

AM/FM STEREO RECEIVER

SX-850

SERVICE MANUAL



MODEL SX-850 COMES IN THREE VERSIONS DISTINGUISHED AS FOLLOWS:

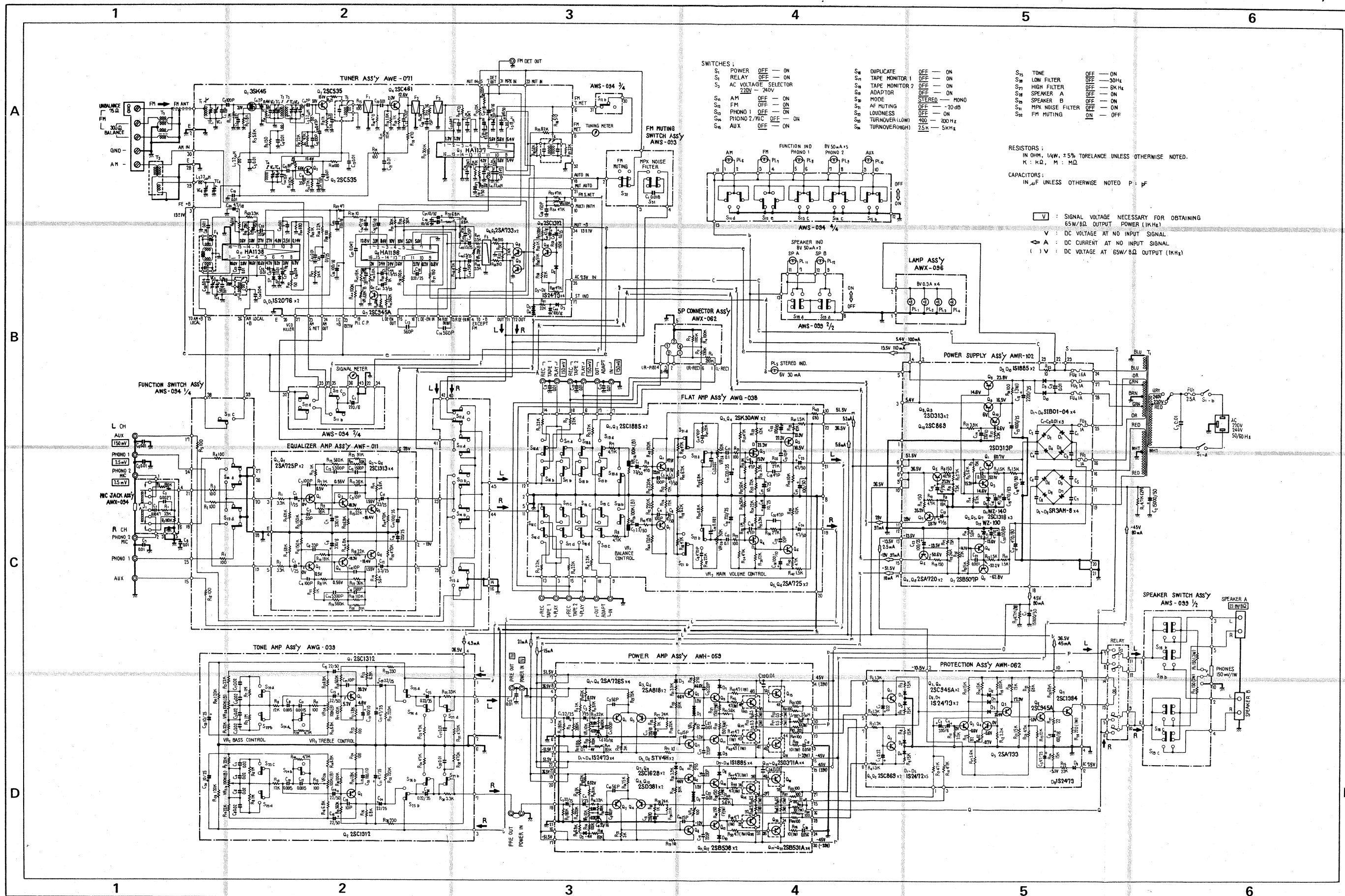
Type	Voltage	Remarks
KC	120V only	CSA (Canada) approved with de-emphasis selector switch (25 μ s/75 μ s)
KU	120V only	UL (U.S.A) approved with de-emphasis selector switch (25 μ s/75 μ s)
HG	220V and 240V (Switchable)	SEMKO (Sweden), NEMKO (Norway), DEMKO (Denmark) and EI (Finland) approved
S	110V, 120V, 220V and 240V (Switchable)	General export model with de-emphasis selector switch (25 μ s/50 μ s/75 μ s)

This service manual is applicable to the KU and KC models.

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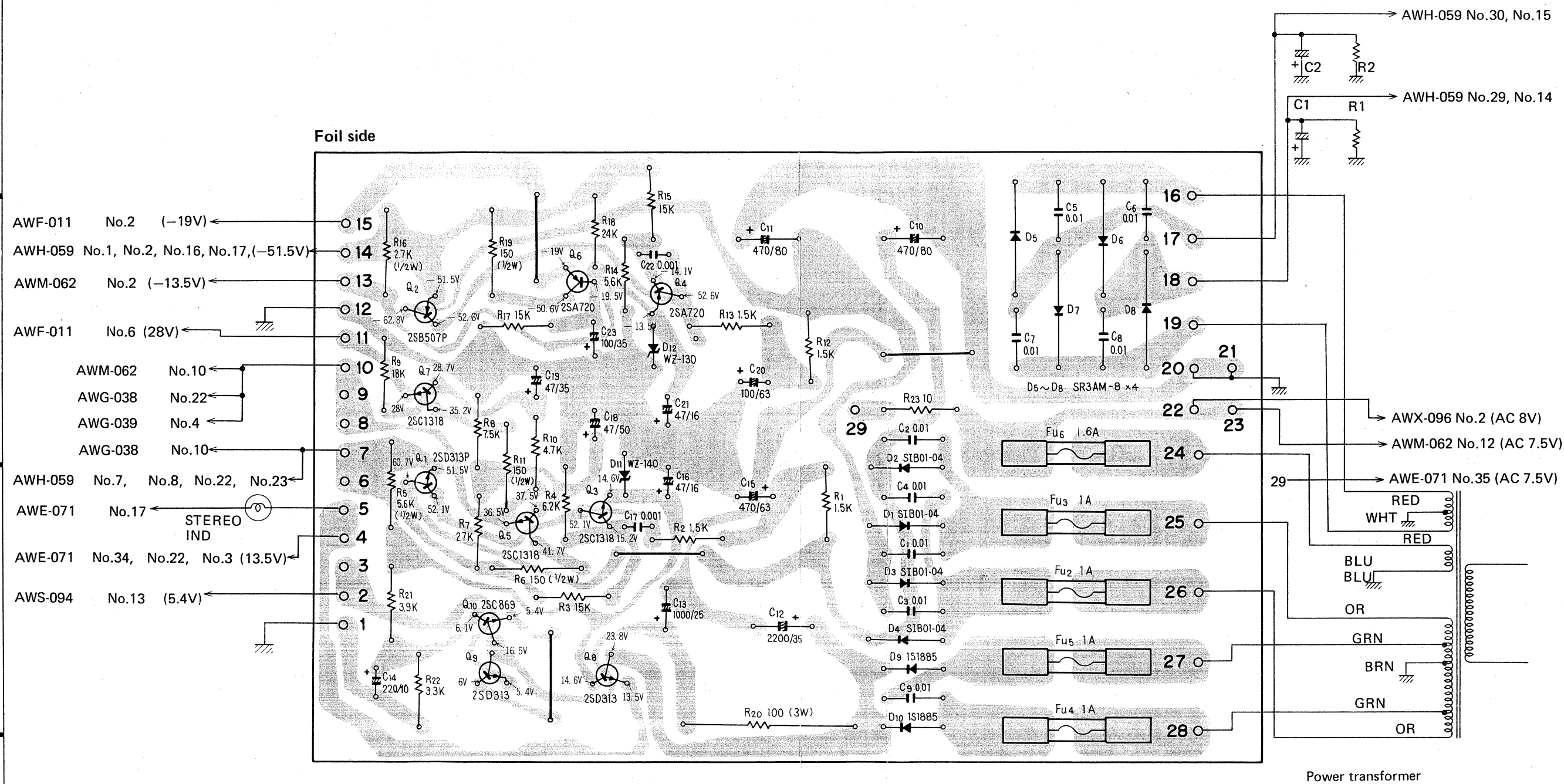
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SX-850/HG

2, POWER SUPPLY ASSEMBLY (AWR-102)



Power transformer



SEMICONDUCTORS

CAPACITORS

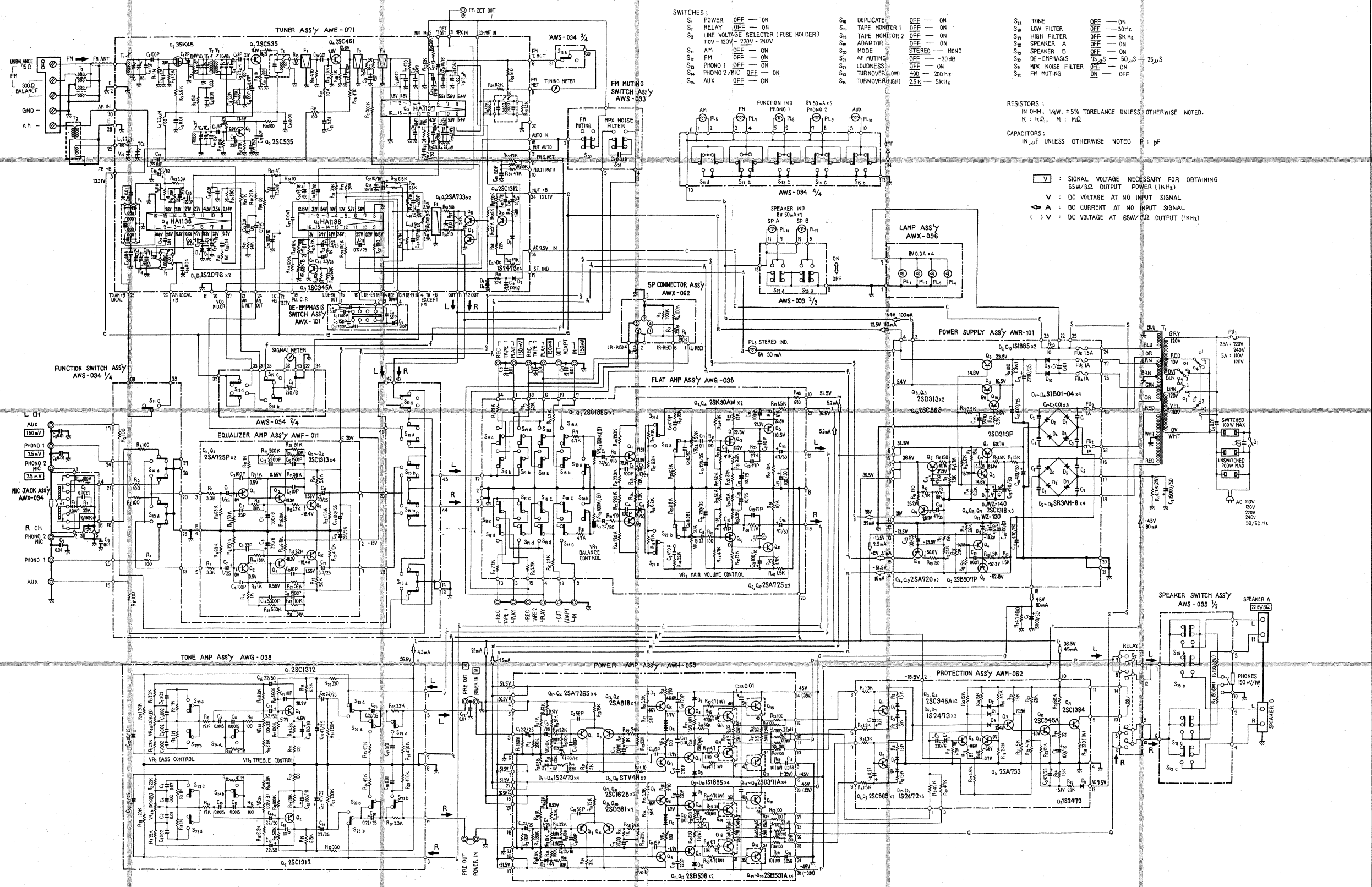
OTHERS

RESISTORS

Symbol	Description		Part No.
R1	Carbon film	1.5k	RD¼PSF 152J
R2	Carbon film	1.5k	RD¼PS 152J
R3	Carbon film	15k	RD¼PS 153J
R4	Carbon film	6.2k	RD¼PS 622J
R5	Carbon film	5.6k ½W	RD¼PS 562J
R6	Carbon film	150 ½W	RD¼PS 151J
R7	Carbon film	2.7k	RD¼PS 272J
R8	Carbon film	7.5k	RD¼PS 752J
R9	Carbon film	18k	RD¼PS 183J
R10	Carbon film	4.7k	RD¼PS 472J
R11	Carbon film	150 ½W	RD¼PS 151J
R12	Carbon film	1.5k	RD¼PSF 152J
R13	Carbon film	1.5k	RD¼PS 152J
R14	Carbon film	5.6k	RD¼PS 562J
R15	Carbon film	15k	RD¼PS 153J
R16	Carbon film	2.7k ½W	RD¼PS 272J
R17	Carbon film	15k	RD¼PS 153J
R18	Carbon film	24k	RD¼PS 243J
R19	Carbon film	150 ½W	RD¼PS 151J
R20	Metal oxide	100 3W	RS3P 101J
R21	Carbon film	3.9k	RD¼PS 392J
R22	Carbon film	3.3k	RD¼PS 332J
R23	Carbon film	10	RD¼PS 100J

SCHEMATIC DIAGRAMS, P.C. BOARD PATTERN AND PARTS LISTS OF "S" MODEL

1. SCHEMATIC DIAGRAM AND MISCELLANEOUS PARTS



1. SPECIFICATIONS

Semiconductors

FETs	3
ICs	3
Transistors	56
Diodes	36

Power Amplifier Section

Continuous Power Output form 20 Hertz to 20,000 Hertz (Both channels driven) ..	65 watts per channel (8 ohms) 85 watts per channel (4 ohms)
--	--

Total Harmonic Distortion (20 Hertz to 20,000 Hertz, from AUX)	
Continuous Rated Power Output. . .	No more than 0.1%
33 watts per channel power output, 8 ohms	No more than 0.05%
1 watt per channel power output, 8 ohms	No more than 0.05%

Intermodulation Distortion (50 Hertz: 7,000Hertz=4:1, from AUX)	
Continuous Rated Power Output. . .	No more than 0.1%
33 watts per channel power output, 8 ohms	No more than 0.05%
1 watt per channel power output, 8 ohms	No more than 0.05%

Frequency Response	7Hz to 90,000Hz ± 1 dB
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Input Sensitivity/Impedance POWER AMP IN	1 V/50k ohms
---	--------------

Output Speaker	A, B, A+B
Headphone	Low Impedance

Damping Factor (20Hz to 20,000Hz, 8 ohms)	25
Hum and Noise (IHF, short-circuited, A Network) ..	100dB

Preamplifier Section

Input (Sensitivity/Impedance)	
PHONO 1	2.5mV/50k ohms
PHONO 2	2.5mV/50k ohms
MIC	6.5mV/50k ohms
AUX	150mV/50k ohms
TAPE PLAY 1	150mV/50k ohms
TAPE PLAY 2	150mV/50k ohms
TAPE PLAY 2 (DIN connector) ..	150mV/50k ohms

PHONO Overload Level (T.H.D. 0.1%)	
PHONO 1	200mV (1kHz)
PHONO 2	200mV (1kHz)

Output Level/Impedance	
TAPE REC 1	150mV
TAPE REC 2	150mV

TAPE REC 2 (DIN connector)	30mV/80k ohms
PRE OUT	1V/100 ohms

Total Harmonic Distortion (20Hz to 20,000Hz 1V output). . .	No more than 0.05%
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Frequency Response PHONO (RIAA equalization). 30Hz to 15,000Hz ± 0.2 dB	
AUX, TAPE PLAY	10Hz to 50,000Hz ± 1 dB

Tone Control BASS	± 7 dB/ ± 10 dB (100Hz) Turnover Frequency 200Hz/400Hz
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TREBLE	± 7 dB/ ± 10 dB (10kHz) Turnover Frequency 5kHz/2.5kHz
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Filter LOW	30Hz (6dB/oct.)
HIGH	6kHz (6dB/oct.)

Loudness Contour (Volume control set at -40dB position)	+6dB (100Hz), +3dB (10kHz)
---	----------------------------

Hum and Noise (IHF, short-circuited, A Network, rated power)	
PHONO	70dB
AUX, TAPE PLAY	90dB
Muting	-20dB

FM Section

Usable Sensitivity ...	
MONO	10.3dBf (1.8 μ V)
STEREO	22.2dBf (7.1 μ V)

50dB Quieting Sensitivity ...	
MONO	17.2dBf (4.0 μ V)
STEREO	38.0dBf (44 μ V)

Signal to Noise Ratio at 65dBf .	MONO
STEREO	72dB

Distortion at 65dBf 100Hz ...	MONO
STEREO	0.15%

1kHz	MONO
STEREO	0.15%

6kHz	MONO
STEREO	0.3%

Frequency Response	30HZ to 15,000Hz ± 0.2 dB
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Capture Ratio	1.0dB
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Alternate Channel Selectivity	80dB
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Spurious Response Ratio	100dB
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Image Response Ratio	85dB
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IF Response Ratio	100dB
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AM Suppression Ratio	55dB
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Muting Threshold	14.0dBf (2.8 μ V)
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Stereo Separation ...	40dB (1kHz), 30dB (30Hz~15kHz)
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Subcarrier Product Ratio	62dB
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SCA Rejection Ratio	62dB
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Antenna Input	300 ohms balanced
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	75 ohms unbalanced
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AM Section

Sensitivity (IHF, Ferrite antenna)	300 μ V/m
(IHF, Ext. antenna)	15 μ V

Selectivity	35dB
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Signal to Noise Ratio	50dB
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Image Rejection	40dB
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IF Rejection	65dB
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Antenna	Built-in Ferrite Loopstick Antenna
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Miscellaneous

Power Requirements	120V 60Hz
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Power Consupcion	UL; 180W, 420W (max.)
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	CSA; 400VA
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Dimensions	526.6(W)x173(H)x411.5(D) mm
	20-3/4(W)x6-13/16(H)x16-3/16(D) in

Weight Without package	19.1 kg (42 lb 3oz)
With package	22.4kg (49 lb 6oz)

Furnished Parts

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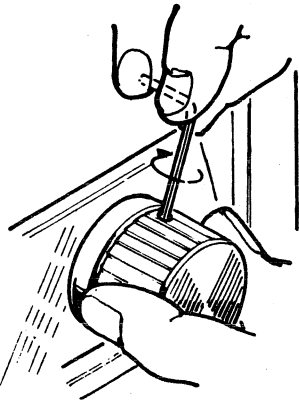
NOTE:

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

HEX WRENCH

The accessory hex. wrench is provided for removing the TUNING knob or tightening its setscrew in event it becomes loose.

If required, loosen the setscrew by inserting the wrench into the hole on the side of the knob and turning the wrench counterclockwise. Be particularly careful not to scratch the front panel when employing the wrench.



2. FRONT PANEL FACILITIES

SPEAKER BUTTONS

Two sets of speaker terminals, A and B, are provided on the rear panel, and the required speaker systems can be selected by depressing the SPEAKERS buttons as follows:
A Speaker systems A operate
B Speaker systems B operate

- NOTES:
- 1. When any two buttons (A and B) are depressed simultaneously, the corresponding pairs of speaker systems will come into operation.
 - 2. For private listening through headphones, return all the SPEAKERS buttons to the OFF (undepressed) position.

PHONES OUTPUT JACK

Accepts stereo headphones.

POWER SWITCH

After turning this switch ON there is a delay of some 3 to 6 seconds, during which time the protection circuit operates to eliminate unpleasant noise.

BASS CONTROL

Clockwise rotation gives stronger emphasis to the bass range below the turnover frequency (which is selected by the BASS TURNOVER switch), while counterclockwise rotation reduces bass response.

BASS TURNOVER SWITCH

This selects the frequency below which the bass tone control will begin to act. This "turnover" frequency can be set at 400Hz or 200Hz, to match the characteristics of the room, the program material, or your personal listening preferences.

tone switch

In the OFF (up) position, this switch causes the amplifier section to operate with a flat frequency response regardless of the tone control setting.

TREBLE TURNOVER SWITCH

This switch selects the frequency above which the treble tone control will begin to act. This "turnover" frequency can be set at 2.5kHz or 5kHz, to match the characteristics of the room, the program material, or your personal listening preferences.

TREBLE CONTROL

Clockwise rotation gives stronger emphasis to the high range above the turnover frequency (selected by the TREBLE TURNOVER switch), while counterclockwise rotation reduces high-range response.

FM TUNING METER

With the SIGNAL meter needle deflected to the right, make fine adjustment by centering the FM TUNING meter needle (indicating optimum reception).

SIGNAL METER

For AM and FM station tuning.
AM tuning: Tune for maximum deflection of the SIGNAL meter needle to the right.
FM tuning: Both the SIGNAL and FM TUNING meters work together

SPEAKER SYSTEM INDICATOR

FM STEREO INDICATOR

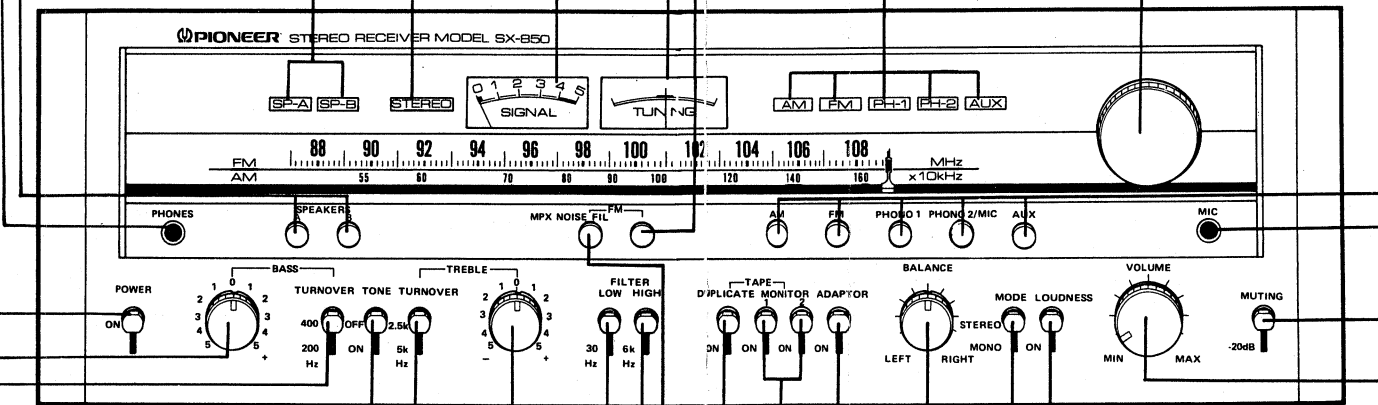
FM MUTING BUTTON

Leave this button undepressed (in the ON position) to suppress unpleasant interstation noise while tuning between FM stations. Low-strength signals may also be suppressed by this function, so to pick up a weak station depress this button to the OFF position.

TUNING KNOB

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

PROGRAM SOURCE INDICATOR



LOW CUT FILTER SWITCH

When low-pitched rumble (from turntable motor or other source) is obstructive, set this switch to the 30Hz position to provide 6dB/octave attenuation at frequencies below 30Hz. If no interference is experienced, set in the up position.

HIGH CUT FILTER SWITCH

When high frequency scratch noise (from worn records or other source) is unpleasant, set this switch to the 6kHz position to provide 6dB/octave attenuation at frequencies above 6kHz. If there is no interference, set in the up position.

MPX NOISE FILTER BUTTON

Comparatively high frequency noise, incurred when receiving weak FM stereo signals, can be eliminated by depressing this button to ON. In this case however, there will be some loss of stereo separation.

ADAPTOR SWITCH

When employing adaptor components, such as a graphic equalizer adaptor, RG processor, or Dolby NR adaptor, set this ADAPTOR switch to ON.

TAPE MONITOR (1 & 2) SWITCHES

- Set these switches to the ON (down) position as follows:
- 1 With a tape deck connected to the TAPE 1 jacks (REC and PLAY), either playback or monitoring of a recording in progress are possible.
 - 2 Same as in 1 above, with a tape deck connected to the TAPE 2 jacks (REC & PLAY, or REC/PLAY jack).
- For normal use, leave in the OFF (up) positions.

TAPE DUPLICATE SWITCH

Set this switch in the ON (down) position to duplicate or edit a recorded tape using two tape decks.

FUNCTION SELECTOR BUTTONS

To select the program source, push the buttons as follows:
AM For AM broadcast reception.

FM For AM broadcast reception.
For FM stereo reception. Automatically receives monophonically during FM monophonic broadcasts. The STEREO indicator lights up when the broadcast is in stereo.

PHONO 1 To operate a turntable connected to the PHONO 1 input jacks.

PHONO 2/MIC As above for PHONO 2 jacks, or for reproduction through a microphone connected to the MIC jack on the front panel. Note: when the microphone is plugged in the turntable connected to the PHONO 2 jacks cannot be used.

AUX For listening to an audio component (cartridge tape player, TV sound tuner, etc.) connected to the AUX input jacks.

NOTE: Only one FUNCTION button should be depressed at a time.

MIC JACK

Accepts a standard 6 ϕ mm microphone plug.

AUDIO MUTING SWITCH - 20dB

Set to -20dB to attenuate the audio output by 20dB. This convenient feature saves having to disturb the VOLUME control, for example when answering the telephone.

VOLUME CONTROL

Governs the level of sound outputs both from the speaker systems and from headphones.

LOUDNESS SWITCH

Set to ON when listening at low volume. The frequency response of the human ear varies according to the listening volume, and the ON position compensates for hearing response by emphasizing the bass and treble.

MODE SWITCH

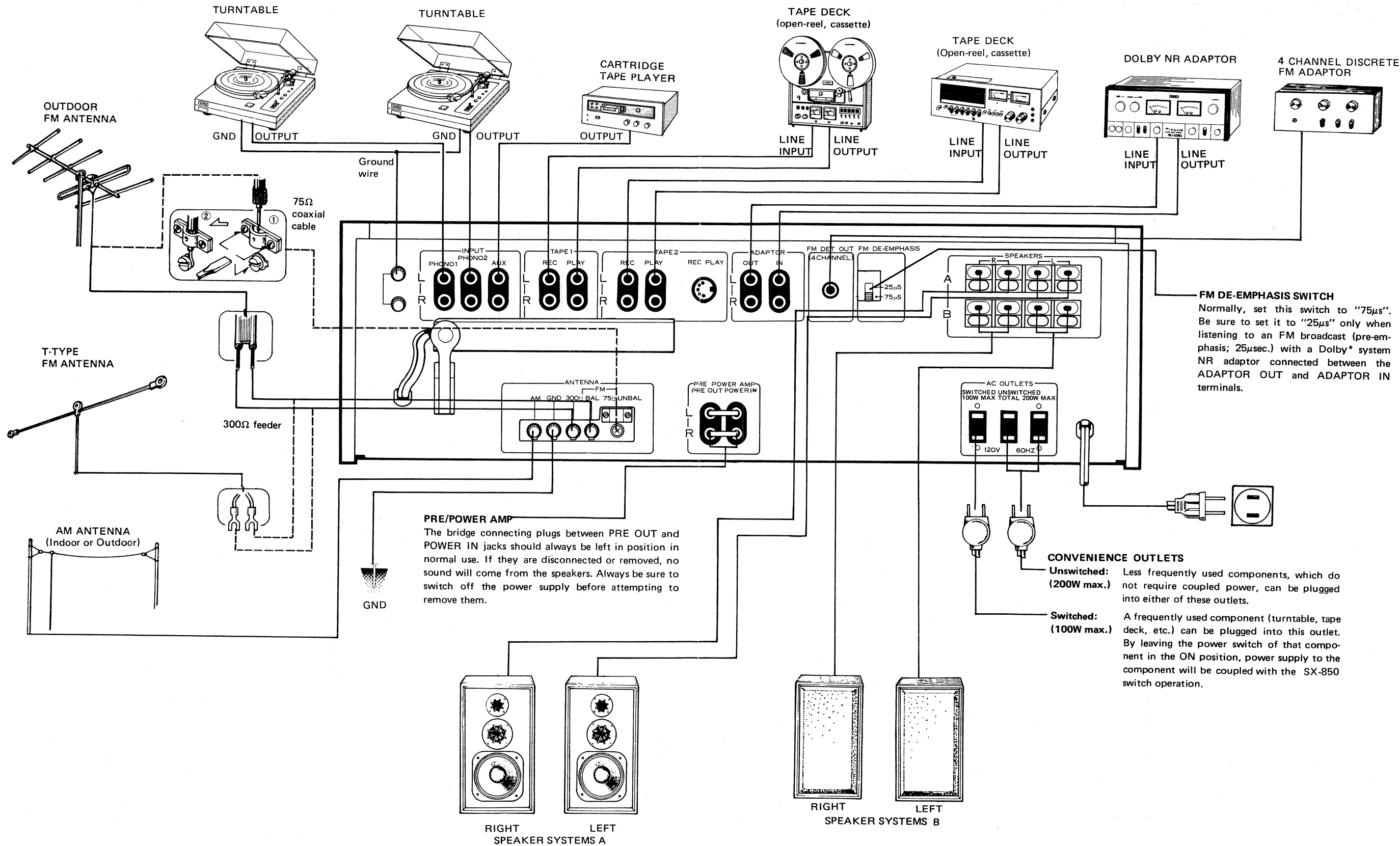
Set to STEREO for normal stereo operation. When set to MONO, left and right channel signals will be mixed and reproduced monophonically from both speaker systems.

NOTE:
Recording stereophonically with the MODE switch in the MONO position may cause channel separation to deteriorate.

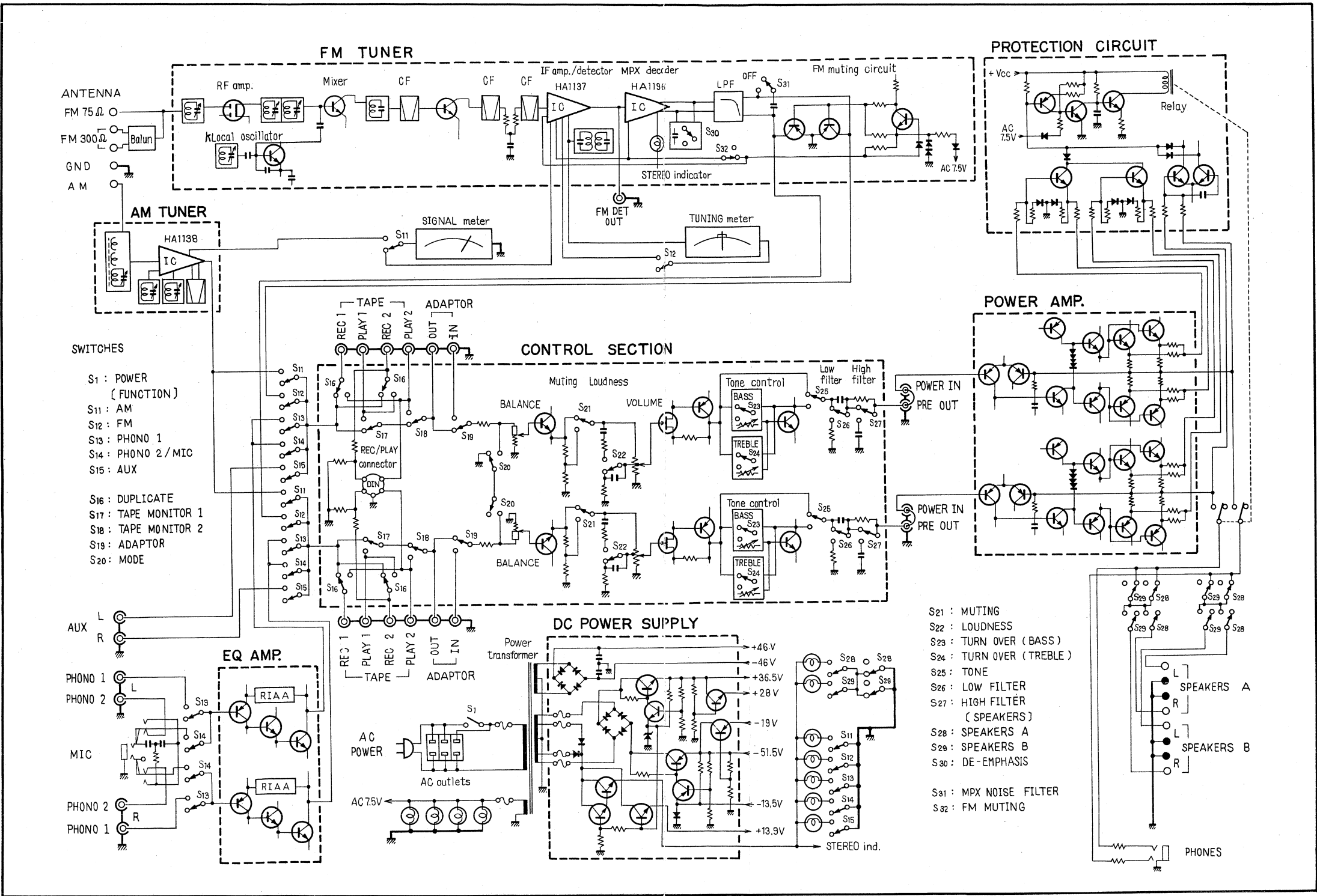
BALANCE CONTROL

Adjusts the balance between the sound volume from the left and right speaker systems or headphones.

3. CONNECTION DIAGRAM



4. BLOCK DIAGRAM



5. CIRCUIT DESCRIPTION

5.1 AM TUNER

The AM tuner employs a 2-gang variable capacitor and an IC (HA1138) with 1 stage RF and 2 stage IF amplification. Fig. 1 shows the HA1138 block diagram.

5.2 FM TUNER

Front End

This is composed of a tuning circuit with a 4-gang variable capacitor, dual-gate MOS FET RF amplifier, and local oscillator. By employing a grounded gate-2 of dual-gate MOS FET, the circuit becomes equivalent to a cascade amplifier, providing large gain with stable operation in the RF amplifier. A variation of a Clapp circuit forms the local oscillator. The generated signal passes from the tuning circuit through a low value capacitor and is applied to the base of the mixing transistor.

Advantages of this circuit include slight frequency drift due to variations in power source voltage, ambient temperature, etc., and low spurious interference in the clean output waveform.

FM IF Amplifier

This section consists of three dual element ceramic filters, an IC (HA1137) and a transistor. Ceramic filters possess excellent selectivity, which cannot be obtained with L-C type tuning filters. The circuit composition uses this quality to provide outstanding selectivity. Excellent sensitivity and S·N ratio are also achieved by employing a transistor and high density IC (HA1137). The HA1137 contains IF limiter amplifier, FM detector, meter drive and muting circuits. Its block diagram is shown in Fig. 2.

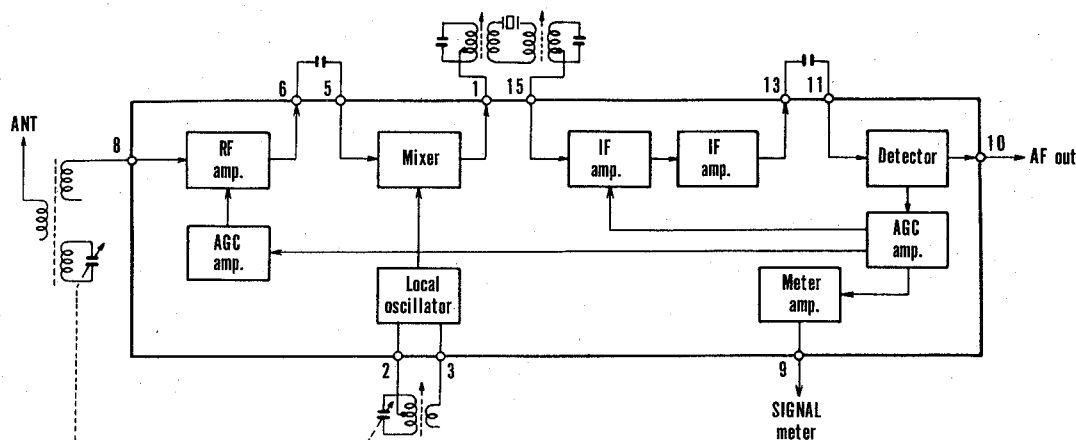


Fig. 1

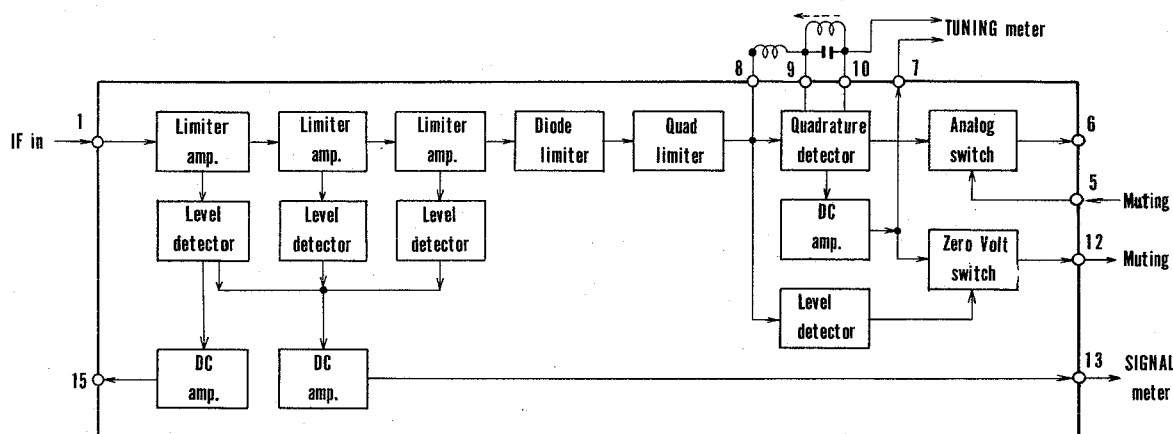


Fig. 2

Multiplex Decoder

The multiplex decoder contains three sections and employs an IC (HA1196) with a block diagram as shown in Fig. 3.

1. Switching Signal Generator

A PLL (phase locked loop) system is employed. 76kHz is generated by the VCO (voltage controlled oscillator: an oscillator in which frequency is controlled by a voltage) and converted into 38kHz by a frequency divider, then divided again to become 19kHz. This signal and the stereo pilot component (19kHz) of the detected signal are applied to a phase comparator where the difference between them is converted into a voltage. By feedback this voltage is applied to the VCO. And the oscillator signal is locked to the pilot signal. This loop is termed PLL and a 38kHz switching signal synchronized to the pilot signal is obtained and employed as a switching signal.

2. Automatic stereo detector

With the PLL locked to the pilot signal, the pilot signal and a 19kHz signal of the same phase are produced. A voltage is then obtained at the phase comparator that is proportional to the pilot signal amplitude. As it increases, the lamp lights and the switch becomes on. The switching signal is applied to the demodulator. However, if the FM muting signal is also applied to pin 12, the detector circuit becomes disabled (grounded). Therefore a switching signal to the demodulator is not supplied and mono reproduction is obtained.

3. Demodulator

Two differential amplifiers are employed in a switching circuit (Fig. 4). The composite signal is applied to the base of Q3. Q1 and Q2 are alternately switched ON and OFF by the switching signal. The composite signal amplified at Q3 is demodulated by the switching of Q1 and Q2. Q6 and Q3 are loosely coupled at their emitters by R1, R2 and R3. Q6 is driven in opposite phase to Q3 and its low level composite signal output is demodulated by switching of Q4 and Q5. The demodulated signals in opposite phase are combined at the collectors of Q1 and Q2, cancelling crosstalk. Adequate current flow is required in Q3 and Q6 for low distortion. However, if the base bias voltage is raised, the voltage range available at the collector

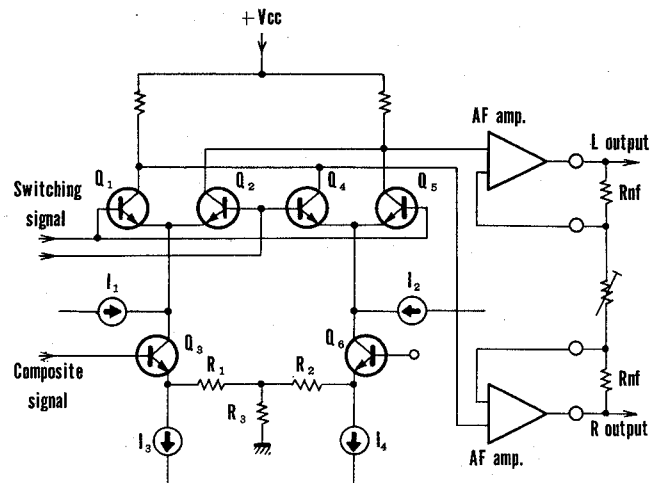


Fig. 4

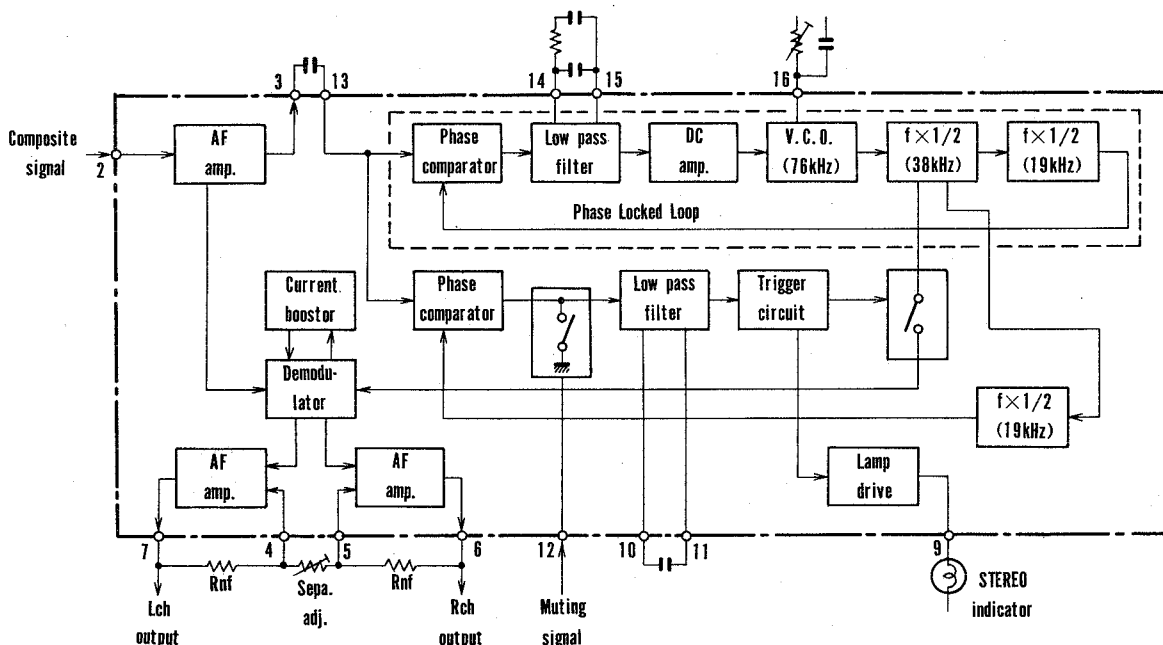


Fig. 3

is reduced and clipping occurs (power supply voltage is limited by IC voltage requirement). For this reason, current from an external source is inserted at Q3 and Q6 collectors and become I1 and I2 in Fig. 4. The same amount of current is removed at the emitters of Q3 and Q6 to become I3 and I4 in Fig. 4. Q3 and Q6 therefore operate with adequate current and distortion in this stage is remarkably reduced. A feedback amplifier amplifies the demodulated signal to produce the IC outputs.

FM Muting Circuit

Fig. 5 shows the FM muting circuit of the SX-850. When there is more than approximately $\pm 70\text{kHz}$ detuning or an extremely low input signal level, a DC voltage becomes generated at pin 12 of HA1137. This is taken as the detector signal for FM muting circuit operation.

In Fig. 5, the voltage of Q1 emitter is held to approximately -1.3V by D1 rectifying action and D2 and D3 forward voltage. When the received signal is extremely low (also includes detuning), a DC voltage (plus) is produced at pin 12 of HA1137 and with the FM MUTING switch ON, this voltage forward biases Q1 base through D4 and Q1 becomes ON. Q2 and Q3 base potentials are drawn by Q1 emitter potential and drop. Since Q2 and Q3 are PNP transistors, they are biased to forward and turn ON. The signal output circuit is thus grounded and muting is attained. At the same time, internal analogue switches in HA1137 is operated.

When the FM MUTING switch is OFF or a station is properly tuned, Q1 base is not forward biased. In this case, Q2 and Q3 base potentials are drawn by Q1 collector potential and rise. Q2 and Q3 therefore become OFF and muting is released.

Since the FM muting signal is also applied to the automatic stereo detector of HA1196 (multiplex decoder IC), muting and stereo thresholds are the same level.

When the power supply is switched ON, the negative voltage supply to Q1 emitter is more rapid than +Vcc increase. Q2 and Q3 thus become temporarily ON and muting is performed. On the other hand, when the power supply is turned OFF, the negative voltage at Q1 emitter is gradually declines. As +Vcc briefly maintained, Q2 and Q3 base potentials are drawn by the negative voltage at Q1 emitter, and they become ON again to perform muting.

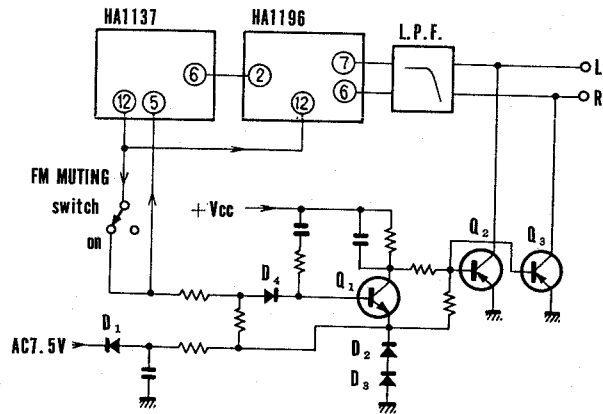


Fig. 5

5.3 EQUALIZER AMPLIFIER

The equalizer amplifier circuit is illustrated in Fig. 6. This circuit possesses excellent stability, employing a twin plus and minus power supply, and combined PNP and NPN transistors. In terms of DC current, the Fig. 6 circuit becomes as shown in Fig. 7.

Q1 emitter is connected to Q3 collector through R_n to effectively perform DC feedback (R_c serves as Q1 emitter resistance). The base voltage of Q1 is determined only by R_b voltage drop from the base current. This design results in very excellent circuit stability.

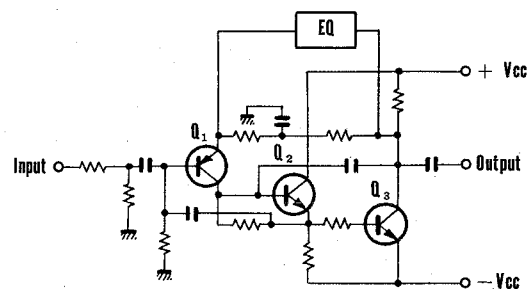


Fig. 6

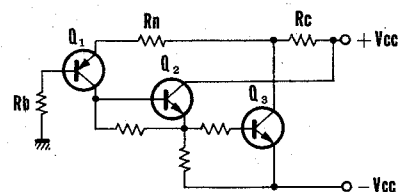


Fig. 7

Metal film resistors with tolerance no more than 1% and polystyrene film capacitors with tolerance no more than 2% are used in the equalizer elements. Deviation with respect to the RIAA playback standard is within $\pm 0.2\text{dB}$. As a result of the +28V and -19V power supplies, the overload input level at 0.1% distortion is 200mV (rms at 1kHz).

When a plug is inserted in the MIC jack and the function switch set to PHONO 2/MIC, the input signal from the MIC jack passes through a circuit which possesses corresponding response to the RIAA recording curve characteristic and is applied to the equalizer amplifier. The equalizer amplifier output response thus becomes flat with respect to an input from the MIC jack. Inserting a plug in the MIC jack breaks the PHONO 2 jack circuits.

5.4 TONE AMPLIFIER

Tone Control Circuit

The SX-850 employs an NFB type tone control circuit. The signals are amplified to adequate level in the 2-stage direct coupled amplifier which is composed of an FET and transistor. The one transistor amplifier is inserted in the next stage and C-B feedback is applied. The selectivity of frequencies of C-B feedback provides tone adjustment. The basic circuit of this stage is shown in Fig. 8.

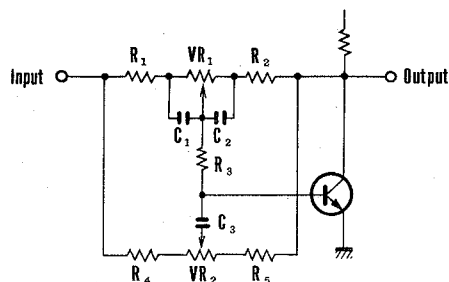


Fig. 8

1. Midrange Operation

C1 and C2 reactance is considerably smaller than VR1 at frequencies above midrange, effectively shorting VR1. At frequencies below midrange C3 reactance becomes large and in effect, open. Consequently, the circuit becomes as shown in Fig. 9 with respect to the midrange. In this figure, the circuit constant is not varied at any position of VR1 and VR2 sliders. The NFB amount is therefore fixed and the circuit gain is also fixed without regard to VR1 and VR2 slider positions.

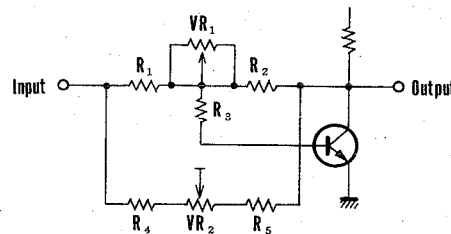


Fig. 9

2. Low Frequency Operation

The reactance of C1 and C2 increases to form a circuit as shown in Fig. 10. This reactance increases to the degree the frequency declines and the NFB amount varies greatly according to VR1 slider position. The circuit gain at low frequencies can therefore be varied by VR1. Capacitance of C1 and C2 is changed by the BASS TURNOVER switch (by adding a capacitor to each in parallel). This allows selection of the frequency at which VR1 begins to take effect.

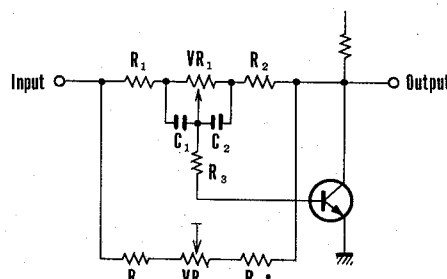


Fig. 10

3. High Frequency Operation

The considerably smaller reactance of C1 and C2 in comparison with VR1 effectively shorts VR1 to form a circuit such as shown in Fig. 11. C3 reactance decreases to the degree that the frequency increases and the NFB amount becomes largely varied according to VR2 slider position. Consequently, the gain at high frequencies can be varied by VR2. C3 capacitance is changed by the TREBLE TURNOVER switch (by adding another capacitor in series) to provide selection of the frequency at which VR2 begins to take effect.

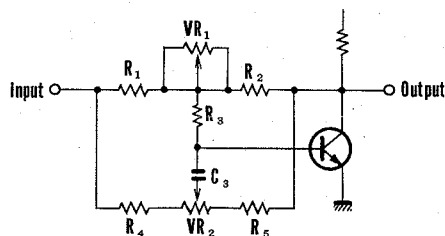


Fig. 11

Tone Defeat Circuit

By setting the TONE switch to OFF, the above described tone control circuit becomes bypassed.

Filter Circuits

Both low and high filters possess CR 1-stage -6dB/octave attenuation characteristics.

5.5 POWER AMPLIFIER

The SX-850 power amplifier employs all stage direct-coupled pure complementary circuit. It is an OCL circuit with balanced positive and negative power supply and center point DC potential kept at 0V (Fig. 12).

The first stage (Q1 and Q2) composes a differential amplifier designed for both signal amplification and stabilization of the center point potential. The predriver (Q3) is a class A amplifier. By providing a constant-current load (R7-R9, Q4, D2), the collector current can be designed for reducing noise figure (NF). A large gain can be obtained since the AC load can also be large.

The next stage (Q5 and Q6) composes a complementary circuit and employs a Darlington connection with the final stage. The final stage is a parallel SEPP circuit. D3 and VR2 provide bias after the driver stage.

Negative feedback is applied from the output stage center point to Q2 base. The AC NFB is determined by the dividing ratio between R10 and R11. Since C3 is open with respect to DC, 100% DC NFB is applied by R10-R12. Circuit DC gain becomes 0dB and the circuit is stable. However, as Q1 base potential variation becomes the center point potential variation, a bias stabilizing circuit (R1-R6, D1, VR1) is provided at Q1 base.

5.6 PROTECTION CIRCUIT

This circuit protects the power transistors in case of overload, the speakers in case of power amplifier malfunction, and also performs a muting function when the power supply is operated ON-OFF. The protection circuit is composed of three sections (Fig. 13).

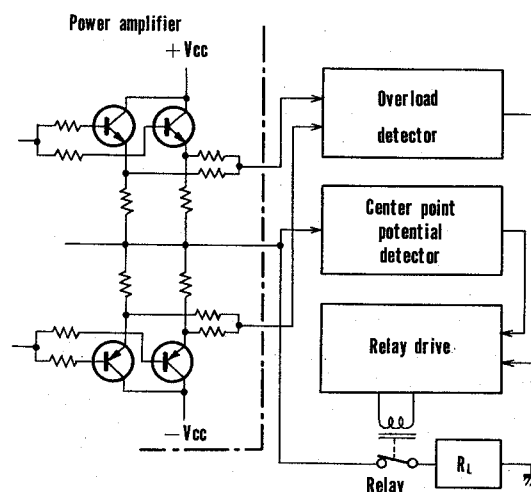


Fig. 13

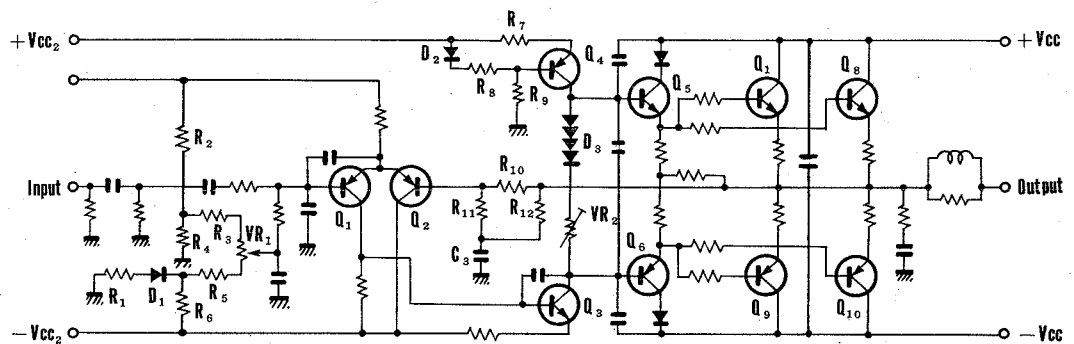


Fig. 12

Relay Drive Circuit (Fig. 14)

The relay which connects the output circuits is driven by this circuit. It also performs a muting function to prevent unpleasant noise during ON-OFF operation of the power supply and cuts the output circuit by command from the detector circuit.

1. Muting Operation

When the power supply is set from OFF to ON, Q6 base is reverse biased through D6 and R19-R21, turning Q6 OFF. Q7 base potential rises with C4 charging through R22 & R23, Q7 becomes ON several seconds later. The collector current of Q7 then flows through the relay coil, operating the relay to turn on the power amplifier output circuit. The reverse bias of Q6 base from D6 & R19-R21 disappears when the power supply is set from ON to OFF. Q6 remains ON due to residual power supply voltage. C4 very rapidly discharges, Q7 base potential drops and Q7 becomes OFF. The relay releases and the power amplifier output circuit becomes OFF.

Note:

Q5 is normally OFF due to base bias and does not participate in the muting operation.

2. Operation by Detector Circuit Command

Command from the detector circuits pass through one of D3, D4 or D5 and are applied in the form of a current flow. Q5 is normally reverse biased through R14, but when a large current flows through one of these diodes, Q5 base potential declines according to the voltage drop at R14. Q5 then becomes ON, Q6 base potential rises and Q6 becomes ON. C4 rapidly discharges and Q7 base potential drops, turning Q7 OFF. The relay releases and the power amplifier output circuit becomes cut off.

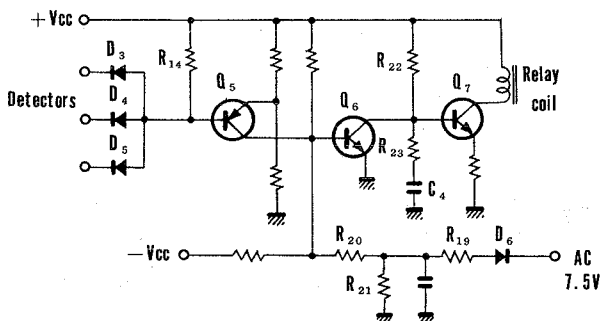


Fig. 14

Overload Detector Circuit

Shorting of the power amplifier load or a load impedance below the specified value causes a command to be sent to the relay drive circuit. This operating principle is shown in Fig. 15.

With the output stage in class B operation, when Qa is operating in the positive half cycle, Qb becomes cut off and the signal current flows as indicated by the solid arrows in Fig. 15. Point D potential at this time is the point A potential divided by R1 and R3. Also, point C potential is the point A potential divided by RE1 and RL (load). Point D is connected to Q1 base and point C to Q1 emitter through R2 and RE2. When RL is extremely small, the point C potential becomes considerably lower than point D. This potential difference forward biases Q1. Q1 becomes ON and current flows in D3.

Qb operates in the negative half cycle and Qa becomes cut off. The signal flows as indicated by the broken line arrows in the center of Fig. 15. Q1 is biased by the potential difference between point C and point E. If RL is extremely small, the point C potential becomes considerably higher than that of point E. Q1 becomes ON and current flows in D3.

If large current flows in Qa and Qb, Q1 becomes ON by RE1 and RE2 voltage drop, and current flows in D3. C1 prevents faulty operation due to external noise.

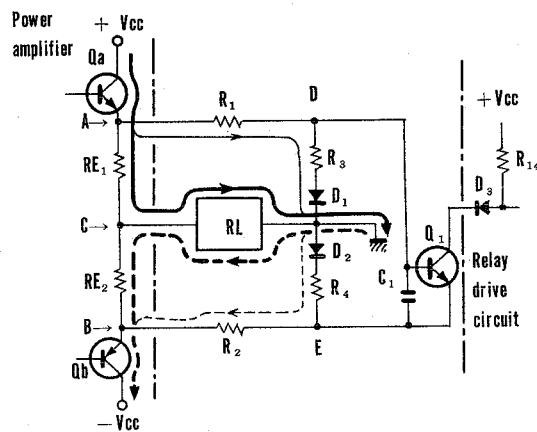


Fig. 15

Center Point Potential Detector Circuit

If DC potential is produced at the junction point of the power amplifier, the command is sent to the relay drive circuit. Fig. 16 shows this operating principle.

Q3 and Q4 compose a differential amplifier. When the same input is applied to both input terminals (Q3 and Q4 bases), output is absent. However, if there is a difference between the terminal inputs, the difference is amplified and becomes the output between the two collectors. During normal operation, an AC signal only is present at the junction point. As C2 reactance is sufficiently low, the same signal is applied to Q3 and Q4 bases, resulting in an absence of output at the collector sides.

When a DC potential is produced at the junction point, it becomes the input of Q3 only. If the voltage is negative, Q3 collector current declines. And at Q4 the collector current increases and the potential drops, causing current to flow through D4.

If the DC voltage is positive, Q3 collector current increases and the potential drops, while at Q4 the collector current decreases and potential rises. Current therefore flows through D5.

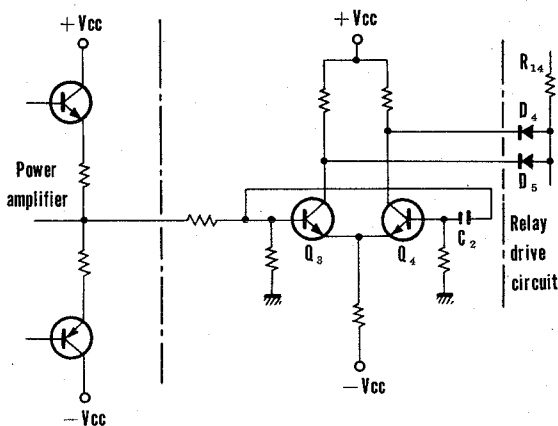
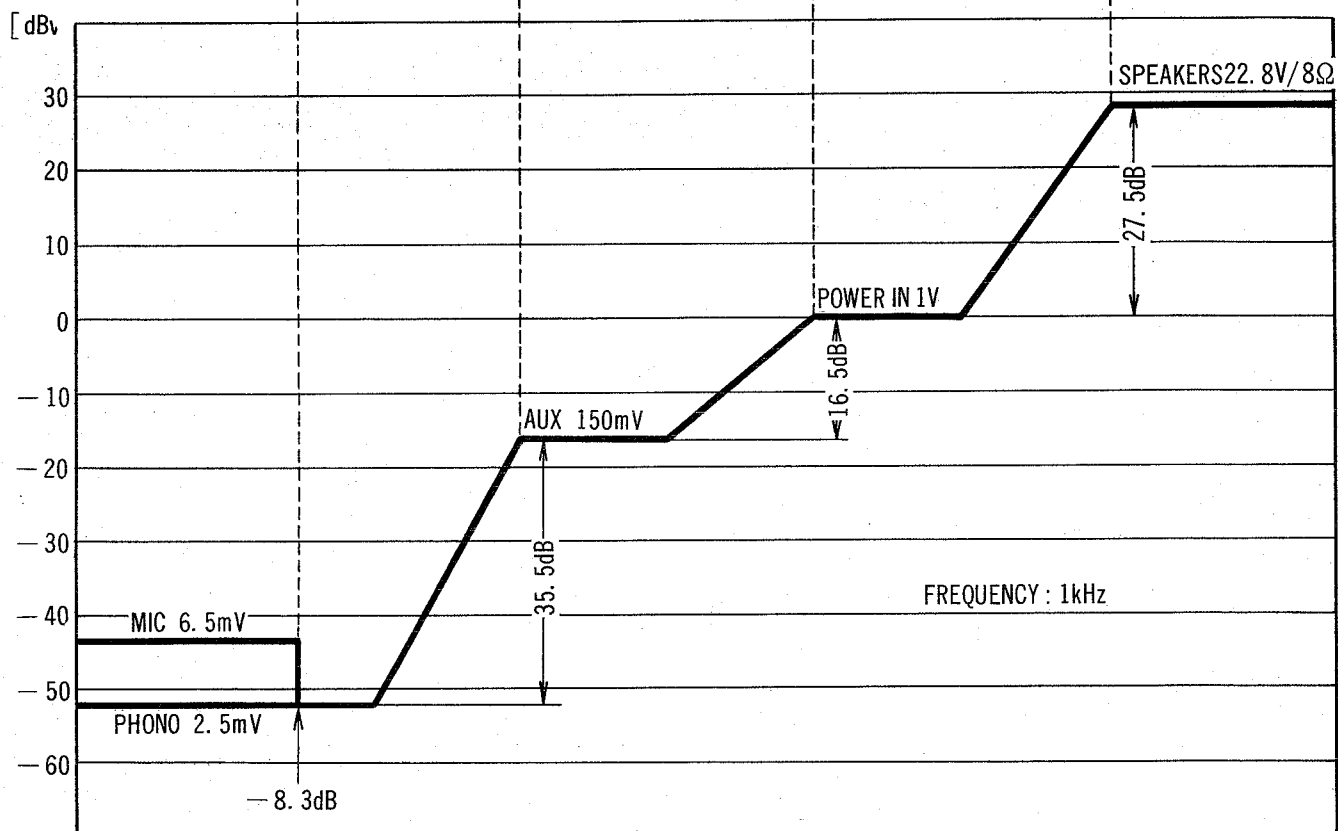
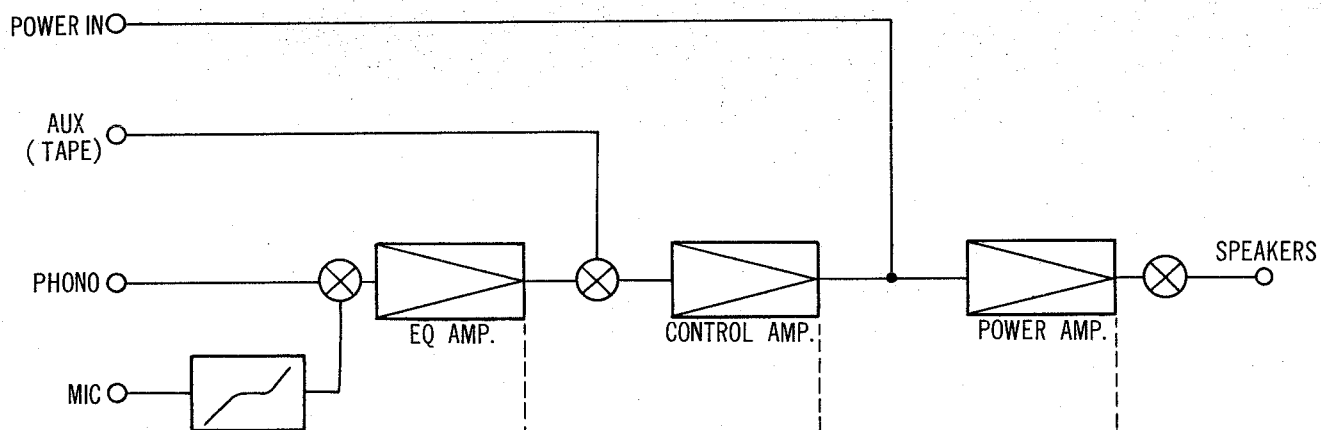


Fig. 16

5.7 POWER SUPPLY

Regulated power supplies are employed for all stages prior to the power amplifier predriver. Power supply for the stages following the power amplifier driver comes from a bridge rectifier and two 15,000 μ F electrolytic capacitors. Position lamps are lighted by DC from a regulated power supply for stable illumination.

6. LEVEL DIAGRAM



7. DISASSEMBLY

Removing the Wooden Cover

Remove the two screws (A) on each side of the wooden cover.

Removing the Bottom Plate

Remove the eleven screws (B) to detach the bottom plate.

Removing the Front Panel

1. Loosen the setscrew of TUNING knob with a hexagonal wrench.
2. Remove all the knob by pulling.
3. Remove the two screws (C) from the top edge of the front panel.
4. Remove the three nuts (D) from the tone and volume control shafts.

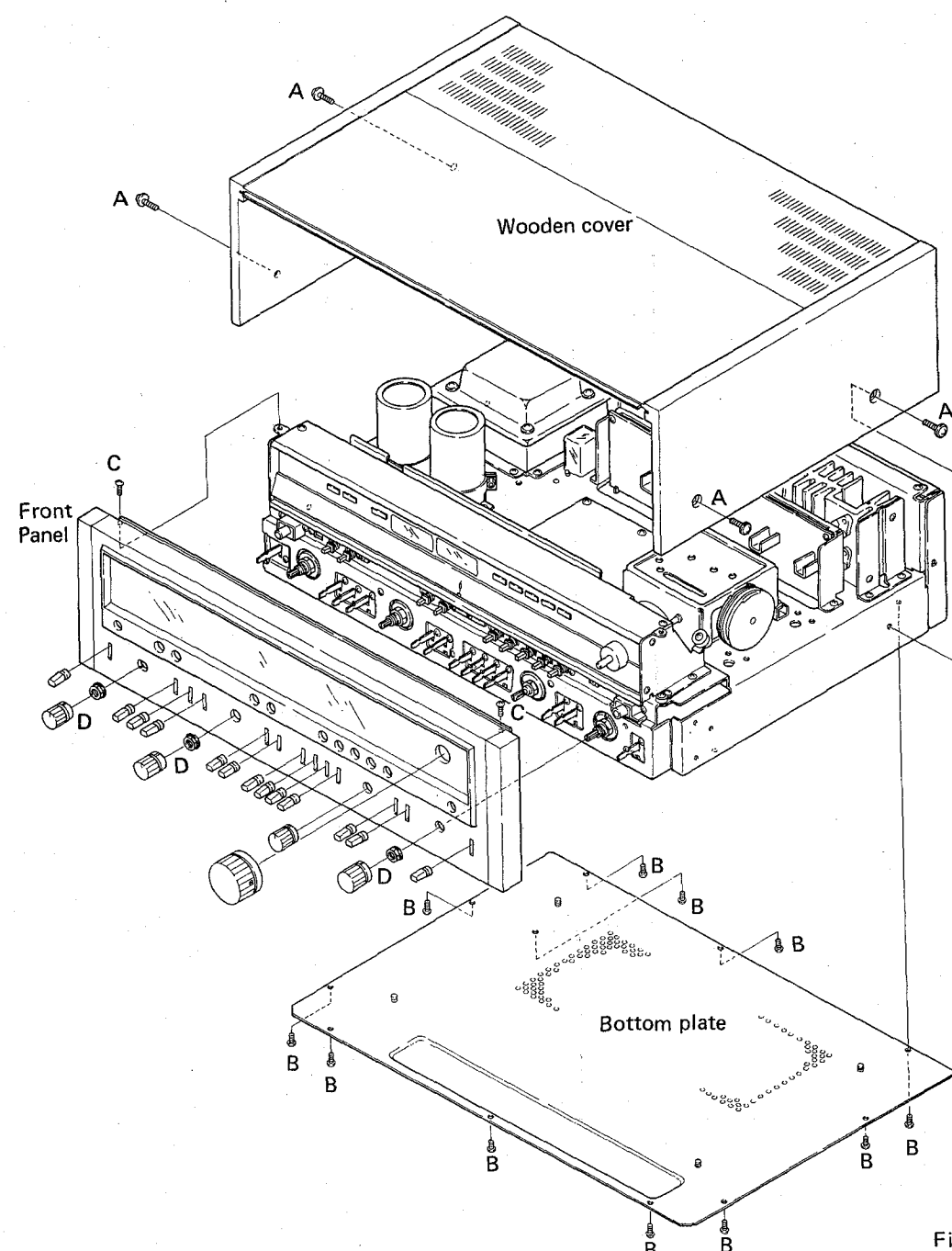


Fig. 17

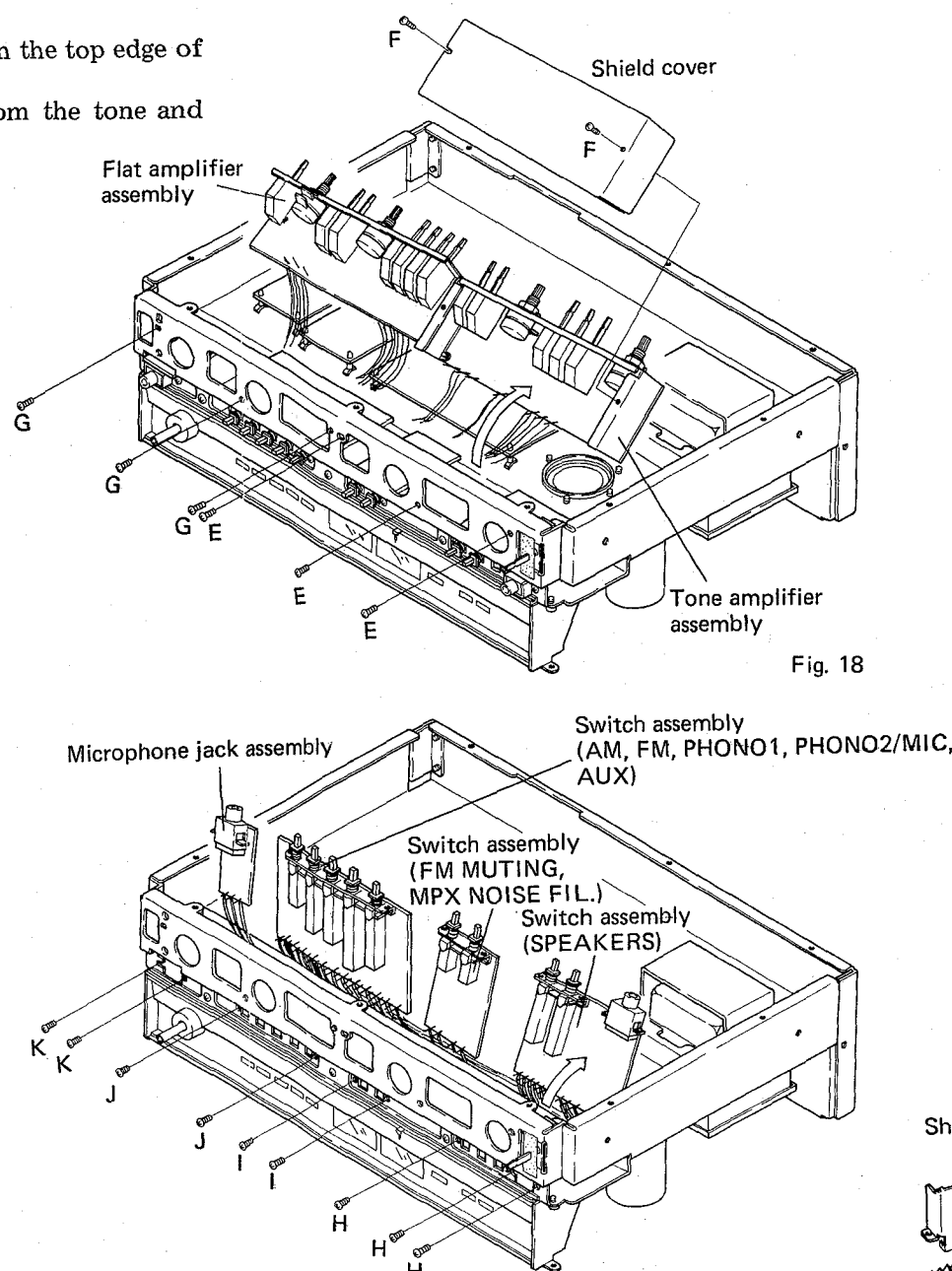


Fig. 19

Removing the Tone Amplifier Assembly

1. Unscrew the three screws (E) of the chassis. Remove the tone amplifier assembly.
2. Remove the two screws (F) to detach the shield cover. After this has been done tone amplifier can be checked.

Removing the Flat Amplifier Assembly

1. Unscrew the three screws (G) of the chassis.
2. Remove the flat amplifier assembly. After this has been done flat amplifier can be checked.

Removing the Switch Assembly (SPEAKERS)

Unscrew the three screws (H) of the chassis.

Removing the Switch Assembly (FM MUTING, MPX NOISE FILTER)

Unscrew the two screws (I) of the chassis.

Removing the Switch Assembly (AM, FM, PHONO 1, PHONO 2/MIC, AUX)

Unscrew the two screws (J) of the chassis.

Removing the Microphone Jack Assembly

Unscrew the two screws (K) of the chassis.

Removing the Power Amplifier Assembly

1. Unscrew the six screws (L) which mount the heat sink and the shield plate on the chassis.
2. Unscrew the three screws (M) at the upper part of the power amplifier assembly.
3. This allows the heat sink to be turned forward. Remove the shield plate.
4. After this has been done the power amplifier can be checked.

NOTE:

Before turning the power on, take particular care that the heat sink and power amplifier assembly are not contacting any other parts of amplifier.

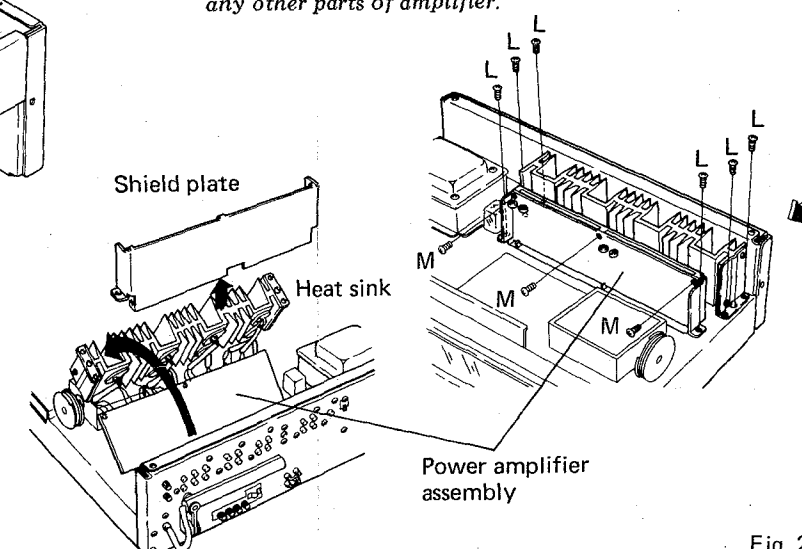
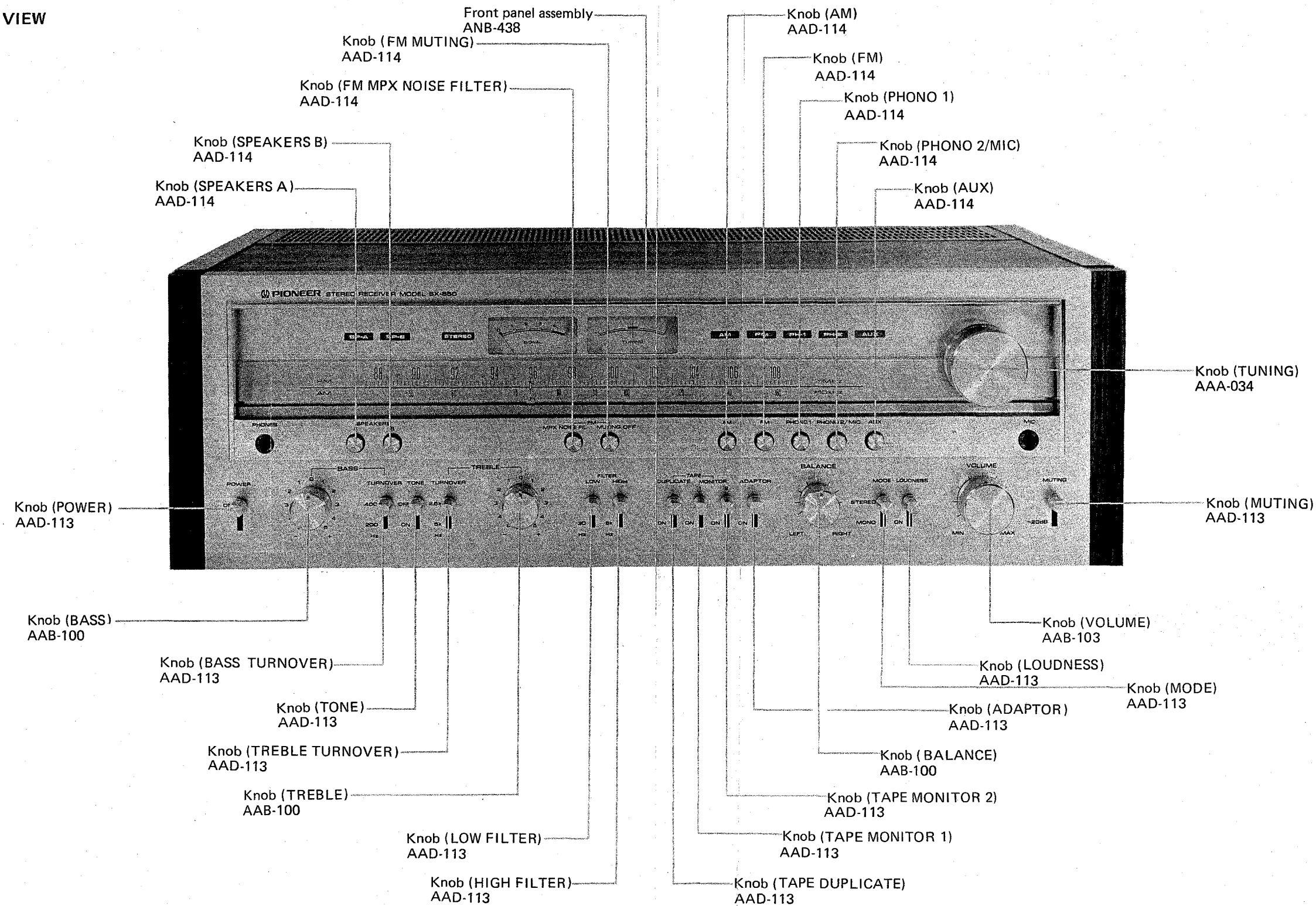


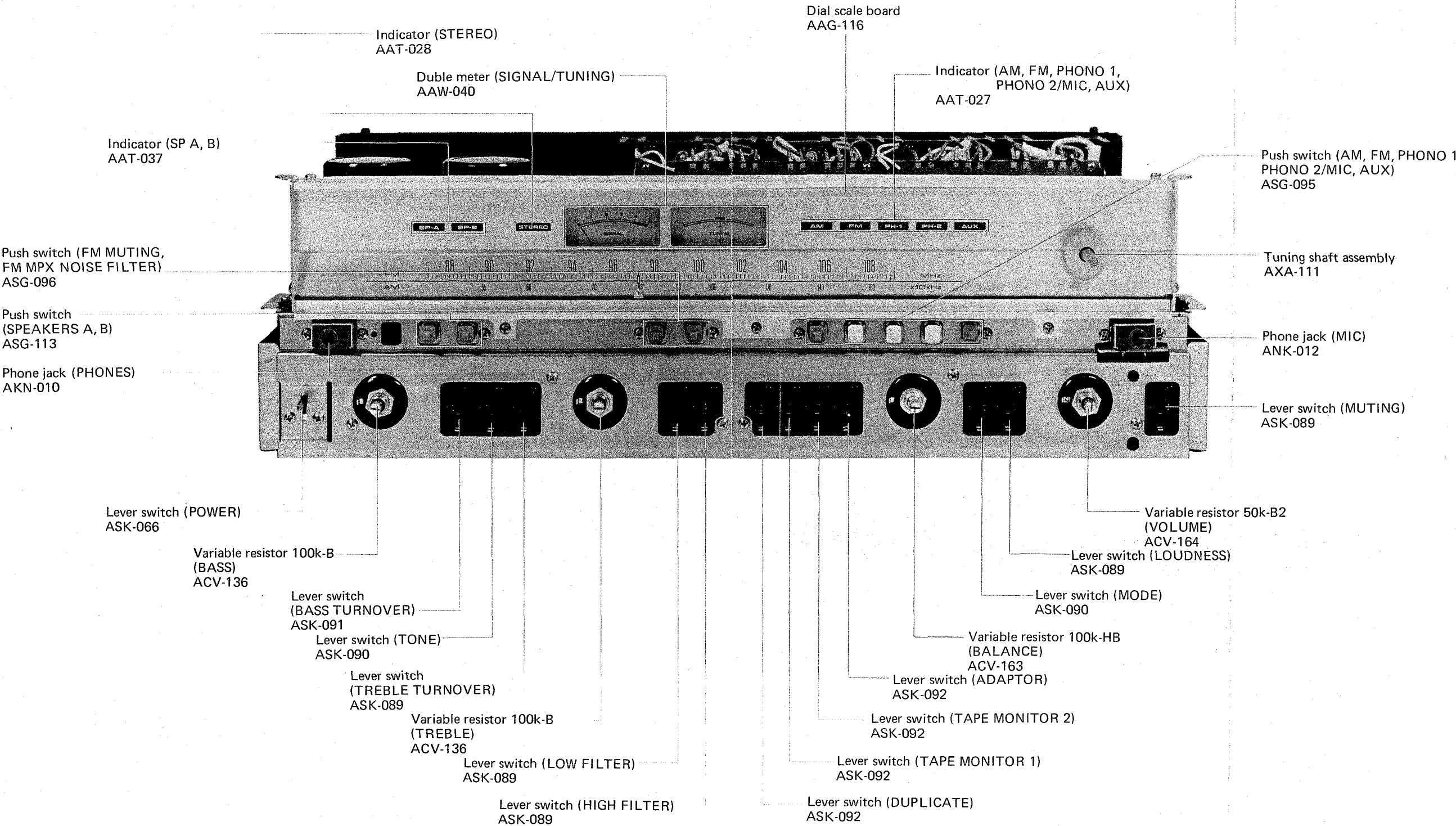
Fig. 20

8. PART LOCATIONS

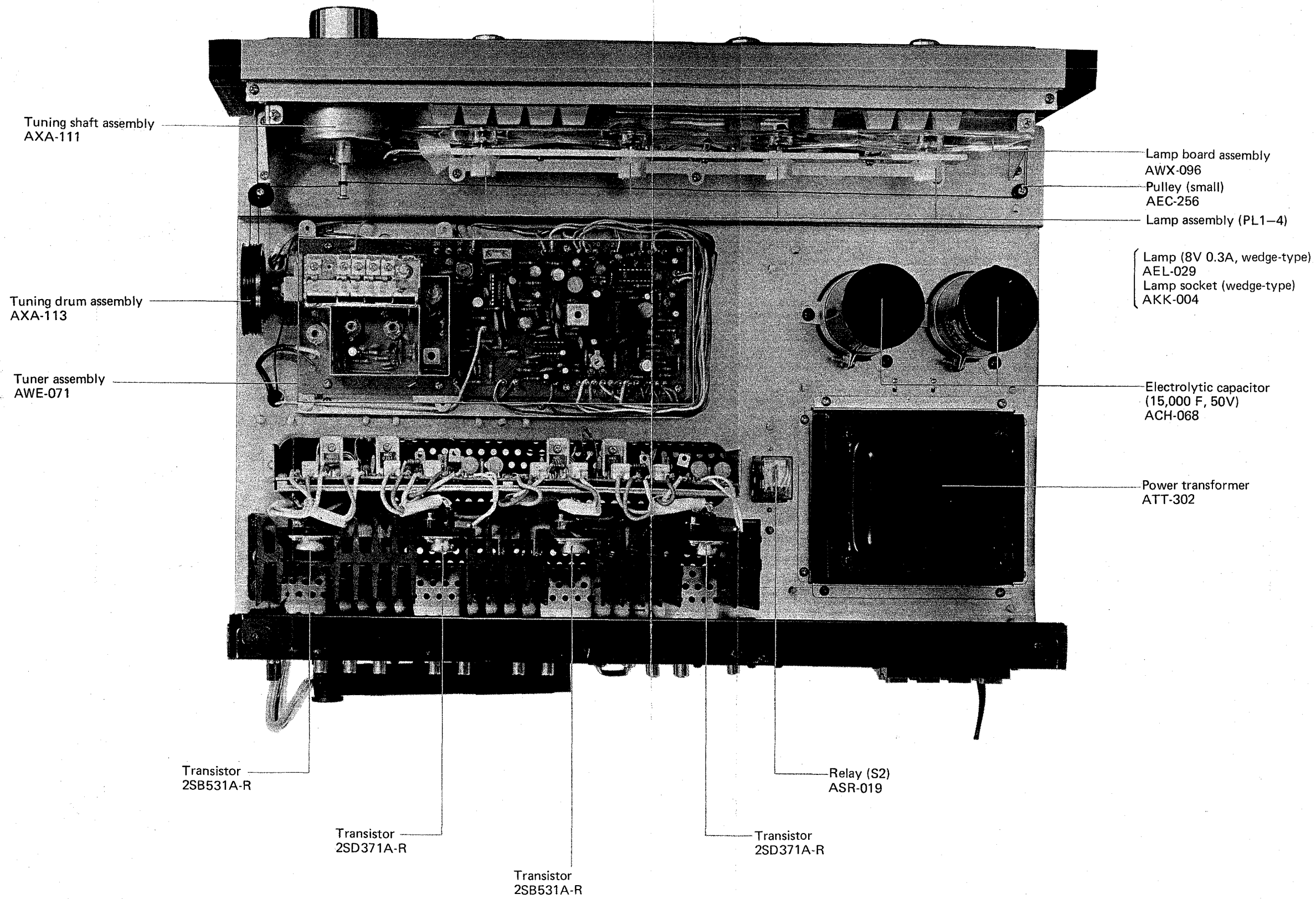
8.1 FRONT PANEL VIEW



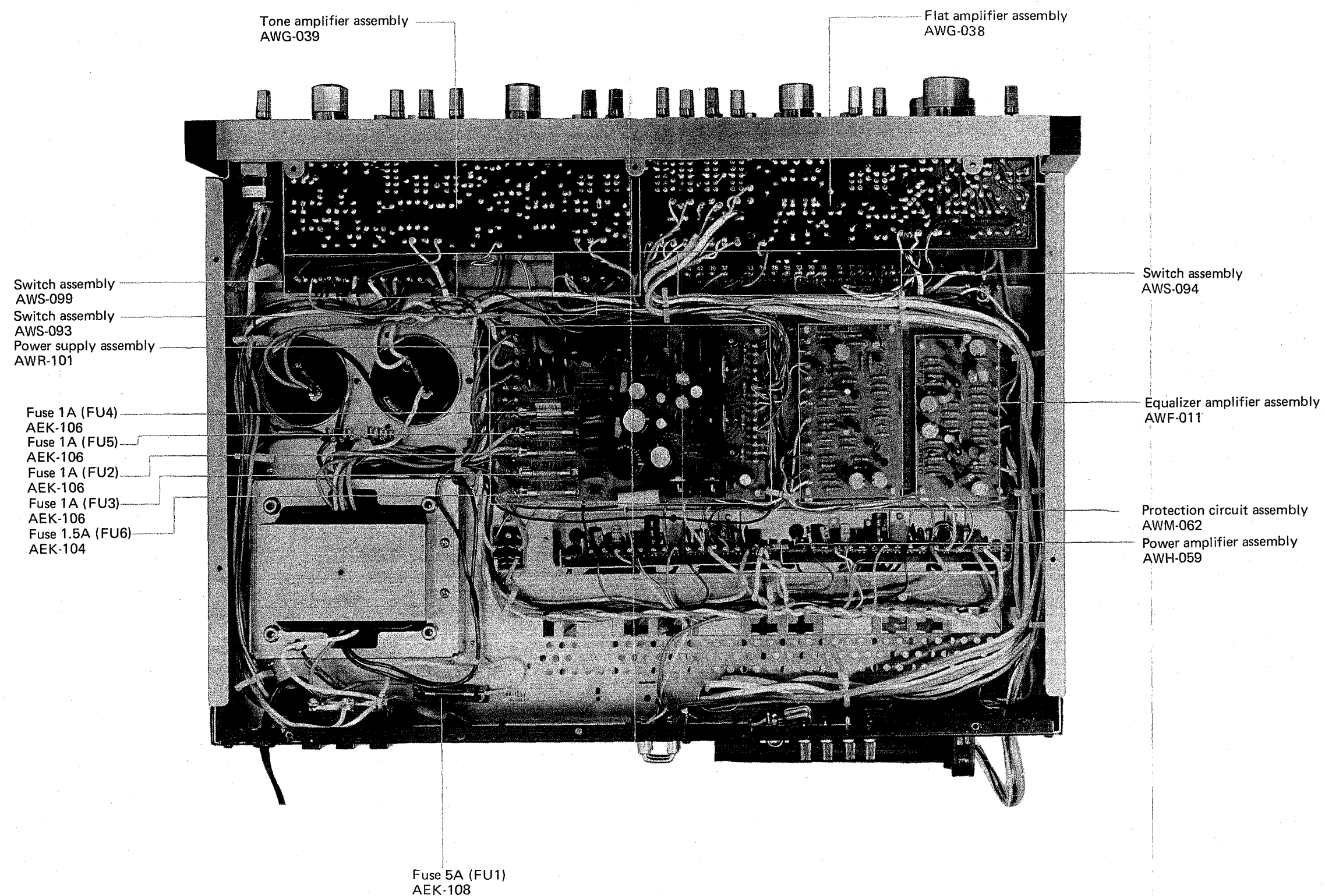
8.2 FRONT VIEW WITH PANEL REMOVED



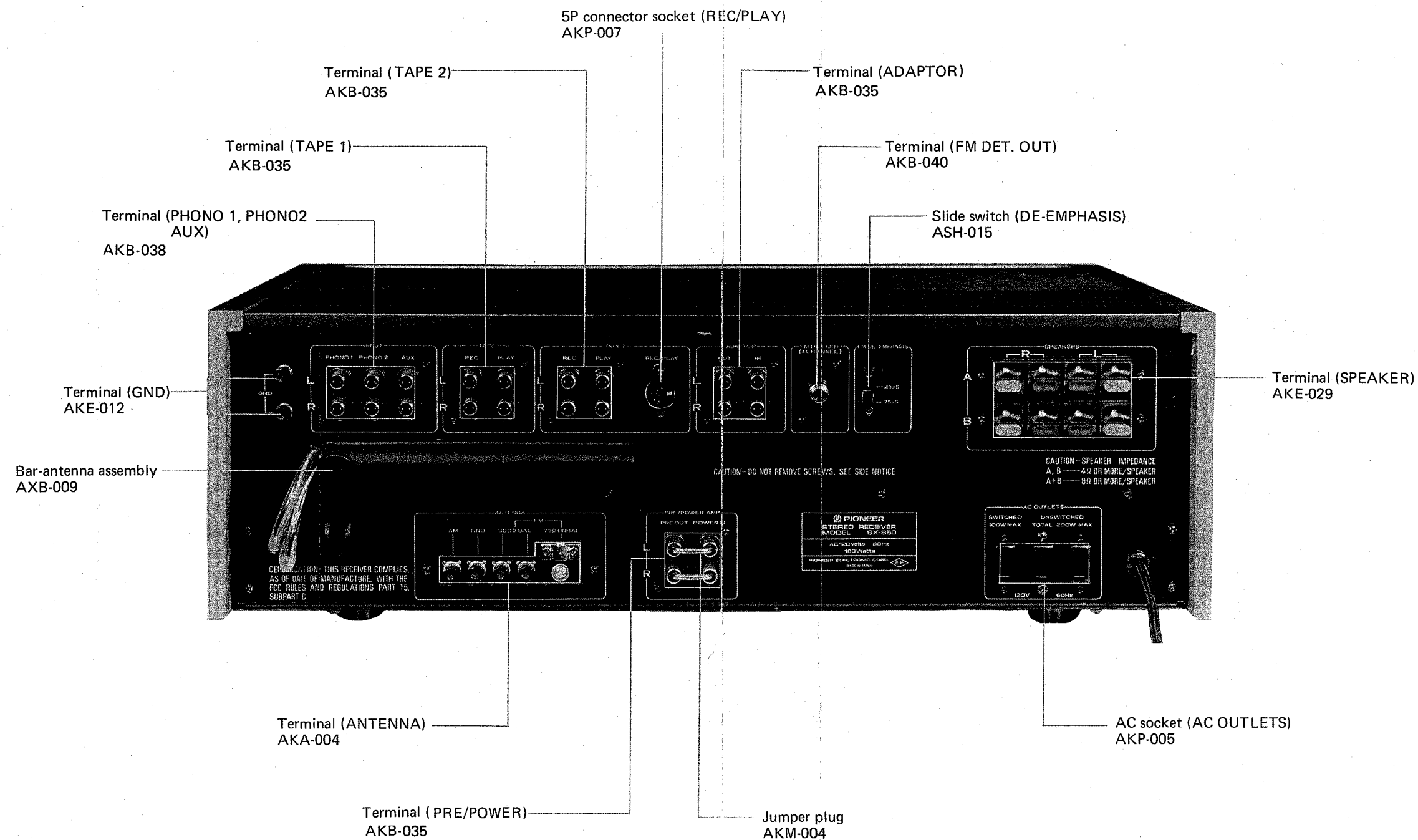
8.3 TOP VIEW



8.4 BOTTOM VIEW



31



9. DIAL CORD STRINGING

1. Remove the wooden cover and the front panel.
2. Remove the three screws to detach the blind sash (Fig. 21).
3. Turn tuning drum fully clockwise (as viewed from X direction in Fig. 22).
4. Tie one end of cord to stud on inner section of tuning drum (more easily performed by loosening setscrew and temporarily removing tuning drum from shaft).
5. Route cord through tuning drum cutout, make a half turn around the drum, then route in sequence to pulley A—dial pointer—pulley B—pulley C.
6. Wind cord 3 turns clockwise (as viewed from rear panel) around tuning shaft, then route to pulley D.
7. Wind cord two turns around tuning drum and tie to spring hook so that tension is applied to the cord.
8. Turn TUNING knob and confirm normal cord motion, then trim off excess cord.
9. With tuning drum at step 1 setting, restrain cord from moving and slip dial pointer on cord. Align it with the starting point (extreme left end of frequency scale).

Dial Pointer Installation Caution

Metal portion of dial pointer is plated. If this section is touched directly by hand or fingerprints and other impurities, contamination is difficult to remove from aventurine finish. As this is not desirable in terms of both appearance and anticorrosion, use extreme care not to touch the metal section when handling the dial pointer.

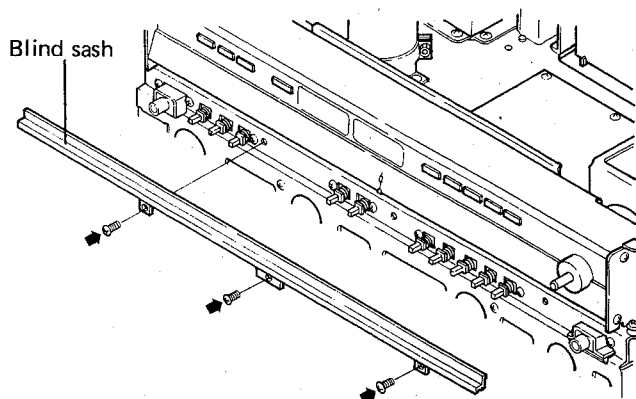


Fig. 21

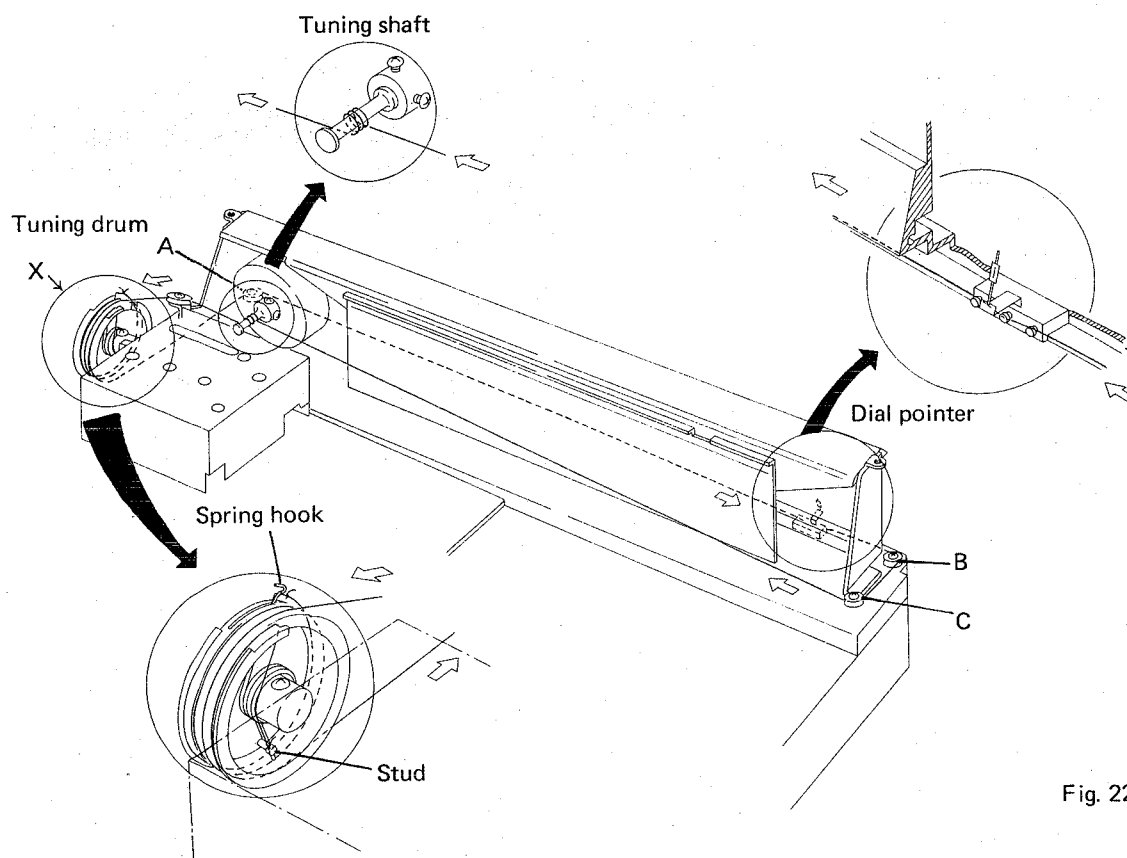


Fig. 22

10. ADJUSTMENTS

10.1 FM TUNER

FM Front End

1. Set function switch to FM.
2. Set FM MUTING switch to OFF.
3. Connect FM signal generator through 300-ohm dummy load to 300 ohm FM antenna terminals.
4. Set DUPLICATE switch to OFF and connect AC voltmeter to TAPE 2 REC jacks.
5. Set FM SG for 100dB output at 400Hz and 100% modulation.
6. Set SX-850 dial indication and FM SG frequency for 87.4MHz.
7. Adjust T4 core for maximum indication on SIGNAL meter.
8. Adjust T6 lower core for center of scale indication on TUNING meter.
9. Set FM SG for 8dB output and adjust cores of T1, T2, and T3 for maximum reading on AC voltmeter.
10. Set FM SG for 100dB output.
11. Set SX-850 dial indication and FM SG frequency for 106MHz.
12. Adjust TC4 for maximum indication on SIGNAL meter.
13. Set FM SG for 8dB output and adjust TC1, TC2 and TC3 for maximum reading on AC voltmeter.
14. Set FM SG for 100dB output.
15. Set SX-850 dial indication and FM SG frequency for 87.4MHz.
16. Adjust T4 core for maximum indication on SIGNAL meter.
17. Set FM SG for 8dB output and adjust cores of T1, T2 and T3 for maximum reading on AC voltmeter.
18. Repeat steps 10~17 to eliminate variations in AC voltmeter readings.
19. After completing above adjustments, adjust T5 core for maximum reading on AC voltmeter.
20. Detune SX-850 to where only noise is received and adjust T6 lower core for center of scale indication on TUNING meter.
21. Set FM SG for 98MHz 60dB output.
22. Tune SX-850 for exact center of scale indication on TUNING meter.
23. Adjust T6 upper core for minimum distortion.
24. Repeat steps 20~23 to eliminate variations in point of minimum distortion.
25. Set FM SG for 100dB output and adjust VR3 so that SIGNAL meter indicates 5 of the scale.

Multiplex Decoder

26. Connect MPX SG (multiplex signal generator) to the external modulator terminals of the FM SG and set the FM SG for external modulation.
27. Connect PILOT OUT terminal of MPX SG to horizontal input terminal of oscilloscope.
28. Through probe, connect oscilloscope vertical input terminal to terminal No. 19.
29. Set FM SG for 98MHz 60dB output unmodulated.
30. Tune SX-850 for exact center of scale indication on TUNING meter.
31. Adjust VR1 so that 4 : 1 frequency ratio Lissajous' (see note below) figure becomes stationary.
32. Set FM SG for 1kHz (L or R), ± 67.5 kHz deviation, 19kHz (pilot signal) and ± 7.5 kHz modulation.
33. Adjust VR2 for minimum L-R crosstalk.

Note:

Signal at terminal No. 19 is 76kHz sawtooth wave and MPX SG pilot out is a 19kHz sinewave. These form a Lissajous' figure as shown in Fig. 23.

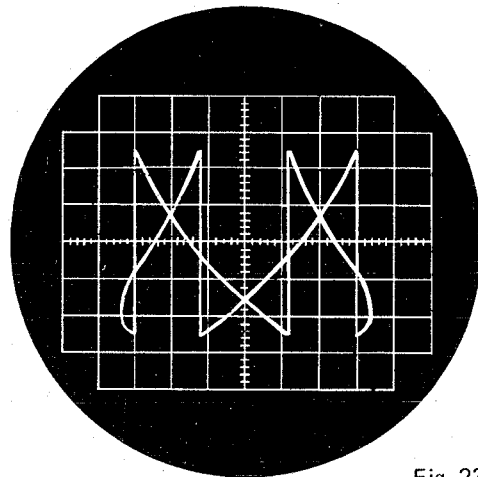


Fig. 23

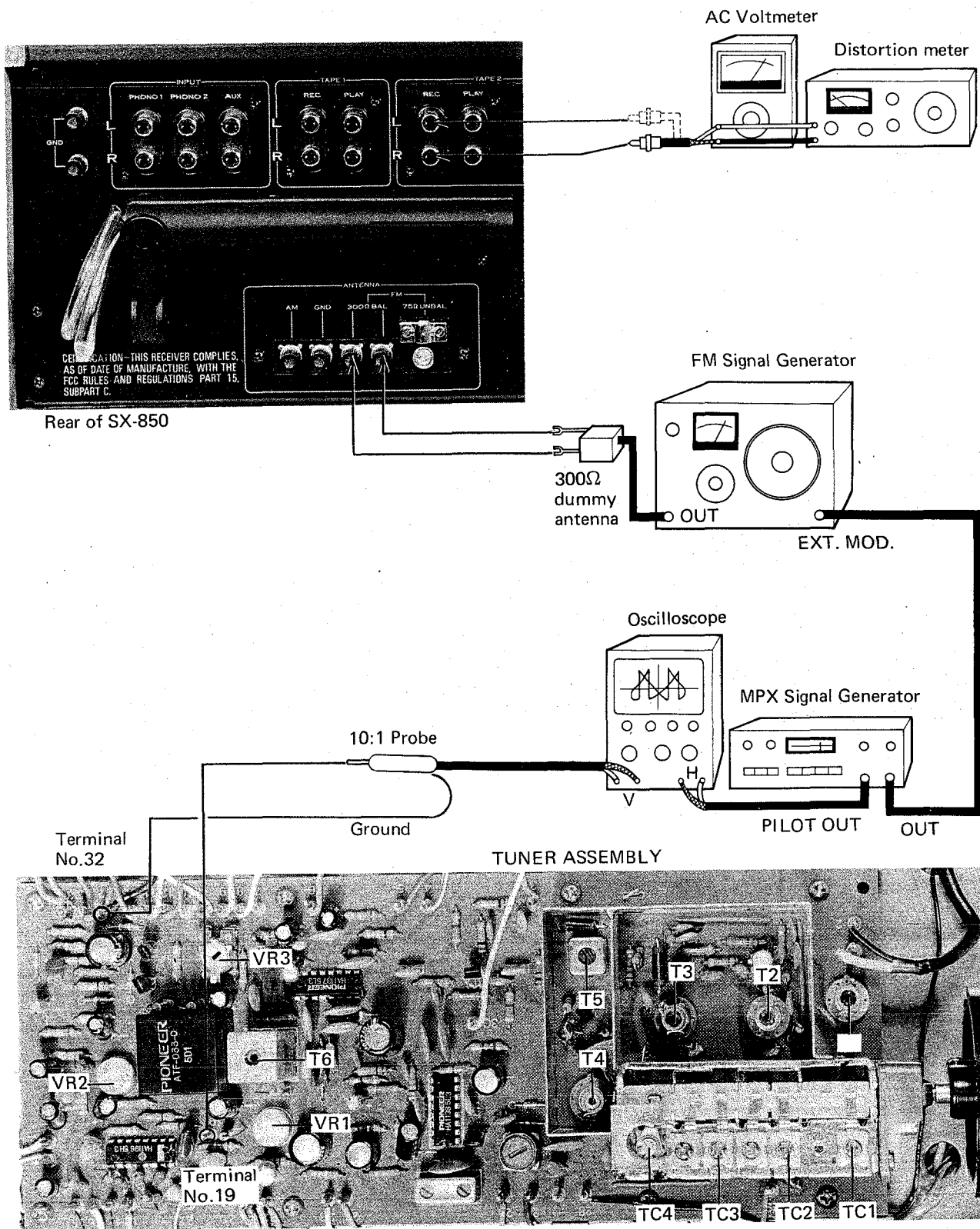
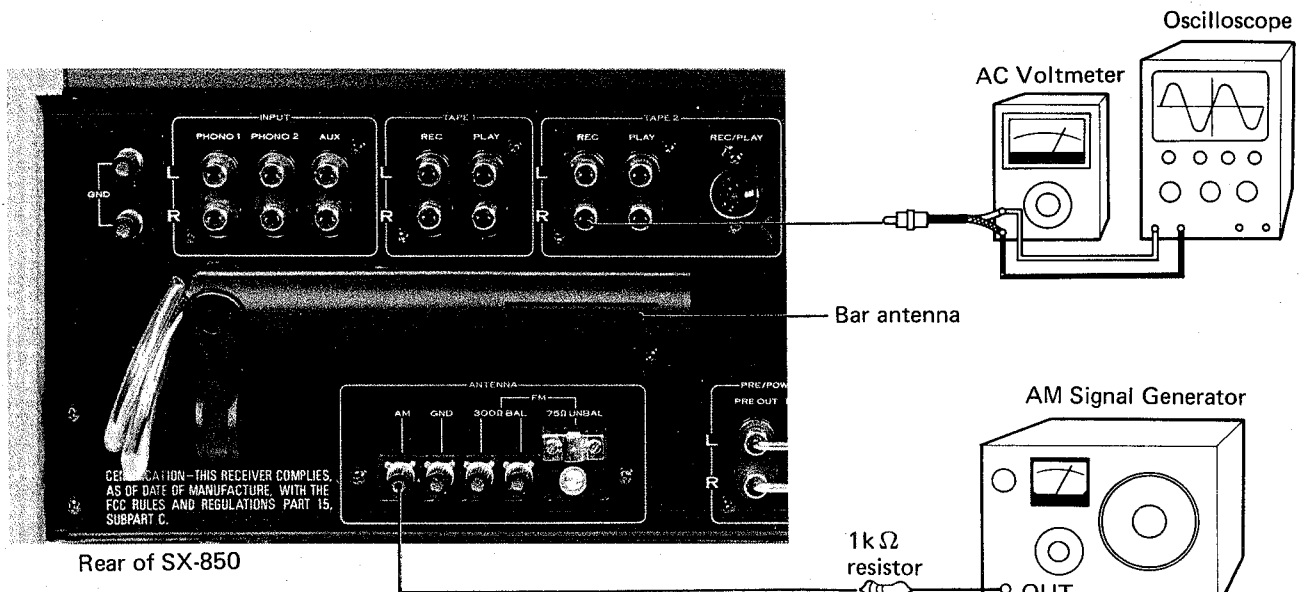


Fig. 24

10.2 AM TUNER

1. Set function switch to AM.
2. Connect AM signal generator through 1k-ohm resistor to AM antenna terminal.
3. Set DUPLICATE switch to OFF and connect an AC voltmeter to TAPE 2 REC jacks.
4. Set AM SG for 400Hz 30% modulation 100dB output.
5. Set SX-850 dial indication and AM SG frequency for 600kHz.
6. Adjust T7 core for maximum reading on AC voltmeter.
7. Set SX-850 dial indication and AM SG frequency for 1,400kHz.
8. Adjust TC5 for maximum reading on AC voltmeter.
9. Set AM SG for 30dB output.
10. Set SX-850 dial indication and AM SG frequency for 600kHz.
11. Adjust T7 and bar antenna core for maximum reading on AC voltmeter.
12. Set SX-850 dial indication and AM SG frequency for 1,400kHz.
13. Adjust TC5 and TC6 for maximum reading on AC voltmeter.
14. Repeat steps 10~13 to eliminate variations in AC voltmeter readings.



TUNER ASSEMBLY

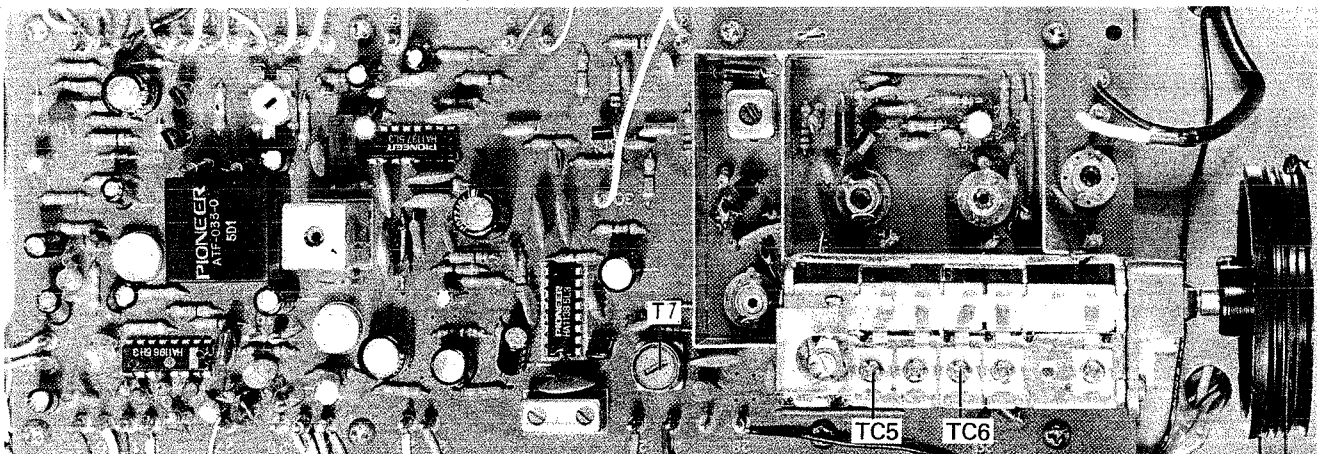


Fig. 25

10.3 POWER AMPLIFIER

1. Turn VR3 and VR4 fully counter-clockwise before turning on the power.
2. Remove jumper plugs connecting POWER IN and PRE OUT jacks.
3. Connect 5.1 k-ohm resistor to POWER IN jacks.
4. Set power amplifier for no load.
5. Set POWER switch to ON.
6. Adjust VR1 for 0V between terminals No. 10 and No. 9.
7. Adjust VR2 for 0V between terminals No. 25 and No. 24.
8. Adjust VR3 for 20mV between terminals No. 12(+) and No. 13(-).
9. Adjust VR4 for 20mV between terminals No. 27(+) and No. 28(-).
10. Allow set to warm up for at least 10 minutes, then readjust.

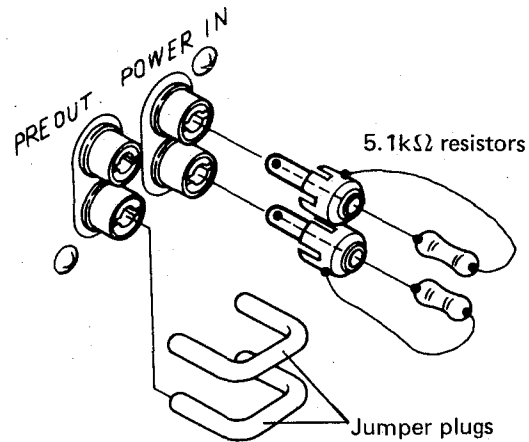
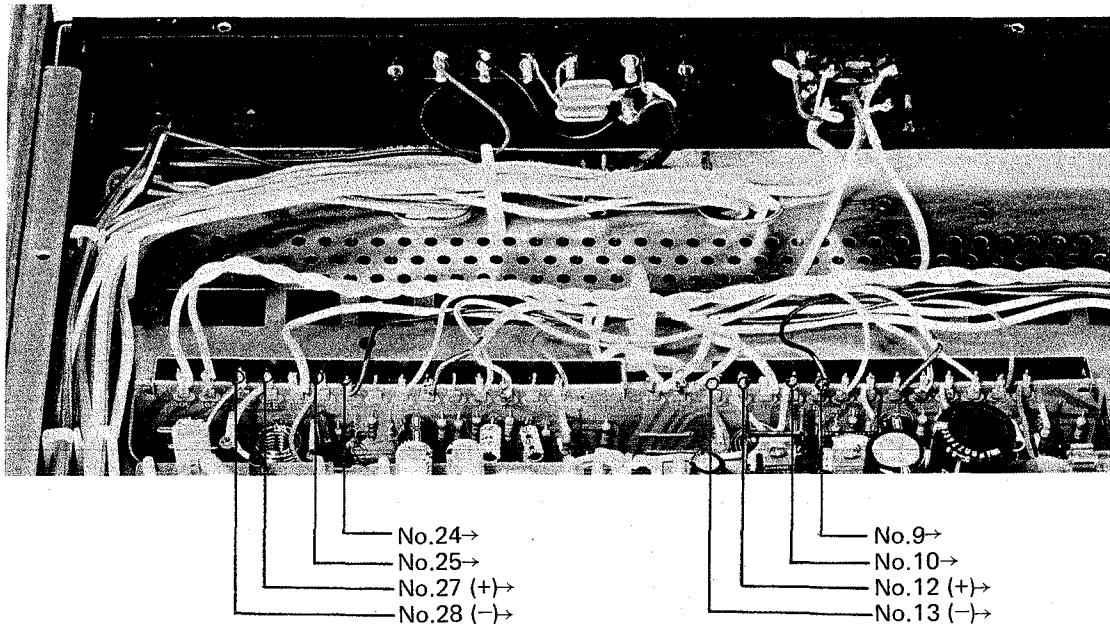
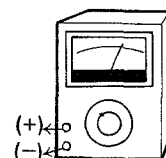


Fig. 26

Bottom View



DC Voltmeter



Top View

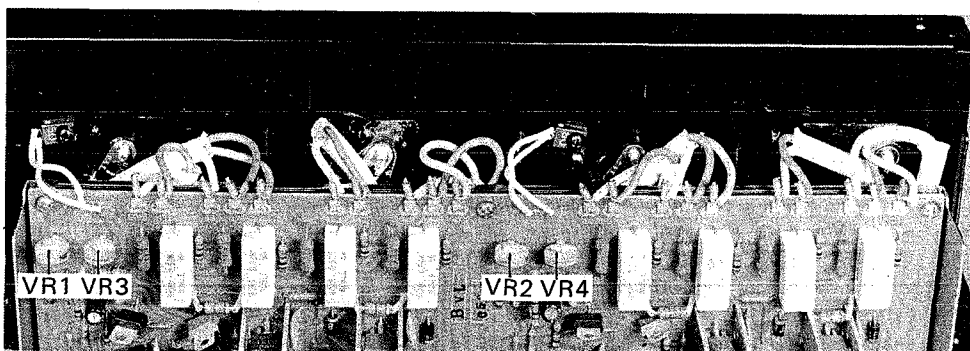


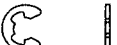
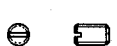
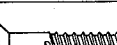
Fig. 27

11. EXPLODED VIEWS

NOMENCLATURE OF SCREWS, WASHERS AND NUTS

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	

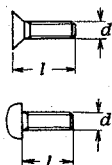
EXAMPLE

PM • 3x8

length in mm (l)

diameter in mm (d)

Symbol



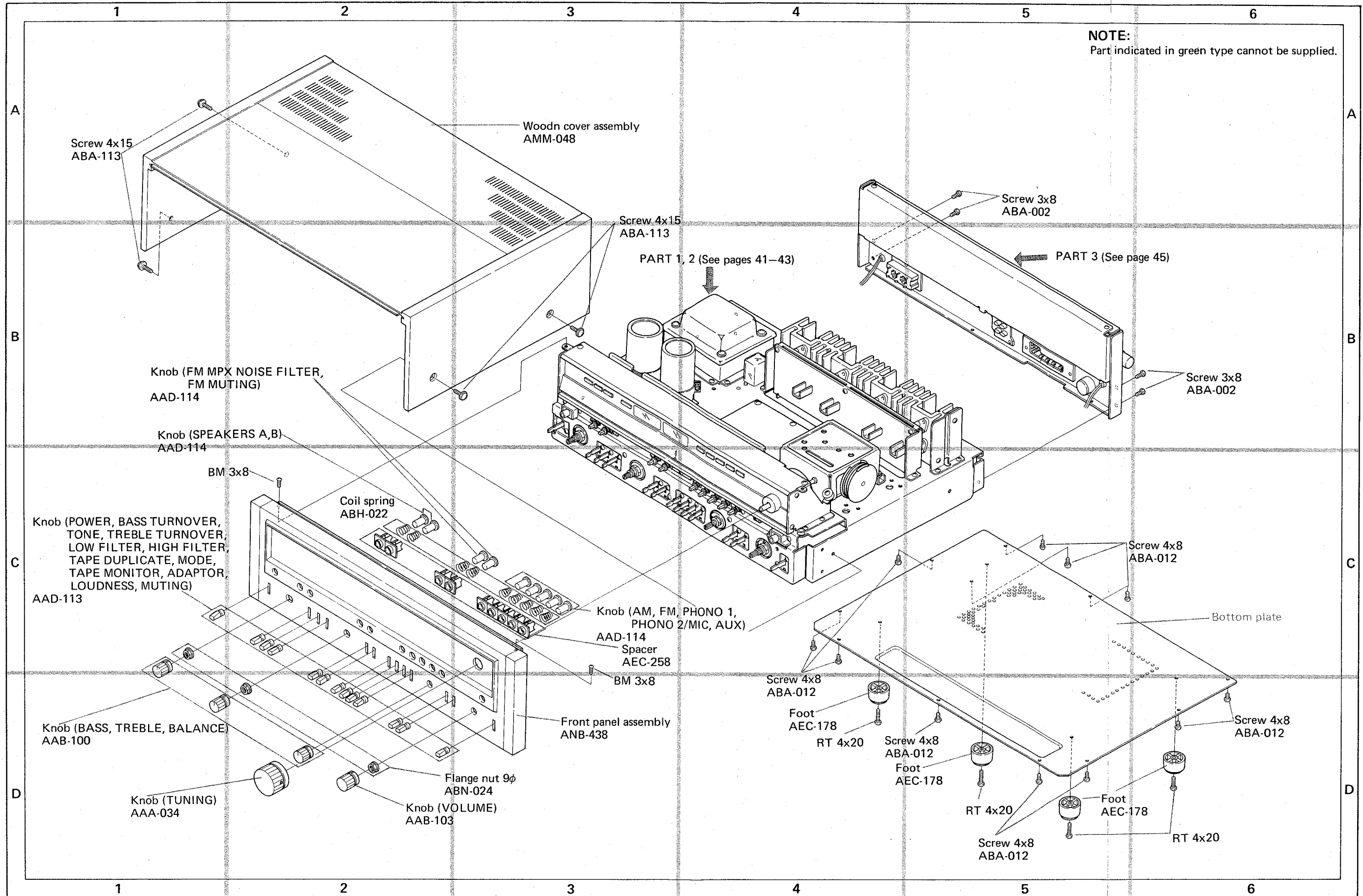
FW • 9φ x 1^t

thickness in mm (t)

diameter in mm (d)

Symbol

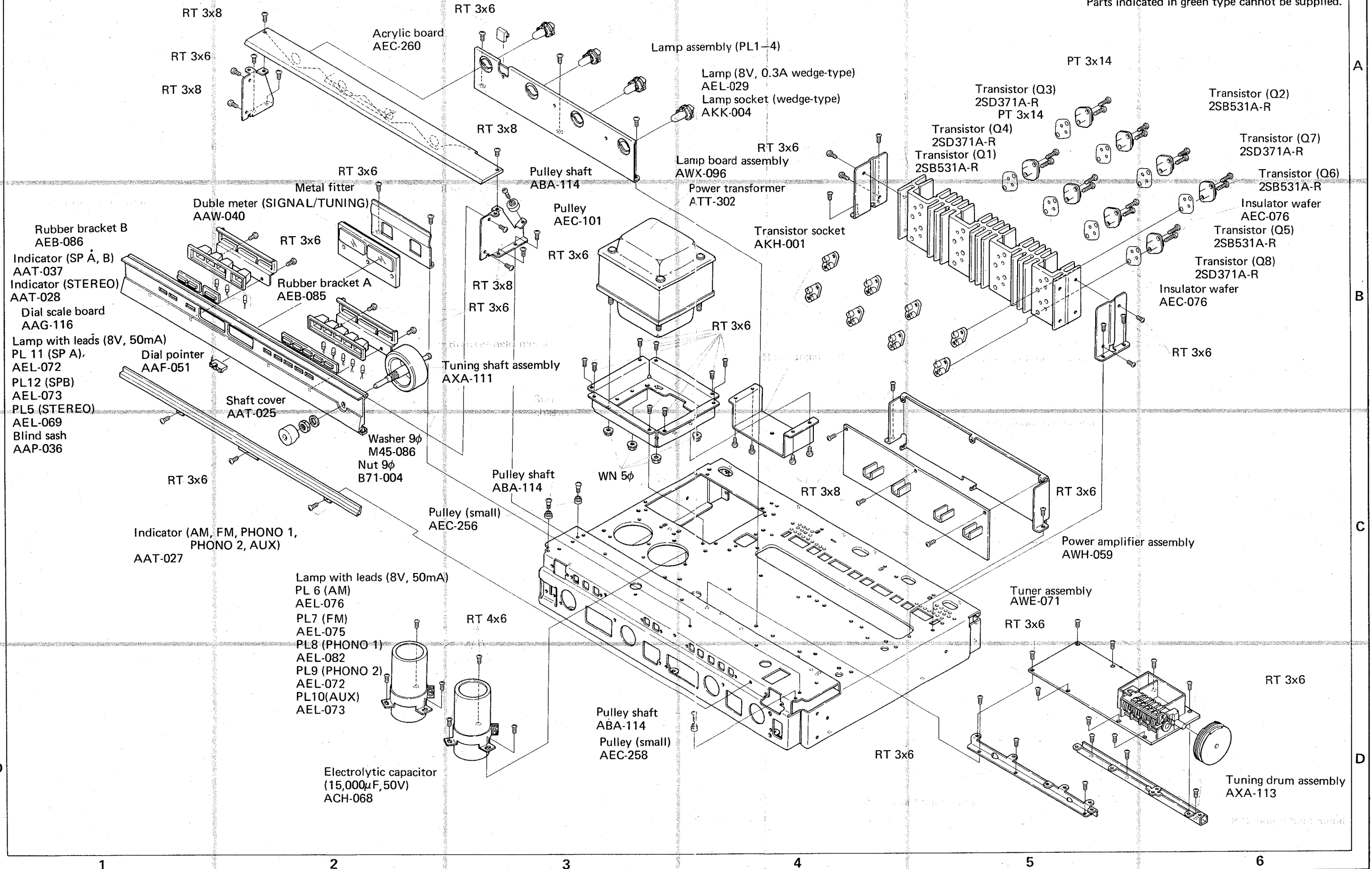




Part 1

NOTE:

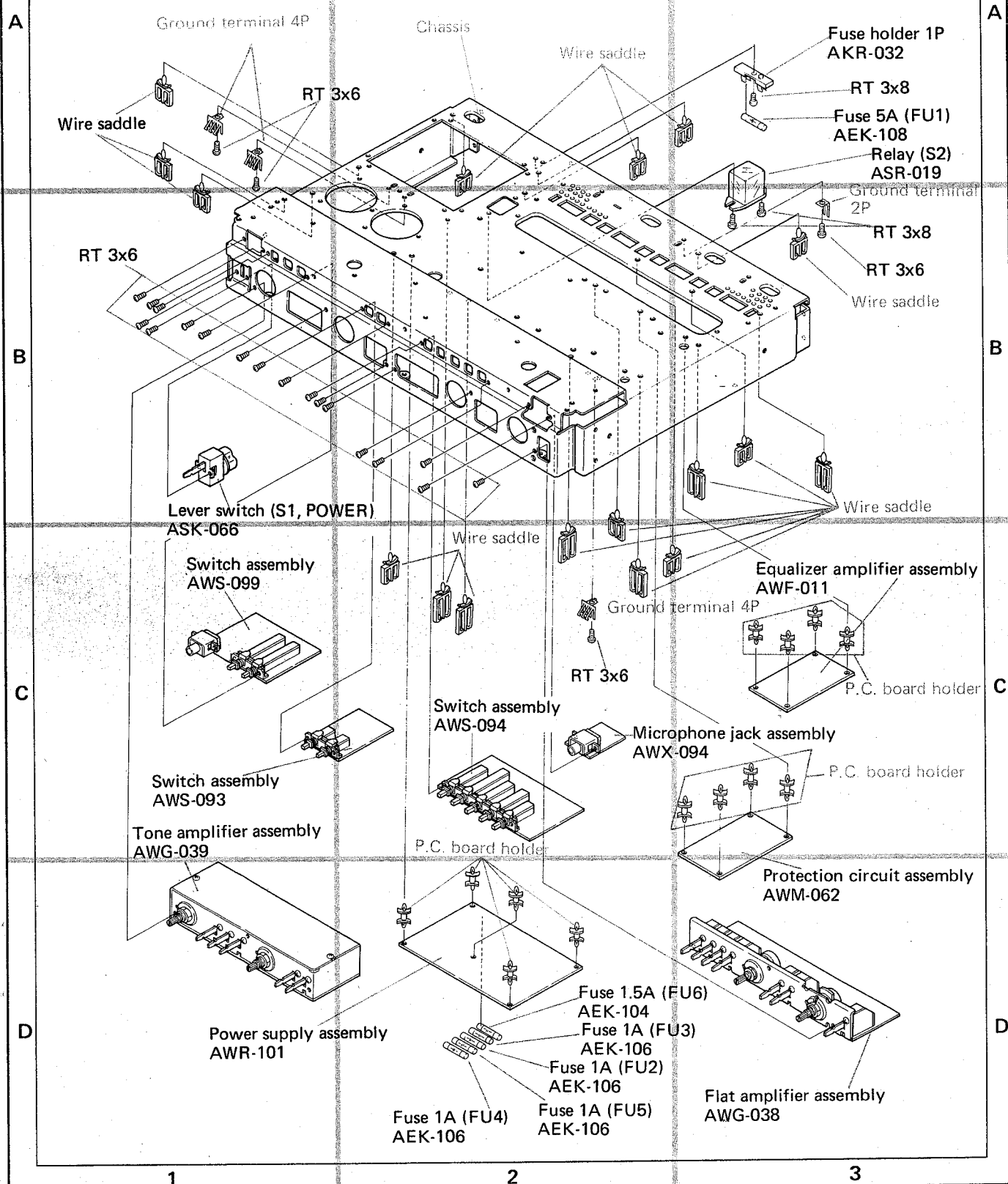
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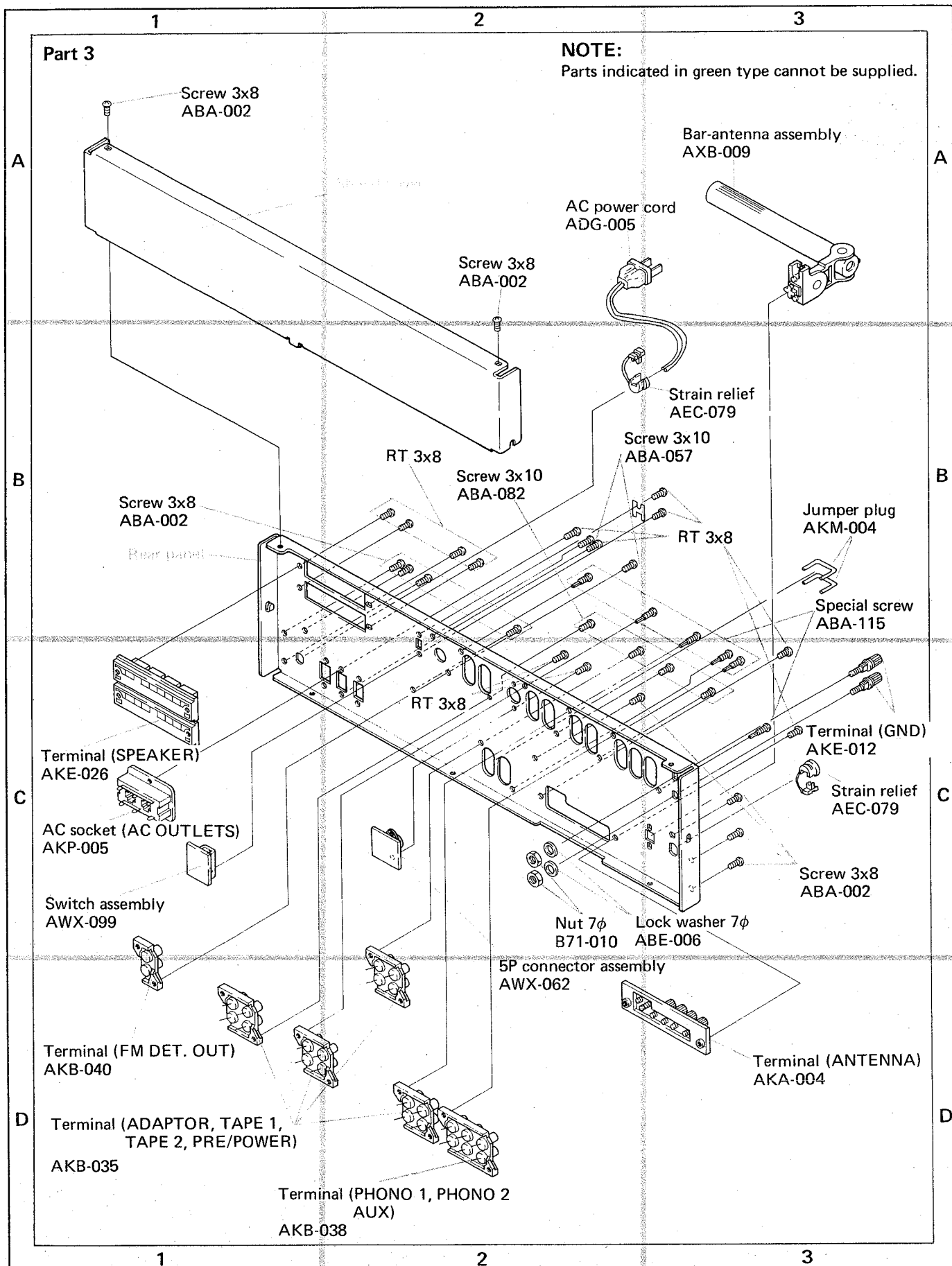


Part 2

NOTE:

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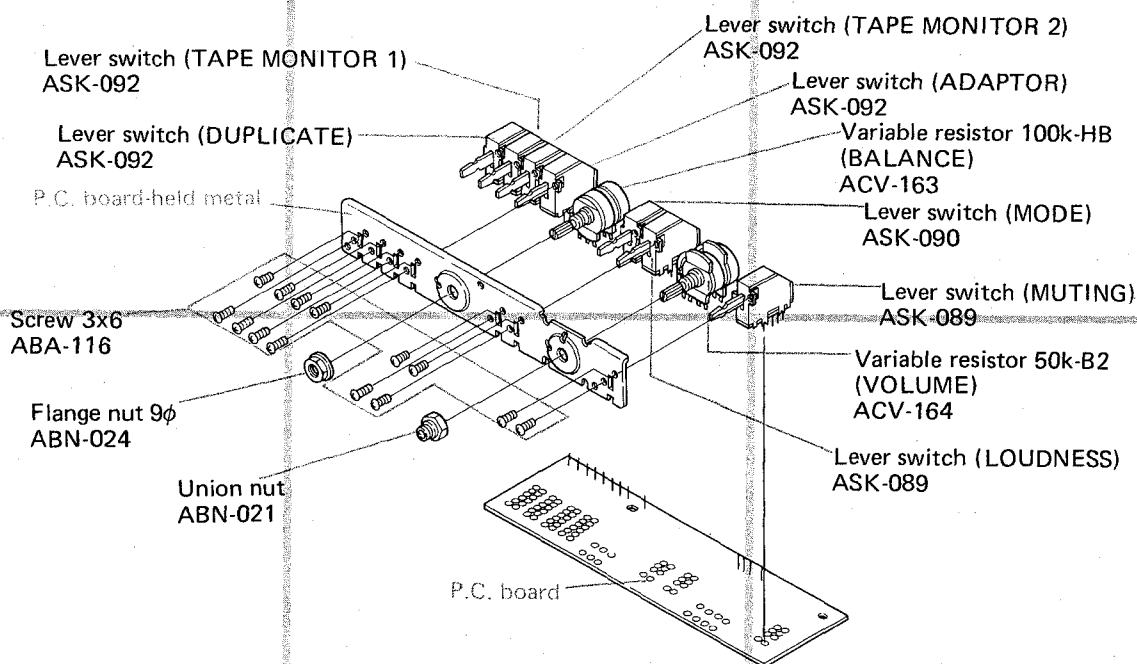




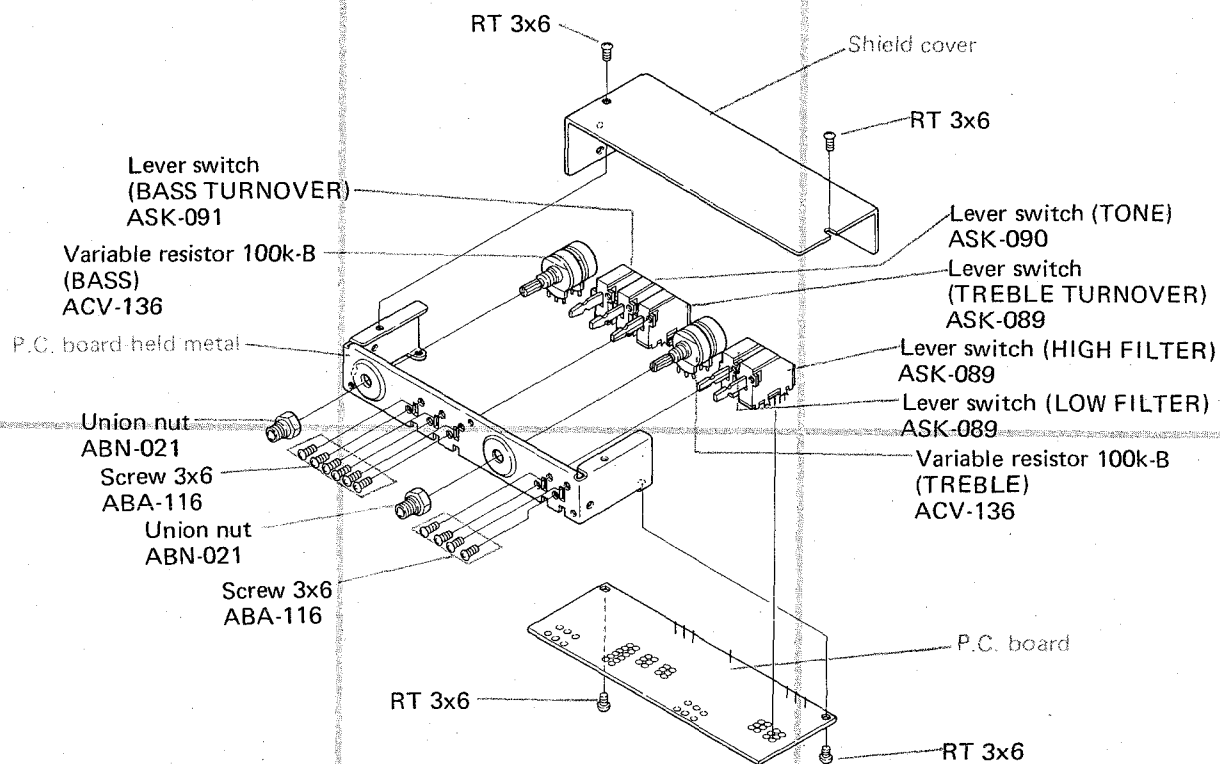
Flat Amplifier Assembly (AWG-038)

NOTE:

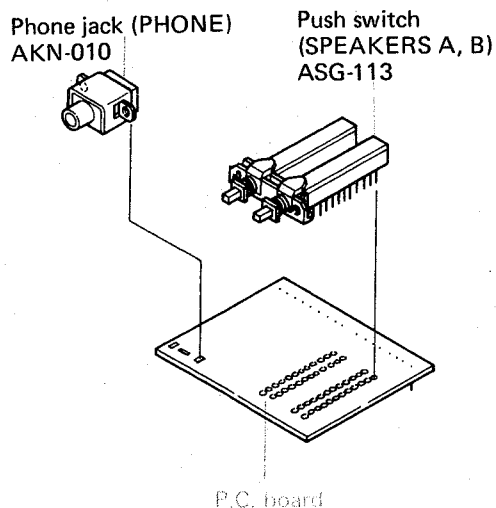
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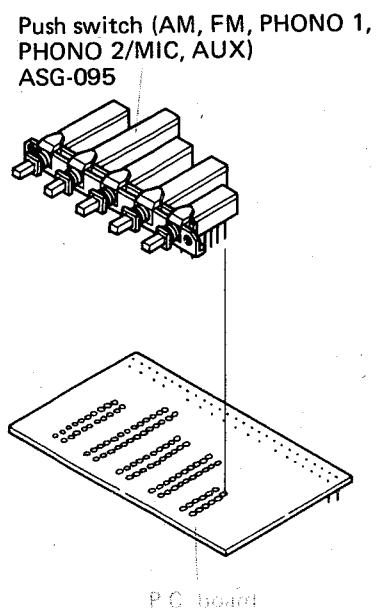
Tone Amplifier Assembly (AWG-039)



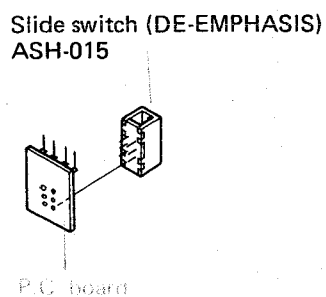
Switch Assembly (AWS-099)



Switch Assembly (AWS-094)



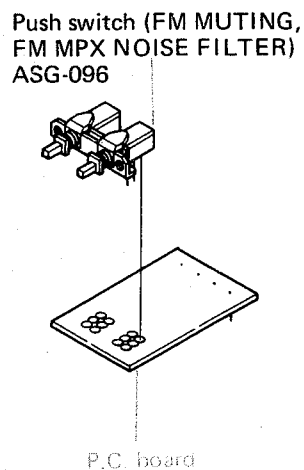
Switch Assembly (AWX-099)



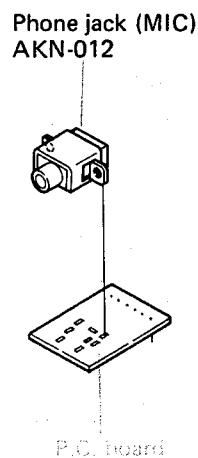
NOTE:

Parts indicated in green type cannot be supplied.

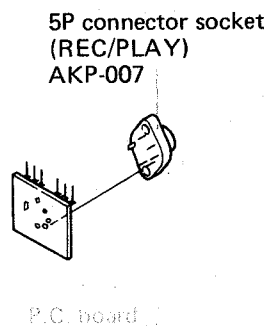
Switch Assembly (AWS-093)



Microphone Jack Assembly (AWX-094)

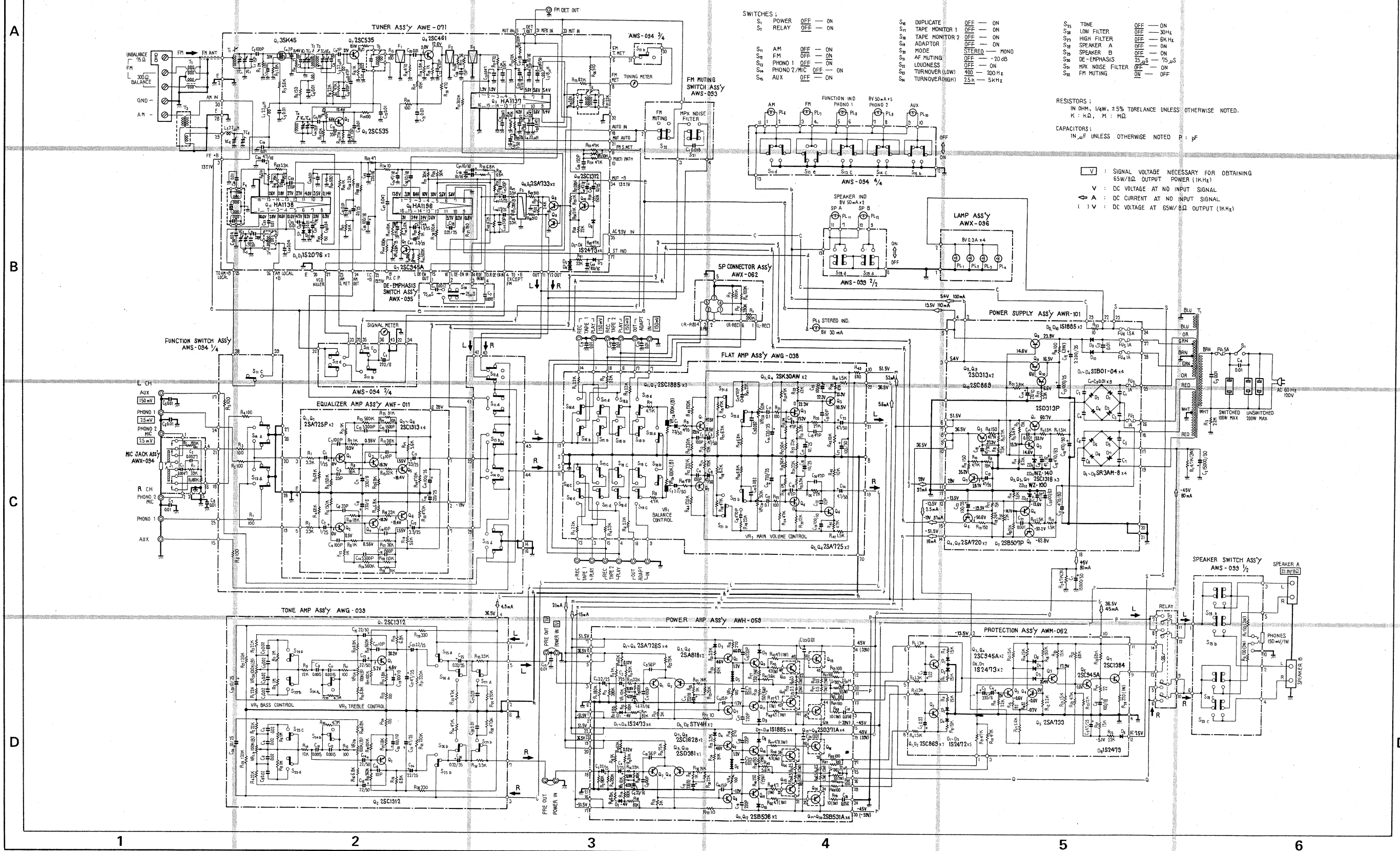


5P Connector Assembly (AWX-062)



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

12.1 SCHEMATIC DIAGRAM AND MISCELLANEOUS PARTS



Miscellaneous Parts

SEMICONDUCTORS

Symbol	Description	Part No.
Q1	Transistor	2SB531A-R
Q2	Transistor	2SB531A-R
Q3	Transistor	2SD371A-R
Q4	Transistor	2SD371A-R
Q5	Transistor	2SB531A-R
Q6	Transistor	2SB531A-R
Q7	Transistor	2SD371A-R
Q8	Transistor	2SD371A-R

LAMPS

Symbol	Description	Part No.
PL1 PL2 PL3 PL4	Lamp assembly* Lamp assembly* Lamp assembly* Lamp assembly* *Lamp assemblies (PL1—PL4) are made up of following parts. (1) Lamp (8V, 0.3A, wedge-type) (2) Lamp socket (wedge-type)	AEL-029 AKK-004
PL5 PL6 PL7 PL8 PL9	Lamp with leads (8V, 50mA) Lamp with leads (8V, 50mA) Lamp with leads (8V, 50mA) Lamp with leads (8V, 50mA) Lamp with leads (8V, 50mA)	AEL-069 AEL-076 AEL-075 AEL-082 AEL-072
PL10 PL11 PL12	Lamp with leads (8V, 50mA) Lamp with leads (8V, 50mA) Lamp with leads (8V, 50mA)	AEL-073 AEL-072 AEL-073

FUSES

Symbol	Description	Part No.
FU1	Fuse 5A (primary)	AEK-108
FU2	Fuse 1A (secondary)	AEK-106
FU3	Fuse 1A (secondary)	AEK-106
FU4	Fuse 1A (secondary)	AEK-106
FU5	Fuse 1A (secondary)	AEK-106
FU6	Fuse 1.5A (lamp circuit)	AEK-104

SWITCHES

Symbol	Description	Part No.
S1	Lever switch (POWER)	ASK-066
S2	Relay	ASR-019

NOTE:

- Capacitors: in μF unless otherwise noted p:pF
- Resistors: in Ω , $\frac{1}{4}W$ unless otherwise noted k:k Ω , M:M Ω

TRANSFORMERS AND COIL

Symbol	Description	Part No.
T1	Power transformer	ATT-302
T2	Ferrite balun	T22-025
T3	Bar-antenna assembly	AXB-009

RESISTORS

Symbol	Description	Part No.
R1	Metal oxide 4.7k 2W	RS2P 472J
R2	Metal oxide 4.7k 2W	RS2P 472J
R3	Carbon film 2.2M $\frac{1}{4}W$	RD $\frac{1}{2}$ PS 225J

CAPACITORS

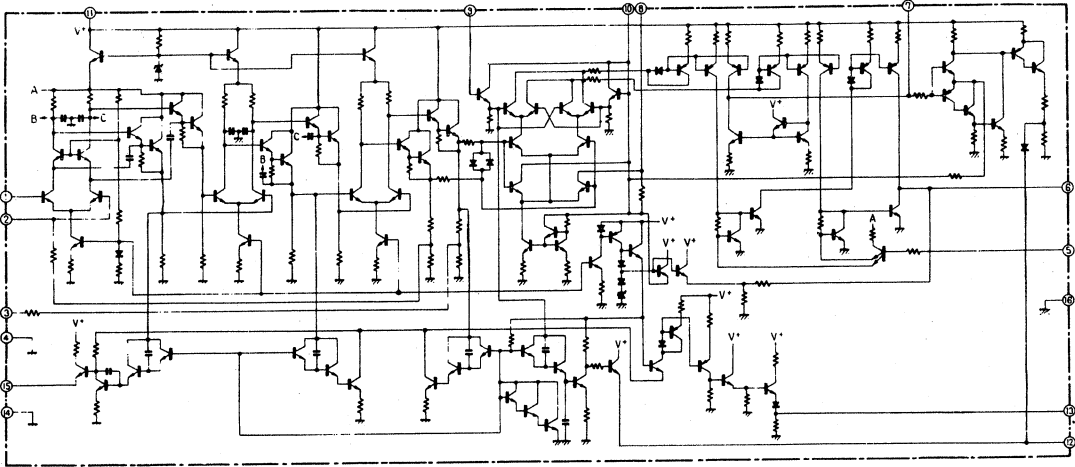
Symbol	Description	Part No.
C1	Electrolytic 15,000 50V	ACH-068
C2	Electrolytic 15,000 50V	ACH-068
C3	Ceramic 0.01 150V(DC1.4kV)	ACG-003
C4	Ceramic 0.01 150V(DC1.4kV)	ACG-003
C5	Ceramic 0.01 50V	CKDYF 103Z 50
C6	Ceramic 0.01 50V	CKDYF 103Z 50
C7	Ceramic 0.01 50V	CKDYF 103Z 50
C8	Ceramic 0.01 50V	CKDYF 103Z 50
C9	Ceramic 0.01 50V	CKDYF 103Z 50
C10	Ceramic 0.01 50V	CKDYF 103Z 50
C11	Ceramic 0.01 50V	CKDYF 103Z 50
C12	Ceramic 0.01 50V	CKDYF 103Z 50

OTHERS

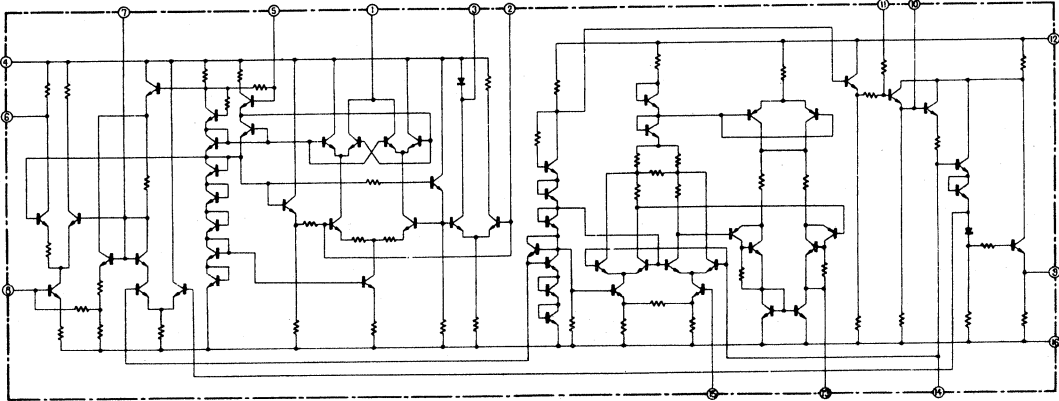
Symbol	Description	Part No.
	AC socket (AC OUTLETS)	AKP-005
	AC power cord	ADG-005

Equivalent Circuit Diagrams of ICs

HA1137 (FM IF IC)

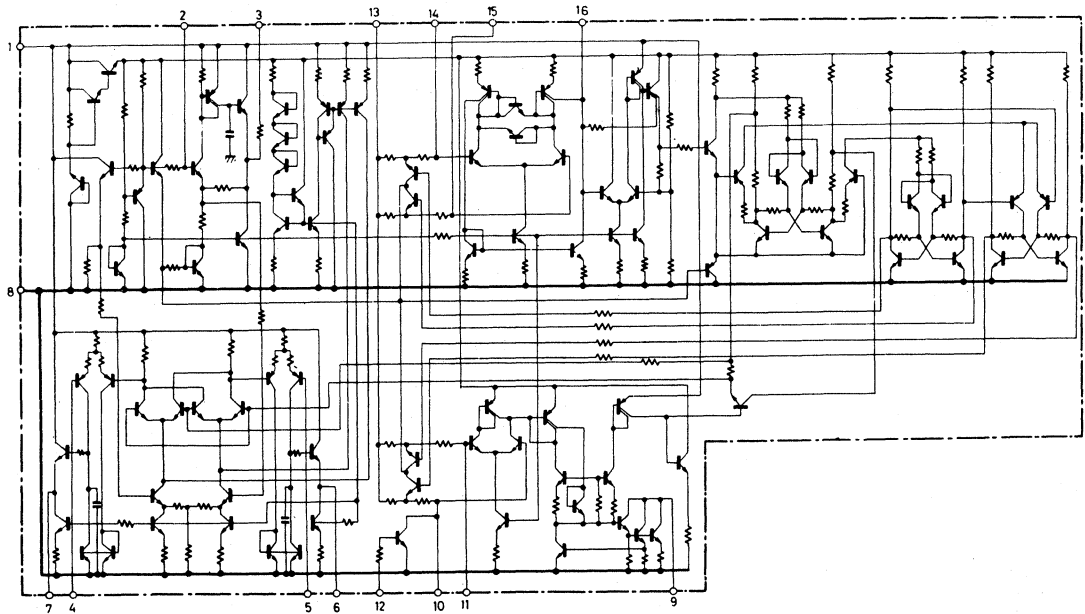


HA1138 (AM IC)



External Appearance of Transistors and ICs

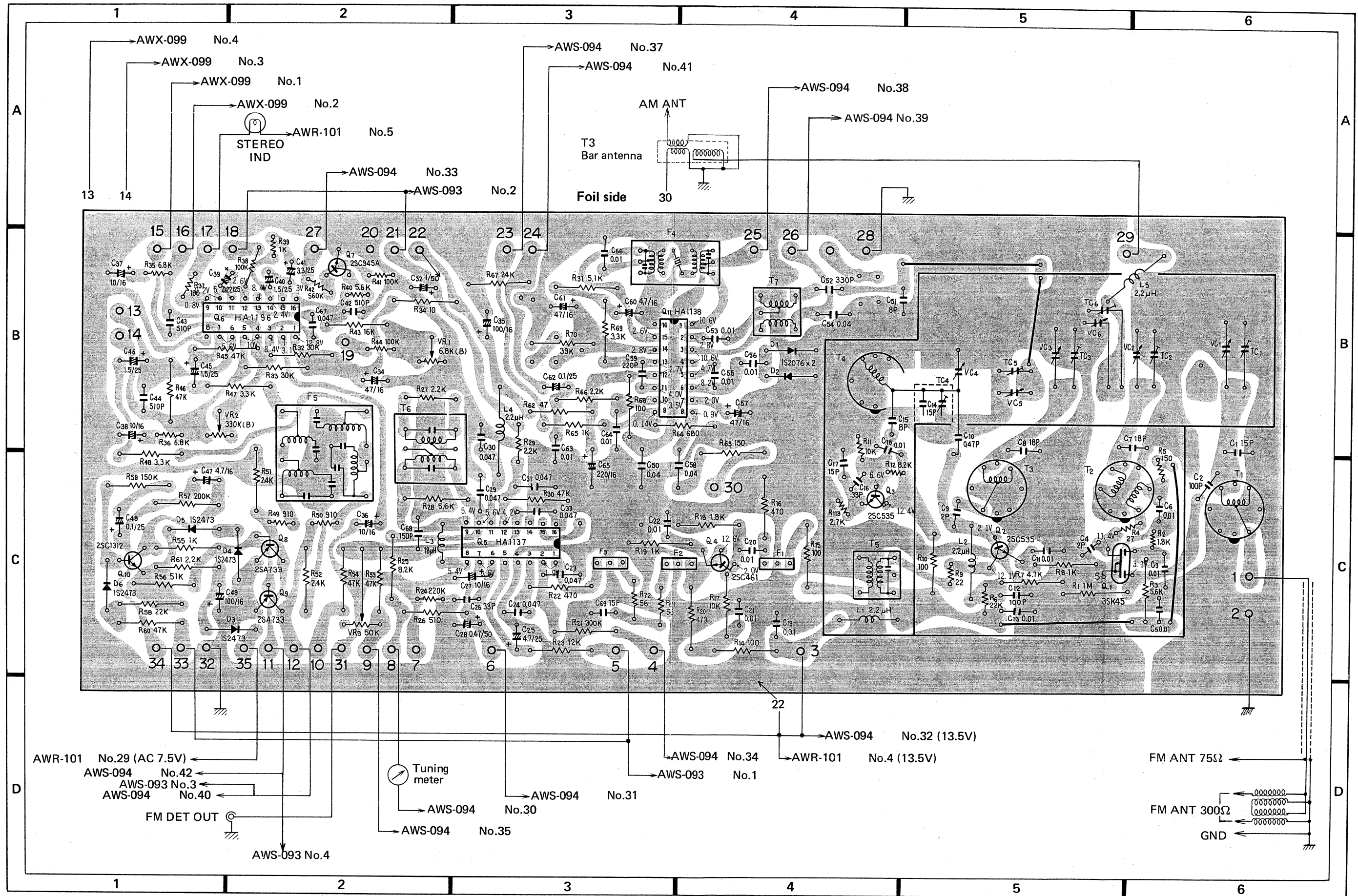
HA1196



2SC1312 2SC1313 2SA725P 2SA725 2SA726 2SC869		2SA898 2SC1903	
2SA733 2SC945A 2SA763S 2SC945 2SA763P 2SC1318 2SA720		2SA818 2SC1628	
2SB531A 2SD371A		HA1137 HA1138 HA1196	
2SC461 2SC535		2SD381 2SB536 2SD313 2SD313P 2SB507	
2SC1384 2SC1885		2SK30AW	
3SK45		2SC1345 2SC1515	
		2SC857	

1	2	3	4	5	6
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Parts List of Tuner Assembly (AWE-071)

CAPACITORS

Symbol	Description				Part No.
C1	Ceramic	15p	50V	CCDSH 150K 50	
C2	Ceramic	100p	50V	CCDSL 101K 50	
C3	Ceramic	0.01	50V	CKDYF 103Z 50	
C4	Ceramic	2p	50V	CCDSL 020C 50	
C5	Ceramic	0.01	50V	CKDYF 103Z 50	
C6	Ceramic	0.01	50V	CKDYF 103Z 50	
C7	Ceramic	18p	50V	CCDSH 180K 50	
C8	Ceramic	18p	50V	CCDSH 180K 50	
C9	Ceramic	2p	50V	CCDSL 020C 50	
C10	Ceramic	0.47	500V	CGB R47K 500	
C11	Ceramic	0.01	50V	CKDYF 103Z 50	
C12	Ceramic	100p	50V	CCDSL 101K 50	
C13	Ceramic	0.01	50V	CKDYF 103Z 50	
C14	Ceramic	15p	50V	CCDLH 150K 50	
C15	Ceramic	8p	50V	CCDCH 080F 50	
C16	Ceramic	33p	50V	CCDCH 330K 50	
C17	Ceramic	15p	50V	CCDCH 150K 50	
C18	Ceramic	0.01	50V	CKDYB 103K 50	
C19	Ceramic	0.01	50V	CKDYF 103Z 50	
C20	Ceramic	0.01	50V	CKDYF 103Z 50	
C21	Ceramic	0.01	50V	CKDYF 103Z 50	
C22	Ceramic	0.01	50V	CKDYF 103Z 50	
C23	Ceramic	0.047	25V	CKDBC 473Z 25	
C24	Ceramic	0.047	25V	CKDBC 473Z 25	
C25	Electrolytic	4.7	16V	CEA 4R7P 16	
C26	Ceramic	33p	50V	CCDSL 330K 50	
C27	Electrolytic	10	16V	CEA 100P 16	
C28	Electrolytic	0.47	50V	CEA R47P 50	
C29	Ceramic	0.047	25V	CKDBC 473Z 25	
C30	Ceramic	0.047	25V	CKDBC 473Z 25	
C31	Ceramic	0.047	25V	CKDBC 473Z 25	
C32	Electrolytic	1	50V	CEA 010P 50	
C33	Ceramic	0.047	25V	CKDBC 473Z 25	
C34	Electrolytic	47	16V	CEA 470P 16	
C35	Electrolytic	100	16V	CEA 101P 16	
C36	Electrolytic	10	16V	CEA 100P 16	
C37	Electrolytic	10	16V	CEA 100P 16	
C38	Electrolytic	10	16V	CEA 100P 16	
C39	Electrolytic	0.22	25V	CSSA R22M 25	
C40	Electrolytic	1.5	25V	CSZA 1R5M 25	
C41	Electrolytic	3.3	25V	CSZA 3R3M 25	
C42	Styrol	510p	50V	CQSH 511J 50	
C43	Styrol	510p	50V	CQSA 511J 50	
C44	Styrol	510p	50V	CQSA 511J 50	
C45	Electrolytic	1.5	25V	CSZA 1R5M 25	
C46	Electrolytic	1.5	25V	CSZA 1R5M 25	
C47	Electrolytic	4.7	16V	CEA 4R7P 16	
C48	Electrolytic	0.1	25V	CSSA 0R1M 25	

Symbol	Description				Part No.
C49	Electrolytic	100	16V	CEA 101P 16	
C50	Ceramic	0.04	50V	CKDYF 403Z 50	
C51	Ceramic	8p	50V	CCDXL 080F 50	
C52	Styrol	330p	50V	CQSA 331J 50	
C53	Mylar	0.01	50V	CQMA 103K 50	
C54	Ceramic	0.04	50V	CKDYF 403Z 50	
C55	Ceramic	0.01	50V	CKDYF 103Z 50	
C56	Ceramic	0.01	50V	CKDYF 103Z 50	
C57	Electrolytic	47	16V	CEA 470P 16	
C58	Ceramic	0.04	50V	CKDYF 403Z 50	
C59	Ceramic	220p	50V	CCDSL 221K 50	
C60	Electrolytic	4.7	16V	CEA 4R7P 16	
C61	Electrolytic	47	16V	CEA 470P 16	
C62	Electrolytic	0.1	25V	CSSA 0R1M 25	
C63	Ceramic	0.01	50V	CKDYB 103K 50	
C64	Ceramic	0.01	50V	CKDYB 103K 50	
C65	Electrolytic	220	16V	CEA 221P 16	
C66	Ceramic	0.01	50V	CKDYB 103K 50	
C67	Mylar	0.047	50V	CQMA 473K 50	
C68	Ceramic	150p	50V	CCDSL 151K 50	
C69	Ceramic	15p	50V	CCDSL 150K 50	
VC	Tuning capacitor				ACK-015
TC4	Ceramic trimer				ACM-006

RESISTORS

Symbol	Description				Part No.
R1	Carbon film	1M		RD%PS 105J	
R2	Carbon film	1.8k		RD%VS 182J	
R3	Carbon film	5.6k		RD%PS 562J	
R4	Carbon film	27		RD%VS 270J	
R5	Carbon film	150		RD%VS 151J	
R6	Carbon film	22k		RD%VS 223J	
R7	Carbon film	4.7k		RD%PS 472J	
R8	Carbon film	1k		RD%PS 102J	
R9	Carbon film	22		RD%VS 220J	
R10	Carbon film	100		RD%PS 101J	
R11	Carbon film	10k		RD%VS 103J	
R12	Carbon film	8.2k		RD%VS 822J	
R13	Carbon film	2.7k		RD%VS 272J	
R14	Carbon film	100		RD%PS 101J	
R15	Carbon film	100		RD%PS 101J	
R16	Carbon film	470		RD%PS 471J	
R17	Carbon film	10k		RD%PS 103J	
R18	Carbon film	1.8k		RD%PS 182J	
R19	Carbon film	1k		RD%PS 102J	
R20	Carbon film	470		RD%PS 471J	

Symbol	Description				Part No.
R21	Carbon film	300k		RD%PS 304J	
R22	Carbon film	470		RD%PS 471J	
R23	Carbon film	12k		RD%PS 123J	
R24	Carbon film	220k		RD%VS 224J	
R25	Carbon film	8.2k		RD%PS 822J	
R26	Carbon film	510		RD%PS 511J	
R27	Carbon film	2.2k		RD%VS 222J	
R28	Carbon film	5.6k		RD%PS 562J	
R29	Carbon film	2.2k		RD%VS 222J	
R30	Carbon film	47k		RD%PS 473J	
R31	Carbon film	5.1k		RD%PS 512J	
R32	Carbon film	30k		RD%PS 303J	
R33	Carbon film	30k		RD%PS 303J	
R34	Carbon film	10		RD%PS 100J	
R35	Carbon film	6.8k		RD%VS 682J	
R36	Carbon film	6.8k		RD%VS 682J	
R37	Carbon film	180		RD%VS 181J	
R38	Carbon film	100k		RD%VS 104J	
R39	Carbon film	1k		RD%VS 102J	
R40	Carbon film	5.6k		RD%VS 562J	
R41	Carbon film	100k		RD%VS 104J	
R42	Carbon film	560k		RD%VS 564J	
R43	Carbon film	16k		RD%PS 163J	
R44	Carbon film	100k		RD%VS 104J	
R45	Carbon film	47k		RD%PS 473J	
R46	Carbon film	47k		RD%PS 473J	
R47	Carbon film	3.3k		RD%PS 332J	
R48	Carbon film	3.3k		RD%PS 332J	
R49	Carbon film	910		RD%VS 911J	
R50	Carbon film	910		RD%VS 911J	
R51	Carbon film	2.4k		RD%PS 242J	
R52	Carbon film	2.4k		RD%PS 242J	
R53	Carbon film	47k		RD%PS 473J	
R54	Carbon film	47k		RD%PS 473J	
R55	Carbon film	1k		RD%PS 102J	
R56	Carbon film	51k		RD%PS 513J	
R57	Carbon film	200k		RD%PS 204J	
R58	Carbon film	22k		RD%PS 223J	
R59	Carbon film	150k		RD%PS 154J	
R60	Carbon film	47k		RD%PS 473J	
R61	Carbon film	2.2k		RD%PS 222J	
R62	Carbon film	47		RD%PS 470J	
R63	Carbon film	150		RD%PS 151J	
R64	Carbon film	680		RD%PS 681J	
R65	Carbon film	1k		RD%PS 102J	
R66	Carbon film	2.2k		RD%PS 222J	
R67	Carbon film	24k		RD%PS 243J	
R68	Carbon film	100		RD%PS 101J	
R69	Carbon film	3.3k		RD%PS 332J	
R70	Carbon film	39k		RD%PS 393J	
R71	Carbon film	56		RD%VS 560J	
R72	Carbon film	56		RD%VS 560J	

Symbol	Description				Part No.
VR1	Semi fixed	6.8k-B			ACP-023
VR2	Semi fixed	330k-B			ACP-042
VR3	Semi fixed	50k-B			ACP-043

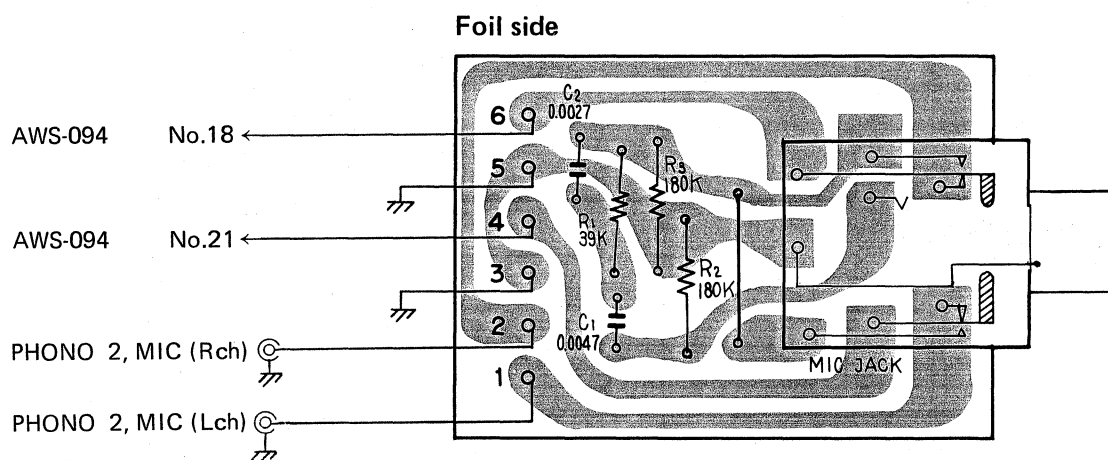
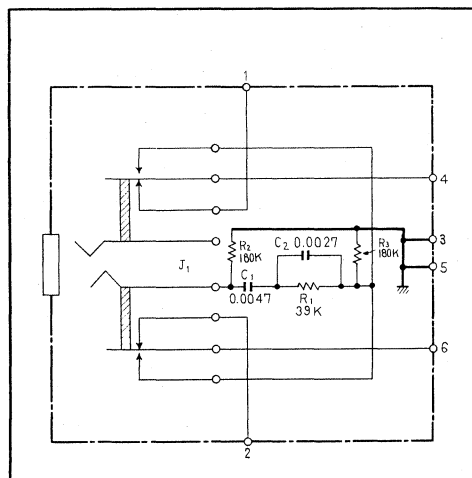
SEMICONDUCTORS

Symbol	Description				Part No.
Q1	Transistor				3SK45-B
Q2	Transistor				2SC535-B
Q3	Transistor				2SC535-B
Q4	Transistor				2SC461-B
Q5	IC				HA1137
Q6	IC				HA1196
Q7	Transistor				2SC945A-Q
Q8	Transistor				2SA733-Q
Q9	Transistor				2SA733-Q
Q10	Transistor				2SC1312-G
Q11	IC				HA1138
D1	Diode				1S2076
D2	Diode				1S2076
D3	Diode				1S2473
D4	Diode				1S2473
D5	Diode				1S2473
D6	Diode				1S2473

COILS, TRANSFORMERS

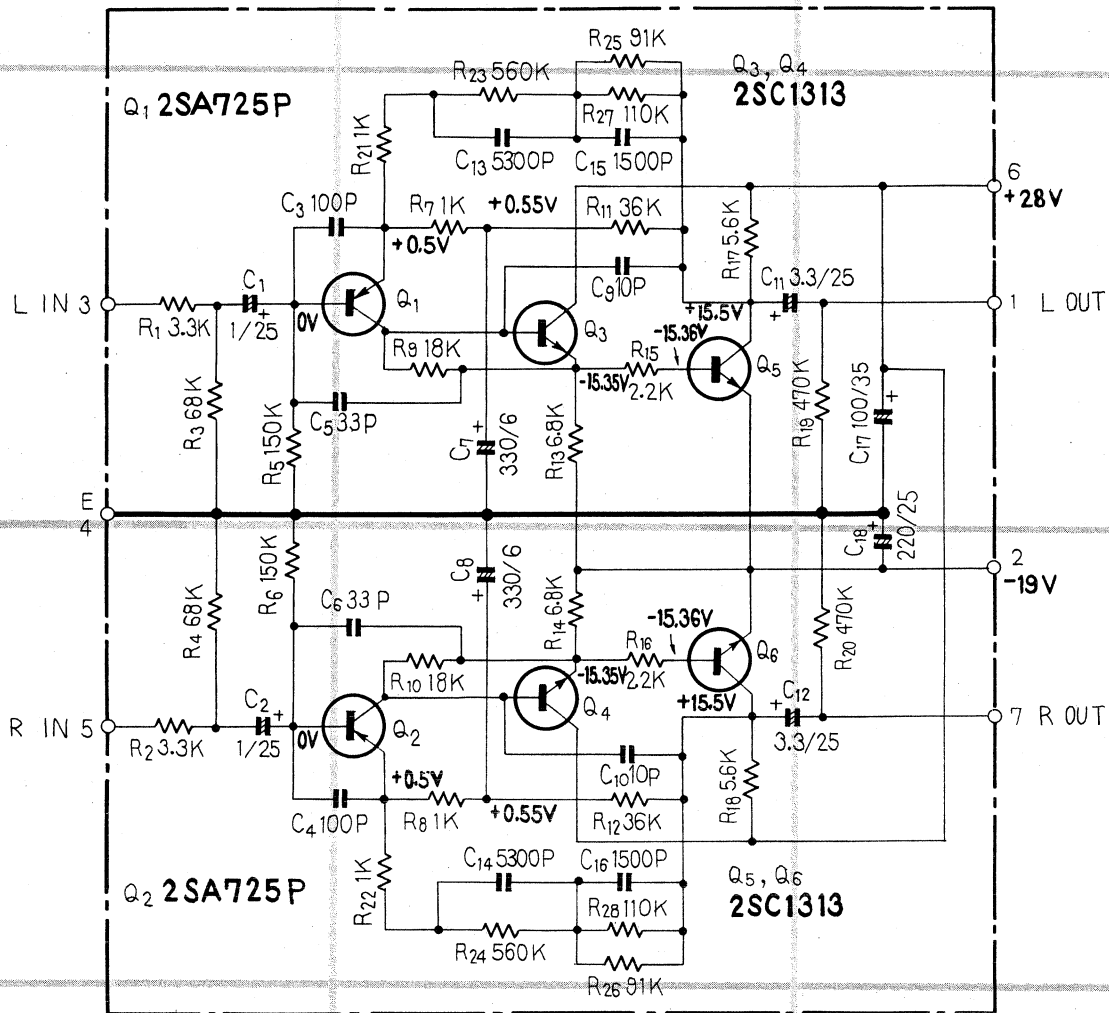
Symbol	Description				Part No.
T1	FM antenna coil				ATC-021
T2	FM RF coil				ATC-015
T3	FM RF coil				ATC-016
T4	FM OSC coil				ATC-022
T5	FM IFT				ATE-008
T6	FM IFT				T73-035
T7	AM OSC coil				ATB-013
F1	FM ceramic filter				ATF-013
F2	FM ceramic filter				ATF-013
F3	FM ceramic filter				ATF-013
F4	AM ceramic filter				ATF-027
F5	Low pass filter				ATF-033
L1	RF chock coil				T24-028
L2	RF chock coil				T24-028
L3	RF chock coil				ATH-007
L4	RF chock coil				T24-028
L5	RF chock coil				T24-028

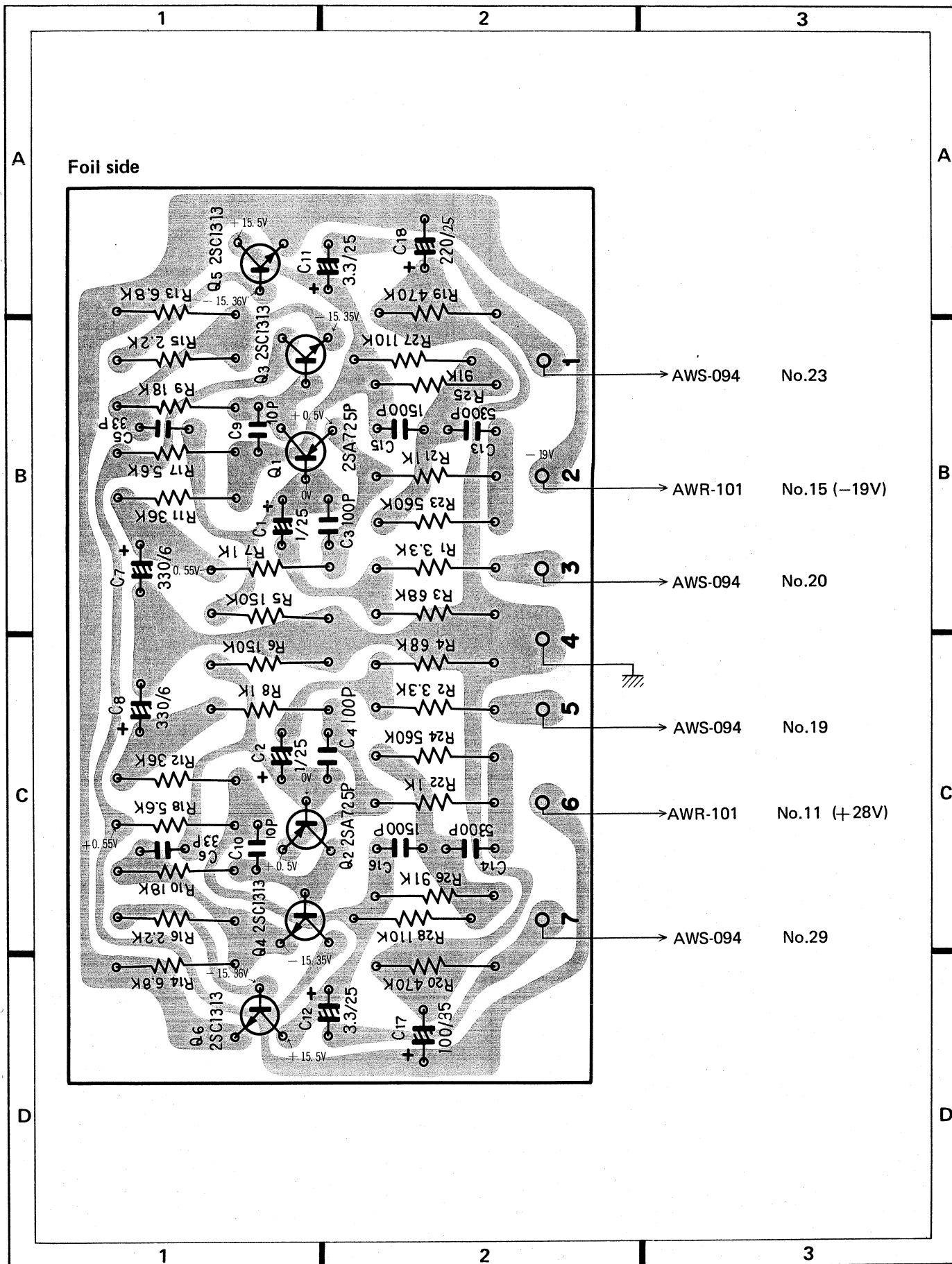
12.3 MICROPHONE JACK ASSEMBLY (AWX-094)



Symbol	Description	Part No.
R1	Carbon film resistor 39k	RD¼PS 393J
R2	Carbon film resistor 180k	RD¼PS 184J
R3	Carbon film resistor 180k	RD¼PS 184J
C1	Mylar capacitor 0.0047 50V	CQMA 472K 50
C2	Mylar capacitor 0.0027 50V	CQMA 272K 50
J1	Jack (MIC)	AKN-012

12.4 EQUALIZER AMPLIFIER ASSEMBLY (AWF-011)





Parts List of Equalizer Amplifier Assembly (AWF-011)

SEMICONDUCTORS

Symbol	Description	Part No.
Q1	Transistor	2SA725P-F (2SA763P-5)
Q2	Transistor	2SA725P-F (2SA763P-5)
Q3	Transistor	2SC1313-G (2SC1345-E)
Q4	Transistor	2SC1313-G (2SC1345-E)
Q5	Transistor	2SC1313-G (2SC1345-E)
Q6	Transistor	2SC1313-G (2SC1345-E)

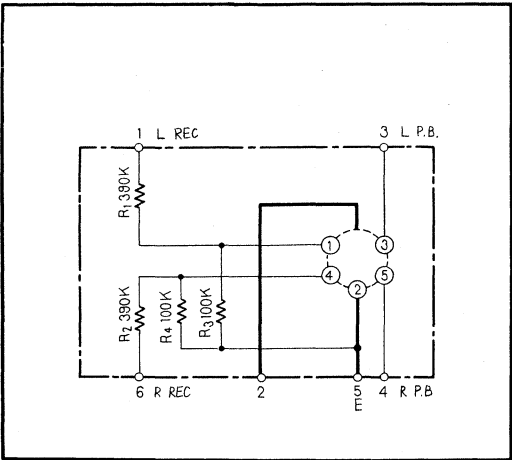
RESISTORS

Symbol	Description	Part No.
R1	Carbon film 3.3k	RD4PS 332J
R2	Carbon film 3.3k	RD4PS 332J
R3	Carbon film 68k	RD4PS 683J
R4	Carbon film 68k	RD4PS 683J
R5	Carbon film 150k	RD4PS 154J
R6	Carbon film 150k	RD4PS 154J
R7	Carbon film 1k	RD4PS 102J
R8	Carbon film 1k	RD4PS 102J
R9	Carbon film 18k	RD4PS 183J
R10	Carbon film 18k	RD4PS 183J
R11	Carbon film 36k	RD4PS 363J
R12	Carbon film 36k	RD4PS 363J
R13	Carbon film 6.8k	RD4PS 682J
R14	Carbon film 6.8k	RD4PS 682J
R15	Carbon film 2.2k	RD4PS 222J
R16	Carbon film 2.2k	RD4PS 222J
R17	Carbon film 5.6k	RD4PS 562J
R18	Carbon film 5.6k	RD4PS 562J
R19	Carbon film 470k	RD4PS 474J
R20	Carbon film 470k	RD4PS 474J
R21	Carbon film 1k	RD4PS 102J
R22	Carbon film 1k	RD4PS 102J
R23	Carbon film 560k	RD4PS 564JNL
R24	Carbon film 560k	RD4PS 564JNL
R25	Carbon film 91k	RD4PS 913J
R26	Carbon film 91k	RD4PS 913J
R27	Carbon film 110k	RD4PS 114J
R28	Carbon film 110k	RD4PS 114J

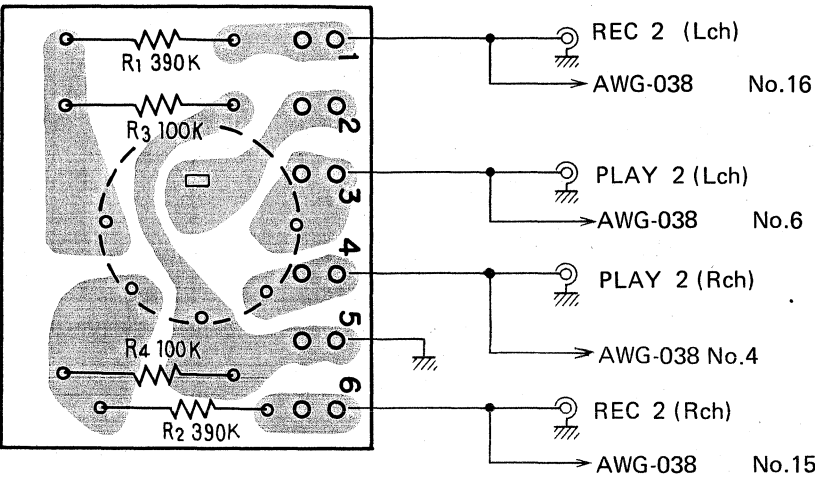
CAPACITORS

Symbol	Description	Part No.
C1	Electrolytic 1 25V	CSSA 010M 25
C2	Electrolytic 1 25V	CSSA 010M 25
C3	Ceramic 100p 50V	CCDSL 101K 50
C4	Ceramic 100p 50V	CCDSL 101K 50
C5	Ceramic 33p 50V	CCDSL 330K 50
C6	Ceramic 33p 50V	CCDSL 330K 50
C7	Electrolytic 330 6V	CEA 331P 6
C8	Electrolytic 330 6V	CEA 331P 6
C9	Ceramic 10p 50V	CCDSL 100K 50
C10	Ceramic 10p 50V	CCDSL 100K 50
C11	Electrolytic 3.3 25V	CEANL 3R3P 25
C12	Electrolytic 3.3 25V	CEANL 3R3P 25
C13	Styrol 5300p 50V	CQSA 532G 50
C14	Styrol 5300p 50V	CQSA 532G 50
C15	Styrol 1500p 50V	CQSA 152G 50
C16	Styrol 1500p 50V	CQSA 152G 50
C17	Electrolytic 100 35V	CEA 101P 35
C18	Electrolytic 220 25V	CEA 221P 25

12.5 5P CONNECTOR ASSEMBLY (AWX-062)

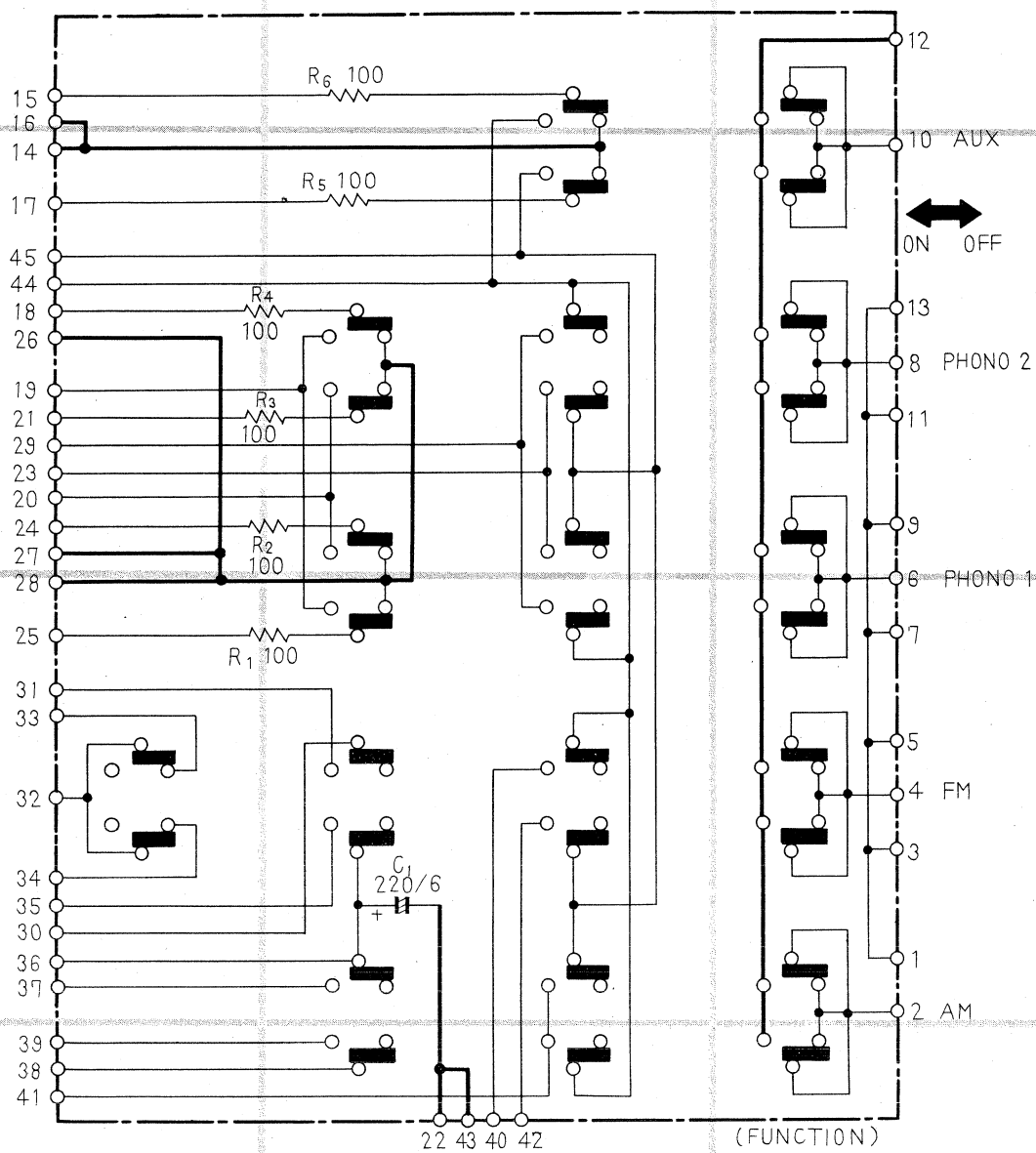


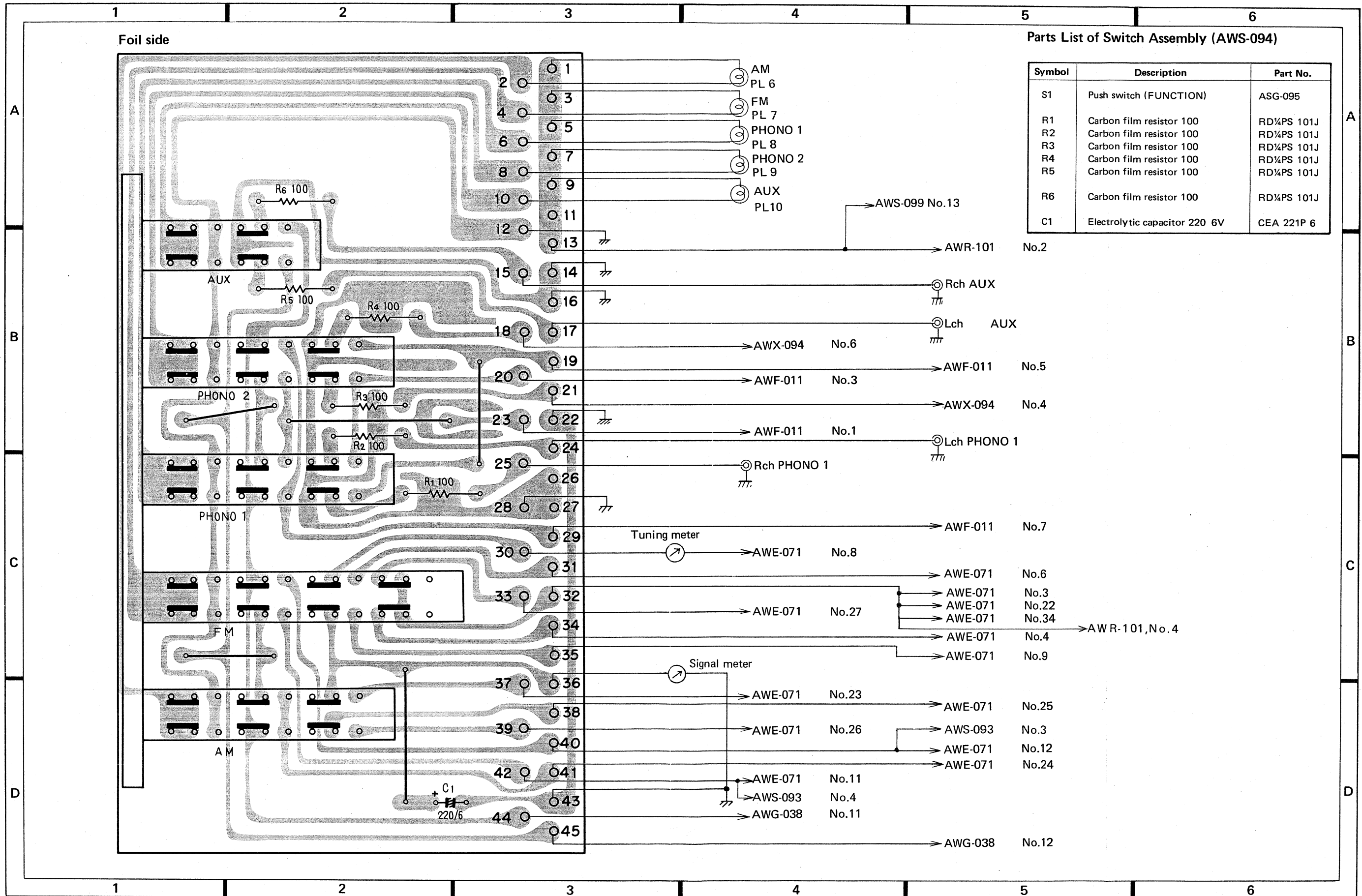
Foil side



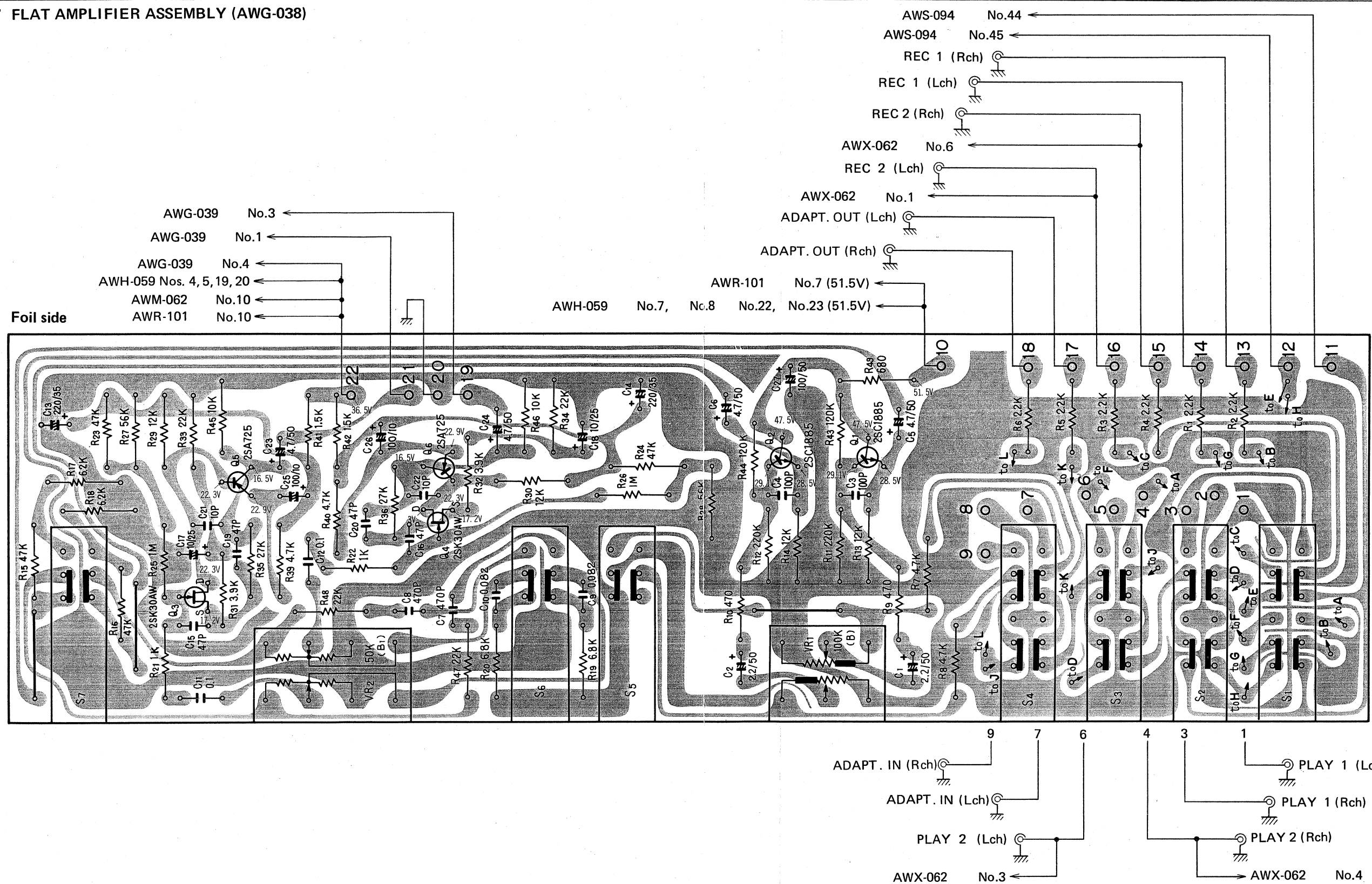
Symbol	Description	Part No.
R1	Carbon film resistor 390k	RD¼PS 394J
R2	Carbon film resistor 390k	RD¼PS 394J
R3	Carbon film resistor 100k	RD¼PS 104J
R4	Carbon film resistor 100k	RD¼PS 104J
	Connector socket 5P (REC/PLAY)	AKP-007

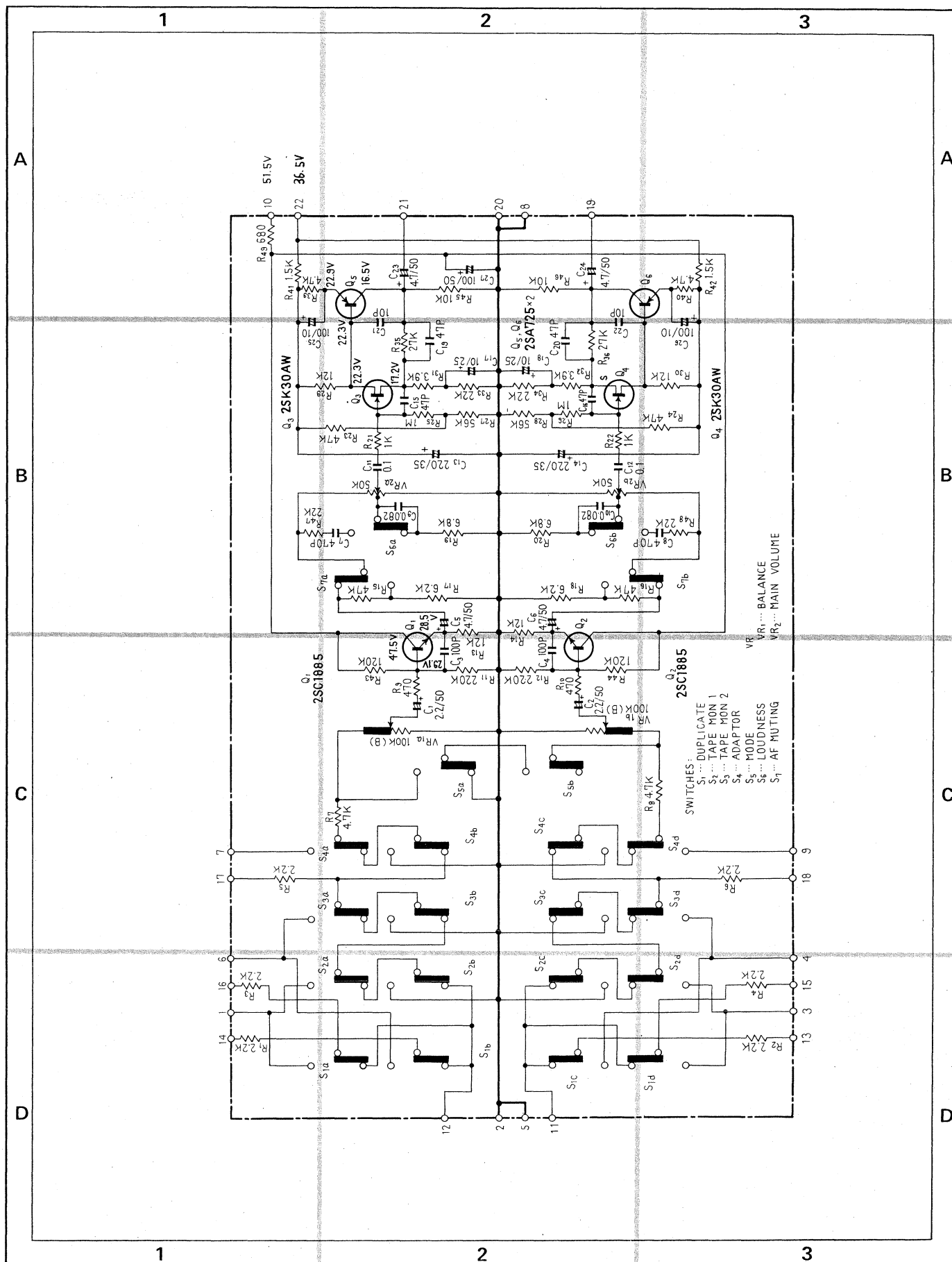
12.6 SWITCH ASSEMBLY (AWS-094)





12.7 FLAT AMPLIFIER ASSEMBLY (AWG-038)





Parts List of Flat Amplifier Assembly (AWG-038)

SEMICONDUCTORS

Symbol	Description	Part No.
Q1	Transistor	2SC1885-R
Q2	Transistor	2SC1885-R
Q3	FET	2SK30AW-Y
Q4	FET	2SK30AW-Y
Q5	Transistor	2SA725-F
Q6	Transistor	2SA725-F

SWITCHES

Symbol	Description	Part No.
S1	Lever switch (DUPLICATE)	ASK-092
S2	Lever switch (TAPE MONITOR 1)	ASK-092
S3	Lever switch (TAPE MONITOR 2)	ASK-092
S4	Lever switch (ADAPTOR)	ASK-092
S5	Lever switch (MODE)	ASK-090
S6	Lever switch (LOUDNESS)	ASK-089
S7	Lever switch (MUTING)	ASK-089

RESISTORS

Symbol	Description	Part No.
R1	Carbon film 2.2k	RD4PS 222J
R2	Carbon film 2.2k	RD4PS 222J
R3	Carbon film 2.2k	RD4PS 222J
R4	Carbon film 2.2k	RD4PS 222J
R5	Carbon film 2.2k	RD4PS 222J
R6	Carbon film 2.2k	RD4PS 222J
R7	Carbon film 4.7k	RD4PS 472J
R8	Carbon film 4.7k	RD4PS 472J
R9	Carbon film 470	RD4PS 471J
R10	Carbon film 470	RD4PS 471J
R11	Carbon film 220k	RD4PS 224JNL
R12	Carbon film 220k	RD4PS 224JNL
R13	Carbon film 12k	RD4PS 123JNL
R14	Carbon film 12k	RD4PS 123JNL
R15	Carbon film 47k	RD4PS 473JNL
R16	Carbon film 47k	RD4PS 473JNL
R17	Carbon film 6.2k	RD4PS 622J
R18	Carbon film 6.2k	RD4PS 622J
R19	Carbon film 6.8k	RD4PS 682J
R20	Carbon film 6.8k	RD4PS 682J
R21	Carbon film 1k	RD4PS 102J
R22	Carbon film 1k	RD4PS 102J
R23	Carbon film 47k	RD4PS 473JNL
R24	Carbon film 47k	RD4PS 473JNL
R25	Carbon film 1M	RD4PS 105JNL
R26	Carbon film 1M	RD4PS 105JNL
R27	Carbon film 56k	RD4PS 563JNL

Symbol	Description	Part No.
R28	Carbon film 56k	RD4PS 563JNL
R29	Carbon film 12k	RD4PS 123JNL
R30	Carbon film 12k	RD4PS 123JNL
R31	Carbon film 3.9k	RD4PS 392J
R32	Carbon film 3.9k	RD4PS 392J
R33	Carbon film 22k	RD4PS 223J
R34	Carbon film 22k	RD4PS 223J
R35	Carbon film 27k	RD4PS 273J
R36	Carbon film 27k	RD4PS 273J
R39	Carbon film 47k	RD4PS 473J
R40	Carbon film 47k	RD4PS 473J
R41	Carbon film 1.5k	RD4PS 152J
R42	Carbon film 1.5k	RD4PS 152J
R43	Carbon film 120k	RD4PS 124J
R44	Carbon film 120k	RD4PS 124J
R45	Carbon film 10k	RD4PS 103J
R46	Carbon film 10k	RD4PS 103J
R47	Carbon film 22k	RD4PS 223J
R48	Carbon film 22k	RD4PS 223J
R49	Carbon film 680	RD4PS 681J
VR1	Variable 100k-HB (BALANCE)	ACV-163
VR2	Variable 50k-B1 (VOLUME)	ACV-164

CAPACITORS

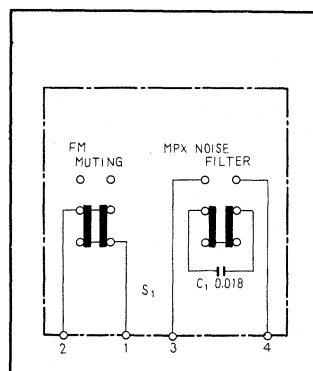
Symbol	Description	Part No.
C1	Electrolytic (NL) 2.2 50V	CEANL 2R2P 50
C2	Electrolytic (NL) 2.2 50V	CEANL 2R2P 50
C3	Ceramic 100p 50V	CCDSL 101K 50
C4	Ceramic 100p 50V	CCDSL 101K 50
C5	Electrolytic (NL) 4.7 50V	CEANL 4R7P 50
C6	Electrolytic (NL) 4.7 50V	CEANL 4R7P 50
C7	Ceramic 470p 50V	CCDSL 471K 50
C8	Ceramic 470p 50V	CCDSL 471K 50
C9	Mylar 0.082 50V	CQMA 823J 50
C10	Mylar 0.082 50V	CQMA 823J 50
C11	Mylar 0.1 50V	CQMA 104K 50
C12	Mylar 0.1 50V	CQMA 104K 50
C13	Electrolytic 220 35V	CEA 221P 35
C14	Electrolytic 220 35V	CEA 221P 35
C15	Ceramic 47p 50V	CCDSL 470K 50
C16	Ceramic 47p 50V	CCDSL 470K 50
C17	Electrolytic 10 25V	CSZA 100P 25
C18	Electrolytic 10 25V	CEZA 100P 25
C19	Ceramic 47p 50V	CCDSL 470K 50
C20	Ceramic 47p 50V	CCESL 470K 50

Symbol	Description			Part No.
C21	Ceramic	10p	50V	CCDSL 100K 50
C22	Ceramic	10p	50V	CCDSL 100K 50
C23	Electrolytic (NL)	4.7	50V	CEANL 4R7P 50
C24	Electrolytic (NL)	4.7	50V	CEANL 4R7P 50
C25	Electrolytic (NL)	100	10V	CEANL 101P 10
C26	Electrolytic (NL)	100	10V	CEANL 101P 10
C27	Electrolytic	100	50V	CEA 101P 50

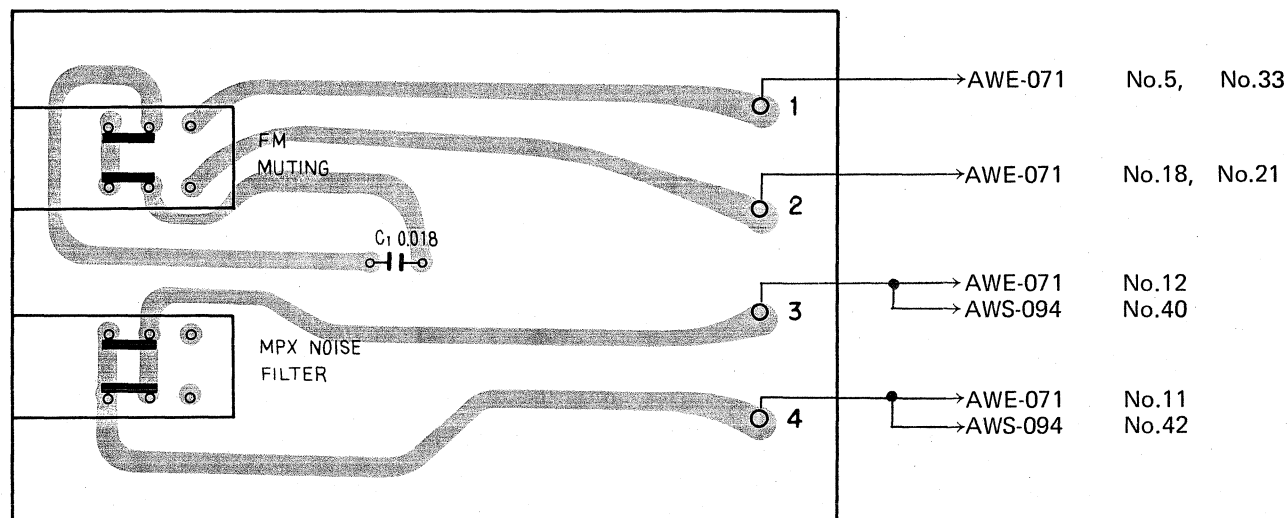
OTHERS

Symbol	Description	Part No.
	Union nut	ABN-021
	Washer faced nut	ABN-024
	Screw	ABA-116

12.8 SWITCH ASSEMBLY (AWS-093)

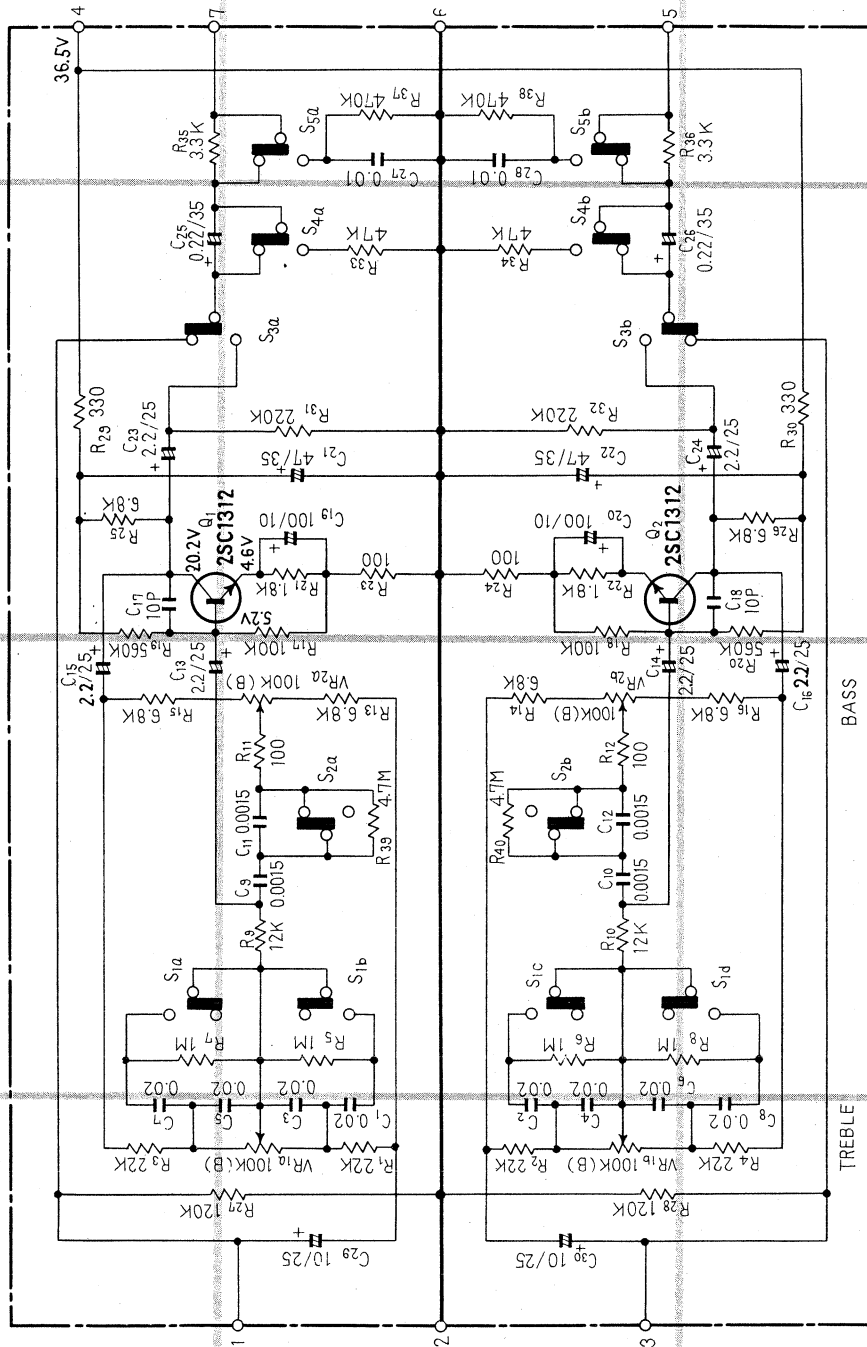


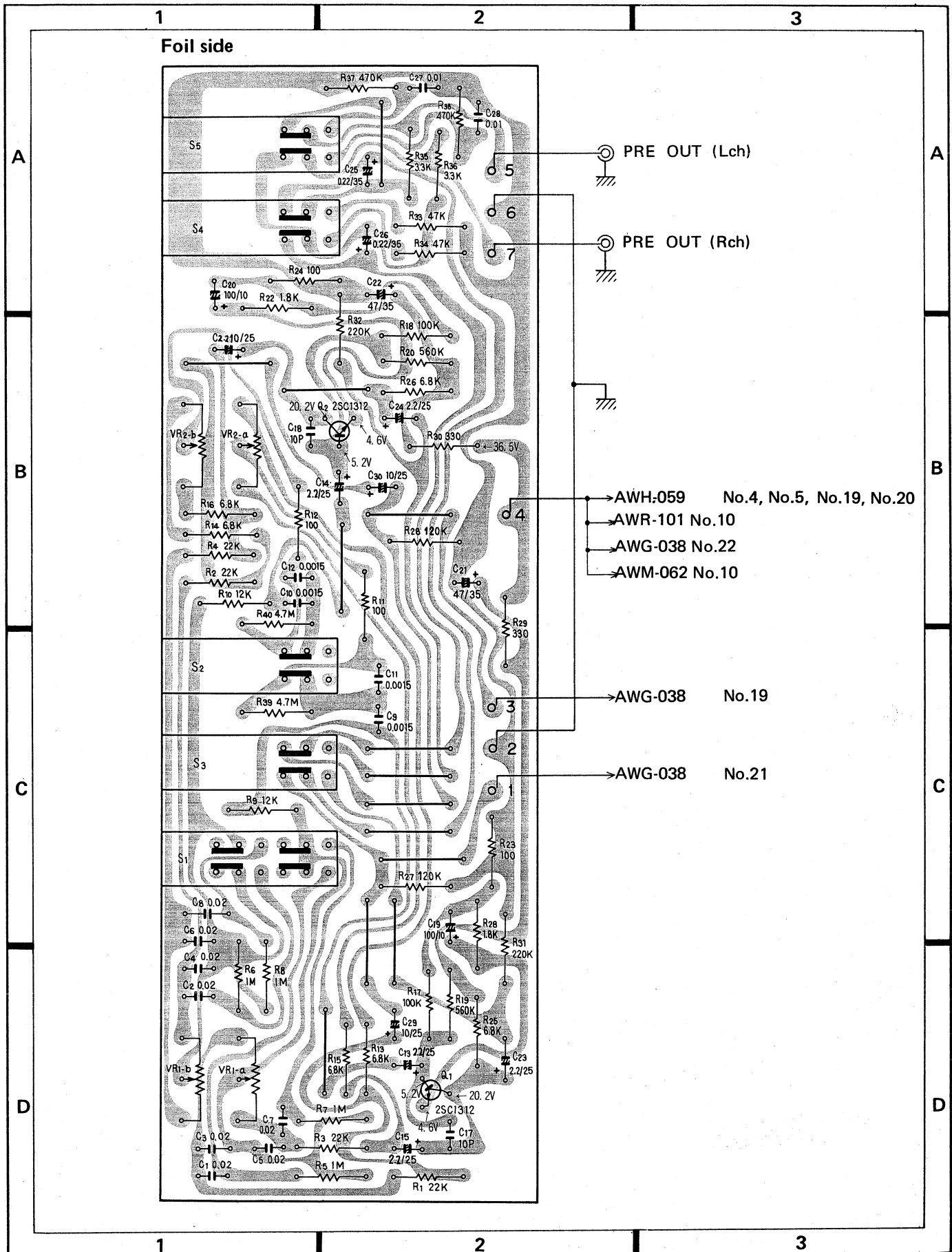
Foil side



Symbol	Description	Part No.
S1	Push switch (FM MUTING, MPX NOISE FILTER)	ASG-096
C1	Mylar capacitor 0.018 50V	CQMA 183J 50

12.9 TONE AMPLIFIER ASSEMBLY (AWG-039)





Parts List of Tone Amplifier Assembly (AWG-039)

SEMICONDUCTORS

Symbol	Description	Part No.
Q1	Transistor	2SC1312-F
Q2	Transistor	2SC1312-F

SWITCHES

Symbol	Description	Part No.
S1	Lever switch (BASS TURNOVER)	ASK-091
S2	Lever switch (TREBLE TURNOVER)	ASK-089
S3	Lever switch (TONE)	ASK-090
S4	Lever switch (LOW FILTER)	ASK-089
S5	Lever switch (HIGH FILTER)	ASK-089

RESISTORS

Symbol	Description	Part No.
R1	Carbon film 22k	RD%PS 223J
R2	Carbon film 22k	RD%PS 223J
R3	Carbon film 22k	RD%PS 223J
R4	Carbon film 22k	RD%PS 223J
R5	Carbon film 1M	RD%PS 105J
R6	Carbon film 1M	RD%PS 105J
R7	Carbon film 1M	RD%PS 105J
R8	Carbon film 1M	RD%PS 105J
R9	Carbon film 12k	RD%PS 123J
R10	Carbon film 12k	RD%PS 123J
R11	Carbon film 100	RD%PS 101J
R12	Carbon film 100	RD%PS 101J
R13	Carbon film 6.8k	RD%PS 682J
R14	Carbon film 6.8k	RD%PS 682J
R15	Carbon film 6.8k	RD%PS 682J
R16	Carbon film 6.8k	RD%PS 682J
R17	Carbon film 100k	RD%PS 104JNL
R18	Carbon film 100k	RD%PS 104JNL
R19	Carbon film 560k	RD%PS 564JNL
R20	Carbon film 560k	RD%PS 564JNL
R21	Carbon film 1.8k	RD%PS 182J
R22	Carbon film 1.8k	RD%PS 182J
R23	Carbon film 100	RD%PS 101J
R24	Carbon film 100	RD%PS 101J
R25	Carbon film 6.8k	RD%PS 682J
R26	Carbon film 6.8k	RD%PS 682J
R27	Carbon film 120k	RD%PS 124J
R28	Carbon film 120k	RD%PS 124J
R29	Carbon film 330	RD%PS 331J
R30	Carbon film 330	RD%PS 331J

Symbol	Description	Part No.
R31	Carbon film 220k	RD%PS 224J
R32	Carbon film 220k	RD%PS 224J
R33	Carbon film 47k	RD%PS 473J
R34	Carbon film 47k	RD%PS 473J
R35	Carbon film 3.3k	RD%PS 332J
R36	Carbon film 3.3k	RD%PS 332J
R37	Carbon film 470k	RD%PS 474J
R38	Carbon film 470k	RD%PS 474J
R39	Carbon film 4.7M	RD%PS 475J
R40	Carbon film 4.7M	RD%PS 475J
VR1	Variable 100k-B dual (BASS)	ACV-136
VR2	Variable 100k-B dual (TREBLE)	ACV-136

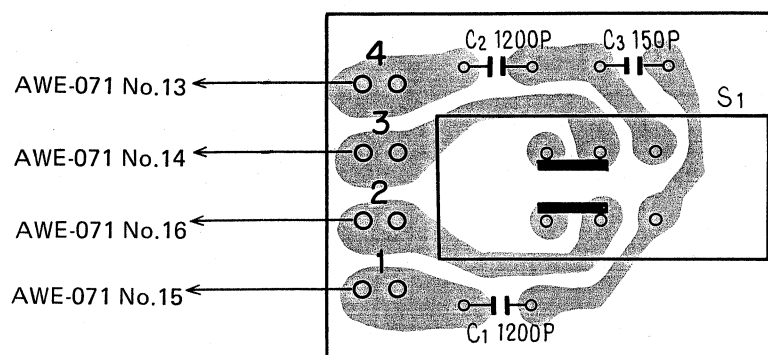
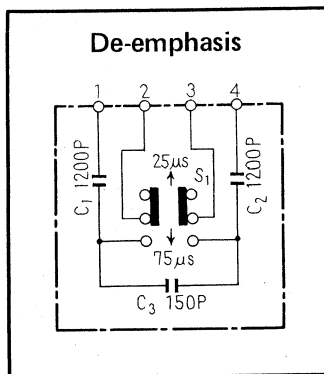
CAPACITORS

Symbol	Description	Part No.
C1	Mylar 0.02 50V	CQMA 203J 50
C2	Mylar 0.02 50V	CQMA 203J 50
C3	Mylar 0.02 50V	CQMA 203J 50
C4	Mylar 0.02 50V	CQMA 203J 50
C5	Mylar 0.02 50V	CQMA 203J 50
C6	Mylar 0.02 50V	CQMA 203J 50
C7	Mylar 0.02 50V	CQMA 203J 50
C8	Mylar 0.02 50V	CQMS 203J 50
C9	Ceramic 0.0015 50V	CKDYA 152J 50
C10	Ceramic 0.0015 50V	CKDYA 152J 50
C11	Ceramic 0.0015 50V	CKDYA 152J 50
C12	Ceramic 0.0015 50V	CKDYA 152J 50
C13	Electrolytic 10 25V	CSZA 100P 25
C14	Electrolytic 10 25V	CSZA 100P 25
C15	Electrolytic 2.2 25V	CSZA 2R2P 25
C16	Electrolytic 2.2 25V	CSZA 2R2P 25
C17	Ceramic 10p 50V	CCDSL 100K 50
C18	Ceramic 10p 50V	CCDSL 100K 50
C19	Electrolytic (NL) 100 10V	CEANL 101P 10
C20	Electrolytic (NL) 100 10V	CEANL 101P 10
C21	Electrolytic 47 35V	CEA 470P 35
C22	Electrolytic 47 35V	CEA 470P 35
C23	Electrolytic 2.2 25V	CSZA 2R2M 25
C24	Electrolytic 2.2 25V	CSZA 2R2M 25
C25	Electrolytic 0.22 35V	CSZA R22K 35
C26	Electrolytic 0.22 35V	CSZA R22K 35
C27	Mylar 0.01 50V	CQMA 103K 50
C28	Mylar 0.01 50V	CQMA 103K 50
C29	Electrolytic 10 25V	CSZA 100P 25
C30	Electrolytic 10 25V	CSZA 100P 25

OTHERS

Symbol	Description	Part No.
	Union nut	ABN-021
	Screw	ABA-116

12.10 SWITCH ASSEMBLY (AWX-099)



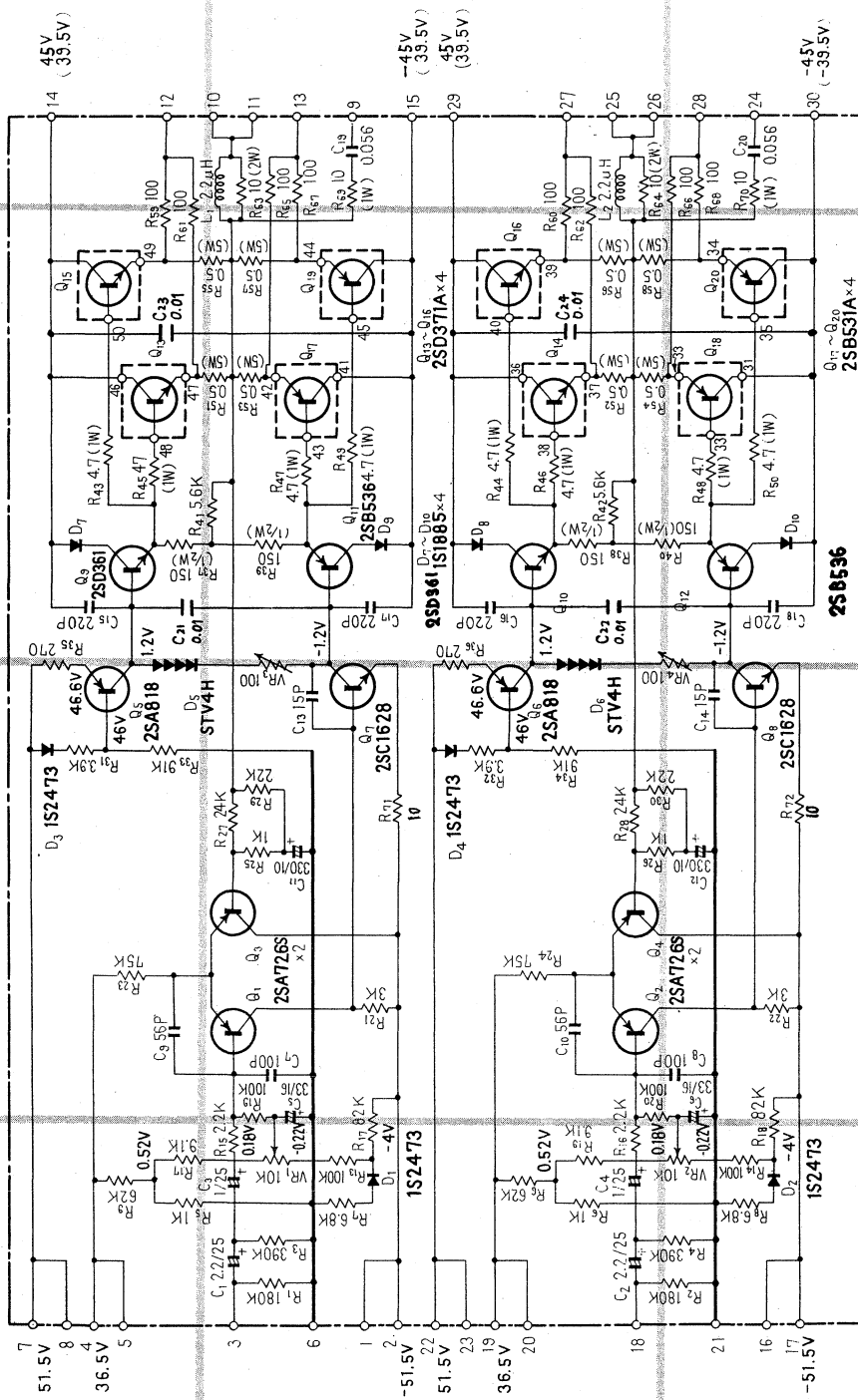
CAPACITORS

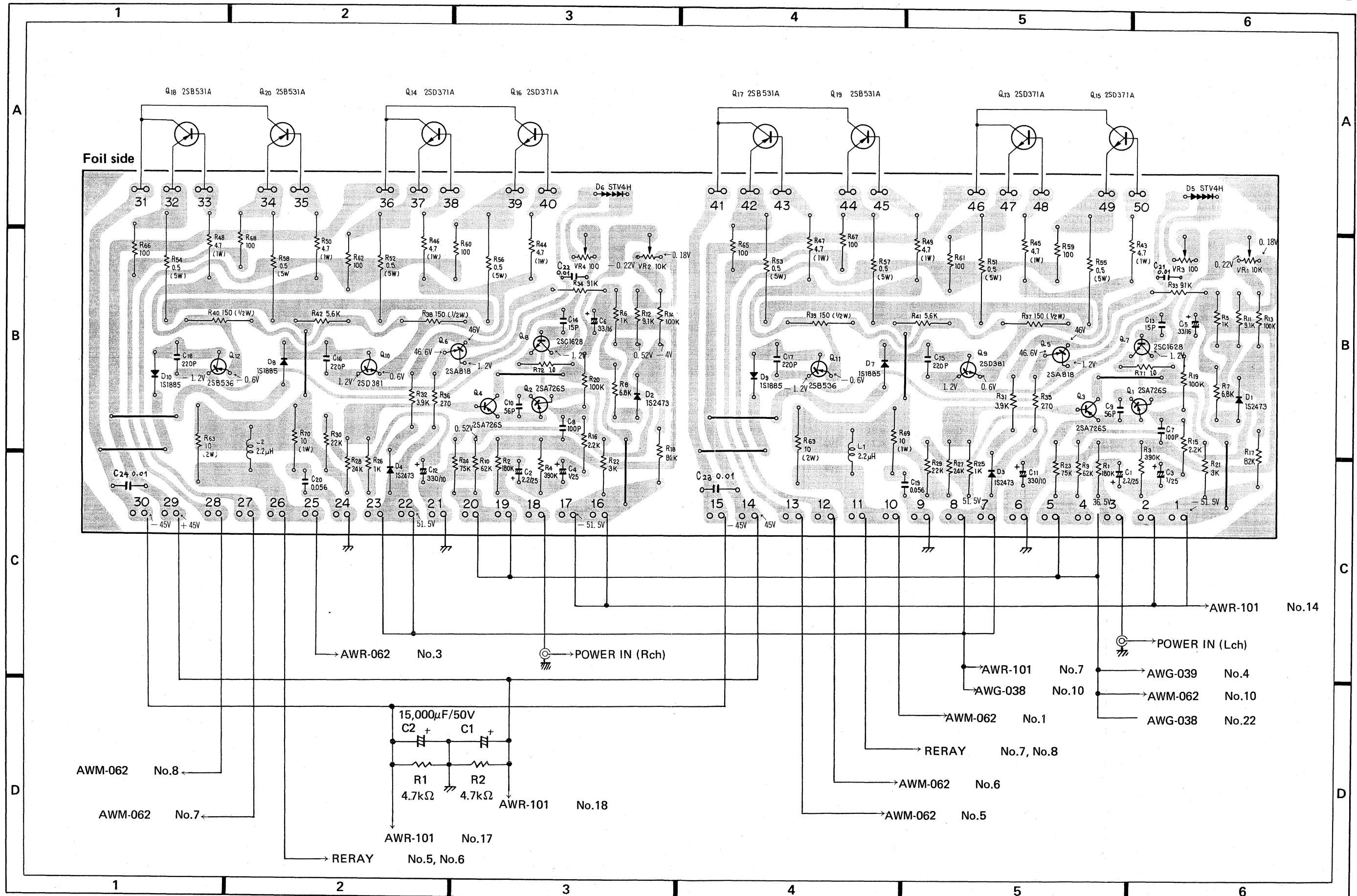
Symbol	Description			Part No.
C1	Mylar	1200p	50V	CQMA 122J 50
C2	Mylar	1200p	50V	CQMA 122J 50
C3	Mylar	150p	50V	CCDSL 151K 50

SWITCH

Symbol	Description	Part No.
S1	Slide switch	ASH-015-0

12.11 POWER AMPLIFIER ASSEMBLY (AWH-059)





Parts List of Power Amplifier Assembly (AWH-059)

CAPACITORS

Symbol	Description				Part No.
C1	Electrolytic	2.2	25V	CSSA 2R2M 25	
C2	Electrolytic	2.2	25V	CSSA 2R2M 25	
C3	Electrolytic	1	25V	CSSA 010M 25	
C4	Electrolytic	1	25V	CSSA 010M 25	
C5	Electrolytic	33	16V	CEA 330P 16	
C6	Electrolytic	33	16V	CEA 330P 16	
C7	Ceramic	100p	50V	CCDSL 101K 50	
C8	Ceramic	100p	50V	CCDSL 101K 50	
C9	Ceramic	56p	50V	CCDSL 560K 50	
C10	Ceramic	56p	50V	CCDSL 560K 50	
C11	Electrolytic	330	10V	CEA 331P 10	
C12	Electrolytic	330	10V	CEA 331P 10	
C13	Ceramic	15p	500V	CCDSL 150K 500	
C14	Ceramic	15p	500V	CCDSL 150K 500	
C15	Ceramic	220p	500V	CCDSL 221K 500	
C16	Ceramic	220p	500V	CCDSL 221K 500	
C17	Ceramic	220p	500V	CCDSL 221K 500	
C18	Ceramic	220p	500V	CCDSL 221K 500	
C19	Mylar	0.056	50V	CQMA 563M 50	
C20	Mylar	0.056	50V	CQMA 563M 50	
C21	Ceramic	0.01	50V	CKOYF 103Z 50	
C22	Ceramic	0.01	50V	CKDYF 103Z 50	
C23	Ceramic	0.01	150V	ACG-004	
C24	Ceramic	0.01	150V	ACG-004	

RESISTORS

Symbol	Description				Part No.
R1	Carbon film	180k		RD%PS 184J	
R2	Carbon film	180k		RD%PS 184J	
R3	Carbon film	390k		RD%PS 394J	
R4	Carbon film	390k		RD%PS 394J	
R5	Carbon film	1k		RD%PS 102J	
R6	Carbon film	1k		RD%PS 102J	
R7	Carbon film	6.8k		RD%PS 682J	
R8	Carbon film	6.8k		RD%PS 682J	
R9	Carbon film	62k		RD%PS 623J	
R10	Carbon film	62k		RD%PS 623J	
R11	Carbon film	9.1k		RD%PS 912J	
R12	Carbon film	9.1k		RD%PS 912J	
R13	Carbon film	100k		RD%PS 104J	
R14	Carbon film	100k		RD%PS 104J	
R15	Carbon film	2.2k		RD%PS 222J	
R16	Carbon film	2.2k		RD%PS 222J	
R17	Carbon film	82k		RD%PS 823J	
R18	Carbon film	82k		RD%PS 823J	
R19	Carbon film	100k		RD%PS 104J	
R20	Carbon film	100k		RD%PS 104J	

Symbol	Description				Part No.
R21	Carbon film	3k		RD%PS 302J	
R22	Carbon film	3k		RD%PS 302J	
R23	Carbon film	75k		RD%PS 753J	
R24	Carbon film	75k		RD%PS 753J	
R25	Carbon film	1k		RD%PS 102J	
R26	Carbon film	1k		RD%PS 102J	
R27	Carbon film	24k		RD%PS 243J	
R28	Carbon film	24k		RD%PS 243J	
R29	Carbon film	22k		RD%PS 223J	
R30	Carbon film	22k		RD%PS 223J	
R31	Carbon film	3.9k		RD%PS 392J	
R32	Carbon film	3.9k		RD%PS 392J	
R33	Carbon film	91k		RD%PS 913J	
R34	Carbon film	91k		RD%PS 913J	
R35	Carbon film	270		RD%PS 271J	
R36	Carbon film	270		RD%PS 271J	
R37	Carbon film	150	¼W	RD%PS 151J	
R38	Carbon film	150	¼W	RD%PS 151J	
R39	Carbon film	150	¼W	RD%PS 151J	
R40	Carbon film	150	¼W	RD%PS 151J	
R41	Carbon film	5.6k		RD%PS 562J	
R42	Carbon film	5.6k		RD%PS 562J	
R43	Metal film	4.7	1W	RN1H 4R7K	
R44	Metal film	4.7	1W	RN1H 4R7K	
R45	Metal film	4.7	1W	RN1H 4R7K	
R46	Metal film	4.7	1W	RN1H 4R7K	
R47	Metal film	4.7	1W	RN1H 4R7K	
R48	Metal film	4.7	1W	RN1H 4R7K	
R49	Metal film	4.7	1W	RN1H 4R7K	
R50	Metal film	4.7	1W	RN1H 4R7K	
R51	Wire wound	0.5	5W	RT5B 0R5K	
R52	Wire wound	0.5	5W	RT5B 0R5K	
R53	Wire wound	0.5	5W	RT5B 0R5K	
R54	Wire wound	0.5	5W	RT5B 0R5K	
R55	Wire wound	0.5	5W	RT5B 0R5K	
R56	Wire wound	0.5	5W	RT5B 0R5K	
R57	Wire wound	0.5	5W	RT5B 0R5K	
R58	Wire wound	0.5	5W	RT5B 0R5K	
R59	Carbon film	100		RD%PS 101J	
R60	Carbon film	100		RD%PS 101J	
R61	Carbon film	100		RD%PS 101J	
R62	Carbon film	100		RD%PS 101J	
R63	Metal oxide	10	2W	RS2P 100J	
R64	Metal oxide	10	2W	RS2P 100J	
R65	Carbon film	100		RD%PS 101J	
R66	Carbon film	100		RD%PS 101J	
R67	Carbon film	100		RD%PS 101J	
R68	Carbon film	100		RD%PS 101J	
R69	Metal oxide	10	1W	RS1P 100J	
R70	Metal oxide	10	1W	RS1P 100J	

Symbol	Description				Part No.
R71	Carbon film	10		RD%PS 100J	
R72	Carbon film	10		RD%PS 100J	
VR1	Semi-fixed	10k-B		ACP-029	
VR2	Semi-fixed	10k-B		ACP-029	
VR3	Semi-fixed	100-B		ACP-019	
VR4	Semi-fixed	100-B		ACP-019	

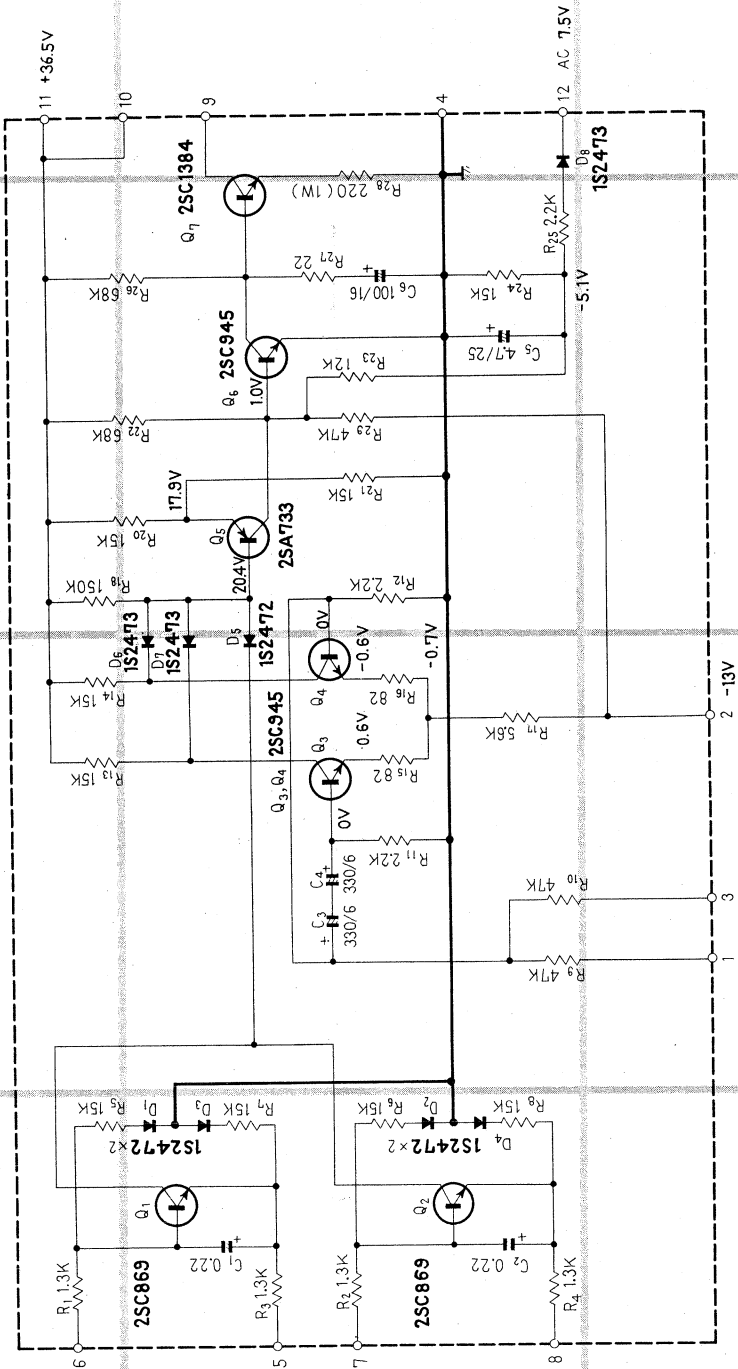
SEMICONDUCTORS

Symbol	Description				Part No.
Q1	Transistor			2SA726S-F	
Q2	Transistor			2SA763S-5	
Q3	Transistor			2SA726S-F	
Q4	Transistor			2SA763S-5	
Q5	Transistor			2SA726S-F	
Q6	Transistor			2SA763S-5	
Q7	Transistor			2SA726S-F	
Q8	Transistor			2SA763S-5	
Q9	Transistor			2SA818-Y	
Q10	Transistor			2SA898-B	
Q11	Transistor			2SA818-Y	
Q12	Transistor			2SA898-B	
D1	Diode			2SC1628-Y	
D2	Diode			2SC1903-B	
D3	Diode			2SC1628-Y	
D4	Diode			2SC1903-B	
D5	Diode			2SD381-M	
D6	Diode			2SC1903-B	
D7	Diode			2SD381-M	
D8	Diode			2SC1903-B	
D9	Diode			2SD381-M	
D10	Diode			2SB536-M	
D11	Diode			2SB536-M	
D12	Diode			1S2473	
D13	Diode			1S2473	
D14	Diode			1S2473	
D15	Diode			1S2473	
D16	Diode			STV4H	
D17	Diode			STV4H	
D18	Diode			1S1885	
D19	Diode			1S1885	
D20	Diode			1S1885	

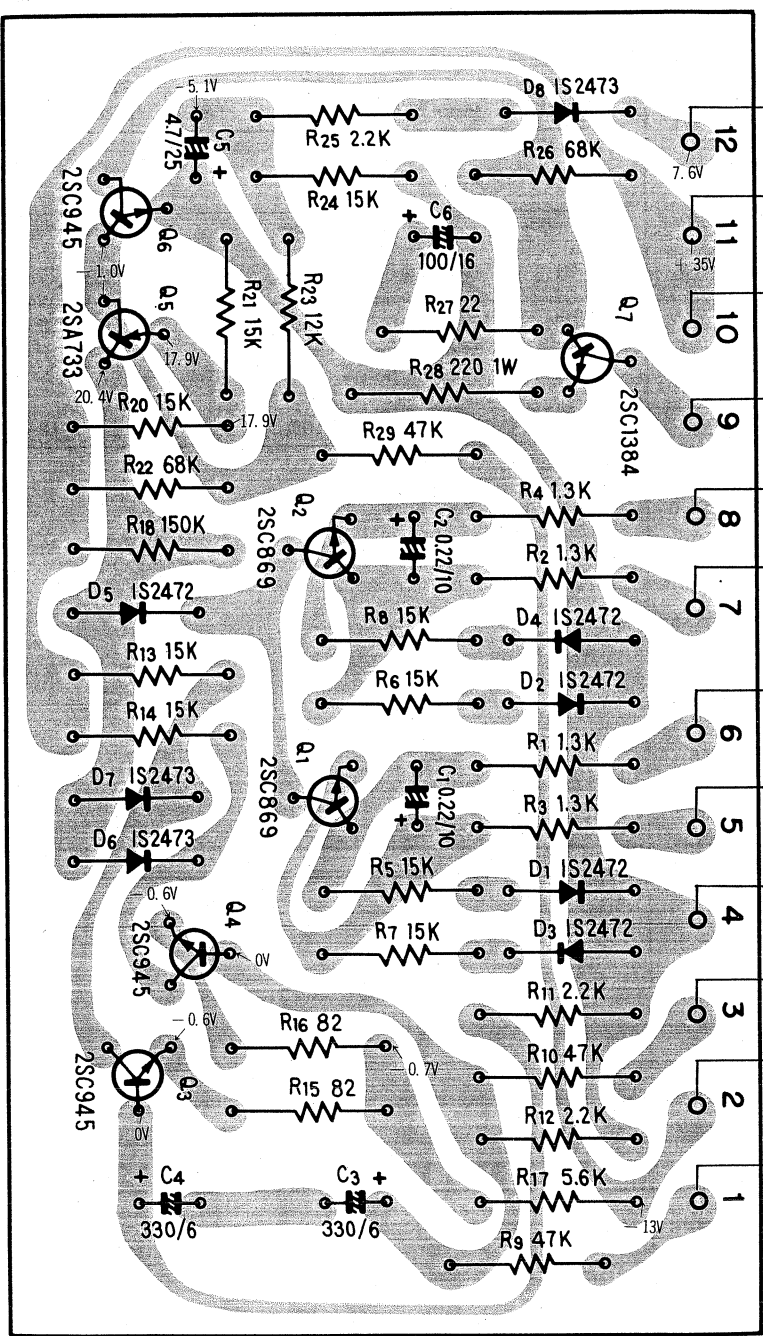
OTHERS

Symbol	Description				Part No.
L1	Choke coil				ANH-203
L2	Choke coil				T63-009
	Heat sink				T63-009
					ANH-203

12.12 PROTECTION CIRCUIT ASSEMBLY (AWM-062)



Foil side



- AWR-101 No.23 (AC7.5V)
- RERAY No.14
- AWG-038 No.22
- AWR-101 No.10
- AWG-039 No.4
- AWH-059 No.4, No.5, No.19, No.20
- RERAY No.13
- AWH-059 No.28
- AWH-059 No.27
- AWH-059 No.12
- AWH-059 No.13
- AWH-059 No.25
- AWR-101 No.13
- AWH-059 No.10

Parts List of Protection Circuit Assembly (AWM-062)

SEMICONDUCTORS

Symbol	Description	Part No.
Q1	Transistor	2SC869-C (2SC857-K) (2SC1515-K)
Q2	Transistor	2SC869-C (2SC857-K) (2SC1515-K)
Q3	Transistor	2SC945-Q
Q4	Transistor	2SC945-Q
Q5	Transistor	2SA733-Q
Q6	Transistor	2SC945-Q
Q7	Transistor	2SC1384-R
D1	Diode	1S2472
D2	Diode	1S2472
D3	Diode	1S2472
D4	Diode	1S2472
D5	Diode	1S2472
D6	Diode	1S2473 (1S1555)
D7	Diode	1S2473 (1S1555)
D8	Diode	1S2473 (1S1555)

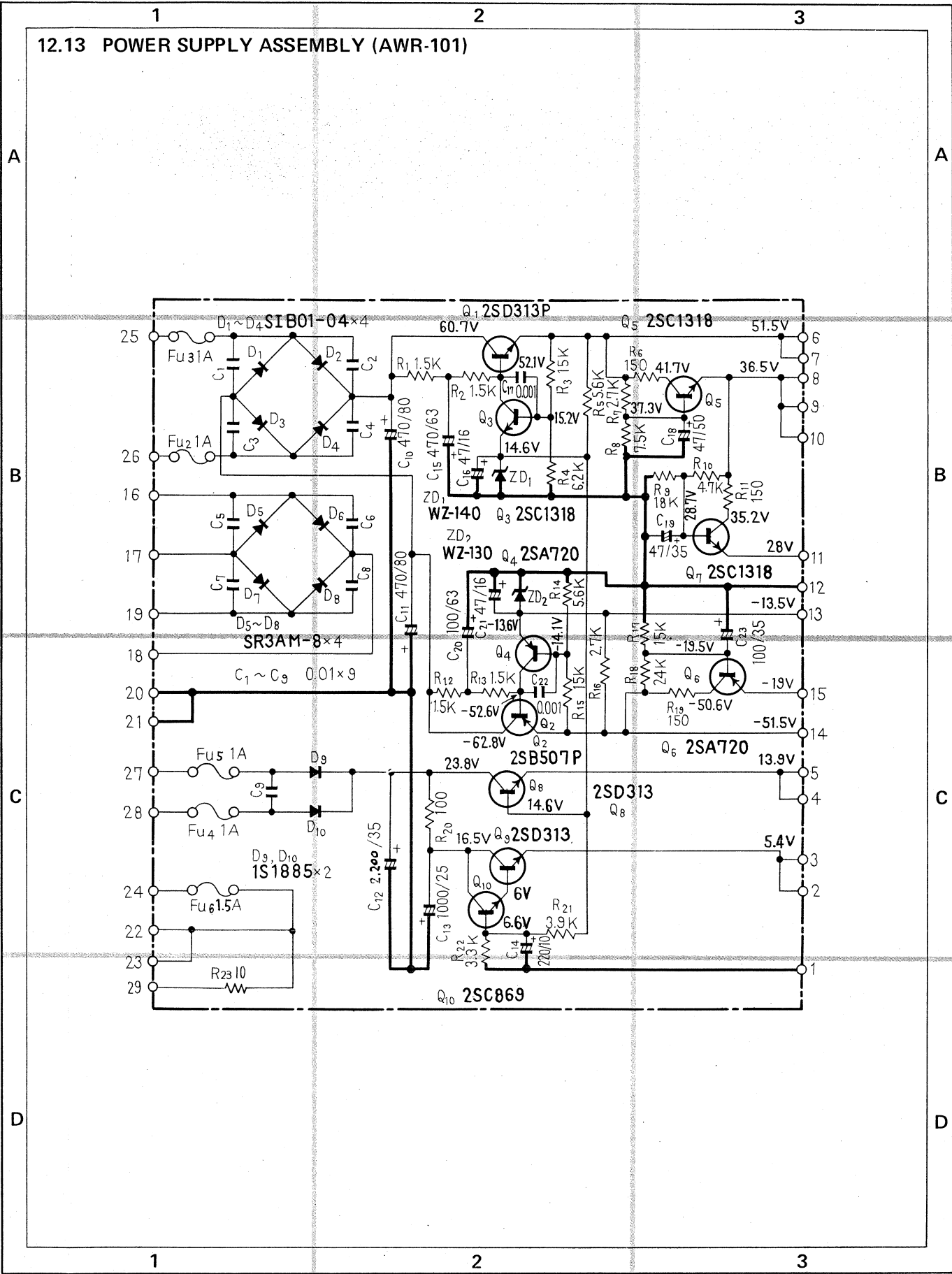
RESISTORS

Symbol	Description	Part No.
R1	Carbon film 1.3k	RD4PS 132J
R2	Carbon film 1.3k	RD4PS 132J
R3	Carbon film 1.3k	RD4PS 132J
R4	Carbon film 1.3k	RD4PS 132J
R5	Carbon film 15k	RD4PS 153J
R6	Carbon film 15k	RD4PS 153J
R7	Carbon film 15k	RD4PS 153J
R8	Carbon film 15k	RD4PS 153J
R9	Carbon film 47k	RD4PS 473J
R10	Carbon film 47k	RD4PS 473J
R11	Carbon film 2.2k	RD4PS 222J
R12	Carbon film 2.2k	RD4PS 222J
R13	Carbon film 15k	RD4PS 153J
R14	Carbon film 15k	RD4PS 153J
R15	Carbon film 82	RD4PS 820J
R16	Carbon film 82	RD4PS 820J
R17	Carbon film 5.6k	RD4PS 562J
R18	Carbon film 150k	RD4PS 154J
R19	Vacancy	
R20	Carbon film 15k	RD4PS 153J
R21	Carbon film 15k	RD4PS 153J
R22	Carbon film 68k	RD4PS 683J
R23	Carbon film 12k	RD4PS 123J

Symbol	Description	Part No.
R24	Carbon film 15k	RD4PS 153J
R25	Carbon film 2.2k	RD4PS 222J
R26	Carbon film 68k	RD4PS 683J
R27	Carbon film 22	RD4PS 220J
R28	Metal oxide 220 1W	RS1P 221J

CAPACITORS

Symbol	Description	Part No.
C1	Electrolytic 0.22 10V	CSSA R22M 10
C2	Electrolytic 0.22 10V	CSSA R22M 10
C3	Electrolytic 330 6V	CEA 331P 6
C4	Electrolytic 330 6V	CEA 331P 6
C5	Electrolytic 4.7 25V	CEA 4R7P 25
C6	Electrolytic 100 16V	CEA 101P 16





Parts List of Power Supply Assembly (AWR-101)

SEMICONDUCTORS

Symbol	Description	Part No.
Q1	Transistor	2SD313P-E
Q2	Transistor	2SB507P-E
Q3	Transistor	2SC1318-Q
Q4	Transistor	2SA720-Q
Q5	Transistor	2SC1318-Q
Q6	Transistor	2SA720-Q
Q7	Transistor	2SC1318-Q
Q8	Transistor	2SD313-E
Q9	Transistor	2SD313-E
Q10	Transistor	2SC869-C
D1	Diode	SIB01-04
D2	Diode	SIB01-04
D3	Diode	SIB01-04
D4	Diode	SIB01-04
D5	Diode	SR3AM-8
D6	Diode	SR3AM-8
D7	Diode	SR3AM-8
D8	Diode	SR3AM-8
D9	Diode	1S1885
D10	Diode	1S1885
D11	Zener diode	WZ-140
D12	Zener diode	WZ-130

RESISTORS

Symbol	Description	Part No.
R1	Carbon film 1.5k	RD½PS 152J
R2	Carbon film 1.5k	RD½PS 152J
R3	Carbon film 15k	RD½PS 153J
R4	Carbon film 6.2k	RD½PS 622J
R5	Carbon film 5.6k ½W	RD½PS 562J
R6	Carbon film 150 ½W	RD½PS 151J
R7	Carbon film 2.7k	RD½PS 272J
R8	Carbon film 7.5k	RD½PS 752J
R9	Carbon film 18k	RD½PS 183J
R10	Carbon film 4.7k	RD½PS 472J
R11	Carbon film 150 ½W	RD½PS 151J
R12	Carbon film 1.5k	RD½PS 152J
R13	Carbon film 1.5k	RD½PS 152J
R14	Carbon film 5.6k	RD½PS 562J
R15	Carbon film 15k	RD½PS 153J
R16	Carbon film 2.7k ½W	RD½PS 272J
R17	Carbon film 15k	RD½PS 153J
R18	Carbon film 24k	RD½PS 243J
R19	Carbon film 150 ½W	RD½PS 151J
R20	Metal oxide 100 3W	RS3P 101J
R21	Carbon film 3.9k	RD½PS 392J
R22	Carbon film 3.3k	RD½PS 332J
R23	Carbon film 10	RD½PS 100J

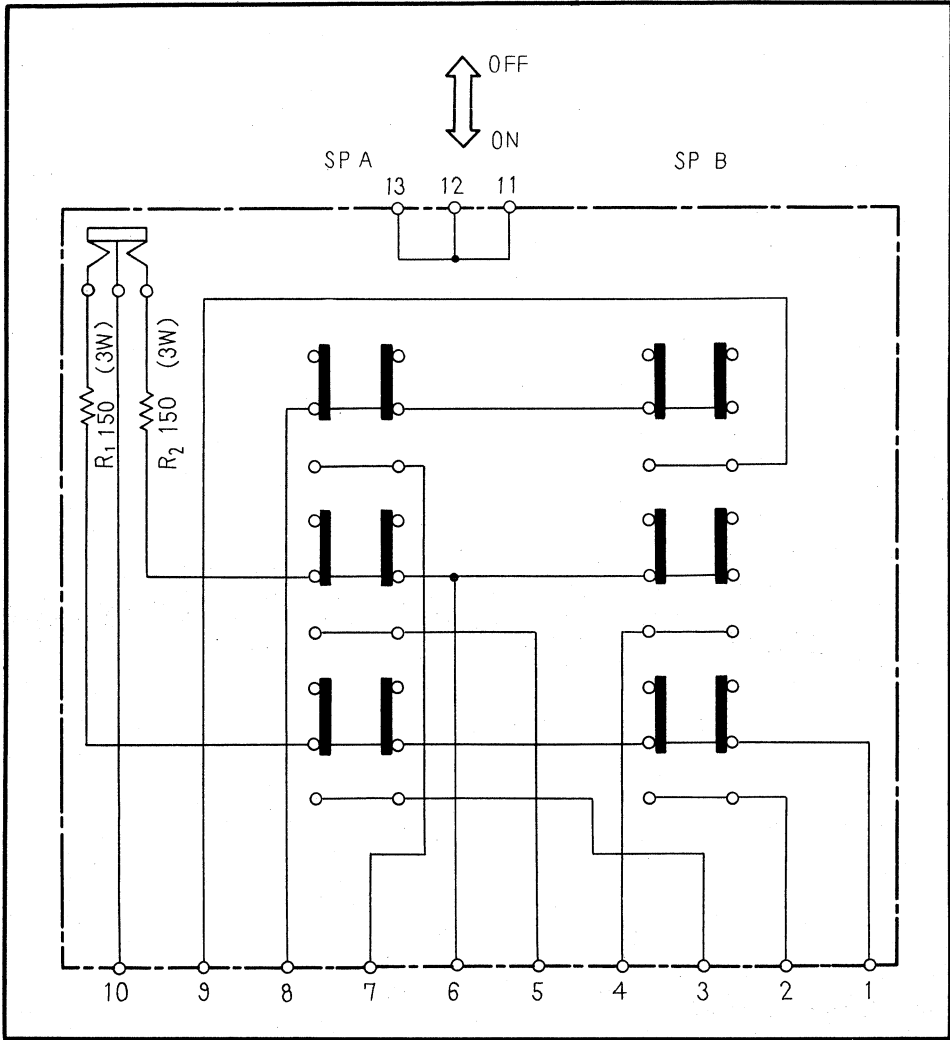
CAPACITORS

Symbol	Description	Part No.
C1	Ceramic 0.01 150V	ACG-004
C2	Ceramic 0.01 150V	ACG-004
C3	Ceramic 0.01 150V	ACG-004
C4	Ceramic 0.01 150V	ACG-004
C5	Ceramic 0.01 150V	ACG-004
C6	Ceramic 0.01 150V	ACG-004
C7	Ceramic 0.01 150V	ACG-004
C8	Ceramic 0.01 150V	ACG-004
C9	Ceramic 0.01 150V	ACG-004
C10	Electrolytic 470 80V	ACH-038
C11	Electrolytic 470 80V	ACH-038
C12	Electrolytic 2,200 35V	ACH-060
C13	Electrolytic 1,000 25V	CEA 102P 25
C14	Electrolytic 220 10V	CEA 221P 10
C15	Electrolytic 470 63V	CEA 471P 63
C16	Electrolytic 47 16V	CEA 470P 16
C17	Ceramic 0.001 50V	CKDYF 102Z 50
C18	Electrolytic 47 50V	CEA 470P 50
C19	Electrolytic 47 35V	CEA 470P 35
C20	Electrolytic 100 63V	CEA 101P 63
C21	Electrolytic 47 16V	CEA 470P 16
C22	Ceramic 0.001 50V	CKDYF 102Z 50
C23	Electrolytic 100 35V	CEA 101P 35

OTHERS

Symbol	Description	Part No.
	Heat sink	ANH-117
	Heat sink	ANH-207
	Transistor socket	AKH-002
	Mica wafer	AEC-043
	Fuse clip	AKR-013
	Fuse clip	AKR-030

12.14 SWITCH ASSEMBLY (AWS-099)



RESISTORS

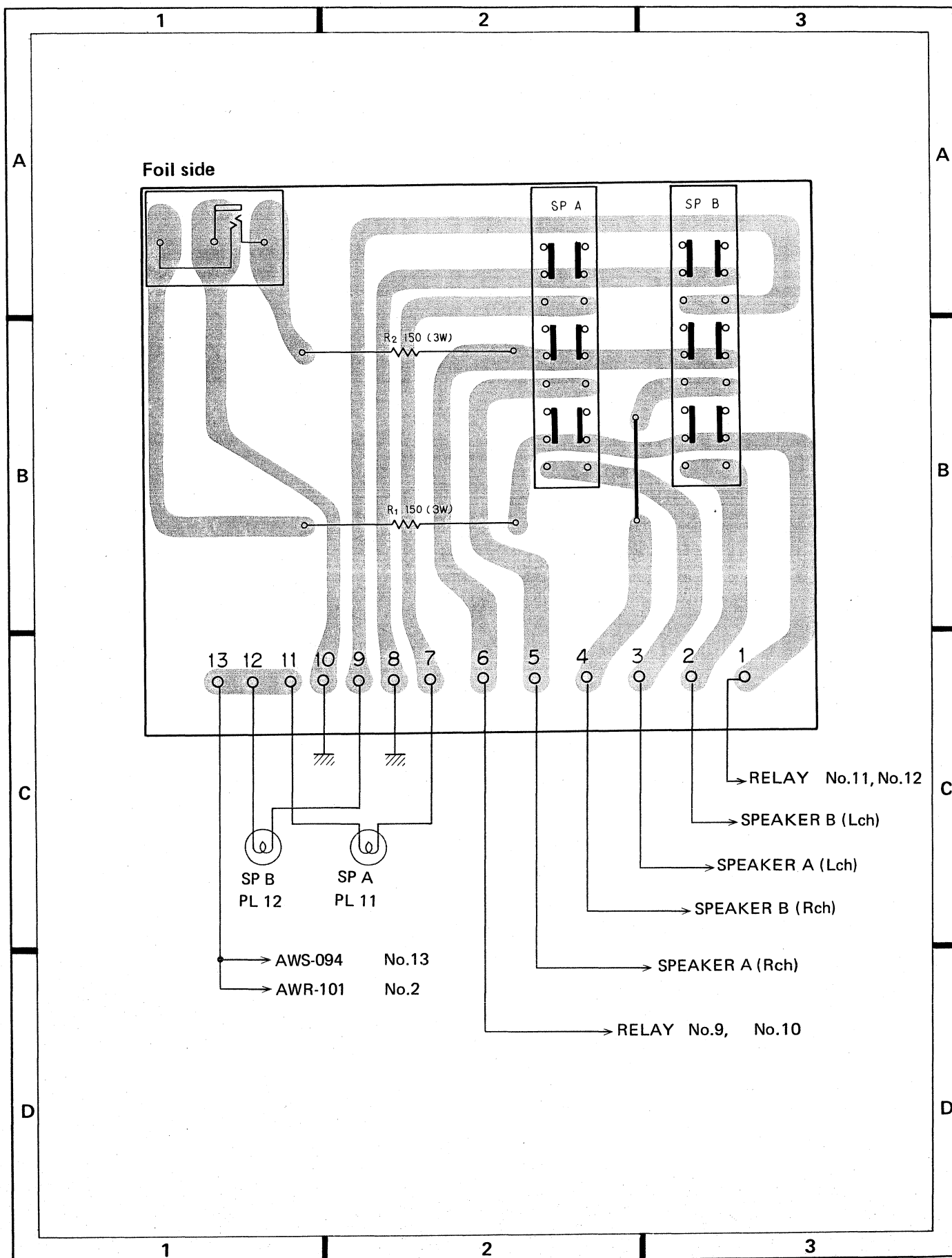
Symbol	Description	Part No.
R1	Metal oxide 150 3W	RS3P 151K
R2	Metal oxide 150 3W	RS3P 151K

SWITCH

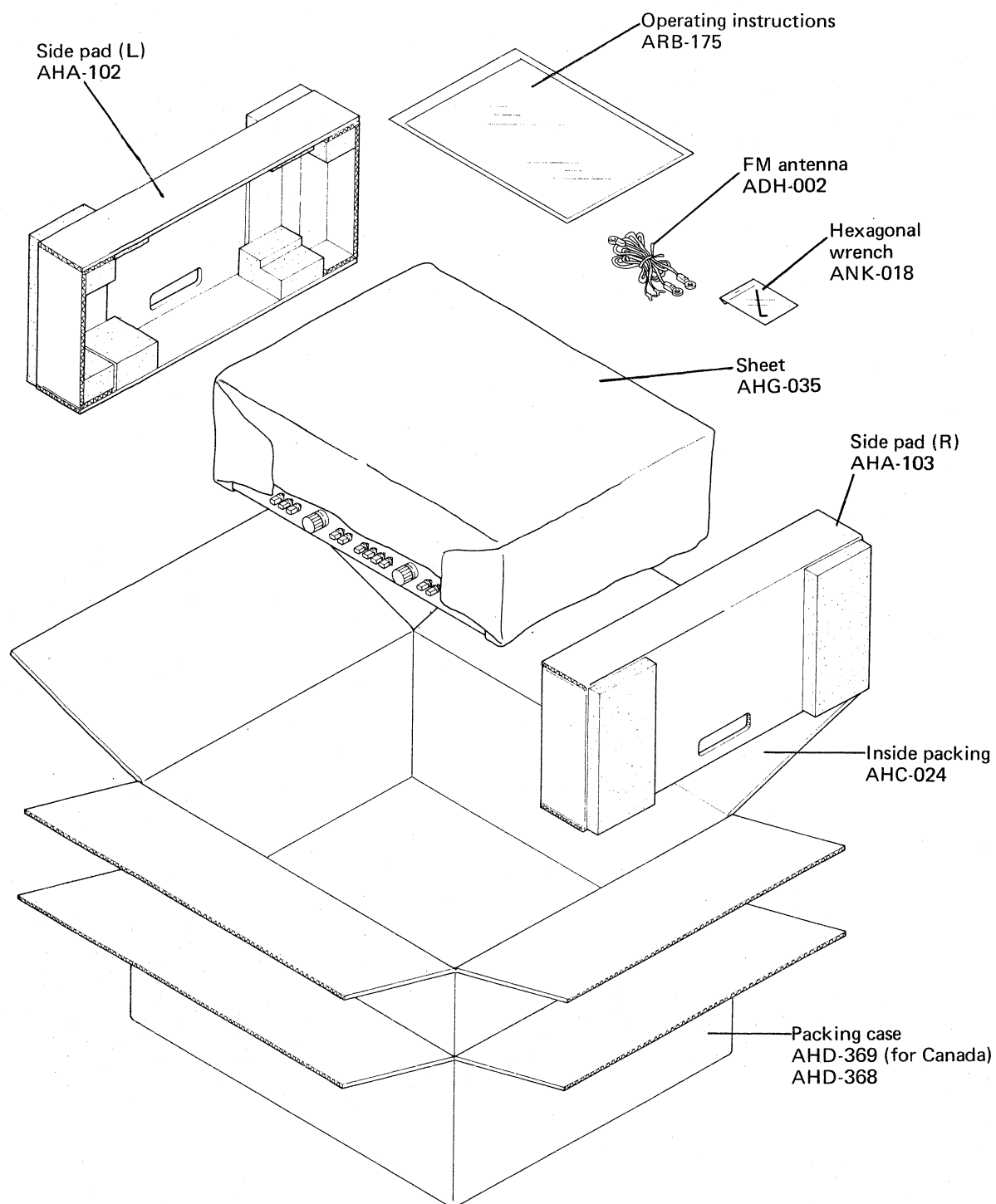
Symbol	Description	Part No.
S1	Push switch (SPEAKERS)	ASG-113

OTHERS

Symbol	Description	Part No.
J1	Phone jack (PHONES)	AKN-010



13. PACKING



AM/FM STEREO RECEIVER

SX-850

HG, S

Additional

Service Manual

NOTES:

- For servicing of the SX-850/HG or S please refer to KU, KC model with the exception of the power supply section and de-emphasis selector which are described in this supplement.
- The specifications for "HG" and S models are same as KC and KU models except for following sections,
Power Requirements 110V, 120V, 220V and 240V (Switchable) HG model
220V and 240V (Switchable) S model
Power Consumption 500W HG model
470W S model

SCHEMATIC DIAGRAMS, P.C. BOARD PATTERN AND PARTS LIST OF "HG" MODEL

1. SCHEMATIC DIAGRAM AND MISCELLANEOUS PARTS

NOTE:

- Capacitors: in μF unless otherwise noted p:pF
- Resistors: in Ω , $\frac{1}{4}W$ unless otherwise noted k:k Ω , M:M Ω

Miscellaneous Parts

SEMICONDUCTORS

Symbol	Description	Part No.
Q1	Transistor	2SB531A-R
Q2	Transistor	2SB531A-R
Q3	Transistor	2SD371A-R
Q4	Transistor	2SD371A-R
Q5	Transistor	2SB531A-R
Q6	Transistor	2SB531A-R
Q7	Transistor	2SD371A-R
Q8	Transistor	2SD371A-R

SWITCHES

Symbol	Description	Part No.
S1	Lever switch (POWER)	ASK-103
S2	Relay	ASR-019
S3	Plug in selector (line Voltage selector)	AKX-037

TRANSFORMERS AND COILS

Symbol	Description	Part No.
T1	Power transformer	ATT-330
T2	Ferrite balun	T22-025
T3	Bar-antenna assembly	AXB-009

LAMPS

Symbol	Description	Part No.
PL1	Lamp assembly*	
PL2	Lamp assembly*	
PL3	Lamp assembly*	
PL4	Lamp assembly*	
*Lamp assemblies (PL1-PL4) are made up of following parts. (1) Lamp (8V, 0.3A, wedge-type) (2) Lamp socket (wedge-type)		AEL-029 AKK-003
PL5	Lamp with leads (8V, 50mA)	AEL-069
PL6	Lamp with leads (8V, 50mA)	AEL-076
PL7	Lamp with leads (8V, 50mA)	AEL-075
PL8	Lamp with leads (8V, 50mA)	AEL-082
PL9	Lamp with leads (8V, 50mA)	AEL-072
PL10	Lamp with leads (8V, 50mA)	AEL-073
PL11	Lamp with leads (8V, 50mA)	AEL-072
PL12	Lamp with leads (8V, 50mA)	AEL-073

RESISTORS

Symbol	Description	Part No.
R1	Metal oxide 4.7k 2W	RS2P 472J
R2	Metal oxide 4.7k 2W	RS2P 472J

CAPACITORS

Symbol	Description	Part No.
C1	Electrolytic 15,000 50V	ACH-068
C2	Electrolytic 15,000 50V	ACH-068
C3	Ceramic 0.01 250V	ACG-001
C4		
C5	Ceramic 0.01 50V	CKDYF 103Z 50
C6	Ceramic 0.01 50V	CKDYF 103Z 50
C7	Ceramic 0.01 50V	CKDYF 103Z 50
C8	Ceramic 0.01 50V	CKDYF 103Z 50
C9	Ceramic 0.01 50V	CKDYF 103Z 50
C10	Ceramic 0.01 50V	CKDYF 103Z 50
C11	Ceramic 0.01 50V	CKDYF 103Z 50
C12	Ceramic 0.01 50V	CKDYF 103Z 50
C13	Styrol 560p 50V	CQSA 561J 50
C14	Styrol 560p 50V	CQSA 561J 50

FUSES

Symbol	Description	Part No.
FU1	Fuse 2.5A (primary)	AEK-403
FU2	Fuse 1A (secondary)	AEK-402
FU3	Fuse 1A (secondary)	AEK-402
FU4	Fuse 1A (secondary)	AEK-402
FU5	Fuse 1A (secondary)	AEK-402
FU6	Fuse 1.6A (lamp circuit)	AEK-405

OTHERS

Symbol	Description	Part No.
	AC socket (AC INLET)	AKP-008
	Terminal (ANTENNA)	AKA-004
	Fuse holder 1P (FU1 Primary)	K91-008

NOTE:

- Capacitors: in μF unless otherwise noted p:pF
- Resistors: in Ω , $\frac{1}{4}W$ unless otherwise noted k:k Ω , M:M Ω

Miscellaneous Parts
SEMICONDUCTORS

Symbol	Description	Part No.
Q1	Transistor	2SB531A-R
Q2	Transistor	2SB531A-R
Q3	Transistor	2SD371A-R
Q4	Transistor	2SD371A-R
Q5	Transistor	2SB531A-R
Q6	Transistor	2SB531A-R
Q7	Transistor	2SD371A-R
Q8	Transistor	2SD371A-R

TRANSFORMERS AND COILS

Symbol	Description	Part No.
T1	Power transformer	ATT-329
T2	Ferrite balun	T22-025
T3	Bar-antenna assembly	AXB-009

RESISTORS

Symbol	Description	Part No.
R1	Metal oxide 4.7k 2W	RS2P 472J
R2	Metal oxide 4.7k 2W	RS2P 472J

LAMPS

Symbol	Description	Part No.
PL1	Lamp assembly*	
PL2	Lamp assembly*	
PL3	Lamp assembly*	
PL4	Lamp assembly*	
	* Lamp assemblies (PL1—PL4) are made up of following parts.	
	(1) Lamp (8V, 0.3A, wedge-type)	AEL-029
	(2) Lamp socket (wedge-type)	AKK-003
PL5	Lamp with leads (8V, 50mA)	AEL-069
PL6	Lamp with leads (8V, 50mA)	AEL-076
PL7	Lamp with leads (8V, 50mA)	AEL-075
PL8	Lamp with leads (8V, 50mA)	AEL-082
PL9	Lamp with leads (8V, 50mA)	AEL-072
PL10	Lamp with leads (8V, 50mA)	AEL-073
PL11	Lamp with leads (8V, 50mA)	AEL-072
PL12	Lamp with leads (8V, 50mA)	AEL-073

CAPACITORS

Symbol	Description	Part No.
C1	Electrolytic 15,000 50V	ACH-068
C2	Electrolytic 15,000 50V	ACH-068
C3	Ceramic 0.01 250V	ACG-001
C4	Ceramic 0.01 250V	ACG-001
C5	Ceramic 0.01 50V	CKDYF 103Z 50
C6	Ceramic 0.01 50V	CKDYF 103Z 50
C7	Ceramic 0.01 50V	CKDYF 103Z 50
C8	Ceramic 0.01 50V	CKDYF 103Z 50
C9	Ceramic 0.01 50V	CKDYF 103Z 50
C10	Ceramic 0.01 50V	CKDYF 103Z 50
C11	Ceramic 0.01 50V	CKDYF 103Z 50
C12	Ceramic 0.01 50V	CKDYF 103Z 50
C13	Styrol 560p 50V	CQSA 561J 50
C14	Styrol 560p 50V	CQSA 561J 50

FUSES

Symbol	Description	Part No.
FU1	Fuse 2.5A (primary)	AEK-102
FU2	Fuse 1A (secondary)	AEK-106
FU3	Fuse 1A (secondary)	AEK-106
FU4	Fuse 1A (secondary)	AEK-106
FU5	Fuse 1A (secondary)	AEK-106
FU6	Fuse 1.5A (lamp circuit)	AEK-104

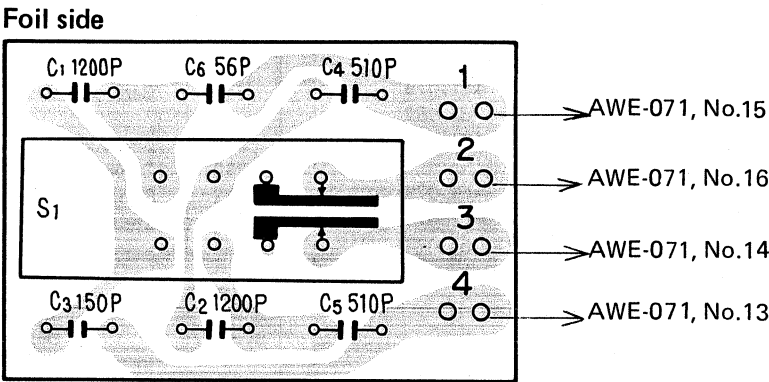
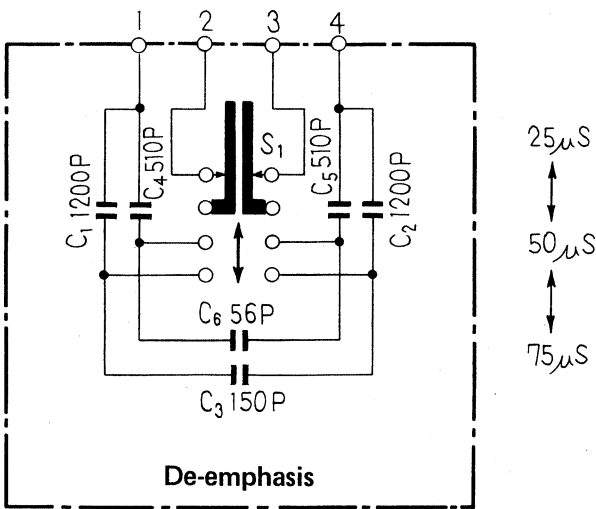
OTHERS

Symbol	Description	Part No.
	AC socket (AC OUTLETS)	AKP-005
	AC power cord	ADG-002

SWITCHES

Symbol	Description	Part No.
S1	Lever switch (POWER)	ASK-097
S2	Relay	ASR-019
S3	Plug in selector (line Voltage selector)	AKR-031

2. SWITCH ASSEMBLY (AWX-101)



Parts List of Switch Assembly (AWX-101)

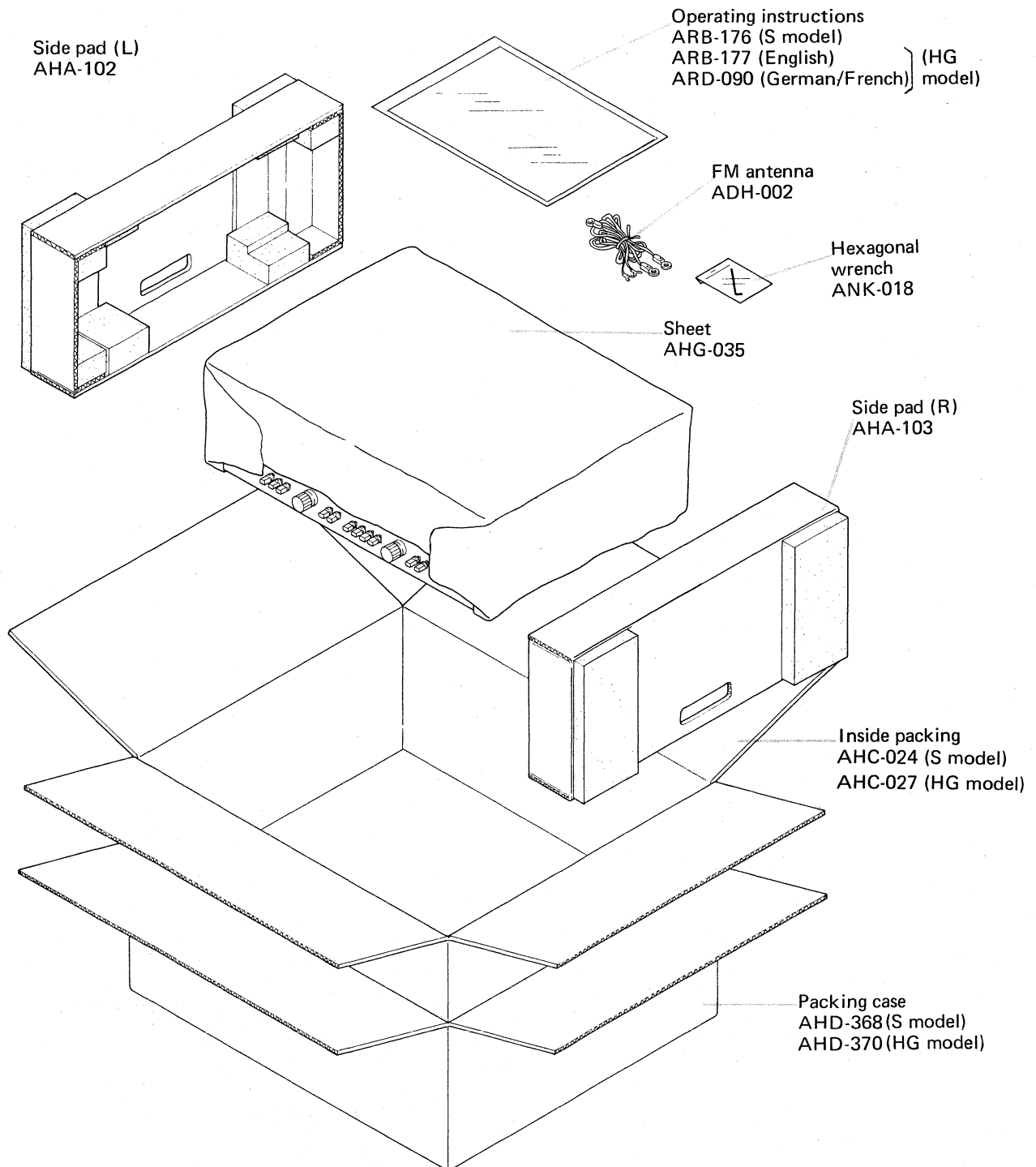
CAPACITORS

Symbol	Description			Part No.
C1	Ceramic	1200p	50V	CKDYA 122J 50
C2	Ceramic	1200p	50V	CKDYA 122J 50
C3	Ceramic	150p	50V	CCDSL 151K 50
C4	Styrol	510p	50V	CQSA 511J 50
C5	Styrol	510p	50V	CQSA 511J 50
C6	Ceramic	56p	50V	CCDSL 560 K 50

SWITCH

Symbol	Description	Part No.
S1	Slide switch	ASH-017

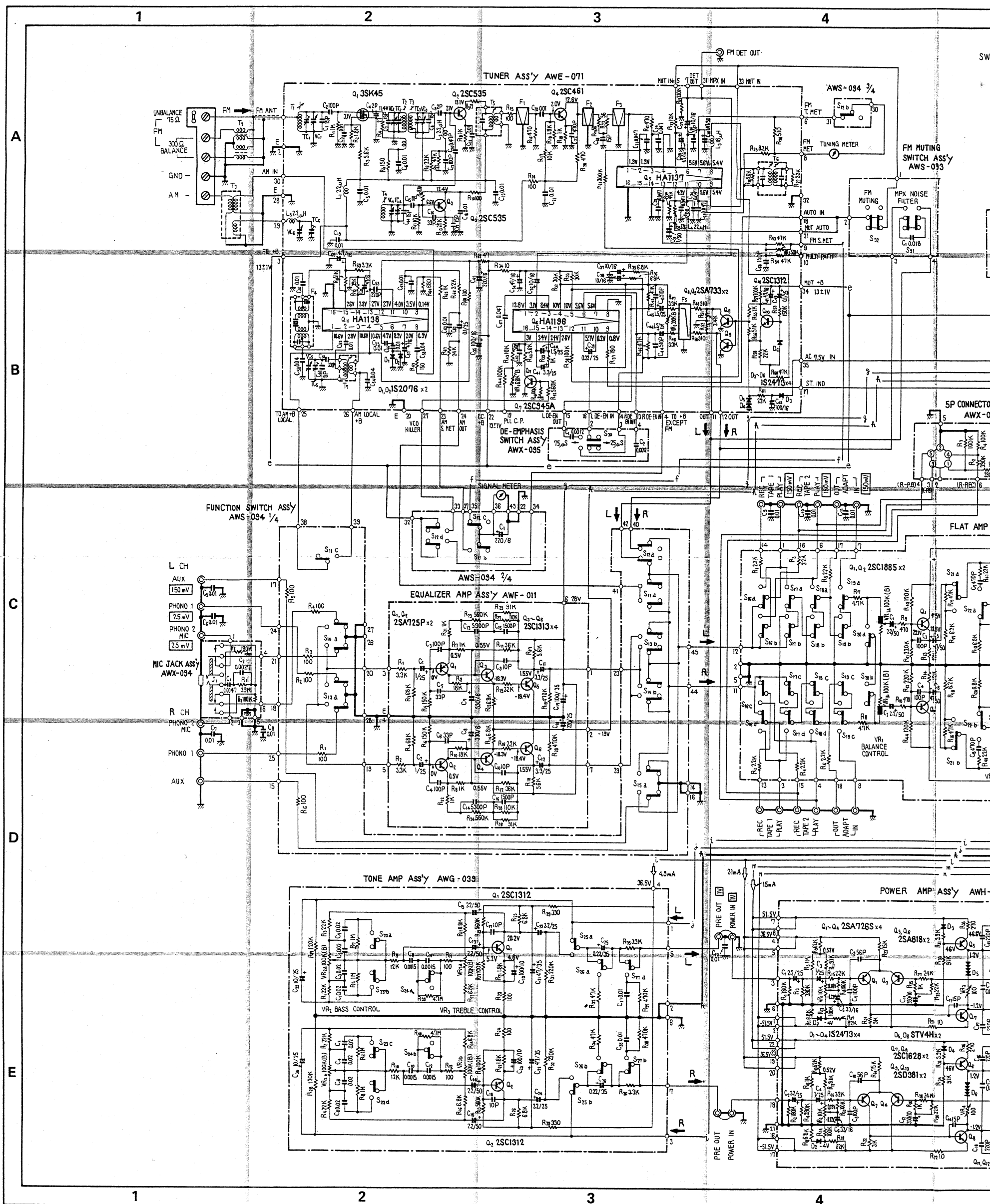
PACKING OF "HG" AND "S" MODELS



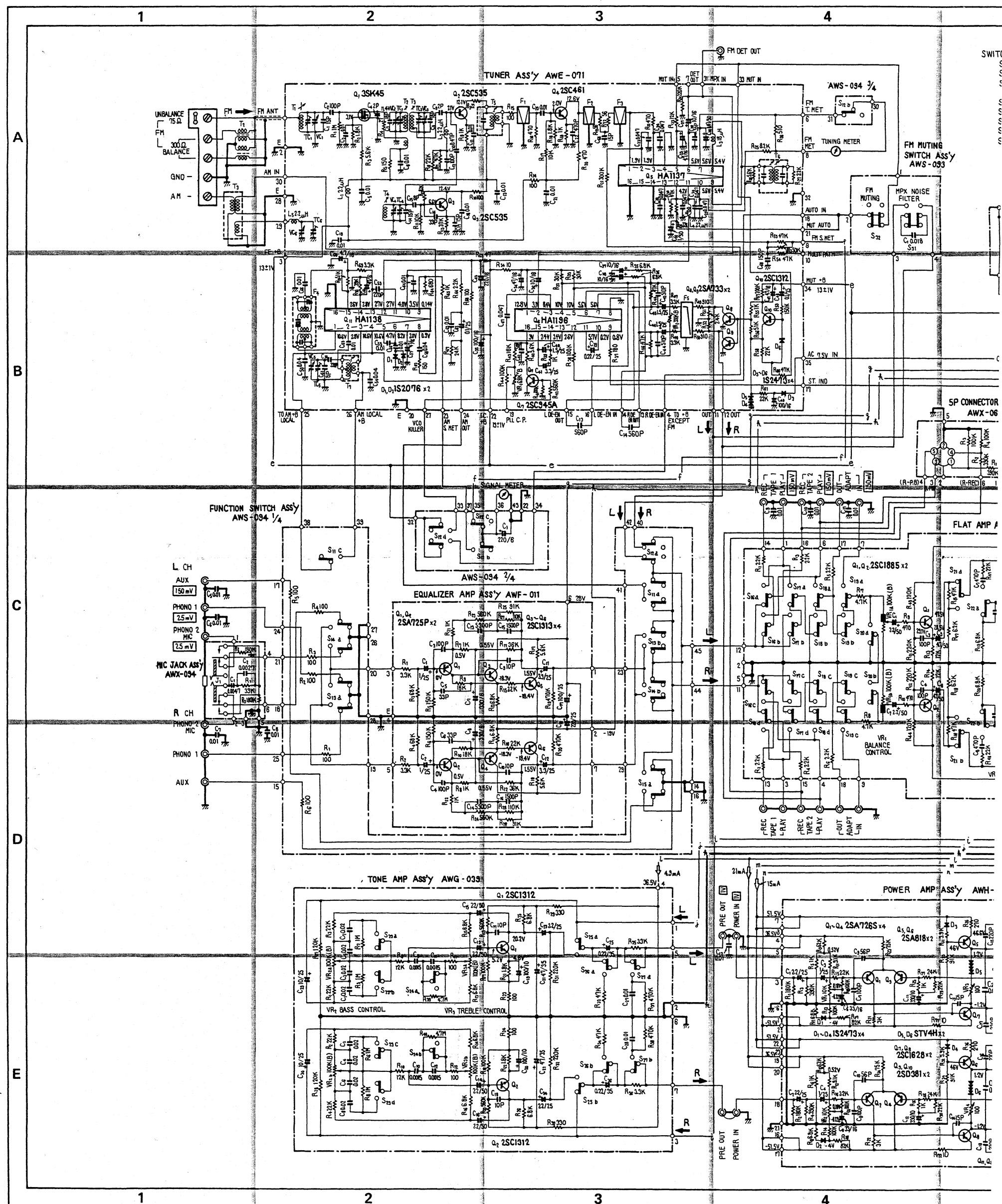
AM/FM STEREO RECEIVER

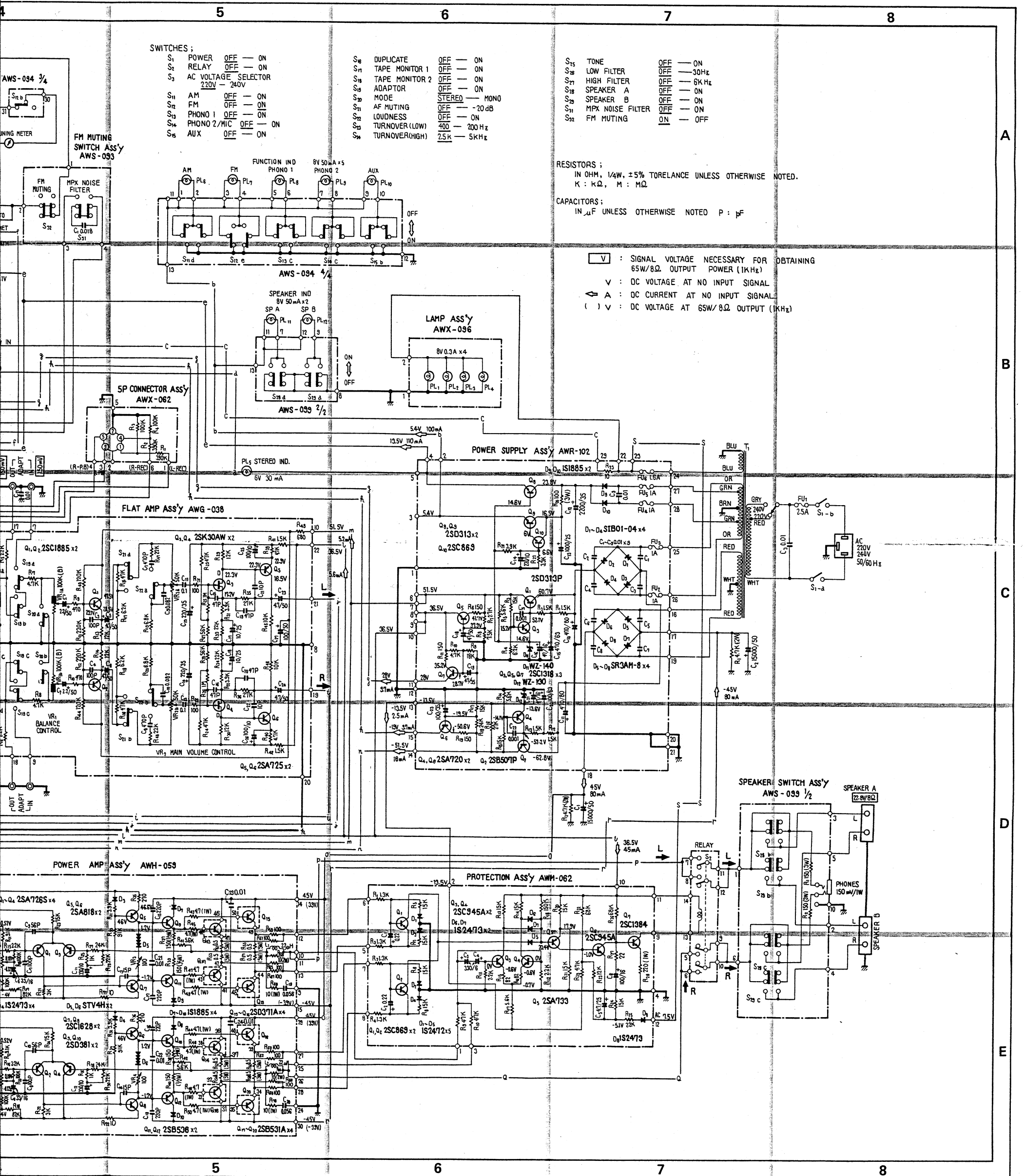
SX-850

KC,KU



SX-850 HG





AM/FM STEREO RECEIVER

SX-850

