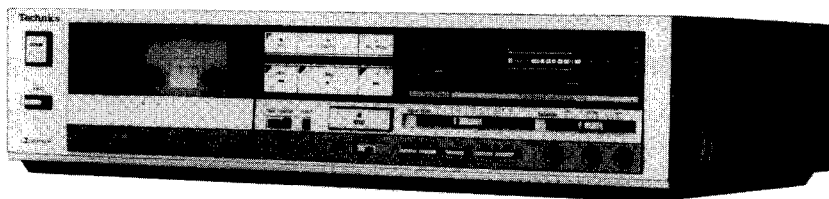


Service Manual

dbx/Dolby B • C NR, 2 Motor
Stereo Cassette Deck

Cassette Deck
RS-M235X
(Silver Face)
(Black Face)



This is the Service Manual for the following areas.

- ☐ For all European areas except United Kingdom.
☐ For United Kingdom.

RS-M235X in black is also available in some countries.

RS-M250 MECHANISM SERIES

Specifications

Track system:	4-track 2-channel stereo recording and playback	Fast forward and rewind time:	Approx. 90 seconds with C-60 cassette tape
Tape speed:	4.8cm/s	Inputs:	MIC; sensitivity 0.25mV, applicable microphone impedance 400Ω—10kΩ LINE; sensitivity 60mV, input impedance 47kΩ or more
Wow and flutter:	0.045% (WRMS), ±0.14% (DIN)	Outputs:	LINE; output level 400mV, output impedance 1.5kΩ or less HEADPHONES; output level 80mV (at 8Ω) applicable headphones impedance 8Ω—600Ω
Frequency response:	Metal tape; 20—20,000 Hz 30—18,000 Hz (DIN) 50—17,000 Hz ±3dB CrO ₂ tape; 20—19,000 Hz 30—18,000 Hz (DIN) 50—16,000 Hz ±3dB Normal tape; 20—18,000 Hz 30—16,000 Hz (DIN) 50—15,000 Hz ±3dB	Bias frequency:	80kHz
Dynamic range:	110dB (at 1kHz) with dbx in	Heads:	2-head system 1-MX head for record/playback 1-double-gap ferrite head for erasure
Max. input level improvement:	10dB or more improved with dbx in (at 1kHz)	Motor:	2-motor system
Signal-to-noise ratio:	dbx in; 92dB Dolby C NR in; 75dB (CCIR) Dolby B NR in; 67dB (CCIR) NR out; 57dB (Signal level = max. input level A weighted, CrO ₂ type tape)	Power requirements:	☐ ...AC; 220V, 50-60Hz ☐ ...AC; 110/125/220/240V, 50-60Hz Pre-set power voltage 240V
		Power consumption:	18W
		Dimensions (W×H×D):	43cm×9.8cm×27.3cm
		Weight:	5.0kg

Design and specifications are subject to change without notice.

*The term dbx is a registered trademark of dbx Inc.

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

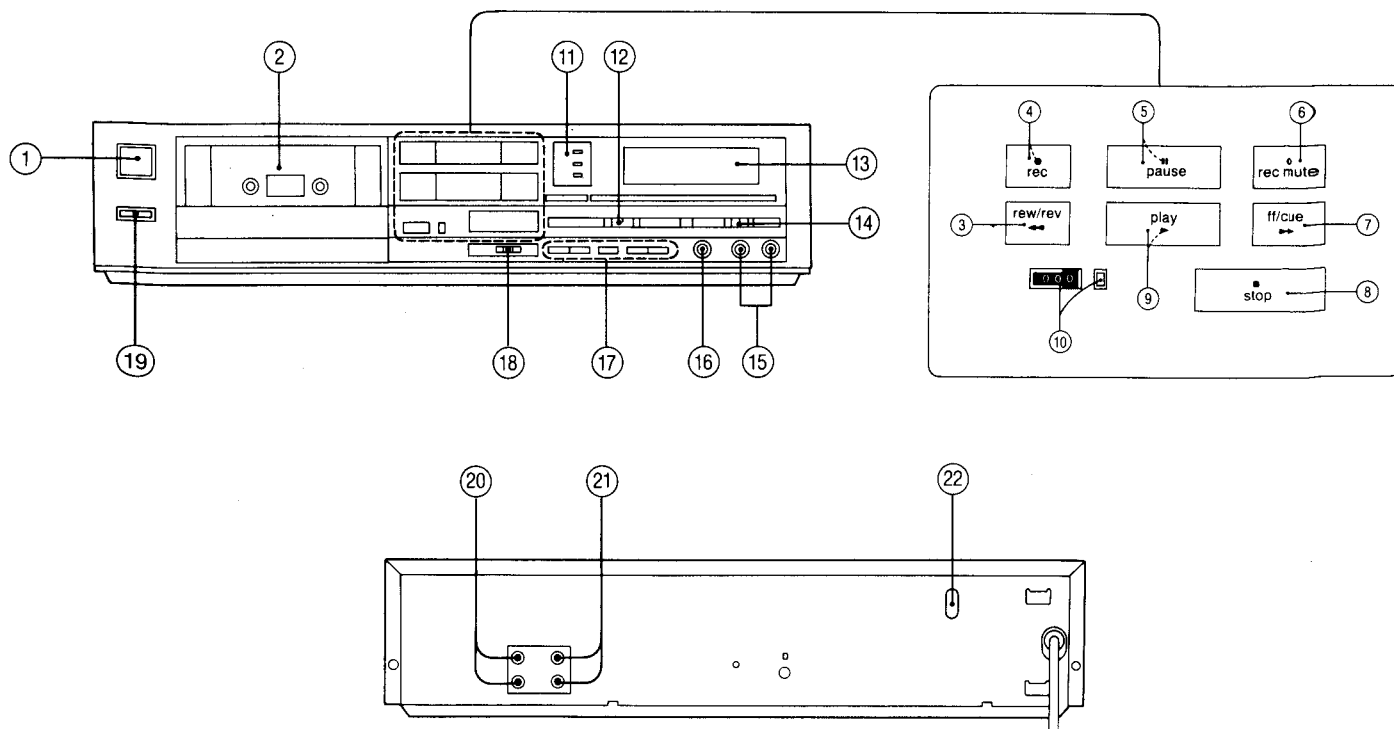
Technics

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

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LOCATION OF CONTROLS AND COMPONENTS



- | | |
|--|--|
| ① Power Switch [power (push on)] | ⑫ Input Level Control [input level] |
| ② Cassette Holder | ⑬ FL (fluorescent level) Meters |
| ③ Rewind/Review Button [rew/rev (◀▶)] | ⑭ Balance Control [balance (lef • center • right)] |
| ④ Record Button and Indicator [rec (○)] | ⑮ Microphone Jacks [mic (L • R)] |
| ⑤ Pause Button and Indicator [pause (■)] | ⑯ Headphones Jack [phones] |
| ⑥ Record Muting Button [rec mute (○)] | ⑰ Noise Reduction Select Switch [Noise Reduction
(<u>Dolby NR</u> C • B • out • <u>dbx</u> tape • disc)] |
| ⑦ Fast Forward/Cue Button [ff/cue (▶▶)] | ⑱ Timer Start Switch (⏻ timer (rec • off • play)) |
| ⑧ Stop Button [stop (■)] | ⑲ Eject Button [eject (▲)] |
| ⑨ Play Button and Indicator [play (▶)] | ⑳ Line Input Jacks [LINE IN (R • L)] |
| ⑩ Tape Counter and Reset Button
[tape counter-reset] | ㉑ Line Output Jacks [LINE OUT (R • L)] |
| ⑪ Tape Indicator [Auto Tape Select
(Normal • CrO ₂ • Metal)] | ㉒ Voltage Selector [VOLTAGE SELECTOR]
* For United Kingdom. |

DISASSEMBLY INSTRUCTIONS

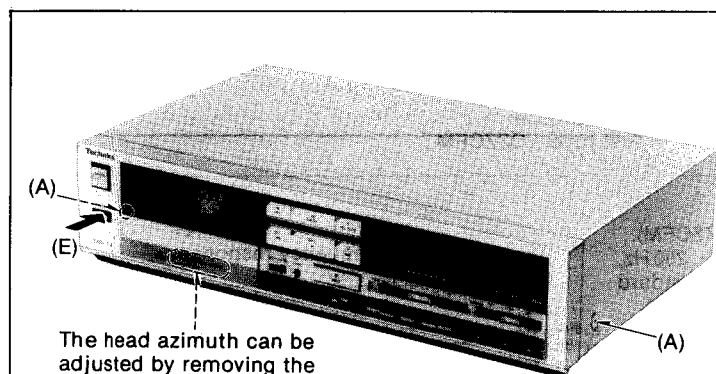


Fig. 1

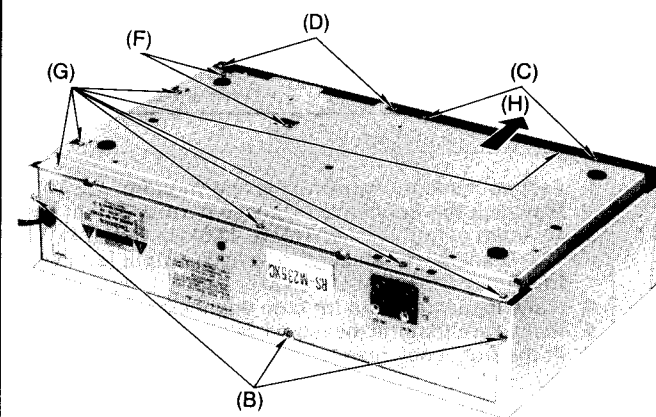


Fig. 2

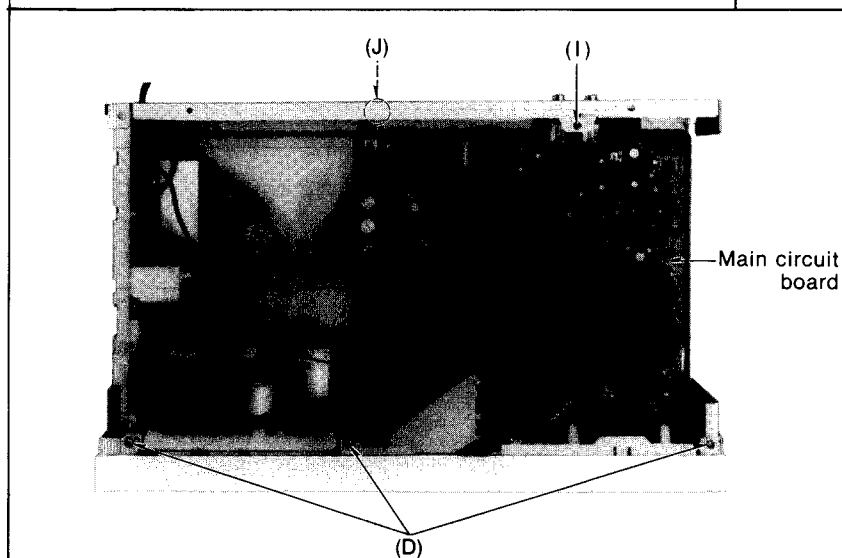
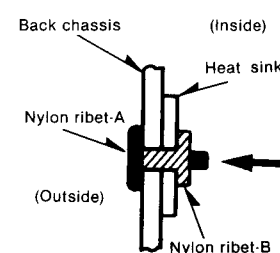


Fig. 3

(J) How to remove nylon rivet



To remove a heat sink from the back chassis, first press nylon rivet-A from the inside in the direction indicated by the arrow as shown above, and extract the rivet to the outside. Next remove nylon rivet-B from the inside. Consequently, the heat sink can be removed from the back chassis.

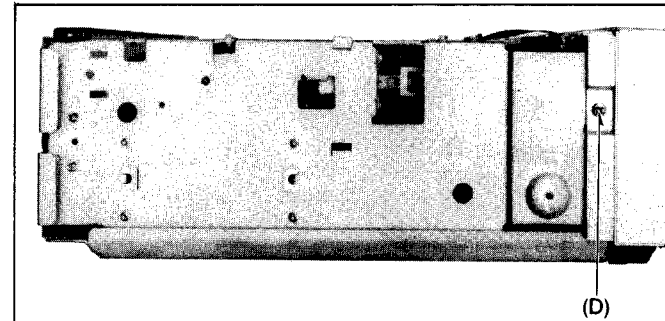


Fig. 4

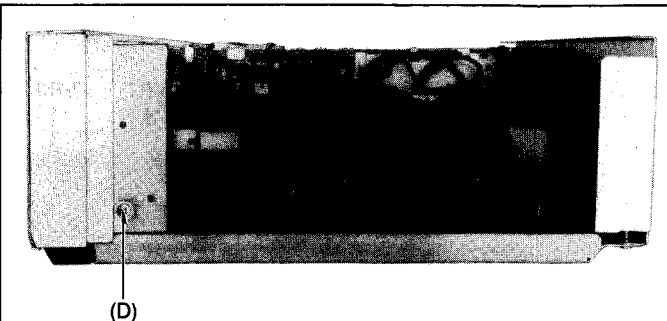


Fig. 5

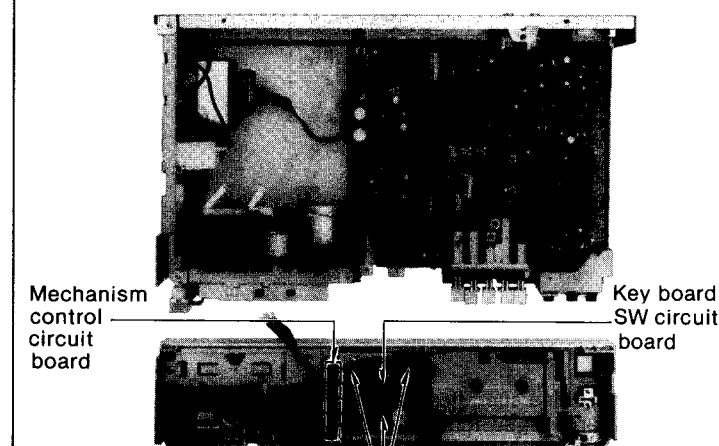


Fig. 6

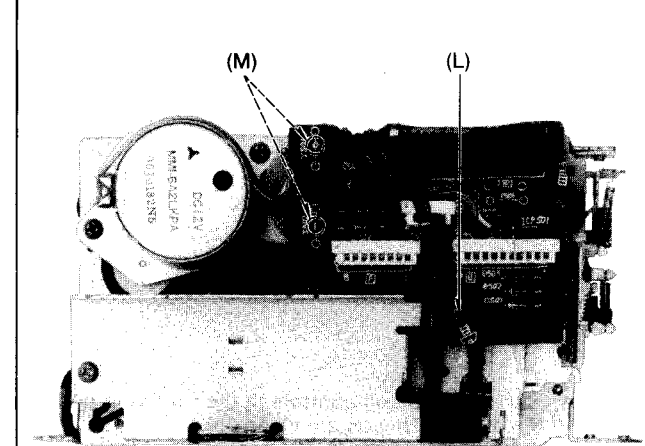


Fig. 7

Ref. No.	Procedure	To remove —	Remove —	Shown in fig. —
1	1	Case cover	• 2 ornament screws(A) • 3 screws(B)	1 2
2	1 → 2	Front panel assembly	• 2 screws(C) • 7 screws(D) • Push the eject button(E)	2 2, 3, 4, 5 1
3	1 → 2 → 3	Mechanism unit	• 2 screws(F)	2
4	4	Bottom cover assembly	• 2 screws(C) • 2 screws(F) • 7 screws(G) • As shown in fig. 2, pull Bottom cover in the direction of arrow (H).	2 2 2 2
5	1 → 2 → 4	Main circuit board	• 1 screw(I) • How to remove nylon rivet(J)	3 3
6	1 → 2 → 6	Key board SW & Mechanism control circuit board	• 3 screws(K)	6
7	1 → 2 → 3 → 7	Mechanism circuit board	• 1 screw(L) • Unsolder the soldered portion of the reel motor terminal(M)	7 7

MEASUREMENT AND ADJUSTMENT METHODS

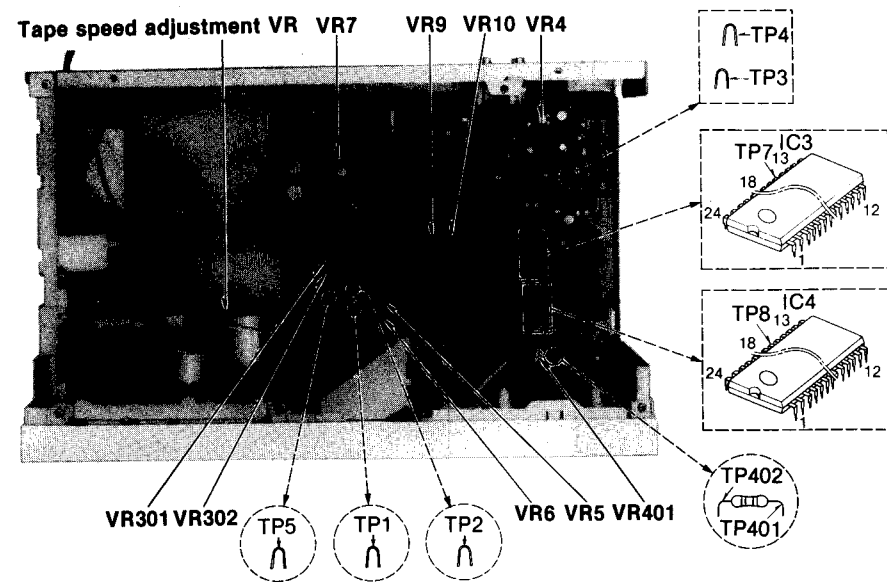


Fig. 1

- NOTES:** Set switches and controls in the following positions, unless otherwise specified.
- Make sure heads are clean
 - Make sure capstan and pressure roller are clean
 - Judgeable room temperature 20±5°C (68±9°F)
 - NR switch: OUT
 - Timer start switch: OFF
 - Input level controls: Maximum
 - Balance control: Center

- A Head azimuth adjustment**
- Condition:
- Playback mode
 - Normal tape mode
- Equipment:
- VTVM
 - Oscilloscope
 - Test tape (azimuth)...QZZCFM

L-CH/R-CH output balance adjustment

1. Make connections as shown in fig. 2.
2. Playback the 8kHz signal from the test tape (QZZCFM). Adjust screw (B) in fig. 3 for maximum output L-CH and R-CH levels. When the output levels of L-CH and R-CH are not at maximum at the same point adjust as follows.
3. Turn screw (B) shown in fig. 3 to find angles A and C (points where peak output levels for left and right channels are obtained). Then, locate angle B between angles A and C, i.e., and point where L-CH and R-CH outputs are balanced. (Refer to figs. 3 and 4.)

L-CH/R-CH phase adjustment

4. Make connections as shown in fig. 5.
5. Playback the 8kHz signal from the test tape (QZZCFM). Adjust screw (B) shown in fig. 3 so that pointers of the two VTVMs swing to maximum and a lissajous waveform as illustrated in fig. 6 is obtained on the oscilloscope.

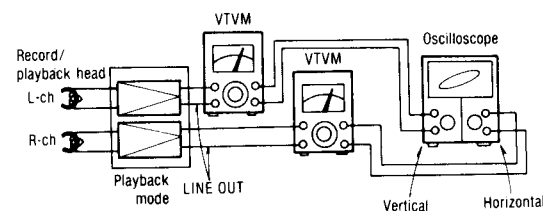


Fig. 5

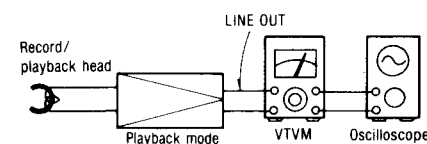


Fig. 2

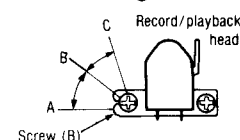


Fig. 3

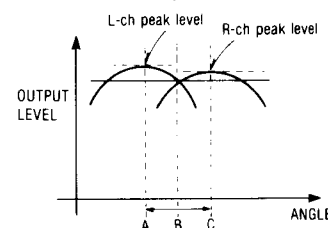


Fig. 4

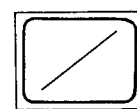


Fig. 6

- B Tape speed**
- Condition:
- Playback mode

- Equipment:
- Digital frequency counter
 - Test tape...QZZCWAT

Tape speed accuracy

1. Test equipment connection is shown in fig. 7.
2. Playback test tape (QZZCWAT 3,000Hz), and supply playback signal to the digital 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%

6. If measured value is not within the standard value, adjust it by using the tape speed adjustment VR shown in Fig. 1.

Tape speed fluctuation

Make measurements in same manner as above (beginning, middle and end of tape), and determine the difference between maximum and minimum values and calculate as follows:

$$\text{Tape speed fluctuation} = \frac{f_1 - f_2}{3,000} \times 100(\%) \quad f_1 = \text{maximum value, } f_2 = \text{minimum value}$$

Standard value: Less than 1%

NOTE:

Please use non metal type screwdriver when you adjust tape speed on this unit. Do not use a metal type screwdriver. If used, the IC protector (ICP501) may be damaged, and the capstan motor may not be driven.

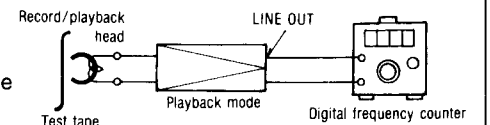


Fig. 7

- C Playback frequency response**
- Condition:
- Playback mode
 - Normal tape mode

- Equipment:
- VTVM
 - Oscilloscope
 - Test tape...QZZCFM

1. Test equipment connection is shown in fig. 2.
2. Playback the frequency response portion of test tape (QZZCFM).
3. Measure output level at 315Hz, 12.5kHz, 8kHz, 4kHz, 1kHz, 250Hz, 125Hz and 63Hz, and compare each output level with the standard frequency 315Hz, at LINE OUT.
4. Make measurements for both channels.
5. Make sure that the measured values are within the range specified in the frequency response chart. (Shown in fig. 9).

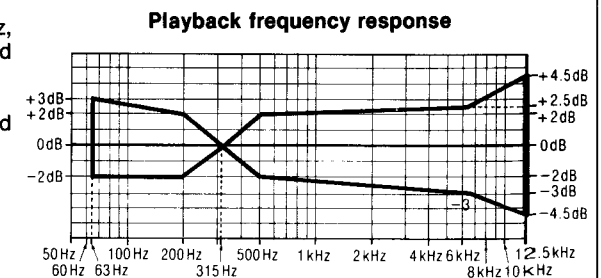


Fig. 9

- D Playback gain**
- Condition:
- Playback mode
 - Normal tape mode

- Equipment:
- VTVM
 - Oscilloscope
 - Test tape...QZZCFM

1. Test equipment connection is shown in fig. 2.
2. Playback standard recording level portion on test tape (QZZCFM 315Hz) and, using VTVM, measure the output level at test points [TP7 (L-CH), TP8 (R-CH)].
3. Make measurements for both channels.

Standard value: 0.28V [0.38±0.05V: at LINE OUT jack]

Adjustment

1. If the measured value is not within standard the adjust VR9 (L-CH) or VR10 (R-CH) (See fig. 1).
2. After adjustment, check "Playback frequency response" again.

E Erase current

Condition:
 • Record mode
 • Metal tape mode

Equipment:
 • VTVM
 • Oscilloscope

1. Test equipment connection is shown in fig. 10.
2. Place UNIT into metal tape mode.
3. Press the record and pause buttons.
4. Read voltage on VTVM and calculate erase current by following formula:

$$\text{Erase current (A)} = \frac{\text{Voltage across resistor R301}}{1 (\Omega)}$$

Standard value: 155±15mA (Metal)

5. If the measured value is not within the standard value adjust it by following the adjustment instructions.

Adjustment

If the erase current is less than 140mA, open the point (A).

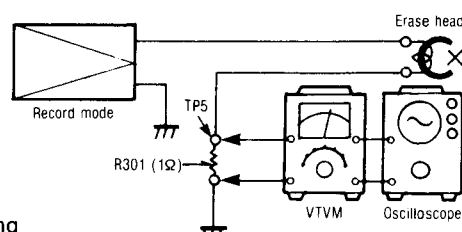


Fig. 10

F Overall frequency response

Condition:
 • Record/playback mode
 • Normal tape mode
 • CrO₂ tape mode
 • Metal tape mode
 • Input level controls...MAX
 • Balance control...Center

Equipment:
 • VTVM
 • ATT
 • AF oscillator
 • Oscilloscope
 • Resistor (600Ω)

• Test tape
 (reference blank tape)
 ...QZZCRA for Normal
 ...QZZCRX for CrO₂
 ...QZZCRZ for Metal

Note:

Before measuring and adjusting, the overall frequency response make sure of the playback frequency response (For the method of measurement, please refer to the playback frequency response).

(Recording equalizer is fixed)

1. Make connections as shown in fig. 10.
2. Place UNIT into normal tape mode and insert the normal reference blank test tape (QZZCRA).
3. Supply a 1kHz signal from the AF oscillator through ATT to LINE IN.
4. Adjust ATT so that input level is -20dB below standard recording level (standard recording level = 0 VU).
5. Adjust the AF oscillator frequency to 1kHz, 50Hz, 100Hz, 200Hz, 500Hz, 4kHz, 8kHz, 10kHz and 12.5kHz signals, and record these signals on the test tape.
6. Playback the signals recorded in step 6, and check if the frequency response curve is within the limits shown in the overall frequency response chart for normal tapes (fig. 11).
 (If the curve is within the charted specifications, proceed to steps 7, 8 and 9.)
 If the curve is not within the charted specifications, adjust as follows;

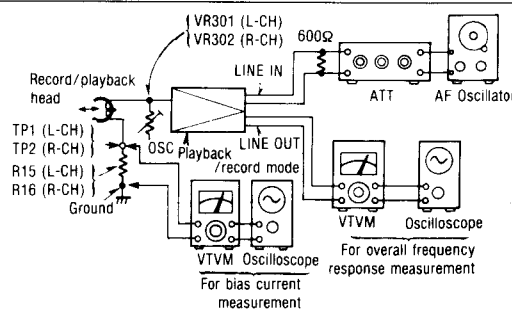


Fig. 10

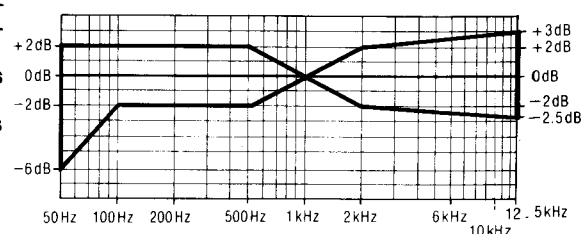
Overall frequency response chart (Normal)

Fig. 11

Adjustment (A):

When the curve exceeds the overall specified frequency response chart (fig. 11) as shown in fig. 12.

- 1) Increase bias current by turning VR301 (L-CH) and VR302 (R-CH).
 (See fig. 1 on page 5.)
- 2) Repeat steps 5 and 6 for confirmation (Proceed to steps 7, 8 and 9 if the curve is now within the charted specifications as shown fig. 11.)
- 3) If the curve still exceeds the specifications (fig. 11), increase bias current further and repeat steps 5 and 6.

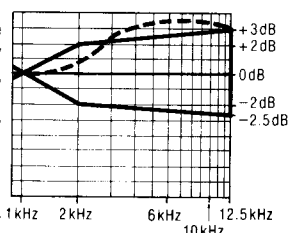


Fig. 12

Adjustment (B):

When the curve falls below the overall specified frequency response chart (fig. 11) as shown in fig. 13.

- 1) Reduce bias current by turning VR301 (L-CH) and VR302 (R-CH).
- 2) Repeat steps 5 and 6 for confirmation (Proceed to steps 7, 8 and 9 if the curve is now within the charted specifications as shown fig. 11.)
- 3) If the curve still falls below the charted specifications (fig. 11), reduce bias current further and repeat steps 5 and 6.

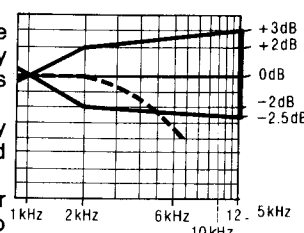


Fig. 13

7. Place UNIT into CrO₂ tape mode.
8. Change test tape to CrO₂ reference blank test tape (QZZCRX), and record 1kHz, 50Hz, 100Hz, 200Hz, 500Hz, 4kHz, 8kHz, 10kHz and 15kHz signals. Then, playback the signals and check if the curve is within the limits shown in the overall frequency response chart or CrO₂ tapes (fig. 14).
9. Place UNIT into metal tape mode and change test tape to metal reference blank test tape (QZZCRZ), and record 1kHz, 50Hz, 100Hz, 200Hz, 500Hz, 4kHz, 8kHz, 10kHz, 12.5kHz and 15kHz signals. Then, playback the signals and check if the curve is within the limits shown in the overall frequency response chart for metal tapes (fig. 14).
10. Confirm that bias currents are approximately as follows when the UNIT is set at different tape mode.
 - Read voltage on VTVM between ground and test point (TP1 for L-CH, TP2 for R-CH) and calculate bias current by following formula:

$$\text{Bias current (A)} = \frac{\text{Value read on VTVM (V)}}{10 (\Omega)}$$

around 410 μ A (Normal position)
 Standard value: around 530 μ A (CrO₂ position)
 around 850 μ A (Metal position)

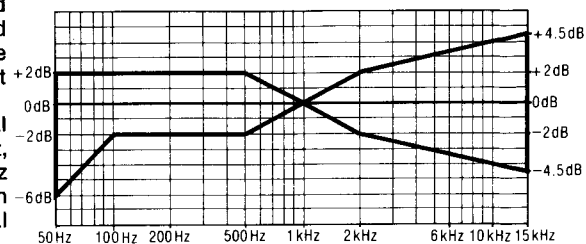
Overall frequency response chart (CrO₂, Metal)

Fig. 14

Ⓒ Overall gain

Condition:

- Record/playback mode
- Normal tape mode
- Input level controls...MAX
- Balance control...Center
- Standard input level;
 - MIC -72 $\pm$ 4dB
 - LINE IN -24 $\pm$ 4dB

Equipment:

- VTVM
- ATT
- Resistor (600 Ω)
- Test tape (reference blank tape)
 - ...QZZCRA for Normal

1. Test equipment connection is shown in fig. 15.
2. Insert the normal reference blank tape (QZZCRA).
3. Place UNIT into record mode.
4. Supply a 1kHz signal through ATT (-24dB) from AF oscillator, to LINE IN.
5. Adjust ATT until monitor level at LINE OUT becomes 0.38V.
6. Playback recorded tape, and make sure that the output level at LINE OUT becomes 0.38V.
7. If measured value is not 0.38V $\pm$ 2dB, adjust it by using VR5 (L-CH) or VR6 (R-CH).
8. Repeat from step (2).

Standard value 0.38V-2dB (300mV)—0.38V + 2dB (480mV)

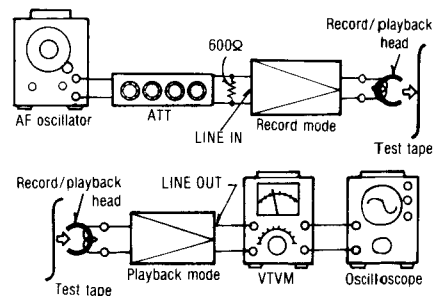


Fig. 15

Ⓓ Fluorescent meter

Condition:

- Record mode
- Input level controls...MAX
- Balance control...Center

Equipment:

- VTVM
- ATT
- AF oscillator

• Check for FL meter

To check the accuracy of the FL meter, measure the output level at LINE OUT.

1. Make connections as shown (See fig. 16).
2. Connect a wire between TP401 and TP402 terminal (See fig. 17).
3. In the recording pause mode, apply 1kHz (-24dB) to LINE IN.
4. Adjust ATT so that output level at LINE OUT is 0.38V

Checking FL meter 0dB segment display ON/OFF

Change the output level at LINE OUT from 0.38V - 1dB ($\approx$ 340mV) to 0.38V + 1dB ($\approx$ 430mV) by adjusting the attenuator, and check that the FL meter 0dB segment display OFF state changes to the ON state.

Checking FL meter -40dB segment display ON/OFF

Lower the signal level 28dB below the standard input level (-24dB-28dB=-52dB $\approx$ 2.5mV) and then further lower the level 12dB (-52dB-12dB=-64dB $\approx$ 0.63mV) by adjusting the attenuator. While lowering the level as described above, make sure that only the -40dB display remains lit the dims or goes off at the lowest level.

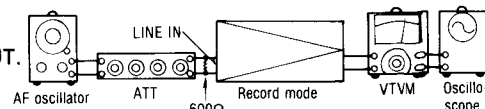


Fig. 16

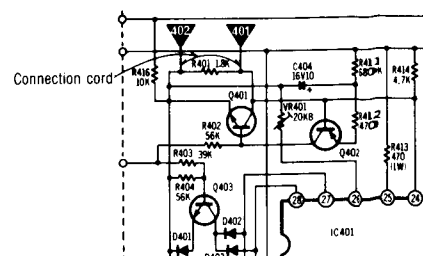


Fig. 17

• Adjustment for FL meter

1. Make connections as shown (See fig. 16).
2. Connect a wire between TP401 and TP402 (See fig. 17).
3. In the recording pause mode, apply 1 kHz (-24dB) to LINE IN.
4. Adjust ATT so that output level at LINE OUT is 0.38V.

-40dB adjustment

5. Adjust ATT so that the level adjusted at step 4 is reduced by 40dB.
6. At this time, check that -40dB indicator is dimmed (intermediate brightness between full brightness and light-out: See fig. 18).
7. If the indicator is not lighted halfway as described in step 6, adjust VR7.

0dB adjustment

8. Restore the condition of step 4 (set output level to 0.38V at LINE OUT).
9. At this time, check that 0dB indicator is dimmed (intermediate brightness between full brightness and light-out: See fig. 19).
10. If improper, adjust VR401.
11. Repeat adjustments at steps 4, 5, 6, 7, 8, 9 and 10 two or three times.
12. Disconnect the wire between TP401 and TP402 terminal, which had been connected at step 2.

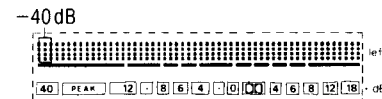


Fig. 18

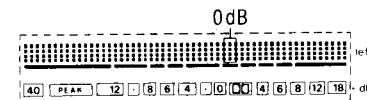


Fig. 19

1 Dolby NR circuit

Condition:

- Record mode
- Dolby NR switch...IN/OUT
- Dolby NR select switch...B/C
- Input level controls...MAX

Equipment:

- VTVM
- AF oscillator
- ATT
- Oscilloscope
- Resistor (600Ω)
- Balance control...Center

Record side

- Check of the Dolby-B type encoder characteristics

1. Make connections as shown in fig. 20.
2. Set the unit to the record mode. (NR select switch is OUT.)
3. Apply a 1 kHz signal to LINE IN.
4. Adjust the ATT so that the output level at TP7 (L-CH) and TP8 (R-CH) is 12.3mV.
5. The output level at pin 14 should be 0dB.
6. Set the NR select switch to B, and make sure that the output signal level at pin 14 of IC3 (L-CH) and IC4 (R-CH) is $+6\text{dB} \pm 2.5\text{dB}$.
7. Set the NR select switch to OUT, and adjust the frequency to 5kHz. The output signal level at pin 14 should be 0dB.
8. Set the NR select switch to B and make sure that the output signal level at pin 14 of IC3 (L-CH) and IC4 (R-CH) is $+8\text{dB} \pm 2.5\text{dB}$.
- Check to Dolby-C type encoder characteristics
9. Repeat steps 1-5 above.
10. Set the NR select switch to C and make sure that the output signal level at pin 14 of IC3 (L-CH) and IC4 (R-CH) is $+11.5\text{dB} \pm 2.5\text{dB}$.
11. Set the NR select switch to OUT and adjust the frequency to 5kHz. The output signal at pin 14 should be 0dB.
12. Set the NR select switch to C and make sure that the output signal level at pin 14 of IC3 (L-CH) and IC4 (R-CH) is $+8.5\text{dB} \pm 2.5\text{dB}$.

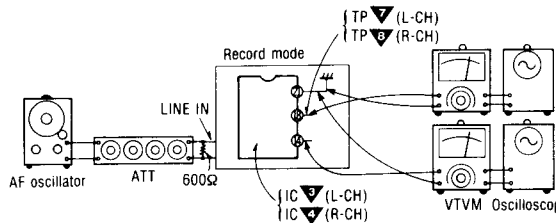


Fig. 20

2 Attack recovery time adjustment (dbx circuit)

Condition:

- Record mode
- Input level control...MAX
- Balance control...Center

Equipment:

- VTVM
- ATT
- AF oscillator
- DC voltmeter
- Noise reduction selector...dbx tape

1. Make the connections as shown in fig. 21 and apply 1kHz -27dB signal from LINE IN, and set the noise reduction selector to dbx tape position.
2. Set the unit to record mode, adjust ATT so that the signal level at C97 (L-CH) and C98 (R-CH) is 300mV.
3. Read voltage on DC voltmeter.

Reference value: $15 \pm 0.5\text{mV}$

4. If measured value is not within reference, adjust VR4 (shown in electrical parts location).

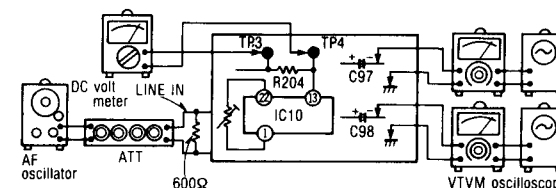


Fig. 21

3 Input scanning time adjustment

Condition:
• Stop mode

Equipment:
• Oscilloscope

1. Connect an oscilloscope to terminal 23 of IC601.
2. Measure the time of the input scanning signal with an oscilloscope as shown in fig. 22.

Standard value: $8.8\text{msec} - 7.2\text{msec}$

3. If the measured value is different from the signal shown (fig. 22) make the necessary adjustment as follows:

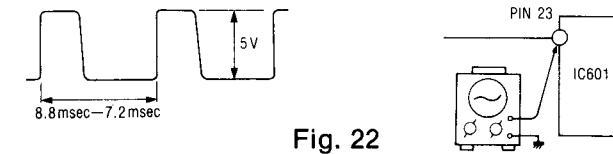


Fig. 22

Adjustment

1. Open point C and short point B on the main circuit board (See fig. 23).
2. Measure the wave form.
3. Make sure that the measured value is within $8\text{msec} \pm 0.8\text{msec}$.
4. If it is beyond the specified value, carry out the following adjustments:
 - If the measured value is less than 7.2msec, open the point B.
 - If the measured value is more than 8.8msec, short the point C.

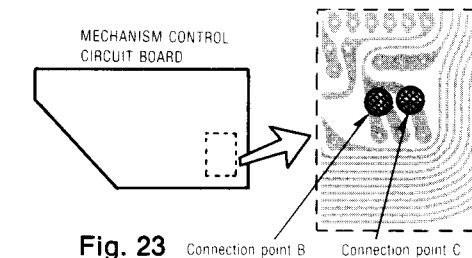
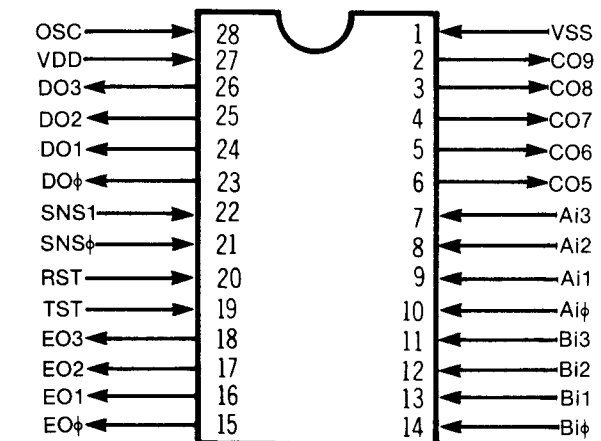
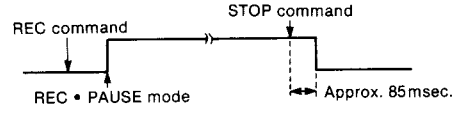
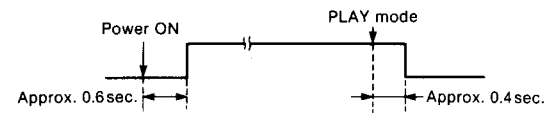
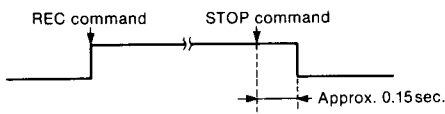
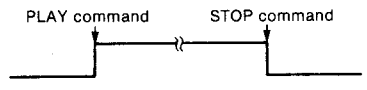
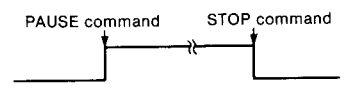
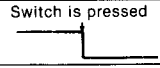
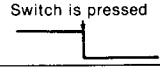
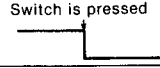
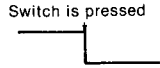


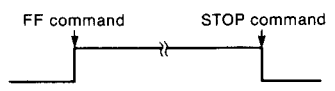
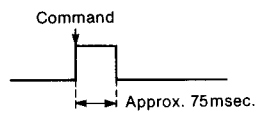
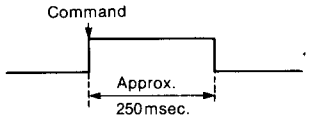
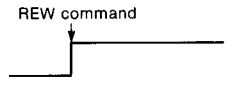
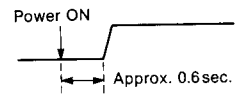
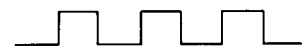
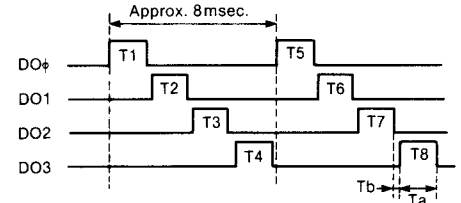
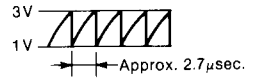
Fig. 23

MN14001RMA (IC601) EACH TERMINAL FUNCTION AND WAVEFORM

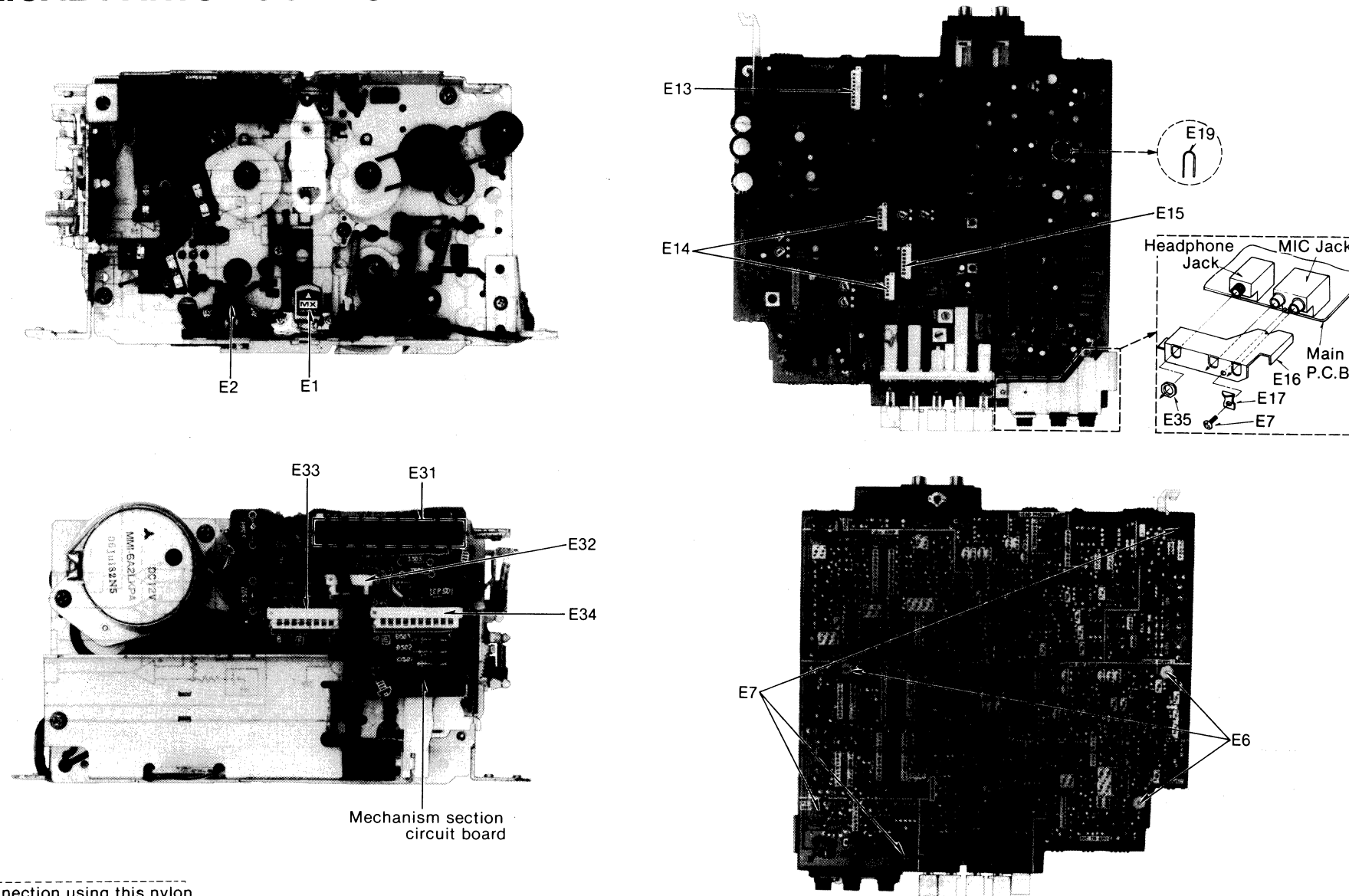
(BOTTOM VIEW)



Terminal No.	Symbol	Name	Function/operation
1	Vss	GND	
2	CO9	BIAS Control	◦ Goes to H immediately after REC or PAUSE operation. ◦ Remains in H during REC or PLAY operation. ◦ Goes to L approximately 85msec after the STOP command is given. 
3	CO8	DMT (Muting)	◦ Goes to L approximately 0.4sec after PLAY operation. ◦ Remains in H in the PAUSE, FF, REW, or STOP mode. ◦ Goes to L approximately 0.5sec after the REC command is given. ◦ Goes to L approximately 0.18sec after CUE or REV operation is begun. 
4	CO7	REC Indication	◦ Goes to H when the REC command is given. ◦ Goes to H immediately after power is supplied in the TIMER REC mode. ◦ Remains in H if the TIMER REC mode is selected when the automatic STOP return mechanism functions at power on. ◦ Goes to L approximately 0.15sec after the STOP command is given in the REC, PAUSE, or REC PLAY mode. 
5	CO6	PLAY Indication	◦ Goes to H when the PLAY command is given. ◦ Goes to H in the TIMER REC or TIMER PLAY mode. 
6	CO5	PAUSE Indication	◦ Goes to H when the PAUSE or REC command is given. 
7	Ai3	Reading of input switch state	◦ Reads switch state according to the scanning of DO ϕ —3. (Accidental erasing protection leaf switch S501 and PAUSE switch).
8	Ai2	Reading of input switch state	◦ Reads switch state according to the scanning of DO ϕ —3. (Mode detection leaf switch S502, REC switch).
9	Ai1	Reading of input switch state	◦ Reads switch state according to the scanning of DO ϕ —3. (PLAY position detection leaf switch S503, TIMER PLAY switch).
10	Ai ϕ	Reading of input switch state	◦ Reads switch state according to the scanning of DO ϕ —2. (STOP position detection leaf switch S503, TIMER REC switch).
11	Bi3	REW key switch	◦ Goes to L when switch is pressed (normal H). 
12	Bi2	FF key switch	◦ Goes to L when switch is pressed (normal H). 
13	Bi1	PLAY key switch	◦ Goes to L when switch is pressed (normal H). 
14	Bi ϕ	STOP key switch	◦ Goes to L when switch is pressed (normal H). 

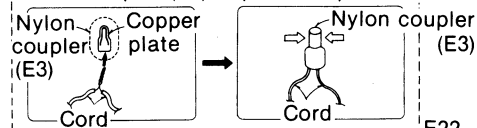
Terminal No.	Symbol	Name	Function/operation
15	EO ϕ	Brake solenoid output	◦ Goes to H in the FF, REW, CUE or REV mode. 
16	EO1	Trigger solenoid output	◦ Remains in H after input of the mechanism selection command (PLAY, PAUSE, STOP, etc.) and until mode detection leaf switch is closed. (H period is approximately 75msec although it differs according to mechanism state.) 
17	EO2	Reel motor rotation output (Reverse): counterclockwise rotation	◦ Remains in H from command input until mode detection leaf switch S502 opens during mechanism mode selection. ◦ Goes to H in REW and REV modes. 
18	EO3	Reel motor rotation output (Forward): clockwise rotation	◦ The above description is applicable during mode selection. ◦ Remains in H in FF or CUE mode. 
19	TST	IC test terminal	◦ Normally connected to GND.
20	RST	Reset terminal	◦ Goes to H approximately 0.6sec after power on to start computer. 
21	SNS ϕ	Rotation detection input	◦ Accepts Hall IC output according to reel table rotation. 
22	SNS1		◦ Non connection.
23	DO ϕ	Input switch scanning	 Pulse width $T_a = 1.8\text{msec}$ $T_b = 200\mu\text{sec}$.
24	DO1		
25	DO2		
26	DO3		
27	V _{DD}	Power supply terminal	◦ Functions at 4.5—6.0V (normally 5.4V).
28	OSC	Oscillation terminal	◦ Generates oscillation at approximately 300—350kHz. • Because the connection of a probe affects the terminal, nothing should be connected to this terminal for any other measurements. • Use Dϕ to 3 in measuring the computer's velocity; Approx. 125Hz in STOP condition. 

ELECTRICAL PARTS LOCATION

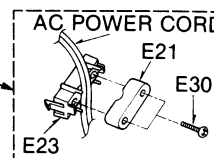
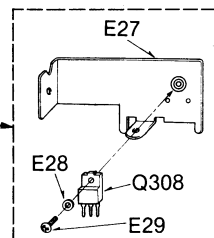
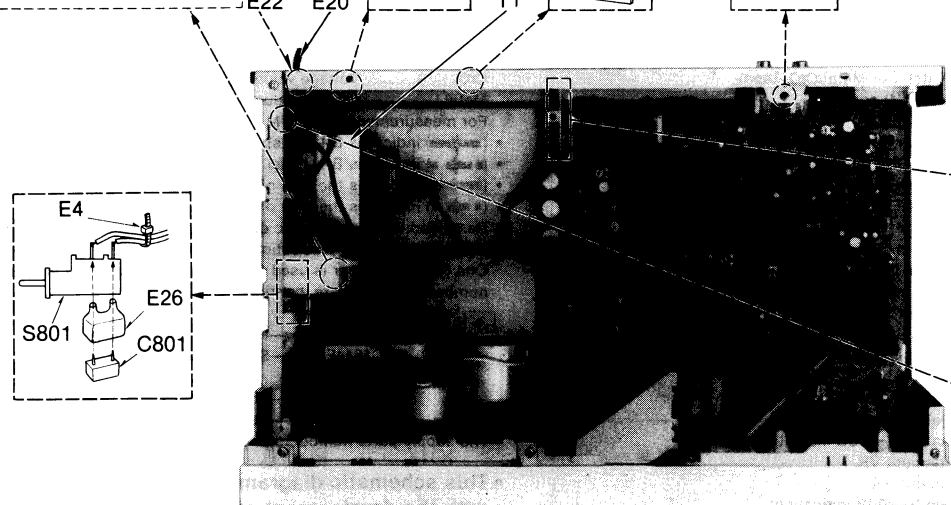
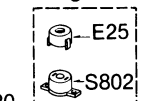


Mechanism section circuit board

Note: Cord connection using this nylon coupler (E3) requires a special tool.



* For United Kingdom.

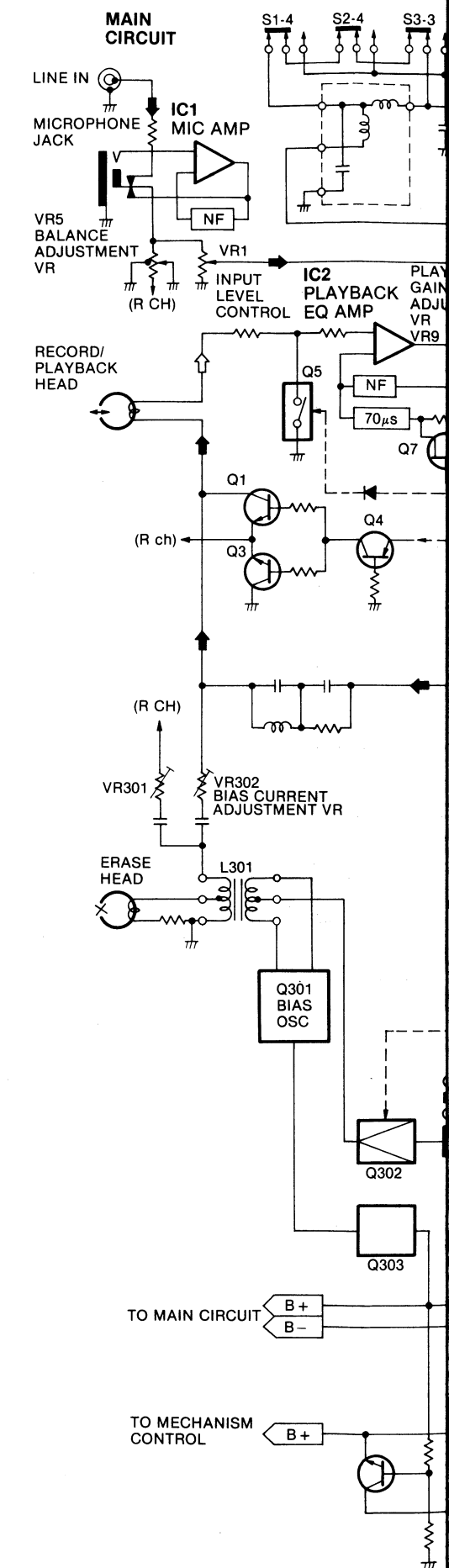


REPLACEMENT PARTS LIST

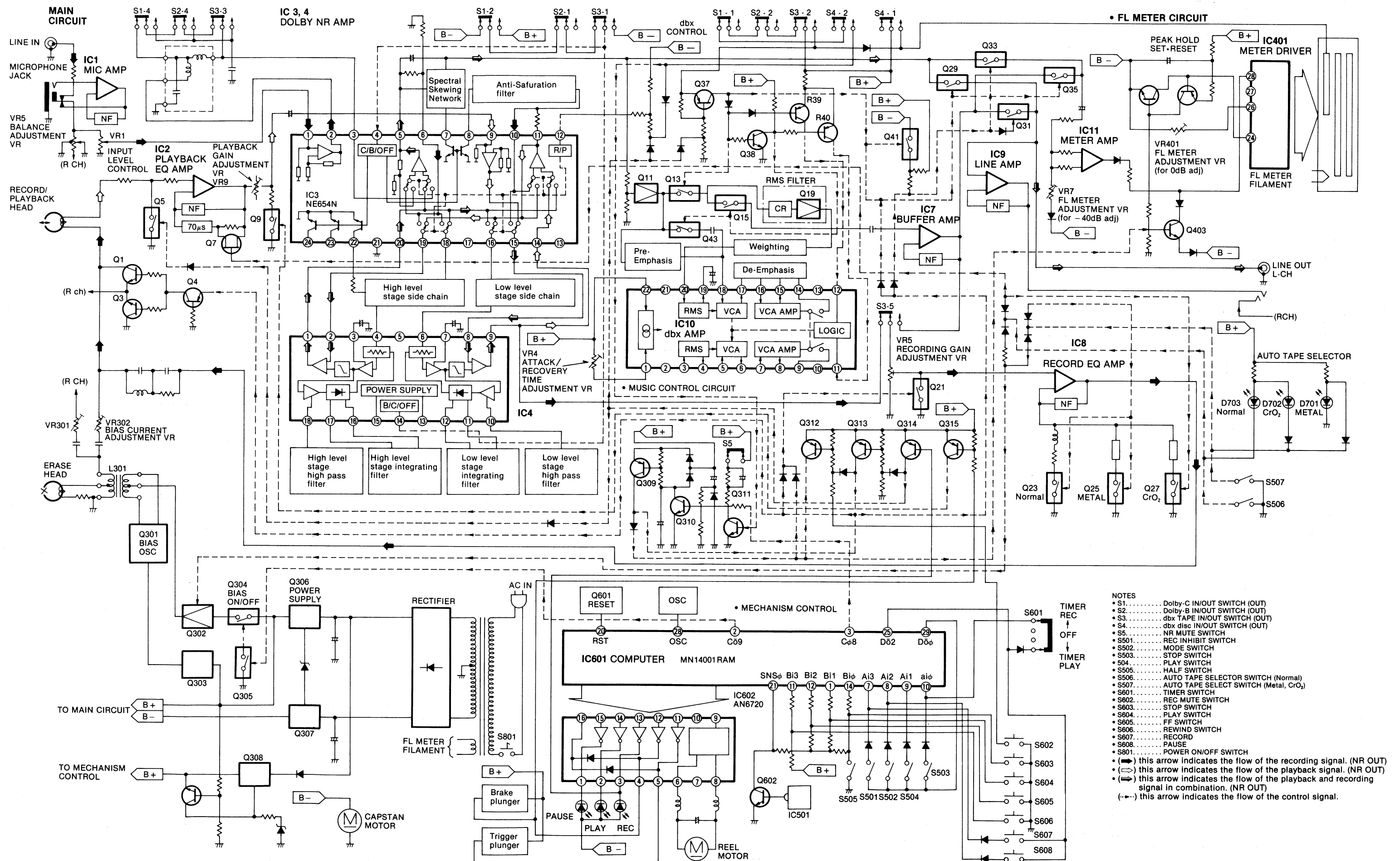
Important safety notice
Components identified by Δ mark have special characteristics important for safety.
When replacing any of these components, use only manufacturer's specified parts.

Ref No.	Part No.	Part Name & Description	Ref No.	Part No.	Part Name & Description
ELECTRICAL PARTS					
E 1	QWY4122Z	Record/Playback Head	E 21	QTD1164	Cord Clamper-A
E 2	QWY2138Z	Erase Head	E 22	QBJ1425	Cord Bushing
E 3	QJT1079	Nylon Coupler	[For United Kingdom]		
E 4	QTD1315	Nylon Binder	E 23	QTD1322	Cord Clamper-B
E 5	RME143ZA	Cord Clamper-A	E 25	[B] QTW0026	Switch Cover (for S802)
E 6	QKJ0608	Spacer (for P.C.B)	[For United Kingdom]		
E 7	XTB3 + 8BFFN	Tapping Screw $\Phi 3 \times 8$	E 26	QTW1195	Spark Killer Cover
E 8	QJT1054	Contact	E 27	QTH1178	Heat Sink
E 9	QJS1922TN	6 Pin Socket	E 28	XWA3B	Washer 3ϕ
E 10	QJS1923TN	9 Pin Socket	E 29	XSN3 + 8S	Screw $\Phi 3 \times 8$
E 11	QJP1922TN	6 Pin Post	E 30	XTN3 + 24B	Tapping Screw $3 + 24B$
E 12	QJP1923TN	9 Pin Post	E 31	QJS1996T	Jumper Socket (14 Pin)
E 13	QJS1988S	Jumper Socket (9 Pin)	E 32	QJS1987S	Jumper Socket (4 Pin)
E 14	QJS1961S	Jumper Socket (5 Pin)	E 33	QJS1983S	Jumper Socket (8 Pin)
E 15	QJS1962S	Jumper Socket (7 Pin)	E 34	QJS1989S	Jumper Socket (10 Pin)
E 16	QMA4556	Microphone Angle	E 35	QNO1070	Nut 12ϕ
E 17	QJC0061	Earth Plate-A	E 36	XTB3 + 12BFZ	Tapping Screw $\Phi 3 \times 12$
E 19	QJT1090	Check Pin	E 37	QKJ0636	Cord Clamper-B
E 20	[B] Δ QFC1205	AC Power Cord			

BLOCK DIAGRAM (L-C)

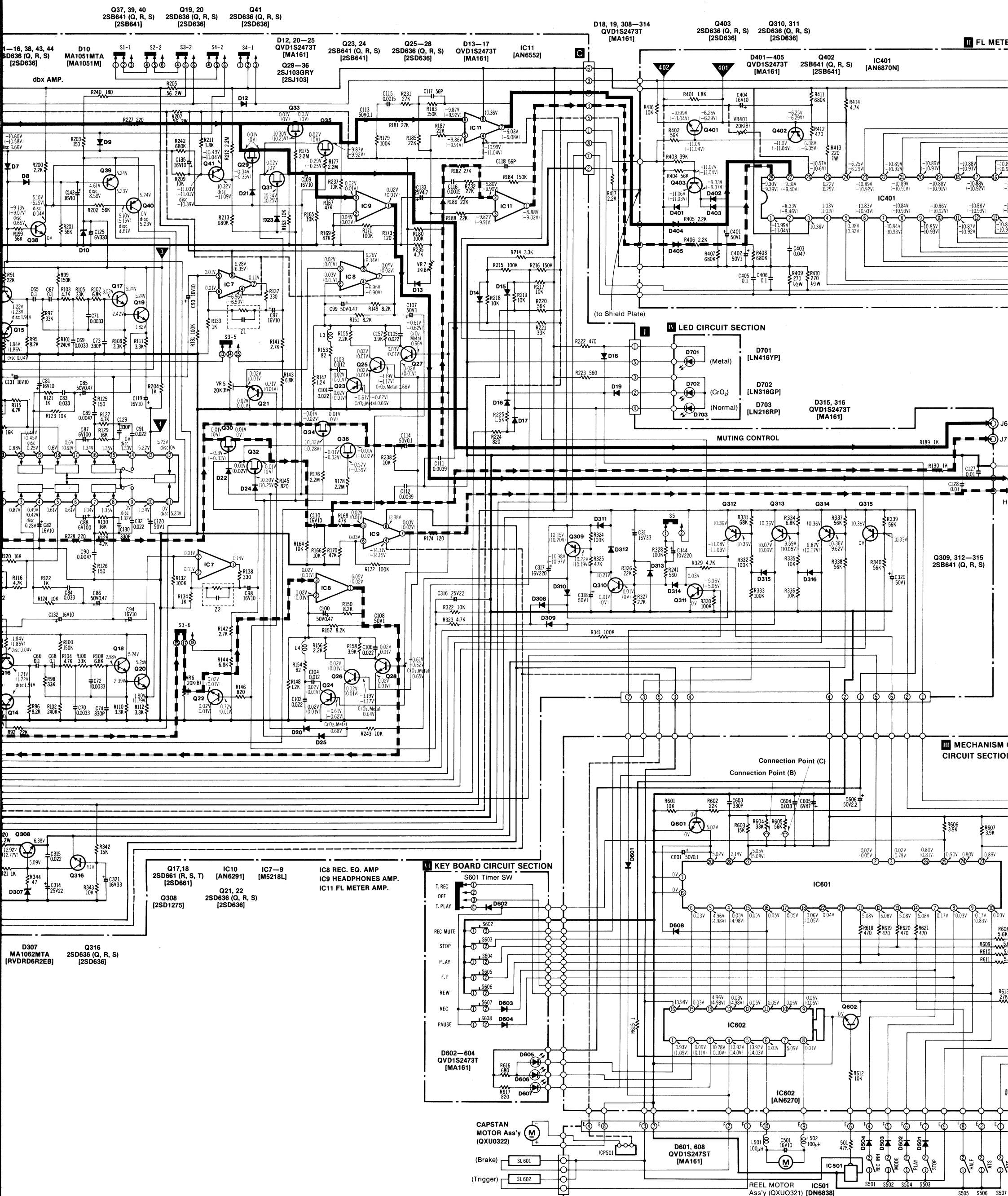


BLOCK DIAGRAM (L-CH ONLY)

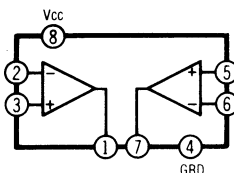
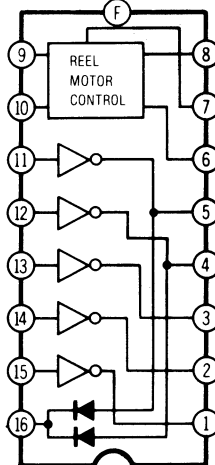
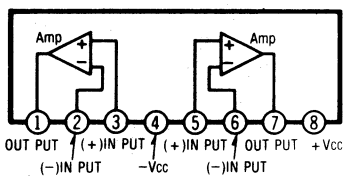


Q37, 39, 40	Q19,
2SB641 (Q, R, S)	2SD636 (Q)
[2SB641]	[2SD636]





IC1, 2, 7, 8, 9 M5218L



SPECIFICATIONS

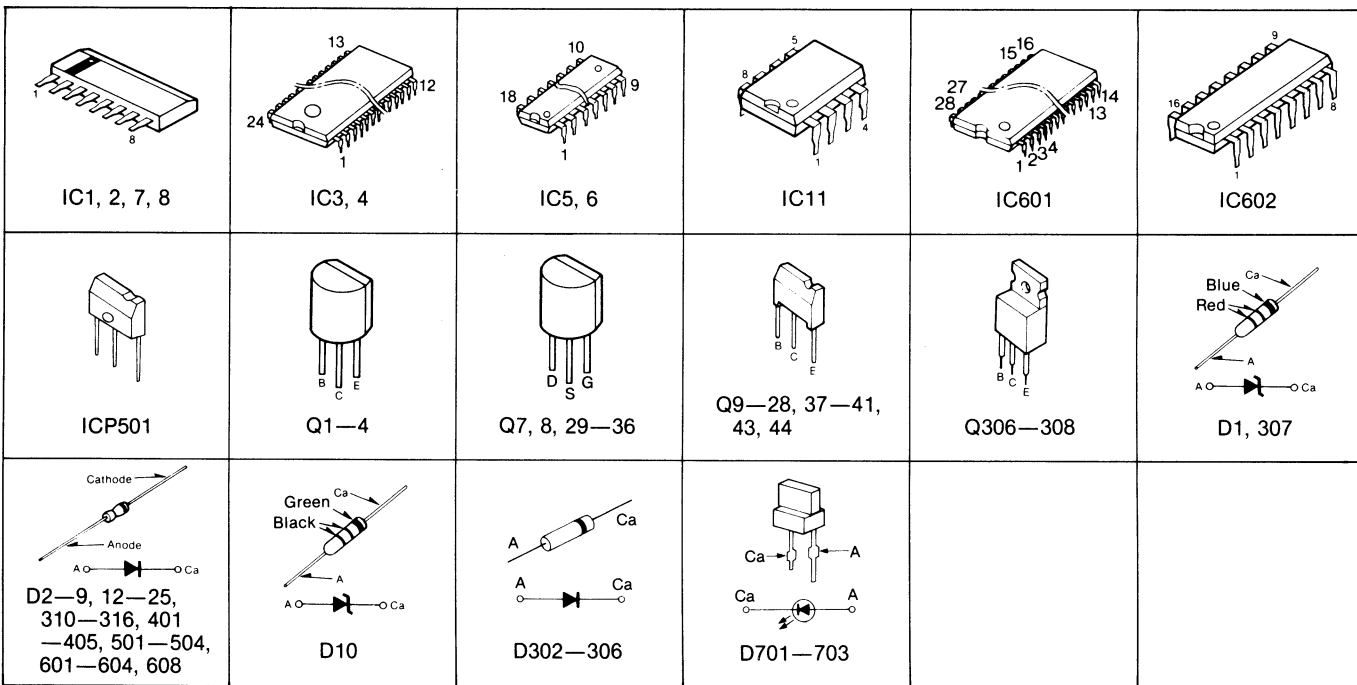
- * Input level controls...MAX
- * Valance controlCenter

Playback S/N ratio * Test tape...QZZCFM	Greater than 45dB
Overall distortion * Test tape ...QZZCRA for Normal ...QZZCRX for CrO ₂ ...QZZCRZ for Metal	Less than 4%
Overall S/N ratio * Test tape...QZZCRA	Greater than 43dB (without NAB filter)

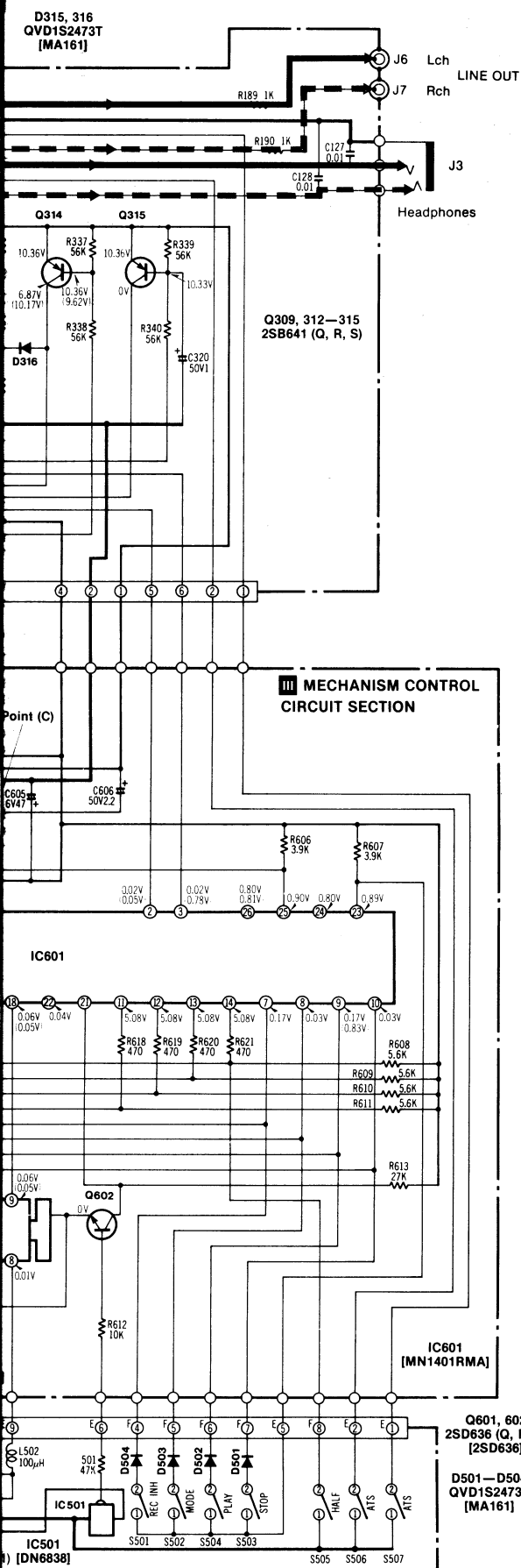
NOTES:

- S1-1—S1-4 Dolby-C IN/OUT switch (shown in out position).
- S2-1—S2-4 Dolby-B IN/OUT switch (shown in out position).
- S3-1—S3-6 dbx tape IN/OUT switch (shown in out position).
- S4-1, S4-2 dbx disc IN/OUT switch (shown in out position).
- S5 NR Mute switch (shown in OFF position).
- S501 REC inhibit switch (shown in OFF position).
- S502 Mode switch (shown in OFF position).
- S503 Stop switch (shown in OFF position).
- S504 Play switch (shown in OFF position).
- S505 Half switch (shown in OFF position).
- S506 Auto tape select switch (for Normal tape).
- S507 Auto tape select switch (for Metal/CrO₂ tape).
- S601 Timer switch (shown in (1) position).
(1)...T. REC, (2)...OFF, (3)...T. PLAY).
- S602 REC Mute switch (shown in OFF position).
- S603 Stop switch (shown in OFF position).
- S604 Play switch (shown in OFF position).
- S605 FF switch (shown in OFF position).
- S606 Rewind switch (shown in OFF position).
- S607 Record switch (shown in OFF position).
- S608 Pause switch (shown in OFF position).
- S801 Power ON/OFF switch (shown in OFF position).
- S802 AC power voltage select switch (shown in 240V position).
* For United Kingdom.
- VR1, 2 Input level control.
- VR3 Channel valance control.
- VR4 Attack recovery time adjustment VR.
- VR5, 6 Recovering gain adjustment VR.
- VR7 FL meter adjustment VR (-40dB indication).
- VR9, 10 Playback gain adjustment VR.
- VR301, 302 Bias current adjustment VR.
- VR401 FL meter adjustment VR (0dB indication).
- Point (A) Erase Current adjustment point.

TERMINATIONS

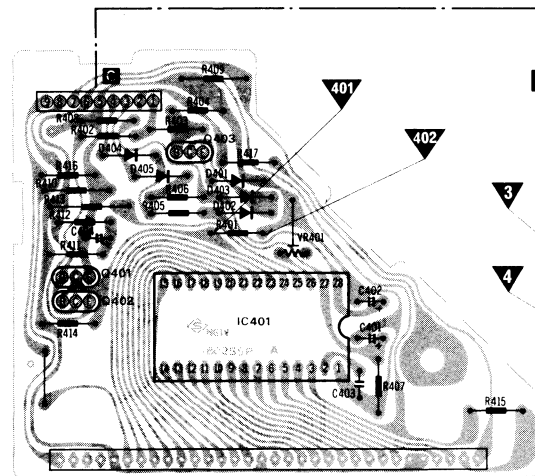


- 20 -



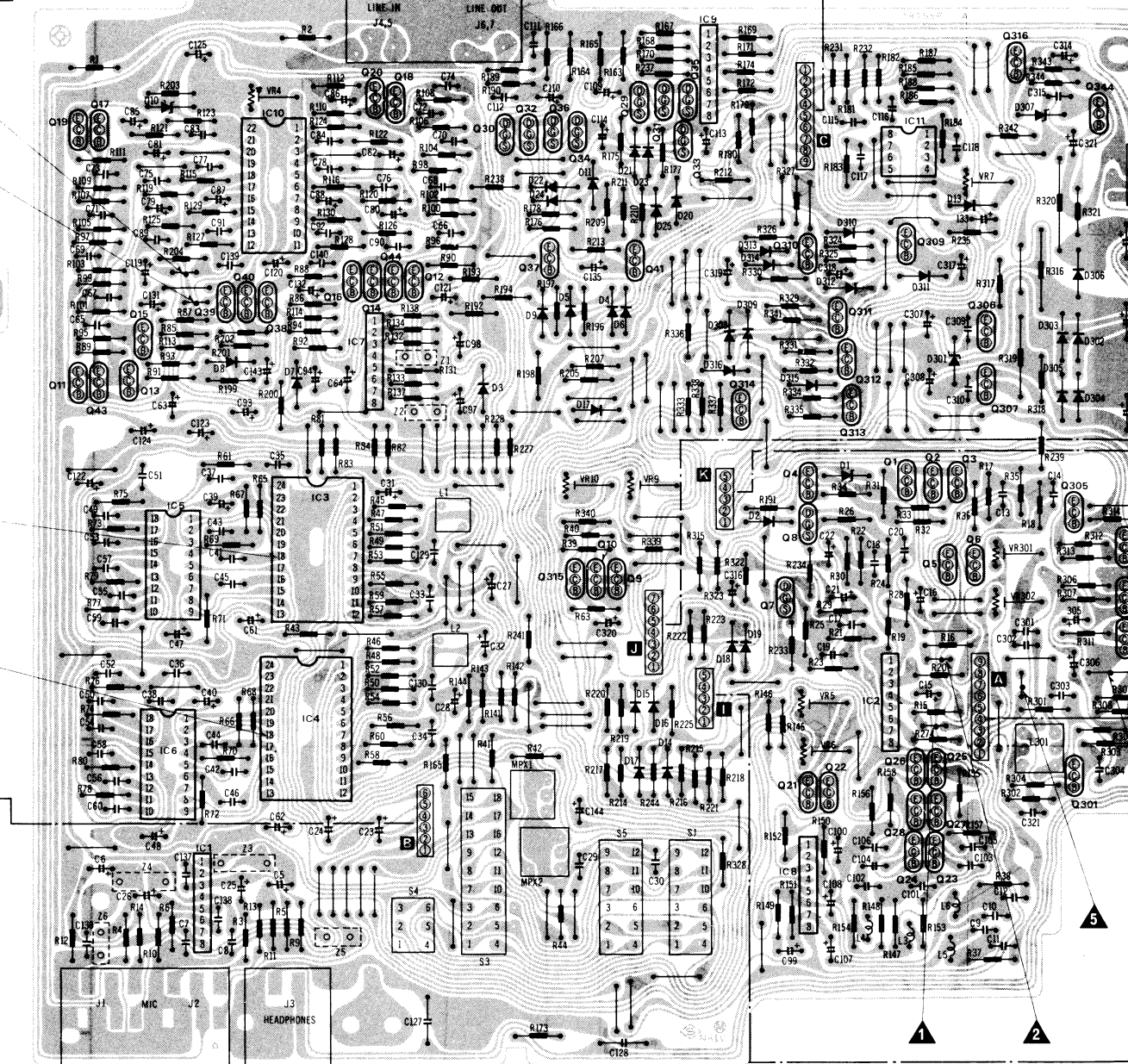
CIRCUIT BOARDS AND WIRING CONNECTION DIAGRAM

IC1 [M5218L] <table><tr><td>1</td><td>0.43V</td></tr><tr><td>2</td><td>0.00V</td></tr><tr><td>3</td><td>0.00V</td></tr><tr><td>4</td><td>-6.96V (-6.90V)</td></tr><tr><td>5</td><td>0V</td></tr><tr><td>6</td><td>0V</td></tr><tr><td>7</td><td>0.39V</td></tr><tr><td>8</td><td>6.26V (6.31V)</td></tr></table>	1	0.43V	2	0.00V	3	0.00V	4	-6.96V (-6.90V)	5	0V	6	0V	7	0.39V	8	6.26V (6.31V)	IC5 [NE652N] <table><tr><td>1</td><td>0.07V (-0.10V)</td></tr><tr><td>2</td><td>-0.07V (0.10V)</td></tr><tr><td>3</td><td>0V</td></tr><tr><td>4</td><td>0V</td></tr><tr><td>5</td><td>-7.02V (-6.91V)</td></tr><tr><td>6</td><td>0V</td></tr><tr><td>7</td><td>0V</td></tr><tr><td>8</td><td>0.07V (-0.10V)</td></tr><tr><td>9</td><td>-0.07V (0.09V)</td></tr><tr><td>10</td><td>0V</td></tr><tr><td>11</td><td>0V</td></tr><tr><td>12</td><td>0V</td></tr><tr><td>13</td><td>6.27V (6.34V)</td></tr><tr><td>14</td><td>-6.61V (-6.52V)</td></tr><tr><td>15</td><td>0V</td></tr><tr><td>16</td><td>0V</td></tr><tr><td>17</td><td>0V</td></tr><tr><td>18</td><td>0V</td></tr></table>	1	0.07V (-0.10V)	2	-0.07V (0.10V)	3	0V	4	0V	5	-7.02V (-6.91V)	6	0V	7	0V	8	0.07V (-0.10V)	9	-0.07V (0.09V)	10	0V	11	0V	12	0V	13	6.27V (6.34V)	14	-6.61V (-6.52V)	15	0V	16	0V	17	0V	18	0V	IC10 [AN6219] <table><tr><td>1</td><td>5.19V</td></tr><tr><td>2</td><td>0V</td></tr><tr><td>3</td><td>0.87V</td></tr><tr><td>4</td><td>0.49V (0.42V)</td></tr><tr><td>5</td><td>disc 0.28V</td></tr><tr><td>6</td><td>0.61V</td></tr><tr><td>7</td><td>0.61V</td></tr><tr><td>8</td><td>1.34V</td></tr><tr><td>9</td><td>1.35V</td></tr><tr><td>10</td><td>0V</td></tr><tr><td>11</td><td>disc 1.32V</td></tr><tr><td>12</td><td>1.34V</td></tr><tr><td>13</td><td>0V</td></tr><tr><td>14</td><td>disc 5.23V</td></tr><tr><td>15</td><td>5.23V</td></tr><tr><td>16</td><td>disc 0V</td></tr><tr><td>17</td><td>5.22V</td></tr><tr><td>18</td><td>0V</td></tr><tr><td>19</td><td>disc 1.33V</td></tr><tr><td>20</td><td>1.35V</td></tr><tr><td>21</td><td>1.34V</td></tr><tr><td>22</td><td>0.60V (0.61V)</td></tr><tr><td>23</td><td>0.60V</td></tr><tr><td>24</td><td>0.49V (0.45V)</td></tr><tr><td>25</td><td>disc 0.25V</td></tr><tr><td>26</td><td>0.88V</td></tr><tr><td>27</td><td>0V</td></tr><tr><td>28</td><td>5.24V</td></tr></table>	1	5.19V	2	0V	3	0.87V	4	0.49V (0.42V)	5	disc 0.28V	6	0.61V	7	0.61V	8	1.34V	9	1.35V	10	0V	11	disc 1.32V	12	1.34V	13	0V	14	disc 5.23V	15	5.23V	16	disc 0V	17	5.22V	18	0V	19	disc 1.33V	20	1.35V	21	1.34V	22	0.60V (0.61V)	23	0.60V	24	0.49V (0.45V)	25	disc 0.25V	26	0.88V	27	0V	28	5.24V	IC601 [MN14001RMA] <table><tr><td>1</td><td>0V</td></tr><tr><td>2</td><td>0.02V (0.05V)</td></tr><tr><td>3</td><td>0.02V (0.78V)</td></tr><tr><td>4</td><td>0.03V (4.98V)</td></tr><tr><td>5</td><td>4.96V (4.98V)</td></tr><tr><td>6</td><td>0.03V</td></tr><tr><td>7</td><td>0.17V</td></tr><tr><td>8</td><td>0.03V</td></tr><tr><td>9</td><td>0.17V (0.83V)</td></tr><tr><td>10</td><td>0.03V</td></tr><tr><td>11</td><td>5.08V</td></tr><tr><td>12</td><td>5.08V</td></tr><tr><td>13</td><td>5.08V</td></tr><tr><td>14</td><td>5.08V</td></tr><tr><td>15</td><td>0.05V</td></tr><tr><td>16</td><td>0.05V</td></tr><tr><td>17</td><td>0.05V</td></tr><tr><td>18</td><td>0.06V (0.05V)</td></tr><tr><td>19</td><td>0V</td></tr><tr><td>20</td><td>5.02V</td></tr><tr><td>21</td><td></td></tr><tr><td>22</td><td>0.04V</td></tr><tr><td>23</td><td>0.89V</td></tr><tr><td>24</td><td>0.80V</td></tr><tr><td>25</td><td>0.90V</td></tr><tr><td>26</td><td>0.80V (0.81V)</td></tr><tr><td>27</td><td>5.05V (5.08V)</td></tr><tr><td>28</td><td>2.14V</td></tr></table>	1	0V	2	0.02V (0.05V)	3	0.02V (0.78V)	4	0.03V (4.98V)	5	4.96V (4.98V)	6	0.03V	7	0.17V	8	0.03V	9	0.17V (0.83V)	10	0.03V	11	5.08V	12	5.08V	13	5.08V	14	5.08V	15	0.05V	16	0.05V	17	0.05V	18	0.06V (0.05V)	19	0V	20	5.02V	21		22	0.04V	23	0.89V	24	0.80V	25	0.90V	26	0.80V (0.81V)	27	5.05V (5.08V)	28	2.14V	Q7 [2SK246] <table><tr><td>S</td><td>-0.72V (-0.74V)</td></tr><tr><td>D</td><td>-0.73V (-0.75V)</td></tr><tr><td>G</td><td>4.06V (-4.04V)</td></tr><tr><td></td><td>CrO₂, Metal, -0.25V</td></tr></table>	S	-0.72V (-0.74V)	D	-0.73V (-0.75V)	G	4.06V (-4.04V)		CrO ₂ , Metal, -0.25V	Q20 [2SD636] <table><tr><td>B</td><td>2.39V</td></tr><tr><td>C</td><td>5.24V</td></tr><tr><td>E</td><td>1.80V (1.79V)</td></tr></table>	B	2.39V	C	5.24V	E	1.80V (1.79V)
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IC2 [M5220L] <table><tr><td>1</td><td>-0.75V (-0.78V)</td></tr><tr><td>2</td><td>0.04V (0.02V)</td></tr><tr><td>3</td><td>0.04V (0.02V)</td></tr><tr><td>4</td><td>-6.96V (-6.90V)</td></tr><tr><td>5</td><td>0.04V (0.02V)</td></tr><tr><td>6</td><td>0.04V (0.02V)</td></tr><tr><td>7</td><td>0.74V (-0.76V)</td></tr><tr><td>8</td><td>6.29V (6.32V)</td></tr></table>	1	-0.75V (-0.78V)	2	0.04V (0.02V)	3	0.04V (0.02V)	4	-6.96V (-6.90V)	5	0.04V (0.02V)	6	0.04V (0.02V)	7	0.74V (-0.76V)	8	6.29V (6.32V)	IC6 [NE652N] <table><tr><td>1</td><td>0.03V (-0.08V)</td></tr><tr><td>2</td><td>-0.04V (0.07V)</td></tr><tr><td>3</td><td>0V</td></tr><tr><td>4</td><td>0V</td></tr><tr><td>5</td><td>-7.02V (-6.91V)</td></tr><tr><td>6</td><td>0V</td></tr><tr><td>7</td><td>0V</td></tr><tr><td>8</td><td>0.03V (-0.08V)</td></tr><tr><td>9</td><td>-0.04V (0.07V)</td></tr><tr><td>10</td><td>0V</td></tr><tr><td>11</td><td>0V</td></tr><tr><td>12</td><td>0V</td></tr><tr><td>13</td><td>6.27V (6.34V)</td></tr><tr><td>14</td><td>-6.61V (-6.52V)</td></tr><tr><td>15</td><td>0V</td></tr><tr><td>16</td><td>0V</td></tr><tr><td>17</td><td>0V</td></tr><tr><td>18</td><td>0V</td></tr></table>	1	0.03V (-0.08V)	2	-0.04V (0.07V)	3	0V	4	0V	5	-7.02V (-6.91V)	6	0V	7	0V	8	0.03V (-0.08V)	9	-0.04V (0.07V)	10	0V	11	0V	12	0V	13	6.27V (6.34V)	14	-6.61V (-6.52V)	15	0V	16	0V	17	0V	18	0V	IC11 [AN6552] <table><tr><td>1</td><td>-8.88V (-9.02V)</td></tr><tr><td>2</td><td>-9.80V (-9.90V)</td></tr><tr><td>3</td><td>-9.82V (-9.91V)</td></tr><tr><td>4</td><td>-10.99V (-11.04V)</td></tr><tr><td>5</td><td>-9.86V (-9.91V)</td></tr><tr><td>6</td><td>-9.87V (-9.92V)</td></tr><tr><td>7</td><td>-9.03V (-9.08V)</td></tr><tr><td>8</td><td>10.36V</td></tr></table>	1	-8.88V (-9.02V)	2	-9.80V (-9.90V)	3	-9.82V (-9.91V)	4	-10.99V (-11.04V)	5	-9.86V (-9.91V)	6	-9.87V (-9.92V)	7	-9.03V (-9.08V)	8	10.36V	IC602 [AN6270] <table><tr><td>1</td><td>0.93V (1.09V)</td></tr><tr><td>2</td><td>0.09V (0.11V)</td></tr><tr><td>3</td><td>10.28V (0.10V)</td></tr><tr><td>4</td><td>13.92V (14.0V)</td></tr><tr><td>5</td><td>13.92V (14.03V)</td></tr><tr><td>6</td><td>0.01V</td></tr><tr><td>7</td><td>5.09V</td></tr><tr><td>8</td><td>0.01V</td></tr><tr><td>9</td><td>0.06V (0.05V)</td></tr><tr><td>10</td><td>0.05V</td></tr><tr><td>11</td><td>0.05V</td></tr><tr><td>12</td><td>0.05V</td></tr><tr><td>13</td><td>0.03V (4.98V)</td></tr><tr><td>14</td><td>4.98V</td></tr><tr><td>15</td><td>0.03V</td></tr><tr><td>16</td><td>13.98V</td></tr></table>	1	0.93V (1.09V)	2	0.09V (0.11V)	3	10.28V (0.10V)	4	13.92V (14.0V)	5	13.92V (14.03V)	6	0.01V	7	5.09V	8	0.01V	9	0.06V (0.05V)	10	0.05V	11	0.05V	12	0.05V	13	0.03V (4.98V)	14	4.98V	15	0.03V	16	13.98V	Q8 [2SK246] <table><tr><td>S</td><td>0.02V (0V)</td></tr><tr><td>D</td><td>0.01V (-0.01V)</td></tr><tr><td>G</td><td>-4.06V (-4.05V)</td></tr><tr><td></td><td>CrO₂, Metal 0.23V</td></tr></table>	S	0.02V (0V)	D	0.01V (-0.01V)	G	-4.06V (-4.05V)		CrO ₂ , Metal 0.23V	Q21 [2SD636] <table><tr><td>B</td><td>0.71V (0.01V)</td></tr><tr><td>C</td><td>0.02V (0.01V)</td></tr><tr><td>E</td><td>0.02V (0.01V)</td></tr></table>	B	0.71V (0.01V)	C	0.02V (0.01V)	E	0.02V (0.01V)																																																																
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IC4 [NE654N] <table><tr><td>1</td><td>-0.01V</td></tr><tr><td>2</td><td>0.07V</td></tr><tr><td>3</td><td>0.04V</td></tr><tr><td>4</td><td>-6.61V (-6.52V)</td></tr><tr><td>5</td><td>0.03V (0.10V)</td></tr><tr><td>6</td><td>0.02V (0.07V)</td></tr><tr><td>7</td><td>0V</td></tr><tr><td>8</td><td>-0.04V (-0.08V)</td></tr><tr><td>9</td><td>-0.01V</td></tr><tr><td>10</td><td>-0.04V (-0.08V)</td></tr><tr><td>11</td><td>-0.04V (-0.08V)</td></tr><tr><td>12</td><td>-7.00V (6.76V)</td></tr><tr><td>13</td><td>6.27V (6.34V)</td></tr><tr><td>14</td><td>-0.04V (0.07V)</td></tr><tr><td>15</td><td>0.03V (-0.08V)</td></tr><tr><td>16</td><td>-0.04V (-0.08V)</td></tr><tr><td>17</td><td>-7.00V (-6.91V)</td></tr><tr><td>18</td><td>0.03V (0.07V)</td></tr><tr><td>19</td><td>-0.04V (0.07V)</td></tr><tr><td>20</td><td>0.03V (-0.08V)</td></tr><tr><td>21</td><td>0V</td></tr><tr><td>22</td><td>0V</td></tr><tr><td>23</td><td>0V</td></tr><tr><td>24</td><td>0V</td></tr></table>	1	-0.01V	2	0.07V	3	0.04V	4	-6.61V (-6.52V)	5	0.03V (0.10V)	6	0.02V (0.07V)	7	0V	8	-0.04V (-0.08V)	9	-0.01V	10	-0.04V (-0.08V)	11	-0.04V (-0.08V)	12	-7.00V (6.76V)	13	6.27V (6.34V)	14	-0.04V (0.07V)	15	0.03V (-0.08V)	16	-0.04V (-0.08V)	17	-7.00V (-6.91V)	18	0.03V (0.07V)	19	-0.04V (0.07V)	20	0.03V (-0.08V)	21	0V	22	0V	23	0V	24	0V	IC8 [M5218L] <table><tr><td>1</td><td>0.05V (0.02V)</td></tr><tr><td>2</td><td>0.02V (0.01V)</td></tr><tr><td>3</td><td>0.02V (0.01V)</td></tr><tr><td>4</td><td>-6.96V (-6.90V)</td></tr><tr><td>5</td><td>0.02V (0.01V)</td></tr><tr><td>6</td><td>0.03V (0.01V)</td></tr><tr><td>7</td><td>0.05V (0.02V)</td></tr><tr><td>8</td><td>6.26V (6.34V)</td></tr></table>	1	0.05V (0.02V)	2	0.02V (0.01V)	3	0.02V (0.01V)	4	-6.96V (-6.90V)	5	0.02V (0.01V)	6	0.03V (0.01V)	7	0.05V (0.02V)	8	6.26V (6.34V)	IC9 [M5218L] <table><tr><td>1</td><td>0.02V (0.01V)</td></tr><tr><td>2</td><td>0.04V (0.03V)</td></tr><tr><td>3</td><td>0.02V (0.01V)</td></tr><tr><td>4</td><td>-14.31V (-14.15V)</td></tr><tr><td>5</td><td>0.02V (0.01V)</td></tr><tr><td>6</td><td>0.03V (0.03V)</td></tr><tr><td>7</td><td>0.03V (0.02V)</td></tr><tr><td>8</td><td>13.98V (13.98V)</td></tr></table>	1	0.02V (0.01V)	2	0.04V (0.03V)	3	0.02V (0.01V)	4	-14.31V (-14.15V)	5	0.02V (0.01V)	6	0.03V (0.03V)	7	0.03V (0.02V)	8	13.98V (13.98V)	Q14 [2SD636] <table><tr><td>B</td><td>-9.11V (-9.08V)</td></tr><tr><td>C</td><td>1.92V</td></tr><tr><td>E</td><td>1.21V (1.22V)</td></tr><tr><td></td><td>disc 1.91V</td></tr></table>	B	-9.11V (-9.08V)	C	1.92V	E	1.21V (1.22V)		disc 1.91V	Q15 [2SD636] <table><tr><td>B</td><td>1.84V (1.86V)</td></tr><tr><td></td><td>disc 0.04V</td></tr><tr><td>C</td><td>1.22V (1.23V)</td></tr><tr><td>E</td><td>1.22V (1.23V)</td></tr><tr><td></td><td>disc 1.91V</td></tr></table>	B	1.84V (1.86V)		disc 0.04V	C	1.22V (1.23V)	E	1.22V (1.23V)		disc 1.91V	Q23, 24 [2SB641] <table><tr><td>B</td><td>-0.61V (-0.62V)</td></tr><tr><td></td><td>CrO₂, Metal 0.66V</td></tr><tr><td>C</td><td>0.02V (0.01V)</td></tr><tr><td>E</td><td>0.02V (0.01V)</td></tr></table>	B	-0.61V (-0.62V)		CrO ₂ , Metal 0.66V	C	0.02V (0.01V)	E	0.02V (0.01V)	Q16 [2SD636] <table><tr><td>B</td><td>1.84V (1.85V)</td></tr><tr><td></td><td>disc 0.04V</td></tr><tr><td>C</td><td>1.22V (1.23V)</td></tr><tr><td>E</td><td>1.21V (1.22V)</td></tr><tr><td></td><td>disc (1.91V)</td></tr></table>	B	1.84V (1.85V)		disc 0.04V	C	1.22V (1.23V)	E	1.21V (1.22V)		disc (1.91V)	Q27 [2SD636] <table><tr><td>B</td><td>-0.61V (-0.62V)</td></tr><tr><td></td><td>CrO₂, Metal 0.66V</td></tr><tr><td>C</td><td>0.03V (0.01V)</td></tr><tr><td>E</td><td>0.02V (0.01V)</td></tr></table>	B	-0.61V (-0.62V)		CrO ₂ , Metal 0.66V	C	0.03V (0.01V)	E	0.02V (0.01V)																																																				
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Q5, 6 [2SD636] <table><tr><td>B</td><td>-6.88V (-0.79V)</td></tr><tr><td>C</td><td>0.02V (0.01V)</td></tr><tr><td>E</td><td>0.04V (0.01V)</td></tr></table>	B	-6.88V (-0.79V)	C	0.02V (0.01V)	E	0.04V (0.01V)	Q17 [2SD661] <table><tr><td>B</td><td>3.02V</td></tr><tr><td>C</td><td>5.24V</td></tr><tr><td>E</td><td>2.42V</td></tr></table>	B	3.02V	C	5.24V	E	2.42V	Q18 [2SD661] <table><tr><td>B</td><td>2.98V</td></tr><tr><td>C</td><td>5.24V</td></tr><tr><td>E</td><td>2.39V</td></tr></table>	B	2.98V	C	5.24V	E	2.39V	Q19 [2SD636] <table><tr><td>B</td><td>2.42V</td></tr><tr><td>C</td><td>5.24V</td></tr><tr><td>E</td><td>1.82V</td></tr></table>	B	2.42V	C	5.24V	E	1.82V	Q26 [2SD636] <table><tr><td>B</td><td>-1.19V (-1.17V)</td></tr><tr><td></td><td>CrO₂, Metal 0.64V</td></tr><tr><td>C</td><td>0.02V (0.01V)</td></tr><tr><td>E</td><td>0.02V (0.01V)</td></tr></table>	B	-1.19V (-1.17V)		CrO ₂ , Metal 0.64V	C	0.02V (0.01V)	E	0.02V (0.01V)	Q29 [2SJ103] <table><tr><td>S</td><td>0.01V (0V)</td></tr><tr><td>D</td><td>0.01V (0V)</td></tr><tr><td>G</td><td>-0.34V (-0.35V)</td></tr></table>	S	0.01V (0V)	D	0.01V (0V)	G	-0.34V (-0.35V)																																																																																																																																												
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Q28 [2SD636] <table><tr><td>B</td><td>-1.19V (-1.17V)</td></tr><tr><td></td><td>CrO₂, Metal 0.64V</td></tr><tr><td>C</td><td>0.02V (0.01V)</td></tr><tr><td>E</td><td>0.02V (0.01V)</td></tr></table>	B	-1.19V (-1.17V)		CrO ₂ , Metal 0.64V	C	0.02V (0.01V)	E	0.02V (0.01V)	Q30 [2SJ103] <table><tr><td>S</td><td>0.01V (0V)</td></tr><tr><td>D</td><td>0.01V (0V)</td></tr><tr><td>G</td><td>-0.30V (-0.31V)</td></tr></table>	S	0.01V (0V)	D	0.01V (0V)	G	-0.30V (-0.31V)	Q31 [2SJ103] <table><tr><td>S</td><td>0.02V (0V)</td></tr><tr><td>D</td><td>0.01V (0V)</td></tr><tr><td>G</td><td>10.34V (10.25V)</td></tr></table>	S	0.02V (0V)	D	0.01V (0V)	G	10.34V (10.25V)	Q32 [2SJ103] <table><tr><td>S</td><td>-0.01V (-0.02V)</td></tr><tr><td>D</td><td>0.01V (0V)</td></tr><tr><td>G</td><td>10.30V (10.25V)</td></tr></table>	S	-0.01V (-0.02V)	D	0.01V (0V)	G	10.30V (10.25V)	Q33 [2SJ103] <table><tr><td>S</td><td>0.01V (0V)</td></tr><tr><td>D</td><td>0.01V (0V)</td></tr><tr><td>G</td><td>10.30V (10.25V)</td></tr></table>	S	0.01V (0V)	D	0.01V (0V)	G	10.30V (10.25V)																																																																																																																																																			
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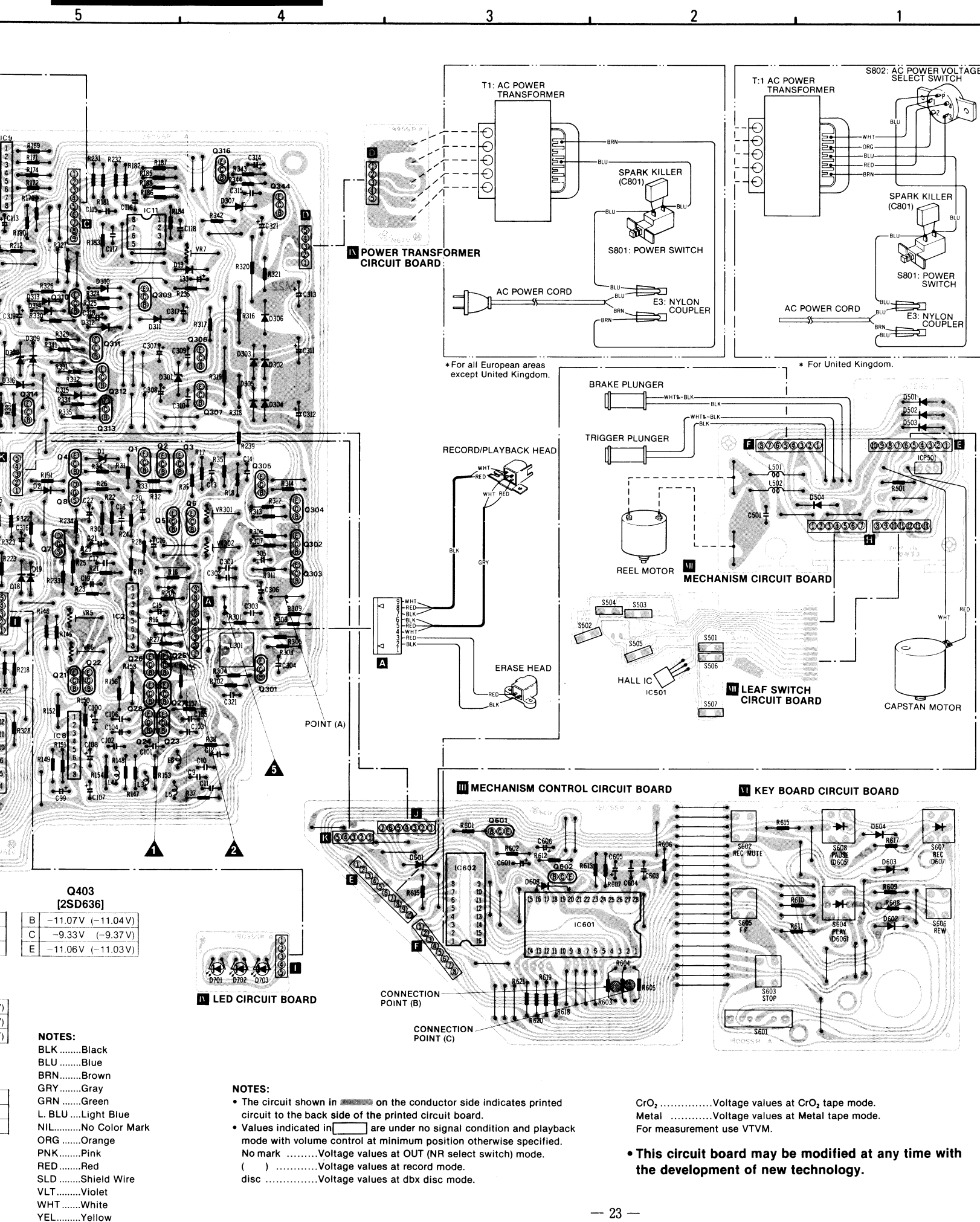


SLIDE VOLUME CIRCUIT BOARD

MAIN CIRCUIT BOARD



Q301 [2SD1225] B -4.83V (-3.73V) C -4.82V (1.19V) E -4.84V (-4.11V)	Q302 [2SD638] B -4.37V (1.91V) C -4.38V (10.28V) E -4.82V (1.27V)	Q303 [2SB641] B -5.31V (-4.95V) C -11.07V (-11.05V) E -4.84V (-4.28V)	Q304 [2SD636] B 0.01V (0.64V) C 10.37V (0.05V) E 0V	Q305 [2SD636] B 0.01V (0V) C 10.21V E 0.01V (0V)	Q306 [2SD1265] B 10.37V (10.36V) C 12.85V (12.63V) E 10.36V	Q307 [2SB941] B -11.67V (-11.66V) C -13.75V (-13.52V) E -11.07V (-11.05V)	Q308 [2SD1275] B 5.09V C 12.92V (12.77V) E 6.38V	Q309 [2SD636] B 0.01V (0V) C 10.21V E 0.01V (0V)	Q310 [2SD636] B 0.01V (0V) C 10.21V E 0.01V (0V)	Q311 [2SD636] B -5.06V (-5.05V) C 0.03V E 0V	Q312 [2SB641] B 10.36V C -11.04V (-11.03V) E 10.36V	Q313 [2SB641] B 10.36V C 10.07V (0.09V) E 10.36V	Q314 [2SB641] B -11.0V (-11.04V) C -6.25V (-6.29V) E -10.99V (-11.04V)	Q315 [2SB641] B 10.33V C 0V E 10.3V	Q316 [2SD636] B 4.1V C 5.09V E 6.38V	Q317 [2SD636] B -11.0V (-11.04V) C -6.25V (-6.29V) E -10.99V (-11.04V)	Q318 [2SD636] B -11.0V (-11.04V) C -6.25V (-6.29V) E -10.99V (-11.04V)	Q319 [2SD636] B -11.0V (-11.04V) C -6.25V (-6.29V) E -10.99V (-11.04V)	Q320 [2SD636] B -11.0V (-11.04V) C -6.25V (-6.29V) E -10.99V (-11.04V)	Q321 [2SD636] B -11.0V (-11.04V) C -6.25V (-6.29V) E -10.99V (-11.04V)	Q322 [2SD636] B -11.0V (-11.04V) C -6.25V (-6.29V) E -10.99V (-11.04V)	Q323 [2SD636] B -11.0V (-11.04V) C -6.25V (-6.29V) E -10.99V (-11.04V)	Q324 [2SD636] B -11.0V (-11.04V) C -6.25V (-6.29V) E -10.99V (-11.04V)	Q325 [2SD636] B -11.0V (-11.04V) C -6.25V (-6.29V) E -10.99V (-11.04V)	Q326 [2SD636] B -11.0V (-11.04V) C -6.25V (-6.29V) E -10.99V (-11.04V)	Q327 [2SD636] B -11.0V (-11.04V) C -6.25V (-6.29V) E -10.99V (-11.04V)	Q328 [2SD636] B -11.0V (-11.04V) C -6.25V (-6.29V) E -10.99V (-11.04V)	Q329 [2SD636] B -11.0V (-11.04V) C -6.25V (-6.29V) E -10.99V (-11.04V)	Q330 [2SD636] B -11.0V (-11.04V) C -6.25V (-6.29V) E -10.99V (-11.04V)	Q331 [2SD636] B -11.0V (-11.04V) C -6.25V (-6.29V) E -10.99V (-11.04V)	Q332 [2SD636] B -11.0V (-11.04V) C -6.25V (-6.29V) E -10.99V (-11.04V)	Q333 [2SD636] B -11.0V (-11.04V) C -6.25V (-6.29V) E -10.99V (-11.04V)	Q334 [2SD636] B -11.0V (-11.04V) C -6.25V (-6.29V) E -10.99V (-11.04V)	Q335 [2SD636] B -11.0V (-11.04V) C -6.25V (-6.29V) E -10.99V (-11.04V)	Q336 [2SD636] B -11.0V (-11.04V) C -6.25V (-6.29V) E -10.99V (-11.04V)	Q337 [2SD636] B -11.0V (-11.04V) C -6.25V (-6.29V) E -10.99V (-11.04V)	Q338 [2SD636] B -11.0V (-11.04V) C -6.25V (-6.29V) E -10.99V (-11.04V)	Q339 [2SD636] B -11.0V (-11.04V) C -6.25V (-6.29V) E -10.99V (-11.04V)	Q340 [2SD636] B -11.0V (-11.04V) C -6.25V (-6.29V) E -10.99V (-11.04V)	Q341 [2SD636] B -11.0V (-11.04V) C -6.25V (-6.29V) E -10.99V (-11.04V)	Q342 [2SD636] B -11.0V (-11.04V) C -6.25V (-6.29V) E -10.99V (-11.04V)	Q343 [2SD636] B -11.0V (-11.04V) C -6.25V (-6.29V) E -10.99V (-11.04V)	Q344 [2SD636] B -11.0V (-11.04V) C -6.25V (-6.29V) E -10.99V (-11.04V)	Q345 [2SD636] B -11.0V (-11.04V) C -6.25V (-6.29V) E -10.99V (-11.04V)	Q346 [2SD636] B -11.0V (-11.04V) C -6.25V (-6.29V) E -10.99V (-11.04V)	Q347 [2SD636] B -11.0V (-11.04V) C -6.25V (-6.29V) E -10.99V (-11.04V)	Q348 [2SD636] B -11.0V (-11.04V) C -6.25V (-6.29V) E -10.99V (-11.04V)	Q349 [2SD636] B -11.0V (-11.04V) C -6.25V (-6.29V) E -10.99V (-11.04V)	Q350 [2SD636] B -11.0V (-11.04V) C -6.25V (-6.29V) E -10.99V (-11.04V)	Q351 [2SD636] B -11.0V (-11.04V) C -6.25V (-6.29V) E -10.99V (-11.04V)	Q352 [2SD636] B -11.0V (-11.04V) C -6.25V (-6.29V) E -10.99V (-11.04V)	Q353 [2SD636] B -11.0V (-11.04V) C -6.25V (-6.29V) E -10.99V (-11.04V)	Q354 [2SD636] B -11.0V (-11.04V) C -6.25V (-6.29V) E -10.99V (-11.04V)	Q355 [2SD636] B -11.0V (-11.04V) C -6.25V (-6.29V) E -10.99V (-11.04V)	Q356 [2SD636] B -11.0V (-11.04V) C -6.25V (-6.29V) E -10.99V (-11.04V)	Q357 [2SD636] B -11.0V (-11.04V) C -6.25V (-6.29V) E -10.99V (-11.04V)	Q358 [2SD636] B -11.0V (-11.04V) C -6.25V (-6.29V) E -10.99V (-11.04V)	Q359 [2SD636] B -11.0V (-11.04V)
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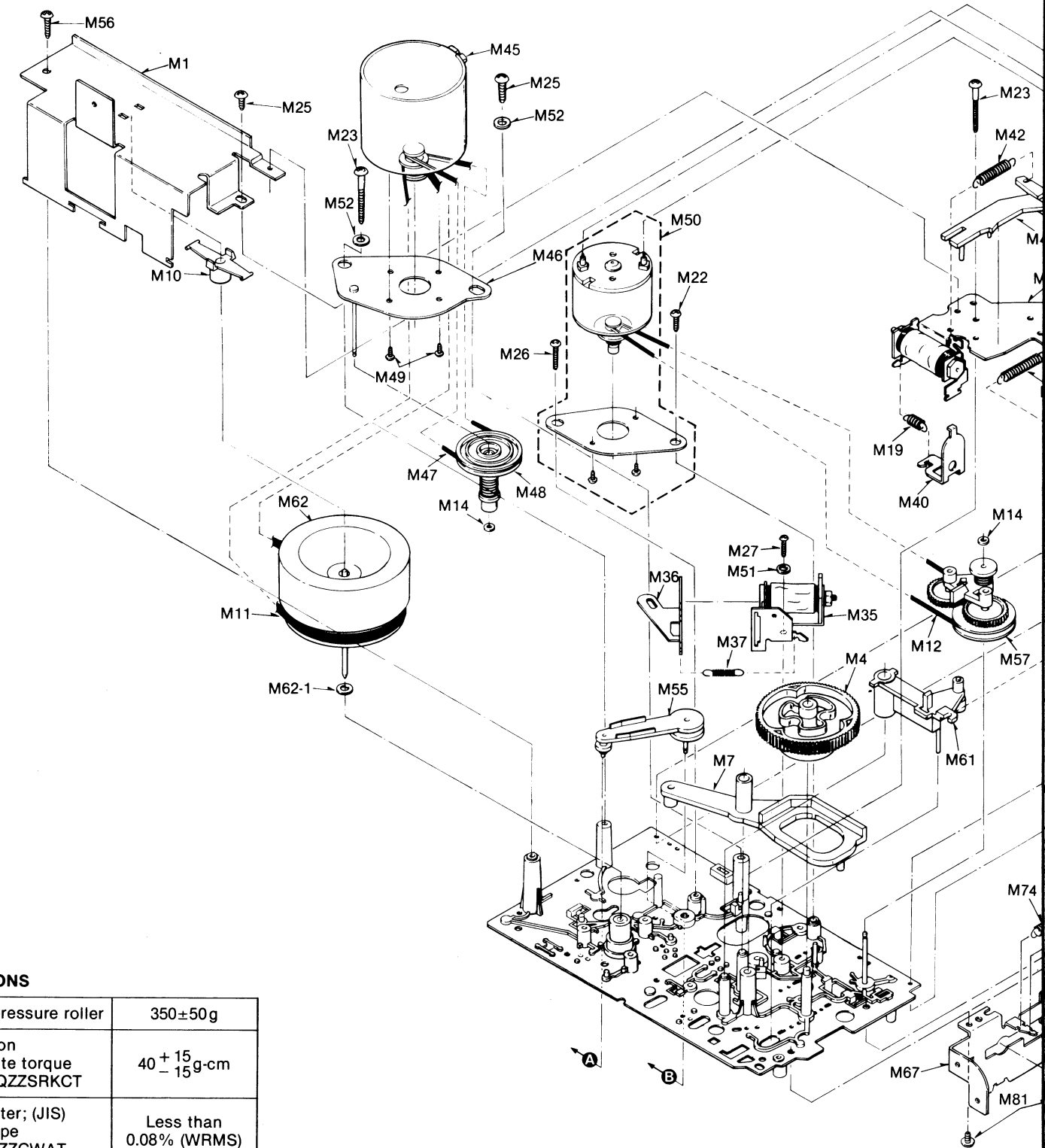
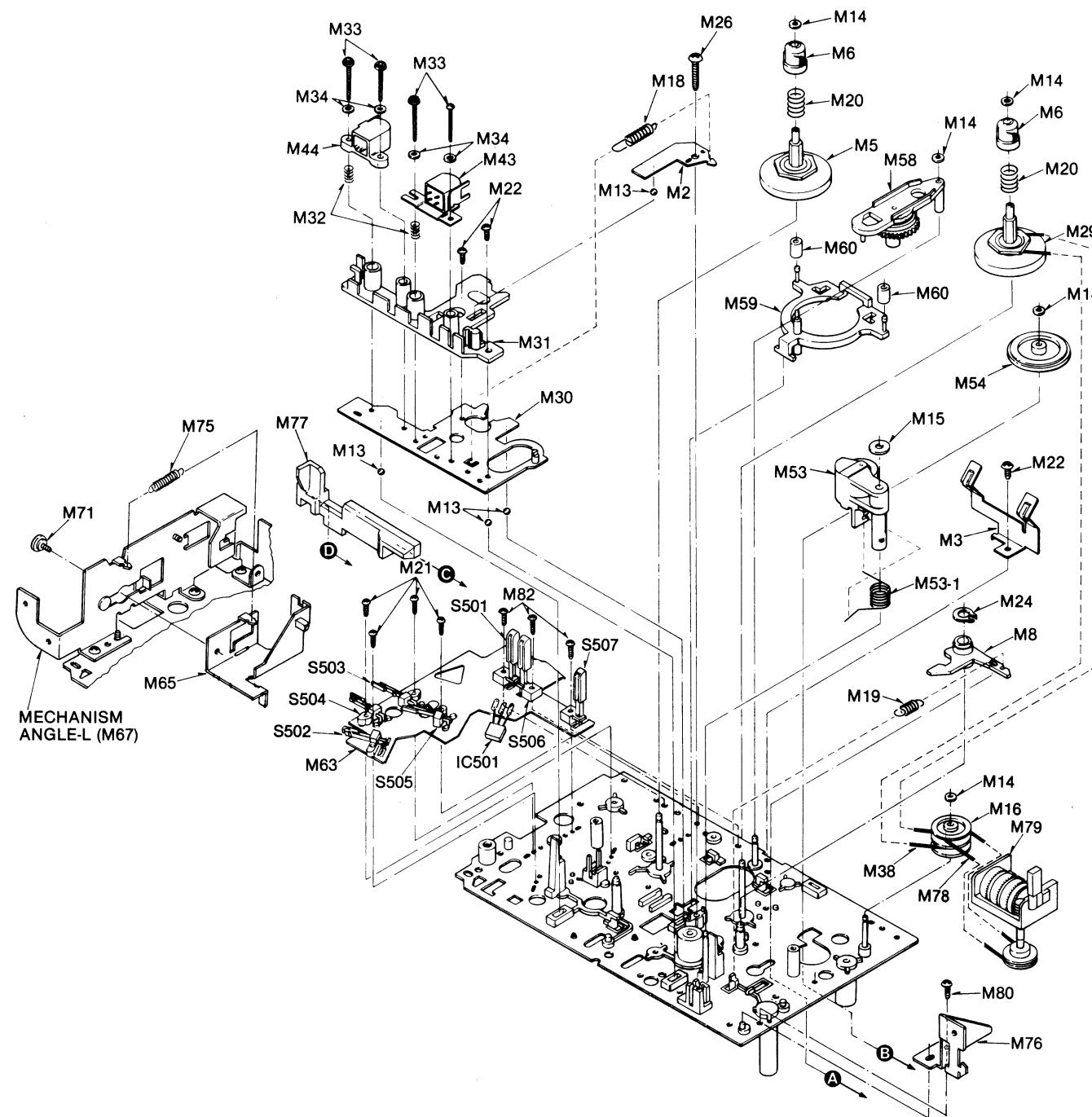
REPLACEMENT PARTS LIST

Important safety notice
Components identified by Δ mark have special characteristics important for safety.
When replacing any of these components, use only manufacturer's specified parts.

Ref No.	Part No.	Ref No.	Part No.	Ref No.	Part No.	Ref No.	Part No.	Ref No.	Part No.
RESISTORS				INTEGRATED CIRCUITS				IC PROTECTOR	
R 1, 2	ERD25TJ273	R 189, 190	ERD25FJ102	R 603	ERD25TJ153	C 133	ECEA25Z4R7	D 302, 303, 304, 305, 306	IC 1 M5220L IC 2 NE654N IC 5, 6 NE652N IC 7, 8, 9 M5218L IC 10 AN6291 IC 11 AN6552 IC 401 AN6870N IC 501 DN6838 IC 601 MN14001RMA IC 602 AN6270
R 3, 4	ERD25FJ102	R 191	ERD25FJ221	R 604	ERD25TJ333	C 135	ECEA1HS100	Δ SM112	
R 5, 6	ERD25TJ273	R 192	ERD25TJ104	R 605	ERD25TJ563	C 136	ECFDD103KXY	D 307 RVD6R2EB	
R 9, 10	ERD25FJ102	R 193	ERD25FJ103	R 606, 607	ERD25FJ392	C 137, 138	ECDD1H820K	D 308, 309, 310, 311, 312, 313, 314, 315, 316	
R 11, 12	ERD25TJ224	R 194	ERD25FJ102	R 608, 609, 610, 611	ERD25FJ562	C 139, 140	ECDD1H331J	MA161	
R 13, 14	ERD25FJ472	R 195	ERD25FJ332	R 612	ERD25FJ103	C 143	ECEA1HS100	D 401, 402, 403, 404, 405	
R 15, 16	ERD25FJ100	R 196, 197	ERD25TJ563	R 613	ERD25FJ273	C 144	ECEA1AS221	MA161	
R 17, 18	ERD25TJ104	R 198	ERD25TJ104	R 615	ERD25FJ1R0	C 301, 302	ECDD1H101K	D 501, 502, 503, 504	
R 19, 20	ERD25FJ101	R 199	ERD25TJ563	R 616	ERD25FJ681	C 303	ECQP1H83JZ	MA161	
R 21, 22	ERD25TJ824	R 200	ERD25FJ222	R 617	ERD25FJ821	C 304	ECFDD822KXY	D 601, 602, 603, 604	
R 23, 24	ERD25TJ183	R 201, 202	ERD25TJ563	R 618, 619, 620, 621	ERD25FJ471	C 305	ECEA25Z4R7	MA161	
R 25, 26	ERD25TJ123	R 203	ERD25FJ151	VARIABLE RESISTORS					
R 27, 28	ERD25FJ391	R 204	ERD25FJ102	VR 1, 2	QVBP1PUA54	C 306	ECEA1ES220	D 608	
R 29, 30	ERD25TJ104	R 205, 207	ERG2ANJ560	VR 3	QVAV5KUG15	C 307	ECEA1CS330	D 701	
R 31, 32	ERD25FJ472	R 209	ERD25FJ103	VR 4	EVNM4AA00B23	C 308	ECEA1CSS331	D 702	
R 33	ERD25FJ561	R 211	ERD25FJ182	VR 5, 6	EVNM4AA00B24	C 309, 310	ECKD1H223ZF	D 703	
R 34	ERD25TJ223	R 212	ERD25TJ225	VR 7, 8	ECFDD223KXY	C 311 Δ	ECEA1ES332	MA161	
R 35, 36	ERD25FJ102	R 213	ERD25TJ684	VR 9, 10	EVNM4AA00B15	C 312, 313	ECEA1CS222	LN416YP	
R 37, 38	ERD25TJ123	R 214	ERD25FJ332	VR 301, 302	EVNM4AA00B24	Δ	ECEA1CS222	LN316GP	
R 39, 40	ERD25FJ151	R 215	ERD25TJ104	CAPACITORS				LN216RP	
R 41, 42	ERD25FJ272	R 216	ERD25TJ154	C 5, 6	ECEA50Z1	C 314	ECKD1H223ZF		
R 43, 44	ERD25FJ472	R 217, 218, 219	ERD25FJ103	C 7, 8	ECFDD223KXY	C 315	ECEA1ES220		
R 45, 46	ERD25FJ101	R 220	ERD25TJ563	C 9, 10	ECKD2H121KB	C 316	ECEA1ES220		
R 47, 48	ERD25FJ512	R 221	ERD25TJ333	C 11, 12	ECKD1H561KB	C 317	ECEA1CS221		
R 49, 50	ERD25FJ103	R 222	ERD25FJ471	C 13, 14	ECKD1H471KB	C 318	ECEA50Z1		
R 51, 52	ERD25FJ102	R 223	ERD25FJ561	C 15, 16	ECEA1AS470	C 319	ECEA1CS330		
R 53, 54	ERD25TJ224	R 224	ERD25FJ821	C 17, 18	ECQM1H392JZ	C 320	ECEA50Z1		
R 55, 56	ERD25TJ683	R 225	ERD25FJ152	C 19, 20	ECDD1H470KC	C 321	ECFDD153KXY		
R 57, 58	ERD25FJ512	R 227, 228	ERD25FJ221	C 21, 22	ECEA50Z1	C 322	ECEA1CS330		
R 59, 60	ERD25FJ222	R 231, 232	ERD25TJ273	C 23, 24	ECQV05224JZ	C 401, 402	ECEA50Z1		
R 61, 62	ERD25TJ823	R 233, 234	ERD25TJ225	C 25, 26	ECEA25Z4R7	C 403	ECFDD473KXY		
R 63	ERD25TJ103	R 235	ERD25FJ472	C 27, 28	ECEA50Z1	C 404	ECEA1HS100		
R 65, 66	ERD25FJ472	R 237, 238, 239	ERD25FJ103	C 29, 30	ECFDD392KXY	C 405, 406	ECQM1H104JZ		
R 67, 68	ERD25TJ123		ERD25FJ181	C 31, 32	ECEA25Z4R7	C 501	ECEA1CN100		
R 69, 70	ERD25TJ473	R 240	ERD25FJ181	C 33, 34	ECQM1H103JZ	C 601	EDEA50Z1R		
R 71, 72	ERD25TJ753	R 241	ERD25FJ561	C 35, 36	ECQM1H683JZ	C 603	ECCD1H331K		
R 73, 74	ERD25TJ334	R 242	ERD25TJ684	C 37, 38	ECQV05154JZ	C 604	ECKD1H333ZF		
R 75, 76, 77, 78	ERD25TJ394	R 243	ERD25FJ103	C 39, 40	ECEA1HS100	C 605	ECEA1AS470		
R 79, 80	ERD25TJ334	R 301	ERD25FJ1R0	C 41, 42	ECQM1H333JZ	C 606	ECEA50Z2R2		
R 81	ERD25TJ153	R 302	ERD25FJ100	C 43, 44, 45, 46	ECQM1H472JZ	C 801 Δ	ECQU2A103MF		
R 82	ERD25TJ153	R 303, 304	ERD25FJ562	C 47, 48	ECEA1HS100	COMBINATION PARTS			
R 83, 84	ERD25FJ102	R 305, 306	ERD25FJ100	C 49, 50	ECQM1H473JZ	Z 1, 2	EXRP181K153		
R 85, 86, 87, 88	ERD25FJ104	R 307	ERD25FJ222	C 51, 52	ECQM1H333JZ	Z 3, 4	EXRP220K124		
R 89, 90	ERD25FJ332	R 308	ERD25FJ332	C 53, 54, 55, 56	ECQM1H104JZ	Z 5, 6	EXRP152K473		
R 91, 92, 93, 94	ERD25TJ223	R 309	ERD25FJ392	C 57, 58	ECQM1H333JZ	TRANSISTORS			
R 95, 96	ERD25FJ822	R 311	ERD25FJ222	C 59, 60	ECQV05224JZ	Q 1, 2, 3	2SD1011		
R 97, 98	ERD25TJ333	R 312	ERD25FJ562	C 61, 62	ECEA25Z4R7	Q 4	2SA921		
R 99, 100	ERD25TJ154	R 313	ERD25TJ473	C 63, 64	ECEA50Z2R2	Q 5, 6	2SD636		
R 101, 102	ERD25TJ244	R 314, 315	ERD25TJ563	C 65, 66, 67, 68	ECQV05104JZ	Q 7, 8	2SK246		
R 103, 104	ERD25FJ472	R 316 Δ	ERQJ12HJ3R9	C 69, 70, 71, 72	ECQM1H332JZ	Q 9, 10, 11, 12, 13, 14, 15, 16	2SD636		
R 105, 106	ERD25TJ333	R 317, 318	ERD25FJ681	C 73, 74	ECDD1H331J	Q 17, 18	2SD661		
R 107, 108	ERD25FJ682	R 319 Δ	ERQ12HJ3R9	C 75, 76	ECQM1H223JZ	Q 19, 20, 21, 22	2SD636		
R 109, 110, 111, 112	ERD25FJ332	R 320	ERX2ANJ8R2	C 77, 78	ECDD1H391J	Q 23, 24	2SB641		
R 113, 114	ERD25TJ223	R 321 Δ	ERD25FJ102	C 79, 80	ECEA50MR68R	Q 25, 26, 27, 28	2SD636		
R 115, 116	ERD25FJ472	R 322 Δ	ERD25FJ103	C 81, 82	ECEA1HS100	Q 29, 30, 31, 32, 33, 34, 35, 36	2SD636		
R 119, 120	ERD25TJ163	R 323	ERD25FJ472	C 83, 84	ECQM1H333JZ	Q 37	2SJ103		
R 121, 122	ERD25FJ102	R 324	ERD25TJ104	C 85, 86	ECEA50MR47R	Q 38	2SD636		
R 123, 124	ERD25FJ103	R 325	ERD25TJ473	C 87, 88	ECEA1AS101	Q 40	2SB641		
R 125, 126	ERD25FJ151	R 326	ERD25TJ223	C 89, 90	ECQM1H472JZ	Q 41, 43, 44	2SD636		
R 127, 128	ERD25FJ472	R 327	ERD25FJ272	C 91, 92	ECQM1H223JZ	Q 49	2SD636		
R 129, 130	ERD25TJ163	R 328	ERD25TJ104	C 93, 94, 97, 98	ECEA1HS100	Q 301	2SD1225		
R 131, 132	ERD25TJ104	R 329	ERD25FJ472	C 99, 100	ECEA50Z4R7	Q 302	2SD638		
R 133, 134	ERD25FJ102	R 330	ERD25TJ104	C 101, 102	ECQM1H223JZ	Q 303, 304	2SB641		
R 137, 138	ERD25FJ331	R 331	ERD25TJ683	C 103, 104	ECFDD123KXY	Q 305	2SD636		
R 141, 142	ERD25FJ272	R 332, 333	ERD25TJ104	C 105, 106	ECFDD223KXY	Q 306	2SD1265		
R 143, 144	ERD25FJ682	R 333	ERD25FJ103	C 107, 108	ECEA50Z1	Q 307	2SB941		
R 145, 146	ERD25FJ821	R 334	ERD25FJ682	C 109, 110	ECEA1HS100	Q 308	2SD1275		
R 147, 148	ERD25FJ122	R 335, 336	ERD25FJ103	C 111, 112	ECFDD392KXY	Q 309	2SB641		
R 149, 150, 151, 152	ERD25FJ392	R 337, 338, 339, 340	ERD25TJ563	C 113, 114	ECQV05104JZ	Q 310, 311	2SD636		
R 153, 154	ERD25FJ820	R 341	ERD25TJ104	C 115, 116	ECFDD152KXY	Q 312, 313, 314, 315	2SB641		
R 155, 156	ERD25FJ222	R 342	ERD25TJ153	C 117, 118	ECCD1H560K	Q 316, 401	2SD636		
R 157, 158	ERD25FJ392	R 343	ERD25FJ103	C 119	ECEA1HS100	Q 402	2SB641		
R 163, 164, 165, 166	ERD25FJ103	R 344	ERD25FJ470	C 120, 121	ECEA50Z1	Q 403	2SD636		
R 167, 168, 169, 170	ERD25FJ102	R 401	ERD25FJ182	C 122	ECEA1HS100	Q 601, 602	2SD636		
R 171, 172	ERD25TJ473	R 402	ERD25TJ563	C 123	ECEA1ASS471	DIODES & RECTIFIERS			
R 173, 174	ERD25TJ104	R 403	ERD25TJ393	C 124	ECEA1AS101	D 1	RVD6R2EB		
Δ ERD25FJ121		R 404	ERD25TJ563	C 125	ECEA1AS331	D 2, 3, 4, 5, 6, 7, 8, 9	MA161		
R 175, 176, 177, 178	ERD25TJ225	R 405, 406	ERD25FJ222	C 127, 128	ECBS1C103NYB	D 10	MA1051M		
R 181, 182	ERD25TJ273	R 407, 408	ERD25TJ684	C 129, 130	ECKD1H681KB	D 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25	MA161		
R 183, 184	ERD25TJ154	R 409, 410	ERD50FJ271	C 131, 132	ECEA1HS100	D 301	MA1220M		
R 185, 186, 187, 188	ERD25FJ103	R 411	ERD25TJ684						
ERD25TJ223		R 412	ERD25FJ471						
		R 413	ERG1ANJ221						
		R 414	ERD25FJ472						
		R 415, 416	ERD25FJ103						
		R 417	ERD25FJ222						
		R 418	ERD25TJ473						
		R 601	ERD25FJ103						
		R 602	ERD25TJ223						

Ref. No.	Part No.	Part Name & Description
MULTIPLEX FILTERS		
MPX 1, 2	QLM9Z9K	Coil
COILS		
L 1, 2	ELM7Q306A	Skewing Network
L 3, 4	QLQX2721D	Peaking Coil
L 5, 6	QLQX0343KWA	Bias Trap Coil
L 301	QLB0198	Bias Oscillation Coil
L 501, 502	QLQZ1014D	Choke Coil
TRANSFORMERS		
T 1 [B] Δ	QLPA69ELX	AC Power Transformer
[D] Δ	QLPD74EIX	AC Power Transformer
[For all Eulopean areas except United Kingdom]		
SWITCHES		
S 1, 2, 3, 4, 5	QSWX413A	Push Switch
(NR Selector/NR MUTE)		
S 501	QSB0289	Leaf Switch (REC Inhibit)
S 502, 503	QSB0287	Leaf Switch (Mode/Play)
S 504, 505	QSB0288	Leaf Switch (Stop/Half)
S 506	QSB0290	Leaf Switch
(for Normal Tape)		
S 507	QSB0289	Leaf Switch
(for CrO2/Metal)		
S 601	QSS1305	Slide Switch (Timer)
S 602, 603	SSG13	Key Board Switch
(Rec Mute/Stop)		
S 604	QSW1125	Key Board Switch with
D606 (Play)		
S 605, 606	SSG13	Key Board Switch
(F.F/REW)		
S 607	QSW1124	Key Board Switch with
D607 (Record)		
S 608	QSW1126	Key Board Switch with
D605 (Pause)		
S 801 Δ	QSW1127	Push Switch
(Power ON/OFF)		
S 802	QSR1407H	Rotary Switch (AC Power
Voltage Selector)		
[For United Kingdom]		
JACKS		
J 1, 2	QJA0542	Microphone Jack
J 3	QJA0266	HeadPhone Jack
J 4, 5, 6, 7	QEJ5030C	Jack Board (LINE IN/OUT)

MECHANICAL PARTS LOCATION

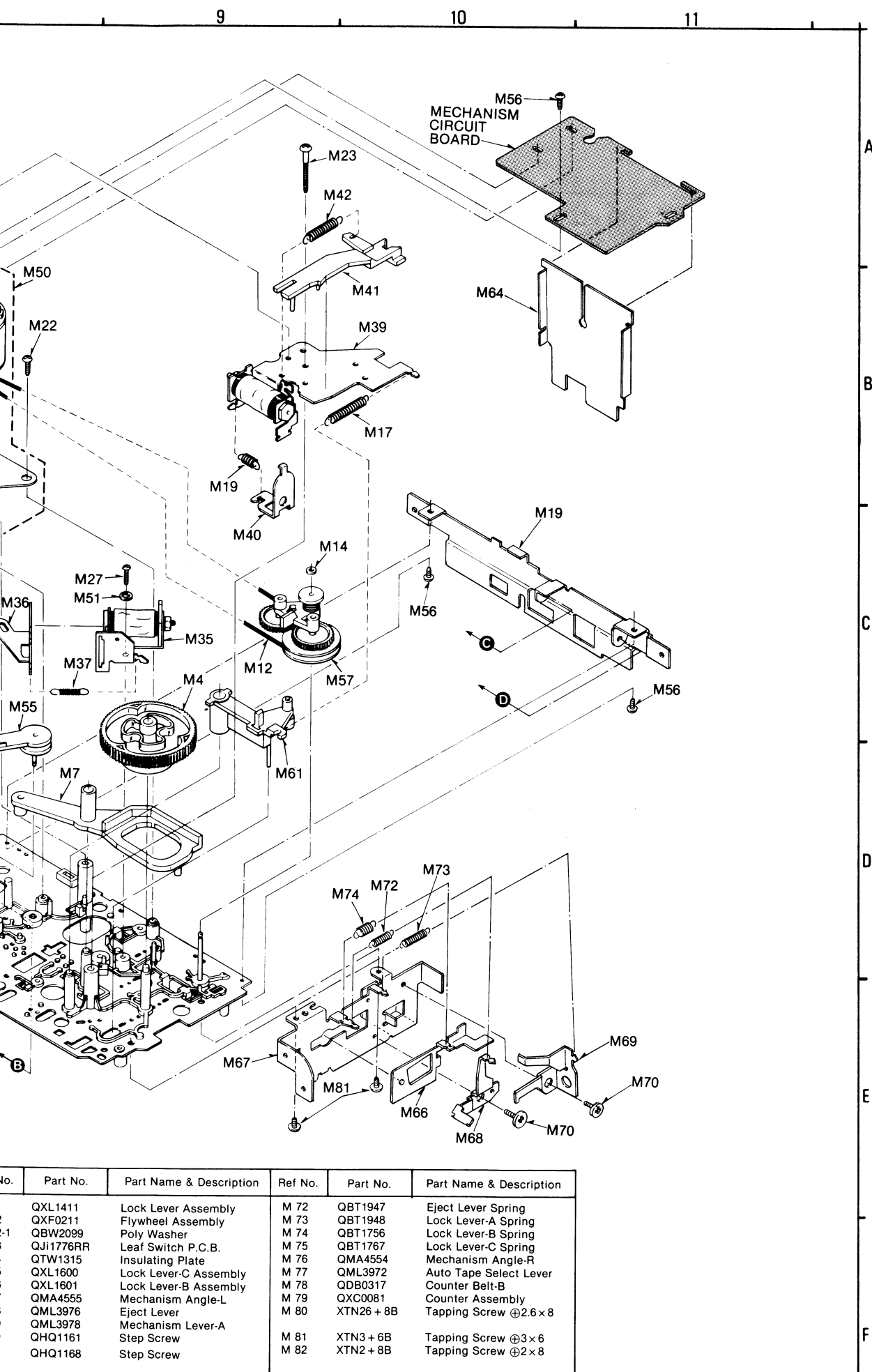


SPECIFICATIONS

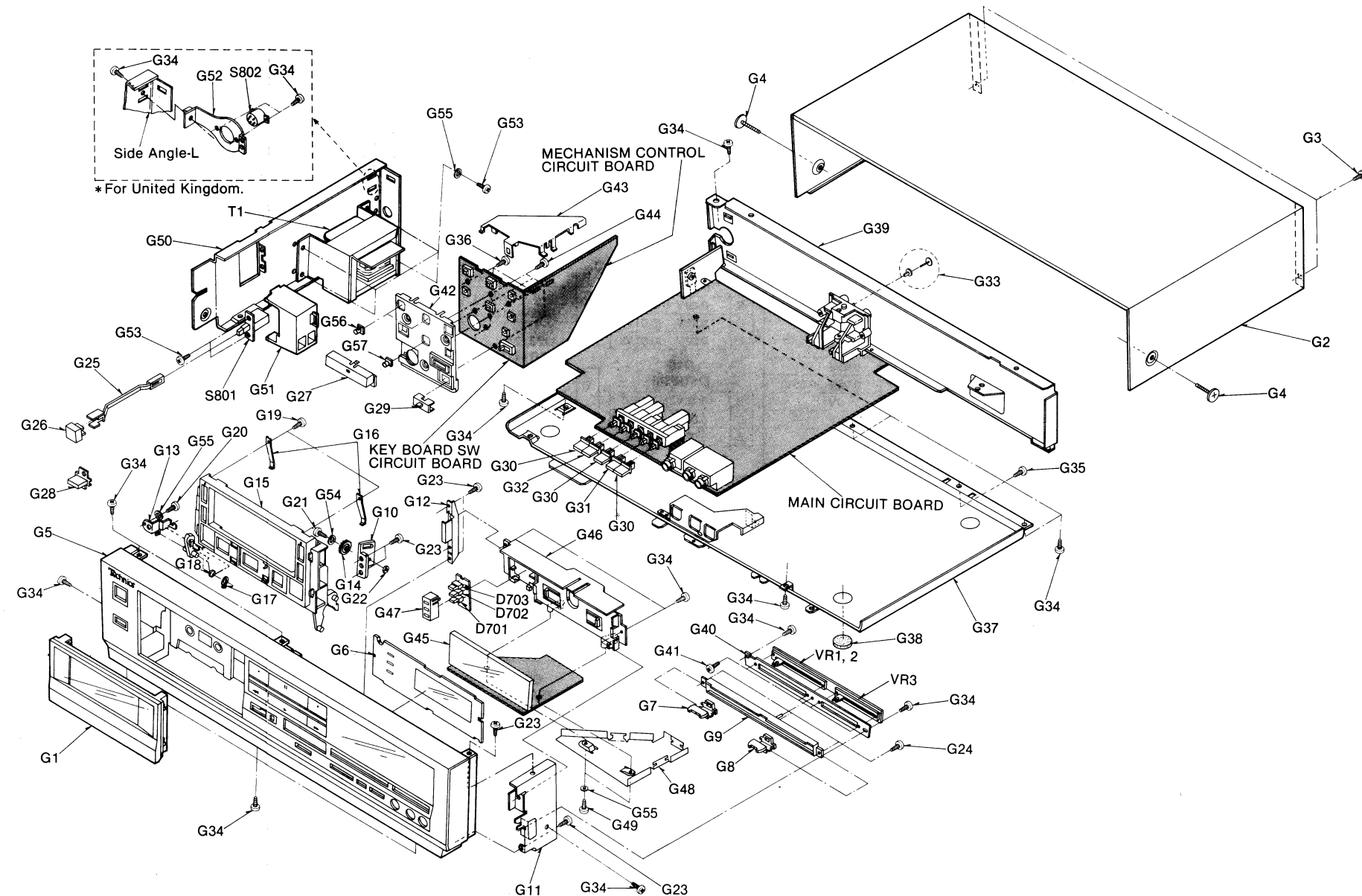
Pressure of pressure roller	350±50g
Takeup tension * Use cassette torque meter.....QZZSRKCT	40 + 15 - 15 g-cm
Wow and flutter; (JIS) * Use test tapeQZZCWAT	Less than 0.08% (WRMS)

REPLACEMENT PARTS LIST

Ref No.	Part No.	Part Name & Description	Ref No.	Part No.	Part Name & Description	Ref No.	Part No.	Part Name & Description	Ref No.	Part No.	Part Name & Description	Ref No.	Part No.	Part Name & Description	Ref No.	Part No.	Part Name & Description	Ref No.	Part No.	Part Name & Description
MECHANICAL PARTS																				
M 1	QMA4528	Flywheel Retainer	M 12	QDB0287	Changing Belt	M 24	XUB4FT	Stop Ring 4φ	M 37	QBT1955	Plunger Spring	M 49	XSN26 + 3	Screw φ2.6×3	M 61	QXL1411	Lock Lever Assembly	M 72	QBT	QBT
M 2	QBP1894	Head Base Plate Spring	M 13	QDK1012	Steel Ball 2.5×	M 25	XTN3+ 10B	Tapping Screw φ3×10	M 38	QDB0167	Counter Belt-A	M 50	QXU0321	Reel Motor Assembly	M 62	QXF0211	Flywheel Assembly	M 73	QBT	QBT
M 3	QBP1979	Cassette Pressure Spring	M 14	QBW2008	Snap Washer	M 26	XTN26 + 12B	Tapping Screw φ2.6×12	M 39	QXA1076	Trigger Plunger Assembly	M 51	XWG26	Washer 2.6φ	M 62-1	QBW2099	Poly Washer	M 74	QBT	QBT
M 4	QXG1059	Main Gear Assembly	M 15	QBW2046	Snap Washer	M 27	XTN26 + 8B	Tapping Screw φ2.6×8	M 40	QML3651	Trigger Plunger Lever	M 52	XWG3	Washer 3φ	M 63	QJ1776RR	Leaf Switch P.C.B.	M 75	QBT	QBT
M 5	QXD0147	Supply Reel Table	M 16	QDP1946	Intermediate Pulley	M 29	QDR1164	Takeup Reel Table	M 41	QML3653	Control Lever	M 53	QXL1550	Pressure Roller Assembly	M 64	QTW1315	Insulating Plate	M 76	QMA	QMA
M 6	QMB1336	Reel Table Hub	M 17	QBT1725	Lock Lever Spring	M 30	QMK1867	Head Base Plate	M 42	QBT1278	Record Lock Lever Spring	M 53-1	QBN1771	Pressure Roller Spring	M 65	QXL1600	Lock Lever-C Assembly	M 77	QML	QML
M 7	QML3655	Cam Follower	M 18	QBT1927	Head Base Plate Spring	M 31	QMZ1263	Spacer	M 43	refer to E1	Record/Playback Head	M 54	QXI0113	Takeup Idler Assembly	M 66	QXL1601	Lock Lever-B Assembly	M 78	QDB	QDB
M 8	QML3660	Idler Select Lever	M 19	QBT1920	Idler Spring	M 32	QBC1103	Spring	M 44	refer to E2	Erase Head	M 55	QXL1603	Idler Lever Assembly	M 67	QMA4555	Mechanism Angle-L	M 79	QXC	QXC
M 9	QMA4543	Mechanism Upper Angle	M 20	QBC1373	Reel Table Spring	M 33	XSN2 + 16	Screw φ2×16	M 45	QXU0322	Capstan Motor Assembly	M 56	XTN3 + 6B	Tapping Screw φ3×6	M 68	QML3976	Eject Lever	M 80	XTN	XTN
M 10	QMZ1293	Flywheel Thrust Retainer	M 21	XTN2 + 5B	Tapping Screw φ2×5	M 34	XWG2	Washer 2φ	M 46	QXA1328	Motor Retainer Assembly	M 57	QXL1408	Swing Gear Assembly	M 69	QML3978	Mechanism Lever-A			
M 11	QDB0333	Flywheel Belt	M 22	XTN26 + 6B	Tapping Screw φ2.6×6	M 35	QXA1232	Brake Plunger Assembly	M 47	QDB0332	Takeup Belt	M 58	QXL1604	Fast Wind Gear Assembly	M 70	QH01161	Step Screw	M 81	XTN	XTN
			M 23	XTN3 + 24B	Tapping Screw φ3×24	M 36	QML3865	Plunger Lever	M 48	QXP0621	Takeup Pulley Assembly	M 59	QML3659	Brake Lever	M 71	QH01168	Step Screw	M 82	XTN	XTN



CABINET PARTS LOCATION



REPLACEMENT PARTS LIST

Ref No.	Part No.	Part Name & Description	Ref No.	Part No.	Part Name & Description	Ref No.	Part No.	Part Name & Description	Ref No.	Part No.	Part Name & Description
CABINET PARTS											
G 1	QYF0601	Cassette Lid	G 9	QGG0208	Slide Guide	G 27	QGO2140	Push Button (STOP)	G 50	QMA4553	Side Angle-L
	Silver Type			Silver Type		G 28	QGO2141	Push Button (EJECT)	G 51	QKJ0598	Switch Cover (for S801)
	QYF0601K	Cassette Lid		QGG0208K	Slide Guide	G 29	QGO2144	Push Button (Timer)	G 52 [B]	QMA4603	Switch Angle (for S802)
	Black Type			Black Type		G 30	QGO2145	Push Button-A	[For United Kingdom]		
G 2	QGC1239	Case Cover	G 10	QKJ0596	Damper Gear Holding Angle	G 31	QGO2146	Push Button-B	G 53	XTN3 + 6B	Tapping Screw $\varnothing 3 \times 6$
	Silver Type		G 11	QMA4551	Side Angle-R	G 32	QGO2147	Push Button-C	G 54	XWG26	Washer 2.6 ϕ
	QGC1239K	Case Cover	G 12	QMA4550	Meter Holding Angle	G 33	QKJ0609	Nylon Ribbet	G 55	XWG3	Washer 3 ϕ
	Black Type		G 13	QMA4552	Holder Angle-L	G 34	XTB3 + 8BFN	Tapping Screw $\varnothing 3 \times 8$	G 56	QKJ0634	LED Cover-A
G 3	XTB3 + 8BFN	Tapping Screw $\varnothing 3 \times 8$	G 14	QDG1254	Damper Gear	G 35	XTB3 + 12BFZ	Tapping Screw $\varnothing 3 \times 12$	G 57	QKJ0635	LED Cover-B
	Silver Type		G 15	QMH2098	Cassette Holder	G 36	XTB3 + 12BFN	Tapping Screw $\varnothing 3 \times 12$	ACCESSORIES		
	XTB3 + 8BFZ	Tapping Screw $\varnothing 3 \times 8$		Silver Type		G 37	QGC1240	Bottom Cover	A 1 [B]	QQT3391	Instruction Book
	Black Type			QMH2098K	Cassette Holder	G 38	QKA1086	Case Foot	[For all European areas except United Kingdom]		
G 4	SNE2095-2	Ornament Screw		Black Type		G 39 [D]	QMK2022	Back Chassis	[D]	QQT3390	Instruction Book
	Silver Type		G 16	QBP1946	Spring	[B] QMK2026			[For all European areas except United Kingdom]		
	SNE2095-3	Ornament Screw	G 17	XUB4FT	Stop Ring 4 ϕ	[For United Kingdom]			A 2	QEB0125	Connection Cord
G 5	QYP1141	Front Panel Assembly	G 18	QBN1961	Holder Spring	G 40	QMA4557	Volume Angle	PACKINGS		
	Silver Type		G 19	XTN26 + 5BFZ	Tapping Screw $\varnothing 2.6 \times 5$	G 41	XSN26 + 3	Screw $\varnothing 2 \times 3$	P 1	QPN4395	Inside Carton
	Black Type		G 20	XTN3 + 8B	Tapping Screw $\varnothing 3 \times 8$	G 42	QMK2021	Operation Chassis	P 2	QPA0701	Cushion-R
G 6	QGL1179	Meter Filter	G 21	XSN26 + 10	Tapping Screw $\varnothing 2.6 \times 10$	G 43	QMA4558	P.C.B. Angle	P 3	QPA0702	Cushion-L
	Silver Type		G 22	XNG26E	Nut 2.6 ϕ	G 44	XTN26 + 8B	Tapping Screw $\varnothing 2.6 \times 8$	P 4	QPS0434	Pad
	Black Type		G 23	XTB3 + 10BFN	Tapping Screw $\varnothing 3 \times 10$	G 45	QSIFL007F	FL Meter	P 5	QPA0712	Spacer
	QGL1179K	Meter Filter	G 24	XTN26 + 8B	Tapping Screw $\varnothing 2.6 \times 8$	G 46	QKJ0593	Meter Holder	P 6	XZB40X60A02	Poly Sheet (for UNIT)
G 7	QYT0657	Slide Knob-A Assembly	G 25	QMR2059	Power Rod	G 47	QKJ0597	Led Holder	P 7	QPC0072	Poly Sheet (for AC Power Cord)
G 8	QYT0658	Slide Knob-B Assembly	G 26	QGO2142	Push Button (Power ON/OFF)	G 48	QTS1594	Shield Plate			
						G 49	XTN3 + 10B	Tapping Screw $\varnothing 3 \times 10$			

Parts Change Notice

(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.
(P)...For U.S.A.
(C)...For Canada.

Model No.

RS-M235X

(F)...For Asian PX.

(J)...For European PX.

Please revise the original parts list in the Service Manual to conform to the change(s) shown herein. If new part numbers are shown, be sure to use them when ordering parts.

Reason for Change		*The circled item indicates the reason. If no marking, see the Notes in the bottom column.			
1. Improve performance					
2. Change of material or dimension					
3. To meet approved specification					
4. Standardization					
5. Addition					
6. Deletion					
7. Correction					
8. Other					
Interchangeability Code		**The circled item indicates the interchangeability. If no marking, see the Notes in the bottom column.			
Parts		Set Production			
A	Original		Early	Original or new parts may be used in early or late production set. Use original parts until exhausted, then stock new parts.	
	New		Late		
B	Original		Early	Original parts may be used in early production sets only. New parts may be used in early or late production sets. Use original parts where possible, then stock new parts.	
	New		Late		
C	Original		Early	New parts only may be used in early or late production sets. Stock new parts.	
	New		Late		
D	Original		Early	Original parts may be used in early production sets only. New parts may be used in late production sets only. Stock both original and new parts.	
	New		Late		
E Other					
Part Number					
Model No.	Ref. No.	Original Part No.	New Part No.	Notes (* - **)	Part Name & Descriptions
RS-M235X	M75 (D/B/N A/F/J)	QBT1767	QBT2000	7	Look Lver-C Spring
"	R93, 94	ERD25TJ223	ERD25TJ683	1-C	Resistors
"	R113, 114	"	"	"	"
"	R119, 120	ERD25TJ163	ERD25TJ153	"	"
"	R129, 130	"	"	"	"
"	R141, 142	ERD25FJ272	ERD25FJ182	"	"
"	R216	ERD25TJ154	ERD25 FJ216	"	Resistor
"	R338	ERD25FJ103	ERD25FJ682	"	"
"	C77, 78	ECCD1H391J	ECCD1H471J	"	Capacitors
"	C81, 82	ECEA1HS100	ECEA16Z10	"	"

File this Parts Change Notice with your copy of the Service Manual.

Original Service Manual is Model No. RS-M235X(N/A/F/J) Order No. ARD82120202C7-14.

(P/C) Order No. ARD83030225C1-14.

(D/B) Order No. ARD82110201C2-14.

Technics
National / Panasonic

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

Parts Change Notice

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except United Kingdom.
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(A)...For Australia.
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(C)...For Canada.

Model No.

RS-M235X

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Please revise the original parts list in the Service Manual to conform to the change(s) shown herein. If new part numbers are shown, be sure to use them when ordering parts.

Reason for Change		*The circled item indicates the reason. If no marking, see the Notes in the bottom column.			
1. Improve performance					
2. Change of material or dimension					
3. To meet approved specification					
4. Standardization					
5. Addition					
6. Deletion					
7. Correction					
8. Other					
Interchangeability Code		**The circled item indicates the interchangeability. If no marking, see the Notes in the bottom column.			
Parts		Set Production			
A	Original		Early	Original or new parts may be used in early or late production set. Use original parts until exhausted, then stock new parts.	
	New		Late		
B	Original		Early	Original parts may be used in early production sets only. New parts may be used in early or late production sets. Use original parts where possible, then stock new parts.	
	New		Late		
C	Original		Early	New parts only may be used in early or late production sets. Stock new parts.	
	New		Late		
D	Original		Early	Original parts may be used in early production sets only. New parts may be used in late production sets only. Stock both original and new parts.	
	New		Late		
E Other					
Part Number					
Model No.	Ref. No.	Original Part No.	New Part No.	Notes (* - **)	Part Name & Descriptions
RS-M235X	C139, 140	ECCD1H331J	ECCD1H391J	1-C	Capacitors
"	Q303	2SB641	2SB643	"	Transistor
"	G2	QGC1239	QGC1245	2-C	Case Cover(Silver Type)
"	G2	QGC1239K	QGC1245K	"	" (Black Type)
"	C87,88 (D/B)	ECEA1AS101	ECEA1AS470		Capacitors

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(P/C) Order No. ARD83030225C1-14.

(D/B) Order No. ARD82110201C2-14.

Technics
■ National / Panasonic

Matsushita Electric Trading Co., Ltd.

P.O. Box 288, Central Osaka Japan
Printed in Japan.

MESSUNGEN UND EINSTELL METHODEN

RS-M235X DEUTSCH

Verwenden Sie bitte diese Broschüre Zusammen
mit der Service-Anleitung für das Modell Nr.
RS-M235X.

Anm.: Wenn nicht anders vorgeschrieben, Drehschalter und Steuereinrichtungen auf die folgenden Positionen stellen.

- Für saubere Köpfe sorgen
- Für saubere Tonwelle und Andruckrolle sorgen.
- Auf normale Raumtemperatur achten: $20 \pm 5^\circ\text{C}$ ($68 \pm 9^\circ\text{F}$)
- Dolby-Schalter: AUS
- Timer Schalter: AUS (OFF)
- Eingangsregler: MAX
- Abgleichkontrolle: Mitte (Zentrum)

A Senkrechtstellen des Kopfes

Bedingung:
• Wiedergabe
• Betriebsart: Normalband

Meßgerät:
• Röhrenvoltmeter
• Oszillograph
• Testband (azimuth)... QZZCFM

Ausgangsbalance-Justierung für linken und rechten Kanal

1. Den Meßaufbau zeigt Fig. 2.
2. 8kHz-Signal des Testbandes (QZZCFM) wiedergeben.
Schraube (B) in Fig. 3 auf maximalen Ausgangspegel des linken und rechten Kanals abgleichen
Sind die Ausgangspegel des linken und rechten Kanals nicht gleichzeitig maximal, wie folgt justieren:
3. Durch Drehen der in Fig. 3 gezeigten Schraube (B) die Winkel A und C (Punkte, wo Spitzenausgangspegel für den linken und rechten Kanal erreicht werden) ermitteln. Anschließend den Winkel B zwischen dem Winkel A und C ermitteln, d.h. den Punkt, wo die Ausgangspegel des linken und rechten Kanals ausbalanciert (ausgeglichen) sind. (Siehe Fig. 3 und 4.)

Phasenjustierung für linken und rechten Kanal

4. Den Meßaufbau zeigt Fig. 5.
5. 8kHz-Signal des Testbandes (QZZCFM) wiedergeben.
Schraube (B), wie in Fig. 3 gezeigt, so einstellen, daß Zeiger von zwei Röhrenvoltmeter auf Maximum ausschlagen und am Oszillographen eine Wellenform wie in Fig. 6 erreicht wird.

B Bandgeschwindigkeit

Bedingung:
• Wiedergabe

Meßgerät:
• Elektronischer Digitalzähler
• Testband... QZZCWAT

Genauigkeit der Bandgeschwindigkeit

1. Den Meßaufbau zeigt Fig. 7.
2. Testband (QZZCWAT 3000Hz) wiedergeben und Ausgangssignal dem Zähler zuführen.
3. Frequenz messen.
4. Beträgt die auf dem Testband aufgezeichnete Frequenz 3000Hz, so ergibt sich die Genauigkeit nach folgender Formel:
$$\text{Genauigkeit der Bandgeschwindigkeit} = \frac{f - 3000}{3000} \times 100(\%)$$

worin f die gemessene Frequenz ist.
5. Die Messung soll im mittleren Teil des Bandes erfolgen.

NORMALWERT: $\pm 1.5\%$

6. Falls der Meßwert nicht im vorgeschriebenen Bereich liegt, bitte mit Bandgeschwindigkeitsregler VR wie in Abb. gezeigt einstellen.

Schwankung der Bandgeschwindigkeit:

Messung, wie oben beschrieben für Anfang, mittleren Teil und Ende des Testbandes wiederholen und Schwankung wie folgt bestimmen:

$$\text{Schwankung} = \frac{f_1 - f_2}{3000} \times 100(\%)$$

f_1 = Maximalwert

f_2 = Minimalwert

NORMALWERT: 1%

Anm:

Verwenden Sie einen nichtmetallischen Schraubenzieher wenn Sie die Bandgeschwindigkeit justieren.
Verwenden Sie keinen Schraubenzieher aus Metall. Wenn Sie einen Verwenden, könnte der IC shoner (ICP501) beschädigt werden und der Bandantriebsachsenmotor läuft nicht.

© Frequenzgang bei Wiedergabe	Bedingung: • Wiedergabe • Betriebsart: Normalband	Meßgerät: • Röhrenvoltmeter • Oszillograph • Testband...QZZCFM
--------------------------------------	--	--

1. Den Meßaufbau zeigt Fig. 2.
2. Gerät auf Wiedergabe schalten. Frequenzgang-Testband QZZCFM wiedergeben.
3. Ausgangsspannung bei 315Hz, 12,5kHz, 8kHz, 1kHz, 250Hz, 125Hz, und 63Hz messen und jede Ausgangsspannung mit der Standardfrequenz 315Hz an der LINE OUT.
4. Messungen an beiden Kanälen durchführen.
5. Prüfen, ob die gemessenen Werte innerhalb des in der Frequenzgang-Übersicht aufgeführten Bereichs liegen. (Siehe Fig. 9).

Ⓢ Wiedergabe-Verstärkung	Bedingung: • Wiedergabe • Betriebsart: Normalband	Meßgerät: • Röhrenvoltmeter • Oszillograph • Testband...QZZCFM
---------------------------------	--	--

1. Den meßaufbau zeigt Fig. 2.
2. Standard-Frequenz (QZZCFM 315Hz) vom Testband wiedergeben und Ausgangsspannung messen. [TP7 (L-CH) TP8 (R-CH)].
3. Messung an beiden Kanälen durchflühren.

NORMALWERT: around 0,28V [0,38±0,05V: at LINE OUT Jack]

Einstellung:

1. Abweichungen können durch Abgleich von VR9 (linker Kanal) und VR10 (rechter Kanal) korrigiert werden. (S. Fig. 1).
2. Nach erfolgtem Abgleich ist der Frequenzgang bei Wiedergabe erneut zu kontrollieren.

Ⓢ Löschstrom	Bedingung: • Aufnahme • Betriebsart: Metallband	Meßgerät: • Röhrenvoltmeter • Oszillograph
---------------------	--	---

1. Den Meßaufbau zeigt Fig. 10.
2. Die Aufnahme-und Pausentaste drücken.
3. Den Bandwahlschalter auf Metallband-Position stellen.
4. Löschstrom nach folgender Formel ermitteln:

$$\text{Löschstrom (A)} = \frac{\text{Die Spannung über beide Enden von R301}}{1 \text{ (Ohm)}}$$

NORMALWERT: 155±15mA (Metal position)
5. Falls der Meßwert nicht im vorgeschriebenen Bereich liegt, auf folgende Weise einstellen.

Einstellung:

Beträgt der Löschstrom weniger als 140mA, den Punkt (A) unterbrechen.

Ⓢ Gesamtfrequenzgang	Bedingung: • Aufnahme und Wiedergabe • Betriebsart "Normalband" • Betriebsart "CrO₂ Band" • Betriebsart "Metallband" • Eingangsregler...MAX • Abgleichkontrolle: Mitte (Zentrum)	Meßgerät: • Röhrenvoltmeter • NF-Generator • Abschwächer • Oszillograph • Testband (Leerband) ...QZZCRA für Normal ...QZZCRX für CrO₂ ...QZZCRZ für Metall • Widerstand (600Ω)
-----------------------------	--	--

Anm.:

Vor Messung und Abgleich des Gesamtfrequenzganges ist sicherzustellen, daß der Frequenzgang bei Wiedergabe korrekt ist (Vgl. entspr. Abschnitt).

(Der Aufnahme-Entzerrer ist fest eingestellt.)

1. Den Meßaufbau zeigt Fig. 10.
2. Gerät auf Betriebsart "Normalband" schalten, und Testband (QZZCRA) einlegen.
3. An LINE IN ein Signal von 1kHz, -24dB zuführen. Das Gerät auf Aufnahme schalten.
4. Den Dämpfungswiderstand feineinstellen, bis die Ausgangsleistung an LINE OUT 0,4V beträgt.
 - Überprüfen, daß der Signalausgangspegel bei einer Ausgangs-Spannung von 0,4V -24±4dB beträgt.
5. Mit dem NF-Oszillator Signale von 50Hz, 100Hz, 200Hz, 500Hz, 1kHz, 4kHz, 8kHz, 10kHz und 12,5kHz und 10kHz zuführen, und diese Signale auf das Testband aufzeichnen.
6. Die in Schritt 6 aufgezeichneten Signale wiedergeben und überprüfen, ob die Frequenzgangkurve innerhalb des Bereichs liegt, der im Frequenzgangdiagramm für normales Band in Fig. 11 gezeigt ist. (Falls die Kurve innerhalb des vorgeschriebenen Bereichs liegt, mit den Schritten 8, 9 und 10 weiterfahren.)
Falls die Kurve außerhalb des vorgeschriebenen Bereichs liegt, wie folgt justieren.

Justierung (A):

Wenn die Kurve den vorgeschriebenen Gesamtfrequenzgangbereich (Fig. 11) überschreitet, wie in Fig. 12 gezeigt.

- 1) Den Vormagnetisierungsstrom durch Abgleichen von VR301 (linker Kanal) und VR302 (rechter Kanal) erhöhen. (S. Fig. 1)
- 2) Die Schritte 5 und 6 zur Überprüfung wiederholen. (Wenn die Kurve dabei innerhalb des vorgeschriebenen Bereichs liegt (Fig. 11) mit den Schritten 7, 8, und 9 weiterfahren.)
- 3) Wenn die Kurve den vorgeschriebenen Bereich (Fig. 11) noch immer überschreitet, den Vormagnetisierungsstrom weiter erhöhen, und die Schritte 5 und 6 wiederholen.

Justierung (B):

Wenn die Kurve unter den vorgeschriebenen Bereich für den Gesamtfrequenzgang (Fig. 11) absinkt, wie in Fig. 13 gezeigt:

- 1) Den Vormagnetisierungsstrom durch abgleichen von VR301 (linker Kanal) und VR302 (rechter Kanal) reduzieren.
- 2) Die Schritte 5 und 6 zur Überprüfung wiederholen. (Falls die Kurve dabei innerhalb des vorgeschriebenen Bereichs in Fig. 11 liegt, mit den Schritten 7, 8, und 9 weiterfahren.)
- 3) Falls die Kurve noch immer unter den vorgeschriebenen Bereich (Fig. 11) absinkt, den Vormagnetisierungsstrom weiter reduzieren, und Schritte 5 und 6 wiederholen.
7. Gerät auf Betriebsart "CrO₂ Band" schalten.
8. Testband QZZCRX einlegen, und Signale von 50Hz, 100Hz, 200Hz, 500Hz, 1kHz, 4kHz, 8kHz, 10kHz und 15kHz und 10kHz aufzeichnen; Anschließend die Signale wiedergeben und prüfen, ob die Kurve innerhalb des Bereichs im Gesamtfrequenzgangdiagramm für CrO₂ band liegt. (Fig. 14).
9. Gerät auf Betriebsart "Metallband" schalten. Testband QZZCRZ einlegen und Signale von 50Hz, 100Hz, 200Hz, 500Hz, 1kHz, 4kHz, 8kHz, 10kHz, 12,5kHz und 15kHz aufnehmen. Anschließend die Signale wiedergeben und prüfen, ob die Kurve innerhalb des Bereichs im Gesamtfrequenzgangdiagramm für Metallband liegt. (Fig. 14).
10. Überprüfen, daß die Vormagnetisierungsströme ungefähr den folgenden Werten entsprechen, wenn der Bandsortenschalter in die entsprechende Position gestellt ist.
 - Spannung zwischen Masse und Testpunkt (TP1 für linken Kanal, TP2 für rechten Kanal) vom Röhrenvoltmeter ablesen und Vormagnetisierungsstrom nach folgender Formel berechnen:

$$\text{Vormagnetisierungsstrom (A)} = \frac{\text{Spannung am Röhrenvoltmeter (V)}}{10 (\Omega)}$$

Ungefähr 410µA (Normal position)
Ungefähr 530µA (CrO₂ position)
Ungefähr 850µA (Metall position)

⑤ Gesamtverstärkung

Bedingung:

- Aufnahme und Wiedergabe
- Betriebsart: Normalband
- Eingangsregler: MAX
- Abgleichkontrolle: Mitte (Zentrum)
- Standard-Eingangspegel:
 - Mikrofon -72±4dB
 - NF-Eingang -24±4dB

Meßgerät:

- Röhrenvoltmeter
- NF-Generator
- Abschwächer
- Oszillograph
- Widerstand (600Ω)
- Testband (Leerband)
QZZCRA für Normal

1. Den Meßaufbau zeigt Fig. 15.
2. Normales Testleerband (QZZCRA) einlegen.
3. Gerät auf "Aufnahme" schalten.
4. Über den Abschwächer ein 1kHz-Signal (-24dB) vom NF-Generator dem NF-Eingang zuführen.
5. Abschwächer so justieren, daß die Ausgangsspannung an der LINE OUT 0,38V erreicht.
6. Das aufgenommene Band abspielen und prüfen, ob der Ausgangspegel an der LINE OUT 0,38V erreicht.
7. Wenn der gemessene Wert nicht 0,38V ±2dB erreicht, die folgenden VR abgleichen: VR5 (L-CH) oder VR6 (R-CH).
8. Ab Punkt 2 Wiederholen.

NORMALWERT: 0.38V-2dB (300mV)—0.38V + 2dB (480mV)

H Fluoreszenzmeter

Bedingung:

- Aufnahme
- Eingangsregler...MAX.
- Abgleichkontrolle
...Mitte (Zentrum)

Meßgerät:

- Röhrenvoltmeter
- Abschwächer
- NF-Generator

• Überprüfung des Fluoreszenzmeters

Um die Genauigkeit des Fluoreszenzmeters zu überprüfen, die Ausgangsspannung an der LINE OUT messen.

1. Den Meßaufbau zeigt Fig. 16.
2. Einen Draht zwischen TP401 und TP402 (siehe Fig. 17).
3. In Betriebsart "Aufnahme-Pause" 1kHz (-24dB) Signal an den NF-Eingang geben.
4. Abschwächer so abstimmen, daß der Ausgangspegel an der LINE OUT 0,38V ist.

Überprüfung des FL-Meters 0dB Segment-Anzeige ON/OFF

Den Ausgangspegel an der LINE OUT von 0,38V -1dB (=250mV) auf 0,38V +1dB (=310mV) durch Abstimmung des Abschwächers verändern und prüfen, ob die 0dB Segment-Anzeige des FL-Meters von OFF auf ON wechselt.

Überprüfung des FL-Meters -40dB Segment-Anzeige ON/OFF

Senken des Signalpegels von 28dB unter den Standard-Eingangspegel (-24dB-28dB=-52dB=2,5mV) und weiterhin den Pegel 12dB (-52dB-12dB=64dB=0,63mV) durch Abstimmung des Abschwächers senken. Beim Senken des Pegels, wie oben beschrieben, sicherstellen, daß nur die -40dB-Anzeige aufleuchtet oder bei niedrigstem Stand erlischt.

• Justierung des FL-Meters

1. Den Meßaufbau zeigt Fig. 16.
2. Einen Draht zwischen TP401 und Masse ziehen (siehe Fig. 17).
3. In Betriebsart "Aufnahme-Pause" 1kHz (-24dB) Signal an den NF-Eingang geben.
4. Abschwächer so abstimmen, daß der Ausgangspegel an der LINE OUT 0,38V beträgt.

Justierung auf -40dB

5. Abschwächer so abstimmen, daß der in Stufe 4 abgestimmte Pegel um 40dB vermindert wird.
6. Zu diesem Zeitpunkt prüfen, ob der -40dB Anzeiger abgeschwächt leuchtet (mittelhell, zwischen ganz hell und erlischt: siehe Fig. 18).
7. Wenn der Anzeiger nicht, wie in Stufe 6 beschrieben, abgeschwächt leuchtet, VR7 abstimmen.

Justierung of 0dB

8. Den Zustand von Stufe 4 herstellen. Ausgangspegel auf 0,38V an der LINE OUT festsetzen.
9. Zu diesem Zeitpunkt prüfen, ob der 0dB Anzeiger abgeschwächt aufleuchtet (mittelhell, zwischen ganz hell und erlischt siehe Fig. 19).
10. Wenn nicht korrekt, VR401 abstimmen.
11. Einstellungen der Stufen 4, 5, 6, 7, 8, 9 und 10 zweibis dreimal wiederholen.
12. Verbindung zwischen TP402 und Masse, die in Stufe 2 hergestellt wurde, unterbrechen.

1 Dolby-Schaltung

Bedingung:

- Aufnahme
- Dolby-Schalter
...IN/OUT (AN/AUS)
- Dolby-Wahlschalter
...B/C
- Eingangsregler...MAX.
- Abgleichkontrolle:
Mitte (Zentrum)

Meßgerät:

- Röhrenvoltmeter
- NF-Generator
- Abschwächer
- Oszillograph
- Widerstand (600Ω)

Aufnahmeseite

• Überprüfung der Dolby-B-Typ Verschlüsselungsmerkmale.

1. Den Meßaufbau zeigt Fig. 20.
2. Gerät auf "Aufnahme" stellen. (Dolby-Wahlschalter ist OUT (AUS).)
3. Dem NF-Eingang ein 1kHz-Signal zuführen.
4. Abschwächer so abstimmen, daß die Ausgangsspannung an TP7 (L-K) und TP8 (R-K) 12,3mV beträgt.
5. Die Ausgangsspannung an Nadel 14 sollte 0dB betragen.
6. Den Dolby-Wahlschalter auf B stellen. Sicherstellen, daß das Ausgangssignalpegel an Nadel 14 von IC3 (L-K) und IC4 (R-K) +6dB±2,5dB beträgt.
7. Dolby-Wahlschalter ausschalten und die Frequenz auf 5kHz abstimmen. Das Ausgangssignal an Nadel 14 sollte 0dB betragen.
8. Dolby-Wahlschalter auf B stellen und sicherstellen, daß das Ausgangssignalpegel an Nadel 14 von IC3 (L-K) und IC4 (R-K) +8dB±2,5dB beträgt.

• Überprüfung der Dolby-C-Typ Verschlüsselungsmerkmale

9. Obige Stufen 1 bis 5 wiederholen.
10. Dolby-Wahlschalter auf C stellen und sicherstellen, daß das Ausgangssignalpegel an Nadel 14 von IC3 (L-K) und IC4 (R-K) +11,5dB±2,5dB beträgt.
11. Dolby-Wahlschalter ausschalten und die Frequenz auf 5kHz abstimmen.
Die Ausgangsspannung an Nadel 14 sollte 0dB sein.
12. Dolby-Wahlschalter auf C stellen und sicherstellen, daß das Ausgangssignalpegel an Nadel 14 von IC3 (L-K) +8,5dB±2,5dB beträgt.

❶ **Einsatz Ausgleichszeit-
Justierung
(dbx Schaltung)**

Meßbedingung:
• Betriebsart Aufnahme
• Eingangspegelregler...MAX
• Abgleichkontrolle
...Mitte (Zentrum)

Meßgeräte:
• Röhrenvoltarmeter
• Dämpfungsglied
• AF-Oszillator
• Gleichstromvoltmeter
• Geräuschverminderungs-
Schalter...dbx Band

1. Führen Sie die in Fig. 21 gezeigten Anschlüsse durch und geben Sie ein 1kHz -27dB Signal vom LINE IN ein und stellen Sie den Lärmreduktionswähler in die Position dbx.
2. Versetzen Sie das Gerät in die Betriebsart Aufnahme und stellen Sie das Dämpfungsglied so ein, daß der Signalpegel beim C97 (linker Kanal) und beim C98 (rechter Kanal) 300mV ist.
3. Voltzahl auf DC Voltmeter ablesen

Bezugswert: $15 \pm 0,5 \text{ mV}$

4. Weicht der Meßwert vom Bezugswert ab, VR4 abgleichen (bei den Elektroteilen angezeigt).

❷ **Einstellung der
Zeitdauer des
Scanning-Puls**

Bedingung:
• Stop

Meßgerät:
• Oszilloskop

1. Oszilloskop an Klemme 23 von IC601 anschließen.
2. Mit Oszilloskop die Zeit des Scanning-Puls wie in Fig. 22) dargestellt messen.

NORMALWERT: 8,8mSec—7,2mSec

3. Falls der gemessene Wert vom unten gezeigten signal (Fig. 22) beträchtlich abweicht, wie folgt erforderliche Justierung vornehmen.

Einstellung:

1. Die Stelle C unterbrechen und den Punkt B im Verdrahtungsplan auf der Hauptleiterplatte kurzschließen. (Siehe Fig 23).
2. Jmpulslänge messen.
3. Überprüfen, ob der gemessene Jmpuls zwischen $8 \text{ msec} \pm 0,8 \text{ msec}$ liegt.
4. Falls er außerhalb dieses Bereichs liegt, folgende Schritte ausführen.
 - Beträgt der Jmpuls weniger als 7,2 den Punkt B unterbrechen.
 - Beträgt der Löschstrom mehr als 8,8msec die Stelle C kurzschließen.

METHODES DES MEASURES ET REGLAGES

RS-M235X FRANCAIS

Ceci est à utiliser conjointement avec le manuel d'entretien du modèle No. RS-M235X.

REMARQUES: Placer les interrupteurs et les contrôles dans les positions suivantes, sauf indication contraire.

- Vérifier que les têtes soient propres.
- Vérifier que le cabestan et le galet presseur soient propres.
- Température ambiante admissible: $20 \pm 5^\circ\text{C}$
- Sélecteur de réduction de bruit: OFF
- Interrupteur de démarrage de la minuterie: OFF
- Contrôles de niveau d'entrée: Maximum
- Contrôle de l'équilibre: Centre

A Réglage de l'azimut de tête

Condition:

- Mode de lecture
- Mode de bande normale

Equipement:

- Voltmètre électronique
- Oscilloscope
- Bande étalon (azimut)
...QZZCFM

Réglage de l'équilibre de la sortie au canal gauche/canal droit

1. Brancher les appareils comme indiqué dans la Fig. 2.
2. Reproduire le signal de 8kHz de la bande étalon (QZZCFM).
Régler la vis (B) dans la Fig. 3 pour obtenir les niveaux de sortie maximum pour les canaux gauche et droit.
Lorsque les niveaux de sortie des canaux gauche et droit ne sont pas simultanément à leur maximum, les régler à nouveau de la façon suivante.
3. Faire tourner la vis indiquée dans la Fig. 3 pour trouver les angles A et C (point où les niveaux de sortie de crête pour les canaux gauche et droit sont obtenus respectivement). Situer alors l'angle B entre les angles A et C, autrement dit, en un point où les niveaux de sortie des canaux gauche et droit atteignent tous deux leur maximum.
(Voir les Fig. 3 et 4).

Réglage de phase canal gauche/canal droit

4. Brancher les appareils comme indiqué dans la Fig. 5.
5. Reproduire le signal de 8kHz de la bande étalon (QZZCFM).
Régler la vis (B) indiquée dans la Fig. 3 de sorte que les aiguilles des deux voltmètres électroniques oscillent au maximum, et qu'on obtienne sur l'oscilloscope une forme d'onde semblable à celle indiquée dans la Fig. 6.

B Vitesse de défilement

Condition:

- Mode de lecture

Equipement:

- Fréquence-mètre numérique
- Bande étalon...QZZCWAT

Précision de la vitesse de défilement

1. Brancher les appareils comme indiqué dans la Fig. 7.
2. Lire la bande étalon (QZZCWAT, 3000Hz) et appliquer le signal de lecture au fréquence-mètre numérique.
3. Mesurer sa fréquence.
4. Sur la base de 3000Hz, déterminer la valeur à l'aide de la formule.

$$\text{Précision de vitesse} = \frac{f - 3000}{3000} \times 100(\%)$$

avec f = valeur mesurée.

5. Effectuer la mesure sur la partie médiane de la bande.

Valeur standard: $\pm 1,5\%$

6. Si la valeur mesurée ne correspond pas à la valeur standard, régler au moyen de la vis VR de réglage de la vitesse de défilement indiquée dans la Fig. 1.

Fluctuations de vitesse de défilement

Faire les mesures de la même façon que ci-dessus (au début, au milieu et en fin de bande) et déterminer la différence entre les valeurs maximale et minimale, puis calculer comme suit.

$$\text{Fluctuations de vitesse} = \frac{f_1 - f_2}{3000} \times 100(\%)$$

f_1 = valeur maximale

f_2 = valeur minimale

Valeur standard: 1%

Note:

Utiliser un tournevis non métallique pour régler la vitesse de bande de cet appareil avec précision.
Ne pas utiliser de tournevis métallique, sinon le protecteur IC (ICP501) peut être endommagé et le moteur du cabestan peut ne pas être entraîné.

Ⓒ Réponse en fréquence à la lecture

- Condition:
- Mode de lecture
 - Mode de bande normale

- Equipement:
- Voltmètre électronique
 - Oscilloscope
 - Bande étalon...QZZCFM

1. Brancher les appareils comme indiqué dans la Fig. 2.
2. Lire la portion de réponse en fréquence de la bande étalon (QZZCFM).
3. Mesurer les niveaux de sortie à 315Hz, 12.5kHz, 8kHz, 4kHz, 1kHz, 250Hz, et 63Hz et comparer chaque niveau de sortie avec celui de la fréquence standard de 315Hz sur la borne LINE OUT.
4. Effectuer les mesures sur les deux canaux.
5. Vérifier que les valeurs mesurées se situent dans la bande spécifiée de la courbe de réponse en fréquence. (Voir Fig. 9).

Ⓓ Gain à la lecture

- Condition:
- Mode de lecture
 - Mode de bande normale

- Equipement:
- Voltmètre électronique
 - Oscilloscope
 - Bande étalon...QZZCFM

1. Brancher les appareils comme indiqué dans la Fig. 2.
2. Lire la partie "niveau standard d'enregistrement de la bande étalon (QZZCFM 315Hz) et, au moyen du voltmètre électronique, mesurer le niveau de sortie aux points de coupure [TP7 pour le canal gauche, TP8 pour le canal droit].
3. Effectuer les mesures sur les deux canaux.

Valeur standard: around 0,28V (0,38±0,05V à la borne LINE OUT)

Réglage

1. Si la valeur mesurée ne correspond pas à la valeur stansard, régler VR9 (canal gauche) ou VR10 (canal droit). (Voir Fig. 1).
2. Après réglage, vérifier à nouveau la "réponse en fréquence à la lecture".

Ⓔ Courant d'effacement

- Condition:
- Mode d'enregistrement
 - Mode de bande métallique

- Equipement:
- Voltmètre électronique
 - Oscilloscope

1. Brancher les appareils comme indiqué dans la Fig. 10.
2. Placer l'UNITE sur le mode de bande métallique.
3. Appuyer sur les boutons d'enregistrement et de pause.
4. Lire le voltage sur le voltmètre électronique et calculer le courant d'effacement au moyen de la formule suivante:

Courant d'effacement (A) =
$$\frac{\text{Voltage à la résistance R301}}{1 (\Omega)}$$

Valeur standard: 155±15mA

5. Si la valeur mesurée ne correspond pas à la valeur standard, régler selon les instructions ci-après.

Réglage

Si le courant d'effacement est inférieur à 140mA, ouvrir le point (A).

Ⓕ Réponse de fréquence globale

- Condition:
- Mode enregistrement/lecture
 - Mode de bande normale
 - Mode de bande CrO₂
 - Mode de bande métallique
 - Contrôles de niveau d'entrée...MAX
 - Contrôle de l'équilibre...Centre

- Equipement:
- Voltmètre électronique
 - Atténuateur
 - Oscillateur
 - Oscilloscope
 - Résistant (600Ω)
 - Bande étalon vierge
 - ...QZZCRA pour band normale
 - ...QZZCRX pour bande CrO₂
 - ...QZZCRZ pour bande métallique

Remarque:

Avant de mesurer et régler la réponse de fréquence globale vérifier que la réponse en fréquence à la lecture soit correcte (pour la méthode de mesure, se reporter au paragraphe intitulé "Réponse en fréquence à la lecture").

- (Le compensateur d'enregistrement est fixe.)
1. Brancher les appareils comme indiqué dans la Fig. 10.
 2. Placer l'UNITE en mode pour bande normale, et introduire la bande étalon vierge normale (QZZCRA).
 3. Appliquer le signal de 1kHz de l'oscillateur AF à la loorne LINE IN, par l'intermédiaire de l'atténuateur.
 4. Régler l'atténuateur de sorte que le niveau d'entrée soit de 20dB en-dessous du niveau d'enregistrement standard (niveau d'enregistrement standard = 0VU).
 5. Régler l'oscillateur AF pour produire des signaux de 50Hz 100Hz, 200Hz, 500Hz, 1kHz, 4kHz, 8kHz, 10kHz et 12,5kHz et enregistrer ces signaux sur la bande étalon.
 6. Reproduire les signaux enregistrés dans la phase 6, et vérifier si la courbe de réponse de fréquence se trouve dans les limites indiquées par la courbe de réponse de fréquence globale pour bandes normales (Fig. 11).
- (Si la courbe est comprise dans les spécifications, passer aux phases 7, 8 et 9).
Si la courbe ne correspond pas aux spécifications du tableau, régler comme suit.

Réglage (A):

Lorsque la courbe dépasse les spécifications du tableau de réponse de fréquence globale (Fig. 11), comme indiqué dans la Fig. 12.

- 1) Augmenter le courant de polarisation en tournant VR301 (L-CH) (canal gauche) et VR302 (R-CH) (canal droit). (Voir Fig. 1 page 5).
- 2) Répéter les phases 5 et 6 pour confirmation. (Passer aux phases 7, 8 et 9 si la courbe est maintenant comprise dans les spécifications du tableau de la Fig. 11).
- 3) Si la courbe dépasse encore les spécifications (Fig. 11), augmenter encore le courant de polarisation et répéter les phases 5 et 6.

Réglage (B):

Lorsque la courbe tombe audessous des spécifications du tableau de fréquence globale (Fig. 11) comme indiqué dans la Fig. 13.

- 1) Réduire le courant de polarisation en tournant VR301 (L-CH) (canal gauche) et VR302 (R-CH) (canal droit).
- 2) Répéter les phases 5 et 6 pour confirmation. (Passer aux phases 7, 8 et 9 si la courbe est maintenant comprise dans les spécifications du tableau de la Fig. 11).
- 3) Si la courbe tombe encore au-dessous des spécifications du tableau (Fig. 11), réduire encore le courant de polarisation et répéter les phases 5-et 6.
7. Placer l'UNITE en mode de bande CrO₂.
8. Enlever la bande étalon vierge normale et placer la bande étalon QZZCRX (bande CrO₂). Enregistrer les signaux de 50Hz, 100Hz 200Hz, 500Hz 1kHz, 4kHz, 8kHz, 10kHz et 15kHz. Reproduire ensuite ces signaux et vérifier si la courbe est comprise dans les limites indiquées par le tableau de réponse de fréquence globale pour les bandes CrO₂ (Fig. 14).
9. Placer l'UNITE en mode de bande métallique, changer la bande étalon pour la bande étalon vierge QZZCRZ (bande métal-lique), et enregistrer les signaux de 50Hz, 100Hz, 200Hz, 500Hz, 1kHz, 4kHz, 8kHz, 10kHz, 12,5kHz et 15kHz. Reproduire ensuite ces signaux, et vérifier si la courbe est comprise dans les limites indiquées par le tableau de réponse de fréquence globale pour les bandes métalliques (Fig. 14).
10. Confirmer que les courants de polarisation sont approximativement les suivants lorque le sélecteur de bande est mis sur ses différentes positions.
 - Lire le voltage sur le voltmètre électronique entre la terre et le point de coupure (TP1 pour le canal gauche et TP2 pour le canal droit) et calculez le courant de polarisation selon la formule.

$$\text{Courant de polarisation (A)} = \frac{\text{Tension lue sur voltm. élec. (V)}}{10 (\Omega)}$$

	Autour de 410µA (position: Normal)
Valeur standard:	Autour de 530µA (position: CrO₂)
	Autour de 850µA (position: Metal)

Ⓒ Gain global

Condition:	Equipement:
• Mode d'enregistrement/lecture	• Voltmètre électronique
• Mode de bande normale	• Oscillateur AF
• Contrôles de niveau d'entrée	• Atténuateur
...MAX	• Oscilloscope
• Contrôle de l'équilibre...Centre	• Résistance (600Ω)
• Niveau d'entrée standard:	• Bande étalon vierge QZZCRA
MIC-72±4dB	pour bande normale
LINE IN-24±4dB	

1. Brancher les appareils comme indiqué dans la Fig. 15.
2. Introduire la bande étalon vierge (QZZCRA).
3. Placer l'UNITE en mode d'enregistrement.
4. Appliquer le signal de 1kHz de l'oscillateur AF à la borne LINE IN, par l'intermédiaire de l'atténuateur (-24dB).
5. Régler l'atténuateur pour que le niveau de contrôle sur la borne LINE OUT soit de 0,38V.
6. Lire la bande ainsi enregistrée et vérifier que le niveau de sortie sur la borne LINE OUT soit de 0,38V.
7. Si la valeur mesurée n'est pas de 0,38V±2dB, régler au moyen de VR5 (canal gauche) ou VR6 (canal droit).
8. Recommencer à partir de la phase (2).

Valeur standard:	0.38V-2dB (300mV)-0.38V + 2dB (480mV)
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H Vumètre fluorescent

Condition:

- Mode d'enregistrement
- Contrôles de niveau d'entrée...MAX
- Contrôle de l'équilibre...Centre

Equipement:

- Voltmètre électronique
- Atténuateur
- Oscillateur AF

• Vérification du vumètre fluorescent

Pour vérifier le degré de précision du vumètre fluorescent, mesurer le niveau de sortie sur la borne LINE OUT.

1. Brancher les appareils comme indiqué dans la Fig. 16.
2. Brancher un câble entre le point de coupure TP401 et TP402. (Voir Fig. 17).
3. Appliquer un signal de 1kHz (-24dB) à la borne LINE IN, alors que l'unité est en mode de pause d'enregistrement.
4. Régler l'atténuateur de sorte que le niveau de sortie sur la borne LINE OUT soit de 0,38V.

Vérification de l'allumage et de l'extinction du segment 0dB du vumètre fluorescent

Changer le niveau de sortie sur la borne LINE OUT de la valeur 0,38V - 1dB ($\approx$ 340mV) à la valeur 0,38V + 1dB ($\approx$ 430mV) en réglant l'atténuateur. Vérifier que le segment 0dB du vumètre fluorescent s'allume alors.

Vérification de l'allumage et de l'extinction du segment -40dB du vumètre fluorescent

Abaissier le niveau de signal de 28dB en-dessous du niveau d'entrée standard (-24dB - 28dB = -52dB $\approx$ 2,5mV); l'abaisser à nouveau d'une valeur de 12dB (-52dB - 12dB = -64dB $\approx$ 0,63mV) en réglant l'atténuateur. Lors de l'abaissement du niveau de signal comme indiqué ci-dessus, vérifier que seul le segment -40dB du vumètre fluorescent reste allumé et qu'il s'obscurcisse ou s'éteigne au niveau le plus bas.

• Réglage du vumètre fluorescent

1. Brancher les appareils comme indiqué dans la Fig. 16.
2. Brancher un câble entre le point de coupure TP401 et TP402. (Voir Fig. 17).
3. Appliquer un signal de 1kHz (-24dB) à la borne LINE IN, alors que l'unité est en mode de pause d'enregistrement.
4. Régler l'atténuateur de sorte que le niveau de sortie sur la borne LINE OUT soit de 0,38V.

Réglage à "-40dB"

5. Régler l'atténuateur de sorte que le niveau réglé à la phase 4 soit réduit de 40dB.
6. A ce moment, vérifier que le segment -40dB s'obscurcisse (luminosité intermédiaire entre pleine luminosité et extinction: voir Fig. 18).
7. Si la luminosité du segment n'est pas comme celle mentionnée à la phase 6 ci-dessus, régler le VR7.

Réglage à "0dB"

8. Rétablir les conditions de la phase 4 (niveau de sortie sur la borne LINE OUT de valeur 0,38V).
9. A ce moment, vérifier que le segment 0dB s'obscurcisse (luminosité intermédiaire entre pleine luminosité et extinction: voir Fig. 19).
10. Si la luminosité du segment n'est pas comme indiqué ci-dessus, régler le VR401.
11. Répéter les réglages des phases 4, 5, 6, 7, 8, 9 et 10 deux ou trois fois.
12. Débrancher le câble entre le point de coupure TP402 et TP401 (câble que l'on avait branché à la phase 2).

① Circuit de réduction de bruit Dolby

Condition:

- Mode d'enregistrement
- Interrupteur de réduction de bruit Dolby...IN/OUT
- Interrupteur de sélection du système de réduction de bruit Dolby...B/C
- Contrôles de niveau d'entrée...MAX
- Contrôle de l'équilibre...Centre

Equipement:

- Voltmètre électronique
- Oscillateur AF
- Atténuateur
- Oscilloscope
- Résistance (600 Ω)

Côté enregistrement

• Vérification des caractéristiques du codeur de type Dolby-B

1. Brancher les appareils comme indiqué dans la Fig. 20.
2. Placer l'unité sur le mode d'enregistrement. (L'interrupteur de sélection du système de réduction de bruit est sur la position OUT).
3. Appliquer un signal de 1kHz à la borne LINE IN.
4. Régler l'atténuateur de sorte que le niveau de sortie aux points de coupure TP7 (canal gauche) et TP8 (canal droit) soit de 12,3mV.
5. Le niveau de sortie à la pointe 14 devrait être de 0dB.
6. Placer l'interrupteur de sélection du système de réduction de bruit sur B et s'assurer que le niveau du signal de sortie à la pointe 14 des circuits intégrés IC3 (canal gauche) et IC4 (canal droit) est de +6dB $\pm$ 2,5dB.
7. Placer l'interrupteur de sélection du système de réduction de bruit sur la position OUT et régler la fréquence sur 5kHz. Le niveau du signal de sortie à la pointe 14 devrait être de 0dB.
8. Placer l'interrupteur de sélection du système de réduction de bruit sur la position B et s'assurer que le niveau du signal de sortie à la pointe 14 des circuits intégrés IC3 (canal gauche) et IC4 (canal droit) soit de +8dB $\pm$ 2,5dB.

• Vérification des caractéristiques du codeur de type Dolby-C

9. Répéter les phases 1 à 5 ci-dessus.
10. Placer l'interrupteur de sélection du système de réduction de bruit Dolby sur la position C et s'assurer que le niveau de signal de sortie à la pointe 14 des circuits intégrés IC3 (canal gauche) et IC4 (canal droit) soit de +11,5dB $\pm$ 2,5dB.

11. Placer l'interrupteur de sélection du système de réduction de bruit sur la position OUT et régler la fréquence sur 5 kHz. Le niveau du signal de sortie à la pointe 14 devrait être de 0dB.
12. Placer l'interrupteur de sélection du système de réduction de bruit sur la position C et s'assurer que le niveau du signal de sortie à la pointe 14 des circuits intégrés IC3 (canal gauche) et IC4 (canal droit) soit de $+8,5\text{dB} \pm 2,5\text{dB}$.

Ⓜ Réglage du temps de recouvrement à l'attaque (circuit dbx)

Condition:

- Mode d'enregistrement
- Contrôles de niveau d'entrée...MAX
- Contrôle de l'équilibre ...Centre

Equipement:

- Voltmètre électronique
- Atténuateur
- Oscillateur AF
- Voltmètre CC
- Sélecteur de réduction de bruit...position de bande dbx ("dbx tape")

1. Faire les branchements comme indiqué dans la Fig. 21 et appliquer un signal de 1kHz-27dB à la borne LINE IN. Placer le sélecteur de réduction de bruit sur la position de bande dbx ("dbx tape").
2. Placer l'unité sur le mode d'enregistrement. Régler l'atténuateur de sorte que le niveau de signal à C97 (canal gauche) et à C98 (canal droit) soit de 300mV.
3. Lire la tension indiquée sur le voltmètre CC.

Valeur de référence: $15 \pm 0,5\text{mV}$

4. Si la valeur lue ne correspond pas à la valeur de référence, régler VR4 (emplacement indiqué au niveau des pièces électriques).

Ⓚ Réglage de la durée de balayage d'entrée

Condition:

- Mode d'arrêt

Equipement:

- Oscilloscope

1. Brancher l'oscilloscope à la borne 23 de IC601.
2. Mesurer la durée du signal de balayage d'entrée au moyen de l'oscilloscope, comme l'indique la Fig. 22.

Valeur standard: 8,8msec—7,2msec

3. Si la valeur mesurée est sensiblement différente de la valeur du signal indiquée ci-dessous, effectuer les réglages nécessaires suivants.

Réglage

1. Ouvrir le point C et court-circuiter le point B sur la plaquette de circuit principale (Voir Fig. 23).
2. Mesurer la valeur de la forme d'onde.
3. S'assurer que la valeur mesurée se trouve entre $8\text{msec} \pm 0,8\text{msec}$.
4. Si elle se situe en dehors de cette plage, procéder aux réglages suivants.
 - Si la valeur mesurée est inférieure à 7,2msec, ouvrir le point B.
 - Si la valeur mesurée est supérieure à 8,8msec, court-circuiter le point C.