ORDER NO. ARD-7703021C

Service Manual

Cassette Deck

RS-615US

Front-Loading Stereo Cassette Deck with
Dolby* Noise-Reduction System,
Timer Stand-By and 3-Position Tape Selector

RS-630U MECHANISM SERIES

Specifications (Catalog specifications for sales)

Power requirement:	AC; 120 V, 50/60 Hz
Power consumption:	10 W
Motor:	DC electronic speed control motor
Track system:	4-track, 2-channel stereo recording and playback
Tape speed:	1-7/8 ips.
Wow and flutter:	0.10% (WRMS)
Frequency response:	CrO_2 tape; 30 ~ 15,000 Hz
	Normal tape; 30 ~ 14,000 Hz
Signal-to-noise ratio:	Dolby NR in; 63 dB (CrO_2 tape above 5 kHz)
	Dolby NR out; 50 dB (Normal tape)
	(Signal level = 250 nWb/m)
Fast forward and rewind time:	Approx. 90 seconds with C-60 cassette tape
Input:	MIC; sensitivity 0.25 mV/applicable microphone impedance 600Ω ~ 20 KΩ
	LINE; sensitivity 60 mV/input impedance 47 KΩ
Output:	LINE; output level 0.42 V/load impedance 50 KΩ over
	HEADPHONES; output level 65 mV/load impedance 8Ω
Head:	2-head system;
	1-super alloy head for record/playback
	1-ferrite head for erasure
Dimensions:	16-1/8"(W) × 5-1/2"(H) × 12"(D)
Weight:	13-1/4 lbs.

Specifications are subject to change without notice.

Technics
by Panasonic

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TECHNICAL INFORMATION

TIMER STAND-BY OPERATION MECHANISM

[FUNCTION]

The timer stand-by system which makes unattended timer recording and playback possible by simply adding one of the audio timer.

With the timer ····· it's only necessary to press the pause button, and then the recording and playback buttons. Then set the timer, and the timer turns off the power to the system.

Next, simply release the pause button, and press the timer stand-by button. Then, when the timer later turns on the power, the recording or playback will automatically begin at the same time.

[DETAIL EXPLANATION]

The explanation of this mechanism will be made based on the drawings which are described as shown in fig. 1, 2 and 3.

(1) When the power ON/OFF switch is turned **"OFF" position** (with the timer stand-by button in the **"ON" position**) as shown in fig. 1 and 2.

1. The timer lever-C is pushed in the direction of arrow (①) as shown in fig. 2.
2. The lock plate and the timer lever-C are locked at point (Ⓑ).
3. When the timer lever-C is moved in the direction of arrow (①), timer lever-B and timer lever-A move at the same time in the directions of arrows (②) and (③) and (④) as shown in fig. 1.
   In this condition, the Auto-Stop driving lever assembly and timer lever-A separate. This is because this timer stand-by mechanism is operated during recording or playback, and if the timer lever-A did not separate, the Auto-Stop operation mechanism would function to stop condition the unit.
4. When timer lever-B moves in the direction of arrow (②), the Auto-Stop driving pawl is pulled in the direction of arrow (⑤) by the spring, and therefore, it will move at same time in the direction of arrow (⑥) and become to engage the projection of the takeup idler.

(2) When the power ON/OFF switch is turned **"ON" position** (with the timer stand-by button in the **"ON" position**) as shown in fig. 1 and 2.

1. The motor starts rotating, and the capstan rotates in the direction of arrow (①).
2. Because the capstan contacts the takeup idler it rotates in the direction shown by arrow (②) at the same time when the capstan rotates.
3. When the takeup idler rotates, the Auto-Stop driving pawl is pushed outward in the direction of arrow (③'), and the Auto-Stop driving lever assembly functions in direction shown by arrow (④'). See fig. 1.
4. The lock plate is released at the same time that part (Ⓐ) of the Auto-Stop driving lever assembly moves toward (④). See fig. 2.
5. Timer lever-C and lever-B return in the direction of arrows (⑤') and (⑥'), and timer lever-A also returns in the diretion of arrow (⑦).
6. The unit then becomes in the usual recording or playback condition.

[ORDINARY AUTO-STOP MECHANISM FUNCTION]

The fig. 4 shows the operation order of the ordinary Auto-Stop mechanism.

I. TOP VIEW/TIMER STAND-BY BUTTON IN THE "ON" POSITION

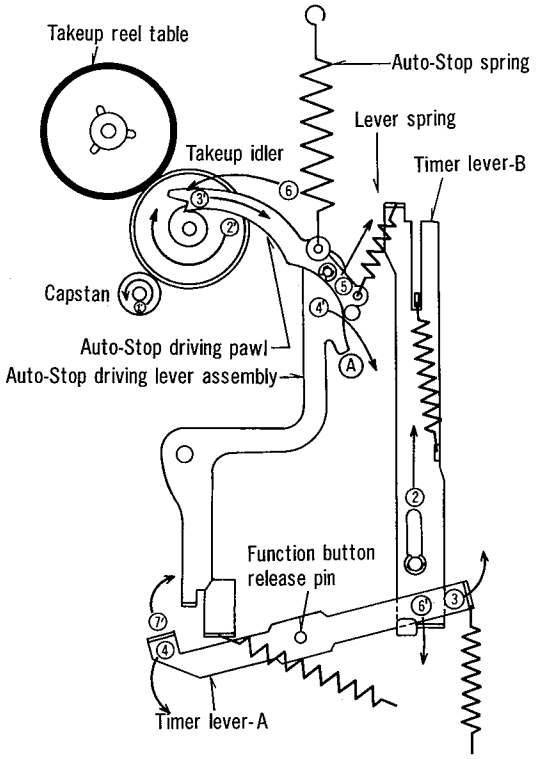

Fig. 1

II. BOTTOM VIEW/TIMER STAND-BY BUTTON IN THE "ON" POSITION

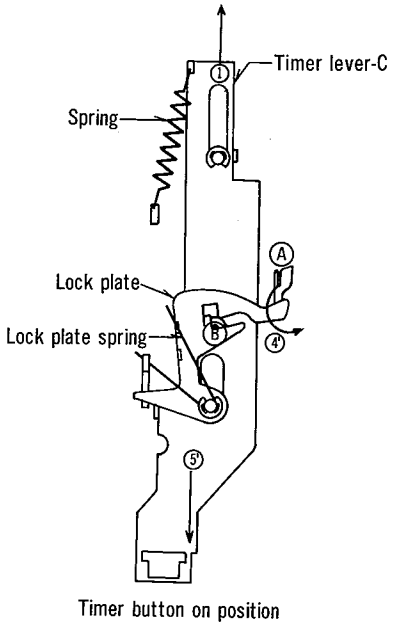

Fig. 2

III. BOTTOM VIEW/TIMER STAND-BY BUTTON IN THE "OFF" POSITION

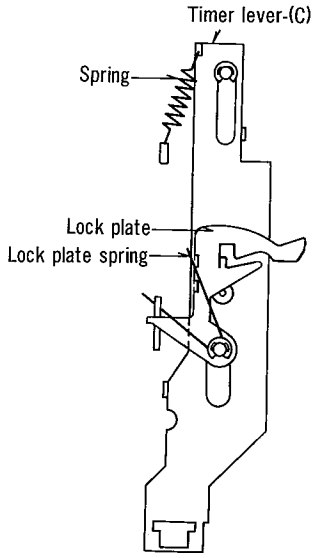

Fig. 3

IV. TOP VIEW/ORDINARY AUTO-STOP MECHANISM

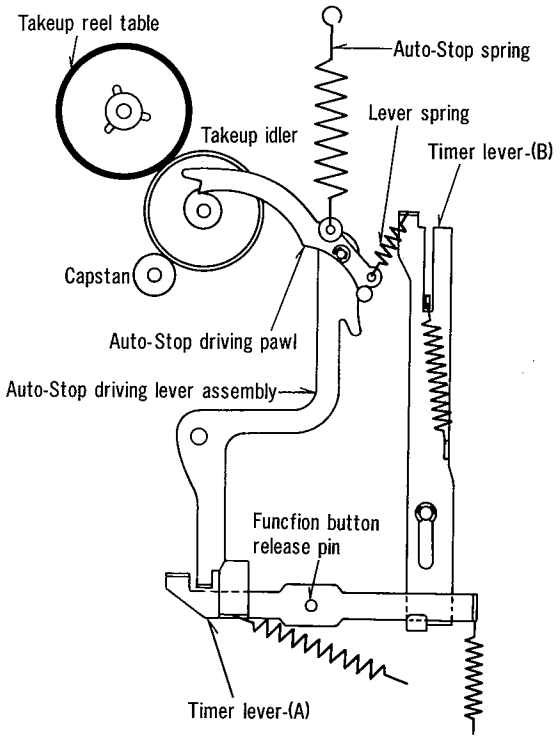

Fig. 4

LOCATION OF CONTROLS AND COMPONENTS

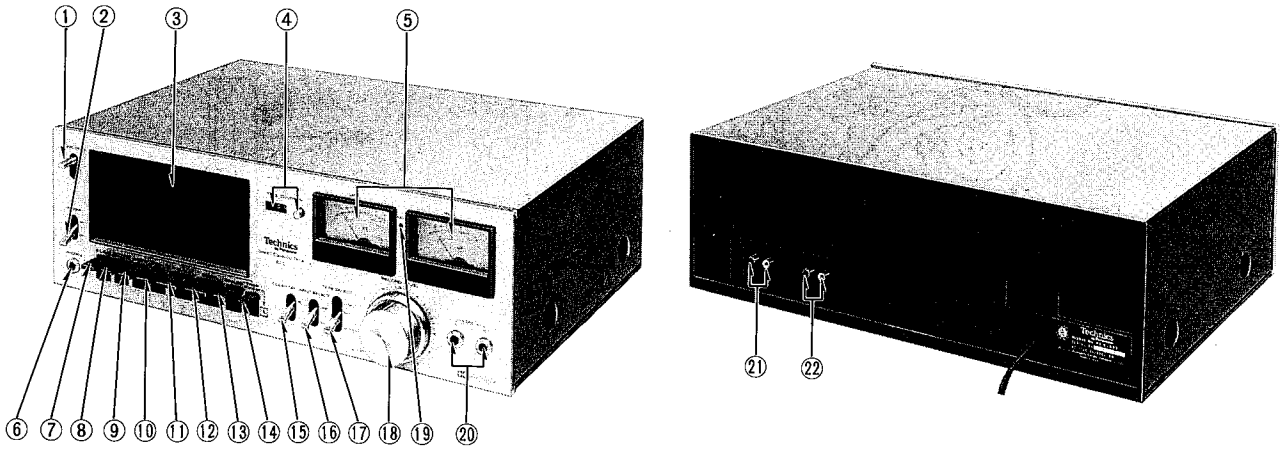

Fig. 5

① Door open lever
② Power switch
③ Cassette compartment door
④ Tape counter and reset button
⑤ Level/VU meters
⑥ Headphones jack
⑦ Eject button
⑧ Record button
⑨ Rewind button
⑩ Fast forward button
⑪ Playback button
⑫ Stop button
⑬ Pause button
⑭ Timer stand-by button
⑮ Dolby noise-reduction switch
⑯ Input selector
⑰ Taps selector
⑱ Record level adjustment
⑲ Recording indication lamp
⑳ Microphone jacks
㉑ Line output jacks
㉒ Line input jacks

DISASSEMBLY INSTRUCTIONS

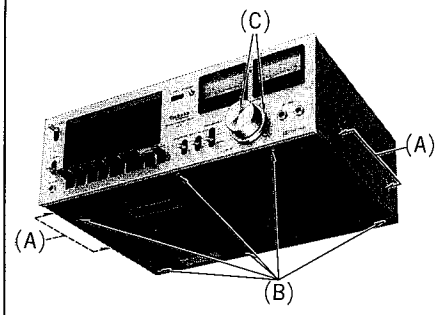

Fig. 6

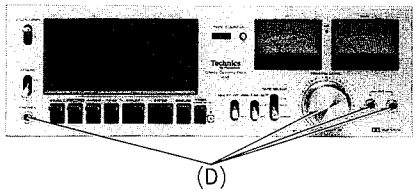

Fig. 7

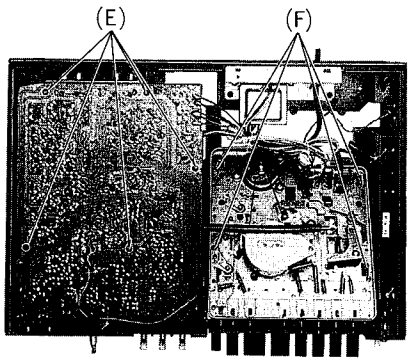

Fig. 8

Procedure	To remove —— .	Remove —— .	Pcs.	Shown in fig. —— .
1	Case cover	(A)	(4)	6
2	Bottom cover	(B)	(6)	6
3	Front panel	(C), (D)	(2), (4)	6, 7
4	Main P.C.B.	(E)	(5)	8
5	Mechanism	(F)	(4)	8

ADJUSTMENTS

Before measuring and adjusting "Overall frequency response", "Overall distortion" and "Overall S/N ratio", confirm that the characteristics of 5 items below are within standard which have much relation to or influence on electrical performances above.

1. Head azimuth adjustment. 2. Bias current. 3. Playback gain. 4. Overall gain.
5. Playback frequency response.

I. TEST INSTRUMENTS

1. Prepare test instruments which are equivalent in accuracy to those shown below.
2. The test instruments should be inspected and corrected by specialists once every 6 months, because a long period of use without maintenance may increase errors in indication.
3. Warm-up the test instruments for 30 minutes and the set to be measured for 10 minutes before taking the measurements. If not, there may arise an error or difference between the initial value and the stabilized value measured after "aging".
4. Specifications of test instruments.

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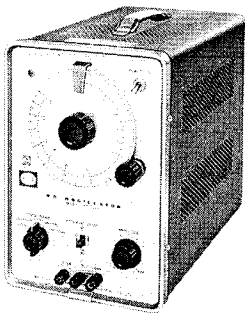
(1) Audio frequency oscillator

a. Oscillation froquency:	5 Hz ~ 500 kHz (5 ranges)
b. Frequency tolerance:	±(3% + 1 Hz)
c. Sine wave	
* Output voltage (at 25°C):	5 Vrms ±10% (without load)
	2.5 Vrms ±10% (with 600Ω load)
* Output frequency response:	Within ±0.2 dB, 20 Hz ~ 20 kHz
	Within ±0.5 dB, 5 Hz ~ 500 kHz
* Distortion factor:	Not more than 0.05%, 200 Hz ~ 20 kHz
	Not more than 0.5%, 5 Hz ~ 500 kHz
* Output impedance:	600Ω unbalanced, within ±15%
* Output attenuator:	0 dB, 20 dB, Error: within ±0.2 dB
d. Temperature in use of set:	Temperature = 0 ~ 40°C, Humidity = 90% or less



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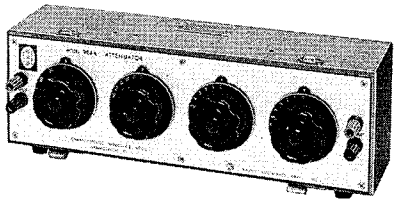
(2) Automatic-stop distortion meter (with vacuum tube voltmeter)

A. Distortion factor measurement	
a. Frequency (fundamental wave):	400 Hz, 1 kHz ±10%
b. Measurement:	0.1 ~ 100% (6 ranges)
c. Input:	50 mV ~ 50 V
d. Fundamental wave attenuation:	60 dB or more
B. Level measurement	
a. Measurement:	1 mV (−60 dB) ~ 30 V (30 dB) (9 ranges)
b. Frequency response (1 kHz basis):	20 Hz ~ 100 kHz ±0.3 dB
c. Input impedance:	1 MΩ ±10%, less than 50 pF
d. Error in indicated value:	Within ±3% at 1 kHz
C. Output terminal	
a. Frequency response:	10 Hz ~ 100 kHz ±1 dB
	100 kHz ~ 1 MHz ±3 dB
b. Output voltage:	1 Vrms ±10% (1 kHz sine wave)

(3) Attenuator

a. Input impedance:	600Ω unbalanced
b. Maximum attenuation:	121 dB
c. Minimum attenuation:	0.1 dB



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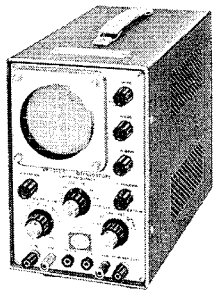
(4) Oscilloscope

a. Cathode ray tube:	Effective ranges 8×8 cm
b. Vertical axis	
* Input sensitivity:	30 mV～30 V/cm
* Frequency band:	DC～2 MHz
* Transient time:	180 ns.
* Input impedance:	1 MΩ, 35 pF
c. Horizontal axis	
* Tuning range:	30 Hz～2 MHz
* Sweep time:	1μs～100 ms/cm
* External sweep:	1 Vp-p/cm or more



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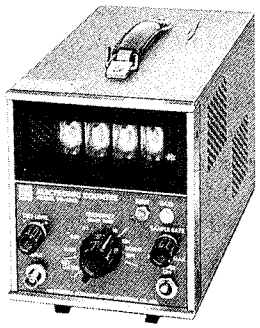
(5) Digital electronic counter

a. Number of figure:	4 (decimal system)
b. Input sensitivity:	100 mVrms
c. Input impedance:	1 MΩ, 40 pF
d. Frequency measurement range:	10 Hz～100 kHz
e. Counting time:	0.1 s, 1 s, 10 s



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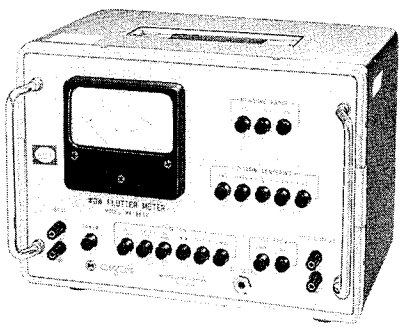
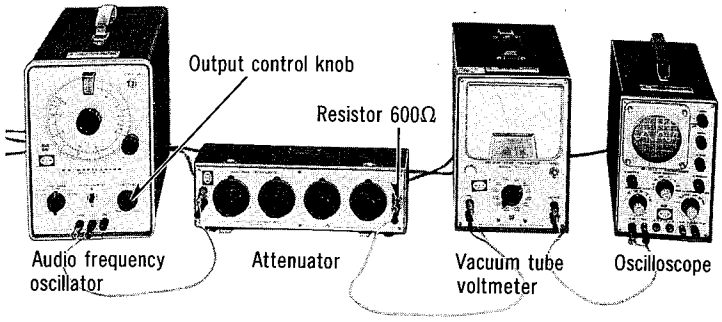
(6) Wow meter

a. Measured center frequency range:	3 kHz ±4%
b. Input level range:	30 mV～3 V
c. Input impedance:	About 50 KΩ unbalanced
d. Measurement:	0.01～3% (5 ranges)
e. Indicator error:	Maximum error in indicated value ±5% in each range
f. Frequency response:	Conforming to weighting curve characteristics (WRMS), JIS C5551. Flat characteristics (RMS) 0.5～200 Hz, within −3 dB (4 Hz basis)
g. Meter indication system:	Effective value indication, conforming to JIS C5551.
h. Meter response characteristics:	About 5～7 sec.
i. Oscillation frequency:	3 frequencies (3 kHz, 3 kHz ±3%)
j. Temperature range:	0～40°C



II. MEASUREMENT CONDITIONS

1. Standard measurement conditions
   * Ambient temperature: 10~30°C (50~86°F)
   * Ambient humidity: 30~90% RH
   * Power voltage accuracy: ±3%
2. Position of tape recorder
   * When measuring, place the unit under test in a horizontal position.
3. Oscillator output voltage adjustment
   * Connect the equipments as shown in the following and adjust the oscillator output control knob for 1 V (f=1 kHz) through the attenuator while keeping the attenuator at 0 dB.
   * When supplying a signal to the tape recorder amplifier, adjust the input level using the attenuator.



III. TEST TAPE

Test tape life

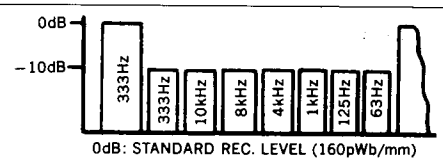
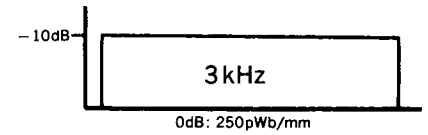
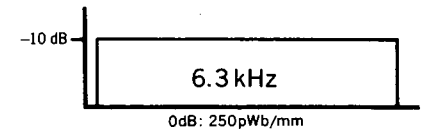
The more frequently the test tape is used, the more the tape characteristics will deteriorate (e.g. lowering of recorded level, worsening of frequency response particularly in high-frequency range, and an increase in wow due to tape elongation) until measured values become unreliable. Even in such a case when a tape is not used, but stored, for a long period of time, tape shows deterioration in performance because of self damagenetization due to storage conditions, etc.

Please refer to the tape life specification and use care not to use a tape longer than its rated life when servicing.

Frequence of use: Not more than 20 times for each tape length.

Storage period: Not more than 6 months.

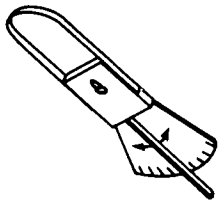
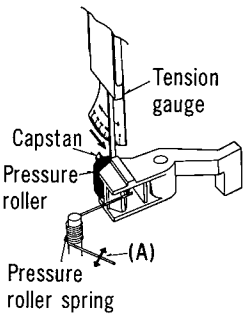
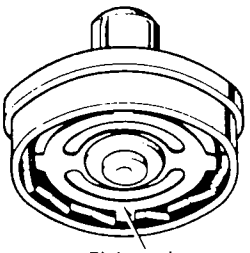
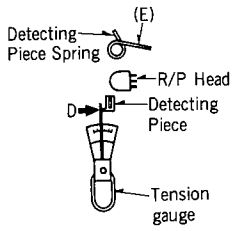
※Test tape

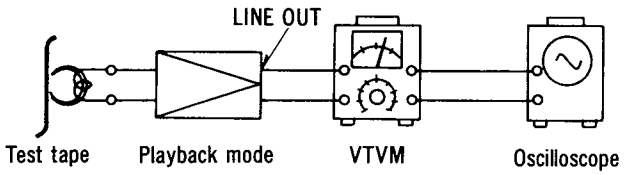
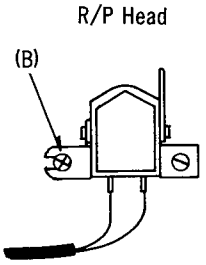
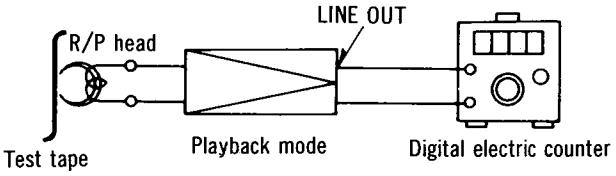
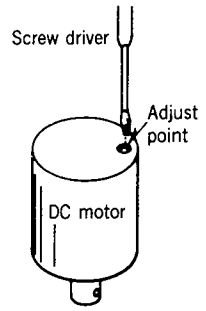
PARTS NO.	PARTS NAME	SPECIFICATIONS	REMARKS
C-FH	Standard recording level and frequency response tape		5 times repetitive recording. Tape speed: 1-7/8 ips. (4.8 cm/s) Full track (10 min.)
C-WAT	Wow and tape speed tape		Tape speed: 1-7/8 ips. (4.8 cm/s) Full track (45 min.)
C-AA	Azimuth tape		Tape speed: 1-7/8 ips. (4.8 cm/s) Full track (15 min.)
C-RA	Reference blank tape (Normal)		Unrecorded tape (20 min.)
C-RF	Reference blank tape (CrO_2)		Unrecorded tape (20 min.)

IV. MEASUREMENT & ADJUSTMENT METHOD

NOTE:

1. Make sure heads are clean.
2. Make sure capstan and pressure roller are clean.
3. Judgeable room temperature: 20±5°C (68±9°F)
4. Dolby NR switch: OUT
5. Tape selector: NORMAL

ITEM	MEASUREMENT & ADJUSTMENT	REMARKS
Pressure of pressure roller Equipment: * Tension gauge (max. 500 gr) 	1. Place UNIT into playback mode. 2. Hook the tension gauge to pressure roller lever and pull it in the direction of the arrow as shown in fig. 9. 3. Measure the tension at the moment when the pressure roller moves away from the capstan. **Standard value: 400±50 gr** **Adjustment method** Bend the part (A) of the pressure roller spring in either direction shown by the arrow until the correct pressure is attained.	* Playback mode  **Fig. 9**
Takeup tension Equipment: * Cassette torque meter (SRK-CT or RP8063)	1. Mount cassette torque meter on UNIT. 2. Place UNIT into playback mode and read takeup torque. 3. Measure several times and determine the mean value. **Standard value: 50±10 gr-cm** If the measured value is not within standard, firstly clean the rotational parts of the mechanism with alcohol, and if it still is not within standard, make the following adjustment. **Adjustment method** Adjust by turning the plate spring attached in the takeup reel table (See fig. 10).	* Playback mode  **Fig. 10**
Auto-Stop detecting piece tension Equipment: * Tension gauge (max. 100 gr)	1. Place UNIT into playback mode. 2. Press part (D) of the detecting piece in a straight line in the direction of the arrow as shown in fig. 11. **Standard value: 50±10 gr** **Adjustment method** Adjust by bending the part (E) of the detecting piece spring.	* Playback mode  **Fig. 11**

ITEM	MEASUREMENT & ADJUSTMENT	REMARKS
Head azimuth adjustment Equipment: * VTVM * Oscilloscope * Test tape (azimuth) ··· C-AA	**Record/playback head adjustment** 1. Test equipment connection is shown below.  **Fig. 12** 2. Play azimuth tape (C-AA 6.3 kHz). 3. Adjust record/playback head angle adjustment screw (B) in fig. 13 so that output level at LINE OUT becomes maximum. 4. Measure both channels, and adjust levels for equal output. 5. After adjustment lock head adjustment screw with lacquer.	* Playback mode  **Fig. 13**
Tape speed Equipment: * Digital electronic counter or frequency counter (RP8067) * Test tape ··· C-WAT	**Tape speed accuracy** 1. Test equipment connection is shown below.  **Fig. 14** 2. Play test tape (C-WAT 3,000 Hz), and supply playback signal to frequency counter. 3. Measure this frequency. 4. On the basis of 3,000 Hz, determine value by following formula: $\text{Tape speed accuracy} = \frac{f - 3{,}000}{3{,}000} \times 100\,(\%)$ where, f = measured value 5. Take measurement at middle section of tape. Standard value: ±1.5% **Adjustment method** 1. Play the test tape (middle). 2. Adjust the tape speed adjustment VR shown on page 16 so that frequency becomes 3,000 Hz. **Tape speed fluctuation** Make measurements in same manner as above (beginning, middle and end of tape), and determine difference between maximum and minimum values and calculate as follows: $\text{Tape speed fluctuation} = \frac{f_1 - f_2}{3{,}000} \times 100\,(\%)$ f_1 = maximum value f_2 = minimum value Standard value: 1%	* Playback mode  **Fig. 15**

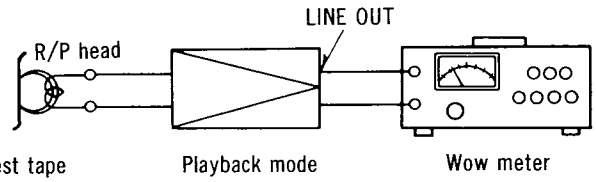
<table>
<tr><th>ITEM</th><th>MEASUREMENT & ADJUSTMENT</th><th>REMARKS</th></tr>
<tr><td>Wow and flutter
Equipment:
* Wow meter
* Test tape··· C-WAT</td><td>1. Test equipment connection is shown below.
 

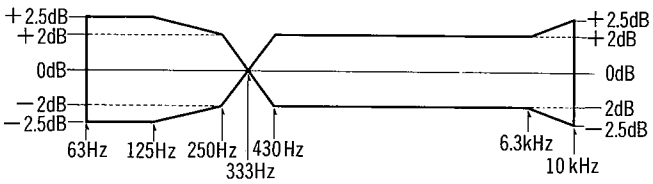
Fig. 16
2. Use wow test tape (3,000Hz) and measure its playback signal on wow meter.
3. Wow and flutter is expressed in percentage and that measurement an be weighted by JIS network (WRMS).
4. Measure at middle section of test tape.
Standard value: 0.10% (WRMS)</td><td>* Playback mode</td></tr>
<tr><td>Playback frequency response
Equipment:
* VTVM
* Oscilloscope
* Test tape··· C-FH</td><td>1. Test equipment connection is as same as "Head azimuth adjustment" but use the test tape (C-FH) instead of head azimuth tape (See fig. 12).
2. Place UNIT into playback mode.
3. Play frequency response test tape (C-FH).
4. Measure output level at 10kHz, 8kHz, 4kHz, 1kHz, 125Hz and 63Hz and compare output level with standard frequency 333Hz, at LINE OUT.
5. Make measurement for both channels.
6. Make sure that the measured value is within the range specified in the frequency response chart.
Playback frequency response chart
 

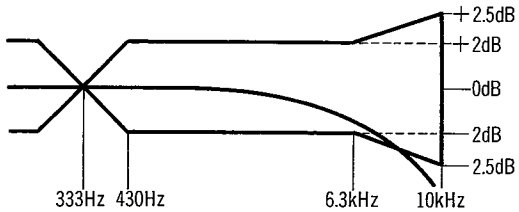
Fig. 17</td><td>* Playback mode</td></tr>
<tr><td>Playback frequency response</td><td>Adjustment
1. If the measured value decreases at high frequency range, as shown in fig. 18, P.C.B. connection points (B) should be shorted to increase at high frequency range (See fig. 22 on page 11).
 

Fig. 18
The corrected value
<table><tr><td>4kHz</td><td>6kHz</td><td>8kHz</td><td>10kHz</td></tr><tr><td>about +0.2dB</td><td>about +0.8dB</td><td>about +1.0dB</td><td>about +1.5dB</td></tr></table></td><td>* Playback mode</td></tr>
</table>

ITEM	MEASUREMENT & ADJUSTMENT	REMARKS

2. If the measured value increases at high frequency range, as shown in fig. 19, P.C.B. connection points (A) should be unsoldered and connection points (B) should be shorted (See fig. 22 on page 11).

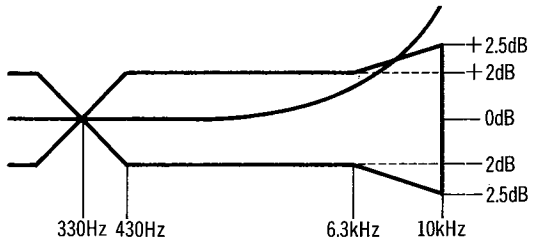


Fig. 19

The corrected value

4 kHz	6 kHz	8 kHz	10 kHz
about −0.2 dB	about −0.8 dB	about −1.0 dB	about −1.5 dB

Caution:
Please do not unsolder both connection points (A), (B) to prevent oscillation.

3. If the measured value increases at middle frequency range, as shown in fig. 20, P.C.B. connection points (C) should be shorted (See fig. 22 on page 11).

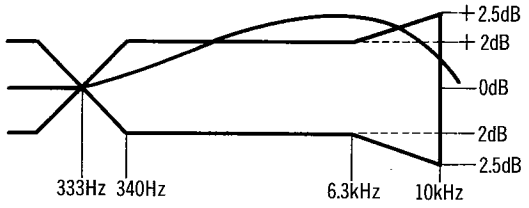


Fig. 20

The corrected value

1 kHz	2 kHz	4 kHz	6 kHz
about −0.8 dB	about −1.0 dB	about −1.4 dB	about −1.4 dB

4. If the measured value decreases at middle frequency range, as shown in fig. 21, P.C.B. connection points (D) should be unsoldered (See fig. 22 on page 11).

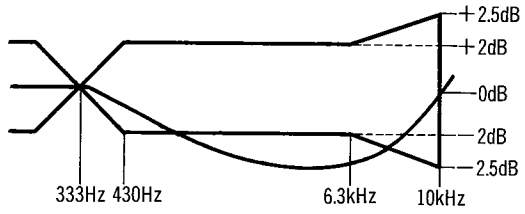


Fig. 21

The corrected value

1 kHz	2 kHz	4 kHz	6 kHz
about +0.3 dB	about +0.7 dB	about +0.8 dB	about +0.8 dB

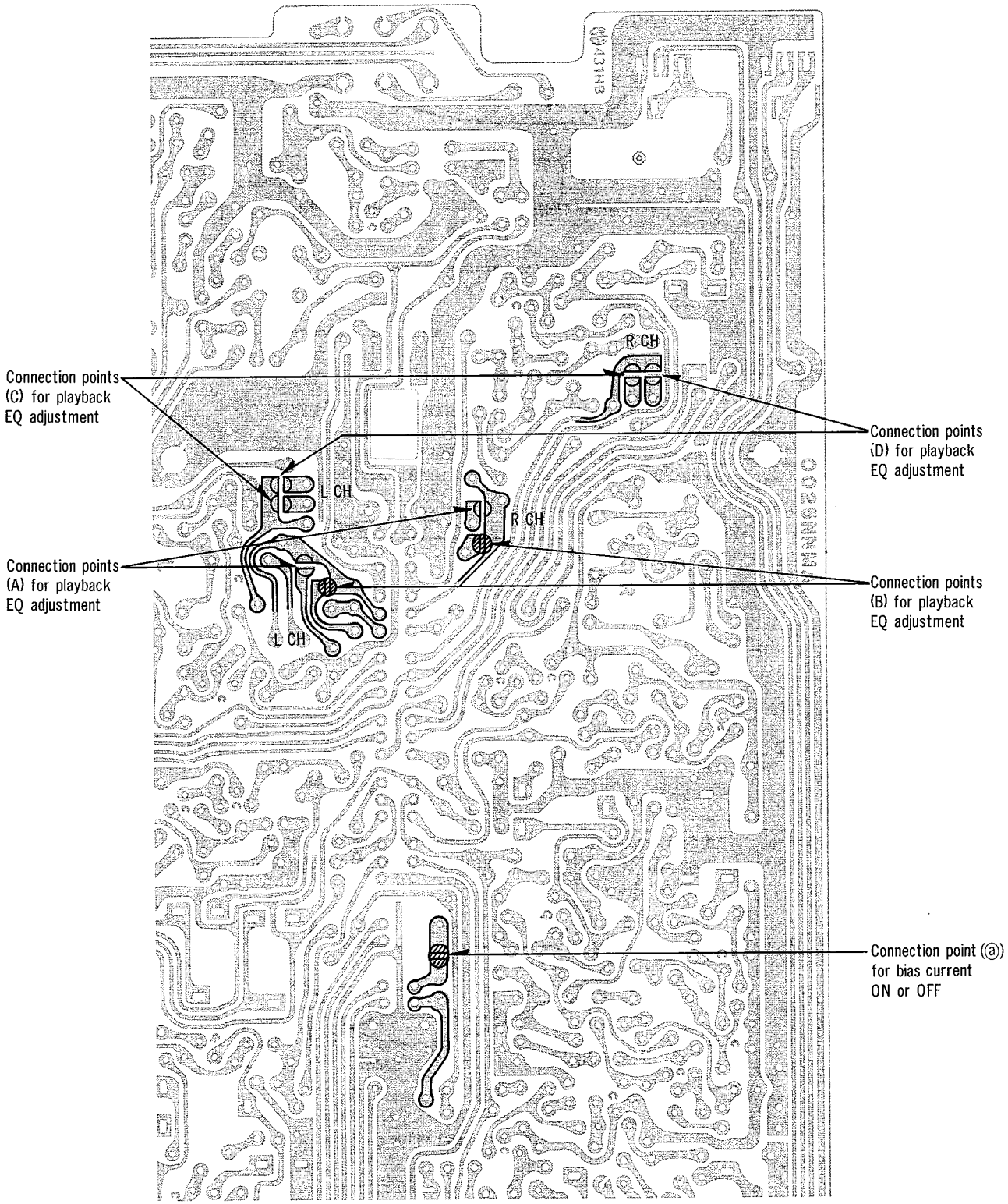
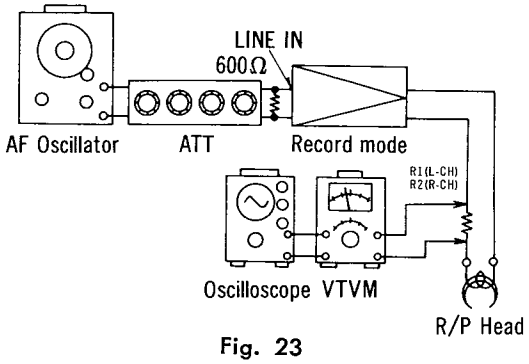
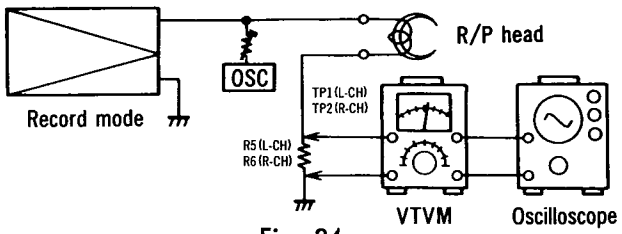
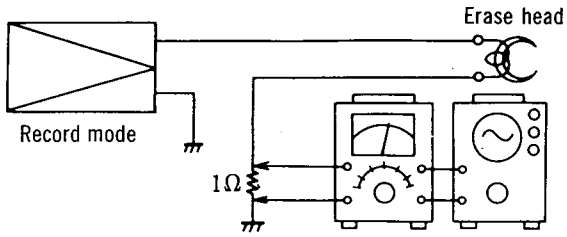
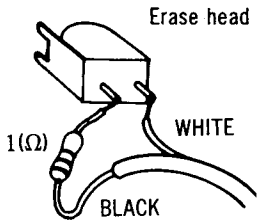
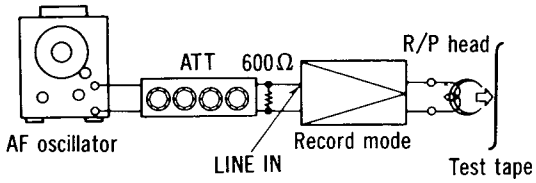
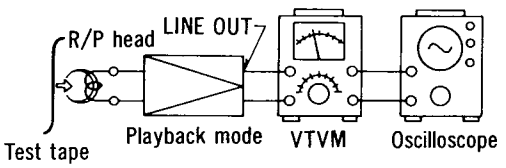
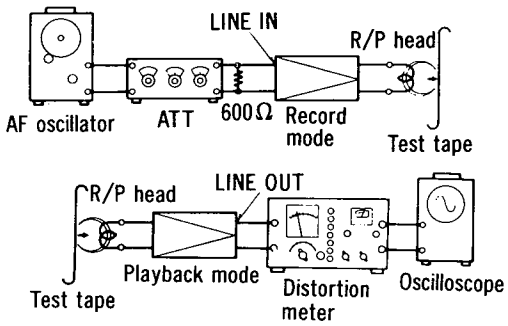
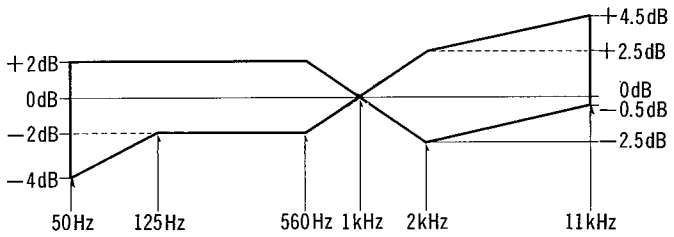
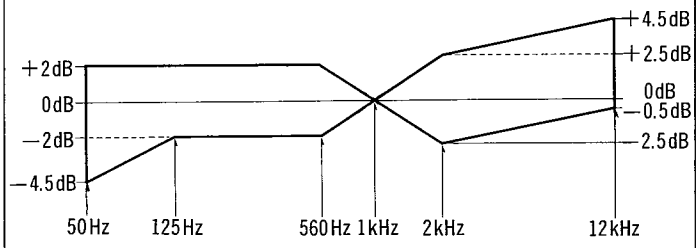
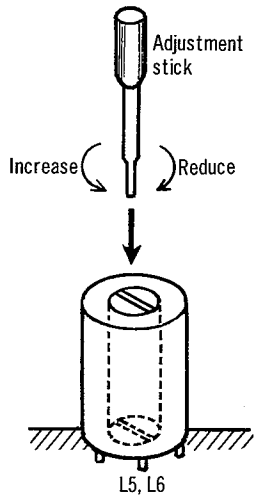

Connection points (C) for playback EQ adjustment
Connection points (A) for playback EQ adjustment
R CH
L CH
R CH
L CH
Connection points (D) for playback EQ adjustment
Connection points (B) for playback EQ adjustment
Connection point (ⓐ) for bias current ON or OFF

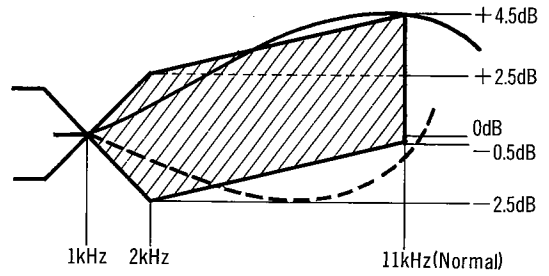
Fig. 22

ITEM	MEASUREMENT & ADJUSTMENT	REMARKS
Playback gain Equipment: * VTVM * Oscilloscope * Test tape··· C-FH	1. Test equipment connection is shown in fig. 12. 2. Play standard recording level portion on test tape (C-FH 333 Hz), and using VTVM measure the output level at LINE OUT jack. 3. Make measurement for both channels. **Standard value: 0.42 V (−7 dB)** **Adjustment** 1. If measured value is not standard, adjust VR1 (L-CH), VR2 (R-CH). (See fig. 32 on page 16). 2. After adjustment, check "Playback frequency response" again.	* Playback mode
Playback S/N ratio Equipment: * VTVM * Oscilloscope * Test tape··· C-FH * Empty cassette	1. Test equipment connection is shown in fig. 12. 2. Play standard recording level test tape (C-FH 333 Hz) and read output level on VTVM. Refer to "Playback gain adjustment". 3. Place empty cassette (which has been cut) and play again. 4. Measure noise level at this time using VTVM, and determine ratio of this level to test tape output signal voltage (333 Hz). **Standard value: Greater than 43 dB** An example calculation is shown below. A: Es = playback output signal voltage of test tape (333 Hz) B: En = playback output noise level Es = 0.42 V (−7 dB) En = 0.003 V (−50 dB) $S/N\ ratio = \frac{Es}{En} = \frac{0.42\,V}{0.003\,V} = 140$ $20 \log_{10} 140 = 43\,dB$ S/N ratio = Es(dB) − En(dB) = −7 − (−50) = 43 dB	* Playback mode
Recording current	 **Fig. 23** 1. Test equipment connection is shown in fig. 23. 2. Stop bias oscillation by unsoldering the connection point for bias current ON or OFF in fig. 22. 3. Supply 1 kHz signal (−24 dB) again and adjust ATT until monitor level at LINE OUT becomes 0.42 V. 4. Measure voltage and then calculate recording current by formura given below. $Recording\ current = \frac{Value\ read\ on\ VTVM\ (V)}{10\ (\Omega)}$ **Standard value:** **0.42 mV: 42 μA (Normal)** **0.44 mV: 44 μA (EX)** **0.60 mV: 60 μA (CrO_2)** 5. Adjust VR11 (L-CH), VR12 (R-CH) (See adjustment part location on page 16).	

ITEM	MEASUREMENT & ADJUSTMENT	REMARKS
Bias current Equipment: * VTVM * Oscilloscope	1. Test equipment connection is shown below.  **Fig. 24** 2. Place UNIT into record mode, and tape selector to "NORMAL". 3. Read voltage on VTVM and calculate bias current by following formula: $\text{Bias current (A)} = \frac{\text{Value read on VTVM (V)}}{10\ (\Omega)}$ Standard value: $500^{+250\mu A}_{-150\mu A}$ (Normal, FeCr) $600^{+250\mu A}_{-150\mu A}$ (CrO_2) 4. Adjust L5 (L-CH) and L6 (R-CH) (See adjustment part location on page 16). 5. Then changing the tape selector to "CrO_2", confirm that bias current become greater by 25% than that for normal.	* Record mode * Be sure the ground end of the meter is connected to the ground end of the resistor. * When bias current is the adjusted on one channel only, note that bias current on the other channel may vary. * When L5 or L6 is the replaced, preset core position to bottom side of coil and then readjust optimum bias current.
Erase current Equipment: * VTVM * Oscilloscope * Resistor (0.1Ω)	1. Connect 0.1Ω resistor between ground side terminal of erase head ground lead wire removed (See fig. 26). 2. Connect VTVM to both ends of 0.1Ω resistor.  **Fig. 25** 3. Place UNIT into record mode, and measure voltage across the 0.1Ω resistor. 4. Determine erase current with the following formula: $\text{Erase current (A)} = \frac{\text{Voltage across both ends of } 0.1\Omega}{0.1\Omega}$ Standard value: 190±35mA (Normal, EX) 100±40mA (CrO_2)	* Record mode  **Fig. 26**
Overall gain Equipment: * AF oscillator * VTVM * ATT * Oscilloscope * Test tape (reference blank tape) ··· C-RA for Normal ··· C-RF for CrO_2	1. Test equipment connection is shown in fig. 27.  	* Record/playback mode * LINE IN level control ··· MAX * Standard input level: MIC ····· −70±3dB LINE IN −24±3dB DIN ····· −36±3dB

ITEM	MEASUREMENT & ADJUSTMENT	REMARKS
	 **Fig. 27** 2. Place UNIT into record mode, and tape selector to "NORMAL". 3. Supply 1 kHz signal (−24 dB) from AF oscillator, through ATT, to LINE IN. 4. Adjust ATT until monitor level at LINE OUT becomes 0.42 V (−7 dB). 5. Using test tape (C-RA), make recording. 6. Playback recorded tape, and make sure the value at LINE OUT on VTVM becomes 0.42 V. 7. If measured value is not 0.42 V, adjust VR11 (L-CH), VR12 (R-CH) (See fig. 32 on page 16). 8. Repeat from step (2). 9. For CrO_2 tape selector to "CrO_2", change test tape to (C-RF), and take the same steps for normal.	
Overall distortion Equipment: * Distortion meter * AF oscillator * ATT * Oscilloscope * Test tape ··· C-RA (reference blank tape)	1. Test equipment connection is shown in fig. 28.  **Fig. 28** 2. Supply 1 kHz signal to LINE IN and adjust ATT so that output level at LINE OUT indicates 0.42 V (−7 dB). 3. Make recording. 4. Playback and measure distortion factor of output signal. 5. When the distortion factor does not satisfy the standard, check the bias current. When the bias current is lower than standard, distortion will increase. Care should be exercised in the adjustment because the bias current also has an influence on the overall frequency response. Refer to "The overall frequency response" and "The bias current adjustment". Standard value: Less than 2.3% (Normal) Less than 3.3% (FeCr) Less than 3.3% (CrO_2)	* LINE IN level control ··· MAX

ITEM	MEASUREMENT & ADJUSTMENT	REMARKS
Overall frequency response Equipment: * VTVM * AF oscillator * ATT * Test tape (reference blank tape) ··· C-RA for Normal ··· C-RF for CrO_2	**Note:** Before measuring, and adjusting, make sure of the playback frequency response (For the method of measurement, please refer to the playback frequency response). 1. Test equipment connection is shown in fig. 27. 2. Load reference blank test tape and place UNIT into record mode. 3. Supply 1 kHz signal from AF oscillator through ATT to LINE IN. 4. Adjust ATT so that input level is −20 dB below standard recording level (standard recording level = 0 VU). 5. At this time, LINE OUT level indicates 0.042 V. 6. Record each frequency 50 Hz, 120 Hz, 560 Hz, 1 kHz, 2 kHz, 3 kHz, 10 kHz and 11 kHz (12 kHz for CrO_2 and EX) at the same level. 7. Playback and express in dB the difference between playback output level of each frequency based on playback output level of 1 kHz. 8. Make sure that the measured value is within the range specified in the overall frequency response chart. **Overall frequency response chart (Normal)**  **Fig. 29** 9. Set the tape selector to CrO_2 or EX. 10. Measure as same as manner above. 11. Make sure that the measured value is within the range specified in the overall frequency response chart for CrO_2 and EX tape below. **Overall frequency response chart (CrO_2 and EX)**  **Fig. 30**	* Record/playback mode * Record level control ··· MAX
Overall frequency response (As a standard for adjustment)	**Adjustment—Using bias current** 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. 31, increase the bias current by turning L5 (L-CH) or L6 (R-CH) in direction of counter-clockwise (↺). 2. When it becomes lower, as shown by dotted line, reduce the bias current by turning in direction of clockwise (↻).	

ITEM	MEASUREMENT & ADJUSTMENT	REMARKS
	 **Fig. 31**	
Overall S/N ratio Equipment: * VTVM * AF oscillator * ATT * Oscilloscope * Test tape··· C-RA (reference blank tape)	1. Test equipment connection is shown in fig. 27. 2. Supply 1 kHz signal to LINE IN and adjust ATT so that output level at LINE OUT indicates 0.42 V (−7 dB). 3. Make recording. 4. Make another recording without supplying signal (disconnect input plug to LINE IN). 5. Rewind to recorded part and playback. 6. Measure output signal level and no signal level (noise), and determine the ratio in decibels (dB). 7. The value is difference between "Playback S/N and overall S/N", but for decibel calculation refer to "Playback S/N measurement" on page 12. **Standard value: Greater than 42 dB (without NAB filter)**	* Record/playback mode * LINE IN level control ··· MAX * Erase the tape with a bulk tape eraser.
Level meter Equipment: * VTVM * Oscilloscope * AF oscillator	1. Supply 1 kHz signal (−24 dB) from AF oscillator, through ATT, to LINE IN jack. 2. Place UNIT into record mode. 3. Adjust ATT until monitor level at LINE OUT becomes 0.42 V. 4. Adjust VR9 (L-CH), VR10 (R-CH) so that VU meter indicates 0 VU (See adjustment parts location on page 16).	* Record mode
Dolby NR circuit Equipment: * VTVM * AF oscillator * ATT * Oscilloscope	1. Place UNIT into record mode, set the Dolby NR switch to OUT position and supply to LINE IN to obtain −34.5 dB at TP3 (L-CH), TP4 (R-CH) (frequency 5 kHz). 2. Confirm that the value at IN position is 8 dB greater than the value at OUT position of Dolby NR switch. 3. When it is not in condition above, adjust as follows. 4. Set VR5 (L-CH), VR6 (R-CH) to maximum. 5. Set the Dolby NR switch to IN position. 6. At this time adjust VR7 (L-CH), VR8 (R-CH) so that the reading of VTVM become 10 dB greater than the value in step (1) above. 7. Adjusting VR5 (L-CH), VR6 (R-CH), make the reading of VTVM become 2 dB smaller than the value obtainted through the adjustment a in step (6) above.	* Record mode * LINE IN level control ··· MAX * Stop the bias oscillation by unsoldering point ⓐ shown in Fig. 22 on page 11.

ADJUSTMENT PARTS LOCATION

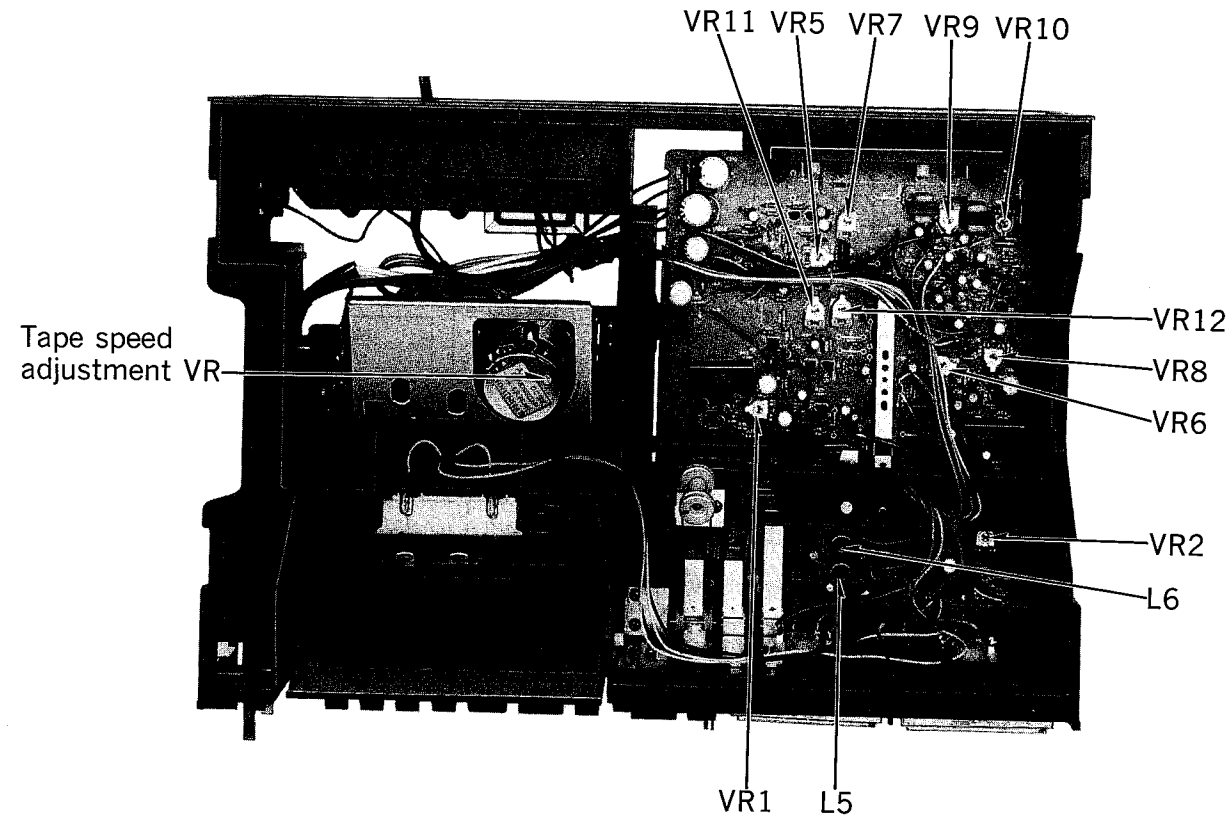
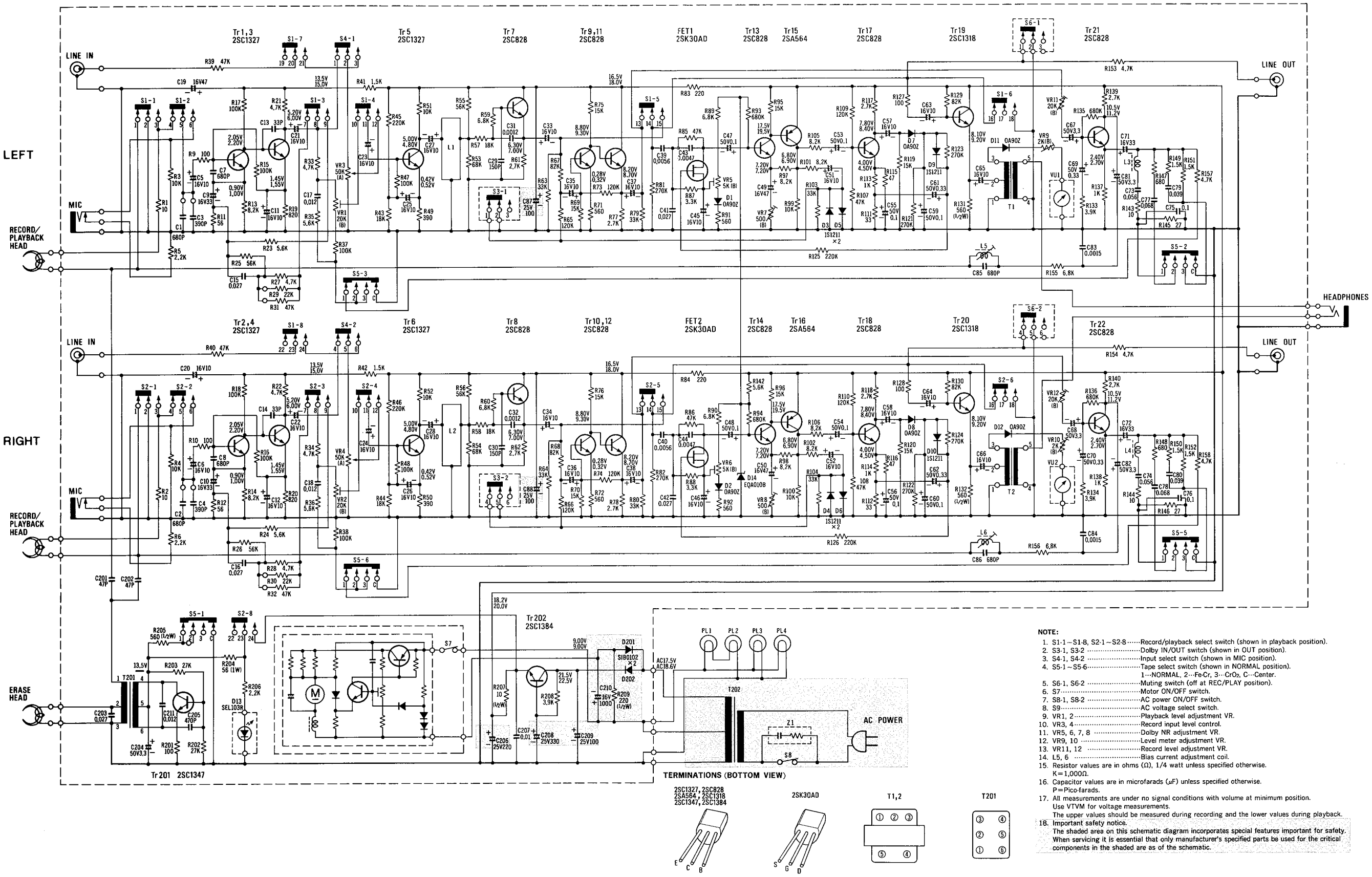


Fig. 32

※ Dolby is the trade mark of Dolby Laboratories Inc.

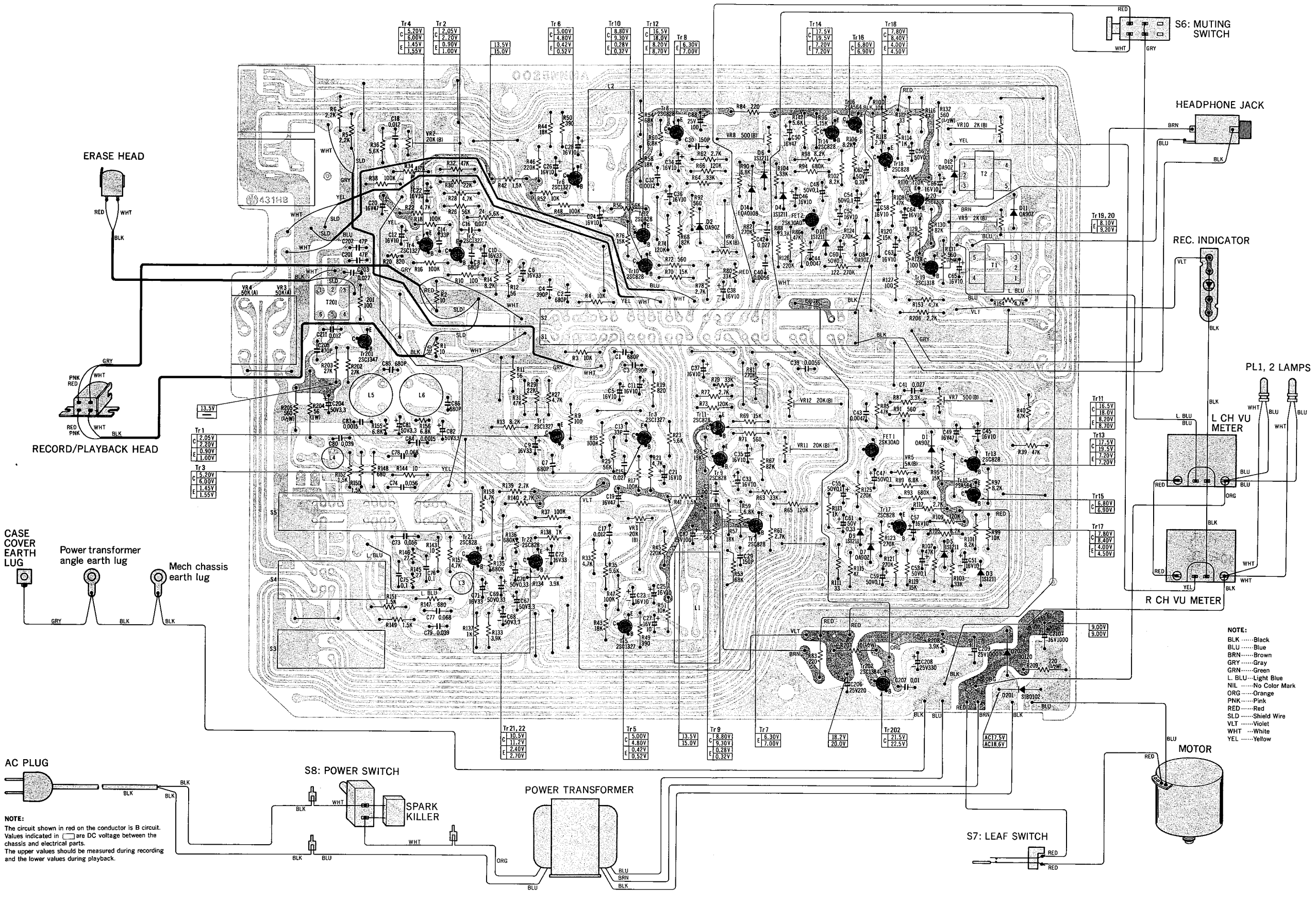
SCHEMATIC DIAGRAM MODEL RS-615US



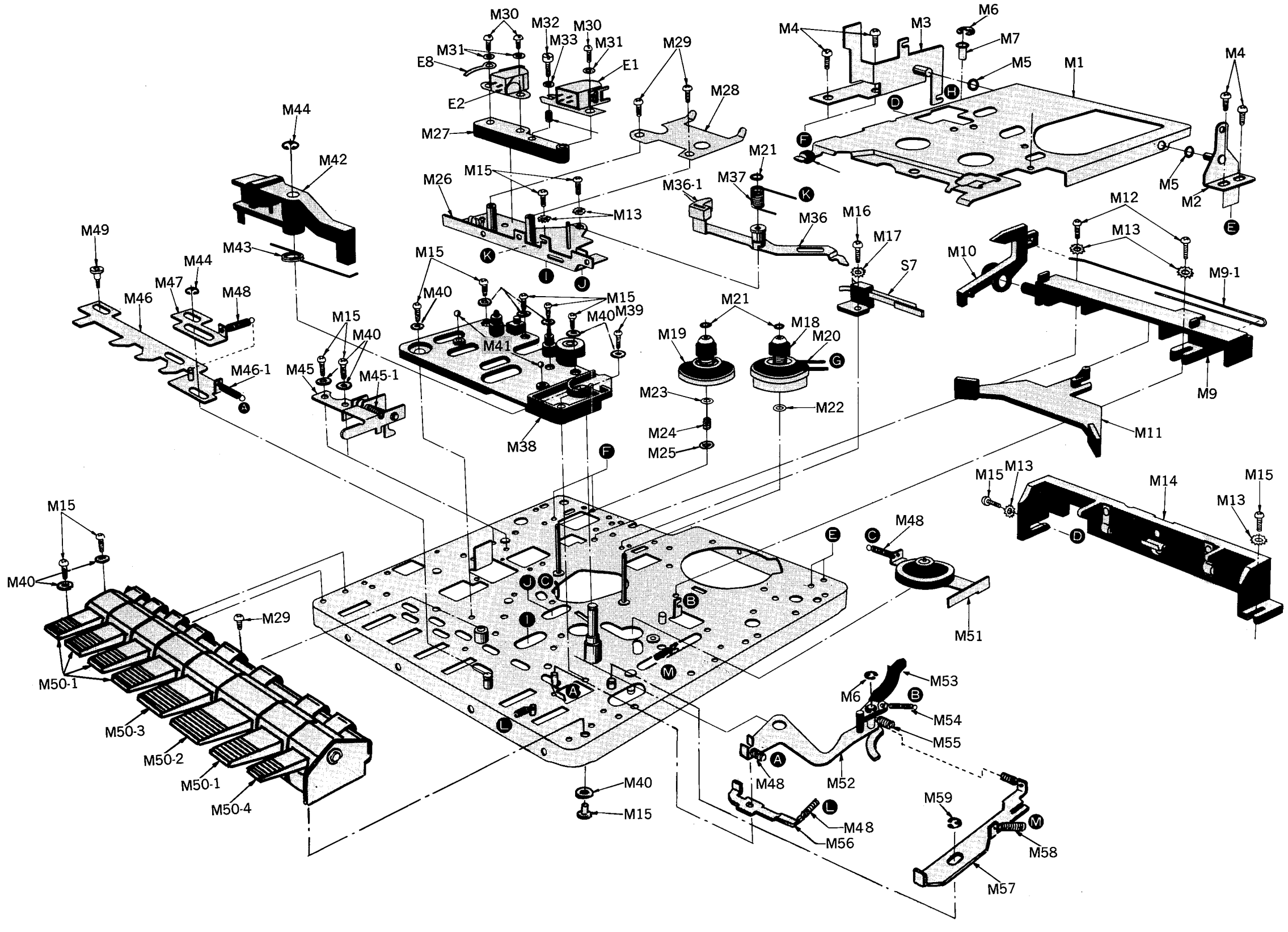
NOTE:

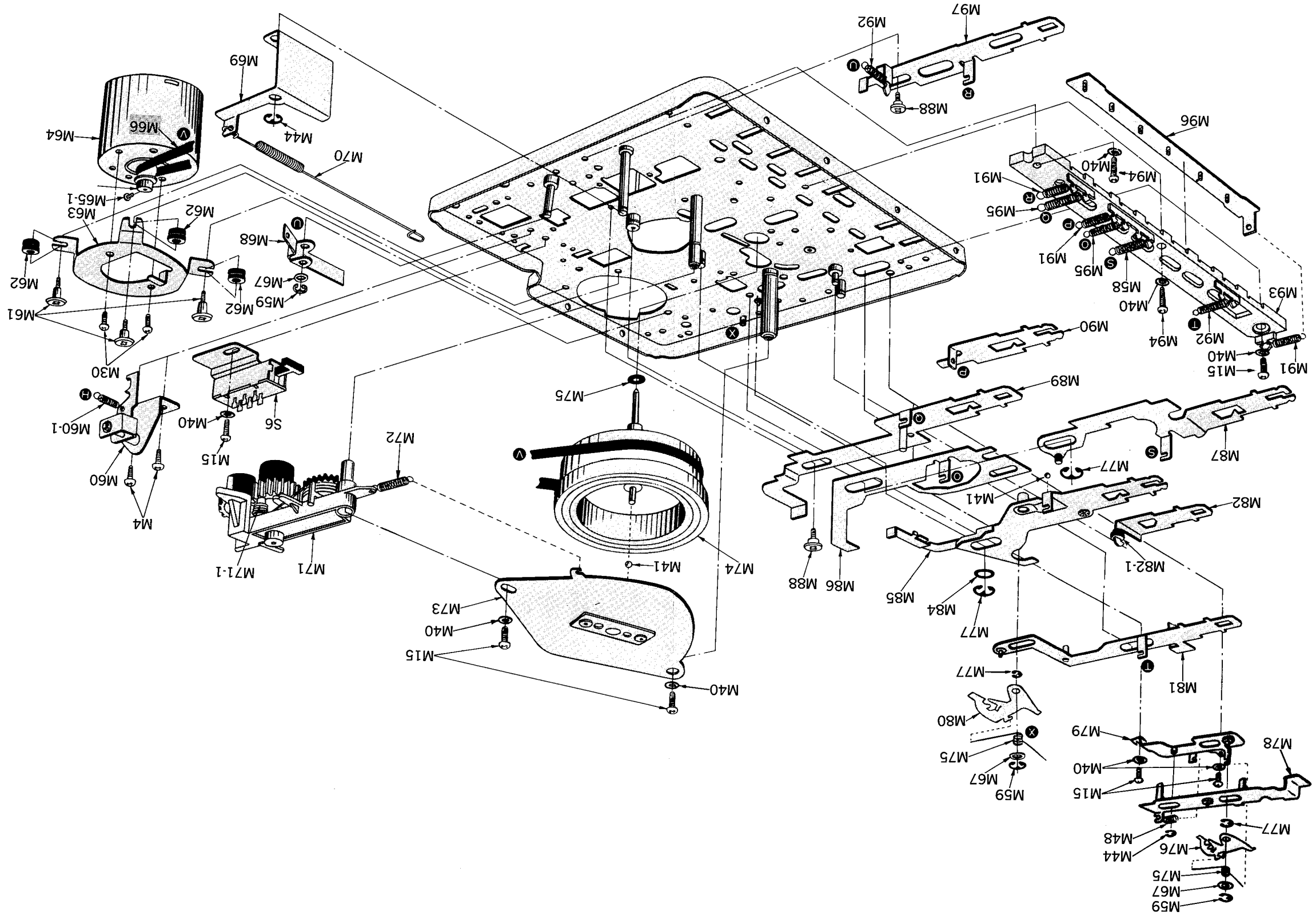
1. S1-1～S1-8, S2-1～S2-8 ……Record/playback select switch (shown in playback position).
2. S3-1, S3-2 ……Dolby IN/OUT switch (shown in OUT position).
3. S4-1, S4-2 ……Input select switch (shown in MIC position).
4. S5-1～S5-6 ……Tape select switch (shown in NORMAL position).
   1 :–NORMAL, 2 :–Fe-Cr, 3 :–CrO2, C :–Center.
5. S6-1, S6-2 ……Muting switch (off at REC/PLAY position).
6. S7 ……Motor ON/OFF switch.
7. S8-1, S8-2 ……AC power ON/OFF switch.
8. S9 ……AC voltage select switch.
9. VR1, 2 ……Playback level adjustment VR.
10. VR3, 4 ……Record input level control.
11. VR5, 6, 7, 8 ……Dolby NR adjustment VR.
12. VR9, 10 ……Level meter adjustment VR.
13. VR11, 12 ……Record level adjustment VR.
14. L5, 6 ……Bias current adjustment coil.
15. Resistor values are in ohms (Ω), 1/4 watt unless specified otherwise.
    K=1,000Ω.
16. Capacitor values are in microfarads (μF) unless specified otherwise.
    P=Pico-farads.
17. All measurements are under no signal conditions with volume at minimum position.
    Use VTVM for voltage measurements.
    The upper values should be measured during recording and the lower values during playback.
18. **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 are as of the schematic.

WIRING CONNECTION DIAGRAM MODEL RS-615US



EXPLODED VIEWS




M97
M92
M88
M69
M44
M70
M64
M66
M65-1
M63
M62
M68
M67
M59
M62
M62
M61
M30
M60-1
M60
M4
M40
S6
M15
M72
M71-1
M71
M75
M41
M74
M73
M40
M15
M40
M88
M86
M96
M91
M40
M94
M95
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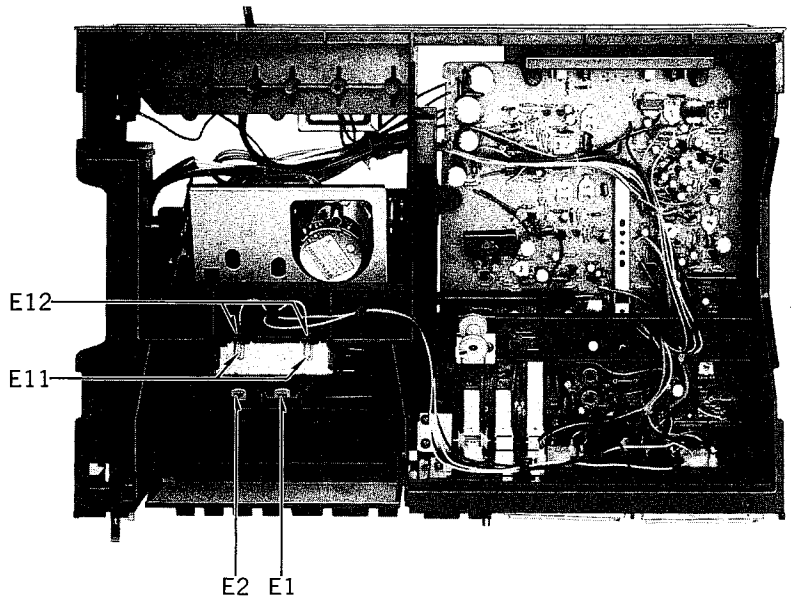
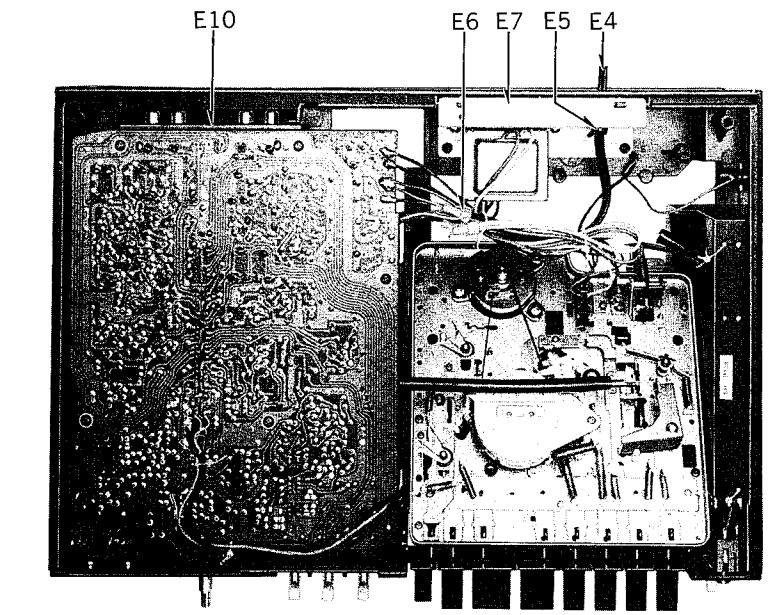
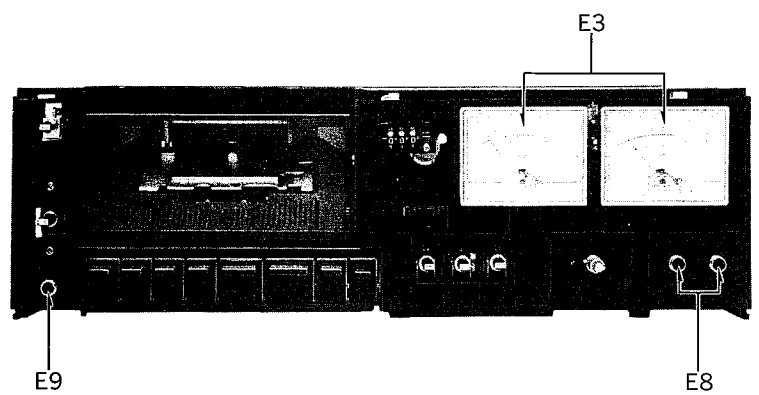
M40
M94
M92
M93
M90
M15
M40
M91
M89
M87
M77
M41
M82
M82-1
M85
M84
M77
M81
M77
M80
M75
M67
M59
M79
M40
M15
M78
M77
M48
M44
M76
M75
M67
M59

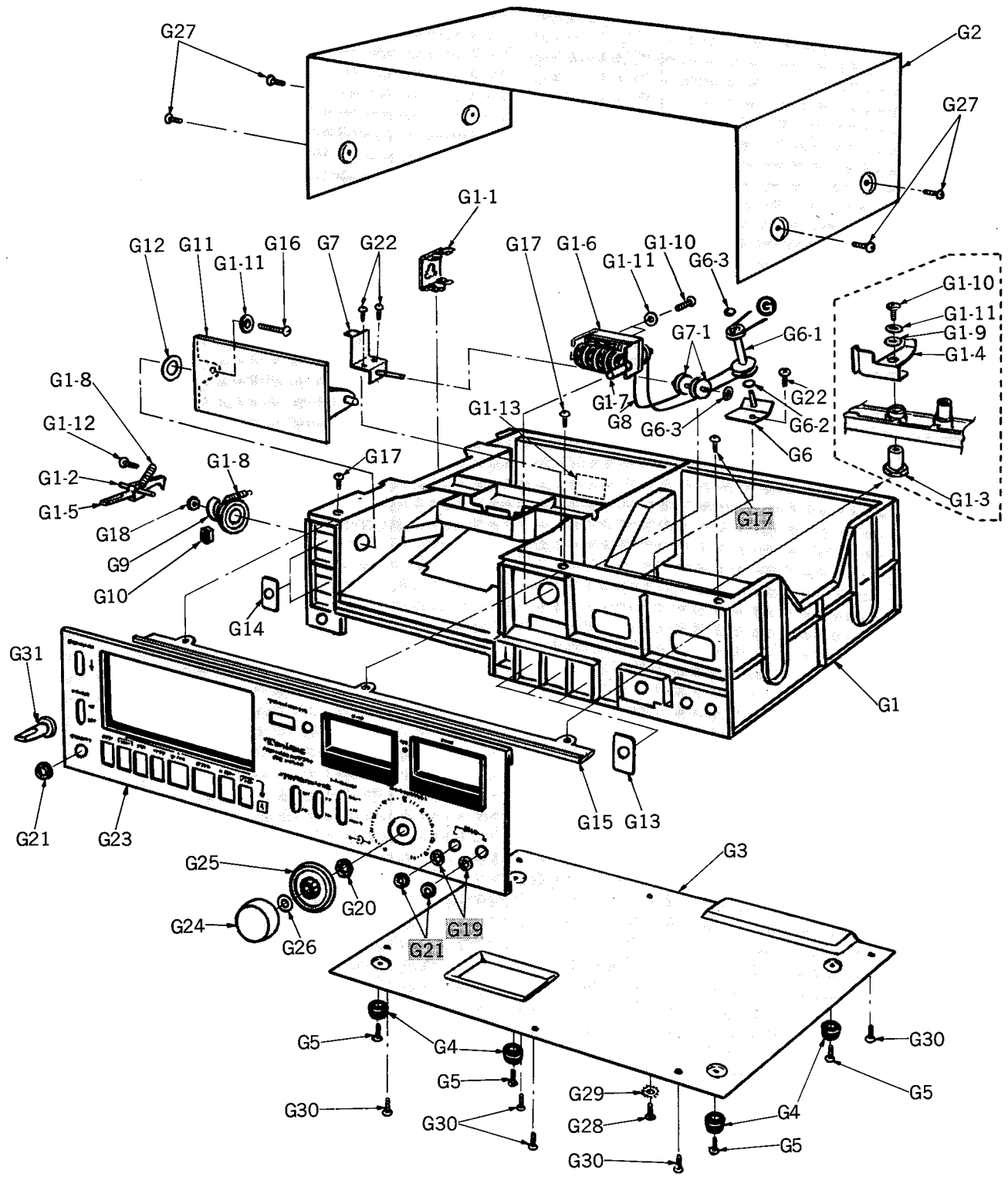
ELECTRICAL PARTS LOCATION



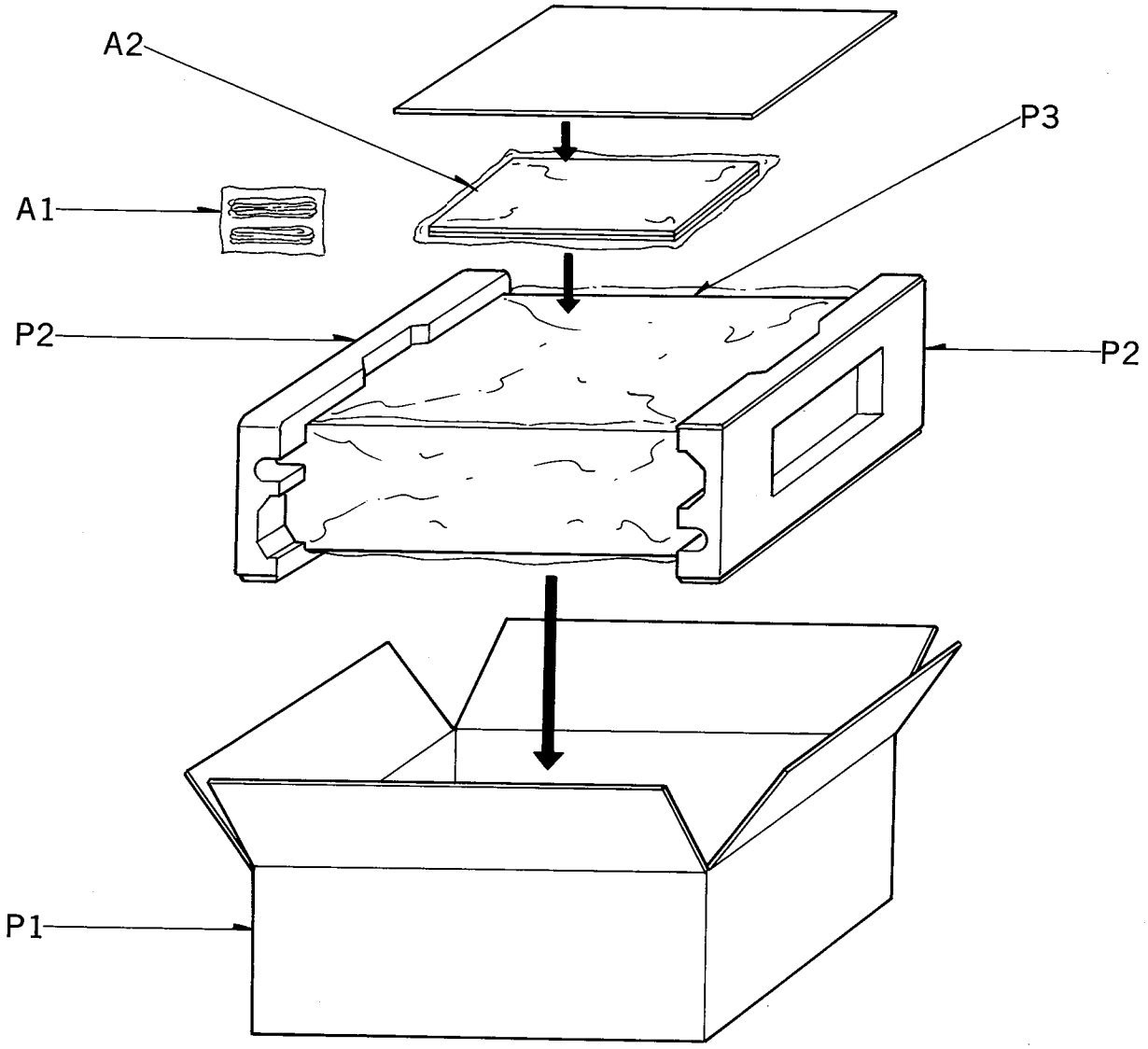




CABINET PARTS



COMPONENT PACKING



PACKINGS

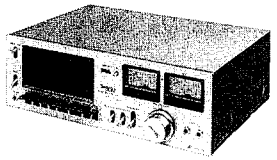
P1	QPNM0097	Inside Carton
P2	QPAM0017	Inner Cushion
P3	XZB50X60A05	Poly Bag

Printed in Japan.

REPLACEMENT PARTS LIST

MODEL RS-615US (Panasonic)

ATTENTION:
Important safety notice.
Components identified by shaded area have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.



RS-615US

Ref. No.		Part No.	Part Name & Description	Pcs/ Set	Remarks
			MECHANICAL PARTS		
M1		QXK1713	Cassette Base Plate Assembly	1	RS-630US
M2		QXA0292	Cassette Base Plate Holding Angle-A	1	〃
M3		QXA0465	Cassette Base Plate Holding Angle-B	1	〃
M4		XTN3+8B	Tapping Screw ⊕3×8	6	COMMON
M5		QBW2019	Washer	2	RS-630US
M6		XUC25FT	Stop Ring 2.5φ	2	COMMON
M7		QDP1595	Roller	1	RS-630US
M8		QBG1132	Cushion Rubber	1	〃
M9		QXT0004	Brake Holder	1	〃
M9-1		QBN1486	Brake Spring	1	〃
M10		QBJ1975B	Erase Safety Lever-B	1	〃
M11		QBJ1941A	Brake	1	〃
M12		XSN26+8	Screw ⊕2.6×8	2	COMMON
M13		XWC26B	Lock Washer	6	〃
M14		QXZ0044	Cassette Retainer Assembly	1	RS-630US
M15		XSN26+6	Screw ⊕2.6×6	18	COMMON
M16		XSN2+5	Screw ⊕2×5	1	〃
M17		XWC2B	Lock Washer	1	〃
M18		QXD0050	Takeup Reel Table Assembly	1	RS-630US
M19		QXD0034	Supply Reel Table Assembly	1	〃
M20		QDB0215	Counter Belt	1	RS-671US
M21		QWQ1124	Snap Washer	2	RS-630US
M22		QBJ3220	Washer	1	〃
M23		QBW2013	〃	1	〃
M24		QBC1272	Back Tension Spring	1	〃
M25		QBW2012	Washer	1	〃
M27		QXK1717	Head Base Plate Assembly	1	RS-630US
M27		QBJ2087A	Head Spacer	1	〃
M28		QMF1814	Cassette Holder	1	〃
M29		XSN26+3	Screw ⊕2.6×3	5	COMMON
M30		XSN2+12	Screw ⊕2×12	3	〃
M31		XWA2B	Spring Washer	3	〃
M32		QHQ1199A	Head Adjustment Screw	1	RS-630US
M33		XWE2	Flat Washer	1	COMMON
M35		QBC1103A	Head Spring	1	RS-630US
M36		QXL1048	Auto-Stop Detecting Lever Assembly	1	
M36-1		QBJ1538A	Auto-Stop Detecting Piece	1	RS-630US
M37		QBN1390	Detecting Lever Spring	1	〃
M38		QXK1716	Upper Base Plate Assembly	1	〃
M39		XSN26+10	Screw ⊕2.6×10	1	COMMON
M40		XWA26B	Spring Washer	17	〃
M41		QDK1012	Steel Ball 2.5φ	4	RS-630US
M42		QXLM010	Pressure Roller Assembly	1	〃
M43		QBN1389	Pressure Roller Spring	1	〃
M44		XUC3FT	Stop Ring 3φ	4	COMMON
M45		QXL0991	Up Lever Assembly	1	RS-630US
M45-1		QBN1485	Up Lever Spring	1	〃
M46		QXR0179	Operation Rod Assembly	1	〃
M47		QMR1411	Operation Rod-C	1	〃
M48		QBT1558M	Idler Spring	3	〃
M49		QHQ1169	Step Screw	1	〃
M50		QXB0438	Push Button Assembly	1	
M50-1		QGO1303	Push Button	5	
M50-2		QGO1304	Stop Button	1	
M50-3		QGO1305	Playback Button	1	
M50-4		QGO1306	Timmer Button	1	
M51		QXLM008	Idler Assembly	1	RS-630US
M52		QXL1046	Auto-Stop Driving Lever Assembly	1	
M53		QML3061	Auto-Stop Driving Pawl	1	
M54		QBT1489M	Auto-Stop Spring	1	RS-630US
M55		QBT1822M	Eject Lever Spring	1	

Ref. No.	Part No.	Part Name & Description	Pcs/ Set	Remarks
M56	QML3057	Timmer Lever-A	1	
M57	QML3058	Timmer Lever-B	1	
M58	QBT1536DMA	Playback Lever Spring	1	RS-630US
M59	XUC2FT	Stop Ring 2ϕ	3	COMMON
M60	QXL0990	Click Lever Assembly	1	RS-630US
M60-1	QBT1817	Click Lever Spring	1	〃
M61	QMS1833	Step Screw	3	
M62	QBG1055A	Motor Rubber Cushion	3	RS-630US
M63	QMA1952A	Motor Angle	1	〃
M64	QDM0980XPAB	Motor	1	〃
M65	QXP0494	Motor Pulley Assembly	1	〃
M65-1	XSN2+3	Screw ⊕2×3	1	COMMON
M66	QDB0141	Capstan Belt	1	RS-630US
M67	QBK7121	Fiber Washer	3	
M68	QML2712A	Eject Operation Lever	1	RS-630US
M69	QML2950	Record/Playback Lever	1	〃
M70	QBT1818	Record/Playback Spring	1	〃
M71	QXG1014E	Fast Wind Lever Assembly	1	〃
M71-1	QBN1447A	Gear Lever Spring	1	〃
M72	QBT1485M	Fast Forward Lever Spring	1	〃
M73	QXH0095A	Flywheel Retainer	1	〃
M74	QXF0115	Flywheel	1	〃
M75	QBJ3221	Washer	1	〃
M76	QBK7121	Fiber Washer	2	〃
M77	XUC5FT	Stop Ring 5ϕ	4	COMMON
M78	QXL1044	Timmer Lever-C	1	
M79	QXA0547	Timmer Angle Assembly	1	
M80	QML2379B	Lock Lever	1	RS-630US
M81	QXR0268	Pause Rod	1	
M82	QXR0241	Stop Rod Assembly	1	RS-630US
M82-1	QBG1497A	Brake Rubber	1	〃
M84	QBK7130A	Fiber Washer	1	
M85	QXRM0002A	Playback Rod Assembly	1	RS-630US
M86	QMR1307A	Playback Rod-B	1	〃
M87	QXR0002B	Fast Forward Rod Assembly	1	〃

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Ref. No.	Part No.	Part Name & Description	Pcs/ Set	Remarks
M88	QHQ1168	Step Screw	2	RS630US
M89	QXL0828	Record Lever Assembly	1	〃
M90	QML1953A	Rewind Lever	1	〃
M91	QBT1580M	Stop Lever Spring	3	〃
M92	QBT1604M	Eject Lever Spring-C	2	〃
M93	QGG0050A	Lever Guide	1	〃
M94	XSN26+10	Screw ⊕2.6×10	2	COMMON
M95	QBT1486DM	Record Lever Spring	1	RS-630US
M96	QXH0227	Push Button Lock Plate	1	RS-640US
M97	QMR1446	Eject Rod	1	RS-630US
M98	XUC4FT	Stop Ring 4ϕ	1	COMMON
		RESISTORS		
R1, 2	ERD25TJ100	Carbon Resistor 10Ω 1/4W	2	
R3, 4	ERD25TJ103	〃 10KΩ 1/4W	2	
R5, 6	ERD25TJ222	〃 2.2KΩ 1/4W	2	
R9, 10	ERD25TJ101	〃 100Ω 1/4W	2	
R11, 12	ERD25TJ560	〃 56Ω 1/4W	2	
R13, 14	ERD25TJ822	〃 8.2KΩ 1/4W	2	
R15, 16	ERD25TJ104	〃 100KΩ 1/4W	2	
R17, 18	ERD18TSJ104	〃 100KΩ 1/4W	2	
R19, 20	ERD25TJ821	〃 820Ω 1/4W	2	
R21, 22	ERD25TJ472	〃 4.7KΩ 1/4W	2	
R23, 24	ERD25TJ562	〃 5.6KΩ 1/4W	2	
R25, 26	ERD25TJ563	〃 56KΩ 1/4W	2	
R27, 28	ERD25TJ472	〃 4.7KΩ 1/4W	2	
R29, 30	ERD25TJ223	〃 22KΩ 1/4W	2	
R31, 32	ERD25TJ473	〃 47KΩ 1/4W	2	
R33, 34	ERD25TJ472	〃 4.7KΩ 1/4W	2	
R35, 36	ERD25TJ562	〃 5.6KΩ 1/4W	2	
R37, 38	ERD25TJ104	〃 100KΩ 1/4W	2	
R39, 40	ERD25TJ473	〃 47KΩ 1/4W	2	
R41, 42	ERD25TJ152	〃 1.5KΩ 1/4W	2	
R43, 44	ERD25TJ183	〃 18KΩ 1/4W	2	
R45, 46	ERD25TJ224	〃 220KΩ 1/4W	2	

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Ref. No.	Part No.	Part Name & Description	Pcs/ Set	Remarks
R47, 48	ERD25TJ104	Carbon Resistor 100KΩ 1/4W	2	
R49, 50	ERD25TJ399	〃 390Ω 1/4W	2	
R51, 52	ERD25TJ103	〃 10KΩ 1/4W	2	
R53, 54	ERD25TJ683	〃 68KΩ 1/4W	2	
R55, 56	ERD25TJ563	〃 56KΩ 1/4W	2	
R57, 58	ERD25TJ183	〃 18KΩ 1/4W	2	
R59, 60	ERD25TJ682	〃 6.8KΩ 1/4W	2	
R61, 62	ERD25TJ272	〃 2.7KΩ 1/4W	2	
R63, 64	ERD25TJ333	〃 33KΩ 1/4W	2	
R65, 66	ERD25TJ124	〃 120KΩ 1/4W	2	
R67, 68	ERD25TJ823	〃 82KΩ 1/4W	2	
R69, 70	ERD25TJ153	〃 15KΩ 1/4W	2	
R71, 72	ERD25TJ561	〃 560Ω 1/4W	2	
R73, 74	ERD25TJ124	〃 120KΩ 1/4W	2	
R75, 76	ERD25TJ153	〃 15KΩ 1/4W	2	
R77, 78	ERD25TJ272	〃 2.7KΩ 1/4W	2	
R79, 80	ERD25TJ333	〃 33KΩ 1/4W	2	
R81, 82	ERD25TJ274	〃 270KΩ 1/4W	2	
R83, 84	ERD25TJ221	〃 220Ω 1/4W	2	
R85, 86	ERD25TJ473	〃 47KΩ 1/4W	1	
R87, 88	ERD25TJ332	〃 3.3KΩ 1/4W	2	
R89, 90	ERD25TJ682	〃 6.8KΩ 1/4W	2	
R91, 92	ERD25TJ561	〃 560Ω 1/4W	2	
R93, 94	ERD25TJ684	〃 680KΩ 1/4W	2	
R95, 96	ERD25TJ153	〃 15KΩ 1/4W	2	
R97, 98	ERD25TJ822	〃 8.2KΩ 1/4W	2	
R99, 100	ERD25TJ103	〃 10KΩ 1/4W	2	
R101, 102	ERD25TJ822	〃 8.2KΩ 1/4W	2	
R103, 104	ERD25TJ333	〃 33KΩ 1/4W	2	
R105, 106	ERD25TJ822	〃 8.2KΩ 1/4W	2	
R107, 108	ERD25TJ473	〃 47KΩ 1/4W	2	
R109, 110	ERD25TJ124	〃 120KΩ 1/4W	2	
R111, 112	ERD25TJ330	〃 33Ω 1/4W	2	
R113, 114	ERD25TJ102	〃 1KΩ 1/4W	2	
R115, 116	ERD25TJ470	〃 47Ω 1/4W	2	

Ref. No.	Part No.	Part Name & Description	Pcs/ Set	Remarks
R117, 118	ERD25TJ272	Carbon Resistor 2.7KΩ 1/4W	2	
R119, 120	ERD25TJ153	〃 15KΩ 1/4W	2	
R121, 122, 123, 124				
	ERD25TJ274	〃 270KΩ 1/4W	4	
R125, 126	ERD25TJ224	〃 220KΩ 1/4W	2	
R127, 128	ERD25TJ101	〃 100Ω 1/4W	2	
R129, 130	ERD25TJ823	〃 82KΩ 1/4W	2	
R131, 132	ERD50TJ561	〃 560Ω 1/2W	2	
R133, 134	ERD25TJ392	〃 3.9KΩ 1/4W	2	
R135, 136	ERD25TJ684	〃 680KΩ 1/4W	2	
R137, 138	ERD25TJ102	〃 1KΩ 1/4W	2	
R139, 140	ERD25TJ272	〃 2.7KΩ 1/4W	2	
R142	ERD25TJ562	〃 5.6KΩ 1/4W	1	
R143, 144	ERD25TJ100	〃 10Ω 1/4W	2	
R145, 146	ERD25TJ270	〃 27Ω 1/4W	2	
R147, 148	ERD25TJ681	〃 680Ω 1/4W	2	
R149, 150, 151, 152				
	ERD25TJ152	〃 1.5KΩ 1/4W	4	
R153, 154	ERD25TJ472	〃 4.7KΩ 1/4W	2	
R155, 156	ERD25TJ682	〃 6.8KΩ 1/4W	2	
R157, 158	ERD25TJ472	〃 4.7KΩ 1/4W	2	
R201	ERD25TJ101	〃 100Ω 1/4W	1	
R202, 203	ERD25TJ273	〃 27KΩ 1/4W	2	
R204	ERG1ANJ560	Metal-oxide Resistor 56Ω 1W	1	
R205	ERD50TJ561	Carbon Resistor 560Ω 1/2W	1	
R206	ERD25TJ222	〃 2.2KΩ 1/4W	1	
R207	ERD50TJ100	〃 10Ω 1/2W	1	
R208	ERD25TJ392	〃 3.9KΩ 1/4W	1	
R209	ERD50TJ221	〃 220Ω 1/2W	1	
		VARIABLE RESISTORS		
VR1, 2	EVLS3AA00B24	Semi-fixed Variable Resistor 20KΩ(B)	2	RS-630US
VR3, 4	EWF15AF30A54	Variable Resistor 50KΩ(A)	1	
VR5, 6	EVLS3AA00B53	Semi-fixed Variable Resistor 5KΩ(B)	2	RS-630US
VR7, 8	EVLS3AA00B52	〃 500Ω(B)	2	〃

Ref. No.	Part No.	Part Name & Description		Pcs/ Set	Remarks
VR9, 10	EVLS3AA00B23	Semi-fixed Variable Resistor	2KΩ(B)	2	RS-640US
VR11, 12	EVLS3AA00B24	〃	20KΩ(B)	2	〃
		CAPACITORS			
C1, 2	ECKD1H681KB	Ceramic Capacitor	680pF	2	
C3, 4	ECKD1H391KB	〃	390pF	2	
C5, 6	ECEA16V10	Electrolytic Capacitor	10μF	2	
C7, 8	ECKD1H681KB	Ceramic Capacitor	680pF	2	
C9, 10	ECEA16V33	Electrolytic Capacitor	33μF	2	
C11, 12	ECEA16V10	〃	10μF	2	
C13, 14	ECCD1H330K	Ceramic Capacitor	33pF	2	
C15, 16	ECQM05273KZ	Mylar Capacitor	0.027μF	2	
C17, 18	ECQM05123KZ	〃	0.012μF	2	
C19, 20	ECEA16V47	Electrolytic Capacitor	47μF	2	
C21, 22, 23, 24, 25, 26, 27, 28					
	ECEA16V10	〃	10μF	8	
C29, 30	ECCD1H151K	Ceramic Capacitor	150pF	2	
C31, 32	ECKD1H122KB	〃	0.0012μF	2	
C33, 34, 35, 36, 37, 38					
	ECEA16V10	Electrolytic Capacitor	10μF	6	
C39, 40	ECQM05562JZ	Mylar Capacitor	0.0056μF	2	
C41, 42	ECQM05273JZ	〃	0.027μF	2	
C43, 44	ECQM05472JZ	〃	0.0047μF	2	
C45, 46	ECEA16V10	Electrolytic Capacitor	10μF	2	
C47, 48	ECEA50MR1	〃	0.1μF	2	
C49, 50	ECEA16V47	〃	47μF	2	
C51, 52	ECEA16V10	〃	10μF	2	
C53, 54, 55, 56	ECEA50ZR1	〃	0.1μF	4	
C57, 58	ECEA16V10	〃	10μF	2	
C59, 60	ECEA50ZR1	〃	0.1μF	2	
C61, 62	ECEA50ZR33	〃	0.33μF	2	
C63, 64, 65, 66	ECEA16V10	〃	10μF	4	
C67, 68	ECEA50V3R3	〃	3.3μF	2	
C69, 70	ECEA50ZR33	〃	0.33μF	2	
C71, 72	ECEA16V33	〃	33μF	2	

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Ref. No.	Part No.	Part Name & Description		Pcs/ Set	Remarks
C73, 74	ECQM05563KZ	Mylar Capacitor	0.056μF	2	
C75, 76	ECQM05104KZ	〃	0.1μF	2	
C77, 78	ECQM05683KZ	〃	0.068μF	2	
C79, 80	ECQM05393KZ	〃	0.039μF	2	
C81, 82	ECEA50V3R3	Electrolytic Capacitor	3.3μF	2	
C83, 84	ECKD1H152KB	Ceramic Capacitor	0.0015μF	2	
C85, 86	ECQS1681KZ	Styrol Capacitor	680pF	2	
C87, 88	ECEA25V100	Electrolytic Capacitor	100μF	2	
C201, 202	ECCD1H470K	Ceramic Capacitor	47pF	2	
C203	ECQM05273KZ	Mylar Capacitor	0.027μF	1	
C204	ECEA50V3R3	Electrolytic Capacitor	3.3μF	1	
C205	ECQS1471KZ	Styrol Capacitor	470pF	1	
C206	ECEA25V220	Electrolytic Capacitor	220μF	1	
C207	ECKD1H103PF	Ceramic Capacitor	0.01μF	1	
C208	ECEA25V330	Electrolytic Capacitor	330μF	1	
C209	ECEA25V1000	〃	1000μF	1	
C210	ECEA16V1000	〃	1000μF	1	
C211	ECQM05123KZ	Mylar Capacitor	0.012μF	1	
		TRANSISTORS			
Tr1, 2, 3, 4, 5, 6	2SC1327	Transistor		6	RS-630US
Tr7, 8, 9, 10, 11, 12, 13, 14					
	2SC828	〃		8	〃
Tr15, 16	2SA564	〃		2	〃
Tr17, 18	2SC828	〃		2	〃
Tr19, 20	2SC1318	〃		2	〃
Tr21, 22	2SC828	〃		2	〃
Tr201	2SC1347	〃		1	〃
Tr202	2SC1384	〃		1	RS-671US
FET1, 2	2SK30AD	〃		2	RS-630US
		DIODES & RECTIFIERS			
D1, 2	0A90Z	Diode		2	RS-630US
D3, 4, 5, 6	1S1211	〃		4	〃
D7, 8	0A90Z	〃		2	〃

Ref. No.	Part No.	Part Name & Description	Pcs/ Set	Remarks
D9, 10	1S1211	Diode	2	RS-630US
D11, 12	OA90Z	〃	2	〃
D13	SEL103R	Illuminate Diode	1	〃
D14	EQA0108S	Diode	1	〃
D201, 202	SIB0102	Silicon Rectifier	2	〃
		COMBINATION PART		
Z1	ECQJ0187A	Spark Killer	1	
		TRANSFORMERS		
T1, 2	QLT2D10A	Output Transformer	2	RS-630US
T201	QLB0158	Oscillator Transformer	1	〃
T202	QLPP17EKE	Power Transformer	1	
		COILS		
L1, 2	QLM9Z002W	MPX Filter Coil	2	RS-630US
L3, 4	QLQX2421Y	Peaking Coil	2	RS-620US
L5, 6	QLH2008	Bias Trap Coil	2	RS-273US
		SWITCHES		
S1, 2	QSS1120	Slide Switch (Record/Playback Selector)	1	RS-630US
S3, 4	QST2216H	Lever Switch (Dolby Input)	2	
S5	QST6309H	Lever Switch (Tape Selector)	1	
S6	QSS2209T	Slide Switch (Muting)	1	RS-630US
S7	QSB0169M1	Leaf Switch (Motor ON/OFF)	1	〃
S8	QST1103S	Lever Switch (Power ON/OFF)	1	
		ELECTRICAL PARTS		
E1	QWY4107Z	Record/Playback Head	1	RS-263AUS
E2	QWY2118	Erase Head	1	RS-630US
E3	QSL1076RNM	Level Meter	2	
E4	RJA10A	AC Power Cord	1	RS-630US
E5	QTD1129	AC Power Cord Bushing	1	
E6	QJT1029A	AC Power Cord Connector	3	
E7	QMAM0072A	Power Transformer Angle	1	

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Ref. No.	Part No.	Part Name & Description	Pcs/ Set	Remarks
E8	QJA0251H	Microphone Jack	2	
E9	QJA0231	Headphone Jack	1	
E10	QEJ5003H	Jack Board Assembly	1	
E11	XAMQ23P400N	Pilot Lamp	2	
E12	QBG1166	Lamp Cover	2	
		CABINET PARTS		
G1	QYMM0028	Main Body Case Assembly	1	
G1-1	QTSM0013	Earth Metal	1	
G1-2	QMS1878	Shaft	1	
G1-3	QMP1603	Record/Playback Pole	1	RS-630US
G1-4	QMLM0031	Record/Playback Lever	1	〃
G1-5	QML3115	Lid Lever	1	
G1-6	QXCM0005	Tape Counter	1	RS-630US
G1-7	QGKM0047H1	Tape Counter Button Cover	1	RS-671US
G1-8	QBT1484M	Spring	1	
G1-9	XWG3E10	Washer	1	COMMON
G1-10	XSN3+6S	Screw ⊕3×6	3	〃
G1-11	XWA3B	Spring Washer	4	〃
G1-12	XTN3+8B	Tapping Screw	1	〃
G1-13	QGK1735	Hole Cover	1	
G2	QGCM0008	Case Cover	1	
G3	QGCM0007	Bottom Cover	1	
G4	QKA1050A	Rubber Foot	4	RS-263AUS
G5	XSN3+8S	Screw ⊕3×8	4	COMMON
G6	QXPM0003	Connection Pulley Holding Angle	1	
G6-1	QXP0496A	Connection Pulley-A	1	
G6-2	QBJ3220	Washer	1	RS-630US
G6-3	QWQ1124	Snap Washer	1	〃
G7	QXPM0004	Connection Pulley Holding Metal	1	
G7-1	QDP1628	Connection Pulley-B	2	RS-676US
G8	QDB0210	Counter Belt-A	1	〃
G9	QKJM0013	Cassette Lid Holder	1	
G10	QBG1567	Cushion	1	
G11	QKFM0023H	Cassette Lid	1	

Ref. No.		Part No.	Part Name & Description	Pcs/ Set	Remarks
G12		QBPM0010	Cassette Lid Spring	1	
G13		QBH2021	Switch Mask-A	3	
G14		QBH2022	Switch Mask-B	2	
G15		QMAM0075	Panel Holding Angle	1	
G16		XSN3+25S	Screw ⊕3×25	1	COMMON
G17		XSS3+8S	Screw ⊕3×8	3	〃
G18		XNG3	Nut 3φ	1	〃
G19		QTWM0020	Spacer	2	
G20		QNQ1039	Nut (VR)	1	
G21		QNQM0001	Jack Nut	3	
G22		XTN3+10B	Screw ⊕3×10	3	COMMON
G23		QYPM0014	Front Panel Assembly	1	
G24		QYT0428	Volume Knob-A Assembly	1	
G25		QYT0427	Volume Knob-B Assembly	1	
G26		QBJ3299	Washer	1	COMMON
G27		XTN4+10B	Screw ⊕4×10	4	〃
G28		XTN3+6B	Screw ⊕3×6	1	〃
G29		XWC3B	Lock Washer 3φ	1	〃
G30		XTN35+10B	Screw ⊕3.5×10	5	〃
G31		QGT1350	Lever Knob	1	
			ACCESSORIES		
A1		RP023A	Connection Cord	2	COMMON
A2		QQT1219	Instruction Book	1	
			PACKINGS		
P1		QPNM0097	Inside Carton	1	
P2		QPAM0017	Inner Cushion	2	
P3		XZB50X60A05	Poly Bag	1	RS-630US

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