

Service Manual

dbx*/Dolby B-C NR, 3 Head
Cassette Deck

Cassette Deck
RS-B85

**



Color

(K)...Black Type



Color	Area
(K)	[M]U.S.A.
(K)	[MC]...Canada.
(K)	[E]All European areas except United Kingdom.
(K)	[EK]....United Kingdom.
(K)	[XA]....Asia, Latin America, Middle East and Africa areas.
(K)	[XL]....Australia.

RS-M250 MECHANISM SERIES

SPECIFICATIONS

Deck system: Stereo cassette deck
Track system: 4-track, 2-channel
Heads: REC/PLAY; AX head
Erasing; Double-gap ferrite head
Motor: 2 motor system
Recording system: AC bias
Bias frequency: 85 kHz
Erasing system: AC bias
Tape speed: 4.8cm/sec. (1-7/8 ips)
Frequency response:
Metal; 20 Hz~22,000 Hz
20 Hz~21,000 Hz (DIN)
30 Hz~20,000 Hz±3 dB
CrO₂; 20 Hz~21,000 Hz
20 Hz~20,000 Hz (DIN)
30 Hz~19,000 Hz±3 dB
Normal; 20 Hz~20,000 Hz
20 Hz~19,000 Hz (DIN)
30 Hz~18,000 Hz±3 dB
Dynamic range
(with dbx in): 110 dB (1 kHz)
S/N (Signal level=max. recording level, CrO₂ type tape)
dbx in; 92 dB (A weighted)
Dolby C NR in; 78 dB (CCIR)
Dolby B NR in; 70 dB (CCIR)
NR out; 60 dB (A weighted)

Wow and flutter: 0.04% (WRMS)
±0.14% (DIN)

Max. input level improvement
(with dbx in): 10 dB (1 kHz)

Fast forward and
rewind time: Approx. 90 seconds
with C-60 cassette tape

Input sensitivity and impedance:
LINE; 60 mV/47 kΩ

Output voltage and impedance:
LINE; 400 mV/1.5 kΩ
HEADPHONES; 125 mV/8Ω

Power consumption: 24 W

Power supply: [M][MC]AC; 120V, 50Hz/60Hz
[E]AC; 220V, 50Hz/60Hz
[EK][XA][XL]AC; 110V/127V/220V/240V,
50Hz/60Hz
Preset power voltage 240 V

Dimensions
(W×H×D): 430×98.5×279mm
(16-7/8"×3-7/8"×10-7/8")

Weight: 5.2kg (11 lbs 3 oz)

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

Matsushita Engineering and
Service Company
50 Meadowland Parkway,
Secaucus, New Jersey 07094

Panasonic Sales Company,
Division of Matsushita Electric
of Puerto Rico, Inc.
Ave. 65 De Infanteria, KM 9.7
Victoria Industrial Park
Carolina, Puerto Rico 00630

Panasonic Hawaii Inc.
91-238 Kauhii St. Ewa Beach
P.O. Box 774
Honolulu, Hawaii 96808-0774

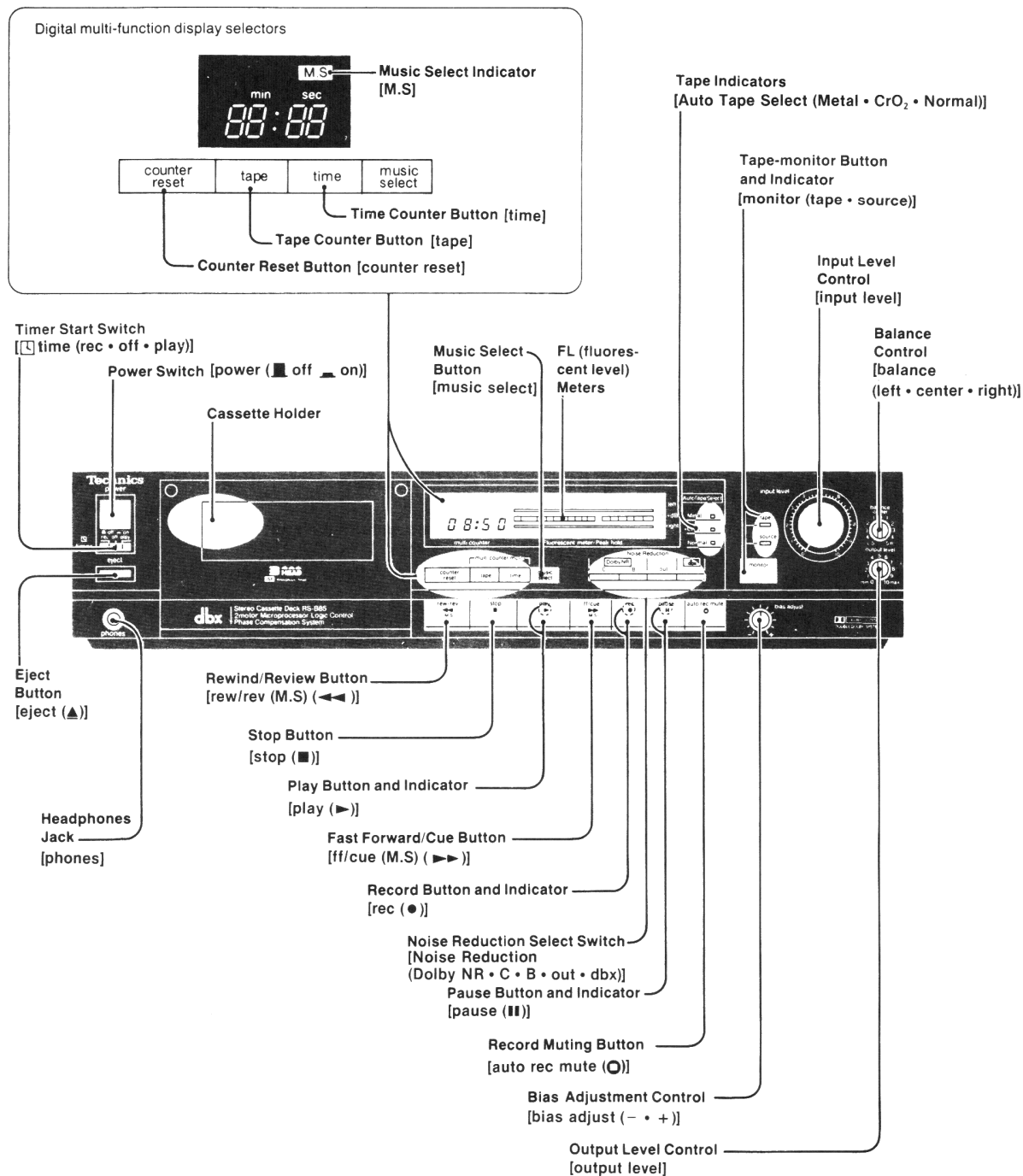
Matsushita Electric
of Canada Limited
5770 Ambler Drive, Mississauga,
Ontario, L4W 2T3

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

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■ LOCATION OF CONTROLS AND COMPONENTS



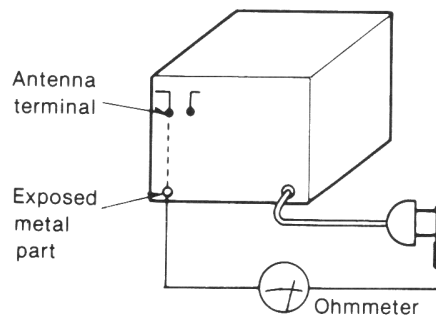
■ SAFETY PRECAUTION

1. Before servicing, unplug the power cord to prevent an electric shock.
2. When replacing parts, use only manufacturer's recommended components for safety.
3. Check the condition of the power cord. Replace if wear or damage is evident.
4. After servicing, be sure to restore the lead dress, insulation barriers, insulation papers, shields, etc.
5. Before returning the serviced equipment to the customer, be sure to make the following insulation resistance test to prevent the customer from being exposed to a shock hazard.

● INSULATION RESISTANCE TEST

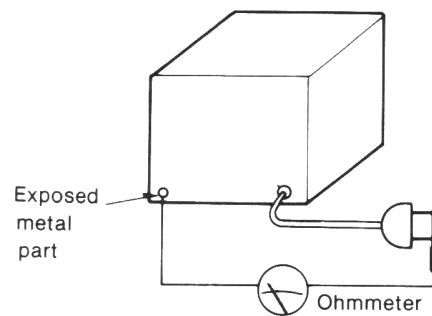
1. Unplug the power cord and short the two prongs of the plug with a jumper wire.
2. Turn on the power switch.
3. Measure the resistance value with ohmmeter between the jumpered AC plug and each exposed metal cabinet part, such as screwheads antenna, control shafts, handle brackets, etc. Equipment with antenna terminals should read between $3M\Omega$ and $5.2M\Omega$ to all exposed parts. (Fig. A) Equipment without antenna terminals should read approximately infinity to all exposed parts. (Fig. B)

Note: Some exposed parts may be isolated from the chassis by design. These will read infinity.



(Fig. A)

Resistance = $3M\Omega - 5.2M\Omega$

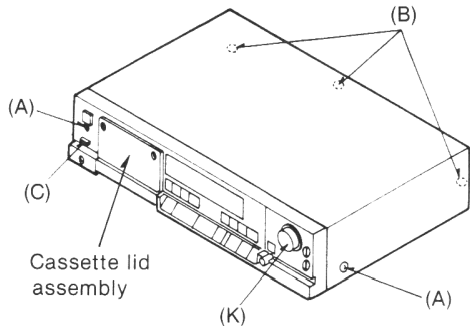
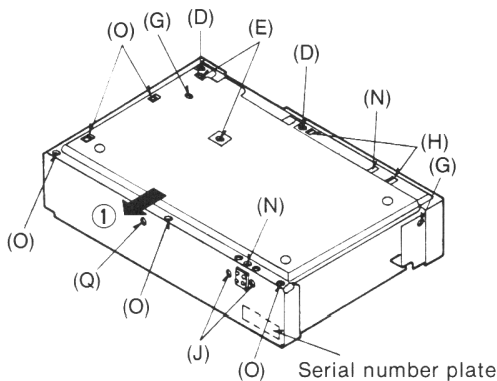
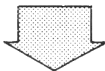


(Fig. B)

Resistance = Approx ∞

4. If the measurement is outside the specified limits, there is a possibility of a shock hazard. The equipment should be repaired and rechecked before it is returned to the customer.

■ DISASSEMBLY INSTRUCTIONS

Ref. No. 1	How to remove the case cover	Ref. No. 2	How to remove the mechanism unit
Procedure 1	• Remove 2 screws (A) and 3 screws (B).  Fig. 1	Procedure 1 ➡ 2	• Push the eject button (C) to remove the cassette lid assembly (see fig. 1). • Remove 2 screws (D) and 2 screws (E).  Fig. 2  • Remove 2 screws (F) (see fig. 3).

Ref. No. 3	How to remove the front panel assembly	• Open the lid of connectors A~N and P, and extract the flat cable. • Remove the connectors O, T and U.	
Procedure 1 ➡ 3			
• Remove 2 screws (G) and 2 screws (H) (see fig. 2). • Remove 2 screws (D) and 2 screws (E) (see fig. 2).		Fig. 3	
Ref. No. 4	How to remove the NR P.C.B.	Ref. No. 6	How to remove the FL meter P.C.B.
Procedure 1 ➡ 4	• Remove one screw (I) (see fig. 3). • Remove 2 latches (J) (see fig. 2).	Procedure 1 ➡ 6	• Remove one screw (M) (see fig. 5).
(J), (Q) How to remove latch To remove a heat sink from the back chassis, first press latch-A from the inside in the direction indicated by the arrow as shown above, and extract the rivet to the outside. Next remove latch-B from the outside. Consequently, the heat sink can be removed from the back chassis. Fig. 4		Ref. No. 7 Procedure 7 • Remove 2 screws (N) and 5 screws (O) (see fig. 2). • Remove 2 screws (D) and 2 screws (H) (see fig. 2). • Remove 2 screws (E) (see fig. 2). • Slide the bottom cover in the direction arrow ① and remove it (see fig. 2).	
Ref. No. 5	How to remove the volume P.C.B.	Ref. No. 8	How to remove the main P.C.B.
Procedure 1 ➡ 4 ➡ 5	• Pull out the input volume knob (K) (see fig. 1). • Remove 4 screws (L).	Procedure 1 ➡ 4 ➡ 7 ➡ 8	• Remove one screw (P) (see fig. 3). • Remove one latch (Q) (see fig. 2 and 4). • Open the lid of connectors A~N, P and V, and extract the flat cable (see fig. 3). • Remove the connectors O, T and U (see fig. 3).
Fig. 5			

*** Serial No. Indication**

- The serial number plate of this product to attached to the back chassis (shown in fig. 2).

MEASUREMENT AND ADJUSTMENT METHODS

1
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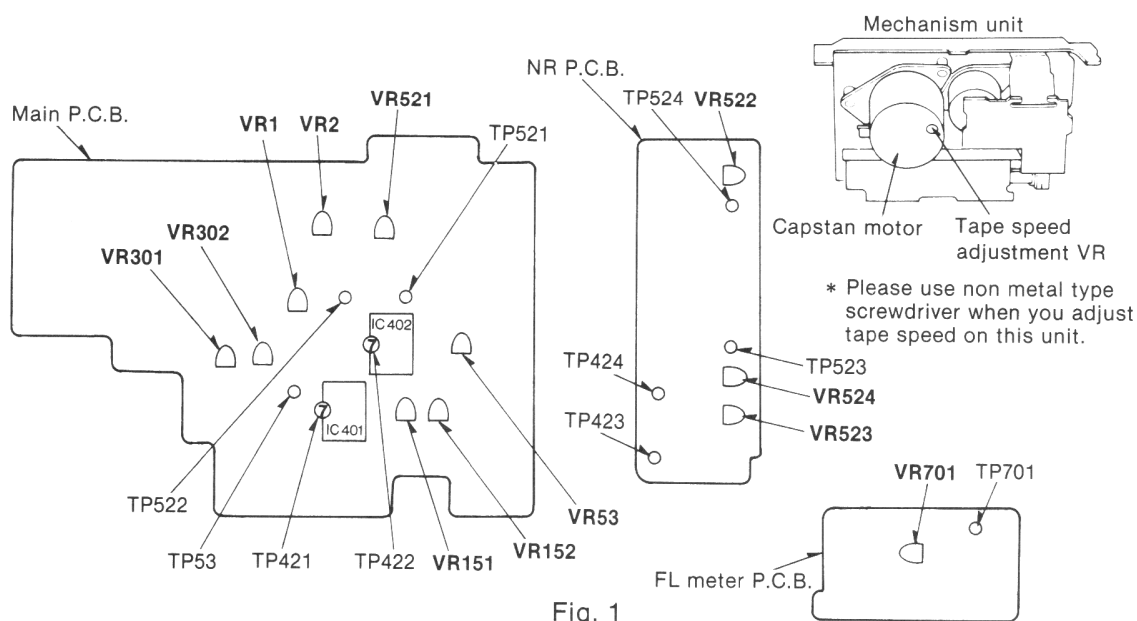


Fig. 1

NOTES: Set switches and controls in the following positions, unless otherwise specified.

- Make sure heads are clean
- Make sure capstan and pinch roller are clean
- Judgeable room temperature $20 \pm 5^\circ\text{C}$ ($68 \pm 9^\circ\text{F}$)
- Monitor selector: Tape
- Input level controls: Maximum
- Output level control: Maximum
- Dolby NR selector: OUT
- Bias fine adjust: Center
- Balance control: Center

A Erase head height adjustment

Condition:
• Playback mode

Equipment:
• Test tape (tape path viewer)
...QZZCRD

Caution:

1. Remove screws (A) and (B) to replace the erase head.
(Do not remove nut (C) since it is provided for erase head height, adjustment).
2. After erase head replacement, check by playing test tape (QZZCRD) to see that the tape travels properly.
3. For any tape travel performance problem, follow the procedure below for adjustment.

Adjustment

1. Adjust nut (C) shown in fig. 2 so that the tape may not get curled or malformed by tape guide of the erase head.

Head Height Adjustment using the Head Adjustment Jig (QZZ0207)

The head adjustment jig (QZZ0207) enables accurate, speedy head height adjustment in the following manner.

- a. Install the plate on the mechanism.
- b. Set the mechanism in the PLAY mode.
- c. Place the check bar on the plate.
- d. Pass the check bar through the tape guides.
- e. Adjust the nut (C) to prevent the check bar from contacting the tape guides.
- f. Operate the tape path viewer (QZZCRD) to make sure that the tape is not in contact with the tape guide (i.e. the tape is not twisted).

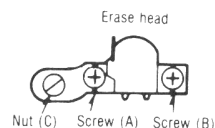


Fig. 2

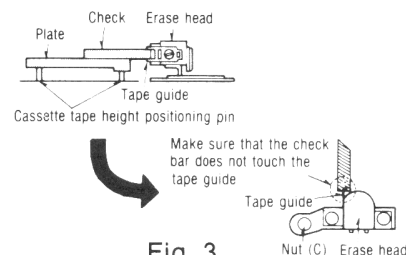


Fig. 3

B Record/playback head adjustment

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

Equipment:
• EVM (Electronic Voltmeter)
• Oscilloscope
• Test tape (azimuth)...QZZCFM

L-CH/R-CH output balance adjustment

1. Make connections as shown in fig. 4.
2. Playback the 8kHz signal from the test tape (QZZCFM).
Adjust screw (D) in fig. 5 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.

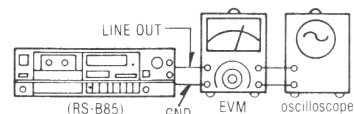


Fig. 4

- Turn screw (D) shown in fig. 5 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., point where L-CH and R-CH outputs are balanced. (Refer to figs. 5 and 6.)

L-CH/R-CH phase adjustment

- Make connections as shown in fig. 7.
- Playback the 8kHz signal from the test tape (QZZCFM). Adjust screw (D) shown in fig. 5 so that pointers of the two EVMs swing to maximum and a lissajous waveform as illustrated in fig. 8 is obtained on the oscilloscope.

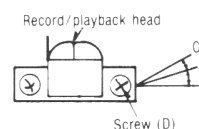


Fig. 5

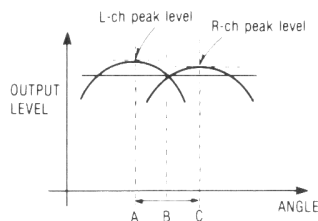


Fig. 6

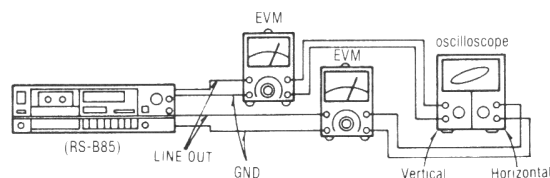


Fig. 7

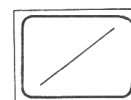


Fig. 8

© Tape speed

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

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

Tape speed accuracy

- Test equipment connection is shown in fig. 9.
- Playback test tape (QZZCWAT 3,000Hz), and supply playback signal to the digital frequency counter.
- Measure this frequency.
- On the basis of 3,000Hz, determine value by following formula:

$$\text{Tape speed accuracy} = \frac{f - 3,000}{3,000} \times 100(\%) \quad \text{where, } f = \text{measured value}$$

- Take measurement at middle section of tape.

Standard value: $\pm 1.5\%$

- If measured value is not within the standard value, adjust it by using the tape speed adjustment VR shown in Fig. 1. **Note:** Please use non metal type screwdriver when you adjust tape speed accuracy on this unit.

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%

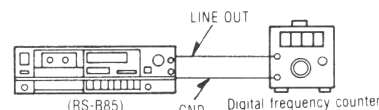


Fig. 9

① Playback frequency response

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

Equipment:
 • EVM (Electronic Voltmeter)
 • Oscilloscope
 • Test tape...QZZCFM

- Test equipment connection is shown in fig. 4.
- Playback the frequency response portion of test tape (QZZCFM).
- 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.
- Make measurements for both channels.
- Make sure that the measured values are within the range specified in the frequency response chart. (Shown in fig. 10).

Playback frequency response chart

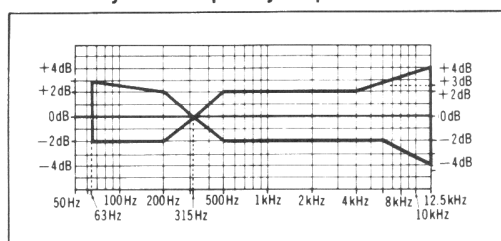


Fig. 10

E Playback gain

Condition:

- Playback mode
- Normal tape mode
- Output level control...MAX

Equipment:

- EVM (Electronic Voltmeter)
- Oscilloscope
- Test tape...QZZCFM

1. Test equipment connection is shown in fig. 11.
2. Playback standard recording level portion on test tape (QZZCFM 315Hz) and, using EVM, measure the output level at test points [TP421 (L-CH), TP422 (R-CH)].
3. Make measurements for both channels.

Standard value: 0.28 V [0.43±0.05 V: at LINE OUT jack]

Adjustment

1. If the measured value is not within the standard, adjust VR1 (L-CH) or VR2 (R-CH) (See fig 1).
2. After adjustment, check "Playback frequency response" again.

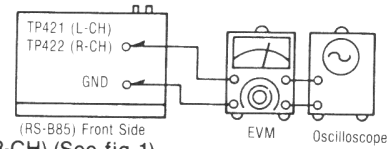


Fig. 11

F Erase current

Condition:

- Record mode
- Metal tape mode
- Bias fine adjustment VR ...Center

Equipment:

- EVM (Electronic Voltmeter)
- Oscilloscope

1. Test equipment connection is shown in fig. 12.
2. Place UNIT into metal tape mode.
3. Press the record and pause buttons.
4. Read voltage on EVM and calculate erase current by following formula:

$$\text{Erase current (A)} = \frac{\text{Voltage across resistor R63}}{1 (\Omega)}$$

Standard value: 95 + 10 - 15 mA (Metal)

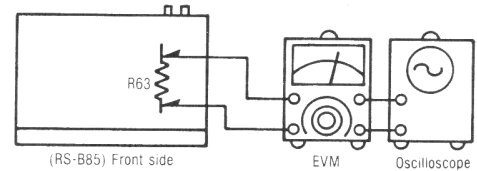


Fig. 12

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

Adjustment

1. Short points (A) and (B) on the main circuit board. Refer to the circuit board diagram on page 26.
2. Measure the erase current.
3. If the erase current is less than 80mA, open the point (B).
4. If the erase current is more than 105mA, open the points (A).

G Overall frequency response

Condition:

- Record/playback mode
- Normal tape mode
- CrO₂ tape mode
- Metal tape mode
- Input level controls...MAX
- Output level control...MAX
- Bias fine adjustment VR ...Center
- Balance control...Center

Equipment:

- EVM (Electronic Voltmeter)
- 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. 14.
 2. Place UNIT into normal tape mode and insert the normal reference blank test tape (QZZCRA).
 3. Supply a 1kHz signal from the AF oscillator through ATT to LINE IN.
 4. Adjust ATT so that input level is -20dB below standard recording level (standard recording level = 0 VU).
 5. Adjust the AF oscillator frequency to 1kHz, 50Hz, 100Hz, 200Hz, 500Hz, 4kHz, 8kHz, 10kHz, 12.5kHz and 14kHz signals, and record these signals on the test tape.
 6. Playback the signals recorded in step 5, and check if the frequency response curve is within the limits shown in the overall frequency response chart for normal tapes (fig. 13). (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;

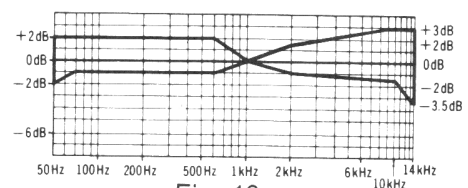
Overall frequency response chart (Normal)

Fig. 13

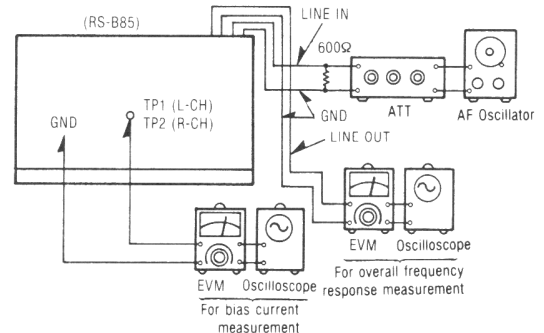


Fig. 14

Adjustment (A):

When the curve exceeds the overall specified frequency response chart (fig. 13) as shown in fig. 15.

- 1) Increase bias current by turning VR301 (L-CH) and VR302 (R-CH).

(See fig. 1 on page 5.)

- 2) Repeat steps 5 and 6 for confirmation (Proceed to steps 7, 8 and 9 if the curve is now within the charted specifications as shown fig. 13).
- 3) If the curve still exceeds the specifications (fig. 13), increase bias current further and repeat steps 5 and 6.

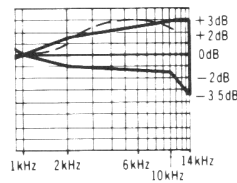


Fig. 15

Adjustment (B):

When the curve falls below the overall specified frequency response chart (fig. 13) as shown in fig. 16.

- 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. 13).
- 3) If the curve still falls below the charted specifications (fig. 13), reduce bias current further and repeat steps 5 and 6.

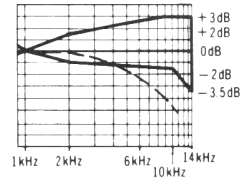


Fig. 16

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, 12.5kHz, 14kHz and 16kHz 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. 17).
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, 14kHz and 16kHz 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. 17).
10. Confirm that bias currents are approximately as follows when the UNIT is set at different tape mode.
 - Read the voltage at the terminals of resistor R61 (L-CH) (R62 (R-CH)), and calculate the bias current from the following formula.

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

around 460μA (Normal position)
 Standard value: around 580μA (CrO₂ position)
 around 940μA (Metal position)

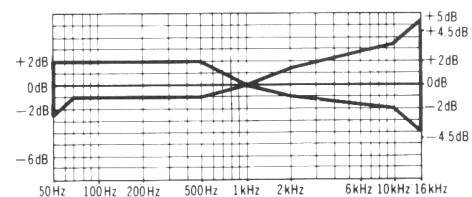
Overall frequency response chart (CrO₂, Metal)

Fig. 17

H Overall gain**Condition:**

- Record/playback mode
- Normal tape mode
- Input level controls...MAX
- Output level control...MAX
- Bias fine adjustment VR ...Center
- Standard input level; LINE IN...-24±3dB (63mV)

Equipment:

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

1. Test equipment connection is shown in fig. 18.
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 0.43V±0.05V.
6. Playback recorded tape, and make sure that the output level at LINE OUT becomes 0.43V±0.05V.
7. If measured value is not 0.43V±0.05V, adjust it by using VR151 (L-CH) or VR152 (R-CH).
8. Repeat from step (2).

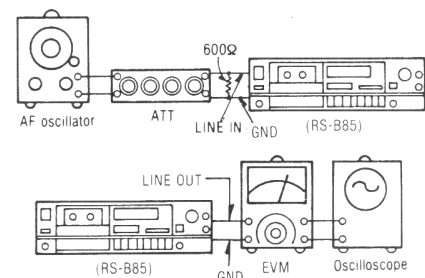


Fig. 18

I Fluorescent meter**Condition:**

- Record mode
- Input level controls...MAX
- Output level control...MAX

Equipment:

- EVM (Electronic Voltmeter)
- 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. 19).
2. Short-circuit TP701 and earth with a wire, then set the monitor switch to source monitor mode.
3. In the recording pause mode, apply 1kHz (-24dB) to LINE IN.
4. Adjust ATT so that output level at LINE OUT is $0.43V \pm 0.05V$.

Checking FL meter 0dB segment display ON/OFF

Change the output level at LINE OUT from $0.43V - 0.05V$ to $0.43V + 0.05V$ by adjusting the attenuator, and check that the FL meter 0dB segment display OFF state changes to the ON state.

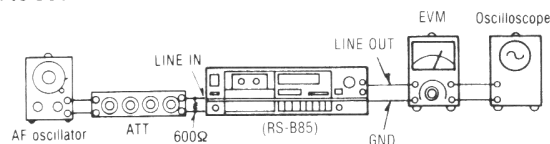


Fig. 19

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 the dims or goes off at the lowest level.

• Adjustment for FL meter

1. Make connections as shown (See fig. 19).
2. Short-circuit TP701 and earth with a wire, then set the monitor switch to source monitor mode.
3. In the recording pause mode, apply 1kHz (-24dB) to LINE IN.
4. Adjust ATT so that output level at LINE OUT becomes $0.43V \pm 0.05V$.

-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. 20).
7. If the indicator is not lighted halfway as described in step 6, adjust VR53.

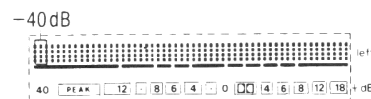


Fig. 20

0dB adjustment

8. Restore the condition of step 4 (set output level to $0.43V \pm 0.05V$ at LINE OUT).
9. At this time, check that 0dB indicator is dimmed (intermediate brightness between full brightness and light-out (See fig. 21)).
10. If improper, adjust VR701.
11. Repeat adjustments at steps 4, 5, 6, 7, 8, 9 and 10 two or three times.
12. Disconnect the wire between TP701 and ground terminal, which had been connected at step 2.



Fig. 21

● Dolby NR circuit

Condition:

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

Equipment:

- EVM (Electronic Voltmeter)
- ATT
- Resistor (600Ω)
- Balance control...Center
- AF oscillator
- Oscilloscope

Record side

- Check of the Dolby-B type encoder characteristics

1. Make connections as shown in fig. 22.
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 TP423 (L-CH) and TP424 (R-CH) is 12.3mV.
5. The output level at pin 21 should be 0dB.
6. Set the NR select switch to B, and make sure that the output signal level at pin 21 of IC403 (L-CH) and IC404 (R-CH) is $+6dB \pm 1.5dB$ (753mV).
7. Set the NR select switch to OUT, and adjust the frequency to 5kHz. The output signal level at pin 21 should be 0dB.
8. Set the NR select switch to B and make sure that the output signal level at pin 21 of IC403 (L-CH) and IC404 (R-CH) is $+8dB \pm 1.5dB$ (948mV).

- Check of 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 21 of IC403 (L-CH) and IC404 (R-CH) is $+11.4dB \pm 1dB$ (1.4V).
11. Set the NR select switch to OUT and adjust the frequency to 5kHz. The output signal at pin 21 should be 0dB.
12. Set the NR select switch to C and make sure that the output signal level at pin 21 of IC403 (L-CH) and IC404 (R-CH) is $+8.4dB \pm 1.5dB$ (1V).

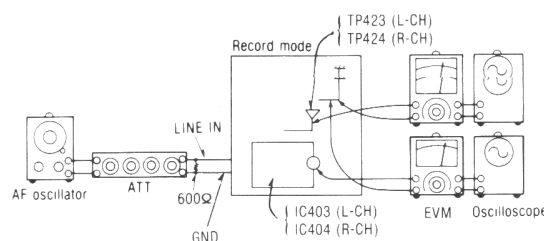


Fig. 22

Playback side

- Check of the Dolby-B type decoder characteristics

1. Make connections as shown in fig. 23.
2. Set the unit to the playback mode. (NR select switch is OUT.)
3. Apply a 1kHz signal to the minus terminals of the C553 (L-CH) and C554 (R-CH).
4. Adjust the ATT so that the output level at TP421 (L-CH) and TP422 (R-CH) is 12.3mV.
5. Set the NR select switch to B, and make sure that the output signal level at TP421 (L-CH) and TP422 (R-CH) is $-6dB \pm 2.5dB$ (189mV).
6. Set the NR select switch to OUT, and adjust the frequency to 5kHz. The output signal level at TP421 (L-CH) and TP422 (R-CH) should be 0dB.

7. Set the NR select switch to B and make sure that the output signal level at TP421 (L-CH) and TP422 (R-CH) is $-10\text{dB} \pm 2.5\text{dB}$ (119mV).
- Check to Dolby-C type decoder characteristics
8. Repeat steps 1-5 above.
9. Set the NR select switch to C and make sure that the output signal level at TP421 (L-CH) and TP422 (R-CH) is $-19\text{dB} \pm 2.5\text{dB}$ (42mV).
10. Set the NR select switch to OUT and adjust the frequency to 5kHz. The output signal at TP421 (L-CH) and TP422 (R-CH) should be 0dB.
11. Set the NR select switch to C and make sure that the output signal level at TP421 (L-CH) and TP422 (R-CH) is $-16\text{dB} \pm 2.5\text{dB}$ (60mV).

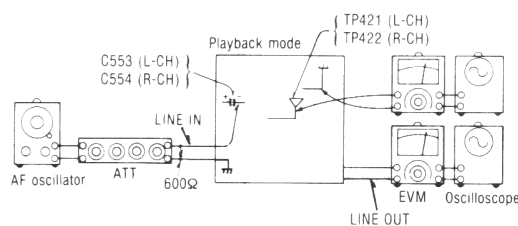


Fig. 23

Ⓚ Attack recovery time adjustment (dbx circuit)

Condition:

- Record mode
- Input level control...MAX
- Noise reduction selector ...dbx tape/dbx disc
- Balance control...Center
- Output level control...MAX
- Bias fine adjustment VR ...Center

Equipment:

- EVM (Electronic Voltmeter)
- ATT
- AF oscillator
- DC voltmeter

Record side

1. Make the connections as shown in fig. 24 and apply 1kHz -27dB signal from LINE IN, and set the noise reduction selector to dbx IN position.
2. Set the unit to record mode, adjust ATT so that the signal level at C449 (L-CH) and C450 (R-CH) is 300mV.
3. Read voltage on DC volt meter.

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

4. If measured value is not within reference, adjust VR522 (shown in Fig. 1).

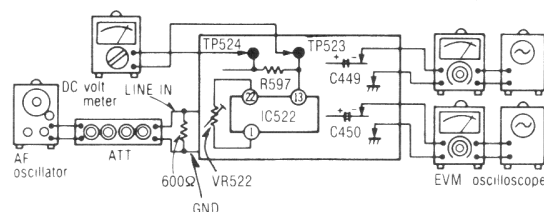


Fig. 24

Playback side

1. Make the connections as shown in fig. 25 and apply 1kHz -27dB signal from LINE IN, and set the noise reduction selector to dbx IN position.
2. Set the unit to record mode, adjust ATT so that the signal level at C521 (L-CH) and C522 (R-CH) is 300mV.
3. Read voltage on DC volt meter.

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

4. If measured value is not within reference, adjust VR521 (shown in Fig. 1).

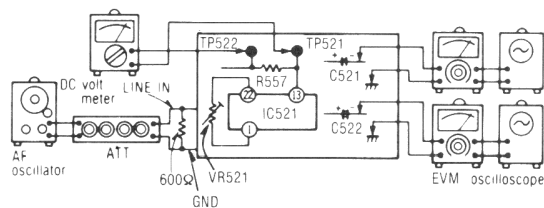


Fig. 25

Ⓛ Overall gain (dbx circuit)

Condition:

- Record/playback mode
- Normal tape mode
- Noise reduction selector ...dbx tape
- Input level controls...MAX
- Output level control...MAX
- Bias fine adjustment VR ...Center
- Standard input level; LINE IN... $-24 \pm 3\text{dB}$ (63mV)

Equipment:

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

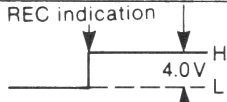
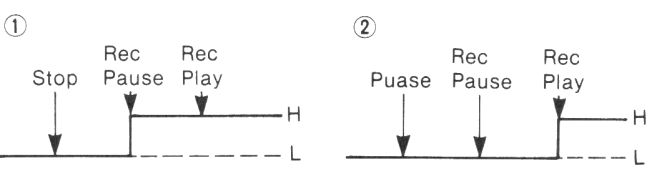
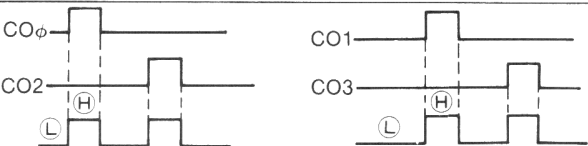
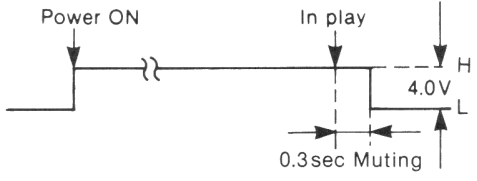
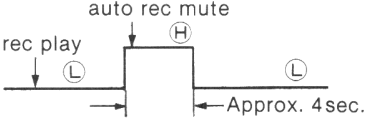
Note:

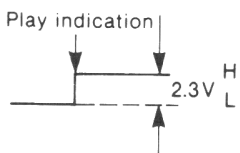
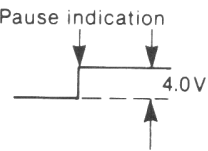
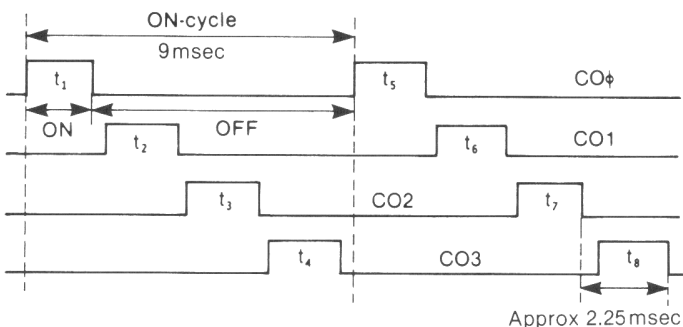
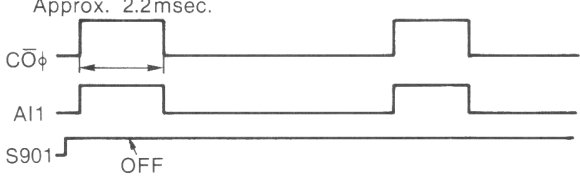
Before adjustment, make sure that the overall gain Ⓛ in the NR OUT mode complies within the specifications.

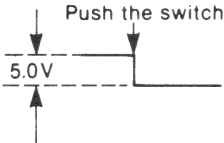
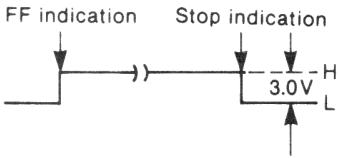
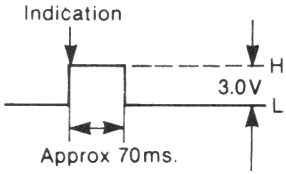
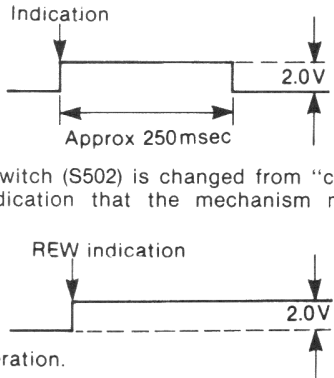
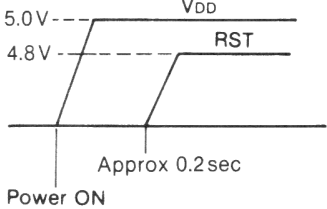
1. Test equipment connection is shown in fig. 18.
2. Insert the normal reference blank tape (QZZCRA).
3. Set the NR switch in the dbx mode and the monitor switch in the source mode.
4. Place UNIT into record mode.
5. Supply a 1kHz signal through ATT (-24dB) from AF oscillator, to LINE IN.
6. Adjust ATT until monitor level at LINE OUT becomes $0.43\text{V} \pm 0.05\text{V}$.
7. Set the monitor switch in the tape mode.
8. Playback recorded tape, and make sure that the output level at LINE OUT becomes $0.43\text{V} \pm 0.05\text{V}$.
9. If measured value is not $0.43\text{V} \pm 0.05\text{V}$, adjust it by using VR523 (L-CH) or VR524 (R-CH).
10. Repeat from step (2).

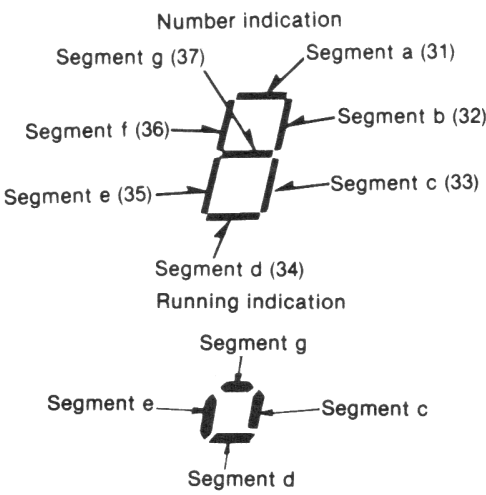
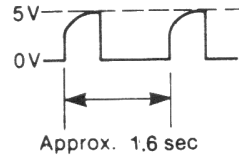
■ MN1405STK (IC902) EACH TERMINAL FUNCTION AND WAVEFORM

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.

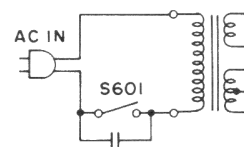
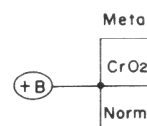
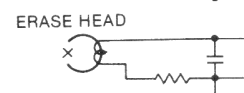
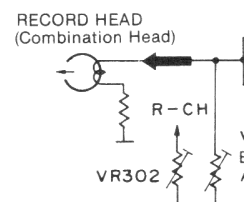
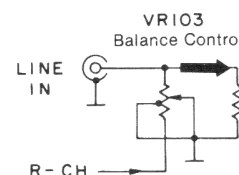
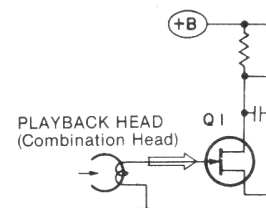
Terminal No.	Symbol	Name	Function/operation
1.	VSS	GND	
2.	C $\bar{O}$ 11	REC indication	 "H" level simultaneously with REC indication. "H" level immediately after power is ON in TIMER REC mode.
3.	C $\bar{O}$ 10	Bias oscillation	
4.	C $\bar{O}$ 9	TIMER OUT M.S. indication	 "H" level during time display. "H" level during REPEAT operation.
5.	C $\bar{O}$ 8	TAPE/SOURCE SELECT	"L" level in power is ON. (TAPE SIDE) "H" level simultaneously with REC indication. (SOURCE SIDE) "L" level simultaneously with PLAY indication. (TAPE SIDE)
6.	C $\bar{O}$ 7	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	REC MUTE	"H" level with auto rec mute button pushed during rec pause mode. When auto rec mute button is pressed during rec play mode, the level goes "H", and about 4sec. later, the mode changes to rec pause causing the level to becomes "L". 

Terminal No.	Symbol	Name	Function/operation
8.	C $\bar{O}$ 5	PLAY indication	 "H" level simultaneously with PLAY indication. Same as the above for TIMER PLAY.
9.	C $\bar{O}$ 4	PAUSE indication	 "H" level simultaneously with PAUSE indication.
10.	C $\bar{O}$ 3	FL grid & input SW. scan	 Approx 2.25msec
11.	C $\bar{O}$ 2	FL grid & input SW. scan	
12.	C $\bar{O}$ 1	FL grid & input SW. scan	
13.	C $\bar{O}$ ϕ	FL grid & input SW. scan	
14.	A13	Input switch state reading	Reads switch states corresponding to scanning of CO ϕ — 3 (this terminal is connected to the accidental erasing protection leaf switch (S501), HALL IC, music select switch (S903) and tape counter switch (S904)).
15.	A12	Input switch state reading	Reads switch states corresponding to scanning of CO ϕ — 3 (when the mode leaf switch (S502) is ON, this terminal is connected to the monitor switch (S291), and timer switch (S902)).
16.	A11	Input switch state reading	Reads switch states corresponding to scanning of CO ϕ — 3 (when the play leaf switch (S503) is ON, this terminal is connected to the auto rec mute switch (S911)).
17.	A1 ϕ	Input switch state reading	Reads switch states corresponding to scanning of CO ϕ — 3 (when the stop leaf switch (S504) is ON, this terminal is connected to the timer rec input).
			Operation example. Counter reset switch (S901) is connected to A11. If only S503 is closed, the waveform is as follows: Approx. 2.2msec.  HALL IC output, music select switch (S903) and tape counter switch (S904) 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	 "H" in the normal case, "L" when the switch is pushed.
19.	Bi2	FF key switch	
20.	Bi1	PLAY key switch	
21.	Bi ϕ	STOP key switch	
22.	EO ϕ	Brake plunger	 "H" during FF/REW operations.
23.	EO1	Trigger plunger	 "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.	E $\bar{O}$ 2	Motor CL	 "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.	E $\bar{O}$ 3	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.	SNS ϕ	Input switch state reading	Reads switch states corresponding to scanning of CO ϕ — 3. (This terminal is connected to the record switch (S909), PAUSE switch (S910) and switch detecting pulses between signal portions.)

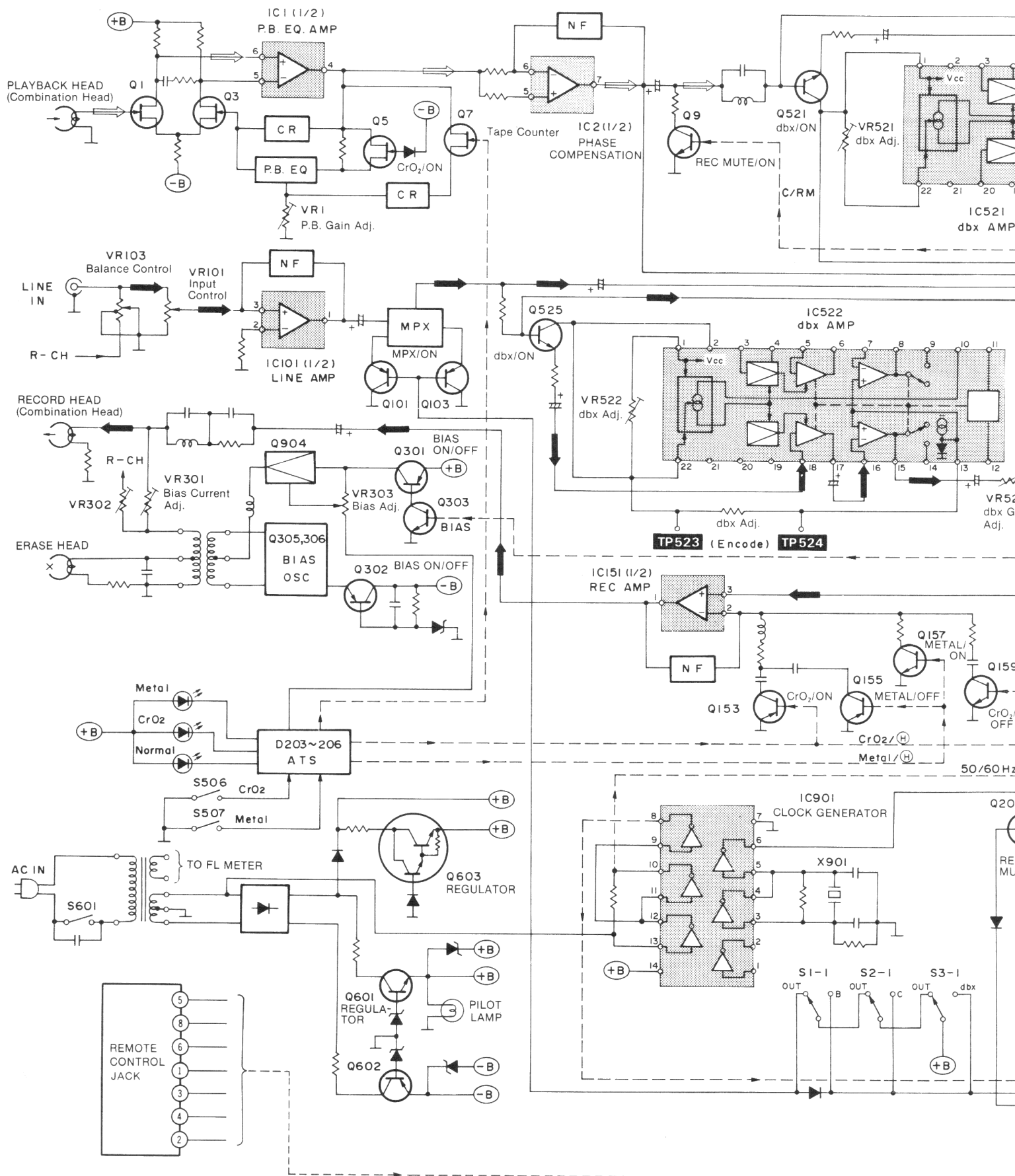
Terminal No.	Symbol	Name	Function/operation
30.	SNS1	Reference signal reading	Time count reference signal: 50/60 Hz
31.	D $\bar{O}$ ϕ	FL counter Segment a	 Number indication Segment g (37) Segment a (31) Segment b (32) Segment f (36) Segment c (33) Segment e (35) Segment d (34) Running indication Segment 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	 Oscillation is approx. 600kHz. Because the connection of a probe affects the terminal, nothing should be connected to this terminal for any other measurements.

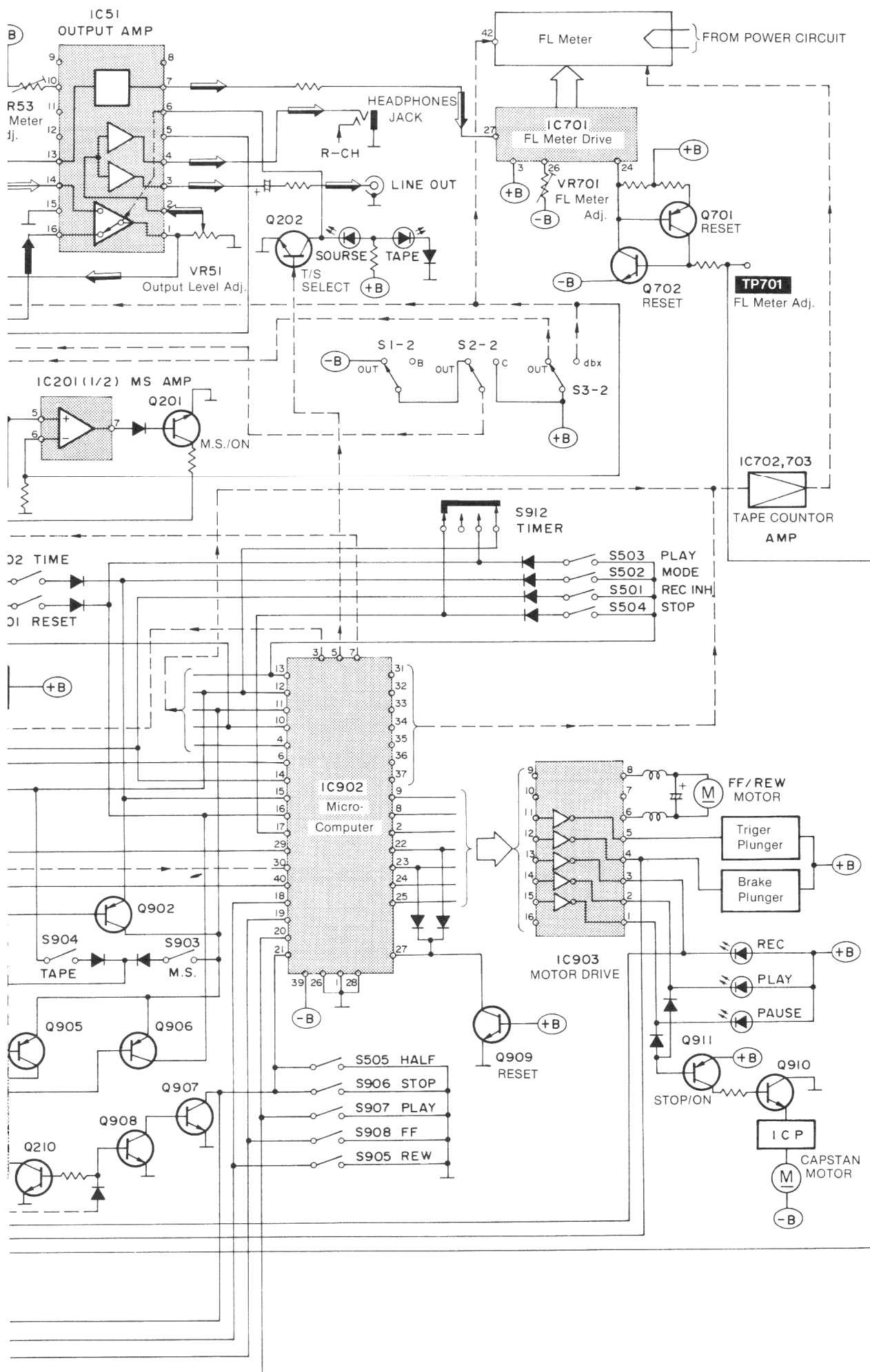
■ BLOCK DIAG



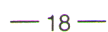
REMOTE CONTROL JACK

■ BLOCK DIAGRAM





C



5

6

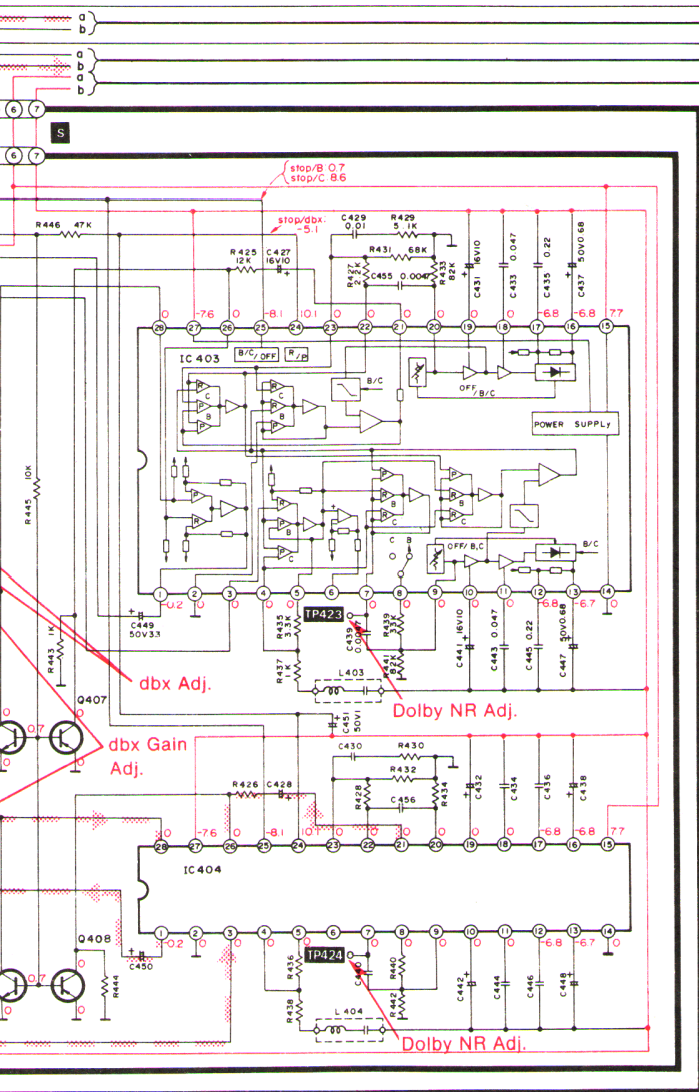
7

8

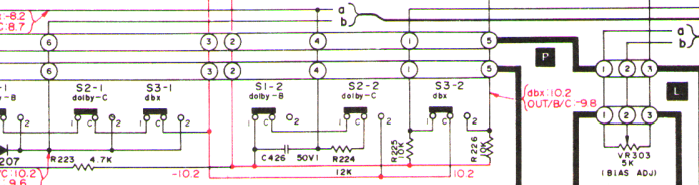
9

Q406, Q407, Q408
11Q 2SA1309Q
ING SWITCHING

IC403, 404
TEA0665
Dolby NR



I NR SWITCH CIRCUIT SECTION



IV VOLUME CIRCUIT SECTION

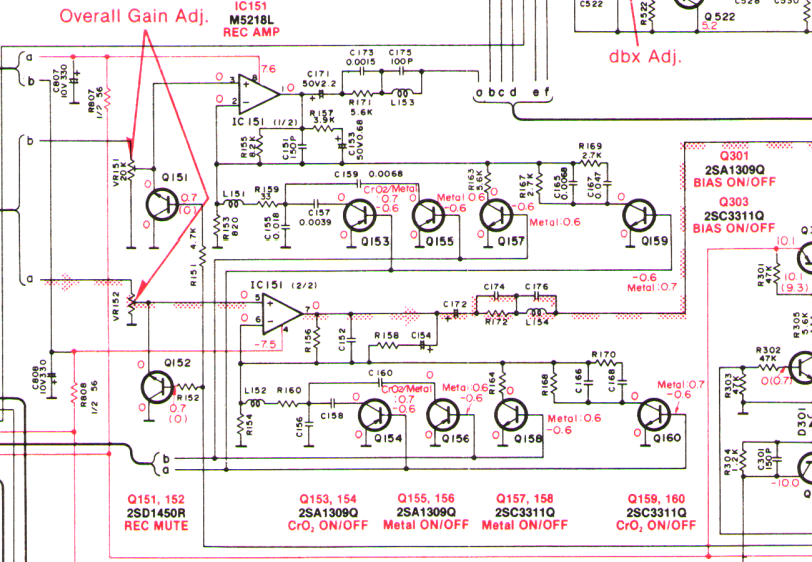
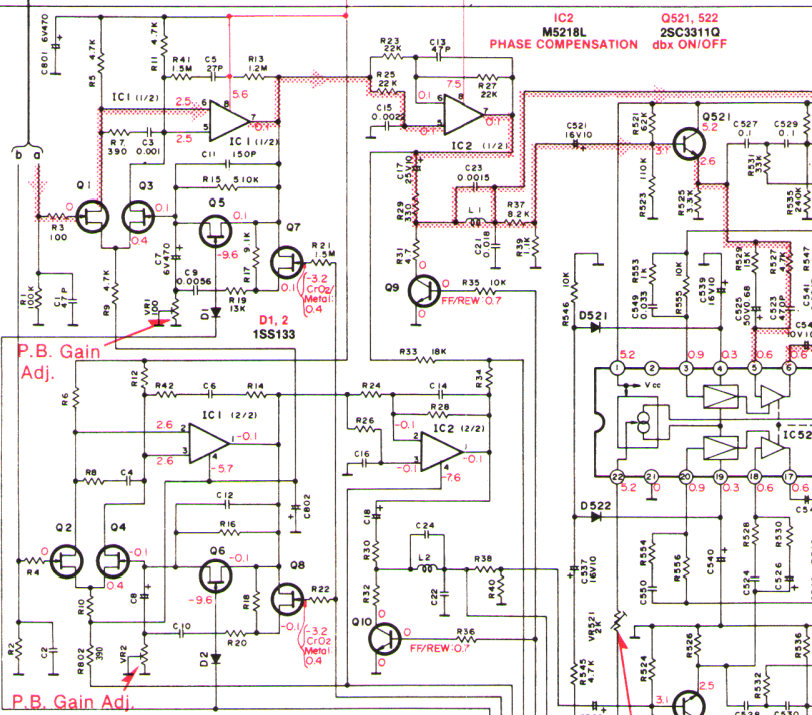
Q1-4 2SK170BLV
LOW NOISE FET

Q5-8 2SK330GRY
CrO₂/ON

IC1 M5219L
P.B. E.Q. AMP

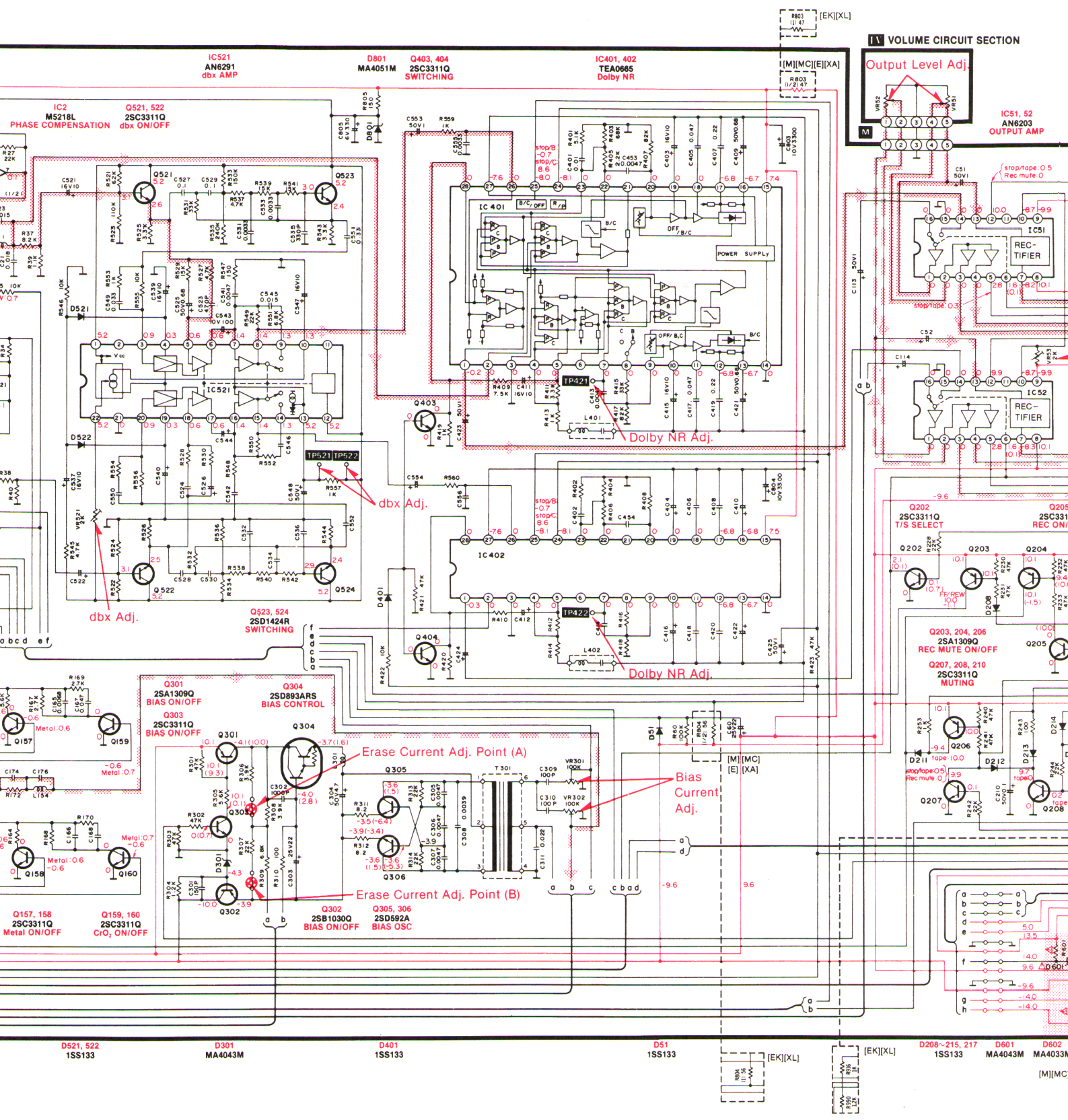
Q9, 10 2SD1450R
REC MUTE

IC52
AN62
dbx Adj.



D521, 522
1SS133

D3
MA40



IV VOLUME CIRCUIT SECTION

Output Level Adj.

IC51, 52
AN6203
OUTPUT AMP(stop) tape 0.5
Rec mute 0(stop) tape 0.5
Rec mute 0FL Meter
Adj.HEADPHONES
CIRCUIT
SECTION

III FL METER CIRCUIT SECTION

Q701
2SA1309Q
RESETQ702
2SC3311Q
RESET

FL Meter Adj. (0dB)

FL Meter Adj. (0dB)

FL Meter Adj. (0dB)

FL Meter Adj. (0dB)

FL Meter Adj. (0dB)

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FL Meter Adj. (0dB)

FL Meter Adj. (0dB)

FL Meter Adj. (0dB)

FL Meter Adj. (0dB)

FL Meter Adj. (0dB)

V AC POWER
TRANSFORMER
CIRCUIT SECTIONVI COUNTER SWITCH
CIRCUIT SECTION

VII OPERATION

NOTES:

- S1-1, S1-2 : Dolby B NR switch (shown in **OUT** position).
- S2-1, S2-2 : Dolby C NR switch (shown in **OUT** position).
- S3-1, S3-2 : dbx switch (shown in **OUT** position).
- S291 : TAPE/SOURCE select switch (shown in **SOURCE** position).
- S501 : Rec inhibit switch (shown in **OFF** position).
- S502 : MODE switch (shown in **OFF** position).
- S503 : PLAY switch (shown in **OFF** position).
- S504 : STOP switch (shown in **OFF** position).
- S505 : HALF switch (shown in **OFF** position).
- S506 : CrO₂ tape detection switch (shown in **OFF** position).
- S507 : Metal tape detection switch (shown in **OFF** position).
- S601 : Power switch (shown in **OFF** position).
- S602 : AC power voltage selector.
- S901 : Counter reset switch (shown in **OFF** position).
- S902 : Time counter switch (shown in **OFF** position).
- S903 : Music select switch (shown in **OFF** position).
- S904 : Tape counter switch (shown in **OFF** position).
- S905 : REW switch (shown in **OFF** position).
- S906 : STOP switch (shown in **OFF** position).
- S907 : PLAY switch (shown in **OFF** position).
- S908 : FF switch (shown in **OFF** position).
- S909 : REC switch (shown in **OFF** position).
- S910 : PAUSE switch (shown in **OFF** position).
- S911 : AUTO REC MUTE switch (shown in **OFF** position).
- S912 : Time switch (shown in **OFF** position).
- Resistance are in ohms (Ω), 1/4 watt unless specified otherwise.
1K = 1,000(Ω), 1M = 1,000k(Ω)
- Capacity are in micro-farads (μ F) unless specified otherwise.
- All voltage values shown in circuitry are under no signal condition and playback mode with volume control at minimum position otherwise specified.
- ()Voltage values at record mode.
- CrO₂Voltage values at CrO₂ tape mode.
- MetalVoltage values at Metal tape mode.
- StopVoltage values at Stop mode.
- TAPEVoltage values at Tape monitor mode.
- dbxVoltage values at dbx mode.
- BVoltage values at Dolby B NR mode.
- CVoltage values at Dolby C NR mode.
- OUTVoltage values at NR OUT mode.
- FF/REWVoltage values at FF/REW mode.
- Rec muteVoltage values at Rec mute mode.
- For measurement use EVM.

- (—) indicates B (bias).
- (—) indicates the flow of the playback signal.
- (—) indicates the flow of the recording signal.

• Important safety notice (Δ)

The shaded area on this schematic diagram incorporates special features important for protection from fire and electrical shock hazards.

When servicing it is essential that only manufacturer's specified parts be used for the critical components in the shaded areas of the schematic.

• 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.

- The part no. of diodes mentioned in the schematic diagram stand for production part No. Regarding the part No. with $\star$ mark the production part No. are different from the replacement part No.

Therefore, when placing an order for replacement part, please use the part No. in the replacement parts list.

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

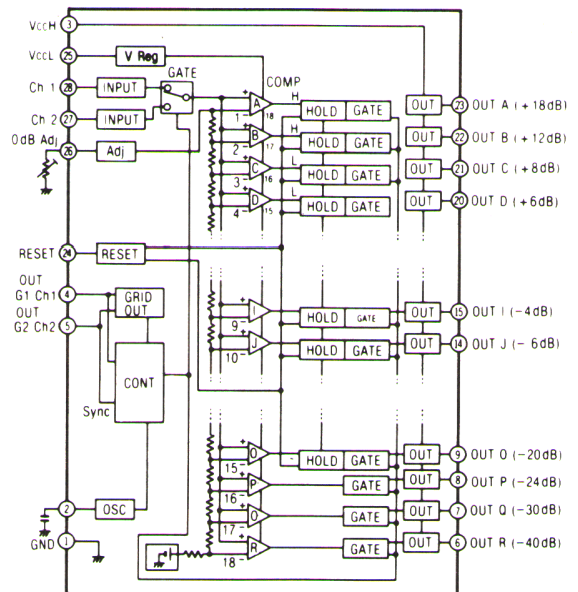
- This schematic diagram may be modified at any time with the development of new technology.

SPECIFICATIONS

- * Input level control...MAX
- * Balance control.....Center

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 2.5%
Overall S/N ratio * Test tape...QZZCRA	Greater than 43dB (without NAB filter)

**EQUIVALENT CIRCUIT
IC701: AN6870N**



ELECTRICAL PARTS LIST

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.

Areas

- * [M] For U.S.A.
- * [MC] For Canada.
- * [E] For European areas except United Kingdom.

- * [EK] For United Kingdom.
- * [XA] For Asia, Latin America, Middle East and Africa areas.
- * [XL] For Australia.

NOTES: RESISTORS

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

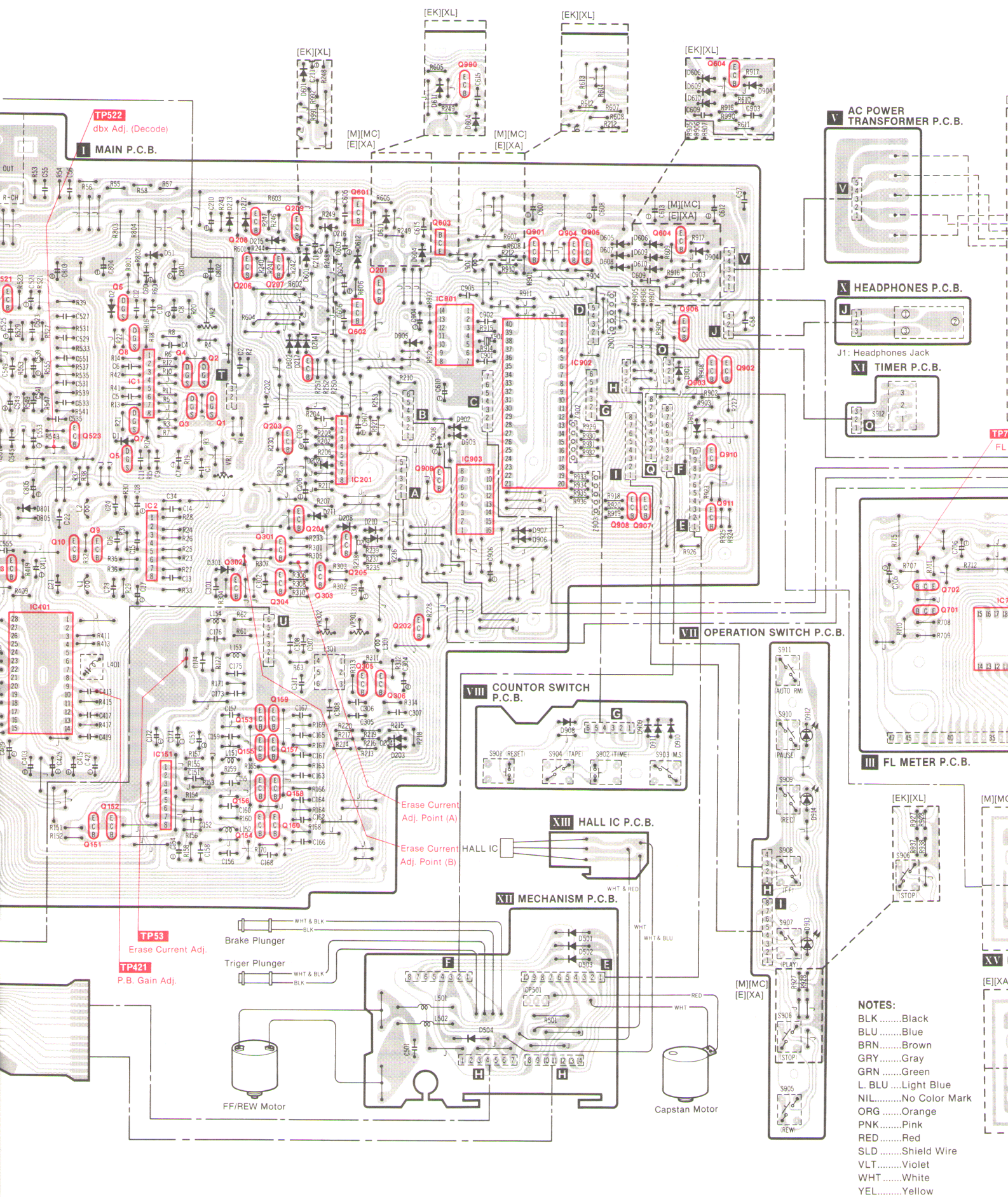
CAPACITORS

ECBA.....Ceramic
ECG.....Ceramic
ECK.....Ceramic
ECC.....Ceramic
ECF.....Ceramic
ECQM.....Polyester film

ECQE.....Polyester film
ECQF.....Polypropylene
ECE.....Electrolytic
ECEN.....Non polar electrolytic
ECQS.....Polystyrene
ECS.....Tantalum
ECS.....Tantalum

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 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241	ERD25TJ473	R 525, 526	ERD25FJ332	R 708	ERD25FJ471	CAPACITORS		C 445, 446	ECQM1H224JZ
R 1, 2	ERD25TJ104	R 242	ERD25TJ223	R 527, 528	ERD25FJ472	R 709	ERD25TJ684	C 3, 4	ECKD1H102KB	C 447, 448	ECEA50MR68R
R 3, 4	ERD25FJ101	R 243	ERD25FJ101	R 529, 530	ERD25TJ153	R 710	ERD25FJ472	C 5, 6	ECCD1H270K	C 449, 450	ECEA1HU3R3
R 5, 6	ERD25FJ472	R 244	ERD25TJ223	R 531, 532	ERD25TJ333	R 711	ERD25FJ182	C 7, 8	ECEA0JU471	C 451	ECEA1HU010
R 7, 8	ERD25FJ391			R 533, 534	ERD25TJ154	R 712	ERD25FJ181	C 9, 10	ECQB1H562JZ	C 452, 453, 454	ECQB1H472JZ
R 9, 10, 11, 12	ERD25FJ472	R 246, 247	ERD25FJ103	R 535, 536	ERD25TJ244	R 713	ERD25FJ103	C 11, 12	ECCD1H151K	C 501	ECEA1CN100E
R 13, 14	ERD25TJ125	R 248	ERD25FJ562	R 537, 538	ERD25FJ472	R 714, 715	ERD25FJ181	C 13, 14	ECCD1H470K	C 521, 522	ECEA1CU100
R 15, 16	ERD25TJ514	R 249	ERD25FJ681	R 539, 540, 541, 542	ERD25TJ153	R 716, 717, 718, 719	ERD25FJ471	C 15, 16	ECQB1H222JZ	C 523, 524	ECDD1H471J
R 17, 18	ERD25FJ912	R 250	ERD25FJ103	R 543, 544	ERD25FJ332	R 801	ERD25FJ331	C 17, 18	ECEA1EU100	C 525, 526	ECEA50MR68R
R 19, 20	ERD25TJ133	R 251	ERD25TJ273	R 545	ERD25FJ472	R 802	ERD25FJ391	C 21, 22	ECQB1H183JZ	C 527, 528, 529, 530	ECQM1H104JZ
R 21, 22	ERD25TJ155	R 252	ERD25TJ473	R 546	ERD25FJ103			C 23, 24	ECQB1H152JZ	C 531, 532, 533, 534	ECQB1H332JZ
R 23, 24, 25, 26, 27, 28	ERD25TJ223	R 253	ERD25FJ102	R 547, 548	ERD25FJ151	R 803	[M][MC] ERD25FJ470	C 51, 52	ECEA1HU010	C 535, 536	ECCD1H331K
R 29, 30	ERD25FJ331	R 291	[E][XA] ERD25FJ102	R 549, 550	ERD25TJ223	R 803	[EK][XL] ERG1ANJ470	C 53, 54	ECEA1CU100	C 537, 539, 540	ECEA1CU100
R 31, 32	ERD25FJ4R7	R 291	[EK][XL] ERD25FJ821	R 551, 552	ERD25FJ682			C 55, 56	ECKD1H102KB		
R 33, 34	ERD25TJ183			R 553, 554	ERD25FJ102			C 57, 58	ECKD1H103ZF		
R 35, 36	ERD25FJ103			R 555, 556	ERD25FJ103			C 60	ECEA1EU220		
R 37, 38	ERD25FJ822	R 292	[M][MC] ERD25FJ681	R 557	ERD25FJ102	R 804	[M][MC] ERD25FJ560	C 103, 104, 105, 106	ECQM1H104JZ	C 541, 542	ECQB1H472JZ
R 39, 40	ERD25FJ112	R 292	[E][XA] ERD25FJ681	R 559, 560	ERD25FJ102	R 804	[E][XA] ERD25FJ560	C 107, 108	ECCD1H390K	C 543, 544	ECEA1AU101
R 41, 42	ERD25TJ155	R 292	[EK][XL] ERD25FJ471	R 561, 562	ERD25TJ623			C 109, 110	ECKD1H152KB	C 545, 546	ECQB1H153JZ
R 51, 52	ERD25FJ222			R 563, 564	ERD25TJ114			C 111, 112	ECKD1H122KB	C 547	ECEA1CU100
R 53, 54	ERD25FJ392									C 548	ECEA1HU010
R 55, 56	ERD25FJ820	R 293	[M][MC] ERD25FJ681	R 565, 566	ERD25FJ332	R 805	ERD25FJ151	C 113, 114	ECEA1HU010	C 549, 550	ECQM1H333JZ
R 57, 58	ERD25FJ680	R 293	[E][XA] ERD25FJ681	R 567, 568	ERD25FJ472	R 807, 808	ERD25FJ560	C 115, 116	ECEA1CU100	C 551, 552	ECQM1H334JZ
R 60	ERD25TJ104	R 293	[EK][XL] ERD25FJ331	R 569, 570	ERD25TJ153	R 901, 902, 903, 904, 905, 906, 907, 908, 909	ERD25TJ273	C 151, 152	ECCD1H151K	C 553, 554	ECEA1HU010
R 61, 62	ERD25FJ100			R 571, 572	ERD25TJ154			C 153, 154	ECEA50MR68R	C 555, 556	ECQB1H332JZ
R 63	ERD25FJ1R0			R 573, 574	ERD25TJ244			C 155, 156	ECQB1H183JZ	C 557, 558	ECEA1CU100
R 103, 104	ERD25TJ273			R 575, 576	ERD25FJ472	R 910	ERD25TJ273	C 157, 158	ECQB1H392JZ		
R 105, 106	ERD25TJ683			R 577, 578	ERD25TJ333	R 911	ERD25TJ473	C 159, 160, 161, 162, 163, 164, 165, 166	ECQB1H682JZ	C 559, 560	ECQB1H223JZ
R 107, 108	ERD25TJ184			R 579, 580, 581, 582	ERD25TJ153	R 912	ERD25TJ153	C 167, 168	ECQM1H473JZ	C 561, 562	ECEA50MR68R
R 109, 110	ERD25FJ242			R 583, 584	ERD25FJ332	R 913	ERD25FJ102	C 171, 172	ECEA1HU2R2	C 563, 564, 565, 566	ECQM1H104JZ
R 111, 112	ERD25TJ473			R 585	ERD25FJ472	R 914, 915	ERD25FJ103	C 173, 174	ECQB1H152JZ	C 567, 568, 569, 570	ECQB1H332JZ
R 113, 114	ERD25FJ242			R 586	ERD25FJ103					C 571, 572	ECCD1H331K
R 115, 116	ERD25FJ912			R 587, 588	ERD25FJ151	R 916	[M][MC] ERD25FJ222	C 175, 176	ECKD2H101KB	C 573	ECEA1CU100
R 117, 118	ERD25FJ822			R 589, 590	ERD25TJ153	R 916	[E][XA] ERD25FJ222	C 178	ECQM1H473JZ	C 575, 576	ECEA1CU100
R 119, 120	ERD25FJ682			R 591, 592	ERD25FJ472			C 202	ECCD1H22KVV	C 577, 578	ECQM1H473JZ
R 121, 122	ERD25FJ152			R 593, 594	ERD25FJ102			C 203	ECEA1CU100	C 579, 580	ECEA1AU470
R 123, 124, 125, 126	ERD25TJ684			R 595, 596	ERD25FJ103			C 204	ECCD1H470K	C 581, 582	ECCD1H391J
R 151, 152	ERD25FJ472			R 597	ERD25FJ102			C 206	ECEA1HU010		
R 153, 154	ERD25FJ821			R 601, 602	Δ ERG1ANJP27C	R 917	ERD25FJ681	C 210	ECEA1HU0R1	C 583	ECEA1CU100
R 155, 156	ERD25FJ822			R 603, 604	Δ ERX1ANJ1R0	R 918, 919	ERD25TJ473	C 211	ECEA1CU100	C 584	ECEA1HU010
R 157, 158	ERD25FJ392					R 920	ERD25FJ103	C 301	ECCD1H151K	C 585, 586	ECQM1H333JZ
R 159, 160	ERD25FJ330					R 921	ERD25TJ223	C 302	ECKD1H102KB	C 587, 588	ECQM1H334JZ
R 163, 164	ERD25FJ562					R 922	ERD25FJ103			C 589, 590	ECEA1CU100
R 167, 168, 169, 170	ERD25FJ272					R 923	ERD25TJ473			C 603, 604	Δ ECEA1CU221
R 171, 172	ERD25FJ562					R 924	ERD25FJ272			C 605, 606	Δ ECKD1H103ZF
R 202	ERD25FJ152					R 925	ERD25TJ473			C 607, 608	Δ ECEA1CS332
R 203	ERD25FJ101					R 926	ERD25FJ103			C 609	Δ ECKD1H472PE
R 204	ERD25TJ473									C 610	ECEA0JU222
R 206	ERD25TJ473										
R 207	ERD25FJ103										
R 210	ERD25TJ183										
R 211	ERD25TJ223										
R 212	ERD25TJ273										
R 213	ERD25TJ104										
R 214	ERD25TJ154										
R 215	ERD25FJ332										
R 216	ERD25FJ103										
R 217	ERD25TJ333										
R 218, 219	ERD25FJ103										
R 220	ERD25TJ563										
R 221	ERD25FJ472										
R 222	ERD25FJ332										
R 223	ERD25FJ472										
R 224	ERD25TJ123										
R 225, 226	ERD25FJ103										
R 227, 228	ERD25TJ223										
R 229	ERD25FJ152										

Ref. No.	Part No.	Ref. No.	Part No.	Ref. No.	Part No.	Part Name & Description	Ref. No.	Part No.	Part Name & Description	
INTEGRATED CIRCUITS		Q 990 [EK][XL] 2SC3311-Q		COILS			S 505	QSB0288C	Leaf Switch (Playback, Half)	
IC 1	M5219L	DIODES & RECTIFIERS		L 1, 2	QLQX2722D	Trap Coil	S 506	QSB0290CA	Leaf Switch (CrO ₂ Tape Detect)	
IC 2	M5218L			L 101, 102	QLM9Z10K	MPX Coil	S 507	QSB0289C	Leaf Switch (Rec Inhibit, Metal Tape Detect)	
IC 51, 52	AN6203	D 1, 2	1SS133	L 151, 152	QLQX2722D	Peaking Coil	S 601	▲ QSW1127AT	Push Switch (Power ON/OFF)	
IC 101	M5219L	D 51	1SS133	L 153, 154	QLQX0343KWA	Bias Trap Coil	S 602 [E]			
IC 151	M5218L	D 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215	1SS133	L 301	QLQX1011Y	Peaking Coil	[EK][XA]			
IC 201	M5218L	D 216	MA4068L	L 401, 402, 403, 404	ELM7Q306A	Skewing Network	[XL]▲ SSR226		AC Voltage Selector	
IC 401, 402, 403, 404	TEA0665	D 217	1SS133	L 501, 502	QLQZ1014D	Choke Coil	S 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911		Push Switch	
IC 501	DN6838-S	D 291	LN446YP	L 901	QLQX1011Y	Choke Coil	SSG13		Slide Switch (Timer)	
IC 521, 522	AN6291	D 292, 293	1SS133	COMBINATION PARTS			JACKS			
IC 701	AN6870N	D 294	LN846RP	Z 901	EXBEQ4272K		J 1	QJA0267H	Headphones Jack	
IC 702, 703	AN6280	D 295	LN346GP	Z 902	EXBEQ4473K		J 2	QJS1955H	Remote Control Jack	
IC 901	M74LS04P	D 296	LN846RP	Z 903	EXBEQ4562K		IC PROTECTOR			
IC 902	MN1405STK	D 297	LN346GP	RESONATOR			ICP 501 QRUF10WH			
IC 903	AN6270	D 298	1SS133	TRANSFORMERS			CONNECTORS			
TRANSISTORS		D 301	MA4043M	X 901	EF0A600K01C		CN 1	QJT1054	Contact	
		D 401	1SS133				CN 2	QJS1921TN	3 Pin Socket	
		D 501, 502, 503, 504	MA162A	T 1	[M][MC]	▲ QLPP62ELX	AC Power Transformer	CN 3	QJS1922TN	6 Pin Socket
		D 521, 522, 523, 524	1SS133	T 1	[XA]	▲ QLPN83ELX	AC Power Transformer	CN 4	QJP1921TN	3 Pin Plug
		D 601	▲ MA4043M	T 1	[E][EK]	▲ QLPA70ELX	AC Power Transformer	CN 5	QJP1922TN	6 Pin Plug
		D 602	▲ MA4033M	T 301	QLB0204K	Bias Oscillation Coil	CN 6	SJT3707	7 Pin Post	
		D 604	▲ MA4068L				CN 7	QJS1996T	14 Pin FPC Socket	
		D 605, 606, 607, 608, 609, 610	▲ SM112				CN 8	QJS1987S	Jumper Socket (4 Pin)	
		D 611, 612	▲ MA4100H				CN 9	QJS1983S	Jumper Socket (8 Pin)	
		D 801	MA4051M				CN 10	QJS1989S	Jumper Socket (10 Pin)	
		D 901	MA162A				CN 11	SJS5721	7 Pin Socket	
		D 902, 903, 904, 905, 906, 907, 908, 909, 910, 911	1SS133				CN 12	QJT1090	Check Pin	
		D 912	SVGAY2202SB1				CN 13	SJS5327	Jumper Socket (3 Pin)	
		D 913	SVGPY2222SB1				CN 14	SJS5421	Jumper Socket (4 Pin)	
		D 914	SVGPR2222SB1				CN 15	SJS5519	Jumper Socket (5 Pin)	
		D 915	1SS133				CN 16	SJS5627	Jumper Socket (6 Pin)	
		VARIABLE RESISTORS						CN 17	SJS5807	Jumper Socket (8 Pin)
		VR 1, 2	EVNK6AA00B12				CN 18	SJS5707	Jumper Socket (7 Pin)	
		VR 51, 52	EWK5SAF20A24							
		VR 53	EVNK6AA00B23							
		VR 101	EWK78A033A54							
		VR 103	EWHFDAF20G15							
		VR 151, 152	EVNK6AA00B24							
		VR 301, 302	EVM38GA00B15							
		VR 303	EWHRCA002B53							
		VR 521	EVNK6AA00B23							
		VR 522	EVNK0AA00B23							
		VR 523, 524	EVNM0AA00B14							
		VR 701	EVNK6AA00B24							



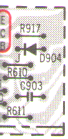
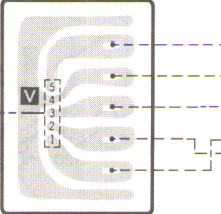
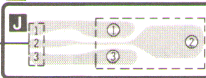
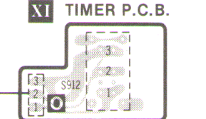
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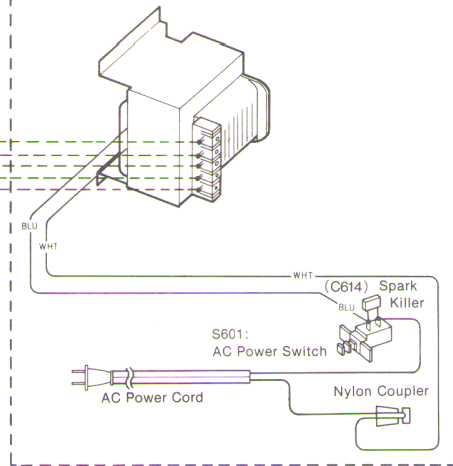
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1


V AC POWER TRANSFORMER P.C.B.

X HEADPHONES P.C.B.

XI TIMER P.C.B.


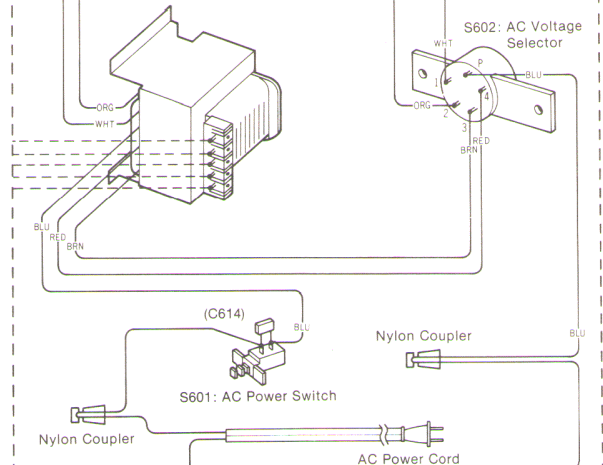
[M][MC]

T1: AC Power Transformer



[E][EK][XA][XL]

T1: AC Power Transformer


NOTES:

[M]U.S.A.

[MC]Canada.

[E]All European areas except United Kingdom.

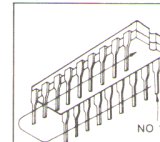
[EK]United Kingdom.

[XA]Asia, Latin America, Middle East and Africa areas.

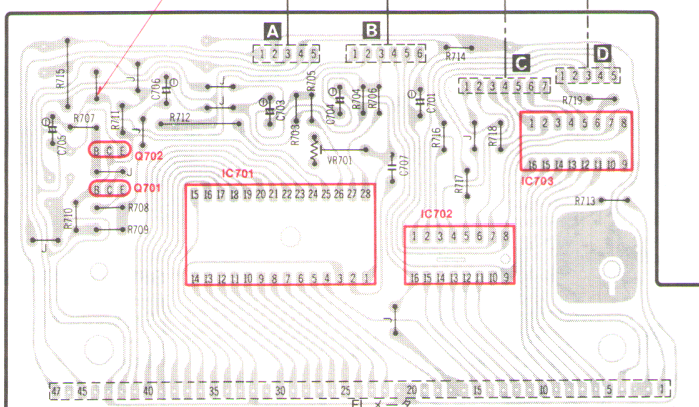
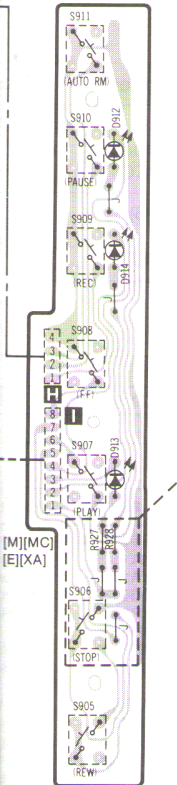
[XL]Australia.

■ TERMINAL GUIDE OF TRANSISTORS, DIODES AND IC'S

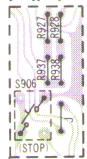
M5218L, M5219L	AN6270



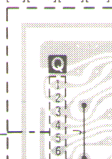
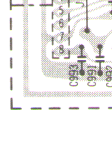
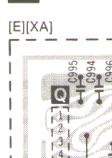
M74LS04P	14Pin	AN6870N	28Pin
AN6203	16Pin	TEA0665	
AN6280		MN1405STK	40Pin
AN6291	22Pin		

III FL METER P.C.B.

III FL METER P.C.B.

[EK][XL]



[M][MC][EK][XL]


XV REMOTE CONTROL P.C.B.

NOTES:

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

2 SB 1030 Q, 2 SD 592 A, 2 SD 893 A	2 SB 941-P, 2 SD 12650, 2 SD 1275-Q	2 SK 170 BLV, 2 SK 330 GRY	2 SD 1330R, 2 SD 1423Q, 2 SD 1424S	2 SA 546 A-H, 2 SC 3311-Q
SM 112, 1 SS 133	MA 162 A	Anode Cathode Ca	MA 4033M, MA 4043M, MA 4051M, MA 4068L, MA 4100H	LN 346 GP GRN LN 446 YP YEL LN 846 RP RED
	SVGPR 2222 SB1	SVGAY 2202 SB1	CN 7 QJS 1996T CN 8 QJS 1987S CN 9 QJS 1983S CN 10 QJS 1989S	CN 12
CN1 CN2 CN4	CN1 CN3 CN5	CN11 CN6		CN13 SJS 5327 3Pin CN14 SJS 5421 4Pin CN15 SJS 5519 5Pin CN16 SJS 5627 6Pin CN17 SJS 5807 8Pin CN18 SJS 5707 7Pin

NOTES:

- When changing mechanism parts, apply the specified grease to the area marked "xx" shown in the drawing "Mechanical Parts Location".
- The grease and/or oil shown in the parentheses function to prevent friction (lubrication).

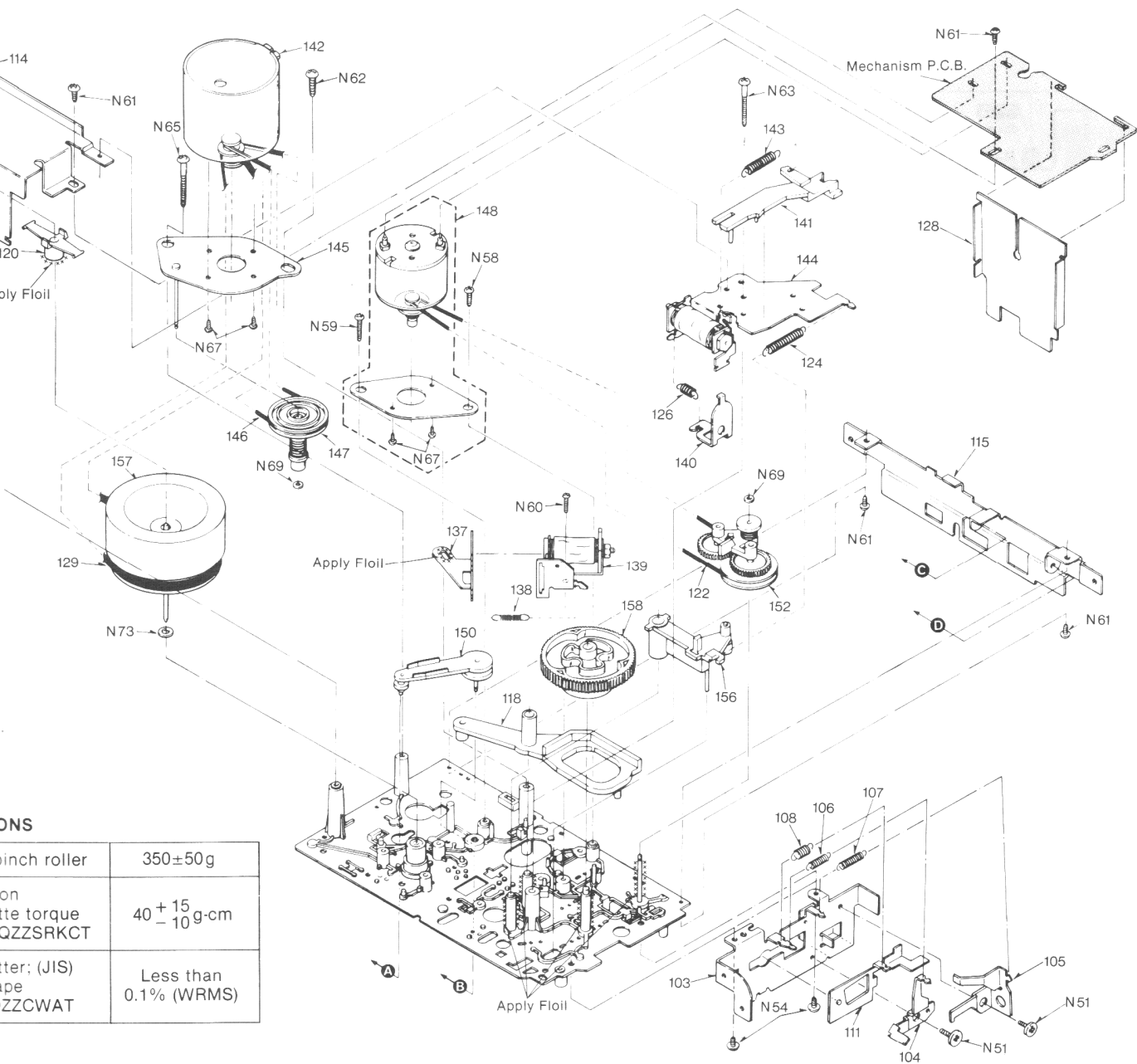
GREASE NAME	SUPPLY NO.
AERO GREASE	RZZ0L04
MOLYCOAT	RZZ0L05
ROCOL PASTE	RZZ0L06
FLOIL	SZZ0L18

SPECIFICATIONS

Pressure of pinch roller	30
Takeup tension * Use cassette torque meter.....QZZSRKCT	40
Wow and flutter; (JIS) * Use test tapeQZZCWAT	0.1%

Pressure of pinch roller	30
Takeup tension * Use cassette torque meter.....QZZSRKCT	40
Wow and flutter; (JIS) * Use test tapeQZZCWAT	Le 0.1%

— 29 —

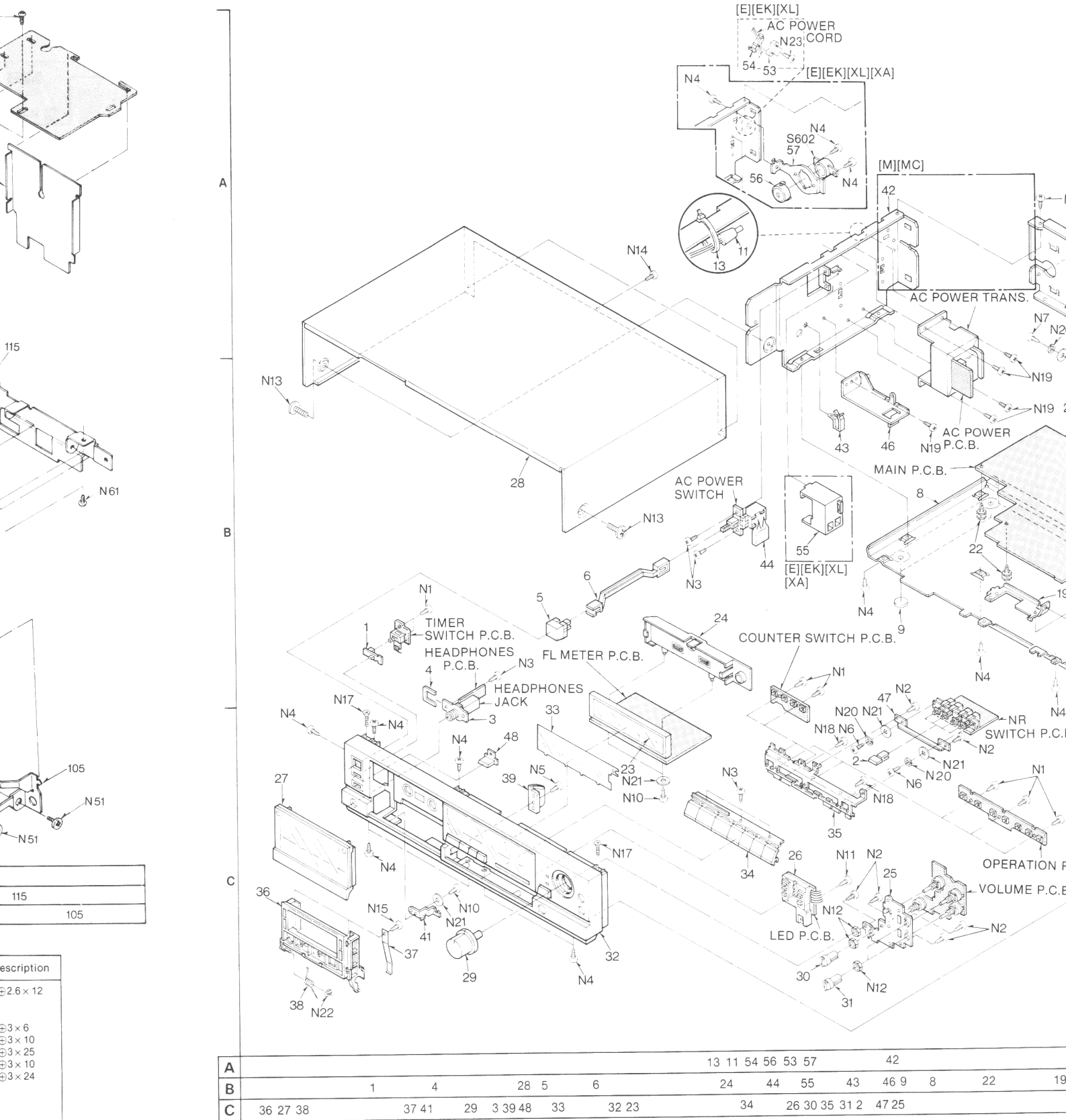


ONS	
inch roller	350±50g
on tte torque QZZSRKCT	40 + 15 - 10 g-cm
ter; (JIS) pe ZZCWAT	Less than 0.1% (WRMS)

4 120	129	157	146	142 145	147	137 150	138	139 158	126 140	122 156	152	143 141 144 124	128
						118			103	108	106	111 107 104	105

No.	Part No.	Part Name & Description	Ref. No.	Part No.	Part Name & Description	Ref. No.	Part No.	Part Name & Description
	QBT1278EM	Record Lock Lever Spring	158	QXG1059	Main Gear Assembly	N 59	XTN26 + 12B	Tapping Screw $\varnothing 2.6 \times 12$
	QXA1076	Trigger Plunger Assembly	159	QWY2133ZA	Erase Head	N 60	XTWQ26 + 8J	Screw $\varnothing 2.6 \times 8$
	QXA1328	Motor Retainer Assembly				N 61	XTV3 + 6BFN	Tapping Screw $\varnothing 3 \times 6$
	QDB0332	Takeup Belt	160	QXH0437	Erase Head Base Plate Assembly	N 62	XTV3 + 10BFN	Tapping Screw $\varnothing 3 \times 10$
	QXP0621	Takeup Pulley Assembly				N 63	XTV3 + 25BFN	Tapping Screw $\varnothing 3 \times 25$
	QXU0334	Reel Motor Assembly				N 64	XTWQ3 + 10J	Tapping Screw $\varnothing 3 \times 10$
	QXL1550	Pinch Roller Assembly				N 65	XTWQ3 + 24F	Tapping Screw $\varnothing 3 \times 24$
	QBN1771A	Pinch Roller Spring				N 66	XSN2DW14	Screw $\varnothing 2 \times 14$
						N 67	XSN26 + 3	Screw $\varnothing 2.6 \times 3$
						N 68	XSN2 + 3	Screw $\varnothing 2 \times 3$
						N 69	QBW2008	Washer
						N 70	QBW2046	Washer
						N 71	XUBQ4FT	Stop Ring $\varnothing 4$
						N 72	QNO1094	Nut
						N 73	QBW2099	Washer
	QXL1603	Idler Lever Assembly	N 51	QHQ1161	Step Screw			
	QXI0113	Takeup Idler Assembly	N 52	QHQ1168	Step Screw			
	QXL1408A	Swing Gear Assembly	N 53	XTN26 + 8B	Tapping Screw $\varnothing 2.6 \times 8$			
	QXL1604	Fast Wind Gear Assembly	N 54	XTV3 + 8JFN	Tapping Screw $\varnothing 3 \times 6$			
	QML3659	Brake Lever	N 55	XTN2 + 6B	Tapping Screw $\varnothing 2 \times 6$			
	QBG1132	Stopper Rubber	N 56	XTN2 + 8B	Tapping Screw $\varnothing 2 \times 8$			
	QXL1411	Lock Lever Assembly	N 57	XTN26 + 6BFN	Tapping Screw $\varnothing 2.6 \times 6$			
	QXF0219	Flywheel Assembly	N 58	XTN26 + 6B	Tapping Screw $\varnothing 2.6 \times 6$			
SCREWS, NUTS & WASHERS								

■ CABINET PARTS LOCATION



NOTES:

[M]U.S.A.

[MC].....Canada.

[E]All European areas
except United Kingdom.

[EK]United Kingdom.

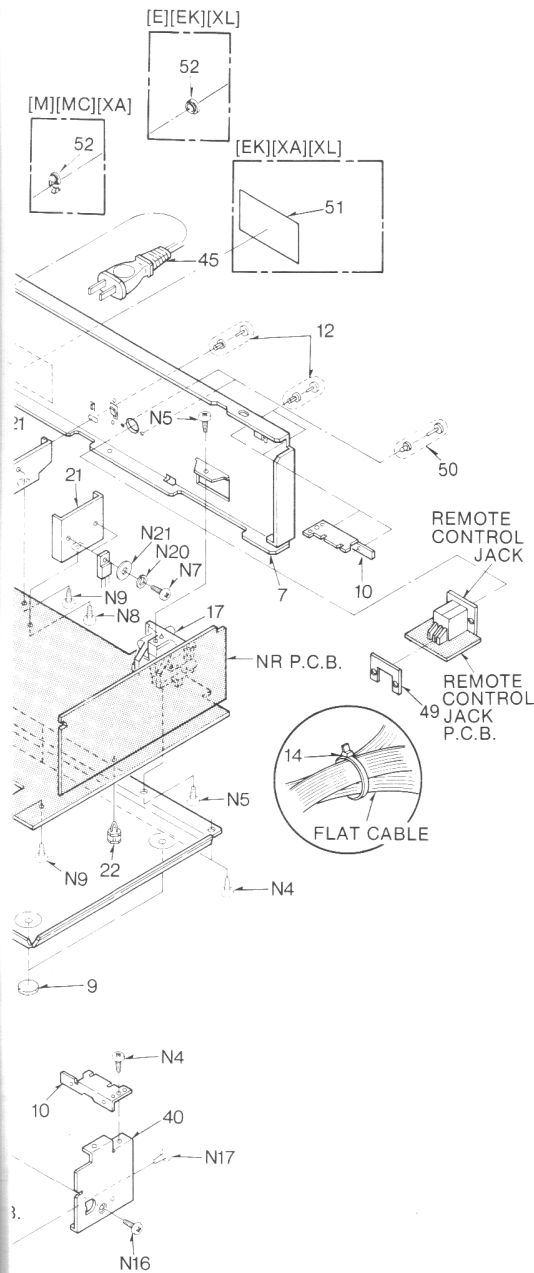
[XA]Asia, Latin America,
Middle East and Africa
areas.

[XL]Australia.

REPLACEMENT PARTS LIST

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

Ref. No.	Part No.	Part Name & Description	Ref. No.	Part No.	Part Name & Description
CABINET PARTS					
1	QGT1642K	Timer Button	52	[M][MC] [XA] QTD1129	Cord Bushing
2	SBC706	NR Button	52	[E][EK] [XL] QBJ1425A	Cord Bushing
3	QMA4771	Headphones Angle	53	[E][EK] [XL] QTD1164	Cord Bushing
4	QMA4624	Headphones Angle Plate	54	[E][EK] [XL] QTD1322	Cord Clamper
5	QG02399	Power Button	55 [E][EK] [XA][XL] QKJ0598	Switch Cover	
6	QMR2059A	Power Rod	56 [E][EK] [XA][XL] QTWM0026	AC Voltage SW Cover	
7 [M][MC] 7 [E][EK] [XA][XL]	SGP6470	Back Chassis	57 [E][EK] [XA][XL] QMA4603	AC Voltage SW Angle	
[E][EK] [XA][XL]	SGP6490	Back Chassis	SCREWS, NUTS & WASHERS		
8	QGC1240KC	Bottom Cover	N 1	XTN26 + 6B	Tapping Screw $\oplus 2.6 \times 6$
9	SKL294	Case Foot	N 2	XTV3 + 10BFN	Tapping Screw $\oplus 3 \times 10$
10	QMA4764	NR P.B. Angle	N 3	XTV3 + 6BFN	Tapping Screw $\oplus 3 \times 6$
11	Δ QJT1079	Nylon Coupler	N 4	XTB3 + 8BFN	Tapping Screw $\oplus 3 \times 8$
12	QKJ0609	Latch	N 5	XTB3 + 12BFZ	Tapping Screw $\oplus 3 \times 12$
13	QTD1315	Cord Clamper	N 6	XSN3 + 6S	Screw $\oplus 3 \times 6$
14	QTD1316	Cord Clamper	N 7	XSN3 + 8S	Screw $\oplus 3 \times 8$
16	SMC1192	Shield Parts	N 8	XSN3 + 6BVS	Screw $\oplus 3 \times 6$
17	QEJ5030C	Jack Board	N 9	XTB3 + 6BFN	Tapping Screw $\oplus 3 \times 6$
18	SUS777	Earth Spring	N 10	XTN3 + 10B	Tapping Screw $\oplus 3 \times 10$
19	SUW2900	Volume Angle	N 11	XTB26 + 8BFZ	Tapping Screw $\oplus 2.6 \times 8$
20	QTH1178	Heat Sink Plate (1)	N 12	SNE4021	Nut
21	QTH1179	Heat Sink Plate (2)	N 13	QH01349K	Ornament Screw
22	QKJ0608	Tapping Support	N 14	XTB3 + 8BFZ	Tapping Screw $\oplus 3 \times 8$
23	SADBG270Z	FL Meter	N 15	XSN26 + 6BV	Screw $\oplus 2.6 \times 6$
24	SHE180	Meter Holder	N 16	XTB3 + 10BFN	Tapping Screw $\oplus 3 \times 10$
25	SMN1948	Volume Angle	N 17	XTS3 + 8B	Tapping Screw $\oplus 3 \times 8$
26	SHR9745	LED Holder	N 18	XTN26 + 8B	Tapping Screw $\oplus 2.6 \times 8$
27	SGE1722	Cassette Lid Assembly	N 19	XTWQC3 + 6M	Tapping Screw $\oplus 3 \times 6$
28	SKA11630K99	Case Cover Assembly	N 20	XWA3B	Washer 3ϕ
29	SBN1191	Volume Knob Assembly	N 21	XWG3	Washer 3ϕ
30	SBN1190	Volume Knob (B)	N 22	XUBQ4FT	Stop Ring 4ϕ
31	QGT1660	Volume Knob (C)	N 23	[E][EK] [XL] XTV3 + 25BFN	Tapping Screw $\oplus 3 \times 25$
32	SGYSB85-KN	Front Panel Assembly	ACCESSORIES		
33	SDU265	Meter Filter	A 1	QEB0125	Connection Cord
34	SBCSB85-KN	Operation Button Assembly	A 2 [M] SQF12285	Instruction Book	
35	SUW2899-1	Button Angle	A 2 [MC] SQF12286	Instruction Book	
36	QMH2098KA	Cassette Holder	[E][EK] [XA][XL] SQF12287	Instruction Book	
37	QBP1946	Tape Pressure Spring	A 3	[XA] Δ SJP9215	AC Plug Adaptor
38	QBN1961	Holder Spring	PACKINGS		
39	QYF0627A	Damper Gear Assembly	P 1 [M] SPG5167	Inner Carton	
40	SUW2907	Side Angle (R)	P 1 [MC] [E][EK] [XA][XL] SPG5168	Inner Carton	
41	QMA4552	Holder Angle (L)	P 2	QPA0701B	Cushion
42	QMA4635	Side Angle(L)	P 3	QPA0702B	Pad
43	QKJ0648	Cord Clamper	P 4	XZB40X60A02	Poly Bag
44					
[E][EK] [XA][XL]	SMX845	Spark Killer Cover			
45					
[M][MC] Δ RJA9YA-K		AC Power Cord			
45 [E] Δ SJA138-3		AC Power Cord			
45 [EK] Δ QFC1205M		AC Power Cord			
45 [XL] Δ SJAG23		AC Power Cord			
45 [XA] Δ RJA52YAK		AC Power Cord			
46	SUW2901	Main P.B. Angle			
47	SUW2902	NR Switch Angle			
48	QG02141K	Eject Button			
49	QMA4645	Remote Control Angle			
50	QKJ0661	Latch (for J2)			
51					
[EK][XL]	SGT34990	Main Name Plate			
51 [XA]	SGT35000	Main Name Plate			



52	45	12	51
21	22	17	7 14 10 49 50
10	9	40	

KM KMC KE KEK KXA KXL

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