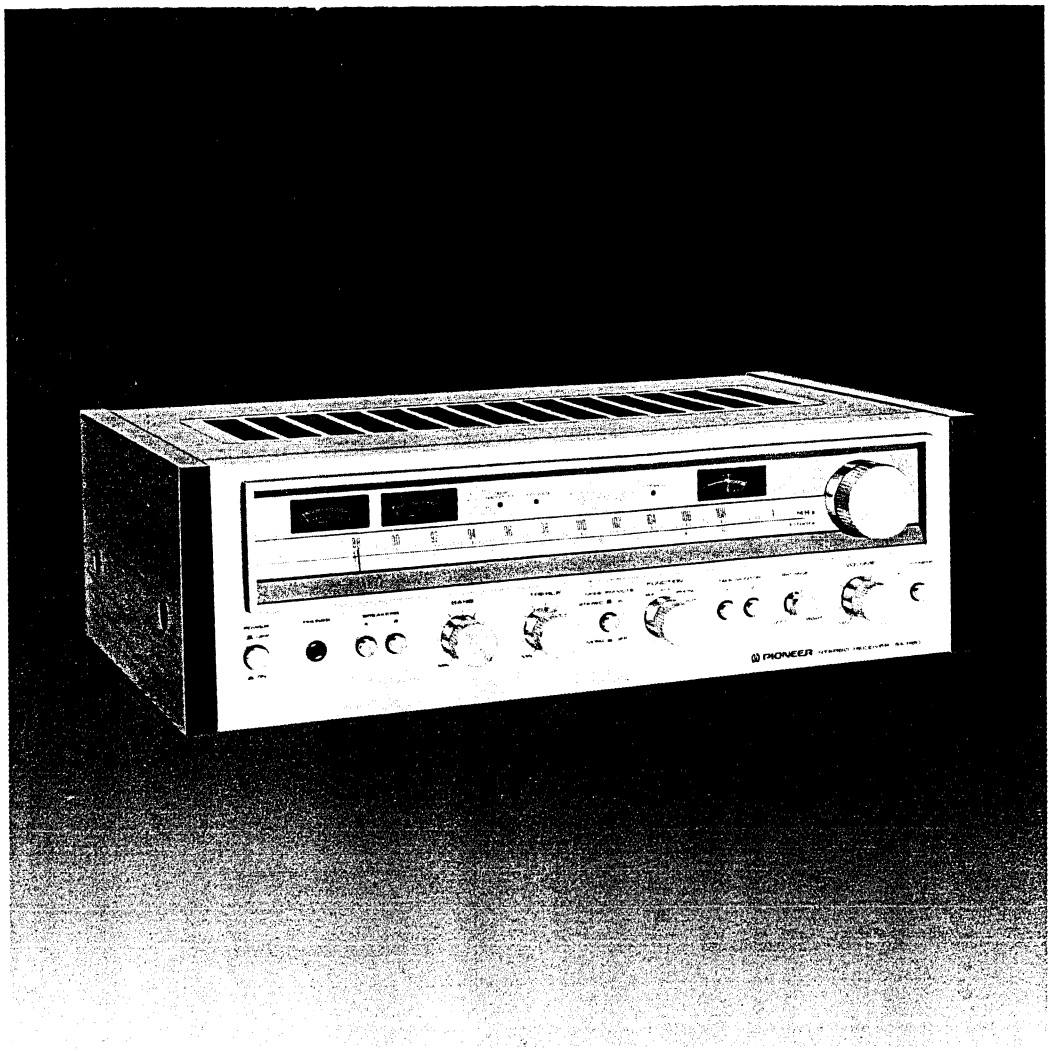


Service Manual

AM/FM STEREO RECEIVER

SX-680

PIONEER®

MODEL SX-680 COMES IN FOUR VERSIONS DISTINGUISHED AS FOLLOWS:

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

MODEL SX-690 COMES IN THREE VERSIONS DISTINGUISHED AS FOLLOWS:

Type	Voltage	Remarks
KU	120V only	U.S.A. model
HG	220V and 240V (Switchable)	United Kingdom model
HGW4	220V and 240V (Switchable)	Europe or Oceania model

Although the basic features of models SX-680 and SX-690 are the same, there are a few minor changes in design. The variations in safety standards in different countries has also necessitated variations in power supply and circuit component specifications. Furthermore, the difference in pre-emphasis characteristics employed by FM broadcasting stations has also meant variations in de-emphasis circuit time constant.

This service manual is applicable to the SX-680/KU. For servicing of the other types please refer to the additional service manuals.

CONTENTS

1. SPECIFICATIONS

Semiconductors

FETs 3
ICs 5
Transistors 21
Diodes 29

Amplifier Section

Continuous Power Output of 30 watts* per channel, min., at 8 ohms or 37 watts per channel at 4 ohms from 20 Hertz to 20,000 Hertz with no more than 0.1% total harmonic distortion.

Total Harmonic Distortion (20 Hertz to 20,000Hertz, from AUX)
  continuous rated power output . . . No more than 0.1%
  15 watts per channel power output,
    8 ohms . . . . . .No more than 0.08%
  1 watt per channel power output,
    8 ohms . . . . . .No more than 0.05%
Intermodulation Distortion (50 Hertz: 7,000 Hertz = 4:1, from AUX)
  continuous rated power output . . . No more than 0.1%
  15 watts per channel power output,
    8 ohms . . . . . .No more than 0.08%
  1 watt per channel power output,
    8 ohms . . . . . No more than 0.05%
Damping Factor (20 Hertz to 20,000 Hertz, 8 ohms) . . 25
Input Sensitivity/Impedance
  PHONO . . . . . 2.5mV/50 kilohms
  AUX . . . . . 150mV/50 kilohms
  TAPE PLAY 1 . . . . . 150mV/50 kilohms
  TAPE PLAY 2 . . . . . 150mV/50 kilohms
PHONO Overload Level (1kHz, T.H.D.: 0.1%) . . . 200mV
Output (Level/Impedance)
  TAPE REC 1 . . . . . 150mV
  TAPE REC 2 . . . . . 150mV
  SPEAKERS . . . . . .A, B, A+B
  HEADPHONES . . . . . Low impedance
Frequency Response
  PHONO(RIAA Equalization) . 30Hz to 15,000Hz ±0.5dB
  AUX, TAPE PLAY . . . . . 5Hz to 100,000Hz ±3dB
Tone Control
  BASS . . . . . +8dB, −8dB (100Hz)
  TREBLE . . . . . +10dB, −10dB (10kHz)
Loudness Contour (Volume control set at −40dB position)
  . . . . . +6dB (100Hz), +3dB (10kHz)
Hum and Noise (IHF, short-circuited, A network, rated power)
  PHONO 75dB
  AUX, TAPE PLAY 90dB

FM Section

Usable Sensitivity
  MONO 10.8dBf (1.9μV)
50dB Quieting Sensitivity
  MONO 16.7dBf (3.8μV)
  STEREO 36.7dBf (38μV)
Signal-to-Noise Ratio at 65dBf
  MONO 80dB
  STEREO 70dB
Distortion at 65dBf
  100Hz . . . MONO 0.07%
    STEREO 0.15%
  1kHz . . . MONO 0.07%
    STEREO 0.15%
  6kHz . . . MONO 0.2%
    STEREO 0.25%
Frequency Response . . . . . 30Hz to 15,000Hz $^{+0.2}_{-1.0}$ dB
Capture Ratio 1.0dB
Selectivity 60dB
Spurious Response Ratio 65dB
Image Response Ratio 65dB
IF Response Ratio 90dB
AM Suppression Ratio 50dB
Muting Threshold 19.2dBf (10μV)
Stereo Separation . . . . 40dB (1kHz), 30dB (30Hz~15kHz)
Subcarrier Production Ratio 50dB
SCA Rejection Ratio 65dB
Antenna Input . . . . . 300 ohms balanced
  75 ohms unbalanced

AM Section

Sensitivity (IHF, ferrite antenna) 300μV/m
  (IHF, ext. antenna) 15μV
Selectivity 26dB
Signal-to-Noise Ratio 50dB
Image Response Ratio 40dB
IF Response Ratio 40dB
Antenna . . . . . Built-in Ferrite Loopstic Antenna

Miscellaneous

Power Requirements 120V, 60Hz
Power Consumption . . . . . 95W (UL), 210VA (CSA)
Dimensions . . . . . 435(W) x 144.5(H) x 314(D) mm
  17-1/8(W) x 5-5/8(H) x 12-3/8(D) in
Weight . . . . . Without package: 8.9kg (19lb 9oz)
  With package: 10.3kg (22lb 11oz)

Furnished Parts

FM T-type antenna 1
Operating instructions 1

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

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

2. FRONT PANEL FACILITIES

POWER METERS

These meters allow you to read out the rated power level when speakers with a nominal impedance of 8 ohms are connected to the receiver's speaker terminals.

NOTE:
These values are related to the impedance of the speakers and they vary according to the frequency. In order to find out the exact output level, connect an 8-ohm dummy load instead of the speakers.

TAPE MONITOR INDICATOR

With either of the TAPE MONITOR switches set to ON, the TAPE MONITOR indicator lights up. This lamp indicates the receiver is monitoring or playing back the tape on the tape deck connected to the TAPE jacks.

SOURCE INDICATOR

With either of the TAPE MONITOR switches set to OFF, the SOURCE indicator lights up. This lamp indicates the receiver is playing the program source; AM broadcast, FM broadcast, record on the turntable, or another component connected to the AUX jacks.

DIAL POINTER

This pointer indicates the broadcasting stations.

STEREO INDICATOR

This indicator lights up when the receiver is tuned in to receive a stereo broadcast.

AM/FM TUNING METER

When tuning in to FM stations, position the meter pointer in the center of FM area for optimum reception. In the case of AM stations, tune for maximum meter deflection toward the right of the scale.

TUNING KNOB

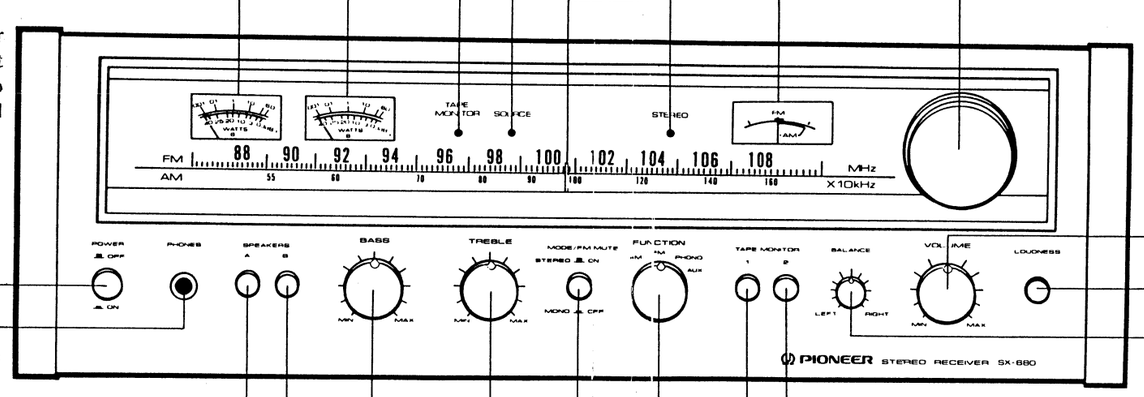
Use this to tune in to broadcasting stations.
Select the station and tune for optimum reception by observing the dial scale and the AM/FM tuning meter.

VOLUME CONTROL

Use this control to adjust the output level to the speakers and headphones. Turn it clockwise to increase the output level. No sound will be heard if you set it to MIN.

LOUDNESS SWITCH

Depress this button (ON position) when listening at a low volume. The frequency response of the human ear varies according to the listening volume, and setting this switch to the ON position compensates for hearing response by emphasizing the bass and treble.



POWER SWITCH

Depress this button (in the ON position) to supply power to the receiver. There will be a short delay when it is set to ON, because the muting circuit has been actuated to suppress the unpleasant noise that is sometimes generated when the power is switched on and off.

PHONES JACK

Plug the headphones into this jack when you want to listen through your stereo headphones.
Release both SPEAKERS buttons if you want to listen to the sound through your headphones only (This means that both buttons will be released).

SPEAKERS SWITCHES

Depress the button corresponding to the speakers connected to the SPEAKERS terminals (A or B) on the rear panel. You can depress both of these buttons to listen to sound from two pairs of speaker systems at the same time.

BASS AND TREBLE CONTROLS

Use these controls to adjust the bass and the treble. If you turn the BASS control to the right from its center position, you will be able to emphasize the sound in the low-frequency range. Conversely, turning this control left from the center position will attenuate the sound.
You can use the TREBLE control to adjust the sound in the high-frequency range.

MODE/FM MUTING SWITCH

This switch is a combination of the FM muting switch and the mode select switch. When the button is left undepressed (ON position) the reproduction is in STEREO mode, while the FM muting function acts to suppress unpleasant interstation noise while tuning between FM stations when listening to FM broadcasting. When the button is depressed (OFF position), however, reproduction is in MONO mode, while the FM muting function does not act, thus enabling suitable reception of weak radio stations when tuning in to the FM broadcasting station.

NOTE:
Recording stereophonically with the mode select switch (MODE/FM MUTE) in the MONO position may cause deterioration in channel separation.

FUNCTION SWITCH

Use this switch to select the program source. For a second after the switch is selected, no sound will be heard. This is due to the operation of the muting circuit, which mute the unpleasant switching noise generated when the FUNCTION switch is selected.

AM: When listening to AM broadcasting.
FM: When listening to FM broadcasting.
The STEREO indicator lights up when the receiver is tuned in to an FM stereo broadcast.
PHONO: When playing a record on the turntable connected to the PHONO jacks.
AUX: When listening to an audio component connected to the AUX jacks.

BALANCE CONTROL

Use this control to balance the volume of the left and right channels. First, however, set the mode select switch (MODE/FM MUTE) to MONO. If the sound appears to be louder on the right, it means that the volume of the right channel is higher. Turn the BALANCE control to the left and adjust. Conversely, if the sound appears to be louder on the left, it means that the volume of the left channel is higher. Therefore, turn the BALANCE control to the right and adjust. After adjusting, return the mode select switch (MODE/FM MUTE) to STEREO.

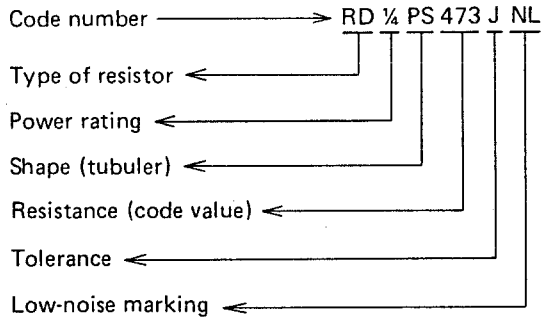
TAPE MONITOR SWITCHES (1, 2)

Depress the switch 1 with a tape deck which is connected to the TAPE 1 jacks (REC and PLAY) when you want to monitor the playback or recording of a tape. The tape on a deck which is connected to the TAPE 2 jacks (REC and PLAY) can be similarly monitored by depressing the switch 2.

NOTE:
Set these switches to the released (OFF) position when you listening to records or a broadcasting.

RESISTANCE VALUE CODES

Code numbers of resistors used in Pioneer equipment are expressed in the following way:—



Furthermore, in the list of parts found in the Service Manual, the resistance (code value) part of the above code number is expressed as □□□ or □□□□.

Resistors included in the Service Manual list of parts

↓

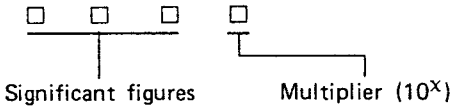
Ex. RD ¼ PS □□□ JNL

When ordering resistor components, first ascertain the actual resistance value from the circuit diagram, and then convert it into code no. form as shown in the following examples.

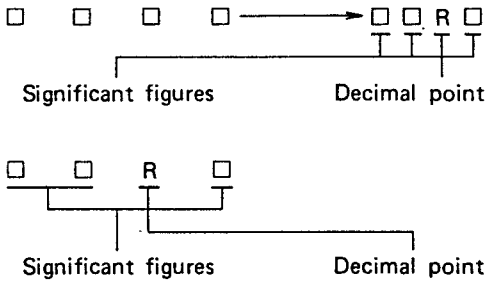
For further details on code numbers, refer to "Tuning Fork" VOL. 1.

Ex. 1 For □□□□ Codes

* General resistors



* Resistors with fractional values

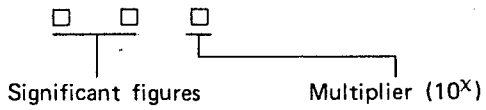


Ex. 1

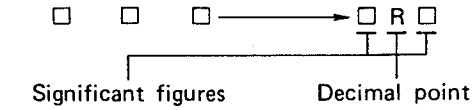
Nominal resistance (Ω)	Significant figure (two figures)	Multiplier (10X)	Resistance value code
5.1	510	.....	5R10
5.62	562	.....	5R62
10	100	.....	10R0
22.5	225	.....	22R5
110	110	x10⁰	1100
1k (1000)	100	x10¹	1001
1.56k (1560)	156	x10¹	1561
10k (10000)	100	x10²	1002
33.6k (33600)	336	x10²	3362
112k (112000)	112	x10³	1123
1M (1000000)	100	x10⁴	1004
1.56M (1560000)	156	x10⁴	1564

Ex. 2 For □□□ Codes

* General resistors



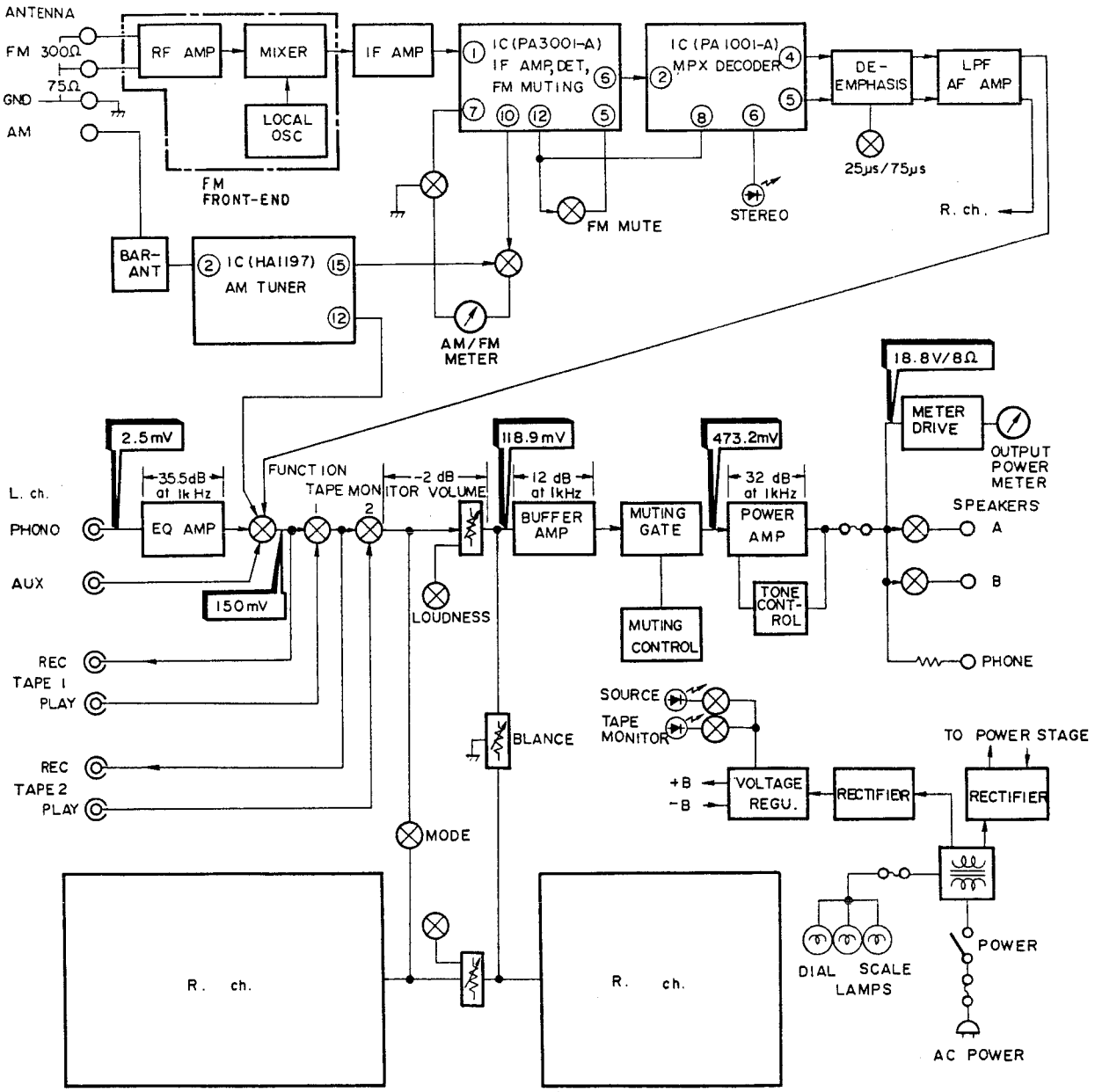
* Resistors with fractional values



Ex. 2

Nominal resistance (Ω)	Significant figure (two figures)	Multiplier (10X)	Resistance value code
0.5	01	.....	0R5
1.5	15	.....	1R5
1	01	x10⁰	010
22	22	x10⁰	220
330	33	x10¹	331
1k (1000)	10	x10²	102
5.6k (5600)	56	x10³	562
68k (68000)	68	x10³	683
820k (820000)	82	x10⁴	824
1M (1000000)	10	x10⁵	105
2.2M (2200000)	22	x10⁵	225

3. BLOCK DIAGRAM



4. CIRCUIT DESCRIPTIONS

4.1 TUNER SECTION

FM Front-end

The FM front-end consists of a 3-ganged tuning capacitor, a dual-gate MOS FET equipped 1-stage RF amplifier, a local oscillator and a mixer. The output of the local oscillator (a modified Clapp circuit employing a single transistor) is applied to the base of the mixer transistor.

IF Amplifier and Detector

This stage is made up of one IC, one transistor, and two dual-element ceramic filters. The NPN transistor inserted between the filters is employed for IF amplifier impedance matching purposes. The IC (PA3001-A) in the following stage incorporates IF amplifiers, quadrature detector, meter drive, and FM muting circuit, etc. See the block diagram on page 18 for the internal structure of this IC.

Multiplex Decoder

The sub-carrier generator (PLL system), NFB demodulator, automatic pilot canceller, and stereo/mono automatic switch are also built from an IC (PA1001-A). With the addition of a few CR elements, a multiplex decoder of high S/N ratio and low distortion has been achieved (Again, refer to page 18 for further details of this IC). A major feature of the PA1001-A is the automatic pilot canceller. This circuit detects the level of the 19kHz pilot signal, and automatically adjusts to that level to cancel out the pilot signal completely. This has made the designing of the low-pass filter in the following stage very much easier, and has further extended the frequency response at the high end.

The output signal from the multiplex decoder is passed on via the de-emphasis circuit and AF amplifier (which serves as both low-pass filter and crosstalk canceller) to the FUNCTION switch.

AM Tuner

The AM tuner stage consists of a 2-ganged tuning capacitor, an IC (HA1197) and a ceramic filter. See page 18 for details of the internal structure of HA1197 which contains a 1-stage RF amplifier, converter, 2-stage IF amplifier, detector, and AGC circuit.

4.2 AUDIO SECTION

Equalizer Amplifier

The phono equalizer amplifier is an emitter-to-emitter feedback-type 3-stage direct-coupled amplifier, designed with a gain of 35.5dB (1kHz), a phono overload level of 200mV (1kHz, THD 0.1%), and equalizer deviation of ±0.3dB (30Hz—15kHz).

Buffer Amplifier

This is a single transistor amplifier with a gain of approx. 12dB.

Power Amplifier

The power amplifier, which includes a hybrid IC (STK-0039) in the power stage, is a first-stage differential amplifier all-stage direct-coupled OCL circuit. This IC features an inverted Darlington connection quasi-complementary circuit power stage integrated with the bias circuit. The output power obtainable with an 8-ohm load is 30 watts (20—20,000Hz, THD 0.1%).

The tone controls (BASS, TREBLE) are operated by changing the frequency response of the power amplifier NFB circuit.

Output Meter Drive Circuit

Fundamentally, this circuit is the same as those employed in the SA-7700 and the SA-6700. A wide meter range is obtained by compressing the dynamic range of the output signal by taking advantage of the initial portion of the diode V_F—I_F relation.

Audio Muting Circuit

The FET gate circuit connected to the input of the power amplifier stage serves as a muting circuit which eliminates unwanted switching noises when the power supply is turned on and off and when the FUNCTION selector is used. The circuitry involved and the voltage changes at different points are shown in Figs. 1—2.

- **When the power supply is turned on**

Since $-B_2$ is applied to the base of Q_2 very quickly, this transistor will remain off when the power supply is first turned on. And, since the $-B_1$ level is established more rapidly than the $+B_2$ level, the potential at point A will initially be lowered to the $-B_1$ level, thereby keeping the FET switched off, and preventing the application of any signal to the input of the power amplifier stage (i.e. the signals are muted during this period).

As the $+B_2$ level is gradually established, the potential of point A will also increase in response, resulting in the FET being turned on some 6 seconds later to terminate the muted condition.

- **When the power supply is turned off**

The $-B_2$ voltage level diminishes relatively rapidly, and Q_2 is turned on by the forward biasing (because $-B_1$ diminishes rather slowly). Consequently, the potential at point A is reduced to $-B_1$, and the FET is turned off. This muting status is achieved within 0.1 second after the power supply is turned off.

- **When FUNCTION selector is operated**

When the FUNCTION selector switch is at any of the selector positions, Q_1 will remain off due to $+B_1$ being applied to its base via the FUNCTION switch. But since this is a non-shorting type selector switch, the $+B_1$ being applied to the base of Q_1 will be interrupted whenever the position of the selector switch is changed. Both Q_1 and Q_2 will thus be turned on temperarily. As a result, the potential at point A will be reduced to $-B_1$, followed by the FET being turned off and the power amplifier stage being muted. However, once the FUNCTION selector switch has been completely switched to the next position, $+B_1$ will again be applied to the base of Q_1, resulting in Q_1 and Q_2 being turned back off. The potential at point A will consequently increase (at a speed determined by the R_1, C_1 time constant) until the FET is turned on, and the muting condition terminated.

Note that when the TAPE MONITOR switch is ON, Q_1 will be disconnected from Q_2, so the power amplifier stage will no longer be muted when the FUNCTION selector is operated.

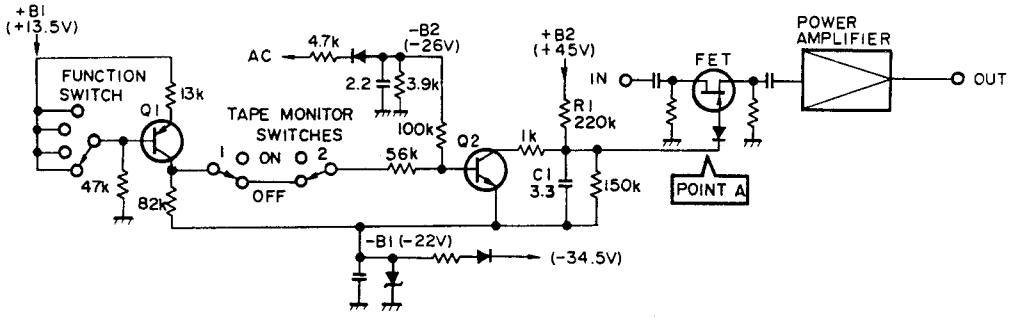


Fig. 1 Basic circuitry of muting circuit

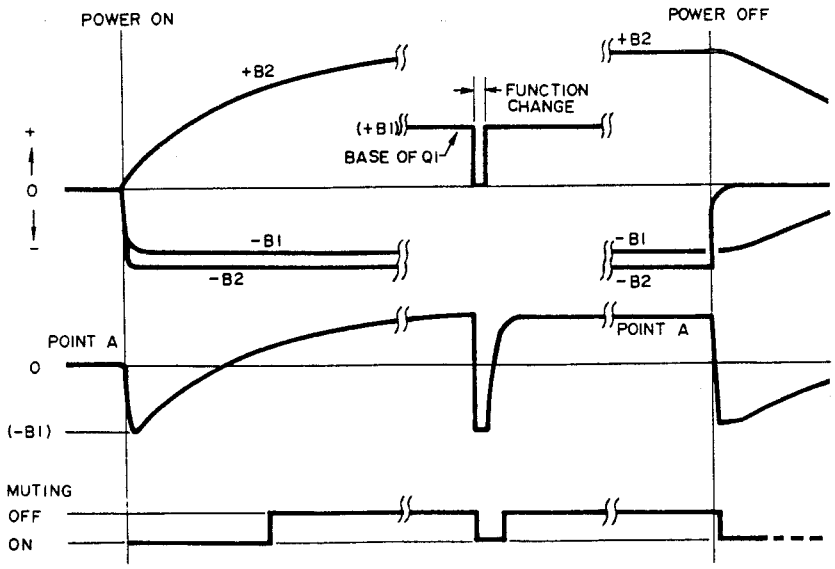


Fig. 2 Voltage changes of different points

5. DISASSEMBLY

Wooden Cover

Remove the two screws on each side of the wooden cover (❶ — ❹).

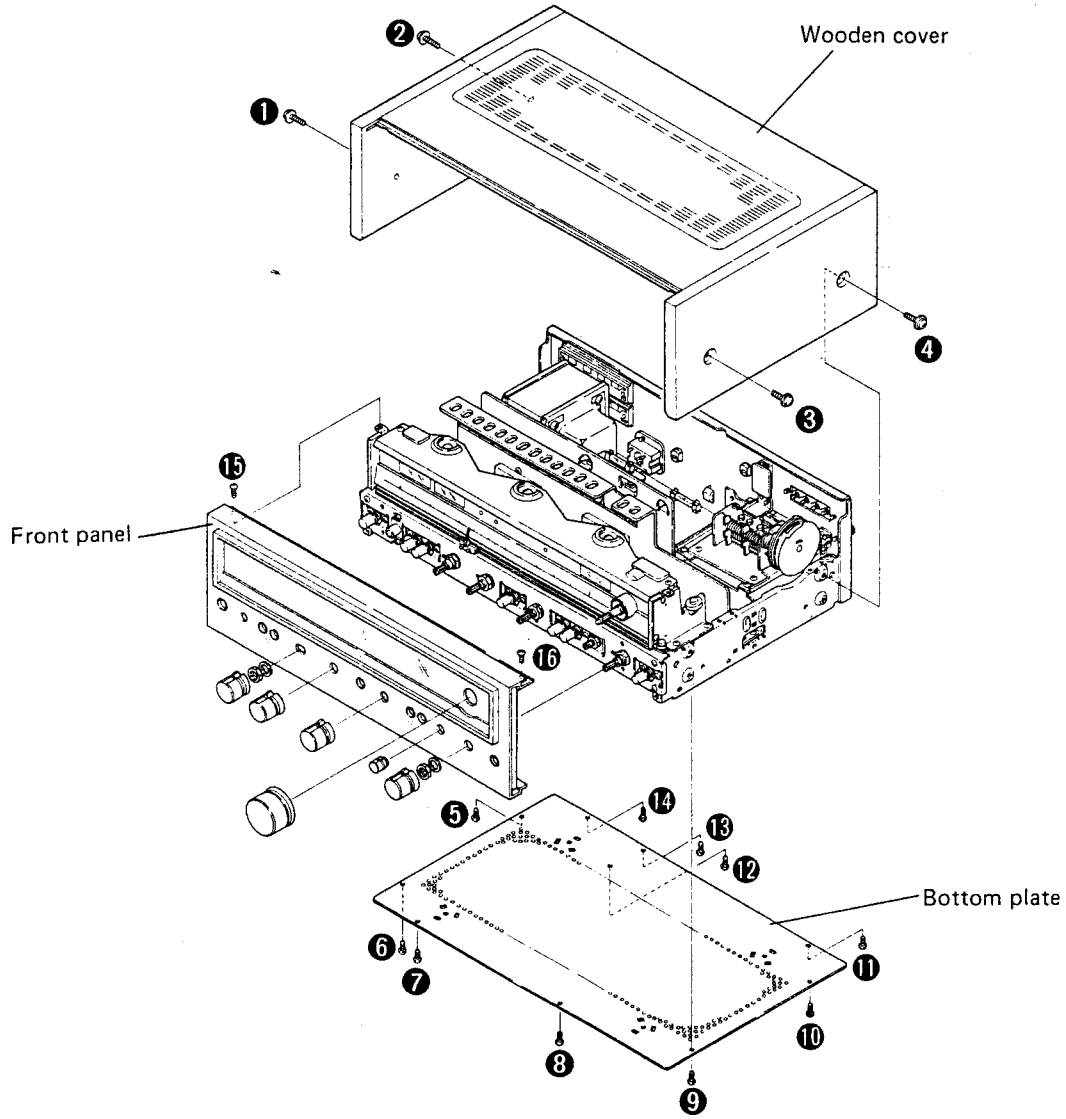
Bottom Plate

Remove the ten screws (❺ — ⓮) to detach the bottom plate.

Front Panel

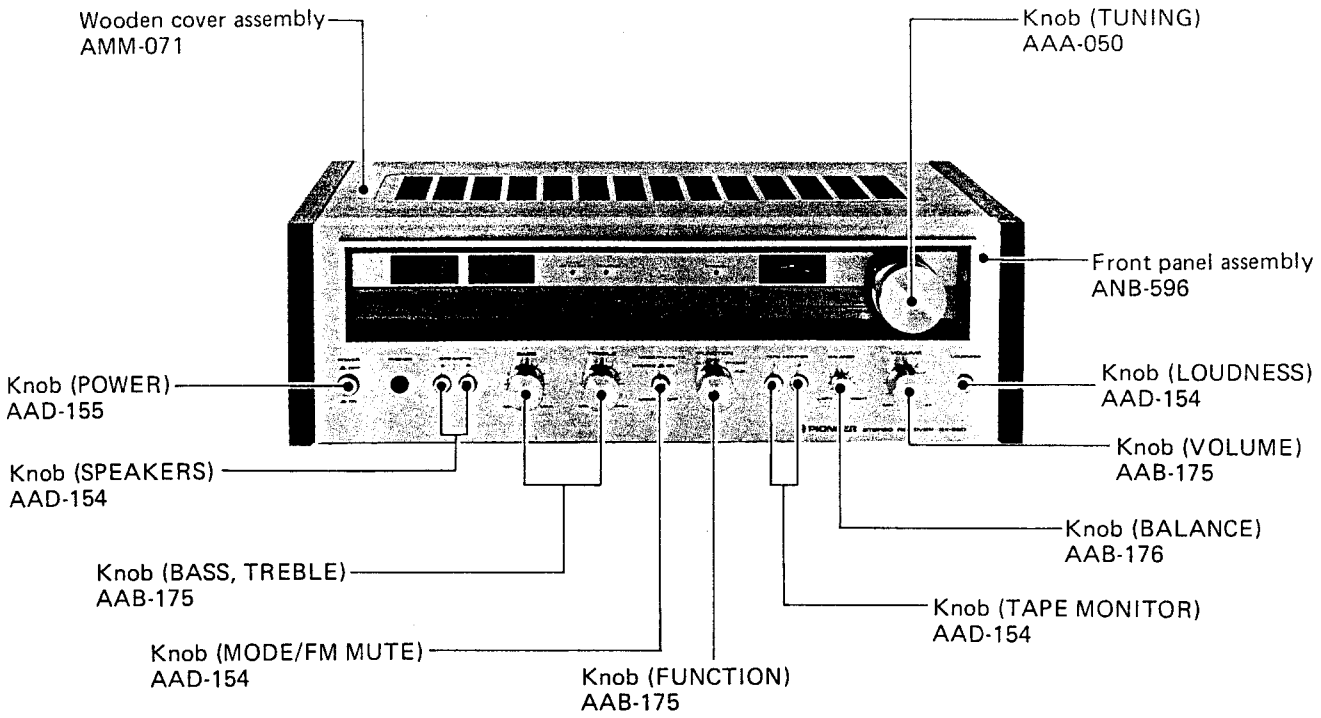
Remove all the knobs by pulling (excluding the push buttons.

Remove the two screws (⓯ , ⓰) from the top edge of the front panel. Remove the two nuts from the control shafts.

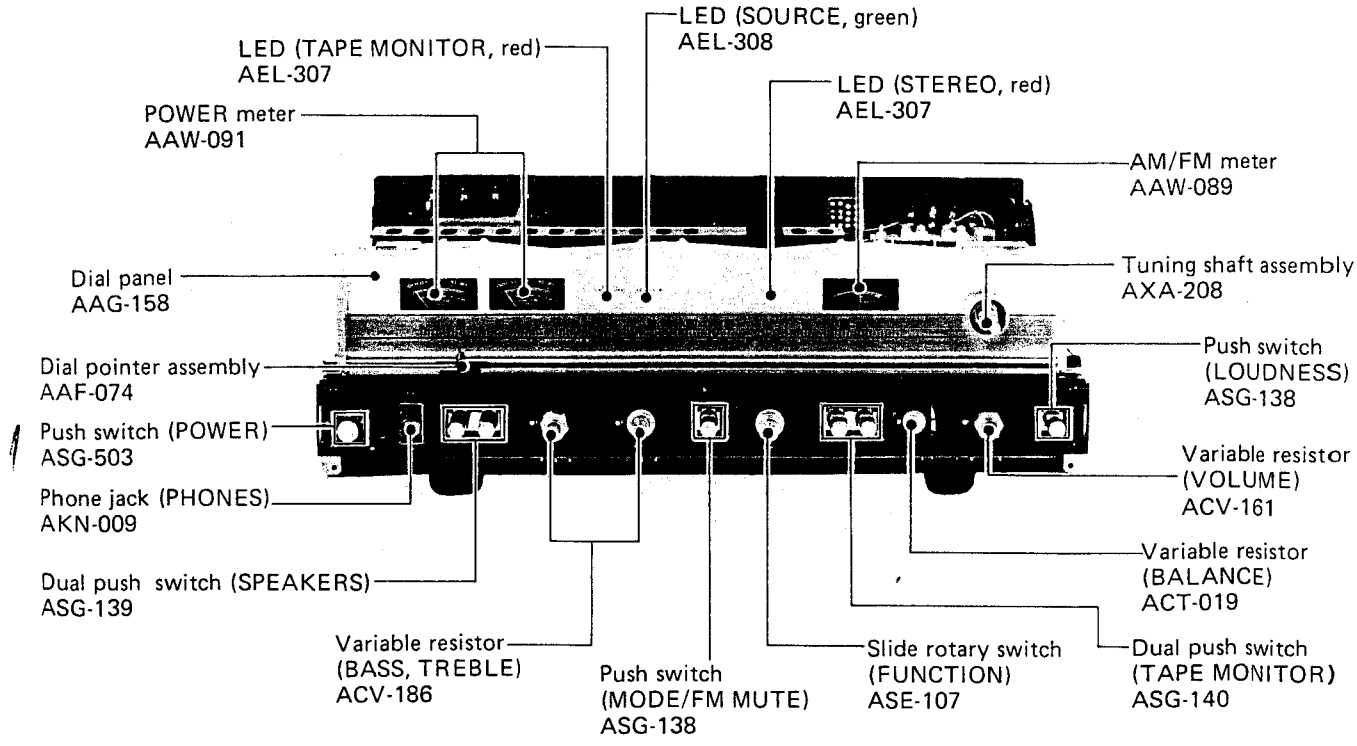


6. PARTS LOCATIONS

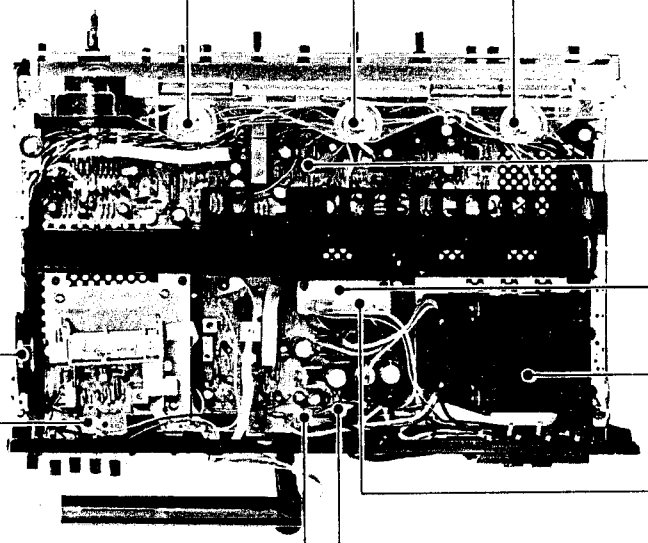
Front Panel View



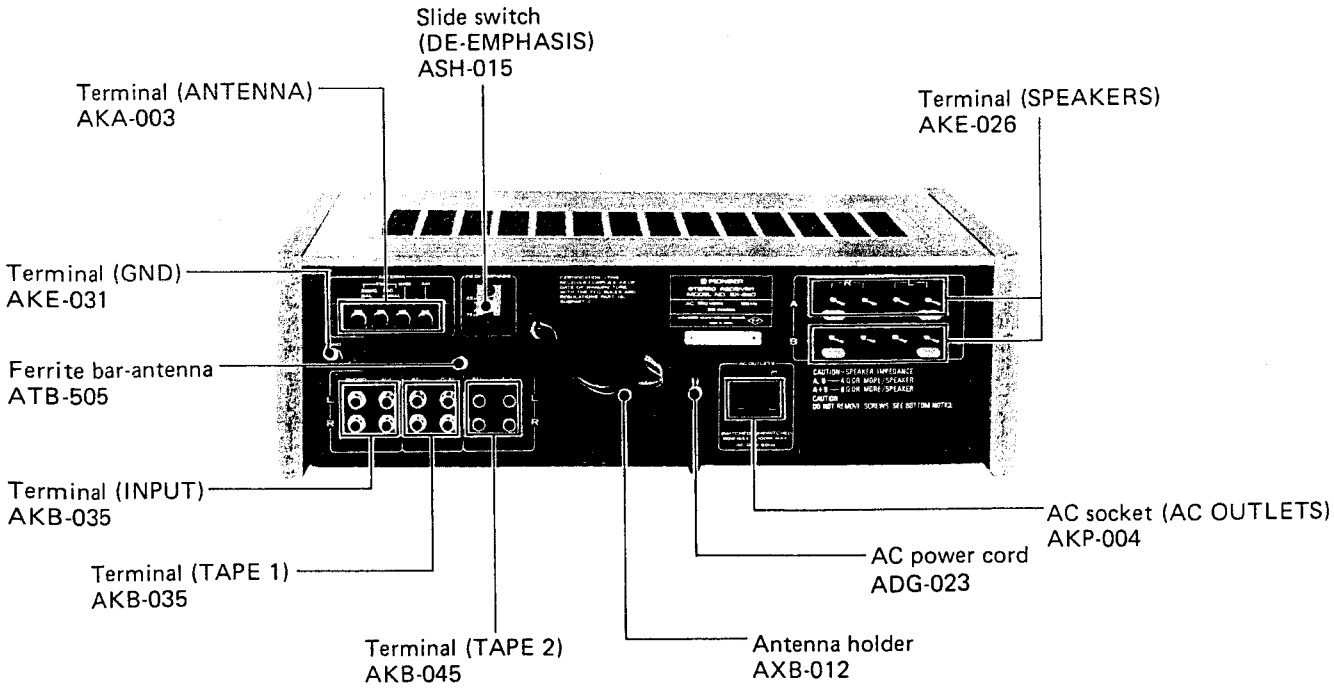
Front View with Panel Removed



Top View

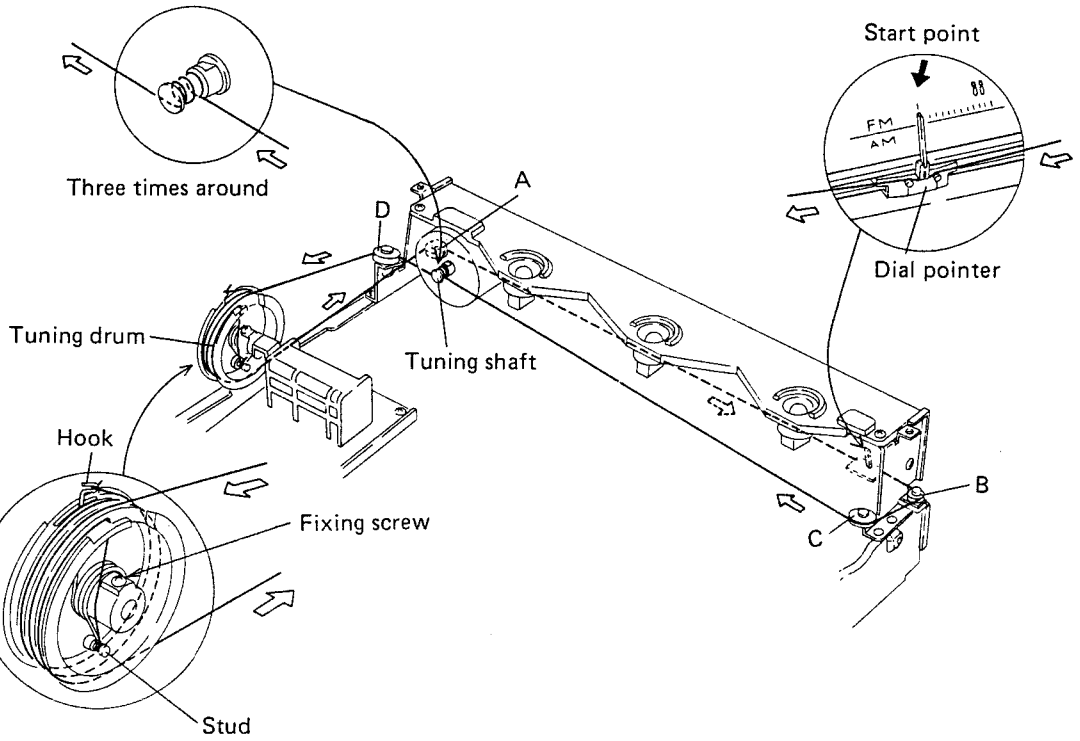


Rear Panel View



7. DIAL CORD STRINGING

1. Remove front panel (See page 10).
2. Remove the tuning drum from the tuning capacitor shaft.
3. Tie one end of the string to the stud on the inside of the tuning drum.
4. Set the tuning capacitor to its maximum capacity (with the vanes fully meshed).
5. Attach the tuning drum to the tuning shaft so that the fixing screw head is pointing exactly upwards.
6. Draw the string out through the gap cut in the tuning drum, and after passing it half-way round the drum, thread it successively over the pulleys A, B, C.
7. Pass the string over pulley D after having wound it three times around the tuning shaft (in a clockwise direction as viewed from the rear).
8. Tie the other end of the string to the hook on the spring, so that the string is tensioned, after passing it twice around the tuning drum.
9. Set the tuning capacitor to its maximum capacity (with the vanes fully meshed).
10. Attach the dial pointer to the string at the start point (at the extreme left-hand dial scale), and secure it firmly to the string.
11. Check that when the tuning shaft is turned, the dial pointer, tuning capacitor, etc., all move smoothly.
12. Paint-lock the knots on the string, and cut off the excess after painting.



8. ADJUSTMENTS

8.1 FM TUNER

The tuning coil in the FM front end does not have an adjusting core. Consequently, tracking adjustments at 90MHz are performed by regulating the gap between rotor and stator of the tuning capacitors (VC_1, VC_2, VC_3). The expression adjust VC_1, (VC_2, VC_3) found in the text means that the two outer rotor blades of each of these tuning capacitors are to be extended outwards with spatula (Part No. GGK-066) as shown in Fig. 5.

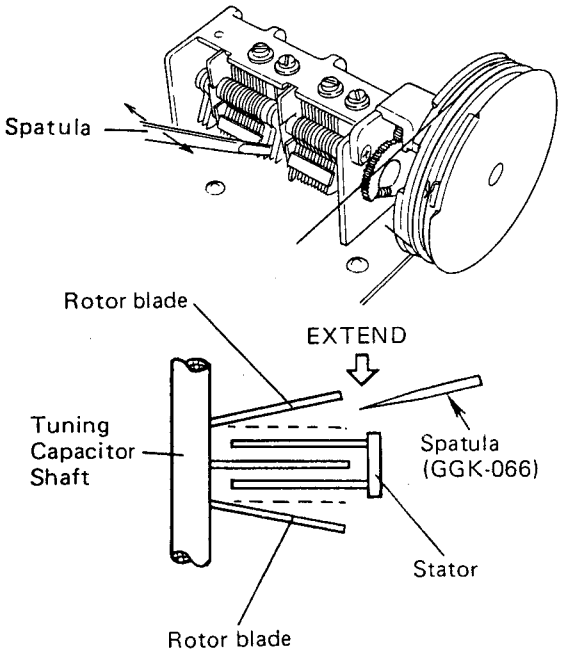


Fig. 5 Adjustment of Tuning Capacitor

1. Connect up the test instruments as shown in Fig. 7.
2. Set the FUNCTION switch to FM.
3. Turn the MODE/FM MUTE switch to OFF.
4. Set the dial pointer of the SX-680 to 106MHz.
5. Set the FM Signal Generator (FM SG) output to 106MHz at 106dB, with 100% modulation (75kHz deviation) for 400Hz. This modulation setting should be used for all the following adjustments.
6. Adjust TC_3 to give the maximum reading on the multitester (with DC 500μA range).
7. Adjust the primary (lower) core of T_2 so that the AM-FM meter (the FM tuning meter) indicator needle reads dead center.
8. Set the FM SG output to 15dB.
9. Adjust TC_1 and TC_2 to give the maximum reading on the multitester.
10. Set the SX-680 dial pointer to 90MHz.
11. Set the FM SG output to 90MHz at 106dB.
12. Adjust VC_3 for maximum reading on the multitester.
13. Set the FM SG output to 15dB.
14. Adjust VC_1 and VC_2 so that the multitester reading reaches a maximum.
15. Repeat the adjustments of VC_3, VC_1 and VC_2 when the dial pointer is at 90MHz, and of TC_3, TC_1 and TC_2 when the dial pointer is at 106MHz, alternately until adjustment at the one frequency requires no further re-adjustment at the other frequency.
16. Adjust the core of T_1 to give the maximum reading on the multitester.
17. De-tune the SX-680 (to a position at which only inter-station noise is heard), and adjust the primary (lower) core of T_2 so that the AM-FM meter indicator needle reads at dead center.
18. Set the FM SG output to 98MHz at 66dB.
19. Tune the SX-680 to a dial reading of 98MHz observe that the AM-FM meter is reading correctly at the center of the meter scale.
20. Adjust the secondary (upper) core of T_2 to give a minimum level of distortion.
21. Repeat the steps detailed in section 17 to 20 for the adjustment of the primary and secondary cores of T_2 until both requirements are fully met.
22. Set the SX-680 dial indication and FM SG frequency for 98MHz.
23. Set the MODE/FM MUTE switch to the ON, and check the muting threshold. If the muting threshold is more than 28dB, cut the jumper lead A.

Multiplex Decoder

24. Connect a MPX Signal Generator (MPX SG) to the external modulator terminals of the FM SG.
25. Connect the 19kHz pilot output signal from the MPX SG to the X-plates (horizontal input) of an oscilloscope, and use a probe to connect the Y-plates (vertical input) to the TP_2 terminal.
26. Set the FM SG output to 66dB, unmodulated.
27. Adjust VR_1 to freeze motion of the resulting Lissajous' figures.

NOTE:
Lissajous' figure adopts the general form shown in Figure 6 due to the fact that the MPX SG 19kHz pilot signal output is a sine wave, and the TP_2 terminal carries a 76kHz saw tooth wave as determined by the adjustment of VR_1.

28. Turn the FM SG modulation mode setting to external modulation.
29. Adjust the MPX SG modulation settings to 1kHz, L + R, 90% modulation (67.5kHz deviation), with 10% pilot modulation (7.5kHz deviation).
30. Adjust the core of T_1 for minimum distortion in the 1kHz demodulated output from L or R channel.

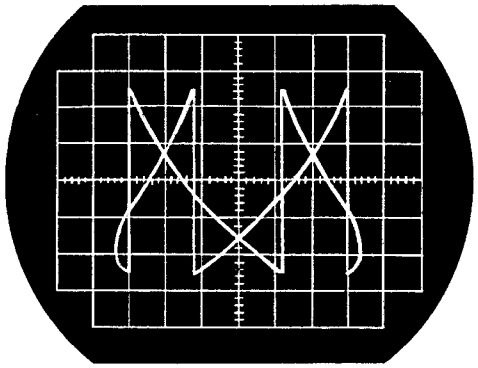


Fig. 6 Lissajous figure

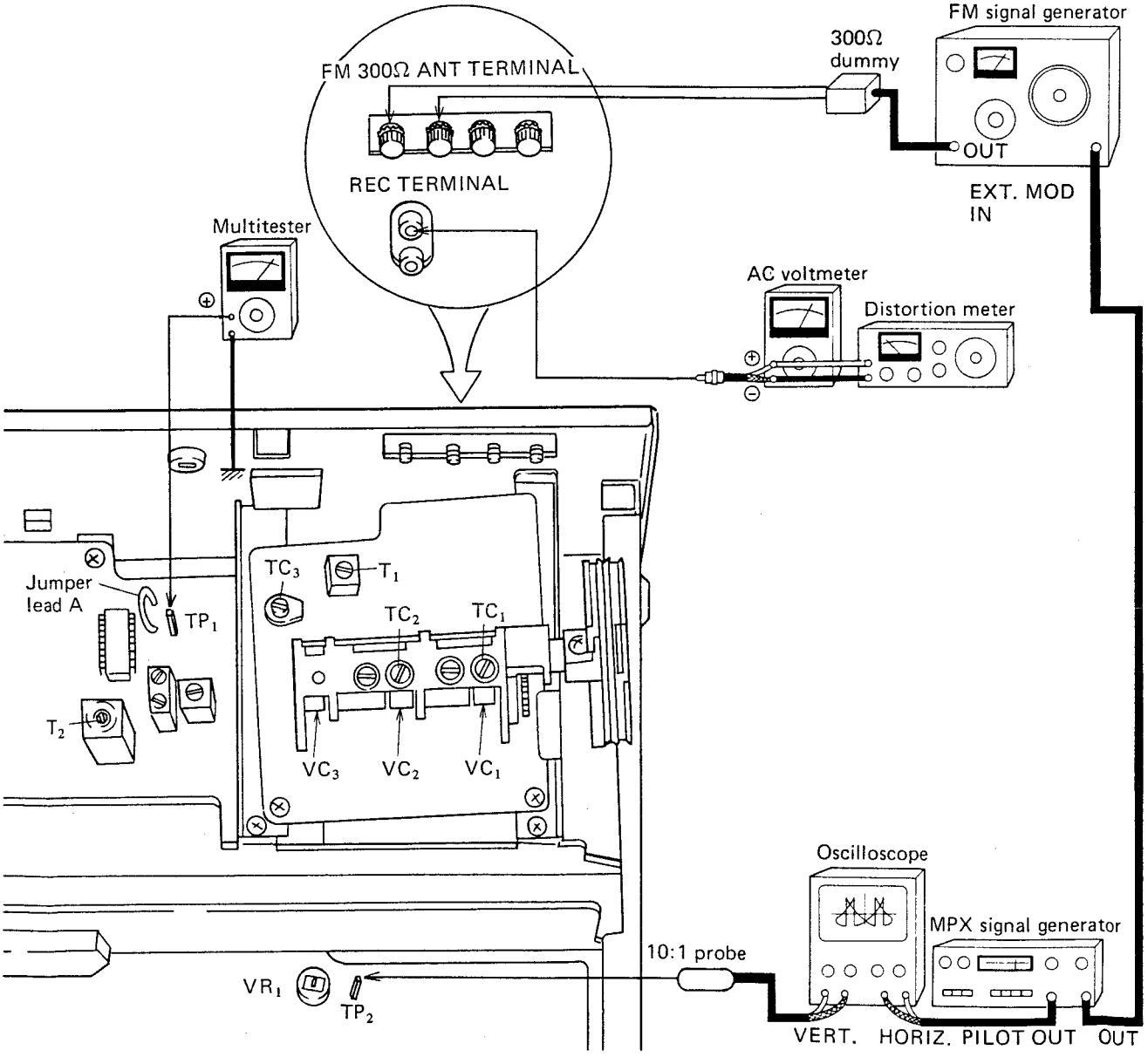


Fig. 7 Connection diagram

8.2 AM TUNER

1. Connect up the test instruments as shown in Fig. 8.
2. Set the FUNCTION switch to AM.
3. Set AM Signal Generator (AM SG) for 400Hz 30% modulation 100dB output.
4. Set the SX-680 dial indication and AM SG frequency for 600kHz.
5. Adjust T_3 core for maximum reading on AC voltmeter.
6. Set the SX-680 dial indication and AM SG frequency for 1400kHz.
7. Adjust TC_4 for maximum reading on AC voltmeter.
8. Set AM SG for 30dB output.
9. Set the SX-680 dial indication and AM SG frequency for 600kHz.
10. Adjust T_3 and bar antenna core for maximum reading on AC voltmeter.
11. Set the SX-680 dial indication and AM SG frequency for 1,400kHz.
12. Adjust TC_4 and TC_5 for maximum reading on AC voltmeter.
13. Repeat steps 9 to 12, alternately until adjustment at the one frequency requires no further re-adjustment at the other frequency.
14. Adjust F_4 core for give the maximum reading on the AC voltmeter.

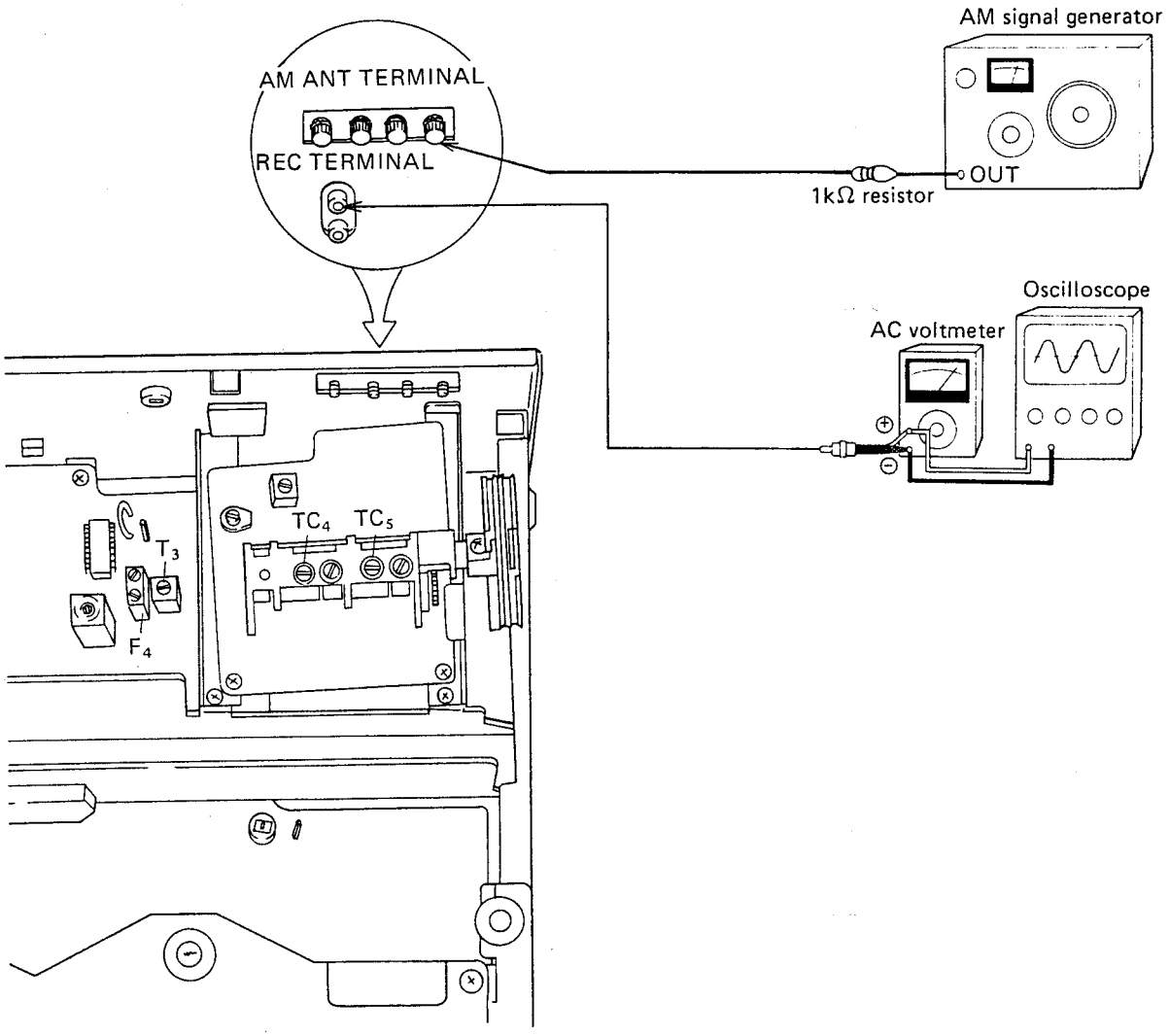


Fig. 8 Connection diagram

9. SCHEMATIC DIAGRAMS, P.C. BOARD PATTERNS AND PARTS LIST

9.1 MISCELLANEA

NOTE:
When ordering resistors, first covert 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 x 10¹*	*561*	*RD¼PS 5 6 1 J*
47kΩ	*47 x 10³*	*473*	*RD¼PS 4 7 3 J*
0.5Ω	*0R5*		*RN2H 0 R 5 K*
1Ω	*010*		*RSIP 0 1 0 K*

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

5.62kΩ	*562 x 10¹*	*5621*	*RN¼SR 5 6 2 1 F*

Miscellaneous Parts

CAPACITORS

Part No.	Symbol & Description		
ACG-001	C1	Ceramic	0.01/250V
ACG-003	C2	Ceramic	0.01/125V

SEMICONDUCTORS

Part No.	Symbol & Description	
STK-0039	Q1, Q2	IC

LAMPS AND FUSES

Part No.	Symbol & Description	
AEL-029	PL1—PL3	Lamp (wedge type, 8V 0.3A)
AEK-100	FU1	Fuse 4A
AEK-104	FU2	Fuse 1.5A
AEK-108	FU3, FU4	Fuse 5A

P.C. BOARD ASSEMBLIES

Part No.	Description
GWM-117	Main board assembly
GWX-179	Phone jack assembly
GWX-180	De-emphasis switch assembly
GWB-101	FM front-end
GWX-186	Tape assembly
GWX-178	Fuse holder assembly
GWX-177	Indicator assembly

OTHERS

Part No.	Symbol & Description	
ATT-511	T1	Power transformer
ATB-505	T2	Ferrite bar-antenna
ASG-503	S9	Push switch (POWER)
AAW-089		AM/FM meter
AAW-091		POWER meter
AKA-003		Terminal (ANTENNA)
AKE-026		Terminal (SPEAKERS)
AKE-031		Terminal (GND)
AKB-035		Terminal (INPUT)
AKB-035		Terminal (TAPE 1)
AKP-004		AC socket (AC OUTLETS)
AKK-005		Lamp socket
ADG-023		AC power cord

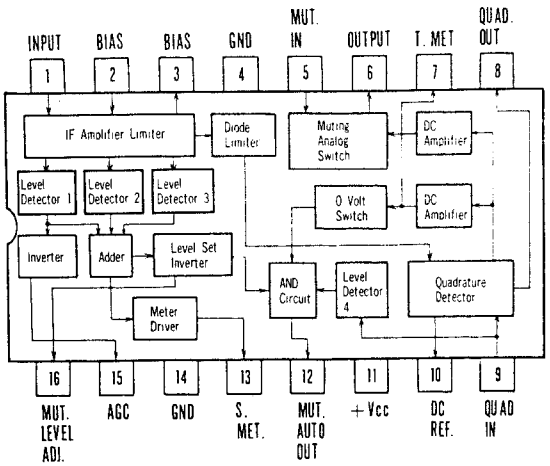
List of Changed Parts for Factory Modification

List of changed parts information will be furnished whenever necessary and you are requested to amend parts number in this parts list.

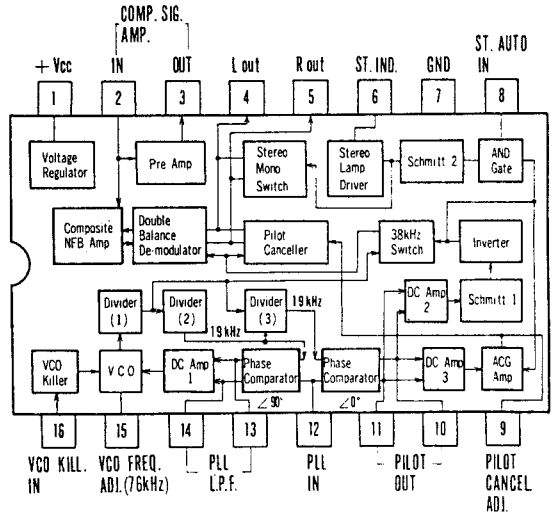
Symbol	Part No.	Description

Block Diagram of ICs

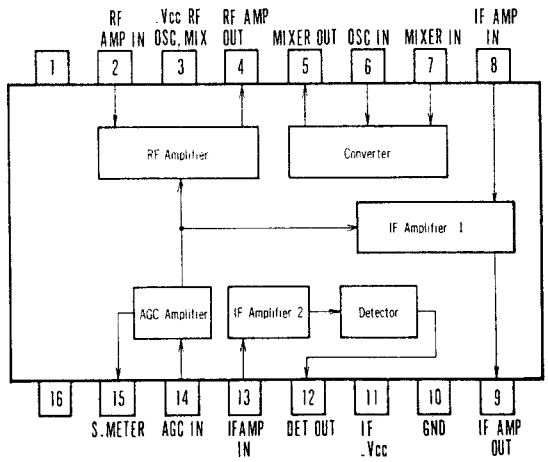
PA3001-A



PA1001-A

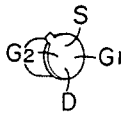


HA1197

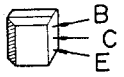


External Appearance of Transistors and ICs

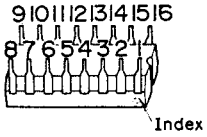
3SK59



2SC461
2SC535

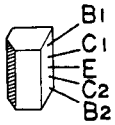


PA3001-A
PA1001-A
HA1197

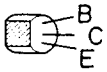


2SA725P
2SA726S
2SC1919

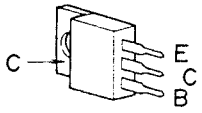
2SA798



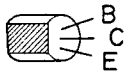
2SA733
2SC945A
2SC1438



2SD712
(2SD313)



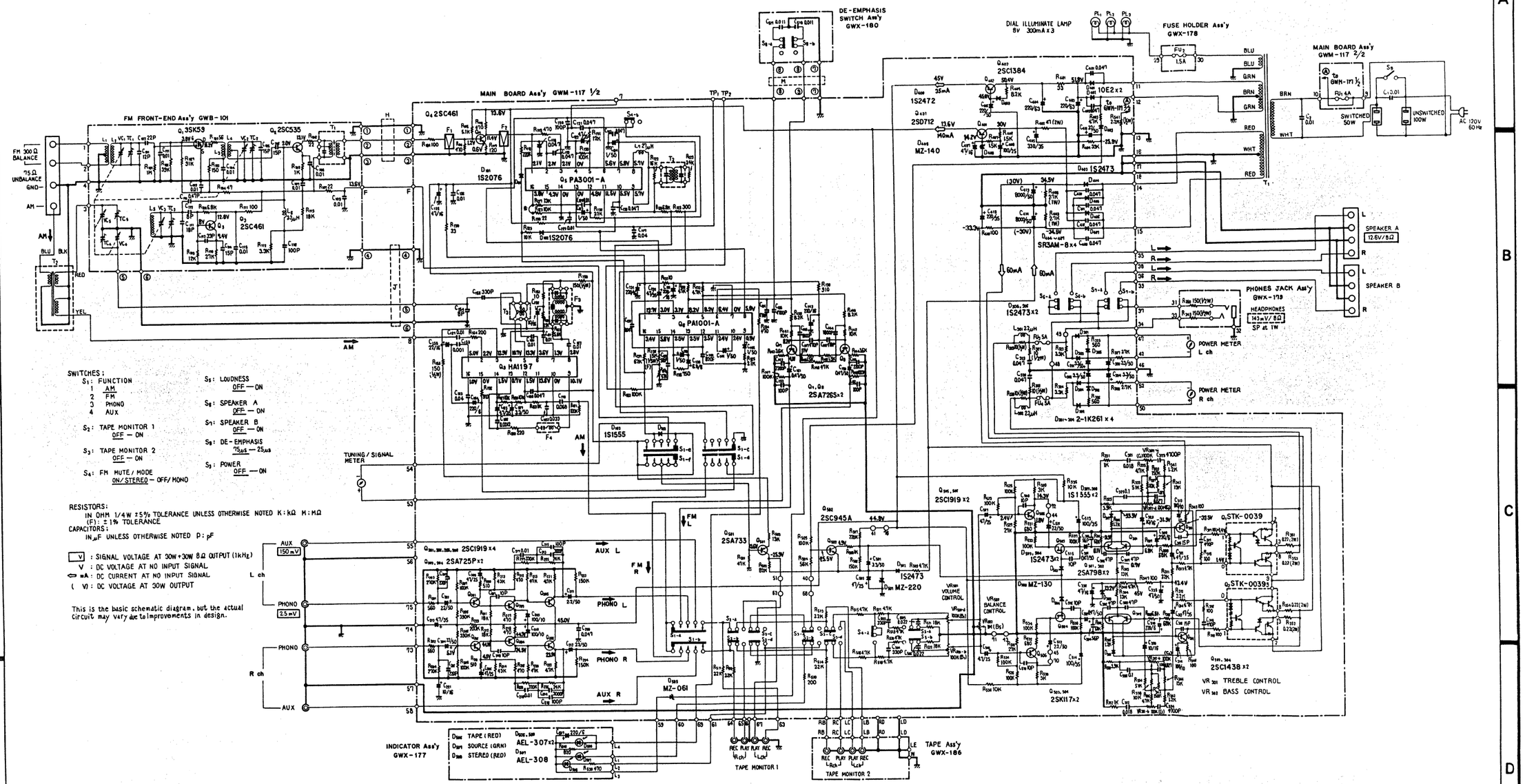
2SC1384



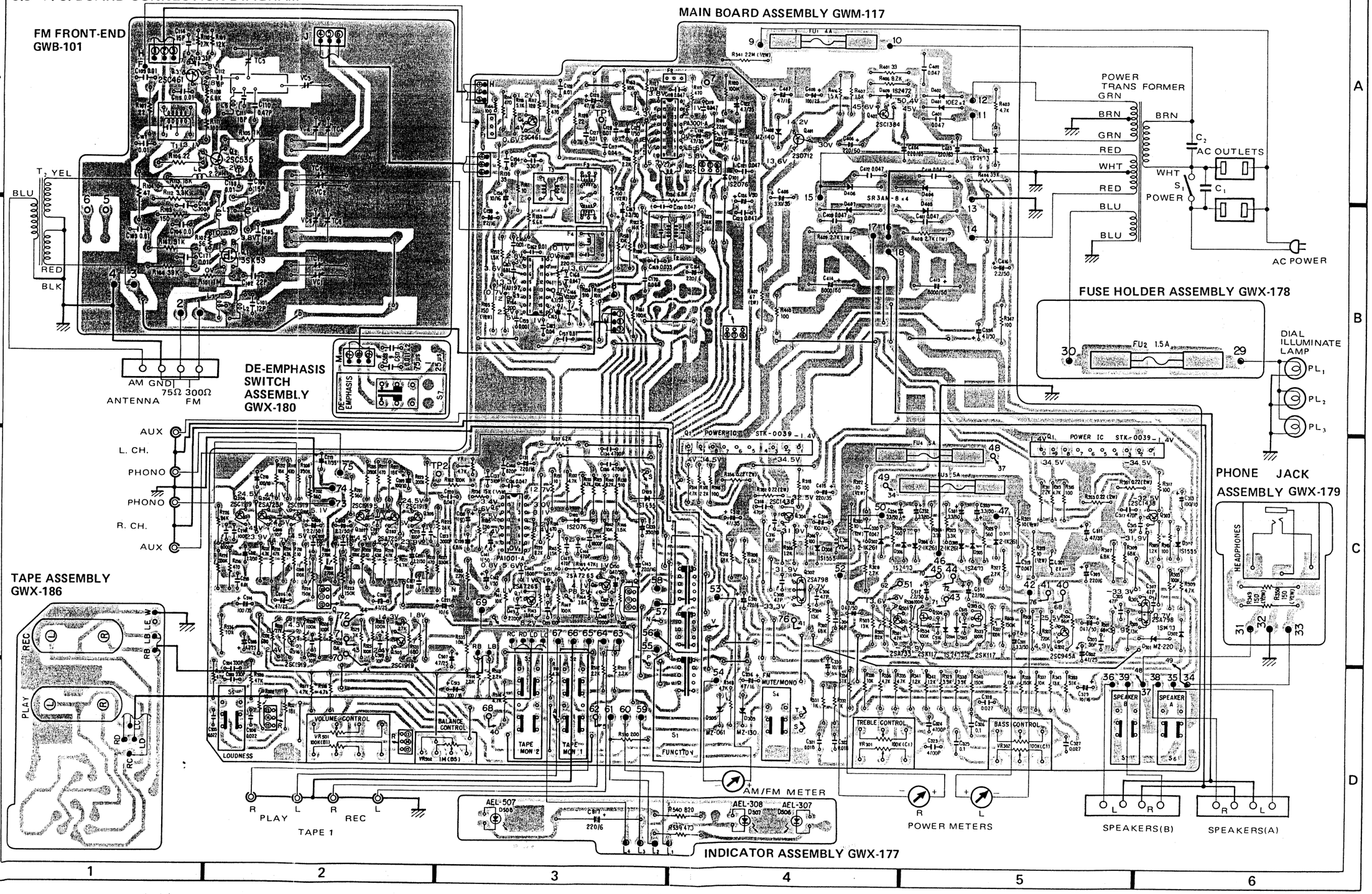
2SK117
(2SK34)

9.2 SCHEMATIC DIAGRAM

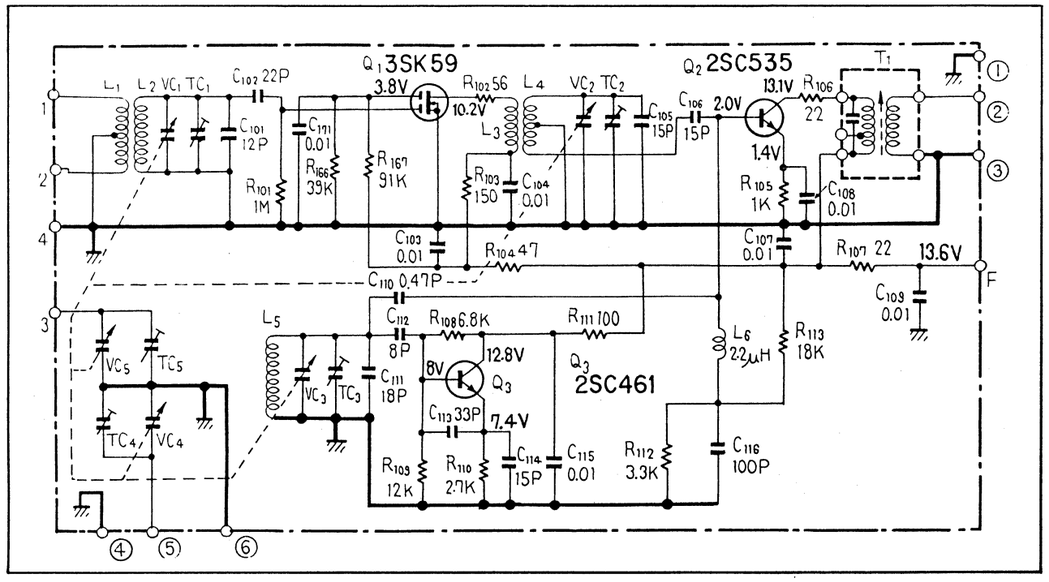
NOTE:
The indicated semiconductors are representative ones only. Other alternative semiconductors may be used and are listed in the parts list.



9.3 P. C. BOARD CONNECTION DIAGRAM



9.4 FM FRONT-END (GWB-101)



Parts List

COIL AND TRANSFORMER

Part No.	Symbol & Description		
T24-028	L6	Choke coil	2.2μH
ATE-039	T1	FM IFT	

CAPACITORS

Part No.	Symbol & Description
CCDUJ 120K 50	C101
CCDSL 220K 50	C102
CKDYF 103Z 50	C103, C104, C107–C109, C115, C171
CCDUJ 150K 50	C105
CCDSL 150K 50	C106
CGB R47K 500	C110
CCDPH 180K 50	C111
CCDLH 080F 50	C112
CCDPH 330K 50	C113
CCDCH 150K 50	C114
CCDSL 101K 50	C116
ACK-012	VC Tuning capacitor
ACM-006	TC3 Ceramic trimmer

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

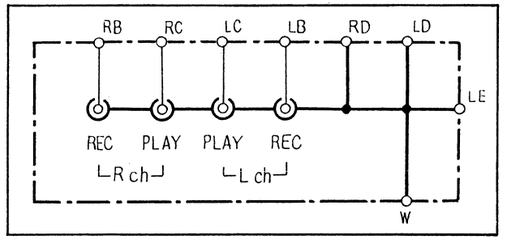
RESISTORS

Part No.	Symbol & Description
RD¼PS □□□ J	R101, R103–107, R112, R113, R166, R167
RD¼VS □□□ J	R102, R108–R111

SEMICONDUCTORS

Part No.	Symbol & Description
3SK59-Y or GR (3SK73-Y or GR)	Q1
2SC535-A or B	Q2
2SC461-B or C	Q3

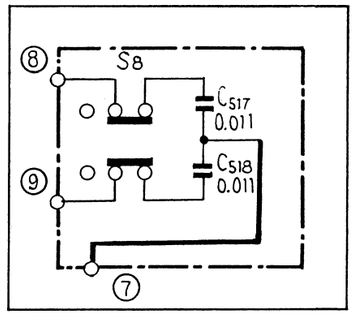
9.5 TAPE ASSEMBLY (GWX-186)



Parts List

Part No.	Symbol & Description
AKB-045	Terminal (TAPE)

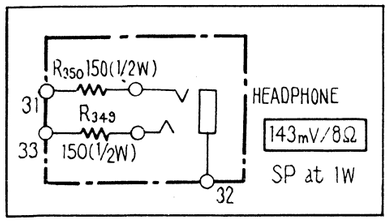
9.6 DE-EMPHASIS SWITCH ASSEMBLY (GWX-180)



Parts List

Part No.	Symbol & Description	
ASH-015	S8	Slide switch (DE-EMPHASIS)
CQMA 113J 50	C517, C518	

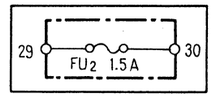
9.7 PHONE JACK ASSEMBLY (GWX-179)



Parts List

Part No.	Symbol & Description
RD½PS 151J	R349, R350
AKN-009	Phone jack (PHONE)

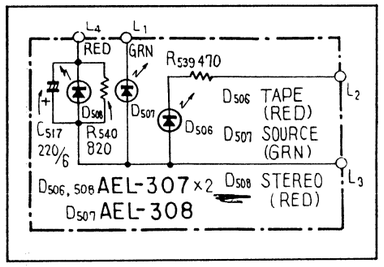
9.8 FUSE HOLDER ASSEMBLY (GWX-178)



Parts List

Part No.	Description
AKR-013	Fuse clip

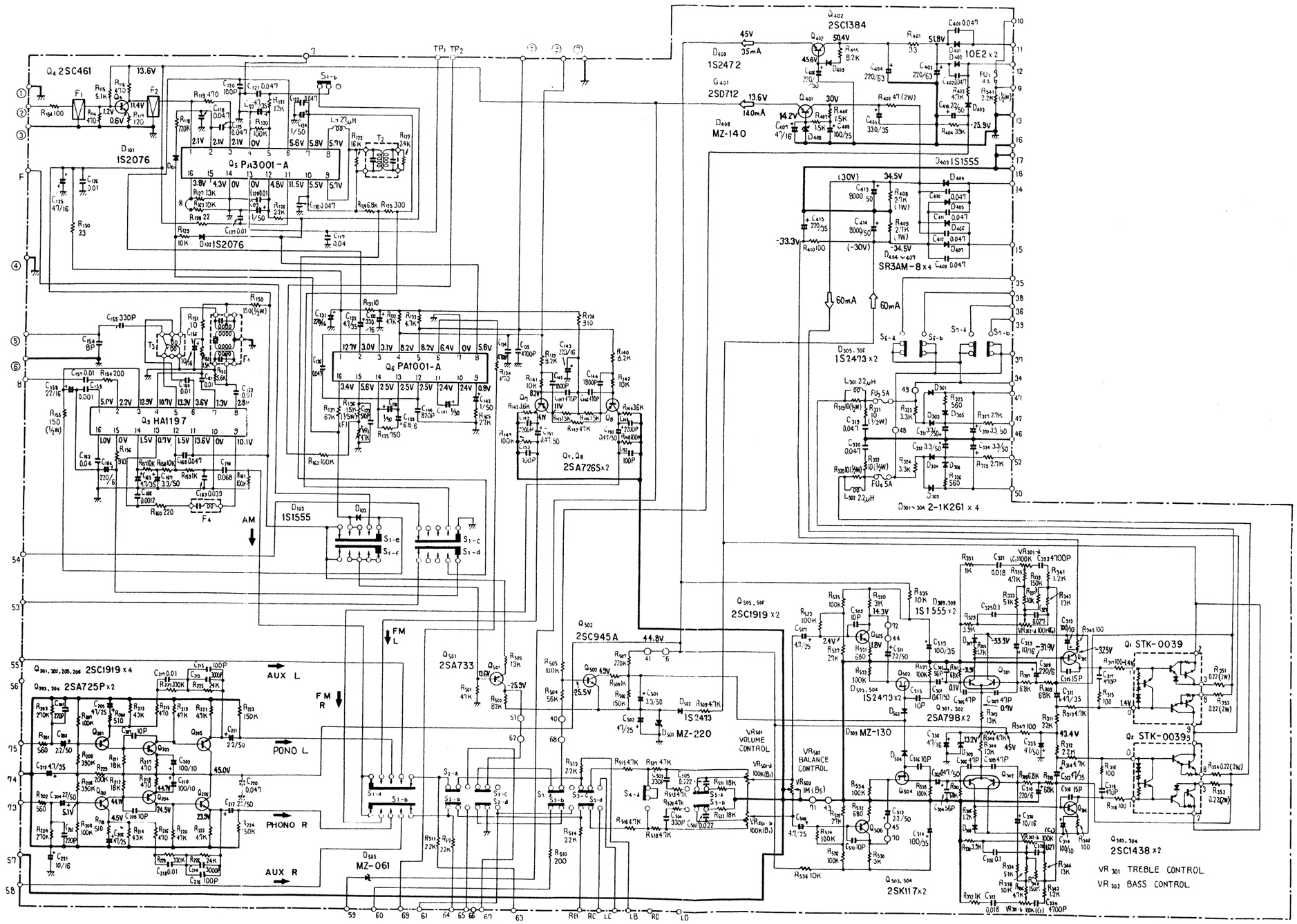
9.9 INDICATOR ASSEMBLY (GWX-177)



Parts List

Part No.	Symbol & Description	
CEB 221P 6	C517	
RD¼PS 471J	R539	
RD¼PS 821J	R540	
AEL-307	D506, D508	LED (red)
AEL-308	D507	LED (green)

9.10 MAIN BOARD ASSEMBLY (GWM-117)



Parts List of Main Board Assembly (GWM-117)

COILS AND FILTERS

Part No.	Symbol & Description	
ATF-013	F1, F2	FM ceramic filter
ATF-034	F3	AM ceramic filter
ATF-038	F4	455 kHz BPF
ATE-040	T2	FM DET
ATB-013	T3	AM osc. coil
ATH-016	L301, L302	AF choke coil 2.2μH
ATH-022	L7	Micro inductor

SWITCHES

Part No.	Symbol & Description	
ASE-107	S1	Slide rotary (FUCTION)
ASG-140	S2, S3	Dual push (TAPE MONITOR 1, 2)
ASG-138	S4, S5	Push (MODE/FM MUTE, LOUDNESS)
ASG-139	S6, S7	Dual push (SPEAKERS)

CAPACITORS

Part No.	Symbol & Description
CCDSL 221K 50	C201, C202
CEANL 2R2P 50	C203, C204, C211, C212, C511, C512
CEANL R47M 50	C301, C302
CEANL 470P 25	C205, C206
CCDSL 100F 50	C207, C208, C509, C510, C515, C516
CEA 101P 10	C209, C210, C313, C314
CKDYA 302J 50 (CQMA 302J 50)	C213, C214
CCDSL 101K 50	C215, C216, C120, C152, C153
CKDYA 103J 50 (CQMA 103J 50)	C217, C218
CEA 4R7P 35	C219, C122, C132, C165
CKDYF 473Z 50	C220, C319, C320, C118, C119, C121, C123
CKDYF 473Z 50	C130, C168
CCDSL 560K 50	C303, C304
CCDSL 470K 50	C305–C308
CEA 220P 6	C309, C310
CEA 470P 35	C311, C312
CCDSL 150K 50	C315, C316
CCDSL 471K 50	C317, C318
CQMA 183J 50	C321, C322
CQMA 472J 50	C323, C324, C134, C135
CQMA 104J 50	C325, C326
CQMA 273J 50	C327, C328
CEANL 100P 16	C329, C330
CEA 3R3P 50	C331–C334, C167, C501
CEA 470P 16	C336, C125, C407
CEA 470P 50	C335

Part No.	Symbol & Description		
CEA 221P 6	C164		
CEA 470P 25	C502		
CEA 100P 16	C221, C156		
CEA 331P 35	C405		
CKDYF 403Z 50	C117, C163		
CKDYF 103Z 50	C126–C128, C157, C160–C162		
CEA 221P 16	C131, C143		
CEA 331P 16	C133		
CQMA 473K 50	C136		
CQSH 511J 50	C137		
CEANL 010M 50	C138, C141		
CSZA 6R8M 6	C139		
CKDYB 821K 50	C140		
CKDYB 182K 50	C144, C145		
CKDYB 471K 50	C146, C147		
CKDYB 222K 50	C148, C149		
CCDXL 080F 50	C154		
CEA 220P 16	C158		
CKDYB 102K 50	C159		
CKDYB 122K 50	C166		
CQMA 683K 50	C170		
ACG-009	C401, C402, C409–C412	Ceramic	0.047/150V
CEA 221P 63	C403, C404		
CEA 221P 35	C415		
CEA 221P 50	C406		
CEA 101P 25	C408		
ACH-082	C413, C414	Electrolytic	8000/50V
CQSH 331J 50	C155		
CQMA 333K 50	C169		
CEA 2R2P 50	C416		
CCDSL 331K 50	C503, C504		
CQMA 223J 50	C505, C506		
CEANL 4R7P 25	C507, C508		
CEA 101P 35	C513, C514		
CEA 010P 50	C124, C129, C142		
CEA R47P 50	C150, C151		

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

RESISTORS

Part No.	Symbol & Description		
C92-051	VR1	Semi-fixed	4.7k-B
ACV-186	VR301, VR302	Variable (TREBLE, BASS)	
ACV-161	VR501	Variable (VOLUME)	
ACT-019	VR502	Variable (BALANCE)	

Part No.	Symbol & Description
RD¼PS □□□ J	R114–R135, R137–R149, R151–R154,
RD¼PS □□□ J	R156–R163, R165
RD¼PS □□□ J	R201–R204, R209–R229, R301–R318,
RD¼PS □□□ J	R323–R348,
RD¼PS □□□ J	R403–R407, R501–R538
RD¼PS □□□ JNL	R205–R208
RD½PS □□□ J	R150, R155, R319–R322
RD¼VS □□□ J	R164
RN⅕SQ □□□□ F	R136
ACN-030	R351–R354 Wire wound 0.22/2W
RF¼PS □□□ J	R401, R410
RS2P □□□ J	R402
RS1P □□□ J	R408, R409
ACN-029	R541 Carbon composition 2.2M/½W

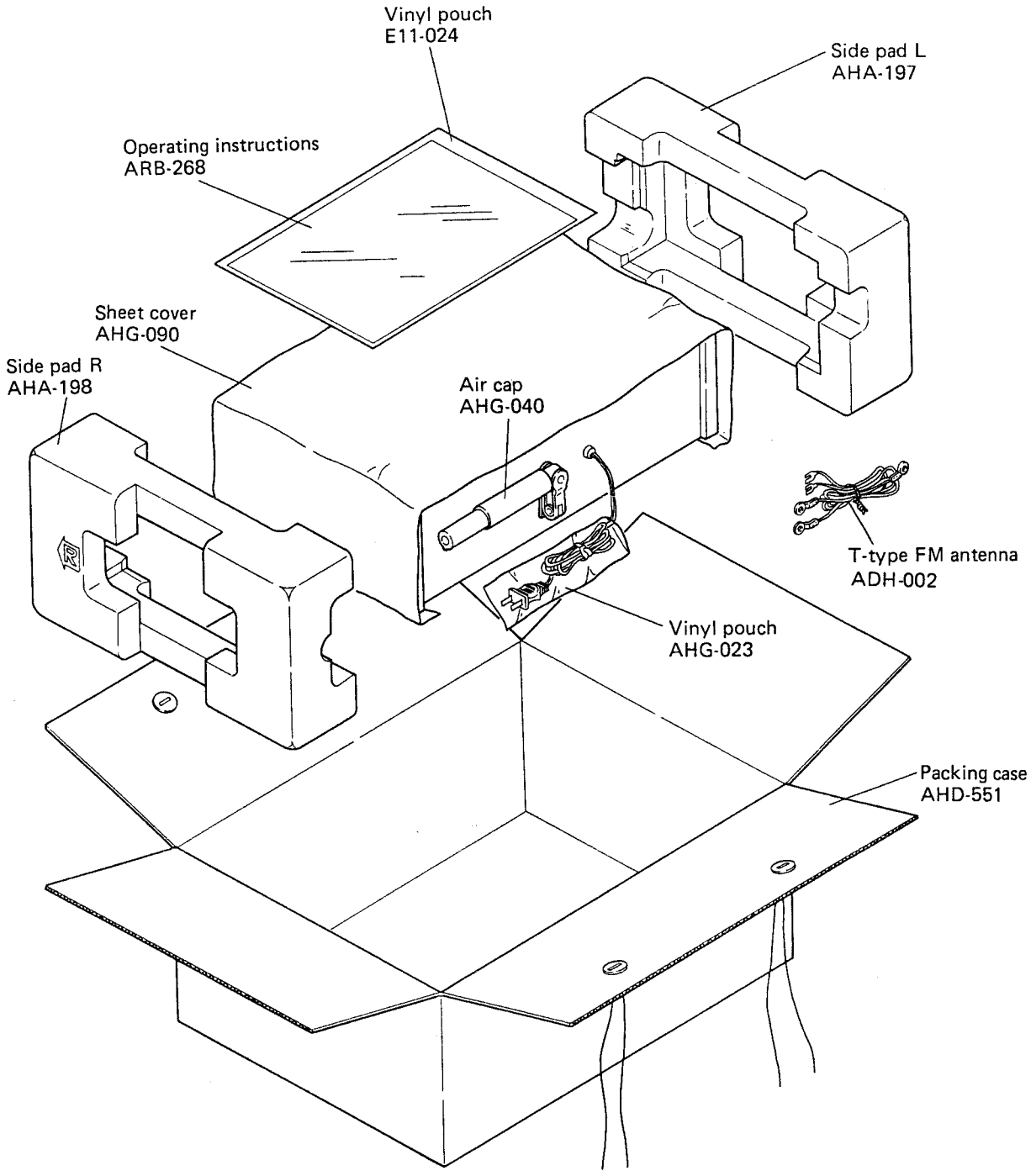
SEMICONDUCTORS

Part No.	Symbol & Description
2SC461-B or C	Q4
PA3001-A	Q5
PA1001-A	Q6
2SA726S-G or F (2SA750-E or F)	Q7, Q8
HA1197	Q9
2SC1919-G or F (2SC1400-E)	Q201, Q202, Q205, Q206, Q505, Q506
2SA725P-F or G	Q203, Q204
2SA798-F or G	Q301, Q302
2SC1438-V or B	Q303, Q304
2SD712-C or D (2SD313-D or E)	Q401
2SC1384-Q or R	Q402
2SA733-Q or R	Q501
2SC945A-Q or R	Q502
2SK117-GR or Y (2SK34-C or D)	Q503, Q504
1S2076 (1S2473) (1S1555)	D101, D102
1S1555 (1S2473)	D103, D307, D308
1S2473 (1S1555)	D403, D405, D306, D502–D504
2-1K261	D301–D304
MZ-130 (WZ-130)	D309
10E2 (SIB01-02)	D401, D402
SR3AM-8 (30D4)	D404–D407
MZ-140 (WZ-140)	D408
1S2472 (1S1554)	D409
MZ-220 (WZ-220)	D501
MZ-061 (WZ-061)	D505

OTHERS

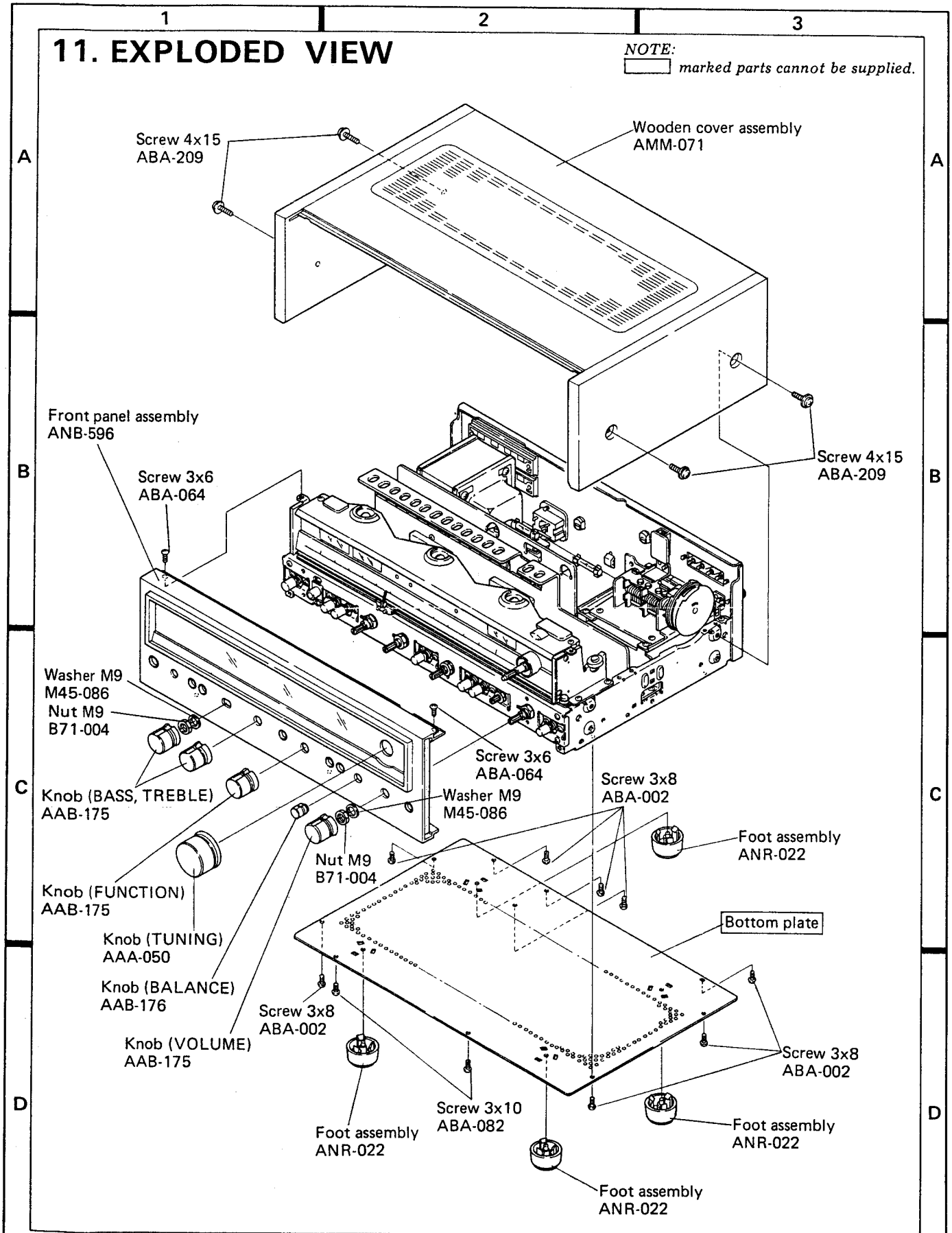
Part No.	Description
AKR-013	Fuse clip
AKH-014	IC socket
ANH-203	Heat sink
ABN-024	Washerfaced nut
ABN-047	Union nut

10. PACKING


Vinyl pouch
E11-024
Side pad L
AHA-197
Operating instructions
ARB-268
Sheet cover
AHG-090
Side pad R
AHA-198
Air cap
AHG-040
T-type FM antenna
ADH-002
Vinyl pouch
AHG-023
Packing case
AHD-551

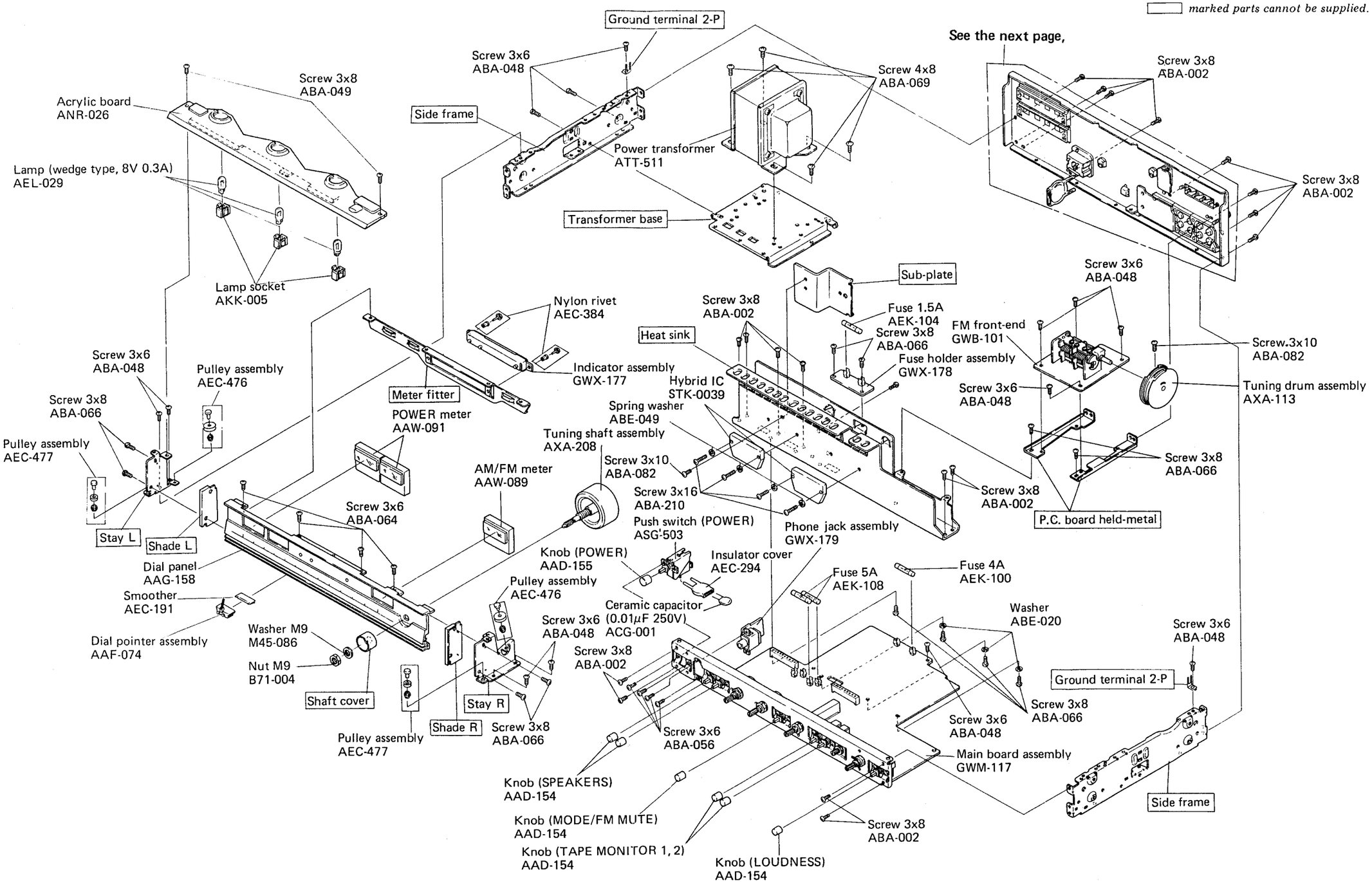
11. EXPLODED VIEW

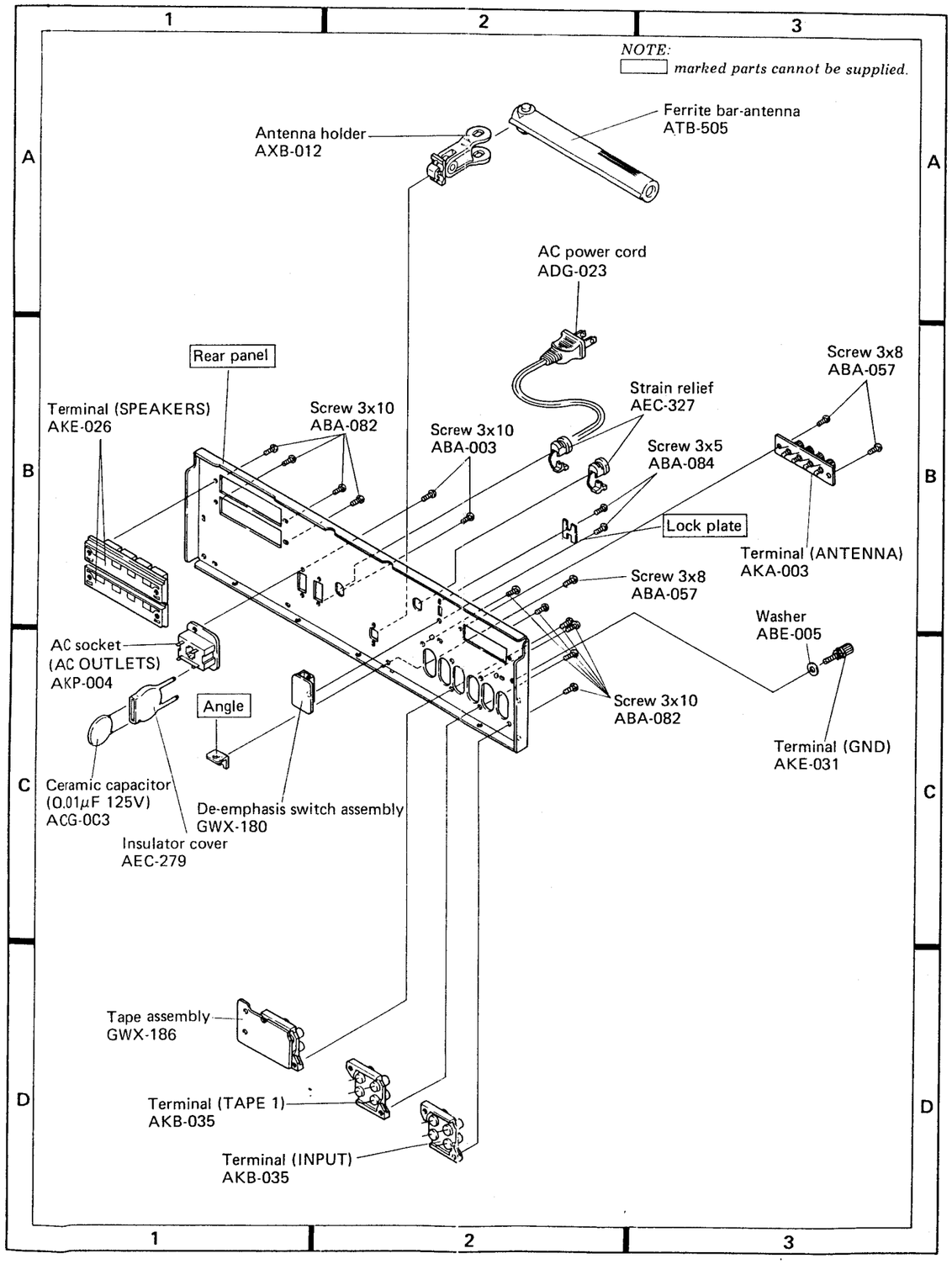
NOTE:
☐ *marked parts cannot be supplied.*



NOTE:
[ ] *marked parts cannot be supplied.*

See the next page,




NOTE:
marked parts cannot be supplied.
Antenna holder
AXB-012
Ferrite bar-antenna
ATB-505
AC power cord
ADG-023
Rear panel
Terminal (SPEAKERS)
AKE-026
Screw 3x10
ABA-082
Screw 3x10
ABA-003
Strain relief
AEC-327
Screw 3x5
ABA-084
Screw 3x8
ABA-057
Lock plate
Terminal (ANTENNA)
AKA-003
Screw 3x8
ABA-057
Washer
ABE-005
AC socket
(AC OUTLETS)
AKP-004
Angle
Screw 3x10
ABA-082
Terminal (GND)
AKE-031
Ceramic capacitor
(0.01μF 125V)
ACG-003
Insulator cover
AEC-279
De-emphasis switch assembly
GWX-180
Tape assembly
GWX-186
Terminal (TAPE 1)
AKB-035
Terminal (INPUT)
AKB-035
1
2
3
A
B
C
D