ORDER NO. ARD-7812089C

Service Manual

Cassette Deck

RS-M22

Front-Loading Vertical Hold Stereo Cassette Deck with
FL Bar Graph Peak Meters, Rewind Auto-Play,
and Separate 3-Position Bias and Equalization Selectors

DOLBY SYSTEM

This is the Service Manual for the following areas.

- [D] ····· For All European areas except United Kingdom.
- [B] ····· For United Kingdom.
- [N] ····· For Asia, Latin America, Middle East and Africa areas.
- [A] ····· For Australia.

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 240 V, 50 Hz only for England
Power consumption:	13 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:	0.05% (WRMS), ±14% (DIN)
Frequency response:	CrO_2/FeCr tape; 25 ~ 16,000 Hz 30 ~ 15,000 Hz (DIN) Normal tape; 25 ~ 14,000 Hz 30 ~ 13,000 Hz (DIN)
Signal-to-noise ratio:	Dolby* NR in; 67 dB (above 5 kHz) Dolby NR out; 57 dB (signal level = max. recording level, FeCr/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 7.2 KΩ, applicable microphone impedance 400Ω ~ 10 KΩ LINE; sensitivity 60 mV, input impedance 47 KΩ
Output:	LINE; output level 650 mV, output impedance 2.2 KΩ or less, load impedance 22 KΩ over HEADPHONE; output level 100 mV, load impedance 8Ω
Rec/pb connection:	5 P DIN type; input sensitivity 0.21 mV, impedance 5.7 KΩ, output level 650 mV, impedance 6 KΩ
Bias frequency:	83 kHz
Head:	2-head system 1-SP head for record/playback 1-double-gap ferrite head for erasure
Dimensions:	43.0 cm (W) × 14.2 cm (H) × 26.7 cm (D) [16-7/8" (W) × 5-5/8" (H) × 10-1/2" (D)]
Weight:	7.1 kg (15 lbs. 11 oz)

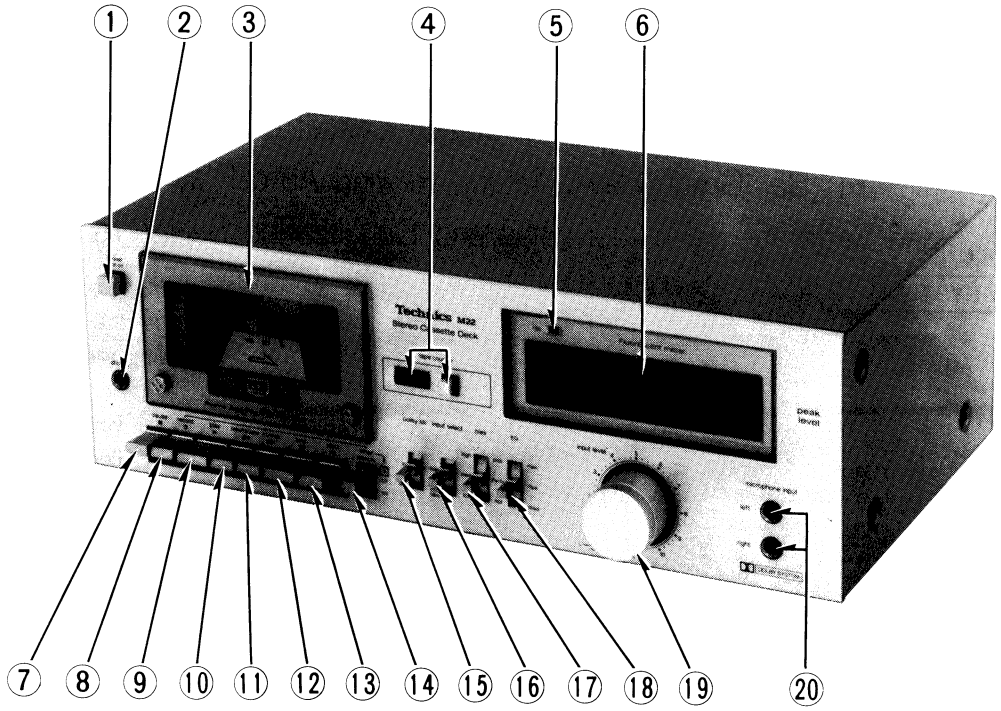
Specifications are subject to change without notice.

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

Technics

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

LOCATION OF CONTROLS AND COMPONENTS



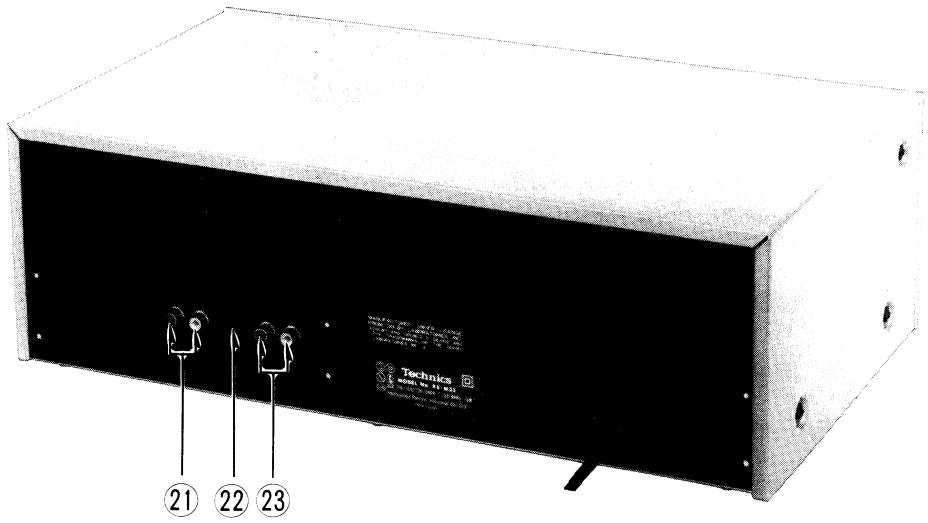


Fig. 1

① Power switch
② Headphones jack
③ Cassette holder
④ Tape counter and reset button
⑤ Recording indication lamp
⑥ Fluorescent level meters
⑦ Pause button
⑧ Record button
⑨ Playback button
⑩ Rewind/review button
⑪ Fast forward/cue button
⑫ Stop button
⑬ Eject button
⑭ Timer stand-by button
⑮ Dolby noise-reduction switch
⑯ Input selector
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

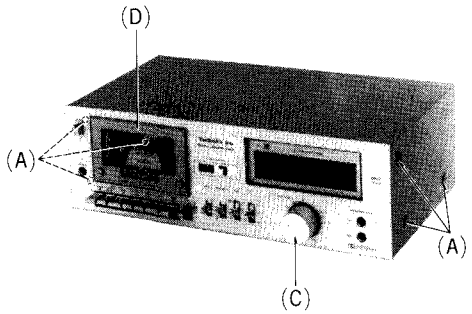


Fig. 2

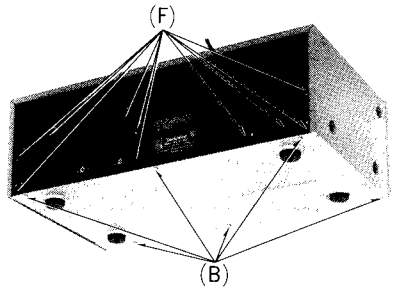


Fig. 3

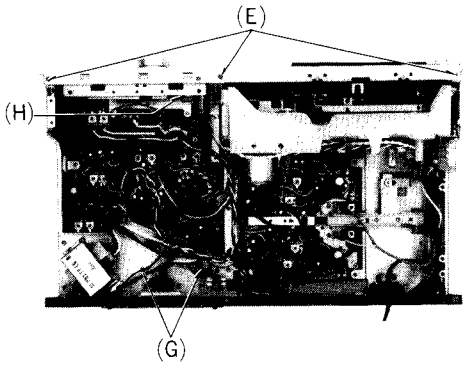


Fig. 4

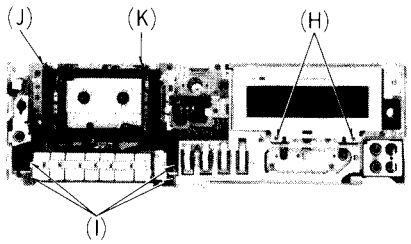


Fig. 5

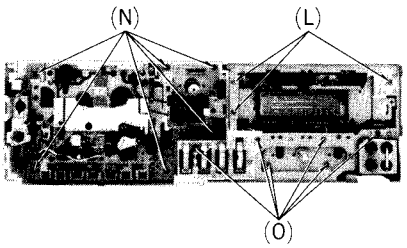


Fig. 6

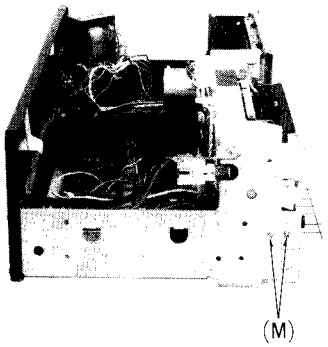


Fig. 7

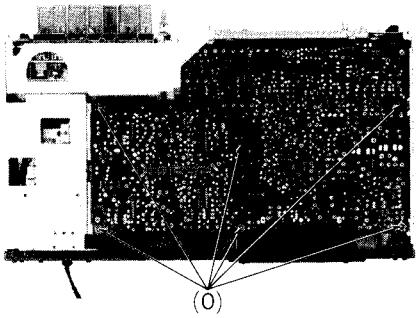


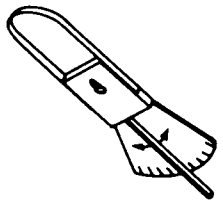
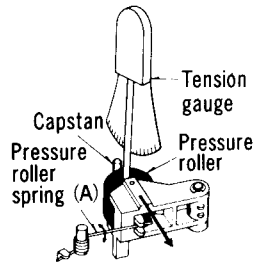
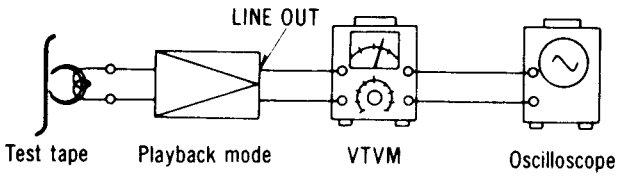
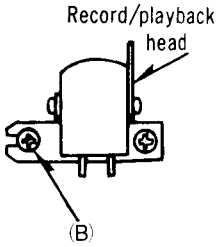
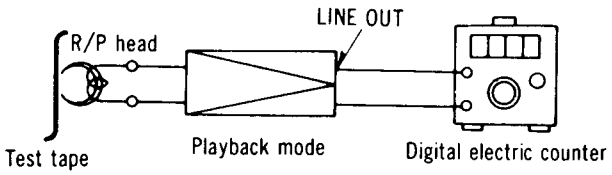
Fig. 8

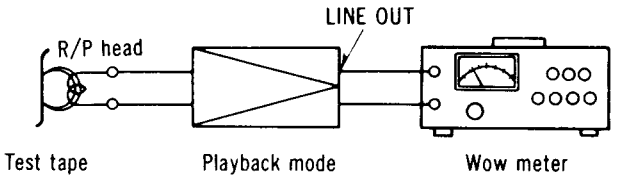
Procedure	To remove —— .	Remove —— .	Shown in fig. —— .
1	Case cover	• 6 black screws ····· (A)	2
2	Bottom cover	• 6 screws ····· (B)	3
3	Front panel	• 2 control knobs ····· (C) • Cassette lid ····· (D) • 3 red screws ····· (E)	2 2 4
3	Rear board	• 10 black screws ····· (F) • 2 red screws ····· (G)	3 4
5	Meter cover	• 3 red screws ····· (H)	4, 5
5	Control button assembly and cassette holder	• 4 red screws ····· (I) • Stop ring ····· (J) • Cassette holder spring ····· (K)	5 5 5
7	Meter unit	• 3 red screws ····· (L)	6
8	Mechanism	• 2 headphones jack holding screw ··· (M) • 6 red screws ····· (N)	7 6
8	Main circuit board	• 12 red screws ····· (O)	6, 8

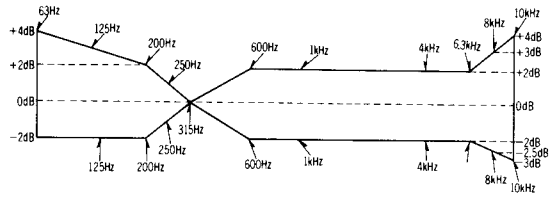
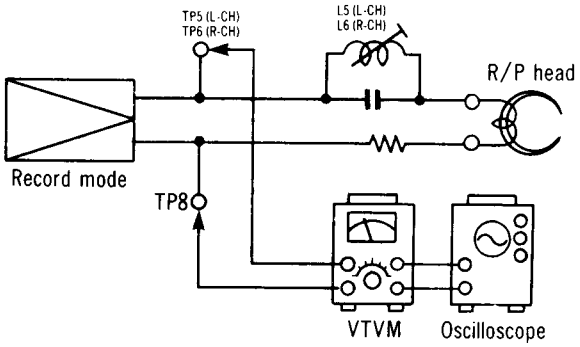
MEASUREMENT AND ADJUSTMENT METHOD

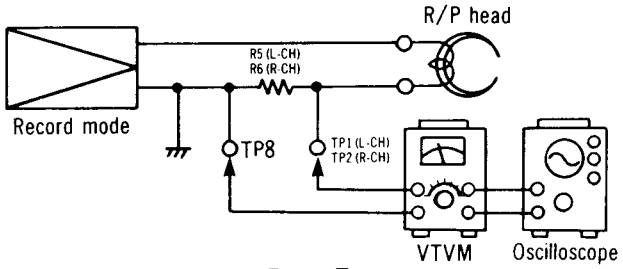
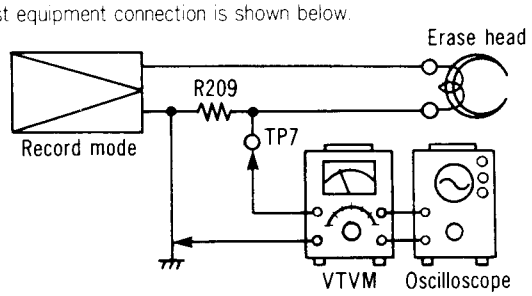
NOTE:

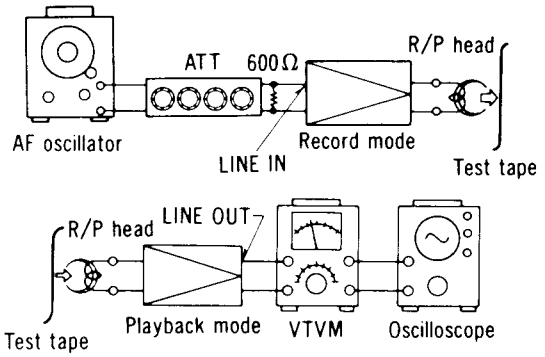
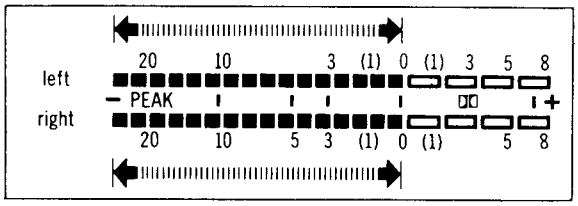
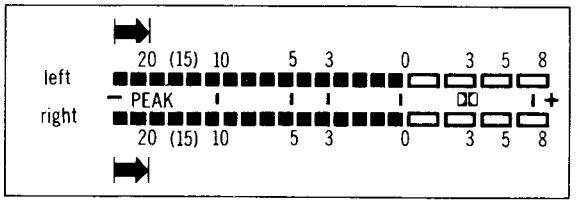
1. Make sure heads are clean.
2. Make sure capstan and pressure roller are clean.
3. Judgeable room temperature: 20±5°C (68±9°F).
4. Dolby NR switch: OUT.
5. Bias selector: LOW.
6. Equalizer selector: 120μS.
7. Input selector: LINE.

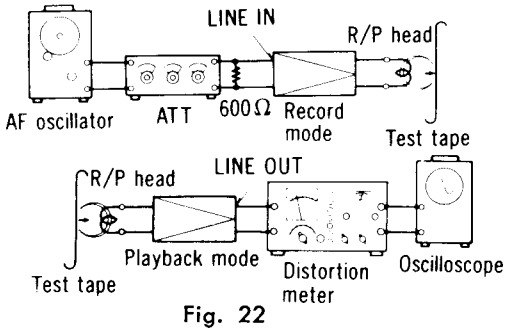
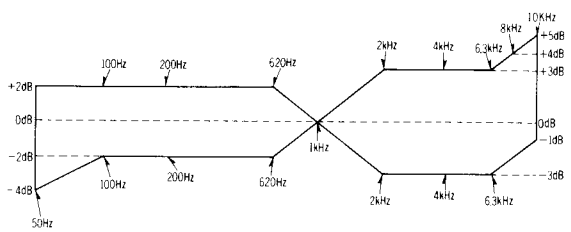
ITEM	MEASUREMENT & ADJUSTMENT	REMARKS
Pressure of pressure roller Equipment: • Tension gauge (max. 500 gr)  Fig. 9	1. Place UNIT into playback mode. 2. Hook the tension gauge to pressure roller lever and pull it in the direction of the arrow as shown in fig. 10. 3. Measure the tension at the moment when the pressure roller moves away from the capstan. **Standard value: 350±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. 10
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±15 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. 11 2. Play azimuth tape (QZZCFM 8kHz). 3. Adjust record/playback head angle adjustment screw (B) in fig. 12 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. 12
Tape speed Equipment: • Digital electronic counter or frequency counter • Test tape ···QZZCWAT	**Tape speed accuracy** 1. Test equipment connection is shown below.  Fig. 13	• Playback mode

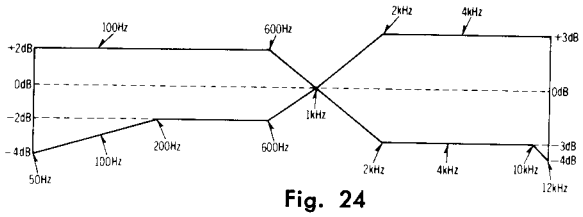
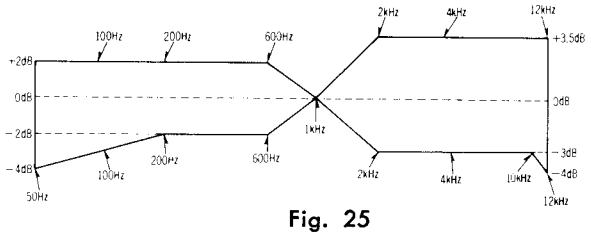
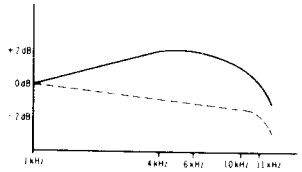
ITEM	MEASUREMENT & ADJUSTMENT	REMARKS
	2. Play test tape (QZZCWAT 3,000Hz), and supply playback signal to frequency counter. 3. Measure this frequency. 4. On the basis of 3,000Hz, determine value by following formula: $\text{Tape speed accuracy} = \frac{f - 3{,}000}{3{,}000} \times 100\ (\%)$ where, 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 tape speed adjustment VR (shown in fig. 28) so that frequency becomes 3,000Hz. **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%**	
Wow and flutter Equipment: * Wow meter * Test tape ··· QZZCWAT	1. Test equipment connection is shown below.  **Fig. 14** 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 can be weighted by JIS network (WRMS). 4. Measure at middle section of test tape. **Standard value: 0.07% (WRMS)**	* Playback mode
Playback frequency response Equipment: * VTVM * Osciiloscope * Test tape ··· QZZCFM	1. Test equipment connection is as same as "Head azimuth adjustment" but use the test tape instead of head azimuth tape (See fig. 11). 2. Place UNIT into playback mode. 3. Playback frequency response test tape. 4. Measure output level at 8kHz, 4kHz, 1kHz, 315Hz, 250Hz, 125Hz and 63Hz, and compare each 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 mode

ITEM	MEASUREMENT & ADJUSTMENT	REMARKS
	Playback frequency response chart  **Fig. 15** **Adjustment method** If the measured value is not standard, adjust VR1 (L-CH), VR2 (R-CH).	
Playback gain Equipment: * VTVM * Oscilloscope * Test tape···QZZCFM	1. Test equipment connection is shown in fig. 11. 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: 0.65V** **Adjustment method** 1. If measured value is not standard, adjust VR3 (L-CH), VR4 (R-CH) (See fig. 28 on page 10). 2. After adjustment, check "Playback frequency response" again.	* Playback mode
Playback S/N ratio Equipment: * VTVM * Oscilloscope * Test tape···QZZCFM * Empty cassette	1. Test equipment connection is shown in fig. 11. 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 playback 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 45dB**	* Playback mode
Bias leak Equipment: * VTVM * Oscilloscope	1. Test equipment connection is shown below.  **Fig. 16** 2. Place UNIT into record mode. 3. Adjust trap coil L5 (L-CH), L6 (R-CH), so that measured value on VTVM becomes minimum. 4. Take adjustment for both channels.	* Record mode

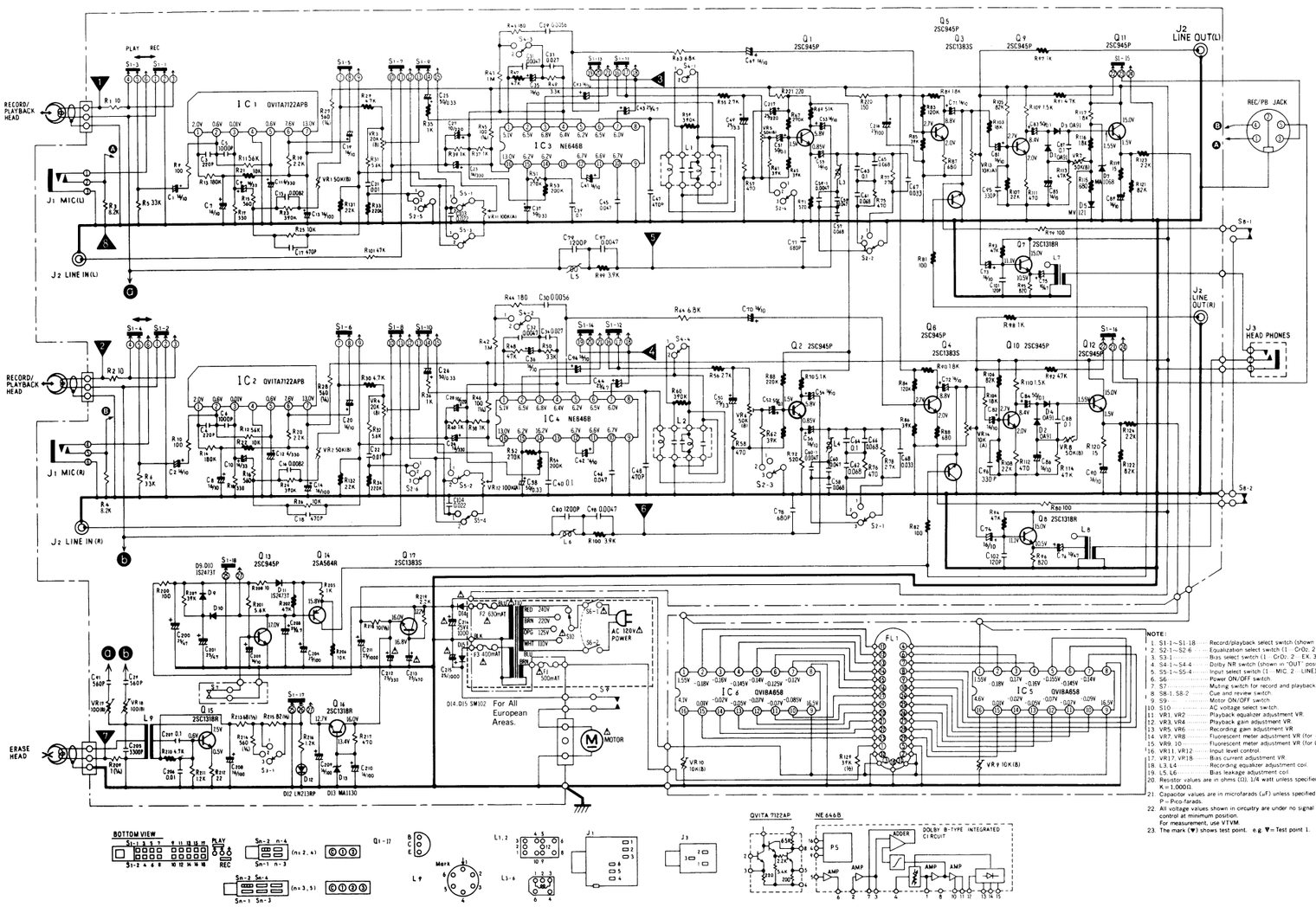
ITEM	MEASUREMENT & ADJUSTMENT	REMARKS
Bias current Equipment: * VTVM * Oscilloscope	1. Test equipment connection is shown below.  **Fig. 17** $\text{Bias current (A)} = \frac{\text{Value read on VTVM (V)}}{10\ (\Omega)}$ 2. Place UNIT into record mode, and bias selector to "LOW". 3. Read voltage on VTVM and calculate bias current by following formula: **Standard value:** **300μA (LOW position)** **310μA (MED position)** **365μA (HIGH position)** 4. Adjust VR17 (L-CH) and VR18 (R-CH). (See adjustment part location on page 10)	* Record mode * When bias current is adjusted on one channel only, note that bias current on the other channel may vary.
Erase current Equipment: * VTVM * Oscilloscope	1. Test equipment connection is shown below.  **Fig. 18** 2. Place UNIT into record mode and set the bias selector to LOW position. 3. Read voltage on VTVM and calculate erase current by following formula: $\text{Erase current (A)} = \frac{\text{Value read on VTVM (V)}}{1\ (\Omega)}$ **Standard value:** **More than 40mA (LOW position)** **More than 45mA (MED position)** **More than 55mA (HIGH position)**	* Record mode * Bias selector ··· LOW

ITEM	MEASUREMENT & ADJUSTMENT	REMARKS
Overall gain Equipment: * AF oscillator * VTVM * ATT * Oscilloscope * Test tape (reference blank tape) ···QZZCRA for Normal	1. Test equipment connection is shown in fig. 19.  **Fig. 19** 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 0.65V. 5. Using test tape, make recording. 6. Playback recorded tape, and make sure the value at LINE OUT on VTVM becomes 0.65V. 7. If measured value is not 0.65V, adjust VR5 (L-CH), VR6 (R-CH) (See fig. 28 on page 10) 8. Repeat from step (2).	* Record/playback mode * Input level control ···· MAX * Standard input level: MIC ····· −72±4dB LINE IN ··· −24±3dB
Fluorescent meter Equipment: * VTVM * AF oscillator * ATT	1. Test equipment connection is shown in fig. 19. 2. Supply 1kHz signal (−24dB) to the LINE IN jack, then press the record button. 3. Adjust the ATT so that the output level at LINE OUT jack becomes 0.65V. (=standard input level). 4. Adjustment at "0dB".  **Fig. 20** A. Adjust VR9 (L-CH) and VR10 (R-CH) so that the Fluorescent meters show an illuminated indication up to "0dB" when the input signal level is 0.9dB higher than the standard input level. B. Then confirm that the Fluorescent meters show an illuminated indication up to "+1dB" when the input signal level is 1.0dB higher than the standard input level. 5. Adjustment at "−20dB"  **Fig. 21**	* Record mode * Input level control····· MAX * Tape selectors ···Normal position

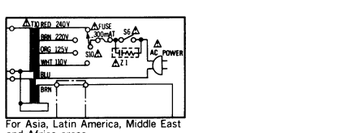
ITEM	MEASUREMENT & ADJUSTMENT	REMARKS
	A. Adjust VR7 (L-CH) and VR8 (R-CH) so that the Fluorescent meters show an illuminated indication up to "−20 dB" when the input signal level is 15.1 dB lower than the standard input level. B. Then confirm that the Fluorescent meters show an illuminated indication up to "−15 dB" when the input signal level is 15.0 dB lower than the standard input level.	
Overall distortion Equipment: * Distortion meter * AF oscillator * ATT * Oscilloscope * Test tape (reference blank tape) ··· QZZCRA for Normal ··· QZZCRX for CrO_2 ··· QZZCRY for FeCr	1. Test equipment connection is shown in fig. 22.  **Fig. 22** 2. Supply 1 kHz signal to LINE IN and adjust ATT so that output level at LINE OUT indicates 0.65 V. 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 2.5% (Normal) Less than 4.0% (FeCr, CrO_2)	* Record/playback mode * Input level control ···· MAX
Overall frequency response Equipment: * VTVM * AF oscillator * ATT * Test tape (reference blank tape) ··· QZZCRA for Normal ··· QZZCRX for CrO_2 ··· QZZCRY for FeCr	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. 19. 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 0.065 V. 6. Record each frequency 50 Hz, 100 Hz, 200 Hz, 1 kHz, 4 kHz, 8 kHz and 10 kHz (12 kHz for CrO_2 tape or FeCr 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. 23**	* Record/playback mode * Input level control ····MAX

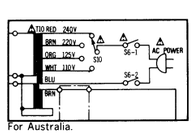
ITEM	MEASUREMENT & ADJUSTMENT	REMARKS
	9. Set the bias selector to CrO_2 position. 10. Measure as same as manner above. 11. Make sure that the measured value is within the range specified in the overall frequency response chart for CrO_2 tape below. **Overall frequency response chart (CrO_2)**  **Fig. 24** 12. Set the bias selector to FeCr position. 13. Measure as same as manner above. 14. Make sure that the measured value is within the range specified in the overall frequency response chart for FeCr tape below. **Overall frequency response chart (FeCr)**  **Fig. 25**	
Overall frequency response adjustment (As a standard for adjustment)	**Adjustment 1—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. 26, increase the bias current by turning VR17 (L-CH), VR18 (R-CH). 2 When it becomes lower, as shown by dotted line, reduce the bias current by turning VR17 (L-CH), VR18 (R-CH). **Note:** 1. For adjustment when the bias current is lower than the standard value use the procedure indicated in adjustment 2, because reducting the bias current beyond this point may worsen the distortion factor. 2 For the method of bias current measurement, refer to "Bias current adjustment" on page 6.  **Fig. 26** **Adjustment 2—Using the peaking coil for recording equalization** When the frequency response is flat in the middle-frequency range and makes a sharp rise or drop in the high-frequency range, as shown in fig. 27, adjust by turning the peaking coil L3 (L-CH), L4 (R-CH) for normal tape recording equalization.	

SCHEMATIC DIAGRAM MODEL RS-M22



NOTE:
1. S1-1~S1-18 ..... Record/playback select switch (shown in playback position)
2. S2-1~S2-6 ..... Equalization select switch (1 ... CrO2, 2 ... EX, 3 ... NORMAL).
3. S3-1 ..... Bias select switch (1 ... CrO2, 2 ... EX, 3 ... NORMAL).
4. S4-1~S4-4 ..... Dolby NR switch (shown in "OUT" position).
5. S5-1~S5-4 ..... Input select switch (1 ... MIC, 2 ... LINE).
6. S6 ..... Power ON/OFF switch.
7. S7 ..... Muting switch for record and playback.
8. S8-1, S8-2 ..... Cue and review switch.
9. S9 ..... Motor ON/OFF switch.
10. S10 ..... AC voltage select switch.
11. VR1, VR2 ..... Playback equalizer adjustment VR.
12. VR3, VR4 ..... Playback gain adjustment VR.
13. VR5, VR6 ..... Recording gain adjustment VR.
14. VR7, VR8 ..... Fluorescent meter adjustment VR (for −20dB indication).
15. VR9, 10 ..... Fluorescent meter adjustment VR (for 0dB indication).
16. VR11, VR12 ..... Input level control.
17. VR17, VR18 ..... Bias current adjustment VR.
18. L3, L4 ..... Recording equalizer adjustment coil.
19. L5, L6 ..... Bias leakage adjustment coil.
20. Resistor values are in ohms (Ω), 1/4 watt unless specified otherwise. K=1,000Ω.
21. Capacitor values are in microfarads (uF) unless specified otherwise. P=Pico-farads.
22. All voltage values shown in circuitry are under no signal condition with volume control at minimum position. For measurement, use VTVM.
23. The mark (▼) shows test point. e.g. ▼=Test point 1.


For Asia, Latin America, Middle East and Africa areas.


For Australia.

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

Ref. No.	Part No.	Part Name & Description
		COMBINATION PART
Z1 [N] △	QCR0008T	Spark Killer
※For Asia, Latin America, Middle East and Africa areas		
		TRANSISTORS
Q1, 2	2SC945P	Transistor
Q3, 4	2SC1383S	"
Q5, 6	2SC945P	"
Q7, 8	2SC1318R	"
Q9, 10, 11, 12, 13	2SC945P	"
Q14	2SA564R	"
Q15, 16	2SC1318R	"
Q17	2SC1383S	"
		INTEGRATED CIRCUITS
IC1, 2	QVITA7122AQB	Integrated Circuit
IC3, 4	NE646B	"
IC5, 6	QVIBA658	"
		DIODES
D1, 2, 3, 4	OA91	Diode
D5	MV121	"
D7	MA1068	Zener Diode
D9, 10, 11	1S2473T	Diode
D12	LN213RP	Light Emitting Diode
D13	MA1130	Zener Diode
D14, 15 △	SM102	Diode
		TRANSFORMERS
T10 [N] △	QLPD27ELCB	Power Transformer
※For All European areas except United Kingdom		
T10 [N][A] △	QLPA42ELCA	Power Transformer
※For Asia, Latin America, Middle East, Africa, Australia and United Kingdom areas		

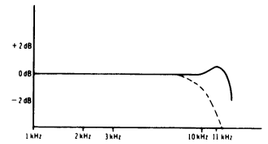
Ref. No.	Part No.	Part Name & Description
		COILS
L1, 2	QLM9Z6K	MPX Filter Coil
L3, 4, 5, 6	QLQM0333	Coil
L7, 8	QLT2D26X	Headphone Transformer
L9	QLB0155	Oscillator Coil
		SWITCHES
S1	QSS1203	Slide Switch
S2	QST6314	Lever Switch
S3	QST2305	"
S4, 5	QST4220	"
S6 [D][B][A]	QSW2214	Push Switch
※For All European areas and Australia		
S6 [N]	QSW1206A	Push Switch
※For Asia, Latin America, Middle East and Africa areas		
S7	QSB0178	Leaf Switch
S8	QSB0186	"
S9	QSB0178	"
S10	QSR1407H	Rotary Switch

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

CAPACITORS
ECG□ ····· Ceramic
ECK□ ····· Ceramic
ECC□ ····· Ceramic
ECF□ ····· Ceramic
ECQM ····· Polyster
ECQE ····· Polyster
ECQF ····· Polypropylene
ECE□ ····· Electrolytic
ECE□N ··· Non polar electrolytic
ECQS ····· Polystyrene
ECS□ ····· Tantalum

Ref. No.	Part No.
	RESISTORS
R1, 2	ERD25TJ100
R3, 4	ERD25TJ822
R5, 6	ERD25TJ333
R9, 10	ERD25TJ101
R11, 12	ERD25TJ563
R13, 14	ERD25TJ184
R15, 16	ERD25TJ561
R17, 18	ERD25TJ331
R19, 20	ERD25TJ222
R23, 24	ERD25TJ394
R25, 26	ERD25TJ103
R27, 28	ERD25TJ561
R31, 32	ERD25TJ562
R37, 38, 39, 40	ERD25TJ102
R41, 42	ERD25TJ105
R43, 44	ERD25TJ181
R45, 46	ERD25TJ101
R49, 50	ERD25TJ332
R57, 58	ERD25TJ471
R61, 62	ERD25TJ393
R63, 64	ERD25TJ682
R75, 76	ERD25TJ471
R77, 78	ERD25TJ272
R79, 80	ERD25TJ101
R95, 96	ERD25TJ821
R101, 102	ERD25TJ473
R103, 104	ERD25TJ183
R109, 110	ERD25TJ152
R111, 112	ERD25TJ471
R113, 114	ERD25TJ473
R117	ERD25TJ182
R119, 120	ERD25TJ150
R129	ERG12ANJ390
R200	
[D][B]	ERG12ANJ101
※For All European areas	
R200	
[N][A]	ERD25TJ101
※For Asia, Latin America, Middle East, Africa and Australia areas	
R201	ERD25TJ562
R205	ERD25TJ102
R208	ERD25TJ100
R209	ERD25TJ1R1
R211	ERD25TJ122
R212	ERD25TJ220
R213	ERG12ANJ680
R214	ERD25TJ561
R215	ERG12ANJ820
R216	ERD25TJ122
R217	ERD25TJ471
R218	ERG12ANJ100
R219	ERD25TJ222
R220	
[D][B]	ERD25TJ151
※For All European areas	
R220	
[N][A]	ERD25TJ101
※For Asia, Latin America, Middle East, Africa and Australia areas	
R221	
[D][B]	ERD25TJ221
※For All European areas	
R221	
[N][A]	ERD25TJ101
※For Asia, Latin America, Middle East, Africa and Australia areas	
R401, 402	ERD25TJ103

Ref. No.	Part No.
	VARIABLE RESISTORS
VR1, 2	EVLS3AA00B54
VR3, 4	EVLS3AA00B24
VR5, 6, 7, 8	EVLS3AA00B54
VR9, 10	EVLS3AA00B14
VR11, 12	EWKN3AF21A15
VR17, 18	EVLS3AA00B15
	CAPACITORS
C1, 2	ECEA16Z10
C3, 4	ECCD1H221K
C5, 6	ECKD1H102MD
C7, 8	ECEA1CS100
C9, 10	ECEA1CS330
C11, 12	ECEA0JS331
C13, 14	ECEA1ES101
C15, 16	ECFTD822KVY
C17, 18	ECKD1H471KB
C19, 20	ECEA1CS100
C21, 22	ECFTD103KVY
C23, 24	ECEA1CS331
C25, 26	ECEA50MR33
C27, 28	ECEA1AS221
C29, 30	ECQM05562JZ
C31, 32	ECQM05472JZ
C33, 34	ECQM05273JZ
C35, 36	ECEA1CS100
C37, 38	ECEA50ZR33
C39, 40	ECQM05104MZ
C41, 42	ECEA1CS100
C43, 44	ECEA1ES4R7
C45, 46	ECFTD473MXY
C47, 48	ECKD1H471KB
C49, 50	ECEA50Z3R3
C51, 52	ECEA50ZR1
C53, 54, 55, 56	ECEA1CS100
C57, 58	ECQM05683KZ
C59, 60	ECFTD473KXY
C61, 62	ECQM05683KZ
C63, 64	ECQM05104KZ
C65, 66	ECQM05683KZ
C67, 68	ECFTD333KXY
C69, 70, 71, 72, 73, 74	ECEA1CS100
C75, 76	ECEA1AS470
C77, 78	ECKD1H681KB
C79, 80	ECQS1122KZ
C81, 82	ECEA1CS100
C83, 84	ECEA50MR1
C85, 86	ECEA1CS100
C87, 88	ECQM05104MZ
C89, 90	ECEA1CS100
C91, 92	ECKD1H561KB
C93, 94	ECEA1CS100
C95, 96	ECCD1H331K
C97, 98	ECFTD472KVY
C101, 102	ECCD1H121K
C103, 104	ECQM05223KZ
C200, 201	ECEA1ES470
C202	ECEA1CS100
C203	ECEA25Z4R7
C204	ECEA1ES101
C205	ECQS1332KZ
C206	ECFTD103KVY
C207	ECQM05104MZ
C208, 209, 210	ECEA1ES101
C211 △	ECEA1VS102
C212 △	ECEA1ES331
C213 △	ECEA1ES471
C214, 215 △	ECEA1VS102
C216	ECEA1ES101
C217	ECEA1ES221

ITEM	MEASUREMENT & ADJUSTMENT	REMARKS
	 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 8(±2.5)dB greater than the value at OUT position of Dolby NR switch.	* Record mode * Input level control ···· MAX
Overall S/N ratio Equipment: * VTVM * AF oscillator * ATT * Oscilloscope * Test tape (reference blank tape) ···QZZCRA	1. Test equipment connection is shown in fig. 19. 2. Supply 1kHz signal to LINE IN and adjust ATT so that output level at LINE OUT indicates 0.65V. 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 5. Standard value: Greater than 43dB (without NAB filter)	* Record/playback mode * Input level control ···· MAX * Erase the tape with a bulk tape eraser.

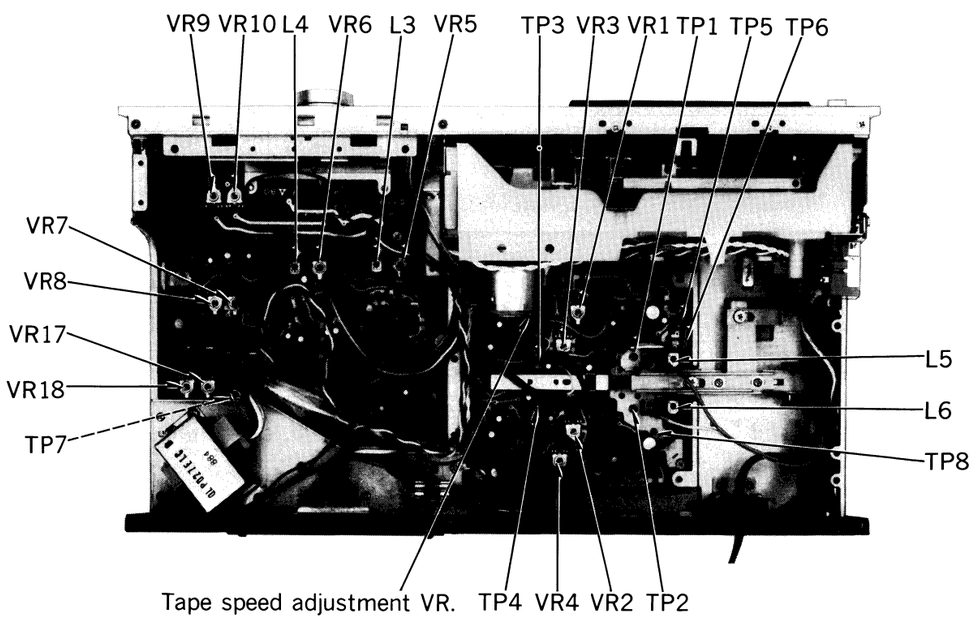
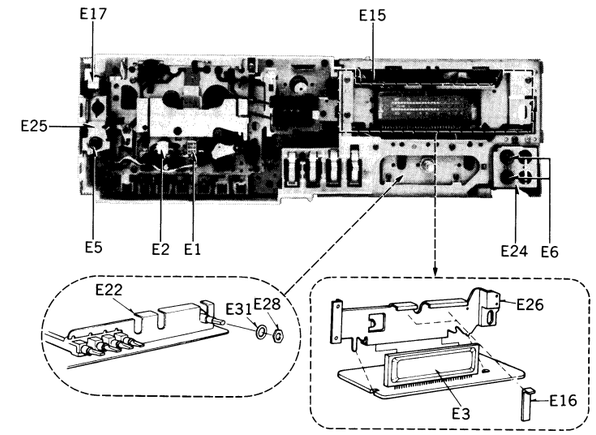


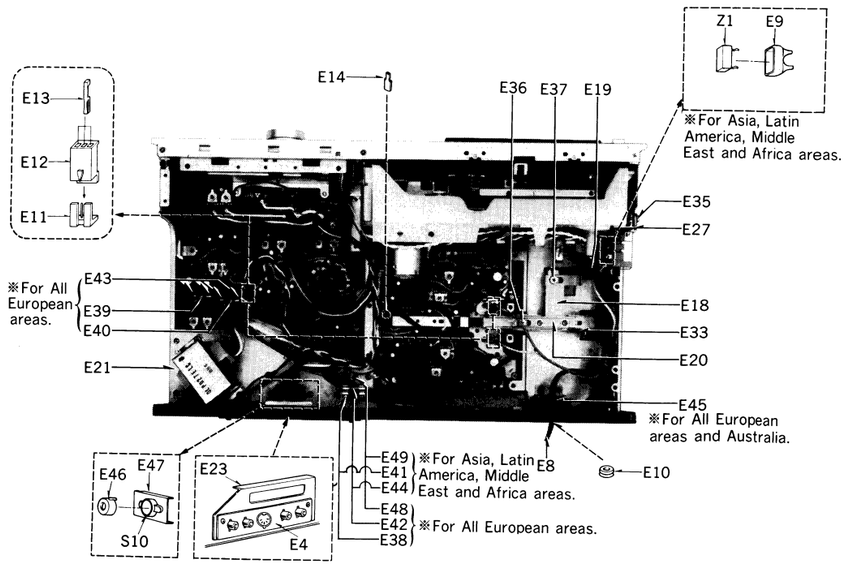
Fig. 28

ELECTRICAL PARTS LOCATION

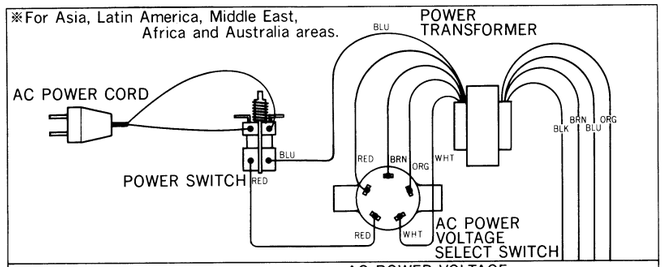
NOTE: ⚠ indicates that only parts specified by the manufacturer be used for safety.

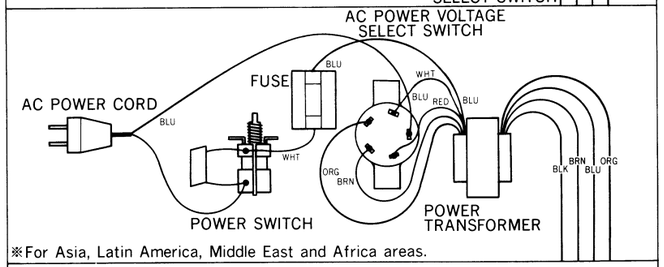
Ref. No.	Part No.	Part Name & Description
	ELECTRICAL PARTS	
E1	QWY4113Z	Record/Playback Head
E2	QWY2122ZA	Erase Head
E3	QSLS001RF	Fluorescent Level Meter
E4	QEJ5002S	Pin Jack Board Assembly
E5	QJA0249	Headphones Jack
E6	QJA0444H	Microphone Jack
E8 [N] ⚠	QFC1204M	AC Power Cord
※For All European areas except United Kingdom		
E8 [E] ⚠	QFC1205M	AC Power Cord
※For United Kingdom		
E8 [N] ⚠	QFC1203M	AC Power Cord
※For Asia, Latin America, Middle East and Africa areas		
E8 [A] ⚠	QFC1208M	AC Power Cord
※For Australia		
E9 [N]	QTW1118	Spark Killer Cover
※For Asia, Latin America, Middle East and Africa areas		
E10		
[D][B][A]	QBJ1425	Cord Bushing
※For All European areas and Australia		
E10 [N]	QTD1129	Cord Bushing
※For Asia, Latin America, Middle East and Africa areas		
E11	QJP1921TN	3 Pin Plug
E12	QJS1921TN	3 Pin Socket
E13	QJT1054	Contact
E14	QJT0055	Connector Terminal
E15	QBG1506	LED Holder
E16	QBM1251	Cushion
E17		
[D][B][A]	QXB0600 "Silver Type"	Power Switch Button
	QXB0600K "Black Type"	〃
※For All European areas and Australia		
E17 [N]	QXB0558 "Silver Type"	Power Switch Button
※For Asia, Latin America, Middle East and Africa areas		
E18	QMA3470	Switch Lever
E19	QMA3471	Record Lever
E20	QMA3500	Adjustment Angle
E21	QMA3472	Transformer Angle
E22	QMA3477	Volume Angle
E23	QMA3469	Jack Board Angle
E24	QMA3479	Microphone Jack Angle
E25	QMA3328	Headphone Jack Angle
E26	QMA3478	Meter Holding Angle
E27	QMA3204	Power Switch Angle
E28	QNQ1039	Nut 9φ
E29	QNQ1004	Nut 8φ
E30	QNQ1070	Nut 10φ
E31	QWQ1133	Washer 9φ
E32	QWQ2002	Washer 8φ
E33	QBT1787	Lock Lever Spring
E35	XSNQ0004S	Screw
E36	QHQ1188S	〃
E37	QHQ1165S	〃
E38 [D][B] ⚠	XBAQ0007	Fuse—400mAT
※For All European areas		
E39 [D][B] ⚠	XBAQ0003	Fuse—500mAT
※For All European areas		
E40 [D][B] ⚠	XBAQ0008	Fuse—630mAT
※For All European areas		
E41 [N]	XBA2E03NS5	Fuse—300mAT
※For Asia, Latin America, Middle East and Africa areas		
E42 [D][B] ⚠	QTF1027	Fuse Holder
※For All European areas		
E43 [D][B] ⚠	QTF1054	Fuse Holder
※For All European areas		
E44 [N] ⚠	QTF1049	Fuse Holder
※For Asia, Latin America, Middle East and Africa areas		
E45		
[D][B][A]	QTD1164	Cord Clamper
※For All European areas and Australia		
E46	RUV387ZB	Voltage Selector Cover
E47	QMA3558	Voltage Selector Angle
E48 [D][B]	QMA3669	Fuse Holder Angle
※For All European areas		
E49 [N]	QMA3418	Fuse Holder Angle
※For Asia, Latin America, Middle East and Africa areas		

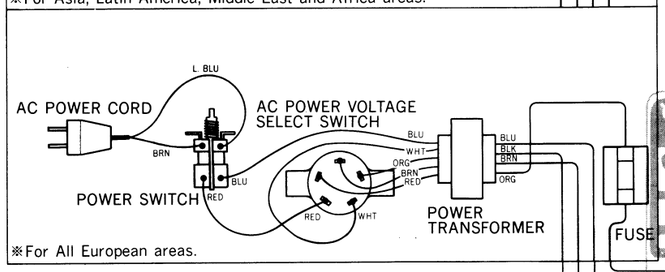


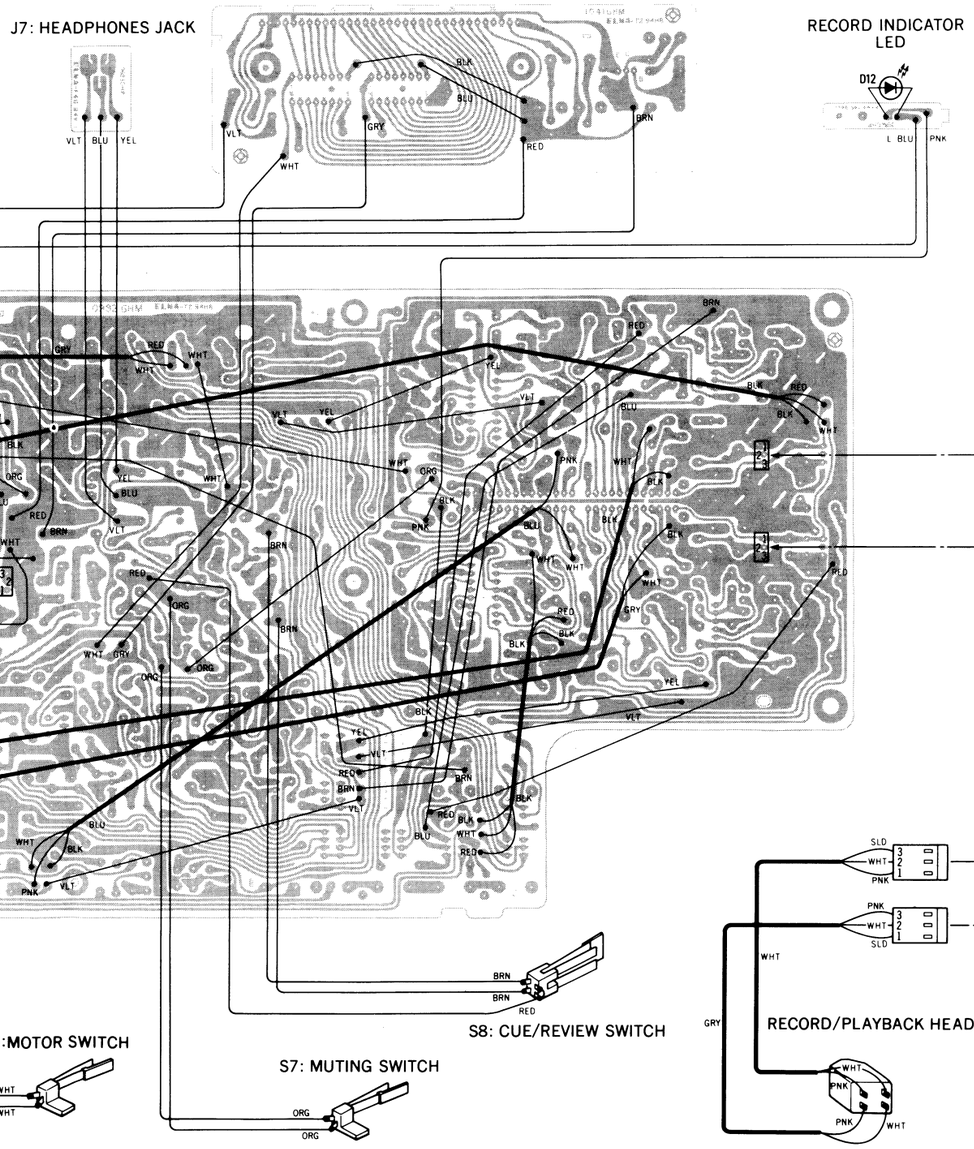


WIRING CONNECTION DIAGRAM MODEL RS-M22







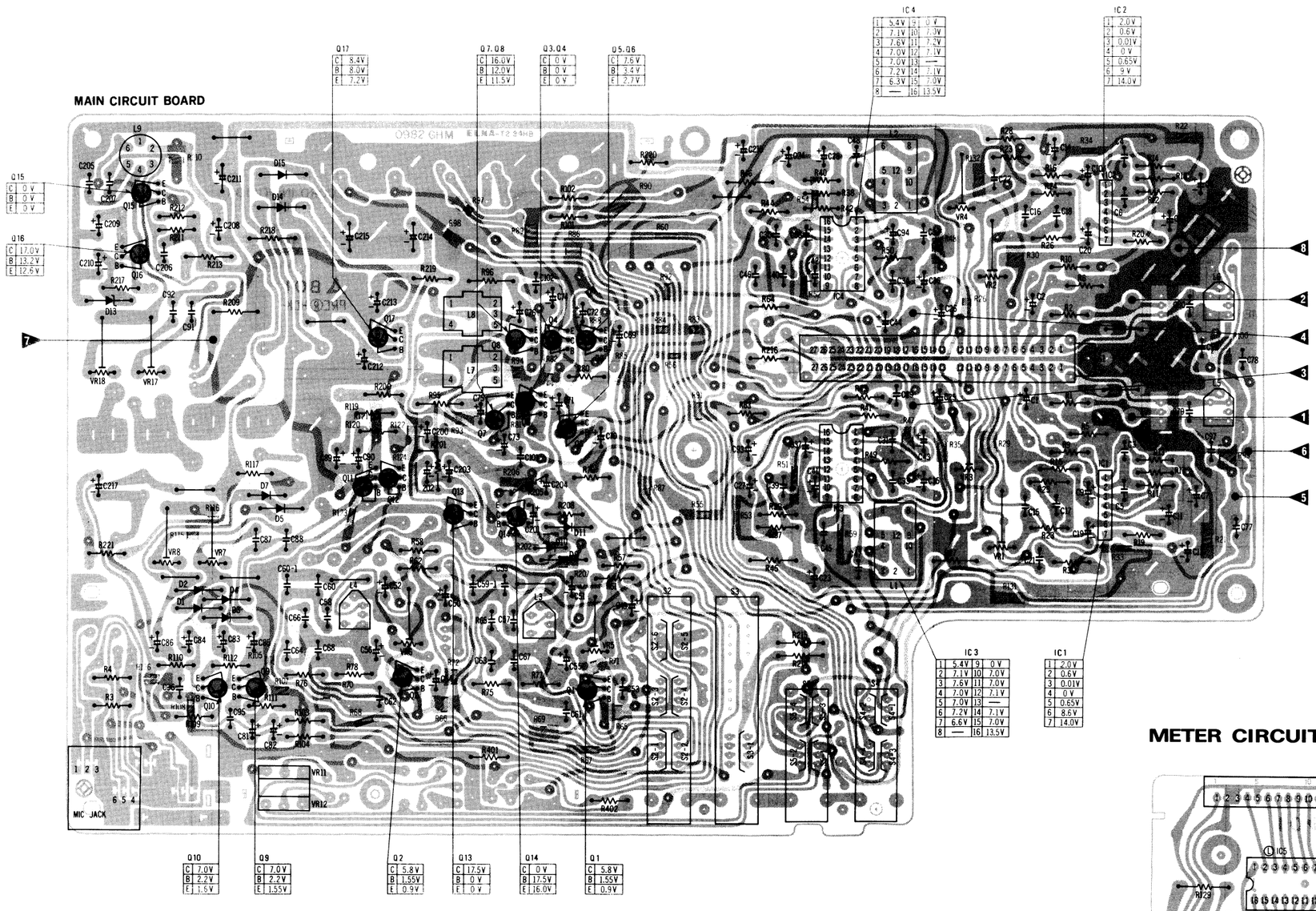


NOTE:

- 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

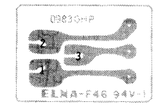
CIRCUIT BOARD

MAIN CIRCUIT BOARD

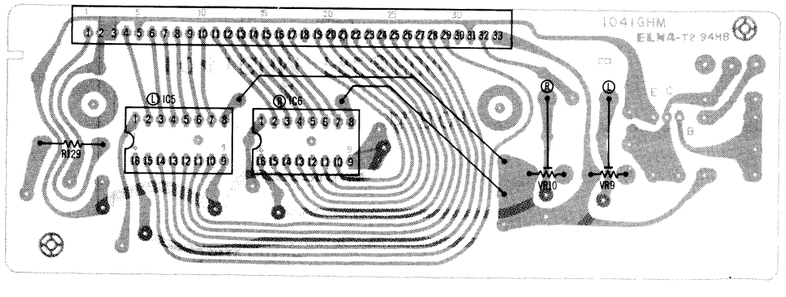


RECORD INDICATION CIRCUIT BOARD

HEADPHONES CIRCUIT BOARD



METER CIRCUIT BOARD



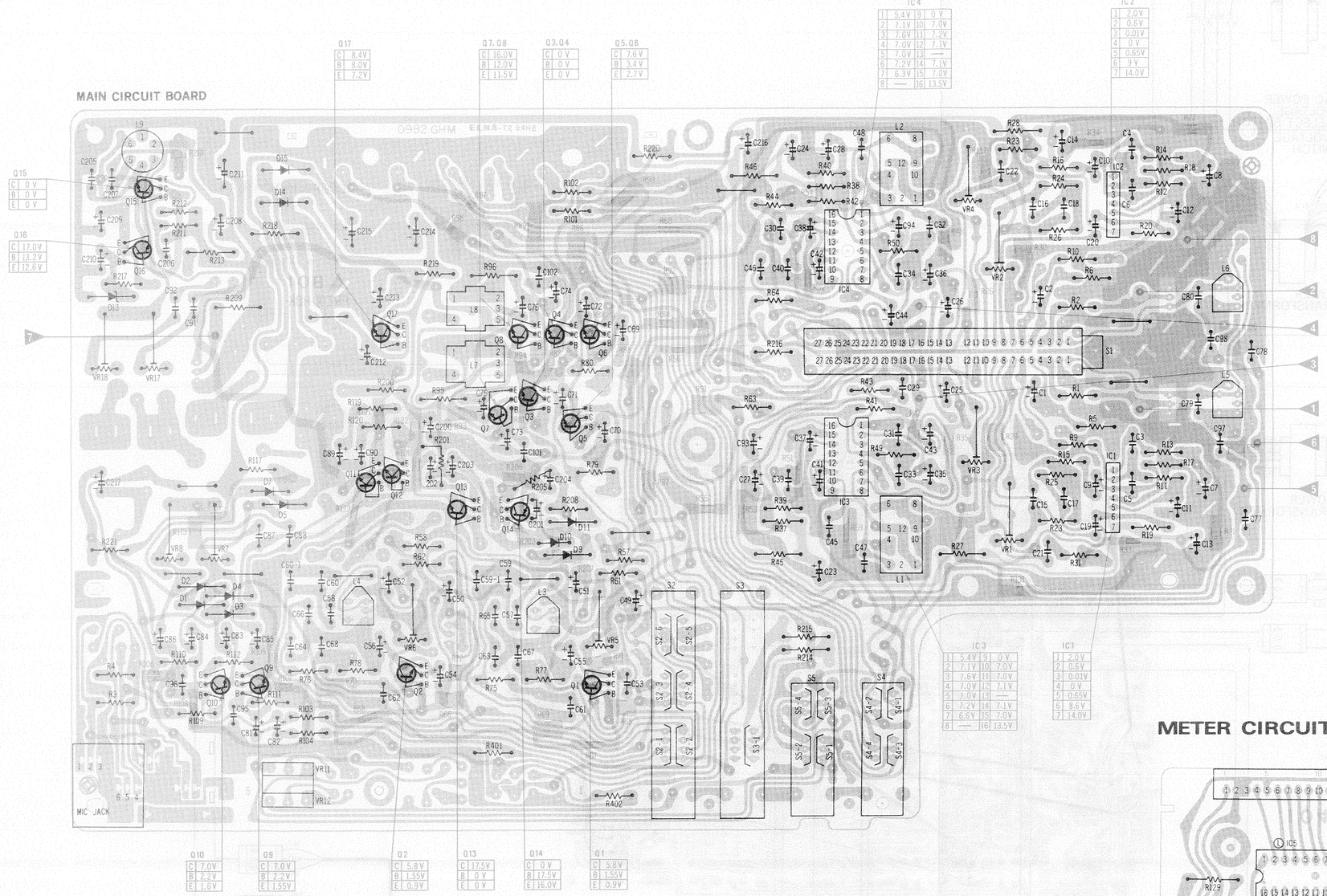
NOTE:

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

CIRCUIT BOARD

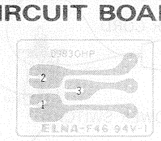
MAIN CIRCUIT BOARD

MAIN CIRCUIT BOARD

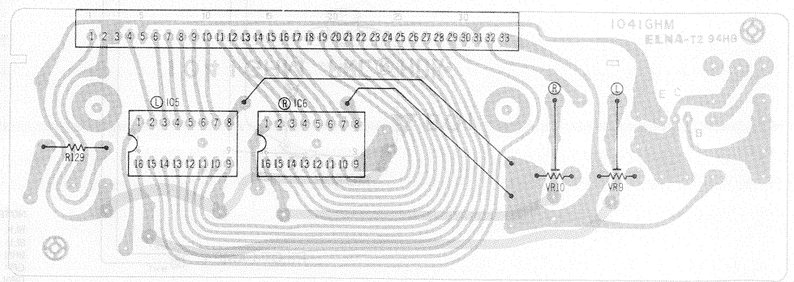


RECORD INDICATION CIRCUIT BOARD

HEADPHONES CIRCUIT BOARD



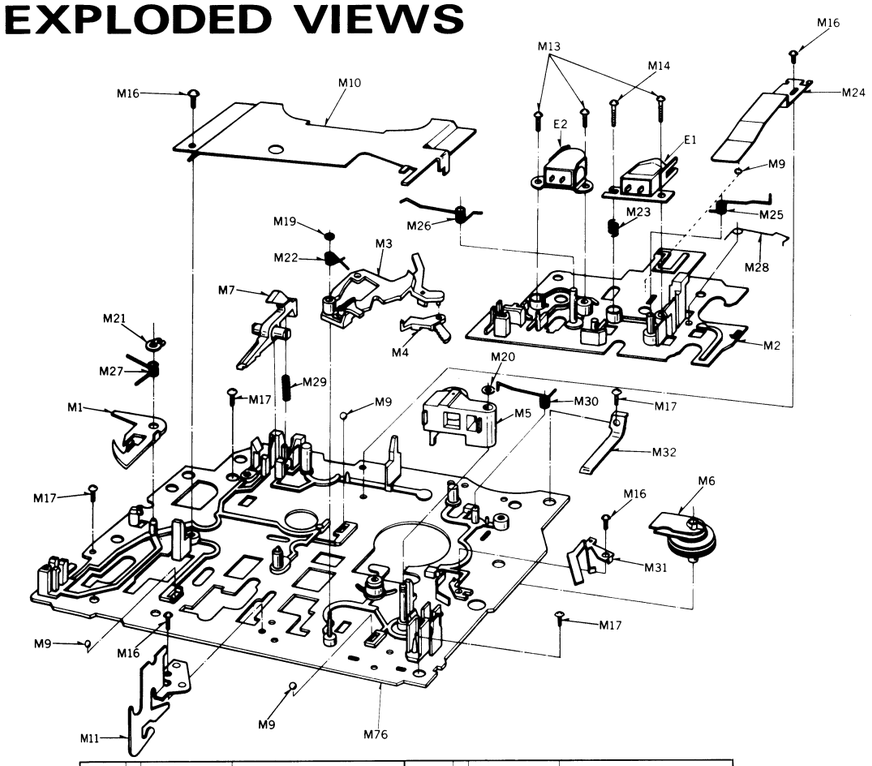
METER CIRCUIT BOARD

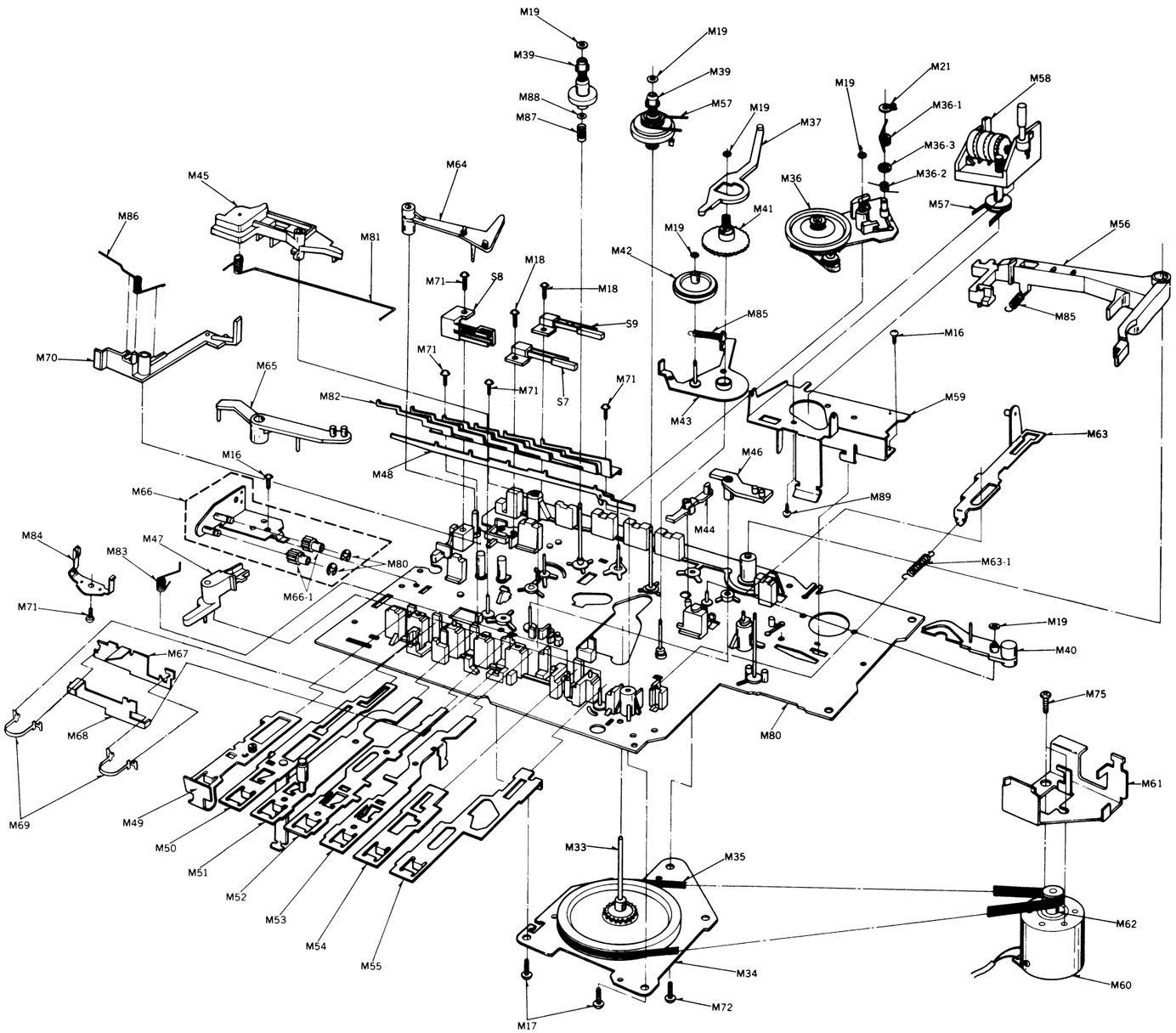


NOTE:

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

EXPLODED VIEWS

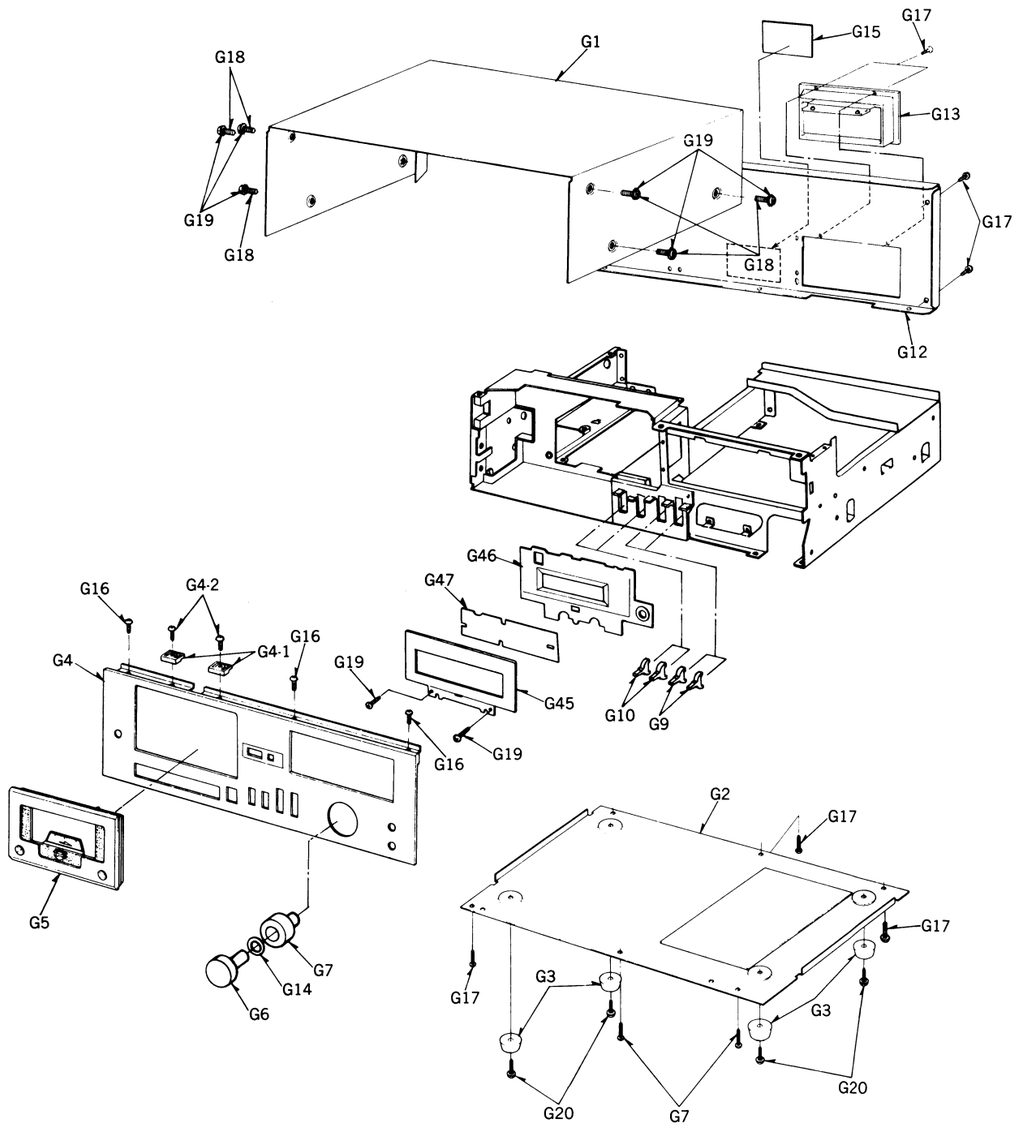


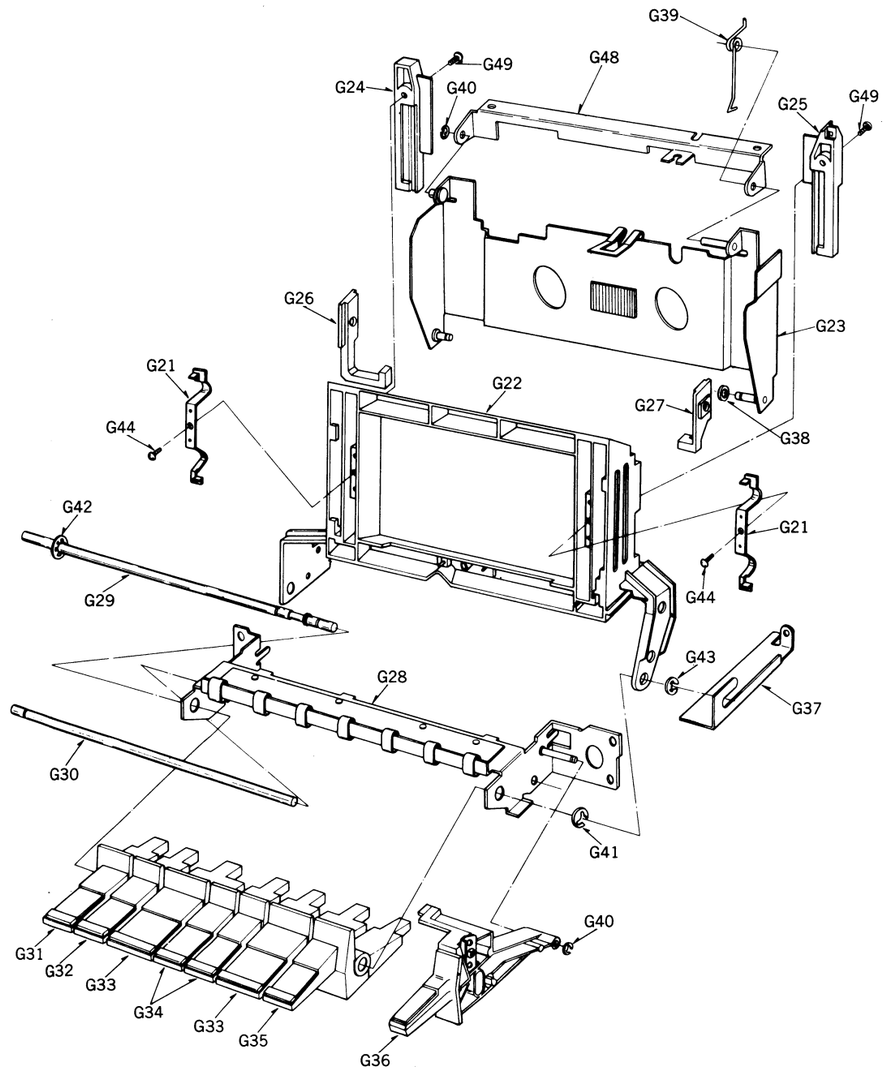


Ref. No.	Part No.	Part Name & Description
		MECHANICAL PARTS
M1	QML2898	Pause Lock Plate
M2	QMK1612	Head Base Plate
M3	QML3047	Obstruction Lever
M4	QML3048	Driving Lever
M5	QXL1057	Pressure Roller Lever Assembly
M6	QXI0098	Takeup Idler Assembly
M7	QML3051	Erase Safety Lever
M9	QDK1012	Steel Ball
M10	QMF1939	Chassis Cover-A
M11	QMA3169	Shaft Reinforcement Angle
M13	XSN2+10	Screw ⊕2×10
M14	QHQ1226	Screw
M16	XTN26+5B	Screw ⊕2.6×5
M17	XTN3+10B	Screw ⊕3×10
M18	XTN26+8B	Screw ⊕2.6×8
M19	QBW2008	Snap Washer
M20	QBW2046	"
M21	XUC4FT	Stop Ring 4ϕ
M22	QBN1515	Connection Spring
M23	QBC1278	Head Spring
M24	QBP1773	Head Base Plate Pressure Spring
M25	QBN1448	Pressure Roller Spring
M26	QBN1481	Playback Spring
M27	QBN1480	Pause Lock Spring
M28	QBN1514	Timer Spring
M29	QBC1193	Safety Lever Spring
M30	QBN1513	Idler Spring
M31	QBP1723	Click Spring
M32	QBP1777	Holder Reinforcement Spring
M33	QXF0131	Flywheel Assembly
M34	QXH0239	Flywheel Retainer Assembly
M35	QDB0236	Capstan Belt
M36	QXL1136	Fast Forward Arm Assembly
M36-1	QBN1517	Fast Forward Spring
M36-2	QBN1559	Fast Forward Arm Spring
M36-3	QMC0080	Collar
M37	QML3040	Cam Lever
M38	QXD0067	Takeup Reel Table Assembly
M39	QXD0084	Supply Reel Table Assembly
M40	QXL1055	Auto-Stop Lever Assembly
M41	QDG1096	Cam Gear
M42	QXG1026	Auto-Stop Gear Assembly
M43	QXL1037	Gear Lever Assembly
M44	QML3042	Auto-Stop Obstruction Lever
M45	QML3217	Pause Lever
M46	QML3295	Cue Lever
M47	QML3124	Lock Release Arm
M48	QXR0275	Lock Rod Assembly
M49	QXR0342	Pause Rod Assembly
M50	QXR0343	Record Rod Assembly
M51	QXR0344	Playback Rod Assembly
M52	QMR1624	Rewind Rod-A
M53	QMR1623	Fast Forward Rod-A
M54	QMR1622	Stop Rod-A
M55	QMR1621	Eject Rod-A
M56	QML3038	Switch Arm
M57	QDB0240	Counter Belt
M58	QXC0028	Tape Counter
	"Silver Type"	
	QXC0043	"
	"Black Type"	
M59	QMA3171	Counter Angle
M60	MMC6A2HYA	DC Motor
M61	QMA3414	Motor Angle
M62	QXP0572	Motor Pulley Assembly
M63	QXR0345	Sub-Eject Rod Assembly
M63-1	QBT1619	Idler Spring
M64	QML3206	Muting Arm
M65	QML3207	Muting Lever
M66	QXG1031	Damper Gear Assembly
M66-1	QDG1102	Holder Gear
M67	QMR1628	Obstruction Rod-A
M68	QMR1629	Obstruction Rod-B
M69	QBP1770	Obstruction Rod Spring
M70	QML3287	Brake Lever
M71	XTN26+6B	Screw ⊕2.6×6
M72	XTN3+25B	Screw ⊕3×25
M75	XSN26+4	Screw ⊕2.6×4
M76	QXK1951	Upper Base Plate Assembly
M80	QXK2052	Lower Base Plate Assembly
M81	QBN1555	Pause Lever Spring
M82	QBP1664	Operation Rod Spring
M83	QBN1531	Lock Release Arm Spring
M84	QBP1662	Lock Rod Spring
M85	QBT1682	Lock Holding Spring
M86	QBN1574	Brake Spring

Ref. No.	Part No.	Part Name & Description
M87	QBC1338	Back Tension Spring
M88	QBW2018	Poly Washer
M89	XTN26+6B	Screw ⊕2.6×6

CABINET PARTS





Ref. No.	Part No.	Part Name & Description
G44	XTN26+5BFV	Tapping Screw ⊕2.6×5
G45	QGK2866 "Silver Type"	Meter Cover-A
	QGK2866K "Black Type"	〃
G46	QGK2868	Meter Cover-B
G47	QKJ0287	Meter Cover-C
G48	QMA3186	Fulcrum Angle
G49	XTN26+8B	Tapping Screw ⊕2.6×8
	ACCESSORIES	
A1	RP023A	Connection Cord

Ref. No.	Part No.	Part Name & Description
A2 [D]	QQT2477	Instruction Book
※For All European areas except United Kingdom		
A2 [BA]	QQT2478	Instruction Book
※For United Kingdom and Australia		
A2 [A]	QQT2504	Instruction Book
※For Asia, Latin America, Middle East and Africa areas		
	PACKINGS	
P1	QPN3784	Inside Carton
P2	QPA0429	Inner Cushion-L
P3	QPA0430	Inner Cushion-R
P4	XZB50X65A02	Poly Bag
P5	QPS0285	Pad

Ref. No.	Part No.	Part Name & Description
	CABINET PARTS	
G1	QGC1104 "Silver Type"	Case Cover
	QGC1110 "Black Type"	〃
G2	QGC1106	Bottom Cover
G3	QKA1076	Rubber Foot
G4	QYP0832 "Silver Type"	Front Panel Assembly
	QYP0832K "Black Type"	〃
G4-1	QKJ0286	Stopper
G4-2	XTS3+8B	Screw ⊕3×8
G5	QYF0348 "Silver Type"	Cassette Lid Assembly
	QYF0364 "Black Type"	〃
G6	QYT0488 "Silver Type"	Volume Knob-A
	QYT0526 "Black Type"	〃
G7	QYT0489 "Silver Type"	Volume Knob-B
	QYT0527 "Black Type"	〃
G9	QYT0491 "Silver Type	Lever Knob-A
	QYT0491K "Black Type"	〃
G10	QYT0492 "Silver Type"	Lever Knob-B
	QYT0492K "Black Type"	〃
G12	QGC1122	Back Cover
G13	QGK2865	Jack Board Ornament
G14	QBW2066	Spacer
G15 [D]	QGS2629	Name Plate
※For All European areas except United Kingdom		
G15 [BA]	QGS2630	Name Plate
※For United Kingdom and Australia		
G15 [N]	QGS2634	Name Plate
※For Asia, Latin America, Middle East and Africa areas		
G16	XTS3+10B	Screw ⊕3×10
G17	XTN3+10B	Tapping Screw ⊕3×10
G18	XSN4+8BVS	Screw ⊕4×8
G19	XWC4BFN	Lock Washer 4φ
G20	XTN4+10B	Tapping Screw ⊕4×10
G21	QBP1771	Holder Spring
G22	QKF6008	Cassette Holder
G23	QXH0285	Chassis Cover Assembly
G24	QKF6010	Holder Piece-L
G25	QKF6009	Holder Piece-R
G26	QMG0050	Holder Slider-L
G27	QMG0049	Holder Slider-R
G28	QXA0637	Push Button Holding Angle
G29	QMN2240	Push Button Shaft-A
G30	QXA01861	Push Button Shaft-B
G31	QGO1473 "Silver Type"	Push Button (PAUSE)
	QGO1551 "Black Type"	〃
G32	QGO1474 "Silver Type"	Push Button (RECORD)
	QGO1552 "Black Type"	〃
G33	QGO1476 "Silver Type"	Push Button (PLAY, STOP)
	QGO1554 "Black Type"	〃
G34	QGO1477 "Silver Type"	Push Button (FF, REW)
	QGO1555 "Black Type"	〃
G35	QGO1475 "Silver Type"	Push Button (EJECT)
	QGO1553 "Black Type"	〃
G36	QXB0556 "Silver Type"	Timer Button Assembly
	QXB0616 "Black Type"	〃
G37	QMA3576	Shaft Retainer Angle
G38	QBW2017	Washer
G39	QBN1554	Chassis Cover Spring
G40	XUC25FT	Stop Ring 2.5φ
G41	XUC4FT	Stop Ring 4φ
G42	QNQ1080	Stop Ring
G43	XUC3FT	Stop Ring 3φ

Printed in Japan

ORDER NO. ARD-7904025S

Service Manual

Cassette Deck

RS-M22

(Silver Face)

Supplementary

Front-Loading Vertical Hold Stereo Cassette Deck with
FL Bar Graph Peak Meters, Rewind Auto-Play,
and Separate 3-Position Bias and Equalization Selectors

For additional information, please refer to the service manual for Model No. RS-M22.

Notes:

1. This service manual indicates the main differences between; original RS-M22 for (D/B/N/A) and RS-M22 for PX.
2. Please file this manual with the service manual for Model No. RS-M22 (original), order No. ARD-7812089C.

PARTS COMPARISON TABLE:

Ref. No.	Description	Parts Number		Remarks
		Original	for PX	
R3, 4	Resistor	ERD25TJ822	ERD25TJ681	
C103, 104	Capacitor	ECQM05223KZ	——	Deleted
E4	Pin Jack Board Assembly	QEJ5002S	QEJ5003S	
G4	Front Panel Assembly	QYP0832	QYP0752	
G15	Name Plate	QGS2629	QGS2710	
A2	Instruction Book	QQT2477	QQT2657	
P1	Inside Carton	QPN3784	QPN3781	

※ Other parts are just same as parts for Asia, Latin America, Middle East and Africa areas.

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