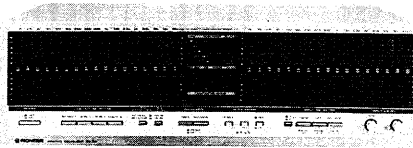


Service Manual

**CIRCUIT DESCRIPTIONS
REPAIR & ADJUSTMENTS**



**ORDER NO.
ARP-342-0**

GRAPHIC EQUALIZER

SG-90

MODEL SG-90 COMES IN SEVEN VERSIONS DISTINGUISHED AS FOLLOWS:

Type	Voltage	Remarks
KU	AC 120V only	U. S. A. model
KC	AC 120V only	Canada model
HEM	AC 220V, 240V (switchable)	European continent model
HB	AC 220V, 240V (switchable)	United Kingdom model
S	AC 110V, 120V, 220V, 240V (switchable)	General export model
S/G	AC 110V, 120V, 220V, 240V (switchable)	U. S. Military model
YP	AC 240V only	Australia model

- This service manual is applicable to the KU type.
For servicing of the S and S/G types, please refer to P30. For other types, please refer to the Additional Service Manual.
- Ce manuel d'instruction se réfère au mode de réglage, en français.
- Este manual de servicio trata del método de ajuste escrito en español.

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1. SPECIFICATIONS

Graphic Equalizer Section

Equalizer Frequency 16, 25, 40, 63, 100, 160, 250, 400, 630 1 k,
1.6 k, 2.5 k, 4 k, 6.3 k, 10 k, 16 k, 25 k

Equalizer level ± 12 dB, ± 6 dB

Total Harmonic Distortion** 0.001% (20 Hz ~ 20 kHz,
1 V, Equalizer Flat)

Input Impedance

INPUT, TAPE 1 PLAY, TAPE 2 PLAY 47 k Ω

Output Impedance

OUTPUT 200 Ω

TAPE 1 REC, TAPE 2 REC 2.2 k Ω

Frequency Response 10 ~ 100 kHz $\pm \frac{1}{2}$ dB (Equalizer Flat)

Hum and Noise (IHFA Network, short circuit, 2 V output)

..... 120 dB (Equalizer Flat)

Hum and Noise (DIN) 96 dB (Equalizer Flat)

Gain 0 dB (Equalizer Flat, Input Level 0 dB)

Auto Fader Section

Fade in time 4 sec.

Fade out time 6 sec

**HARMONIC DISTORTION (BY AUTOMATIC DISTOR-
TION ANALYZER)

MISCELLANEOUS

Power Requirements

KU, KC models

AC 100 Volts, 50/60 Hz

S, S/G models

... ~ AC 110 V/120 V/220 V/240 V (switchable), 50/60 Hz

Power Consumption

KU, KC models 40 Watts (max.)

S, S/G models 34 Watts (max)

Dimensions 420(W) x 131(H) x 351(D) mm

16-9/19(W) x 5-3/16(H) x 13-13/16(D) in.

Weight 7.2 kg (15 lb 14 oz)

ACCESSORIES

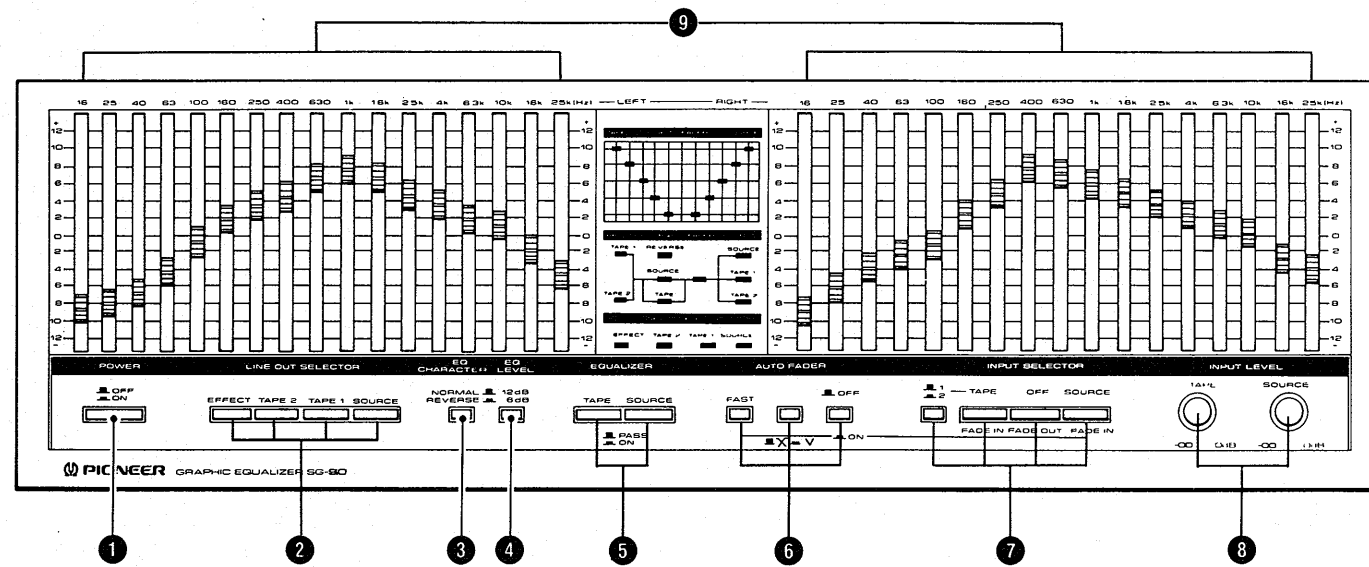
Pin-plug connecting cords 2

Operating Instructions 1

NOTE:

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

2. FRONT PANEL FACILITIES



1 POWER SWITCH (POWER)

When this switch is pressed to the ON position, power is supplied to the unit's main circuits. To turn the power off, press once again.

2 LINE OUT SELECTOR (LINE OUT SELECTOR)

These selectors are monitor switches which allow you to listen either to the sounds created by the equalizer, or to the original signal without equalizer coloration. When switches SOURCE ~ TAPE 2 are pressed, the signals are output from the unit without regard to the input level control setting or equalizer coloration.

EFFECT: This switch is pressed when you wish to listen to sound with equalizer effects added. The signals same as the sound heard, are output from the recording terminals (TAPE 1, 2 REC) on the rear panel. The signals output from the recording terminals will not be switched whether TAPE 1, TAPE 2 or SOURCE (explained below) are pressed.

TAPE 2: Press this switch when you wish to listen to programs played back from the tape deck connected to the TAPE 2 terminals without being effected by the equalizer unit controls.

TAPE 1: Press this switch when you wish to listen to programs played back from the tape deck connected to the TAPE 1 terminals without being effected by the equalizer unit controls.

SOURCE: Press this switch when you wish to listen to program sources (FM broadcasts, record player, etc.) which are connected to the equalizer unit's INPUT terminals, without being effected by the equalizer unit controls. Also, if two or all three of these switches are pressed together, the switch furthest right will be given priority.

NOTE:
Even if the equalizer or the auto fader is not used, turn the power switch on for playback.

3 EQUALIZER CHARACTER SELECTOR (EQ CHARACTER)

This switch is pressed when you wish to invert all bands of the frequency compensation curve set with the graphic equalizer controls.

NORMAL: For normal compensation, the switch is pressed to the NORMAL position. The graphic equalizer controls are moved, and the frequency compensation curve of the pattern set with the controls is effected normally.

REVERSE: When you wish to invert all bands of the frequency compensation curve set during normal compensation, press the switch to the REVERSE position.

4 EQUALIZER LEVEL SELECTOR (± 12 dB / ± 6 dB)

This selector is used to choose the ratio of frequency boosting/attenuation.

± 12 dB: During normal compensation, the switch should be pressed to the ± 12 dB position.

± 6 dB: When you wish to proportion the compensation curve in finer gradations, press the selector switch to the ± 6 dB position. In this position, the overall volume of boosting/attenuation will be cut in half, allowing you to set the GRAPHIC EQUALIZER CONTROLS to more delicate effects.

5 EQUALIZER SELECTOR (EQUALIZER)

This selector allows you to choose the mode (TAPE, SOURCE) effected by the equalizer.

TAPE: Press this switch to the ON position when you wish to add equalizer effects to tape playback sounds.

SOURCE: Press this switch to the ON position when you wish to add equalizer effects to program source (FM broadcasts, record player, etc.) sounds. When you do not wish to add equalizer effects, release the TAPE or SOURCE switches respectively to the PASS position.

6 AUTO FADER CONTROL

Beginning with the switch on the right, these three switches are as follow:

AUTO FADER SWITCH (OFF / ON)

Press this switch to the ON position when operating the auto fader.

CROSS POINT SWITCH

This switch is used when operating auto fader when you wish to overlap source sounds with tape sounds.

∨ : When pressed to this position, the source and tape sounds will not be overlapped. At the instant the sound fading out (source or tape) is completely extinguished, the other sound (source or tape) will immediately begin fading in.

∧ : When released to this position, the source and tape sounds will overlap as they fade out and in.

FAST: When this switch is pressed during auto fader, the fade out or fade in time will be shortened during the time the switch is pressed. Continue to press this switch until quick fade in or fade out is completed.

7 INPUT SELECTOR

Beginning on the right, these switches are as follows:

When AUTO FADER switch is OFF:

SOURCE: This switch is pressed to input source sounds (FM broadcasts, records player, etc.) without using the auto fader.

OFF: This switch is pressed to cut out the input of source or tape playback sounds without using the auto fader.

TAPE: This switch is pressed to input tape playback sounds without using the auto fader.

1 / 2 SWITCH

Press this switch to select tape deck 1 or 2 connected to the unit's rear panel. Use this when performing tape playback.

When AUTO FADER switch is ON:

SOURCE/FADE IN: When this switch is pressed, source sounds (FM broadcasts, record player, etc.) will be input (fading in).

OFF/FADE OFF: When this switch is pressed, source or tape playback sounds will be cut (fading out).

TAPE/FADE IN: When this switch is pressed, tape playback sounds will be input (fading in).

NOTE:
When auto fader is OFF, mixing is not possible.

8 INPUT LEVEL CONTROLS (INPUT LEVEL)

These are controls for adjusting the level of source or tape input.

TAPE: Use this control for adjusting the input level coming from tape decks 1 and 2 connected to the unit's rear panel.

SOURCE: Use this control for adjusting the input level of program sources (FM broadcasts, record player, etc.)

9 GRAPHIC EQUALIZER CONTROLS (GRAPHIC EQUALIZER)

Operating these controls that divide the entire frequency spectrum into 17 sections can induce changes in the sound quality of the signals in the selected mode (TAPE or SOURCE).

These controls have many uses: they can add an equalization effect to the playback sound of a tape, to the stereo source (such as record play) or to a microphone. The equalization effect is applied to all the selected modes.

NOTE:
In order to protect the speakers from damage resulting from power overload, do not excessively increase the stereo amplifier's volume level when boosting the treble range on this unit.

FADER CONTROL SECTION

This section features fade in and fade out functions which superimpose the sound of the source (example: end of a song or piece of music) and the tape playback sound (example: start of a song or piece of music) onto each other. One effective use of these functions, for instance, is when recording a medley of your favorite singer's hits.

Fade-in: The sound volume is gradually increased.

Fade-out: The sound volume is gradually reduced.



REGARDING SOURCE FADE IN

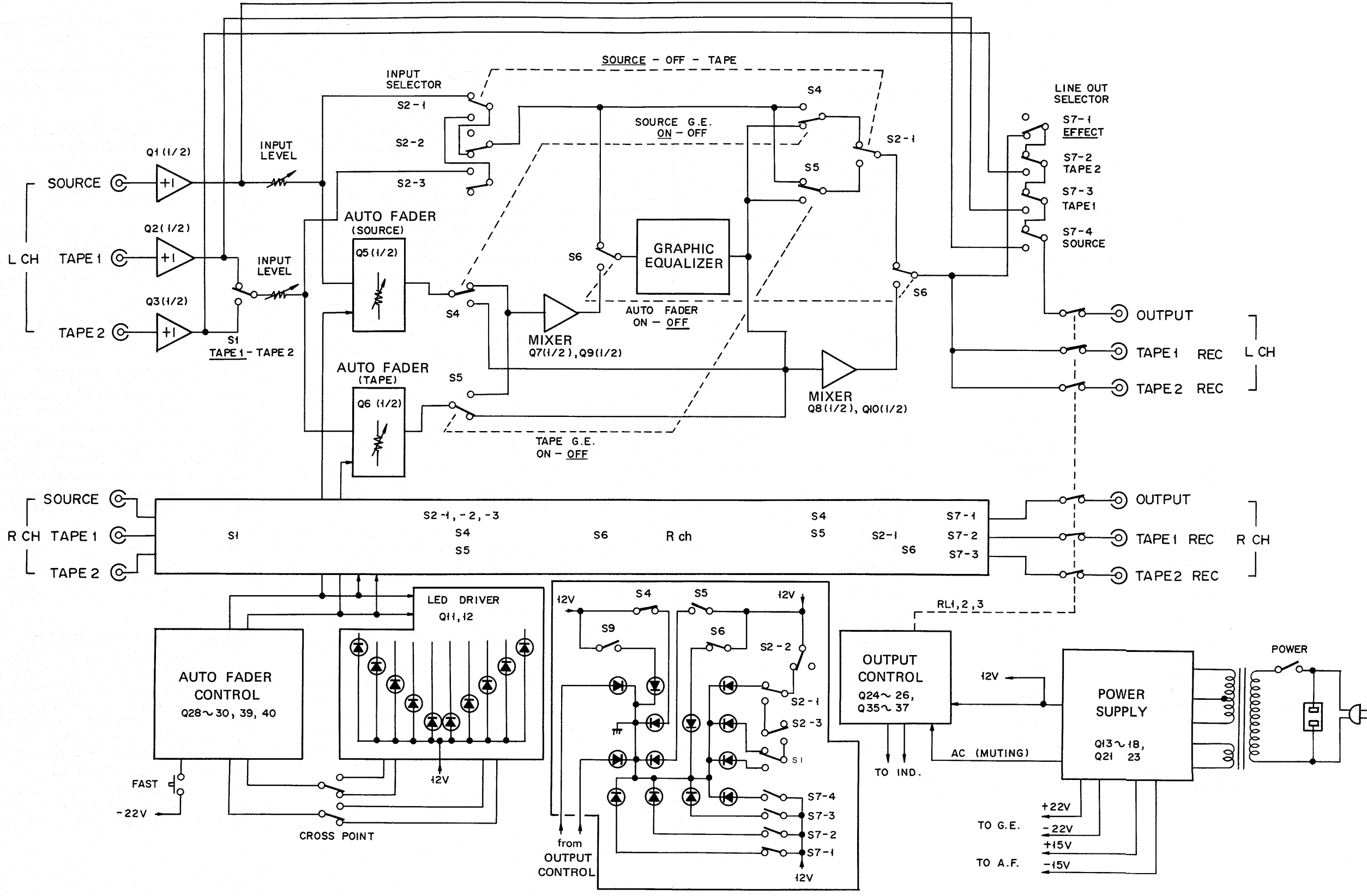
Besides using this switch for normal source (FM broadcasts, record player, etc.) fade in, it can also be pressed during a tape playback in order to fade in a source program while fading out the tape playback sounds. When used with the crosspoint switch, the end of one program (for example, tape playback) can be overlapped with the beginning of another program (for example, source program).

REGARDING TAPE FADE IN

Besides using this switch for tape playback fade in, this switch can be pressed during a source program to fade in tape playback while fading out the source program.

3. BLOCK DIAGRAM

*S2, S7: Lock-release type



4. CIRCUIT DESCRIPTIONS

4.1 SIGNAL ROUTES

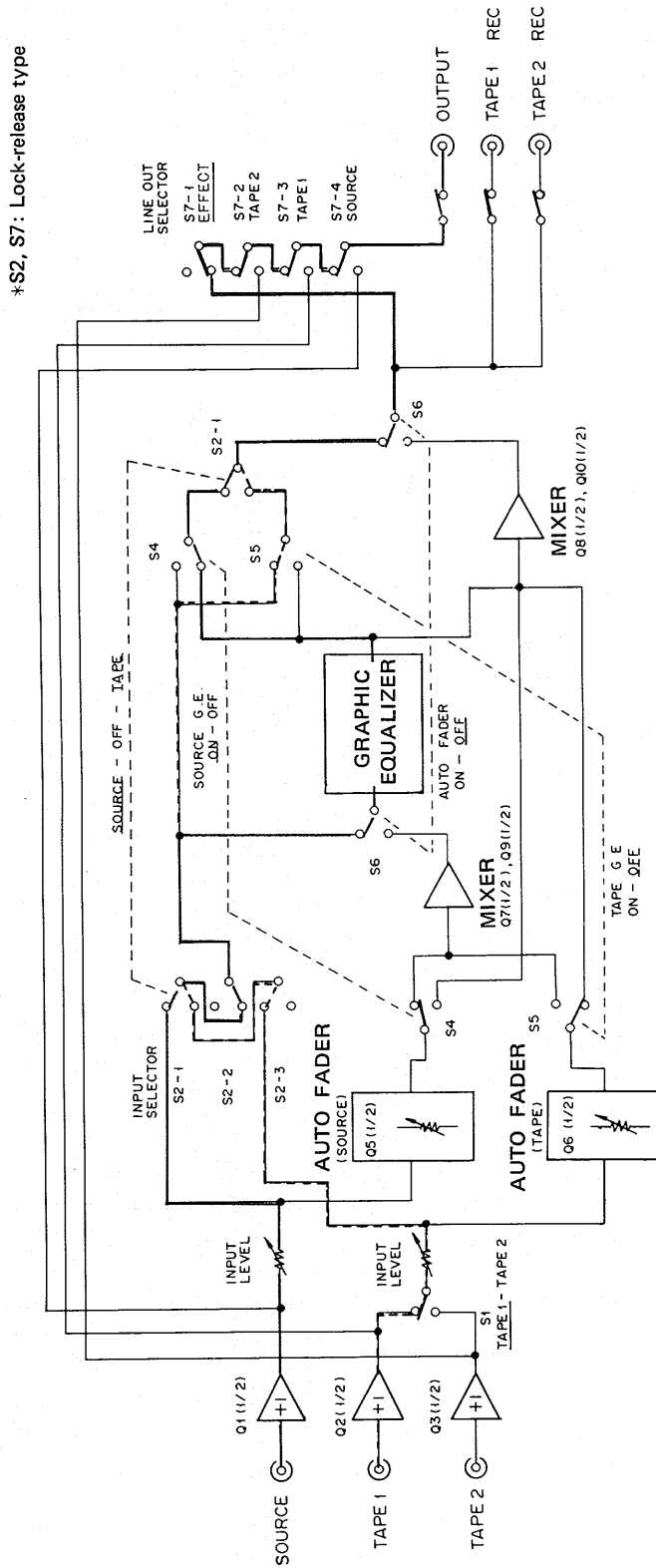


Fig. 4-1 Signal routes (AUTO FADER OFF)

*S2, S7: Lock-release type

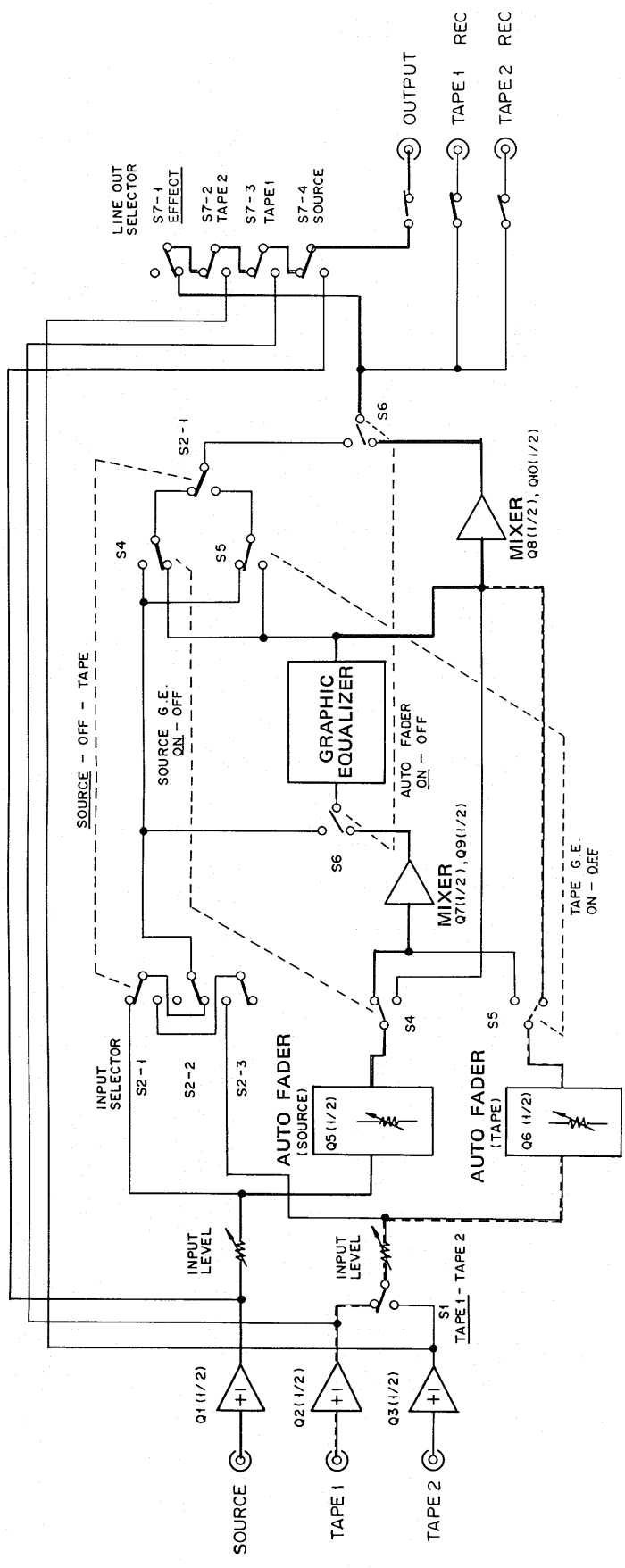


Fig. 4-2 Signal routes (AUTO FADER ON)

4.2 CIRCUIT DESCRIPTIONS

Graphic Equalizer Section

A resonance circuit employing an equivalent inductance circuit is incorporated in the Q201 amplifier feedback loop. A total of 17 center frequencies have been set in the 16Hz to 25kHz range. Fig. 4-3 shows where the 25kHz frequency has been set.

Center frequency f_0 is estimated from the following equation.

$$f_0 = 1/(2\pi\sqrt{C_{185} \cdot C_{205} \cdot R_{147} \cdot R_{215}})$$

The frequency response curves are inverted by S9, and the rate of change (6dB/12dB) is switched by S10.

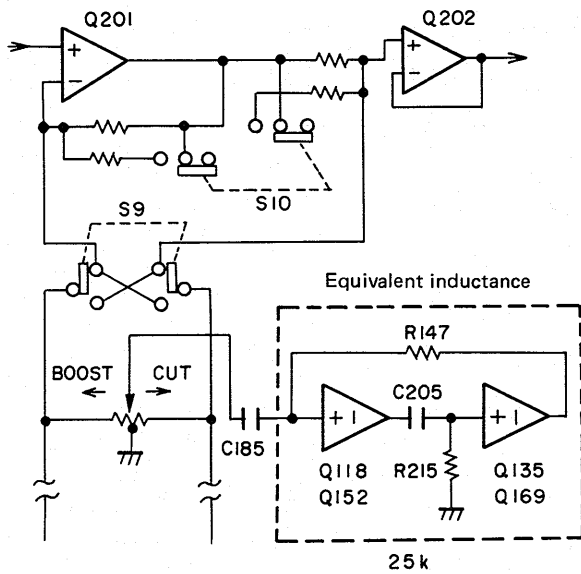


Fig. 4-3 Graphic equalizer

Auto-Fader Circuit

Refer to the CA-100 manual for details on fundamental operation. The FAST switch featured in the SG-90 enables the fade-in/out rate to be speeded up.

The fader voltage generator circuit consists of capacitors (C301 and C302) for charging/discharging purposes, CROSS POINT transistor switches (Q27, Q28, Q39, and Q40), and a FAST transistor switch (Q29 and Q30).

Output Control Circuit

The SG-90 output is controlled by relay switch. The muting circuit is activated by R325, C306 when the POWER switch is switched on.

To prevent oscillation due to the signal loop formed by tape deck (PLAY), SG-90, and tape deck (REC), the REC terminal circuit linking the same tape deck is disconnected when a TAPE input is applied. When the source input is applied, Q26 is turned on, and the signal is passed to both tape terminals.

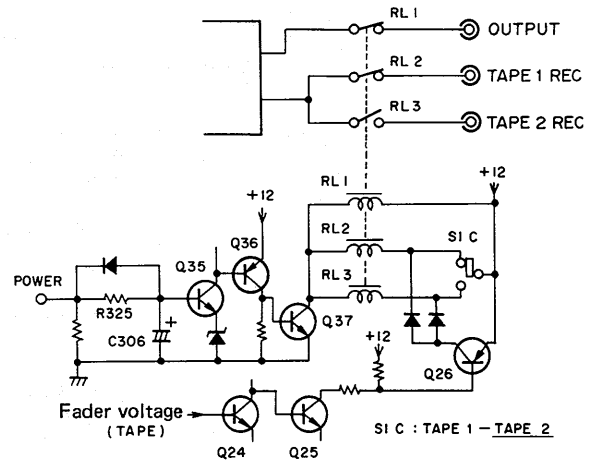


Fig. 4-4 Output control

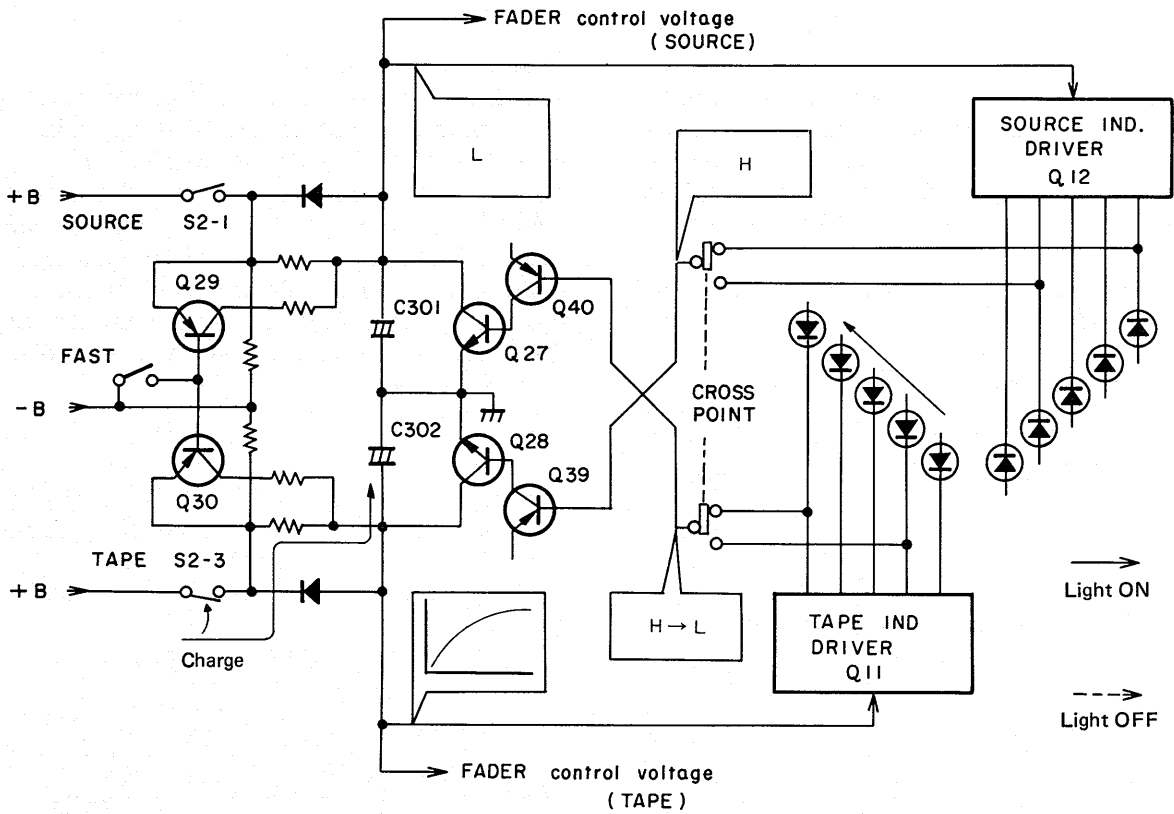


Fig. 4-5 AUTO FADER OFF → TAPE

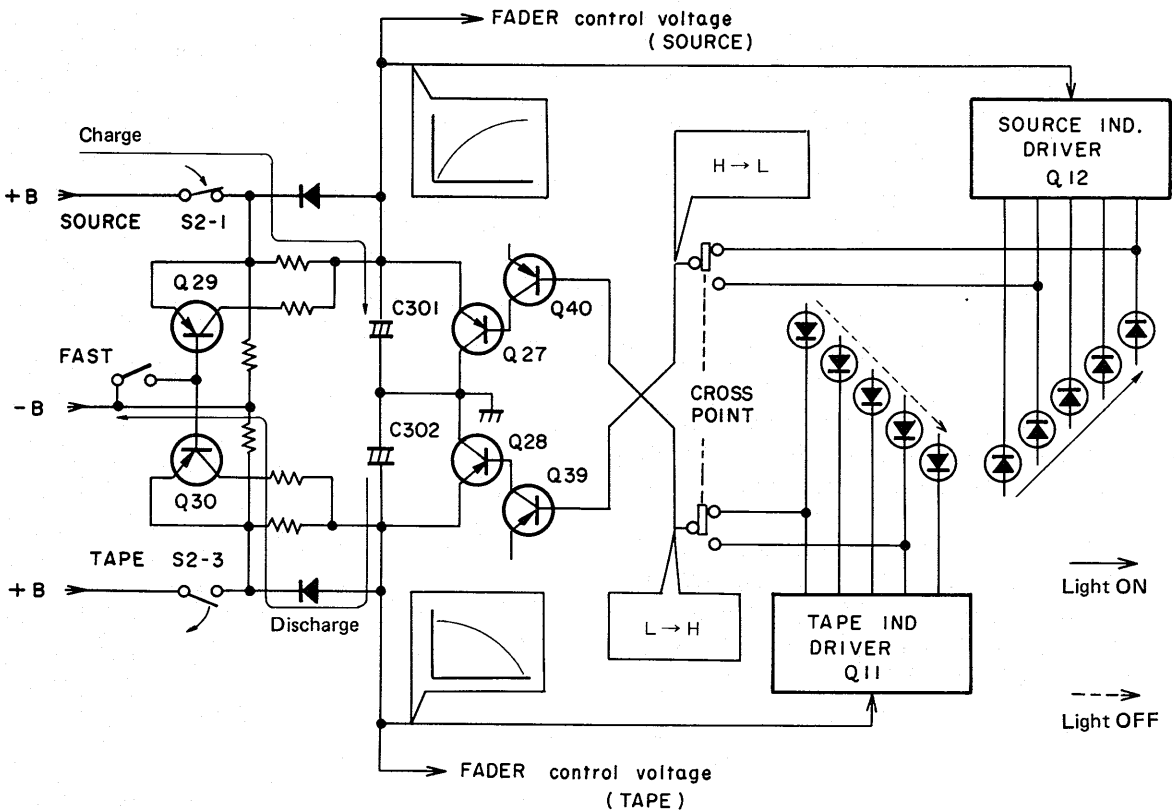


Fig. 4-6 AUTO FADER TAPE → SOURCE

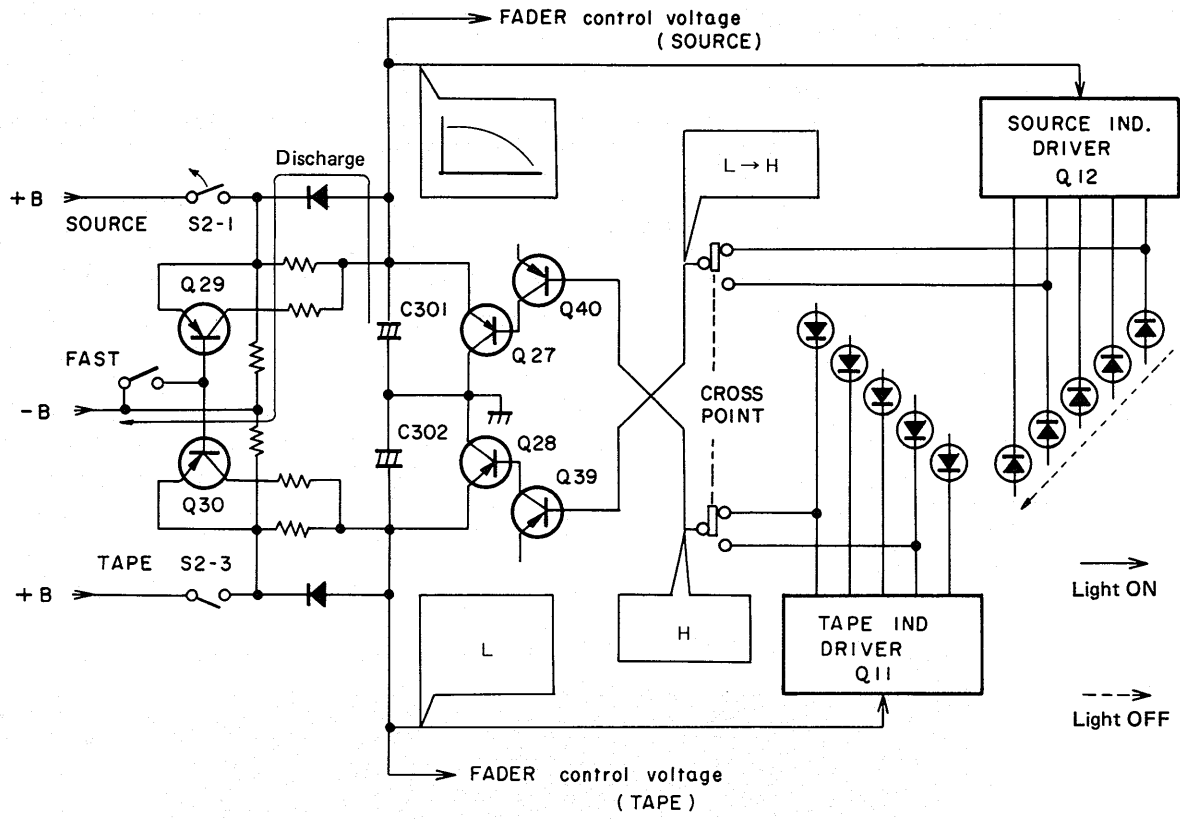


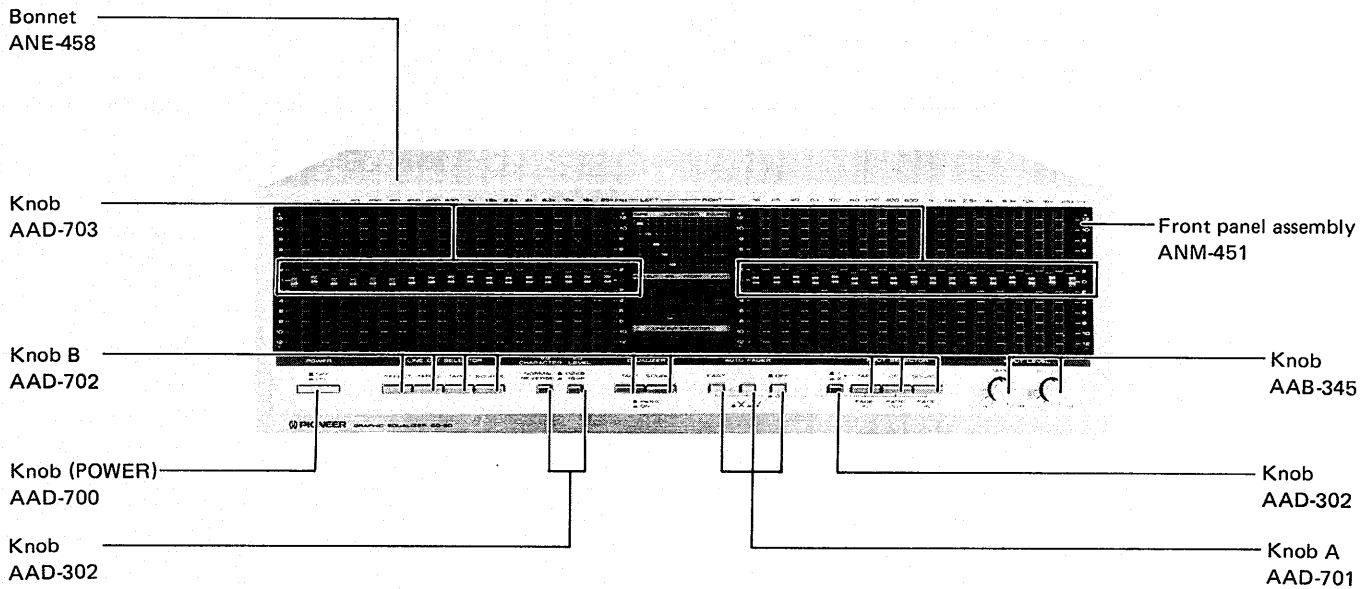
Fig. 4-7 AUTO FADER SOURCE → OFF

5. PARTS LOCATION

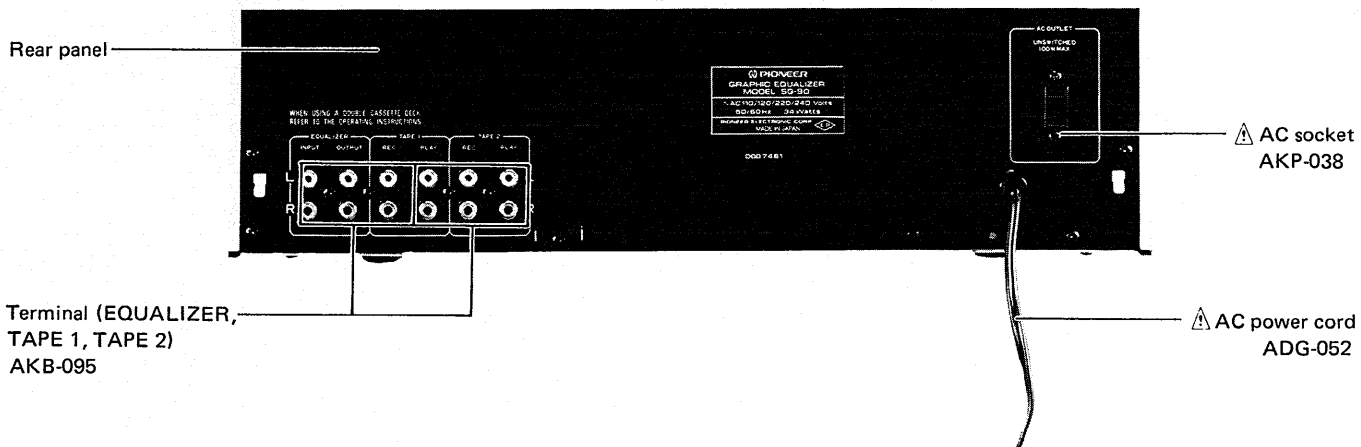
NOTES:

- The \triangle 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.

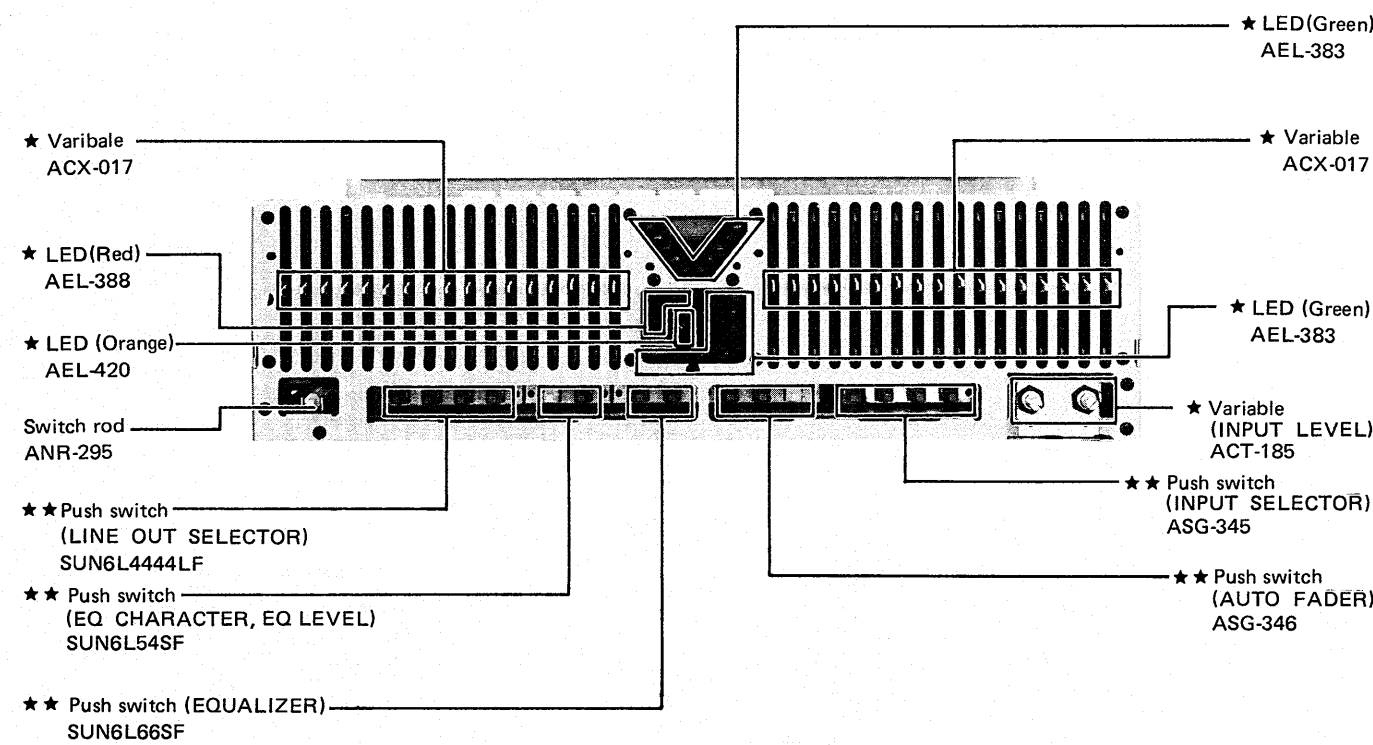
Front Panel View



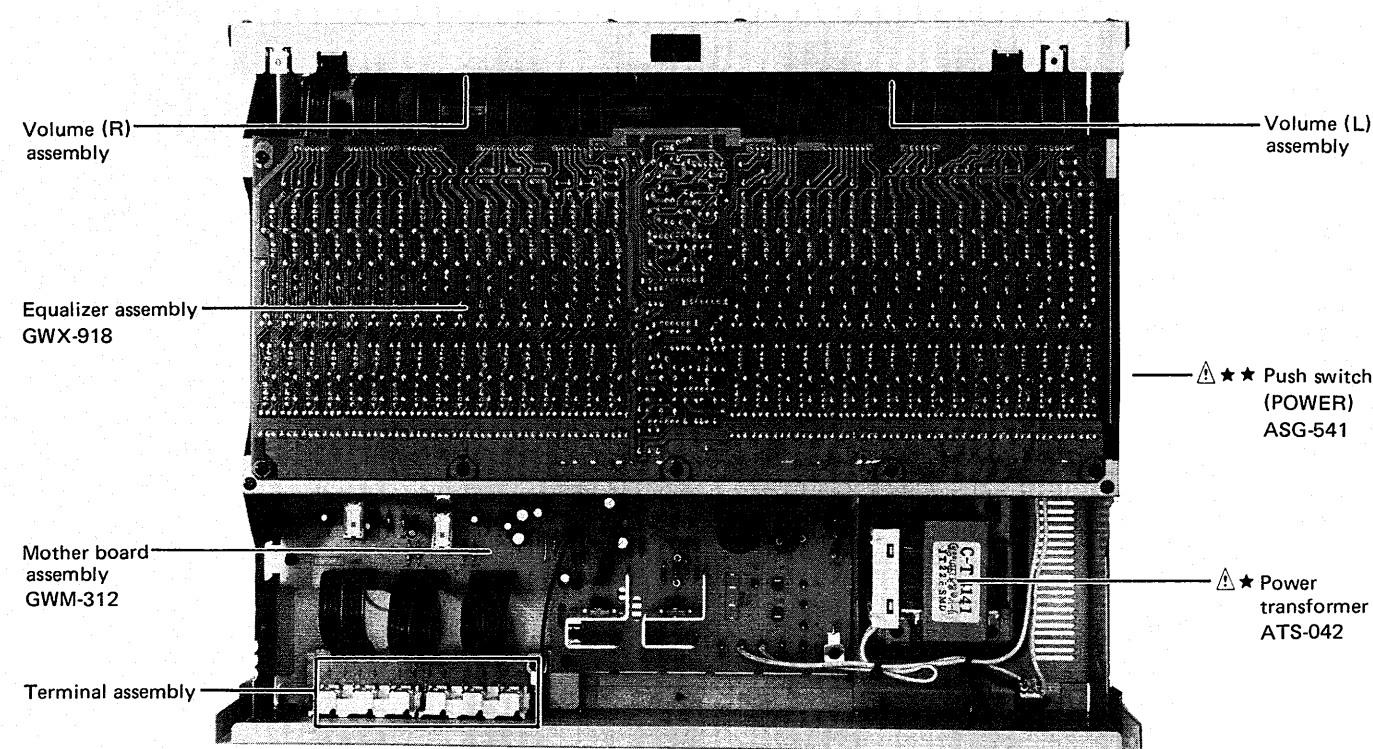
Rear View



Front View

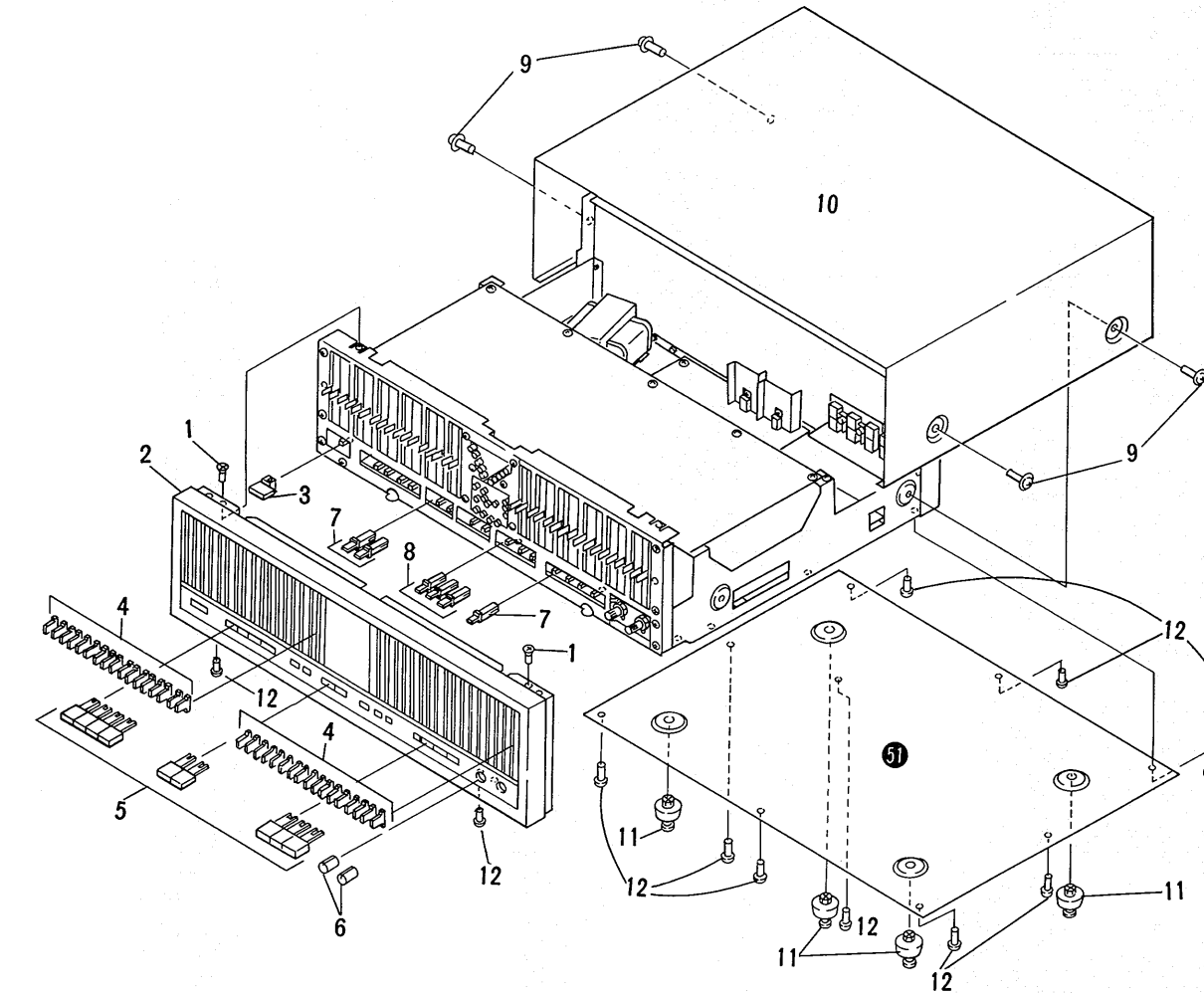


Top View



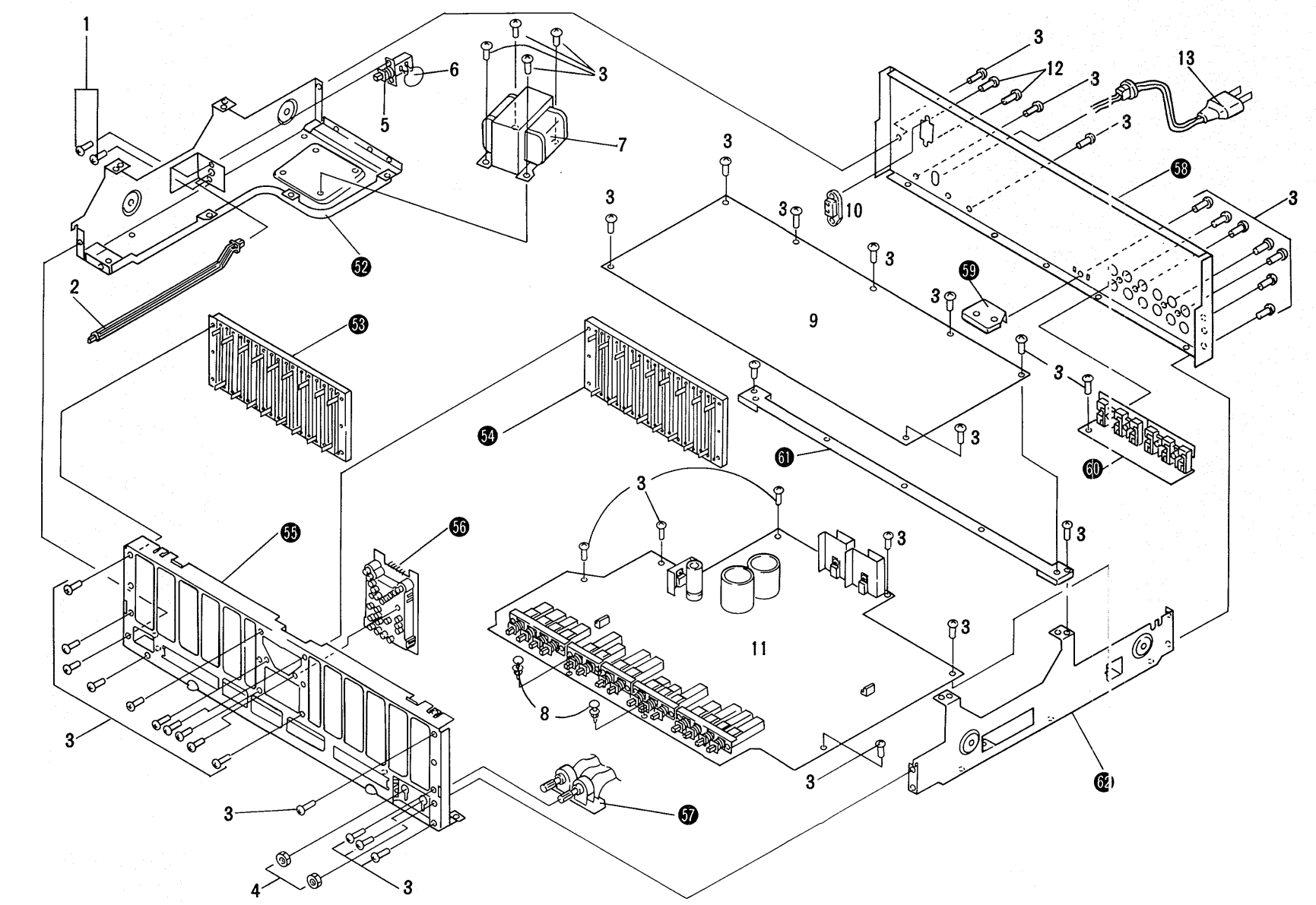
6. EXPLODED VIEW AND PARTS LIST

Exterior Components



NOTES:
• Parts without part number cannot be supplied.
• 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 ★★ and ★.
★★ GENERALLY MOVES FASTER THAN ★
This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

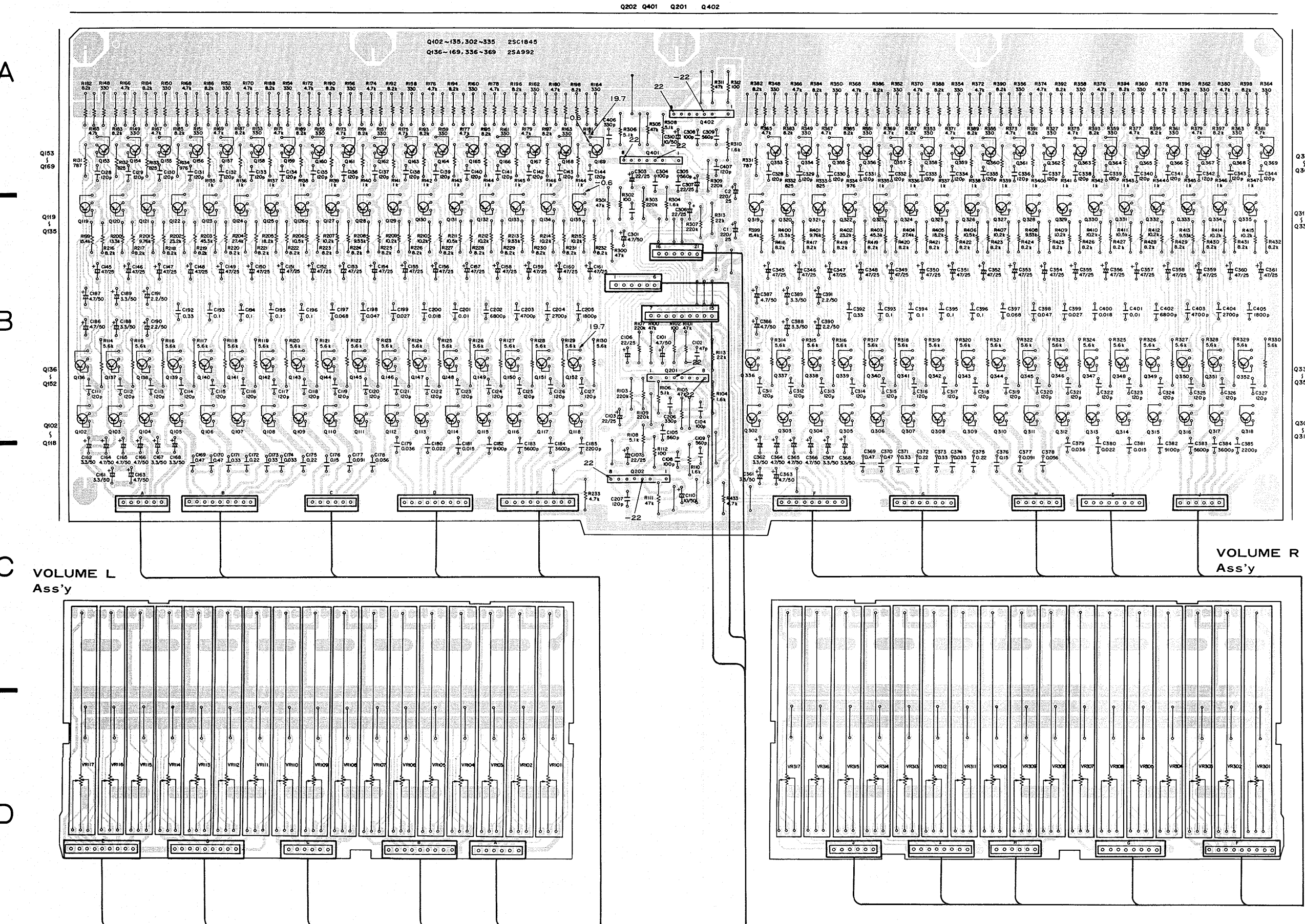
Mark	No.	Part No.	Description	Mark	No.	Part No.	Description
	1.	CBZ30P080FMC	Screw (3 x 8)	11.	AEP-007	Bumper	
	2.	ANM-451	Front panel assembly	12.	BBT30P080FZK	Screw (3 x 8)	
	3.	AAD-700	Knob (POWER)	51.		Bottom plate	
	4.	AAD-703	Knob				
	5.	AAD-702	Knob B				
	6.	AAB-345	Knob				
	7.	AAD-302	Knob				
	8.	AAD-701	Knob A				
	9.	FBT40P080FCR	Screw (4 x 8)				
	10.	ANE-458	Bonnet				



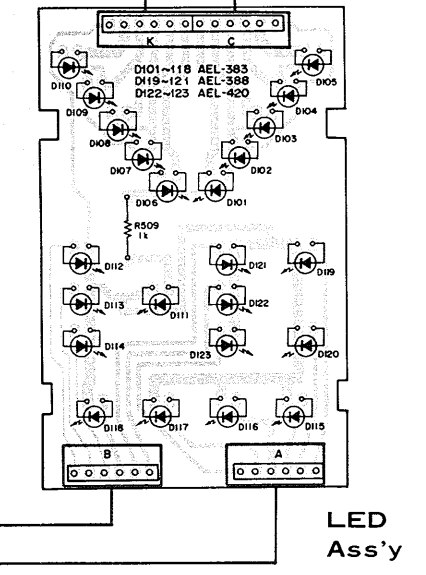
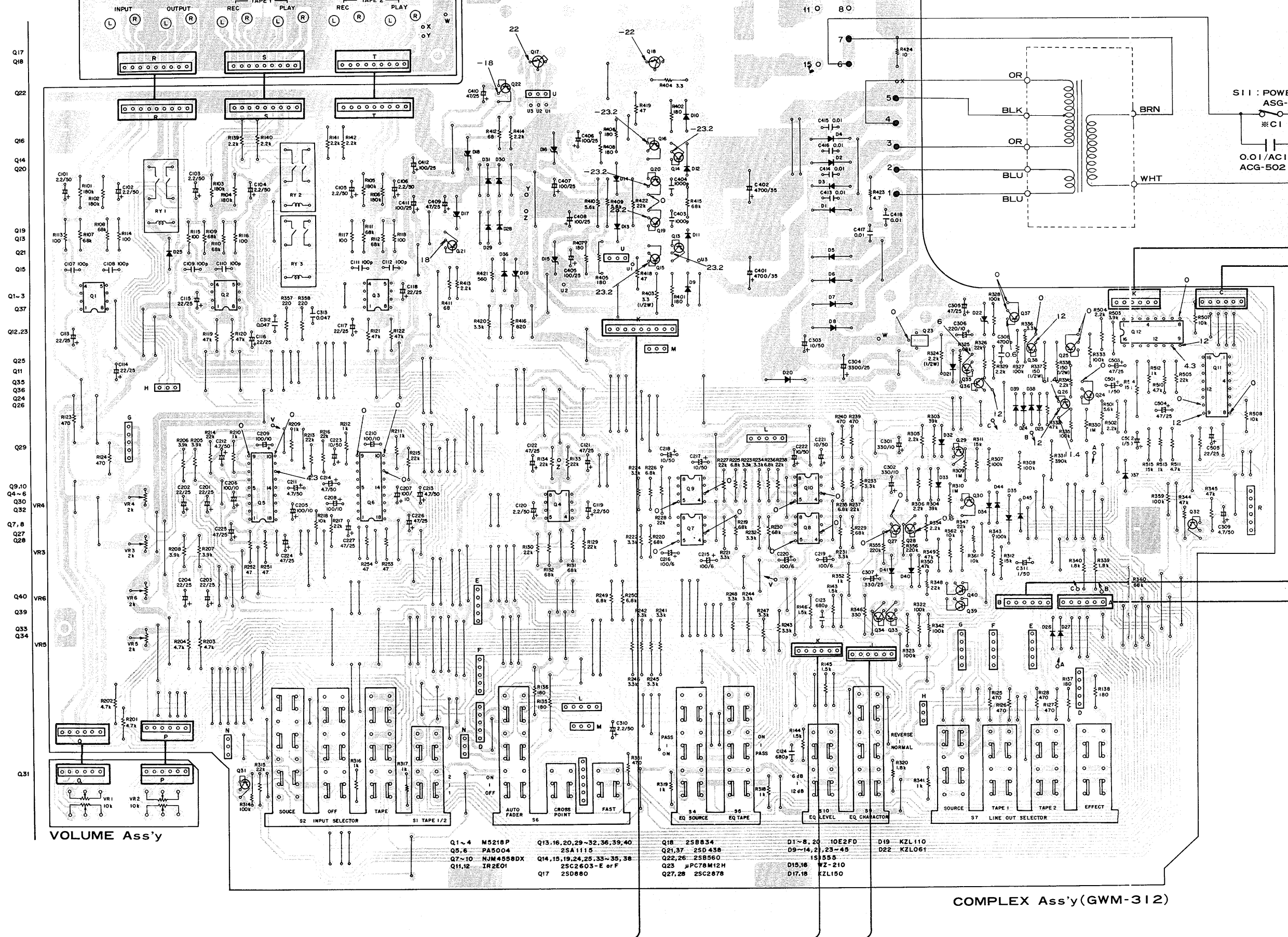
Mark	No.	Part No.	Description	Mark	No.	Part No.	Description
	1.	VMZ30P080FMC	Screw (3 x 8)	51.			...
	2.	ANR-295	Switch rod	52.			Transformer frame
	3.	BBZ30P080FZK	Screw (3 x 8)	53.			Volume (L) assembly
	4.	NK90FZB	Nut	54.			Volume (R) assembly
Δ ★★	5.	ASG-541	Push switch (POWER)	55.			Front stay
Δ ★	6.	ACG-502	Ceramic capacitor	56.			LED assembly
Δ ★	7.	ATS-042	Power transformer (120V)	57.			Volume assembly
Δ	8.	AEC-525	Nylon rivet	58.			Rear panel
Δ	9.	GWX-918	Equalizer assembly	59.			PCB holder
Δ	10.	AKP-038	AC socket	60.			Terminal assembly
	11.	GWM-312	Mother board assembly	61.			Center frame
Δ	12.	MTZ30P100FZK	Screw (3 x 10)	62.			Right frame
	13.	ADG-052	AC power cord				

7. P.C. BOARDS CONNECTION DIAGRAM

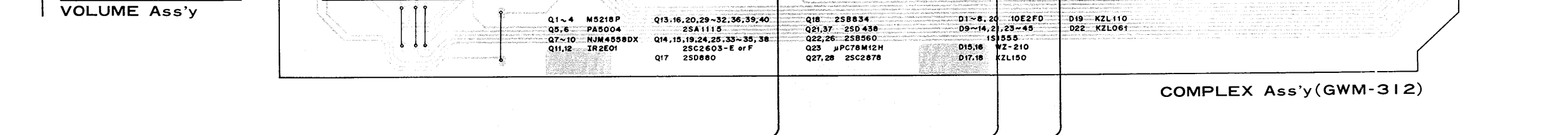
EQUALIZER Ass'y(GWX-918)



INPUT TERMINAL Ass'y



COMPLEX Ass'y(GWM-312)



8. SCHEMATIC DIAGRAM

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

A

B

C

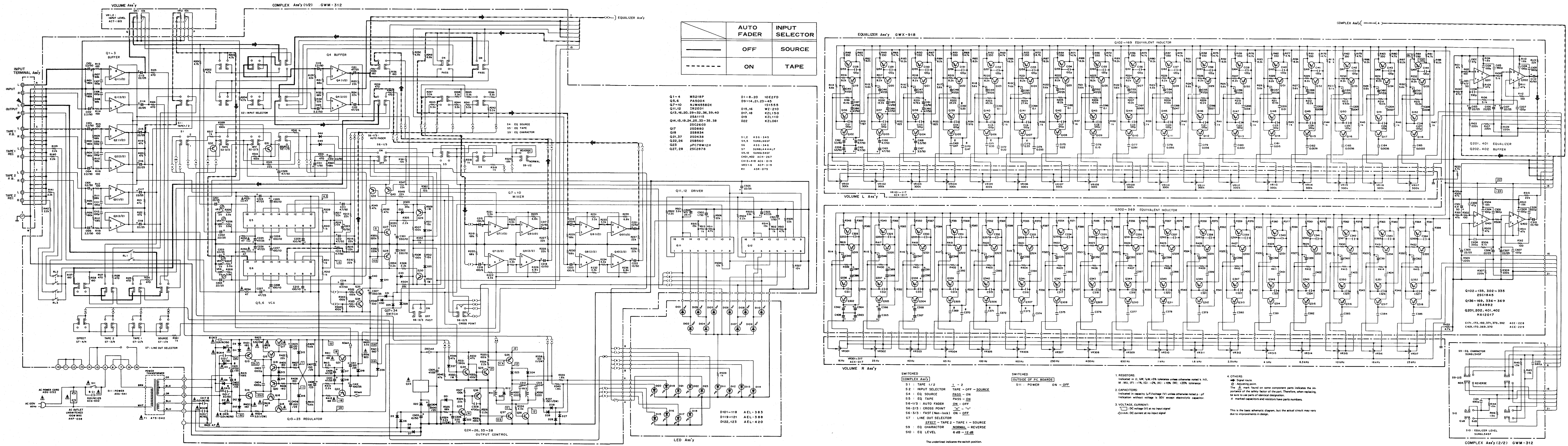
D

A

B

C

D



	AUTO FADER	INPUT SELECTOR
—	OFF	SOURCE
- - -	ON	TAPE

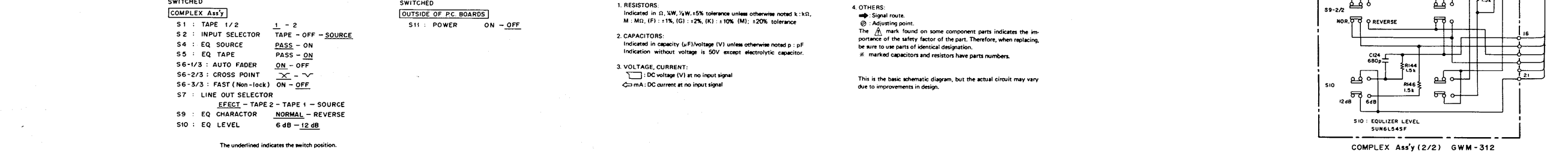
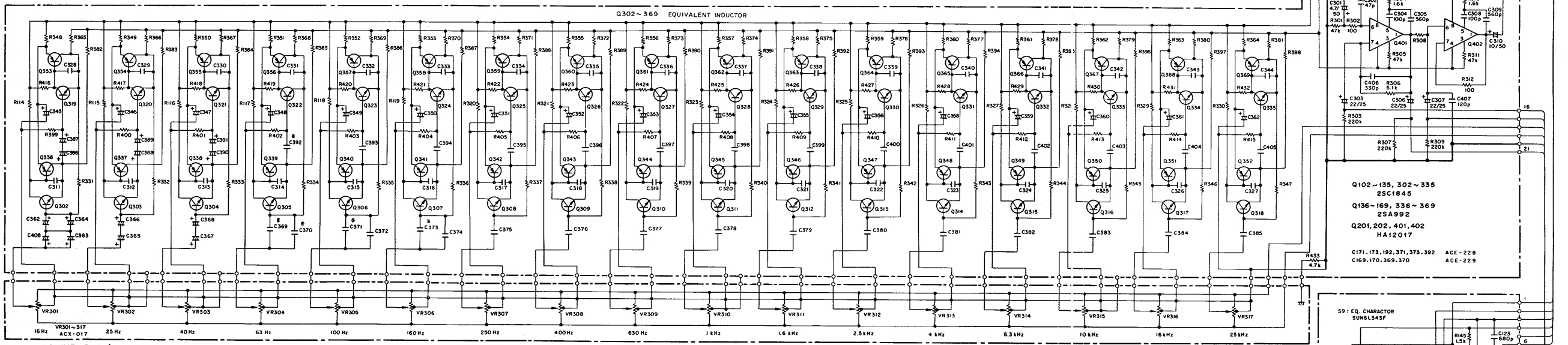
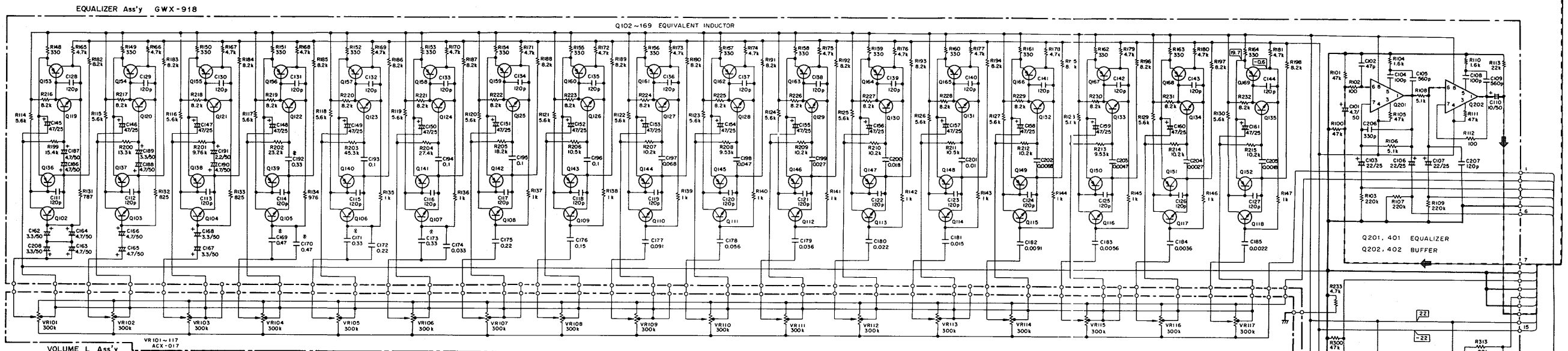
- Q1-4 M5218P
Q5-8 PA0004
Q7-10 NJM45580X
Q11,12 IR2E01
Q13,16,20,29-32,36,39,40
Q14,15,19,24,25,33-35,38
Q17 Q18
Q21,37 2SD438
Q22,26 2SD950
Q23 JPC78M12H
Q27,28 2SC2878
- D1-6,20 10E2FD
D9-14,21,23-45 10F555
D15,16 WZ-210
D17,18 KZL150
D19 KZL110
D22 KZL061
- S1,2 456-345
S4,5 SUPRELESP
S6 ASS-346
S7 SUPRELE444LF
S10 SUPRELE45F
CA0,402 ACC-267
CA13-18 ACC-019
VW1-6 ACC-319
RV ASS-075

- D101-118 AEL-383
D119-124 AEL-388
D122,123 AEL-420

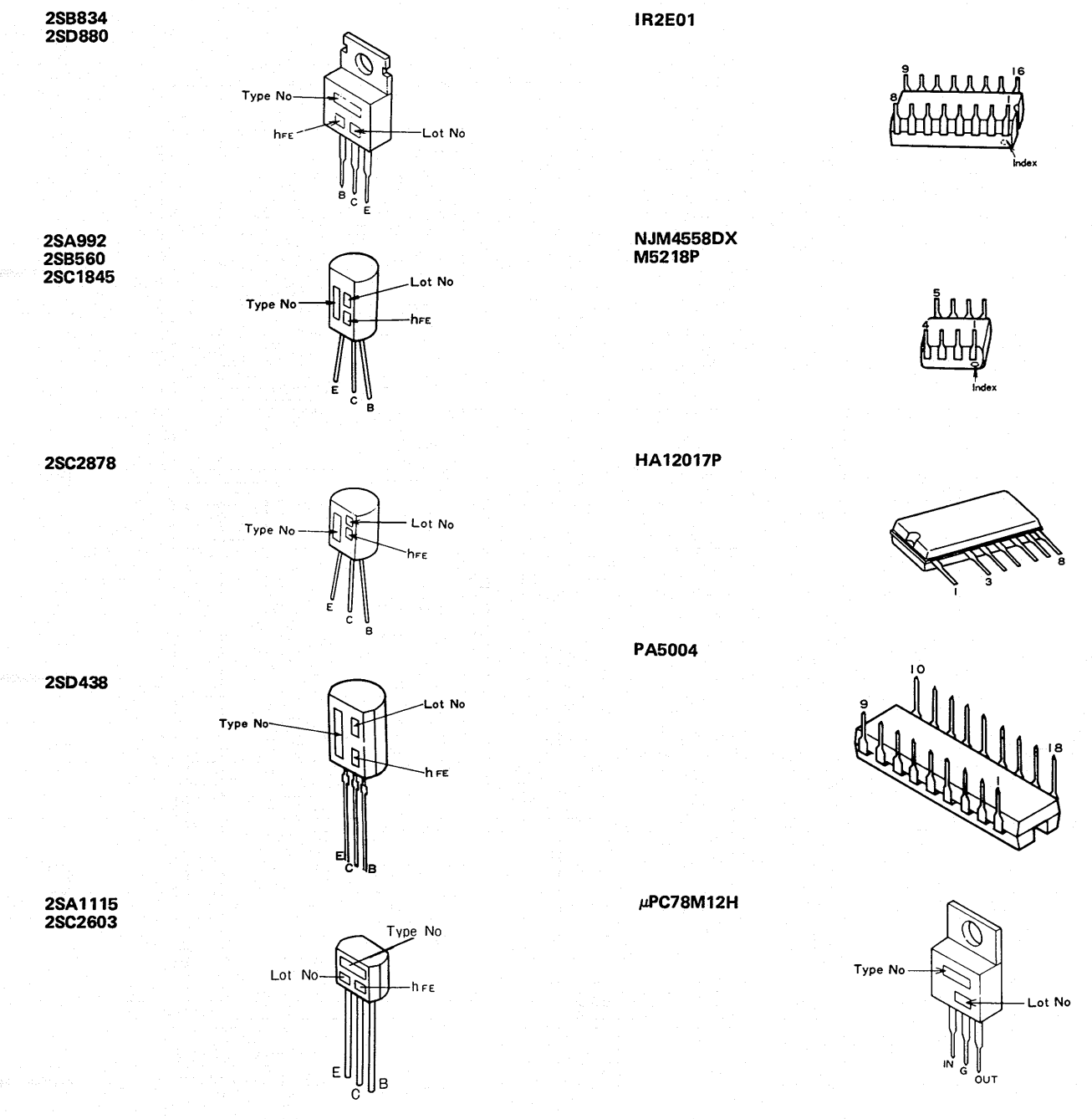
- Q102-135, 302-335 2SC1845
Q136-169, 336-369 2SA992
Q201, 401, 402 9A15017
C171,172,192,371,379,392 ACC-228
C186,170,369,370 ACC-229

- RESISTORS:
Indicated in Ω, kΩ, MΩ, 1% tolerance unless otherwise noted.
1%: 100, 1% (100); 5%: 100 (5); 10%: 100 (10)
- CAPACITORS:
Indicated in pF (pF), nF (nF), μF (μF) unless otherwise noted.
Indicated in pF (pF) unless otherwise noted.
Indicated in nF (nF) unless otherwise noted.
Indicated in μF (μF) unless otherwise noted.
- VOLTAGE CURRENTS:
DC: Voltage (V) or no input signal
AC: mA, DC current at no input signal
- OTHERS:
⊕: Signal source
⊙: Adjusting point
The β mark beside some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
If marked capacitors and resistors have parts numbers.
- This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

- SWITCHED OUTSIDE OF PC BOARDS:
S11 POWER ON - OFF



External Appearances of Transistors and IC's



9. ELECTRICAL PARTS LIST

NOTES:

- When ordering resistors, first convert resistance values into code form as shown in the following examples.
- 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 RD½PS 560 J
 47kΩ 47 × 10³ 473 RD½PS 473 J
 0.5Ω 0R5 RN½H 0R5 K
 1Ω 010 RS1P 010 K
- When there are 3 effective digits (such as in high precision metal film resistors).
 5.62kΩ 562 × 10¹ 5621 RN¼SR 5621 F
- 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 ★★ and ★.
 ★★ **GENERALLY MOVES FASTER THAN ★**
 This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

Miscellaneous

P. C. BOARD ASSEMBLIES

Mark	Part No.	Symbol & Description
	GWM-312	Mother board assembly
	GWX-918	Equalizer assembly
	non supply	Volume (L) assembly
	non supply	Volume (R) assembly
	non supply	Volume assembly
	non supply	Terminal assembly
	non supply	LED assembly

OTHERS

Mark	Part No.	Symbol & Description
★	ATS-042	T1 Power transformer
★	ASG-541 (ASG-539)	S11 Push switch (POWER)
Δ	ACG-502	C1 Ceramic (0.01/AC125V)
Δ	AKP-038	AC Socket
Δ	ADG-052	AC Power cord

Mother Board Assembly (GWM-312)

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★★	M5218P	Q1 - Q4
★★	NJM4558DX	Q7 - Q10
★★	PA5004	Q5, Q6
★★	IR2E01	Q11, Q12
★★	2SA1115	Q13, Q16, Q20, Q29, Q30, Q31, Q32, Q39, Q40
★★	2SC2603	Q14, Q15, Q19, Q24, Q25, Q33 - Q35, Q38
Δ	2SD880	Q17
Δ	2SB834	Q18
★	2SC2878	Q27, Q28

Miscellaneous

Mark	Part No.	Symbol & Description
★★	2SB560	Q22, Q26
★★	2SD438	Q21, Q37
★★	μPC78M12H	Q23
Δ	10E2FD	D1 - D8
★	10E2FD	D20
★	KZL061	D22
★	KZL150	D17, D18
★	WZ-210	D15, D16
★	KZL110	D19
★	1S1555 (1S2473)	D9 - D25, D28 - D45

SWITCHES

Mark	Part No.	Symbol & Description
★★	SUN6L4444LF	S7 Push switch (LINE OUT SELECTOR)
★★	SUN6L54SF	S9, S10 Push switch (EQ CHARACTER, EQ LEVEL)
★★	SUN6L66SF	S4, S5 Push switch (EQUALIZER)
★★	ASG-345	S1, S2 Push switch (INPUT SELECTOR)
★★	ASG-346	S6 Push switch (AUTO FADER)

CAPACITORS

Mark	Part No.	Symbol & Description
	ACH-267	C401, C402 Electrolytic (4700/35V)
Δ	ACG-019	C413 - C418 Ceramic (0.01/AC150V)
	CEA 010M 50L	C311, C501, C502

Mark	Part No.	Symbol & Description	Mark	Part No.	Symbol & Description
	CEA 2R2M 50L	C310		CQSA 331J 50	C206, C406
	CEA 4R7M 50L	C211 - C214, C309		CEXA 2R2M 50	C190, C191, C390, C391
	CEA 100M 50L	C217, C218, C221 - C223, C303		CEXA 3R3M 50	C162 - C168, C188, C189, C208
	CEA 220M 25L	C201 - C204, C505			C362 - C368, C388, C389, C408
	CEA 470M 25L	C224 - C227, C305, C503, C504, C409, C410		CEXA 4R7M 50	C101, C163 - C166, C186, C187, C301, C363 - C366, C386, C387
	CEA 101M 6L	C215, C216, C219, C220		CEXA 220M 25	C103, C106, C107, C303, C306, C307
	CEA 101M 10L	C205 - C209		CEXA 100M 50	C110, C130
	CEA 101M 25L	C405 - C408, C411, C412		CEA 470M 25L	C145 - C161, C345 - C361
	CEA 221M 10L	C306		CEA 221M 25L	C1, C2
	CEA 331M 10L	C301, C302		CQMA 182J 50	C205, C405
	CEA 331M 25L	C307		CQMA 222J 50	C185, C385
	CEA 332M 25L	C304		CQMA 272J 50	C204, C404
	CEXA 2R2M 50	C101 - C106, C119, C120		CQMA 362J 50	C184, C384
	CEXA 220M 25	C113 - C118		CQMA 472J 50	C203, C403
	CEXA 470M 25	C121, C122		CQMA 562J 50	C183, C483
	CQMA 102J 50	C403, C404		CQMA 682J 50	C202, C402
	CQSA 101J 50	C107 - C112		CQMA 912J 50	C182, C382
	CQSA 681J 50	C123, C124		CQMA 103J 50	C201, C401
	CKDYF 472Z 50	C308		CQMA 153J 50	C181, C381
	CKDYF 473Z 50	C312, C313		CQMA 183J 50	C200, C400

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-319	VR3 - VR6 (Semi-fixed, 2k)
Δ	RD1/2PSFL □□□ J	R403, R404
Δ	RD1/4PMFL □□□ J	R251 - R254, R401, R402, R411, R412, R416, R418, R419, R423, R324, R337, R338
	RD1/2PS □□□ J	R324, R337, R338
	RD1/4PM □□□ J	Other resistors
	CQMA 223J 50	C180, C380
	CQMA 273J 50	C199, C399
	CQMA 333J 50	C174, C374
	CQMA 363J 50	C179, C379
	CQMA 473J 50	C198, C398
	CQMA 563J 50	C178, C378
	CQMLA 683J 50	C197, C397
	CQMLA 913J 50	C177, C377
	CQMLA 104J 50	C193 - C196, C393 - C396
	CQMLA 154J 50	C176, C376
	CQMLA 224J 50	C172, C175, C372, C375
	ACE-228	C171, C173, C192, C371, C373, C392 Mylar (0.33/50V)
	ACE-229	C169, C170, C369, C370 Mylar (0.47/50V)

OTHERS

Mark	Part No.	Symbol & Description
★★	ASR-075	RL1 - RL3 Relay
	VBZ30P060FMC	Screw (3 x 6)

Equalizer Assembly (GWX-918)

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★★	HA12017P	Q201, Q202, Q401, Q402
★★	2SA992	Q136 - Q169, Q336 - Q369
★★	2SC1845	Q102 - Q135, Q302 - Q335

CAPACITORS

Mark	Part No.	Symbol & Description
	CQSA 470J 50	C102, C302
	CQSA 101J 50	C104, C108, C304, C308
	CQSA 121J 50	C111 - C144, C207, C311 - C344, C407
	CQSA 561J 50	C105, C109, C305, C309

Volume (L) Assembly

Mark	Part No.	Symbol & Assembly
★	ACX-017	VR101 - VR117 Variable (300k)
	PMZ20P030FZB	Screw (2 x 3)

Volume (R) Assembly

Mark	Part No.	Symbol & Description
★	ACX-017	VR301 - VR317 Variable (300k)
	PMZ20P030FZB	Screw (2 x 3)

LED Assembly

Mark	Part No.	Symbol & Description
★	AEL-383	D101 - D118 LED (C green)
★	AEL-388	D119 - D121 LED (F red)
★	AEL-420	F122, F123 LED (C range)
	RD1/4PM681J	R509

Terminal Assembly

Mark	Part No.	Symbol & Description
	AKB-095	Terminal (EQUALIZER, TAPE1, TAPE2)

Volume Assembly

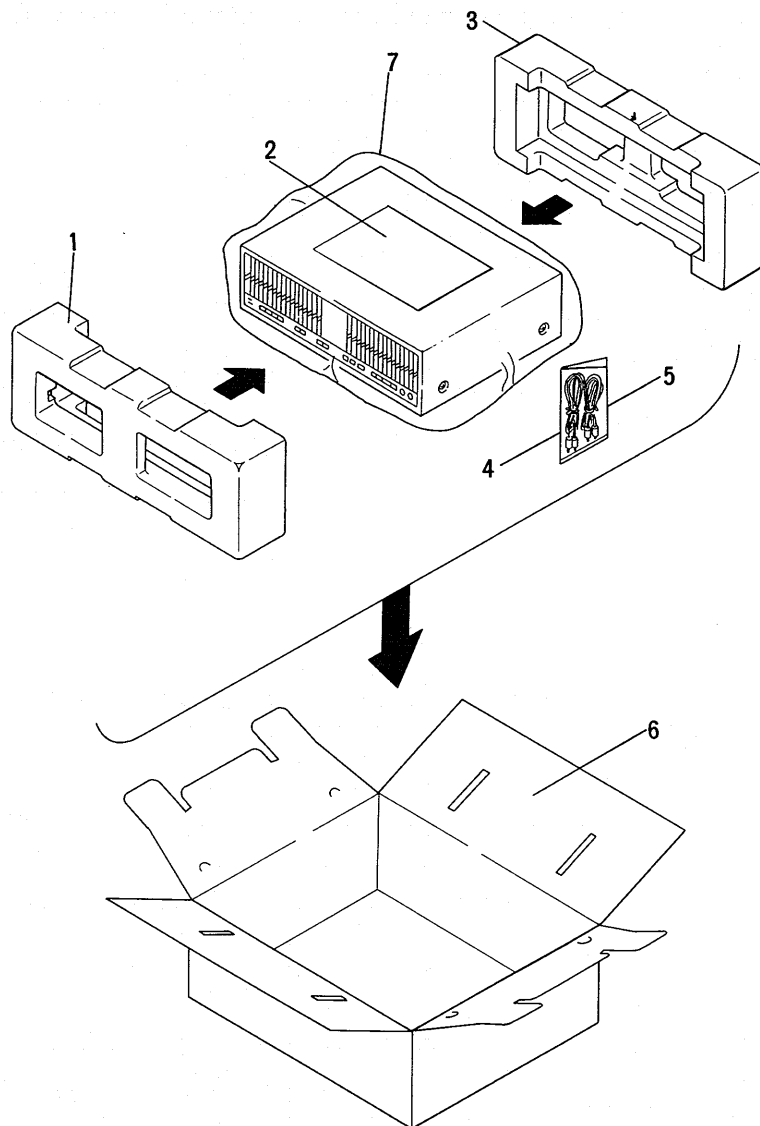
Mark	Part No.	Symbol & Description
★	ACT-185	VR1, VR2 Variable (10k, INPUT LEVEL)

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
Δ	RD1/4PMF 331J	R148 - R164, R348 - R364
	RN1/4PQ □□□□ F	R135 - R147, R199 - R215
		R335 - R347, R399 - R415
	RD1/4PM □□□ J	Other resistors

10. PACKING



Mark	No.	Part No.	Description
	1.	AHA-352	Front pad
	2.	ARB-573	Operating instructions (English)
	3.	AHA-353	Rear pad
	4.	ADE-005	Connecting cord (gray)
	5.	ADE-055	Connecting cord (black)
	6.	AHE-246	Packing case

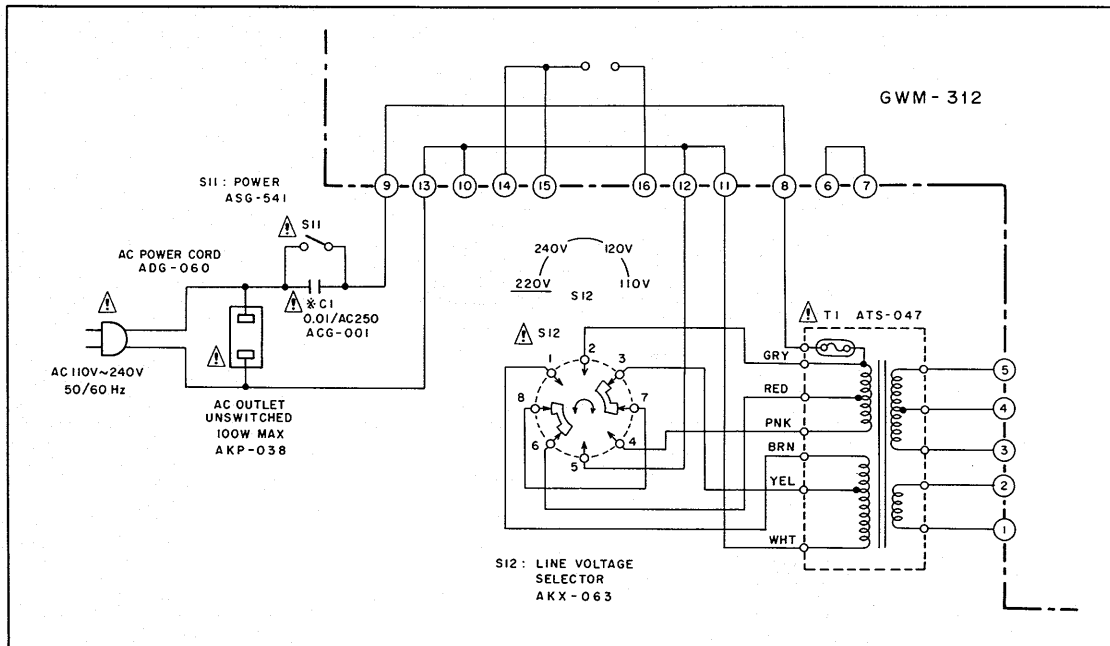
11. FOR S AND S/G TYPES

S and S/G types are the same as the KU type with the exception of the following sections.

Contrast of Miscellaneous Parts

Mark	Symbol & Description	Part No.			Remarks
		KU type	S type	S/G type	
⚠ ★	T1 Power transformer (120V) (110, 120, 220, 240V)	ATS-042 ATS-047	... ATS-047	
⚠ ★★	S12 Line voltage selector	...	AKX-063	AKX-063	
⚠	C1 Ceramic (0.01/AC125V) (0.01/AC250V)	ACG-502 ACG-001	... ACG-001	
⚠	AC power cord	ADG-052	ADG-060	ADG-060	
	Screw (3 x 10)	...	VTZ30P100FZK	VTZ30P100FZK	Line Voltage Selector
	Packing case	AHE-246	AHE-246	AHE-247	
	Spacer	AHB-138	
	Operating instructions (Spanish)	...	ARC-060	

POWER SUPPLY CIRCUIT FOR S AND S/G TYPES



12. ADJUSTMENTS

Gain Adjustments of Electronic Volume (VCA)

		SOURCE VCA (Q5)	TAPE VCA (Q6)
1	First setting	INPUT LEVEL → MAX	
		EQUALIZER → PASS	
2		LINE OUT SELECTOR → EFFECT	
		FADER → OFF	
3		INPUT SELECTOR → SOURCE	INPUT SELECTOR → TAPE I
4		Apply signal (1V, 1kHz) to INPUT terminal	Apply Signal (1V, 1kHz) to TAPE1 PLAY terminal
5	Adjustment	FADER → ON	
		Turn VR 3 (L), VR 4 (R)	Turn VR 5 (L), VR 6 (R)
5	Requirement	DC 1V ±25mV at OUTPUT terminal	

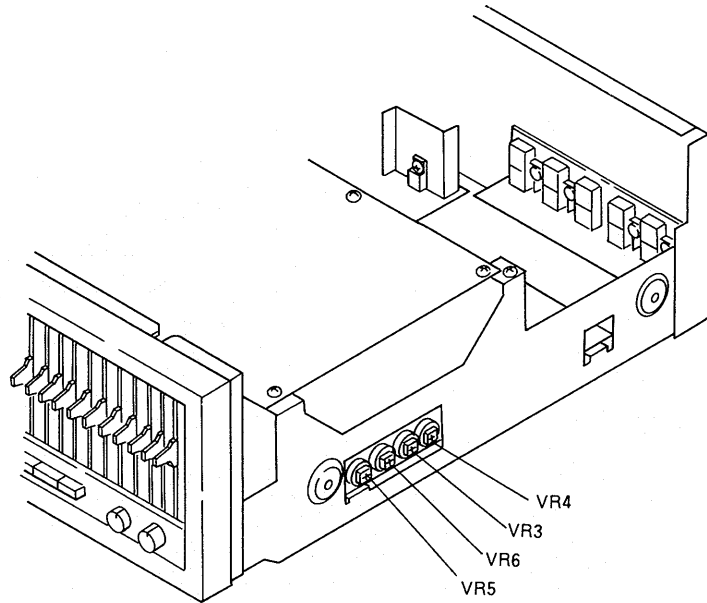


Fig. 12 Adjustment points

12. RÉGLAGE

Réglage du gain pour le volume électronique (VCA)

		VCA source (Q5)	VCA bande (Q6)
1	Premier réglage	Niveau d'entrée → MAX Egalisateur → PASS Sélecteur de sortie de ligne → EFFECT Atténuateur → OFF	
2		Sélecteur d'entrée → SOURCE	Sélecteur d'entrée → TAPE 1
3		Appliquer le signal (1V, 1kHz) à la borne d'entrée (INPUT)	Appliquer le signal (1V, 1kHz) à la borne de lecture TAPE 1 PLAY
4	Réglage	Atténuateur → ON	
5		Tourner VR3 (G), VR4 (D)	Tourner VR5 (G), VR6 (D)
	Valeur requise	c.c. 1V ±25mV à la borne de sortie (OUTPUT)	

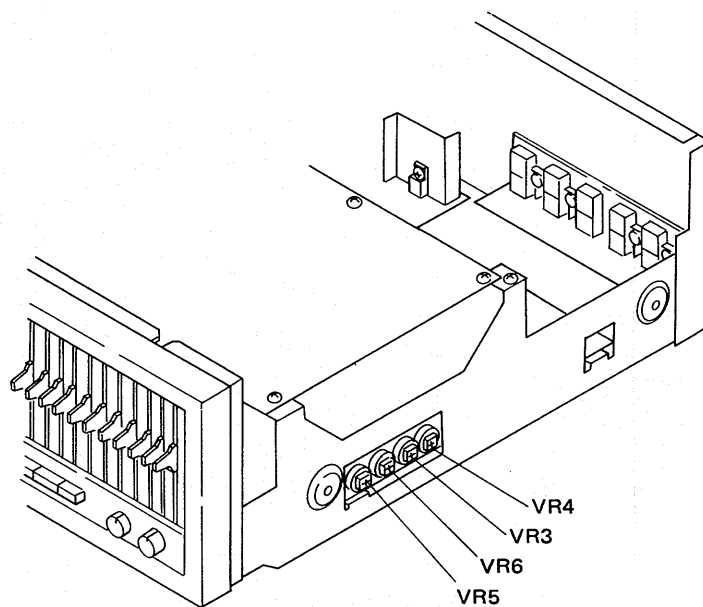


Fig. 12 Points de réglage

12. AJUSTE

Ajustes de ganancia del volumen electrónico (VCA)

		SOURCE VCA (Q5)	TAPE VCA (Q6)
1	Primer ajuste	INPUT LEVEL → MAX EQUALIZER → PASS LINE OUT SELECTOR → EFFECT FADER → OFF	
2		INPUT SELECTOR → SOURCE	INPUT SELECTOR → TAPE 1
3		Aplicar la señal (1V, 1kHz) al terminal INPUT	Aplicar la señal (1V, 1kHz) al terminal TAPE 1 PLAY
4	Ajuste	FADER → ON	
5		Girar VR3 (Izq.) y VR4 (Der.)	Girar VR5 (Izq.) y VR6 (Der.)
	Requisitos	1V CC ±25mV en el terminal OUTPUT	

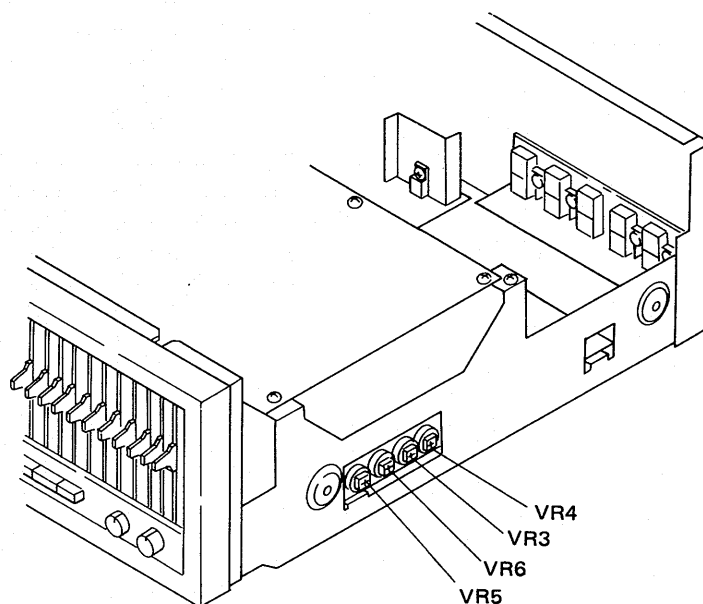


Fig. 12 Puntos de ajuste

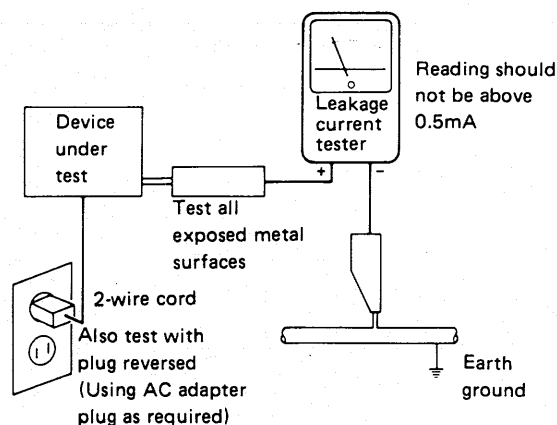
13. SAFETY INFORMATION

1. SAFETY PRECAUTIONS

The following check should be performed for the continued protection of the customer and service technician.

LEAKAGE CURRENT CHECK

Measure leakage current to a known earth ground (water pipe, conduit, etc.) by connecting a leakage current tester such as Simpson Model 229-2 or equivalent between the earth ground and all exposed metal parts of the appliance (input/output terminals, screwheads, metal overlays, control shaft, etc.). Plug the AC line cord of the appliance directly into a 120V AC 60Hz outlet and turn the AC power switch on. Any current measured must not exceed 0.5mA.



AC Leakage Test

ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

2. PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in the appliance have special safety related characteristics. These are often not evident from visual inspection nor the protection afforded by them necessarily can be obtained by using replacement components rated for voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual.

Electrical components having such features are identified by marking with a Δ on the schematics and on the parts list in this Service Manual.

The use of a substitute replacement component which does not have the same safety characteristics as the PIONEER recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, or other hazards.

Product Safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current PIONEER Service Manual. A subscription to, or additional copies of, PIONEER Service Manual may be obtained at a nominal charge from PIONEER.