ORDER NO. ARD-7806038C

Service Manual

Cassette Deck

RS-616

Front-Loading Vertical Hold High Fidelity Stereo
Cassette Deck with Rewind Auto Play System

DOLBY SYSTEM

RS-631 MECHANISM SERIES

Specifications (Catalog specifications for sales)

Power requirement:	AC; 110/125/220/240 V, 50/60 Hz Preset power voltage; 220 V for Europe, 125 V for Asia Power consumption; 10 W
Motor:	Electronic control DC motor
Track system:	4-track 2-channel stereo recording and playback
Tape speed:	4.8 cm/s (1-7/8 ips.)
Wow and flutter:	0.07% (WRMS), 0.2% (DIN)
Frequency response:	CrO_2/FeCr tape; 30 ~ 16,000 Hz 30 ~ 14,000 Hz (DIN) Normal tape; 30 ~ 14,000 Hz 30 ~ 13,000 Hz (DIN)
Signal-to-noise ratio:	Dolby* NR in; 66 dB (above 5 kHz) Dolby NR out; 56 dB (signal level = max. recording level, FeCr or CrO_2 type tape)
Fast forward and rewind time:	Approx. 90 seconds with C-60 cassette tape
Input:	MIC; sensitivity 0.25 mV, input impedance 10 KΩ, applicable microphone impedance 400Ω ~ 10 KΩ LINE; sensitivity 60 mV, input impedance 56 KΩ
Output:	LINE; output level 420 mV, load impedance 22 KΩ over HEADPHONE; output level 65 mV, impedance 8Ω
Rec/pb connection:	5P DIN type; input level 8 mV, impedance 5.6 KΩ, output level 420 mV, impedance 1 KΩ
Bias frequency:	90 kHz
Head:	2-head system 1-LH head for record/playback 1-double-gap ferrite head for erasure
Dimensions:	46 cm(W) × 15 cm(H) × 27.1 cm(D) [18"(W) × 6"(H) × 10-3/4"(D)]
Weight:	5.2 kg (11 lbs 8 oz)

Specifications are subject to change without notice.
* 'Dolby' and the double-D symbol are trademarks of Dolby Laboratories.

Technics

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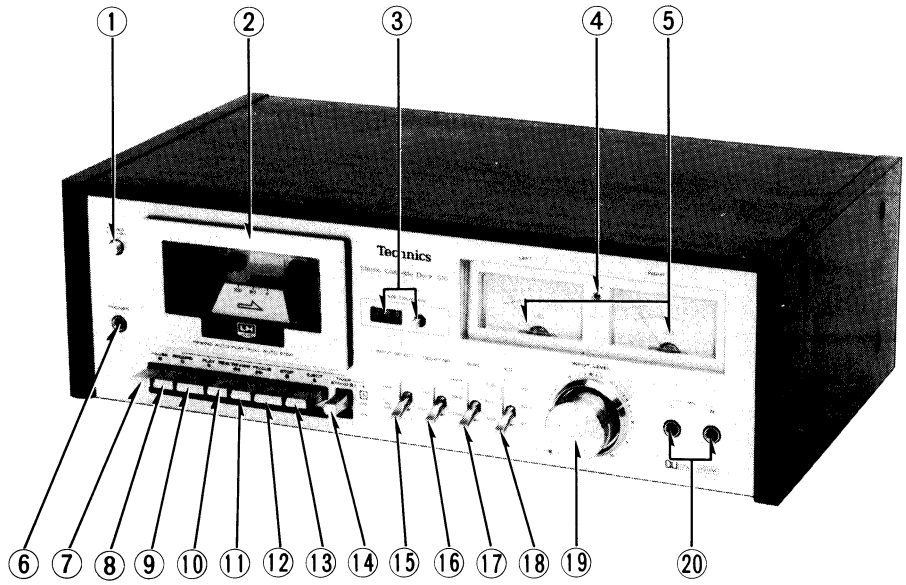
LOCATION OF CONTROLS AND COMPONENTS



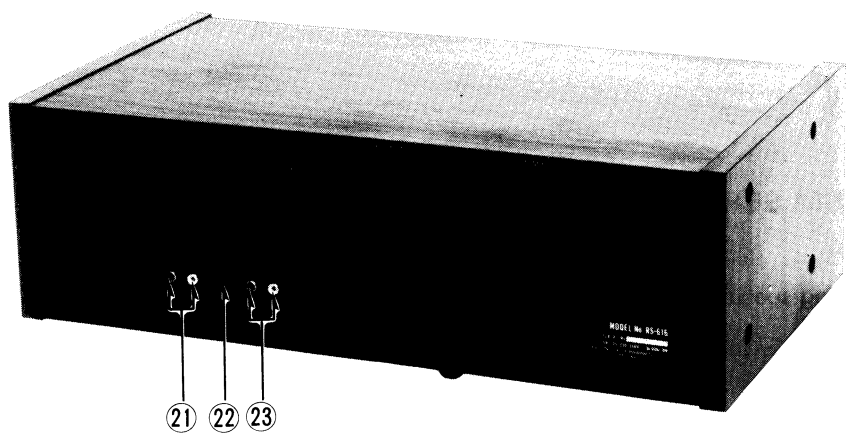


Fig. 1

① Power switch
② Cassette compartment door
③ Tape counter and reset button
④ Recording indication lamp
⑤ Level meters
⑥ Headphones jack
⑦ Pause button
⑧ Record button
⑨ Play button
⑩ Rewind/review button
⑪ Fast forward/cue button
⑫ Stop button
⑬ Eject button
⑭ Timer stand-by button
⑮ Input selector
⑯ Dolby noise-reduction switch
⑰ Bias selector
⑱ Equalization selector
⑲ Input level controls
⑳ Microphone jacks
㉑ Line output jacks
㉒ Record/playback connection socket
㉓ Line input jacks

DISASSEMBLY INSTRUCTIONS

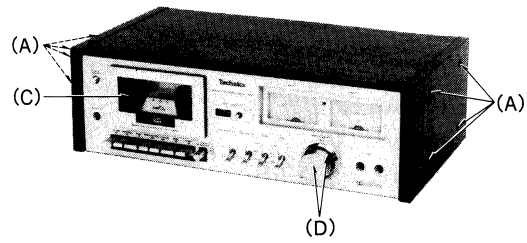


Fig. 2

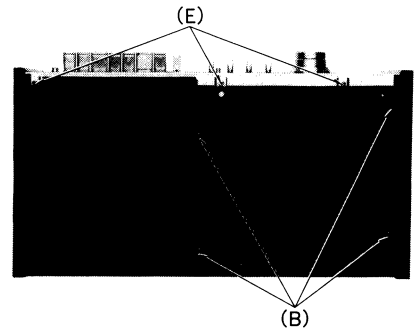


Fig. 3

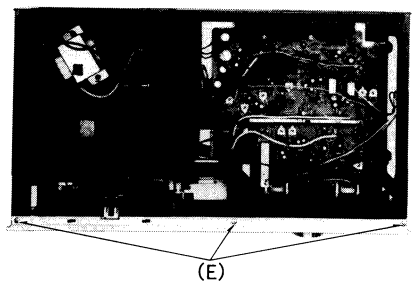


Fig. 4

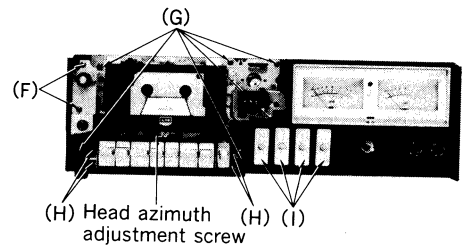


Fig. 5

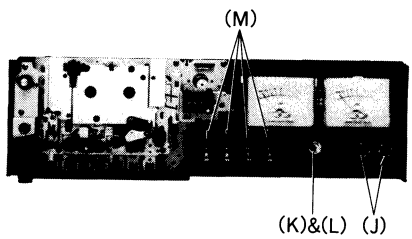


Fig. 6

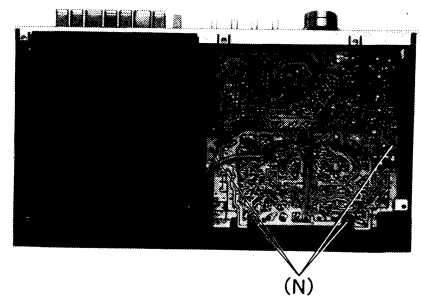


Fig. 7

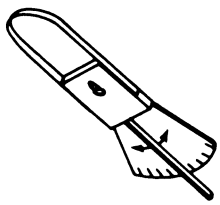
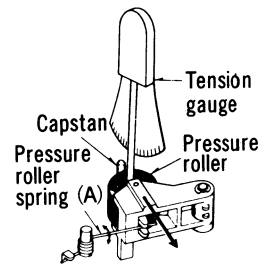
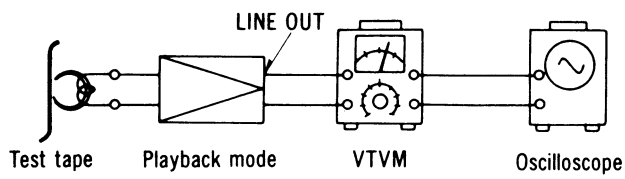
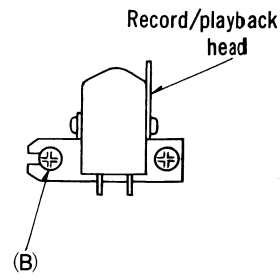
Procedure	To remove —— .	Remove —— .	Pcs.	Shown in fig. —— .
1	Case cover	• Screws ····· (A)	8	2
2	Bottom cover	• Screws ····· (B)	4	3
3	Front panel	• Cassette lid ····· (C) ※ • Control knobs ····· (D) • Screws ····· (E)	1 2 6	2 2 3, 4
4	Mechanism	• Screws ····· (F) • Red screws ····· (G)	2 6	5 5
5	Operation button unit and cassette holder	• Screws ····· (H)	4	5
6	Circuit board	• Switch shelters ····· (I) • Nuts ····· (J) • Nuts and washer ····· (K), (L) • Screws ····· (M) • Screws ····· (N)	4 2 1, 1 4 4	5 6 6 6 7

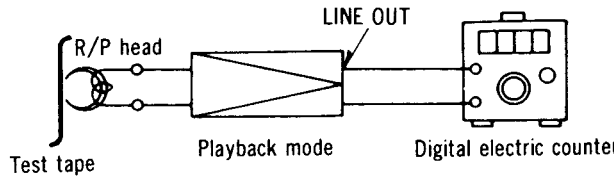
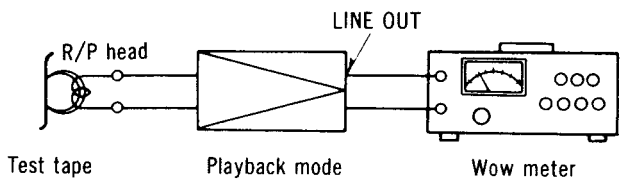
※The head azimuth can be adjusted by removing the cassette lid (C).

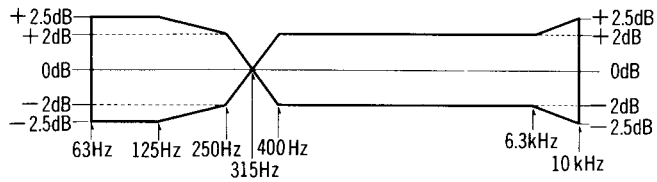
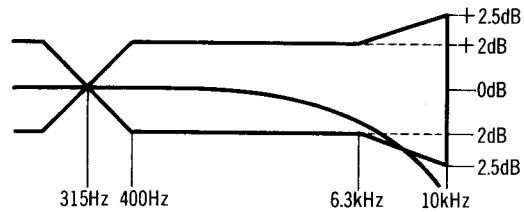
MEASUREMENT AND ADJUSTMENT METHOD

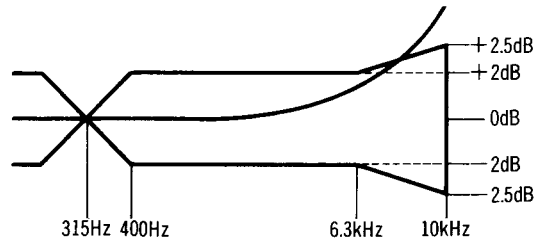
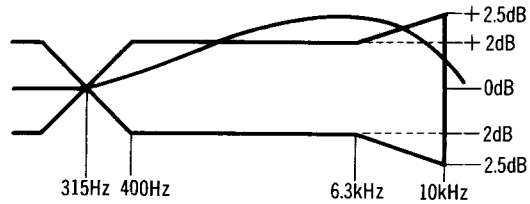
NOTE:

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. Bias selector: LOW.
6. Equalizer selector: 120μS.

ITEM	MEASUREMENT & ADJUSTMENT	REMARKS
Pressure of pressure roller Equipment: * Tension gauge (max. 500 gr)  **Fig. 8**	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 ··· QZZSRKCT	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±20 gr-cm**	* Playback mode
Head azimuth adjustment Equipment: * VTVM * Oscilloscope * Test tape (azimuth) ··· QZZCFM	**Record/playback head adjustment** 1. Test equipment connection is shown below.  **Fig. 10** 2. Play azimuth tape (QZZCFM 8kHz). 3. Adjust record/playback head angle adjustment screw (B) in fig. 11 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. 11**

ITEM	MEASUREMENT & ADJUSTMENT	REMARKS
Tape speed Equipment: * Digital electronic counter or frequency counter (RP8067) * Test tape ··· QZZCWAT	**Tape speed accuracy** 1. Test equipment connection is shown below.  **Fig. 12** 2. Play test tape (QZZCWAT 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 so that frequency becomes 3,000 Hz. 3. Tape speed adjustment VR shown in fig. 28. **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
Wow and flutter Equipment: * Wow meter * Test tape ··· QZZCWAT	1. Test equipment connection is shown below.  **Fig. 13** 2. Use wow test tape (3,000 Hz) and measure its playback signal on wow meter. 3. Wow and flutter is expressed in percentage and that measurement can be weighted by JIS network (WRMS). 4. Measure at middle section of test tape. **Standard value: 0.07% (WRMS)**	* Playback mode

ITEM	MEASUREMENT & ADJUSTMENT	REMARKS
Playback frequency response Equipment: * VTVM * Oscilloscope * Test tape ··· C-FH	1. Test equipment connection is as same as "Head azimuth adjustment" but use the test tape (QZZCFM) instead of head azimuth tape (See fig. 10). 2. Place UNIT into playback mode. 3. Play frequency response test tape. 4. Measure output level at 8kHz, 4kHz, 1kHz, 315Hz, 250Hz, 125Hz and 63Hz and compare output level with standard frequency 315Hz, 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. 14**	* Playback mode
Playback frequency response	**Adjustment** 1. If the measured value decreases at high frequency range, as shown in fig. 15, P.C.B. connection points (B) should be shorted to increase at high frequency range (See fig. 18 on page 7).  **Fig. 15** The corrected value 4kHz: about +0.1dB 6kHz: about +0.4dB 8kHz: about +0.7dB 10kHz: about +1.2dB	* Playback mode

ITEM	MEASUREMENT & ADJUSTMENT	REMARKS
	2. If the measured value increases at high frequency range, as shown in fig. 16, P.C.B. connection points (A) should be unsoldered and connection points (B) should be shorted (See fig. 18 on page 7).  **Fig. 16** **The corrected value** 4kHz: about −0dB; 6kHz: about −0.2dB; 8kHz: about −0.4dB; 10kHz: about −0.8dB **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. 17, P.C.B. connection points (C) should be shorted (See fig. 18 on page 7).  **Fig. 17** **The corrected value** 1kHz: about −0.3dB; 2kHz: about −0.7dB; 4kHz: about −0.8dB; 6kHz: about −0.8dB	
Playback gain Equipment: * VTVM * Oscilloscope * Test tape ··· QZZCFM	1. Test equipment connection is shown in fig. 10. 2. Play standard recording level portion on test tape (QZZCFM 315Hz), and using VTVM measure the output level at LINE OUT jack. 3. Make measurement for both channels. **Standard value: 0.42V (−7dB)** **Adjustment** 1. If measured value is not standard, adjust VR1 (L-CH), VR2 (R-CH) (See fig. 28 on page 12). 2. After adjustment, check "Playback frequency response" again.	* Playback mode

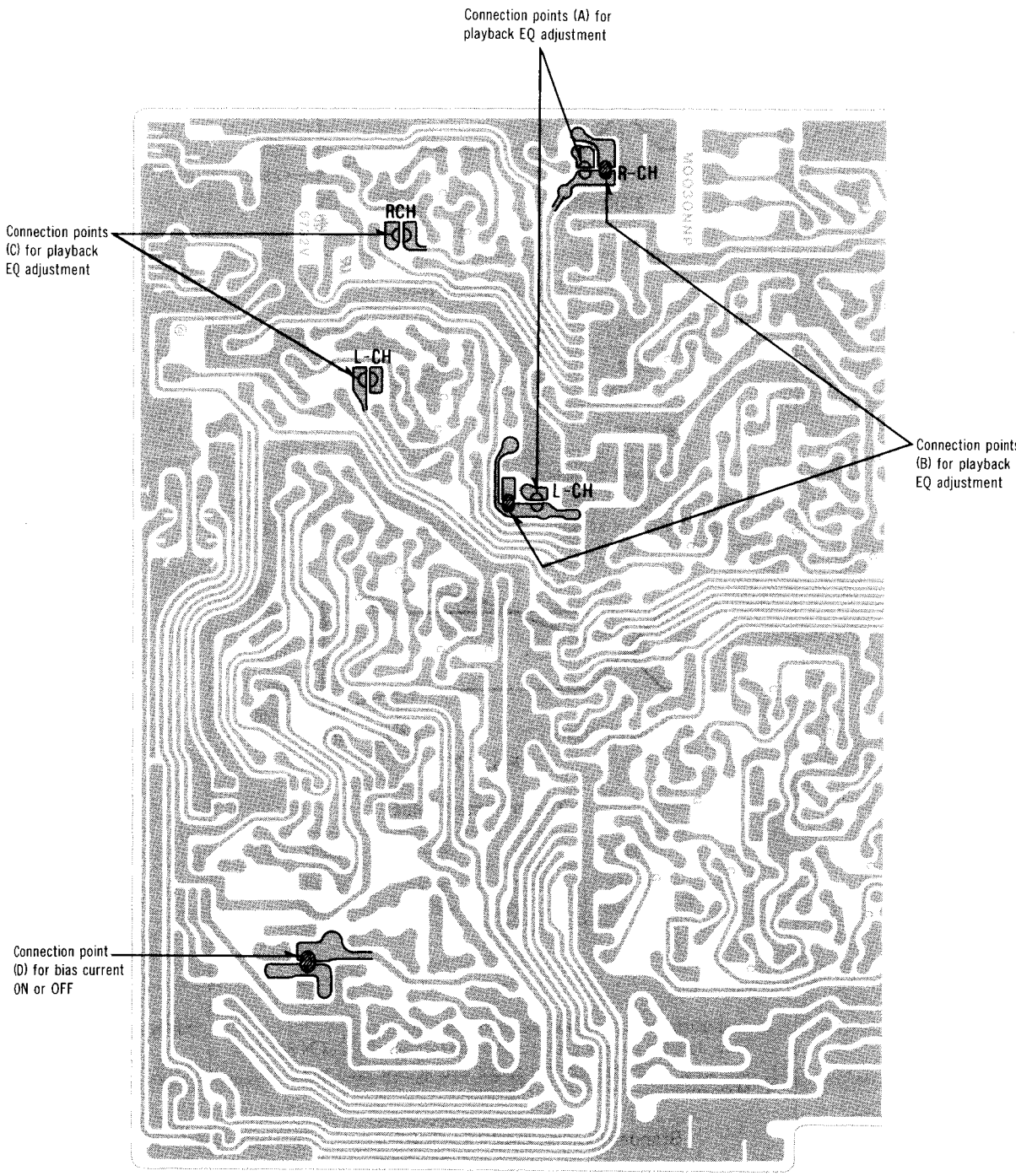
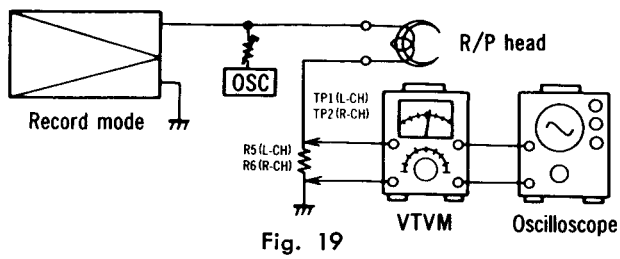
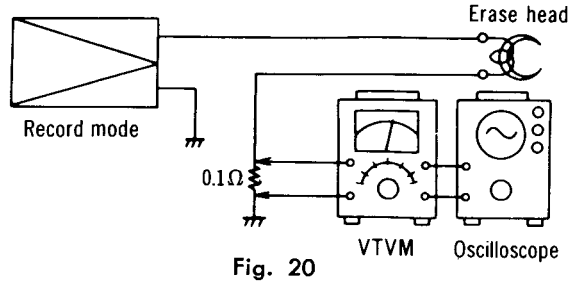
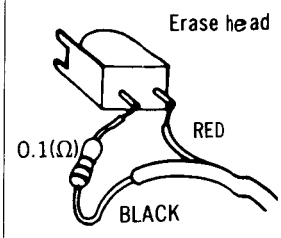
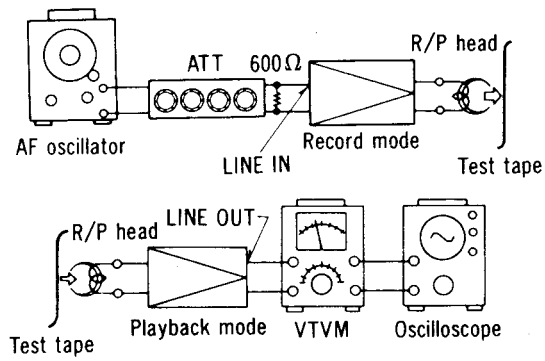
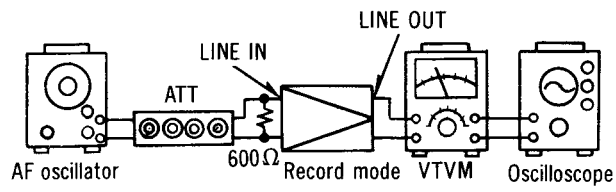
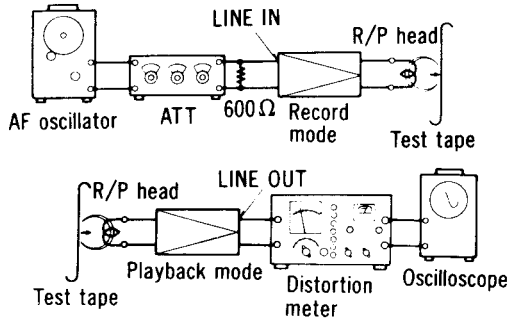
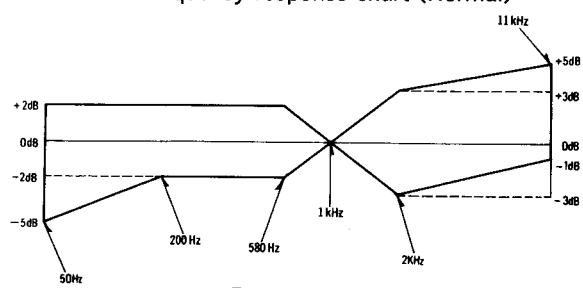
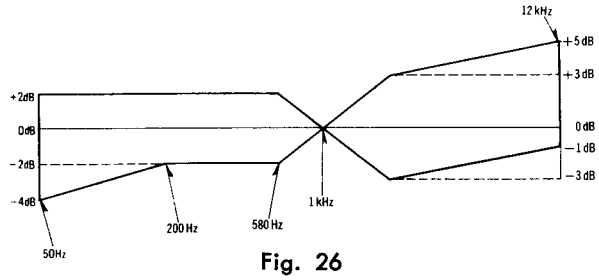
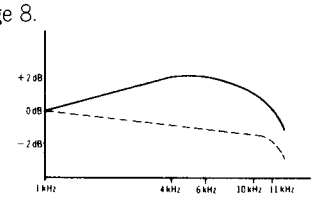

Connection points (A) for playback EQ adjustment
R-CH
RCH
Connection points (C) for playback EQ adjustment
L-CH
L-CH
Connection points (B) for playback EQ adjustment
Connection point (D) for bias current ON or OFF

Fig. 18

ITEM	MEASUREMENT & ADJUSTMENT	REMARKS
Playback S/N ratio Equipment: * VTVM * Oscilloscope * Test tape ··· QZZCFM * Empty cassette	1. Test equipment connection is shown in fig. 10. 2. Play standard recording level test tape (QZZCFM 315Hz) 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 (315Hz). **Standard value: Greater than 43dB** An example calculation is shown below. A: Es = playback output signal voltage of test tape (315Hz) B: En = playback output noise level Es = 0.42V (−7dB) En = 0.003V (−50dB) $S/N\ ratio = \frac{Es}{En} = \frac{0.42V}{0.003V} = 140$ $20 \log_{10} 140 = 43dB$ S/N ratio = Es(dB) − En(dB) = −7 − (−50) = 43dB	* Playback mode
Bias current Equipment: * VTVM * Oscilloscope	1. Test equipment connection is shown below.  **Fig. 19** 2. Place UNIT into record mode, and bias selector to "LOW". 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:** $250^{+130\mu A}_{-80\mu A}$ (LOW position) $275^{+130\mu A}_{-80\mu A}$ (MED position) $330^{+130\mu A}_{-80\mu A}$ (HIGH position) 4. Adjust L5 (L-CH) and L6 (R-CH) (See adjustment part location on page 12).	* Record mode * 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. 21). 2. Connect VTVM to both ends of 0.1Ω resistor.  **Fig. 20**	* Record mode  **Fig. 21**

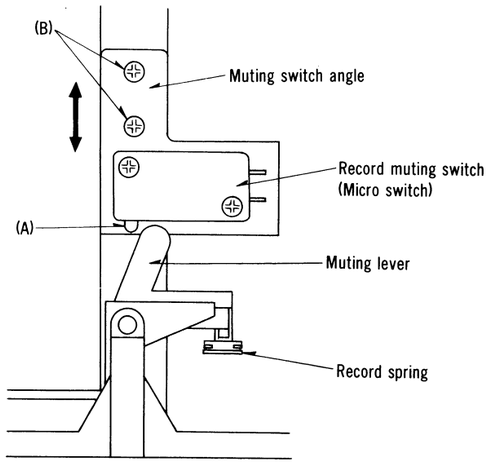
ITEM	MEASUREMENT & ADJUSTMENT	REMARKS
	3. Place UNIT into record mode, and measure voltage across the 0.1Ω resistor. 4. Determine erase current with the following formula: $\text{Erase current (A)} = \frac{\text{Voltage across both ends of } 0.1\Omega}{0.1\Omega}$ **Standard value:** **70±33mA (LOW position)** **80±33mA (MED position)** **90±33mA (HIGH position)**	
Overall gain Equipment: * AF oscillator * VTVM * ATT * Oscilloscope * Test tape (reference blank tape) ··· QZZCRA for Normal	1. Test equipment connection is shown in fig. 22.  **Fig. 22** 2. Place UNIT into record mode, and equalizer selector to 120μS, bias selector to LOW (for normal tape). 3. Supply 1kHz signal (−24dB) from AF oscillator, through ATT, to LINE IN. 4. Adjust ATT until monitor level at LINE OUT becomes 0.42V (−7dB). 5. Using test tape, make recording. 6. Playback recorded tape, and make sure the value at LINE OUT on VTVM becomes 0.42V. 7. If measured value is not 0.42V, adjust VR11 (L-CH), VR12 (R-CH) (See fig. 28 on page 12). 8. Repeat from step (2).	* Record/playback mode * LINE IN level control ··· MAX * Standard input level: MIC·· ····· −72±3dB LINE IN ··· −24±3dB DIN·· ····· −36±3dB
Level meter Equipment: * VTVM * Oscilloscope * AF oscillator * ATT	1. Test equipment connection is shown in fig. 23.  **Fig. 23** 2. Supply 1kHz signal from the AF oscillator, through the ATT, to the LINE IN jack. 3. Adjust ATT so that the monitor level at LINE OUT becomes 0.42V. 4. Adjust VR9 (L-CH) and VR10 (R-CH) so that the level meters indicate 0dB.	* Record mode * LINE IN level control ··· MAX

ITEM	MEASUREMENT & ADJUSTMENT	REMARKS
Overall distortion Equipment: * Distortion meter * AF oscillator * ATT * Oscilloscope * Test tape (reference blank tape) ··· QZZCRA for Normal ··· QZZCRX for CrO_2	1. Test equipment connection is shown in fig. 24.  **Fig. 24** 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% (CrO_2)**	* Record/playback mode * LINE IN level control ··· MAX
Overall frequency response Equipment: * VTVM * AF oscillator * ATT * Test tape (reference blank tape) ··· QZZCRA for Normal ··· QZZCRX 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. 22. 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). 6. Record each frequency 50 Hz, 100 Hz, 200 Hz, 1 kHz, 2 kHz, 4 kHz and 11 kHz (12 kHz for CrO_2 tape) 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. 25** 9. Set the bias and equalizer selector to CrO_2 position. 10. Measure as same as manner above.	* Record/playback mode * LINE IN level control ··· MAX

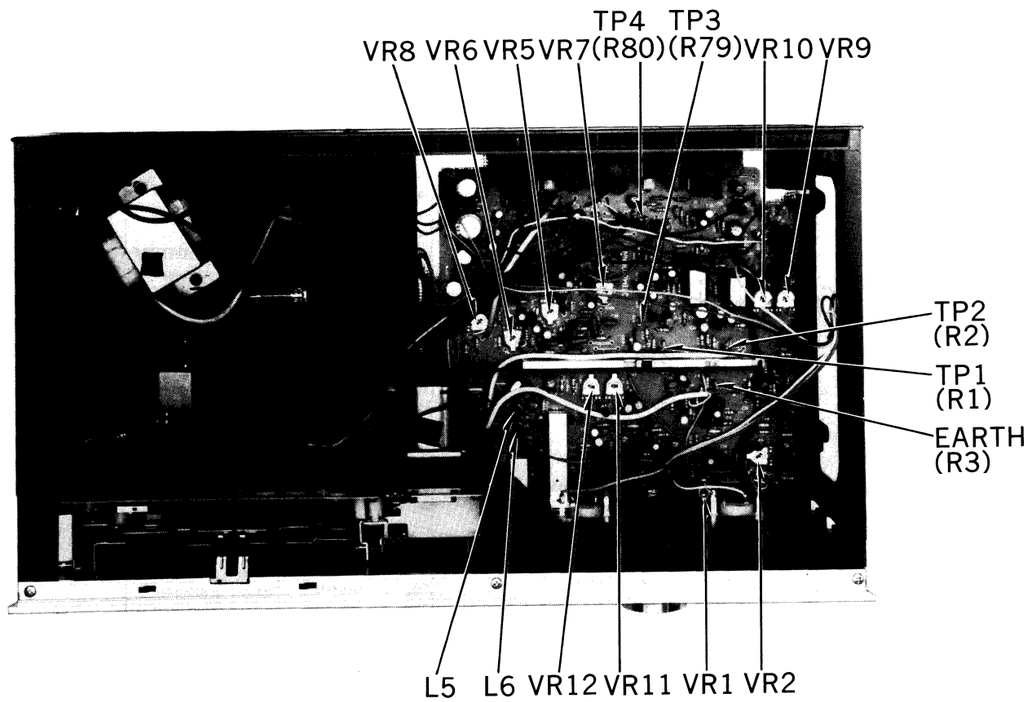
ITEM	MEASUREMENT & ADJUSTMENT	REMARKS
	11. Make sure that the measured value is within the range specified in the overall frequency response chart for CrO_2 tape below. **Overall frequency response chart (CrO_2)**  **Fig. 26**	
Overall frequency response adjustment (As a standard for adjustment)	1. When the frequency response between the middle and high-frequency range becomes higher than the standard value, as shown by the solid line in fig. 27, increase the bias current by turning L5 (L-CH), L6 (R-CH). 2. When it becomes lower, as shown by dotted line, reduce the bias current by turning L5 (L-CH), L6 (R-CH). **Note:** For the method of bias current measurement, refer to "Bias current adjustment" on page 8.  **Fig. 27**	
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 −34.5dB at TP3 (L-CH), TP4 (R-CH) (frequency 5kHz). 2. Confirm that the value at IN position is 8dB 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 10dB greater than the value in step (1) above. 7. Adjusting VR5 (L-CH), VR6 (R-CH), make the reading of VTVM become 2dB 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 (D) shown in adjustment parts location on page 7.
Overall S/N ratio Equipment: * VTVM * AF oscillator * ATT * Oscilloscope * Test tape (reference blank tape) ··· QZZCRA	1. Test equipment connection is shown in fig. 22. 2. Supply 1kHz signal to LINE IN and adjust ATT so that output level at LINE OUT indicates 0.42V (−7dB). 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 detemine 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 8. **Standard value:** **Greater than 42dB (without NAB filter)**	* Record/playback mode * LINE IN level control ···MAX * Erase the tape with a bulk tape eraser.

HOW TO INSTALL THE RECORD-MUTING SWITCH

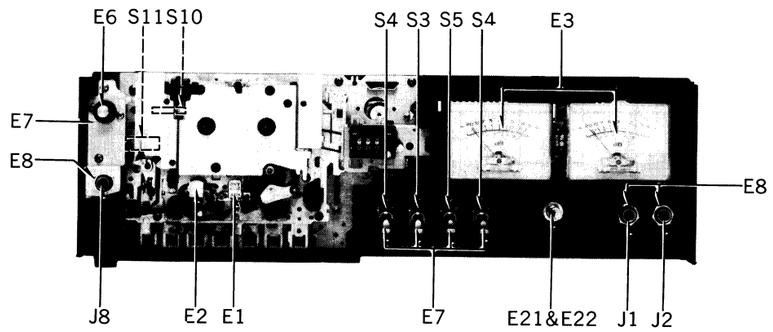
1. Lock the record button, and then mount it with screw (B) so that the cap and micro switch (A) do not contact each other.
2. Then play the music tape. Durring the playback, press the record button lightly several times, confirm whether the playback sound is interrupted or not.

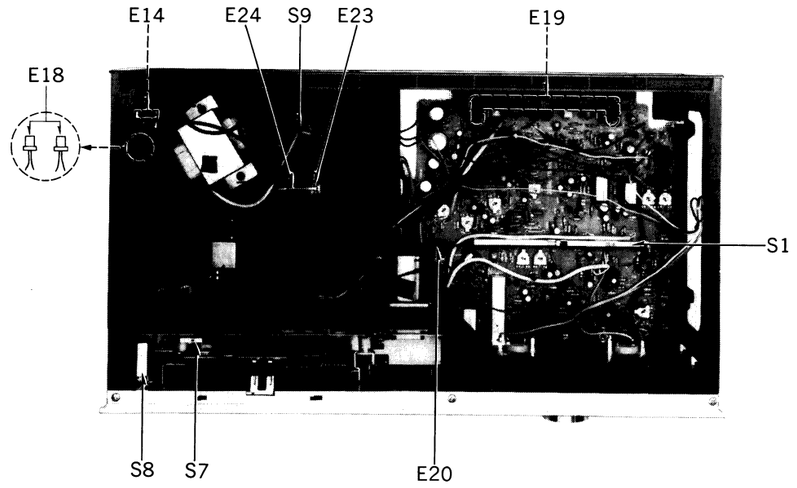


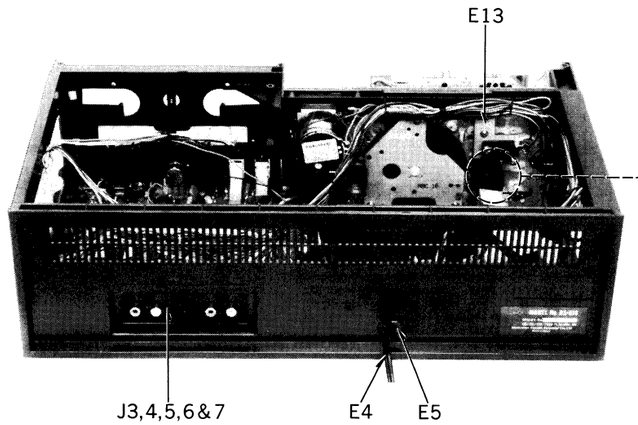
ADJUSTMENT PARTS LOCATION

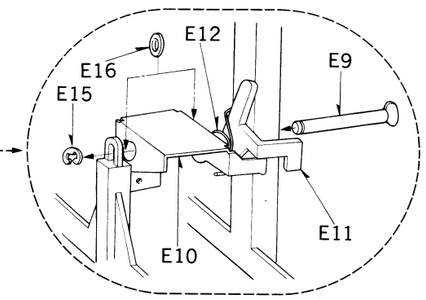


ELECTRICAL PARTS LOCATION









NOTE: S indicates that only parts specified by the manufacturer be used for safety.

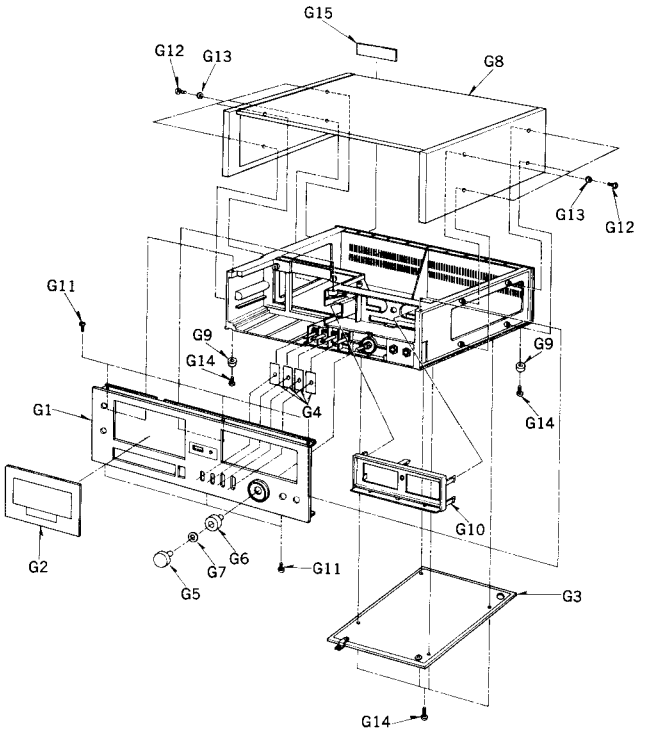
Ref. No.		Part No.	Part Name & Description
		ELECTRICAL PARTS	
E1		QWY4113Z	Record/Playback Head
E2		QWY2122ZA	Erase Head
E3	S	QSL1092RNM	Level Meter with Pilot Lamp
E4	S	QFC1203M	AC Power Cord
E5		QTD1129	Power Cord Bushing
E6		QXBM0018	Push Button (Power Switch)
E7		QMAM0083	Power Switch Angle
E8		QNQ1070	Nut
E9		QMS1236	Record Lever Shaft
E10		QMLM0033	Record Lever
E11		QMLM0034	Muting Lever
E12		QBN1621	Muting Lever Spring
E13		QMFM0007	Muting Switch Angle
E14		QTSM0020	Earth Metal
E15		XUC3FT	Stop Ring ø3
E16		QBK7005	Washer
E18		QJT1029	Connection Terminal
E19		QKJM0017	Jack Cover Plate
E20		QBSM0001	Recording Connection Wire
E21		XWG9D15AW	Washer for Volume
E22		QNQ1039	Nut for Volume
E23	S	QTF1056	Fuse Holder
E24	S	XBA2E03NS5	Fuse (0.3A)

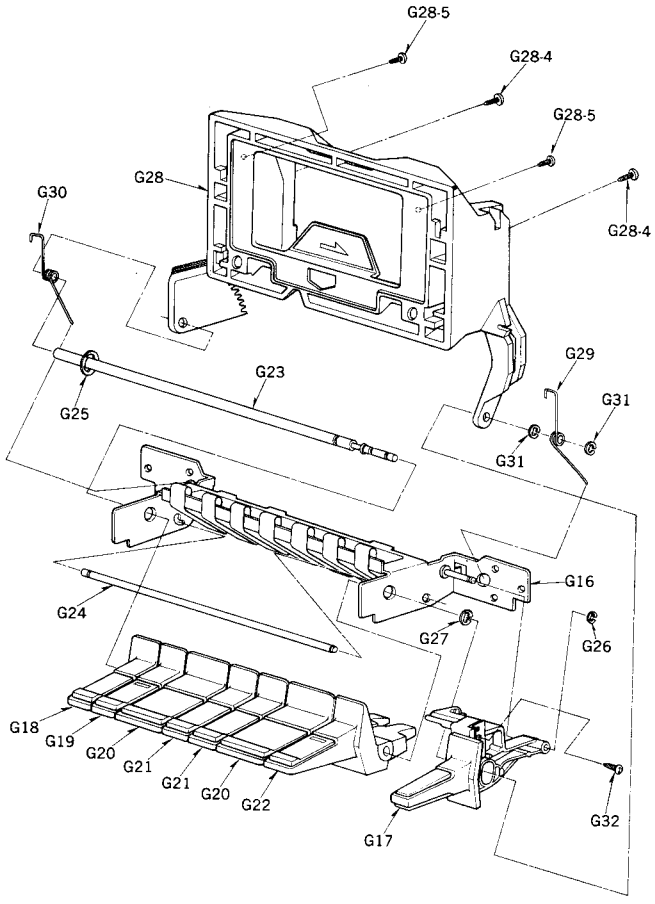
H

1.

2.

CABINET PARTS

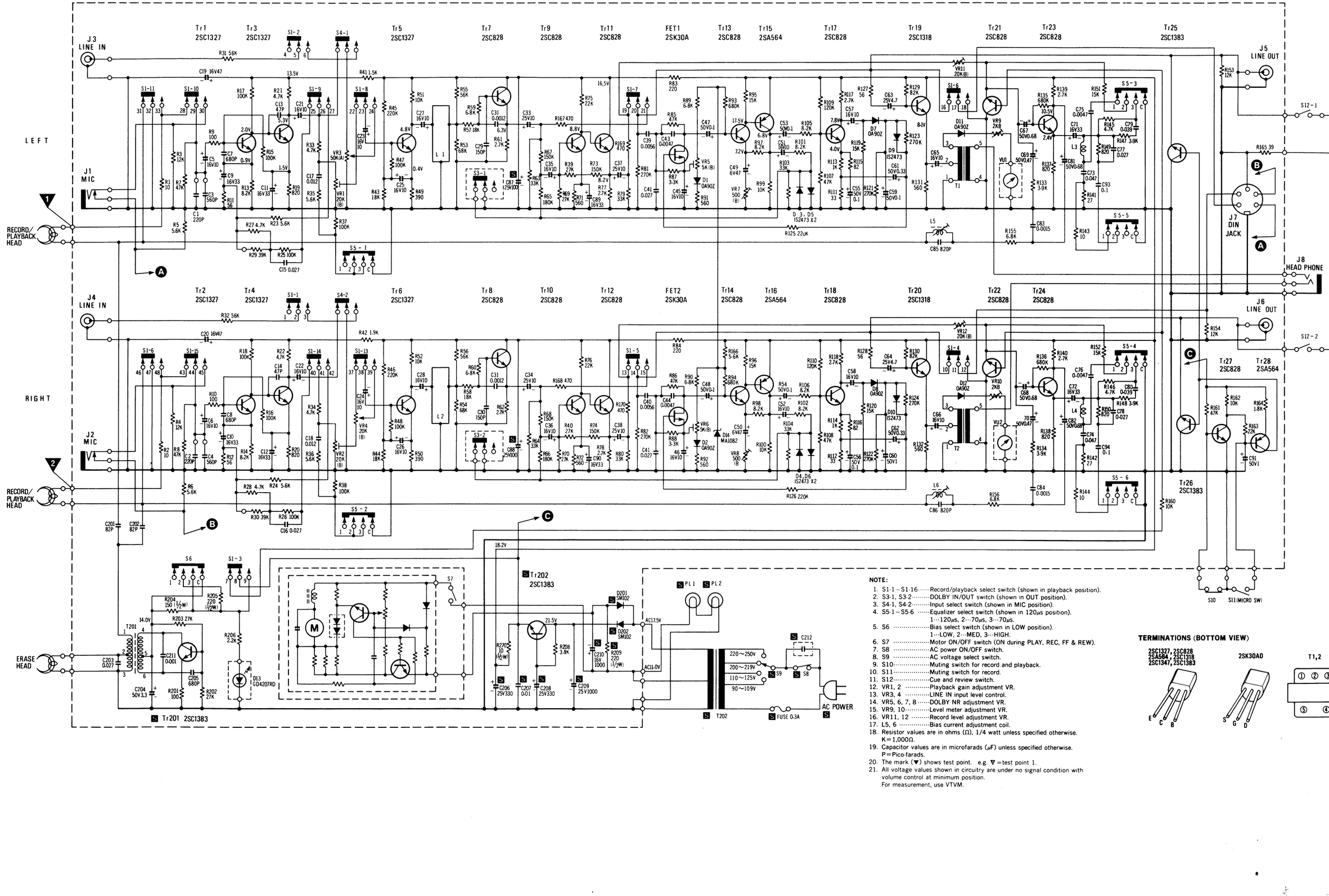




NOTE: S indicates that only parts specified by the manufacturer be used for safety.

Ref. No.		Part No.	Part Name & Description
			CABINET PARTS
G1		QYPM0025	Front Panel Assembly
G2		QYFM0031	Cassette Lid Assembly
G3		QYCM0020	Bottom Board Assembly
G4		QBH2021S	Switch Shelter
G5		QYT0458	Volume Knob-1
G6		QYT0457	Volume Knob-2
G7		QBW2066	Volume Washer
G8		QYWM0010	Wooden Case Cover
G9		QKA1050	Rubber Foot
G10		QYKM0001	Level Meter Cover Assembly
G11		XTN3+8B	Tapping Screw ⊕3×8
G12		XTN4+20B	Tapping Screw ⊕4×20 (Black)
G13		XWG4E10FZ	Washer (Black)
G14		XTN3+10B	Tapping Screw ⊕3×10
G15		QGSM0087	Name Plate
G16		QXA0669	Push Button Holding Angle
G17		QXB0556	Timer Button Assembly
G18		QGO1473	Pause Button
G19		QGO1474	Record Button
G20		QGO1476	Button (Playback, Stop)
G21		QGO1477	Button (FF, REW)
G22		QGO1475	Eject Button
G23		QMN2240	Bush Button Shaft-A
G24		QMN1861	Bush Button Shaft-B
G25		QNQ1080	Stop Ring
G26		XUC25FT	Stop Ring ϕ2.5
G27		XUC4FT	Stop Ring ϕ4
G28		QYFM0029	Cassette Holder Assembly
G28-4		XTN26+8B	Tapping Screw ⊕2.6×8
G28-5		XTN26+6B	Tapping Screw ⊕2.6×6
G29		QBN1622	Lid Spring-1
G30		QBN1623	Lid Spring-2
G31		XUC3FT	Stop Ring ϕ3
G32		XTN26+5B	Tapping Screw ⊕2.6×5
G33		QYMM0047	Main Case Assembly
			ACCESSORIES
A1		RP023A	Connection Cord-G
A2		QFT1TCCPTRJZ	Demonstration Tape
A3	S	XBA2E03NS5	Fuse (0.3A)
A4		QQT2302	Instruction Book
			PACKINGS
P1		QPNM0120	Inside Carton
P2		QPAM0024	Inner Carton
P3		XZB50X65A02	Poly Bag

SCHEMATIC DIAGRAM MODEL RS-616



NOTE:

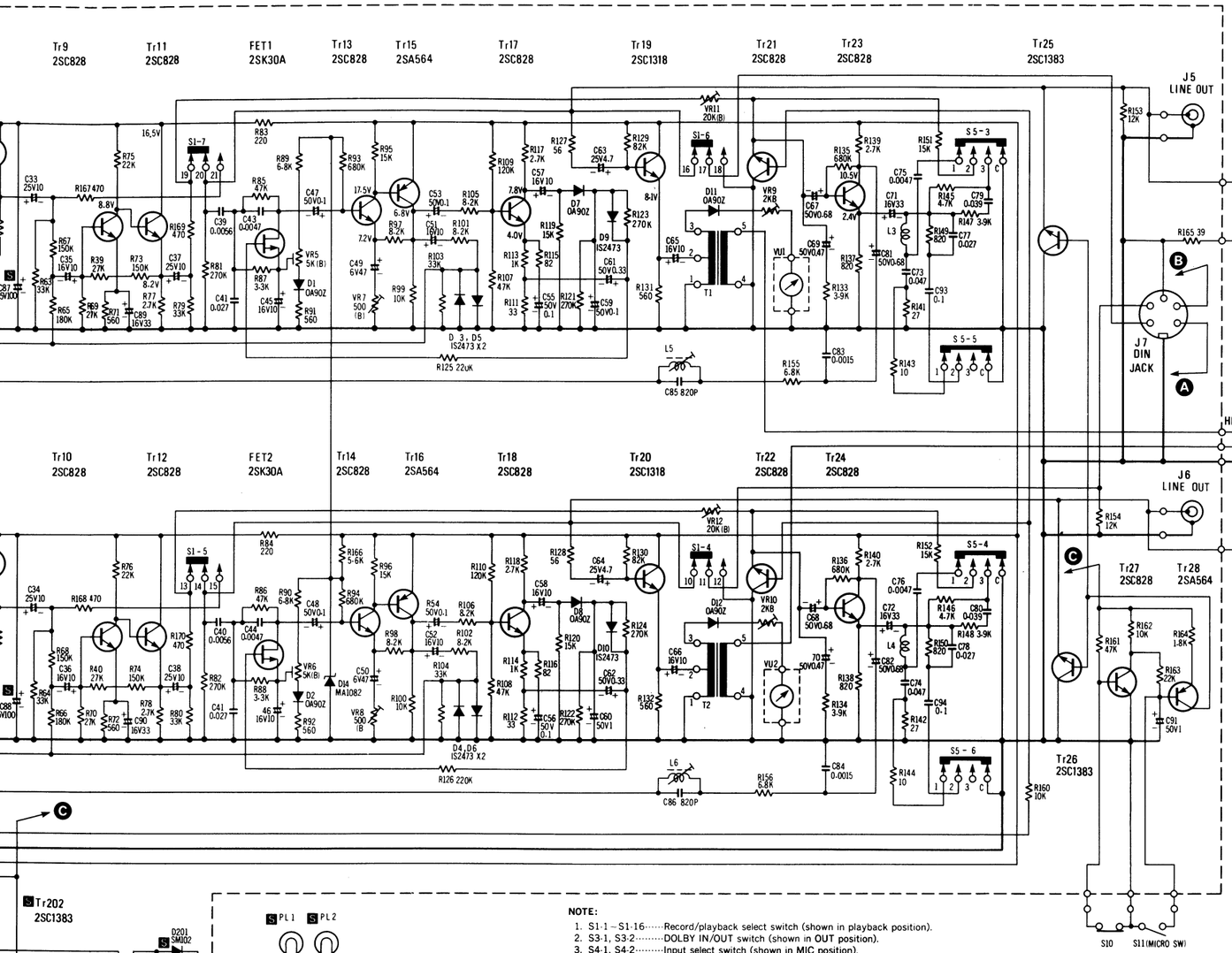
1. S1-1 ~ S1-16 ..... Record/playback select switch (shown in playback position).
2. S3-1, S3-2 ..... DOLBY IN/OUT switch (shown in OUT position).
3. S4-1, S4-2 ..... Input select switch (shown in MIC position).
4. S5-1 ~ S5-6 ..... Equalizer select switch (shown in 120μs position).
   1···120μs, 2···70μs, 3···70μs.
5. S6 ..... Bias select switch (shown in LOW position).
   1···LOW, 2···MED, 3···HIGH.
6. S7 ..... Motor ON/OFF switch (ON during PLAY, REC, FF & REW).
7. S8 ..... AC power ON/OFF switch.
8. S9 ..... AC voltage select switch.
9. S10 ..... Muting switch for record and playback.
10. S11 ..... Muting switch for record.
11. S12 ..... Cue and review switch.
12. VR1, 2 ..... Playback gain adjustment VR.
13. VR3, 4 ..... LINE IN input level control.
14. VR5, 6, 7, 8 ..... DOLBY NR adjustment VR.
15. VR9, 10 ..... Level meter adjustment VR.
16. VR11, 12 ..... Record level adjustment VR.
17. L5, 6 ..... Bias current adjustment coil.
18. Resistor values are in ohms (Ω), 1/4 watt unless specified otherwise.
    K = 1,000Ω.
19. Capacitor values are in microfarads (μF) unless specified otherwise.
    P = Pico-farads.
20. The mark (▼) shows test point. e.g. ▽ = test point 1.
21. All voltage values shown in circuitry are under no signal condition with volume control at minimum position.
    For measurement, use VTVM.

TERMINATIONS (BOTTOM VIEW)

2SC1327, 2SC828
2SA564, 2SC1318
2SC1347, 2SC1383

2SK30AD

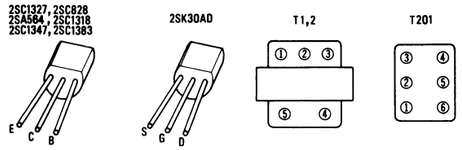
T1, 2



NOTE:

1. S1-1～S1-16·····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 ·····Equalizer select switch (shown in 120μs position).
   1···120μs, 2···70μs, 3···70μs.
5. S6 ·····Bias select switch (shown in LOW position).
   1···LOW, 2···MED, 3···HIGH.
6. S7 ·····Motor ON/OFF switch (ON during PLAY, REC, FF & REW).
7. S8 ·····AC power ON/OFF switch.
8. S9 ·····AC voltage select switch.
9. S10·····Muting switch for record and playback.
10. S11·····Muting switch for record.
11. S12·····Cue and review switch.
12. VR1, 2 ·····Playback gain adjustment VR.
13. VR3, 4 ·····LINE IN input level control.
14. VR5, 6, 7, 8·····DOLBY NR adjustment VR.
15. VR9, 10·····Level meter adjustment VR.
16. VR11, 12 ·····Record level adjustment VR.
17. L5, 6 ·····Bias current adjustment coil.
18. Resistor values are in ohms (Ω), 1/4 watt unless specified otherwise.
    K=1,000Ω.
19. Capacitor values are in microfarads (μF) unless specified otherwise.
    P=Pico-farads.
20. The mark (▼) shows test point. e.g. ▼=test point 1.
21. All voltage values shown in circuitry are under no signal condition with volume control at minimum position.
    For measurement, use VTVM.

TERMINATIONS (BOTTOM VIEW)



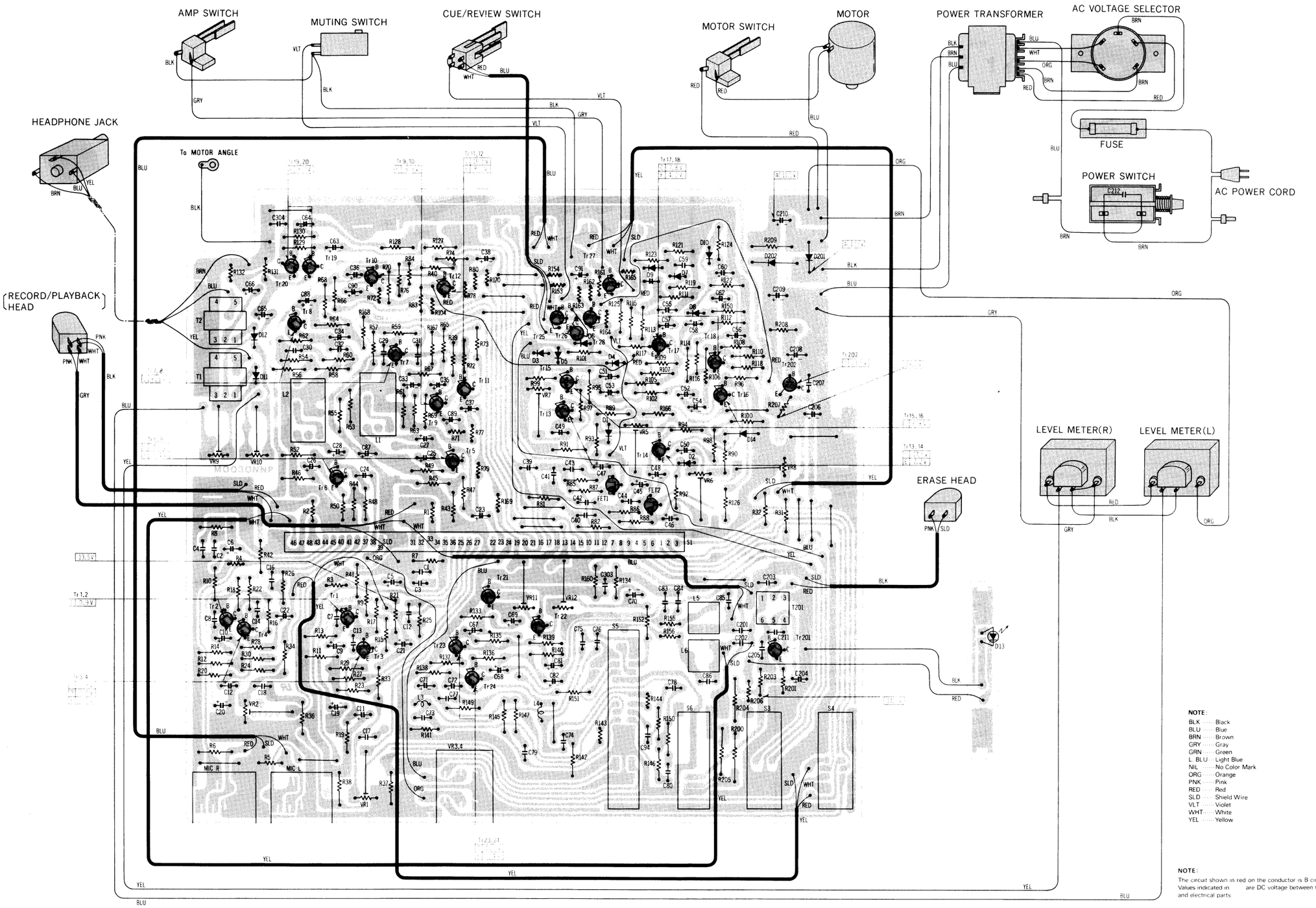
NOTE: RESITORS ERD ·····Carbon
ERG ·····Metal oxide
CAPACITORS ECEA ·····Electrolytic
ECCD ·····Ceramic
ECKD ·····Ceramic
ECQM·····Polyster
ECQS ·····Polystyrene

NOTE: ■ indicates that only parts specified by the manufacturer be used for safety.

Ref. No.		Part No.	Part Name & Description
		TRANSISTORS	
Tr1, 2, 3, 4, 5, 6		2SC1327	Transistor
Tr7, 8, 9, 10, 11, 12, 13, 14		2SC828	〃
Tr15, 16		2SA564	〃
Tr17, 18		2SC828	〃
Tr19, 20		2SC1318	Transistor
Tr21, 22, 23, 24		2SC828	〃
Tr25, 26		2SC1383	〃
Tr27		2SC828	〃
Tr28		2SA564	〃
Tr201, 202	■	2SC1383	〃
		FET	
FET1, 2		2SK30AD	FET
		DIODES & RECTIFIERS	
D1, 2		OA90Z	Diode
D3, 4, 5, 6		1S2473	〃
D7, 8		OA90Z	〃
D9, 10		1S2473	〃
D11, 12		OA90Z	〃
D13		GD4207RD	Light Emitting Diode
D14		MA1082	Diode
D201, 202	■	SM102	Rectifier
		TRANSFORMERS	
T1, 2		QLT2D26X	Headphone Transformer
T201		QLB0158	Bias OSC Transformer
T202	■	QLPZ9ELX	Power Transformer
		COILS	
L1, 2		QLM9Z5K	MPX Filter
L3, 4		QLQX2421Y	Record EQ Coil
L5, 6		QLQX1032W	Bias Trap Coil
		SWITCHES	
S1		QSSG206F	Slide Switch (Record/Playback Selector)
S3, 4		QES1383	Lever Switch (DOLBY IN/OUT, Input Select)
S5		QES1382	Lever Switch (EQ Select)
S6		QES1441H	Lever Switch (Bias Select)
S7		QSB0178	Leaf Switch (Motor ON/OFF)
S8	■	ESB70124	Push Switch (Power ON/OFF)
S9	■	QSR1407	Rotary Switch (AC Voltage Selector)
S10		QSB0178	Leaf Switch (Muting)
S11		QSM0070	Micro Switch (Muting)
S12		QSB0186	Leaf Switch (Cue and Review)
		JACKS	
J1, 2		QJA0256H	TMS Jack (MIC)
J3, 4, 5, 6, 7		QEJ5002H	Line IN/OUT & DIN Jack Assembly
J8		QJA0255H	TMS Jack (PHONES)

Ref. No.		Part No.
		RESISTORS
R1, 2		ERD25TJ100
R3, 4		ERD25TJ123
R5, 6		ERD25TJ562
R7, 8		ERD25TJ473
R9, 10		ERD25TJ101
R11, 12		ERD25TJ560
R13, 14		ERD25TJ822
R15, 16		ERD25TJ104
R17, 18		ERD25TJ104
R19, 20		ERD25TJ821
R21, 22		ERD25TJ472
R23, 24		ERD25TJ562
R25, 26		ERD25TJ104
R27, 28		ERD25TJ472
R29, 30		ERD25TJ393
R31, 32		ERD25TJ563
R33, 34		ERD25TJ472
R35, 36		ERD25TJ562
R37, 38		ERD25TJ104
R39, 40		ERD25TJ273
R41, 42		ERD25TJ152
R43, 44		ERD25TJ183
R45, 46		ERD25TJ224
R47, 48		ERD25TJ104
R49, 50		ERD25TJ391
R51, 52		ERD25TJ103
R53, 54		ERD25TJ683
R55, 56		ERD25TJ563
R57, 58		ERD25TJ183
R59, 60		ERD25TJ682
R61, 62		ERD25TJ272
R63, 64		ERD25TJ333
R65, 66		ERD25TJ184
R67, 68		ERD25TJ154
R69, 70		ERD25TJ273
R71, 72		ERD25TJ561
R73, 74		ERD25TJ154
R75, 76		ERD25TJ223
R77, 78		ERD25TJ272
R79, 80		ERD25TJ333
R81, 82		ERD25TJ274
R83, 84		ERD25TJ221
R85, 86		ERD25TJ473
R87, 88		ERD25TJ332
R89, 90		ERD25TJ682
R91, 92		ERD25TJ561
R93, 94		ERD25TJ684
R95, 96		ERD25TJ153
R97, 98		ERD25TJ822
R99, 100		ERD25TJ103
R101, 102		ERD25TJ822
R103, 104		ERD25TJ333
R105, 106		ERD25TJ822
R107, 108		ERD25TJ473
R109, 110		ERD25TJ124
R111, 112		ERD25TJ330
R113, 114		ERD25TJ102
R115, 116		ERD25TJ820
R117, 118		ERD25TJ272
R119, 120		ERD25TJ153
R121, 122, 123, 124		
R125, 126		ERD25TJ274
R127, 128		ERD25TJ224
R129, 130		ERD25TJ560
R131, 132		ERD25TJ823
R133, 134		ERD25TJ561
R135, 136		ERD25TJ392
R137, 138		ERD25TJ821
R139, 140		ERD25TJ821
R141, 142		ERD25TJ272
R143, 144		ERD25TJ270
R145, 146		ERD25TJ100
R147, 148		ERD25TJ472
R149, 150		ERD25TJ392
R151, 152		ERD25TJ821
R153, 154		ERD25TJ153
R155, 156		ERD25TJ123
R160		ERD25TJ682
R161		ERD25TJ103
R162		ERD25TJ473
R163		ERD25TJ223
R164		ERD25TJ182
R165		ERD25TJ390
R166		ERD25TJ562
R167, 168		ERD25TJ471
R169, 170		ERD25TJ471
R201		ERD25TJ101
R202, 203		ERD25TJ273
R204		ERD50TJ151
R205		ERD50TJ221
R206		ERD25TJ222
R207		ERD50TJ100
R208		ERD25TJ392
R209	■	ERD50TJ221
		VARIABLE RESISTORS
VR1, 2		EVLS3AA00B24
VR3, 4		EWKN3AF21A54
VR5, 6		EVLS3AA00B53
VR7, 8		EVLS3AA00B52
VR9, 10		EVLS3AA00B23
VR11, 12		EVLS3AA00B24
		CAPACITORS
C1, 2		ECKD1H221K
C3, 4		ECKD1H561K
C5, 6		ECEA16M10R
C7, 8		ECKD1H681K
C9, 10, 11, 12		ECEA1CS330
C13, 14		ECCD1H470K
C15, 16		ECQM05273KZ
C17, 18		ECQM05123KZ
C19, 20		ECEA1ES470
C21, 22, 23, 24, 25, 26, 27, 28		ECEA1HS100
C29, 30		ECCD1H151K
C31, 32		ECKD1H122K
C33, 34, 35, 36, 37, 38		ECEA1HS100
C39, 40		ECQM05562JZ
C41, 42		ECQM05273JZ
C43, 44		ECQM05472JZ
C45, 46		ECEA1HS100
C47, 48		ECEA50MR1R
C49, 50		ECEA1AS470
C51, 52		ECEA1HS100
C53, 54, 55, 56		ECEA50ZR1
C57, 58		ECEA1HS100
C59, 60		ECEA50ZR1
C61, 62		ECEA50ZR33
C63, 64		ECEA1JS4R7
C65, 66		ECEA1HS100
C67, 68		ECEA50ZR68
C69, 70		ECEA50ZR47
C71, 72		ECEA1CS330
C73, 74		ECQM05473KZ
C75, 76		ECQM05472KZ
C77, 78		ECQM05273KZ
C79, 80		ECQM05393KZ
C81, 82		ECEA50ZR68
C83, 84		ECKD1H152K
C85, 86		ECQS1821KZ
C87, 88	■	ECEA1ES101
C89, 90		ECEA1CS330
C91		ECEA2AS010
C93, 94		ECQM05104KZ
C201, 202		ECCD1H820K
C203		ECQM1273KZ
C204		ECEA2AS3R3
C205		ECQS1681KZ
C206	■	ECEA1ES331
C207	■	ECKD1H103PF
C208	■	ECEA1ES331
C209	■	ECEA1VS102
C210	■	ECEA1CS102
C211		ECKD1H102K
C212	■	ECQM6223KZ

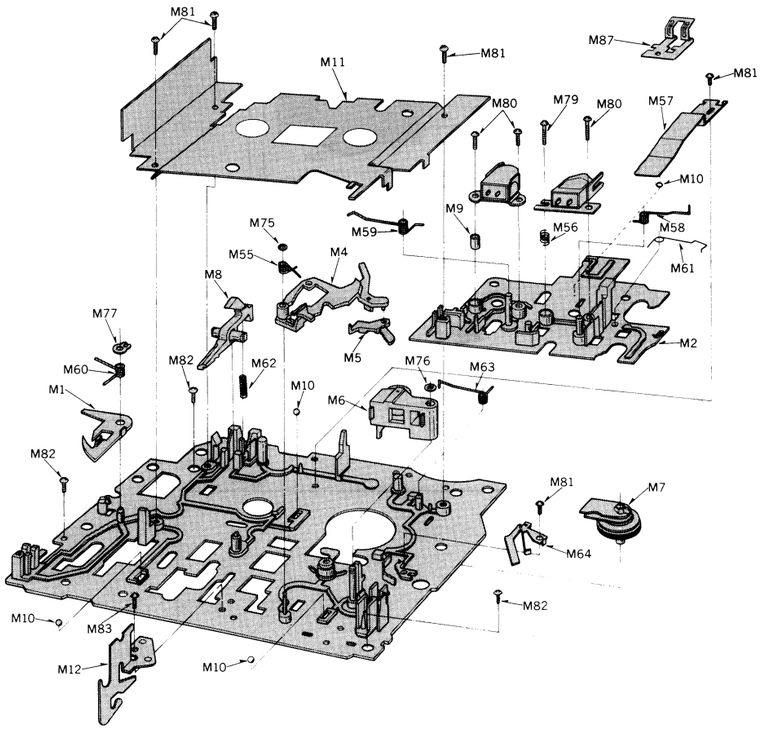
WIRING CONNECTION DIAGRAM MODEL RS-616

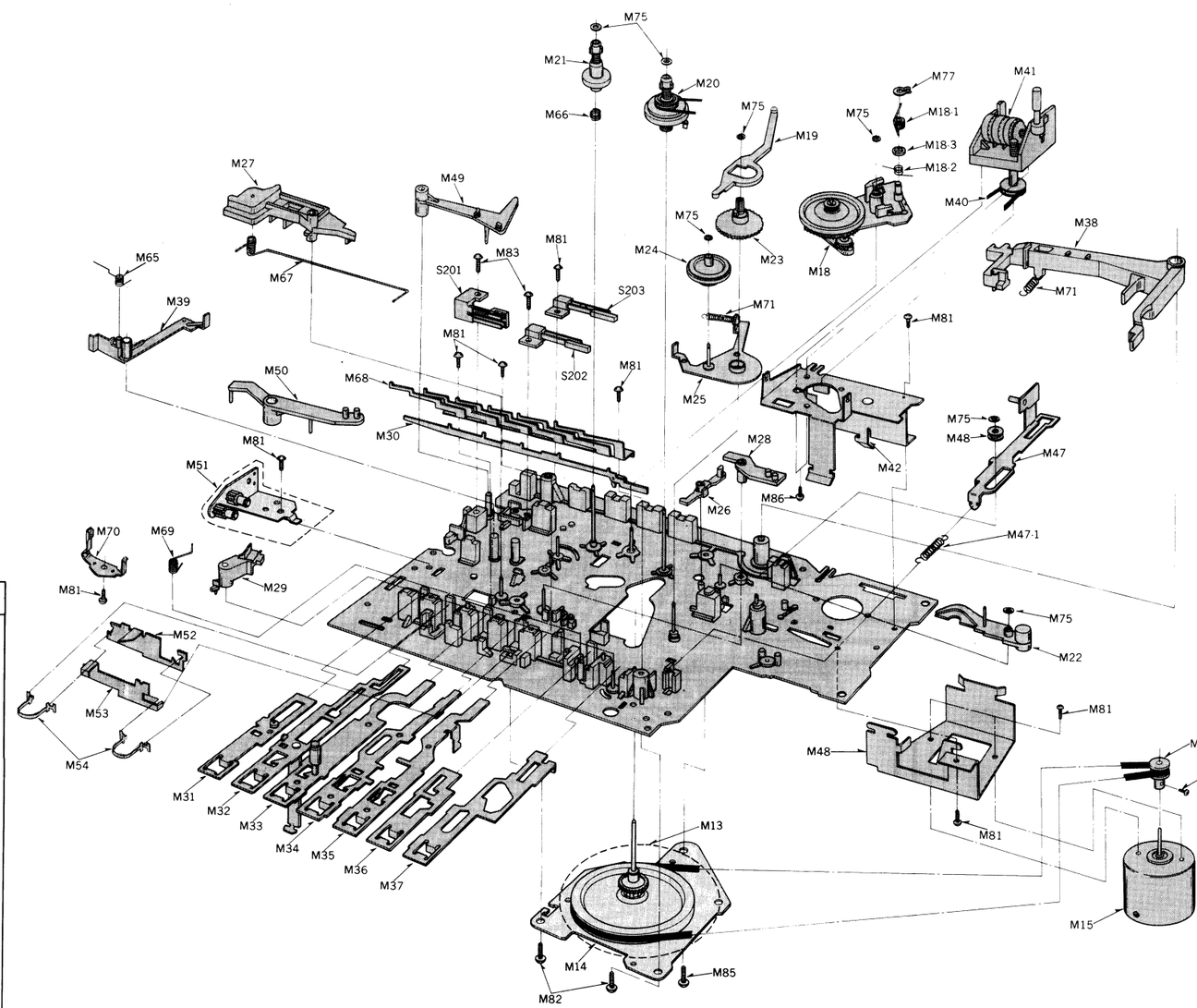


NOTE:
BLK ..... Black
BLU ..... Blue
BRN ..... Brown
GRY ..... Gray
GRN ..... Green
L BLU ... Light Blue
NIL ..... No Color Mark
ORG ..... Orange
PNK ..... Pink
RED ..... Red
SLD ..... Shield Wire
VLT ..... Violet
WHT ..... White
YEL ..... Yellow

NOTE:
The circuit shown in red on the conductor is B circuit.
Values indicated in and electrical parts are DC voltage between the chassis

EXPLODED VIEWS





Ref. No.	Part No.	Part Name & Description
	MECHANICAL PARTS	
M1	QML2898	Pause Lock Plate
M2	QMK1612	Head Base Plate
M4	QML3047	Obstruction Lever
M5	QML3048	Driving Lever
M6	QXL1057	Pressure Roller Lever Assembly
M7	QXI0098	Takeup Idler Assembly
M8	QML3051	Erase Safety Lever
M9	QMC0061	Erase Head Spacer
M10	QDK1012	Steel Ball 2.5φ
M11	QXH0289	Chassis Cover-A
M12	QMA3169	Fulcrum Angle
M13	QXF0131	Flywheel
M14	QXH0272	Flywheel Retainer Assembly
M15	MHI5R9CHY	Motor
M16	QXP0572	Motor Pulley Assembly
M16-1	XSN2+3	Screw ⊕2×3
M17	QDB0241	Flywheel Belt
M18	QXL1136	Fast Forward Arm Assembly
M18-1	QBN1517	Fast Forward Spring
M18-2	QBN1559	Fast Forward Arm Spring
M18-3	QMC0080	Collar
M19	QML3040	Cam Lever
M20	QXD0067	Takeup Reel Table Assembly
M21	QXD0084	Supply Reel Table Assembly
M22	QXL1055	Auto-Stop Lever Assembly
M23	QDG1096	Cam Gear
M24	QXG1026	Auto-Stop Gear Assembly

Ref. No.	Part No.	Part Name & Description
M25	QXL1037	Gear Lever Assembly
M26	QML3042	Auto-Stop Obstruction Lever
M27	QML3217	Pause Lever
M28	QML3049	Cue Lever
M29	QML3124	Lock Release Arm
M30	QXR0275	Lock Rod Assembly
M31	QXR0342	Pause Rod Assembly
M32	QXR0343	Record Rod Assembly
M33	QXR0344	Playback Rod Assembly
M34	QMR1624	Rewind Rod-A
M35	QMR1623	Fast Forward Rod-A
M36	QMR1622	Stop Rod-A
M37	QMR1621	Eject Rod-A
M38	QML3038	Switch Arm
M39	QML3287	Brake Lever
M40	QDB0240	Counter Belt
M41※	QXC0017	Tape Counter
M41※	QXC0025	Tape Counter
M42	QMA3171	Counter Angle
M47	QXR0403	Eject Rod-B
M47-1	QBT1619	Idler Spring
M48	QMA3414	Motor Angle
M49	QML3206	Muting Arm
M50	QML3207	Muting Lever
M51	QXG1031	Damper Gear Assembly
M52	QMR1628	Obstruction Rod-A
M53	QMR1629	Obstruction Rod-B
M54	QBP1770	Obstruction Rod Spring

Ref. No.	Part No.	Part Name & Description
M55	QBN1515	Connection Spring
M56	QBC1278	Head Spring
M57	QBP1773	Head Base Plate Pressure Spring
M58	QBN1488	Pressure Roller Spring
M59	QBN1481	Playback Spring
M60	QBN1480	Pause Lock Spring
M61	QBN1514	Timer Spring
M62	QBC1193	Safety Lever Spring
M63	QBN1513	Idler Spring
M64	QBP1723	Click Spring
M65	QBN1574	Brake Spring
M66	QBC1279	Back Tension Spring
M67	QBN1555	Pause Spring
M68	QBP1664	Operation Rod Spring
M69	QBN1531	Lock Release Arm Spring
M70	QBP1662	Lock Rod Spring
M71	QBT1682	Lock Holding Spring
M75	QBW2008	Snap Washer
M76	QBW2046	〃
M77	XUB4FT	Stop Ring C4φ
M79	QHQ1226	Screw
M80	XSN2+10	Screw ⊕2×10
M81	XTN26+5B	Tapping Screw ⊕2.6×5
M82	XTN3+10B	Tapping Screw ⊕3×10
M83	XTN26+8B	Tapping Screw ⊕2.6×8
M84	XSN26+3	Screw ⊕2.6×3
M85	XTN3+25B	Tapping Screw ⊕3×20
M86	XSN3+5S	Screw ⊕3×5
M87	QBP1807	Cassette Retainer Spring

"※" in indicates that QXC0017 is used for the set with marking of black paint on the counter angle.

Printed in Japan.