



Service Manual

CASSETTE TAPE DECK

CT-F1250

 **PIONEER®**

MODEL CT-F1250 COMES IN SIX VERSIONS DISTINGUISHED AS FOLLOWS:

| Type | Voltage | Remarks |
|------|-------------------------------------|----------------------|
| KU | AC 120V only | U.S.A. model |
| KC | AC 120V only | Canada model |
| D | AC 120V, 220V and 240V (Switchable) | General export model |
| D/G | AC 120V, 220V and 240V (Switchable) | U.S. military model |
| HB | AC 220V and 240V (Switchable) | United Kingdom model |
| HE | AC 220V and 240V (Switchable) | Europe model |

• This service manual is applicable to the CT-F1250/KU, KC. For servicing of the other types, please refer to the additional service manuals.

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1. SPECIFICATIONS

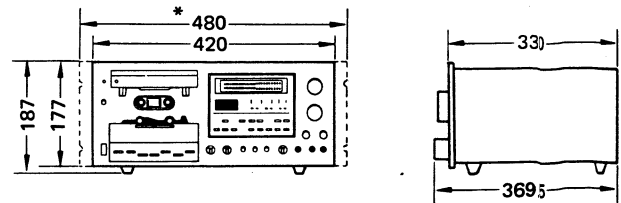
Systems Compact cassette, 2-channel stereo
 Motors Capstan drive; Quartz PLL DD motor x 1
 Reel drive; DC high torque motor x 1
 Heads Ferrite recording/
 playback combination type head x 1
 Erasing head x 1
 Fast Winding Time Approximately 85 seconds
 (C-60 tape)
 Wow and Flutter No more than 0.03% (WRMS)
 Frequency Response
 -20dB Recording :
 Standard, LH tapes 20 to 18,000Hz
 (25 to 16,000Hz \pm 3dB)
 Ferrichrome tape 20 to 20,000Hz
 (25 to 17,500Hz \pm 3dB)
 Chromium dioxide tape 20 to 19,000Hz
 (25 to 17,500Hz \pm 3dB)
 Metal tape 20 to 20,000Hz
 (25 to 18,500Hz \pm 3dB)
 0dB Recording :
 Chromium dioxide tape 20 to 12,000Hz
 Metal tape 20 to 14,500Hz
 Signal-to-Noise Ratio DolbY NR OFF; More than 59dB
 DolbY NR ON; More than 69dB
 (over 5kHz)
 Harmonic Distortion No more than 1.0% (0dB)
 Inputs (Sensitivity/Maximum allowable input/Impedance)
 MIC (L, R); 0.3mV/100mV/30 kilohms, 6mm diam. jack
 (Reference MIC impedance; 250 ohms to 10 kilohms)
 LINE x 2; (60mV/25V/50 kilohms) Pin jack
 Outputs (Reference level/Maximum level/Load impedance)
 LINE x 2; (450mV/640mV/50 kilohms) Pin jack
 HEADPHONES x 1; 63mV/90mV/8 ohms, 6mm diam.
 jack
 Semiconductors Transistors x 139
 Diodes x 125, (Zener; 9, LED; 18)
 ICs x 22

- Subfunctions
- DolbY NR system (ON/OFF) with LED indicator lamp
 - Tape selector with 4 positions (METAL/STD/CrO₂/Fe-Cr).
 - Tape calibration function
 - Memory stop/Memory play function
 - Counter repeat/End repeat
 - Auto start/Auto stop
 - Fluorescence tube level meter (-30 to +8dB)
 (Peak/Peakhold/Average selector)
 - 4-digit Fluorescence tape counter
 - Automatic tape slack canceller
 - Pitch control (\pm 6%) Play position only
 - REC muting function

- Mixing control used for MIC and LINE inputs
 - Level meter and Tape counter brightness selectors
 - Cassette compartment illumination
 (Remaining tape marker)
 - Output level controls with click-stop for reference playback level
- Power Requirements AC 120V 60Hz
 Power Consumption 59 watts
 Dimensions 420(W) x 187(H) x 369.5(D)mm Max.
 16-9/16 x 7-3/8 x 14-1/2 in.
 Weight 10.9kg (24 lb)
 Furnished parts Stereo connecting cords with
 pin plugs x 2
 Head cleaning swabs x 3
 Operating instructions x 1

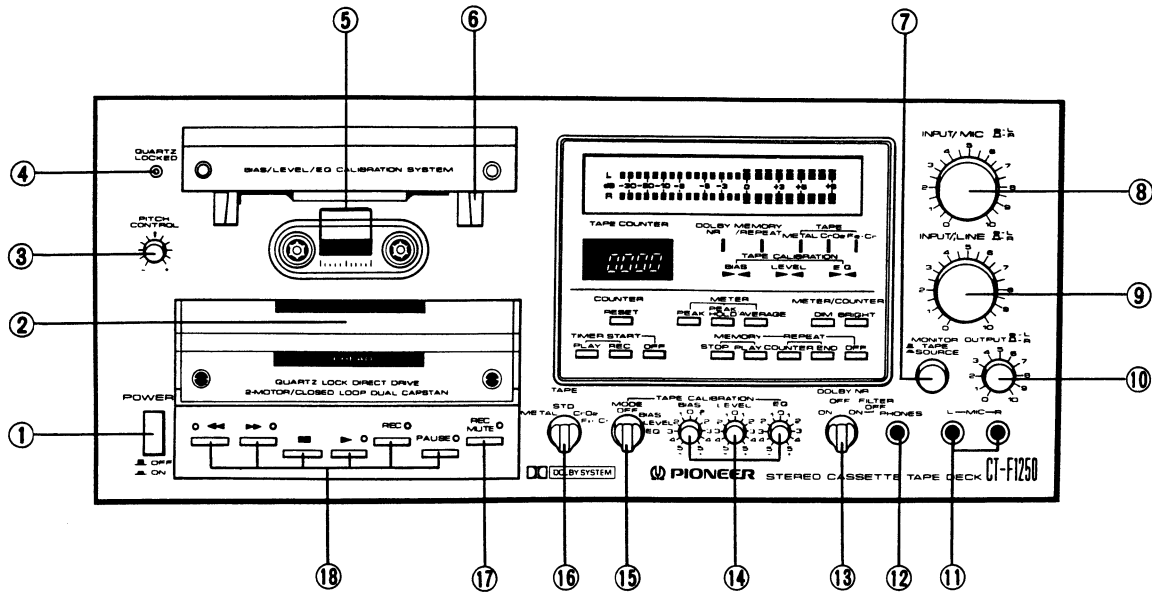
NOTE:
 Specifications and the design subject to possible modification without notice due to improvements.

- NOTES:
1. Reference Tapes: Standard & LH: DIN 45513/BLATT6 or equiv.
 : CrO₂: DIN 45513/BLATT7(CrO₂) or equiv.
 2. Reference Recording Level: Meter 0dB indicating level (160 nwb/m magnetic level = Philips cassette reference level)
 3. Reference Signal: 333Hz
 4. Wow & Flutter: • JIS [3kHz, with acoustic compensation (weighted), rms value]
 5. Frequency Response: • Measured at -20dB level, DOLBY NR OFF, level deviation is \pm 6dB without indication.
 6. Signal to Noise Ratio: • Measured at the third harmonic distortion 3% level, weighted.
 7. Sensitivity: Input level (mV) required for reference recording level with input (REC) controls set to maximum.
 8. Maximum Allowable Input: While decreasing settings of input (REC) level controls and increasing level at input jacks, this is the maximum input level (mV) at the point where recording amplifier output waveform becomes clipped.
 9. Reference Output Level: Playback output level when meter indicates 0dB.
 10. Maximum Output Level: Playback output level with respect to reference recording level when output (PLAY) level controls are set to maximum.



420(W) x 187(H) x 369.5(D)mm Max.
 * with rackmount adaptor JA-R102
 * 480(W) x 187(H) x 380(D)mm Max.

2. FRONT PANEL FACILITIES



① POWER SWITCH

The power comes on when the POWER switch is depressed. The level meter and tape counter, and the remaining tape marker will then come on.

② DUST COVER

When you are not using the tape deck, always keep this cover in place to prevent dust and dirt from adhering to the head section and rotating parts.

③ PITCH CONTROL KNOB

You can use this knob to make the tape travel $\pm 6\%$ faster or slower than the rated tape speed during playback. When the knob is set to the central position (click-stop), the quartz PLL circuit is activated, the QUARTZ LOCKED indicator comes on, and the tape speed is quartz-locked to the rating (4.8 cm/sec.). When the knob is rotated counterclockwise, the speed drops and the musical steps are lowered. Conversely, when it is rotated clockwise, the speed increases and the musical steps are raised. The tape speed does not change during a recording.

④ QUARTZ LOCKED INDICATOR

When the PITCH CONTROL knob is set to its center position, the quartz PLL circuit is activated and this indicator comes on. It goes off, however, when the knob is rotated either clockwise or counterclockwise. During a recording, this indicator will remain on even if the PITCH CONTROL knob is rotated, and the quartz PLL circuit will be activated.

⑤ REMAINING TAPE MARKER

If this marker is visible, it means that there is enough tape remaining for several minutes of recording or playback.

⑥ CASSETTE TAPE GUIDE

⑦ MONITOR SWITCH

This switch is used to select the output signal which is made available at the output jacks and headphones. 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 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.

⑧ MIC RECORDING LEVEL CONTROLS

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

⑨ LINE RECORDING LEVEL CONTROLS

These 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 front control is for the left channel and the back control for the right channel.

⑩ OUTPUT (PLAYBACK LEVEL) CONTROLS

Use these to adjust the output signal level during playback. 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 (back) and the left channel (front) independently.

When playing back a reference tape (160 nwb/m), a reference playback level (0dB) is obtained with these controls set to the "6" click stop position.

⑪ MIC JACKS

These are the input jacks for microphone recording. Plug the left channel microphone into the L jack and the right channel microphone into the R jack.

⑫ HEADPHONE JACK

This is the output jack for your stereo headphones. You will be able to hear the sound from signals selected by the MONITOR switch. Use this jack when you want to monitor the quality of a recording or when you want to listen to a tape privately on the CT-F1250. Adjust the output level with the OUTPUT controls.

NOTES:

- Use low-impedance headphones. If you use a high-impedance model, you will not be able to obtain sufficient volume.
- You will damage the microphone if you plug it into the HEADPHONE jack by mistake.

⑬ DOLBY NR/MULTIPLEX FILTER SWITCH

Set this switch to DOLBY NR ON when recording with the Dolby NR system or when playing back a tape which has been recorded with the Dolby NR system.

Set this switch to the ON (filter ON) position when recording without the FM stereo broadcast pilot signal (19kHz).

ON When playback in Dolby NR or when recording an FM stereo broadcast in Dolby NR using an FM tuner with MPX pilot signal leakage.

OFF..... When not recording or playback in Dolby NR.

ON When playback in Dolby NR or when recording a FILTER OFF program source in Dolby NR other than an FM stereo broadcast, or when using an FM tuner with no MPX pilot signal leakage.

⑭ TAPE CALIBRATION BIAS, LEVEL, EQ KNOBS

When adjusting the tape calibration, set the MODE selector to the BIAS, LEVEL and EQ positions in sequence, and at each position, adjust the tape calibration knobs (BIAS, LEVEL and EQ) so that both parts of the indicators (▶ and ◀) light up at the same time in a well-balanced fashion or flicker.

⑮ TAPE CALIBRATION MODE SELECTOR

When adjusting the tape calibration, set this selector to the BIAS, LEVEL and EQ positions in sequence. When you are not using tape calibration be sure to set the MODE selector to the OFF position.

⑯ TAPE SELECTOR

This selector allows the bias and equalizer characteristics to be selected during recording and the equalizer characteristics during playback in line with the type of tape you are using.

METAL: For using metal tapes

STD: For using standard or LH tapes

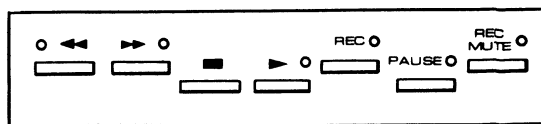
CrO₂: For using chrome tapes

Fe-Cr: For using ferrichrome tapes

⑰ REC MUTE BUTTON/INDICATOR

You can create unrecorded sound gaps, or blanks, while you are recording by depressing this button. When this button is depressed, the indicator winks at intervals of about one second.

⑱ OPERATING 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.)

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

▶ (PLAY)..... Depress this button when play back a tape, and depress this button together with the REC button for recording. (The tape will travel from left to right.)

REC Depress this button together with the PLAY button for recording.


This button will not work when a cassette is not loaded or when the erasure prevention tabs of a loaded cassette have been broken off.

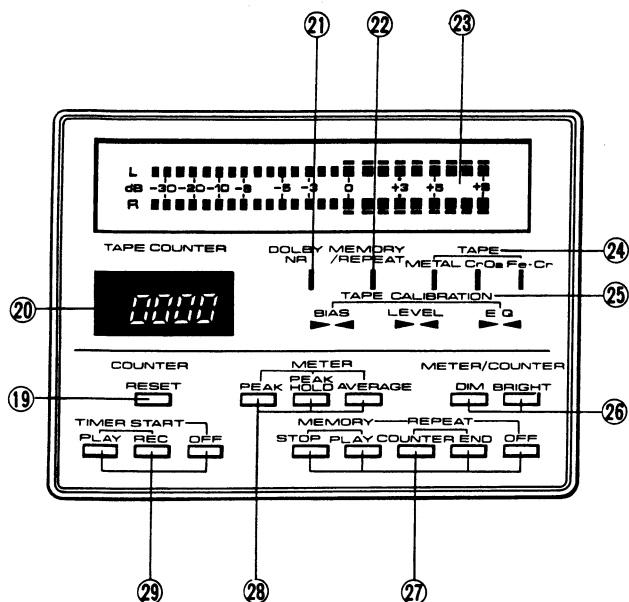
PAUSE..... Depress this button to stop the tape temporarily during recording or playback. Depress it again to allow the tape to continue to travel as before.

NOTES:

- When any of the operating buttons are depressed, the corresponding indicator (except STOP mode) will come on signifying that the deck is set to that respective mode.
- All the operating buttons are released (OFF) to stop mode when the POWER switch is turned OFF.

*Manufactured under license from Dolby Laboratories.

*Dolby and  are trademarks of Dolby Laboratories.



19 COUNTER RESET BUTTON

Depress this button to reset the tape counter display to "0000."

20 TAPE COUNTER

This indicates the position of the tape run. The counter reverts to "0000" when the power is switched on.

21 DOLBY NR INDICATOR

This lights up when the DOLBY NR switch is set to ON.

22 MEMORY/REPEAT INDICATOR

This indicator comes on when the MEMORY/REPEAT switches are depressed, signifying that the deck is set to the respective mode.

23 LEVEL METER

This indicates the input level during recording and the output level during playback.

By operating the LEVEL METER switches, it can be made to function as a peak meter, a peak hold meter or as a level meter.

The input signal level is indicated. When the MONITOR switch is set to SOURCE, they indicate the input signal level, and when it is set to TAPE, they indicate the playback output level.

24 TAPE INDICATORS (METAL, CrO₂, Fe-Cr)

The indicator corresponding to the position of the TAPE selector lights up to indicate what type of tape is being used. There is no indicator for standard tapes.

25 TAPE CALIBRATION INDICATORS

The indicator corresponding to the type of tape calibration adjustment comes on. The bias, level and equalizer characteristics are optimum for the type of tape being used if both parts (▶ and ◀) of the indicators light up at the same time in a well-balanced fashion, or flicker, when the MODE selector is set to the BIAS, LEVEL and EQ positions in sequence.

26 LEVEL METER/COUNTER BRIGHTNESS SELECTORS

Use this switch to select the meter/counter brightness.

DIM: Depress this switch at night or in dark locations when the existing meter/counter brightness is too high.

BRIGHT: Depress this switch when using the deck in daylight or other bright locations.

27 MEMORY/REPEAT SWITCHES

MEMORY STOP: Depress this switch and the tape will be rewound to that spot at which the tape counter was preset to "0000" during rec/play, when the REW button is depressed at any position you like.

PLAY: Depress this switch and the tape will be rewound to that spot at which the tape counter was preset to "0000" during rec/play, and playback will start from that spot, when the REW button is depressed at any position you like.

REPEAT COUNTER: Depress this switch when you want to play back a tape during playback or recording from the point at which the tape counter was set to "0000" up to the end of the tape.

END: Depress this switch when you want to play back a tape from the beginning to the end of that tape.

OFF: Depress this switch during normal tape playback or recording to release the MEMORY and REPEAT switches.

28 LEVEL METER SWITCHES

PEAK When this switch is depressed, the meter functions as a peak meter, and the peak level of the signals is indicated for about 2 seconds.

PEAK HOLD The meter functions as a peak level meter and the highest level of the signals is indicated when this switch is depressed.

AVERAGE The meter functions as a level meter when this switch is depressed.

29 TIMER START SWITCHES

Depress these switches when you are playing back or recording a tape with the use of a timer.

PLAY: When this switch is depressed, the deck will automatically be set to the playback mode at the preset timer time, and playback will begin. Use this switch for wake-up playback instead of an alarm clock.

REC: When this switch is depressed, the deck will automatically be set to the recording mode at the preset timer time, and recording will begin. Use this switch for recording FM programs when you are out of the house or otherwise occupied.

OFF: Always depress this switch when you do not intend to record or play back a tape using the timer (This will release the REC and PLAY switches of TIMER START).

3. DISASSEMBLY

External Components

1. Remove the bonnet by undoing screws ①.
2. Remove the front panel by undoing screws ②.
3. Remove the bottom plate by undoing screws ③.
4. The function switch assembly is mounted onto the chassis by means of rubber bushes. Remove it by gently raising it up.

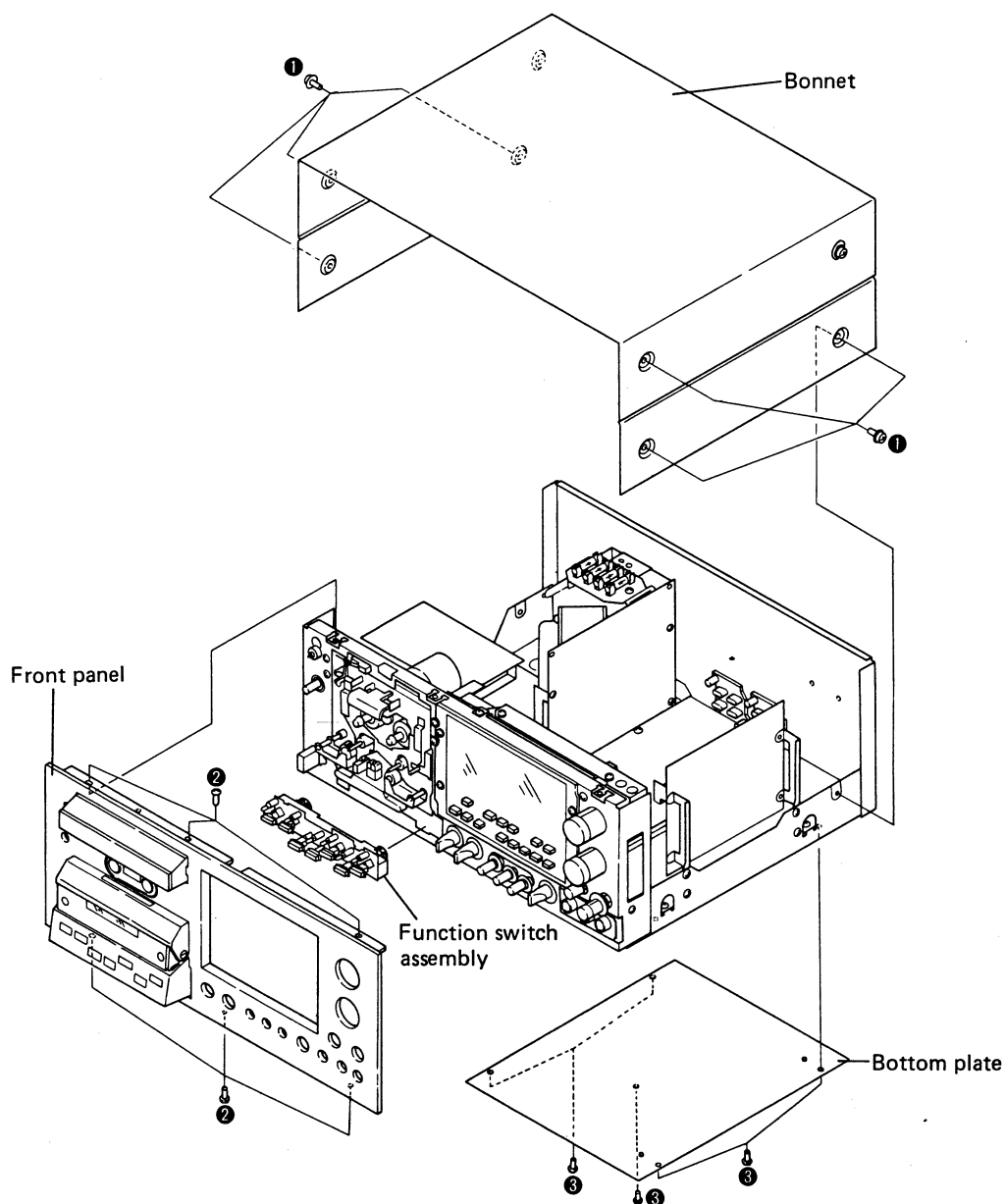


Fig. 3-1 Disassembly of exterior parts

Mechanical Assembly

After removing the front panel, undo screws ①. **Sub-head Assembly, Pinch-roller Arm Assembly and Pressure Arm**

1. Remove the sub-head base assembly by undoing screws ① and the socket-head hexagonal bolt.
2. Remove the feed side pinch-roller arm assembly by loosening the height adjuster (nut).
3. Remove the take-up side pinch-roller arm assembly by taking off E-washer ①.
4. Remove the pressure arm by taking off E-washer ②. When the pinch pressure spring is replaced with a new one, take care to ensure that the new spring is properly seated. The requirements of the sub-section entitled "Pinch roller pressure adjustments" (Page 32) included in the section "Mechanical adjustments" shall be satisfied.

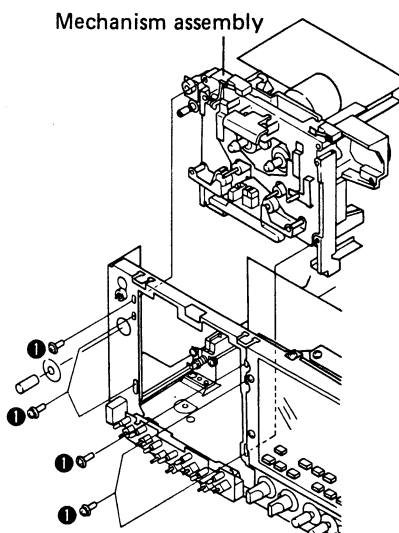


Fig. 3-2 Remove the mechanism assembly

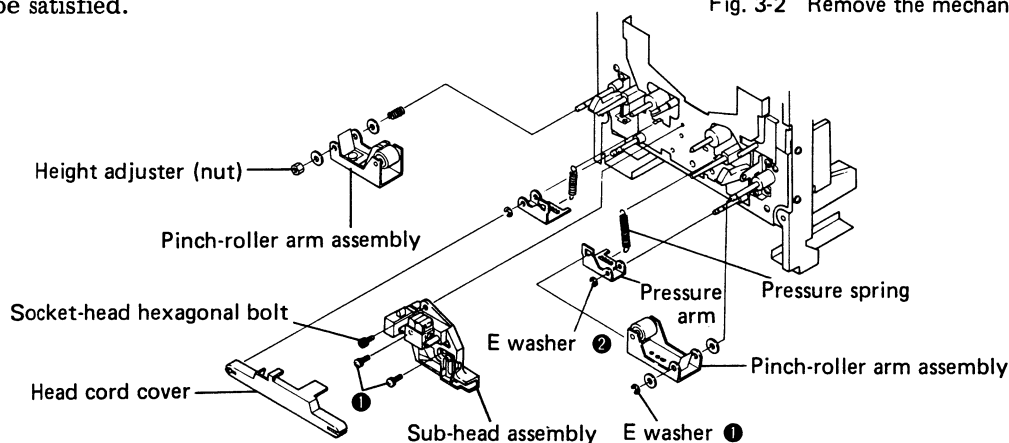


Fig. 3-3 Remove the sub-head assembly, pinch-roller arm assembly and pressure arm

Fluorescent Indicator Tube

1. Remove the indicator lens assembly by undoing screws ①.
2. Remove the indicator amplifier assembly by undoing screws ②.
3. The fluorescent indicator tube is mounted on the indicator assembly. Remove it by means of a soldering iron. Take great care when handling the indicator tube so as to avoid damaging it.

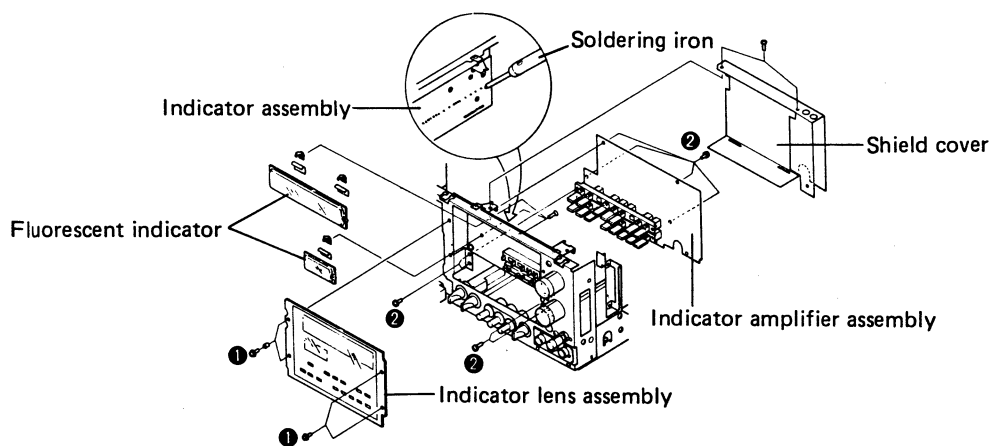


Fig. 3-4 Remove the fluorescent indicator tube

Mechanical Assembly

When replacing a motor or a belt, be careful of the sequence of disassembly and reassembly of the various components concerned.

1. Remove the capstan D.D motor by undoing screw ①.
2. Remove solenoid A by undoing screws ②.
3. Remove the plunger chassis assembly by un-

- doing screws ③.
4. Remove the sub-chassis assembly by undoing screws ④.
5. Remove the take-up motor by undoing screws ⑤ and remove solenoid B by undoing screws ⑥.

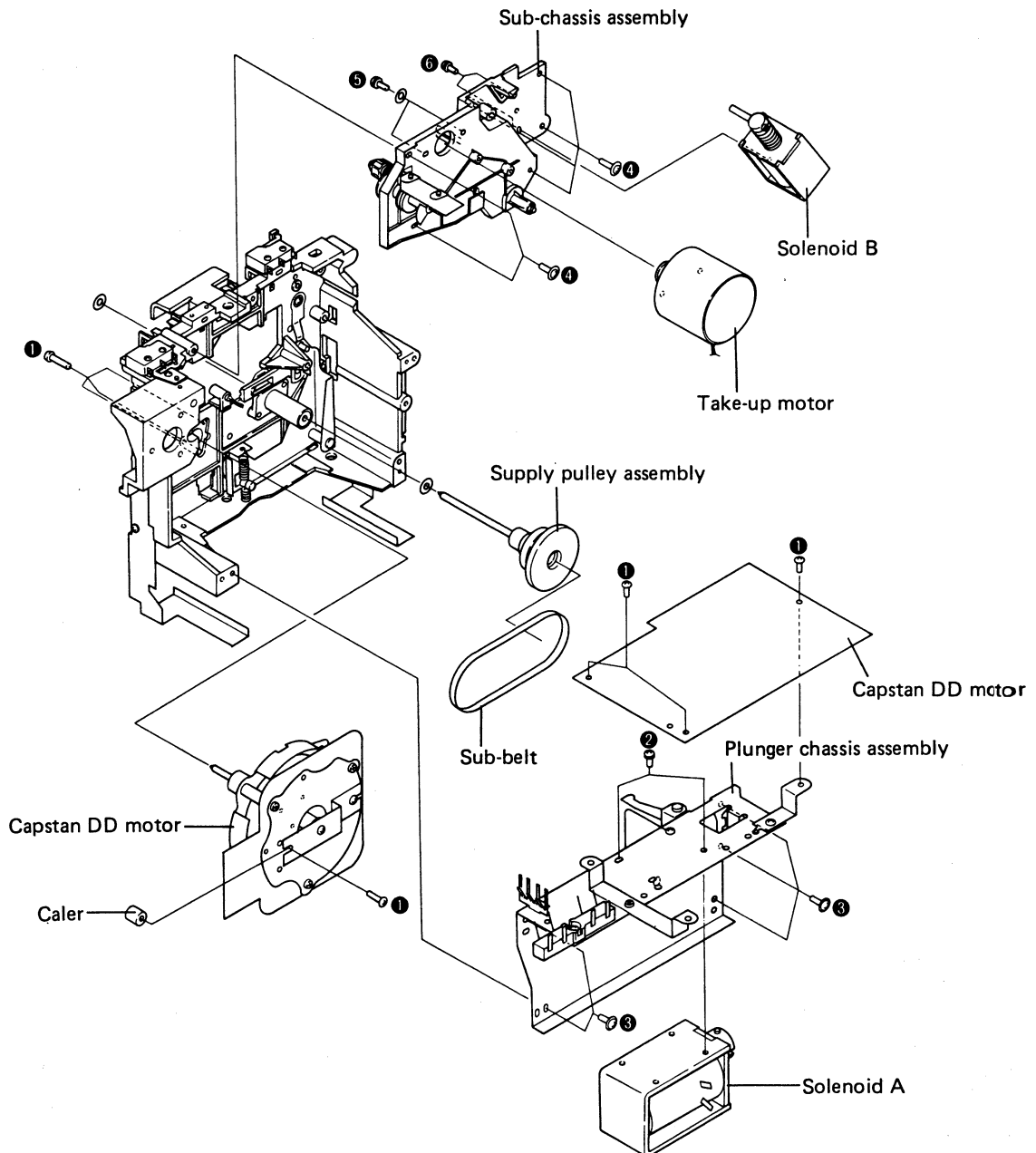
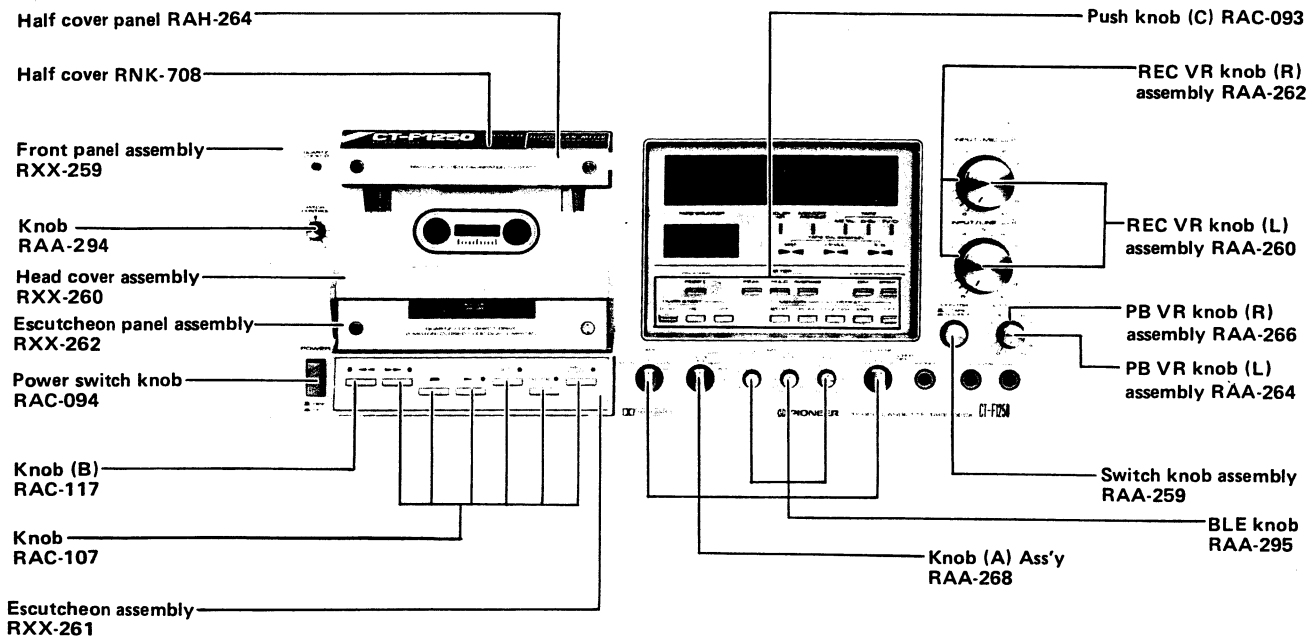


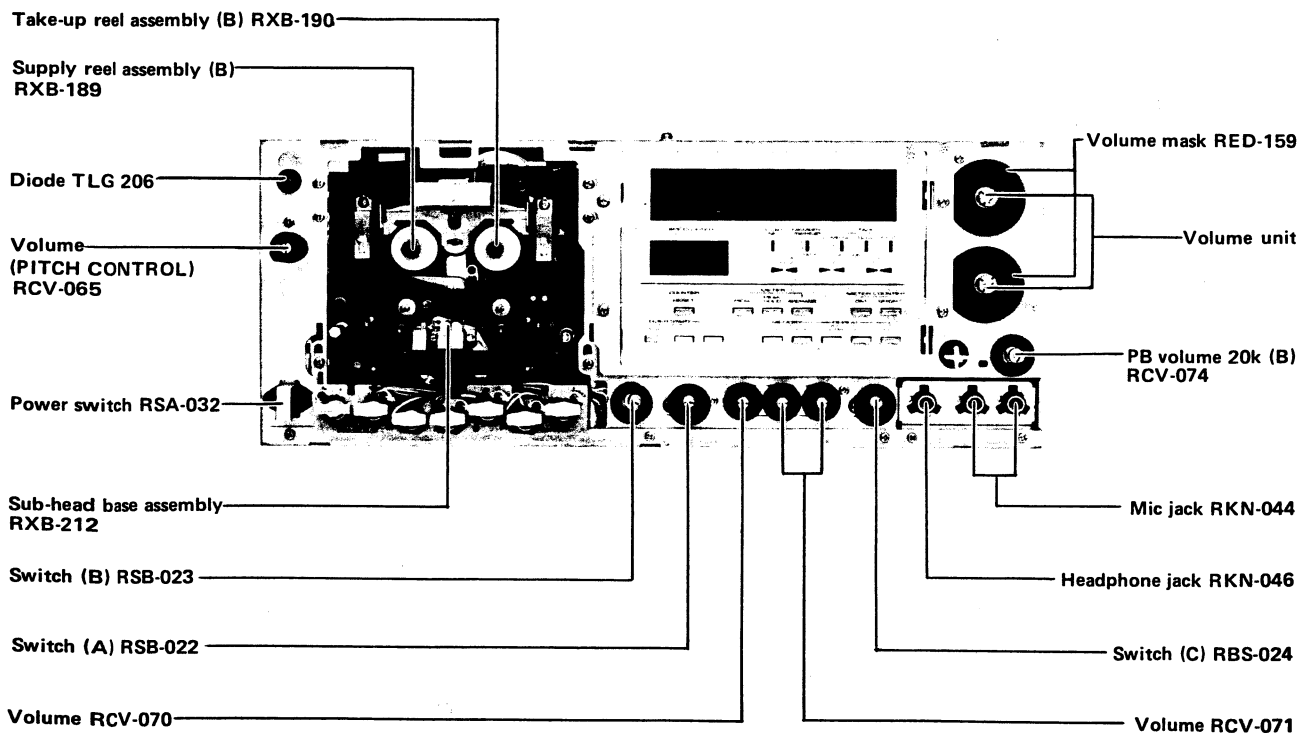
Fig. 3-5 Disassembly of mechanism assembly

4. PARTS LOCATION

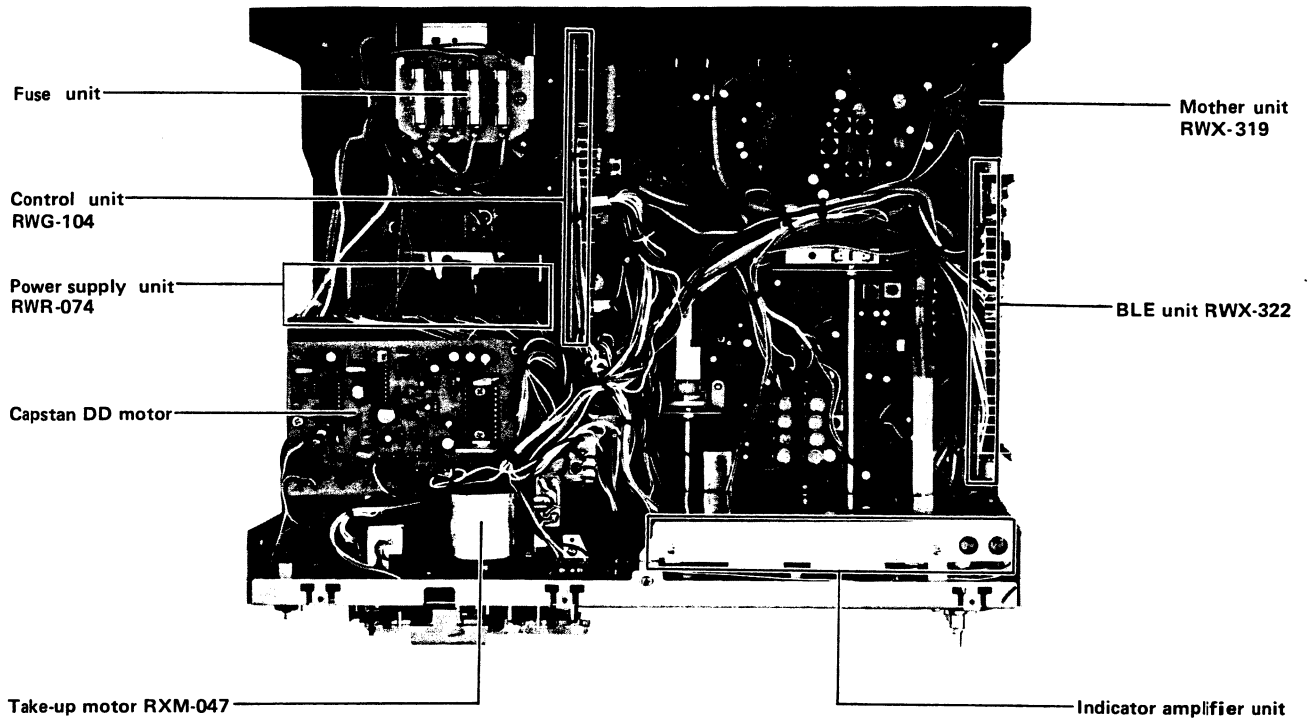
FRONT PANEL VIEW



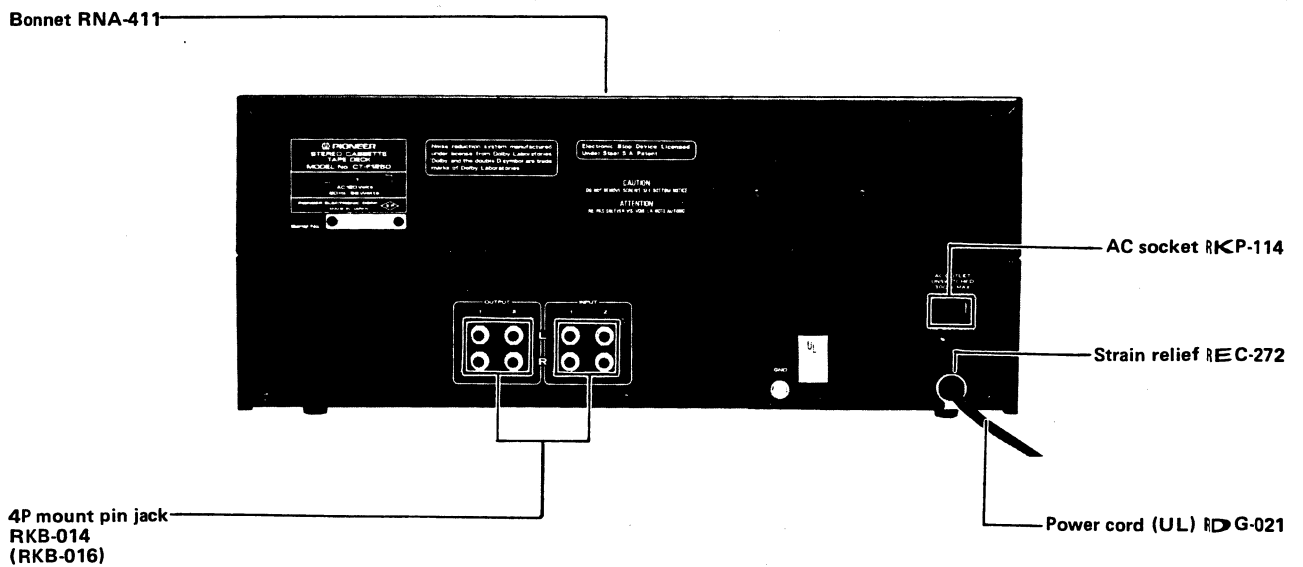
FRONT VIEW WITH FRONT PANEL REMOVED



TOP VIEW WITH BONNET REMOVED

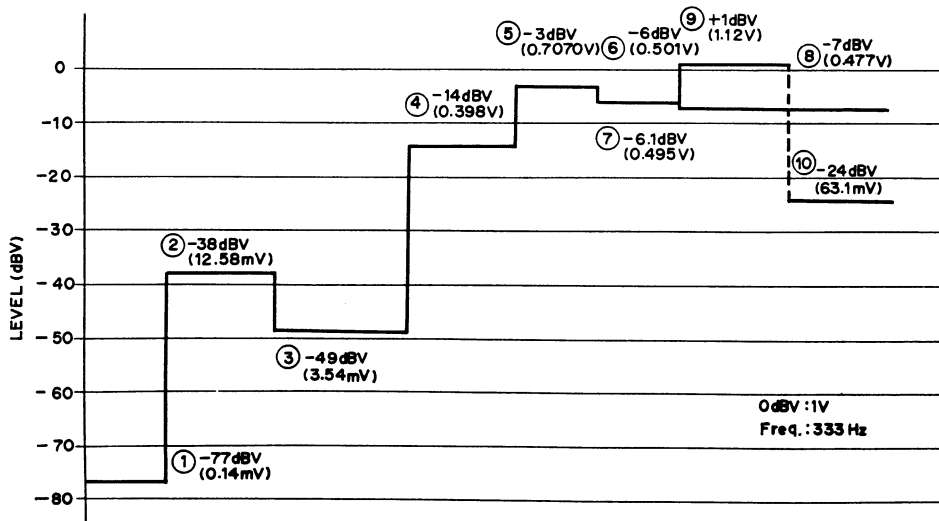
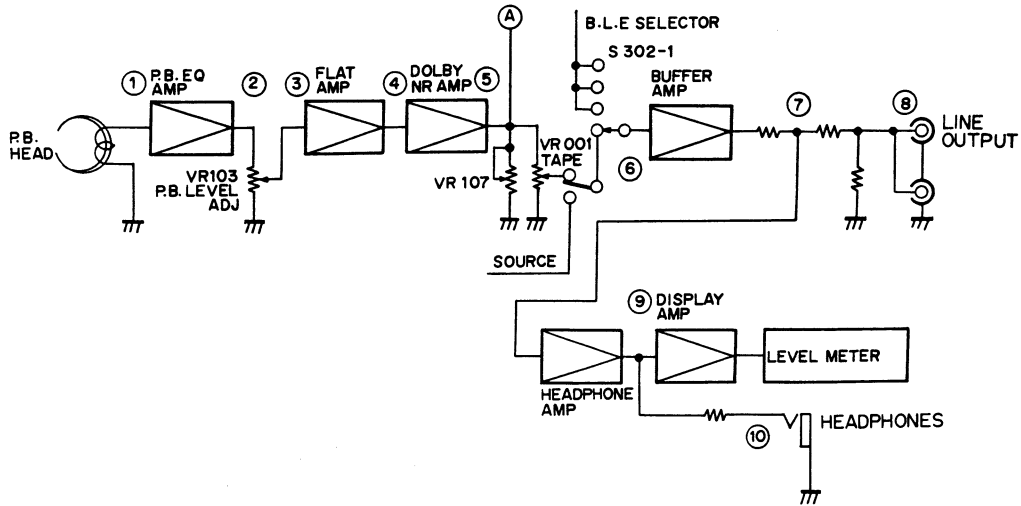


REAR PANEL VIEW

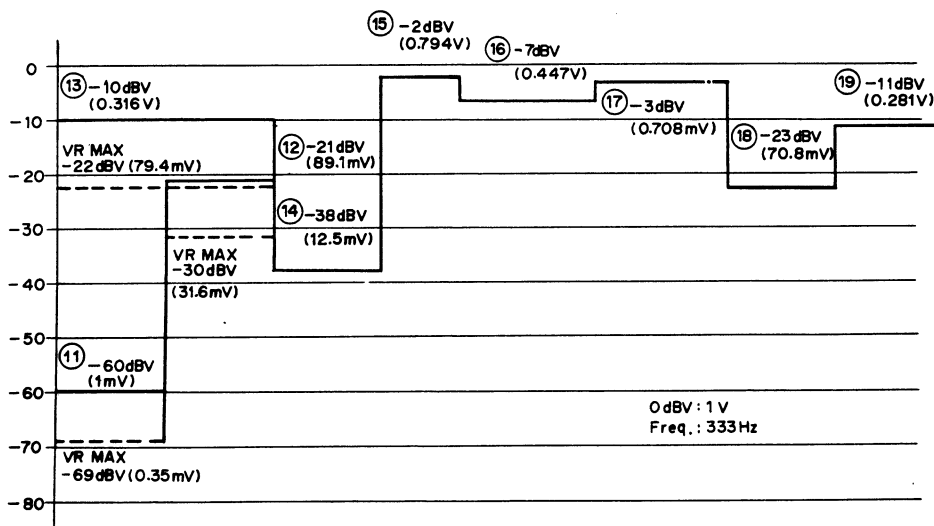
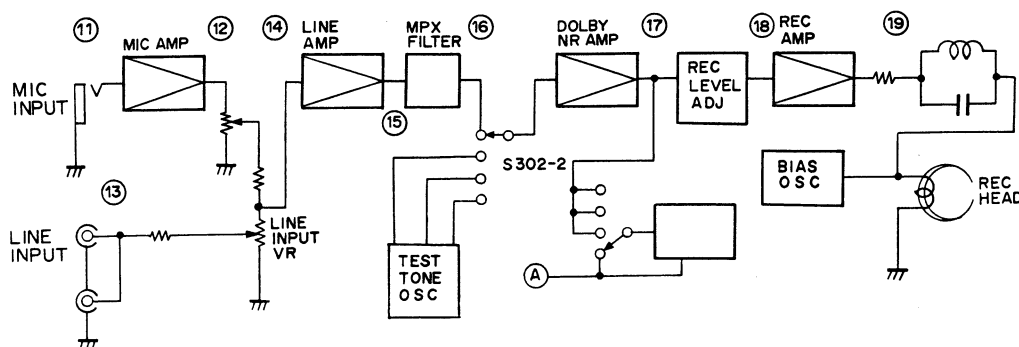


5. LEVEL DIAGRAM

PLAYBACK



RECORDING



6. CIRCUIT DESCRIPTIONS

For the details of the circuits, refer to the block diagram on page 25, the level diagram on page 12, and the complete diagram on page 57.

6-1 PLAYBACK CIRCUIT

Equalizer Amplifier

This is a negative feedback type amplifier employing a low-noise, high-gain FET (2SK-117) in the first stage.

Tape selector

The bias and equalizer switches on this unit can be set to the appropriate settings for STD, CrO₂, Fe-Cr and metal type tapes. This switching is performed by means of selector switch S301 on the front panel. An indicator lamp lights up to display the setting of the respective tape position.

Playback Equalizer

The playback equalizer can be set for Metal/CrO₂/Fe-Cr tapes (70μsec) or STD tapes (120μsec).

When setting the tape selector to the Metal, CrO₂ or Fe-Cr positions, the +16V passes through R133 to bias Q107 and turn it on. When Q107 comes on, the fixed time constant of the high frequency playback is made 70μsec by means of the direct circuit to C119 and R129.

For STD tapes, when Q107 is off, the fixed time constant of the high frequency playback is 120μsec.

Playback Flat Amplifier

This is a direct-coupled amplifier utilizing two transistors (Q111, Q113) which give a flat frequency response. This amplifies the output of the playback equalizer amplifier and guards against the interference of recording bias from the trap circuit on the input side.

Buffer Amplifier

This is an emitter follower type buffer amplifier operated by transistor Q115. It leads the playback output to the LINE OUT.

Headphone Amplifier

This employs the headphone amplifier section in IC (PA4001). Output is divided by resistors R219 and R220 and supplied to the headphones.

6-2 RECORDING AMPLIFIER

Microphone Amplifier

This is utilized by the microphone amplifier section of the IC (PA4001). The input is a differential amplifier construction, and the output an emitter follower. Its gain is about 40dB.

Line In Amplifier

This utilizes the flat amplifier section of IC (PA4001). Its gain is about 36dB.

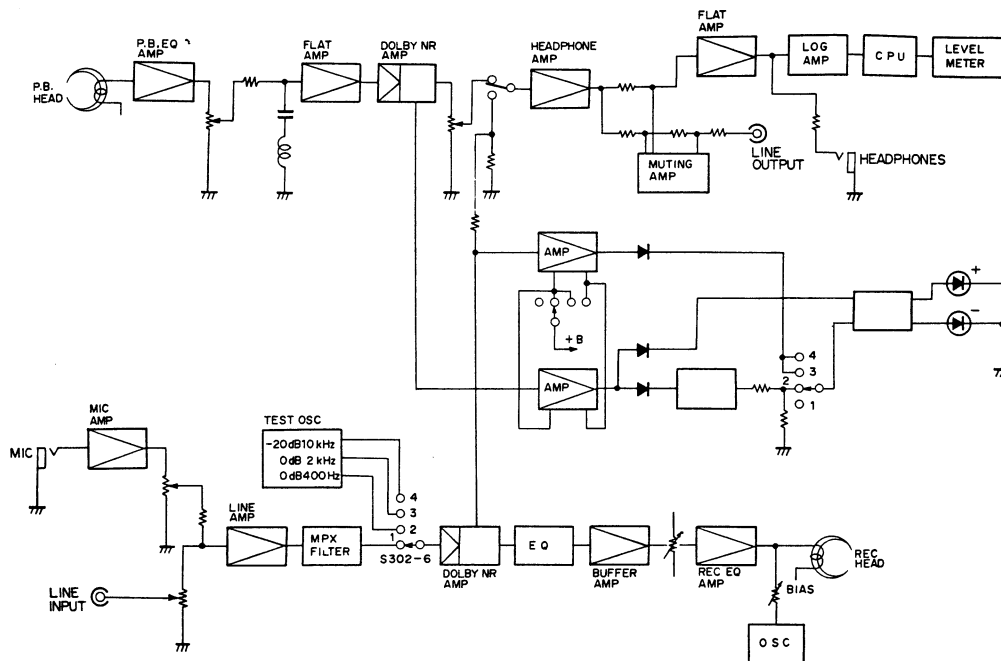


Fig. 6-1 Block diagram

Recording Amplifier

This utilizes the record amplifier section of IC (PA4001). The input is a differential amplifier construction and the output, complementary construction.

• IC (PA4001)

This is shown in the block diagram in graph 6-2. This is a system IC exclusively developed for use in Pioneer tape decks. This IC is a 16 pin dual line type which incorporates the microphone amplifier, flat amplifier, recording amplifier and headphone amplifier.

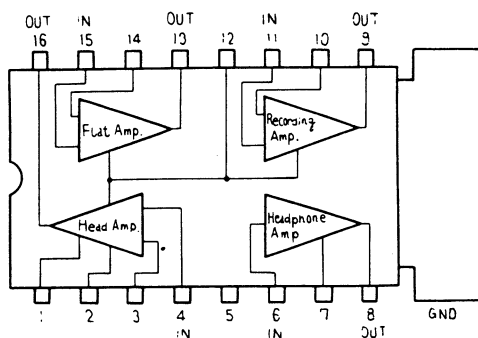


Fig. 6-2 Block diagram of PA4001

Record Bias Switching Circuit

The record bias switch can be changed to 4 positions for use with LH, CrO₂, Fe-Cr and metal tape. By changing tape selector switch S301, the semi-fixed resistors for each tape position are connected.

Record Equalizer Switching Circuit

The record equalizer can be switched to 4 positions for use with STD, CrO₂, Fe-Cr and metal tapes. The equalizer is set by changing tape selector S301. The peaking frequency for each equalizer is approximately 18kHz for STD, 17kHz for CrO₂, 16kHz for Fe-Cr and 20kHz for metal tapes.

BIAS, LEVEL, EQ Variable Circuits

■ Variable Bias Circuit

The variable bias volume VR305 is connected to the bias coil of the oscillator block, and its output in turn is connected to the semi-fixed variable bias volume VR307 (metal), VR309 (STD), VR311 (CrO₂) and VR313 (Fe-Cr). The bias can be adjusted within a range of approx. ±45% or greater.

■ Variable Level, EQ Circuits

The output of the record Dolby amplifier enters the variable EQ circuit. This circuit, an oscillation

circuit performed by L305 and C347 ($f_o \approx 20\text{kHz}$) allows variation of the high range frequency response. Next, the variable EQ circuit is connected to the variable level circuit.

BIAS, LEVEL, EQ Calibration

To enable the tape to perform to record and playback at its optimum capability, it is necessary for the tape in use to be set the ideal bias, EQ and recording levels. This deck enables adjustment to these proper settings.

■ Amplifier (Q1314, Q1317, IC1301)

The signals from the record and playback of the Dolby amplifier operate the comparator, peak level memory circuits and amplify them to the required level.

■ Peak Level Memory Circuit

When performing bias calibration, this circuit memorizes the peak playback output level. This is composed of a loop containing the waveform rectifier circuit (IC1302 $\frac{1}{4}$), AND circuit (IC1303), comparator circuit (IC1302-2/4), counter circuit (IC1304) and D/A conversion circuit.

■ Comparator (Q1310, Q1311, Q1312, Q1313)

The comparator compares an output of amplifier (IC1301), to enable adjustments.

1. When performing bias calibration, the peak playback levels (output of memory circuit) of the playback of some inputs are compared with others.
2. When performing level calibration, output of the playback of a certain input level is compared with that of another input level.
3. When performing equalizer calibration, the playback output of a certain input is compared with the record output of another input. Then when the two inputs are matched, both the tape calibration indicators on the front panel light up.

■ Test Tone Circuit

This is an oscillator which puts out a signal for the various calibration adjustments. It is a Wenbridge type employing a 2-transistor amplitude governor with an FET, and there are 3 circuits which oscillate at 400Hz, 2kHz and 10kHz, respectively.

1. The 400Hz oscillator signal is for level calibration.
2. The 2kHz signal is for bias calibration.
3. The 10kHz signal is for EQ calibration.

Level Meter Circuit

The level meters are fluorescent display tubes which provide indication by means of a 3-chip IC and microcomputer.

The signal taken from the headphone amplifier's output terminal is connected to logarithmic direct current voltage by means of the logarithmic compressor amplifier IC801. The converted direct current voltage becomes the standard input for the other comparator, the display mode of the level meter is converted to direct current by means of D/A converter IC803.

Therefore the comparator IC puts out a control signal to the microcomputer (IC804), to always compare the level meter mode with the standard input, and functions to ensure that the standard input (record or playback signal) and the compared input (display mode) are the same.

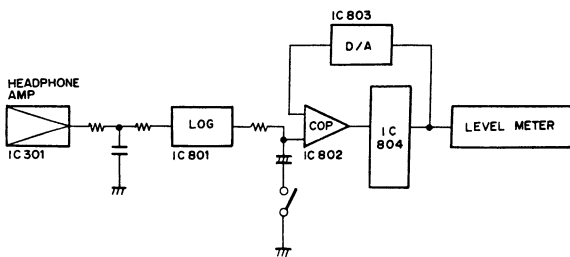


Fig. 6-3 Level meter circuit

Counter Circuit

The counter on this unit is a fluorescent display tube driven by a 4-digit up-down counter IC.

The pulse signal for the counter is supplied from the output of the Schmidt circuit. During FF, PLAY and PLAY/REC, the Q806 is on and the Q805 is off, permitting an up count display. During REW, Q806 is off and Q805 is on, permitting the down count display.

The segment output from the counter IC passes buffer IC807 and drives the fluorescent display tubes.

After the grid output passes the dimmer circuit, it passes IC806 and drives the fluorescent tubes. When the dimmer circuit is on, the brightness is reduced by $\frac{1}{4}$ of its ordinary intensity.

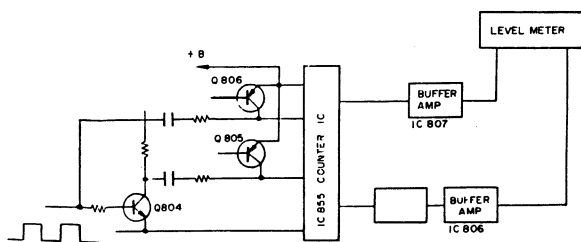


Fig. 6-4 Counter circuit

6-3 DOLBY NR PROCESSOR CIRCUIT

Recording Mode Operation

1. Input signals are first applied to the MPX filter where the FM broadcasting station's pilot signal is removed, and where an 85kHz bias trap is employed to prevent mis-operation of the Dolby NR noise reduction system.
2. From the MPX filter, the signals are passed on to the buffer amplifier whose output is divided into 2 routes. The main signal is passed directly to the adding amplifier, while the sub-signal is passed via the side chain amplifier and clipper before being recombined with the main signal in the adding amplifier.
3. Besides being applied to the clipper, the side chain amplifier output is also passed via the voltage controlled amplifier and interfrating amplifier back to the side chain amplifier input, forming a variable filter circuit.
4. In addition to the above, the side chain amplifier output is further applied to a high-pass filter and rectifier where it is converted into a DC voltage for control of the voltage controlled amplifier.
5. When the level of the signal passed through the high-pass filter is low, the rectifier output DC voltage will be almost "0", resulting in a minimum turnover frequency for the variable filter. The level of the adding amplifier output will thus be 10dB (above 5kHz) higher than the level of the main signal, thereby contracting the dynamic range.
6. The clipper produces a time lag in the signal applied to the voltage-controlled amplifier, and since it is not capable of responding to sudden level changes, no uncontrolled signals will be applied to the adding amplifier.
7. When the level of the signal passed through the high-pass filter is high, the rectifier output DC voltage will also be high, and the variable filter turnover frequency will be increased. The sub-signal level will therefore become almost "0", so there will be no contraction of the dynamic range.

Playback Mode Operation

Although each section of the Dolby NR Processor operates in the same way as during recording mode, the sub-signal is derived from the output of the adding amplifier. And since the adding amplifier is an inversion amplifier (where output phase is opposite to input phase), the sub-signal will be of opposite phase, thereby forming an NFB loop.

In Dolby NR B noise reduction systems, contraction and expansion occur within a fixed frequency range determined by the variable filter

circuit. And, in order to achieve perfectly symmetrical operation, it is necessary to fix a reference level for the operational point. This is the so-called "Dolby NR level", below which no contraction and expansion is performed.

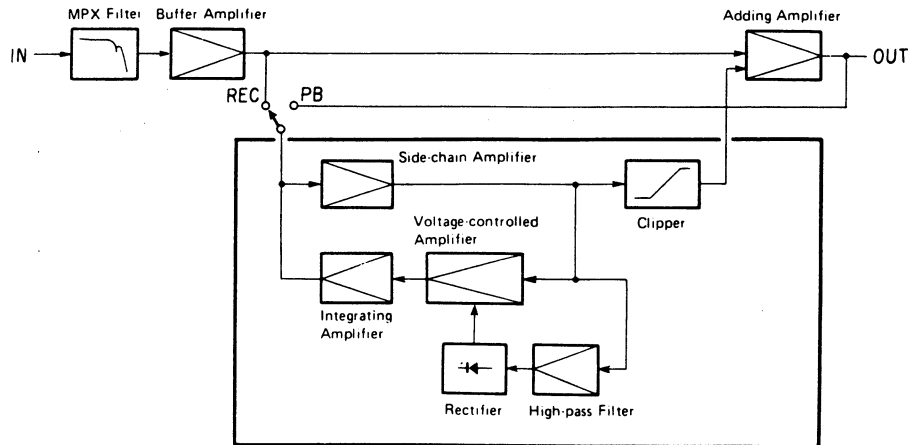


Fig. 6-5 Dolby processor circuit

6-4 CONTROL CIRCUIT

Play Operation (Fig. 6-6)

1. When a cassette is loaded, the cassette detector switch S1102 is switched to the HALF side, and the tape slack removal circuit functions (this will be explained later).
2. When PLAY switch S903 is set on, the No.15 pin on IC501 reaches a high level (henceforth referred to as H level), and +B1 flows to R589 - Q531 - reel motor (RM) - R583 - Q527 and the reel motor begins rotation.
3. Also, +B1 flows to the pinch solenoid SL1101 - Q524 - Q525, and operates SL1101, starting the PLAY operation. (The capstan motor begins rotation the same time the power is turned on.)

REC Operation (Fig. 6-6)

1. When loading a cassette on which the accidental erasure prevention tabs are attached, the accidental erasure prevention switch goes to the NO HOLE side. Then, the PLAY switch S903 and REC switch S904 come on simultaneously.
2. The No.5 pin on IC501 reaches low level (henceforth referred to as L level), the No.16 pin reaches H level, and the current flows from R434 - Q314 and Q314 comes on. When Q314 comes on, the bias oscillator circuit operates and recording function starts. Also, the pinch solenoid SL1101 and reel motor (RM) function the same as in PLAY operation.

3. In the case of a cassette from which the accidental erasure prevention tabs have been removed, S1101 goes to the HOLE side, and even if S904 goes on, since the No.5 pin on IC501 does not reach L level the REC function does not begin.

FF/REW Operations (Fig. 6-6)

1. When the FF switch S902 is turned on, the No.22 pin on IC501 reaches H level, +B1 flows on the R589 - Q531 - reel motor - Q526 route and the reel motor begins rotation.
2. At the same time, +B1 flows to the brake solenoid SL1102 - Q523, and SL1102 operates to release the brake.
3. For REW operation, the polarity of the voltage to the reel motor is reversed, but the process is basically the same as FF operation.

Pause Operation (Fig. 6-6)

1. As explained in the previous section, during play or REC operation +B1 is supplied to pinch solenoid SL1101, the reel motor and the capstan motor. During record operation +B is also supplied to the bias oscillator.
2. Now, if the PAUSE switch S906 is turned on, the No.15 pin on IC501 reaches L level, SL1101 does not function and the reel motor stops rotation. PLAY or REC operations are temporarily stopped.

Timer Start Operation (Fig. 6-6)

■ Play Operation

1. The timer start PLAY switch S801-1 is set to ON, and the timer turns the power supply switch on. When the power supply voltage rises completely (approx. 4 seconds later) the No.14 pin on IC501 reaches H level.
2. At the same time, current flows to Q817 via the D818 — C818 — R862 — Q817 route, and Q817 is turned on instantly. This turns on play switch S903 and play operation begins.

■ REC/PLAY Operation

1. Set the TIMER START REC switch S801-2 to ON, and use the timer to turn on the power. When the power supply voltage rises completely (approx. 4 seconds later) the No.14 pin on IC501 reaches H level.
2. At the same time, in the same manner as the play operation, current flows to Q817, which comes on instantly. Then PLAY switch S903 and REC switch S904 come on simultaneously and REC/PLAY operation begins.

Memory Stop Operation (Fig. 6-6)

To perform memory stop operation, set the MEMORY STOP switch on, and push the REW switch to rewind the tape. When the tape counter reaches the "9999" position, the rewind operation will stop.

1. Set the memory stop switch S801-4 on, and rewind switch S901 on to begin rewind. When the tape counter reaches the "9999" position, a pulse will be emitted from tape counter IC805. The pulse passes R864 to bias Q819 and turn it on. When Q819 comes on, the No.11 pin on IC501 instantly reaches L level.
2. According to the program of IC501, when the No.11 pin reaches L level, the output is stopped and all operations are halted.

Memory Play Operation (Fig. 6-6)

To perform memory play operation, set the memory play switch to ON and push the REW switch to rewind the tape. When the tape counter reaches "9999", the unit will switch from rewind to play.

1. When the memory play switch S801-5 is set on, the No.9 pin on IC501 is boosted to L level.
2. The rewind switch is turned on, and rewind operation started. When the tape counter reaches "9999", a pulse is emitted from counter IC805. This pulse passes R864 to bias Q819 and turn it on. When Q819 comes on, the No.11 pin on IC501 instantly goes to L level.

3. According to the program of IC501, when the No.9 and No.11 pin have been boosted to L level, the set momentarily stops, and then begins play operation.

Counter Repeat Operation (Fig. 6-6)

To perform counter repeat operation the REPEAT (counter) switch is set on, and when the tape stops (auto stop) in the PLAY or REC/PLAY modes, rewind begins automatically. When the "9999" point is reached on the tape counter, play operation resumes.

1. When the REPEAT (counter) switch S801-6 is set on, the No.8 and No.9 pins on IC501 are boosted to L level.
2. When tape run stops during PLAY or REC/PLAY operation, the No.12 pin on IC501 instantly reaches L level. (Refer to the section that follows concerning the auto stop.)
3. According to the program of IC501, when the No.8 and No.9 pins reach L level, the No.12 pin also reaches L level and the set automatically rewinds.
4. When the counter display reaches "9999", a pulse is generated from Counter IC805. This pulse passes through R864 to Q819 to bias the latter and turn it on. When Q819 comes on, the No.11 pin on IC501 instantly reaches L level.
5. According to the program of IC501, when the No.12 pin reaches L level, rewind is performed, and when the No.11 pin reaches L level during this operation the unit will assume the play mode.

End Repeat Operation (Fig. 6-6)

To perform end repeat, set the REPEAT (end) switch to on, and perform PLAY or REC operation. When the tape is stopped (auto stop), the tape rewinds automatically and when rewound to the start, tape will commence play automatically.

1. When the REPEAT (end) switch S801-7 is set on, the No.8 and No.9 pins on IC501 are set at L level.
2. "As per step 2 of COUNTER REPEAT" the unit automatically performs rewind operation.
3. When the tape has been completely rewound, the auto stop circuit functions, and the No.12 pin on IC501 once again instantly reaches L level.
4. When the No.12 pin on IC501 reaches L level and rewind operation automatically begins, when the No.12 pin once again reaches L level during this operation IC501 is programmed to automatically set the unit to play operation.

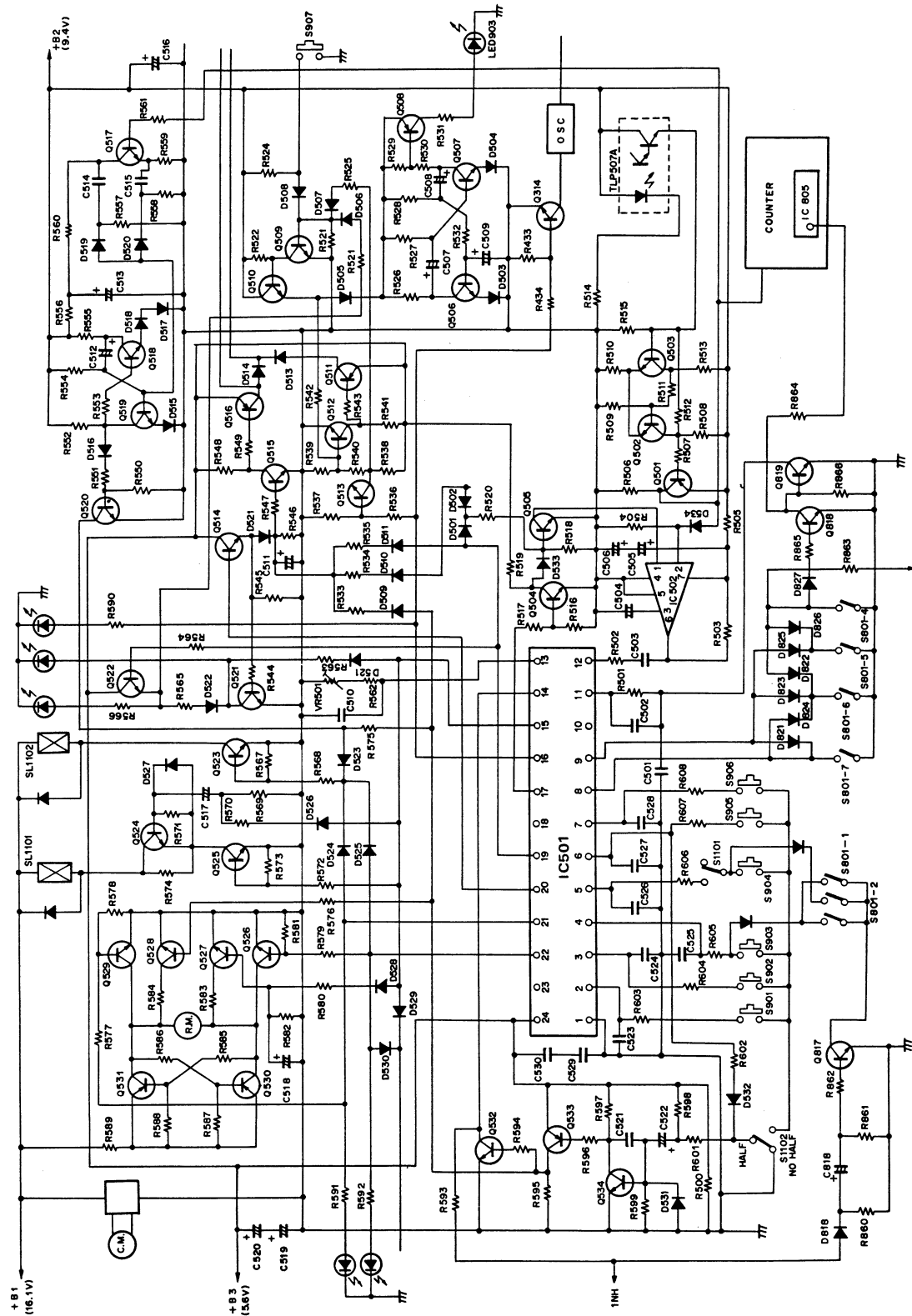


Fig. 6-6 Control circuit



Tape Slack Removal Circuit (Fig. 6-7)

The tape transport for this unit is the closed loop dual capstan system. During PLAY or REC/PLAY operation, if slack is present in the tape, the required tape tension cannot be obtained within the loop and normal tape/head contact cannot be made. For this reason, when inserting the cassette a circuit is provided to turn the supply reel in the rewind direction and remove any slack from the tape.

1. When the cassette is inserted, the cassette switch S1102 moves to the HALF side. +B3 flows via the R598 - C522 - Q534 route and Q534, Q533 come on.
2. When Q533 comes on, +B3 flows via the Q533 - R575 - D523 - R568 - Q523 route, and Q523 comes on. By Q523 coming on, +B1 flows to the brake solenoid SL1102 route, and SL1102 functions to release the brake.
3. At the same time, +B3 flows via the Q533 - R576 - Q528 route and turns on Q528.
4. When Q508 comes on, +B1 flows via the R589 - Q530 - R586 - R584 - Q528 route to turn on Q530.
5. When Q530 and Q528 come on, +B1 flows via the Q530 - reel motor RM - R584 - Q528 route, and the reel motor turns in the rewind direction to remove the slack from the tape.
6. The time for the reel motor to rotate in the rewind direction is determined by the changing time of C522 (approx. 1 sec.). Also the rotation torque of the reel motor is determined by the value of R584.

7. In the case very little or no slack is present in the tape, overwinding of the tape may result. The following operation prevents such from happening.
8. The take-up reel rotation is detected by a photo interrupter, and its sending pulse is fed to Q517 via the Q501 - R561 - Q517 route, and Q517 is turned on and off.
9. As Q517 is turned on and off, minute pulses from C514, C515, D519, D520 are generated. The pulses cause the single stability multivibrator composed of Q518, Q519 to operate, and Q520 is turned on for a fixed period (1.5 sec.).
10. When Q520 comes on, the current which had been fed to Q523 by means of +B3 via the Q533 - R575 - D523 - R568 - Q523 route stops flowing and goes off. When Q523 goes off, brake solenoid SL1102 is released, and a brake is applied to the tape transport to prevent its overwinding.

Pinch Solenoid Switching Circuit (Fig. 6-8)

When the play switch is turned on, a high voltage (approx. 16V) is fed to increase the strength of suction to the pinch solenoid. This circuit is to reduce the heat on the pinch solenoid when the voltage drops (to approx. 8V) after suction.

1. When the play switch S903 is set on, the No.15 pin on IC501 reaches H level. Q525 passes through R572 and is biased, turning it on.
2. At the same time, Q524 is biased via the D526 - R570 - C517 - Q524 route and comes on.

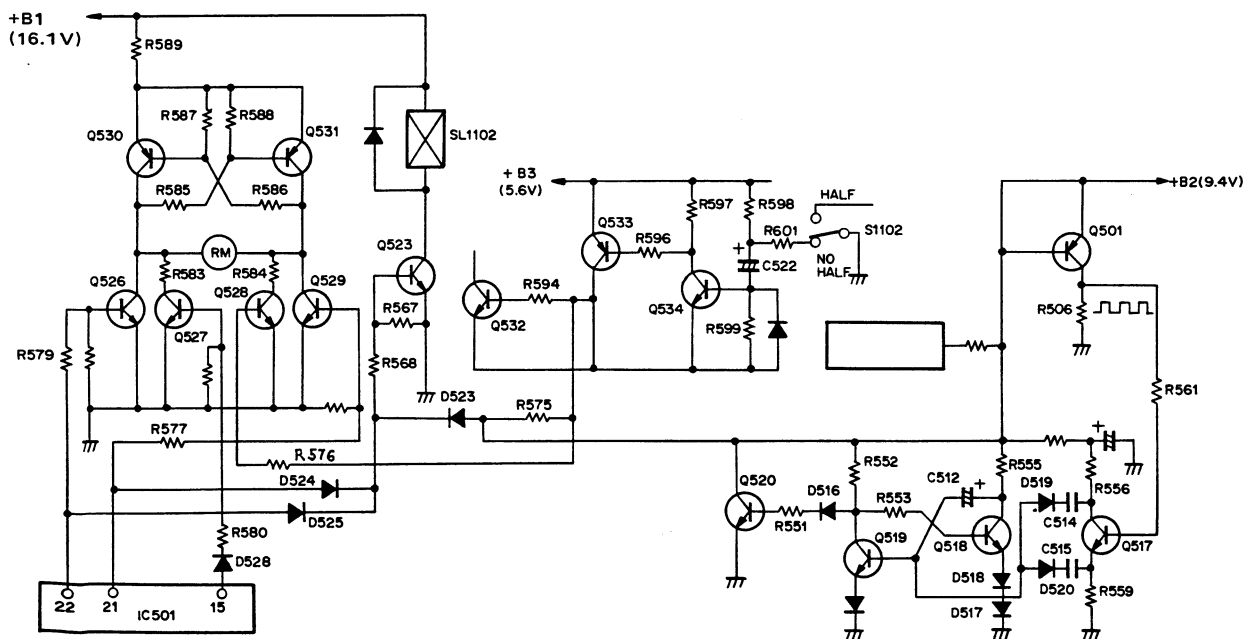


Fig. 6-7 Tape slack removal circuit



- When Q525 and Q524 come on, +B1 and a nearly equal voltage (approx. 16V) are fed to the pinch solenoid, which applies strong suction and play operation starts.
- Charging of C517 is promptly completed (after approx. 0.3 sec.) and the bias current to Q524 stops, turning it off. The current to the pinch solenoid SL1101 flows via the SL1101 - R574 - Q525 route, but a low voltage (approx. 8V) sufficient to maintain the necessary contact is fed to SL1101 by R574.

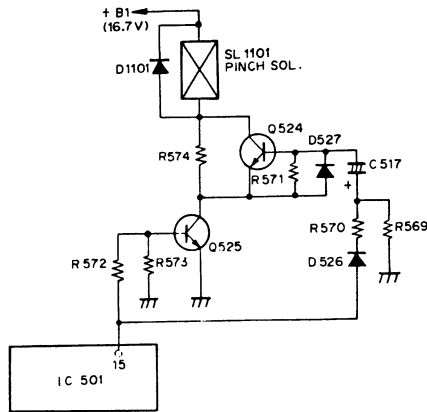


Fig. 6-8 Pinch solenoid switching circuit

Auto Stop Circuit (Fig. 6-9)

When the tape reaches its end in PLAY, PLAY/REC, FF or REW modes, this circuit functions to automatically release the mechanism. This circuit is jointed to the sensing switch employing a photo interrupter, and the take-up reel by a belt. It detects the tape motion and when the tape halts it releases the mechanism.

- During tape run, a pulse is generated from the photo interrupter (TLP507A). This sensing pulse is a Schmidt circuit composed of Q501, Q502, Q503, which rectifies the waves, passes them through D534 and is fed to the No.2 pin on IC502.

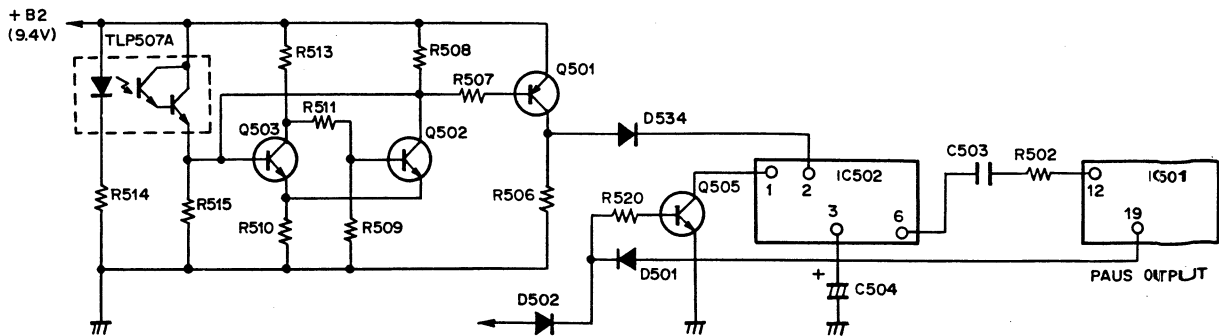


Fig. 6-9 Auto stop circuit

- When a pulse is fed to the No.2 pin on IC502, the No.6 pin reaches H level. However, since the pulse from the photo interrupter stops if the tape run halts, it reaches L level after approx. 2.5 seconds. The time it takes for the No.16 pin to change to L level is established by the condenser C504 attached to the No.3 pin.
- When the No.6 pin on IC502 reaches L level, the No.12 pin on IC501 also reaches L level via the R502 - C503 route, and the mechanism is released.
- When the power switch is turned on or the pause is operated, the No.1 pin on IC502 maintains L level by means of Q505, and prevents the No.6 pin from reaching L level.

6-5 MUTING CIRCUIT

This circuit prevents clicks and other noises generated during the on and off switching of the unit.

When Switching The Power On (Fig. 6-10)

- When the power switch is set to on, the emitter of Q1601 immediately generates approx. 5.6V. At this time since the current does not flow to C1603, the potential at both terminals of C603 is 0V. Thus, in the Schmidt circuit composed of Q1602, Q1603, the former is off and the latter on.
- Then, since Q1604 is for off and Q1605 is for on, +B 3 passes through D101 and flows with Q117, Q119, Q121 as its base. Q117, Q119 and Q121 come on and short the line output and headphone amplifier output.
- On the one hand, C1607 and C1615 are charged rapidly. As C1615 is charged, since the base potential of Q1608 becomes -0.6V, it goes off. Thus the potential at both terminals of ZD1603 becomes 6V and this current passes through R1613 to charge C1603.
- The charging of C1603 is soon complete (about 4 seconds after the power switch is turned on),



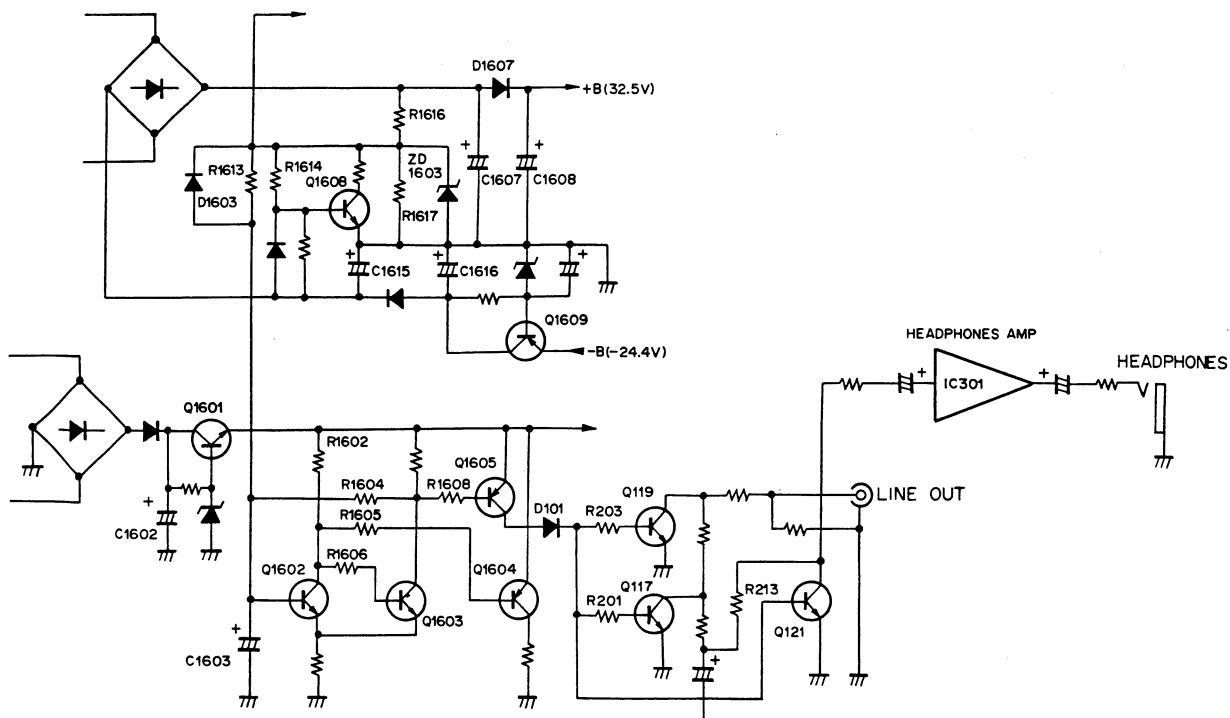


Fig. 6-10 Muting circuit 1

the Q1602 base potential rises, and as the Schmidt circuit reaches its turnover level, Q1602 comes on and Q1603 goes off. As Q1604 comes on, Q1605, Q117, Q119 and Q121 go off, and the muting of the line output is cancelled.

When Switching The Power Off (Fig. 6-10)

1. When switching the power off, the charge to C1607, C1615 is quickly discharged. Then the charge of C1603 passes through D1603, R1614 to flow to Q1608, turning it on.
2. The base potential of Q1602 falls due to the discharging of C1603 and the Schmidt circuit turns over to set Q1602 off and Q1603 on. Q1604 goes off and Q1605, Q117, Q119 and Q121 come on, and short the line input and headphone amplifier input.

Also, after turning off the power switch, the electrical charge of C1602 acts as a power source for working the various circuits.

Muting During FF, REW And STOP Operations (Fig. 6-11)

This circuit prevents noises (i.e. motor noise) from occurring during FF, REW and STOP operations.

1. During FF, REC and STOP operations, since the No.20 pin on IC501 reaches H level, the current flows to Q514 and turns it on.

2. With Q514 on, Q515, Q516 come on. +B3 takes the Q516 - S102-3 - D102 - R201 route to turn on Q117, and the Q516 - S102-3 - D102 - R203 route to turn on Q119, thus muting the line output.
3. At the same time, +B3 takes the Q516 - D514 - R373 route to bias Q303 and turn it on, thus muting the record amplifier.
4. When monitor switch S102-3 is set to the SOURCE position, the line output is not muted.

Muting When Switching From STOP To PLAY or PLAY/REC (Fig. 6-11)

This is a circuit to suppress noise during PLAY and REC operation.

1. When the unit is in the STOP mode, Q117, Q119 and Q303 are on, thus muting the line output and the record amplifier. Also, C511 is in the charged state (refer to the previous section on muting during FF, REW, STOP operations.).
2. By setting the PLAY switch to on, the No.20 pin on IC501 reaches L level and the current stops flowing to Q514 to turn it off. As Q514 goes off, Q515, Q516, Q117, Q119 and Q303 go off, and the muting function stops.
3. However, at the same time Q514 goes off, the electrical charge on C511 is fed to R546 and

discharges. While C511 is discharging (approx. 1 sec) Q515, Q516, Q117 and Q119 come on, and mute the switching noise produced when the unit is switched to PLAY (approx. 1 sec.)

4. During PLAY operations, +B3 flows on the R538 - R540 - Q512 route, and Q512 turns on Q511. Then +B3 flows via the Q511 - D513 - R373 - Q303 route, and Q300 comes on to mute the record amplifier.

5. When switching from the STOP mode to REC, the muting functions the same as in points 1-3, but since the No.16 pin on IC501 reaches H level, it passes R536 to bias Q513 and turn it on. As Q513 comes on, Q512, Q511 and Q303 go off, and the record amplifier muting is cancelled.

Bias Muting Circuit (Fig. 6-11)

When the PAUSE is operated during recording or when the record controls are released, the relative speed of the tape and head increases, and this in some cases causes the bias signal to be recorded.

When the tape is played back at the rated speed, this recorded bias signal can be heard as a "click" noise. The purpose of the bias muting circuit is to prevent this phenomenon.

1. Bias muting functions in the same manner as the muting operates when the unit is set from STOP to RECORD. (Refer to muting during switching from the STOP mode to PLAY or PLAY/REC.)

2. When the pause switch is set on during recording operation, the No.19 pin on IC501 reaches H level and takes the route D510 - R534 - R547 - Q515 to turn on Q515. When Q515 comes on, Q516 also comes on.

3. As Q516 comes on, +B3 flows via the Q516 - R432 - Q317 route to bias Q317 and turn it on.

4. As Q317 comes on, Q315 also comes on, and since the record bias takes the C339 - Q315 - R432 - Q317 route to bias Q317 and turn it on.

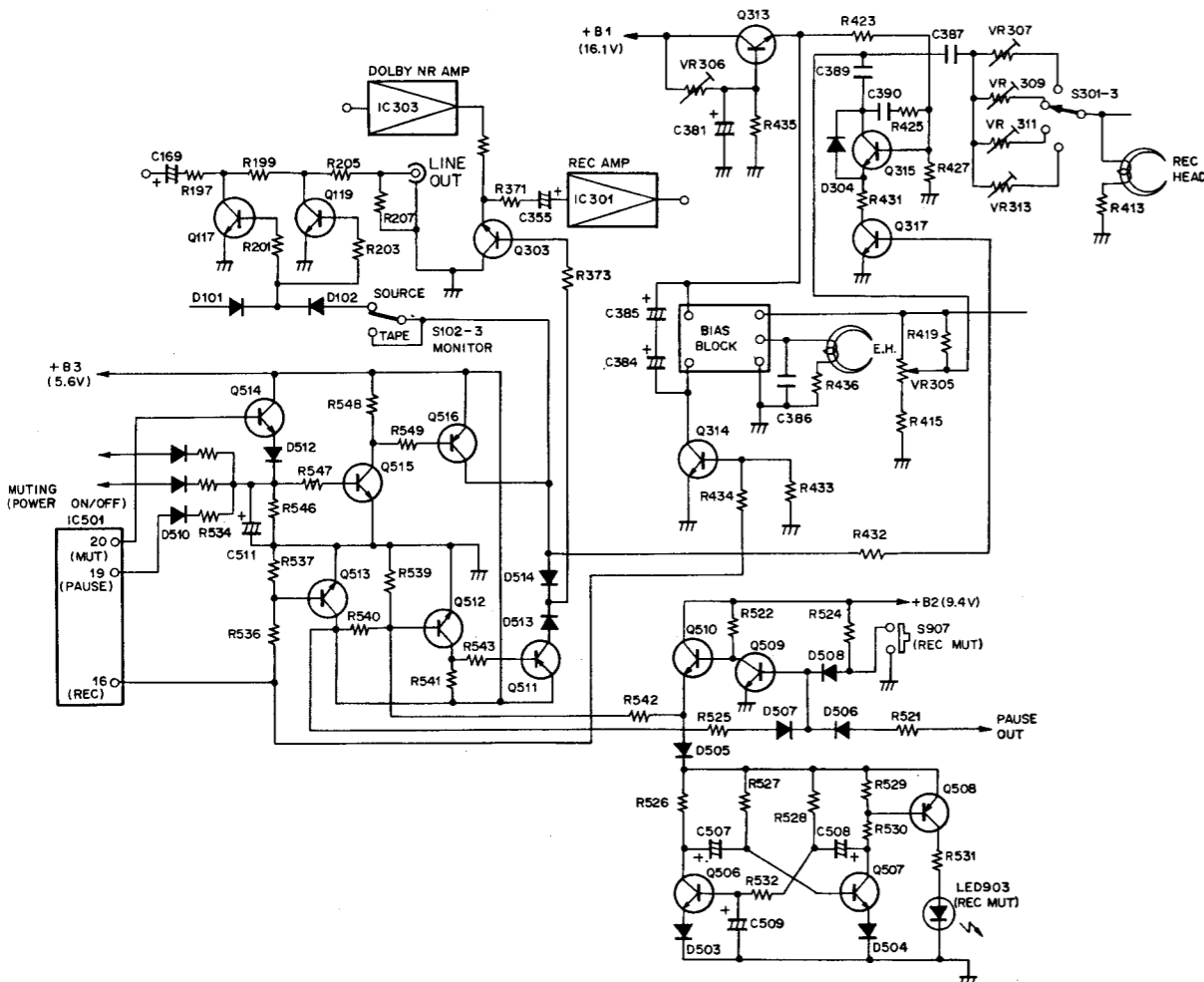


Fig. 6-11 Muting circuit 2

5. By pressing the pause switch again, the unit is released from the PAUSE mode, and recording continues. However, even if the No.19 pin on IC501 reaches L level, no bias is fed to the record head during the time (approx. 1 sec.) that C511 discharges, and turns on Q515, Q516, Q317, Q315.

The discharge of C511 ends soon and Q516 goes off, permitting the bias signal to be fed to the record head.

REC MUTE Operation (Fig. 6-11)

This is a circuit which enables the making of non-recorded segments without having to turn off the mic or line input volume. This is employed to create the unrecorded segment on the tape required for the operation of the music sensor (PMS) playback. Also, when the REC MUTE is pressed, the REC MUTE indicator lamp flashes (at approx. 1 sec. intervals).

1. By holding the REC MUTE switch on during recording the current by which the R525 - D508 route biases Q509 is stopped and Q509 goes off.

2. As Q509 goes off, +B2 passes through R522 and biases Q510 to turn it on.

3. As Q510 comes on, +B2 takes the Q510 - D505 route, and the flip-flop circuit composed of Q506, Q507 functions. By this, Q508 comes on and off repeatedly, +B2 takes the Q510 - D505 - Q505 - R531 route to make LED 903 flash (at approx. 1 sec. intervals).

4. At the same time, +B2 takes the Q510 - R542 route to bias Q520 and turn it on. As Q512 comes on, Q511 will also come on.

5. As Q511 comes on +B3 will take the Q511 - D513 - R373 route to bias Q303 and turn it on, and this mutes the record amplifier.

Pitch Control Circuit (Fig. 6-12)

This enables a ±6% variation of the fixed tape speed during playback. However, when in the PLAY/REC setting, variation from the fixed tape speed is not possible.

1. During record operation, the No.16 pin on IC501 reaches H level, and the unit is automatically quartz-locked at a fixed speed (standard speed). (LED1101 comes on.)

2. During play operation, when VR1101-1,2 is at its center click position, the coupled S1103 comes on and the unit is quartz-locked at a fixed speed. (LED1101 comes on.)

3. During PLAY operation, when the VR1101-1,2 is in other than the center click position, pitch control is possible, and the tape speed can be adjusted in a range of ±6% or greater. (LED1101 does not come on.)

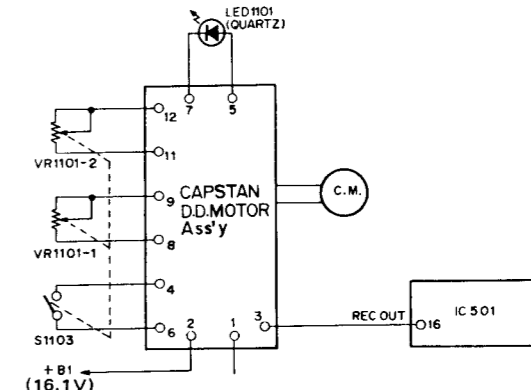
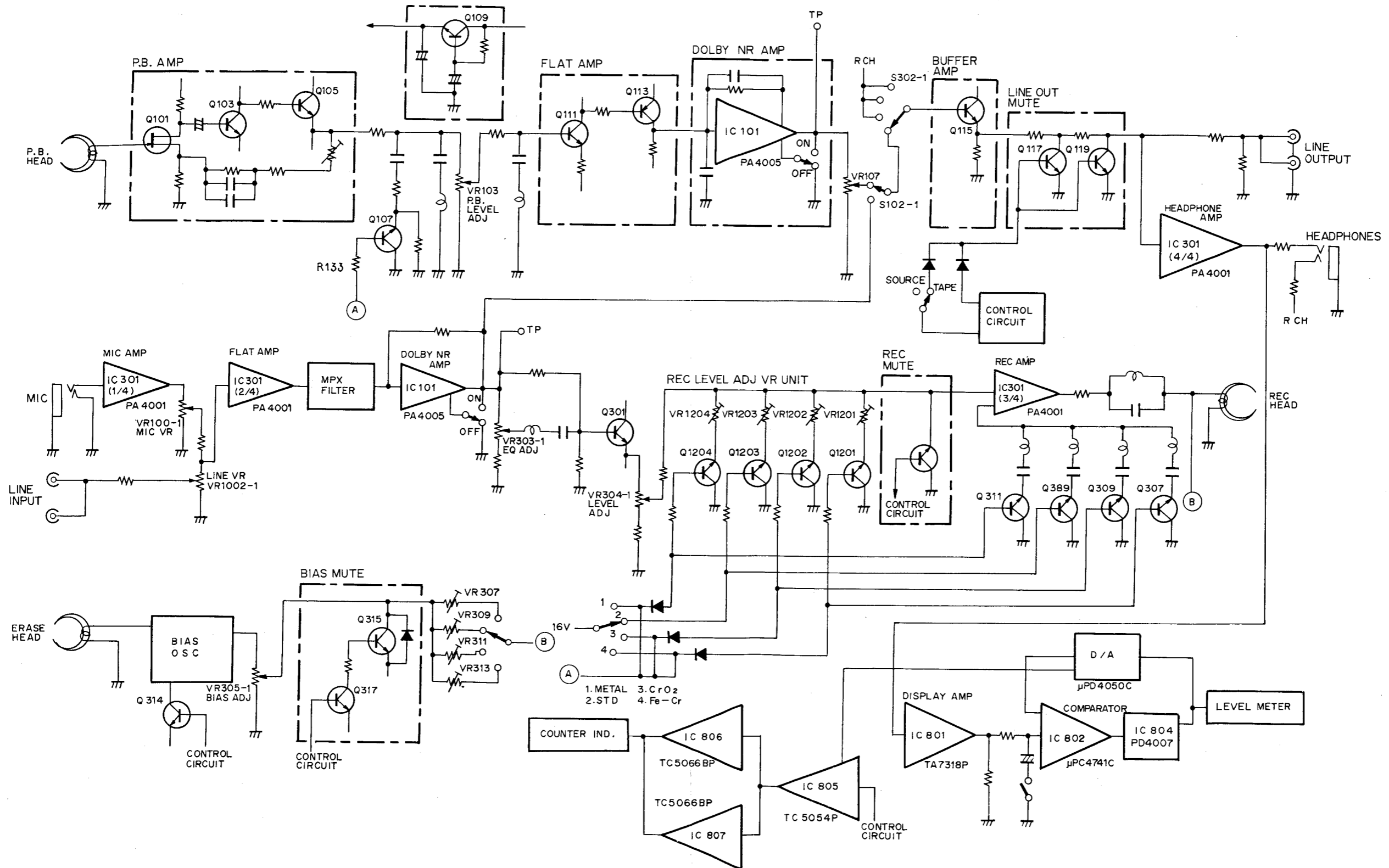


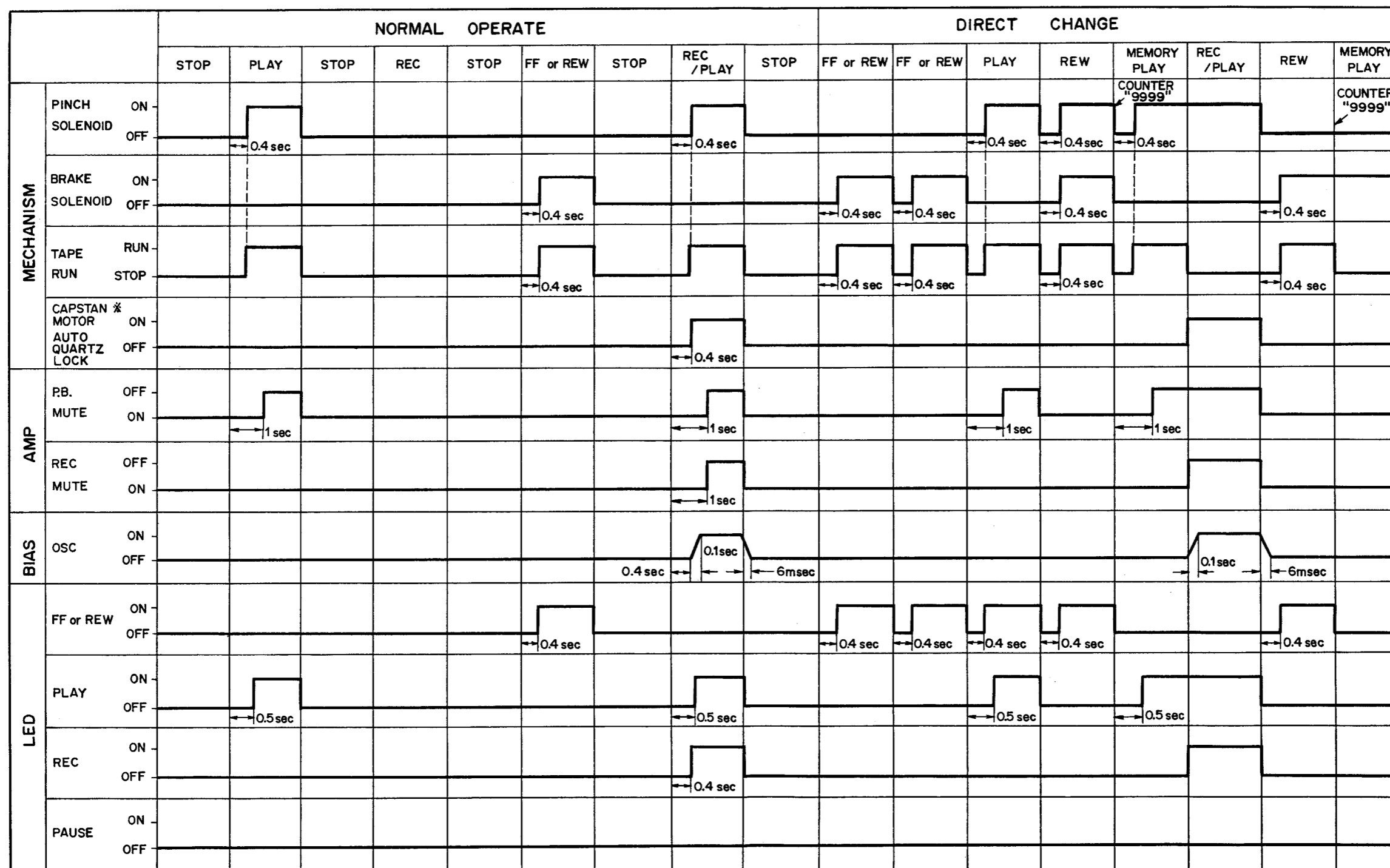
Fig. 6-12 Pinch control circuit

7. BLOCK DIAGRAM



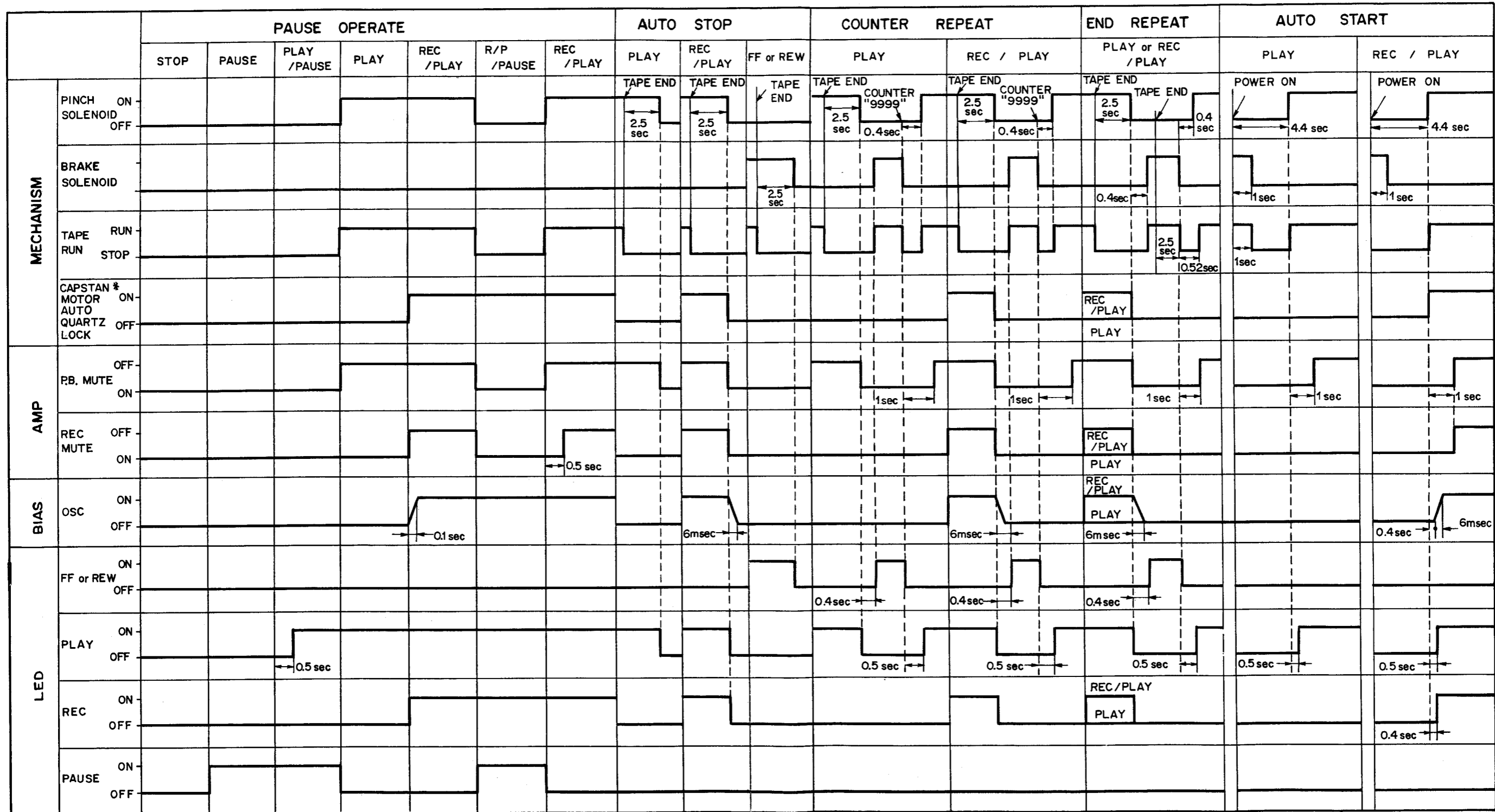
8. TIMING CHART

CHART 1



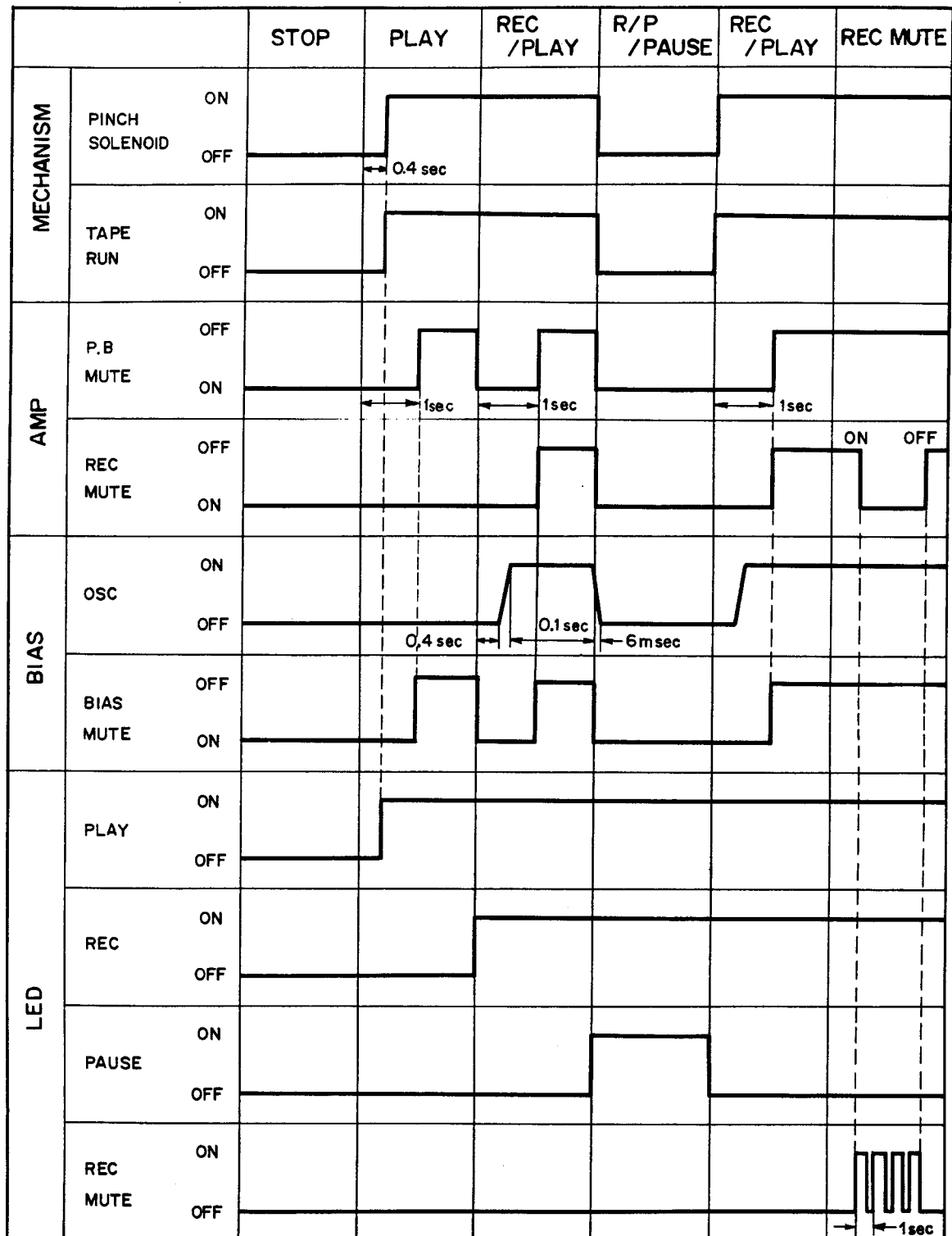
* When the pitch controls are not at the center click-stop position.
 (When the pitch control knobs are at the center click-stop position, the circuit stays on when the power is on.)

CHART 2



* When the pitch controls are not at the center click-stop position.
 (When the pitch control knobs are at the center click-stop position, the circuit stays on when the power is on.)

CHART 3



9. MECHANICAL ADJUSTMENTS

9-1 PINCH ROLLER PRESSURE ADJUSTMENT

1. Put the unit into the PLAY condition.
2. Using a tension gauge (Stick weighing instrument: approximately 500g full scale), gently drop the pinch arm (Fig. 9-1).
3. The force necessary to separate the pinch roller from the capstan shall be between 360 and 440g on the take-up side, and between 90 and 130g at the supply side. If outside these values, reset the pinch pressure spring.
4. If Paragraph 3 cannot be satisfied by resetting the pinch pressure spring, replace it with a new one.

9.2 REEL BASE TORQUE

Reel base torque during play, fast forward, and rewind modes is measured by a torque meter. Allowable torque ranges are tabulated in Table 1. If measured values lie outside these ranges, clean both reel bases and idlers, plus other areas such as the pinch roller contacting surface, and then measure again. If the measured values still lie outside the allowable ranges, replace the supply reel base full assembly (RXB-189) and/or take-up reel base full assembly (RXB-190).

Table 1

| Take-up Reel Base | |
|-----------------------------|---------------|
| Play take-up torque | 35 ~ 50 g.cm |
| Fast forward take-up torque | 80 ~ 100 g.cm |
| Rewind back tension torque | 3 ~ 9 g.cm |
| Supply Reel Base | |
| Play back tension torque | 4 ~ 8 g.cm |
| Rewind take-up torque | 80 ~ 100 g.cm |

9-3 TAPE GUIDE ADJUSTMENT

Adjustment Standard

Put the unit into the PLAY mode, and check that the tape is running normally without curling around the hand guides (Fig. 9-2).

Method of Adjustment

If the tape curls around the head guides, turn the height adjuster to the left or right so as to obtain a suitable tape height.

Post-adjustment Check

Put the unit into the PLAY mode, and check that the tape does not come into contact with the head guide.

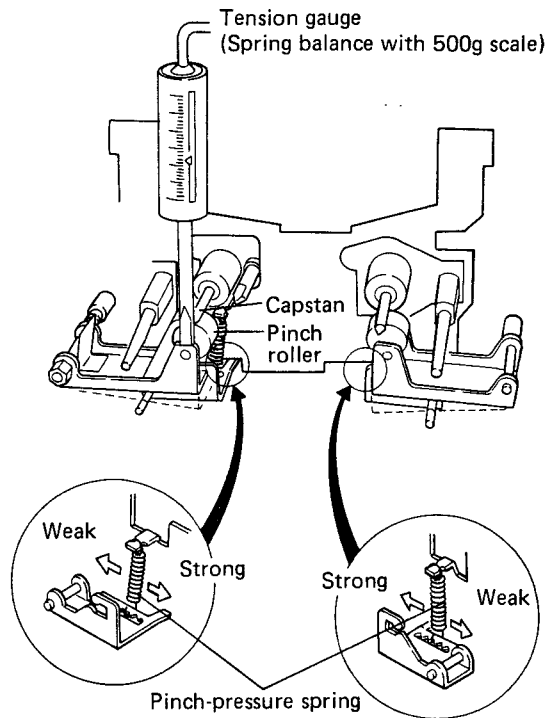


Fig. 9-1 Pinch roller pressure adjustment

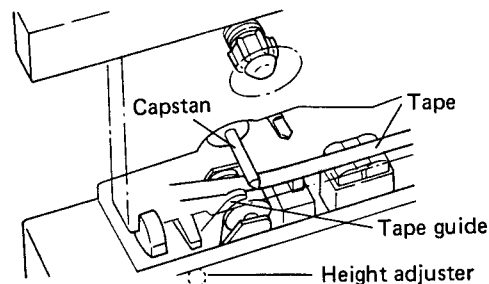


Fig. 9-2 Tape guide adjustment

9-4 CAPSTAN MOTOR LOCK RANGE ADJUSTMENT

Adjustment Standard

The phase deviation between CH1 and CH2 in diagram 8-5 should be 0.3ms or less.

Adjustment Method

With the mechanism assembly in PLAY, set in the quartz lock status, observe the wave forms of the two channel oscilloscope, and confirm the phase deviation between CH1 and CH2.

If the deviation is outside the standard, adjust VR1702 until the phases coincide as in diagram 9-3. Finally, lock VR1702 with paint.

9-5 PITCH CONTROL, CENTER CLICK POSITION SPEED ADJUSTMENT

1. Connect the frequency counter to the TP terminal of the D.D. motor control assembly.
2. Insert test tape STD-301 (for testing tape speed and wow and flutter) and put the unit in the PLAY mode.
3. Put the pitch control volume in the center click position (quartz lock ON) and measure the tape speed. Next, turn the quartz lock OFF (short terminals No.1 and 4 of the motor control assembly).
4. Adjust VR1701 of the D.D. motor control assembly so that the difference between tape speed with the quartz lock OFF is not more than $\pm 6\text{Hz}$ different from the quartz lock ON tape speed (Fig. 9-4).

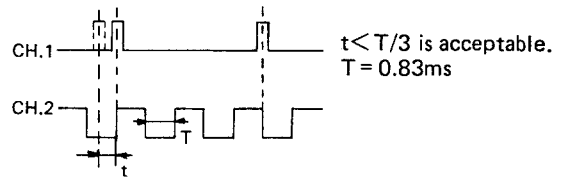
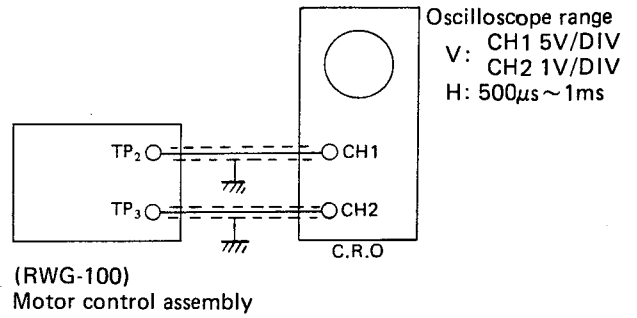


Fig. 9-3 Capstan motor lock range adjustment

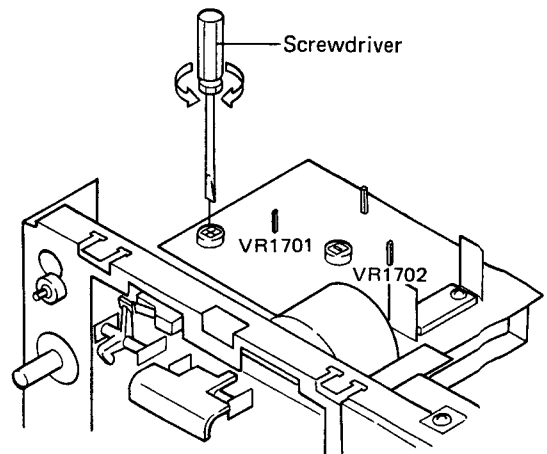


Fig. 9-4 Pitch control, center click position speed adjustment

10. ELECTRICAL ADJUSTMENTS

Before performing electrical adjustments, check the following items.

1. Ensure that all mechanical adjustments have been completed.
2. Adjust the measuring level to 0dBv 1V, and place a 50kΩ (47 to 52kΩ) dummy resistor across the line output terminals.
3. Perform adjustments using the A-side (the side with the label) of the specified test tapes.
 - STD-331A: For overall replay
 - STD-341A: For replay adjustments
 - STD-601 : STD blank tape
 - STD-603 : CrO₂ blank tape
 - STD-604 : METAL blank tape
4. Obtain the following measuring instruments. Millivoltmeter, low frequency generator oscilloscope, attenuator.
5. Unless otherwise defined, the term "recording condition" as used in this manual shall mean the condition when a cassette shell is loaded, and both the PLAY and REC switches are pressed.
6. Unless otherwise specified, adjustments shall be performed on both L and R channels.
7. Clean the heads and also remove any residual magnetism using a head demagnetizer.
8. Always perform adjustments in the specified sequence. If the sequence is changed, the performance of the unit may be degraded.

Adjustment Sequence

1. Head angle adjustment
2. Playback equalizer adjustment
3. Playback level adjustment
4. Meter adjustment
5. Erase current adjustment
6. Confirmation and adjustment of bias trap
7. Bias adjustment
8. Adjustment of record and playback frequency response
9. Record level adjustment
10. Confirmation of tape calibration adjustment
11. Adjustment of Dolby NR recording
12. Adjustment of Dolby NR playback

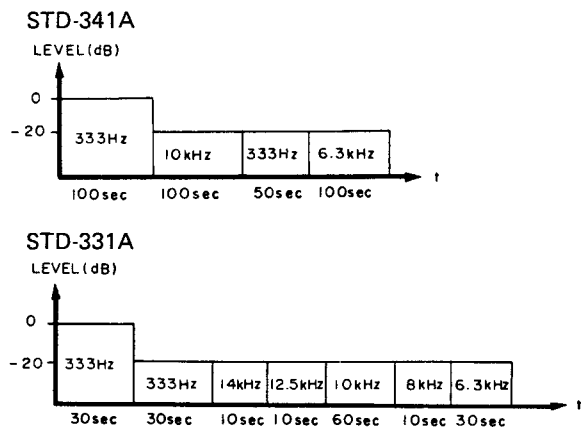


Fig. 10-1 Recorded contents of test tape

10-1 HEAD ANGLE ADJUSTMENT

1. Connect an mV meter to the line output terminals. Set the output volume to its maximum and the tape selector switch to the STD position.
2. Play the STD-331A test tape's 10kHz, -20dB signal and turn the head angle adjustment screw A (shown in figure 10-2) so that both the left and right channels are at their maximum outputs.
3. After adjustment, be sure to lock the screw in position using "screw tight green" No.300.

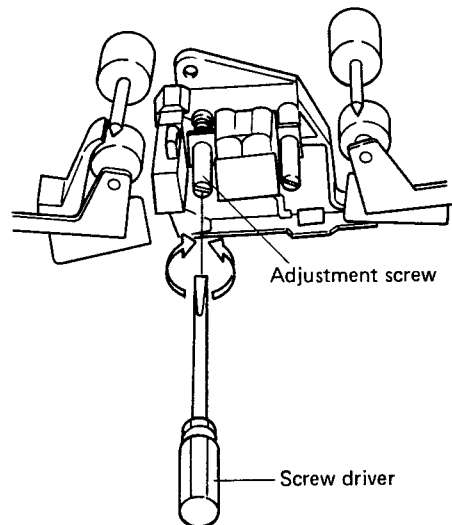


Fig. 10-2 Head angle adjustment

10-2 PLAYBACK EQUALIZER ADJUSTMENT

1. Connect an mV meter to the line output terminals. Set the tape selector switch to STD and set the semi-fixed volume VR103 (L ch) and VR104 (R ch) used for output level adjustment to their maximum levels.
2. Play back the 333Hz, -20dB signal from test tape STD-341A and read the display of the mV meter.
3. Play back the same tape's 10kHz, -20dB signal and adjust the EQ adjustment volume VR101 (L ch) and VR102 (R ch) so that the output deviation is within +1dB (+1dB ~ -0.3dB) of the previous 333Hz signal.
4. Confirm that the output deviation of the same tape's 14kHz, -20dB playback signal is within the range of 2.7dB (-0.5 ~ +2.2dB) of the previous mV meter reading of the 333Hz signal.
5. Move the tape selector switch to the METAL, CrO₂ and Fe-Cr positions. Confirm that the mV meter readings for the 10kHz, -20dB test tape playback signals in each position are within -4.3 ±1dB range of the reading for the STD position.

10-3 PLAYBACK LEVEL ADJUSTMENT

Because this adjustment determines the Dolby NR playback level, it should be performed precisely.

1. Connect an mV meter to the No.20 (L ch) and No.21 (R ch) TP terminals of the mother unit.
2. Play back the 333Hz, 0dB signal on the STD-341A test tape and adjust the VR103 (L ch) and VR104 (R ch) so that the mV meter indicates 1dBv (1.12V).
3. Insert an empty cassette into the unit and set it to the playback mode. Feed in a 333Hz signal from the No.5 (L ch) and No.6 (R ch) TP terminals on the mother unit.
4. Adjust the input level so that the readout of the mV meter connected to No.20 (L ch) and No.21 (R ch) TP terminals is -3dBv (710mV).
5. Set the line output to the click position, and adjust VR107 (L ch) and VR108 (R ch) so that the output level of the line input is -7dBv (447mV).

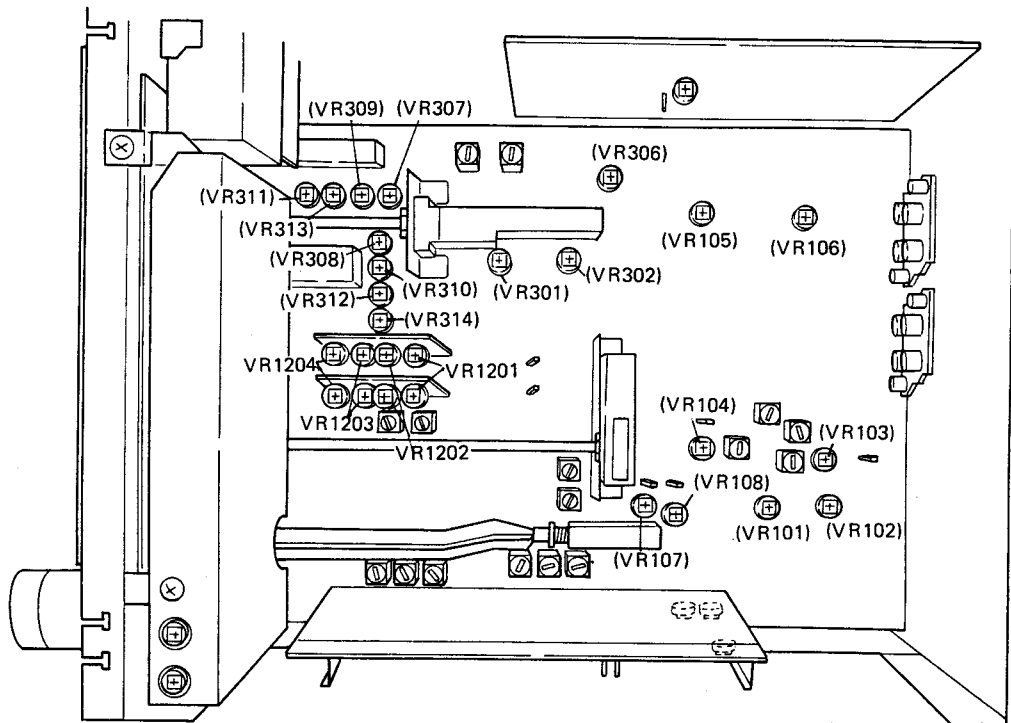


Fig. 10-3 Adjustment points

10-4 METER ADJUSTMENT

1. Set the meter switches (PEAK, PEAK HOLD, AVERAGE) to OFF, and the MONITOR switch to SOURCE.
2. Connect an mV meter to the No.40 (L ch) and No.41 (R ch) TP terminals on the mother unit.
3. Feed a 333Hz, -10dBv (316mV) signal to the line input terminals and adjust the line input volume so that the mV meter displays -3dBv (710mV).
4. Turn the VR801 (L ch) and VR802 on the display amplifier unit in a clockwise direction from MIN, and stop at the point where the level meter position reaches 0dB.
5. Shut off the line input volume to "0" and raise the input of the line input terminals.
6. Confirm that when the level meter readout is at -20dB, the meter displays -23 (+3 ~ -2dBv) (100mV ~ 94mV), and when the level meter is at +5dB the mV meter displays 2 ± 2dBv (1V ~ 997mV).

| TP signal | Level meter indication |
|------------|------------------------|
| +2 ± 2dBv | +5dB |
| -23 ± 3dBv | -20dB |

Table 1

10-5 ERASE CURRENT ADJUSTMENT

1. Set the line input volume to the minimum and connect an mV meter to the No.103 and No.102 (GND) terminals on the mother unit.
2. Set the unit to the RECORD mode without recording any signal (or by running an unrecorded tape).
3. Adjust VR306 so that the mV meter displays 160mV (160mA). Take care at this time, since the measured frequency is very high because of the bias frequency.

10-6 CONFIRMATION AND ADJUSTMENT OF BIAS TRAP

1. Connect an mV meter and oscilloscope to the No.20 (L ch) and No.21 (R ch) TP terminals on the mother unit.
2. Set the tape selector switch to the STD position and the MONITOR switch to TAPE.
3. Insert test tape STD-603 and record without any signal.
4. Move the L101 (L ch) and L102 (R ch) high enough so that the bias leakage waveforms can be confirmed on the oscilloscope.
5. Adjust L103 (L ch) and L104 (R ch) so that

the bias leakage waveforms on the oscilloscope are at their lowest level.

6. Next, re-adjust the L101 (L ch) and L102 (R ch) moved in step 4 so that the bias leakage waveforms are at their lowest level.
7. Connect an mV meter to the No.107 - No.53 (GND) (L ch) and the No.107 - 74 (GND) (R ch) TP terminals on the mother unit.
8. Set the tape selector switch to the METAL position, and set the unit to the record mode.
9. Adjust L307 (L ch) and L308 (R ch) so that the mV meter displays the lowest figure.

10-7 BIAS ADJUSTMENT

- Set each of the tape calibration knobs to the following positions:
MODE - OFF, BIAS (VR305) - 0 (click point)
LEVEL (VR304) - 0 (click point),
EQ (VR303) - 0 (click point).

■ Adjustment For STD Tape

1. Connect an mV meter to the line output terminals, set the tape selector switch to STD, and the monitor switch to the SOURCE position.
2. Set the bias adjustment volume VR309 (L ch) and VR310 (R ch) to their minimum levels and the record level adjustment volume VR1203 (L ch, R ch) to their respective mechanical center points.
3. Feed a 2kHz, -10dBv (316mV) signal into the line input terminals, and adjust the line input volume so that the mV meter shows -14.5dBv (188mV).
4. Using the STD-601 test tape, record the signal in step 3, and adjust the VR309 (L ch) and VR310 (R ch) so that during playback it passes its highest mV meter reading (playback output) and then drops 0.6dB.

■ Adjustment For Metal Tape

1. Connect an mV meter to the line output terminals, set the tape selector to metal and the MONITOR switch to SOURCE.
2. Set the bias adjustment volume VR307 (L ch) and VR308 (R ch) to the minimum, and the record level adjustment volume VR1204 (L ch, R ch) to their respective mechanical center positions.
3. Feed a 2kHz, -10dBv (316mV) signal to the line input terminal and adjust the line input volume so that the mV meter indicates -14.5dB (188mV).
4. Record the signal in step 3 on the STD-604 test tape, and adjust the VR309 (L ch) and VR310 (R ch) so that during playback the mV meter reading (playback output) passes its highest value and drops 0.6dB.

■ **Adjustment For CrO₂ Tape**

1. Connect an mV meter to the line output terminals, set the tape selector switch to CrO₂ and the MONITOR switch to the SOURCE position.
2. Set the bias adjustment volume VR311 (L ch) and VR312 (R ch) to their minimum, and the record level adjustment volume VR1202 (L ch, R ch) to their respective mechanical center positions.
3. Feed a 2kHz, -10dBv (316mV) signal to the line input terminals, and adjust the line input volume so that the mV meter displays -14.5dB (188mV).
4. Using test tape STD-603, record the signal in step 3, and adjust the VR311 (L ch) and VR312 (R ch) so that during playback the mV meter reading (playback output) passes its highest level and drops 0.6dB.

■ **Adjustment For Fe-Cr Tape**

1. Connect an mV meter to the line output terminals, set the tape selector to Fe-Cr and the monitor switch to SOURCE.
2. Set the bias adjustment volume VR313 (L ch) and VR314 (R ch) to the minimum, and the record level adjustment volume VR1202 (L ch, R ch) to their respective mechanical center positions.
3. Feed a 2kHz, -10dBv (316mV) signal to the line input terminals, and adjust the line input volume to that the mV meter displays -14.5dB (188mV).
4. Using Fe-Cr tape (SONY DUAD C-60), record the signal in step 3, and adjust the VR313 (L ch) and VR314 (R ch) so that during playback the mV meter reading (playback output) passes its highest level and drops 0.6dB.

10-8 ADJUSTMENT OF RECORD AND PLAYBACK FREQUENCY RESPONSE

■ If the surrounding temperature is below 15C. during adjustments, the adjustment value in the brackets () should be applied.

1. Set the tape selector switch to STD and the Dolby NR switch to the OFF position.
2. Connect an mV meter to the line output terminals, and feed a 333Hz, -30dBv (31.6mV) signal to the line input terminals.
3. Set the MONITOR switch to SOURCE, and adjust the line input volume so that the mV meter reads -34.5dBv (18.8mV).
4. Record the 333Hz signal on test tape STD-601, and set the monitor switch to TAPE.
5. Next, record and play back the 10kHz signal simultaneously, and adjust VR309 (L ch) and

VR310 (R ch) so that the deviation in playback output in relation to the 333Hz signal is +0.5dB (+1dB).

6. Confirm that the record and playback frequency response is within the range shown in page 40.
7. Set the tape selector switch to metal and record and play back the 333Hz and 10kHz signals on test tape STD-604 as done in the previous step. Then, adjust VR307 (L ch) and VR308 (R ch) so that the deviation of the playback output of the 10kHz signal is within +0.5dB (+1dB) of the 333Hz signal.
8. Set the tape selector switch to CrO₂ and record and play back the 333Hz and 10kHz signals on test tape STD-603. Then, adjust VR311 (L ch) and VR312 (R ch) so that the deviation of the playback output of the 10kHz signal is within +0.5dB (+1dB) of the 333Hz signal.
9. Set the tape selector switch to Fe-Cr and record and play back the 333Hz and 10kHz signals on Fe-Cr tape (SONY DUAD C-60). Then adjust VR313 (L ch) and VR314 (R ch) so that the deviation of the playback output of the 10kHz signal is within +0.5dB (+1dB) of the 333Hz signal.
10. After the above adjustments have been completed, if the frequency response does not meet the standards shown in page 40, adjust according to the method below.

■ If the frequency response above 8kHz is too high or too low, adjust by also matching it with the peaking coil.

| Tape | Peaking coil |
|------------------|---|
| METAL | L ₃₁₃ (L ch) L ₃₁₄ (R ch) |
| STD | L ₃₀₉ (L ch) L ₃₁₀ (R ch) |
| CrO ₂ | L ₃₁₁ (L ch) L ₃₁₂ (R ch) |

Table 2

- If the 1kHz ~ 10kHz response for the tapes shows a gradual drop or rise, repeat the 10-7 "BIAS ADJUSTMENT". At this time, allow the bias point for all tapes to go to 0.6 ± 0.5dB at 2kHz.
11. After 10-9 "ADJUSTMENT OF RECORDING LEVEL" has been completed, record and play back the tape within the fixed frequency range in the standards of page 40, and confirm that they are within the standards.

NOTE:

Because the left and right channels on each bias adjustment volume are affected, repeat the adjustments 1 or 3 times.

10-9 RECORD LEVEL ADJUSTMENT

1. Set the Dolby NR switch to OFF, and connect an mV meter to the No.40 (L ch) and No.41 (R ch) TP terminals on the mother unit.
2. Feed a 333Hz, -10dBv (316mV) signal to the line input terminals, and adjust the line input volume so that the mV meter indicates -3dBv (710mV).
3. Set the tape selector switch to the STD position and the Dolby NR switch to ON, and then record the 333Hz signal on the STD-601 test tape.
4. Connect an mV meter to the No.20 (L ch) and No.21 (R ch) TP terminals on the mother unit.
5. With the set in the RECORD mode, adjust VR1203 (L ch, R ch) so that the mV meter displays -3dBv (710mV).
6. With the tape selector switch in the metal position, set the Dolby NR switch to ON and record the 333Hz signal on test tape STD-604.
7. Connect an mV meter to the No.20 (L ch) and No.21 (R ch) TP terminals on the mother unit.
8. With the unit in the RECORD mode, adjust VR1204 (L ch, R ch) so that the mV meter displays -3dBv (710mV).
9. With the tape selector switch in the CrO₂ position, set the Dolby NR switch to ON and record the 333Hz signal on the STD-603 test tape.
10. Connect an mV meter to the No.20 (L ch) and No.21 (R ch) TP terminals on the mother unit.
11. With the unit in the RECORD mode, adjust VR1202 (L ch, R ch) so that the mV meter displays -3dBv (710mV).
12. With the tape selector switch to the Fe-Cr position, set the Dolby NR switch to ON and record the 333Hz signal on Fe-Cr tape (SONY DUAD C-60).
13. With the unit in the record mode, adjust VR1201 (L ch, R ch) so that the mV meter shows -3dBv (710mV).

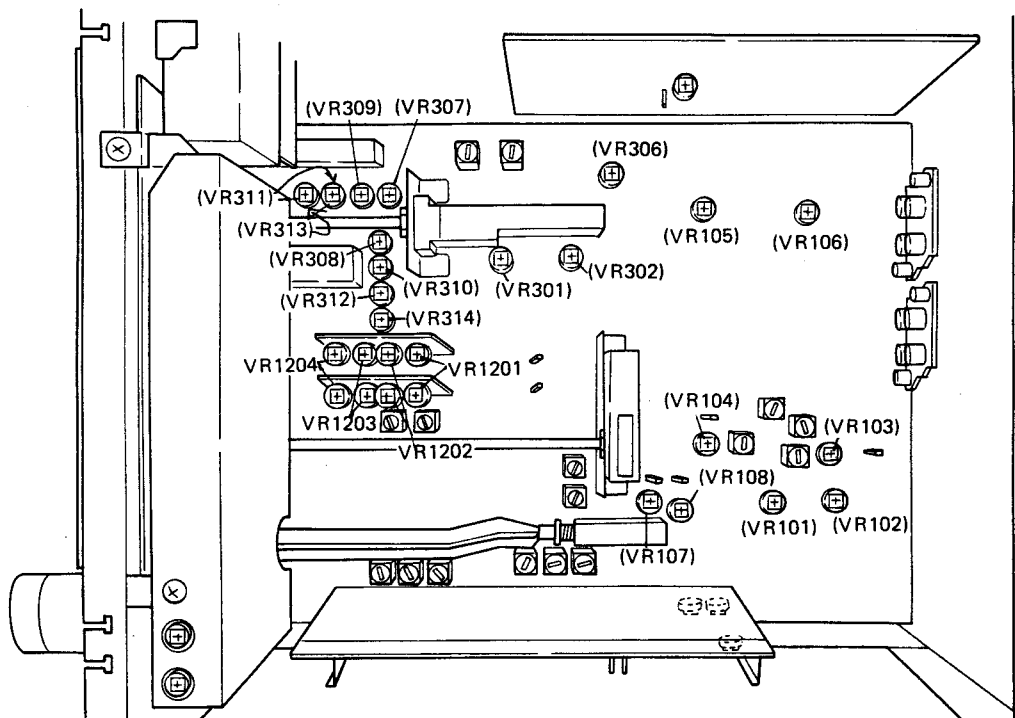


Fig. 10-4 Adjustment points

10-10 CONFIRMATION OF TAPE CALIBRATION ADJUSTMENT

1. Using the STD-601 test tape, perform the bias, level and EQ adjustments in accordance with "TAPE CALIBRATION PROCEDURE", and confirm that the displays of their respective knobs are within the -3 to +3 range.
2. Using STD-603 test tape, perform the bias, level and EQ adjustments as in step 1, above, and confirm that the settings of their knobs are within the -3 to +3 range.
3. Perform the adjustments for the STD-604 test tape in the same manner as step 1 for bias, level and EQ, and confirm that the settings of their knobs are within the -3 to +3 range.
4. After confirming the tape calibration adjustments with each type of tape, confirm that the record and playback frequency response is within the standards shown in page 40.

10-11 ADJUSTMENT OF DOLBY NR RECORDING

1. Connect an mV meter to the No.40 (L ch) and No.41 (R ch) TP terminals on the mother unit.
2. Feed a 1kHz, -10dBv (316mV) signal to the line input terminals, and with the Dolby NR switch set to OFF, adjust the input volume so that the mV meter displays 0dBv (1V).

3. When the input level has dropped 40dB in relation to the value in step 2, adjust VR301 (L ch) and VR302 (R ch) so that the mV meter displays -34dBv (20mV).

10-12 ADJUSTMENT OF DOLBY NR PLAYBACK

1. Connect an mV meter to the No.20 (L ch) and No.21 (R ch) TP terminals of the mother unit, and set the Dolby NR switch to OFF.
2. Set the playback adjustment level VR103 (L ch) and VR104 (R ch) to their minimum, feed a 1kHz signal from the No.5 (L ch) and No.6 (R ch) TP terminals on the mother unit, and adjust the input level so that the mV meter readout is 0dBv (1V).
3. Set the Dolby NR switch ON, and when the input level has dropped 34dB in relation to the value in step 2, adjust the VR103 (L ch) and VR104 (R ch) so that the mV meter readout is -40dBv (10mV).
4. After adjustment of Dolby playback, return the playback level adjustment VR103 (L ch) and VR104 (R ch) to their original positions. Then a repeat of the adjustment of playback level is recommendable.

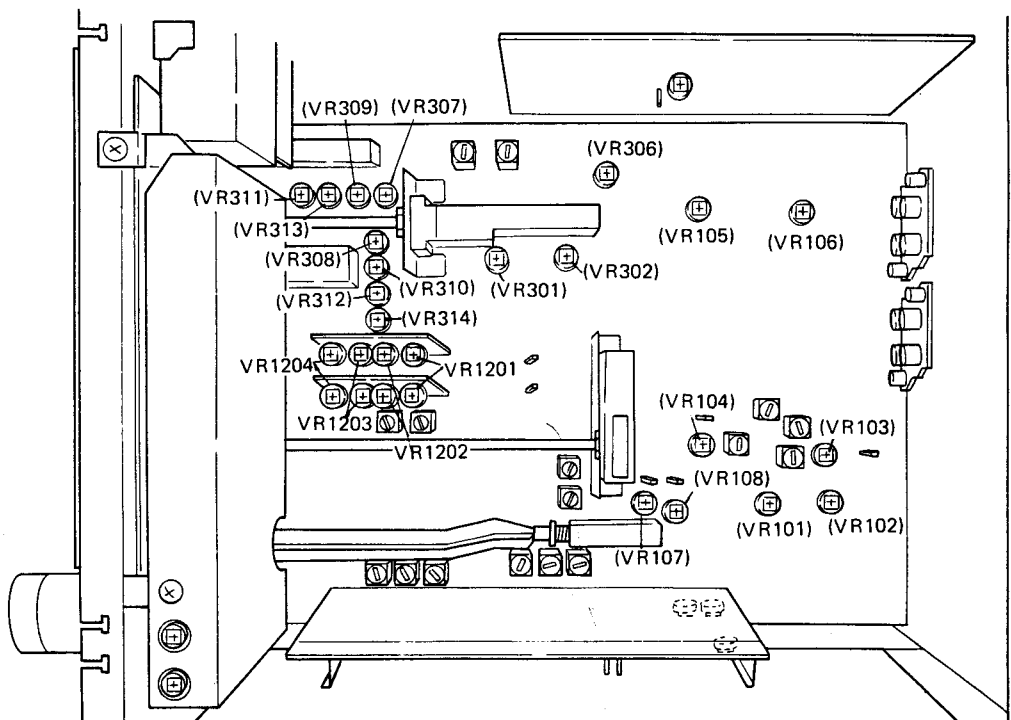
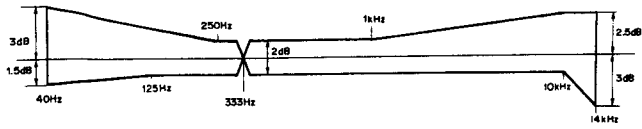


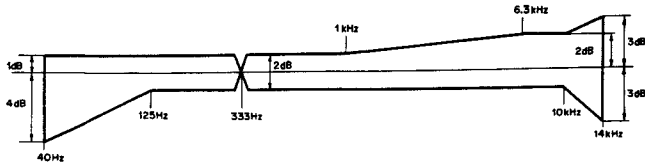
Fig. 10-5 Adjustment points



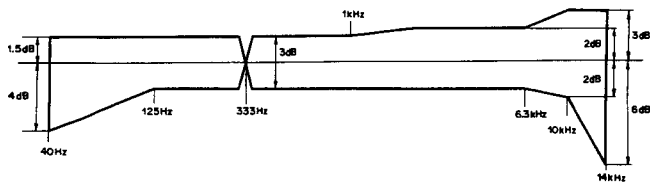
- Using STD-331A and the STD position, with DOLBY NR OFF.

Note:

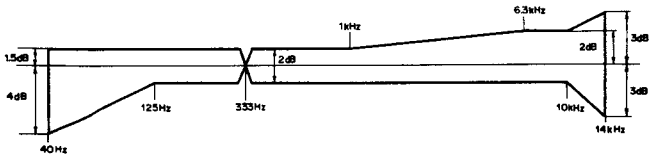
The frequency characteristics for the R channel shall be obtained by subtraction 1dB from the value indicated on the meter at 40Hz and 63kHz respectively.



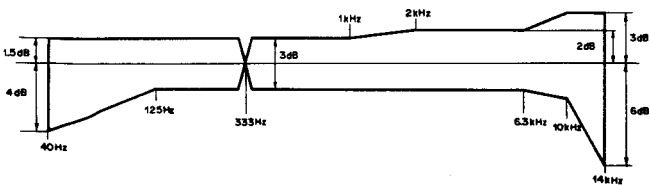
- Using STD-601 and the STD position, with DOLBY NR OFF.



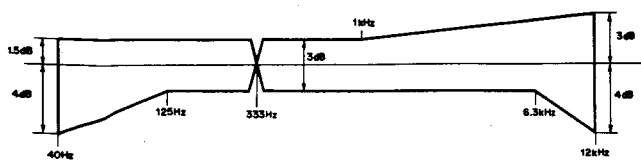
- Using STD-601 and the STD position, with DOLBY NR ON.



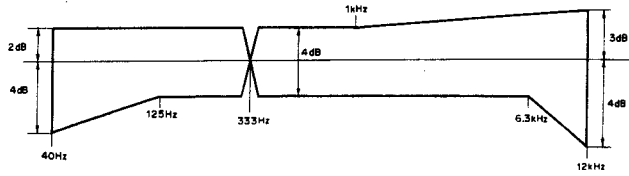
- Using STD-603 and the CrO₂ position, with DOLBY NR OFF.



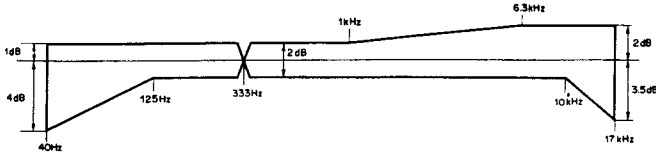
- Using STD-603 and CrO₂ position, with DOLBY NR ON.



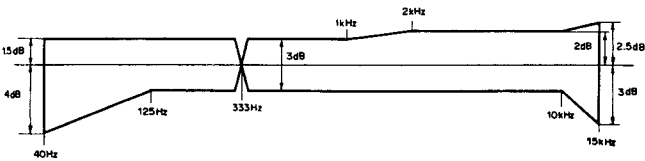
- Using Fe-Cr tape (SONY DUAD C-60) and the Fe-Cr position, with DOLBY NR OFF.



- Using Fe-Cr tape (SONY DUAD C-60) and the Fe-Cr position, with DOLBY NR ON.



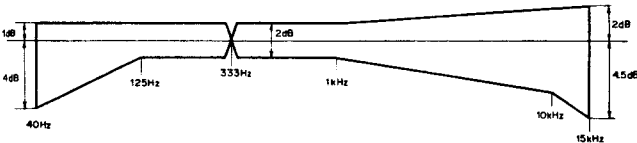
- Using STD-604 and the METAL position, with DOLBY NR OFF.



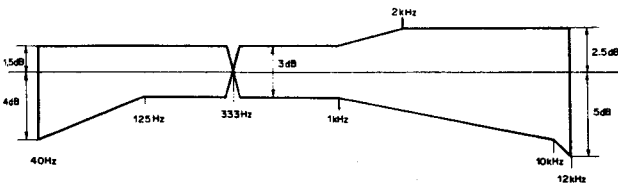
- Using STD-604 and the METAL position, with DOLBY NR ON.

Overall frequency response after BLE adjustment.

After BLE adjustment, frequency response must meet the specifications listed below.



- DOLBY NR OFF.



- DOLBY NR ON.

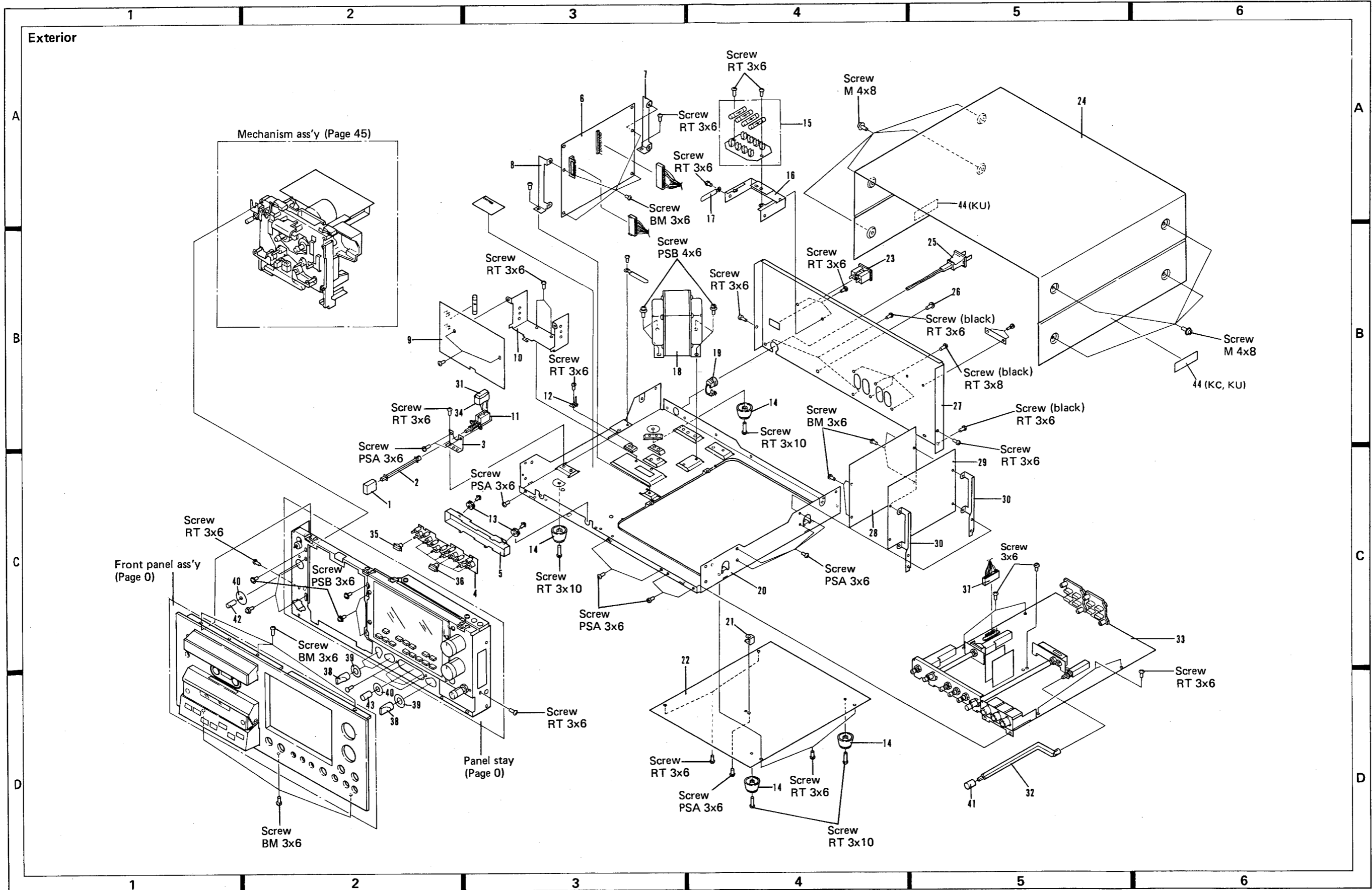
11. EXPLODED VIEWS

11.1 EXTERIOR

• Parts without part number cannot be supplied.

Parts List

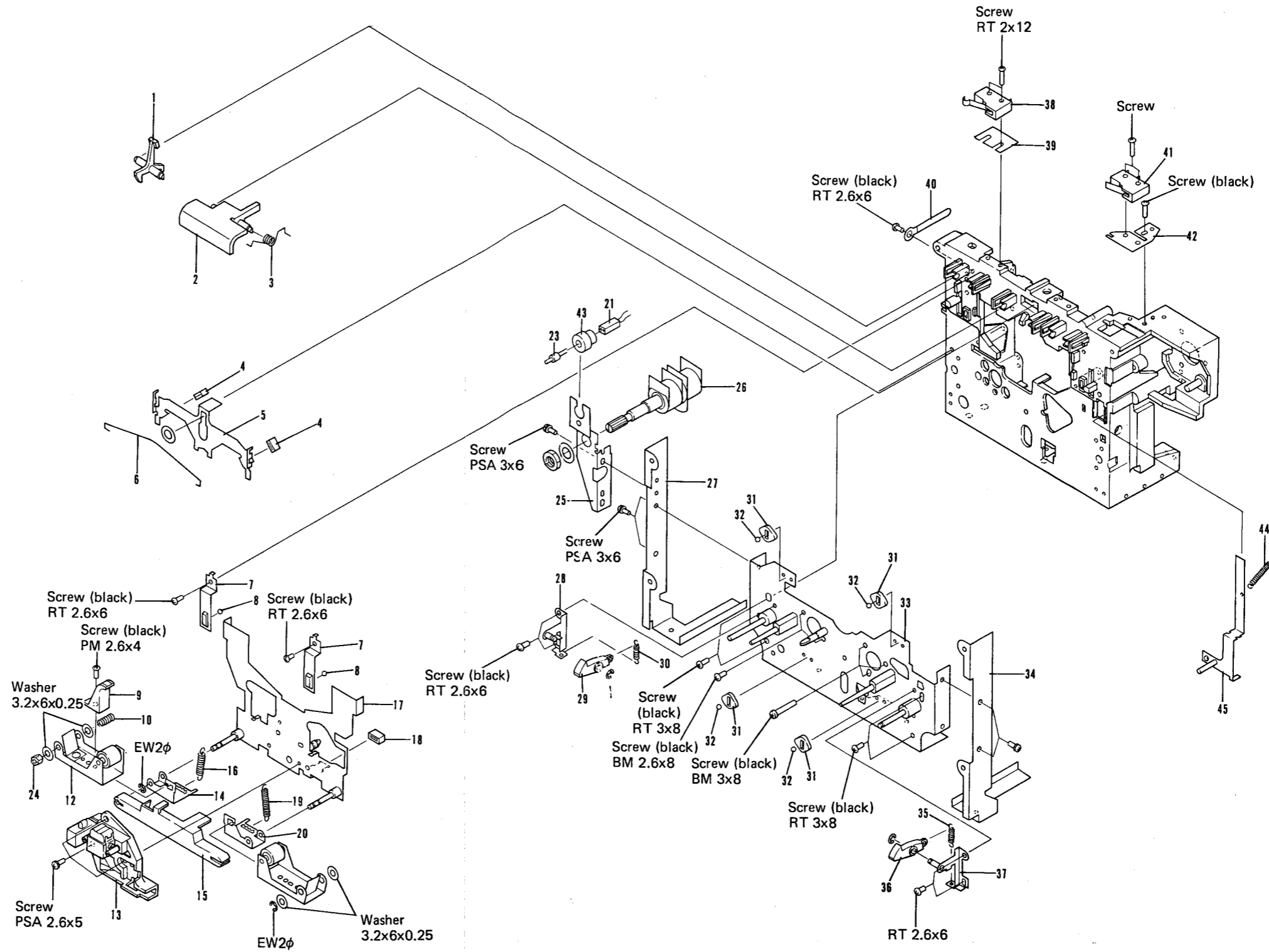
| Key No. | Parts No. | Description |
|---------|-----------|-----------------------------------|
| 1. | RAC-094 | Power switch knob |
| 2. | | Power switch joint-bar |
| 3. | | Power switch holder |
| 4. | RWS-075 | Function switch unit |
| 5. | | Function switch P.C. board holder |
| 6. | RWG-104 | Control unit |
| 7. | | Control bracket (A) |
| 8. | | Control bracket (B) |
| 9. | RWR-074 | Power supply unit |
| 10. | | Power supply holder |
| 11. | RSA-032 | Power switch (KU, KC) |
| 12. | | Terminal 1P |
| 13. | | Rubber bush |
| 14. | RXA-905 | Foot assembly |
| 15. | | Fuse unit |
| 16. | | P.C. board frame |
| 17. | | UL cord clamber |
| 18. | RTT-176 | Power transformer |
| 19. | REC-272 | Strain relief |
| 20. | | Main chassis |
| 21. | | P.C. board stand |
| 22. | | Bottom plate |
| 23. | RKP-114 | AC socket |
| 24. | RNA-411 | Bonnet |
| 25. | RDG-021 | Power cord (UL) |
| 26. | | Screw |
| 27. | | Rear panel |
| 28. | | BLE shield cover |
| 29. | RWX-322 | BLE unit |
| 30. | | BLE bracket |
| 31. | RWX-109 | Spark killer (KU) |
| | RWX-150 | Spark killer (KC) |
| 32. | | Switch joint-bar (A) |
| 33. | RWX-319 | Mother unit |
| 34. | REC-250 | Capacitor cover (D) |
| 35. | RAC-117 | Knob (B) |
| 36. | RAC-107 | Knob |
| 37. | RKP-111 | Connector ass'y |
| 38. | RAA-268 | Knob (A) ass'y |
| 39. | RED-151 | Volume mask (B) |
| 40. | RED-047 | Switch mask |
| 41. | RAA-259 | Switch knob ass'y |
| 42. | RAA-294 | Knob |
| 43. | RAA-295 | BLE knob |
| 44. | RRW-112 | UL caution label |



11.2 MECHANISM ASSEMBLY 1

Parts List

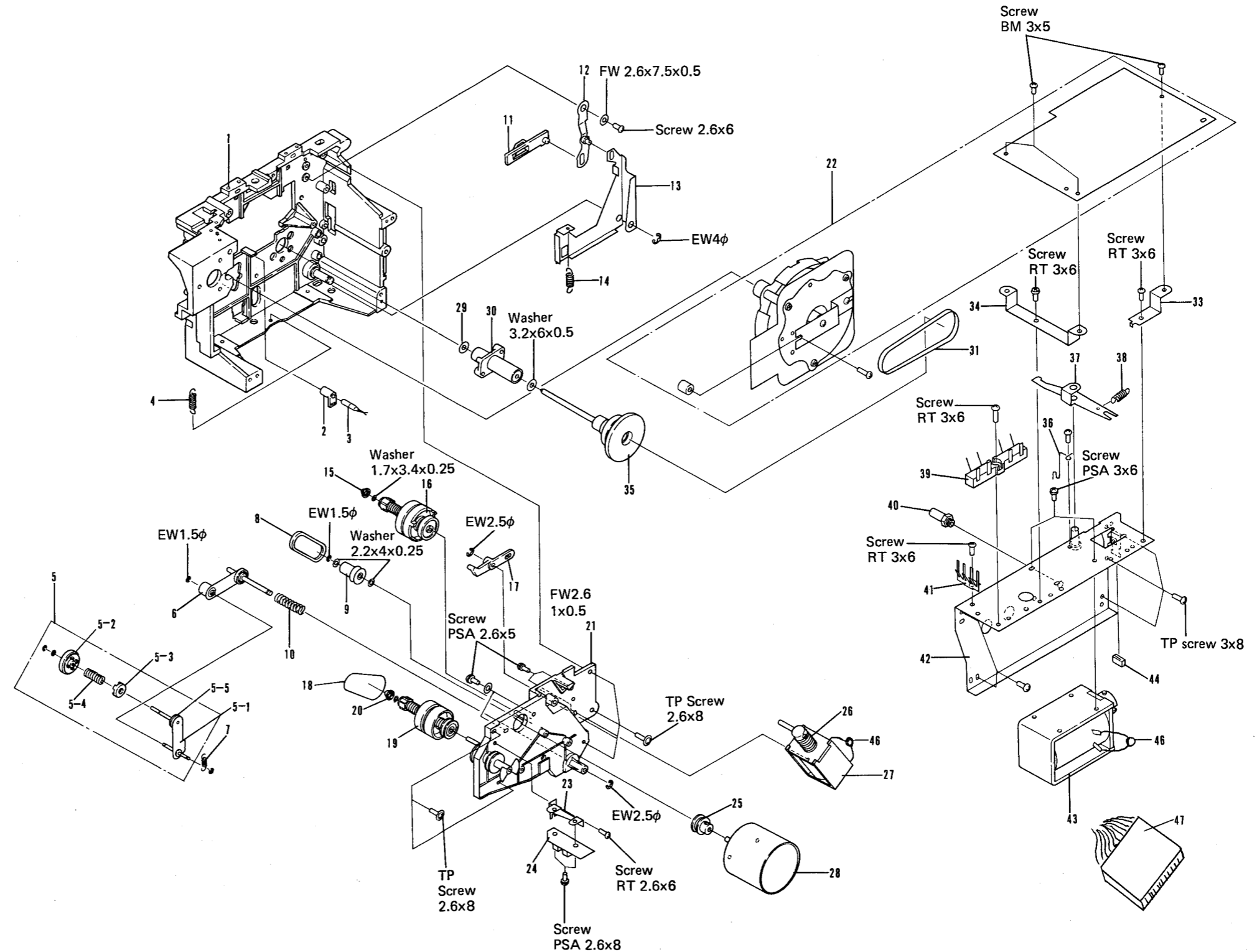
| Key No. | Parts No. | Description |
|---------|-----------|----------------------------------|
| 1. | RNK-533 | Detector arm |
| 2. | RNK-556 | Half holder |
| 3. | RBH-534 | Spring |
| 4. | REB-187 | Brake shoe |
| 5. | | Brake plate |
| 6. | RBH-563 | Brake spring |
| 7. | RBK-119 | Head base holder |
| 8. | REF-013 | Steel ball |
| 9. | RNK-348 | Tape guide |
| 10. | RBH-374 | Spring |
| 11. | | Socket-head screw 2.6x5 Ni |
| 12. | RXB-257 | Pinch-roller arm assembly |
| 13. | RXB-212 | Sub-head base assembly |
| 14. | | Arm (B) |
| 15. | RNK-703 | Head cord cover |
| 16. | RBH-647 | Spring (B). |
| 17. | | Head base assembly |
| 18. | REB-153 | Stopper |
| 19. | RBH-373 | Spring |
| 20. | | Arm (A) |
| 21. | | Connector socket assembly (2P) |
| 22. | | Quartz holder |
| 23. | TLG 206 | Diode |
| 24. | RNK-535 | Height adjuster |
| 25. | | Volume bracket |
| 26. | RCV-065 | Volume |
| 27. | | Mechanism holder (L) |
| 28. | | Half holder bracket (L) assembly |
| 29. | RNK-534 | Half holder arm |
| 30. | RBH-503 | Spring |
| 31. | | Ball guide |
| 32. | REF-013 | Steel ball |
| 33. | | Base assembly |
| 34. | | Mechanism holder (R) |
| 35. | RBH-503 | Spring |
| 36. | RNK-534 | Half holder |
| 37. | | Half holder bracket (R) assembly |
| 38. | RSF-022 | Microswitch |
| 39. | REC-278 | Switch spacer |
| 40. | | Cord clasper (B) |
| 41. | RSF-024 | Microswitch (B) |
| 42. | | Switch bracket |
| 43. | | Quartz holder |
| 44. | RBH-524 | Spring |
| 45. | | Half detector arm assembly |



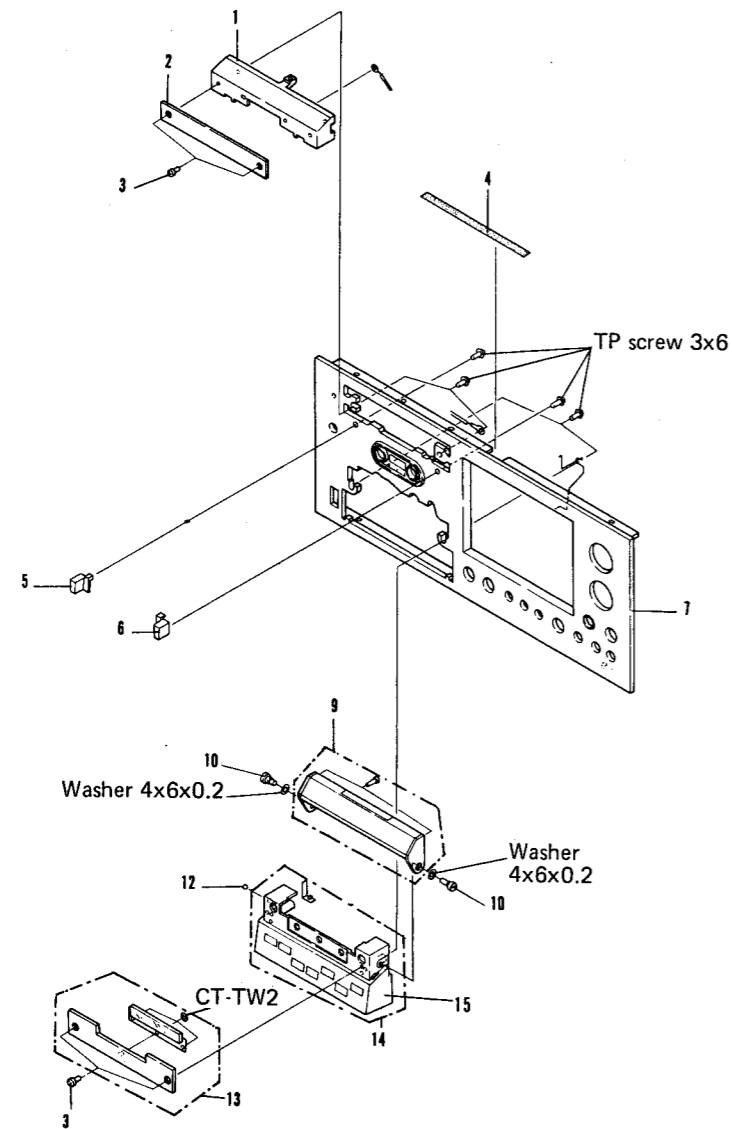
11.3 MECHANISM ASSEMBLY 2

Parts List

| Key No. | Parts No. | Description |
|---------|-----------|---------------------------|
| 1. | | Mechanism chassis |
| 2. | REB-297 | Lamp holder |
| 3. | REL-072 | Lamp (B) |
| 4. | RBH-505 | Spring |
| 5. | RXB-144 | Idler arm full assembly |
| 5-1. | | Idler arm assembly |
| 5-2. | RNK-561 | Idler |
| 5-3. | RNK-562 | Spring cap |
| 5-4. | RBH-498 | Spring |
| 5-5. | RED-141 | Felt |
| 6. | | Arm assembly |
| 7. | RBH-564 | Spring |
| 8. | REB-317 | TU belt |
| 9. | RXA-998 | Take-up pulley assembly |
| 10. | RBH-502 | Spring |
| 11. | | Idler arm |
| 12. | | Arm lever assembly |
| 13. | | Arm |
| 14. | RBH-511 | Spring |
| 15. | RNK-815 | Reel cap |
| 16. | RXB-189 | Supply reel assembly (B) |
| 17. | | Brake arm |
| 18. | REB-272 | Sensing belt |
| 19. | RXB-190 | Take-up reel assembly (B) |
| 20. | RNK-815 | Reel cap |
| 21. | | Sub-chassis assembly |
| 22. | | Capstan D.D. motor |
| 23. | | Sensing holder |
| 24. | | Sensing unit |
| 25. | RXB-064 | Motor pulley (B) assembly |
| 26. | RBH-507 | Spring |
| 27. | RXP-069 | Solenoid (B) |
| 28. | RXM-047 | Take-up motor |
| 29. | RBF-037 | Washer |
| 30. | RXB-162 | Bearing (B) assembly |
| 31. | REB-368 | Sub-belt |
| 32. | ..... | ..... |
| 33. | | Control bracket (B) |
| 34. | | Control bracket (A) |
| 35. | RXB-243 | Supply pulley assembly |
| 36. | RBH-557 | Spring |
| 37. | | Solenoid lever |
| 38. | RBH-506 | Spring (A) |
| 39. | | 4P terminal |
| 40. | | Screw |
| 41. | | 4P terminal |
| 42. | | Solenoid chassis assembly |
| 43. | RXP-068 | Solenoid (A) |
| 44. | REB-153 | Stopper |
| 45. | ..... | ..... |
| 46. | WO3B | Diode |
| 47. | RKP-064 | Connector assembly (16P) |



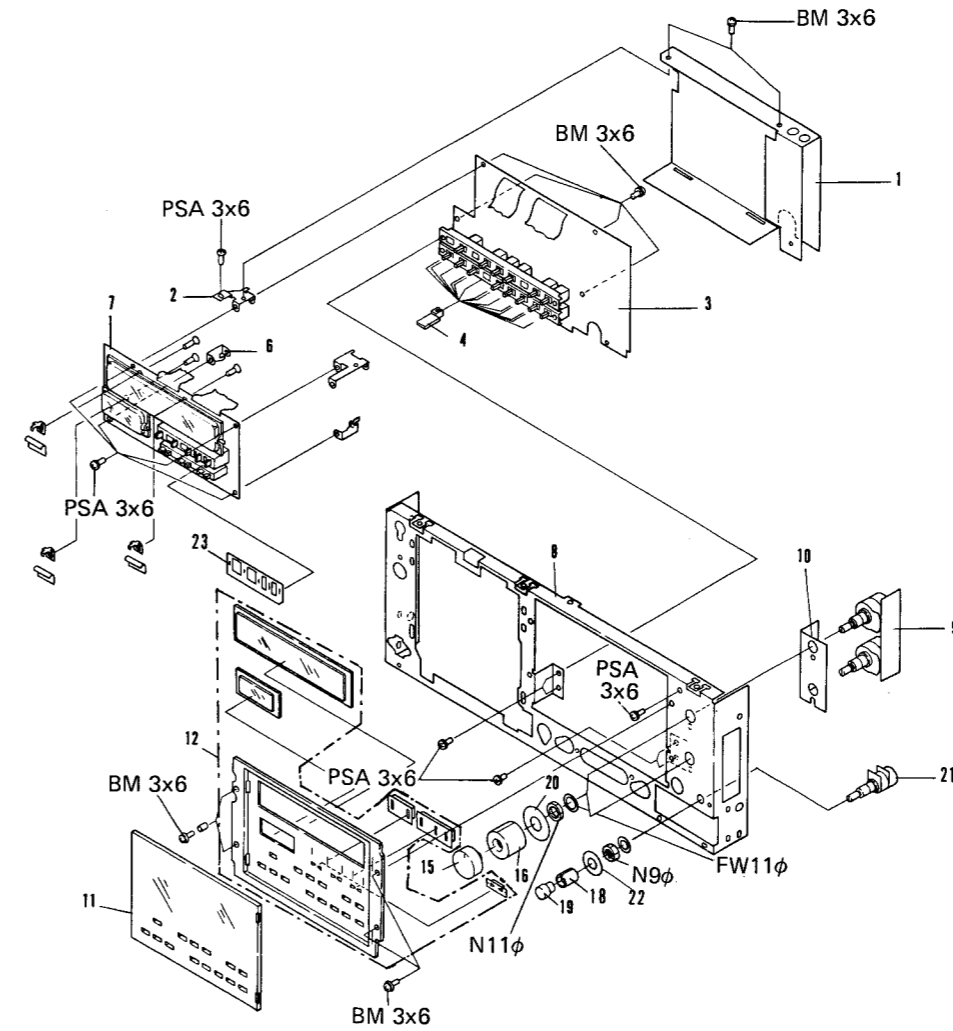
11.4 FRONT PANEL



Parts List

| Key No. | Parts No. | Description | Key No. | Parts No. | Description |
|---------|-----------|----------------------|---------|-----------|---------------------------|
| 1. | RNK-708 | Half cover | 11. | ..... | ..... |
| 2. | RAH-264 | Half cover panel | 12. | REF-014 | Steel ball |
| 3. | RBA-044 | Screw (A) | 13. | RXX-262 | Escutcheon panel assembly |
| 4. | REB-223 | Cover cushion (D) | 14. | RXX-261 | Escutcheon assembly |
| 5. | RNK-566 | Guide (L) | 15. | RNK-729 | Escutcheon |
| 6. | RNK-608 | Guide (R) | | | |
| 7. | RXX-259 | Front panel assembly | | | |
| 8. | ..... |  |  |  |  |
| 9. | RXX-260 | Head cover assembly | | | |
| 10. | RBA-045 | Screw (B) | | | |

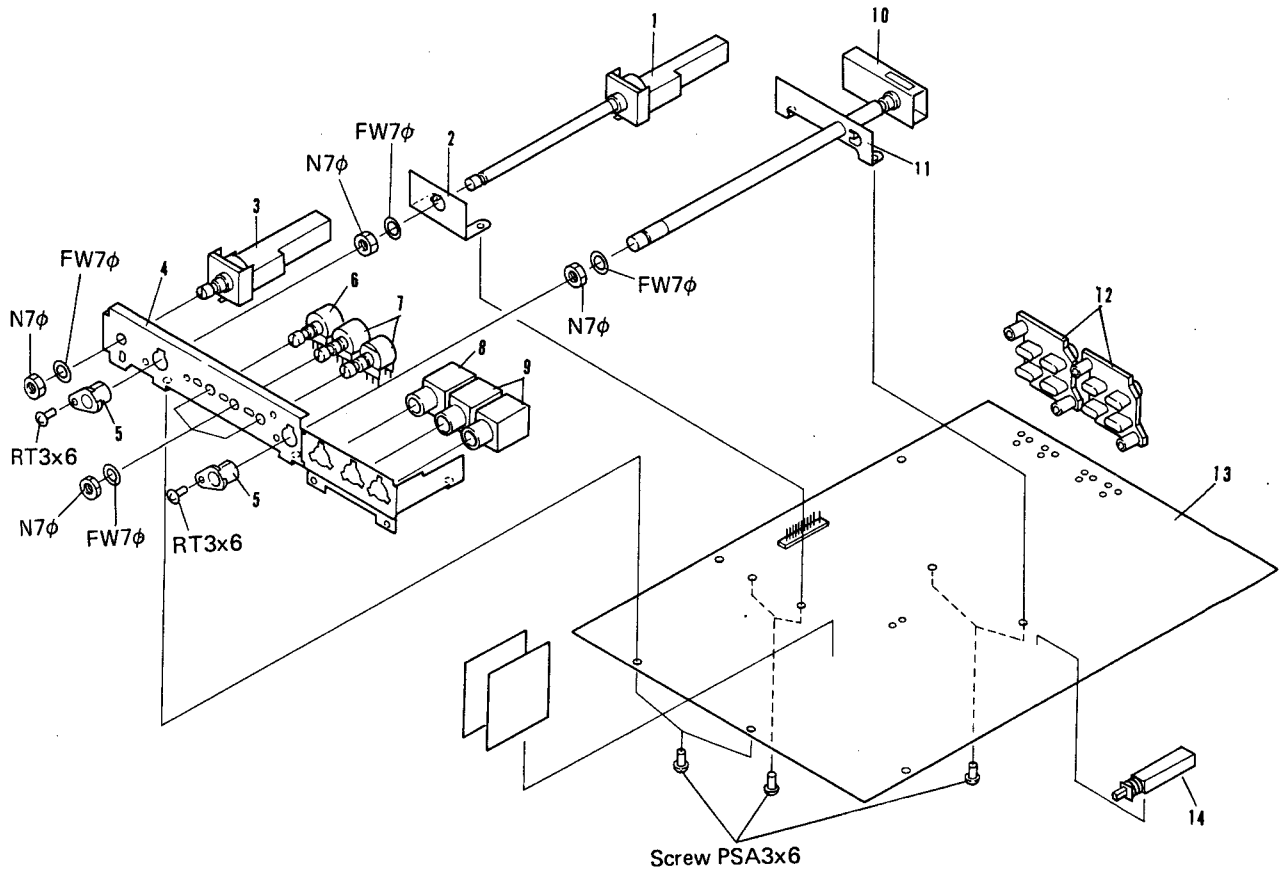
11.5 PANEL STAY



Parts List

| Key No. | Parts No. | Description | Key No. | Parts No. | Description |
|---------|-----------|--------------------------|---------|-----------|--------------------------|
| 1. | | Shield cover | 16. | RAA-262 | REC VR knob (R) assembly |
| 2. | | Holder (A) | 17. | ..... | ..... |
| 3. | | Indicator amplifier unit | 18. | RAA-266 | PB VR knob (R) assembly |
| 4. | RAC-093 | Push knob (C) | 19. | RAA-264 | PB VR knob (L) assembly |
| 5. | | Holder (B) | 20. | RED-159 | Volume mask |
| 6. | | Holder (C) | 21. | RCV-074 | PB volume 20K (B) |
| 7. | RWX-317 | Indicator unit | 22. | RED-151 | Volume mask (B) |
| 8. | | Panel stay | 23. | RED-172 | Diode mask |
| 9. | | Volume unit | | | |
| 10. | | Shield cover (B) | | | |
| 11. | RNK-707 | Indicator lens | | | |
| 12. | RXX-263 | Indicator assembly | | | |
| 13. | ..... |  |  |  |  |
| 14. | ..... |  |  |  |  |
| 15. | RAA-260 | REC VR knob (L) assembly | | | |

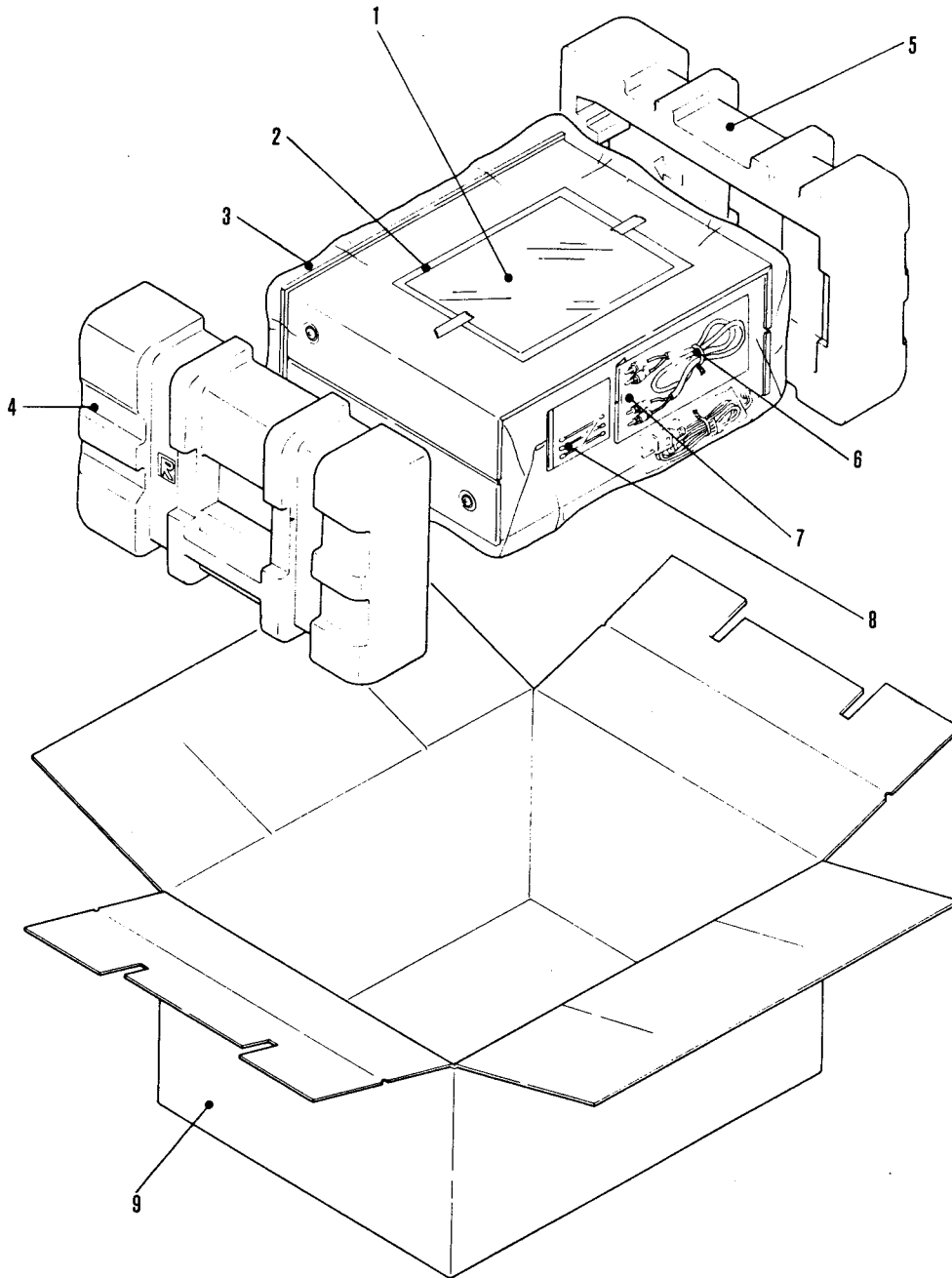
11.6 MOTHER ASSEMBLY



Parts List

| Key No. | Parts No. | Description |
|---------|----------------------|---------------------|
| 1. | RSB-022 | Switch (A) |
| 2. | | Switch holder |
| 3. | RSB-023 | Switch (B) |
| 4. | | Mother bracket |
| 5. | | Joint-bar guide (A) |
| 6. | RCV-070 | Volume |
| 7. | RCV-071 | Volume |
| 8. | RKN-046 | Headphone Jack |
| 9. | RKN-044 | Mic Jack |
| 10. | RBS-024 | Switch (C) |
| 11. | | Switch holder (A) |
| 12. | RKB-014 (RKB-016) | 4P mount pin jack |
| 13. | | Mother board |
| 14. | RSG-083 | Switch |

12. PACKING



Parts List

| Key No. | Part No. | Description | Key No. | Part No. | Description |
|---------|----------|--|---------|----------|---------------------------------|
| 1. | RRB-104 | Operating instructions | 6. | RDE-010 | Connection cord |
| 2. | RHL-018 | Vinyl bag (for operating instructions) | 7. | RHL-019 | Vinyl bag (for connection cord) |
| 3. | RHL-031 | Vinyl bag (for cassette tapedeck) | 8. | REA-021 | Head cleaning assembly |
| 4. | RHA-175 | Side pad R | 9. | RHG-284 | Packing case (for KU type) |
| 5. | RHA-174 | Side pad L | | RHG-285 | Packing case (for KC type) |

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

13.1 MISCELLANEOUS PARTS LIST

NOTE:

• 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 × 10¹ 561 RD¼PS 561 J
 47kΩ 47 × 10³ 473 RD¼PS 473 J
 0.5Ω 0R5 RN2H 0R5 K
 1Ω 010 RSIP 010 K

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

5.62kΩ 562 × 10¹ 5621 RN¼SR 5621 F

| UNITS | | OTHERS | |
|----------|----------------------|----------|----------------------|
| Part No. | Description | Part No. | Symbol & Description |
| RWG-104 | Control unit | RDG-021 | Power cord (UL) |
| RWS-075 | Function switch unit | RWX-109 | Spark killer (KU) |
| RWX-319 | Mother unit | RWX-150 | Spark killer (KC) |
| RWR-074 | Power supply unit | RKP-114 | AC socket |
| RWX-322 | BLE unit | RXM-047 | Take-up motor |
| RWX-317 | Indicator unit | RXP-068 | Solenoid (A) |
| RWG-100 | Control unit | RXP-069 | Solenoid (B) |
| RXM-056 | Motor unit | REL-072 | Lamp (B) |
| | | RXB-212 | Sub-head base ass'y |

SWITCHES

| Part No. | Symbol & Description |
|----------|----------------------|
| RSA-032 | Power switch (KCU) |
| RSF-022 | Microswitch |
| RSF-024 | Microswitch (B) |

TRANSFORMER

| Part No. | Symbol & Description |
|----------|----------------------|
| RTT-176 | Power transformer |

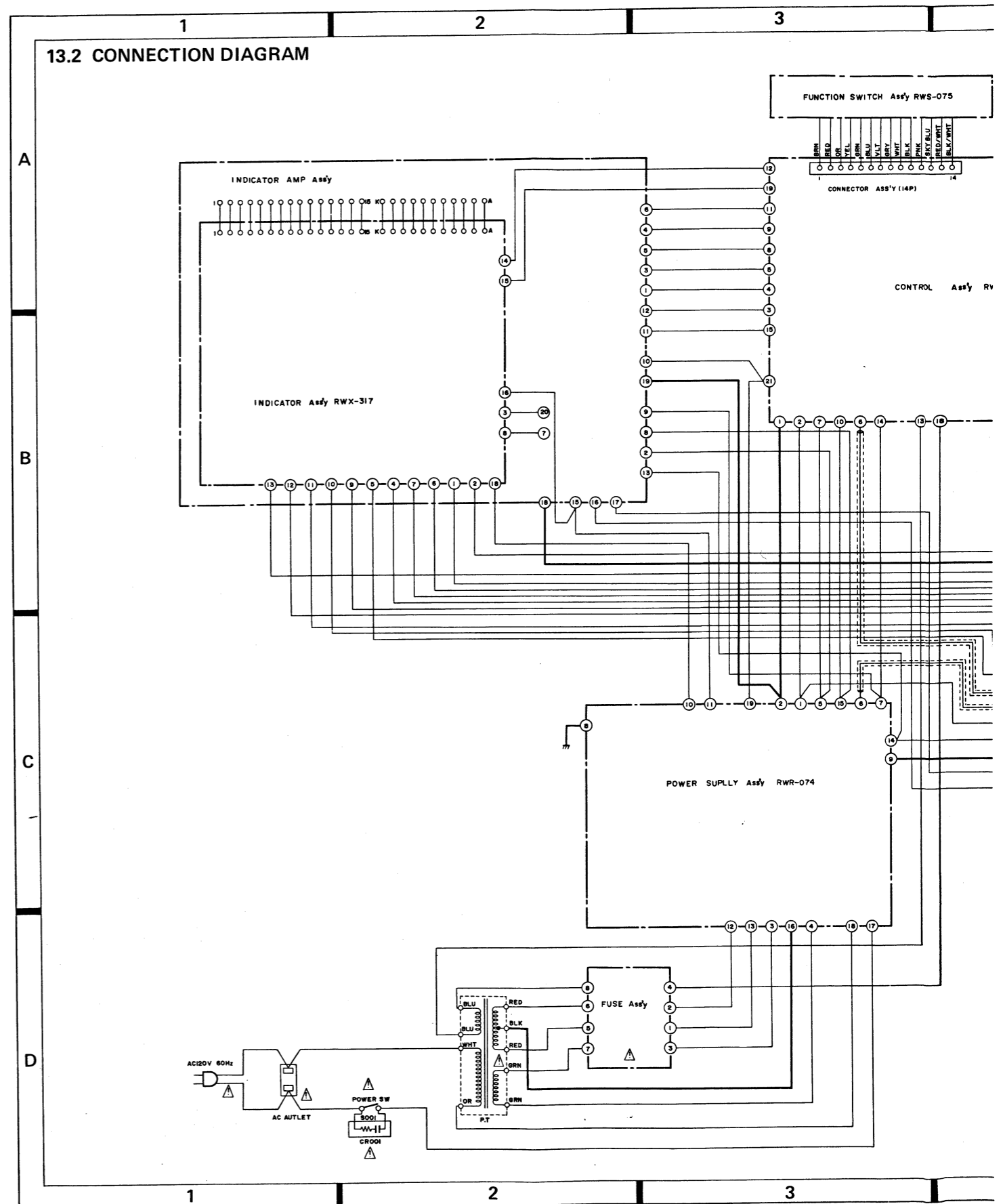
SEMICONDUCTORS

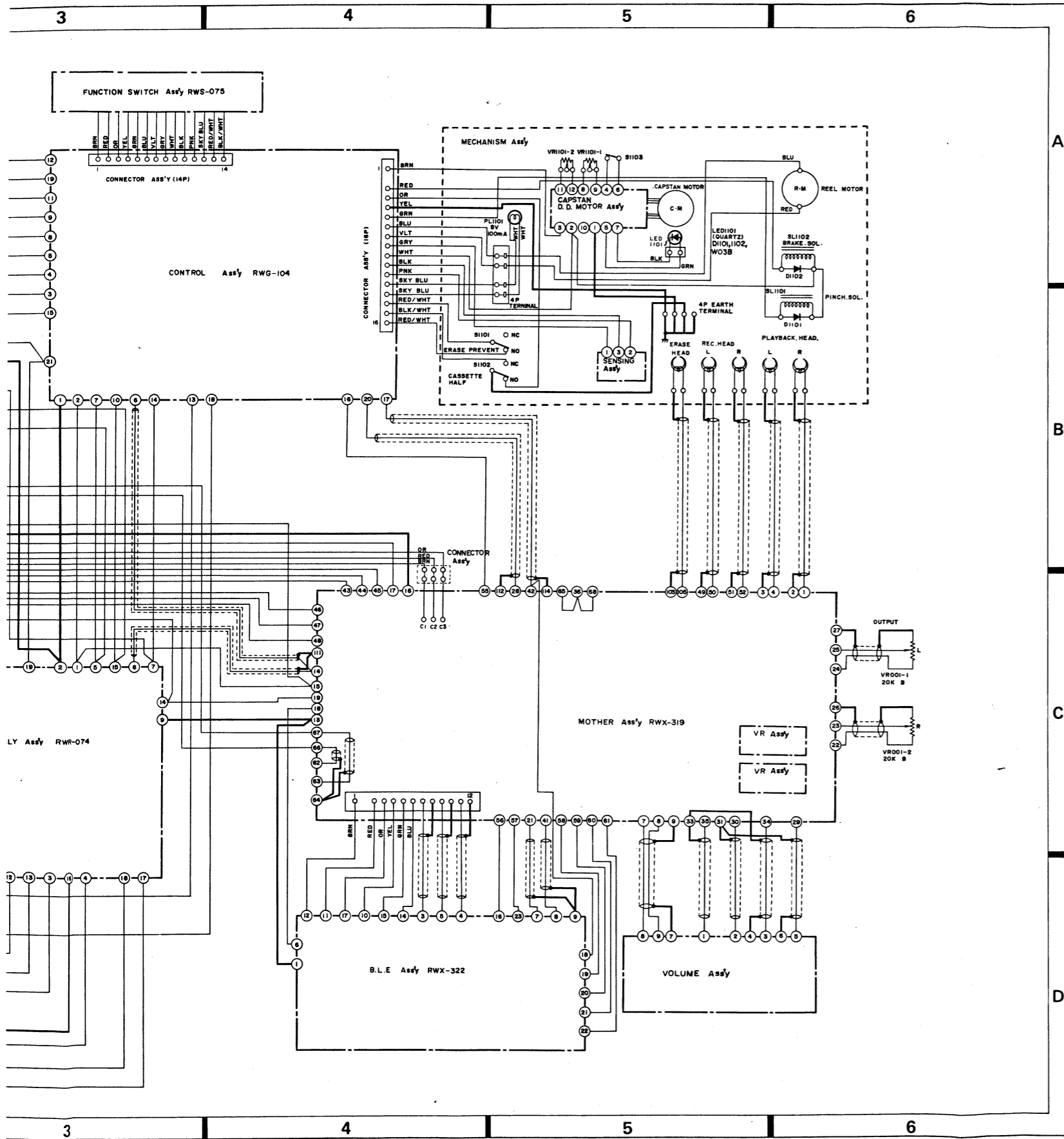
| Part No. | Symbol & Description |
|----------|----------------------|
| W03B | Diode |
| TLG206 | Diode |

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

RESISTORS

| Part No. | Symbol & Description |
|----------|----------------------|
| RCV-074 | PB volume 20k (B) |
| RCV-065 | Volume (at switch) |





Appearance of Transistors and ICs

| | | | |
|--|---|--|--|
| <p>2SC1384NC 2SA684NC 2SC1384</p> <p>hFE Lot No Type No E C B</p> | <p>2SC1419</p> <p>Type No Lot No hFE B C E</p> | <p>2SK117</p> <p>Type No Lot No Loss D G S</p> | <p>PA4001</p> <p>1 16 8 9</p> |
| <p>2SA733A</p> <p>Type No Lot No hFE Suffix E C B</p> | <p>2SC1650</p> <p>Type No Lot No hFE E C B</p> | <p>μPC4741C μPC324C μPD4081C TC4024BP</p> <p>Index</p> | <p>PD4007</p> <p>15 14 28 Index</p> |
| <p>2SA887</p> <p>Type No hFE Lot No B C E</p> | <p>2SC1740 2SC2634 2SC1740LN</p> <p>Type No Lot No hFE E C B</p> | <p>PA4005 μPD4050C PD1003 PD1003 PA2004 TC5066BP</p> <p>9 16 Index</p> | <p>TA7318P</p> <p>9 1</p> |
| <p>2SC2060 2SA934</p> <p>Type No hFE Lot No E C B</p> | <p>2SD234 2SD526 2SD837</p> <p>Type No Lot No hFE B C E</p> | <p>NJM4558D-D</p> <p>5 8 Index</p> | <p>TC5054P</p> <p>13 24 12</p> |
| <p>2SC2320L 2SA999L</p> <p>Suffix Lot No hFE Type No B C E</p> | <p>2SK30A</p> <p>Type No Lot No Loss S G D</p> | <p>PA2005</p> <p>10 1 20 Index</p> | |

13.3 SCHEMATIC DIAGRAM

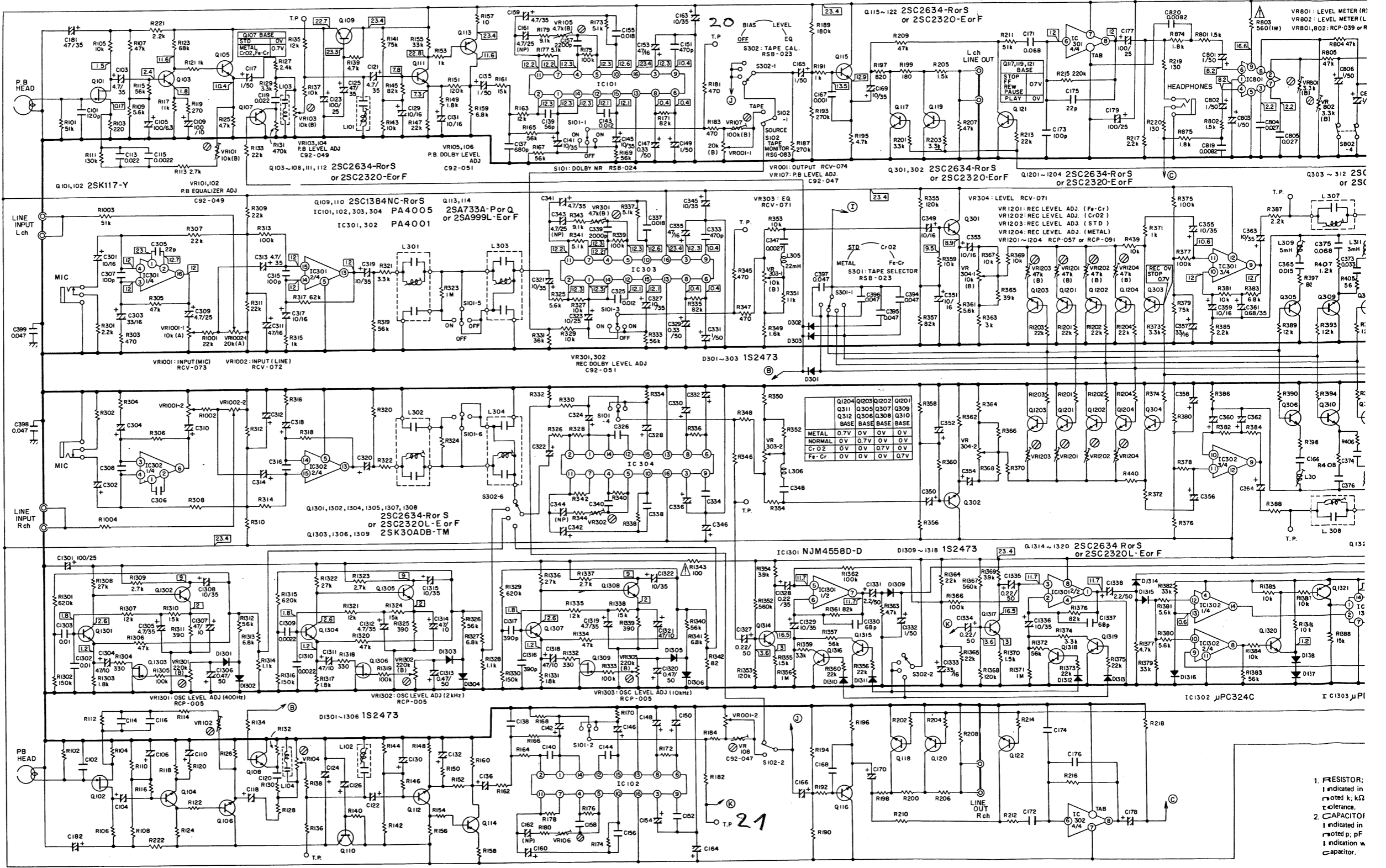
Part 1

A

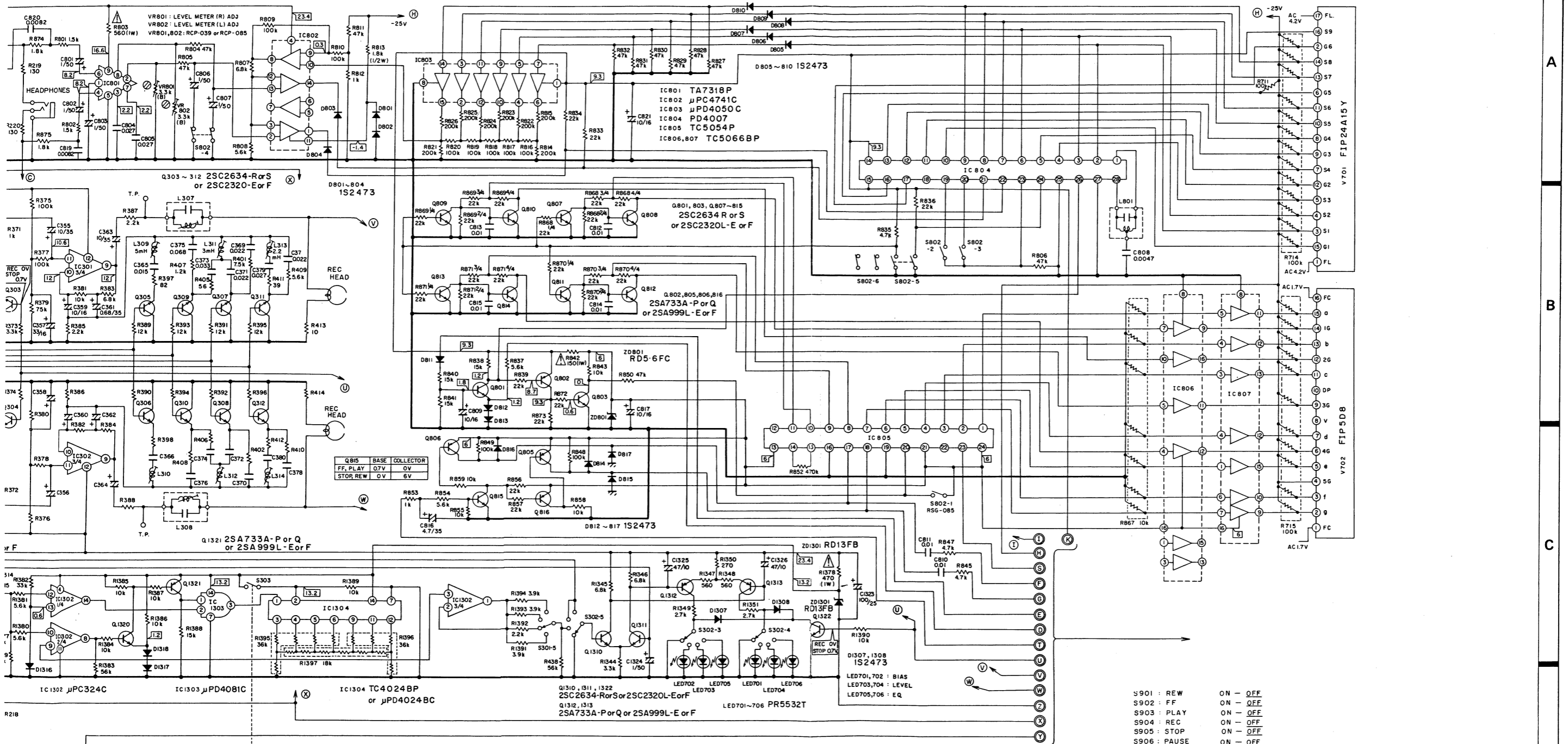
B

C

D



1 RESISTOR:
 1 indicated in
 noted k; kΩ
 tolerance.
 2 CAPACITOR
 1 indicated in
 noted p; pF
 1 indication w
 capacitor.



1. RESISTOR;
Indicated in Ω, 1/4W, ±5% tolerance unless otherwise noted; k; M; MΩ, (F); ±1%, (G); ±2%, (K); ±10% tolerance.

2. CAPACITORS;
Indicated in capacity (μF)/voltage(V) unless otherwise noted; p; pF
Indication without voltage is 50V except electrolytic capacitor.

3. VOLTAGE, CURRENT;
□: DC voltage (V) at no input signal

4. OTHERS;
⊕: Adjusting point.
The Δ 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.

SWITCHES
S001 : POWER ON - OFF
S101-1-7 : DOLBY NR (MPX FIL) ON - OFF - ON(FIL OFF)
S102-1-3 : MONITOR TAPE - SOURCE
S301-1-5 : TAPE SELECTOR METAL - STD - CrO2 - Fe-Cr
S302-1-6 : TAPE CALIBRATION (MODE) OFF - BIAS - LEVEL - EQ
S303 : VR305 ON - OFF

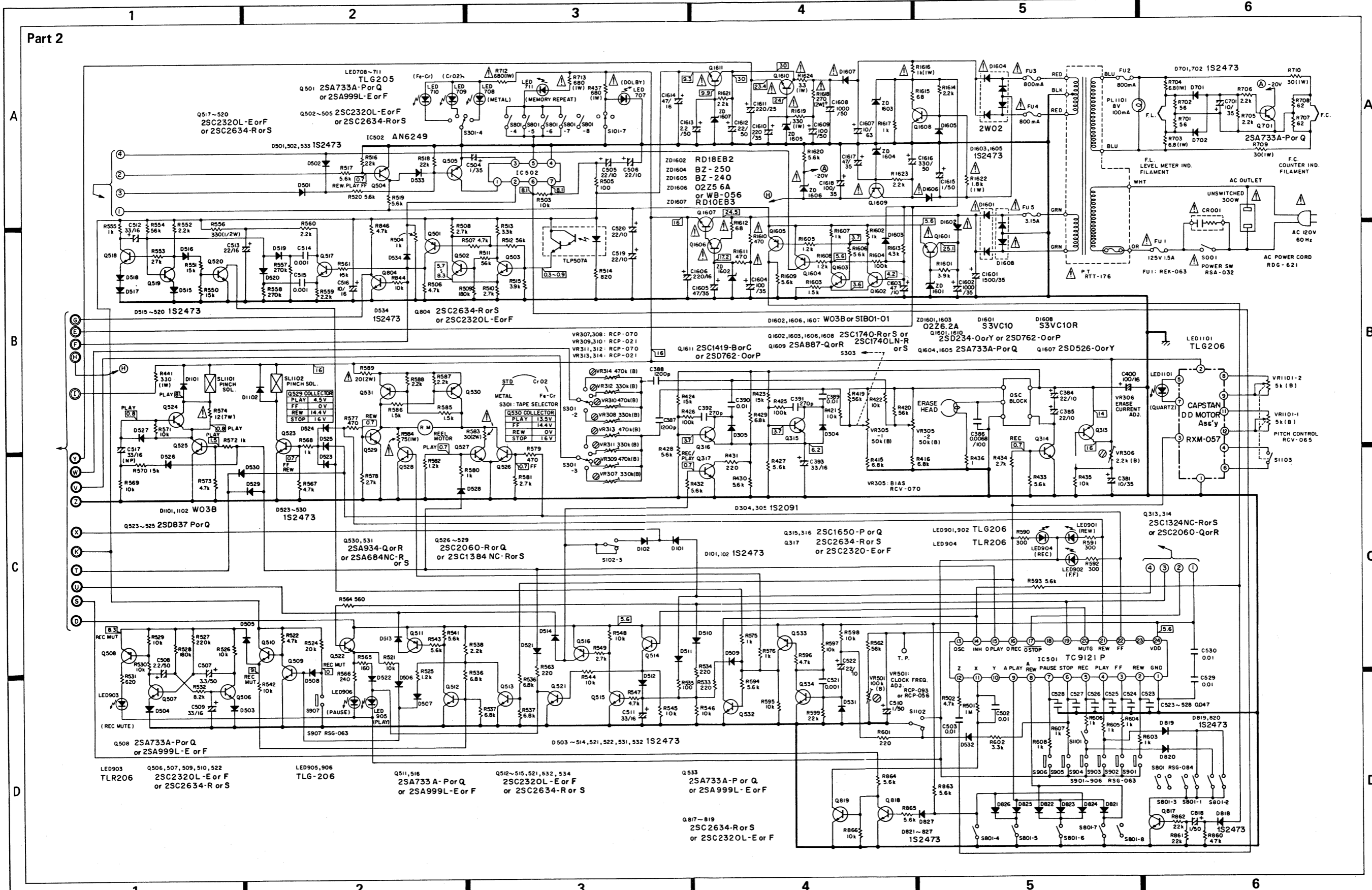
S801-1-3 : TIMER START PLAY - REC - OFF
S801-4-8 : MEMORY & REPEAT STOP - PLAY - COUNTER - END - OFF
S802-1 : COUNTER RESET ON - OFF
S802-2-4 : METER (PEAK HOLED) PEAK - PEAK HOLED - AVERAGE
S802-5-6 : METER / COUNTER DIM - BRIGHT

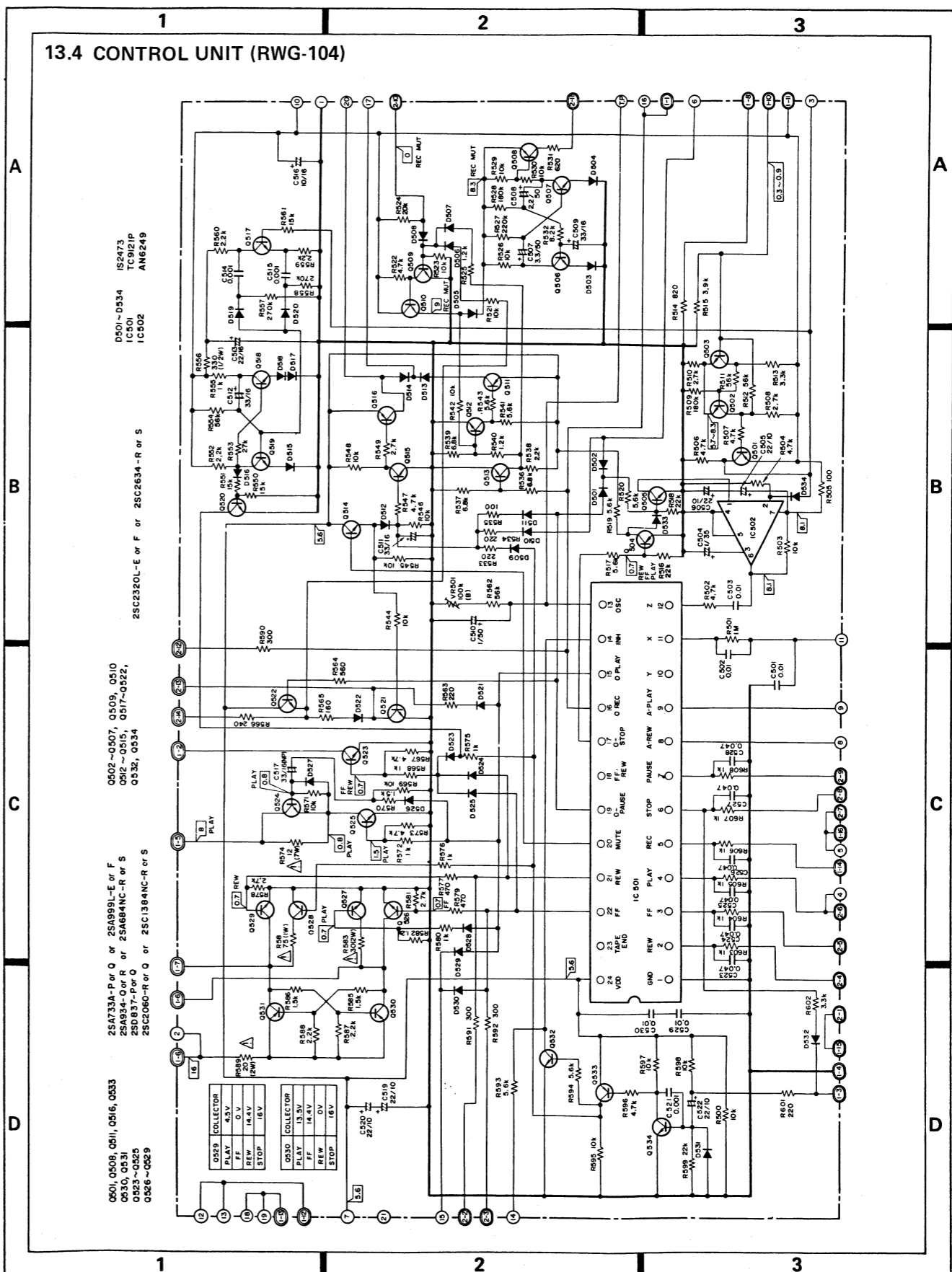
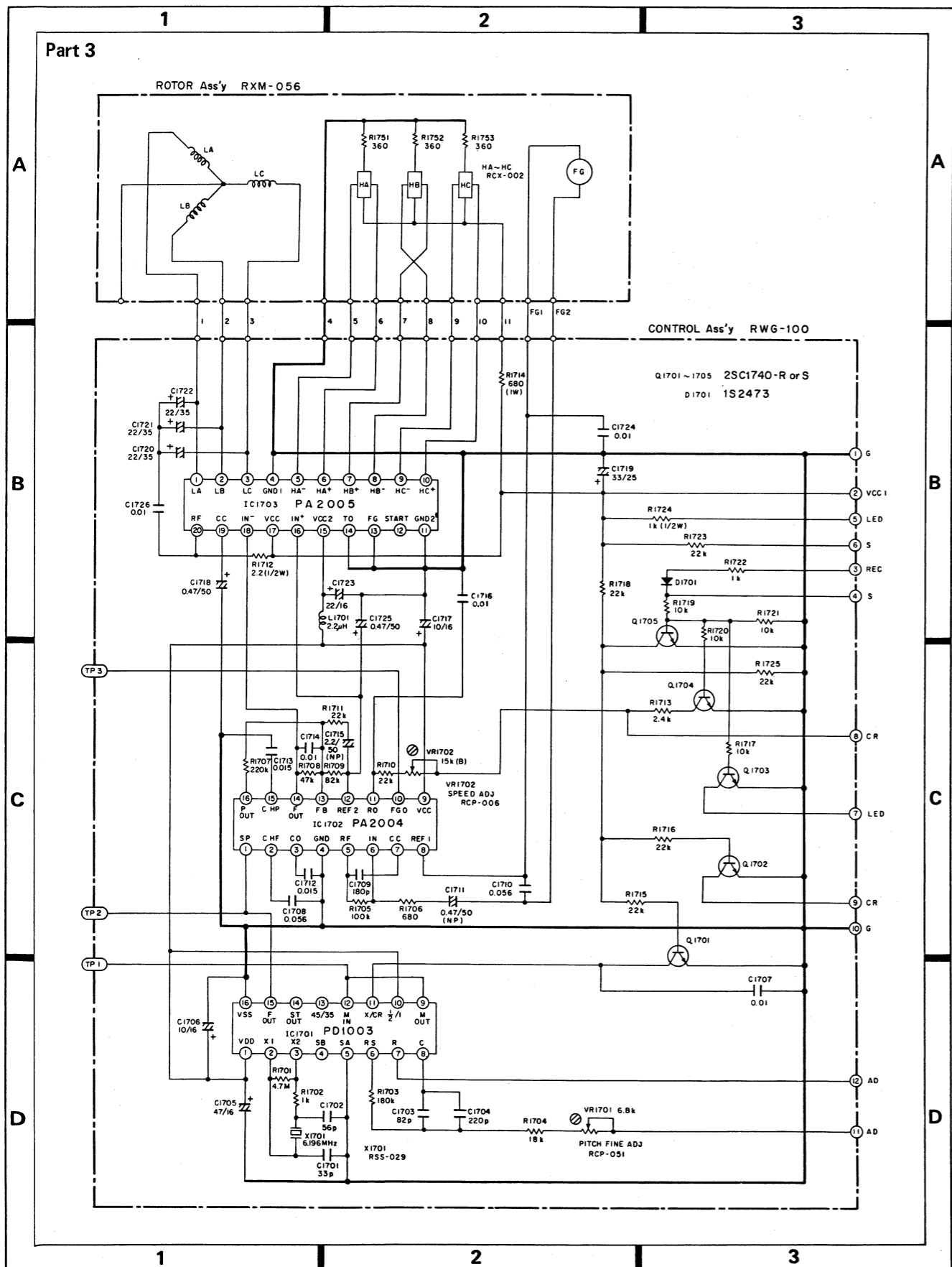
S901 : REW ON - OFF
S902 : FF ON - OFF
S903 : PLAY ON - OFF
S904 : REC ON - OFF
S905 : STOP ON - OFF
S906 : PAUSE ON - OFF
S907 : REC MUTE ON - OFF
S1101 : ERASE PREVENT DETECTOR HOLE - NO HOLE
S1102 : CASSETTE HALF HALF - NO HALF
S1103 : QUARTZ ON - OFF

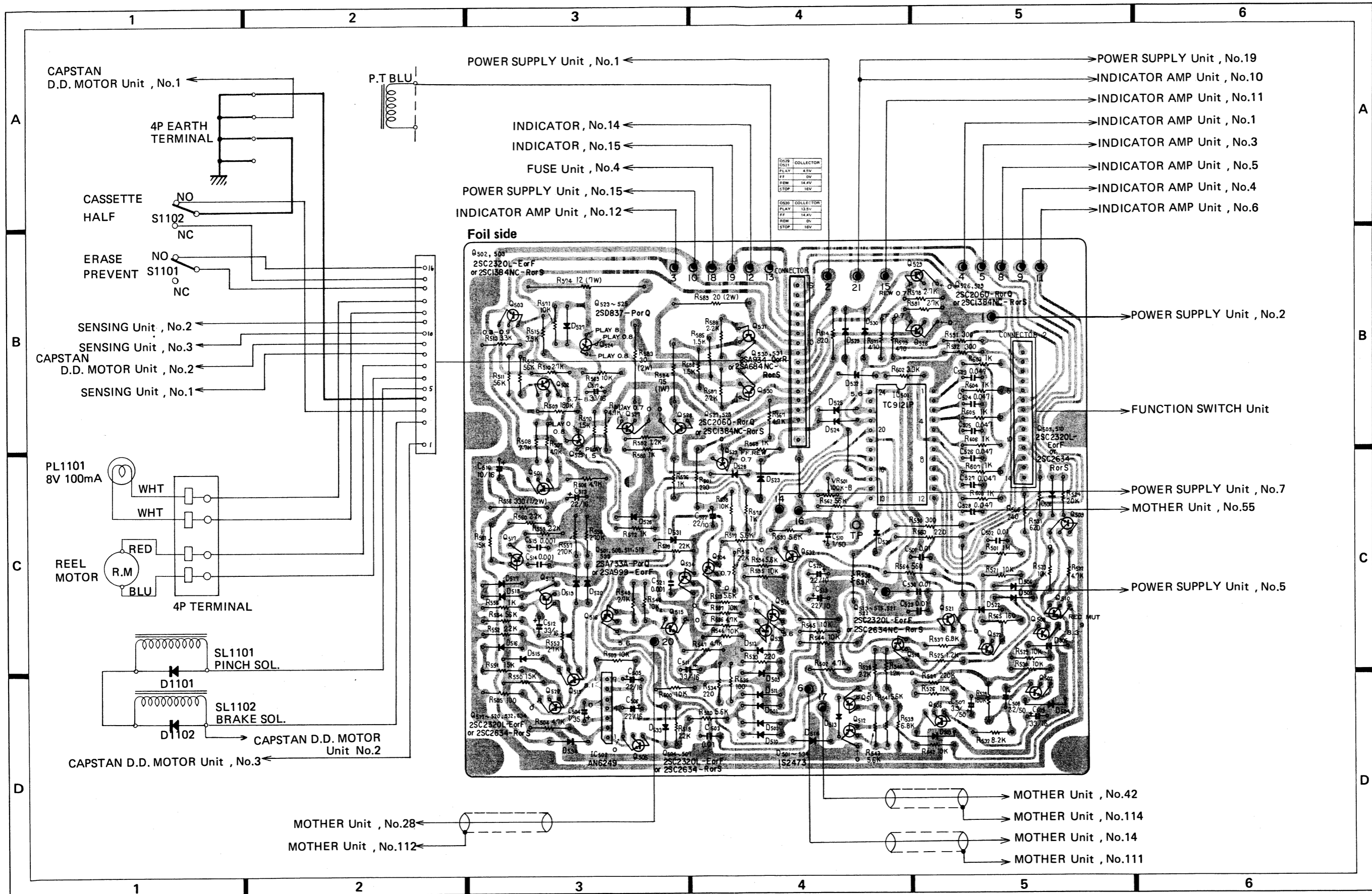
The underlined indicates the switch position.

This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

Part 2







Parts List of Control unit (RWG-104)

CAPACITORS

| Part No. | Symbol & Description |
|---------------|------------------------------|
| CQMA 103K 50 | C501-C503 |
| CSZAH 010M 35 | C504 |
| CEA 2R2P 50 | C508 |
| CEA 3R3P 50 | C507 |
| CEA 220P 16 | C513 |
| CEA 330M 16NP | C517 |
| CEA 330P 16 | C509, C511, C512 |
| CEA 100P 16 | C516 |
| CEA 220P 10 | C505, C506, C519, C520, C522 |
| CEA 010P 50 | C510 |

| | |
|---------------|------------------|
| CQMA 102K 50 | C514, C515, C521 |
| CKDYF 473Z 50 | C523-C528 |
| CKDYF 103Z 50 | C529, C530 |

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-093 (RCP-056) | VR501 Semi-fixed 100K (B) |
| RCN-042 | R574 Wire wound 12 7W |
| RCN-043 | R589 20 2W |
| RCN-044 | R583 30 2W |
| RS1PF 750J | R584 |
| RD½PSF 331J | R556 |

| | |
|-------------|---|
| RD½PM □□□ J | R501-R555, R557-R573, R575-R582, R585-R588, R590-R608 |
|-------------|---|

SEMICONDUCTORS

| Part No. | Symbol & Description |
|---------------------|----------------------------------|
| 2SA999L (2SA733A) | Q501, Q508, Q511, Q516, Q533 |
| 2SC2634 (2SC2320L) | Q502-Q507, Q509, Q510, Q512-Q515 |
| 2SC2060 (2SC1384NC) | Q526-Q529 |
| 2SA934 (2SA684NC) | Q530, Q531 |
| 2SD837 | Q523-Q525 |
| 1S2473-T | D501-D534 |
| TC9121P | IC501 |
| AN6249 | IC502 |

12.5 INDICATOR AMPLIFIER UNIT

Parts List

CAPACITORS

| Part No. | Symbol & Description |
|--------------|-----------------------------|
| CEA 100P 16 | C809, C817, C821 |
| CEA 4R7P 35 | C816 |
| CEA 010P 50 | C801-C803, C806, C807, C818 |
| CQMA 273J 50 | C804, C805 |
| CQMA 103J 50 | C812-C815 |
| CQMA 103K 50 | C810, C811 |
| CQMA 472K 50 | C808 |
| CQMA 822K 50 | C819, C820 |

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

RESISTORS

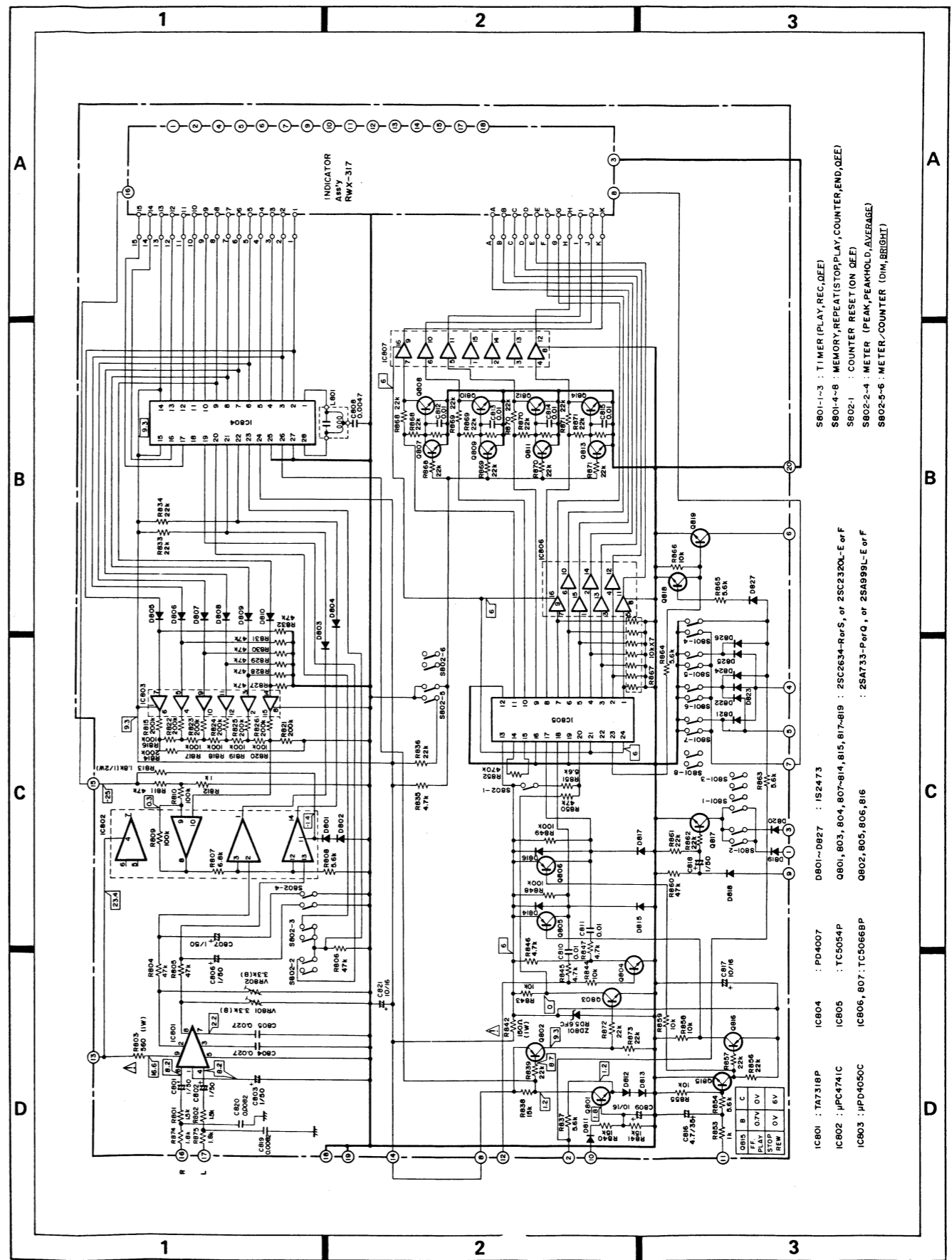
| Part No. | Symbol & Description |
|-------------------|--|
| RCP-039 (RCP-085) | VR801, VR802 Semi-fixed 3.3K (B) |
| RCX-005 | R867 Resistor |
| RCX-007 | R868-R871 Resistor |
| RS1PF □□□ J | R803, R842 |
| RS½PF 182J | R813 |
| RD½PM □□□ J | R801, R802, R804-R812, R814-R841, R843-R866, R872-R875 |

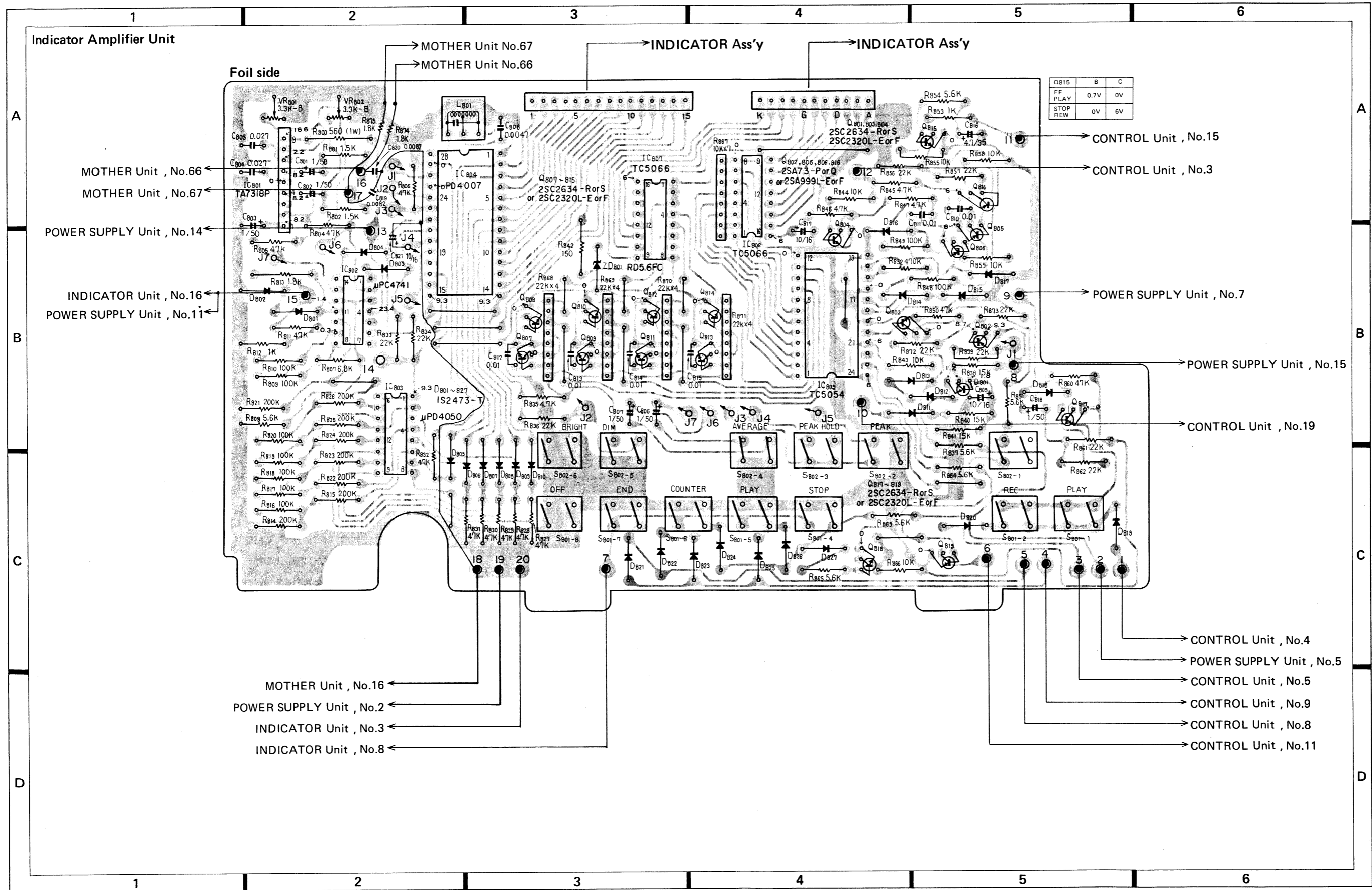
SWITCHES AND OTHERS

| Part No. | Symbol & Description |
|----------|----------------------|
| RSG-084 | S801 Switch D |
| RSG-085 | S802 Switch E |
| RTD-015 | L801 Oscillator coil |
| RWX-317 | Indicator unit |

SEMICONDUCTORS

| Part No. | Symbol & Description |
|--------------------|--|
| 2SC2634 (2SC2320L) | Q801, Q803, Q804, Q807-Q815, Q817-Q819 |
| 2SA733A (2SA999L) | Q802, Q805, Q806, Q816 |
| 1S2473-T | D801-D819, D821-D827 |
| 1S2473 | D820 |
| RD5-6FC | ZD801 |
| TA7318P | IC801 |
| μPC4741C | IC802 |
| μPD4050C | IC803 |
| PD4007 | IC804 |
| TC5054P | IC805 |
| TC5066BP | IC806, IC807 |





| | | |
|------|------|----|
| Q815 | B | C |
| FF | 0.7V | 0V |
| PLAY | 0V | 6V |
| STOP | 0V | 6V |
| REW | 0V | 6V |

Indicator Amplifier Unit

MOTHER Unit No.67

INDICATOR Ass'y

INDICATOR Ass'y

Foil side

MOTHER Unit , No.66

MOTHER Unit , No.67

POWER SUPPLY Unit , No.14

INDICATOR Unit , No.16

POWER SUPPLY Unit , No.11

CONTROL Unit , No.15

CONTROL Unit , No.3

POWER SUPPLY Unit , No.7

POWER SUPPLY Unit , No.15

CONTROL Unit , No.19

CONTROL Unit , No.4

POWER SUPPLY Unit , No.5

CONTROL Unit , No.5

CONTROL Unit , No.9

CONTROL Unit , No.8

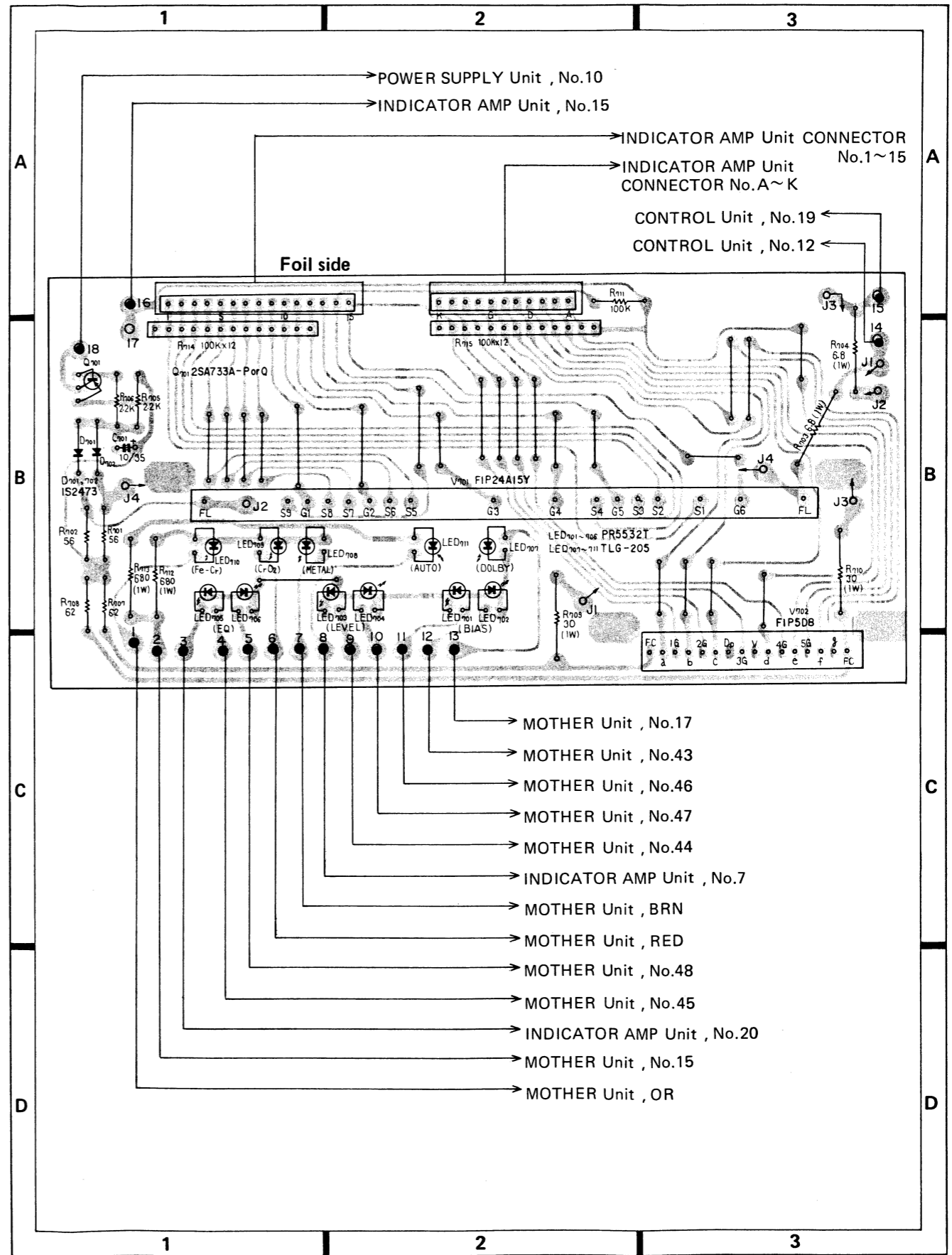
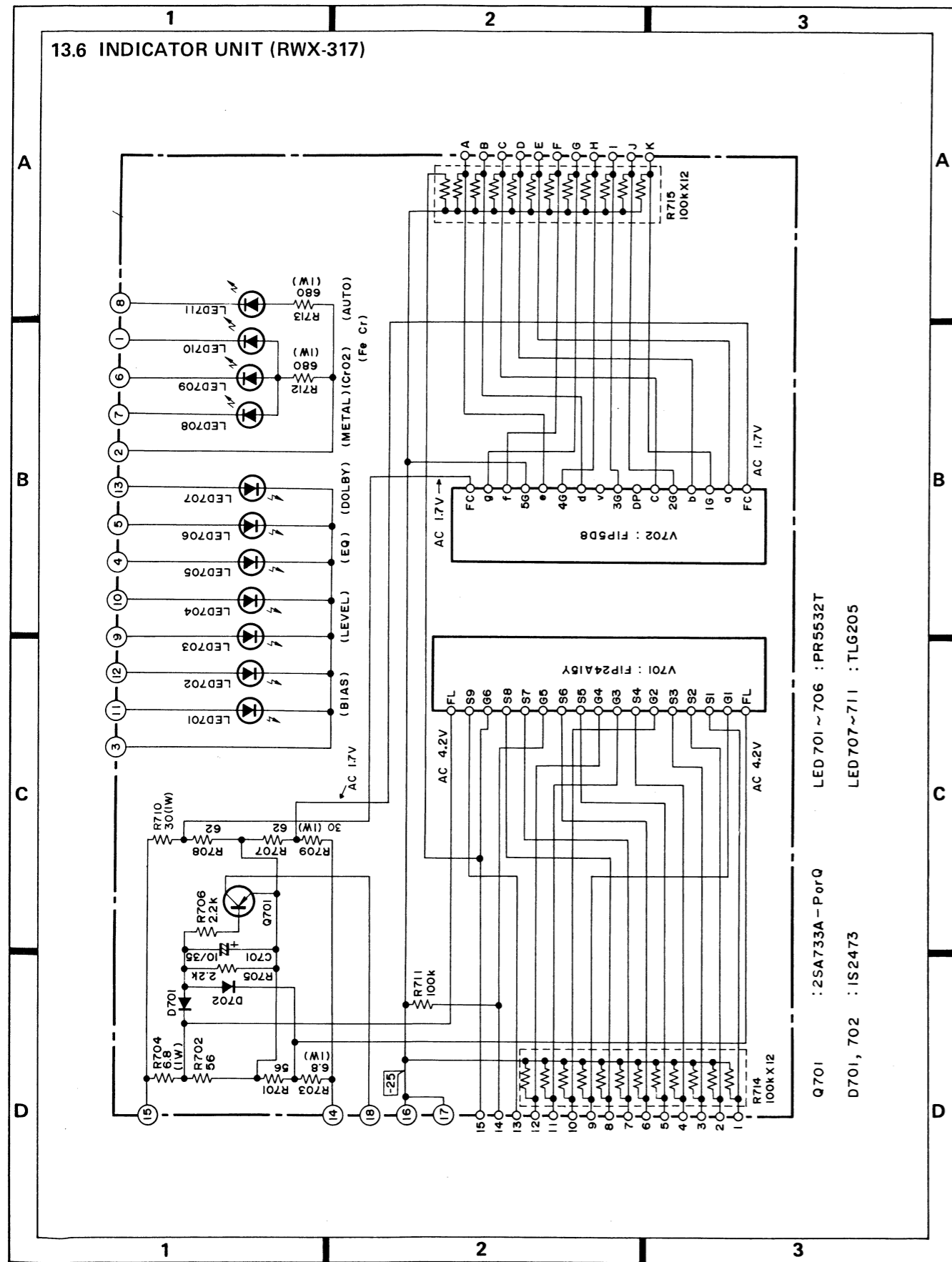
CONTROL Unit , No.11

MOTHER Unit , No.16

POWER SUPPLY Unit , No.2

INDICATOR Unit , No.3

INDICATOR Unit , No.8



Parts List

CAPACITOR

| Part No. | Symbol & Description |
|-------------|----------------------|
| CEA 100P 35 | C701 |

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

RESISTORS

| Part No. | Symbol & Description |
|-------------|------------------------------------|
| RS1PF □□□ J | R703, R704, R709, R710, R712, R713 |
| RD¼PM □□□ J | R701, R702, R705–R708, R711 |
| RCX-006 | R714, R715 Resistor |

SEMICONDUCTORS

| Part No. | Symbol & Description |
|----------|----------------------|
| 2SA733A | Q701 |
| 1S2473 | D701, D702 |
| PR5532T | LED701–LED706 |
| TLG205 | LED707–LED711 |

OTHERS

| Part No. | Symbol & Description |
|-----------|---------------------------------|
| FIP24A15Y | V701 Fluorescent indicator tube |
| FIP5D8 | V702 Fluorescent indicator tube |

13.7 BLE UNIT (RWX-322)

Parts List

CAPACITORS

| Part No. | Symbol & Description |
|--------------|--|
| CEA 101P 25 | C1301, C1323 |
| CEA 470P 10 | C1304, C1307, C1311, C1314, C1318, C1321, C1325, C1326 |
| CEA 330P 16 | C1333 |
| CEA 100P 35 | C1308, C1315, C1322, C1329, C1336 |
| CEA 4R7P 35 | C1305, C1312, C1319 |
| CEA 2R2P 50 | C1331, C1338 |
| CEA 010P 50 | C1324, C1332 |
| CEA R47P 50 | C1306, C1313, C1320 |
| CEA R22M50 | C1327, C1328, C1334, C1335 |
| CQMA 103J 50 | C1302, C1303 |
| CQMA 222J 50 | C1309, C1310 |
| CQSA 391J 50 | C1316, C1317 |
| CQSA 680J 50 | C1330, C1337 |

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

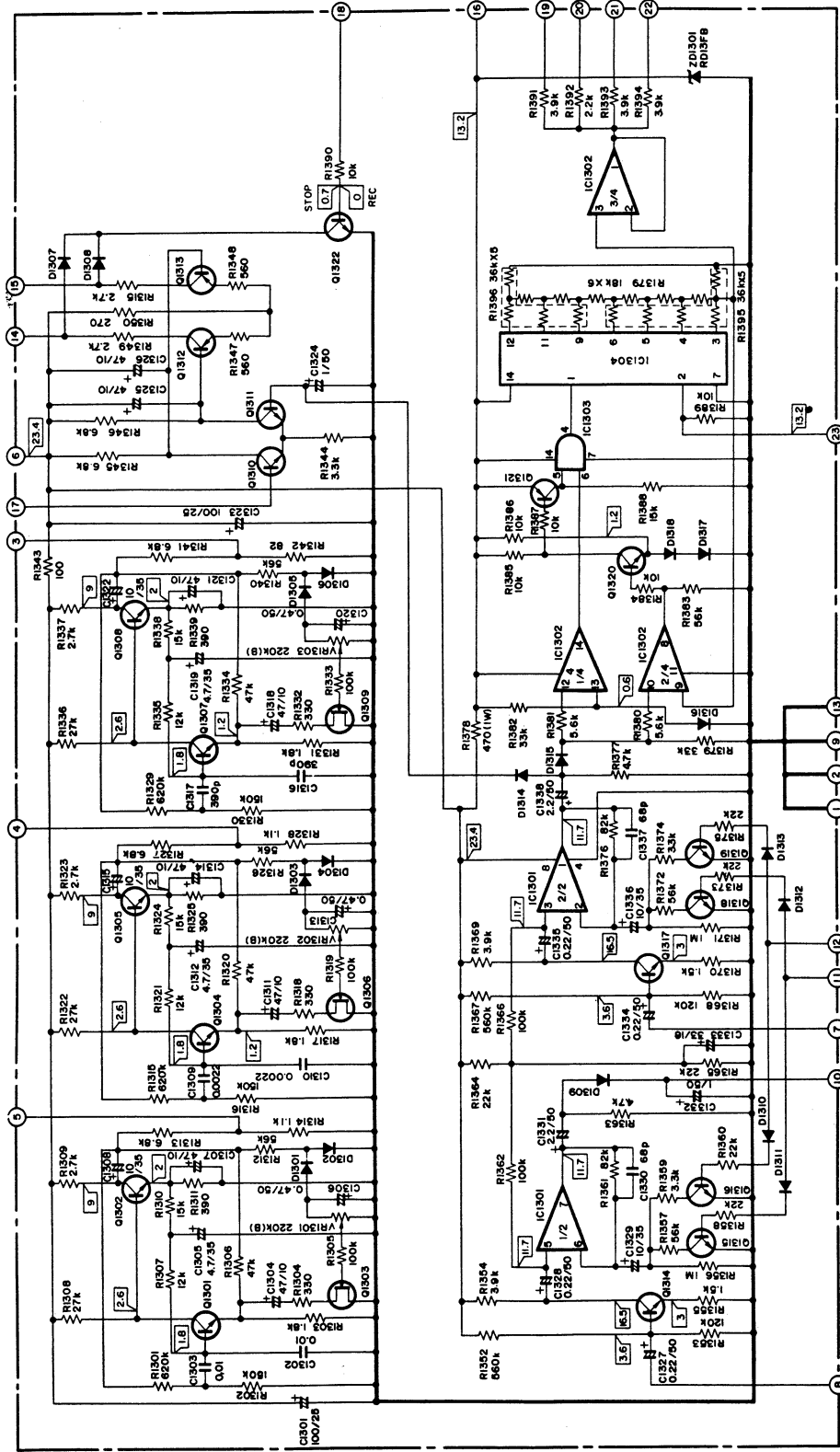
RESISTORS

| Part No. | Symbol & Description |
|------------|---------------------------------------|
| RCP-005 | VR1301–VR1303 Semi-fixed 220K (B) |
| RCX-008 | R1395, R1396 Resistor |
| RCX-009 | R1397 Resistor |
| REK-062 | R1343 Fuse resistor |
| RS1PF 471J | R1378 |
| RD¼PM□□□ J | R1301–R1342, R1344–R1377, R1379–R1394 |

SEMICONDUCTORS

| Part No. | Symbol & Description |
|-----------------------|--|
| 2SC2634 (2SC2320L) | Q1301, Q1302, Q1304, Q1305, Q1307, Q1308, Q1310, Q1311, Q1314–Q1320, Q1322 |
| 2SK30A-DB-TM | Q1303, Q1306, Q1309 |
| 2SA733A (2SA999L) | Q1312, Q1313, Q1321 |
| 1S2473-T RD13FB | D1301, D1302, D1304–D1318 ZD1301 |
| NJM4558D-D | IC1301 |
| μPC324C | IC1302 |
| μPD4081C | IC1303 |
| TC4024BP | IC1304 |

BLE Unit (RWX-322)



IC1301 : NJM4558D-D
 IC1302 : μ PC324C
 IC1303 : μ PD4081C
 IC1304 : TC4024BP

Q1301, 1302, 1304, 1305,
 1307, 1308, 1310, 1311,
 1314, 1315, 1316, 1317,
 1318, 1319, 1320, 1322, : 2SC2634-R or S or 2SC2320L-E or F

Q1312, 1313, 1321 : 2SA733A-P or O or 2SA999L-E or F
 Q1303, 1306, 1309 : 2SK30ADB-TM
 D1301~1318 : 1S2473

A
 B
 C
 D

A
 B
 C
 D

1

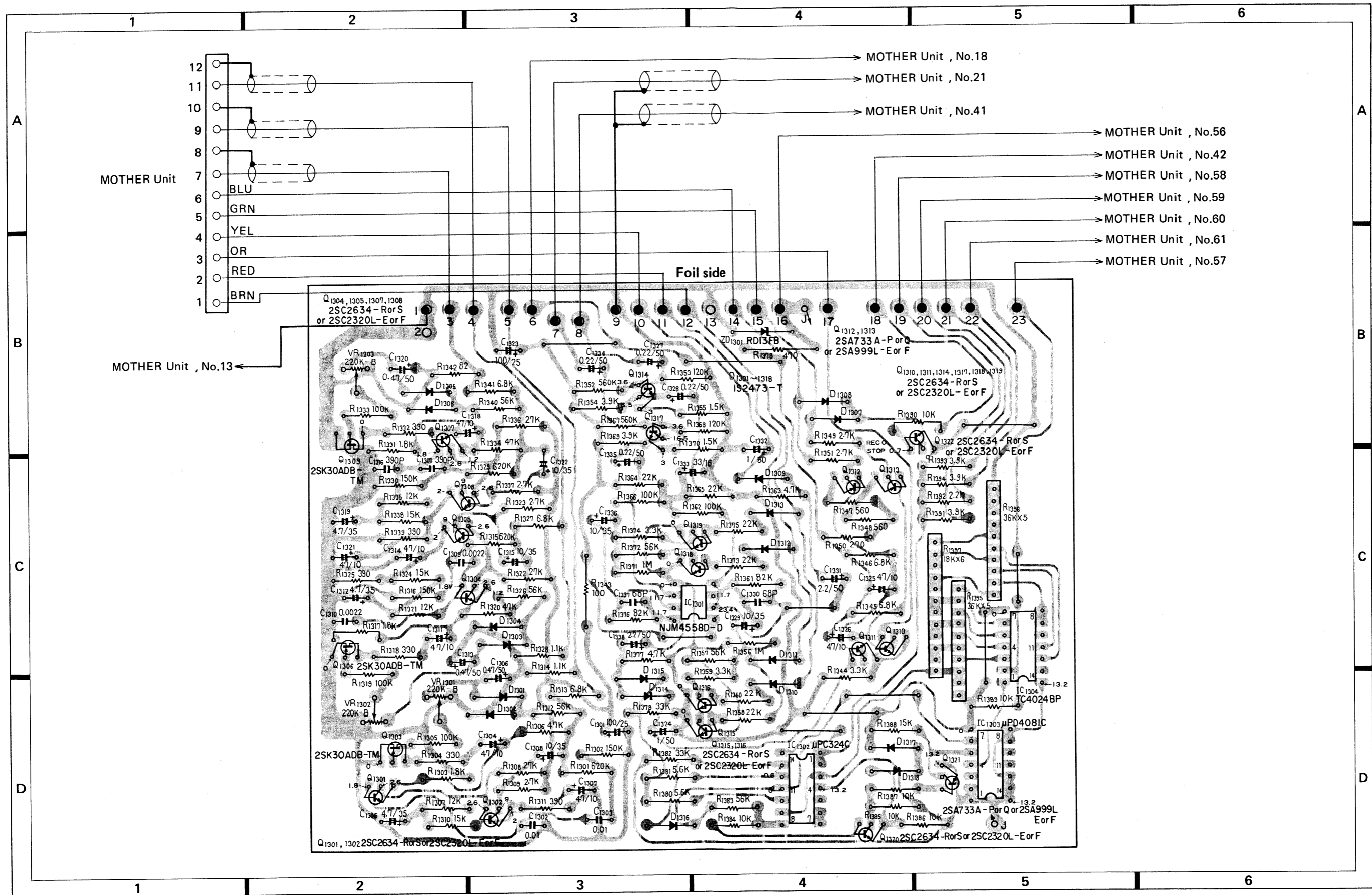
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3

1

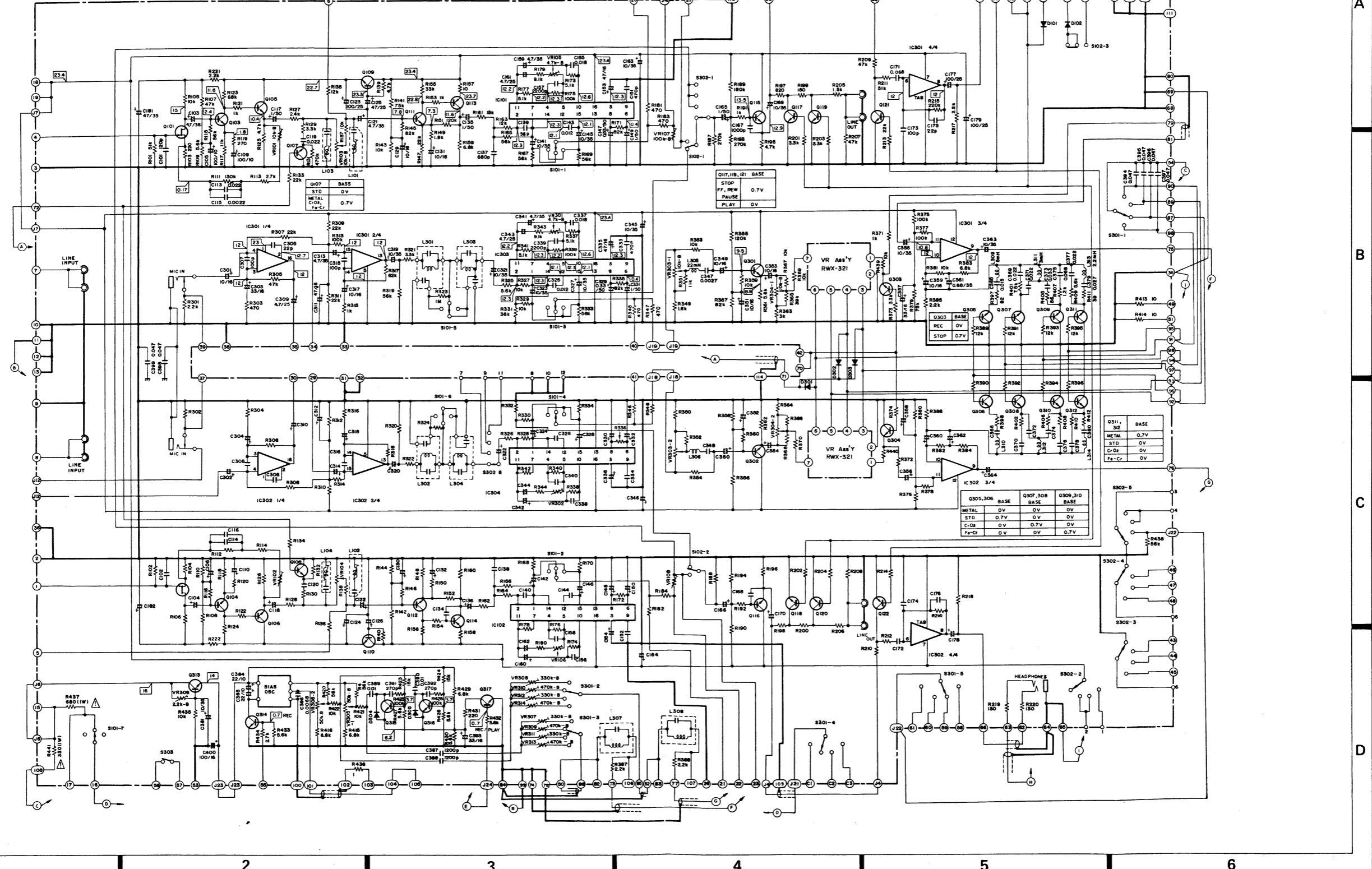
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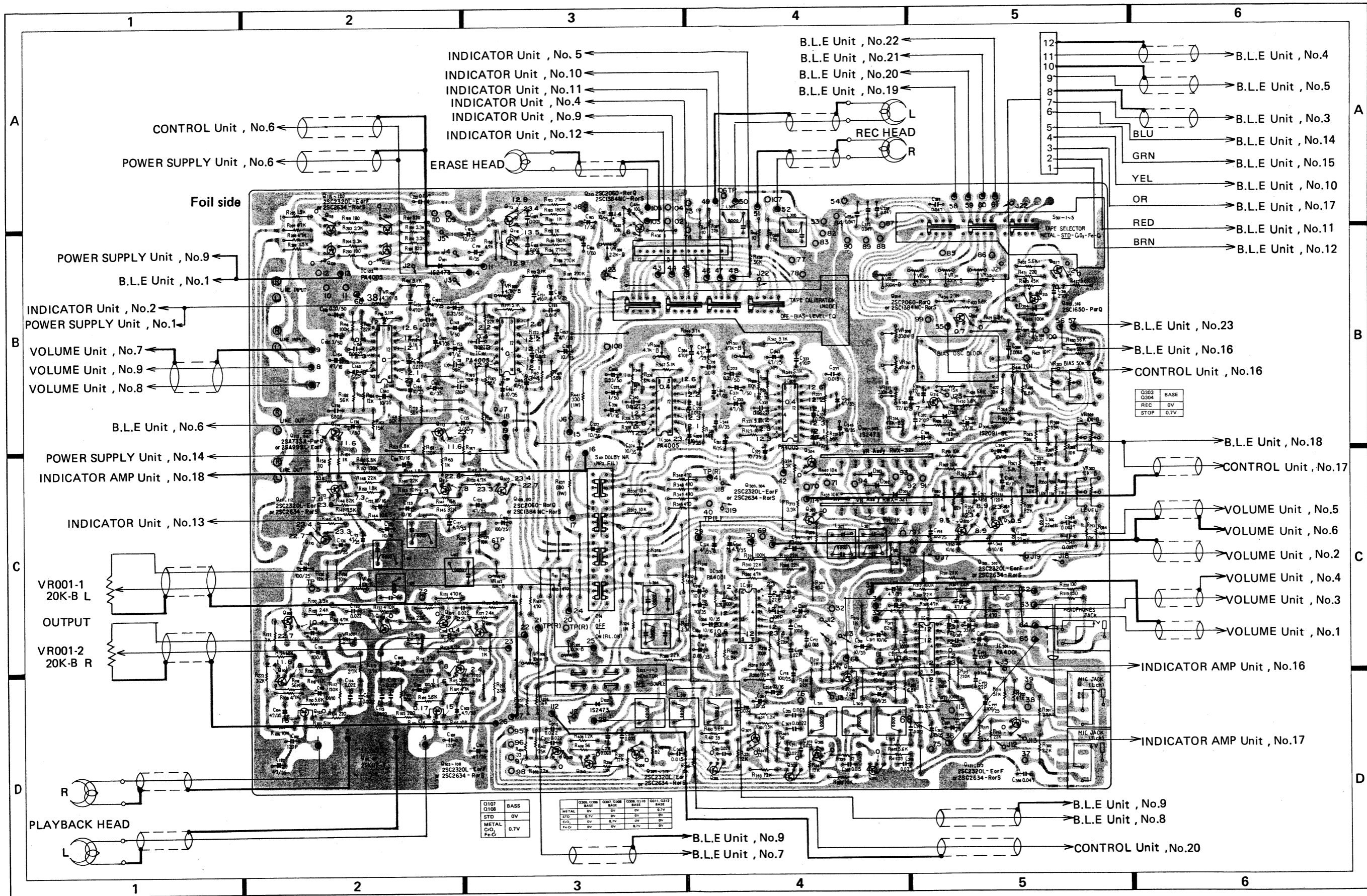
13.8 MOTHER UNIT (RWX-319)

- Q101, 102 : 2SK17-Y
- Q103, 114 : 2SA733A - R or Q or 2SA999L - E or F
- Q103 ~ 108, 111, 112
- Q115 ~ 122, Q301 ~ 312, 317 : 2SC2634 - R or S or 2SC2320 - E or F
- Q109, 110, 313, 314 : 2SC1384NC - R or S or 2SC2060 - Q or R
- Q315, 316 : 2SC1650 - P or Q
- IC301, 302 : PA4001
- IC101, 102, 303, 304 : PA4005
- D101, 102, 301, 302, 303 : IS2473
- D304, 305 : IS2091-BL
- S101 ~ 17 : DOLBY NR & (MPX FIL) ON-OFF-ON
- S102-1-3 : MONITOR SOURCE - TAPE
- S301-1-5 : TAPE SELECTOR METAL - STD - CrO2 - Fe - Cr
- S302-1-6 : B.L.E SELECTOR OFF - BIAS - LEVEL - EQ
- S303 : RESET ON-OFF



| | | | | | |
|-----------|------|-----------|------|-----------|------|
| Q303, 306 | BASE | Q307, 308 | BASE | Q309, 310 | BASE |
| METAL | O.V | O.V | O.V | O.V | O.V |
| STD | O.V | O.V | O.V | O.V | O.V |
| CrO2 | O.V | O.V | O.V | O.V | O.V |
| Fe-Cr | O.V | O.V | O.V | O.V | O.V |

| | |
|-----------|------|
| Q311, 312 | BASE |
| METAL | O.V |
| STD | O.V |
| CrO2 | O.V |
| Fe-Cr | O.V |



| | |
|-------|------|
| Q107 | BASS |
| Q108 | STD |
| METAL | 0.7V |
| Fe-C | 0.7V |

| | | | | | | | | | |
|-------|------|------|------|------|------|------|------|------|------|
| Q303 | Q304 | Q305 | Q306 | Q307 | Q308 | Q309 | Q310 | Q311 | Q312 |
| METAL | OV | OV | OV | OV | OV | OV | OV | OV | OV |
| STD | 0.7V | OV | OV | OV | OV | OV | OV | OV | OV |
| Fe-C | OV | 0.7V | OV | OV | OV | OV | OV | OV | OV |

Parts List of Mother Unit (RWX-319)

SWITCHES

| Part No. | Symbol & Description |
|----------|------------------------|
| RSB-024 | S101 Rotary switch (C) |
| RSG-083 | S102 Push switch |
| RSB-023 | S301 Rotary switch (B) |
| RSB-022 | S302 Rotary switch (A) |

CAPACITORS

| Part No. | Symbol & Description |
|---------------|---|
| CQSA 121J 50 | C101, C102 |
| CEA 101P 25 | C123, C124, C177-C179 |
| CEA 101P 10 | C105, C106, C109, C110 |
| CEA 470P 35 | C125, C126, C181, C182 |
| CEA 470P 16 | C153, C154, C311, C312, C335, C336 |
| CEA 330P 16 | C303, C304, C357, C358, C393 |
| CEA 220P 10 | C384, C385 |
| CEA 100P 35 | C141, C142, C145, C146, C163, C164, C169, C170, C319-C324, C327, C328, C345, C346, C355, C356, C363, C364, C381 |
| CEA 100P 16 | C129-C132, C317, C318, C349-C354, C359, C360 |
| CEA 4R7P 35 | C103, C104, C121, C122, C159, C160, C313, C314, C341, C342 |
| CEA 010P 50 | C117, C118, C165, C166, C135, C136 |
| CEA R47P 50 | C171, C172 |
| CEA 010M 50 | C149, C150, C331, C332 |
| CEA R33M 50 | C147, C148, C329, C330 |
| CEA 4R7M 25NP | C161, C162, C343, C344 |
| CEANL 100P 16 | C301, C302 |
| CEANL 4R7P 25 | C309, C310 |
| CSZA R68M 35 | C361, C362 |
| CQMA 223J 50 | C113, C114, C119, C120, C369-C372, C377, C378 |
| CQMA 183K 50 | C155, C156, C337, C338 |
| CQMA 123K 50 | C143, C144, C325, C326 |
| CQMA 272K 50 | C347, C348 |
| CQMA 222J 50 | C115, C116 |
| CQMA 222K 50 | C157, C158, C339, C340 |
| CQMA 153J 50 | C365, C366 |
| CQMA 273J 50 | C379, C380 |
| CQMA 333J 50 | C374 |
| CQMA 683J 50 | C375, C376 |
| CQMA 103K 50 | C389, C390 |
| CCDSL 101K 50 | C173, C174, C307, C308, C315, C316 |
| CQSA 560J 50 | C139, C140 |
| CCDSL 220K 50 | C175, C176, C305, C306 |
| CQSA 681J 50 | C137, C138 |
| CKDYB 471K 50 | C151, C152, C333, C334 |
| CKDYF 473Z 50 | C394-C399 |
| CKDYF 102Z 50 | C167, C168 |
| CQSA 271J 50 | C391, C392 |
| CQSA 122K 50 | C387, C388 |
| CQPA 682J 100 | C386 |
| CEA 101P 16 | C400 |

COILS

| Part No. | Symbol & Description |
|----------|--|
| RTF-058 | L101-L104, L307, L308 Trap coil |
| RTF-034 | L301, L302 MPX coil (C) |
| RTF-035 | L303, L304 MPX coil (D) |
| RTF-064 | L305, L306 EQ coil |
| RTF-067 | L309, L310 Peaking coil (5mH) STD |
| RTF-068 | L311, L312 Peaking coil (3mH) CrO ₂ |
| RTF-050 | L313, L314 Peaking coil |

OTHERS

| Part No. | Symbol & Description |
|-----------|----------------------|
| RKB-014 | Mount pin jack 4P |
| (RKB-016) | |
| RKN-046 | Headphones jack |
| RKN-044 | Mic jack |

SEMICONDUCTORS

| Part No. | Symbol & Description |
|---------------------|--|
| 2SK117-Y | Q101, Q102 |
| 2SA999L (2SA733) | Q113, Q114 |
| 2SC1384NC (2SC2060) | Q109, Q110, Q313, Q314 |
| 2SC2634 (2SC2320L) | Q103-Q108, Q111, Q112, Q115-Q122, Q301-312, Q317 |
| 2SC1650 | Q315, Q316 |
| 1S2473-T | D101, D102, D301-D303 |
| 1S2091-BL | D304, D305 |
| PA4001 | IC301, C302 |
| PA4005 | IC101, IC102, IC303, IC304 |

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

RESISTORS

| Part No. | Symbol & Description |
|----------|--|
| RCV-071 | VR303, VR304 Volume 10K (B) |
| RCV-070 | VR305 Volume 50K (B) at switch |
| C92-049 | VR101-VR104 Semi-fixed 10K (B) |
| C92-051 | VR105, VR106, VR301, VR302 Semi-fixed 4.7K (B) |
| C92-047 | VR107, VR108 Semi-fixed 100K (B) |
| C92-401 | VR306 Semi-fixed 2.2K (B) |
| RCP-021 | VR307, VR308, VR311, VR312 Semi-fixed 330K (B) |
| RCP-070 | VR309, VR310, VR313, VR314 Semi-fixed 470K (B) |

| Part No. | Symbol & Description |
|-------------|--|
| RS1PF □□□ J | R437, R441 |
| RD¼PM □□□ J | R101-R184, R187-R222, R301-R398, R401-R416, R419-R436, R438-R440 |

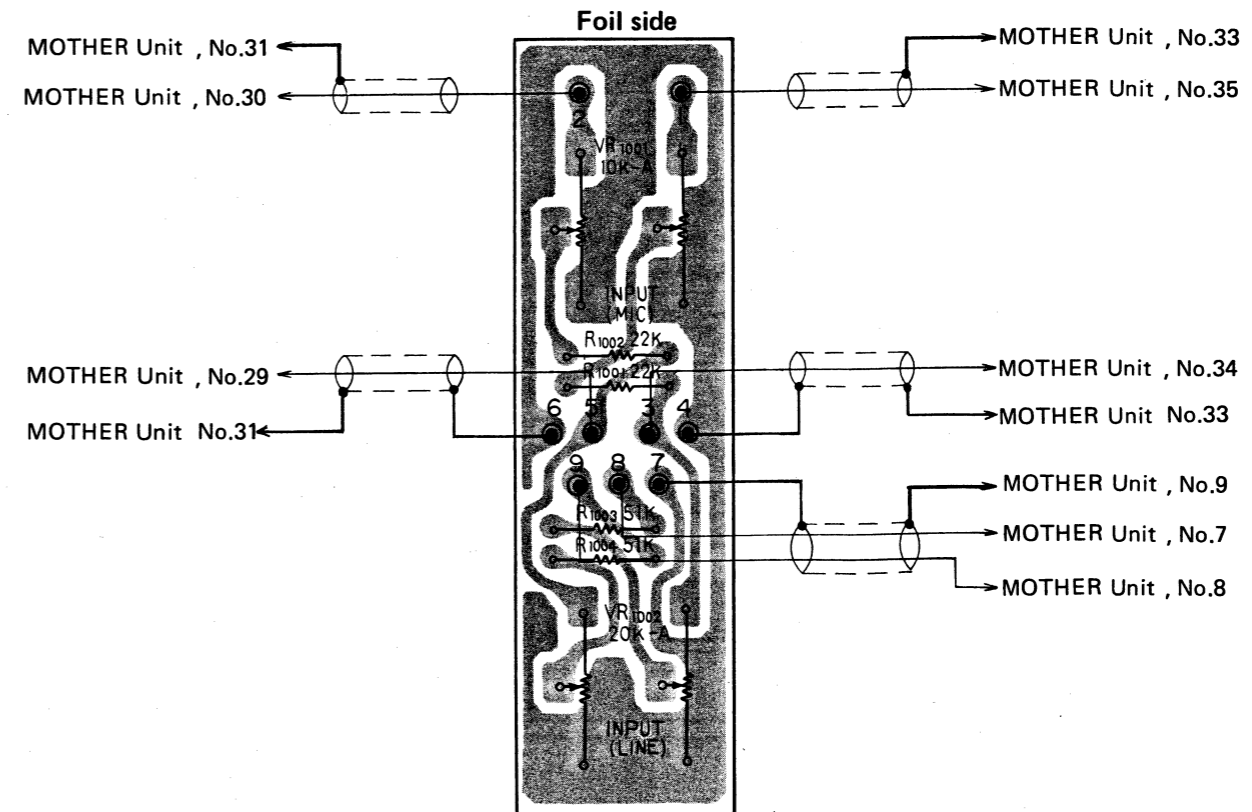
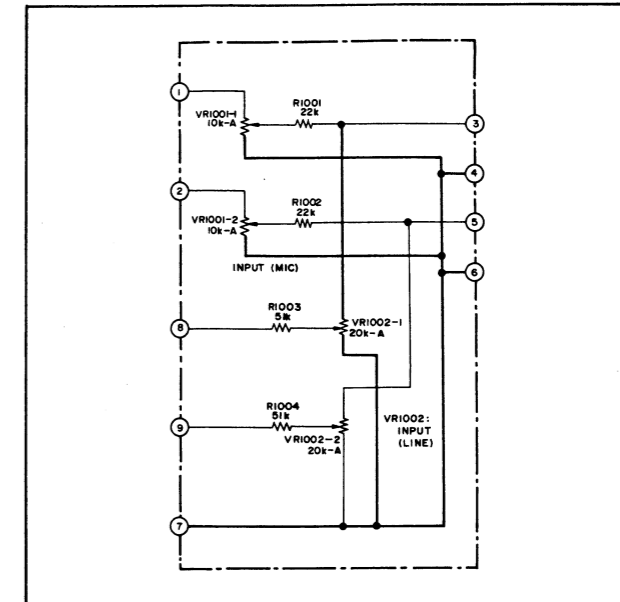
13.9 VOLUME UNIT

Parts List

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

RESISTORS

| Part No. | Symbol & Description |
|-------------|-----------------------|
| RCV-073 | VR1001 Volume 10K (A) |
| RCV-072 | VR1002 Volume 20K (A) |
| RD¼PM □□□ J | R1001-R1004 |



13.10 FUNCTION SWITCH UNIT (RWS-075)

SWITCHES

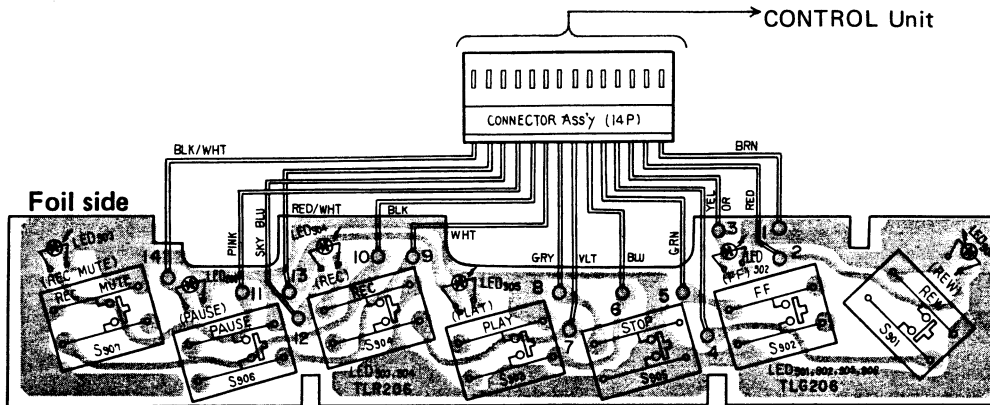
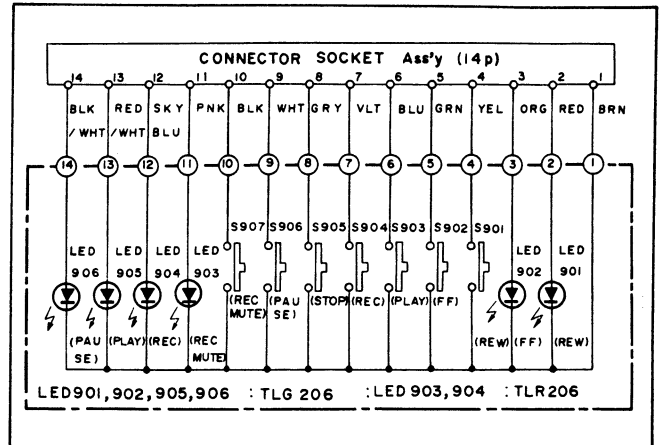
| Part No. | Symbol & Description |
|----------|---------------------------|
| RSG-063 | S901-S907 Function switch |

SEMICONDUCTORS

| Part No. | Symbol & Description |
|----------|--------------------------------|
| TLG206 | LED901, LED902, LED905, LED906 |
| TLR206 | LED903, LED904 |

OTHERS

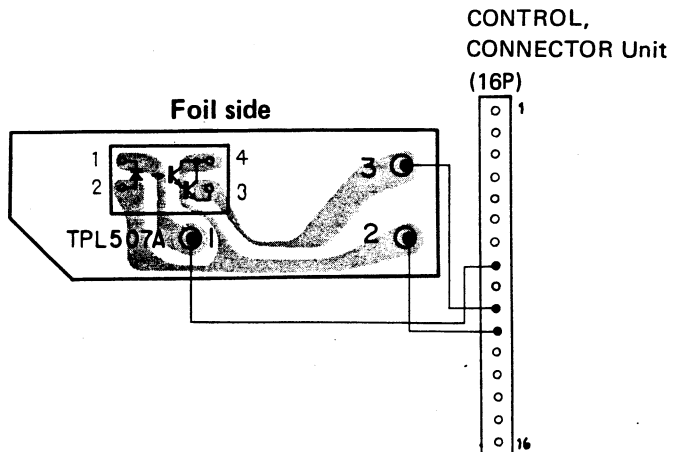
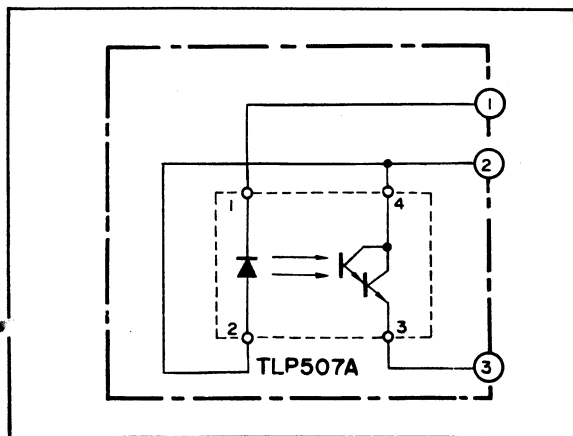
| Part No. | Symbol & Description |
|----------|-------------------------------|
| RKP-110 | Connector socket assembly 14P |
| RNK-733 | LED holder |



13.11 SENSING UNIT

Part List

| Part No. | Symbol & Description |
|----------|----------------------|
| TLP507A | Photo coupler |



13.12 SEMI-FIXED VOLUME UNIT

Parts List

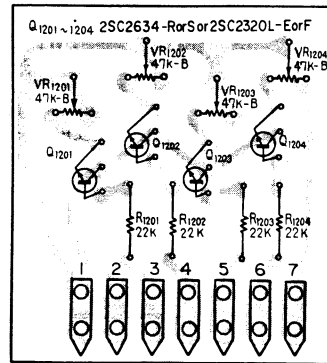
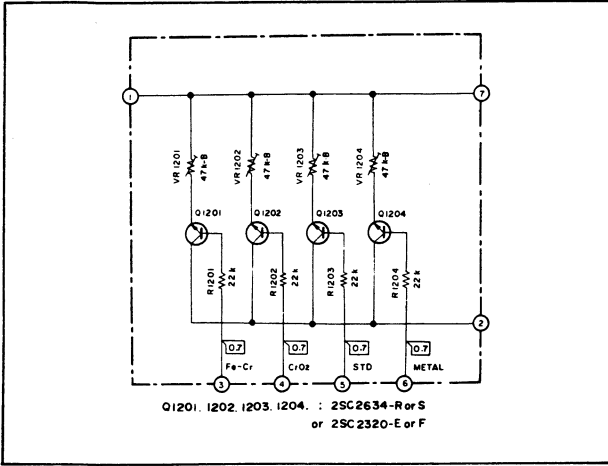
Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

RESISTORS

| Part No. | Symbol & Description |
|----------------------|----------------------------------|
| RCP-057 (RCP-091) | VR1201—VR1204 Semi-fixed 47K (B) |
| RD¼PM 223J | R1201—R1204 |

SEMICONDUCTORS AND OTHER

| Part No. | Symbol & Description |
|-----------------------|----------------------|
| 2SC2634 (2SC2320L) | Q1201—Q1204 |

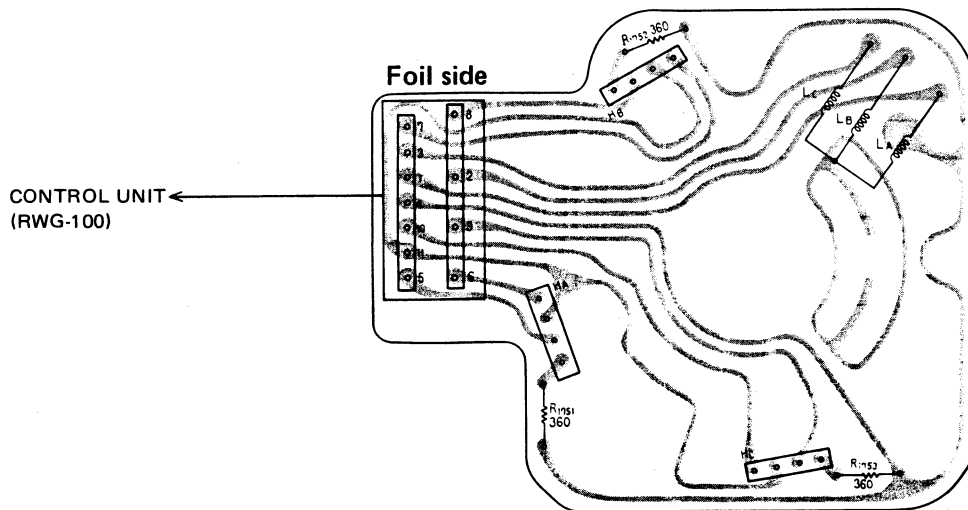


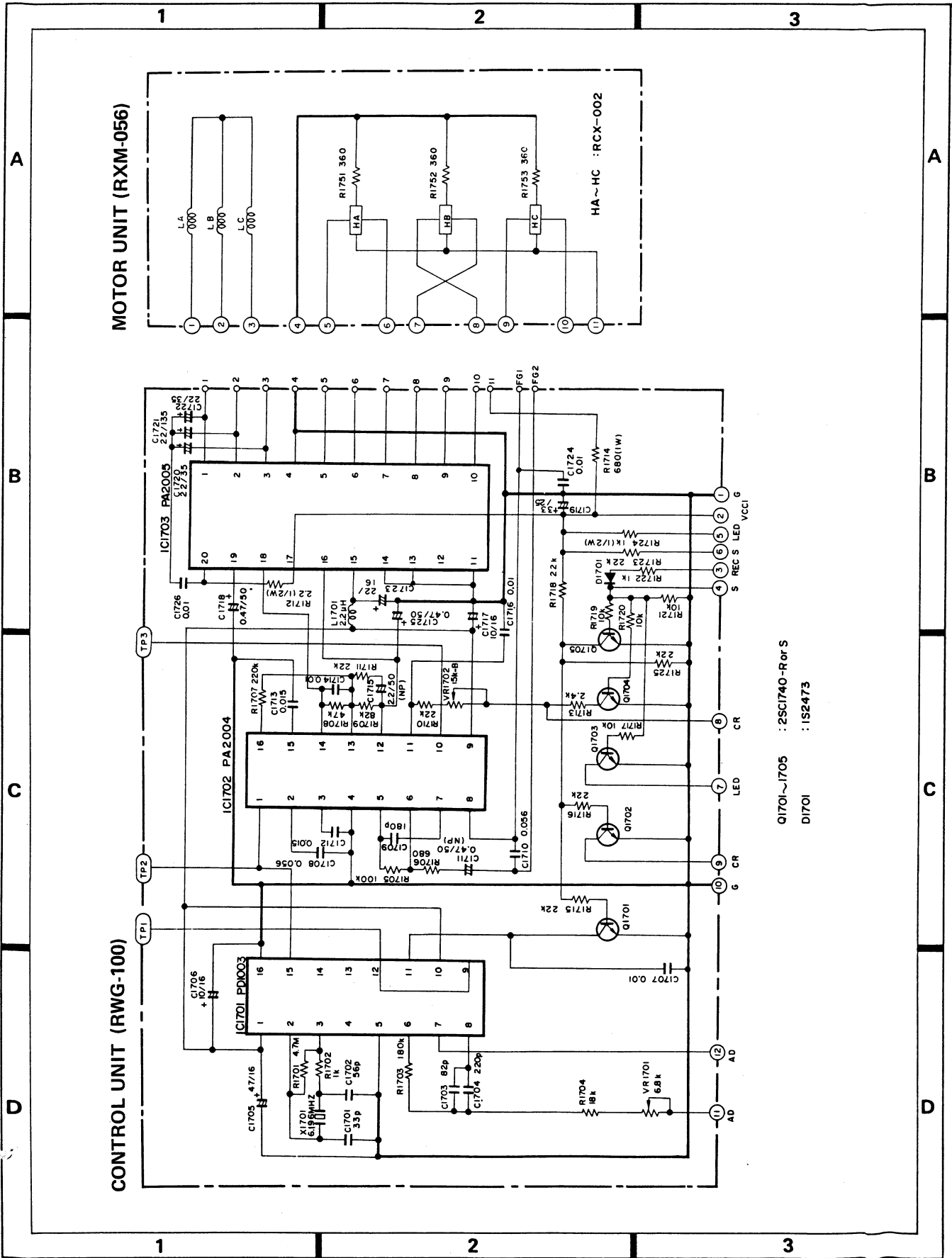
13.13 CAPSTAN D. D. MOTOR

Parts List

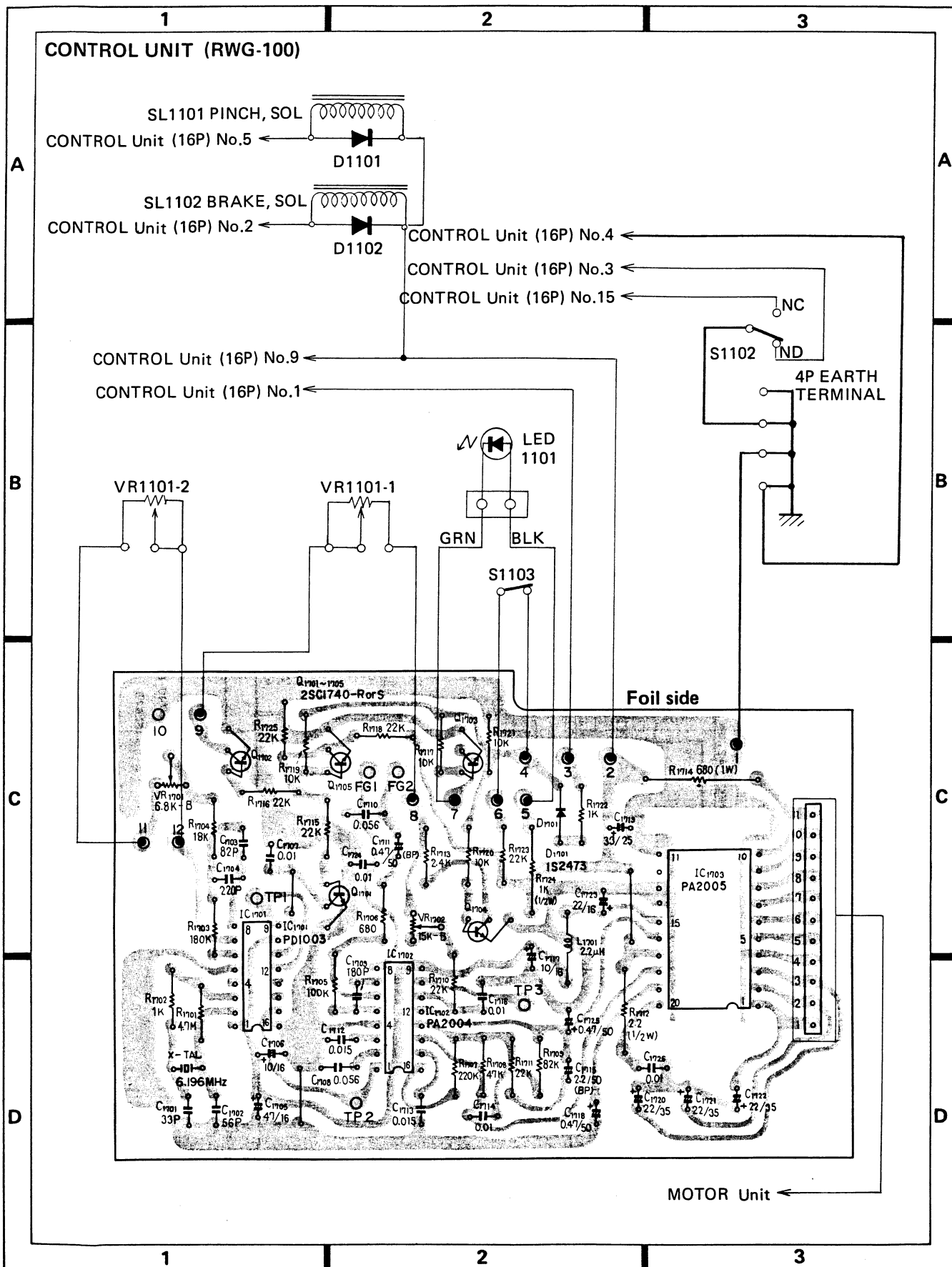
| Part No. | Symbol & Description |
|----------|----------------------|
| RXM-056 | Motor unit |
| RNG-100 | Control unit |

Motor unit (RXM-065)





Q1701~1705 : 2SC1740-R or S
 D1701 : 1S2473



Control Unit (RWG-100) Parts List

CAPACITORS

| Part No. | Symbol & Description |
|---------------|----------------------------|
| CCDCH 330J 50 | C1701 |
| CCDCH 560J 50 | C1702 |
| CCDCH 820J 50 | C1703 |
| CCDSL 181K 50 | C1709 |
| CKDYF 103Z 50 | C1707, C1716, C1724, C1726 |
| CEA R47P 50 | C1718, C1725 |
| CEA 100P 16 | C1717 |
| CEA 220P 16 | C1723 |
| CEA 220P 35 | C1720-C1722 |
| CEA 330P 25 | C1719 |
| CEA 470P 16 | C1705 |
| CEA R47M 50NP | C1711 |
| CEA 2R2M 50NP | C1715 |
| CSZAH 100M 16 | C1706 |
| QOSH 221J 50 | C1704 |
| CQMA 153J 50 | C1712 |
| CQMA 153K 50 | C1713 |
| CQMA 563K 50 | C1708, C1710 |
| CQMA 103K 50 | C1714 |

OTHERS

| Part No. | Symbol & Description |
|----------|----------------------|
| RSS-029 | X1701 |
| RTH-002 | L1701 |

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-051 | VR1701 Semi-fixed 6.8K (B) |
| RCP-006 | VR1702 Semi-fixed 15K (B) |
| RD $\frac{1}{2}$ PM $\square\square\square$ J | R1701-R1703, R1705-R1711, R1713, R1715-R1723, R1725 |
| RD $\frac{1}{2}$ PS $\square\square\square$ J | R1712, R1724 |
| RN $\frac{1}{4}$ PR 1802F | R1704 |
| RS1PF 681J | R1714 |

SEMICONDUCTORS

| Part No. | Symbol & Description |
|----------|----------------------|
| PD1003 | IC1701 |
| PA2004 | IC1702 |
| PA2005 | IC1703 |
| 2SC1740 | Q1701-Q1705 |
| 1S2473 | D1701 |

13.14 POWER SUPPLY UNIT (RWR-074)

CAPACITORS

| Part No. | Symbol & Description |
|-------------|----------------------|
| CEA 152P 35 | C1601 |
| CEA 010P 50 | C1615 |
| CEA 2R2P 50 | C1613 |
| CEA 100P 63 | C1607 |
| CEA 220P 50 | C1612 |
| CEA 470P 10 | C1603 |
| CEA 470P 16 | C1614 |
| CEA 470P 35 | C1605, C1617 |
| CEA 101P 50 | C1609 |
| CEA 101P 35 | C1604, C1618 |
| CEA 221P 16 | C1606 |
| CEA 221P 35 | C1610 |
| CEA 221P 25 | C1611 |
| CEA 331P 50 | C1616 |
| CEA 102P 35 | C1602 |
| CEA 102P 50 | C1608 |

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

RESISTORS

| Part No. | Symbol & Description |
|--|--|
| RCN-045 | R1618 |
| RS1PF $\square\square\square$ J | R1616, R1619, R1622, R1624 |
| RD $\frac{1}{4}$ PSF $\square\square\square$ J | R1601, R1610-R1612, R1621, R1623 |
| RD $\frac{1}{4}$ PS $\square\square\square$ J | R1602-R1609, R1613-R1615, R1617, R1620 |

SEMICONDUCTORS

| Part No. | Symbol & Description |
|------------------------|----------------------------|
| 2SD234 | Q1601, Q1610 |
| 2SC1740LN (2SC1740) | Q1602, Q1603, Q1606, Q1608 |
| 2SA733A | Q1604, Q1605 |
| 2SD526 | Q1607 |
| 2SA887 | Q1609 |
| 2SC1419 | Q1611 |

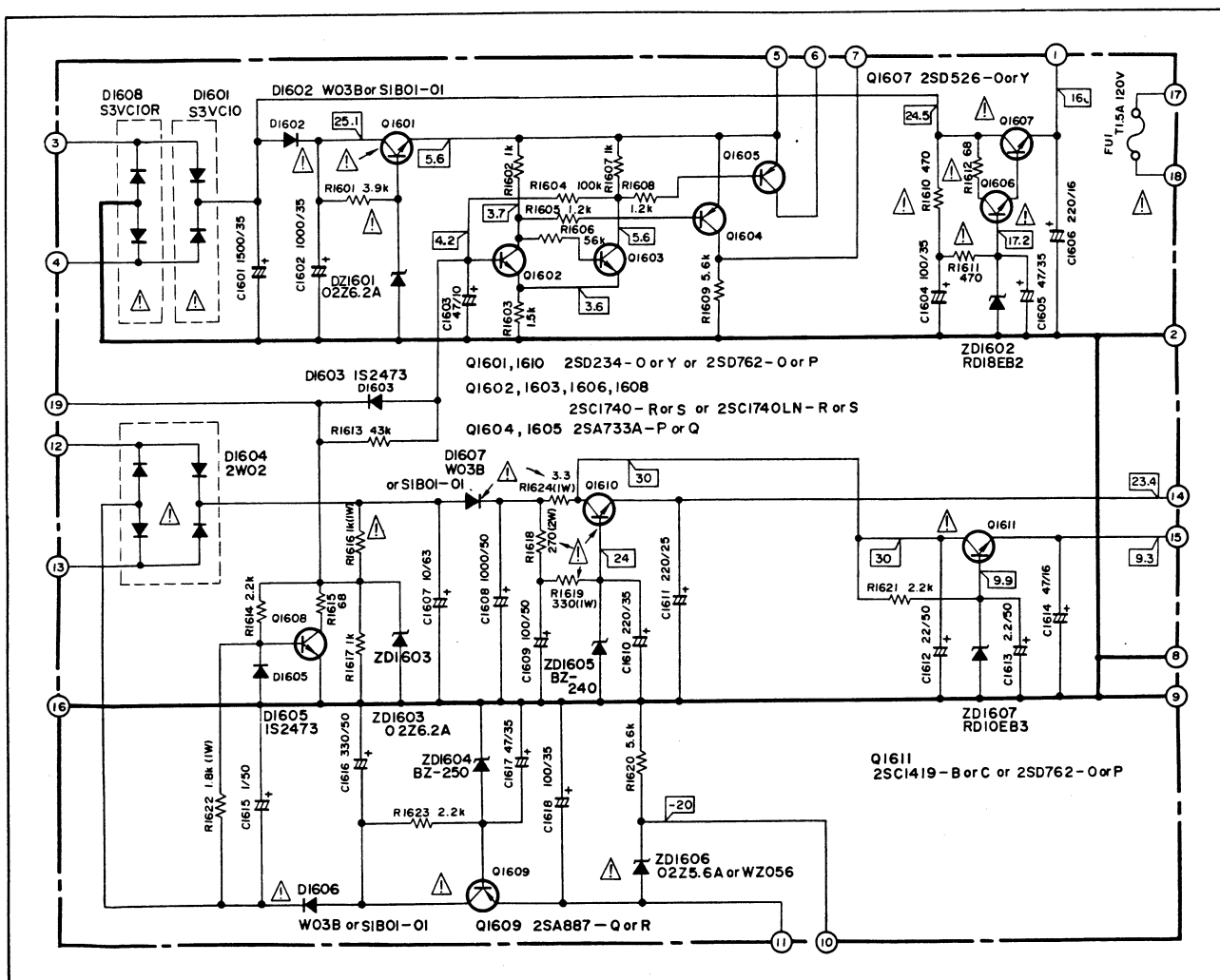
| Part No. | Symbol & Description |
|------------|----------------------|
| S3VC10 | D1601 |
| W03B | D1602, D1606, D1607 |
| (SIB01-01) | |
| 1S2473 | D1603, D1605 |
| 2W02 | D1604 |
| S3VC10R | D1608 |
| 02Z6-2A | ZD1601, ZD1603 |
| RD18EB2 | ZD1602 |
| BZ-250 | ZD1604 |
| BZ-240 | ZD1605 |
| 02Z5.6A | ZD1606 |
| (WZ-056) | |
| RD10EB3 | ZD1607 |

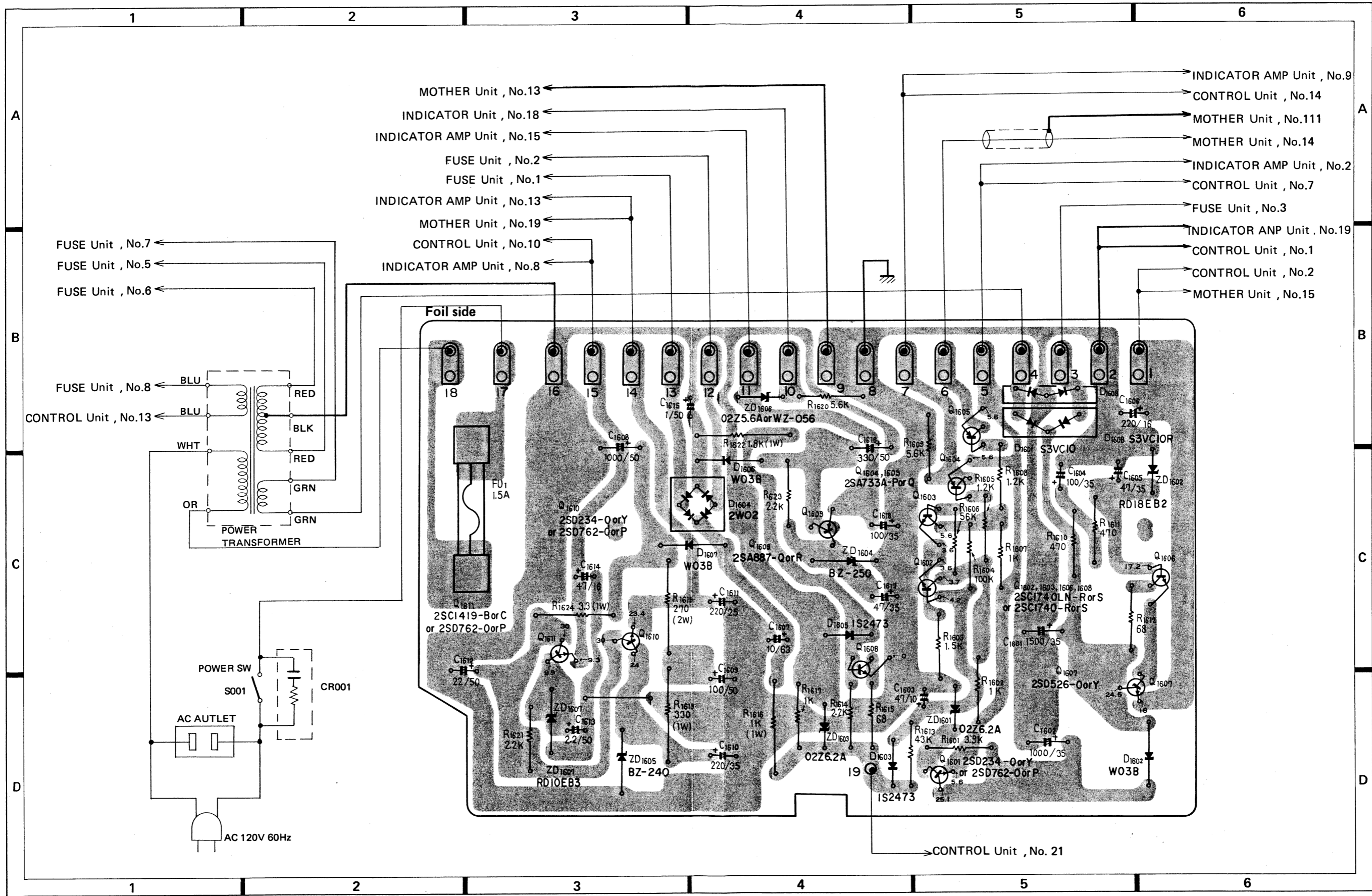
FUSE

| Part No. | Symbol & Description |
|----------|----------------------|
| REK-063 | FU1 Fuse 1.5A |

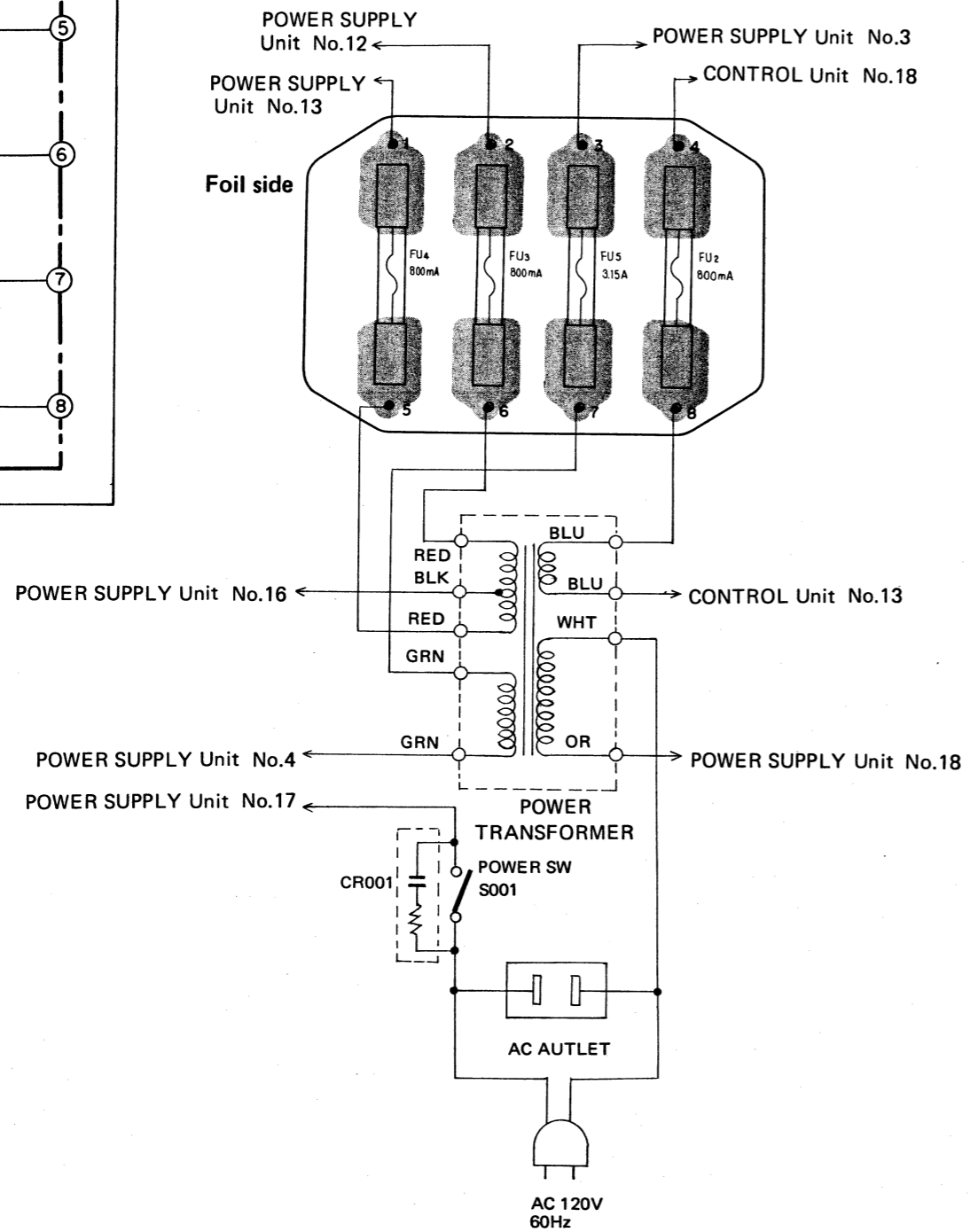
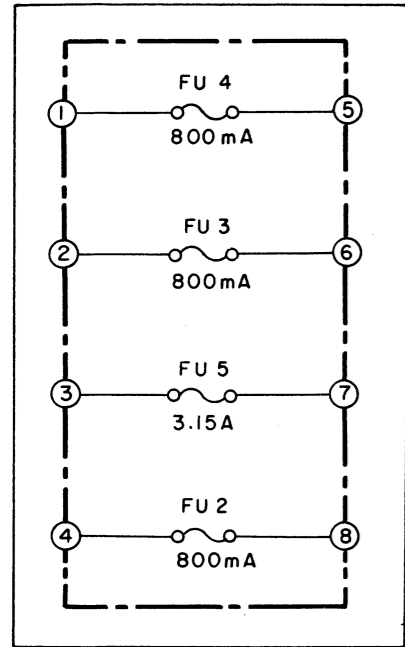
OTHERS

| Part No. | Symbol & Description |
|----------|----------------------|
| REE-051 | Insulator |
| RKH-005 | Insulator |
| RBA-026 | Screw |





13.15 FUSE ASSEMBLY



Parts List

| Part No. | Symbol & Description |
|----------|----------------------|
| REK-058 | FU2-FU4 Fuse 800mA |
| REK-044 | FU5 Fuse 3.15A |