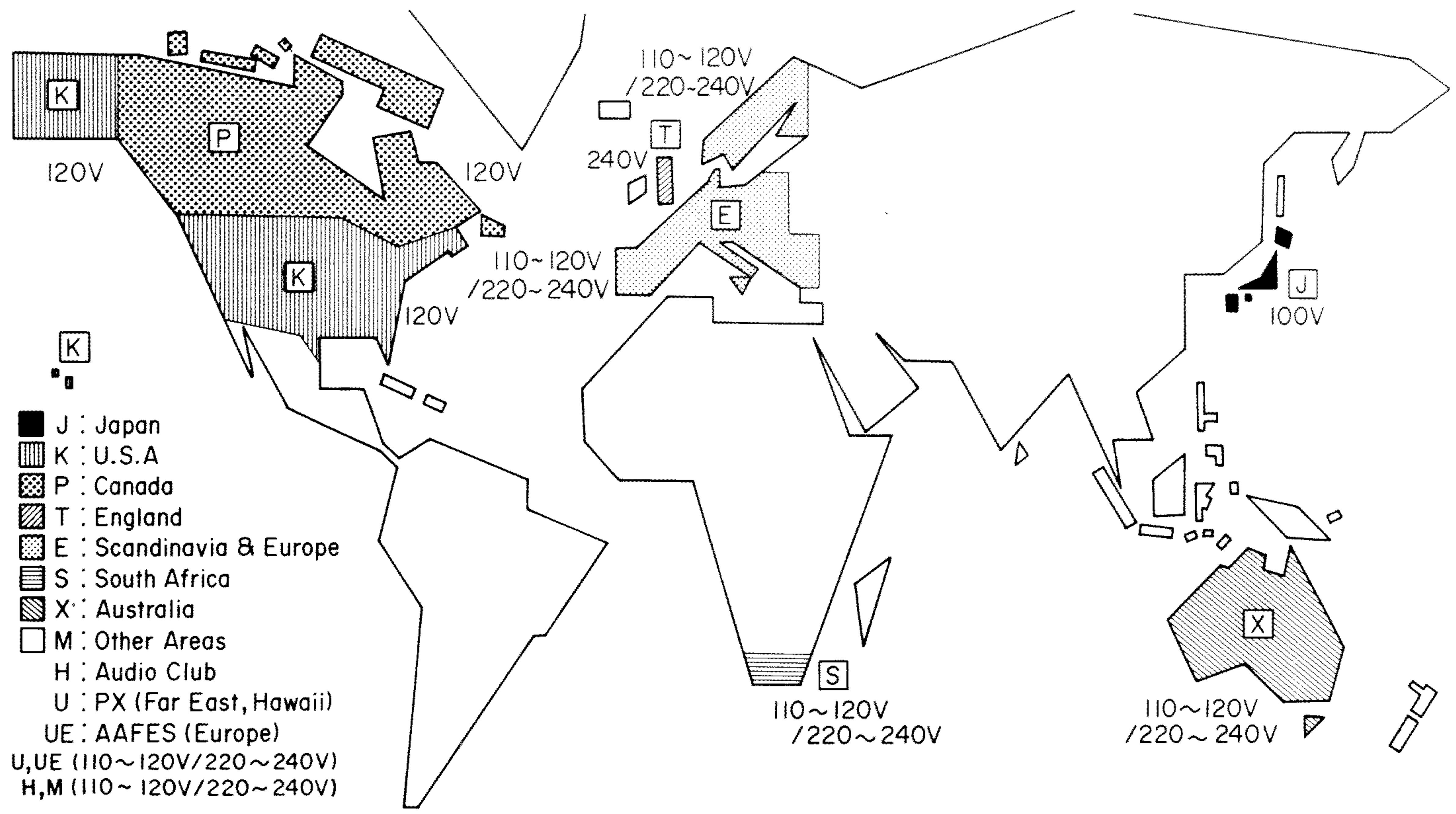
WORLD MAP & AREA CODE



Note:

Component and circuitry are subject to modification to insure best operation under differing local conditions. This manual is based on, the U.S. (K) standard, and provides information on regional circuit modification through use of alternate schematic diagrams, and information on regional component variations through use of parts list.

A product of
TRIO-KENWOOD CORPORATION
Shionogi Shibuya Building, 17-5, 2-chome Shibuya, Shibuya-ku, Tokyo 150 Japan

KENWOOD U.S.A. CORPORATION
1315 E Watsoncenter Rd. Carson, California 90745, U.S.A.
75 Seaview Drive, Secaucus, New Jersey 07094, U.S.A.
TRIO-KENWOOD CANADA INC.
1070 Jayson Court Mississauga, Ontario Canada L4W 2V5
TRIO-KENWOOD ELECTRONICS, N.V.
Leuvensesteenweg 504, B-1930 Zaventem, Belgium
TRIO-KENWOOD ELECTRONICS, GmbH
Rudolf-Braas-Str. 20, 6056 Heusenstamm, West Germany
TRIO-KENWOOD FRANCE S.A.
5, Boulevard Ney, 75018 Paris, France
TRIO-KENWOOD AG
Unterboesch 6331 Huenenberg/ZUG Switzerland
TRIO-KENWOOD (AUSTRALIA) PTY. LTD.
4E Woodcock Place, Lane Cove, N.S.W. 2066, Australia
KENWOOD & LEE ELECTRONICS, LTD.
Wang Kee Building, 5th Floor, 34-37, Connaught Road Central, Hong Kong

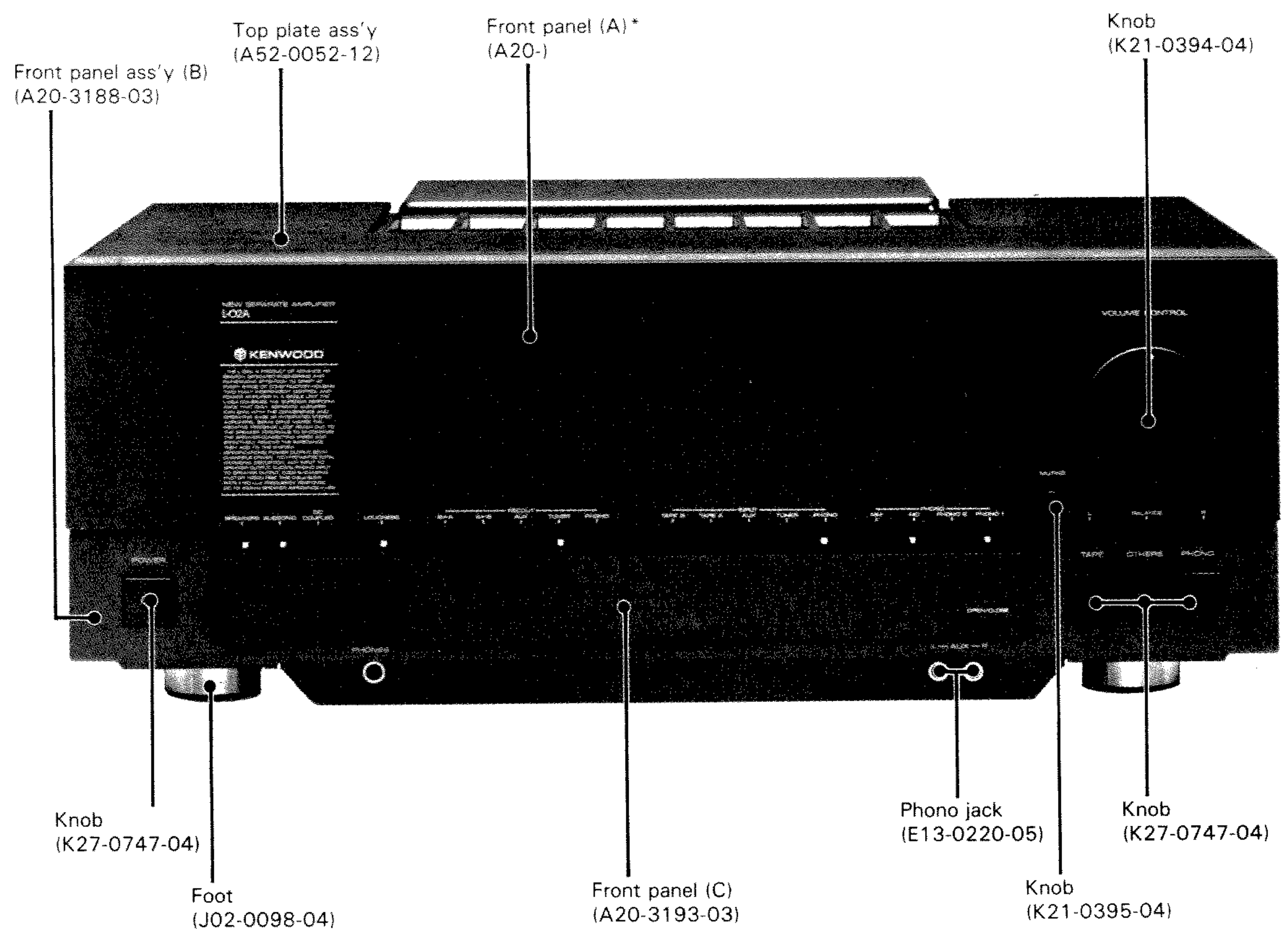
© 1982-8 PRINTED IN JAPAN B51-1328-00 (T) 2233

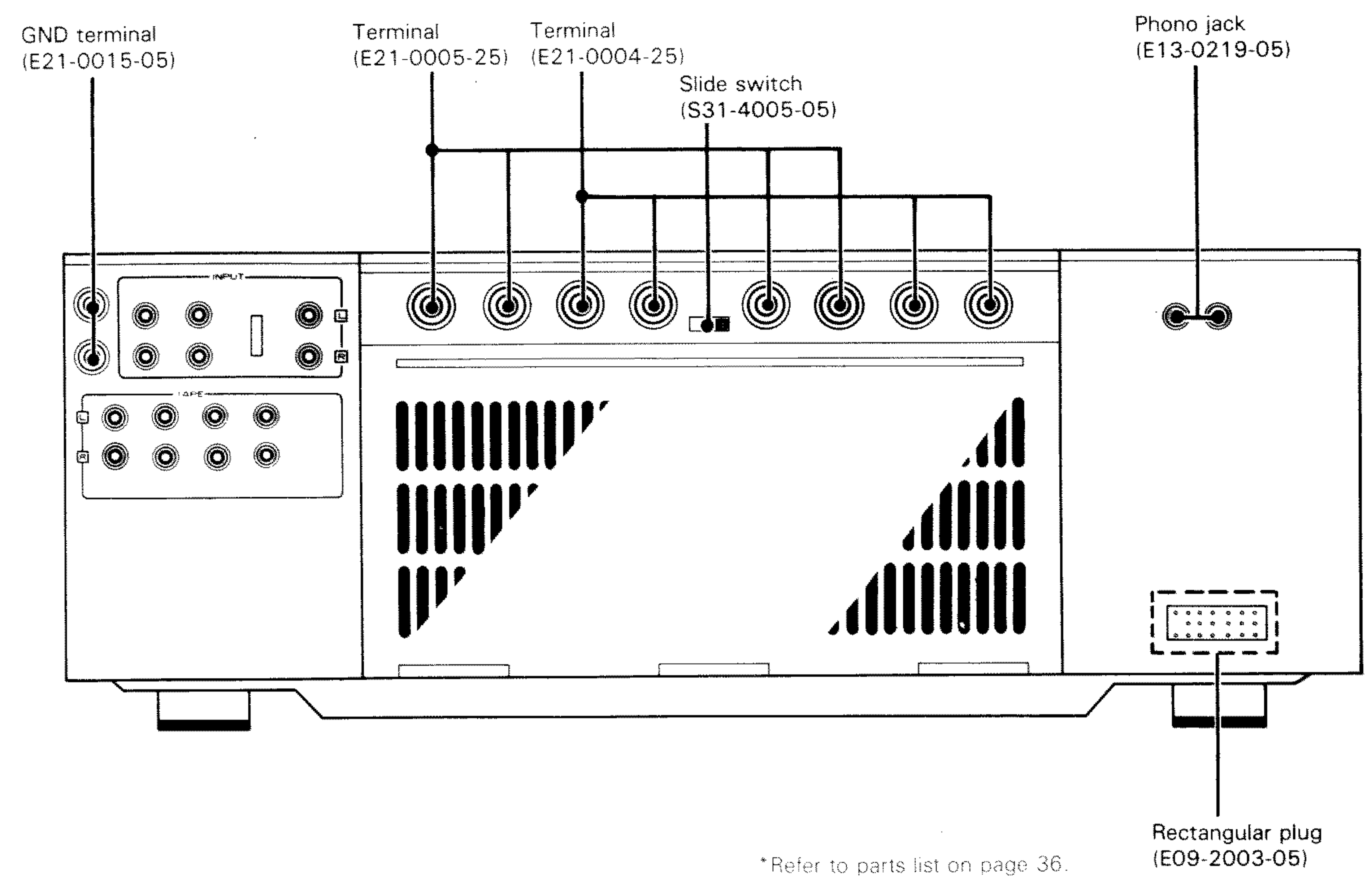
SERVICE MANUAL

KENWOOD®

L-02A

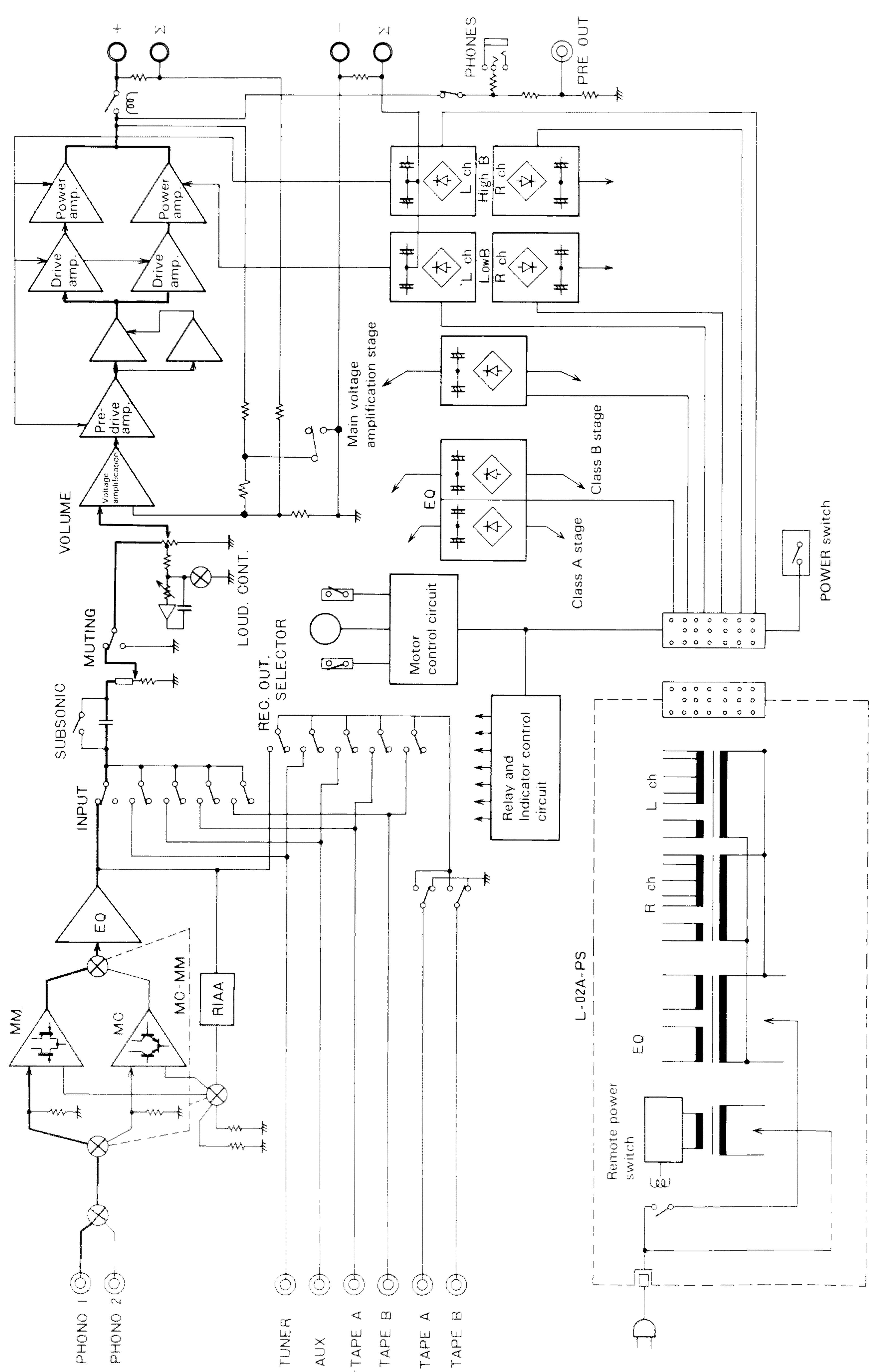
NEW SEPARATE AMPLIFIER





*Refer to parts list on page 36.

BLOCK DIAGRAM



CIRCUIT DESCRIPTION

POWER SWITCH CIRCUIT

When the power cord is plugged into an AC receptacle, power is applied to the relay driver circuit in the L-02APS and the circuit goes into the standby state. Setting the main power switch (S1) to ON sends the Q2 base current through D9 so that Q1 goes on. This activates relay RL1 to supply power to the amplifier. The Q2 base current normally ceases when the main power switch (S1) is set to OFF, de-energizing relay RL1 and turning off power to the amplifier. However, if the control unit is out, setting the main power switch to OFF causes it to be retracted; the Q2 base current continues flowing through the motor control circuit until retraction is complete. Full retraction of the control unit activates a detector switch (S2), turning off the Q2 base current. Power to the amplifier section goes off at this time.

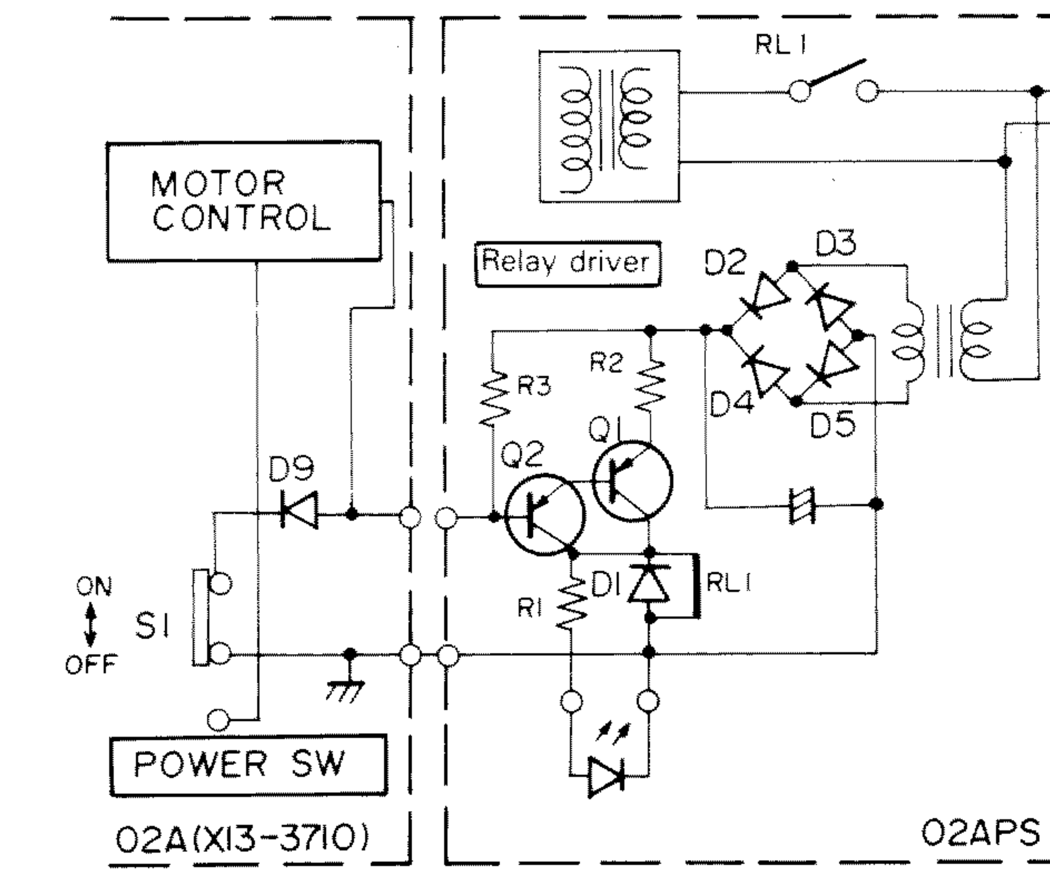


Fig. 1

Equalizer (EQ) amplifier

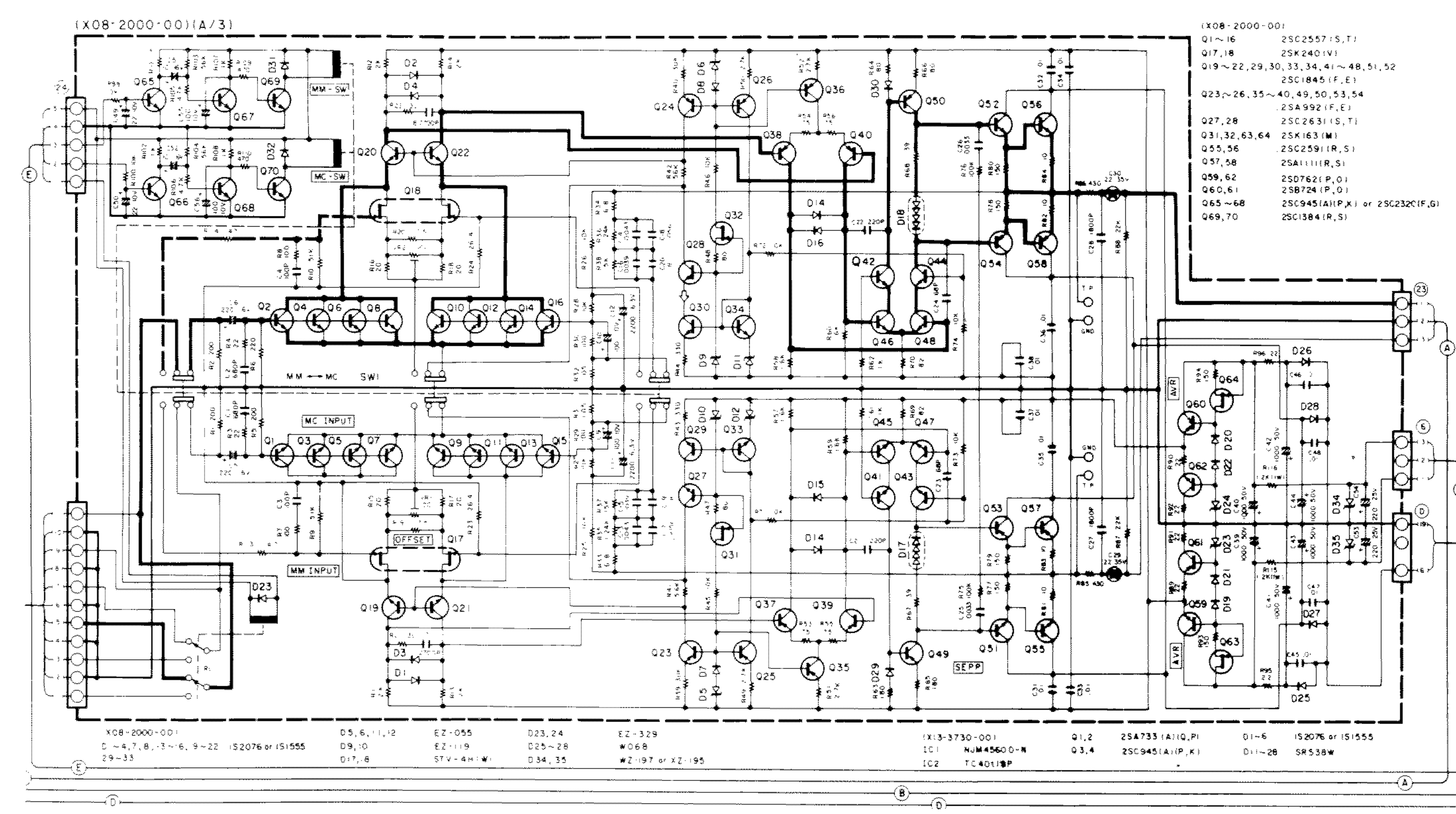


Fig. 2

The EQ board of the L-02A includes the following.

- An FET differential input circuit for the MM cartridge.
- A bipolar transistor differential input circuit for the MC cartridge.
- A driver circuit for MM/MC switching.
- A 3-stage differential voltage amplifier circuit.
- A Darlington power amplifier circuit.
- A regulated power supply for the stages of the voltage amplifier.
- A power supply for the power amplifier.

1. Differential input circuits

The Hi-gm FET (Q18) is switched on for MM input by the solenoid switch. This results in a DC amplifier configuration with adjustable offset. Eight low noise transistors (Q2, Q4, Q6, Q8, Q10, Q12, Q14, and Q16) are connected in two parallel sets for MC input. Together with input elements which are matched to each type of cartridge, these act as EQ amplifiers for the MM/MC cartridges. The signals from these circuits are sent to the next stage via the common cascode loads (Q20 and Q22).

CIRCUIT DESCRIPTION

2. Voltage amplifier circuit

A large common mode rejection ratio (CMRR), a large power supply rejection ratio (PSRR), and a differential amplifier configuration (Q38, Q40, Q46, and Q48) are used to achieve high stability. Further improvement in performance is provided by the constant current circuit (Q24, Q26, Q28, Q30, Q36, and Q50) and a temperature compensation circuit (D8, D30, and Q34).

3. Power amplifier circuit

A two-stage Darlington complementary output circuit is employed with an Hi-f_T transistor in its final stage. A separate rectification circuit is used for the power amplifier power supply.

4. Power supply for the voltage amplification stages

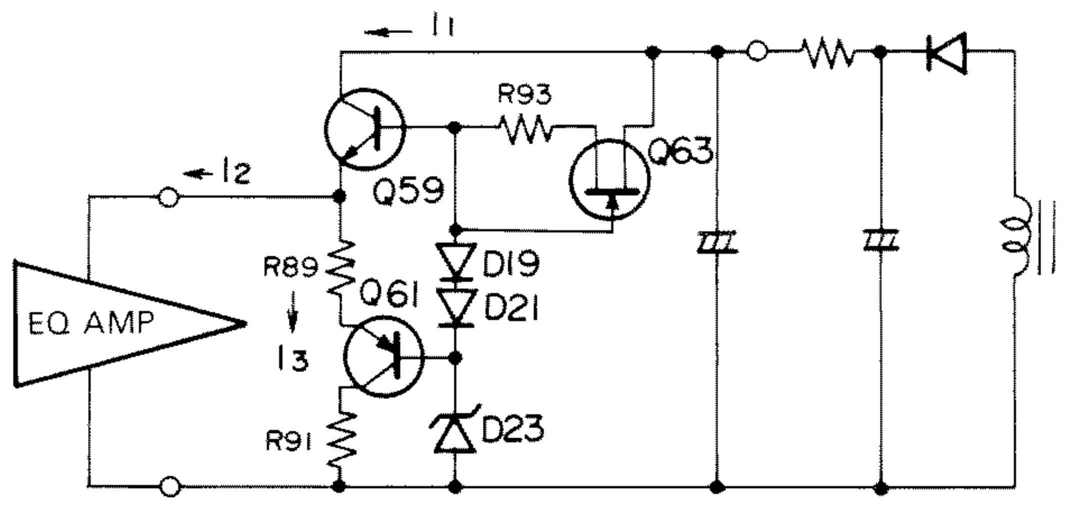


Fig. 3

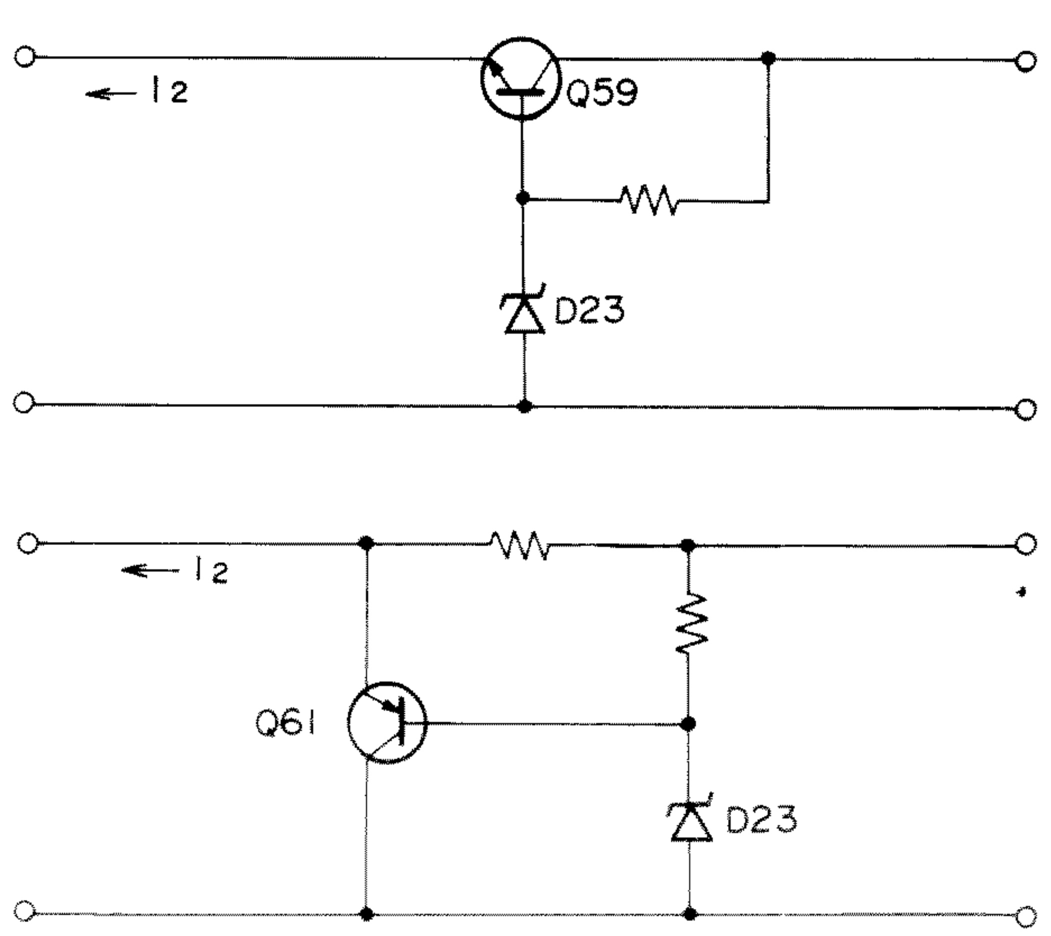


Fig. 4

A push-pull constant voltage circuit is employed to minimize variations in current as seen from the rectifier circuit. The constant current circuit consists of Q63. Zener voltage is output by D23 after its impedance has been reduced by Q59 and Q61. Q59 acts as an ordinary series-control constant voltage circuit, while Q61 is a parallel-control type circuit which operates as a current absorber. If I_2 (see Figs. 3 and 4) is increased by a signal, the emitter voltage of Q59 and Q61 drop to reduce I_3. Conversely, the emitter voltages of Q59 and Q61 increase to raise I_3 when I_2 drops. Therefore, I_1 (the current seen from the rectifier circuit) is less subject to variation; i.e., the power supply impedance is reduced.

5. Solenoid switch driver

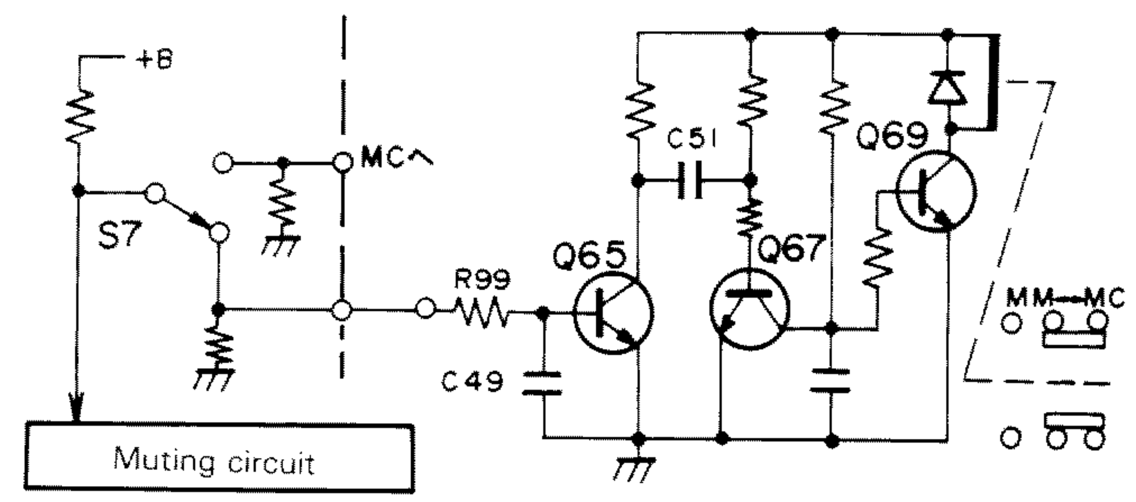


Fig. 5

A six-pole/double-throw solenoid switch is used to switch the input circuits of the EQ amplifiers. When the MM button (S7) on the control unit is depressed, current flows through Q65 and the level at its collector drops to "L." The "L" pulse passing through C51 turns off Q67 so that the Q67 collector voltage increases. This turns on Q69 so that the plunger is pulled to slide the switch to the MM position. If C51 is charged, the states of Q67 and Q69 are reversed so that the solenoid current ceases. Similarly, depressing the MC button actuates the MC plunger driver (Q66, Q68, and Q70), sliding the solenoid switch to the MC position. A delay circuit consisting of R99 and C49 is included on the input side of the solenoid switch driver so that a muting operation is first performed. This prevents shock noise from being produced when the input circuits of the EQ amplifiers are switched during operation.

CIRCUIT DESCRIPTION

MAIN AMPLIFIER

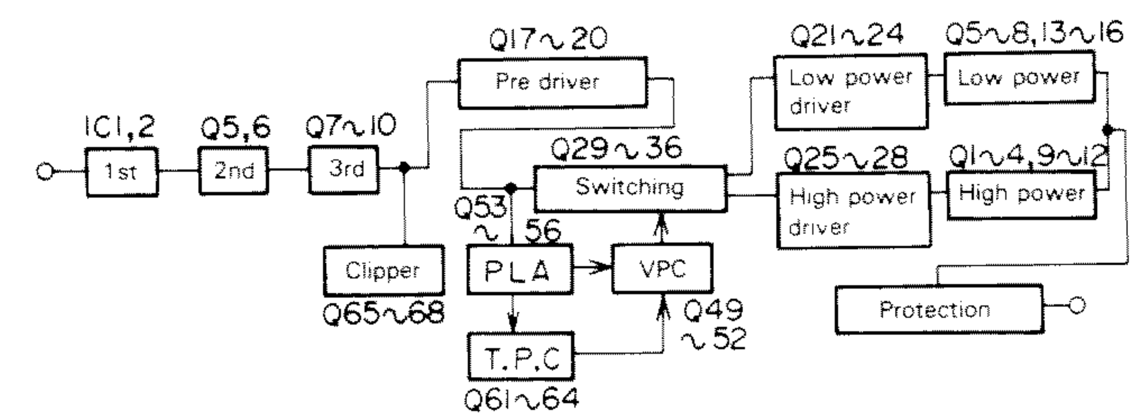


Fig. 6

1. Classe A voltage amplifier

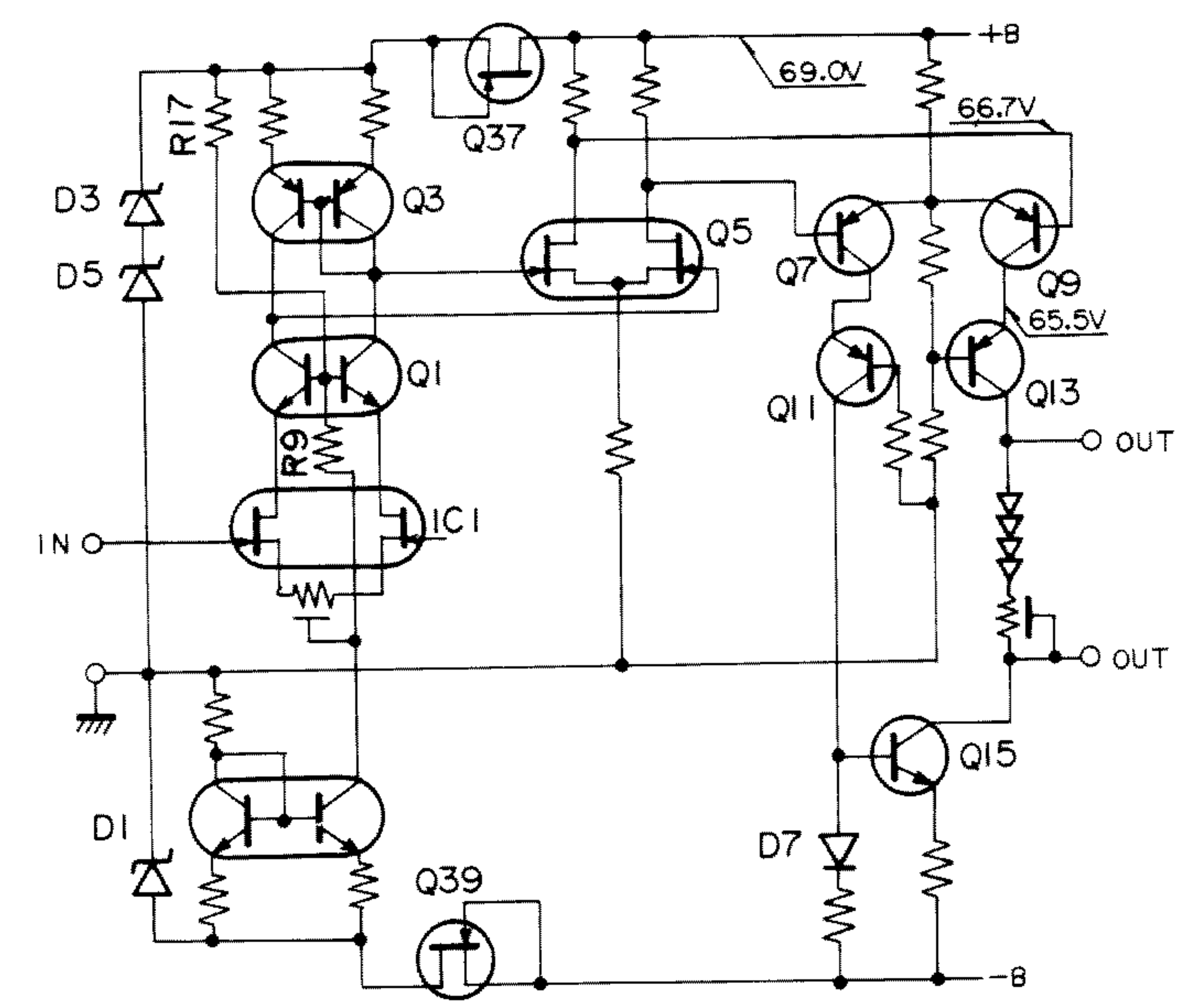


Fig. 7

A single-chip dual FET (IC1) with minimal drift is used together with a cascode bootstrap (Q1). The cascode bootstrap lowers the drain-source voltage of the FET; this is necessary because of the FET's low voltage rating. The drain voltage is determined by the voltage at the base of Q1. Approximately 9 volts is applied to the drain through a voltage divider consisting of R9 and R17. A current-mirror load (Q3) is added to achieve high gain.

The power supply for the first stage is regulated by a constant current circuit (Q37 and Q39) and the constant voltage elements (D1, D3, and D5). A dual FET (Q5) is also employed in the second stage to convert impedance and shift the signal level. This is necessary because of the high output impedance of the first stage. The third stage consists of a PNP differential circuit (Q7 and Q9), a cascode circuit (Q11 and Q13), and a current mirror load (D7 and Q15). This configuration provides high output with low drift over a wide range of frequencies.

Cascode connection

The collector load on the input transistor (Q9) becomes the emitter input impedance of the output transistor (Q13); hence the low impedance load. Because of this, the amount of output signal feedback to the base of Q9 resulting from collector-base capacitance (Cob) is considerably reduced; this results in a considerable improvement in frequency response. Also, DC drift is minimized because the current leakage between the collector and base of Q9 is reduced by the low collector-base voltage.

2. Clipper circuit

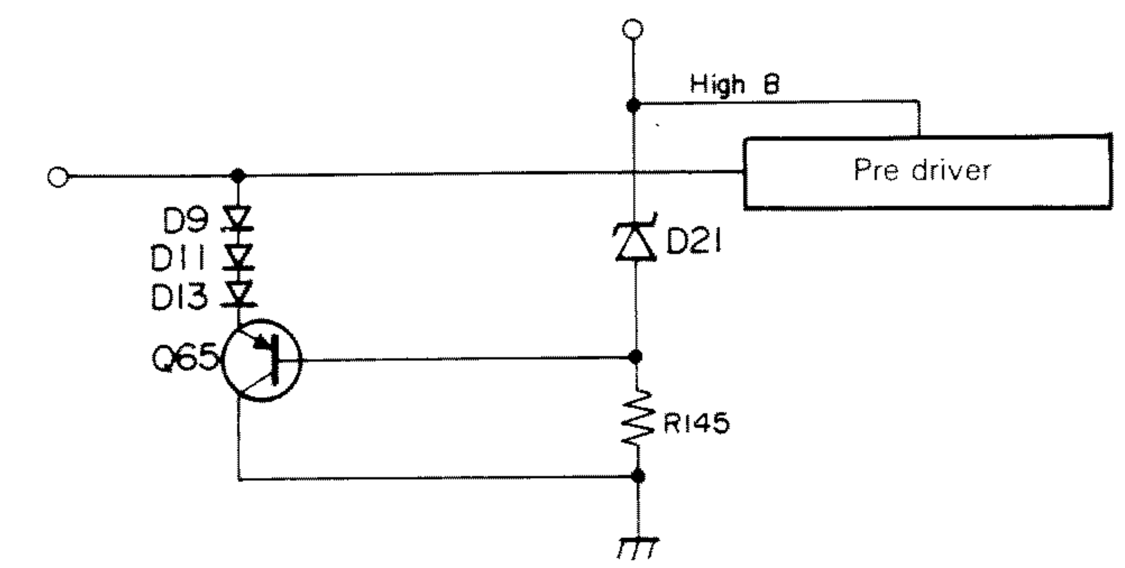


Fig. 8

A clipper circuit is added to the input side of the pre-driver. This limits the output voltage and eliminates clipping in the power stage. Although the amplifier can deliver more than 190 watts of output into an 8-ohm load if the clipper circuit is eliminated or not operational, the clipping waveform will be disturbed. If either the positive or negative clipping circuit is defective, the DC protection circuit operates due to imbalance in the output signal.

The voltage at the base of Q65 is 62 V, which is equivalent to the difference between the pre-driver power supply voltage (about 70 V) and the Zener voltage of D21 (about 8 V). Collector current starts to flow if the emitter voltage of Q65 exceeds 62.6 V; therefore, the input voltage to the pre-driver is limited to about 64.4 V. Diodes (D9, D11, and D13) are used to prevent reverse current flow from damaging Q65.

CIRCUIT DESCRIPTION

3. Dynamic linear drive (DLD) circuit

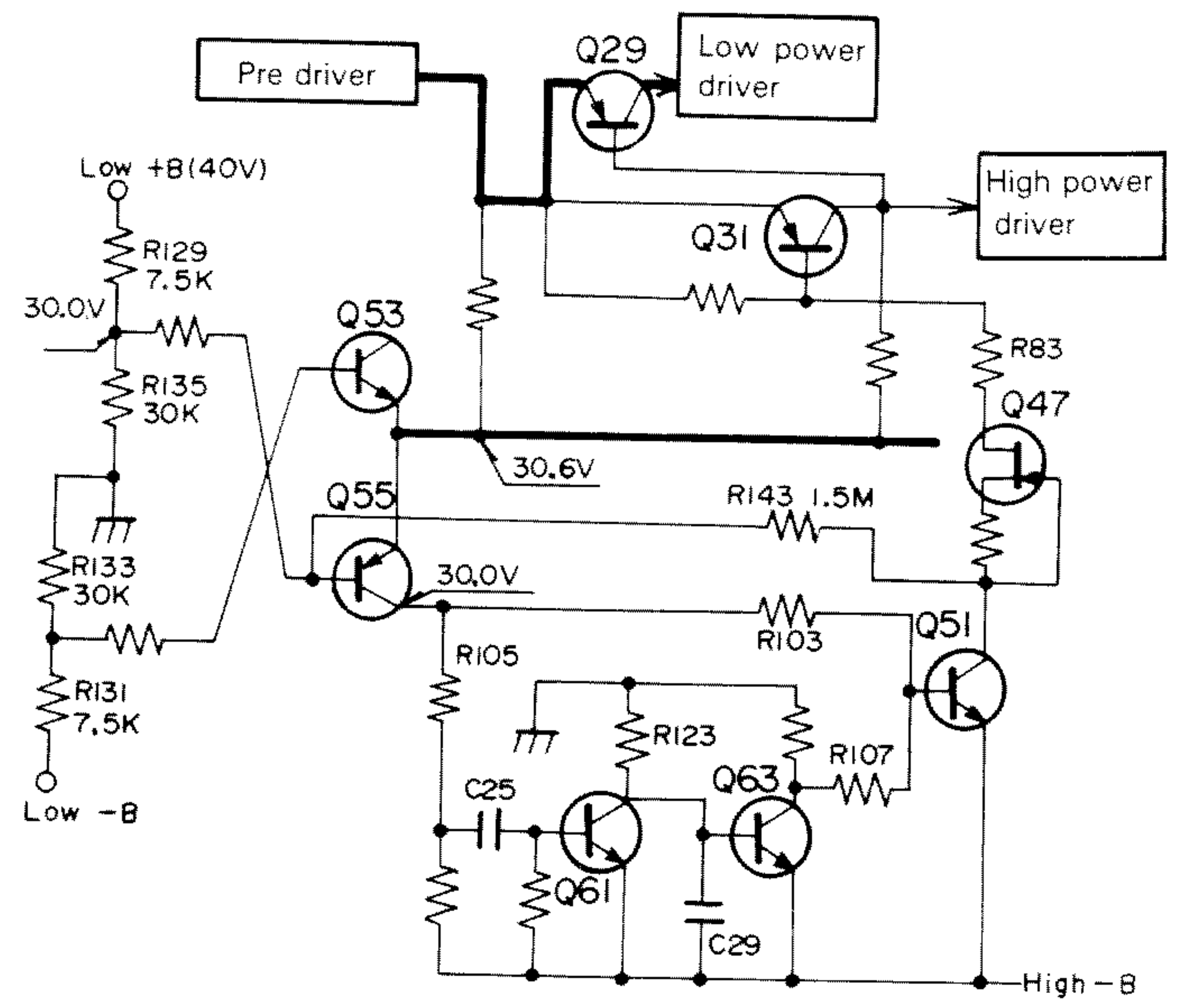


Fig. 9

This circuit is basically the same as that used in the KA-7X/9X series; however switching is performed between the pre-driver and the driver to achieve higher control speed. Transistors Q53 and Q55 detect the peak level for switching. The voltage at the base of Q55 is about 30 V: this is derived from a voltage divider consisting of R129 and R135. The emitter of Q55 is connected to the output. Q55 is turned on if the output voltage of the pre-driver exceeds a voltage of (30 + 0.6) volts; this turns on Q51 through R103. When Q51 goes on, Q31 is turned on via Q47 and R83 so that the high power circuit becomes operational. When Q31 goes on, Q29 is turned off so that the low power circuit is disconnected. Positive feedback is applied through R143 to Q55 from the collector of Q51, providing Q55 with the hysteresis characteristic necessary to ensure proper operation. When Q55 goes on, it turns on Q61 through R105 and C25. This turns off Q64 while turning on Q51. When Q61 goes off, Q63 stays off and Q51 is held on for about 2 mS by the time constant circuit (R123 and C29). Q47, which is connected to the collector of Q51, acts as a constant current element. The high impedance of Q47 protects switching transistor Q31 against power supply ripple and other undesirable effects produced when Q51 is turned on.

4. Protection circuit

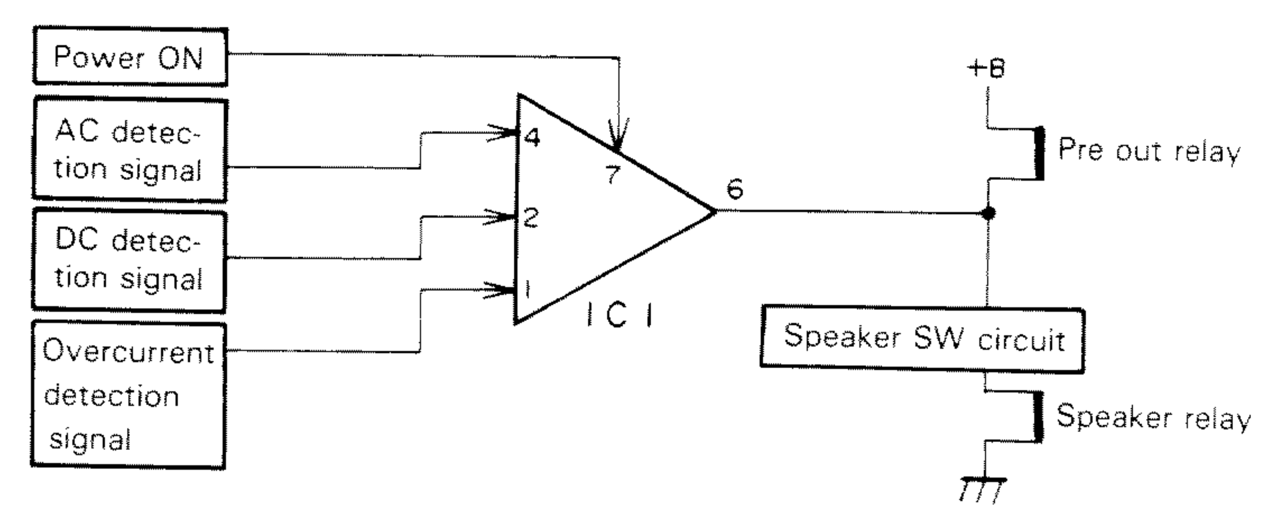


Fig. 10

IC1 (μPC 1237H) turns off the speaker relays to protect the power amplifier and the speakers if any of the following four signals is received: (1) the overcurrent detection signal, (2) the DC detection signal, (3) the AC detection signal, and (4) the power on signal.

The overcurrent detection circuit detects operation of the limiter circuit (see Fig. 11). With this limiter circuit, both Q1 and Q7 are turned on if voltage appears across R43 due to excess current through the power transistors; this lowers the pre-driver input voltage, limiting the current flow through the power transistors. Both Q9 and Q11 are turned on to deliver the overcurrent detection signal to IC1 when Q7 goes on.

A filter circuit consisting of R37 and C51 is used for DC detection. IC1 performs a protective operation if the DC voltage at its second pin exceeds 0.6 V or drops below -0.2 V.

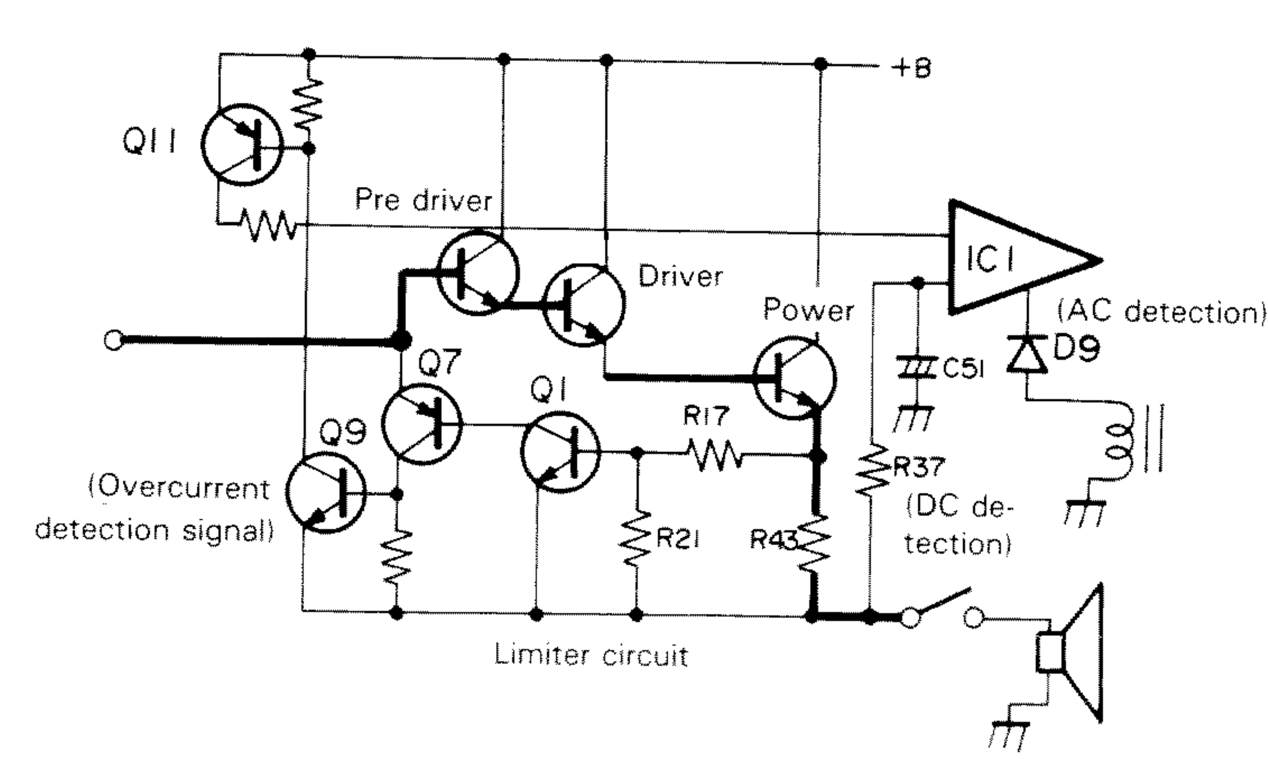


Fig. 11

The AC detection circuit causes IC1 to initiate its protective operation before amplifier operation is destabilized when AC voltage to the power transformer is cut off.

CIRCUIT DESCRIPTION

IC1 protection is also provided when the power supply is turned on. This protection is maintained by the time constant circuit (R103 and C53) until power amplifier operation stabilizes. The output of IC1 is fed directly to the headphones and pre-out relay, to the speaker relays (RL1 to RL4) through the speaker switch, and to the NF relay (RL1 in X09) through the relay driver (Q14).

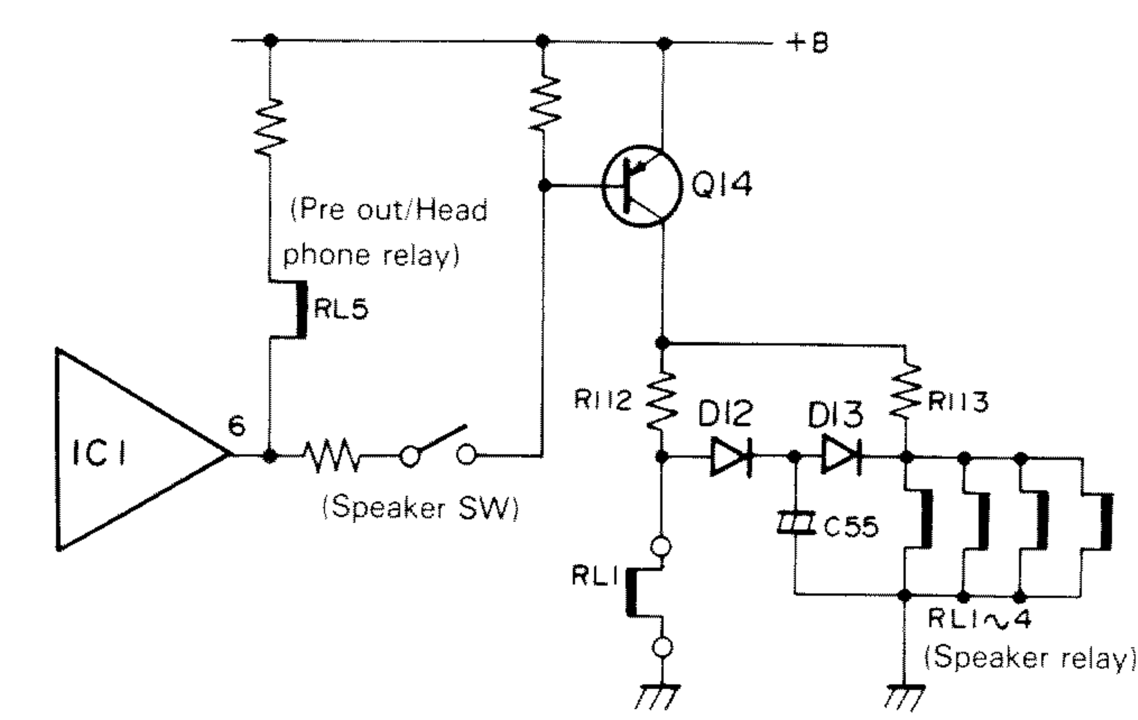


Fig. 12

The time lag circuit causes the speaker relays to go on before the NF relay, and the NF relay to go off before the speaker relays. Since negative feedback is applied through the speaker relays, amplifier gain increases when they are turned off. The NF relay acts to hold amplifier gain to a constant level.

See Fig. 12. Usually, Q14 is turned on and the speaker relays are (RL1 to RL4) activated when the speaker switch is set to ON. The time constant circuit (R112 and C55) delays activation of the NF relay. When the speaker switch is turned off (or when a protective operation is performed), Q14 goes off and the NF relay is deactivated. The speaker relays remain on for a short time due to the current flow through C55 and D19, then they are deactivated also. This time lag prevents uncomfortably loud signals produced by increased amplifier gain from reaching the headphones and pre-out.

LOUDNESS CONTROL

The L-02A is not equipped with a tone control circuit; a variable frequency loudness control is used to control low frequencies.

The loudness level of this circuit is varied in 3 levels by selecting one of the three resistors. The section which corresponds to capacitor in an ordinary loudness control is a Miller circuit which uses a variable output operational amplifier.

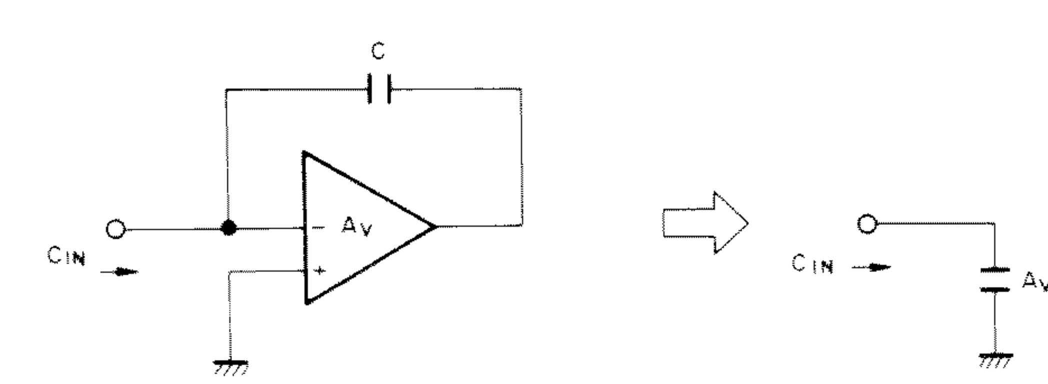


Fig. 13

In the above figure, when capacitor C is connected to the parallel negative-feedback circuit, response is lowered at higher frequency levels. The input impedance of the circuit is capacitive and its equivalent capacitance is given by

$C_{IN} = A_V \cdot C$

where A_V: gain of amplification

Thus, equivalent input capacitance is large even if the capacitor used is small.

The equivalent input capacitance can be varied by varying the gain of amplification. In the circuit of the L-02A, the gain of amplification is

$$A_V = \frac{R7}{(R5+VR1)}$$

Therefore, equivalent input capacitance is given by

$$C_{IN} = C \cdot \frac{R7}{(R5+VR1)} \quad (\mu F)$$

C_{IN} corresponds to the capacitor in a conventional loudness control.

CIRCUIT DESCRIPTION

INPUT SELECTOR

The input selector circuit consists of a three key switch on the lower right of the front panel and the relating circuits in the control unit.

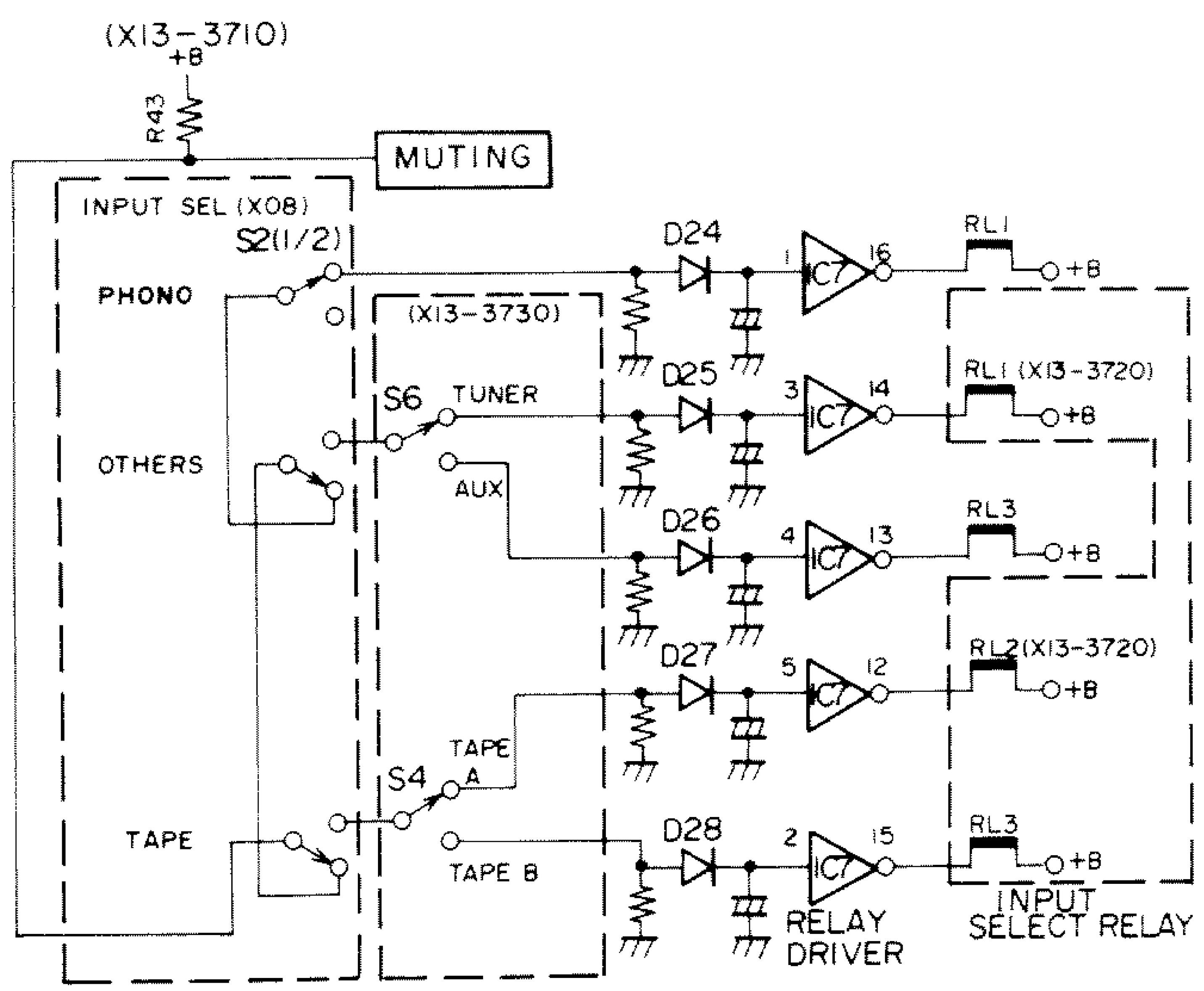


Fig. 14

• PHONO

The H level signal from R43 (muting circuit) in X13-3710 is applied to pin 1 of IC7 through S2 in X08-2000 so that RL1 is actuated. RL1 allows the EQ amplifier output signal to be fed to the SUBSONIC-DC switch.

• OTHERS

When the OTHERS position is selected with S2, an H level signal is applied to S6. When TUNER or AUX is selected by S6, RL1 (X13-3720) or RL3 is actuated by the driver (IC7) so that the selected input source is connected.

• TAPE

When the TAPE position is selected, TAPE A or TAPE B can be selected by means of S4 in X13-3730.

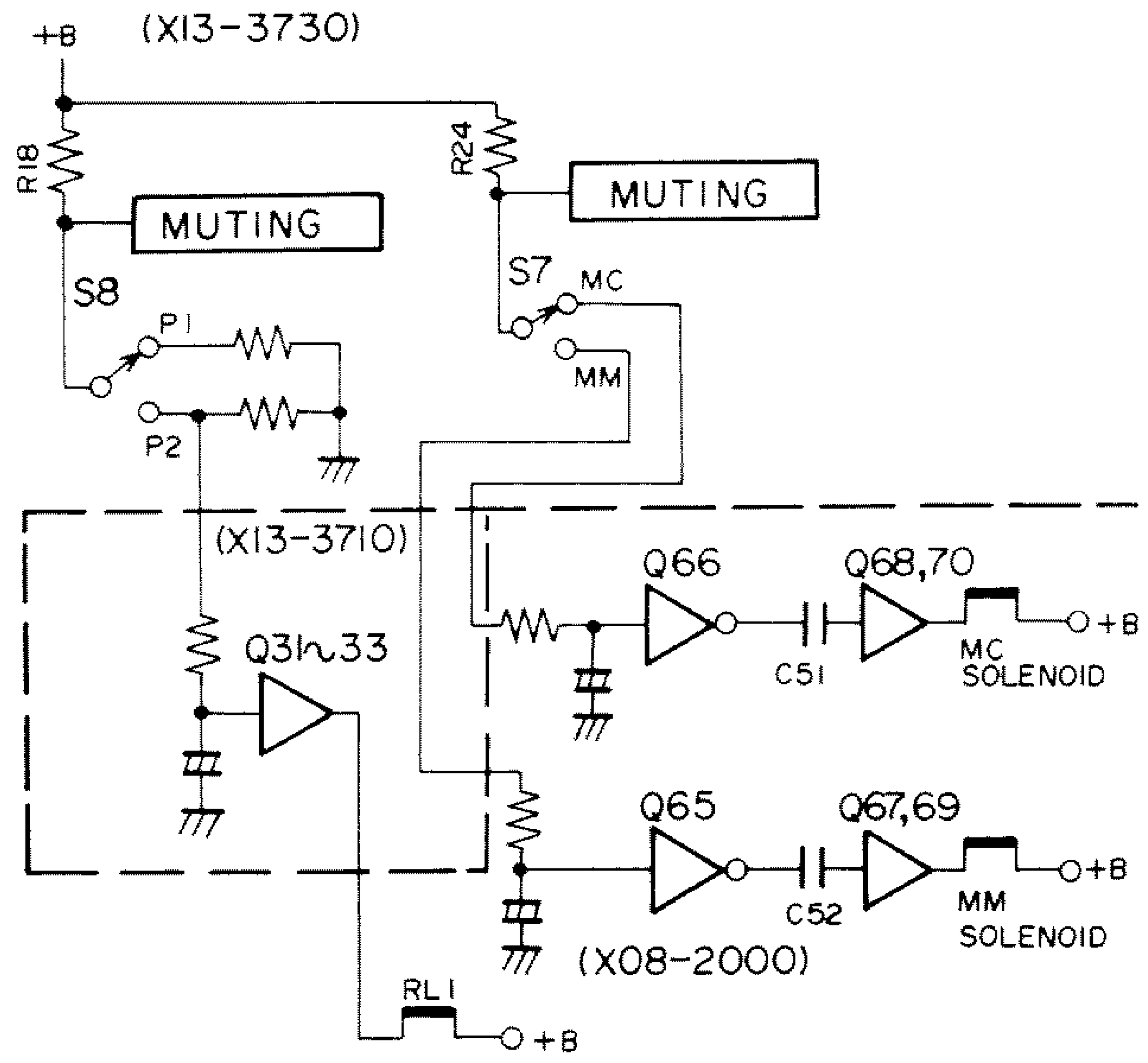


Fig. 15

• PHONO 1

When S8 is set to the PHONO 1 position, RL1 in X08-2000 is turned OFF and PHONO 1 is connected to the EQ amplifier.

• PHONO 2

When S8 is set to the PHONO 2 position, RL1 is actuated and PHONO 2 is connected to the EQ amplifier.

• MC

When S7 in X13-3730 is set to the MC position, Q66 in X08-2000 is turned ON to actuate the MC solenoid. The MC solenoid shifts the magnet relay to the MC position. After C52 has been charged, the solenoid current is cut off but the magnet relay is held in the MC position.

• MM

When S7 is set to the MM position, Q65 in X08-2000 is turned ON to actuate the MM solenoid. The MM solenoid shifts the magnet relay to the MM position.

CIRCUIT DESCRIPTION

REC OUT CIRCUIT

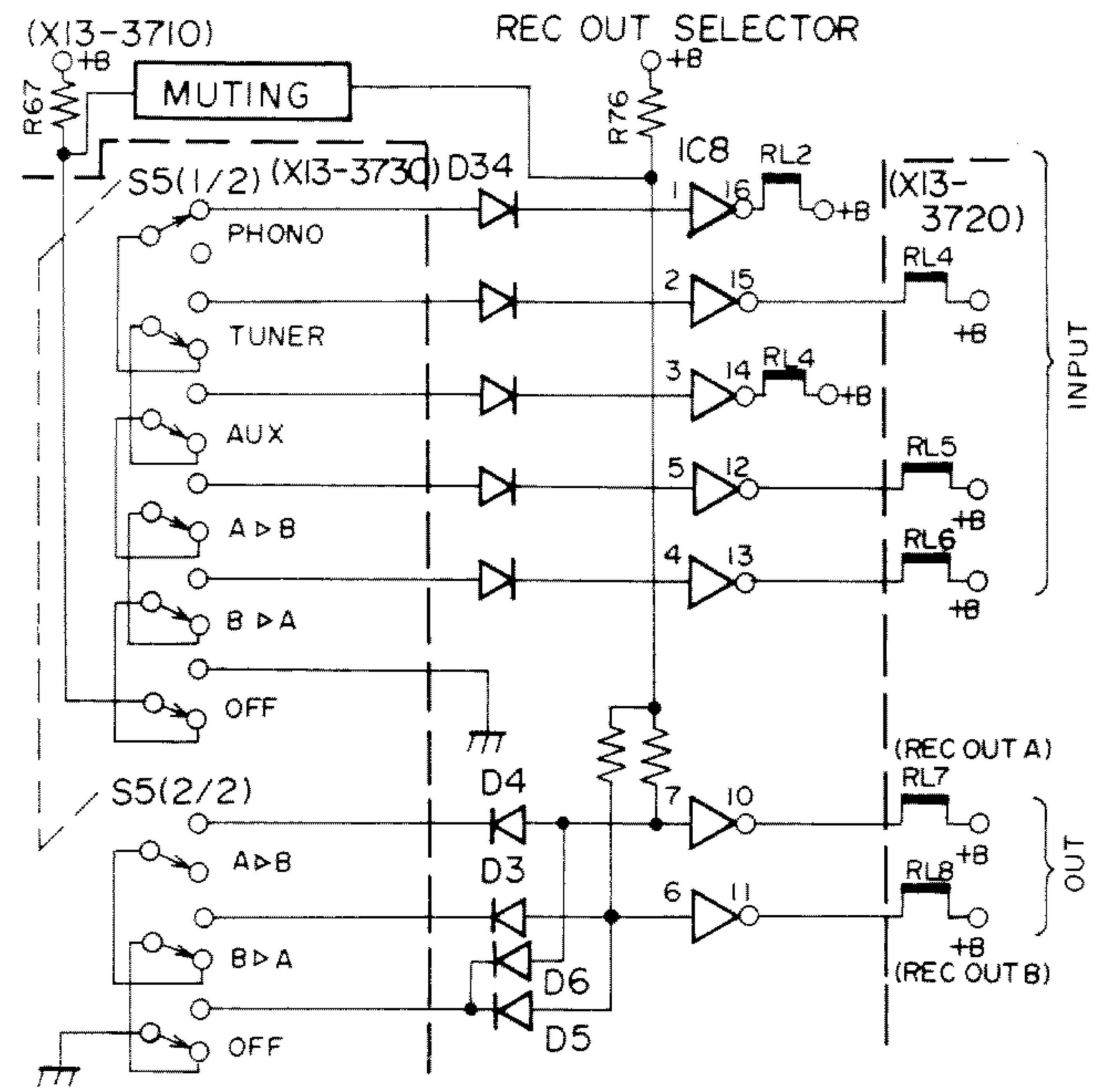


Fig. 16

The REC OUT circuit is similar to the input selector circuit.

• TAPE A

The H level signal from R67 in X13-3710 is applied to driver IC8 when TAPE A▷B is selected by S5 (1/2). This actuates RL5 to select the TAPE A PLAY input terminals. Also, RL7 is turned OFF at this time by S5 (2/2).

• TAPE B

RL6 is actuated in the same manner as with TAPE A when TAPE B▷A is selected by S5.

• OFF

All relays related to REC OUT are turned OFF when OFF is selected by S5.

CIRCUIT DESCRIPTION

MOTOR CONTROL UNIT

1) Initialization when the power is turned on

When power switch S1 is turned on, the relay in the power supply unit is turned ON at the same time. The circuits then starts operating when the power supply voltage reaches a certain level. The conditions of the circuits are initialized as follows before operation starts. The voltage applied to pins 8 and 9 of IC1 rises to H after the amount of time determined by R26 and C5 has elapsed to allow the power supply voltage to rise. During this period, an H level signal is output from pin 10 of IC1. This signal is applied to the R terminal of the JK-FF (IC2) to reset it. Therefore, its Q output becomes L and $\bar{Q}$ becomes H. The level applied to the R terminal then drops and the JK-FF is enabled to receive data. S2 and S3 are the rear and front limit switches which are turned ON when the control unit is moved to the in and out positions. The control unit is normally in the in position when the power switch is turned ON. Therefore, the inputs to AND gate 1 are both L so that its output is L; the inputs to AND gate 2 are both H so that its output is H. Q3 goes ON and an L level signal is applied to pins 9 and 12 of IC3 so that the bases of motor drive transistors Q6 and Q7 become L. Therefore, the motor does not rotate. The initial state of the motor control unit is shown in Fig. 17.

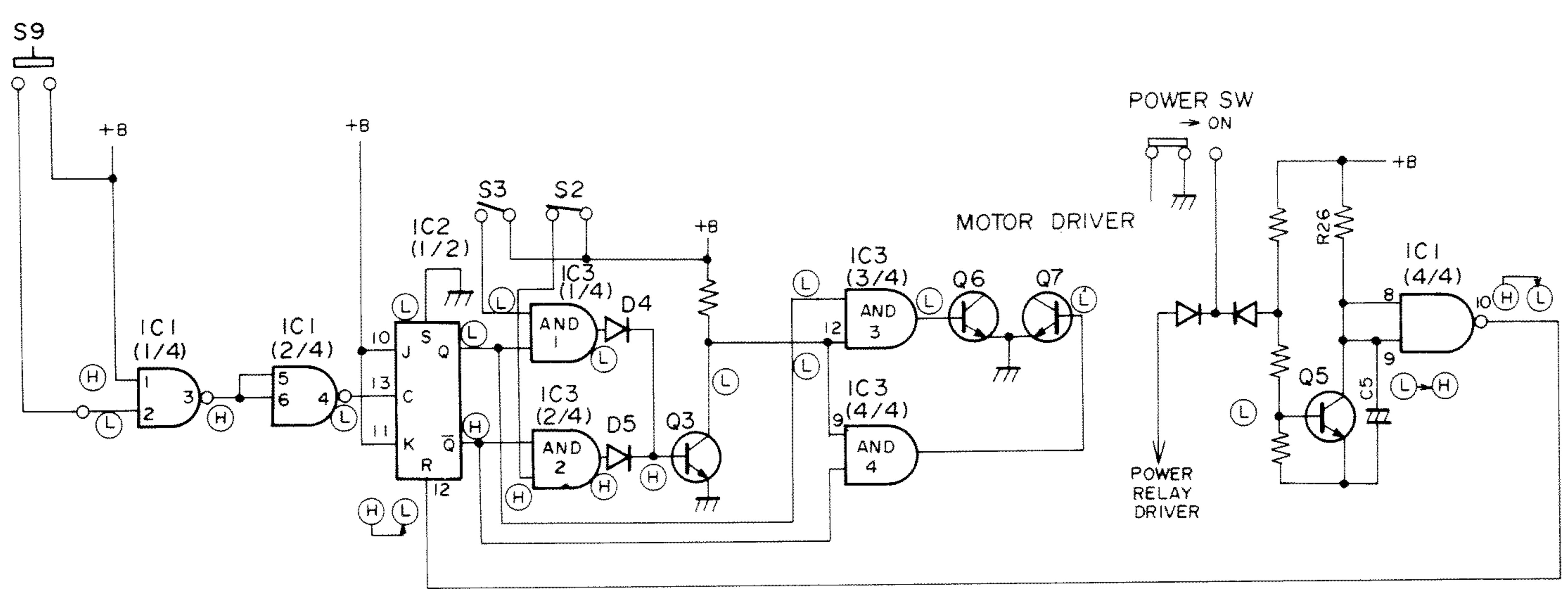


Fig. 17 Initial state of motor control circuit

CIRCUIT DESCRIPTION

2) OPEN/CLOSE operation

When the control unit OPEN/CLOSE switch (S9 in X13-3730-10) is pressed once, H is applied to both pins 1 and 2 of IC1 (a NAND gate). The level at pin 4 of IC1 then becomes H. This level is applied to the C terminal of the JK-FF. Since H is applied to both the J and K terminals, the state of the flip-flop is reversed; that is the state of the JK-FF is inverted each time S9 is pressed.

When the JK-FF is set, the inputs to AND gate 1 are L and H, as are those to AND gate 2. Thus, the outputs of both gates are L and Q3 is turned OFF so that H is applied to one input of both AND gates 3 and 4.

H is applied to the other input of AND gate 3 and L is applied to the other input of AND gate 4 because the JK-FF is set. Therefore, H is applied to the base of Q6 and L is applied to the base of Q7. This causes motor current to flow from the power supply→Q11→motor→Q8→GND so that the motor rotates to push out the control unit. S2 is then turned OFF, but this does not affect motor operation because the output level of AND gate 2 is held at L.

When the control unit reaches the fully projected position, S3 is turned ON. The inputs to AND gate 1 then both become H, so its output becomes H to turn Q3 ON. This causes AND gates 3 and 4 to close so that the base voltage of Q6 and Q7 drops to L and the motor stops.

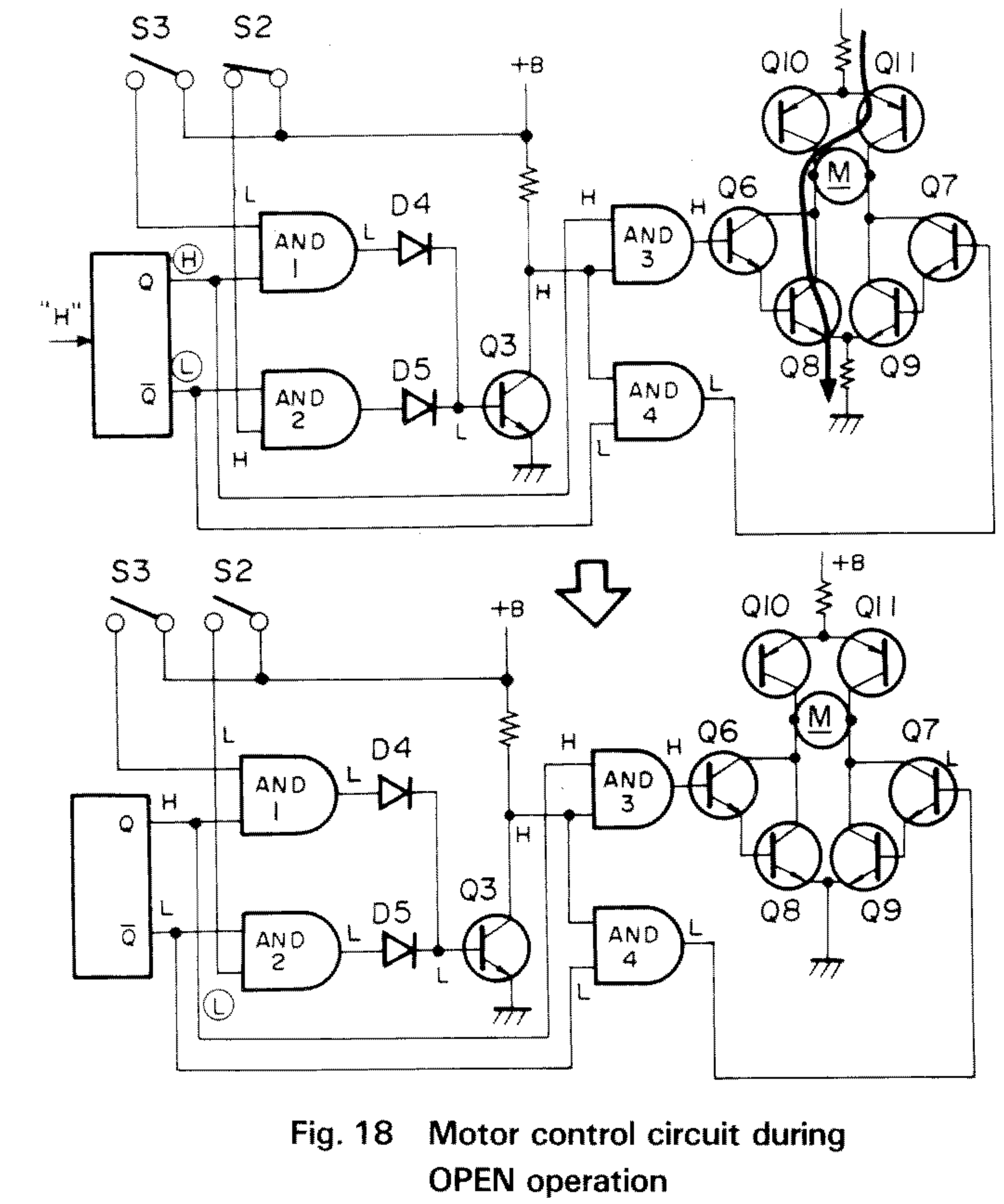


Fig. 18 Motor control circuit during OPEN operation

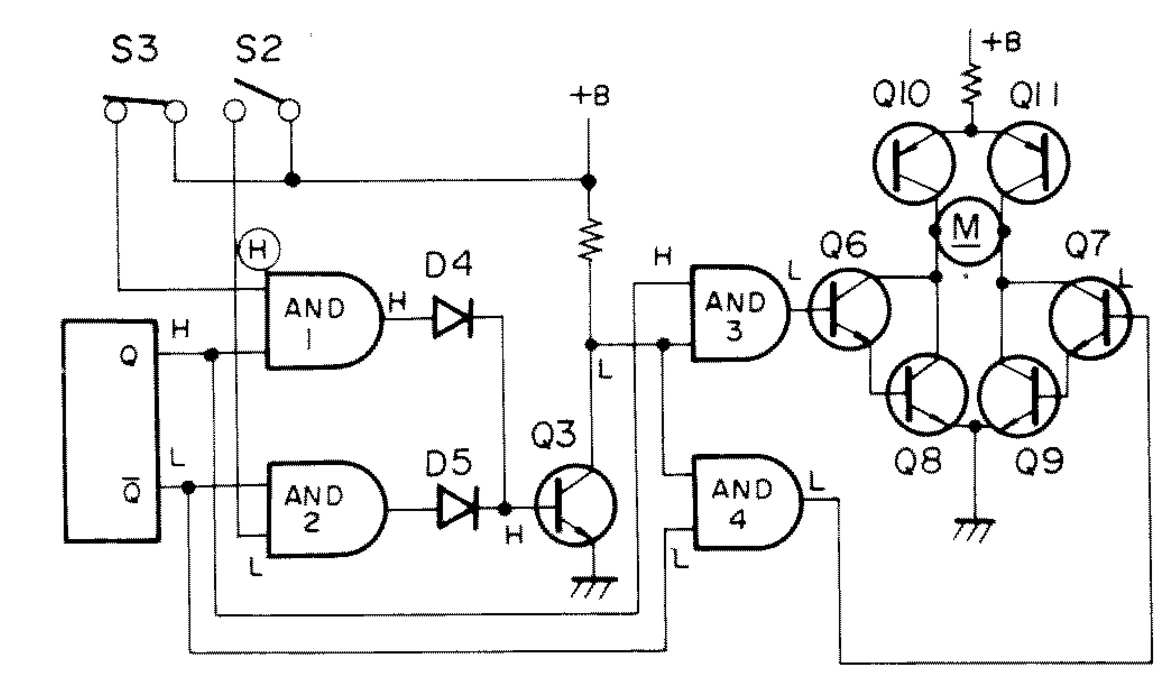


Fig. 19 Motor control circuit when control unit is in the fully projected position

CIRCUIT DESCRIPTION

When S9 is pressed while the control unit is in the OUT position, the state of the JK-FF is inverted; that is, Q becomes L and $\bar{Q}$ becomes H. Therefore, the output levels of both AND gates 1 and 2 drop to L. The output level of the NOR gate consisting of D4, D5 and Q3 rises to H because both inputs are L. This H level is applied to both AND gates 3 and 4 so that the outputs from the JK-FF are applied to the bases of Q6 and Q7. The motor now rotates in the opposite direction to retract the control unit. When retraction starts, the motor keeps rotating even though S3 is turned OFF because the output level of AND gate 1 is held at L.

When the control unit reaches the fully retracted position, S2 is turned ON. This causes the output level of AND gate 2 to become H. Both AND gates 3 and 4 are then closed to drop the levels at the base of Q6 and Q7 so that the motor stops.

When S9 is pressed while the motor is rotating, the state of the JK-FF is reversed. At this time, both S2 and S3 are OFF and both AND gates 3 and 4 are open. Therefore, the outputs of the JK-FF are applied to the bases of Q6 and Q7 so that the direction of rotation is reversed.

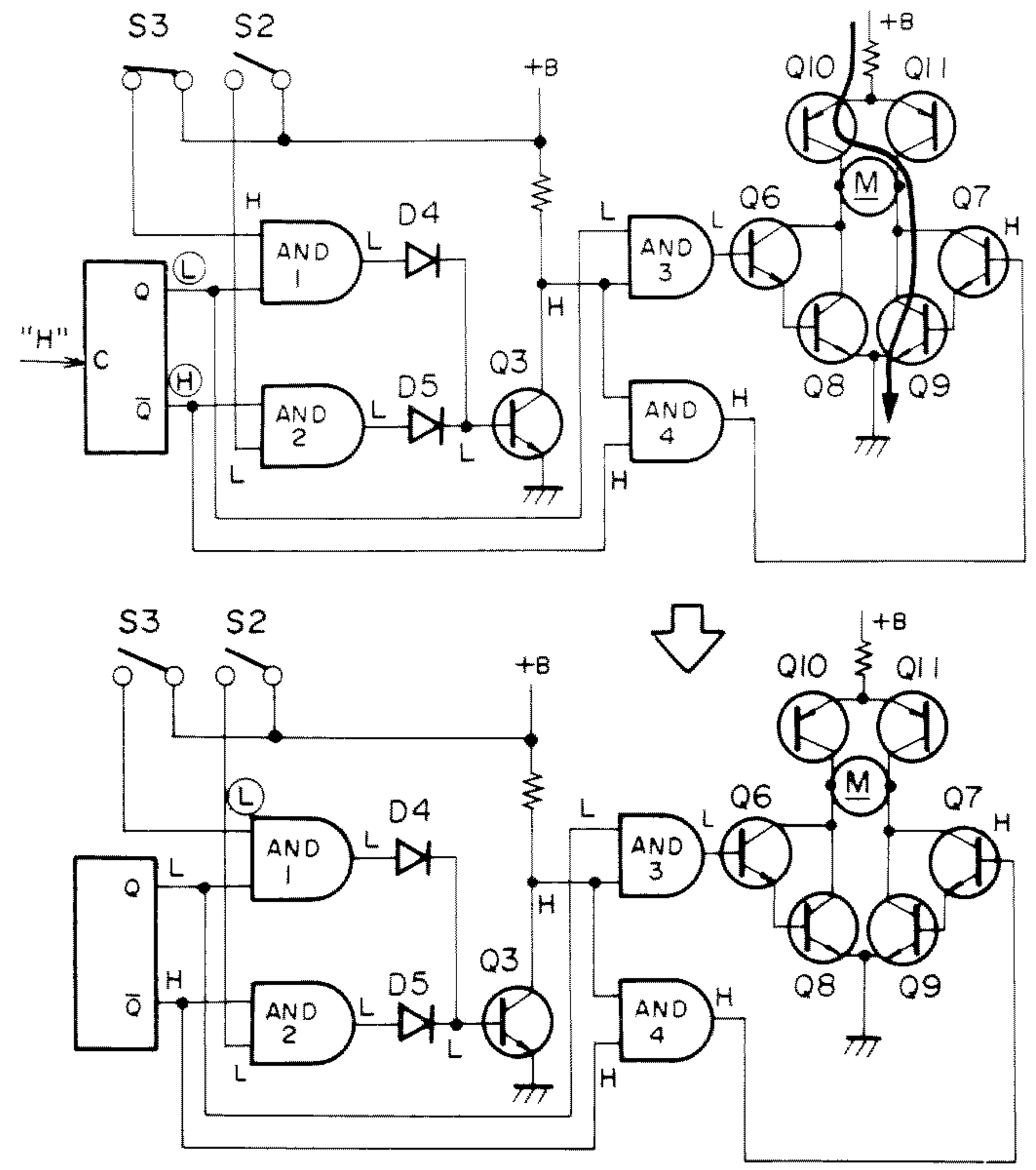


Fig. 20 Motor control circuit during CLOSE operation

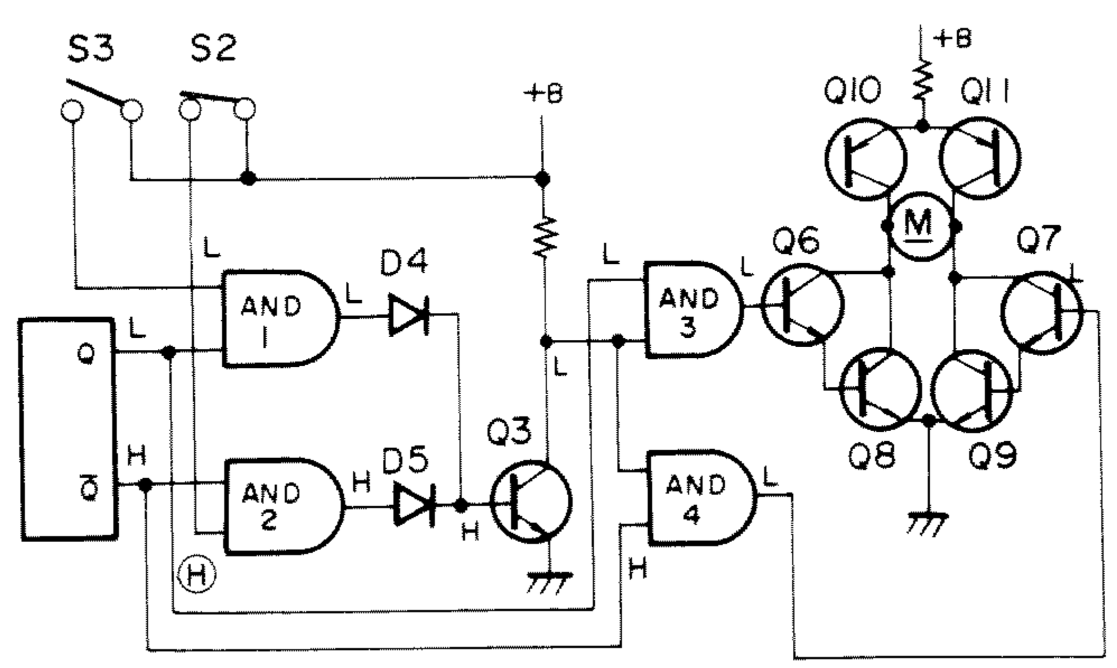


Fig. 21 Motor control circuit when control unit is in the retracted position

CIRCUIT DESCRIPTION

3) Protection circuit

A large amount of current flows through the motor if it is focibly stopped by some obstruction. This current produces a large voltage drop across R33. This voltage across R33 turns Q12 ON. If this condition lasts for a certain amount of time (the period determined by R4 and C3), Q1 is turned ON and Q2 is turned OFF so that the collector level of Q2 rapidly rises. However, C4 cannot be charged instantaneously, so H is applied to pin 2 of IC1 (1/4). This causes a clock pulse to be applied to the JK-FF to reverse its state and the direction of motor rotation and prevent the motor and circuit from being damaged.

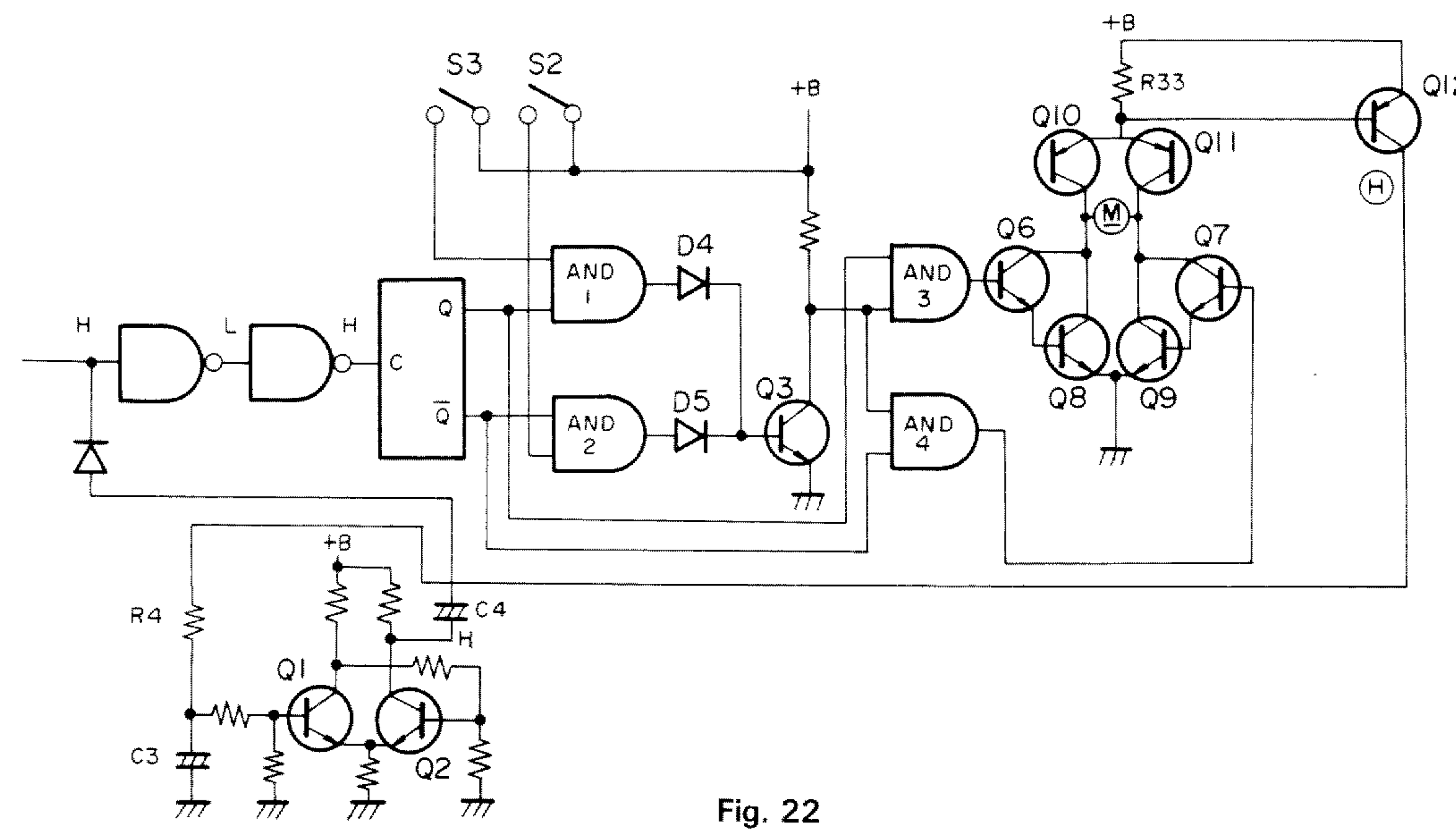


Fig. 22

CIRCUIT DESCRIPTION

4) Power OFF operation

The power is not turned off immediately when the POWER switch is turned off if the control unit is not in fully retracted position.

(a) Power-off operation when the control unit is fully retracted position:

When the POWER switch is turned off, Q5 is turned ON to set the output level of NAND gate 4 to H. The output level of NAND gate 3 is L because S2 is ON; H is applied to its input through D6, then Q4 is turned OFF to turn off the power relay.

(b) Power-off operation when the control unit is in fully projected position or in motion:

When the POWER switch is turned OFF, the output level of NAND gate 4 becomes H. This H level is applied to both NAND gate 3 and the JK-FF to retract the control unit. S2 is OFF while the control unit is being retracted, so the output level of NAND gate 3 is H. Since Q4 is ON, the power relay is kept ON. When the control unit reaches the fully retracted position, S2 is turned ON. Subsequent operation is as described in (a).

(c) Other operation:

If the motor is overloaded during the operation described in (b), Q12 is turned ON and the collector level of Q2 becomes H. This H level is applied to NAND gate 3 through D7. This turns off the power in the same manner as when S2 is turned ON. (The control unit will not be completely retracted.)

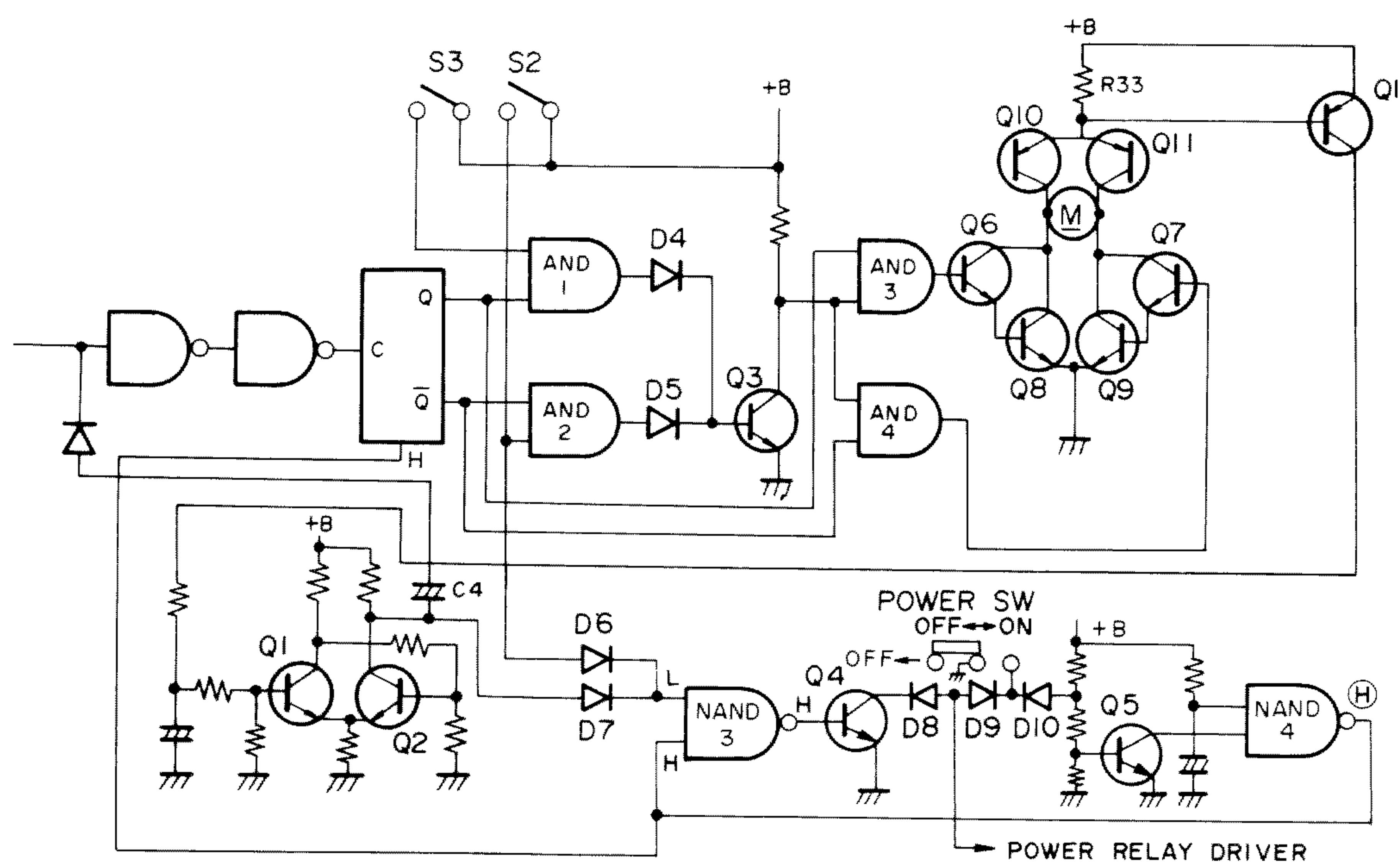


Fig. 23

CIRCUIT DESCRIPTION

INPUT SWITCHING AND MUTING CIRCUITS

The L-02A is constructed so that all input switching is accomplished by relays; these relays are activated by means of selector switches. All relays (except for PHONO 1 ⟶ 2 and MM ⟶ MC) are driven by ICs 7 and 8 (X13-3710-00). Further, a muting circuit is included in X13-3710-00 to prevent shock noise when the input selection switches are operated; this circuit operates only when the selector switches are operated. A diagram of this muting circuit is shown in Figure 24; this diagram shows the state of the circuit when sound is being output. IC5 (1/2) is a monostable multivibrator which assumes the stable condition ($Q = L$, $\bar{Q} = H$) when it is not being triggered; this multivibrator enables operation of the IC7 relay driver, and also applies H to the base of Q19. Since Q19 is a emitter follower, application of H to the base of Q19 will let C10 to be charged after a certain period of time, causing the level at pin 12 of IC6 1/4 (NAND gate 3) to become H also. Further, since the IC2 (2/2) JK-FF is in the reset condition when the muting switch is not set to ON, the $\bar{Q}$ output (H) of the monostable multivibrator is applied as is to pin 13 of NAND gate 3; this causes the output of NAND gate 3 to become L so that the relay goes ON and the signal is passed. In other words, the relay goes OFF and the signal is blocked whenever either of the inputs of the NAND gate become L. Operation of the muting circuit for the various selector switches is described below.

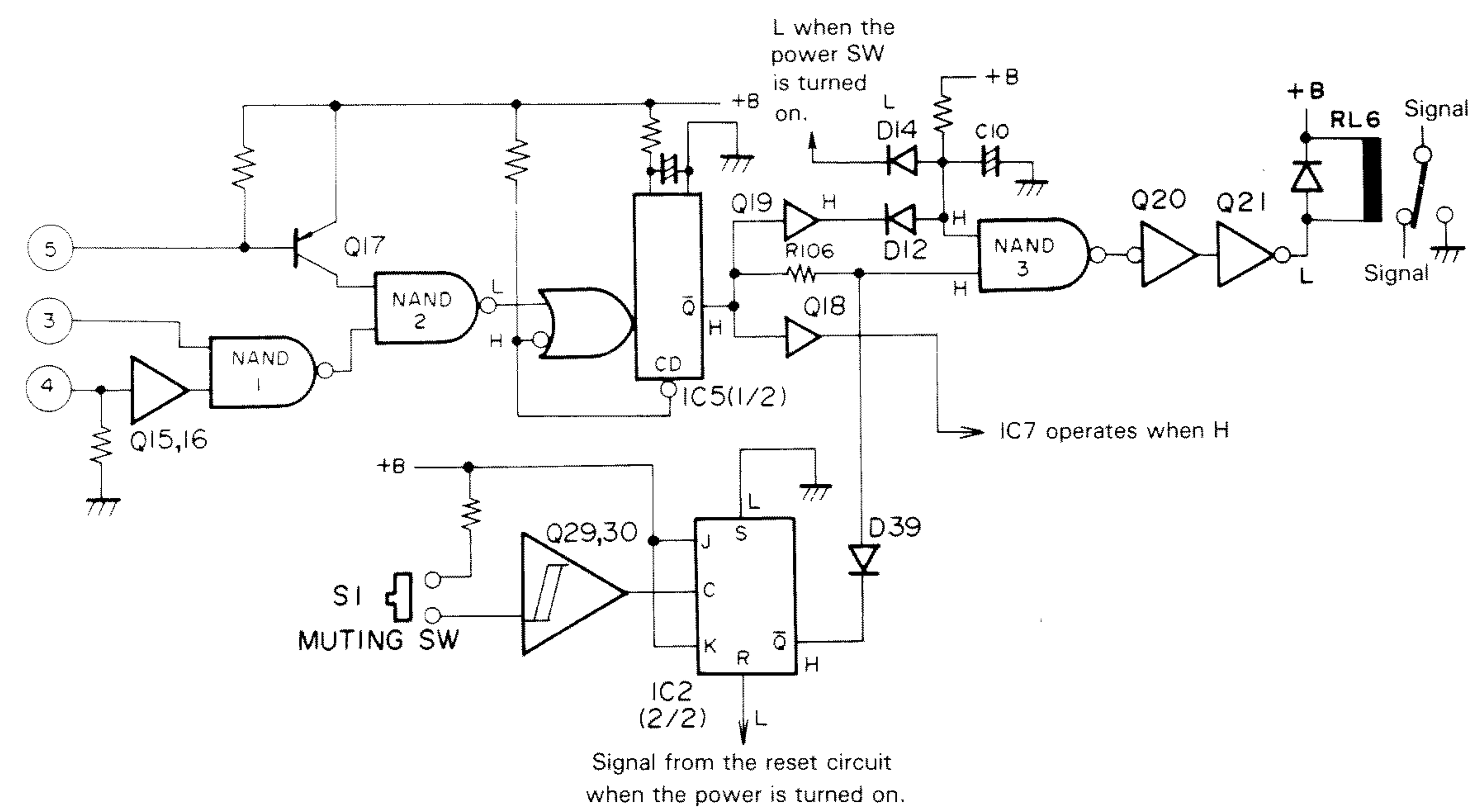


Fig. 24 Muting circuit during normal state

CIRCUIT DESCRIPTION

1) When the PHONO, OTHERS, or TAPE switch is operated

When the PHONO key (X08-2000-00 B/3 S2) is depressed, ④ and ⑤ of Figure 25 are connected so that both Q17 and Q15 go on. Since ③ is L when MM-MC is not being switched, the output of IC4 1/4 (NAND gate 1) is H and the inputs to IC4 2/4 (NAND gate 2) are both H; thus, the output of NAND gate 2 is L. (See Figure 25(a).)

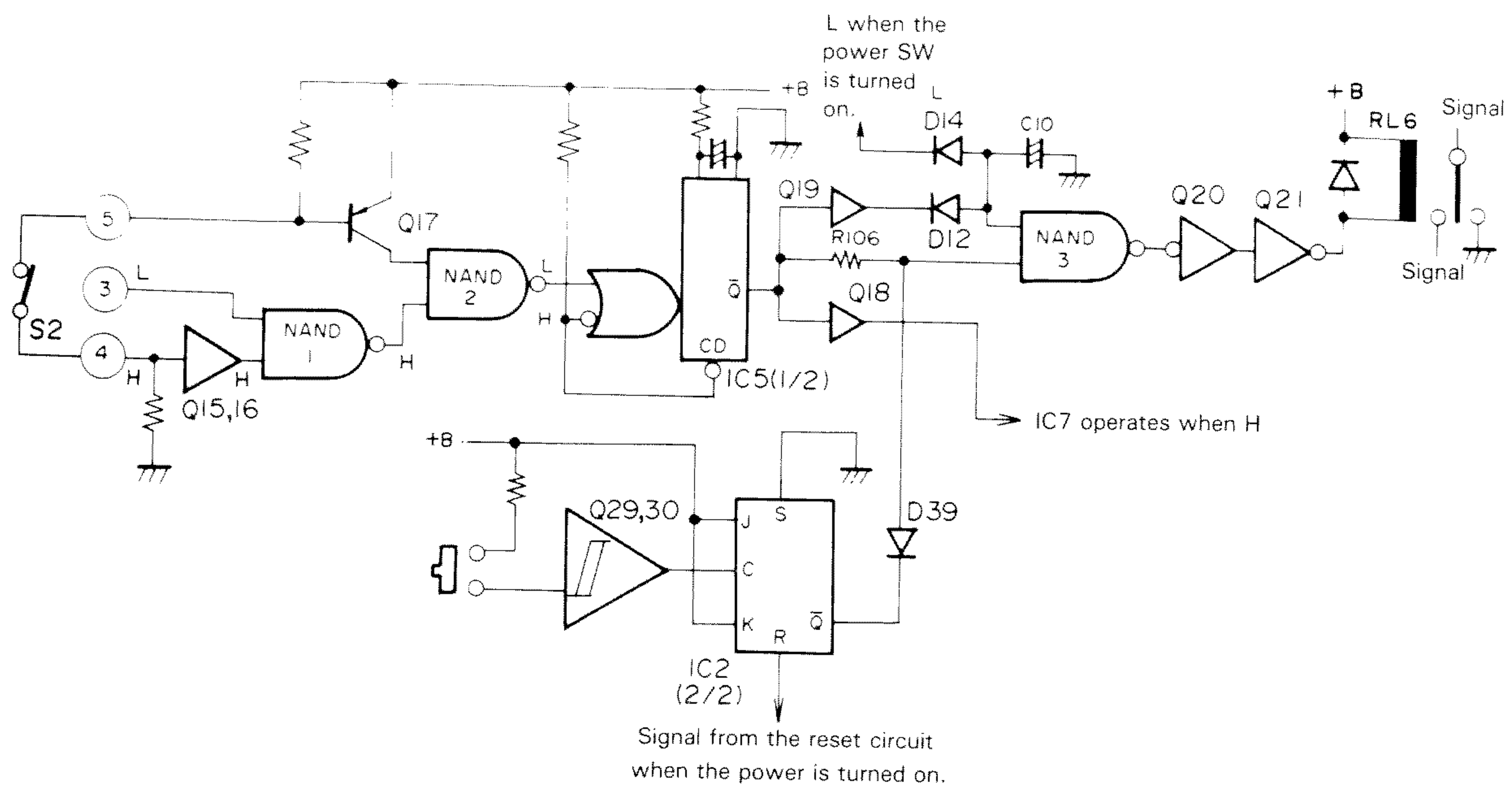


Fig. 25(a) During PHONO selection

When the OTHERS key is depressed, ④ is released and the input level at pin 1 of NAND gate 1 becomes L. This makes the output of the NAND gate H regardless of the state of pin 2. Since ⑤ is grounded either through R96 or R97, Q17 goes ON and both inputs to NAND gate 2 are H; therefore, the outout level of NAND gate 2 is L. When the TAPE key is pressed, ⑤ is grounded through either R94 or R95 and other conditions are the same as when the OTHERS key is pressed. (See Figure 25(b).)

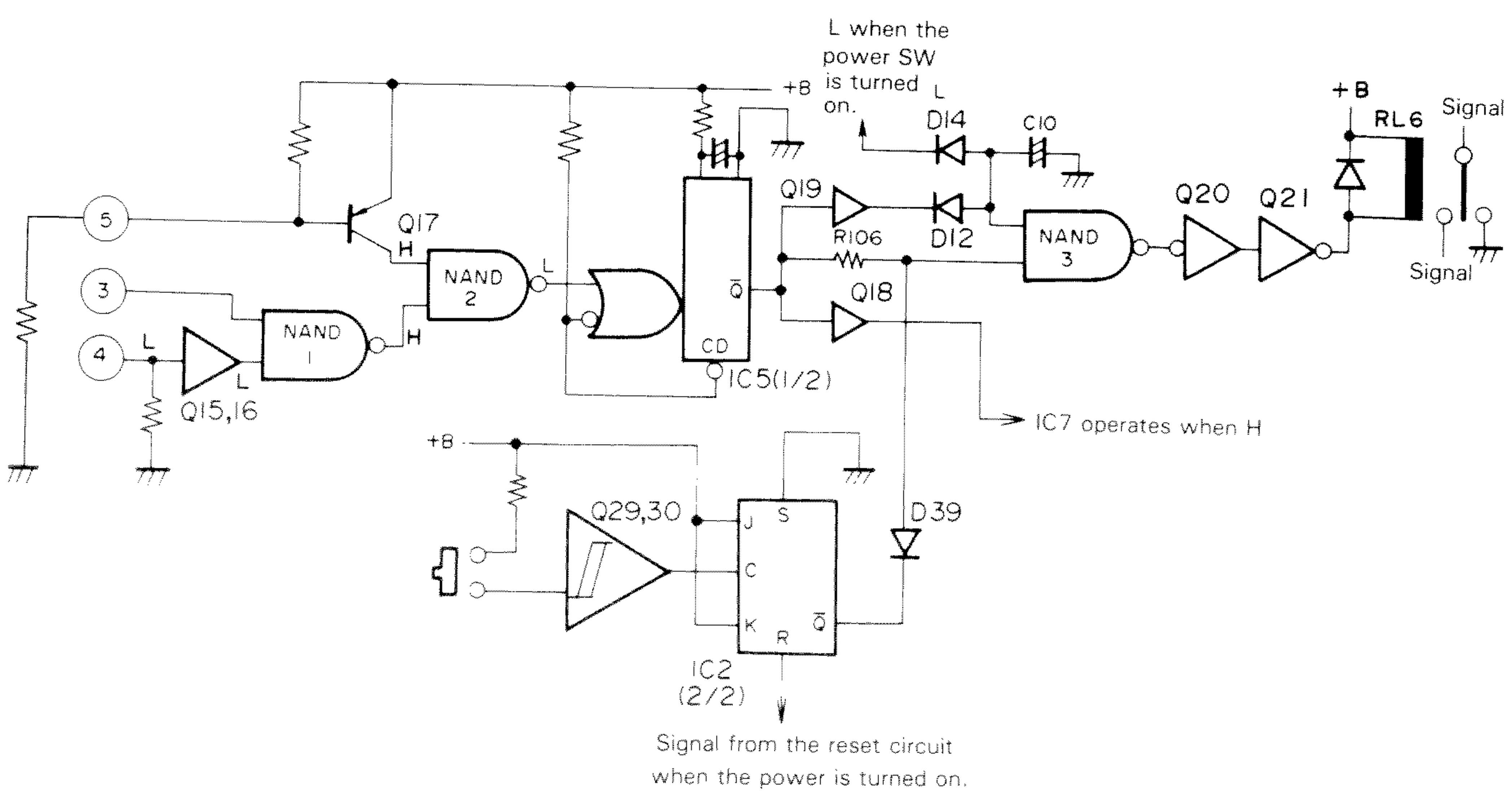


Fig. 25(b) During TAPE or OTHERS selection

CIRCUIT DESCRIPTION

Since ⑤ is released whenever any of these keys is operated, Q17 goes off momentarily and the output level of NAND gate 2 momentarily goes to H. IC5 (1/2), the monostable multivibrator, is then triggered at the instant when the level at pin 5 (the trigger pin) goes from L to H. Since the $\bar{Q}$ output of the monostable multivibrator is applied directly to pin 13 of NAND gate 3, the output level of NAND gate 3 momentarily becomes H and the signal is blocked. When the $\bar{Q}$ output of IC5 (1/2) becomes L, the emitter output level of Q19 also falls to L so that C10 is discharged and the input level at pin 12 of NAND gate 3 becomes L slightly later than that at pin 13. This serves to hold the output level of NAND gate 3 to H. (See Figure 26.)

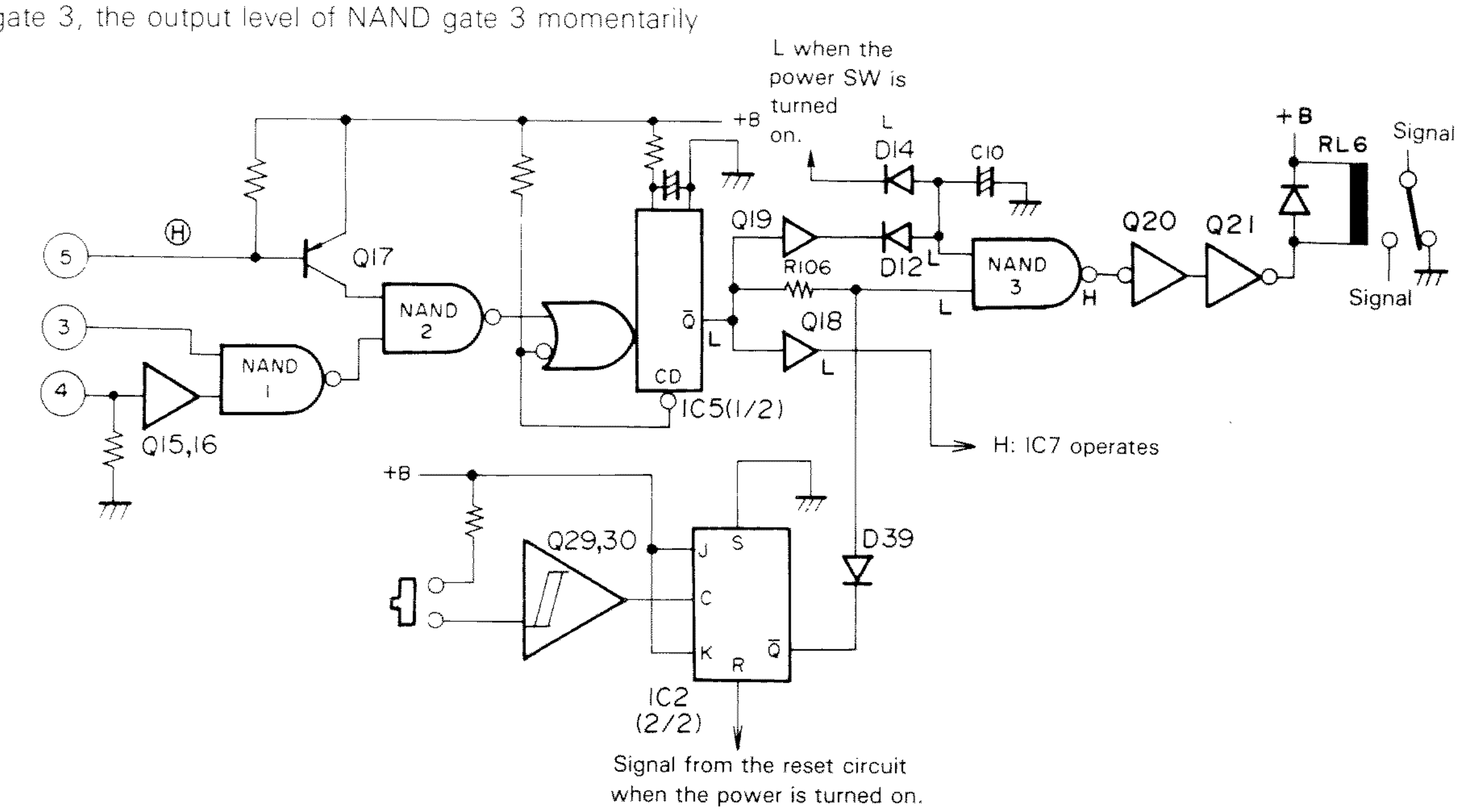


Fig. 26 Condition when the monostable multivibrator is activated

The time constant of the monostable multivibrator is fixed to approximately 0.5 seconds by R46 and C9. During this time (the time when the $\bar{Q}$ output is L), the level at pins 1 to 4 of IC7 is L; thus, relays 1 and 3 and relays 1 and 3 of X13-3720-00 are all OFF and the input is released. When the monostable multivibrator returns to its stable state, the output level of $\bar{Q}$ becomes H, causing the output level of the emitter of Q18 to become H so that relay driver IC7 sets the relays ON according to the selector switch positions. (See Figure 27.)

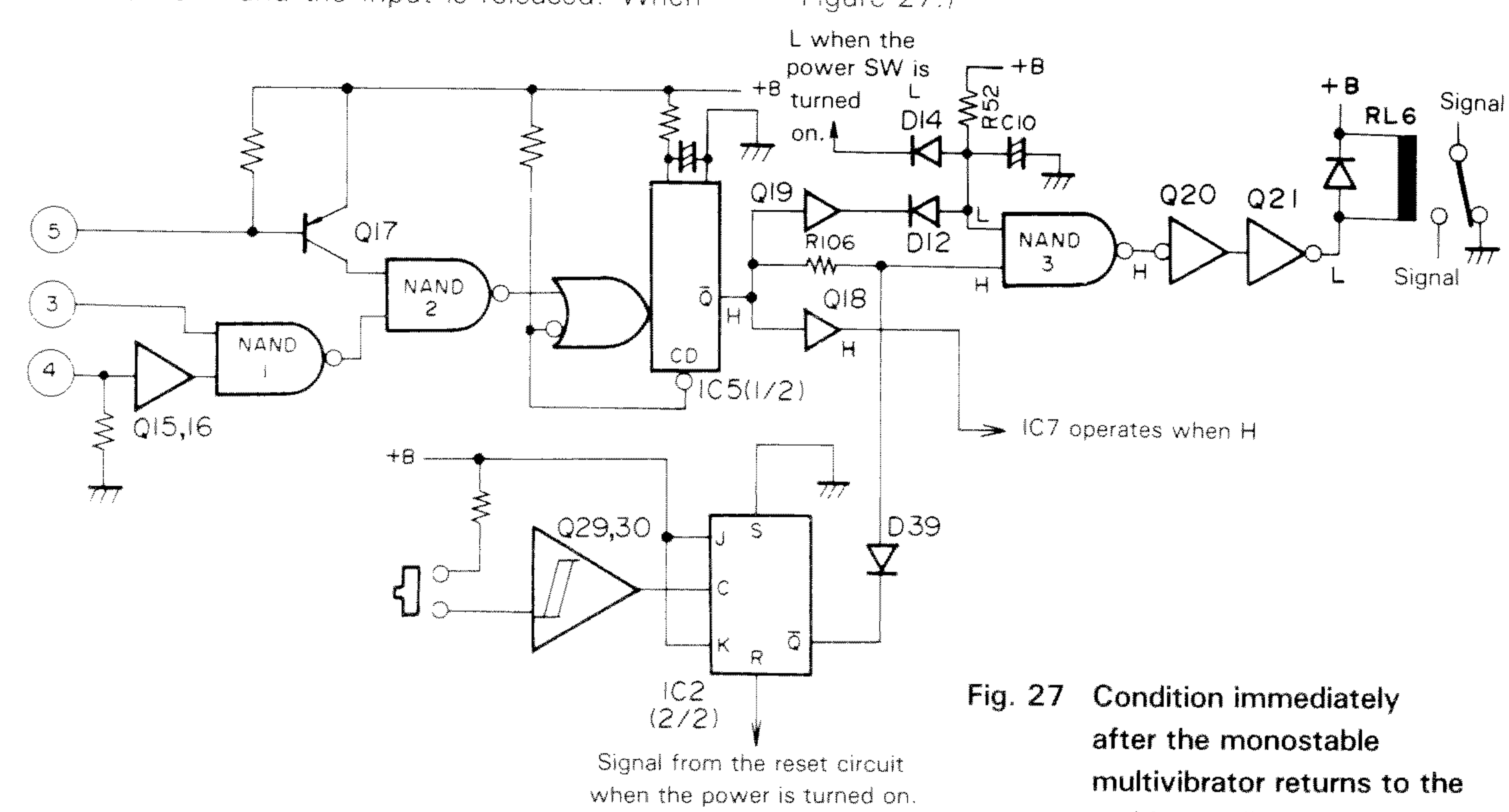


Fig. 27 Condition immediately after the monostable multivibrator returns to the stable condition

CIRCUIT DESCRIPTION

Although the level at pin 13 of NAND gate 3 becomes H as soon as the monostable multivibrator returns to the stable condition (to H), the level at pin 12 remains H for the period of time determined by the time constant of R52 and C10.

Therefore, the muting relay is restored approximately 0.5 seconds after the input relay is switched so that switching noise is avoided.

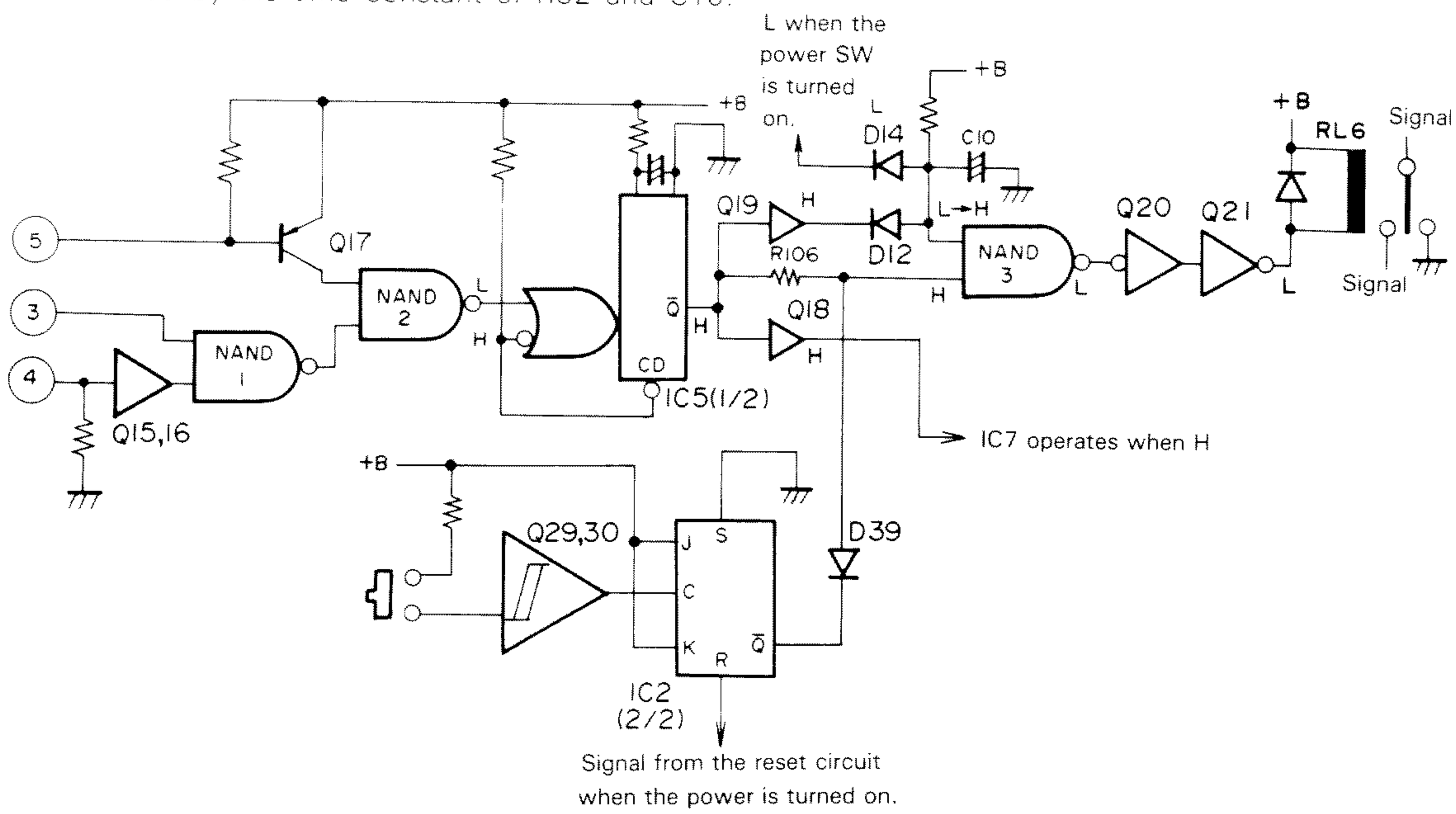


Fig. 28 Muting relay restoration

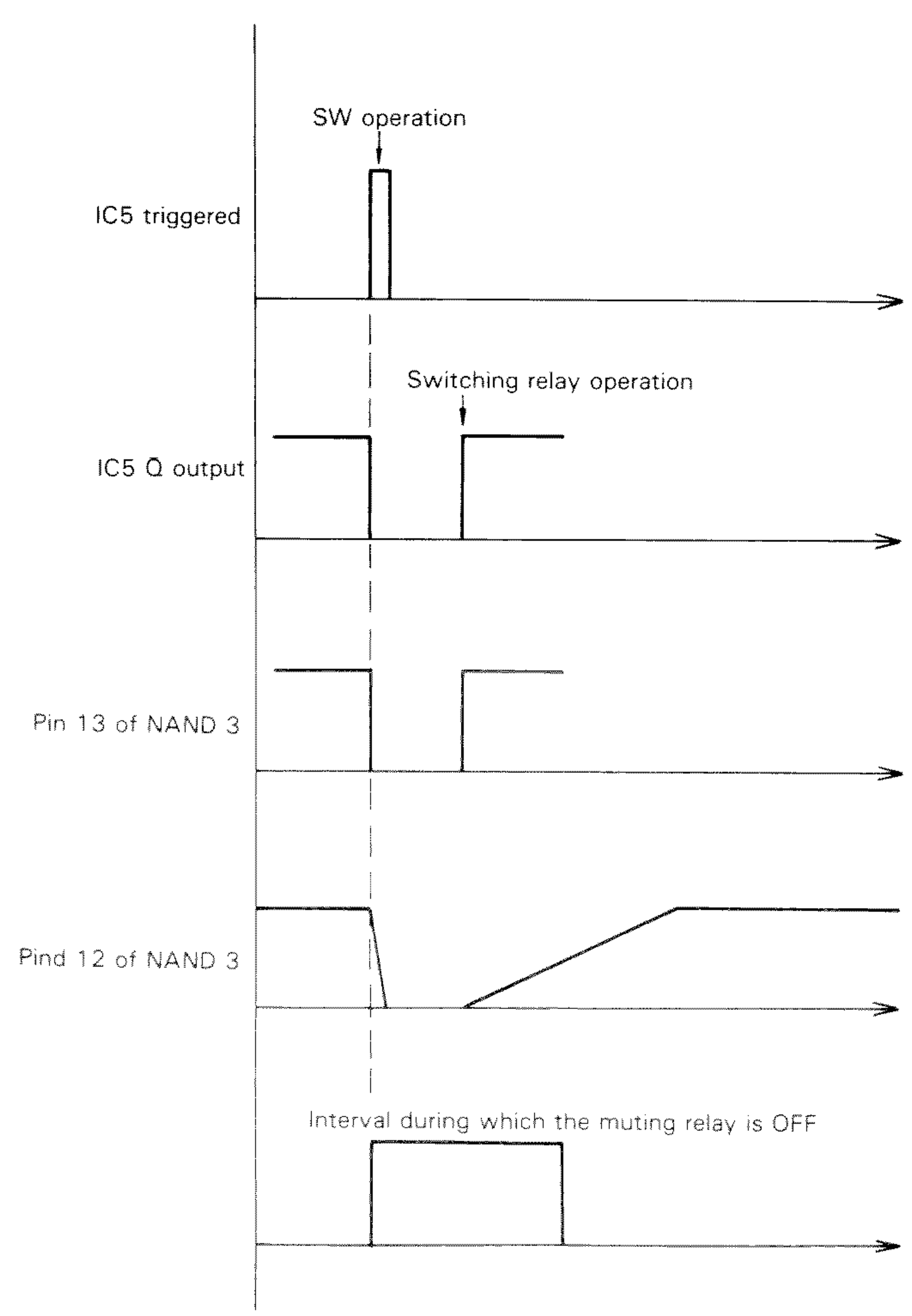


Fig. 29 Timing diagram for muting relay operation

CIRCUIT DESCRIPTION

2) During switching between TAPE A ⟶ B or TUNER ⟶ AUX

When the OTHERS key is pressed, ⑤ is connected to R96 or R97 via selection switch S6 (1/2) or S4 (1/2) of X13-3730-00; when the TAPE key is pressed, it is connected to R94 or R95 in the same manner. Since ⑤ is momentarily released when S6 or S4 operates, muting is performed in exactly the same manner as described in 1) above. (See Figure 28.)

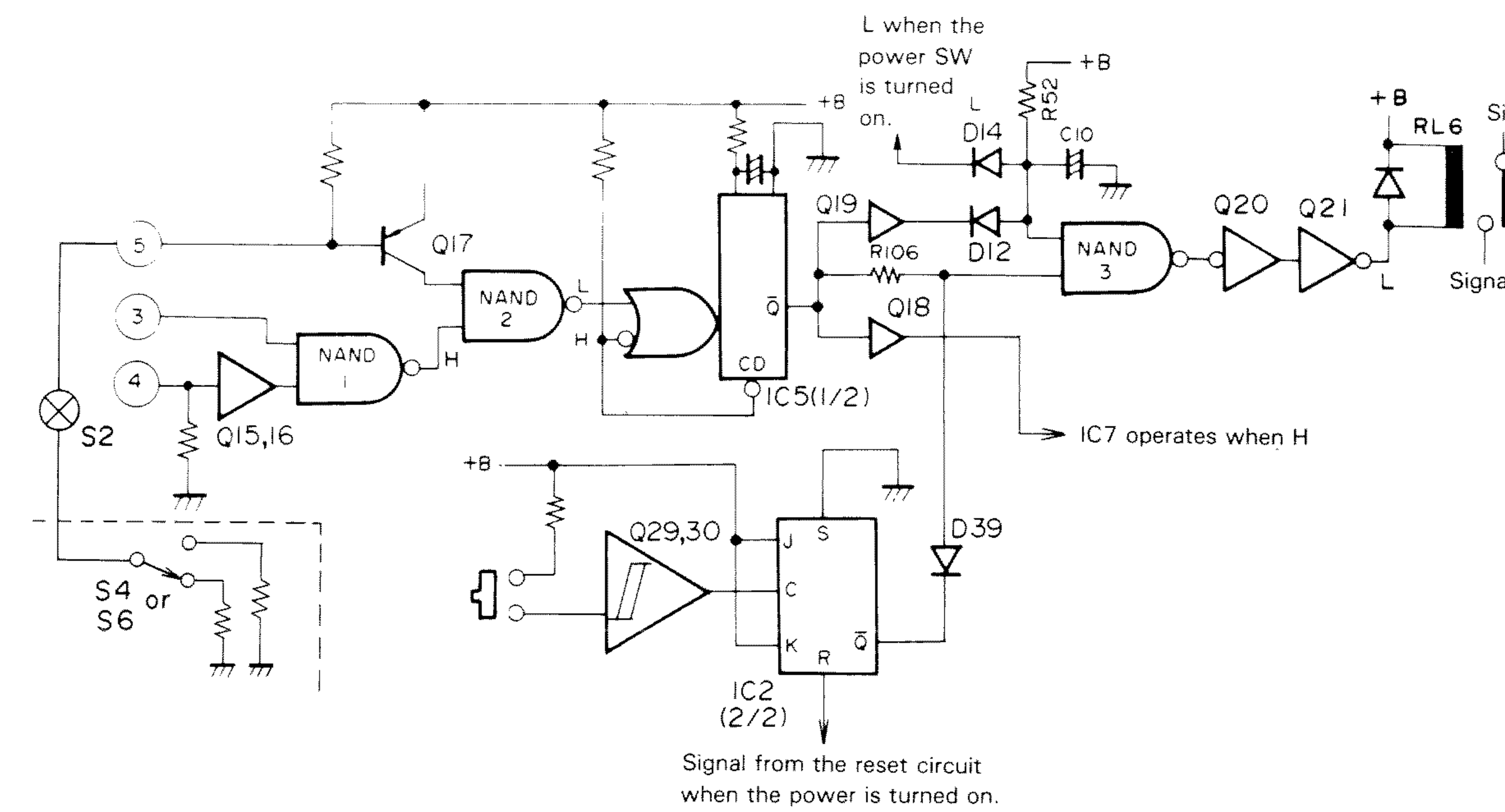


Fig. 30 Switching between TAPE A ⟶ B and TUNER ⟶ AUX

3) During switching between PHONO 1 ⟶ 2

Since the PHONO input is selected by S2 in X08-2000-00, ④ and ⑤ are connected by S2 so that Q15 and Q17 go ON and H is applied to pin 1 of NAND gate 1 and pin 12 of NAND gate 2. Therefore, both NAND gates 1 and 2 are open. When the PHONO input is switched between 1 and 2, the level at ③ becomes H momentarily so that IC5 (1/2) is triggered and muting is performed as described in 1) above.

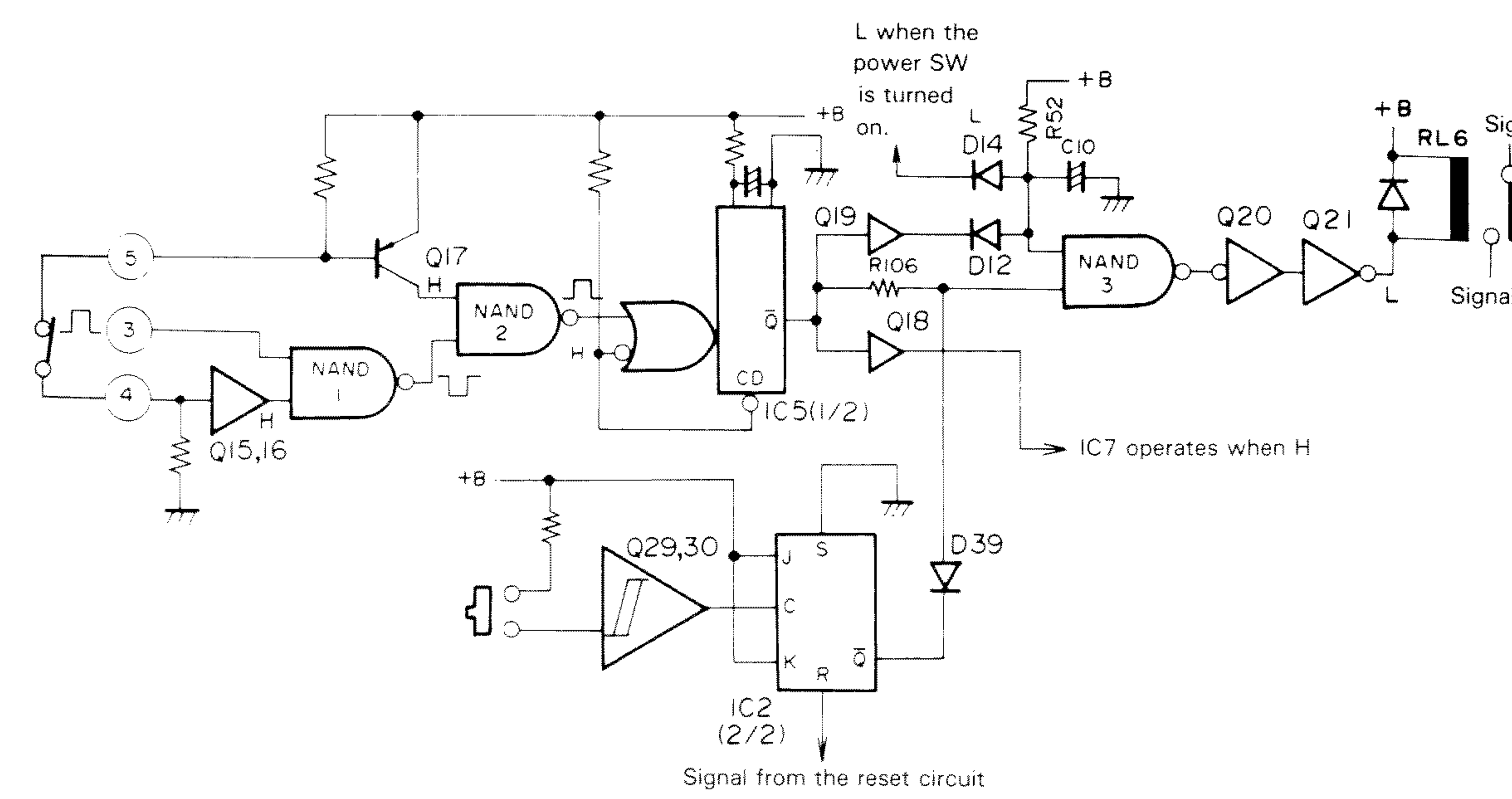


Fig. 31 Switching between PHONO 1 ⟶ 2

CIRCUIT DESCRIPTION

4) During switching between MM→MC

Here, ④ and ⑤ are connected as described in 3) above so that both NAND gates 1 and 2 are open. During switching between MM and MC, the level at 3 becomes H while the switch is between contacts. Afterwards, a signal is added which produces a series of positive pulses (with a duration of about 3 seconds in the case of MM→MC and about 1.5 seconds in the case of MC→MM) with a period of 0.1 second and a duty ratio of 50. Therefore, the monostable multivibrator in IC5 (1/2) is triggered. Since the period of the pulse series is lower than the time constant of the monostable multivibrator, the vibrator remains active until the series has ended and for the period of time determined by the time constant following the rising edge of the last pulse. Thus, activation is different than in the case of other switching operations. The reason for the long active period is to prevent direct current in the output from reaching the final stage of the equalizer amp until the amplifer stabilizes following switching of its first stage. A considerable amount of time is required for stabilization because the MC equalizer in this unit is an AC amplifier.

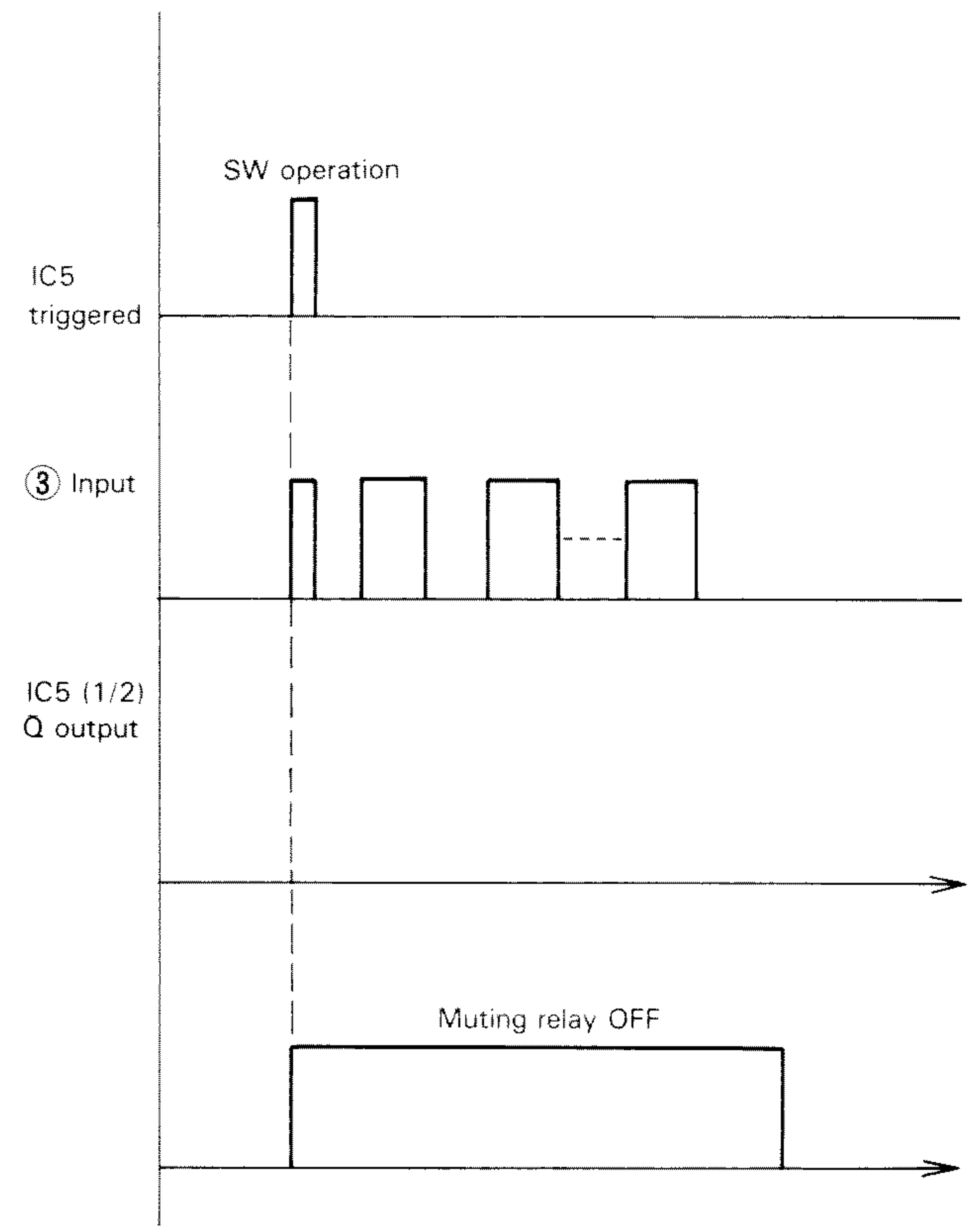


Fig. 32 Timing diagram for MM→MC switching

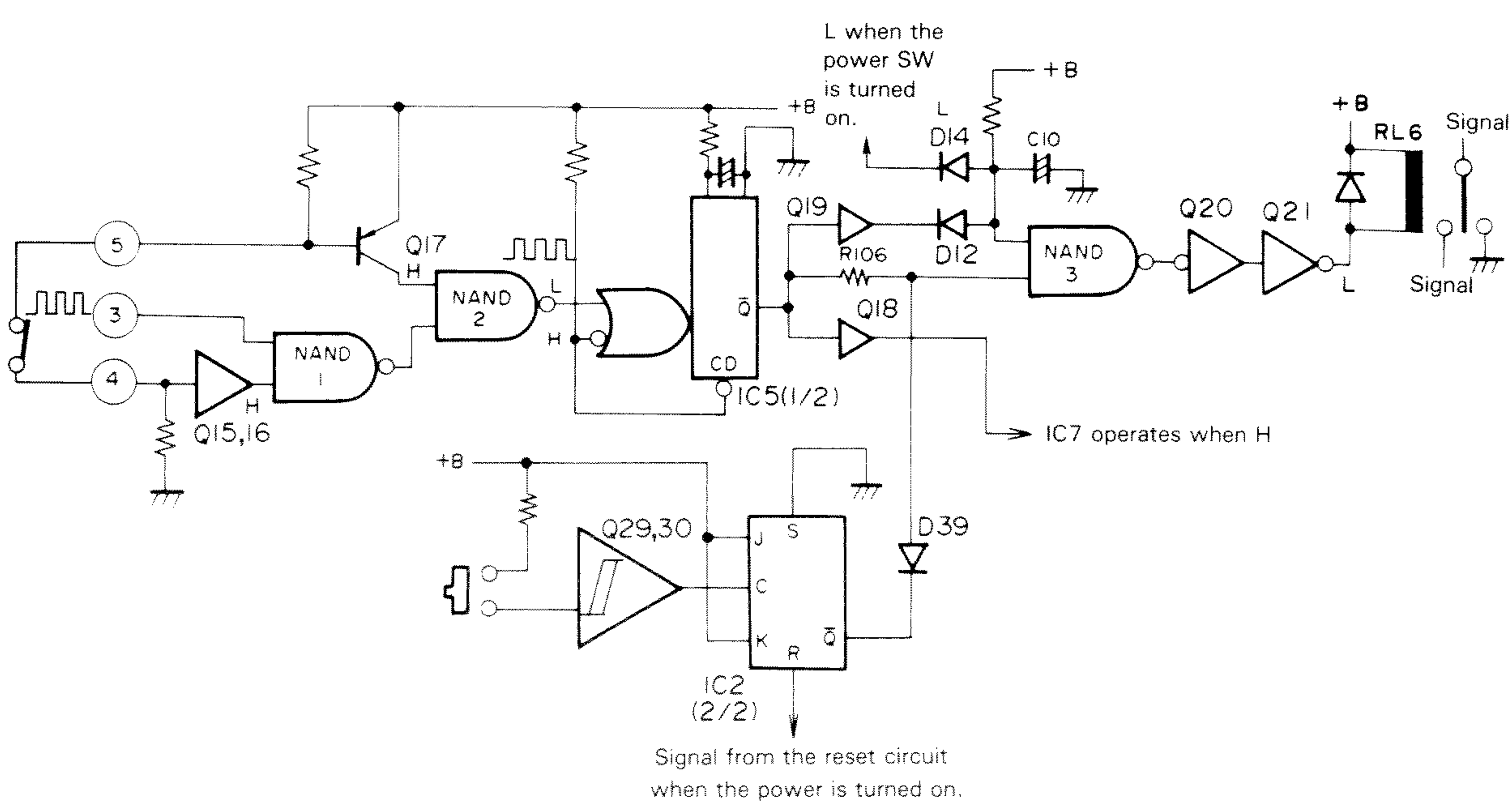


Fig. 33 Switching between MM→MC

CIRCUIT DESCRIPTION

5) Muting switch and power switch operation

When muting switch S1 is set to ON, the clock is applied to the IC2 (2/2) JK-FF through a Schmitt circuit consisting of Q29 and Q30. Since both the J and K pins of the JK flip-flop are H, the element operates as a T flip-flop and the output is reversed each time S1 goes ON. When the power is turned on, IC1 (4/4) causes the level at the reset terminal to become H for a certain period of time; this resets the JK flip-flop to its initial condition. Since the $\bar{Q}$ output is H, the flip-flop is disconnected from the muting relay drive circuit by D39. When S1 goes ON at this time, the JK flip-flop reverses and the $\bar{Q}$ output level becomes L. This causes the level at pin 13 of NAND gate 3 to become L so that the muting relay goes OFF to block the signal. When S1 goes ON again, the JK flip-flop is again reversed so that the signal is fully restored. Further, when the power is turned off, the level of pin 12 of NAND gate 3 is set to L through D14; this causes the muting relay to go OFF.

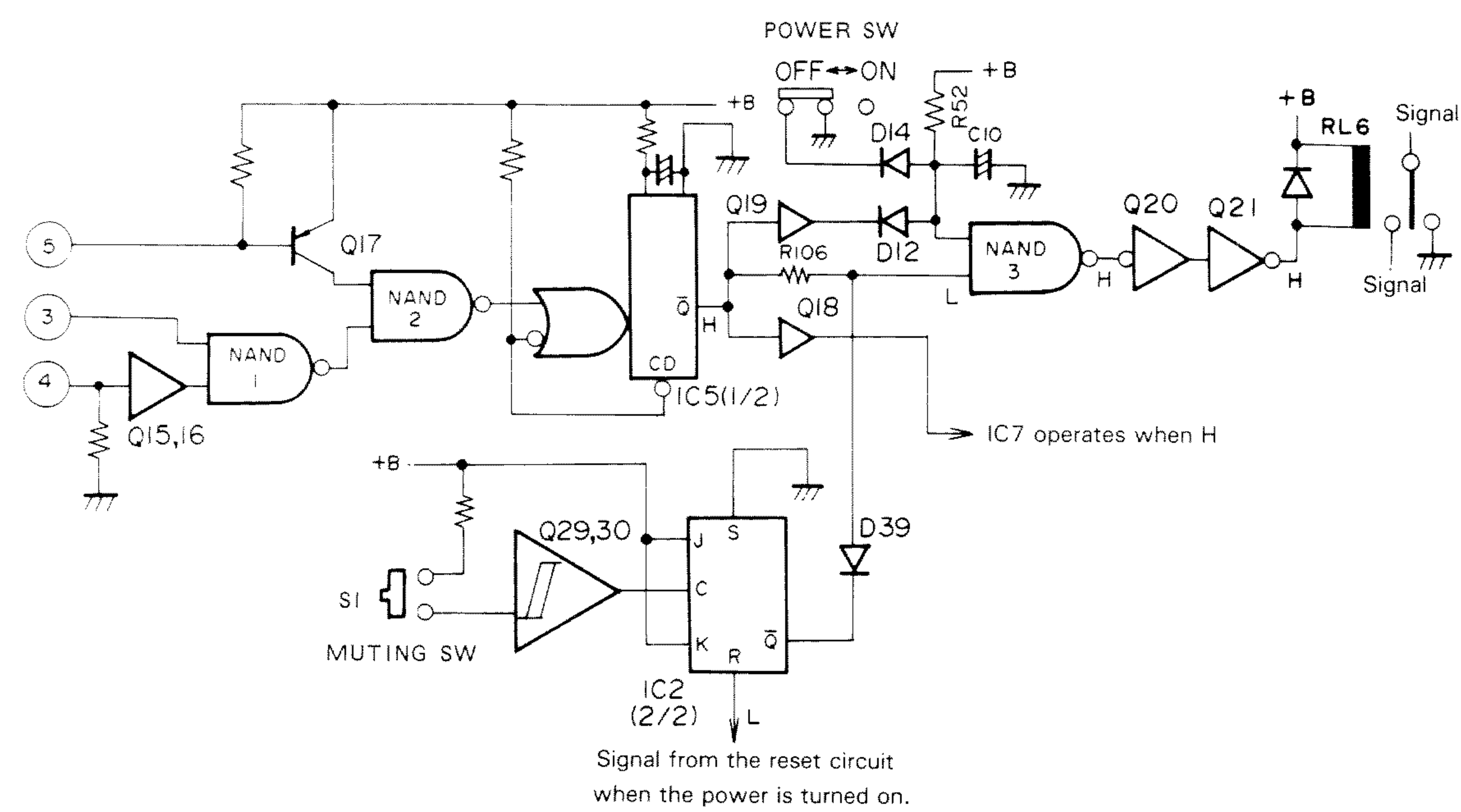
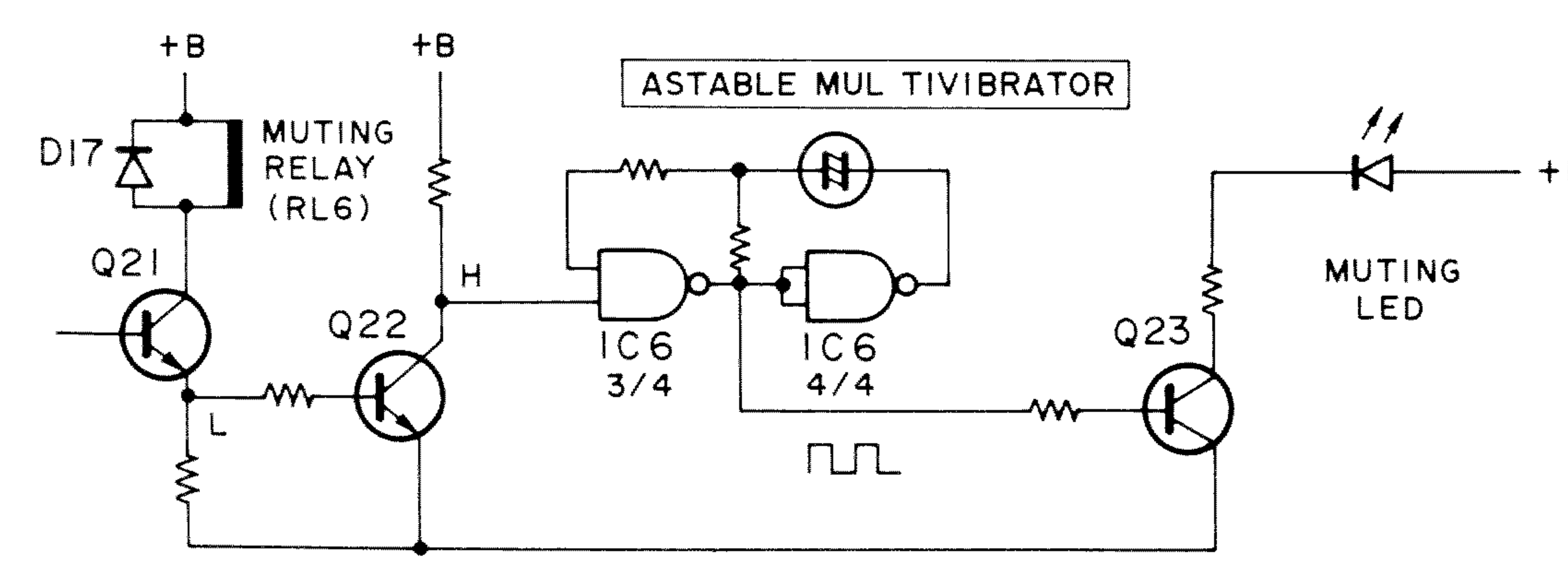


Fig. 34 Condition when the muting switch is on

6) Muting LED flashing circuit

Since Q21 is OFF while the muting relay is OFF, Q22 is also OFF and the level at pin 2 becomes H. Therefore, the astable multivibrator consisting of IC6 (3/4) (4/4) operates and Q23 causes the LED in the volume control knob to flash.



CIRCUIT DESCRIPTION

REC OUT MUTING CIRCUIT

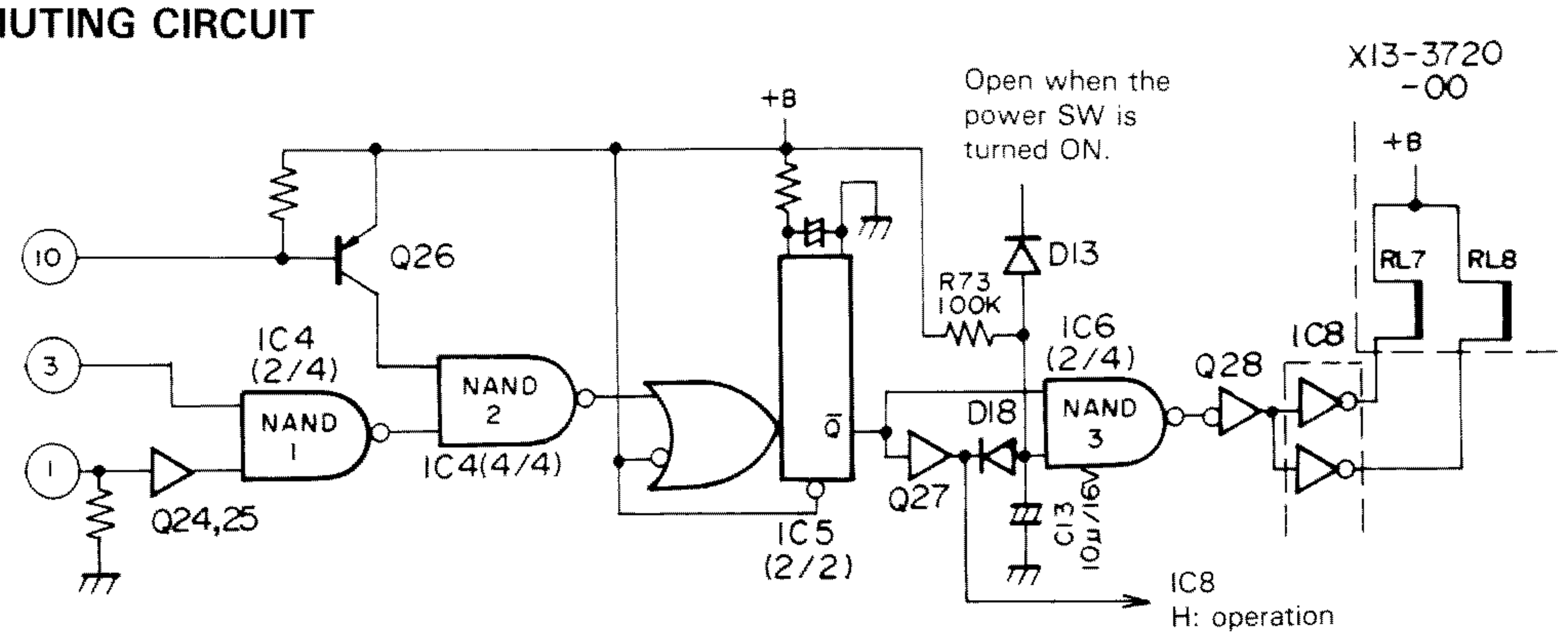


Fig. 35 REC OUT muting circuit

In the L-02A, the REC OUT circuit is muted along with the main signal system when switching is done. The REC OUT muting circuit is shown in Fig. 35. The following explanation is simplified because the principle is similar to that of the muting circuit for the main signal system. The REC OUT signals are turned ON and OFF by connecting terminal ⑩ (the base of Q26) to an IC8 input which corresponds to the relay to be turned ON.

1) Muting when the REC OUT switch is operated

Terminal 10 is momentarily disconnected from all circuits when the REC OUT switch is operated. Therefore, Q26 is turned OFF and the output level of NAND gate 2 rises from L to H. This triggers monostable multivibrator IC5 (2/2) so that the $\bar{Q}$ output level drops to L. This L level sets the output level of NAND gate 3 to H, causing relays 7 and 8 to be turned OFF so that the REC OUT output is muted. The emitter level of Q27 is also set to L when $\bar{Q}$ drops to L, so all gate inputs of IC 8 are set to L to disable the REC OUT selector being switched. The $\bar{Q}$ output level returns to H after about 0.5 second (as determined by the 0.47μF capacitor and 100 kΩ resistor), then the REC OUT selector is set to the condition corresponding to the REC OUT switch setting. However, relays 7 and 8 are turned ON after an additional 0.5 seconds (determined by C13 and R73) has passed.

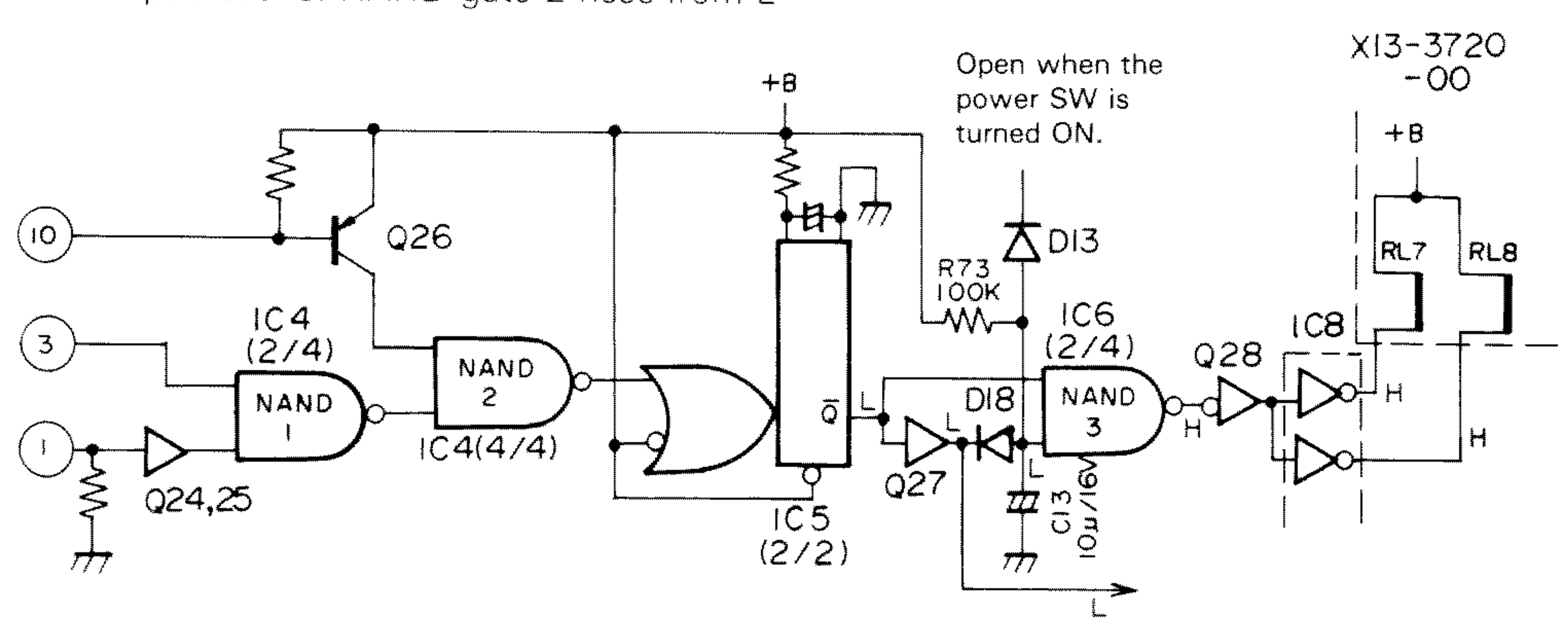


Fig. 36 Muting circuit when monostable multivibrator is active

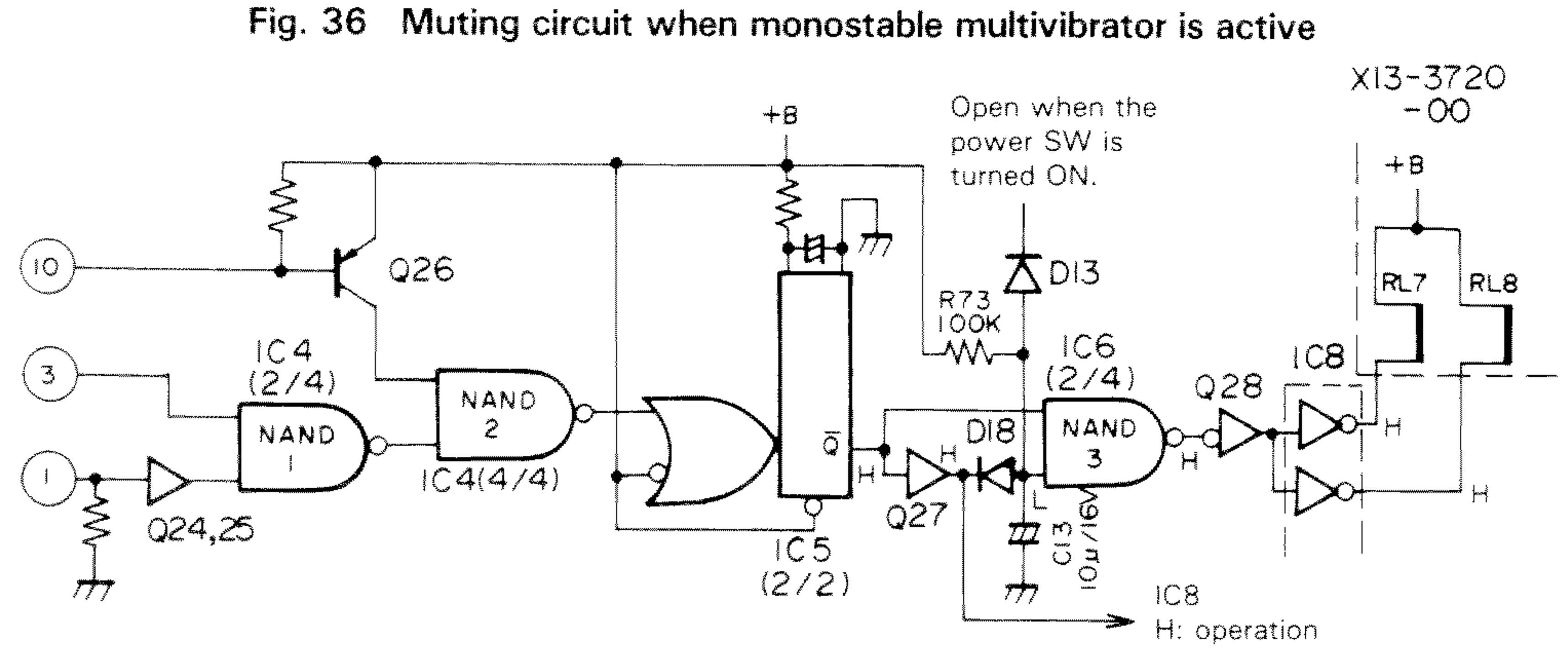


Fig. 37 Muting circuit when monostable multivibrator is stable

CIRCUIT DESCRIPTION

2) Muting during switching between PHONO 1 and 2 or MM and MC

Terminals ① and ⑩ are connected when PHONO is selected. Therefore, both Q24 and Q26 are ON to set both pin 5 of NAND gate 1 and pin 8 of NAND gate 2 to H so that NAND gates 1 and 2 are open. When the input source is switched between PHONO 1 and PHONO 2 or MM and MC in this condition, the main signal system muting signal is applied to terminal 3. Thus, REC OUT is muted at the same timing as the main signal system.

3) Muting when REC OUT switch is switched from OFF to any other position

When the REC OUT switch is OFF, pins 6 and 7 of IC8 are grounded by D5 and D6 in X13-3730-00 so that REC OUT relays RL6 and RL7 are OFF. Terminal 10 is grounded through R15 in X13-3730-00 so that Q26 is ON. Therefore, when the REC OUT switch is switched from OFF to any other position, Q26 is turned OFF momentarily so the REC OUT circuit is muted in the same manner as when the REC OUT switch is switched normally. Thus, no shock noise is applied to the tape deck.

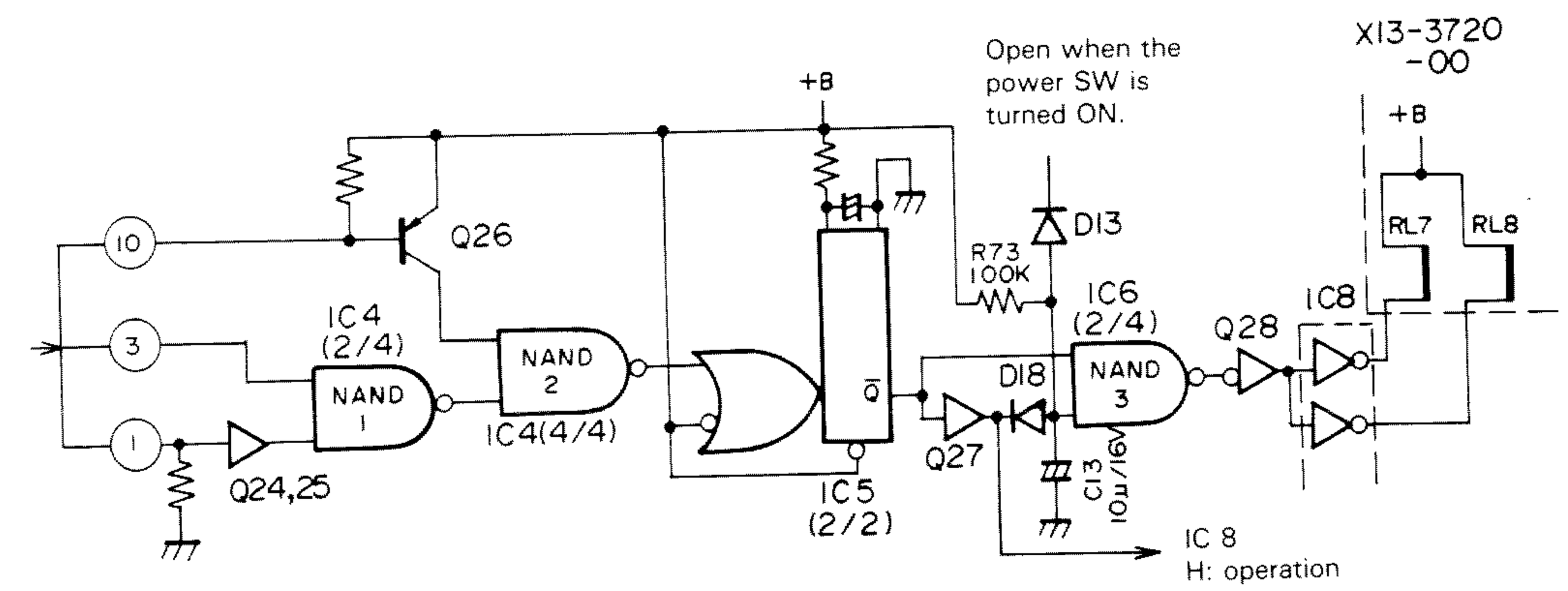
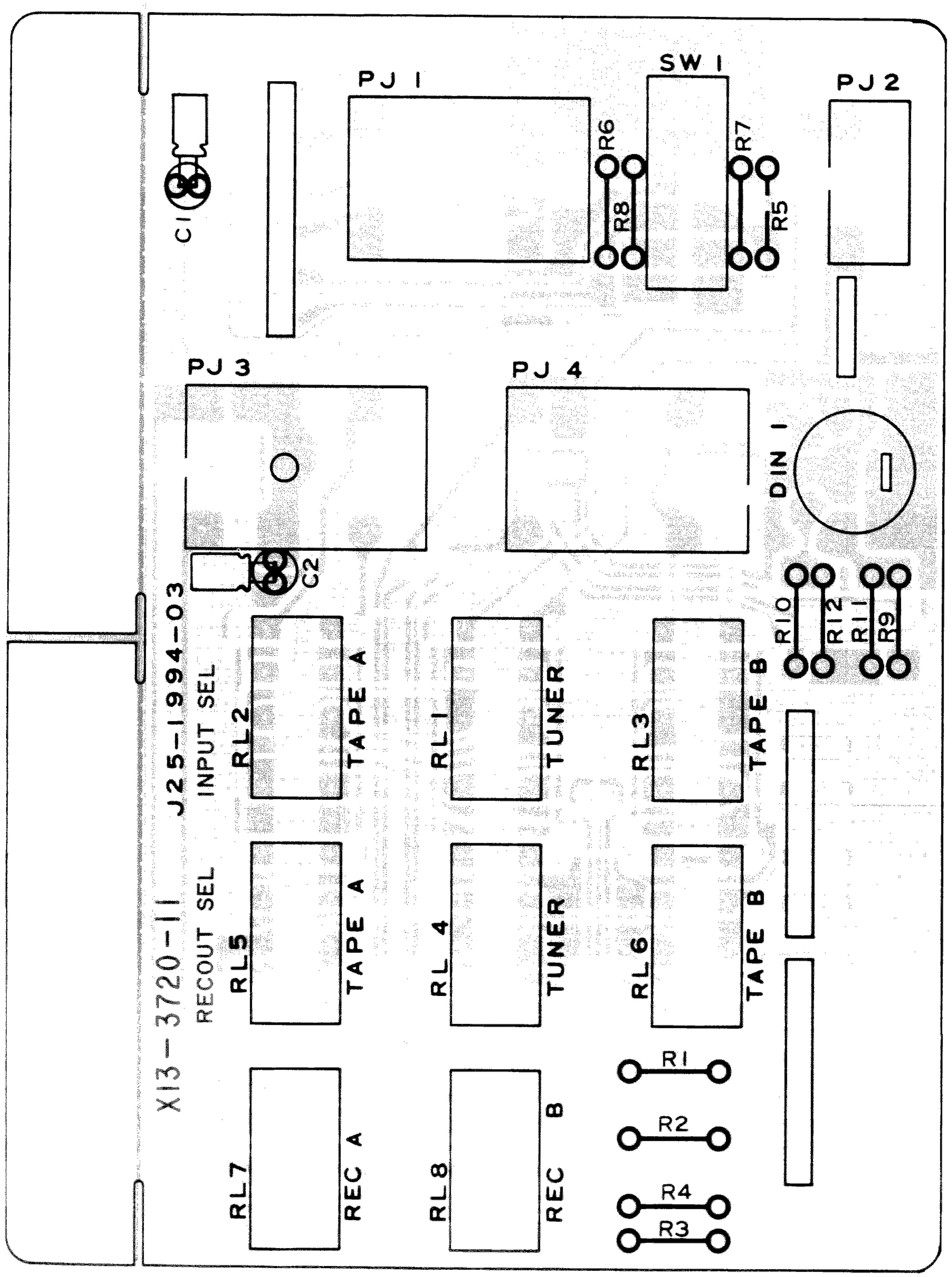


Fig. 38 Muting circuit when PHONO is selected

PC BOARD

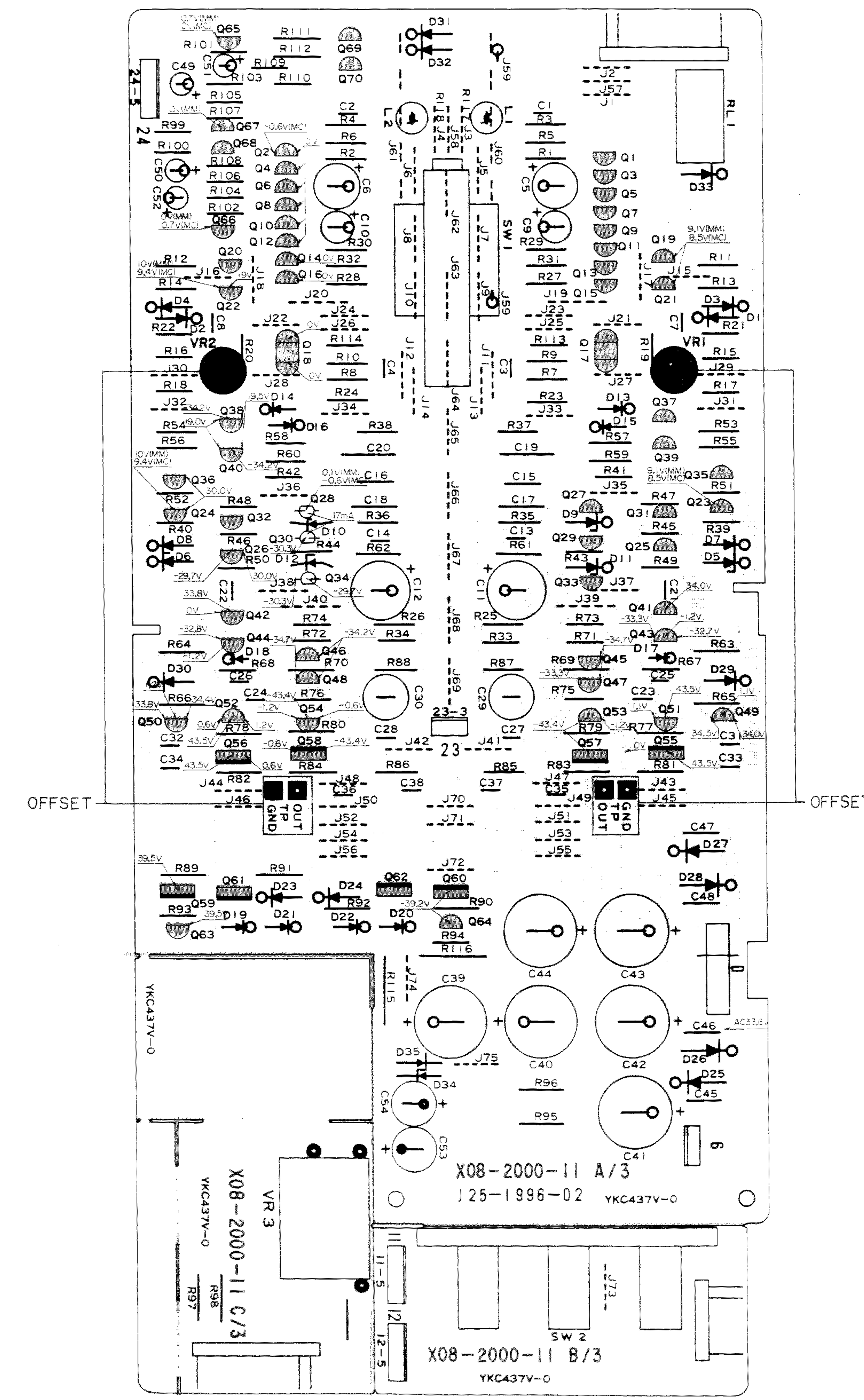
SUB (X13-3720-11) Component side view



Refer to the schematic diagram for the values of resistors and capacitors.
The PC board drawing is viewing from the side easy to check.

PC BOARD

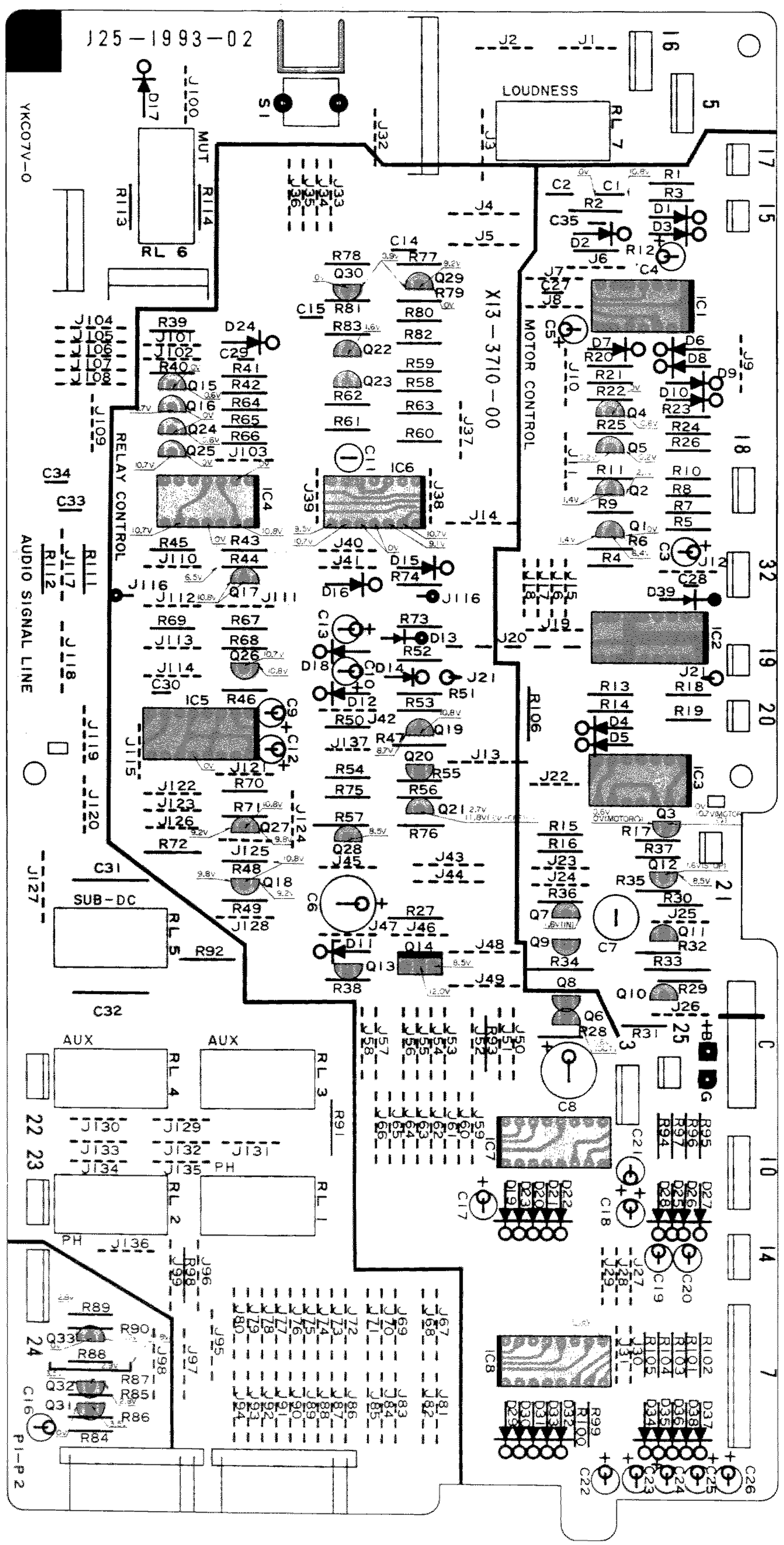
PRE AMP (X08-2000-11) Component side view



Refer to the schematic diagram for the values of resistors and capacitors.
The PC board drawing is viewing from the side easy to check.

PC BOARD

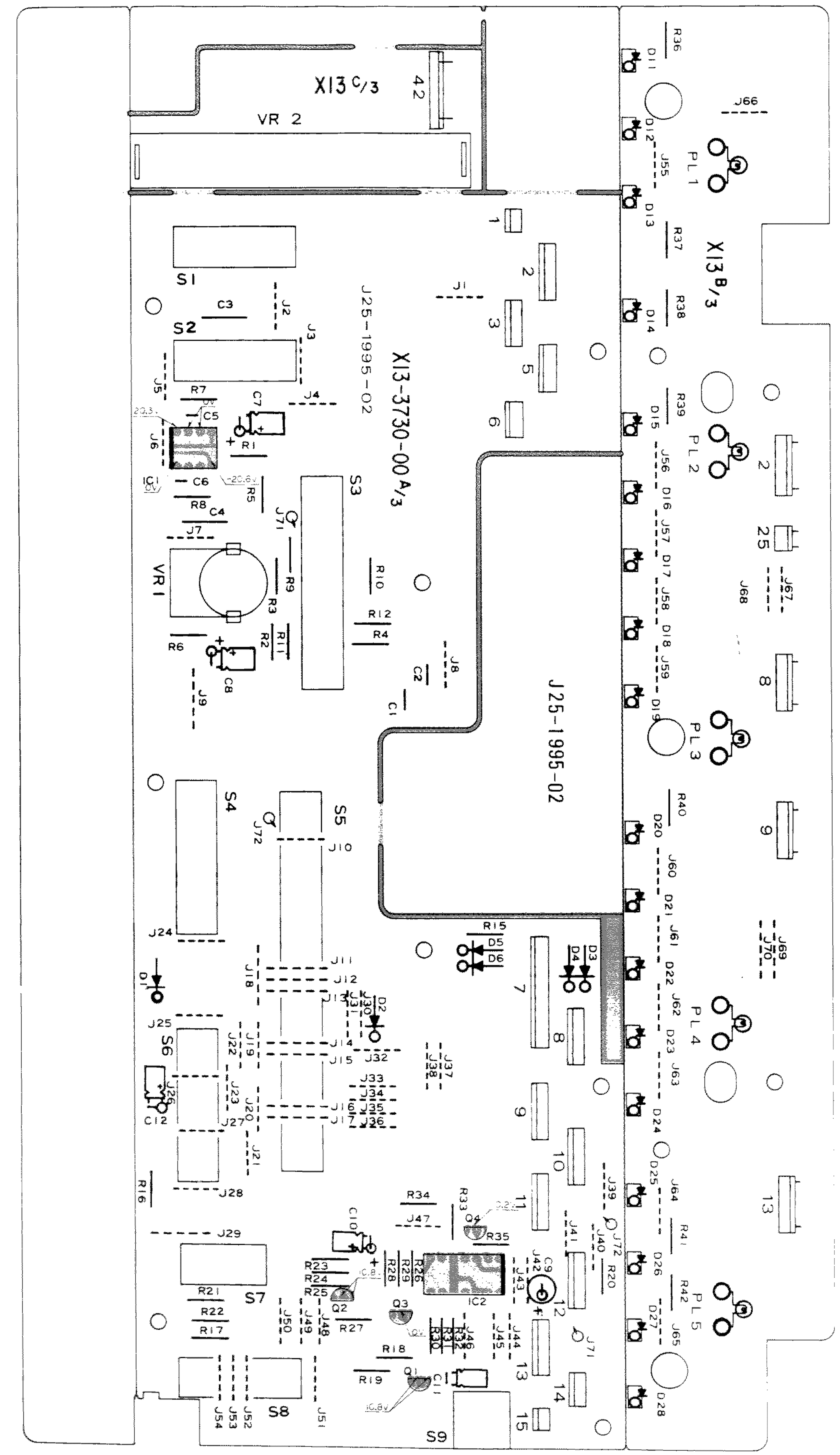
SUB (X13-3710-00) Component side view



Refer to the schematic diagram for the values of resistors and capacitors
The PC board drawing is viewing from the side easy to check

PC BOARD

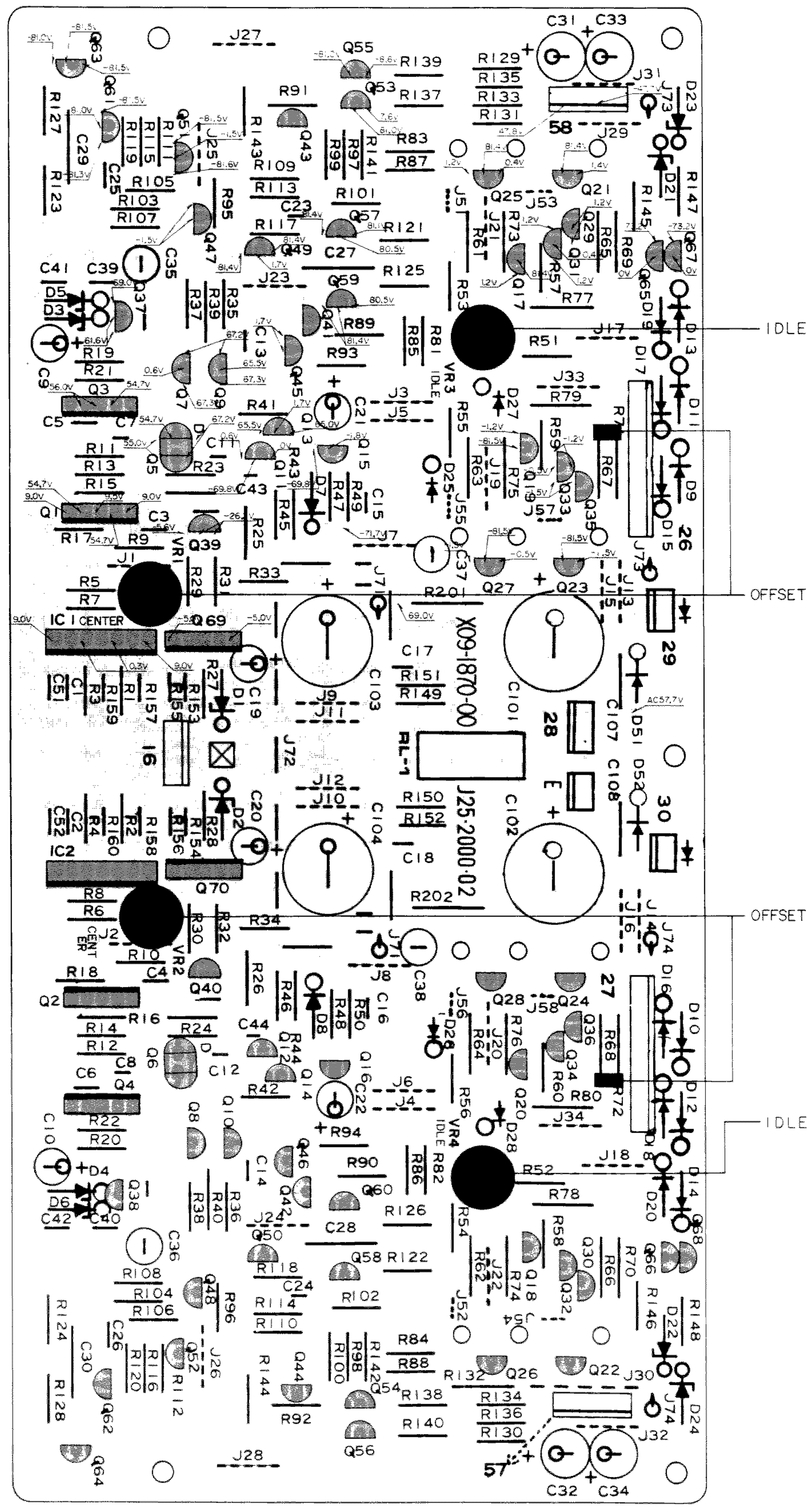
SWITCH (X13-3730-00) Component side view



Refer to the schematic diagram for the values of resistors and capacitors
The PC board drawing is viewing from the side easy to check

PC BOARD

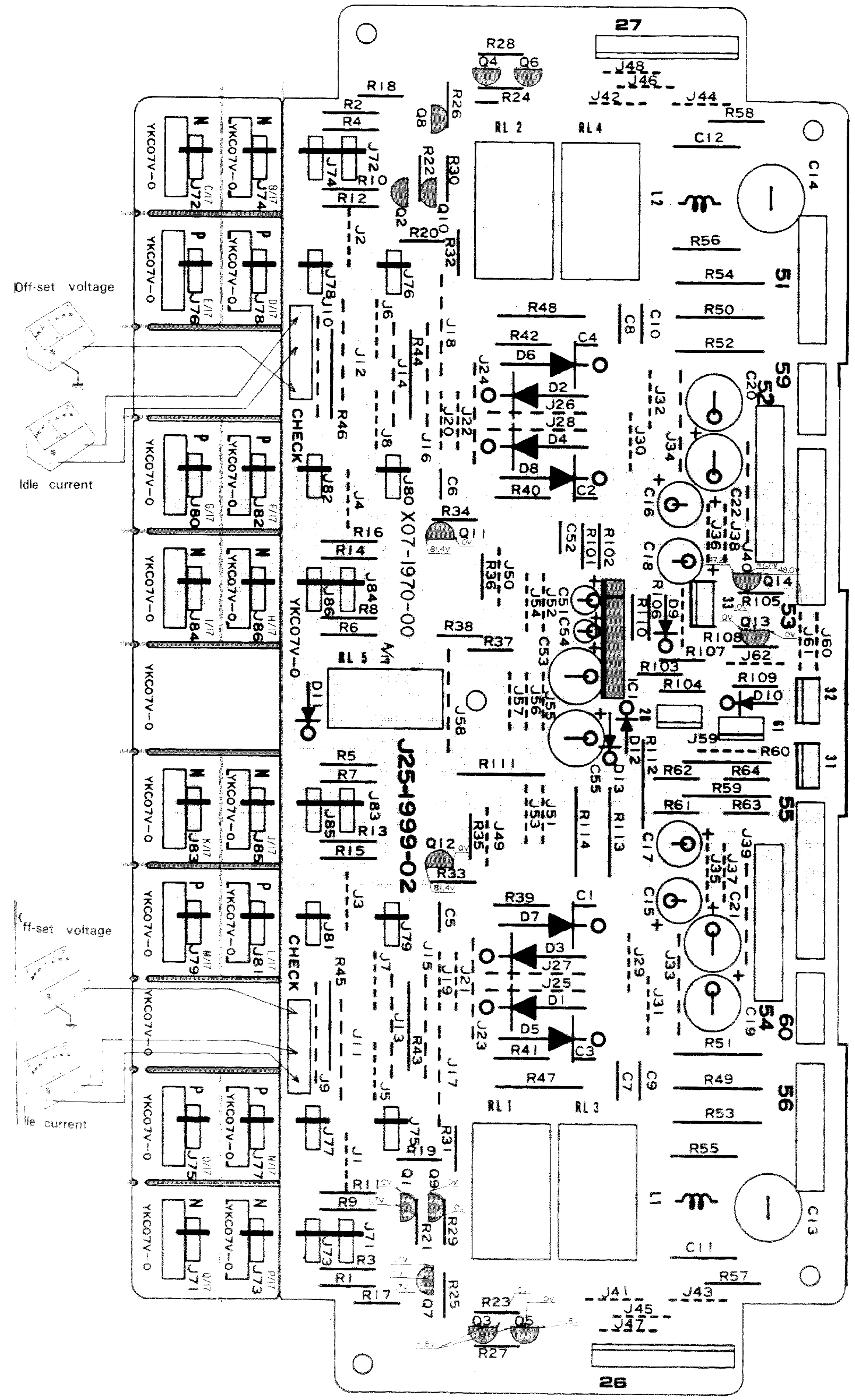
AUDIO AMP (X09-1870-00) Component side view



Refer to the schematic diagram for the values of resistors and capacitors
The PC board drawing is viewing from the side easy to check

PC BOARD

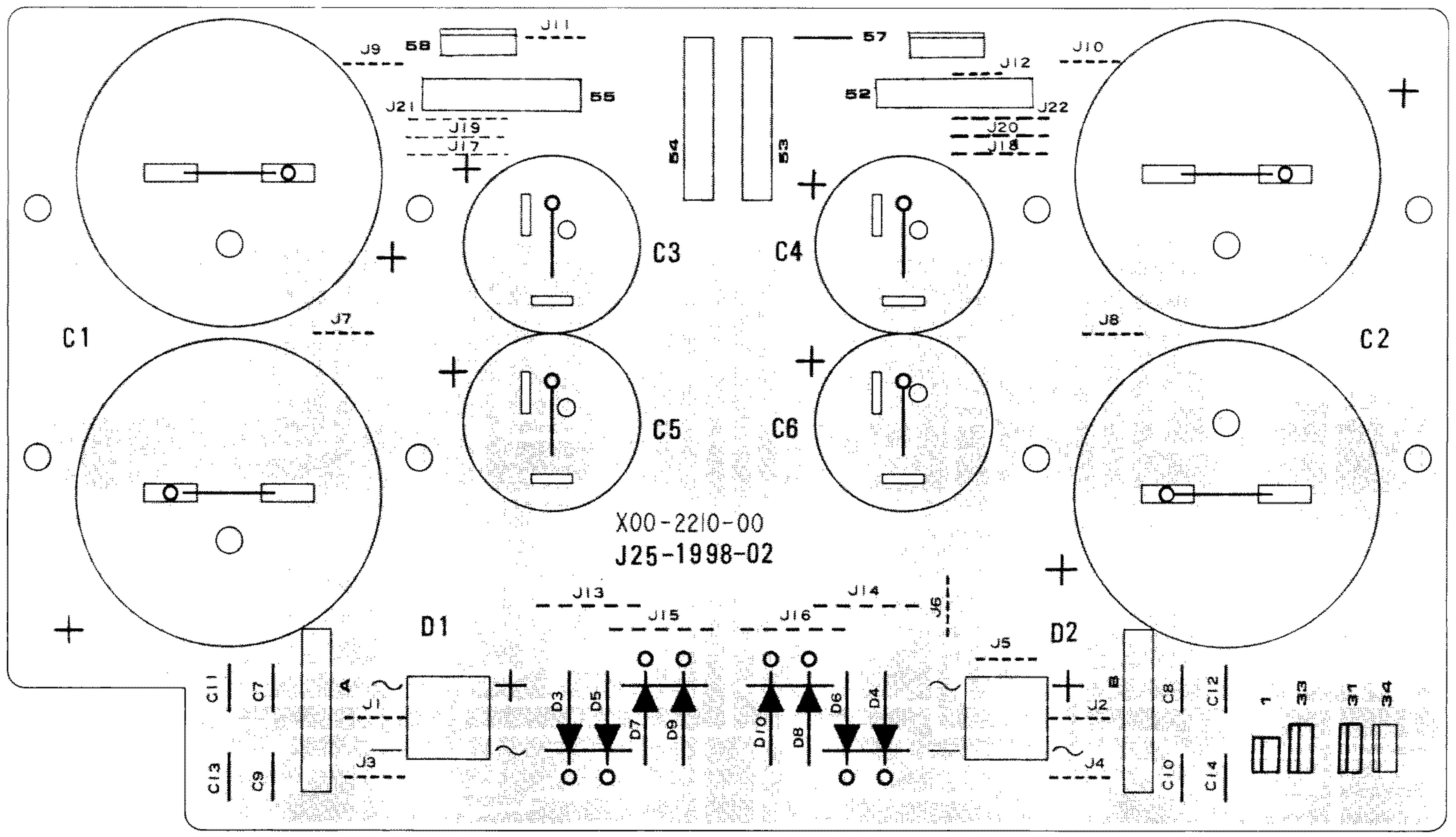
POWER AMP (X07-1970-00) Component side view



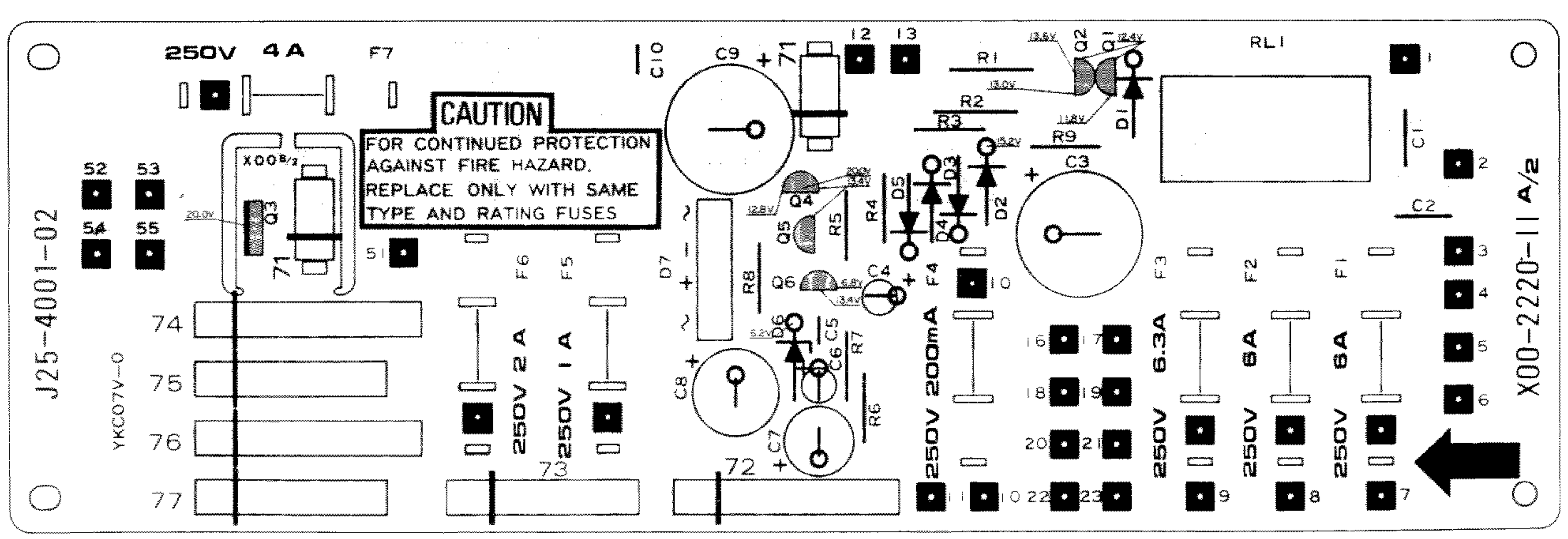
Refer to the schematic diagram for the values of resistors and capacitors.
The PC board drawing is viewing from the side easy to check.

PC BOARD

POWER SUPPLY (X00-2210-00) Component side view



POWER SUPPLY (X00-2220-00) Component side view (L-02A-PS)



Refer to the schematic diagram for the values of resistors and capacitors
The PC board drawing is viewing from the side easy to check

ADJUSTMENT/REGLAGES/ABGLEICH

ADJUSTMENT

Refer to PC BOARD on page 27, 30 and 31

NO.	ITEM	INPUT SETTINGS	OUTPUT SETTINGS	AMPLIFIER SETTINGS	ALIGNMENT POINTS	ALIGN FOR	FIG.
1	OFFSET (PRE AMP)	–	Connect a DC voltmeter to T.P (X08-2000)	PHONO: MM	VR1 (R) VR2 (L)	0 V	(a)
2	OFFSET (POWER AMP)	–	Connect a DC voltmeter to the CHECK terminal and GND (X07-1970)	VOLUME: 0	VR1 (L) VR2 (R) (X09-1870)	0 V	(b)
3	IDLE CURRENT	–	Connect a DC voltmeter to CHECK terminals (X07-1970)	VOLUME: 0	VR3 (L) VR4 (R) (X09-1870)	22 mV	(c)

REGLAGE

N°.	ITEM	REGLAGE DE L'ENTREE	REGLAGE DE LA SORTIE	REGLAGE DE L'AMPLICATEUR	POINTS DE L'ALIGNEMENT	ALIGNER POUR	FIG.
1	DECALAGE (PRE-AMP.)	–	Connecter un voltmètre CC sur T.P. (X08-2000)	PHONO: MM	VR1 (R) VR2 (L)	0 V	(a)
2	DECALAGE (AMP. DE PUISSANCE)	–	Connecter un voltmètre CC au terminal CHECK et GND (X07-1970)	VOLUME: 0	VR1 (L) VR2 (R) (X09-1870)	0 V	(b)
3	REGLAGE DU COURANT DE POLARISATION	–	Connecter un voltmètre CC au terminal CHECK (X07-1970)	VOLUME: 0	VR3 (L) VR4 (R) (X09-1870)	22 mV	(c)

ABGLEICH

NR.	GEGENSTAND	EINGANGS-EINSTELLUNG	AUSGANG-EINSTELLUNG	VORSTÄRKER EINSTELLUNG	ABGLEICH-PUNKTE	ABGLEICHEN FÜR	ABB.
1	VERSCHIEBUNG (VORVERSTÄRKER)	–	Einen Gleichspannungsmesser über T.P. anschließen (X08-2000)	PHONO: MM	VR1 (R) VR2 (L)	0 V	(a)
2	VERSCHIEBUNG (VERSTÄRKER)	–	Einen Gleichspannungsmesser zu Klemme CHECK und GND anschließen (X07-1970)	VOLUME: 0	VR1 (L) VR2 (R) (X09-1870)	0 V	(b)
3	LEERLAUFS	–	Einen Gleichspannungsmesser zu Klemme CHECK anschließen (X07-1970)	VOLUME: 0	VR3 (L) VR4 (R) (X09-1870)	22 mV	(c)

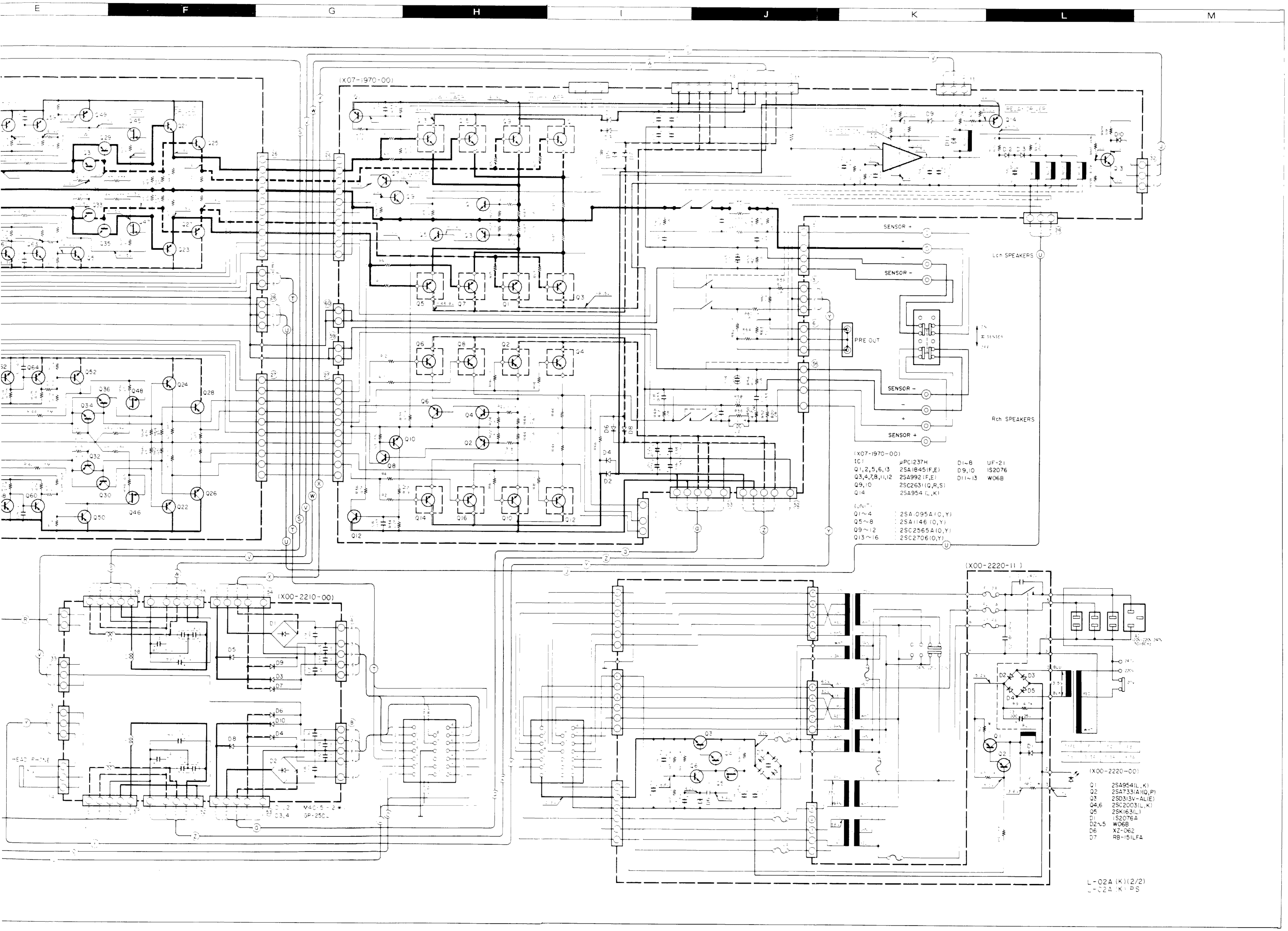
Note:
A self-restoring thermal switch is built into the power transformer. This switch is activated to cut output of the transformer when its temperature rises beyond 150°C. The amount of time required for recovery is approximately 5 minutes.

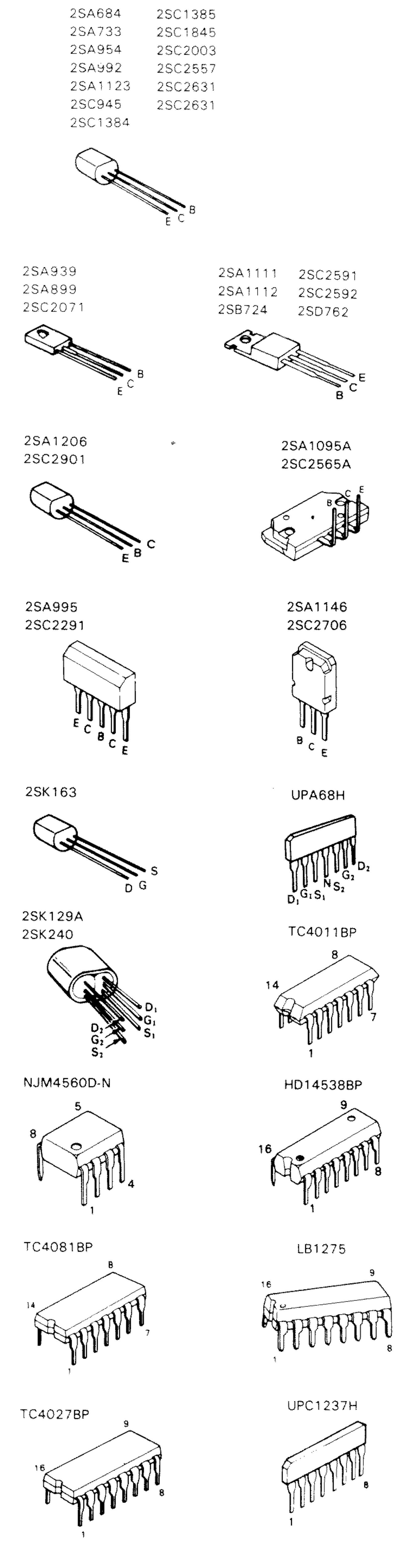
Remarque:
Un commutateur thermique à auto-déclenchement est incorporé au transformateur de puissance. Ce commutateur est activé pour couper l'alimentation du transformateur lorsque sa température s'élève au dessus de 150°C. Cinq minutes sont environ nécessaires pour que le transformateur soit de nouveau mis sous tension.

Bemerkung:
Ein Rückstell-Thermoschalter ist in den Netztransformator eingebaut. Der Schalter wird aktiviert, wenn seine Temperatur über 150° ansteigt, wobei der Transformatorausgang abgetrennt wird. Die zur Erholung erforderliche Zeit beträgt ca. 5 Minuten.

NEW SEPARATE AMPLIFIER

L-02A





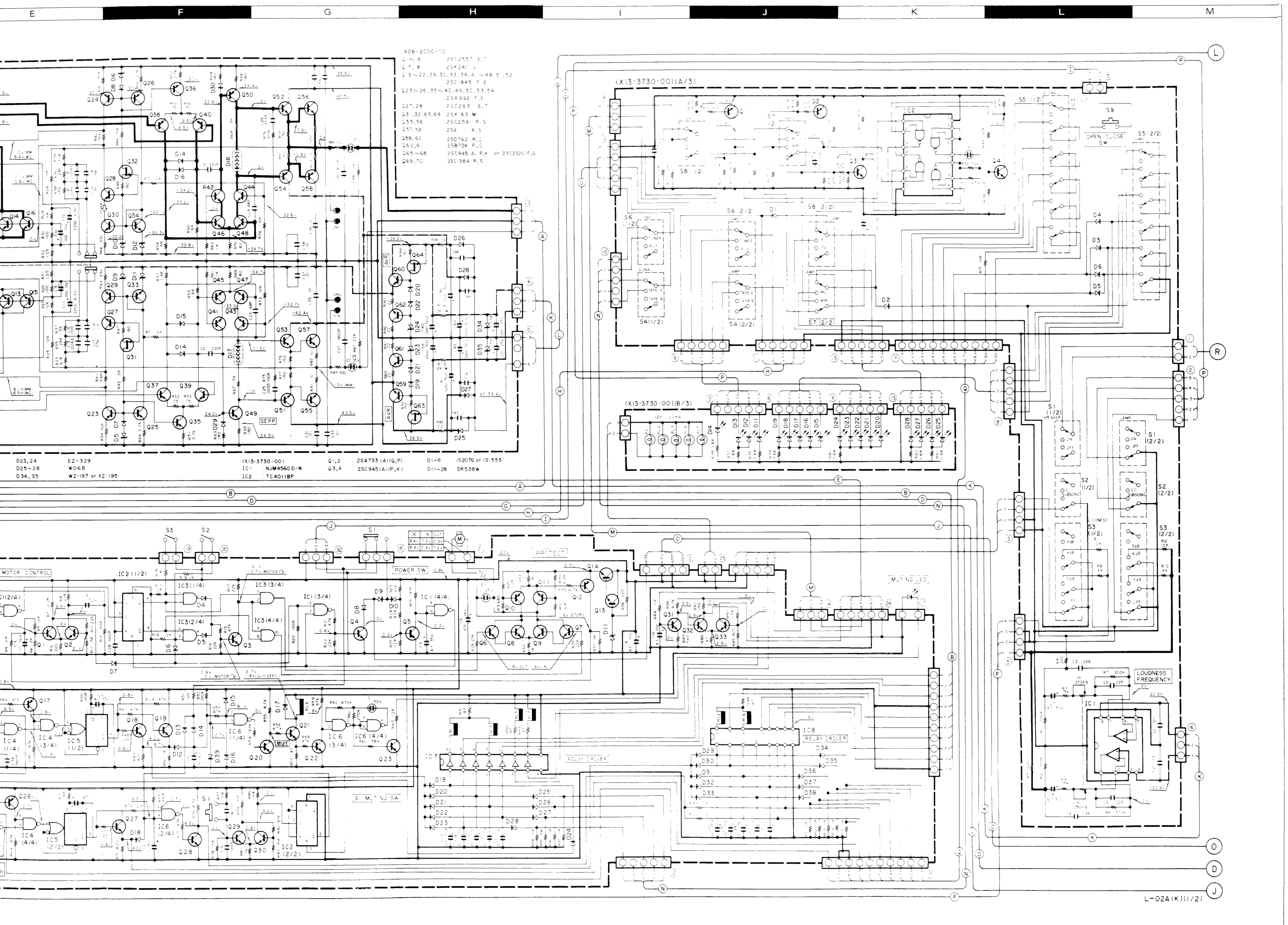
- DC voltages are measured by a VOM of 20 kΩ/V input impedance
- Les tensions de courant continu sont mesurées par un multimètre d'une impédance d'entrée de 20 kΩ/V.
- Die Gleichstrom-Spannungen werden durch ein Vielfachmeßgerät von 20 kΩ/V Eingangs-Impedanz gemessen.

KENWOOD®

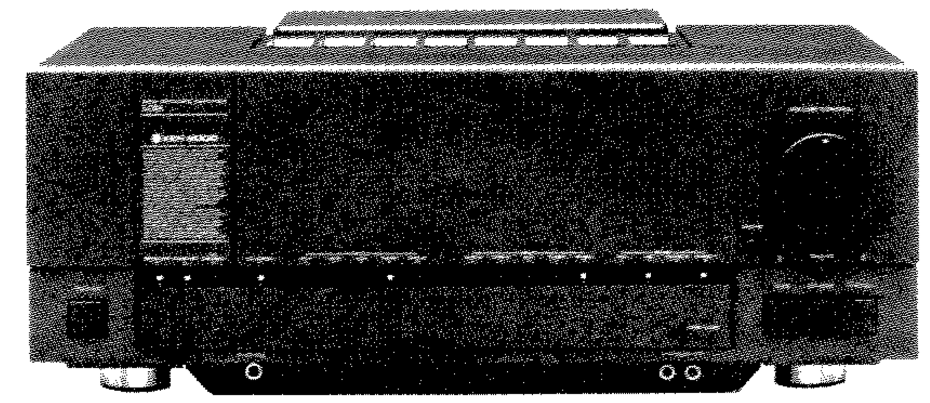
NEW SEPARATE AMPLIFIER

• DC voltages are measured by a VOM of 20 kΩ/V input impedance

• Les tensions de courant continu sont mesurées par un d'une impédance d'entrée de 20 kΩ/V.



- DC voltages are measured by a VOM of 20 kΩ/V input impedance
- Les tensions de courant continu sont mesurées par un multimètre d'une impédance d'entrée de 20 kΩ/V.
- Die Gleichstrom-Spannungen werden durch ein Vielfachmeßgerät von 20 kΩ/V Eingangs-Impedanz gemessen.



Specifications

Power output

170 watts* per channel minimum RMS, both channels driven, at 8 ohms from 20 Hz to 20,000 Hz with no more than 0.003% total harmonic distortion.

Total Harmonic Distortion (20 Hz to 20,000 Hz)	
AUX input to SPEAKER output	0.003% at rated power into 8 ohms
	0.003% at 1/2 rated power into 8 ohms
	0.003% at 1 watt power into 8 ohms
PHONO input to SPEAKER output	0.003% at rated power with VOLUME −20 dB
Intermodulation Distortion (60 Hz:7 kHz = 4:1)	0.003% at rated power into 8 ohms
Damping Factor	10,000, at 55 Hz into 8 ohms
Transient Response	
Rise Time	1.0 μS
Slew Rate	±110 V/μS
Frequency Response	DC to 350 kHz −3 dB
Speaker Impedance	Accepts 4 ohms to 16 ohms
Input Sensitivity/Impedance	
Phono (MM)	2.5 mV/33 kohms, 47 kohms, 100 kohms
Phono (MC)	0.1 mV/100 ohms
Tuner, Aux, Tape Play (A, B)	150 mV/30 kohms
Signal to Noise Ratio (IHF, A)	
Phono (MM)	91 dB for 2.5 mV input
	97 dB for 5.0 mV input
	103 dB for 10 mV input
Phono (MC)	73 dB for 0.1 mV input
Tuner, AUX, Tape (A, B)	110 dB for 150 mV input
Maximum Input Level for Phono (MM)	350 mV (RMS), THD 0.0007% at 1,000 Hz
(MC)	15 mV (RMS), THD 0.0007% at 1,000 Hz
Output Level/Impedance	
Tape REC (Pin)	150 mV/430 ohms
Frequency Response for Phono	RIAA standard curve ±0.2 dB (20 Hz to 20,000 Hz)
Loudness Control (at −30 dB VOLUME Level)	+3 dB, +6 dB, +9 dB variable from 30 Hz to 100 Hz
Subsonic Filter	6 dB/Oct at 18 Hz

General

Power Consumption	300 W	
AC Outlet	Switched 2, Unswitched 1	
Dimensions	**Amplifier (L-02A)**	**Power Supply (L-02A-PS)**
	W 480 mm (18-7/8")	W 480 mm (18-7/8")
	H 183 mm (7-3/16")	H 183 mm (7-3/16")
	D 327 mm (12-7/8")	D 163 mm (6-27/64")
Net Weight	17.5 kg (38.5 lb)	17 kg (37.4 lb)

* Measured pursuant to Federal Trade Commission's Trade Regulation rule on Power Output Claims for Amplifier in U.S.A.

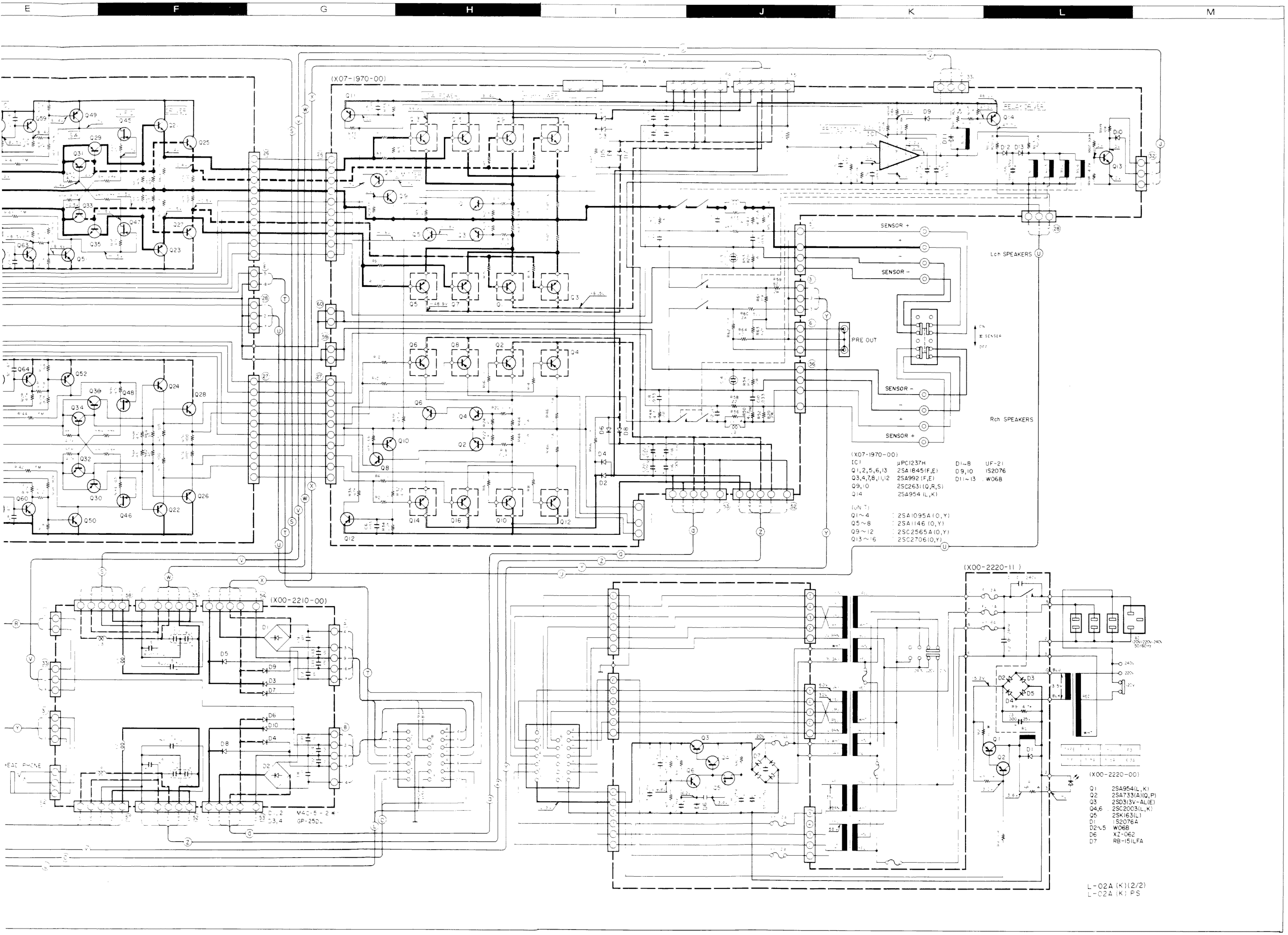
Kenwood follows a policy of continuous advancements in development. For this reason specifications may be changed without notice.

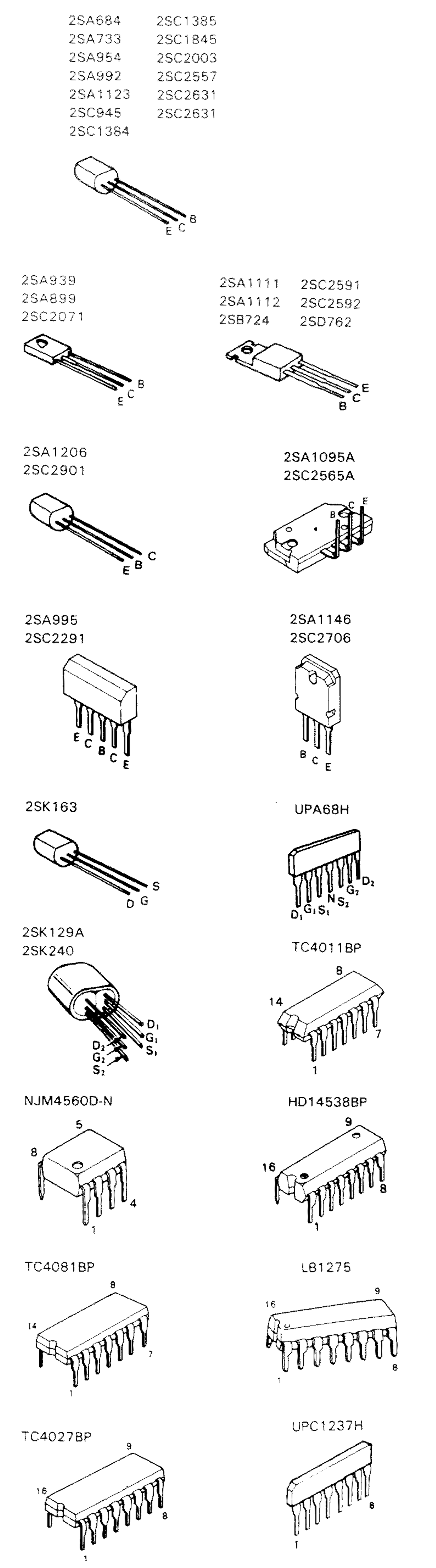
Kenwood poursuit une politique de progrès constants en ce qui concerne le développement. Pour cette raison, les spécifications sont sujettes à modifications sans préavis.

Kenwood strebt ständige Verbesserungen in der Entwicklung an. Daher bleiben Änderungen der technischen Daten jederzeit vorbehalten.

NEW SEPARATE AMPLIFIER

L-02A

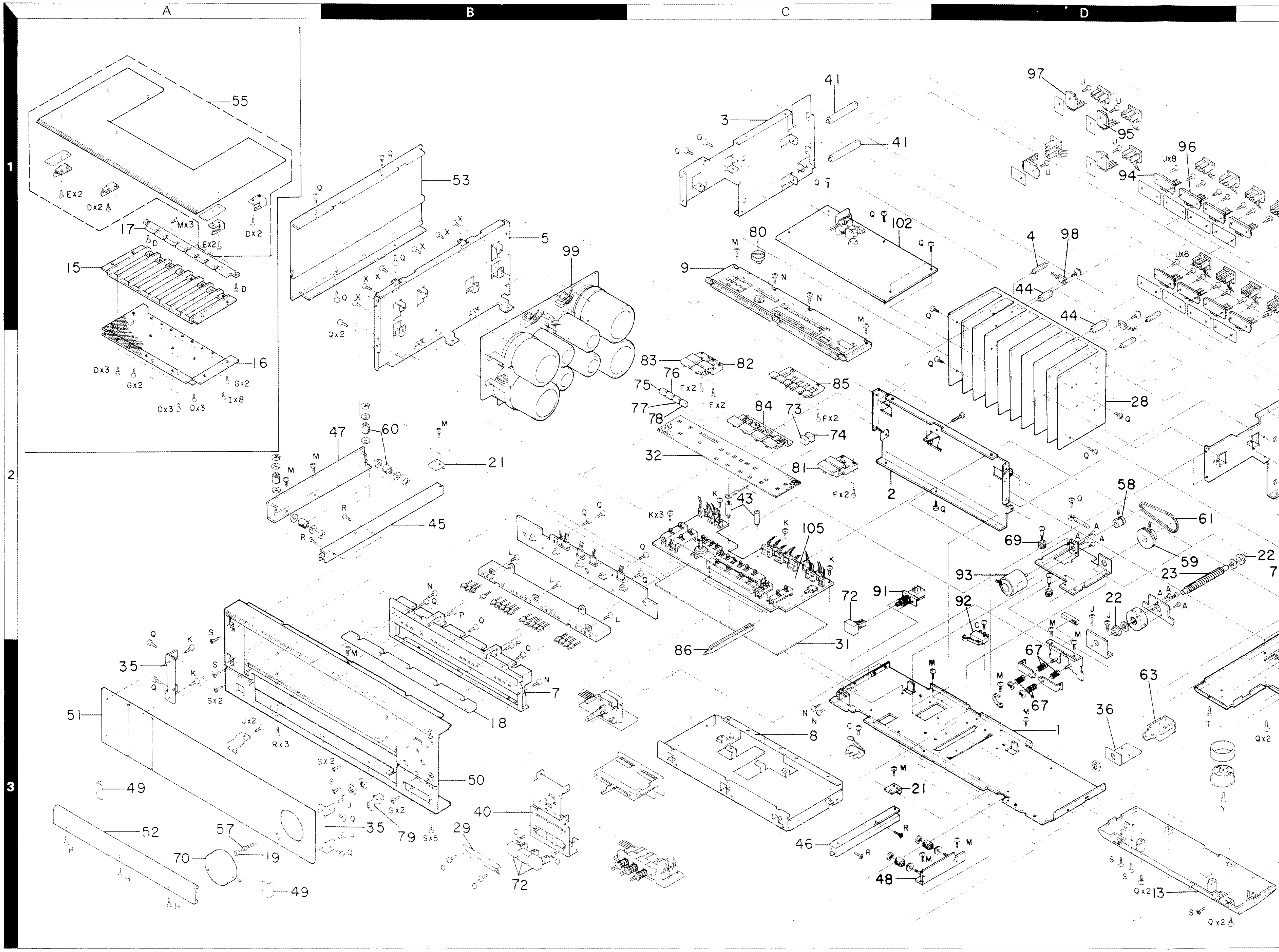




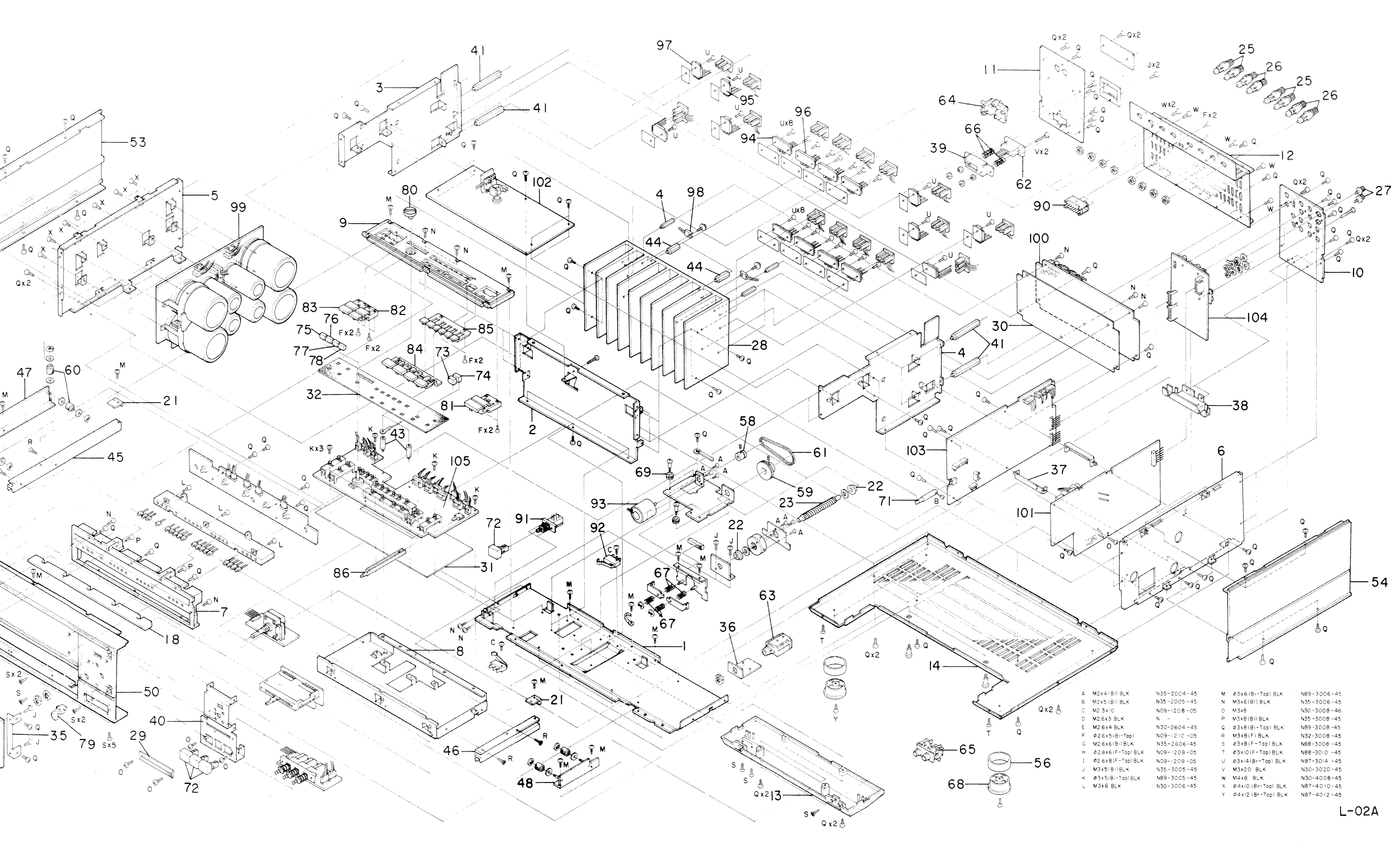
- DC voltages are measured by a VOM of 20 kΩ/V input impedance
- Les tensions de courant continu sont mesurées par un multimètre d'une impédance d'entrée de 20 kΩ/V.
- Die Gleichstrom-Spannungen werden durch ein Vielfachmeßgerät von 20 kΩ/V Eingangs-Impedanz gemessen.

- DC voltages are measured by a VOM of 20 kΩ/V input impedance
- Les tensions de courant continu sont mesurées par un multimèt d'une impédance d'entrée de 20 kΩ/V.

EXPLODED VIEW



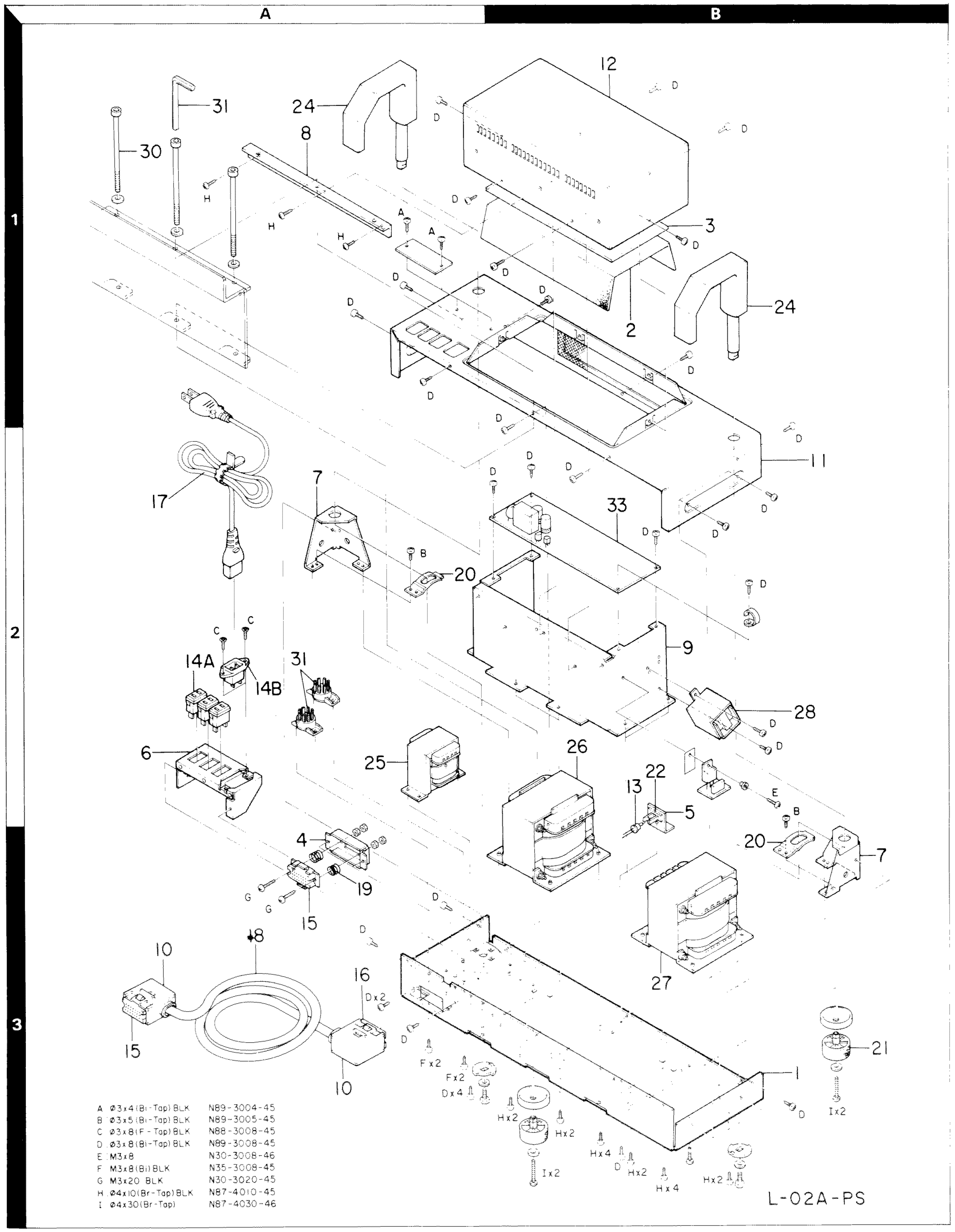
EXPLODED VIEW



A	M2x4 (Bi) BLK	N35-2004-45	M	ø3x6 (Bi-Top) BLK	N89-3006-45
B	M2x5 (Bi) BLK	N35-2005-45	N	M3x6 (Bi) BLK	N35-3006-45
C	M2.3x10	N09-1208-05	O	M3x8	N30-3008-46
D	M2.6x3 BLK	N - -	P	M3x8 (Bi) BLK	N35-3008-45
E	M2.6x4 BLK	N30-2604-45	Q	ø3x8 (Bi-Top) BLK	N89-3008-45
F	ø2.6x5 (Bi-Top)	N09-1210-05	R	M3x8 (F) BLK	N32-3008-45
G	M2.6x6 (Bi) BLK	N35-2606-45	S	ø3x8 (F-Top) BLK	N88-3008-45
H	ø2.6x6 (F-Top) BLK	N09-1209-05	T	ø3x10 (F-Top) BLK	N88-3010-45
I	ø2.6x8 (F-Top) BLK	N09-1209-05	U	ø3x14 (Br-Top) BLK	N87-3014-45
J	M3x5 (Bi) BLK	N35-3005-45	V	M3x20 BLK	N30-3020-45
K	ø3x5 (Bi-Top) BLK	N89-3005-45	W	M4x8 BLK	N30-4008-45
L	M3x6 BLK	N30-3006-45	X	ø4x10 (Br-Top) BLK	N87-4010-45
			Y	ø4x12 (Br-Top) BLK	N87-4012-45

L-02A

EXPLODED VIEW (L-02APS)



PARTS LIST

* New Parts

Parts without **Parts No.** are not supplied.
Les articles non mentionnés dans le **Parts No.** ne sont pas fournis.
Teile ohne **Parts No.** werden nicht geliefert.

Ref. No. 参照番号	Parts No. 部品番号	Description 部品名／規格	Remarks 備考
L-02A UNIT			
1 3D	NO STOCK	MAIN CHASSIS	
2 2D	NO STOCK	METALLIC FRAME	
3 1C	NO STOCK	METALLIC FRAME	
4 2E	NO STOCK	METALLIC FRAME	
5 1B	NO STOCK	METALLIC FRAME	
6 2F	NO STOCK	METALLIC FRAME	
7 3B	NO STOCK	DRESSING PANEL	
8 3C	NO STOCK	MAIN CHASSIS	
9 1C	NO STOCK	DRESSING PANEL	
10 1F	NO STOCK	REAR PANEL	
11 1E	NO STOCK	REAR PANEL	
12 1F	NO STOCK	REAR PANEL	
13 3D	NO STOCK	BOTTOM PLATE	
14 3E	NO STOCK	BOTTOM PLATE	
15 1A	NO STOCK	DRESSING PLATE	
16 1B	NO STOCK	MESH PLATE	
17 1A	NO STOCK	ESCUTCHEON	
18 3B	NO STOCK	LIGHTING PLATE	
19 3A	NO STOCK	CAP	
21 3D	NO STOCK	STOPPER	
22 2D	NO STOCK	RETAINER	
23 2D	NO STOCK	SHAFT	
25 1F	NO STOCK	TERMINAL	
26 1F	NO STOCK	TERMINAL	
27 1F	NO STOCK	TERMINAL	
28 2D	NO STOCK	HEAT SINK	
29 3B	NO STOCK	SHIELDING	
30 2E	NO STOCK	INSULATING PLATE	
31 3C	NO STOCK	INSULATING PLATE	
32 2C	NO STOCK	CLOTH	
35 3B	NO STOCK	MOUNTING HARDWARE	
36 3D	NO STOCK	MOUNTING HARDWARE	
37 2E	NO STOCK	MOUNTING HARDWARE	
38 2F	NO STOCK	MOUNTING HARDWARE	
39 1E	NO STOCK	MOUNTING HARDWARE	
40 3B	NO STOCK	MOUNTING HARDWARE	
41 1C	NO STOCK	STUD	
42 1D	NO STOCK	STUD	
43 2C	NO STOCK	STUD	
44 1D	NO STOCK	STUD	
45 2B	NO STOCK	RAIL	
46 3C	NO STOCK	RAIL	
47 2B	NO STOCK	RAIL	
48 3C	NO STOCK	RAIL	
49 3A	NO STOCK	ESCUTCHEON	
50 3B	A20-3188-03	FRONT PANEL ASSY (B)	*
51 3A	A20-3194-02	FRONT PANEL (A)	*K
51 3A	A20-3194-02	FRONT PANEL (A)	UM
51 3A	A20-3194-02	FRONT PANEL (A)	XE
51 3A	A20-3316-02	FRONT PANEL (A)	*T
52 3A	A20-3193-03	FRONT PANEL (C)	*
53 1B	A50-0101-02	SIDE PLATE	*
54 3F	A50-0102-02	SIDE PLATE	*
55 1A	A52-0052-12	TOP PLATE ASSY	*
-	B46-0060-00	WARRANTY CARD	T
-	B46-0061-30	WARRANTY CARD	K
-	B46-0062-30	WARRANTY CARD	U
-	B46-0063-13	WARRANTY CARD(MILITARY)	U
-	B46-0064-20	WARRANTY CARD	X
-	B46-0078-03	WARRANTY CARD	E

Ref. No. 参照番号	Parts No. 部品番号	Description 部品名／規格	Remarks 備考
-	B50-4413-00	INSTRUCTION MANUAL	*K
-	B50-4414-00	INSTRUCTION MANUAL	*U
-	B50-4415-00	INSTRUCTION MANUAL	*M
-	B50-4415-00	INSTRUCTION MANUAL	X
-	B50-4416-00	INSTRUCTION MANUAL	*T
-	B50-4417-00	INSTRUCTION MANUAL	*E
-	B58-0261-04	CAUTION CARD	*
-	B59-0018-00	SERVICE STATIONS LIST	
56 3E	B07-1027-04	ESCUTCHEON (FOOT)	
57 3A	B30-0385-05	LAMP (LED)	
58 2D	D15-0190-04	PULLEY	
59 2D	D15-0191-04	PULLEY	
60 2B	D15-0192-04	PULLEY	
61 2D	D16-0072-04	BELT	
62 1E	E09-2003-05	RECTANGULAR PLUG	
63 3D	E11-0104-05	PHONE JACK	
64 1E	E13-0219-05	PHONO JACK	
65 3E	E13-0220-05	PHONO JACK	
66 1E	G01-0465-04	COIL SPRING	*
67 3D	G01-0466-04	COIL SPRING	*
-	H01-3440-04	CARTON BOX	*K
-	H01-3440-04	CARTON BOX	UM
-	H01-3440-04	CARTON BOX	XE
-	H01-3441-04	CARTON BOX	*T
-	H10-1613-02	POLYSTYRENE FIXTURE	*
-	H12-0100-04	PACKING FIXTURE	*
-	H20-0454-04	COVER	
-	H25-0078-04	BAG (235x315)	
68 3E	J02-0098-04	FOOT	
69 2D	J42-0095-05	BUSHING	
70 3A	K21-0394-04	KNOB VOL.	
71 2E	K21-0395-04	KNOB MUTING	
72 3B	K27-0747-04	KNOB INPUT,POWER	
73 2C	K27-0748-04	KNOB MC	
74 2C	K27-0749-04	KNOB MM	
75 2C	K27-0750-04	KNOB OFF	
76 2C	K27-0751-04	KNOB 3DB	
77 2C	K27-0752-04	KNOB 6DB	
78 2C	K27-0753-04	KNOB 9DB	
79 3B	K29-0474-04	KNOB BALANCE	
80 1C	K29-0475-04	KNOB LOUD.F	
81 2C	K29-0476-03	KNOB PHONO	
82 2C	K29-0478-03	KNOB DC,COUPLED	
83 2C	K29-0479-03	KNOB SPKR.	
84 2C	K29-0480-03	KNOB TUNER,TAPE	
85 2C	K29-0481-04	KNOB REC,SEL	
86 3C	K29-0482-04	KNOB OPEN-CLOSE	
90 1E	S31-4005-05	SLIDE SWITCH	
91 2C	S40-2112-05	PUSH SWITCH	
92 3C	S50-1024-05	SENSITIVE SWITCH	
93 2C	T42-0014-05	DC MOTOR	
94 1D	V01-1095-90	2SA1095A(O,Y)	*
95 1D	V01-1146-20	2SA1146(O,Y)	*
96 1D	V03-2565-11	2SC2565A(O,Y)	*
97 1D	V03-2706-20	2SC2706(O,Y)	*
98 1D	V11-5101-70	STV-2H(O)	
100 1E	X07-1970-00	POWER AMP PCB ASSY	*
101 2E	X08-2000-11	PRE AMP PCB ASSY	*K
101 2E	X08-2000-11	PRE AMP PCB ASSY	UM

E: Scandinavia & Europe H: Audio Club K: USA P: Canada
S: South Africa T: England U: PX (Far East, Hawaii)
UE: AAFES (Europe) X: Australia M: Other Areas

PARTS LIST

* New Parts

Parts without **Parts No.** are not supplied.
Les articles non mentionnés dans le **Parts No.** ne sont pas fournis.
Teile ohne **Parts No.** werden nicht geliefert.

Ref. No. 参照番号	Parts No. 部品番号	Description 部品名／規格	Re-marks 備考
101 2E	X08-2000-11	PRE AMP PCB ASSY	XT
101 2E	X08-2002-71	PRE AMP PCB ASSY	*E
102 1C	X09-1870-00	AUDIO AMP PCB ASSY	*K
102 1C	X09-1870-00	AUDIO AMP PCB ASSY	UM
102 1C	X09-1870-00	AUDIO AMP PCB ASSY	XT
102 1C	X09-1872-71	AUDIO AMP PCB ASSY	*E
103 2E	X13-3710-00	SUB PCB ASSY	*
104 2F	X13-3720-11	SUB PCB ASSY	*K
104 2F	X13-3720-11	SUB PCB ASSY	UM
104 2F	X13-3720-11	SUB PCB ASSY	XT
104 2F	X13-3722-71	SUB PCB ASSY	*E
105 2C	X13-3730-00	SWITCH PCB ASSY	*
106 1B	X00-2210-00	POWER SUPPLY PCB ASSY	*
POWER SUPPLY (X00-2210-00)			
C1 ,2	C90-1210-05	ELECTRO 10000UF 90WV	
C3 -6	C90-1209-05	ELECTRO 8000UF 50WV	
C7 -14	C54-2710-39	CERAMIC 0.01UF P	
L1 -4	L33-0275-05	CHOKE COIL	
D1 ,2	V11-2101-40	M4C-51-12*1	
D3 -10	V11-2401-50	GP25DL	
POWER AMP (X07-1970-00)			
C5 -10	C46-1733-35	MYLAR 0.033UF J	
C11 ,12	C46-1747-45	MYLAR 0.47UF J	
C13 ,14	C26-1722-67	NP-ELEC 22UF 50WV	
C15 -18	C90-1222-05	ELECTRO 10UF 100WV	
C19 -22	C90-1221-05	ELECTRO 47UF 50WV	
C51	C24-1233-67	ELECTRO 33UF 16WV	
C52	C46-1710-25	MYLAR 0.001UF J	
C53	C25-1233-67	LL-ELEC 33UF 16WV	
C54	C24-1447-57	ELECTRO 4.7UF 25WV	
C55	C24-6510-77	ELECTRO 100UF 35WV	
L1 ,2	L39-0085-05	COIL	
R1 -16	R43-1210-05	FL-PROOF RD10 J 2E	
R43 -46	R90-0195-05	METAL-PLATE0.22 K 3H	
R47 -50	R47-5547-95	FL-PROOF RS4.7 J 3D	
R51 -54	R47-5582-15	FL-PROOF RS820 J 3D	
R55 ,56	R47-5422-95	FL-PROOF RS2.2 J 3A	
R57 ,58	R43-1222-05	FL-PROOF RD22 J 2E	
R59 ,60	R47-5582-15	FL-PROOF RS820 J 3D	
R111,112	R47-5582-15	FL-PROOF RS820 J 3D	
R113	R47-5515-15	FL-PROOF RS150 J 3D	
RL1 -4	S51-2058-05	RELAY	
RL5	S51-2041-05	RELAY	
D1 -8	V11-5102-30	UF-21	
D9 ,10	V11-0271-05	1S2076	
D11 -13	V11-0295-05	W06B	
IC1	V30-0678-10	UPC1237H	
Q1 ,2	V03-1845-10	2SC1845(F,E)	
Q3 ,4	V01-0992-10	2SA992(F,E)	
Q5 ,6	V03-1845-10	2SC1845(F,E)	
Q7 ,8	V01-0992-10	2SA992(F,E)	
Q9 ,10	V03-2631-10	2SC2631(Q,R,S)	
Q11 ,12	V01-0992-10	2SA992(F,E)	
Q13	V03-1845-10	2SC1845(F,E)	
Q14	V01-0954-10	2SA954(L,K)	
PRE AMP (X08-2000-11)			
C1 ,2	C91-0098-05	POLYSTY 680PF J	
C3 ,4	C91-0088-05	POLYSTY 100PF K	
C5 ,6	C24-1222-77	ELECTRO 220UF 16WV	

Ref. No. 参照番号	Parts No. 部品番号	Description 部品名／規格	Re-marks 備考
C7 ,8	C91-0104-05	POLYSTY 2700PF J	
C9 ,10	C24-1010-77	ELECTRO 100UF 10WV	
C11 ,12	C24-0822-87	ELECTRO 2200UF 6.3WV	
C13 ,14	C49-2043-24	MYLAR 0.0043UF G	
C15 ,16	C49-2039-34	POLYPRO 0.039UF G	
C17 ,18	C49-2056-34	MYLAR 0.056UF G	
C19 ,20	C49-2018-44	POLYPRO 0.18UF G	
C21 ,22	C91-0092-05	POLYSTY 220PF J	
C23 ,24	C91-0176-05	POLYSTY 68PF K	
C25 ,26	C49-2033-25	POLYPRO 0.0033UF J	
C27 ,28	C91-0102-05	POLYSTY 1800PF J	
C29 ,30	C26-6522-67	NP-ELEC 22UF 35WV	
C31 -38	C46-1710-36	MYLAR 0.01UF K	
C39 -44	C24-1710-87	ELECTRO 1000UF 50WV	
C45 -48	C54-2710-39	CERAMIC 0.01UF P	
C49 ,50	C24-1022-67	ELECTRO 22UF 10WV	
C51 ,52	C24-1210-67	ELECTRO 10UF 16WV	
C53 ,54	C24-1422-77	ELECTRO 220UF 25WV	
C55 ,56	C24-1010-77	ELECTRO 100UF 10WV	
L1 ,2	L40-1011-43	INDUCTOR	
-	N10-2030-46	HEXAGON NUT	
R1 ,2	R48-2220-15	RN 200 J 2E	
R3 ,4	R48-2222-05	RN 22 J 2E	
R5 ,6	R48-2220-15	RN 200 J 2E	
R7 ,8	R48-2210-15	RN 100 J 2E	
R9 ,10	R48-2210-45	RN 100K J 2E	
R9 ,10	R48-2251-35	RN 51K J 2E	
R11 -14	R48-2220-25	RN 2K J 2E	
R23 ,24	R48-2264-93	RN 26.4 F 2E	
R25 -28	R48-2210-35	RN 10K J 2E	
R29 ,30	R48-6210-15	RN 100 J 2E	
R31 ,32	R92-0243-05	RN 1.05 F 2E	
R35 ,36	R48-2124-13	RN 1.24K F 2E	
R37 ,38	R48-2150-23	RN 15K F 2E	
R53 -56	R48-2275-05	RN 75 J 2E	
R57 -60	R48-2216-25	RN 1.6K J 2E	
R63 -66	R43-1218-15	FL-PROOF RD180 J 2E	
R69 ,70	R43-1282-05	FL-PROOF RD82 J 2E	
R77 -80	R43-1215-15	FL-PROOF RD150 J 2E	
R81 -84	R43-1210-05	FL-PROOF RD10 J 2E	
R85 ,86	R48-2243-15	RN 430 J 2E	
R87 ,88	R48-2222-35	RN 22K J 2E	
R89 -92	R43-1222-05	FL-PROOF RD22 J 2E	
R95 ,96	R43-1222-05	FL-PROOF RD22 J 2E	
R97 ,98	R48-2243-25	RN 4.3K J 2E	
R115,116	R47-5412-25	FL-PROOF RS1.2K J 3A	
VR1 ,2	R12-0501-05	TRIMMING POTENTIOMETER	
VR3	R10-4009-05	POTENTIOMETER	*
RL1	S51-2056-05	RELAY	
S1	S90-0059-05	SOLENOID SWITCH	*
S2	S42-3055-05	PUSH SWITCH	
D1 -4	V11-0271-05	1S2076	
D5 ,6	V11-4109-60	EZ-055	
D7 ,8	V11-0271-05	1S2076	
D9 ,10	V11-4114-90	EZ-119	
D11 ,12	V11-4109-60	EZ-055	
D13 -16	V11-0271-05	1S2076	
D17 ,18	V11-5100-10	STV-4H(W)	
D19 -22	V11-0271-05	1S2076	
D23 ,24	V11-4109-70	EZ-329	

E: Scandinavia & Europe H: Audio Club K: USA P: Canada
S: South Africa T: England U: PX (Far East, Hawaii)
UE : AAFES (Europe) X: Australia M: Other Areas

PARTS LIST

* New Parts

Parts without **Parts No.** are not supplied.
Les articles non mentionnés dans le **Parts No.** ne sont pas fournis.
Teile ohne **Parts No.** werden nicht geliefert.

Ref. No. 参照番号	Parts No. 部品番号	Description 部品名／規格	Re-marks 備考
D25 -28	V11-0295-05	W06B	
D29 -33	V11-0271-05	1S2076	
D34 ,35	V11-4100-30	WZ-197	
Q1 -16	V03-2557-10	2SC2557(S,T)	
Q17 ,18	V09-0153-20	2SK240(V)	*
Q19 -22	V03-1845-10	2SC1845(F,E)	
Q23 -26	V01-0992-10	2SA992(F,E)	
Q27 ,28	V03-2631-40	2SC2631(S,T)	
Q29 ,30	V03-1845-10	2SC1845(F,E)	
Q31 ,32	V09-0144-11	2SK163(M)	
Q33 ,34	V03-1845-10	2SC1845(F,E)	
Q35 -40	V01-0992-10	2SA992(F,E)	
Q41 -48	V03-1845-10	2SC1845(F,E)	
Q49 ,50	V01-0992-10	2SA992(F,E)	
Q51 ,52	V03-1845-10	2SC1845(F,E)	
Q53 ,54	V01-0992-10	2SA992(F,E)	
Q55 ,56	V03-2591-30	2SC2591(R,S)	
Q57 ,58	V01-1111-30	2SA1111(R,S)	
Q59	V04-0762-30	2SD762(P,O)	
Q60 ,61	V02-0724-20	2SB724(P,O)	
Q62	V04-0762-30	2SD762(P,O)	
Q63 ,64	V09-0144-11	2SK163(M)	
Q65 -68	V03-0945-41	2SC945(A)(P,K)	
Q69 ,70	V03-1384-10	2SC1384(R,S)	
AUDIO AMP (X09-1870-00)			
C1 ,2	C71-1727-05	CERAMIC 27PF J	
C3 ,4	C52-1756-16	CERAMIC 560PF K	
C5 ,6	C52-1747-16	CERAMIC 470PF K	
C7 ,8	C52-1782-16	CERAMIC 820PF K	
C9 ,10	C24-2010-57	ELECTRO 1UF 100WV	
C11 ,12	C71-1715-15	CERAMIC 150PF J	
C13 ,14	C91-0171-05	POLYSTY 27PF K	
C15 ,16	C52-1747-16	CERAMIC 470PF K	
C17 ,18	C91-0169-05	POLYSTY 18PF K	
C19 ,20	C24-1047-67	ELECTRO 47UF 10WV	
C21 ,22	C24-1210-67	ELECTRO 10UF 16WV	
C23 -26	C52-1756-16	CERAMIC 560PF K	
C27 -30	C46-1747-45	MYLAR 0.47UF J	
C31 -34	C24-2010-67	ELECTRO 10UF 100WV	
C35 -38	C26-2010-57	NP-ELEC 1UF 100WV	
C39 -42	C55-1722-38	CERAMIC 0.022UF Z	
C43 ,44	C71-1715-15	CERAMIC 150PF J	
C45 ,46	C71-1703-01	CERAMIC 3PF C	
C47 ,48	C71-1705-01	CERAMIC 5PF C	
C51 ,52	C71-1702-01	CERAMIC 2PF C	
C101,102	C24-2047-77	ELECTRO 470UF 100WV	
C103,104	C24-2033-77	ELECTRO 330UF 100WV	
C107,108	C54-2710-39	CERAMIC 0.01UF P	
R1 ,2	R48-2210-15	RN 100 J 2E	
R3 ,4	R48-2227-45	RN 270K J 2E	
R5 -8	R48-2256-05	RN 56 J 2E	
R33 ,34	R47-5456-25	FL-PROOF RS5.6K J 3A	
R39 ,40	R43-1282-05	FL-PROOF RD82 J 2E	
R61 -68	R43-1243-15	FL-PROOF RD430 J 2E	
R69 -76	R43-1210-15	FL-PROOF RD100 J 2E	
R77 -80	R43-1268-15	FL-PROOF RD680 J 2E	
R153-156	R49-6230-33	RN 30K F 2E	
R157-160	R49-6212-13	RN 120 F 2E	
R201,202	R47-5482-05	FL-PROOF RS82 J 3A	
VR1 ,2	R12-0502-05	TRIMMING POTENTIOMETER	
VR3 ,4	R12-0511-05	TRIMMING POTENTIOMETER	

Ref. No. 参照番号	Parts No. 部品番号	Description 部品名／規格	Re-marks 備考
RL1	S51-2041-05	RELAY	
D1 ,2	V11-4109-90	EZ-056	
D3 ,4	V11-4109-40	EZ-242	
D5 ,6	V11-4109-70	EZ-329	
D7 -20	V11-0273-05	1S2076A	
D21 -24	V11-4114-80	EZ-081	
D25 -28	V11-5101-70	STV-2H(O)	
D29 ,30	V11-0273-05	1S2076A	
D51 -53	V11-0295-05	W06B	
IC1 ,2	V09-0145-30	UPA68H(L,M)	
Q1 ,2	V03-2291-20	2SC2291(F,G)	
Q3 ,4	V01-0995-10	2SA995(F,G)	
Q5 ,6	V09-0163-10	2SK129A(L,M)	*
Q7 -12	V01-0199-05	2SA899(B,V)	
Q13 ,14	V01-0939-00	2SA939	
Q15 -18	V03-2071-00	2SC2071	
Q19 ,20	V01-0939-00	2SA939	
Q21 ,22	V03-2592-40	2SC2592(R,S)	
Q23 ,24	V01-1112-40	2SA1112(R,S)	
Q25 ,26	V03-2592-40	2SC2592(R,S)	
Q27 ,28	V01-1112-40	2SA1112(R,S)	
Q29 -32	V01-1206-00	2SA1206	
Q33 -36	V03-2901-00	2SC2901	
Q37 -40	V09-0144-60	2SK163(L)	
Q45 -48	V09-0144-11	2SK163(M)	
Q49 ,50	V01-1123-10	2SA1123(Q,R,S)	
Q51 -54	V03-2631-10	2SC2631(Q,R,S)	
Q55 ,56	V01-1123-10	2SA1123(Q,R,S)	
Q57 -60	V01-0992-10	2SA992(F,E)	
Q61 -64	V03-1845-10	2SC1845(F,E)	
Q65 ,66	V01-1123-10	2SA1123(Q,R,S)	
Q67 ,68	V03-2631-10	2SC2631(Q,R,S)	
Q69 ,70	V03-2291-20	2SC2291(F,G)	
SUB (X13-3710-00)			
C1	C46-1710-37	MYLAR 0.01UF M	
C2	C46-1715-27	MYLAR 0.0015UF M	
C3	C24-1047-67	ELECTRO 47UF 10WV	
C4	C24-1710-57	ELECTRO 1UF 50WV	
C5	C24-6547-57	ELECTRO 4.7UF 35WV	
C6	C24-1247-77	ELECTRO 470UF 16WV	
C7	C26-1410-67	NP-ELEC 10UF 25WV	
C8	C24-1247-77	ELECTRO 470UF 16WV	
C9	C24-6547-57	ELECTRO 4.7UF 35WV	
C10	C24-1210-67	ELECTRO 10UF 16WV	
C11	C26-1710-57	NP-ELEC 1UF 50WV	
C12	C24-6547-57	ELECTRO 4.7UF 35WV	
C13	C24-1210-67	ELECTRO 10UF 16WV	
C14	C46-1710-37	MYLAR 0.01UF M	
C15	C46-1715-27	MYLAR 0.0015UF M	
C16	C24-1047-67	ELECTRO 47UF 10WV	
C17 -26	C24-1022-67	ELECTRO 22UF 10WV	
C27 -30	C55-1710-38	CERAMIC 0.01UF Z	
C31 ,32	C49-2033-45	MYLAR 0.33UF J	
C33 ,34	C91-0088-05	POLYSTY 100PF K	
C35	C52-1747-16	CERAMIC 470PF K	
C36	C52-1756-16	CERAMIC 560PF K	
R27	R43-1222-05	FL-PROOF RD22 J 2E	
R33	R47-5418-95	FL-PROOF RS1.8 J 3A	
R34	R47-5401-05	FL-PROOF RS1 J 3A	
R38	R42-1222-15	FL-PROOF RD220 J 2E	
R57	R43-1247-05	FL-PROOF RD47 J 2E	

E: Scandinavia & Europe H: Audio Club K: USA P: Canada
S: South Africa T: England U: PX (Far East, Hawaii)
UE : AAFES (Europe) X: Australia M: Other Areas

PARTS LIST

* New Parts
Parts without **Parts No.** are not supplied.
Les articles non mentionnés dans le **Parts No.** ne sont pas fournis.
Teile ohne **Parts No.** werden nicht geliefert.

Ref. No. 参照番号	Parts No. 部品番号	Description 部品名／規格	Re-marks 備考
R87	R47-5415-15	FL-PROOF RS150 J 3A	
R91 -93	R43-1247-05	FL-PROOF RD47 J 2E	
R98	R43-1247-05	FL-PROOF RD47 J 2E	
R111,112	R48-2233-15	RN 330 J 2E	
RL1 -7	S51-2056-05	RELAY	
S1	S40-1052-05	PUSH SWITCH	
D1 -10	V11-0271-05	1S2076	
D11	V11-4104-10	XZ-100	
D12 -39	V11-0271-05	1S2076	
IC1	V30-0301-70	TC4011BP	
IC2	V30-1050-06	TC4027BP	
IC3	V30-0299-10	TC4081BP	
IC4	V30-0301-70	TC4011BP	
IC5	V30-0806-10	HD14538BP	
IC6	V30-0301-70	TC4011BP	
IC7 ,8	V30-0759-10	LB1275	
Q1 -7	V03-0945-41	2SC945(A)(P,K)	
Q8 ,9	V03-0373-05	2SC1384(Q,R)	
Q10 ,11	V01-0130-05	2SA684(Q,R)	
Q12	V01-0733-40	2SA733(A)(Q,P)	
Q13	V03-0945-41	2SC945(A)(P,K)	
Q14	V04-0762-30	2SD762(P,O)	
Q15 ,16	V03-0945-41	2SC945(A)(P,K)	
Q17	V01-0733-40	2SA733(A)(Q,P)	
Q18 -20	V03-0945-41	2SC945(A)(P,K)	
Q21	V03-2003-30	2SC2003(L,K)	
Q22 -25	V03-0945-41	2SC945(A)(P,K)	
Q26	V01-0733-40	2SA733(A)(Q,P)	
Q27 -31	V03-0945-41	2SC945(A)(P,K)	
Q32 ,33	V03-2003-30	2SC2003(L,K)	
SUB (X13-3720-11)			
C2	C26-1710-57	NP-ELEC 1UF 50WV	
C3 -6	C71-1768-05	CERAMIC 68PF J	
PJ1	E13-0440-05	PHONO JACK	
PJ2	E13-0219-05	PHONO JACK	
PJ3 ,4	E13-0440-05	PHONO JACK	
R1 -4	R42-1247-05	FL-PROOF RD47 J 2E	
R5 ,6	R48-2210-45	RN 100K J 2E	
R7 ,8	R48-2251-35	RN 51K J 2E	
RL1 -8	S51-2056-05	RELAY	
S1	S31-2059-05	SLIDE SWITCH	
SWITCH (X13-3730-00)			
D11 -28	B30-0258-05	LAMP	
PL1 -5	B30-0196-05	LAMP	
C1 ,2	C46-1710-36	MYLAR 0.01UF K	
C3 ,4	C49-2039-35	POLYPRO 0.039UF J	
C5 ,6	C71-1722-05	CERAMIC 22PF J	
C7 ,8	C25-1747-57	LL-ELEC 4.7UF 50WV	
C9	C24-1210-67	ELECTRO 10UF 16WV	
C10	C24-1022-77	ELECTRO 220UF 10WV	
C11	C26-1710-57	NP-ELEC 1UF 50WV	
C12	C24-1010-77	ELECTRO 100UF 10WV	
VR1	R06-6006-05	POTENTIOMETER	*
VR2	R13-5031-05	POTENTIOMETER	*
S1 ,2	S42-2072-05	PUSH SWITCH	
S3	S42-4023-05	PUSH SWITCH	
S4	S42-2073-05	PUSH SWITCH	
S5	S42-6013-05	PUSH SWITCH	
S6	S42-2073-05	PUSH SWITCH	

Ref. No. 参照番号	Parts No. 部品番号	Description 部品名／規格	Re-marks 備考
S7	S42-2071-05	PUSH SWITCH	
S8	S42-2072-05	PUSH SWITCH	
S9	S40-1052-05	PUSH SWITCH	
D1 -6	V11-0271-05	1S2076	
IC1	V30-0344-40	NJM4560D-N	
IC2	V30-0301-70	TC4011BP	
Q1 ,2	V01-0733-40	2SA733(A)(Q,P)	
Q3 ,4	V03-0945-41	2SC945(A)(P,K)	

E: Scandinavia & Europe H: Audio Club K: USA P: Canada
S: South Africa T: England U: PX (Far East, Hawaii)
UE : AAFES (Europe) X: Australia M: Other Areas

PARTS LIST

* New Parts
Parts without **Parts No.** are not supplied.
Les articles non mentionnés dans le **Parts No.** ne sont pas fournis.
Teile ohne **Parts No.** werden nicht geliefert.

Ref. No. 参照番号	Parts No. 部品番号	Description 部品名／規格	Re-marks 備考
L-02A-PS			
1 3B	NO STOCK	MAIN CHASSIS	
2 1B	NO STOCK	SHIELDING	
3 1B	NO STOCK	REINFORCING HARDWARE	
4 3A	NO STOCK	MOUNTING HARDWARE	
5 2B	NO STOCK	MOUNTING HARDWARE	
6 2A	NO STOCK	MOUNTING HARDWARE	
7 2A	NO STOCK	MOUNTING HARDWARE	
8 1A	NO STOCK	MOUNTING HARDWARE	
9 2B	NO STOCK	REINFORCING HARDWARE	
10 3A	NO STOCK	COVER	
11 1B	A01-0432-02	METALLIC CABINET	*
12 1B	A01-0433-03	METALLIC CABINET	*
-	B58-0260-04	CAUTION CARD	*
13 2B	B30-0191-05	LED	
-	E30-0737-05	SPEAKER CORD	K
-	E30-0738-05	SPEAKER CORD	UM
-	E30-0738-05	SPEAKER CORD	XT
-	E30-0738-05	SPEAKER CORD	E
14A 2A	E03-0031-05	AC OUTLET	
14B 2A	E03-0058-05	AC INLET	*
15 3A	E09-2002-05	RECTANGULAR PLUG	*
16 3A	E09-2003-05	RECTANGULAR PLUG	*
17 3A	E30-0725-05	POWER CORD	KU
17 3A	E30-0725-05	POWER CORD	M
17 3A	E30-0726-05	POWER CORD	*E
17 3A	E30-0728-05	POWER CORD	*T
17 3A	E30-0729-05	POWER CORD	*X
18 3A	E30-0715-05	POWER CORD	*
19 3A	G01-0465-04	COIL SPRING	*
20 2A	G02-0092-04	FLAT SPRING	*
-	H01-3443-04	CARTON BOX	*K
-	H01-3443-04	CARTON BOX	UM
-	H01-3443-04	CARTON BOX	XE
-	H01-3444-04	CARTON BOX	*T
-	H10-1614-03	POLYSTYRENE FIXTURE	*
-	H10-1615-03	POLYSTYRENE FIXTURE	*
-	H12-0096-02	PACKING FIXTURE	*
-	H12-0101-04	PACKING FIXTURE	*
-	H12-1111-04	PACKING FIXTURE	*
-	H20-0464-04	COVER	*
-	H25-0067-03	BAG	
-	H25-0194-04	BAG	
21 3B	J02-0101-05	FOOT	
22 2B	J19-0509-04	LED HOLDER	
24 1A	K01-0073-05	HANDLE	*
25 2A	L01-2756-05	POWER TRANS	*
26 2B	L01-2731-05	POWER TRANS	*K
26 2B	L01-2736-05	POWER TRANS	*U
26 2B	L01-2736-05	POWER TRANS	MX
26 2B	L01-2736-05	POWER TRANS	TE
27 3B	L01-2741-05	POWER TRANS	*K
27 3B	L01-2746-05	POWER TRANS	*U
27 3B	L01-2746-05	POWER TRANS	MX
27 3B	L01-2746-05	POWER TRANS	TE
28 2B	L01-2766-05	POWER TRANS	*
30 1A	N09-1204-05	SCREW	*

Ref. No. 参照番号	Parts No. 部品番号	Description 部品名／規格	Re-marks 備考
31 2A	S29-1134-05	ROTARY WAFER SWITCH	
-	W01-0087-05	SPANNER	
32 1A	W01-0323-04	SPANNER	
33 2B	X00-2220-11	POWER SUPPLY PCB ASSY	*K
33 2B	X00-2220-11	POWER SUPPLY PCB ASSY	UM
33 2B	X00-2220-11	POWER SUPPLY PCB ASSY	X
33 2B	X00-2222-71	POWER SUPPLY PCB ASSY	*T
33 2B	X00-2222-71	POWER SUPPLY PCB ASSY	E
POWER SUPPLY (X00-2220-11)			
C1 ,2	C91-0079-05	CERAMIC 0.01UF AC125V	
C3	C24-1410-87	ELECTRO 1000UF 25WV	
C4	C24-1210-67	ELECTRO 10UF 16WV	
C5	C55-1710-38	CERAMIC 0.01UF Z	
C6	C24-1210-67	ELECTRO 10UF 16WV	
C7	C24-1210-77	ELECTRO 100UF 16WV	
C8	C24-1422-77	ELECTRO 220UF 25WV	
C9	C24-1433-87	ELECTRO 3300UF 25WV	
C10	C55-1710-38	CERAMIC 0.01UF Z	
F1 ,2	F05-3121-05	FUSE 250V T3.15A	TE
F1 ,2	F06-4024-05	FUSE 250V 4A	KU
F1 ,2	F06-4024-05	FUSE 250V 4A	MX
F3	F05-6027-05	FUSE 250V 6A	KU
F3	F05-6027-05	FUSE 250V 6A	MX
F3	F05-6321-05	FUSE 250V T6.3A	TE
F4	F05-2015-05	FUSE 250V T200MA	TE
F5 ,6	F05-2029-05	FUSE 250V 2A	TE
F5 ,6	F06-2027-05	FUSE 250V 2A	KU
F5 ,6	F06-2027-05	FUSE 250V 2A	MX
F7	F05-4024-05	FUSE 250V F4A	TE
F7	F06-4024-05	FUSE 250V 4A	KU
F7	F06-4024-05	FUSE 250V 4A	MX
-	J13-0055-05	FUSE HOLDER	
R1	R47-5468-15	FL-PROOF RS680 J 3A	
R2	R43-1210-05	FL-PROOF RD10 J 2E	
R8	R43-1222-15	FL-PROOF RD220 J 2E	
RL1	S51-1036-05	RELAY	
D1	V11-0273-05	1S2076A	
D2 -5	V11-0295-05	W06B	
D6	V11-4101-50	XZ-062	
D7	V11-5102-20	RB-151LFA	
Q1	V01-0954-10	2SA954(L,K)	
Q2	V01-0733-40	2SA733(A)(Q,P)	
Q3	V04-0313-60	2SD313V-AL(E)	
Q4	V03-2003-30	2SC2003(L,K)	
Q5	V09-0144-60	2SK163(L)	
Q6	V03-2003-30	2SC2003(L,K)	

E: Scandinavia & Europe H: Audio Club K: USA P: Canada
S: South Africa T: England U: PX (Far East, Hawaii)
UE : AAFES (Europe) X: Australia M: Other Areas

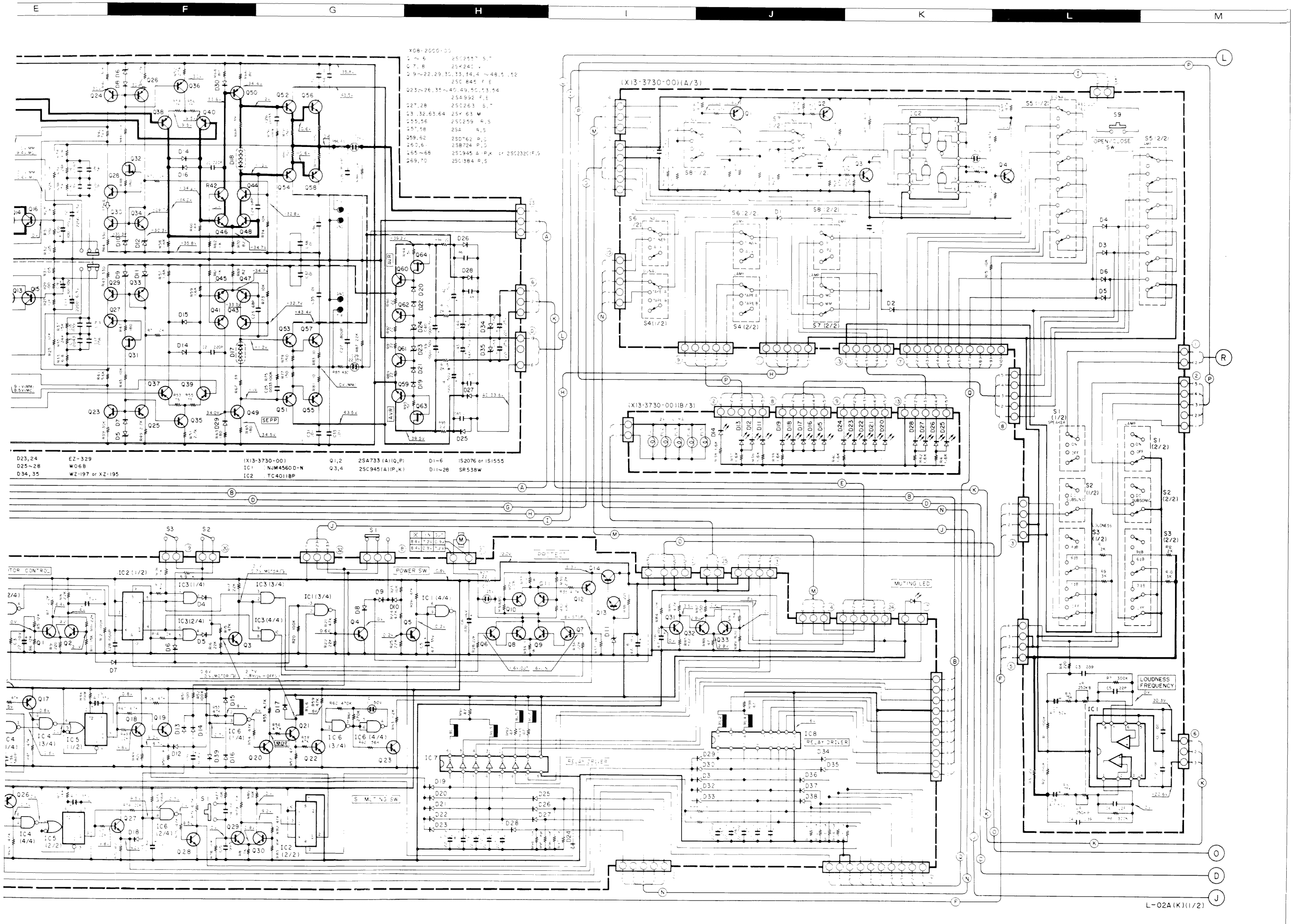
KENWOOD® NEW SEPARATE AMPLIFIER

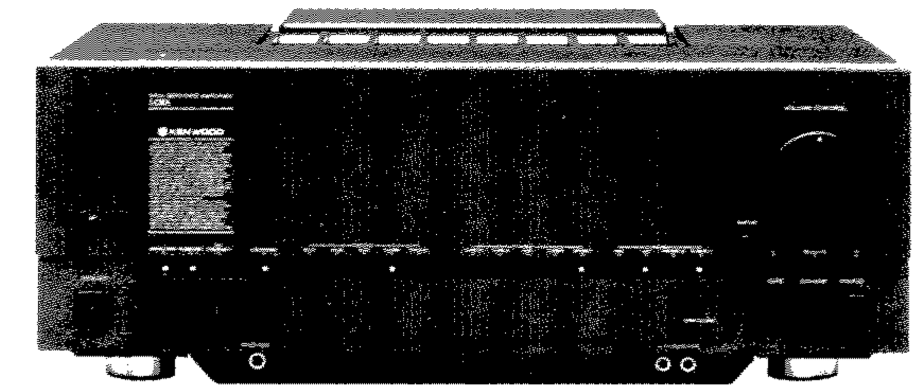
• DC voltages are measured by a VOM of 20 kΩ/V input impedance

• Les tensions de courant continu sont mesurées par un multimètre d'une impédance d'entrée de 20 kΩ/V.

NEW SEPARATE AMPLIFIER

L-02A





Specifications

Power output
170 watts* per channel minimum RMS, both channels driven, at 8 ohms from 20 Hz to 20,000 Hz with no more than 0.003% total harmonic distortion.

Total Harmonic Distortion (20 Hz to 20,000 Hz)	
AUX input to SPEAKER output	0.003% at rated power into 8 ohms
	0.003% at 1/2 rated power into 8 ohms
	0.003% at 1 watt power into 8 ohms
PHONO input to SPEAKER output	0.003% at rated power with VOLUME −20 dB
Intermodulation Distortion (60 Hz:7 kHz = 4:1)	0.003% at rated power into 8 ohms
Damping Factor	10,000 at 55 Hz into 8 ohms
Transient Response	
Rise Time	1.0 μS
Slew Rate	±110 V/μS
Frequency Response	DC to 350 kHz, −3 dB
Speaker Impedance	Accepts 4 ohms to 16 ohms
Input Sensitivity/Impedance	
Phono (MM)	2.5 mV/33 kohms, 47 kohms, 100 kohms
Phono (MC)	0.1 mV/100 ohms
Tuner, Aux, Tape Play (A, B)	150 mV/30 kohms
Signal to Noise Ratio (IHF, A)	
Phono (MM)	91 dB for 2.5 mV input
	97 dB for 5.0 mV input
	103 dB for 10 mV input
Phono (MC)	73 dB for 0.1 mV input
Tuner, AUX, Tape (A, B)	110 dB for 150 mV input
Maximum Input Level for Phono (MM)	350 mV (RMS), THD 0.0007% at 1,000 Hz
(MC)	15 mV (RMS), THD 0.0007% at 1,000 Hz
Output Level/Impedance	
Tape REC (Pin)	150 mV/430 ohms
Frequency Response for Phono	RIAA standard curve ±0.2 dB (20 Hz to 20,000 Hz)
Loudness Control (at −30 dB VOLUME Level)	+3 dB, +6 dB, +9 dB variable from 30 Hz to 100 Hz
Subsonic Filter	6 dB/Oct at 18 Hz

General

Power Consumption	300 W	
AC Outlet	Switched 2, unswitched 1	
Dimensions	**Amplifier (L-02A)**	**Power Supply (L-02A-PS)**
	W 480 mm (18-7/8")	W 480 mm (18-7/8")
	H 183 mm (7-3/16")	H 183 mm (7-3/16")
	D 327 mm (12-7/8")	D 163 mm (6-27/64")
Net Weight	17.5 kg (38.5 lb)	17 kg (37.4 lb)

* Measured pursuant to Federal Trade Commission's Trade Regulation rule on Power Output Claims for Amplifiers in U.S.A.

- DC voltages are measured by a VOM of 20 kΩ/V input impedance
- Les tensions de courant continu sont mesurées par un multimètre d'une impédance d'entrée de 20 kΩ/V.
- Die Gleichstrom-Spannungen werden durch ein Vielfachmeßgerät von 20 kΩ/V Eingangs-Impedanz gemessen.

Kenwood follows a policy of continuous advancements in development. For this reason specifications may be changed without notice.

Kenwood poursuit une politique de progrès constants en ce qui concerne le développement. Pour cette raison, les spécifications sont sujettes à modifications sans préavis.

Kenwood strebt ständige Verbesserungen in der Entwicklung an. Daher bleiben Änderungen der technischen Daten jederzeit vorbehalten.

KENWOOD®

NEW SEPARATE AMPLIFIER

- DC voltages are measured by a VOM of 20 kΩ/V input impedance
- Les tensions de courant continu sont mesurées par un multimètre d'une impédance d'entrée de 20 kΩ/V.