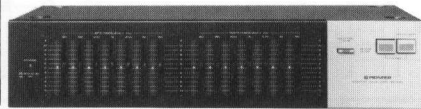


Service Manual

**CIRCUIT DESCRIPTIONS
REPAIR & ADJUSTMENTS**



**ORDER NO.
ARP-125-0**

GRAPHIC EQUALIZER

SG-530

MODEL SG-530 COMES IN SIX VERSIONS DISTINGUISHED AS FOLLOWS:

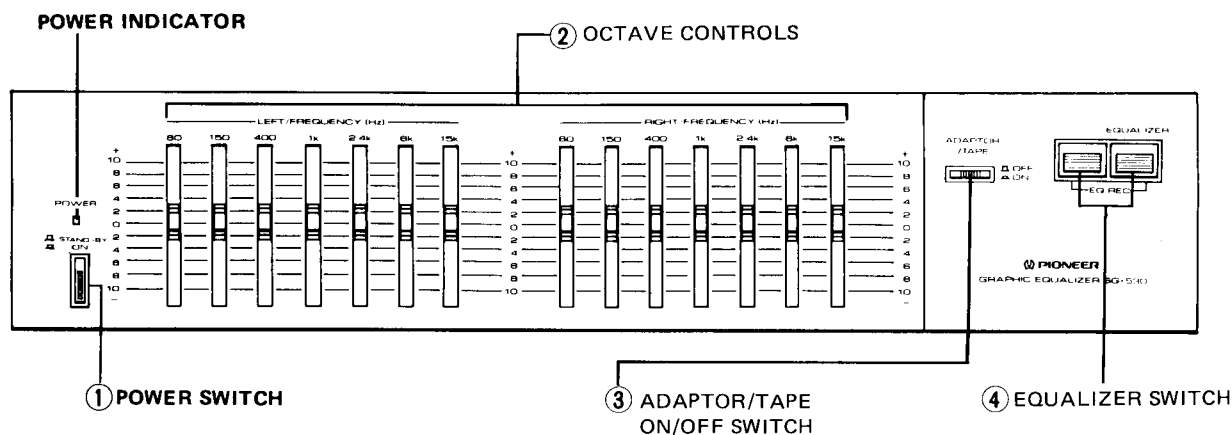
Type	Voltage	Remarks
KU	120V only	U.S.A. model
R	110V – 120V and 220V – 240V (Switchable)	General export model
R/G	110V – 120V and 220V – 240V (Switchable)	U.S. Military model
WE	220V – 240V	Europe model
WB	220V – 240V	United Kingdom model
WP	220V – 240V	Australia model

This service manual is applicable to the KU type. When repairing the R, R/G, WE, WB and WP types, please see page 15.

CONTENTS

1. FRONT PANEL FACILITIES	2	7. P.C.BOARDS CONNECTION DIAGRAM	9
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1. FRONT PANEL FACILITIES

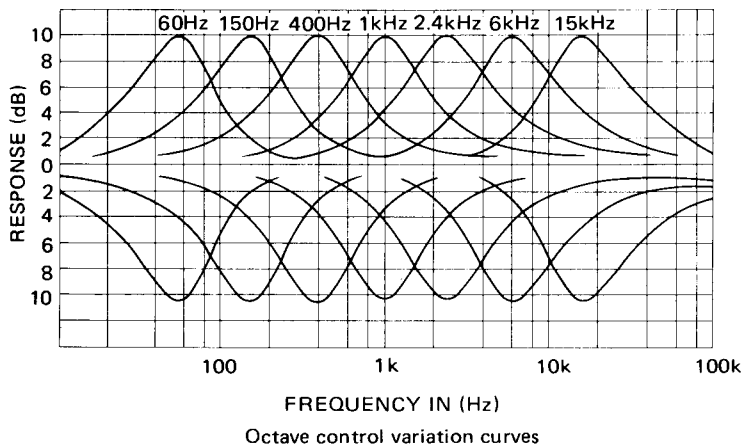


① POWER SWITCH

Depress this switch to turn power on to the SG-530. Because this switch is connected to the secondary winding of the power transformer, power is still supplied to the primary winding even when the power switch is returned to the STAND-BY (\square) position. Always unplug the power cord from the wall socket when the SG-530 is not going to be used for a long time.

② OCTAVE CONTROLS

Move these controls above or below the center (zero) position to boost or attenuate the corresponding frequency bands by up to $\pm 10\text{dB}$ as shown in the figure below. The seven frequency bands are centered at 60Hz, 150Hz, 400Hz, 1kHz, 2.4kHz, 6kHz and 15kHz.



③ ADAPTOR/TAPE ON/OFF SWITCH

Depress this switch when listening to the tape deck connected to the rear panel TAPE terminals. In the ON position, only the signal from the TAPE PLAY terminals enters the equalizer. In the OFF position, only the signal from the EQUALIZER INPUT terminals enters the equalizer.

④ EQUALIZER SWITCH

- Press the right-hand EQUALIZER switch to compensate for the frequency response of the signals entering the EQUALIZER INPUT (REC) terminals. The compensated signals are then made available from the EQUALIZER OUTPUT (PLAY) terminals as the output signals.
- Press both switches when recording signals which have been compensated by the SG-530. The compensated signals are then made available from the EQUALIZER OUTPUT (PLAY) terminals and ADAPTOR/TAPE (REC) terminals.

The same source signals are output at the ADAPTOR/TAPE (REC) terminals as the signals entering the INPUT (REC) terminals. When the front panel's ADAPTOR/TAPE switch is pushed to the ON position, the signals entering the ADAPTOR/TAPE (PLAY) terminals are made available at the OUTPUT (PLAY) terminals. Use this when connecting a second tape deck or connecting an adaptor component such as a mic mixing amplifier. When a tape deck has been connected, the front panel's ADAPTOR/TAPE switch functions as a tape monitor switch.

2. SPECIFICATIONS

Graphic Equalizer Section

Equalizer Range (Individual channel adjust)	$\pm 10\text{dB}$ 60Hz, 150Hz, 400Hz, 1kHz, 2.4kHz, 6kHz, 15kHz
Total Harmonic Distortion (1kHz, All Control; Flat, Output: 1V)	0.005%
Gain (Control: Flat)	0dB
Max. Output Voltage (1kHz, T.H.D.: 0.01%, R_L : 50k Ω)	6V
Frequency Response	5Hz ~ 70kHz $_{-1}^{+0}\text{dB}$
Signal-to-Noise Ratio (IHF A Network, short circuited, 1V Output)	100dB
Input Impedance	50k ohms
Output Impedance	No more than 600 ohms

Miscellaneous

Power Requirements	AC120V, 60Hz
Power Consumption	10W
Dimensions	420(W) x 97(H) x 216(D) mm 16-9/16(W) x 3-13/16(H) x 8-1/2(D) in.
Weight (without package)	2.8kg, 6 lb 3oz

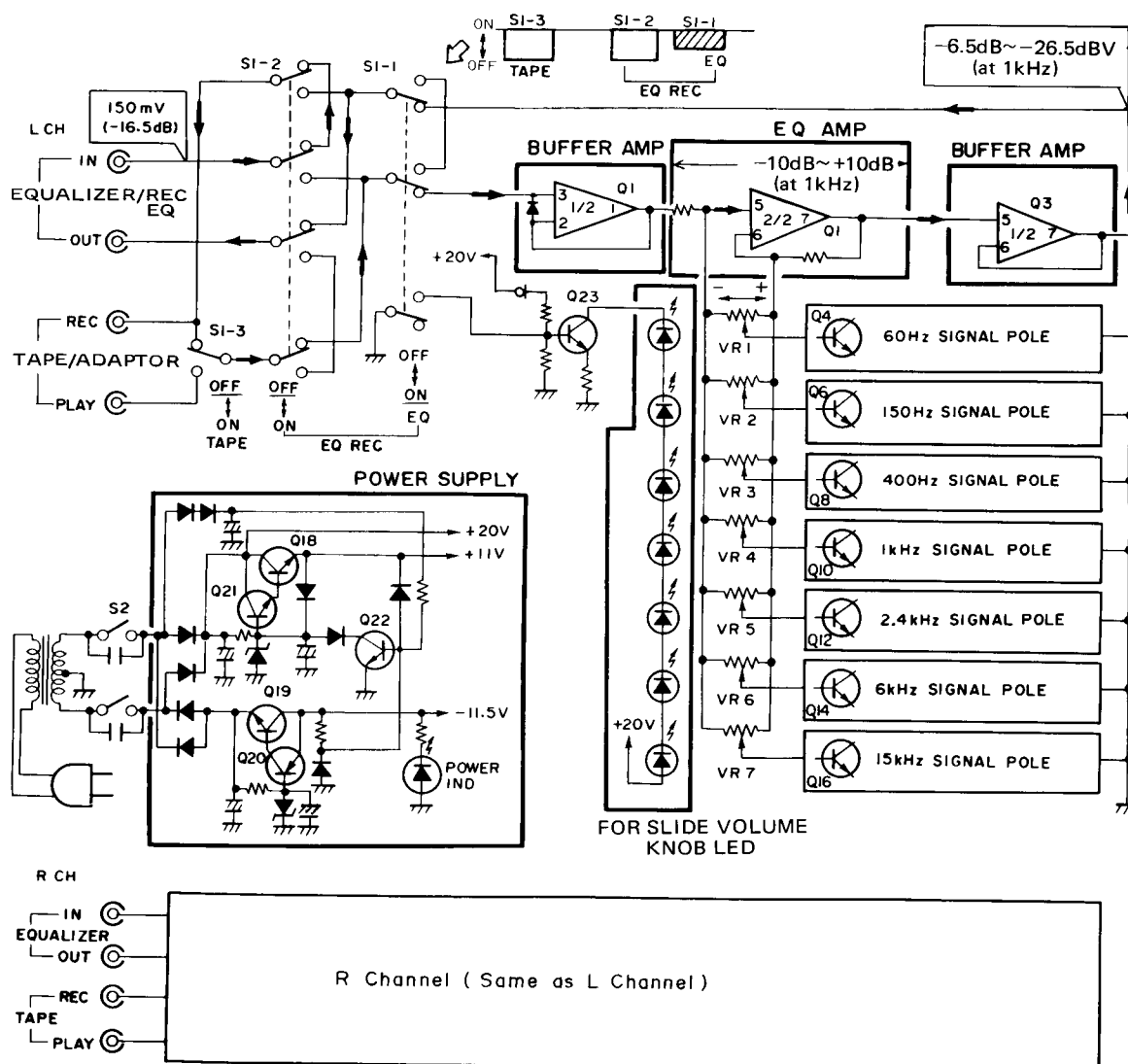
Furnished Parts

Connection cord with pin plugs	2
Operating Instructions	1

NOTE:

Specifications and the design subject to possible modification without notice due to improvements.

3. BLOCK DIAGRAM



NOTE:

Push-button switches S1-1, S1-2 and S1-3 are locked independently.

4. CIRCUIT DESCRIPTIONS

GRAPHIC EQUALIZER SECTION

A graphic equalizer is a device which divides the audio frequency band into several segments called octaves so that the level of each individual octave can be increased or reduced. The SG-530 divides reproduced frequencies into 7 octaves with center frequencies of 60 Hz, 150 Hz, 400 Hz, 1 kHz, 2.4 kHz, 6 kHz and 15 kHz. The level of each octave can be varied throughout a range of ± 10 dB, and the left channel and the right channel can be adjusted independently.

Further, when the equalizer switch (EQ SW) is ON, the LEDs built into the level controls (sliding variable resistor knobs) light to allow the frequency response of each octave to be determined visually. The equalizer element is an LC series resonance circuit in which the active element is an inductor equivalent. This resonance circuit is connected to the variable resistor linking the positive and negative input terminals. (See Figure 4-1.)

This causes the impedance of the resonance circuit and the resistance of the variable resistor to act as constants for the input circuit and the feedback circuit. Further, buffer amplifiers are located before and after the EQ AMP so that the frequency response of the equalizer element are not affected by the impedance of audio equipment connected to the SG-530.

Figure 4-1 shows the equivalent circuit for the graphic equalizer section. In the area surrounded by the dotted line, the circuit on the Q1 side of point A is equivalent to an inductance and a resistance connected in series. Any required resonant frequency can be obtained by changing the inductance and capacitance of the series resonance circuit by varying C_1 , C_2 , R_3 and R_4 . With the SG-530, 7 equalizer elements with different resonance frequencies are included in one EQ AMP, and each frequency segment can be adjusted independently. The frequency response of each octave is boosted when the slider of the variable resistor is moved toward the minus input side (the feedback input side) of EQ AMP IC1; conversely, it is reduced when the slider is moved to the plus side.

POWER SUPPLY CIRCUIT

As is shown in Figure 4-2, two voltage (+11 V and -11.5 V) are supplied by the regulated power supply of the graphic equalizer section. The LED set in the knob of each sliding resistor is supplied with stable current by Q23, so the light emitted

by the LED is steady. Further, the load on Q18 and Q21 is light because the LED current is obtained after full wave rectification. Q23 goes ON when the EQ switch is turned ON to release GND on the base side, and the LED lights when Q23 goes ON.

SWITCH SECTION

• TAPE switch (S1-3)

This switch selects between a program source or a tape playback (or REC monitor) signal.

• EQ REC switch (S1-1 and S1-2)

Turning this switch on causes an equalized program source signal to be output to the REC terminals.

• EQ switch (S1-1)

This switch determines whether or not a signal is to be equalized; when this switch is OFF, the equalizing circuit is by-passed and the input signal is connected directly to the output terminals.

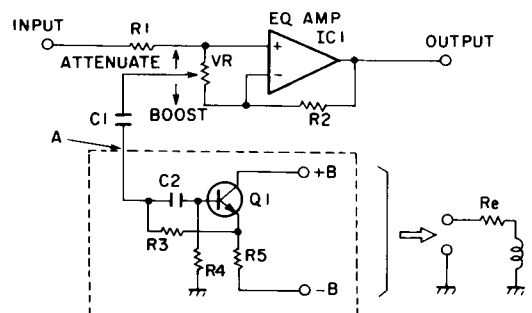


Fig. 4-1 Graphic equalizer

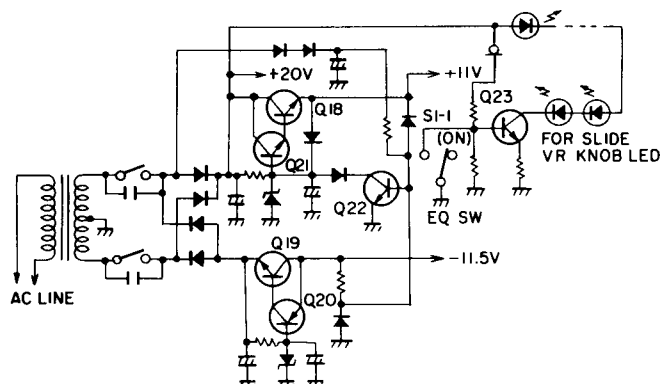
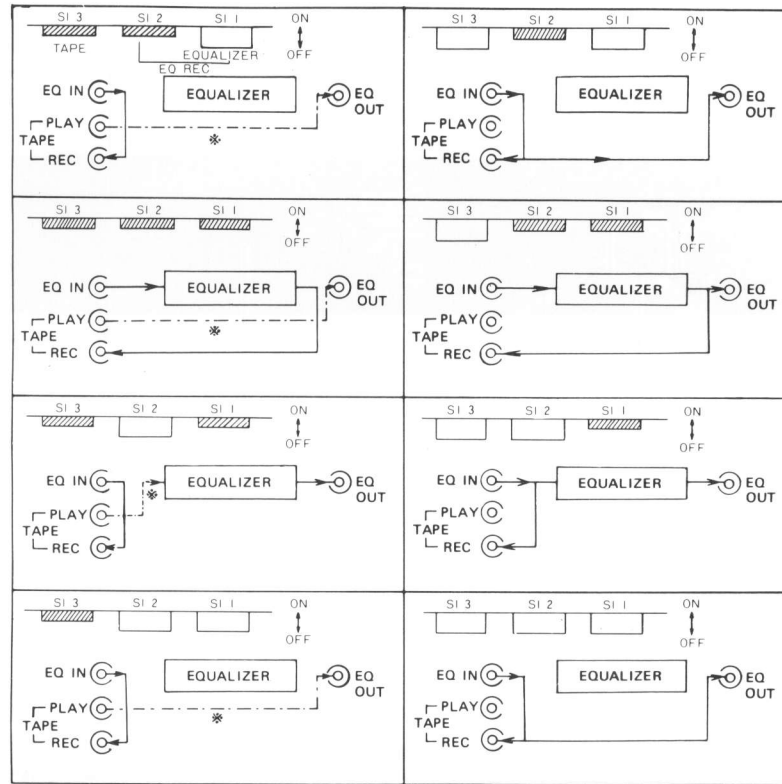


Fig. 4-2 Power supply circuit



* TAPE PLAYBACK ROUTE

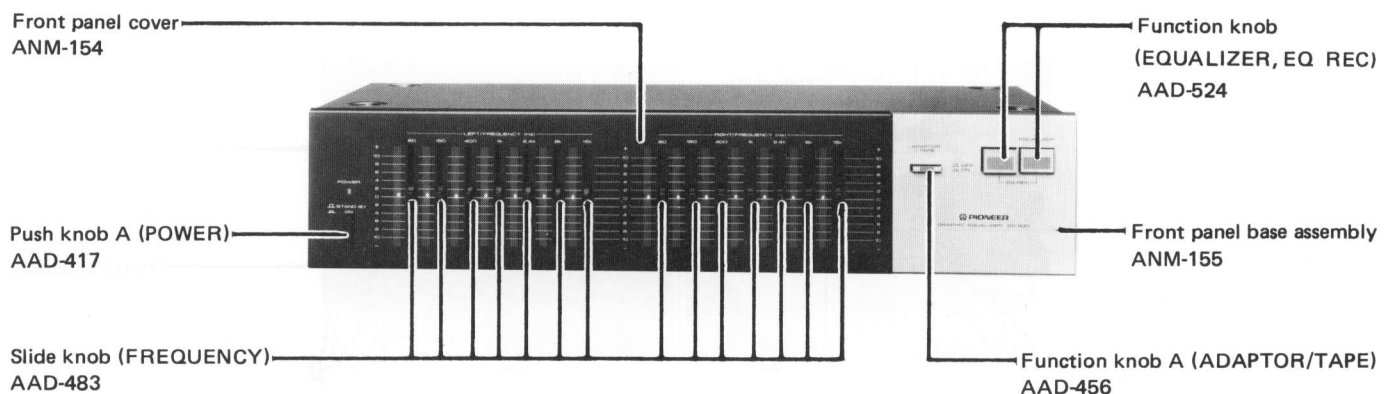
SI-1 : EQUALIZER } EQ REC
 SI-2 :
 SI-3 : TAPE

5. PARTS LOCATION

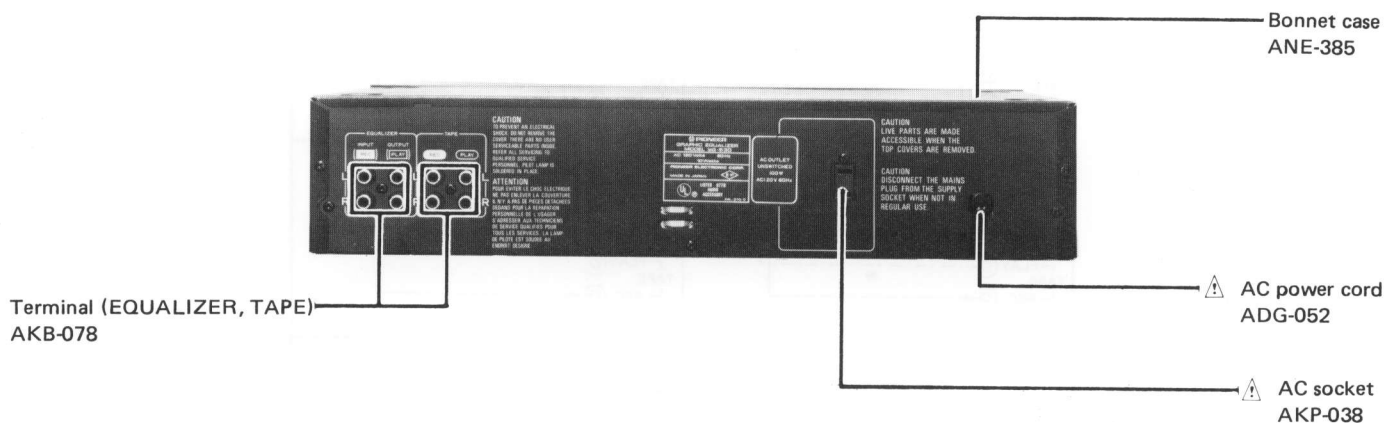
NOTES:

- The Δ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- For your Parts Stock Control, the fast moving items are indicated with the marks $\star\star$ and \star .
 $\star\star$ GENERALLY MOVES FASTER THAN \star
 This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

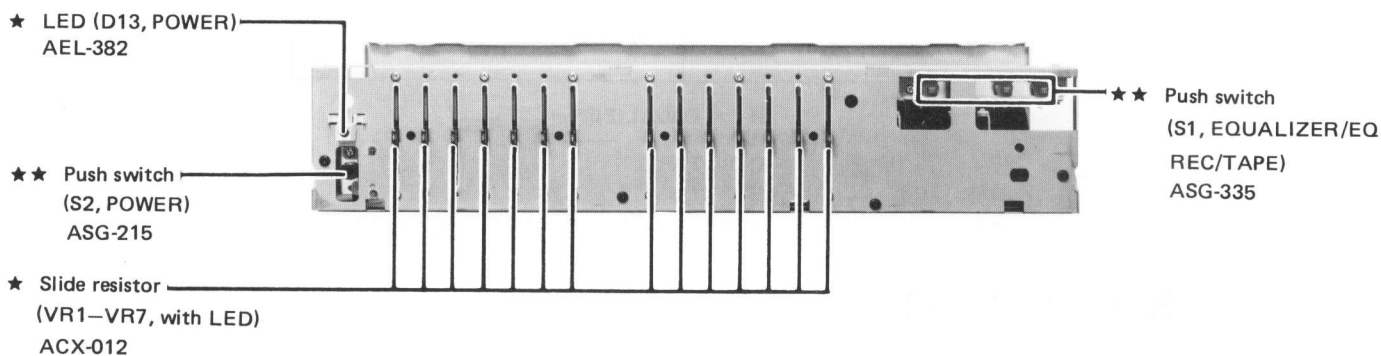
Front Panel View



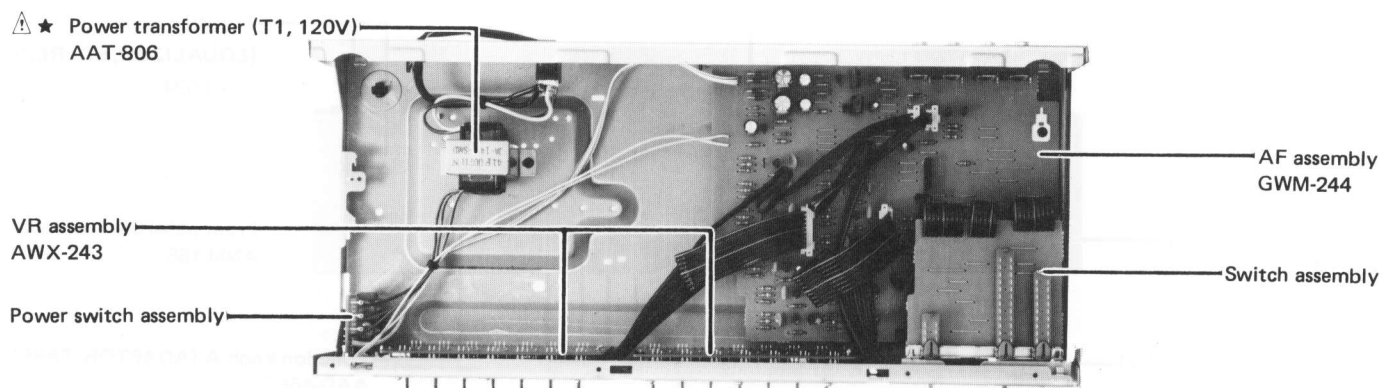
Rear Panel View



Front View with Panel Removed



Top View with Bonnet Case Removed



6. PARTS LIST

NOTES:


- When ordering resistors, first convert resistance values into code form as shown in the following examples.

Ex. 1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J=5%, and K=10%).

560Ω 56 × 10¹ 561 RD%PS 561 J
 47kΩ 47 × 10³ 473 RD%PS 473 J
 0.5Ω 0R5 RN2H 0R5 K
 1Ω 010 RS1P 010 K

Ex. 2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62kΩ 562 × 10¹ 5621 RN%SR 5621 F




- The  mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
 - For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.
- ★★ GENERALLY MOVES FASTER THAN ★
- This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.:

Miscellaneous Parts

P.C. BOARD ASSEMBLIES

Mark	Part No.	Symbol & Description
	GWM-244	AF Assembly
	AWX-243	VR Assembly

OTHERS

Mark	Part No.	Symbol & Description
	★ ATT-806	T1 Power transformer (120V)
	AKP-038	AC socket (AC OUTLETS)
	ADG-052	AC power cord

AF Assembly (GWM-244)

CAPACITORS

Mark	Part No.	Symbol & Description
	CEA 100M 50L	C1, C2, C5, C6
	CEA R33M 50L	C15, C16
	CEA R68M 50L	C17, C18
	CEA 1R5M 50L	C19, C20
	CEA 101M 25L	C37–C39
	CEA 220M 25L	C40, C41
	CEA 471M 25L	C35, C36
	CQMLA 124K 50	C13, C14, C33, C34
	CQMA 153K 50	C29, C30
	CQMA 223K 50	C9, C10
	CQMA 393K 50	C31, C32
	CQMA 563K 50	C11, C12
	CKDYB 102K 50	C23, C24
	CKDYB 222K 50	C25, C26
	CKDYB 391K 50	C21, C22
	CKDYB 562K 50	C27, C28
	CKDYB 822K 50	C7, C8
	CCDSL 221J 50	C3, C4

RESISTORS

NOTE: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Part No.	Symbol & Description
	RD%PM □□□J	R1–R79

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★★	M5218L (NJM4558DX)	Q1–Q3
★★	2SC1815 (2SC1919)	Q4–Q17
★★	2SD313 (2SD880)	Q18, Q19
★★	JA101 (2SA1115/A/)	Q20
★★	JC501 (2SC2603/A/)	Q21–Q24
★	10E2 (SIB01-02)	D1–D4
★	KZL120	D5, D6
★	US1035 (1S1555)	D7–D12, D15, D16
★	10YD13BFD	D14

OTHERS

Mark	Part No.	Symbol & Description
	AKB-078	Terminal 4P (TAPE, EQUALIZER)

Switch Assembly

Mark	Part No.	Symbol & Description
★ ★	ASG-335	S1 Push switch (EQUALIZER/ EQ REC/TAPE)

Power Switch Assembly

Mark	Part No.	Symbol & Description
★ ★	ASG-215 ACG-019	S2 Push switch (POWER) C42, C43 (0.01/AC150V)

LED Assembly

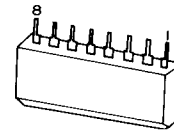
Mark	Part No.	Symbol & Description
★	AEL-382	D13 LED (POWER)

VR Assembly (AWX-243)

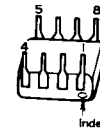
Mark	Part No.	Symbol & Description
★	ACX-012	VR1—VR7 Slide resistor (with LED) (20k-B3)

External Appearance of Transistors and ICs

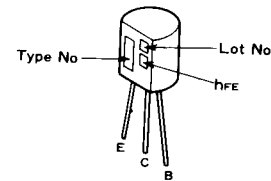
M5218L



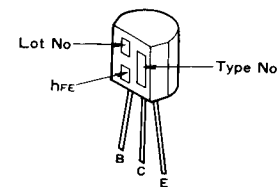
NJM4558DX



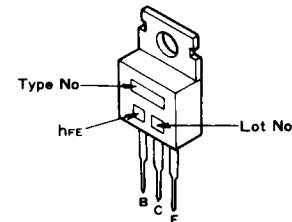
2SC1815



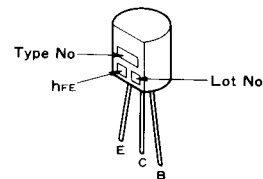
2SC1919



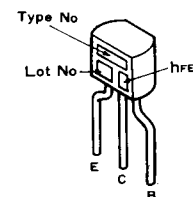
2SD313 2SD880



JA101 JC501



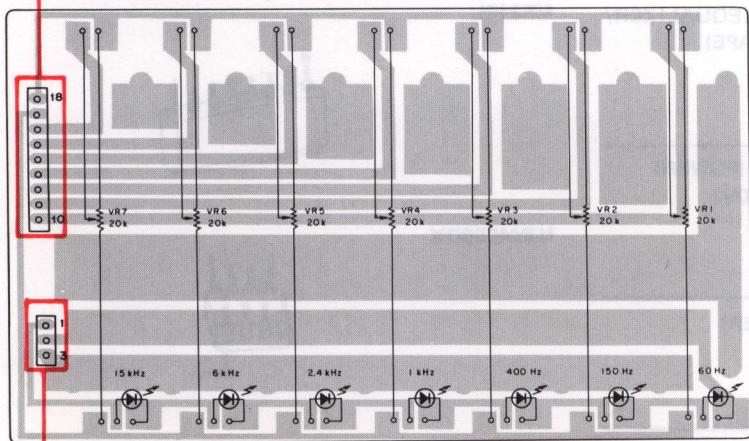
2SC2603/A/ 2SA1115/A/



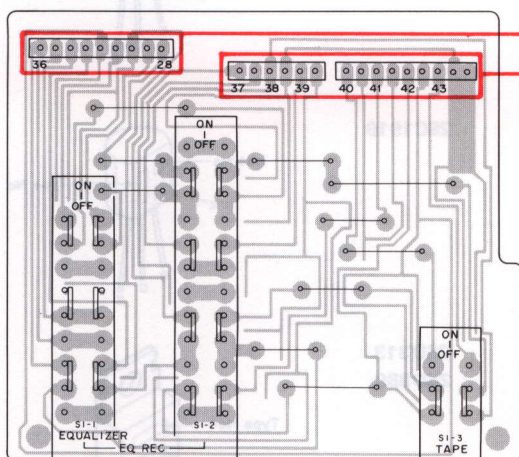
7. P.C.BOARDS CONNECTION DIAGRAM

AF Ass'y (GWM-244)

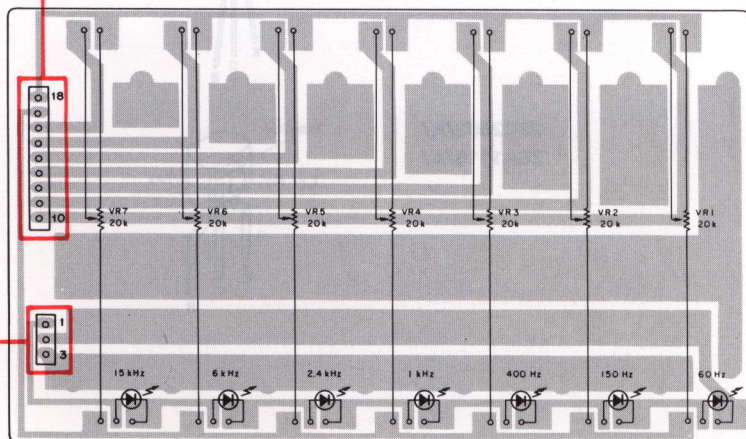
VOLUME Ass'y (AWX-243)



SWITCH Ass'y

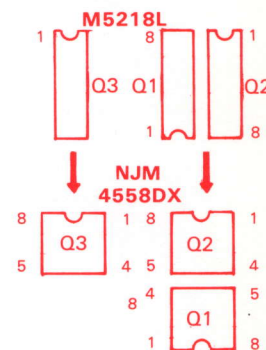


VOLUME Ass'y (AWX-243)

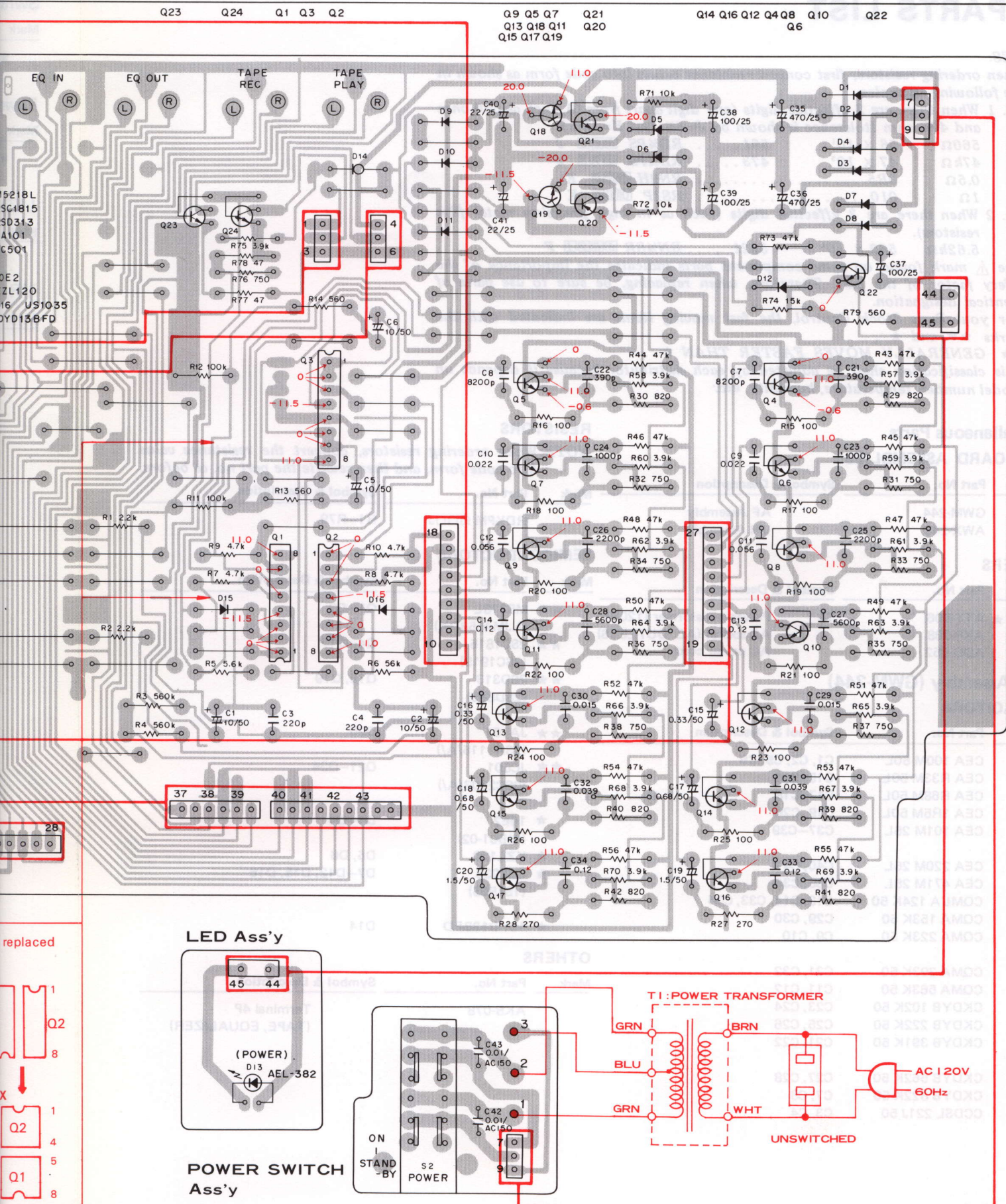


Q1~3 M5218L
 Q4~17 25C1815
 Q18,19 25D313
 Q20 JA101
 Q21~24 JC501
 D1~4 10E2
 D5,6 KZL120
 D7~12,15,16 US1035
 D14 10YD138FD

Q1~Q3 can be replaced
 as follows.



y (GWM-244)



D



4

5

6

NOTE:

The indicated semiconductors are representative ones only. Other alternative semiconductors may be used and are listed in the parts list.

1. RESISTORS:

Indicated in Ω , $\frac{1}{2}W$, $\pm 5\%$ tolerance unless otherwise noted k : k Ω ,
M : M Ω , (F) : $\pm 1\%$, (G) : $\pm 2\%$, (K) : $\pm 10\%$, (M) : $\pm 20\%$ tolerance

2. CAPACITORS:

Indicated in capacity (μF)/voltage (V) unless otherwise noted p : pF
Indication without voltage is 50V except electrolytic capacitor.

3. VOLTAGE, CURRENT:

$\square V$: Signal voltage at 150 mV output (1kHz)

\square : DC voltage (V) at no input signal

$\square mA$: DC current at no input signal

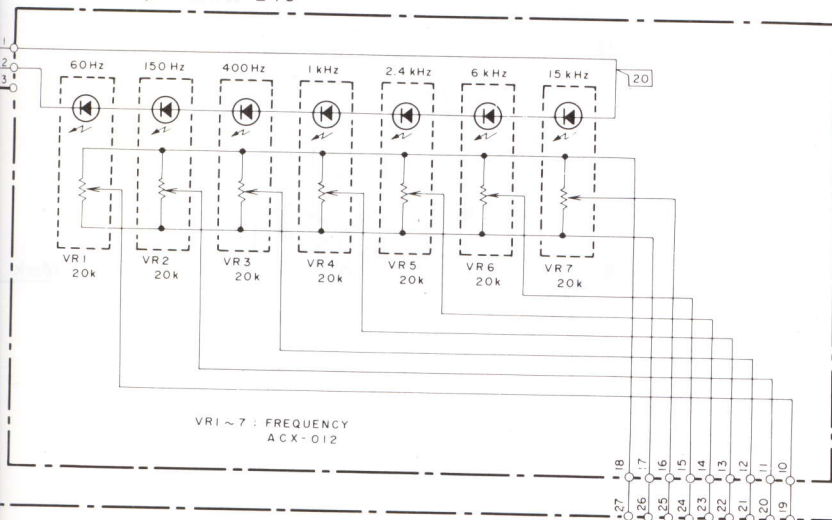
4. OTHERS:

\rightarrow : Signal route.

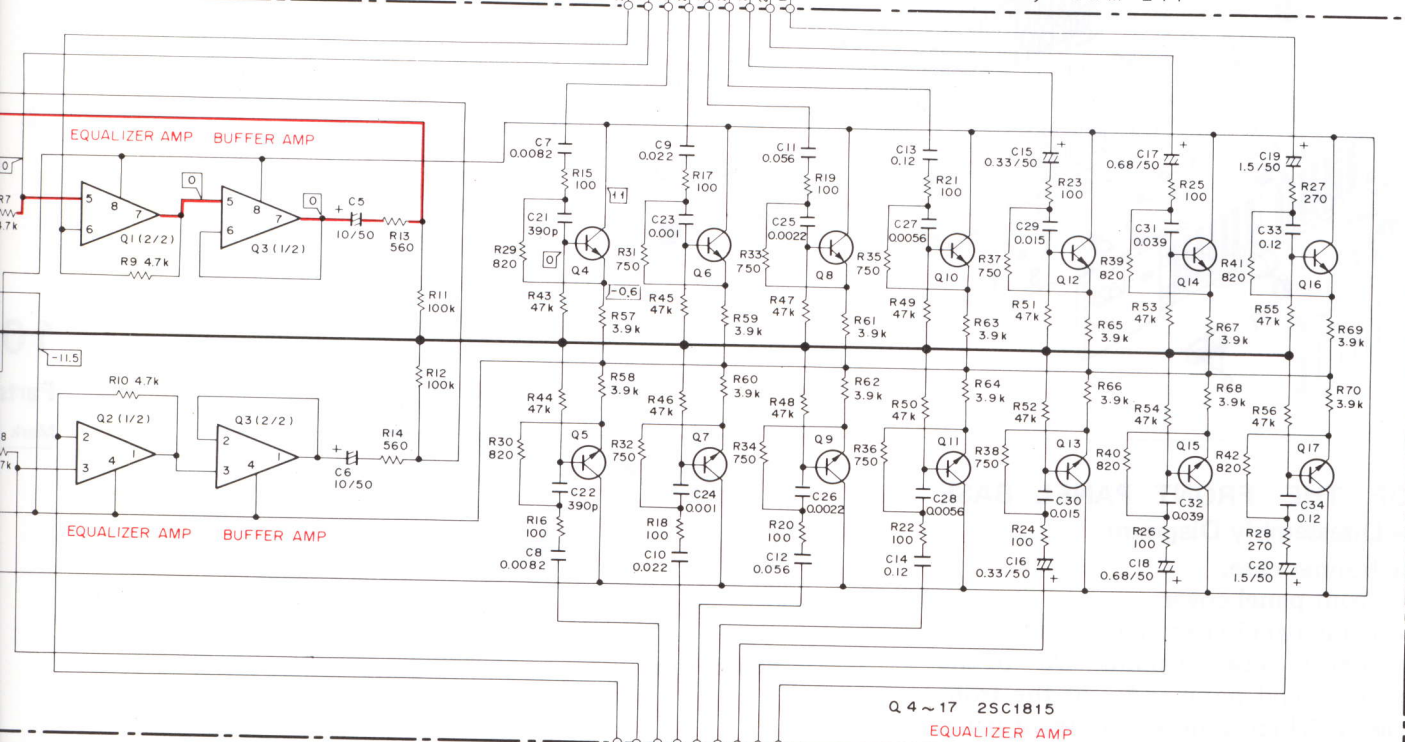
The Δ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.

This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

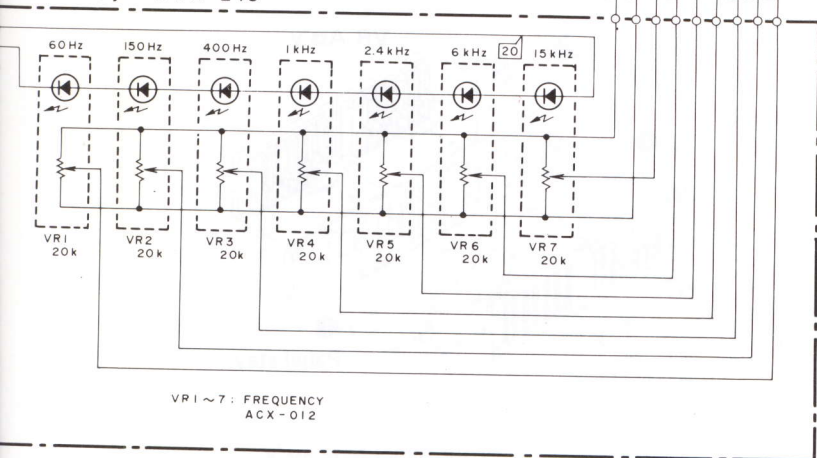
VOLUME Ass'y AWX-243



AF Ass'y GWM-244

Q 4 ~ 17 2SC1815
EQUALIZER AMP

VOLUME Ass'y AWX-243



SWITCHES:

S1-1 : EQUALIZER	ON - OFF
S1-1,2 : EQ REC	ON - OFF
S1-3 : TAPE	ON - OFF
S2 : POWER	ON - STAND-BY

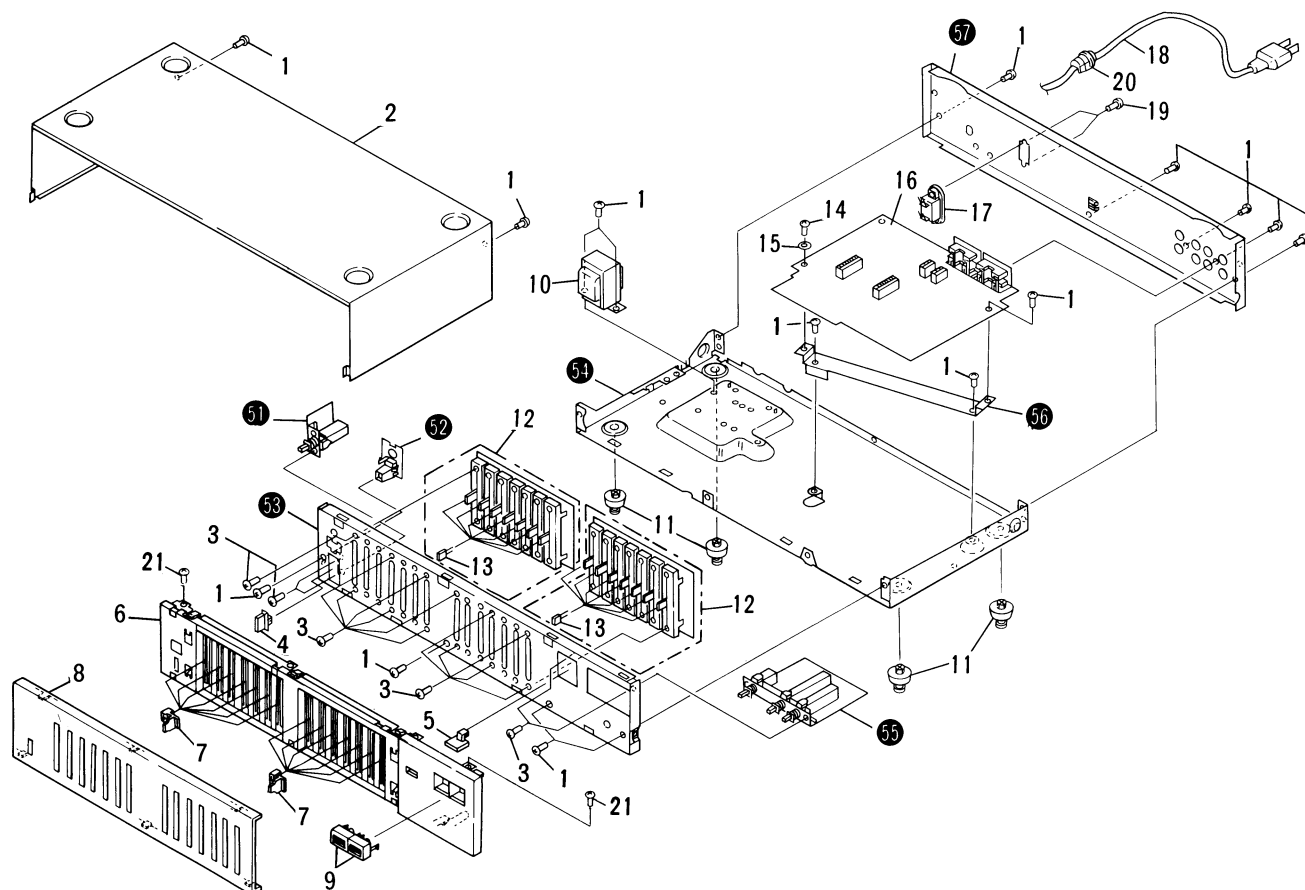
The underlined indicates the switch position.

4

5

6

9. EXPLODED VIEW

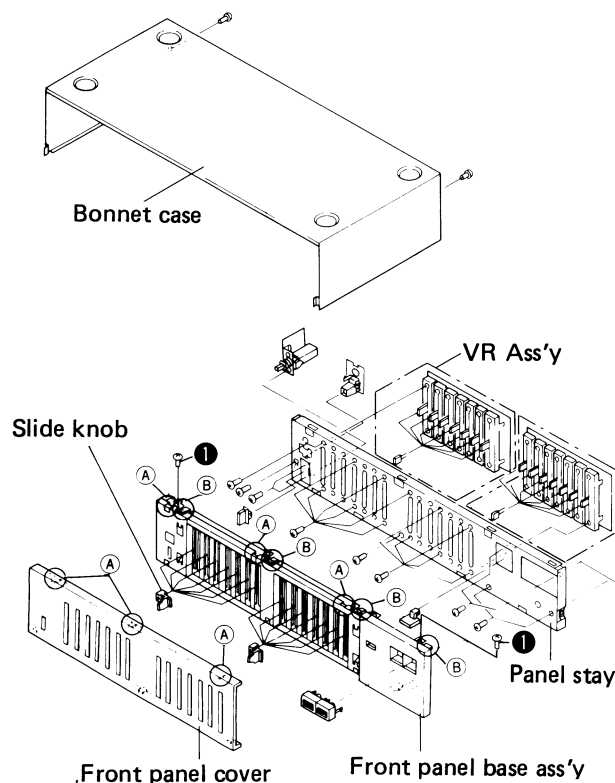


REMOVAL OF THE FRONT PANEL BASE ASS'Y (See the Disassembly Diagram)


1. Remove the bonnet case.
2. Remove the front panel cover.
Release the front panel cover lock by inserting a small screwdriver between point **A** of the front panel cover and point **A** of the front panel base ass'y. Then, remove the front panel cover and remove the slide knob.
3. Remove the front panel base ass'y.
Remove the two screws **1** and release the panel stay lock by pushing against the hook at point **B** of the front panel base ass'y with the small screwdriver, and remove the ass'y by pulling forward.




Assembly

4. Position the front panel base ass'y on the panel stay.
5. Attach the slide knob to the VR ass'y control.
6. Attach the front panel cover.
7. Attach the bonnet case.



Parts List

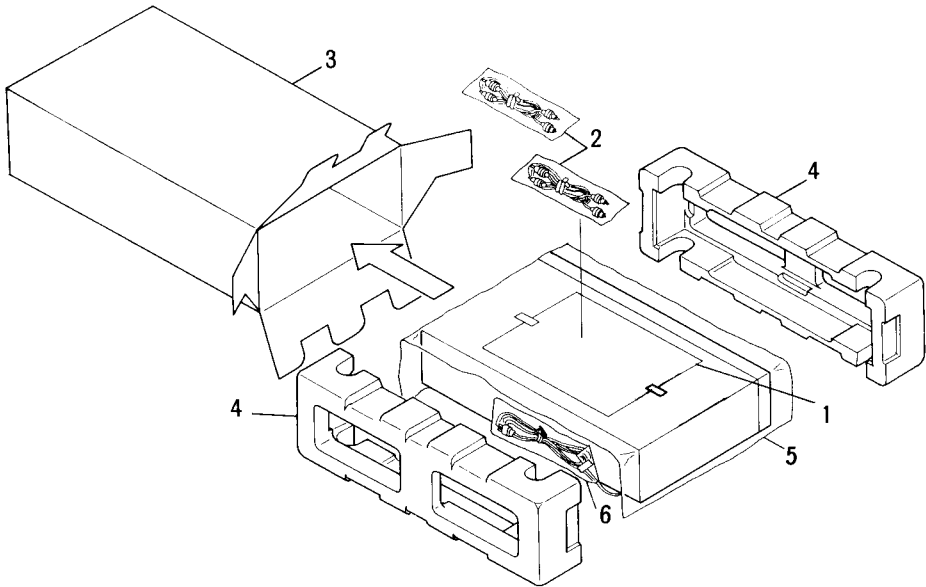
- NOTES:
- Parts without part number cannot be supplied.
 - The  mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
 - For your Parts Stock Control, the fast moving items are indicated with the marks **★★** and **★**.
★★ GENERALLY MOVES FASTER THAN ★
This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

Mark	No.	Part No.	Description	Mark	No.	Part No.	Description
	1.	BBZ30P080FZK	Screw 3 X 8		16.	GWM-244	AF assembly
	2.	ANE-385	Bonnet case		17.	AKP-038	AC socket (AC OUTLETS)
	3.	PMZ30P060FZB	Screw 3 X 6		18.	ADG-052	AC power cord
	4.	AAD-417	Push knob A (POWER)		19.	MTZ30P100FZK	Screw 3 X 10
	5.	AAD-456	Function knob A (ADAPTOR/TAPE)		20.	AEC-327	Strain relief
					21.	VBZ30P060FMC	Screw 3 X 6
	6.	ANM-155	Front panel base assembly				
	7.	AAD-483	Slide knob (FREQUENCY)				
	8.	ANM-154	Front panel cover		51.		Power switch assembly
	9.	AAD-524	Function knob (EQUALIZER, EQ)		52.		LED assembly
	★ 10.	ATT-806	Power transformer (120V)		53.		Panel stay
					54.		Chassis
	11.	AEC-903	Foot assembly		55.		Switch assembly
	12.	AWX-243	VR assembly				
★	13.	AEL-394	LED		56.		P.C.B holder
	14.	AEC-558	Nylon rivet		57.		Rear panel
	15.	WA35F100N080	Washer				

10. PACKING

Parts List

Mark	No.	Part No.	Description
	1.	ARB-496	Operating instructions (English)
	2.	ADE-005	Connection cord
		ADE-055	Connection cord (Black)
	3.	AHE-033	Packing case
	4.	AHA-308	Front rear pad
	5.	AHG-140	Sheet
	6.	AHG-023	Vinyl bag










11. FOR R,R/G,WE,WB AND WP TYPES

Model SG-530 R, R/G, WE, WB and WP types are the same as the SG-530 KU with the exception of following sections.

11.1 CONTRAST OF MISCELLANEOUS PARTS

NOTES:

- Parts without part number cannot be supplied.
- The  mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- For your Parts Stock Control, the fast moving items are indicated with the marks **★★** and **★**.
★★ GENERALLY MOVES FASTER THAN ★
 This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

Mark	Symbol & Description	Part No.					
		KU type	R type	R/G type	WE type	WB type	WP type
 ★ ★	T1 Fuse Assembly (P.C. board)	.....	.....	.....	Non supply	.....	Non supply
 ★ ★	T1 Power transformer (120V)	ATT-806	.....	.....	.....	.....	.....
	T1 Power transformer (110V—120V, 220V—240V)	.....	ATT-807	ATT-807	.....	.....	.....
	T1 Power transformer (220V—240V)	.....	.....	.....	ATT-808	ATT-808	ATT-808
 ★ ★	S3 Voltage selector switch	.....	AKX-501	AKX-501	.....	.....	.....
 ★	AC socket (AC OUTLETS)	AKP-038	AKP-038	AKP-038	AKP-026	AKP-044	.....
 ★	AC power cord	ADG-052	ADG-072	ADG-072	ADG-071	ADG-063	ADG-064
	Strain relief	AEC-327	.....	.....	.....	.....	.....
 ★ ★	FU1 Fuse (2A)	.....	.....	.....	AEK-017	.....	.....
	Packing case	AHE-033	AHE-060	AHE-060	AHE-060	AHE-060	AHE-060
	Operating instructions (English)	ARB-496	ARB-503	ARB-503	.....	ARB-503	ARB-503
	Operating instructions (Spanish)	.....	ARC-022	.....	.....	.....	.....
	Operating instructions (English/German/French/Italian)	.....	.....	.....	ARE-045	.....	.....

11.2 SPECIFICATIONS

The specifications for SG-530/R, R/G, WE, WB and WP types are the same as the SG-530/KU type except for following sections.

Miscellaneous

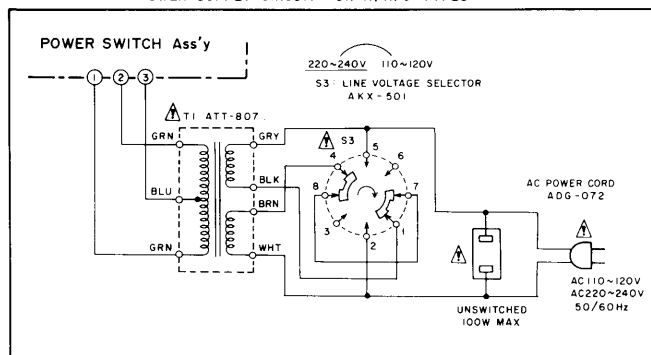
Power Requirements

WE, WB, WP types AC220 — 240V 50/60Hz

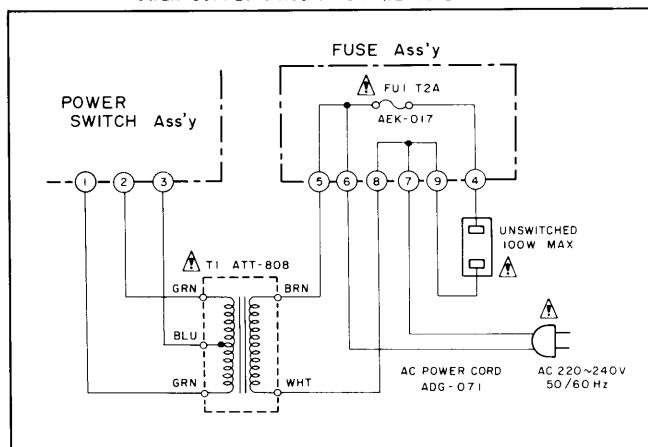
R, R/G types ... AC110V — 120V, 220V — 240V
50/60Hz

11.3 SCHEMATIC DIAGRAMS AND P.C. BOARD

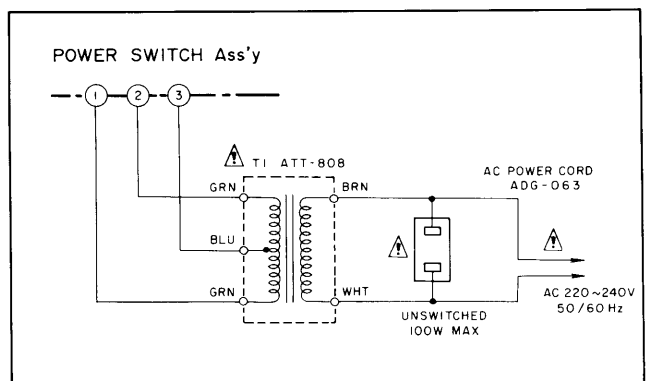
POWER SUPPLY CIRCUIT FOR R, R/G TYPES



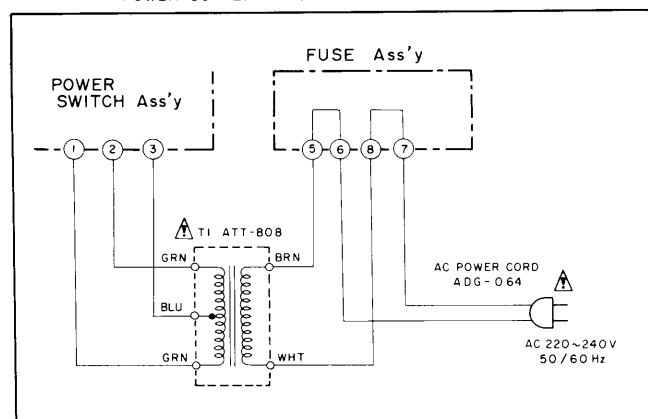
POWER SUPPLY CIRCUIT FOR WE TYPE



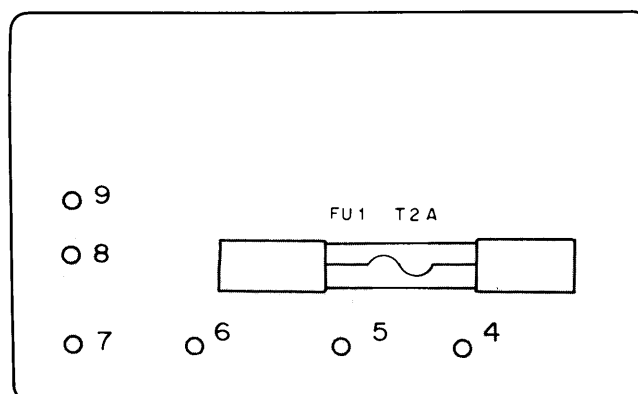
POWER SUPPLY CIRCUIT FOR WB TYPE



POWER SUPPLY CIRCUIT FOR WP TYPE



Fuse Assembly (WE type)



Fuse Assembly (WP type)

