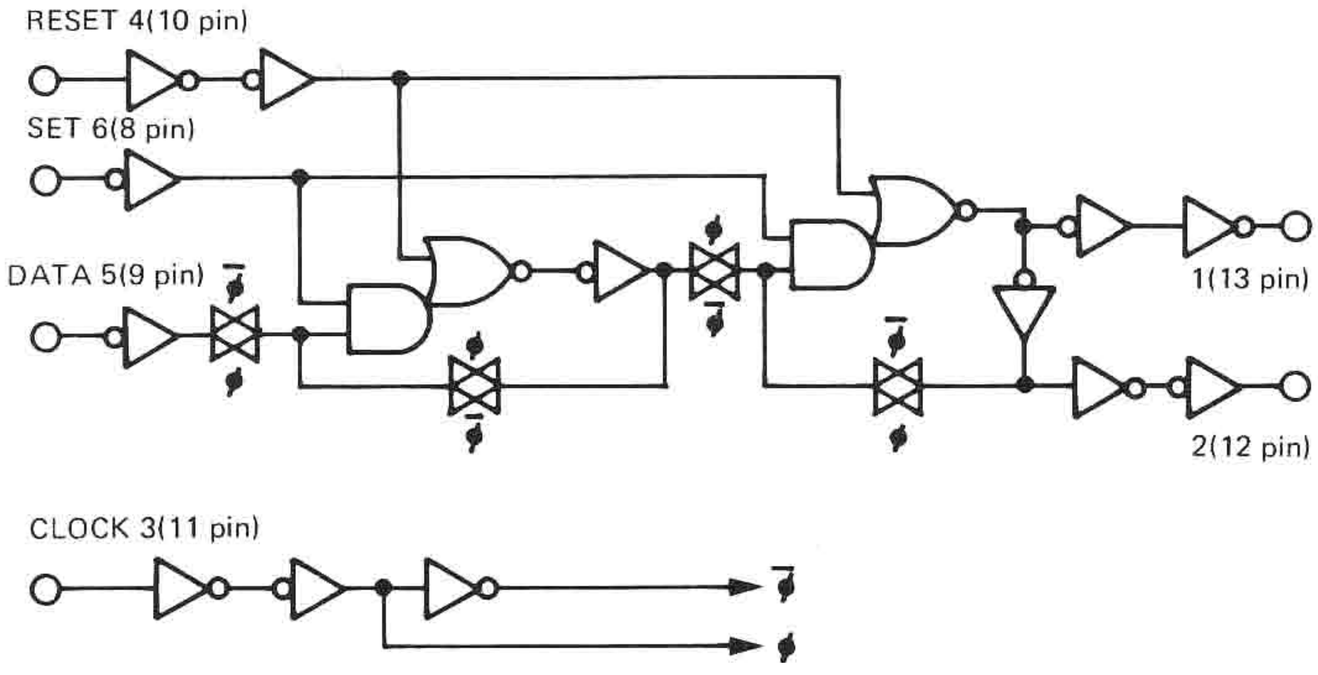


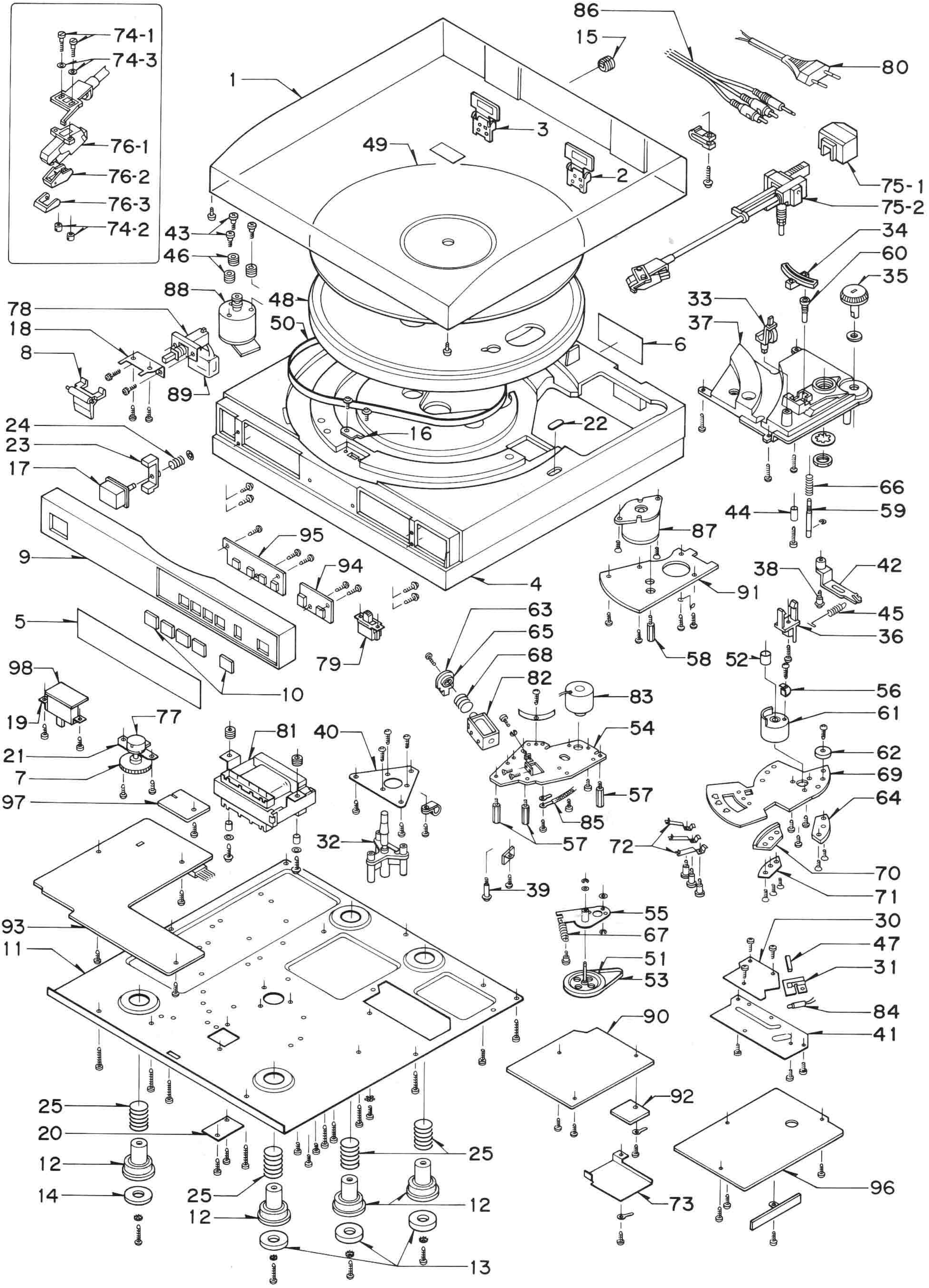

# DUAL D-TYPE FLIP-FLOP LC4013

## TOP VIEW




## EQUIVALENT CIRCUIT




74-1
74-3
76-1
76-2
76-3
74-2
86
15
80
1
3
49
2
75-1
75-2
34
60
35
43
46
88
48
50
78
18
8
89
16
22
6
33
37
24
23
17
66
44
59
87
95
94
9
4
38
42
91
45
36
5
63
65
68
82
83
54
57
85
58
52
56
61
62
69
64
79
98
10
19
77
81
40
21
7
97
32
72
39
55
67
51
53
70
71
30
47
31
84
41
90
92
73
96
93
11
25
20
12
14
13

# ADJUSTMENT

As all adjustments must be performed with the bottom plate mounted on the cabinet, the ADJUSTING JIG in Fig. 1 is required to obtain correct adjustments.
Insert the jig from Ⓐ in Fig. 2 into the 7P plug on the Control P.C.Board and pull out the test points. Then, perform the adjustments.

**Note:** Perform the adjustments in the described order.

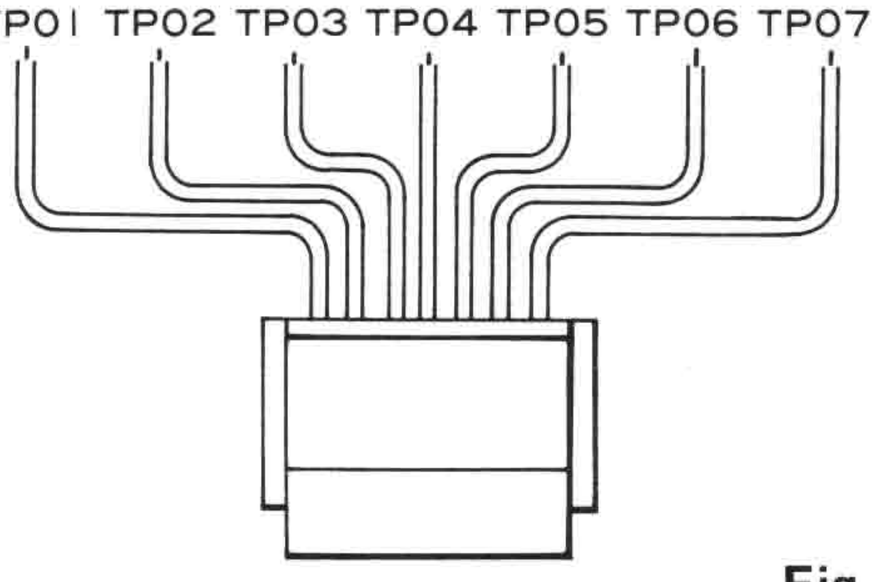



Fig. 1

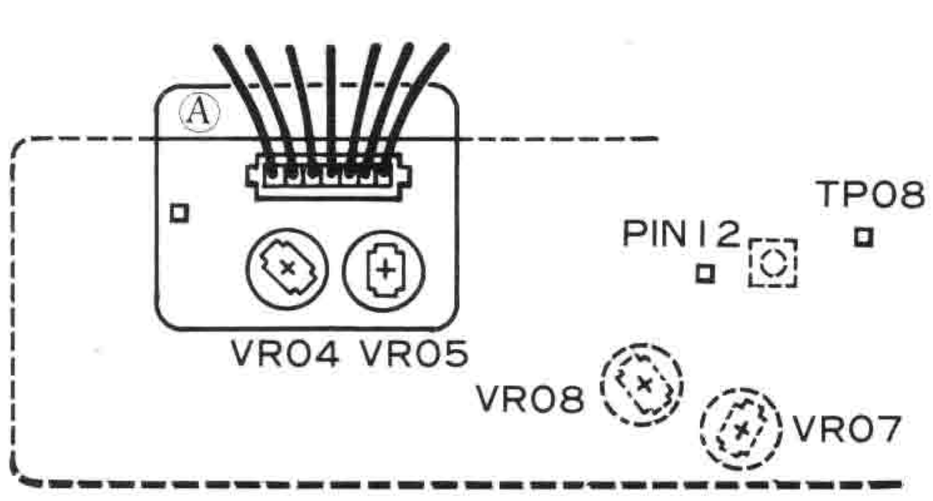



Fig. 2

## CLOCK OSCILLATION FREQUENCY ADJUSTMENT

1. Remove the bottom plate and connect the frequency counter to Pin 12 (GND) and TP08 (+).

2. Adjust L01 for 400 kHz±1 kHz.

## STYLUS HEIGHT ADJUSTMENT

1. Mount the bottom plate on the cabinet.

2. Disengage the turntable belt from the motor to prevent the turntable from rotating.

3. Set the tone arm in "Cueing Up" mode and turn the stylus height adjusting screw in Fig. 3 until the stylus height becomes 7.8 mm away from the surface of the turntable.

   **Note:** If the bottom plate has been already removed, the readjustment is required with the bottom plate mounted on the cabinet.

## PC1 GAIN ADJUSTMENT

1. Insert the adjusting jig into the 7P plug.

2. Connect the DC voltmeter to TP01 (—) and TP02 (+).

3. Place the STANDARD REFLECTOR on the turntable and move the cartridge in "Cueing Up" mode over the REFLECTOR. Then, adjust VR06 until the voltmeter reads 3.2 V±0.2 V.

4. If the correct adjustment cannot be obtained in the above procedure, cut off R39 (330 K) and perform the above adjustment again.

   **Note:** If the bottom plate has been already removed, the readjustment is required with the plate mounted on the cabinet.

# ADJUSTMENT (Continued)

## RETURN ADJUSTMENT

1. Set VR02 to "Mechanical Center" position and adjust the return point by turning it either clockwise (inward) or counterclockwise (outward), so that the return action takes place at the end of music.

2. Adjust VR02, so that the returning arm lowers exactly at the armrest.

## PHOTOTRANSISTOR SENSITIVITY ADJUSTMENT

1. Short-circuit TP04 and TP05 with the resistor (150 ohms).

2. Connect the DC voltmeter to TP06 (+) and TP91 (—).

3. The voltage changes when the tone arm in "Cueing Up" mode is moved towards the center over the turntable. Adjust VR03 until the voltage becomes 50 mV ±5 mV at the low point.

## READ-IN ADJUSTMENT

1. When the pickup is set at the 30 cm read-in position with the turntable removed, the mechanical trimmer can be observed through the hole Ⓐ in Fig. 4.
   The pickup lowering position moves inward when the trimmer is moved to the right and it moves outward when the trimmer is moved to the left.

2. Adjust the mechanical trimmers for the 25 cm and 17 cm read-in positions by following the same procedure as described above.

## MUSIC SELECTION ADJUSTMENT

1. Set the Approach VR to "Center Click" position.

2. Select a music program near the outer circumference of a record and a program near the inner circumference and check for the malselection.
   If the beginning or the last portion of music is not played, adjust VR04 and VR05.
   **Note:** VR04 and VR05 are connected in series.

3. Check the read-in position changes by turning the APPROACH knob.

## SPEED ADJUSTMENT

1. Set the SPEED SELECT button to "33" position and adjust VR07 until the speed becomes 33 1/3 rpm. Use a strobosheet on the market for the measurement.

2. Set the SPEED SELECT button to "45" position and adjust VR08 for the correct speed.

   **Note:** Be sure to perform this adjustment after the "33" speed adjustment.

# CARTRIDGE REPLACEMENT

The cartridge has a sensor which detects "Silent Space" between music programs.
As the sensor leads are not plug-in type, replace the cartridge by following the steps as described below.

1. Remove the bottom plate of the unit and unsolder the three leads (A) . (See Fig. 6)

2. Remove the screw holding the cartridge and disconnect the plug-in type leads (Signal Leads). Then, pull out the cartridge to the extent that the leads removed in Step 1 do not enter into the tone arm.

3. Remove the upper lid of the cartridge and the printed circuit board. Then, unsolder the leads. (See Fig. 7)

4. Solder the leads removed in Step 3 and mount the cartridge on the arm.

5. Connect the three leads (A) in Fig. 6 to the printed circuit board.

6. Perform the overhung adjustment of the cartridge. (See Fig. 8)

   **Note:** Readjustment of the unit is required after the cartridge replacement.

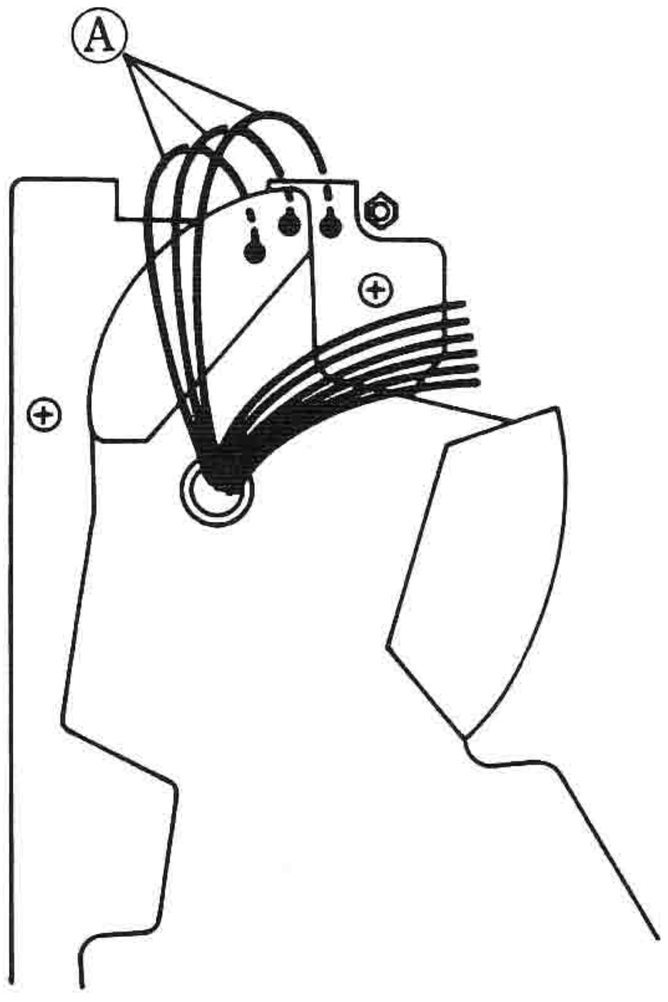



Fig. 6

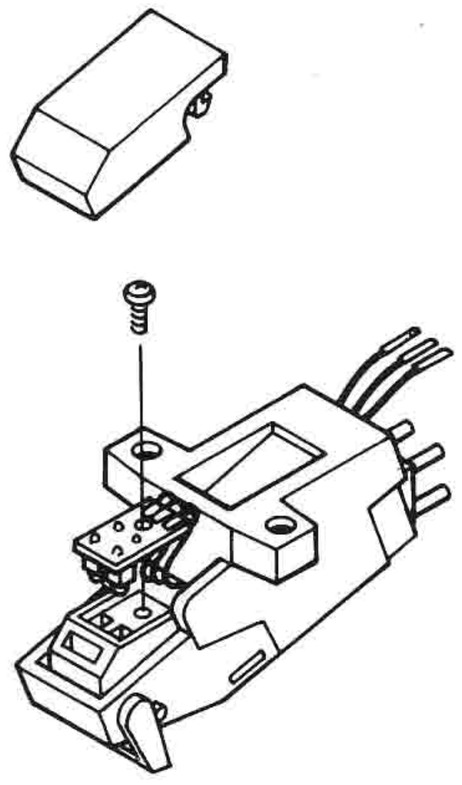
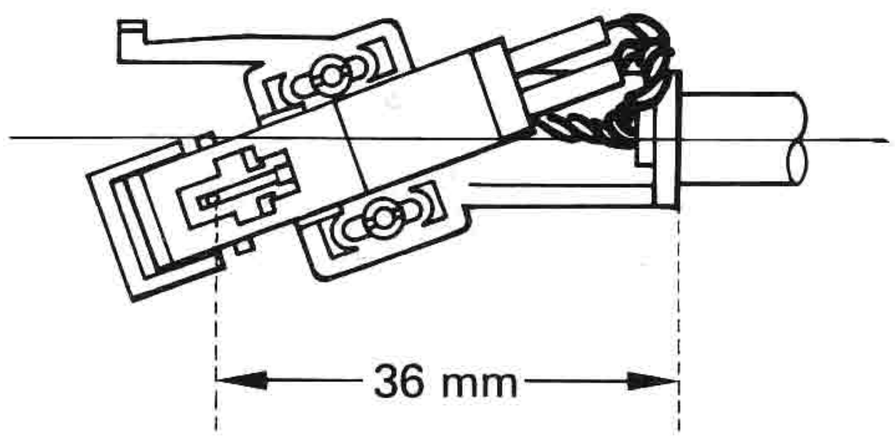


Fig. 7



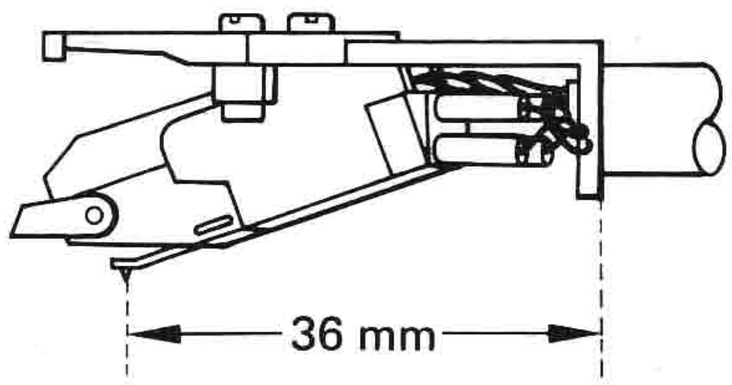
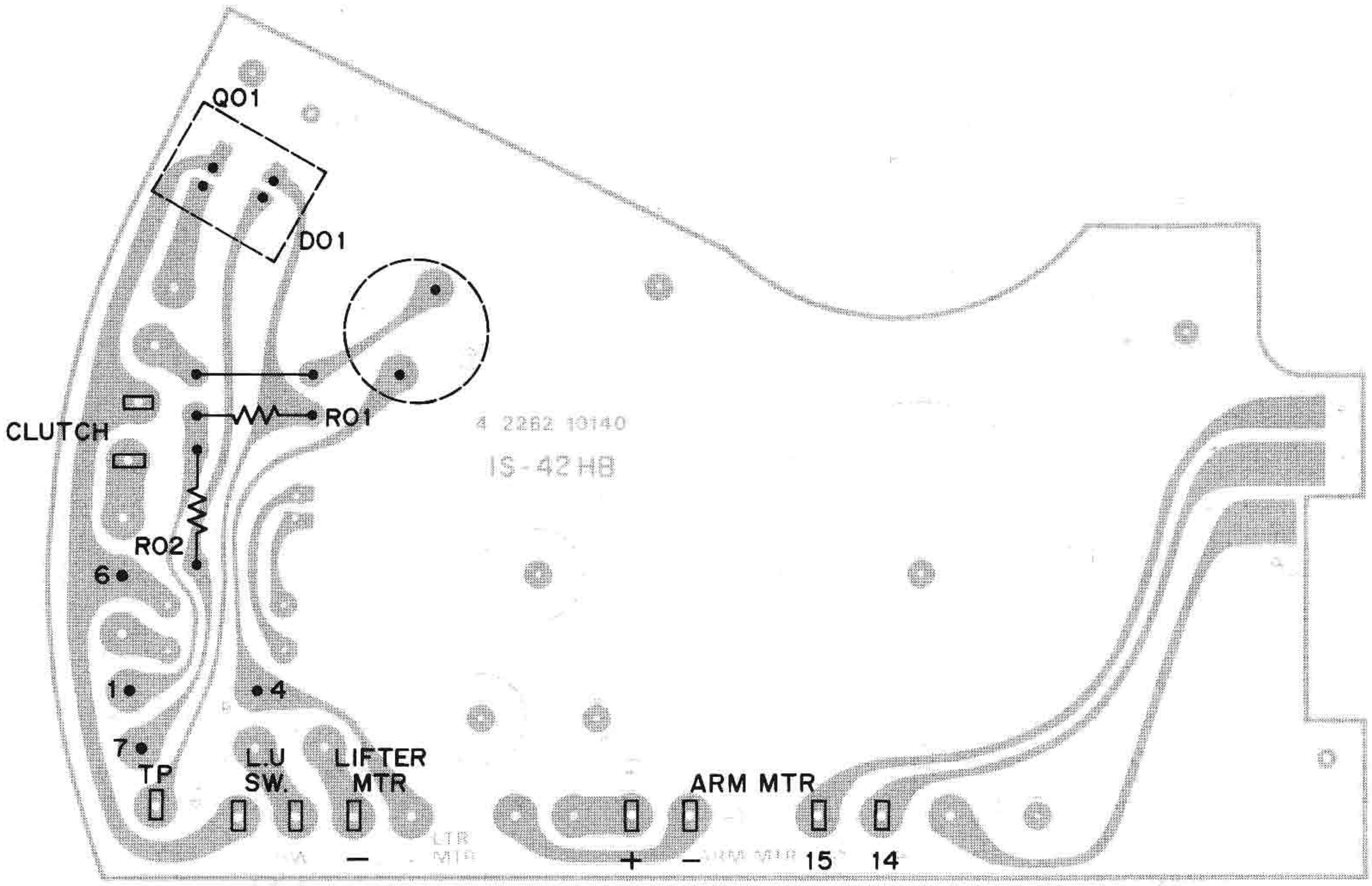
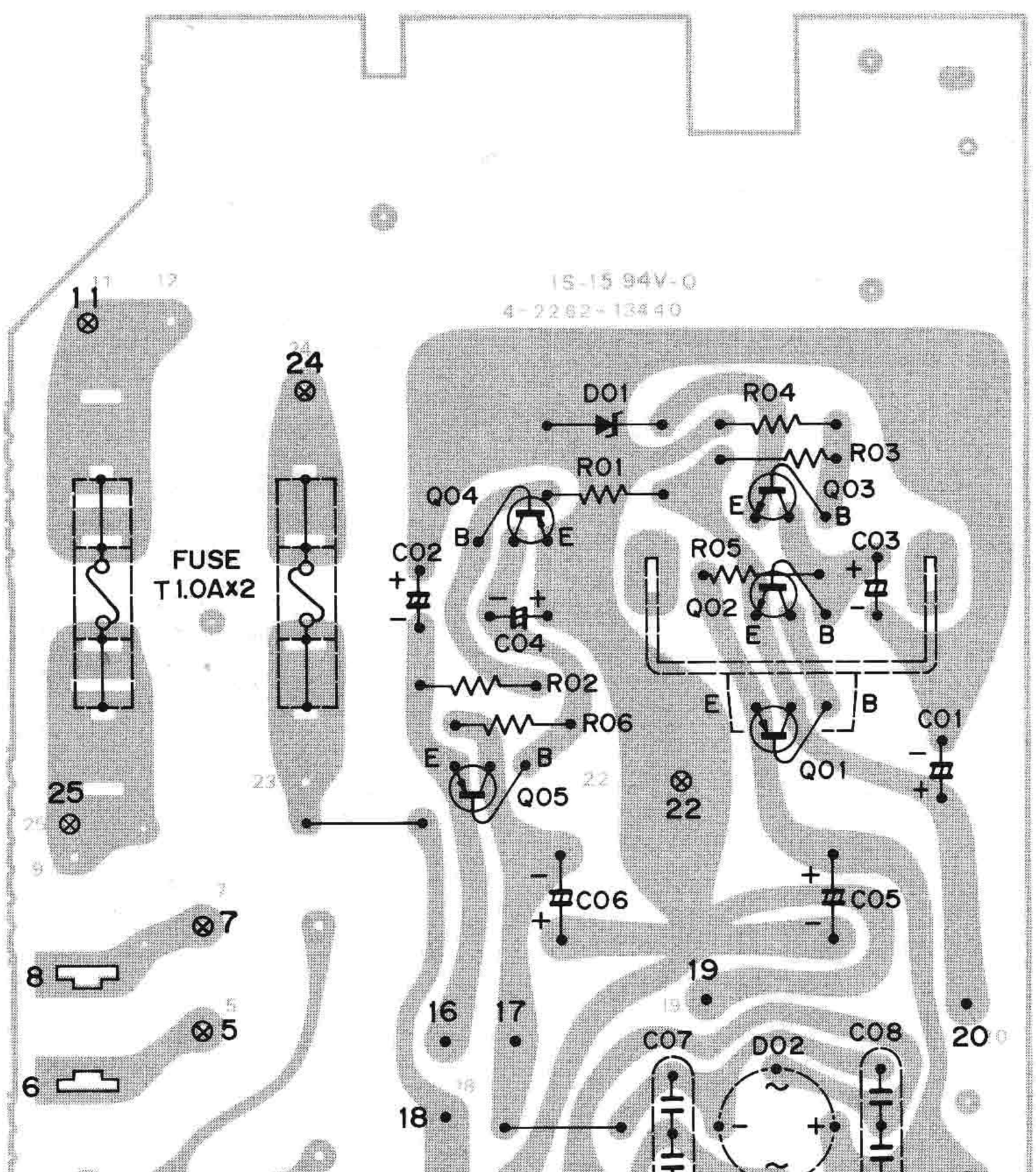




Fig. 8

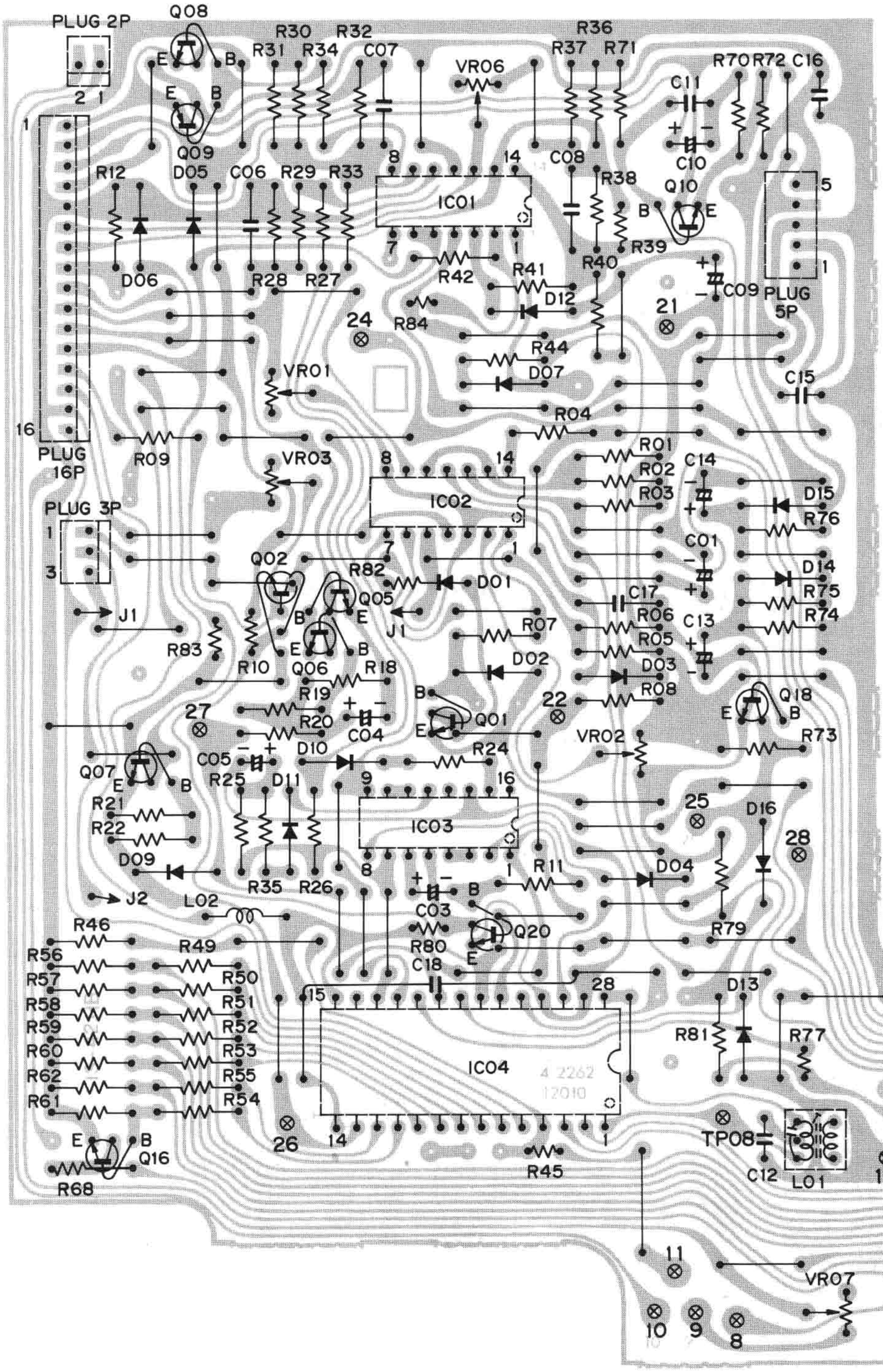
# MECHA P.C.BOARD
## (BOTTOM VIEW)



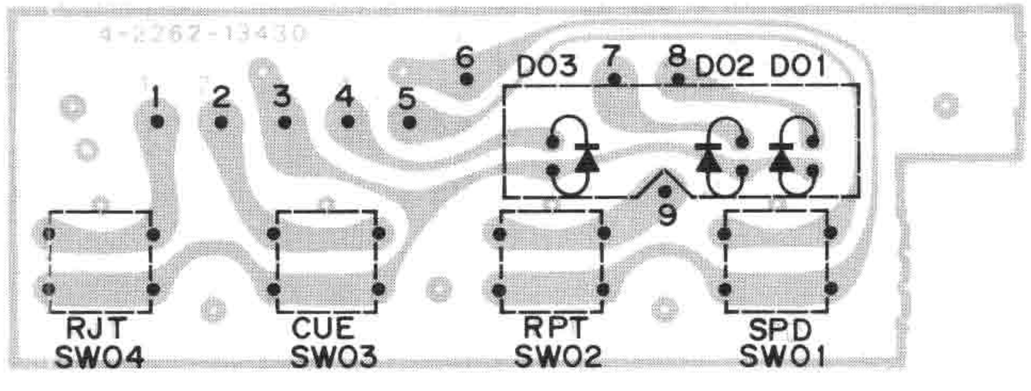

# POWER SUPPLY P.C.BOARD
## (BOTTOM VIEW)



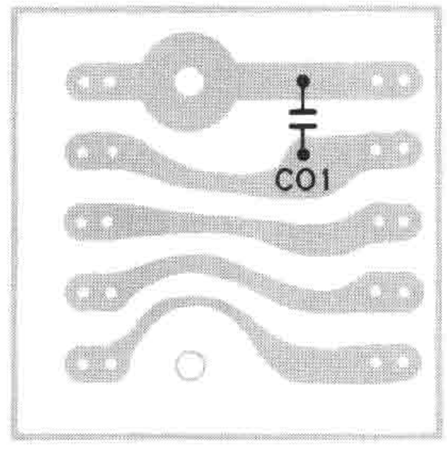
# CONTROL P.C.BOARD
(BOTTOM VIEW)



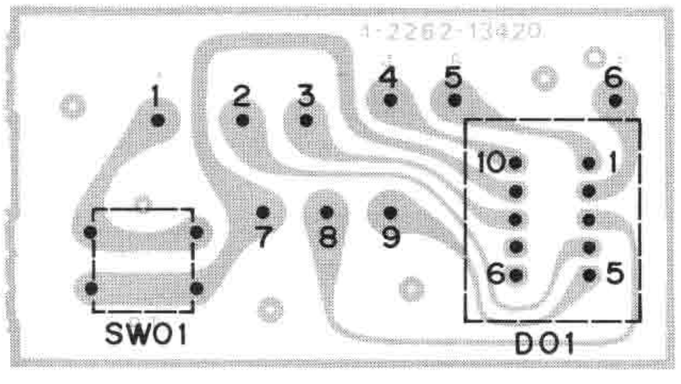
# TOUCH SWITCH P.C.BOARD
(BOTTOM VIEW)

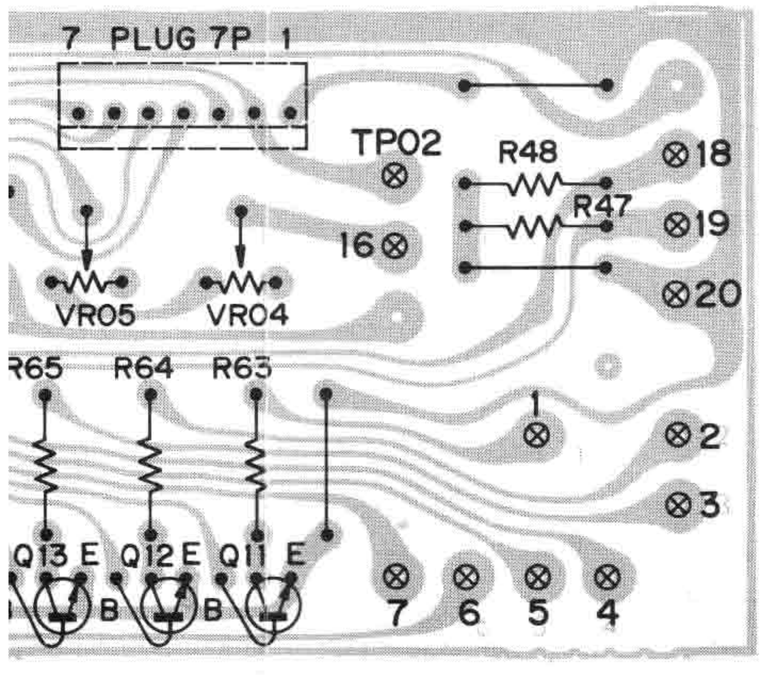



# PHONO P.C.BOARD
(BOTTOM VIEW)

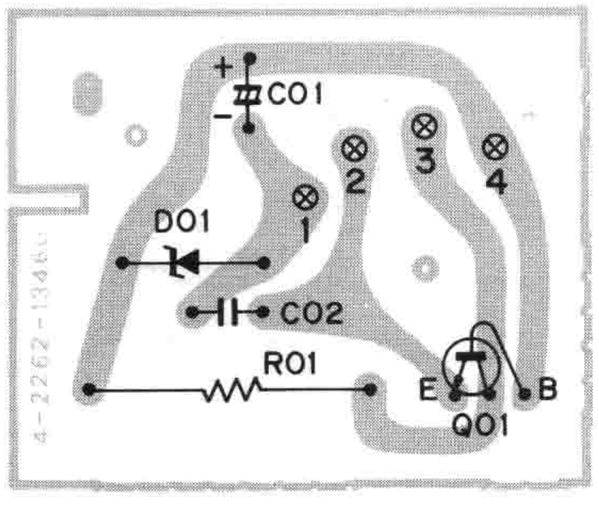



# L.E.D. INDICATOR P.C.BOARD
(BOTTOM VIEW)



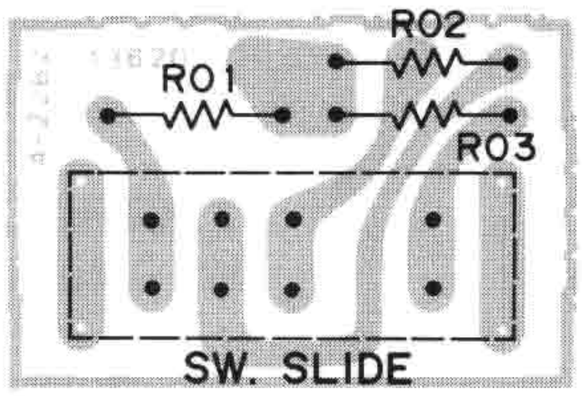




# STOP P.C.BOARD
(BOTTOM VIEW)



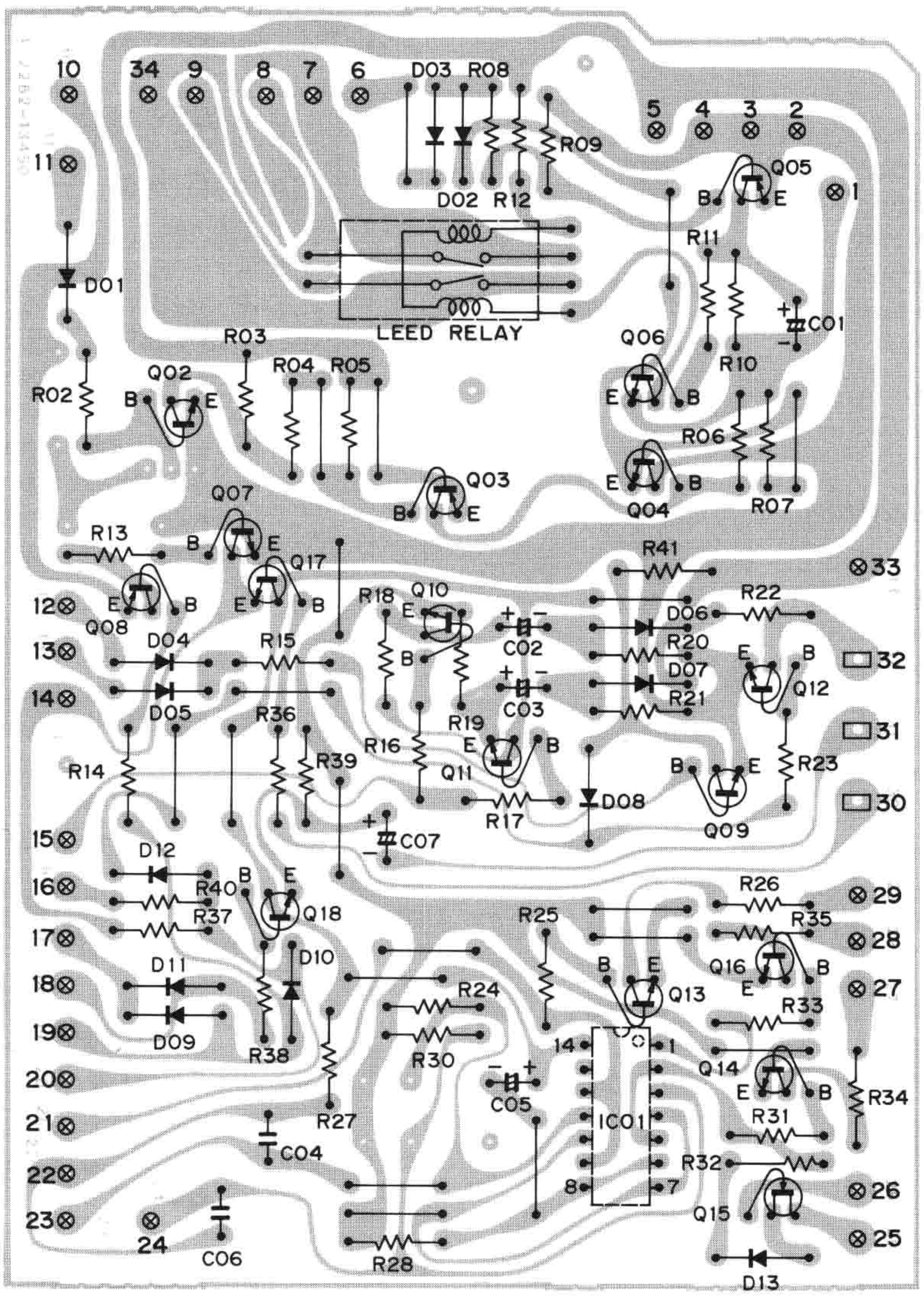
# SENSOR SWITCH P.C.BOARD

## (BOTTOM VIEW)




# AUTO FUNCTION P.C.BOARD

## (BOTTOM VIEW)



AC 110/220V
50Hz

BLK

MECHA P. C. B. ASS'Y
1310-4001-08771

PHONO P. C. B. ASS'Y
1310-4001-10860

ARM MOTOR

PLUNGER

5V 60mA

AUTO FUNCTION P. C. B. ASS'Y
1310-4001-12080

UP/DOWN
MOTOR

L.E.D. P. C. B. ASS'Y
1310-4001-12100

TOUCH SW. P. C. B. ASS'Y
1310-4001-12090

AC SELECTOR
220V ⟷ 110V

OUT - APPROACH - IN

PHONO P. C. B. ASS'Y
1310-4001-10860

POWER SUPPLY
P. C. B. ASS'Y
1310-4001-12062

TRANS.

DRIVE
MOTOR

STOP P. C. B. ASS'Y
1310-4001-12070

CONTROL P. C. B. ASS'Y
1310-4001-12050

AC SELECTOR
220V ⟷ 110V

SENSOR P. C. B. ASS'Y
1310-4001-12310

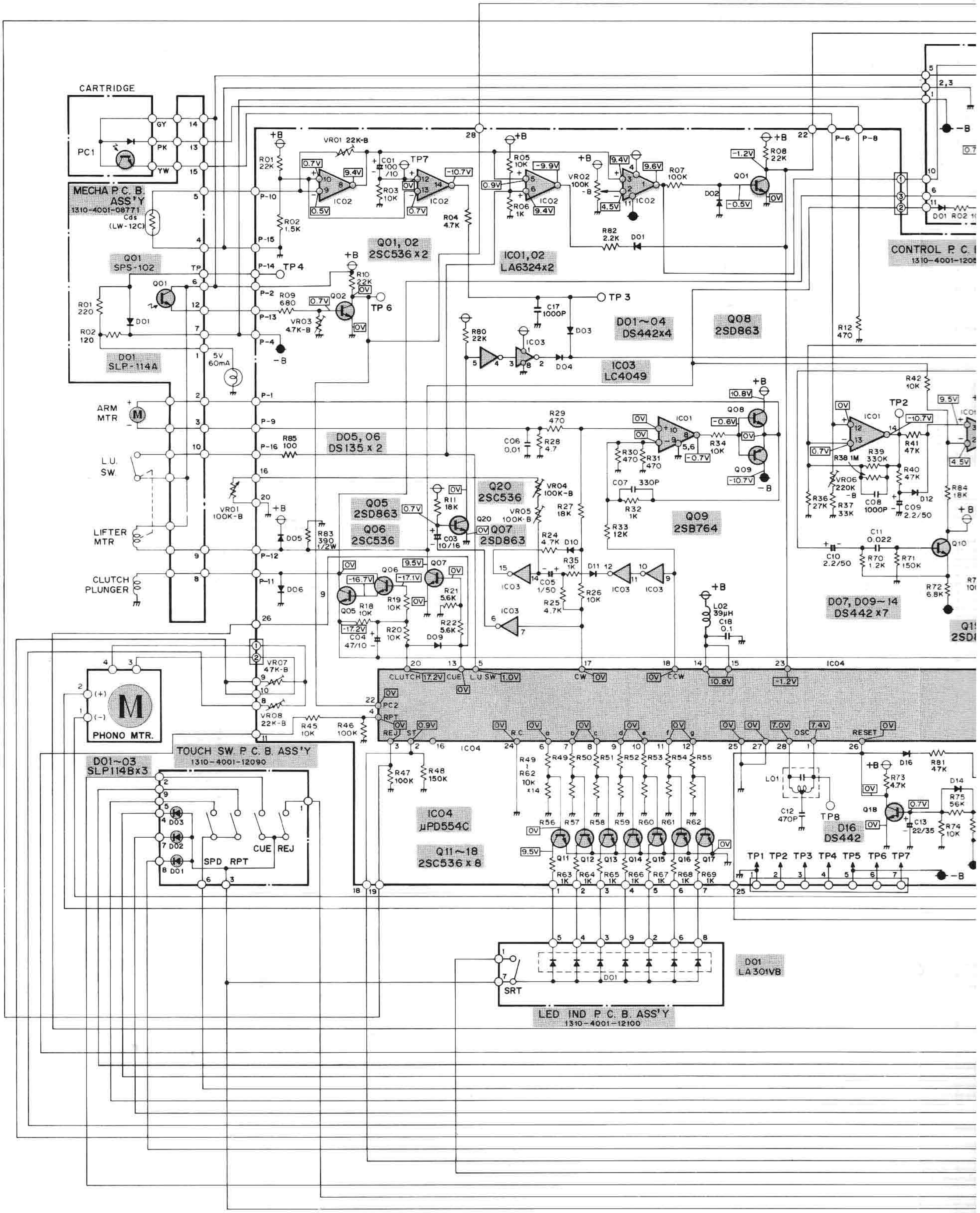
H M L
SENSOR

C01
0.01/250

POWER
SW.

OmA

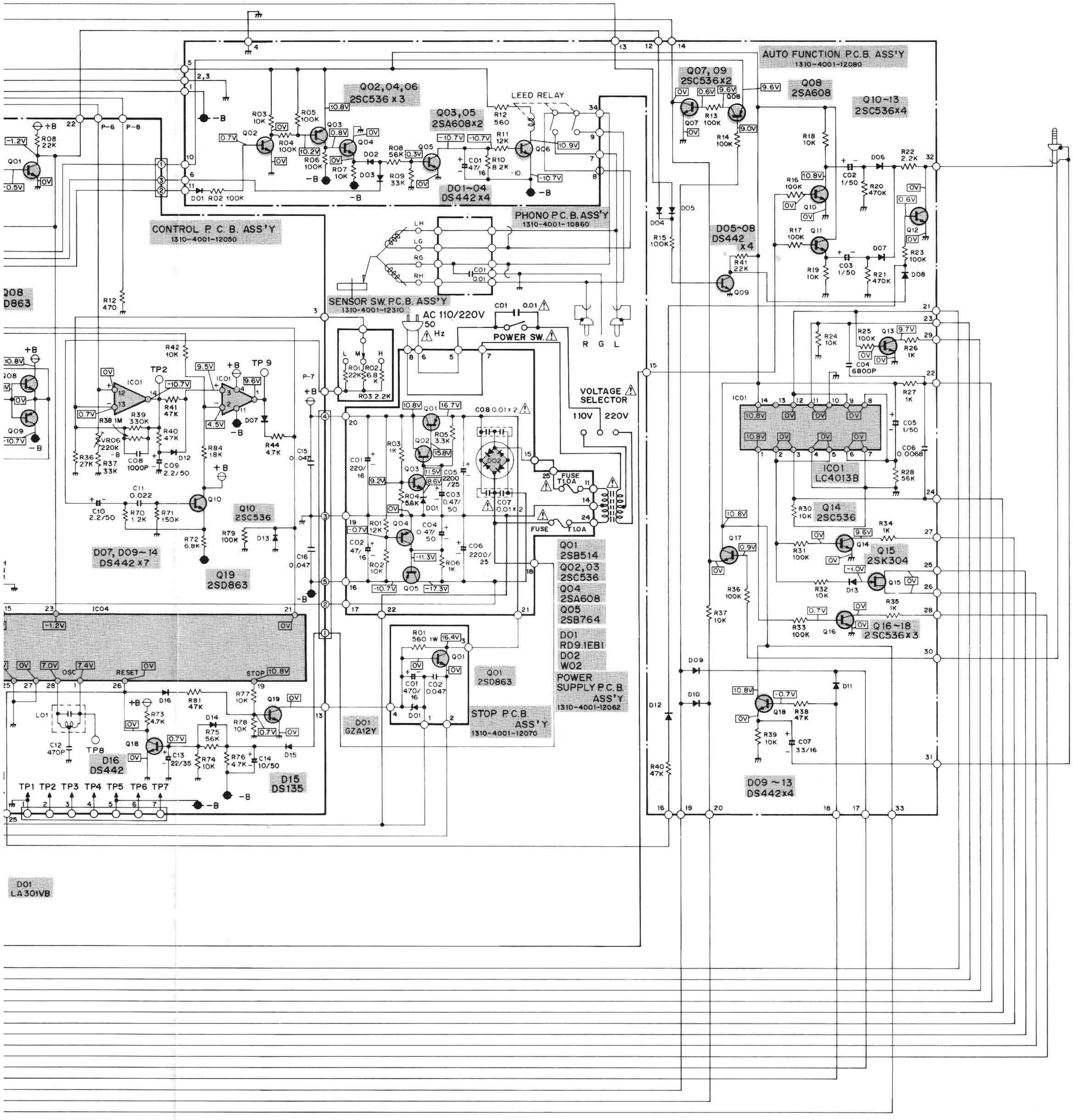
-IN




## PRODUCT SAFETY NOTICE

Each precaution in this manual should be followed during servicing. Components identified with the IEC symbol ⚠ in the parts list and the schematic diagram designate components in which safety can be of special significance. When replacing a component identified with ⚠, use only the replacement parts designated, or parts with the same ratings of resistance, wattage or voltage that are designated in the parts list in this manual.

Leakage-current or resistance measurements must be made to determine that exposed parts are acceptably insulated from the supply circuit before returning the product to the customer.




D01
LA 301VB

,in the parts
component
voltage that

ed from the

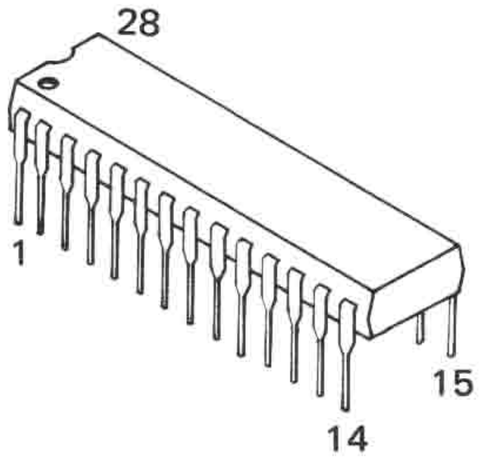
**NOTES:**

1. All resistors values are indicated in "ohm" ($K=10^3$, $M=10^6$).
2. All capacitors values are indicated in "$\mu$F" ($P=10^{-12}$).
3. All voltages indicated on the schematics are measured under the following conditions.
   a. Use a V.T.V.M.
   b. All voltages ±10% with respect to chassis gr
   c. No signals at input terminals
   d. AC input at 220 volts 50 Hz
4. This is a basic schematic diagram.

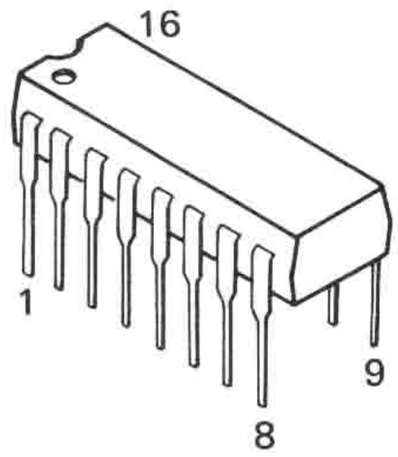
Because Fisher products are subject to continuous improvement, Fisher Corporation reserves the right to make any change modifications without notice.

# SEMICONDUCTOR LEAD IDENTIFICATION

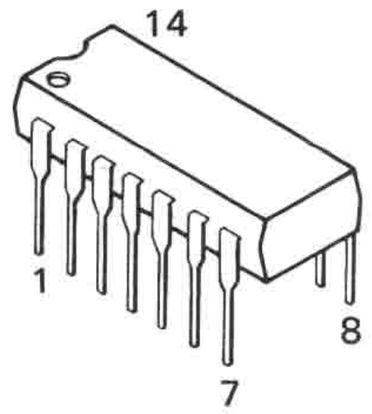
## INTEGRATED CIRCUITS




- μPD554

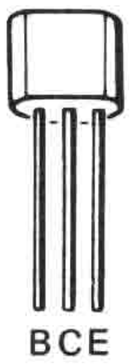



- LC4049



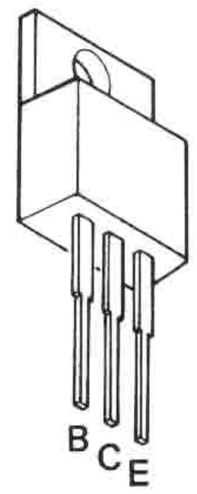

- LA6324
- LC4013

## BI-POLAR TRANSISTORS



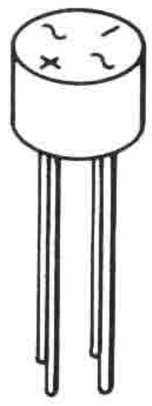

- 2SA608
- 2SC536
- 2SD863


- 2SB764

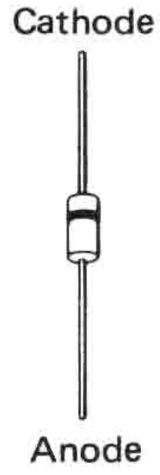



- 2SB514

## DIODES



- W02




- DS-135D
- DS-442
- RD9.1