

# Service Manual

Stereo Graphic Equalizer

## SH-E4/(K)

[D],[EK],[EW],[EB],[EF],  
[EGA],[EH],[XA],[XL],[Ei],[PC]



- \* The colors of this model include silver and black.
- \* The black type model is indicated by (K) in the Service Manual.

### Areas

- \* [D] is available in Scandinavia.
- \* [EK] is available in United Kingdom.
- \* [EW] is available in Switzerland.
- \* [EB] is available in Belgium.
- \* [EF] is available in France.
- \* [EGA] is available in F.R. Germany.
- \* [EH] is available in Holland.
- \* [XA] is available in Southeast Asia, Oceania, Africa, Middle Near East and Central South America.
- \* [XL] is available in Australia.
- \* [Ei] is available in Italy.
- \* [PC] is available in European Audio Club.

## Specifications

(Specifications are subject to change without notice for further improvement.)

### (DIN 45 500)

Frequency response (center position)	: 5 Hz~100 kHz, -3 dB
Maximum output voltage	: 8 V (1 kHz, THD 0.01%)
Rated output voltage	: 1 V
Rated total harmonic distortion	: 0.005% (20 Hz~20 kHz) 0.003% (1 kHz)
Input sensitivity	: 1 V
Signal-to-noise ratio	: 95 dB (100 dB, IHF' A)
Maximum input voltage	: 8 V (1 kHz)
Input impedance	: 47 k $\Omega$
Gain	: 0 $\pm$ 1 dB
Channel balance 250 Hz~6300 Hz	: $\pm$ 0.5 dB
Channel separation 1 kHz	: 60 dB

Band level controls	: +12 dB~-12 dB (12 elements continuously variable)
Center frequency	: 25 Hz, 40 Hz, 63 Hz, 100 Hz, 160 Hz, 250 Hz, 500 Hz, 1 kHz, 2 kHz, 4 kHz, 8 kHz, 16 kHz

### GENERAL

Power supply	: AC 240 V, 50 Hz/60 Hz. (For United Kingdom and Australia) AC 220 V, 50 Hz/60 Hz. (For continental Europe) AC 110 V/120 V/220 V/240 V, 50 Hz/60 Hz. (For others)
Power consumption	: 9.5 W
Dimensions (H $\times$ W $\times$ D)	: 50 $\times$ 315 $\times$ 240 mm (1-31/32" $\times$ 12-13/32" $\times$ 9-7/16")
Weight	: 2.0 kg (4.4 lb)

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# Technics

Matsushita Electric Trading Co., Ltd.  
P.O. Box 228, Central Osaka Japan

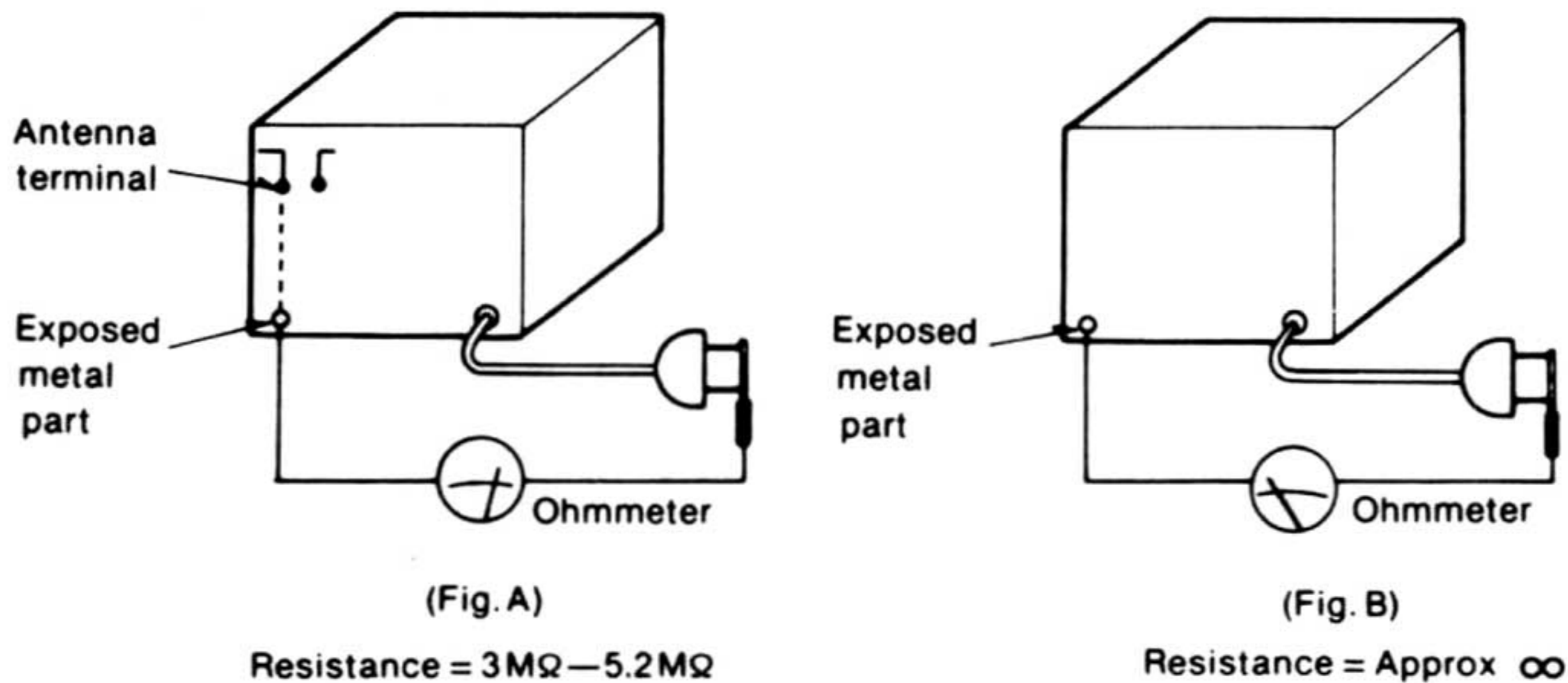
## SAFETY PRECAUTION

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)

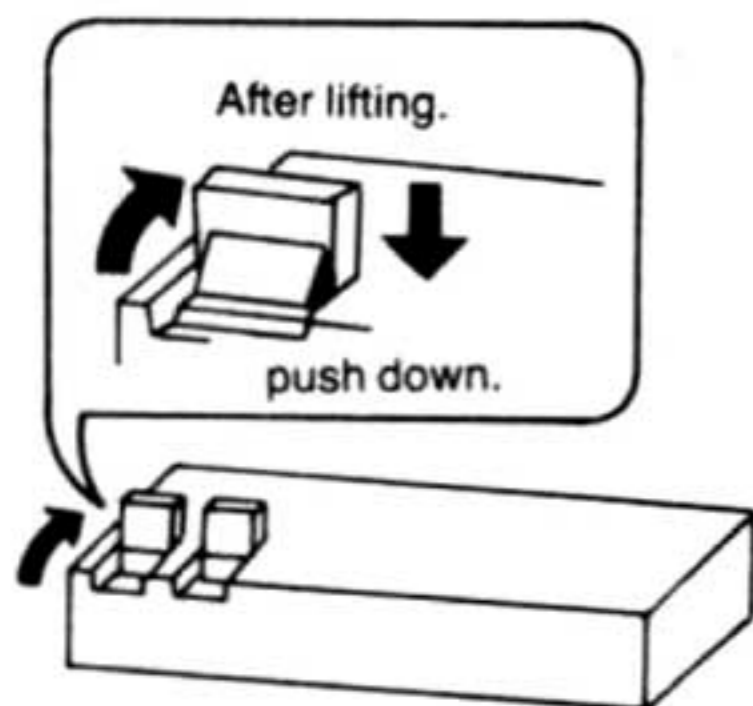
**Note:** Some exposed parts may be isolated from the chassis by design. These will read infinity.



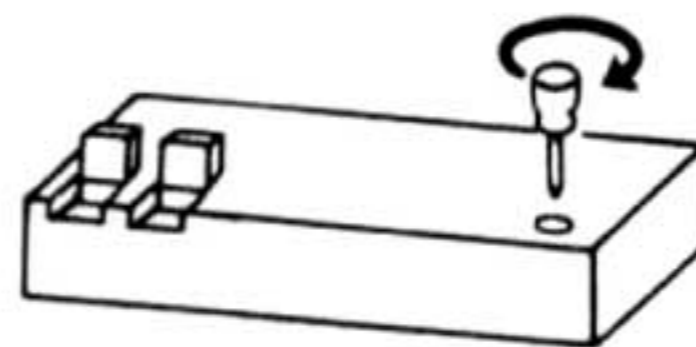
4. If the measurement is outside the specified limits, there is a possibility of a shock hazard. The equipment should be repaired and rechecked before it is returned to the customer.

## STANDARD CONNECTION METHOD WITH DIRECT CONNECTORS

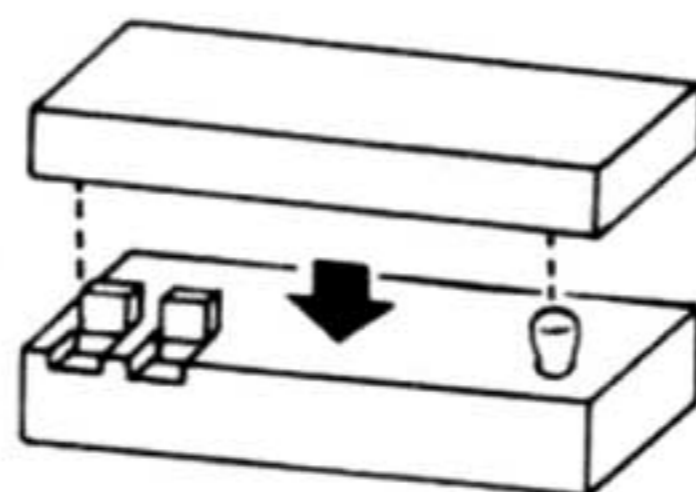
- ① Lift the direct connector on the tape deck. Push it straight down to lock it into place.



- ③ Insert the pin into the top panel. (Push in and turn clockwise  $90^\circ$ .)



- ④ Lower this unit (SH-E4) onto the tape deck. Line up the direct connector and stabilizing pin properly.

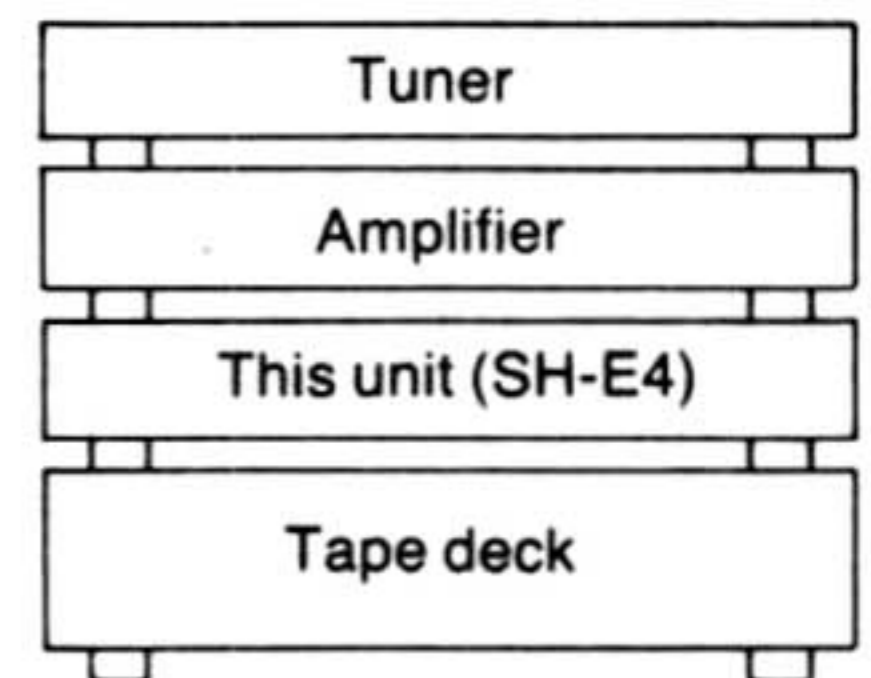


- ⑤ In the same way as in steps ①~③, place the amplifier on the equalizer, and connect the tuner to the amplifier.

- ⑥ Connect the turntable and speakers with their respective accompanying cords.

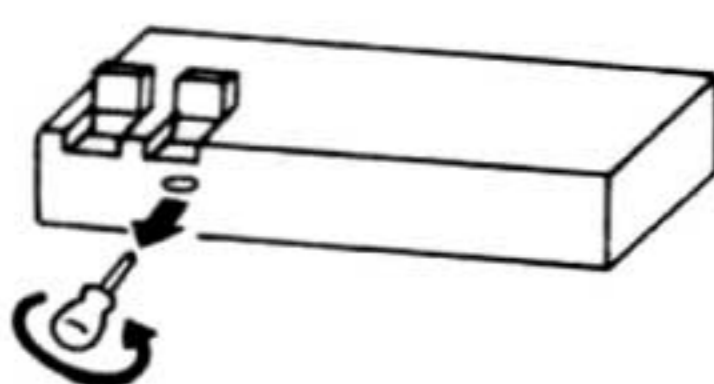
### Notes:

1. When using the direct connectors, do not use pin cords.
2. When using this unit (SH-E4), place it between amplifier and tape deck.

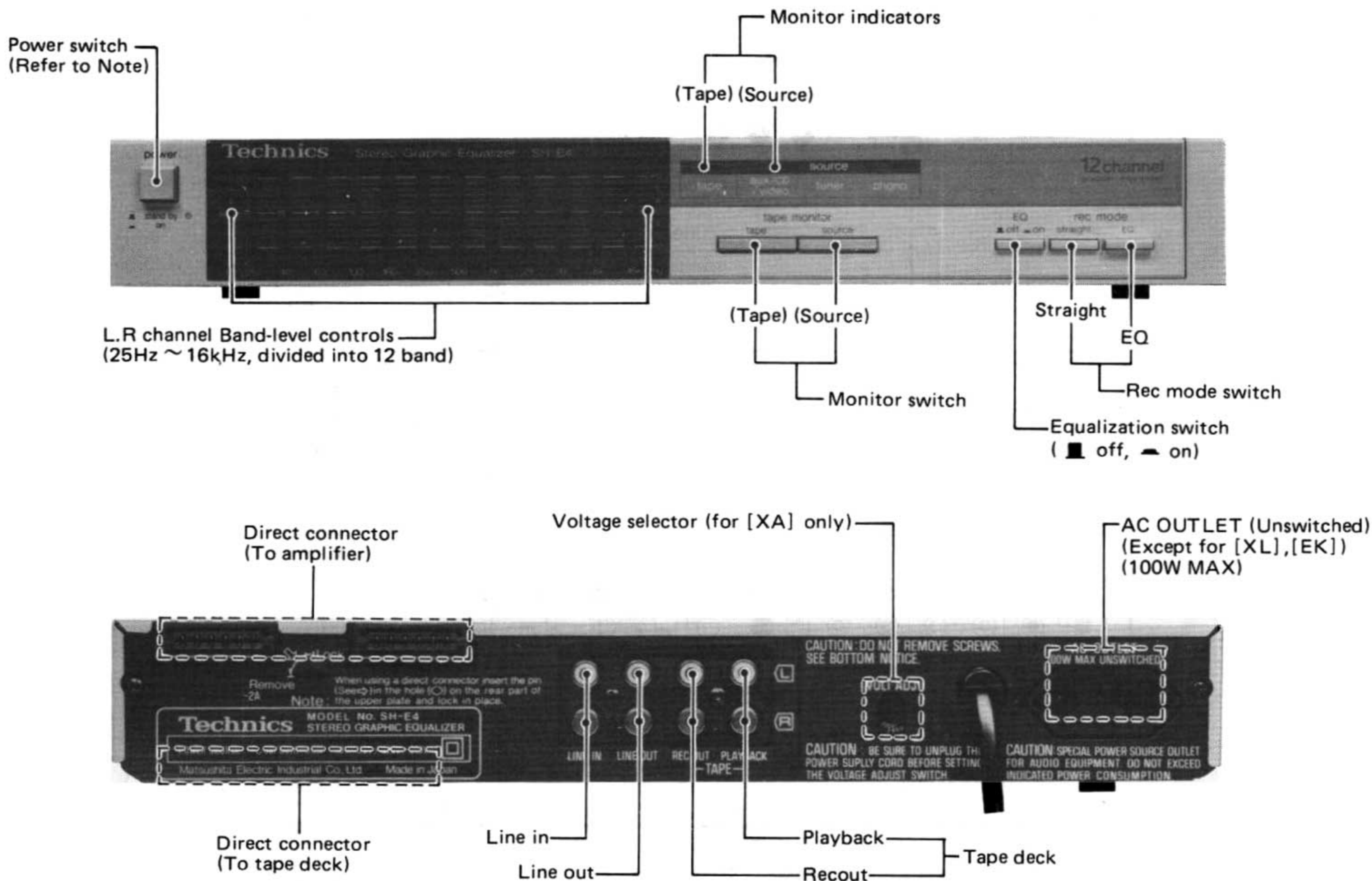


3. Position the units in a straight column to avoid twisting and breaking the direct connectors.
4. If this unit is installed in a rack, first make the direct connector connections.

- ② Remove the stabilizing pin from the back panel. (Turn counter-clockwise  $90^\circ$  and pull.)



# LOCATION OF CONTROLS



## Note:

If the power is switched on while other equipment is being used, the sound will be momentarily interrupted.

Regardless of the switch setting, the primary circuit is always "live" as long as the power cord is connected to an electrical outlet.

## Recording mode selector (rec mode)

This switch is used, when recording on a tape deck, to select whether or not to make correction adjustments during recording.

### •EQ (■—■):

Set the switch to this position to make correction adjustments during recording.

### •Straight (■—■):

Set to this position to record without equalizer correction.

## Equalization switch (EQ)

This switch can be used to turn the equalization circuitry on and off.

### •on (■—■):

Set to this position for equalizer correction.

### •off (■—■):

Set to this position to turn off equalizer correction. By turning this switch on and off, the equalizer effect can also be checked. When this switch is in the "off" (■—■) position, signals will still pass through the unit and be emitted, regardless of whether the power "stand by" ⏻•on" switch is in the "on" or "off" position.

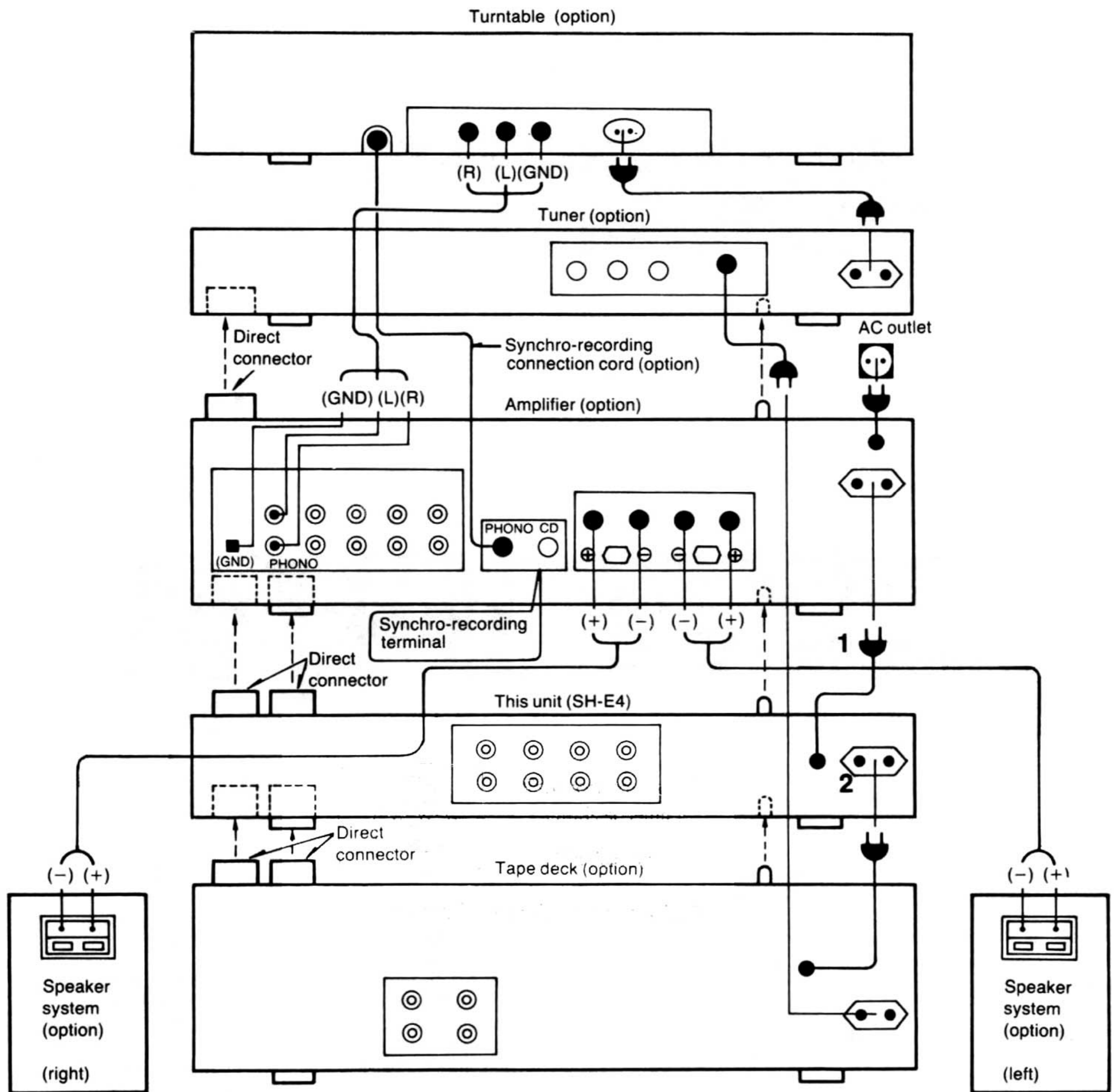
• The power supply for this unit varies depending upon the areas. Also, the parts used for power supply are different.

So, refer to the circuit diagram and the replacement parts list.

\* 240V (50/60Hz) for Australia. [XL] and United Kingdom [EK] areas.

\* 110V-120V, 220V-240V (50/60Hz) for [XA] and [PC] areas.

# CONNECT WITH DIRECT CONNECTORS



**1** Do not disconnect the power cord of this unit even if the power switch is switched OFF. If the power cord is disconnected, tape deck playback, recording and direct operation functions cannot be used. Note, however, that the power cord should be disconnected if the entire system is not to be used for a long time, because otherwise there is some consumption of electricity even if the power switch is OFF.

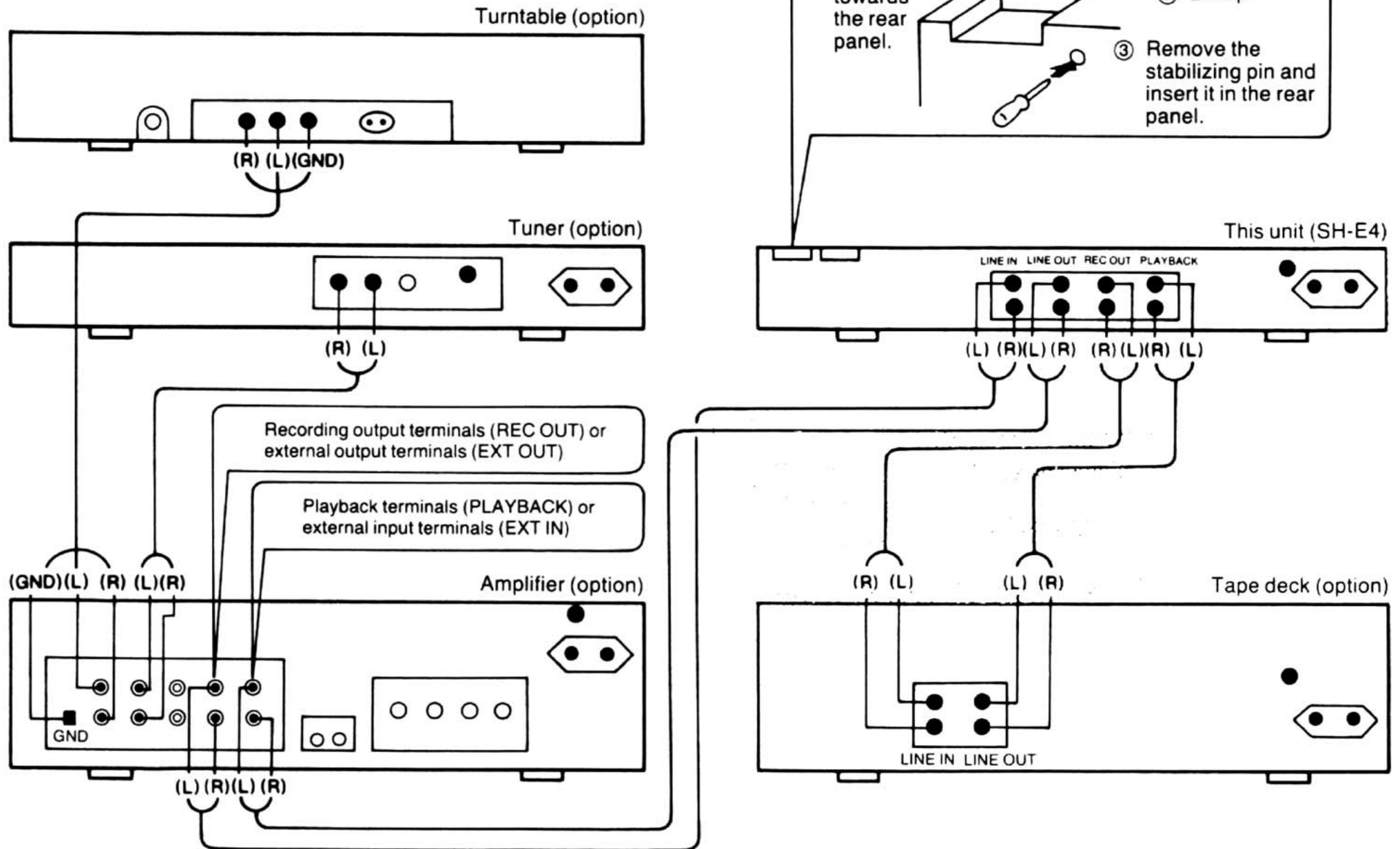
## **2 "UNSWITCHED" outlet:**

Power is always available, regardless of power switch setting. Equipment rated up to 100 W can be connected. (Not equipped for some countries)

**Note:** The configuration of the AC outlet and AC power plug differs according to area.

## CONNECT WITH PIN CORDS

- For connection with an integrated amplifier.  
Connection to the TAPE terminals of an integrated amplifier.

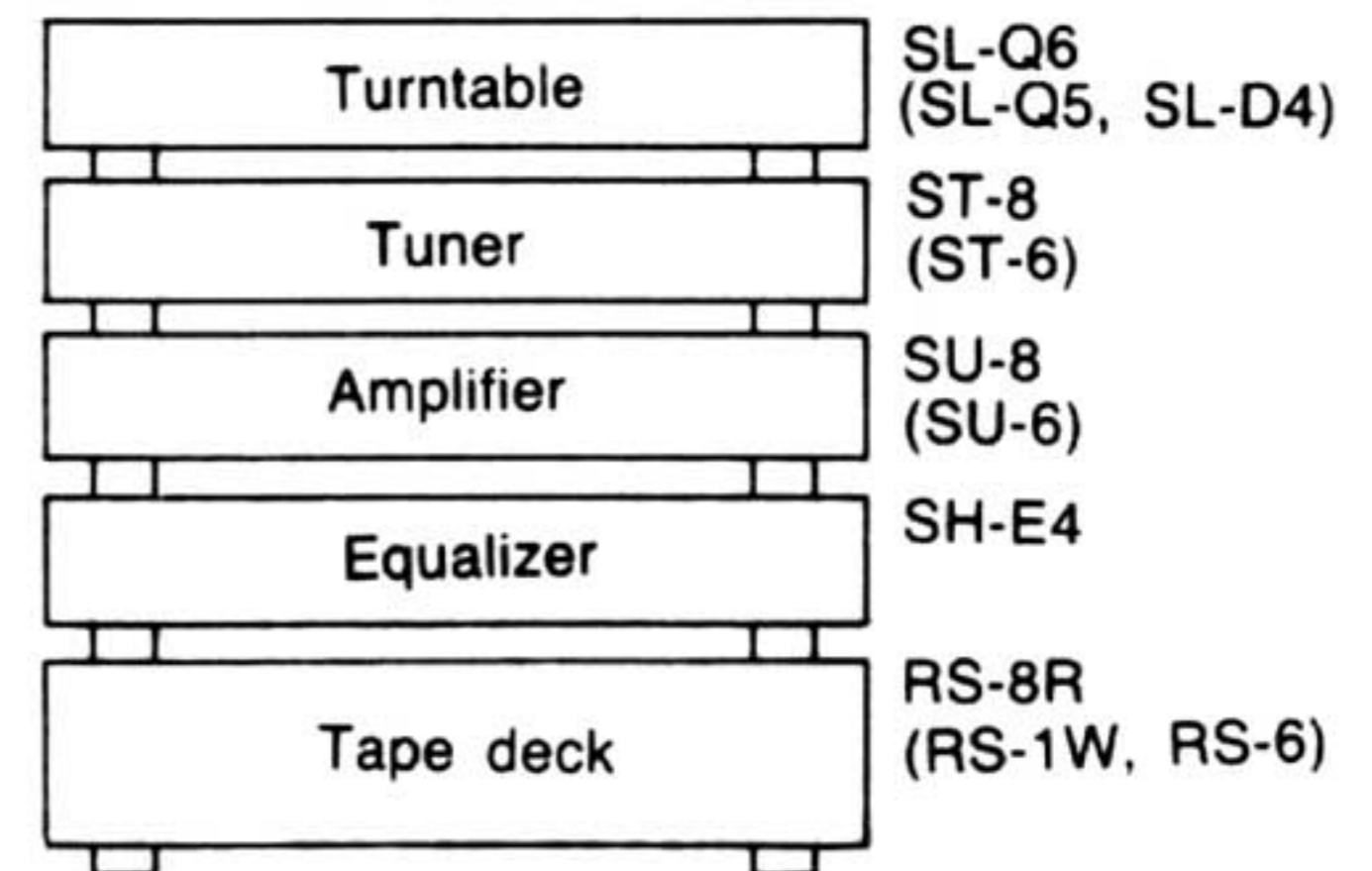


## DIRECT OPERATION

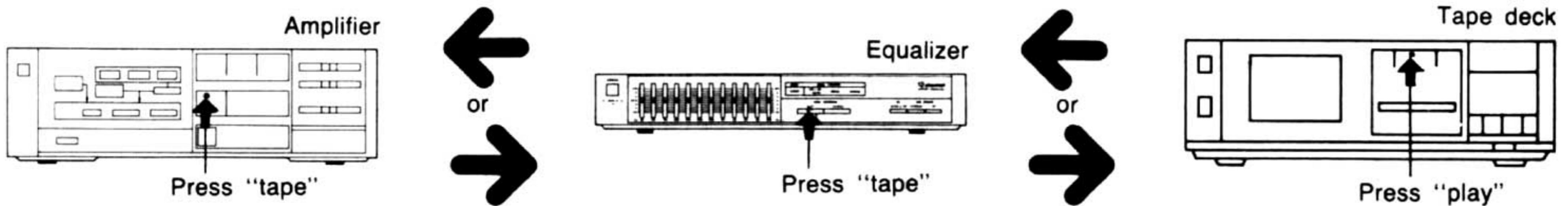
"Direct operation" means that, once each component has been prepared for operation, any operation can be conveniently selected and started by one-touch operation.

This function is possible only by the combination of Technics components shown in the figure at the right, and which have been connected by direct connectors.

Operation at the equalizer, or at the individual components, is possible.



- To listen to a tape... Press the "tape" button on the equalizer or amplifier, or the "play" button on the tape deck.



- To listen to discs...

- To listen to radio broadcasts...

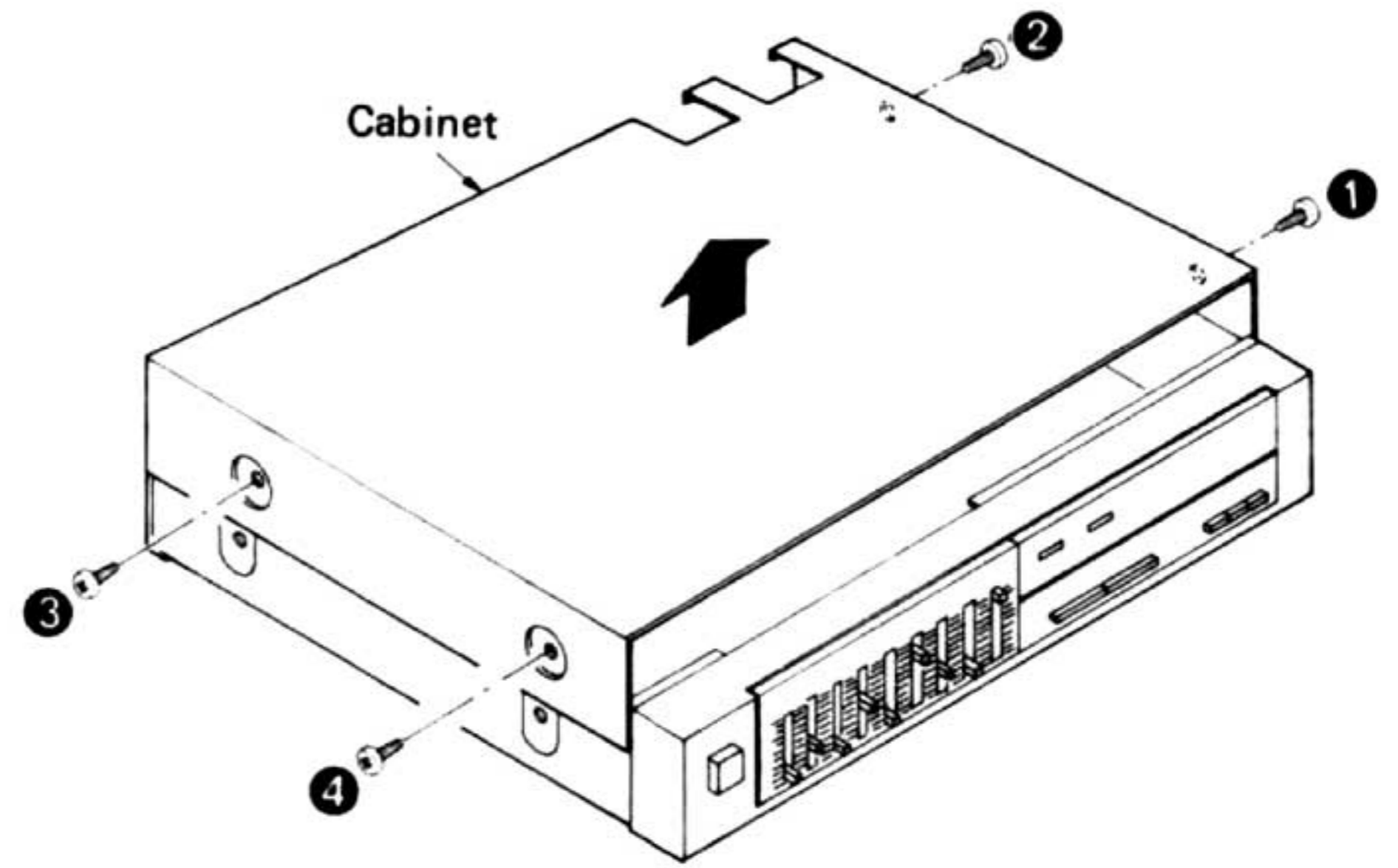
Refer to the section "Direct Operation" (in the operating instructions of the amplifier) for disc play or radio broadcasts.

### Notes:

1. Do not switch the tuner on while playing a disc or tape, or while tape recording, because to do so will cause the "tuner" input selector to be automatically activated.
2. If, while listening to a disc or radio broadcast, the tape deck is switched off and the tape indicator is illuminated, press the tape-monitor selector marked "source".
3. Even though another input selector is pressed while listening to a turntable or a compact-disc player, the turntable or compact-disc player will continue to operate; be sure to stop it.
4. If the equalizer power is ON, switching from "tape" to "source" should be done by using the "source" switch of the equalizer.

# DISASSEMBLY INSTRUCTIONS

## 1. How to remove the cabinet [Fig. 1]



[Fig. 1]

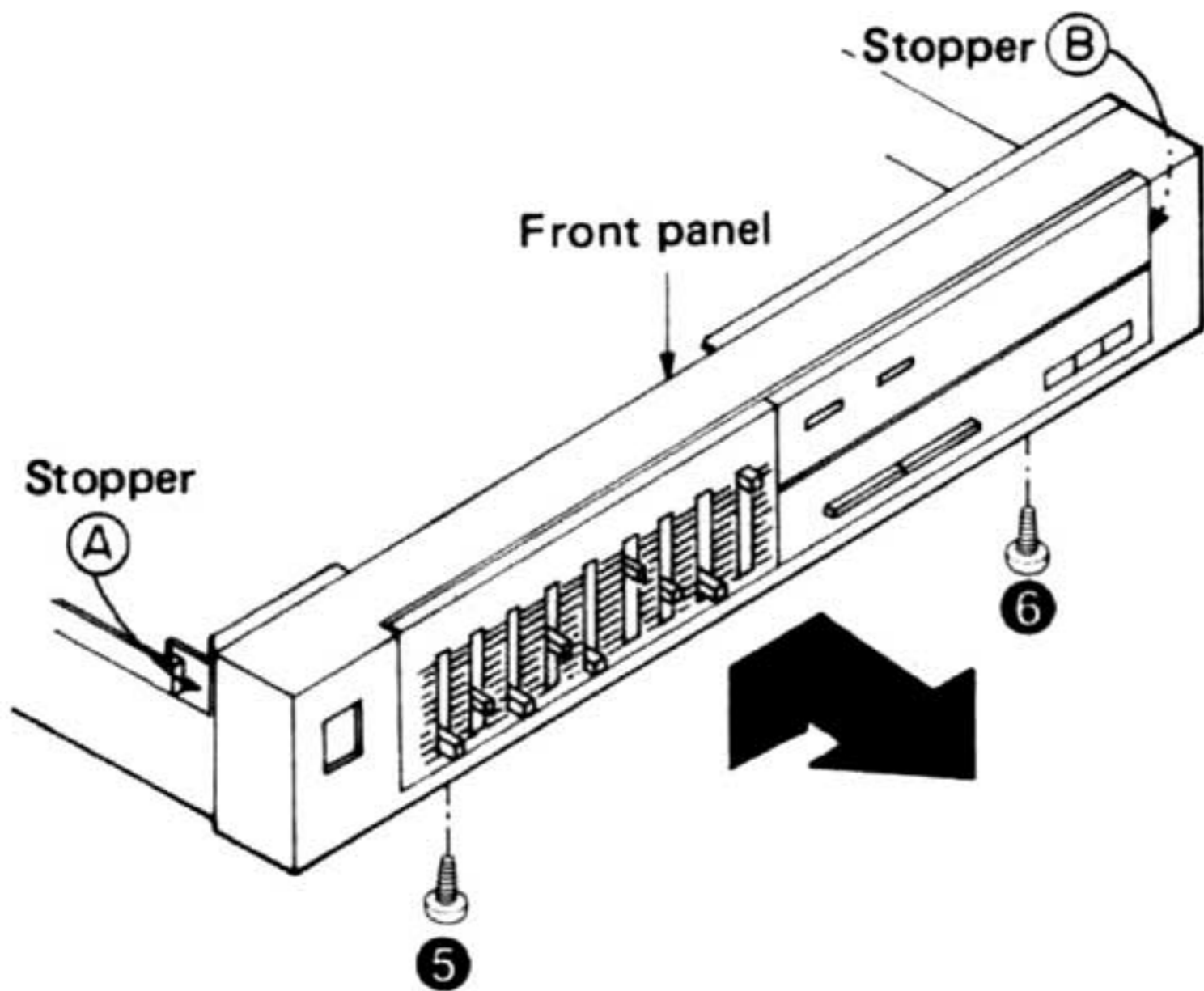
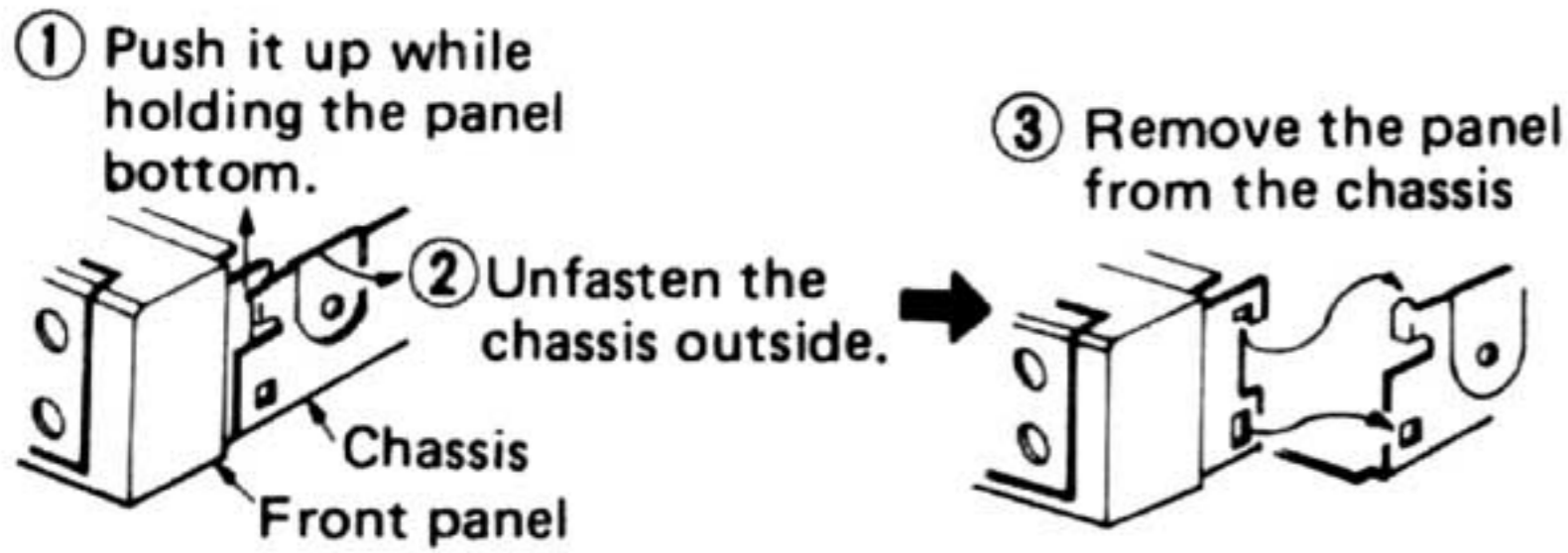
## 2. How to remove the front panel [Fig. 2, 3]

1. Remove the cabinet.
2. Pull to the 3 connectors (Fig. 3 : J4, J7, J8.)
3. Remove the 2 setscrews (Fig. 2: ⑤, ⑥) of the front panel.
4. Release the chassis stopper from inside ①, ②, and lift the front panel to remove.

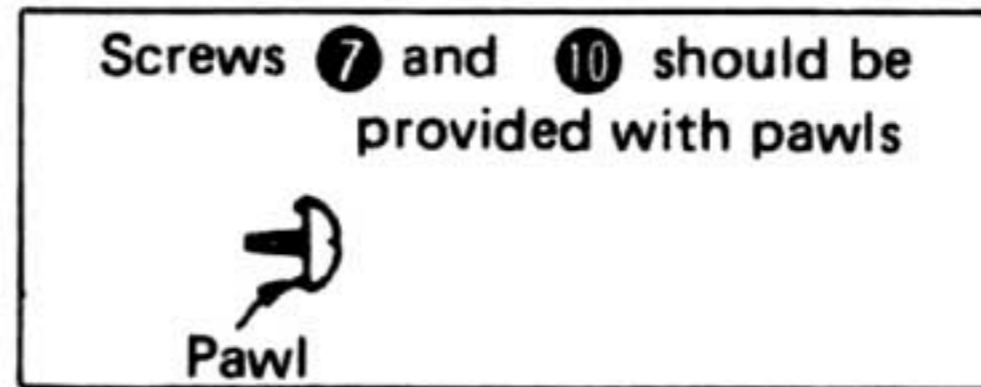
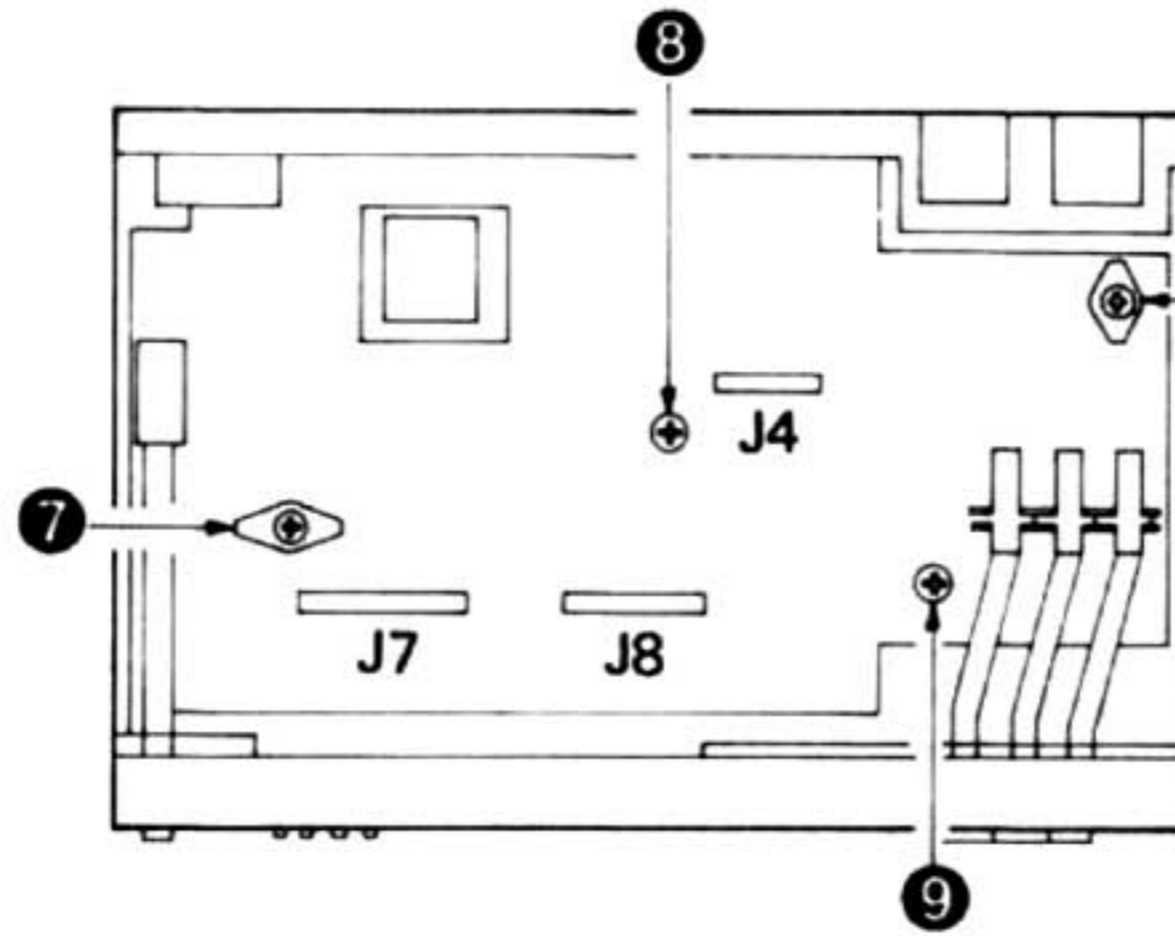
## 3. How to remove the P.C.B. [Fig. 3, 4, 5]

1. Remove the front panel and cabinet.
2. Remove the rear terminals 2 setscrews (Fig. 4: ⑪, ⑫) and the 4 setscrews (Fig. 3: ⑦ ~ ⑩) of the P.C.B.
3. Pull up the P.C.B. (Fig. 5)

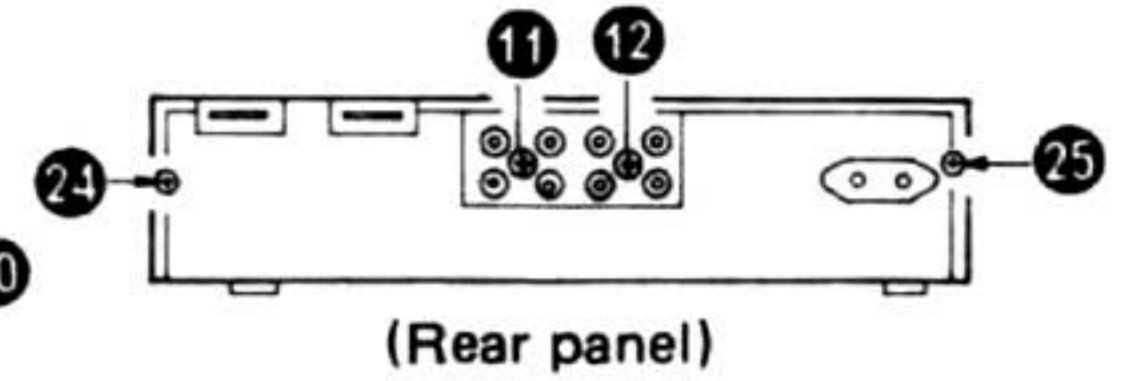
### ● To remove the chassis stopper



[Fig. 2]

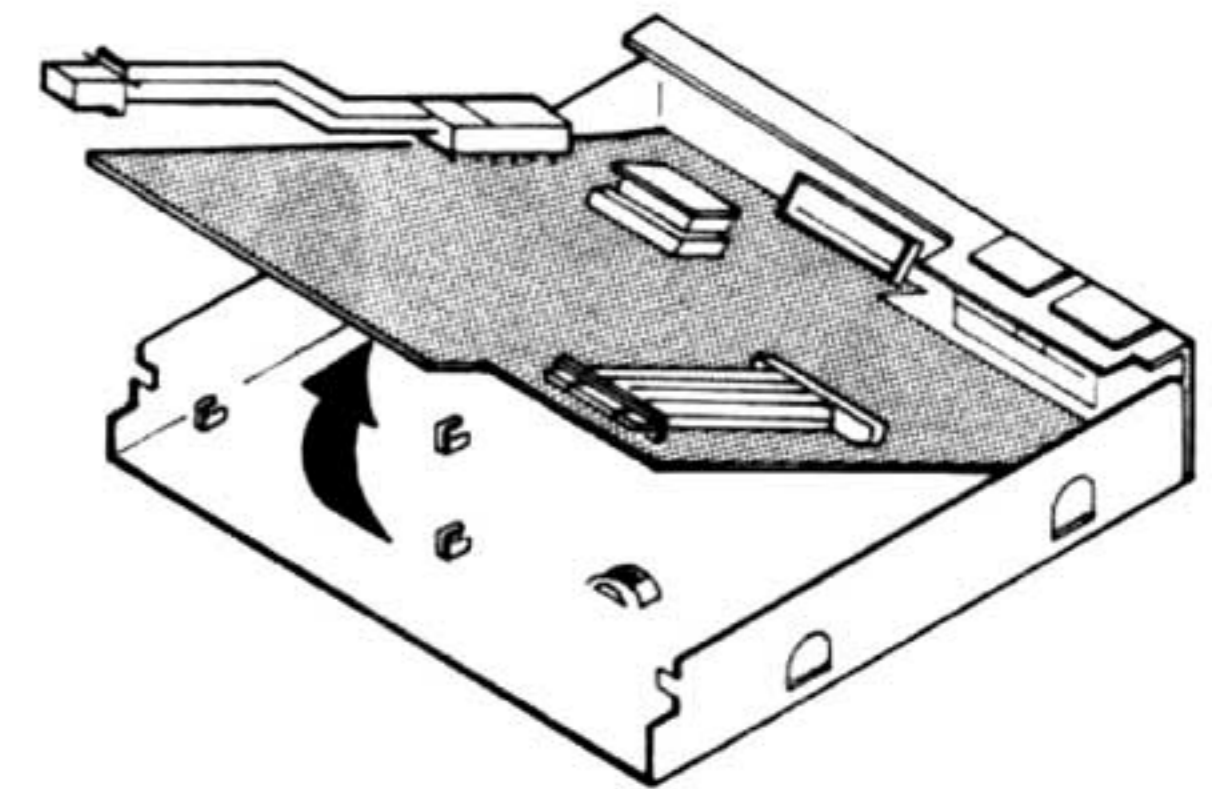


[Fig. 3]



(Rear panel)

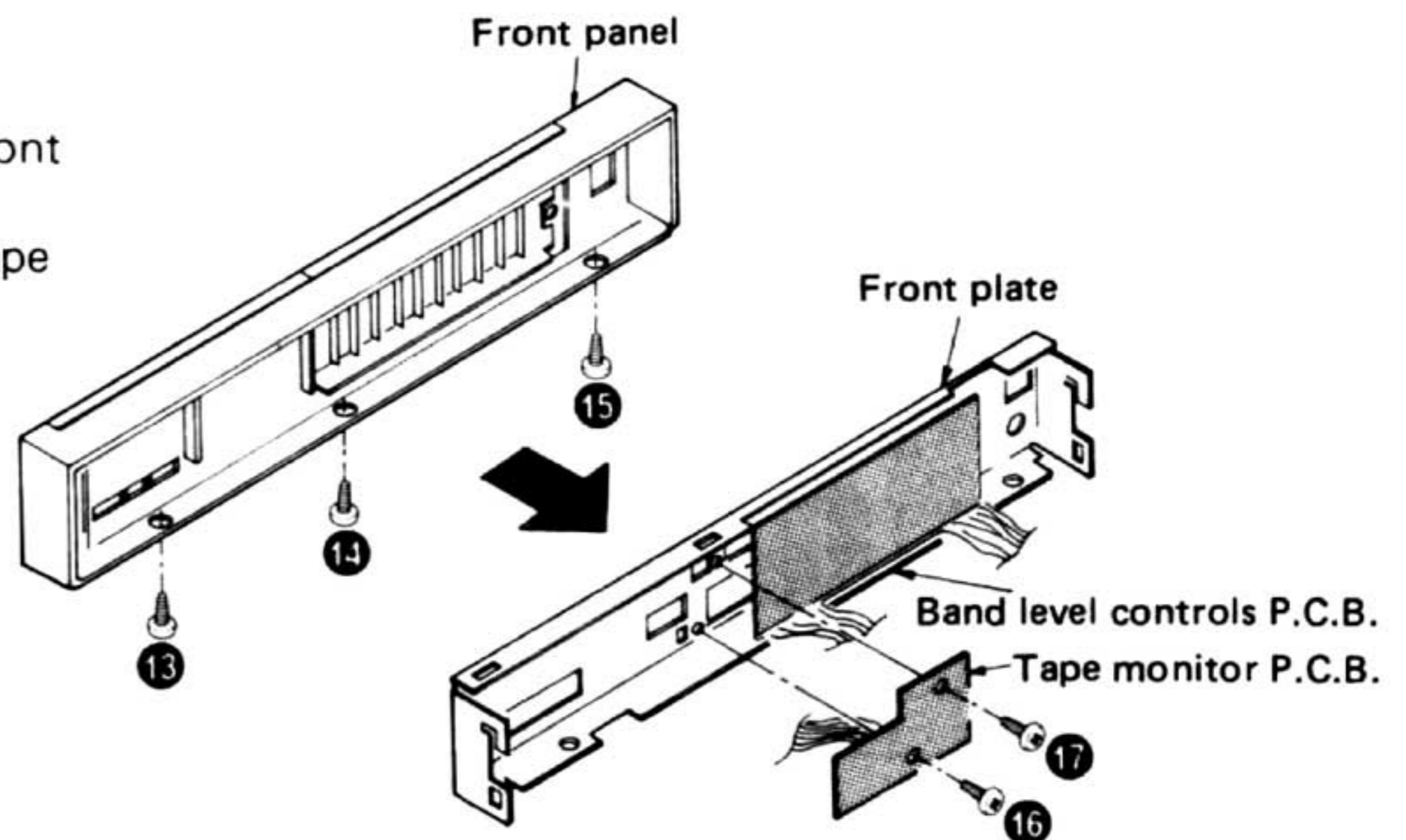
[Fig. 4]



[Fig. 5]

## 4. How to remove the front plate [Fig. 6]

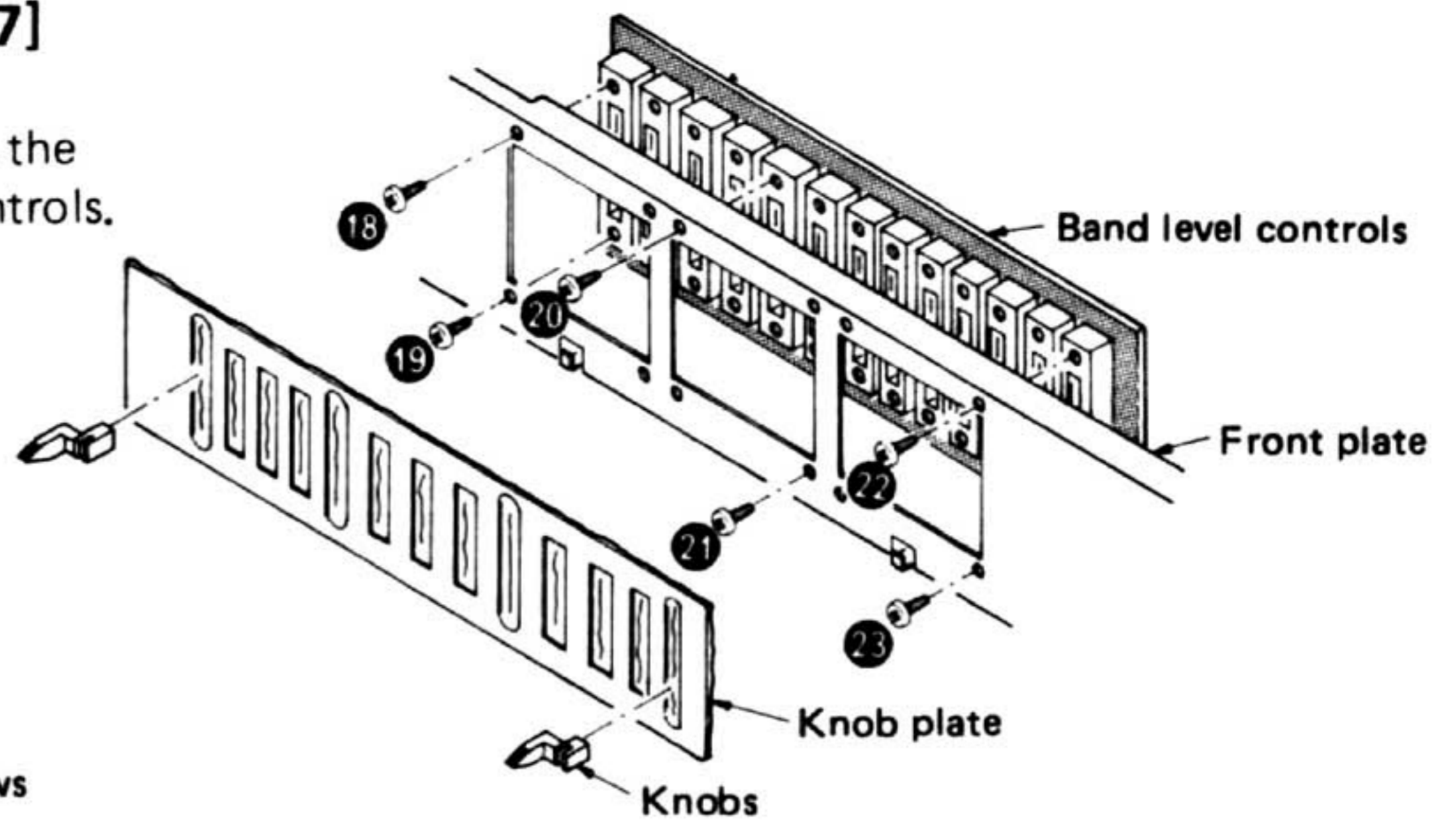
1. Remove the front panel.
2. Remove the 3 setscrews (Fig. 6: ⑬ ~ ⑮) of the front plate.
3. Remove the 2 setscrews (Fig. 6: ⑯, ⑰) of the tape monitor P.C.B.



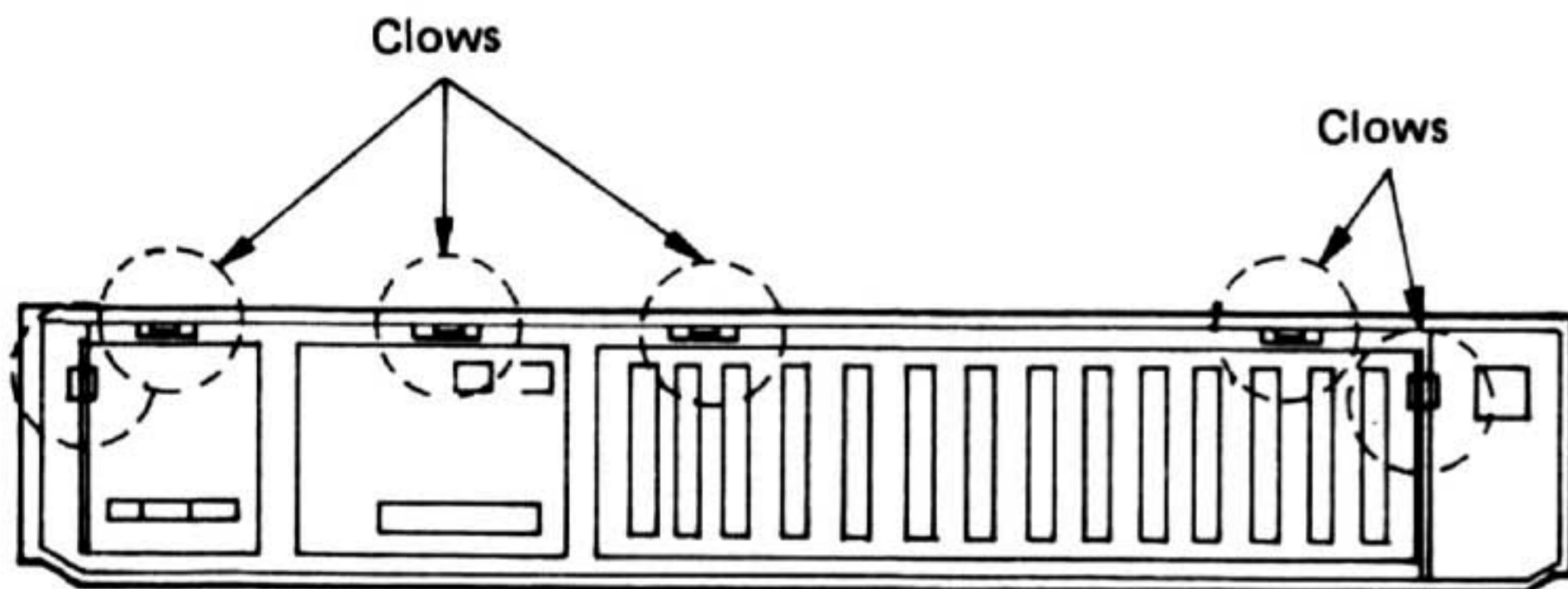
[Fig. 6]

## 5. How to remove the band level controls [ Fig. 7 ]

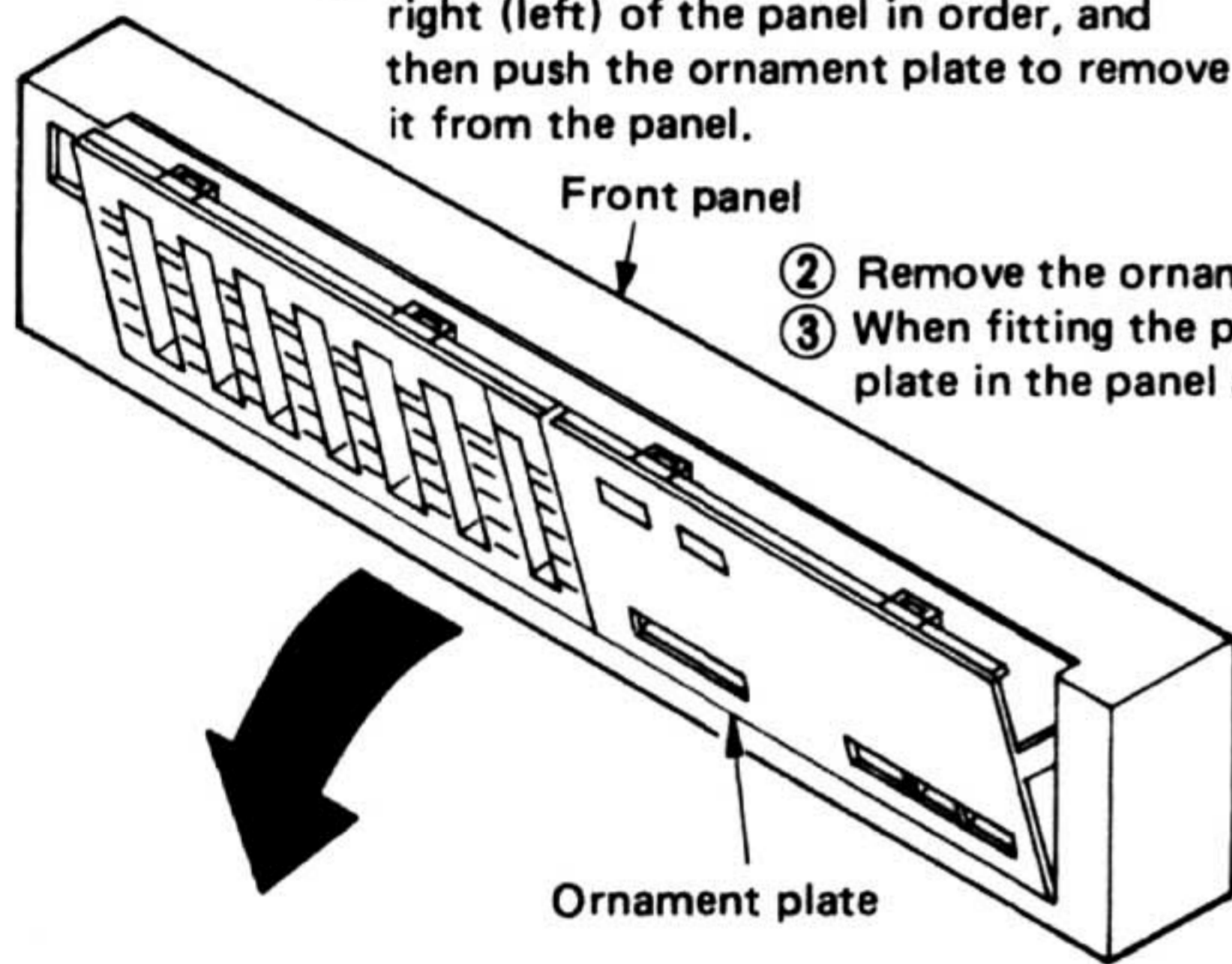
1. Remove the front panel.
2. Remove the knobs and the knob plate, then remove the 6 setscrews (Fig. 6: 18 ~ 23 ) of the band level controls.



[ Fig. 7 ]



- 1 Unfasten the claws from left (right) to right (left) of the panel in order, and then push the ornament plate to remove it from the panel.



- 2 Remove the ornament plate aslant from the panel.
- 3 When fitting the plate, first fit the bottom of the plate in the panel and then push in the upper claws.

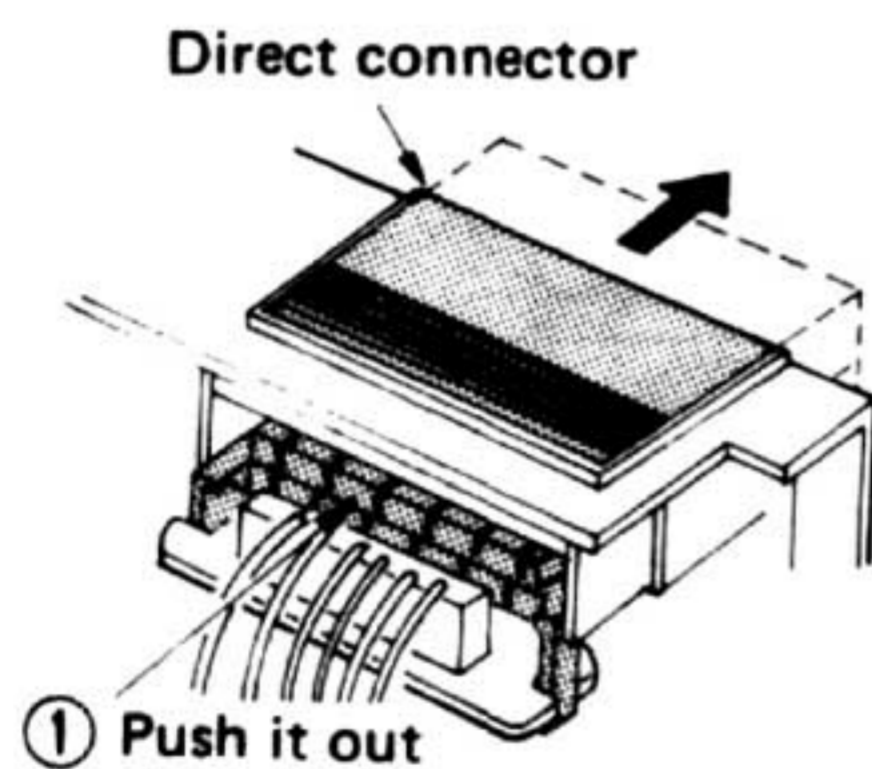
[ Fig. 8 ]

## 6. How to remove the ornament plate [ Fig. 8 ]

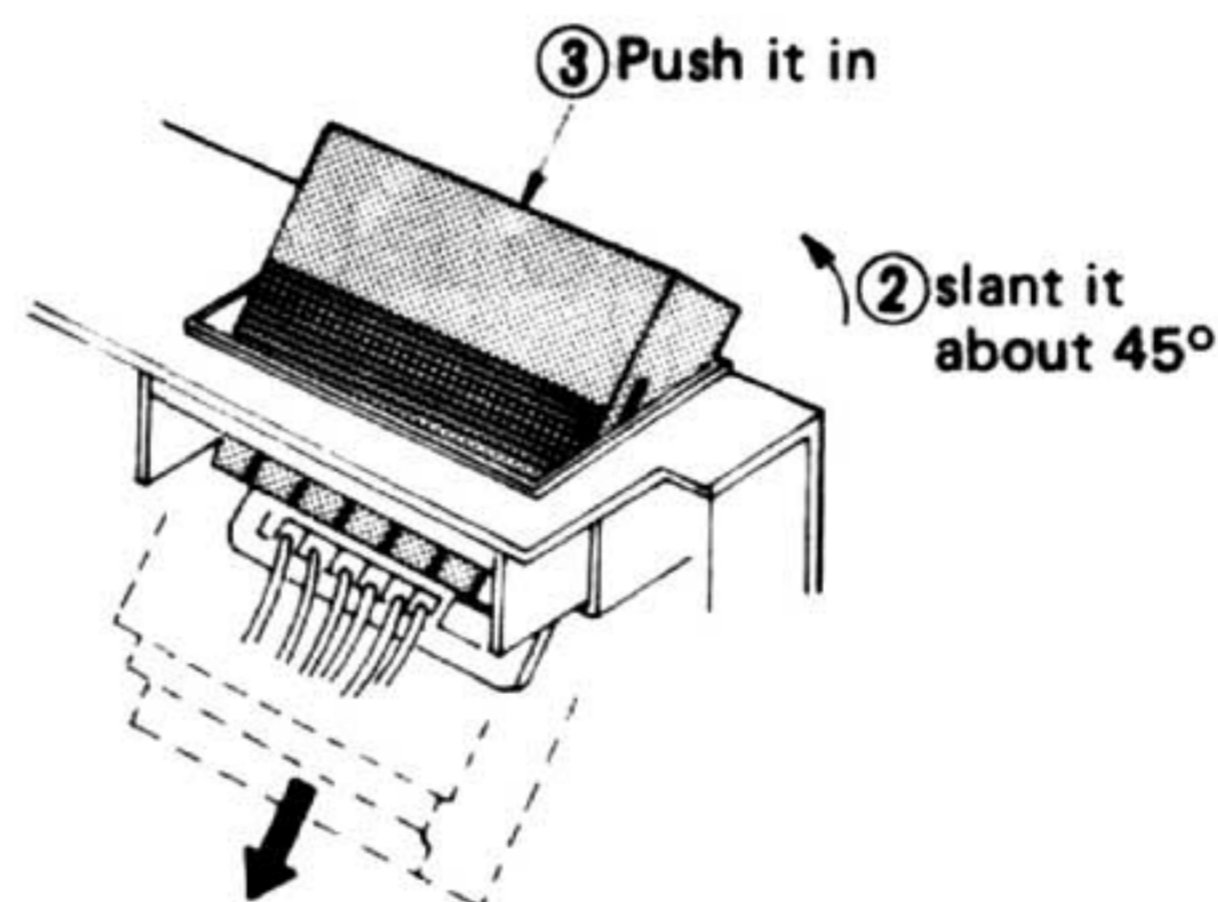
1. Remove the front panel.
2. Remove the ornament plate as shown in Fig. 8.

## 7. How to remove the direct connector [ Fig. 9, 10, 11 ]

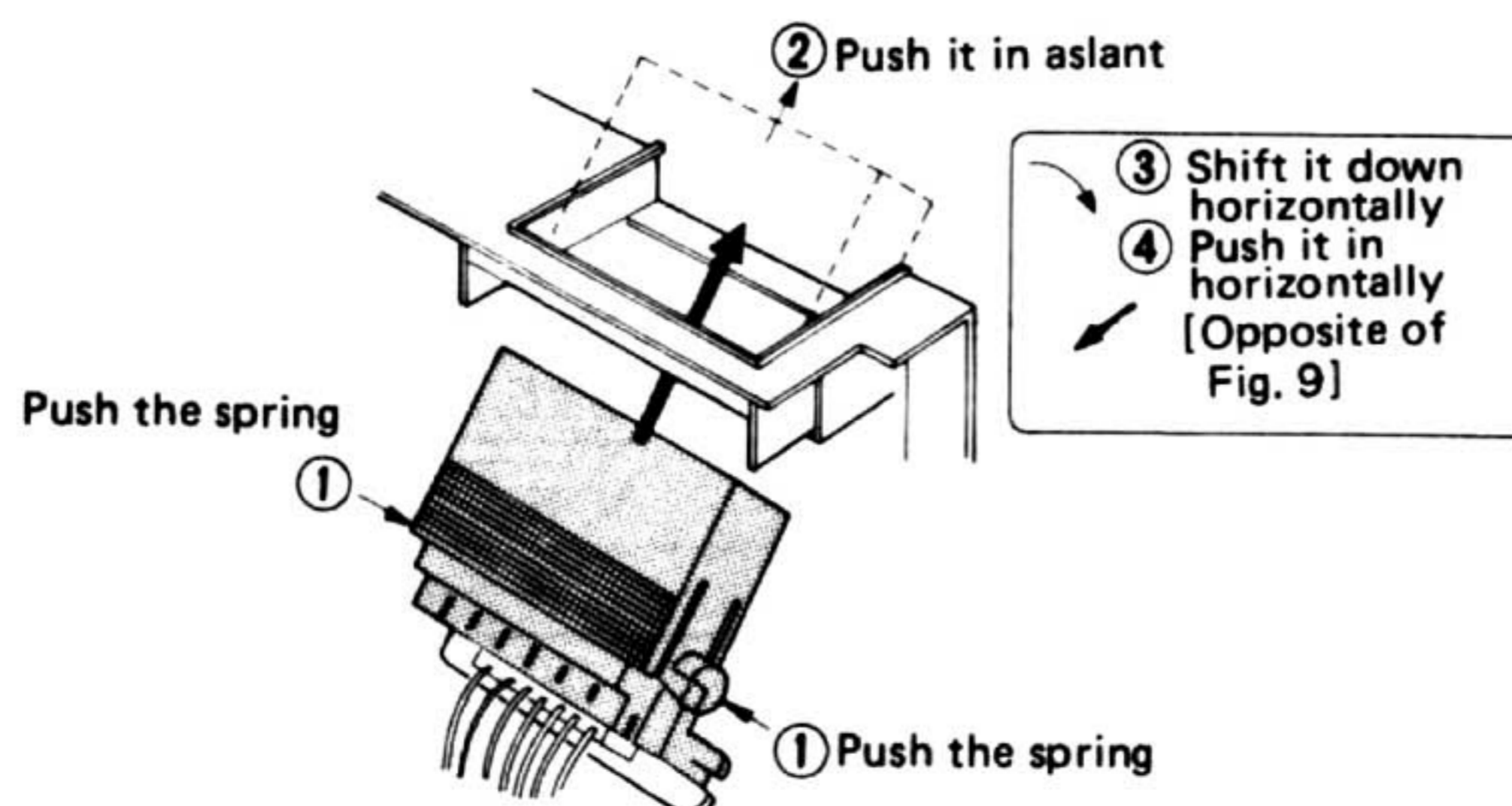
1. Remove the cabinet.
2. Remove the 4 setscrews (Fig. 4: 11, 12, 21, 22) of the rear panel.
3. Remove the direct connector as shown in Fig. 9 and 10.
4. When fitting the connector, follow the procedure shown in Fig. 11.



[ Fig. 9 ]



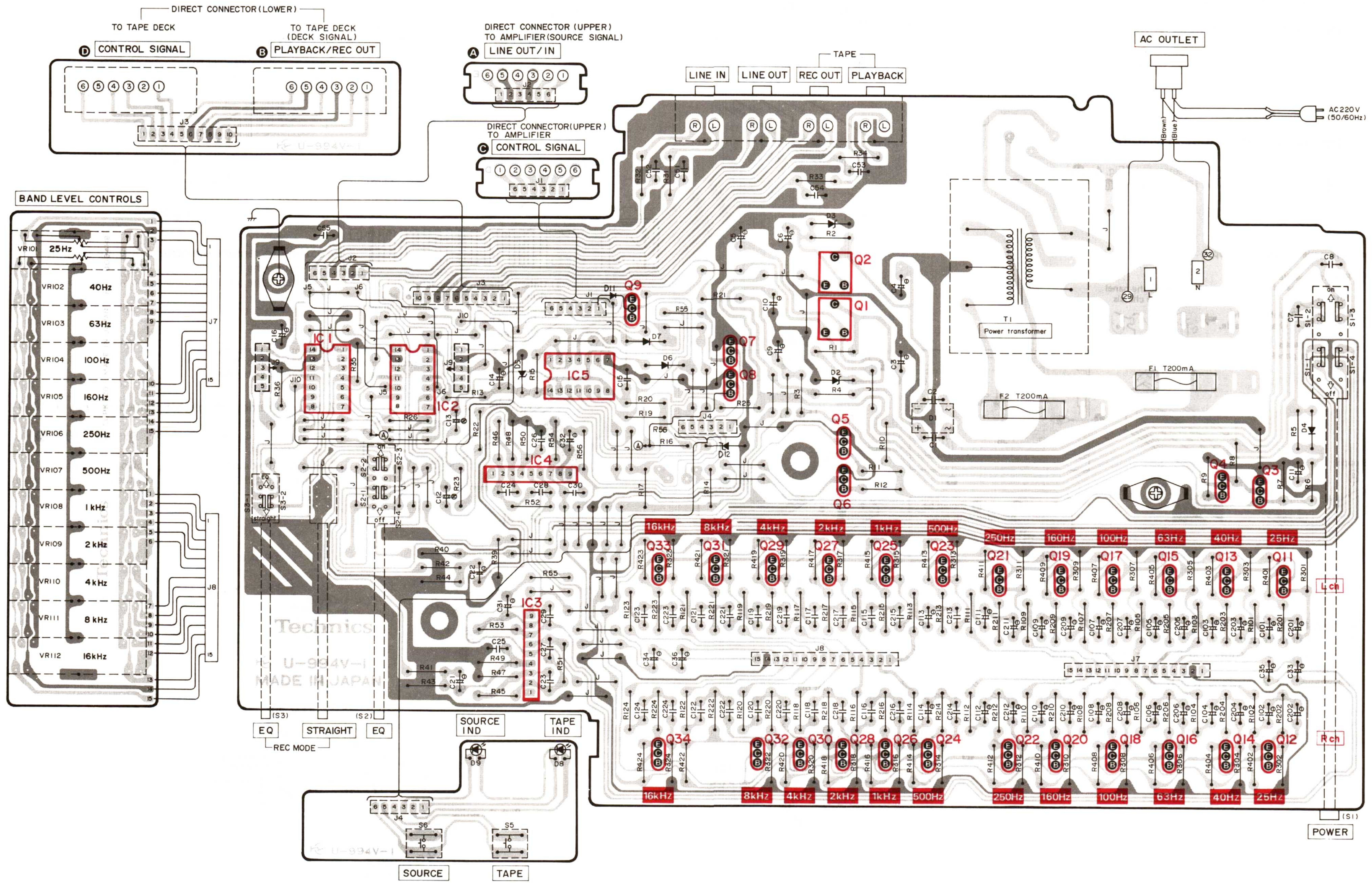
[ Fig. 10 ]



[ Fig. 11 ]

# CIRCUIT BOARDS AND WIRING CONNECTION DIAGRAM

Ground (Earth) Lines

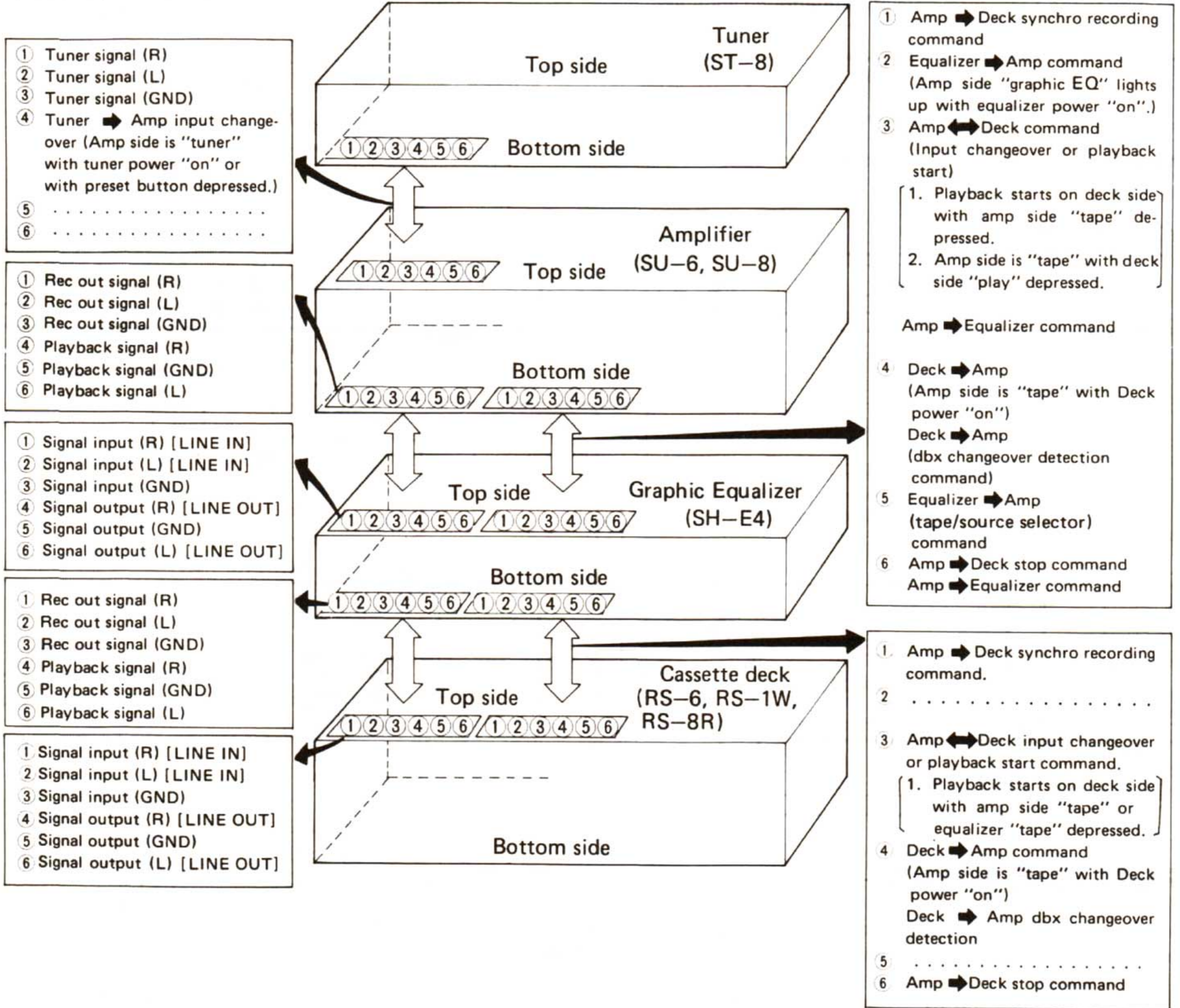




# TERMINAL FUNCTION OF DIRECT CONNECTOR

( . . . . . ) Terminals not used.

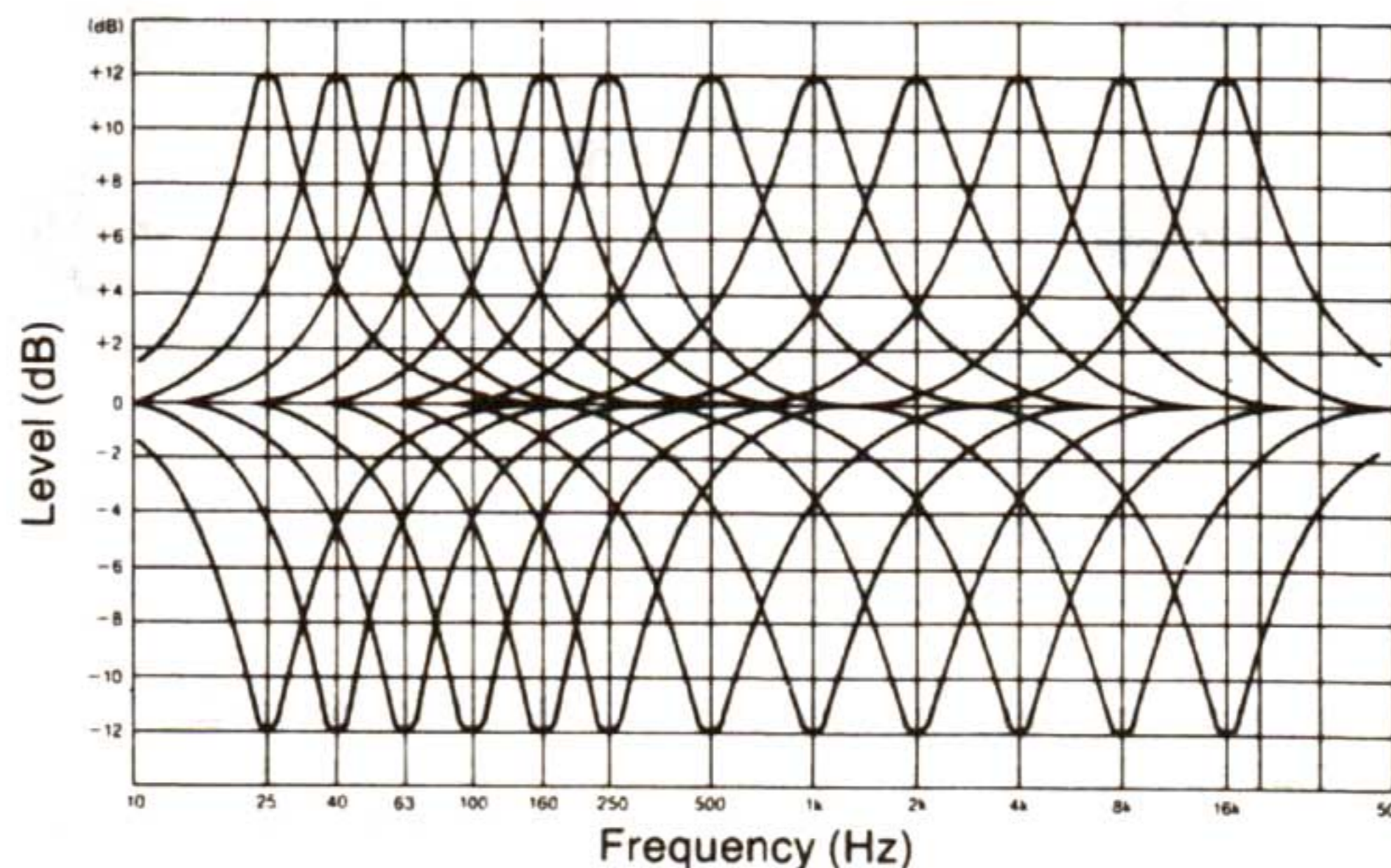
( . . . . . ) Terminals not used.



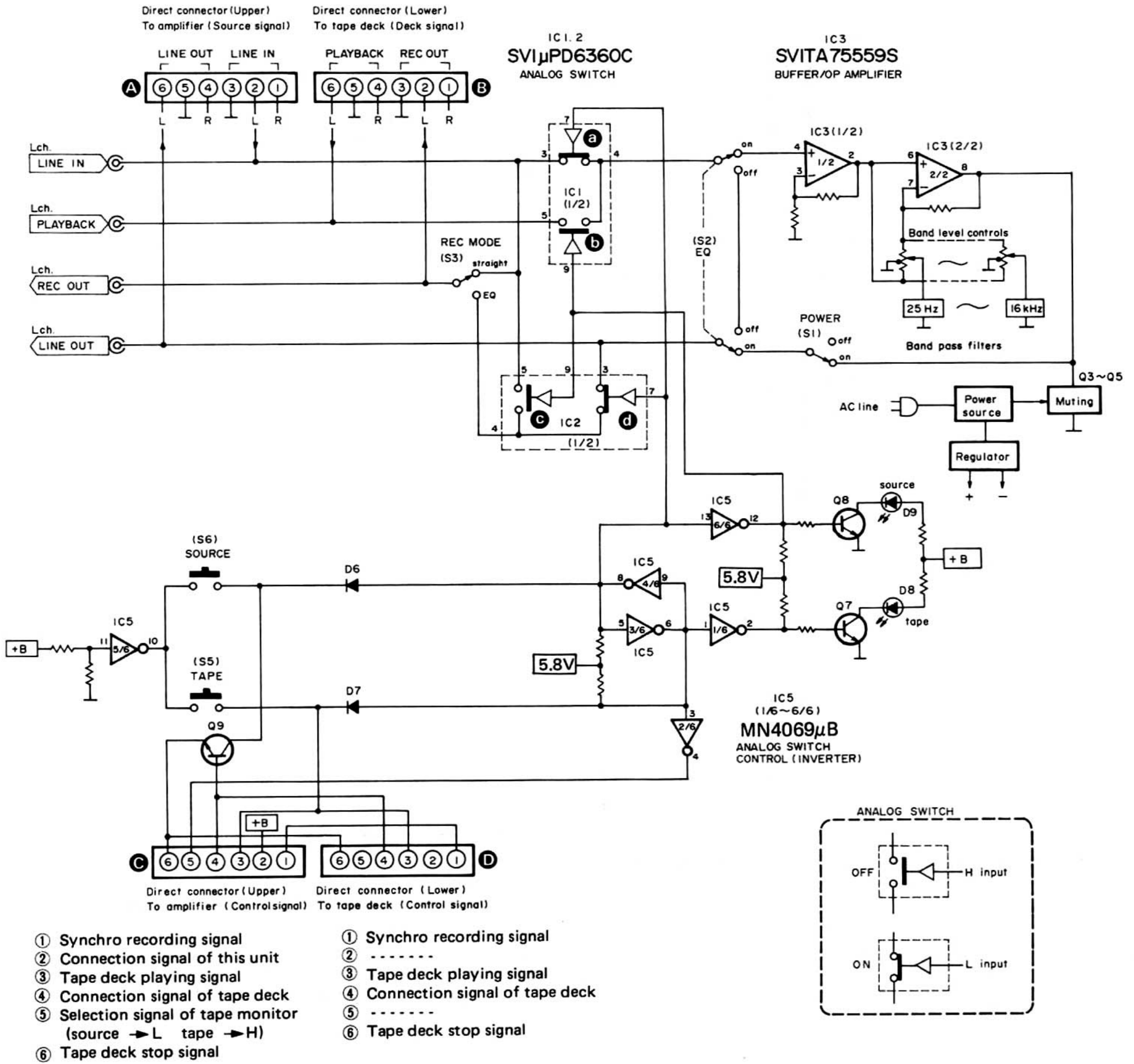
Terminal ⑥ is not used in RS-1W.

# TOTAL FREQUENCY RESPONSE

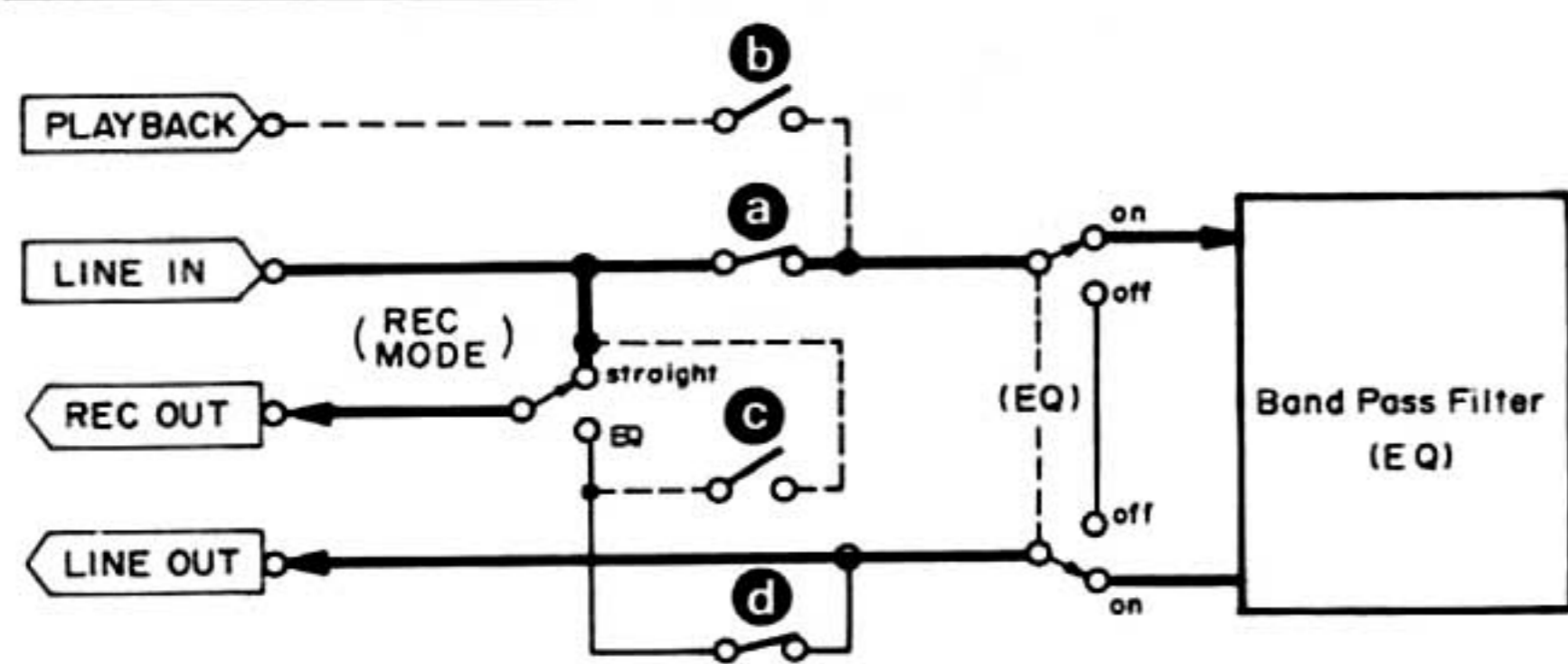
Frequency response ( $\pm 12$  dB position)



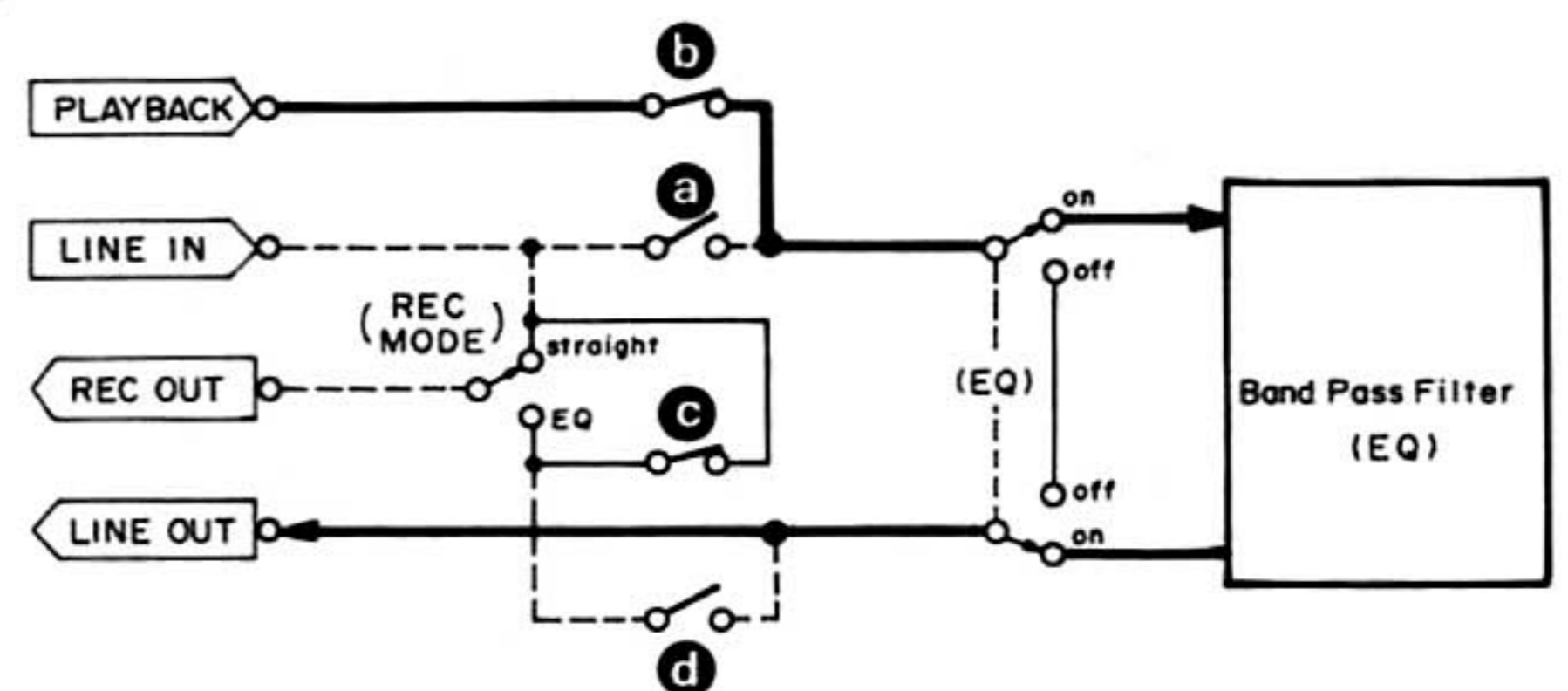
# BLOCK DIAGRAM



Tape monitor switch to "source" position

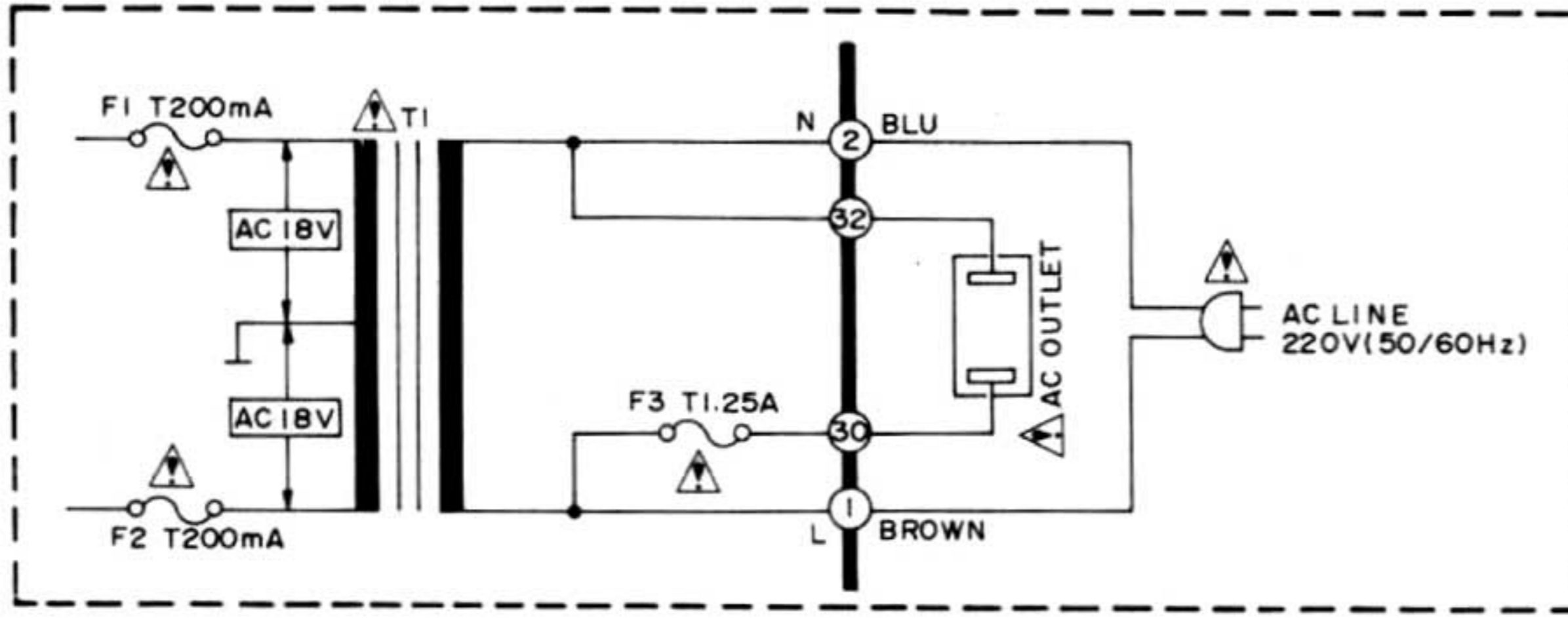


Tape monitor switch to "tape" position

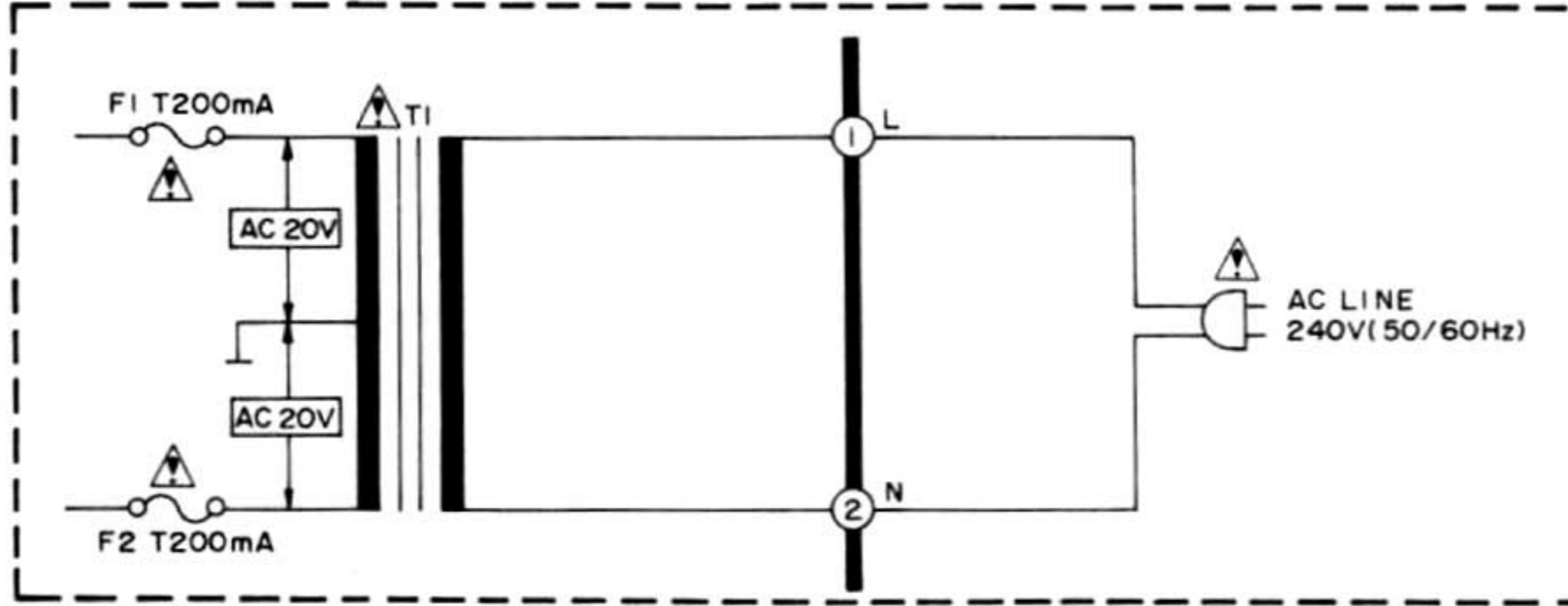


# POWER CIRCUITS TO BE CHANGED AND THE AREAS

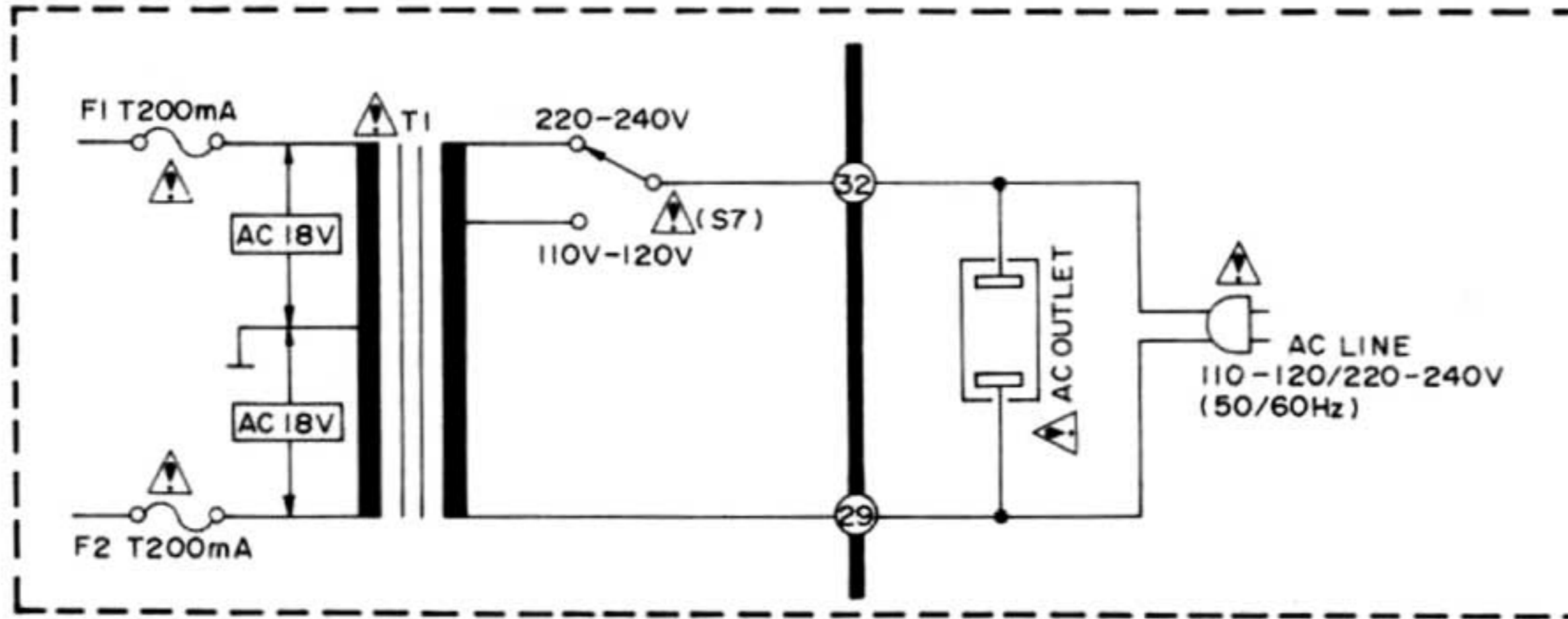
● For F.R. Germany [EGA] and Switzerland [EW] areas.



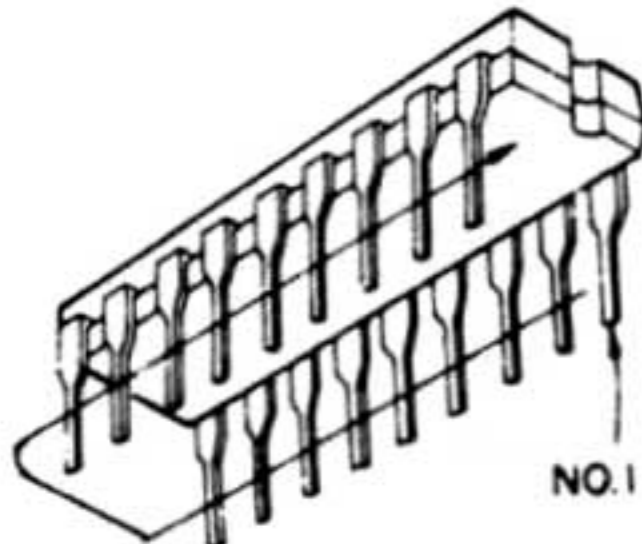
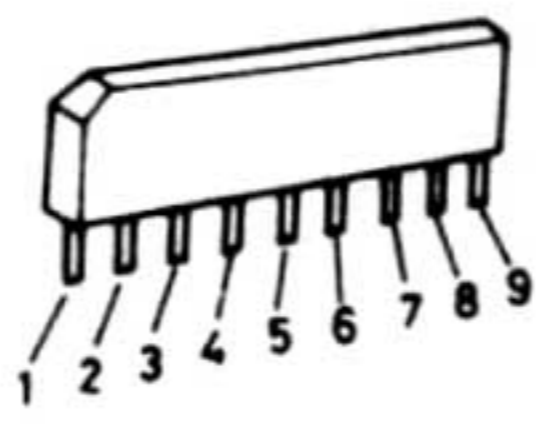
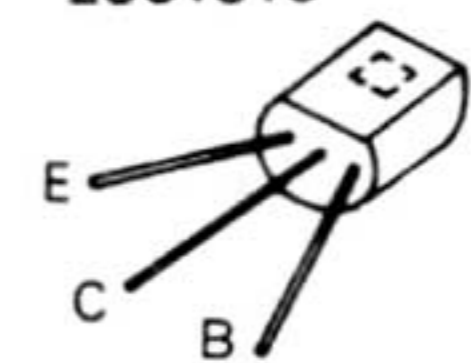

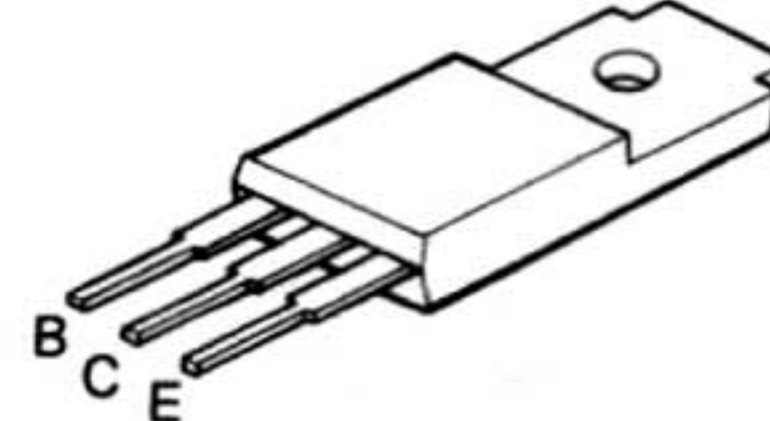
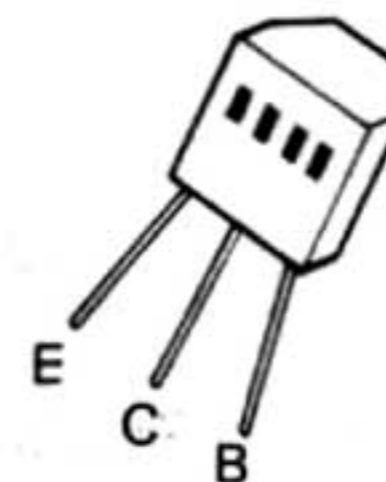




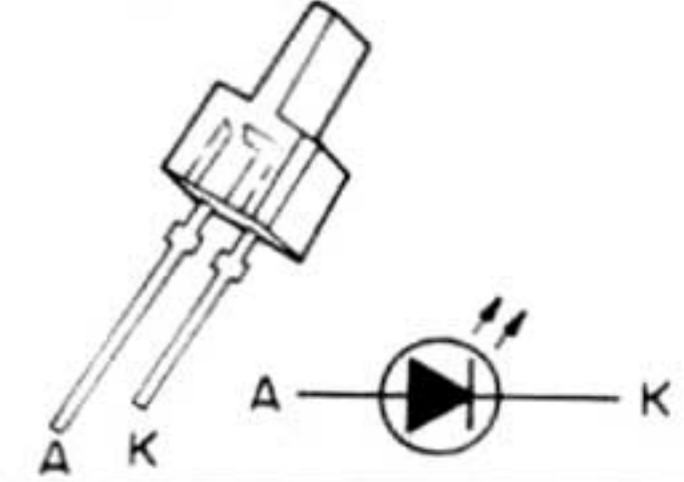


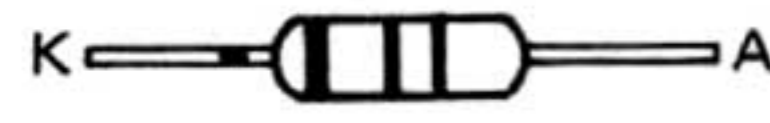


● For United Kingdom [EK] and Australia [XL] areas.

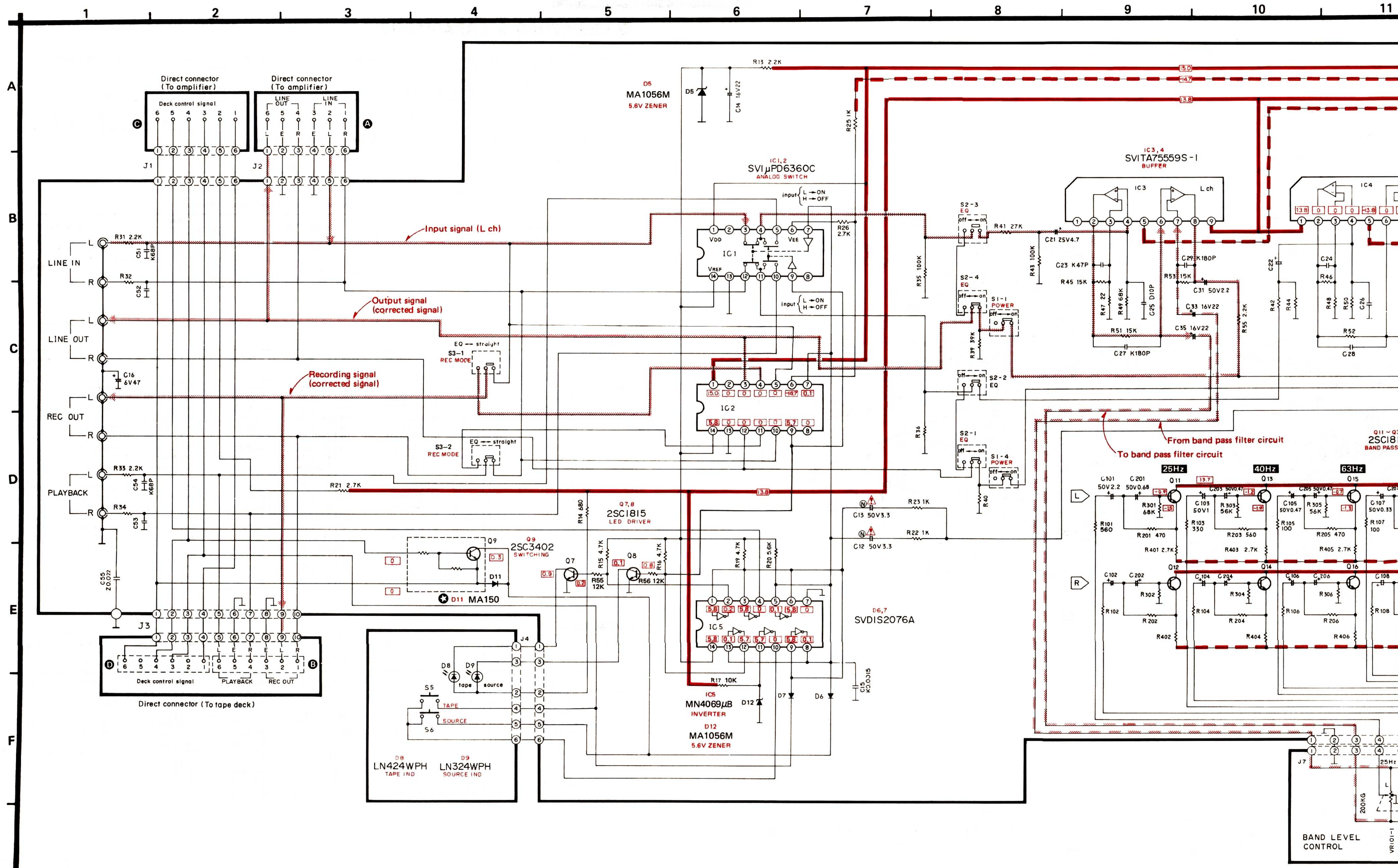


● For [XA], [PC] areas.



● Terminal guide of IC's, Transistors and Diodes

 <p>SV1<math>\mu</math>PD6360C MN4069<math>\mu</math>B</p> <p>14pin</p>	<p>SVITA75559S</p> 	<p>2SA1015 2SC2878 2SC1815</p>  <p>E C B</p>	<p>SVD1B4B42</p> 	
<p>2SD1406, 2SB1015</p>  <p>B C E</p>	<p>2SC3402</p>  <p>E C B</p>	<p>MA1150</p>  <p>K — A</p>  <p>K — A</p>	<p>SVD1S2076</p>  <p>K — A</p>  <p>K — A</p>	<p>LN324WPH LN424WPH</p>  <p>A K</p>  <p>A — K</p>
<p>MA1056M</p>  <p>K — A</p>  <p>K — A</p>	<p>MA150</p>  <p>K — A</p>  <p>K — A</p>			

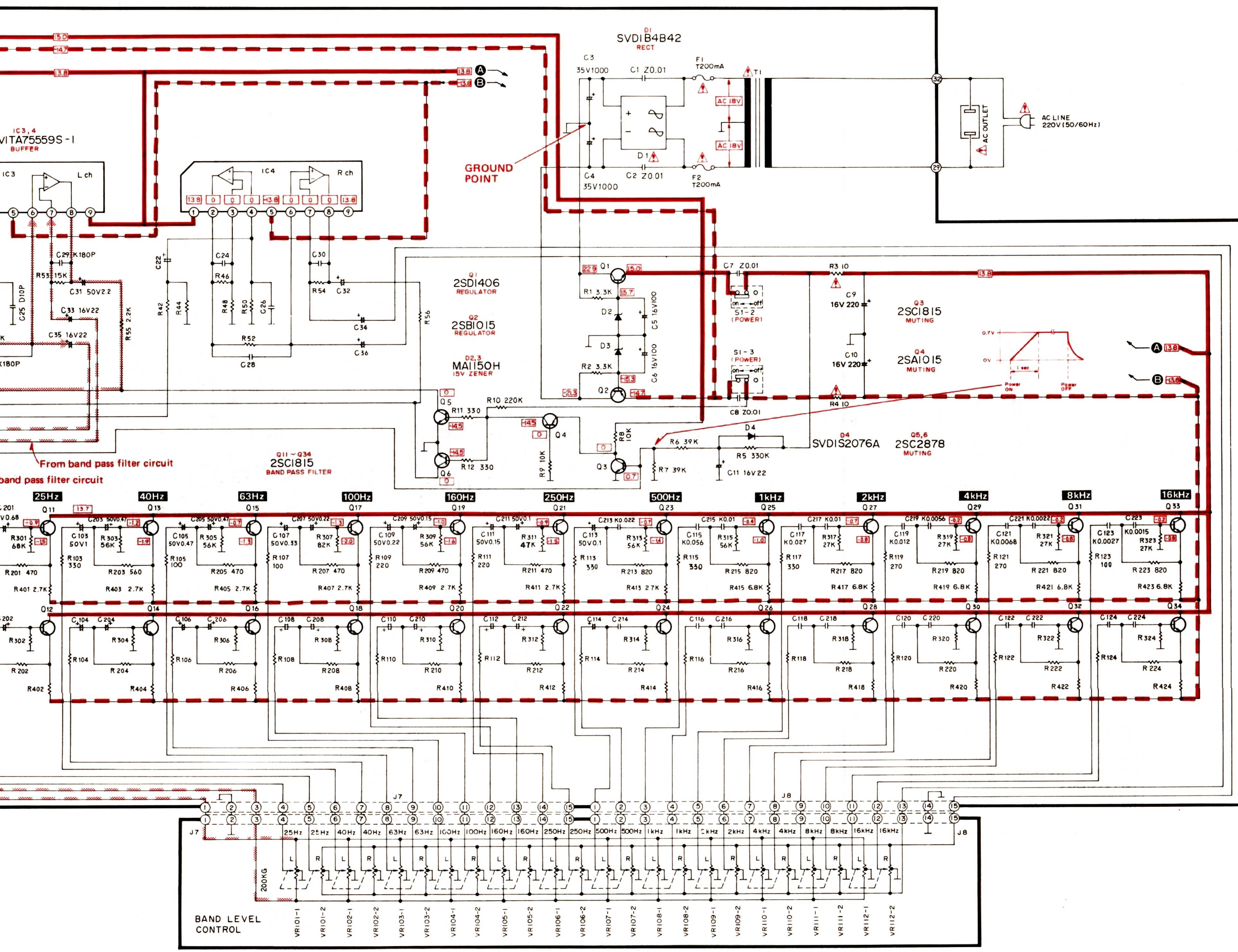


# SCHEMATIC DIAGRAM

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

- \* The part No. of transistors, IC and diodes mentioned in the schematic diagram stand for production part No. Regarding the part No. with \* 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 part list.
- \* This is the basic circuit diagram (For continental Europe) of this unit.  
Note that part of the circuit is subject to change depending on the areas.
- \* Regarding the circuits to be changed in the basic circuit diagram (For continental Europe) and related areas [EW], [EK], [XL], [EGA], [PC] and [XA], refer to page 12.

- Note**
1. S1-1 ~ 1-4 : Power source switch in "on" position.  
on ↔ off
  2. S2-1 ~ 2-4 : EQ switch in "on" position.  
on ↔ off
  3. S3-1 ~ 3-2 : Rec mode switch in "straight" position.  
Straight ↔ EQ
  4. S5, 6 : Tape monitor switch in "source" position.  
(S5 Tape switch)  
(S6 Source switch)
  5. S7 [XA] : Power source selector switch in "220V-240V" position.  
110V-120V ↔ 220V-240V
  6.   Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high-impedance) with the chassis taken as standard. Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.
  7. — Positive voltage lines. - - - Negative voltage lines  
- - - - - Signal lines of left channel  
- - - - - Signal lines of band pass filter (Lch)
  8. Important safety notice.  
Components identified by ▲ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.



# REPLACEMENT PARTS LIST

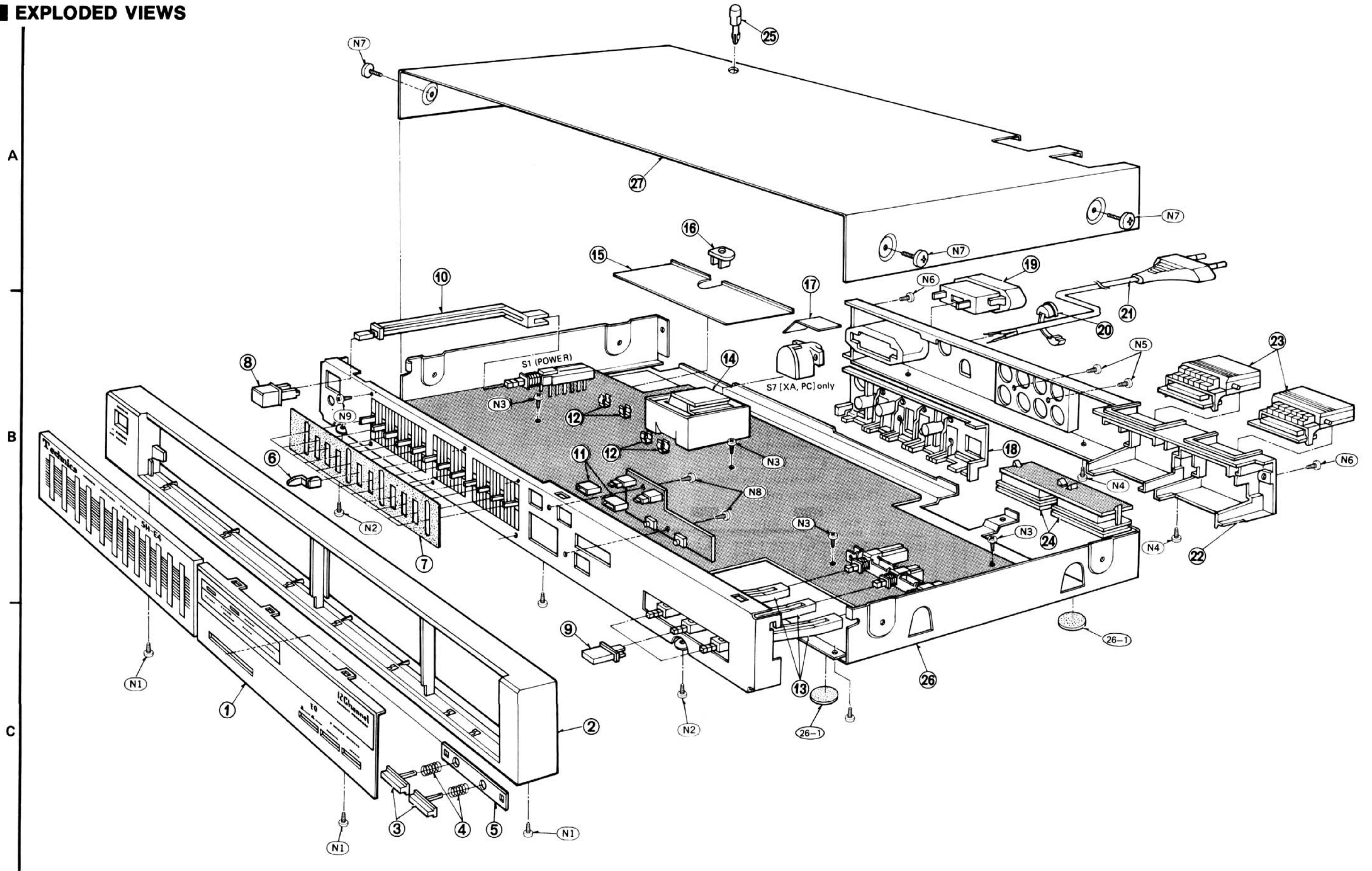
- Notes:** 1. Part numbers are indicated on most mechanical parts. Please use this part number for parts order.  
 2. Important safety notice: Components identified by  $\Delta$  mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.  
 3.  $\text{\textcircled{K}}$  -marked parts are used for black type only, while  $\text{\textcircled{O}}$ -marked parts are for silver type only.  
 4. Part other than  $\text{\textcircled{K}}$  and  $\text{\textcircled{O}}$ -marked are used for both black and silver type.  
 5. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.  
 6. The  $\text{\textcircled{S}}$  mark is service standard parts and may differ from production parts.  
 7. The parenthesized numbers in the column of description stand for the quantity per set. Black type model No. : SH-E4(K)

Ref. No.	Part No.	Part Name & Description
<b>INTEGRATED CIRCUITS</b>		
IC1,2	SVIUPD6360C	Analog switch
IC3,4	SVITA75559S	Buffer, Operation
IC5	MN4069 $\mu$ B	Inverter
<b>TRANSISTORS</b>		
Q1	2SD1406-Y	Regulator
Q2	2SB1015-Y	Regulator
Q3,7,8,11~34	2SC1815L-G	Muting, LED Driver, Band Pass Filter
Q4	$\text{\textcircled{S}}$ 2SA1015-Y	Muting
Q5,6	2SC2878A-T	Muting
Q9	2SC3402Y-T	Switching
<b>DIODES</b>		
D1	$\Delta$ SVD1B4B42	Rectifier
D2,3	MA1150H	15V Zener
D4,6,7	SVD1S2076A	Switching
D5,12	MA1056M	5.6V Zener
D8	LN424WPH	LED, tape Ind.
D9	LN324WPH	LED, source Ind.
D11	$\text{\textcircled{S}}$ MA162A	Switching
<b>TRANSFORMER</b>		
T1(XA,PC)only	SLTK5K3	Power Source
T1(other)	$\Delta$ SLTK5K4	Power Source
<b>FUSES</b>		
F1,2	$\Delta$ XBA2C02TR0	T200mA, 250V
F3(EW,EGA) only	$\Delta$ XBA2C12TR0	T1.25A, 250V
<b>SWITCHES</b>		
S1	$\Delta$ SSHK40	Power Source
S2,3	SSHK43	EQ on-off, Rec Mode
S5,6	SSG13	Tape, Source Select
S7(XA,PC)only	$\Delta$ SSRK15	Voltage Selector
<b>VARIABLE RESISTORS</b>		
VR101~112	EWAMB8C09G25	Band Level Control, 200k $\Omega$ (G)

Ref. No.	Part No.	Part Name & Description
<b>CABINET and CHASSIS PARTS</b>		
1	$\text{\textcircled{O}}$ SGXK82SA	Sub Front Panel (Silver) (1)
1	$\text{\textcircled{K}}$ SGXK82BA	Sub Front Panel (Black) (1)
2	$\text{\textcircled{O}}$ SGWK220-1SA	Front Panel (Silver) (1)
2	$\text{\textcircled{K}}$ SGWK220-1BA	Front Panel (Black) (1)
3	SBC469-1	Button, Tape Monitor (2)
4	SUSK32	Spring, Tape Monitor (2)
5	SUBK12	Spacer, Tape Monitor (1)
6	SBCK32	Button, Frequency EQ. (1)
7	SGXK79	Spacer, Frequency EQ. (1)
8	SBC489	Button, Power (1)
9	SBC315-4T	Button, EQ. Rec Mode (3)
10	SUBK6-1	Connection Rod, Power (1)
11	SUDK12	Cover, Source Ind. (2)
12	SJT347	Clip, Fuse (4)
13	SUB69	Connection Rod, EQ, Rec Mode (3)
14	SHGK469	Spacer, Power Transformer (1)
15	SMXK31	Insulation Sheet, Chassis (1)
16	SHEK4	Spacer, PCB (2)
17(XA,PC)	$\text{\textcircled{O}}$ SMXK32-1	Insulation Sheet, AC Socket (1)
17(other)	$\text{\textcircled{K}}$ SMXK32	Insulation Sheet, AC Socket (1)
18	SJF3055-1N	Terminal Board, Tape, Line IN/OUT (1)
19	$\Delta$ SJS9225	Socket, AC Outlet (1)
20	SHR127	Bushing, AC Cord (1)
21(EK)	$\Delta$ SJA149-1	Cord, Power Source (1)
21(XL)	$\Delta$ QFC1208M	Cord, Power Source (1)
21(EGA)	$\Delta$ SJA153	Cord, Power Source (1)
21(other)	$\Delta$ SJA151	Cord, Power Source (1)

Ref. No.	Part No.	Part Name & Description
<b>CABINET and CHASSIS PARTS</b>		
22(XA,PC)	SGPK220-2A	Rear Panel (1)
22(D)	SGPK220-3A	Rear Panel (1)
22(EW)	SGPK220-3B	Rear Panel (1)
22(EK, XL)	SGPK220-5A	Rear Panel (1)
22(other)	SGPK220-3C	Rear Panel (1)
23	SJS9607-1	Socket, Direct Connection (2)
24	SJS9605	Socket, Direct Connection (2)
25	$\text{\textcircled{O}}$ SHE135	Pin(Silver) (1)
25	$\text{\textcircled{K}}$ SHE135-1	Pin(Black) (1)
26	SKUKHE6-SN	Bottom Board(W/ Feet) (1)
26-1	SKL245-2	Foot (4)
27	$\text{\textcircled{O}}$ SKCK70S1	Cabinet(Silver) (1)
27	$\text{\textcircled{K}}$ SKCK70BB1	Cabinet(Black) (1)
<b>SCREWS</b>		
N1	$\text{\textcircled{S}}$ XTB3+8BFN	Tapping, $\text{\textcircled{+}}3\times 8$ (3)
N2	$\text{\textcircled{S}}$ XTB3+8BFN	Tapping, $\text{\textcircled{+}}3\times 8$ (2)
N3	$\text{\textcircled{S}}$ XTB3+8BFN	Tapping, $\text{\textcircled{+}}3\times 8$ (4)
N4	$\text{\textcircled{S}}$ XTB3+10BFZ	Tapping, $\text{\textcircled{+}}3\times 10(3)$
N5	$\text{\textcircled{S}}$ XTB3+10BFZ	Tapping, $\text{\textcircled{+}}3\times 10(2)$
N6	$\text{\textcircled{S}}$ XTN3+10BFZ	Tapping, $\text{\textcircled{+}}3\times 10(2)$
N7	$\text{\textcircled{O}}$ SNE2095-4	Cabinet(Silver) (4)
N7	$\text{\textcircled{K}}$ SNE2095-5	Cabinet(Black) (4)
N8	$\text{\textcircled{S}}$ XTB3+8B	Tapping, $\text{\textcircled{+}}3\times 8$ (2)
N9	XSN2+2AFZ	Screw, $\text{\textcircled{+}}2\times 2$ (6)
<b>PACKING PARTS</b>		
P1(EF)	SPGK128	Carton Box (1)
P1(EK,EGA,XL)	SPGK126	Carton Box (1)
P1(other)	$\text{\textcircled{O}}$ SPGK125	Carton Box(Silver) (1)
P1(other)	$\text{\textcircled{K}}$ SPGK127	Carton Box(Black) (1)
P2(EK,EGA,XL)	SPSK65-1	Pad, Front (1)
P2(other)	SPSK65	Pad, Front (1)
P3(EK, EGA, XL)	SPSK66-1	Pad, Rear (1)
P3(other)	SPSK66	Pad, Rear (1)
P4	SPP691-1	Polyethylene Sheet (1)
P5(XL)	SQFK10059	Instruction Book (1)
P5(EGA)	SQFK10061	Instruction Book (1)
P5(Ei)	SQFK10063	Instruction Book (1)
P5(other)	SQFK10060	Instruction Book (1)
<b>ACCESSORIES</b>		
A1	SJPK2201	Cord, Pin-Pin (2)
A2(EGA)	$\Delta$ XBA2C12TR0	Fuse, T1.25A, 250V (3)

**EXPLODED VIEWS**



A				10			15	27	16	25	17		19					
B		8	6		7		12	11	12		14		18	24	20	21	22	23
C		1			3	4	5	9	2		13	26-1		26			26-1	

# RESISTORS & CAPACITORS

- Notes:** 1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.  
 2. Important safety notice: Components identified by  $\Delta$  mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.

3. The "S" mark is service standard parts and may differ from production parts.  
 4. Unless otherwise specified. All resistors are in OHMS ( $\Omega$ ) K = 1000 $\Omega$ , M = 1000k $\Omega$   
 All capacitors are in MICROFARADS ( $\mu$ F) P =  $\mu$  $\mu$ F

Black type model No. : SH-E4(K)

## Numbering System of Resistor

Example

ERD	25	F	J	101
Type	Wattage (1/4W)	Shape	Tolerance	Value (100 $\Omega$ )
	50			
	Wattage (1/2W)			

## Numbering System of Capacitor

Example

ECKD	1H	102	Z	F
Type	Voltage	Value	Tolerance	Peculiarity
ECEA	50	M	R47	R
Type	Voltage	Peculiarity use	Value	Special use

Capacitor Type	Voltage		Tolerance
	ECEA Type	Others	
ECEA : Electrolytic	1C : 16V	D : 25V DC	J : $\pm$ 5%
ECCD : Ceramic	25 : 25V	1H : 50V DC	K : $\pm$ 10%
ECKD : Ceramic	1E : 25V		Z : +80%, -20%
ECFT : Semi Conductor	1H : 50V		
	50 : 50V		

## RESISTORS

Ref. No.	Part No.	Value	Ref. No.	Part No.	Value	Ref. No.	Part No.	Value	Ref. No.	Part No.	Value
R1.2	ERD25FJ332	3.3K	R39,40	ERD25TJ393	39K	R123,124	ERD25FJ101	100	R315,316	ERD25TJ563	56K
R3,4	ERD25FJ100	10	R41,42	ERD25TJ273	27K	R201,202	ERD25FJ471	470	R317,318	ERD25TJ273	27K
R5	ERD25TJ334	330K	R43,44	ERD25TJ104	100K	R203,204	ERD25FJ561	560	R319,320	ERD25TJ273	27K
R6,7	ERD25TJ393	39K	R45,46	ERD25TJ153	15K	R205,206	ERD25FJ471	470	R321,322	ERD25TJ273	27K
R8,9	ERD25FJ103	10K	R47,48	ERD25TJ223	22K	R207,208	ERD25FJ471	470	R323,324	ERD25TJ273	27K
R10	ERD25TJ224	220K	R49,50	ERD25TJ683	68K	R209,210	ERD25FJ471	470	R401,402	ERD25FJ272	2.7K
R11,12	ERD25FJ331	330	R51,52	ERD25TJ153	15K	R211,212	ERD25FJ471	470	R403,404	ERD25FJ272	2.7K
R13	ERD25FJ222	2.2K	R53,54	ERD25TJ153	15K	R213,214	ERD25FJ821	820	R405,406	ERD25FJ272	2.7K
R14	ERD25FJ681	680	R55,56	ERD25TJ123	12K	R215,216	ERD25FJ821	820	R407,408	ERD25FJ272	2.7K
R15,16	ERD25FJ472	4.7K	R101,102	ERD25FJ561	560	R217,218	ERD25FJ821	820	R409,410	ERD25FJ272	2.7K
R17	ERD25FJ472	4.7K	R103,104	ERD25FJ331	330	R219,220	ERD25FJ821	820	R411,412	ERD25FJ272	2.7K
R18	ERD25FJ822	8.2K	R105,106	ERD25FJ101	100	R221,222	ERD25FJ821	820	R413,414	ERD25FJ272	2.7K
R19	ERD25FJ472	4.7K	R107,108	ERD25FJ101	100	R223,224	ERD25FJ821	820	R415,416	ERD25FJ682	6.8K
R20	ERD25FJ562	5.6K	R109,110	ERD25FJ221	220	R301,302	ERD25TJ683	68K	R417,418	ERD25FJ682	6.8K
R21	ERD25FJ272	2.7K	R111,112	ERD25FJ221	220	R303,304	ERD25TJ563	56K	R419,420	ERD25FJ682	6.8K
R22,23	ERD25FJ102	1K	R113,114	ERD25FJ331	330	R305,306	ERD25TJ563	56K	R421,422	ERD25FJ682	6.8K
R31,32	ERD25FJ222	2.2K	R115,116	ERD25FJ331	330	R307,308	ERD25TJ823	82K	R423,424	ERD25FJ682	6.8K
R33,34	ERD25FJ222	2.2K	R117,118	ERD25FJ331	330	R309,310	ERD25TJ563	56K			
R35,36	ERD25TJ104	100K	R119,120	ERD25FJ271	270	R311,312	ERD25TJ473	47K			
			R121,122	ERD25FJ271	270	R313,314	ERD25TJ563	56K			

## CAPACITORS

Ref. No.	Part No.	Value	Ref. No.	Part No.	Value	Ref. No.	Part No.	Value	Ref. No.	Part No.	Value
C1,2	ECKD1H103ZF	0.01	C23,24	ECCD1H470K	47P	C105,106	ECEA50ZR47	0.47	C205,206	ECEA50ZR47	0.47
C3,4	ECEA1VU102	1000	C25,26	ECCD1H100KC	10P	C107,108	ECEA1HSR33	0.33	C207,208	ECEA50ZR22	0.22
C5,6	ECEA1CU101	100	C27,28	ECKD1H181KB	180P	C109,110	ECEA50ZR22	0.22	C209,210	ECEA50ZR15	0.15
C7,8	ECKD1H103ZF	0.01	C29,30	ECKD1H181KB	180P	C111,112	ECEA50ZR15	0.15	C211,212	ECEA50ZR1	0.1
C9,10	ECEA1ES221	220	C31,32	ECEA50Z2R2	2.2	C113,114	ECEA50ZR1	0.1	C213,214	ECFTD223KX	0.022
C11	ECEA1ES220	22	C33,34	ECEA1ES220	22	C115,116	ECFTD563KX	0.056	C215,216	ECFTD103KX	0.01
C12,13	ECEA1HN3R3	3.3	C35,36	ECEA1ES220	22	C117,118	ECFTD273KX	0.027	C217,218	ECFTD103KX	0.01
C14	ECEA1ES220	22	C51,52	ECCD1H680K	68P	C119,120	ECFTD123KX	0.012	C219,220	ECFTD562KX	0.0056
C15	ECFTD152KX	0.0015	C53,54	ECCD1H680K	68P	C121,122	ECFTD682KX	0.0068	C221,222	ECFTD222KX	0.0022
C16	ECEA1AS470	47	C55	ECKD1H223ZF	0.022	C123,124	ECFTD272KX	0.0027	C223,224	ECFTD152KX	0.0015
C21,22	ECEA25Z4R7	4.7	C101,102	ECEA50Z2R2	2.2	C201,202	ECEA50ZR68	0.68			
			C103,104	ECEA50Z1	1	C203,204	ECEA50ZR47	0.47			



# Service Manual

Stereo Graphic Equalizer

SH-E4/(K)

[D],[EK],[EW],[EB],[EF],  
[EGA],[EH],[XA],[XL],[Ei],[PC]

Supplement

## Areas

- \* [D] is available in Scandinavia.
- \* [EK] is available in United Kingdom.
- \* [EW] is available in Switzerland.
- \* [EB] is available in Belgium.
- \* [EF] is available in France.
- \* [EGA] is available in F.R. Germany.
- \* [EH] is available in Holland.
- \* [XA] is available in Southeast Asia, Oceania, Africa, Middle Near East and Central South America.
- \* [XL] is available in Australia.
- \* [Ei] is available in Italy.
- \* [PC] is available in European Audio Club.

- \* The colors of this model include silver and black.
- \* The black type model is indicated by (K) in the Service Manual.

Please use this manual together with the service manual for Model No. SH-E4/(K), Order No. HAD83122693C9.

## CHANGES

1. The positive (+B) voltage and negative (-B) voltage of schematic diagram was changing.
2. The change parts of parts list refer.

### ● Parts change note

#### Notes:

1. Important safety notice:

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

2. The "Ⓢ" mark is service standard parts and may differ from production parts.

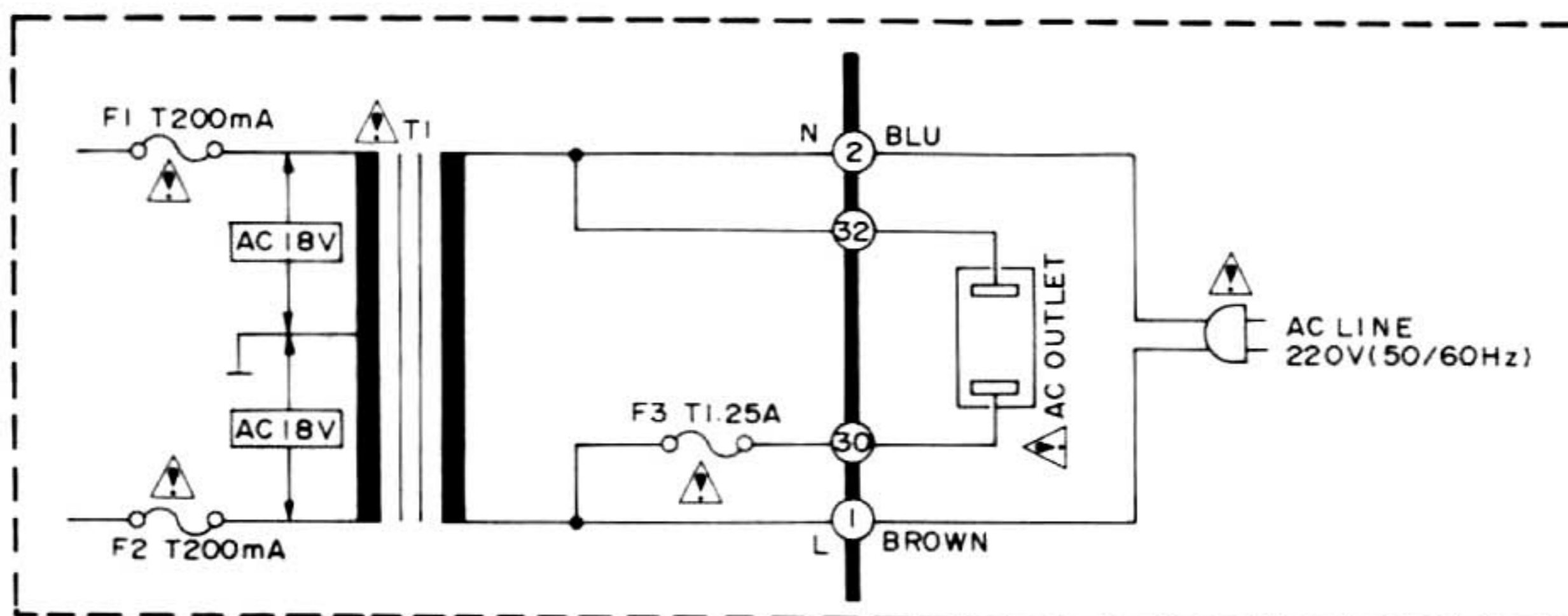
Ref. No.	Colors	Change of Part No.		Part Name & Description	Pcs/Set	Remarks
		OLD	NEW			
<b>DIODES</b>						
D2, 3		MA1150H	MA1160M	16V Zener	1	
<b>CABINET and CHASSIS PART</b>						
22 [EK] only		SGPK220-5A	SGPK220-5B	Rear Panel	1	
<b>RESISTORS</b>						
R3, 4		ERD25FJ100	ERD25FJ220	Carbon, 22 $\Omega$ , 1/4W	1	Ⓢ $\Delta$
R6		ERD25TJ393	ERD25TJ153	Carbon, 15 k $\Omega$ , 1/4W	1	Ⓢ
R10		ERD25TJ224	Deletion	—		
R14		ERD15FJ681	Deletion	—		
R15, 16		ERD25FJ472	Deletion	—		
R18		ERD25FJ822	Deletion	—		
R37, 38		Addition	ERD25TJ273	Carbon, 27 k $\Omega$ , 1/4W	2	Ⓢ
R61, 62		Addition	ERD25TJ123	Carbon, 12 k $\Omega$ , 1/4W	2	Ⓢ
R63		Addition	ERD25FJ182	Carbon, 1.8 k $\Omega$ , 1/4W	1	Ⓢ
R64, 65, 66		Addition	ERD25FJ102	Carbon, 1 k $\Omega$ , 1/4W	3	Ⓢ
R67		Addition	ERD25FJ103	Carbon, 10 k $\Omega$ , 1/4W	1	Ⓢ
R68, 69		Addition	ERD25FJ681	Carbon, 680 $\Omega$ , 1/4W	2	Ⓢ
R70		Addition	ERD25FJ562	Carbon, 5.6 k $\Omega$ , 1/4W	1	Ⓢ
<b>CAPACITORS</b>						
C5, 6		ECEA1CU101	ECEA1CS331	Electrolytic, 330 $\mu$ F, 16V	2	Ⓢ
C12, 13		ECEA1HN3R3	ECEA1CS100	Electrolytic, 10 $\mu$ F, 16V	2	$\Delta$
C15		ECFTD152KX	ECKD1H223ZF	Ceramic, 0.022 $\mu$ F, 50V	1	Ⓢ

# Technics

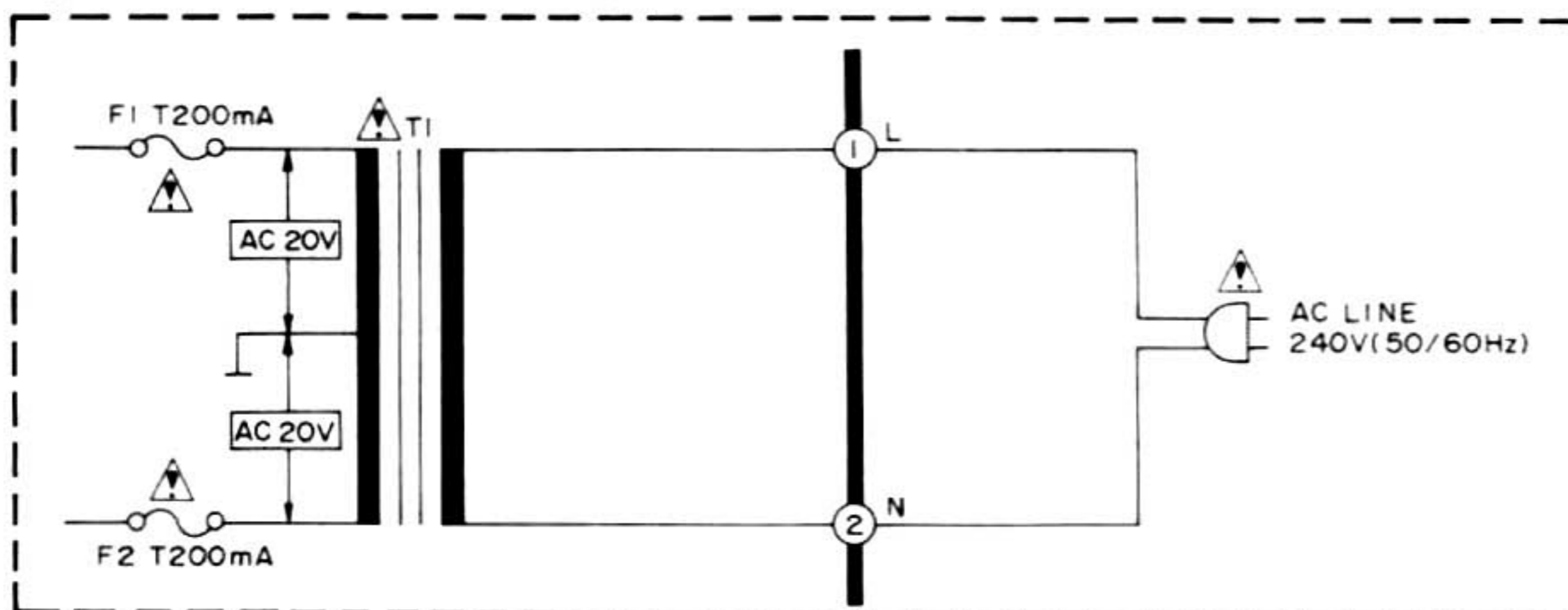
Matsushita Electric Trading Co., Ltd.  
P.O. Box 288, Central Osaka Japan

# POWER CIRCUITS TO BE CHANGED AND THE AREAS

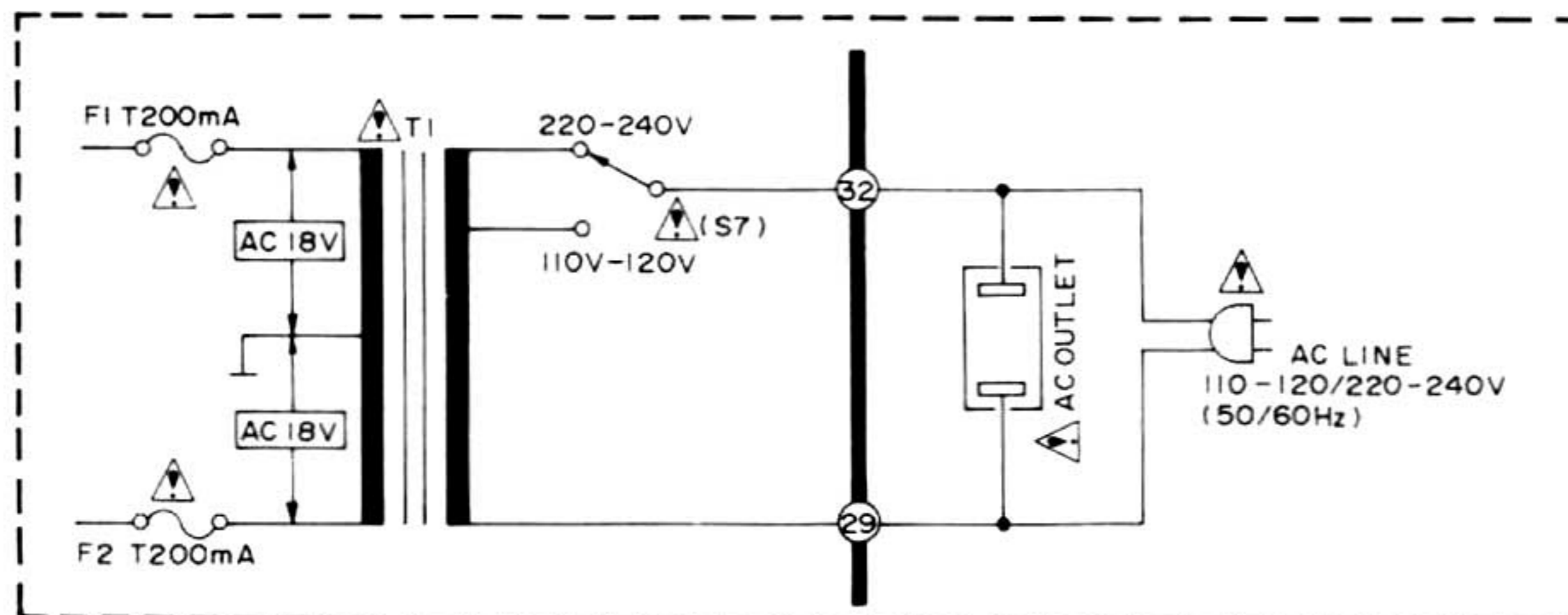
- For F.R. Germany [EGA] and Switzerland [EW] areas.



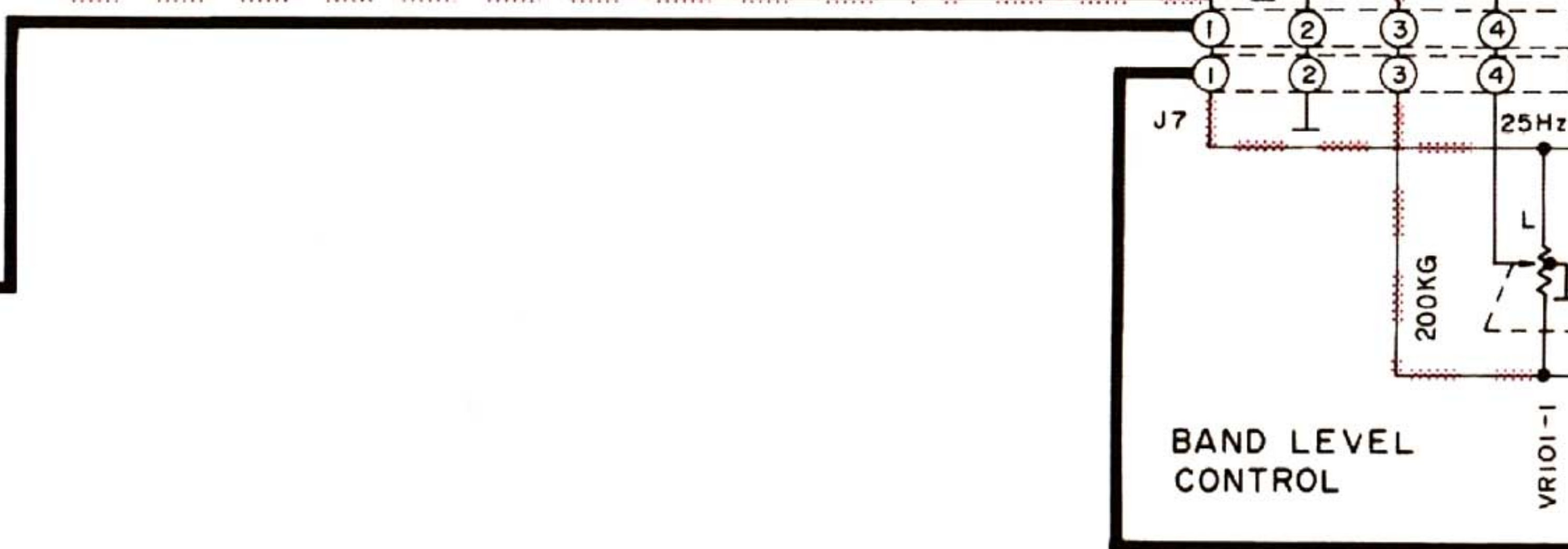
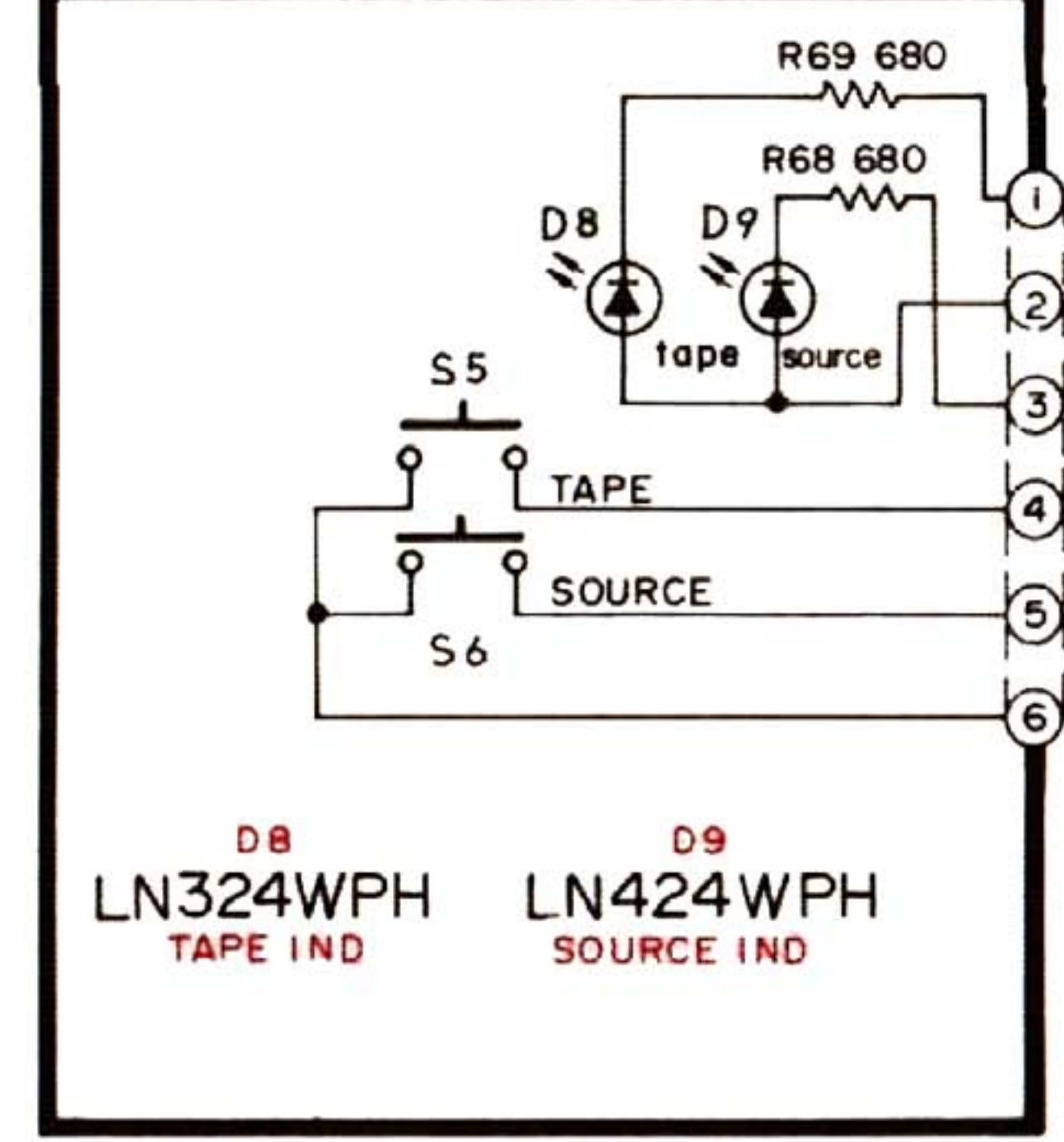
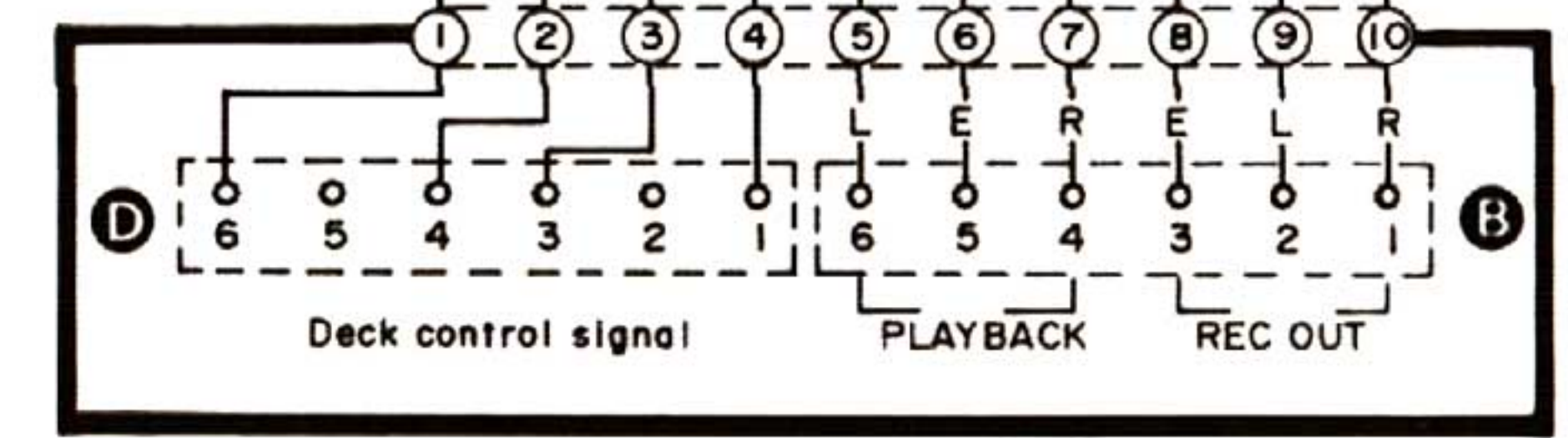
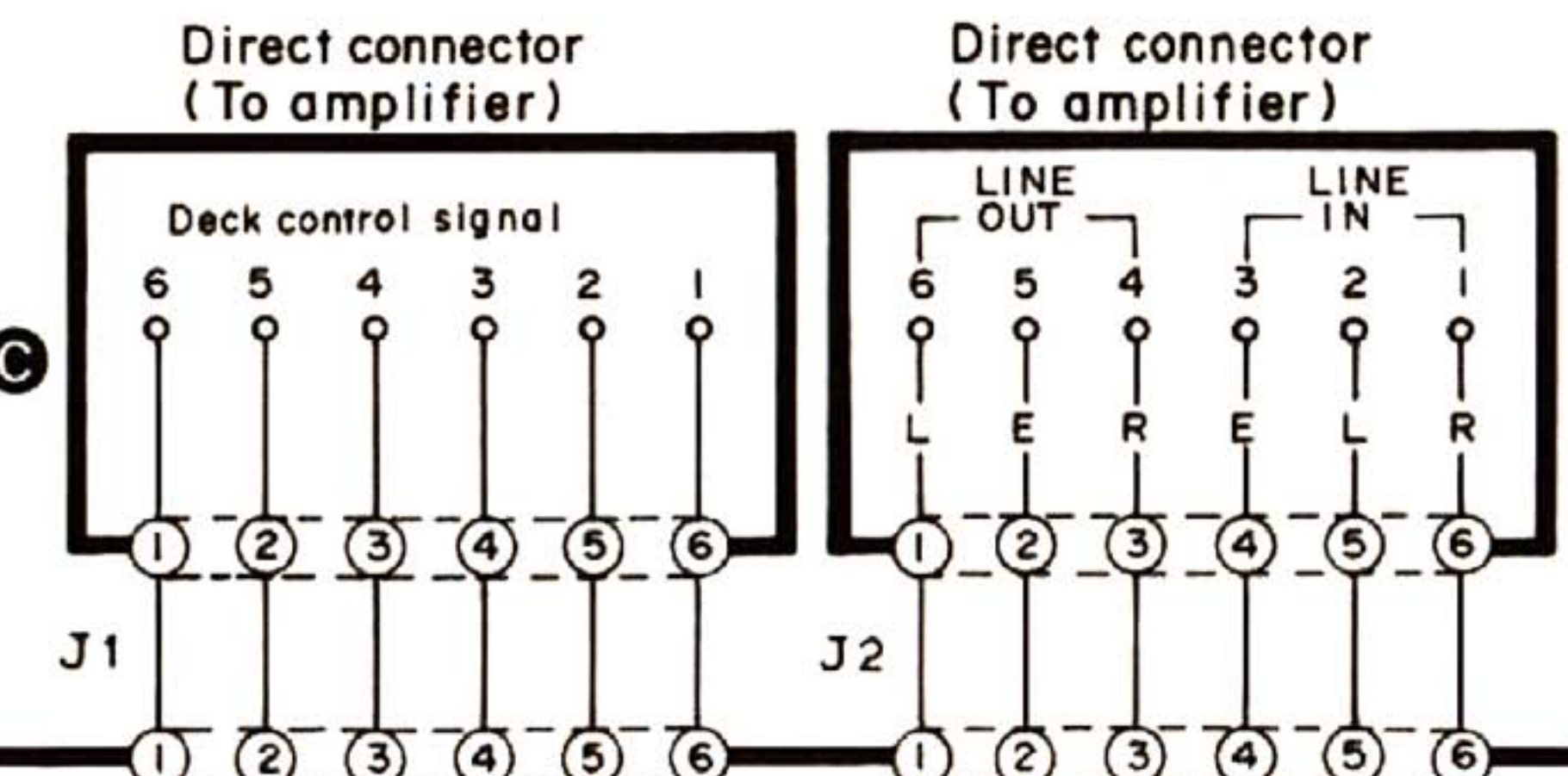
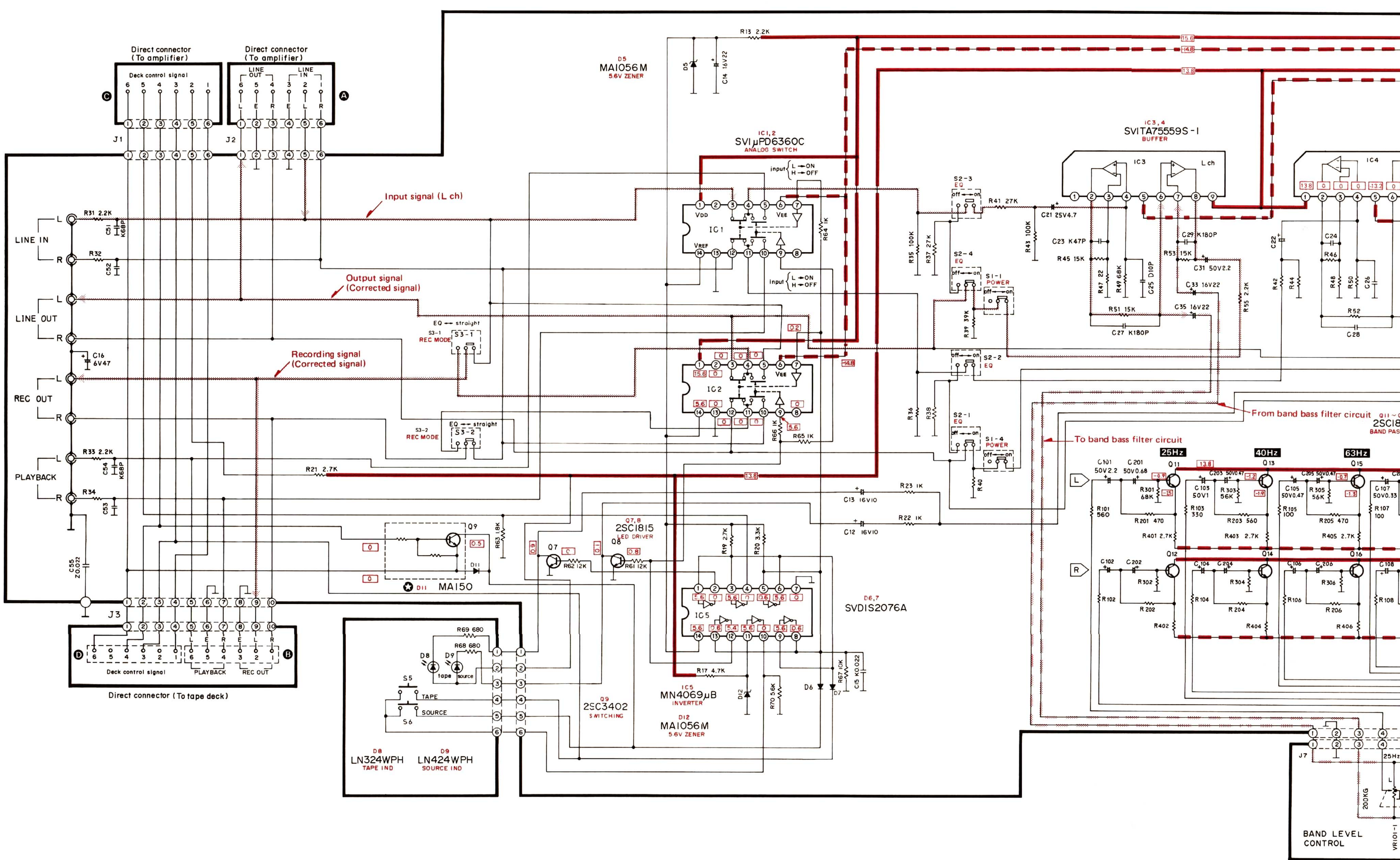
- For United Kingdom [EK] and Australia [XL] areas.

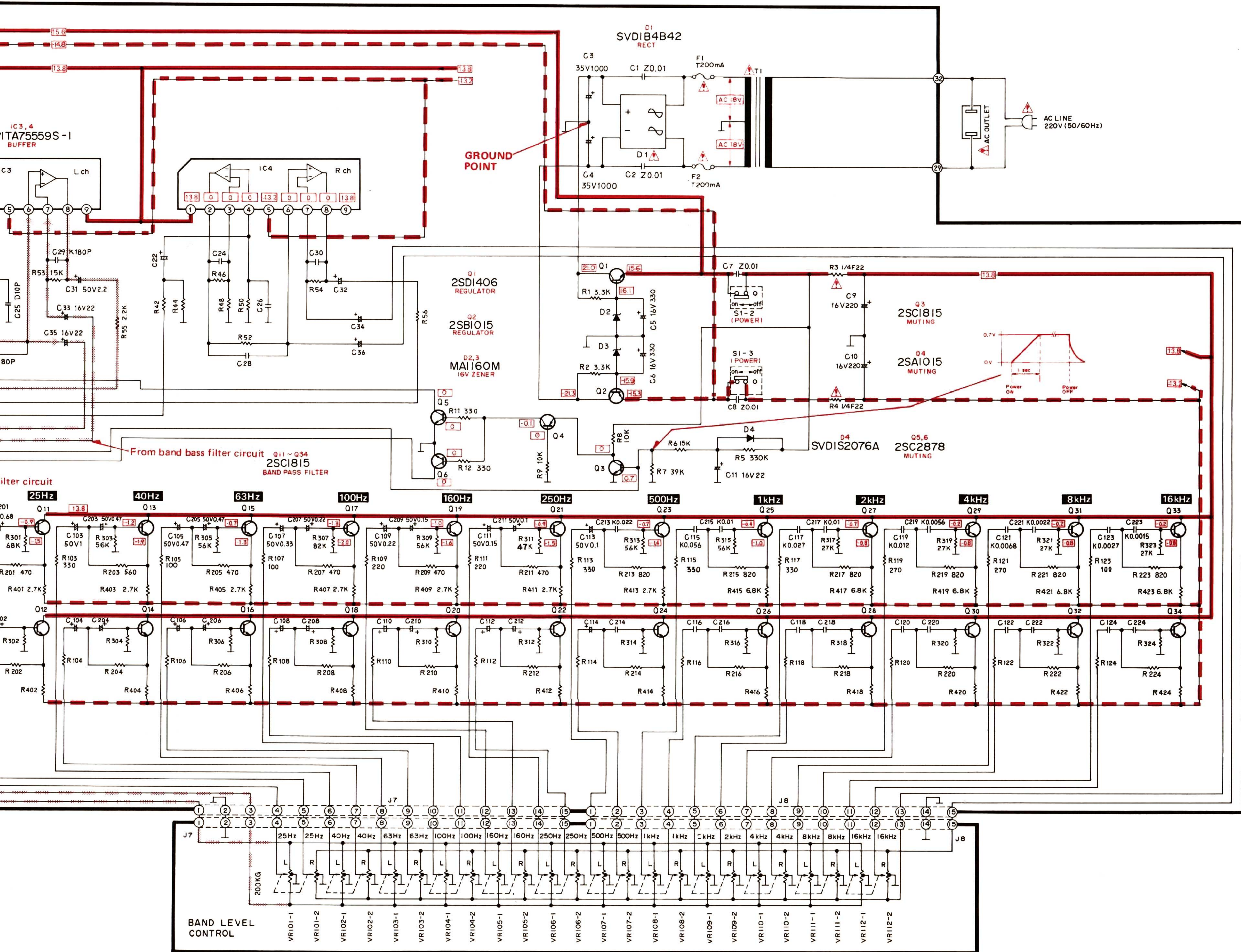


- For [XA], [PC] areas.



A  
B  
C  
D  
E  
F





## SCHEMATIC DIAGRAM

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

\* The part No. of transistors, IC and 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 part list.

\* This is the basic circuit diagram (For continental Europe) of this unit.

Note that part of the circuit is subject to change depending on the areas.

\* Regarding the circuits to be changed in the basic circuit diagram (For continental Europe) and related areas [EW], [EK], [XL], [EGA], [PC] and [XA].

- Note**
- S1-1 ~ 1-4 : Power source switch in "on" position.  
on  $\leftrightarrow$  off
  - S2-1 ~ 2-4 : EQ switch in "on" position.  
on  $\leftrightarrow$  off
  - S3-1 ~ 3-2 : Rec mode switch in "straight" position.  
Straight  $\leftrightarrow$  EQ
  - S5, 6 : Tape monitor switch in "source" position.  
(S5 Tape switch)  
(S6 Source switch)
  - S7 [XA] : Power source selector switch in "220V-240V" position.  
110V-120V  $\leftrightarrow$  220V-240V

6.  $\square$  Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high-impedance) with the ground point taken as standard. Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.

- Positive voltage lines. Negative voltage lines
  - Signal lines of left channel
  - Signal lines of band pass filter (Lch)

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

- This booklet includes the specifications of Model SH-E4/(K) (Order No. HAD83122693C9) written in German, French and Spanish.
- File this booklet together with the service manual of Model SH-E4/(K).
- Dieses Büchlein umfaßt die technischen Daten von Modell SH-E4/(K) (Bestell-Nr. HAD83122693C9) in den Sprachen Deutsch, Französisch und Spanisch.
- Bewahren Sie dieses Büchlein zusammen mit dem Service-Handbuch von Modell SH-E4/(K) auf.
- Cette brochure comprend les spécifications du Modèle SH-E4/(K) (N° d'ordre: HAD83122693C9) écrites en français, en allemand et en espagnol.
- Classer cette brochure en même temps qu'avec le manuel de service du Modèle SH-E4/(K).
- Este librito incluye las especificaciones de Modelo SH-E4/(K) (Pedido N°. HAD83122693C9) escritas en alemán, francés y español.
- Guardar este librito juntamente con el manual de servicio de Modelo SH-E4/(K).

## DEUTSCH

### ■ TECHNISCHE DATEN (Spezifikationen Können infolge von Verbesserungen ohne Ankündigung geändert werden.)

#### (DIN 45 500)

<b>Frequenzgang (mittelstellung)</b>	: 5 Hz~100 kHz, -3 dB
<b>Maximalausgangsspannung</b>	: 8 V (1 kHz, THD 0,01%)
<b>Nennausgangsspannung</b>	: 1 V
<b>Nennklirrfaktor</b>	: 0,005% (20 Hz~20 kHz) 0,003% (1 kHz)
<b>Eingangsspannung</b>	: 1 V
<b>Geräuschabstand</b>	: 95 dB (100 dB, IHF, A)
<b>Maximaleingangsspannung</b>	: 8 V (1 kHz)
<b>Eingansimpedanz</b>	: 47 kΩ
<b>Verstärkung</b>	: 0±1 dB
<b>Kanalsymmetrie</b>	
250 Hz~6300 Hz	: ±0,5 dB
<b>Kanaltrennung 1 kHz</b>	: 60 dB

<b>Frequenzgangregler</b>	: +12 dB~-12dB (12 Regler, stufenlos verstellbar)
<b>Mittelfrequenzen</b>	: 25 Hz, 40 Hz, 63 Hz, 100 Hz, 160 Hz, 250 Hz, 500 Hz, 1 kHz, 2 kHz, 4 kHz, 8 kHz, 16 kHz

#### ALLGEMEINE DATEN

<b>Stromversorgung</b>	: Wechselstrom, 220 V, 50 Hz/60 Hz. (Für Kontinentaleuropa) Wechselstrom, 110 V/120 V/220 V/ 240 V, 50 Hz/60 Hz. (Für andere Länder)
<b>Leistungsaufnahme</b>	: 9,5 W
<b>Abmessungen (H×B×T)</b>	: 50×315×240 mm (1-31/32"×12-13/32"×9-7/16")
<b>Gewicht</b>	: 2,0 kg (4,4 lb)

# FRANÇAIS

## ■ CARACTERISTIQUES (Sujet à changement sans préavis.)

### (DIN 45 500)

<b>Courbe de réponse (position centrale)</b>	: 5 Hz~100 kHz, -3 dB
<b>Tension de sortie maximale</b>	: 8 V (1 kHz, THD 0,01%)
<b>Tension de sortie nominale</b>	: 1 V
<b>Distortion harmonique totale</b>	: 0,005% (20 Hz~20 kHz) 0,003% (1 kHz)
<b>Sensibilité d'entrée Signal/Bruit</b>	: 1 V : 95 dB (100 dB, IHF' A)
<b>Tension d'entrée maximale</b>	: 8 V (1 kHz)
<b>Impédance d'entrée</b>	: 47 kΩ
<b>Gain</b>	: 0±1 dB
<b>Équilibrage de canal 250 Hz~6300 Hz</b>	: ±0,5 dB
<b>Séparation de canal 1 kHz</b>	: 60 dB

### Commandes de niveau de gamme

: +12 dB~-12 dB  
(12 éléments, continuellement variables)

**Fréquences charnières** : 25 Hz, 40 Hz, 63 Hz, 100 Hz, 160 Hz, 250 Hz, 500 Hz, 1 kHz, 2 kHz, 4 kHz, 8 kHz, 16 kHz

### GENERALITES

<b>Alimentation</b>	: CA. 220 V, 50 Hz/60 Hz. (Pour l'Europe continentale) CA. 110 V/120 V/220 V/240 V, 50 Hz/60 Hz. (Pour les autres pays)
<b>Consommation</b>	: 9,5 W
<b>Dimensions (h×l×pr) mm</b>	: 50×315×240 mm (1-31/32"×12-13/32"×9-7/16")
<b>Poids</b>	: 2,0 kg (4,4 lb)

# ESPAÑOL

## ■ ESPECIFICACIONES (Estas especificaciones están sujetas a cualquier cambio sin previo aviso.)

### (DIN 45 500)

<b>Respuesta de frecuencia (posición central)</b>	: 5 Hz~100 kHz, -3 dB
<b>Tensión de salida máxima</b>	: 8 V (1 kHz, THD 0,01%)
<b>Tensión de salida de régimen</b>	: 1 V
<b>Distorsión armónica total nominal</b>	: 0,005% (20 Hz~20 kHz) 0,003% (1 kHz)
<b>Sensibilidad de entrada Relación de señal ruido</b>	: 1 V : 95 dB (100 dB, IHF' A)
<b>Tensión de entrada máxima</b>	: 8 V (1 kHz)
<b>Impedancia de entrada</b>	: 47 kΩ
<b>Ganancia</b>	: 0±1 dB
<b>Equilibrio de canales 250 Hz~6300 Hz</b>	: ±0,5 dB
<b>Separación de canales 1 kHz</b>	: 60 dB

### Controles de nivel de banda

: +12 dB~-12 dB  
(12 elementos, continuamente variables)

**Frecuencia central** : 25 Hz, 40 Hz, 63 Hz, 100 Hz, 160 Hz, 250 Hz, 500 Hz, 1 kHz, 2 kHz, 4 kHz, 8 kHz, 16 kHz

### EN GENERAL

<b>Alimentación de corriente</b>	: C.A. de 220 V, 50 Hz/60 Hz. (Para Europa continental) C.A. de 110 V/120 V/220 V/240 V, 50 Hz/60 Hz. (Para los demás)
<b>Consumo de corriente</b>	: 9,5 W
<b>Dimensiones (alto×ancho×prof.)</b>	: 50×315×240 mm (1-31/32"×12-13/32"×9-7/16")
<b>Peso</b>	: 2,0 kg (4,4 lb)