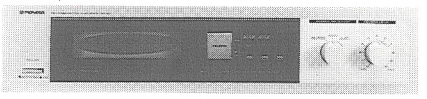
PIONEER®

Service Manual

CIRCUIT DESCRIPTIONS
REPAIR & ADJUSTMENTS



ORDER NO.
ARP-445-0

REVERBERATION AMPLIFIER

SR-60

MODEL SR-60 COMES IN ISX 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

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

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1. SPECIFICATIONS

Reverberation Amplifier Section

Reberb time (REVERB) 400Hz . . . . . 0~3 sec
Reberb time (ECHO) 400Hz . . . . . 0~3 sec
Delay time (DUET) 400Hz . . . . . 100 m/sec
Input (Sensitivity/Impedance) 150mV/50kΩ
(at 1kHz, REVERB LEVEL volume: 0)
Frequency Response . . . . . 10Hz to 70kHz $^{+0}_{-1}$ dB
(at REVERB LEVEL volume: 0)
Total Harmonic Distortion 0.005%
(at 1kHz, 1V, REVERB LEVEL volume: 0)
Maximum Output Level 6.5V
(at 1kHz, 0.01%, REVERB LEVEL volume: 0)
Signal to Noise Ratio (IHF A Network, short circuit)
at 1V, REVERB LEVEL volume: 0 ..... 98dB
at 2V, REVERB LEVEL volume: 0 ..... 104dB
Output (level/Impedance)
REVERBERATION OUTPUT 150mV/220Ω
(at 1kHz, REVERB LEVEL volume: 0)
TAPE REC 150mV/220Ω

Miscellaneous

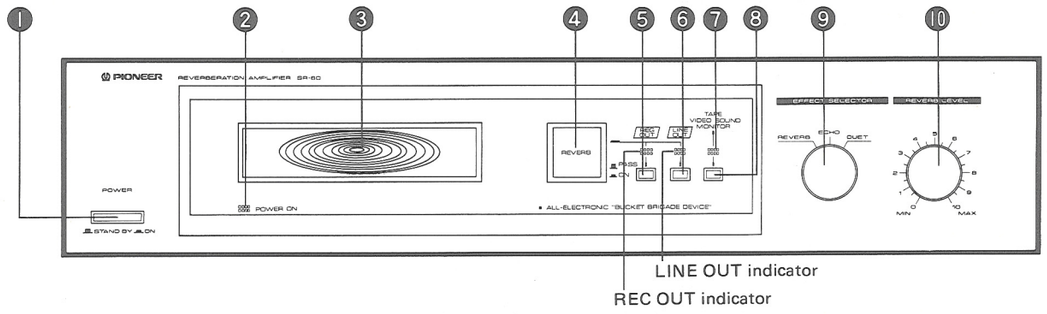
Power Requirements
KU, KC models . . . . . AC120 Volts, 60Hz
S, S/G models . . . . . ~AC110V/120V/220V/240V
(switchable), 50/60Hz
HB model . . . . . a.c. 240 Volts~50/60Hz
YP model . . . . . a.c. 240 Volts~50Hz
Power Consumption . . . . . 25 Watts (max.)
Dimensions . . . . . 420 (W) x 99 (H) x 340 (D) mm
16-9/16 (W) x 3-7/8 (H) x 13-3/8 (D) in
Weight (without package) . . . . . 4.6kg (10 lb 2 oz)

Furnished Parts

Connection cord with pin plugs 2
Operating instructions 1

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

2. FRONT PANEL FACILITIES



❶ POWER SWITCH

When this switch is set to the ON position, power is supplied to the unit's main circuits and the indicator lights. The unit's power switch is geared to selecting the transformer's secondary and so even at the STAND-BY position, the unit's circuitry will work as long as the power cord is connected to the power outlet.
Disconnect the power cord from the power outlet when you do not plan to use the unit for a long period of time.

❷ POWER INDICATOR

This comes on as soon as the SR-60's power switch is set to ON to indicate that power is being supplied.

❸ REVERBERATION EFFECT INDICATOR

This displays the reverberation effect graphically. When the reverberation effect is increased (the REVERB LEVEL control is rotated clockwise) the winking intervals of the light are lengthened. Conversely, when this time is reduced (the reverb level control is rotated counterclockwise), these intervals are cut short. Also, the lighting area increases in proportion to the size of the reverberation components. This area is increased as the reverb level control is rotated clockwise. The reverb level control is set to the preferred position as you check out the reverberation, but if the reverberation indicator's circle of light remain on the display, it means that the reverberation components are excessive (too much of an echo). Use this as a base for adjustments.

❹ REVERBERATION SWITCH

Depress this switch to produce a reverberation effect with the signals fed from the REVERBERATION INPUT jacks. The reverberation effect indicator will come on, and signals featuring a reverberation effect only will be fed out from the model SR-60's OUTPUT jacks.

❺ RECORDING (REC) OUT SWITCH

Depress this switch when recording a program source whose signals feature a reverberation effect onto a tape in a deck connected to the mode SR-60's TAPE/VIDEO SOUND jacks. This will allow signals with the reverberating sound to be made available from the SR-60's the TAPE REC/OUTPUT jacks.

❻ LINE OUT SWITCH

Depress this switch to produce a reverbration effect with the signals fed from the REVERBRATION INPUT jacks or TAPE/VIDEO SOUND MONITOR PLAY jacks.

NOTE:
The REC OUT switch, the LINE OUT switch are coupled. When you depress one switch, make sure that another is released. Do not depress more than one switch at a time.

❼ TAPE/VIDEO SOUND MONITOR INDICATOR

This comes on when the tape monitor switch is depressed.

❽ TAPE/VIDEO SOUND MONITOR SWITCH

Depress this switch to monitor the sound on the tape as it is being recorded or when playing back a tape using a tape deck connected to the SR-60's TAPE/VIDEO SOUND jacks. (The tape monitor indicator comes on.)

❾ EFFECT SELECTOR

Use these to select the type of reverb effect.
REVERB: For normal reverb effect.
ECHO: For a echo effect even though one person is singing. This is particulary effective with an electric guitar.
DUET: For a duet effect even though one person is singing.
Try out the selector and find the best combinations that suit your particular purpose.

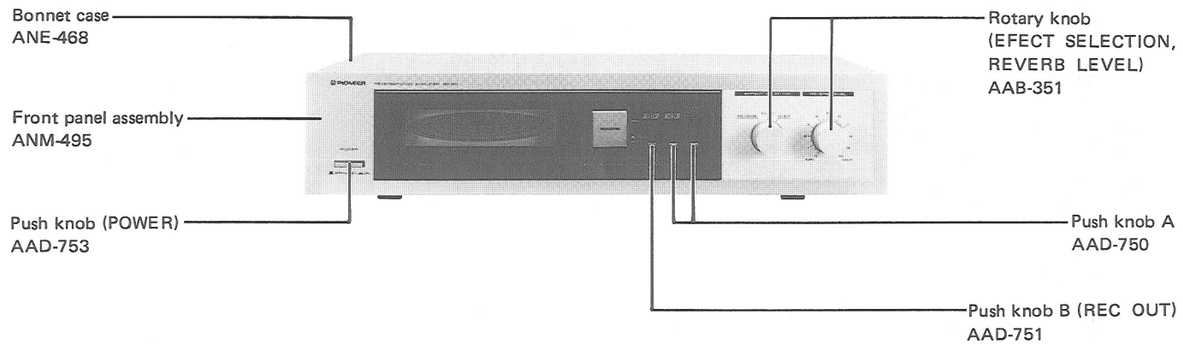
❿ REVERB LEVEL CONTROL

This is used to adjust the depth of the reverberation. When it is set to the '0' (MIN) position, only the original sound will be heard. The reverberation component increases as this control is rotated clockwise. Listen to the sound as it reverberates and adjust this control to the optimum position.

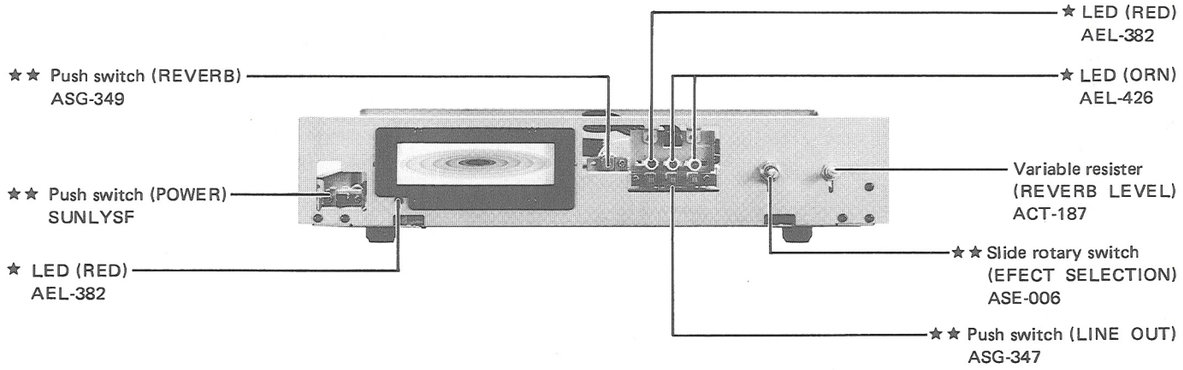
3. PARTS LOCATION

NOTES:
- *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.

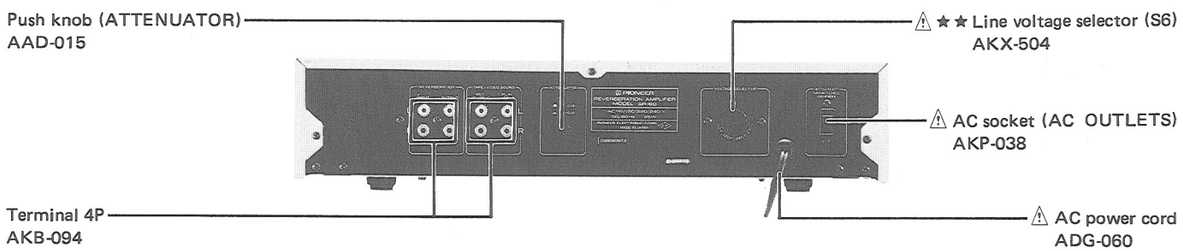
Front Panel View



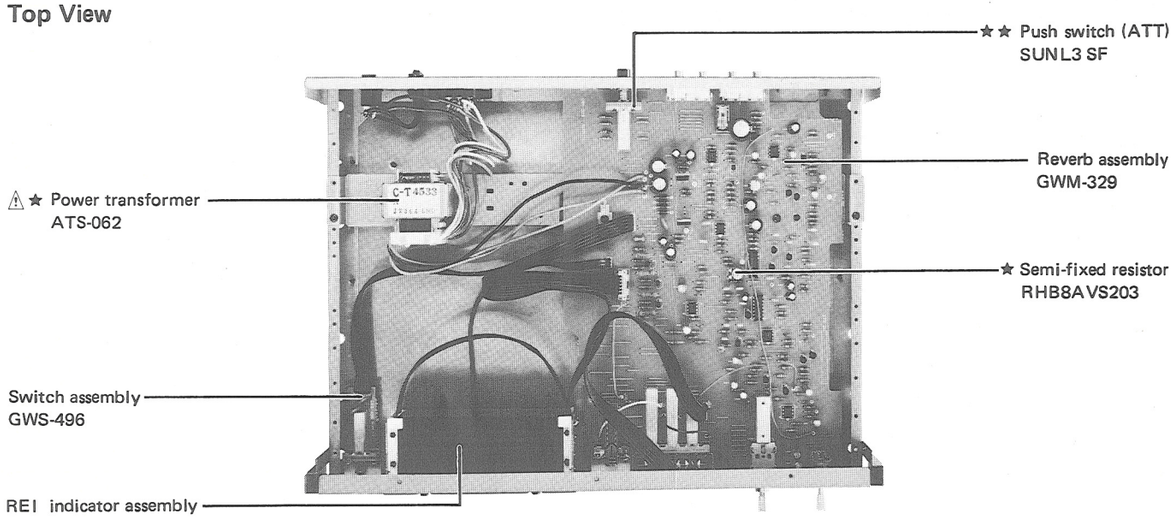
Front View with Panel Removed



Rear Panel View



Top View

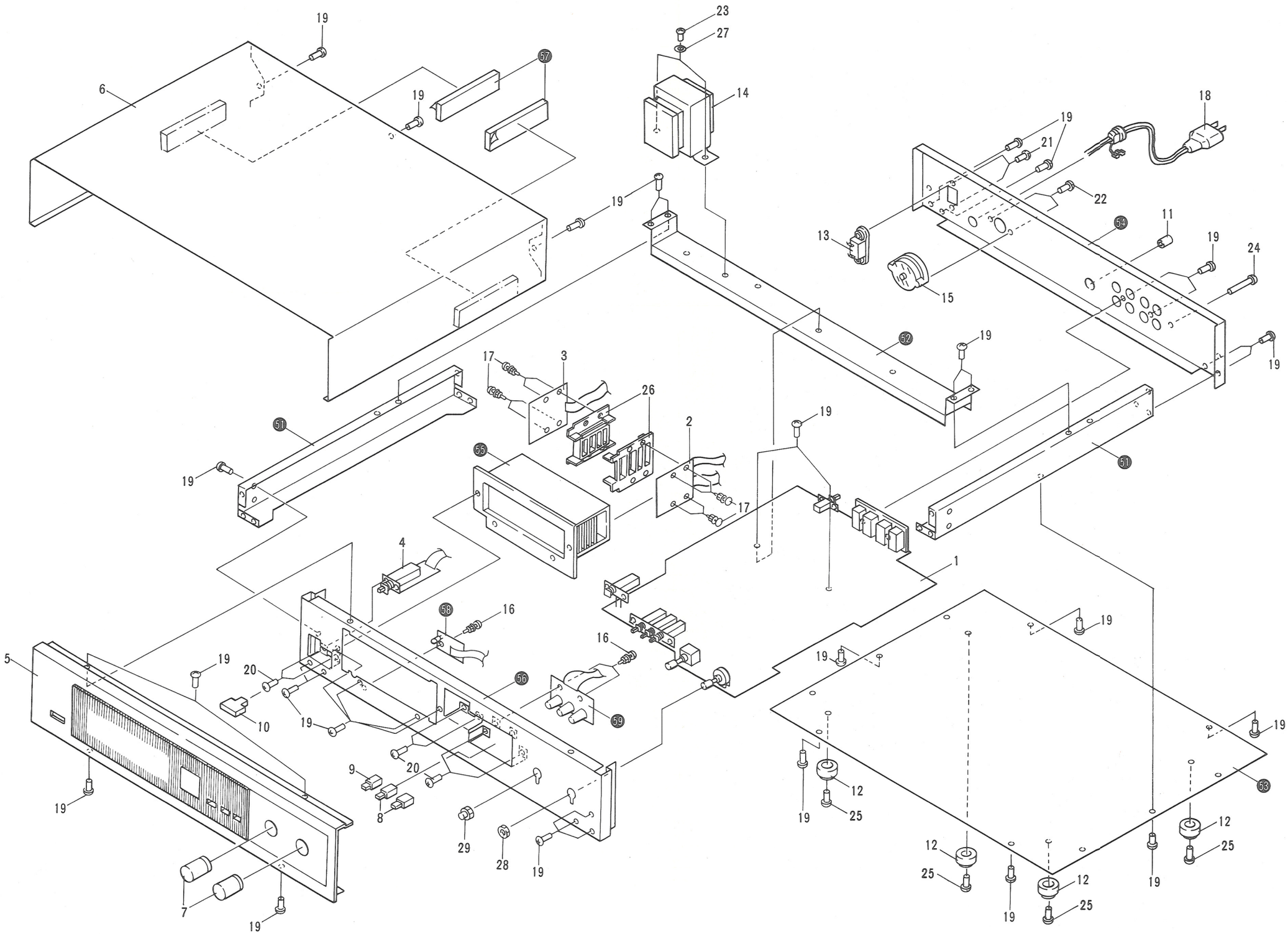


4. EXPLODED VIEW

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.

Parts List

Mark	No.	Part No.	Description
	1.	GWM-329	Reverb assembly
	2.	GWX-952	Lamp A assembly
	3.	GWX-953	Lamp B assembly
	4.	GWS-496	Switch assembly
	5.	ANM-495	Front panel assembly
	6.	ANE-468	Bonnet case
	7.	AAB-351	Rotary knob
	8.	AAD-750	Push knob A
	9.	AAD-751	Push knob B
	10.	AAD-753	Push knob
	11.	AAD-015	Push knob
	12.	AEC-351	Leg assembly
⚠ ★★	13.	AKP-038	AC socket (AC OUTLETS)
⚠ ★★	14.	ATS-062	Power transformer (110V, 120V, 220V, 240V)
⚠ ★★	15.	AKX-504	Line voltage selector (S6)
	16.	AEC-525	Nylon rivet
	17.	AEC-558	Nylon rivet
⚠ ★★	18.	ADG-060	AC power cord
	19.	BCZ30P060FZK	Screw 3 x 8
	20.	VMZ30P060FMC	Screw 3 x 6
	21.	MTZ30P100FZK	Screw 3 x 10
	22.	VTZ30P100FZK	Screw 3 x 10
	23.	VTZ40P080FMC	Screw 4 x 8
	24.	ABA-176	Screw
	25.	VTZ40P160FMC	Screw 4 x 16
	26.	ANR-079	Lamp box
	27.	WA45F125K50	Washer
	28.	NK90FZB	Nut
	29.	ABN-082	Guide boss
	51.		Side stay
	52.		Center frame
	53.		Bottom plate
	54.		Rear panel
	55.		REI indicator assembly
	56.		Panel stay
	57.		Cushion rubber
	58.		LED A assembly
	59.		LED B assembly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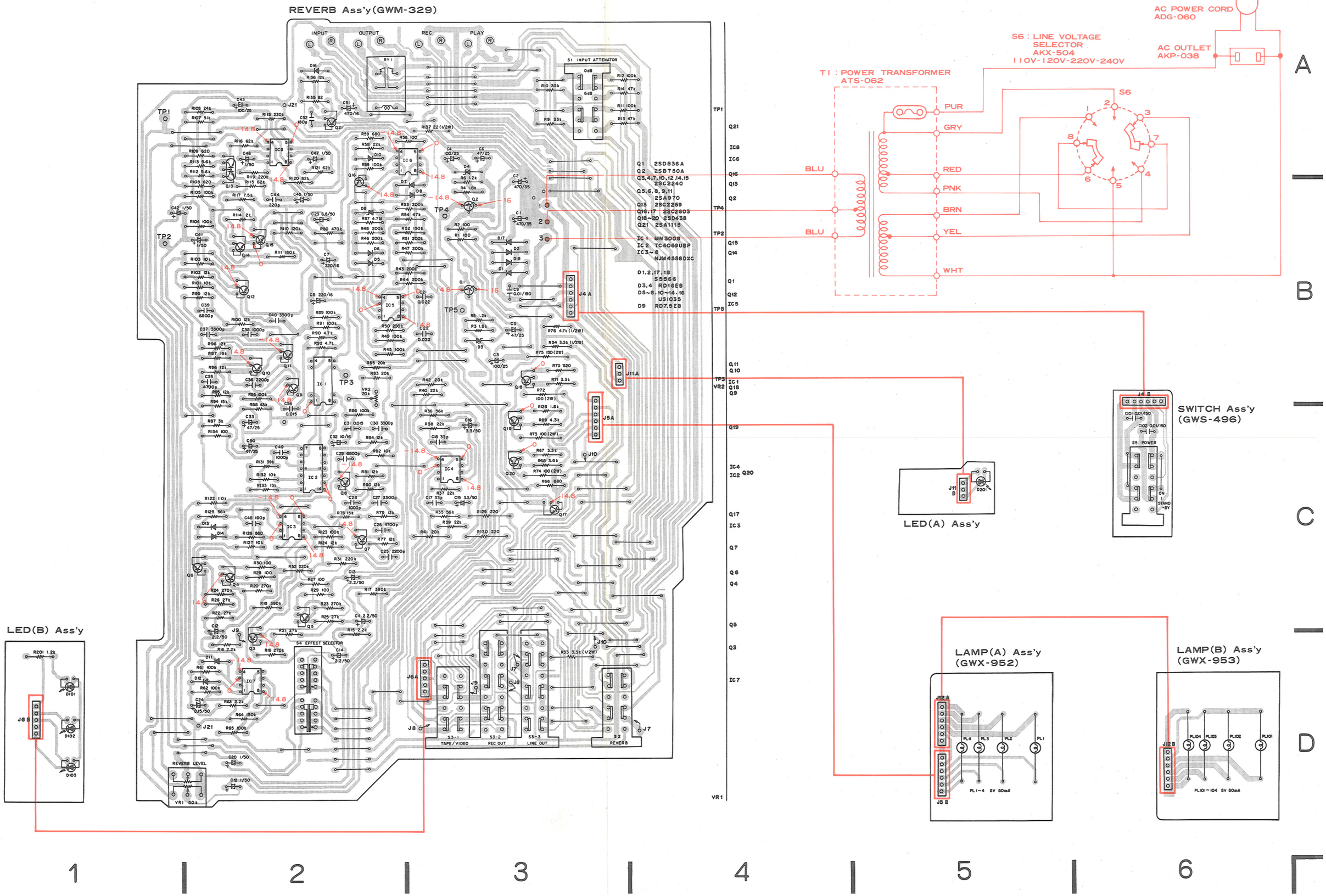
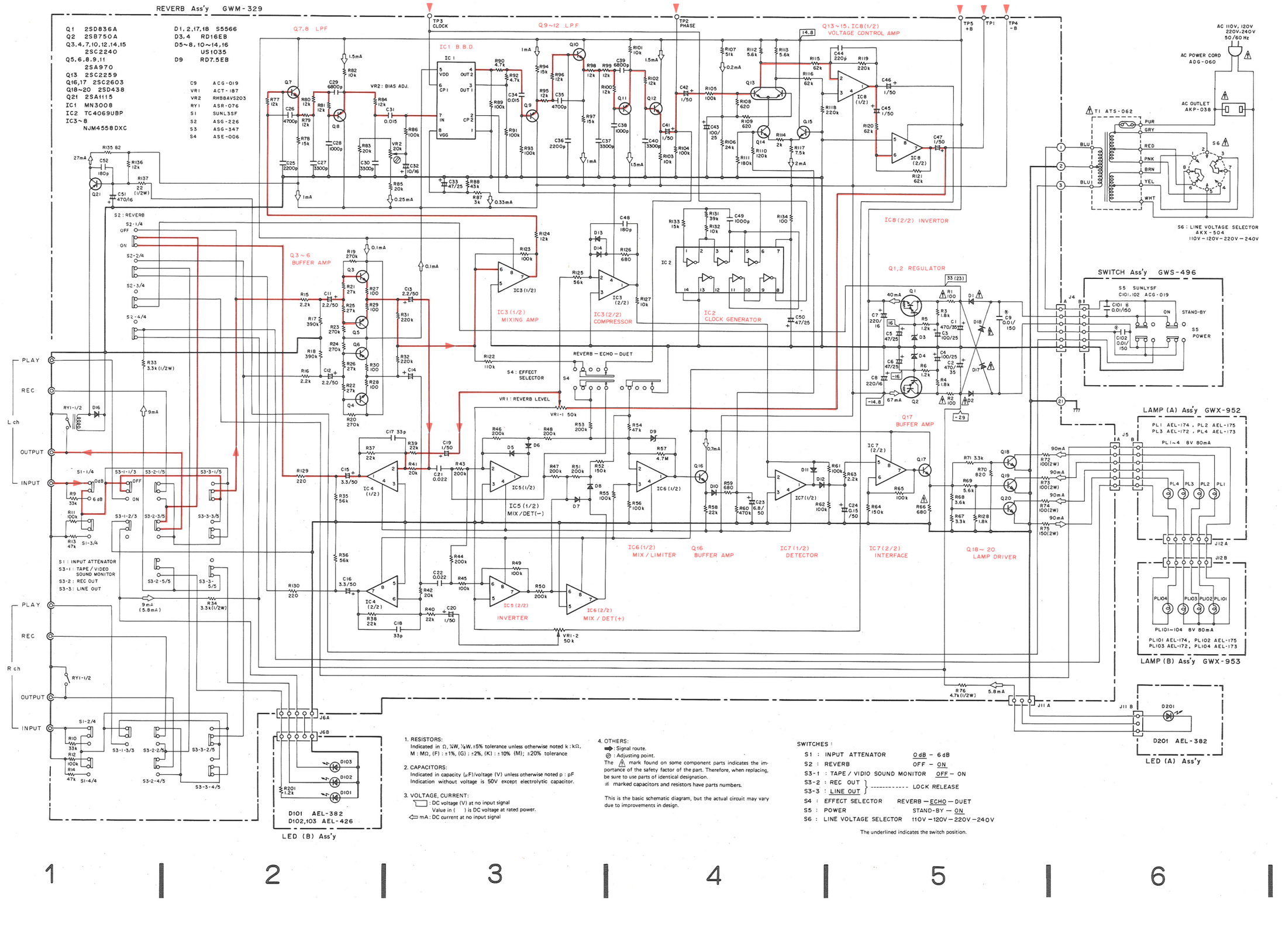
5. P.C.BOARDS CONNECTION DIAGRAM



6. SCHEMATIC DIAGRAM

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



1. RESISTORS:
Indicated in Ω, ¼W, ⅛W, ±5% tolerance unless otherwise noted k : kΩ, M : MΩ, (F) : ±1%, (G) : ±2%, (K) : ±10% (M); ±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:
: 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 ⚠ 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.
※ marked capacitors and resistors have parts numbers.

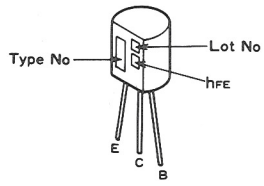
This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

SWITCHES :
S1 : INPUT ATTENATOR 0dB – 6dB
S2 : REVERB OFF – ON
S3-1 : TAPE / VIDIO SOUND MONITOR OFF – ON
S3-2 : REC OUT } ---------- LOCK RELEASE
S3-3 : LINE OUT }
S4 : EFFECT SELECTOR REVERB – ECHO – DUET
S5 : POWER STAND-BY – ON
S6 : LINE VOLTAGE SELECTOR 110V – 120V – 220V – 240V

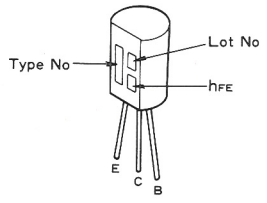
The underlined indicates the switch position.

External Appearance of Transistors and ICs

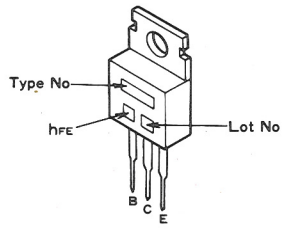
2SA970
2SC2240



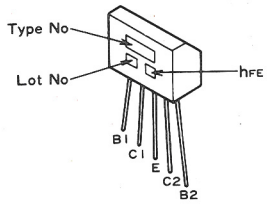
2SA992
2SC1845



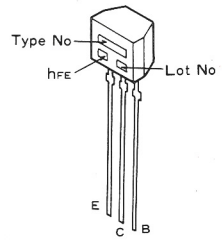
2SB750A
2SD836A



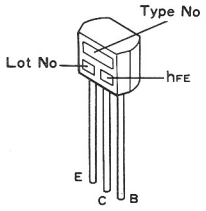
2SC2259



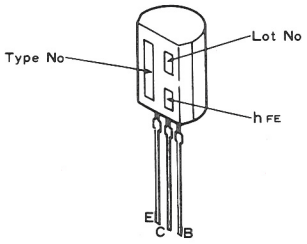
2SC2458



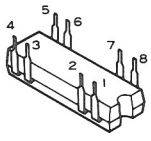
2SC2603
2SA1115



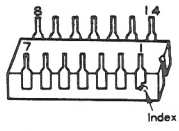
2SD438



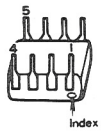
MN3008



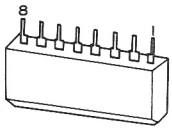
TC4069UBP



NJM4558DXC



M5218



7. 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 × 10¹*	*561 .....*	*RD¼PS 5 6 1 J*
47kΩ	*47 × 10³*	*473 .....*	*RD¼PS 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 × 10¹*	*5621 ....*	*RN¼SR 5 6 2 1 F*

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

Miscellaneous Parts

P. C. BOARD ASSEMBLIES

Mark	Part No.	Symbol & Description
	GWM-329	Reverb assembly
	GWX-952	Lamp A assembly
	GWX-953	Lamp B assembly
	GWS-496	Switch assembly
	no supply	LED A assembly
	no supply	LED B assembly

OTHERS

Mark	Part No.	Symbol & Description
⚠	AKP-038	AC socket (AC OUTLETS)
⚠ ★	ATS-062	T1 Power transformer (110V, 120V, 220V, 240V)
⚠ ★★	AKX-504	S6 Line voltage selector
⚠	ADG-060	AC power cord

Reverb Assembly (GWM-329)

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★★	2SD836A	Q1
★★	2SB750A	Q2
★★	2SC2240 (2SC1845)	Q3, Q4, Q7, Q10, Q12, Q14, Q15,
★★	2SA1115	Q21
★★	2SA970 (2SA992)	Q5, Q6, Q8, Q9, Q11
★★	2SC2259	Q13
★★	2SC2603 (2SC2458)	Q16 – Q17
★★	2SD438	Q18 – Q20
★★	MN3008	IC1
★★	TC4069UBP	IC2
★★	NJM4558DXC	IC3 – IC8
★	US1035 (1S1555)	D5 – D8, D10 – D14, D16
★	RD7.5EB (HZ7.5EB)	D9
★	RD16EB (HZ16EB)	D3, D4
★	S5566	D1, D2, D17, D18

SWITCHES, RELAY

Mark	Part No.	Symbol & Description
★★	ASG-349	S2, Push switch (REVERB)
★★	ASE-006	S4, Slide rotary swtich (EFECT SELECTION)
★★	ASG-347	S3, Push switch (MON, RECOUT, LINEOUT)
★★	SUNL3SF	S1, Push switch (ATT)
★★	ASR-076	RY1, Relay

CAPACITORS

Mark	Part No.	Symbol & Description
	CEA471M35L	C1, C2
	CEA101M25L	C3, C4, C43
	CEA221M16L	C7, C8
	CEA470M25L	C5, C6, C33, C50
	CEA100M16L	C32
	CEA471M16L	C51
	CEANL2R2M50	C11 – C14
	CEANL010M50	C19, C20, C41, C42, C45 – C47
	CEANL6R8M50	C23
	CEANL3R3M50	C15, C16
	CEANLR15M50	C24
	CQMA223J50	C21, C22
	CQMA153J50	C31, C34
	CQMA682J50	C29, C39
	CQMA472J50	C26, C35
	CQMA332J50	C27, C30, C37, C40
	CQMA222J50	C25, C36
	CQMA102J50	C28, C38, C49
	CCDSL330J50	C17, C18
	CCDSL181J50	C48, C52
	CCDSL221J50	C44
	ACG-019	C9, Ceramic (0.01/150V)

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
★	ACT-187	VR1 Variable (REVERB LEVEL 50k)
★	RHB8AVS203	VR2 Semi fixed (BBD BIAS)
	RD1/2PM□□□J	R33, R34, R76, R137
	RFA1/4PS270J	R1, R2
	RD1/4PMFL681J	R66
	RS2LMF□□□J	R72 – R75
	RD1/4PM□□□J	Other resistors

OTHERS

Mark	Part No.	Symbol & Description
	AKB-094	4P Terminal (L type)
		6P Jumper connector
		Earth terminal

Switch Assembly (GWS-496)

Mark	Part No.	Symbol & Description
★★	SUNLYSF	S5 Push switch (POWER)
	ACG-019	C101, C102 Ceramic (0.01/150V)

LED A Assembly

Mark	Part No.	Symbol & Description
★	AEL-382	D201 LED (RED)

LED B Assembly

Mark	Part No.	Symbol & Description
★	AEL-382	D101 LED (RED)
★	AEL-426	D102, D103 LED (ORN)

Lamp A Assembly (GWX-952)

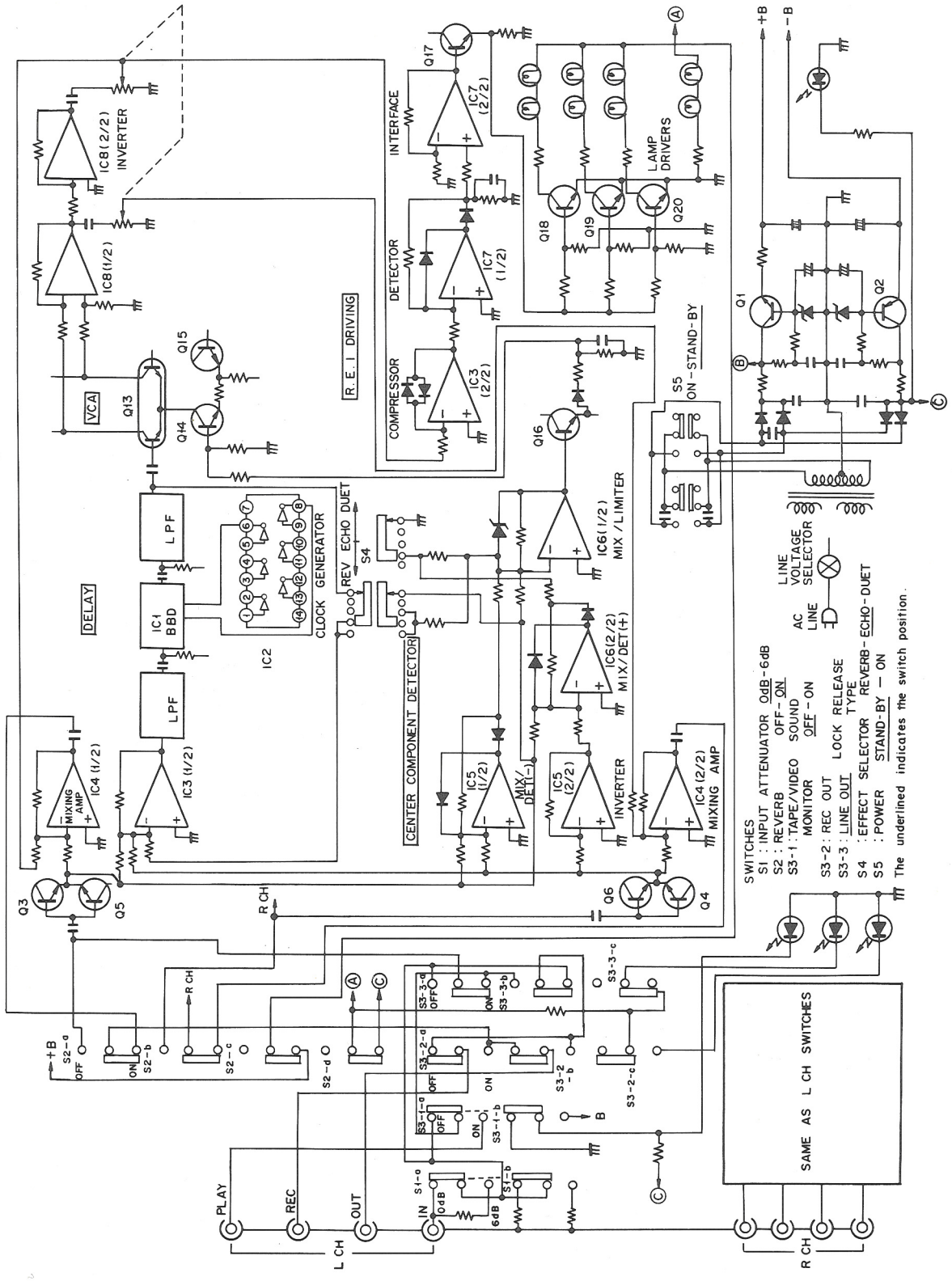
Mark	Part No.	Symbol & Description
★★	AEL-172	PL-3 Pilot lamp (GREEN)
★★	AEL-173	PL-4 Pilot lamp (BLUE)
★★	AEL-174	PL-1 Pilot lamp (ORN)
★★	AEL-175	PL-2 Pilot lamp

Lamp B Assembly (GWX-953)

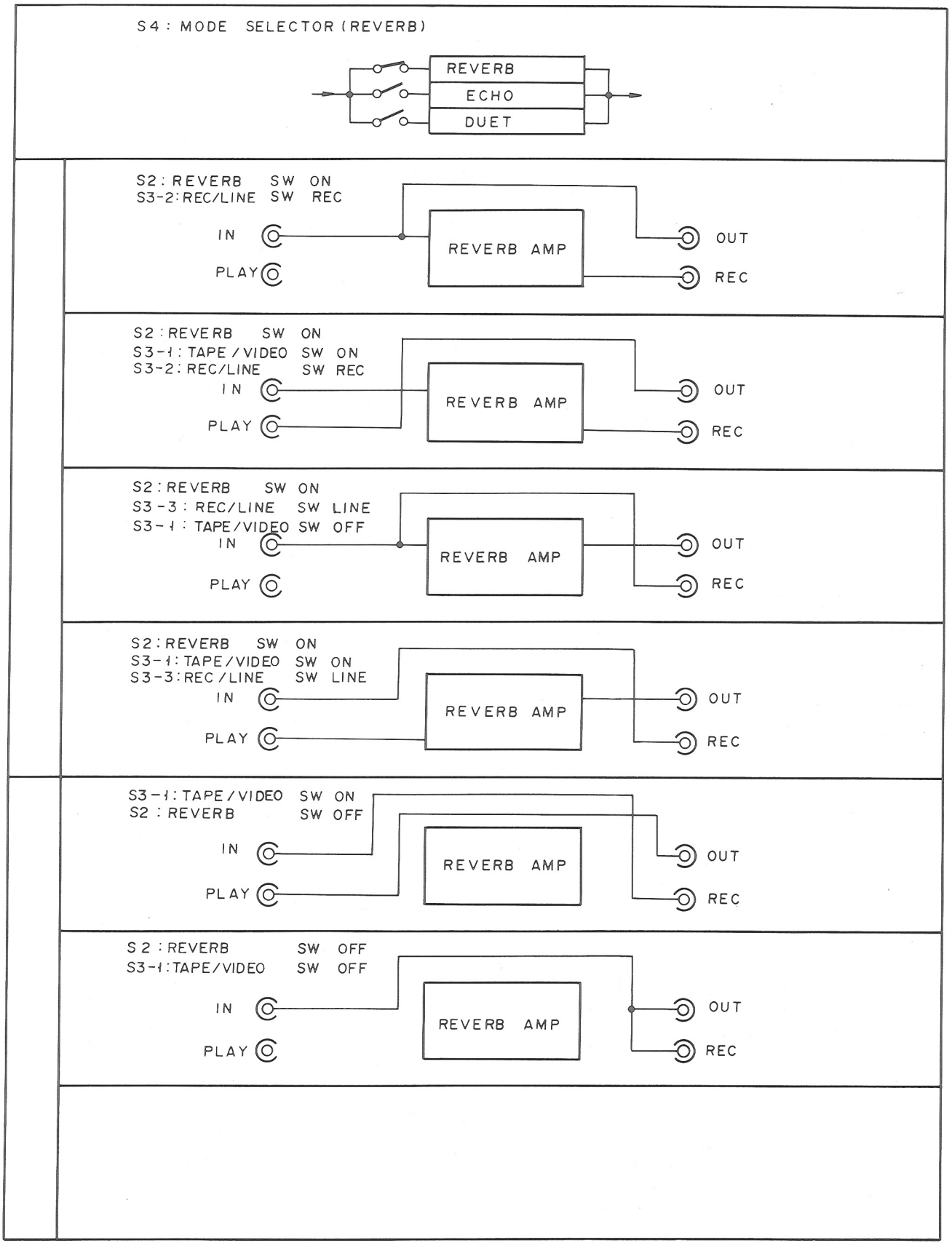
Mark	Part No.	Symbol & Description
★★	AEL-172	PL-103 Pilot lamp (GREEN)
★★	AEL-173	PL-104 Pilot lamp (BLUE)
★★	AEL-174	PL-101 Pilot lamp (ORN)
★★	AEL-175	PL-102 Pilot lamp

8. BLOCK DIAGRAM

8.1 BLOCK DIAGRAM

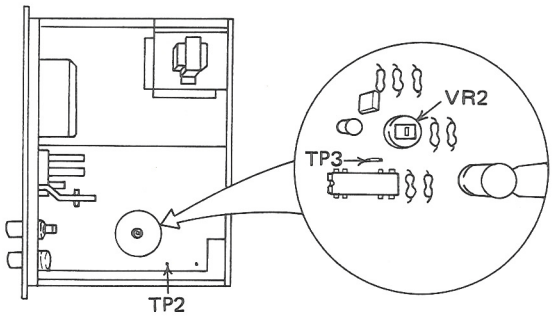


8.2 SIGNAL PATH



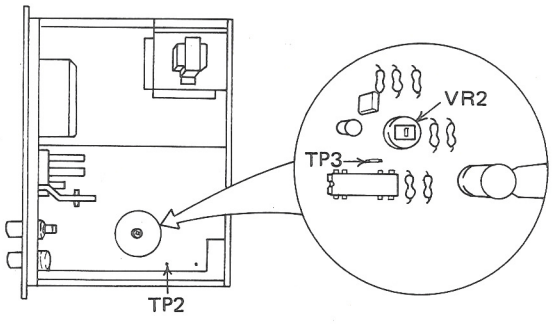
9. ADJUSTMENT

1. Set the ATTENUATOR switch to 0dB.
2. Press the REVERBERATION ON switch (i.e., switch on).
3. Check that the TAPE/VIDEO switch is OFF.
4. Check if the frequency measured at the TP3 terminal reads 10kHz.
5. Connect the oscilloscope to the TP2 terminal.
6. Apply a 400Hz signal to the input terminal and adjust VR2 so that the waveform is symmetrical at the top and bottom at a waveform distortion of about 5%.



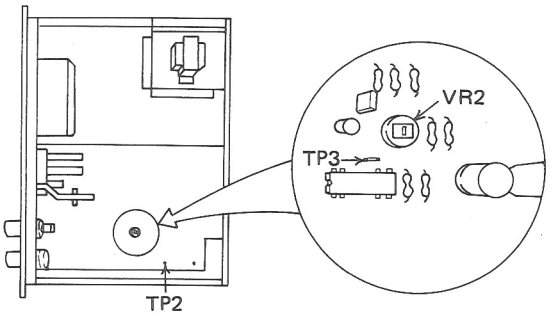
9. RÉGLAGE

1. Placer le commutateur de l'atténuateur (ATTENUATOR) sur la position 0dB.
2. Appuyer sur l'interrupteur d'enclenchement de la réverbération (REVERBERATION ON).
3. Vérifier que le commutateur de contrôle d'enregistrement (TAPE/VIDEO) soit sur la position déclenchée (OFF).
4. Vérifier si la fréquence mesurée à la borne de TP3 est de 10kHz.
5. Raccorder l'oscilloscope à la borne TP2.
6. Appliquer un signal de 400 Hz à la borne d'entrée ensuite régler la VR2 de sorte que la forme d'onde soit symmétrique au sommet et au fond de l'onde, à distorsion de 5 % environ.



9. AJUSTE

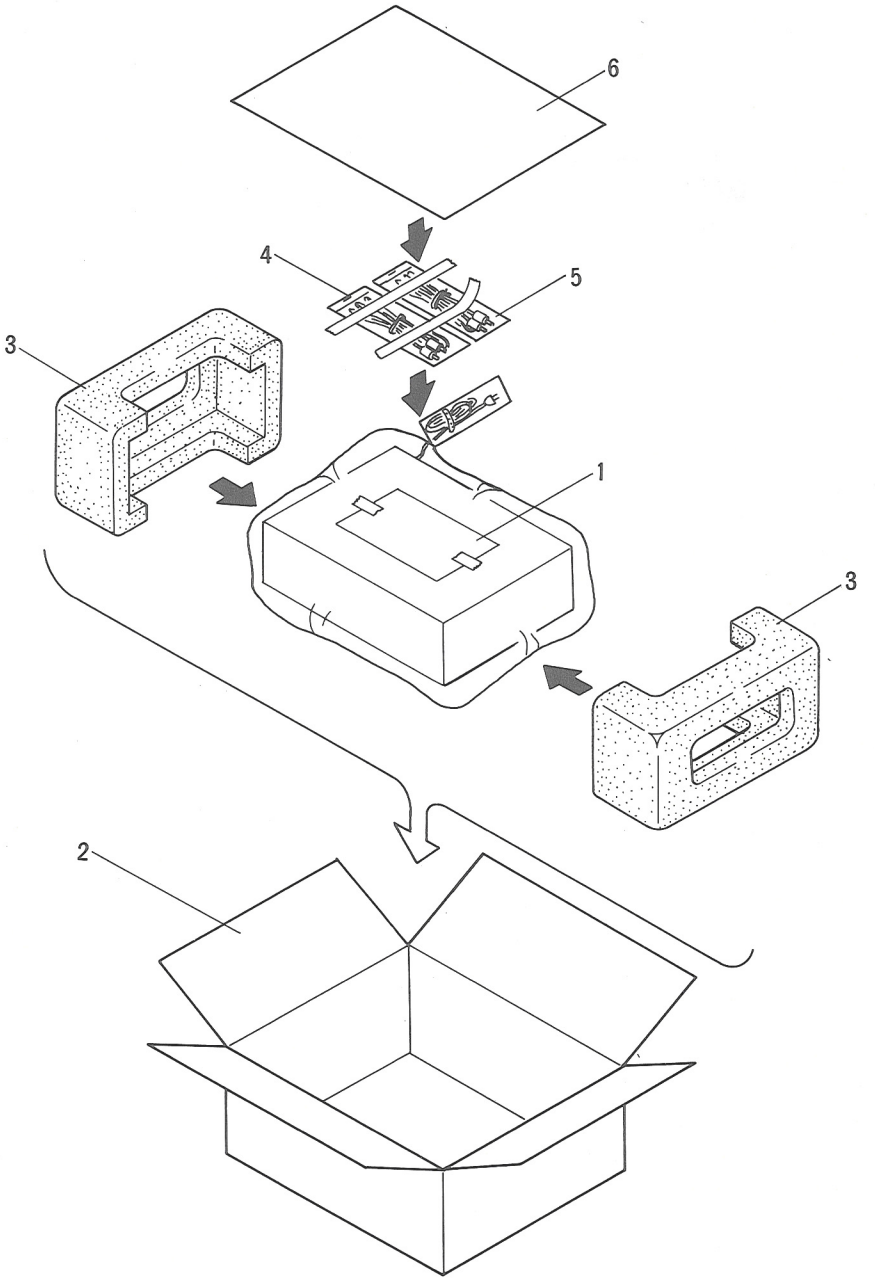
1. Poner el atenuador (ATTENUATOR) en la posición 0dB.
2. Presionar el interruptor de reverberación activada (REVERBERATION ON) (conectar el interruptor).
3. Comprobar que el monitor de cintas (TAPE/VIDEO) esté en la posición OFF.
4. Comprobar si la frecuencia medida en el terminal TP3 es de 10kHz.
5. Conectar el sociloscopio al terminal TP2.
6. Aplicar una señal de 400 Hz al terminal de entrada, luego ajustar la VR2 para que la forma de onda sea simétrica en la cumbre y en el fondo de la onda con una distorsión de unos 5%.



10. PACKING

Parts List

Mark	No.	Part No.	Description
	1.	ARB-580	Operating instructions (English)
	2.	AHE-281	Packing case (S type)
		AHE-282	Packing case (S/G type)
	3.	AHA-366	Side pad
	4.	ADE-072	Connection cord (Gray)
	5.	ADE-073	Connection cord (Black)
	6.	AHB-142	Packing spacer (S/G type only)



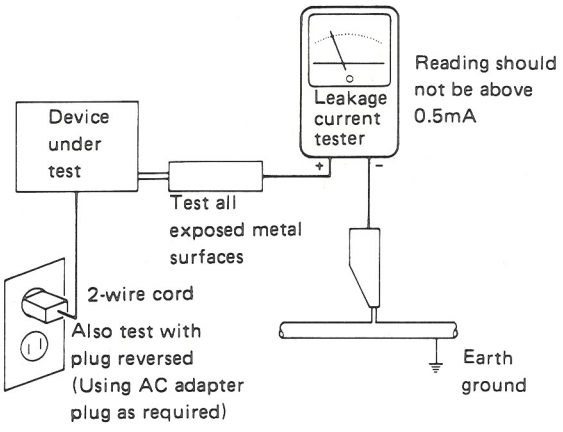
11. SAFETY INFORMATION

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 ⚠ on the schematics and on the parts list in this Service Manual.

The use of a substitute replacement component which dose 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.