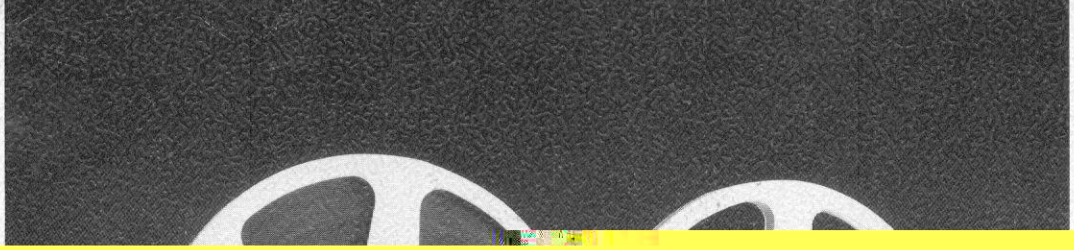


MODEL RT-909 COMES IN TWO VERSIONS DISTINGUISHED AS FOLLOWS:

Type	Voltage	Remarks
KU	120V only	U.S.A. model
D/G	120V, 220V and 240V (Switchable)	U.S. Military model

This service manual is applicable to the RT-909/KU. When repairing the RT-909 D/G, please see the additional service manual.

CONTENTS

1. SPECIFICATIONS

Type	4-track, 2-channel stereo tape deck (Recording, forward playback with reverse playback)
Operation system	Solenoid drive, direct switchable function buttons and pre-set function buttons for timer recording and playback.
Heads	Hard permalloy recording head ; 1 Ferrite erasing head ; 1 Hard permalloy forward playback head ; 1 Hard permalloy reverse playback head ; 1
Motors	Capstan drive motor ; 1 (FG Servo DC motor) Reel base drive motors ; 2 (6-pole inner-rotor special induction type)
Maximum Reel Size	10-1/2-inch reel (26cm)
Tape Speed	19cm/s (7-1/2ips), 9.5cm/s (3-3/4ips) $\pm$0.6%
Fast Forward/Rewind Times	Less than 120sec. with 10-1/2-inch reel and 720m tape
Wow and Flutter	No more than 0.04% WRMS (19cm/s) No more than 0.08% WRMS (9.5cm/s)
Signal-to-Noise Ratio	More than 60dB
Total Harmonic Distortion	Less than 1% (19cm/s)
Frequency Response	
19cm/s	20Hz to 30,000Hz (20Hz to 28,000Hz $\pm$3dB)
9.5cm/s	20Hz to 20,000Hz (20Hz to 18,000Hz $\pm$3dB)
Crosstalk	More than 50dB
Channel Separation	More than 50dB
Erasing Coefficient	More than 60dB
Recording Bias Frequency	125kHz
Equalization	NAB standards

Inputs (Sensitivity/Maximum allowable level/Input impedance)
MIC x 2; 0.316mV/100mV/27kΩ, 6mm diam. jacks
(suitable microphone, 250Ω to 10kΩ)
LINE x 2; 50mV/25V/50kΩ

Outputs (Reference level/Maximum level/Load impedance)
LINE x 2; 450mV/900mV/50kΩ,
HEADPHONES x 1; 50mV/8Ω, 6mm diam. jack

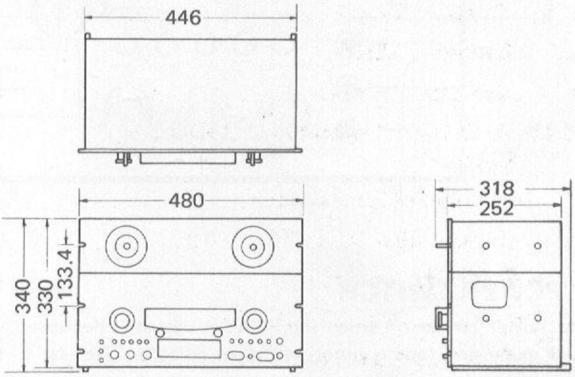
Semiconductors	123; transistors (4;FET's), 43;IC's, 111; diodes (including 5; LEDs and 6; zener diodes) 2; Photo Interrupters.

Accessory Functions
- Automatic repeat play (Automatic reverse)
- Fluorescent display level meter with peak/average switch (−30dB to +8dB)
- 4-digit fluorescent tape counter
- Height-adjustable reel base
- Timer aid recording/playback device
- Pause switch
- Independent Bias/EQ selectors
- Pitch control ($\pm$6% only in playback mode)
- MIC/LINE mixing
- Add-on recording
- Independent Left/Right recording mode switches
- Output level control (clicked for reference level; Left/Right Coupled)
- Reel clamps
- Dimmer switch
- EIA rack mounting

Power Requirements	AC 120V 60Hz
Power Consumption	166 watts, Max. (UL)
Dimensions	480(W) x 340(H) x 318(D)mm 18-7/8 x 13-3/8 x 12-1/2in
Weight	Without package; 21kg/46lb 5oz With package; 25.5kg/56lb 4oz
Accessories	• 10in metal reel (Pioneer PR-101) x 1 • 10-1/2in reel adapters x 2 [PP-220] • Connecting cord with pin plugs x 2 • Head cleaning swabs x 3 • Sensing tape x 1 • Splicing tape x 1 • Operating instructions x 1 • Blank panel x 1

Note:
Specifications and the design subject to possible modification without notice due to improvements.

Dimensions

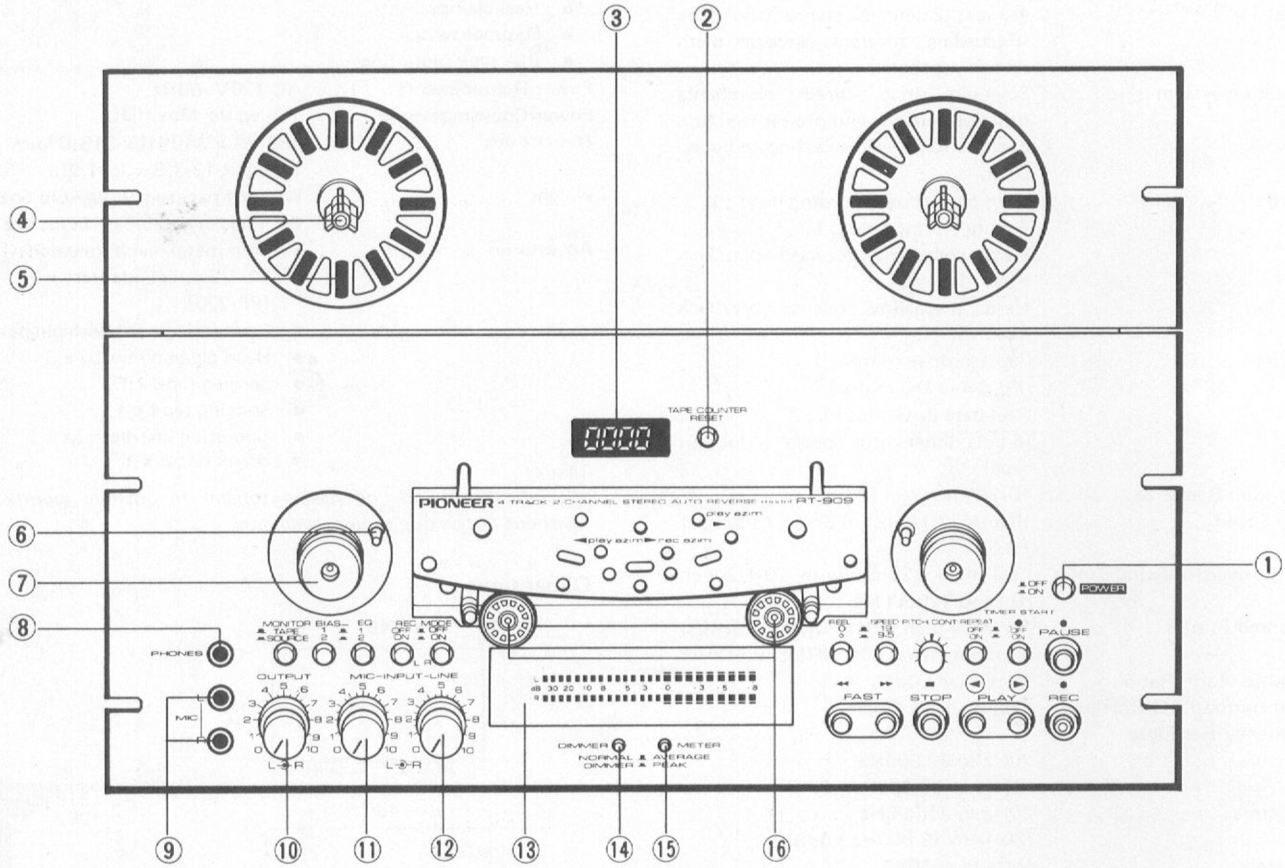


unit = mm

Test Conditions:

1. Reference tape: Scotch #206
2. Reference recording level: meter 0dB level (NAB standard reference level)
3. Reference signal: 1,000Hz
4. Wow & Flutter: at 3,000Hz weighted RMS
5. Frequency response: measured at −20dB level (19cm/s)
6. Signal-to-Noise ratio: measured at the signal level where 3rd harmonic distortion is 3%, and noise level is corrected by A curve.
7. Total Harmonic Distortion: measured at reference recording level
8. Channel separation: measured at reference recording level
9. Channel crosstalk: measured at 0dB level (reference recording level)
10. Sensitivity: Input level (mV) for reference recording measured with input (recording) level control set at maximum position.
11. Maximum allowable input level: measured at the point where the output signal wave is clipped while gradually turning the input control.
12. Reference output level: meter 0dB level.
13. Maximum output (playback) level: Output level to reference recording level, measured with output (playback) level control set at maximum position.

2. FRONT PANEL FACILITIES



① POWER SWITCH

The power comes on when the POWER switch is depressed. The level meter and tape counter, will then come on. Release to turn the power off.

② COUNTER RESET BUTTON

Push this button to reset the tape counter to "0000."

③ TAPE COUNTER

This indicates how much tape has been recorded or played back and how much there is left over.

④ REEL CLAMPER

⑤ REEL BASE

⑥ TENSION ARM

Push down the arm and lock it while threading the tape. Release the lock after the tape has been threaded.

⑦ GUIDE ROLLER

⑧ HEADPHONE JACK

Plug your stereo headphones into this jack to hear the sound from the signals selected by the MONITOR switch. Use headphones to monitor a recording or listen to a performance directly taped from the RT-909. The output level of the headphones can be adjusted by the OUTPUT level controls.

NOTES:

- *Please use low impedance-type headphones. If you use high impedance-type headphones, you may not obtain sufficient volume.*
- *Do not connect a microphone to this jack, as the microphone may be damaged.*

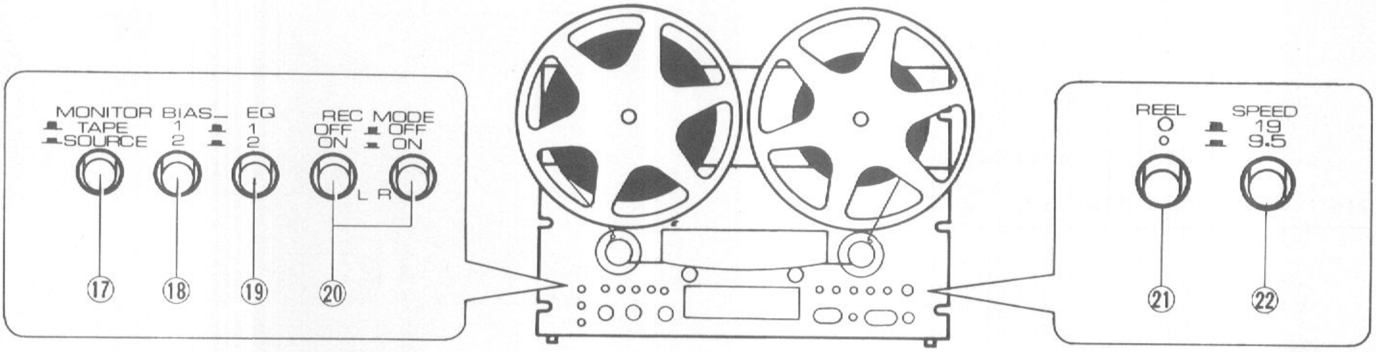
⑨ MIC JACKS (L, R)

These are the input jacks for microphone recording. The L (left) and R (right) channels can be used independently. As long as the microphones have a standard 6mm diameter plug, you can use either a low impedance (600-ohms) or high impedance (10 – 50 kohms) type.

⑩ OUTPUT CONTROLS

Use these controls to adjust the output signal level. Turning the controls to the right increases the level. The controls are coupled when turned but it is also possible to adjust the right channel (outer) and the left channel (inner) independently.

When playing back a reference tape, a reference playback level (0dB) is obtained with these controls set to the center click stop position.



⑪ MIC-INPUT (RECORDING LEVEL) CONTROLS

Use these controls to adjust the recording level when you are recording with a microphone (or microphones). Use the inner control for the left channel and the outer control for the right channel.

⑫ LINE-INPUT (RECORDING LEVEL) CONTROLS

These controls adjust the recording input level from the LINE INPUT terminals on the rear panel. The level increases as the controls are turned to the right. The inner control is for the left channel and the outer control for the right channel.

⑬ FL METER

This indicates the input level during recording and the output level during playback.
By operating the METER switches, it can be made to function as a peak meter, or as a (AVERAGE) meter.
The input signal level is indicated when the MONITOR switch has been depressed, and the playback output level is indicated when the MONITOR switch has been released.

⑭ DIMMER SWITCH

Use this switch to select the brightness of the level meters and tape counter.

NORMAL (■): When using the tape deck in daylight or other bright locations.
DIMMER (▬): At night or in dark locations when the existing brightness is too high.

⑮ METER SWITCH

AVERAGE (■): When the switch is released to AVERAGE, the meter functions as an ordinary level meter.
PEAK (▬): When this switch is depressed to PEAK, the meter functions as a peak meter.

⑯ PINCH ROLLER

⑰ MONITOR SWITCH

This switch is used to select the output signal which is made available at the output and headphone jacks. Since the indication of the level meter can be switched over at the same time, always make it a rule to depress this switch when adjusting the recording level (set to SOURCE position).

For playback: Set the switch to the released (TAPE) position. If it is set to the depressed (SOURCE) position, you will not be able to hear the playback sound.

For recording: Set the switch to the released (TAPE) position and you will then be able to hear the signals (playback sound) immediately after you have recorded the sound source.
If the switch is set to the depressed (SOURCE) position, you will be able to hear the signals (recording input) immediately before you record the sound source.

⑱ BIAS SWITCH

This selects the recording bias current according to the type of tape used for recording. Push for 2; released for 1.

1: For standard tapes.
2: For low noise and high output tapes.

⑲ EQ SWITCH

This selects the recording equalization characteristics according to the type of tape used. Push for 2; released for 1.

1: For standard tapes.
2: For low noise and high output tapes.

⑳ REC MODE SWITCHES (L, R)

Make absolutely sure that these switches are depressed and set to ON for recording.

L: For recording on the left (L) channel.
R: For recording on the right (R) channel.

Depress both switches (L and R) for stereo recording. Do not select these switches during actual recording.

㉑ REEL SIZE SELECTOR

Set this selector to the corresponding to the size (diameter) of the reel being used.

o mark: Set the switch to the depressed position when using a 7-inch (17cm) reel.
O mark: Set the switch to the released position when using a 10-inch (26cm) reel.

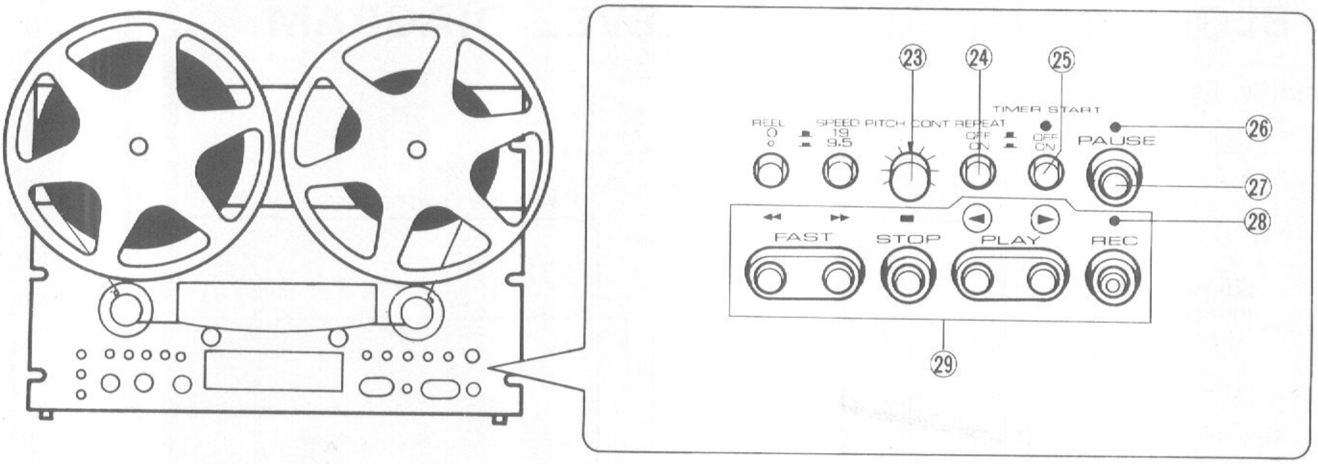
NOTES:

- *Always use two reels of the same size.*
- *Do not use reels with a diameter of 5 inches (12cm) or less.*

㉒ SPEED SWITCH

This switch selects the tape speed. Push for a 9.5cm/s speed; release for a 19cm/s speed (released position).

■ 19cm/s: Used for recording music programs, etc.
▬ 9.5cm/s: Used for recording lengthy conversations, etc.



㉓ PITCH CONTROL KNOB

You can use this to make the tape travel 6% faster or slower than the normal tape speed during playback. When set to the central position (▼), the tape speed is 19cm/s or 9.5cm/s (standard values). Turn the control to the left and the speed drops and the musical steps are lowered; conversely, turn it to the right, and the speed rises and the musical steps are raised. This control cannot be used during recording.

㉔ REPEAT BUTTON

This button allows you to reverse the tape forward for reverse playback automatically. If you remember to work the tape counter and REPEAT button, then the tape will automatically be reversed and the tape deck will be set to forward playback when the "0000" display on the tape counter gives way to "9999" during reverse playback. Be sure to release this button when you do not require repeated playback.

㉕ TIMER START SWITCH

When unattended recording or wake-up playing back a tape with the help of a timer, depress this switch and then select the REC MODE switches as in the table below. When this switch is set to ON, the green indicator will come on. The TIMER START switch works only when the tape is traveling in a forward direction.

Application	TIMER START switch	REC MODE switch
For unattended recording	Depress to ON.	Depress L and R to ON.
For wake-up playback	Depress to ON.	Release L and R to OFF.

㉖ PAUSE INDICATOR

This green lamp lights up when the PAUSE button is pressed to indicate the tape has stopped temporarily.

㉗ PAUSE BUTTON

Depress this button to stop the tape temporarily during recording and playback. Once the button is depressed, the green indicator lights up to indicate that the deck is now set to the pause mode. Depress the button again to allow the tape to resume traveling. This button does not work in the fast forward and rewind modes.

When the fast forward (▶▶) or rewind (◀◀) button is depressed from the tape playback (forward or reverse) pause mode, the pause function is released and the tape is set to the fast forward or the rewind mode.
The pause mode can also be released with the STOP button.

㉘ RECORDING INDICATOR (REC)

This red lamp lights up during recording. Check that it has lit up before recording.

㉙ FUNCTION BUTTONS

◀◀ (REW): Depress this button to rewind the tape. (The tape will travel at high speed from right to left.)

▶▶ (FF): Depress this button to send the tape forward at top speed. (The tape will travel from left to right).

PLAY: Depress the forward (▶) or reverse (◀) PLAY button to play back (forward playback or reverse playback) or record the tape. When this button is depressed, the lamp lights up to indicate the direction of the tape.

- (▶) Forward playback: The tape travels from left to right.
- (◀) Reverse playback: The tape travels from right to left.

REC: Depress the REC button and the forward (▶) PLAY button for tape recordings (and the tape travels from left to right).
If the reverse (◀) PLAY button is depressed during recording while the tape is traveling in the forward direction, the recording mode will be released and the deck is set to the reverse playback mode.

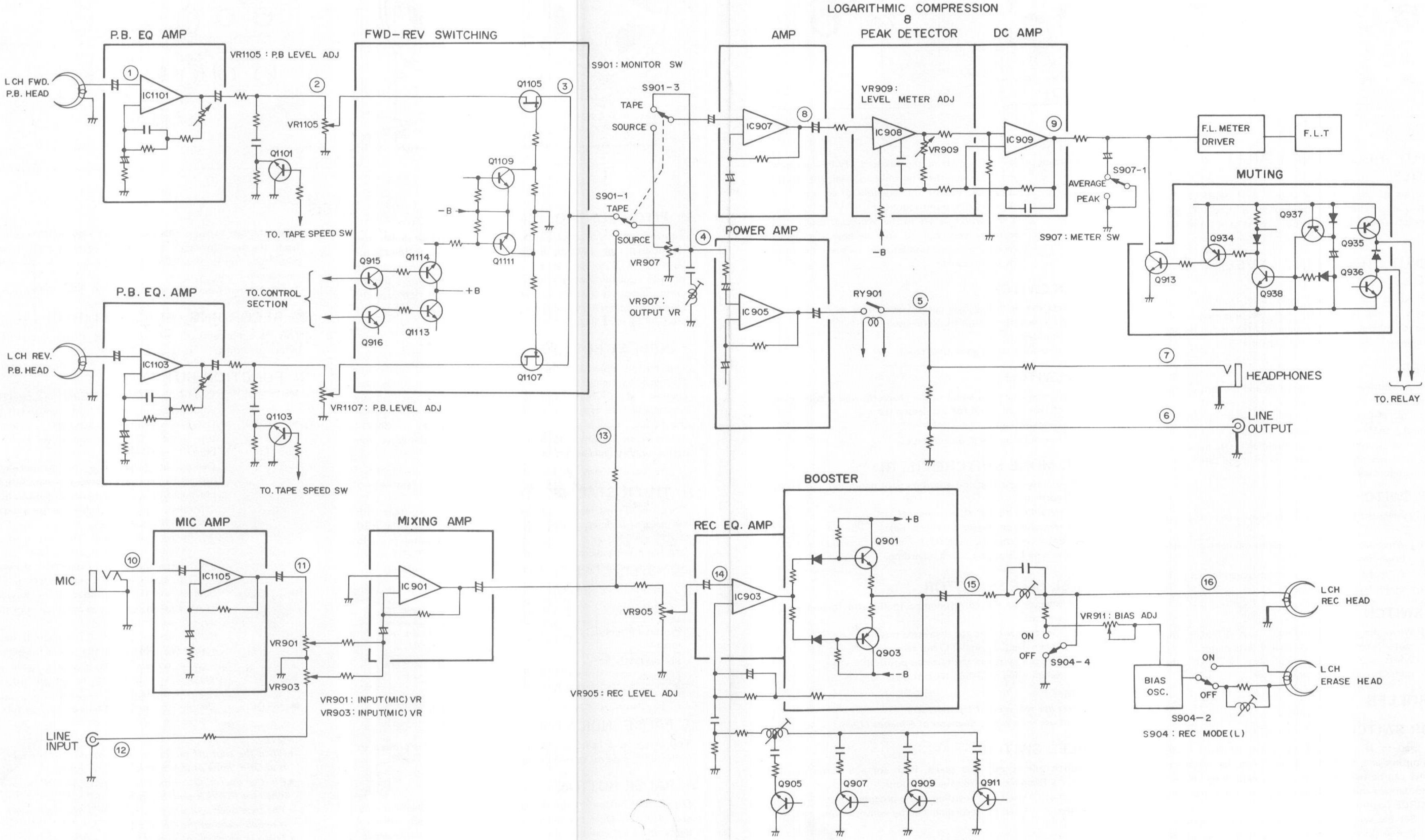
■ (STOP): Depress this button to stop the tape run and to release the operating buttons.

NOTE:

- *When the shut-off switch which is coupled to the tension arm is at OFF, none of the function button indicators come on.*
- *All the operating buttons are released (OFF) to stop mode when the POWER switch is turned OFF.*
- *The tape deck will be forward mode when the POWER switch is re-depressed to the ON position.*
- *There is no need to press the (■) stop button if you want to change over from one function to another.*

3. BLOCK DIAGRAM AND LEVEL DIAGRAM

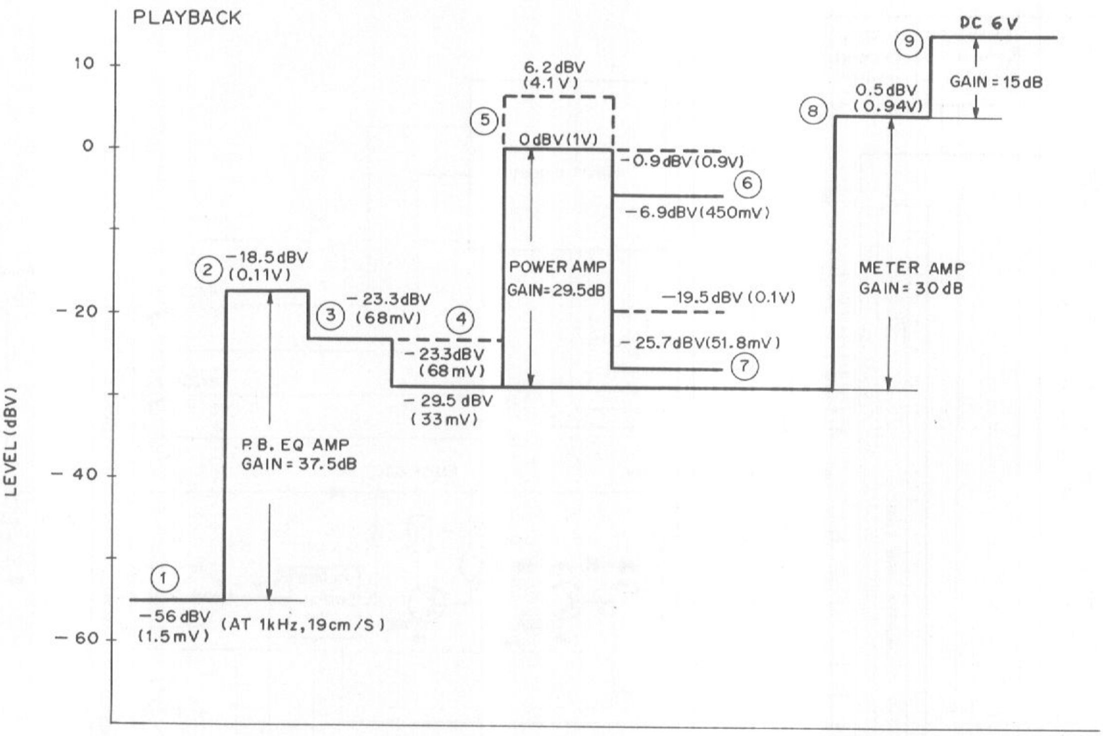
Amplifier Section



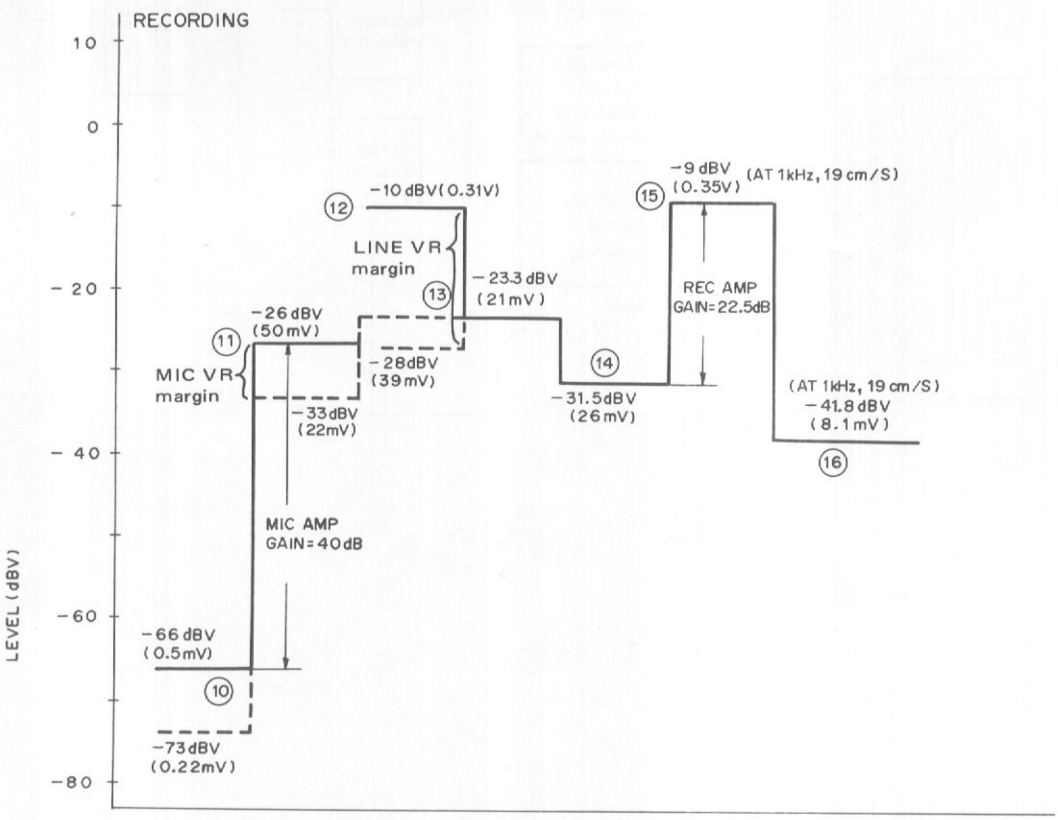
LEVEL DIAGRAM

NOTES:
- *0dBv = 1V*
- *Frequency: 1kHz*
- *The level measurement points are indicated on the block diagram.*

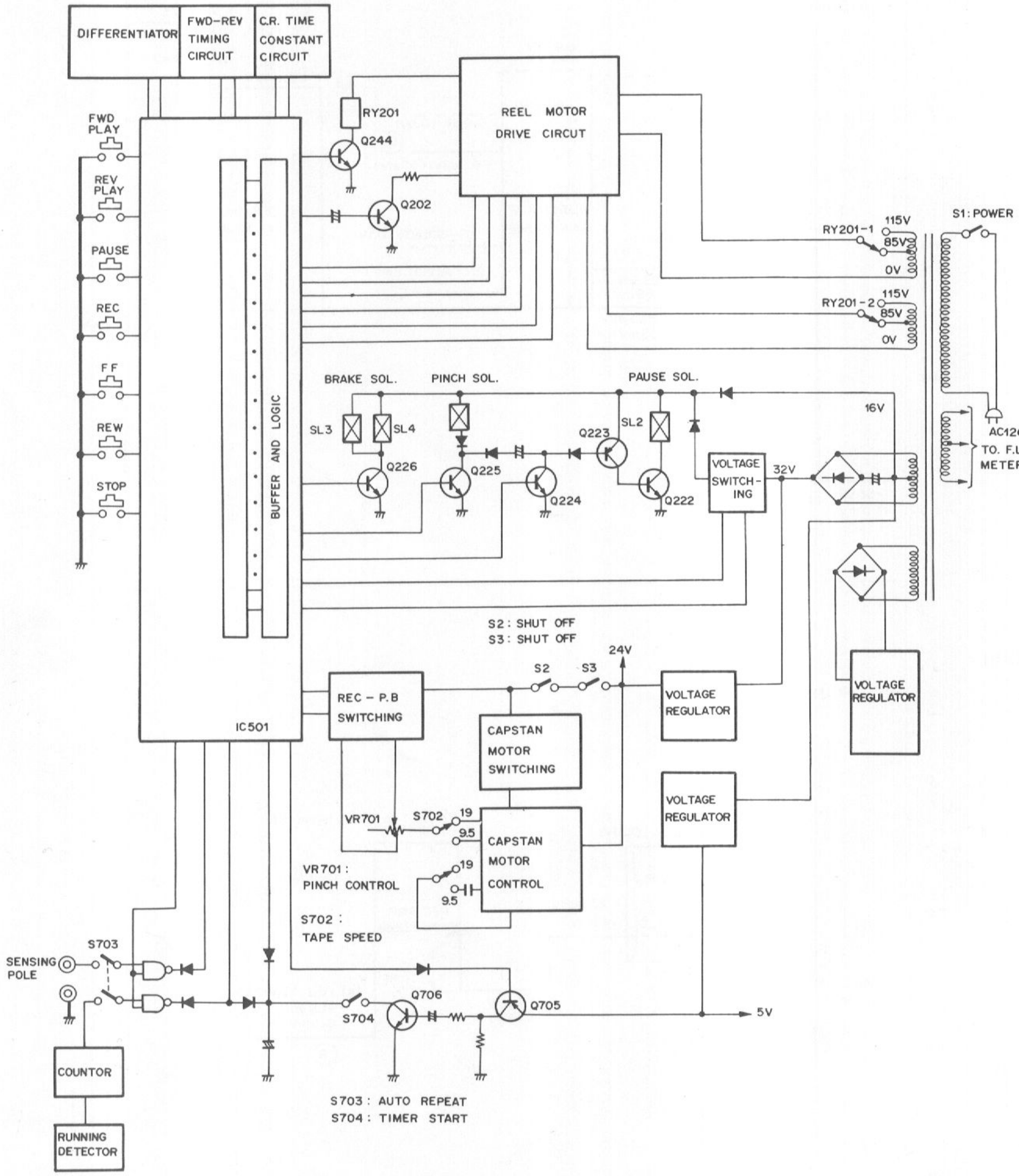
Playback



Recording



Control Section



4. DISASSEMBLY

Bonnet

Remove screws ❶

Front Panels

1. Remove knob A, B assembly, and the pitch control knob.
2. Remove screws ❷ to remove the upper front panel.
3. Remove screws ❸ and ❹ to remove the lower front panel.

Head Base

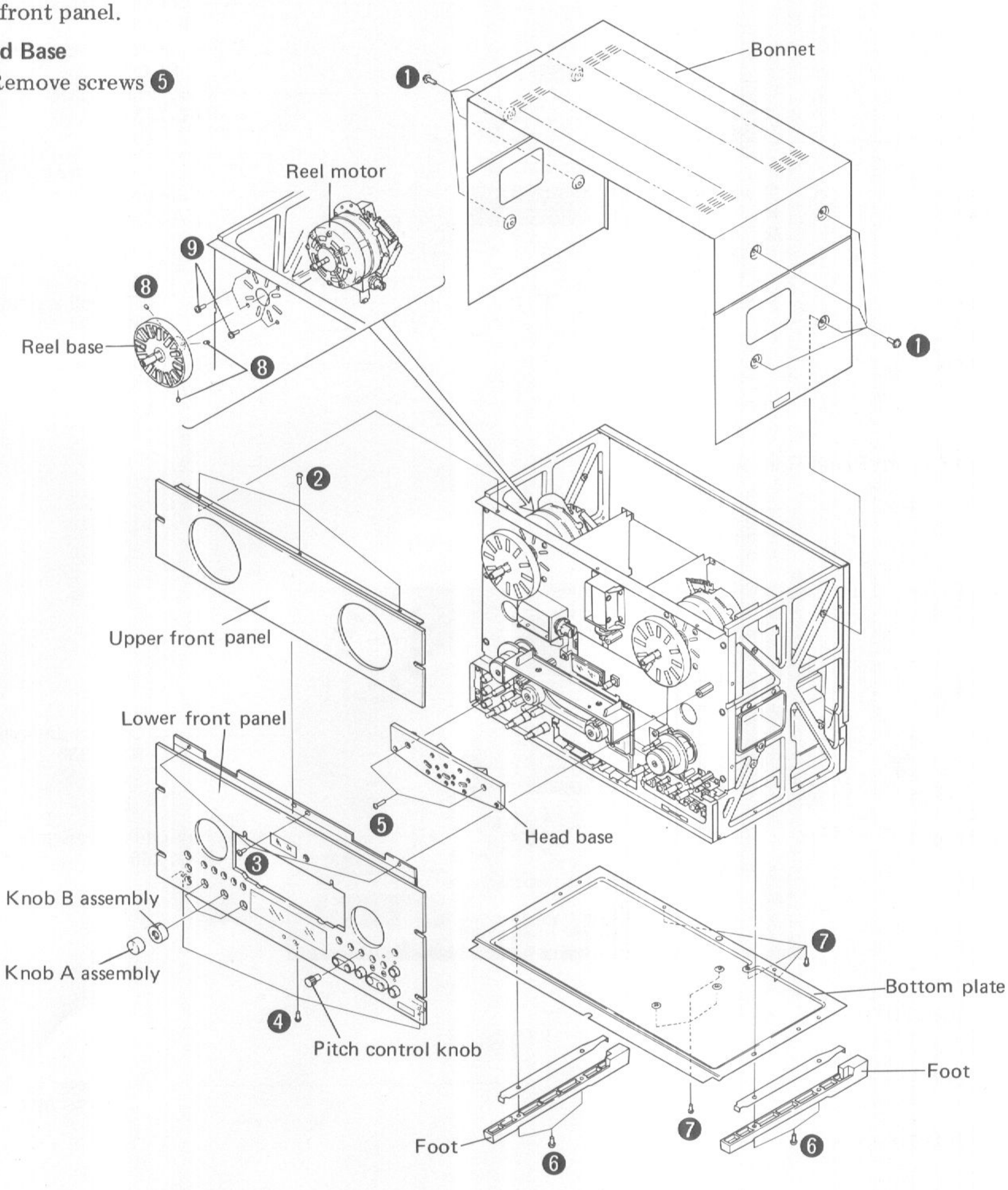
Remove screws ❺

Foot and Bottom Plate

1. Remove screws ❻ to remove the foot.
2. Remove screws ❼ to remove the bottom plate.

Reel Motor

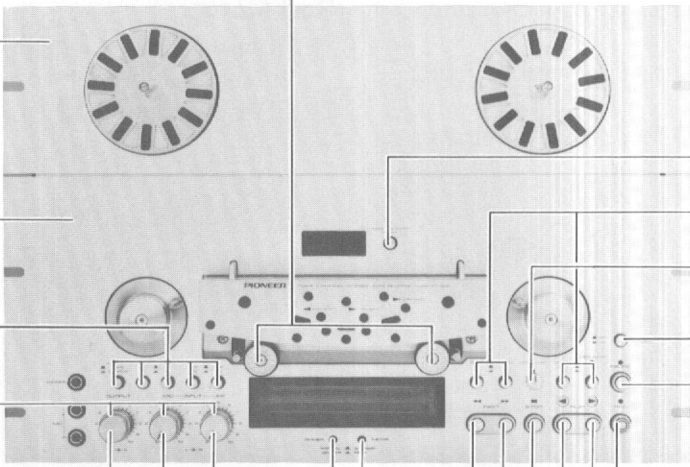
1. Remove the hexagonal setscrews ❽ with a hexagonal wrench to remove the reel base.
2. Remove screws ❾ to remove the reel motor.



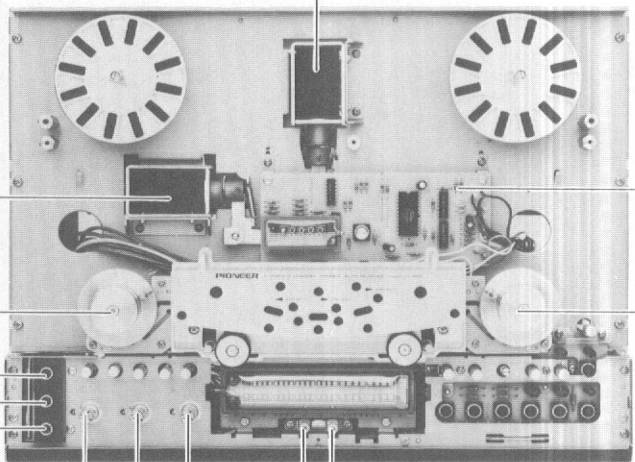
5. PARTS LOCATION

• *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*

Front Panel View

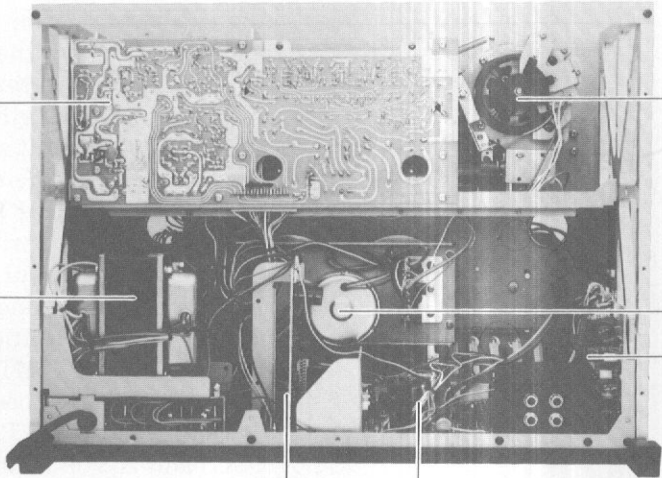


Front View with Front Panel Removed



Rear View with Rear Panel Removed

• *Parts without part number cannot be supplied.*



Control B assembly
RWG-105

⚠ Reel motor
RXM-060

⚠ Power transformer
RTT-178

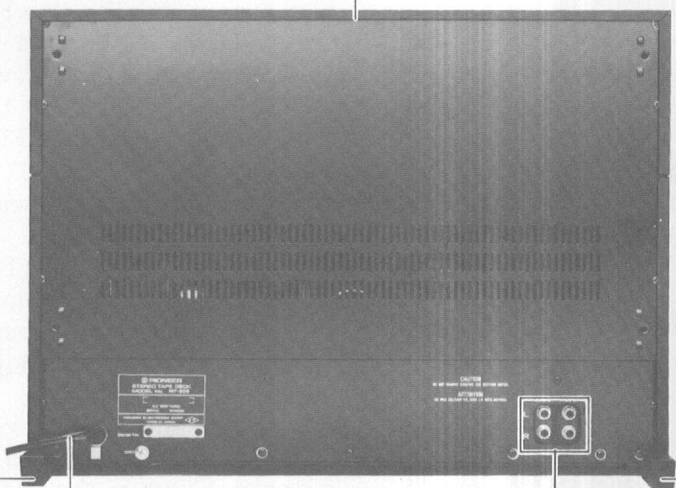
Capstan motor

Preamplifier assembly
RWF-088

Driver assembly
RWX-339

Mother assembly
RWX-340

Rear View



Bonnet
RNA-424

Foot R
REC-319

Foot L
REC-320

⚠ Power code
RDG-022

Terminal (OUTPUT, INPUT)
RKB-014

6. CIRCUIT DESCRIPTIONS

Refer to the block diagram on page 7 for an outline of the signal amplifier section circuit composition.

6.1 PLAYBACK CIRCUIT

1. In play mode (FWD) magnetic signals recorded on the tape are converted into electrical signals in the FWD playback head. These signals are then amplified and equalized in IC1101, and the IC output passed via equalizer elements (VR1101, R1115, C1118 and R1109) in a negative feedback loop for compensation of playback characteristics.
2. The different playback characteristics at different tape transport speeds are switched by Q1101. When the TAPE SPEED switch S702 is in the 9.5cm/s position, Q1101 will be turned off, and the high frequency time constant of the NFB loop (VR1101, R1115, C1118 and R1109) will be 90μs. When S702 is switched to the 19cm/s position, Q1101 is turned on for a high frequency time constant of 50μs.
3. The equalized playback signal is then passed via VR1105 – Q1105 (Q1105 described later) and the S901 MONITOR switch to the OUTPUT volume control VR907. This signal is finally passed to the power amplifier stage in IC905 before being applied to the LINE OUTPUT and HEADPHONES.
4. Part of the playback signal applied to VR907 is passed on to IC907 where it is amplified, and then on to IC908 where it is subject to logarithmic compression and peak level detection. The signal is further passed to a DC amplifier stage in IC909 and to the FL meter drive circuit used to average out the playback signal with peak levels detected by IC909, and opened and closed by the S907 METER switch. Q913 is the muting transistor employed when the power switch is turned on and off.

6.2 RECORDING CIRCUIT

1. The MIC input is first amplified by IC1105 and applied to the VR901 MIC level volume control. The LINE input is passed via R901 to the LINE volume control VR903. These signals are then applied to IC901 for mixing and inversion amplification. (With this inversion amplifier stage, the mixing process is free of any mutual interference from volume control operation. For example, when the MIC level volume control is moved while the LINE volume control remains fixed, there is no effect on the LINE input signal whatsoever).
2. This amplified recording signal is then applied to VR905 and IC903 where it is subject to further amplification and equalization before being applied to the recording head via the R935 constant current resistor and the C969, L903 bias trap. Furthermore, Q901 and Q903 at the IC903 output serve as the booster amplifier used to drive the recording head.
3. The signal amplified by Q901 is passed via the S901 MONITOR switch to the VR907 OUTPUT volume control. Then like the playback signal, this recording signal is passed to the IC905 power amplifier prior to being applied to the LINE OUTPUT and HEADPHONES.
4. Again like the playback signal, the signal from the center tap of VR907 is passed via IC907, IC908 and IC909 to the FL meter drive circuit.
5. Hence, in the RT-909, line output and headphones output levels may be both controlled by the OUTPUT volume control. When S901 is in the TAPE position, the line output and headphones output levels are coupled to the FL meter, while in the SOURCE position, the FL meter display is fixed irregardless of the OUTPUT volume control position.

6.3 OSCILLATOR CIRCUIT

The RT-909 has been equipped with a constant voltage type oscillator in order to ensure greater bias current stability (see Fig. 6-1).

1. When the IC506 (1/4 – 4) in the control stage (control A ass'y) is switched to low (L) level, Q501 and Q918 are both turned on. If either (or both) of the REC MODE switches S904 and S905 are on, Q917 will also be turned on, resulting in the application of B+ (15V) to the bias oscillator.
2. However, since B– (15V) is normally applied to the oscillator circuit, the oscillator output only appears after a passage of time determined by the R1009/C975 time constant when B+ (15V) is applied.
3. Hence, the output voltage is controlled by Q912 – Q920 – Q919 depending on the difference between the feedback voltage from the C979, R1015, D907, R1013, R1011 and VR913 feedback circuit, and the ZD901 reference voltage, thereby achieving a constant voltage.
4. Once Q917 is turned on, B+ (15V) is applied to Q502 via D921 and R537, thereby turning this transistor on to light up the REC indicator lamp LED601. The Q502 transistor is used to prevent the LED lamp lighting up by mistake

when difference occur upon the rise and fall in the operational control power line B (5V) and signal power line B+ (15V).

6.4 FWD – REV PLAYBACK SIGNAL SWITCHING CIRCUIT

See Fig. 6-2.

1. During FWD play mode, IC505 (3/4) is switched to H level, so Q915 is turned on, and the corresponding current subjected to impedance conversion at Q1114. Q1111 is thereby turned on, and Q1107 turned off.
2. With Q1111 on and Q1107 off, the REV playback amplifier signal is blocked. And since IC505 (4/4) is switched to L level, Q1109 will be turned off, and Q1105 turned on (due to the zero gate bias), resulting in the FWD playback amplifier signal being passed via Q1105 to the MONITOR switch. During either stop or rewind modes, IC505 (3/4), (4/4) are switched to H level, resulting in Q1105 and Q1107 both being turned off for playback muting.
3. When switching from FWD to REV playback, IC505 (3/4) is switched from H to L level, while IC505 (4/4) is switched from L to H level, resulting in a charge current from the Q1113 emitter being applied to C1147 and C1148, and Q1109 and Q1111 being turned on while Q1105 and Q1107 are turned off. The signals from the FWD and REV playback amplifiers are thereby muted.

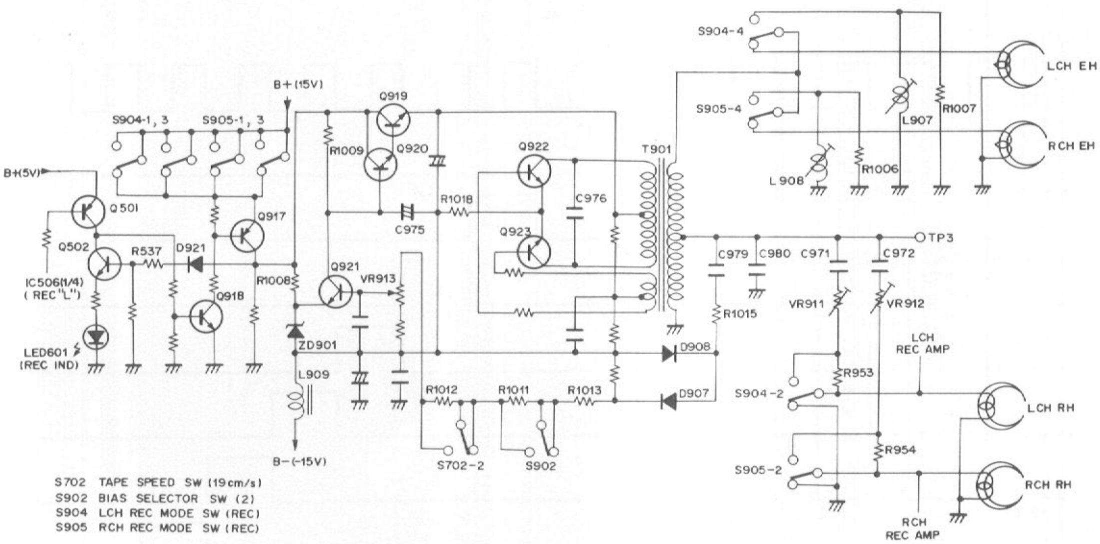


Fig. 6-1 Oscillator circuit

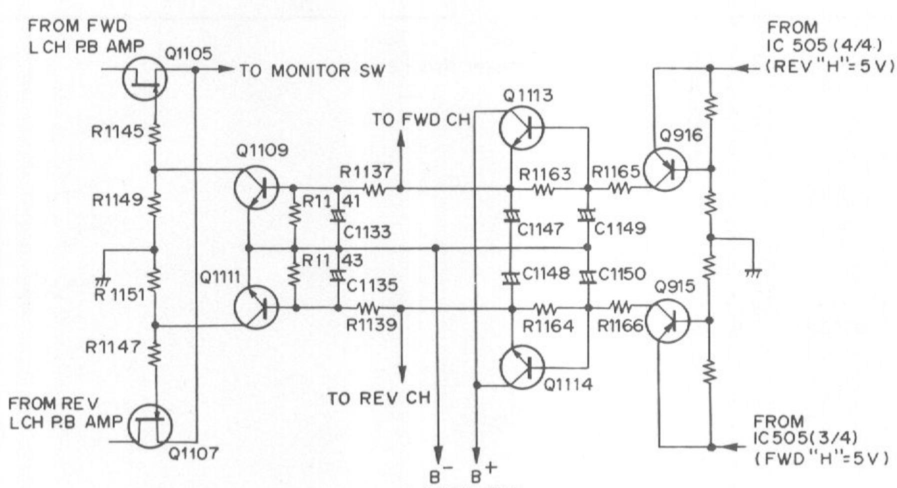


Fig. 6-2 FWD-REW Playback signal switch circuit

6.5 FL METER DRIVE CIRCUIT

Refer to the drive ass'y circuit on page 67.

1. The FL meter employed in the RT-909 is a dynamic lighting type. Clock pulses (approx. 3kHz) prepared by the IC801 (1/6 — 3/6) multivibrator are subsequently divided by 8 in the IC801 octonary Johnson counter.
2. These divided clock pulses are then transferred as output signals from the T0 ~ T7 output terminals (see Fig. 6-3), and used in the generation of time shared reference voltages at points (A), (B), (C) and (D). These reference voltages are then compared with the IC909 output signals (level meter drive analog signals) at IC804 (IC805 for the right channel) where the analog/digital conversion is performed. The FL meter segments (anode) are then driven via the open-drain type high-resistivity IC806 and IC807. And when the FL meter grid is driven by means of the 6 output pulses T1 — T4, T5 — T7 (and thereby switching both segments and grid to H level), the signal level is also activated when the segments are illuminated.
3. The relation between the reference voltage pulses and the grid pulses is outlined in Fig. 6-0. The reference voltages prepared by the T1 — T6 pulses synchronized with the grid drive pulses, vary in regular order from high to low voltage levels. The reason for not applying the T0 and T4 pulses to the grid is to eliminate segment blurring due to delay of the analog/digital converted signals.

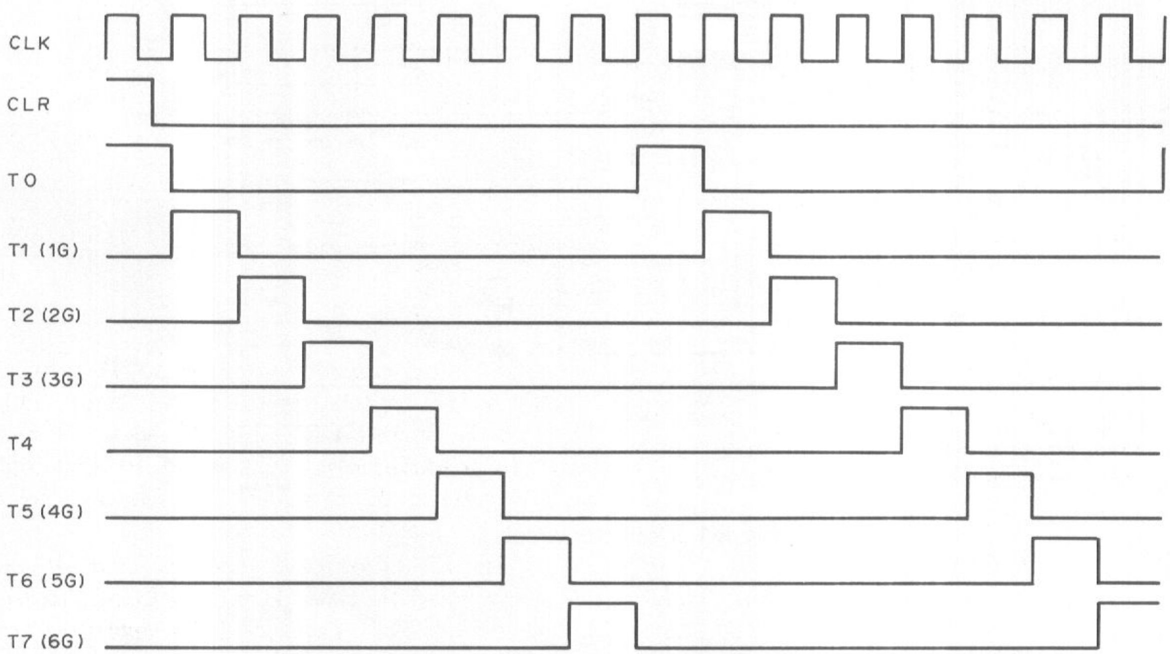


Fig. 6-3 F.L meter drive circuit

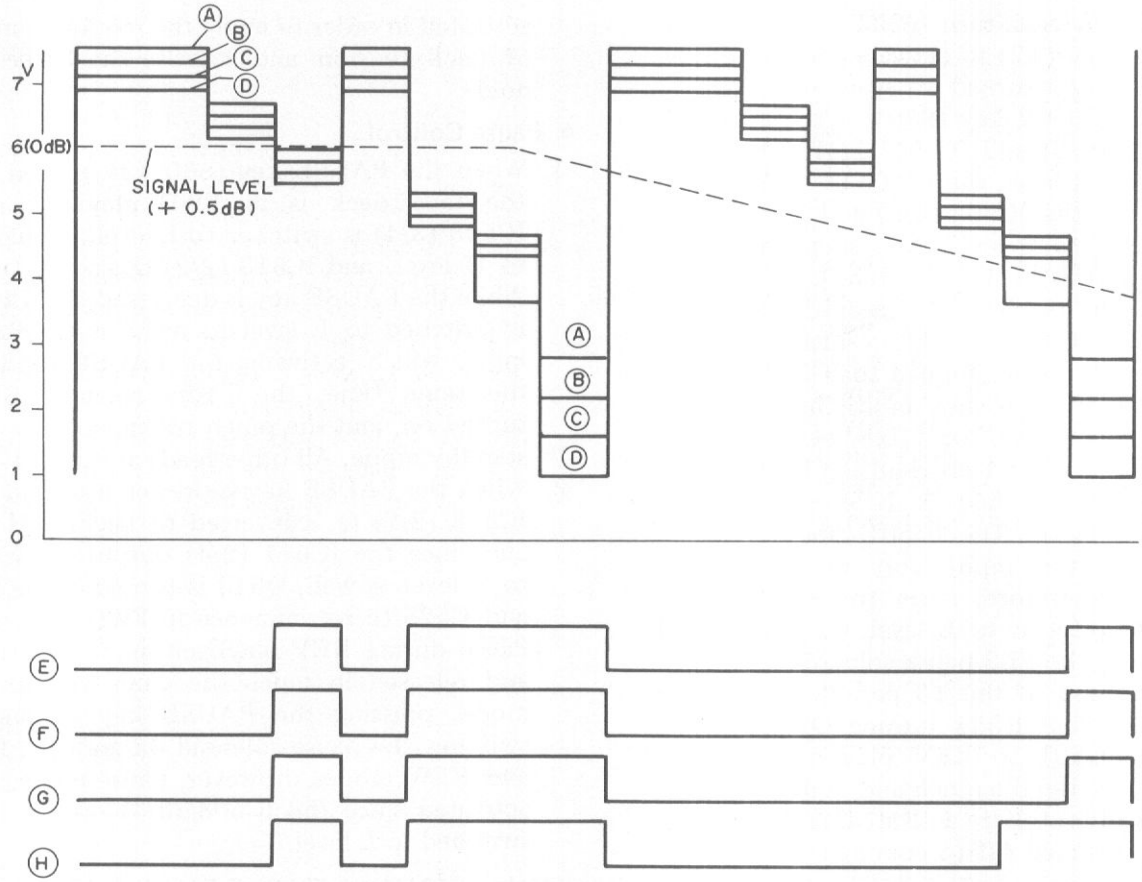


Fig. 6-4 F.L meter drive circuit

6.6 CONTROL CIRCUITS

See the block diagram on page 10 for an outline of the control circuits. Also refer to the general circuit diagram on page 46 for the following descriptions.

■ When the Power Switch is Turned On

When the S1 power switch is turned on, IC501 is locked in stop mode during the T1 period (time constant formed by C520 connected to pin 5 of IC501, and a resistor located inside the IC), irregardless of the on/off position of the IC501 shut-off switches S2 and S3. If S2 and S3 happen to be on, the capstan motor will rotate in the FWD direction.

■ Play Mode

1. When the FWD PLAY key (S603) is pressed while the capstan motor is rotating in the FWD direction, IC502 (1/6) is switched from L to H level. The IC504 (1/4), (2/4) flip-flop output (pin 4 of IC504 2/4) is thus switched to H level, and since the IC504 (3/4), (4/4) flip-flop output (pin 10 of IC504 4/4) is also switched to H level. The IC505 (4/4) NAND output will be switched to L level, and the IC502 (4/6) inversion output switched to H level. If the PAUSE switch (S601) is off, the IC511 (2/4) AND output will be switched to H level, and then differentiated by the R535/C525 time constant to drive the Q513, and be finally applied to pin 8 of IC501.
2. The IC501 outputs (pins 17 and 18) are thus switched to L level, and the IC508 (5/6), (6/6) and IC509 (2/6), (3/6) inversion outputs switched to H level. Q241 is then turned on by the IC508 (5/6) output, resulting in the activation of the reel motor drive circuit to start up the left and right reel motors. (The reel motor drive circuit is described in a later section on page 19).
The IC509 (2/6) output is applied to IC511 (3/4), (4/4), resulting in Q239 or Q243 being turned on by the FWD or REV output in order to obtain the required amount of torque for the appropriate reel motor. The IC508 (6/6) output is applied to Q226, and once this transistor is turned on the left and right brake solenoids (SL3/SL4) are activated. The IC509 (3/6) output is applied to Q225, thereby turning the transistor on to activate the SL1 pinch

solenoid, and also turn Q222 on for a fixed period of time (T2) to activate the pause solenoid SL2. SL2 is turned off again after T2.

3. If the REV PLAY key (S604) is then pressed, the IC502 (2/6) and IC504 (1/4) outputs are switched to H level, the IC505 (3/4) output to L level, and the IC502 (5/6) and IC511 (1/4) outputs also to H level. And since the IC502 (5/6) output is switched from L to H level, Q507 will be turned on in accordance to the R522, C516 time constant, resulting in a differential pulse being applied to IC513 (1/2) R to activate the one-shot multivibrator. Since $\overline{Q}$ remains at H level for a fixed period of time (T3), Q509 is turned on resulting in the R534 output being switched to L level and IC505 also becoming L. The IC501 input therefore becomes a stop input only during the T3 period. Furthermore, since the IC507 (2/4) output is switched to L level, Q520 is turned on and only the SL2 pause solenoid is activated. At the end of the T3 period, a voltage is generated across R534 turning Q512 on and switching IC501 to REV play mode. As in FWD play mode, the pinch and brake solenoids and the reel motor are activated, and the pause solenoid switched off to commence REV play mode.
4. To reverse the capstan motor, Q208 and Q209 are turned on by the IC504 (1/4), (2/4) output, thereby determining the FWD ↔ REW direction. For example, switching from FWD to REV involves the IC504 (1/4) output being switched to H level, and Q209, Q212 and Q211 being turned on in that order to reverse the direction. For switching from REV to FWD, Q208, Q213 and Q210 are turned on in order.

■ FF and REW Modes

1. When the FF key (S606) is pressed, pin 22 of IC501 is switched to L level, resulting in the IC508 (2/6) and IC510 (2/3) outputs being switched to H level and Q244 being turned on. This activates the RY201 relay, thereby switching the supply voltage for the reel motors being increased from 85V to 115V. At the same time Q242 and Q237 are turned on, resulting in 115V being applied to the right reel motor. The required amount of back tension is applied to the left reel motor (by activation of Q238), and the brake solenoid is also activated.
2. When the REW key (S607) is pressed, Q244 is again turned on, and 115V applied to the reel motors. Q240 and Q238 are both turned on to apply 115V to the left motor, while Q237 is activated in order to apply the required amount of back tension and activate the brake solenoid.

■ Pause Control

1. When the PAUSE key (S601) is pressed while the tape deck is in FWD playback mode, IC503 (3/4) is switched to L level, IC502 (6/6) to H level, and IC513 (2/2) Q also to L level. While the PAUSE key is depressed, IC512 (1/4) is switched to L level to serve as the PAUSE input which activates the PAUSE mode. At the same time, the pause solenoid SL2 is turned on, and the pinch roller put into pause standby mode. All other loads are turned off.
2. When the PAUSE key is pressed a second time, IC513 (2/2) Q is inverted to become H level, and since the IC511 (2/4) output is switched to H level as well, Q513 is turned on via R535 and C525 to recommence in FWD play mode. Pause during REV playback mode is activated and released in much the same way. In stop mode, pressing the PAUSE key on and off switches the pause solenoid on and off. In FF and REW modes, however, pause mode is not activated since the IC503 (3/4) output is not switched to L level.

■ Solenoid Voltage Control Circuit

The solenoid activation current is increased during initial activation of the solenoid in order to ensure sufficient pull. After the solenoid has been activated, however, the current is reduced to avoid unnecessary heating of the solenoid.

1. The 15V rectified voltage is normally applied to all solenoids via D225. A high 32V rectified voltage is applied to the solenoids only for a fixed period of time T4 (Q219 switching time).
2. Normally, Q219 is turned off while Q218 is on. When playback mode is started from stop mode, for example, IC510 (3/3) is switched to H level, followed by Q217 being turned on according to the R554, C216 time constant. And since Q218 is turned off and Q219 turned on, the 32V voltage is applied.
3. Once C216 is charged up, Q217 is turned off and Q218 turned on, resulting in Q219 being turned off. The 32V supply is consequently stopped, and the 15V voltage supplied via D225.

- **Reel Motor Drive Circuit**

1. When the,tape deck is in playback mode, constant current outputs are obtained from Q229 and Q230. The levels of these outputs are sunk (reduced) by Q231 and Q232 to obtain suitable constant current output levels to be applied to Q237 and Q238 for control of the reel motor terminal voltage.
2. When the reel motor drive circuit bias transistor (Q241) is turned on, the reel motor is rotated. When Q241 is turned off, the reel motor stops. Q239 serves in supplying the back tension during REV playback mode, while Q243 is employed in supplying back tension during FWD playback mode.
3. During FF mode, Q229 and Q237 are turned on to apply maximum voltage to the reel motors. Q230 supplies a constant current output. When Q242 is turned on, optimum current is obtained and applied to Q238, resulting in back tension being applied to the reel motors. During REW mode, Q230 and Q229 are simply inverted. Subsequent operation is the same as in FF mode. Q223 and Q234 are turned on when the REEL size selector switch (S701) is in the LARGE position, and are used in adjusting take-up tension during FF and REW modes.

- **Timing**

When switching from FF or REW mode to playback (FWD or REV) mode, an electromagnetic brake is applied to the reel motors. Furthermore, once the reel base speed is reduced to a particular level, a mechanical brake is also applied (for a fixed period of time T5) prior to switching to playback mode. See Fig. 6-0 for the corresponding time chart. The electromagnetic brake FF/REW switching is controlled by IC501.

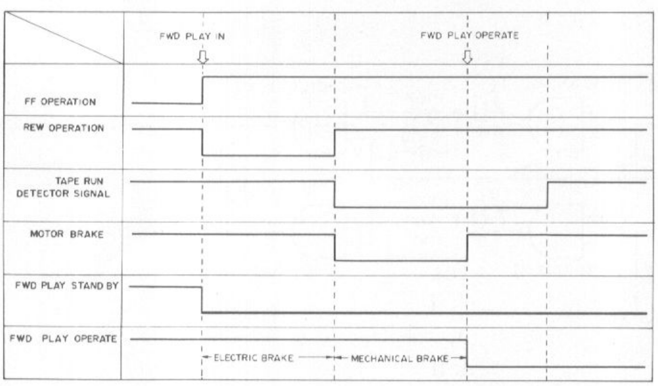


Fig. 6-5 Timing operation

- **Timer Start**

1. When the REC MODE switches S904 and S905 and the TIMER switch S704 are turned on, and the power switch turned on with the SHUT OFF switches (S2 and S3) both on, IC501 is locked in stop mode for a fixed period of time (T1). Q705 also stays off during the T1 period.
2. After the T1 period, Q706 is turned on following the C701, R710 time constant period, resulting in recording/playback mode being activated via D501 and D502. If the REC MODE switch is turned off, the deck may used for morning alarm purposes (playback mode). Note that even if the TIMER START switch has been turned on, normal operation will commence if the SHUT OFF switch is turned off or the STOP key is pressed on.

6.7 ELECTRONIC COUNTER (See Fig. 6-7)

1. The 2 photo-interrupters (PIR400 and PIR401) on the reel motors both generate 2 pulse output signals for every complete revolution of each motor. The signals from each photo-interrupter have been arranged to maintain a phase difference of 90°.
2. The output signals from the photo-interrupters are applied to the Schmitt circuit composed of the IC100 (1/6), (2/6) and IC100 (4/6), (5/6) inverting buffer amplifiers for formation of waveform signals.
3. These waveform signals are processed by IC100 and IC101, the waveforms at each of the designated points being shown in the time chart in Fig. 6-6.
4. When the up-input terminal of the up/down counter LSI (IC102) is switched from L to H level with the down-input terminal at H level, the counter will count up. When the up-input is at H level and the down-input terminal is switched from L to H level, the counter will count down. Therefore, when a waveform signal (processed as shown in Fig. 6-6) is applied to the up (pin 18) or down (pin 17) input terminals of IC102, the counter will automatically commence to count up or down accordingly.
5. The (G) and (H) signals applied to the up/down counter LSI (IC102) inputs are processed into signals used for numerical display (single digit, 7 segment dynamic display), and consequently passed to the outputs as digit (grid for FL) and segment (anode for FL) drive signals. These output signals are then passed through the high resistivity buffer amplifiers IC103 and IC104 (open drain type high resistivity ICs used as FL drive buffer amplifiers, and which have been

designed not to break down if a minus output voltage is applied following failure of the FL lamp to light up), thereby driving the FL counter.

6. When the up/down counter LSI (IC102) counts down, a bollow signal is generated during the 0.5 bit period just prior to the FL counter display switching from 0000 to 9999. This bollow signal is then applied to IC507 via the AUTO REPEAT switch (S703) in order to switch the tape transport direction from REV to FWD.
7. The IC100 (6/6) output (the signal resulting from inversion of the point B signal) is applied to Q204, and is used as the magnetic brake rotating frequency detector signal when the deck is switched from FF or REW mode to stop or playback (or recording) mode.
8. The R114 resistor is used in the preparation of clock pulses for the up/down counter LSI. In the RT-909, this resistor is 330kΩ, the oscillator frequency thus becoming 55kHz. The C105 capacitor prevents mis-operation of the counter when the power switch is turned on, this being achieved by resetting the counter and setting the FL display to 0000.

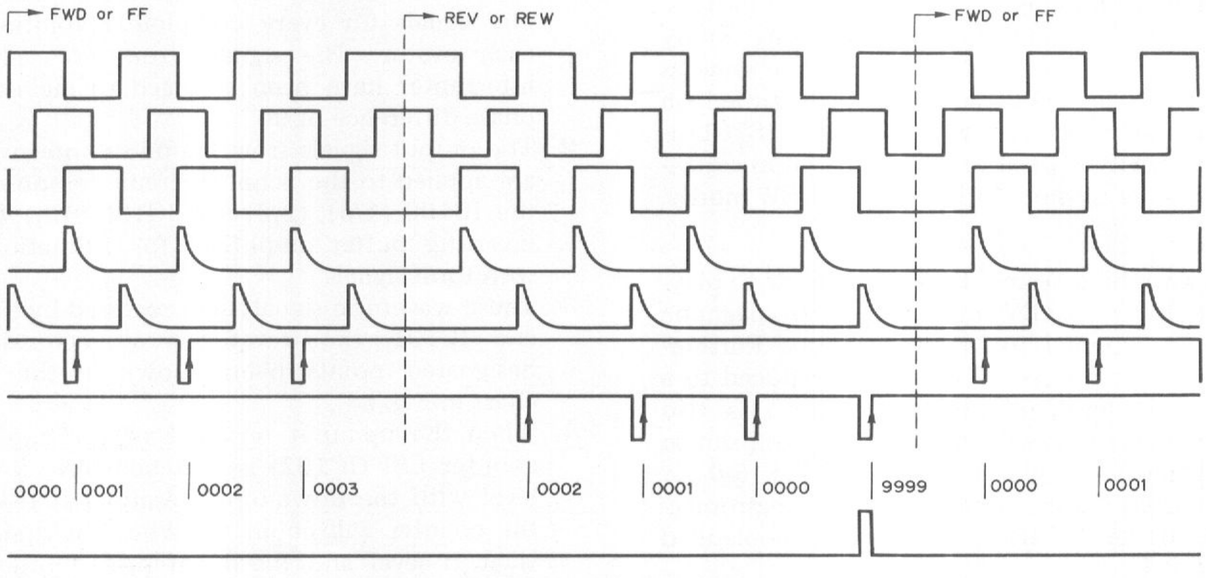


Fig. 6-6 Electronic counter

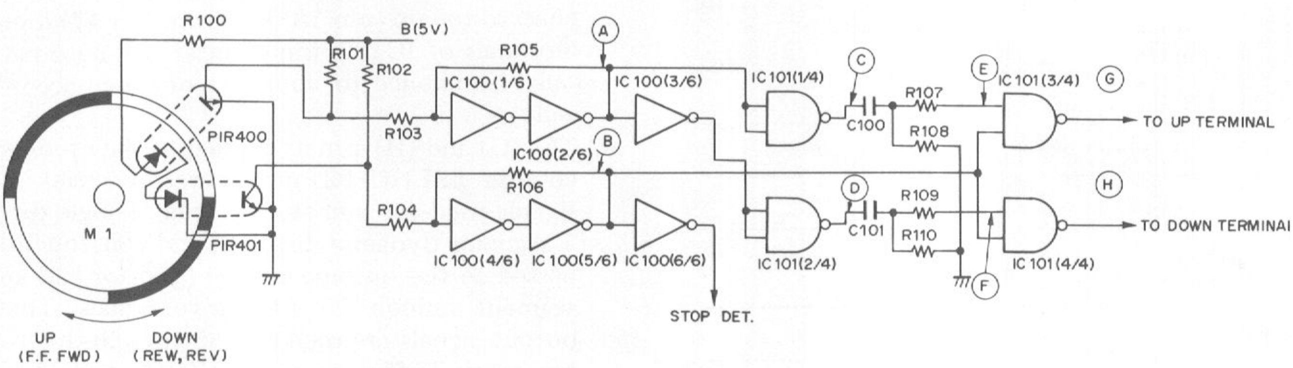


Fig. 6-7 F.L meter drive circuit

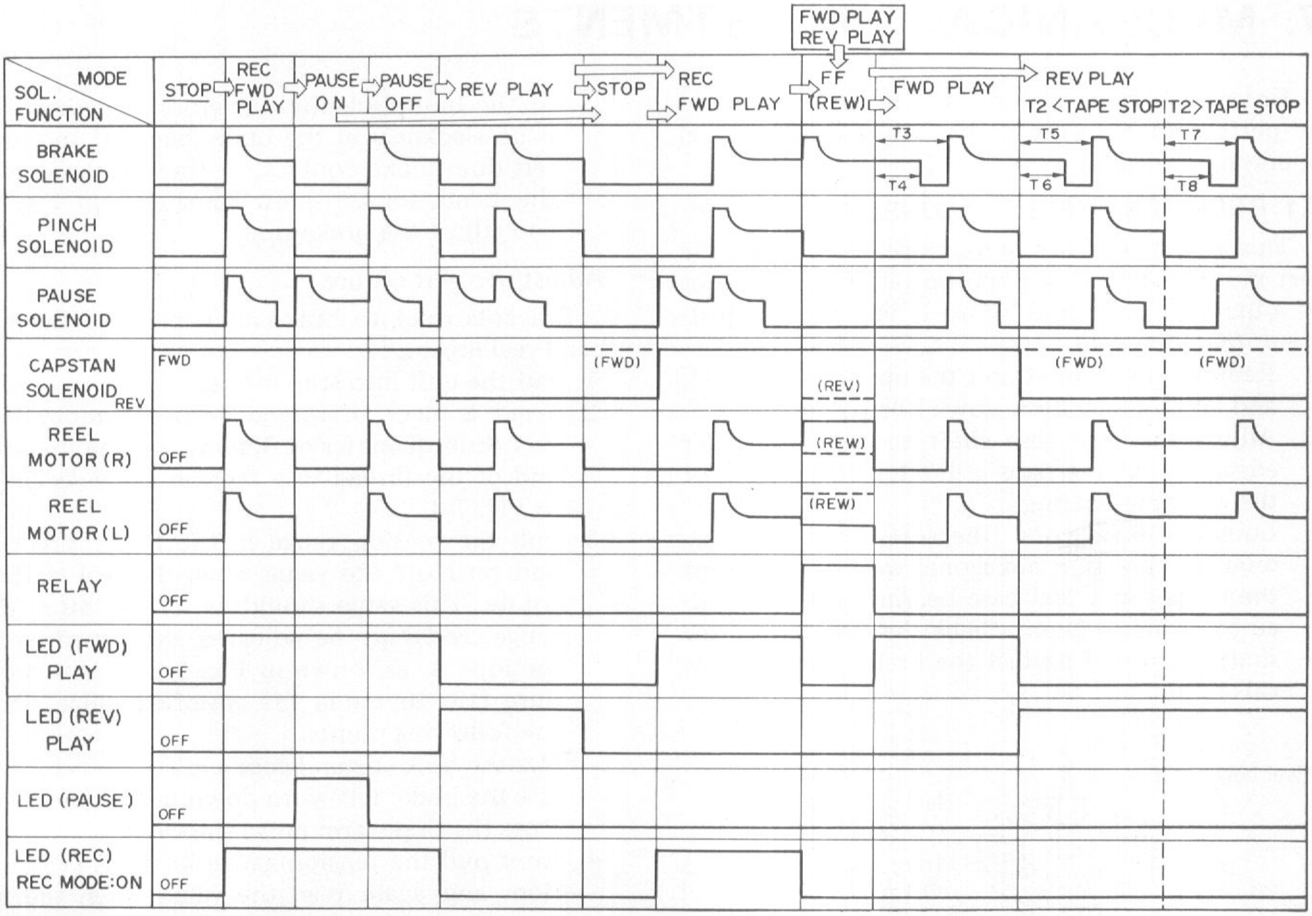
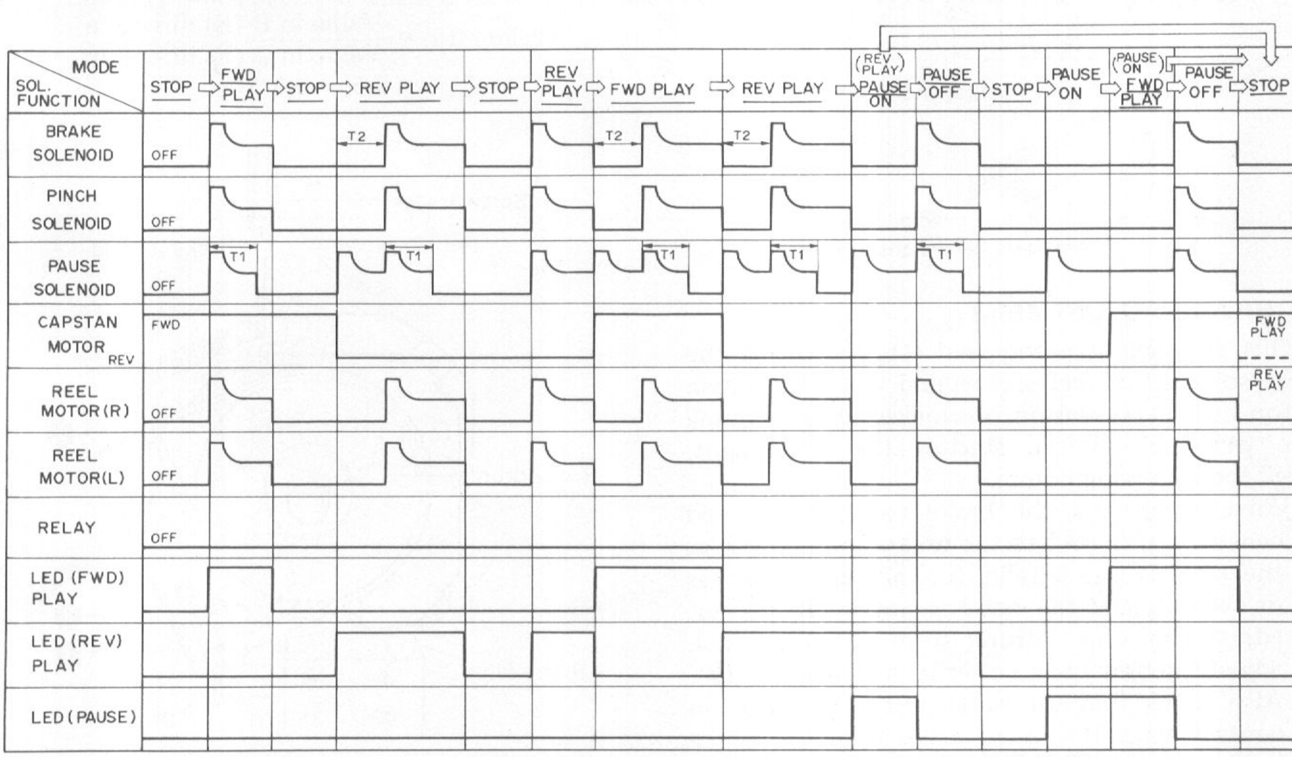


Fig. 6-7 Timing chart

T4,T6,T8 : SOL. BRAKE OFF
T3,T5,T7 : TAPE RUNNING STOP



T1 : PAUSE SOL. ON
T2 : FWD − REV

Fig. 6-8 Timing chart

7. MECHANICAL ADJUSTMENTS

Unless otherwise stated, all adjustments should be performed with the unit in the normal vertical operating position.

7.1 REEL BASE HEIGHT ADJUSTMENT

This adjustment is required after exchanging the reel motor, or when an appropriate height cannot be obtained by means of reel base shaft adjustment. (See Fig. 7-1).

1. Remove the bonnet and the upper front panel, and lay the tape deck down horizontally.
2. Adjust the reel base shaft so that the lower edge of the reel base is level with part A of the reel base bearing.
3. Loosen the setscrew (the screw with a hexagonal hole) with a hexagonal wrench to permit the chassis and reel base bearing to be separated by 1mm ±0.1mm. Check that the reel motor shaft is pressed against the brake drum side at this time.

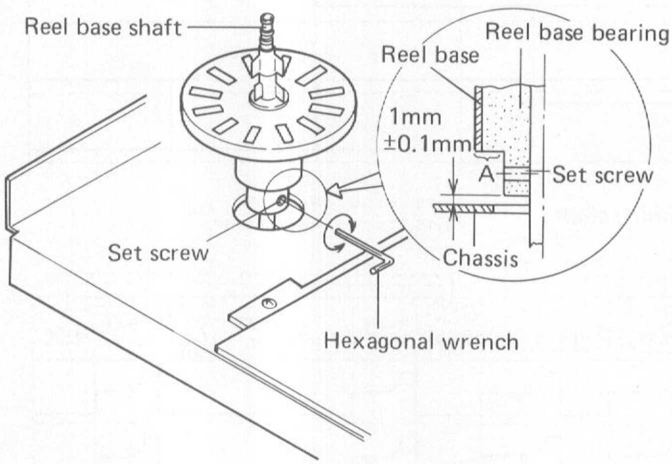


Fig. 7-1 Reel base height adjustment

7.2 BRAKE ADJUSTMENT

This adjustment is required after replacing the brake solenoid or reel motor, and when too much or too little tape tension is achieved after stopping tape transport. Before starting the adjustment, check the following points.

1. First check that the brake band is mounted centrally in respect to the brake drum, and that the band is also parallel (i.e. no tape slackness or twisting). If the band is not in the center, adjust the brake drum; if it is not parallel, adjust the brake band after loosening screw ❶.
2. Also check that the brake felt is no longer in contact with the brake drum after the brake has been released (by pressing the movable core of the brake solenoid inwards), and that there is no slackness in the brake band. If the brake felt does make contact, or there is slackness in the band, loosen screw ❷ shown in Fig. 7-2 and adjust the brake ring.

Adjustment Procedure

Brackets refer to brake adjustment of the right hand reel motor.

1. Put the unit into stop mode.
2. Wind a piece of thread onto an empty No.7 reel (hub diameter of 60mm), and tie the other end of the thread to a tension gauge as shown in Fig. 7-3.
3. Pull the tension gauge in the B (E) direction, and read off the value when the reel starts to rotate. This value should lie in the 350 — 450g range, and may be adjusted by screwdriver at section A as shown in Fig. 7-2. If this procedure fails to attain the specified range, check the following points.
   Has the brake drum become dirty?
   Has the brake felt worn down or become dirty?
   Does the brake arm move smoothly?
4. Next pull the tension gauge in the A (F) direction, and again read the value when the reel starts to rotate. This value and the previously measured value (in step 3) should be related according to the following expression:

$$\text{Brake ratio} = \frac{\text{Value in B (E) direction}}{\text{Value in A (F) direction}} = 2.5 - 3.5$$

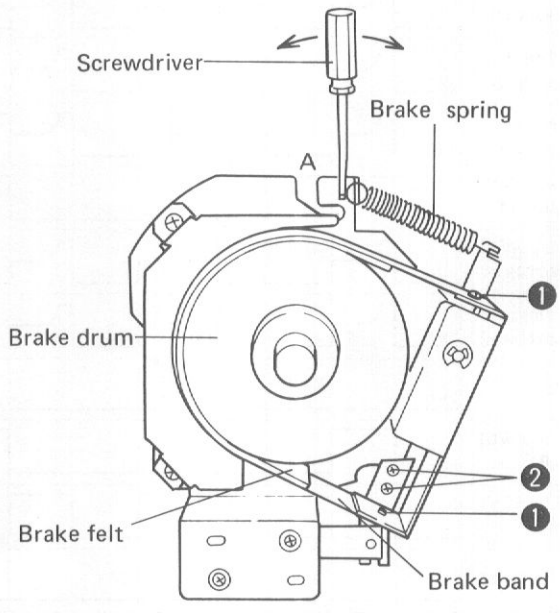


Fig. 7-2 Brake adjustment

7.3 TAKE-UP TORQUE AND BACK TENSION TORQUE ADJUSTMENTS

This adjustment is required following replacement of the reel motor, and when tape transport behaves abnormally.

Prior to Adjustment

1. Set both the R and L shut-off switches coupled to the tension arm to the ON position (and retain with rubber bands).
2. Since torque varies at temperatures considerably lower or higher than 20° C, also check the ambient temperature prior to commencement of the adjustment.

■ Take-up Torque Adjustment during FWD PLAY Mode

Brackets refer to take-up torque adjustment during REV PLAY mode.

1. Set the REEL switch to the 10 inch position (released position).
2. Start the unit in FWD PLAY (REV PLAY) mode, and "take-up" the tension gauge in the D (C) direction (tension gauge "fed in") as shown in Fig. 7-3. Adjust VR203 (VR204) in the Control B Assembly shown in Fig. 7-4 so that the tension gauge reads 240 − 260g. Take-up torque is increased by turning these VRs clockwise, and decreased by turning counter clockwise.
3. Next set the REEL switch to the 7 inch position (depressed position), and repeat the procedure described above in step 2. In this case, adjust the tension gauge value to 140 − 160g by means of VR201 (VR202).

■ Back Tension Torque Adjustment during FWD PLAY Mode

Brackets refer to back tension adjustment during REV PLAY mode.

1. Set the REEL switch to the 10 inch position (released position).
2. Put the unit into FWD PLAY (REV PLAY) mode. Pull the tension gauge in the B (E) direction as shown in Fig. 7-3, and read off the gauge value. Adjust the gauge reading to 95 − 105g by means of VR210 (VR209).

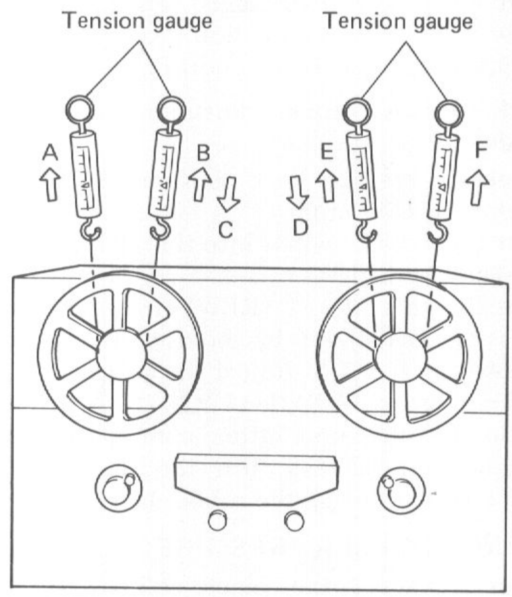


Fig. 7-3 Torque and tension adjustment

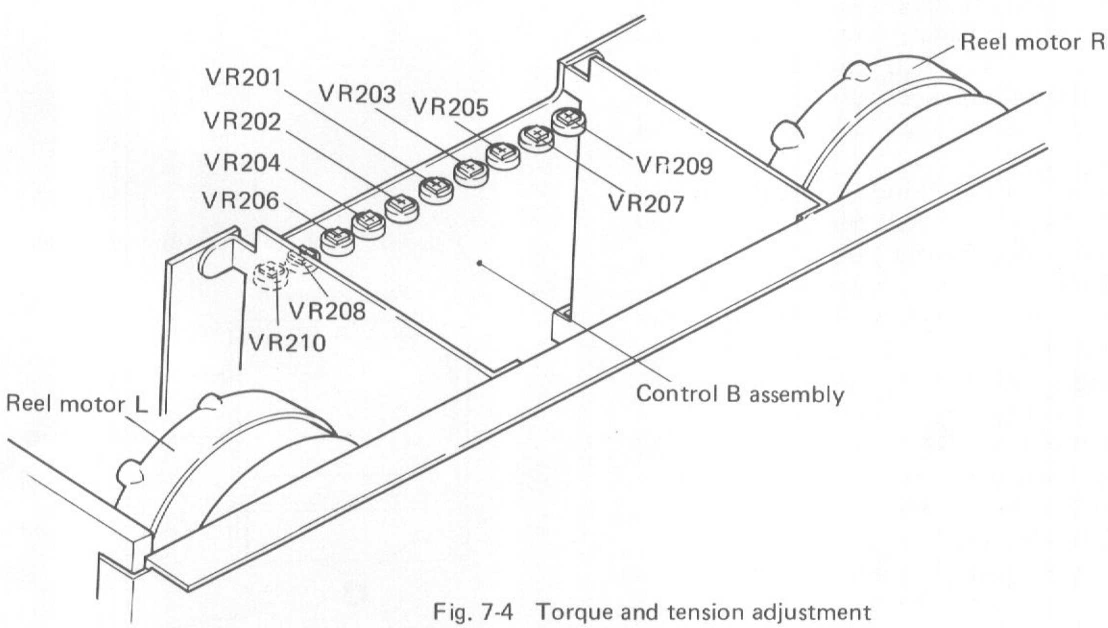


Fig. 7-4 Torque and tension adjustment

■ **Take-up Torque Adjustment during FF Mode**

Brackets refer to take-up torque adjustment for REW mode.

1. Set the REEL switch to the 7 inch position (depressed position).
2. Put the unit into FF mode, and have the tension gauge "taken up" (i.e. "fed in") in the D (C) direction as shown in Fig. 7-3. Adjust the tension gauge reading to 440 − 460g by VR205 (VR206). When switching the unit over to stop mode after completing the adjustment, set the shut-off switch to the OFF position (by removing the rubber bands). The motor will rotate in the reverse direction if the STOP button is pressed under these conditions.

■ **Back Tension Torque Adjustment during FF Mode**

Brackets refer to back tension torque adjustment during REW mode.

1. Put the REEL switch into the 10 inch position (released position).
2. Put the unit into FF (REW) mode, and pull the tension gauge out in the B (E) direction as shown in Fig. 7-3. Adjust the gauge readings to 60 − 65g by VR208 (VR207). Again, when stopping the unit after completion of the adjustment, always turn the shut-off switch OFF (by removing the rubber bands).

7.4 PINCH ROLLER PRESSURE ADJUSTMENT

After replacing the pinch solenoid or pinch rollers, or if the tape tends to slip during tape transport, adjust the pinch roller pressure as described below.

1. Push the movable core of the pinch solenoid upwards by hand. At the point when the pinch roller meets the capstan, loosen screw ❶ to obtain a gap of 0.5 to 0.8mm between the pinch solenoid and silencer rubber as shown in Fig. 7-5, and then adjust the position of the pinch solenoid.
2. Put the unit into PLAY mode, but without any tape in the reels, and pull the tension gauge straight down while gently pressing against the cap of the pinch roller by hand (see Fig. 7-6). Then check that the pinch roller disengages the capstan within the 1.2 − 1.4kg tension gauge reading range, and that the pinch roller ceases to rotate.
3. If the measured value lies outside this range, check the following points and then readjust.
   Has the pinch roller become dirty?
   Has the capstan become dirty?
   Has the pressure spring become ineffective?

7.5 PAUSE ADJUSTMENT

Pause adjustment is required following replacement of the pause solenoid, and when switching the pause switch on and off during recording and playback modes results in imperfect recording. Note, however, that the pinch roller pressure adjustment must be completed before commencing the pause adjustment.

1. Put the unit into PAUSE mode.
2. Loosen screw ❶ as shown in Fig. 7-7 to obtain a gap of 0.5 − 1mm between the capstan and pinch roller, and then adjust the mounting position of the pause solenoid.

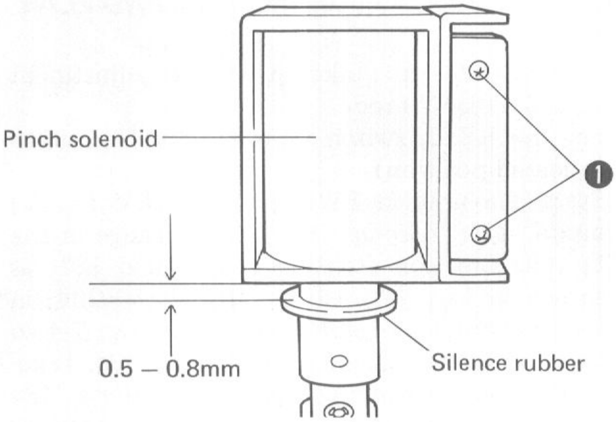


Fig. 7-5 Pinch roller pressure adjustment

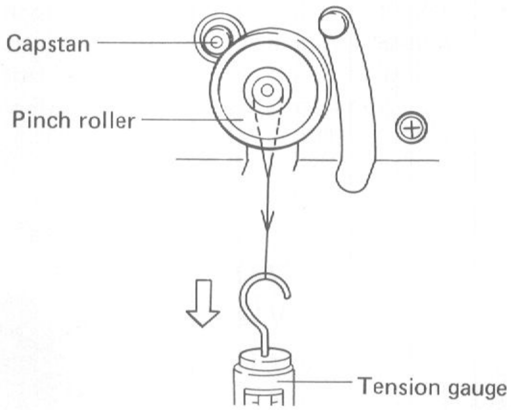


Fig. 7-6 Pinch roller pressure adjustment

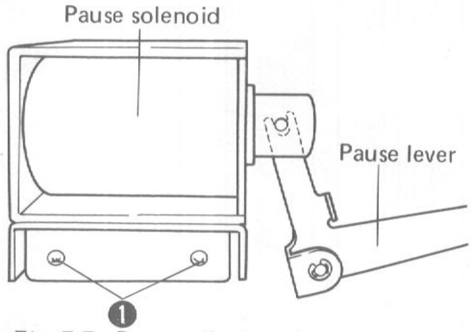


Fig. 7-7 Pause adjustment

7.6 TAPE SPEED ADJUSTMENT

Check the following points before commencing to adjust tape speed.

1. Set the pitch controls to their center click-stop positions.
2. Clean the capstan shaft and pinch rollers with anhydrous alcohol.
3. Use the same size reels on the supply and take-up sides.
4. Complete the take-up torque, back tension torque, and pinch roller pressure adjustments before commencing tape speed adjustment.

Adjustment Procedure

1. Set the SPEED switch to the 19 position (released position), and load the STD-101 test tape used in wow and flutter measurements. Play the tape until approximately equal amounts are on both reels.
2. Connect a frequency counter to the OUTPUT terminals, and start up the unit in PLAY mode. If the frequency counter fails to register 3,000Hz, adjust VR21 in the servo assembly as shown in Fig. 7-8.
3. Next set the SPEED switch to 9.5 (depressed position), and adjust VR22 (also shown in Fig. 7-8) to obtain a frequency counter reading of 1,500Hz.

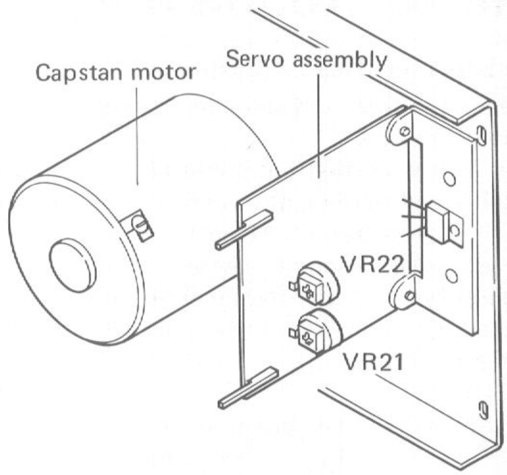


Fig. 7-8 Tape speed adjustment

8. HEAD ADJUSTMENTS

Before Beginning Head Adjustment

1. Clean the head and demagnetize the head with a head eraser.
2. The following test equipments are necessary in head adjustments and electrical adjustments.
   AC millivoltmeter (AC mV meter), DC voltmeter, Oscilloscope, Attenuator, Low frequency generator, Frequency counter
3. All adjustments should be performed with the designated test tape.
   STD-154 .... Play system adjustment tape
   STD-502 .....Record/play general adjustment tape
4. Position the switches as follows unless otherwise specified.
   SPEED switch 19
   BIAS switch 2
   EQ switch 1
   MONITOR switch ....TAPE
   METER switch ....PEAK
   DIMMER switch .... NORMAL
   OUTPUT volume .... Central position (Center click stop)

8.1 APPROXIMATE ADJUSTMENT

■ Height Adjustment

Adjust the following screws (see Fig. 8-2) to attain the dimensions as shown in Fig. 8-1 for each head during tape transport.

FWD playback head 1 2 3
Recording head 6 7 8
REV playback head 11 12 13
Erase head 16 17

Note:
If the Fig. 8-1 dimensions for the height of the erase head cannot be obtained, remove screws 18 and 19 and also the head base, loosen screws 16 and 17, and replace the E head spacer.
E head spacer C (0.1t) RNF-638
E head spacer D (0.2t) RNF-639

■ Tilt Adjustment

Adjust the following screws shown in Fig. 8-2 so that both the top and bottom of the head surface make uniform contact with the tape during tape transport.

FWD playback head 1 2
Recording head 6 7
REV playback head 11 12

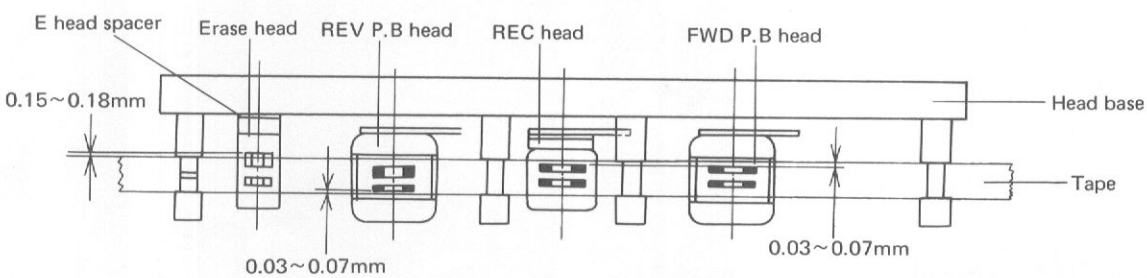


Fig. 8-1 Dimensions for the height of heads

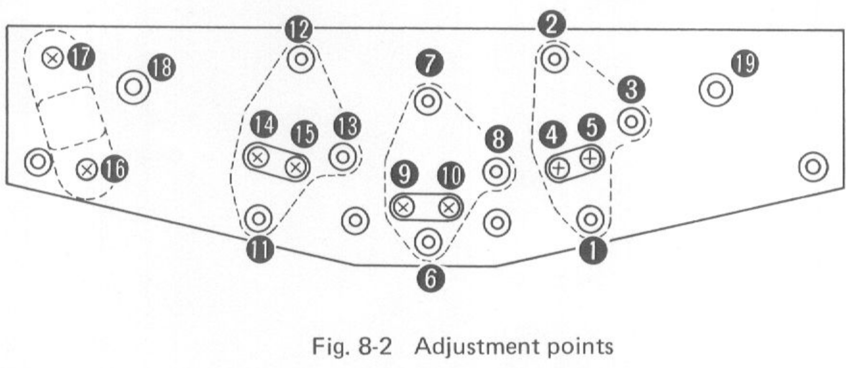


Fig. 8-2 Adjustment points

■ **Azimuth Adjustment**

Adjust the following screws shown in Fig. 8-2 so that the head gap is at an exact right angle to the direction of the tape.

FWD playback head .... ❸
Recording head .... ❽
REV playback head .... ⓭

8.2 PLAYBACK HEAD ADJUSTMENT

■ **FWD Playback Head Adjustment**

The brackets refer to adjustments for the REV playback head.

1. Connect an AC millivoltmeter to the OUTPUT terminals, and play the 15kHz section of the STD-154 test tape at 19cm/s in FWD (REV) mode.
2. Adjust screw ❸ (⓭) shown in Fig. 8-2 until the AC millivoltmeter gives a maximum reading. As long as there is no big difference in output between left and right channels, this may be disregarded.
3. Check that there is no change in output when the tape is pressed in slightly by hand (near the head gap) during tape transport. If the output does vary, loosen screws ❹ and ❺ (⓮ and ⓯) shown in Fig. 8-2, and move the head around in a horizontal plane (i.e. in either left or right directions) to find the most suitable position.

8.3 RECORDING HEAD ADJUSTMENT

This adjustment should always come after the playback head adjustments.

1. Connect an AC millivoltmeter to the OUTPUT terminals, and apply a 2kHz signal to the INPUT terminals (at any suitable signal level).
2. Record this 2kHz signal onto the STD-502 test tape, and play the recorded portion back. Adjust screws ❻, ❼ and ❽ as shown in Fig. 8-2 so as to obtain maximum output level in both left and right channels.
3. Next apply a 15kHz signal and record it onto the same test tape. During playback, fine adjust screw ❽ to again obtain maximum output level in both channels.
4. Then gently press against the tape (by finger) during transport at a spot near the head gap, and check for any change in output level. If the level does vary, loosen screws ❾ and ❿ as shown in Fig. 8-2, and move the head around in a horizontal plane (either to left or right) to find the optimum position.

9. ELECTRICAL ADJUSTMENTS

Proceed as Follows before Beginning Adjustment of the Electrical System.

1. Confirm that the mechanism section has been properly adjusted.
2. When making measurements, make the level 0dBv=1V, and connect a 50kΩ (47−52kΩ) dummy load to the OUTPUT terminals.
3. Furthermore, adjustment will also apply to both left and right channels unless otherwise indicated.
4. Always perform adjustment in the following sequence. If this sequence is not followed, complete adjustment will be impossible, and the set will not display its full performance.
   1. Supply Voltage Adjustment
   2. Playback Level Adjustment
   3. Playback Equalizer Adjustment
   4. Oscillator Voltage Adjustment
   5. Bias Trap and Dummy Coil Adjustment
   6. Level Meter 0dB Adjustment
   7. Recording Bias Adjustment
   8. Recording Level Adjustment
   9. Record/Play Frequency Response

9.1 POWER SUPPLY VOLTAGE ADJUSTMENT

1. Connect a DC voltmeter between terminal no.69 on the mother assembly and ground.
2. Adjust VR914 so as to obtain a meter reading of 15 ±0.2V.

9.2 PLAYBACK LEVEL ADJUSTMENT

1. Connect an AC millivoltmeter to the OUTPUT terminals.
2. Play the 700Hz/0dB portion of the STD-154 test tape.
3. Adjust VR1105 (L ch) and VR1106 (R ch) during FWD mode, and VR1107 (L ch) and VR1108 (R ch) during REV mode in order to obtain a millivoltmeter reading of −7dBv (450mV).

9.3 PLAYBACK EQUALIZER ADJUSTMENT

1. Again connect the AC millivoltmeter to the OUTPUT terminals.
2. Play the 700Hz/−10dB and 10kHz/−10dB portions of the STD-154 test tape.
3. The AC millivoltmeter should shown a level difference of no more than $0^{+0.5}_{-0}$ between these two portions of tape. If the meter readings exceed this specification, adjust VR1101 (L ch) and VR1102 (R ch) during FWD mode, and VR1103 (L ch) and VR1104 (R ch) during REV mode.

9.4 OSCILLATOR VOLTAGE ADJUSTMENT

1. Turn the REC MODE switch for both left and right channels, and also the PAUSE switch on, and then press the REC and PLAY switches (i.e. REC/PAUSE mode).
2. Connect an AC voltmeter (with either 50 or 100V range) between GND and TP3 on the mother assembly with a connector cord of low distribution capacitance. Adjust VR913 to obtain a meter reading of 30 ±0.5V.

Note:

- *Because of the high oscillator frequency (125kHz) be careful not to introduce any error during the measurement or adjustment stages.*
- *Do not forget to disconnect the AC voltmeter from the TP terminal after completing the adjustment. (Distribution capacitance in the measuring equipment may lead to change in oscillator frequency, resulting in error in the following adjustment).*

9.5 BIAS TRAP AND DUMMY COIL ADJUSTMENTS

1. Connect an oscilloscope to the TP4 and TP5 terminals on the mother assembly. Turn on the REC MODE switch for both left and right channels to put the unit into recording mode. Adjust L903 and L904 to obtain minimum bias voltage at TP4 and TP5.
2. Put the unit into MONO (L ch) recording mode, and adjust L908 (right channel dummy coil) to again obtain minimum bias voltage at TP4.
3. Then put the unit into MONO (R ch) recording mode, and adjust L907 (left channel dummy coil) to obtain minimum bias voltage at TP5.
4. After completion of the above adjustments, connect an AC millivoltmeter and oscilloscope to the OUTPUT terminals, and turn the REC MODE switches for both left and right channels on to put the unit into recording mode. Adjust L901 (L ch) and L902 (R ch) to minimize the bias leak waveform shown in the oscilloscope. When the point of minimum bias leak is not clear, remove the base plate, and adjust from the top side of the mother assembly.

9.6 LEVEL METERS 0dB ADJUSTMENT

1. Connect an AC millivoltmeter to the OUTPUT terminals.
2. Set the MONITOR switch to SOURCE, and the OUTPUT level control to the center click-stop position. Adjust the INPUT (LINE) level controls to obtain a millivoltmeter reading of −7dBv (450mV).
3. Then adjust VR909 (L ch) and VR910 (R ch) to positions where the FL meter [0dB] segment just lights up.

9.7 RECORDING BIAS ADJUSTMENT

1. Connect the AC millivoltmeter to the OUTPUT terminals again.
2. Apply an input signal of 1kHz/−10dBv (316mV) to the INPUT terminals.
3. Set the OUTPUT level control to the center click-stop, and the MONITOR switch to SOURCE. Adjust the INPUT (LEINE) level controls to obtain a meter reading of −7dBv (450mV).
4. Turn both the left and right channel REC MODE switches on, and set the MONITOR switch to the TAPE position. Then record a 1kHz/−10dBv (316mV) signal onto the STD-502 test tape. Turn VR911 (L ch) and VR912 (R ch) from minimum to maximum positions (clockwise rotation), and locate the VR settings at which the AC millivoltmeter exceeds the maximum reading by up to 0.2dB. (See Fig. 9-2).

Note:
VR911 and VR912 influence each other, so this adjustment will have to be repeated several times.

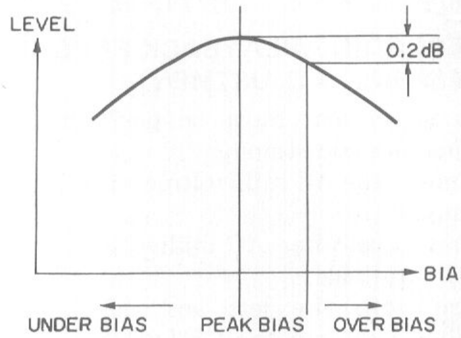


Fig. 9-2 Recording bids adjustment

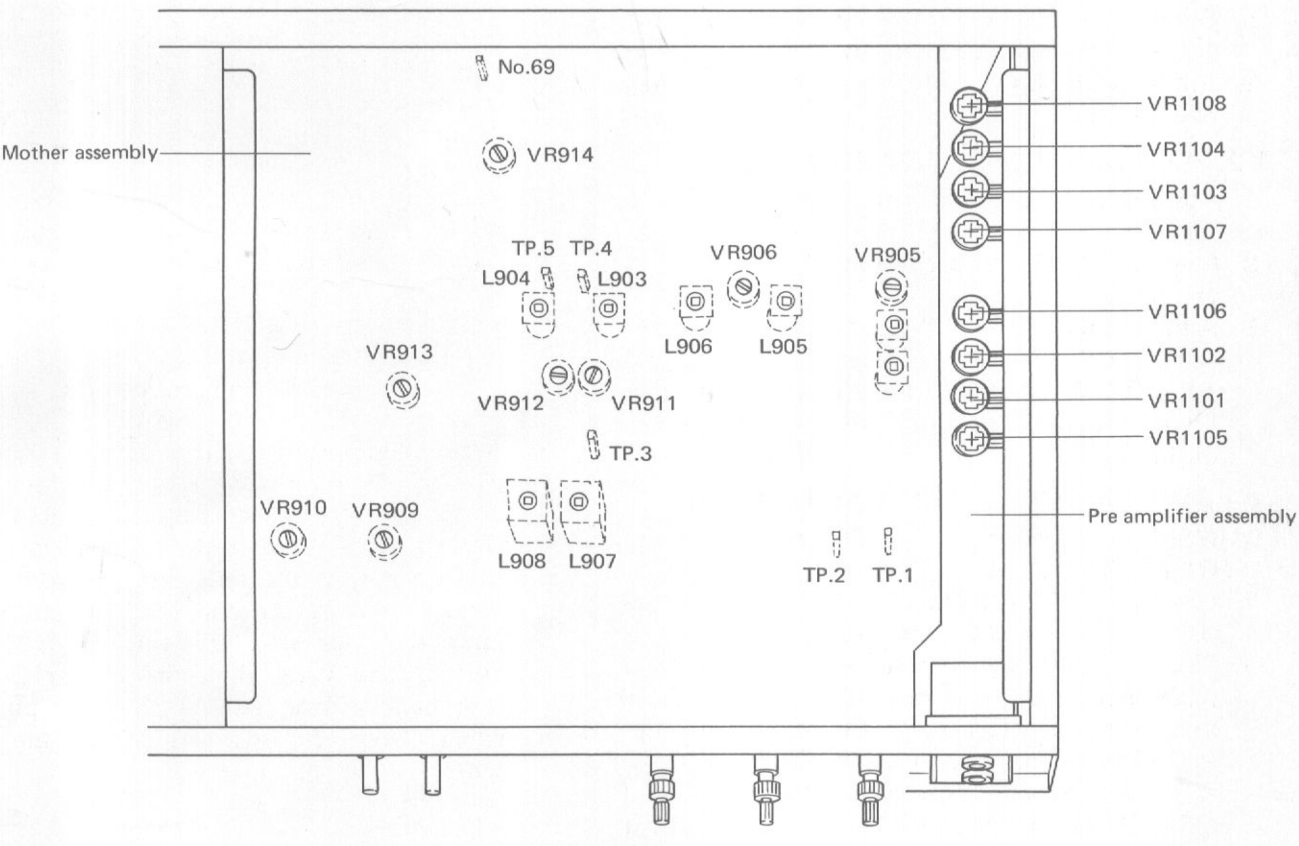


Fig. 9-1 Adjustment points

9.8 RECORDING LEVEL ADJUSTMENT

1. Again connect the AC millivoltmeter to the OUTPUT terminals.
2. Apply a 1kHz/−10dBv (316mV) signal to the INPUT terminals.
3. Set the OUTPUT level control to the center click-stop, and the MONITOR switch to the TAPE position. Record the 1kHz/−10dBv signal onto the STD-502 test tape, and adjust VR905 (L ch) and VR906 (R ch) to obtain a meter reading of −7dBv (450mV).

9.9 RECORDING/PLAYBACK FREQUENCY RESPONSE ADJUSTMENT

This adjustment must be performed after the recording bias adjustment.

1. Connect the AC millivoltmeter to the OUTPUT terminals.
2. Connect another AC millivoltmeter to the INPUT terminals.
3. Turn both the left and right REC MODE switches on, set the OUTPUT level control to the center click-stop position and the MONITTOR switch to SOURCE. Adjust the INPUT (LINE) level controls to give a −7dBv (450mV) reading in the AC millivoltmeter.
4. Without changing the INPUT (LINE) level control, drop the input level by 20dB by attenuator, and record the 1kHz portion and all the other frequencies indicated in Fig. 9-3 onto the STD-502 test tape. Then set the MONITOR switch to the TAPE position, and check that the level differences between the 1kHz playback output level and the playback output levels at all other frequencies satisfy the specified ratings. If the output levels fail to satisfy the specifications, adjust L905 (L ch) and L906 (R ch).

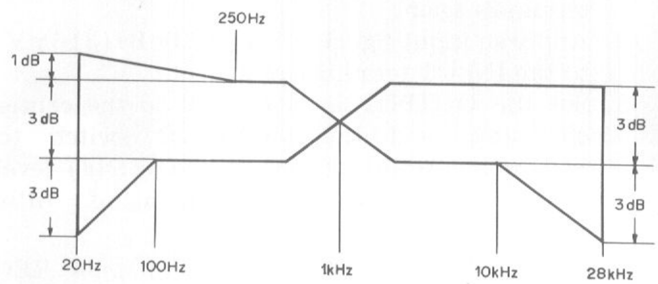


Fig. 9-3 REC/PB frequency response adjustment

MEMO

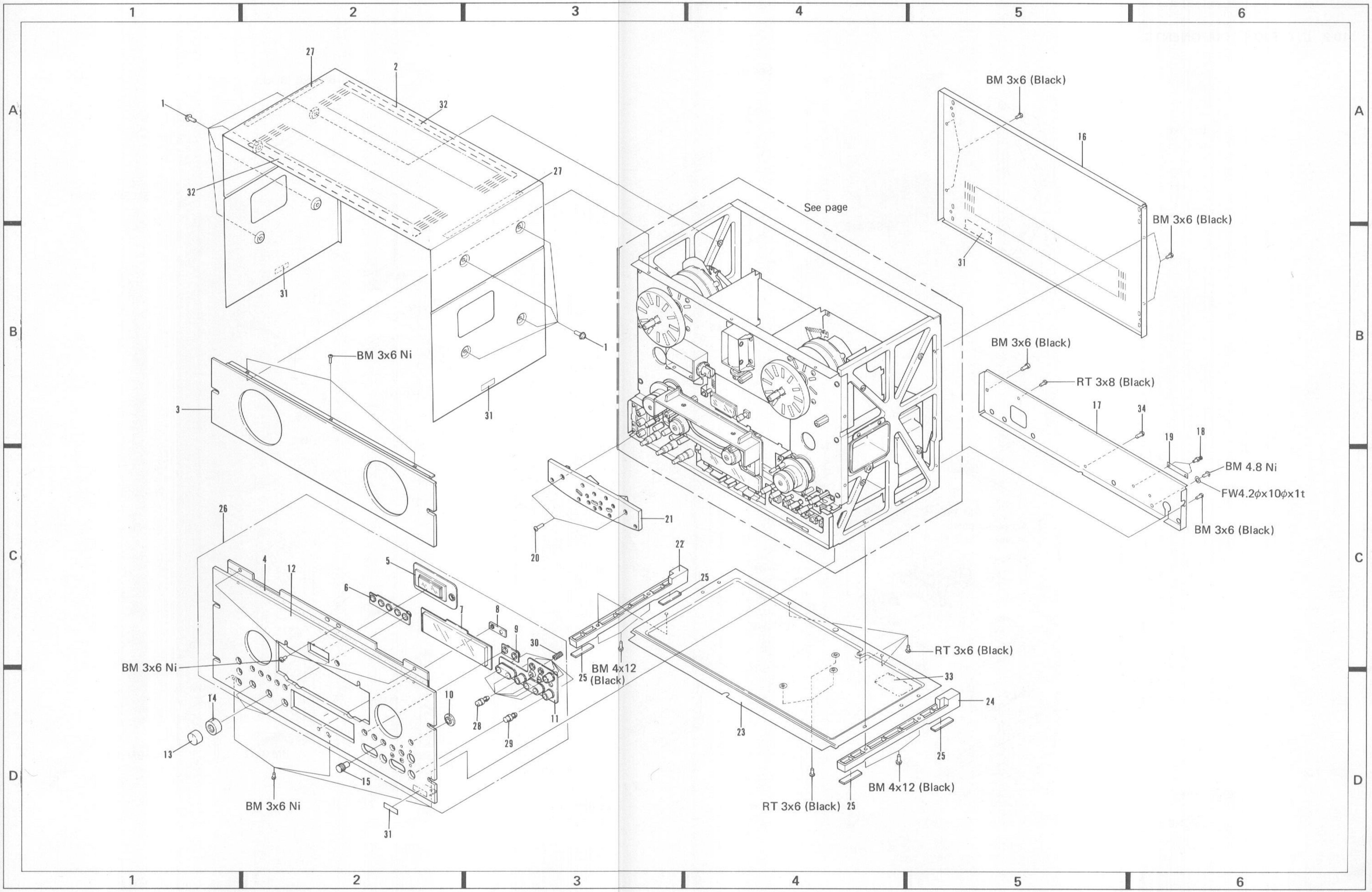
10. EXPLODED VIEWS AND PARTS LIST

10.1 EXTERIOR COMPONENTS

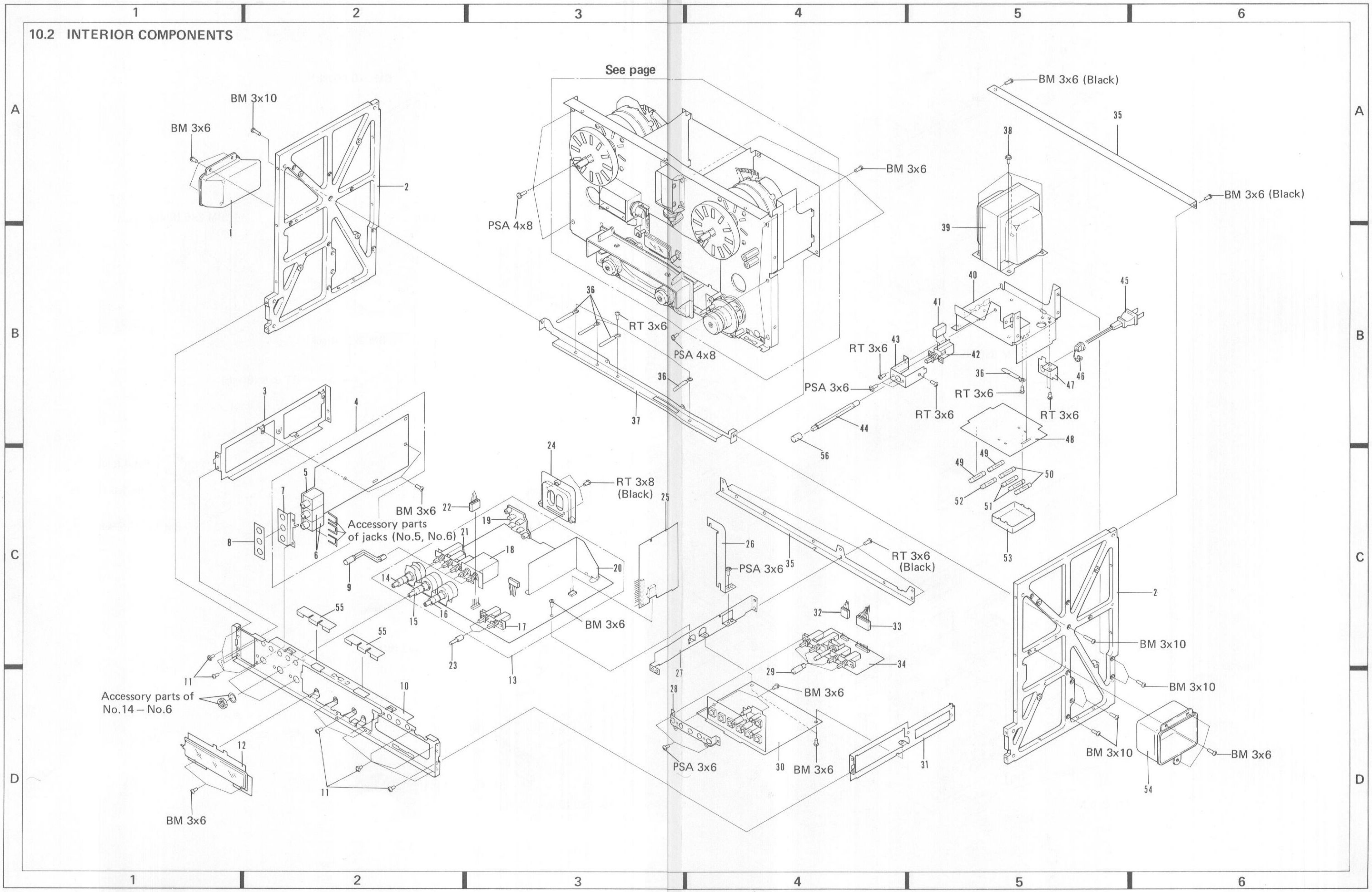
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *Parts without part number cannot be supplied.*

Parts List

Key No.	Part No.	Description
1.	ABA-010	Frange screw M4x5
2.	RNA-424	Bonnet
3.	RAH-293	Front panel
4.		Panel cushion
5.	RNK-829	Counter lens
6.		Escutcheon C
7.	RNK-831	Meter lens
8.		Escutcheon
9.		Escutcheon A
10.		Escutcheon B
11.		Escutcheon
12.		Front panel
13.	RAC-120	Knob A assembly
14.	RAC-121	Knob B assembly
15.	RAC-122	Knob (PITCH CONTROL)
16.		Rear panel
17.		Rear panel
18.		Rivet
19.		Serial no. plate
20.	RBA-017	Countersink screw with hexagon hole M4x8
21.	RNG-230	Head base
22.	REC-320	Foot L
23.		Bottom plate
24.	REC-319	Foot R
25.	RED-167	Foot felt
26.	RXX-268	Front panel assembly
27.	REB-220	Cover cushion A
28.	RAC-118	Function knob assembly
29.	RAC-119	REC knob assembly
30.	RBH-622	Knob return spring
31.	RRW-112	UL caution label A
32.	REB-221	Cover cushion B
33.		UL caution label C
34.	RBA-057	Screw


1
2
3
4
5
6
A
B
C
D
27
2
32
1
27
32
31
1
31
BM 3x6 Ni
3
26
See page
BM 3x6 (Black)
16
BM 3x6 (Black)
31
BM 3x6 (Black)
RT 3x8 (Black)
17
34
19
18
BM 4.8 Ni
FW4.2φx10φx1t
BM 3x6 (Black)
21
20
22
25
4
12
5
6
7
8
9
30
BM 3x6 Ni
25
BM 4x12 (Black)
RT 3x6 (Black)
33
24
14
10
28
29
11
13
15
BM 3x6 Ni
31
23
25
BM 4x12 (Black)
RT 3x6 (Black)
25

10.2 INTERIOR COMPONENTS



Parts List

Key No.	Part No.	Description
1.	RNK-832	Handle L
2.		Frame
3.		Chassis L
4.	RWF-088	Preamplifier assembly
5.	RKN-056	Headphones jack
6.	RKN-058	Mic jack
7.		Jack bracket
8.		Jack mask
9.	RNK-812	Switch joint
10.		Chassis
11.		TP screw 3x6
12.		Fluolescent meter assembly
13.	RWX-340	Mother assembly
14.	RCV-076	Variable resistor (OUTPUT)
15.	RCV-079	Variable resistor (MIC)
16.	RCV-075	Variable resistor (LINE)
17.	RSG-087	Meter switch
18.		Switch shield
19.	RKB-014	Terminal (OUTPUT, INPUT)
20.		Heat sink
21.	RSG-086	Mode switch
22.	RKP-126	Connector assembly (4p)
23.	RAC-113	Meter knob assembly
24.		Jack escutcheon
25.	RWX-339	Driver assembly
26.		Holder A
27.		Center bracket
28.		Switch bracket
29.	RAC-115	Switch knob assembly
30.	RXX-267	Control A assembly
31.		Chassis R
32.	RKP-121	Connector assembly (5p)
33.	RKP-128	Connector assembly (9p)
34.	RWS-079	Switch assembly
35.		Reinforced metal
36.	RNE-605	UL cord clamper D
37.		L angle
38.		TP screw M4x8
⚠ 39.	RTT-178	Power transformer
40.		Bracket
⚠ 41.	RWX-109	Spark killer (UL)
⚠ 42.	RSA-021	Power switch (KC, KU)
43.		Switch holder
44.	RNK-811	Power switch joint
⚠ 45.	RDG-022	Power code
46.	REC-272	Strain relief
47.		AC code holder
48.		Fuse assembly
49.	REK-048	Fuse 0.5A
50.	REK-055	Fuse 2A
51.	REK-051	Fuse 1A
52.	REK-044	Fuse 4A
53.		Fuse cover
54.	RNK-834	Handle R
55.		Arm mask B
56.	RAD-130	Switch cap

10.3 PANEL STAY COMPONENTS

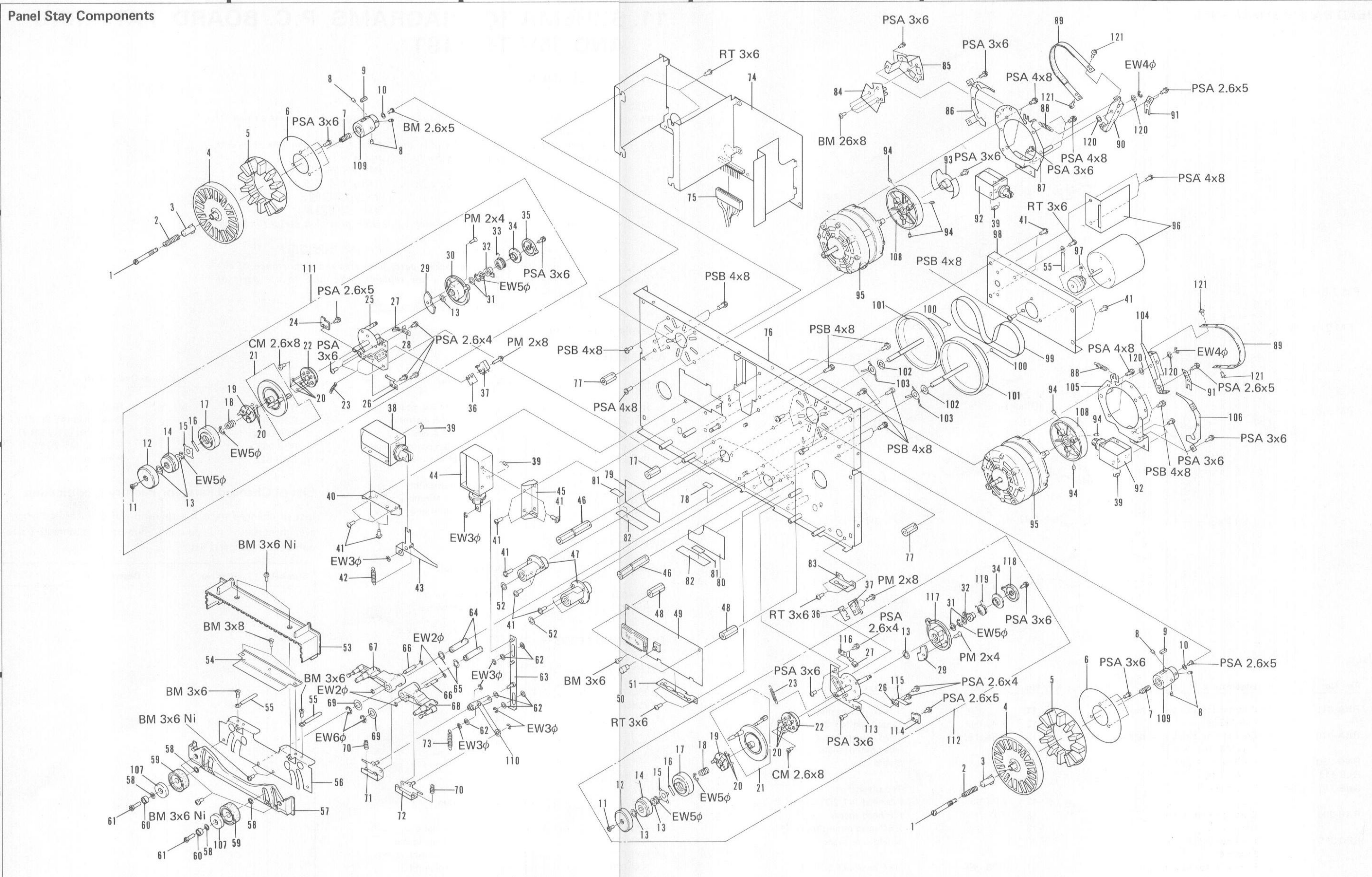
Parts List

Key No.	Part No.	Description
1.	RLB-116	Reel base shaft
2.	RBH-585	Reel base spring
3.	RNG-227	Reel base blade
4.	RNG-209	Reel base
5.	REB-349	Reel sheet
6.		Reel plate
7.	RBH-586	Reel base adjust spring
8.		Setscrew with hexagon hole M4x4
9.	RLB-129	Sliding key
10.		Nylon washer 3.2ϕx6ϕx0.5t
11.		Countersink screw with hexagon hole M4x8
12.		Roller cap
13.		Nylon washer 6.2ϕx12ϕx0.5t
14.		Guide roller assembly
15.		Spring
16.		Parallel pin
17.		Guide case
18.		Spring
19.		Ball holder
20.		Nylon ball
21.		Guide table assembly
22.		Ball tray
23.		Arm return spring
24.		Stopper L
25.		Roller stay L assembly
26.		Lock plate L
27.		Stopper
28.		Stopper bracket L
29.		Sub balance weight
30.		Shut-off cam L

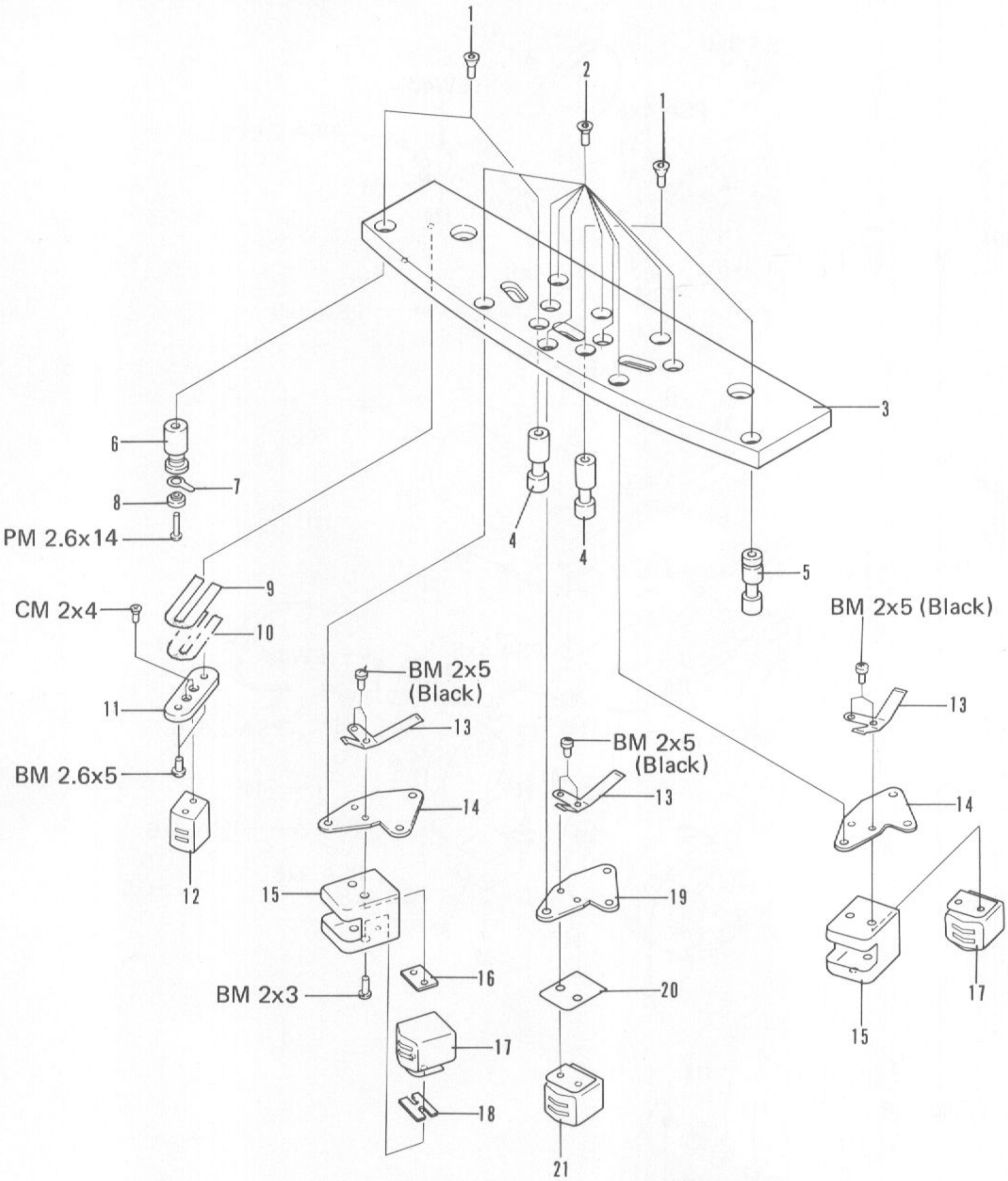
Key No.	Part No.	Description
31.		Nylon washer 6.2ϕx12ϕx0.3t
32.		Damper plate
33.		Damper spring L
34.		Damper cap
35.		Damper stopper L
36.	REC-278	Switch spacer
37.	RSF-022	Micro switch
38.	RXP-070	Pause solenoid
39.		Diode W03C
40.		Solenoid stay
41.		TP screw M3x6
42.	RBH-584	Pause lever spring
43.		Pause lever
44.	RXP-071	Pinch solenoid
45.		Solenoid stay
46.		Head base stay
47.	RXB-174	Bearing assembly
48.		Boss
49.	RWX-336	Counter assembly
50.	RAC-114	Counter knob assembly
51.		Stay
52.	REB-052	Oil thrower washer A
53.	RNK-835	Head housing A
54.		Shield plate
55.		UL code clamper (D)
56.		Shield plate
57.	RNK-842	Head housing B
58.	RBF-033	Polyethylene washer
59.	RXB-194	Pinch roller assembly
60.	RLB-105	Pinch roller collar
61.	RBA-050	Countersink screw with hexagon screw M3x6
62.		Nylon washer 4.2ϕx8ϕx0.5t
63.		Center link assembly
64.		Pinch arm shaft
65.		Nylon washer 8.2ϕx16ϕx0.5t
66.	RLB-108	Shaft
67.	RXB-195	Pinch arm L assembly
68.	RXB-196	Pinch arm R assembly
69.		Nylon washer 8.2ϕx16ϕx0.5t
70.	RBH-645	Pressure spring
71.		Pressure plate L assembly
72.		Pressure plate R assembly
73.	RBH-583	Senter link return spring
74.	RWG-105	Control B assembly
75.	RKP-130	Connector assembly (19p)
76.		Chassis assembly
77.		Panel stud
78.	RED-166	Stopper felt
79.		Arm mask L
80.		Arm mask R
81.	REB-374	Arm cushion
82.		Arm mask A
83.		P.C.B. holder
84.		Sensing assembly
85.		Sensing bracket

Key No.	Part No.	Description
86.		Brake guide L
87.		Brake bracket L assembly
88.	RBH-591	Brake spring
89.	RXB-204	Brake band assembly
90.		Brake arm L
91.		Brake link
92.	RXP-075	Brake solenoid
93.	RNK-827	Sensor slit
94.		Setscrew with hexagon hole M4x5
⚠ 95.	RXM-060	Reel motor
96.		Capstan motor
97.	RXB-239	Pulley assembly
98.		Motor stay
99.	REB-361	Belt
100.	N23-608	Nylon ball
101.	RXB-283	Capstan assembly
102.		Nylon washer 6.2ϕx12ϕx0.5t
103.	RBK-139	Thrust spring
104.		Brake arm R
105.		Brake bracket R assembly
106.		Brake guide R
107.	REC-305	Pinch roller cap
108.	RNK-833	Brake drum
109.		Reel base bearing
110.		Joint assembly
111.	RXX-265	Tension roller assembly L
112.	RXX-266	Tension roller assembly R
113.		Roller stay R assembly
114.		Stopper R
115.		Lock plate R
116.		Stopper bracket R
117.		Shut-off cam R
118.		Damper stopper R
119.		Damper spring R
120.	B22-424	Washer 5ϕ
121.		TP screw M2.6x5

Panel Stay Components



10.4 HEAD BASE COMPONENTS



Parts List

Key No.	Part No.	Description
1.	RBA-015	Countersink screw with hexagon hole M3x8
2.	RBA-016	Countersink screw with hexagon hole M3x10
3.	RNG-230	Head base
4.	RLB-111	Tape guide
5.	RLB-112	Tape guide R
6.	RXB-200	Sensing guide assembly
7.		Sensing lug
8.	REC-315	Insulator collar
9.		Spacer C
10.		Spacer D (for head height adjustment)
11.		E head mount plate
12.	RPS-047	Erase head (4T 2C EH)
13.	RBK-137	Head adjust spring
14.		Head mount plate
15.		Shield case
16.		Tap plate
17.	RPB-065	P.B head (4T 2C PBH)
18.		P.B head spacer
19.		REC head mount plate
20.		Shield case spacer
21.	RPB-064	REC head (4T 2C RH)

11. SCHEMATIC DIAGRAMS, P.C. BOARD PATTERNS AND PARTS LIST

11.1 MISCELLANEA

NOTES:

- *When ordering resistors, first convert resistance values into code form as shown in the following examples.*

  Ex. 1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J = 5%, and K = 10%).

560Ω	*56 x 10¹*	*561 ....*	*RD¼PS 561J*
47kΩ	*47 x 10³*	*473 ....*	*RD¼PS 473J*
0.5Ω	*0R5 ....*		*RN2H 0R5K*
1Ω	*010 ....*		*RSIP 010K*

  Ex. 2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62kΩ	*562 x 10¹*	*5621.........*	*RN¼SR 5621F*

- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*

Miscellaneous Parts

ASSEMBLIES

Part No.	Symbol	Description
RWX-336		Counter assembly
RWG-105		Control B assembly
RXX-267		Control A assembly
RWS-078		Function switch assembly
RWS-079		Switch assembly
RWX-339		Driver assembly
RWX-340		Mother assembly
RWF-088		Pre amplifier assembly

SWITCHES

Part No.	Symbol	Description
⚠ RSA-021	S1	Power switch
RSF-022	S2, S3	Micro switch

SEMICONDUCTORS

Part No.	Symbol & Description
2SD686	Q214
2SB682	Q221
⚠ 2SC2535	Q237, Q238
W03C	D1–D4

OTHERS

Part No.	Symbol	Description
⚠ RWX-109	CR1	Spark killer
⚠ RTT-178	T1	Power transformer
RXP-071	SL1	Pinch solenoid
RXP-070	SL2	Pause solenoid
RXP-075	SL3, SL4	Brake solenoid
⚠ RXM-060	M1, M2	Reel motor
RPB-047		Erase head (4T 2C EH)
RPB-064		REC head (4T 2C RH)
RPB-065		P.B head (4T 2C PBH)
⚠ EDG-022		Power code

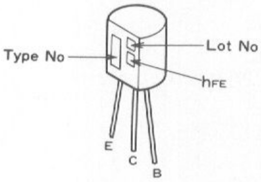
List of Changed Parts for Factory Modification

List of changed parts information will be furnished whenever necessary and you are requested to amend parts number in this parts list.

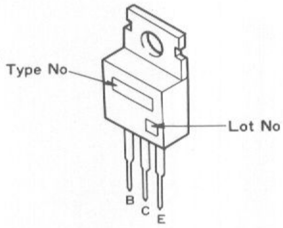
Symbol	Part No.	Description

Appearance of Transistors and ICs

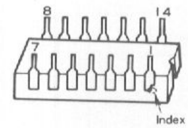
2SA562
2SA1015
2SC1815



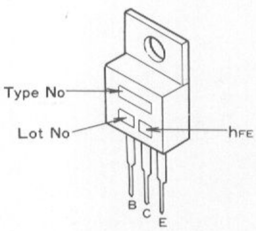
2SC2535
2SD686



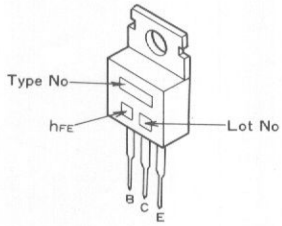
TC4001BP
TC4011BP
TC4013BP
TC4069UBP
TC4071BP
TC4075BP
TC4081BP
μPC324C
μPC4069C
μPD4001C
μPD4011C
μPD4071C
μPD4075BC
μPD4081C



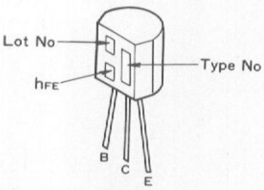
2SA682
2SB682
2SD704
2SD712



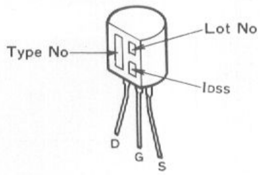
2SD235
2SD837



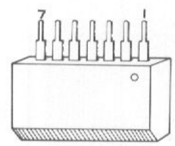
2SA999



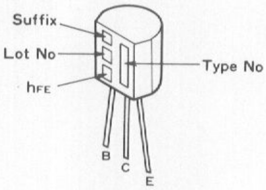
2SK117



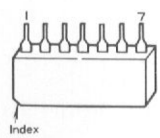
M51970L
M5214L



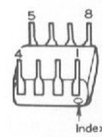
2SA999L
2SC2320L



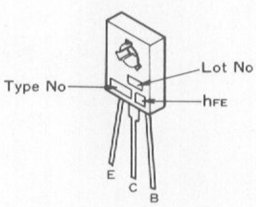
TA7136AP



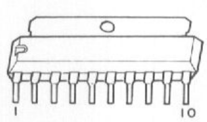
μPC4558C



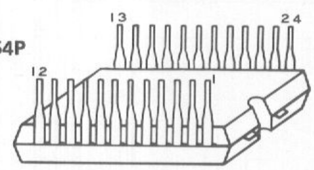
2SC1382



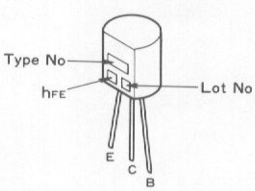
TA7220P



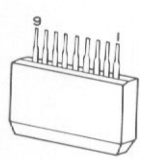
TC5054P



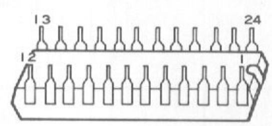
2SC1740



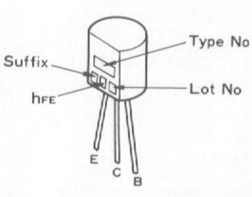
TA7318P



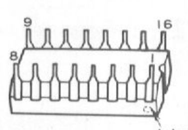
AN6251



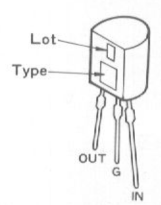
2SC1740LN



TC4022BP
TC4049BP
TC4050BP
TC5066BP
μPD4049C

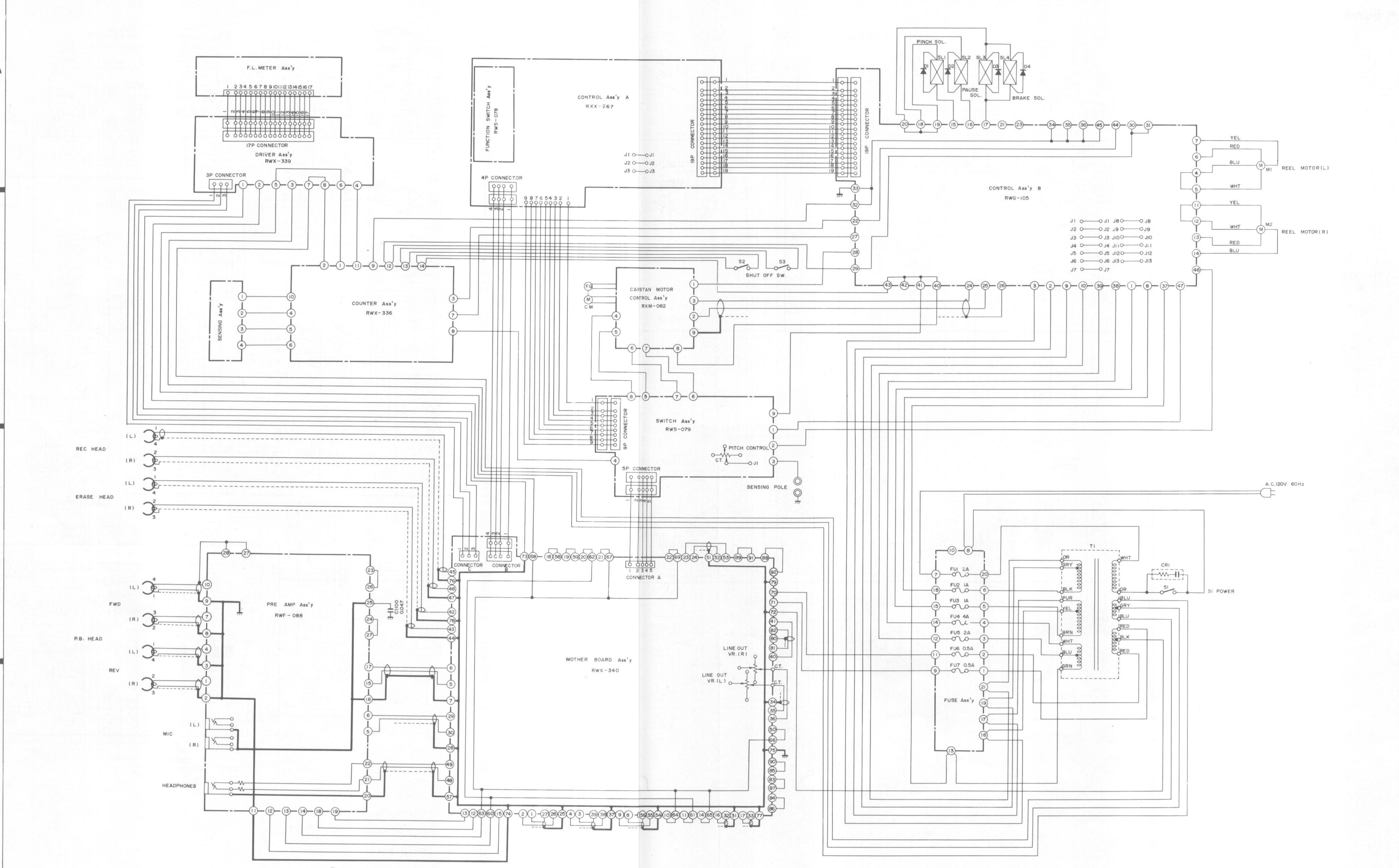


TA78L005AP



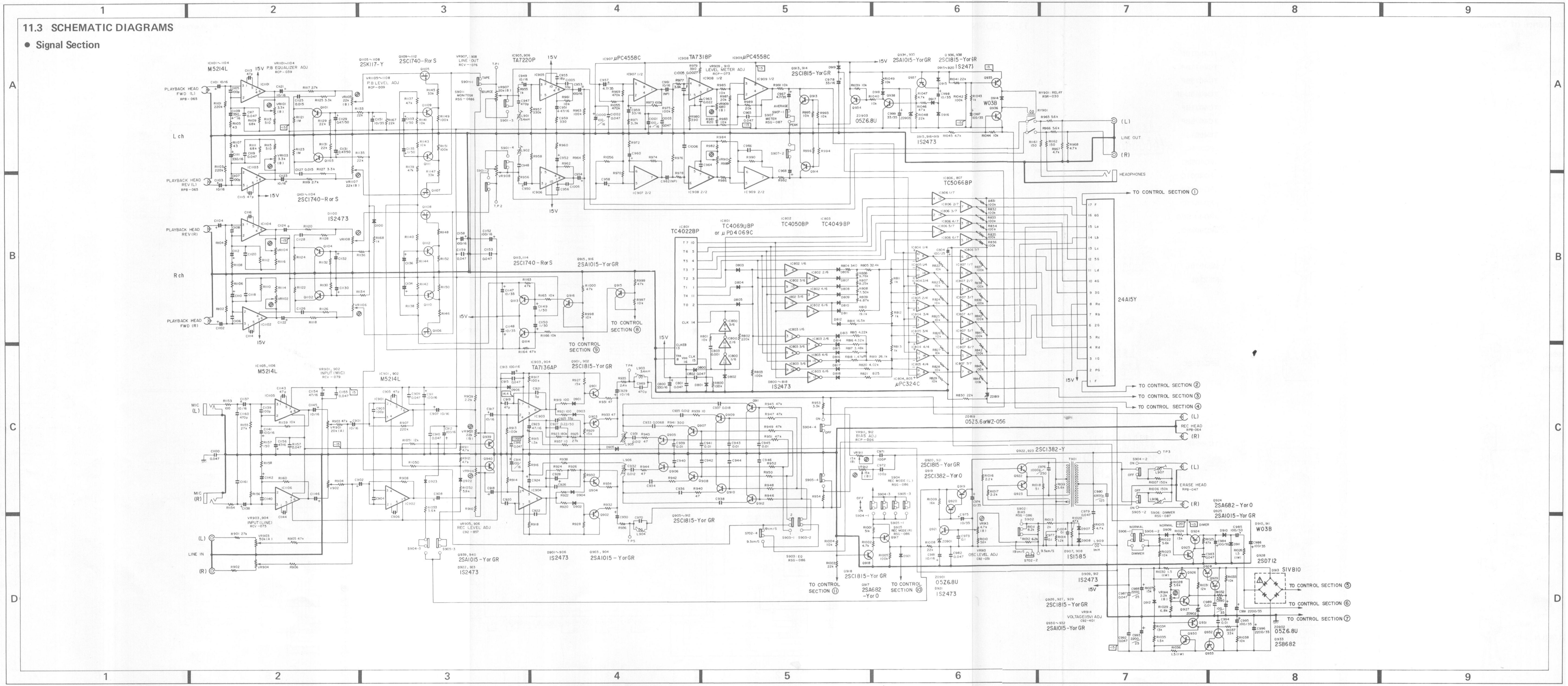
11.2 CONNECTION DIAGRAM

● *Assemblies without part no. cannot be supplied.*

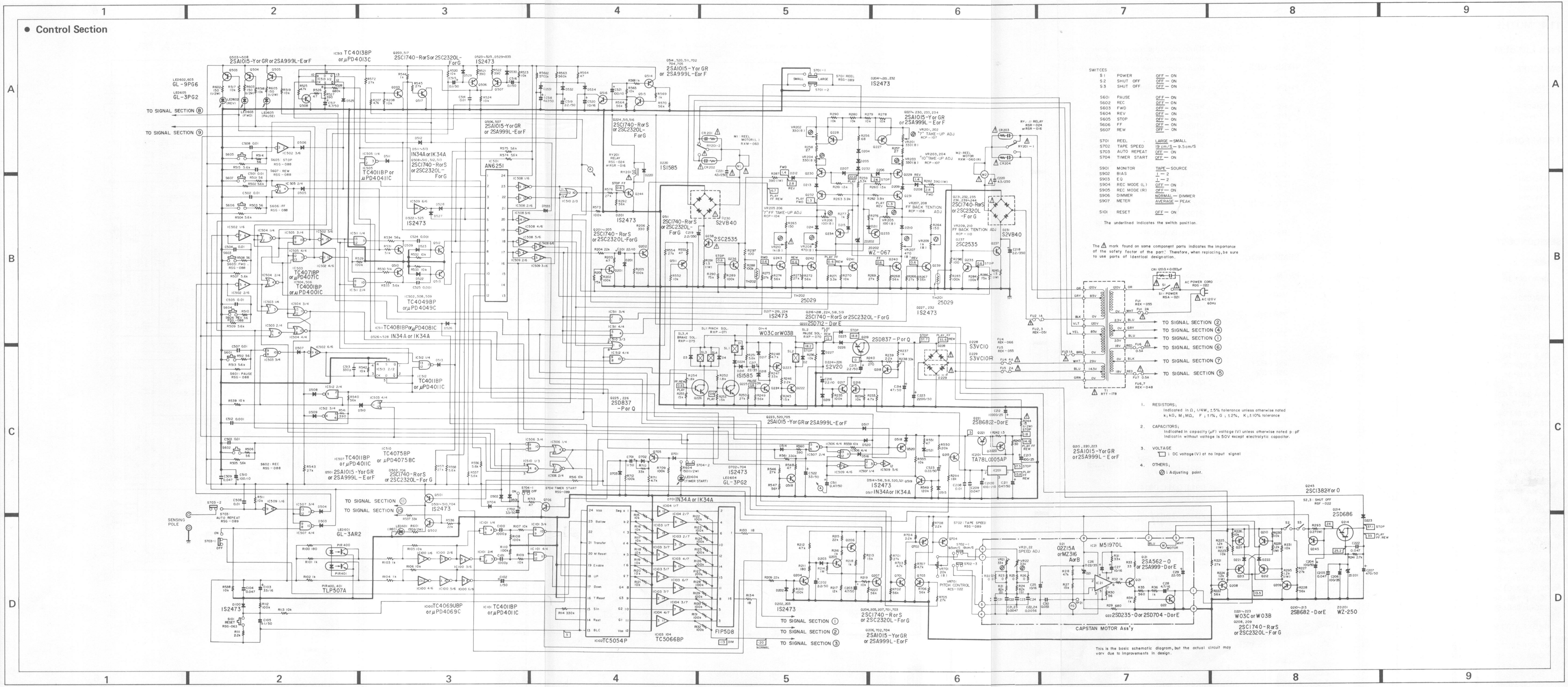


11.3 SCHEMATIC DIAGRAMS

- **Signal Section**



Control Section



11.4 MOTHER ASSEMBLY (RWX-340)

Parts List of Mother Assembly

SWITCHES

Part No.	Symbol & Description	
RSG-086	S901–S905	Mode switch
RSG-087	S906, S907	Meter switch

TRANSFORMER AND COILS

Part No.	Symbol & Description	
RTD-021	T901	Oscillator transformer
RTF-013	L901–L904	Trap coil
RTF-014	L905, L906	Peaking coil
RTD-022	L907, L908	Dummy coil
RTF-056	L909	Line coil

SEMICONDUCTORS

Part No.	Symbol & Description
CEA 100P 16	C901, C902, C907, C908, C917, C918, C929, C930, C949, C950, C981
CEA 222M 35	C991, C996
CEA 222M 25	C988, C993
CEA 101P 50	C984, C985
CEA 101P 35	C986, C990, C995, C997
CEA 330P 35	C999
CEA 101P 16	C911–C914, C953, C954, C1000, C1001
CEA 100P 35	C974, C975, C998
CEA 470P 16	C923, C924, C951, C952
CEA 330P 16	C959, C960, C978
CEA 4R7P 35	C957, C958, C967, C968
CEA R10M 50	C927, C928
CEA 100M 16NP	C961, C962
CQSA 471K 50	C947, C948, C969, C970
CQSA 101K 50	C971, C972
CQSA 682J 125	C980
CQSA 102J 250	C976
CQMA 104K 50	C973, C977, C1004
CQMA 473K 50	C965, C966, C979
CQMA 223K 50	C963, C964
CQMA 153J 50	C937, C938
CQMA 123J 50	C931, C932
CQMA 103J 50	C935, C936
CQMA 682J 50	C933, C934
CCDCH 101J 50	C903, C904, C919, C920
CCDCH 470J 50	C905, C906
CCDCH 330J 50	C925, C926
CCDCH 180J 50	C955, C956
CCDCH 050J 50	C921, C922
CKDYF 473Z 50	C909, C910, C915, C916, C982, C983, C987, C992, C1002, C1003
CKDYF 103Z 50	C939–C946, C989, C994
CQMA 272J 50	C1005, C1006

RESISTORS

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Part No.	Symbol & Description	
RCV-079	VR901, VR902	MIC volume
RCV-075	VR903, VR904	LINE volume
C92-857	VR905, VR906	Semi-fixed 22k-B
RCV-076	VR907, VR908	OUTPUT volume
RCP-073	VR909, VR910	Semi-fixed 680Ω-B
RCP-006	VR911, VR912	Semi-fixed 15k-B
C92-051	VR913	Semi-fixed 4.7k-B
C92-401	VR914	Semi-fixed 2.2k-B
RD¼PM □□□ J	R901–R936, R939–R1020, R1022–R1025, R1027–R1029, R1031–R1035, R1037–R1049	
RS1PF □R□J	R1026, R1030, R1036	

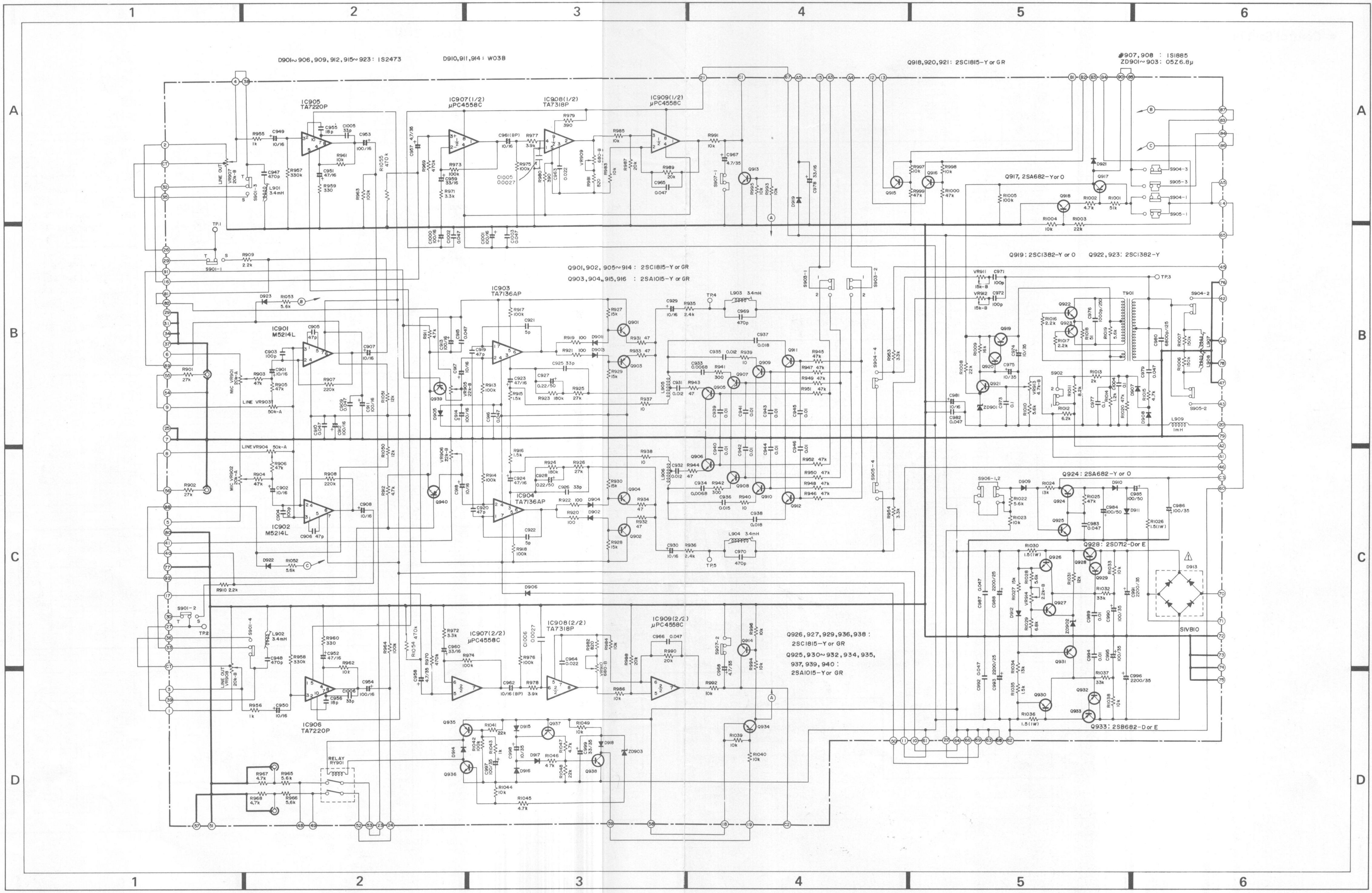
SEMICONDUCTORS

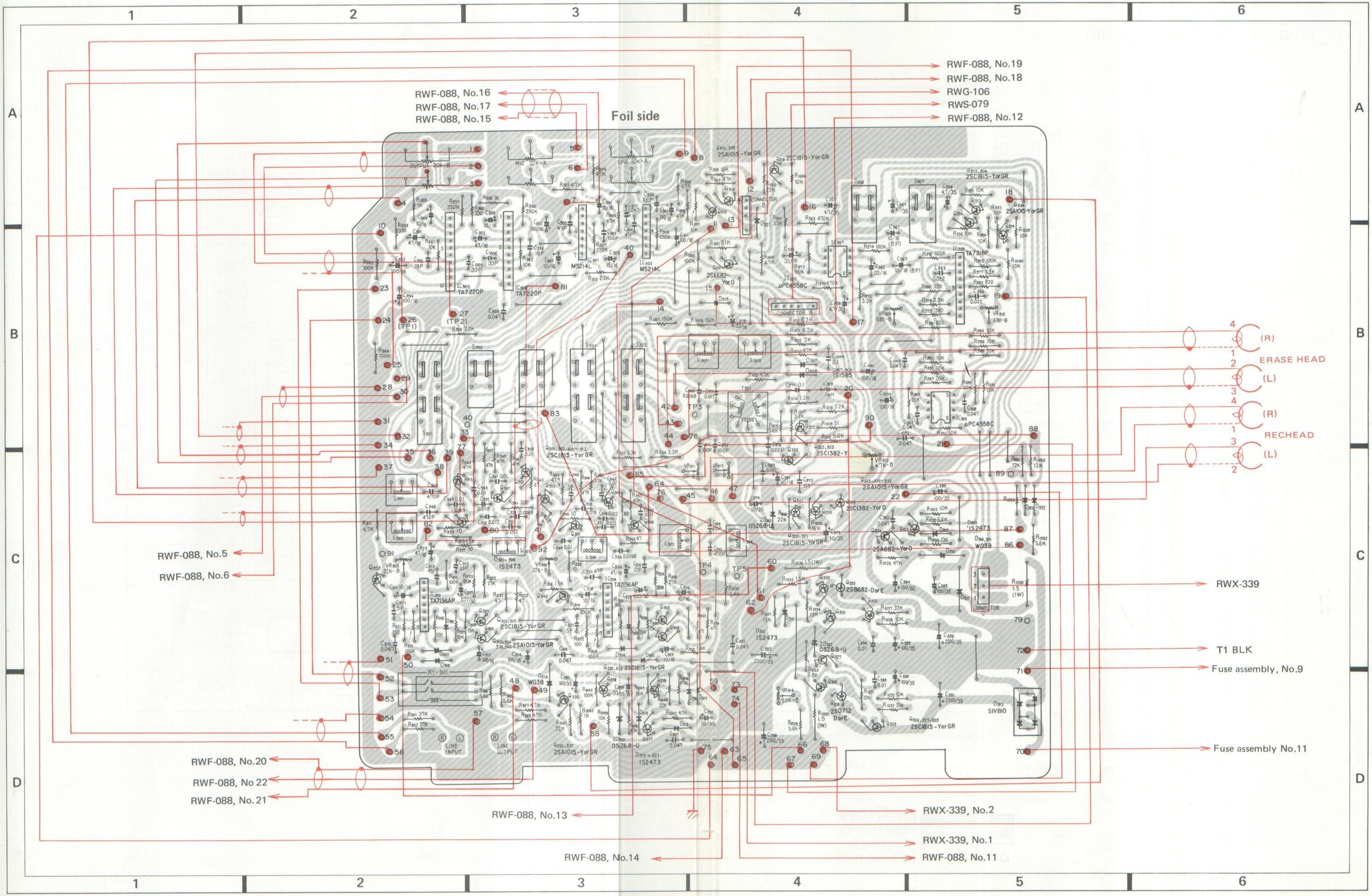
Part No.	Symbol & Description
2SC1815	Q901, Q902, Q905–Q914, Q918, Q920, Q921, Q926, Q927, Q929, Q936, Q938
2SA1015	Q903, Q904, Q915, Q916, Q925, Q939, Q930–Q932, Q934, Q935, Q937, Q940,
2SB682	Q933
2SD712	Q928
2SC1382Y	Q922, Q923
2SC1382	Q919
2SA682	Q917, Q924
M5214L	IC901, IC902
TA7136AP	IC903, IC904
TA7220P	IC903, IC906
µPC4558C	IC907, IC909
TA7318P	IC908
1S2473	D901–D906, D909, D912, D915–D919, D921–D923
1S1585	D907, D908
W03B	D910, D911, D914
SIVB10	D913
05Z6-8U	ZD901–ZD903

OTHERS

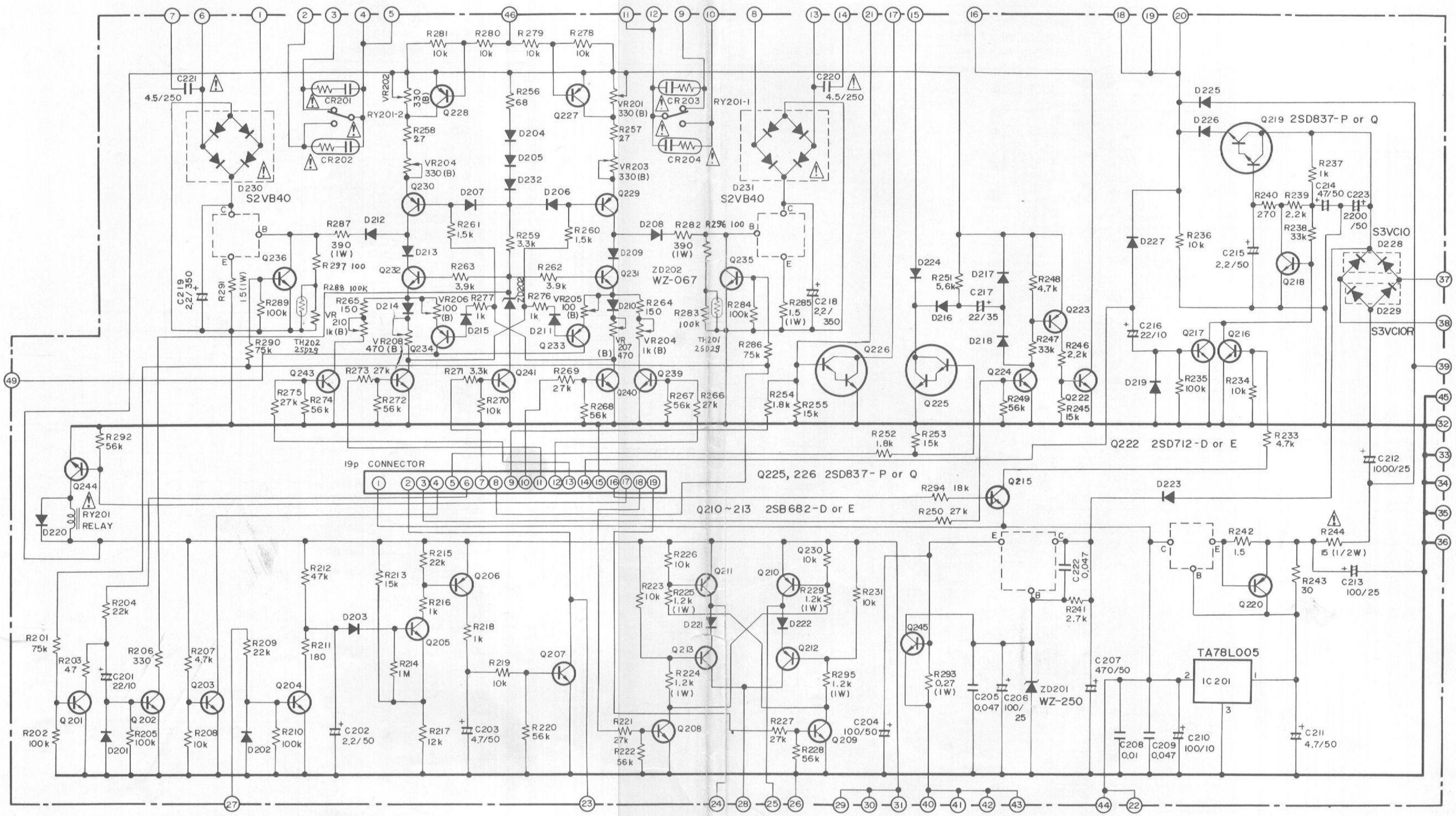
Part No.	Symbol & Description
RKB-014	Terminal
RBA-039	Screw

RT-909


D901~906, 909, 912, 915~923 : 1S2473
D910, 911, 914 : W03B
Q918, 920, 921 : 2SC1815-Y or GR
D907, 908 : 1S1885
ZD901~903 : 05Z6.8μ
Q917, 2SA682-Y or O
Q919 : 2SC1382-Y or O
Q922, 923 : 2SC1382-Y
Q901, 902, 905~914 : 2SC1815-Y or GR
Q903, 904, 915, 916 : 2SA1015-Y or GR
Q924 : 2SA682-Y or O
Q928 : 2SD712-D or E
Q933 : 2SB682-D or E
Q926, 927, 929, 936, 938 : 2SC1815-Y or GR
Q925, 930~932, 934, 935, 937, 939, 940 : 2SA1015-Y or GR
IC905 TA7220P
IC906 TA7220P
IC907(1/2) μPC4558C
IC907(2/2) μPC4558C
IC908(1/2) TA7318P
IC908(2/2) TA7318P
IC909(1/2) μPC4558C
IC909(2/2) μPC4558C
IC901 M5214L
IC902 M5214L
IC903 TA7136AP
IC904 TA7136AP
RELAY RY901
SIVB10
T901
TP.1
TP.2
TP.3
TP.4
TP.5


Foil side
RWF-088, No.16
RWF-088, No.17
RWF-088, No.15
RWF-088, No.19
RWF-088, No.18
RWG-106
RWS-079
RWF-088, No.12
ERASE HEAD
RECHEAD
RWF-088, No.5
RWF-088, No.6
RWX-339
T1 BLK
Fuse assembly, No.9
Fuse assembly No.11
RWF-088, No.20
RWF-088, No 22
RWF-088, No.21
RWF-088, No.13
RWX-339, No.2
RWX-339, No.1
RWF-088, No.14
RWF-088, No.11

11.5 CONTROL B ASSEMBLY (RWG-105)



Q201~205, 207~209, 216~218, 224, 231, 232, 235, 236, 239~244 : 2SC1740-R or S or 2SC2320L-F or G

Q245 : 2SC1382-D or Y

Q206, 215, 220, 223, 227~230, 233, 234 : 2SA1015-Y or GR or 2SA999L-E or F

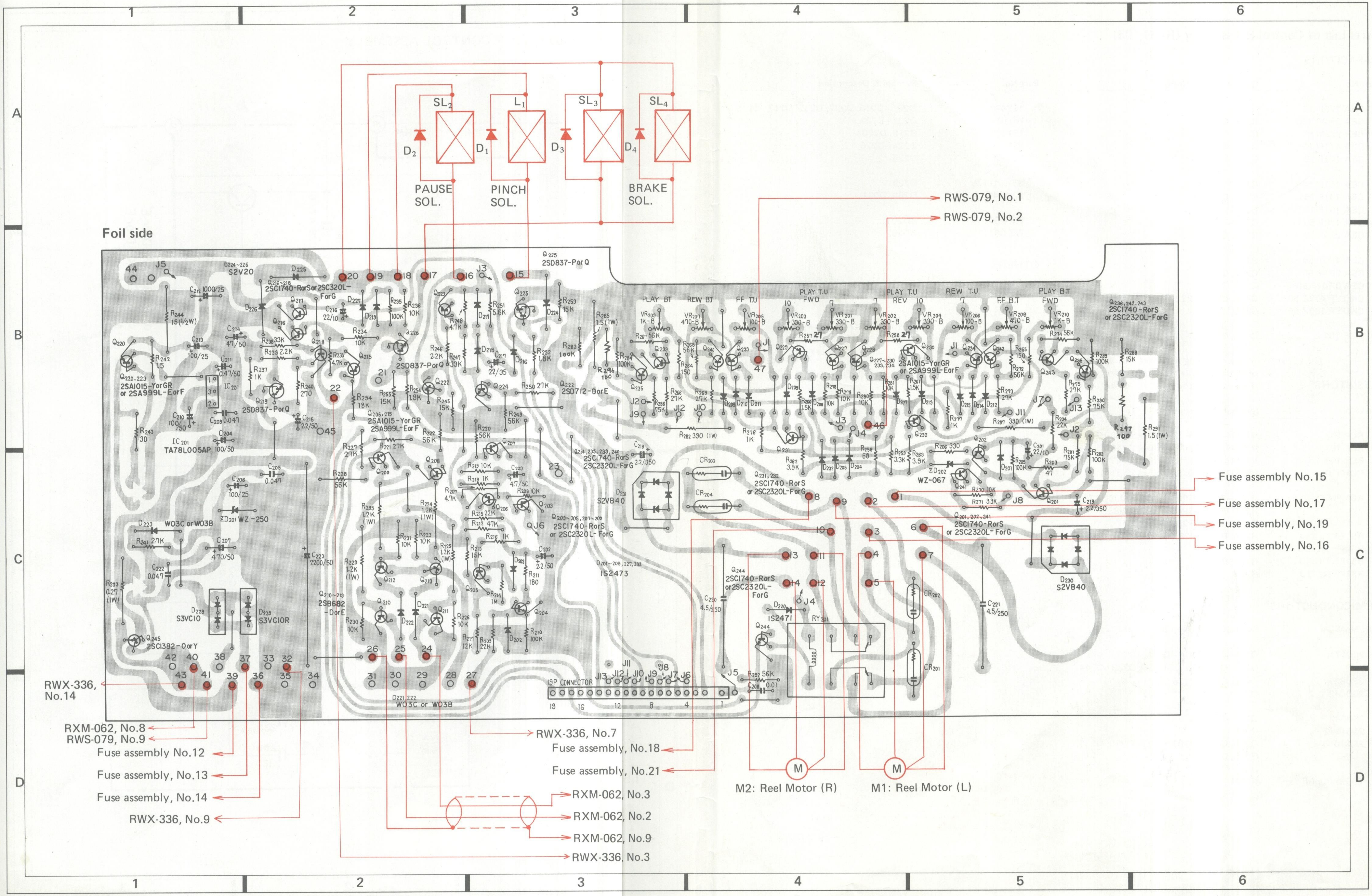
D201~215, 217~219, 227, 232 : 1S2473

D216, 220 : 1S1585

D221~223 : W03C or W03B

D224~226 : S2V20

Foil side


PAUSE SOL.
PINCH SOL.
BRAKE SOL.
RWS-079, No.1
RWS-079, No.2
Fuse assembly No.15
Fuse assembly No.17
Fuse assembly, No.19
Fuse assembly, No.16
RWX-336, No.14
RXM-062, No.8
RWS-079, No.9
Fuse assembly No.12
Fuse assembly, No.13
Fuse assembly, No.14
RWX-336, No.9
RWX-336, No.7
Fuse assembly, No.18
Fuse assembly, No.21
RXM-062, No.3
RXM-062, No.2
RXM-062, No.9
RWX-336, No.3
M2: Reel Motor (R)
M1: Reel Motor (L)
19P CONNECTOR

Parts List of Control B Assembly (RWG-105)

CAPACITORS

Part No.	Symbol & Description
CEA 220P 35	C217
CEA 2R2P 350	C218, C219
CEB 222M 50	C223
CEA 471M 50	C207
CEA 102P 25	C212
CEA 101M 50	C204
CEA 101P 25	C206, C213
CEA 101P 10	C210
CEA 470P 50	C214
CEA 220P 10	C201, C216
CEA 4R7P 50	C203
CEA 2R2P 50	C202, C215
CEA 0R47P 50	C211
CKDYF 473Z 50	C205, C209, C222
CKDYF 103Z 50	C208
⚠ RCE-201	C220, C221

Note: *When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.*

RESISTORS

Part No.	Symbol & Description		
RCP-107	VR201–VR204	Semi-fixed	330Ω-B
RCP-104	VR205, VR206	Semi-fixed	100Ω-B
RCP-108	VR207, VR208	Semi-fixed	470Ω-B
RCP-110	VR209, VR210	Semi-fixed	1k-B
RD¼PM □□□ J	R201–R223, R226–R228, R230, R231, R233–R243, R245–R281, R283, R284, R286, R288–R290, R292		
RS1PF □□□ J	R224, R225, R287, R282, R295, R229		
⚠ RS½PF □□□ J	R244		
RS1PF □R□ J	R285, R291		
RS1PF R□□ J	R293		

SEMICONDUCTORS

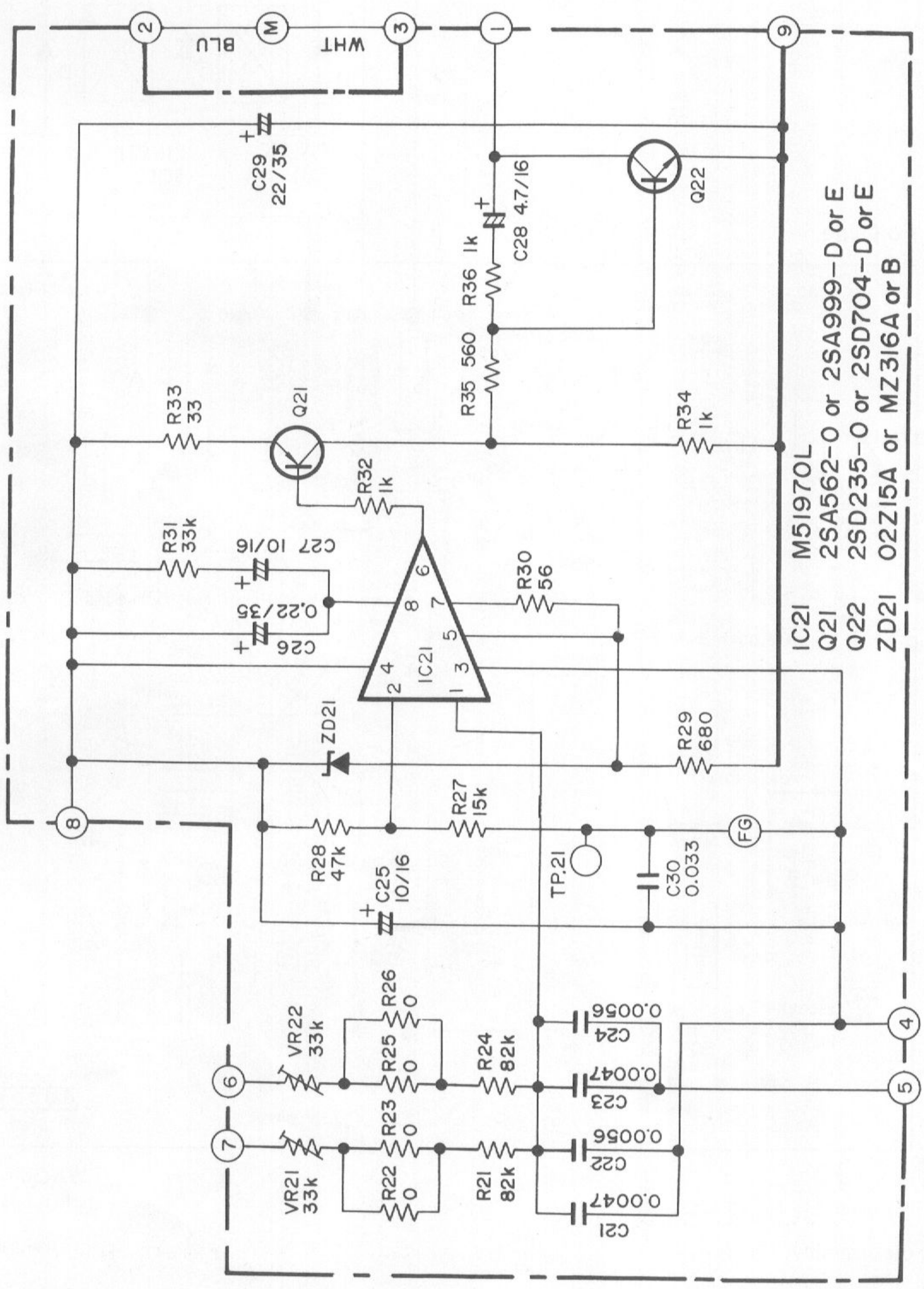
Part No.	Symbol & Description
2SC1740	Q201–209, Q216–Q218, Q224, Q231, Q232, Q235, Q236, Q239–Q244
2SD837	Q219, Q225, Q226
2SD712	Q222
2SB682	Q210–Q213
2SC1382	Q245
2SA1015	Q206, Q220, Q223, Q227–Q230, Q233, Q215, Q234
TA78L005AP	IC201

Part No.	Symbol & Description
1S2473-T	D201–D215, D227, D232, D217–D219
W03B	D221–D223
1S1585	D216, D220
S2V20	D224–D226
⚠ S3VC10	D228
⚠ S3VC10R	D229
⚠ S2VB40	D230, D231
WZ-250	ZD201
WZ-067	ZD202

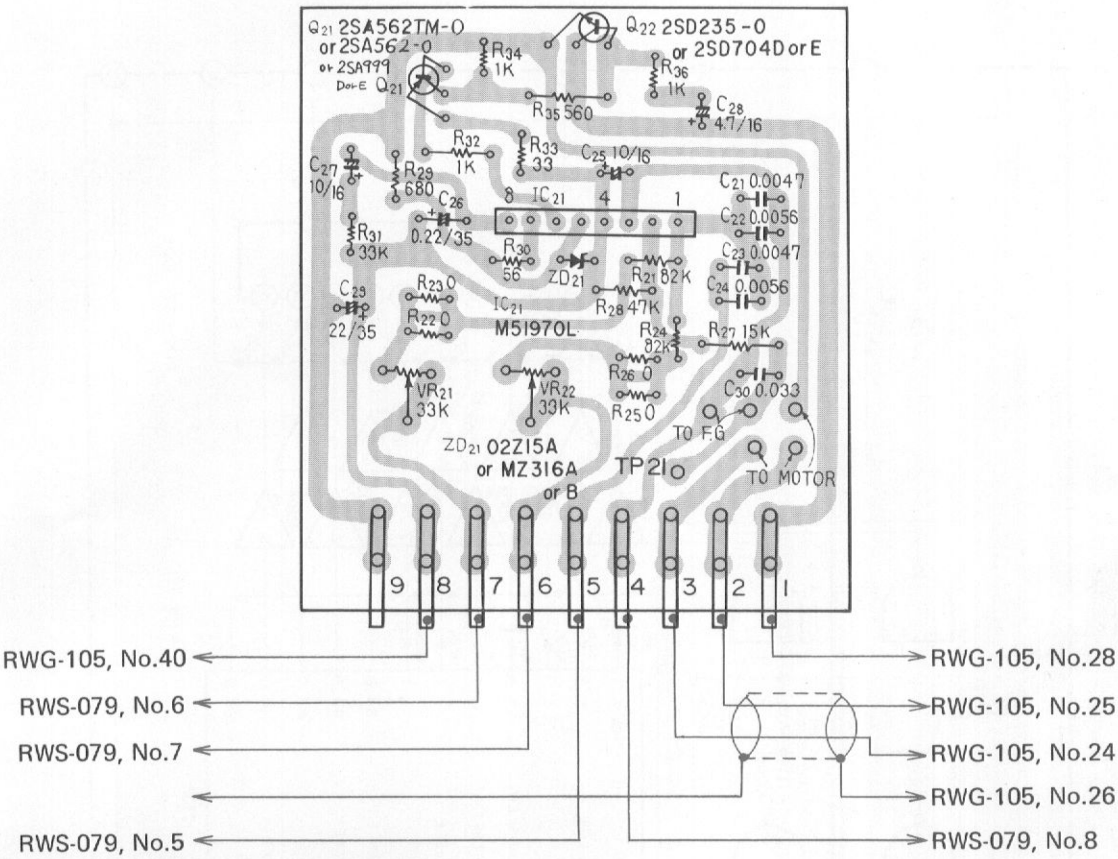
OTHERS

Part No.	Symbol & Description	
⚠ RSR-024	RY201	Relay
⚠ RWX-030	CR201–CR204	Spark killer
REE-051		Spacer
RKH-005		Spacer

11.6 CAPSTAN MOTOR CONTROL ASSEMBLY



Foil side



Parts List

CAPACITORS

Part No.	Symbol & Description
CQPA 472G 50	C21, C23
(CQPA 472F 50)	
CQMA 562J 50	C22, C24
CEA 100P 16	C25, C27
CSZA R22M 35	C26
(CSZAH R22M 35)	
CEA 4R7P 16	C28
CEA 220P 35	C29
CQMA 333K 50	C30

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

RESISTORS

Part No.	Symbol & Description
RCP-119	VR21, VR22 Semi-fixed 33k-B
RN¼PR □□□ G	R21, R22
RD¼VS □□□ J	R27–R36

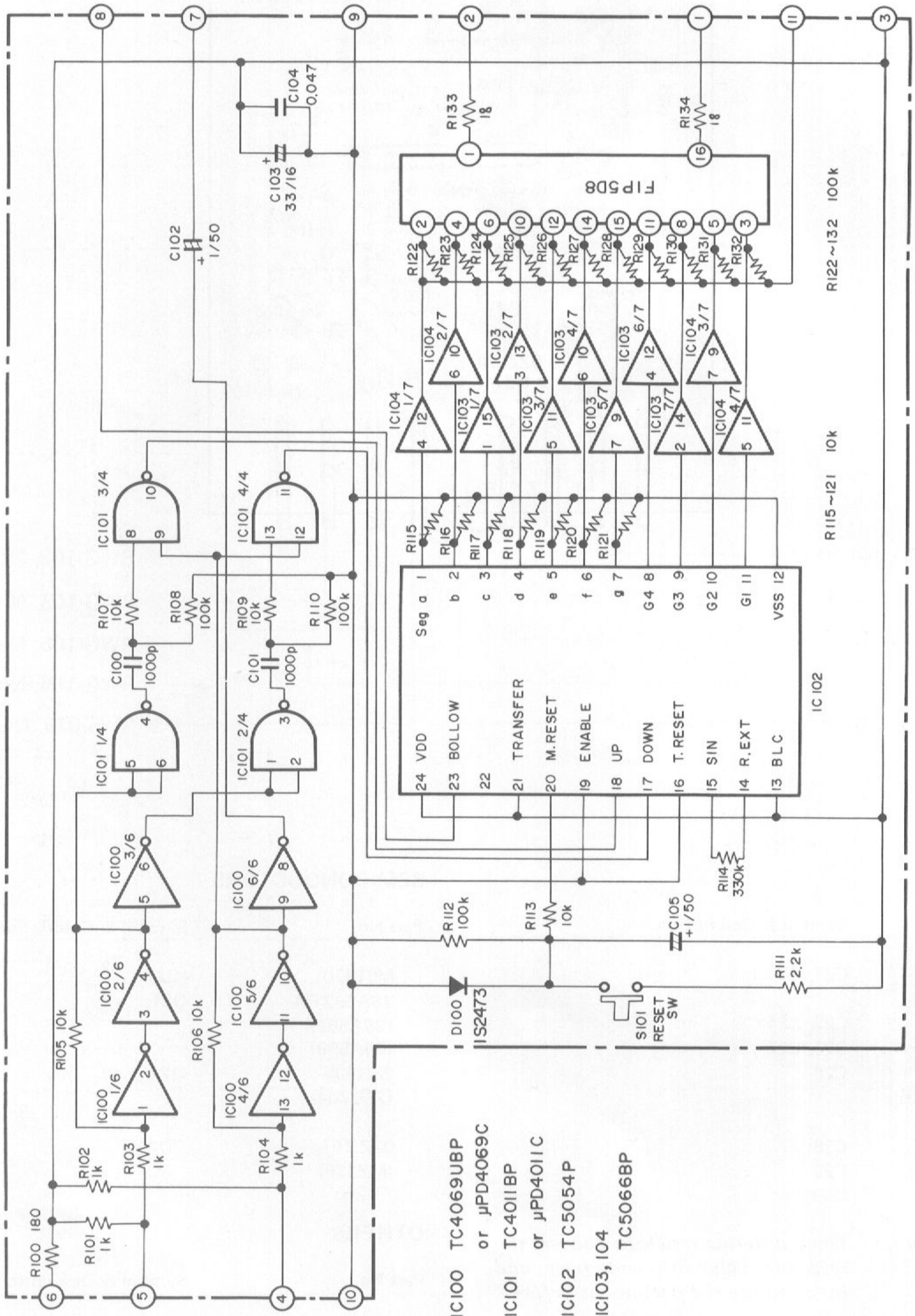
SEMICONDUCTORS

Part No.	Symbol & Description
M51970L	IC21
2SA562TM	Q21
(2SA562)	
(2SA999)	
2SD235	Q22
(2SD704)	
02Z 15A	ZD21
(MZ316)	

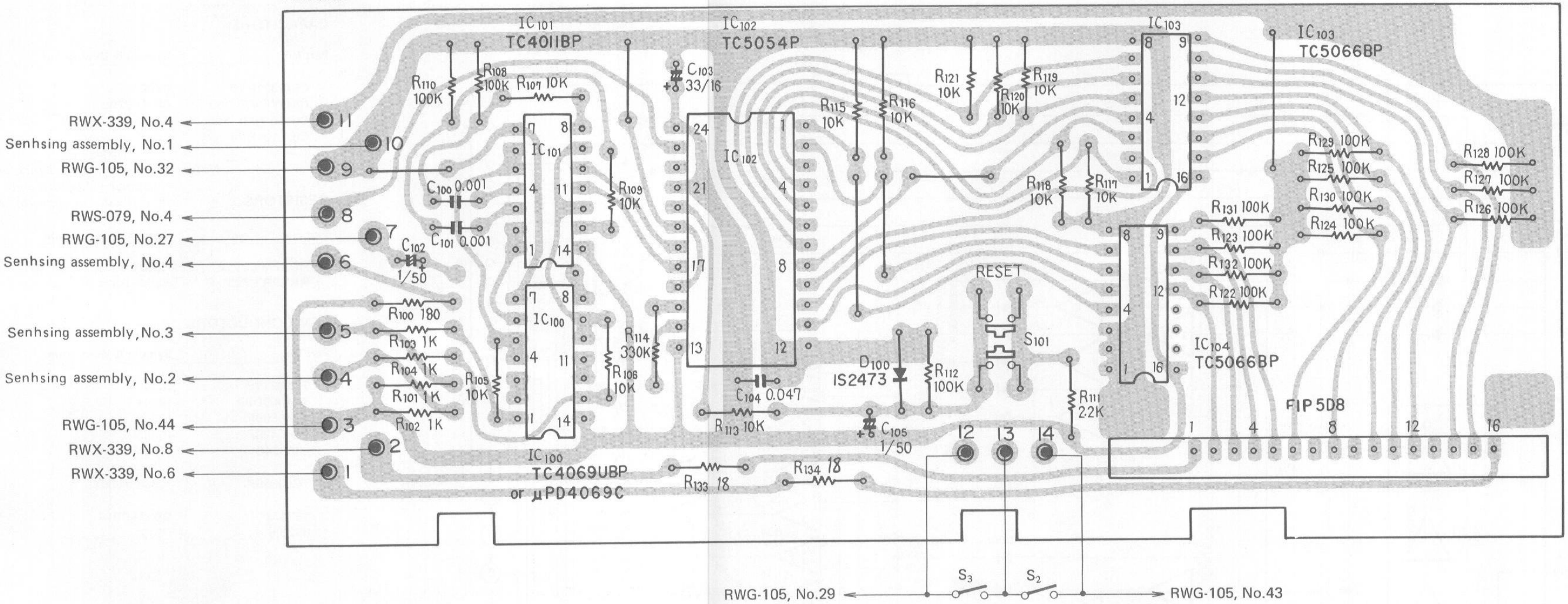
OTHERS

Part No.	Symbol & Description
REE-051	Insulator spring
REE-068	Insulator spacer

11.7 COUNTER ASSEMBLY (RWX-336)



Foil side



Parts List of Counter Assembly (RWX-366)

SWITCH

Part No.	Symbol & Description	
RSG-063	S101	Function switch

CAPACITORS

Part No.	Symbol & Description
CKDYB 102K 50	C100, C101
CEA 010P 50	C102, C105
CEA 330P 16	C103
CKDYF 473Z 50	C104

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

RESISTORS

Part No.	Symbol & Description
RD¼PM □□□ J	R100–R134

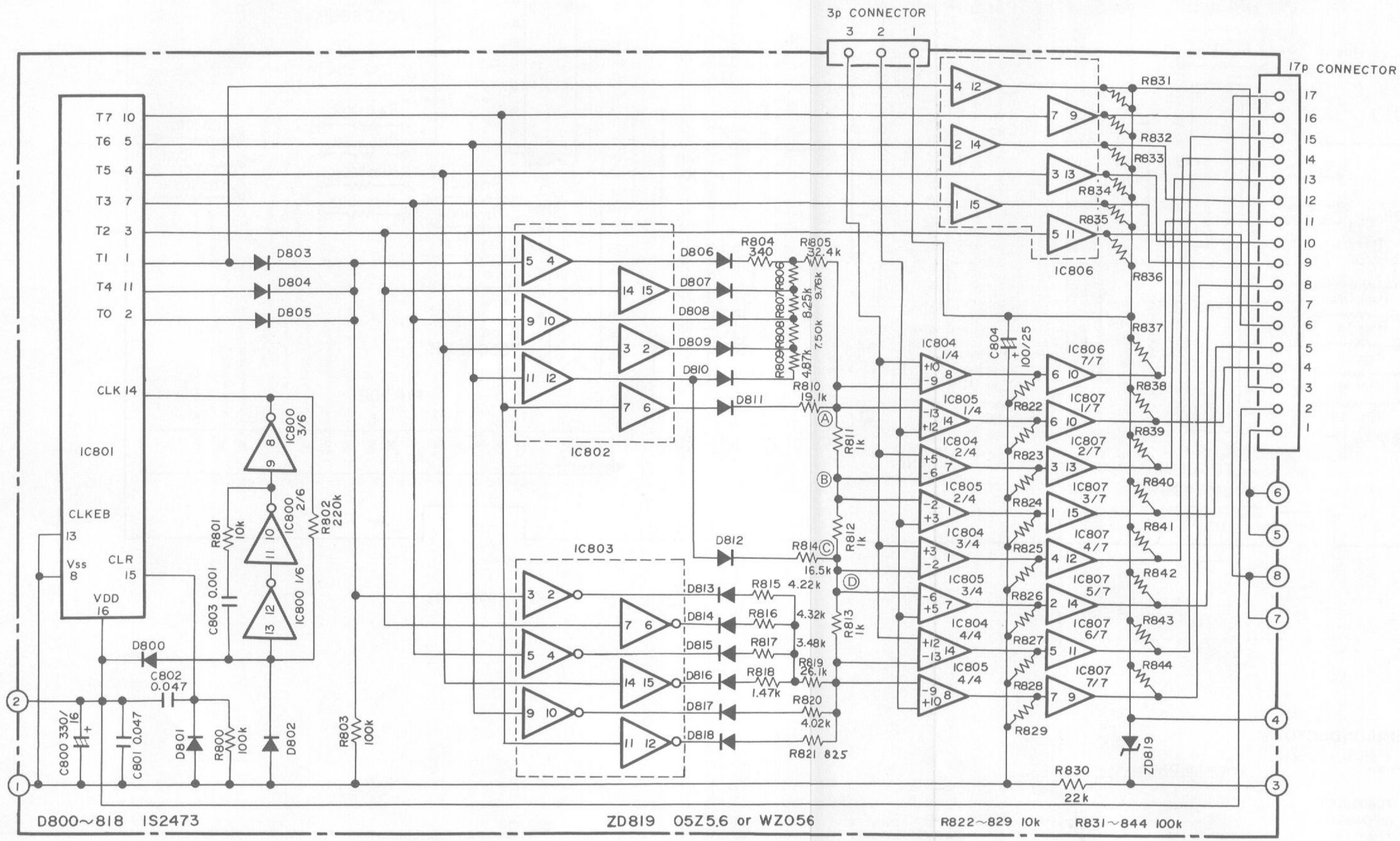
SEMICONDUCTORS

Part No.	Symbol & Description
TC4069UBP (µPD4069C)	IC100
TC4011BP (µPD4011C)	IC101
TC5054P	IC102
TC5066BP	IC103, IC104
1S2473	D100

OTHERS

Part No.	Symbol & Description
FIP5D8	Flourescent indicator tube

11.8 DRIVE ASSEMBLY (RWX-339)



IC800 TC4069UBP or μPD4069C
IC801 TC4022BP
IC802 TC4050BP
IC803 TC4049BP
IC804,805 μPC324C
IC806,807 TC5066BP

Parts List

CAPACITORS

Part No.	Symbol & Description
CEA 331P 16	C800
CKDYF 473Z 50	C801, C802
CQMA 102K 50	C803
CEA 101P 25	C804

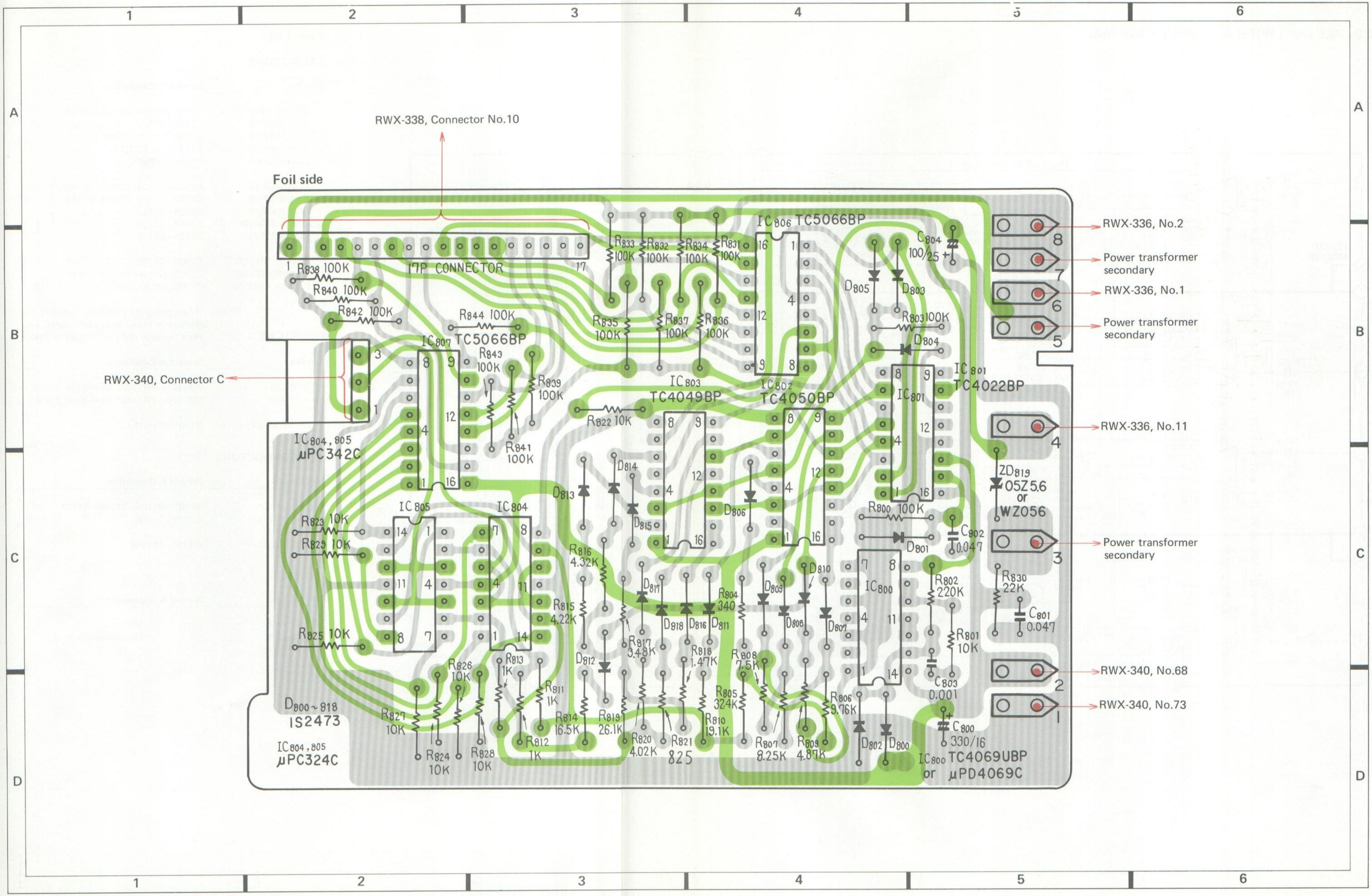
Note: When ordering resistors, convert the resistance value into code form, and then rewite the part no. as before.

RESISTORS

Part No.	Symbol & Description
RD¼PM □□□ J	R800–R803, R822–R844
RN¼PR □□□□ F	R804–R821

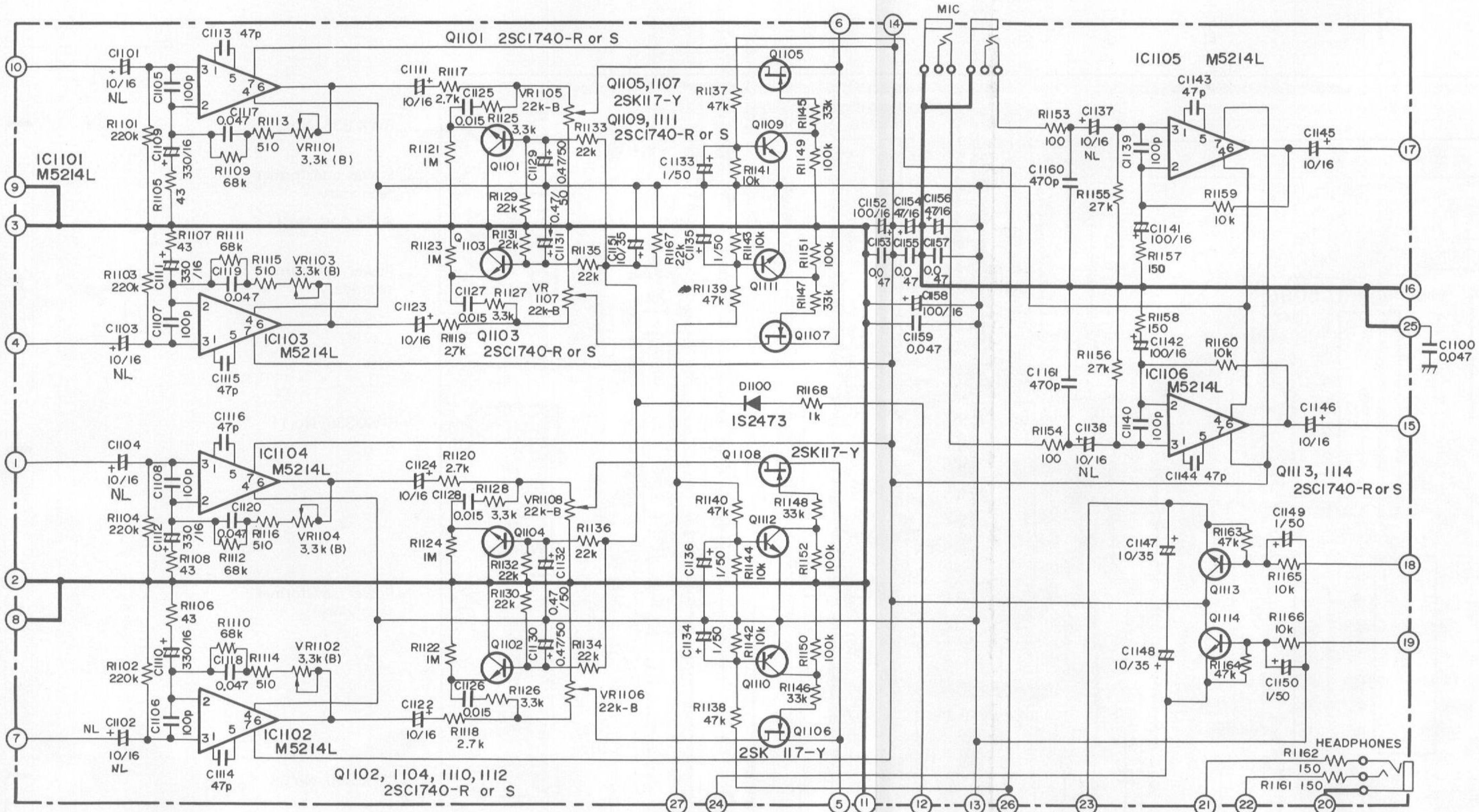
SEMICONDUCTORS

Part No.	Symbol & Description
TC4022BP	IC800
TC4069UBP	IC801
TC4050BP	IC802
TC4049BP	IC803
μPC324C	IC804, IC805
TC5066BP	IC806, IC807
1S2473	D800–D818
05Z5.6	D819



RWX-338, Connector No.10
Foil side
17P CONNECTOR
RWX-340, Connector C
RWX-336, No.2
Power transformer secondary
RWX-336, No.1
Power transformer secondary
RWX-336, No.11
Power transformer secondary
RWX-340, No.68
RWX-340, No.73
IC806 TC5066BP
IC807 TC5066BP
IC803 TC4049BP
IC802 TC4050BP
IC801 TC4022BP
IC804, 805 µPC342C
IC805
IC804
IC800
ZD819 05Z5.6 or WZ056
D800~818 IS2473
IC804, 805 µPC324C
IC800 TC4069UBP or µPD4069C

11.9 PRE AMPLIFIER ASSEMBLY (RWF-088)



Parts List

CAPACITORS

Part No.	Symbol & Description
CEANL 100P 16	C1101–C1104, C1137, C1138
CEA 331P 16	C1109–C1112
CEA 101P 16	C1141, C1142, C1152, C1158
CEA 100P 35	C1147, C1148, C1151
CEA 470P 16	C1154, C1156
CEA 100P 16	C1121–C1124, C1145, C1146
CEA 010P 50	C1133–C1136, C1149, C1150
CEA R47P 50	C1129–C1132
CQMA 473J 50	C1117–C1120
CQMA 153J 50	C1125–C1128
CCDCH 101J 50	C1105–C1108, C1139, C1140
CCDCH 470J 50	C1113–C1116, C1143, C1144
CKDYF 473Z 50	C1100, C1153, C1155, C1157, C1159

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

RESISTORS

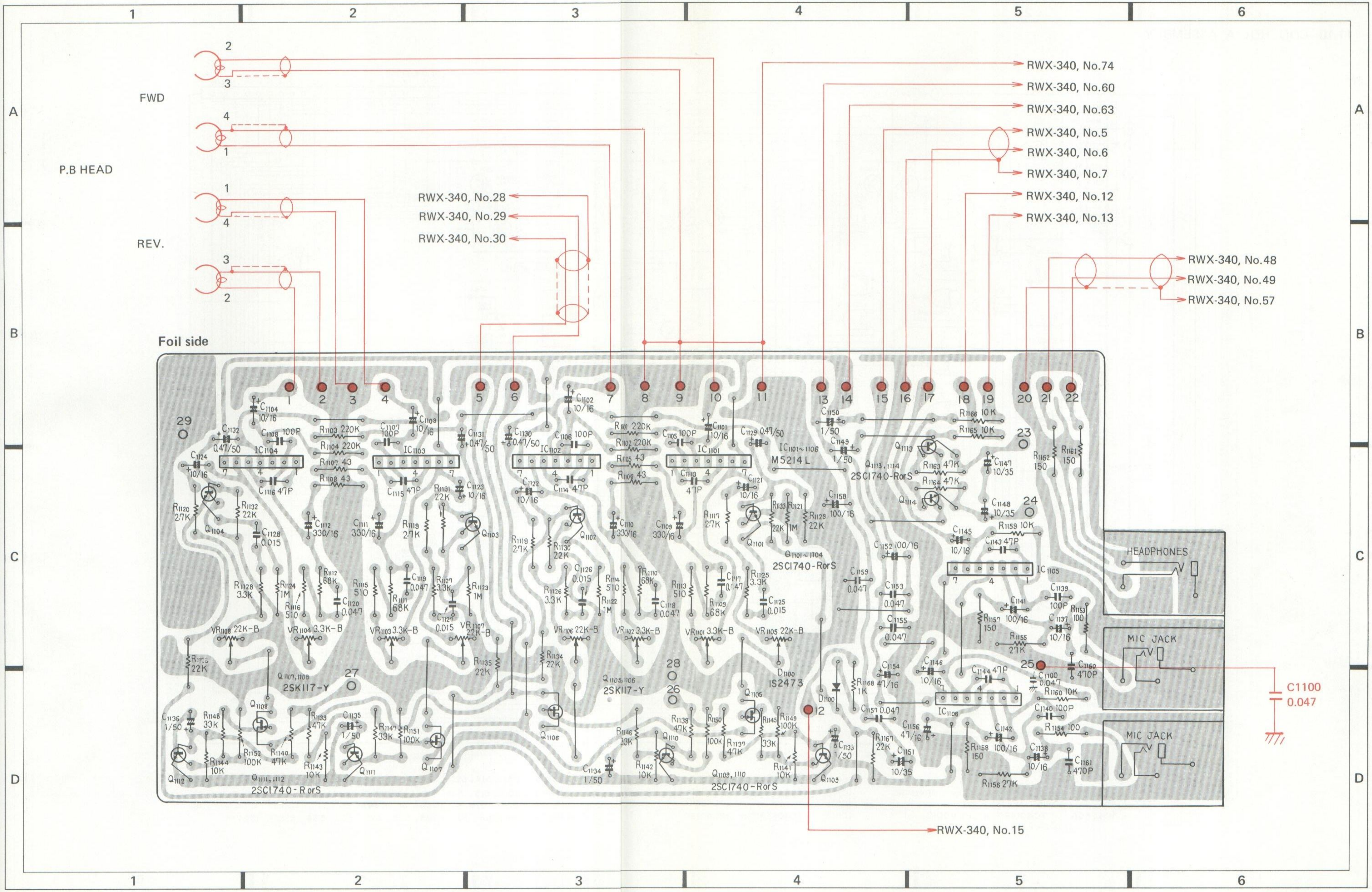
Part No.	Symbol & Description
RCP-039	VR1101–VR1104 Semi-fixed 3.3k-B
RCP-009	VR1105–VR1108 Semi-fixed 22k-B
RD¼PM □□□ J	R1101–R1168

SEMICONDUCTORS

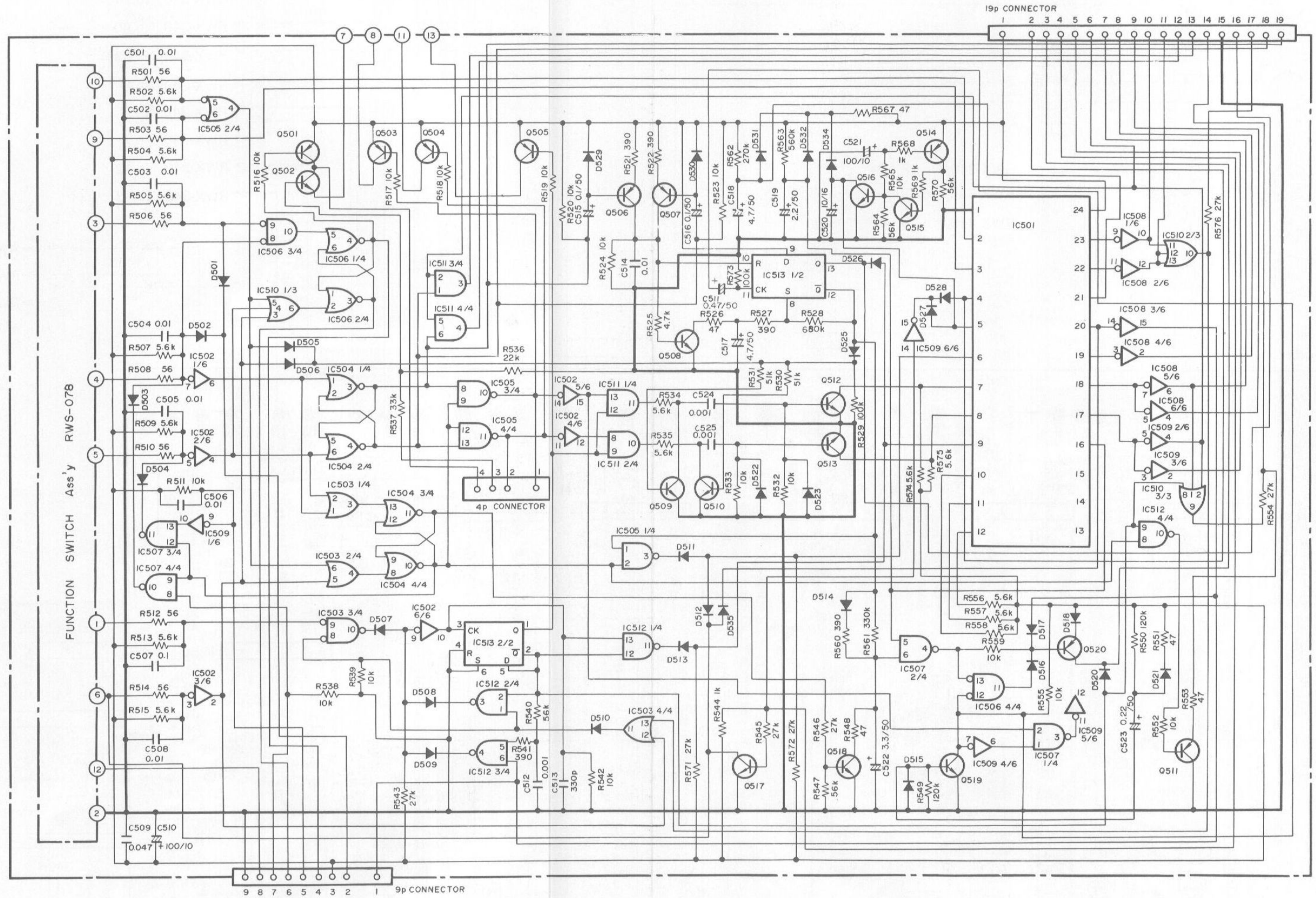
Part No.	Symbol & Description
2SC1740LN	Q1101–Q1104, Q1109–Q1114
2SK117Y	Q1105–Q1108
M5214L	IC1101–IC1106

OTHERS

Part No.	Symbol & Description
RKN-058	MIC jack
RKN-056	Headphones jack


P.B HEAD
FWD
REV.
Foil side
RWX-340, No.74
RWX-340, No.60
RWX-340, No.63
RWX-340, No.5
RWX-340, No.6
RWX-340, No.7
RWX-340, No.12
RWX-340, No.13
RWX-340, No.28
RWX-340, No.29
RWX-340, No.30
RWX-340, No.48
RWX-340, No.49
RWX-340, No.57
RWX-340, No.15
HEADPHONES
MIC JACK
MIC JACK
C1100
0.047
IC1101~1106
M5214L
Q1101~1104
2SC1740-RorS
Q1113,1114
2SC1740-RorS
Q1107,1108
2SK117-Y
Q1105,1106
2SK117-Y
Q1111,1112
2SC1740-RorS
Q1109,1110
2SC1740-RorS
D1100
1S2473

11.10 CONTROL A ASSEMBLY

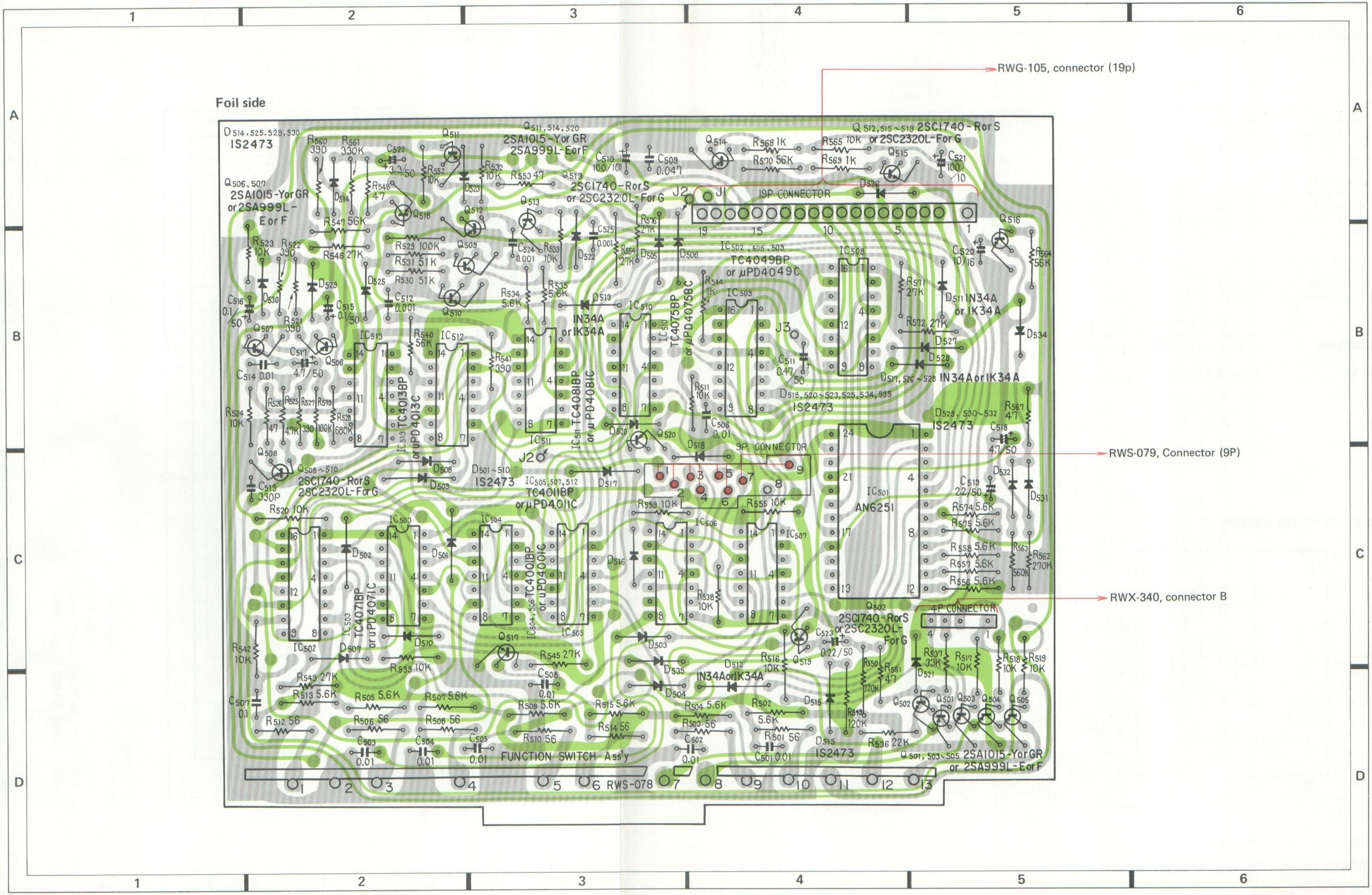


IC501 : AN6251
IC502, 508, 509 : TC4049BP or μPD4049C
IC503 : TC4071BP or μPD4071C
IC504, 506 : TC4001BP or μPD4001C

IC505, 507, 512 : TC4011BP or μPD4011C
IC510 : TC4075BP or μPD4075BC
IC511 : TC4081BP or μPD4081C
IC513 : TC4013BP or μPD4013C

Q501, 503~507, 511, 514, 520 : 2SA1015-Y or GR or 2SA999L-E or F
Q502, 508~510, 512, 513, 515~519 : 2SC1740-R or S or 2SC2320L-F or G
D511~513, 517, 526~528 : 1N34A or 1K34A
D501~510, 514~516, 518, 520~523, 525, 529~532, 534, 535 : 1S2473

Foil side


RWG-105, connector (19p)
RWS-079, Connector (9P)
RWX-340, connector B
19P CONNECTOR
9P CONNECTOR
4P CONNECTOR
FUNCTION SWITCH Ass'y
RWS-078
IC501 AN6251
TC4049BP or μPD4049C
TC4075BP or μPD4075BC
TC4081BP or μPD4081C
TC4013BP or μPD4013C
TC4011BP or μPD4011C
TC4001BP or μPD4001C
TC4071BP or μPD4071C
2SA1015-Y or GR or 2SA999L-E or F
2SC1740-R or S or 2SC2320L-F or G
1S2473
1N34A or 1K34A

Parts List of Control A Assembly

CAPACITORS

Part No.	Symbol & Description
CKDYF 103Z 50	C501–C508, C514
CEA R10M 50	C515, C516
CEA 2R2M 50	C519
CEA 4R7M 50	C517, C518
CEA 010P 50	C526
CEA 100P 16	C520
CEA R22M 50	C523
CEA 101P 10	C510, C521
CQMA 102K 50	C512, C524, C525
CKDYF 473Z 50	C509
CKDYB 331K 50	C513
CQMA 104K 50	C507
CEA R47P 50	C511
CEA 3R3M 50	C522

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

RESISTORS

Part No.	Symbol & Description
RD¼PM □□□ J	R501–R572

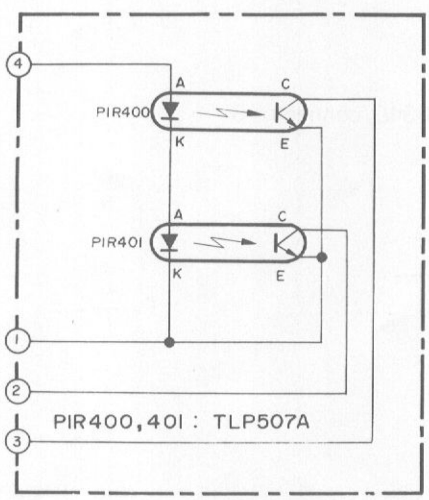
SEMICONDUCTORS

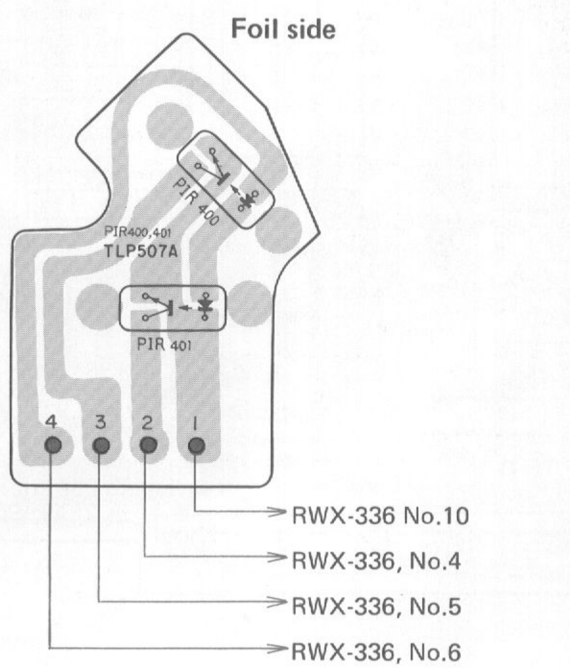
Part No.	Symbol & Description
AN6251	IC501
TC4049BP	IC502, IC508, IC509
TC4075BP	IC510
TC4001BP	IC504, IC506
TC4011BP	IC505, IC507, IC512
TC4071BP	IC503
TC4081BP	IC511
TC4013BP	IC513
2SA1015	Q501, Q503–Q507, Q511, Q514, Q520
2SC1740	Q502, Q508–Q510, Q512, Q513, Q515–Q519
1S2473	D501–D510, D514, D516, D534, D535, D518, D520–D523, D525, D529, D530–D532
1N34A	D511–D513, D526–D528, D517

OTHERS

Part No.	Symbol & Description
RKP-128	Connector assembly
RKP-027	Connector
RWS-078	Function switch assembly

11.11 SENSING ASSEMBLY

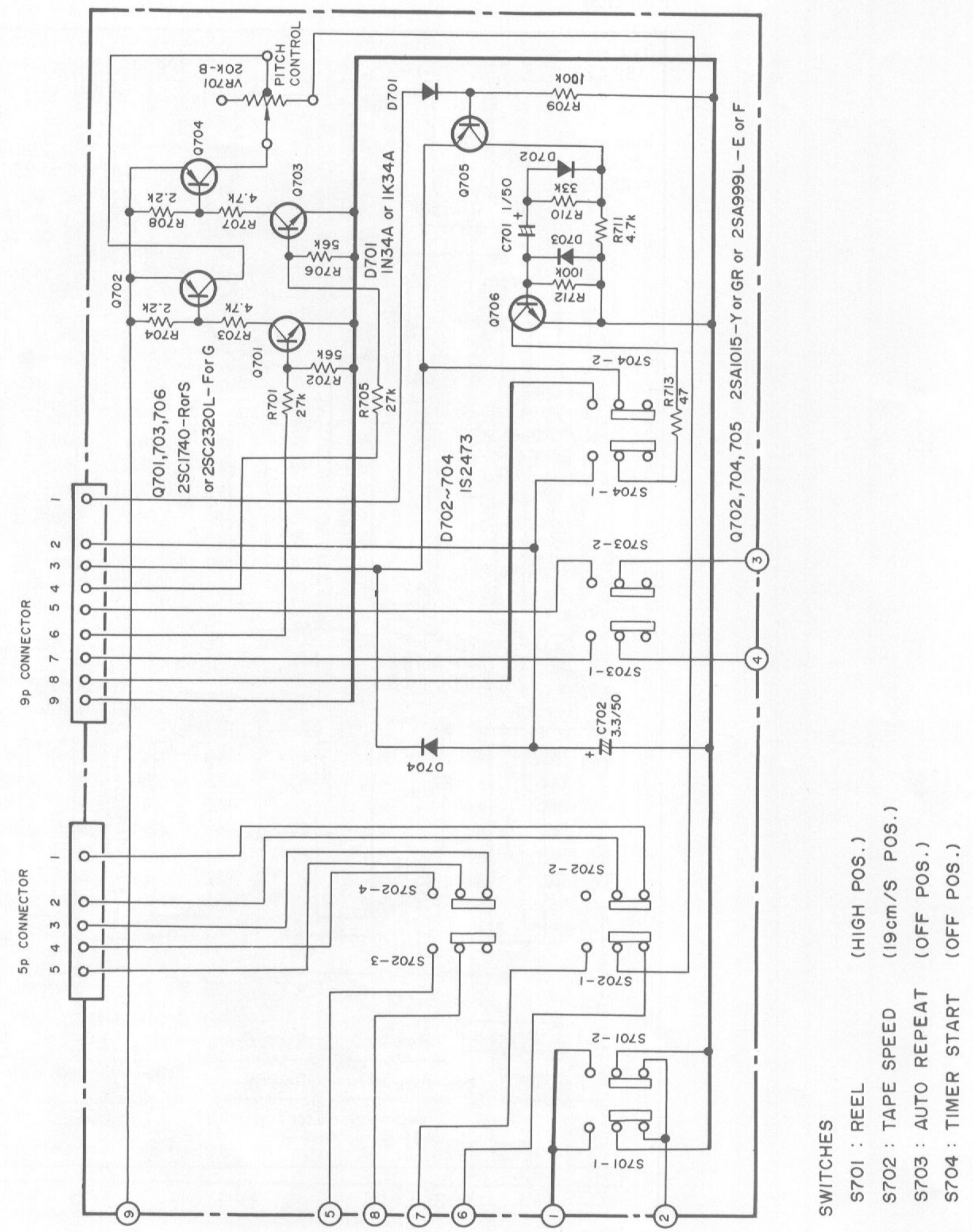


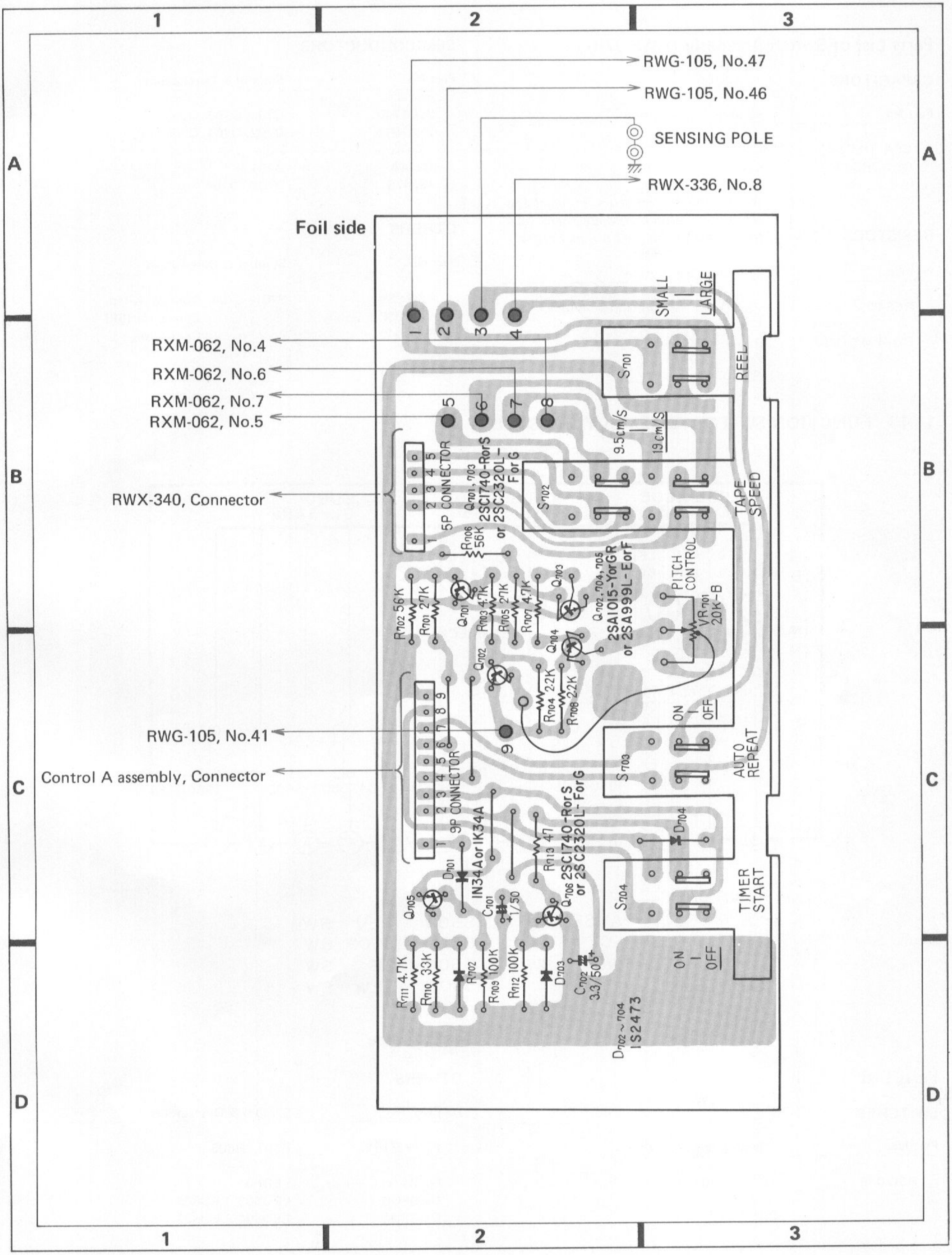


Parts List

Part No.	Symbol & Description
TLP507A	PIR400, PIR401

11.12 SWITCH ASSEMBLY (RWS-079)




1
2
3
A
B
C
D
RWG-105, No.47
RWG-105, No.46
SENSING POLE
RWX-336, No.8
Foil side
RXM-062, No.4
RXM-062, No.6
RXM-062, No.7
RXM-062, No.5
RWX-340, Connector
RWG-105, No.41
Control A assembly, Connector
SMALL
LARGE
REEL
9.5cm/s
19cm/s
TAPE SPEED
5P CONNECTOR
Q701, 703 2SC1740-RorS or 2SC2320L-ForG
R706 56K
R702 56K
R701 27K
R703 4.7K
R705 27K
R707 4.7K
Q702, 704, 705 2SA1015-YorGR or 2SA999L-EorF
PITCH CONTROL
VR701 20K-B
R704 2.2K
R708 22K
ON OFF
AUTO REPEAT
9P CONNECTOR
1N34A or 1K34A
D701
D704
R713 47
Q706 2SC1740-RorS or 2SC2320L-ForG
C701 1/50
TIMER START
R711 4.7K
R710 33K
R709 100K
R712 100K
D702
D703
C702 3.3/50
D702~704 1S2473

Parts List of Switch Assembly (RWS-079)

CAPACITORS

Part No.	Symbol & Description
CEA 010P 50	C701
CEA 3R3P 50	C702

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

RESISTORS

Part No.	Symbol & Description
RCS-022	VR701 Pitch control volume
RD¼PM □□□ J	R701–R713

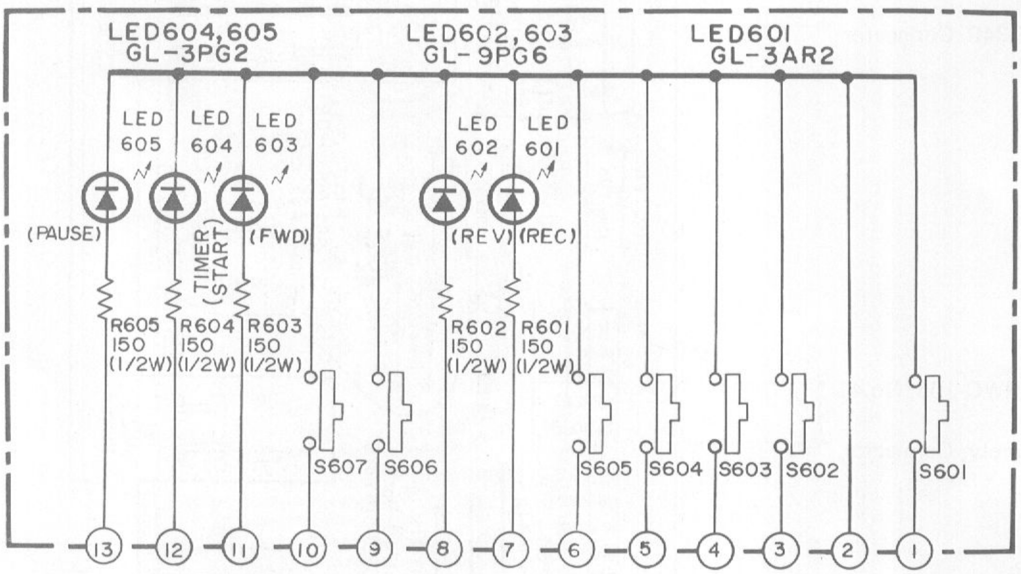
SEMICONDUCTORS

Part No.	Symbol & Description
2SC1740	Q701, Q703, Q706
2SA1015	Q702, Q704, Q705
1N34A	D701
1S2473	D702–D704

OTHERS

Part No.	Symbol & Description
RSG-089	S701–S704 Control switch
RKP-036	Connector (5P)
RKP-040	Connector

11.13 FUNCTION SWITCH ASSEMBLY (RWS-078)



SWITCHES

S601	PAUSE	SW	S604	REV	SW
S602	REC	SW	S605	STOP	SW
S603	FWD	SW	S606	FF	SW
			S607	REW	SW

Parts List

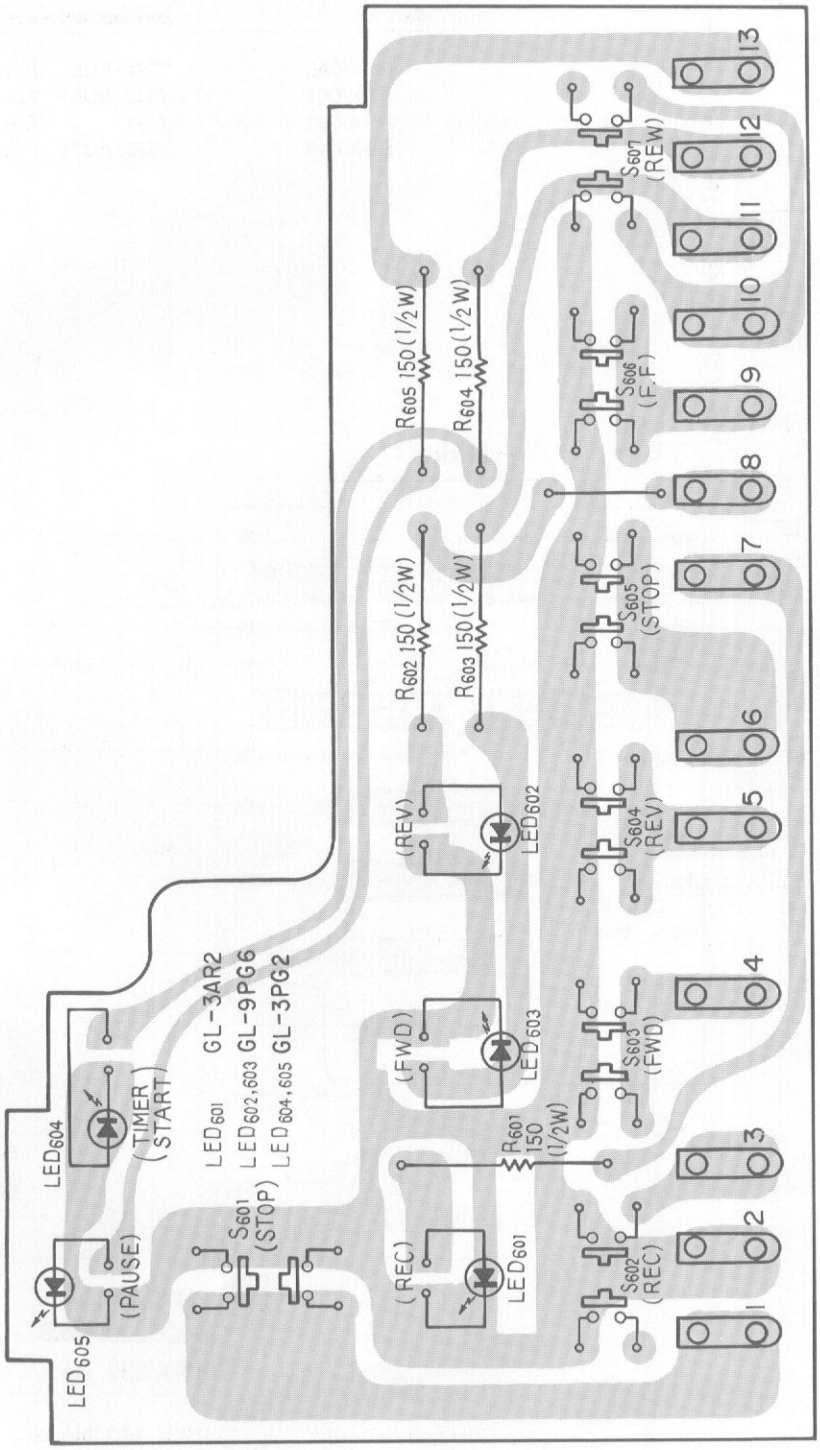
SWITCHES

Part No.	Symbol & Description
RSG-088	S601–S607 Push switch

OTHERS

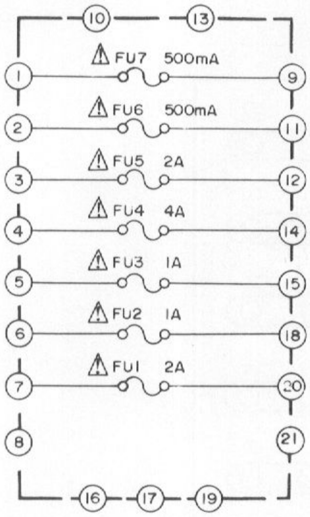
Part No.	Symbol & Description
RS½PF 151J	R601–R605
GL-3AR2	LED601
GL-9PG6	LED602, LED603
GL-3PG2	LED604, LED605

Foil side



S607 (REW)
S606 (F.F)
S605 (STOP)
S604 (REV)
S603 (FWD)
S602 (REC)
S601 (STOP)
R605 150 (1/2W)
R604 150 (1/2W)
R602 150 (1/2W)
R603 150 (1/2W)
R601 150 (1/2W)
(REV) LED602
(FWD) LED603
(REC) LED601
LED604 (TIMER START)
LED605 (PAUSE)
LED601 GL-3AR2
LED602,603 GL-9PG6
LED604,605 GL-3PG2
1
2
3
4
5
6
7
8
9
10
11
12
13

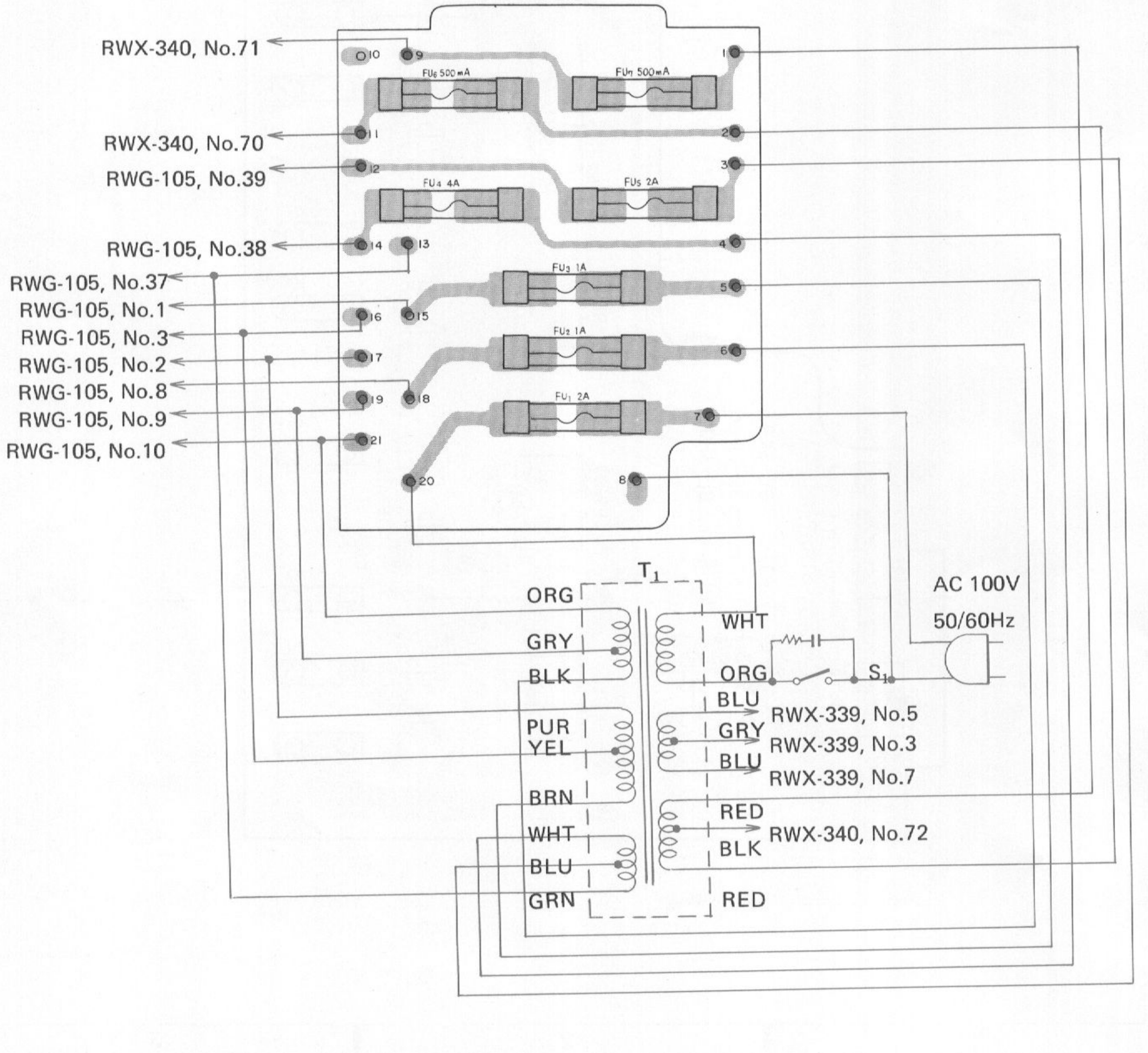
11.14 FUSE ASSEMBLY



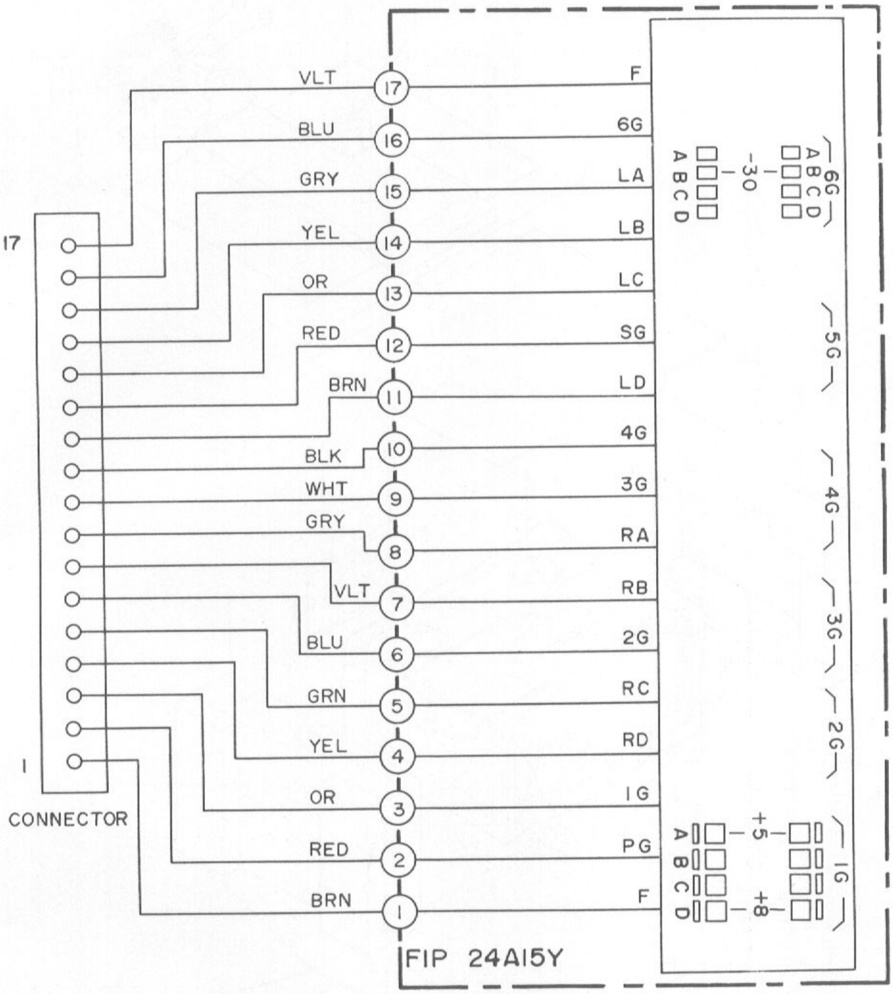
Parts List

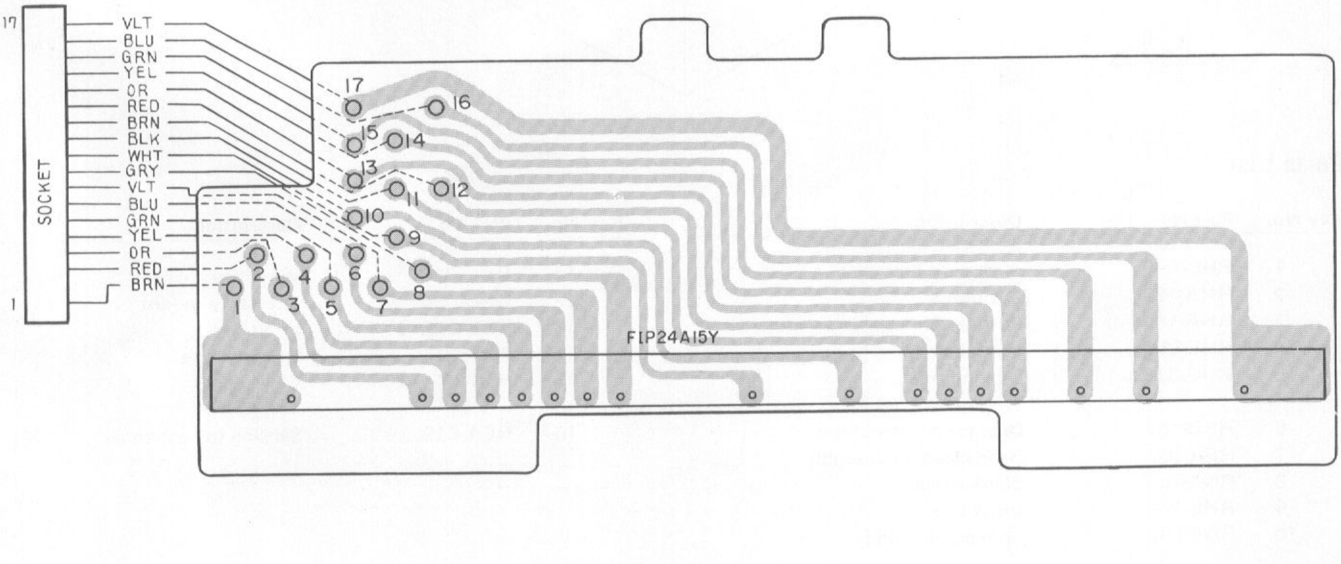
Part No.	Symbol & Description	
REK-055	FU1, FU5	Fuse 2A
REK-051	FU2, FU3	Fuse 1A
REK-066	FU4	Fuse 4A
REK-048	FU6, FU7	Fuse 0.5A

Foil side

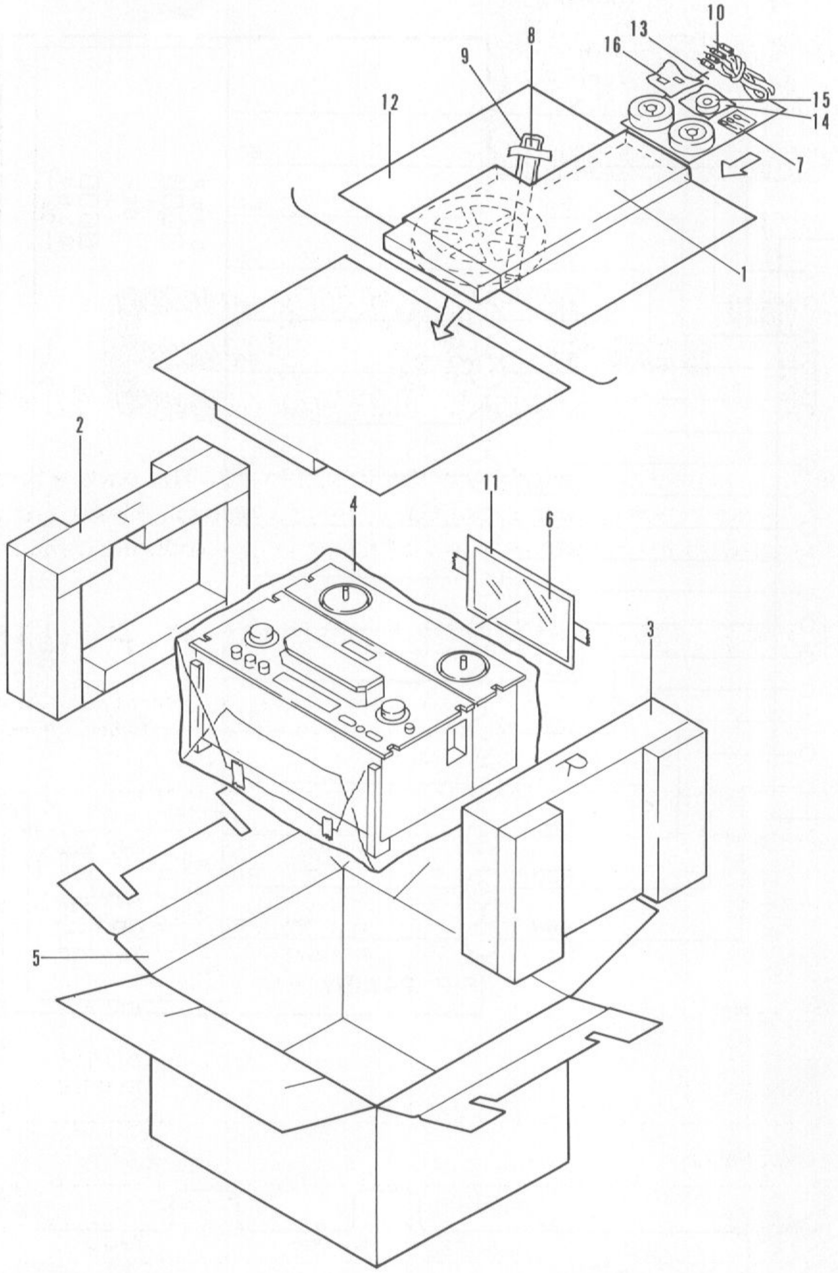


11.15 F.L. METER ASSEMBLY





12. PACKING



Parts List

Key No.	Part No.	Description
1.	RHC-095	Accessory box
2.	RHA-188	Cushion L
3.	RHA-189	Cushion R
4.	RHL-055	Vinyl bag
5.	RHG-313	Packing case
6.	RRB-107	Operating instructions
7.	REA-021	Head cleaning assembly
8.	RNA-428	Blank panel
9.	RHL-056	Vinyl bag
10.	RDE-010	Connection code
11.	RHL-018	Vinyl bag
12.	RHC-094	Accessory mount
13.	RHL-025	Vinyl bag
14.	P45-851	Splicing tape
15.	H46-853	Vinyl bag B
16.	REA-019	Sensing foil assembly

ADDITIONAL

Service Manual

PIONEER

3-MOTOR 4-HEAD
TAPE DECK

RT-909 D/G

This additional service manual is applicable to the RT-909 D/G. The parts which are different from the RT-909/KU are covered in this additional service manual. Please use this additional service manual together with the RT-909/KU service manual when ordering parts and repair.

1. CONTRAST OF MISCELLANEOUS PARTS

- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. There fore, when replacing, be sure to use parts of identical designation.*

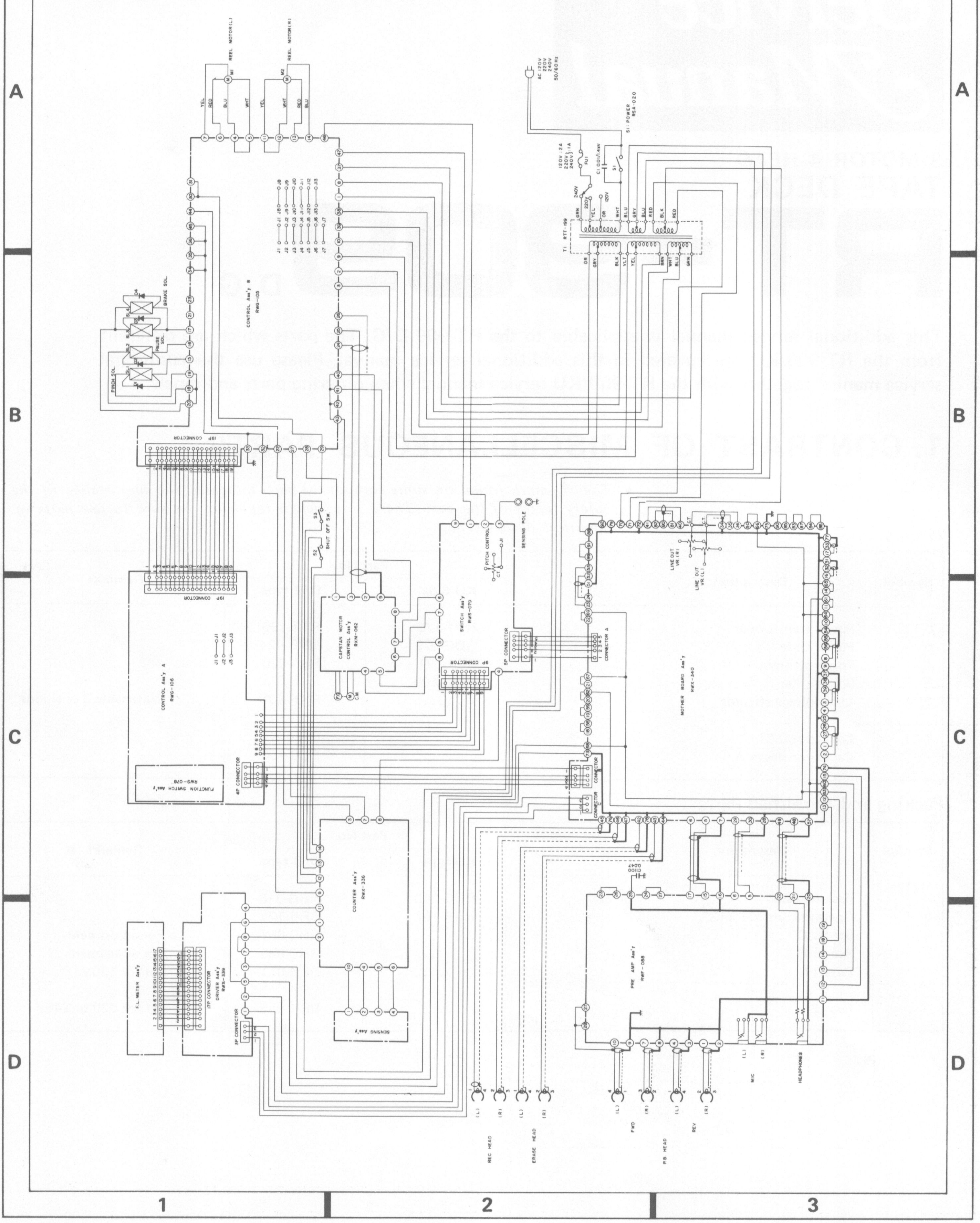
Others

Symbol	Description	Part No.		Remarks
		KU type	D/G type	
⚠T1	Power transformer	RTT-178	RTT-199	
⚠	Power code	RDG-022	RDG-024	
⚠	Power switch	RSA-021	RSA-020	
⚠	Spark killer	RWX-109	....	
⚠	Line voltage selector	....	RKR-020	Switchable 3 positions
⚠C1	Capacitor 0.01	....	C43-003	
	Capacitor sleeve A	....	REC-150	

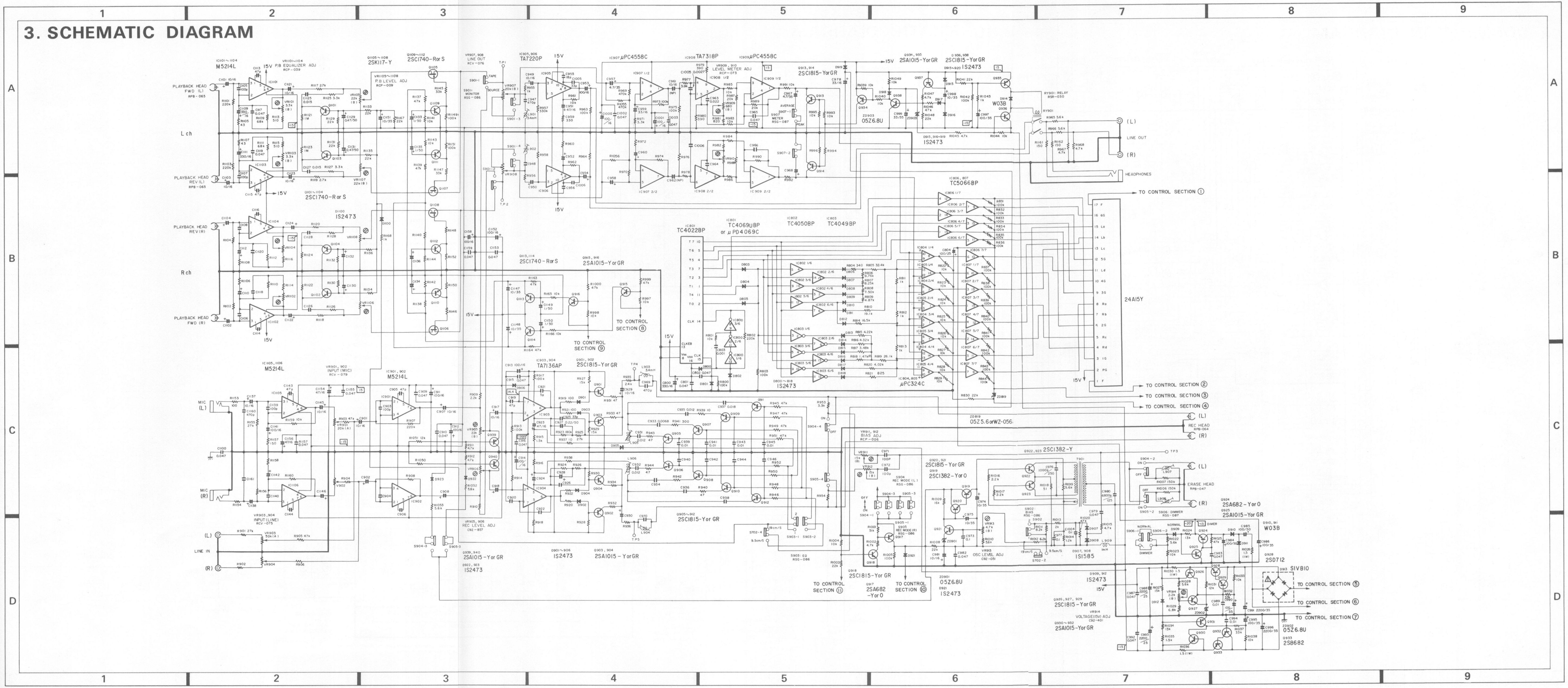
Packing and Furnished Parts

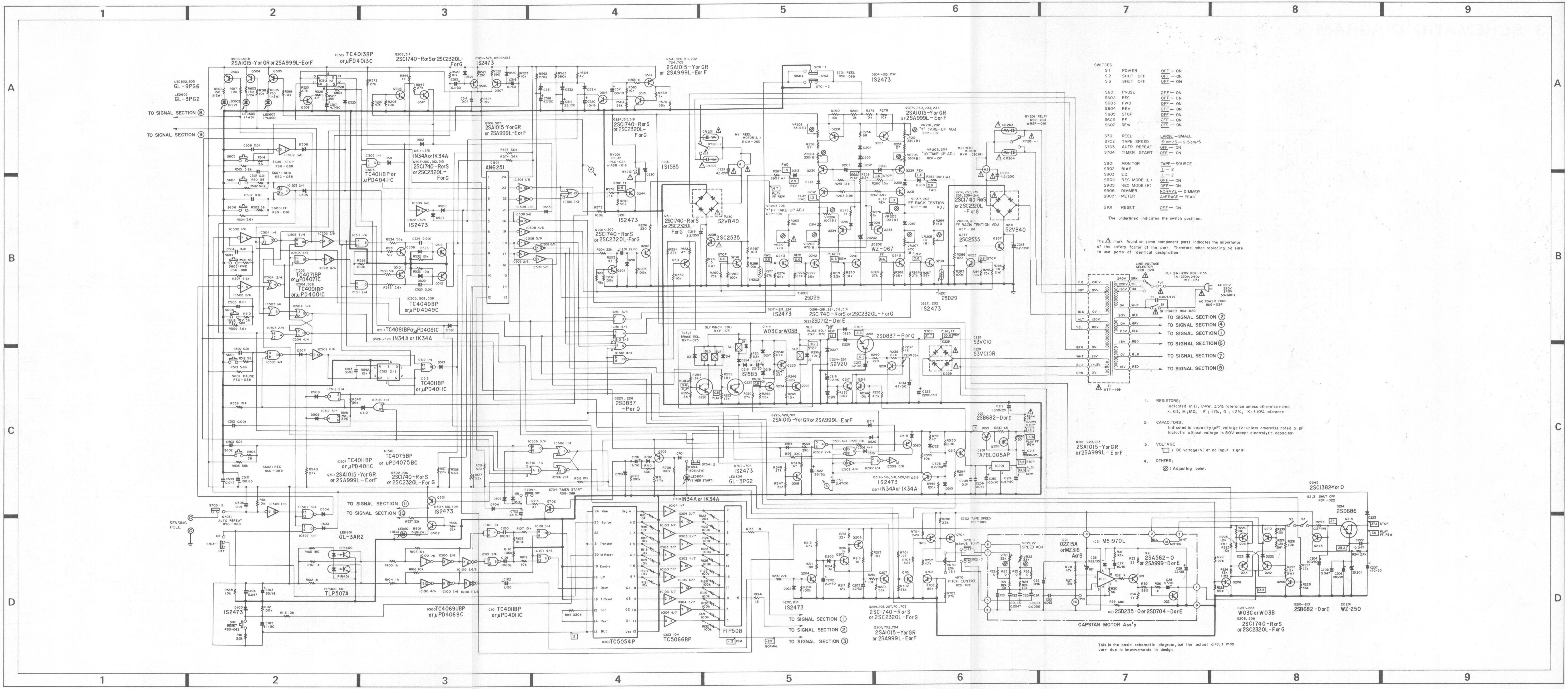
Symbol	Description	Part No.		Remarks
		KU type	D/G type	
	Packing case	RHG-313	RHG-318	
	Operating instructions	RRB-107	RRB-125	
	Spacer C	....	RHC-061	For adjustment
	Spacer C	....	RHC-083	For adjustment
	Fuse 1A	....	REK-051	Set for 120V
	Fuse 2A	....	REK-055	Set for 220 or 240V

2. CONNECTION DIAGRAM



3. SCHEMATIC DIAGRAM




CAPSTAN MOTOR Ass'y
This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.