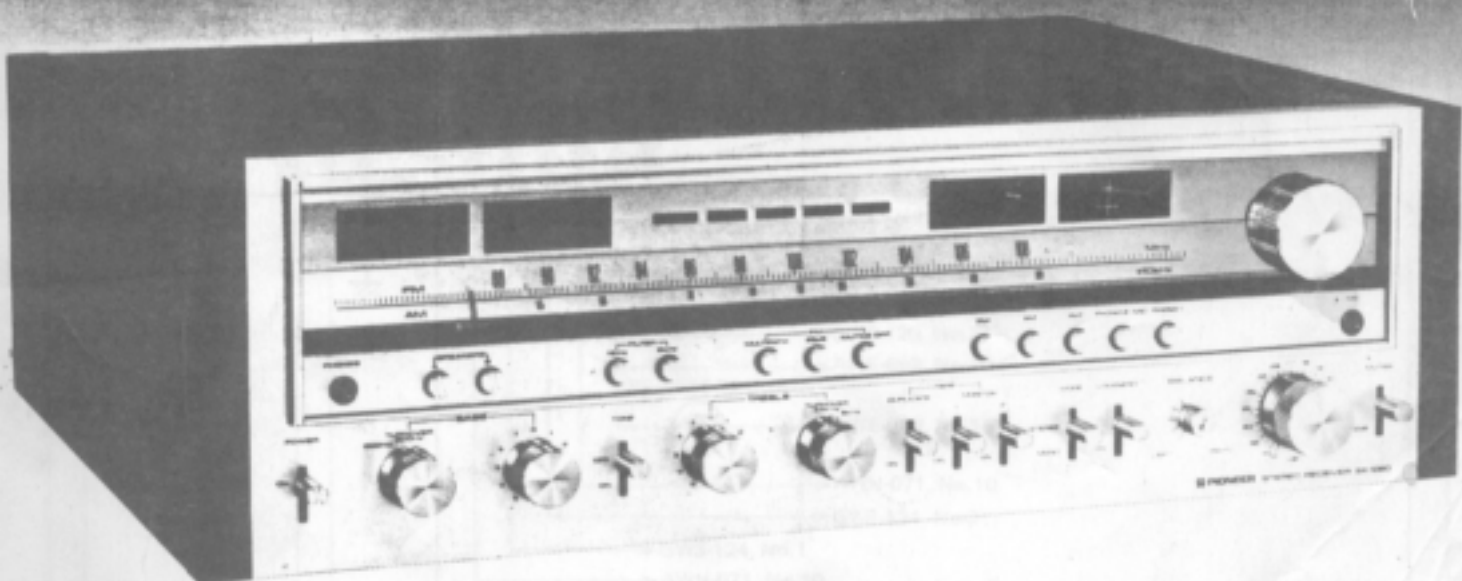


AM/FM STEREO RECEIVER

SX-1080

SERVICE MANUAL



 PIONEER

MODEL SX-1080 COMES IN FIVE VERSIONS DISTINGUISHED AS FOLLOWS:

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

NOTICE:

- This service manual is applicable to the SX-1080/KU.
- The SX-1080/HG, S/G, S, KC service manual is issued as an appendix.

CONTENTS

1.	SPECIFICATIONS	3
2.	CONNECTION DIAGRAM.....	5
3.	FRONT PANEL FACILITIES	7
4.	DISASSEMBLY	10
5.	PARTS LOCATION	
5.1	Front Panel View	11
5.2	Front View with Front Panel Removed	12
5.3	Top View with Bonnet Removed	13
5.4	Bottom View with Bottom Plate Removed	14
5.5	Rear Panel View	15
6.	LEVEL DIAGRAM.....	16
7.	BLOCK DIAGRAM	17
8.	CIRCUIT DESCRIPTIONS	
8.1	Tuner	19
8.2	Phono, Mic Input Circuit	20
8.3	Flat Amplifier	20
8.4	Tone Control	20
8.5	Power Amplifier	20
8.6	Meter Amplifier	21
8.7	Protection Circuit	22
8.8	Power Supply	22

9.	ADJUSTMENT	
9.1	AM Tuner	23
9.2	FM Tuner	24
9.3	FM MPX	25
9.4	Power Amplifier	26
9.5	Meter	26
10.	DIAL CORD STRINGING	27
11.	EXPLODED VIEWS	28
11.1	Exterior	29
11.2	Component of Panel Stay	31
11.3	Component of Chassis	33
11.4	Rear Panel	35
12.	SCHEMATIC DIAGRAMS, P.C. BOARD PATTERNS AND PARTS LIST	
12.1	Miscellaneous Parts List	36
12.2	Schematic Diagram	39
12.3	Tuner Assembly (AWE-092)	41
12.4	Power Transistor Connector Assembly (AWX-125)	47
12.5	Tone Control Assembly (AWG-056)	48
12.6	Flat Amplifier Assembly (GWG-112)	51
12.7	Power Amplifier Assembly (AWH-071)	54
12.8	Speaker Selector Assembly (GWS-124)	57
12.9	Function Equalizer Assembly (GWS-125)	60
12.10	Filter Assembly (AWT-001)	64
12.11	Power Supply Assembly (AWR-152)	66
12.12	Terminal Assembly (GWS-126)	70
12.13	Terminal Assembly (GWS-127)	70
12.14	Speaker Terminal Assembly (GWS-128)	71
12.15	Protection Assembly (AWM-120)	72
13.	PACKING	75

1. SPECIFICATIONS

Semiconductors

FETs	5
ICs	8
Transistors	36
Diodes	42

Power Amplifier Section

Continuous power output of 120 watts* per channel, min. at 8 ohms or 150 watts* per channel at 4 ohms from 20 Hertz to 20,000 Hertz with no more than 0.05% total harmonic distortion.

Total Harmonic Distortion (20 Hertz to 20,000 Hertz)

Continuous Rated Power Output . . . No more than 0.05%
60 watts per channel power

output, 8 ohms No more than 0.02%

1 watt per channel power

output, 8 ohms No more than 0.02%

Intermodulation Distortion (50 Hertz: 7,000 Hertz = 4:1)

Continuous Rated Power Output . . . No more than 0.05%

60 watts per channel power

output, 8 ohms No more than 0.02%

1 watt per channel power

output, 8 ohms No more than 0.02%

Frequency Response 5 Hertz to 100,000 Hertz ± 0.5 dB

Input Sensitivity/Impedance

POWER AMP IN 1V/50 kilohms

Output

Speaker A, B, A+B

Damping Factor

(20 Hertz to 20,000 Hertz, 8 ohms) 30

Hum and Noise (IHF, short-circuited, A Network) . . . 100dB

Preamplifier Section

Input (Sensitivity/Impedance)

PHONO 1, 2 2.5mV/50 kilohms

MIC 7.5mV/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: 0.05%)

PHONO 1, 2 200mV

Output Level/Impedance

TAPE REC 1 150mV

TAPE REC 2 150mV

PRE OUT 1V/1 kilohms

Total Harmonic Distortion

(20Hz to 20,000Hz 1V output) . . . No more than 0.05%

Frequency Response

PHONO (RIAA equalization) . 20Hz to 20,000Hz ± 0.2 dB

AUX, TAPE PLAY 5Hz to 80,000Hz ± 0.5 dB

Tone Control

BASS ± 7 dB/ ± 10 dB (100Hz)

Turnover Frequency 200Hz/400Hz

TREBLE ± 7 dB/ ± 10 dB (10kHz)

Turnover Frequency 5kHz/2.5kHz

Filter

LOW 15Hz (6dB/oct.)

HIGH 6kHz (6dB/oct.)

Loudness Contour (Volume control set

at -40 dB position) $+6$ dB (100Hz) $+3$ dB (10kHz)

Hum and Noise

(IHF, short-circuited, A Network)

PHONO 76dB

AUX, TAPE PLAY 90dB

Muting -20 dB

FM Section

Usable Sensitivity

MONO 9.8dBf (1.7 μ V)

50dB Quieting Sensitivity

MONO 14.2dBf (2.8 μ V)

STEREO 37dBf (39 μ V)

Signal to Noise Ratio

(at 75dBf) . . . STEREO 74dB

(at 65dBf) . . . MONO 80dB

STEREO 71dB

Distortion (at 65dBf)

100Hz MONO/STEREO 0.1%/0.2%

1kHz MONO/STEREO 0.1%/0.15%

6kHz MONO/STEREO 0.1%/0.2%

Frequency Response 30Hz to 15,000Hz ± 0.5 dB

Capture Ratio 1.0dB

Alternate Channel Selectivity 80dB

Spurious Response Ratio 100dB

Image Response Ratio 90dB

1F Response Ratio 100dB

AM Suppression Ratio 55dB

Muting Threshold 19.2dBf (5 μ V)

Stereo Separation . . . 50dB (1kHz), 35dB (30Hz - 15kHz)

Subcarrier Product Ratio 65dB

SCA Rejection Ratio 65dB

Antenna Input 300 ohms balanced

75 ohms unbalanced

AM Section

Sensitivity (IHF, Ferrite antenna)	300 μ V/m
(IHF, Ext. antenna)	15 μ V
Selectivity	30dB
Signal-to-Noise Ratio	50dB
Image Response Ratio	40dB
IF Response Ratio	40dB
Antenna	Built-in Ferrite Loopstick Antenna

Miscellaneous

Power Requirements	120V 60Hz
Power Consumption	350W (UL), 800W (CSA) 1100W (max.)
Dimensions	526(W) x 176(H) x 440(D) mm 21-11/16(W) x 6-15/16(H) x 17-5/16(D) in
Weight Without Package	21.3kg (47lb)
With Package	24.2kg (53lb 6oz)

Furnished Parts

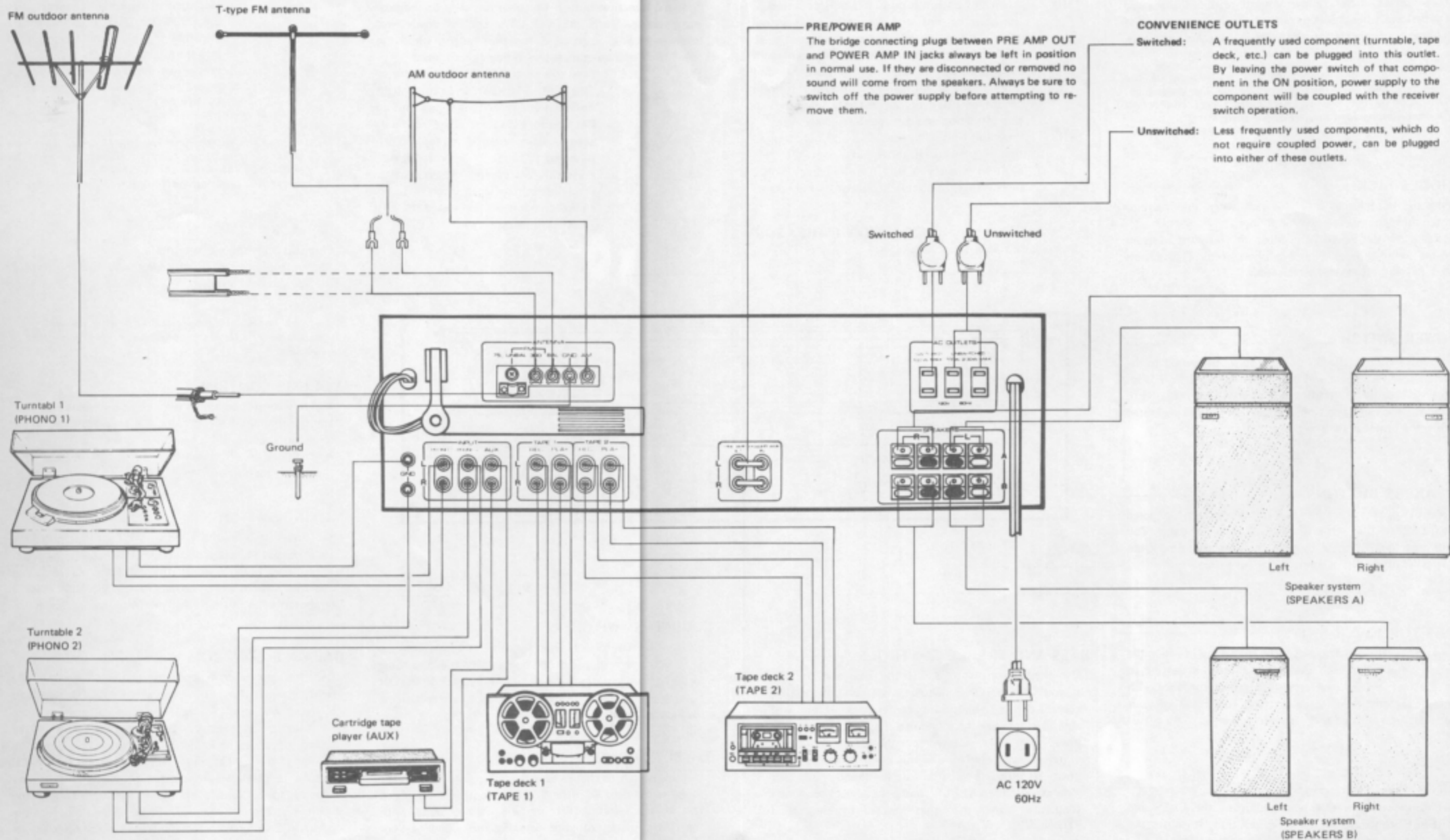
FM T-type Antenna	1
Operating Instructions	1
Hex. Wrench	1

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

NOTE:

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

2. CONNECTION DIAGRAM



3. FRONT PANEL FACILITIES

POWER METERS

These power 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.

PHONES JACK

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

POWER SWITCH

Flip this switch to the ON position to supply power to the stereo 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.

SPEAKERS BUTTONS

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

BASS TURNOVER SWITCH

Use this switch to change over the frequency in which the sound adjustment with the BASS control is starting to take effect. Select 200Hz or 400Hz in accordance with the characteristics of your listening room and of your speakers, and with your general preference.

TONE SWITCH

Set this switch to ON when adjusting the BASS and TREBLE controls. In the OFF position, it causes the amplifier to operate with a flat frequency response.

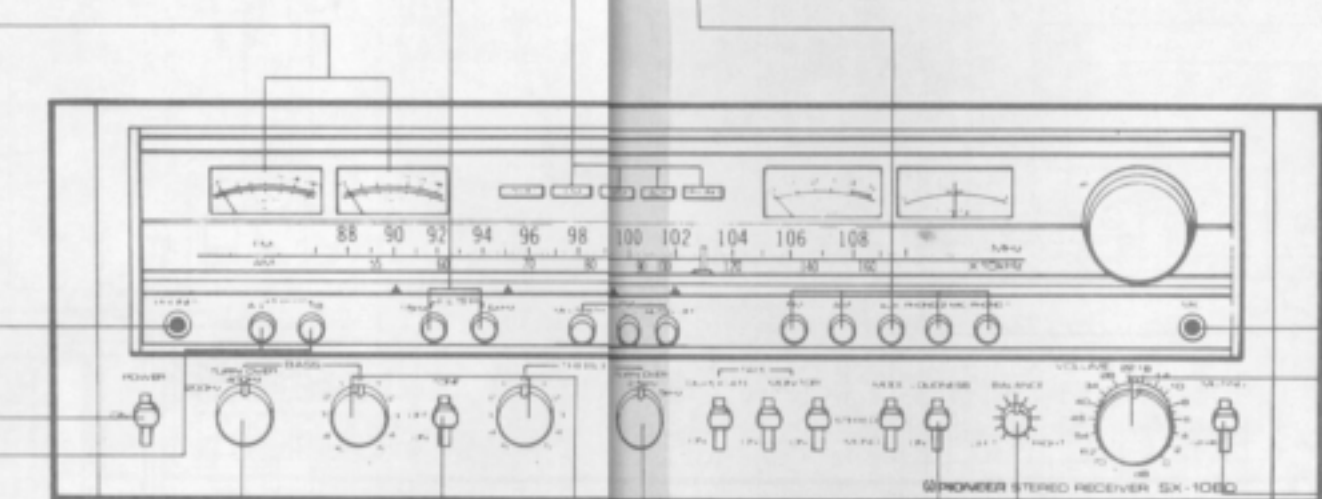
FILTER BUTTONS

15Hz . . . When this button is pressed, a 6dB/oct attenuation can be provided for frequencies below 15Hz. This means that you can cancel out noise in the ultra-low frequencies which is generated by low-pitched rumble from a turntable and other forms of distortion. Although this noise cannot be heard, it can generate intermodulation distortion and damage the speakers.

6kHz . . . Press this button to provide a 6dB/oct attenuation at frequencies above 6kHz. Set it to this position when you find high-frequency noise, such as that from scratched records, unpleasant.

FUNCTION INDICATOR

These indicators show the selected program source.



BASS AND TREBLE CONTROLS

Use these controls to adjust the bass and the treble. If you set the TONE switch to ON and turn the BASS control to the right from its center position, you will be able to emphasize the sound in a frequency range which is lower than that selected by the BASS TURNOVER switch. Conversely, turning this control from the center position to the left will attenuate the sound.

You can use the TREBLE control to adjust the sound in a frequency higher than that selected by the TREBLE TURNOVER switch.

FUNCTION BUTTONS

Press the function button which corresponds to the program source. Turn the VOLUME control down first before selecting a different function button while the sound from one program source is being reproduced.

FM Press this button for FM broadcasts. The FM STEREO indicators light up when the receiver is tuned into an FM stereo broadcast. The sound is automatically received monophonically during FM monophonic broadcasts.

AM Press this button for AM broadcasts.

AUX Press this button when listening to an audio component connected to the AUX input jacks.

LOUDNESS SWITCH

Set this switch to ON 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.

TREBLE TURNOVER SWITCH

Use this switch to change over the frequency in which the sound adjustment with the TREBLE control is starting to take effect. Select 2.5kHz or 5kHz in accordance with the characteristics of your listening room and of your speakers, and with your general preference.

PHONO 2/MIC . . . Press this button when playing a record on the turntable connected to the PHONO 2 jacks, or when using a microphone which you have plugged into the MIC jack.

PHONO 1 Press this button when playing a record on the turntable connected to the PHONO 1 jacks.

NOTES:
1. Unplug the microphone from the MIC jack when you do not intend to use the microphone otherwise you will not be able to use the PHONO 2 jacks.
2. Only one function button should be pressed at a time.

MIC JACK

Plug your microphone into this jack. The microphone signals are reproduced in mono through the left and right speakers.

NOTE:
A high impedance (approx. 50 kilohms) dynamic type microphone with a standard plug can be connected to this jack.

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 ∞. The scale is graduated in dB which indicate the attenuation when the maximum output level is 0dB.

MUTING SWITCH

Set this switch to the -20dB position to attenuate the audio output indicated by the VOLUME control by 20dB. There is no need to adjust the VOLUME control if you use this switch when turning down the audio output temporarily and when changing over records or tapes.

BALANCE CONTROL

Use this control to balance the volume of the left and right channels. First, however, set the MODE switch to MONO, and adjust so that the sound appears to come from somewhere exactly between the two speakers. 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 switch to STEREO.

FM MUTING BUTTON

ON (released position) . . . Release this button to suppress unpleasant inter-station noise when tuning in to FM stations.

OFF (depressed position) . Depress this button to pick up weak stations.

FM 25 μ S BUTTON

Press this button when listening to a Dolby* FM broadcast; otherwise keep this button at the released position.

FM MULTIPATH BUTTON

Use this switch to detect multipath sound when installing the FM antenna in a position which yields the minimum multipath interference.

POWER SWITCH**TUNING KNOB**

Use this to tune in to broadcasting stations.

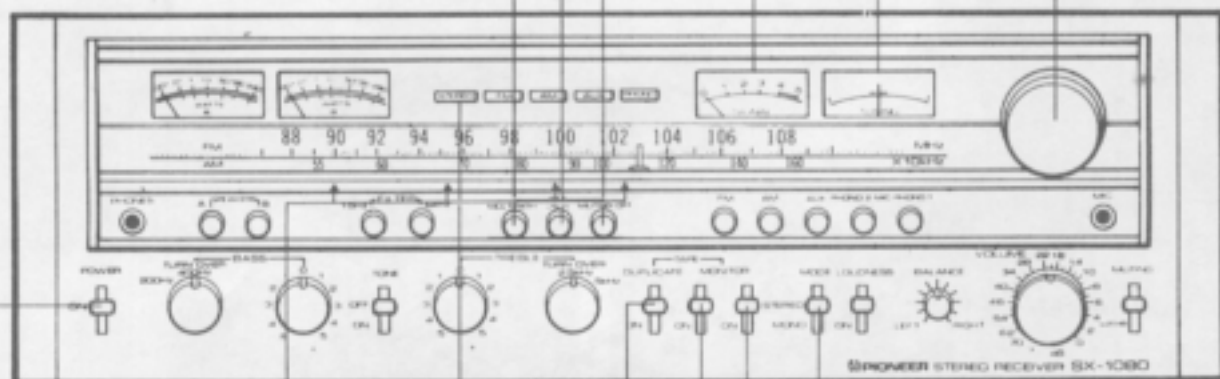
Select the station and tune for optimum reception by observing the SIGNAL meter for AM stations and both the SIGNAL and TUNING meters for FM stations.

SIGNAL METER

When tuning in to an AM or FM station, the optimum reception position is indicated by the maximum deflection of the meter pointer to the right.

TUNING METER

When tuning in an FM station, the optimum reception position is indicated when the meter pointer deflects to dead center. Check that the SIGNAL meter pointer has deflected as far to the right as possible.

**MEMORY MARKERS**

These are very convenient for frequent tuning in to the same broadcasting station.

STEREO INDICATOR

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

TAPE MONITOR SWITCHES (1, 2)

Set switch 1 to ON 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 setting switch 2 to ON.

NOTE:

Set these switches to the upper (off) position when listening to records or the broadcast.

MODE SWITCH

Use this switch for selecting mono or stereo performances.

STEREO: Set to this position for normal stereo operation.

MONO: When set to this position, the left and right channel signals will be mixed and reproduced monophonically from both speaker systems.

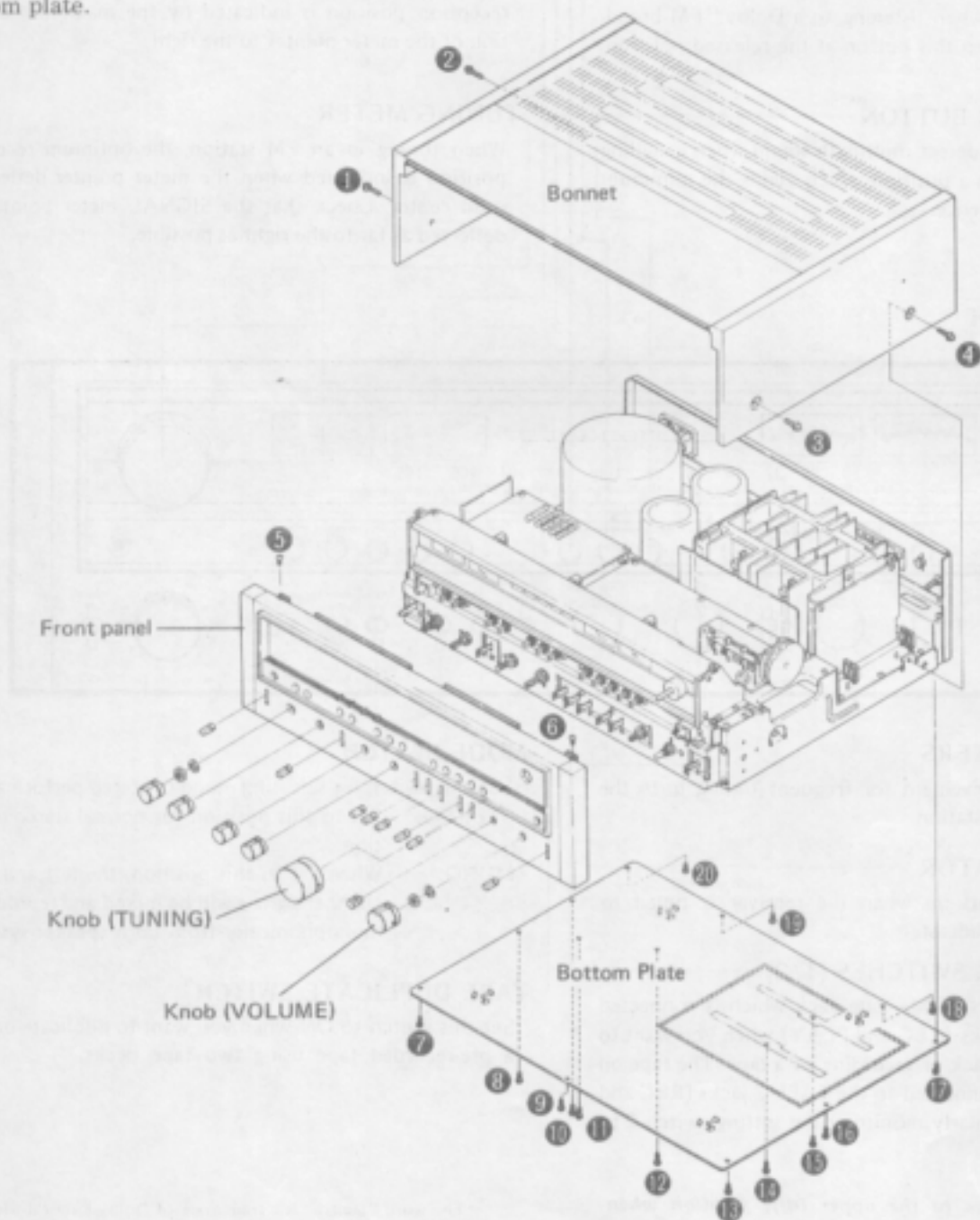
TAPE DUPLICATE SWITCH

Set this switch to ON when you want to duplicate or edit a pre-recorded tape using two tape decks.

*The word "Dolby" is a trademark of Dolby Laboratories Inc.

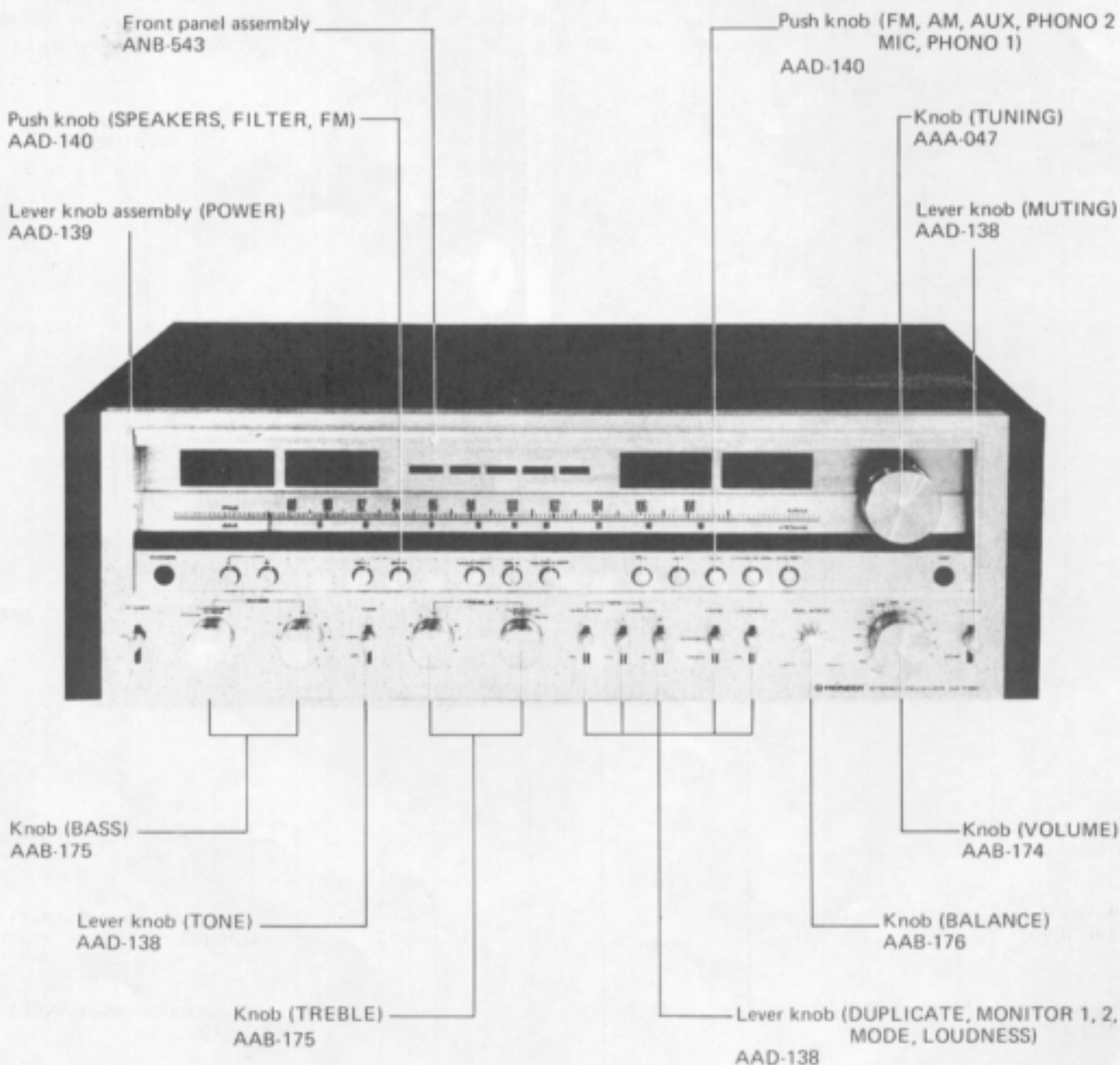
4. DISASSEMBLY

1. Remove screws ① ~ ④ and remove the bonnet.
2. Remove screws ⑤ ~ ⑥, all the knobs, and remove the two nuts and two washers at the front panel. (However, loosen the set screws with the accessory allen wrench before attempting to remove the TUNING and VOLUME knobs.)
3. Remove screws ⑦ ~ ⑳ and remove the bottom plate.

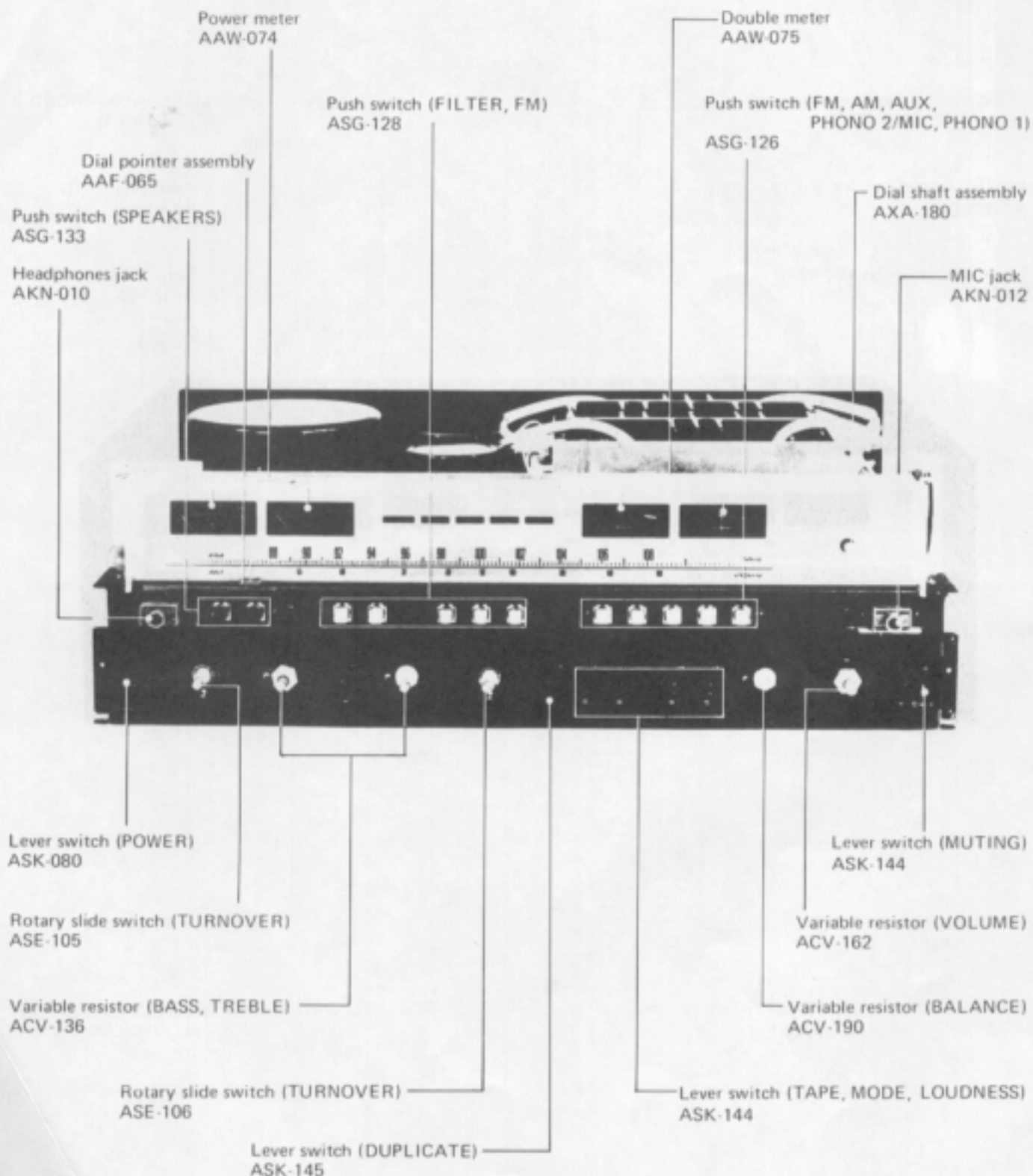


5. PARTS LOCATION

5.1 FRONT PANEL VIEW



5.2 FRONT VIEW WITH FRONT PANEL REMOVED



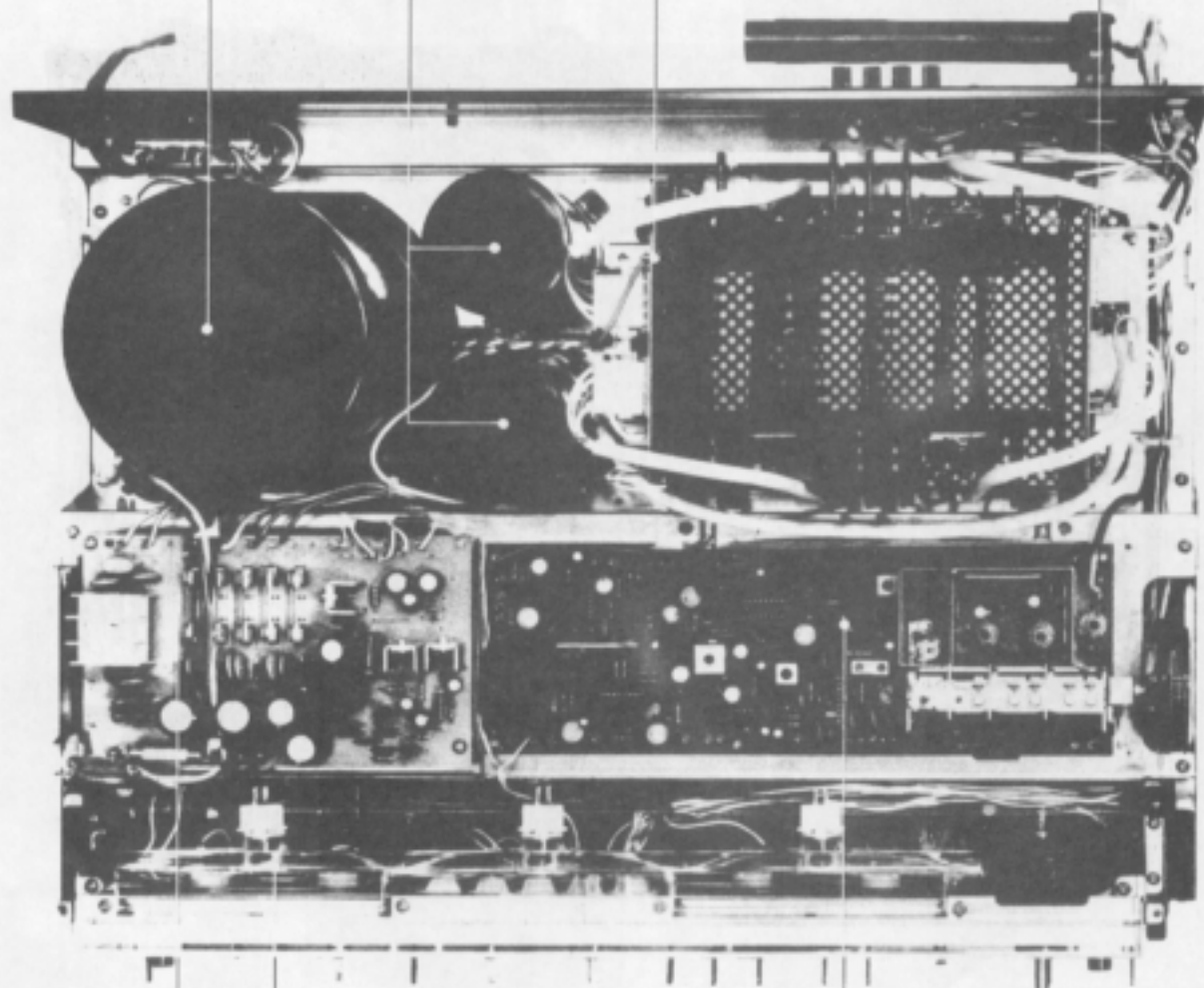
5.3 TOP VIEW WITH BONNET REMOVED

Capacitor
ACH-085

Power amplifier assembly
AWH-071

Power amplifier assembly
AWH-071

Power transformer
ATT-448



Power supply assembly
AWR-152

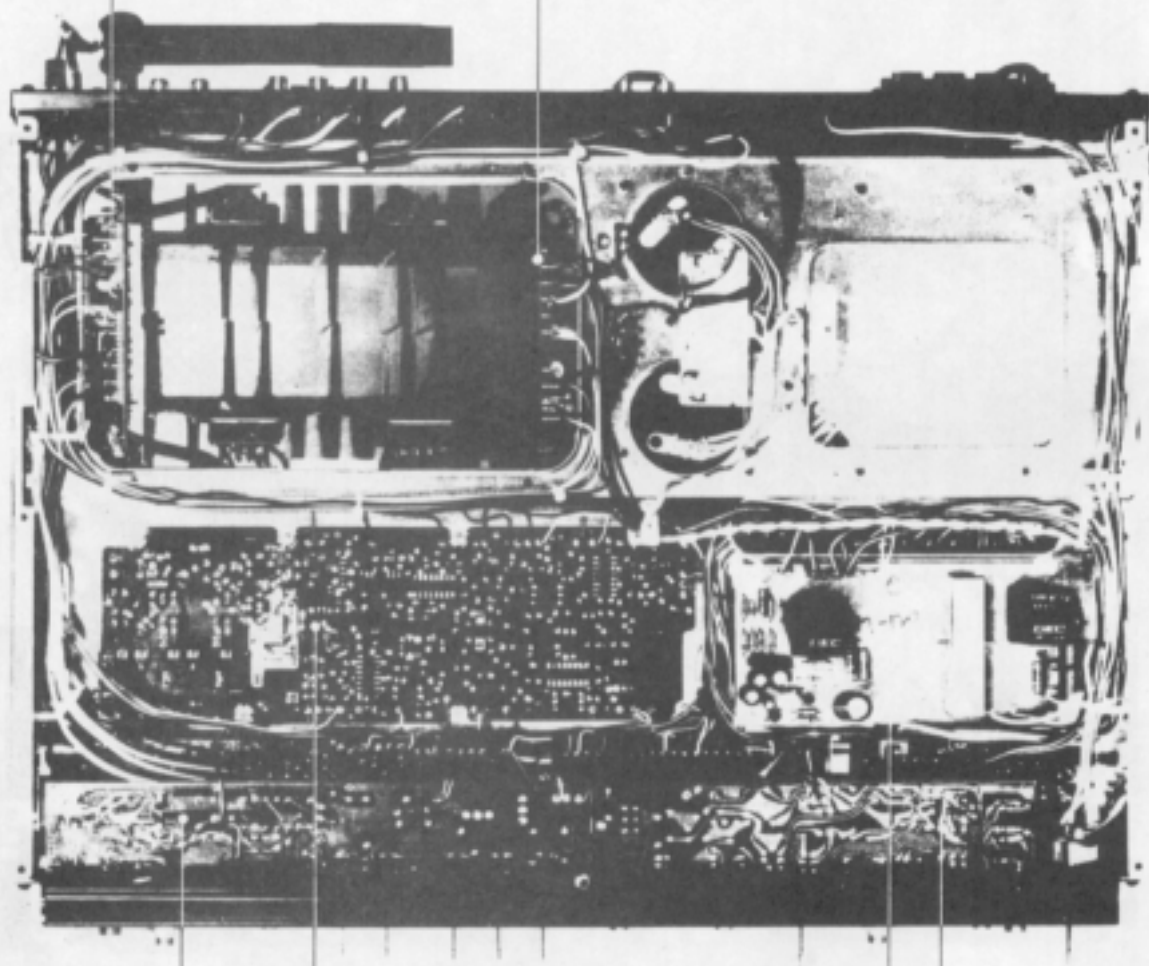
Tuner assembly
AWE-092

Acrylic board
ANR-020

5.4 BOTTOM VIEW WITH BOTTOM PLATE REMOVED

Power amplifier assembly
AWH-071

Power amplifier assembly
AWH-071



Flat amplifier assembly
GWG-112

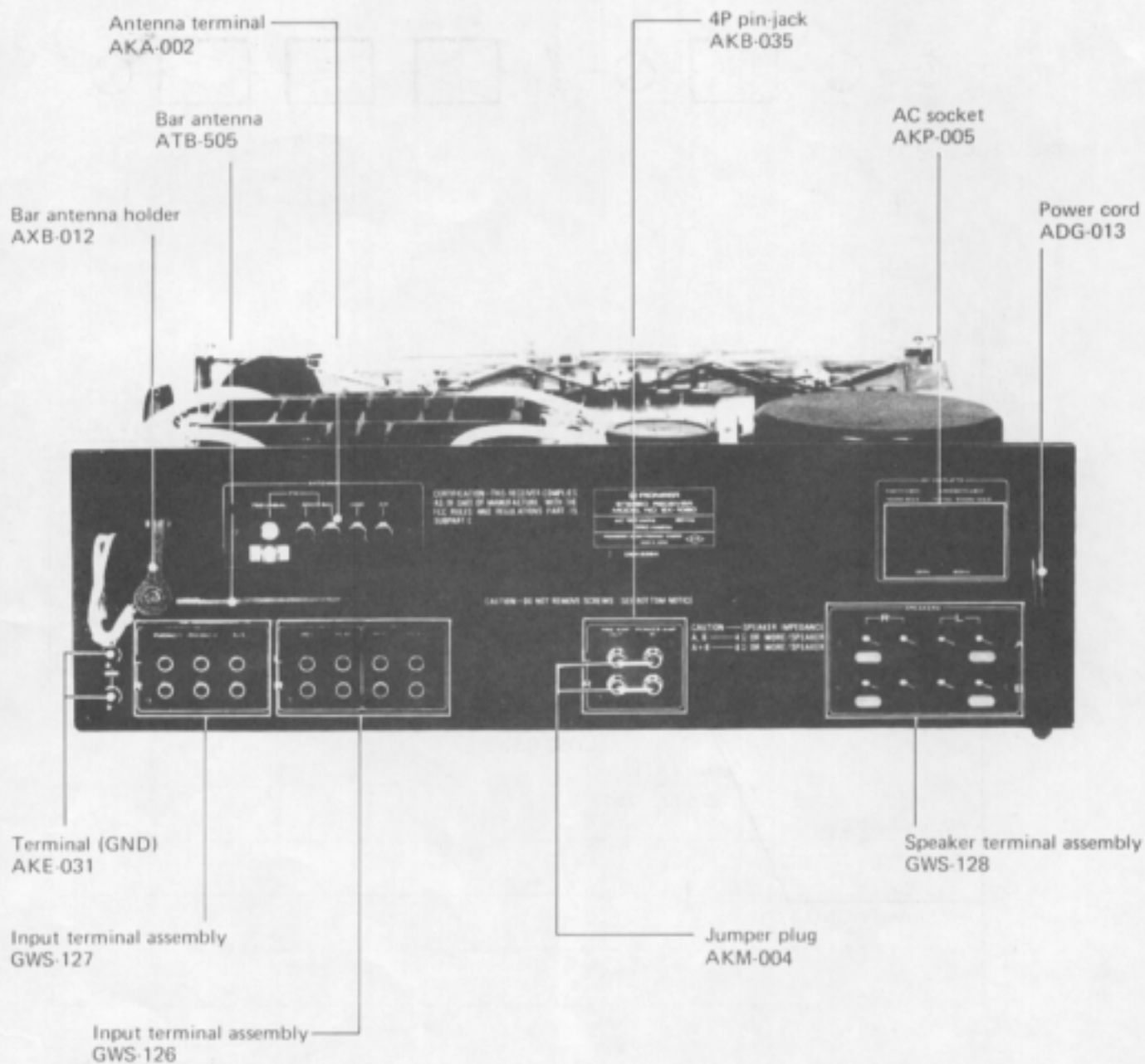
Tone control assembly
AWG-056

Tuner assembly
AWE-092

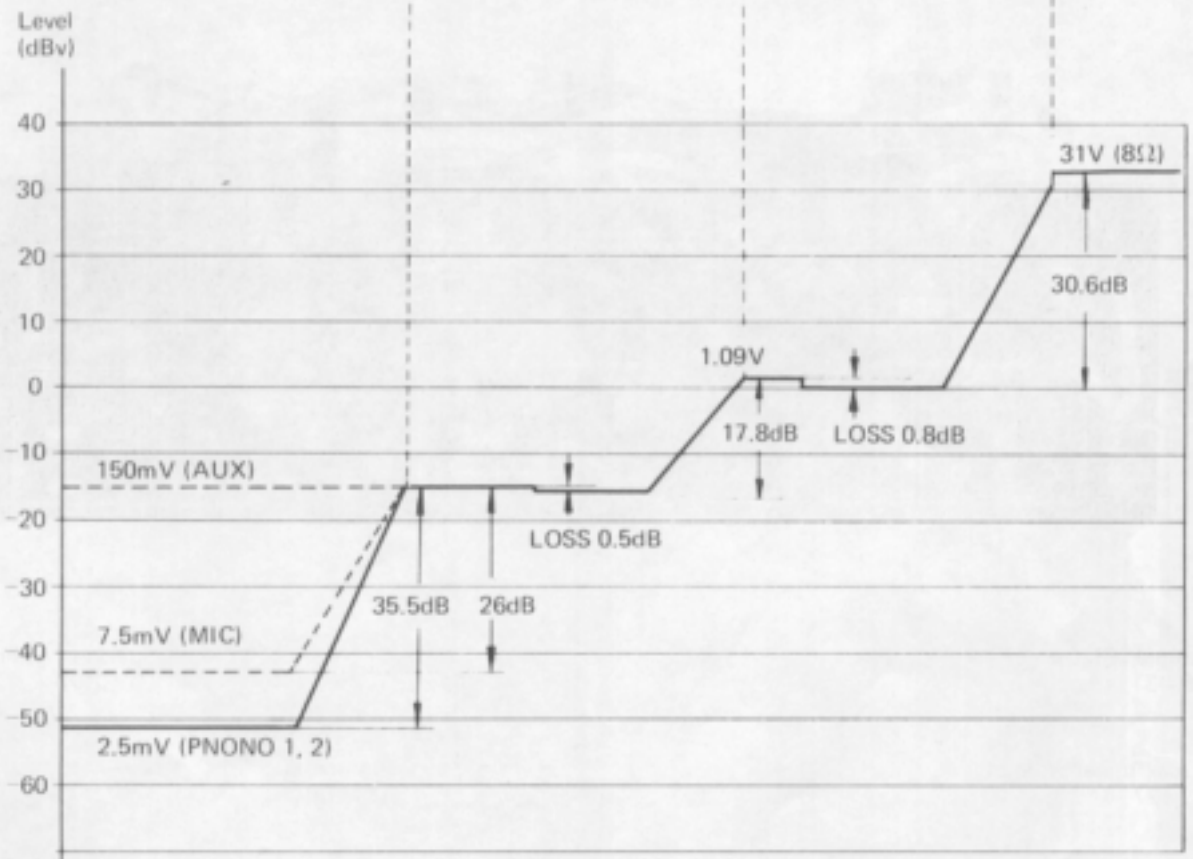
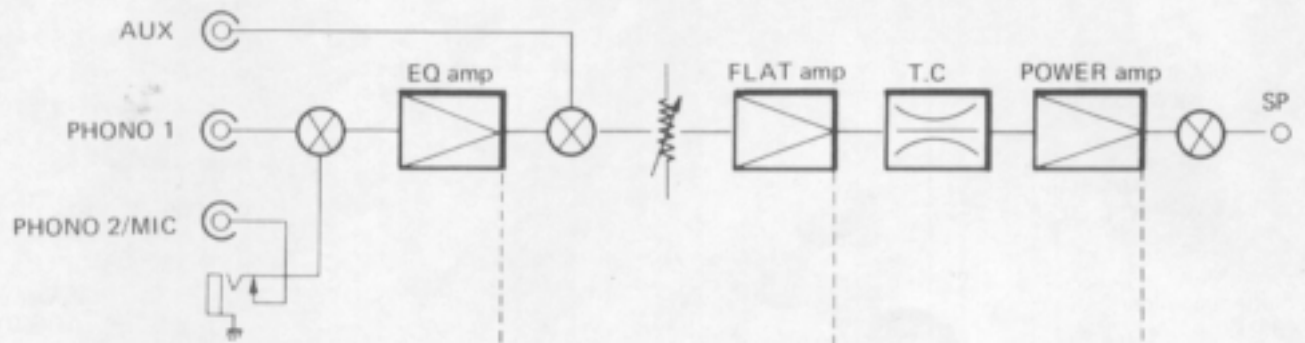
Protection assembly
AWM-120

LEVEL DIAGRAM

5.5 REAR PANEL VIEW

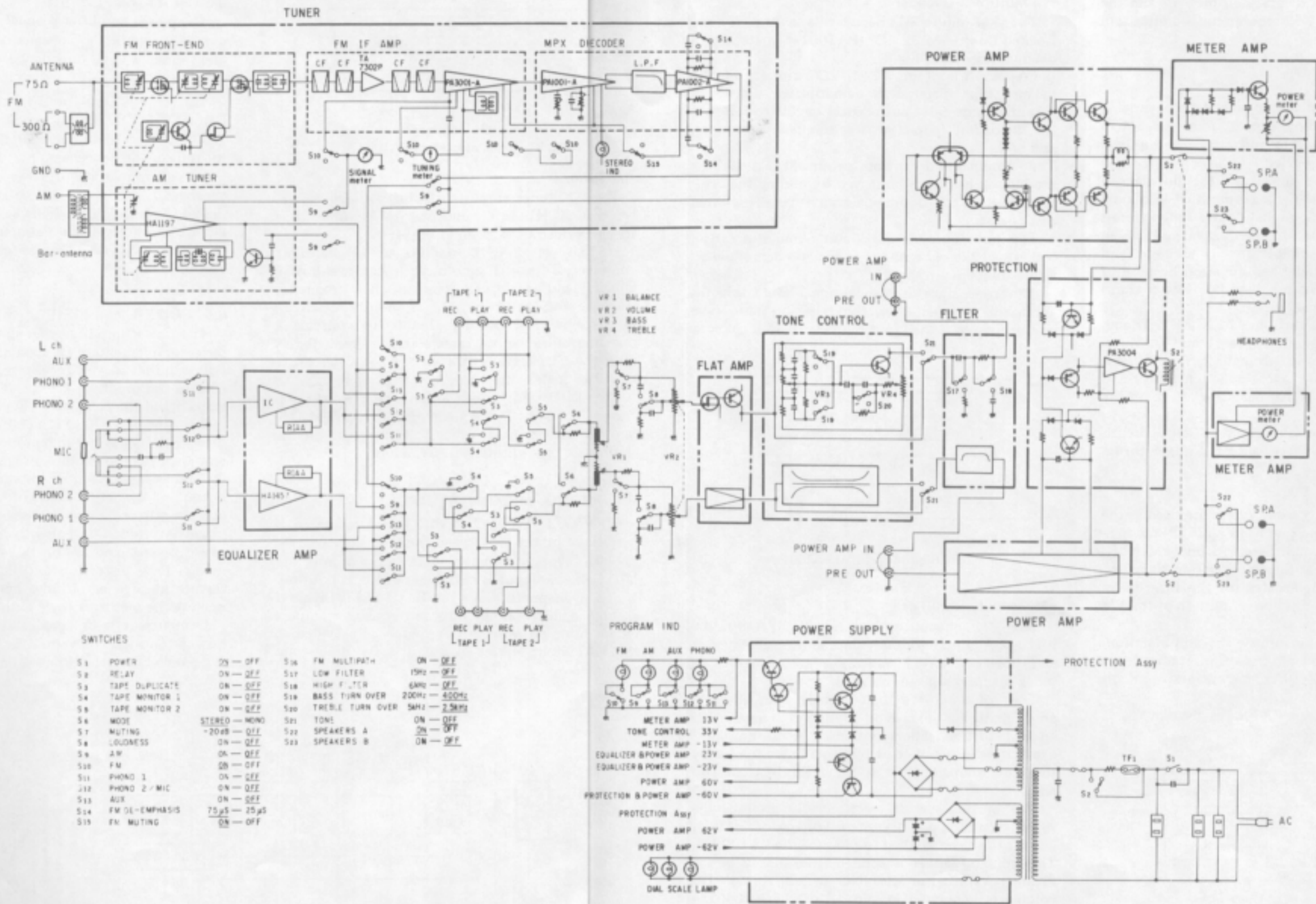


6. LEVEL DIAGRAM



0 dBv=1V
Frequency: 1 kHz

7. BLOCK DIAGRAM



8. CIRCUIT DESCRIPTIONS

Refer to the block diagram on page 17 and the schematic on page 37 for the circuit composition of this unit.

8.1 FM TUNER

FM Front end

The FM front end employs a 4-stage variable capacitor in the tuning circuit, dual gate MOS FETs at the RF amplifier and mixer, and a local oscillator with J-FET buffer.

The FM front-end input is 75Ω unbalanced single-tuned circuit. The RF amplifier is a dual gate MOS FET. An M-coupled double-tuned circuit is inserted between stages. The dual gate FET is an amplifying element suitable for RF circuits, and features extremely stable amplification because of its low NF (Noise Figure), high PG (Power Gain) and low feedback capacitance.

The mixer is also a dual gate MOS FET. The reception signal is applied to gate 1 and the local oscillator signal is applied to gate 2. This circuit has low local oscillator signal injection power and the strong reception signal has little effect on the local oscillator.

The local oscillator is a modified Clapp circuit. Its output signal is injected into the mixer thru a J-FET buffer.

IF Amplifier

Four dual element ceramic filters are used as the selection elements, and one IC (TA7302P) containing two differential amplifiers and one FM IF IC (PA3001-A) are used as the amplification elements.

The TA7302P compensates for the filter insertion loss, and also limits the amplitude of the FM signal.

The PA3001-A performs IF amplification, amplitude limiting and FM detection. It also drives the TUNING and SIGNAL meters and controls muting.

The block diagram of the PA3001 is given in Fig. 1.

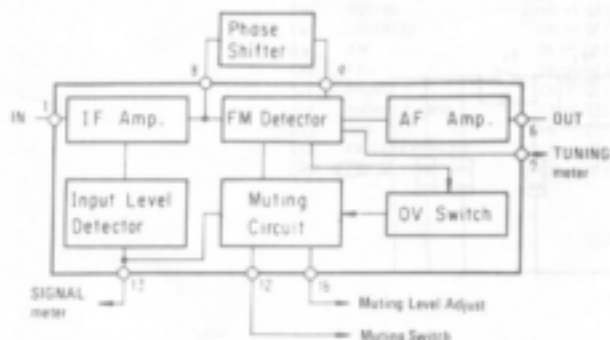


Fig. 1 Block diagram of PA3001-A

FM Multiplex Decoder

The FM multiplex decoder is a PLL (Phase-Locked-Loop) MPX IC (PA1001-A). Its block diagram is given in Fig. 2.

PA1001-A contains a PLL VCO circuit, double-balance type differential demodulator with NFB amplifier, and pilot auto-cancel circuit to improve the distortion characteristics, frequency response, and S/N.

The nonlinear distortion produced at the demodulator has been improved by adding the NFB amplifier to the double-balance type differential demodulator.

The pilot auto-cancel circuit eliminates carrier leakage (19kHz), without a loss of demodulated signal frequency response.

Moreover, since the cancel signal level tracks the input pilot signal level, the rejection ratio does not drop even if the input pilot signal level changes.

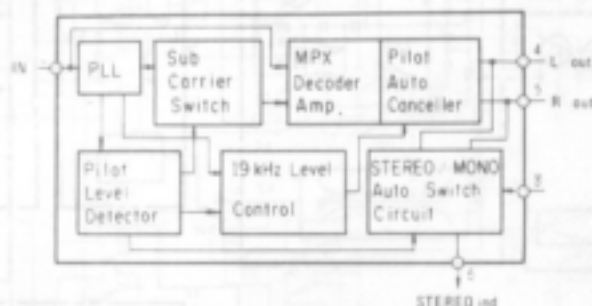


Fig. 2 Block diagram of PA1001-A

FM Output Amplifier

The FM output amp is an IC (PA1002-A). PA1002-A contains an AF amp, muting gate circuit and power ON/OFF muting control circuit. Its block diagram is given in Fig. 3.

The AF amp is a differentially coupled NFB amp featuring excellent dynamic range, S/N and distortion characteristics. A de-emphasis characteristic is obtained by providing a frequency selection characteristic at the NFB loop of this amp.

The muting circuit electronically grounds the signal circuit when a control voltage of 1.4V or greater has been applied to pin 8 of the PA1002-A. This control voltage is applied from pin 12 of the PA3001-A thru the MUTING switch. A 1.4V DC voltage is generated at pin 12 of the PA3001-A when de-tuned more than $\pm 70\text{kHz}$ and at weak inputs (antenna input conversion $5\mu\text{V}$ or less).

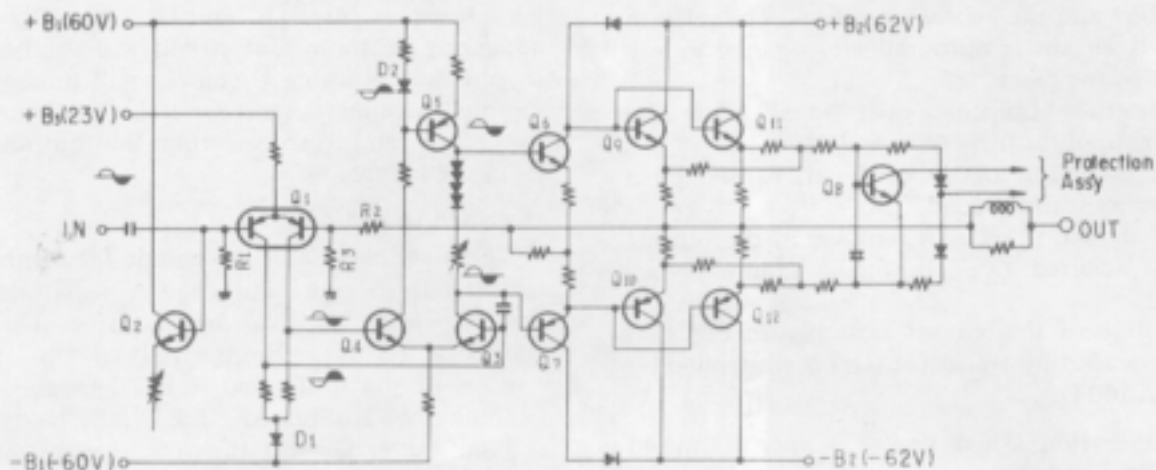


Fig. 5 Block diagram of power amplifier

Q_2 is a Q_1 temperature compensation transistor which prevents changes in the center voltage due to the temperature characteristic of Q_1 . Since the output center voltage is applied to the feedback side base of Q_1 by R_2 and R_3 , the input side base potential of Q_1 becomes the standard. Therefore, the input side base potential of Q_1 must be maintained constant at 0V. The voltage generated across R_1 by the input side base current of Q_1 is cancelled by the base current of Q_2 to maintain the input side base potential of Q_1 constant at 0V.

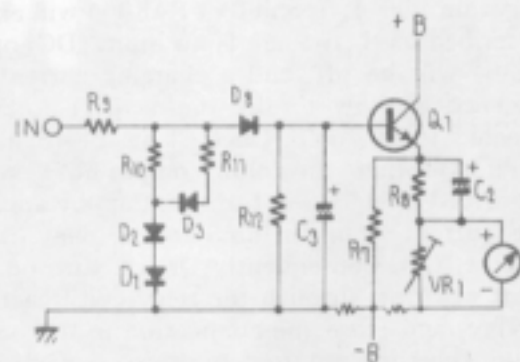


Fig. 6 Schematic diagram of meter amplifier

8.6 METER AMPLIFIER

In order to indicate the 0.01W - 120W range with one meter without range switching, a logarithmic indication type meter must be employed and the input signal must be logarithmically compressed. The meter amplifier circuit is shown in Fig. 6.

This circuit consists of a logarithmic compression circuit and a meter drive circuit. The output signal of the power amplifier is applied to the logarithmic compression circuit, and its dynamic range is compressed.

The principles of the logarithmic compression circuit are given in Fig. 7. The output voltage of this circuit is the value divided by R_9 and Z . The attenuation at low signal input is reduced and the attenuation at large signal input is increased, by using the rise of the diode current-voltage characteristic at Z .

The compressed signal is shaped by D_8 and applied to Q_1 of the meter drive circuit. Q_1 current amplifies the DC voltage from D_8 to drive the power meter.

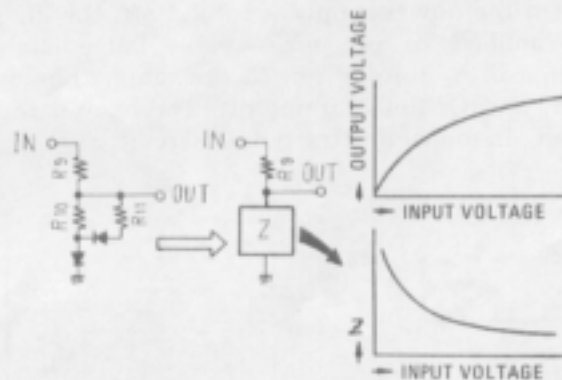


Fig. 7 Schematic diagram of logarithmic compressor

8.7 PROTECTION CIRCUIT

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

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

An outline of this circuit is shown in Fig. 8-1. The relay-activating transistor (Q_r) is controlled by the IC (PA3004).

Muting Operation When Power Supply Is turned Off and On (Fig. 8-1)

When the power supply is first turned on, the voltages on pins 1, 7, and 6 of PA3004 will exceed a prescribed level. If there is no input (DC) on pin no.4, S_2 will be off, and a charging current will commence to flow to the timing capacitor (C_t) connected to pin no.8. Once C_t has been charged up to a level where the voltage on pin no.8 exceeds a prescribed level, S_1 will turn on, thereby applying a bias current from pin no.3 to the relay driving transistor (Q_r). Consequently Q_r will turn on, and current will flow through the relay coil to activate the relay, and close the connection in the output circuit. The time required for this connection to close after the power supply is first turned on is several seconds. During this period, any unwanted transient noises will be therefore muted.

When the power supply is turned off, the input (AC) applied to pin no.7 ceases immediately, resulting in S_2 turning on, C_t discharging rapidly, and S_1 and Q_r both turning off. The relay is thus opened, disconnecting the output circuit.

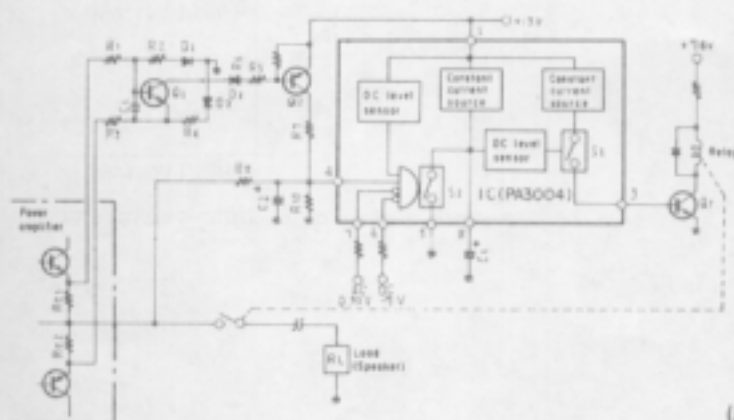


Fig. 8-1 Schematic diagram of protection

DC Voltage Detector (Fig. 8-1)

The output circuit is connected to pin no.4 via a low-pass filter (R_8 and C_2). Any DC voltages appearing in the output circuit will also be applied to pin no.4, turning S_2 on. C_t will thus discharge rapidly, turning S_1 and Q_r off, thereby releasing the relay, and disconnecting the output circuit from the load.

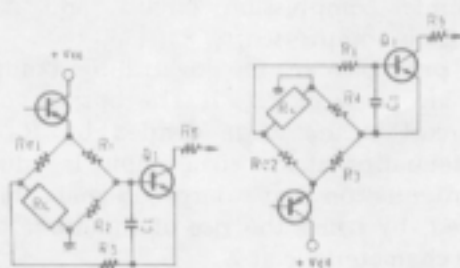
Overload Detection

The overload detector circuit incorporates the load (RL) in one side of a Wheatstone bridge (see Fig. 8-2). The base and emitter of a sensing transistor (Q_1) are connected to the opposite corners of the bridge, so if RL decreases, Q_1 will become forward biased. If RL falls below a prescribed value, Q_1 will turn on, thereby passing a current through R_5 , D_3 and R_6 . Due to the voltage difference generated across R_6 , Q_2 will become forward biased, and consequently turn on. A DC voltage will then be applied to pin no.4, turning S_2 on, and resulting in the rapid discharge of C_t , and S_1 and Q_r both turning off. The relay will again be released to disconnect the output circuit.

8.8 POWER SUPPLY

The power amplifier and power stage plus and minus supply voltages ($\pm 62V$) are obtained by means of a bridge full-wave rectification system. 22000/71 \times 2 electrolytic capacitors are used.

Plus and minus voltages are supplied to the small signal circuit of the AF Section thru a constant voltage circuit by full-wave rectification from a winding separate from the power stage supply. Tuner section, lamp circuit and protection circuit power is supplied thru transistors Darlington connected ripple filter, after full-wave rectification.



(a) Positive half-cycle bridge (b) Negative half-cycle bridge

Fig. 8-2

9. ADJUSTMENT

9.1 AM TUNER

- Confirm that the dial pointer is at the start point.
 - Connect as shown in Fig. 9, and set the FUNCTION switch to "AM".
1. Set an AM signal generator to 400Hz, 30% modulation, 30dB output, at no input from AGC.
 2. Set the AM signal generator and the SX-1080 dial pointer to 600kHz, and adjust T_7 for maximum output.
 3. Set the AM signal generator and the SX-1080 dial pointer to 1400kHz, and adjust TC_6 for maximum output.
 4. Repeat steps 2 and 3 until reception is perfect at 600kHz and 1400kHz.
 5. Adjust F_6 for maximum output.
 6. Adjust the core of the bar antenna (at 600kHz reception) and trimmer TC_5 (at 1400kHz reception) for maximum output and minimum output deviation at 600kHz and 1400kHz.

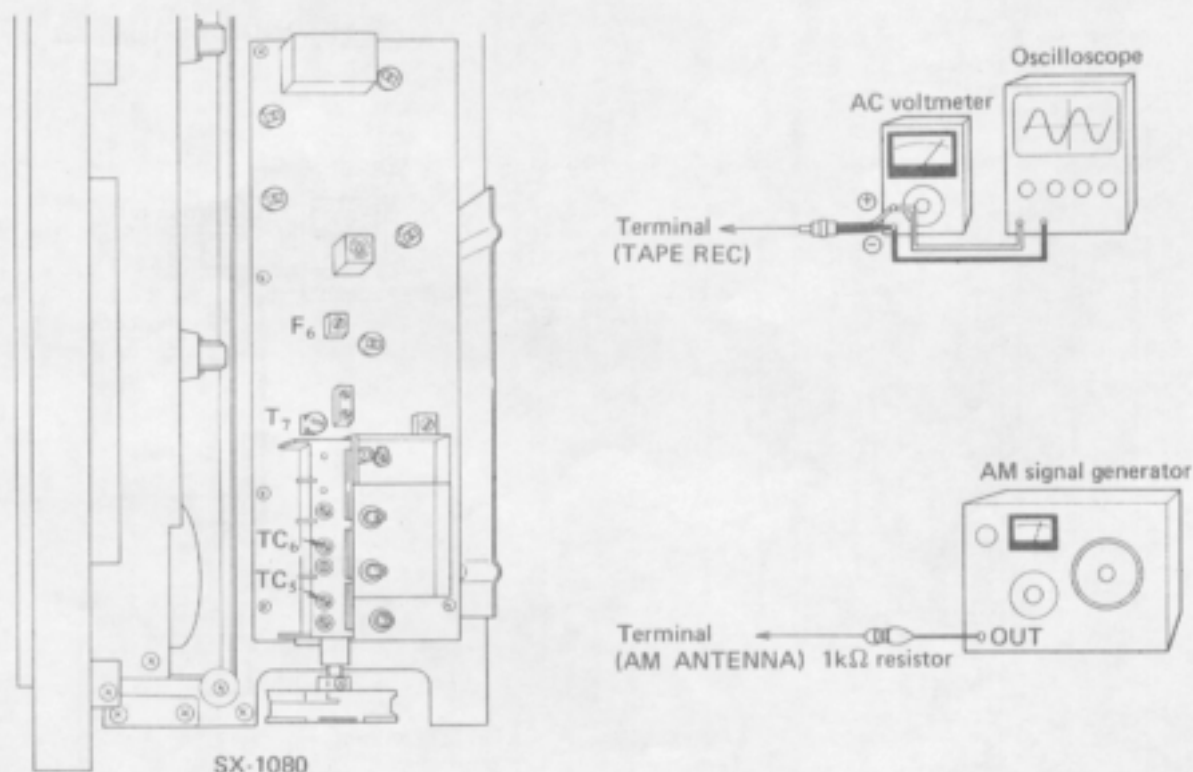


Fig. 9 Connection of AM tracking adjustment

9.2 FM TUNER

- Confirm that the dial is set to the start point.
 - Connect as shown in Fig. 10, and set the FUNCTION switch to "FM" and the MUTING switch to "OFF".
1. Set an FM signal generator to 400Hz, 100% modulation 66dB output.
 2. Set TC_4 to near center capacitance, set the FM signal generator and the SX-1080 dial pointer to 90MHz, and adjust T_4 for maximum deflection at the signal meter.
 3. Under the state of "2" above, adjust the primary (bottom) core of T_6 so that the pointer of the tuning meter deflects to the center of the scale.
 4. Set the FM signal generator output to 15dB, and adjust T_1, T_2, T_3 for maximum output.
 5. Set the FM signal generator and the SX-1080 dial pointer to 106MHz, and adjust TC_4 for maximum deflection at the signal meter. (Make the FM signal generator output 10dB).
 6. Set the FM signal generator output to 15dB, and adjust TC_1, TC_2, TC_3 for maximum output.
 7. Repeat steps 2 - 6 until reception at 90MHz and 106MHz is perfect. At this time, adjust T_5 for maximum output.

8. Adjust the primary core (bottom) of T_6 so that the pointer of the tuning meter deflects to the center of the scale in the untuned state (noise only).
9. Set the FM signal generator output to 66dB, set the SX-1080 dial pointer to 98MHz, and tune the FM signal generator at the tuning meter. (Pointer of tuning meter deflects to the center of the scale).
10. Adjust the secondary side (top) of T_6 for minimum distortion.
11. Repeat steps 8 - 10 until the minimum distortion point does not change.
12. Set the FM signal generator output to 100dB, and adjust VR_2 for maximum deflection at the signal meter (Fig. 11).
13. Set the FM signal generator output to 26 dB. Set the MUTING switch to "ON" and adjust VR_1 so that the output waveform disappears.



Fig. 11 Meter deflection

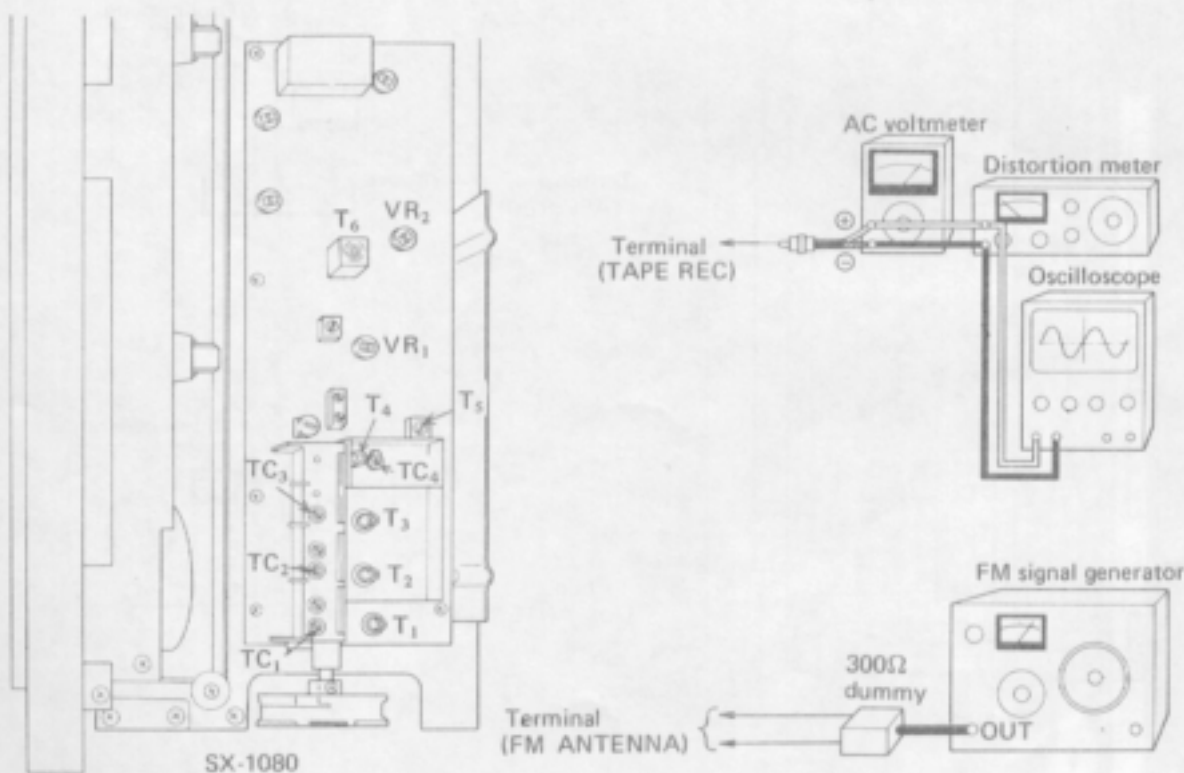


Fig. 10 Connection of FM tracking adjustment

9.3 FM MPX

- Connect as shown in Fig. 12, and set the FUNCTION switch to "FM" and the MUTING switch to "OFF".
1. Set the FM signal generator to 98MHz unmodulated, 66dB output.
 2. Connect the output of the MPX SG PILOT OUT terminal to the horizontal axis input terminal of an oscilloscope and tuner ass'y terminal 13 to the vertical axis input.
 3. Set the SX-1080 dial pointer to 98MHz and adjust the FM signal generator so that the tuning meter deflects to the center of the scale.
 4. Adjust VR₃ so that a Lissajous pattern is traced on the oscilloscope (Fig. 13).
 5. Modulate the MPX SG at L+R (1kHz) to deviate the 67.5kHz pilot signal (19kHz) 7.5kHz.
 6. Adjust T₅ for minimum L channel or R channel distortion. (However, within $\pm 90\%$ of the core adjustment range).
 7. Make the MPX SG main signal L or R and adjust VR₄ for best separation.
 8. Next, set the MPX SG to 7.5kHz by pilot signal (19kHz).
 9. Adjust VR₅ for minimum output.

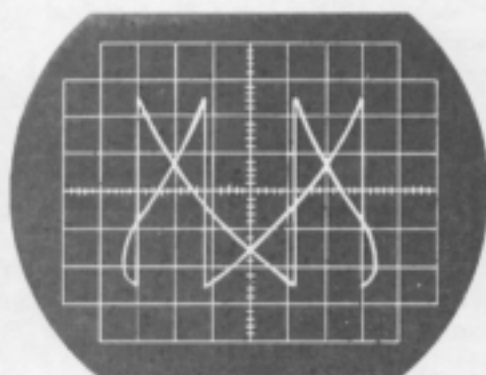


Fig. 13 Lissajous pattern

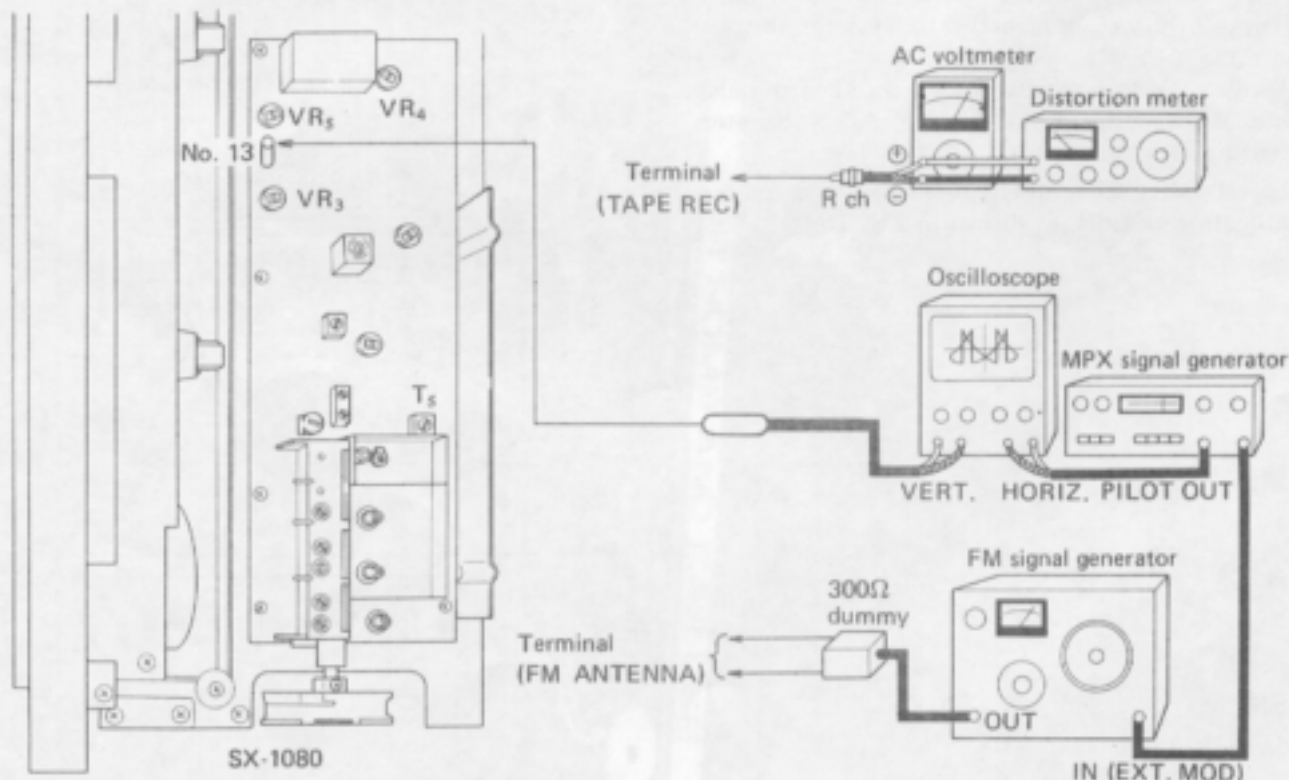


Fig. 12 Connection of FM MPX adjustment

9.4 POWER AMPLIFIER

Center Voltage Adjustment

1. Connect a DC voltmeter between power amplifier ass'y (AWH-071) L-ch terminal 10 and ground .
2. Check if the voltage between terminal 10 and ground is 0V, adjust to 0V with VR₂.
3. When 0V cannot be obtained by performing the adjustment of item 2 above, cut the jumper wire shown in Fig. 14 and adjust to 0V with VR₂.
4. Thr R-ch also uses the power amplifier ass'y (AWH-071). Check and adjust this channel in accordance with items 1 - 3 above.

Idle Current Adjustment

1. Connect a DC voltmeter between terminals 13-23 of the power amplifier ass'y (AWH-071) L-ch side .
2. Set the power switch to "ON", wait 10 minutes, and then check if the DC voltmeter reads 30mV. If it doesn't read 30mV, adjust to 30mV by turning VR₁.
3. The R-ch also uses the power amplifier ass'y (AWH-071). Check and adjust this channel in accordance with items 1 - 4 above.

9.5 METER AMPLIFIER

1. Push speaker selector switch button "A".
2. Connect an AC voltmeter to speaker output terminal (A).
3. Apply a 1kHz sine wave to the input terminals, and adjust the input for an AC voltmeter reading of 31V.
4. Adjust VR₁ (L) and VR₂ (R) for a meter indication of 0dB, as shown in Fig. 15.

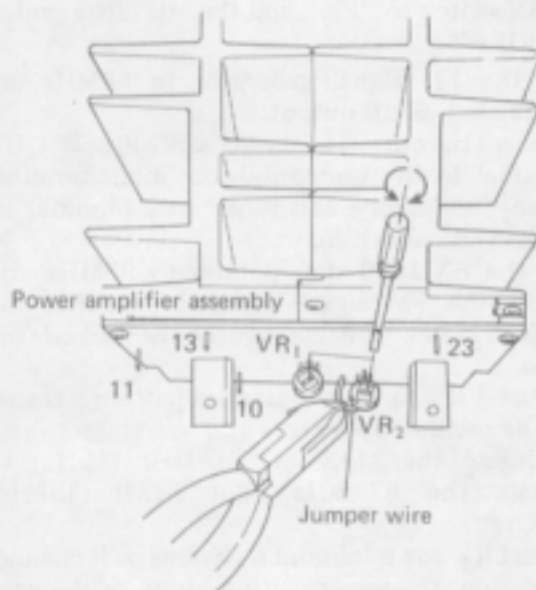


Fig. 14 Power amplifier adjustment

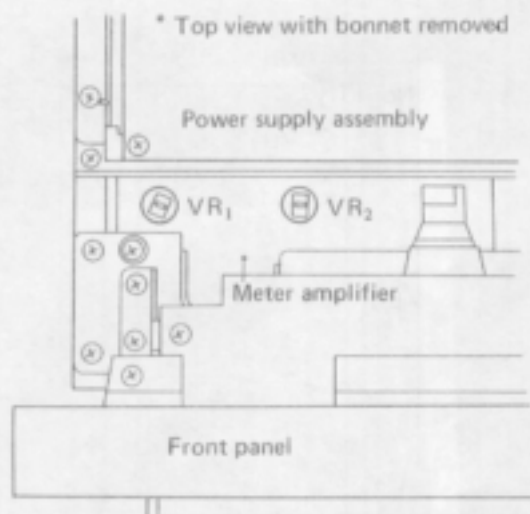


Fig. 15 Meter adjustment

10. DIAL CORD STRINGING

Remove the bonnet and front panel as described in "Disassembly" on page 10. Loosen screws ① - ③ and remove the blind sash as shown in Fig. 16.

1. Turn the front-end variable capacitor shaft fully clockwise (Vanes of capacitor fully inside.)
2. Tie one end of the string to the peg on the dial pulley.
3. Position the dial pulley so that the set screw is at the top and tighten the screw.
4. Pass the string through the notch in the dial pulley, wrap it 1/2 turn around the pulley and pass it thru pulley A → B pulley C → dial shaft (3 turns) → pulley D. Next, wrap the string two turns around the pulley, along the pulley grooves, and tie it to the spring hook.
5. Turn the dial shaft and confirm that the movement of the dial pulley and string is normal, and then cut off the surplus string.
6. Turn the dial shaft counter clockwise (variable capacitor vanes fully outside) and set the dial pointer to the start point of the scale and attach it to the string.

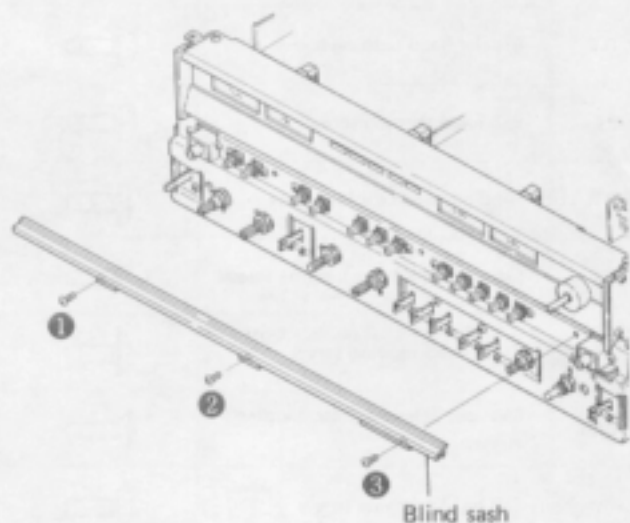


Fig. 16 Remove blind sash

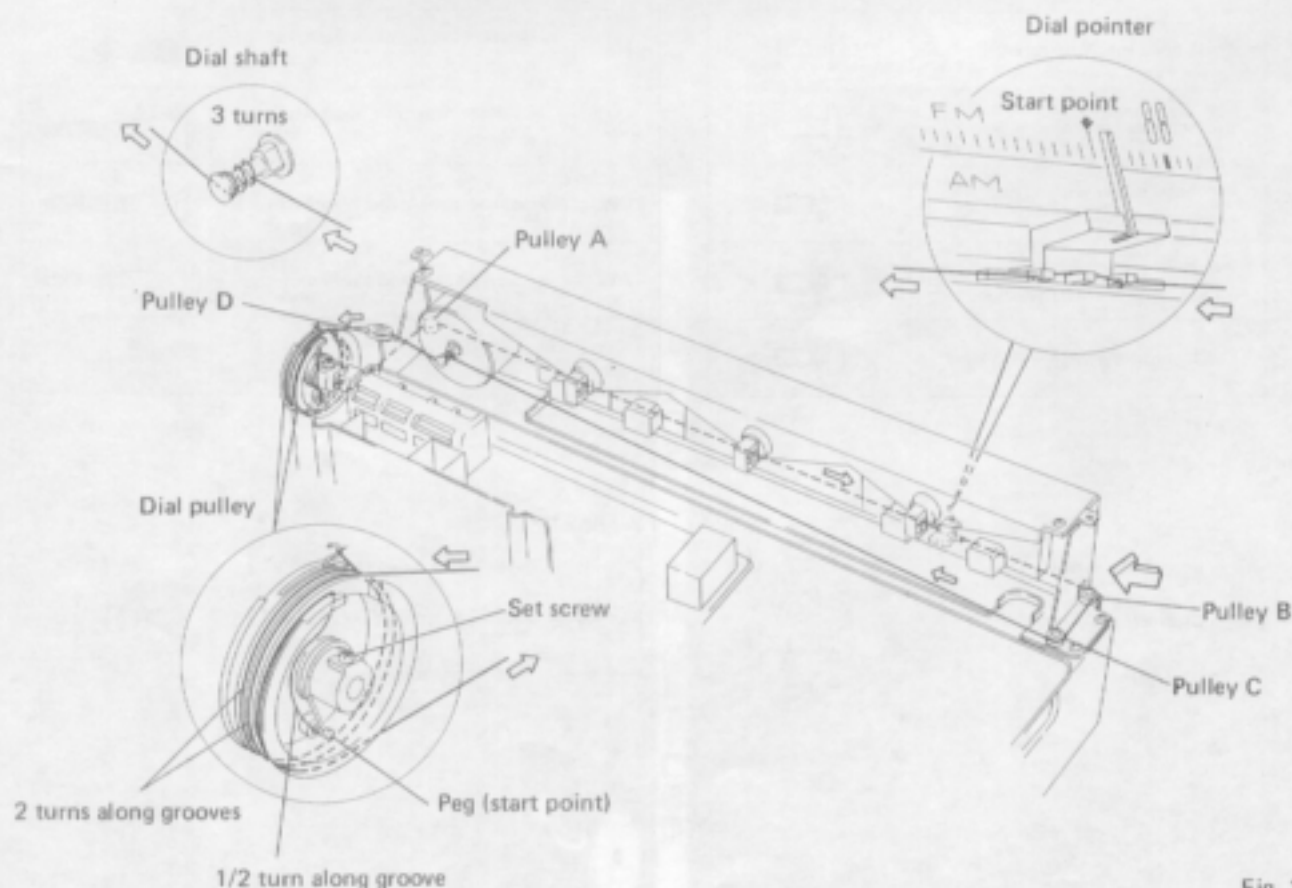

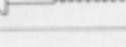


Fig. 17

11. EXPLODED VIEWS

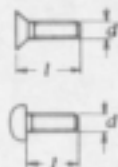
The following symbols stand for screws, washers and nuts as shown in exploded view.

Symbol	Description	Shape
RT	Brazier head tapping screw	
PT	Pan head tapping screw	
BT	Binding head tapping screw	
CT	Countersunk head tapping screw	
TT	Truss head tapping screw	
OCT	Oval countersunk head tapping screw	
PM	Pan head machine screw	
CM	Countersunk head machine screw	
OCM	Oval countersunk head machine screw	
TM	Truss head machine screw	
BM	Binding head machine screw	
PSA	Pan head screw with spring lock washer	
PSB	Pan head screw with spring lock washer and flat washer	
PSF	Pan head screw with flat washer	

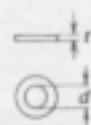
Symbol	Description	Shape
EW	E type washer	
FW	Flat washer	
SW	Spring lock washer	
N	Nut	
WN	Washer faced nut	
ITW	Internal toothed lock washer	
OTW	Outernal toothed lock washer	
SC	Slotted set screw (Cone point)	
SF	Slotted set screw (Flat point)	
HS	Hexagon socket headless set screw	
OCW	Oval countersunk head wood screw	
CW	Countersunk head wood screw	
RW	Round head wood screw	

EXAMPLE

PM • 3x8
 length in mm (l)
 diameter in mm (d)
 Symbol

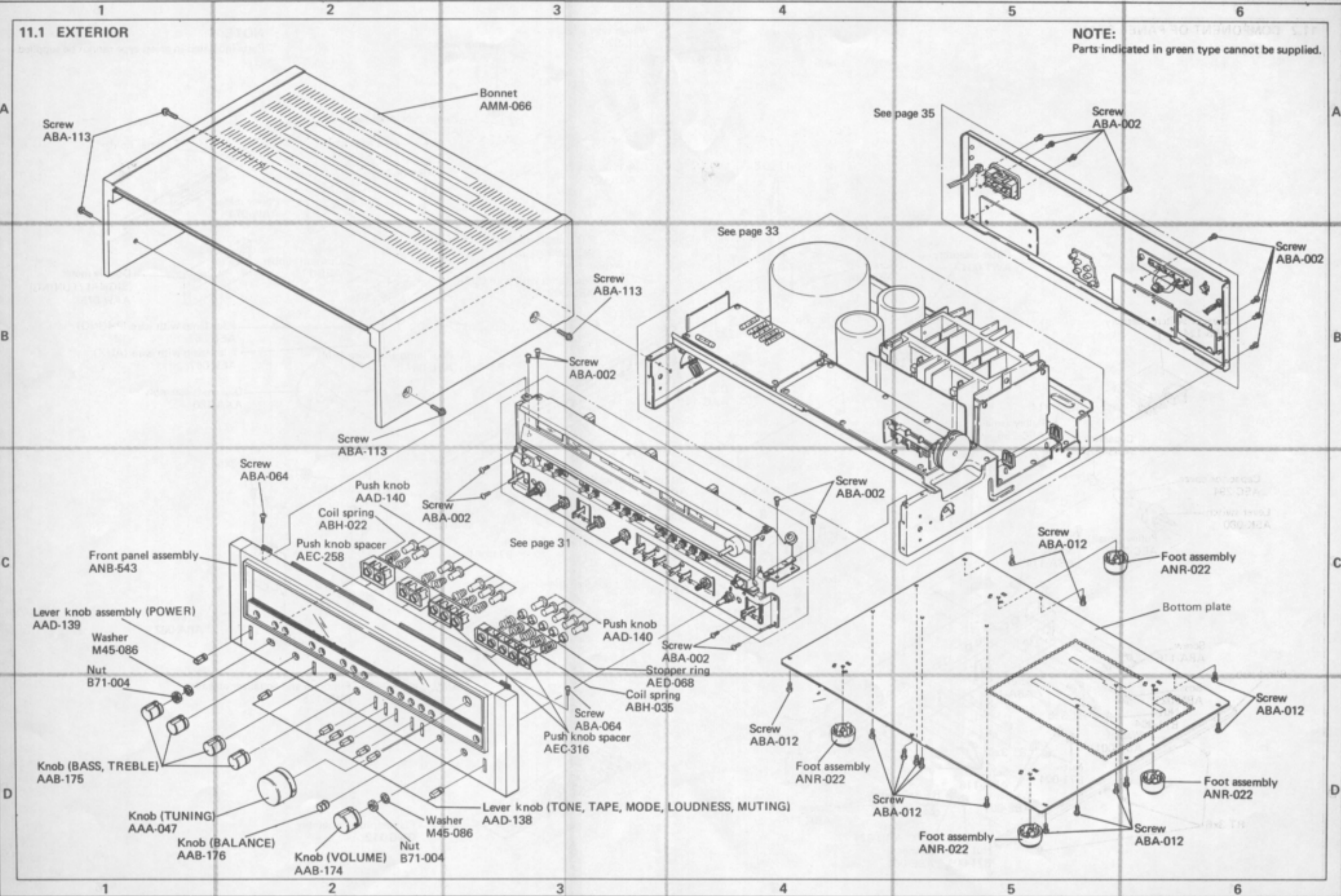


FW • 9φ × 1^t
 thickness in mm (t)
 diameter in mm (d)
 Symbol



11.1 EXTERIOR

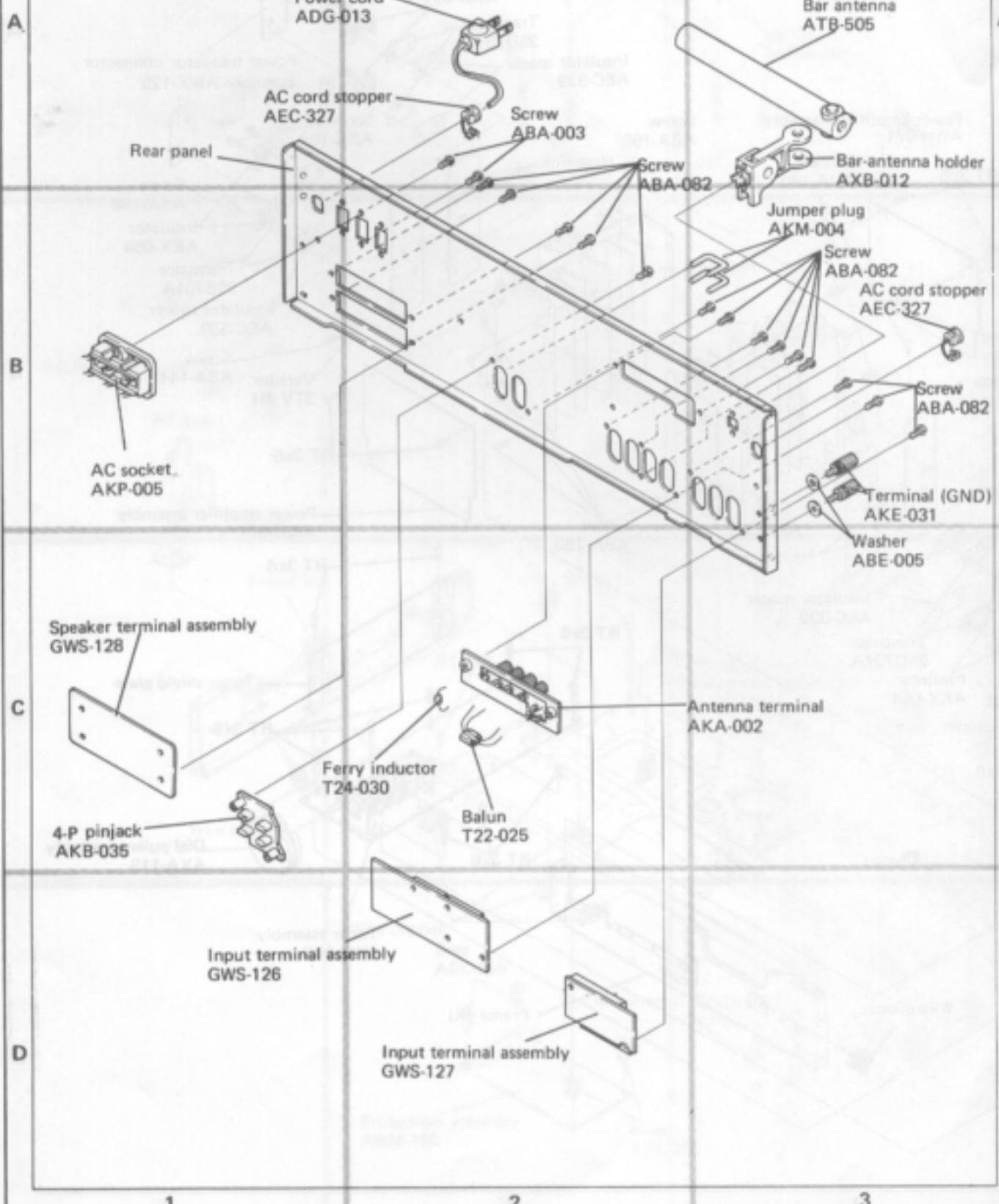
NOTE: Parts indicated in green type cannot be supplied.



11.4 REAR PANEL

NOTE:

Parts indicated in green type cannot be supplied.



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

12.1 MISCELLANEOUS PARTS LIST

NOTE:

- Capacitors: in μF unless otherwise noted p:pF
- Resistors: in Ω , $\frac{1}{2}W$ unless otherwise noted k:k Ω , M:M Ω

SWITCH

Symbol	Part No.	Description	Symbol	Part No.	Description
S1	ASK-080	Lever Switch (POWER)	PL3	AEL-067	Pilot lamp with wire (AUX)
S2	ASR-046		PL4	AEL-067	Pilot lamp with wire (PHONO)
			PL5	AEL-069	Pilot lamp with wire (STEREO IND.)

TRANSFORMERS AND COILS

Symbol	Part No.	Description	Symbol	Part No.	Description
T1	T22-025	Balun transformer	PL7	AEL-029	Wedge type pilot lamp (Dial scale)
T2	ATB-505	Bar antenna	PL8	AEL-029	Wedge type pilot lamp (Dial scale)
T3	T24-030	Ferry inductor	PL9	AEL-029	Wedge type pilot lamp (Dial scale)
T4	ATT-448	Power transformer	FU1	AEK-302	Fuse (10A)
			FU2	AEK-104	Fuse (1.5A)
			FU3	AEK-106	Fuse (1A)
			FU4	AEK-106	Fuse (1A)
			FU5	AEK-106	Fuse (1A)

RESISTOR

Symbol	Part No.	Description
R1	RD $\frac{1}{2}$ PS 225J	Carbon film 2.2M $\frac{1}{2}W$
R2	RS 2P 122J	Metal oxide 1.2k 2W
R3	RS 2P 122J	Metal oxide 1.2k 2W

CAPACITORS

Symbol	Part No.	Description
C1	CKDBC 104Z 25	Ceramic 0.1 25V
C2	CKDBC 104Z 25	Ceramic 0.1 25V
C3	CKDBC 104Z 25	Ceramic 0.1 25V
C4	CKDBC 104Z 25	Ceramic 0.1 25V
C5	ACG-001	Ceramic 0.01 250V
C6	ACG-003	Ceramic 0.01 125V
C7	ACH-085	Electrolytic 22000 71V
C8	ACH-085	Electrolytic 22000 71V
C9	CEA 010P 80	Electrolytic 1 80V

SEMICONDUCTORS

Symbol	Part No.	Description
Q1	2SD737/A/-B or C	Transistor
Q2	2SD737/A/-B or C	Transistor
Q3	2SB701/A/-B or C	Transistor
Q4	2SB701/A/-B or C	Transistor
Q5	2SD737/A/-B or C	Transistor
Q6	2SD737/A/-B or C	Transistor
Q7	2SB701/A/-B or C	Transistor
Q8	2SB701/A/-B or C	Transistor

LAMPS AND FUSES

Symbol	Part No.	Description
PL1	AEL-069	Pilot lamp with wire (FM)
PL2	AEL-067	Pilot lamp with wire (AM)

OTHERS

Symbol	Part No.	Description
	AWE-092	Tuner assembly
	GWS-125	Function and equalizer assembly
	GWG-112	Flat amplifier assembly
	AWG-056	Tone control assembly
	AWT-001	Filter assembly
	GWS-124	Speaker switch assembly
	AWH-071	Power amplifier assembly
	AWR-152	Power supply assembly
	AWM-120	Protection and surge killer assembly
	AWX-125	Power transistor connector assembly
	GWS-126	Input terminal assembly
	GWS-127	Input terminal assembly
	GWS-128	Speaker terminal assembly
	ATB-505	Bar antenna
	AXB-012	Bar antenna holder

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

List of Changed Parts for Factory Modification

Symbol	Part No.	Description

External Appearance of Transistor and ICs

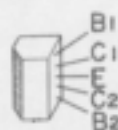
PA1001-A
PA1002-A
PA3001-A
HA1197



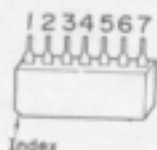
HA1457



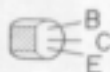
2SA979



TA7302P



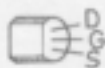
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2SA872A
2SC945A
2SC1438
2SC1775A
2SC1906
2SC1915



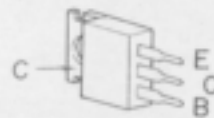
2SA684A
2SA912
2SC1384
2SC1885



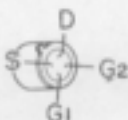
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2SK68A



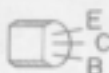
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2SD381A



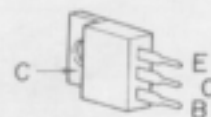
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2SA726S
2SA904A
2SC869
2SC1312
2SC1914
2SC1919



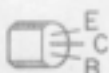
2SB682
2SD712



2SK55

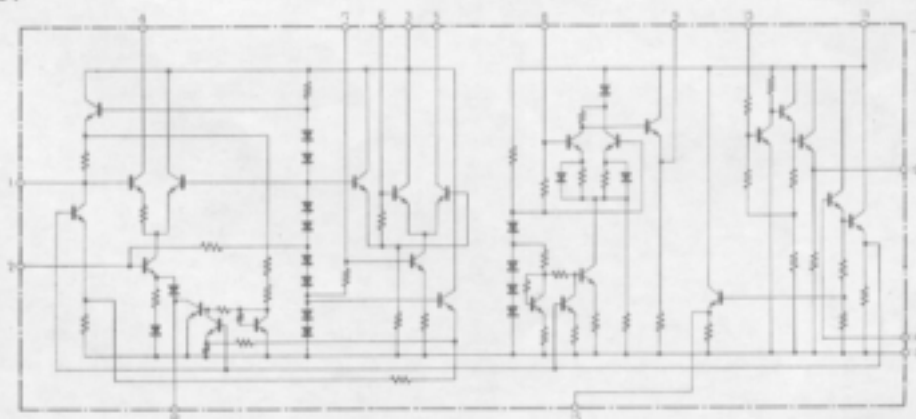


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2SC1735

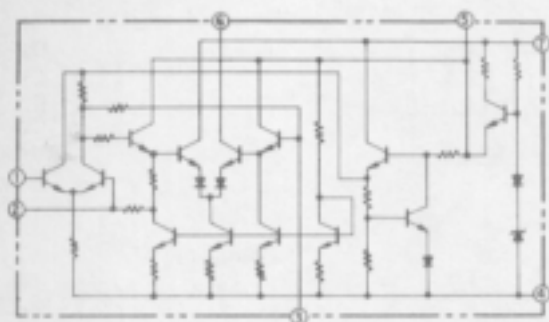


Circuit Diagram of IC

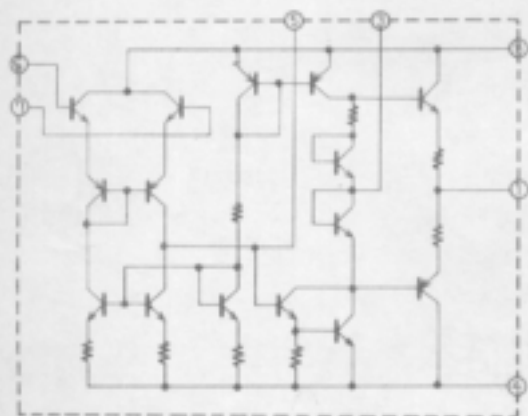
HA1197



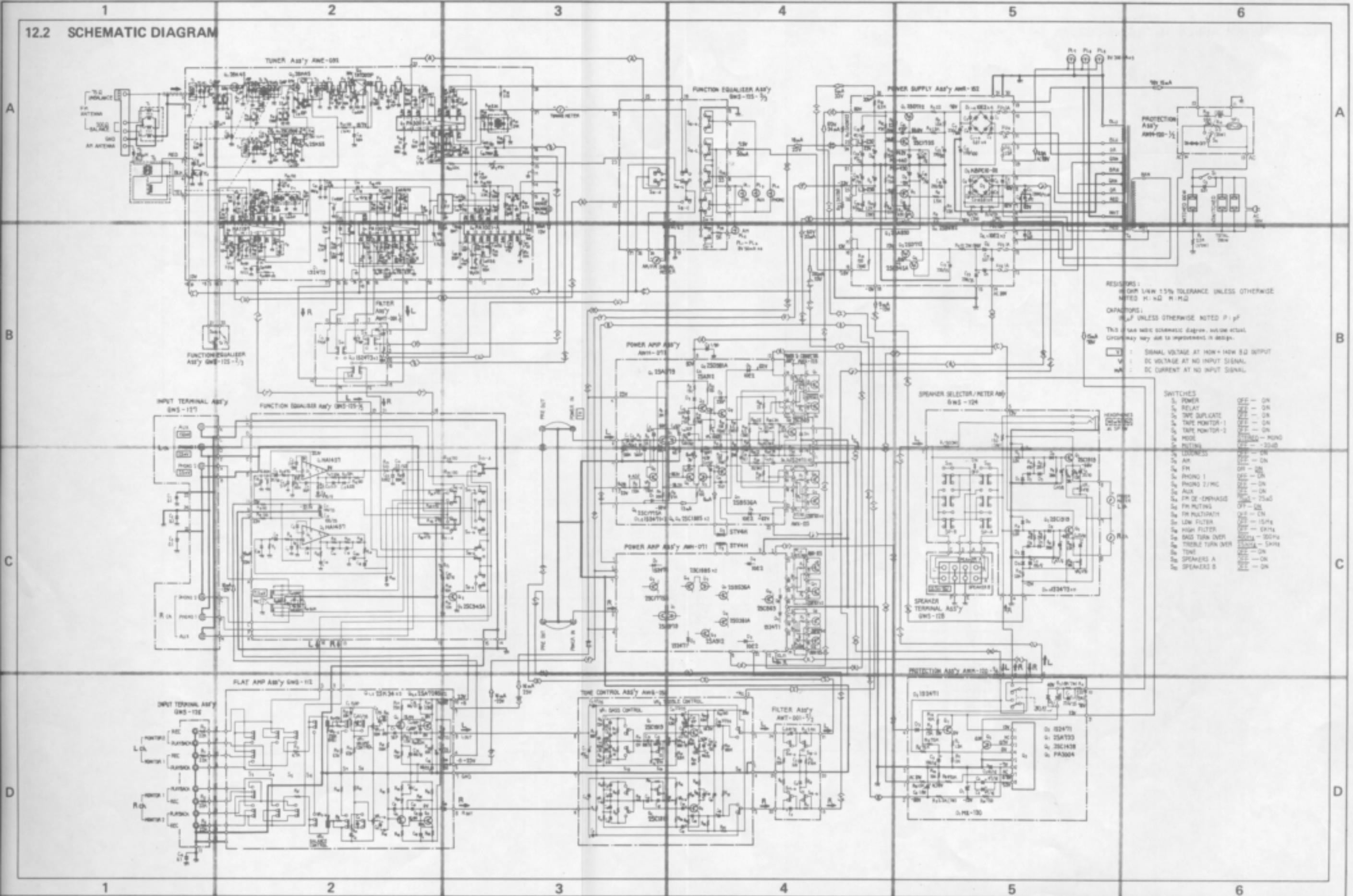
TA730P



HA1457



12.2 SCHEMATIC DIAGRAM



RESISTORS:
 Ω OHM 1/4W 5% TOLERANCE UNLESS OTHERWISE NOTED
 M Ω K Ω M Ω
 CAPACITORS:
 μF UNLESS OTHERWISE NOTED P μF
 THIS IS A WIRE SCHEMATIC DIAGRAM, AND THE ACTUAL CIRCUITRY MAY VARY AS TO IMPLEMENTATION.

⊖ : SIGNAL VOLTAGE AT 100V - 100W 8Ω OUTPUT
 ⊕ : DC VOLTAGE AT NO INPUT SIGNAL
 Ⓢ : DC CURRENT AT NO INPUT SIGNAL

SWITCHES

POWER	1
RELAY	1
TUNE SPLIT	1
TUNE MONITOR-1	1
TUNE MONITOR-2	1
REAR	1
REAR	1
FRONT 1	1
FRONT 2	1
FRONT 3	1
FRONT 4	1
FRONT 5	1
FRONT 6	1
FRONT 7	1
FRONT 8	1
FRONT 9	1
FRONT 10	1
FRONT 11	1
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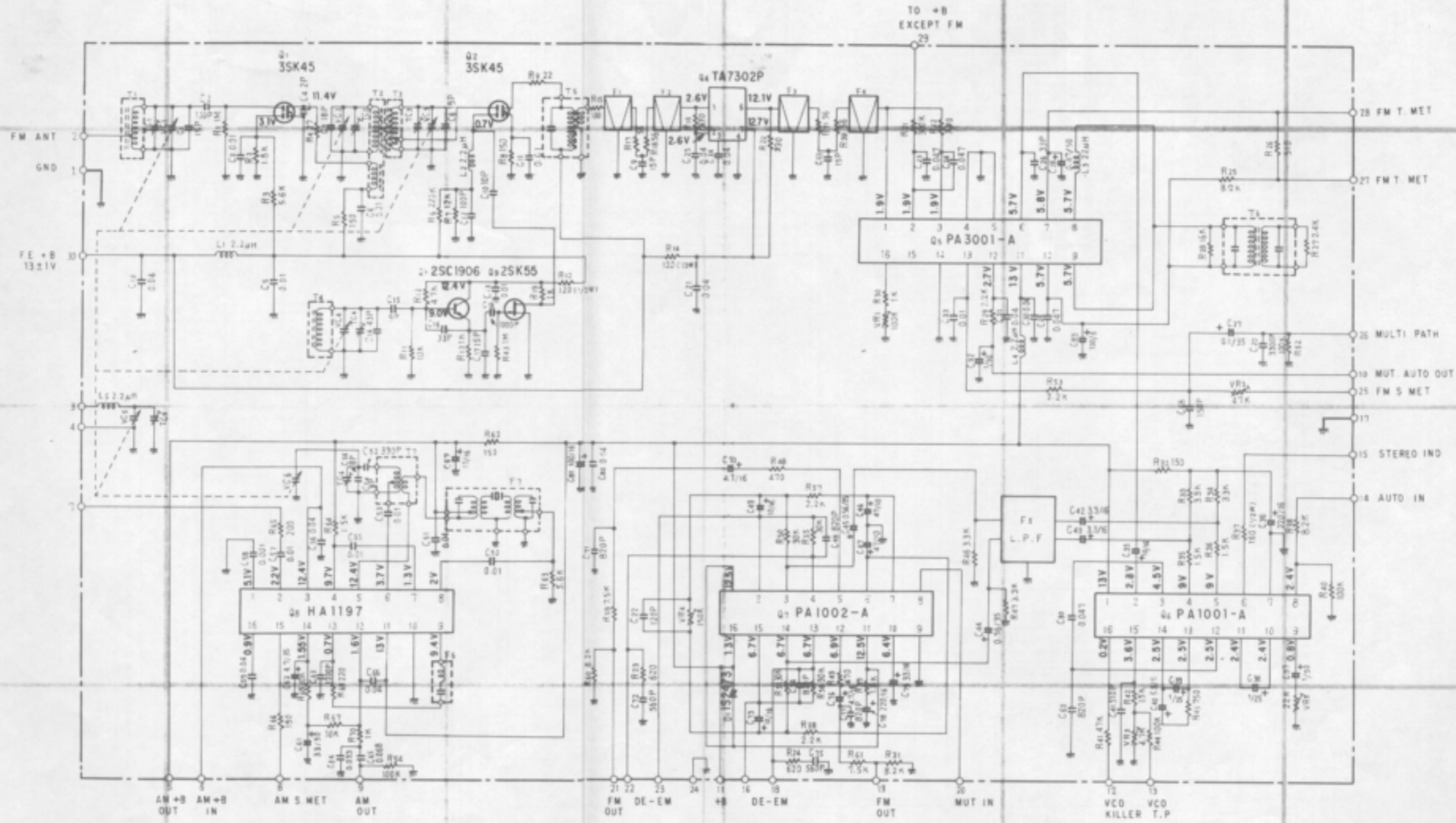
12.3 TUNER ASSEMBLY (AWE-092)

A

B

C

D



1 2 3 4 5 6

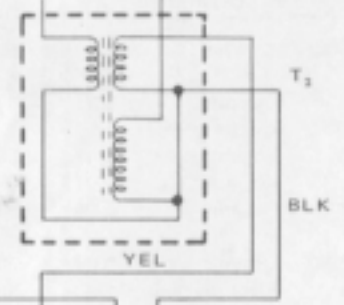
A

A

AWR-152, No.16
 GWS-124, No.5
 AWM-120, No.9
 GWS-125, No.26

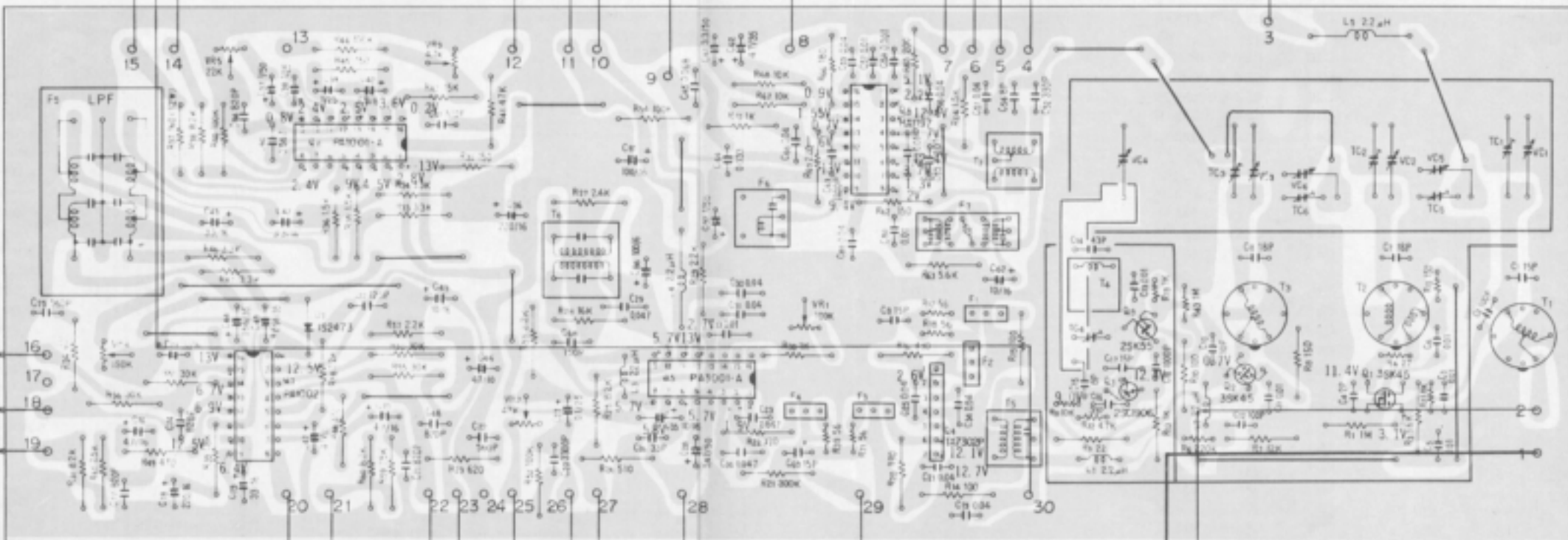
GWS-125, No.21
 GWS-125, No.20
 GWS-125, No.22
 GWS-125, No.18
 AWT-001, No.1

Antenna terminal (AM)



Foil side

AWT-001, No.9

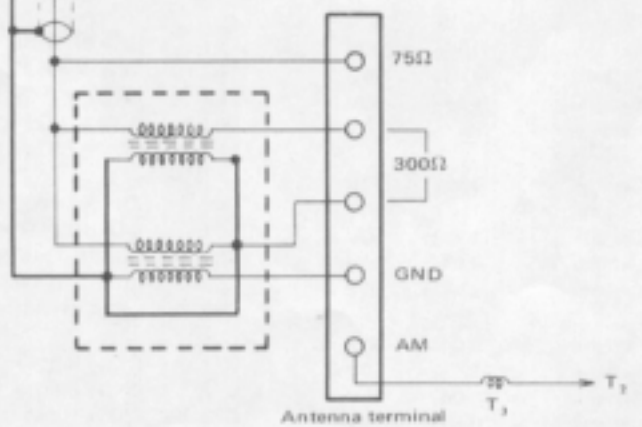


AWT-001, No.3
 AWT-001, No.4
 AWT-001, No.18

AWT-001, No.2
 AWT-001, No.14
 AWT-001, No.12
 AWT-001, No.13
 GWS-125, No.23

GWS-125, No.25
 GWS-125, No.28
 GWS-125, No.30
 AWT-001, No.16

TUNING METER



B

B

C

C

D

D

1 2 3 4 5 6

Parts List of Tuner Assembly (AWE-092)

(MMA) tunings: 455kHz

TRANSFORMER, COILS AND FILTERS

Symbol	Part No.	Description	Symbol	Part No.	Description			
T1	ATC-021	FM antenna coil	C25	CKDYF 403Z 50	Ceramic	0.04	50V	
T2	ATC-015	FM RF coil	C26	CCDSL 330K 50	Ceramic	33p	50V	
T3	ATC-016	FM RF coil	C27	CSZA 0R1M 35	Electrolytic	0.1	35V	
T4	ATC-057	FM RF coil	C28	CEA R47P 50	Electrolytic	0.47	50V	
T5	ATE-039	FM matching coil	C29	CKDBC 473Z 25	Ceramic	0.047	25V	
T6	ATE-030	FM detector transformer	C30	CKDYF 403Z 50	Ceramic	0.04	50V	
T7	ATB-013	AM OSC coil	C31	CKDYF 403Z 50	Ceramic	0.04	50V	
F1	ATF-018	FM ceramic filter	C32	CEA 010P 50	Electrolytic	1	50V	
F2	ATF-018	FM ceramic filter	C33	CKDYF 103Z 50	Ceramic	0.01	50V	
F3	ATF-018	FM ceramic filter	C34	CKDYF 103Z 50	Ceramic	0.04	50V	
F4	ATF-018	FM ceramic filter	C35	CSZA 100M 16	Electrolytic	10	16V	
F5	ATF-047	Low pass filter	C36	CEA 221P 16	Electrolytic	220	16V	
F6	ATF-038	455kHz filter	C37	CEA 010P 50	Electrolytic	1	50V	
F7	ATF-034	AM ceramic filter	C38	CSZA 010M 25	Electrolytic	0.1	25V	
L1	T24-028	RF choke coil	C39	CSZA 100M 16	Electrolytic	10	16V	
L2	T24-028	RF choke coil	C40	CSZA 6R8M6	Electrolytic	6.8	6V	
L3	ATH-014	Micro inductor	C41	CQSH 511J 50	Styrol	510p	50V	
L4	T24-028	RF choke coil	C42	CSZA 3R3M 16	Electrolytic	3.3	16V	
L5	T24-028	RF choke coil	C43	CSZA 3R3M 16	Electrolytic	3.3	16V	

CAPACITORS

Symbol	Part No.	Description						
VC	ACK-022	Variable capacitor						
TC4	ACM-006	Ceramic trimmer						
C1	CCDTH 150K 50	Ceramic	15p	50V				
C2	CCDSL 101K 50	Ceramic	100p	50V				
C3	CKDYF 103Z 50	Ceramic	0.01	50V				
C4	CCDSL 020C 50	Ceramic	2p	50V				
C5	CKDYF 103Z 50	Ceramic	0.01	50V				
C6	CKDYF 103Z 50	Ceramic	0.01	50V				
C7	CCDTH 180K 50	Ceramic	18p	50V				
C8	CCDTH 180K 50	Ceramic	18p	50V				
C9	CCDSL 150K 50	Ceramic	15p	50V				
C10	CCDSL 100F 50	Ceramic	10p	50V				
C11	CKDYB 103K 50	Ceramic	0.01	50V				
C12	CCDSL 101K 50	Ceramic	100p	50V				
C13	CKDYB 103K 50	Ceramic	0.01	50V				
C14	CCDLH 430K 50	Ceramic	43p	50V				
C15	CCDCH 080F 50	Ceramic	8p	50V				
C16	CCDCH 330K 50	Ceramic	33p	50V				
C17	CCDCH 150K 50	Ceramic	15p	50V				
C18	CKDYB 102K 50	Ceramic	1000p	50V				
C19	CKDYF 403Z 50	Ceramic	0.04	50V				
C20	CKDYA 332J 50	Ceramic	3300p	50V				
C21	CKDYF 403Z 50	Ceramic	0.04	50V				
C22	CCDSL 121K 50	Ceramic	120p	50V				
C23	CKDBC 473Z 25	Ceramic	0.047	25V				
C24	CKDBC 473Z 25	Ceramic	0.047	25V				
C46	CEA 470P 10	Electrolytic	47	10V				
C47	CEA 470P 10	Electrolytic	47	10V				
C48	ACE-019	Styrol	880p					
C49	CSZA 100M 16	Electrolytic	10	16V				
C50	CKDYF 103Z 50	Ceramic	0.01	50V				
C51	CKDYF 403Z 50	Ceramic	0.04	50V				
C52	CQSA 331J 50	Styrol	330p	50V				
C53	CKDYF 103Z 50	Ceramic	0.01	50V				
C54	CCDXL 080F 50	Ceramic	8p	50V				
C55	CKDYF 103Z 50	Ceramic	0.01	50V				
C56	CKDYF 403Z 50	Ceramic	0.04	50V				
C57	CKDYF 103Z 50	Ceramic	0.01	50V				
C58	CKDYB 102K 50	Ceramic	1000p	50V				
C59	CKDYF 403Z 50	Ceramic	0.04	50V				
C60	CKDYB 821K 50	Ceramic	820p	50V				
C61	CEA 3R3P 50	Electrolytic	3.3	50V				
C62	CEA 4R7P 35	Electrolytic	4.7	35V				
C63	CKDYB 122K 50	Ceramic	1200p	50V				
C64	CQMA 333J 50	Mylar	0.033	50V				
C65	CQMA 683J 50	Mylar	0.068	50V				
C66	CKDYF 403Z 50	Ceramic	0.04	50V				
C67	CEA 100P 16	Electrolytic	10	16V				
C68	CCDSL 151K 50	Ceramic	150p	50V				
C69	CCDSL 151K 50	Ceramic	150p	50V				
C70	CSZA 4R7M 16	Electrolytic	4.7	16V				
C71	CKDYB 821K 50	Ceramic	820p	50V				
C72	CKDYB 561K 50	Ceramic	560p	50V				
C73	CSZA 100M 16	Electrolytic	10	16V				

Symbol	Part No.	Description	Symbol	Part No.	Description
C74	ACE-019	Styrol 880p	R26	RD%PS 511J	Carbon film 510
C75	CKDYB 561K 50	Ceramic 560p 50V	R27	RD%PS 242J	Carbon film 2.4k
C76	CSZA 4R7M 16	Electrolytic 4.7 16V	R28	RD%PS 163J	Carbon film 16k
C77	CKDYB 821K 50	Ceramic 820p 50V	R29	RD%PS 222J	Carbon film 2.2k
C78	CEA 221P 16	Electrolytic 220 16V	R30	RD%PS 102J	Carbon film 1k
C79	CEA 330P 16	Electrolytic 33 16V	R31	RD%PS 822J	Carbon film 8.2k
C80	QOMA 473K 50	Mylar 0.047 50V	R32	RD%PS 151J	Carbon film 150
C81	CEA 101P 16	Electrolytic 100 16V	R33	RD%PS 332J	Carbon film 3.3k
C82	CKDYF 403Z 50	Ceramic 0.04 50V	R34	RD%PS 332J	Carbon film 3.3k
C83	CEA 101P 6	Electrolytic 100 6V	R35	RD%PS 152J	Carbon film 1.5k
C84	CKDYB 821K 50	Ceramic 820p 50V	R36	RD%PS 152J	Carbon film 1.5k
C85	CKDYF 403Z 50	Ceramic 0.04 50V	R37	RD%PS 161J	Carbon film 160

RESISTORS

Symbol	Part No.	Description	Symbol	Part No.	Description
VR1	C92-047	Semi fixed 100k	R41	RD%PS 473J	Carbon film 47k
VR2	C92-048	Semi fixed 47k	R42	RN $\frac{1}{2}$ SQ 1502F	Metal film 15k
VR3	C92-051	Semi fixed 4.7k	R43	RD%VS 105J	Carbon film 1M
VR4	ACP-057	Semi fixed 150k	R44	RD%PS 104J	Carbon film 100k
VR5	ACP-056	Semi fixed 22k	R45	RD%PS 751J	Carbon film 750
R1	RD%PS 105J	Carbon film 1M	R46	RD%PS 332J	Carbon film 3.3k
R2	RD%VS 182J	Carbon film 1.8k	R47	RD%PS 332J	Carbon film 3.3k
R3	RD%PS 562J	Carbon film 5.6k	R48	RD%PS 471J	Carbon film 470
R4	RD%VS 270J	Carbon film 27	R49	RD%PS 471J	Carbon film 470
R5	RD%VS 151J	Carbon film 150	R50	RD%PS 303J	Carbon film 30k
R6	RD%VS 224J	Carbon film 220k	R51	RD%PS 303J	Carbon film 30k
R7	RD%PS 123J	Carbon film 12k	R52	RD%PS 104J	Carbon film 100k
R8	RD%PS 151J	Carbon film 150	R53	RD%PS 222J	Carbon film 2.2k
R9	RD%PS 220J	Carbon film 22	R54	RD%PS 104J	Carbon film 100k
R10	RD%PS 121J	Carbon film 120 $\frac{1}{2}W$	R55	RD%PS 303J	Carbon film 30k
R11	RD%VS 103J	Carbon film 10k	R56	RD%PS 303J	Carbon film 30k
R12	RD%VS 472J	Carbon film 4.7k	R57	RD%PS 222J	Carbon film 2.2k
R13	RD%PS 102J	Carbon film 1k	R58	RD%PS 222J	Carbon film 2.2k
R14	RD%PS 121J	Carbon film 120 $\frac{1}{2}W$	R59	RD%PS 752J	Carbon film 7.5k
R15	RD%PS 101J	Carbon film 100	R60	RD%PS 822J	Carbon film 8.2k
R16	RD%PS 331J	Carbon film 330	R61	RD%PS 752J	Carbon film 7.5k
R17	RD%VS 560J	Carbon film 56	R62	RD%PS 151J	Carbon film 150
R18	RD%VS 560J	Carbon film 56	R63	RD%PS 562J	Carbon film 5.6k
R19	RD%VS 102J	Carbon film 1k	R64	RD%PS 152J	Carbon film 1.5k
R20	RD%PS 331J	Carbon film 330	R65	RD%PS 201J	Carbon film 200
R21	RD%PS 304J	Carbon film 300k	R66	RD%PS 181J	Carbon film 180
R22	RD%PS 331J	Carbon film 330	R67	RD%PS 103J	Carbon film 10k
R23	RD%PS 621J	Carbon film 620	R68	RD%PS 103J	Carbon film 10k
R24	RD%PS 621J	Carbon film 620	R69	RD%PS 222J	Carbon film 2.2k
R25	RD%PS 822J	Carbon film 8.2	R70	RD%PS 102J	Carbon film 1k
			R71	RD%VS 560J	Carbon film 56
			R72	RD%VS 560J	Carbon film 56

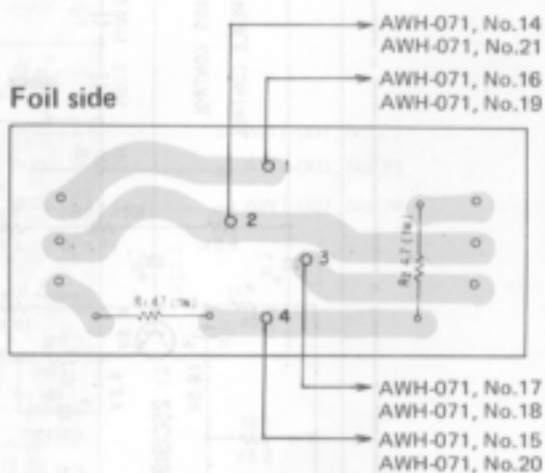
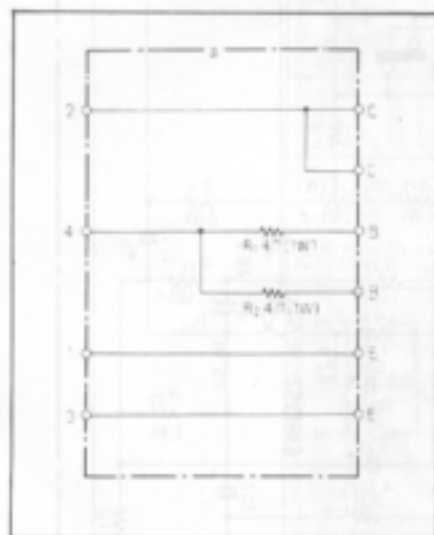
SEMICONDUCTORS

Symbol	Part No.	Description
Q1	3SK45-B	FET
Q2	3SK45-B	FET
Q3	2SC1906	Transistor
Q4	TA 7302P	IC
Q5	PA3001-A	IC
Q6	PA 1001-A	IC
Q7	PA 1002-A	IC
Q8	HA1197	IC
Q9	2SK55-D	FET
D1	1S2473	Diode

List of Changed Parts for Factory Modification

Symbol	Part No.	Description

12.4 POWER TRANSISTOR CONNECTOR ASSEMBLY (AWX-125)

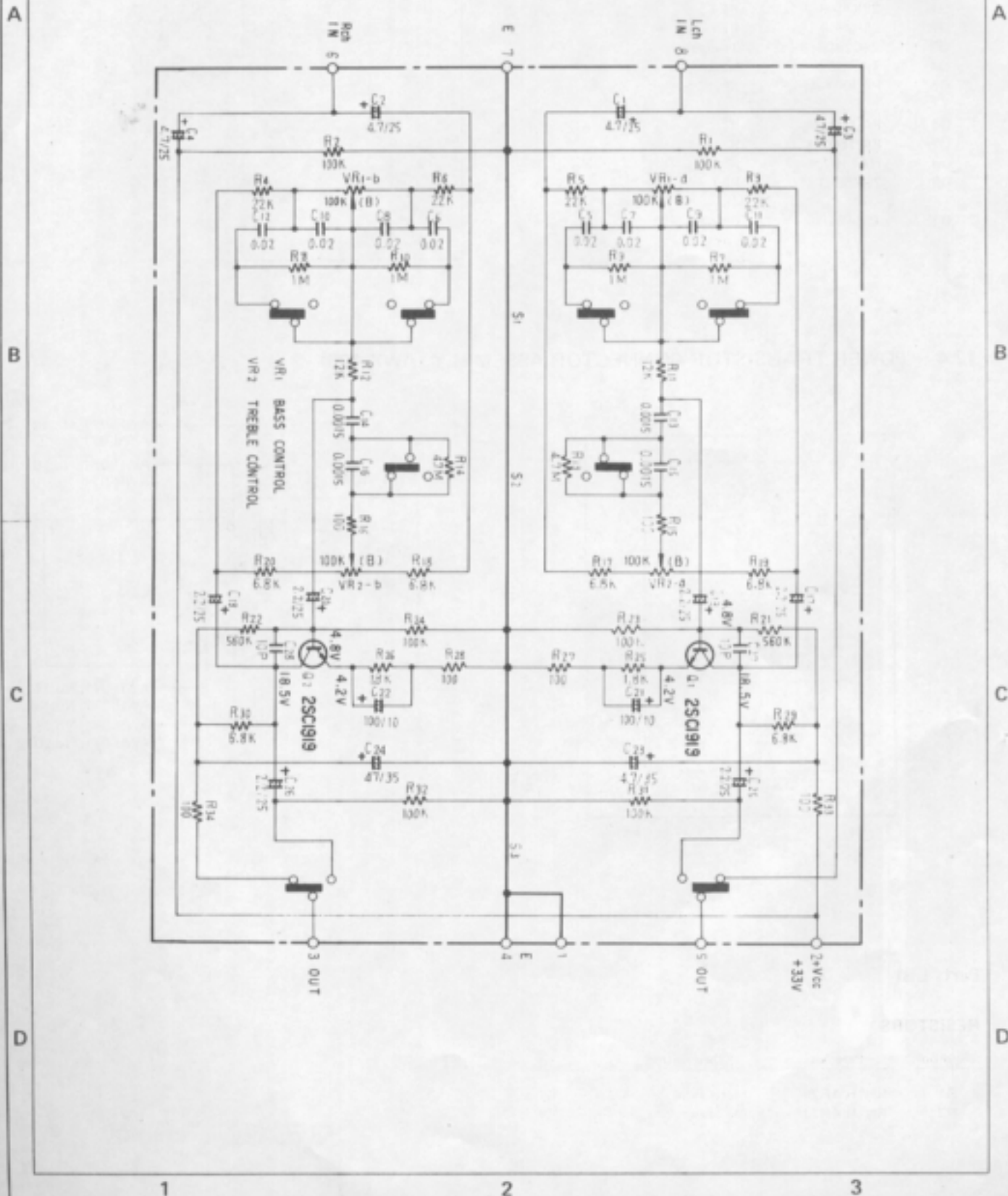


Parts List

RESISTORS

Symbol	Part No.	Description
R1	RN1H 4R7J	Metal film 4.7 1W
R2	RN1H 4R7J	Metal film 4.7 1W

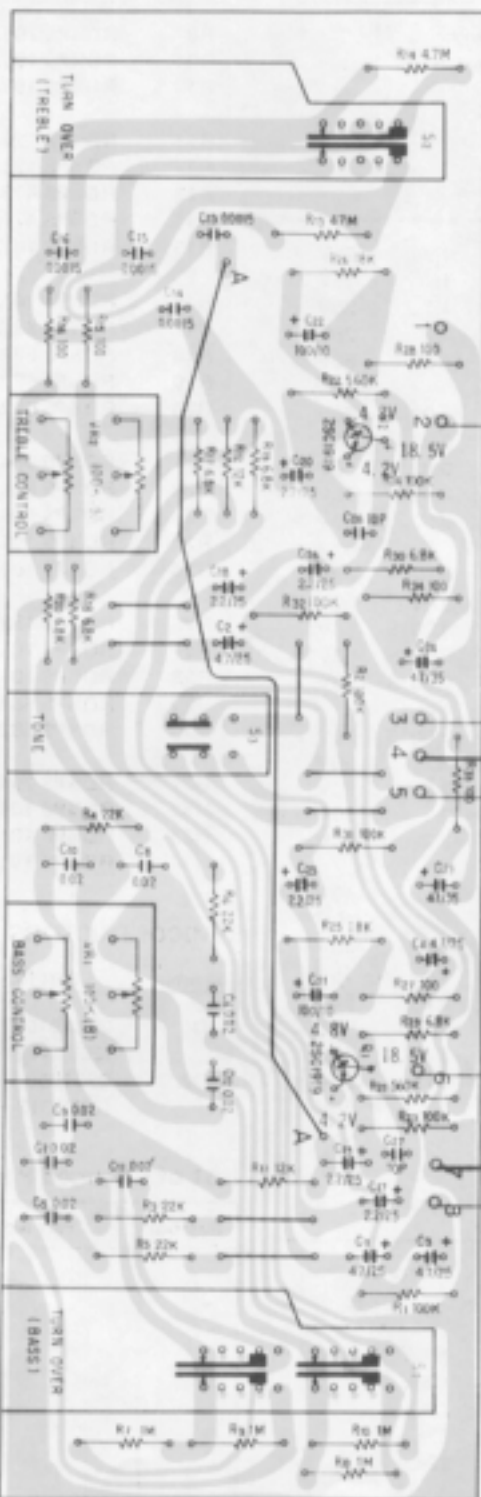
12.5 TONE CONTROL ASSEMBLY (AWG-056)



1 2 3

A

Foil side



AWR-152, No.20

AWT-001, No.22

AWT-001, No.23

AWT-001, No.24

GWG-112, No.6

GWG-112, No.7

GWG-112, No.8

B

C

D

1 2 3

12.6 FLAT AMPLIFIER ASSEMBLY (GWG-112)

Parts List

SWITCHES

Symbol	Part No.	Description
S1	ASK-145	Lever switch
S2	ASK-144	Lever switch
S3	ASK-144	Lever switch
S4	ASK-144	Lever switch
S5	ASK-144	Lever switch
S6	ASK-144	Lever switch

CAPACITORS

Symbol	Part No.	Description
C1	CCDSL 151K 50	Ceramic 150p 50V
C2	CCDSL 151K 50	Ceramic 150p 50V
C3	CSZA 0R1M 35	Electrolytic 0.1 35V
C4	CSZA 0R1M 35	Electrolytic 0.1 35V
C5	CSZA 010M 25	Electrolytic 1 25V
C6	CSZA 010M 25	Electrolytic 1 25V
C7	CCDSL 560K 50	Ceramic 56p 50V
C8	CCDSL 560K 50	Ceramic 56p 50V
C9	CCDSL 680K 50	Ceramic 68p 50V
C10	CCDSL 680K 50	Ceramic 68p 50V
C11	CCDSL 100F 50	Ceramic 10p 50V
C12	CCDSL 100F 50	Ceramic 10p 50V
C13	CEANL 101P 10	Electrolytic 100 10V
C14	CEANL 101P 10	Electrolytic 100 10V
C15	CEANL 101P 10	Electrolytic 100 10V
C16	CEANL 101P 10	Electrolytic 100 10V
C17	CEA 101P 25	Electrolytic 100 25V
C18	CEA 101P 25	Electrolytic 100 25V
C19	CEANL 4R7P 25	Electrolytic 4.7 25V
C20	CEANL 4R7P 25	Electrolytic 4.7 25V

RESISTORS

Symbol	Part No.	Description
VR1	ACV-162	Variable resistor 100k
VR2	ACV-190	Variable resistor 250k
R5	RD%PS 472J	Carbon film 4.7k
R6	RD%PS 472J	Carbon film 4.7k
R7	RD%PS 473J	Carbon film 47k
R8	RD%PS 473J	Carbon film 47k
R9	RD%PS 622J	Carbon film 6.2k
R10	RD%PS 622J	Carbon film 6.2k
R11	RD%PS 622J	Carbon film 6.2k
R12	RD%PS 622J	Carbon film 6.2k
R13	RD%PS 683J	Carbon film 68k
R14	RD%PS 683J	Carbon film 68k
R15	RD%PS 101J	Carbon film 100

Symbol	Part No.	Description
R16	RD%PS 101J	Carbon film 100
R17	RD%PS 223J	Carbon film 22k
R18	RD%PS 223J	Carbon film 22k
R19	RD%PS 134J	Carbon film 130k
R20	RD%PS 134J	Carbon film 130k
R21	RD%PS 753J	Carbon film 75k
R22	RD%PS 753J	Carbon film 75k
R23	RD%PS 122J	Carbon film 1.2k
R24	RD%PS 122J	Carbon film 1.2k
R25	RD%PS 822J	Carbon film 8.2k
R26	RD%PS 822J	Carbon film 8.2k
R27	RD%PS 392J	Carbon film 3.9k
R28	RD%PS 392J	Carbon film 3.9k
R29	RD%PS 103J	Carbon film 10k
R30	RD%PS 103J	Carbon film 10k
R31	RD%PS 101J	Carbon film 100
R32	RD%PS 101J	Carbon film 100

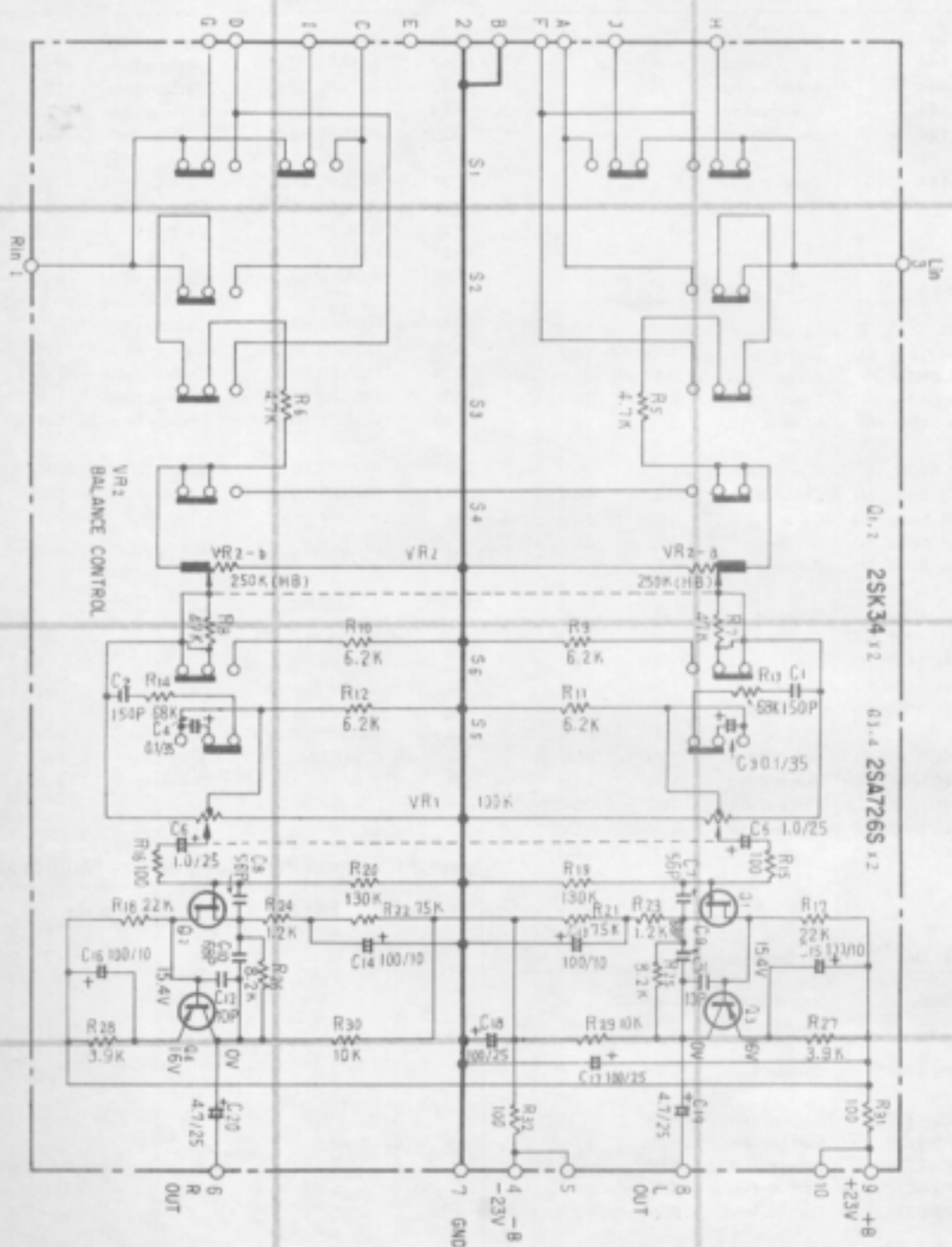
SEMICONDUCTORS

Symbol	Part No.	Description
Q1	2SK34-C or D (2SK68A-L or M)	FET
Q2	2SK34-C or D (2SK68A-L or M)	FET
Q3	2SA726S-F or G (2SA872A-D or E)	Transistor
Q4	2SA726S-F or G (2SA872A-D or E)	Transistor

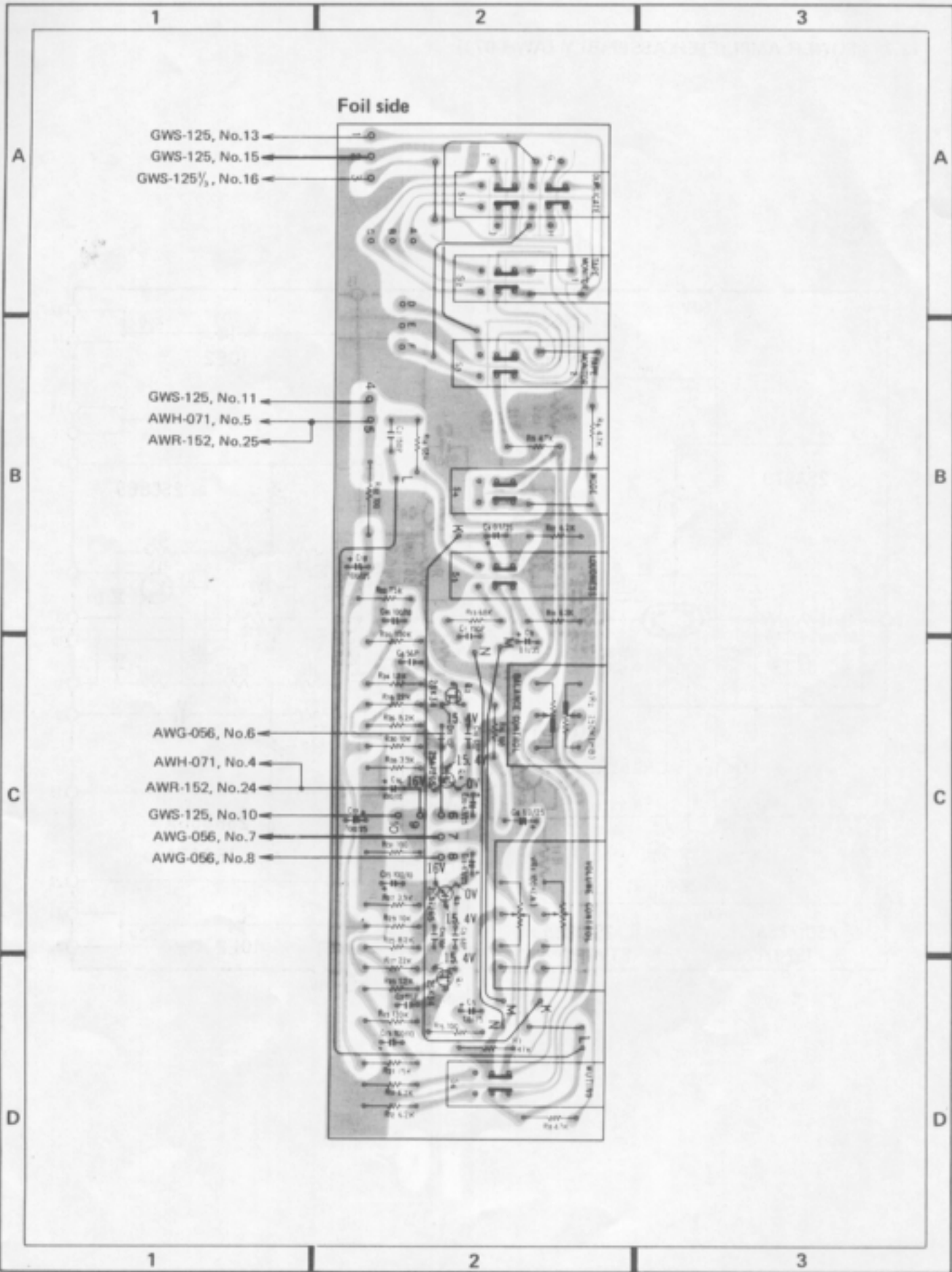
List of Changed Parts for Factory Modification

Symbol	Part No.	Description

Flat Amplifier Assembly (GWG-112)



Foil side

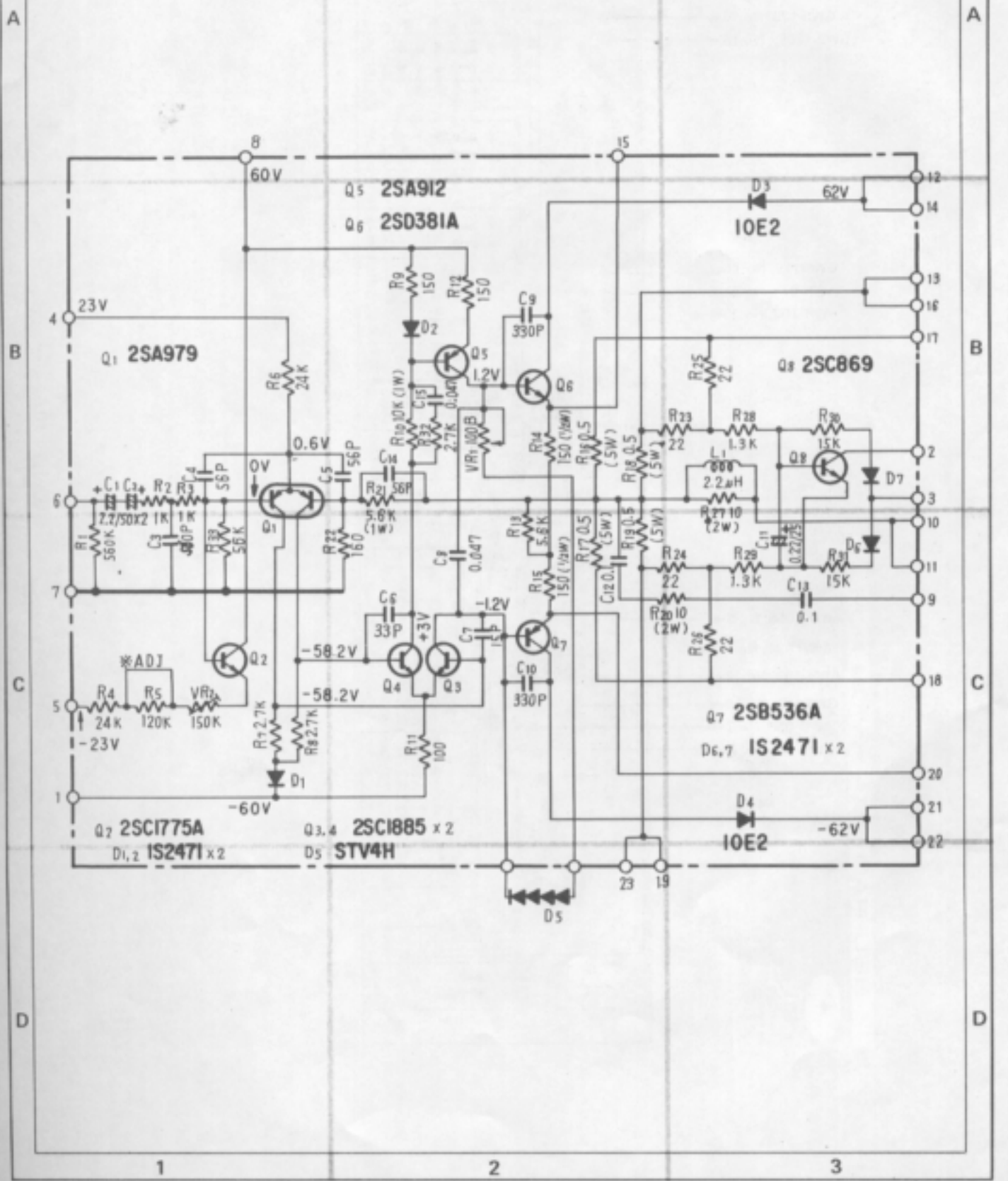


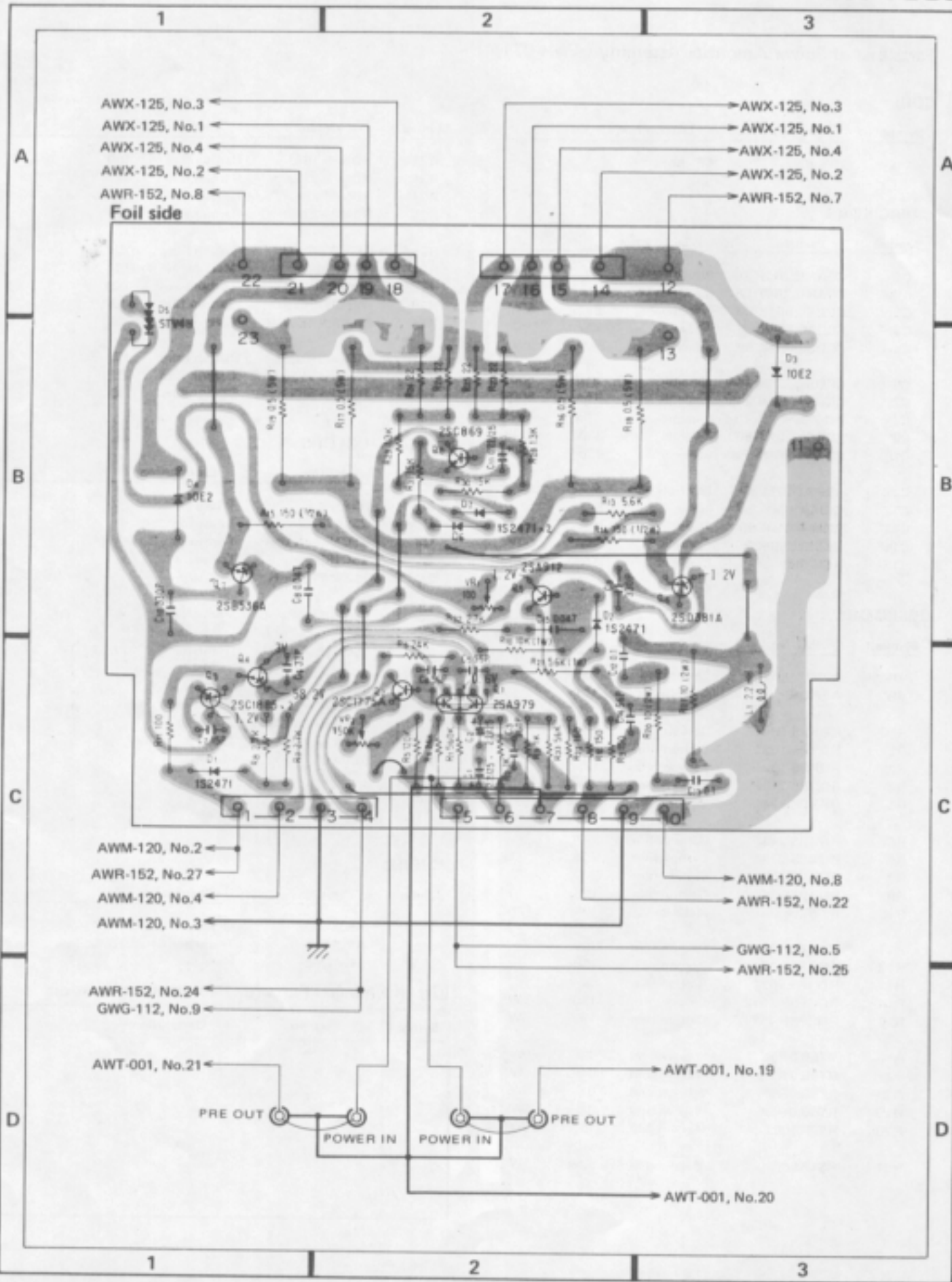
- GWS-125, No.13
- GWS-125, No.15
- GWS-125 $\frac{1}{2}$, No.16

- GWS-125, No.11
- AWH-071, No.5
- AWR-152, No.25

- AWG-056, No.6
- AWH-071, No.4
- AWR-152, No.24
- GWS-125, No.10
- AWG-056, No.7
- AWG-056, No.8

12.7 POWER AMPLIFIER ASSEMBLY (AWH-071)





- AWX-125, No.3
- AWX-125, No.1
- AWX-125, No.4
- AWX-125, No.2
- AWR-152, No.8

- AWX-125, No.3
- AWX-125, No.1
- AWX-125, No.4
- AWX-125, No.2
- AWR-152, No.7

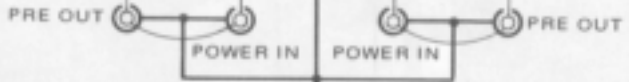
Foil side

- AWM-120, No.2
- AWR-152, No.27
- AWM-120, No.4
- AWM-120, No.3
- AWR-152, No.24
- GWG-112, No.9

- AWM-120, No.8
- AWR-152, No.22
- GWG-112, No.5
- AWR-152, No.25

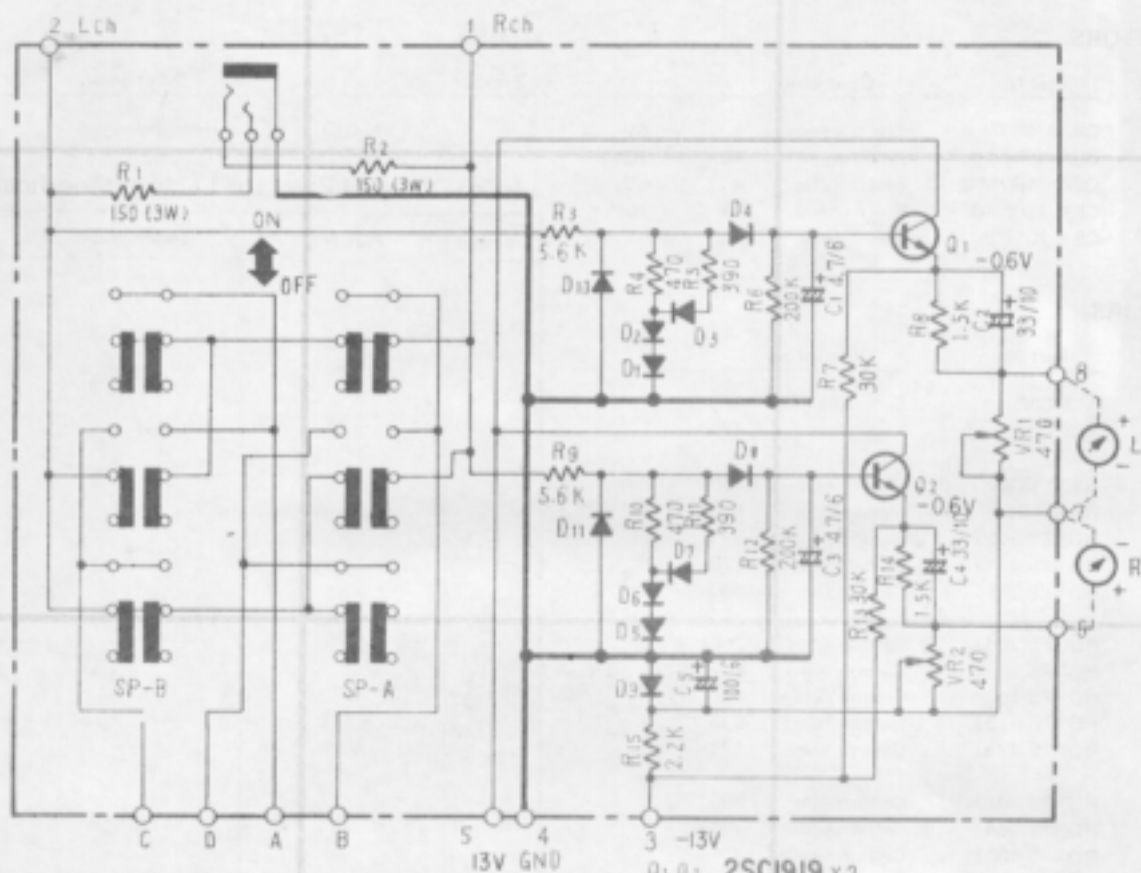
- AWT-001, No.21

- AWT-001, No.19



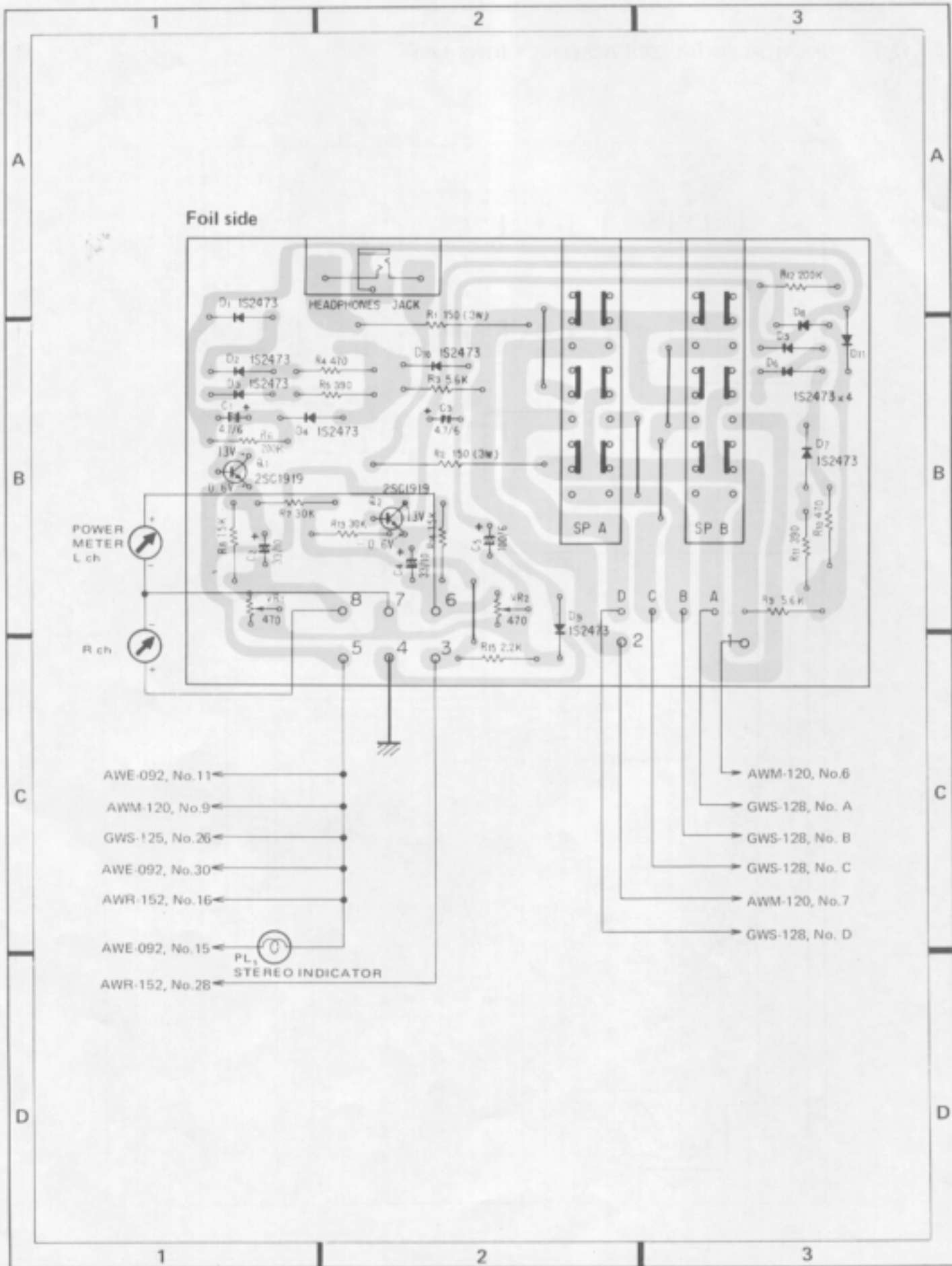
- AWT-001, No.20

Speaker Selector Assembly (GWS-124)

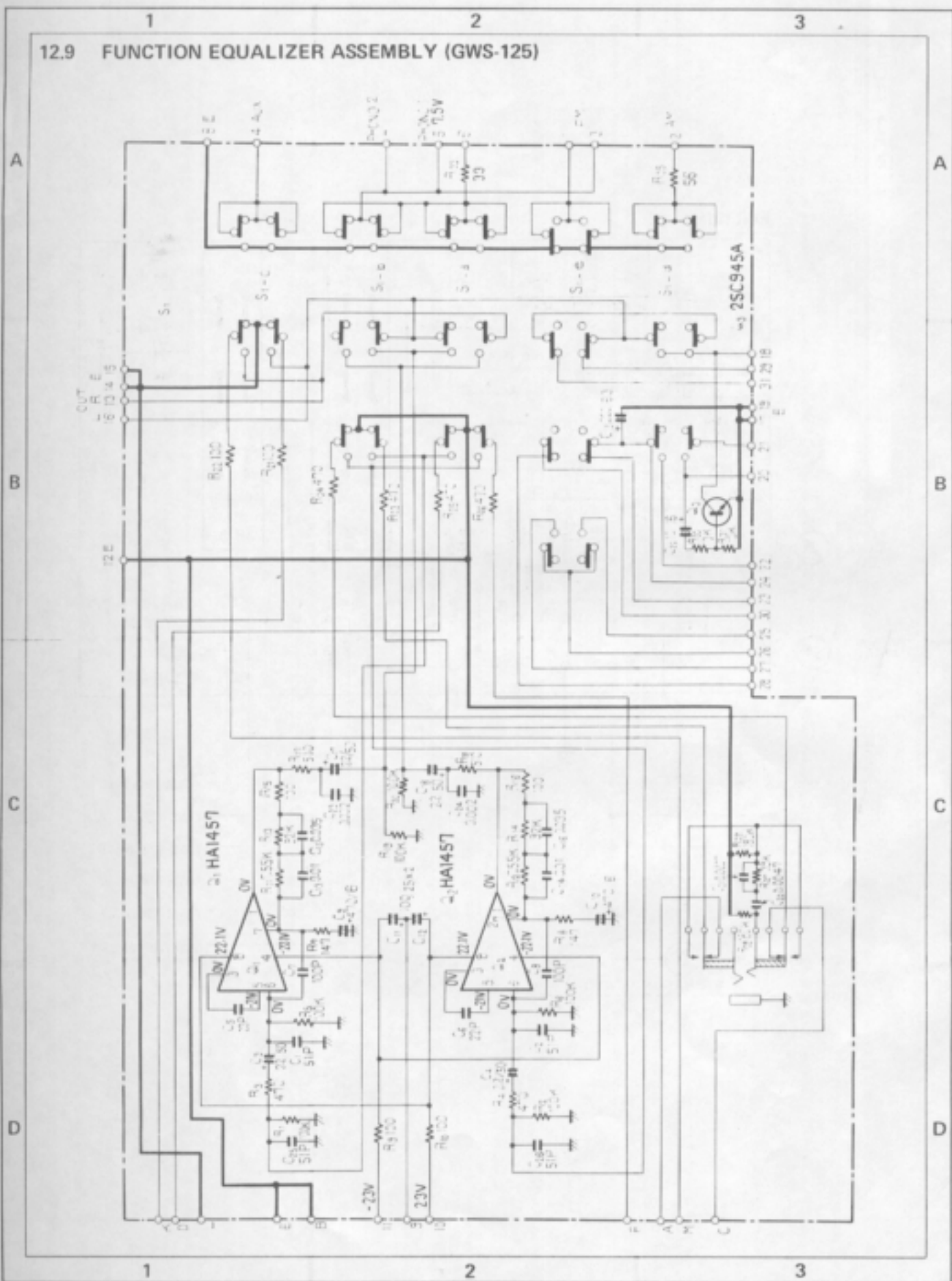


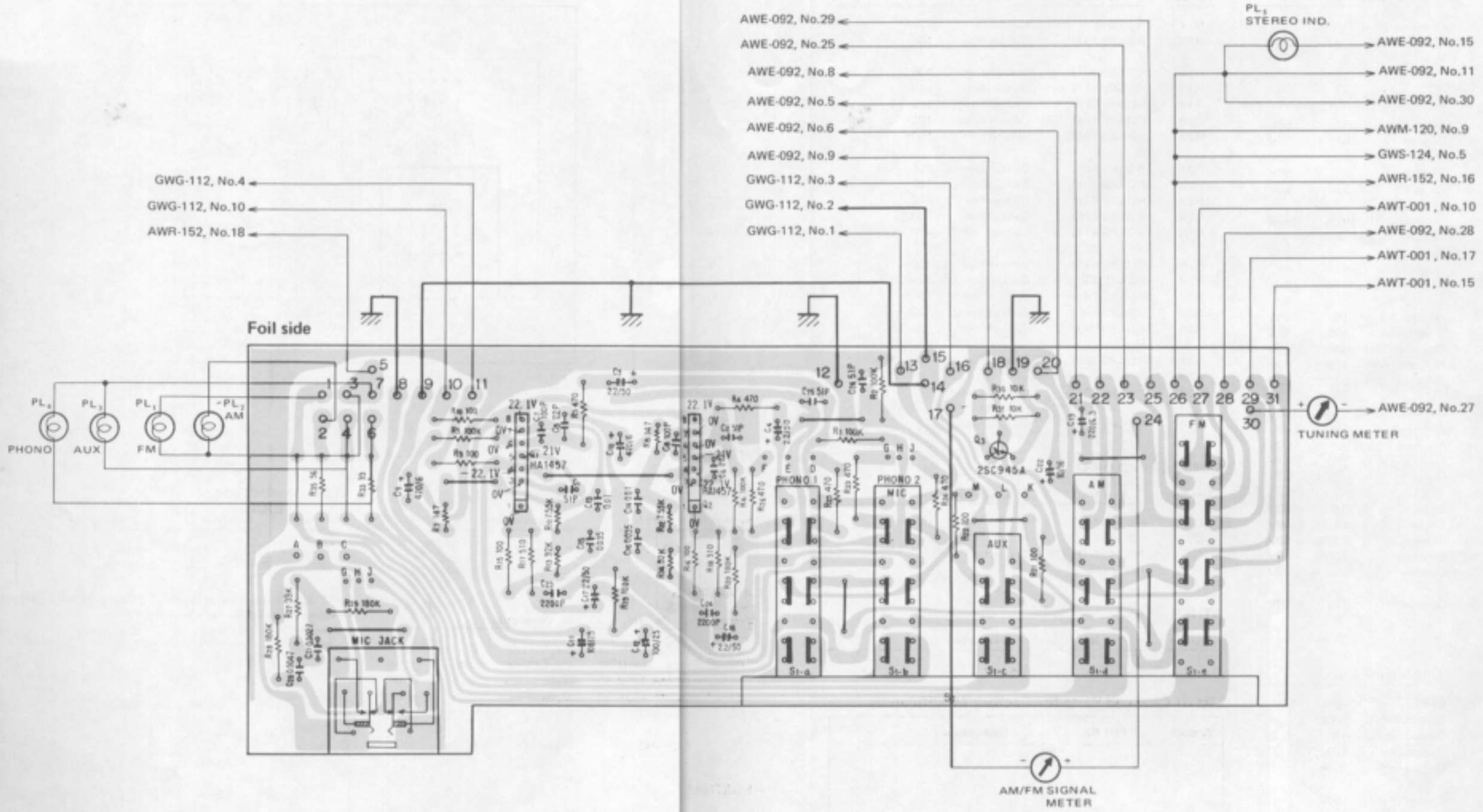
Q1, Q2: 2SC1919 x 2

D1 ~ D11: IS2473 x 11



12.9 FUNCTION EQUALIZER ASSEMBLY (GWS-125)





1 2 3 4 5 6

A

B

C

D

1 2 3 4 5 6

Parts List of Function and Equalizer Assembly (GWS-125)

SWITCH

Symbol	Part No.	Description	Symbol	Part No.	Description
S1	ASG-126	Push switch	R14	ACN-012	Metal film 92k
			R15	RD%PS 101J	Carbon film 100

CAPACITORS

Symbol	Part No.	Description	Symbol	Part No.	Description
C1	CCDSL 510J 50	Ceramic 51p 50V	R16	RD%PS 101J	Carbon film 100
C2	CCDSL 510J 50	Ceramic 51p 50V	R17	RD%PS 511J	Carbon film 510
C3	CEANL 2R2P 50	Electrolytic 2.2 50V	R18	RD%PS 511J	Carbon film 510
C4	CEANL 2R2P 50	Electrolytic 2.2 50V	R19	RD%PS 104J	Carbon film 100k
C5	CCDSL 220K 50	Ceramic 22p 50V	R20	RD%PS 104J	Carbon film 100k
C6	CCDSL 220K 50	Ceramic 22p 50V	R21	RD%PS 101J	Carbon film 100
C7	CCDSL 101K 50	Ceramic 100p 50V	R22	RD%PS 101J	Carbon film 100
C8	CCDSL 101K 50	Ceramic 100p 50V	R23	RD%PS 471J	Carbon film 470
C9	CEA 471P 6	Electrolytic 470 6V	R24	RD%PS 471J	Carbon film 470
C10	CEA 471P 6	Electrolytic 470 6V	R25	RD%PS 471J	Carbon film 470
C11	CEA 101P 25	Electrolytic 100 25V	R26	RD%PS 471J	Carbon film 470
C12	CEA 101P 25	Electrolytic 100 25V	R27	RD%PS 393J	Carbon film 39k
C13	CQPA 103G 50	Polypropylene 0.01 50V	R28	RD%PS 184J	Carbon film 180k
C14	CQPA 103G 50	Polypropylene 0.01 50V	R29	RD%PS 184J	Carbon film 180k
C15	CQPA 353G 50	Polypropylene 0.035 50V	R30	RD%PS 103J	Carbon film 10k
C16	CQPA 353G 50	Polypropylene 0.035 50V	R31	RD%PS 103J	Carbon film 10k
C17	CEANL 2R2P 50	Electrolytic 2.2 50V	R32
C18	CEANL 2R2P 50	Electrolytic 2.2 50V	R33	RD%PS 330J	Carbon film 33
C19	CEA 221K 6.3	Electrolytic 220 6.3V	R34
C20	CQMA 472K 50	Mylar 0.0047 50V	R35	RD%PS 560J	Carbon film 56
C21	CQMA 272K 50	Mylar 0.0027 50V			
C22	CEA 100P 16	Electrolytic 10 16V			
C23	CKDYF 222Z 50	Ceramic 2200p 50V			
C24	CKDYF 222Z 50	Ceramic 2200p 50V			
C25	CCDSL 510J 50	Ceramic 51p 50V			
C26	CCDSL 510J 50	Ceramic 51p 50V			

SEMICONDUCTORS

Symbol	Part No.	Description
Q1	HA 1457	IC
Q2	HA 1457	IC
Q3	2SC945A-Q or R (2SC1914-F)	Transistor

OTHER

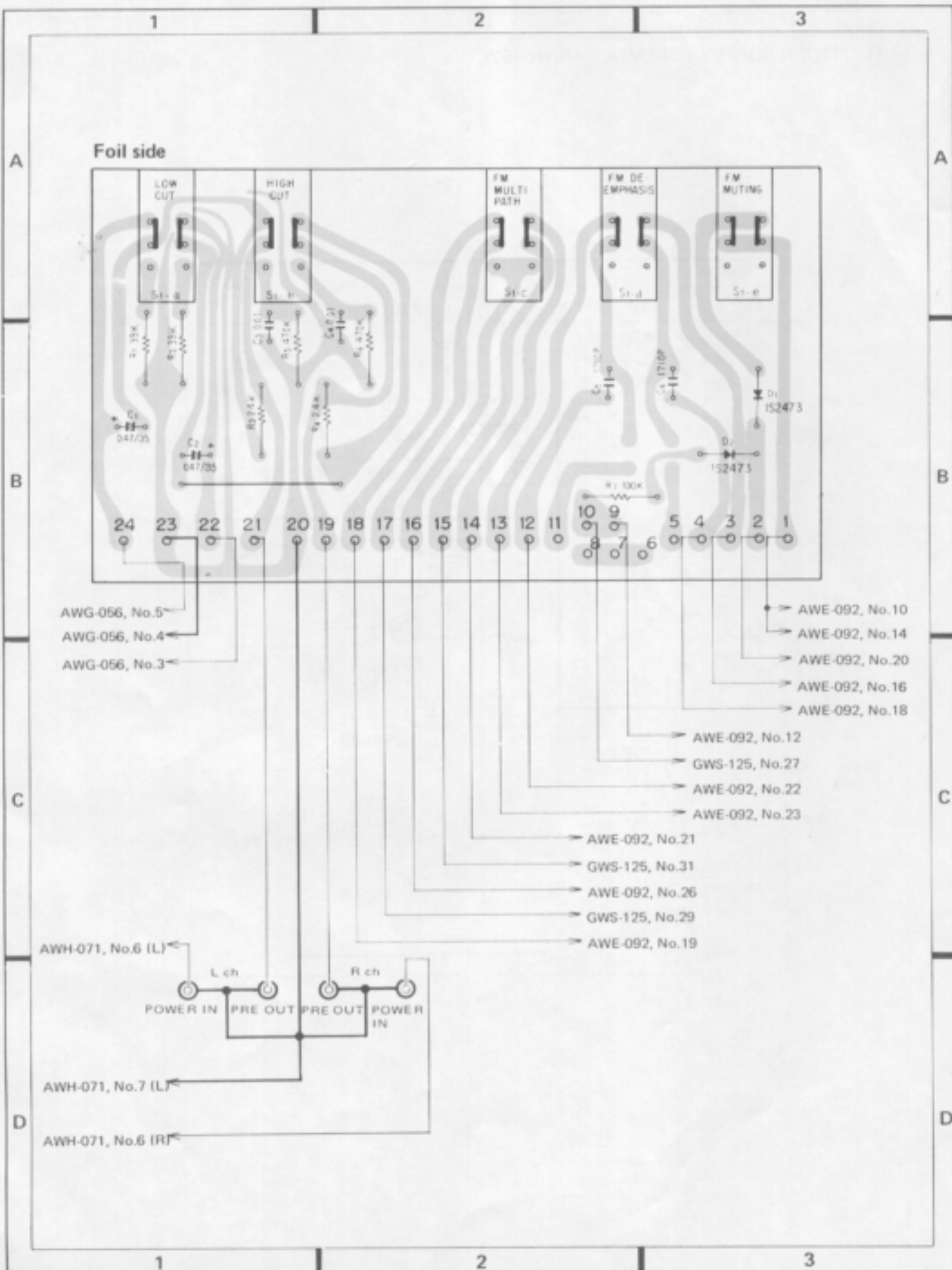
Symbol	Part No.	Description
	AKN-012	Mic jack

RESISTORS

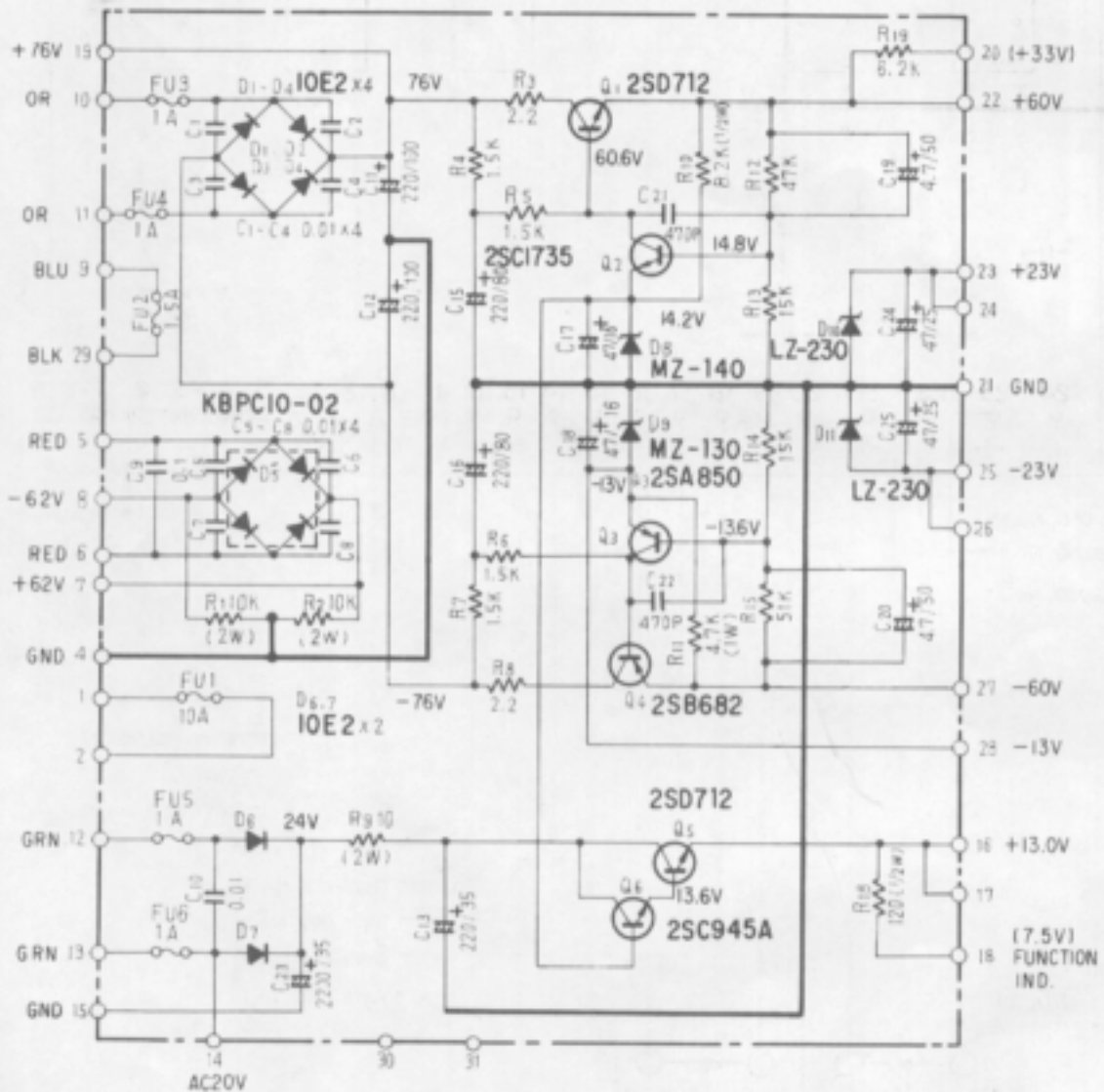
Symbol	Part No.	Description
R1	RD%PS 104J	Carbon film 100k
R2	RD%PS 104J	Carbon film 100k
R3	RD%PS 471J	Carbon film 470
R4	RD%PS 471J	Carbon film 470
R5	RD%PS 104J	Carbon film 100k
R6	RD%PS 104J	Carbon film 100k
R7	RN% SQ 1470F	Metal film 147 %W
R8	RN% SQ 1470F	Metal film 147 %W
R9	RD%PS 101J	Carbon film 100
R10	RD%PS 101J	Carbon film 100
R11	ACN-011	Metal film 7.55k
R12	ACN-011	Metal film 7.55k
R13	ACN-012	Metal film 92k

List of Changed Parts for Factory Modification

Symbol	Part No.	Description



12.11 POWER SUPPLY ASSEMBLY (AWR-152)



A

A

B

B

C

C

D

D

1 2 3 4 5 6

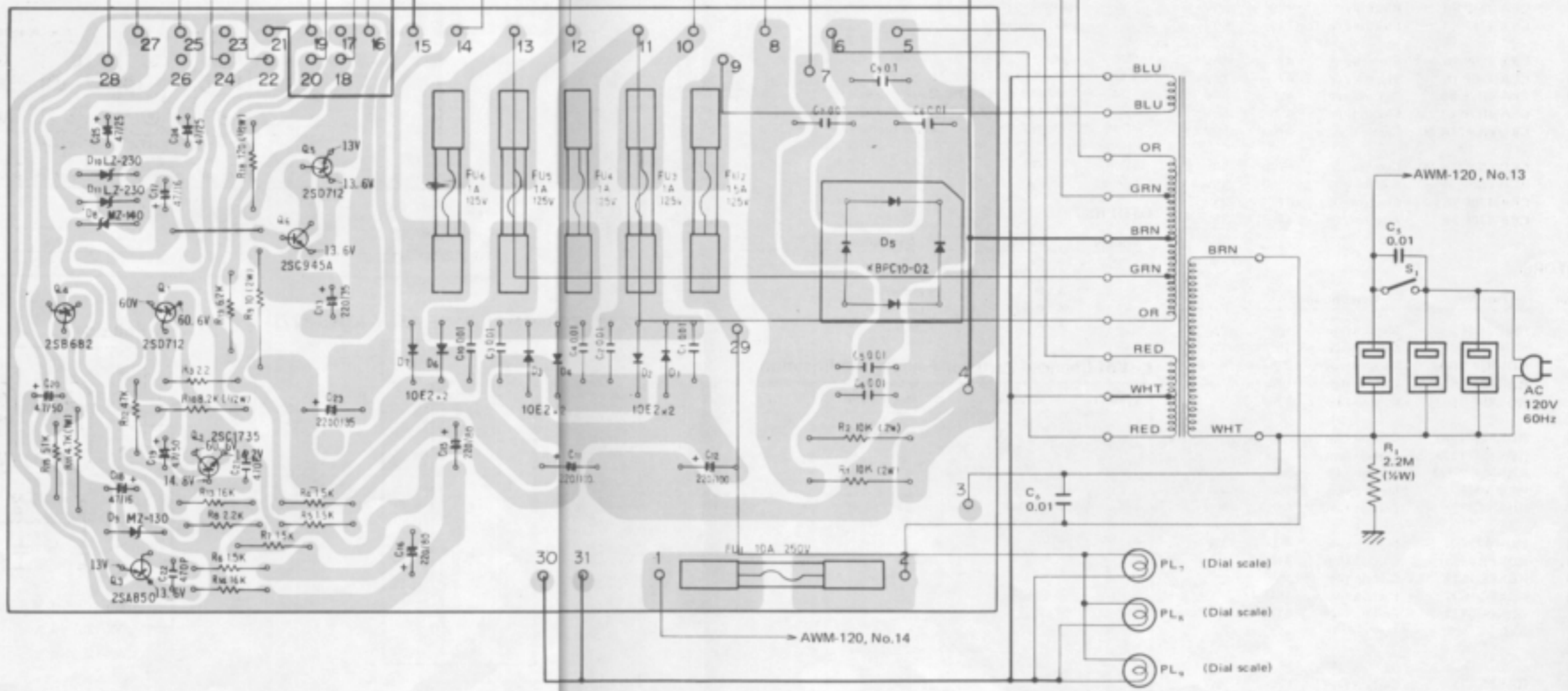
- AWG-056, No.2 ←
- AWM-120, No.12 ←
- AWH-071, No.8 ←
- AWH-071, No.4 ←
- GWG-112, No.9 ←
- AWH-071, No.5 ←
- GWG-112, No.5 ←
- AWM-120, No.2 ←
- AWH-071, No.1 ←
- GWS-124, No.3 ←

- GWS-125, No.5
- GWS-124, No.5
- AWM-120, No.9
- AWE-092, No.15
- AWE-092, No.11
- GWS-125, No.26
- AWE-092, No.30
- AWM-120, No.1

- AWH-071, No.22
- AWH-071, No.12

- AWM-120, No.13

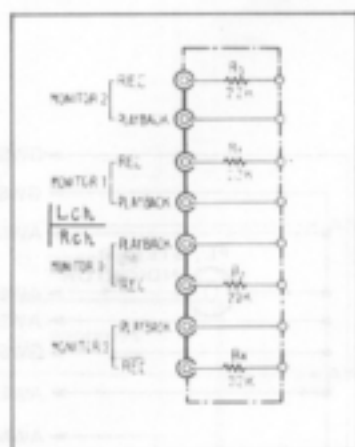
Foil side



1 2 3 4 5 6

- PL₁ (Dial scale)
- PL₂ (Dial scale)
- PL₃ (Dial scale)

12.12 TERMINAL ASSEMBLY (GWS-126)



Parts List

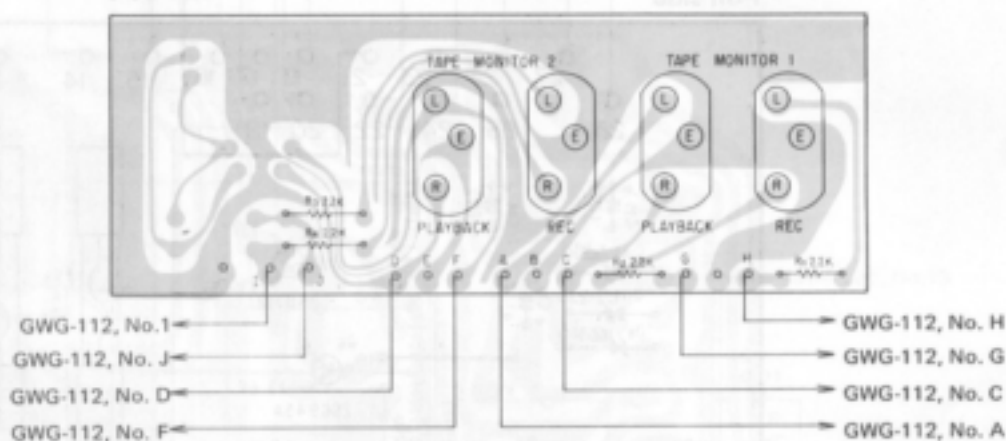
RESISTORS

Symbol	Part No.	Description
R1	RD%PM 222J	Carbon film 2.2k
R2	RD%PM 222J	Carbon film 2.2k
R3	RD%PS 222J	Carbon film 2.2k
R4	RD%PS 222J	Carbon film 2.2k

OTHER

Symbol	Part No.	Description
	AKB-027	4P pin jack

Foil side



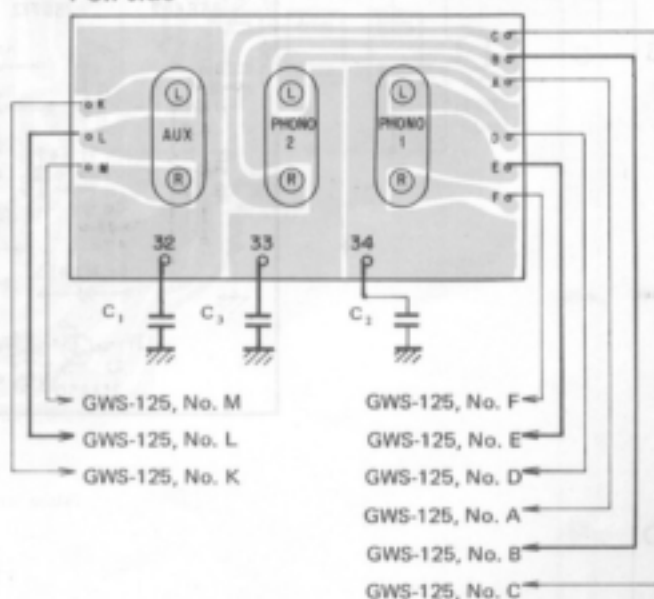
12.13 TERMINAL ASSEMBLY (GWS-127)



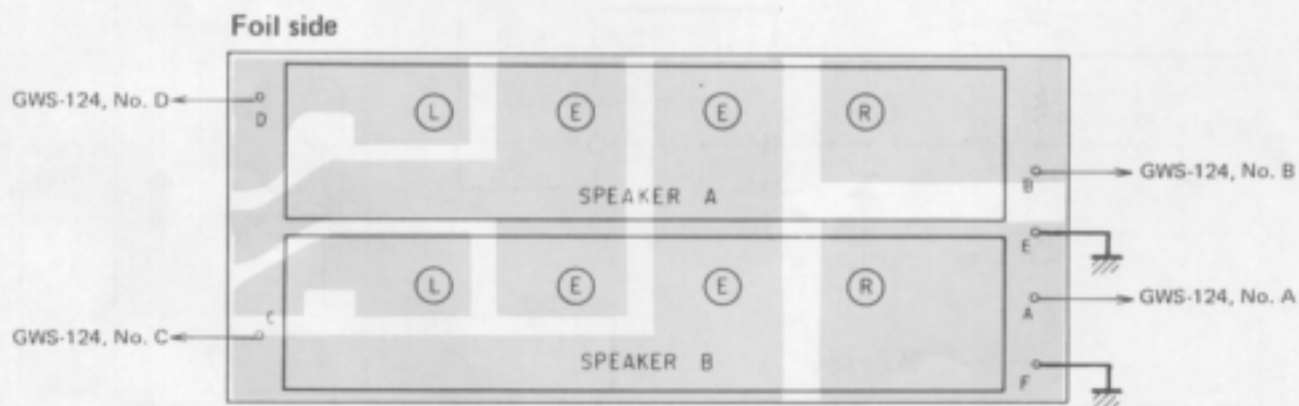
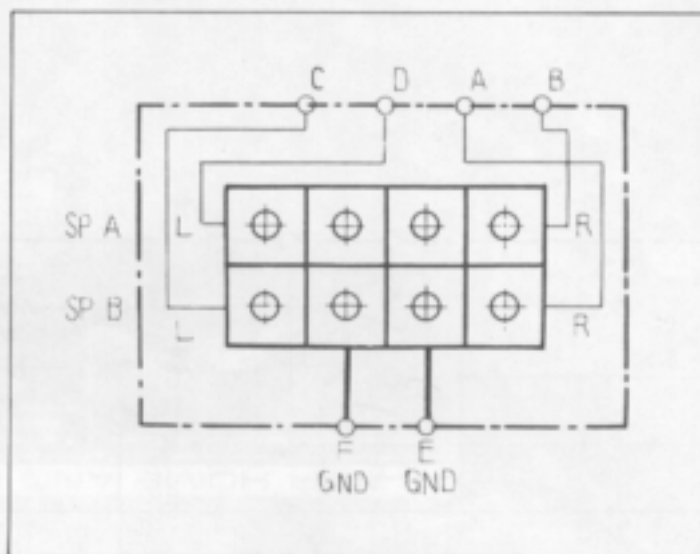
Part List

Symbol	Part No.	Description
	AKB-028	6-P pinJack

Foil side



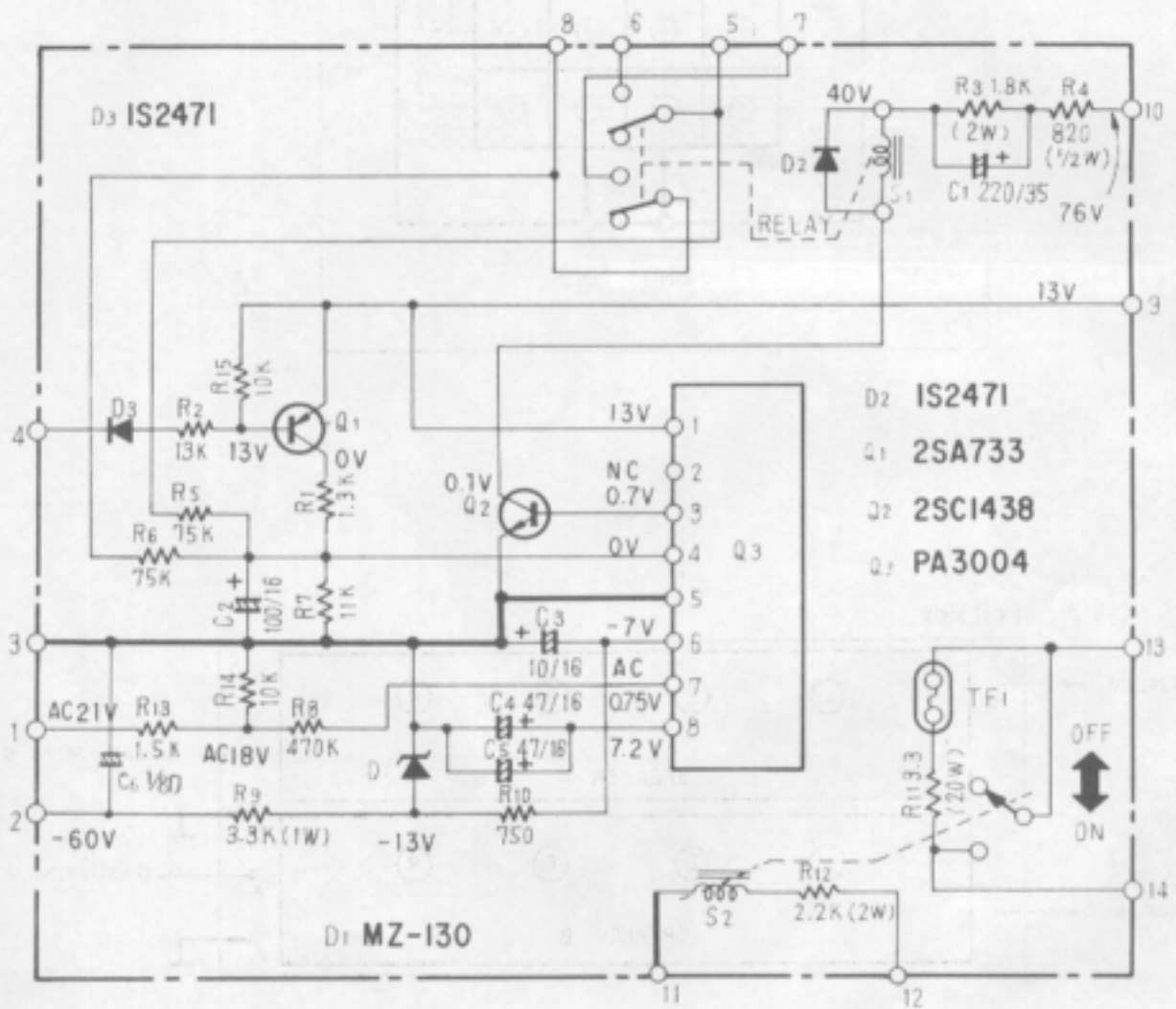
12.14 SPEAKER TERMINAL ASSEMBLY (GWS-128)

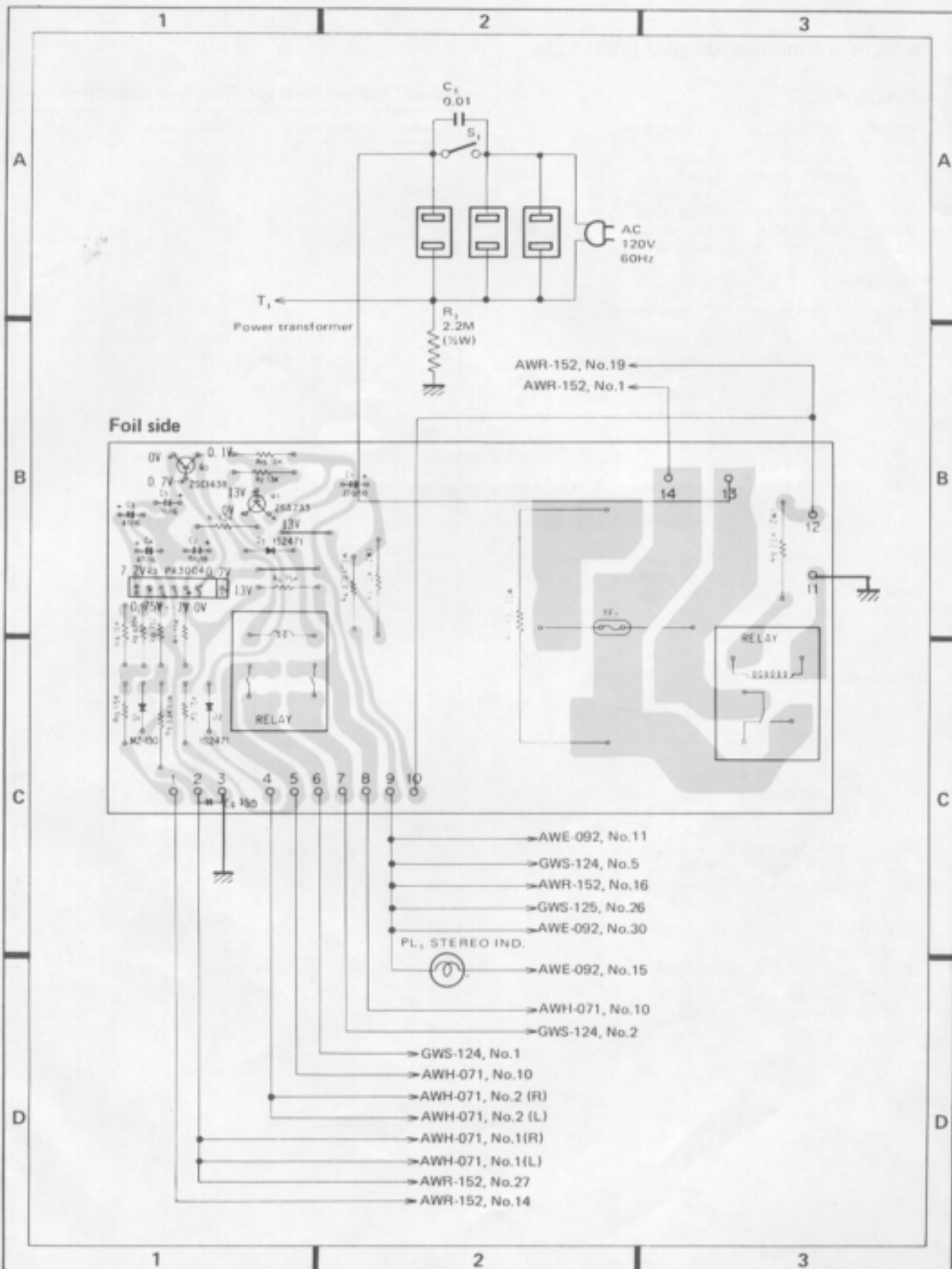


Parts List

Symbol	Part No.	Description
	AKE-029	Push terminal C

12.15 PROTECTION ASSEMBLY (AWM-120)





13. PACKING

