

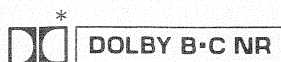
Service Manual

****dbx/Dolby B • C NR-Equipped
Stereo Cassette Deck**

Cassette Deck

RS-B405

Color



(K)...Black Type
(S)...Silver Type



Color	Areas
(K)	[MC].....Canada.
(K) (S)	[EG].....F.R. Germany.
(K) (S)	[EH].....Holland.
(K) (S)	[XA].....Asia, Latin America, Middle Near East and Africa.
(K) (S)	[XL].....Australia.
(K) (S)	[XB].....Saudi Arabia.

RS-B405 MECHANISM SERIES

SPECIFICATIONS

■ CASSETTE DECK SECTION

Deck system	Stereo cassette deck
Track system	4-track, 2-channel
Heads	
REC/PLAY	Solid Permaloy head
Erasing	Double-gap ferrite head
Motors	Electronically controlled DC motor
Recording system	AC bias
Bias frequency	80 kHz
Erasing system	AC erase
Tape speed	4.8 cm/sec. (1-7/8 ips)
Frequency response	
METAL	20 Hz~18 kHz
	30 Hz~17 kHz (DIN)
	40 Hz~17 kHz (±3 dB)
CrO ₂	20 Hz~17 kHz
	30 Hz~16 kHz (DIN)
	40 Hz~16 kHz (±3 dB)
NORMAL	20 Hz~16 kHz
	30 Hz~15 kHz (DIN)
	40 Hz~15 kHz (±3 dB)
Dynamic Range (with dbx in)	110 dB (1 kHz)
S/N (signal level = max recording level, CrO ₂ type tape)	
Max. Input level improvement (with dbx in)	10 dB
dbx in	92 dB (A weighted)
Dolby C NR in	74 dB (CCIR)
Dolby B NR in	66 dB (CCIR)
NR out	56 dB (A weighted)
Wow and flutter	0.08% (WRMS)
	±0.2% (DIN)

Fast Forward and Rewind Time

Approx. 100 seconds with C-60 cassette tape

Input sensitivity and impedance

MIC	0.25 mV/400 Ω~10 kΩ
LINE	60 mV/47 kΩ

Output voltage and impedance

LINE	400 mV/2.2 kΩ
HEADPHONES	80 mV/8 Ω

■ GENERAL

Power consumption 17W

Power supply

For Canada	AC 60 Hz, 120V
For continental Europe	AC 50 Hz/60 Hz, 220V
For other	

AC 50 Hz/60 Hz, 110V/127V/220V/240V

Dimensions (W×H×D) 430 × 102 × 237 mm
(16-15/16" × 3-31/32" × 9-13/32")

Weight 3.5 kg (7.5 lb.)

Note:

Specifications are subject to change without notice.
Weight and dimensions are approximate.

* Dolby noise reduction manufactured under license from
Dolby Laboratories Licensing Corporation.
"Dolby" and the double-D symbol are trade marks of Dolby
Laboratories Licensing Corporation.

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

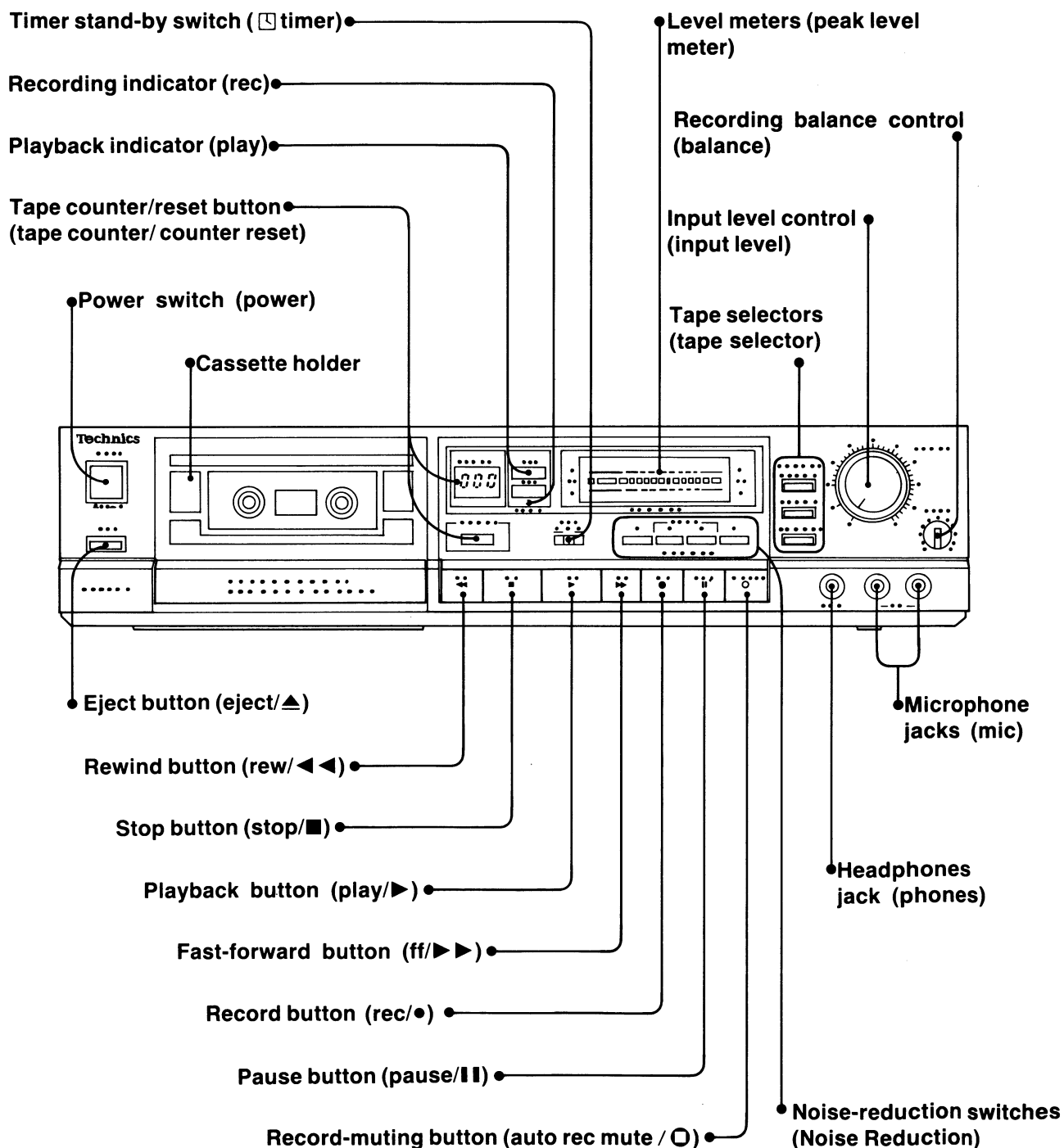
Technics

Matsushita Electric of Canada Limited
5770 Ambler Drive, Mississauga, Ontario, L4W2T3
Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

■ CONTENTS

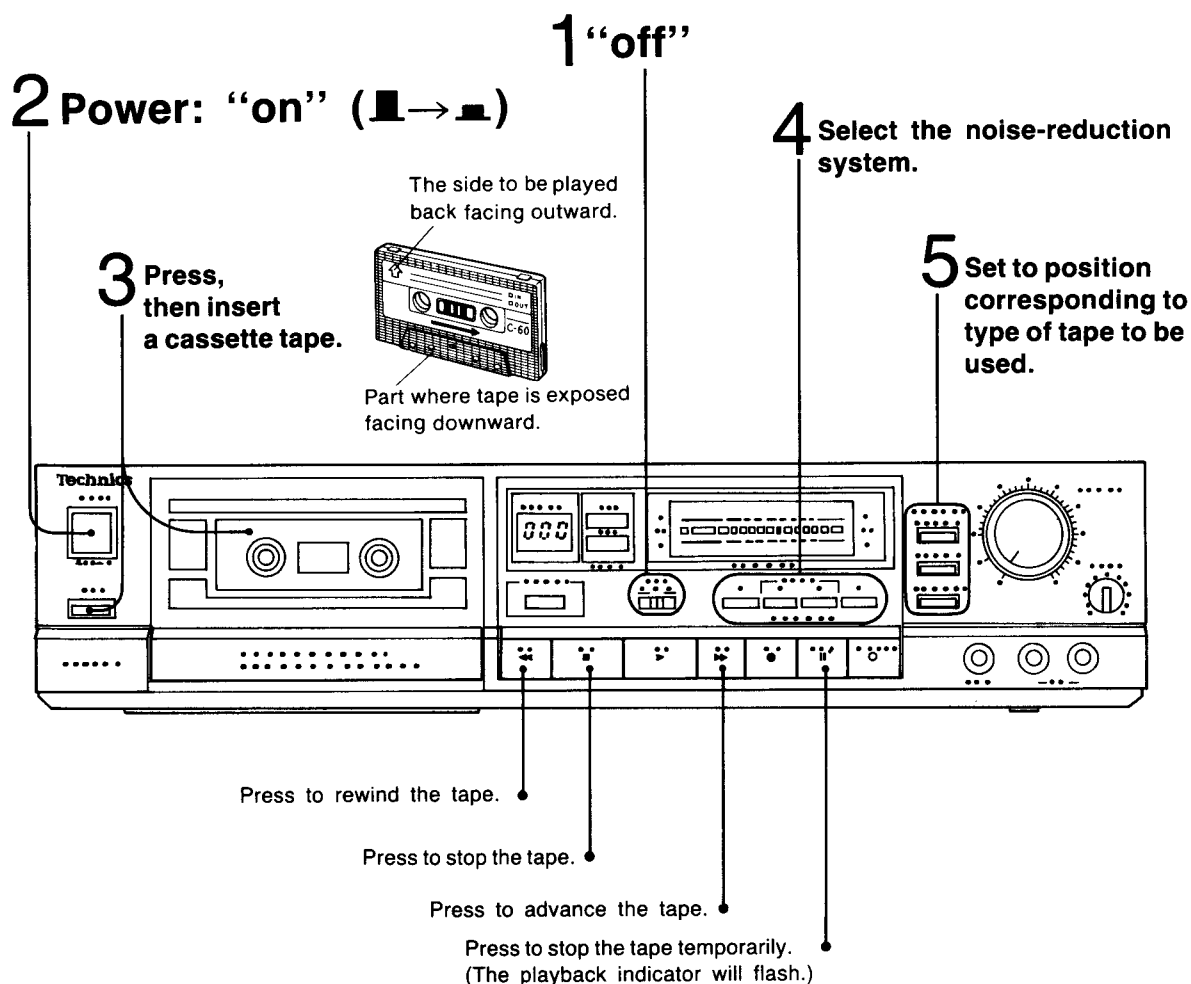
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■ LOCATION OF CONTROLS



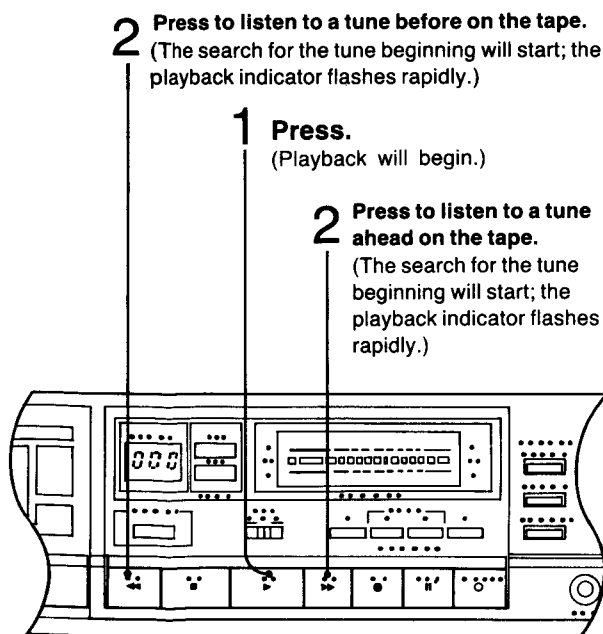
■ OPERATION

Standard Operating Procedures



Auto music select

This feature is used to locate the beginning of the current of following song.



Notes:

The following describes those instances in which the tape that is fast-forwarded or rewound does not stop at the beginning, or stops in the middle, of a song:

- When the music is very soft, e.g., classical music which is mainly pianissimo
- When there is sustained silence of 4 seconds or more within the recording (e.g., of a conversation or a lecture)
- When the interval between songs is very short or contains audible noise
- Tapes recorded by using fade-in or fade-out techniques.

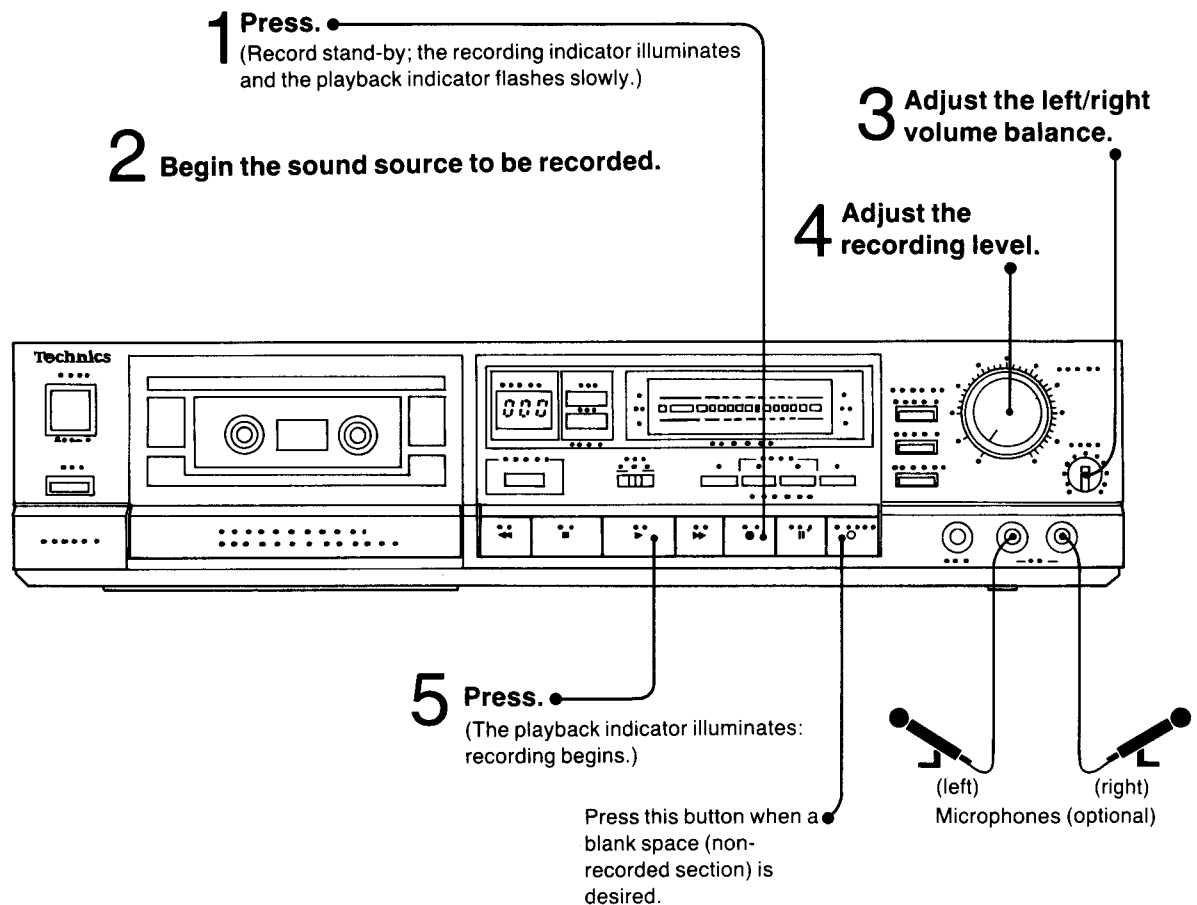
• Fade-in and fade-out

To start a recording with the volume level at minimum ("0") and gradually increase to the ordinary recording level is called the "fade-in" technique. Conversely, to end a recording by gradually reducing the volume level to minimum is called the "fade-out" technique.

Music select system manufactured under license of Starr, S.A., Bruxelles, Belgium.

Recording

Have you completed the “Standard Operating Procedures” (page 3) ?



Adjustment of the recording level

The numbers which you should use as a guide for the adjustment of the tape level will differ depending upon the type of tape used.

Noise Reduction (NR)	Normal Tape CrO ₂ Tape	Metal Tape
dbx	+8 dB	+12 dB
Dolby NR B•C NR out	+6 dB	+8 dB

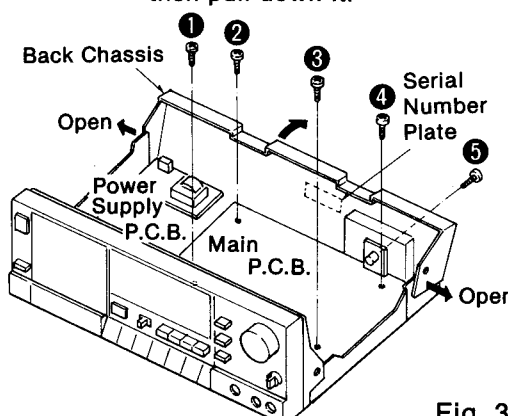
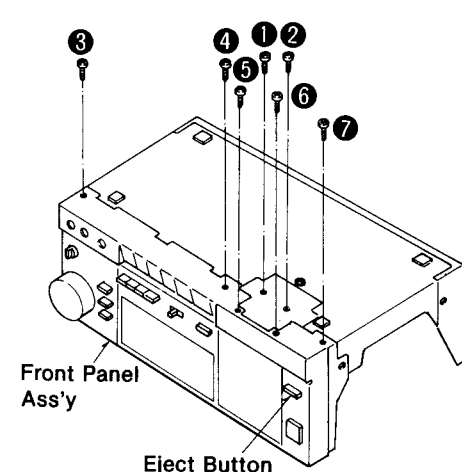
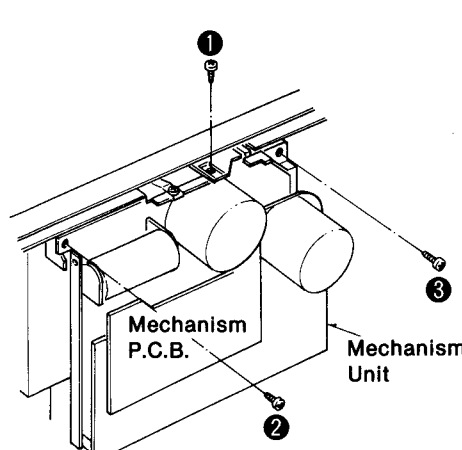
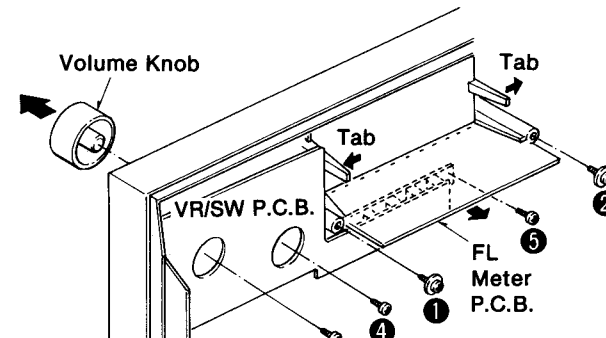
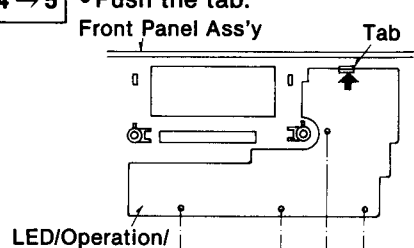
•Make the adjustment so that the maximum level indicated in the table illuminated.

To erase recorded sounds

Note that any sounds on the tape will be automatically erased if a new recording is made on that part of the tape.

- 1 Press the noise-reduction select button marked “out”.**
- 2 Set the input level control to the minimum (0) position.**
- 3 Prepare in the same way as for recording, and then let the tape run.**

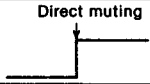
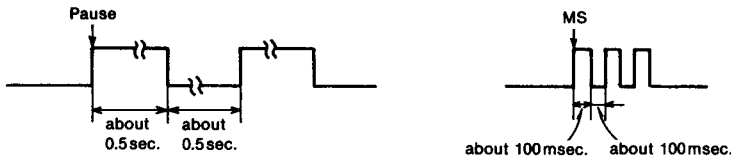
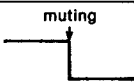
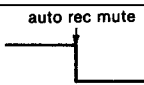
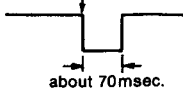
■ DISASSEMBLY INSTRUCTIONS

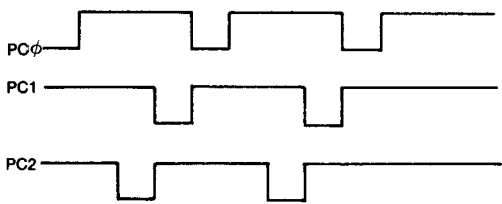
Ref. No. 1	How to remove the cabinet	Ref. No. 3	How to remove the main P.C.B.	
Procedure 1	Remove the 4 screws and remove the cabinet.	Procedure 1 → 3	- Remove the 5 screws (①~⑤). - Open the sides of back chassis, and then pull down it.	
Ref. No. 2	How to remove the mechanism unit	 Fig. 3		
Procedure 1 → 2	- Remove the 2 screws (①, ②). - Push the eject button.			
 Fig. 1 ↓ Remove the 3 screws (①~③).  Fig. 2		Ref. No. 4		How to remove the VR/SW P.C.B. and FL meter P.C.B.
		Procedure 1 → 4	- Remove the 2 screws (①~②). - Push the 2 tabs, and then remove the FL meter P.C.B. - Remove the 3 screws (③~⑤). - Pull out the volume knob, and then remove the VR/SW P.C.B.	
		 Fig. 4		
		Ref. No. 5	How to remove the LED/operation SW P.C.B.	
		Procedure 1 → 3 → 4 → 5	- Remove the 4 screws (①~④). - Push the tab.	
		 Fig. 5		
		Ref. No. 6	How to remove the front panel	
		Procedure 1 → 3 → 4 → 5 → 6	Remove the 5 screws (③~⑦). (See Fig. 1)	

* Serial No. Indication

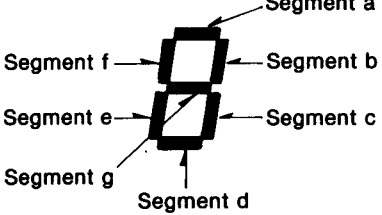
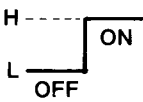
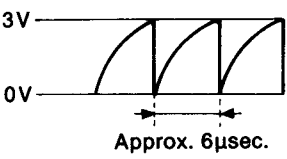
- The serial number plate of this product is attached to the back chassis (shown in Fig. 3).

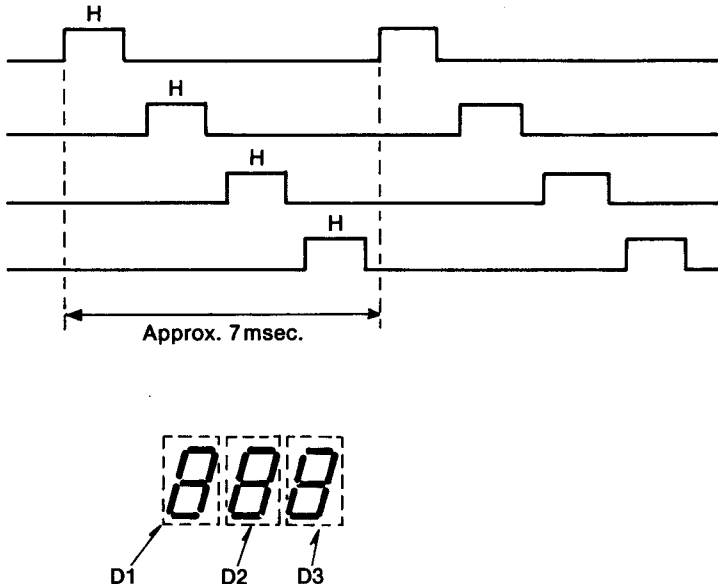
■ MICROCOMPUTER TERMINAL FUNCTION AND WAVEFORM (IC901: LM6416E-1984) * This microcomputer is used for mechanical operation.

Terminal No.	Symbol	Function/operation
1.	PD ϕ	REC LED • "L" in rec mode, light up in rec mode. • Light up in immediately after timer rec command given.
2.	PD1	Bias control • "L" in rec mode only.
3.	PD2	Music select function detection • In power on mode, music select function is detected. • "L" in music select function "off", "H" in music select function "on".
4.	PD3	Power off detection • In power off mode, "H" in direct muting mode. 
5.	Extal	Clock oscillation
6.	Xtal	• Clock oscillation of about 400kHz
7.	INT	Reel table rotation detection • Rotation of reel table is detected by photo sensor for the detection of tape end.
8.	RES	Reset terminal • Used to reset the microcomputer when power is thrown in.
9.	PE ϕ	PLAY LED • Light up in play mode. • In pause mode, LED is lit up or down at intervals of about 0.5sec. • In music select mode, LED is lit up or down at intervals of about 100msec. 
10.	PE1	Plunger drive • PE1 terminal serves to retain the attraction of plunger to keep the state of Cue/Review during music select mode.
11.	PE2	Direct muting output • "L" in muting mode. 
12.	PE3	Auto rec mute output • In rec mode only, "L" in auto rec mute mode. 
13.	TEST	• Connection to GND
14.	V _{ss}	
15.	PF ϕ	Capstan motor drive • "H" when power is thrown in. • When mechanism mode is changed over, the level goes "L".
16.	PF1	FF/REW motor control • "H" in rew mode.
17.	PF2	FF/REW motor control • "H" in FF/Play mode.
18.	PF3	FF/REW motor torque control • "L" in play mode.
19.	PG ϕ	Plunger drive • The level goes "L" for about 70msec. when the mechanism mode is changed (when shifting the head angle.) 
20.	V _{DD}	Power supply • Operative on about 5.6 volts.
21.	PA ϕ	Input switch stage reading • Input of rec inh. switch (S901) and FF switch (S704). • The above-mentioned inputs are read in accordance with PC ϕ and PC2.
22.	PA1	Input switch stage reading. • Input of mechanism play switch (S902), play switch (S703) and auto rec mute switch (S707). • The above-mentioned inputs are read in accordance with PC ϕ ~PC2.

Terminal No.	Symbol	Function/operation
23.	PA2	Input switch stage reading • Input of timer play switch (S708), stop (S702) and rec switch (S705). • The above-mentioned inputs are read in accordance with PC ϕ ~PC2.
24.	PA3	Input switch stage reading • Input of timer rec switch (S708), rew switch (S701) and pause switch (S706). • The above mentioned inputs are read in accordance with PC ϕ ~PC2.
25. 26. 27.	PC ϕ PC1 PC2	Input switch scanning 
28.	PC3	• Non connection.

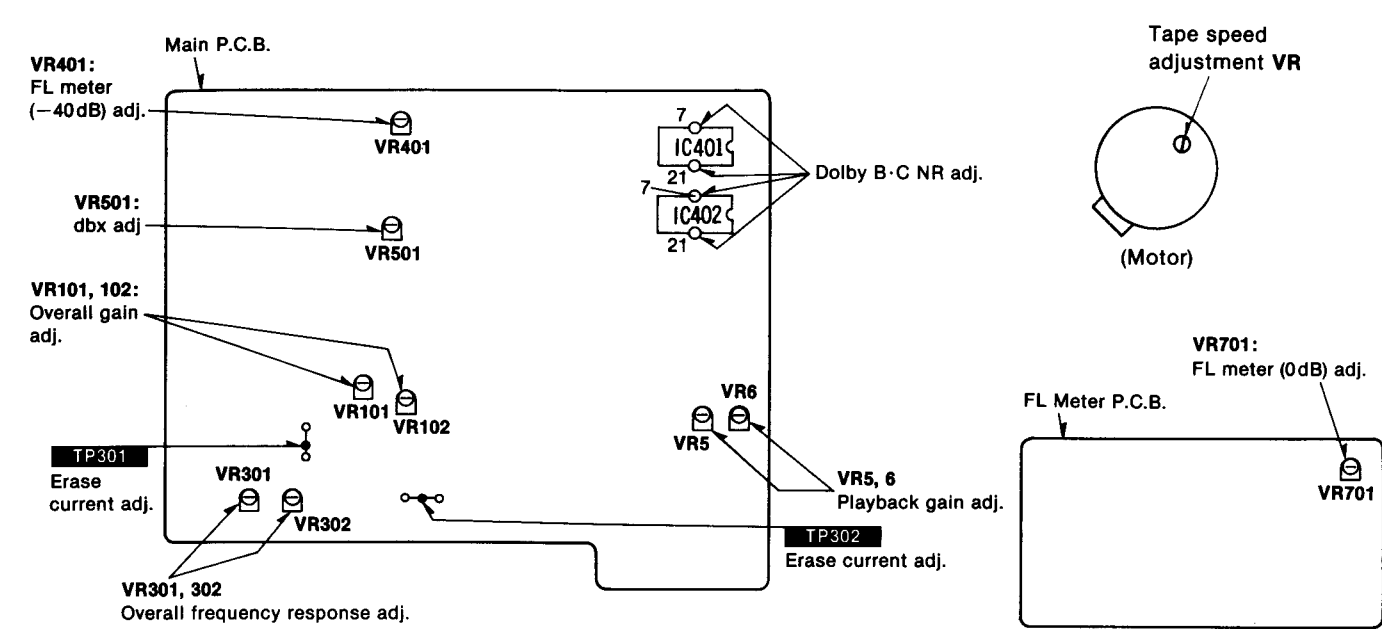
(IC702: LM6417E-589) * This microcomputer is used for tape counter operation.

Terminal No.	Symbol	Name	Function/operation
1.	PD ϕ	Counter Segment a	Number indication  
2.	PD 1	Counter Segment b	
3.	PD 2	Counter Segment c	
4.	PD 3	Counter Segment d	
5.	OSC	Oscillation Terminal	• Clock oscillation of about 200kHz.  Note) Do not connect anything to this terminal during other measurement because it will be otherwise affected by the probe.
6.	PE ϕ	Counter Segment e	• Refer to PD ϕ ~PD 3.
7.	PE 1	Counter Segment f	
8.	PE 2	Counter Segment g	
9.	PE 3	—	• Non connection.
10.	TEST	TEST	• Connection to GND.
11.	Vss	—	• Connection to GND.
12.	INT	—	• Non connection.
13.	RST	Reset Terminal	• Used to reset the microcomputer when power is thrown in. • Reset at "L" level (0.3 V _{DD} or less).
14.	V _{DD}	Power Supply Terminal	• Operative on approx. 5.0 volts.
15.	PA ϕ	Up/Down Command	• Selection of delay time for operation mode. • When diode (D252) is used, play time is zero.

Terminal No.	Symbol	Name	Function/operation
16.	PA 1	Counter Reset Input	• In "L" level, counter indication is reset to <i>000</i>
17.	PA 2	Counter Up/Down Input	• Up counting with "H" level. • Down counting with "L" level.
18.	PA 3	Reel Table Pulse	• The rotation of reel table is detected by photo sensor, and the pulses are used to carry up or down for the counter. • With the takeup reel table rotated twice, the count number changes.
19.	PC ϕ	Input Scan only	 Approx. 7msec. D1 D2 D3
20.	PC 1	Counter D1 & Input Scan	
21.	PC 2	Counter D2 & Input Scan	
22.	PC 3	Counter D3 & Input Scan	

MEASUREMENT AND ADJUSTMENT METHODES

Adjustment Point



Measurement Condition

- Input level controls; Maximum
- Balance controls; Center
- Tape select switch; Normal
- Dolby NR switch; Out
- Timer start switch; Off
- Make sure heads are clean
- Make sure capstan and pressure roller are clean.
- Judgeable room temperature $20 \pm 5^\circ\text{C}$ ($68 \pm 9^\circ\text{F}$)

Measuring instrument

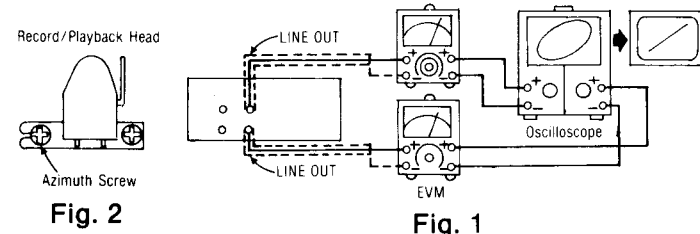
- EVM (Electronic Voltmeter)
- Oscilloscope
- Digital frequency counter
- AF oscillator
- ATT (Attenuator)
- DC voltmeter
- Resistor (600Ω)

Test tape

- Head azimuth adjustment (8kHz, -20dB); QZZCFM
- Tape speed adjustment (3kHz, -10dB); QZZCWAT
- Playback frequency response (315Hz, 12.5kHz, 10kHz, 8kHz, 4kHz, 1kHz, 250Hz, 125Hz, 63Hz, -20dB); QZZCFM
- Playback gain adjustment (315Hz, 0dB); QZZCFM
- Overall frequency response, Overall gain adjustment
 - Normal reference blank tape; QZZCRA
 - CrO₂ reference blank tape; QZZCRX
 - Metal reference blank tape; QZZCRZ

Head azimuth adjustment

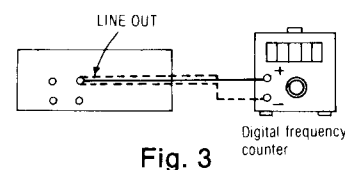
1. Test equipment connection is shown in Fig. 1.
2. Playback the azimuth adjusted part (8kHz, -20dB) of the test tape (QZZCFM) and regulate the angle adjusting screw so that the outputs of L-CH and R-CH are maximized. (When the adjusting positions are different with L-CH and R-CH, find a position where the outputs of L-CH and R-CH are balanced, and then make the adjustment.)
3. At the same time, obtain a lissajous waveform and eliminate phase deflection.
4. After adjustment, lock the tape guide height and angle adjustment screws.



Tape speed adjustment

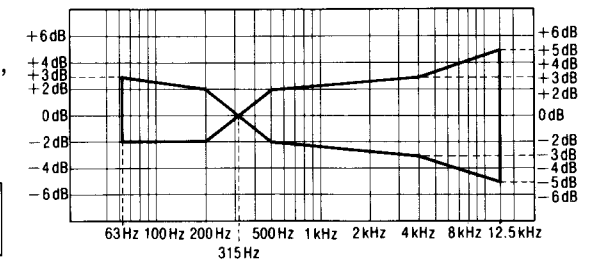
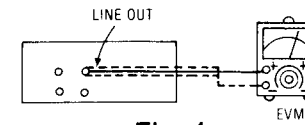
1. Test equipment connection is shown in Fig. 3.
2. Playback the middle part of the test tape (QZZCWAT).
3. Adjust the VR in the motor so that the output is within the standard.

Standard value: $3000 \pm 20\text{Hz}$



Playback frequency response

1. Test equipment connection is shown in Fig. 4.
2. Playback the playback frequency response part (315Hz, 12.5kHz~63Hz, -20dB) of the test tape (QZZCFM).
3. Check that the frequency is within the range shown in Fig. 5 for both L-CH and R-CH.



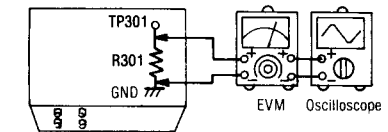
Playback gain adjustment

1. Test equipment connection is shown in Fig. 4.
2. Playback the playback gain adjusted part (315Hz, 0dB) of the test tape (QZZCFM).
3. Adjust VR5, (L-CH) (VR6 (R-CH)) so that the output is within the standard.

Standard value: $0.4 \pm 0.5\text{dB}$ (0.02V)

Erase current adjustment

1. Test equipment connection is shown in Fig. 6.
2. Set the tape selector switch to the metal position.
3. Insert the metal tape.
4. Press the record and pause buttons.
5. At this time make sure that the output between TP301 and the ground is within the standard.
6. Cut off TP302 if the value is smaller than 240mA.

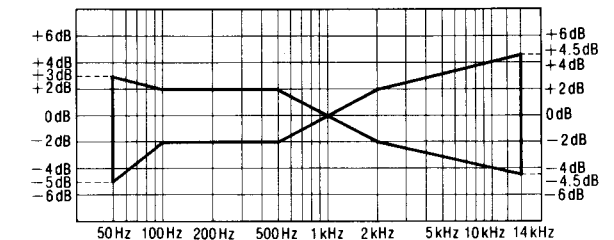
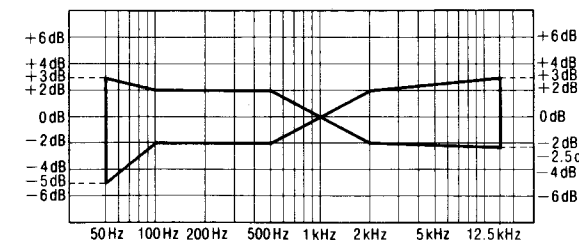
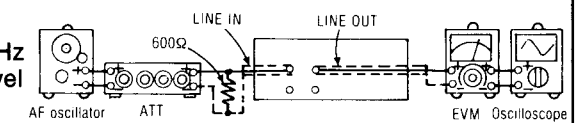


Standard value: $210 \pm 30\text{mA}$ (Metal) ($210 \pm 30\text{mV}$)

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

Overall frequency response

1. Test equipment connection is shown in Fig. 7.
2. Set the tape selector switch to the normal position.
3. Set a normal blank tape (QZZCRA) and record by applying signal (50Hz, 100Hz, 200Hz, 500Hz, 1kHz, 4kHz, 8kHz, 10kHz and 12.5kHz), 20dB attenuated from the reference input level signal (1kHz, -24dB).
4. Playback the signal recorded in step 3, and check that the level of each output frequency is within the range shown in Fig. 8 in comparison with the reference frequency (1kHz).
5. If it is not within the standard range, adjust the bias current by VR301 (L-CH) (VR302 (R-CH)) so that the frequency level is within the standard.
 - Level up in high frequency range.....Increase the bias current.
 - Level down in high frequency range.....Decrease the bias current.
6. After that increase the signal recorded on CrO₂ blank tape (QZZCRX) and metal blank tape (QZZCRZ) up to 14kHz and adjust in the same way as mentioned above and check that the frequency level is within the range shown in Fig. 9.



Overall gain

1. Test equipment connection is shown in Fig. 4.
2. Set the tape selector switch to the normal position.
3. Set a normal blank tape (QZZCRA) and record by applying signal (1kHz, -20dB) of the test tape (QZZCFM).
4. Adjust the VR101, 102 so that the output is within the standard.
5. Playback the signal recorded in step 3, and check that the level of each output frequency is within the range shown in Fig. 5 for both L-CH and R-CH.
6. If it is not within the standard range, adjust the bias current by VR301 (L-CH) (VR302 (R-CH)) so that the frequency level is within the standard.

Fluorescent

1. Test equipment connection is shown in Fig. 4.
2. Set a normal blank tape (QZZCRA) and record by applying signal (1kHz, -20dB) of the test tape (QZZCFM).
3. Adjust the VR101, 102 so that the output is within the standard.
4. Apply level signal (1kHz, -20dB) of the test tape (QZZCFM).
5. Adjust VR401 so that the output is within the standard.
6. Adjust VR701 so that the output is within the standard.
7. Repeat the steps 4 and 5.

Dolby NR circuit

1. Test equipment connection is shown in Fig. 4.
2. Set a normal blank tape (QZZCRA) and record by applying signal (1kHz, -20dB) of the test tape (QZZCFM).
3. Adjust by VR401 (L-CH) (VR402 (R-CH)) so that the output is within the standard.
4. Set NR switch to the normal position.
5. Check that the output is within the standard.

Dolby C (E)

1. Test equipment connection is shown in Fig. 4.
2. Set NR switch to the normal position.
3. Check that the output is within the standard.

dbx attack

1. Test equipment connection is shown in Fig. 4.
2. Set a normal blank tape (QZZCRA) and record by applying signal (1kHz, -20dB) of the test tape (QZZCFM).
3. Apply 1kHz signal (1kHz, -20dB) of the test tape (QZZCFM).
4. Adjust by VR501 (L-CH) (VR502 (R-CH)) and VR503 so that the output is within the standard.
5. Adjust VR504 so that the output is within the standard.

Tape speed
adjustment VR

(Motor)

VR701:
FL meter (0dB) adj.

C.B.

VR701

er are clean.
C (68±9°F)

HB); QZZCFM
gain adjustment
RA
K
Z

Oscilloscope

Digital frequency
counter

3

Playback frequency response

1. Test equipment connection is shown in Fig. 4.
2. Playback the playback frequency response part (315Hz, 12.5kHz~63Hz, -20dB) of the test tape (QZZCFM).
3. Check that the frequency is within the range shown in Fig. 5 for both L-CH and R-CH.

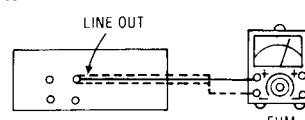


Fig. 4

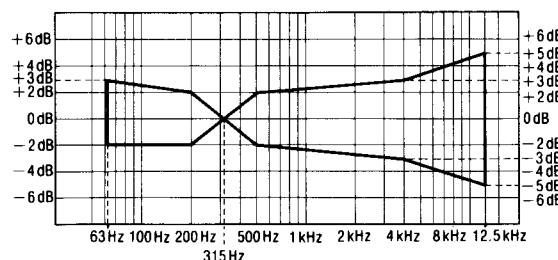


Fig. 5

Playback gain adjustment

1. Test equipment connection is shown in Fig. 4.
2. Playback the playback gain adjusted part (315Hz, 0dB) of the test tape (QZZCFM).
3. Adjust VR5, (L-CH) (VR6 (R-CH)) so that the output is within the standard.

Standard value: $0.4 \pm 0.5 \text{ dB}$ (0.02V)

Erase current adjustment

1. Test equipment connection is shown in Fig. 6.
2. Set the tape selector switch to the metal position.
3. Insert the metal tape.
4. Press the record and pause buttons.
5. At this time make sure that the output between TP301 and the ground is within the standard.
6. Cut off TP302 if the value is smaller than 240mA.

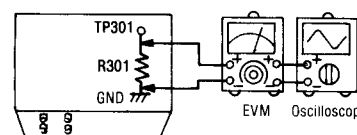


Fig. 6

Standard value: $210 \pm 30 \text{ mA}$ (Metal) ($210 \pm 30 \text{ mV}$)

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

Overall frequency response

1. Test equipment connection is shown in Fig. 7.
2. Set the tape selector switch to the normal position.
3. Set a normal blank tape (QZZCRA) and record by applying signal (50Hz, 100Hz, 200Hz, 500Hz, 1kHz, 4kHz, 8kHz, 10kHz and 12.5kHz), 20dB attenuated from the reference input level signal (1kHz, -24dB).
4. Playback the signal recorded in step 3, and check that the level of each output frequency is within the range shown in Fig. 8 in comparison with the reference frequency (1kHz).
5. If it is not within the standard range, adjust the bias current by VR301 (L-CH) (VR302 (R-CH)) so that the frequency level is within the standard.
 - Level up in high frequency range..... Increase the bias current.
 - Level down in high frequency range..... Decrease the bias current.
6. After that increase the signal recorded on CrO₂ blank tape (QZZCRX) and metal blank tape (QZZCRZ) up to 14kHz and adjust in the same way as mentioned above and check that the frequency level is within the range shown in Fig. 9.

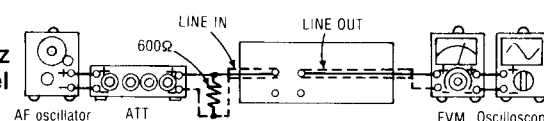


Fig. 7

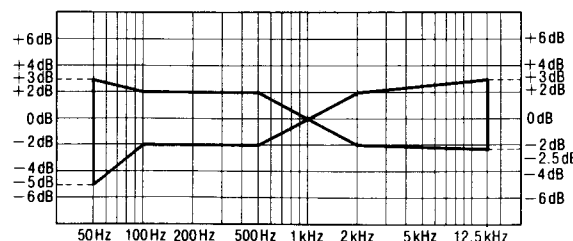


Fig. 8

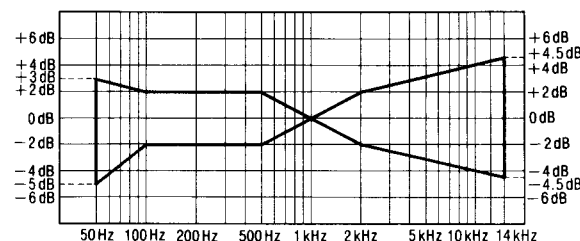


Fig. 9

Overall gain adjustment

1. Test equipment connection is shown in Fig. 7.
2. Set the tape selector switch to the normal position.
3. Set a normal blank tape (QZZCRA) and apply the reference input level signal (1kHz, -24dB) in record pause mode.
4. Adjust the output 0.42V by attenuator and then record.
5. Playback the signal recorded in step 3, and check that the output is within the standard.
6. If it is not within the standard, adjust VR101 (L-CH) (VR102 (R-CH)) and repeat the step (2), (3) and (4) until the output is within the standard.

Standard value: $0.4 \text{ V} \pm 0.05 \text{ V}$

Fluorescent meter adjustment

1. Test equipment connection is shown in Fig. 7.
2. Set a normal blank tape (QZZCRA) and apply the reference input level signal (1kHz, -24dB) in record pause mode.
3. Adjust the output to 0.4V by attenuator.
 - -40dB adjustment —
4. Apply level signal 40dB attenuated from the input of step 2.
5. Adjust VR401 so that the -40dB segment part is half lighted. (See Fig. 10.)
 - 0dB adjustment —
6. Adjust VR701 so that the 0dB segment part is half lighted when the input of step 2 is applied. (See Fig. 11.)
7. Repeat the above steps (2), (3), (4), (5) and (6) and check that both -40dB and 0dB segment parts are half lighted.

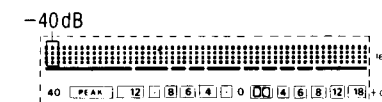


Fig. 10

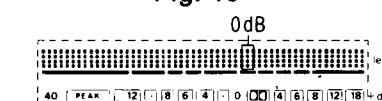


Fig. 11

Dolby NR circuit

1. Test equipment connection is shown in Fig. 12.
2. Set a normal tape and apply 1kHz signal in record pause mode.
3. Adjust by attenuator so that the output between terminal 7 of IC401 (L-CH) (IC402 (R-CH)) and ground is 12.3mV.

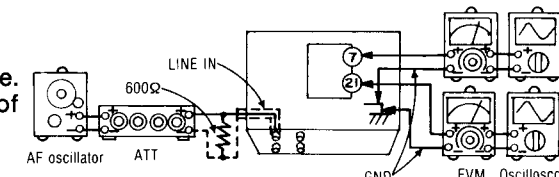


Fig. 12

— Dolby B (Encode characteristic) —

4. Set NR switch to "Dolby B" and change the input signal to 1kHz, 5kHz.
5. Check that the output between terminal 21 of IC401 (L-CH) (IC402 (R-CH)) and ground change as specified from the level in NR out mode.

Standard value: $6 \pm 2.5 \text{ dB}$ (1kHz), $8 \pm 2.5 \text{ dB}$ (5kHz)

— Dolby C (Encode characteristic) —

6. Set NR switch to "Dolby C" and change the input signal to 1kHz, 5kHz.
7. Check that the output between terminal 21 of IC401 (L-CH) (IC402 (R-CH)) and ground change as specified from the level in NR out mode.

Standard value: $11.5 \pm 2.5 \text{ dB}$ (1kHz), $8.5 \pm 2.5 \text{ dB}$ (5kHz)

dbx attack recovery time adjustment

1. Test equipment connection is shown in Fig. 13.
2. Set a normal tape and NR switch to "dbx".
3. Apply 1kHz, -27dB signal in record pause mode.
4. Adjust by attenuator so that the output between C541 (L-CH) (C542 (R-CH)) and ground is 300mV.
5. Adjust VR501 that the DC voltmeter reading is within the reference.

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

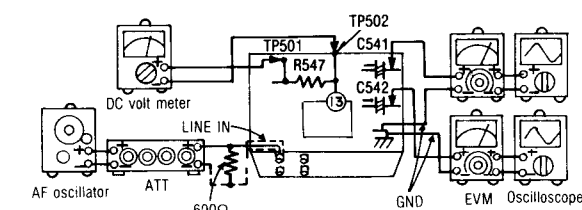
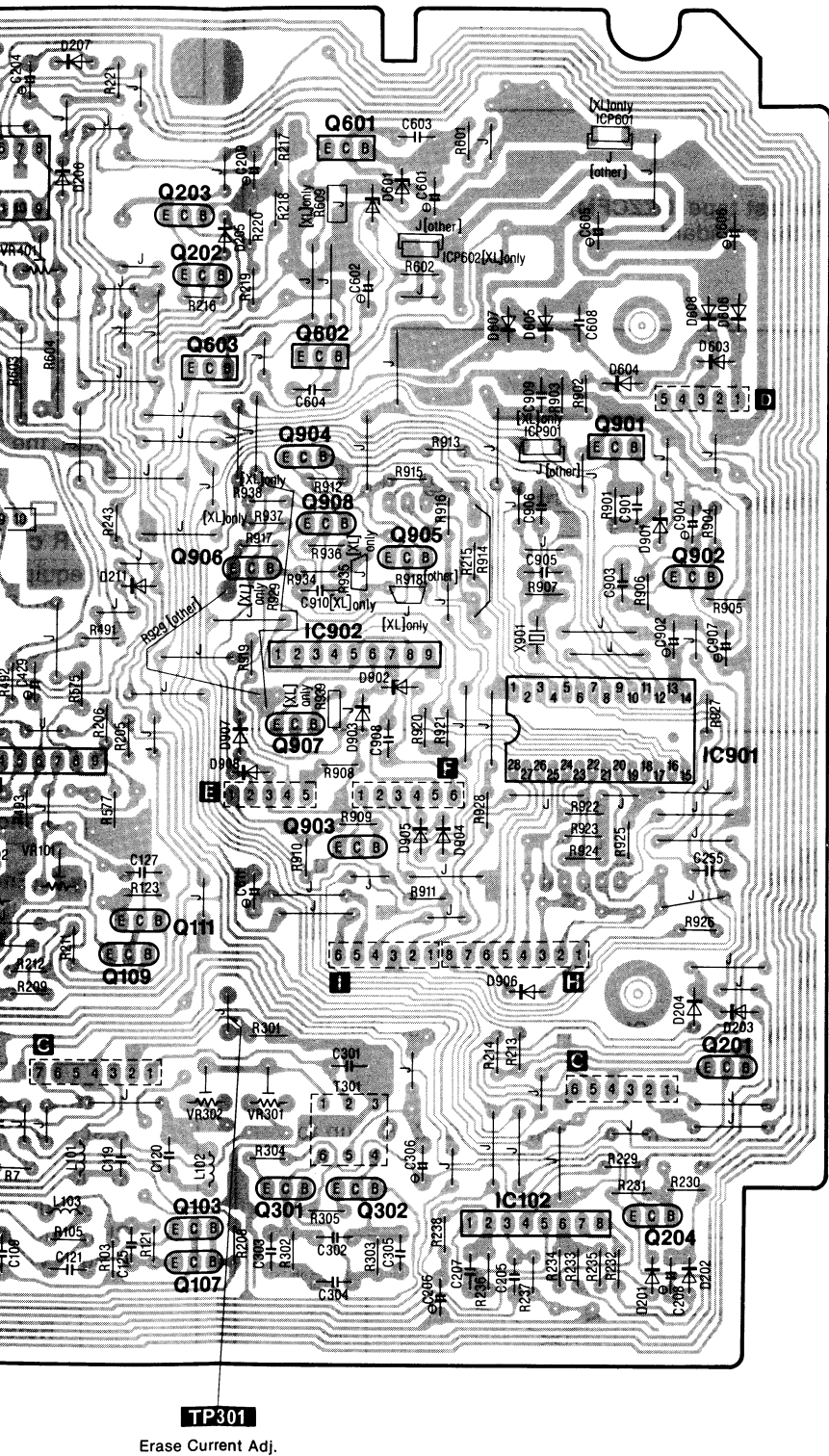
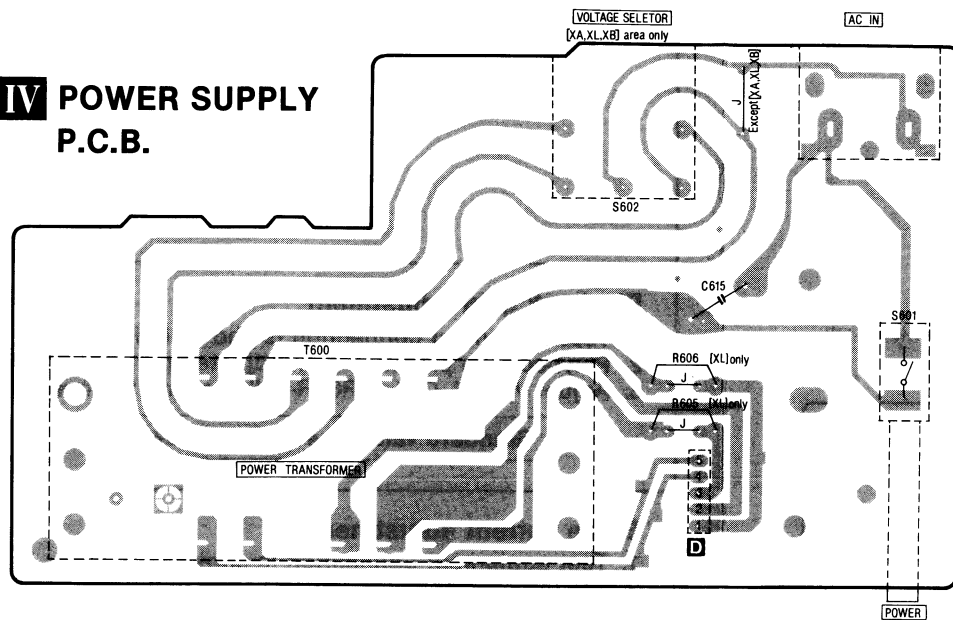


Fig. 13

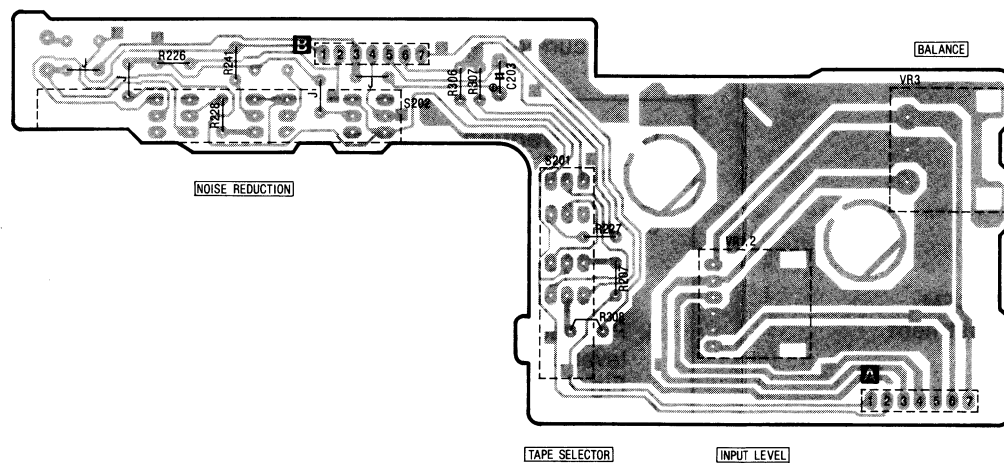
www.hifiengine.com



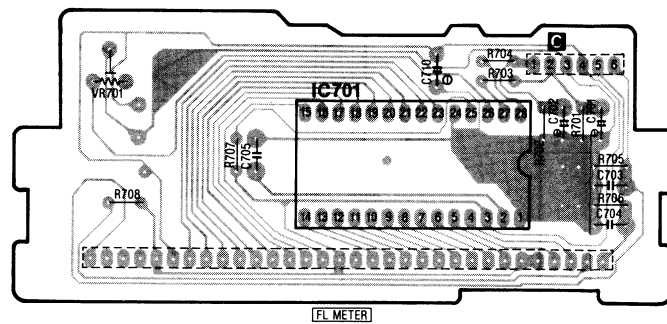
IV POWER SUPPLY P.C.B.



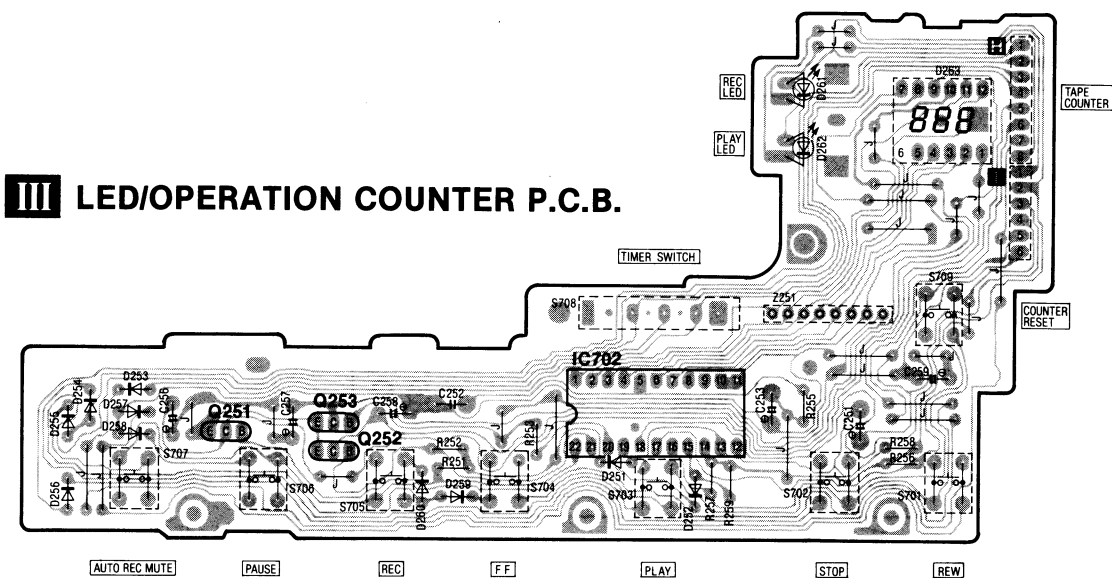
II VR/SW P.C.B.



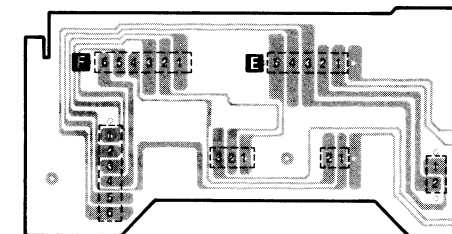
VI FL METER P.C.B.



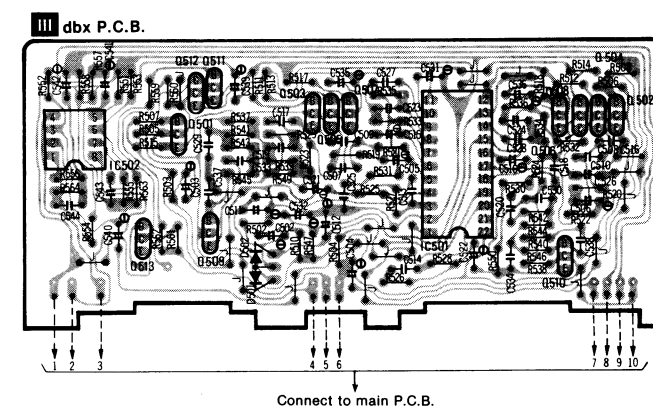
III LED/OPERATION COUNTER P.C.B.



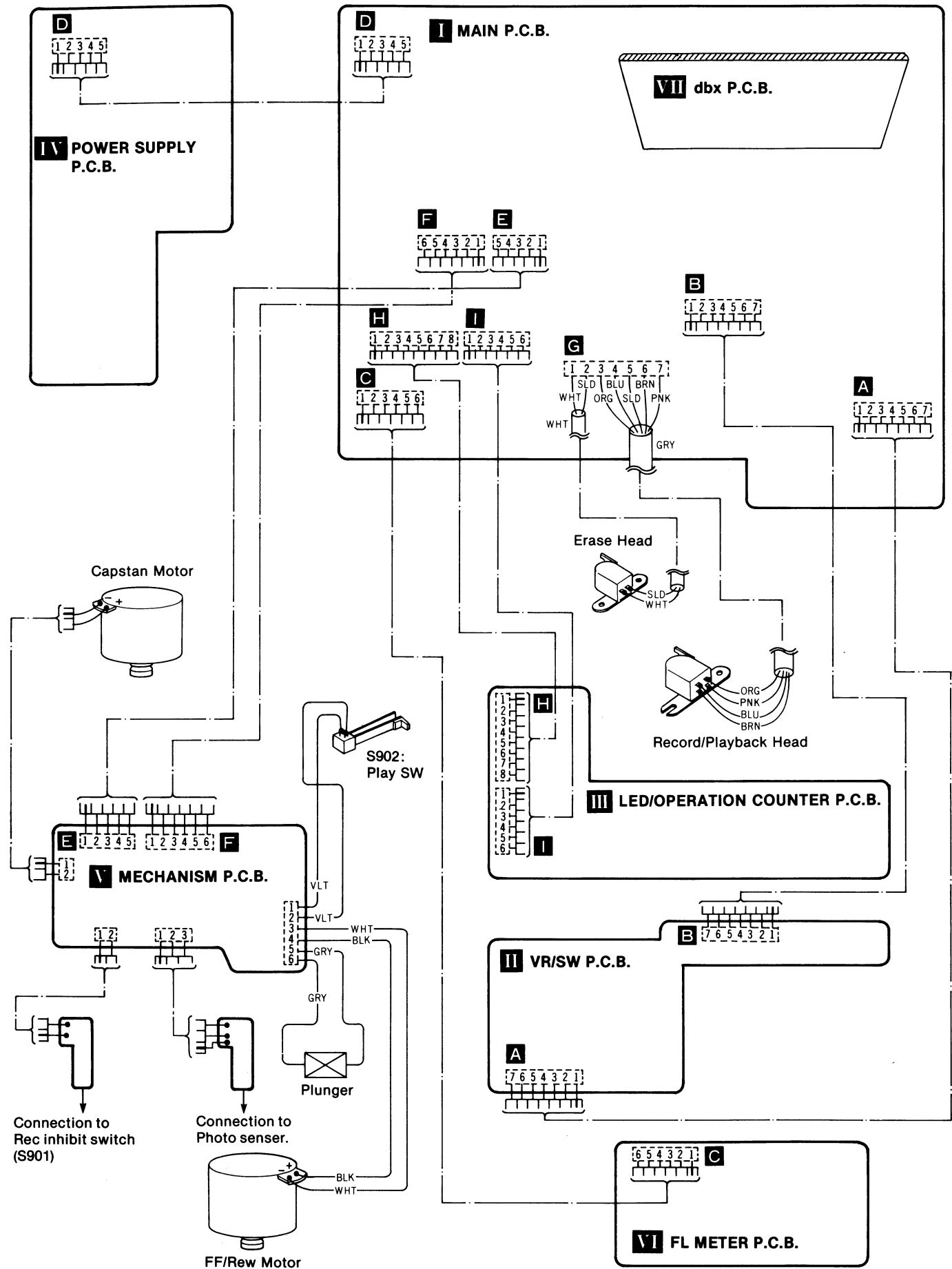
V MECHANISM P.C.B.



VII dbx P.C.B.



■ WIRING CONNECTION DIAGRAM



■ RESISTORS AND CAPACITORS

Notes: • Part numbers are indicated on most mechanical parts. Please use this part number for parts order.
• The unit of resistance is Ω (ohm).
K=1000 Ω , M=1000k Ω

Resistor Type	Wattage	Tolerance
ERD : Carbon	10 : 1/8W	G : $\pm 2\%$
ERO : Film	12 : 1/2W	J : $\pm 5\%$
ERG : Metal Oxide	25 : 1/4W	
ERC : Solid	1 : 1W	
	2 : 2W	
	S1 : 1/2W	
	S2 : 1/4W	

ERD10TLJ□□□ → Chip type carbon
ERO10MKG□□□ → Chip type metal film

• The unit of capacitance is μF (microfarad).
P=10 μF .
• Bracketed indications in Ref. columns specify the area.
Parts without these indications can be used for all area.

Capacitor Type	Voltage		Tolerance
	ECEA Type	Other	
ECEA : Electrolytic	0J : 6.3V	1H : 50V	C : $\pm 0.25\mu F$
ECCD : Ceramic	1A : 10V	2H : 500V	J : $\pm 5\%$
ECKD : Ceramic	1C : 16V	1 : 100V	K : $\pm 10\%$
ECQM : Polyester	1E : 25V	KC : 400V	Z : $\pm 80\%, -20\%$
ECQP : Polyester	1H : 50V		Y : $\pm 22\%$
ECET : Electrolytic	1J : 35V		
ECEA...N : Non-polar Electrolytic	1V : 35V		
	25 : 25V		
	56 : 56V		

• RESISTORS

Ref. No.	Part No.	Value	Ref. No.	Part No.	Value	Ref. No.	Part No.	Value	Ref. No.	Part No.	Value
R1, 2	ERDS2TJ223	22k	R233	ERDS2TJ393	39k	R493, 494	ERDS2TJ123	12k	R611	ERDS2TJ101	100
R3, 4	ERDS2TJ472	4.7k	R234	ERDS2TJ393	39k	R495, 496	ERDS2TJ153	15k	R701, 702	ERDS2TJ104	100k
R5, 6	ERDS2TJ155	1.5M	R235	ERDS2TJ103	10k	R502	ERD25TJ123	12k	R703, 704	ERDS2TJ102	1k
R7, 8	ERDS2TJ101	100	R236	ERDS2TJ563	56k	R503, 504	ERD25FJ102	1k	R705, 706	ERDS2TJ181	180
R9, 10	ERDS2TJ101	100	R237	ERDS2TJ102	1k	R505, 506	ERD25TJ104	100k	R707	ERDS2TJ181	180
R13, 14	ERDS2TJ473	47k				R507, 508	ERD25TJ104	100k	R708	ERDS2TJ103	10k
R15, 16	ERDS2TJ102	1k	R238	ERDS2TJ101	100	R510	ERD25FJ103	10k			
R17, 18	ERDS2TJ820	82	R239, 240	ERDS2TJ223	22k	R511, 512	ERD25TJ563	56k	R901	ERDS2TJ102	1k
R19, 20	ERDS2TJ102	1k	R241	ERDS2TJ473	47k	R513, 514	ERD25TJ223	22k	R902	ERDS2TJ182	1.8k
R21, 22	ERDS2TJ153	15k	R243	ERDS2TJ103	10k	R515, 516	ERD25FJ332	3.3k	R903	ERDS2TJ103	10k
			R244	ERDS2TJ183	18k				R904	ERDS2TJ471	470
R23, 24	ERDS2TJ564	560k	R251, 252	ERDS2TJ822	8.2k	R517, 518	ERD25TJ563	56k	R905, 906	ERDS2TJ103	10k
R25, 26	ERDS2TJ682	6.8k	R253	ERDS2TJ822	8.2k	R519, 520	ERD25TJ153	15k	R907	ERDS2TJ105	1M
R101, 102	ERDS2TJ272	2.7k	R255	ERDS2TJ273	27k	R521, 522	ERD25FJ472	4.7k	R908	ERDS2TJ471	470
R103, 104	ERDS2TJ122	1.2k	R256, 257	ERDS2TJ333	33k	R523, 524	ERD25FJ822	8.2k	R909	ERDS2TJ392	3.9k
R105, 106	ERDS2TJ470	47	R258, 259	ERDS2TJ333	33k	R525, 526	ERD25FJ102	1k	R910	ERDS2TJ223	22k
R109, 110	ERDS2TJ103	10k				R527, 528	ERD25FJ103	10k	R911	ERDS2TJ103	10k
R113, 114	ERDS2TJ103	10k	R290	ERDS2TJ103	10k	R529, 530	ERD25TJ333	33k			
R119, 120	ERDS2TJ682	6.8k	R301	ERDS2TJ1R0	1	R531, 532	ERD25FJ151	150	R912	ERDS2TJ104	100k
R121, 122	ERDS2TJ222	2.2k	R302, 303	ERDS2TJ683	68k	R533, 534	ERD25FJ472	4.7k	R913	ERDS2TJ821	820
R123, 124	ERDS2TJ822	8.2k	R304, 305	ERDS2TJ220	22	R535, 536	ERD25TJ153	15k	R914	ERG2ANJ330	33
			R306	ERDS2TJ391	390				R915	ERDS2TJ104	100k
			R307	ERDS2TJ181	180				R916	ERDS2TJ821	820
R201, 202	ERDS2TJ222	2.2k				R537, 538	ERD25TJ154	150k	R917	ERDS2TJ104	100k
R203	ERDS2TJ223	22k	R308	ERD2FCG560	56	R539, 540	ERD25TJ244	240k	R918	ERDS2TJ821	820
R204	ERDS2TJ153	15k	[XL] only			R541, 542	ERD25FJ472	4.7k			
R205	ERDS2TJ223	22k	R308 [other]	ERDS2TJ560	56	R543, 544	ERD25TJ153	15k	except [XL]		
R206	ERDS2TJ104	100k				R545, 546	ERD25TJ153	15k	R919	ERDS2TJ391	390
R207	ERDS2TJ472	4.7k				R547	ERD25FJ102	1k	R920, 921	ERDS2TJ103	10k
R208	ERDS2TJ103	10k				R549, 550	ERD25FJ332	3.3k	R922, 923	ERDS2TJ103	10k
R209	ERDS2TJ103	10k	R378	ERDS2TJ220	22	R551, 552	ERD25TJ104	100k			
R211, 212	ERDS2TJ472	4.7k	R401, 402	ERDS2TJ242	2.4k	R553, 554	ERD25FJ102	1k	R924, 925	ERDS2TJ103	10k
R213	ERDS2TJ152	1.5k	R403, 404	ERDS2TJ562	5.6k	R555, 556	ERD25FJ101	100	R926	ERDS2TJ121	120
			R405, 406	ERDS2TJ332	3.3k				R927	ERDS2TJ151	150
R214	ERDS2TJ153	15k	R407, 408	ERDS2TJ102	1k				R928	ERDS2TJ391	390
R215, 216	ERDS2TJ103	10k	R409, 410	ERDS2TJ333	33k				R929	ERG3ANJ390	39
R217, 218	ERDS2TJ273	27k	R411, 412	ERDS2TJ823	82k	R557, 558	ERD25FJ822	8.2k	[XL] only		
R219	ERDS2TJ273	27k	R413, 414	ERDS2TJ272	2.7k	R559	ERD25FJ222	2.2k	R929 [other]	ERG1ANJ390	39
R220	ERDS2TJ683	68k	R415, 416	ERDS2TJ512	5.1k	R560	ERD25TJ333	3.3k	R934	ERDS2TJ471	470
R221	ERDS2TJ101	100	R417, 418	ERDS2TJ683	68k	R561	ERD25TJ473	4.7k	[XL] only		
R224	ERDS2TJ333	33k				R562	ERD25FJ822	8.2k	R935	ERDS2TJ224	220k
R225	ERDS2TJ223	22k	R419, 420	ERDS2TJ222	2.2k	R563, 564	ERD25TJ153	15k	[XL] only		
R226	ERDS2TJ472	4.7k	R421, 422	ERDS2TJ823	82k	R571, 572	ERDS2TJ152	1.5k	R936	ERDS2TJ331	330
R227	ERDS2TJ682	6.8k	R423, 424	ERDS2TJ684	680k	R573, 574	ERDS2TJ822	8.2k	[XL] only		
			R425, 426	ERDS2TJ684	680k	R575, 576	ERDS2TJ562	5.6k	[XL] only		
R228	ERDS2TJ103	10k	R427, 428	ERDS2TJ103	10k	R577, 578	ERDS2TJ472	4.7k	[XL] only		
R229	ERDS2TJ273	27k	R451, 452	ERDS2TJ332	3.3k	R601, 602	ERDS2TJ391	390	R937, 938	ERDS2TJ472	4.7k
R230	ERDS2TJ393	39k	R453, 454	ERDS2TJ562	5.6k	R603, 604	ERDS1FJ470	47	[XL] only		
R231	ERDS2TJ273	27k	R455, 456	ERDS2TJ121	120	R605, 606	ERQ14LKR22	0.22			
R232	ERDS2TJ392	3.9k	R457, 458	ERDS2TJ470	47	[XL] only			R939	ERDS2TJ271	270
			R491, 492	ERDS2TJ272	2.7k	[XL] only			[XL] only		

• CAPACITORS

Ref. No.	Part No.
C1, 2	ECKD1H122
C3, 4	ECKD1H681
C5, 6	ECKD1H681
C7, 8	ECEA1EU4F
C9, 10	ECEA0JU22
C11, 12	ECQB1H562
C15, 16	ECEA1CU10
C17, 18	ECEA1HU01
C101, 102	ECKD1H102
C103, 104	ECEA1HU01
C105, 106	ECQB1H822
C109, 110	ECQM1H273
C113, 114	ECEA1CU10
C117, 118	ECKD1H561
C119, 120	ECKD2H121
C121, 122	ECQB1H472
C125, 126	ECQB1H103
C127, 128	ECQM1H103
C201	ECFD1E104
C202	ECEA1EU4F
C203	ECEA1CKS1
C204	ECEA1HUR
C205	ECFD1H822
C206	ECEA1CU10
C207	ECKD1H470
C208	ECEA1HU01
C209	ECEA1AU22

■ ELECTRIC

Notes: • Part numbers
Please use th

Ref. No.	Part
INTEGRATED CIRCUITS	
IC1	AN7014
IC101	MN6634
IC102	M5218L
IC103, 104	AN6203
IC401, 402	TEA066
IC501	AN6291
IC502	M5218P
IC701	AN6870
IC702	LM6417
IC901	LM6416
IC902	BA6218
TRANSISTORS	
Q1, 2	2SJ103C
Q101, 102, 107, 108, 202, 203	2SA130
Q103 ~ 106, 111, 112, 204, 251 ~ 253, 301, 302, 401 ~ 404, 902, 903	2SC331
Q109, 110	2SD133
Q201	2SB103
Q205, 206	2SA125
Q501 ~ 508	2SC260
Q509, 510	2SD142
Q511, 512	2SA111
Q513	2SC260
Q601	2SD126
Q602	2SB941
Q603, 901	2SC184

RESISTORS AND CAPACITORS

- Notes:**
- Part numbers are indicated on most mechanical parts. Please use this part number for parts order.
 - The unit of resistance is Ω (ohm).
K=1000 Ω , M=1000k Ω

Resistor Type	Wattage	Tolerance
ERD : Carbon	10 : 1/8W	G : $\pm 2\%$
ERO : Film	12 : 1/2W	J : $\pm 5\%$
ERG : Metal Oxide	25 : 1/4W	
ERC : Solid	1 : 1W	
	2 : 2W	
	S1 : 1/2W	
	S2 : 1/4W	

ERD10TJ□□□ → Chip type carbon
ERO10MKG□□□ → Chip type metal film

- The unit of capacitance is μF (microfarad).
P=10 μF .
- Bracketed indications in Ref. columns specify the area.
Parts without these indications can be used for all area.

Capacitor Type	Voltage		Tolerance
	ECEA Type	Other	
ECEA : Electrolytic	0J : 6.3V	1H : 50V	C : $\pm 0.25\mu\text{F}$
ECCD : Ceramic	1A : 10V	2H : 500V	J : $\pm 5\%$
ECKD : Ceramic	1C : 16V	1 : 100V	K : $\pm 10\%$
EQCM : Polyester	1E : 25V	KC : 400V	Z : $\pm 80\%$, -20%
EQCP : Polyester	1H : 50V		Y : $\pm 22\%$
ECET : Electrolytic	1J : 63V		
ECEA...N : Non-polar Electrolytic	1V : 35V		
	25 : 25V		
	56 : 56V		

RESISTORS

Ref. No.	Part No.	Value	Ref. No.	Part No.	Value	Ref. No.	Part No.	Value	Ref. No.	Part No.	Value
R1, 2	ERDS2TJ223	22k	R233	ERDS2TJ393	39k	R493, 494	ERDS2TJ123	12k	R611	ERDS2TJ101	100
R3, 4	ERDS2TJ472	4.7k	R234	ERDS2TJ393	39k	R495, 496	ERDS2TJ153	15k	R701, 702	ERDS2TJ104	100k
R5, 6	ERDS2TJ155	1.5M	R235	ERDS2TJ103	10k	R502	ERD25FJ123	12k	R703, 704	ERDS2TJ102	1k
R7, 8	ERDS2TJ101	100	R236	ERDS2TJ563	56k	R503, 504	ERD25FJ102	1k	R705, 706	ERDS2TJ181	180
R9, 10	ERDS2TJ101	100	R237	ERDS2TJ102	1k	R505, 506	ERD25FJ104	100k	R707	ERDS2TJ181	180
R13, 14	ERDS2TJ473	47k				R507, 508	ERD25FJ104	100k	R708	ERDS2TJ103	10k
R15, 16	ERDS2TJ102	1k	R238	ERDS2TJ101	100	R510	ERD25FJ103	10k			
R17, 18	ERDS2TJ820	82	R239, 240	ERDS2TJ223	22k	R511, 512	ERD25FJ563	56k	R901	ERDS2TJ102	1k
R19, 20	ERDS2TJ102	1k	R241	ERDS2TJ473	47k	R513, 514	ERD25FJ223	22k	R902	ERDS2TJ182	1.8k
R21, 22	ERDS2TJ153	15k	R243	ERDS2TJ103	10k	R515, 516	ERD25FJ332	3.3k	R903	ERDS2TJ103	10k
			R244	ERDS2TJ183	18k				R904	ERDS2TJ471	470
R23, 24	ERDS2TJ564	560k	R251, 252	ERDS2TJ822	8.2k	R517, 518	ERD25FJ563	56k	R905, 906	ERDS2TJ103	10k
R25, 26	ERDS2TJ682	6.8k	R253	ERDS2TJ822	8.2k	R519, 520	ERD25FJ153	15k	R907	ERDS2TJ105	1M
R101, 102	ERDS2TJ272	2.7k	R255	ERDS2TJ273	27k	R521, 522	ERD25FJ472	4.7k	R908	ERDS2TJ471	470
R103, 104	ERDS2TJ122	1.2k	R256, 257	ERDS2TJ333	33k	R523, 524	ERD25FJ822	8.2k	R909	ERDS2TJ392	3.9k
R105, 106	ERDS2TJ470	47	R258, 259	ERDS2TJ333	33k	R525, 526	ERD25FJ102	1k	R910	ERDS2TJ223	22k
R109, 110	ERDS2TJ103	10k				R527, 528	ERD25FJ103	10k	R911	ERDS2TJ103	10k
R113, 114	ERDS2TJ103	10k	R290	ERDS2TJ103	10k	R529, 530	ERD25FJ333	33k			
R119, 120	ERDS2TJ682	6.8k	R301	ERDS2TJ1R0	1	R531, 532	ERD25FJ151	150	R912	ERDS2TJ104	100k
R121, 122	ERDS2TJ222	2.2k	R302, 303	ERDS2TJ683	68k	R533, 534	ERD25FJ472	4.7k	R913	ERDS2TJ821	820
R123, 124	ERDS2TJ822	8.2k	R304, 305	ERDS2TJ220	22	R535, 536	ERD25FJ153	15k	R914	ERG2ANJ330	33
			R306	ERDS2TJ391	390				R915	ERDS2TJ104	100k
R201, 202	ERDS2TJ222	2.2k	R307	ERDS2TJ181	180	R537, 538	ERD25FJ154	150k	R916	ERDS2TJ821	820
R203	ERDS2TJ223	22k				R539, 540	ERD25FJ244	240k	R917	ERDS2TJ104	100k
R204	ERDS2TJ153	15k	R308	ERD2FCG560	56	R541, 542	ERD25FJ472	4.7k	R918	ERDS2TJ821	820
R205	ERDS2TJ223	22k	[XL] only			R543, 544	ERD25FJ153	15k			
R206	ERDS2TJ104	100k	R308 [other]	ERDS2TJ560	56	R545, 546	ERD25FJ153	15k			
R207	ERDS2TJ472	4.7k				R547	ERD25FJ102	1k	R919	ERDS2TJ391	390
R208	ERDS2TJ103	10k	R378	ERDS2TJ220	22	R549, 550	ERD25FJ332	3.3k	R920, 921	ERDS2TJ103	10k
R209	ERDS2TJ103	10k	R401, 402	ERDS2TJ242	2.4k	R551, 552	ERD25FJ104	100k	R922, 923	ERDS2TJ103	10k
R211, 212	ERDS2TJ472	4.7k	R403, 404	ERDS2TJ562	5.6k	R553, 554	ERD25FJ102	1k			
R213	ERDS2TJ152	1.5k	R405, 406	ERDS2TJ332	3.3k	R555, 556	ERD25FJ101	100	R924, 925	ERDS2TJ103	10k
			R407, 408	ERDS2TJ102	1k				R926	ERDS2TJ121	120
R214	ERDS2TJ153	15k	R409, 410	ERDS2TJ333	33k	R557, 558	ERD25FJ822	8.2k	R927	ERDS2TJ151	150
R215, 216	ERDS2TJ103	10k	R411, 412	ERDS2TJ823	82k	R559	ERD25FJ222	2.2k	R928	ERDS2TJ391	390
R217, 218	ERDS2TJ273	27k	R413, 414	ERDS2TJ272	2.7k	R560	ERD25FJ333	3.3k	R929	ERG3ANJ390	39
R219	ERDS2TJ273	27k	R415, 416	ERDS2TJ512	5.1k	R561	ERD25TJ473	47k	[XL] only		
R220	ERDS2TJ683	68k	R417, 418	ERDS2TJ683	68k	R562	ERD25FJ822	8.2k	R929 [other]	ERG1ANJ390	39
R221	ERDS2TJ101	100				R563, 564	ERD25TJ153	15k	R934	ERDS2TJ471	470
R224	ERDS2TJ333	33k	R419, 420	ERDS2TJ222	2.2k	R571, 572	ERDS2TJ152	1.5k	[XL] only		
R225	ERDS2TJ223	22k	R421, 422	ERDS2TJ823	82k	R573, 574	ERDS2TJ822	8.2k	R935	ERDS2TJ224	220k
R226	ERDS2TJ472	4.7k	R423, 424	ERDS2TJ684	680k	R575, 576	ERDS2TJ562	5.6k	[XL] only		
R227	ERDS2TJ682	6.8k	R425, 426	ERDS2TJ684	680k	R577, 578	ERDS2TJ472	4.7k	R936	ERDS2TJ331	330
			R427, 428	ERDS2TJ103	10k	R601, 602	ERDS2TJ391	390	[XL] only		
R228	ERDS2TJ103	10k	R451, 452	ERDS2TJ332	3.3k	R603, 604	ERDS1FJ470	47	R937, 938	ERDS2TJ472	4.7k
R229	ERDS2TJ273	27k	R453, 454	ERDS2TJ562	5.6k	R605, 606	ERQ14LKR22	0.22	[XL] only		
R230	ERDS2TJ393	39k	R455, 456	ERDS2TJ121	120	[XL] only			R939	ERDS2TJ271	270
R231	ERDS2TJ273	27k	R457, 458	ERDS2TJ470	47	R609	ERDS2TJ470	47	[XL] only		
R232	ERDS2TJ392	3.9k	R491, 492	ERDS2TJ272	2.7k	[XL] only					

CAPACITORS

Ref. No.	Part No.	Value	Ref. No.	Part No.	Value	Ref. No.	Part No.	Value	Ref. No.	Part No.	Value
C1, 2	ECKD1H122KB	0.0012	C251	ECEA1HKS010	1	C427, 428	ECQB1H122JZ	0.0012	C541, 542	ECEA1CU100	10
C3, 4	ECKD1H681KB	680p	C252	ECKD1H221KB	220p	C429, 430	ECEA1CU100	10	C543, 544	ECCD1H181K	180p
C5, 6	ECKD1H681KB	680p	C253	ECEA1CKS100	10	C431, 432	ECEA1CU100	10	C601	ECEA1CU331	330
C7, 8	ECEA1EU4R7	4.7				C451, 452	ECEA1HUR33	0.33	C602	ECEA1CU102	0.001
C9, 10	ECEA0JU221	220	C255	ECKD1H333ZF	0.033	C453, 454	ECEA1CU100	10	C603, 604	ECKD1H103ZF	0.01
C11, 12	ECQB1H562JZ	0.0056	C256	ECEA1HKS33	0.33	C455, 456	ECKD1H102KB	0.001	C605	ECEA1CU332	0.0033
C15, 16	ECEA1CU100	10	C257, 258	ECEA1HKS33	0.33	C502	ECEA1CU100	10	C606	ECEA1CU222	0.0022
C17, 18	ECEA1HU010	1	C259	ECEA1AU470	47				C608	ECKD2H682PEL	0.0068
C101, 102	ECKD1H102KB	0.001	C301	ECQP1183JZ	0.018	C503, 504	ECEA1HUR22	0.22	C609, 610	ECEA1AU471	470
C103, 104	ECEA1HU010	1	C302	ECKD1H332KB	0.0033	C505, 506	ECEA50MR68R	0.68	C611	ECEA1AU331	330
			C303	ECFD1H222KD	0.0022	C507, 508	ECCD1H471K	470p			
C105, 106	ECQB1H822JZ	0.0082	C304	ECKD1H682KB	0.0068	C509, 510	ECQB1H223JZ	0.022	C612, 613	ECKD1H103ZF	0.01
C109, 110	ECQM1H273JZ	0.027	C305	ECKD1H222KD	0.0022	C511, 512	ECEA1CU100	10	C615	ECKDNS103ZV	0.01
C113, 114	ECEA1CU100	10	C306	ECEA1EU4R7	4.7	C513, 514	ECQM1H333JZ	0.033	C620	ECEA0JU331	330
C117, 118	ECKD1H561KB	560p				C515, 516	ECEA0JU470	47	C701, 702	ECEA1EU4R7	4.7
C119, 120	ECKD2H121KB	120p	C401, 402	ECCD1H820K	82p	C517, 518	ECQM1H104JZ	0.1	C703, 704	ECFD1E104MD	0.1
C121, 122	ECQB1H472JZ	0.0047	C403, 404	ECQB1H472JZ	0.0047	C519, 520	ECQM1H104JZ	0.1	C705	ECFD1V473KD	0.047
C125, 126	ECQB1H103JZ	0.01	C405, 406	ECEA1CU100	10	C521, 522	ECEA50MR33R	0.33	C710	ECEA1EU220	22
C127, 128	ECQM1H103JZ	0.01	C407, 408	ECQM1H473JZ	0.047				C901	ECKD1H103ZF	0.01
C201	ECFD1E104MD	0.1	C409, 410	ECQM1H224JZ	0.22	C523, 524	ECCD1H391K	390p	C902	ECEA0JU101	100
C202	ECEA1EU4R7	4.7	C411, 412	ECEA50MR68R	0.68	C525, 526	ECQB1H472JZ	0.0047	C903	ECKD1H103ZF	0.01
			C413, 414	ECQB1H103JZ	0.01	C527, 528	ECQB1H103JZ	0.022			
			C415, 416	ECQM1H473JZ	0.047	C529, 530	ECQB1H332JZ	0.0033	C904	ECEA1HU010	1
C203	ECEA1CKS100	10	C417, 418	ECEA1CU100	10	C531	ECEA1CU100	10	C905, 906	ECKD1H221KB	220p
C204	ECEA1HUR47	0.47	C419, 420	ECQM1H473JZ	0.047	C532	ECEA1HU010	1	C907	ECEA1HU010	1
C205	ECFD1H822KDY	0.0082				C533, 534	ECQB1H332JZ	0.0033	C908	ECEA1CN100	10
C206	ECEA1CU100	10				C535, 536	ECEA1CU100	10	C909	ECKD1H103ZF	0.01
C207	ECCD1H470K	47p	C421, 422	ECQM1H224JZ	0.22	C537, 538	ECCD1H331K	330p	C910	ECKD1H103ZF	0.01
C208	ECEA1HU010	1	C423, 424	ECEA50MR68R	0.68	C539, 540	ECEA1HUR33	0.33	[XL] only		
C209	ECEA1AU220	22	C425, 426	ECQB1H152JZ	0.0015						

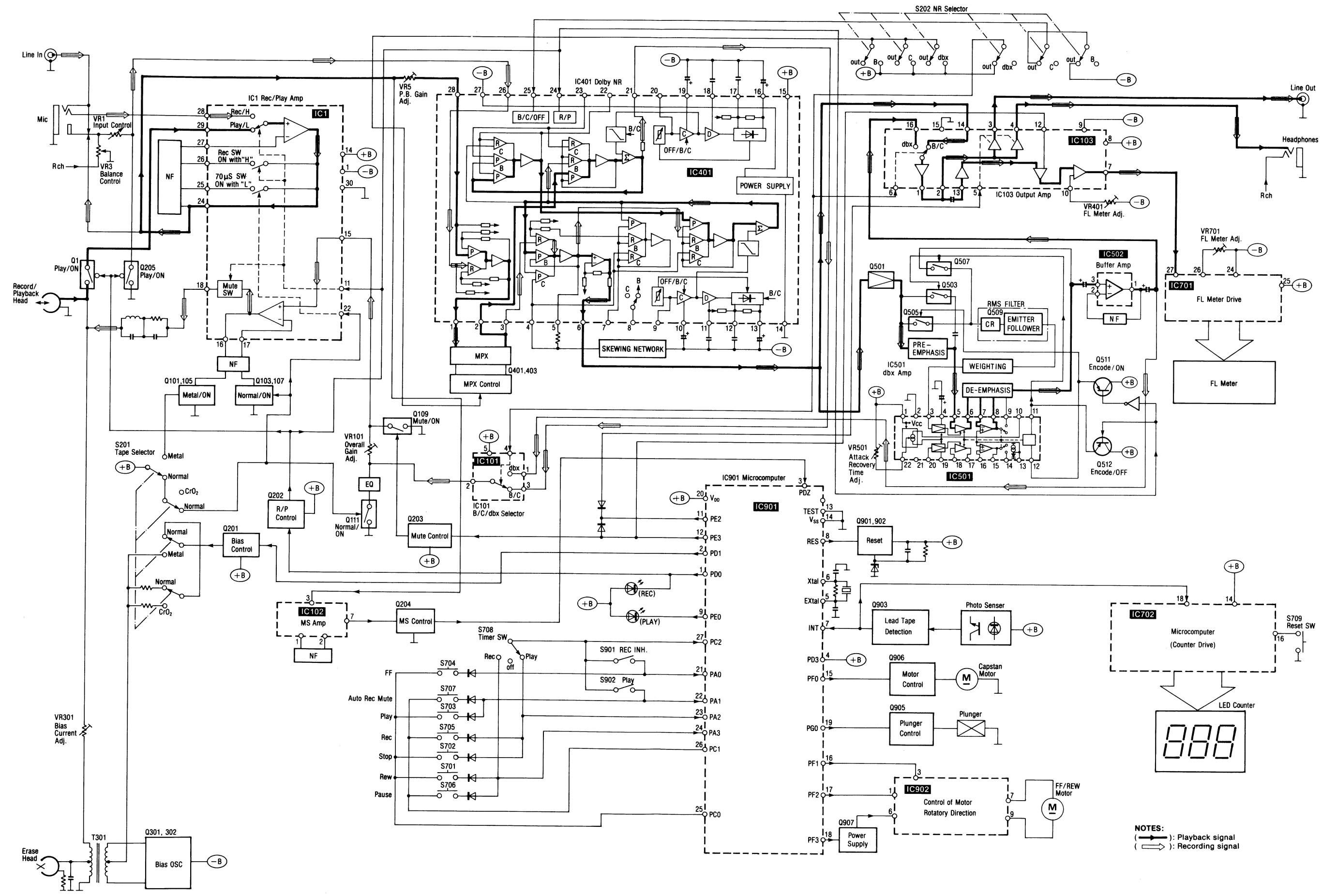
ELECTRICAL PARTS LIST

- Notes:**
- Part numbers are indicated on most mechanical parts. Please use this part number for parts order.

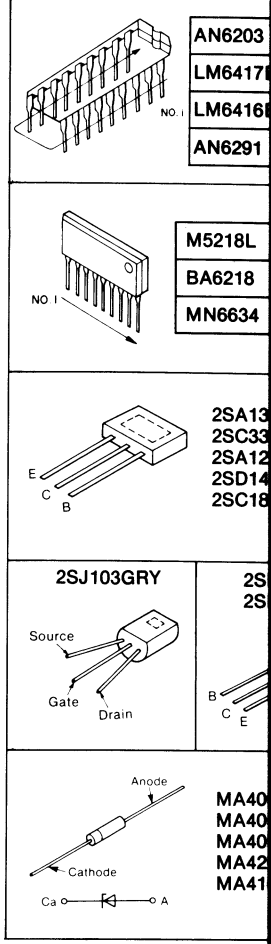
- Important safety notice:
Components identified by Δ mark have special characteristics important for safety.
When replacing any of these components, use only manufacturer's specified parts.

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
INTEGRATED CIRCUITS			Q904, 905	2SB1030Q	Transistor	SPARK LILLERS OR COMBINATION PARTS		
IC1	AN7014K	Integrated Circuit	Q906	2SB621A – R	Transistor	Z 251	EXBF8E561J4R	Component Combination
IC101	MN6634	Integrated Circuit	Q907	2SD592ANCO	Transistor			
IC102	M5218L	Integrated Circuit	Q908 [XL] only	2SC3311A – Q	Transistor			
IC103, 104	AN6203	Integrated Circuit	DIODES & RECTIFIERS			FLUORESCENT DISPLAY TUBE		
IC401, 402	TEA0665	Integrated Circuit	D1, 2, 201 – 209, 211, 251 – 260, 603, 604, 904 – 908	MA165	Diode	FL1	SADBG369Z	FL Meter
IC501	AN6291	Integrated Circuit				RESONATORS		
IC502	M5218P	Integrated Circuit	D261	LN346GP	LED	X901	SVFCSB400P – M	Ceramic Filter
IC701	AN6870N	Integrated Circuit	D262	LN846RP	LED	IC PROTECTOR		
IC702	LM6417E – 589	Integrated Circuit	D263	SVGLB203DN1	Diode	ICP601, 602 [XL] only	SRUN15	IC Protector
IC901	LM6416E – 1984	Integrated Circuit	D501	SVDMC911	Diode	ICP901 [XL] only	SRUN10	IC Protector
IC902	BA6218	Integrated Circuit	D601	MA4100M	Diode	TRANSFORMERS		
			D605 – 608	1SR35200	Diode	T301	SL09C19 – K	Oscillator Coil
			D611	MA4051M	Diode	T600 [EG, EH] ⚠	SLT5V04 – K	Power Transformer
			D901, 902	MA4056 – M	Diode	T600 [XL] ⚠	SLT5V05 – K	Power Transformer
			D903	MA4082H	Diode	T600 [XA, XB] ⚠	SLT5V06 – K	Power Transformer
						T600 [MC] ⚠	SLT5V07 – K	Power Transformer
			VARIABLE RESISTORS			SWITCHES		
TRANSISTORS			VR1, 2	EWC5SA000A54	Variable Resistor	S201	SSH3700	Tape Selector
Q1, 2	2SJ103GR	Transistor	VR3	EWHFDAF15G15	Variable Resistor	S202	SSH4104	Dolby NR
Q101, 102, 107, 108, 202, 203	2SA1309Q	Transistor	VR5, 6, 701	EVND4AA00B24	Variable Resistor	S601	⚠ ESB8215V	Power Source
Q103 – 106, 111, 112, 204, 251 – 253, 301, 302, 401 – 404, 902, 903	2SC3311A – Q	Transistor	VR101, 102	EVND4AA00B54	Variable Resistor	S602	⚠ SSR187 – 1	Voltage Selector
Q109, 110	2SD1330R	Transistor	VR301, 302	EVND4AA00B15	Variable Resistor	S701 – 707, 709	SSG13	Key Board
Q201	2SB1030Q	Transistor	VR401	EVND4AA00B23	Variable Resistor	S708	QSS1305H	Timer
Q205, 206	2SA1253 – S	Transistor	VR501	EVND4AA00B23	Variable Resistor	S901	SMQA1040	Leaf Switch
Q501 – 508	2SC2603EFG	Transistor				S902	SMQA1023	Leaf Switch
Q509, 510	2SD1424R	Transistor	COILS					
Q511, 512	2SA1115E	Transistor	L101, 102	SLQX303 – 1K	Coil			
Q513	2SC2603EFG	Transistor	L103, 104	QLQX2722D	Coil			
Q601	2SD1265 – 0	Transistor	L401, 402	QLM9Z10K	Coil			
Q602	2SB941 – P	Transistor	L403, 404	ELM7Q306A	Coil			
Q603, 901	2SC1846 – R	Transistor						

■ BLOCK DIAGRAM

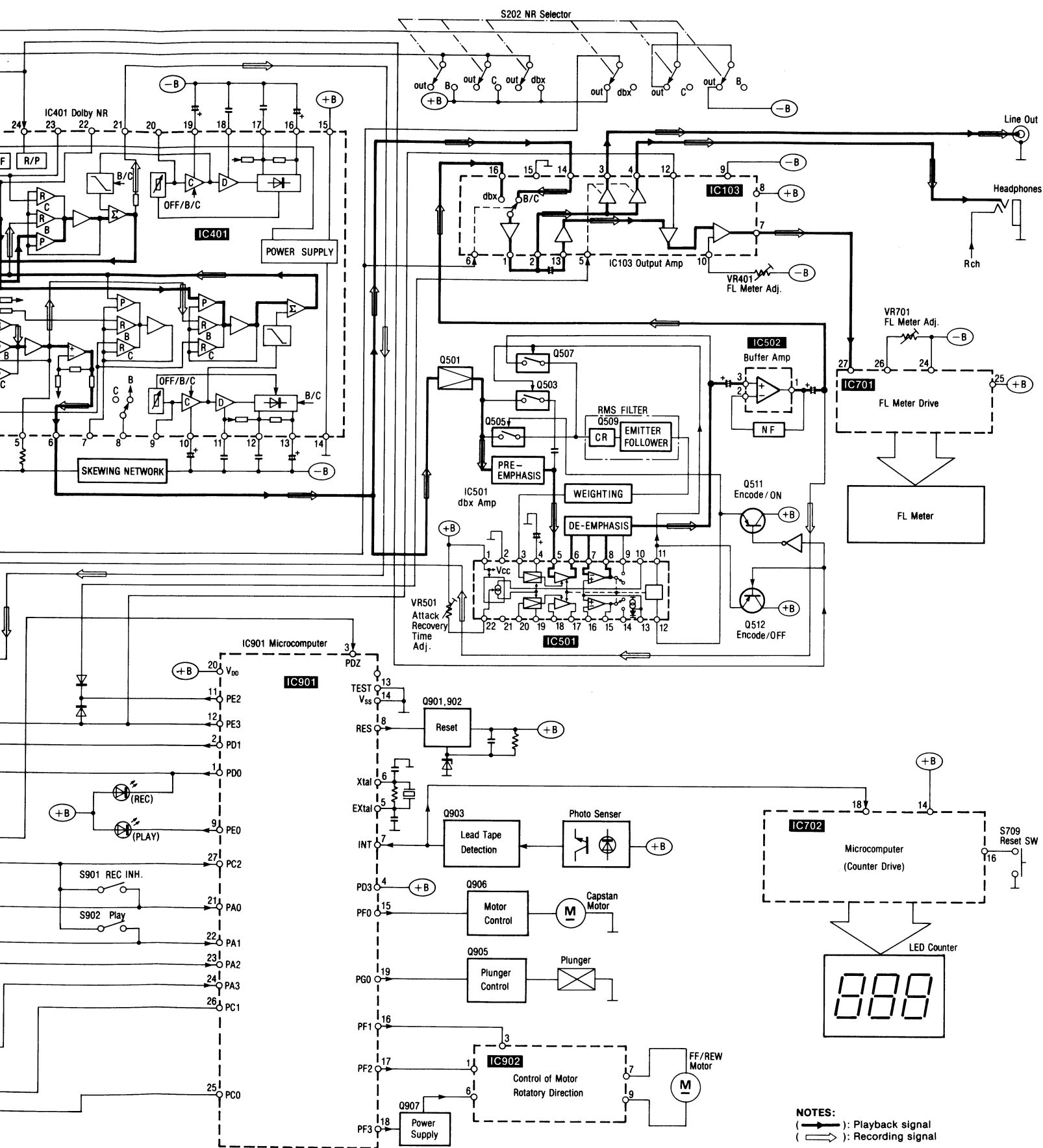


• Terminal Guide of T



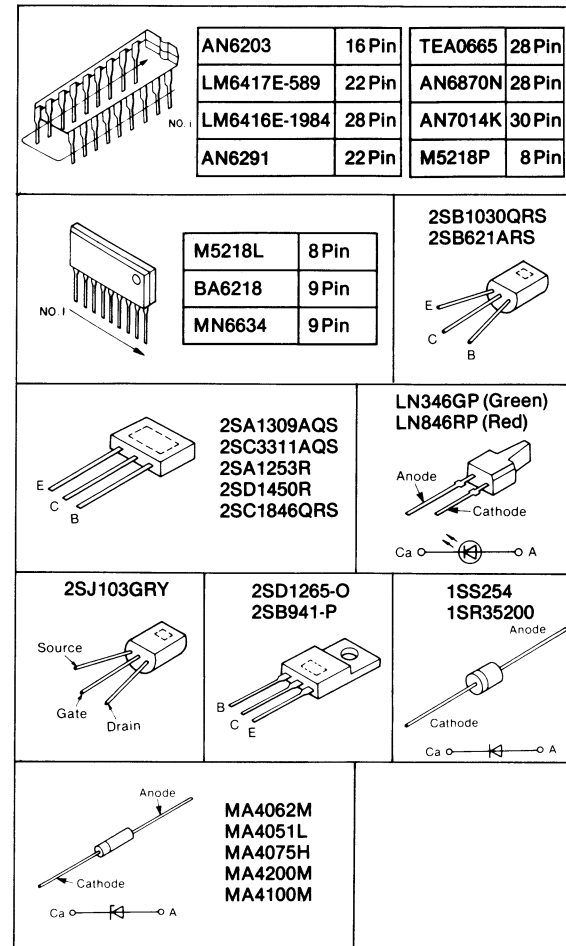
SPECIFICATIONS * Imp

Playback S/N ratio	* Test tape... QZZCFM
Overall distortion	* Test tape
	...QZZCRA for Normal
	...QZZCRX for CrO ₂
	...QZZCRZ for Metal
Overall S/N ratio	* Test tape... QZZCRA



NOTES:
 (→): Playback signal
 (⇨): Recording signal

Terminal Guide of Transistors Diodes and IC's



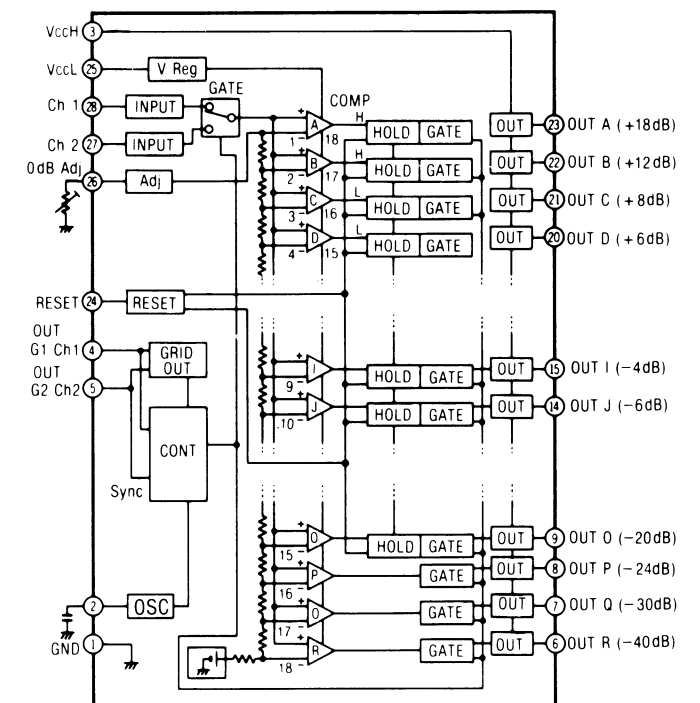
SCHEMATIC DIAGRAM

- Notes:**
- **S201-1, S201-2** : Tape select switch in "normal" position. (S201-1: CrO₂, S201-2: Metal, S201-1, S201-2: Normal)
 - **S202-1~S202-3** : NR select switch in "out" position. (S202-1: B, S202-2: C, S202-3: dbx, S202-1~S202-3: out)
 - **S601-1, S601-2** : Power switch in "on" position.
 - **S602** : Voltage select switch in "240V" position. (240V↔220V↔127V↔110V) (XA, XL, XB areas only.)
 - **S701** : Rew switch in "off" position.
 - **S702** : Stop switch in "off" position.
 - **S703** : Play switch in "off" position.
 - **S704** : FF switch in "off" position.
 - **S705** : Rec switch in "off" position.
 - **S706** : Pause switch in "off" position.
 - **S707** : Auto rec mute switch in "off" position.
 - **S708** : Timer switch in "off" position.
 - **S709** : Counter reset switch in "off" position.
 - **S901** : Rec inhibit switch in "off" position.
 - **S902** : Mechanism play switch 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 (μF) 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.
 - For measurement use EVM.

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.

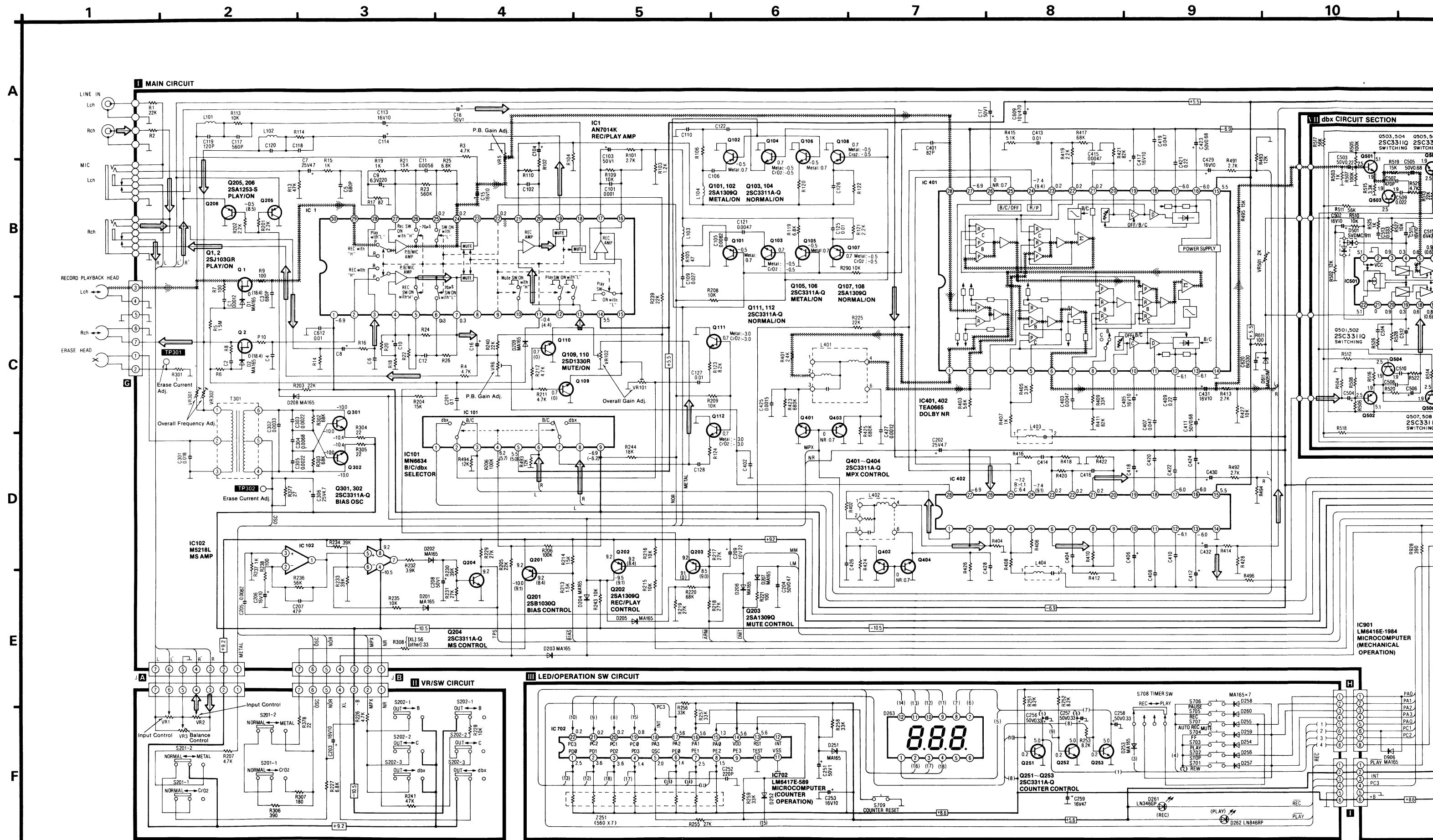
- * Caution!**
- IC and LSI are sensitive to static electricity. Secondary trouble can be prevented by taking care during repair.
- Cover the parts boxes made of plastics with aluminum foil.
 - Ground the soldering iron.
 - Put a conductive mat on the work table.
 - Do not touch the legs of IC or LSI with the fingers directly.

EQUIVALENT CIRCUIT IC701: AN6870N



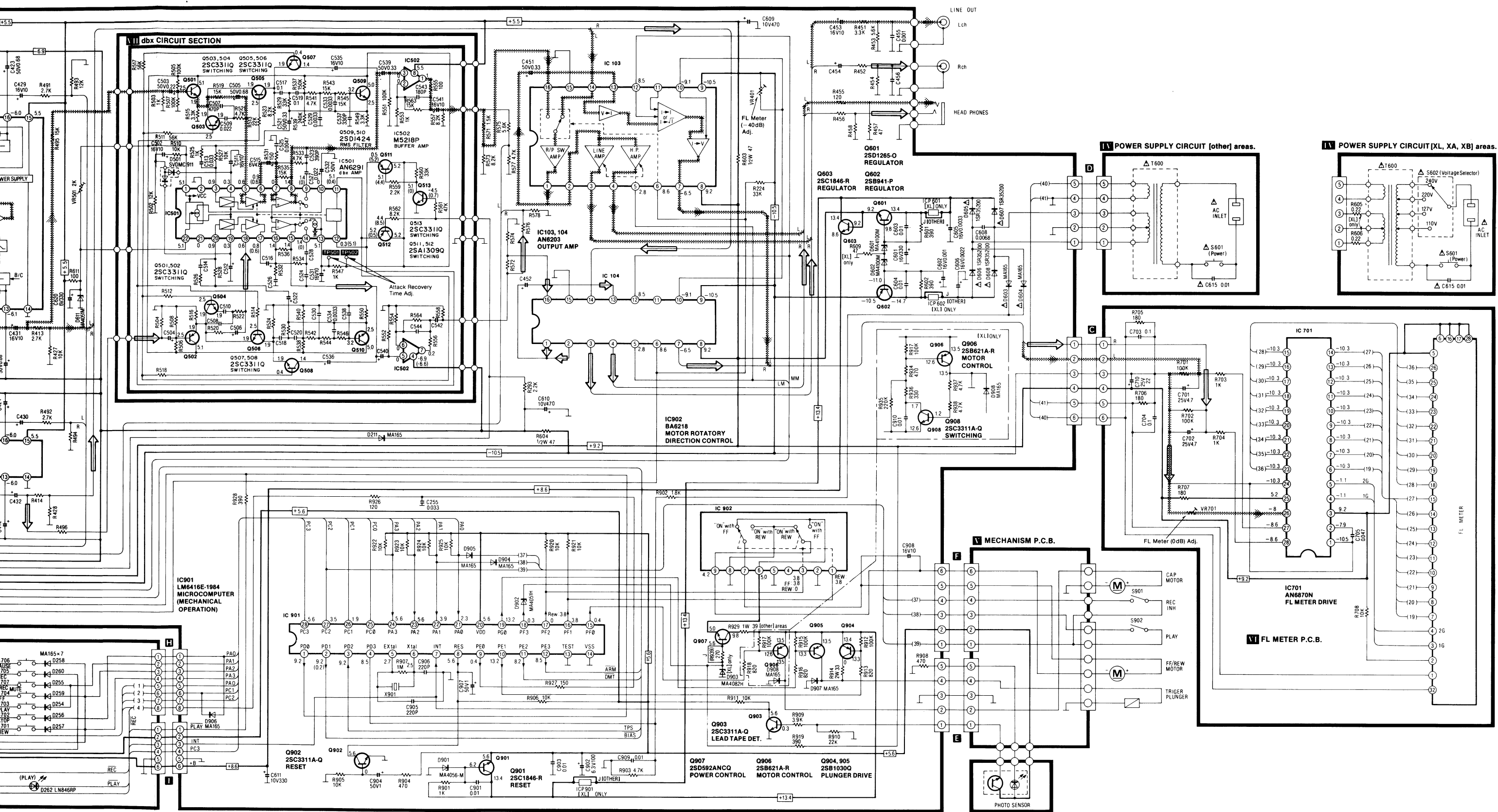
SPECIFICATIONS * Input level control... MAX

Playback S/N ratio * Test tape... QZZCFM	Greater than 45dB
Overall distortion * Test tape ... QZZCRA for Normal ... QZZCRX for CrO ₂ ... QZZCRZ for Metal	Normal..... Less than 3.5% CrO ₂ , Metal... Less than 4%
Overall S/N ratio * Test tape... QZZCRA	Greater than 43dB (without NAB filter)



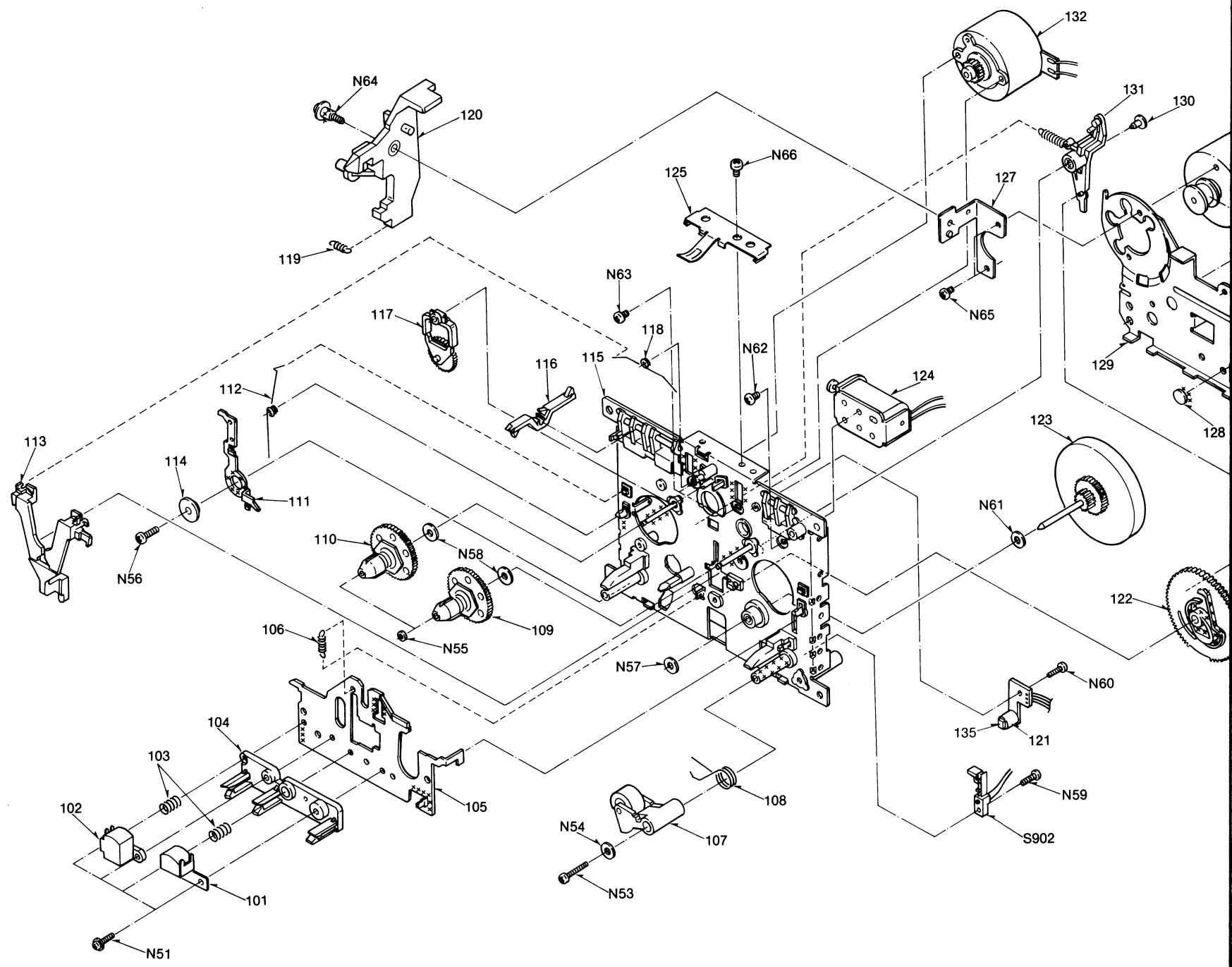
Notes:

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



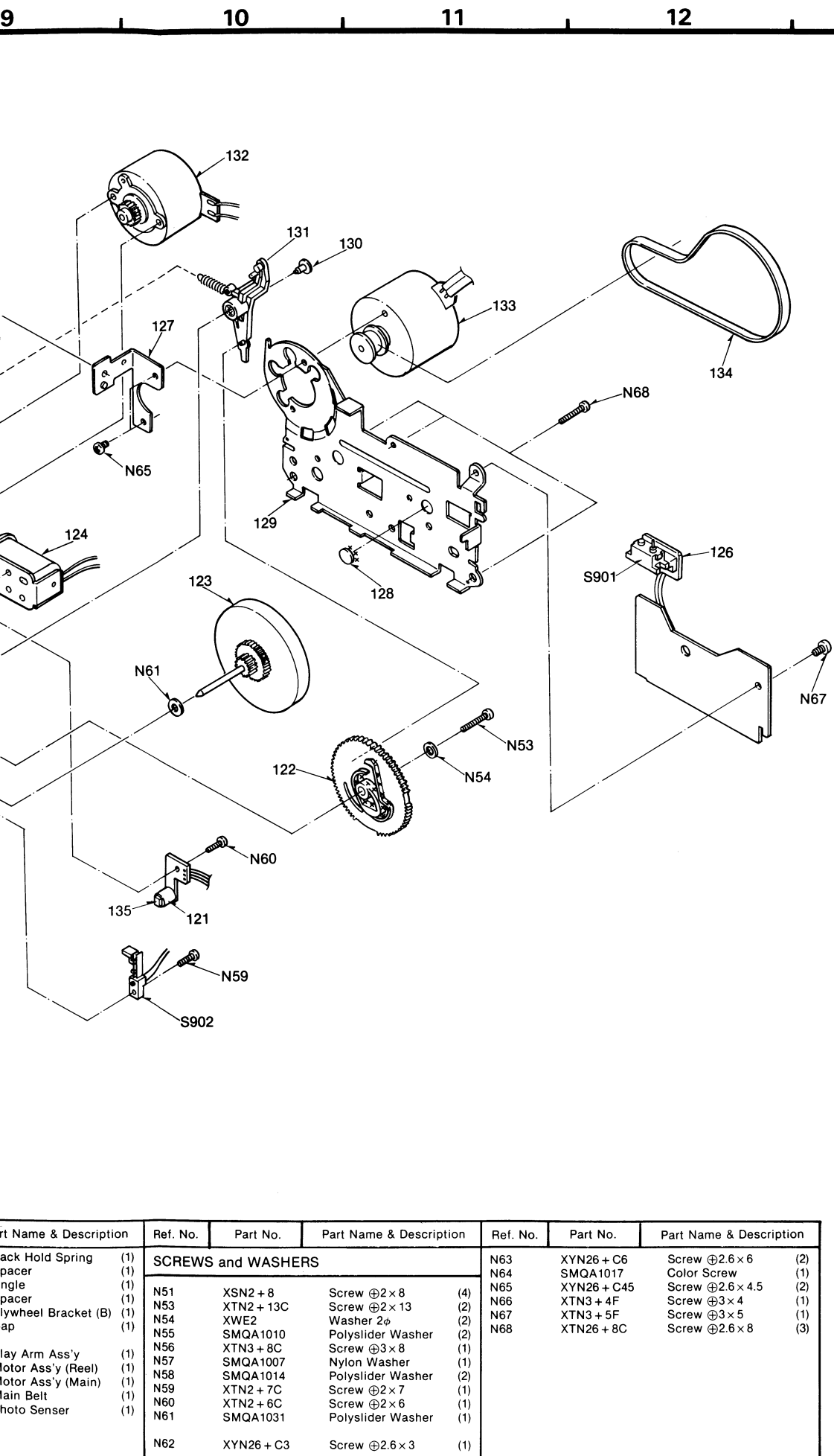
MECHANICAL PARTS LOCATION

Notes:
• When changing mechanism parts, apply the specified grease (RZZOL05) to the areas marked "xx" shown in the drawing "Mechanical Parts Location".

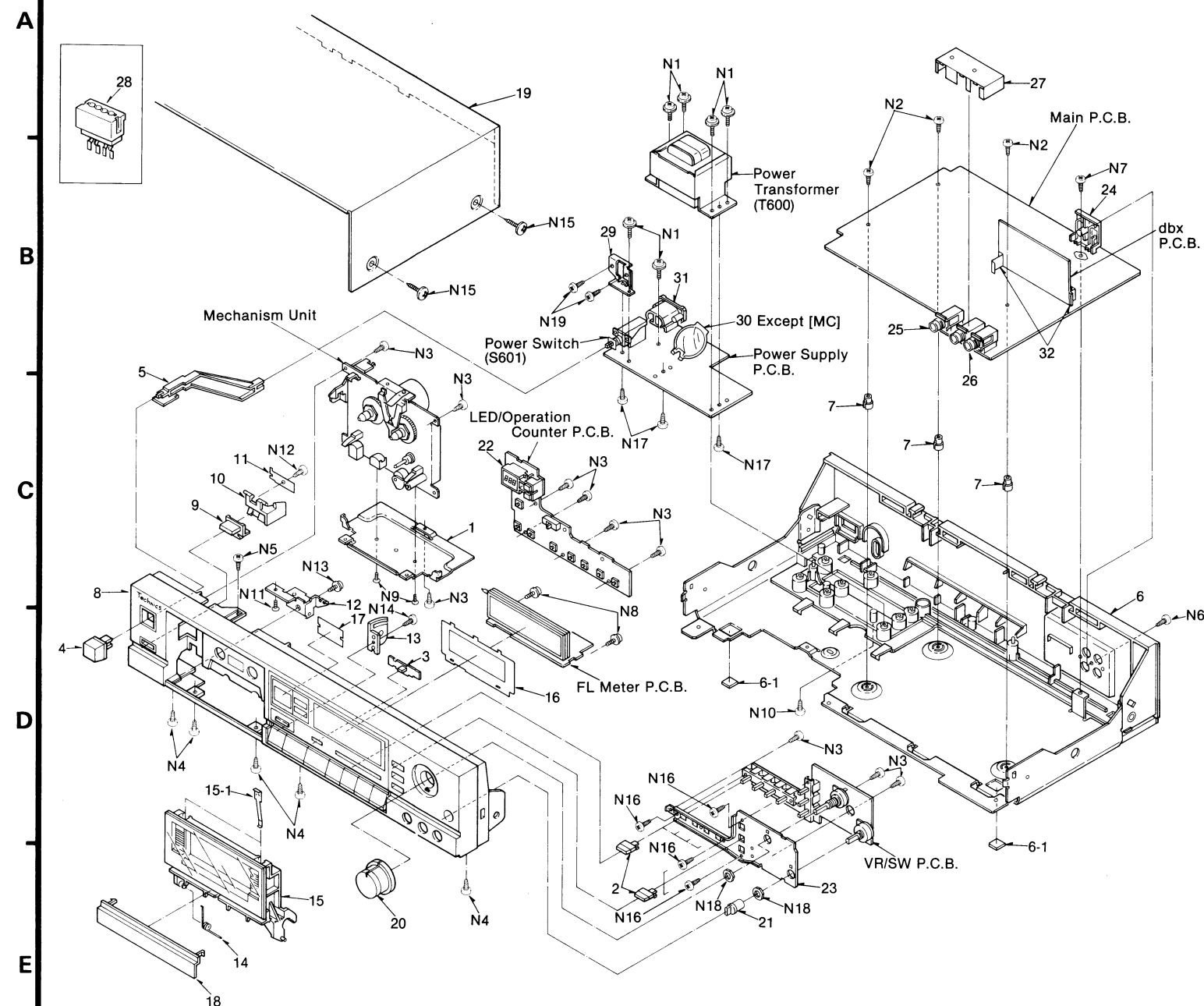


REPLACEMENT PARTS LIST

Ref. No.	Part No.	Part Name & Description	Ref. No.	Part No.	Part Name & Description	Ref. No.	Part No.	Part Name & Description	Ref. No.	Part No.	Part Name & Description
MECHANISM PARTS						125	SMQA1027	Pack Hold Spring (1)	SCREWS and WASHERS		
101	SJH99	R.P Head (1)	111	SMQA1011	Eject Stopper Arm (1)	126	SMQA1021	Spacer (1)	N51	XSN2 + 8	Screw @2x
102	SJH100	E Head (1)	112	SMQA1012	Stopper Spring (1)	127	SMQA1020	Angle (1)	N53	XTN2 + 13C	Screw @2x
103	SMQA1001	Head Spring (2)	113	SMQA1015	Hold Lever (1)	128	SMQA1034	Spacer (1)	N54	XWE2	Washer 2x
104	SMQA1002	Head Spacer (1)	114	SMQA1009	Spacer (1)	129	SMQA1035	Flywheel Bracket (B) (1)	N55	SMQA1010	Polyslider V
105	SMQA1003	Head Base (1)	115	SMQA1008	Chassis Ass'y (1)	130	SMQA1029	Cap (1)	N56	XTN3 + 8C	Screw @3x
106	SMQA1004	Head Base Spring (1)	116	SMQA1025	Rec Safety Lever (1)	131	SMQA1028	Play Arm Ass'y (1)	N57	SMQA1007	Nylon Wash
107	SMQA1005	Pinch Roller Arm Ass'y (1)	117	SMQA1016	Idler Ass'y (1)	132	SMQA1036	Motor Ass'y (Reel) (1)	N58	SMQA1014	Polyslider V
108	SMQA1006	Pinch Roller Spring (R) (1)	118	SMQA1024	Hold Spring (1)	133	SMQA1037	Motor Ass'y (Main) (1)	N59	XTN2 + 7C	Screw @2x
109	SMQA1026	Take Up Reel Ass'y (1)	119	SMQA1019	Lever Spring (1)	134	SMQA1038	Main Belt (1)	N60	XTN2 + 6C	Screw @2x
110	SMQA1013	Supply Reel Ass'y (1)	120	SMQA1018	Eject Arm (1)	135	SMQA1041	Photo Sensor (1)	N61	SMQA1031	Polyslider V
			121	SMQA1022	Spacer (1)						
			122	SMQA1033	Cam Gear (B) (1)						
			123	SMQA1032	Flywheel Ass'y (1)						
			124	SMQA1030	Plunger (1)						



CABINET PARTS LOCATION



REPLACEMENT PARTS LIST

- Notes:**
- Part numbers are indicated on most mechanical parts. Please use this part number for parts order.
 - 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.
 - Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.
 - Δ -marked Parts are used for silver type only.
 - $\circ$ -marked Parts are used for black type only.
 - Part other than Δ and $\circ$ -marked are used for both black and silver type.
 - The parenthesized numbers in the column of description stand for the quantity per set.

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
CABINET & CHASSIS PARTS					
1	SMN2012	Angle (1)	6	SYKSB405 - KL	Chassis Ass'y (1)
2	Δ SBC799	Button (7)	6 [XL, XA, XB]	SYKSB405 - KC	Chassis Ass'y (1)
2	$\circ$ SBC799-1	Button (3)	6 [MC]		
3	SBD133	Knob (1)	7	[6-1] SKL293 SHE185	Foot Spacer (4)
4	Δ SBC666-3	Button (1)	8	Δ SGYSB405-KE	Front Panel Ass'y (1)
4	$\circ$ SBC666	Button (1)	8	$\circ$ SGYSB405-SE	Front Panel Ass'y (1)
5	SUB258	Connection Rod (1)	9	Δ SBC736-1	Button (1)
6 [EG, EH]	SYKSB405 - KG	Chassis Ass'y (1)	9	$\circ$ SBC736	Button (1)
			10	SUB236-2	Rod (1)
			11	SMN1971	Angle (1)
			12	SMN2011	Angle (1)
			13	SKJSB405-KE	Damper Gear Ass'y (1)

Ref. No.	Part No.	Description	
14	SUS820	Spring (1)	
15	SGXSB405-KE	Cassette Holder Ass'y (1)	
[15-1]	[QBP2006A	Spring (2)	
16	SDU303-1	Filter (1)	
17	SDU304	LCD Filter (1)	
18	Δ SGX7843-1	Ornament (1)	
18	$\circ$ SGX7843-3	Ornament (1)	
19	Δ SKC1970K99	Cabinet (1)	
19	$\circ$ SKC1970S98	Cabinet (1)	
20	Δ SBN1211	Knob, Volume (1)	
20	$\circ$ SBN1211-1	Knob, Volume (1)	
21	Δ SBN1205	Knob, Balance (1)	
21	$\circ$ SBN1205-1	Knob, Balance (1)	
22	SHR9801	Bracket (1)	
23	SMN2010	Angle (1)	
24	SJF3057N	Terminal Board (1)	
25	SJJ126B	Jack (1)	
26	SJJ127HH	Jack (1)	
27	SMN1970-1	Angle (1)	
28	SJT30643-V	Socket, J [C] (1)	
28	SJT30743-V	Socket, J [A] [B] (2)	
29	SMN1983	Angle (1)	
30	SMX888	Shield Parts (1)	
except [MC]			
31	Δ SJS9237	AC Inlet (1)	
31 [XL] only	Δ SJS9236	AC Inlet (1)	
31 [other]			
32	SMN1978	P.B. Holder (2)	

SCREWS, NUTS & WASHERS

N1	XTW3 + 12QFR	Tapping, $\Phi 3 \times 12$ (6)
N2	XTB3 + 14J	Tapping, $\Phi 3 \times 14$ (3)
N3	XTV3 + 10JFR	Tapping, $\Phi 3 \times 10$ (9)
N4	XTB3 + 8J	Tapping, $\Phi 3 \times 8$ (6)
N5	XTB3 + 6FFR	Tapping, $\Phi 3 \times 6$ (1)
N6	XTB3 + 12JFZ	Tapping, $\Phi 3 \times 12$ (1)
N7	XTB3 + 8JFZ1	Tapping, $\Phi 3 \times 8$ (1)
N8	XTWS3 + 10QFR	Tapping, $\Phi 3 \times 10$ (2)
N9	XTS3 + 8FFR	Tapping, $\Phi 3 \times 8$ (2)
N10	XTB3 + 10GFZ	Tapping, $\Phi 3 \times 10$ (1)
N11	XTS3 + 10J	Tapping, $\Phi 3 \times 10$ (1)
N12	XTB26 + 8J	Tapping, $\Phi 26 \times 8$ (1)
N13	XTW3 + 10T	Tapping, $\Phi 3 \times 10$ (1)
N14	XTB3 + 12J	Tapping, $\Phi 3 \times 12$ (1)
N15	Δ SNE2125-1	Cabinet (4)
N15	$\circ$ SNE2125	Cabinet (4)
N16	XTN3 + 6FFR	Tapping, $\Phi 3 \times 6$ (4)
N17	XTV3 + 6JFZ	Tapping, $\Phi 3 \times 6$ (3)
N18	XNS8	Nut (2)
N19	XYN3 + C6	Tapping, $\Phi 3 \times 6$ (2)

ACCESSORIES

A1 [XL, XA, EH]	SQF12728	Instruction Book (1)
A1 [EG]	SQF12730	Instruction Book (1)
A1 [MC]	SQF12755	Instruction Book (1)
A1 [XB]	SQF12826	Instruction Book (1)
A2 Δ [EG, XA, EH]	SJA171	Power Cord (1)
A2 [XL] Δ	SJA173	Power Cord (1)
A2 [MC] Δ	SJA170	Power Cord (1)
A2 [XB] Δ	SJA183	Power Cord (1)
A3	SJP5213-1	Plug (1)
A3 [XA] only		
A3 Δ [XB] only	SJP9215	Plug (1)
A4	SJP2264	Connection Cable (1)

PACKINGS

P1 Δ	SPG5593	Carton Box (1)
P1 $\circ$	SPG5594	Carton Box (1)
P2	SPS4708	Pad, Left Side (1)
P3	SPS4709	Pad, Right Side (1)
P4	SPS4756	Spacer (1)
P5	XZB50X65A02	Polyethylene Sheet (1)