

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.

- For Asia, Latin America, Middle East and Africa areas.
- For Australia.
- For Asian PX.
- 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	Bias frequency:	80kHz
Dynamic range:	110dB (at 1kHz) with dbx in	Heads:	2-head system 1-AX (AMORPHOUS) 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; 110/125/220/240V, 50-60 Hz Preset power voltage 240V
Fast forward and rewind time:	Approx. 90 seconds with C-60 cassette tape	Power consumption:	<input type="checkbox"/> ; 16W <input type="checkbox"/> ; 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.

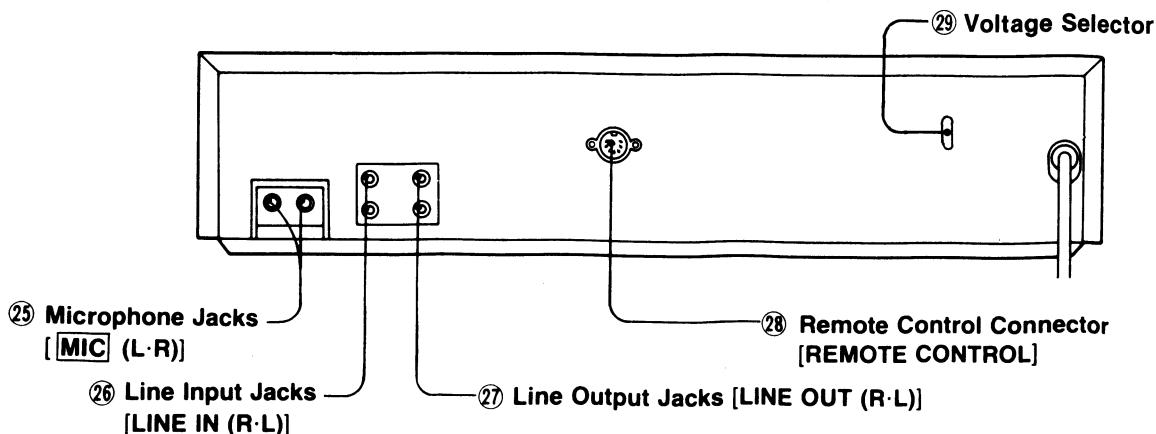
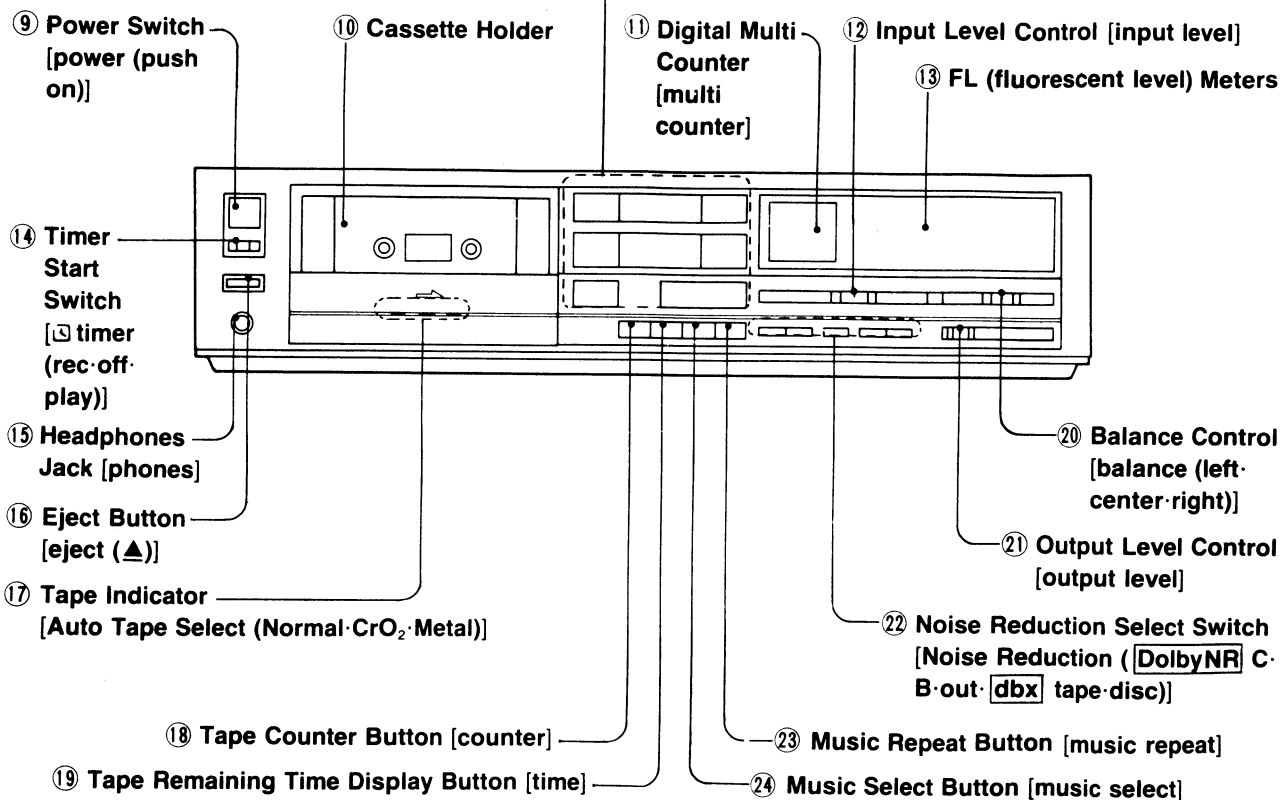
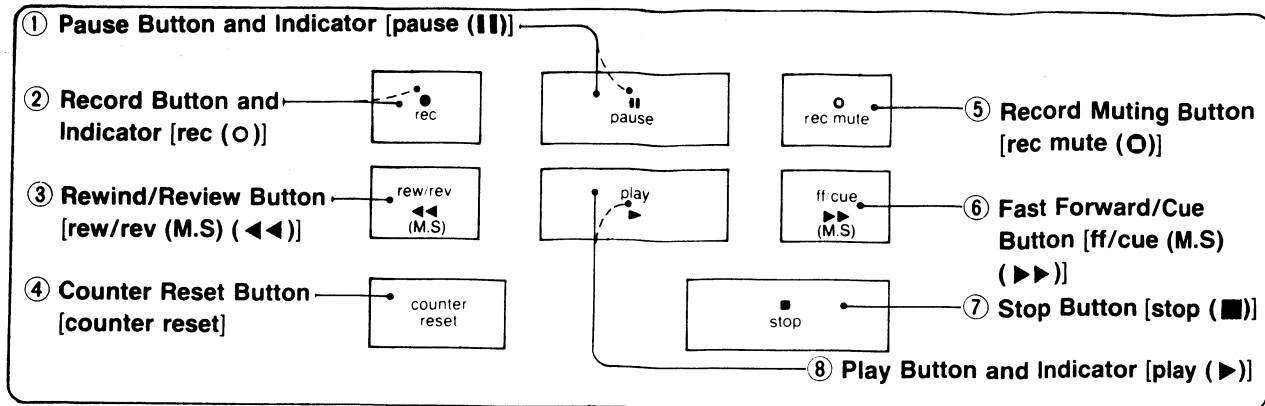
** 'Dolby' and the double-D symbol are trademarks of Dolby Laboratories Licensing Corporation.

Technics

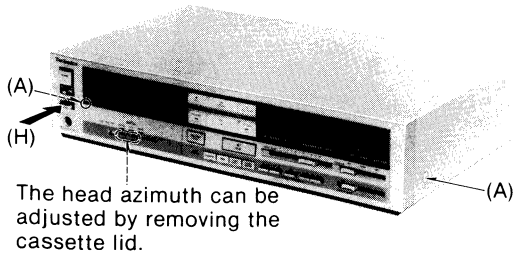
Panasonic Tokyo
Matsushita Electric Industrial Co., Ltd.
1-2, 1-chome, Shibakoen, Minato-ku, Tokyo 105 Japan

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

LOCATION OF CONTROLS AND COMPONENTS



DISASSEMBLY INSTRUCTIONS



The head azimuth can be adjusted by removing the cassette lid.

Fig. 1

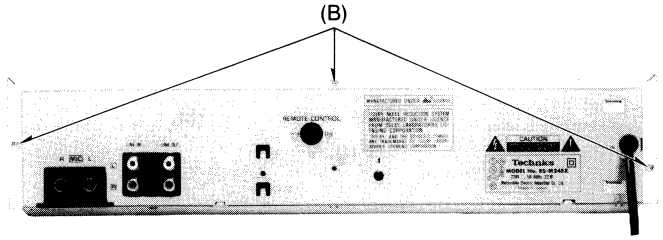
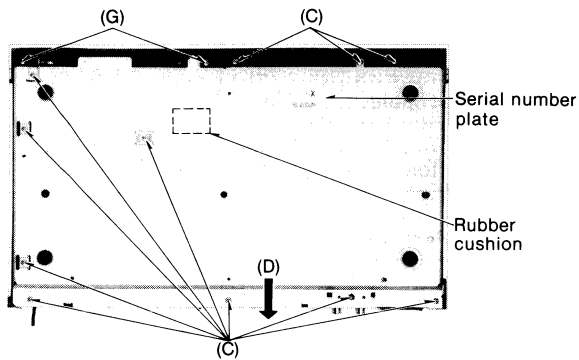
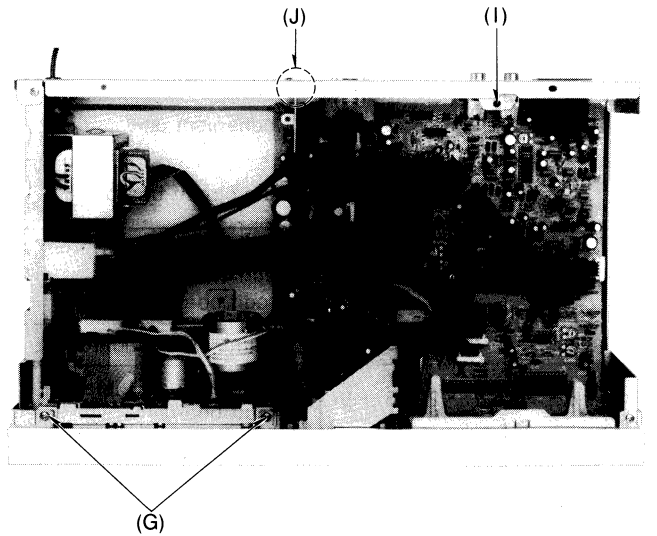


Fig. 2

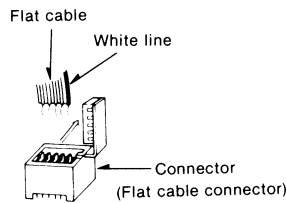


NOTE:
When removing the bottom cover, do not allow the rubber cushion on the bottom cover to be trapped by the terminals of the electric components.

Fig. 3



(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.

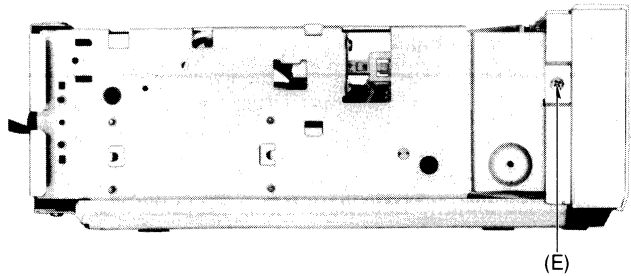
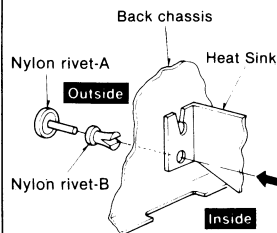


Fig. 5

(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.

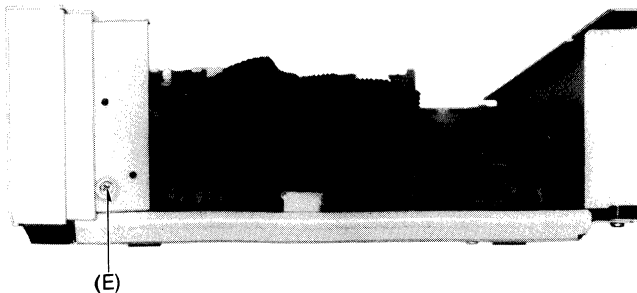
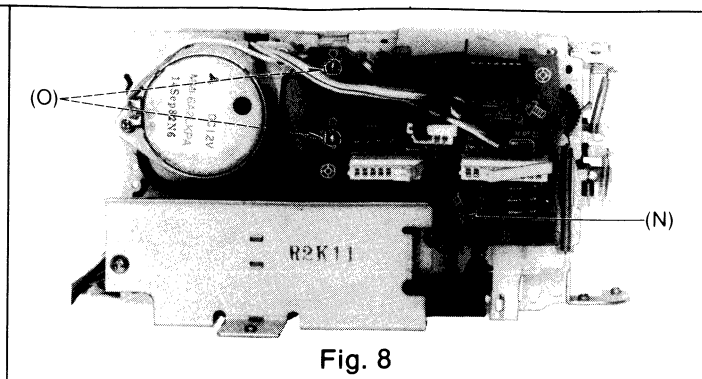
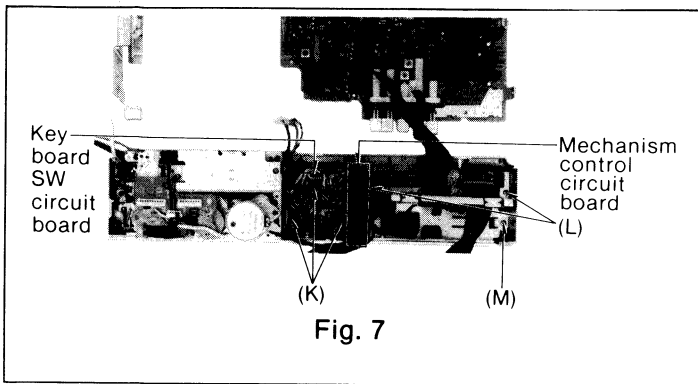


Fig. 6

Fig. 4



Ref. No.	Procedure	To remove —	Remove —	Shown in fig. —
1	1	Case cover	<ul style="list-style-type: none"> • 2 ornament screws(A) • 3 screws(B) 	1 2
2	2	Bottom cover assembly	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 2 screws.....(E) • How to remove flat cable.....(F) 	5, 6 4
4	1 → 2 → 3 → 4	Mechanism unit	<ul style="list-style-type: none"> • 4screws(G) • Push the eject button(H) 	3, 4 1
5	1 → 2 → 3 → 5	Main circuit board	<ul style="list-style-type: none"> • 1 screw(I) • How to remove nylon rivet(J) 	4 4
6	1 → 2 → 3 → 6	Key board SW and Mechanism control circuit board	<ul style="list-style-type: none"> • 3 screws(K) 	7
7	1 → 2 → 3 → 7	Volume circuit board	<ul style="list-style-type: none"> • 2 screws.....(L) 	7
8	1 → 2 → 3 → 8	FL Meter and FL Meter circuit board	<ul style="list-style-type: none"> • 1 screw(M) 	7
9	1 → 2 → 3 → 9	Mechanism circuit board	<ul style="list-style-type: none"> • 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

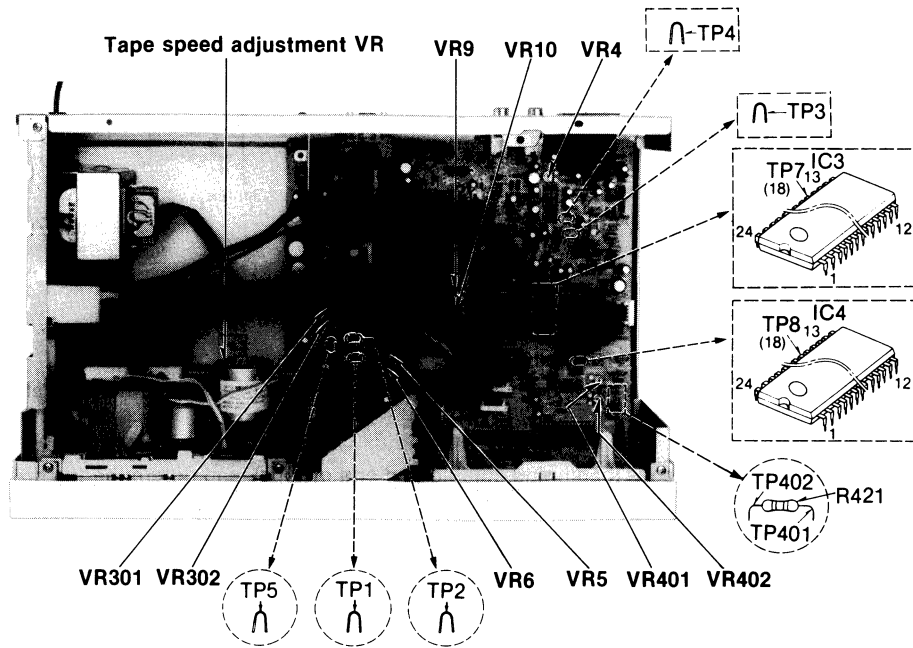


Fig. 1

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.

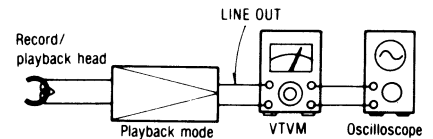


Fig. 2

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 figs. 3 and 4.)

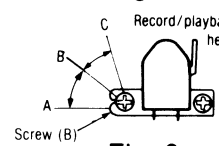


Fig. 3

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.

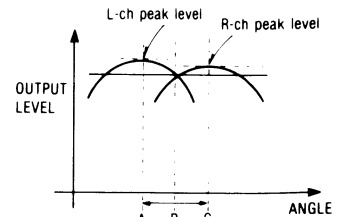


Fig. 4

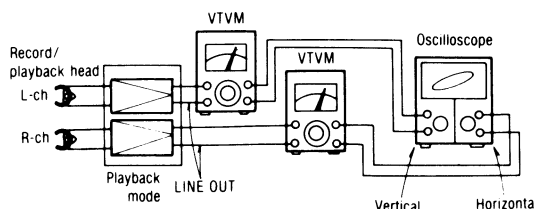


Fig. 5

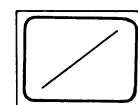


Fig. 6

Ⓔ 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:
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.

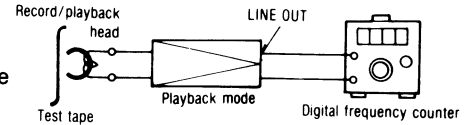


Fig. 7

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:

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

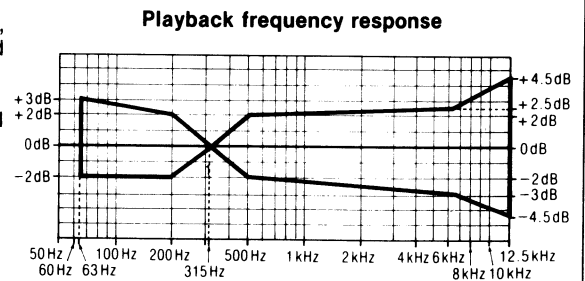


Fig. 8

Ⓓ 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: 0.28 V [0.38±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.

E Erase current

Condition:

- Record mode
- Metal tape mode

Equipment:

- VTVM
- Oscilloscope

- Test equipment connection is shown in fig. 9.
- Place UNIT into metal tape mode.
- Press the record and pause buttons.
- 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)

- 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).

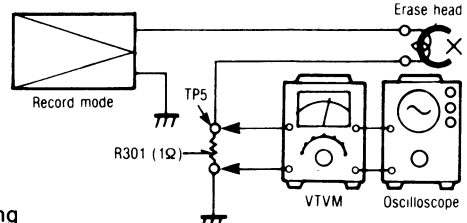


Fig. 9

F 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)

- Make connections as shown in fig. 10.
- Place UNIT into normal tape mode and insert the normal reference blank test tape (QZZCRA).
- Supply a 1 kHz signal from the AF oscillator through ATT to LINE IN.
- Adjust ATT so that input level is -20dB below standard recording level (standard recording level = 0 VU).
- 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.
- 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;

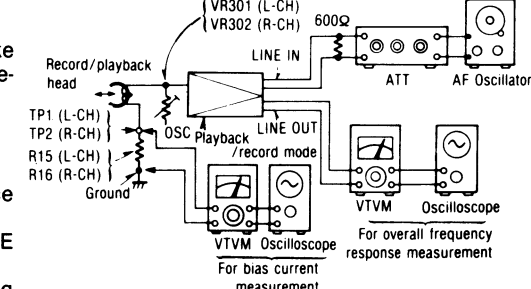


Fig. 10

Overall frequency response chart (Normal)

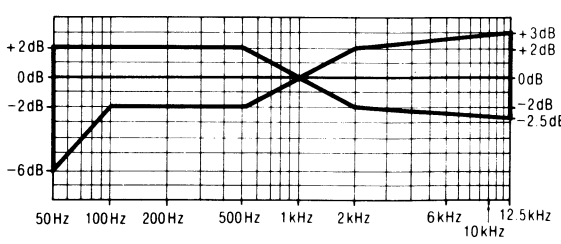


Fig. 11

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

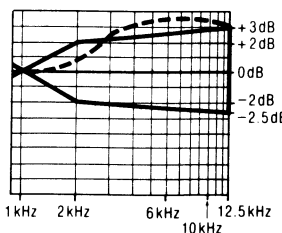


Fig. 12

- Increase bias current by turning VR301 (L-CH) and VR302 (R-CH). (See fig. 1 on page 8.)
- 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.)
- If the curve still exceeds the specifications (fig. 11), increase bias current further and repeat steps 5 and 6.

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

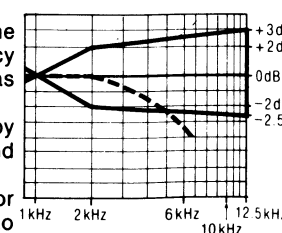


Fig. 13

- Reduce bias current by turning VR301 (L-CH) and VR302 (R-CH).
- 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.)
- If the curve still falls below the charted specifications (fig. 11), reduce bias current further and repeat steps 5 and 6.

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)

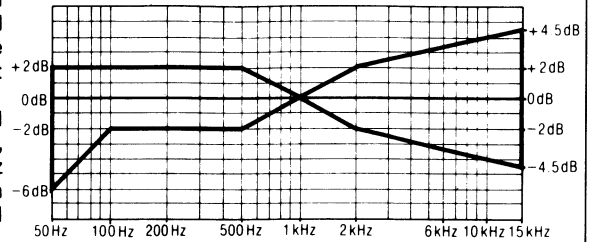


Fig. 14

Ⓒ 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±4dB
 LINE IN -24±4dB

Equipment:

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

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±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)

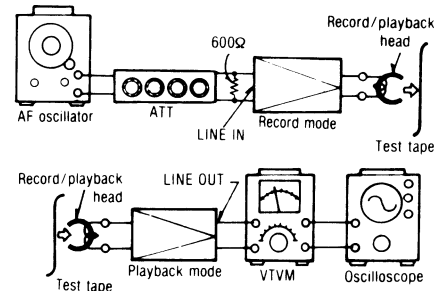


Fig. 15

Ⓓ 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 (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 (≈340mV) to 0.38V + 1dB (≈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 ≈ 2.5mV) and then further lower the level 12dB (-52dB - 12dB = -64dB ≈ 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.

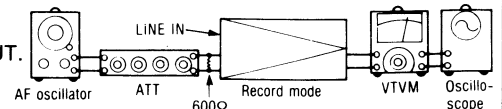


Fig. 16

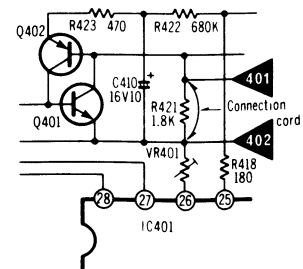


Fig. 17

• 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.

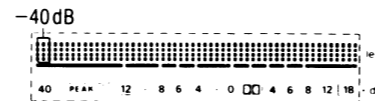


Fig. 18

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.

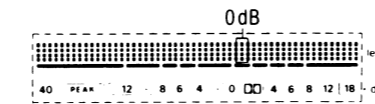


Fig. 19

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 +6dB±2.5dB.
 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 +8dB±2.5dB.
- 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 +11.5dB±2.5dB.
 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 +8.5dB±2.5dB.

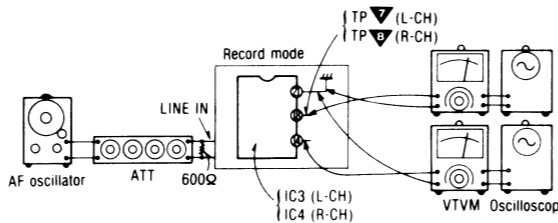


Fig. 20

2 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 volt meter.

Reference value: 15±0.5mV

4. If measured value is not within reference, adjust VR4 (shown in fig. 1).

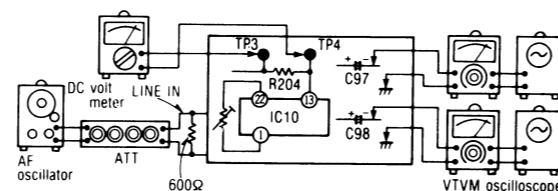
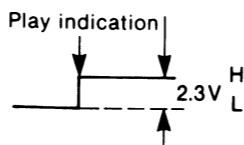
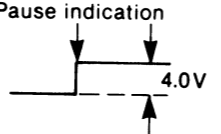
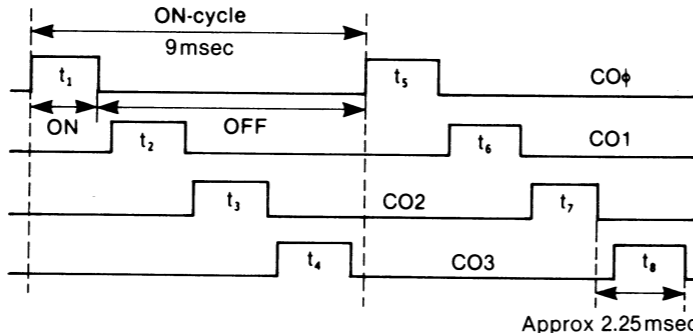
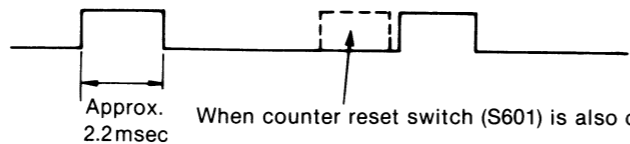
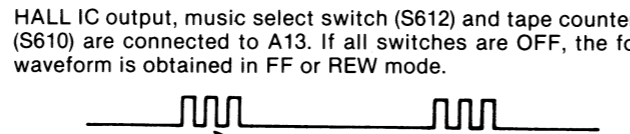
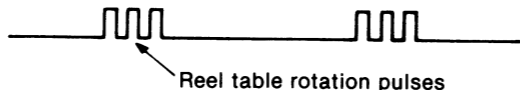


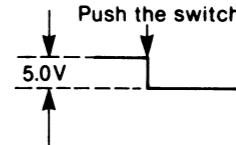
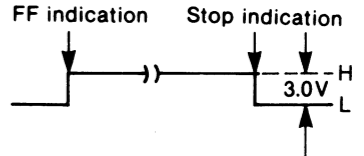
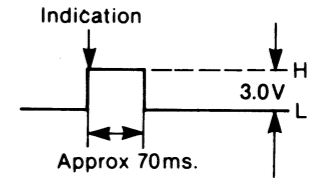
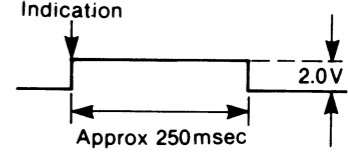
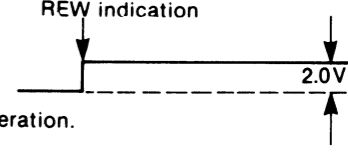
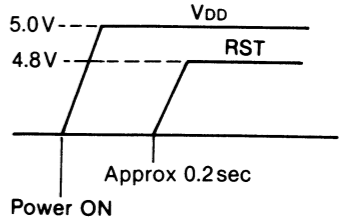
Fig. 21

MN1405RMB (IC601) EACH TERMINAL FUNCTION AND WAVEFORM

NOTE: When the microcomputer does not operate, check terminal ⑩ for presence of the reference signal. The microcomputer starts operation only after the signal is applied to terminal ⑩

Terminal No.	Symbol	Name	Function/operation
1.	VSS	GND	
2.	C011	REC indication R/P selector	<p>"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.</p>
3.	C010	Bias oscillation	<p>"H" level during time display. "H" level during REPEAT operation.</p>
4.	C09	TIMER OUT Repeat indication	<p>"H" level during time display. "H" level during REPEAT operation.</p>
5.	C08	No connection	Not used.
6.	C07	Muting	<p>"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.</p>
7.	C06	TIMER REC-PLAY Signal output	<p>Becomes "H" level only when power is supplied.</p>

Terminal No.	Symbol	Name	Function/operation
8.	C05	PLAY indication	 <p>"H" level simultaneously with PLAY indication. Same as the above for TIMER PLAY.</p>
9.	C04	PAUSE indication	 <p>"H" level simultaneously with PAUSE indication.</p>
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)).
			<p>Operation example Counter reset switch (S601) and stop switch (S503) are connected to A10. If only S503 is closed, the waveform is as follows:</p>  <p>When counter reset switch (S601) is also closed:</p>  <p>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.</p>  <p>Reel table rotation pulses</p>

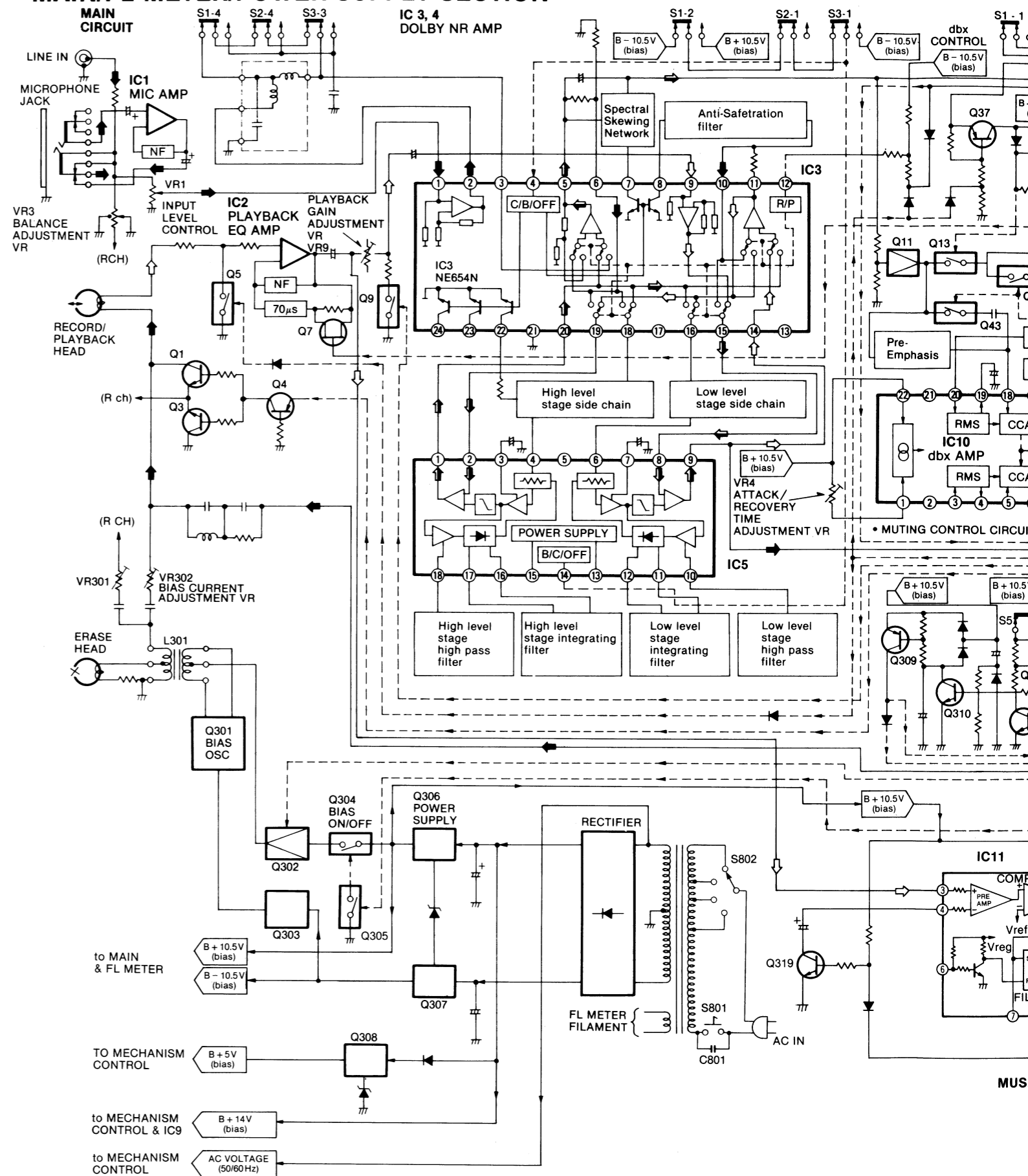
Terminal No.	Symbol	Name	Function/operation
18.	Bi3	REW key switch	 <p>Push the switch. "H" in the normal case, "L" when the switch is pushed.</p>
19.	Bi2	FF key switch	
20.	Bi1	PLAY key switch	
21.	Biφ	STOP key switch	
22.	E0φ	Brake plunger	 <p>"H" during FF/REW operations.</p>
23.	E01	Trigger plunger	 <p>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.)</p>
24.	E02	Motor CL	 <p>Approx 250msec "H" until mode switch (S502) is changed from "close" to "open" following the indication that the mechanism mode has been changed.</p>  <p>"H" in REW operation.</p>
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	<p>Computer's RESET terminal. Reset is less than 0.8V.</p>  <p>Power ON</p>
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.	D0φ	FL counter Segment a	<p>Number indication</p> <p>Segment g (37)</p> <p>Segment a (31)</p> <p>Segment f (36)</p> <p>Segment b (32)</p> <p>Segment e (35)</p> <p>Segment c (33)</p> <p>Segment d (34)</p> <p>Running indication</p> <p>Segment g</p> <p>Segment e</p> <p>Segment c</p> <p>Segment d</p> <p>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:</p>
32.	D01	FL counter Segment b	
33.	D02	FL counter Segment c	
34.	D03	FL counter Segment d	
35.	D04	FL counter Segment e	
36.	D05	FL counter Segment f	
37.	D06	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	<p>Approx. 1.6 sec</p> <p>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.</p>

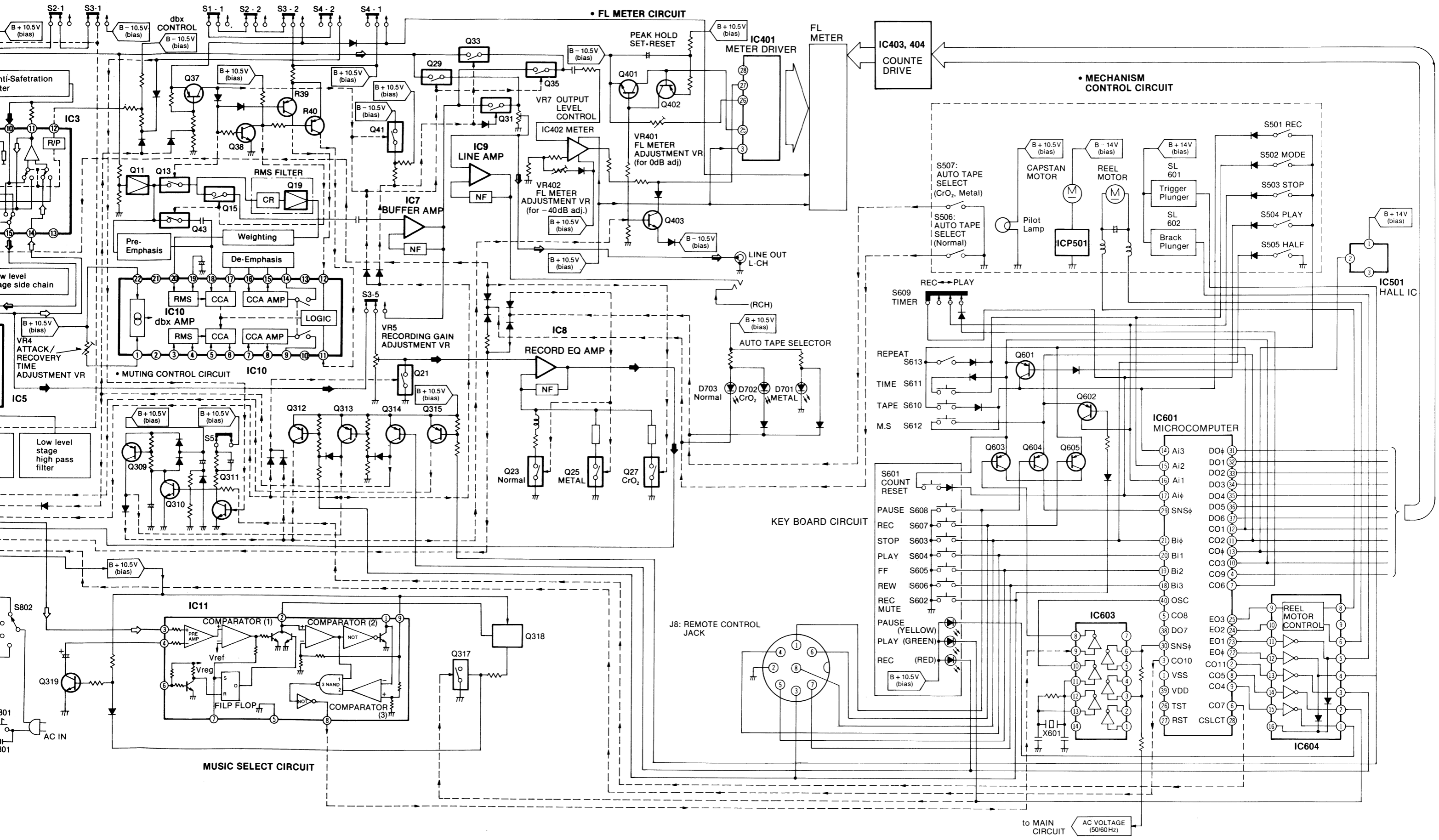
NOTES:

- 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



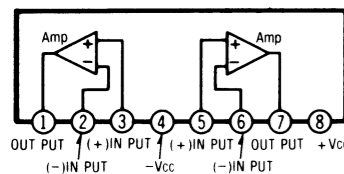
Q11		Q12		Q13		Q14		Q15	
B	disc 2.57V tape 2.54V (2.57V)	B	disc 2.55V tape 2.52V (2.51V)	B	disc -0.03V tape 2.60V (2.59V)	B	disc -0.03V tape 2.57V (2.57V)	B	disc 2.58V (2.57V) tape 0.06V (2.57V)
E	disc 1.98V tape 1.94V (1.93V)	E	disc 1.95V tape 1.92V (1.95V)	E	disc 1.93V (1.92V) tape 1.93V (1.92V)	E	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 0.06V 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 1.90V tape 1.91V (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 5.30V (5.29V) tape 5.29V	C	disc 5.29V tape 5.29V	C	disc 5.30V tape 5.29V (5.30V)

Q39		Q40		Q43		Q44	
B	disc 8.62V (8.57V) tape 9.23V (4.67)	B	disc 7.82V (7.78V) tape 4.67V (7.77V)	B	disc 0.06V tape 0.06V (2.64V)	B	disc 0.06V 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 0V 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 1.99V tape 1.96V (1.99V)	C	disc 1.97V tape 1.93V (1.97V)

EQUIVALENT CIRCUIT

IC1, 2, 7, 8, 9 M5218L



SPECIFICATIONS

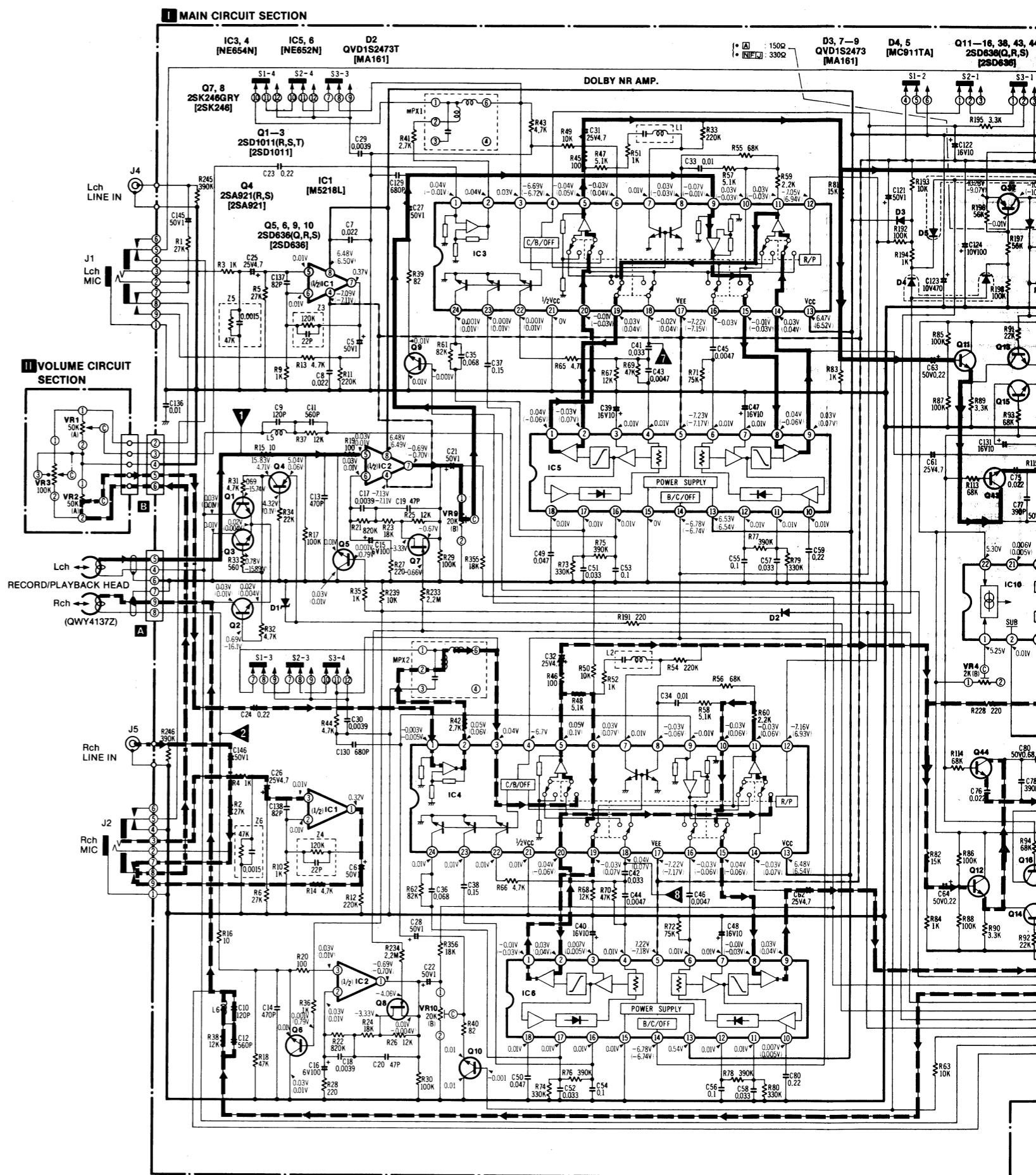
Playback S/N ratio * Test tape...QZZCFM	Greater than 45dB
Overall distortion * Test tape ...QZZCRA for Normal ...QZZCRX for CrO ₂ ...QZZCRZ for Metal	Less than 4%
Overall S/N ratio * Test tape...QZZCRA	Greater than 43dB (without NAB filter)

- * Output level control... MAX
- * Input level control ...MAX
- * Balance controlCenter

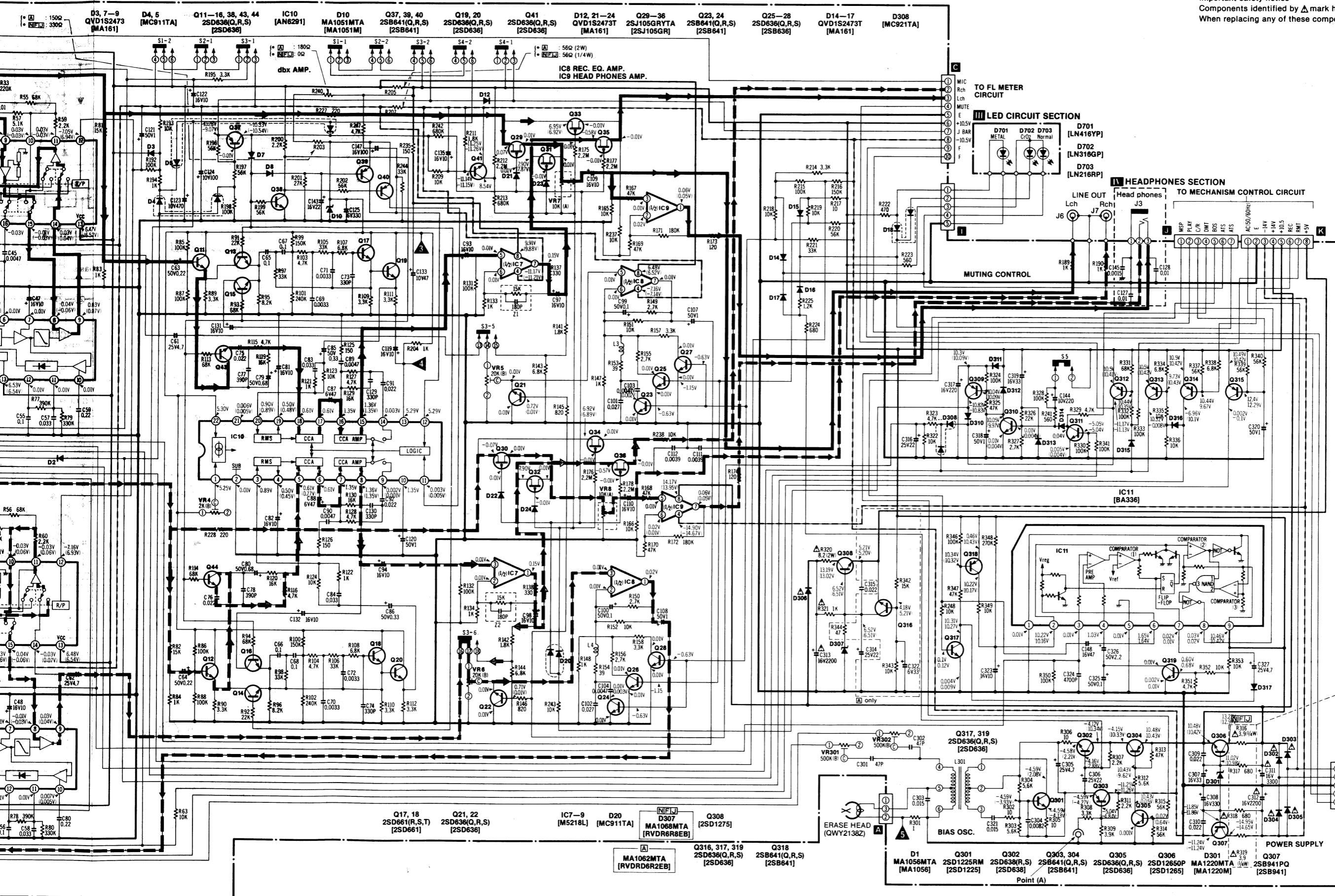
- NOTES:
- S1-1—S1-4Dolby-C IN/OUT switch (shown in out position).
 - S2-1—S2-4Dolby-B IN/OUT switch (shown in out position).
 - S3-1—S3-6dbx tape IN/OUT switch (shown in out position).
 - S4-1, S4-2dbx disc IN/OUT switch (shown in out position).
 - S5NR Mute switch (shown in OFF position).
 - S801Power 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 (μF) 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.

- No mark Voltage values at OUT (NR select switch) mode.
() Voltage values at record mode.
disc Voltage values at dbx disc mode.
tape Voltage 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 numbers 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
1S2473T77 ← 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.

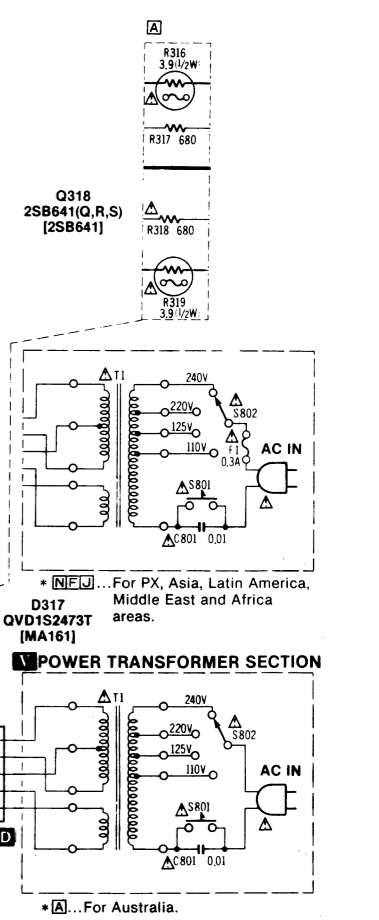
SCHEMATIC DIAGRAM



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.

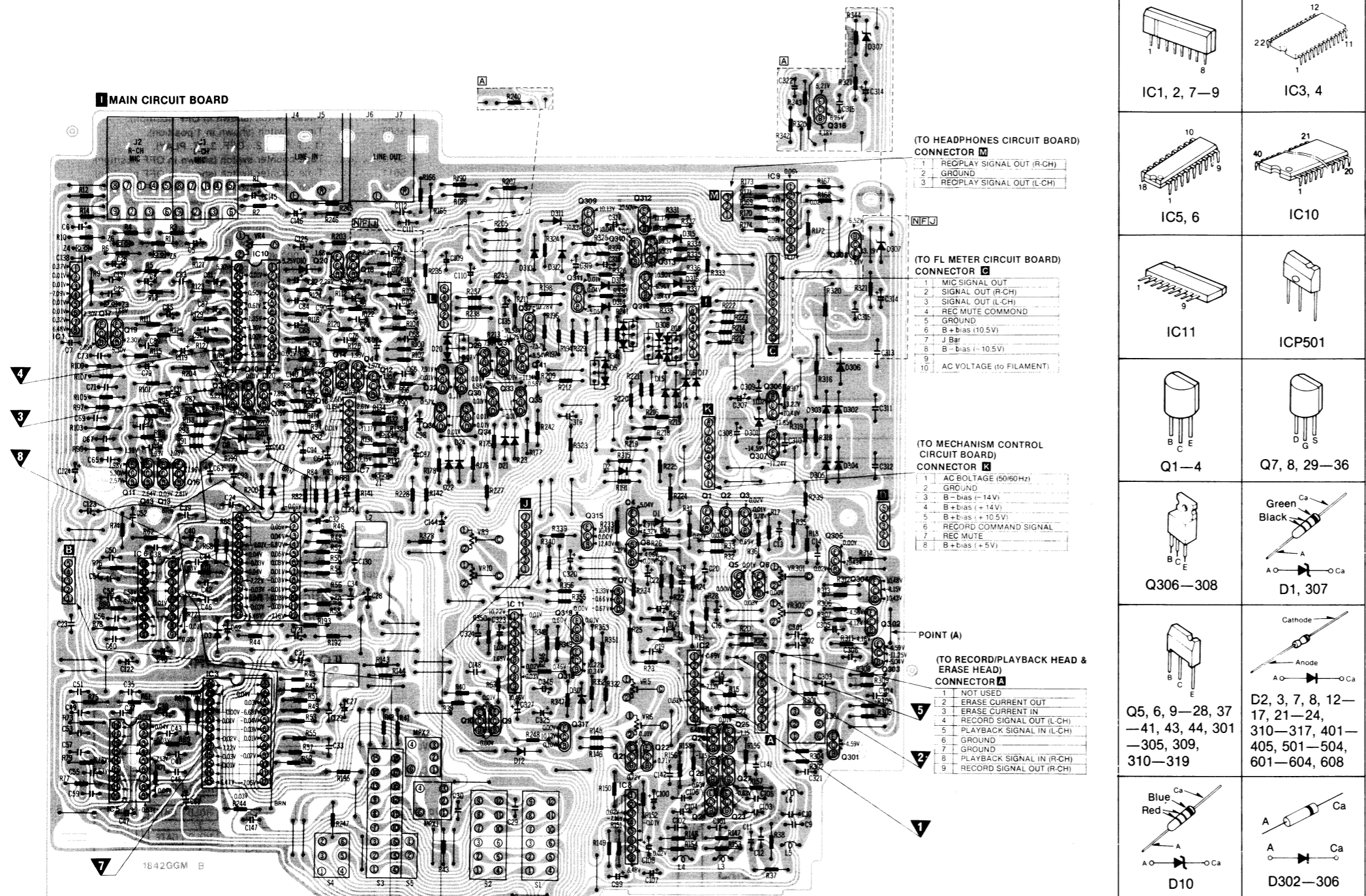


NOTES:
N For Asia, Latin America, Middle East and Africa areas.
A For Australia.
F For Asian PX.
J For European PX.



CIRCUIT BOARD

• MAIN CIRCUIT BOARD



(TO HEADPHONES CIRCUIT BOARD)
CONNECTOR **M**

1	REPLAY SIGNAL OUT (R-CH)
2	GROUND
3	REPLAY SIGNAL OUT (L-CH)

(TO FL METER CIRCUIT BOARD)
CONNECTOR **N**

1	MIC SIGNAL OUT
2	SIGNAL OUT (R-CH)
3	SIGNAL OUT (L-CH)
4	REC MUTE COMMAND
5	GROUND
6	B + bias (+0.5V)
7	J bar
8	B - bias (-10.5V)
10	AC VOLTAGE (to FILAMENT)

(TO MECHANISM CONTROL CIRCUIT BOARD)
CONNECTOR **O**

1	AC VOLTAGE (50/60Hz)
2	GROUND
3	B - bias (-14V)
4	B + bias (+14V)
5	B + bias (+10.5V)
6	RECORD COMMAND SIGNAL
7	REC MUTE
8	B + bias (+5V)

(TO RECORD/PLAYBACK HEAD & ERASE HEAD)
CONNECTOR **P**

1	NOT USED
2	ERASE CURRENT OUT
3	ERASE CURRENT IN
4	RECORD SIGNAL OUT (L-CH)
5	PLAYBACK SIGNAL IN (L-CH)
6	GROUND
7	GROUND
8	PLAYBACK SIGNAL IN (R-CH)
9	RECORD SIGNAL OUT (R-CH)

(TO MECHANISM CONTROL CIRCUIT BOARD)
CONNECTOR **Q**

1	MUSIC SELECTOR
2	PLAYBACK COMMAND SIGNAL
3	CLUE REVIEW MUTE
4	MUTING COMMAND SIGNAL
5	BIAS OSCILLATOR
6	AUTO TAPE SELECTOR (C/O)
7	AUTO TAPE SELECTOR (Metal)

(TO SLIDE VOLUME CIRCUIT BOARD)
CONNECTOR **R**

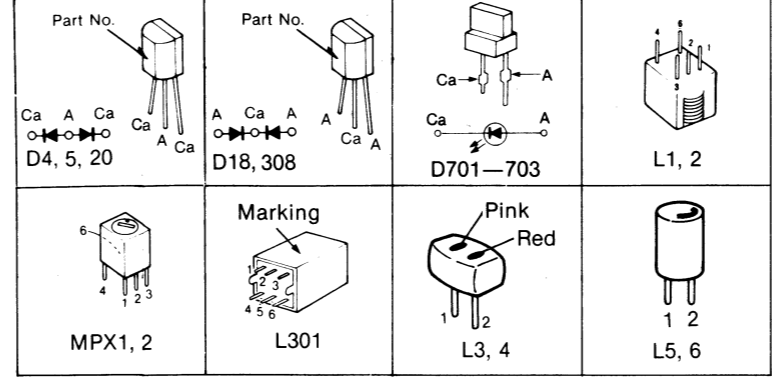
1	RECORD SIGNAL IN (L-CH)
2	RECORD SIGNAL OUT (L-CH)
3	GROUND
4	RECORD SIGNAL OUT (R-CH)
5	RECORD SIGNAL IN (R-CH)

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:

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



	IC1, 2, 7-9		IC3, 4
	IC5, 6		IC10
	IC11		ICP501
	Q1-4		Q7, 8, 29-36
	Q306-308		D1, 307
	Q5, 6, 9-28, 37-41, 43, 44, 301-305, 309, 310-319		D2, 3, 7, 8, 12-17, 21-24, 310-317, 401-405, 501-504, 601-604, 608
	D10		D302-306
	MPX1, 2		L301
	L3, 4		L5, 6

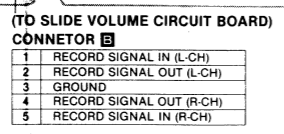
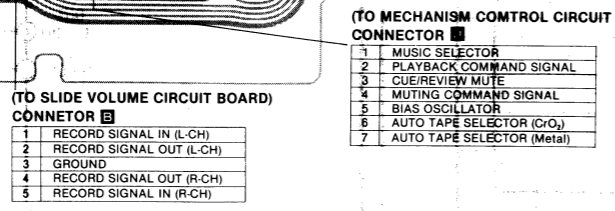
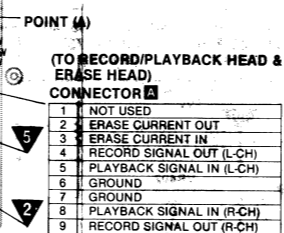
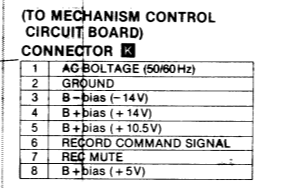
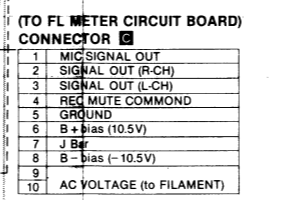
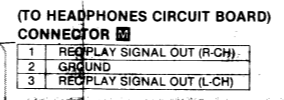
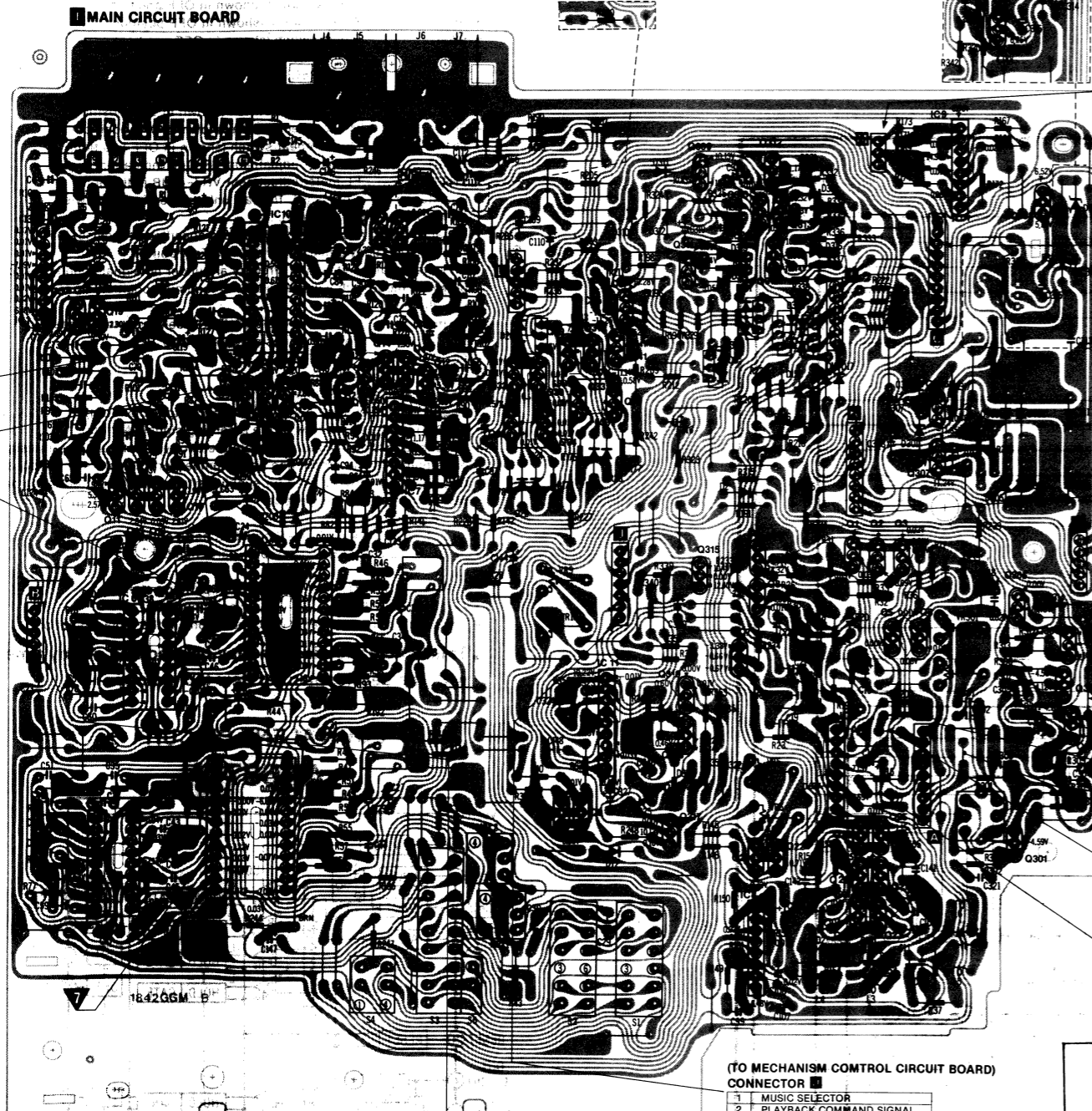
REPLACEMENT PARTS LIST

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.
RESISTORS							
R 1, 2	ERD25TJ273	R 147, 148	ERD25FJ102	R 308	ERD25FJ332	R 419	ERD25FJ103
R 3, 4	ERD25FJ120	R 149, 150	ERD25FJ272	R 309	ERD25FJ392	R 420	ERD25FJ472
R 5, 6	ERD25TJ273	R 151, 152	ERD25FJ103	R 311	ERD25FJ222	R 421	ERD25FJ182
R 9, 10	ERD25FJ102	R 153, 154	ERD25FJ390	R 312	ERD25FJ562	R 422	ERD25J684
R 11, 12	ERD25TJ224	R 155, 156	ERD25FJ272	R 313	ERD25TJ473	R 423	ERD25FJ471
R 13, 14	ERD25FJ472	R 157, 158	ERD25FJ332	R 314, 315	ERD25TJ563	R 424	ERD25TJ563
R 15, 16	ERD25FJ100	R 165, 166	ERD25FJ103	R 316		R 425	ERD25FJ103
R 17, 18	ERD25TJ473	R 167, 168, 169, 170	ERD25TJ473				
R 19, 20	ERD25FJ101		ERD25TJ184				
R 21, 22	ERD25TJ824	R 171, 172	ERD25FJ392				
		R 173, 174	ERD25FJ121				
		R 175, 176, 177, 178	ERD25FJ225				
R 23, 24	ERD25TJ183	R 189, 190	ERD25FJ102				
R 25, 26	ERD25TJ123						
R 27, 28	ERD25FJ221						
R 29, 30	ERD25TJ104	R 191	ERD25FJ221				
R 31, 32	ERD25FJ472	R 192	ERD25TJ120				
R 33	ERD25FJ561	R 193	ERD25FJ103				
R 34	ERD25TJ223	R 194	ERD25FJ102				
R 35, 36	ERD25FJ102	R 195	ERD25FJ332				
R 37, 38	ERD25TJ123	R 196, 197	ERD25FJ563				
R 39, 40	ERD25FJ820	R 198	ERD25TJ104				
		R 199	ERD25TJ563				
		R 200	ERD25FJ222				
		R 201	ERD25TJ273				
R 41, 42	ERD25FJ272						
R 43, 44	ERD25FJ472						
R 45, 46	ERD25FJ101						
R 47, 48	ERD25FJ512						
R 49, 50	ERD25FJ103						
R 51, 52	ERD25FJ102						
R 53, 54	ERD25TJ224						
R 55, 56	ERD25TJ683						
R 57, 58	ERD25FJ512						
R 59, 60	ERD25FJ222						
R 61, 62	ERD25TJ823						
R 63	ERD25FJ103						
R 65, 66	ERD25FJ472						
R 67, 68	ERD25TJ123						
R 69, 70	ERD25TJ473						
R 71, 72	ERD25TJ753						
R 73, 74	ERD25TJ334						
R 75, 76, 77, 78							
R 79, 80	ERD25TJ394						
R 81, 82	ERD25TJ334						
	ERD25TJ153						
R 83, 84	ERD25FJ102						
R 85, 86, 87, 88							
	ERD25TJ104						
R 89, 90	ERD25FJ332						
R 91, 92	ERD25TJ223						
R 93, 94	ERD25TJ683						
R 95, 96	ERD25FJ822						
R 97, 98	ERD25TJ333						
R 99, 100	ERD25TJ154						
R 101, 102	ERD25TJ244						
R 103, 104	ERD25FJ472						
R 105, 106	ERD25TJ333						
R 107, 108	ERD25FJ682						
R 109	ERD25FJ332						
R 110, 111, 112							
	ERD25FJ332						
R 113, 114	ERD25TJ683						
R 115, 116	ERD25FJ472						
R 119, 120	ERD25TJ163						
R 121, 122	ERD25FJ102						
R 123, 124	ERD25FJ103						
R 125, 126	ERD25FJ151						
R 127, 128	ERD25FJ472						
R 129, 130	ERD25TJ163						
R 131, 132	ERD25TJ104						
R 133, 134	ERD25FJ102						
R 137, 138	ERD25FJ331						
R 141, 142	ERD25TJ182						
R 143, 144	ERD25FJ682						
R 145, 146	ERD25FJ821						
R 147, 148	ERD25FJ102						
R 149, 150	ERD25FJ272						
R 151, 152	ERD25FJ103						
R 153, 154	ERD25FJ390						
R 155, 156	ERD25FJ272						
R 157, 158	ERD25FJ332						
R 165, 166	ERD25FJ103						
R 167, 168, 169, 170	ERD25TJ473						
R 171, 172	ERD25FJ392						
R 173, 174	ERD25FJ121						
R 175, 176, 177, 178	ERD25FJ225						
R 189, 190	ERD25FJ102						
R 191	ERD25FJ221						
R 192	ERD25TJ120						
R 193	ERD25FJ103						
R 194	ERD25FJ102						
R 195	ERD25FJ332						
R 196, 197	ERD25FJ563						
R 198	ERD25TJ104						
R 199	ERD25TJ563						
R 200	ERD25FJ222						
R 201	ERD25TJ273						
R 202	ERD25TJ563						
R 203 [A]	ERD25FJ151						
[For Australia,]							
[N]	ERD25FJ331						
[For Asia, Latin America, Middle East and Africa areas.]							
R 204	ERD25FJ102						
R 205, 207							
[A]	ERD2ANJ560						
[For Australia,]							
[NFJ]	ERD25FJ560						
[For PX,]							
[For Asia, Latin America, Middle East and Africa areas.]							
R 209	ERD25FJ103						
R 211	ERD25FJ182						
R 212	ERD25FJ225						

CIRCUIT BOARD
• MAIN CIRCUIT BOARD

ELECTRICAL PA



IC1, 2, 7-9	IC3, 4
IC5, 6	IC10
IC11	ICP501
Q1-4	Q7, 8, 29-36
Q306-308	D1, 307
Q5, 6, 9-28, 37-41, 43, 44, 301-305, 309, 310-319	D2, 3, 7, 8, 12-17, 21-24, 310-317, 401-405, 501-504, 601-604, 608
D10	D302-306
MPX1, 2	L3, 4
L301	L5, 6

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.

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
- ECGD
- ECKD
- ECDD
- ECFD
- ECQM
- ECQE
- ECQF

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	ERD25F1203	R 149, 150	ERD25FJ272	R 309	ERD25FJ392	R 420	ERD25FJ472	
R 5, 6	ERD25TJ273	R 151, 152	ERD25FJ103	R 311	ERD25FJ222	R 421	ERD25FJ182	
R 9, 10	ERD25F1202	R 153, 154	ERD25FJ390	R 312	ERD25FJ562	R 422	ERD25TJ684	
R 11, 12	ERD25TJ224	R 155, 156	ERD25FJ272	R 313	ERD25TJ473	R 423	ERD25FJ471	
R 13, 14	ERD25FJ472	R 157, 158	ERD25FJ332	R 314, 315	ERD25TJ563	R 424	ERD25TJ566	
R 15, 16	ERD25FJ100	R 165, 166	ERD25FJ103	R 316		R 425	ERD25FJ103	
R 17, 18	ERD25TJ473	R 167, 168, 169, 170		[A] Δ	ERQ12HJ3R9	R 426, 427		
R 19, 20	ERD25FJ101			[For Australia.]		[A] Δ	ERD50FJ271	
R 21, 22	ERD25TJ824	R 171, 172	ERD25TJ184	[NFJ] Δ	ERD25FJ3R9	[For Australia.]	[NFJ] Δ	ERD25FJ181
		R 173, 174	ERD25FJ121	[For PX.		For Asia, Latin America,	[For PX.	
		R 175, 176, 177, 178		Middle East and Africa		areas.]	For Asia, Latin America,	
R 23, 24	ERD25TJ183	R 189, 190	ERD25FJ102	areas.]		R 317, 318	Δ	ERD25FJ681
R 25, 26	ERD25TJ123							
R 27, 28	ERD25FJ221	R 191	ERD25FJ221	R 319		R 428 [A]	ERG2ANJ470	
R 29, 30	ERD25TJ104	R 192	ERD25TJ104	[For Australia.]		[NFJ] Δ	ERD25FJ470	
R 31, 32	ERD25FJ472	R 193	ERD25FJ103	[For Australia.]		[For PX.		
R 33	ERD25FJ561	R 194	ERD25FJ102	[NFJ] Δ	ERD25FJ3R9	For Asia, Latin America,		
R 34	ERD25TJ223	R 195	ERD25FJ332	[For PX.		Middle East and Africa		
R 35, 36	ERD25FJ102	R 196, 197	ERD25TJ563	areas.]		R 429	ERD25FJ471	
R 37, 38	ERD25TJ123	R 198	ERD25TJ104			R 431	ERD25FJ470	
R 39, 40	ERD25FJ820	R 199	ERD25TJ563			R 432, 433, 434, 435		
		R 200	ERD25FJ222			R 436	ERD25FJ222	
		R 201	ERD25TJ273			R 437, 438, 439		
R 41, 42	ERD25FJ272	R 202	ERD25TJ563	R 320	Δ	ERX2ANJ8R2		
R 43, 44	ERD25FJ472	R 203 [A]	ERD25FJ151	R 321	Δ	ERD25FJ102		
R 45, 46	ERD25FJ101	[For Australia.]		R 322	Δ	ERD25FJ103		
R 47, 48	ERD25FJ512	[N]	ERD25FJ331	R 323	Δ	ERD25FJ472		
R 49, 50	ERD25FJ103	[For Asia, Latin America,		R 324	Δ	ERD25TJ104		
R 51, 52	ERD25FJ102	Middle East and Africa		R 325	Δ	ERD25TJ473		
R 53, 54	ERD25TJ224	areas.]		R 326	Δ	ERD25TJ223		
R 55, 56	ERD25TJ683			R 327	Δ	ERD25FJ272		
R 57, 58	ERD25FJ512			R 328	Δ	ERD25TJ104		
R 59, 60	ERD25FJ222			R 329	Δ	ERD25FJ472		
				R 330	Δ	ERD25TJ104		
R 61, 62	ERD25TJ823			R 331	Δ	ERD25TJ683		
R 63	ERD25FJ103			R 332, 333	Δ	ERD25TJ104		
R 65, 66	ERD25FJ472			R 334	Δ	ERD25FJ682		
R 67, 68	ERD25TJ123			R 335, 336	Δ	ERD25FJ103		
R 69, 70	ERD25TJ473			R 337	Δ	ERD25TJ563		
R 71, 72	ERD25TJ753			R 338	Δ	ERD25FJ682		
R 73, 74	ERD25TJ334			R 339, 340	Δ			
R 75, 76, 77, 78								
				R 209	Δ	ERD25FJ103		
				R 211	Δ	ERD25FJ182		
				R 212	Δ	ERD25FJ225		
				R 213	Δ	ERD25TJ684		
				R 214	Δ	ERD25FJ332		
				R 215	Δ	ERD25TJ104		
				R 216	Δ	ERD25TJ154		
				R 217, 218, 219	Δ			
				R 220	Δ	ERD25FJ103		
				R 221	Δ	ERD25TJ333		
				R 222	Δ	ERD25FJ471		
				R 223	Δ	ERD25FJ561		
				R 224	Δ	ERD25FJ681		
				R 225	Δ	ERD25FJ122		
				R 227, 228	Δ	ERD25FJ221		
				R 233, 234	Δ	ERD25FJ225		
				R 235	Δ	ERD25FJ151		
				R 237, 238, 239	Δ			
				R 240 [A]	Δ	ERD25FJ181		
				[For Australia.]				
				R 241	Δ	ERD25FJ561		
				R 242	Δ	ERD25TJ684		
				R 243	Δ	ERD25FJ103		
				R 244	Δ	ERD25TJ333		
				R 245, 246	Δ	ERD25TJ394		
				R 247	Δ	ERD25FJ472		
				R 248	Δ	ERD25FJ103		
				R 301	Δ	ERD25FJ1R0		
				R 302	Δ	ERD25FJ100		
				R 303, 304	Δ	ERD25FJ562		
				R 305, 306	Δ	ERD25FJ100		
				R 307	Δ	ERD25FJ222		

VARIABLE RESISTOR

- VR 1, 2 QVBP1PUA54
- VR 3 QVAV5KUG15
- VR 4 EVNM4AA00B
- VR 5, 6 EVNM4AA00B
- VR 7, 8 QVBF1PUA14
- VR 9, 10 EVNM4AA00B
- VR 301, 302 EVNM4AA00B
- VR 401 EVNM4AA00B
- VR 402 EVNM4AA00B

CAPACITORS

- C 5, 6 ECEA50Z1
- C 7, 8 ECFDD223KX
- C 9, 10 ECKD2H121K
- C 11, 12 ECKD1H561K
- C 13, 14 ECKD1H471K
- C 15, 16 ECEA1AS101
- C 17, 18 ECKD1H392J
- C 19, 20 ECCD1H470K
- C 21, 22 ECEA50Z1
- C 23, 24 ECQV05224J2
- C 25, 26 ECEA254R7

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:
[N].....For Asia, Latin America, Middle East and Africa areas.
[A].....For Australia.
[F].....For Asian PX.
[J].....For European PX.

ELECTRICAL PARTS LIST

REPLACEMENT PARTS LIST

Important safety notice
Components identified by Δ mark have special characteristics important for safety.

NOTES: RESISTORS

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

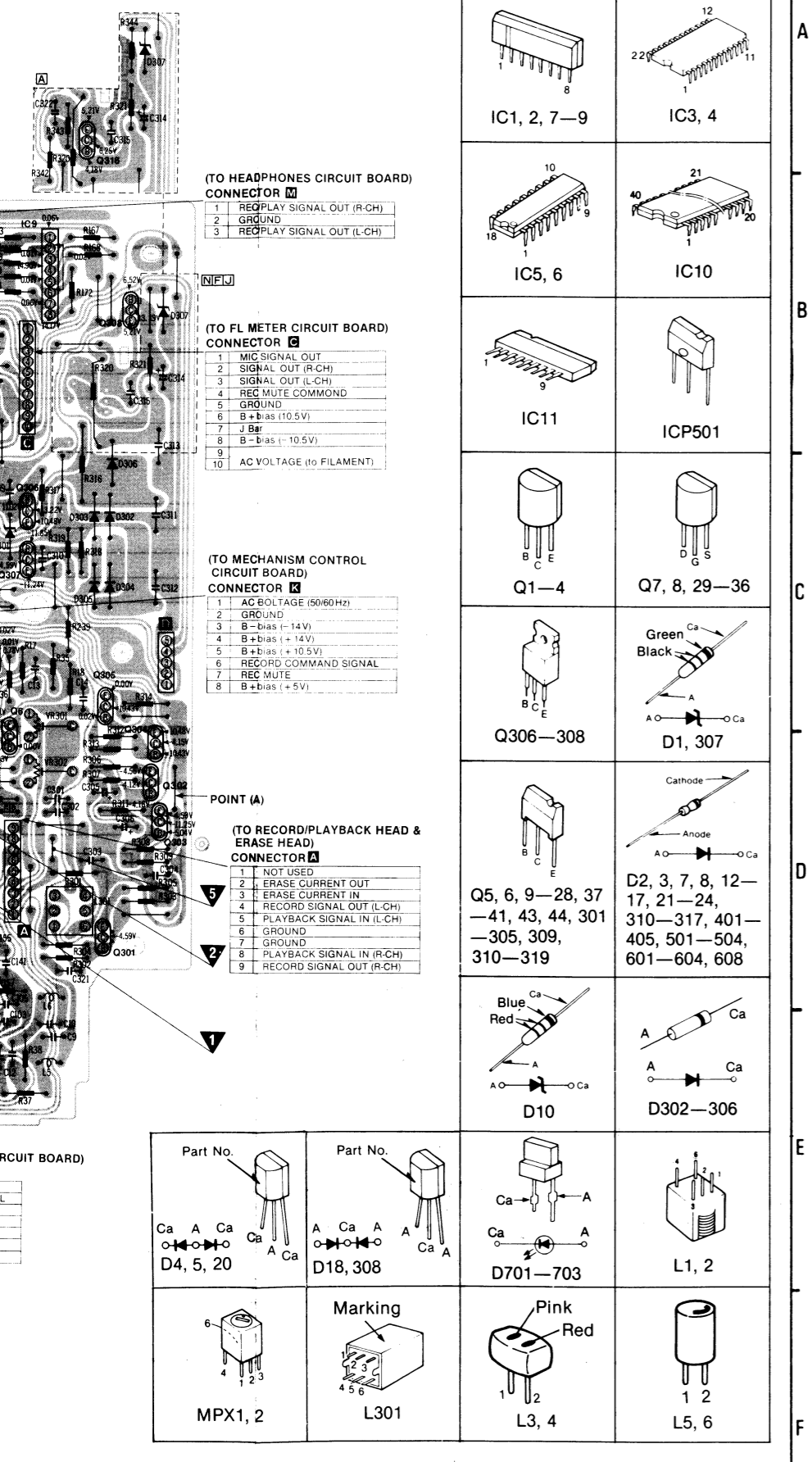
CAPACITORS

- ECBA.....Ceramic
ECG.....Ceramic
ECK.....Ceramic
ECC.....Ceramic
ECF.....Ceramic
ECQM.....Polyester film
ECQE.....Polyester film
ECQF.....Polypropylene

- ECED.....Electrolytic
ECEEN.....Non polar electrolytic
ECQS.....Polystyrene
ECOS.....Tantalum
QCS.....Tantalum

Main parts list table with columns for Ref. No., Part No., and descriptions for various components like resistors, capacitors, diodes, and transistors.

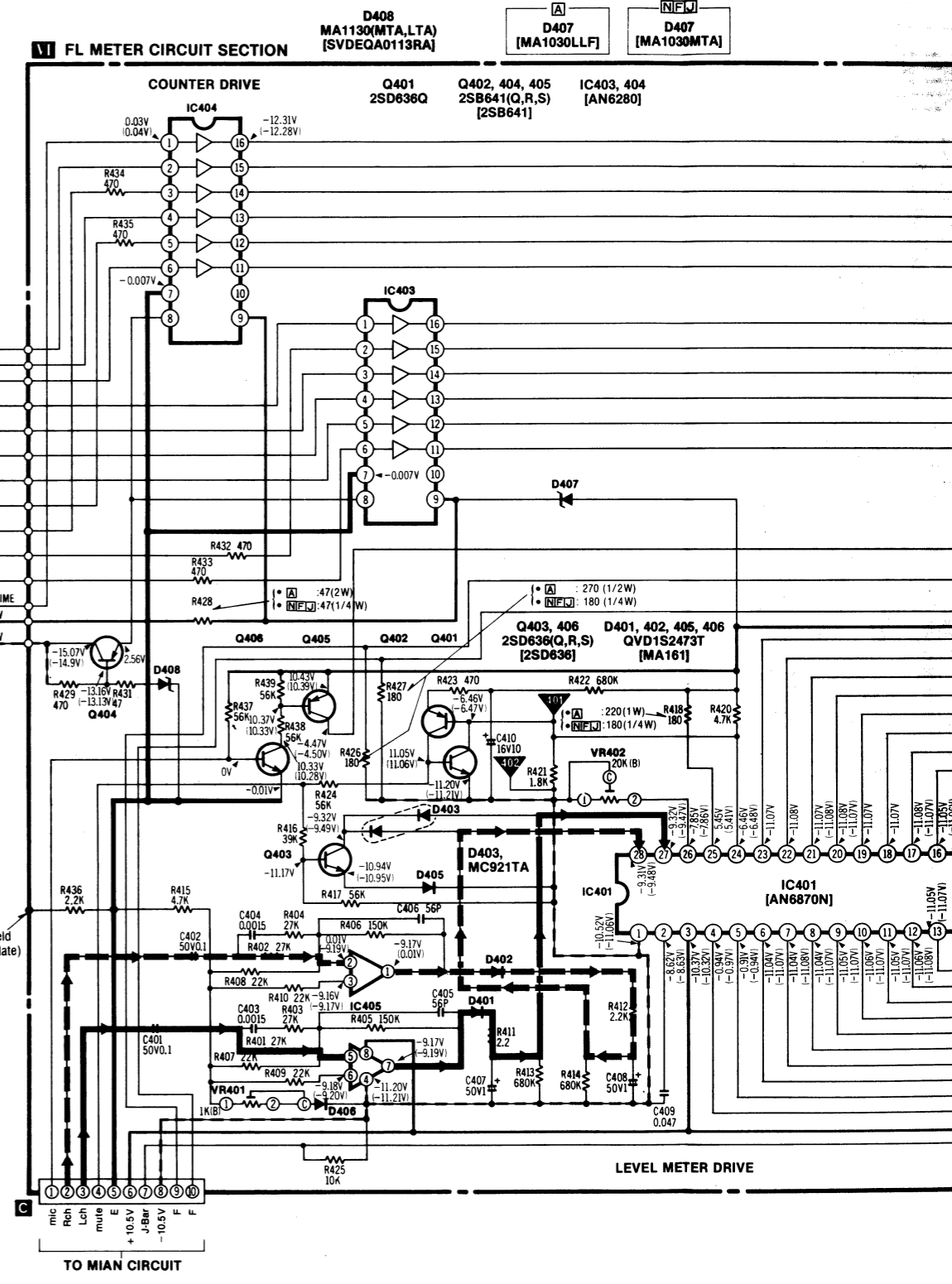
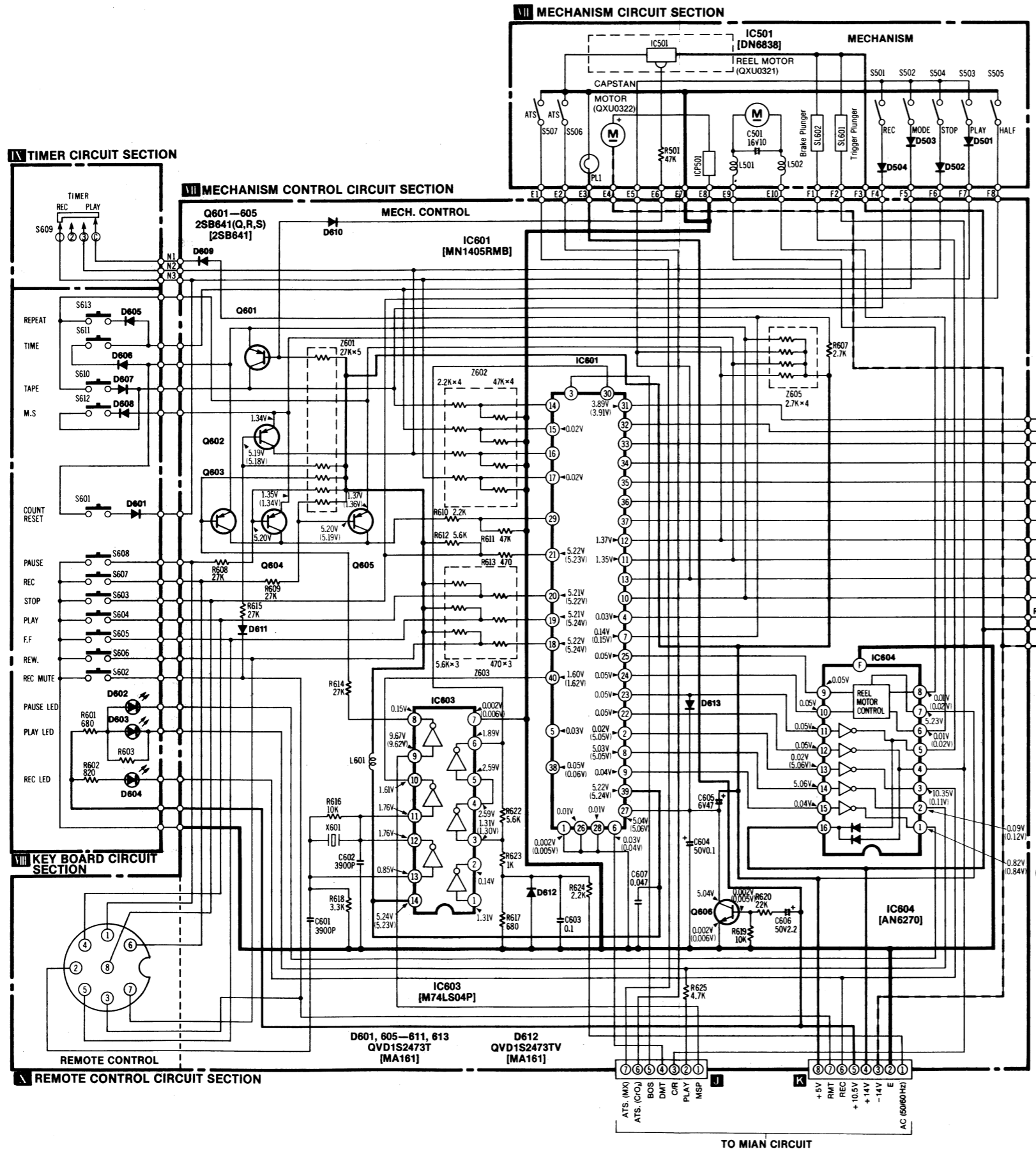
Table listing Multiplex Filters, Resonators, Coils, Transformers, Diodes & Rectifiers, Fuses, Switches, Combination Parts, Transistors, Variable Resistors, Jacks, Connectors, and I.C. Protector.



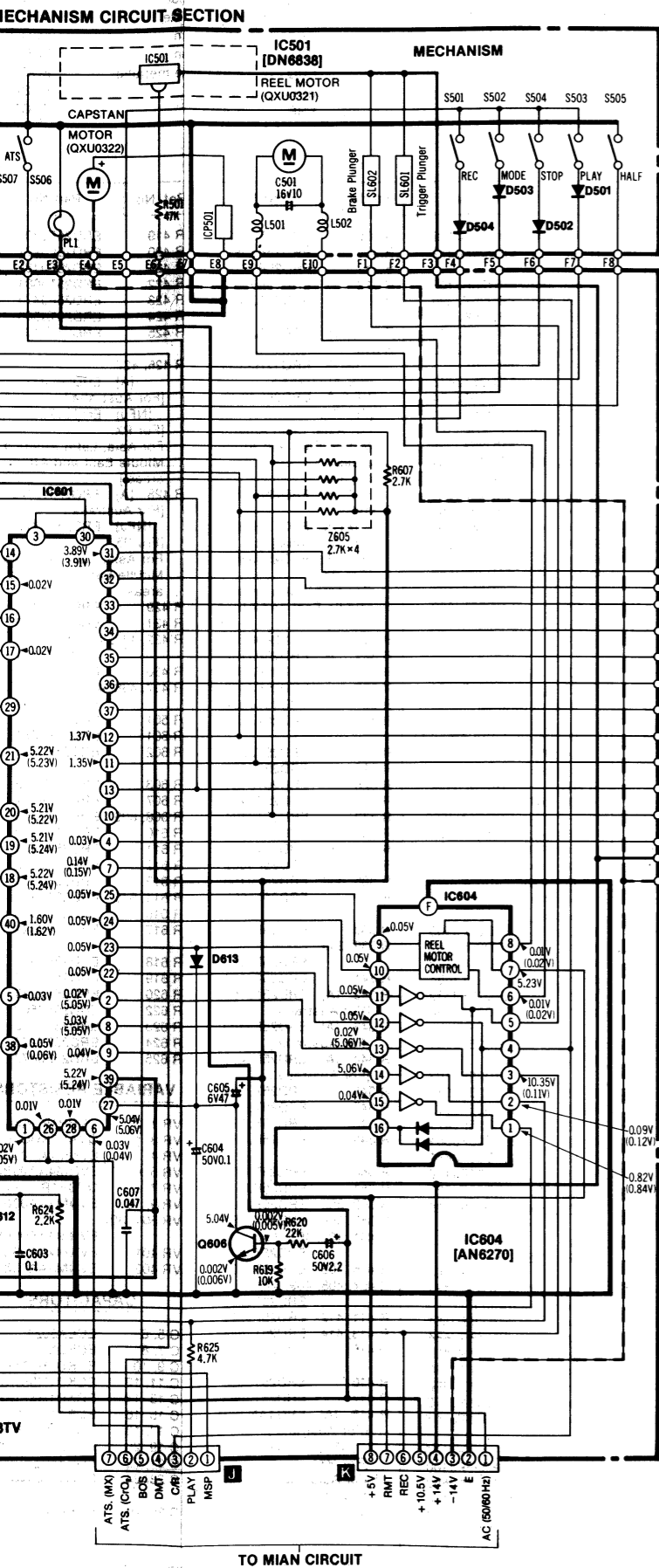
SCHEMATIC DIAGRAM

• FL METER/MECHANISM CONTROL/KEY BOARD SECTION

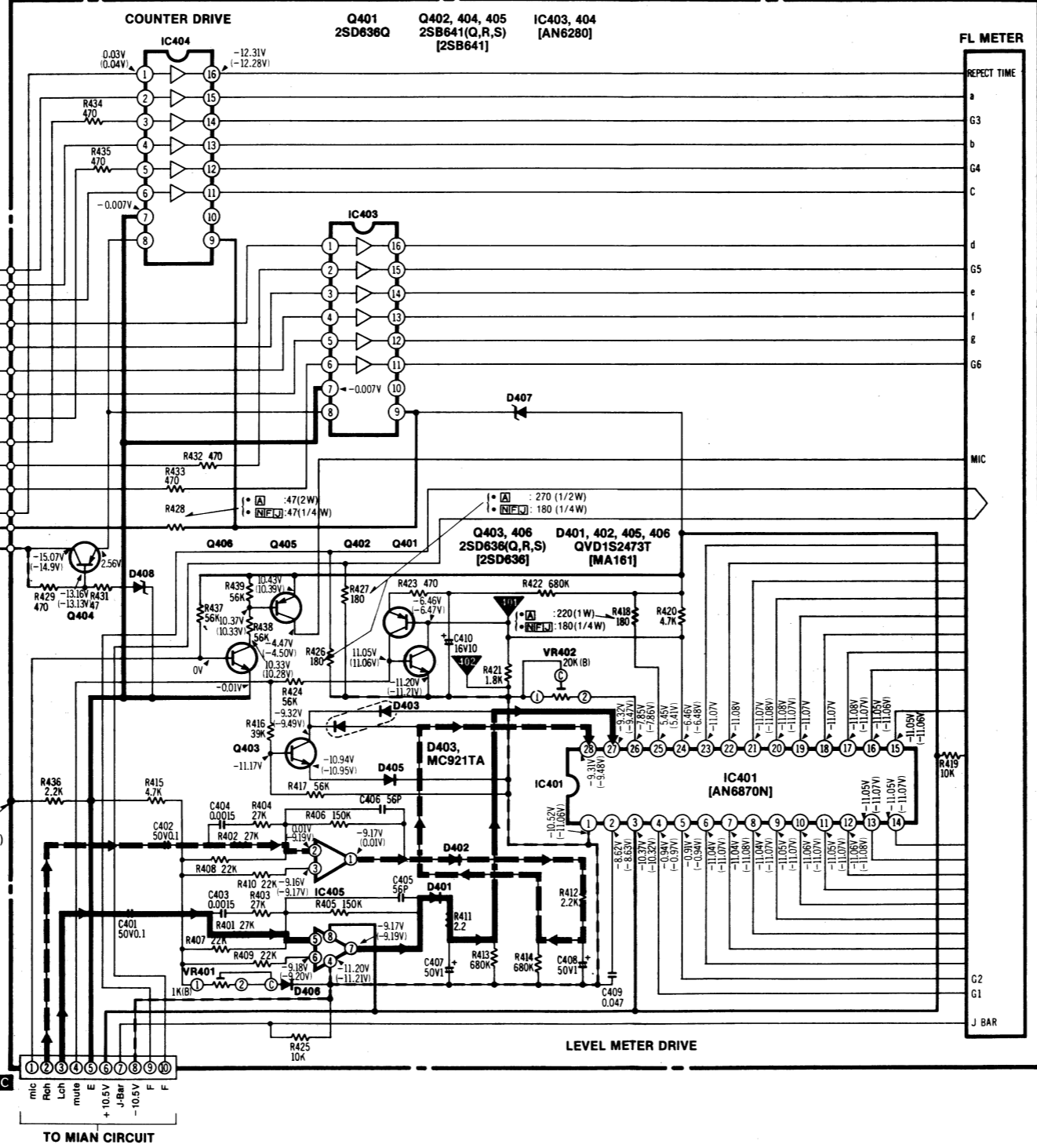
NOTES:
N..... For Asia Middle East areas.
A..... For Australia
F..... For Asia
J..... For Europe



MECHANISM CIRCUIT SECTION



FL METER CIRCUIT SECTION



NOTES:

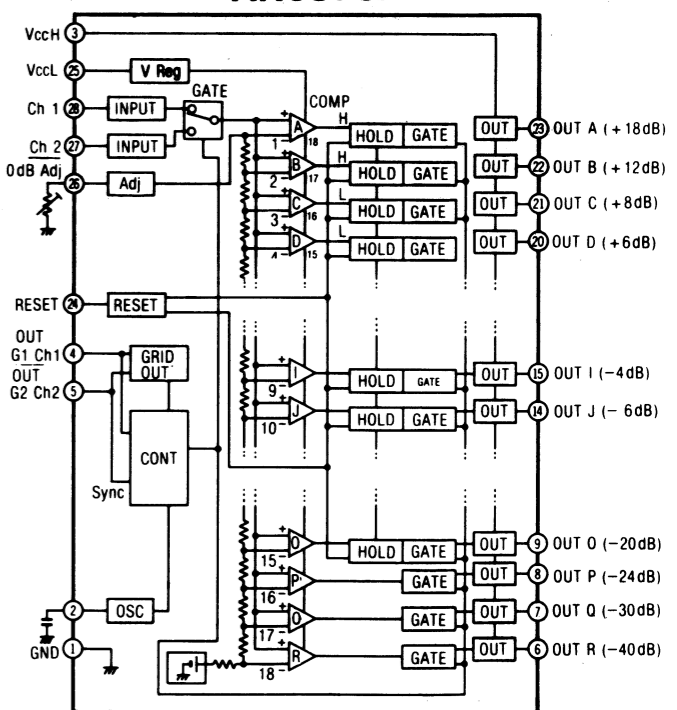
- N**..... For Asia, Latin America, Middle East and Africa areas.
- A**..... For Australia.
- F**..... For Asian PX.
- J**..... For European PX.

NOTES:

- 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..... Counter reset switch (shown in OFF position).
- 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).
- S609..... Timer switch (shown in 1 position). (1...T. REC, 2...OFF, 3...T. PLAY).
- S610..... Tape counter switch (shown in OFF position).
- S611..... Time counter switch (shown in OFF position).
- S612..... Music select switch (shown in OFF position).
- S613..... Music repeat switch (shown in OFF position).
- VR401..... FL meter adjustment VR (0dB indication).
- VR402..... FL meter adjustment VR (-40dB indication).
- Resistance are in ohms (Ω), 1/4 watt unless specified otherwise. 1K = 1,000(Ω), 1M = 1,000(kΩ).
- Capacity are in micro-farads (μF) 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.
- No mark..... Voltage values at OUT (NR select switch) mode.
- ()..... Voltage values at record 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).
- Described in the schematic diagram are two types of numbers; the supply parts numbers and production parts numbers 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 1S2473T77 — Production parts number [MA161] — Supply parts number
- 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.

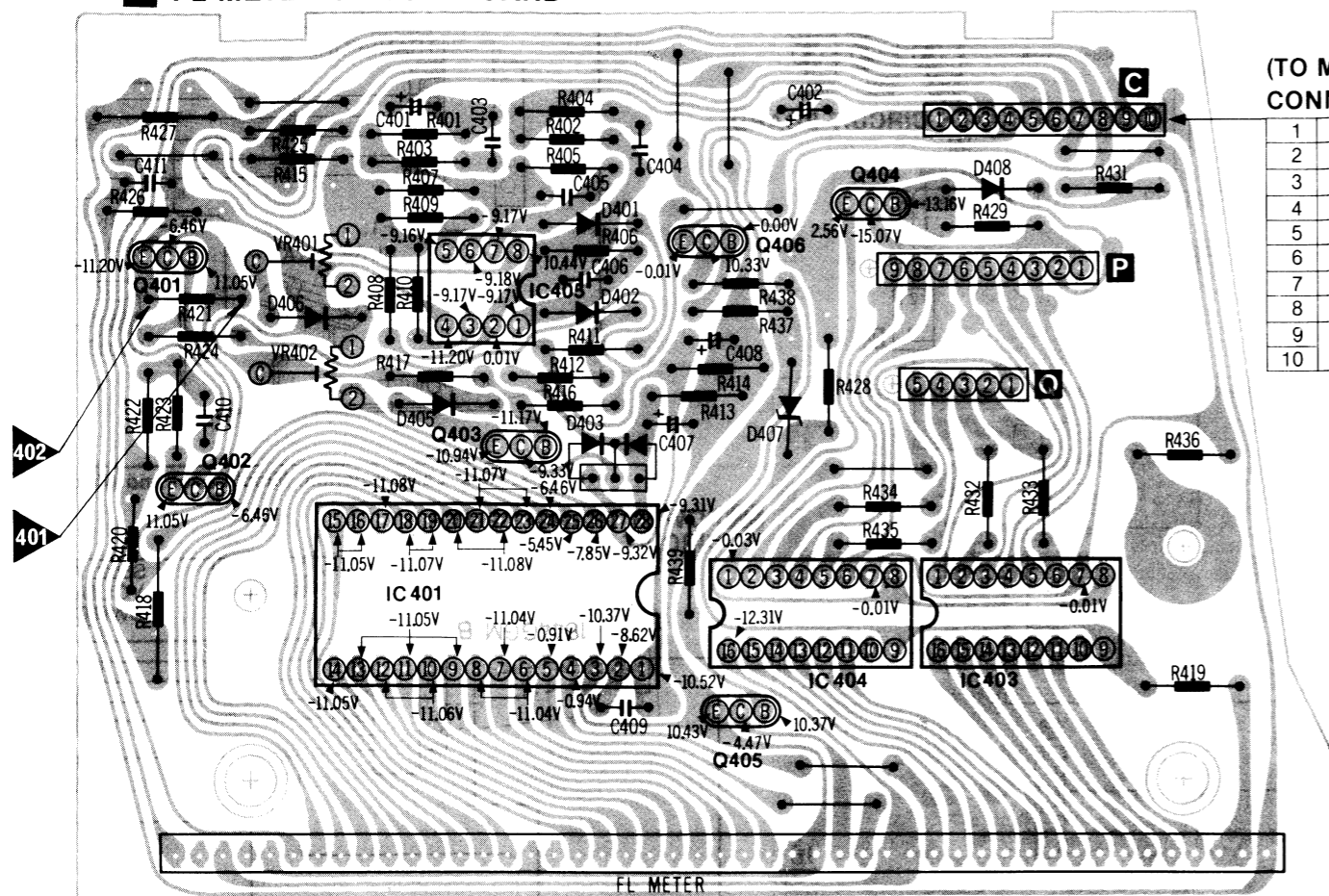
EQUIVALENT CIRCUIT AN6870N



CIRCUIT BOARD

• FL METER/MECHANISM CONTROL/KEY BOARD SECTION

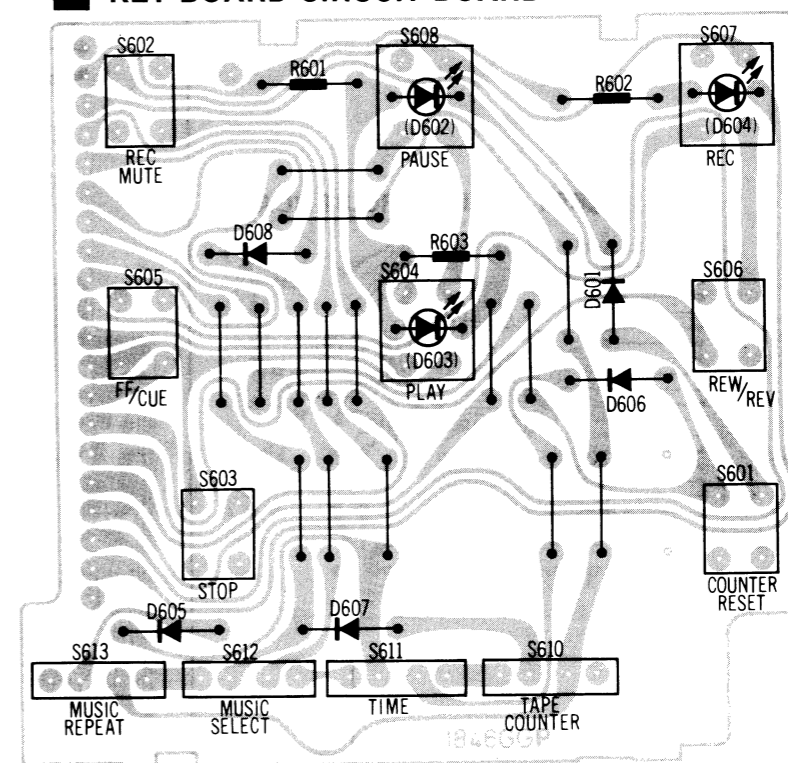
VI FL METER CIRCUIT BOARD



(TO MAIN CIRCUIT BOARD)
CONNECTOR C

1	MIC SIGNAL IN
2	SIGNAL IN (R-CH)
3	SIGNAL IN (L-CH)
4	REC MUTE COMMON
5	GROUND
6	B + bias (10.5V)
7	J Bar
8	B - bias (-10.5V)
9	
10	AC VOLTAGE (to FILAMENT)

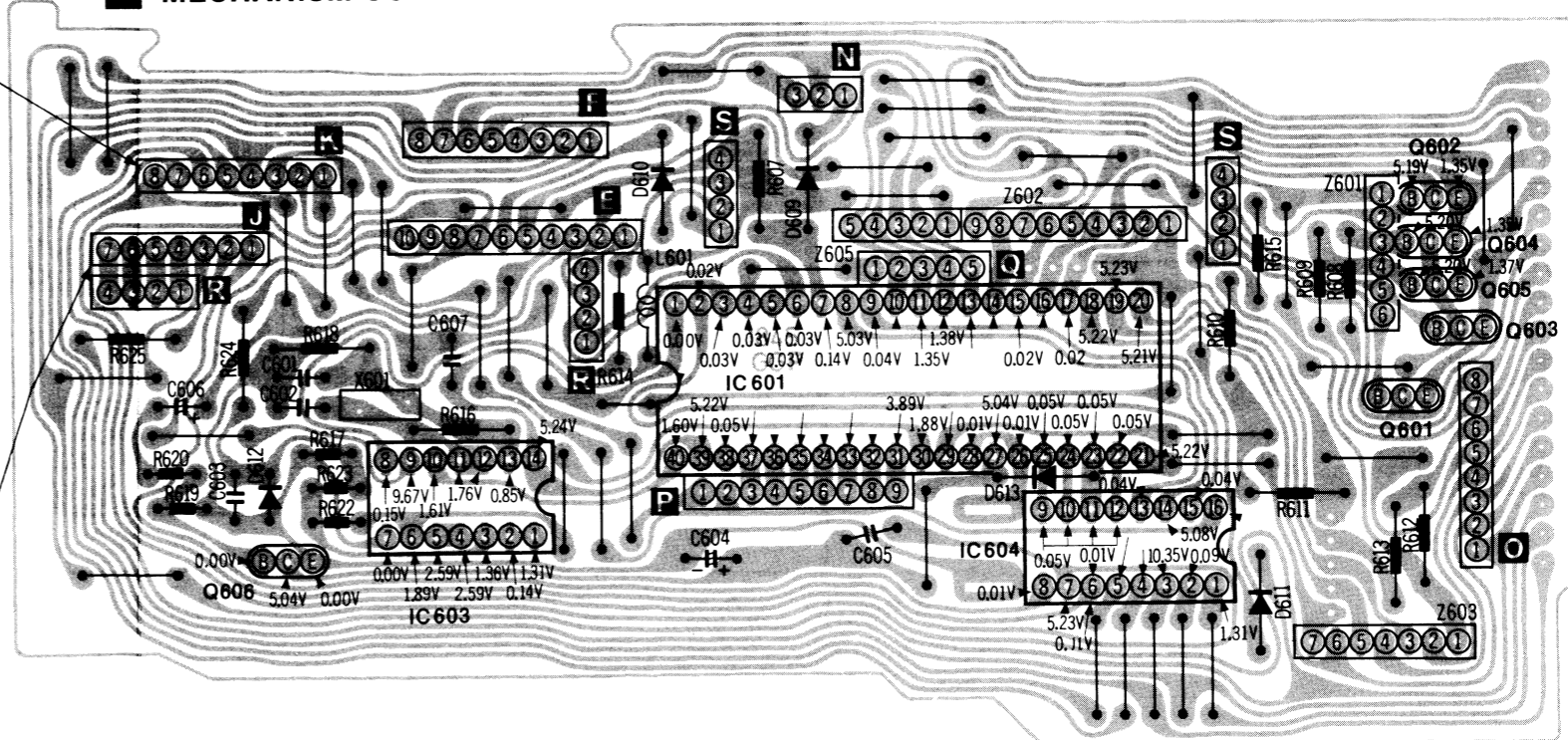
VII KEY BOARD CIRCUIT BOARD



(TO MECHANISM CONTROL
CIRCUIT BOARD)
CONNECTOR K

1	AC BOLTAGE (50/60 Hz)
2	GROUND
3	B - bias (-14V)
4	B + bias (+14V)
5	B + bias (+10.5V)
6	RECORD COMMAND SIGNAL
7	REC MUTE
8	B + bias (+5V)

VIII MECHANISM CONTROL CIRCUIT BOARD

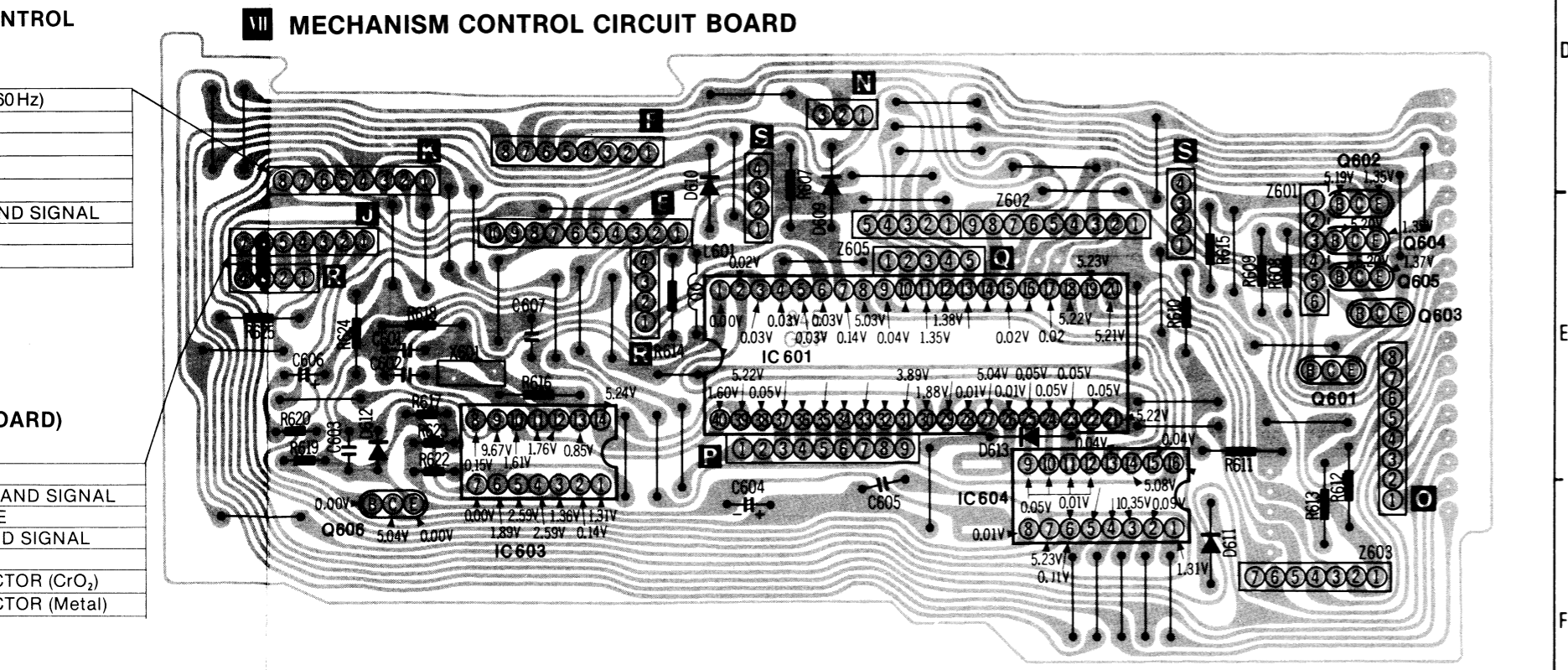
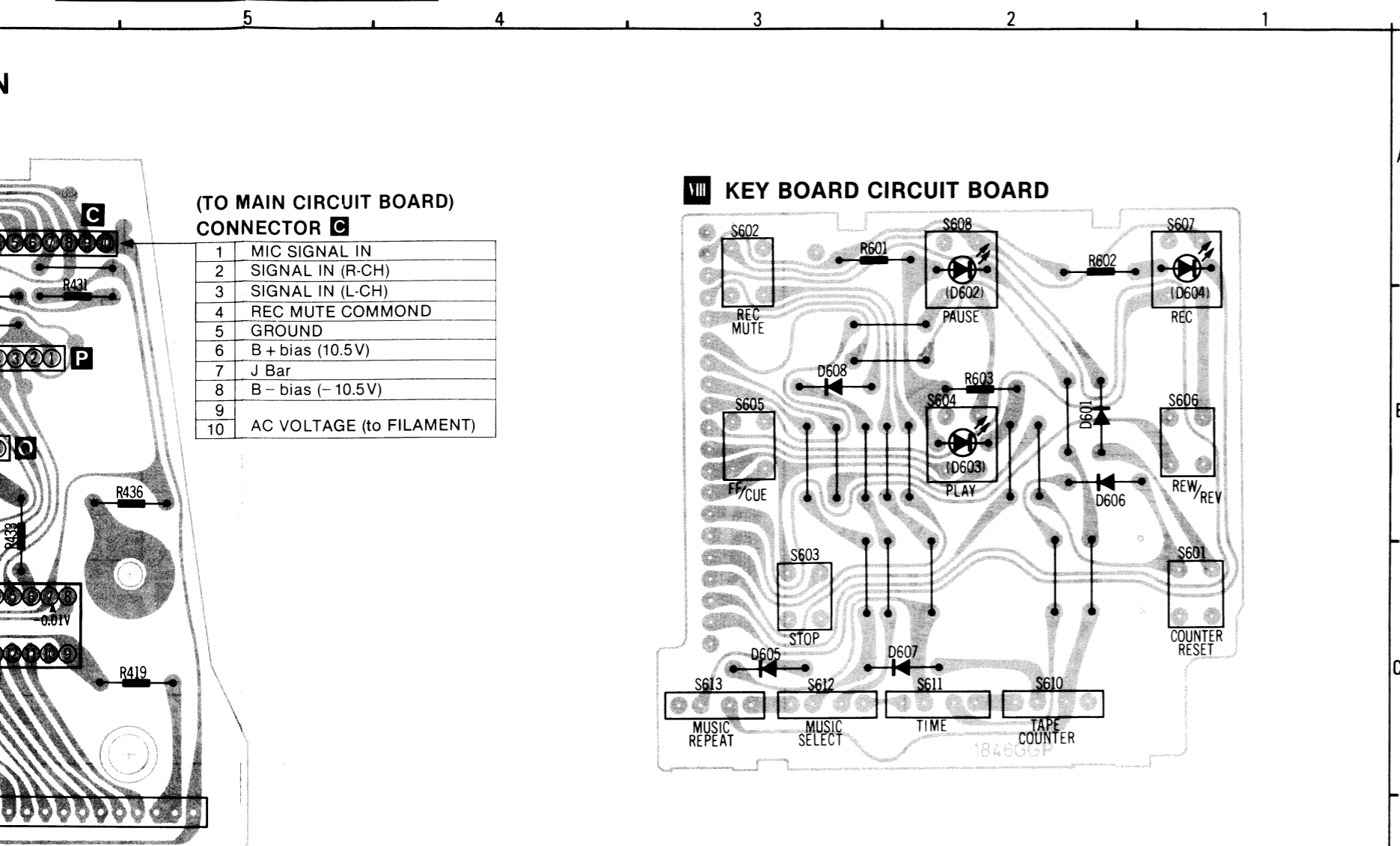


(TO MAIN CIRCUIT BOARD)
CONNECTOR J

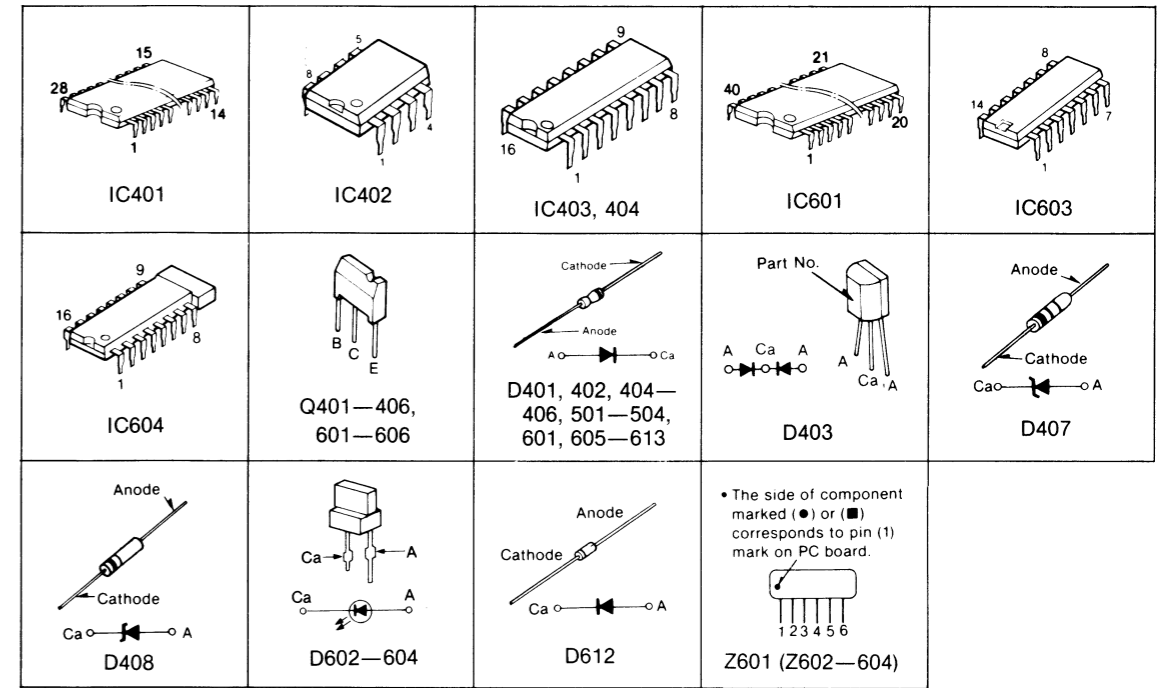
1	MUSIC SELECTOR
2	PLAYBACK COMMAND SIGNAL
3	CUE/REVIEW MUTE
4	MUTING COMMAND SIGNAL
5	BIAS OSCILLATOR
6	AUTO TAPE SELECTOR (CrO ₂)
7	AUTO TAPE SELECTOR (Metal)

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.

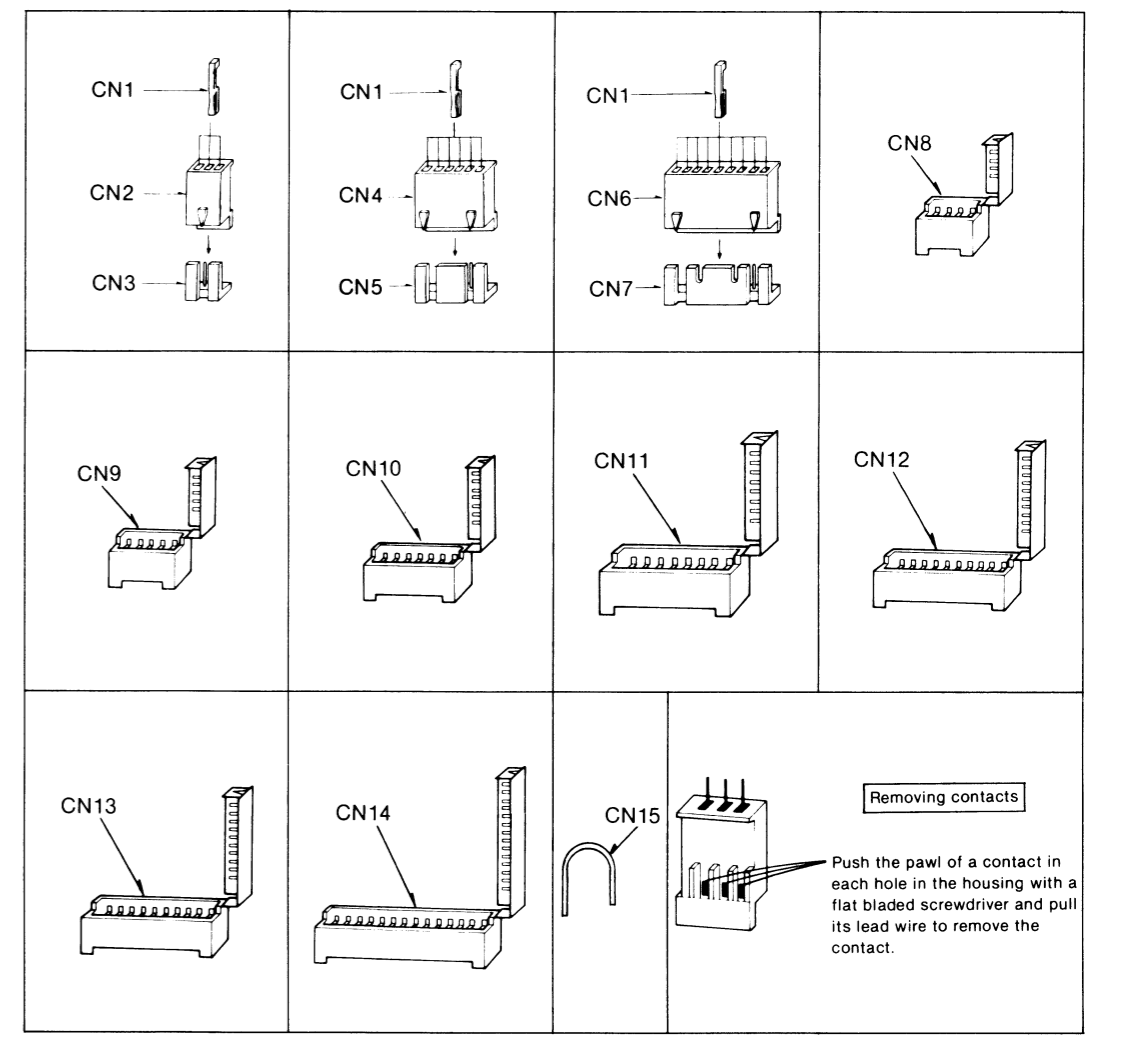
• This circuit board diagram may be modified at any time with the development of new technology.



TERMINATIONS



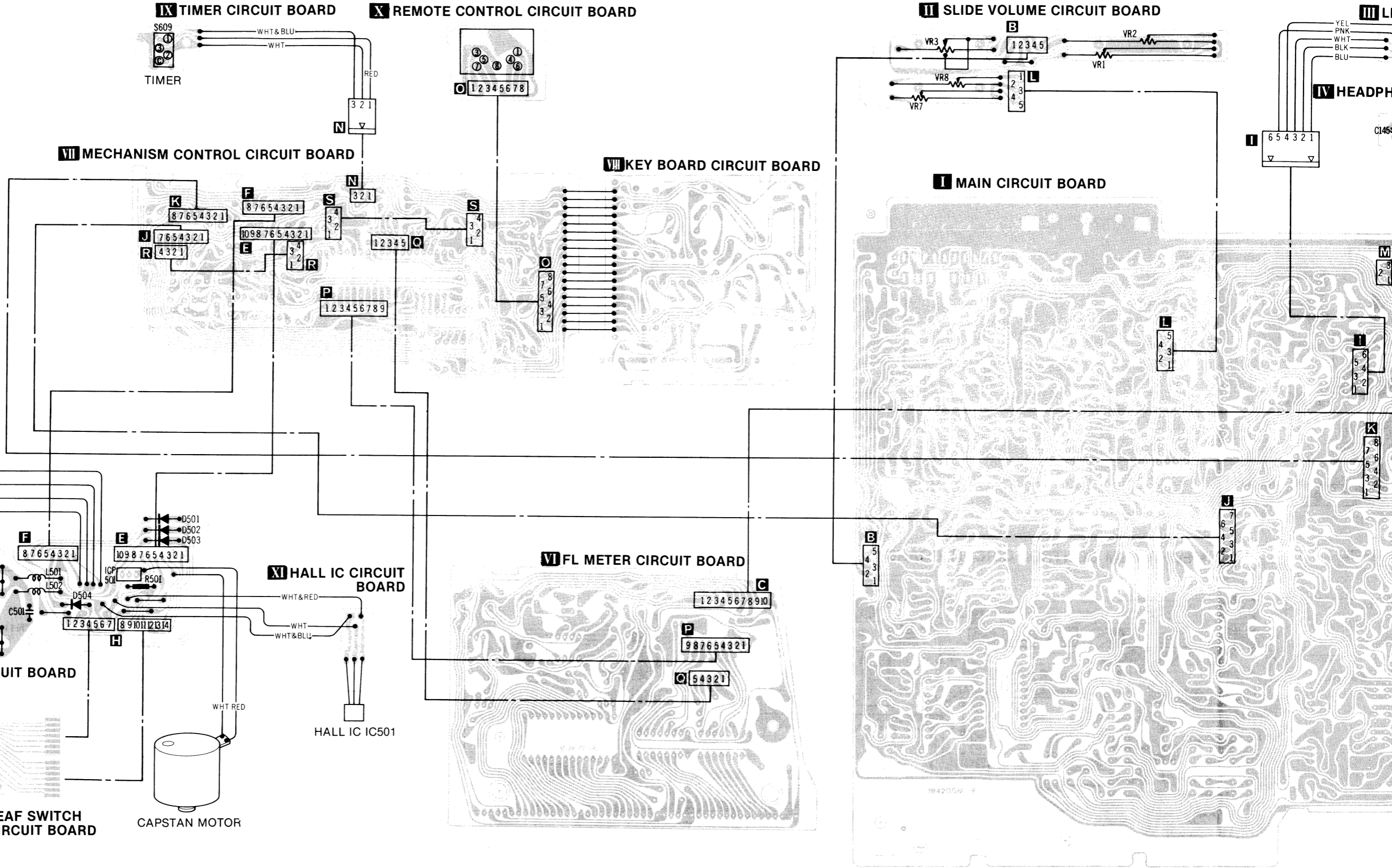
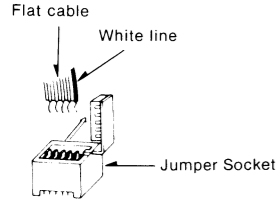
CONNECTORS



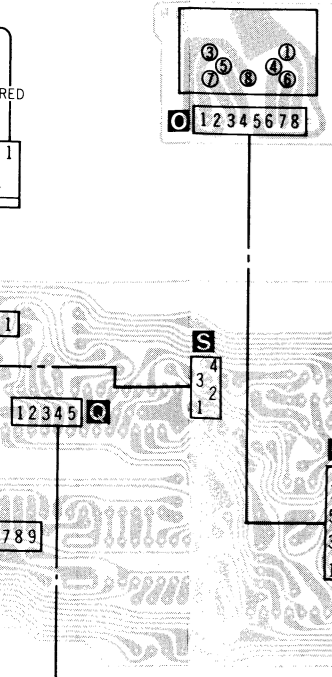
WIRING CONNECTION DIAGRAM

Connection of a flat cable

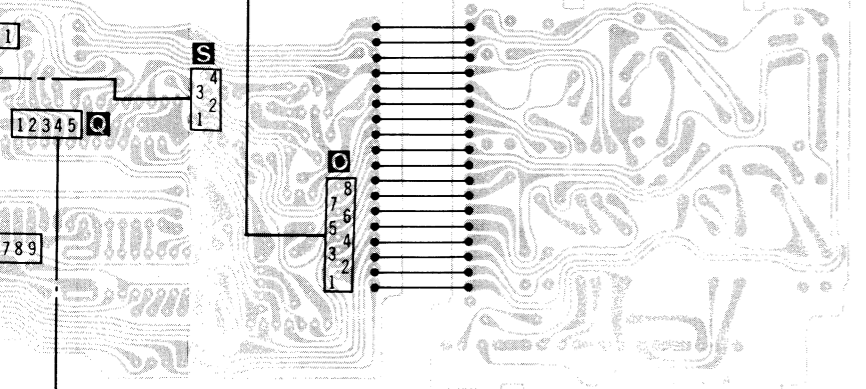
To connect a flat cable, direct the cable so that its white line faces the right side as shown below, then insert the cable into a jumper socket and close the lid of the jumper socket.



X REMOTE CONTROL CIRCUIT BOARD



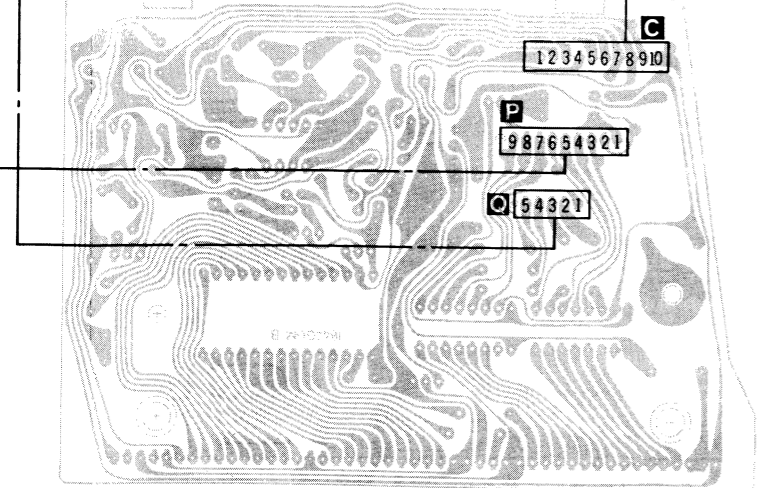
VII KEY BOARD CIRCUIT BOARD



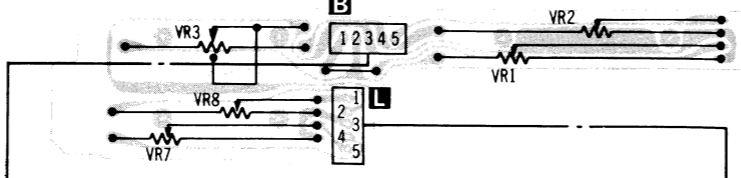
CIRCUIT BOARD



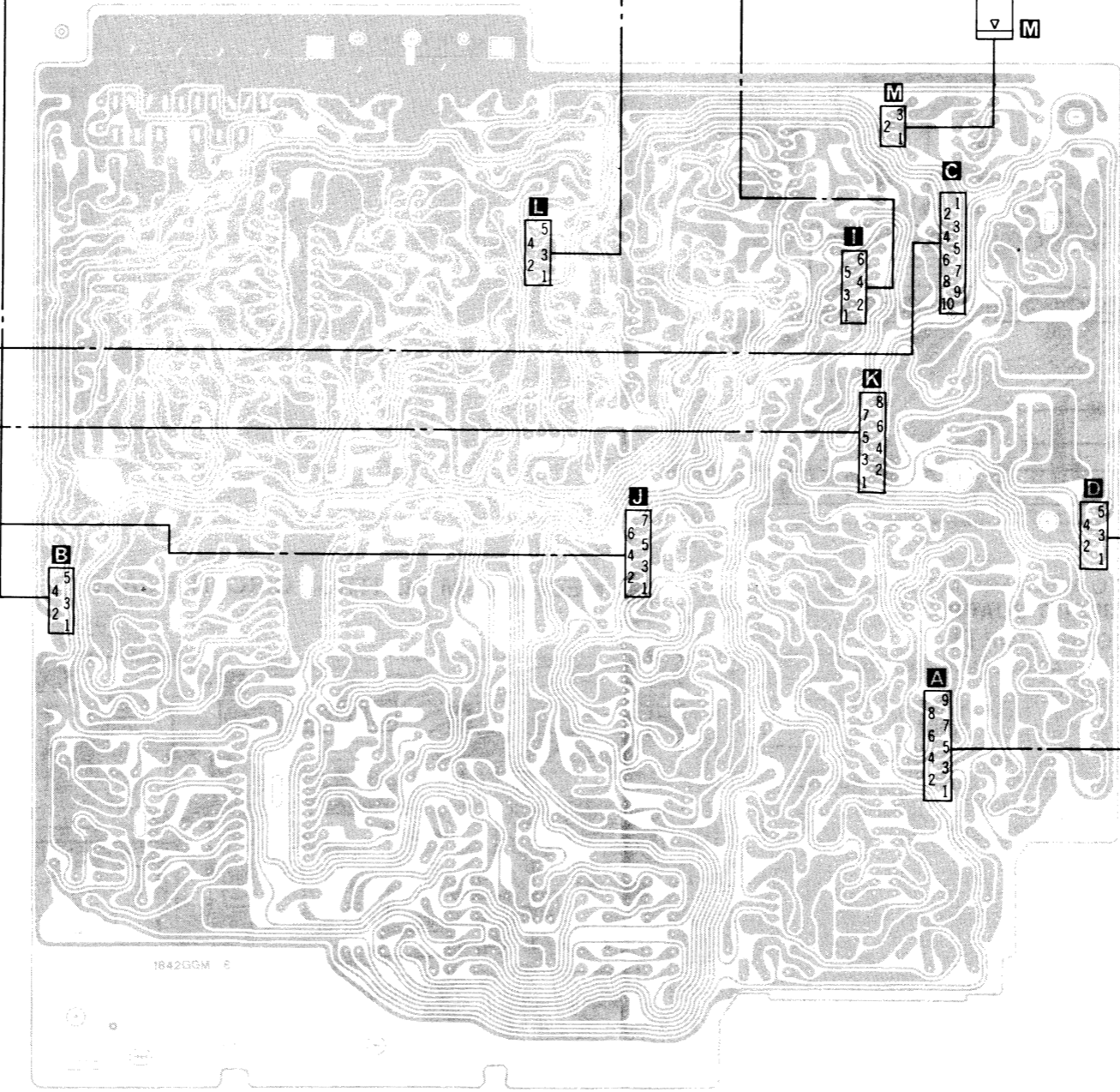
VI FL METER CIRCUIT BOARD



II SLIDE VOLUME CIRCUIT BOARD



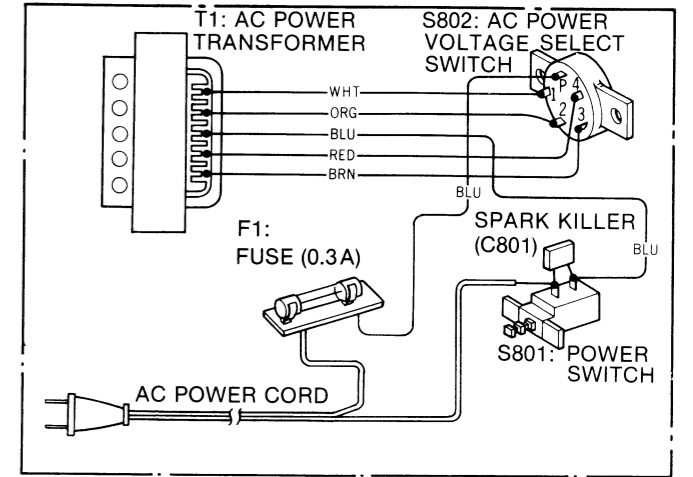
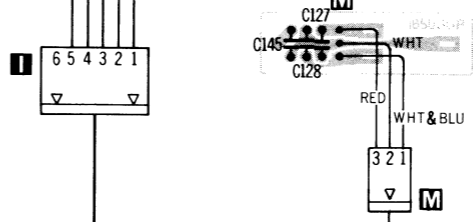
I MAIN CIRCUIT BOARD



III LED CIRCUIT BOARD

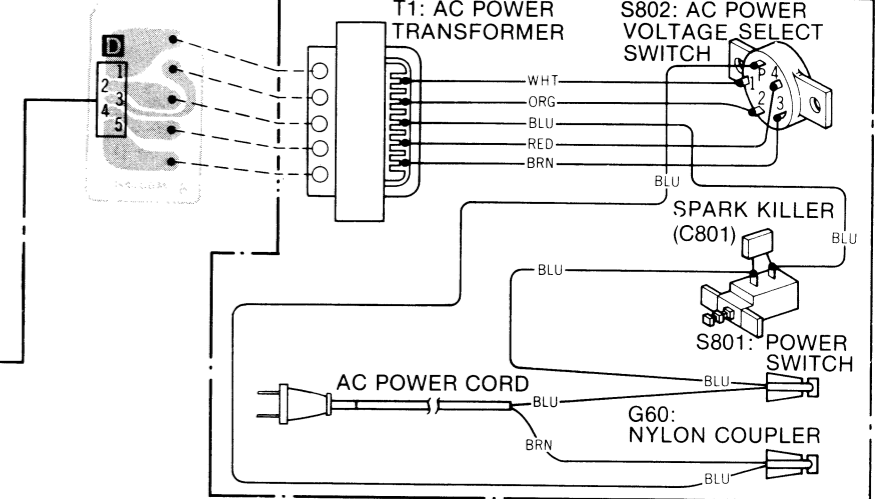


IV HEADPHONES CIRCUIT BOARD

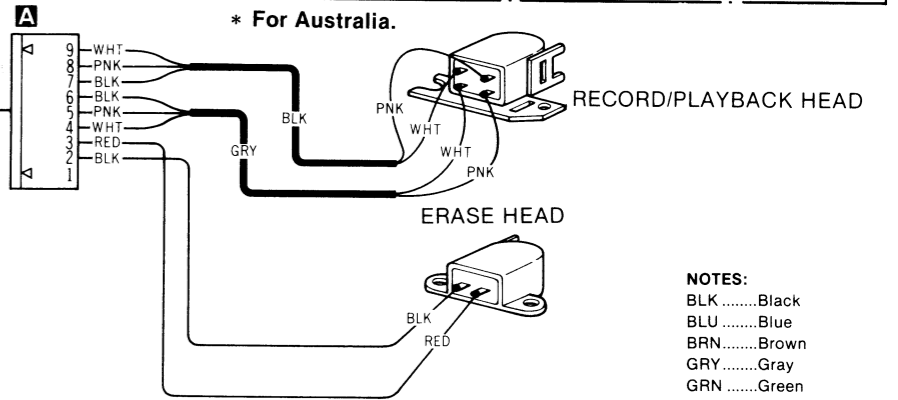


* For PX, Asia, Latin America, Middle East and Africa areas.

V POWER TRANSFORMER CIRCUIT BOARD

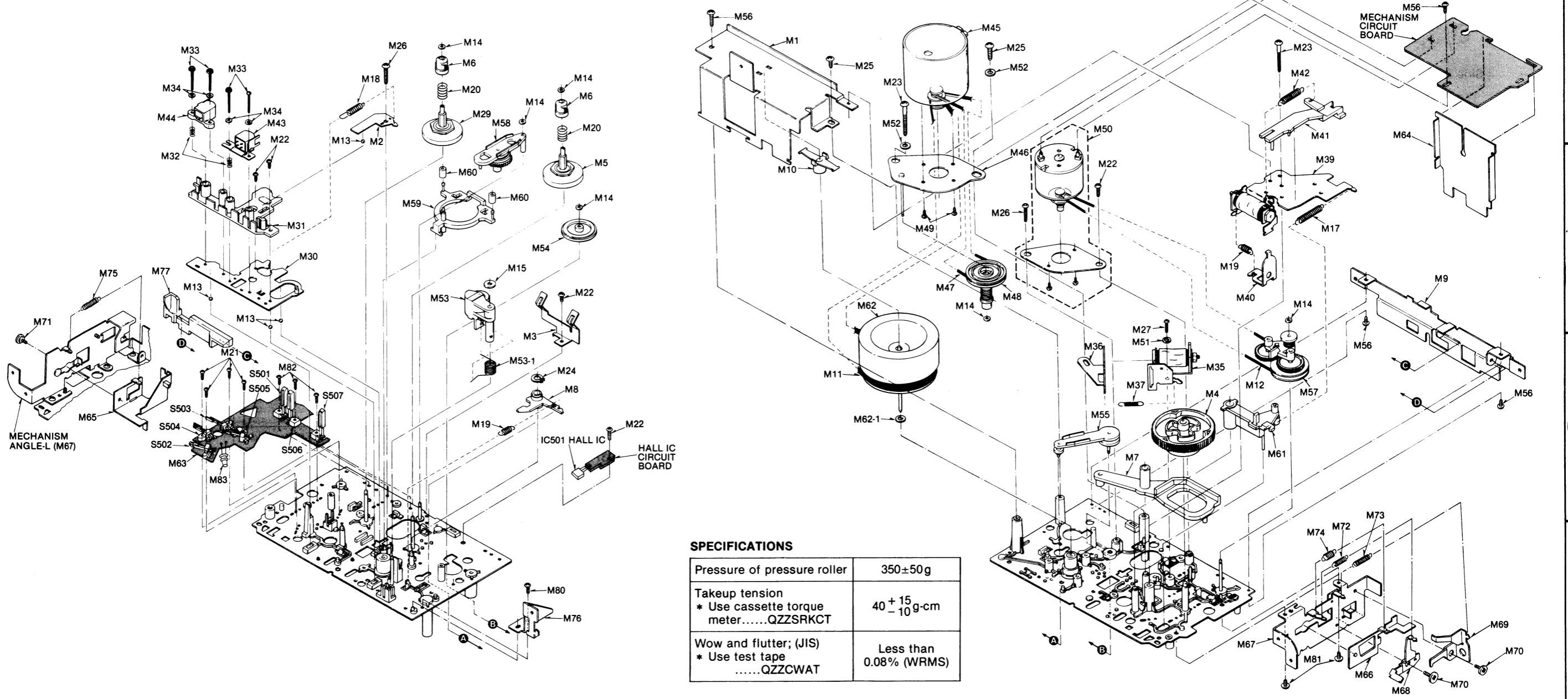


* For Australia.



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

MECHANICAL PARTS LOCATION



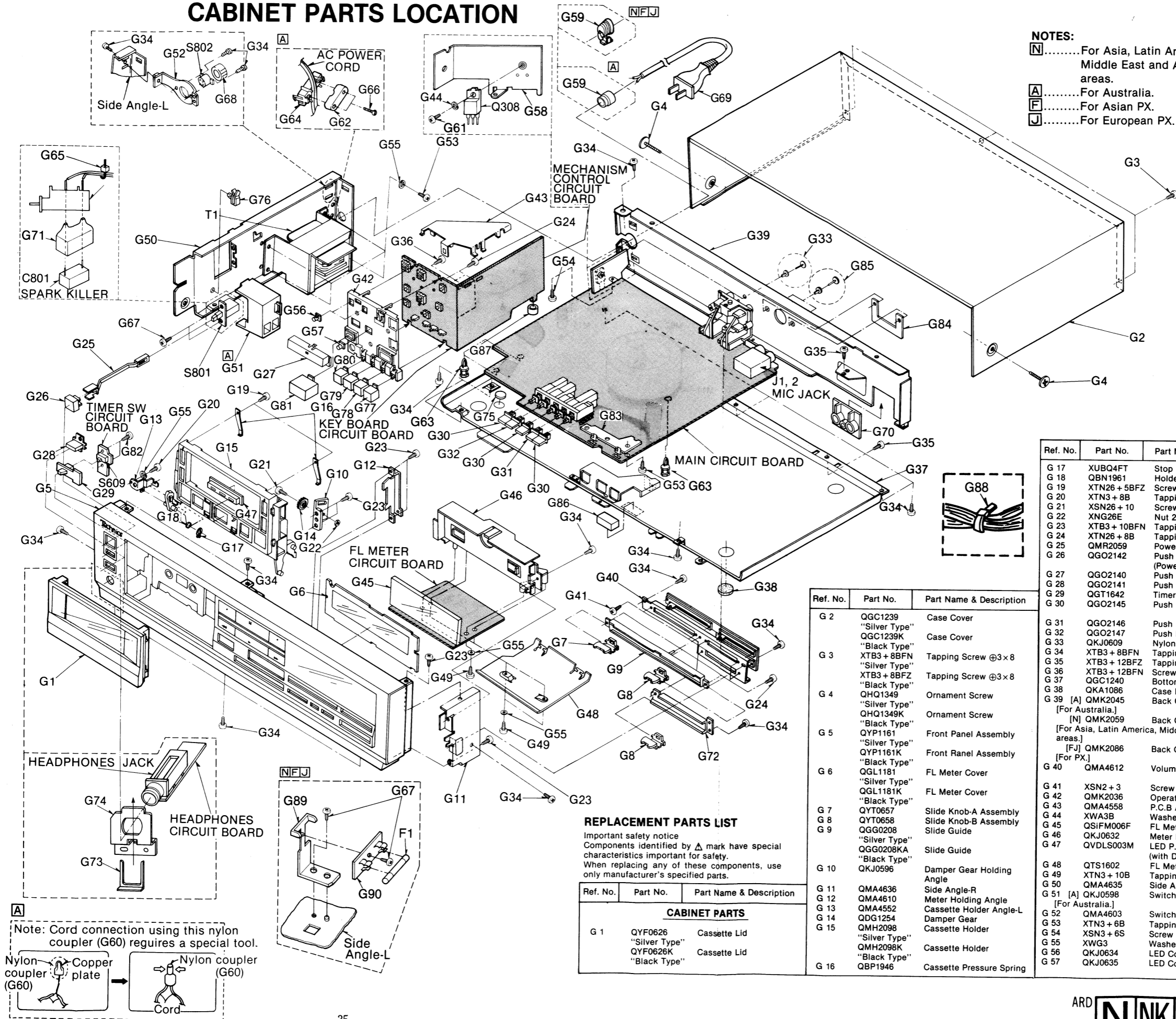
SPECIFICATIONS

Pressure of pressure roller	350±50g
Takeup tension * Use cassette torque meter.....QZZSRKCT	40 + 15 - 10 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
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 53-1	QBN1771	Pressure Roller Spring	M 68	QML3976	Eject Lever
M 4	QXG1059	Main Gear Assembly	M 20	QBC1373	Reel Table Spring	M 37	QBT1955	Plunger Spring	M 54	QXI0113	Takeup Idler Assembly	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 55	QXL1603	Idler Lever Assembly	M 70	QH1161	Step Screw
M 6	QMB1336	Reel Table Hub	M 22	XTN26+6B	Tapping Screw φ2.6×6	M 40	QML3651	Trigger Plunger Lever	M 56	XTN3+6B	Tapping Screw φ3×6	M 71	QH1168	Step Screw
M 7	QML3655	Cam Follower	M 23	XTN3+24B	Tapping Screw φ3×24	M 41	QML3653	Control Lever	M 57	QXL1408	Swing Gear Assembly	M 72	QBT2001	Eject Lever Spring
M 8	QML3660	Idler Select Lever	M 24	XUB4FT	Stop Ring 4φ	M 42	QBT1278	Record Lock Lever Spring	M 58	QXL1604	Fast Wind Gear Assembly	M 73	QBT1998	Lock Lever-A Spring
M 9	QMA4543	Mechanism Upper Angle	M 25	XTN3+10B	Tapping Screw φ3×10	M 43	QWY4137Z	Record/Playback Head	M 59	QML3659	Brake Lever	M 74	QBT1999	Lock Lever-B Spring
M 10	QMZ1293	Flywheel Thrust Retainer	M 26	XTN26+12B	Tapping Screw φ2.6×12	M 44	QWY2138Z	Erase Head	M 60	QBG1132	Brake Rubber	M 75	QBT2000	Lock Lever-C Spring
M 11	QDB0333	Flywheel Belt	M 27	XTN26+8B	Tapping Screw φ2.6×8	M 45	QXU0322	Capstan Motor Assembly	M 61	QXL1411	Lock Lever Assembly	M 76	QMA4554	Mechanism Angle-R
M 12	QDB0287	Changing Belt	M 28	QML1867	Head Base Plate	M 46	QXA1328	Motor Retainer Assembly	M 62	QXF0211	Flywheel Assembly	M 77	QML3972	Auto Tape Select Lever
M 13	QDK1012	Steel Ball 2.5φ	M 29	QDR1164	Supply Reel Table	M 47	QDB0332	Takeup Belt	M 62-1	QBW2099	Poly Washer	M 80	XTN26+8B	Tapping Screw φ2.6×8
M 14	QBW2008	Snap Washer	M 30	QMK1867	Head Base Plate	M 48	QXP0621	Takeup Pulley Assembly	M 63	QJI1776RR	Leaf Switch P.C.B.	M 81	XTN3+6B	Tapping Screw φ3×6
M 15	QBW2046	Snap Washer	M 31	QMZ1263	Spacer	M 49	XSN26+3	Screw φ2.6×3	M 64	QTW1315	Insulating Plate	M 82	XTN2+8B	Tapping Screw φ2×8
			M 32	QBC1103	Spring	M 50	QXU0321	Reel Motor Assembly	M 65	QXL1600	Lock Lever-C Assembly	M 83	XAMQ50S12	Pilot Lamp
			M 33	XSN2+16	Screw φ2×16	M 51	XWG26	Washer 2.6φ						

CABINET PARTS LOCATION



NOTES:
[N].....For Asia, Latin America, Middle East and Africa areas.
[A].....For Australia.
[F].....For Asian PX.
[J].....For European PX.

Ref. No.	Part No.	Part Name & Description
G 58	QTH1178	Heat Sink
G 59	[A] QBJ1425	Cord Bushing
	[For Australia.]	
	[NFJ] QTD1129	Cord Bushing
	[For PX.]	
	For Asia, Latin America, Middle East and Africa areas.]	
G 60	[A] Δ QJT1079	Nylon Coupler
	[For Australia.]	
G 61	XSN3 + 8S	Screw @3 x 8
G 62	[A] QTD1164	Cord Clamper-A
	[For Australia.]	
G 63	QKJ0608	Spacer (for P.C.B)
G 64	[A] QTD1322	Cord Clamper-B
	[For Australia.]	
G 65	QTD1315	Nylon Binder
G 66	[A] XTN3 + 24B	Tapping Screw @3 x 24
	[For Australia.]	
G 67	XTN3 + 6B	Tapping Screw @3 x 6
G 68	QTW0026	Switch Cover (for S802)
G 69	[A] Δ SJA23	AC Power Cord
	[For Australia.]	
	[NFJ] Δ RJA52YA-K	AC Power Cord
	[For PX.]	
	For Asia, Latin America, Middle East and Africa areas.]	
G 70	QGK3355	MIC Cover
G 71	QTW1195	Spark Killer Cover
G 72	QGG0219	Slide Guide
	"Silver Type"	
	QGG0219K	Slide Guide
	"Black Type"	
	QMA4624	
G 73	QMA4614	Headphones Holding Plate
G 74	QMA4614	Headphones Angle
G 75	QTW1336	Insulator Sheet
G 76	QKJ0648	Cord Clamper
G 77	QGO2211	Push Button (Repeat)
G 78	QGO2214	Push Button (Music Select)
		(Music Select)
G 79	QGO2213	Push Button (Time Counter)
		(Time Counter)
G 80	QGO2212	Push Button (Tape Counter)
		(Tape Counter)
G 81	QGO2210	Push Button (Counter Reset)
		(Counter Reset)
G 82	XTN26 + 6B	Tapping Screw @2.6 x 6
G 83	QMA4613	P.B Holding Angle (A)
G 84	QMA4645	Remote Control Angle
G 85	QKJ0661	Nylon Ribet
G 86	QBM1333	Rubber Cushion
G 87	QBM1332	Cap
G 88	QTD1316	Nylon Binder
G 89	[NFJ] QMA3418	Fuse Angle
	[For PX.]	
	For Asia, Latin America, Middle East and Africa areas.]	
G 90	[NFJ] Δ QTF1056	Fuse Holder
	[For PX.]	
	For Asia, Latin America, Middle East and Africa areas.]	
ACCESSORIES		
A 1	[NA] QQT3448	Instruction Book
	[For Australia, Asia, Latin America, Middle East and Africa areas.]	
	[FJ] QQT3521	Instruction Book
	[For PX.]	
A 2	QEB0125	Connection Cord
A 3	[N] Δ QJP0603S	AC Plug Adaptor
	[For Asia, Latin America, Middle East and Africa areas.]	
PACKINGS		
P 1	[A] QPN4438	Inside Carton
	[For Australia.]	
	[N] QPN4457	Inside Carton
	[For Asia, Latin America, Middle East and Africa areas.]	
	[FJ] QPN4456	Inside Carton
	[For PX.]	
P 2	QPA0701	Cushion-R
P 3	QPA0702	Cushion-L
P 4	QPS0434	Pad
P 5	QPA0712	Spacer
P 6	XZB40X60A02	Poly Sheet (for Unit)
P 7	QPC0072	Poly Sheet (for AC Power Cord)

Ref. No.	Part No.	Part Name & Description
G 17	XUBQ4FT	Stop Ring
G 18	QBN1961	Holder Spring
G 19	XTN26 + 5BZF	Screw @2.6 x 5
G 20	XTN3 + 8B	Tapping Screw @3 x 8
G 21	XSN26 + 10	Screw @2.6 x 10
G 22	XNG26E	Nut 2.6φ
G 23	XTB3 + 10BFN	Tapping Screw @3 x 10
G 24	XTN26 + 8B	Tapping Screw @2.6 x 8
G 25	QMR2059	Power Rod
G 26	QGO2142	Push Button (Power ON/OFF)
G 27	QGO2140	Push Button (STOP)
G 28	QGO2141	Push Button (for Eject)
G 29	QGT1642	Timer Switch Knob
G 30	QGO2145	Push Button-A
G 31	QGO2146	Push Button-B
G 32	QGO2147	Push Button-C
G 33	QKJ0609	Nylon Ribet
G 34	XTB3 + 8BFN	Tapping Screw @3 x 8
G 35	XTB3 + 12BFZ	Tapping Screw @3 x 12
G 36	XTB3 + 12BFZ	Screw @3 x 12
G 37	QGC1240	Bottom Cover
G 38	QKA1086	Case Foot
G 39	[A] QMK2045	Back Chassis
	[For Australia.]	
	[N] QMK2059	Back Chassis
	[For Asia, Latin America, Middle East and Africa areas.]	
G 5	QYP1161	Front Panel Assembly
	"Silver Type"	
	QYP1161K	Front Panel Assembly
	"Black Type"	
G 6	QGL1181	FL Meter Cover
	"Silver Type"	
	QGL1181K	FL Meter Cover
	"Black Type"	
G 7	QYT0657	Slide Knob-A Assembly
G 8	QYT0658	Slide Knob-B Assembly
G 9	QGG0208	Slide Guide
	"Silver Type"	
	QGG0208KA	Slide Guide
	"Black Type"	
G 10	QKJ0596	Damper Gear Holding Angle
G 11	QMA4636	Side Angle-R
G 12	QMA4610	Meter Holding Angle
G 13	QMA4552	Cassette Holder Angle-L
G 14	QDG1254	Damper Gear
G 15	QMH2098	Cassette Holder
	"Silver Type"	
	QMH2098K	Cassette Holder
	"Black Type"	
G 16	QBP1946	Cassette Pressure Spring

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
CABINET PARTS		
G 1	QYF0626	Cassette Lid
	"Silver Type"	
	QYF0626K	Cassette Lid
	"Black Type"	

