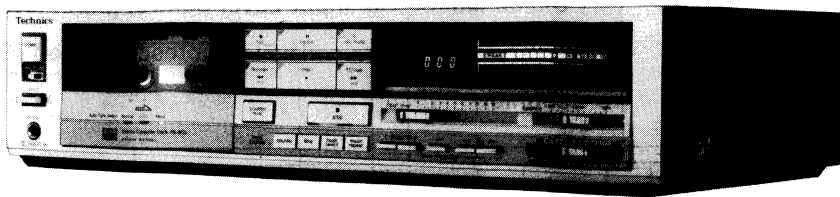


Service Manual

dbx -Equipped Microprocessor
Controlled Cassette Deck

Cassette Deck
RS-M245X
(Silver Face)
(Black Face)



RS-M245X in black is also available in some countries.

This is the Service Manual for the following areas.

- N** For Asia, Latin America, Middle East and Africa areas.
- A** For Australia.
- P** For Asian PX.
- J** For European PX.

RS-M250 MECHANISM SERIES

Specifications

Track system:	4-track 2-channel stereo recording and playback	Inputs:	MIC; sensitivity 0.25mV applicable microphone impedance 400Ω—10kΩ
Tape speed:	4.8cm/s		LINE; sensitivity 60mV, input impedance 47kΩ or more
Wow and flutter:	0.045% (WRMS)	Outputs:	LINE; output level 400mV, output impedance 1.5kΩ or less
Frequency response:	Metal tape; 20—20,000 Hz 50—18,000 Hz±3dB CrO ₂ tape; 20—19,000 Hz 50—17,000 Hz±3dB Normal tape; 20—18,000 Hz 50—16,000 Hz±3dB		HEADPHONES; output level 125mV (at 8Ω) applicable headphone impedance 8Ω—600Ω
Dynamic range:	110dB (at 1kHz) with dbx* in	Bias frequency:	80kHz
Max. input level improvement:	10dB or more improved with dbx in (at 1kHz)	Heads:	2-head system 1-AX (AMORPHOUS) head for record/playback 1-double-gap ferrite head for erasure
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)	Motor:	2-motor system
Fast forward and rewind time:	Approx. 90 seconds with C-60 cassette tape	Power requirements:	AC; 110/125/220/240V, 50-60 Hz Preset power voltage 240V
		Power consumption:	NFJ ; 16W A ; 22W
		Dimensions:	43cm(W)×9.8cm(H)×27.3cm(D)
		Weight:	5.1kg

Design and specifications are subject to change without notice.

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

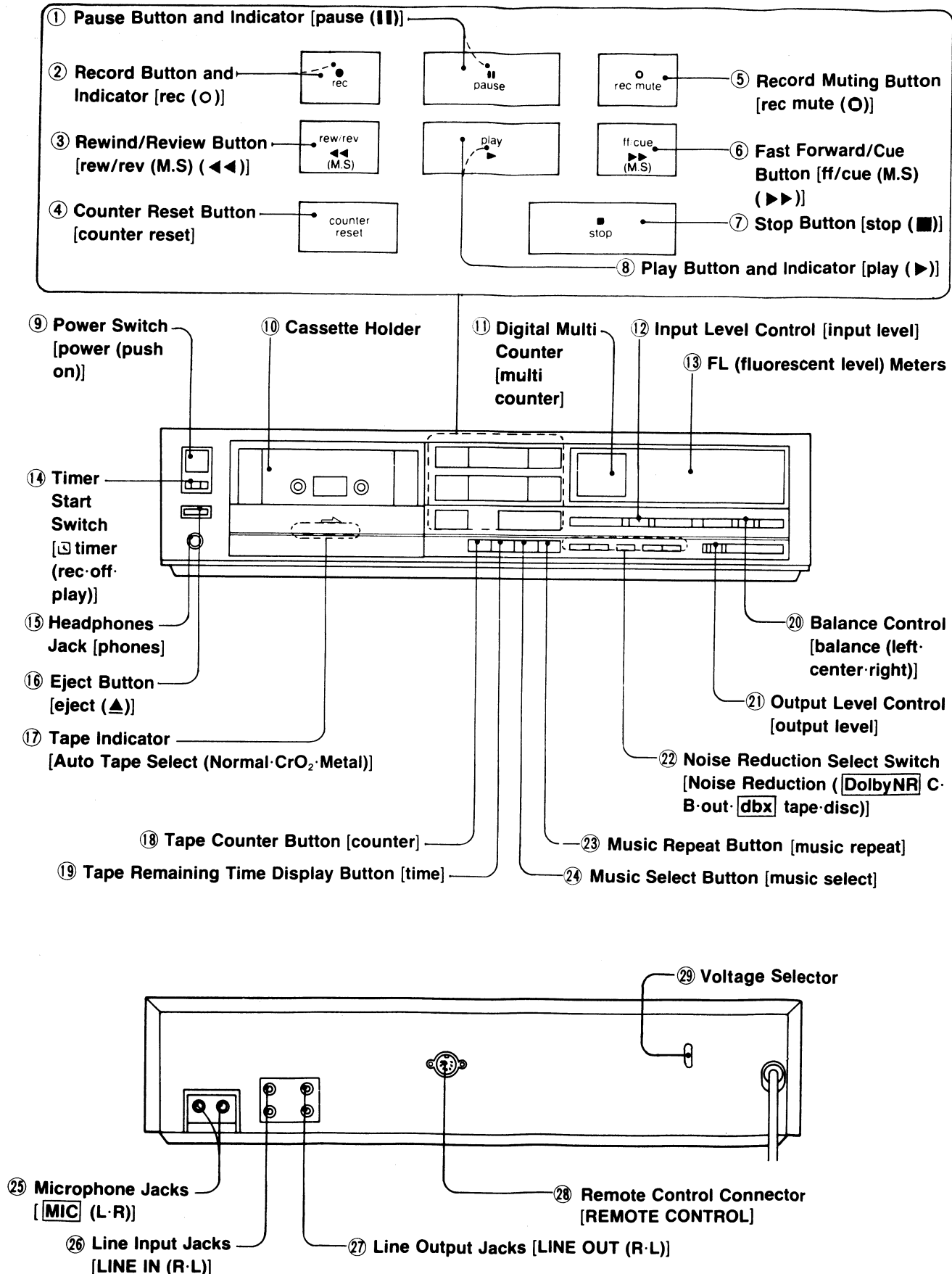
** 'Dolby' and the double-D symbol are trademarks of Dolby Laboratories Licensing Corporation.

Technics

Panasonic Tokyo
Matsushita Electric Industrial Co., Ltd.
1-2, 1-chome, Shibakoen, Minato-ku, Tokyo 105 Japan

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

LOCATION OF CONTROLS AND COMPONENTS



DISASSEMBLY INSTRUCTIONS

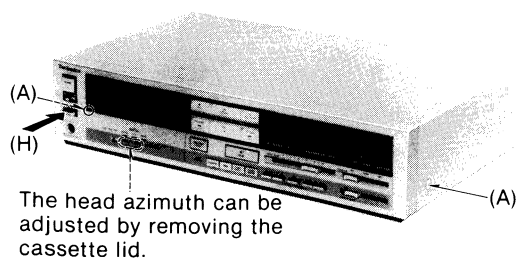


Fig. 1

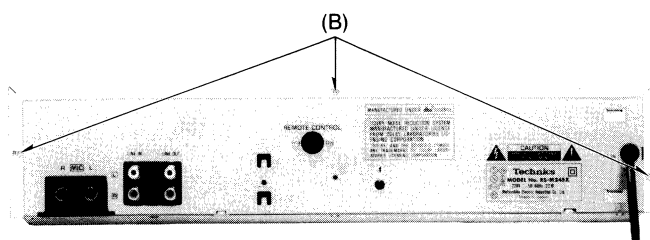
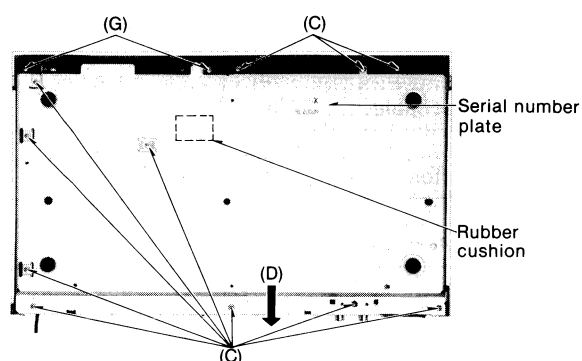


Fig. 2

**NOTE:**

When removing the bottom cover, do not allow the rubber cushion on the bottom cover to be trapped by the terminals of the electric components.

Fig. 3

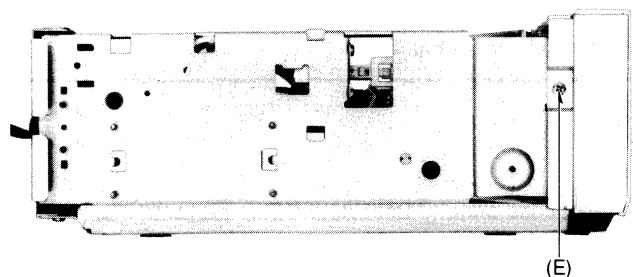


Fig. 5

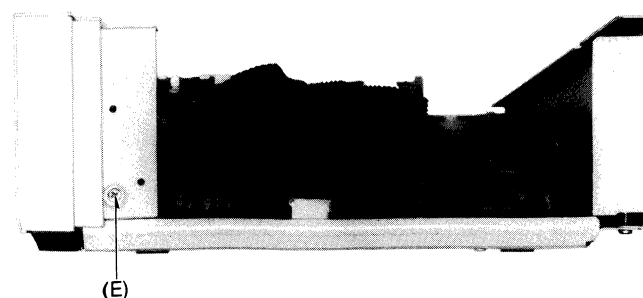
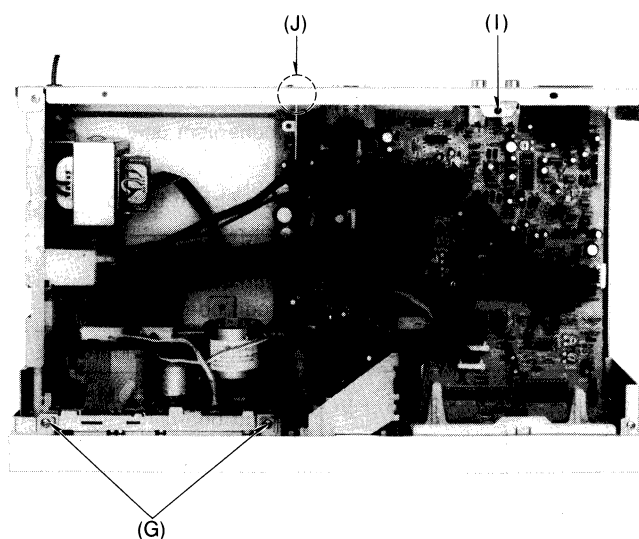
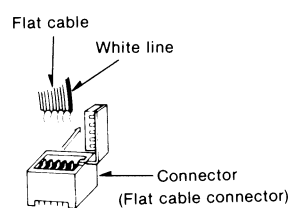
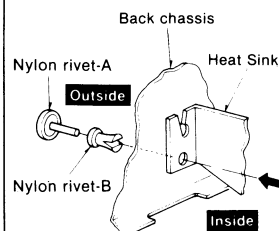


Fig. 6

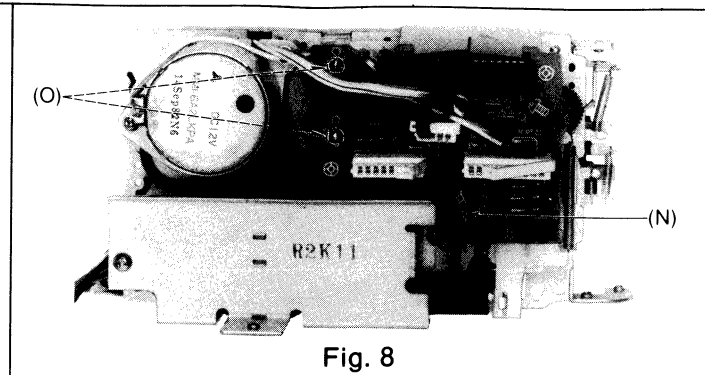
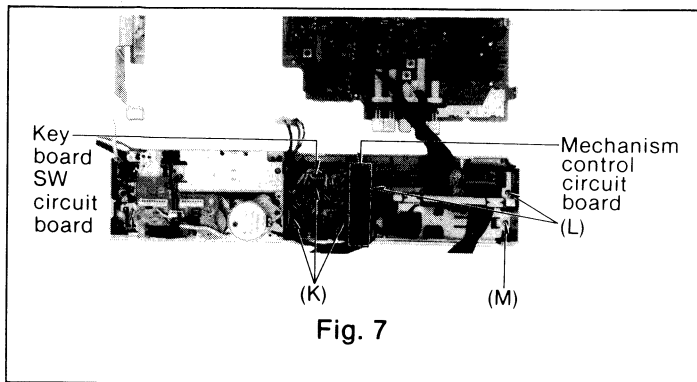
**(F) How to remove flat cable**

Open the lid of connector in the direction of the arrow as shown above, and extract the flat cable to disconnect.

(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 outside. Consequently, the heat sink can be removed from the back chassis.

Fig. 4



Ref. No.	Procedure	To remove —.	Remove —.	Shown in fig. —.
1	1	Case cover	• 2 ornament screws(A) • 3 screws(B)	1 2
2	2	Bottom cover assembly	• 11 screws(C) • As shown in fig. 3, pull bottom cover in the direction of arrow (D).	3
3	1 → 2 → 3	Front panel assembly and Mechanism unit	• 2 screws.....(E) • How to remove flat cable.....(F)	5, 6 4
4	1 → 2 → 3 → 4	Mechanism unit	• 4screws(G) • Push the eject button(H)	3, 4 1
5	1 → 2 → 3 → 5	Main circuit board	• 1 screw(I) • How to remove nylon rivet(J)	4 4
6	1 → 2 → 3 → 6	Key board SW and Mechanism control circuit board	• 3 screws(K)	7
7	1 → 2 → 3 → 7	Volume circuit board	• 2 screws.....(L)	7
8	1 → 2 → 3 → 8	FL Meter and FL Meter circuit board	• 1 screw(M)	7
9	1 → 2 → 3 → 9	Mechanism circuit board	• 1 screw(N) • Unsolder the soldered portion of the reel motor terminal (O)	8 8

*** Serial No. Indication.**

The serial number plate of this product is attached to the bottom cover (shown in Fig. 3).

OPERATING PRECAUTIONS

When the recorder is turned off during playback or music selection, the head base plate will not return. This prevents the cassette holder from opening. To open the cassette holder, turn on the recorder again (the head base plate will return) and press the EJECT button.

DISASSEMBLY NOTES

When the bottom cover is removed for repair, measurement, or adjustment, the grounds of the mechanism chassis, back chassis, and side panel must be disconnected.

Otherwise, the auto tape selector will not operate normally and noise will be generated. To prevent these problems, use a cord to connect the mechanism chassis and the ground of the main circuit board.

MEASUREMENT AND ADJUSTMENT METHODS

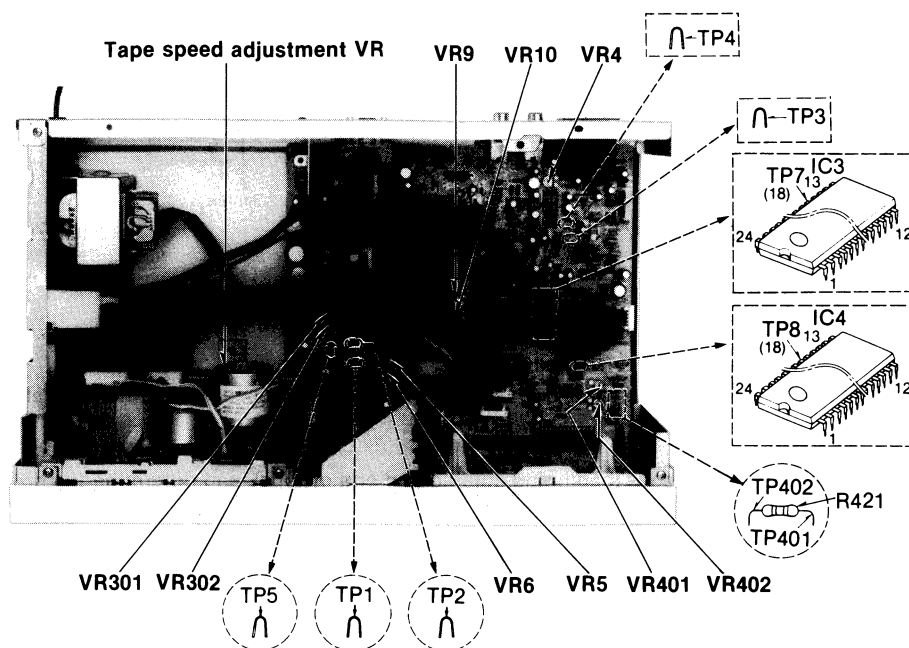


Fig. 1

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 $20 \pm 5^\circ\text{C}$ ($68 \pm 9^\circ\text{F}$)
- NR switch: OUT
- Timer start switch: OFF
- Input level controls: Maximum
- Output level control: 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.

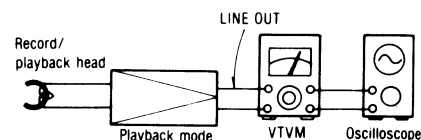


Fig. 2

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 fig. 3 and 4.)

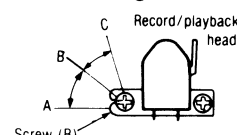


Fig. 3

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.

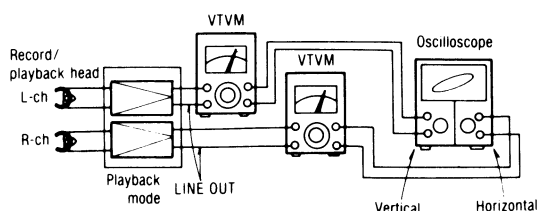


Fig. 5

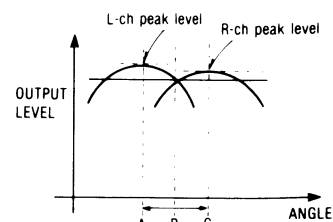


Fig. 4

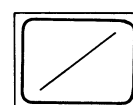


Fig. 6

Ⓔ 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:

$$\text{Tape speed accuracy} = \frac{f - 3,000}{3,000} \times 100(\%) \quad \text{where, } f = \text{measured value}$$
5. Take measurement at middle section of tape.

Standard value: $\pm 1.5\%$

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

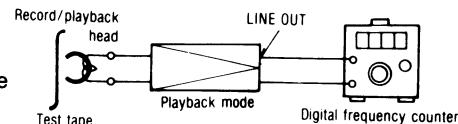


Fig. 7

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:

Use non metal type screwdriver when you adjust tape speed on this unit.

Ⓒ Playback frequency response

Condition:
• Playback mode
• Normal tape mode
• Output level control...MAX

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. 8).

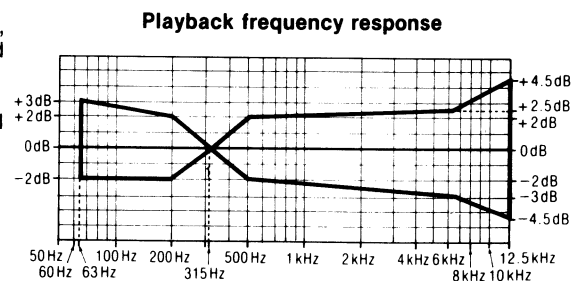


Fig. 8

Ⓓ Playback gain

Condition:
• Playback mode
• Normal tape mode
• Output level control...MAX

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 $\pm$ 0.05V: at LINE OUT jack]

Adjustment

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

Ⓔ Erase current

Condition:
 • Record mode
 • Metal tape mode

Equipment:
 • VTVM
 • Oscilloscope

1. Test equipment connection is shown in fig. 9.
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).

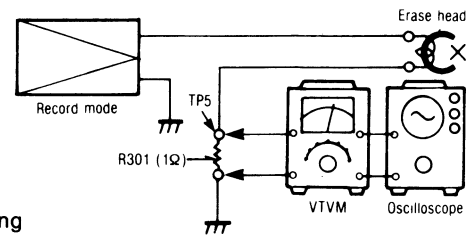


Fig. 9

Ⓕ Overall frequency response

Condition:
 • Record/playback mode
 • Normal tape mode
 • CrO₂ tape mode
 • Metal tape mode
 • Input level control...MAX
 • Output level control...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 1 kHz 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;

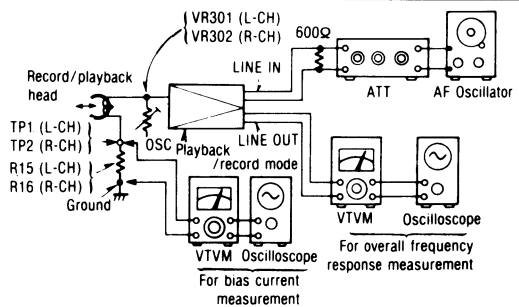


Fig. 10

Overall frequency response chart (Normal)

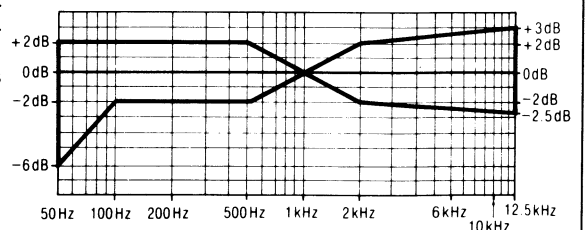


Fig. 11

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 8.)
- 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.

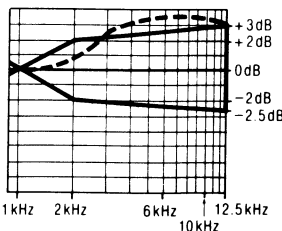


Fig. 12

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.

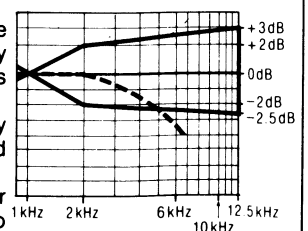


Fig. 13

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 for 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 200 μ A (Normal position)
Standard value: around 250 μ A (CrO₂ position)
around 380 μ A (Metal position)

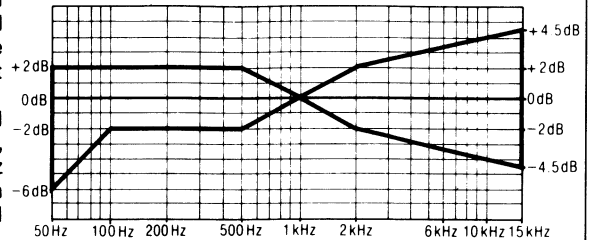
Overall frequency response chart (CrO₂, Metal)

Fig. 14

Overall gain

Condition:

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

Equipment:

- VTVM
- AF oscillator
- ATT
- Oscilloscope
- 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)

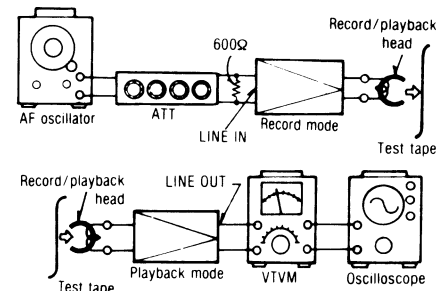


Fig. 15

Fluorescent meter

Condition:

- Record mode
- Input level control...MAX
- Output level control...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 then dims or goes off at the lowest level.

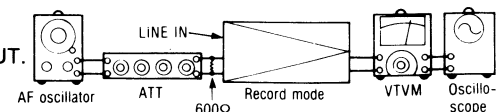


Fig. 16

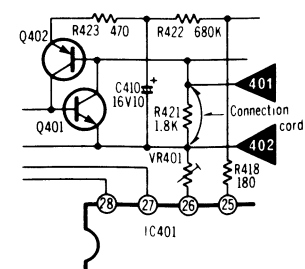


Fig. 17

• 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 1kHz (-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 VR402.

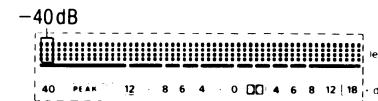


Fig. 18

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.

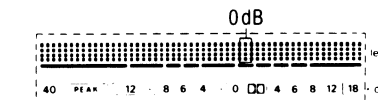


Fig. 19

① Dolby NR circuit

Condition:

- Record mode
- Dolby NR switch...IN/OUT
- Dolby NR select switch...B/C
- Input level control...MAX
- Output level control...MAX
- Balance control...Center

Equipment:

- VTVM
- ATT
- Resistor (600Ω)
- AF oscillator
- Oscilloscope

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 1kHz 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 $+8.5\text{dB} \pm 2.5\text{dB}$.

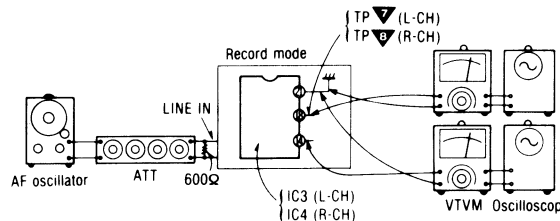


Fig. 20

① Attack recovery time adjustment (dbx circuit)

Condition:

- Record mode
- Input level control...MAX
- Output level control
- Balance control...Center
- Noise reduction selector ...dbx tape

Equipment:

- VTVM
- ATT
- AF oscillator
- DC voltmeter

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 fig. 1).

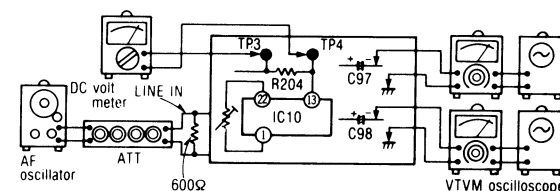
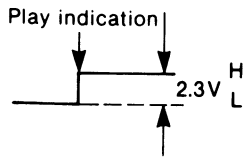
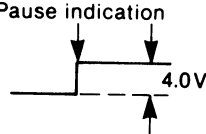
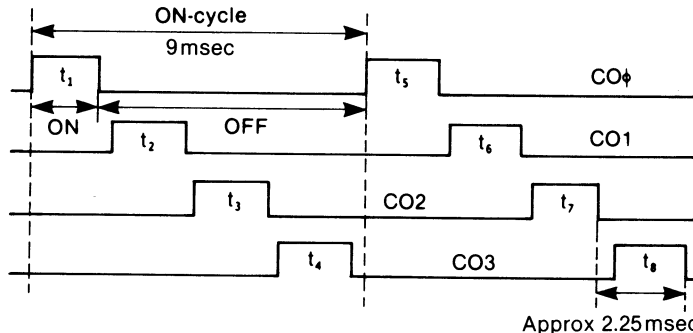
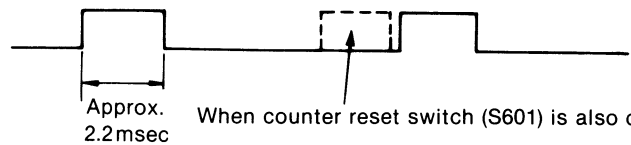
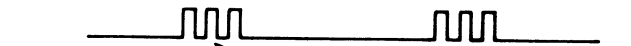
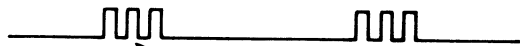


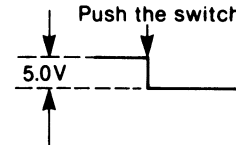
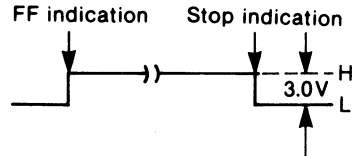
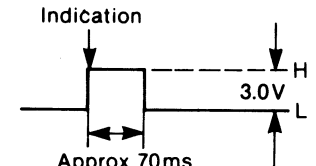
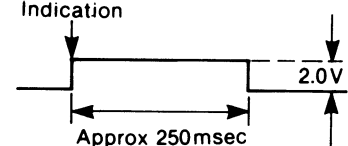
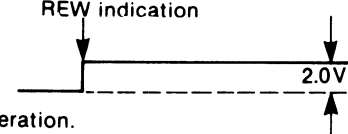
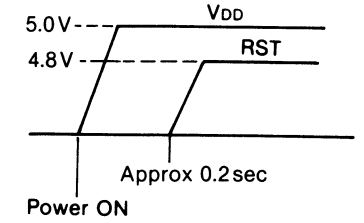
Fig. 21

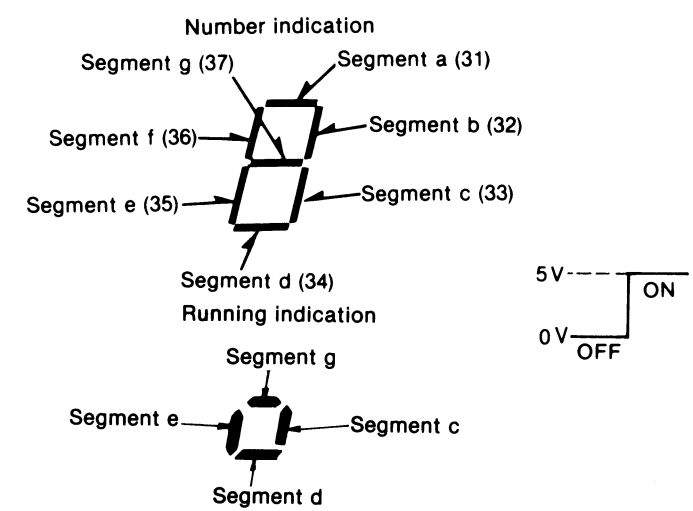
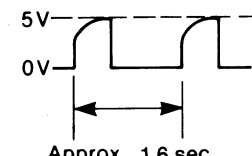
MN1405RMB (IC601) EACH TERMINAL FUNCTION AND WAVEFORM

NOTE: When the microcomputer does not operate, check terminal ③⑩ for presence of the reference signal. The microcomputer starts operation only after the signal is applied to terminal ③⑩

Terminal No.	Symbol	Name	Function/operation
1.	VSS	GND	
2.	C $\bar{O}$ 11	REC indication R/P selector	REC indication "H" level simultaneously with REC indication. "H" level immediately after power is ON in TIMER REC mode. "H" level held if in TIMER REC position, when STOP AUTO RESET mechanism operates.
3.	C $\bar{O}$ 10	Bias oscillation	① Stop Rec Pause Rec Play ② Puase Rec Pause Rec Play
4.	C $\bar{O}$ 9	TIMER OUT Repeat indication	COϕ CO1 CO2 CO3 "H" level during time display. "H" level during REPEAT operation.
5.	C $\bar{O}$ 8	No connection	Not used.
6.	C $\bar{O}$ 7	Muting	Power ON In play 0.3sec Muting "L" level 0.3 second after "PLAY" finish. "H" level in PAUSE, FF, REW STOP. "L" level approx. 0.4 second after "REC PAUSE" is switched to REC. "L" level approx. 0.4 second after command in case PAUSE mode is set to REC command. Approx. 0.2 second after the CUE/REVIEW operation, the signal goes to "L" level.
7.	C $\bar{O}$ 6	TIMER REC-PLAY Signal output	Approx. 80μs Becomes "H" level only when power is supplied.

Terminal No.	Symbol	Name	Function/operation
8.	C05	PLAY indication	 "H" level simultaneously with PLAY indication. Same as the above for TIMER PLAY.
9.	C04	PAUSE indication	 "H" level simultaneously with PAUSE indication.
10.	C03	FL grid & input SW. scan	
11.	C02	FL grid & input SW. scan	
12.	C01	FL grid & input SW. scan	
13.	C0φ	FL grid & input SW. scan	
14.	A13	Input switch state reading	Reads switch states corresponding to scanning of COφ — 3 (this terminal is connected to the accidental erasing protection leaf switch (S501), HALL IC, music select switch (S612) and tape counter switch (S610)).
15.	A12	Input switch state reading	Reads switch states corresponding to scanning of COφ — 3 (when the mode leaf switch (S502) is ON, this terminal is connected to the repeat switch (S613), and timer switch (S609)).
16.	A11	Input switch state reading	Reads switch states corresponding to scanning of COφ — 3 (when the play leaf switch (S504) is ON, this terminal is connected to the REC MUTE switch (S602)).
17.	A1φ	Input switch state reading	Reads switch states corresponding to scanning of COφ — 3 (when the stop leaf switch (S503) is ON, this terminal is connected to the counter reset switch (S601)).
			Operation example Counter reset switch (S601) and stop switch (S503) are connected to A10. If only S503 is closed, the waveform is as follows:  When counter reset switch (S601) is also closed:  HALL IC output, music select switch (S612) and tape counter switch (S610) are connected to A13. If all switches are OFF, the following waveform is obtained in FF or REW mode.  Reel table rotation pulses

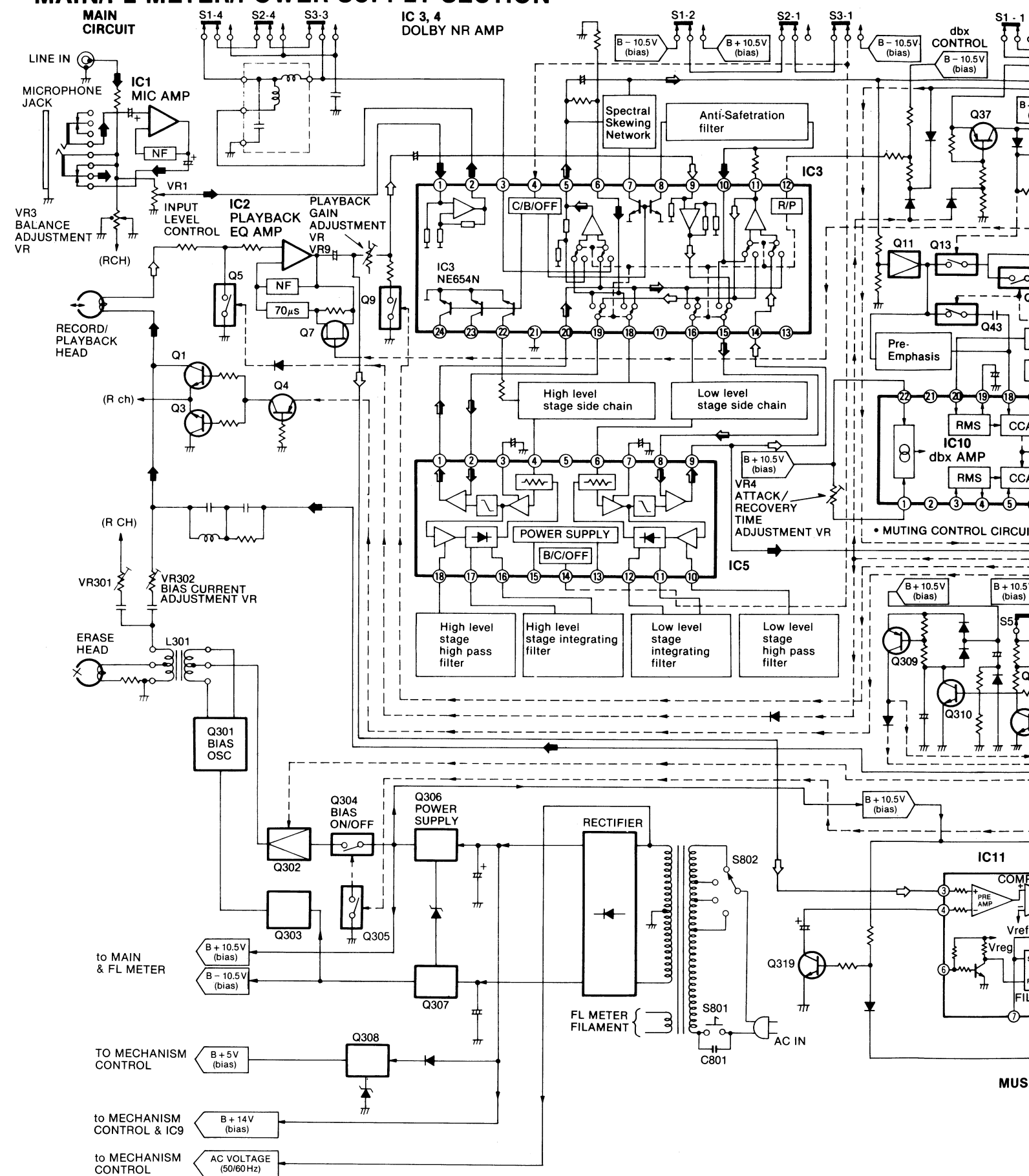
Terminal No.	Symbol	Name	Function/operation
18.	Bi3	REW key switch	 Push the switch. "H" in the normal case, "L" when the switch is pushed.
19.	Bi2	FF key switch	
20.	Bi1	PLAY key switch	
21.	Biφ	STOP key switch	
22.	E0φ	Brake plunger	 "H" during FF/REW operations.
23.	E01	Trigger plunger	 Approx 70ms. "H" until mode switch (S502) is closed after the input to switch the mechanism, such as PLAY, PAUSE, STOP, etc. has been applied. (Approx. 70ms. depending on the mechanism condition.)
24.	E02	Motor CL	 Approx 250msec "H" until mode switch (S502) is changed from "close" to "open" following the indication that the mechanism mode has been changed.  "H" in REW operation.
25.	E03	Motor UNCL	Same as the above in MODE conversion. "H" during FF (Cue).
26.	TST	Chip test	Connected to GND.
27.	RST	RESET	Computer's RESET terminal. Reset is less than 0.8V.  Power ON
28.	CSLCT	CSLCT	Connected to GND.
29.	SNSφ	Input switch state reading	Reads switch states corresponding to scanning of COφ — 3. (This terminal is connected to the record switch (S607), PAUSE switch (S608) and switch detecting pulses between signal portions.)

Terminal No.	Symbol	Name	Function/operation
30.	SNS1	Reference signal reading	Time count reference signal: 50/60Hz
31.	D $\bar{O}$ 4	FL counter Segment a	 Number indication Segment g (37) Segment a (31) Segment f (36) Segment b (32) Segment e (35) Segment c (33) Segment d (34) Running indication Segment g Segment e Segment c Segment d Counter number changes when takeup reel table rotates two turns. Each segment of running indication changes when the reel table rotates a half turn. Waveforms change since dynamic lighting is used: 5V --- ON 0V --- OFF
32.	D $\bar{O}$ 1	FL counter Segment b	
33.	D $\bar{O}$ 2	FL counter Segment c	
34.	D $\bar{O}$ 3	FL counter Segment d	
35.	D $\bar{O}$ 4	FL counter Segment e	
36.	D $\bar{O}$ 5	FL counter Segment f	
37.	D $\bar{O}$ 6	FL counter Segment g	
38.	DO7	No connection	Not used.
39.	VDD	Power source	Operated at 4.5V to 6.0V.
40.	OSC	Oscillation terminal	 Approx. 1.6 sec Oscillation is approx. 600kHz. Because the connection of a probe affects the terminal, nothing should be connected to this terminal for any other measurements. Use COφ to 3 in measuring the computer's velocity; Approx. 110Hz in STOP condition.

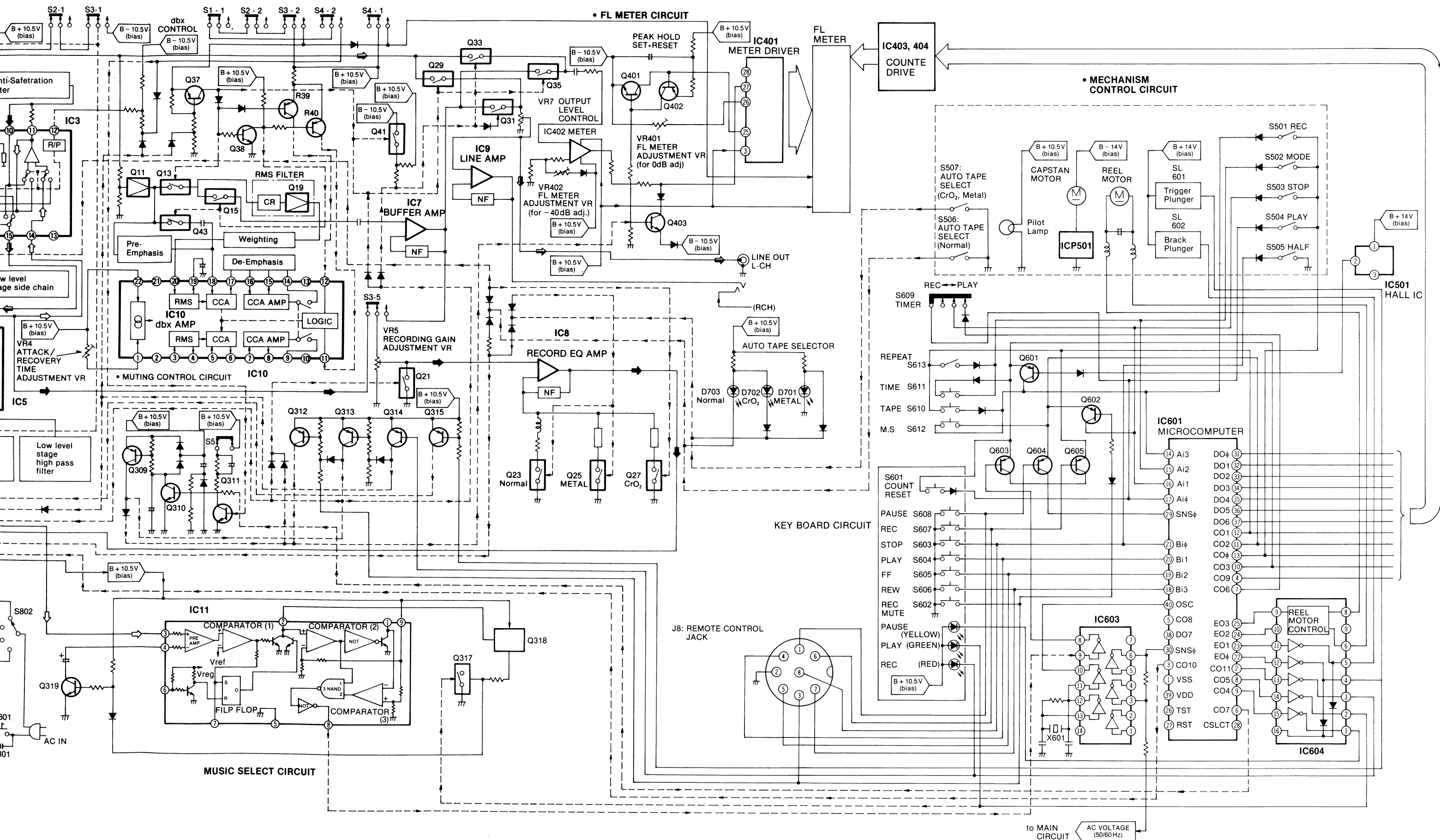
NOTES:

- S1Dolby-C IN/OUT SWITCH (OUT)
- S2Dolby-B IN/OUT SWITCH (OUT)
- S3dbx TAPE IN/OUT SWITCH (OUT)
- S4dbx disc IN/OUT SWITCH (OUT)
- S5NR MUTE SWITCH
- S501REC INHIBIT SWITCH
- S502MODE SWITCH
- S503STOP SWITCH
- S504PLAY SWITCH
- S505HALF SWITCH
- S506AUTO TAPE SELECT SWITCH (Normal)
- S507AUTO TAPE SELECT SWITCH (Metal, CrO₂)
- S601COUNTER RESET SWITCH
- S602REC MUTE SWITCH
- S603STOP SWITCH
- S604PLAY SWITCH

- S605FF SWITCH
- S606REWIND SWITCH
- S607RECORD SWITCH
- S608PAUSE SWITCH
- S609TIMER SWITCH
- S610TAPE COUNTER SWITCH
- S611TIME COUNTER SWITCH
- S612MUSIC SELECT SWITCH
- S613MUSIC REPEAT SWITCH
- S801POWER ON/OFF SWITCH
- S802AC POWER VOLTAGE SELECT SWITCH
- (→) this arrow indicates the flow of the recording signal. (NR OUT)
- (⇄) this arrow indicates the flow of the playback signal. (NR OUT)
- (⇄) this arrow indicates the flow of the playback and recording signal in combination. (NR OUT)
- (---) this arrow indicates the flow of the control signal.

BLOCK DIAGRAM
• MAIN/FL METER/POWER SUPPLY SECTION

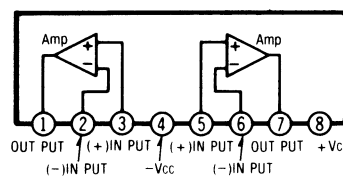
- **MECHANISM CONTROL SECTION**



Q11	Q12	Q13	Q14	Q15
B disc 2.57V tape 2.54V (2.57V)	B disc 2.55V tape 2.52V (2.51V)	B disc -0.03V tape 0.03V	B disc -0.03V tape 2.57V (2.57V)	B disc 2.58V (2.57V) tape 0.06V
E disc 1.98V (1.93V) tape 1.94V (1.98V)	E disc 1.95V tape 1.92V (1.95V)	E disc -0.03V tape 1.93V (1.92V)	E disc 1.96V (1.95V) tape 1.91V (1.90V)	E disc 1.93V (1.92V) tape 1.94V (1.93V)
C disc 5.30V (5.29V) tape 5.30V	C disc 5.30V (5.29V) tape 5.30V	C disc 1.98V tape 1.94V (1.98V)	C disc 1.95V tape 1.92V (1.95V)	C disc 1.93V (1.92V) tape 1.90V (1.92V)
Q16	Q17	Q18	Q19	Q20
B disc 2.60V tape 0.005V (2.60V)	B disc 2.89V (2.88V) tape 2.88V	B disc 2.87V tape 2.87V	B disc 2.30V (2.29V) tape 2.29V	B disc 2.29V tape 2.29V
E disc 1.95V tape 2.29V (1.95V)	E disc 2.29V tape 2.29V	E disc 2.29V tape 2.29V	E disc 1.68V (1.67V) tape 1.68V	E disc 1.68V tape 1.68V
C disc — tape —	C disc 5.30V tape 5.29V	C disc 5.29V tape 5.29V	C disc 5.30V (5.29V) tape 5.29V	C disc 5.30V tape 5.29V (5.30V)
Q39	Q40	Q43	Q44	
B disc 4.67V tape 8.62V (8.57V)	B disc 7.82V (7.78V) tape 4.67V (7.77V)	B disc 2.64V tape 0.06V (2.64V)	B disc 2.61V tape 0.06V (2.61V)	
E disc 5.30V (5.29V) tape 5.30V	E disc 5.30V (5.29V) tape 5.30V	E disc 0V tape 0.001V (1.99V)	E disc 1.97V tape 0.001V (1.97V)	
C disc 0V (0.002V) tape 0V (5.29V)	C disc 0.003V (0.002V) tape 5.29V (0.002V)	C disc 1.95V tape 1.96V (1.99V)	C disc 1.93V (1.92V) tape 1.93V (1.97V)	

EQUIVALENT CIRCUIT

IC1, 2, 7, 8, 9 M5218L



NOTES:

- S1-1—S1-4Dolby-C IN/OUT switch (shown in out position).
- S2-1—S2-4Dolby-B IN/OUT switch (shown in out position).
- S3-1—S3-6dbx tape IN/OUT switch (shown in out position).
- S4-1, S4-2dbx disc IN/OUT switch (shown in out position).
- S5NR Mute switch (shown in OFF position).
- S801Power ON/OFF switch (shown in OFF position).
- S802AC power voltage select switch.
- VR1, 2Input level control.
- VR3Channel balance control.
- VR4Attack recovery time adjustment VR.
- VR5, 6Recording gain adjustment VR.
- VR7, 8Output level control.
- VR9, 10Playback gain adjustment VR.
- VR301, 302Bias current adjustment VR.
- Point (A)Erase Current adjustment point.
- Resistance are in ohms (Ω), 1/4 watt unless specified otherwise.
1K = 1,000(Ω), 1M = 1000k(Ω).
- Capacity are in micro-farads (μ F) unless specified otherwise.
- The mark (▼) shows test point. e.g. ▼ = Test point 1.
- All voltage values shown in circuitry are under no signal condition and playback mode with volume control at minimum position otherwise specified.

SPECIFICATIONS

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)

No markVoltage values at OUT (NR select switch) mode.

()Voltage values at record mode.

discVoltage values at dbx disc mode.

tapeVoltage values at dbx tape mode.

For measurement use VTVM.

• (—) indicates B+ (bias).

• (—) indicates B- (bias).

• (→) indicates the flow of the playback signal. (NR out).

• (→) indicates the flow of the recording signal. (NR out).

• (→) indicates the flow of the playback signal. (dbx tape or dbx disc)

• (→) indicates the flow of the record signal. (dbx tape)

Described in the schematic diagram are two types of numbers; the supply parts numbers and production parts number for transistors and diodes. One type of number is used for supply parts number and production parts number when they are identical.

e.g. Q1

2SC1844(E, F) ← Production parts number

[2SC1844E] ← Supply parts number

D212

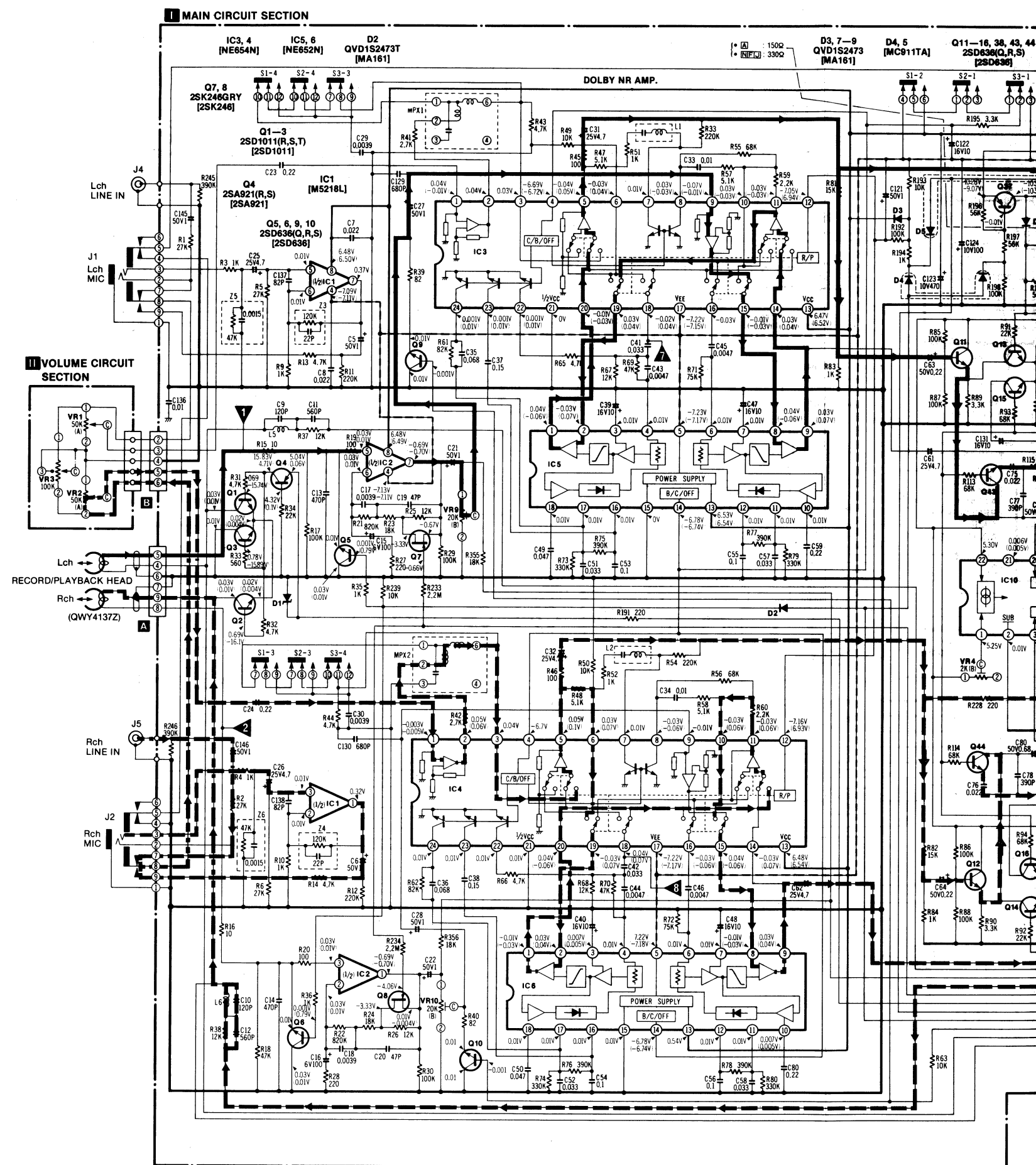
1S2473777 ← Production parts number

[MA161] ← Supply parts numbers

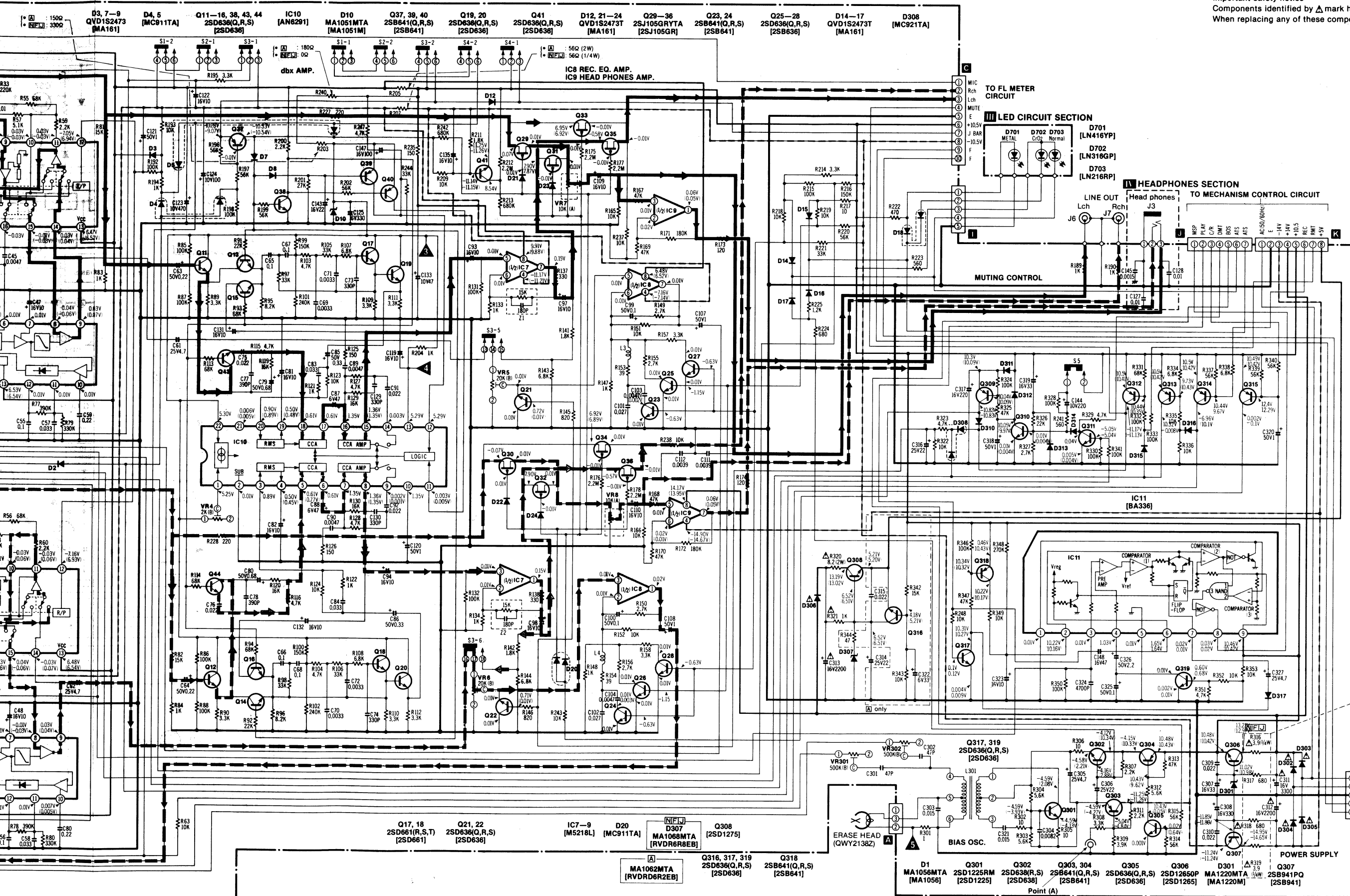
• The supply parts number is described alone in the replacement parts list.

• This schematic diagram may be modified at any time with the development of new technology.

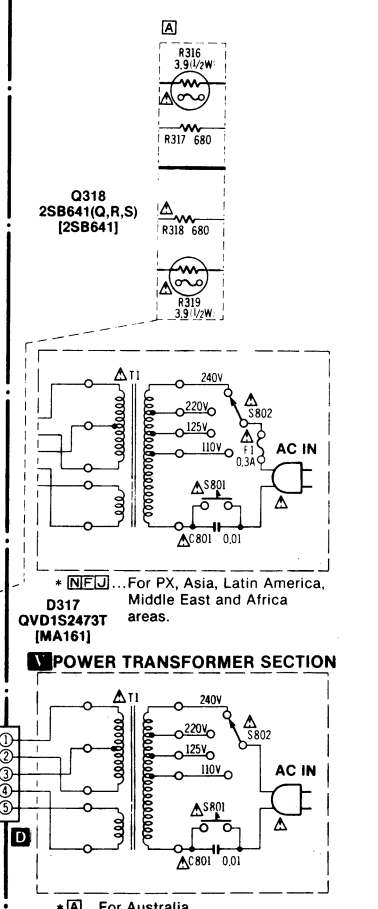
SCHEMATIC DIAGRAM



NOTE:
 • 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.

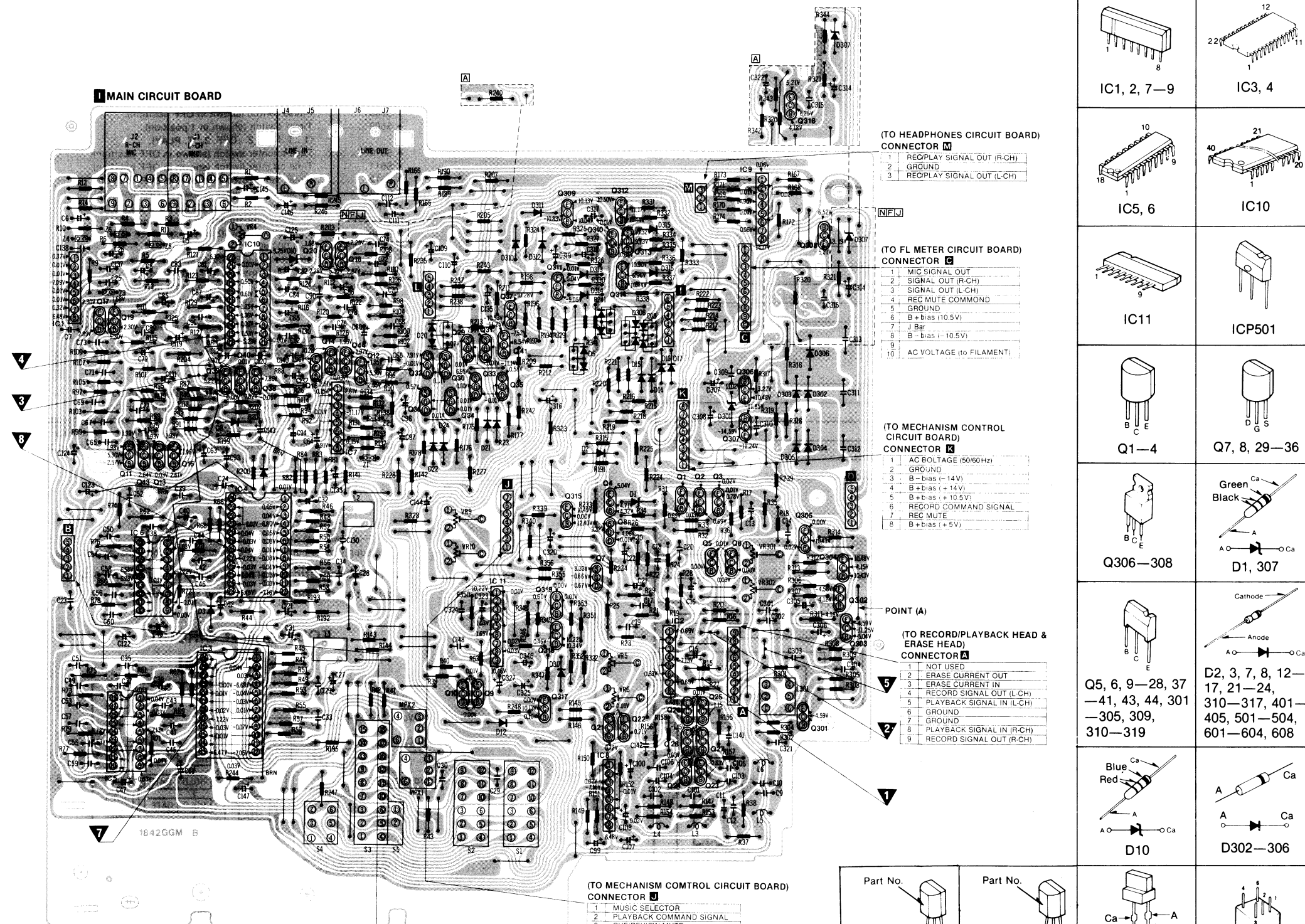


NOTES:
 Δ For Asia, Latin America, Middle East and Africa areas.
 Δ For Australia.
 Δ For Asian PX.
 Δ For European PX.



CIRCUIT BOARD

• MAIN CIRCUIT BOARD



NOTES:

- The circuit shown in on the conductor side indicates printed circuit on the back side of the printed circuit board.
- All voltage values shown in circuitry are under no signal condition and playback mode with volume control at minimum position.
- For measurement, use VTVM.

This circuit board diagram may be modified at any time with the development of new technology.

NOTES:

- For Asia, Latin America, Middle East and Africa areas.
- For Australia.
- For Asian PX.
- For European PX.

ELECTRICAL PA

NOTES: RESISTORS

- ERD Carbon
- ERG Metal-oxide
- ERS Metal-oxide
- ERO Metal-film
- ERX Metal-film
- ERQ Fuse type metallic
- ERC Solid
- ERF Cement

CAPACITORS

- ECBA
- ECG
- ECK
- ECC
- ECF
- ECQM
- ECQE
- ECQF

REPLACEMENT PARTS LIST

Important safety notice
Components identified by 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.
RESISTORS							
R 1, 2	ERD25TJ273	R 147, 148	ERD25FJ102	R 308	ERD25FJ332	R 419	ERD25FJ103
R 3, 4	ERD25FJ102	R 149, 150	ERD25FJ272	R 309	ERD25FJ392	R 420	ERD25FJ472
R 5, 6	ERD25TJ273			R 311	ERD25FJ222	R 421	ERD25FJ182
R 9, 10	ERD25FJ102	R 151, 152	ERD25FJ103	R 312	ERD25FJ562	R 422	ERD25TJ684
R 11, 12	ERD25TJ224	R 153, 154	ERD25FJ390	R 313	ERD25TJ473	R 423	ERD25FJ471
R 13, 14	ERD25FJ472	R 155, 156	ERD25FJ272			R 424	ERD25TJ563
R 15, 16	ERD25FJ100	R 157, 158	ERD25FJ332	R 314, 315	ERD25TJ563	R 425	ERD25FJ103
R 17, 18	ERD25TJ473	R 165, 166	ERD25FJ103	R 316			
R 19, 20	ERD25FJ101	R 167, 168, 169, 170		[A]	ERQ12HJ3R9	R 426, 427	
R 21, 22	ERD25TJ824		ERD25TJ473	[For Australia.]		[A]	ERD50FJ271
		R 171, 172	ERD25TJ184	[NFJ]	ERD25FJ3R9	[For Australia.]	
		R 173, 174	ERD25FJ121	[For PX.]		[NFJ]	ERD25FJ181
		R 175, 176, 177, 178		For Asia, Latin America,		[For PX.]	
			ERD25FJ225	Middle East and Africa		For Asia, Latin America	
R 23, 24	ERD25TJ183	R 189, 190	ERD25FJ102	areas.]		Middle East and Africa	
R 25, 26	ERD25TJ123			R 317, 318		areas.]	
R 27, 28	ERD25FJ221	R 191	ERD25FJ221		ERD25FJ681	R 428 [A]	ERG2ANJ470
R 29, 30	ERD25TJ104	R 192	ERD25TJ104	R 319		[For Australia.]	
R 31, 32	ERD25FJ472	R 193	ERD25FJ103	[A]	ERQ12HJ3R9	[NFJ]	ERD25FJ470
R 33	ERD25FJ561	R 194	ERD25FJ102	[For Australia.]		[For PX.]	
R 34	ERD25TJ223	R 195	ERD25FJ332	[NFJ]	ERD25FJ3R9	For Asia, Latin America	
R 35, 36	ERD25FJ102	R 196, 197	ERD25TJ563	[For PX.]		Middle East and Africa	
R 37, 38	ERD25TJ123	R 198	ERD25TJ104	For Asia, Latin America,		areas.]	
R 39, 40	ERD25FJ820	R 199	ERD25TJ563	Middle East and Africa			
		R 200	ERD25FJ222	areas.]		R 429	ERD25FJ471
R 41, 42	ERD25FJ272	R 201	ERD25TJ273			R 431	ERD25FJ470
R 43, 44	ERD25FJ472			R 320	ERX2ANJ8R2	R 432, 433, 434, 435	
R 45, 46	ERD25FJ101	R 202	ERD25TJ563	R 321	ERD25FJ102		ERD25FJ471
R 47, 48	ERD25FJ512	R 203 [A]	ERD25FJ151	R 322	ERD25FJ103	R 436	ERD25FJ222
R 49, 50	ERD25FJ103	[For Australia.]		R 323	ERD25FJ472	R 437, 438, 439	
R 51, 52	ERD25FJ102	[N]	ERD25FJ331	R 324	ERD25TJ104		ERD25TJ563
R 53, 54	ERD25TJ224	[For Asia, Latin America,		R 325	ERD25TJ473		ERD25TJ223
R 55, 56	ERD25TJ683	Middle East and Africa					ERD25FJ681
R 57, 58	ERD25FJ512	areas.]		R 326	ERD25TJ223	R 602	ERD25FJ821
R 59, 60	ERD25FJ222			R 327	ERD25FJ272		
		R 204	ERD25FJ102	R 328	ERD25TJ104	R 603	ERD25FJ102
R 61, 62	ERD25TJ823	R 205, 207		R 329	ERD25FJ472	R 607	ERD25FJ272
R 63	ERD25FJ103	[A]	ERG2ANJ560	R 330	ERD25TJ104	R 608, 609	ERD25TJ273
R 65, 66	ERD25FJ472	[For Australia.]		R 331	ERD25TJ683	R 610	ERD25FJ222
R 67, 68	ERD25TJ123	[NFJ]	ERD25FJ560	R 332, 333	ERD25TJ104	R 611	ERD25TJ473
R 69, 70	ERD25TJ473	[For PX.]		R 334	ERD25FJ682	R 612	ERD25FJ562
R 71, 72	ERD25TJ753	For Asia, Latin America,		R 335, 336	ERD25FJ103	R 613	ERD25FJ471
R 73, 74	ERD25TJ334	Middle East and Africa		R 337	ERD25TJ563	R 614, 615	ERD25TJ273
R 75, 76, 77, 78		areas.]				R 616	ERD25FJ103
R 79, 80	ERD25TJ394	R 209	ERD25FJ103	R 338	ERD25FJ682	R 617	ERD25FJ681
R 81, 82	ERD25TJ153	R 211	ERD25FJ182	R 339, 340			
		R 212	ERD25FJ225		ERD25TJ563	R 618	ERD25FJ332
		R 213	ERD25TJ684	R 341	ERD25TJ104	R 619	ERD25FJ103
R 83, 84	ERD25FJ102	R 214	ERD25FJ332	R 342 [A]	ERD25TJ153	R 620	ERD25TJ223
R 85, 86, 87, 88		R 215	ERD25TJ104	[For Australia.]		R 622	ERD25FJ562
	ERD25TJ104			R 343 [A]	ERD25FJ103	R 623	ERD25FJ102
R 89, 90	ERD25FJ332	R 216	ERD25TJ154	[For Australia.]		R 624	ERD25FJ222
R 91, 92	ERD25TJ223	R 217, 218, 219		R 344 [A]	ERD25FJ470	R 625	ERD25FJ472
R 93, 94	ERD25TJ683			[For Australia.]			
R 95, 96	ERD25FJ822	R 220	ERD25TJ563	R 346	ERD25TJ104	VARIABLE RESISTOR	
R 97, 98	ERD25TJ333	R 221	ERD25TJ333	R 347	ERD25TJ473	VR 1, 2	QVBP1PUA54
R 99, 100	ERD25TJ154	R 222	ERD25FJ471	R 348	ERD25TJ274	VR 3	QVAV5KUG15
R 101, 102	ERD25TJ244	R 223	ERD25FJ561	R 349	ERD25FJ103	VR 4	EVNM4AA00E
R 103, 104	ERD25FJ472	R 224	ERD25FJ681			VR 5, 6	EVNM4AA00E
		R 225	ERD25FJ122	R 350	ERD25TJ104	VR 7, 8	QVBF1PUA14
R 105, 106	ERD25TJ333	R 227, 228	ERD25FJ221	R 351	ERD25FJ472	VR 9, 10	EVNM4AA00E
R 107, 108	ERD25FJ682	R 233, 234	ERD25FJ225	R 352, 353	ERD25FJ103	VR 301, 302	
R 109	ERD25FJ332			R 355, 356	ERD25TJ183		EVNM4AA00E
R 110, 111, 112		R 235	ERD25FJ151	R 401, 402, 403, 404			EVNM4AA00E
R 113, 114	ERD25TJ683	R 237, 238, 239		R 405, 406	ERD25TJ273	VR 401	EVNM4AA00E
R 115, 116	ERD25FJ472		ERD25FJ103	R 407, 408, 409, 410	ERD25TJ154	VR 402	EVNM4AA00E
R 119, 120	ERD25TJ163	R 240 [A]	ERD25FJ181		ERD25TJ223	CAPACITORS	
R 121, 122	ERD25FJ102	[For Australia.]		R 411, 412	ERD25FJ222	C 5, 6	ECEA50Z1
R 123, 124	ERD25FJ103	R 241	ERD25FJ561	R 413, 414	ERD25TJ684	C 7, 8	ECCFD223KX
R 125, 126	ERD25FJ151	R 242	ERD25TJ684	R 415	ERD25FJ222	C 9, 10	ECKD2H121K
		R 243	ERD25FJ103			C 11, 12	ECKD1H561K
R 127, 128	ERD25FJ472	R 244	ERD25TJ333	R 416	ERD25TJ393	C 13, 14	ECKD1H471K
R 129, 130	ERD25TJ163	R 245, 246	ERD25TJ394	R 417	ERD25TJ563	C 15, 16	ECEA1A5101
R 131, 132	ERD25TJ104	R 247	ERD25FJ472	R 418 [A]	ERG1ANJ221	C 17, 18	ECQM1H392J
R 133, 134	ERD25FJ102	R 248	ERD25FJ103	[For Australia.]		C 19, 20	ECCD1H470K
R 137, 138	ERD25FJ331			[NFJ]	ERD25FJ181	C 21, 22	ECEA50Z1
R 141, 142	ERD25TJ182	R 301	ERD25FJ1R0	[For PX.]		C 23, 24	ECQV05224J2
R 143, 144	ERD25FJ682	R 302	ERD25FJ100	For Asia, Latin America,			
R 145, 146	ERD25FJ821	R 303, 304	ERD25FJ562	Middle East and Africa			
		R 305, 306	ERD25FJ100	areas.]			
		R 307	ERD25FJ222				

ELECTRICAL PARTS LIST

REPLACEMENT PARTS LIST

Important safety notice
Components identified by  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.	Ref. No.	Part No.		
RESISTORS													
R 1, 2	ERD25TJ273	R 147, 148	ERD25FJ102	R 308	ERD25FJ332	R 419	ERD25FJ103	C 27, 28	ECEA50Z1	C 318	ECEA50Z1	Q 404, 405	2SB641
R 3, 4	ERD25FJ102	R 149, 150	ERD25FJ272	R 309	ERD25FJ392	R 420	ERD25FJ472	C 29, 30	ECFDD392KVY			Q 406	2SD636
R 5, 6	ERD25TJ273			R 311	ERD25FJ222	R 421	ERD25FJ182	C 31, 32	ECEA25Z47	C 319	ECEA1CS330	Q 601, 602, 603, 604, 605	2SB641
R 9, 10	ERD25FJ102	R 151, 152	ERD25FJ103	R 312	ERD25FJ562	R 422	ERD25TJ684	C 33, 34	ECQMH1H03JZ	C 320	ECEA50Z1		2SB641
R 11, 12	ERD25TJ224	R 153, 154	ERD25FJ390	R 313	ERD25TJ473	R 423	ERD25FJ471	C 35, 36	ECQM1H683JZ	C 321	ECFDD153KXY	Q 606	2SD636
R 13, 14	ERD25FJ472	R 155, 156	ERD25FJ272			R 424	ERD25TJ563	C 37, 38	ECQV05154JZ	C 322 [A]	ECQD1CS330	DIODES & RECTIFIERS	
R 15, 16	ERD25FJ100	R 157, 158	ERD25FJ332	R 314, 315	ERD25TJ563	R 425	ERD25FJ103	C 39, 40	ECEA1HS100	[For Australia.]		D 1	MA1056
R 17, 18	ERD25TJ473	R 165, 166	ERD25FJ103	R 316				C 41, 42	ECQMH1H333JZ	C 323	ECEA1HS100	D 2, 3	MA161
R 19, 20	ERD25FJ101	R 167, 168, 169, 170			[A] Δ ERQ12HJ3R9	R 426, 427		C 43, 44, 45, 46	ECQM1H472JZ	C 324	ECFDD472KVY	D 4, 5	MC911TA
R 21, 22	ERD25TJ824	ERD25TJ473			[NFJ] Δ ERD25FJ3R9	[A] ERD50FJ271				C 325	ECEA50Z2R2	D 7, 8	MA161
		R 171, 172	ERD25TJ184		[For PX.	[NFJ] ERD25FJ181		C 47, 48	ECEA1HS100	C 326	ECEA50Z2R2	D 10	MA1051
		R 173, 174	ERD25FJ121		For Asia, Latin America,	[For PX.		C 49, 50	ECQM1H473JZ	C 327	ECEA25Z47	D 12, 14, 15, 16, 17	MA161
		R 175, 176, 177, 178			Middle East and Africa	For Asia, Latin America,		C 51, 52	ECQM1H333JZ	C 401, 402	ECEA50Z2R1	D 18, 19	MC921TA
R 23, 24	ERD25TJ183	ERD25FJ225		R 189, 190	ERD25FJ102	For Asia, Latin America,		C 53, 54, 55, 56				D 20	MC911TA
R 25, 26	ERD25TJ123	ERD25FJ102				Middle East and Africa				C 403, 404	ECFDD152KVY	D 21, 22, 23, 24	MA161
R 27, 28	ERD25FJ221					areas.]				C 405, 406	ECOD1H560K	D 301	MA1220M
R 29, 30	ERD25TJ104	R 191	ERD25FJ221			Δ ERD25FJ681	R 428 [A] ERG2ANJ470	C 57, 58	ECQM1H333JZ	C 407, 408	ECEA50Z1	D 302, 303, 304, 305, 306	
R 31, 32	ERD25FJ472	R 192	ERD25TJ104				[For Australia.]	C 59, 60	ECQV05224JZ	C 409	ECFDD473KXY	D 307 [A] RVDRD6R2EB	
R 33	ERD25FJ561	R 193	ERD25TJ103				[NFJ] ERD25FJ470	C 61, 62	ECEA25Z47	C 410	ECEA1HS100	[For Australia.]	RVDRD6R8EB
R 34	ERD25TJ223	R 194	ERD25FJ102				[For PX.	C 63, 64	ECEA50Z2R2	C 501	ECEA1CN100	[For PX.	
R 35, 36	ERD25FJ102	R 195	ERD25FJ332				For Asia, Latin America,	C 65, 66, 67, 68	ECQV05104JZ	C 601, 602	ECFDD392KVY	For Asia, Latin America,	Middle East and Africa
R 37, 38	ERD25TJ123	R 196, 197	ERD25TJ563				Middle East and Africa	C 69, 70, 71, 72	ECQM1H332JZ	C 603	ECQV05104JZ	areas.]	
R 39, 40	ERD25FJ820	R 198	ERD25TJ104				areas.]			C 604	ECEA50Z1R1	D 308	MC921TA
		R 199	ERD25TJ563							C 605	ECEA1A5470	D 310, 311, 312, 313, 314, 315,	
R 41, 42	ERD25FJ272	R 200	ERD25FJ222									316, 317, 401, 403	
R 43, 44	ERD25FJ472	R 201	ERD25TJ273									MA161	
R 45, 46	ERD25FJ101											D 403	MC921TA
R 47, 48	ERD25FJ512	R 202	ERD25TJ563									D 405, 406	MA161
R 49, 50	ERD25FJ103	R 203 [A]	ERD25FJ151									D 407 [A]	MA1033LLF
R 51, 52	ERD25FJ102	[For Australia.]										[For Australia.]	MA1030MTA
R 53, 54	ERD25TJ224	[N] ERD25FJ331										[For PX.	
R 55, 56	ERD25TJ683	[For Asia, Latin America,										For Asia, Latin America,	Middle East and Africa
R 57, 58	ERD25FJ512	Middle East and Africa										areas.]	
R 59, 60	ERD25FJ222	areas.]											
R 61, 62	ERD25TJ823	R 204	ERD25FJ102										
R 63	ERD25FJ103	R 205, 207											
R 65, 66	ERD25FJ472	[A] ERG2ANJ560											
R 67, 68	ERD25TJ123	[For Australia.]											
R 69, 70	ERD25TJ473	[NFJ] ERD25FJ560											
R 71, 72	ERD25TJ753	[For PX.											
R 73, 74	ERD25TJ334	For Asia, Latin America,											
R 75, 76, 77, 78		Middle East and Africa											
		areas.]											
	ERD25TJ394	R 209	ERD25FJ103										
R 79, 80	ERD25TJ334	R 211	ERD25FJ182										
R 81, 82	ERD25TJ153	R 212	ERD25FJ225										
		R 213	ERD25TJ684										
R 83, 84	ERD25FJ102	R 214	ERD25FJ332										
R 85, 86, 87, 88		R 215	ERD25TJ104										
	ERD25TJ104												
R 89, 90	ERD25FJ332	R 216	ERD25TJ154										
R 91, 92	ERD25TJ223	R 217, 218, 219											
R 93, 94	ERD25TJ683		ERD25FJ103										
R 95, 96	ERD25FJ822	R 220	ERD25TJ563										
R 97, 98	ERD25TJ333	R 221	ERD25TJ333										
R 99, 100	ERD25TJ154	R 222	ERD25FJ471										
R 101, 102	ERD25TJ244	R 223	ERD25FJ561										
R 103, 104	ERD25FJ472	R 224	ERD25FJ681										
		R 225	ERD25FJ122										
R 105, 106	ERD25TJ333	R 227, 228	ERD25FJ221										
R 107, 108	ERD25FJ682	R 233, 234	ERD25FJ225										
R 109	ERD25FJ332												
R 110, 111, 112		R 235	ERD25FJ151										
	ERD25FJ332	R 237, 238, 239											
R 113, 114	ERD25TJ683		ERD25FJ103										
R 115, 116	ERD25FJ472	R 240 [A]	ERD25FJ181										
R 119, 120	ERD25TJ163	[For Australia.]											
R 121, 122	ERD25FJ102	R 241	ERD25FJ561										
R 123, 124	ERD25FJ103	R 242	ERD25TJ684										
R 125, 126	ERD25FJ151	R 243	ERD25FJ103										
		R 244	ERD25TJ333										
R 127, 128	ERD25FJ472	R 245, 246	ERD25TJ393										
R 129, 130	ERD25TJ163	R 247	ERD25FJ472										
R 131, 132	ERD25TJ104	R 248	ERD25FJ103										
R 133, 134	ERD25FJ102												
R 137, 138	ERD25FJ331	R 301	ERD25FJ1R0										
R 141, 142	ERD25TJ182	R 302	ERD25FJ100										
R 143, 144	ERD25FJ682	R 303, 304	ERD25FJ562										
R 145, 146	ERD25FJ821	R 305, 306	ERD25FJ100										
		R 307	ERD25FJ222										

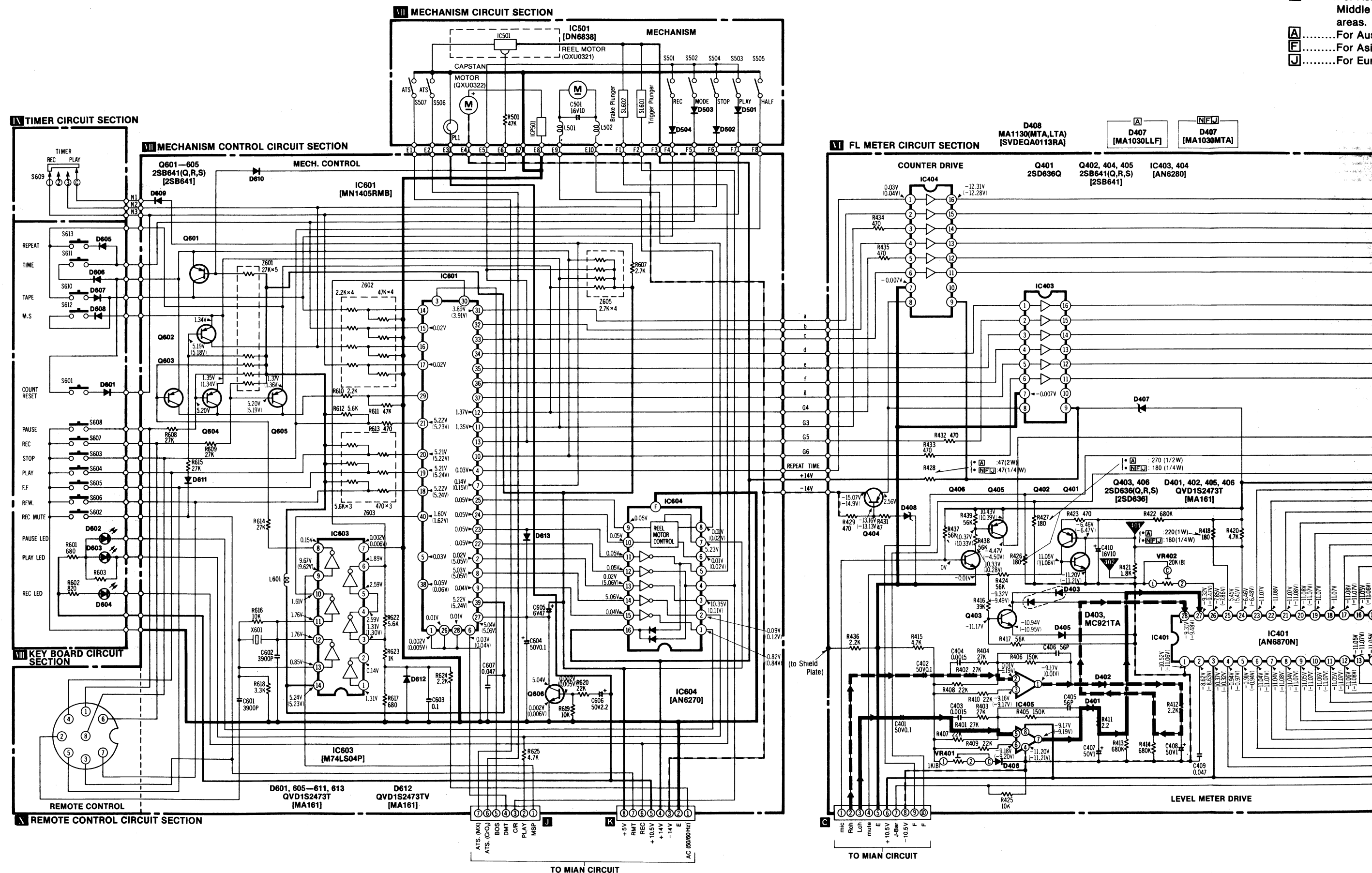
Ref. No.	Part No.	Part Name & Description
MULTIPLEX FILTERS		
MPX 1, 2	QLM9Z9K	MPX Filter
RESONATOR		
X 601	EFOA600K01C	Ceramic Filter
COILS		
L 1, 2	ELM7Q306A	Skewing Network
L 3, 4	QLQX2721D	Peaking Coil
L 5, 6	QLQX0343KWA	Bias Trap Coil
L 301	QLB0198	Bias Oscillation Coil
L 501, 502	QLQZ1014D	Choke Coil
L 601	QLQX1011Y	Choke Coil
TRANSFORMERS		
T 1 [A] Δ	QLPA70ELX	AC Power Transformer
[For Australia.]		
[NFJ] Δ	QLPN83ELX	AC Power Transformer
[For PX.		
For Asia, Latin America, Middle East and Africa areas.]		
FUSE		
F 1		
[NFJ] Δ	XBA2E03NS5	Fuse (0.3A)
[For PX.		
For Asia, Latin America, Middle East and Africa areas.]		
SWITCHES		
S 1, 2, 3, 4, 5		
	QSWX413A	Push Switch
		(NR Selector/NR MUTE)
S 501	QSB0289	Leaf Switch (REC Inhibit)
S 502	QSB0287	Leaf Switch (Mode)
S 503	QSB0288	Leaf Switch (Stop)
S 504	QSB0287	Leaf Switch (Play)
S 505	QSB0288	Leaf Switch (Eject)
S 506	QSB0290	Leaf Switch
		(for CrO ₂ Tape)
S 507	QSB0289	Leaf Switch
		(for Metal Tape)
S 601, 602, 603		
	SSG13	Key Board Switch
		(Rec Mode/Stop/Counter Reset)
S 604	QSW1126	Key Board Switch
		with D603 (Play)
S 605, 606		
	SSG13	Key Board Switch
		(F.F/REW)
S 607	QSW1124	Key Board Switch with
		D604 (Record)
S 608	QSW1125	Key Board Switch with
		D602 (Pause)
S 609	QSS1306	Slide Switch (Timer)
S 610, 611, 612, 613		
	Δ QSW1130	Key Board Switch with
		(Tape Counter/Time Counter/M.S/Repeat)
S 801 Δ	QSW1127	Push Switch
		(Power ON/OFF)
S 802 Δ	QSR1407	Rotary Switch
		(Voltage Selector)
JACKS		
J 1, 2	QJA0453	Jack (Microphone)
J 3	QJA0267	Jack (Headphone)
J 4, 5, 6, 7		
	QEJ5030C	Jack Board (LINE IN/OUT)
J 8	QJS1955H	Remote Control Socket
CONNECTORS		
CN 1	QJT1054	Contact
CN 2	QJS1921TN	3 Pin Socket
CN 3	QJP1921TN	3 Pin Post
CN 4	QJS1922TN	6 Pin Socket
CN 5	QJP1922TN	6 Pin Post
CN 6	QJS1923TN	9 Pin Socket
CN 7	QJP1923TN	9 Pin Post
CN 8	QJS1987S	Jumper Socket (4 Pin)
CN 9	QJS1961S	Jumper Socket (5 Pin)
CN 10	QJS1962S	Jumper Socket (7 Pin)
CN 11	QJS1983	Jumper Socket (8 Pin)
CN 12	QJS1988S	Jumper Socket (9 Pin)
CN 13	QJS1989S	Jumper Socket (10 Pin)
CN 14	QJS1996T	Jumper Socket (14 Pin)
CN 15	QJT1090	Check Pin

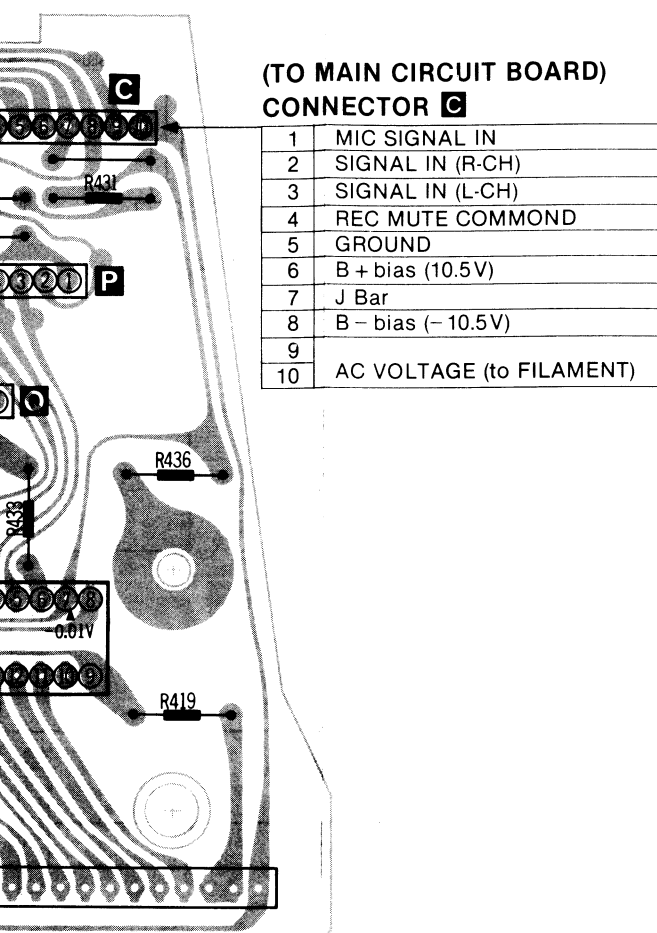
SCHEMATIC DIAGRAM

• FL METER/MECHANISM CONTROL/KEY BOARD SECTION

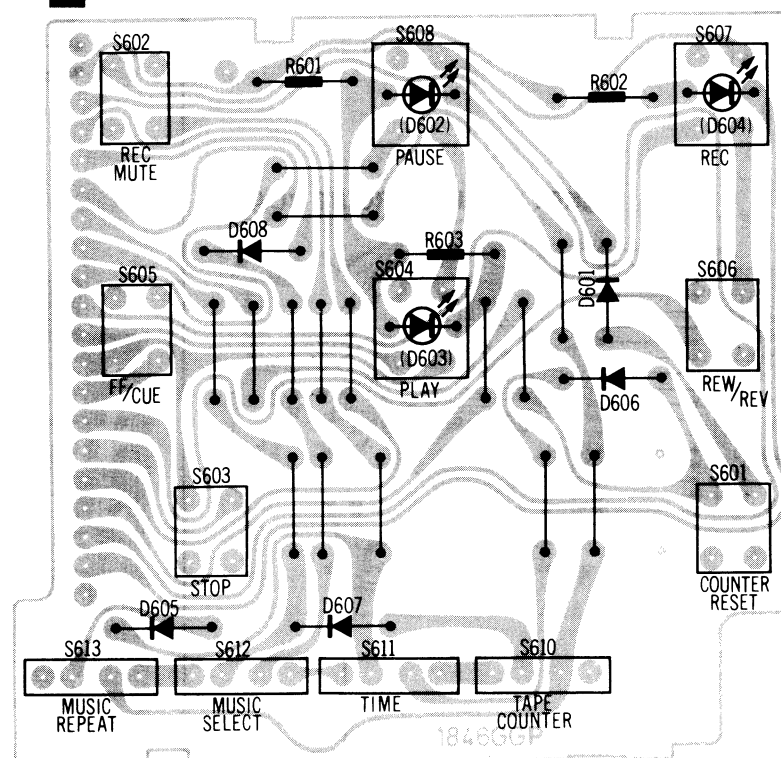
NOTES:

- [N]..... For Asia Middle East areas.
- [A]..... For Australia.
- [F]..... For Europe.
- [J]..... For Japan.

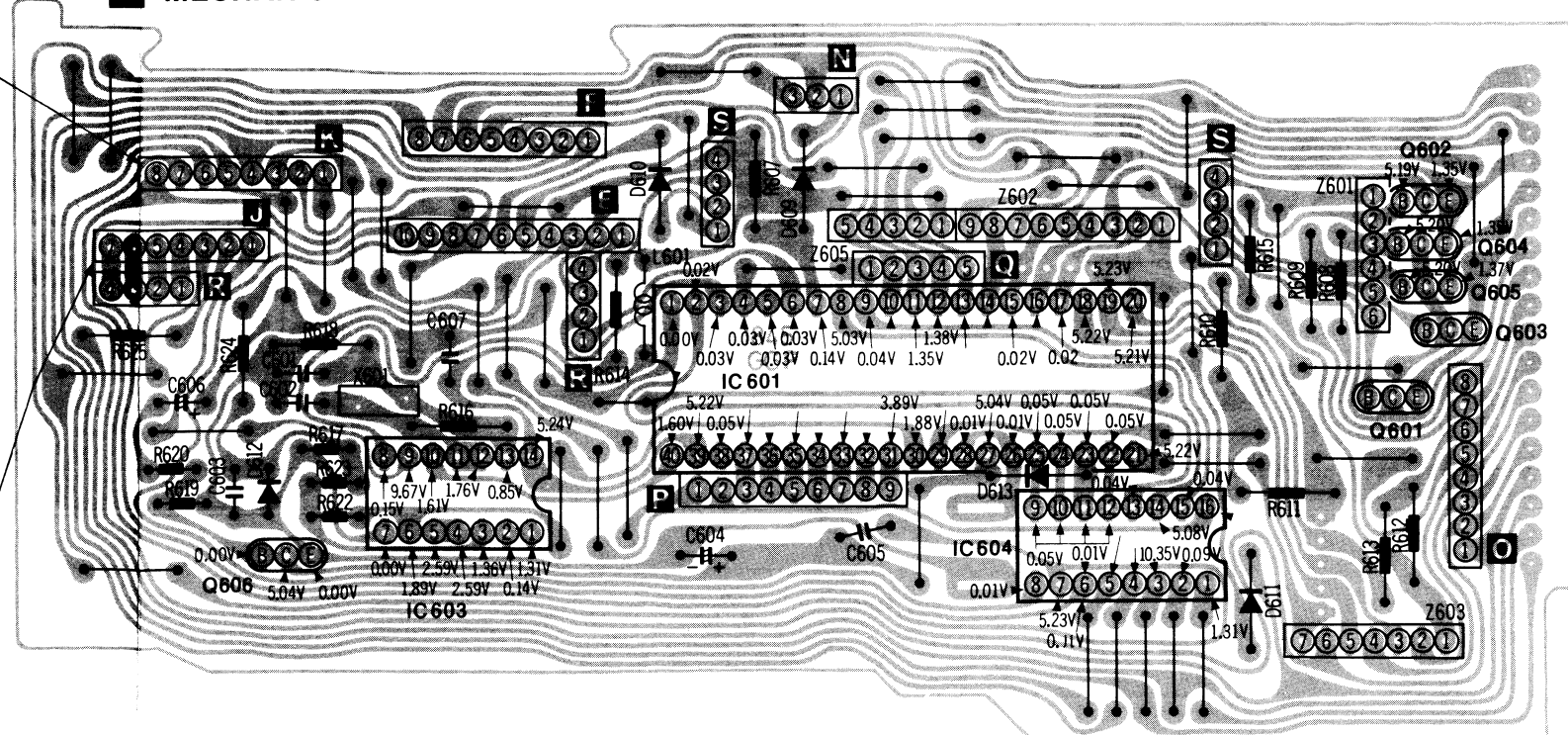




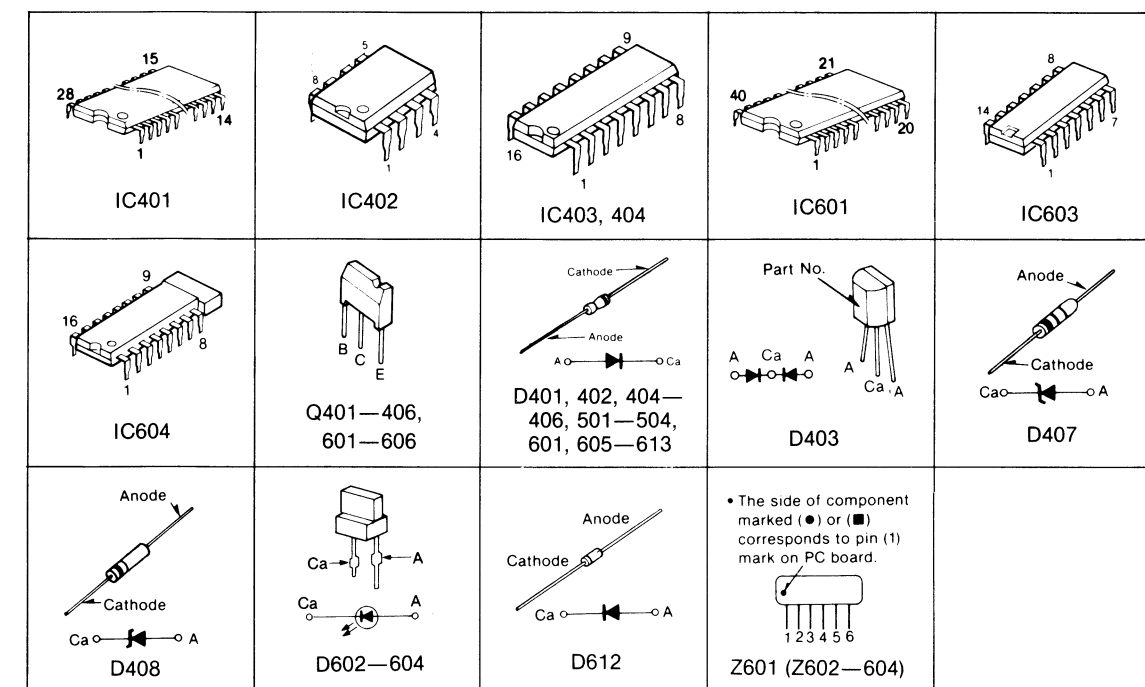
VIII KEY BOARD CIRCUIT BOARD



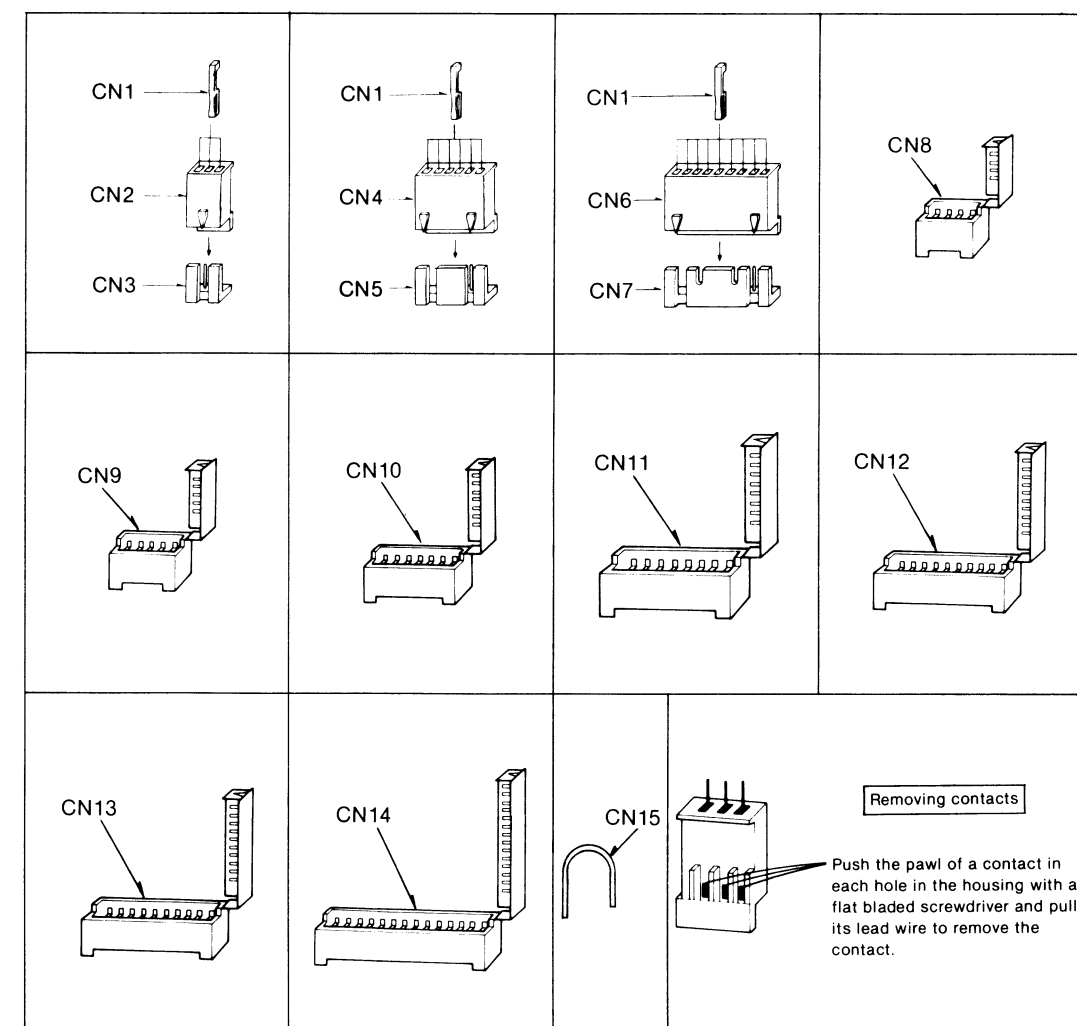
VII MECHANISM CONTROL CIRCUIT BOARD



TERMINATIONS



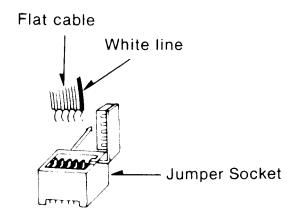
CONNECTORS



WIRING CONNECTION DIAGRAM

Connection of a flat cable

To connect a flat cable, direct the cable so that its white line faces the right side as shown below, then insert the cable into a jumper socket and close the lid of the jumper socket.



A

B

C

D

E

F

IX TIMER CIRCUIT BOARD

X REMOTE CONTROL CIRCUIT BOARD

II SLIDE VOLUME CIRCUIT BOARD

III LEAF SWITCH CIRCUIT BOARD

VII MECHANISM CONTROL CIRCUIT BOARD

VIII KEY BOARD CIRCUIT BOARD

I MAIN CIRCUIT BOARD

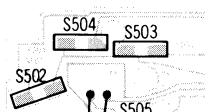
IV HEADPHONE CIRCUIT BOARD

BRAKE PLUNGER

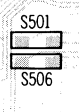
TRIGGER PLUNGER

REEL MOTOR

VII MECHANISM CIRCUIT BOARD



PILOT LAMP



XIII LEAF SWITCH CIRCUIT BOARD

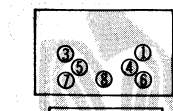
CAPSTAN MOTOR

XI HALL IC CIRCUIT BOARD

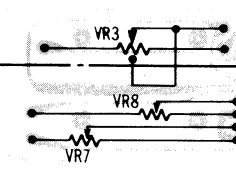
VI FL METER CIRCUIT BOARD

S609

TIMER



1 2 3 4 5 6 7 8



B

1 2 3 4 5

1 2 3 4 5

1 2 3 4 5

1 2 3 4 5



1 2 3 4 5 6

1 2 3 4 5 6

1 2 3 4 5 6

1 2 3 4 5 6

1 2 3 4 5 6

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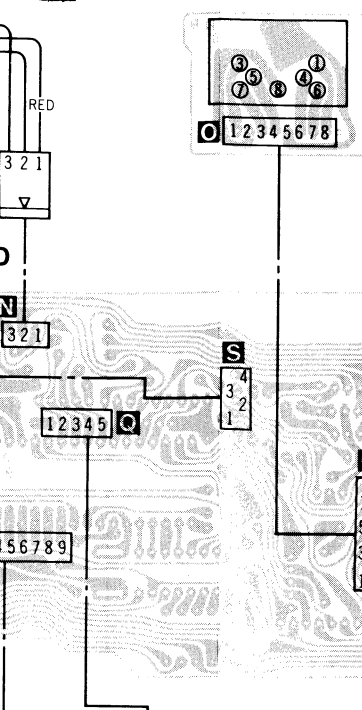
1 2 3 4 5 6

1 2 3 4 5 6

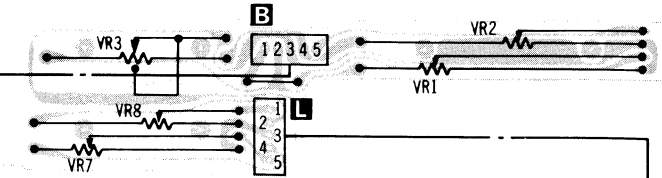
1 2 3 4 5 6

1 2 3 4 5 6

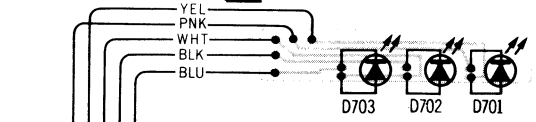
X REMOTE CONTROL CIRCUIT BOARD



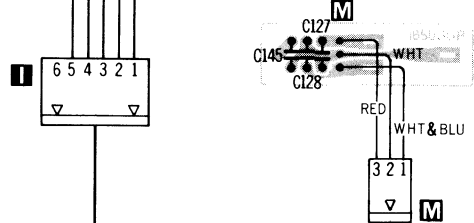
II SLIDE VOLUME CIRCUIT BOARD



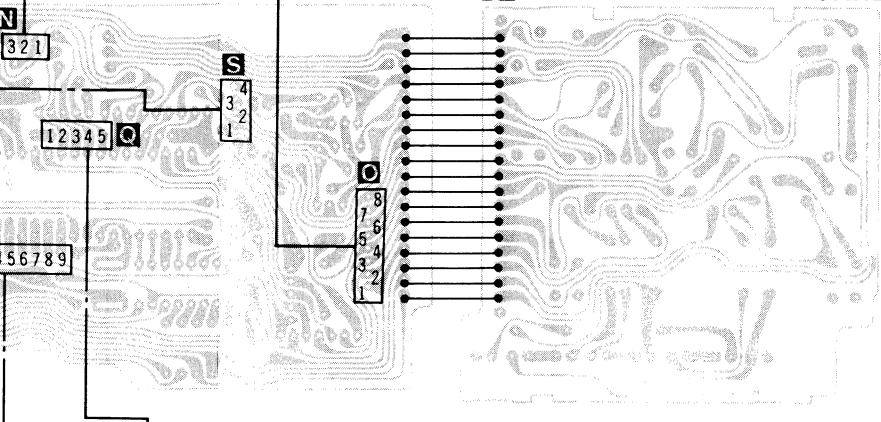
III LED CIRCUIT BOARD



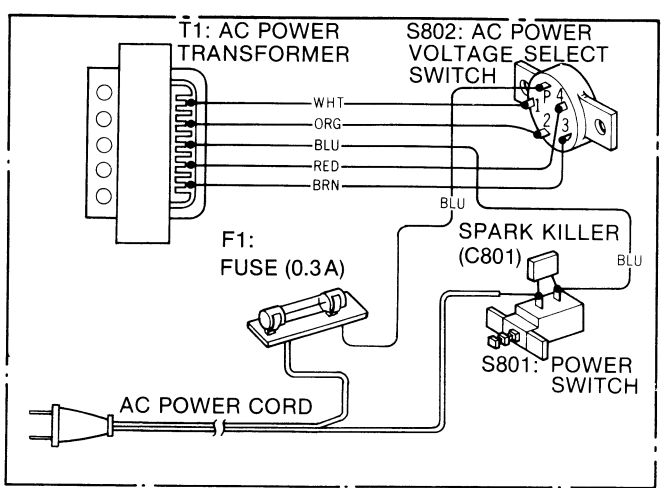
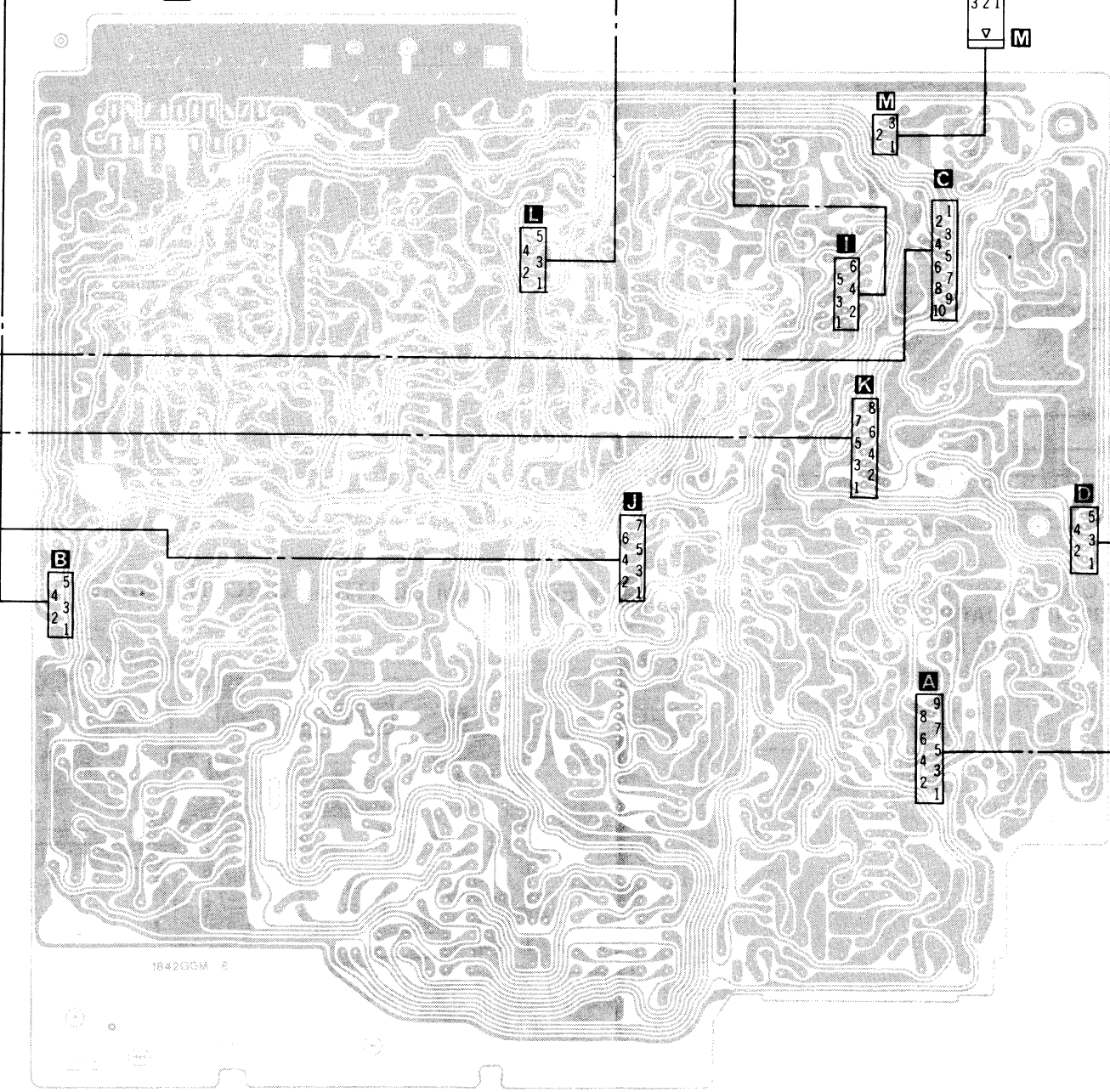
IV HEADPHONES CIRCUIT BOARD



VII KEY BOARD CIRCUIT BOARD

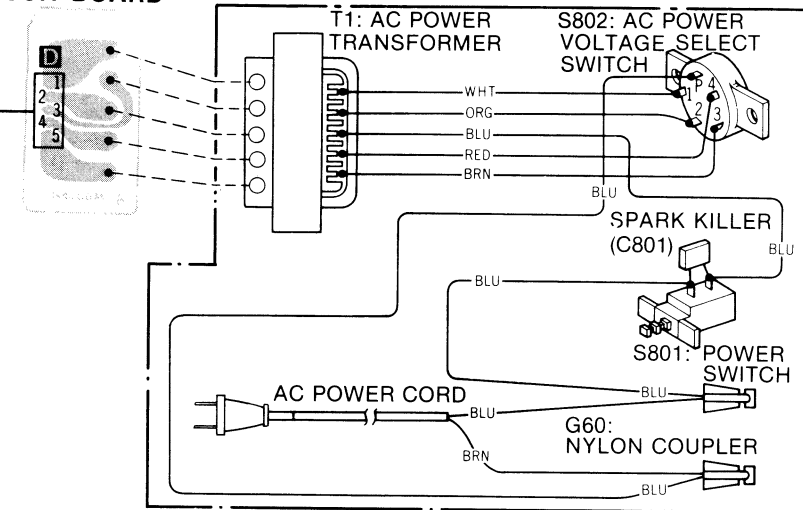


I MAIN CIRCUIT BOARD

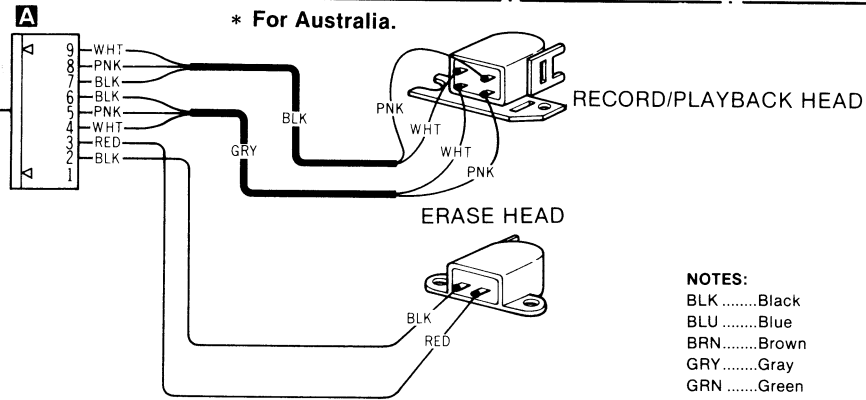


* For PX, Asia, Latin America, Middle East and Africa areas.

V POWER TRANSFORMER CIRCUIT BOARD

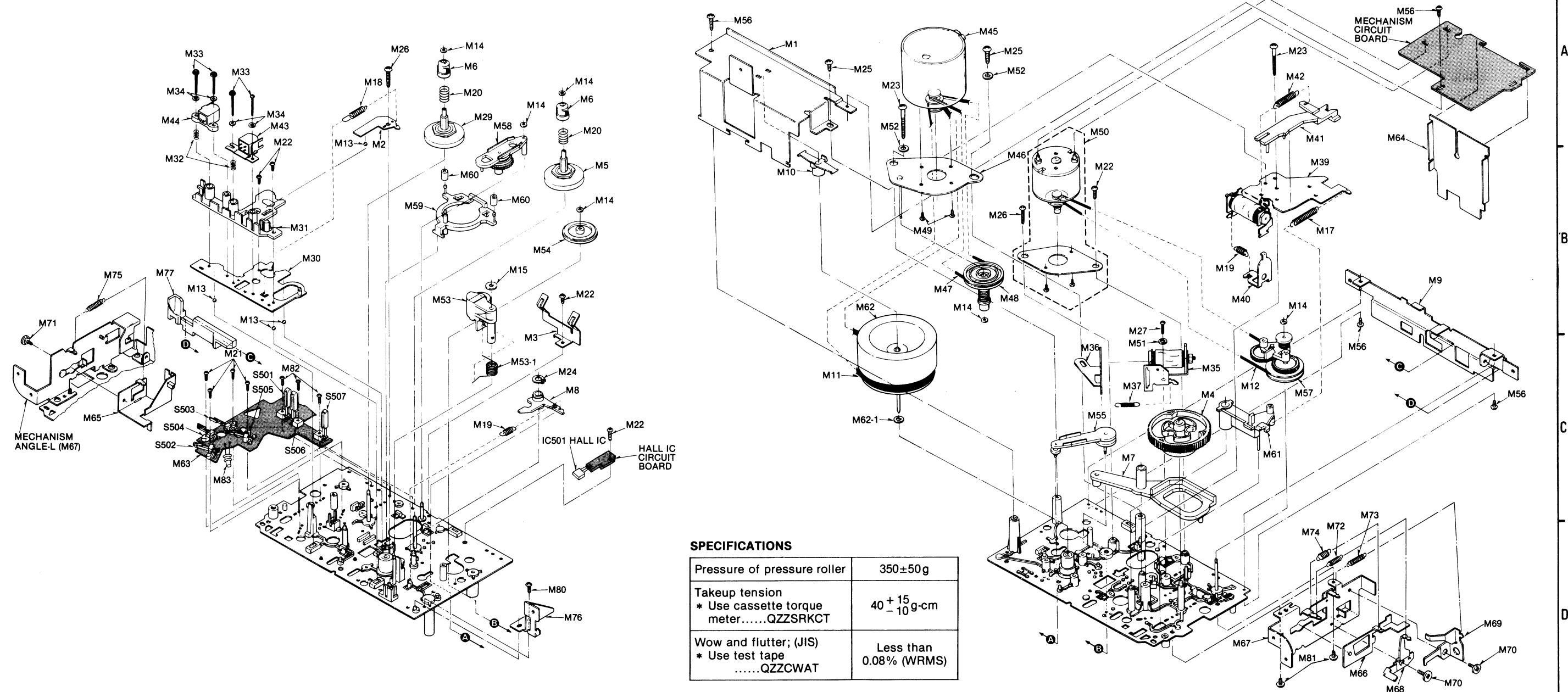


* For Australia.



- NOTES:**
- BLKBlack
 - BLUBlue
 - BRNBrown
 - GRYGray
 - GRNGreen
 - L. BLULight Blue
 - NILNo Color Mark
 - ORGOrange
 - PNKPink
 - REDRed
 - SLDShield Wire
 - VLTViolet
 - WHTWhite
 - YELYellow

MECHANICAL 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	Ref. No.	Part No.	Part Name & Description
MECHANICAL PARTS														
M 1	QMA4528	Flywheel Retainer	M 17	QBT1725	Lock Lever Spring	M 34	XWG2	Washer 2φ	M 52	XWG3	Washer 3φ	M 66	QXL1601	Lock Lever-B Assembly
M 2	QBP1894	Head Base Plate Spring	M 18	QBT1927	Head Base Plate Spring	M 35	QXA1232	Brake Plunger Assembly	M 53	QXL1550	Pressure Roller Assembly	M 67	QMA4623	Mechanism Angle-L
M 3	QBP1979	Cassette Pressure Spring	M 19	QBT1920	Idler Spring	M 36	QML3865	Plunger Lever				M 68	QML3976	Eject Lever
M 4	QXG1059	Main Gear Assembly	M 20	QBC1373	Reel Table Spring	M 37	QBT1955	Plunger Spring				M 69	QML3978	Mechanism Lever-A
M 5	QXD0147	Takeup Reel Table	M 21	XTN2+6B	Tapping Screw Φ2×6	M 39	QXA1076	Trigger Plunger Assembly	M 53-1	QBN1771	Pressure Roller Spring	M 70	QHQ1161	Step Screw
M 6	QMB1336	Reel Table Hub				M 40	QML3651	Trigger Plunger Lever	M 54	QXI0113	Takeup Idler Assembly	M 71	QHQ1168	Step Screw
M 7	QML3655	Cam Follower	M 22	XTN26+6B	Tapping Screw Φ2.6×6	M 41	QML3653	Control Lever	M 55	QXL1603	Idler Lever Assembly			
M 8	QML3660	Idler Select Lever	M 23	XTN3+24B	Tapping Screw Φ3×24	M 42	QBT1278	Record Lock Lever Spring	M 56	XTN3+6B	Tapping Screw Φ3×6	M 72	QBT2001	Eject Lever Spring
M 9	QMA4543	Mechanism Upper Angle	M 24	XUB4FT	Stop Ring 4φ	M 43	QWY4137Z	Record/Playback Head	M 57	QXL1408	Swing Gear Assembly	M 73	QBT1998	Lock Lever-A Spring
M 10	QMZ1293	Flywheel Thrust Retainer	M 25	XTN3+10B	Tapping Screw Φ3×10				M 58	QXL1604	Fast Wind Gear Assembly	M 74	QBT1999	Lock Lever-B Spring
			M 26	XTN26+12B	Tapping Screw Φ2.6×12				M 59	QML3659	Brake Lever	M 75	QBT2000	Lock Lever-C Spring
			M 27	XTN26+8B	Tapping Screw Φ2.6×8	M 44	QWY2138Z	Erase Head	M 60	QBG1132	Brake Rubber	M 76	QMA4554	Mechanism Angle-R
			M 29	QDR1164	Supply Reel Table	M 45	QXU0322	Capstan Motor Assembly	M 61	QXL1411	Lock Lever Assembly	M 77	QML3972	Auto Tape Select Lever
M 11	QDB0333	Flywheel Belt	M 30	QMK1867	Head Base Plate	M 46	QXA1328	Motor Retainer Assembly	M 62	QXF0211	Flywheel Assembly	M 80	XTN26+8B	Tapping Screw Φ2.6×8
M 12	QDB0287	Changing Belt	M 31	QMZ1263	Spacer	M 47	QDB0332	Takeup Belt				M 81	XTN3+6B	Tapping Screw Φ3×6
M 13	QDK1012	Steel Ball 2.5φ	M 32	QBC1103	Spring	M 48	QXP0621	Takeup Pulley Assembly	M 62-1	QBW2099	Poly Washer	M 82	XTN2+8B	Tapping Screw Φ2×8
M 14	QBW2008	Snap Washer				M 49	XSN26+3	Screw Φ2.6×3	M 63	QJI1776RR	Leaf Switch P.C.B.	M 83	XAMQ50S12	Pilot Lamp
M 15	QBW2046	Snap Washer	M 33	XSN2+16	Screw Φ2×16	M 50	QXU0321	Reel Motor Assembly	M 64	QTW1315	Insulating Plate			
						M 51	XWG26	Washer 2.6φ	M 65	QXL1600	Lock Lever-C Assembly			

CABINET PARTS LOCATION

