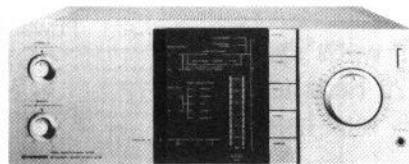


Service Manual



ORDER NO.
ART-590-0

NON SWITCHING AMP
STEREO AMPLIFIER

A-9

MODEL A-9 COMES IN SIX VERSIONS DISTINGUISHED AS FOLLOWS:

Type	Voltage	Remarks
KU	120V only	U.S.A. model
S	110V, 120V, 220V and 240V (Switchable)	General export model
S/G	110V, 120V, 220V and 240V (Switchable)	U.S. Military model
HE	220V and 240V (Switchable)	Europe model
HB	220V and 240V (Switchable)	United Kingdom model
KC	120V only	Canada model

- This service manual is applicable to the HE and HB types.
- Ce manuel d'instruction se réfère au mode de réglage, en français.
- Este manual de servicio trata del método de ajuste escrito en español.

CONTENTS

1. SPECIFICATIONS	2
2. FRONT PANEL FACILITIES	3
3. BLOCK DIAGRAM	6
4. CIRCUIT DESCRIPTIONS	7
5. PARTS LOCATION	10
6. PACKING	12
7. P.C. BOARDS CONNECTION DIAGRAM	13
8. EXPLODED VIEW	21
9. SCHEMATIC DIAGRAM	25
10. ELECTRICAL PARTS LIST	29
11. ADJUSTMENTS	34
RÉGLAGE	35
AJUSTE	36

1. SPECIFICATIONS

Amplifier Section

Continuous Power Output is 110 watts* per channel, min., at 8 ohms from 20 Hertz to 20,000 Hertz with no more than 0.003% total harmonic distortion.

Continuous Power Output at 1 kHz (both channels driven)
 T.H.D. 0.003%, 8 ohms 120 watts per channel
 Total Harmonic Distortion (20 Hertz to 20,000 Hertz, 8 ohms, from TUNER)
 continuous rated power output No more than 0.003%
 55 watts per channel power output .. No more than 0.003%
 Intermodulation Distortion (50 Hertz:7,000 Hertz = 4:1,
 8 ohms, from TUNER)
 continuous rated power output No more than 0.005%
 55 watts per channel power output .. No more than 0.003%
 Damping Factor (20 Hertz to 20,000 Hertz, 8 ohms)
 60

Input Sensitivity/Impedance

PHONO MM 2.5 mV/50 kilohms
 cartridge load capacitance:
 PHONO MM 100, 200, 300, 400 pF
 PHONO MC 0.1 mV/100 ohms
 cartridge load resistance:
 PHONO MC 33, 100 ohms
 TUNER, AUX, TAPE PLAY 1, 2 150 mV/50 kilohms
 Phono Overload Level (T.H.D. 0.0015 %, 1,000 Hz)
 PHONO MM 250 mV
 PHONO MC 10 mV

Output Level/Impedance

TAPE REC 1, 2 150 mV/50 kilohms
 Speaker A/OFF, B/OFF (4~16 Ω)

Frequency Response

PHONO (RIAA Equalization) 20 Hz to 20,000 Hz±0.2 dB
 TUNER, AUX, TAPE PLAY 1, 2 5 Hz to 200,000 Hz±0.5 dB

Tone Control

BASS +10 dB/-10 dB (100 Hz, 50 Hz)
 Turnover Frequency: 400 Hz/200 Hz
 TREBLE +10 dB/-10 dB (10 kHz, 20 kHz)
 Turnover Frequency: 2.5 kHz/5 kHz

Filter

LOW (SUBSONIC) 20 Hz (12 dB/oct.)
 Loudness Contour (Volume control set at -40 dB position)
 +6 dB (100 Hz), +3 dB (10 kHz)

Hum and Noise (IHF, short circuited A network)

PHONO MM 90 dB
 PHONO MC 74 dB
 TUNER, AUX, TAPE PLAY 1, 2 110 dB
 Hum and Noise (DIN, continuous rated power output/50 mW)
 PHONO MM 80 dB/68 dB
 PHONO MC 75 dB/70 dB
 TUNER, AUX, TAPE PLAY 1, 2 95 dB/70 dB
 Muting -20 dB

Miscellaneous

Power Requirements

HE, HB models 220/240 V (switchable), 50/60 Hz
 S, S/G models . 110/120/220/240 V (switchable), 50/60 Hz

Power Consumption

HE, HB models 820 W (max.)
 S, S/G models 300 W (max.)

Dimensions 420 (W) x 150 (H) x 430 (D) mm
 16-9/16 (W) x 5-15/16 (H) x 16-15/16 (D) in
 Weight (without package) 16 kg (35 lb 4 oz)

Furnished Parts

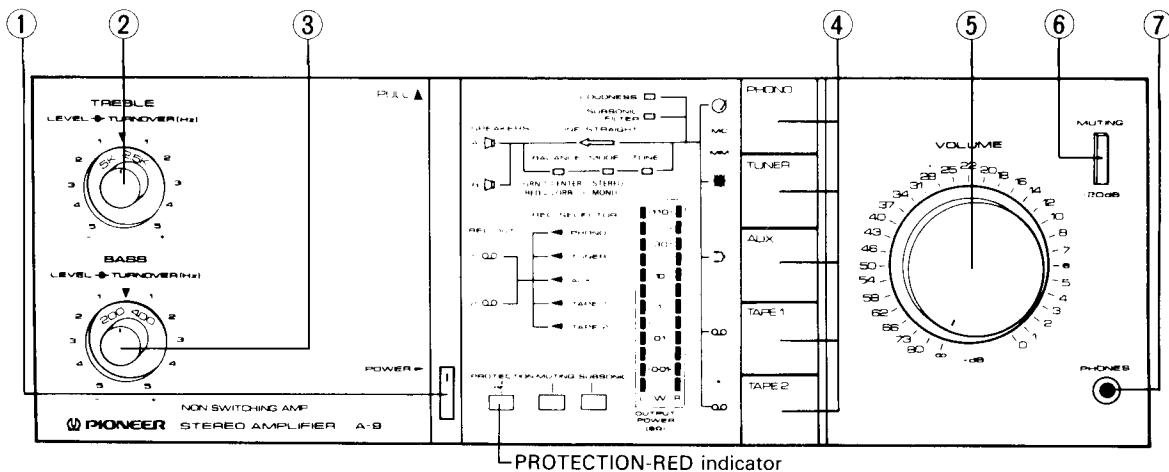
Operating Instructions 1 (HE model only; 2)
 Fuse (S, S/G models only) 1 (10 A or 5 A)

*Measured pursuant to the Federal Trade Commission's Trade Regulation rule on Power Output Claims for Amplifiers.

NOTE:

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

2. FRONT PANEL FACILITIES



① POWER SWITCH

Power is supplied to the stereo amplifier as soon as this switch is depressed to the ON position.

The power is turned off when the switch is released to the OFF position.

Immediately after the power switch has been set to ON, the muting circuit is actuated, the PROTECTION-RED indicator lights up red/and about 6 seconds after this when the muting circuit has been released, this indicator goes from red to green.

② TREBLE CONTROL

This is used to adjust the treble (high-frequency range) sound. When it is rotated clockwise from the "▼" position with the LINE STRAIGHT-OFF switch depressed (the TONE, MODE and BALANCE indicators light), the level of sound above the frequency selected by the TREBLE-TURNOVER switch is emphasized. Conversely, when the control is rotated counterclockwise from the "▼" position, the level of sound above the frequency selected by the TREBLE-TURNOVER switch is attenuated.

③ BASS CONTROL

This is used to adjust the bass (low-frequency range) sound. When it is rotated clockwise from the "▼" position with the LINE STRAIGHT-OFF switch depressed (the TONE, MODE and BALANCE indicators light), the level of sound below the frequency selected by the BASS-TURNOVER switch is emphasized. Conversely, when the control is rotated counterclockwise from the "▼" position, the level of sound below the frequency selected by the BASS-TURNOVER switch is attenuated.

④ FUNCTION SWITCHES

These are used to select the sound source. At the left of each switch is a function indicator (pictographic) which lights when the corresponding switch has been depressed. This indicates that the lighted function has been selected.

PHONO: Depress for playing records on a turntable connected to the PHONO jacks.

TUNER: Depress for listening to a program on a tuner connected to the TUNER jacks.

AUX: Depress for listening to the sound from a stereo component connected to the AUX jacks.

TAPE 1: Depress to listen to a tape in a tape deck connected to the TAPE-1 jacks or to monitor a recording.

TAPE 2: Depress to listen to a tape in a tape deck connected to the TAPE-2 jacks or to monitor a recording.

NOTE:

Depress only one FUNCTION switch at a time. The desired program source may not be selected if two or more switches are depressed at the same time.

⑤ VOLUME CONTROL

This is used to adjust the volume of sound heard through the speakers or headphones. The scale gives the attenuation when the rated output power is 0 dB. No sound is heard when it is set to the "∞" position. To increase the volume, rotate this control slowly clockwise (○).

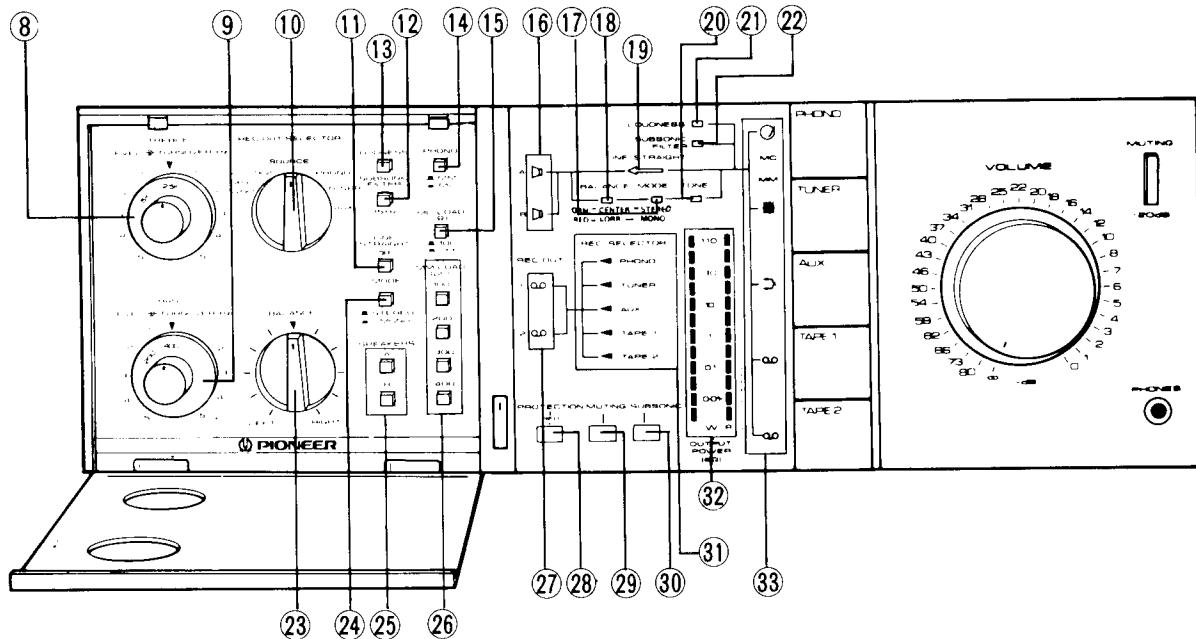
⑥ MUTING -20 dB SWITCH

The volume is attenuated by -20 dB when this switch is depressed to the ON position (MUTING indicator lights). The switch can be used effectively when the stylus descends onto the record during record play, when the sound is to be turned down temporarily and when you want to adjust the sound precisely as you listen to a program source under low sound level conditions.

⑦ PHONES JACK

Connect the plug on your headphones to this jack when listening to a program in private.

To listen to a program through the headphones, release both the SPEAKERS A and B switches.



⑧ TREBLE-TURNOVER selector switch

This is used to select the frequency at which the TREBLE control starts to have an effect on the tone quality when it is used for adjustment.

2.5 k: Allows the frequency band above 2.5 kHz to be adjusted.

5 k: Allows the frequency band above 5 kHz to be adjusted.

⑨ BASS-TURNOVER SELECTOR SWITCH

This is used to select the frequency at which the BASS control starts to have an effect on the tone quality when it is used for adjustment.

400: Allows the frequency band below 400 Hz to be adjusted.

200: Allows the frequency band below 200 Hz to be adjusted.

⑩ REC OUT SELECTOR SWITCH

This is used to select the output signal which is fed out to the TAPE REC jacks.

COPY 2 ▶ 1: The output signal is fed out from the TAPE 2 PLAY jacks to the TAPE 1 REC jacks (when dubbing a tape from TAPE 2 to TAPE 1).

COPY 1 ▶ 2: The output signal is fed out from the TAPE 1 PLAY jacks to the TAPE 2 REC jacks (when dubbing a tape from TAPE 1 to TAPE 2).

SOURCE: The output signal of the program source (PHONO, TUNER, AUX, etc.) selected by the FUNCTION switch is fed out to the TAPE 1 REC and TAPE 2 REC jacks.

PHONO: The output signal from the PHONO jacks is fed out to the TAPE 1 REC and TAPE 2 REC jacks.

TUNER:

The output signal from the TUNER jacks is fed out to the TAPE 1 REC and TAPE 2 REC jacks.

AUX:

The output signal from the AUX jacks is fed out to the TAPE 1 REC and TAPE 2 REC jacks.

⑪ LINE STRAIGHT-OFF SWITCH

When this switch is released to the ON position (the LINE STRAIGHT indicator lights), the signal from the input jacks is directly sent to the power amplifier input without passing through the tone control circuit. When this switch is depressed to the OFF position, the input signal's tone quality can be adjusted with the tone controls.

⑫ SUBSONIC 15 Hz FILTER SWITCH

Depressing this switch to the ON position actuates the subsonic filter with the 15 Hz cutoff frequency. Once the SUBSONIC FILTER indicator has lighted, it means that noise has been detected. Depress the SUBSONIC FILTER switch. This filter serves to attenuates frequencies lower than 15 Hz with a 12 dB/oct slope and, therefore, it can be used to suppress the ultra-low-range noise which is generated by record warp and other factors. This noise cannot actually be heard by the ear but it can cause cross modulation distortion and even speaker damage. Use this switch when required during record play.

⑬ LOUDNESS SWITCH

The bass and treble sound is emphasized when this switch is depressed to the ON position (LOUDNESS indicator lights) under low volume listening conditions.

When the volume of sound is low, the capability of the ear to pick up the bass and treble sound drops off, compared with high volume listening conditions. The LOUDNESS switch compensates for this characteristic of the ear. The bass and treble are emphasized when the switch is set to ON and the sound comes alive even when the volume is low.

⑯ PHONO MM/MC SELECTOR SWITCH

This switch is set to the position that corresponds to the type of cartridge being used when listening to a record on a turn-table connected to the PHONO jacks.

- MM: Set here when using an MM cartridge.
- MC: Set here when using an MC cartridge.

NOTE:

Some MC cartridges on the market have the same high output power as MM cartridges. Consult the instructions accompanying the cartridge.

⑰ MC LOAD (Ω) SWITCH

This switch is set to the position that corresponds to the output impedance of the MC (moving coil) cartridge being used for record play.

⑯ SPEAKERS A/B INDICATORS

These light when one of the SPEAKERS switches has been depressed.

⑰ MODE INDICATOR

This lights up green (STEREO) or red (MONO) in accordance with the selected position of the MODE selector.

⑱ BALANCE INDICATOR

Depending on the position of the BALANCE control, this lights up green (when the control is at the CENTER position) or red (when it is rotated LEFT or RIGHT position).

⑲ LINE STRAIGHT INDICATOR

This lights when the LINE STRAIGHT-OFF switch has been released to ON in place of the BALANCE, MODE and TONE indicators.

⑳ TONE INDICATOR

This lights when the tone control circuitry has been actuated.

㉑ LOUDNESS INDICATOR

This lights when the LOUDNESS switch has been set to ON.

㉒ SUBSONIC FILTER INDICATOR

This lights when the SUBSONIC FILTER switch has been set to ON.

㉓ BALANCE CONTROL

This is used to adjust the balance of the sound from the left and right channels. When rotated clockwise from its center position, the volume of the left (L) channel is reduced; when rotated counterclockwise, the volume of the right (R) channel is reduced.

To adjust the balance, first set the BALANCE control to its center position, set the MODE selector to MONO and rotate the control so that the sound seems to be coming from the midpoint between the left and right speakers.

㉔ MODE SELECTOR

This is used to select the mode.

- STEREO: Set here for ordinary stereo listening.
- MONO: Set here to mix the left and right channel stereo input signals and hear them in mono through both the left and right speakers.

㉕ SPEAKERS SWITCHES

These are used to select the speakers through which you will listen to the sound. When one of the switches is depressed, the corresponding speaker indicator will light to indicate that the selected speakers are now working.

- A: The sound is heard from the speakers connected to the speaker A terminals.
- B: The sound is heard from the speakers connected to the speaker B terminals.

No sound will be heard when SPEAKERS A and B switches are both released. This is the position at which the sound can be heard through the headphones.

㉖ MM LOAD (pF) SWITCH

This switch is set to the position that corresponds to the designated load capacitance of the MM (moving magnet) cartridge being used for record play.

㉗ REC OUT 1, 2 INDICATORS

These indicate the tape deck which is recording in accordance with the position selected by the REC OUT SELECTOR switch.

㉘ PROTECTION-RED INDICATOR

This lights in red or green, depending on the operating mode of the power protection circuit.

㉙ MUTING INDICATOR

This lights in accordance with the position of the MUTING -20 dB switch.

㉚ SUBSONIC DETECTION INDICATOR

This lights upon detection of ultra-low-frequency noise components generated by record warp and other factors or any other noise contained in the program source. When it has lighted, depress the SUBSONIC FILTER switch to the ON position. The indicator goes off at the ON position.

㉛ REC SELECTOR INDICATOR

This indicates the program source (PHONO, TUNER, AUX, etc.) being recorded in accordance with the position of the REC OUT SELECTOR switch.

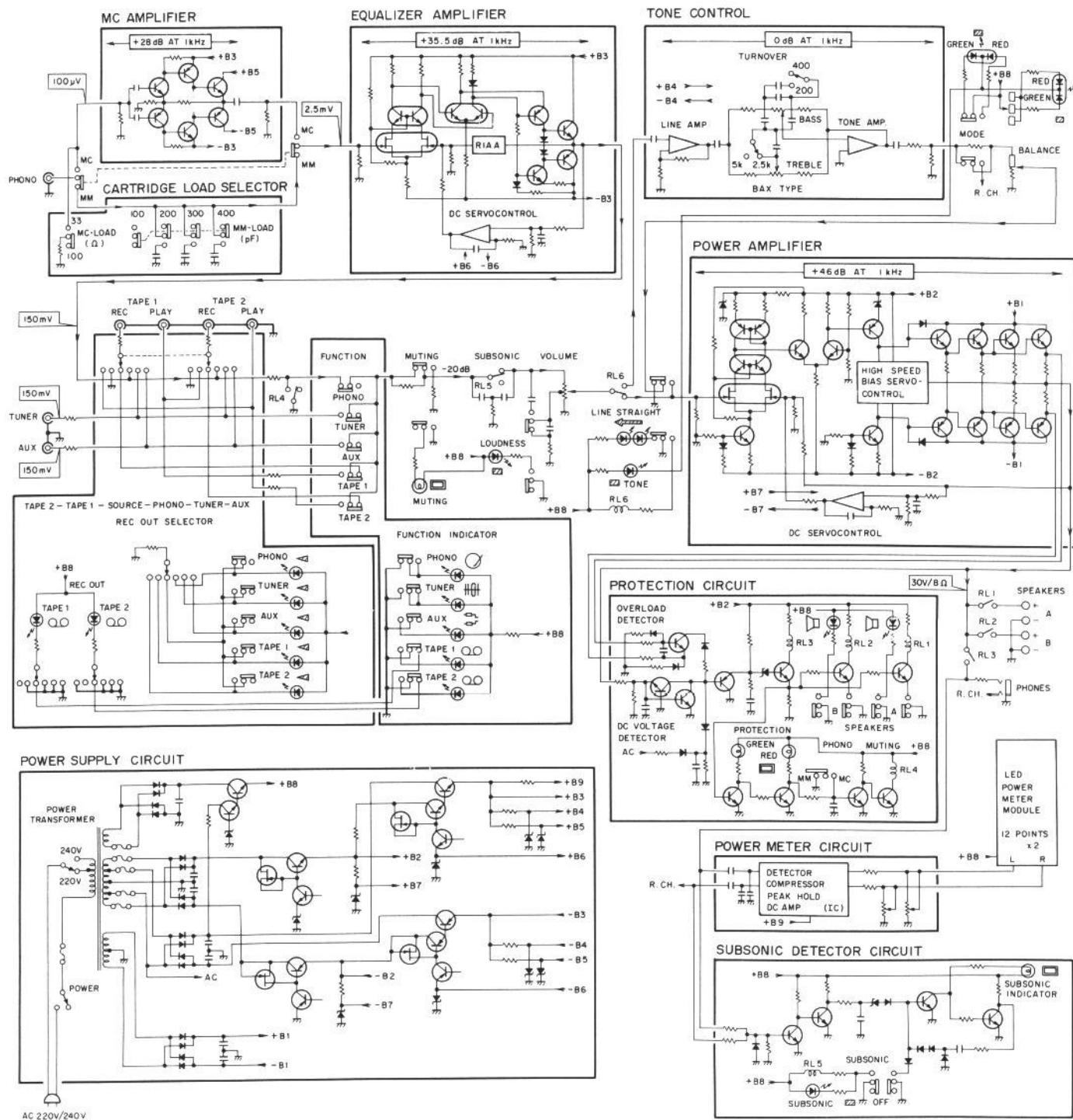
㉜ OUTPUT POWER 8 Ω METER

This indicates the output level when speakers with an 8-ohm impedance are connected to the speaker terminals. L is for the left channel and R for the right channel.

㉝ FUNCTION INDICATORS

The indicator corresponding to the selected FUNCTION switch lights.

3. BLOCK DIAGRAM



4. CIRCUIT DESCRIPTIONS

4.1 AMPLIFIER SECTION

Cartridge Load Selector

When the PHONO MM switch is placed to the ON position, the MM LOAD (C) switch may be positioned to provide four different levels of input capacitance (100pF, 200pF, 300pF, 400pF) in the phono input circuit. The input impedance of the equalizer amplifier is set at 50k Ω /100pF, and operating the MM LOAD (C) switch places capacitors in parallel configuration in the input circuit.

When the PHONO MC switch is placed to the ON position, operating the MC LOAD (R) switch places input resistance into the phono input circuit to provide two different levels (33 Ω , 100 Ω) of cartridge loading.

MC Amplifier

To provide compatibility with low-output moving-coil cartridges, the MC amp is a flat-response voltage amplifier with a gain of 28dB. This amplifier is switched into the before stage of the equalizer amplifier by the PHONO MC switch being placed to the ON position. Circuitry is completely symmetrical, and consists of 3-stages with direct coupling. The first stage uses ultra-low noise NPN and PNP transistors, and an S/N ratio of 74dB (100 μ V input, IHF-A) is attained.

Equalizer Amplifier

The first stage is a cascade connected differential amp using an ultra-low noise twin FET and NPN twin transistor. The second stage differential amp, in combination with the modified current mirror of the third stage serves to cancel even-harmonic distortion components, and the output stage is a class A configuration symmetrical complementary SEPP.

A DC servocontrol circuit is also built into the equalizer amplifier. This circuit serves to hold DC area gain of the equalizer amplifier to less than 1, so that even when an extremely low frequency is input into the amp, it is practically eliminated from the output. This circuit also functions to minimize DC drift at the output mid-point. Output is returned to the input stage through the integrating amp (consisting of operational amplifier IC μ PC741C), holding circuit gain in the DC area to less than 1.

Using FETs in the first stage, combined with the DC servocontrol function eliminates the need for coupling capacitors between inputs and outputs, and there is no sound degradation due to capacitors.

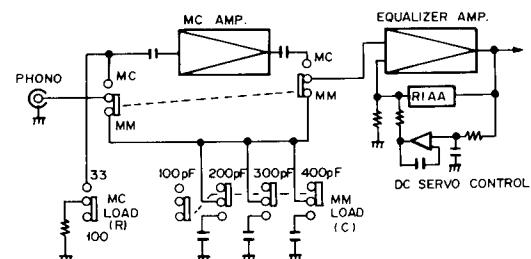


Fig. 4-1 Cartridge load selector circuit

Tone Control

Tone control is by a BAX type tone control circuit with a turnover frequency selector. To improve S/N ratio, a line amp has been added to the before stage. Both line amp and tone amp use operational amplifiers (IC μ PC4558DX).

An attenuator is used in the output circuit to equalize the level with the line straight circuit. This brings the total gain of the tone control section to 0dB.

Line Straight Circuit

When the LINE STRAIGHT OFF switch is in the LINE STRAIGHT position, the tone control circuit (including line amp), MODE (STEREO/MONO) switch, and BALANCE control are bypassed, and the signal circuit is directly coupled from the VOLUME control to the power amp for pure DC amplification.

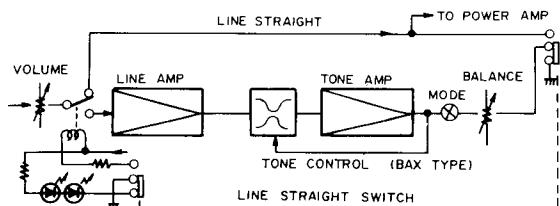


Fig. 4-2 Line straight circuit

Power Amplifier

The first stage is a cascade connected differential amplifier using a low noise twin FET and an NPN twin transistor, and the load circuit is the current mirror type. The power stage is a 3-stage Darlington arrangement, with the final stage a parallel SEPP.

Bias voltage is supplied to the power stages through the high speed bias servocontrol circuit. The B class push-pull power stage alternately drives the N and P channels during each half-cycle, and the high speed bias servocontrol circuit controls the bias voltage so that the idle channel of the power stage is maintained in the active region. (Refer to the section on the High Speed Bias Servocontrol Circuit for operational details.)

The power amplifier has a built in DC servocontrol circuit functioning to reduce gain in the DC area to less than 1, so that even if a DC input were present, it would, for all practical purposes, not appear at the output. This circuit also functions to hold center-point DC drift to a minimum. The signal is returned from the output stage to the input stage via the integrating amp (constructed of an operational amplifier), and circuit gain in the DC area is held to less than 1.

The use of FETs in the first stage, combined with the DC servocontrol circuit eliminate the need for coupling capacitors between inputs and outputs, thereby preserving tonal quality.

- **High Speed Bias Servocontrol Circuit**

By operating the power stage only within the active region (no possible cut-off) and with minimum idle current, the high speed bias servocontrol circuit prevents the generation of switching distortion and reduces heat loss.

This circuit is outlined in Fig. 4-4. When there is no signal applied to the circuit, Q1 and Q2 are almost cut off, while Q3 and Q4 will be on. The voltage across the collector and base of both of these transistors (Q3 and Q4) at this time may be disregarded. Consequently, with the power stage bias circuit consisting of 4 PN junctions formed by Q3, D3 and Q4, and VR1.

With R1 and D1 ensuring a constant flow of current, the base of Q1 and point X may be brought to the same level on an AC basis (level fluctuations due to the signal) by a simple shift in DC level. Furthermore, Q1 may be considered emitter-follower with R3 as the emitter resistance.

When the voltage across points Y and X is increased by the positive portion of the signal applied to this circuit, it becomes the input signal of this emitter-follower (Q1). Since the emitter-follower voltage gain is practically 1, a voltage more or less equal to that of the input signal (that is, the voltage increase across points Y and X) is produced at R3. And the R3 voltage is the voltage applied across the base and collector of Q3 which forms part of the power stage bias circuit. So the bias voltage applied to Q3 will be in excess by the same amount the voltage across points Y and X is increased (by positive portion of the signal) above the voltage level when no signal is being applied. Consequently, the increase in voltage across points Y and X cancels the decrease in voltage across points X and Z, thereby maintaining the idle current without cutting the PNP power stage off (noting that there actually is a slight decrease in current). For the negative portions of the signal, Q2 and Q4 are operated in the same manner, thereby preventing the NPN power stage from being cut off.

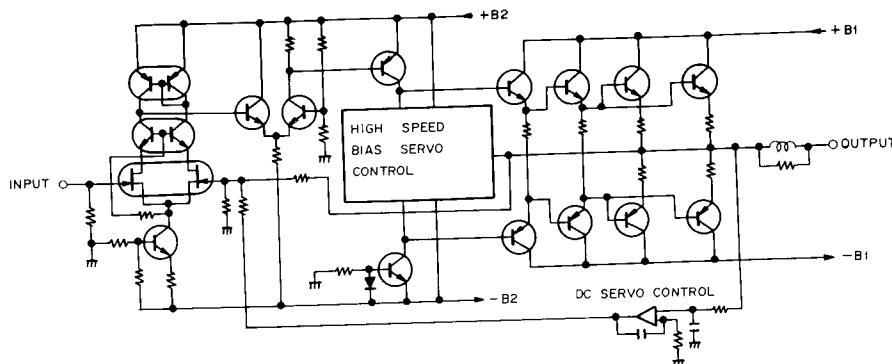


Fig. 4-3 Power amplifier circuit

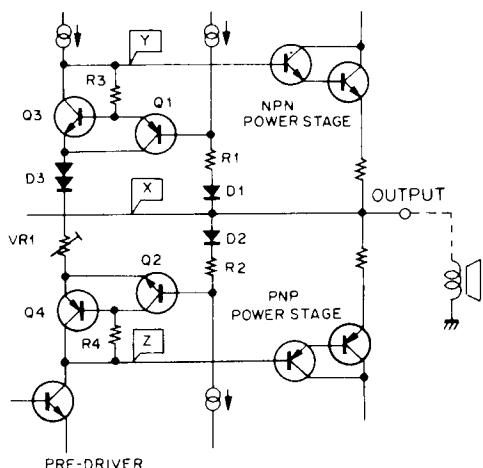


Fig. 4-4 Basic circuitry of High speed bias servocontrol circuit

4.2 POWER INDICATOR CIRCUIT

The A-9 indicates power output from 0.01 watt to 110 watts peak power using a 12 point LED display without range switching. The power amplifier output signal is passed through a low-pass filter, then input to IC (TA7318P-A). This IC consists of a detector circuit, compressor (40dB), and peak-hold circuit for each channel. The signal, after being processed by this IC, is input to the LED power meter module containing the voltage comparators and LED drivers. Here, the LEDs are driven (illuminated) in accordance with the input level.

4.3 PROTECTION CIRCUIT

The purpose of this circuit is to protect both the speakers and the power amplifiers. The relay in the output circuit is automatically opened in any of the following cases:

1. During the "transient operations" when the power supply is turned on and off.
2. Upon detection of a DC voltage in the output circuit, caused by component failure or accident.
3. Upon detection of an overload, caused by a short circuit in the load.

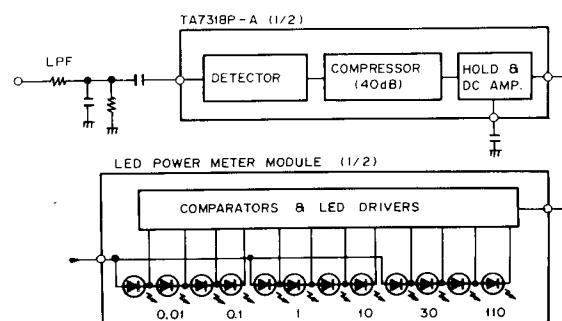


Fig. 4-5 Power indicator circuit

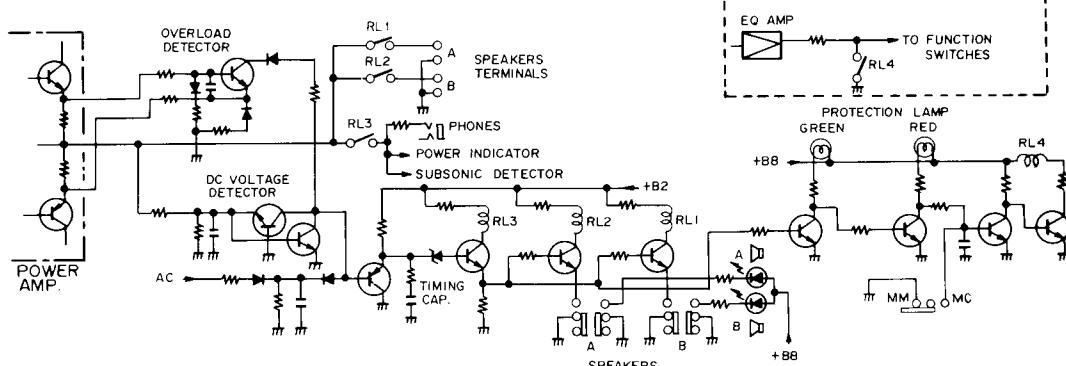
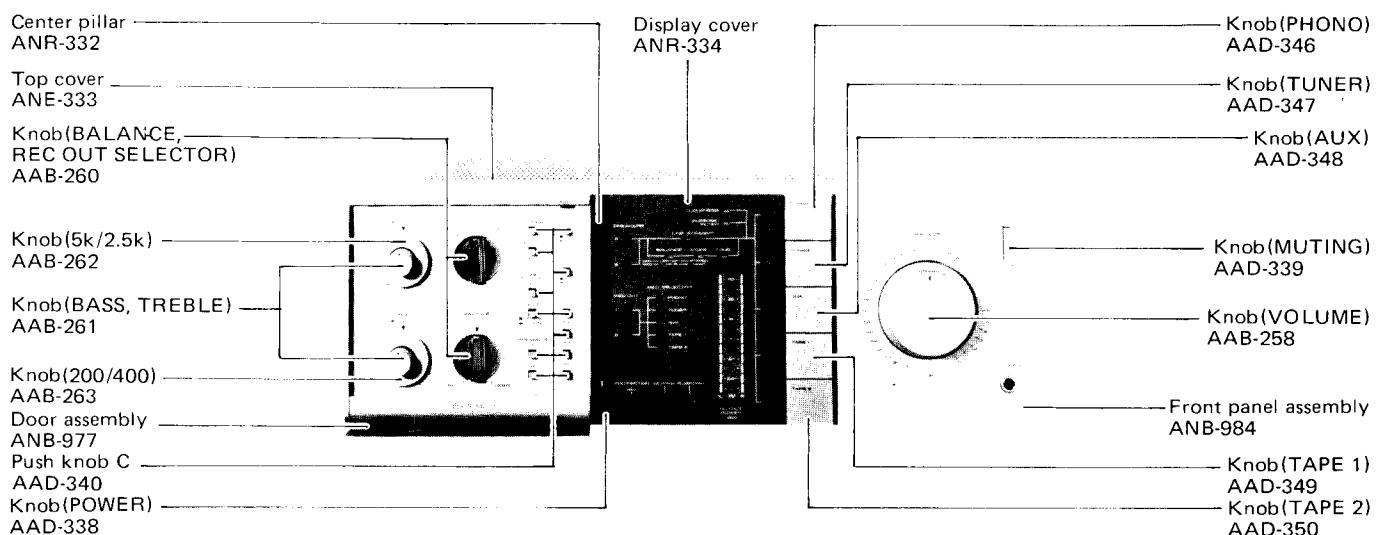


Fig. 4-6 Protection circuit

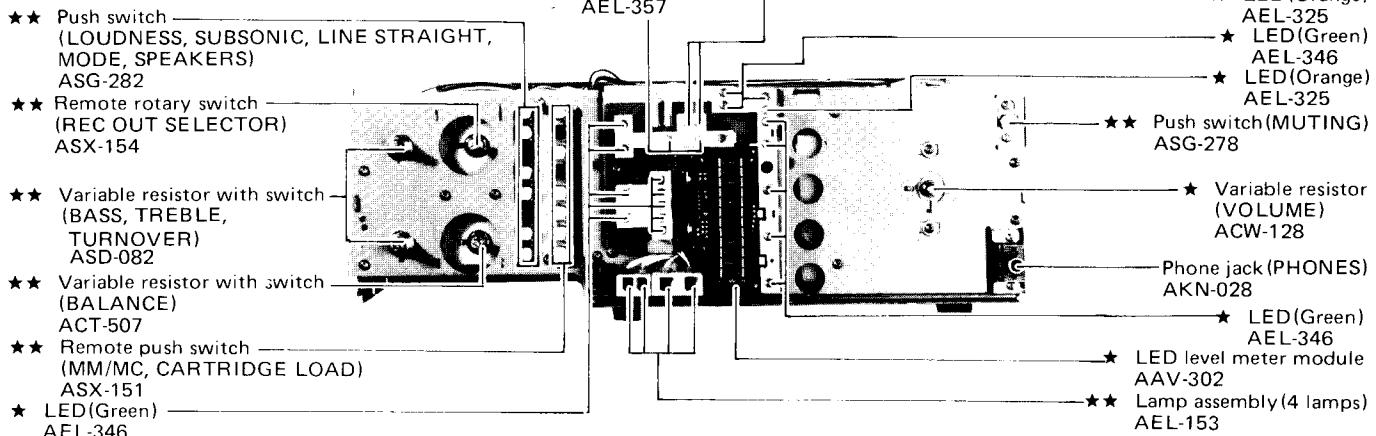
5. PARTS LOCATION

- 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.

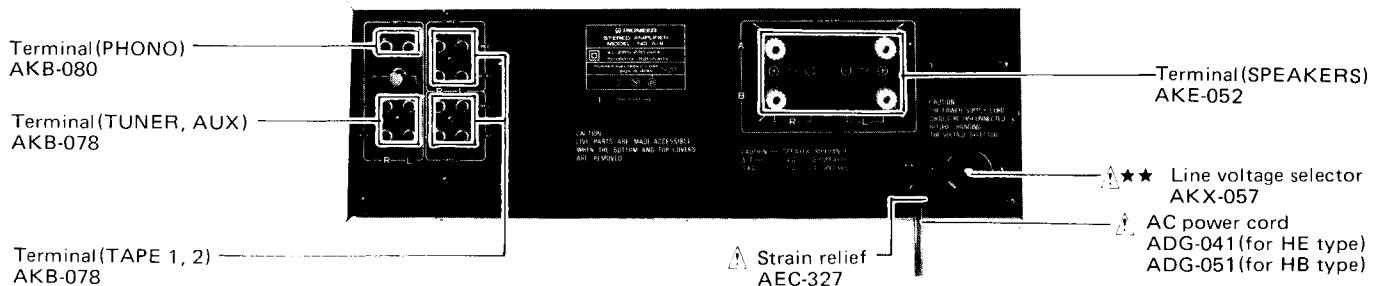
Front Panel View



Front View with Panel Removed



Rear Panel View



Top

Power GWH-1

Regula AWR-1

Power GWR-1

Tone c GWG-1

★★ R (I A

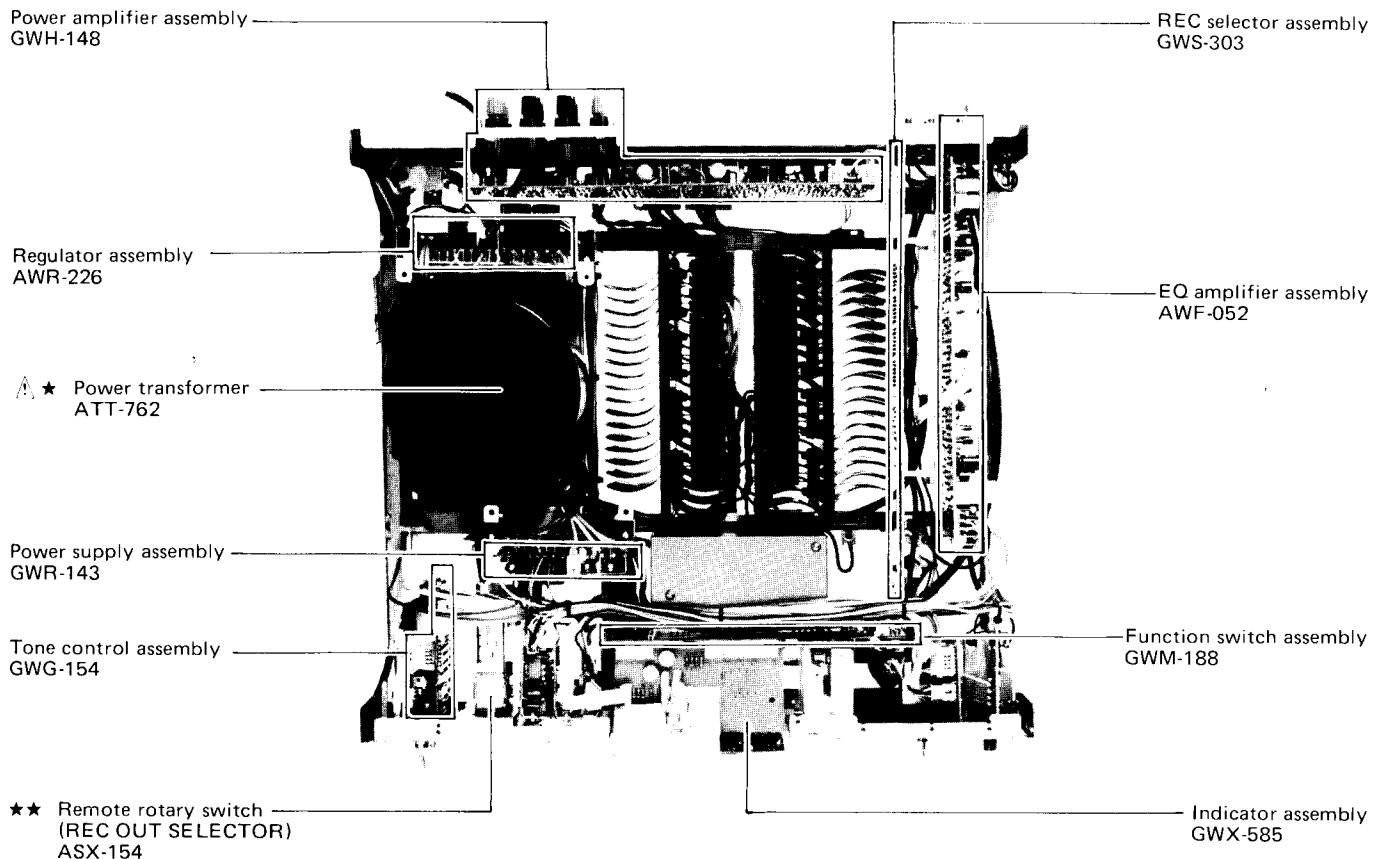
Bott

Tone c GWG-1

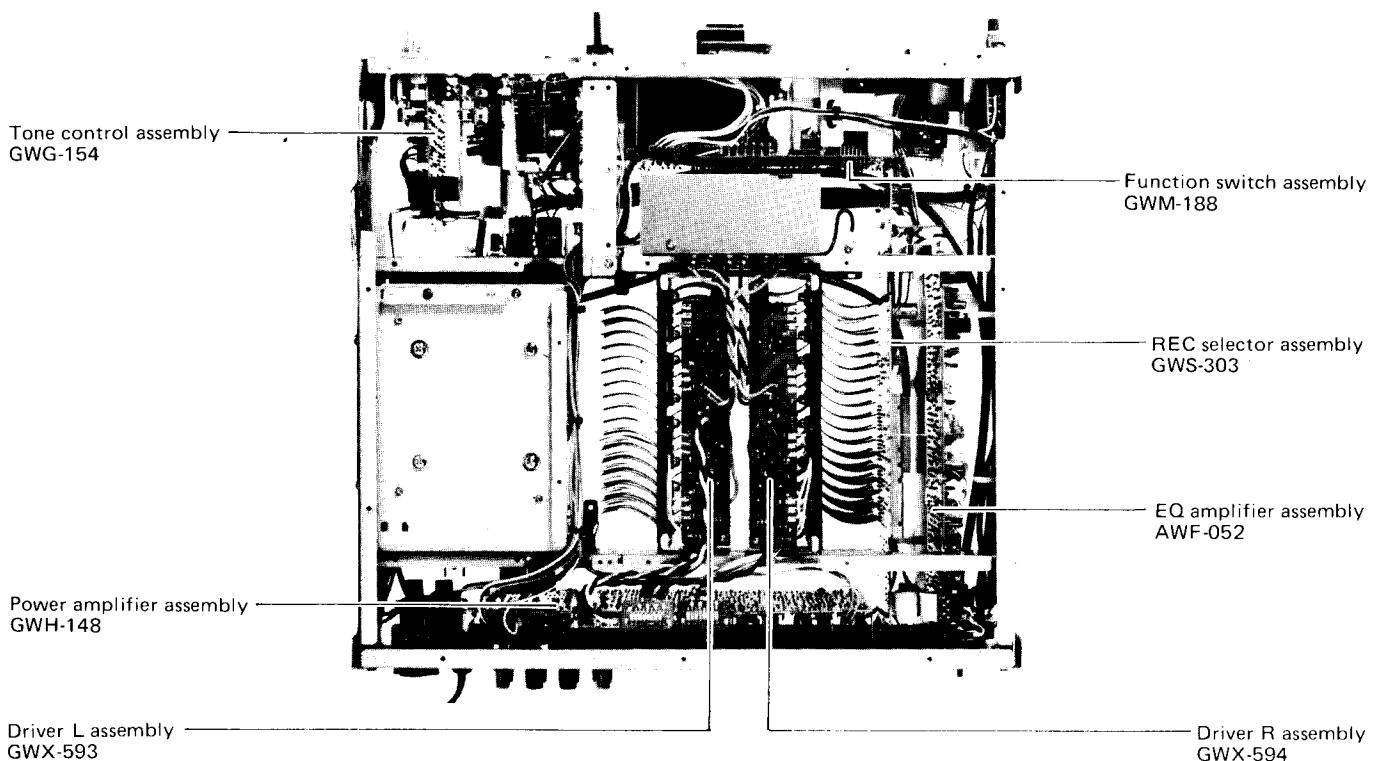
Power GWH-

Driver GWX-1

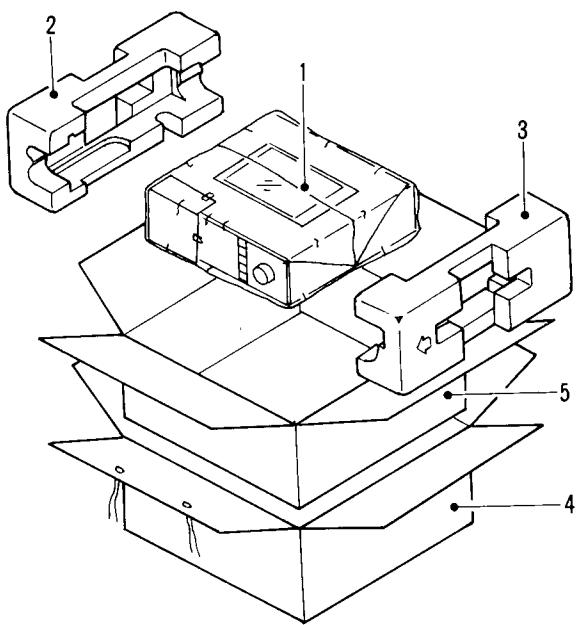
Top View



Bottom View



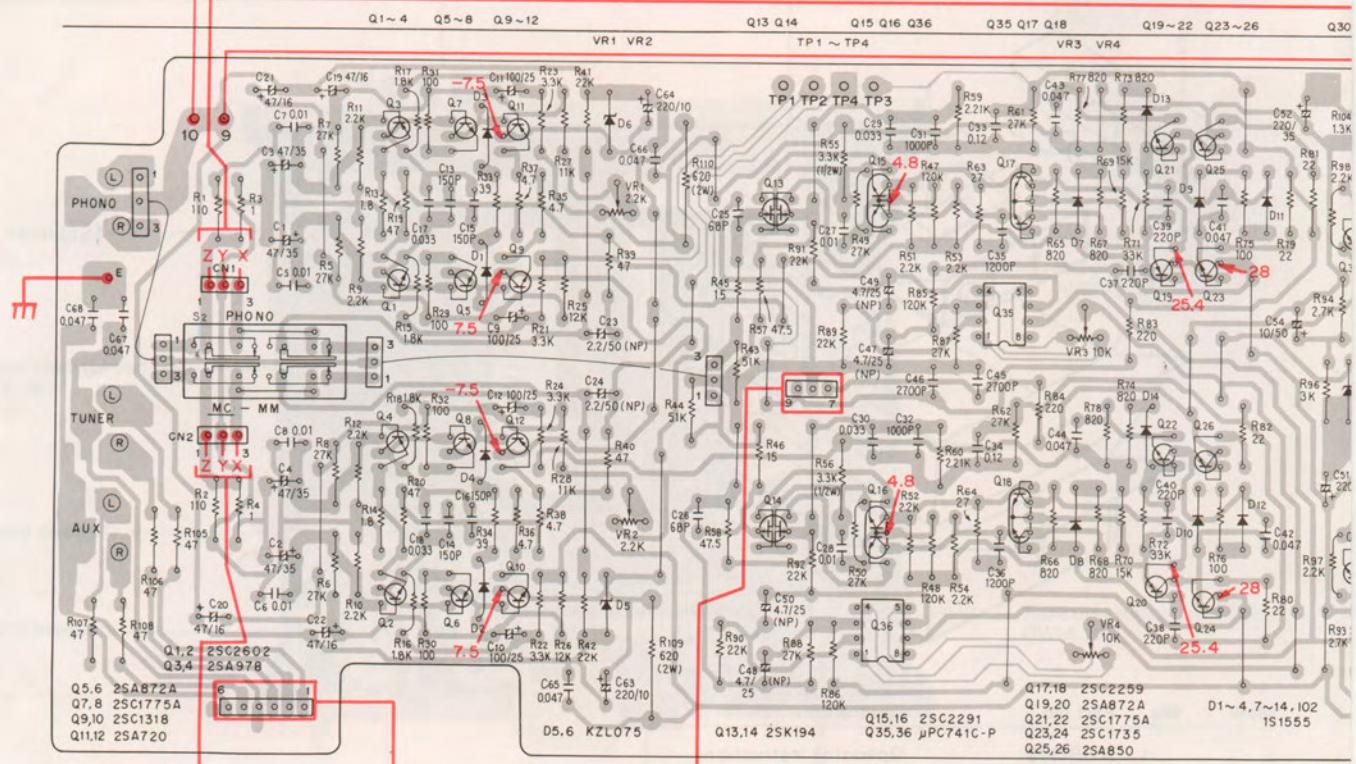
6. PACKING



Mark	No.	Part No.	Description
1.	ARB-399		Operating instructions (English)
	ARD-156		Operating instructions (German/French/Italian, HE type only)
2.	AHA-279		Side pad L
3.	AHA-280		Side pad R
4.	AHD-874		Packing case
5.	AHC-063		Inside packing

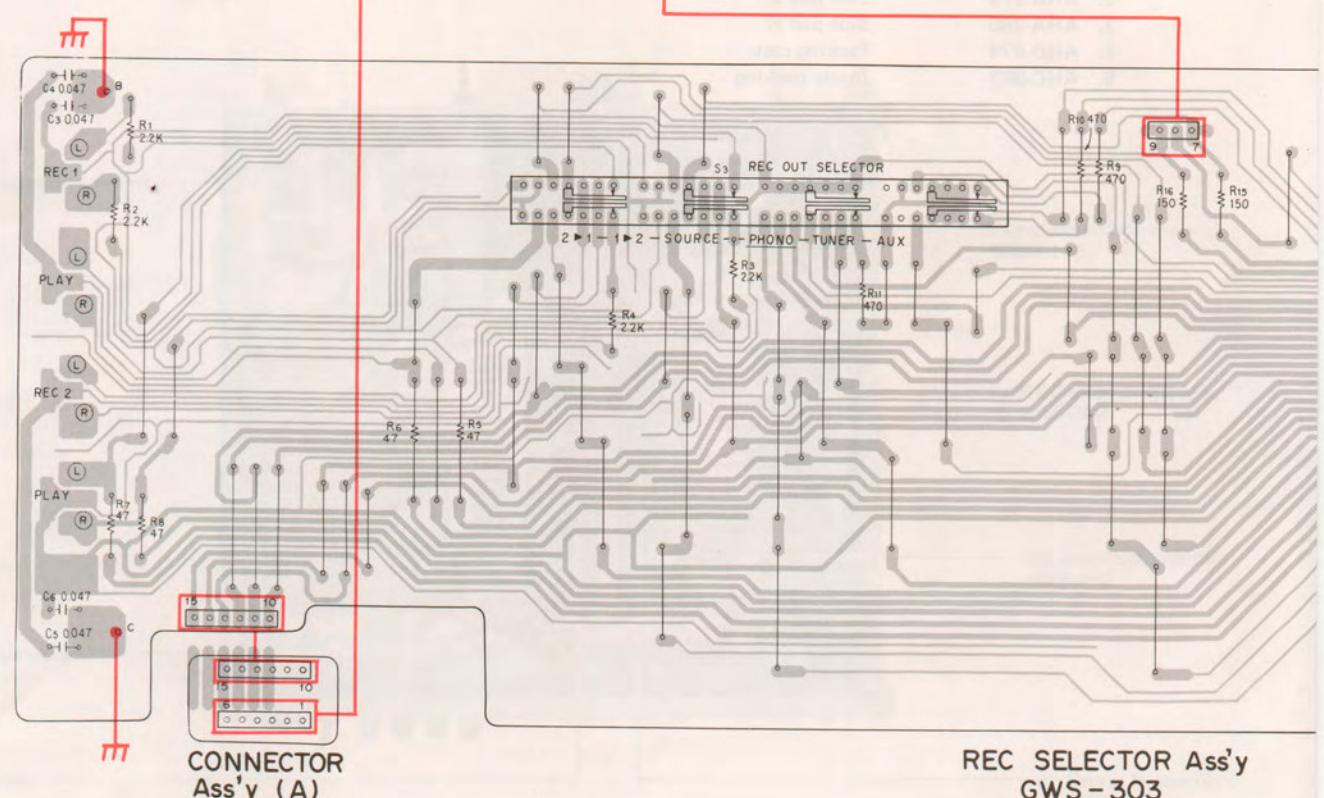
7. P.C. BOARDS CONNECTION DIAGRAM

EQUALIZER AMP Ass'y
AWF-052



Q5,6 2SAB72A	6	1							
Q7,8 2SC1775A									
Q9,10 2SC1318									
Q11,12 2SA720									
00476	220/10		25	R86 120K		Q17,18 2SC2259			
D5.6 KZL075						Q19,20 2SA872A			D1~4,7
						Q15,16 2SC2291			
						Q35,36 μ PC741C-P			
						Q23,24 2SC1735			
						Q25,26 2SA850			

Q



REC SELECTOR Ass'y
GWS-303

13

1

2

2

146.

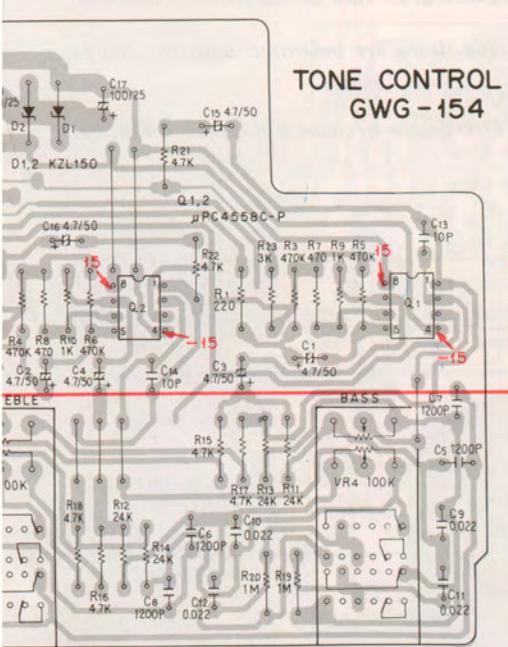
1

Temporary

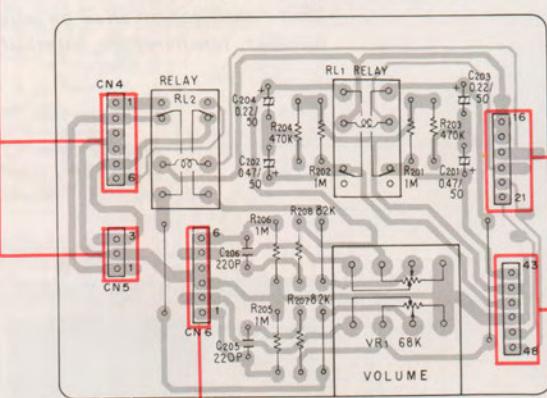
1

Printed in Japan

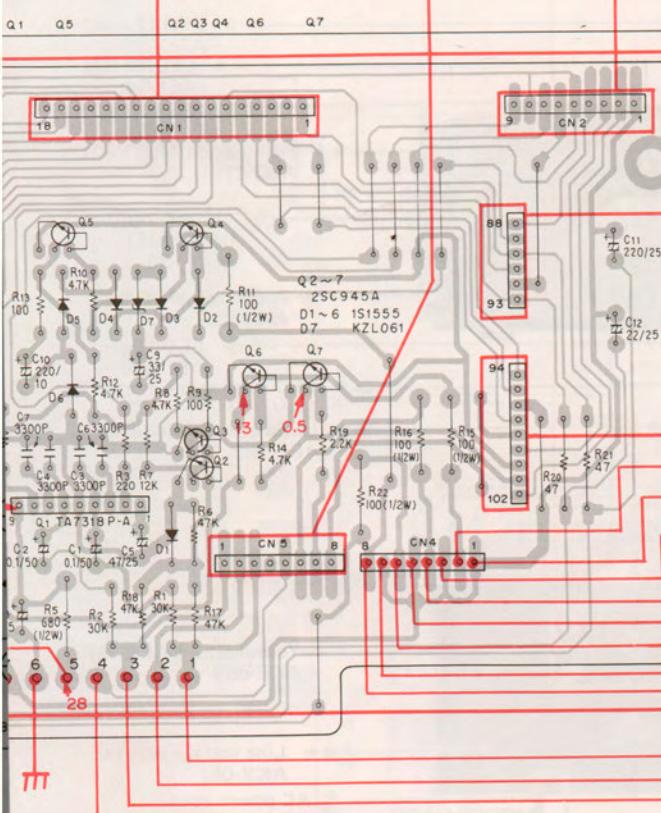
TONE CONTROL Ass'y
GWG-154



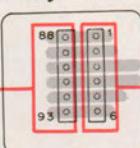
VOLUME CONTROL Ass'y



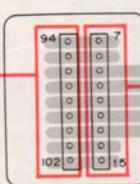
SW1



CONNECTOR
Ass'y (D)



CONNECTOR
Ass'y (E)

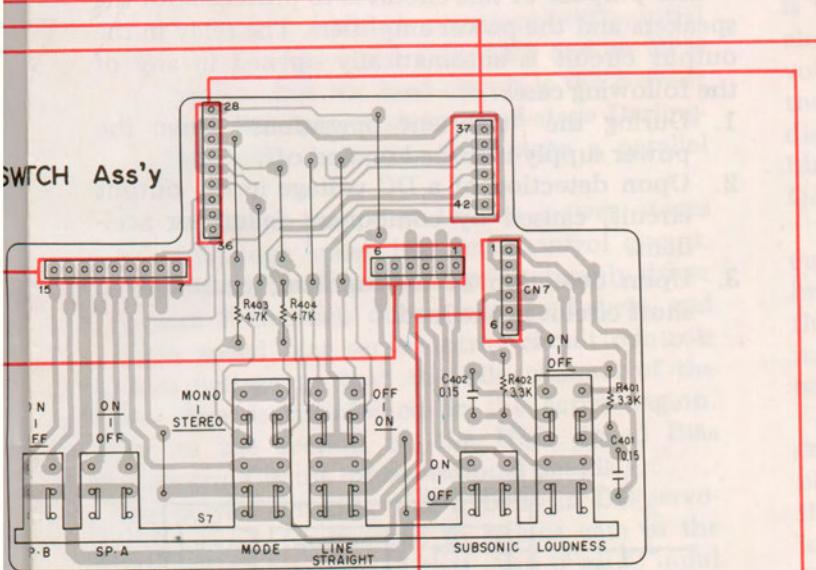


PL1 ~ 4: LAMP Ass'y
8V 50mA

CONNECTOR
Ass'y (F)

→ A
→ B
→ C

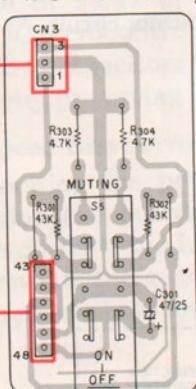
A



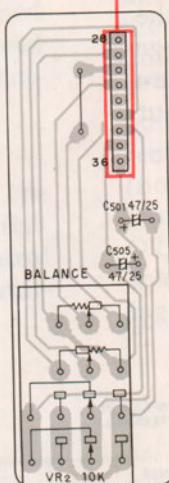
B

→ D
→ E
→ F
→ G

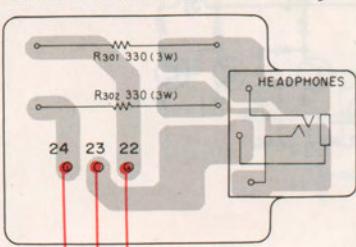
FM MUTING Ass'y



C



HEADPHONES JACK Ass'y



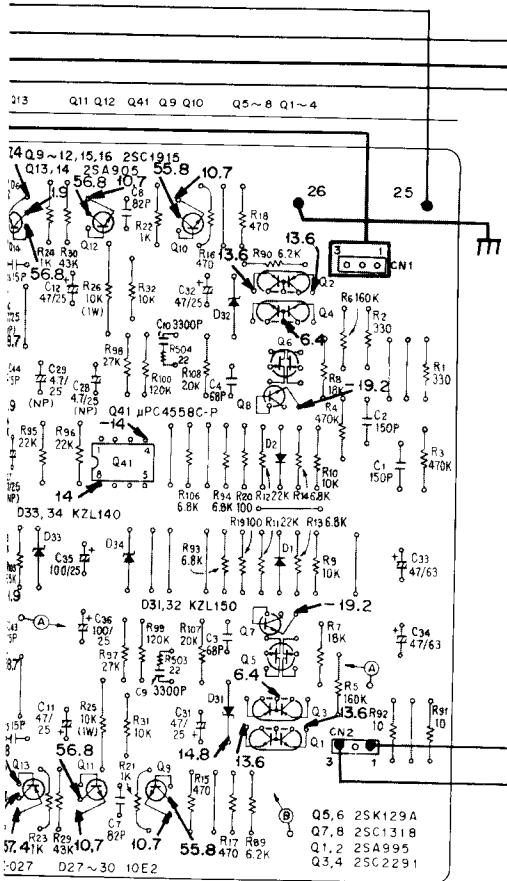
D

→ H
→ I

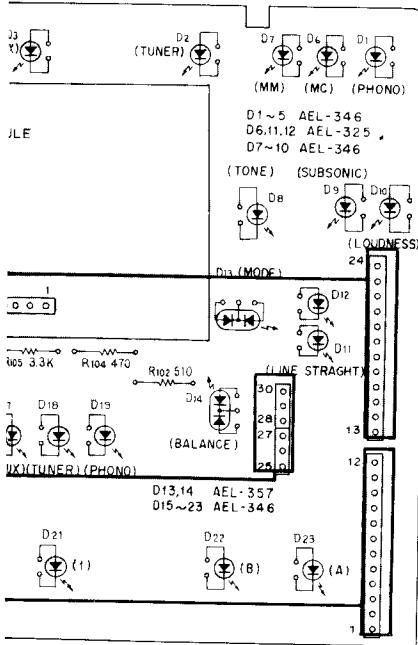
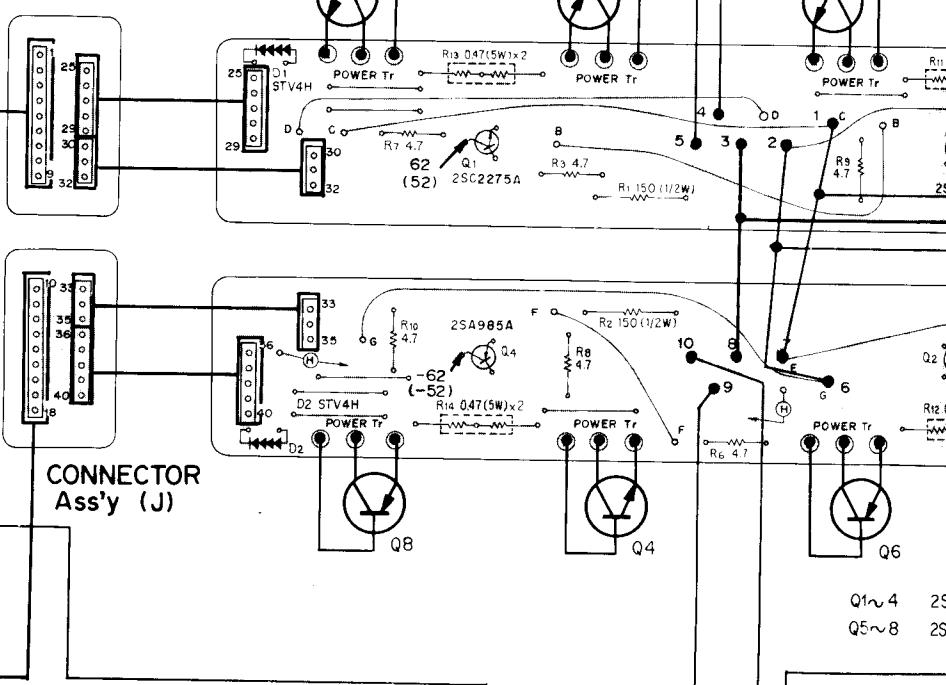
4

5

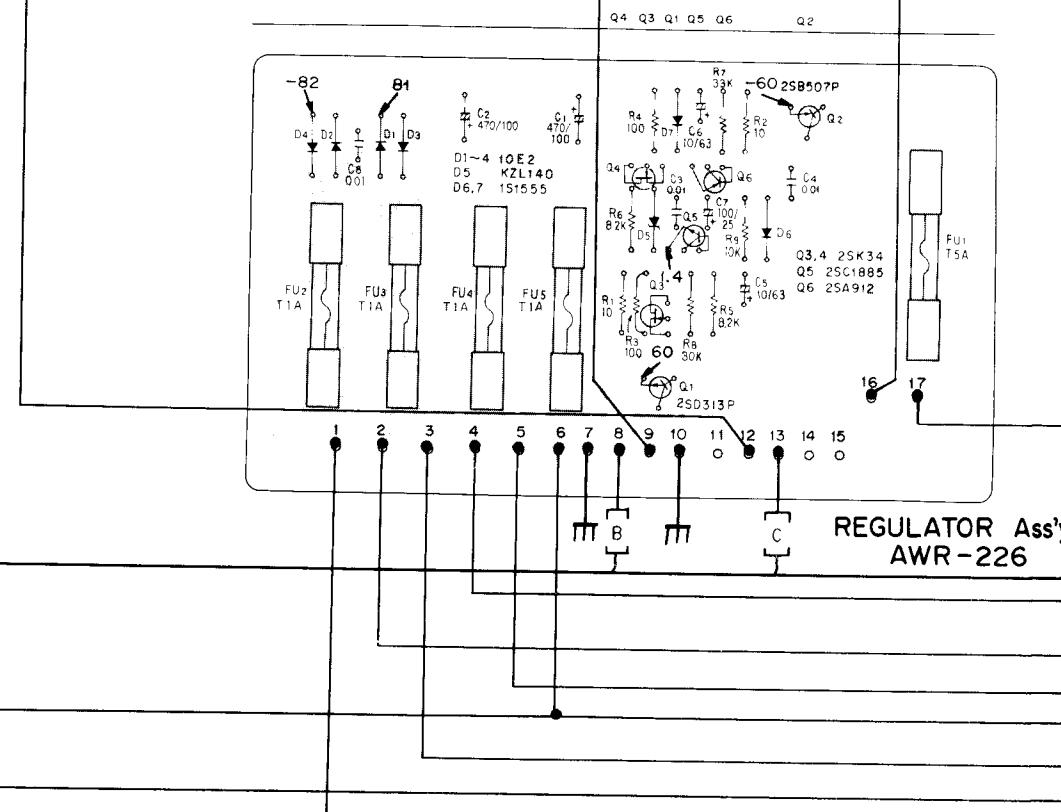
6



**CONNECTOR
Ass'y (1)**



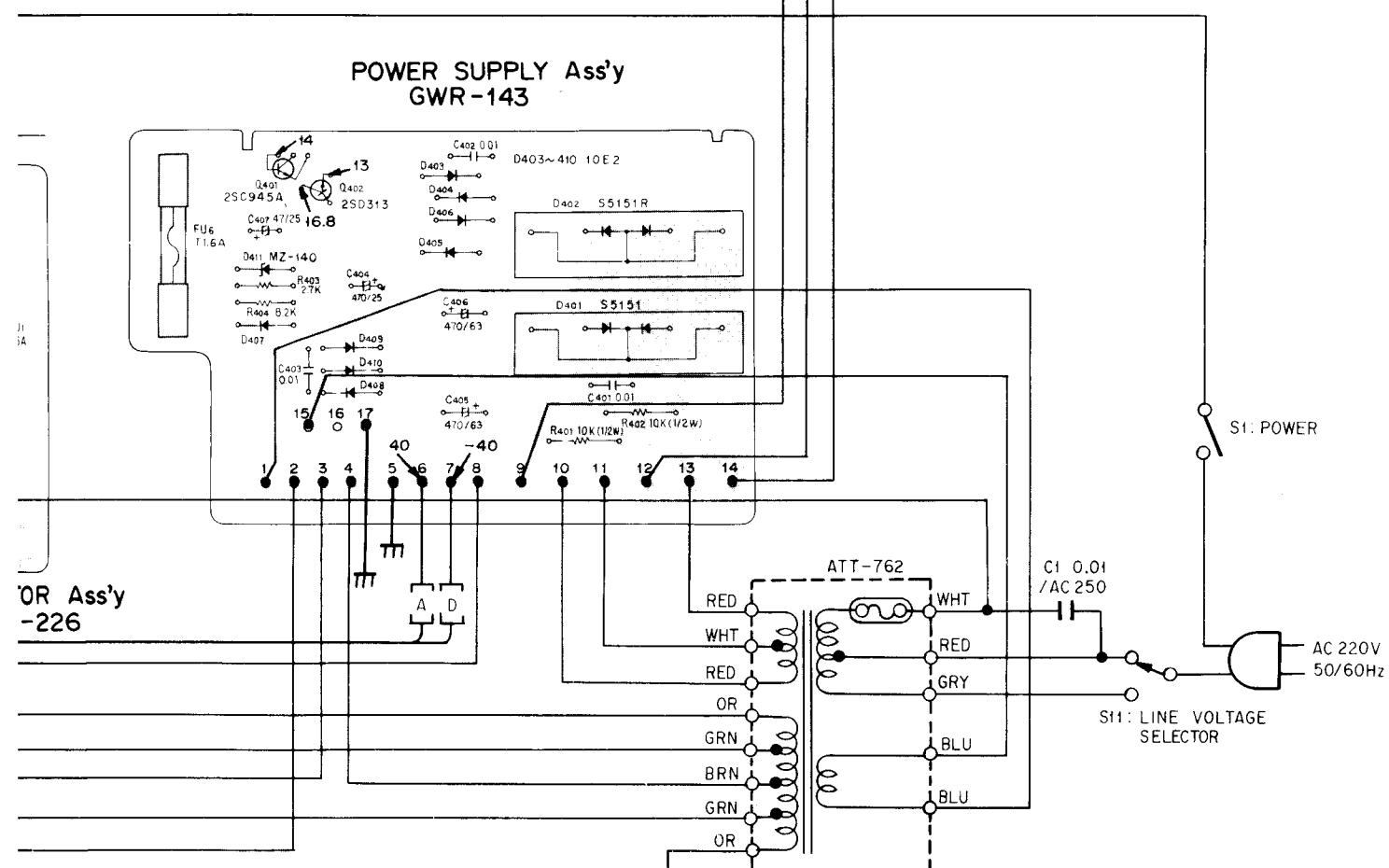
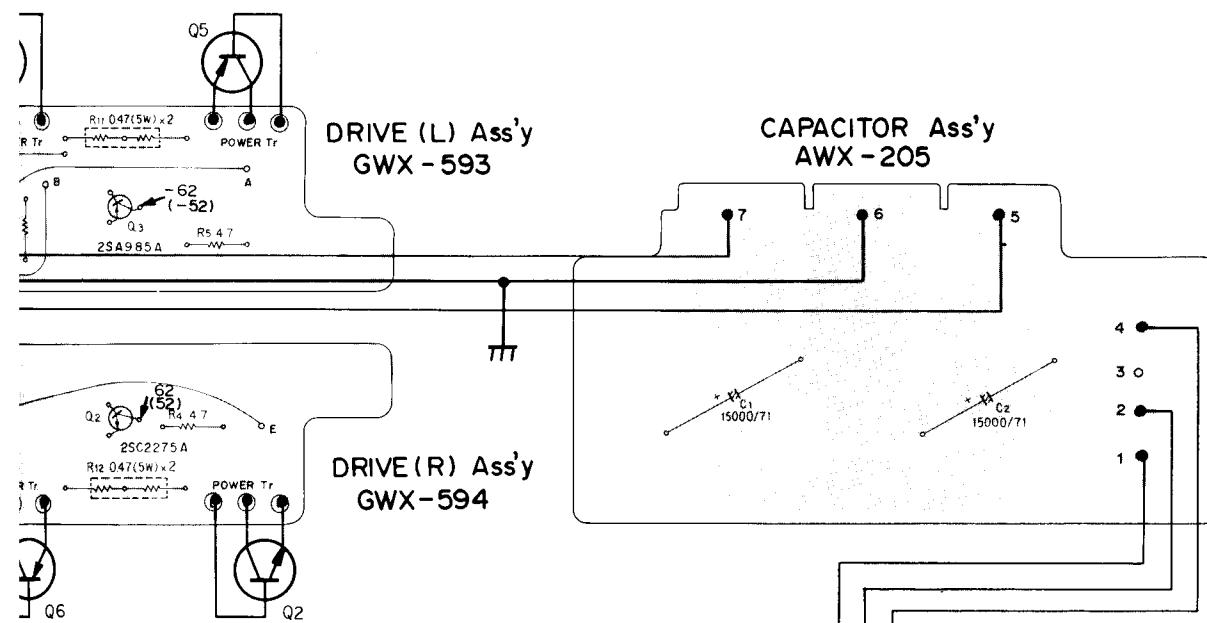
CONNECTOR Ass'y (J)



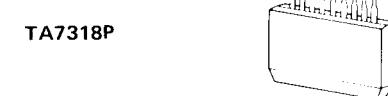
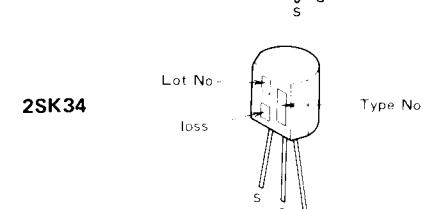
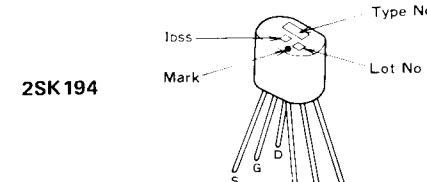
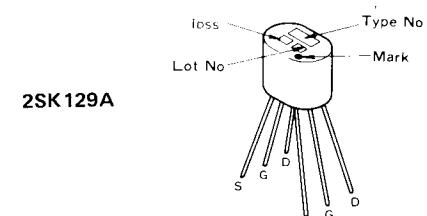
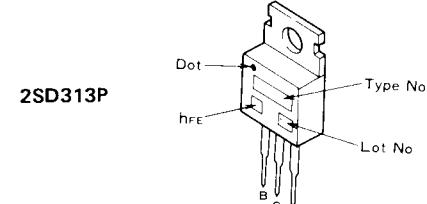
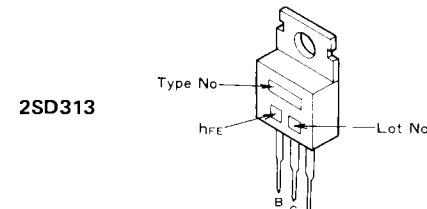
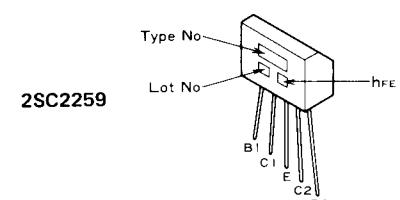
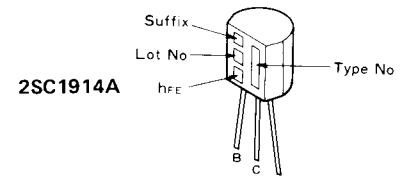
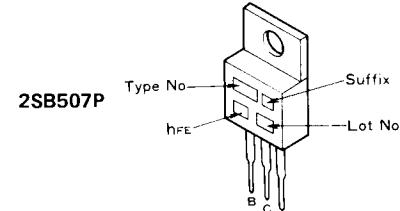
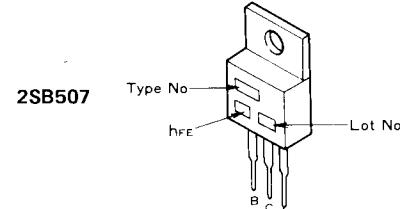
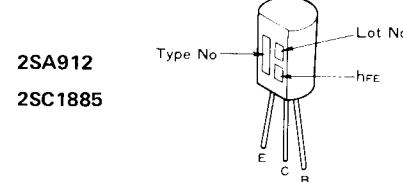
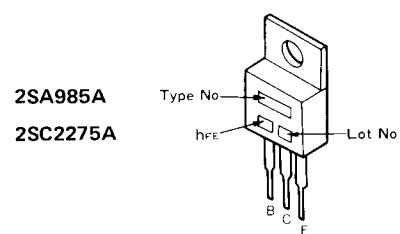
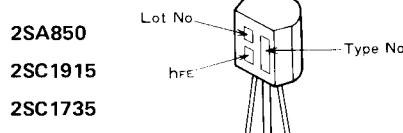
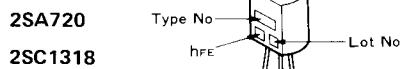
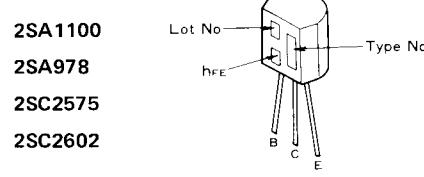
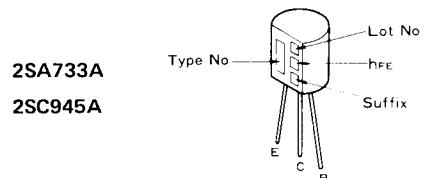
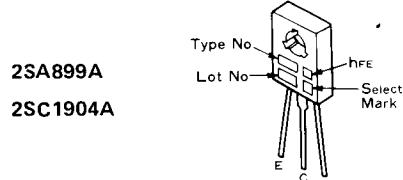
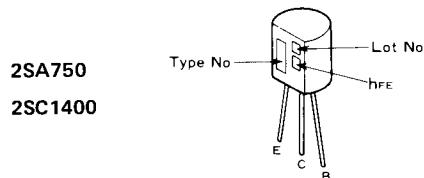
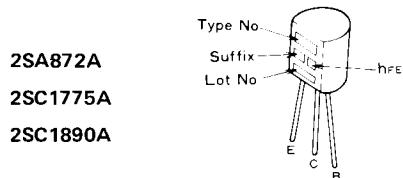
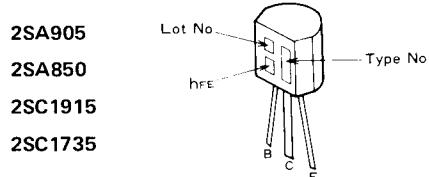
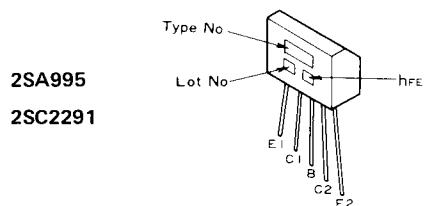
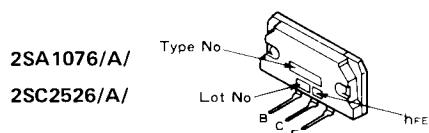
4

5

6



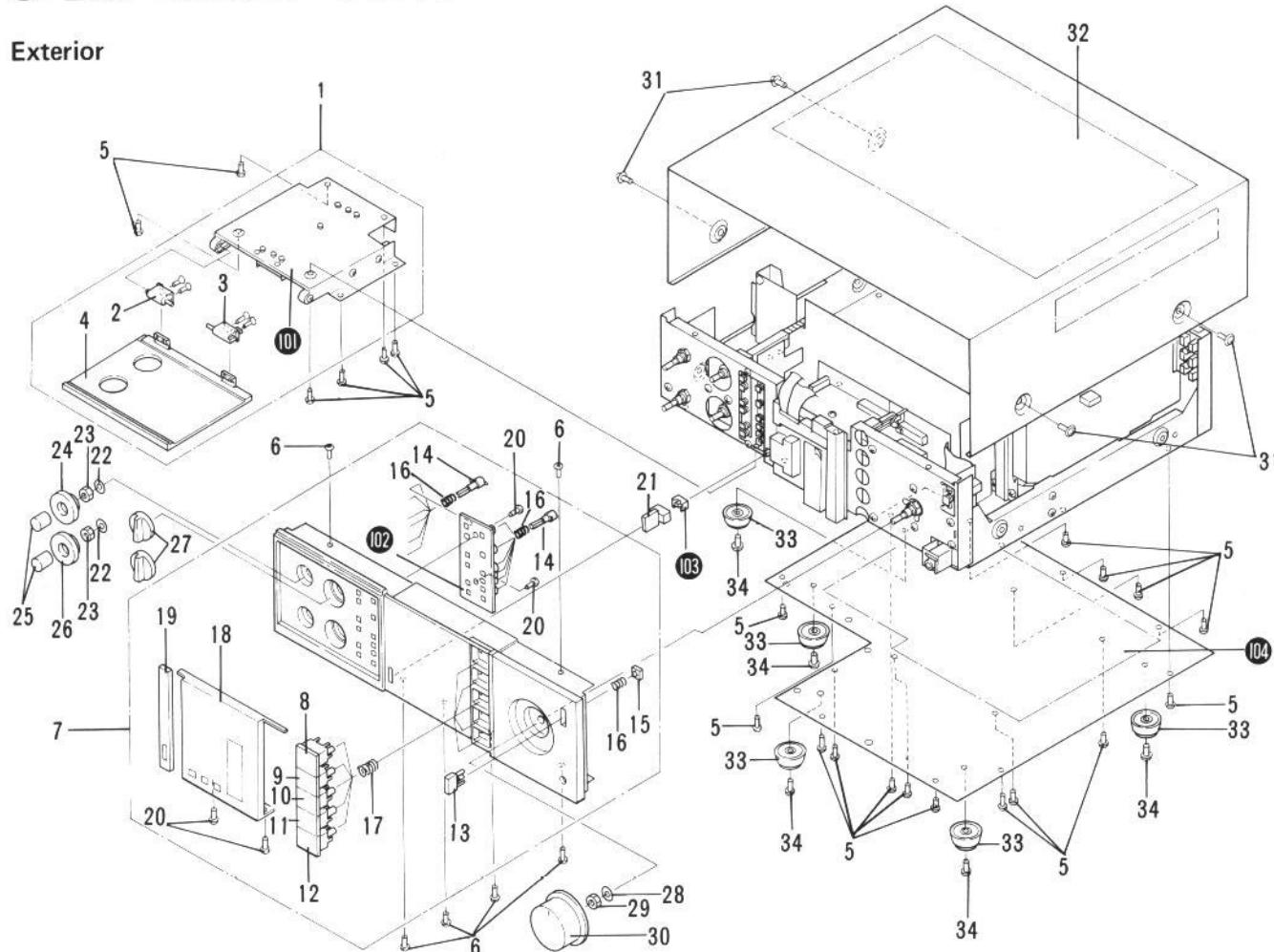
External Appearance of Transistors and ICs



D

8. EXPLODED VIEW

Exterior



Exterior Components

Mark	No.	Part No.	Description	Mark	No.	Part No.	Description
1.	AXC-003		Door mechanism assembly	21.	AAD-338		Knob(POWER)
2.	ANR-340		Hinge L	22.	WAX1F160U050		Washer 11φ
3.	ANR-341		Hinge R	23.	NKX1FUC		Nut M11
4.	ANB-977		Door assembly	24.	AAB-262		Knob(5k/2.5k)
5.	VBZ30P060FMC		Screw 3x6	25.	AAB-261		Knob(BASS, TREBLE)
6.	VBZ30P080FMC		Screw 3x8	26.	AAB-263		Knob(200/400)
7.	ANB-984		Front panel assembly	27.	AAB-260		Knob(BALANCE, REC OUT SELECTOR)
8.	AAD-346		Knob(PHONO)	28.	WA92F140U100		Washer 9.2φ
9.	AAD-347		Knob(TUNER)	29.	NK90FUC		Nut M9
10.	AAD-348		Knob(AUX)	30.	AAB-258		Knob(VOLUME)
11.	AAD-349		Knob(TAPE 1)	31.	ABA-193		Screw
12.	AAD-350		Knob(TAPE 2)	32.	ANE-333		Top cover
13.	AAD-339		Knob(MUTING)	33.	AEC-083		Cabinet bumper
14.	AAD-340		Push knob C	34.	VTZ40P120FMC		Screw 4x12
15.	AEC-564		Knob holder				
16.	ABH-045		Coiled spring	101.			Door holder
17.	ABH-069		Coiled spring	102.			Knob spacer
18.	ANR-334		Display cover	103.			Flexible ring
19.	ANR-332		Center pillar	104.			Bottom plate
20.	VBZ30P080FZK		Screw 3x8				

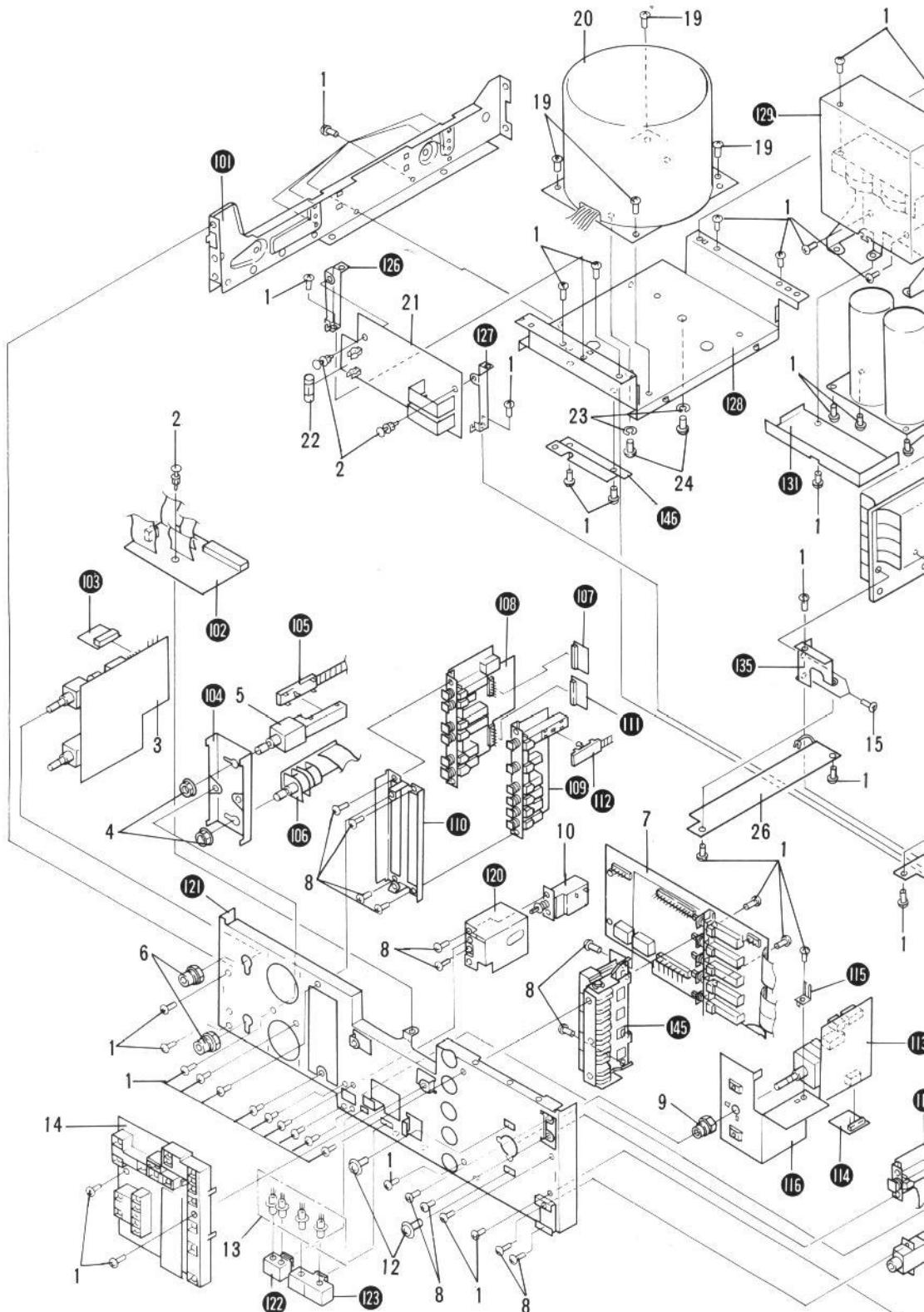
NOTES:

- 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.

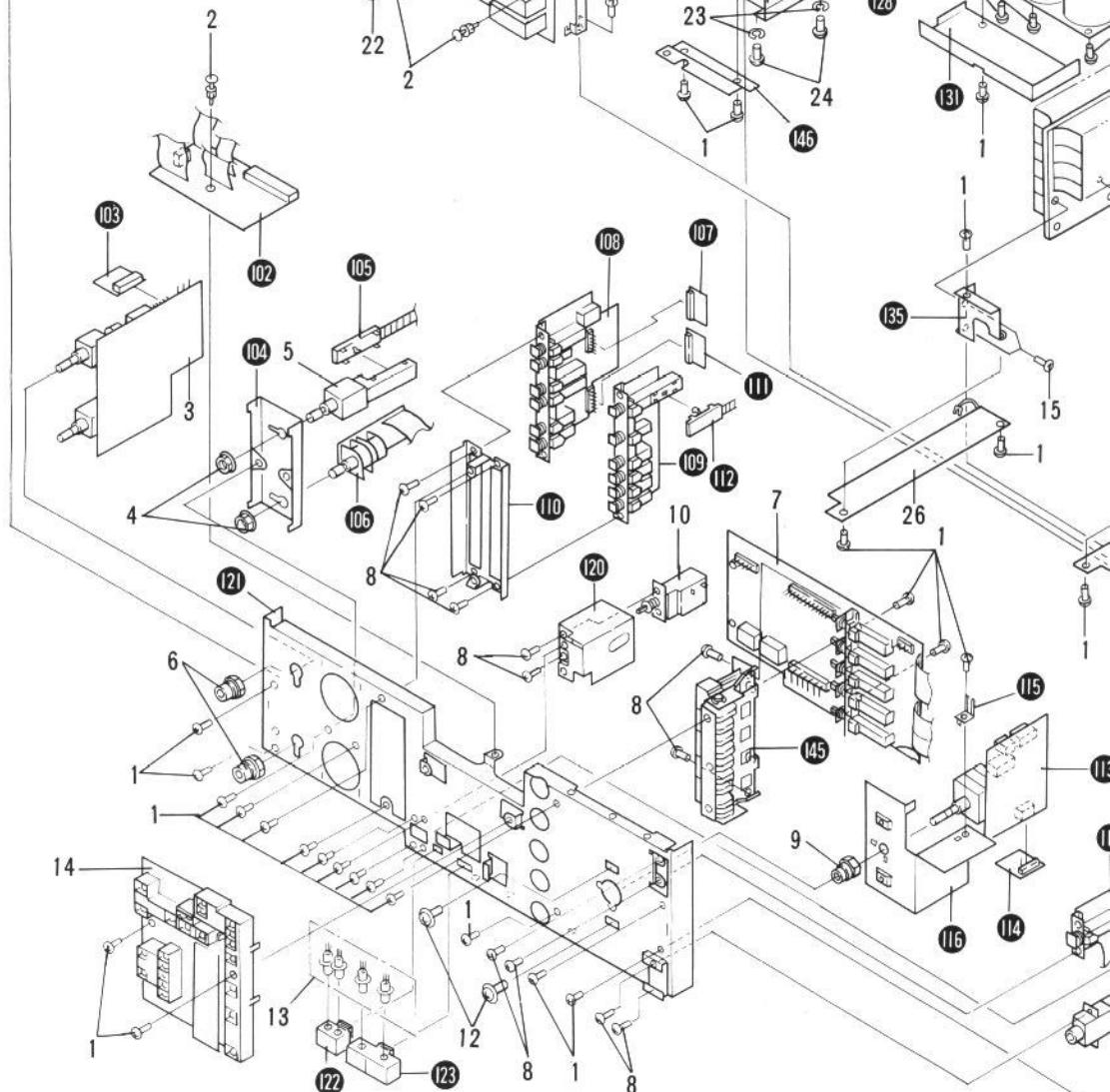
Interior Components

Mark	No.	Part No.	Description	Mark	No.	Part No.	Description
 ★★	1.	VBZ30P060FMC	Screw 3x6		101.		Side frame L
	2.	AEC-352	Nylon rivet		102.		Connector assembly
	3.	GWG-154	Tone control assembly		103.		Connector assembly
	4.	ABN-048	Washerfaced nut		104.		Holder
	5.	ASX-154	Remote rotary switch		105.		Remote belt
 ★★	6.	ABN-066	Union nut		106.		Balance control assembly
	7.	GWM-188	Function switch assembly		107.		Connector E assembly
	8.	ABA-261	Screw		108.		Switch assembly
	9.	ABN-046	Union nut		109.		Load selector assembly
	10.	ASG-535	Push switch(POWER)		110.		Holder
 ★★	11.	BBT30P080FZK	Screw 3x8		111.		Connector D assembly
	12.	ABA-214	Screw		112.		Remote belt
	13.	AEL-153	Lamp assembly(4 lamps)		113.		Volume control assembly
	14.	GWX-585	Indicator assembly		114.		Connector C assembly
	15.	VBZ30P080FMC	Screw 3x8		115.		Ground terminal 2-P
 ★★	16.	AWR-226	Regulator assembly		116.		Slide plate
	17.	AEK-015	Fuse(T5A250V)		117.		Sub-frame
	18.	AEK-402	Fuse(T1A250V)		118.		AF muting assembly
	19.	VTZ40P080FMC	Screw 4x8		119.		Headphones jack assembly
	20.	ATT-762	Power transformer		120.		Switch holder
 ★★	21.	GWR-143	Power supply assembly		121.		Panel stay
	22.	AEK-405	Fuse(T1.6A250V)		122.		Lamp holder A
	23.	WS50FMC	Spring washer 5φ		123.		Lamp holder B
	24.	ABA-100	Screw 5x12		124.		P.C.B. holder B
	25.	AWX-205	Capacitors assembly		125.		P.C.B. holder C
 ★★	26.	GWX-593	Driver L assembly		126.		P.C.B. holder D
	27.	GWX-594	Driver R assembly		127.		P.C.B. holder E
	28.	ABA-258	Screw		128.		Transformer frame
	29.	2SA1076/A-/B*	*hfe should have the same value.		129.		Shield cover A
	(2SA1076/A-/G*)				130.		Capacitors holder
 ★★	30.	2SC2526/A-/B*	*hfe should have the same value.		131.		Shield cover B
	(2SC2526/A-/G*)				132.		Wire saddle
	31.	AEC-488	Insulator wafer		133.		Center frame
	32.	GWS-303	REC selector assembly		134.		Heat sink
	33.	AWF-052	EQ amplifier assembly		135.		Holder A
 ★★	34.	GWH-148	Power amplifier assembly		136.		Holder B
	35.	AKX-057	Line voltage selector		137.		Clamp plate
	36.	VBZ30P120FMC	Screw 3x12		138.		Connector A assembly
	37.	AEC-327	Strain relief		139.		Connector B assembly
	38.	ADG-041	AC power cord(for HE type)		140.		P.C.B. holder A
 ★★	39.	ADG-051	AC power cord(for HB type)		141.		Shield plate
	40.	WG70FMC	Locking washer		142.		Connector assembly
		B71-010	Nut M7				

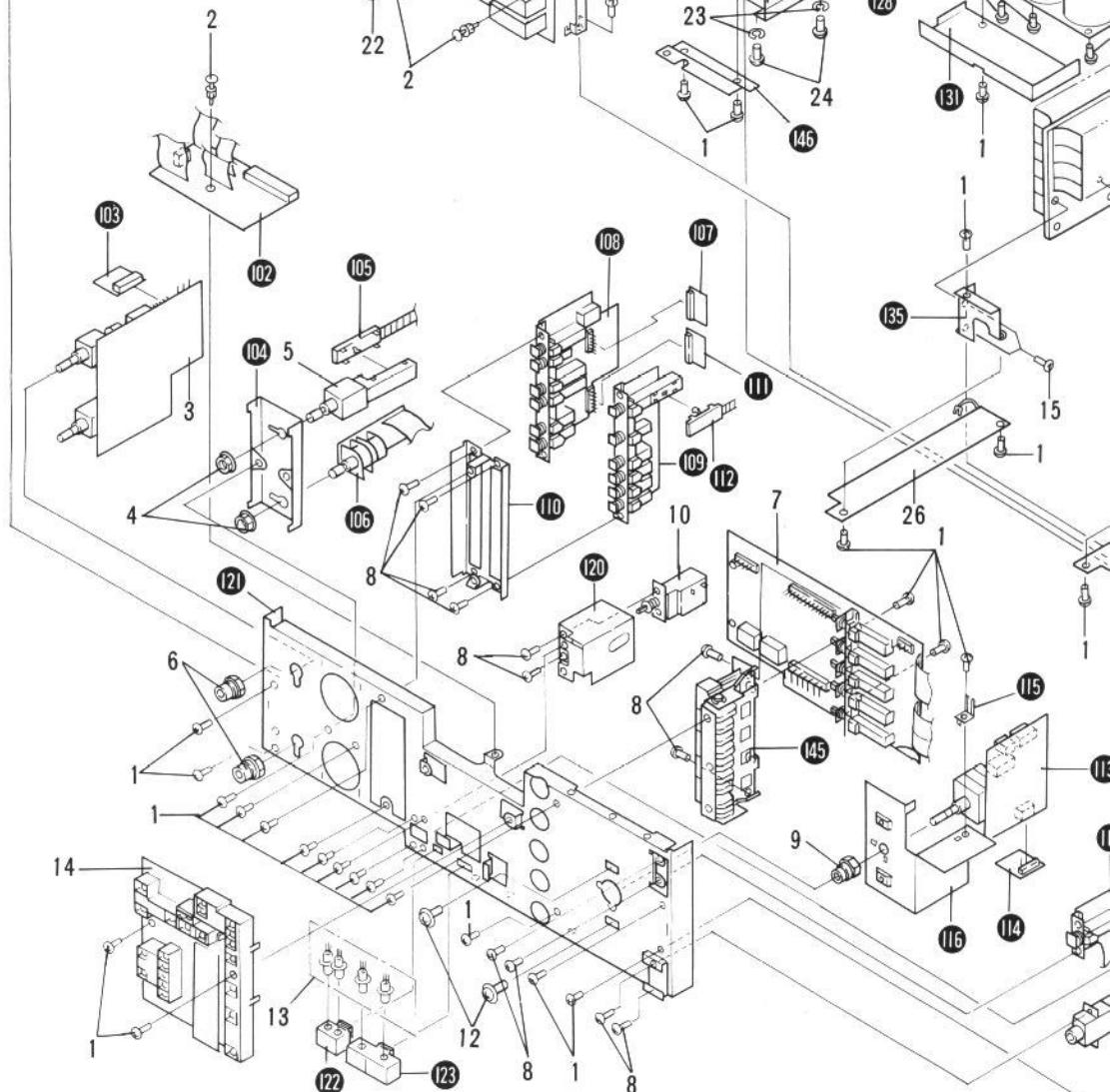
A



B

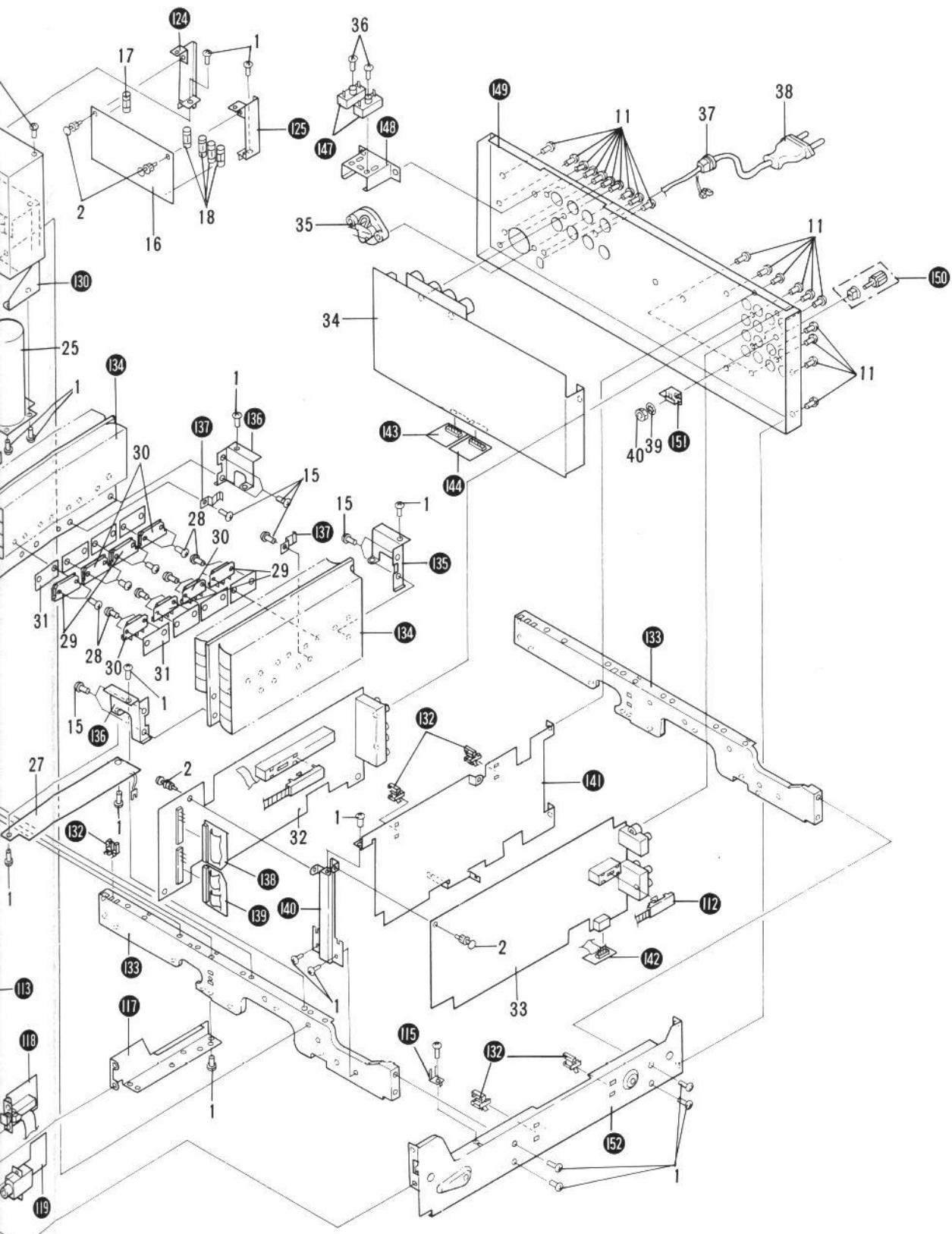


C



D

Mark	No.	Part No.	Description	Mark	No.	Part No.	Description
	143.		Connector assembly		148.		Shelf
	144.		Connector assembly		149.		Rear panel
	145.		Lever assembly		150.		Terminal(GND)
	146.		Plate		151.		Grounding plate
	147.		Terminal strip 2-P		152.		Side frame R



A

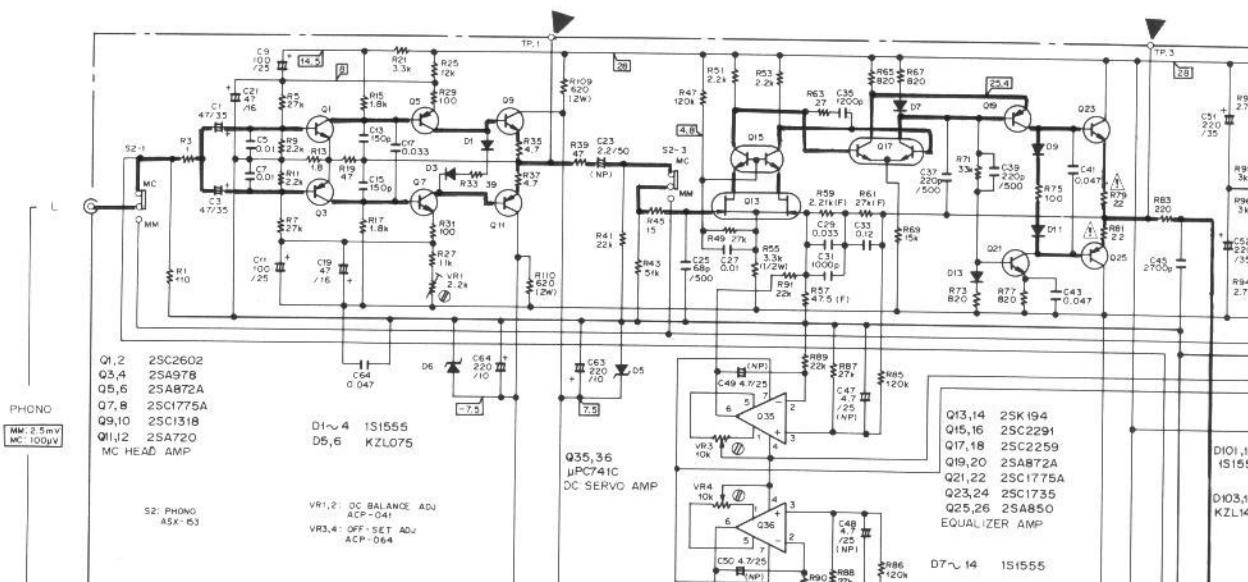
B

C

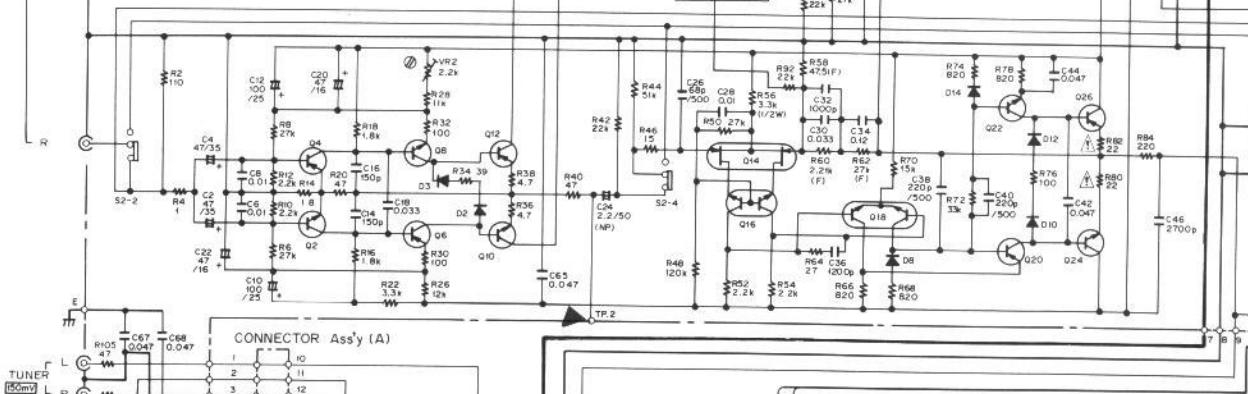
D

9. SCHEMATIC DIAGRAM

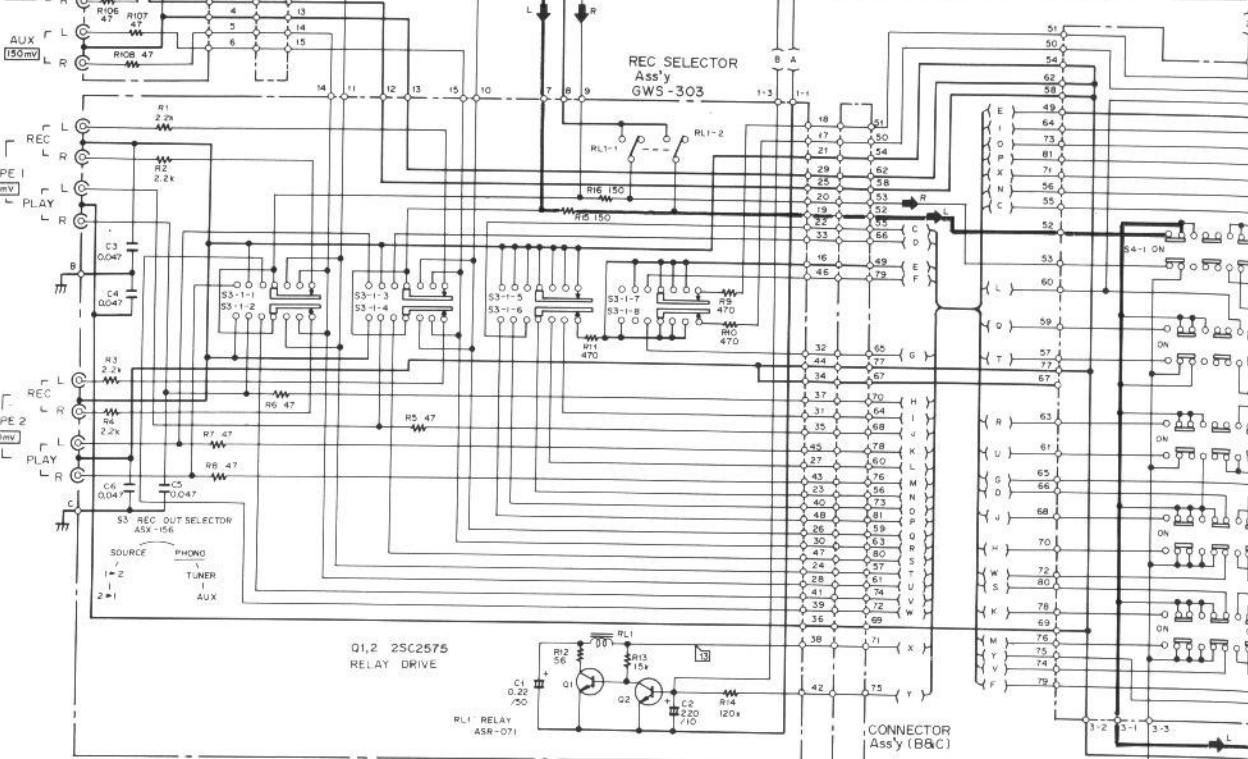
A



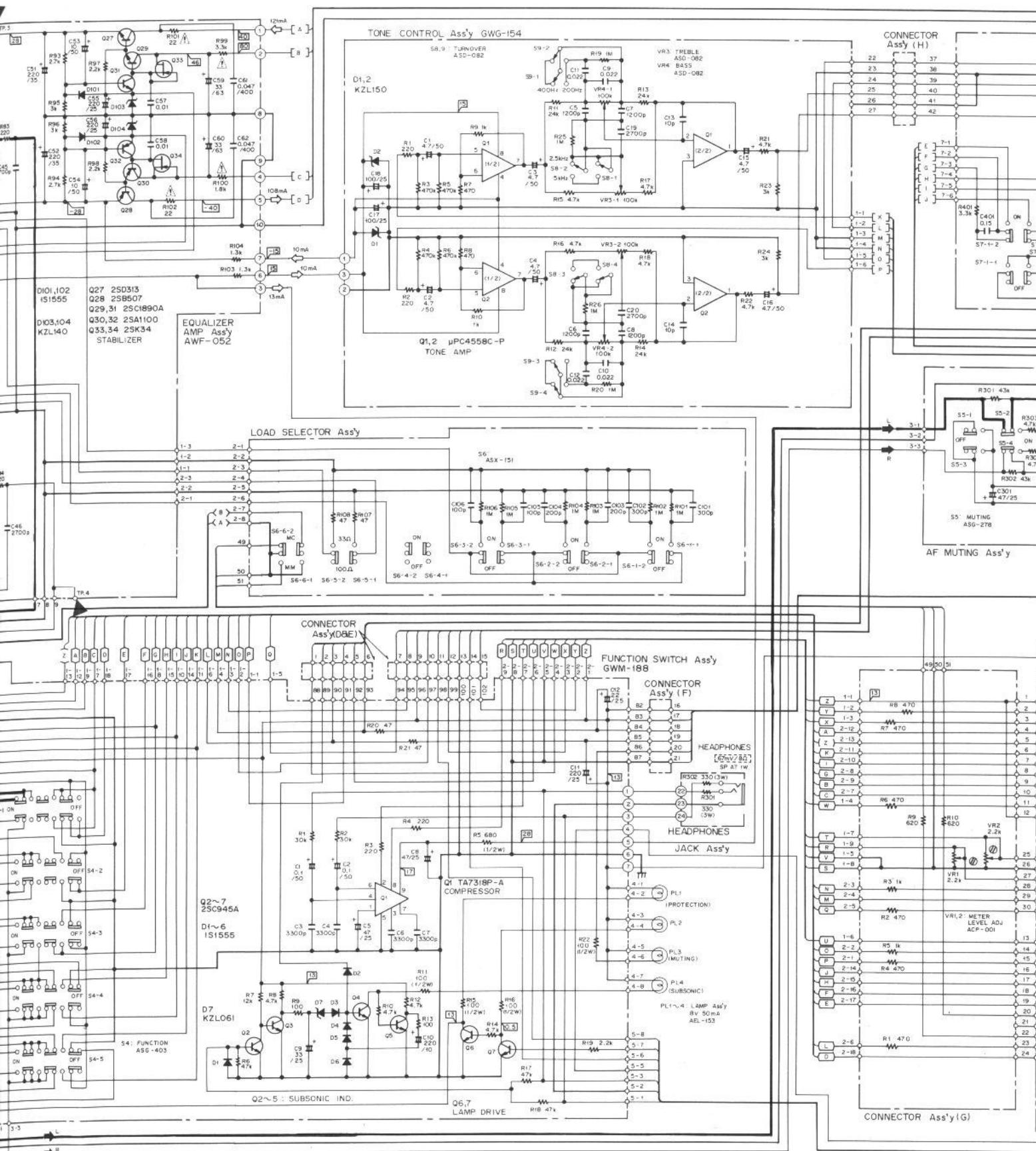
B

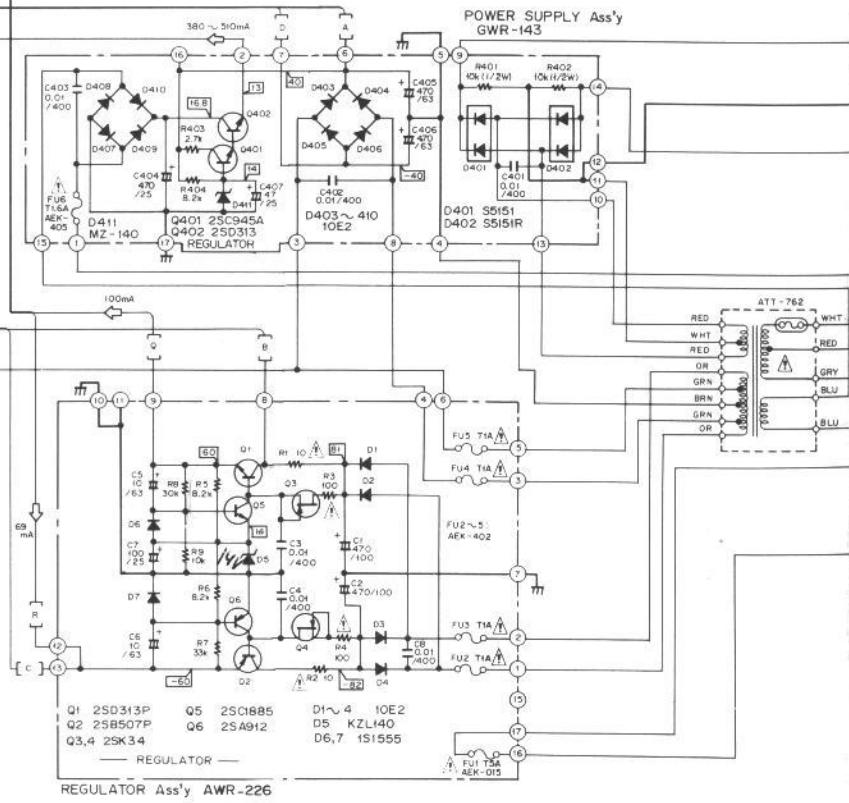
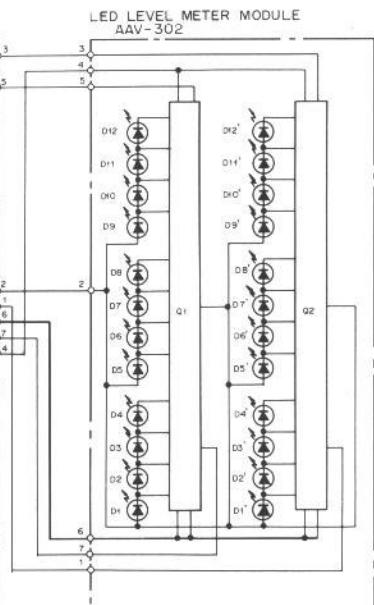
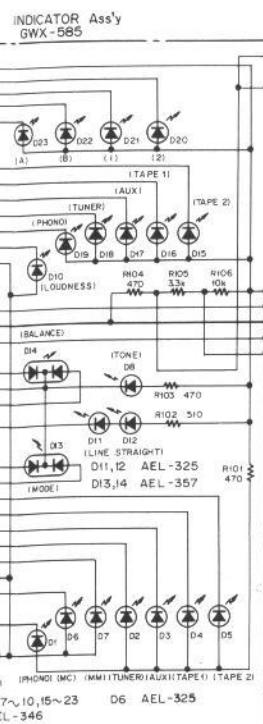
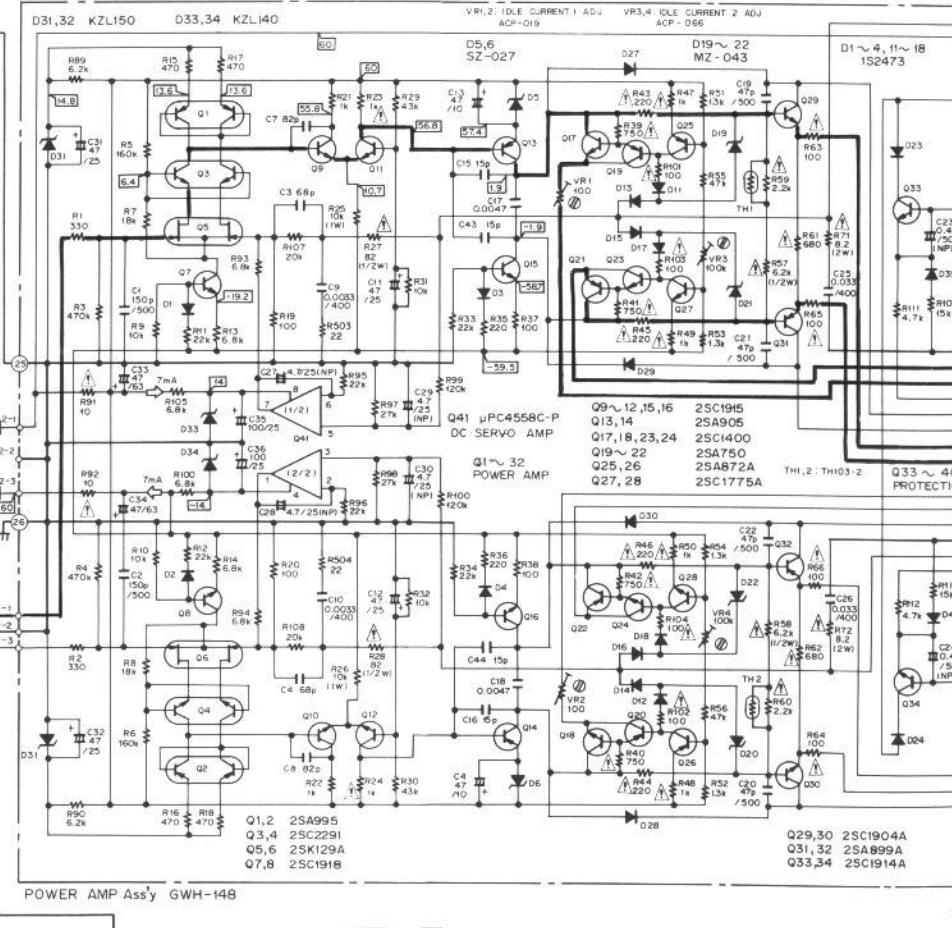
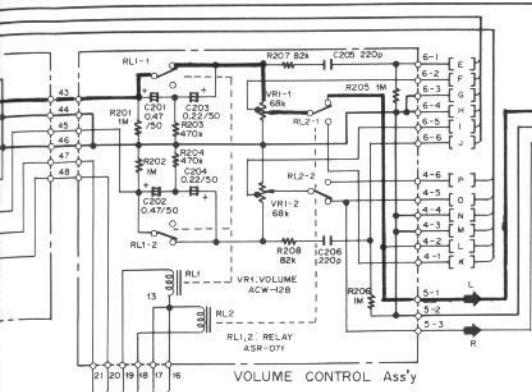
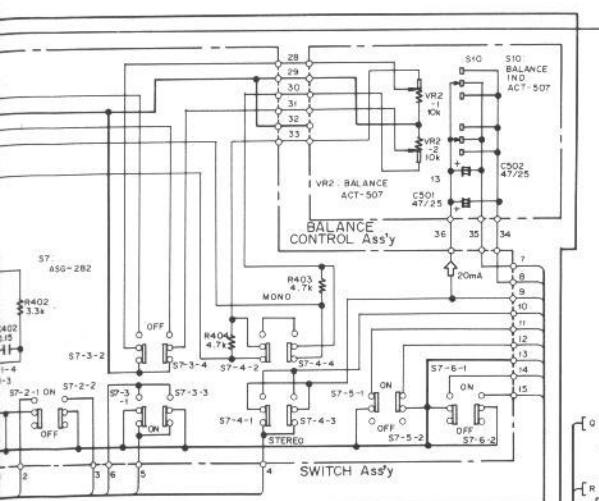


C



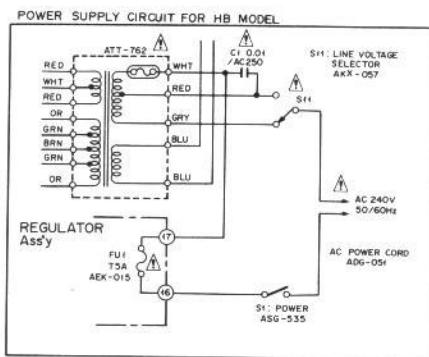
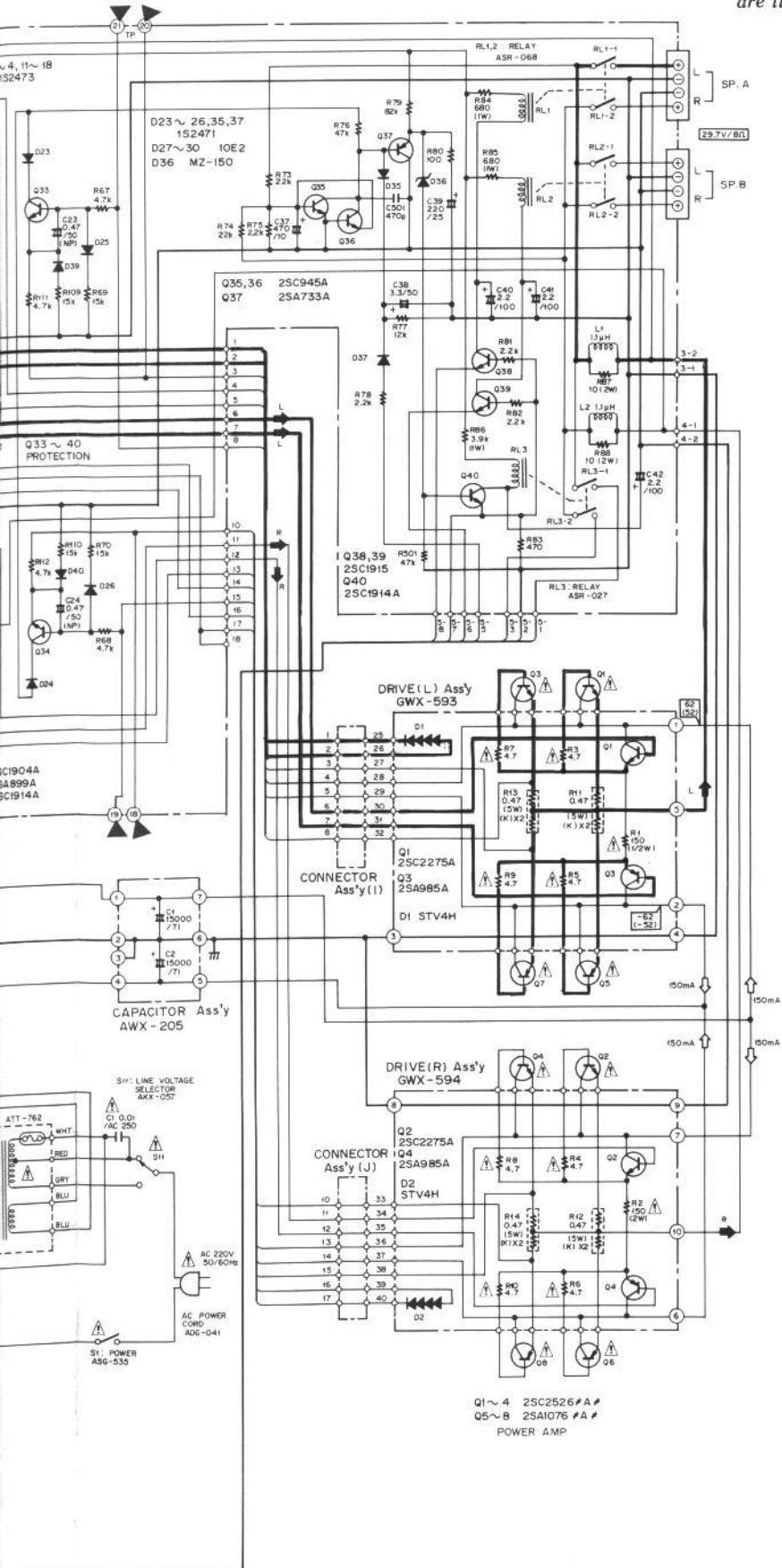
D





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 (), $\pm 5\%$ tolerance unless otherwise noted k : k₁, M : M₁, (F) : $\pm 1\%$, (G) : $\pm 2\%$, (K) : $\pm 10\%$, (M) : $\pm 20\%$ tolerance

2. CAPACITORS:

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

3 VOLTAGE, CURRENT

Signal voltage at 110 W + 110 W 8:1 output (1kHz)
 DC voltage (V) at no input signal
 Value in <input type="text"/> is DC voltage at rated power
 mA DC current at no input signal

4. OTHERS:

→ Signal route

The mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing,

SWITCHES

S1 : POWER	ON - OFF
S2 : PHONO (SIGNAL)	MC - MM
S3 : REC OUT SELECTOR 2-1 → 1-2 → SOURCE	PHONO - TUNER - AL
S4-1 : FUNCTION (PHONE)	ON - OFF
S4-2 : FUNCTION (TUNER)	ON - OFF
S4-3 : FUNCTION (AUX)	ON - OFF
S4-4 : FUNCTION (TAPE II)	ON - OFF
S4-5 : FUNCTION (TAPE II)	ON - OFF
S5 : MUTING (-20dB)	ON - OFF
S6-1 : MM LOAD (1400p)	ON - OFF
S6-2 : MM LOAD (300p)	ON - OFF
S6-3 : MM LOAD (200p)	ON - OFF
S6-4 : MM LOAD (100p)	ON - OFF
S6-5 : MC LOAD	100Ω - 33Ω
S6-6 : PHONE (IND)	MC - MM
S7-1 : LOUDNESS	ON - OFF
S7-2 : SUBSONIC FILTER (15Hz)	ON - OFF
S7-3 : LINE STRAIGHT	ON - OFF
S7-4 : MODE	STEREO - MONO
S7-5 : SPEAKERS (A)	ON - OFF
S7-6 : SPEAKERS (B)	ON - OFF
S8 : TURNOVER (TREBLE)	2.5kHz - 5kHz
S9 : TURNOVER (BASS)	400Hz - 200Hz
S10 : BALANCE (IND)	ON - OFF
S11 : LINE VOLTAGE SELECTOR	

220V - 240V

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

10. ELECTRICAL 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	56×10^1	561	RD $\frac{1}{4}$ PS	5 6 1 J
47kΩ	47×10^3	473	RD $\frac{1}{4}$ PS	4 7 3 J
0.5Ω	0R5		RN2H	0 R 5 K
1Ω	010		RS1P	0 1 0 K

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

5.62kΩ	562×100	5621	RN $\frac{1}{4}$ SR	5 6 2 1 F
--------	------------------	------	---------------------	-----------

- The **i** 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

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
A ★★	2SC2526/A-B*	Q1, Q3, Q5, Q7
(2SC2526/A-G*)		
A ★★	2SA1076/A-B*	Q2, Q4, Q6, Q8
(2SA1076/A-G*)		

*hfe of Q1-Q8 should have the same value.

OTHERS

Mark	Part No.	Symbol & Description
A ★	ATT-762	T1 Power transformer (220V/240V)
A	ACG-001	C1 Ceramic capacitor (0.01/AC250V)
★★	AEL-153	PL1 Lamp assembly
★★	ASG-535	S1 Push switch (POWER)
★★	AKX-057	S10 Line voltage selector
▲	ADG-041	AC power cord (for HE type)
▲	ADG-051	AC power cord (for HB type)

FUSES

Mark	Part No.	Symbol & Description
A ★★	AEK-015	FU1 (T5A250V)
A ★★	AEK-402	FU2-FU5 (T1A250V)
A ★★	AEK-405	FU6 (T1.6A250V)

Power Amplifier Assembly (GWH-148)

CAPACITORS

Mark	Part No.	Symbol & Description
GWH-148	Power amplifier assembly	ACF-015 C1, C2 Mica (150p/500V)
GWR-143	Power supply assembly	ACF-017 C19-C22 Mica (47p/500V)
GWG-154	Tone control assembly	CCDSL 680J 50 C3, C4
AWF-052	EQ amplifier assembly	CCDSL 820J 50 C7, C8
GWS-303	REC selector assembly	CCDSL 150J 50 C15, C16, C43, C44
GWM-188	Function switch assembly	CQMA 472J 50 C17, C18
GWX-585	Indicator assembly	CQMA 332K 400 C9, C10
AWX-205	Capacitors assembly	CQMA 333K 400 C25, C26
GWX-593	Driver L assembly	ACH-318 C27-C30 Electrolytic (4.7/25V, NP)
GWX-594	Driver R assembly	CEA 470M 25L C11, C12, C31, C32
AWR-226	Regulator assembly	CEA 470M 63L C33, C34
		CEA 101M 25L C35, C36
		CEA 470M 10L C13, C14
		CEA 471M 10L C37
		CEA 221M 25L C39
		CEA 2R2M 100L C40-C42
		CEA 3R3M 50L C38
		ACH-356 C23, C24 Electrolytic (0.47/50, NP)
		CKDYB 471K 50 C501

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
★	ACP-019	VR1, VR2 Semifixed (100-B)
★	ACP-066	VR3, VR4 Semifixed (100k-B)
A	RD%PMF □□□ J	R101-R104
A	RD%PMFL □□□ J	R23, R24, R39-R50, R59-R66, R91, R92
A	RD%PSF □□□ J	R27, R28, R57, R58
	RS1P □□□ J	R25, R26, R84-R86
	RS2P 100J	R87, R88
	RN2P 8R2K	R71, R72
	RD%PM □□□ J	R1, R2, R5-R22, R29-R38, R51-R56, R67-R70, R73-R83, R89, R90, R93-R100, R105-R112, R501, R503, R504
	RD%PM □□□ JNL	R3, R4

OTHERS

Mark	Part No.	Symbol & Description
★★	ASR-068	RL1, RL2 Relay
★★	ASR-027	RL3 Relay
	AKE-052	Terminal (SPEAKERS)
	PMZ30P060FMC	Screw 3x6
	VBZ30P060FMC	Screw 3x6

Power Supply Assembly (GWR-143)

CAPACITORS

Mark	Part No.	Symbol & Description
	CEA 471M 63L	C405, C406
	CEA 471M 25L	C404
	CEA 470M 25L	C407
	CQMA 103K 400	C401-C403

RESISTORS

Mark	Part No.	Symbol & Description
	RD%PM272J	R403
	RD%PM822J	R404
	RD%PS103J	R401, R402

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★★	2SA995	Q1, Q2
★★	2SC2291	Q3, Q4
★★	2SC1318	Q7, Q8
★★	2SC1915	Q9-Q12, Q15, Q16, Q38, Q39
★★	2SA905	Q13, Q14
★★	2SC1775A-E	Q27, Q28
★★	2SA872A-E	Q25, Q26
★★	2SC1400-E*	Q17, Q18, Q23, Q24
(2SC1400-U*)		
★★	2SA750-E*	Q19-Q22
(2SA750-U*)		
*hfe of Q17-Q24 should have the same value.		
★★	2SK129A	Q5, Q6
★★	2SC1885	Q29, Q30
★★	2SA912	Q31, Q32
★★	2SC1914A	Q33, Q34, Q40
★★	2SC945A (2SC2575)	Q35, Q36
★★	2SA733A (2SA1100)	Q37
★★	μPC4558C-P (NJM4558DX)	Q41
★	1S2473 (1S1555)	D1-D4, D11-D18
★	1S2471	D23-D26, D35, D37, D39, D40
★	SZ-027	D5, D6
★	MZ-043	D19-D22
★	KZL150	D31, D32
★	KZL140	D33, D34
★	MZ-150	D36
★	10E2	D27-D30
★	TH103-2	TH1, TH2

OTHER

Mark	Part No.	Symbol & Description
	PMZ30P060FMC	Screw 3x6

Headphone Jack Assembly

Mark	Part No.	Symbol & Description
	RS3P 331J	R301, R302
	AKN-028	Phone jack (PHONES)

Regulator Assembly (AWR-226)

Mark	Part No.	Symbol & Description
	ACH-343	C1, C2 Electrolytic (470/100V)
	CEA 100M 63L	C5, C6
	CEA 101M 25L	C7
	CQMA 103K 400	C3, C4, C8

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 $\frac{1}{2}$ PM 105J	R101-R106
	RD $\frac{1}{2}$ PM 470J	R107, R108

Mark	Part No.	Symbol & Description
▲	RD $\frac{1}{2}$ PMFL □□□ J	R1-R4
	RD $\frac{1}{2}$ PM □□□ J	R5-R9

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★★	2SD313P	Q1
★★	2SB507P	Q2
★★	2SC1885-R	Q5
★★	2SA912-R	Q6
★★	2SK34-D	Q3, Q4
★	10E2	D1-D4
★	1S1555 (1S2473)	D6, D7
★	KZL140	D5

OTHER

Mark	Part No.	Symbol & Description
	PBZ30P060FMC	Screw 3x6

Tone Control Assembly (GWG-154)

CAPACITORS

Mark	Part No.	Symbol & Description
	CEANL 4R7M 50	C1-C4, C15, C16
	CEA 101M 25L	C17, C18
	CCDSL 100D 50	C13, C14
	CQMA 122J 50	C5-C8
	CQMA 272J 50	C19, C20
	CQMA 223J 50	C9-C12

RESISTORS

Mark	Part No.	Symbol & Description
★★	ASD-082	VR3, VR4 Variable (BASS, TREBLE) (S8) with switch (TURNOVER)

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★★	μ PC4558C-P (NJM4558DX)	Q1, Q2
★	KZL150	D1, D2

Load Selector Assembly

Mark	Part No.	Symbol & Description
	CQSA 301J 50	C101, C102
	CQSA 101J 50	C105, C106
	CQSA 201J 50	C103, C104

Mark	Part No.	Symbol & Description
★★	ASX-151	S6 Remote push switch (MM/MC, CARTRIDGE LOAD)

Switch Assembly

Mark	Part No.	Symbol & Description
	CQMA 154J 50	C401, C402
	RD $\frac{1}{2}$ PM 472J	R403, R404
★★	ASG-282	S7 Push switch (LOUDNESS, SUBSONIC, LINE STRAIGHT, MODE, SPEAKERS)

Balance Control Assembly

Mark	Part No.	Symbol & Description
	CEA 470M 25L	C501, C502

AF Muting Assembly

Mark	Part No.	Symbol & Description
	CEA 470M 25L	C301
	RD $\frac{1}{2}$ PM 433J	R301-R302
	RD $\frac{1}{2}$ PM 472J	R303, R304
★★	ASG-278	S5 Push switch (MUTING)

Volume Control Assembly

Mark	Part No.	Symbol & Description
	CEANL R47M 50	C201, C202
	CCDSL 221J 50	C205, C206
	CEANL R22M 50	C203, C204

RESISTORS

Mark	Part No.	Symbol & Description
★	ACW-128	VR1 Variable (VOLUME)
	RD $\frac{1}{2}$ PM 105J	R201-R208

OTHERS

Mark	Part No.	Symbol & Description
★★	ASR-071	RL1, RL2 Relay

Connector Assembly

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

Mark	Part No.	Symbol & Description	Mark	Part No.	Symbol & Description
★ ACP-001 RD1/4PM □□□ J	VR1, VR2 R1-R10	Semifixed (2.2k-B)	★ ACP-041 ★ ACP-064	VR1, VR2 VR3, VR4	Semifixed (2.2k-B) Semifixed (10k-B)

Indicator Assembly

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	Mark	Part No.	Symbol & Description
RD1/4PM □□□ J	R101-R106		RD1/4PM □□□ J	R1-R4, R9-R54, R63-R78, R83-R100, R103-R108	

SEMICONDUCTORS

Mark	Part No.	Symbol & Description	Mark	Part No.	Symbol & Description
★ AEL-346	D1-D5, D7-D10, D15-D23	LED (Green)	★★ 2SC2602-G	Q1, Q2	
★ AEL-325	D6, D11, D12	LED (Orange)	★★ 2SA978-G	Q3, Q4	
★ AEL-357	D13, D14	LED (Red/Green)	★★ 2SC1775A-E	Q7, Q8	
★ AAV-302		LED level meter module	★★ 2SA872A-E	Q5, Q6	
			★★ 2SC1318	Q9, Q10	

OTHER

Mark	Part No.	Symbol & Description	Mark	Part No.	Symbol & Description
	VBZ030P060FMC	Screw 3x6	★★ 2SA720	Q11, Q12	

EQ Amplifier Assembly (AWF-052)

CAPACITORS

Mark	Part No.	Symbol & Description	Mark	Part No.	Symbol & Description
CEANL 470M 35	C1-C4		★★ 2SD313	Q27	
ACH-323	C23, C24	Electrolytic (2.2/50V, NP)	★★ 2SB507	Q28	
ACH-318	C47-C50	Electrolytic (4.7/25V, NP)	★★ 2SC1890A	Q29, Q31	
CEANL 470M 16	C19-C22		★★ 2SA1100	Q30, Q32	
CEA 100M 50L	C53, C54		(2SA733A)		
CEA 101M 25L	C9-C12		★★ 2SK34-D	Q33, Q34	
CEA 330M 63L	C60		★ 1S1555 (1S2473)	D1-D4, D7-D14, D101, D102	
CEA 221M 25L	C55, C56		★ KZL075	D5, D6	
CEA 221M 35L	C51, C52		★ KZL140	D103, D104	
CEA 221M 10L	C63, C64				
CEA 330M 80L	C59				
CQMA 333J 50	C17, C18				
CQMA 103J 50	C5-C8, C27, C28				
CQMA 122J 50	C35, C36				
CQMA 473J 50	C41-C44, C65-C68				
ACF-016	C25, C26	Mica (68p/500V)	AKB-080		Terminal (PHONO)
CKDYB 103K 50	C57, C58		AKB-078		Terminal (TUNER, AUX)
CCDSL 151J 50	C13-C16		★★ ASX-153		Remote slide switch (MM/MC)
CCDSL 221J 500	C37-C40		PBZ30P060FMC		Screw 3x6
CQMA 473K 400	C61, C62				
CQPA 124G 50	C33, C34				
CQPA 333G 50	C29, C30				
CQPA 102G 50	C31, C32				
CQSA 272J 50	C45, C46				

OTHERS

Mark	Part No.	Symbol & Description
	AKB-080	Terminal (PHONO)
	AKB-078	Terminal (TUNER, AUX)
★★ ASX-153		Remote slide switch (MM/MC)
PBZ30P060FMC		Screw 3x6

REC Selector Assembly (GWS-303)

CAPACITORS

Mark	Part No.	Symbol & Description
	CEA R22M 50L	C1
	CEA 221M 25L	C2
	CQMA 473J 50	C3-C6

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-R16

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★★	2SC2575	Q1, Q2

OTHERS

Mark	Part No.	Symbol & Description
★★	ASX-156	Remote slide switch(REC SELECTOR)
	AKB-078	Terminal (TAPE)
★★	ASR-071	RL1 Relay

Function Switch Assembly (GWM-188)

CAPACITORS

Mark	Part No.	Symbol & Description
	CEA 0R1M 50L	C1, C2
	CEA 470M 25L	C5, C8
	CQMA 332J 50	C3, C4, C6, C7
	CEA 330M 25L	C9
	CEA 221M 10L	C10
	CEA 221M 25L	C11
	CEA 220M 25L	C12

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%PS □□□ J	R5, R11, R15, R16, R22
	RD%PM □□□ J	R1-R4, R6-R10, R12-R14, R17-R21

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★★	TA7318P-A	Q1
★★	2SC945A (2SC2575)	Q2-Q7
★	1S1555 (1S2473)	D1-D6
★	KZL061	D7

SWITCH

Mark	Part No.	Symbol & Description
★★	ASG-403	S4 Push switch (FUNCTION)

Driver R Assembly (GWX-594)

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%PSF 151J	R2
▲	RD%PMF 4R7J	R4, R6, R8, R10
	ACN-114	R12, R14 Wire wound (0.47/5Wx2)

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★★	2SC2275A-Q*	Q2
★★	(2SC2275A-R*)	
★★	2SA985A-Q*	Q4
	(2SA985A-R*)	

*hfe of Q2 and Q4 should have the same value.

★ STV4H	D2
---------	----

Capacitors Assembly (AWX-205)

Mark	Part No.	Symbol & Description
	ACH-210	C1, C2 Electrolytic capacitor (15000/71V)
	ABA-261	Brazier head screw

Driver L Assembly (GWX-593)

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%PMF 4R7J	R3, R5, R7, R9
	RD%PSF 151J	R1
	ACN-114	R11, R13 Wire wound (0.47/5Wx2)

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★★	2SC2275A-Q*	Q1
★★	(2SC2275A-R*)	
★★	2SA985A-Q*	Q3
	(2SA985A-R*)	

*hfe of Q1 and Q3 should have same value.

★ STV4H	D1
---------	----

OTHER

Mark	Part No.	Symbol & Description
	PBZ30P060FMC	Screw 3x6

11. ADJUSTMENTS

Power Amplifier

- Turn VR1, VR3 (L) and VR2, VR4 (R) fully around in the counter-clockwise direction.
- Without any load or input signal, turn the POWER switch ON.

Adjustment point	Prescribed value	Measuring terminals
VR1(L)	50mVDC	no. 21(+) and no. 20(-)
VR3(L)	75mVDC	
VR2(R)	50mVDC	no. 19(+) and no. 18(-)
VR4(R)	75m VDC	

Output Power Indicator Calibration

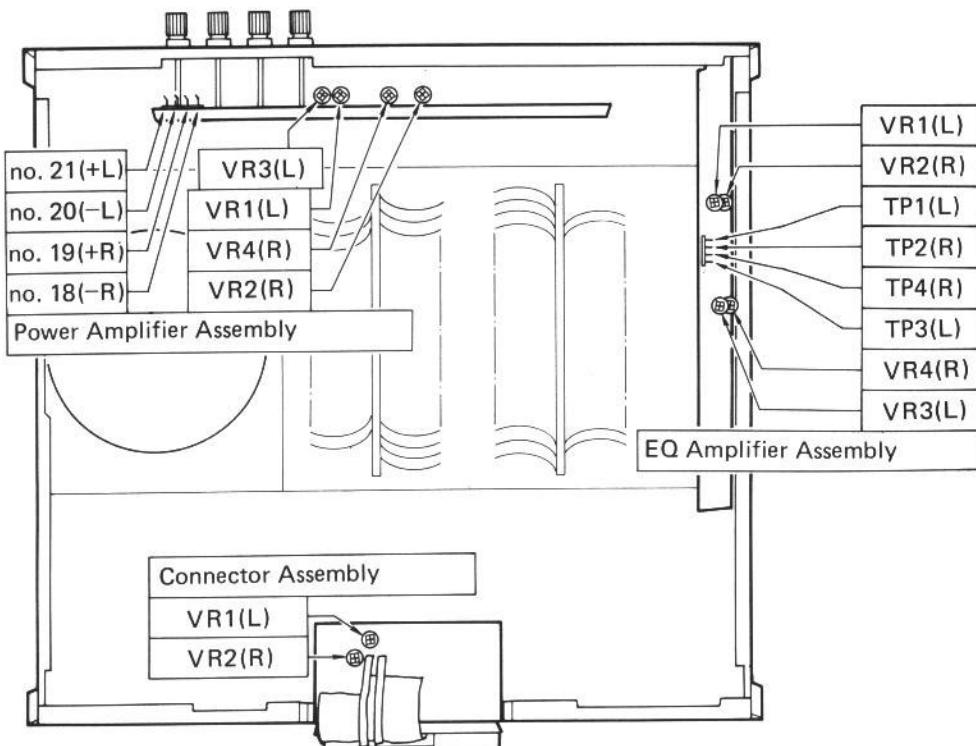
1. Set the LINE STRAIGHT OFF switch to OFF (LINE STRAIGHT) position.
2. Set the SPEAKERS selector to the A position, and connect an 8Ω resistor and AC voltmeter to the speaker output terminals.
3. Set the FUNCTION switch to the AUX position, and apply a 1kHz, 150mV signal to the AUX input terminals.

4. Adjust the VOLUME control for an AC voltmeter reading of 28V.
5. Adjust VR1 (L) and VR2 (R) on the connector assembly so that the all points of the output power indicators light at above 28V.

Preamplifier (EQ Amplifier Assembly)

- Without input signal, turn the POWER switch ON.

Adjustment point	Prescribed value	Measuring terminals
MC Amplifier DC Balance		
VR1(L)	$0 \pm 30\text{mV}$ DC	TP1 and ground
VR2(R)	$0 \pm 30\text{mV}$ DC	TP2 and ground
EQ Amplifier DC Balance		
VR3(L)	$0 \pm 1\text{mV}$ DC	TP3 and ground
VR4(R)	$0 \pm 1\text{mV}$ DC	TP4 and ground



Service Manual

NON SWITCHING AMP
STEREO AMPLIFIER

A-9 S
S/G

ORDER NO.
ART-588-0

The basic performance of the S/G type (U.S. Military model) and S type (General export model) is the same as the HE type (European continent model). This additional service manual is applicable to the S/G and S types, please refer to the HE type service manual (ART-590) with the exception of this supplements.

SPECIFICATIONS

The specifications for S/G and S types are the same as the HE type except for following sections;

Miscellaneous

Power Requirements 110/120/220/240V(Switchable), 50/60Hz
Power Consumption 300W

Furnished Parts

Fuse(10A) x 1
Fuse(5A) x 1

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.

The parts for S/G and S types are the same as the HE type except for following sections;

Mark	Symbol & Description	Part No.			Remarks
		HE type	S type	S/G type	
 ★ T1	Power transformer	ATT-762	ATT-761	ATT-761	
 ★★ FU1	Fuse (5A)	AEK-015	AEK-108	(AEK-108)	220/240V
 ★★ FU1	Fuse (10A)	(AEK-114)	AEK-114	110/120V
 ★★ FU2-FU5	Fuse (1A)	AEK-402	AEK-106	AEK-106	
 ★★ FU6	Fuse (1.6A)	AEK-405	
 ★★ FU6	Fuse (1.5A)	AEK-104	AEK-104	

PIONEER ELECTRONIC CORPORATION 4-1, Meguro 1-Chome, Meguro-ku, Tokyo 153, Japan

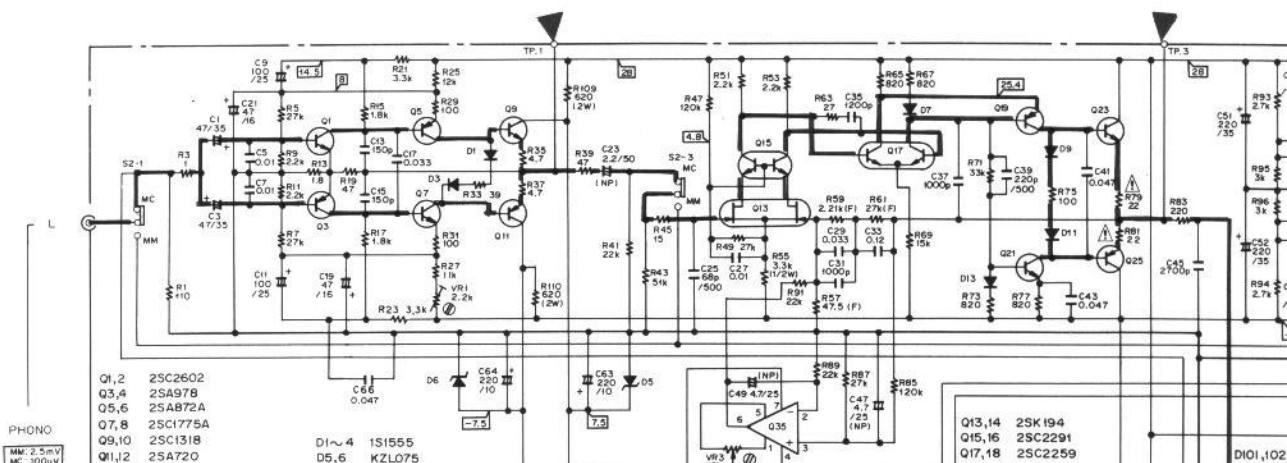
U.S. PIONEER ELECTRONICS CORPORATION 85 Oxford Drive, Moonachie, New Jersey 07074, U.S.A.

PIONEER ELECTRONIC (EUROPE) N.V. Luithagen-Haven 9, 2030 Antwerp, Belgium

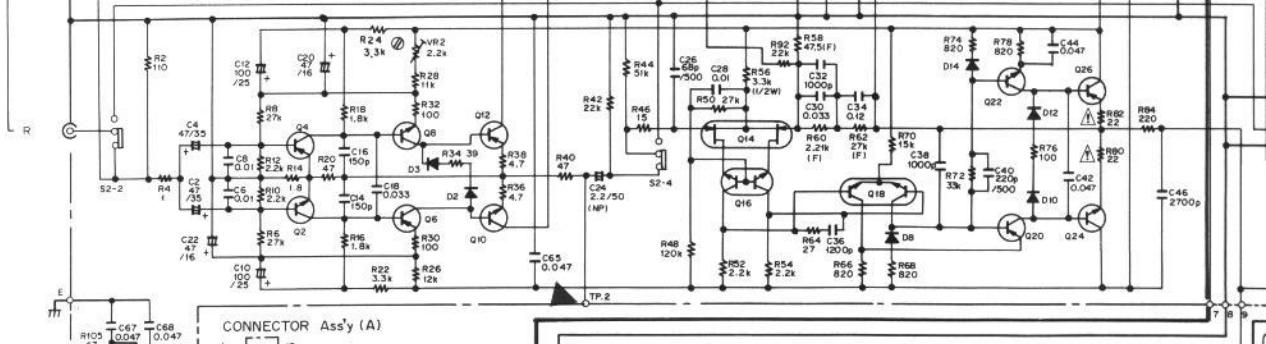
PIONEER ELECTRONICS AUSTRALIA PTY. LTD. 178-184 Boundary Road, Braeside, Victoria 3195, Australia

SCHEMATIC DIAGRAM

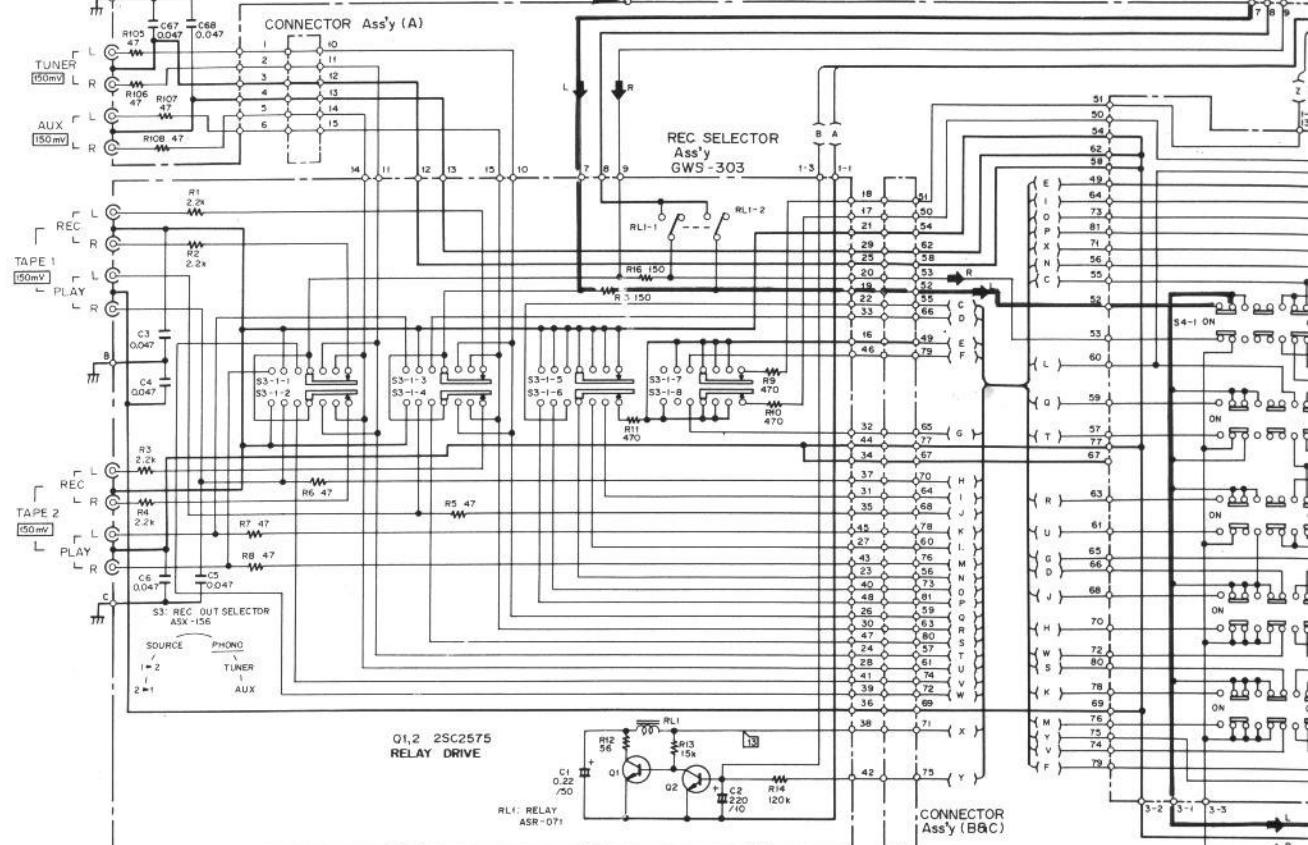
A

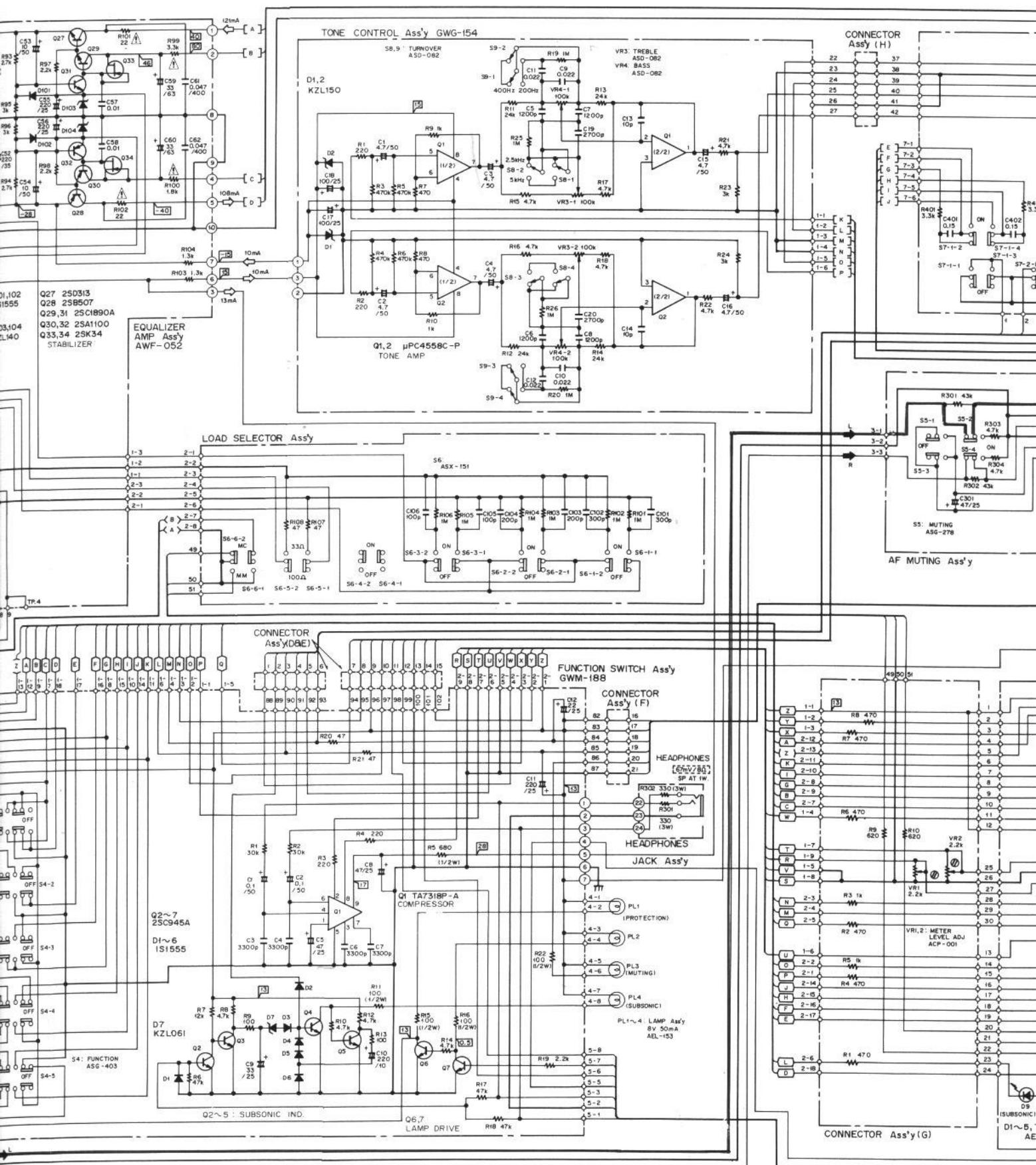


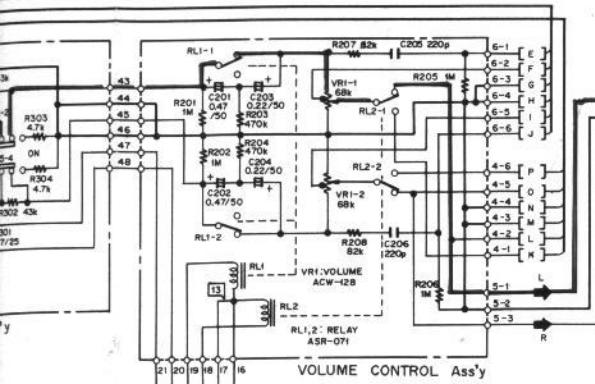
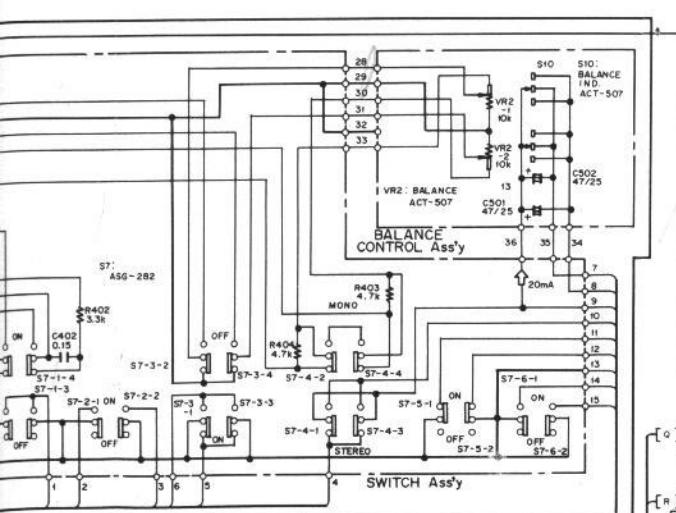
B



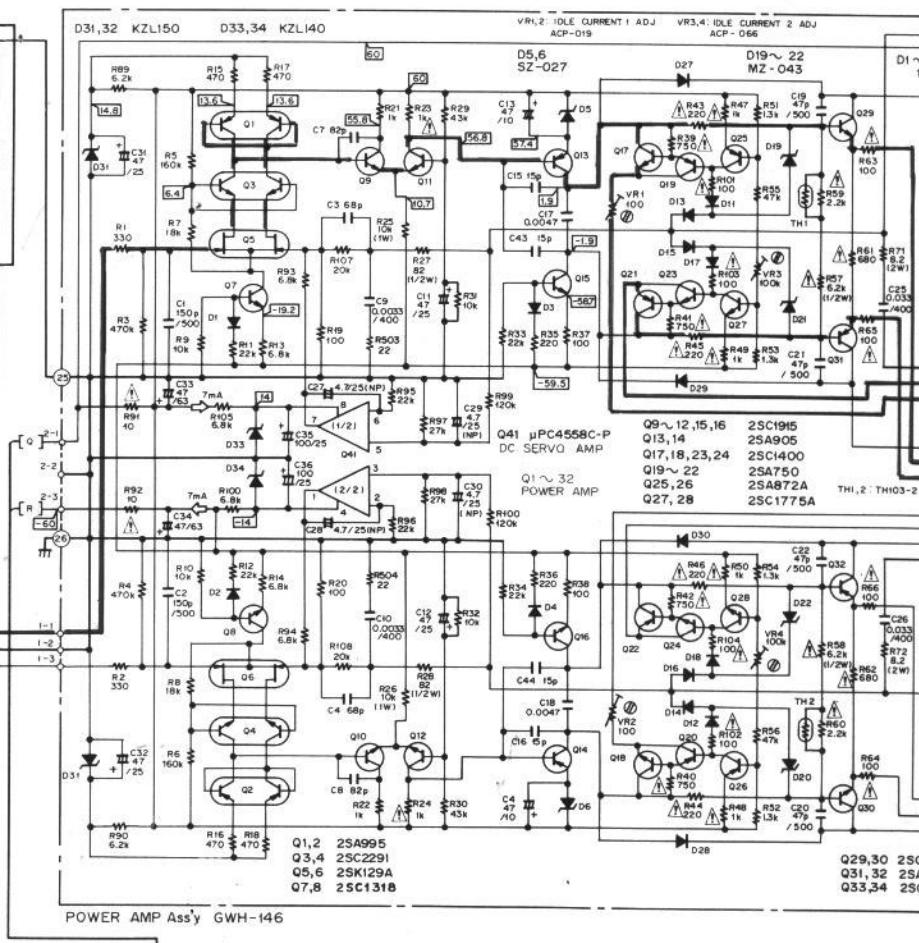
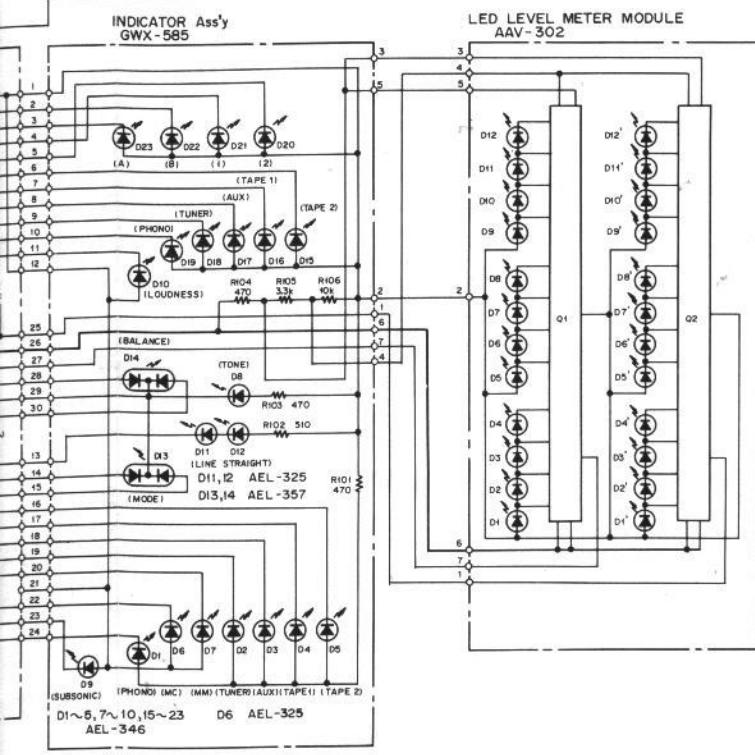
C



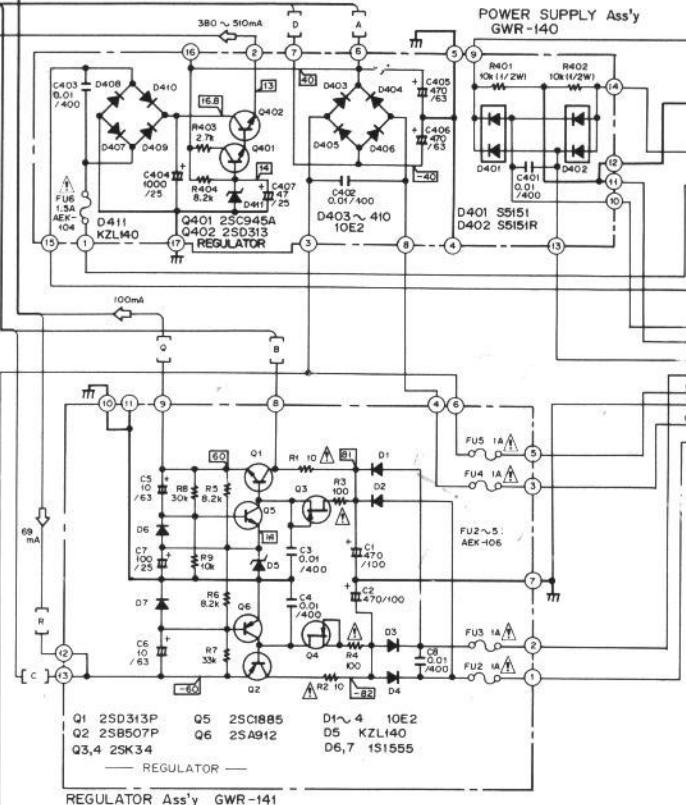


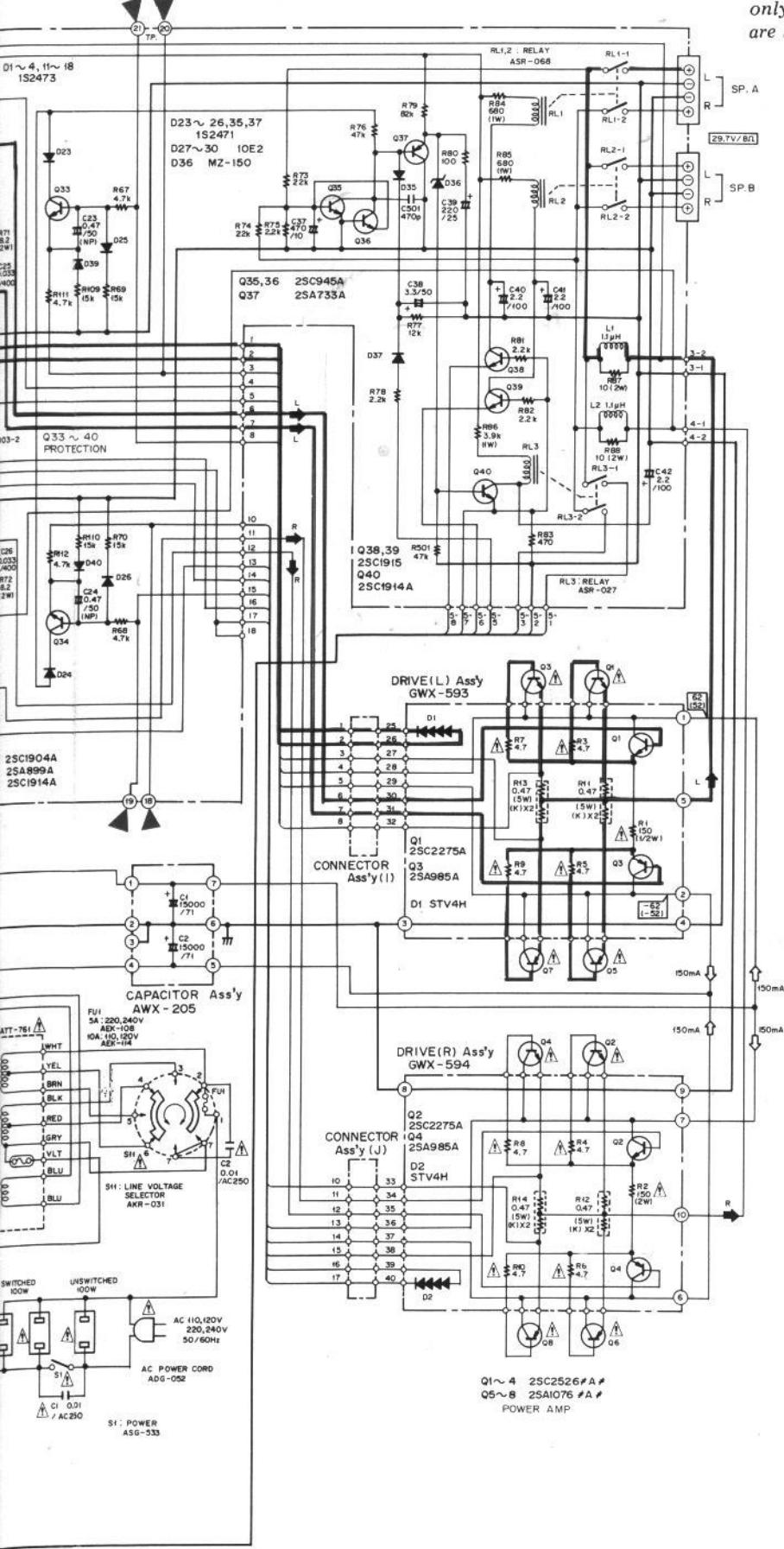


LED LEVEL METER MODULE
AAV-303



POWER SUPPLY Ass'y
GWR-140





NOTE:

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

A

B

C

D

1. RESISTORS:

Indicated in capacity ($\mu\Omega$)/voltage (V) unless otherwise noted k : $k\Omega$, M : $M\Omega$, (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:

Signal voltage at 110 W + 110 W BI output (1kHz)
DC voltage (V) at no input signal
Value in () is DC voltage at rated power.

↔ mA: DC current at no input signal

4. OTHERS:

→: Signal route.
∅: Adjusting point.

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

SWITCHES:

S1: POWER	ON - OFF
S2: PHONO (SIGNAL)	MC - MM
S3: REC OUT SELECTOR	2 → 1 → 2 - SOURCE - PHONO - TUNER - AUX
S4-1: FUNCTION (PHONO)	ON - OFF
S4-2: FUNCTION (TUNER)	ON - OFF
S4-3: FUNCTION (AUX)	ON - OFF
S4-4: FUNCTION (TAPE 1)	ON - OFF
S4-5: FUNCTION (TAPE 2)	ON - OFF
S5: MUTING (-20dB)	ON - OFF
S6-1: MM LOAD (400p)	ON - OFF
S6-2: MM LOAD (300p)	ON - OFF
S6-3: MM LOAD (200p)	ON - OFF
S6-4: MM LOAD (100p)	ON - OFF
S6-5: MC LOAD	100Ω - 33Ω
S6-6: PHONO (IND)	MC - MM
S7-1: LOUDNESS	ON - OFF
S7-2: SUBSONIC FILTER (15Hz)	ON - OFF
S7-3: LINE STRAIGHT	ON - OFF
S7-4: MODE	STEREO - MONO
S7-5: SPEAKERS (A)	ON - OFF
S7-6: SPEAKERS (B)	ON - OFF
S8: TURNOVER (TREBLE)	2.5kHz - 5kHz
S9: TURNOVER (BASS)	400Hz - 200Hz
S10: BALANCE (IND)	ON - OFF
S11: LINE VOLTAGE SELECTOR (110V - 120V - 220V - 240V)	

The underlined indicates the switch position.

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