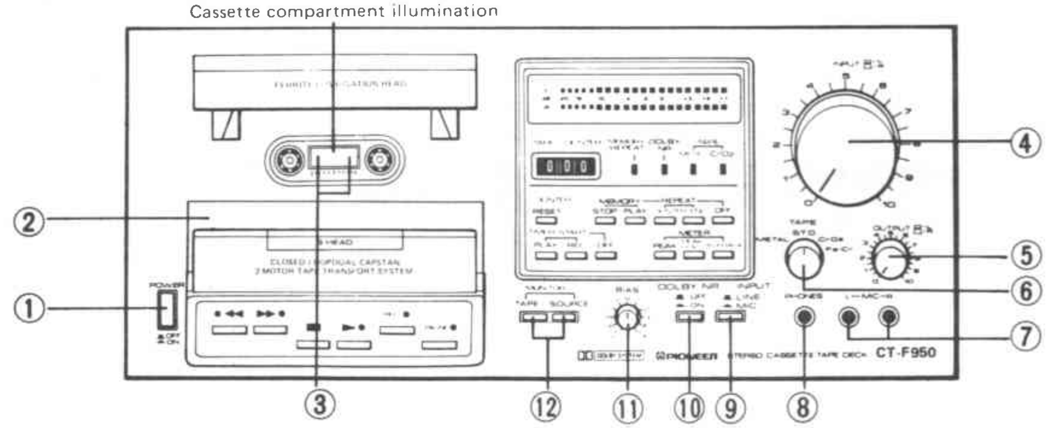
Service Manual

CASSETTE TAPE DECK

CT-F950

PIONEER

2. FRONT PANEL FACILITIES



①POWER SWITCH

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

②DUST COVER

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

③REMAINING TAPE MARKER

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

④INPUT (RECORDING LEVEL) CONTROLS

Use these to adjust the level of the input signals from the MIC jacks or rear panel INPUT jacks.
Turning these controls to the right increases the level.
The controls are coupled to the left and right channels, but you can also use them to adjust the right channel (back) and the left channel (front) independently.

⑤OUTPUT (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.

⑥TAPE 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 ordinary or LH tapes
CrO_2:	For using chrome tapes
Fe-Cr:	For using ferrichrome tapes

⑦MIC 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.

⑧HEADPHONES JACK

This is the output jack for your stereo headphones. You will be able to hear sound from signals selected by the MONITOR switches. 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-F950. 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 HEADPHONES jack by mistake.*

⑨INPUT SELECTOR SWITCH

Use this switch to select the program source which you intend to record.

LINE:	Set to this position for recording a program source which is connected to the rear panel INPUT jacks.
MIC:	Set to this position for recording signals from a microphone, or microphones, connected to the MIC jacks.

NOTE:
You will be able to record signals from the INPUT jacks if the LINE switch is depressed even when the microphones are plugged into the MIC jacks.

⑩DOLBY* NR SWITCH

Set this switch to ON for recording with the built-in Dolby noise reduction system and for the playback of tapes which have been recorded using the Dolby NR system.

⑪BIAS CONTROL

Use this control to adjust the bias in accordance with the characteristics of the tape being used. It is set so that the center (click stop) position corresponds to the standard bias.

⑫MONITOR SWITCHES

You will be able to listen to the recorded signals (playback sound) if you depress the TAPE while you are recording a program. You will be able to listen to the signals (recording input) just before they are recorded if you depress the SOURCE. Use these switches to monitor your recording. Depress the TAPE during playback.

*Manufactured under license from Dolby Laboratories.
*Dolby and DD are trademarks of Dolby Laboratories.

1. SPECIFICATION

Systems .... Compact cassette, 2-channel stereo
Motors .... Capstan drive; DC servo 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 0.04% (WRMS)

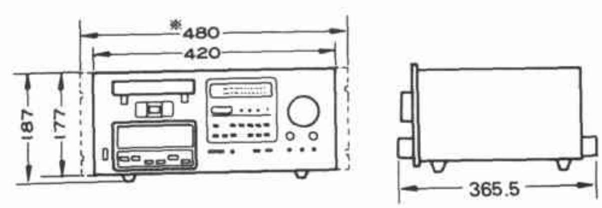
Frequency Response
–20dB Recording
Standard, LH tapes .... 20 to 17,000Hz (25 to 15,000Hz ± 3dB)
Ferrichrome tape .... 20 to 19,000Hz (25 to 17,000Hz ± 3dB)
Chromium dioxide tape .... 20 to 19,000Hz (25 to 17,000Hz ± 3dB)
Metal tape .... 20 to 19,000Hz (25 to 18,000Hz ± 3dB)
0dB Recording
Chromium dioxide tape .... 20 to 11,000Hz
Metal tape .... 20 to 14,000Hz
Signal-to-Noise Ratio .. Dolby NR OFF; More than 59dB
Dolby NR ON; More than 69dB (over 5kHz)

Harmonic Distortion .... No more than 1.2% (0dB)
Inputs (Sensitivity/Maximum allowable input/Impedance)
MIC (L, R); 0.3mV/100mV/30kilohms, 6mm diam. jack (Reference MIC impedance; 250 ohms to 30 kilohms)
LINE x 2; (60mV/25V/100 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 76
Diodes x 84, Photo interrupter x 1
ICs x 13
Subfunctions
- Dolby NR system (ON-OFF) with LED indicator lamp
- Fluorescent tube level meter (–20 to +7dB) (Peak/Peakhold/average selector)
- Fluorescent tape counter
- Bias fine adjusting control knob
- Memory stop/Memory play
- Counter repeat/End repeat
- Input selector
- Automatic tape slack canceller
- Cassette compartment illumination
- Standby mechanism with unattended recording
- Tape Selector 4 position.
- Click Stop. Output VR.

Power Requirements .... AC 120V 60Hz
Power Consumption .... 54 watts
Dimensions .... 420(W) x 187(H) x 365.5(D)mm Max.
16-9/16 x 7-3/8 x 14-3/8 in.
Weight 10.1kg (22lb 4oz.)
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.
: CrO_2: DIN 45513/BLATT7(CrO_2) 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 ±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.



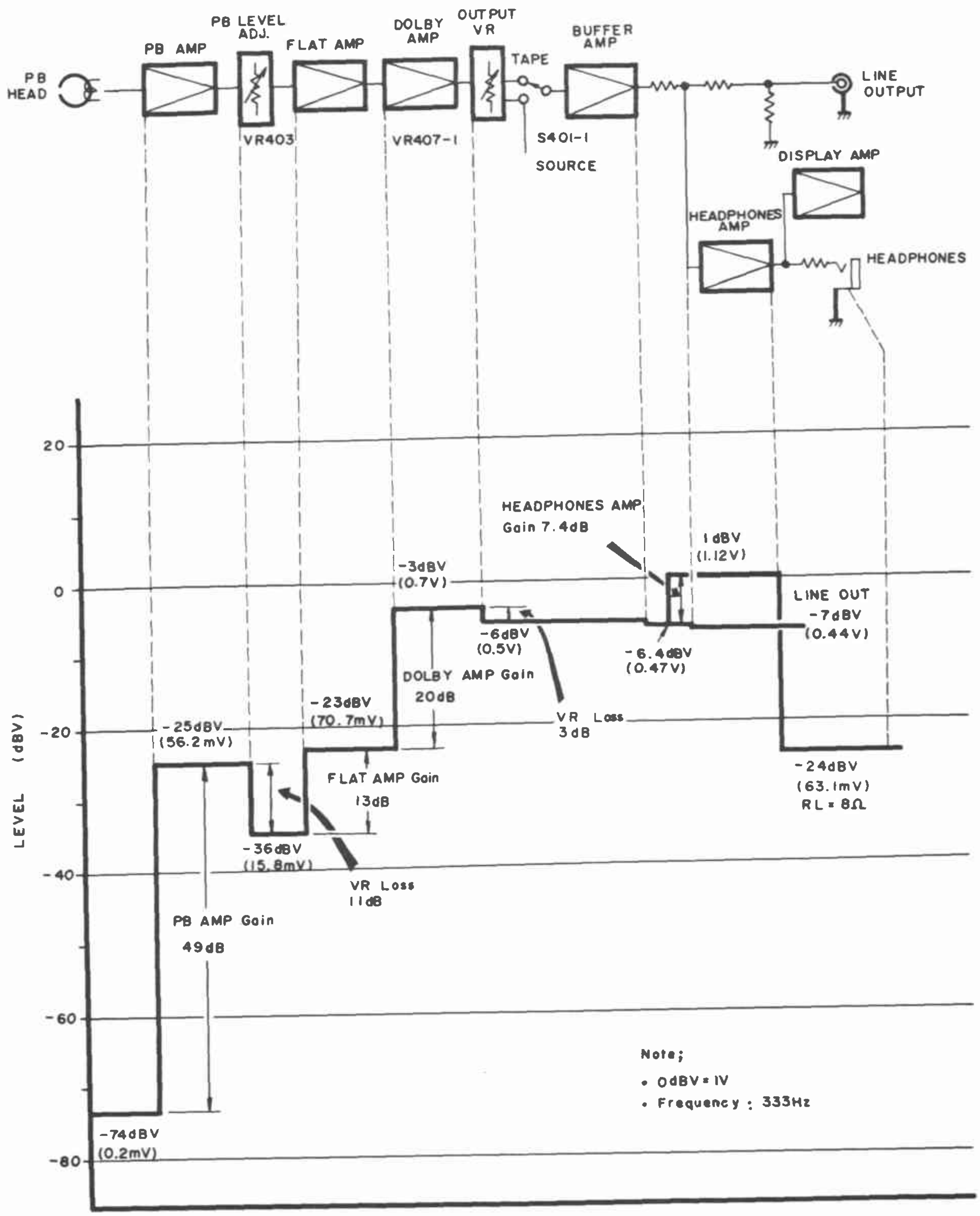
420(W) x 187(H) x 365.5(D)mm Max.

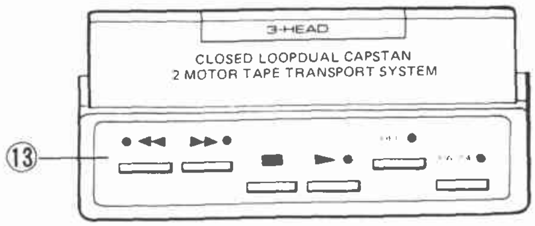
* with rackmount adaptor JA-R102
* 480(W) x 187(H) x 380(D) mm Max.

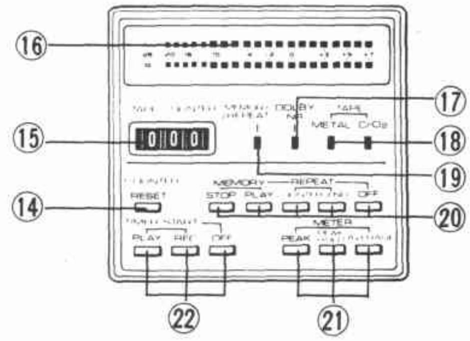
Unit: mm

3. LEVEL DIAGRAM

PLAYBACK







⑬ OPERATING SWITCHES

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

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

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

▶ (PLAY): Depress this switch when playing back a tape. (The tape will travel from left to right.)

REC: Depress this switch together with the PLAY switch for recording.
This switch 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 switch 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 switches are depressed, the corresponding indicator (except STOP mode) will come on signifying that the deck is set to that respective mode.*
- *All the operating switches are released (OFF) to stop mode when the POWER switch is turned OFF.*

⑭ COUNTER RESET BUTTON

Depress this button to reset the tape counter display to "000."

⑮ TAPE COUNTER

This indicates the position of the tape run. The counter reset to "000" when the power is switched on.

⑯ LEVEL METER

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

⑰ DOLBY NR INDICATOR

This lights up when the DOLBY NR switch is set to ON and it indicates that a tape is being recorded or played back with the Dolby NR system.

⑱ TAPE INDICATORS

METAL: This light comes on when the TAPE selector is set to METAL.

CrO_2: This light comes on when the TAPE selector is set to CrO_2.

⑲ MEMORY/REPEAT INDICATOR

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

⑳ 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 "000" during rec/play, when the REW switch 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 "000" during rec/play, and playback will start from that spot, when the REW switch 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 "000" 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.

㉑ METER SWITCHES

PEAK: The meter functions as a peak level meter when this switch is depressed.

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.

㉒ TIMER START SWITCHES

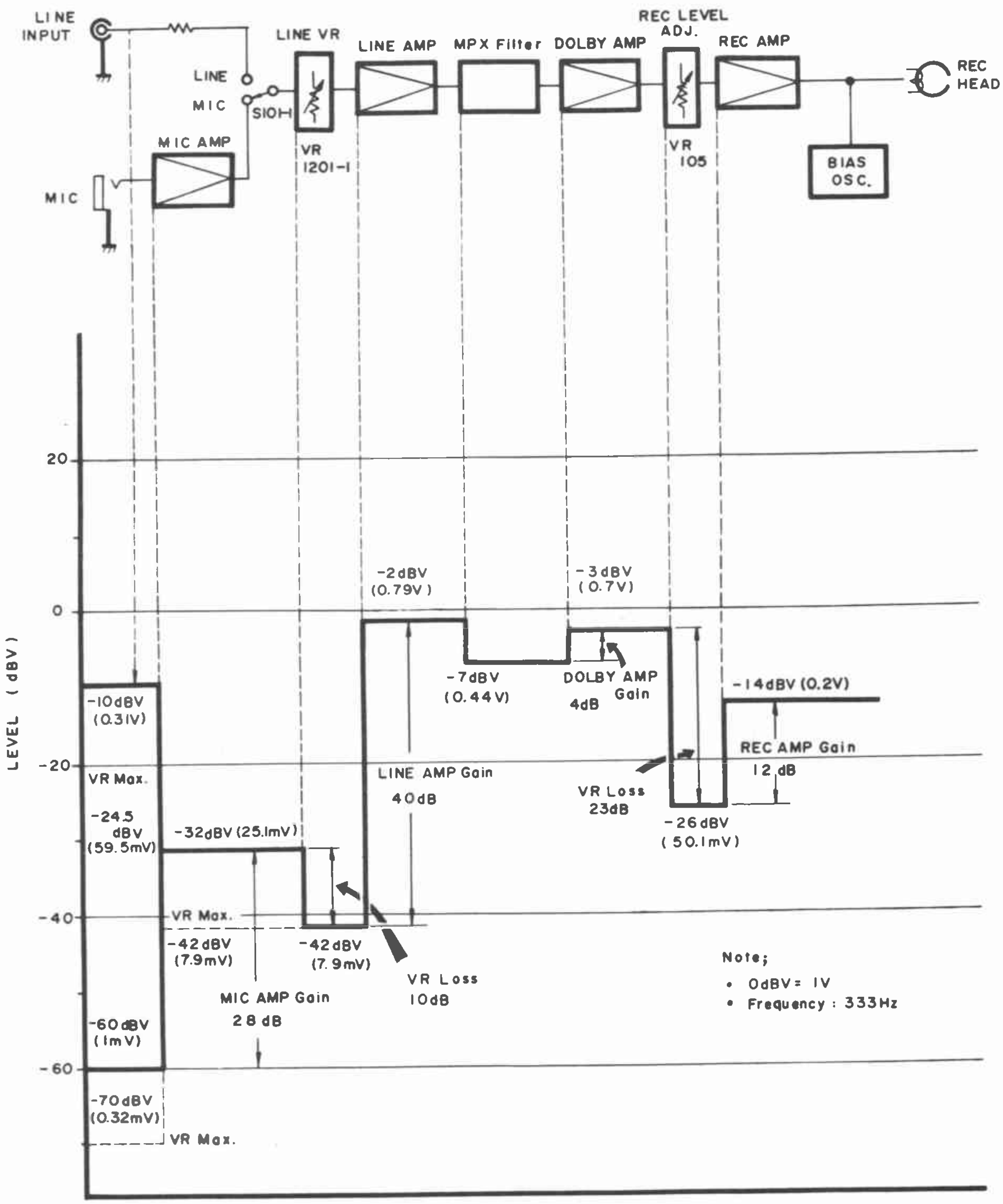
Depress these switches when you are playing back or recording a tape with the use of a timer.

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.

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.

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

RECORDING


LINE INPUT
LINE
MIC
S101-1
LINE VR
VR 1201-1
LINE AMP
MPX Filter
DOLBY AMP
REC LEVEL ADJ.
VR 105
REC AMP
REC HEAD
BIAS OSC.
MIC AMP
MIC
LEVEL (dBV)
20
0
-20
-40
-60
-10dBV (0.31V)
VR Max.
-24.5 dBV (59.5mV)
-60dBV (1mV)
-70dBV (0.32mV)
VR Max.
-32dBV (25.1mV)
VR Max.
-42dBV (7.9mV)
-42dBV (7.9mV)
MIC AMP Gain 28 dB
VR Loss 10dB
-2dBV (0.79V)
LINE AMP Gain 40dB
-7dBV (0.44V)
-3dBV (0.7V)
DOLBY AMP Gain 4dB
VR Loss 23dB
-26dBV (50.1mV)
-14dBV (0.2V)
REC AMP Gain 12 dB
Note;
• 0dBV = 1V
• Frequency : 333Hz

4. DISASSEMBLY

External Components

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

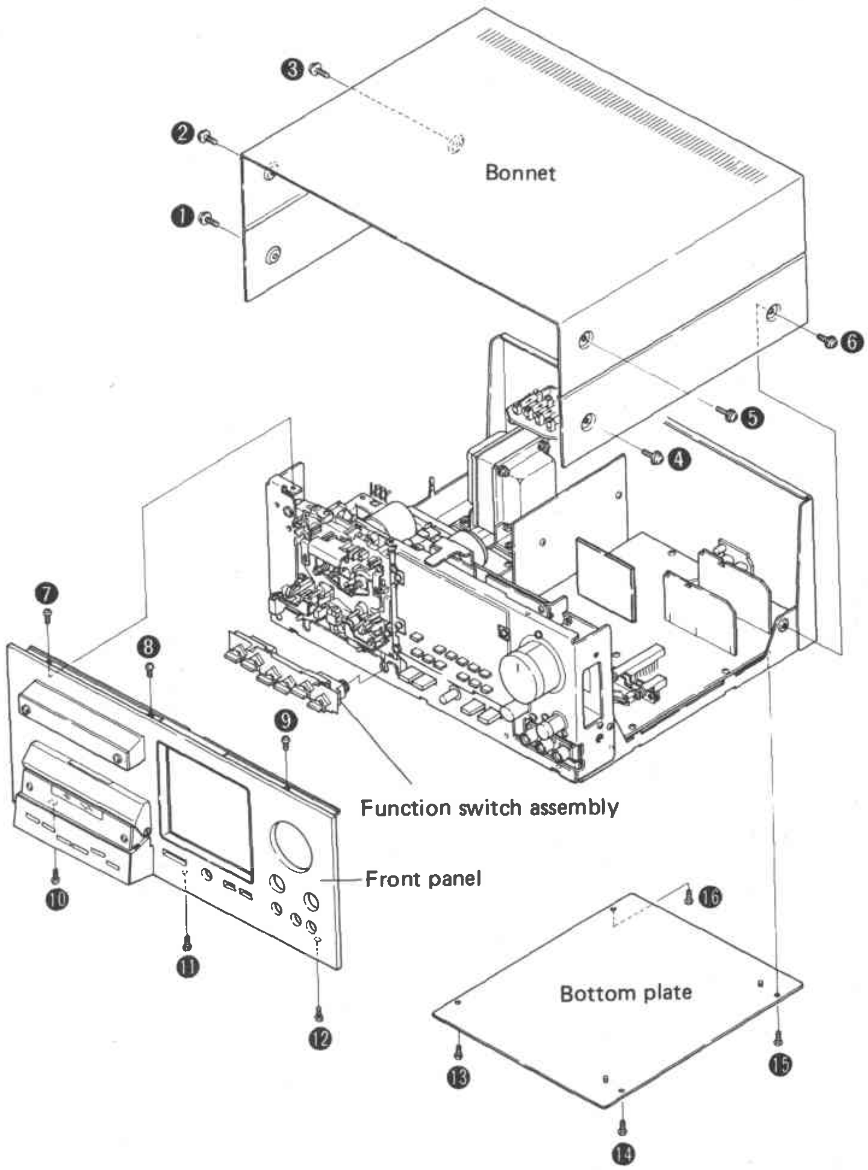


Fig. 4-1 Disassembly of exterior parts

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 motor by undoing screws ❶ to ❸.
2. Remove solenoid A by undoing screws ❹ to ❻.
3. Remove the plunger chassis assembly by undoing screws ❼ to ⓫.
4. Remove the sub-chassis assembly by undoing screws ⓬ to ⓱.
5. Remove the take-up motor by undoing screws ⓲ and ⓳, and remove solenoid B by undoing screws ⓴ and ㉑.

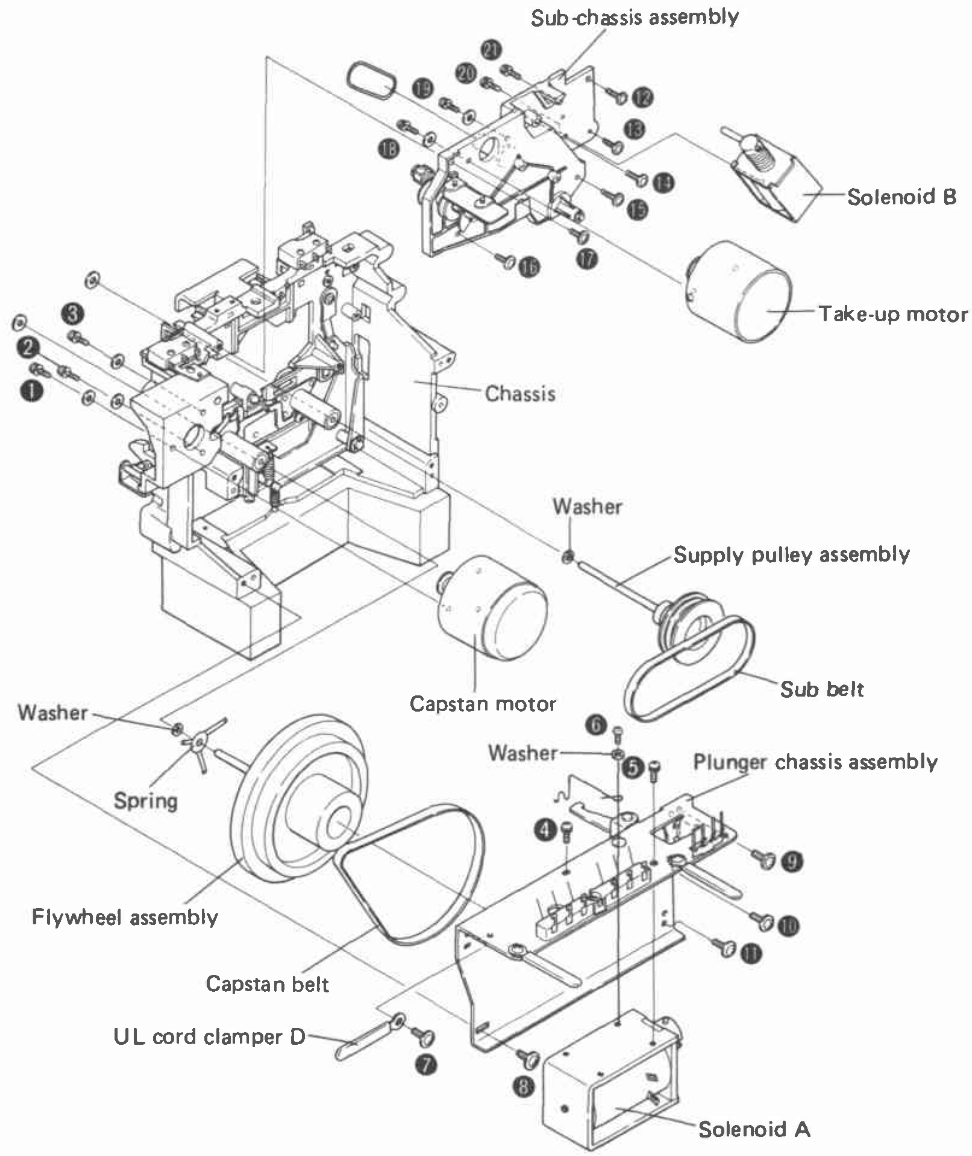


Fig. 4-5 Disassembly of mechanism assembly

Mechanical Assembly

After removing the front panel, undo screws ❶ to ❻.

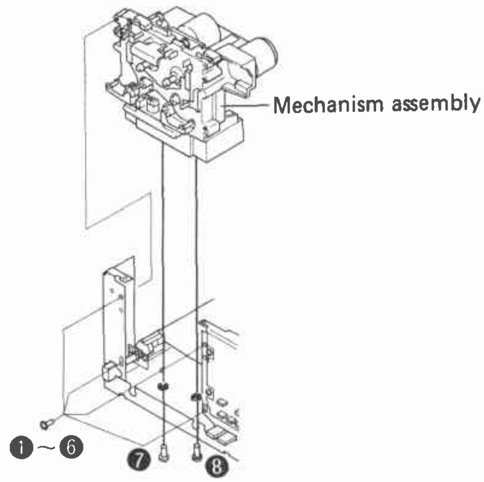


Fig. 4-2 Remove the mechanism assembly

Sub-head Assembly, Pinch-roller Arm Assembly and Pressure Arm

1. Remove the sub-head base assembly by undoing screws ❶ and ❷ and the socket-head hexagonal bolt.
2. Remove the feed side pinch-roller arm assembly by loosening the height adjuster (unt).
3. Remove the take-up side pinch-roller arm assembly by taking off E-washer ❶.
4. Remove the pressure arm by taking off E-washer ❷ 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 30) included in the section "Mechanical adjustments" shall be satisfied.

Fluorescent Indicator Tube

1. Remove the indicator lens assembly by undoing screws ❶ to ❹.
2. Remove the indicator amplifier assembly by undoing screws ❺ to ⓫.
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.

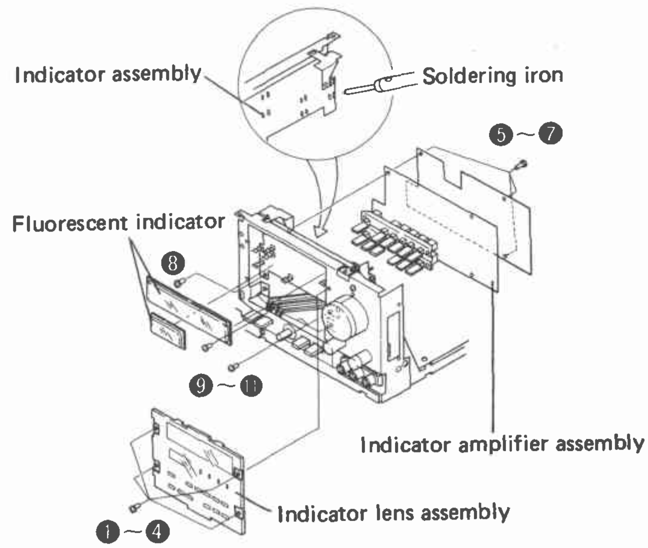


Fig. 4-3 Remove the fluorescent indicator tube

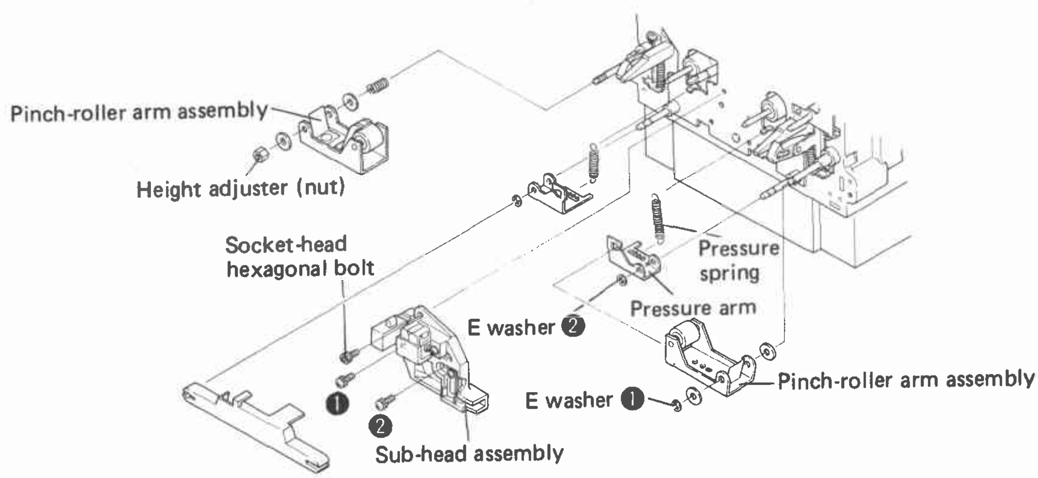
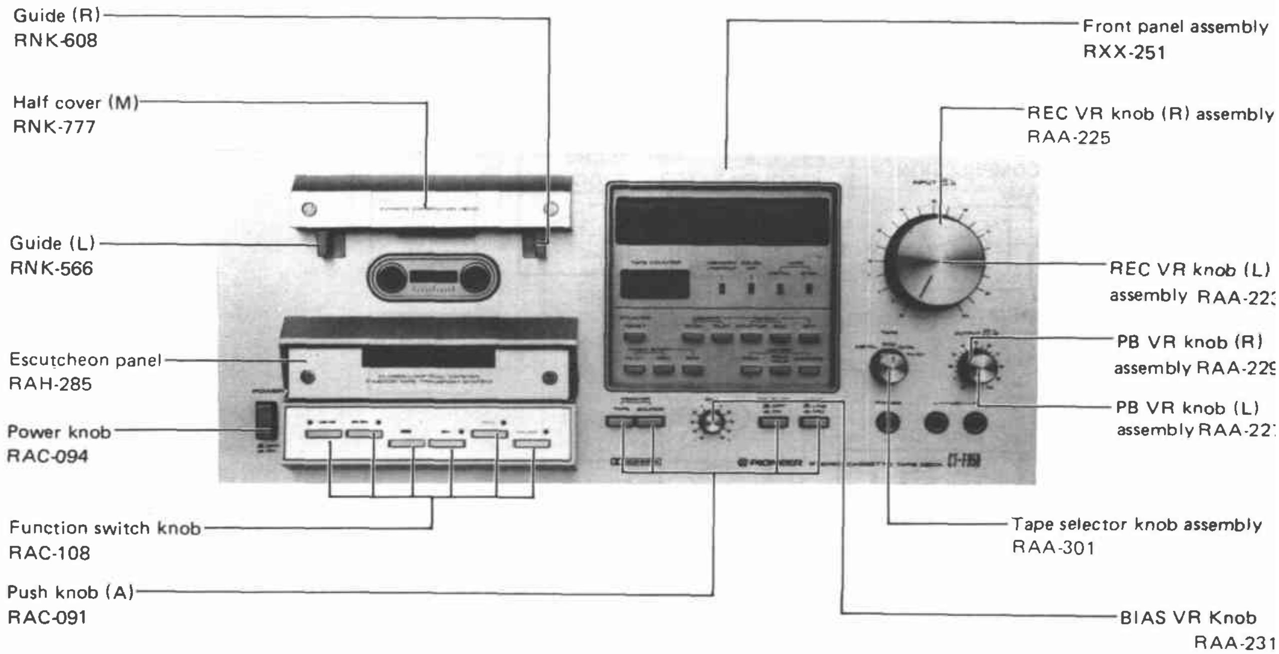


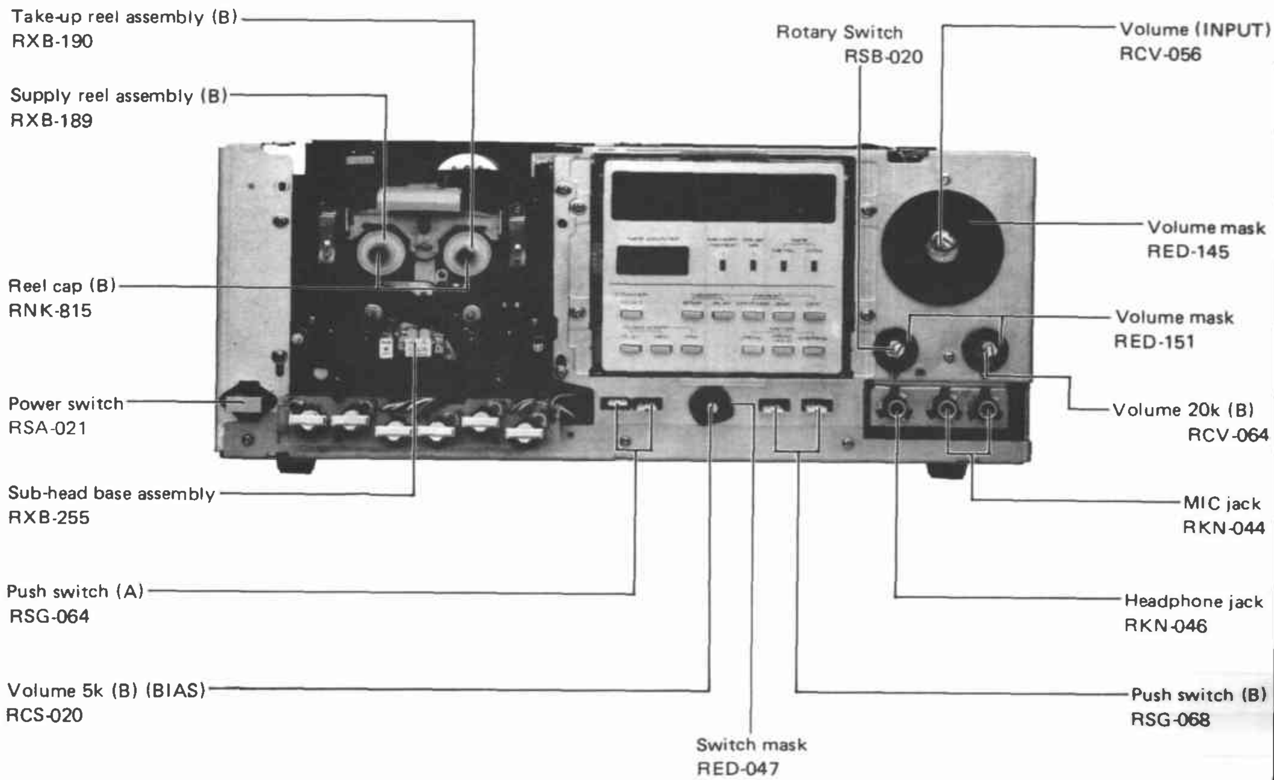
Fig. 4-4 Remove the sub-head assembly, pinch-roller arm assembly and pressure arm

5. PARTS LOCATION

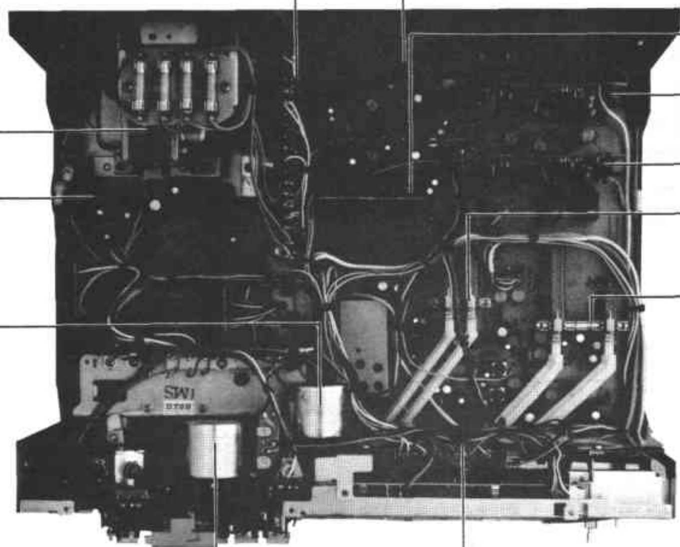
FRONT PANEL VIEW



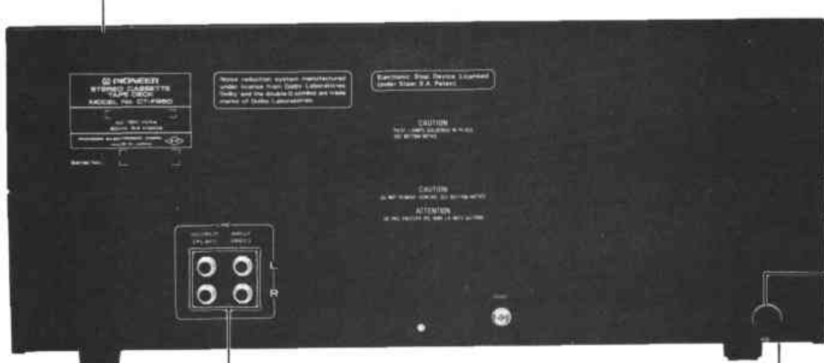
FRONT VIEW WITH FRONT PANEL REMOVED

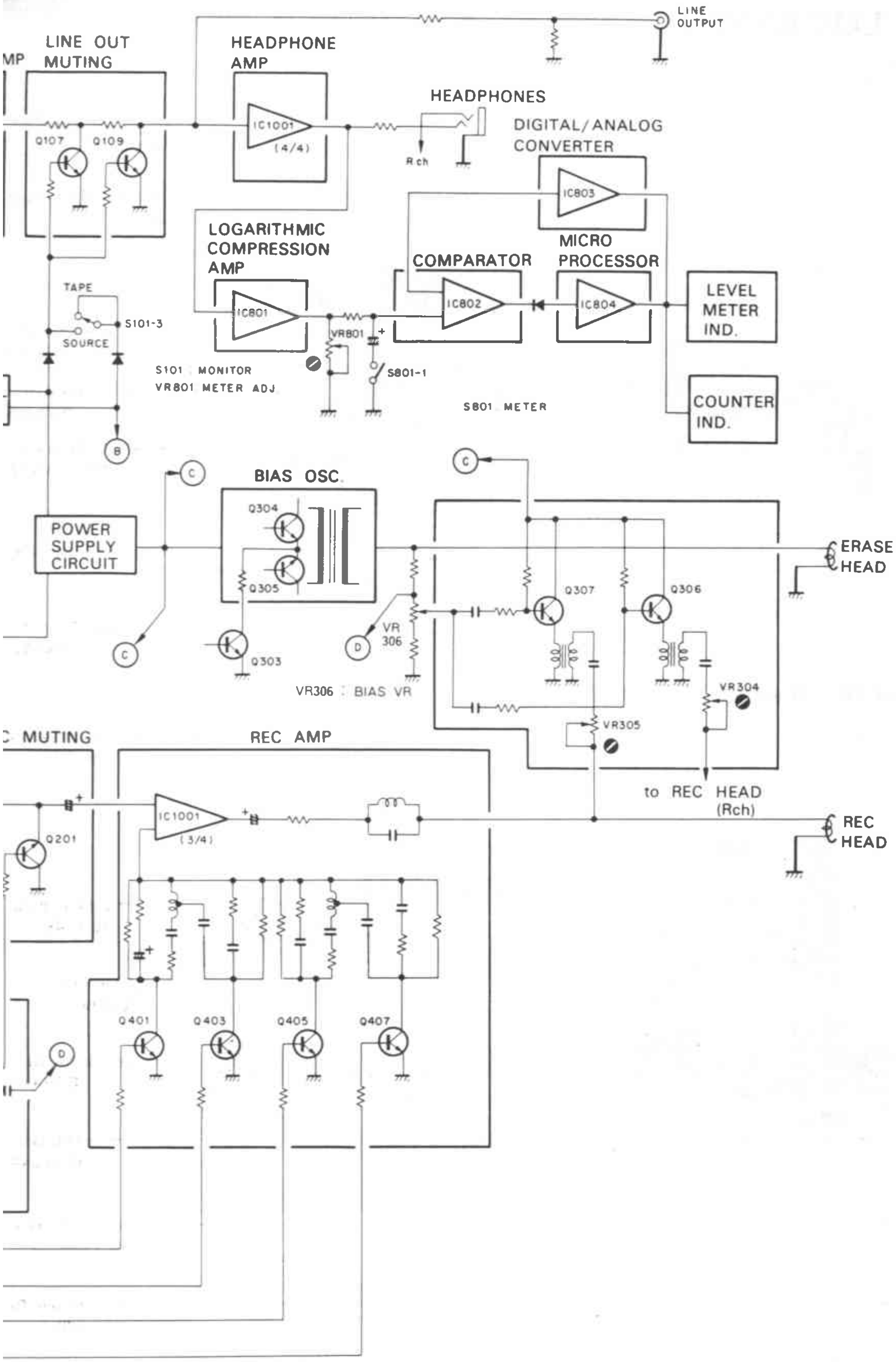


TOP VIEW WITH BONNET REMOVED

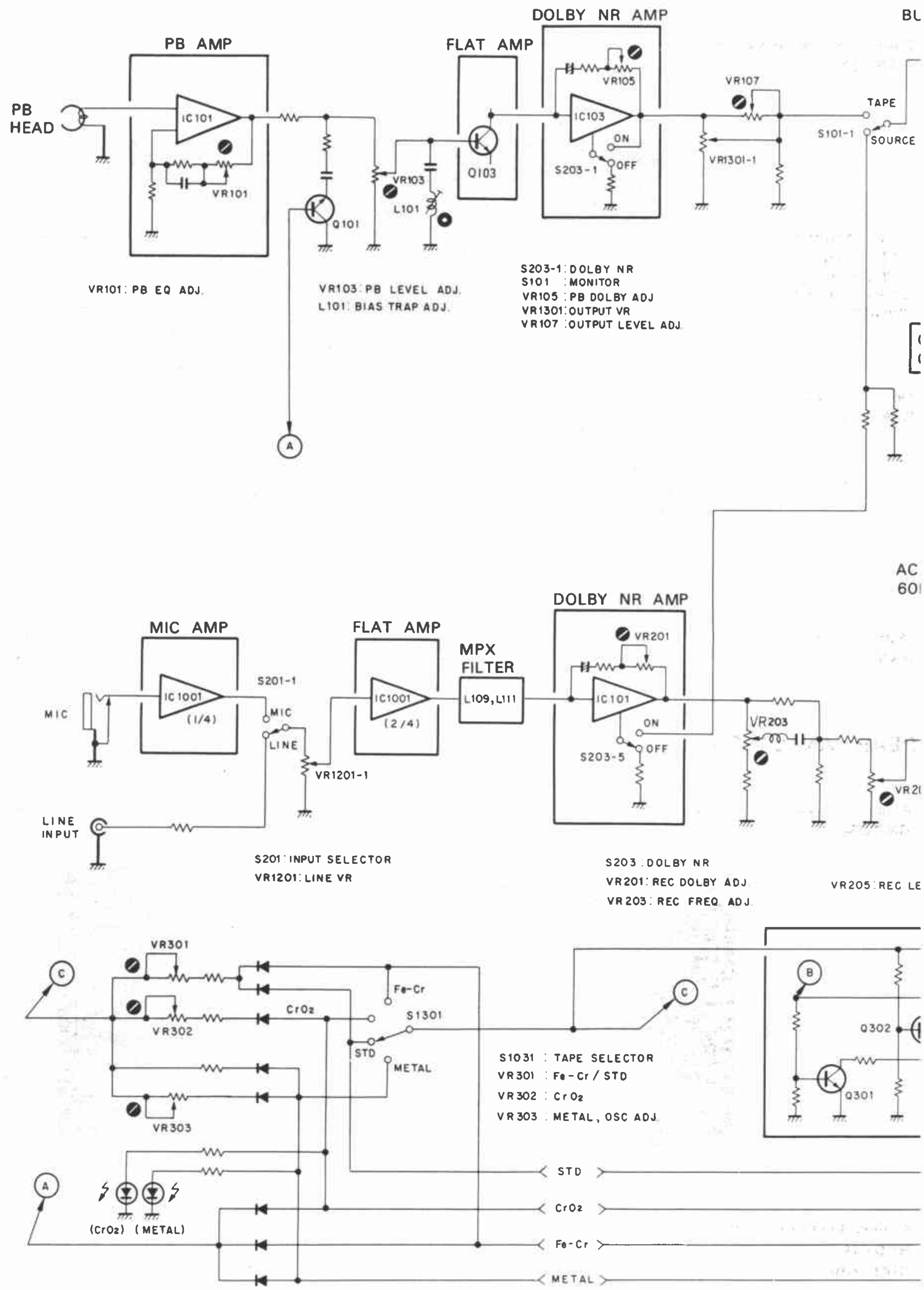


REAR PANEL VIEW




LINE OUTPUT
LINE OUT MUTING
HEADPHONE AMP
HEADPHONES
IC1001 (4/4)
Q107
Q109
R ch
DIGITAL/ANALOG CONVERTER
IC803
LOGARITHMIC COMPRESSION AMP
MICRO PROCESSOR
COMPARATOR
IC801
IC802
IC804
LEVEL METER IND.
TAPE
S101-3
SOURCE
VR801
S801-1
S101 MONITOR
VR801 METER ADJ
S801 METER
COUNTER IND.
BIAS OSC.
Q304
Q305
Q303
POWER SUPPLY CIRCUIT
Q307
Q306
ERASE HEAD
VR 306
VR306 BIAS VR
VR304
VR305
MUTING
REC AMP
to REC HEAD (Rch)
IC1001 (3/4)
Q201
REC HEAD
Q401
Q403
Q405
Q407

6. BLOCK DIAGRAM



7. CIRCUIT DESCRIPTIONS

For details of the circuit of the CT-F950, refer to the block diagram on Page 13 and also the overall schematic diagram on Page 54.

7.1 RECORDING AND PLAYBACK CIRCUIT

Playback Equalizer Amplifier

The playback equalizer amplifier is an NFB type amplifier which uses a low-noise high-gain monolithic IC (AN370).

Playback Flat Amplifier (Q_{103}, Q_{104})

The playback flat amplifier is a single transistor amplifier possessing flat frequency characteristics. It is used to amplify the output of the playback equalizer amplifier. A trap circuit is used at the input side to prevent entry of the recording bias.

Buffer Amplifier (Q_{105}, Q_{106})

The buffer amplifier is an emitter follower type circuit which is used to take the output of the Dolby NR amplifier to the LINE OUTPUT terminals.

IC (PA4001)

The PA4001 was developed by PIONEER as a system IC for use in tape decks. It contains a microphone amplifier, headphone amplifier, flat amplifier and recording amplifier. Its block diagram is shown in Fig. 7-1.

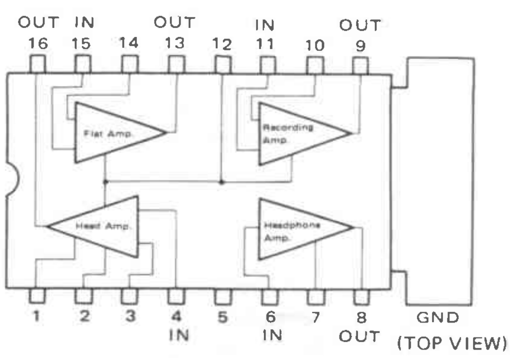


Fig. 7-1 Block diagram of PA4001

Headphone Amplifier

The headphone amplifier consists of the headphone amplifier section of the PA4001. This is a complimentary amplifier having a gain of approximately 7.4dB. The headphone output is taken off a resistive voltage divider.

Microphone Amplifier

The microphone amplifier consists of the microphone amplifier section of the PA4001. It has a gain of about 28dB.

7.2 TAPE SELECTOR CIRCUIT

The CT-F950 has been designed to use metal, CrO_2, Fe-Cr and normal tapes. The tape selector circuit (see Fig. 7-2) is switched to suitable equalizer and bias levels according to the type of tape employed. This switching, plus the tape indicator (CrO_2/METAL) switching is performed by the TAPE switch S_{1301}.

Playback Equalizer Switching Circuit

The playback equalizer may be switched to either of 2 positions: 70μsec for METAL/ CrO_2, Fe-Cr and 120μsec for STD. When the TAPE switch S_{1301} is in the METAL position (or CrO_2, or Fe-Cr positions), a bias current flows from D_{309} (or D_{311} or D_{310}) to Q_{101} via R_{117}, resulting in the transistor being turned on. The C_{119} and R_{115} series circuit is thus connected to the playback amplifier to set up the 70μsec equalizer amplifier. When S_{1301} is switched to the STD position, Q_{101} is turned off, thereby reverting to the 120μsec equalizer amplifier.

Recording Bias Generator and Bias Selector Circuit

Metal tapes require a bias current of about twice the level of the bias required for conventional STD tapes. For this reason the push-pull generator output is amplified by a bias amplifier (composed of step-up transformers L_{301} and L_{302} plus coupling amplifiers Q_{306} and Q_{307}) prior to being applied to the head. The bias amplifier input may be adjusted by the front panel BIAS control. Whereas more conventional bias controls vary the B voltage of the oscillator, the system employed in the CT-F950 also varies the erasure current at the same time. Since erasure efficiency is a particular problem with metal tapes, the CT-F950 has been designed to also vary the secondary side of the oscillator transformer.

Bias switching for each type of tape is achieved through the TAPE switch S_{1301}. Bias level is changed by first maintaining a constant oscillation level by R_{320}, and then changing the voltage by inserting resistors in parallel. The parallel connected resistors involved are R_{326} and VR_{303} for metal tapes, R_{327} and VR_{302} for CrO_2, and R_{328} and VR_{301} for Fe-Cr and STD.

Recording Equalizer Selector Circuit

The recording equalizer is switched to 4 separate positions (METAL, CrO_2, Fe-Cr, and STD). Transistors Q_{401}, Q_{403}, Q_{405} and Q_{407} are turned on and off according to the position of the TAPE switch S_{1301}, thereby switching the LC resonance circuit in the recording equalizer, amplifier.

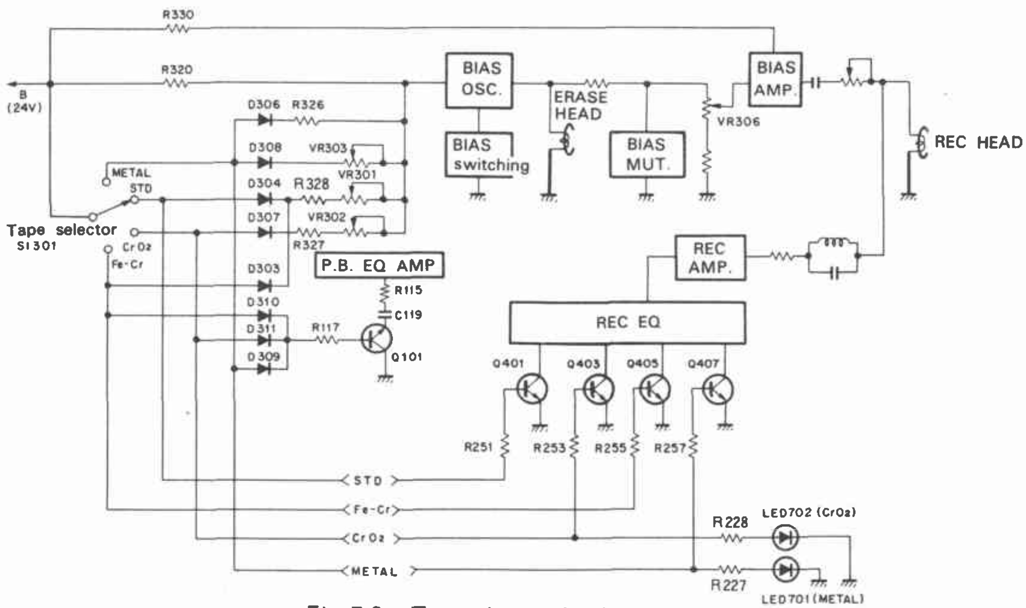


Fig. 7-2 Tape selector circuit

7.3 LEVEL METER

The level meter circuit is shown in Fig. 7-3. It consists basically of 3 ICs (IC_{801}, IC_{802} and IC_{803}) and 1 microcomputer. Levels are displayed in digital form using a fluorescent indicator tube.

1. The signal obtained from the output terminals of the headphone amplifier is converted into a IC voltage by means of a logarithmic compression amplifier. This DC voltage becomes the reference input for the comparator.
2. The comparative input to the comparator is a DC voltage obtained by passing the indication condition of the level meter through a digital/analog converter.
3. Accordingly, the comparator continually compares the reference voltage with the indication condition of the level meter, and sends signals to the microcomputer so as to maintain the comparative input (level meter indication condition) equal to the reference input.

   The level meter is primarily a peak reading meter, however it is possible to use it either as a VU or PEAK HOLD meter by pressing switch S_{801-1} (VU) or S_{801-2} (PEAK HOLD).

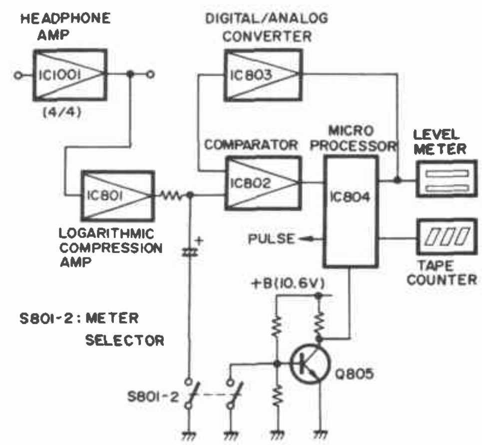


Fig. 7-3 Level meter circuit

7.4 ELECTRONIC COUNTER

The electronic counter consists of a microcomputer (IC_{804}) and a counter type fluorescent indicator tube (Fig. 7-7). Sensing pulses emitted from the mechanical assembly undergo wave shaping at Q_{801} to Q_{803} and then enter the microcomputer (IC_{804}). The input pulses are added and subtracted in the memory of the computer, and the resultant numerical value is displayed at the counter indicator tube.

7.5 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 employed, 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 integrating 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 contraction 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 level", below which no contraction and expansion is performed.

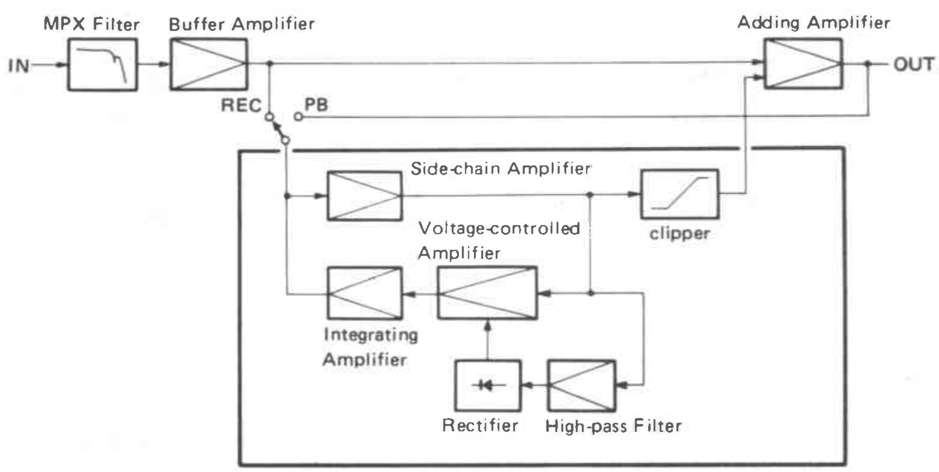


Fig. 7-4 Dolby NR processor circuit

7.6 CONTROL CIRCUIT

PLAY Operation

1. When a cassette shell is loaded, the cassette shell detection switch will go into the SHELL position and the slack elimination circuit (Described later) will commence functioning.
2. When the PLAY switch S_{903} is pressed on, the voltage at Pin 17 of IC_{501} will become a High level (Hereafter abbreviated to H level). Current from $+B_1$ will flow from the capstan motor CM to Q_{522}. As a result, Q_{522} will become conductive, and CM will start to rotate, At the same time, current from +B1 will flow through Q_{321}, the reel motor RM, R_{553} and Q_{517}, and hence RM will also start or rotate.
3. The voltage at Pin 15 of IC_{501} will also become an H level. Current from $+B_1$ will flow through the pinch solenoid SL_{1101}, Q_{512} and Q_{511}, hence SL_{1101} will operate and the unit will go into the PLAY mode.

REC Operation

1. When a cassette shell having erasure prevention tabs is loaded (The erasure prevention switch S_{1103} will go into the NO HOLE position), the PLAY switch S_{903} and the REC switch S_{904} will go on simultaneously. The operation of the pinch solenoid S_{1101} and the capstan motor CM is the same as for "PLAY operation".
2. The voltage on Pin 16 of IC_{501} becomes H level. As base current flows from R_{309}, R_{310} to Q_{303}, Q_{303} becomes conductive, the bias oscillator circuit operates and the unit goes into the REC mode.

   When a cassette shell which does not have erasure prevention tabs is loaded (S_{1103} goes into the HOLE position), Pin 5 of IC_{501} will become Low level (Hereafter called L level), regardless of the position of S_{904}, and hence the unit will go into the REC mode.

FF, REW Operation

1. When the FF switch S_{902} is turned on, Pin 22 of IC_{501} will become H level. Current from $+B_1$ will flow through Q_{521}, the reel motor RM and Q_{516}, and thus RM will start to rotate.
2. Current from $+B_1$ will flow through the brake solenoid SL_{1102}, R_{545} and Q_{513}, hence SL_{1102} will operate and the brake will be removed.
3. The REW operation is basically the same as the FF operation except that the polarity of the voltage supplied to RM is reversed.

PAUSE Operation

1. As previously explained, when the unit is in either the PLAY or REC modes, current from $+B_1$ flows into the pinch solenoid SL_{1101}, the capstan motor CM, the reel motor RM and the bias oscillator circuit.
2. If now the PAUSE switch is pushed on, Pin 15 of IC_{501} will become L level. As a result, SL_{1101} will not operate and RM will not rotate (Refer to section entitled "PLAY operation"). Hence the PLAY or REC condition will be temporarily removed.

TIMER START Operation

■ PLAY Operation

1. Press the TIMER START PLAY switch S_{801-5} on, and then put the POWER switch on using the timer etc. While C_{812} is charging up, Pin 4 of IC_{501} will become L level, and thus the unit will operate in the same way as if the PLAY switch S_{403} were put on.
2. When the power supply voltage reaches its final value (after about 4 seconds), Pin 14 of IC_{501} will become H level, and the unit will go into the PLAY mode.

■ REC/PLAY Operation

1. Press the TIMER START PLAY switch S_{801-4} on, and then put the POWER switch on using the timer etc. While C_{811} and C_{812} are charging up, Pins 4 and 5 of IC_{501} will become L level, and thus the unit will operate in the same way as if the PLAY switch S_{903} and the REC switch S_{904} were put on simultaneously.
2. In the same way as for PLAY operation, Pin 14 of IC_{501} becomes H level, whereupon the unit commences REC/PLAY operation.

MEMORY STOP Operation

Press the MEMORY STOP switch on, and then press the REW switch on. When the tape counter indication reaches "999", the REW operation will stop.

1. Press the MEMORY STOP switch S_{801-1} on, and press the REW switch S_{901} on. When the tape counter indication reaches "999", a pulse will be sent from the microcomputer (IC_{804}).

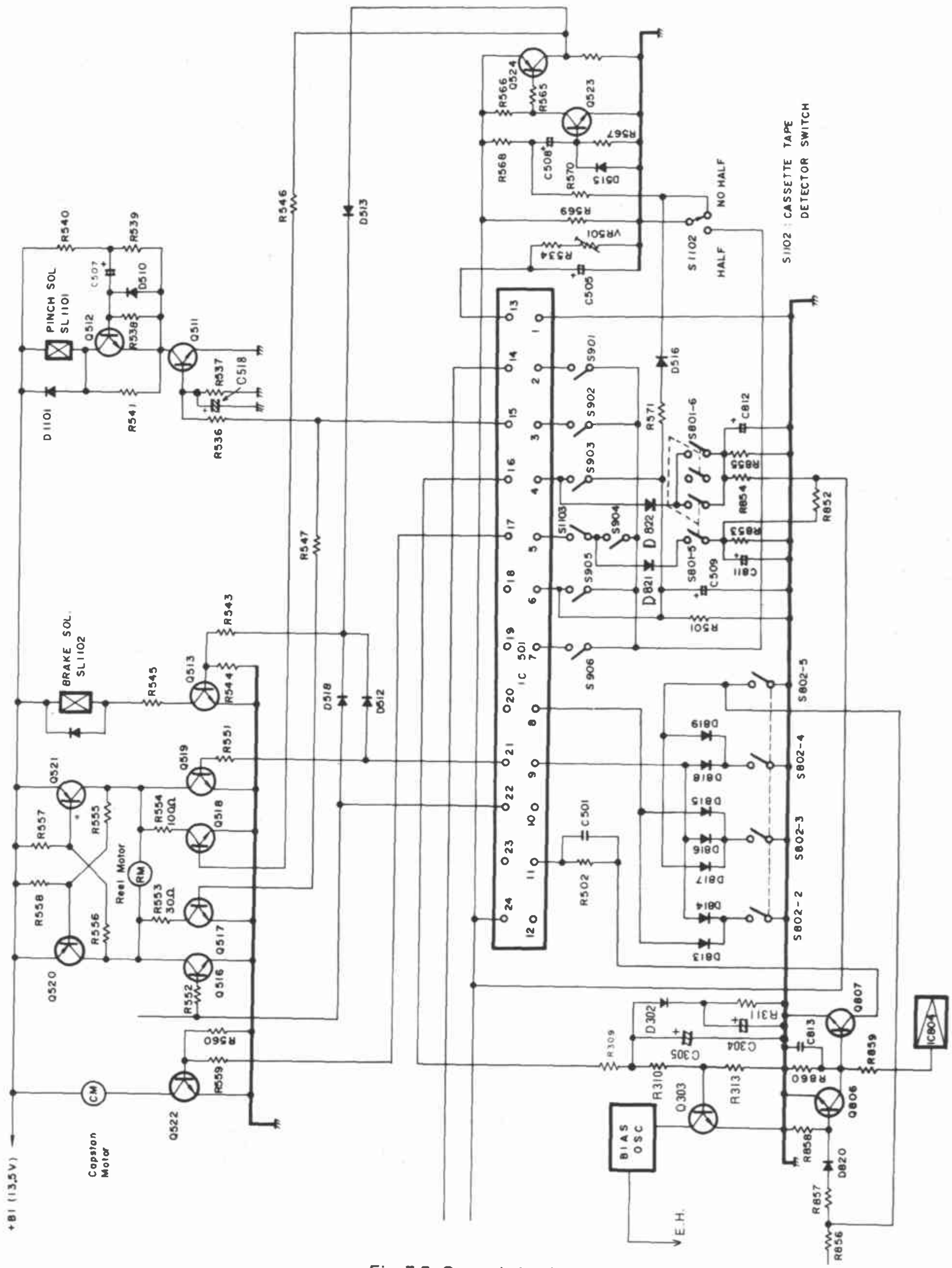


Fig. 7-5 Control circuit

Current will flow from R_{859} to Q_{807}, thus Q_{807} will be turned on, and as a result of the integral pulse, Pin 11 of IC_{501} will momentarily become L level.

2. When Pin 11 of IC_{501} becomes L level as a result of the program within the IC, the output will go into the STOP mode, and thus the unit will cease operation.

EMORY PLAY Operation

. Press the MEMORY PLAY switch on, and then put the REW switch on.

. When the tape counter indication reaches "999", a pulse will be sent from the microcomputer (IC_{804}). Current will flow from R_{859} to Q_{807}, thus turning on Q_{807}, and as a result of the integral pulse, Pin 11 of IC_{501} will momentarily become L level.

. When Pins 9 and 10 of IC_{501} are to L level by means of the program in the IC, the unit will momentarily go into the STOP mode and then commence PLAY.

ounter Repeat

Press the REPEAT (counter) switch on. When ıe tape stops during PLAY or REC/PLAY (auto op), the unit will automatically go into the REW .ode, and when the tape counter indication ·aches "999", it will revert to PLAY.

. Press the REPEAT (COUNTER) switch S_{802-3} on, and set Pins 8 and 9 of IC_{501} to the L level.

When the tape stops during PLAY or REC/PLAY, Pin 12 of IC_{501} will momentarily go to the L level. When Pins 8 and 9 of IC_{501} are set to the L level by means of the program in the IC, and Pin 12 goes to the L level, the unit will automatically go into the REW mode.

. When the counter indication becomes "999", a pulse will be emitted from the microcomputer (IC_{804}). Current will flow from R_{859} to Q_{807}, resulting in Q_{807} being turned on, while Pin 11 of IC_{501} will momentarily go to the L level as a result of the integral pulse.

. If Pin 11 of IC_{501} goes to the L level during the REW operation of the unit, resulting from Pin 12 going to the L level, the unit will go into the PLAY mode as a result of the program contained IC_{501}.

5. Because of the program contained in IC_{501}, COUNTER REPEAT is not possible during FF or REW (Auto stop is possible).

End Repeat

Press the REPEAT (END) switch on. If the tape stops during PLYA or REC/PLAY (auto stop), the unit will automatically go into the REW mode, and when the tape has completely rewound, the unit will once again go into the PLAY mode.

1. Press the REPEAT (END) switch S_{802-2} on, and set Pins 8 and 9 of IC_{501} to the L level.
2. For details of the REW operation, refer to paragraph 2 "COUNTER REPEAT".
3. When the tape completely rewinds, Pin 12 of IC_{501} will once again momentarily go to the L level.

Pinch Solenoid Switching Circuit

This circuit is designed to protect the pinch solenoid from overheating. It operates after the PLAY switch has been pressed on, by applying a high voltage (approximately 13V) to the pinch solenoid for a period of about 0.5 seconds, in order to increase its attractive force, and then reducing the voltage to about 6V after the solenoid has operated (Fig. 7-6).

1. When the PLAY switch S_{903} is pressed on, Q_{511} becomes conductive, the pinch solenoid SL_{1101} operates and the unit goes into the PLAY mode (Refer to section entitled "PLAY mode").

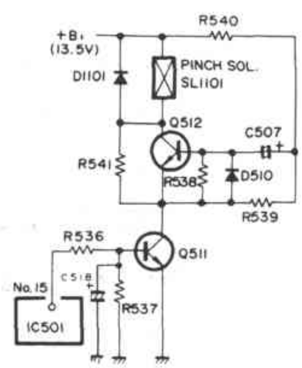


Fig. 7-6 Pinch solenoid switching circuit

2. Current will flow from +B through R_{540}, C_{507} and Q_{512}. A voltage approximately equal to the +B voltage (approximately 13V) will be applied to the pinch solenoid SL_{1101} until Q_{512} becomes fully conductive.
3. When C_{507} becomes fully charged (after an interval of about 0.5 seconds), Q_{512} will be reduced by R_{541} to the minimum value (approximately 6V) necessary to hold the plunger in position.
4. If Pin 12 of IC_{501} goes once again to the L level during the REW operation of the unit, resulting from Pin 12 going to the L level, the unit will go into the PLAY mode as a result of the program contained in IC_{501}.
5. Because of the program contained in IC_{501}, END REPEAT is not possible during FF or REW (Auto stop is possible).

Auto Stop Circuit

This circuit is used to automatically release the mechanism in the event that the tape stops during PLAY, REC, FF or REW. It employs a photo-interrupter type switch linked to the take-up reel by means of a belt, in order to detect the running of the tape (Fig. 7-7).

1. When the tape is running, pulse signals emitted from the photo-interrupter (TLP and hence Q_{801}, Q_{802}, Q_{803}, Q_{504} and Q_{503} switch on and off continuously. At the s time, C_{503} will charge and discharge repeate While Q_{503} is turning on and off, the poten of point A will be relatively low, and thus Q will turn off.
2. When the tape stops running, pulse signals f the photo interrupter lamp will disappear, thus Q_{503} will go off. When this happ C_{503} will charge up. The potential of poin will start to rise, and Q_{502} and Q_{501} will turned on. Consequently, Pin 12 of IC_{501} become L level, and the unit will go into STOP mode.
3. When either the POWER switch is turned and off, or the PAUSE button is pressed, H level will be applied to the base of Q_{503} f D_{503} and D_{504} and thus the potential at poin will not rise. Consequently, the unit will go into the STOP mode.

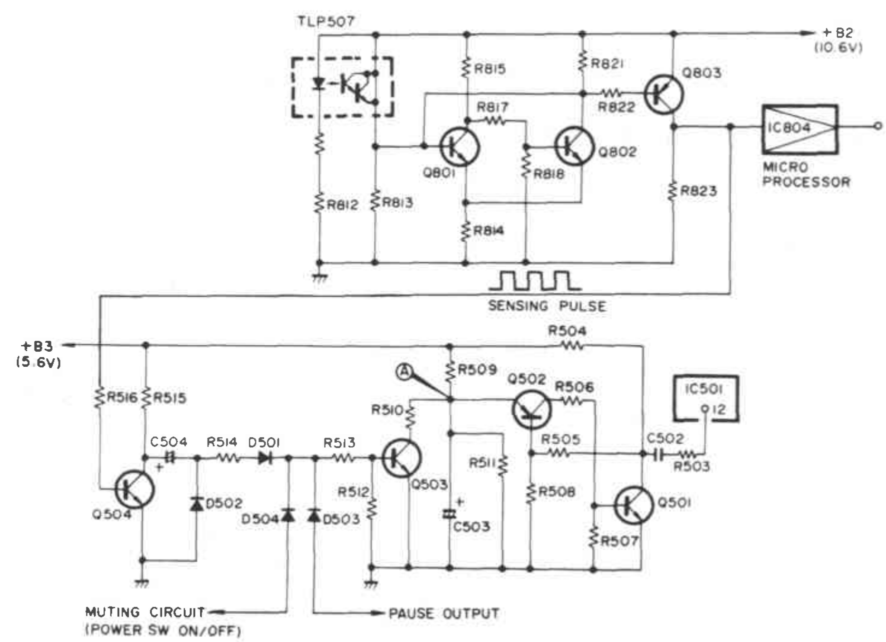


Fig. 7-7 Auto stop circuit

Tape Slack Elimination Circuit

The CT-F950 employs a closed loop capstan to provide constant speed drive for the tape. If slackness appears in the tape during PLAY, it will be impossible to obtain the necessary loop tension, and thus the normal tape head contact will be lost. The tape slack elimination circuit is designed to take up any slack when a cassette tape is loaded, by causing the supply reel to rotate in the REW direction (Fig. 7-8).

1. When a cassette shell is loaded, the cassette tape switch S_{1102} will go into the SHELL position. As a result, current will flow from $+B_3$ through R_{568}, C_{508} and Q_{523}, and thus Q_{523} will be turned on.
2. When Q_{524} becomes conductive, current will flow from $+B_3$ through Q_{524}, D_{513} R_{543} and Q_{513}, and thus Q_{513} will become conductive. Accordingly, current will flow from $+B_1$ through the brake solenoid SL_{1101}, R_{545} and Q_{513}, and thus SL_{1101} will operate (Brake will be removed).
3. At the same time, current from $+B_3$ will flow through Q_{524}, R_{546} and Q_{518}, and as a result Q_{518} will be turned on.
4. When Q_{518} is turned on, current from $+B_1$ will flow through Q_{520}, R_{555}, R_{554} and Q_{518} and hence Q_{520} will become conductive. When Q_{520} and Q_{528} become conductive, current will flow from $+B_1$ through Q_{520}, the reel motor RM, R_{554} and Q_{518}. As a result, RM will rotate in the reverse direction and take up the slack.
   The time required to take up any slack will be determined by the charging time of C_{508} (approximately 0.5 seconds), and the rotational torque of RM will be determined by the value of R_{554}.
5. Muting when the unit is switched from STOP to REC is basically the same as that described in Paragraphs 1 to 3. Pin 16 of IC_{501} will become H level, and hence current will flow through R_{522} to Q_{505}. When Q_{505} becomes conductive, Q_{506}, Q_{507} and Q_{101} will be turned off, and thus the muting condition will be removed from the recording amplifier.

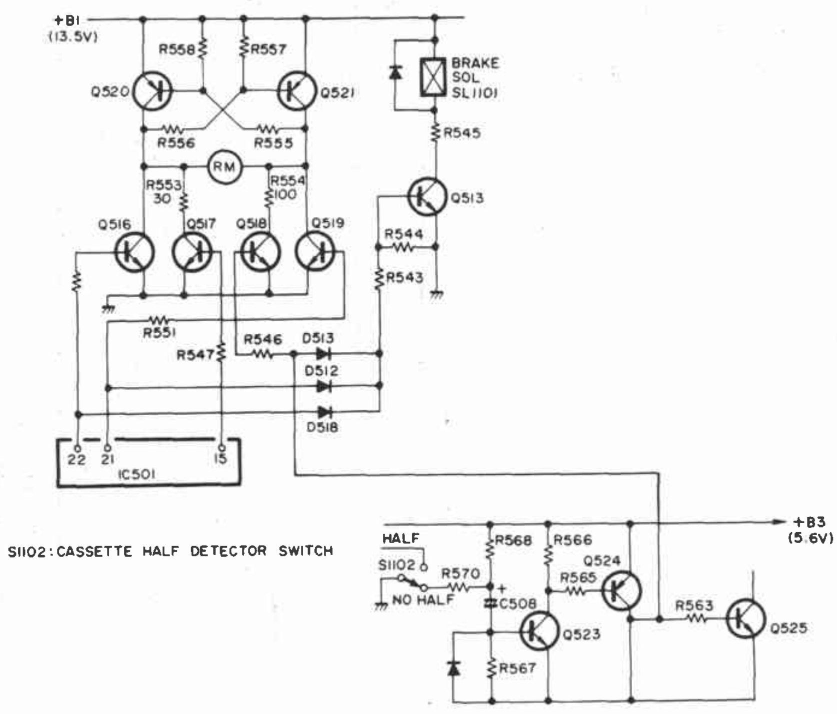
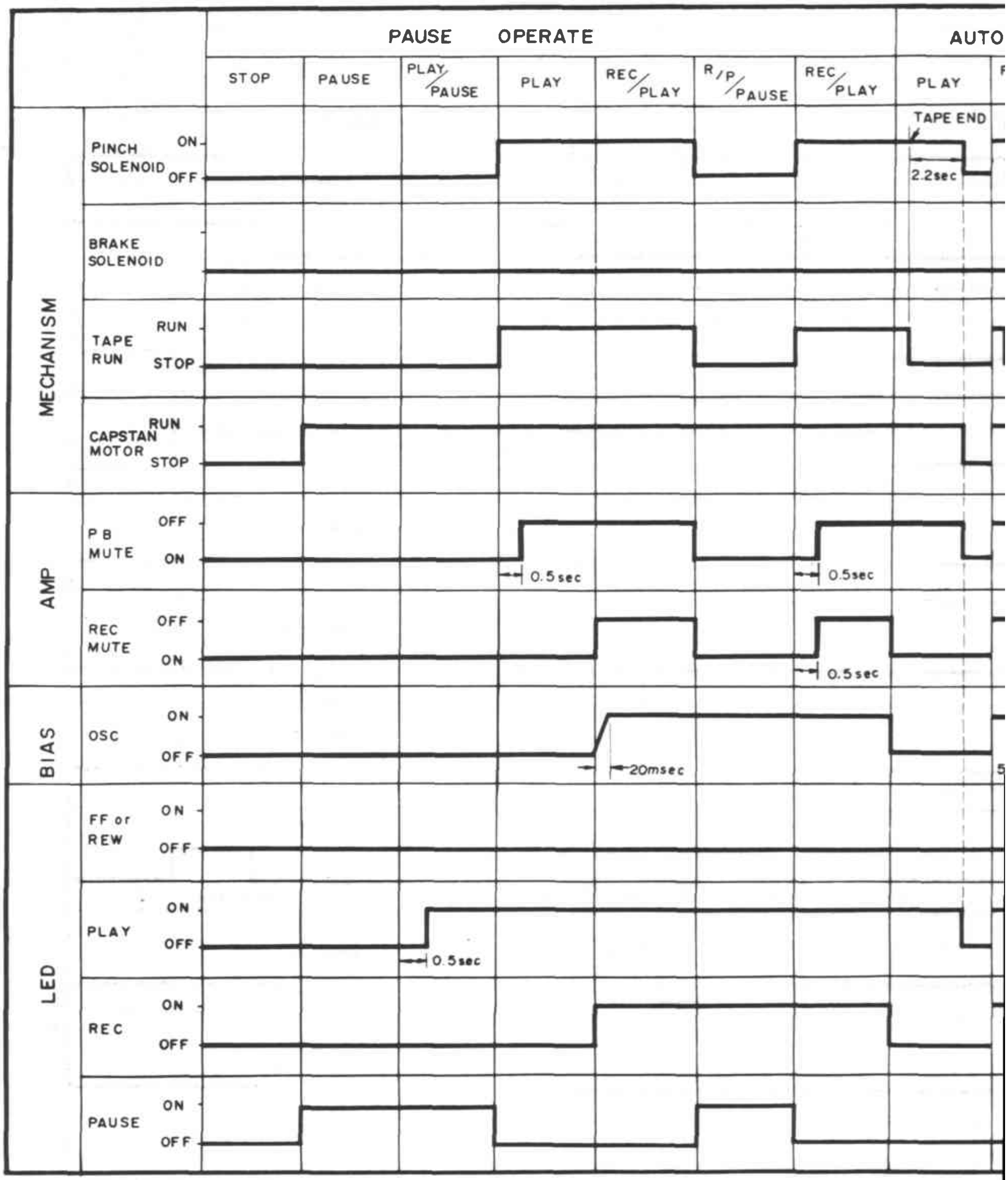
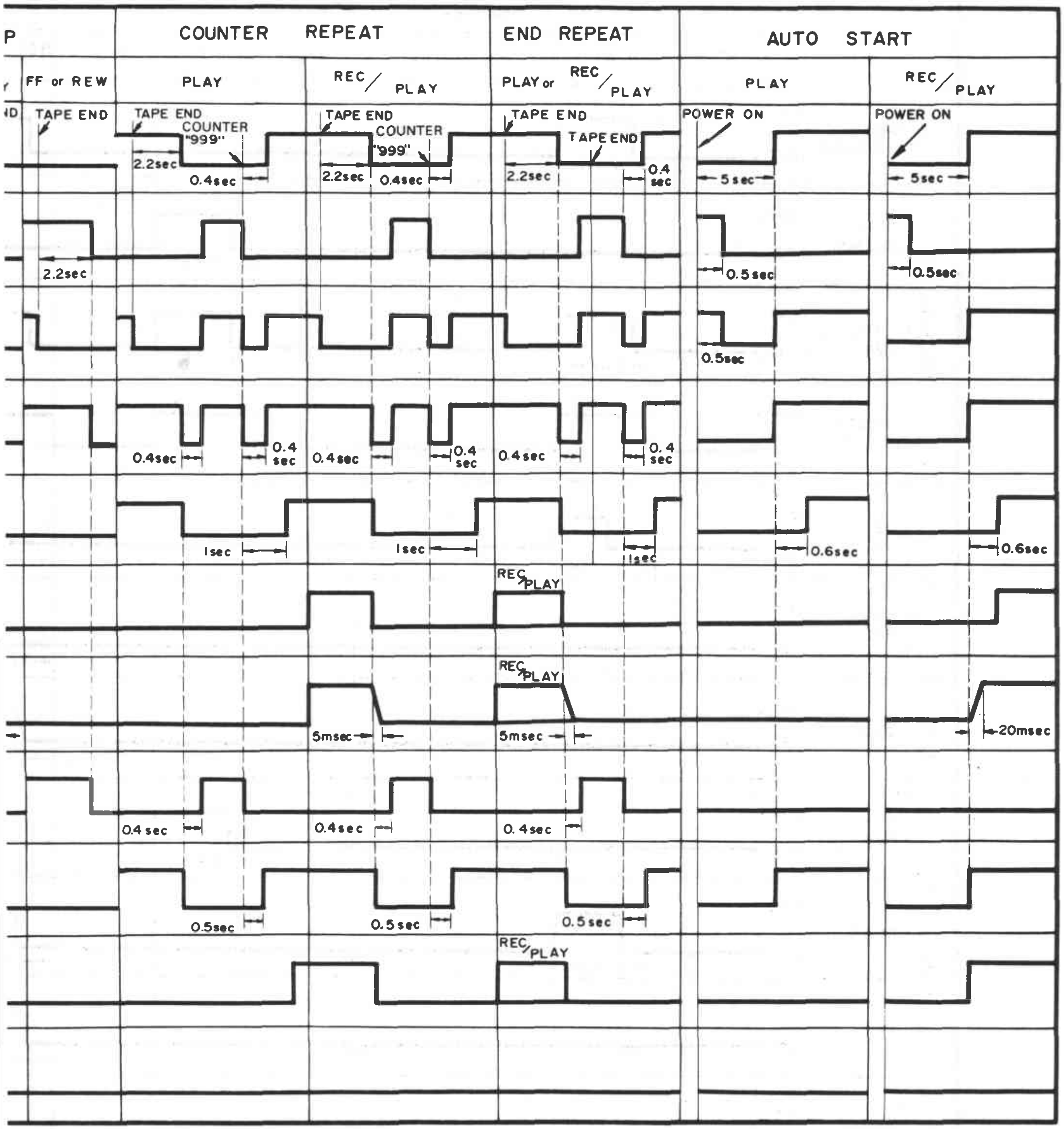
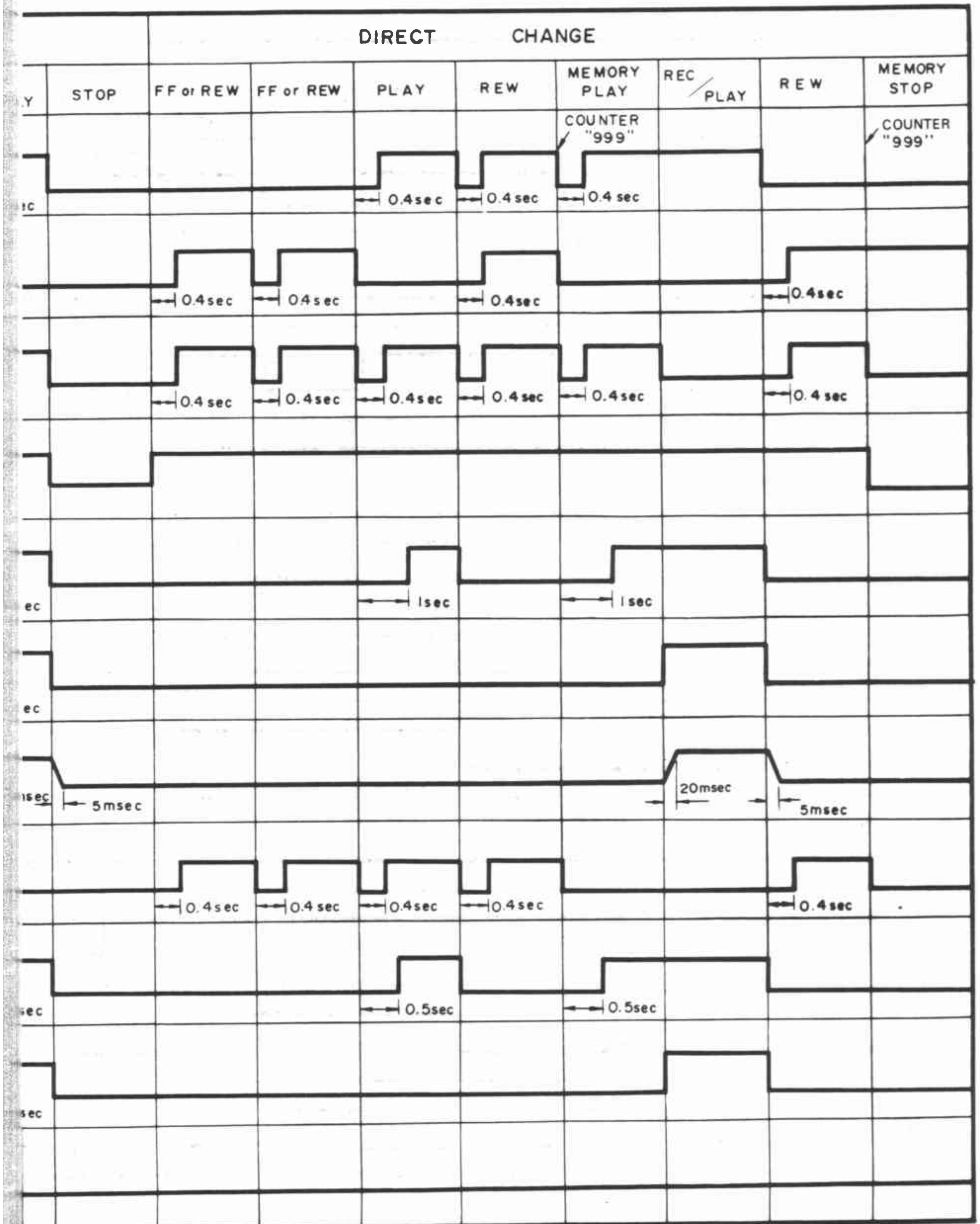


Fig. 7-8 Tape slack elimination circuit

Timing Chart 2

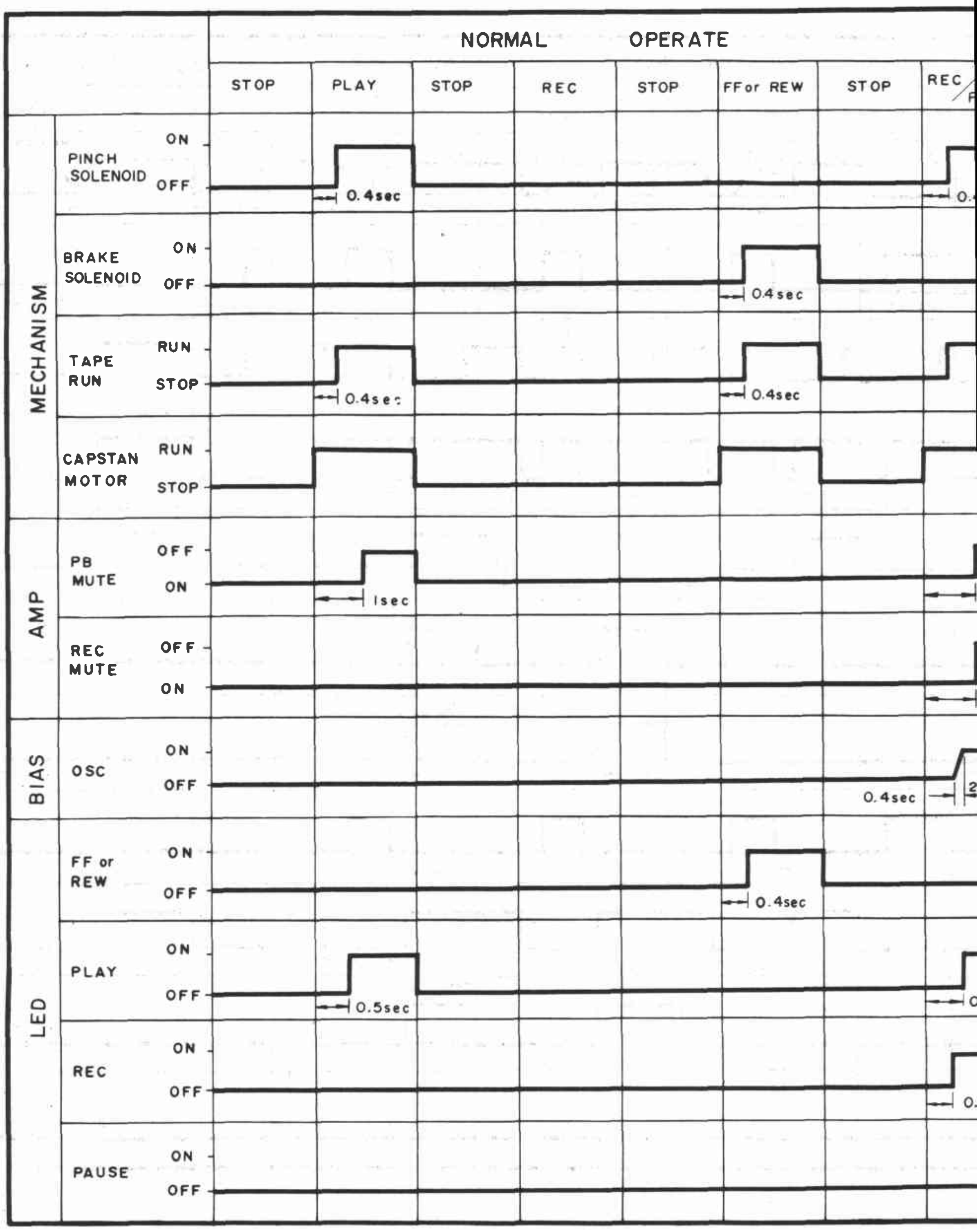



P
COUNTER REPEAT
END REPEAT
AUTO START
FF or REW
PLAY
REC/PLAY
PLAY or REC/PLAY
PLAY
REC/PLAY
TAPE END
TAPE END
COUNTER "999"
TAPE END
COUNTER "999"
TAPE END
TAPE END
POWER ON
POWER ON
2.2sec
0.4sec
2.2sec
0.4sec
2.2sec
0.4 sec
5sec
5sec
2.2sec
0.5sec
0.5sec
0.5sec
0.4sec
0.4 sec
0.4sec
0.4 sec
0.4sec
0.4 sec
1sec
1sec
1sec
0.6sec
0.6sec
REC/PLAY
REC/PLAY
5msec
5msec
20msec
0.4 sec
0.4sec
0.4 sec
0.5sec
0.5 sec
0.5 sec
REC/PLAY



DIRECT CHANGE
STOP
FF or REW
FF or REW
PLAY
REW
MEMORY PLAY
REC/PLAY
REW
MEMORY STOP
COUNTER "999"
COUNTER "999"
0.4sec
1sec
20msec
5msec
0.5sec

Timing Chart 1



7.7 MUTING CIRCUIT

Muting When the Power Switch is Pressed On and Off

This circuit is designed to eliminate noise (e.g. click noise) when the POWER switch is pressed on or off (Fig. 7-9).

■ **When Power Switch is Pressed On**

1. When the POWER switch is pressed on, the emitter voltage of Q_{601} will immediately rise to approximately 5.6V. Because current does not flow into C_{603}, the voltage across its terminals will be 0V. Consequently, in the Schmitt trigger comprising Q_{602} and Q_{603}, Q_{602} will be turned off and Q_{603} will be turned on. Also, Q_{504} will be turned off and Q_{505} will be turned on, and thus the 5.6V source will produce a current flow through D_{401} into Q_{107} and Q_{109}. As a result, Q_{107} and Q_{109} will become conductive, thus short circuiting the LINE OUTPUT.
2. Meanwhile, C_{607} and C_{615} rapidly charge up. When C_{608} charges up, the base potential of Q_{608} will become -6V, and hence Q_{608} will be turned off.
   Consequently, the voltage across the terminals of ZD_{603} will become approximately 6V. Thi voltage will cause current to flow through R_{61} and charge up C_{603}. When the voltage acros C_{603} reaches the reversing level of the mutin circuit (Approximately 4 seconds after th POWER switch has been pressed on), Q_{602} wil turn on and Q_{603} will turn off. Because Q_{604} will be turned on, and Q_{605}, Q_{107} and Q_{109} will be turned off, the LINE OUTPUT mutin condition will be removed.

■ **When the Power Switch is Pressed Off**

1. When the power switch is pressed off, th charges stored on C_{607} and C_{615} will rapidl decay. Consequently, the charge on C_{603} wil flow through D_{603} and R_{603} into the base o Q_{614}. When Q_{608} becomes conductive, th charge on C_{603} will rapidly decay.
2. Consequently, Q_{602} will now be turned on, an Q_{604} turned off. Q_{604} will be turned off, an Q_{605}, Q_{107} and Q_{109} turned on, hence th LINE OUTPUT will be muted. After th POWER switch has been pressed off, the powe supply for the unit will be charged on C_{602}.

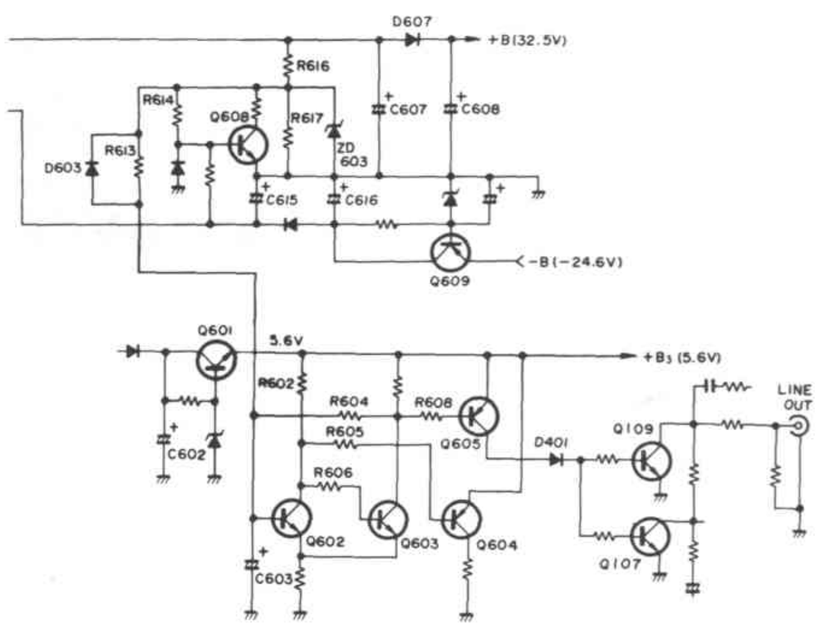


Fig. 7-9 Muting circuit 1

Muting during FF, REW and STOP

This circuit is designed to eliminate noise (e.g. motor noise), during FF, REW or STOP (Fig. 7-10).

1. During FF, REW or STOP, Pin 20 of IC_{501} will become H level, and hence base current will flow into Q_{508}.
2. When Q_{518} becomes conductive, Q_{509} and Q_{510} will also become conductive. Current from +B3 will flow through Q_{510}, Q_{402}, S_{101-3}. R_{175}, R_{177}, Q_{107} and Q_{109}. Accordingly, Q_{407} and Q_{409} will become conductive, and the LINE OUTPUT will be muted.
3. At the same time, current will flow from +B3 through Q_{510}, D_{517}, R_{243} and Q_{201}. Q_{201} will thus become conductive and mute the recording amplifier.
4. When the MONITOR switch S_{401-3} is in the SOURCE position, the LINE OUTPUT will not muted.

Muting During Changeover from Stop to Play (or REC)

This circuit is designed to prevent switching noise when the PLAY or REC switches are operated (Fig. 7-10).

1. When the unit is in the STOP condition, Q_{107}, Q_{109} and Q_{201} will be conductive, and hence the LINE OUTPUT and the recording amplifier will be muted. Also, C_{506} will be charged (Refer to previous section entitled "Muting when unit is in STOP condition").
2. When the PLAY switch is pressed on, Pin 20 of IC_{501} will become L level, and hence current will not flow through Q_{508}.
3. When Q_{508} becomes non-conductive, the charge on C_{506} will decay via R_{529}. During the interval that C_{506} is discharging (approximately 1 second), Q_{509}, Q_{510}, Q_{107} and Q_{109} will become conductive. After about 1 second, the unit will go into the PLAY condition, and thus switching noise will be muted.
4. When the unit is in the PLAY condition, current will flow from +B3 through R_{523}, R_{524} and Q_{506}, and thus Q_{506} and Q_{507} will go on. Consequently, current from +B3 will flow through Q_{507}, D_{508}, R_{243} and Q_{201}, and hence the recording amplifier will remain muted.

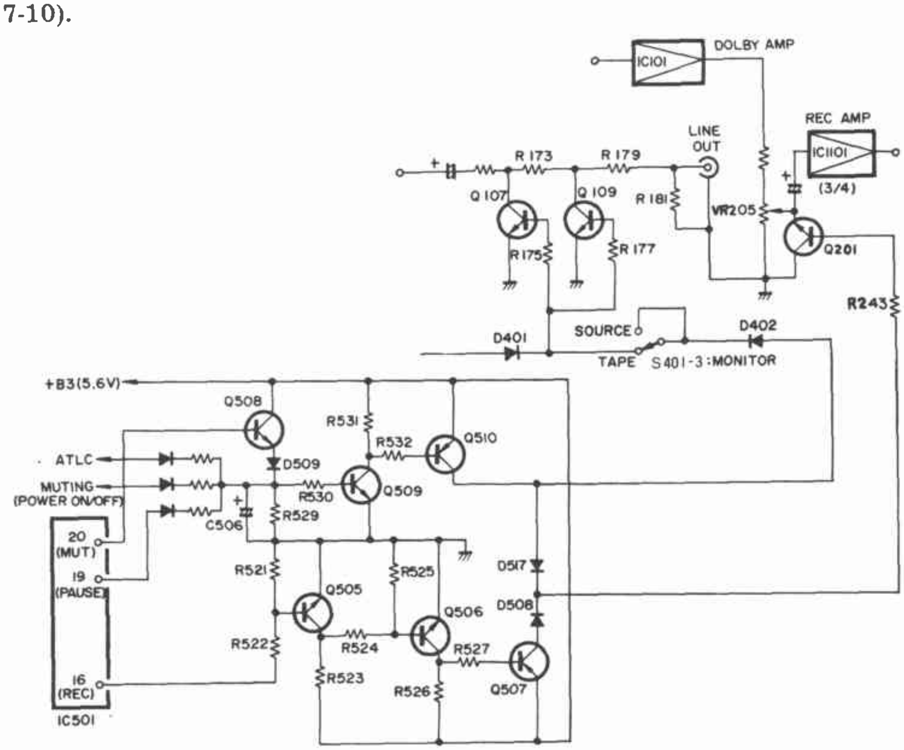


Fig. 7-10 Muting circuit 2

5. Muting when the unit is switched from STOP to REC is basically the same as that described in Paragraphs 1 to 3. Pin 16 of IC_{501} will become H level, and hence current will flow through R_{522} to Q_{505}. When Q_{505} becomes conductive, Q_{506}, Q_{507} and Q_{201} will be turned off, and thus the muting condition will be removed from the recording amplifier.

Bias Muting Circuit

During recording, the bias signal is sometimes recorded due to the increase in the relative speed of the tape and head during the on/off switching of the PAUSE or release of the recording controls. The recorded bias signal can be heard as a "click" noise when the tape is played back at its fixed speed; the purpose of this circuit is to suppress this noise.

1. During REC/PLAY operation (when the REC and PLAY switches are turned on simultaneously), the No. 16 pin on IC_{501} reaches H level, and because the Q_{303} receives bias and comes on, the oscillator circuit operates.
2. When the PAUSE switch is turned on, the No. 19 pin of IC_{501} reaches H level, and the bias comes on through the D_{507} — R_{520} — R_{530} route to send bias current to Q_{509}.
3. With Q_{509} on, Q_{510} is also turned on, and +B takes the D_{517} — R_{301} route to turn on Q_{301}.
4. With Q_{301} turned on, C_{303} and R_{303} follow a fixed time constant and turn on Q_{302} by reducing the emmiter voltage.
5. When Q_{302} comes on, the bias current flows through the condenser and is grounded. Bias current is supplied to neither the base of Q_{306}, Q_{307} nor to the record head.
6. When the PAUSE switch is set to OFF, the PAUSE operation is halted and recording resumes. However, even if the No. 19 pin on IC_{501} reaches L level, since the discharge time for C_{303} (determined by the C_{303} and R_{308} time constants) only turns on Q_{302}, there is no bias supplied to the record head.

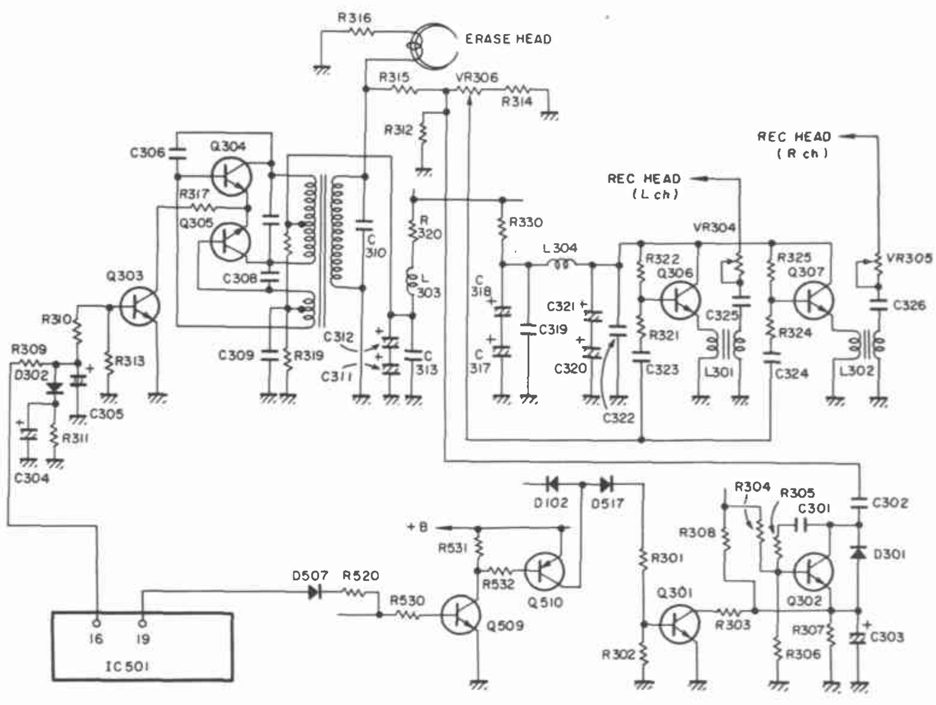


Fig. 7-11 Bias muting circuit

8. MECHANICAL ADJUSTMENTS

8.1 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. 8-1).
3. The force necessary to separate the pinch roller from the capstan shall be between 360 and 440g at 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.

8.2 TAPE SPEED ADJUSTMENT

1. Connect a frequency counter to the OUTPUT terminals.
2. Replay the 3kHz part of the test tape STD-301. Adjust the semi-fixed resistor in the motor until the frequency at the start of the tape falls within the range 2,995Hz to 3,010Hz (Fig. 8-2).
3. When the semi-fixed resistor is turned in the clockwise direction, the tape speed will increase, and vice-versa.

8.3 TAPE GUIDE ADJUSTMENT

Adjustment Standard

Put the unit into the PLAY mode, and check that the tape is running normally without curling around the head guides (Fig. 8-3).

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.

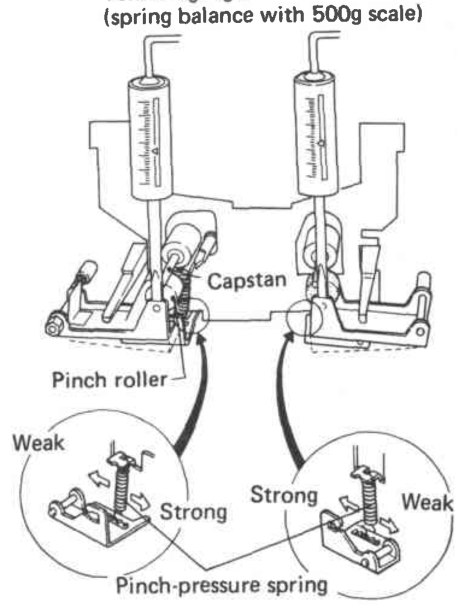


Fig. 8-1 Pinch roller pressure adjustment

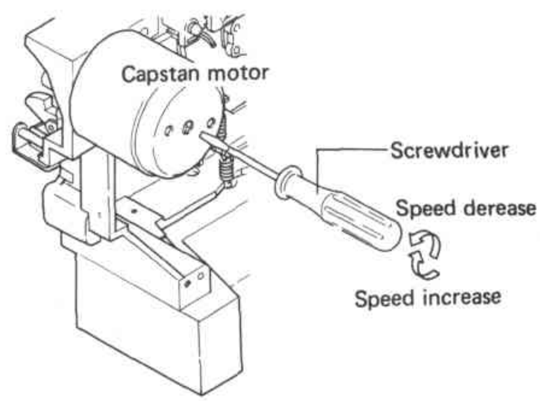


Fig. 8-2 Tape speed adjustment

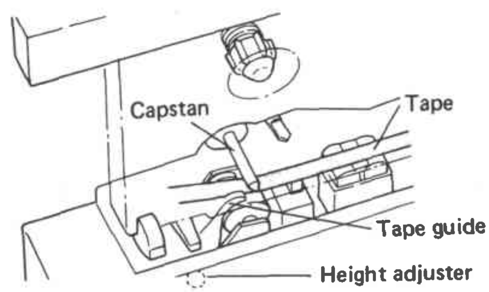


Fig. 8-3 Tape guide adjustment

9. 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 (47kΩ 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	:	CrO_2 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 azimuth adjustment
2. Playback equalizer adjustment
3. Playback level adjustment
4. Level meter 0dB adjustment
5. Approximate adjustment of recording current
6. Erasure current adjustment
7. Bias trap adjustment
8. Approximate adjustment of recording bias
9. Recording equalizer and variable equalizer adjustments
10. Recording and playback frequency response adjustment
11. Recording level adjustment
12. Recording dolby NR adjustment
13. Playback dolby NR adjustment
14. Output level adjustment

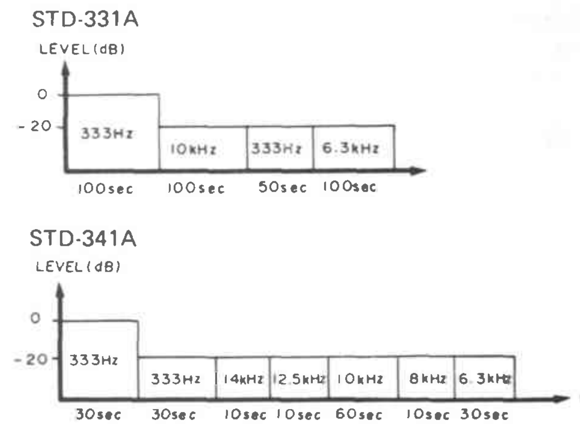


Fig. 9-1 Recorded contents of test tape

9.1 HEAD AZIMUTH ADJUSTMENT

1. Connect the millivoltmeter to the OUTPUT terminals.
2. Turn the OUTPUT level control to the maximum position, and put the TAPE switch to STD.
3. Replay the -20dB part of the 10kHz test tone on the STD-341A test tape. Turn the head azimuth adjustment screw until the output from both L and R channels becomes a maximum (Fig. 9-2).
4. After adjustment, apply lock paint to the adjustment screw.

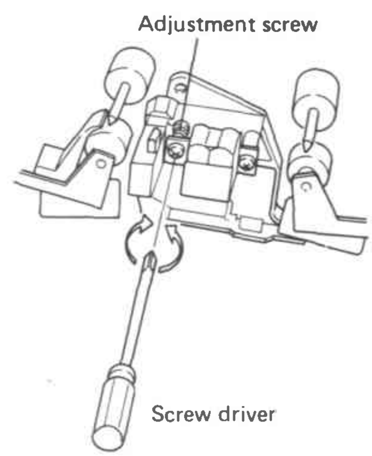


Fig. 9-2 Head azimuth adjustment

9.2 PLAYBACK EQUALIZER ADJUSTMENT

1. Connect an millivoltmeter to the OUTPUT terminals.
2. Set the TAPE switch to STD, turn VR_{103} and VR_{104} up to maximum positions, and VR_{107} and VR_{108} to central positions.
3. Play the 333Hz, –20dB portion of the STD-341A test tape, and adjust the OUTPUT volume control to obtain a –20dBv (0.1V) reading in the millivoltmeter.
4. Next play the 10kHz, –20dB portion of the same test tape, and adjust VR_{101} (left channel) and VR_{102} (right channel) to obtain a +1dB level difference from the 333Hz output reading.
5. Then, play back the 14kHz, –20dB (signal) and confirm with the mV meter indication that the output difference is over +0.5dB when compared with the previously played 333Hz signal. When less than 0.5dB, adjust in accordance with the flow chart on page 37.
6. Change the TAPE switch to the METAL position (or CrO_2 or Fe-Cr positions), and check that the frequency response referenced at 333Hz is within –4.0 ± 1dB at 10kHz.

9.3 PLAYBACK LEVEL ADJUSTMENT

The playback level must be carefully adjusted owing to the fact that it will determine the Dolby NR level.

1. Connect the millivoltmeter to TP terminals No. 26 (left) and No. 25 (right) on the mother ass'y (The OUTPUT potentiometer may be set at any position).
2. Replay the 0dB part of the 333Hz test tone on the STD-341A test tape. Adjust VR_{103} :L-ch. and VR_{104} :R-ch. until the respective indications on the millivoltmeter become 1dBv (1.12V).

9.4 LEVEL METER 0dB ADJUSTMENT

1. Connect millivoltmeters to the TP terminals No.30 (left) and No.29 (right) on the mother ass'y.
2. Set the MONITOR switch to the SOURCE position.
3. Apply a 333Hz, –10dBv (316mV) signal to the INPUT terminals, and adjust the INPUT level controls so that the millivoltmeters read –3dBv (700mV).
4. Then immediately adjust VR_{801} (left) and VR_{802} (right) in the indicator amplifier ass'y so that the level meters read 0dB at this time. First turn VR_{801} and VR_{802} full around counterclockwise, then turn back clockwise and stop when the 0dB segment lights up.
5. Also check that the following readings are obtained in the level meters when the input signal level is changed.

Input Signal	Level Meter Reading
333Hz, –5dBv (560mV)	+5 ± 2dB
333Hz, –26dBv (50mV)	–16 ± 2dB

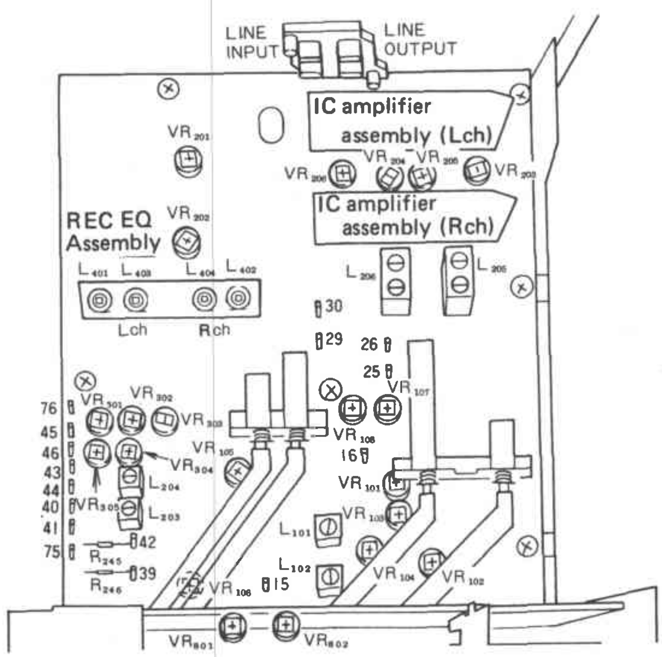


Fig. 9-3 Adjustment points

9.5 APPROXIMATE ADJUSTMENT OF RECORDING CURRENT

1. Connect millivoltmeters to the TP terminals No.30 (left) and No.29 (right) in the mother ass'y.
2. Short circuit the base of Q_{303} (mother ass'y) to ground (circuit board pattern ground).
3. Set the MONITOR switch to SOURCE, and turn the DOLBY NR switch off. Then apply a 333Hz, −10dBv (316mV) signal to the INPUT terminals.
4. Start the CT-F950 in recording mode.
5. Adjust the INPUT level control to obtain readings of −3dBv (700mV) in the millivoltmeters.
6. Next connect one millivoltmeter across TP terminal No.40 (left) and ground (mother ass'y), and the other across TP terminal No.43 (right) and ground.
7. Set the TAPE switch to the STD position, and adjust VR_{205} (left) and VR_{206} (right) to obtain readings of 1.55mV.
8. Also check that the following readings are obtained in the millivoltmeters when the TAPE switch is changed to the other positions.

TAPE Switch Position	AC Millivoltmeter Reading
METAL	2.14mV
CrO_2	1.84mV
Fe-Cr	1.45mV

9.6 ERASURE CURRENT ADJUSTMENT

1. Set the TAPE switch to the METAL position, and turn the INPUT volume control down to minimum level. Then connect an millivoltmeter across the mother ass'y TP terminals Nos.45 and 76.
2. Proceed in recording mode without any input signal (but with an unrecorded tape being used).
3. Adjust VR_{303} so as to obtain a millivoltmeter reading of 160mV.

9.7 BIAS TRAP ADJUSTMENT

1. Connect millivoltmeters across the mother ass'y TP terminal No.42 (left) and ground, and TP terminal No.39 (right) and ground.
2. Set the TAPE switch to the METAL position, and turn the INPUT level control up to maximum level. Proceed in recording mode (with unrecorded tape) but without any input signal.
3. Adjust L_{203} (left) and L_{204} (right) to obtain minimum readings in the millivoltmeters.
4. Then change the MONITOR switch to the SOURCE position, and connect the millivoltmeters across the mother ass'y TP terminal No.16 (left) and ground, and TP terminal No.15 (right) and ground. Adjust L_{101} (left) and L_{102} (right) to again reduce the millivoltmeter readings to minimum level.

Note:
This adjustment must be performed as carefully as possible since the result will influence the frequency response during recording and playback modes when the DOLBY NR switch is on.

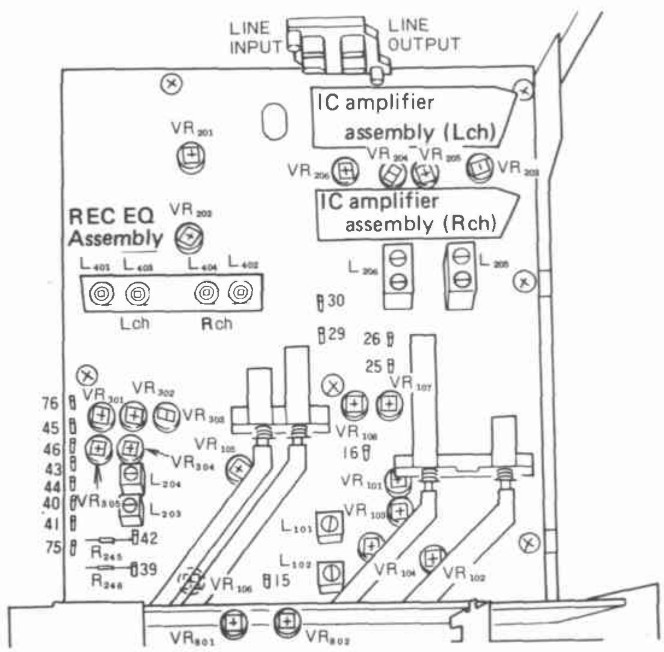


Fig. 9-4 Adjustment points

9.8 APPROXIMATE ADJUSTMENT OF RECORDING BIAS

1. Set the BIAS control to the center click-stop position, and the TAPE switch to the METAL position. Then proceed with the CT-F950 in recording mode.
2. Connect an millivoltmeter across the mother ass'y TP terminal No.40 (left) and ground, and another meter across TP terminal No.43 (right) and ground.
3. Adjust VR_{305} (left) and VR_{304} (right) so that the meters read 12mV.
4. Next change the TAPE switch to STD, and adjust VR_{301} to obtain meter readings of 6mV. Change the switch again to the CrO_2 position, and adjust VR_{302} to obtain meter readings of 9.5mV.
5. Then set the MONITOR switch to the SOURCE position, and apply a 333Hz, −10dBv (316mV) signal to the INPUT terminals.
6. Connect the millivoltmeters to the OUTPUT terminals, and adjust the INPUT level controls so that the meters read − 10dBv (316mV).
7. After completing the above adjustments, set the MONITOR switch to the TAPE position, and record and play back the 333Hz, − 10dBv (316mV) signal onto/from the STD-601 test tape. Then after first turning VR_{305} (left) and VR_{304} (right) counterclockwise, turn them back clockwise and stop at the maximum position.

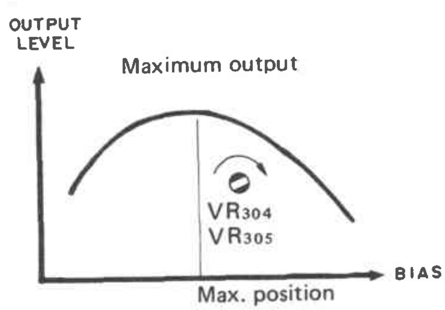


Fig. 9-5 Output level

9.9 RECORDING EQUALIZER AND VARIABLE EQUALIZER ADJUSTMENTS

1. Connect millivoltmeters to the mother ass'y TP terminals No.30 (left) and No.29 (right).
2. Short circuit the base of Q_{303} (mother ass'y) to ground (circuit board pattern).
3. Set the MONITOR switch to SOURCE, and apply a 333Hz, −10dBv (316mV) signal to the INPUT terminals. Then proceed in recording mode.
4. Adjust the INPUT level controls to obtain meter readings of −3dBv (700mV).
5. Next connect an millivoltmeter to TP terminal No.5 in the IC amplifier ass'y, and adjust VR_{203} and VR_{204} to obtain the same output levels for the 333Hz and 10kHz input signals. (Variable equalizer adjustment).
6. Then set the TAPE switch to the STD position, and connect millivoltmeters across the mother ass'y TP terminal No.40 (left) and ground, and TP terminal No.43 (right) and ground. Switch the input to 15kHz and obtain the same AC millivoltmeter readings by employing an attenuator in the input stage. Adjust L_{401} (left) and L_{402} (right) so that the amount of attenuation required is 13.0dB. (STD recording equalizer adjustment).
7. Change the TAPE switch setting to METAL, and adjust in the same way as described above in step 6. In this case, adjust L_{403} and L_{404} so that the attenuation required will be 16.0dB. (METAL recording equalizer adjustment).
8. Finally set the TAPE switch to the CrO_2 and Fe-Cr positions, the required amount of attenuation being 19.6 ± 1.5dB and 12.6 ± 1.5 dB respectively.

9.10 RECORDING AND PLAYBACK FREQUENCY RESPONSE ADJUSTMENT

1. Connect millivoltmeters to the OUTPUT terminals.
2. Set the TAPE switch to STD, and the MONITOR switch to SOURCE, and apply a 333Hz, −30dBv (31.6mV) signal to the INPUT terminals. Adjust the INPUT level controls so as to obtain meter readings of −27dB (44.6mV).
3. Set the Monitor switch to TAPE, record 333Hz, − 30dBv (31.6mV) and 10kHz, − 30dBv signals onto the STD-601 test tape. Play these sections back again, and adjust VR_{304} (left) and VR_{305} (right) so that the output difference between these two signals is about 0dB at 10kHz.
4. Then, confirm that the record/playback frequency response of test tape STE-601 is within the fixed standard range (page 40).
5. Set the tape selector switch to METAL, and use the STD-604 test tape as in the previous instructions. Record the 333Hz and 10kHz signals and play them back. Then, confirm that the playback output deviation of the 10kHz signal is within +1 ± 1dB of the 333Hz signal.

5. When a certain type of tape does not meet with the standards specified in section 4, confirm that the adjustments are within the standards of recording and playback frequency response adjustment with the Dolby NR switch on, and then adjust VR205 (Lch) and VR206 so that the value in section 3 is within the range of -2.5 ± 0.5dB (800 — 710mV).

9.12 OUTPUT LEVEL ADJUSTMENT

1. Connect millivoltmeters to the mother ass'y TP terminals No.26 (L-ch) and No.25 (R-ch), and turn VR_{103} and VR_{104} down to minimum positions.
2. Apply the 333Hz signal to the mother ass'y TP terminals No.16 (left) and No.15 (right), and adjust the INPUT level controls so that the millivoltmeters read -3dBv (700mV).
3. Set the OUTPUT level controls to the center click-stop positions, and connect millivoltmeters to the OUTPUT terminals. Adjust VR_{107} (left) and VR_{108} (right) so as to obtain meter readings of -7dBv (446mV).

9.13 RECORDING DOLBY NR ADJUSTMENT

1. Connect up the millivoltmeter to TP terminals No.29 (left) and No.30 (right) on the mother ass'y.
2. Apply a -10dBv (316mV) 1kHz signal to the INPUT terminals.
3. Put the DOLBY NR switch off, and then adjust the INPUT potentiometer so that the indication on the millivoltmeter becomes 0dBv (1V).
4. Next, set the level of the input signal of Paragraph 2 above, to -50dBv (3.16mV).
5. Put the DOLBY NR switch on. Adjust VR_{201} (left) and VR_{202} (right) so that the millivoltmeter indication becomes -34dBv (19.9mV).

9.14 PLAYBACK DOLBY NR ADJUSTMENT

1. Connect the millivoltmeter to terminals No.25 (left) and No.26 (right) on the mother ass'y.
2. Put VR_{103} and VR_{104} in the minimum settings.
3. Apply a 1kHz signal to TP terminals No.15 (left) and No. 16 (right) on the mother ass'y. Adjust the input level so that the millivoltmeter indication becomes 0dBv (1V).
4. Next, apply an input which is 34dB below that of paragraph 3 above.
5. Put the DOLBY NR switch on. Adjust VR_{106} : L-ch and VR_{105} : R-ch. so that the indication on the millivoltmeter becomes −40dBv (1mV).

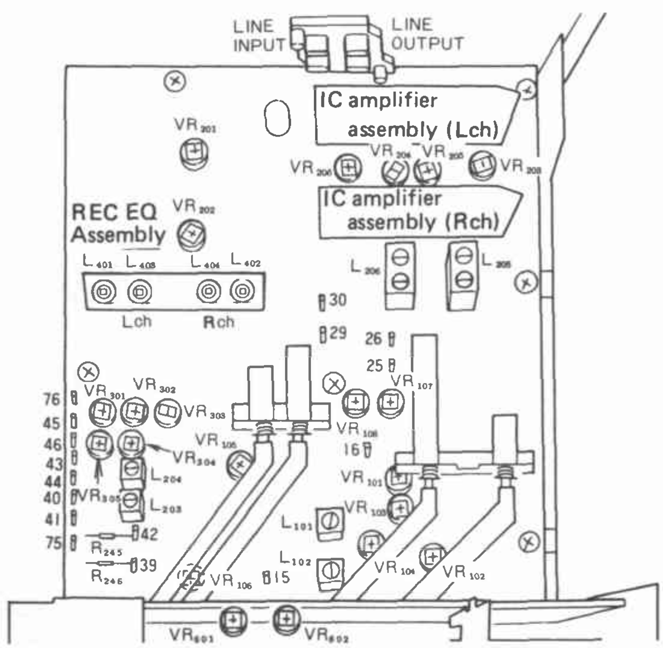


Fig. 9-7 Adjustment points

6. If outside the specified standards, refer to "9-6, ERASURE CURRENT ADJUSTMENT" and adjust VR303 so that the value is within the range of 160 ± 20mV.
7. Then, confirm that the record/playback frequency response for metal tape is within the fixed standard range.
8. Set the tape selector switch to CrO_2 and using test tape STD-603 as in the previous instructions, record and play back the 333Hz and 10kHz signals. Then confirm that the playback output deviation of the 10kHz signal is within 0 ± 1dB of the 333Hz signal. If outside the specified standards, adjust VR302.
9. Then, confirm that the record/playback frequency response for test tape STD-603 is within the fixed standard range (page 40).
10. Set the tape selector switch to Fe-Cr; record and play back the 333Hz and 10kHz signals on a SONY DUAD C-60 and confirm that they are within the fixed standard range (page 40).
11. Set the Dolby switch to ON, and confirm that the record and playback frequency response for all types of tapes is within the fixed standard range (page 40).

* when making adjustments, also refer to the flow chart on page 37.

9.11 RECORDING LEVEL ADJUSTMENT

NOTE:
Since this adjustment sets the recording level, it must be performed accurately.

1. Set the MONITOR switch to SOURCE, and apply a 333Hz, −10dBv (316mV) signal to the INPUT terminals.
2. Turn the DOLBY NR switch off, and connect millivoltmeters to the mother ass'y TP terminals No.30 (left) and No.29 (right). Adjust the INPUT level control so that the meters read −3dBv (710mV).
3. Then set the TAPE switch to the STD position, and turn the DOLBY NR switch on, and also change the MONITOR switch to the TAPE position. Record the 333Hz −10dBv (316mV) signal onto the STD-601 test tape, and adjust VR_{205} (left) and VR_{206} (right) so as to obtain millivoltmeter readings of −2.5dBv (750mV). during playback.
4. Set the TAPE switch to CrO_2, and then to METAL, and record the 333Hz, −10dBv (316mV) signal onto the STD-603 test tape and the STD-604 test tape respectively as described above under step 3. During playback with both tapes, check that millivoltmeter readings are within −3dBv (710mV) ± 1.5dB in the both cases.

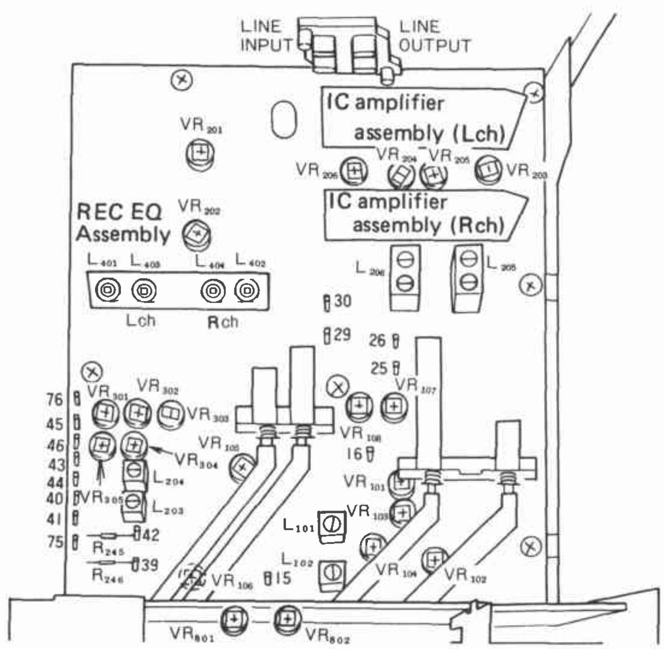
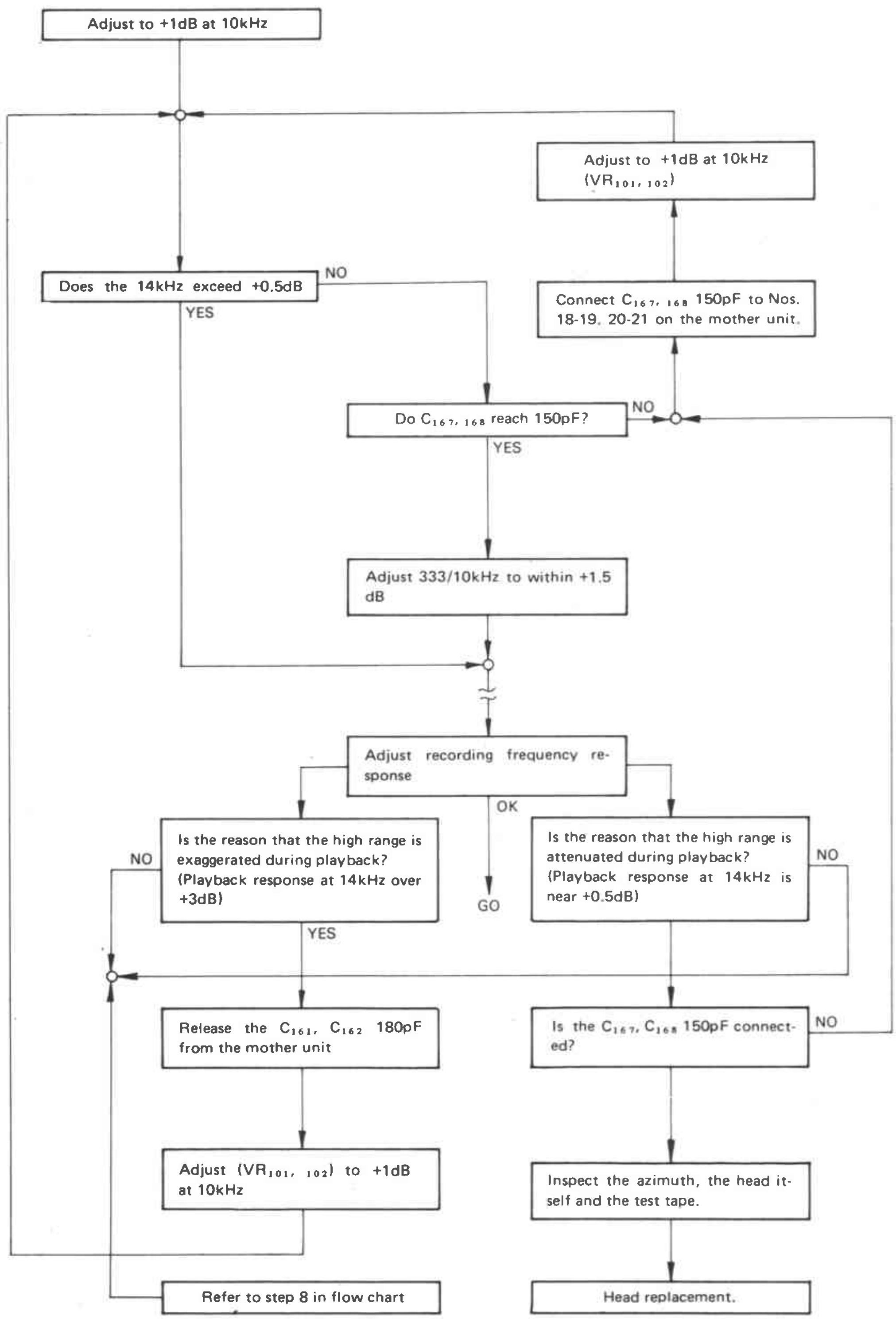
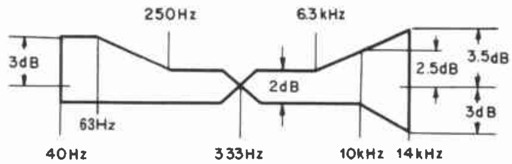


Fig. 9-6 Adjustment points

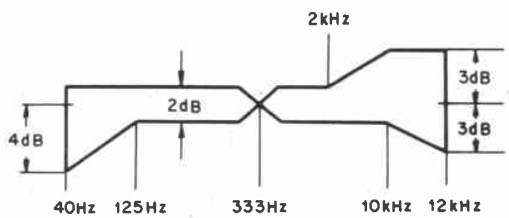
Playback adjustment flow chart



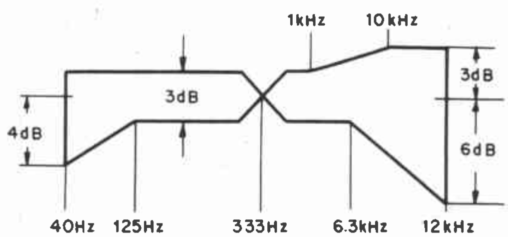


* Using STD-331A and the STD position, with DOLBY NR OFF.

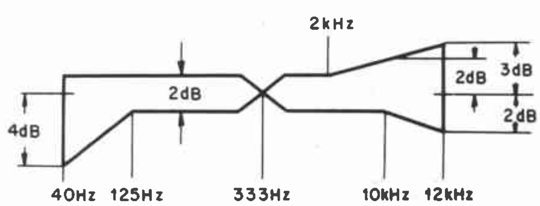
Note:
The frequency characteristics for the R channel shall be obtained by subtracting 1dB from the value indicated on the meter at 40Hz and 63Hz respectively.



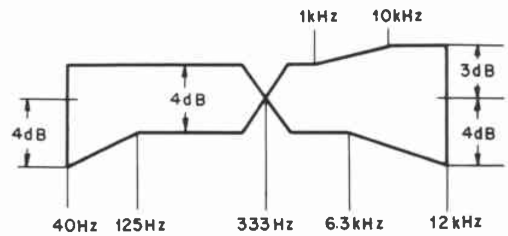
* Using STD-601 and the STD position, with DOLBY NR OFF.



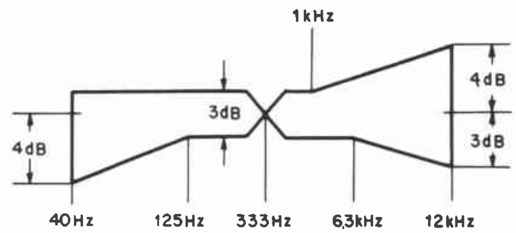
* Using STD-601 and the STD position, with DOLBY NR ON.



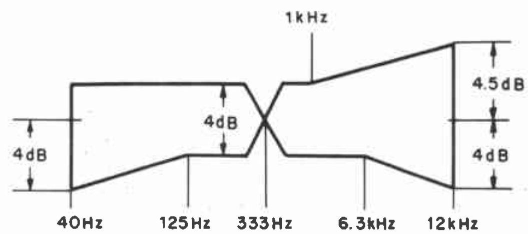
* Using STD-603 and the CrO_2 position, with DOLBY NR ON.



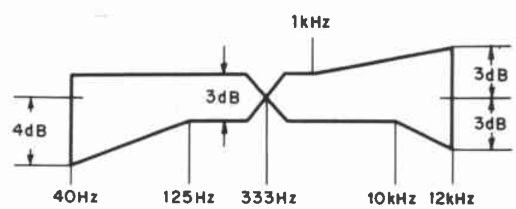
* Using STD-603 and the CrO_2 position, with DOLBY NR OFF.



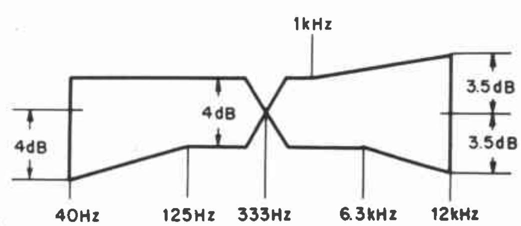
* Using SONY DUAD C-60 and the Fe-Cr position, with DOLBY NR OFF.



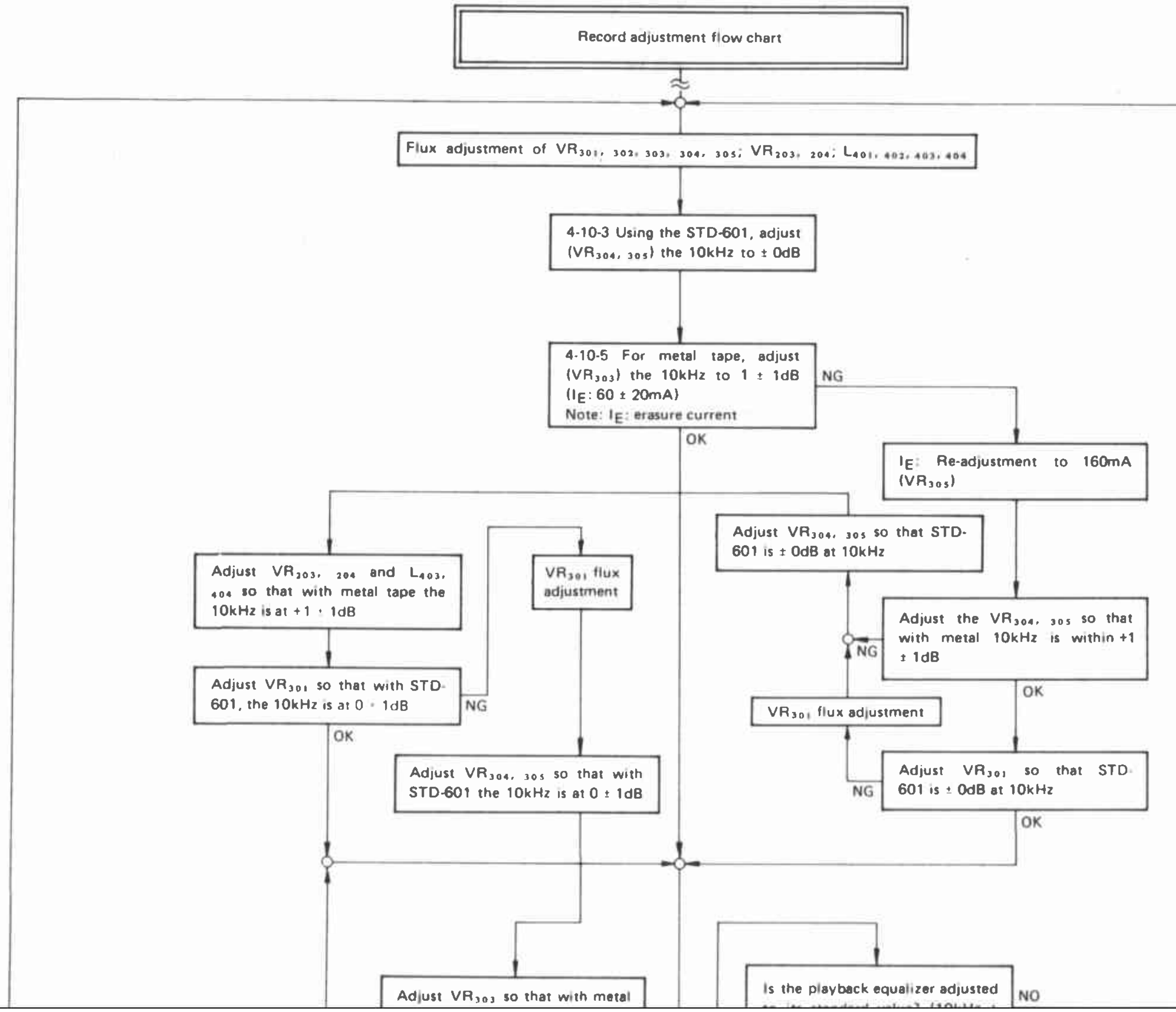
* Using SONY DUAD C-60 and the Fe-Cr position, with DOLBY NR ON.



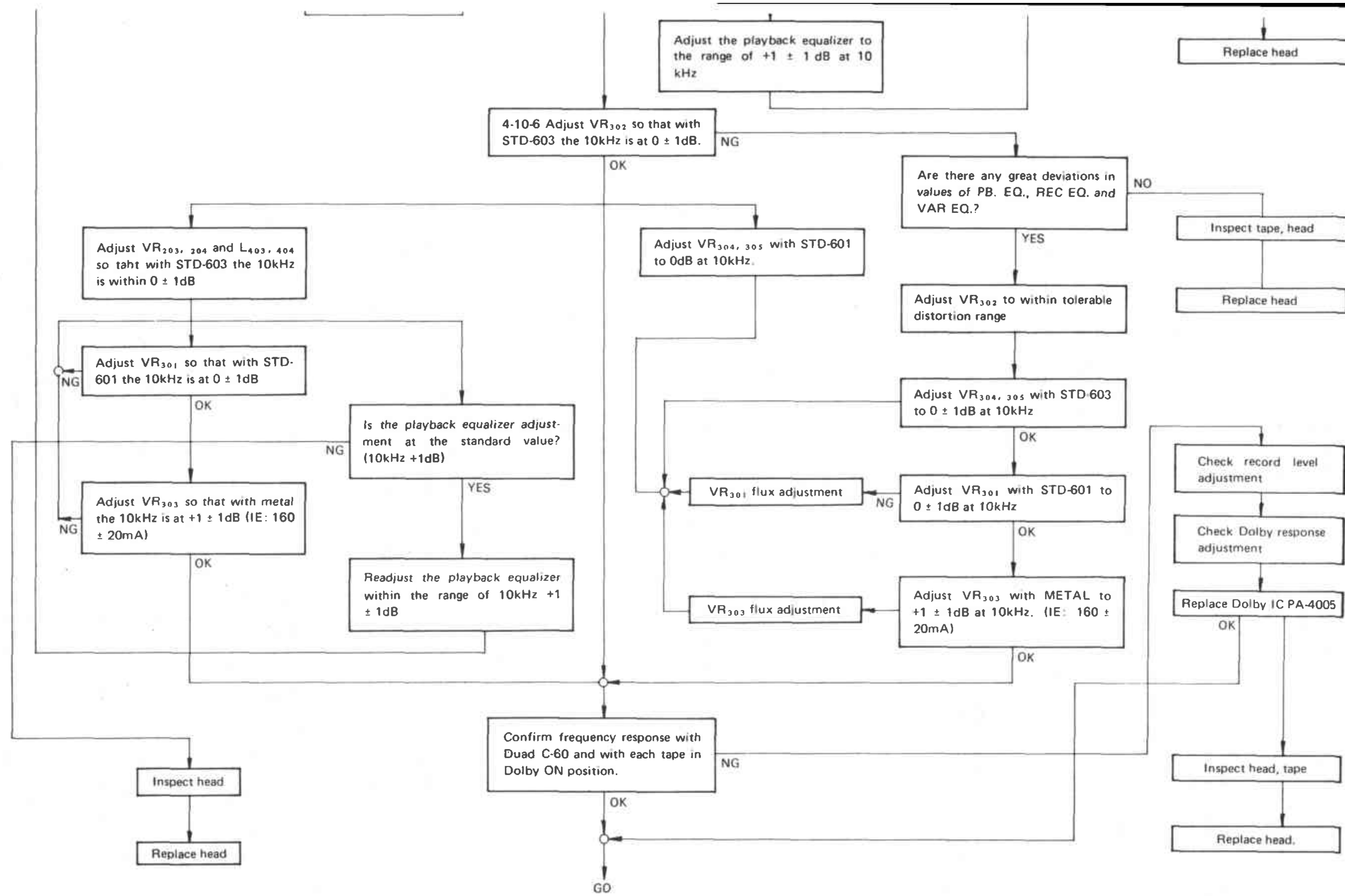
* Using STD-604 and the METAL position, with DOLBY NR OFF.



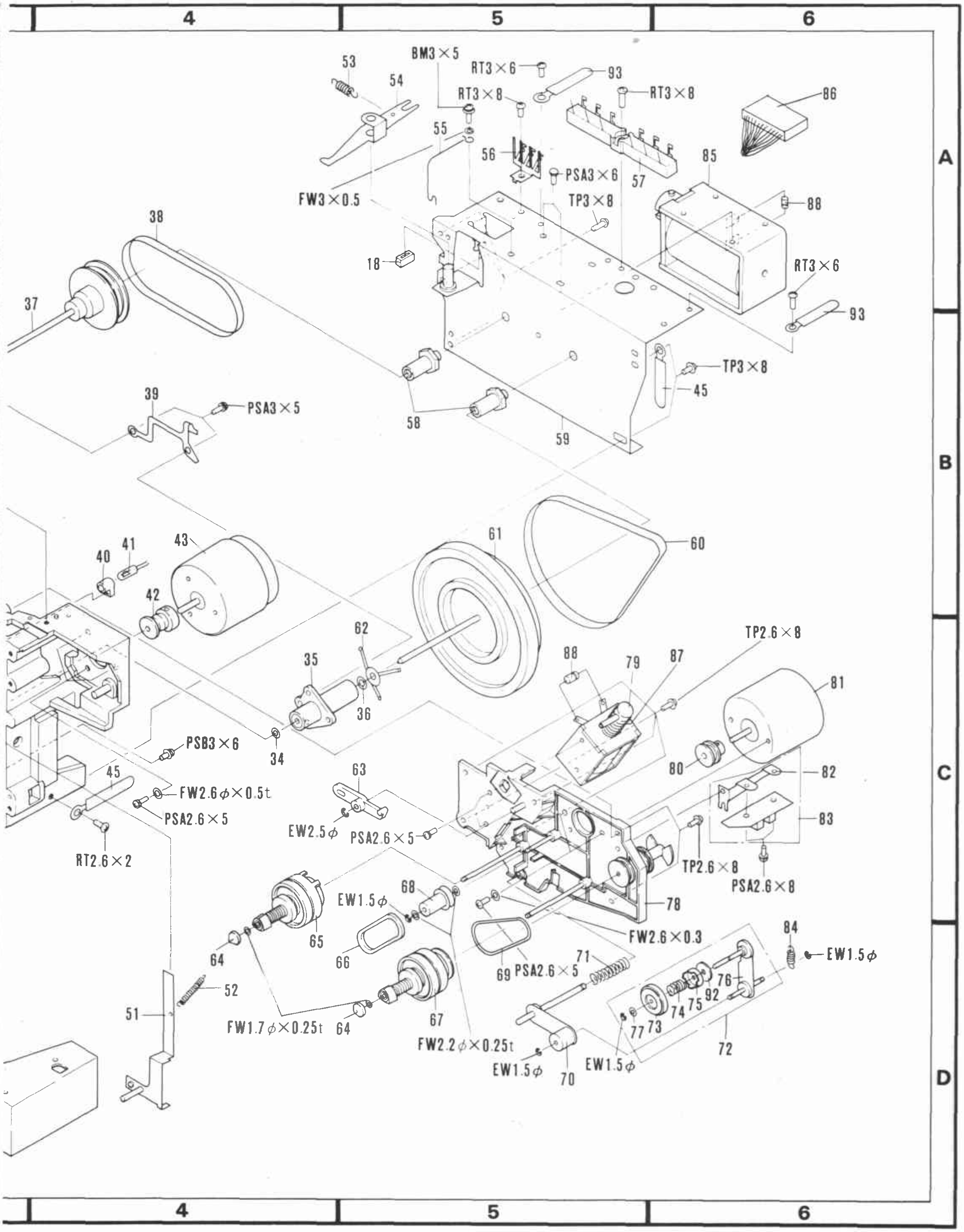
* Using STD-604 and the METAL position, with DOLBY NR ON.



Record adjustment flow chart
Flux adjustment of VR301, 302, 303, 304, 305; VR203, 204; L401, 402, 403, 404
4-10-3 Using the STD-601, adjust (VR304, 305) the 10kHz to ± 0dB
4-10-5 For metal tape, adjust (VR303) the 10kHz to 1 ± 1dB (IE: 60 ± 20mA) Note: IE: erasure current
NG
OK
IE: Re-adjustment to 160mA (VR305)
Adjust VR304, 305 so that STD-601 is ± 0dB at 10kHz
Adjust the VR304, 305 so that with metal 10kHz is within +1 ± 1dB
NG
OK
VR301 flux adjustment
Adjust VR301 so that STD-601 is ± 0dB at 10kHz
NG
OK
Adjust VR203, 204 and L403, 404 so that with metal tape the 10kHz is at +1 ± 1dB
VR301 flux adjustment
Adjust VR301 so that with STD-601, the 10kHz is at 0 ± 1dB
NG
OK
Adjust VR304, 305 so that with STD-601 the 10kHz is at 0 ± 1dB
Adjust VR303 so that with metal
Is the playback equalizer adjusted
NO

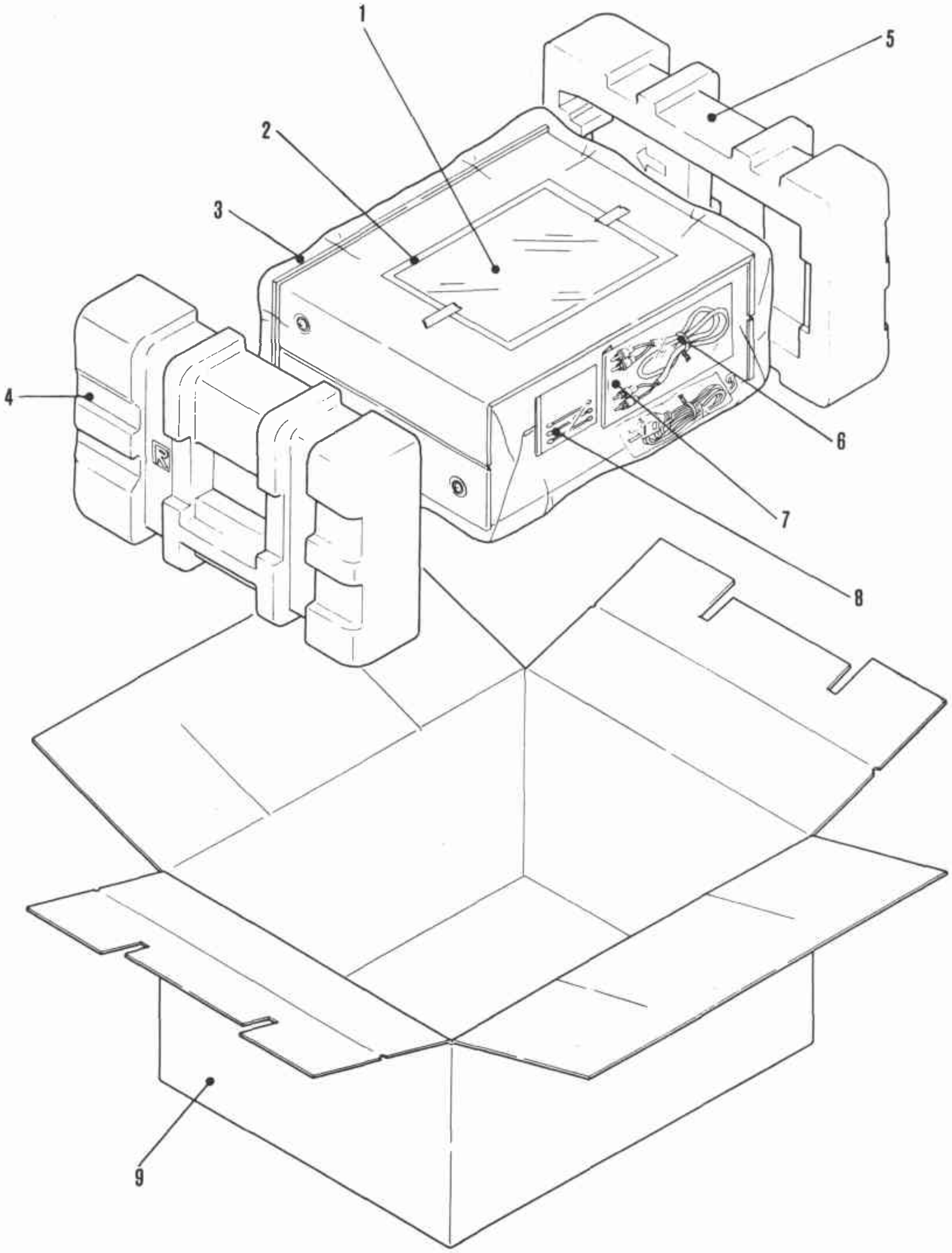


Replace head
Adjust the playback equalizer to the range of +1 ± 1 dB at 10 kHz
4-10-6 Adjust VR302 so that with STD-603 the 10kHz is at 0 ± 1dB.
NG
OK
Are there any great deviations in values of PB. EQ., REC EQ. and VAR EQ.?
NO
YES
Inspect tape, head
Replace head
Adjust VR302 to within tolerable distortion range
Adjust VR304, 305 with STD-601 to 0dB at 10kHz.
Adjust VR203, 204 and L403, 404 so taht with STD-603 the 10kHz is within 0 ± 1dB
Adjust VR304, 305 with STD-603 to 0 ± 1dB at 10kHz
OK
Adjust VR301 so that with STD-601 the 10kHz is at 0 ± 1dB
NG
OK
Is the playback equalizer adjustment at the standard value? (10kHz +1dB)
NG
YES
Check record level adjustment
Check Dolby response adjustment
Replace Dolby IC PA-4005
OK
VR301 flux adjustment
Adjust VR301 with STD-601 to 0 ± 1dB at 10kHz
NG
OK
Adjust VR303 so that with metal the 10kHz is at +1 ± 1dB (IE: 160 ± 20mA)
NG
OK
Readjust the playback equalizer within the range of 10kHz +1 ± 1dB
VR303 flux adjustment
Adjust VR303 with METAL to +1 ± 1dB at 10kHz. (IE: 160 ± 20mA)
OK
Confirm frequency response with Duad C-60 and with each tape in Dolby ON position.
NG
OK
Inspect head
Replace head
Inspect head, tape
Replace head.
GO



4
5
6
A
B
C
D
53
54
BM3×5
RT3×6
93
RT3×8
RT3×8
86
55
56
PSA3×6
57
85
FW3×0.5
TP3×8
88
38
18
37
RT3×6
93
TP3×8
45
39
PSA3×5
58
59
43
61
60
40
41
42
62
TP2.6×8
35
88
79
87
81
36
PSB3×6
34
80
82
45
63
FW2.6φ×0.5t
PSA2.6×5
83
EW2.5φ
PSA2.6×5
TP2.6×8
RT2.6×2
PSA2.6×8
68
EW1.5φ
78
65
FW2.6×0.3
66
84
64
71
EW1.5φ
69
PSA2.6×5
76
52
75
92
74
51
73
77
67
FW1.7φ×0.25t
64
72
FW2.2φ×0.25t
EW1.5φ
EW1.5φ
70

10. PACKING



Parts List

Key No.	Part No.	Description
1.	RRB-106	Operating instructions
2.	RHL-018	Vinyl bag (for operating instructions)
3.	RHL-031	Vinyl bag (for cassette tapedeck)
4.	RHA-175	Side pad R
5.	RHA-174	Side pad L
6.	RDE-010	Connection cord
7.	RHL-019	Vinyl bag (for connection cord)
8.	REA-021	Head cleaning assembly
9.	RHG-282	Packing case (for KU type)
	RHG-281	Packing case (for KC type)

11. EXPLODED VIEWS

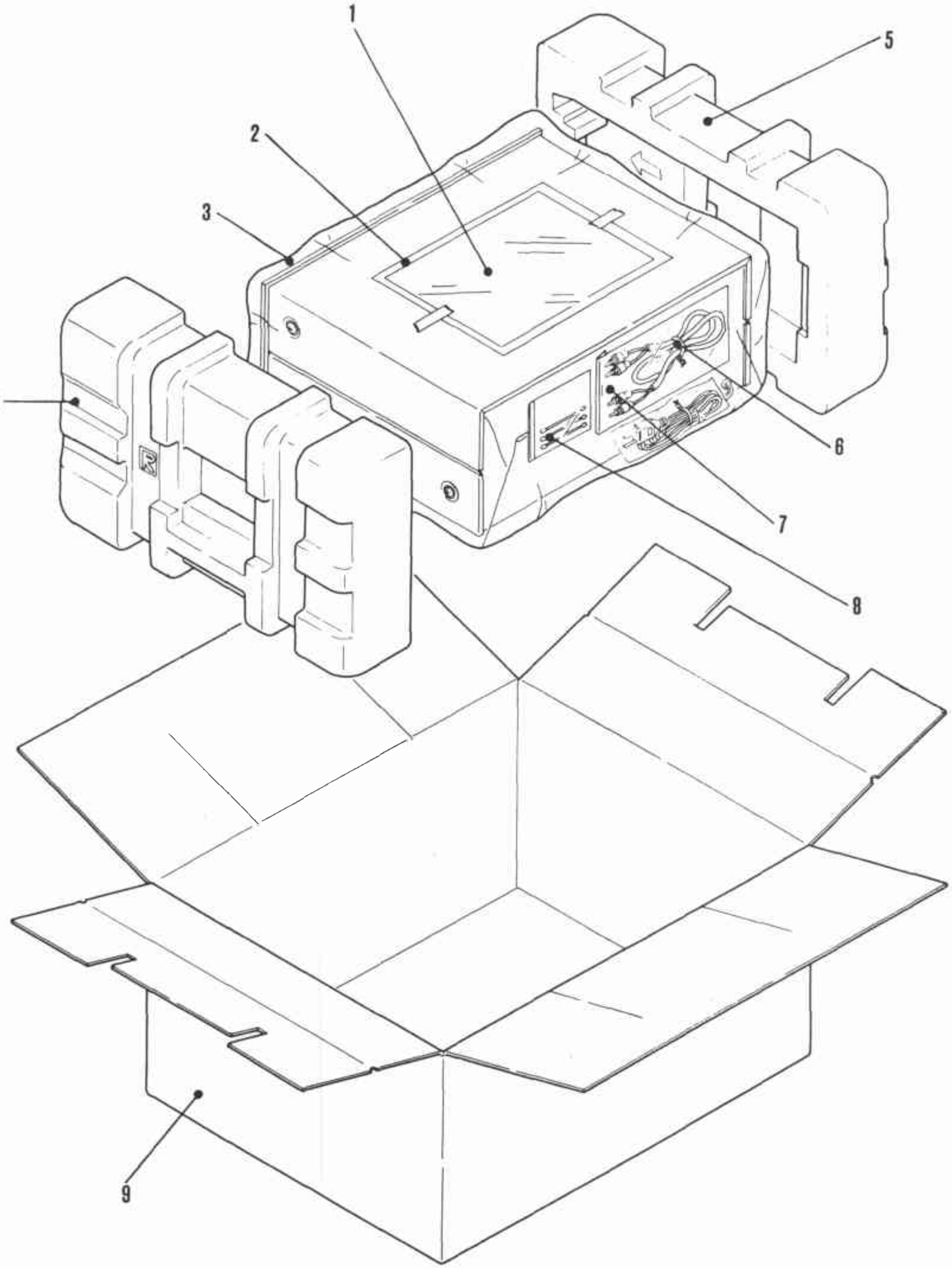
11.1 EXTERIOR

● *Parts without part number cannot be supplied.*

Key No.	Part No.	Description
1.		Mechanism assembly
2.		Panel stay (B)
3.	RAC-094	Power knob
4.		Switch joint-bar (D)
5.	RSA-021	Power switch
6.	RWG-103	Control assembly
7.		Bracket
8.		UL cord clamper (B)
9.	RNK-777	Half cover (M)
10.	RAC-108	Function switch knob
11.		Function switch unit
12.		Panel holder
13.		Rubber bush
14.	RXX-251	Front panel assembly
15.		Power knob guide
16.		Lens
17.	RNK-566	Guide L
18.	RNK-608	Guide R
19.	RBA-045	Screw (B)
20.		Nylon washer 4ϕ x 6ϕ x 0.2t
21.	REF-014	Steel ball
22.	RBK-132	Spring
23.	RXB-169	Head cover assembly
24.	RAH-285	Escutcheon panel
25.	RNK-731	Escutcheon lens
26.	RBA-044	Screw (A)
27.	RNK-780	Escutcheon (M)
28.	RWR-067	Power supply assembly
29.		Heat sink
30.		Power supply P.C. board
31.	RTT-175	Power transformer (KU)
	RTT-185	Power transformer (KC)
32.		Terminal 1P
33.	REC-272	Strain relief
34.	RXA-905	Foot assembly
35.		Chassis
36.		Bottom plate
37.		Screw M4 x 8
38.		Rear panel
39.	RDG-022	Power cord
40.	RNA-364	Bonnet
41.	REB-223	Rubber (D)
42.		Switch joint-bar (C)
43.		Switch joint-bar (B)
44.		Switch joint-bar (A)
45.	RAC-091	Push knob (A)

Key No.	Part No.	Description
46.	RWX-359	Mother assembly
47.	RCS-020	Volume 5k-B (BIAS)
48.		Shield cover
49.		Mother P.C. board
50.	RSG-064	Push switch (A)
51.	RSG-068	Push switch (B)
52.	RKB-014 (RKB-016)	4P mount pinjack
53.	RWX-360	IC amp assembly
54.	RKN-046	Headphone jack
55.	RKN-044	MIC jack
56.	RWX-361	REC EQ assembly
57.	REB-233	Cover cushion
58.	RAH-287	Half cover panel
59.	RWX-109	Spark killar (UL)
	RWX-150	Spark killar (KC)
60.	REC-250	Capacitor cover D
61.	RAH-286	Function panel
62.	RBA-038	Screw
63.	RBM-004	Wire nut
64.	RRW-112	UL Caution label (A)
65.	RBA-026	Screw

10. PACKING

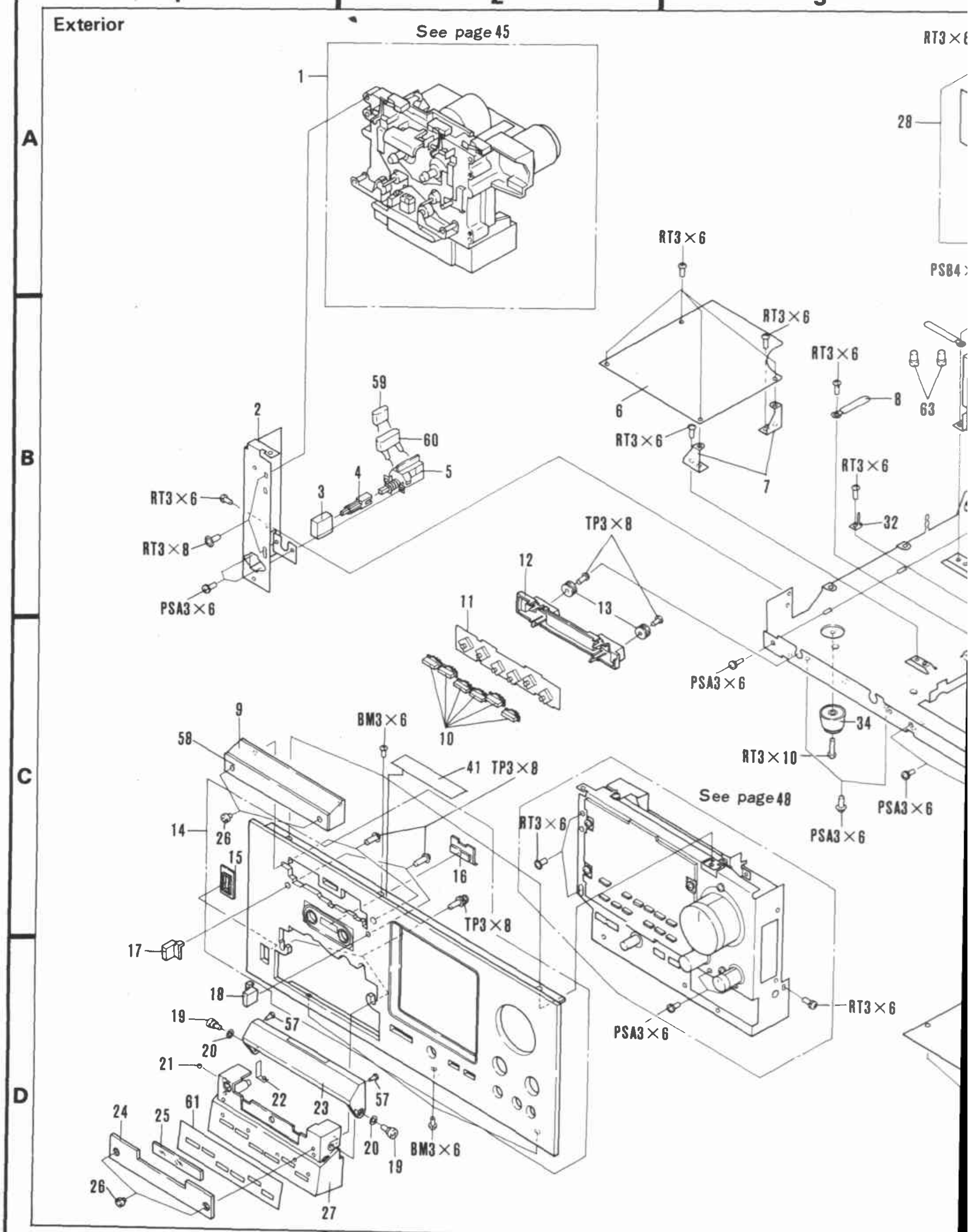


Parts List

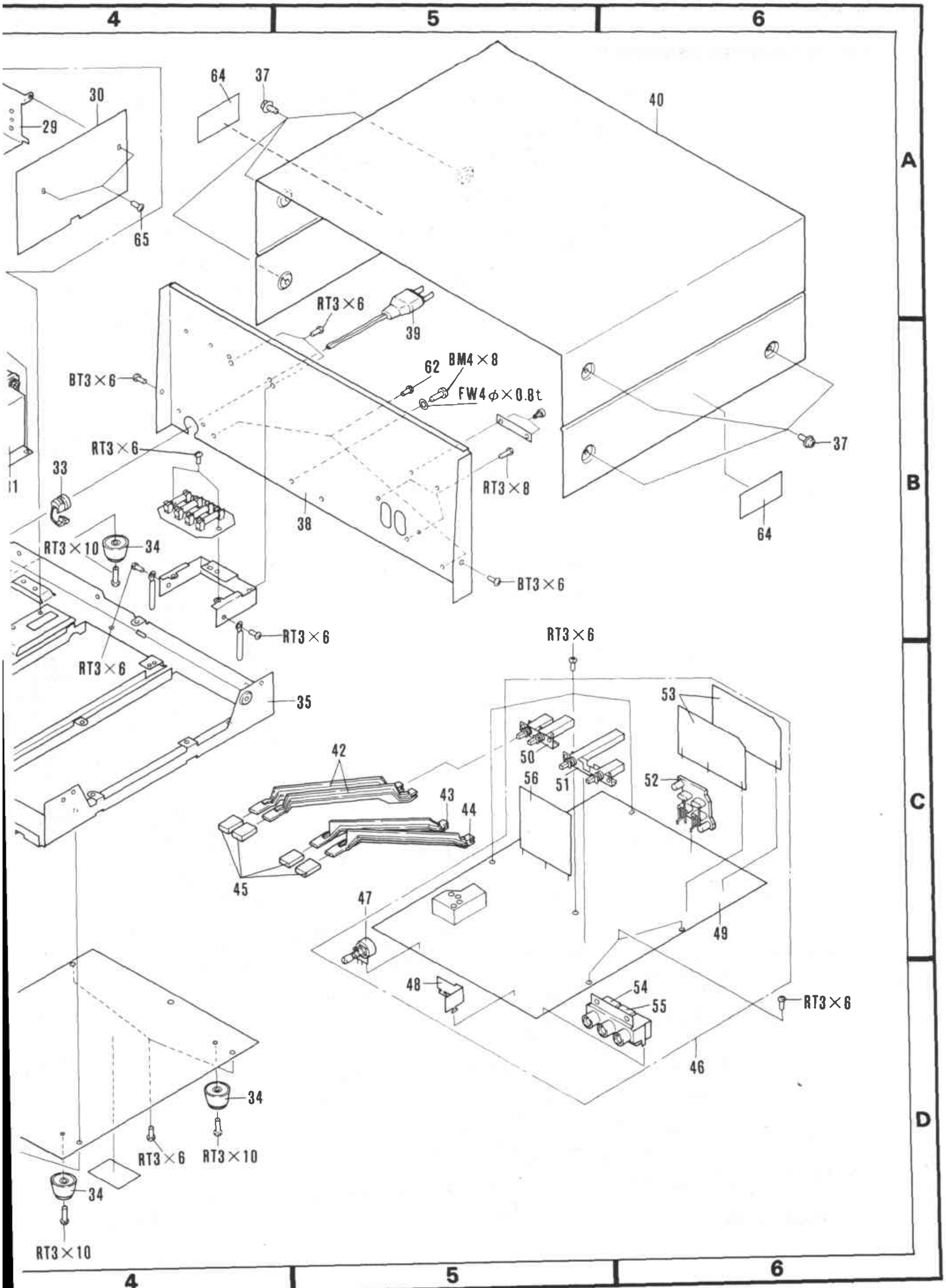
Key No.	Part No.	Description
1.	RRB-106	Operating instructions
2.	RHL-018	Vinyl bag (for operating instructions)
3.	RHL-031	Vinyl bag (for cassette tapedeck)
4.	RHA-175	Side pad R
5.	RHA-174	Side pad L
6.	RDE-010	Connection cord
7.	RHL-019	Vinyl bag (for connection cord)
8.	REA-021	Head cleaning assembly
9.	RHG-282	Packing case (for KU type)
	RHG-281	Packing case (for KC type)

1	2	3

Exterior



1	2	3


4
5
6
A
B
C
D
64
37
40
30
29
65
RT3×6
39
62
BM4×8
FW4φ×0.8t
BT3×6
RT3×6
37
RT3×8
33
38
64
RT3×10
34
BT3×6
RT3×6
RT3×6
RT3×6
35
53
42
50
56
51
52
43
44
45
47
49
48
54
55
RT3×6
46
34
RT3×6
RT3×10
34
RT3×10

11.3 PANEL STAY

• *Parts without part number cannot be supplied.*

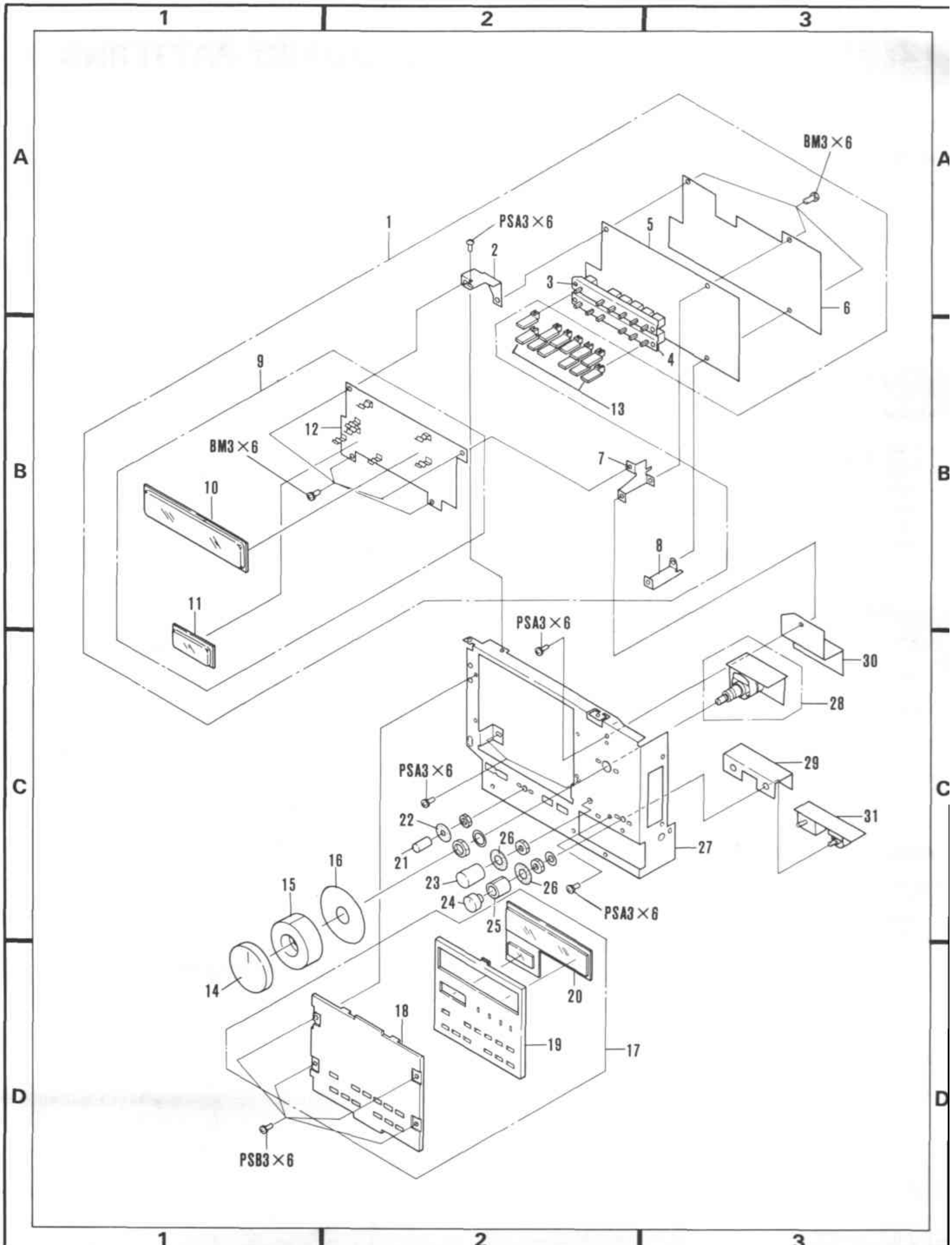
Key No.	Part No.	Description
1.	RWX-328	Indicator amp assembly
2.		P.C. holder
3.	RSG-066	Switch (E)
4.	RSG-067	Switch (F)
5.		Indicator P.C. assembly
6.		Shield cover
7.		Holder (M)
8.		Holder (C)
9.		Indicator unit
10.	LD8242	Fluorescent indicator tube
11.	FIP 5D 8	Fluorescent indicator tube
12.		Indicator P.C. board
13.	RAC-093	Push knob (C)
14.	RAA-223	REC VR knob (L) assembly
15.	RAA-225	REC VR knob (R) assembly

Key No.	Part No.	Description
16.	RED-145	Volume mask
17.	RXX-252	Indicator lens assembly
18.		Indicator lens
19.		Indicator panel (M)
20.		Meter lens
21.	RAA-231	BIAS VR knob
22.	RED-047	Switch mask
23.	RAA-301	Tape selector knob assembly
24.	RAA-227	PB VR knob (L) assembly
25.	RAA-229	PB VR knob (R) assembly
26.	RED-151	Volume mask
27.		Panel stay (M)
28.		Volume unit
29.		Shield cover (tape selector)
30.		Shield cover (M)
31.		Tape selector assembly

Parts List

• *Parts without part number cannot be supplied.*

Key No.	Part No.	Description
1.		Arm assembly
2.		Arm
3.		Arm
4.	RBH-511	Spring
5.	RSF-022	Microswitch
6.	REC-278	Spacer
7.	RSF-024	Microswitch (B)
8.		Switch bracket
9.		Detector arm
10.	RNK-556	Half holder
11.	RBH-534	Spring
12.	RBH-563	Spring
13.		Brake plate
14.	REB-187	Brake shoe
15.	RBK-119	Head base holder
16.	RBF-013	Steel ball
17.		Head base assembly
18.	REB-153	Stopper
19.	RNK-348	Tape guide
20.	RBH-374	Spring
21.	RNK-535	Adjuster
22.	RXB-005	Pinch-roller arm assembly
23.		Arm (B)
24.	RBH-516	Spring
25.		Arm (A)
26.	RBH-373	Spring
27.		Socket-head screw M2.6 x 5 Ni
28.	RXB-255	Sub-head base assembly
29.		Terminal 3ϕ
30.		Cord clamper
31.	RNK-703	Head cord cover
32.	RLA-994	Pinch-roller arm shaft (L)
33.	RLA-993	Pinch-roller arm shaft (R)
34.	RBF-037	Washer
35.	RXB-093	Bearing assembly
36.		Washer 3ϕ x 6ϕ x 0.5t
37.	RXB-058	Supply pulley assembly
38.	REB-314	Sub belt
39.		Terminal (GND)
40.	REB-297	Lamp holder
41.	REL-072	Lamp (B)
42.	RXB-063	Motor pulley Assembly
43.	RXM-050	Motor
44.		Chassis
45.		UL cord clamper (D)
46.		Half holder bracket L assembly
47.	RNK-534	Half holder arm
48.	RBH-503	Spring
49.		Half holder bracket R assembly
50.		Mechanism holder
51.		Half detector arm assembly
52.	RBH-524	Spring
53.	RBH-506	Spring
54.		Solenoid lever
55.	RBH-557	Spring
56.		Terminal 4P
57.		6P plug
58.		Screw
59.		Solenoid chassis assembly
60.	REB-270	Capstan belt
61.	RXB-055	Flywheel assembly
62.	RBK-107	Spring
63.		Brake operation lever
64.	RNK-815	Reel cap (B)
65.	RXB-189	Supply reel assembly (B)
66.	REB-317	TU belt
67.	RXB-190	Take-up reel assembly (B)
68.	RXA-998	Take-up pulley assembly
69.	REB-272	Sensing belt
70.		Arm assembly
71.	RBH-502	Spring
72.	RXB-144	Idler arm full assembly
73.	RNK-561	Idler
74.	RBH-498	Spring
75.	RNK-562	Spring holder
76.		Idler arm assembly
77.		Washer 2.2ϕ x 5ϕ x 0.5t
78.		Sub-chassis assembly
79.	RXP-056	Solenoid (B)
80.	RXB-064	Motor pulley (B) assembly
81.	RXM-047	Take up motor
82.		Sensing holder
83.		Sensing unit
84.	RBH-564	Spring
85.	RXP-062	Solenoid (A)
86.	RKP-044	Connector (13p)
87.	RBH-507	Spring
88.	W03B	Diode
89.	RNF-527	Spacer
90.	RBH-505	Spring
91.	REB-194	Rubber
92.		Friction felt
93.		UL cord clamper (B)



1
2
3
A
B
C
D
BM3×6
PSA3×6
1
2
3
4
5
6
7
8
9
10
11
12
13
BM3×6
PSA3×6
30
28
29
31
27
PSA3×6
22
21
26
16
15
23
26
24
25
PSA3×6
14
20
18
19
17
PSB3×6

12. SCHEMATIC DIAGRAMS P.C. BOARD PATTERNS AND PARTSLIST

12.1 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 .... RS1P 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

ASSEMBLIES

Part No.	Description
RWX-359	Mother assembly
RWX-328	Indicator amplifier assembly
RWR-067	Power supply assembly
RWX-360	Integrated amplifier assembly
RWG-103	Control assembly

SWITCHES

Part No.	Symbol & Description	
RSA-021	S001	Power switch (CT-F950/KC, KU)
RSF-024	S1102	Microswitch B (CASSETTE HALF DETECTOR)
RSF-022	S1103	Microswitch (ERASE PREVENT DETECTOR)

TRANSFORMER

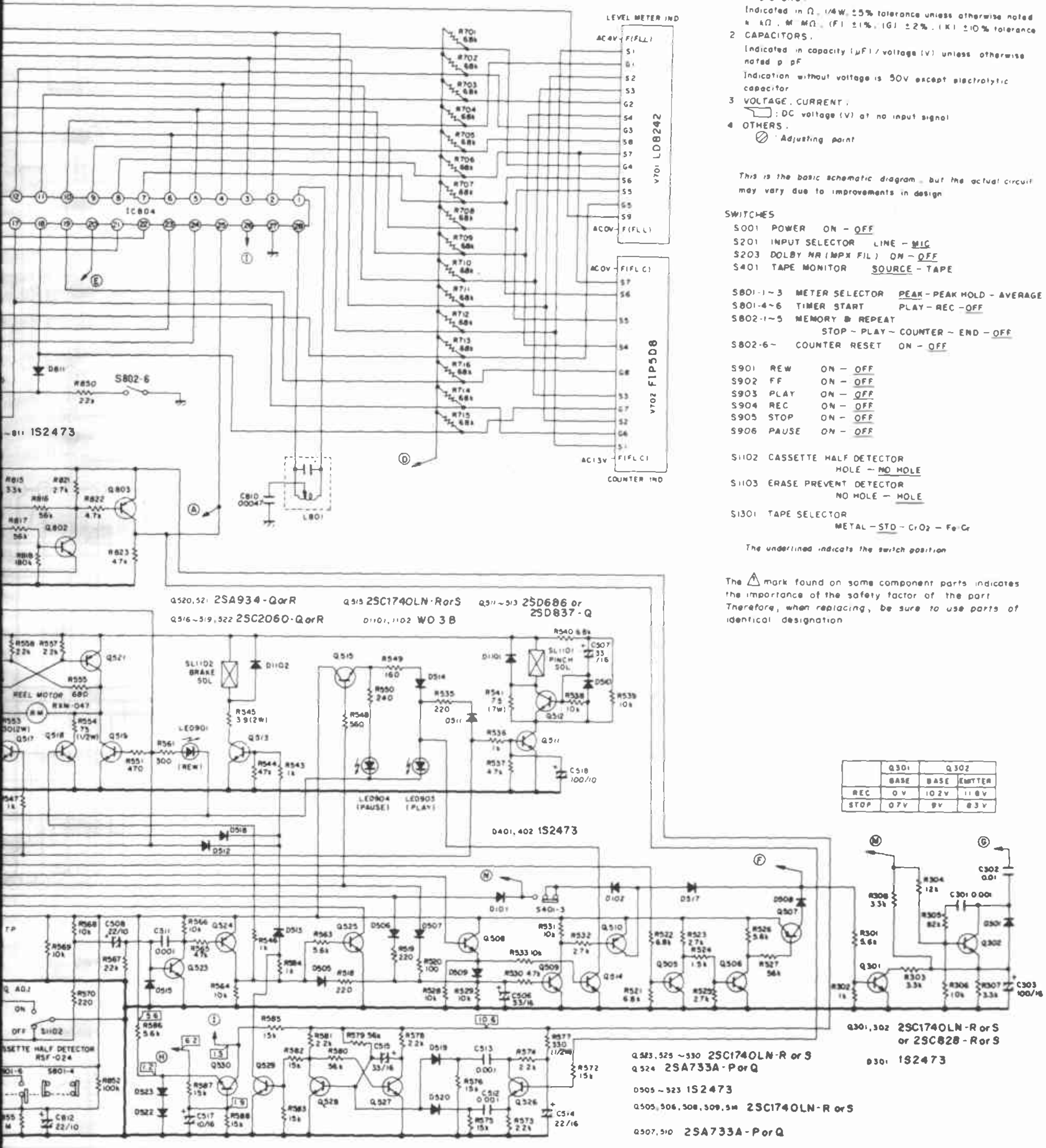
Part No.	Symbol & Description	
RTT-175	T001	Power transformer (CT-F950/KU)
RTT-185	T001	Power transformer (CT-F950/KC)

SEMICONDUCTORS

Part No.	Symbol & Description
W03B	D1101, D1102 Diode

OTHERS

Part No.	Symbol & Description	
RWX-109	CR001	Spark killer (CT-F950/KU)
RWX-150	CR001	Spark killer (CT-F950/KC)
RXP-062	SL1101	Solenoid A (PINCH SOL.)
RXP-056	SL1102	Solenoid B (BRAKE SOL.)
REL-072	PL1101	Lamp B (CASSETTE-LAMP)
RXM-050	Motor	
RXM-047	Take-up motor	
RDG-022	Power cord	



1 RESISTORS.
Indicated in Ω, 1/4W, ±5% tolerance unless otherwise noted k: kΩ, 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

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

SWITCHES

S001 POWER ON – <u>OFF</u>
S201 INPUT SELECTOR LINE – <u>MIC</u>
S203 DOLBY NR (MPX FIL) ON – <u>OFF</u>
S401 TAPE MONITOR <u>SOURCE</u> – TAPE

S801-1~3 METER SELECTOR <u>PEAK</u> – PEAK HOLD – AVERAGE
S801-4~6 TIMER START PLAY – REC – <u>OFF</u>
S802-1~5 MEMORY & REPEAT
STOP – PLAY – COUNTER – END – <u>OFF</u>
S802-6~ COUNTER RESET ON – <u>OFF</u>

S901 REW ON – <u>OFF</u>
S902 FF ON – <u>OFF</u>
S903 PLAY ON – <u>OFF</u>
S904 REC ON – <u>OFF</u>
S905 STOP ON – <u>OFF</u>
S906 PAUSE ON – <u>OFF</u>

S1102 CASSETTE HALF DETECTOR
HOLE – <u>NO HOLE</u>
S1103 ERASE PREVENT DETECTOR
NO HOLE – <u>HOLE</u>

S1301 TAPE SELECTOR
METAL – <u>STD</u> – CrO_2 – FeCr

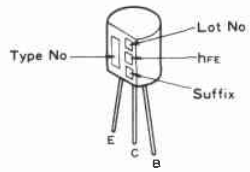
The underlined indicate the switch position

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

	Q301	Q302	
	BASE	BASE	EMITTER
REC	0V	10.2V	11.8V
STOP	0.7V	9V	8.3V

Appearance of Transistors and ICs

2SA733A



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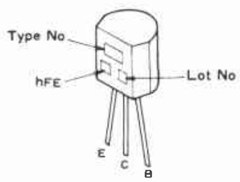
2SC2060



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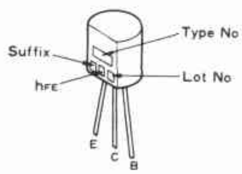
2SC1327



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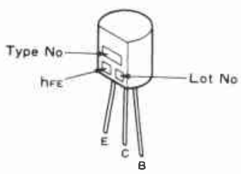

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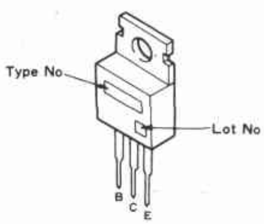

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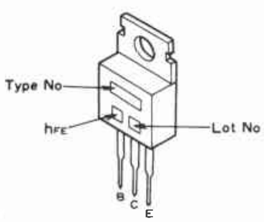

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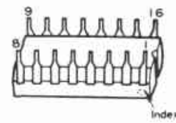
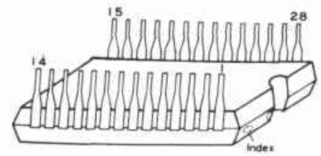
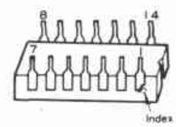
μPD4050C



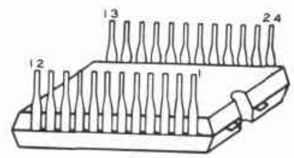
PD4004



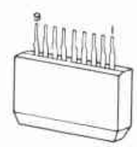
μPC324C



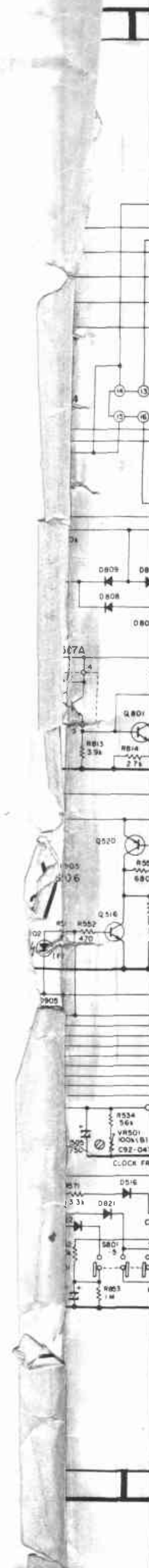
TC9121P

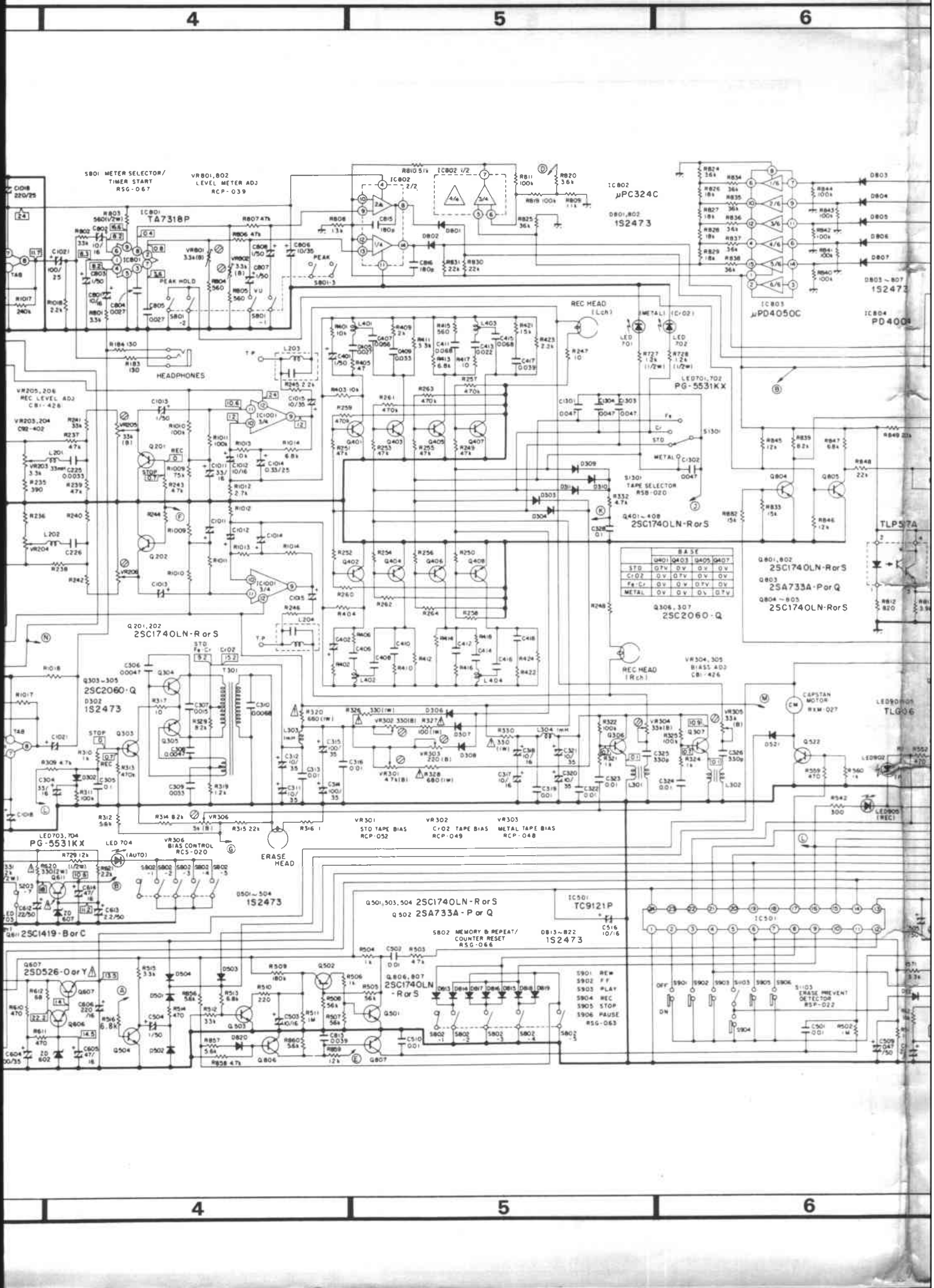


TA7318P

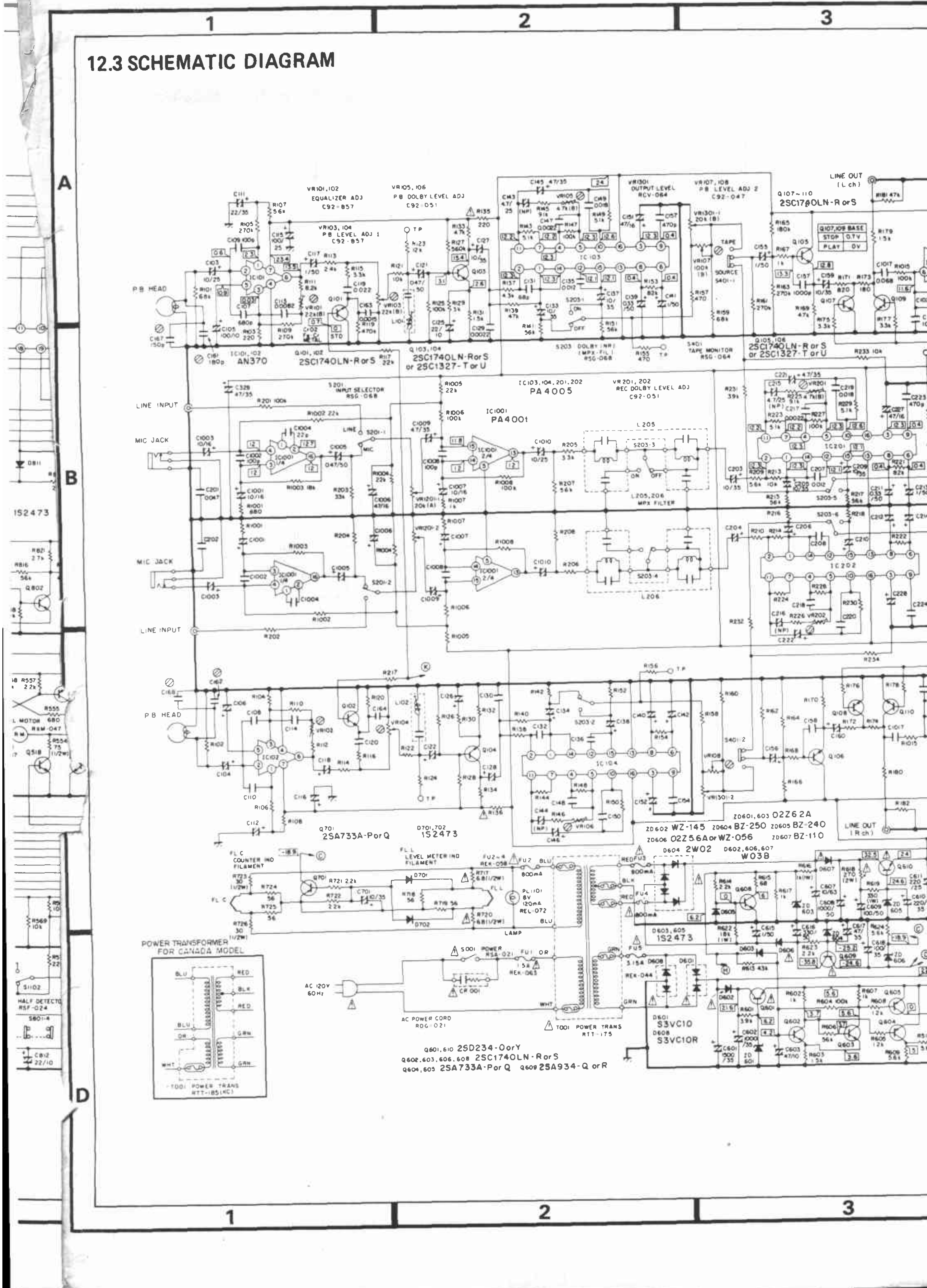


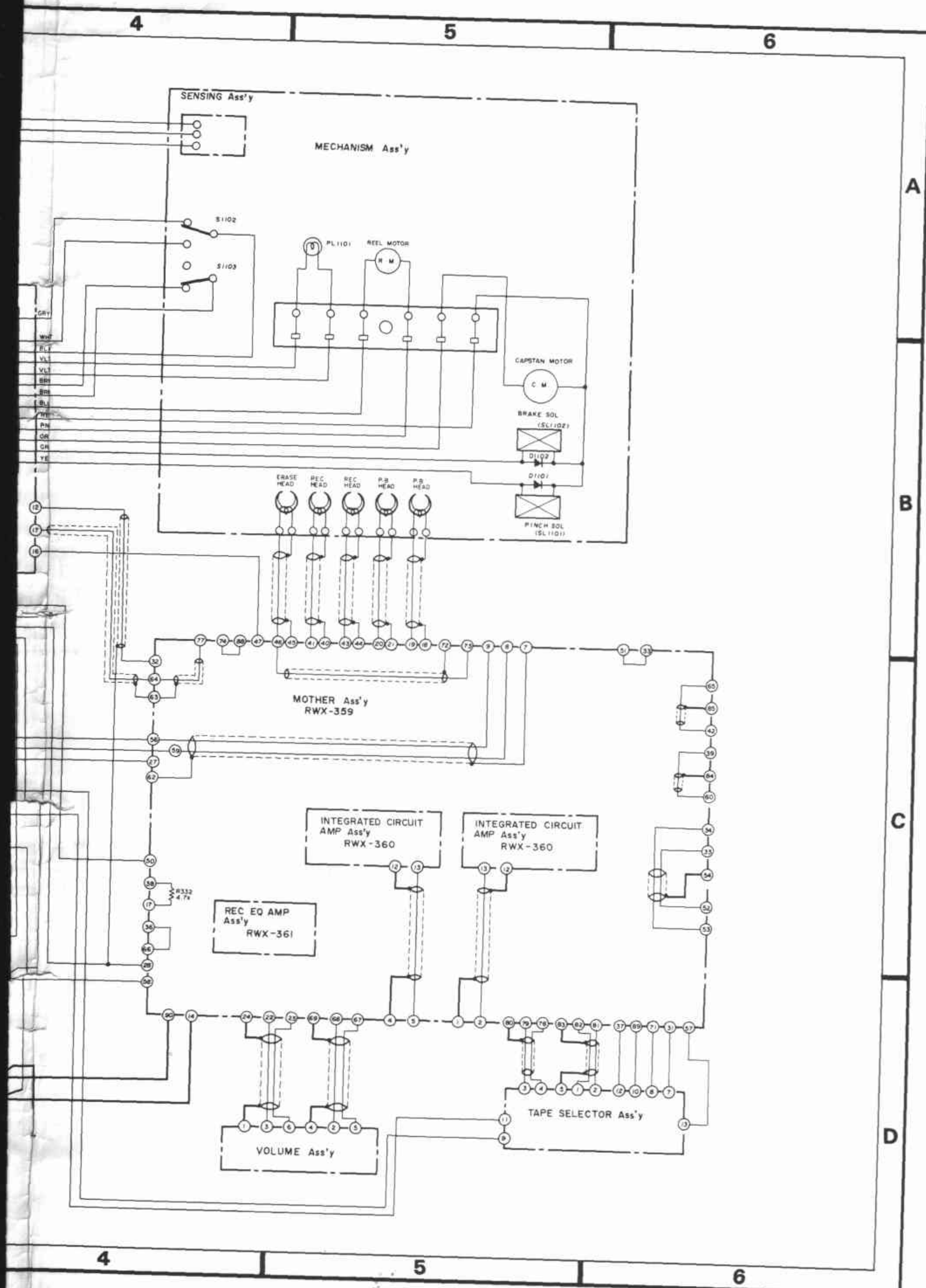
AN370




4
5
6
S801 METER SELECTOR/ TIMER START RSG-067
VR801,802 LEVEL METER ADJ RCP-039
IC801 TA7318P
IC802 μPC324C
D801,802 1S2473
IC803 μPD4050C
D803~807 1S2473
HEADPHONES
REC HEAD (Lch)
LED701,702 PG-5531KX
S1301 TAPE SELECTOR RSB-020
Q401~408 2SC1740LN-R or S
Q801,802 2SC1740LN-R or S
Q803 2SA733A-P or Q
Q804~805 2SC1740LN-R or S
Q306,307 2SC2060-Q
Q201,202 2SC1740LN-R or S
Q303~305 2SC2060-Q
D302 1S2473
REC HEAD (Rch)
VR304,305 BIAS ADJ CBI-426
CAPSTAN MOTOR RXM-027
VR301 STD TAPE BIAS RCP-052
VR302 CrO2 TAPE BIAS RCP-049
VR303 METAL TAPE BIAS RCP-048
ERASE HEAD
LED703,704 PG-5531KX
VR306 BIAS CONTROL RCS-020
D501~504 1S2473
Q611 2SC1419-B or C
Q501,503,504 2SC1740LN-R or S
Q502 2SA733A-P or Q
IC501 TC9121P
S802 MEMORY & REPEAT/ COUNTER RESET RSG-066
D813~822 1S2473
Q607 2SD526-O or Y
Q806,807 2SC1740LN-R or S
S901 REW
S902 FF
S903 PLAY
S904 REC
S905 STOP
S906 PAUSE
RSG-063
S1103 ERASE PREVENT DETECTOR RSP-022

12.3 SCHEMATIC DIAGRAM

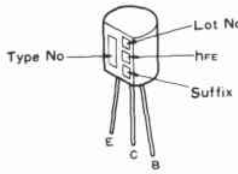




SENSING Ass'y
MECHANISM Ass'y
S1102
S1103
PL1101
REEL MOTOR
CAPSTAN MOTOR
BRAKE SOL (SL1102)
D1102
D1101
PINCH SOL (SL1101)
ERASE HEAD
REC HEAD
REC HEAD
P.B HEAD
P.B HEAD
MOTHER Ass'y RWX-359
INTEGRATED CIRCUIT AMP Ass'y RWX-360
INTEGRATED CIRCUIT AMP Ass'y RWX-360
REC EQ AMP Ass'y RWX-361
R332 4.7k
TAPE SELECTOR Ass'y
VOLUME Ass'y
GRY
WHT
BLU
VLT
BRN
PNK
ORG
GRN
YEL
4
5
6
A
B
C
D

Appearance of Transistors and ICs

2SA733A



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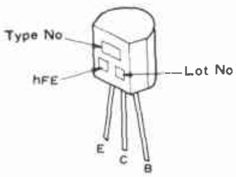
2SC2060



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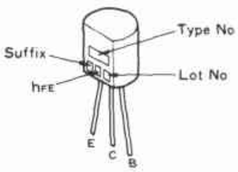
2SC1327



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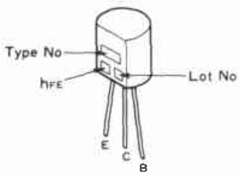

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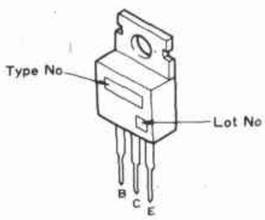
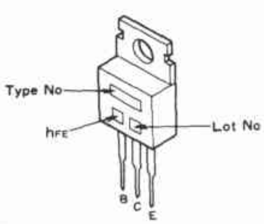
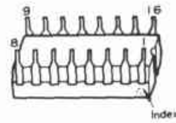


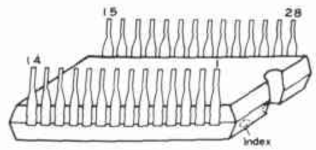
2SD837



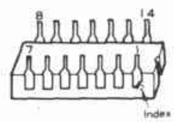
PA4005
μPD4050C



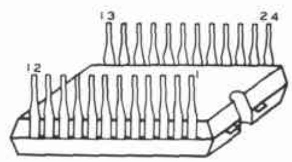
PD4004



μPC324C

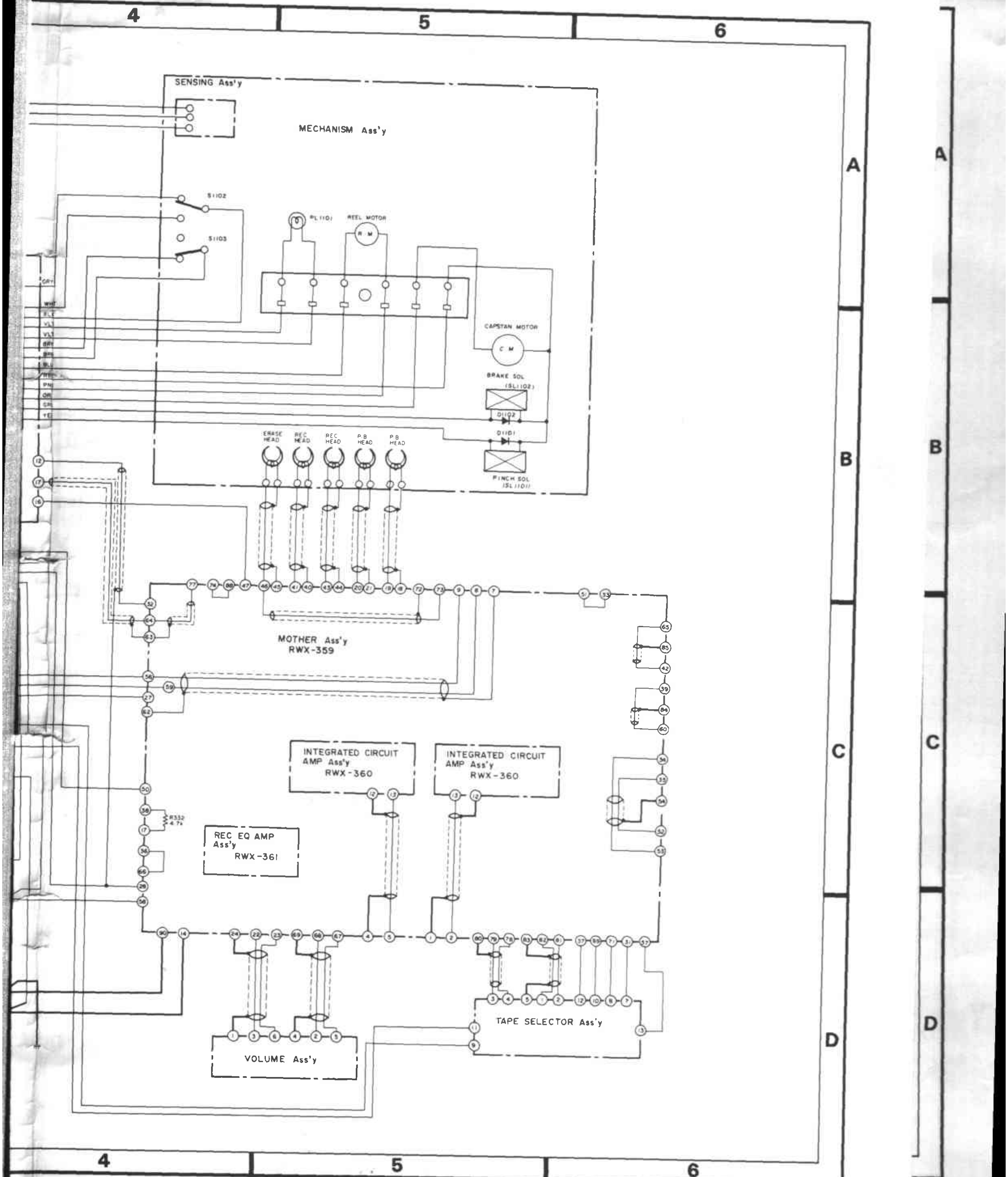


TC9121P



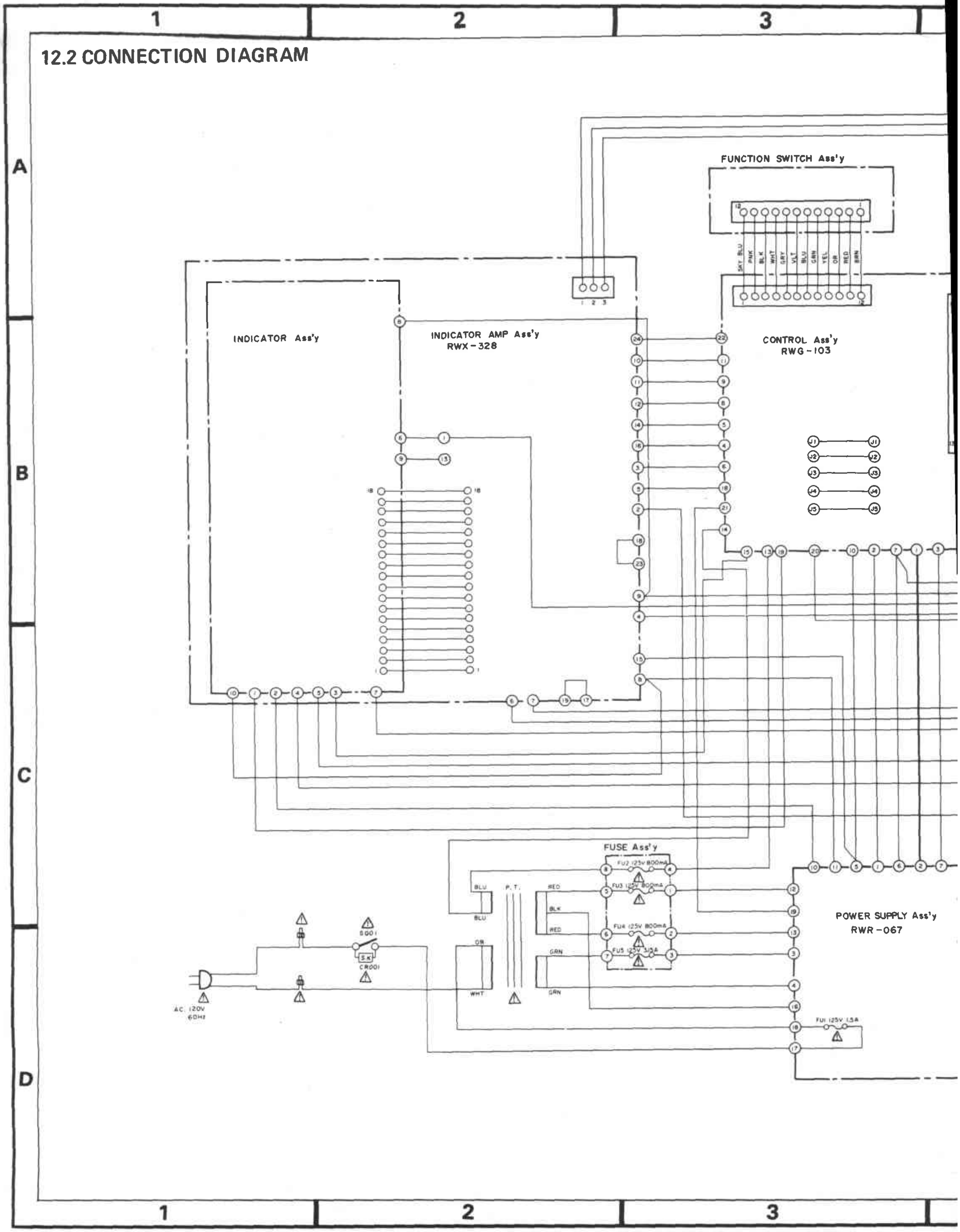
TA7318P

AN370



SENSING Ass'y
MECHANISM Ass'y
S1102
S1103
PL1101
REEL MOTOR
R M
CAPSTAN MOTOR
C M
BRAKE SOL
(SL1102)
D1102
D1101
PINCH SOL
(SL1101)
ERASE HEAD
REC HEAD
REC HEAD
P.B HEAD
P.B HEAD
GRY
WHT
VLT
BRN
BLU
PNK
ORG
YE
MOTHER Ass'y
RWX-359
INTEGRATED CIRCUIT
AMP Ass'y
RWX-360
INTEGRATED CIRCUIT
AMP Ass'y
RWX-360
REC EQ AMP
Ass'y
RWX-361
R332
4.7k
TAPE SELECTOR Ass'y
VOLUME Ass'y

12.2 CONNECTION DIAGRAM



.5 MOTHER ASSEMBLY (RWX-359)

rts List

SEMBLIES

t No.	Symbol & Description
RWX-360	Integrated amplifier assembly
RWX-361	REC EQ assembly

/ITCHES

t No.	Symbol & Description	
RSG-068	S201, S203	Push switch (DOLBY NR INPUT)
RSG-064	S401	Push switch (MONITOR)

)ILS

t No.	Symbol & Description	
RTF-058	L101, L102	Trap coil
RTF-033	L201, L202	Trap coil
RTF-055	L203, L204	Trap coil
RTF-040	L205, L206	MPX filter brock
RTD-018	L301, L302	Matching transformer
RTF-057	L303, L304	Line coil
T64-001	T301	OSC coil

APACITORS

rt No.	Symbol & Description
CEANL 100P 25	C103, C104
CEA 101P 25	C115, C116, C314, C315, C320, C321
CEA 101P 16	C303
CEA 101P 10	C105, C106
CEA 470P 35	C328
CEA 470P 16	C151, C152, C227, C228
CEA 220P 10	C125, C126
CEA 100P 35	C127, C128, C133, C134, C137, C138, C159, C160, C203–C206, C209, C210, C311, C312
CEA 4R7P 35	C145, C146, C221, C222
CEA 010P 50	C117, C118, C155, C156, C305
CEA 010M 50	C141, C142, C213, C214
CEA R47P 50	C121, C122
CEA R33M 50	C139, C140, C211, C212
CEA 220P 35	C111, C112
CEA 330P 16	C304
CEA 100P 16	C317, C318, C229, C230-C232
CEA 4R7M 25NP	C143, C144, C215, C216
CQMA 104K 50	C328
CQMA 333K 50	C309
CQMA 223K 50	C119, C120
CQMA 183K 50	C149, C150, C219, C220
CQMA 153K 50	C307
CQMA 123K 50	C135, C136, C207, C208
CQMA 103K 50	C302, C323, C324
CQMA 682K 50	C310
CQMA 822K 50	C113, C114
CQMA 472K 50	C306, C308
CQMA 332K 50	C225, C226
CQMA 222K 50	C129, C130, C147, C148, C217, C218
CQMA 102K 50	C301, C165, C166
CQMA 152K 50	C163, C164
RCE-023	C131, C132
RCE-008	C325, C326
RCE-025	C161, C162
CCDSL 101K 50	C109, C110
CKDYB 681K 50	C107, C108
CKDYB 471K 50	C153, C154, C223, C224
CKDYF 473Z 50	C201, C202, C327
CKDYF 103Z 50	C313, C316, C319, C322
CKDYF 108Z 50	C157, C158

RESISTORS

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

Part No.	Symbol & Description		
C92-857	VR101-VR104	Semi-fixed	22K-B
C92-051	VR105, VR106, VR201, VR202	Semi-fixed	4R7K-B
C92-047	VR107, VR108	Semi-fixed	100K-B
C92-402	VR203, VR204	Semi-fixed	3R3K-B
C81-426	VR205, VR206, VR304, VR305	Semi-fixed	33K-B
RCP-052	VR301	Semi-fixed	4.7K-B
RCP-049	VR302	Semi-fixed	330-B
RCP-048	VR303	Semi-fixed	220-B
RCS-020	VR306	Volume 5K-B (BIAS)	
RD¼PM □□□ J	R101-R134, R137-R184, R201-R264, R301-R317, R319, R321, R322, R324, R325, R329, R332		
RD¼PF 221J	R135, R136		
RD½PF 122J	R331		
RS1PF □□□ J	R320, R326-R328, R330		

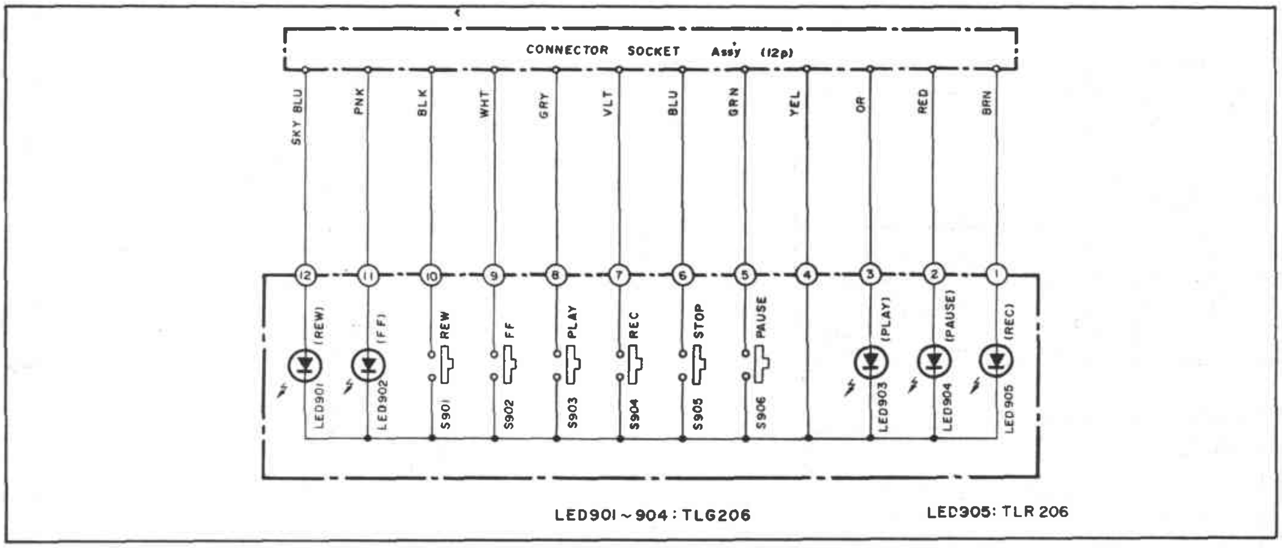
SEMICONDUCTORS

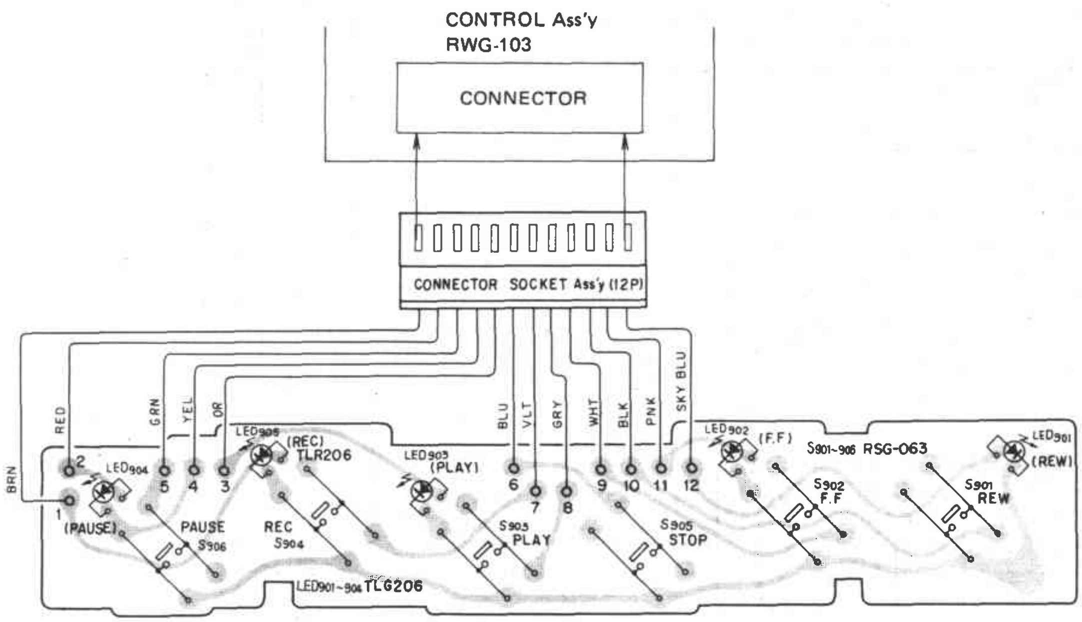
Part No.	Symbol & Description
AN370	IC101, IC102
PA4005	IC103, IC104, IC201, IC202
2SC1740LN	Q101, Q102, Q107-Q110, Q201, Q202
2SC1740LN (2SC1327)	Q103-Q106
2SC1740LN (2SC828)	Q301, Q302
2SC2060-Q	Q303-Q307
1S2473-T	D101, D102, D301-D304, D306-D311

OTHERS

Part No.	Symbol & Description
RKB-014 (RKB-016)	4P mount pinjack
RKN-044	MIC jack
RKN-046	Headphone jack
RBF-042	Ceramic tube
RBF-041	Ceramic tube

12.4 FUNCTION SWITCH ASSEMBLY





Parts List

SWITCHES

Part No.	Symbol & Description
RSG-063	S901–S906 Function switch

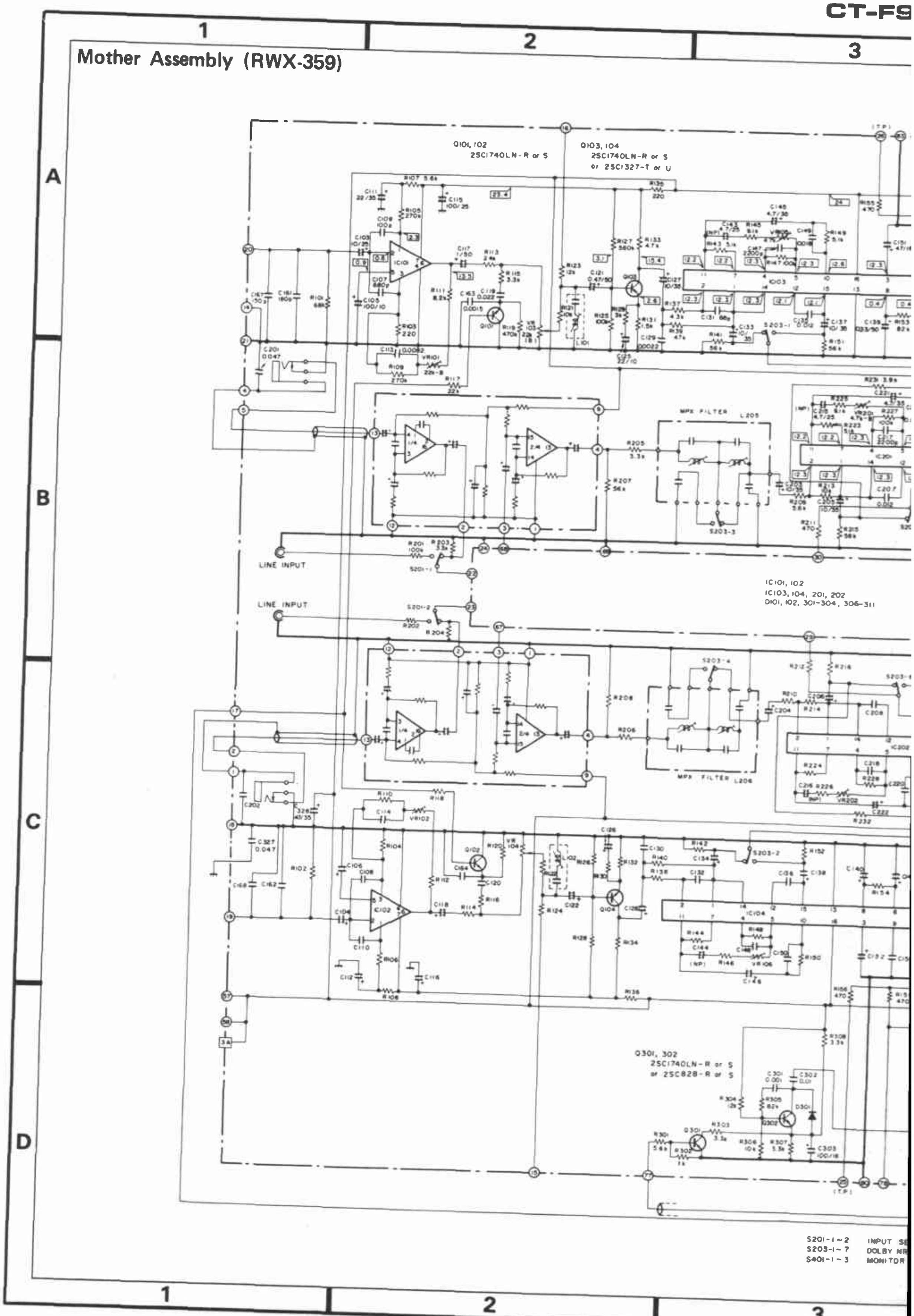
SEMICONDUCTORS

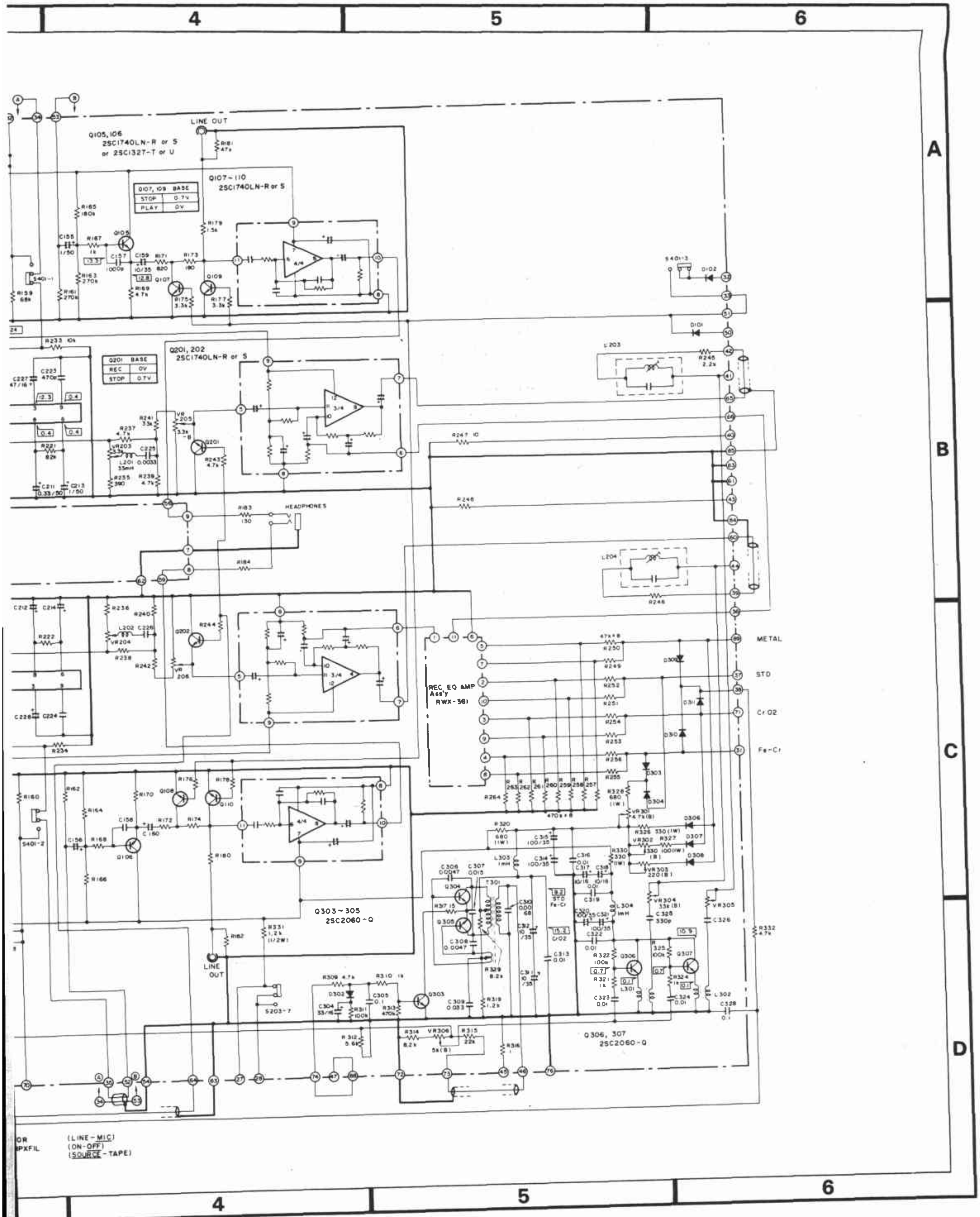
Part No.	Symbol & Description
TLG 206	LED901–LED904
TLR 206	LED905

OTHERS

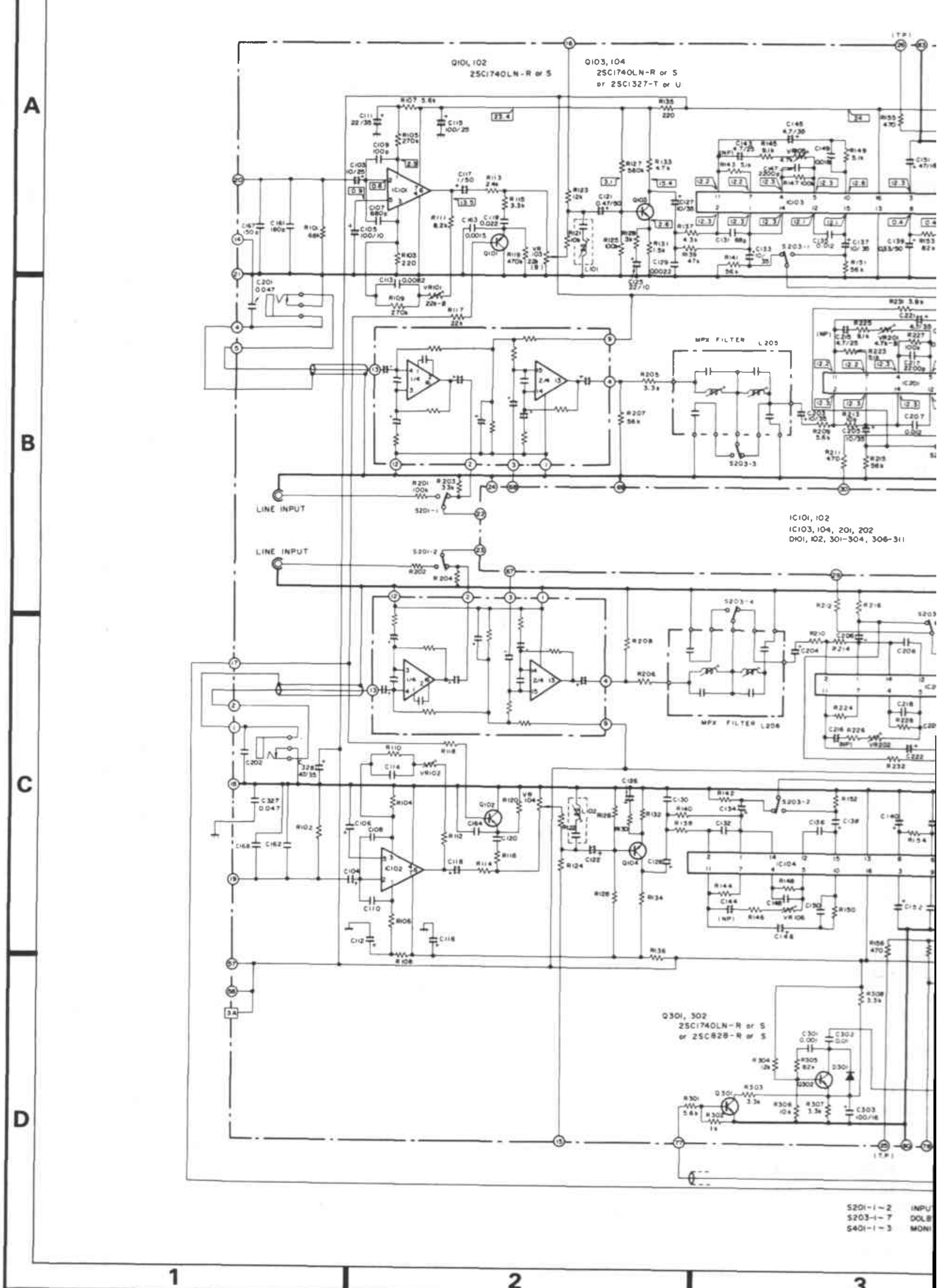
Part No.	Symbol & Description
RKP-042	Connector socket assembly (12P)
RNK-733	LED holder

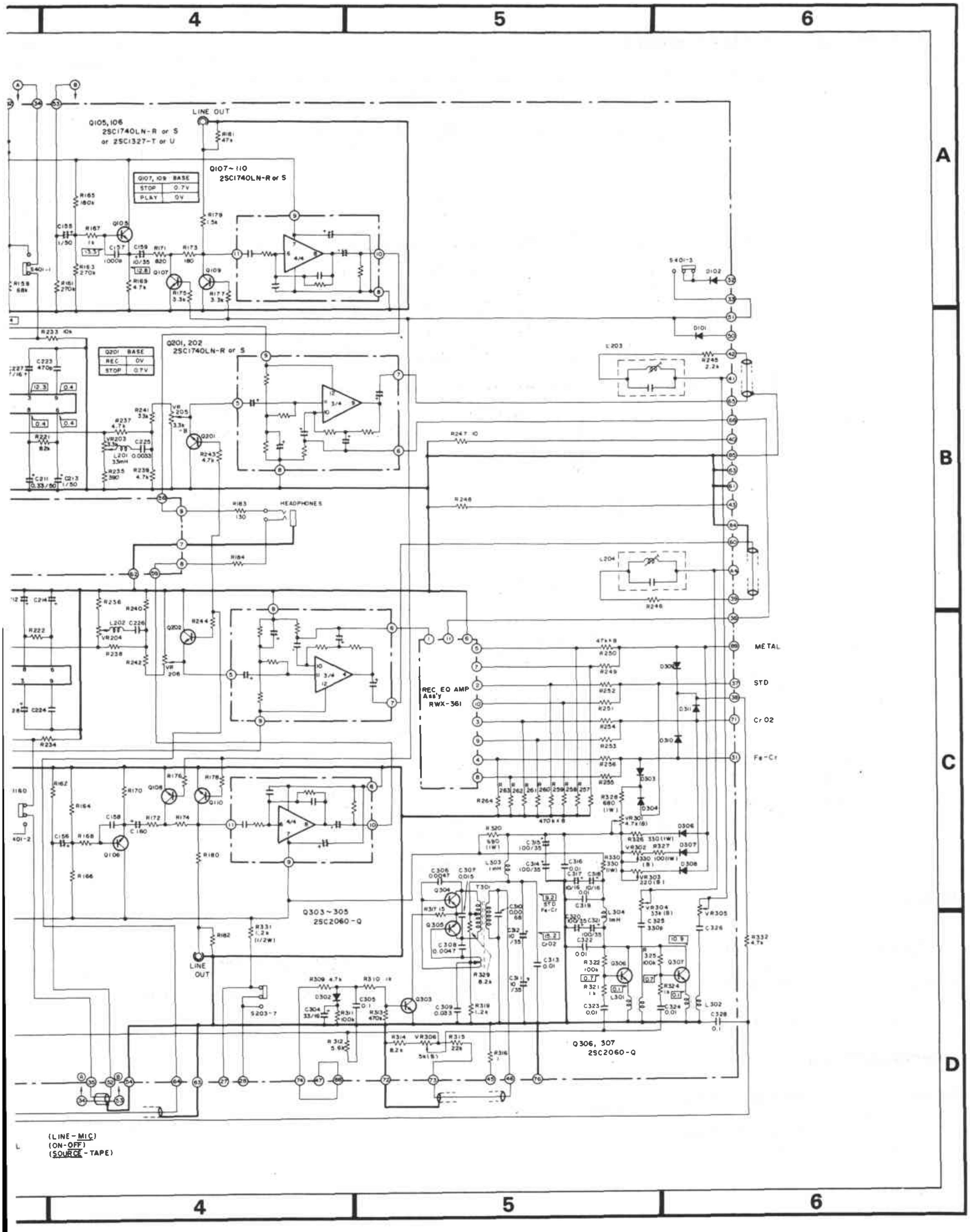
Mother Assembly (RWX-359)



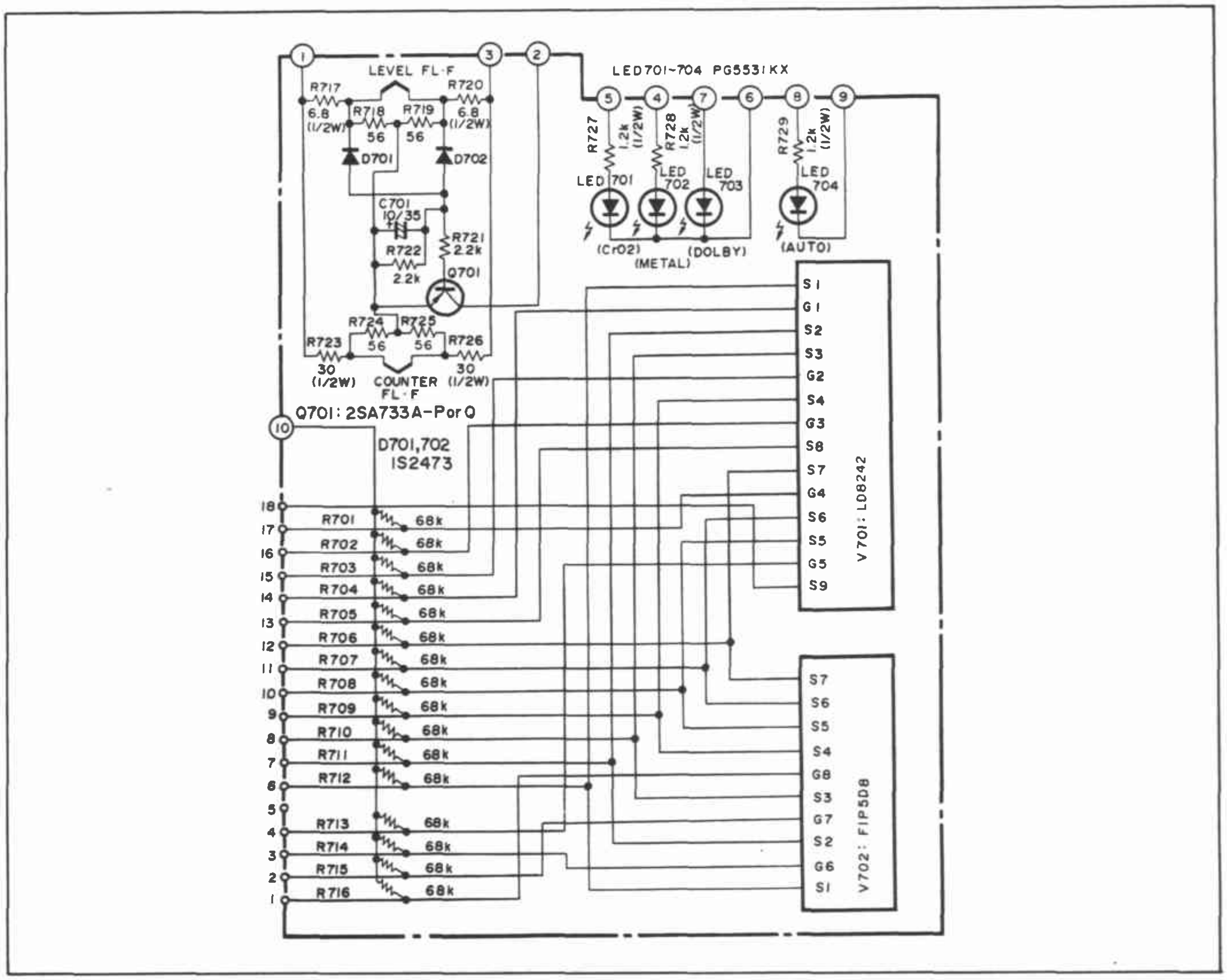

4
5
6
A
B
C
D
LINE OUT
Q105, 106
2SC1740LN-R or S
or 2SC1327-T or U
Q107~110
2SC1740LN-R or S
Q107, 109 BASE
STOP 0.7V
PLAY 0V
Q201, 202
2SC1740LN-R or S
Q201 BASE
REC 0V
STOP 0.7V
HEADPHONES
REC EQ AMP
Ass'y
RWX-361
METAL
STD
Cr O2
Fe-Cr
Q303~305
2SC2060-Q
Q306, 307
2SC2060-Q
LINE
OUT
(LINE-MIC)
(ON-OFF)
(SOURCE-TAPE)

Mother Assembly (RWX-359)




4
5
6
A
B
C
D
LINE OUT
Q105, 106
2SC1740LN-R or S
or 2SC1327-T or U
Q107~110
2SC1740LN-R or S
Q201, 202
2SC1740LN-R or S
HEADPHONES
REC EQ AMP
Ass'y
RWX-361
METAL
STD
Cr O2
Fe-Cr
Q303~305
2SC2060-Q
Q306, 307
2SC2060-Q
S203-7
(LINE-MIC)
(ON-OFF)
(SOURCE-TAPE)

12.8 INDICATOR ASSEMBLY



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
RD¼PM □□□ J	R701–R716, R718, R719, R721, R722, R724, R725
RD½PF 122J	R727–R729
RS½PF □□□ J	R717, R720, R723, R726

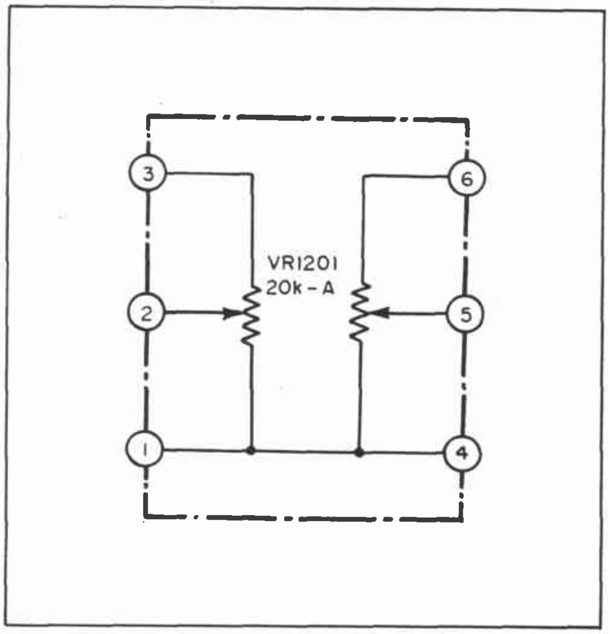
SEMICONDUCTORS

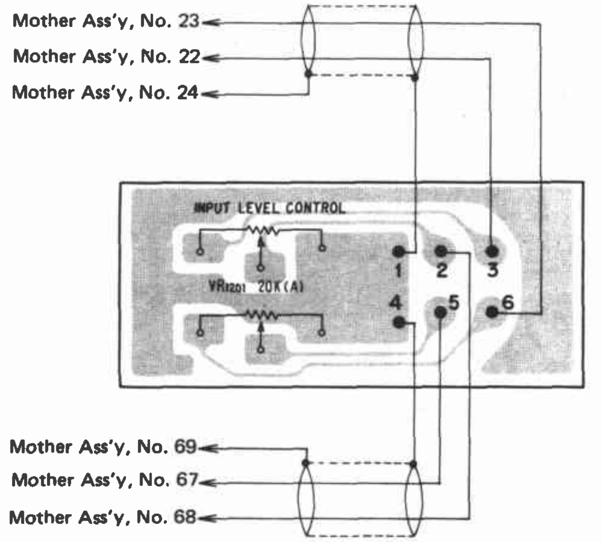
Part No.	Symbol & Description
2SA733A	Q701
1S2473	D701, D702
PG5531KX	LED701–LED704

OTHERS

Part No.	Symbol & Description
LD8242	V701 Fluorescent indicator tube (LEVEL)
FIP5D8	V702 Fluorescent indicator tube (COUNTER)
RDD-001	Cord (18P)

12.6 VOLUME ASSEMBLY

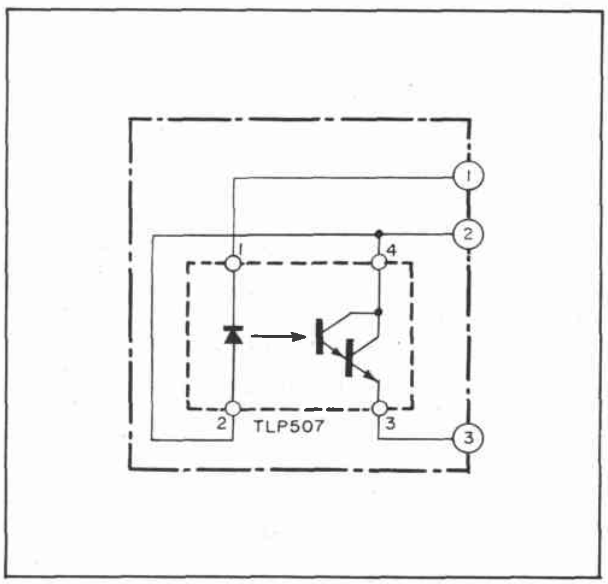


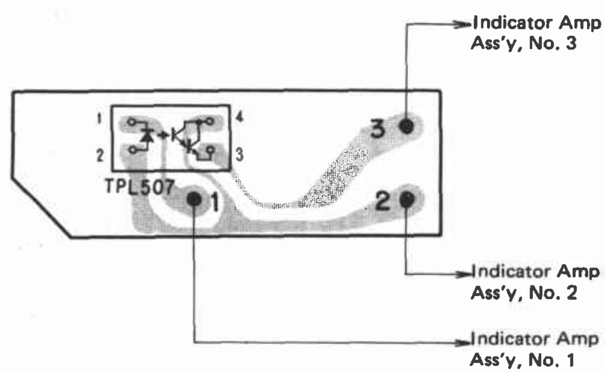


Parts List

Part No.	Symbol & Description	
RCV-056	VR1201	Volume 20k(A) (INPUT)

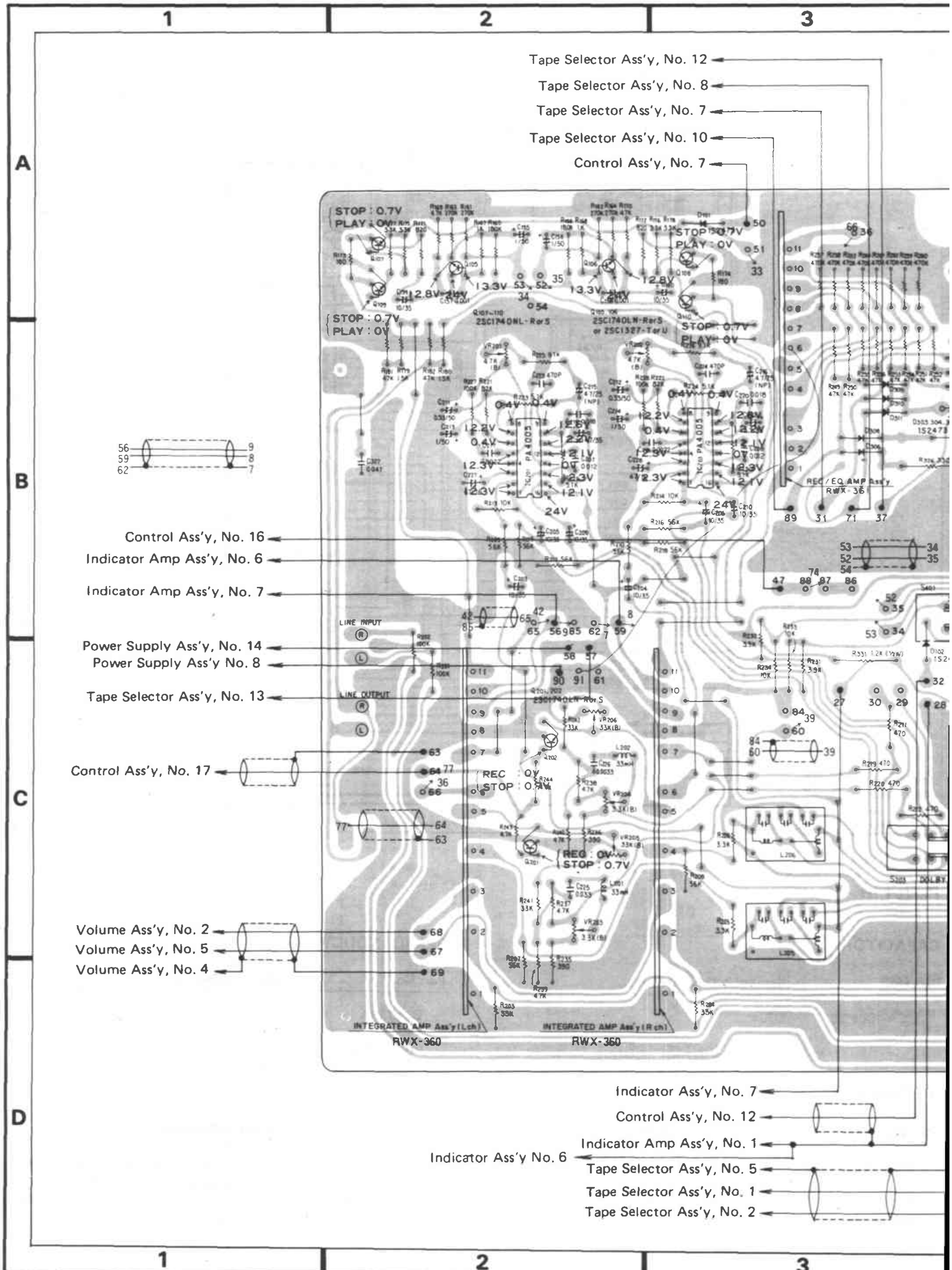
12.7 SENSING ASSEMBLY

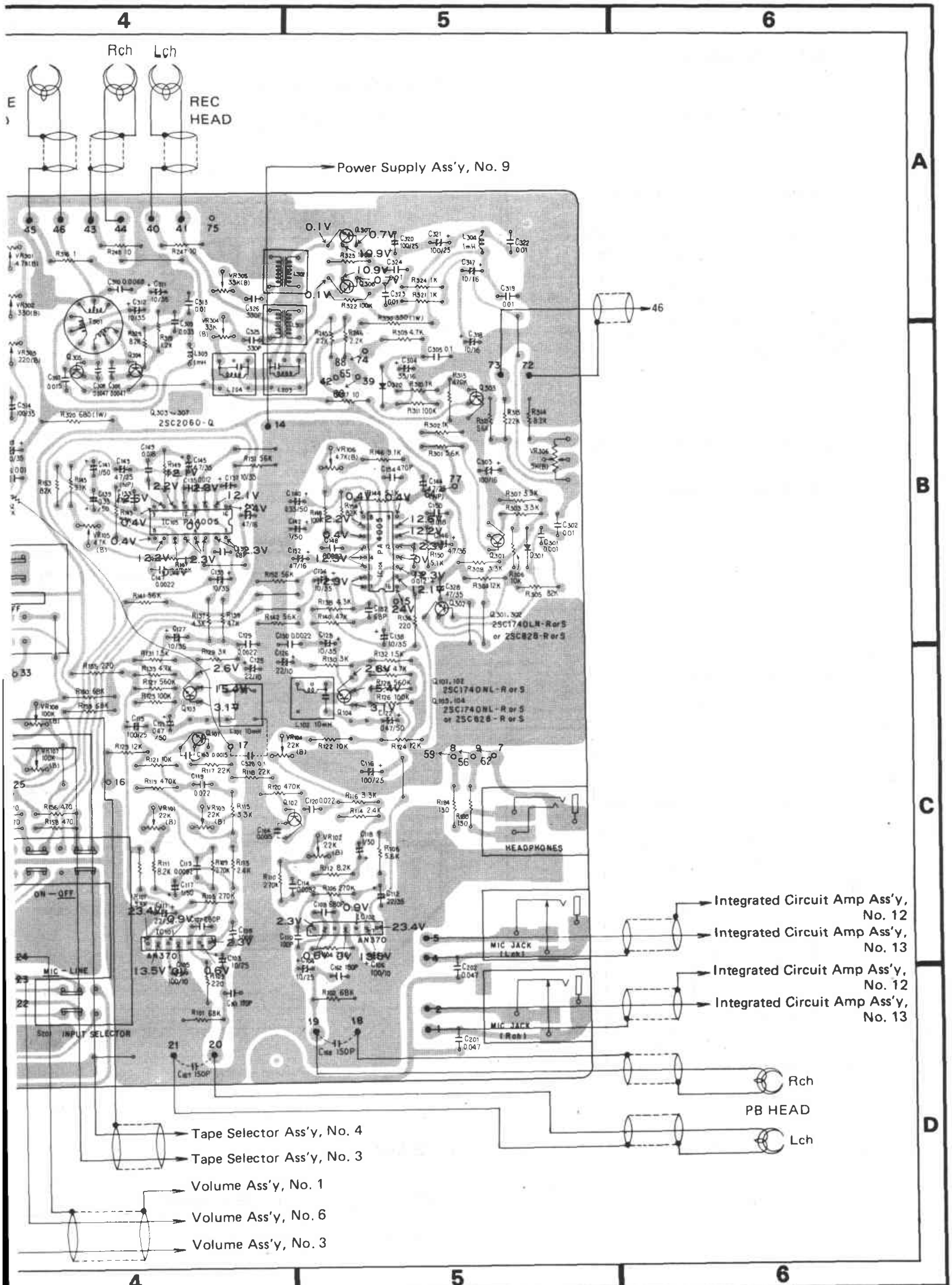




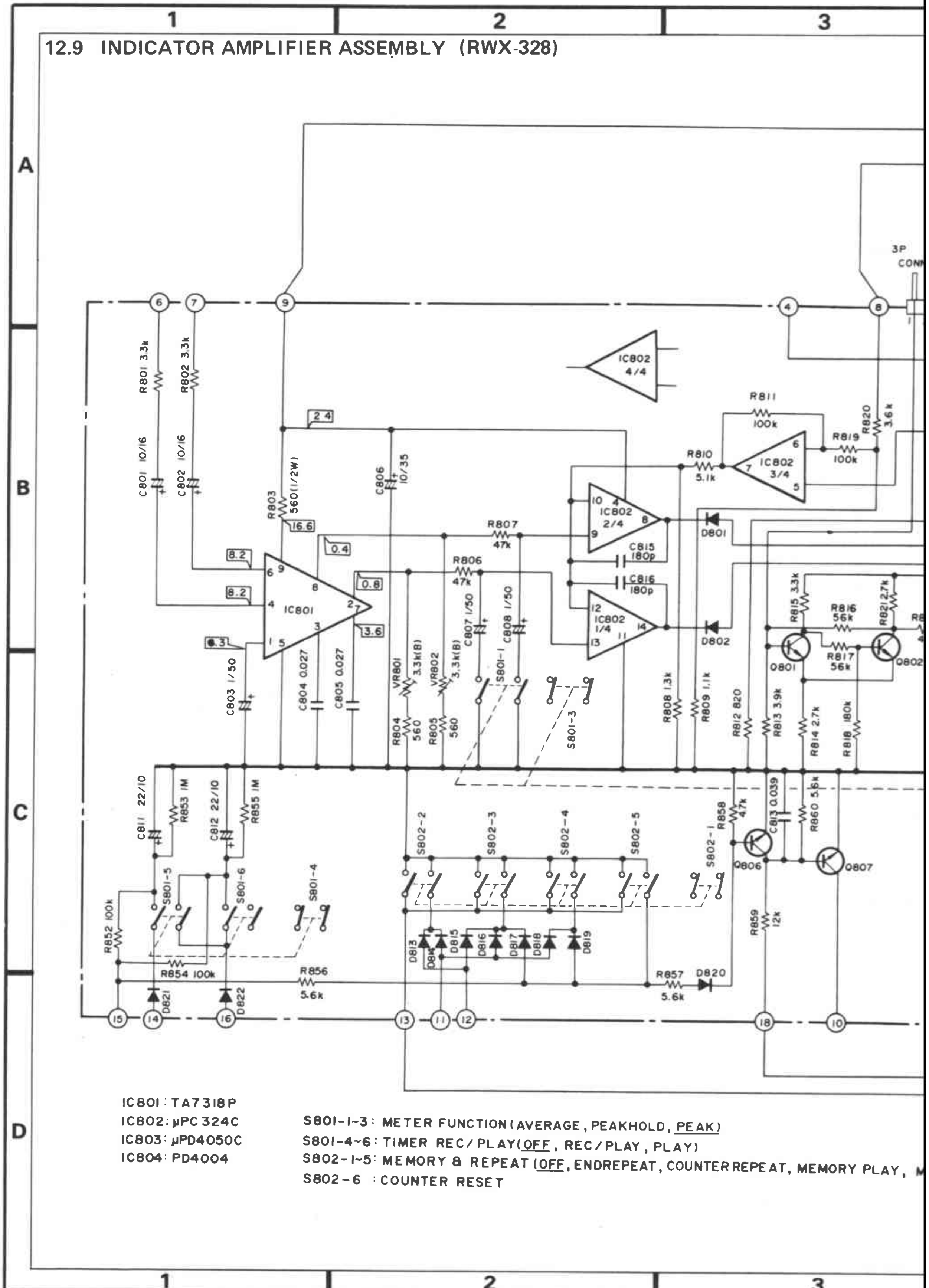
Parts List

Part No.	Symbol & Description
TLP 507A	Photo interrupter


1
2
3
A
B
C
D
Tape Selector Ass'y, No. 12
Tape Selector Ass'y, No. 8
Tape Selector Ass'y, No. 7
Tape Selector Ass'y, No. 10
Control Ass'y, No. 7
STOP : 0.7V
PLAY : 0V
Q107~110
2SC1740NL-R or S
Q105, 106
2SC1740LN-R or S
or 2SC1327-T or U
REC / EQ AMP Ass'y
RWX-361
Control Ass'y, No. 16
Indicator Amp Ass'y, No. 6
Indicator Amp Ass'y, No. 7
Power Supply Ass'y, No. 14
Power Supply Ass'y No. 8
Tape Selector Ass'y, No. 13
Control Ass'y, No. 17
Volume Ass'y, No. 2
Volume Ass'y, No. 5
Volume Ass'y, No. 4
LINE INPUT
LINE OUTPUT
Q201, 202
2SC1740LN-R or S
REC : 0V
STOP : 0.7V
INTEGRATED AMP Ass'y (L ch)
RWX-360
INTEGRATED AMP Ass'y (R ch)
RWX-360
Indicator Ass'y, No. 7
Control Ass'y, No. 12
Indicator Amp Ass'y, No. 1
Indicator Ass'y No. 6
Tape Selector Ass'y, No. 5
Tape Selector Ass'y, No. 1
Tape Selector Ass'y, No. 2

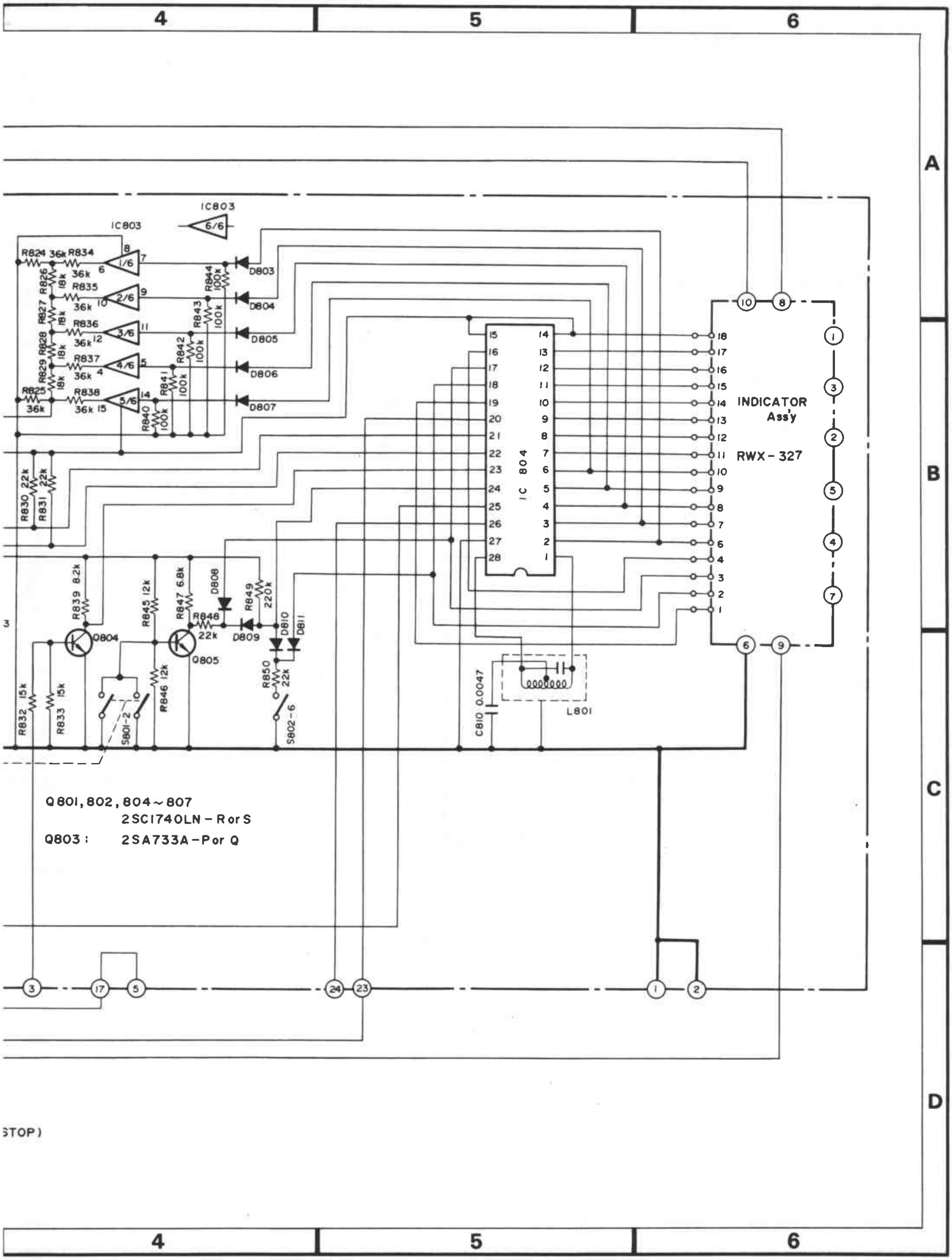

4
5
6
Rch
Lch
REC
HEAD
A
B
C
D
Power Supply Ass'y, No. 9
46
2SC2060-Q
2SC1740LN-R or S
or 2SC828-R or S
2SC1740NL-R or S
HEADPHONES
MIC JACK (Lch)
MIC JACK (Rch)
AN370
ON-OFF
MIC-LINE
INPUT SELECTOR
Integrated Circuit Amp Ass'y, No. 12
Integrated Circuit Amp Ass'y, No. 13
Integrated Circuit Amp Ass'y, No. 12
Integrated Circuit Amp Ass'y, No. 13
Rch
PB HEAD
Lch
Tape Selector Ass'y, No. 4
Tape Selector Ass'y, No. 3
Volume Ass'y, No. 1
Volume Ass'y, No. 6
Volume Ass'y, No. 3
4
5
6

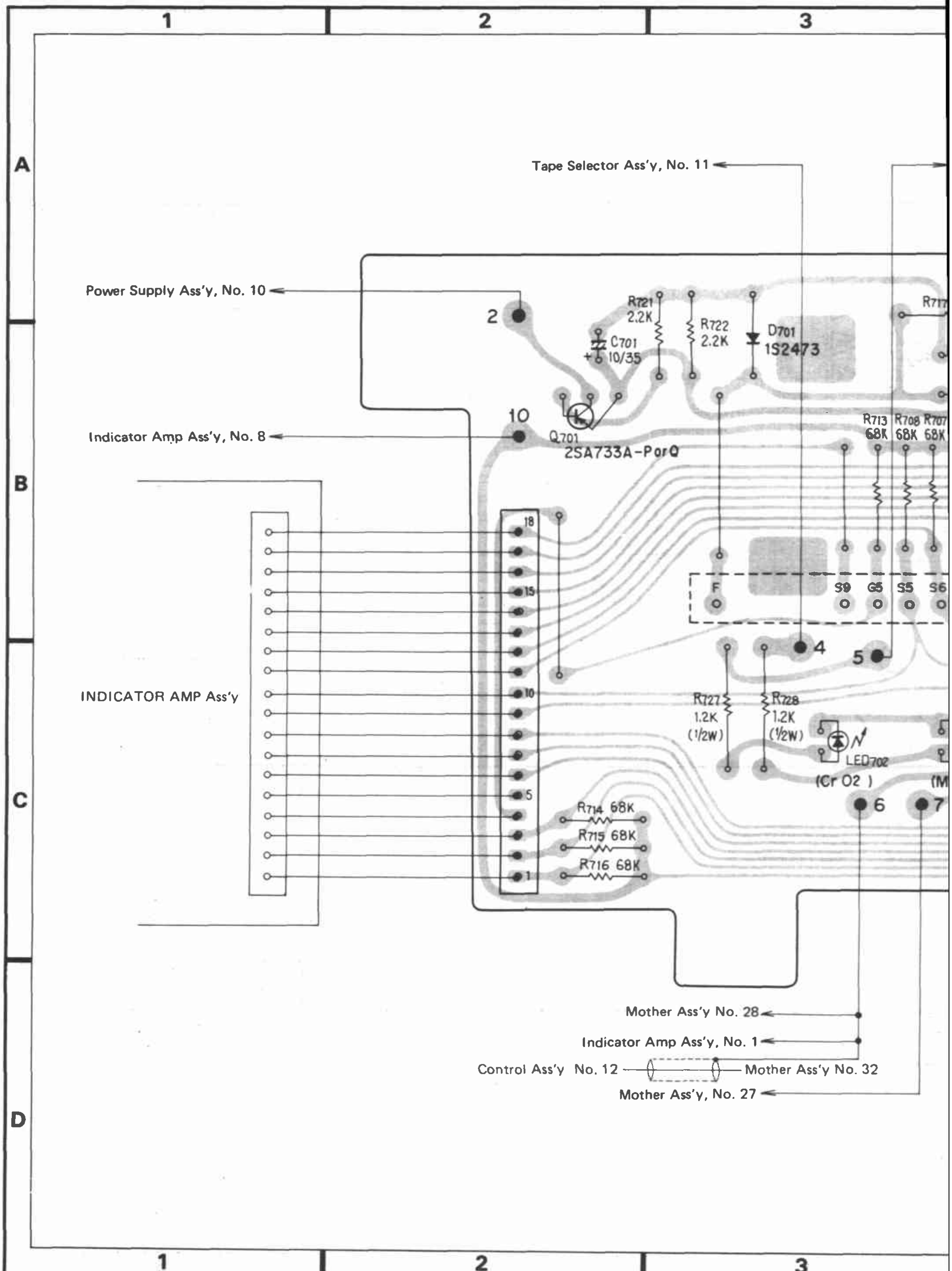
12.9 INDICATOR AMPLIFIER ASSEMBLY (RWX-328)



IC801: TA7318P
IC802: μPC324C
IC803: μPD4050C
IC804: PD4004

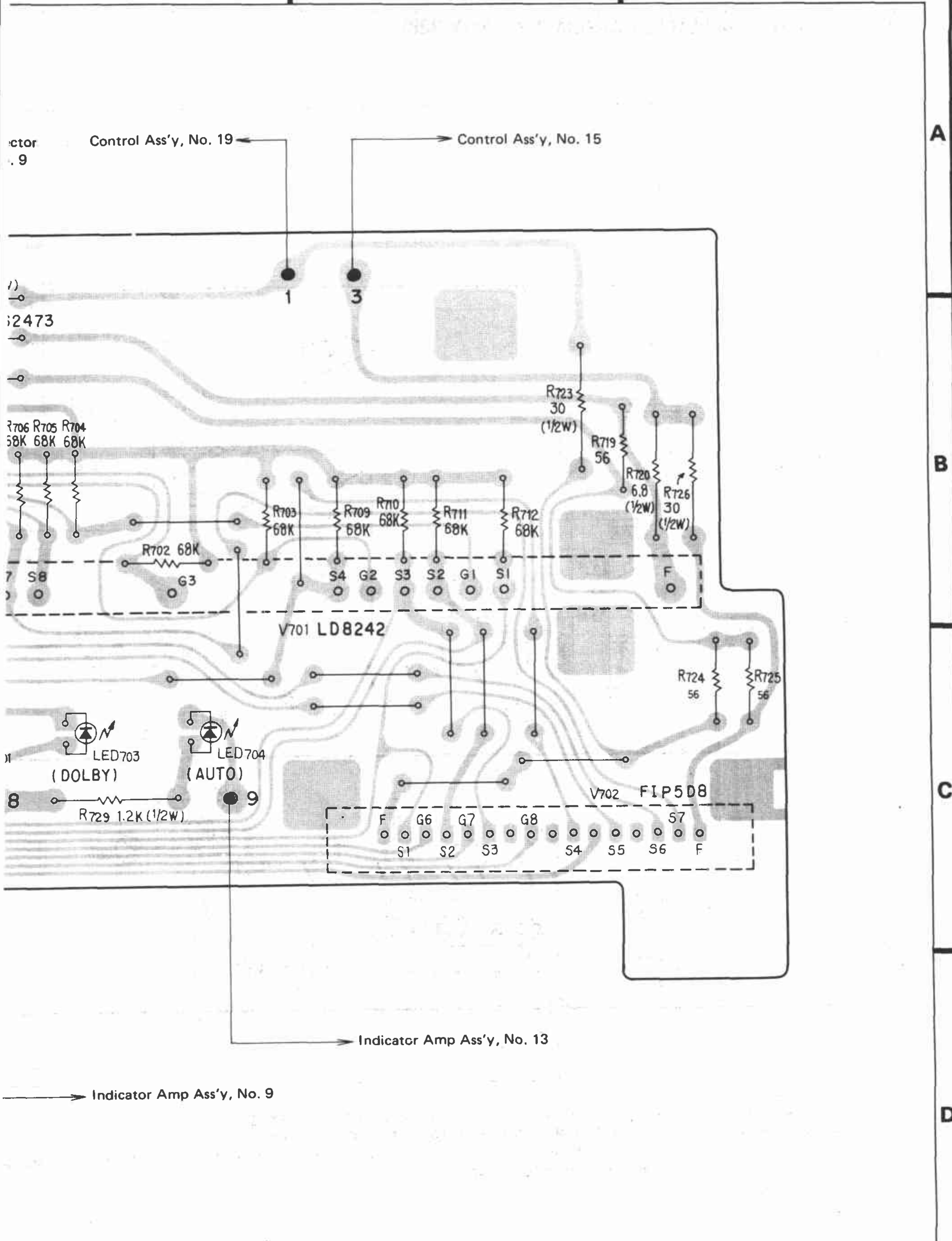
S801-1~3: METER FUNCTION (AVERAGE, PEAKHOLD, PEAK)
S801-4~6: TIMER REC/PLAY (OFF, REC/PLAY, PLAY)
S802-1~5: MEMORY & REPEAT (OFF, ENDREPEAT, COUNTER REPEAT, MEMORY PLAY, M
S802-6 : COUNTER RESET


4
5
6
A
B
C
D
IC803
IC803
1/6
2/6
3/6
4/6
5/6
6/6
R824 36k
R834 36k
R826 18k
R835 36k
R827 18k
R836 36k
R828 18k
R837 36k
R829 18k
R825 36k
R838 36k
R844 100k
R843 100k
R842 100k
R841 100k
R840 100k
D803
D804
D805
D806
D807
R830 22k
R831 22k
IC 804
INDICATOR Ass'y
RWX-327
R839 8.2k
Q804
R845 12k
R846 12k
R847 6.8k
R848 22k
Q805
D808
D809
R849 220k
D810
D811
R850 22k
S802-6
S801-2
R832 15k
R833 15k
C810 0.0047
L801
Q801, 802, 804~807
2SC1740LN - R or S
Q803 : 2SA733A - P or Q
STOP)



1
2
3
A
B
C
D
Tape Selector Ass'y, No. 11
Power Supply Ass'y, No. 10
Indicator Amp Ass'y, No. 8
R721 2.2K
R722 2.2K
D701 1S2473
C701 10/35
Q701 2SA733A-PorQ
R713 68K
R708 68K
R707 68K
INDICATOR AMP Ass'y
F
S9
G5
S5
S6
R727 1.2K (1/2W)
R728 1.2K (1/2W)
LED702
(Cr O2)
R714 68K
R715 68K
R716 68K
Mother Ass'y No. 28
Indicator Amp Ass'y, No. 1
Control Ass'y No. 12
Mother Ass'y No. 32
Mother Ass'y, No. 27

4	5	6



A
B
C
D
ector
. 9
Control Ass'y, No. 19
Control Ass'y, No. 15
1
3
2473
R723
30
(1/2W)
R719
56
R720
6.8
(1/2W)
R726
30
(1/2W)
R706 68K
R705 68K
R704 68K
R703 68K
R709 68K
R710 68K
R711 68K
R712 68K
R702 68K
S8
G3
S4
G2
S3
S2
G1
S1
F
V701 LD8242
R724
56
R725
56
LED703
(DOLBY)
LED704
(AUTO)
8
9
R729 1.2K (1/2W)
V702 FIP5D8
F G6 G7 G8 S7
S1 S2 S3 S4 S5 S6 F
Indicator Amp Ass'y, No. 13
Indicator Amp Ass'y, No. 9

4	5	6

Parts List of Indicator Amplifier Assembly (RWX-328)

SWITCHES AND COIL

Part No.	Symbol & Description	
RSG-067	S801	Switch F
RSG-066	S802	Switch E
RTD-015	L801	Oscillation coil

CAPACITORS

Part No.	Symbol & Description
CEA 100P 16	C801, C802
CEA 100P 35	C806
CEA 220P 10	C811, C812
CEA 010P 50	C803, C807, C808
CQMA 273K 50	C804, C805
CQMA 393K 50	C813
CQMA 472K 50	C810
CCDSL 181K 50	C815, C816

RESISTORS

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

Part No.	Symbol & Description	
RCP-039	VR801, VR802	Semi-fixed 3.3K (B)
RDPS □□□ J	R801, R802, R804–R850, R852-R860	
RD½PF 561J	R803	

OTHER

Part No.	Symbol & Description
RKP-046	Connector 3P

SEMICONDUCTORS

Part No.	Symbol & Description
TA7318P	IC801
μPC324C	IC802
μPD4050C	IC803
PD4004	IC804
2SC1740LN	Q801, Q802, Q804–Q807
2SA733A	Q803
1S2473	D801–D811, D813–D822

12.10 INTEGRATED AMPLIFIER ASSEMBLY (RWX-360)

Parts List

CAPACITORS

Part No.	Symbol & Description
CEA 100P 16	C1001, C1007, C1021
CEA 221P 25	C1018
CEA 101P 25	C1021
CEA 470P 16	C1006
CEA 330P 16	C1011
CEA 100P 25	C1010
CEA 4R7P 35	C1009
CEA 010P 50	C1013
CSSA R33M 25	C1014
CEA 100P 35	C1015
CEANL 100P 16	C1003
CEANL R47P 50	C1005
CQMA 683K 50	C1017
CCDSL 101K 50	C1002, C1008, C1016
CCDSL 220K 50	C1004, C1020

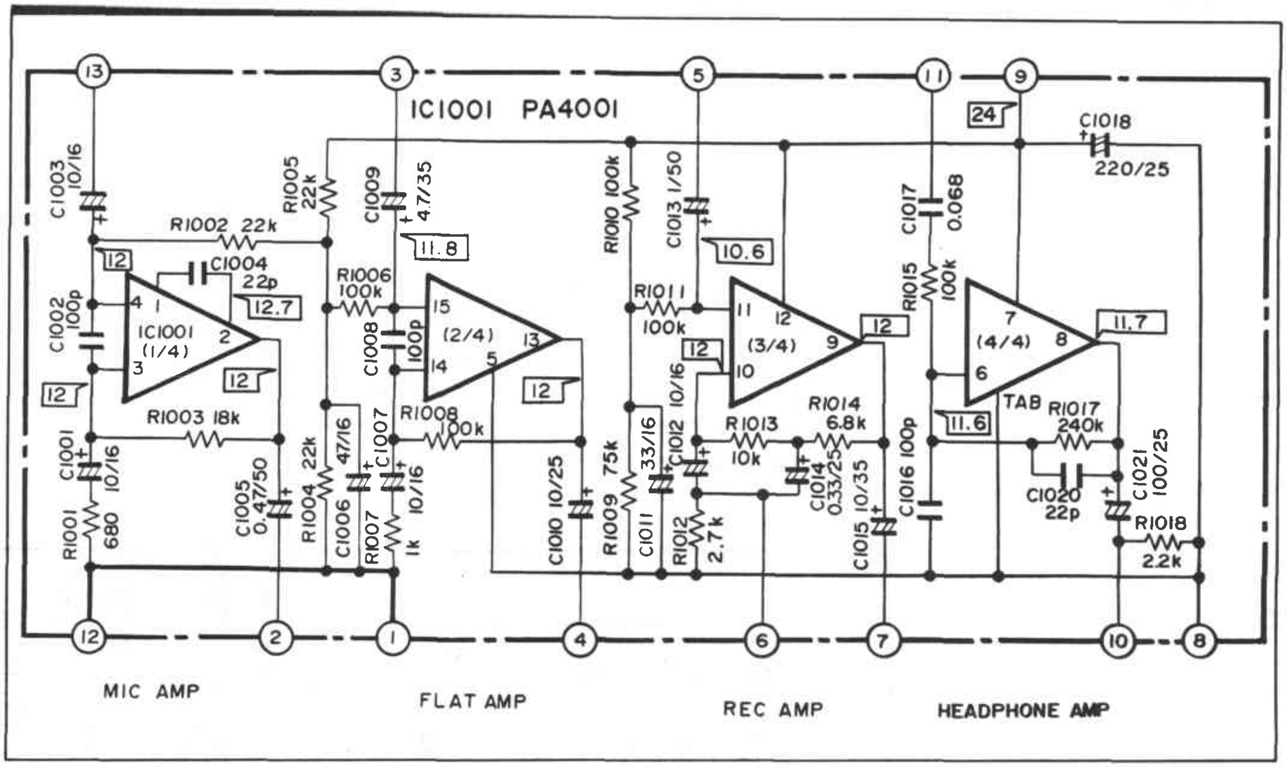
RESISTORS

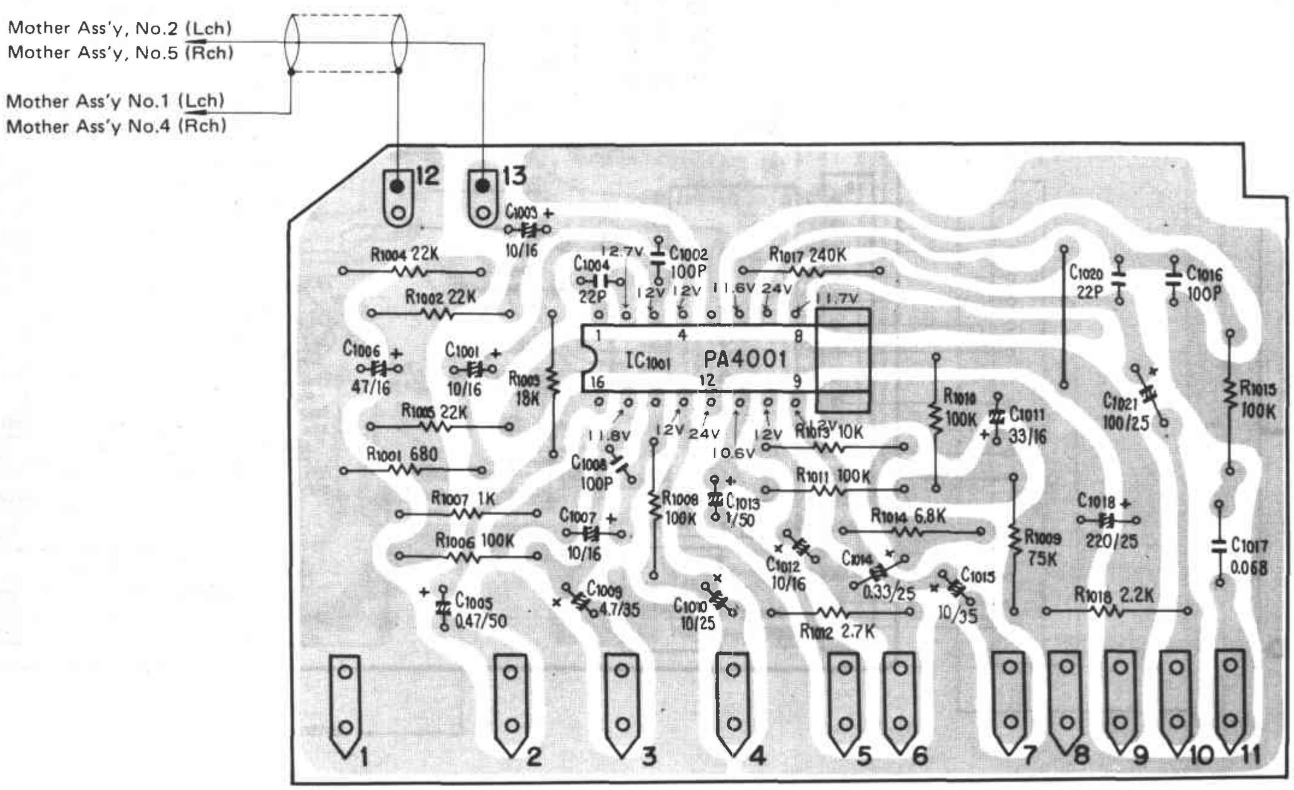
Note: When ordering resistors, convert resistance value into code form, then rewrite the part no. as bef

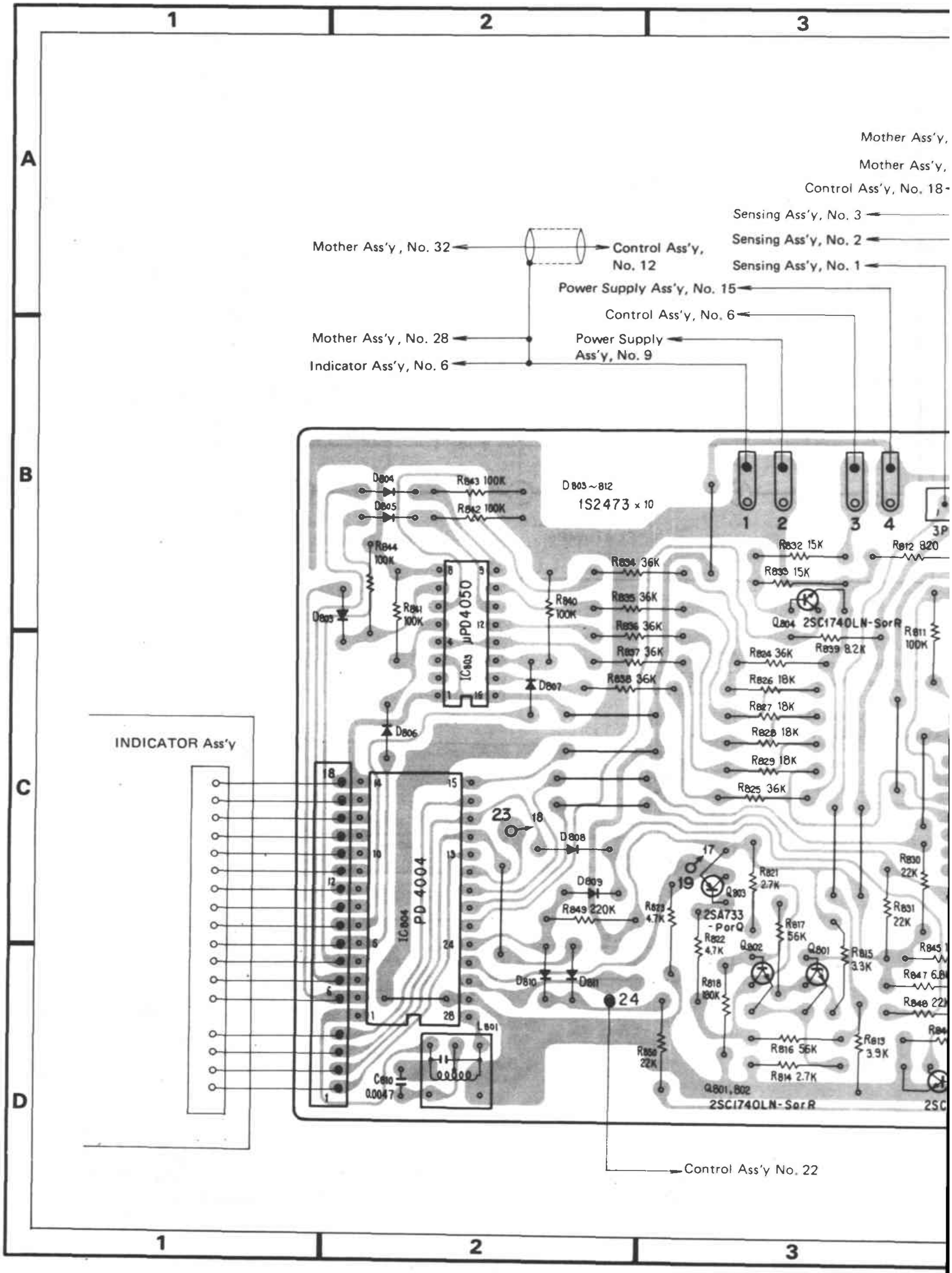
Part No.	Symbol & Description
RD¼PS □□□ J	R1001–R1015, R1017, R1018

SEMICONDUCTOR AND OTHER

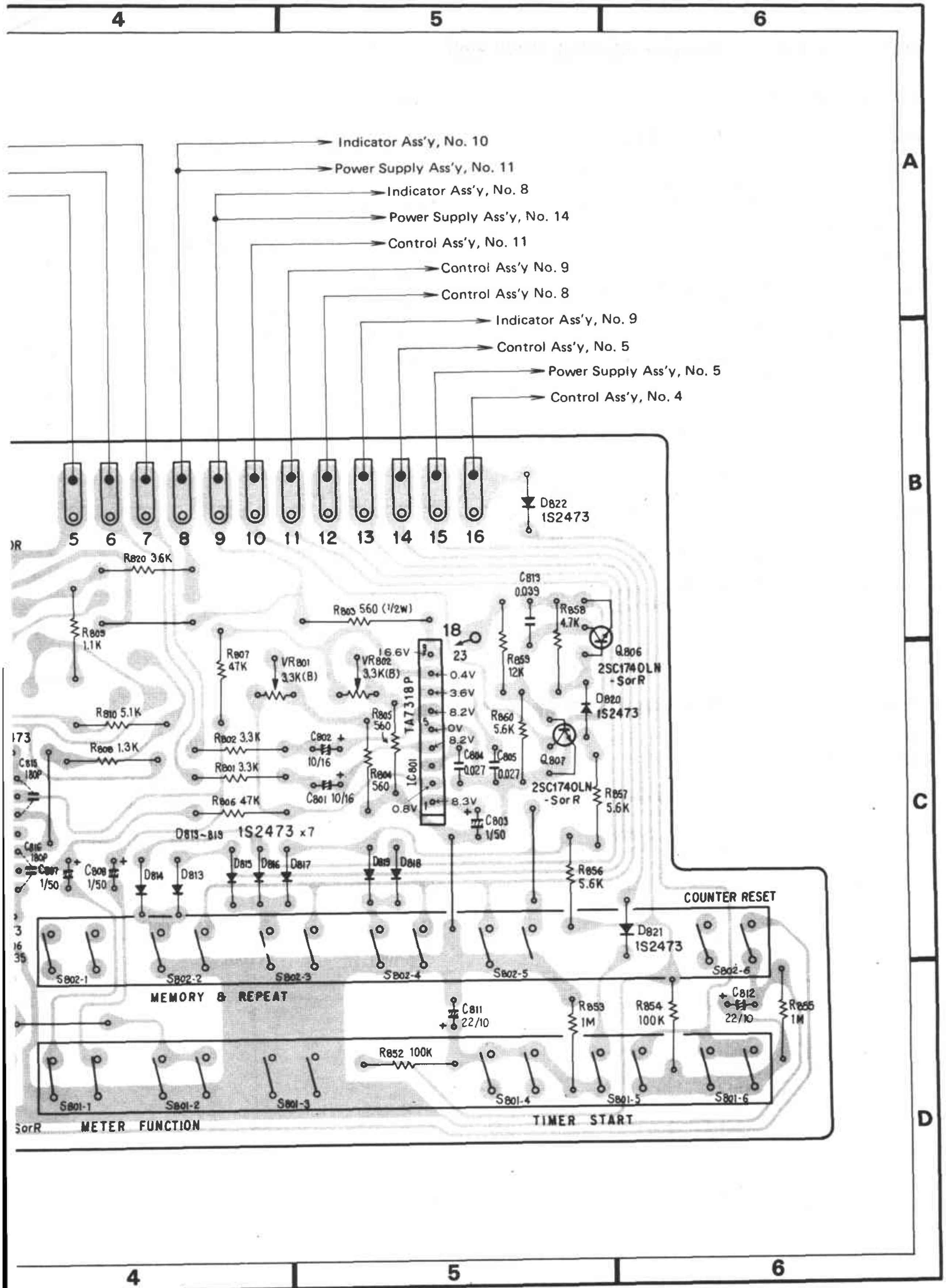
Part No.	Symbol & Description
PA-4001	IC1001
RKF-015	Connector


IC1001 PA4001
MIC AMP
FLAT AMP
REC AMP
HEADPHONE AMP

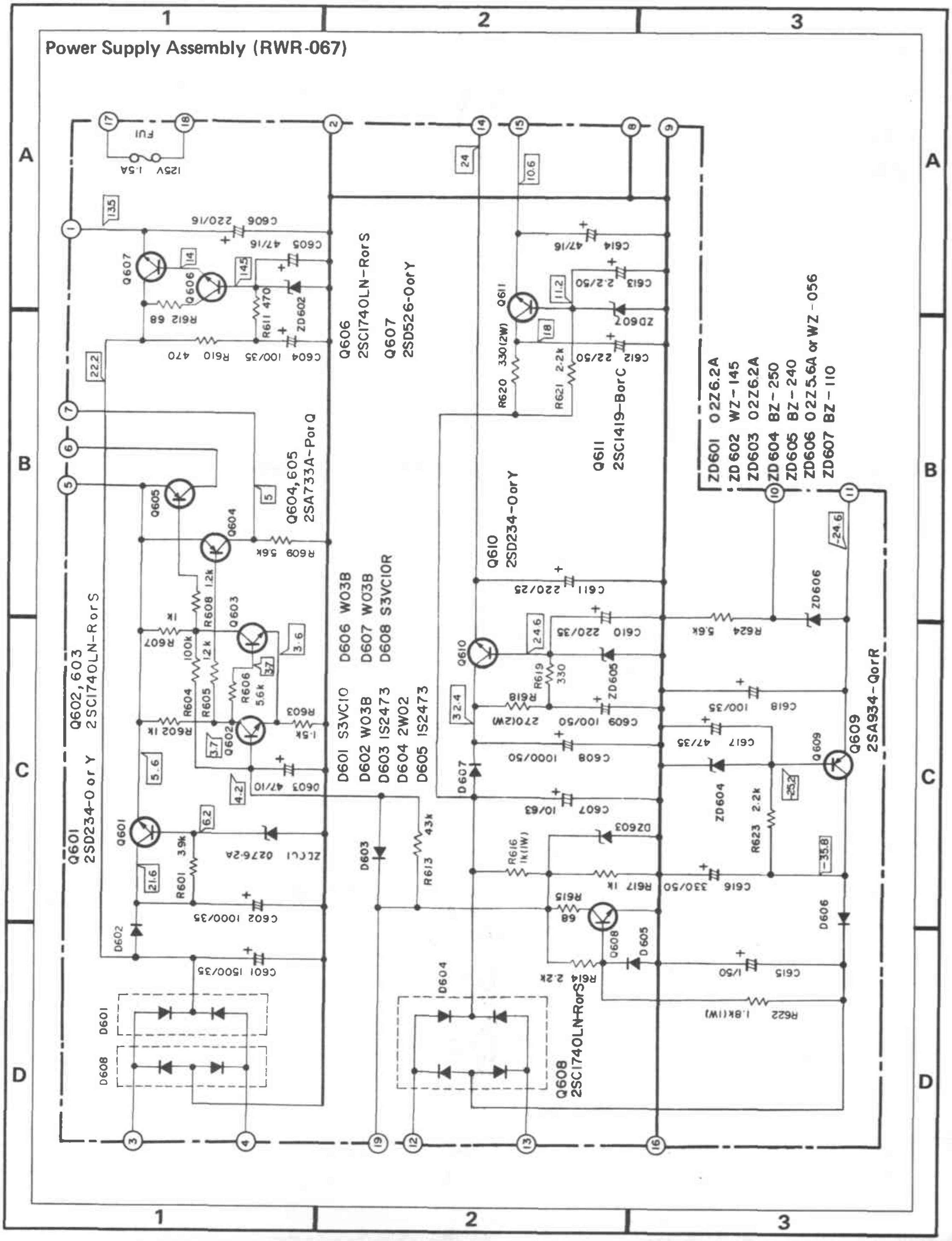

Mother Ass'y, No.2 (Lch)
Mother Ass'y, No.5 (Rch)
Mother Ass'y No.1 (Lch)
Mother Ass'y No.4 (Rch)
IC1001 PA4001



1
2
3
A
B
C
D
Mother Ass'y,
Mother Ass'y,
Control Ass'y, No. 18
Sensing Ass'y, No. 3
Sensing Ass'y, No. 2
Sensing Ass'y, No. 1
Mother Ass'y, No. 32
Control Ass'y, No. 12
Power Supply Ass'y, No. 15
Control Ass'y, No. 6
Mother Ass'y, No. 28
Power Supply Ass'y, No. 9
Indicator Ass'y, No. 6
D803~812 1S2473 x 10
INDICATOR Ass'y
μPD4050
IC803
PD 4004
IC804
2SC1740LN-SorR
2SA733-PorQ
Q801, 802 2SC1740LN-SorR
Control Ass'y No. 22


4
5
6
A
B
C
D
Indicator Ass'y, No. 10
Power Supply Ass'y, No. 11
Indicator Ass'y, No. 8
Power Supply Ass'y, No. 14
Control Ass'y, No. 11
Control Ass'y No. 9
Control Ass'y No. 8
Indicator Ass'y, No. 9
Control Ass'y, No. 5
Power Supply Ass'y, No. 5
Control Ass'y, No. 4
5 6 7 8 9 10 11 12 13 14 15 16
D822 1S2473
R820 3.6K
R809 1.1K
R803 560 (1/2W)
C813 0.039
R858 4.7K
Q806 2SC1740LN -SorR
R859 12K
R807 47K
VR801 3.3K(B)
VR802 3.3K(B)
TA7318P
IC801
16.6V
0.4V
3.6V
8.2V
0V
8.2V
8.3V
0.8V
18
23
D820 1S2473
R860 5.6K
Q807 2SC1740LN -Sor R
R857 5.6K
R810 5.1K
R808 1.3K
R802 3.3K
R801 3.3K
R806 47K
C802 10/16
C801 10/16
R805 560
R804 560
C804 0.027
C805 0.027
C803 1/50
C815 180P
C816 180P
C807 1/50
C808 1/50
D813~819 1S2473 x7
D814
D813
D815
D816
D817
D819
D818
R856 5.6K
COUNTER RESET
D821 1S2473
S802-1
S802-2
S802-3
S802-4
S802-5
S802-6
MEMORY & REPEAT
C811 22/10
R853 1M
R854 100K
C812 22/10
R855 1M
R852 100K
S801-1
S801-2
S801-3
S801-4
S801-5
S801-6
METER FUNCTION
TIMER START
SorR

Power Supply Assembly (RWR-067)



12.11 POWER SUPPLY ASSEMBLY (RWR-067)

Parts List

FUSE

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

CAPACITORS

Part No.	Symbol & Description
CEA 152P 35	C601
CEA 102P 35	C602
CEA 470P 10	C603
CEA 101P 35	C604, C618
CEA 470P 16	C605, C 614
CEA 221P 16	C 606
CEA 100P 63	C 607
CEA 102P 50	C 608
CEA 101P 50	C 609
CEA 221P 35	C 610
CEA 221P 25	C 611
CEA 220P 50	C 612
CEA 2R2P 50	C 613
CEA 010P 50	C 615
CEA 331P 50	C 616
CEA 470P 35	C 617

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

RESISTORS

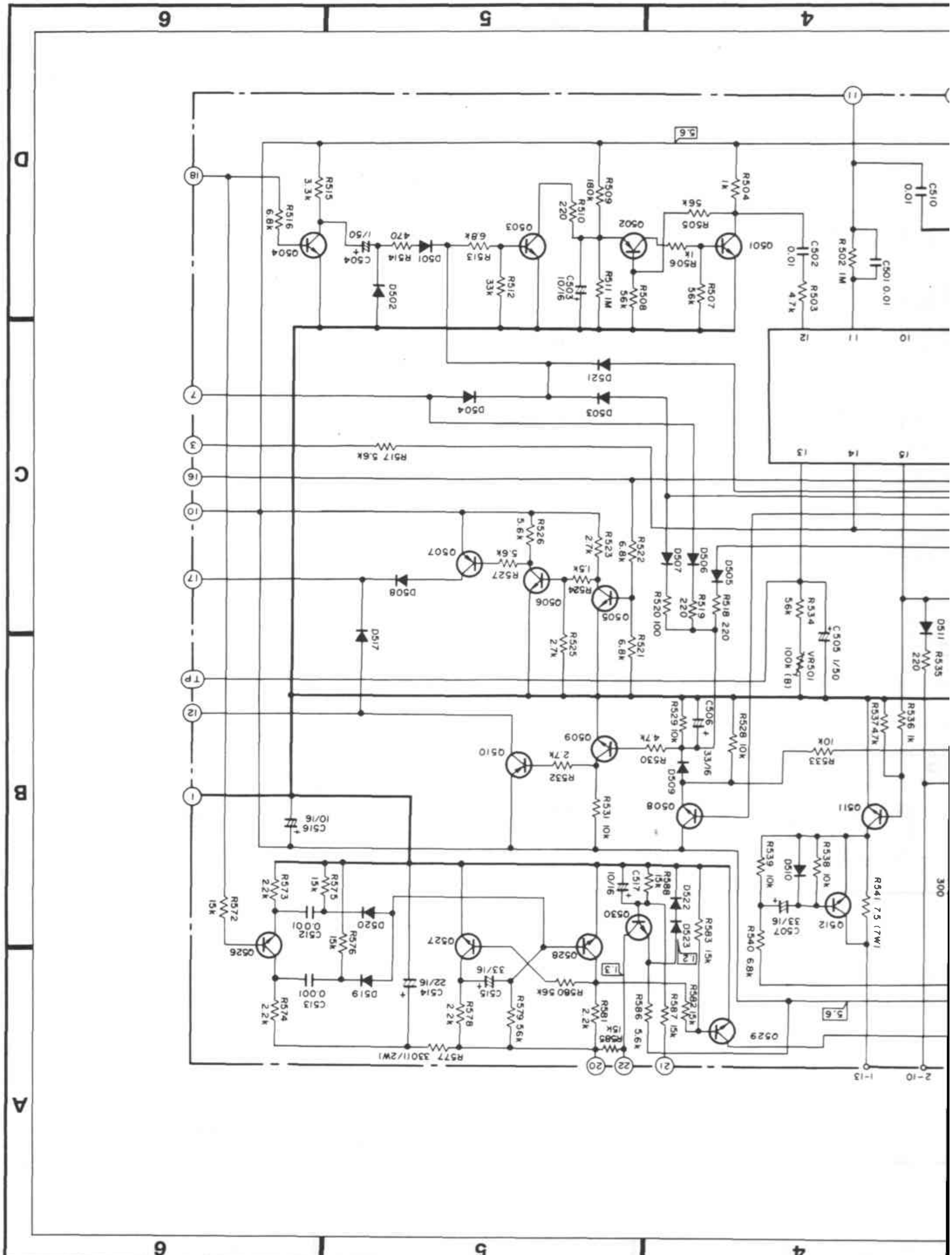
Part No.	Symbol & Description	
RD¼PSF □□□ J	R601, R610–R612, R621, R623	
RD¼PS □□□ J	R602–R609, R613–R615, R617, R624	
RS1PF □□□ J	R616, R619, R622	
RCN-039	R618	270 2W
RCN-040	R620	330 2W

SEMICONDUCTORS

Part No.	Symbol & Description
2SD234	Q601, Q610
2SC1740LN	Q602, Q603, Q606, Q608
2SA733A	Q604, Q605
2SD526	Q607
2SA934	Q609
2SC1419	Q611
S3VC10	D601
W03B (S1B01-01)	D602, D606, D607
1S2473	D603, D605
2W02	D604
S3VC10R	D608
02Z6.2A	ZD601, ZD603
WZ-145	ZD602
BZ-250	ZD604
BZ-240	ZD605
02Z5.6A (WZ-056)	ZD606
BZ-110	ZD607

OTHERS

Part No.	Symbol & Description
RKH-005	Insulator
REE-051	Insulator



6
5
4
D
C
B
A
R515 3.3k
R516 6.8k
Q504
C504 1/50
R514 470
D501
R513 6.8k
Q503
R509 180k
R510 220
Q502
R505 56k
R504 1k
Q501
R506 1k
C502 0.01
R503 4.7k
C510 0.01
R502 1M
C501 0.01
D502
R512 33k
C503 10/16
R511 1M
R508 56k
R507 56k
5.6
D521
D504
D503
R517 5.6k
R526 5.6k
Q507
R527 5.6k
Q506
R523 2.7k
R524 1.5k
Q505
R522 6.8k
D507
D506
D505
R520 100
R519 220
R518 220
D508
D517
R525 2.7k
R521 6.8k
R534 56k
VR501 100k (B)
C505 1/50
D511
R535 220
C506 33/16
R529 10k
R528 10k
R537 4.7k
R536 1k
Q509
R530 4.7k
Q510
R532 2.7k
D509
R533 10k
Q508
R531 10k
Q511
C516 10/16
R539 10k
D510
R538 10k
Q512
C507 33/16
R540 6.8k
R541 7.5 (7W)
300
R572 15k
R573 2.2k
R575 15k
C512 0.001
R576 15k
D520
Q526
C513 0.001
D519
R574 2.2k
C514 22/16
Q527
C515 33/16
R578 2.2k
R579 5.6k
Q528
R580 56k
R581 2.2k
C517 10/16
R588 15k
Q530
D522
D523
R583 15k
R582 15k
R586 5.6k
R587 15k
R585 15k
Q529
R577 330 (1/2W)
1.3
18
7
3
16
10
17
TP
12
1
20
22
21
11
12
13
14
15
1-13
2-10

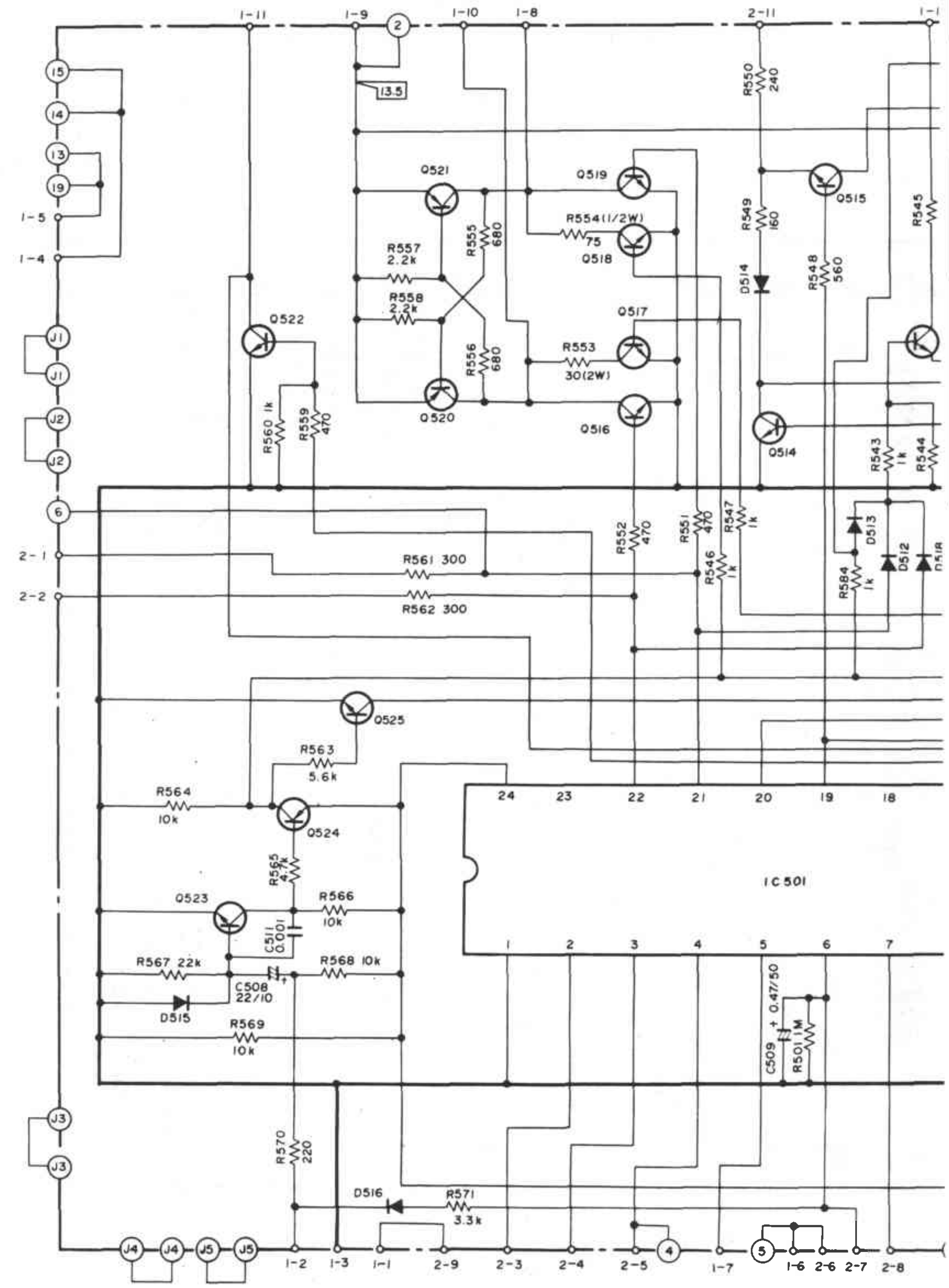
1 2 3

12.12 CONTROL ASSEMBLY (RWG-103)

Q502, 507, 510, 524 2SA733A – P or Q
Q520, 521 2SA934 – Q or R
Q511 ~ 513 2SD686 or 2SD837 – Q
Q516 ~ 519, Q522 2SC2060 – Q or R
Q501, 503 ~ 506, 508, 509, 514, 515, 523, 525 ~ 530 2SC1740LN – R or S

D501 ~ 523 1S2473
IC501 TC9121P

A

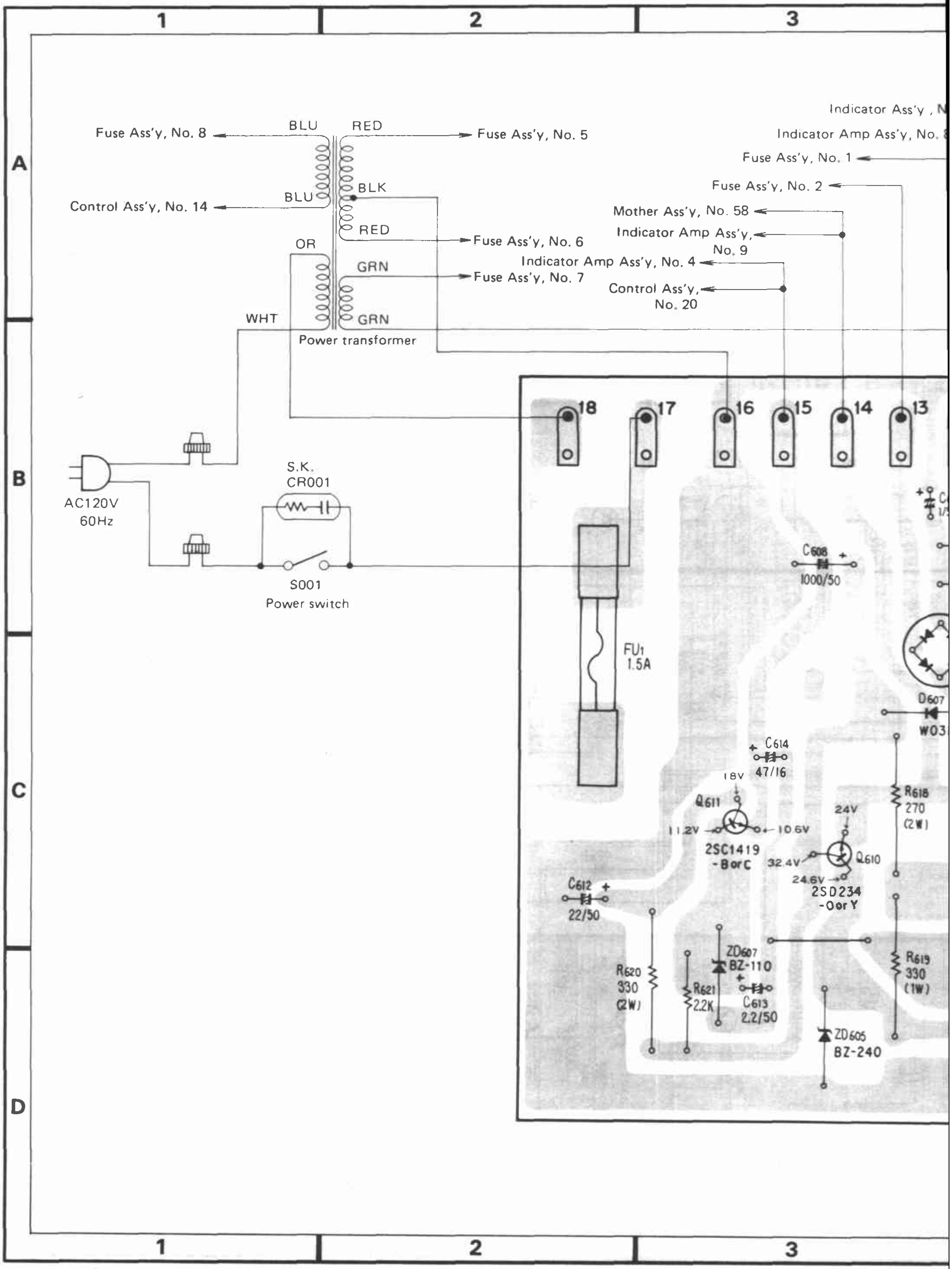


B

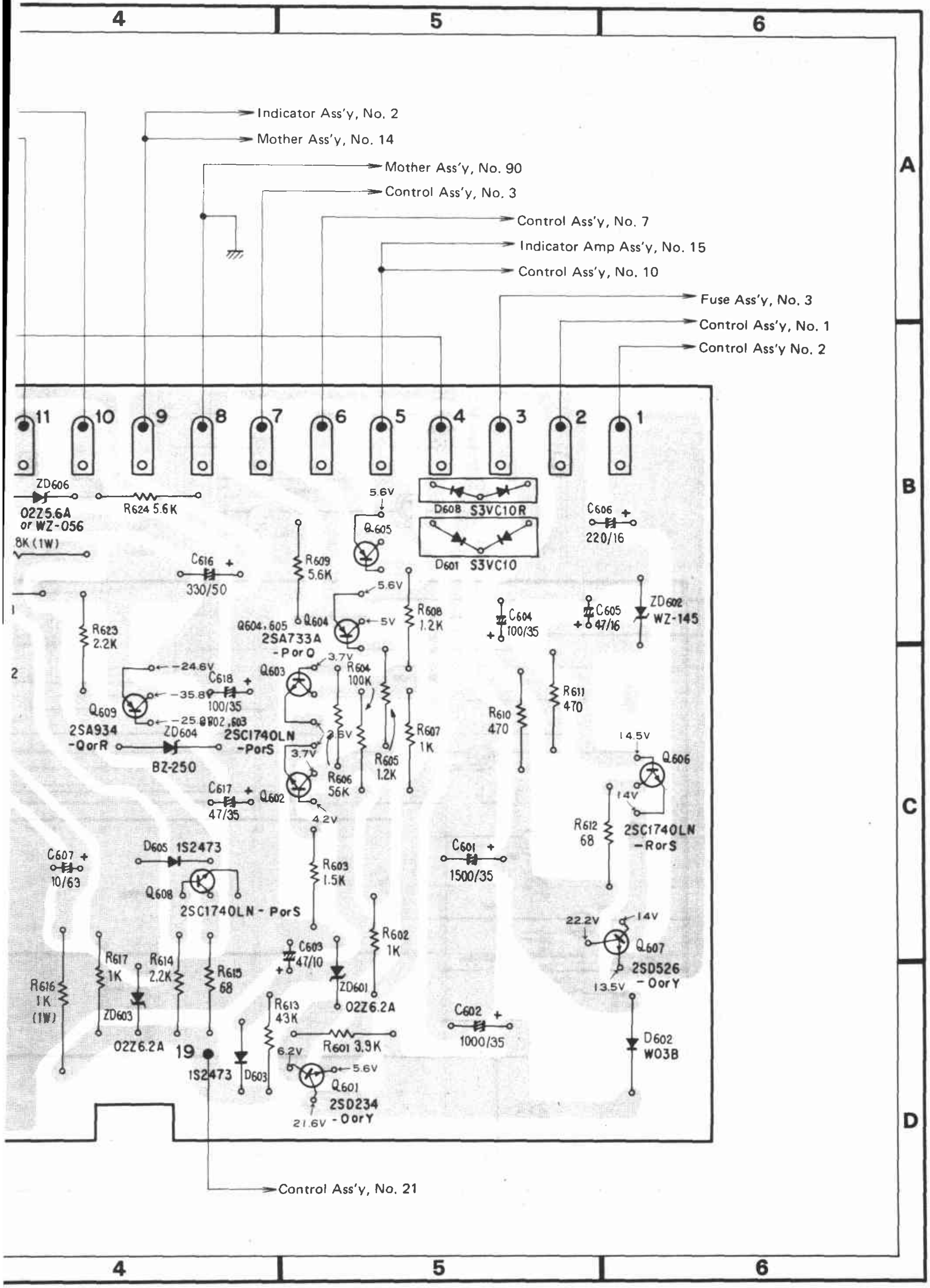
C

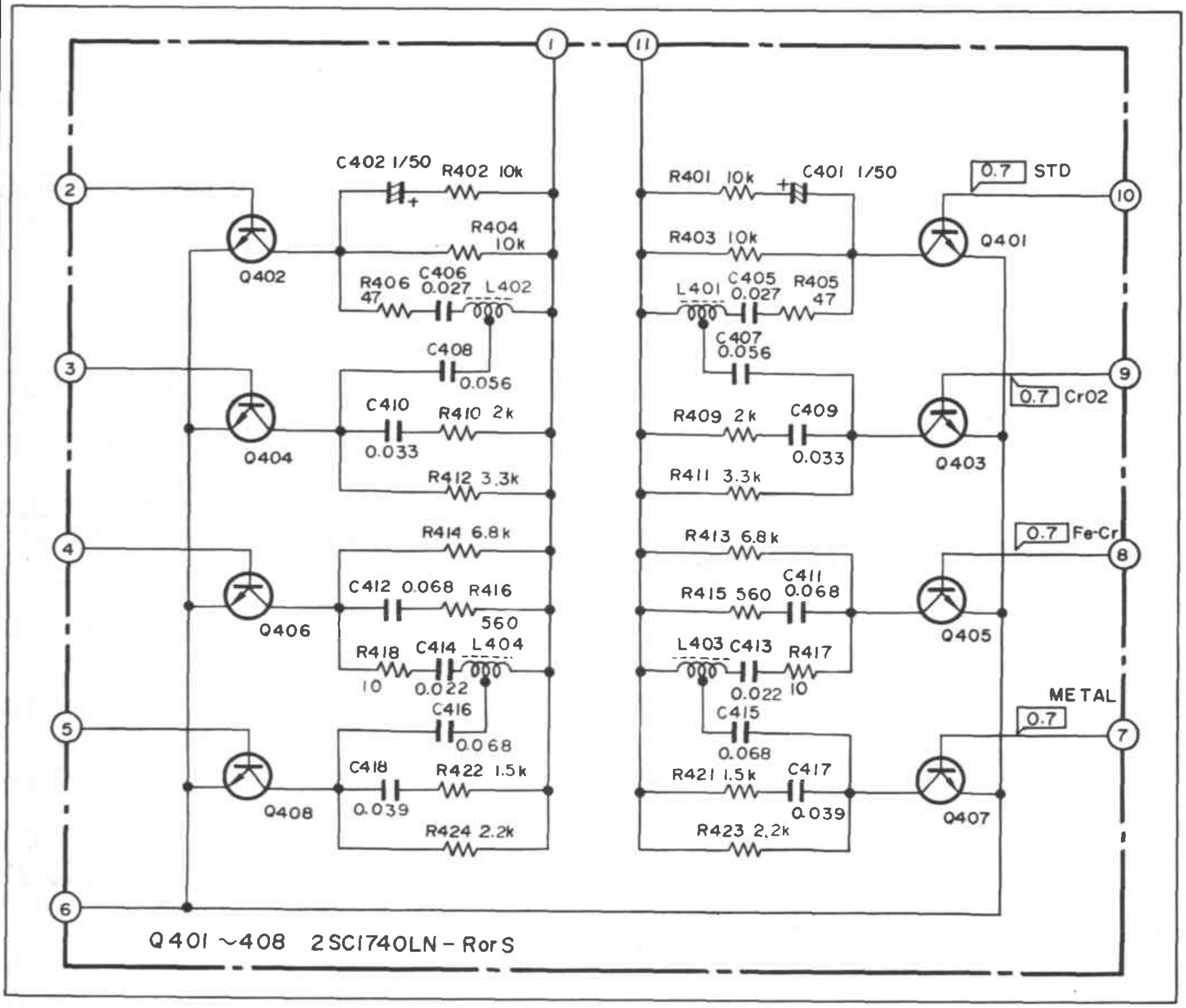
D

1 2 3



1
2
3
A
B
C
D
Indicator Ass'y , N
Indicator Amp Ass'y, No. 8
Fuse Ass'y, No. 1
Fuse Ass'y, No. 2
Mother Ass'y, No. 58
Indicator Amp Ass'y, No. 9
Indicator Amp Ass'y, No. 4
Control Ass'y, No. 20
Fuse Ass'y, No. 8
BLU
RED
Fuse Ass'y, No. 5
Control Ass'y, No. 14
BLU
BLK
RED
Fuse Ass'y, No. 6
OR
GRN
Fuse Ass'y, No. 7
WHT
GRN
Power transformer
18
17
16
15
14
13
AC120V
60Hz
S.K.
CR001
S001
Power switch
C608
1000/50
FU1
1.5A
D607
C614
47/16
18V
Q611
11.2V
10.6V
2SC1419
-B or C
24V
32.4V
Q610
24.6V
2SD234
-O or Y
R618
270
(2W)
C612
22/50
R620
330
(2W)
R621
2.2K
ZD607
BZ-110
C613
2.2/50
ZD605
BZ-240
R619
330
(1W)


4
5
6
A
B
C
D
Indicator Ass'y, No. 2
Mother Ass'y, No. 14
Mother Ass'y, No. 90
Control Ass'y, No. 3
Control Ass'y, No. 7
Indicator Amp Ass'y, No. 15
Control Ass'y, No. 10
Fuse Ass'y, No. 3
Control Ass'y, No. 1
Control Ass'y No. 2
11 10 9 8 7 6 5 4 3 2 1
ZD606
02Z5.6A
or WZ-056
R624 5.6K
D608 S3VC10R
D601 S3VC10
C606 220/16
C616 330/50
R609 5.6K
Q605
5.6V
5V
R608 1.2K
C604 100/35
C605 47/16
ZD602 WZ-145
R623 2.2K
Q604, 605
2SA733A
-P or Q
Q604
Q603
3.7V
R604 100K
R611 470
R610 470
-24.6V
-35.8V
-25.8V
C618 100/35
Q609
2SA934
-Q or R
ZD604
BZ-250
Q602, 603
2SC1740LN
-P or S
R605 1.2K
R607 1K
R606 56K
14.5V
Q606
14V
C617 47/35
Q602
4.2V
R612 68
2SC1740LN
-R or S
C607 10/63
D605 1S2473
Q608
2SC1740LN - P or S
R603 1.5K
C601 1500/35
22.2V
Q607
2SD526
- O or Y
13.5V
C603 47/10
ZD601 02Z6.2A
R602 1K
R616 1K (1W)
R617 1K
R614 2.2K
R615 68
ZD603
02Z6.2A
19
1S2473
D603
R613 43K
6.2V
R601 3.9K
5.6V
Q601
2SD234
- O or Y
21.6V
C602 1000/35
D602 W03B
Control Ass'y, No. 21
4
5
6



Parts List

COILS

Part No.	Symbol & Description	
RTF-069	L401, L402	Peaking coil
RTF-070	L403, L404	Peaking coil

CAPACITORS

Part No.	Symbol & Description
CEA 010P 50	C401, C402
CQMA 683J 50	C411, C412, C415, C416
CQMA 563J 50	C407, C408
CQMA 393J 50	C417, C418
CQMA 333J 50	C409, C410
CQMA 273J 50	C405, C406
CQMA 223J 50	C413, C414

RESISTORS

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

Part No	Symbol & Description
RD¼PM □□□J	R401, R402, R405, R406, R409–R418 R421–R424
RD¼PS 103J	R403
RD¼VS 103J	R404

SEMICONDUCTORS

Part No.	Symbol & Description
2SC1740LN	Q401–Q408

OTHER

Part No.	Symbol & Description
RKF-019	Connector

Parts List of Control Assembly (RWG-103)

CAPACITORS

Part No.	Symbol & Description
CQMA 103K 50	C501, C502, C510
CEA 330P 16	C506, C507, C515
CEA 220P 16	C514
CEA 220P 10	C508
CEA 100P 16	C503, C516, C517
CEA 010P 50	C504, C505
CEA R47P 50	C509
CQMA 102K 50	C511–C513

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

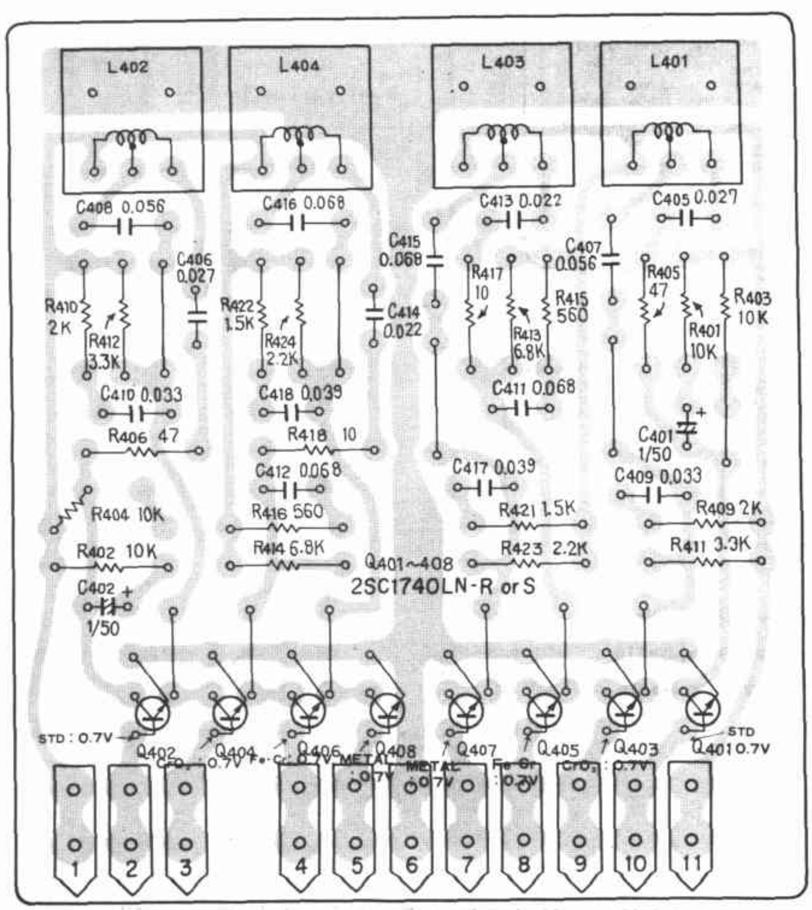
RESISTORS

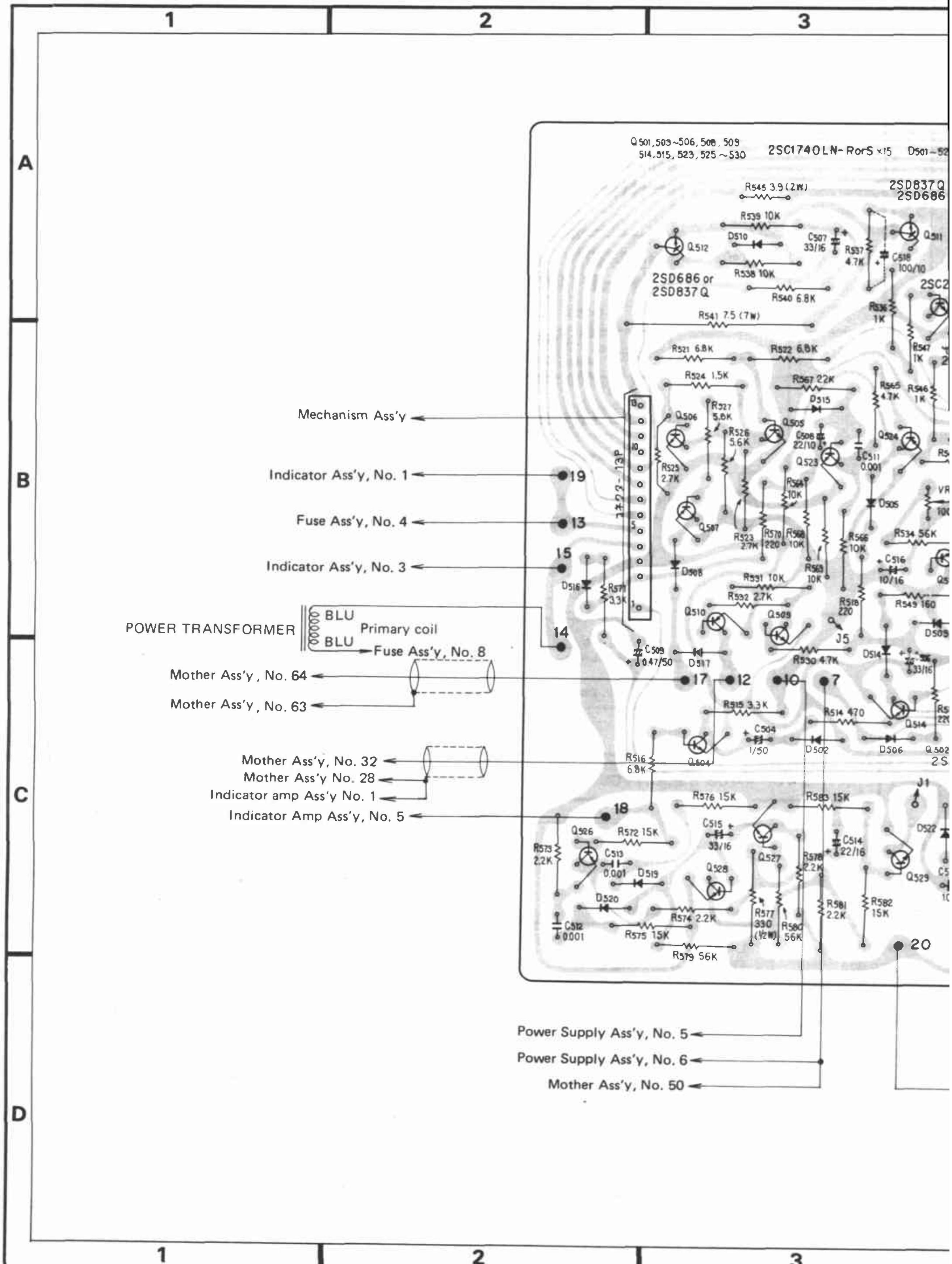
Part No.	Symbol & Description	
C92-047	VR501	Semi-fixed 100k-(B)
RD¼PS □□□ J	R501–R540, R542–R544, R546–R552, R555–R576, R578–R588	
RD½PF □□□ J	R554	
RD½PS □□□ J	R577	
RCN-032	R541	Wire wound 7.5 7W
RCN-031	R545	Wire wound 3.9 2W
RCN-037	R553	Wire wound 30 2W

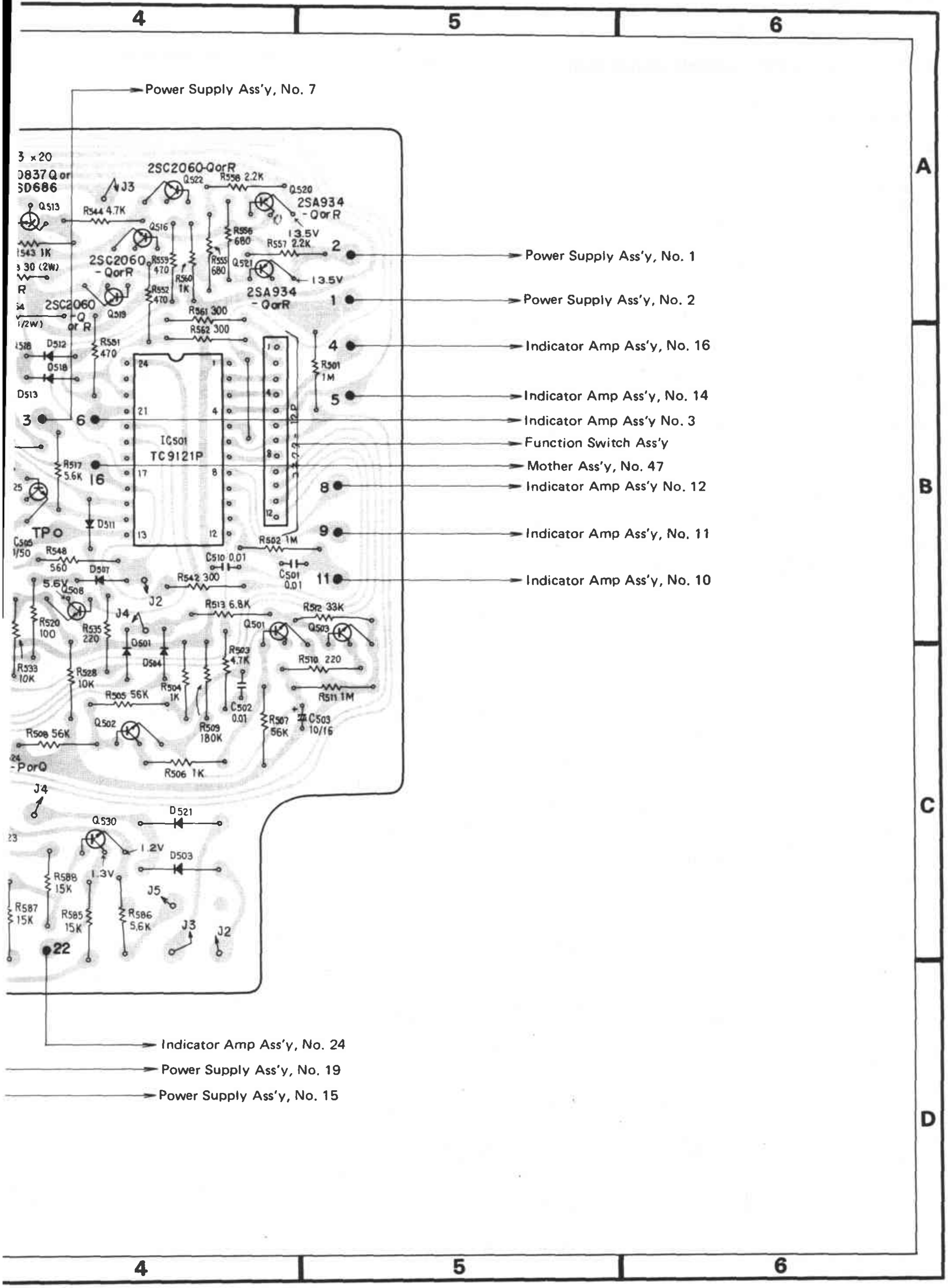
SEMICONDUCTORS

Part No.	Symbol & Description
TC9121P	IC501
2SC1740LN	Q501, Q503–Q506, Q508, Q509, Q514 Q515, Q523, Q525-Q530
2SA733A	Q502, Q507, Q510, Q524
2SD686 (2SD837)	Q511–Q513
2SC2060	Q516–Q519, Q522
2SA934	Q520, Q521
1S2473	D501–D523

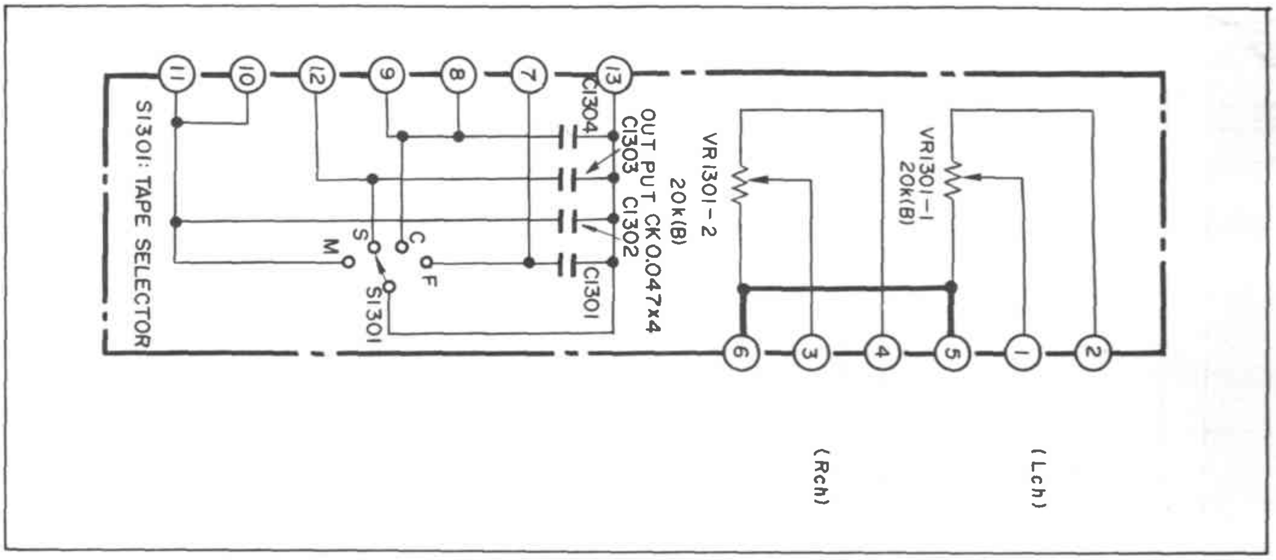
12.13 REC EQ ASSEMBLY (RWX-361)

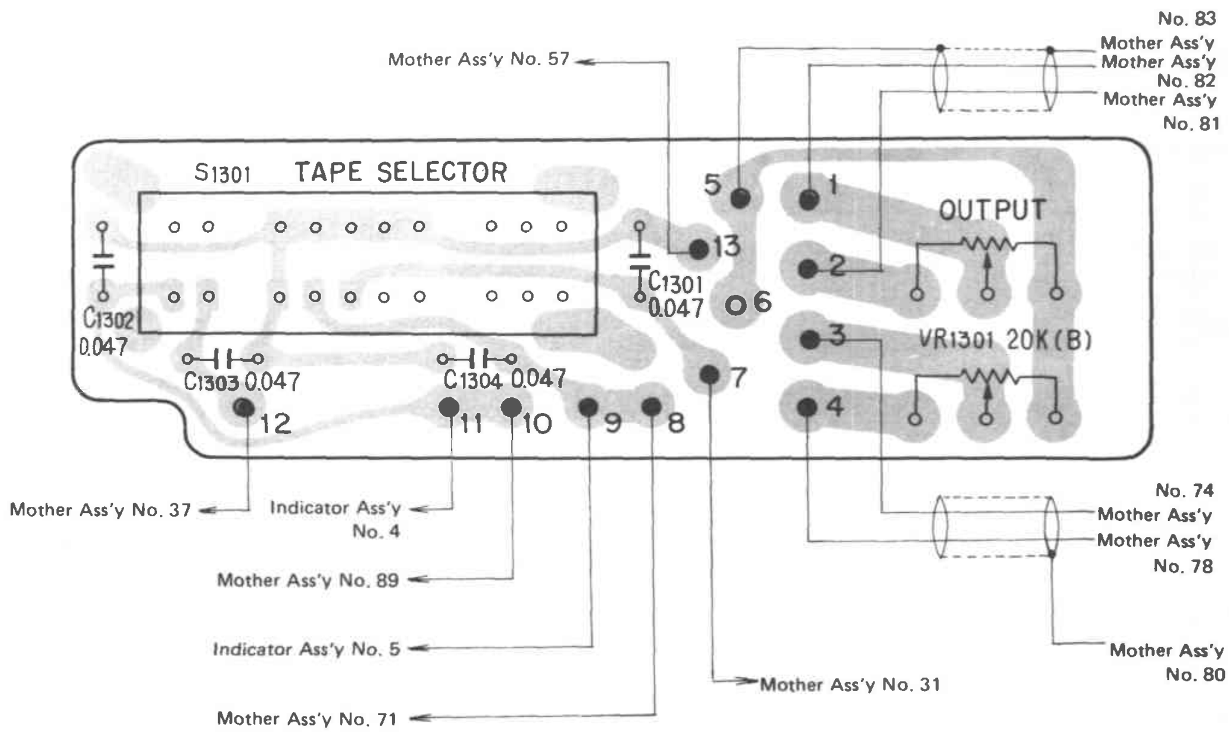



1
2
3
A
B
C
D
Q501, 503~506, 508, 509
514, 515, 523, 525~530
2SC1740LN-RorS ×15
2SD837Q
2SD686
2SD686 or
2SD837Q
Mechanism Ass'y
Indicator Ass'y, No. 1
Fuse Ass'y, No. 4
Indicator Ass'y, No. 3
POWER TRANSFORMER
BLU
Primary coil
BLU
Fuse Ass'y, No. 8
Mother Ass'y, No. 64
Mother Ass'y, No. 63
Mother Ass'y, No. 32
Mother Ass'y No. 28
Indicator amp Ass'y No. 1
Indicator Amp Ass'y, No. 5
Power Supply Ass'y, No. 5
Power Supply Ass'y, No. 6
Mother Ass'y, No. 50


Power Supply Ass'y, No. 7
Power Supply Ass'y, No. 1
Power Supply Ass'y, No. 2
Indicator Amp Ass'y, No. 16
Indicator Amp Ass'y, No. 14
Indicator Amp Ass'y No. 3
Function Switch Ass'y
Mother Ass'y, No. 47
Indicator Amp Ass'y No. 12
Indicator Amp Ass'y, No. 11
Indicator Amp Ass'y, No. 10
Indicator Amp Ass'y, No. 24
Power Supply Ass'y, No. 19
Power Supply Ass'y, No. 15
IC501
TC9121P
2SC2060-QorR
2SA934 -QorR
2SC2060 -QorR
2SA934 -QorR
13.5V
1.2V
1.3V
5.6V
TP

12. 14 TAPE SELECTOR ASSEMBLY

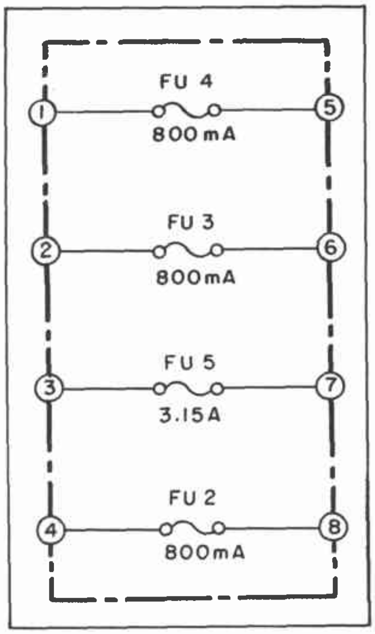


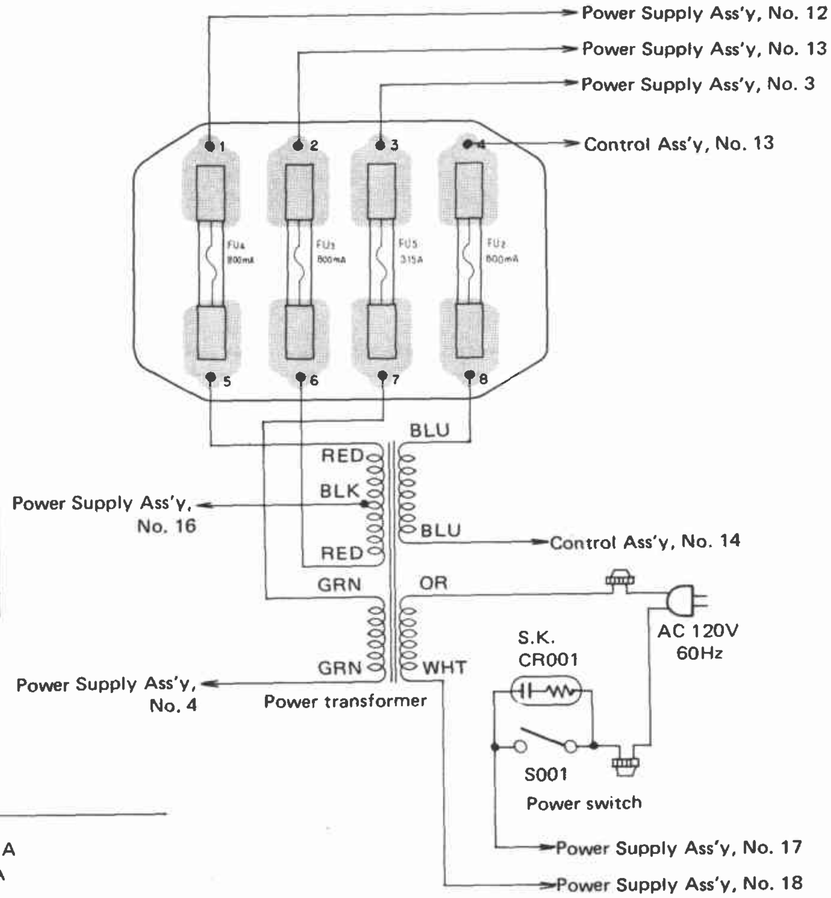


Parts List

Part No.	Symbol & Description	
RSB-020	S1301	Switch (TAPE)
RCV-064	VR1301	Volume 20K (B) (OUTPUT)
CKDYF 473Z 50	C1301-C1304	

12.15 FUSE ASSEMBLY

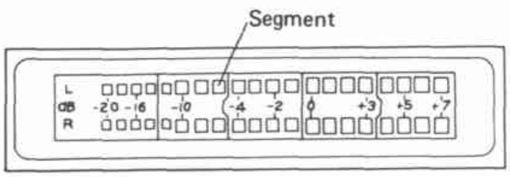
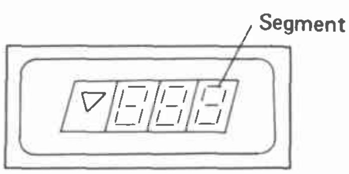




Parts List

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

13. TROUBLE SHOOTING

CONDITION	CAUSE AND REPAIR
■ Fluorescent indicator lamps (level meters and tape counter) do not light up, even though voltage is applied to the filament.	■ Defective Q_{701} (2SA733) in the indicator assembly.
■ Level meter segments (see Fig. 13-1) fail to light up even though the numerals and the tape counter are on.  Fig. 13-1	■ Load a recorded tape or test tape and check the presence of an input signal. ■ Defective IC_{801} (TA7318P) or IC_{802} (μPC324) in the indicator amplifier assembly.
■ Only one, or two, columns in the tape counter light up.	■ Defect in the parallel vinyl-covered leads connecting the indicator assembly to the indicator amplifier assembly. ■ Defective IC_{804} (PD4004) in the indicator amplifier assembly.
■ One of the segments in the tape counter digits fails to light up (see Fig. 13-2).  Fig. 13-2	■ Defective soldering of a component in the indicator assembly (if the level meter is operating normally). ■ Defective IC_{804} (PD4004) in the indicator amplifier assembly (if the level meter is not operating properly).
■ Only one of the level meter segments lights up, or else the segments light up and turn off again rather sporadically.	■ Defective IC_{804} (PD4004).
■ The level meter numerals do not light up.	■ Defective soldering of component(s) in the indicator assembly. ■ A break in the parallel vinyl-covered leads connecting the indicator assembly to the indicator amplifier assembly.
■ Level meter and tape counter lamps are rather dull.	■ Defective Q_{701} (2SA733) in the indicator assembly.
■ Tape counter does not return to 000 when the COUNTER RESET is pressed.	■ Defective IC_{804} (PD4004). ■ Defective COUNTER RESET push-button.