

# Service Manual

Cassette Deck  
**RS-M5**  
 (Silver Face)

Metal-Tape Compatible Stereo Cassette Deck  
 with Dolby NR and Full Auto-Stop



## RS-631 MECHANISM SERIES

### Specifications

Power requirements:	AC; 120V, 50-60Hz	Inputs:	MIC; sensitivity 0.25 mV, input impedance 10 k $\Omega$ over applicable microphone impedance 400 $\Omega$ — 10 k $\Omega$
Power consumption:	10 W		LINE; sensitivity 60 mV, input impedance 47 k $\Omega$
Motor:	Electronic control DC motor	Outputs:	LINE; output level 420 mV, output impedance 1.4 k $\Omega$ or less, load impedance 22 k $\Omega$ over HEADPHONE; output level 60 mV, load impedance 8 $\Omega$
Track system:	4-track 2-channel stereo recording and playback	Bias frequency:	80 kHz
Tape speed:	4.8 cm/s (1-7/8 ips)	Heads:	2-head system; 1-MX head for record/playback 1-double-gap ferrite head for erasure
Wow and flutter:	0.07% (WRMS)	Dimensions:	41.0 cm (W) $\times$ 14.2 cm (H) $\times$ 20.5 cm (D) [16-1/8" (W) $\times$ 5-9/16" (H) $\times$ 8-1/16" (D)]
Frequency response:	Metal tape; 20—17,000 Hz CrO <sub>2</sub> tape; 20—16,000 Hz Normal tape; 20—15,000 Hz	Weight:	4.0 kg (8 lbs. 13 oz)
Signal-to-noise ratio:	Dolby* NR in; 66 dB (above 5 kHz) Dolby NR out; 56 dB (signal level = max. recording level, CrO <sub>2</sub> type tape)		
Fast forward and rewind time:	Approx. 86 seconds with C-60 cassette tape		

Specifications are subject to change without notice.

\* 'Dolby' and the double-D symbol are trademarks of Dolby Laboratories.

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## LOCATION OF CONTROLS AND COMPONENTS

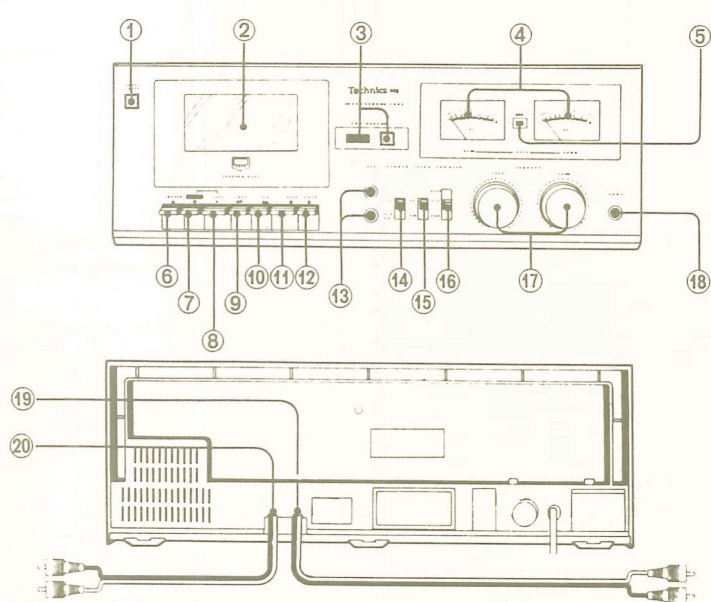


Fig. 1

- ① Power switch (power)
- ② Cassette holder
- ③ Tape counter and Reset button (tape counter)
- ④ VU meters (left-level-right)
- ⑤ Recording indication lamp (rec)
- ⑥ Pause button (pause) (II)
- ⑦ Record button (record) (O)
- ⑧ Play button (play) (▶)
- ⑨ Rewind button (rew) (◀◀)
- ⑩ Fast forward button (ff) (▶▶)
- ⑪ Stop button (stop) (■)
- ⑫ Eject button (eject) (▲)
- ⑬ Microphone jacks (mic) (left/right)
- ⑭ Input selector (input select)
- ⑮ Dolby noise-reduction switch (Dolby NR)
- ⑯ Tape selector (tape select)
- ⑰ Input level controls (left/input level/right)
- ⑱ Headphones jack (phones)
- ⑲ Line input cord (LINE IN)
- ⑳ Line output cord (LINE OUT)

# DISASSEMBLY INSTRUCTIONS

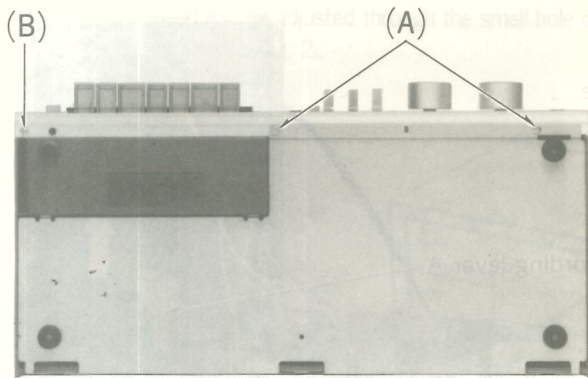
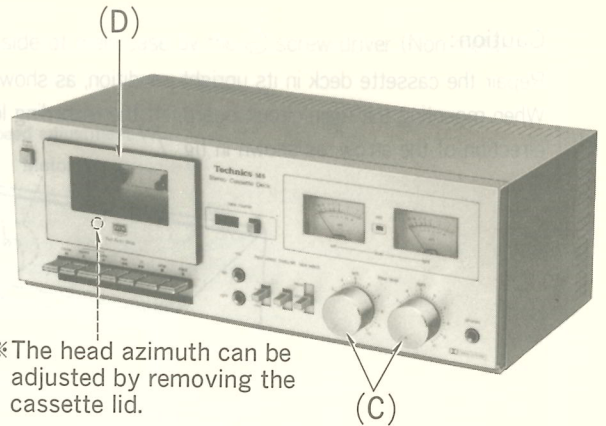


Fig. 2



※The head azimuth can be adjusted by removing the cassette lid.

Fig. 3

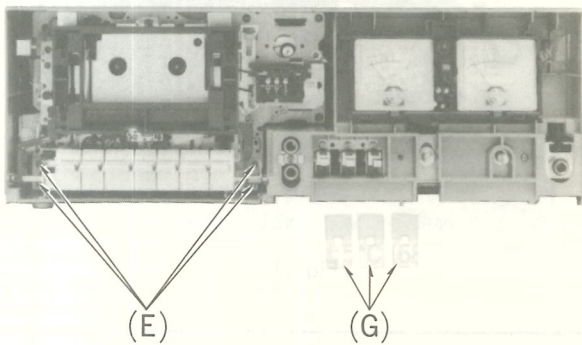


Fig. 4

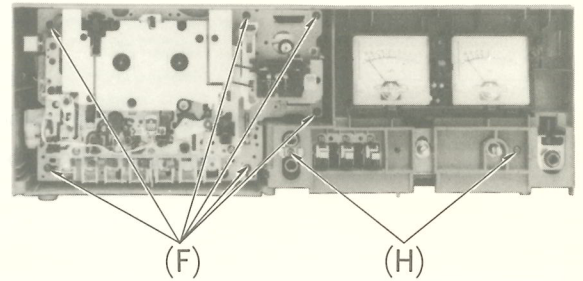


Fig. 5

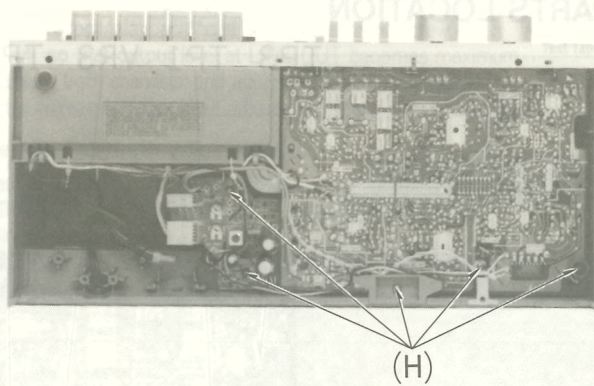


Fig. 6

Ref. No.	Procedure	To remove — .	Remove — .	Shown in fig. — .
1	1	Bottom cover	• 2 screws ..... (A)	2
2	1→2	Front panel	• 1 screw ..... (B) • 2 control knobs ..... (C) • Cassette lid ..... (D)	2 3 3
3	1→2→3	Operation button assembly and cassette holder	• 4 red screws ..... (E)	4
4	1→2→3→4	Mechanism unit	• 6 red screws ..... (F)	5
5	1→2→5	Main circuit board and oscillation circuit board	• 3 switch shelters ..... (G) • 7 screws ..... (H)	4 5, 6

# ASSEMBLY INSTRUCTIONS

**Caution:**

Repair the cassette deck in its upright condition, as shown in fig. 7.  
When mounting the main circuit board, lift the recording lever-A in the direction of the arrow, as shown in fig. 7.

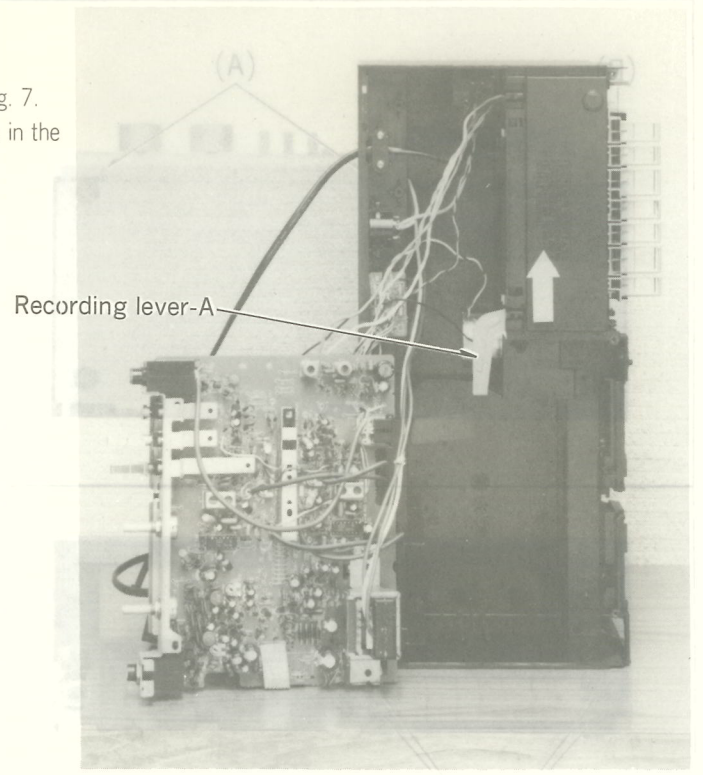


Fig. 7

## MEASUREMENT AND ADJUSTMENT METHODS

### ADJUSTMENT PARTS LOCATION

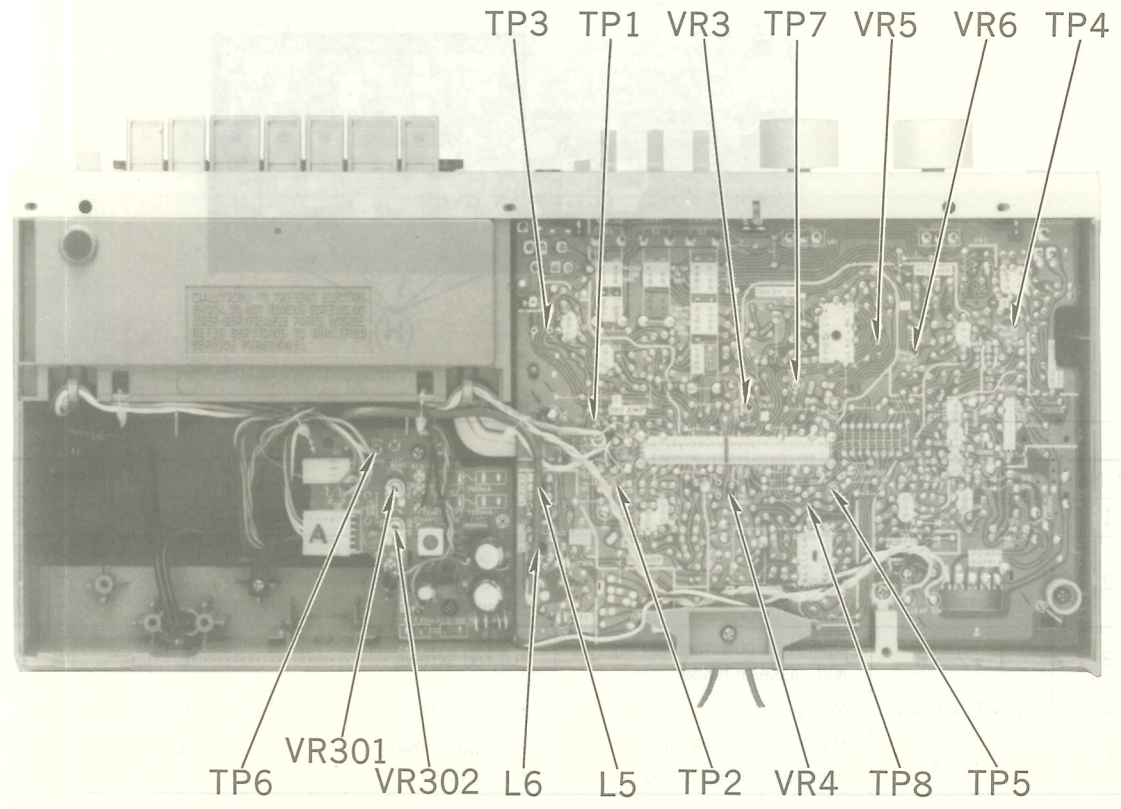
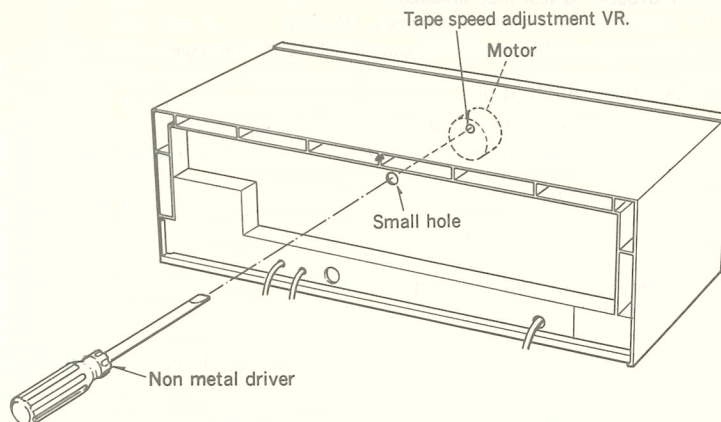


Fig. 1

**NOTE 1:** Tape speed can be adjusted through the small hole on the back-side of main case by the ⊖ screw driver (Non metal type) as shown in fig. 2.

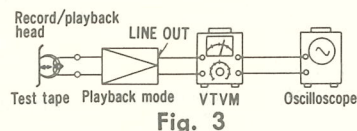


**Fig. 2**

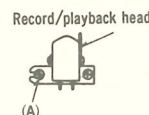
**NOTES 2:** Keep good condition, set lever switches and controls in the following positions, unless otherwise specified.

- Make sure heads are clean.
- Make sure capstan and pressure roller are clean.
- Judgeable room temperature: 20 ± 5°C (68 ± 9°F)
- Dolby NR switch: OUT
- Tape selector: Normal position
- Input selector: Line in
- Input level controls: Maximum

ITEM	MEASUREMENT & ADJUSTMENT
<p><b>A</b> Head azimuth adjustment</p> <p>Condition:</p> <ul style="list-style-type: none"> <li>* Playback mode</li> </ul> <p>Equipment:</p> <ul style="list-style-type: none"> <li>* VTVM      * Oscilloscope</li> <li>* Test tape (azimuth) ... QZZCFM</li> <li>* Test tape (tape path viewer) ... QZZCRD</li> </ul>	<p><b>Record/playback head azimuth adjustment</b></p> <ol style="list-style-type: none"> <li>1. Test equipment connection is shown in fig. 3.</li> <li>2. Playback azimuth tape (QZZCFM 8 kHz).</li> <li>3. Adjust record/playback head angle adjustment screw (A) in fig. 4 so that output level at LINE OUT becomes maximum.</li> <li>4. Measure both channels, and adjust levels for equal output.</li> <li>5. After adjustment lock head adjustment screw (A) with lacquer.</li> </ol> <p><b>Erase head azimuth adjustment</b></p> <ol style="list-style-type: none"> <li>1. Test equipment connection is the same above but use the tape path viewer (QZZCRD) instead of test tape (QZZCFM).</li> <li>2. Playback this tape.</li> <li>3. Adjust screw (B) shown in fig. 5 so that the tape may not get curled or malformed by tape guide of the erase head.</li> <li>4. After adjustment, lock head adjust screw (B) with lacquer.</li> </ol>
<p><b>B</b> Tape speed</p> <p>Condition:</p> <ul style="list-style-type: none"> <li>* Playback mode</li> </ul> <p>Equipment:</p> <ul style="list-style-type: none"> <li>* Digital electronic counter or frequency counter</li> <li>* Test tape ... QZZCWAT</li> </ul>	<p><b>Tape speed accuracy</b></p> <ol style="list-style-type: none"> <li>1. Test equipment connection is shown in fig. 6.</li> <li>2. Playback test tape (QZZCWAT 3,000 Hz), and supply playback signal to digital electronic counter.</li> <li>3. Measure this frequency.</li> <li>4. On the basis of 3,000 Hz, determine value by following formula:</li> </ol> $\text{Tape speed accuracy} = \frac{f - 3,000}{3,000} \times 100 (\%)$ <p style="text-align: center;">where, f = measured value</p> <ol style="list-style-type: none"> <li>5. Take measurement at middle section of tape.</li> </ol> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p>Standard value: ±1.5%</p> </div>



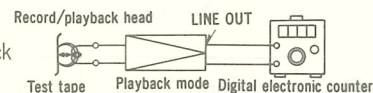
**Fig. 3**



**Fig. 4**



**Fig. 5**



**Fig. 6**

ITEM	MEASUREMENT & ADJUSTMENT
	<p><b>Adjustment method</b></p> <ol style="list-style-type: none"> <li>1. Playback the test tape (middle).</li> <li>2. Adjust so that frequency becomes 3,000Hz.</li> <li>3. Tape speed adjustment VR shown in "NOTE 1" on page 4.</li> </ol> <p><b>Tape speed fluctuation</b></p> <p>Make measurements in same manner as above (beginning, middle and end of tape), and determine the difference between maximum and minimum values and calculate as follows:</p> $\text{Tape speed fluctuation} = \frac{f_1 - f_2}{3,000} \times 100 (\%)$ <p><math>f_1</math> = maximum value, <math>f_2</math> = minimum value</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p><b>Standard value: Less than 1%</b></p> </div>
<p><b>Ⓒ Playback frequency response</b></p> <p>Condition:</p> <ul style="list-style-type: none"> <li>* Playback mode</li> <li>* Tape selector ... Normal position</li> </ul> <p>Equipment:</p> <ul style="list-style-type: none"> <li>* VTVM</li> <li>* Oscilloscope</li> <li>* Test tape ... QZZCFM</li> </ul>	<ol style="list-style-type: none"> <li>1. Test equipment connection is shown in fig. 3.</li> <li>2. Place UNIT into playback mode.</li> <li>3. Playback frequency response test tape (QZZCFM).</li> <li>4. Measure output level at 315Hz, 12.5kHz, 8kHz, 4kHz, 250Hz, 125Hz and 63Hz, and compare each output level with standard frequency 315Hz, at LINE OUT.</li> <li>5. Make measurement for both channels.</li> <li>6. Make sure that the measured value is within the range specified in the playback frequency response chart. (shown in fig. 7).</li> </ol> <div style="text-align: center;"> <p><b>Playback frequency response chart</b></p> <p><b>Fig. 7</b></p> </div>
<p><b>Ⓓ Playback gain</b></p> <p>Condition:</p> <ul style="list-style-type: none"> <li>* Playback mode</li> <li>* Tape selector ... Normal position</li> </ul> <p>Equipment:</p> <ul style="list-style-type: none"> <li>* VTVM</li> <li>* Oscilloscope</li> <li>* Test tape ... QZZCFM</li> </ul>	<ol style="list-style-type: none"> <li>1. Test equipment connection is shown in fig. 3.</li> <li>2. Playback standard recording level portion on test tape (QZZCFM 315Hz), and using VTVM measure the output level at LINE OUT.</li> <li>3. Make measurement for both channels.</li> </ol> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p><b>Standard value: around 0.39V</b></p> </div> <p><b>Adjustment</b></p> <ol style="list-style-type: none"> <li>1. If measured value is not within standard, adjust VR3 (L-CH), VR4 (R-CH) (See fig. 1 on page 3).</li> <li>2. After adjustment, check "Playback frequency response" again.</li> </ol>
<p><b>Ⓔ Bias leakage</b></p> <p>Condition:</p> <ul style="list-style-type: none"> <li>* Record mode</li> <li>* Input level controls ... MAX</li> <li>* Tape selector ... Metal position</li> </ul> <p>Equipment:</p> <ul style="list-style-type: none"> <li>* VTVM</li> <li>* Oscilloscope</li> </ul>	<ol style="list-style-type: none"> <li>1. Test equipment connection is shown in fig. 8.</li> <li>2. Place UNIT into record mode.</li> <li>3. Adjust trap coils L5 (L-CH), L6 (R-CH), so that measured value becomes minimum.</li> <li>4. Make adjustment for both channels.</li> </ol> <div style="text-align: center;"> <p><b>Fig. 8</b></p> </div>
<p><b>Ⓕ Erase current</b></p> <p>Condition:</p> <ul style="list-style-type: none"> <li>* Record mode</li> <li>* Tape selector ... Metal position</li> </ul> <p>Equipment:</p> <ul style="list-style-type: none"> <li>* VTVM</li> <li>* Oscilloscope</li> </ul>	<ol style="list-style-type: none"> <li>1. Test equipment connection is shown in fig. 9.</li> <li>2. Place UNIT into record mode and measure voltage at test point 6.</li> <li>3. Determine erase current with the following formula:</li> </ol> $\text{Erase current (A)} = \frac{\text{Voltage across both ends of R304}}{1 (\Omega)}$ <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p><b>Standard value: around 155 mA (Tape selector ... Metal)</b></p> </div> <ol style="list-style-type: none"> <li>4. If measured value is not within standard, adjust as follows.</li> </ol> <div style="text-align: center;"> <p><b>Fig. 9</b></p> </div>

ITEM	MEASUREMENT & ADJUSTMENT
	<p><b>Adjustment</b></p> <ol style="list-style-type: none"> <li>1. Open the point (A) and short the point (B) on the main circuit board in the wiring connection diagram (See page 8).</li> <li>2. Make measurement for erase current.</li> <li>3. Make sure that the measured value is within the erase current of 145mA to 165mA.</li> <li>4. If it is beyond the value, carry out the following adjustments: <ul style="list-style-type: none"> <li>• If the erase current is less than 145mA, short the point (A).</li> <li>• If the erase current is more than 165mA, open the points (A) and (B).</li> </ul> </li> </ol>
<p><b>Ⓒ Bias current</b></p> <p>Condition:</p> <ul style="list-style-type: none"> <li>* Record mode</li> <li>* Tape selector <ul style="list-style-type: none"> <li>... Normal position</li> <li>... CrO<sub>2</sub> position</li> <li>... Metal position</li> </ul> </li> </ul> <p>Equipment:</p> <ul style="list-style-type: none"> <li>* VTVM</li> <li>* Oscilloscope</li> </ul>	<ol style="list-style-type: none"> <li>1. Test equipment connection is shown in fig. 10.</li> <li>2. Place UNIT into record mode, and tape selector to normal position.</li> <li>3. Read voltage on VTVM and calculate bias current by following formula: <math display="block">\text{Bias current (A)} = \frac{\text{Value read on VTVM (V)}}{10 (\Omega)}</math> </li> </ol> <p style="text-align: center;"><b>Standard value: around 400<math>\mu</math>A (Normal position)</b></p> <p style="text-align: center;"><b>Standard value: around 550<math>\mu</math>A (CrO<sub>2</sub> position), around 830<math>\mu</math>A (Metal position)</b></p> <ol style="list-style-type: none"> <li>4. If measured value is not within standard, adjust VR301 (L-CH) and VR302 (R-CH) (See fig. 1 on page 3).</li> <li>5. Set the tape selector to each position.</li> <li>6. Make sure that the measured value is within standard.</li> </ol>
<p><b>Ⓓ Overall gain</b></p> <p>Condition:</p> <ul style="list-style-type: none"> <li>* Record/playback mode</li> <li>* Input level controls ... MAX</li> <li>* Standard input level; <ul style="list-style-type: none"> <li>MIC ... -72 <math>\pm</math> 4 dB</li> <li>LINE IN ... -24 <math>\pm</math> 3 dB</li> </ul> </li> </ul> <p>Equipment:</p> <ul style="list-style-type: none"> <li>* VTVM</li> <li>* AF oscillator</li> <li>* ATT</li> <li>* Oscilloscope</li> <li>* Resistor (600<math>\Omega</math>)</li> <li>* Test tape (reference blank tape) <ul style="list-style-type: none"> <li>... QZZCRA for Normal</li> </ul> </li> </ul>	<ol style="list-style-type: none"> <li>1. Test equipment connection is shown in fig. 11.</li> <li>2. Place UNIT into record mode, and tape selector to normal position.</li> <li>3. Supply 1 kHz signal (-24 dB) from AF oscillator, through ATT to LINE IN.</li> <li>4. Adjust ATT until monitor level at LINE OUT becomes 0.39 V.</li> <li>5. Using test tape, make recording.</li> <li>6. Playback recorded tape, and make sure the value at LINE OUT on VTVM becomes 0.39 V (-7 dB).</li> <li>7. If measured value is not 0.39 V, adjust VR5 (L-CH), VR6 (R-CH) (See fig. 1 on page 3).</li> <li>8. Repeat from step (2).</li> </ol>
<p><b>Ⓙ Overall frequency response</b></p> <p>Condition:</p> <ul style="list-style-type: none"> <li>* Record/playback mode</li> <li>* Tape selector <ul style="list-style-type: none"> <li>... Normal position</li> <li>... CrO<sub>2</sub> position</li> <li>... Metal position</li> </ul> </li> <li>* Input level controls ... MAX</li> </ul> <p>Equipment:</p> <ul style="list-style-type: none"> <li>* VTVM</li> <li>* AF oscillator</li> <li>* ATT</li> <li>* Oscilloscope</li> <li>* Resistor (600<math>\Omega</math>)</li> <li>* Test tape (reference blank tape) <ul style="list-style-type: none"> <li>... QZZCRA for Normal</li> <li>... QZZCRX for CrO<sub>2</sub></li> <li>... QZZCRZ for Metal</li> </ul> </li> </ul>	<p><b>Note:</b></p> <p>Before measuring and adjusting, make sure of the playback frequency response (For the method of measurement, please refer to the playback frequency response).</p> <ol style="list-style-type: none"> <li>1. Test equipment connection is shown in fig. 11.</li> <li>2. Place the normal test tape (QZZCRA) in the cassette holder.</li> <li>3. Place UNIT into record mode, and tape selector to normal position.</li> <li>4. Supply 1 kHz signal from AF oscillator through ATT to LINE IN.</li> </ol>

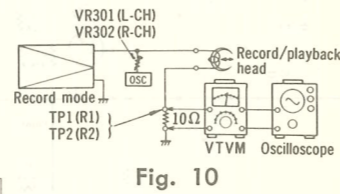


Fig. 10

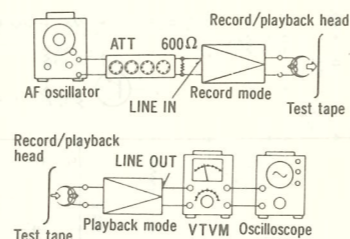


Fig. 11

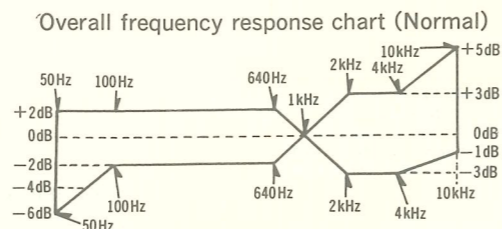


Fig. 12

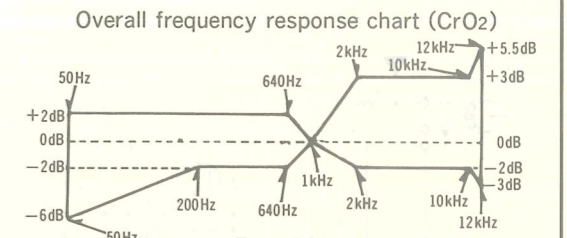


Fig. 13

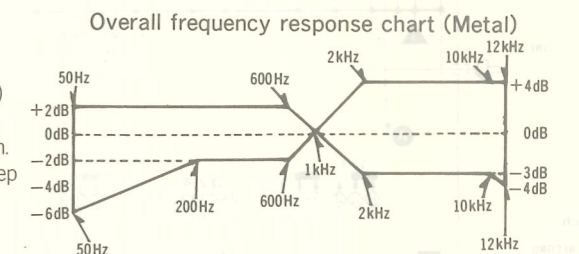


Fig. 14

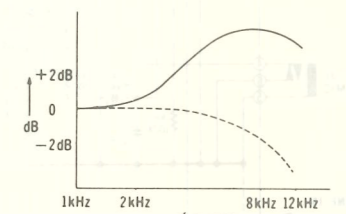


Fig. 15

ITEM	MEASUREMENT & ADJUSTMENT
<p><b>Ⓚ Level meter</b></p> <p>Condition:</p> <ul style="list-style-type: none"> <li>* Record mode</li> <li>* Input level controls ... MAX</li> </ul> <p>Equipment:</p> <ul style="list-style-type: none"> <li>* VTVM</li> <li>* AF oscillator</li> <li>* ATT</li> <li>* Oscilloscope</li> <li>* Resistor (600<math>\Omega</math>)</li> </ul>	<ol style="list-style-type: none"> <li>5. Adjust ATT so that input level is -20 dB below standard recording level (standard recording level=0 VU).</li> <li>6. At this time, LINE OUT level indicates 0.039 V.</li> <li>7. Record each frequency 1kHz, 50Hz, 200Hz, 640Hz (600Hz for metal), 2kHz, 8kHz, 10kHz (12kHz for CrO<sub>2</sub> and metal).</li> <li>8. Playback and express in dB the difference between playback output level of each frequency based on playback output level of 1 kHz.</li> <li>9. Make sure that the measured value is within the range specified in the overall frequency response chart (shown in fig. 12).</li> <li>10. Change test tape to CrO<sub>2</sub> (QZZCRX) and metal (QZZCRZ).</li> <li>11. Set the tape selector to each position.</li> <li>12. Measure in the same manner from step (3) to step (8).</li> <li>13. Make sure that the measured value is within the range specified in the overall frequency response chart for CrO<sub>2</sub> and metal tape shown in fig. 13 and 14.</li> </ol> <p><b>Adjustment—Using bias current</b></p> <ol style="list-style-type: none"> <li>1. When the frequency response between the middle and high frequency range becomes higher than the standard value, as shown by the solid line in fig. 15, refer to bias current adjustment.</li> <li>2. When it becomes lower, as shown by dotted line, refer to bias current adjustment.</li> </ol> <p><b>Note:</b></p> <p>For the method of bias current measurement, refer to "Ⓒ Bias current adjustment" on page 6.</p>
<p><b>Ⓛ Level meter</b></p> <p>Condition:</p> <ul style="list-style-type: none"> <li>* Record mode</li> <li>* Input level controls ... MAX</li> </ul> <p>Equipment:</p> <ul style="list-style-type: none"> <li>* VTVM</li> <li>* AF oscillator</li> <li>* ATT</li> <li>* Oscilloscope</li> <li>* Resistor (600<math>\Omega</math>)</li> </ul>	<ol style="list-style-type: none"> <li>1. Test equipment connection is shown in fig. 16.</li> <li>2. Supply 1 kHz signal from the AF oscillator, through the ATT to the LINE IN.</li> <li>3. Adjust ATT so that the monitor level at LINE OUT becomes 0.39 V.</li> <li>4. Check to see that the level meter stays within the range of -1 dB to +1 dB.</li> <li>5. If it is beyond the range, carry out the following adjustments: <ul style="list-style-type: none"> <li>• Open soldered points (C) (L-CH) and (E) (R-CH) indicated as "DOWN" where level more than +1 dB.</li> <li>• Open soldered points (D) (L-CH) and (F) (R-CH) indicated as "UP" where level less than -1 dB.</li> </ul> (See wiring connection diagram and circuit boards on page 8.) </li> </ol>
<p><b>Ⓜ Dolby NR circuit</b></p> <p>Condition:</p> <ul style="list-style-type: none"> <li>* Record mode</li> <li>* Dolby NR switch ... IN/OUT</li> <li>* Input level controls ... MAX</li> </ul> <p>Equipment:</p> <ul style="list-style-type: none"> <li>* VTVM</li> <li>* AF oscillator</li> <li>* ATT</li> <li>* Oscilloscope</li> <li>* Resistor (600<math>\Omega</math>)</li> </ul>	<ol style="list-style-type: none"> <li>1. Test equipment connection is shown in fig. 17.</li> <li>2. Place UNIT into record mode, set the Dolby NR switch to OUT position and supply to LINE IN to obtain -34.5 dB at TP7 (L-CH), TP8 (R-CH) (frequency 5 kHz).</li> <li>3. Confirm that the value at IN position is 8 (<math>\pm</math>2.5) dB greater than the value at OUT position of Dolby NR switch.</li> </ol>

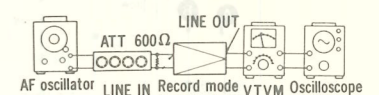


Fig. 16

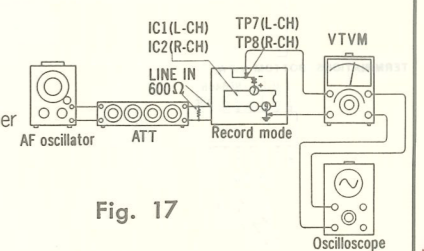
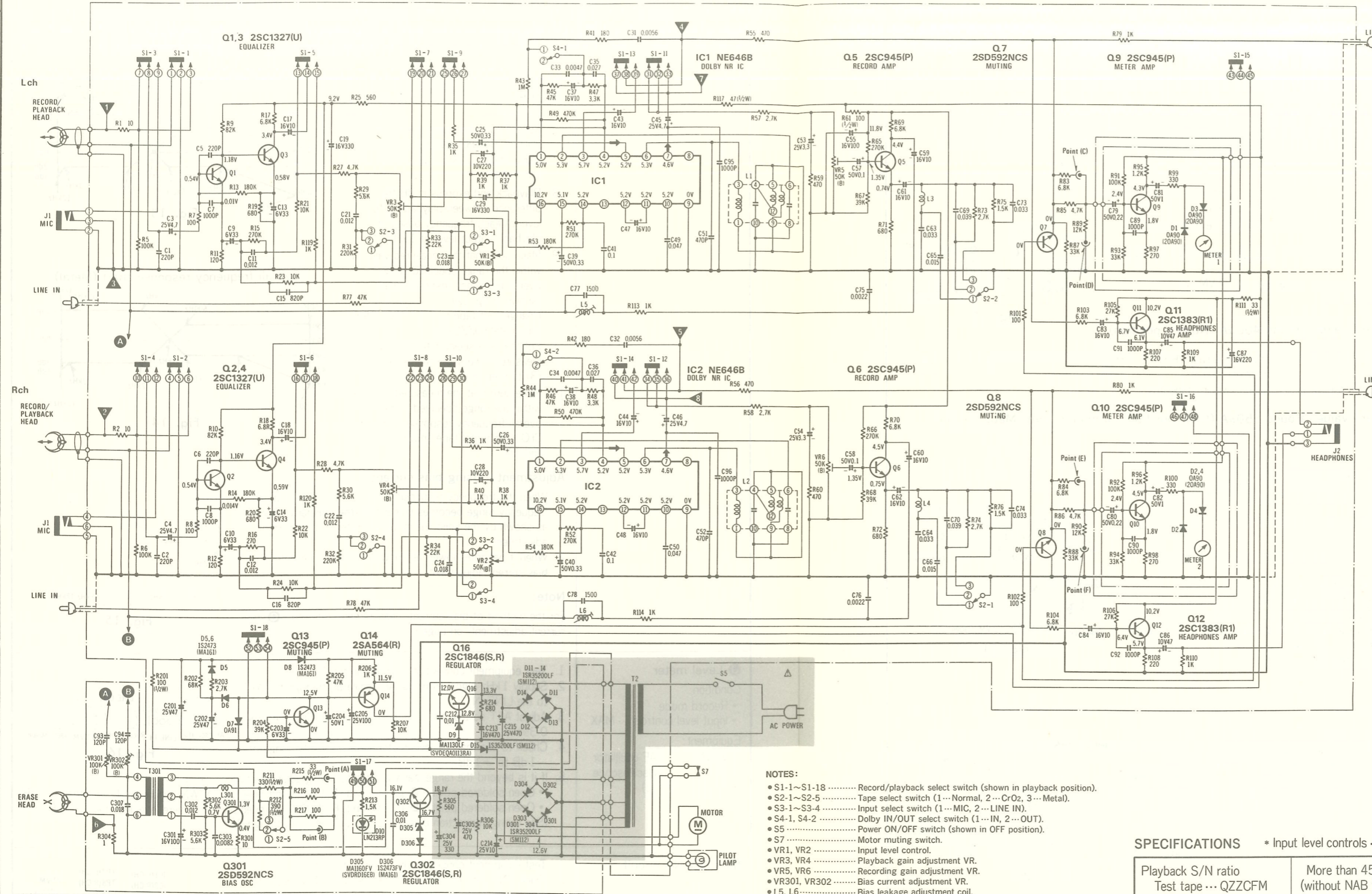


Fig. 17

NOTES: RESISTORS  
 ERD ... Carbon  
 ERG ... Metal-oxide  
 ERO ... Metal-film  
 ERX ... Metal-film  
 ERQ ... Fuse type metallic  
 ERC ... Solid  
 ERF ... Cement

CAPACITORS  
 ECG ... Ceramic  
 ECK ... Ceramic  
 ECC ... Ceramic  
 ERO ... Metal-film  
 ECF ... Ceramic  
 ECQM ... Polyester film  
 ECQE ... Polyester film  
 ECQP ... Polypropylene  
 ECE ... Electrolytic  
 ECEIN ... Non polar electrolytic  
 EQS ... Polystyrene  
 ECSD ... Tantalum

# SCHEMATIC DIAGRAM



NOTE:  $\Delta$  indicates that only parts specified by the manufacturer be used for safety.

Ref. No.	Part No.	Ref. No.	Part No.
<b>RESISTORS</b>			
R1, 2	ERD25FJ100	R95, 96	ERD25FJ122
R5, 6	ERD25TJ104	R97, 98	ERD25FJ271
R7, 8	ERD25FJ101	R99, 100	ERD25FJ331
R9, 10	ERD25TJ823	R101, 102	ERD25FJ101
R11, 12	ERD25FJ121	R103, 104	ERD25FJ682
R13, 14	ERD25TJ184	R105, 106	ERD25TJ273
R15, 16	ERD25TJ274	R107, 108	ERD25FJ221
R17, 18	ERD25FJ682	R109, 110	ERD25FJ102
R19, 20	ERD25FJ681	R111	ERG12ANJ330
R21, 22, 23, 24	ERD25FJ103	R113, 114	ERD25FJ102
R25	ERD25FJ561	R117	ERD50FJ470
R27, 28	ERD25FJ472	R119, 120	ERD25FJ102
R29, 30	ERD25FJ562	R201	ERD50FJ101
R31, 32	ERD25TJ224	R202	ERD25TJ683
R33, 34	ERD25TJ223	R203	ERD25FJ272
R35, 36, 37, 38, 39, 40	ERD25FJ102	R204	ERD25TJ393
R41, 42	ERD25FJ181	R205	ERD25TJ473
R43, 44	ERD25TJ105	R206	ERD25FJ102
R45, 46	ERD25TJ473	R207	ERD25FJ103
R47, 48	ERD25FJ332	R211	ERD50FJ331
R49, 50	ERD25TJ474	R212	ERD50FJ391
R51, 52	ERD25TJ274	R213	ERD25FJ152
R53, 54	ERD25TJ184	R214 $\Delta$	ERD25FJ681
R55, 56	ERD25FJ471	R215	ERG12ANJ330
R57, 58	ERD25FJ272	R216, 217	ERD25FJ101
R59, 60	ERD25FJ471	R301	ERD25FJ100
R61	ERD25FJ101	R302, 303	ERD25FJ562
R65, 66	ERD25TJ274	R304	ERD25FJ190
R67, 68	ERD25TJ393	R305 $\Delta$	ERD25FJ561
R69, 70	ERD25FJ682	R306 $\Delta$	ERD25FJ103
<b>VARIABLE RESISTORS</b>			
R71, 72	ERD25FJ681	VR1, 2	QVH3AA067A54
R73, 74	ERD25FJ272	VR3, 4, 5, 6	EVNK4AA00B54
R75, 76	ERD25FJ152	VR301, 302	EVNK4AA00B15
R77, 78	ERD25TJ473		
R79, 80	ERD25FJ102		
R83, 84	ERD25FJ682		
R85, 86	ERD25FJ472		
R87, 88	ERD25TJ333		
R89, 90	ERD25TJ123		
R91, 92	ERD25TJ104		
R93, 94	ERD25TJ333		
<b>CAPACITORS</b>			
C1, 2	ECCD1H221K		
C3, 4	ECEA25M4R7		
C5, 6	ECCD1H221K		
C7, 8	ECFWD102KVY		
C9, 10	ECEA1CS330		
C11, 12	ECFDD123KVY		

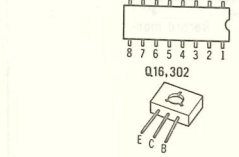
Ref. No.	Part No.	Part Name & Description
<b>TRANSFORMERS</b>		
T2	QLPW11EKC	Power Transformer
T301	QLB0198K	Bias Oscillation Transformer
<b>COILS</b>		
L1, 2	QLM927	MPX Filter
L3, 4	QLQX0332K	Peaking Coil
L5, 6	QLQC2721K	Bias Trap Coil
L301	QLQX2421Y	RF Trap Coil
<b>SWITCHES</b>		
S1	QSS1205T	Slide Switch (Record/Playback Selector)
S2	QES1490	Lever Switch (Tape Selector)
S3	QES1491	Lever Switch (Input Selector)
S4	QES1492	Lever Switch (Dolby IN/OUT Selector)
S5	QSW1115AU	Push Switch (Power ON/OFF)
S7	QSB0247	Leaf Switch (Motor ON/OFF)
<b>JACKS</b>		
J1	QJA0257H	Microphone Jack
J2	QJA0249C	Headphone Jack

- NOTES:
- S1-1~S1-18 ..... Record/playback select switch (shown in playback position).
  - S2-1~S2-5 ..... Tape select switch (1...Normal, 2...CrO<sub>2</sub>, 3...Metal).
  - S3-1~S3-4 ..... Input select switch (1...MIC, 2...LINE IN).
  - S4-1, S4-2 ..... Dolby IN/OUT select switch (1...IN, 2...OUT).
  - S5 ..... Power ON/OFF switch (shown in OFF position).
  - S7 ..... Motor muting switch.
  - VR1, VR2 ..... Input level control.
  - VR3, VR4 ..... Playback gain adjustment VR.
  - VR5, VR6 ..... Recording gain adjustment VR.
  - VR301, VR302 ..... Bias current adjustment VR.
  - L5, L6 ..... Bias leakage adjustment coil.
  - Connection points (A) and (B) ..... For erase current adjustment.
  - Connection points (C), (D), (E) and (F) ..... For level meters adjustment.
  - Resistance are in ohms (Ω), 1/4 watt unless specified otherwise. K = 1,000Ω, M = 1,000kΩ.
  - Capacity are in microfarads (μF) unless specified otherwise. P = Pico-farads.
  - The mark (∇) shows test point. e.g. ∇ = Test point 1.
  - All voltage values shown in circuitry are under no signal condition and record mode with volume control at minimum position. For measurement, use VTVM.

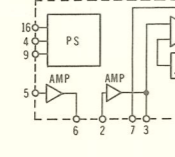
### SPECIFICATIONS \* Input level controls ... MAX

Playback S/N ratio Test tape ... QZZCFM	More than 45 dB (without NAB filter)
Overall distortion Test tape ... QZZCRA for Normal ... QZZCRX for CrO <sub>2</sub> ... QZZCRZ for Metal	Less than 3% (Normal) Less than 4% (CrO <sub>2</sub> , Metal)
Overall S/N ratio Test tape ... QZZCRA	More than 43 dB (without NAB filter)

### TERMINATIONS (BOTTOM VIEW)



### EQUIVALENT CIRCUIT

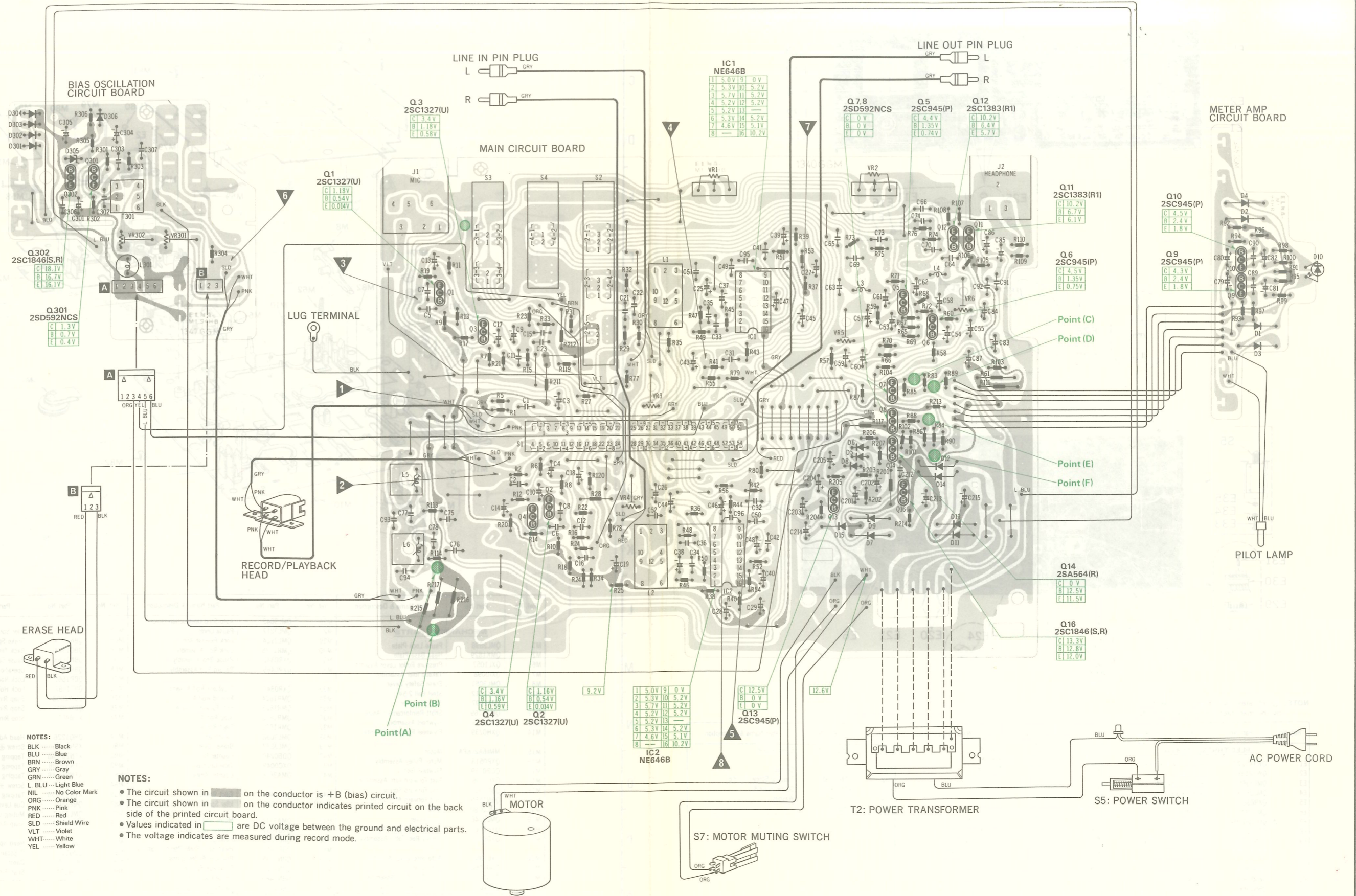


Important safety notice.  
 The shaded area on this schematic diagram incorporates special features important for safety.  
 When servicing it is essential that only manufacturer's specified parts be used for the critical components in the shaded areas of the schematic diagram.



# WIRING CONNECTION DIAGRAM AND CIRCUIT BOARDS

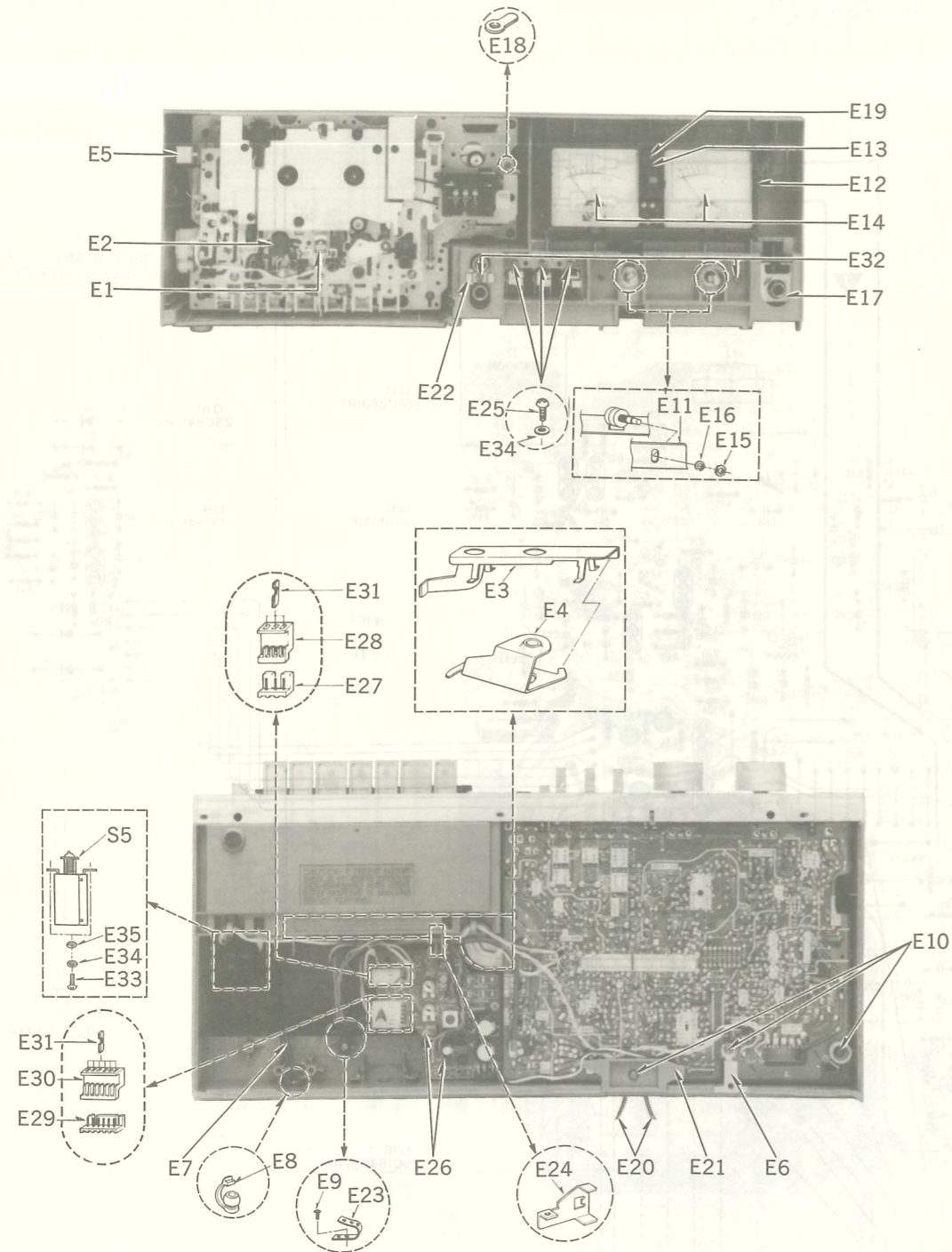
Ref. No.	Part No.
C13, 14	ECEA1CS330
C15, 16	ECKD1H821KB
C17, 18	ECEA1HS100
C19	ECEA1CS331
C21, 22	ECFDD123KVY
C23, 24	ECFDD183KVY
C25, 26	ECEA50MR33R
C27, 28	ECEA1AS221
C29	ECEA1CS331
C31, 32	ECQM1H562JZ
C33, 34	ECQM1H472JZ
C35, 36	ECQM1H273JZ
C37, 38	ECEA1HS100
C39, 40	ECEA50MR33R
C41, 42	ECFWD104MXY
C43, 44	ECEA1HS100
C45, 46	ECEA1JS4R7
C47, 48	ECEA1HS100
C49, 50	ECFDD473KVY
C51, 52	ECKD1H471KB
C53, 54	ECEA2AS3R3
C55	ECEA1ES101
C57, 58	ECEA1HSR1
C59, 60	ECEA2AS010
C61, 62	ECEA1HS100
C63, 64	ECFDD333KVY
C65, 66	ECFDD153KVY
C69, 70	ECFDD393KVY
C73, 74	ECFDD333KVY
C75, 76	ECFDD222KVY
C77, 78	ECQP1152JZ
C79, 80	ECEA1HSR22
C81, 82	ECEA2AS010
C83, 84	ECEA1HS100
C85, 86	ECEA1AS470
C87	ECEA1CS221
C89, 90, 91, 92	ECKD1H102ZF
C93, 94	ECKD1H121K
C95, 96	ECKD1H102ZF
C201, 202	ECEA1ES470
C203	ECEA1CS330
C204	ECEA2AS010
C205	ECEA1ES101
C212	ECKD1H103ZF
C213	ECEA1CS471
C214	ECEA1HS100
C215	ECEA1ES471
C301	ECEA1ES101
C302	ECFDD123KVY
C303	ECFDD822KVY
C304	ECEA1ES331
C305	ECEA1ES471
C306	ECFDD103KVY
C307	ECQP1183JZ
<b>TRANSISTORS</b>	
Q1, 2, 3, 4	2SC1327
Q5, 6	2SC945
Q7, 8	2SD592NCS
Q9, 10	2SC945
Q11, 12	2SC1383
Q13	2SC945
Q14	2SA564
Q16	2SC1846
Q301	2SD592NCS
Q302	2SC1846
<b>DIODES &amp; RECTIFIERS</b>	
D1, 2, 3, 4	20A90
D5, 6	MA161
D7	OA91
D8	MA161
D9	SVDEQA0113RA
D10	LN213RP
D11, 12, 13, 14, 15	SM112
D301, 302, 303, 304	SM112
D305	SVDRD16EB
D306	MA161
<b>INTEGRATED CIRCUITS</b>	
IC1, 2	NE646B



- NOTES:**
- BLK ..... Black
  - BLU ..... Blue
  - BRN ..... Brown
  - GRY ..... Gray
  - GRN ..... Green
  - L. BLU ..... Light Blue
  - NIL ..... No Color Mark
  - ORG ..... Orange
  - PNK ..... Pink
  - RED ..... Red
  - SLD ..... Shield Wire
  - SLT ..... Violet
  - WHT ..... White
  - YEL ..... Yellow

- NOTES:**
- The circuit shown in    on the conductor is +B (bias) circuit.
  - The circuit shown in    on the conductor indicates printed circuit on the back side of the printed circuit board.
  - Values indicated in    are DC voltage between the ground and electrical parts.
  - The voltage indicates are measured during record mode.

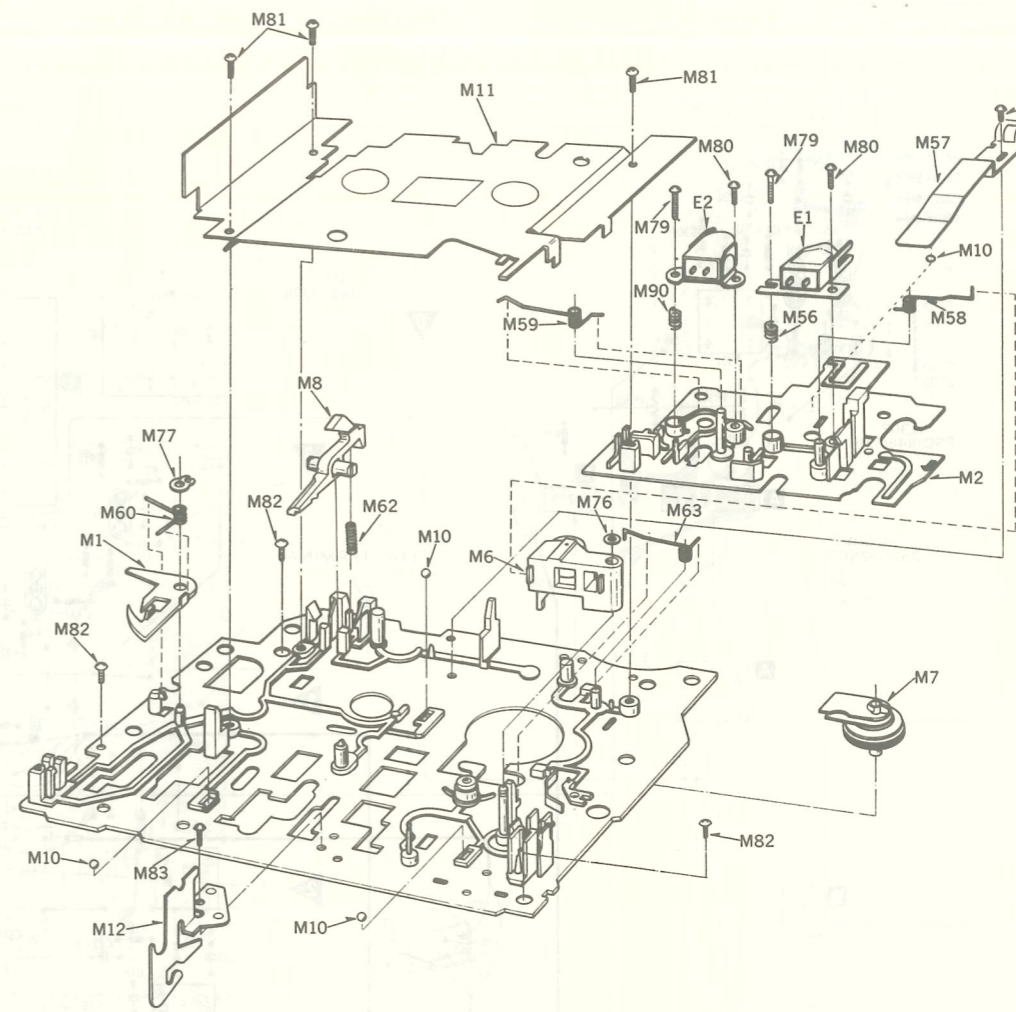
# ELECTRICAL PARTS LOCATION



NOTE:  $\Delta$  indicates that only parts specified by the manufacturer be used for safety.

Ref. No.	Part No.	Part Name & Description	Ref. No.	Part No.	Part Name & Description	Ref. No.	Part No.	Part Name & Description
<b>ELECTRICAL PARTS</b>								
E1	QWY4122Z	Record/Playback Head	E15	QNQ1004	Nut 8 $\phi$	E30	QJS1922TN	6 Pin Socket
E2	QWY2138Z	Erase Head	E16	QWQ2002	Washer	E31	QJT1054	Contact
E3	QML3568	Recording Lever-A	E17	QNQ1070	Nut 12 $\phi$	E32	XTN3+8B	Tapping Screw $\phi$ 3 $\times$ 8
E4	QML3569	Recording Lever-B	E18	QJT0015	Lug Terminal	E33	XSN3+8S	Screw $\phi$ 3 $\times$ 8
E5	QXR0667	Power Button Assembly	E19	XAMQ21P100N	Pilot Lamp	E34	XWA3B	Washer
E6	QMA3840	Earth Plate	E20	QFC2133	Pin Cord	E35	XWG3	"
E7	$\Delta$ QFC1201MA	AC Power Cord	E21	QKJ0382H	Cord Clamper			
E8	QTD1129	Cord Bushing	E22	QMA3841	Microphone Holder			
E9	XTN3+10B	Tapping Screw $\phi$ 3 $\times$ 10	E23	RME144ZA	Cord Clamper			
E10	XTN3+16B	Tapping Screw $\phi$ 3 $\times$ 16	E24	QMA3960	Circuit Board Angle			
E11	QMA3893	Volume Angle	E25	XSN3+6S	Screw $\phi$ 3 $\times$ 6			
E12	QKJ0381	Level Meter Holder	E26	QJT1067	Check Pin			
E13	QBG1366	Rubber Bush	E27	QJP1921TNL	3 Pin Post			
E14	QSL1113RNM	Level Meter	E28	QJS1921TN	3 Pin Socket			
			E29	QJP1922TNL	6 Pin Post			

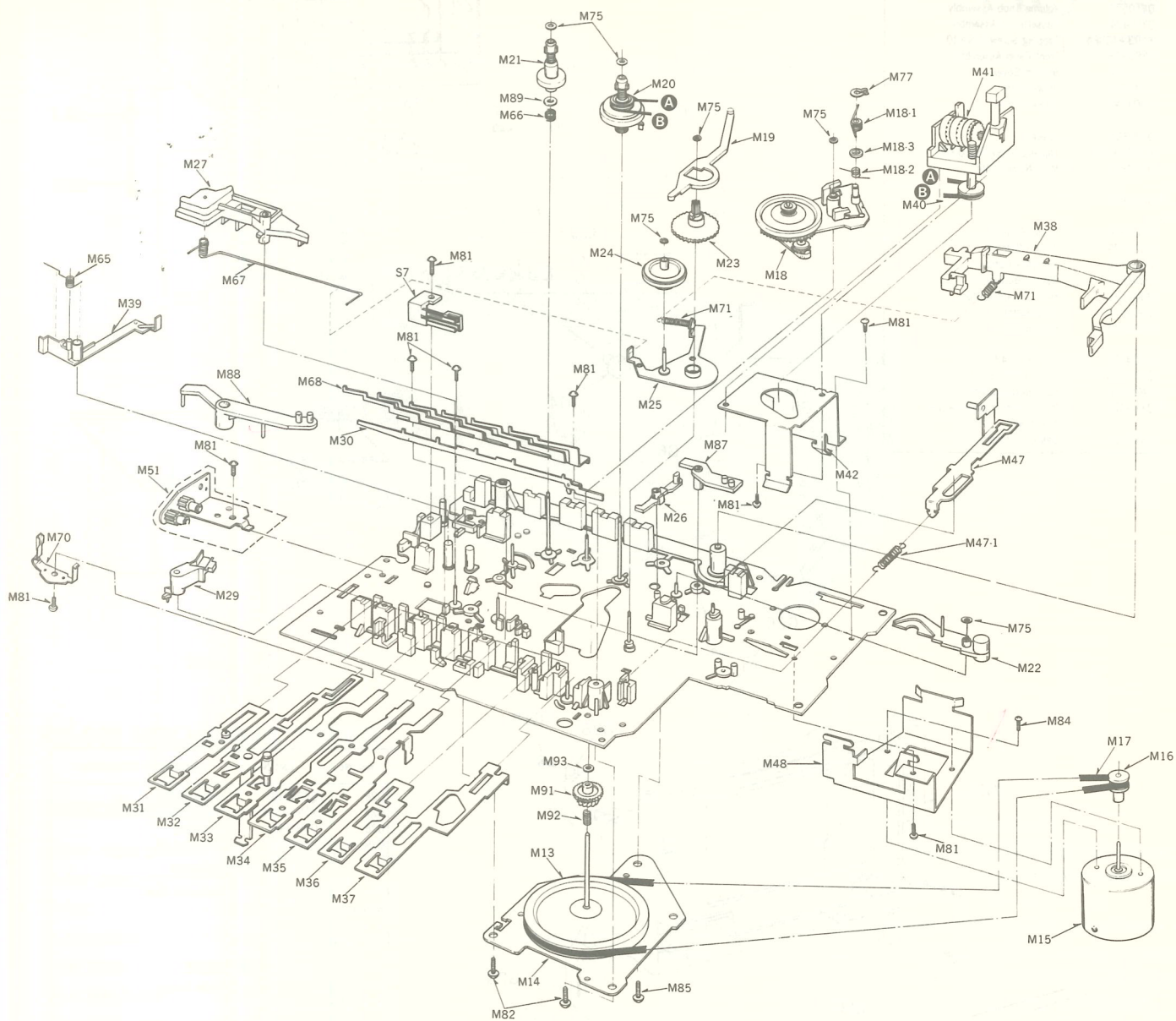
# MECHANISM EXPLODED VIEWS



Ref. No.	Part No.	Part Name & Description	Ref. No.	Part No.	Part Name & Description	Ref. No.	Part No.	Part Name & Description
<b>MECHANICAL PARTS</b>								
M1	QML2898	Pause Lock Plate	M26	QML3042	Auto-Stop Obstruction Lever	M63	QBN1513	Idle Spring
M2	QMK1829	Head Base Plate	M27	QML3217	Pause Lever	M65	QBN1574	Brake Spring
M6	QXL1057	Pressure Roller Lever Assembly	M29	QML3124	Lock Release Arm	M66	QBC1344	Back Tension Spring
M7	QX10098	Takeup Idler Assembly	M30	QMR1735	Lock Rod Assembly	M67	QBN1555	Pause Spring
M8	QML3051	Erase Safety Lever	M31	QXR0342	Pause Rod Assembly	M68	QBP1664	Operation Rod Spring
M10	QDK1012	Steel Ball 2.5 $\phi$	M32	QXR0465	Record Rod Assembly	M70	QBP1662	Lock Rod Spring
M11	QGK2997	Chassis Cover	M33	QXR0344	Playback Rod Assembly	M71	QBT1682	Lock Holding Spring
M12	QMA3169	Shaft Reinforcement Angle	M34	QMR1624	Rewind Rod-A	M75	QBW2008	Snap Ring 2 $\phi$
M13	QXF0163	Flywheel Assembly	M35	QMR1623	Fast Forward Rod-A	M76	QBW2046	Snap Ring 3 $\phi$
M14	QXH0239	Flywheel Retainer Assembly	M36	QMR1622	Stop Rod-A	M77	XUB4FT	Stop Ring C4 $\phi$
M15	MMI6A2LKPA	Motor	M37	QMR1621	Eject Rod-A	M79	QHQ1226	Head Adjustment Screw
M16	QXP0513	Motor Pulley Assembly	M38	QML3038	Switch Arm	M80	XSN2+10	Screw $\phi$ 2 $\times$ 10
M17	QDB0219	Flywheel Belt	M39	QML3287	Brake Lever	M81	XTN26+6B	Tapping Screw $\phi$ 2.6 $\times$ 6
M18	QXL1136	Fast Forward Arm Assembly	M40	QDB0240	Counter Belt	M82	XTN3+10B	Tapping Screw $\phi$ 3 $\times$ 10
M18-1	QBN1517	Fast Forward Spring	M41	QXC0049	Tape Counter	M83	XTN26+8B	Tapping Screw $\phi$ 2.6 $\times$ 8
M18-2	QBN1559	Fast Forward Arm Spring	M42	QMA3676	Counter Angle	M84	XSN26+3	Screw $\phi$ 2.6 $\times$ 3
M18-3	QMC0080	Collar	M47	QXR0403	Eject Rod-B	M85	XTN3+25B	Tapping Screw $\phi$ 3 $\times$ 25
M19	QML3040	Cam Lever	M47-1	QBT1619	Idle Spring	M87	QML3504	Cue Lever
M20	QXD0067	Takeup Reel Table Assembly	M48	QMA3414	Motor Angle	M88	QML3207	Muting Lever
M21	QXD0084	Supply Reel Table Assembly	M51	QXG1031	Damper Gear Assembly	M89	QBW2012	Snap Ring
M22	QXL1384	Auto-Stop Lever Assembly	M56	QBC1278	Head Spring	M90	QBC1103	Head Spring
M23	QDG1096	Cam Gear	M57	QBP1841	Head Base Plate Pressure Spring	M91	QDG1116	Capstan Gear
M24	QXG1026	Auto-Stop Gear Assembly	M58	QBN1488	Pressure Roller Spring	M92	QBC1301	Capstan Spring
M25	QXL1037	Gear Lever Assembly	M59	QBN1733	Playback Spring	M93	QBW2049	Snap Ring

13 12 11 10 9 8 7 6 5 4 3 2 1

A  
B  
C  
D  
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H  
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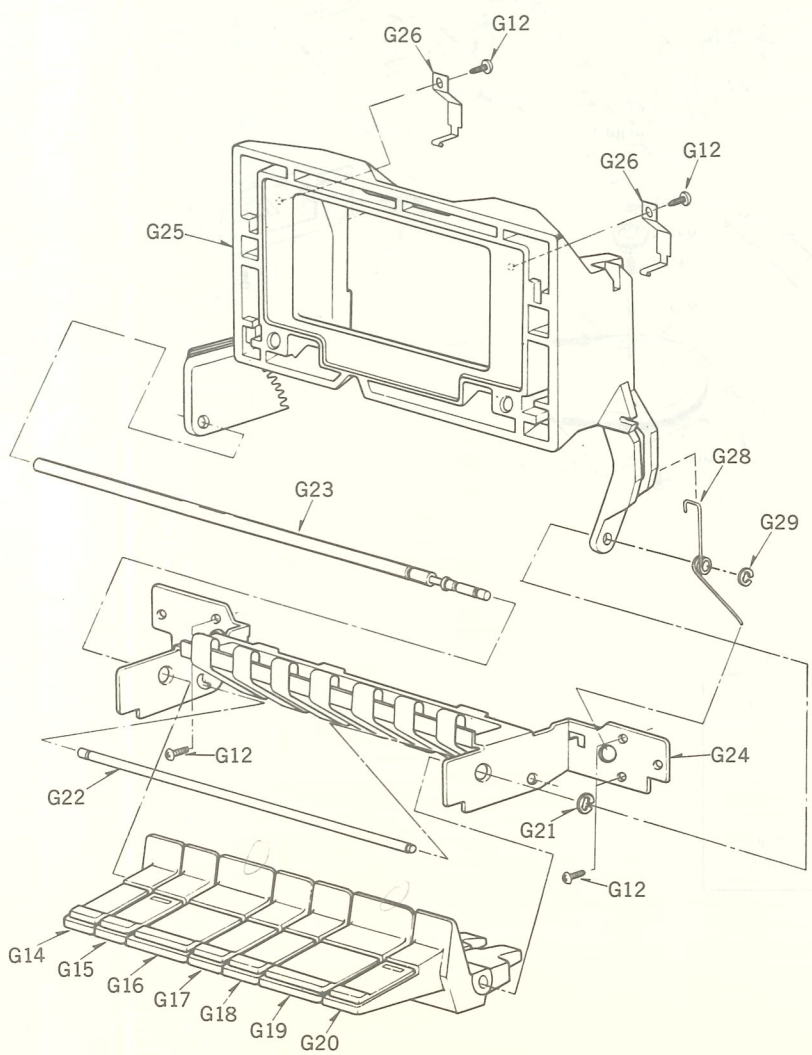
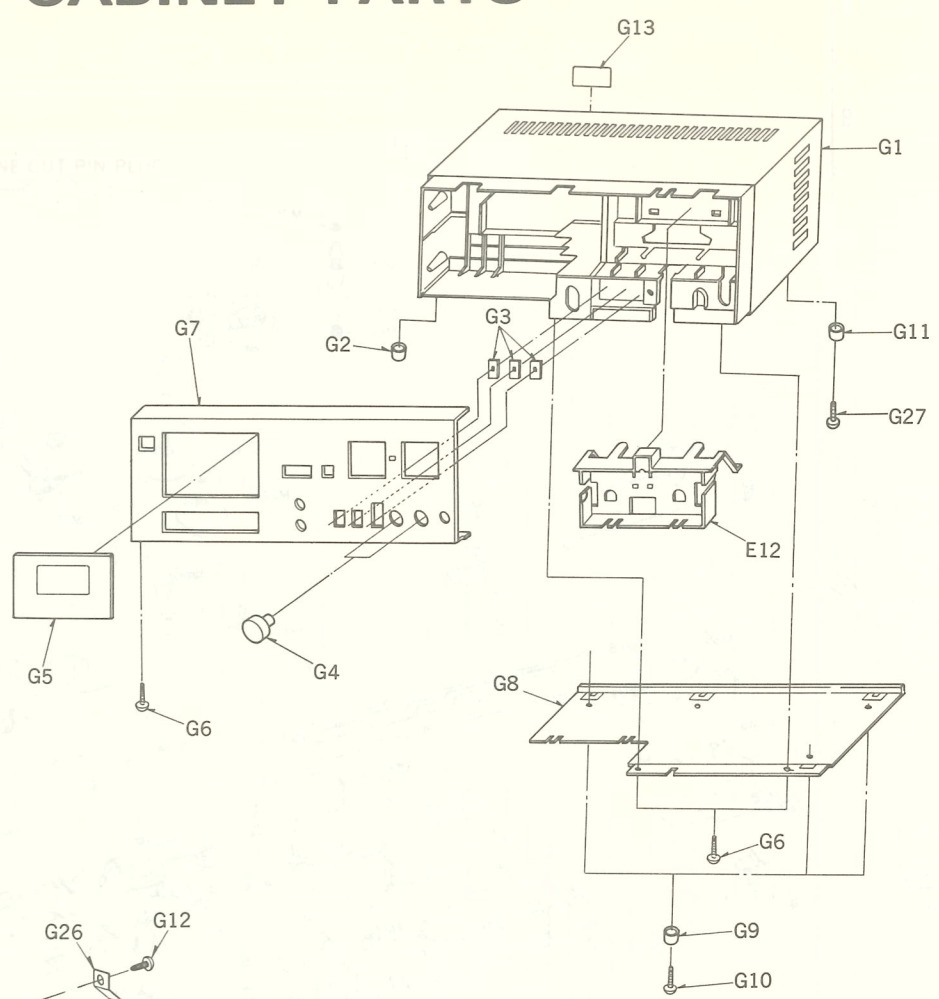


SPECIFICATIONS

Pressure of pressure roller	350 ± 50 g
Takeup tension * Use cassette torque meter ... QZZSRKCT	50 ± 15 g-cm
Wow and flutter (JIS) * Use test tape ... QZZCWAT	Less than 0.12% (WRMS)

# CABINET PARTS

Ref. No.	Part No.	Part Name & Description
<b>CABINET PARTS</b>		
G1	QKM1424	Main Case
G2	QKA1081	Case Foot
G3	QGK2998	Switch Shelter
G4	QYT0572	Volume Knob Assembly
G5	QYF0434	Cassette Lid Assembly
G6	XTB3+10BFN	Tapping Screw $\phi 3 \times 10$
G7	QYP0968	Front Panel Assembly
G8	QGC1176	Bottom Cover
G9	QKA1083	Rubber Foot
G10	QH1299	Screw $\phi 3 \times 8$
G11	QKJ0385	Spacer
G12	XTN26+6B	Tapping Screw $\phi 2.6 \times 6$
G13	QGS2826	Main Name Plate
*For U.S.A. <input type="checkbox"/> QGS2827		
*For Canada. <input type="checkbox"/> QGS2827		
G14	QGO1580	Pause Button
G15	QGO1579	Record Button
G16	QGO1578	Playback Button
G17	QGO1577	Rewind Button
G18	QGO1576	Fast Forward Button
G19	QGO1575	Stop Button
G20	QGO1574	Eject Button
G21	XUC4FT	Stop Ring $4\phi$
G22	QMN1861	Push Button Shaft-B
G23	QMN2535	Push Button Shaft-A
G24	QXA0720	Push Button Holding Angle Assembly
G25	QKF6011	Cassette Holder



Ref. No.	Part No.	Part Name & Description
G26	QBP1818	Holder Spring
G27	XTN3+16B	Tapping Screw $\phi 3 \times 16$
G28	QBN1641	Lid Spring
G29	XUC3FT	Stop Ring $3\phi$
<b>ACCESSORIES</b>		
A1	<input type="checkbox"/> QQT2851	Instruction Book
*For U.S.A. <input type="checkbox"/> QQT2852		
*For Canada. <input type="checkbox"/> QQT2852		
<b>PACKINGS</b>		
P1	<input type="checkbox"/> QPN4046	Inside Carton
*For U.S.A. <input type="checkbox"/> QPN4006		
*For Canada. <input type="checkbox"/> QPN4006		
P2	QPA0516	Cushion
P3	XZB40X60A02	Poly Bag
P4	QPS0477	Pad
P5	QPS0432	Spacer