

<R42-285-0>

Service Manual

4-CHANNEL RECEIVER

QX-9900/FW

<72H02M31D>

PIONEER®

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1. SPECIFICATIONS

SEMICONDUCTORS

FETs	8
ICs	4
Transistors	113
Diodes	62

POWER AMPLIFIER SECTION

Music Power Output (IHF)	240W (4Ω) 180W (8Ω)
Continuous Power Output (1kHz each channel driven)	50W/50W/50W/50W (4Ω) 38W/38W/38W/38W (8Ω)
Continuous Power Output (1kHz 2 channels driven)	45W + 45W/45W + 45W (4Ω) 35W + 35W/35W + 35W (8Ω)
Continuous Power Output (1kHz 4 channels driven)	36W x 4 (4Ω) 30W x 4 (8Ω)
Power Output in the Range of 20Hz to 20kHz	
(2 channels driven)	33W + 33W/33W + 33W { 8Ω, Harmonic Distortion }
(4 channels driven)	28W x 4 { less than 0.5% }
Harmonic Distortion	Less than 0.5% (Continuous Power Output) Less than 0.03% (8Ω, 18W + 18W/18W + 18W Power Output)
Intermodulation Distortion	Less than 0.5% (Continuous Power Output) Less than 0.05% (8Ω, 18W + 18W/18W + 18W Power Output)
Power Bandwidth (IHF)	
2 channels driven	5Hz to 80kHz (8Ω, Harmonic Distortion)
4 channels driven	5Hz to 70kHz less than 0.5%)
Frequency Response	5Hz to 90kHz, ± 1 dB
Input Sensitivity/Impedance (1kHz Continuous Power Output)	500mV/50kΩ
Speakers	2 pairs for Front, 2 pairs for Rear (4 to 16Ω)
Headphone Jacks	Front and Rear
Damping Factor	50 (8Ω, 1kHz)
Output Level Meters	0 dB = 35W/8Ω (4 channels)

PREAMPLIFIER SECTION

Output Voltage	500mV (Rated output), 4.5V (Max.)
Harmonic Distortion	Less than 0.5%
Frequency Response	10Hz to 20kHz, ± 1 dB
Input Sensitivity/Impedance (1kHz, for rated output)	PHONO 1 MAG 2.9mV/45kΩ PHONO 2 MAG 2.9mV/45kΩ MIC 3.8mV/50kΩ AUX 1, 2 200mV/60kΩ TAPE MONITOR 1, 2 200mV/60kΩ
Recording Output	TAPE REC 1, 2 (Pin jack) 200mV TAPE REC (DIN connector) 35mV
BASS Control	-10.5 dB, +10.5 dB/100Hz
TREBLE Control	-10 dB, + 9.5 dB/10kHz
LOW Filter	- 8 dB/50Hz (6 dB/oct.)
HIGH Filter	- 8 dB/10kHz (6 dB/oct.)
Equalization Curve	PHONO: RIAA S.T.D.
Loudness Contour	+7 dB/100Hz, +4 dB/10kHz With Volume Control set at -40 dB position.
Muting	-20 dB
Hum and Noise (IHF, Short circuited, A network)	PHONO: More than 75 dB, AUX More than 85 dB

FM TUNER SECTION

Frequency Range	88MHz to 108MHz
Usable Sensitivity (IHF)	1.8 μV
Capture Ratio (IHF)	2 dB
Selectivity (IHF)	More than 70 dB
Image Rejection	More than 85 dB (98MHz)
IF Rejection	More than 100 dB (90MHz)
Spurious Rejection	More than 90 dB (98MHz)
AM Suppression	50 dB
Signal to Noise Ratio	70 dB
Harmonic Distortion	Mono: less than 0.3% (100% Mod.) Stereo: less than 0.5% (100% Mod.)
Tuning Indicator	Signal strength type and Center tuning type
Muting	Switchable to ON-OFF
Stereo Separation	More than 40 dB (1kHz)
Sub Carrier Suppression	More than 50 dB
Noise Filter	Switchable to ON-OFF
Antenna Input	Impedance 300Ω balanced and 75Ω unbalanced
De-emphasis	75μsec and 50μsec (switchable)

In some countries, model QX-9900 is delivered with a selector switch for adjusting the FM de-emphasis from 50 to 75μsec. If your unit is equipped with such a switch on the chassis, and if the high sound range gives an impression of weakness, move the de-emphasis switch to its other position.

AM TUNER SECTION

Frequency Range	525kHz to 1,605kHz
Usable Sensitivity (IHF)	10 μV
Selectivity (IHF)	More than 35 dB
Image Rejection	More than 80 dB (1,000kHz)
IF Rejection	More than 75 dB
Signal to Noise Ratio	More than 50 dB
Antenna	Built-in ferrite loopstick antenna

MISCELLANEOUS

Power Requirements	110V, 120V, 130V, 220V and 240V (Switchable)
	50-60Hz
Power Consumption	480W (Max.)
AC Outlets	Switched 1, Unswitched 2
Dimensions (overall)	22-1/16 in./560mm (width) 6-11/16 in./170mm (height) 16-15/16 in./430mm (depth)
Weight	Without package 46 lb 14 oz/21.3 kg With package 56 lb 12 oz/25.8 kg
Furnished Parts	FM T-type antenna 1 Speaker plugs 8 Polishing cloth 1 Operating instructions 1

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

2. FRONT PANEL FACILITIES-1

POWER SWITCH

Push once to switch the power ON, once again to turn it OFF.

SPEAKER SWITCHES

Up to four pairs of speakers can be connected and switched on and off (in pairs) with the SPEAKER switch buttons. Button released: respective pair of speakers in operation. Button depressed: respective pair of speakers off. (When released, these buttons light up.) For correlation with 2-channel or 4-channel mode, see explanations for MODE switch.

PHONES JACKS

Plug the headphones into FRONT jack to hear the left and right front channels. Likewise, plug the headphones into REAR jack to hear in the left and right rear channels.

FILTER BUTTONS

LOW: Use this filter to cut out low-frequency noise (hum, rumble).
HIGH: Use this filter to cut out high-frequency noise (hiss).

LOUDNESS BUTTONS

The loudness circuit compensates for an apparent loss in very low and very high frequency ranges when the listening volume is rather low. At normal and high volumes, leave these buttons in OFF position (released). The left button functions on the front channels, the right button on the rear channels.

AUDIO MUTING BUTTON

With this switch set to -20dB position, the output level is attenuated by 20dB.

VOLUME CONTROL

Controls the output volumes of all four channels simultaneously. Turning the knob to the right will increase the volume.

SELECTOR SWITCH

This switch selects the program source.

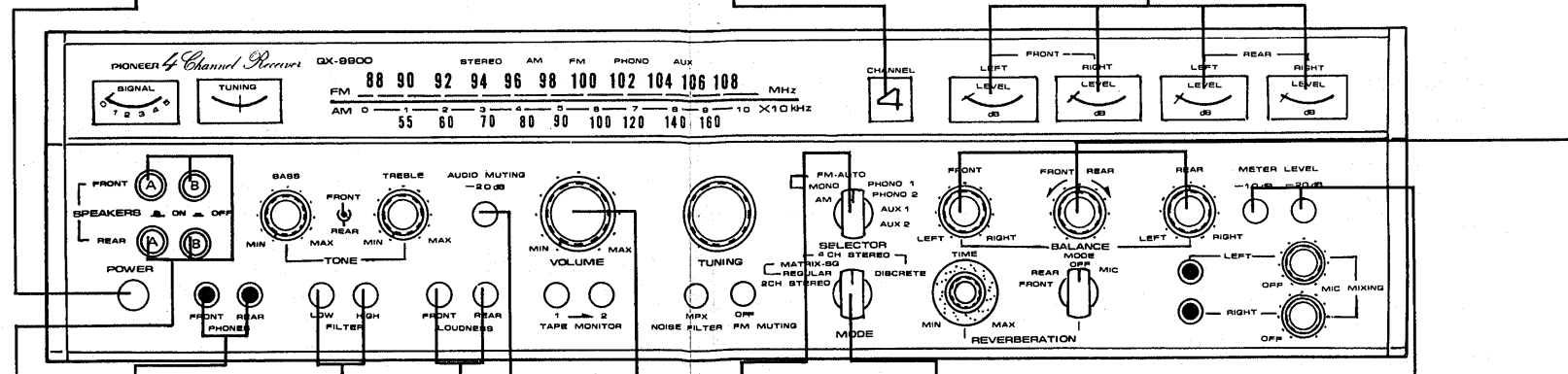
- AM AM reception.
- FM MONO FM monophonic reception only.
- FM AUTO FM reception, with automatic switching for either stereo or monophonic programs.
- PHONO 1 For playing records on a turntable plugged into the PHONO 1 jacks.
- PHONO 2 Same as above for PHONO 2 jacks.
- AUX 1 For playing signals fed to the AUX 1 jacks.
- AUX 2 Same as above for AUX 2 jacks.

4/2 CHANNEL INDICATOR

Lights up in accordance with the position of the MODE switch.

LEVEL METERS

Indicate output level of the amplifier.



MODE SWITCH

Selects the various 2-channel and 4-channel listening modes.
2 CH STEREO . . . Used for reproduction of 2-channel stereo. Use this position for listening to FM monophonic and AM broadcasts.

4 CH STEREO MATRIX-

REGULAR Used for 4-channel reproduction of regular matrix records or FM stereo broadcasts playing matrix records. Also use this position when listening to 2-channel records and FM stereo broadcasts, adding 4-channel effects.

MATRIX-SQ Used for 4-channel reproduction of SQ system records and FM broadcasts with the use of SQ record. Also use this position when listening to 2-channel stereo records and FM stereo broadcasts.

DISCRETE Used for reproduction of discrete 4-channel tapes and cartridge tapes. If a decoder is added, this position may be used to reproduce discrete 4-channel records (CD-4).

NOTE: With this switch set to 2 CH STEREO, sound from the rear left speaker (CH. 2) will be the same as that from the front left speaker (CH. 1) while sound from the rear right speaker (CH. 4) will be the same as that from the front right speaker (CH. 3). To hear the front speakers only, turn off the rear speakers by operating the SPEAKER switches.

BALANCE CONTROLS

FRONT Controls the relative volume of the front left and right channels.

FRONT / REAR . . . Controls the relative volume of the two front channels as opposed to the two rear channels.

REAR Controls the relative volume of the rear left and right channels.

METER LEVEL BUTTONS

Select meter sensitivity.

-10dB: Push this button, the level meters indicate 10dB more than actual output level. Therefore, subtract 10 from the meter reading to obtain actual output. E.g. when the meter is indicating -3dB, the actual output level is -13dB.

-20dB: Level meters indicate 20dB more than actual output level. Subtract 20 from the meter reading to obtain actual output.

-30dB: With both buttons pushed, the meters indicate 30dB more than actual output level.

NOTE: When -10dB and -20dB buttons are not pushed, the level meters indicate actual output level. A reading of 0dB indicates 35W per channel into an 8Ω load.

(Continued on pp. 5, 6.)

3. FRONT PANEL FACILITIES-2

FM TUNING METER

Meter for indicating correct FM tuning. After the SIGNAL meter reading has been peaked, adjust tuning so that the pointer of this meter falls at the center mark.

SIGNAL METER

Indicates the intensity of the received AM or FM radio signal.

FM STEREO INDICATOR

This lamp lights when an FM stereo broadcast is being received.

TUNING KNOB

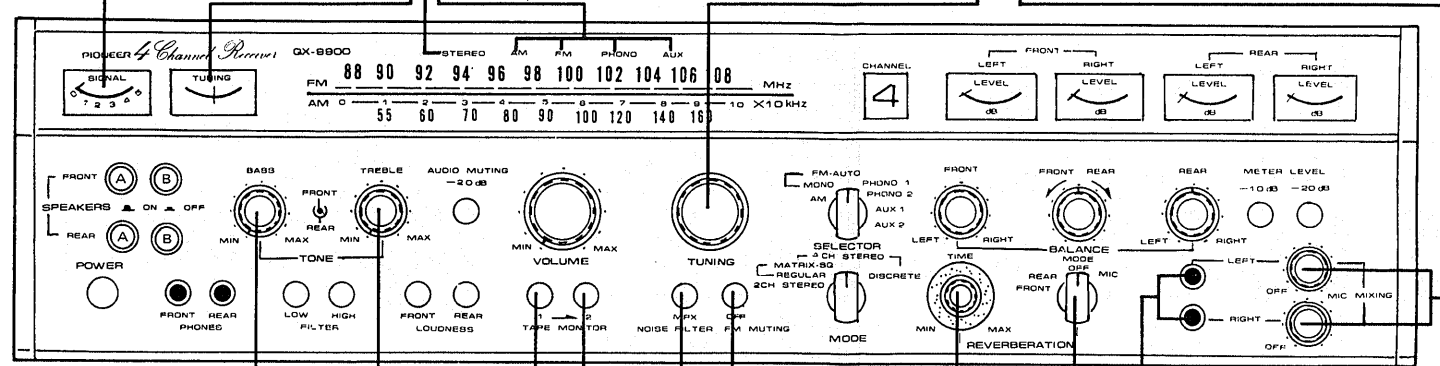
For tuning in AM and FM stations.

PROGRAM INDICATORS

Lights up in accordance with the position of the SELECTOR switch.

MIC MIXING LEVEL CONTROLS

To add microphone sound to a program, plug one or two microphones into the MIC jacks and turn one or both of these controls clockwise until you obtain the desired balance between microphone sound and the underlying program. If only one microphone is connected, its sound will be heard through both front speakers if the MIC MIXING control for the other channel is at position OFF. To add microphone sound to one channel only, the other control must be turned clockwise, too.



BASS CONTROLS

Turning the control to the right will increase the tone, and to the left will decrease the tone. The smaller (inner) knob controls the front channels, the larger (outer) one controls the rear channels.

TREBLE CONTROLS

Use these controls in the same way as the BASS CONTROLS.

TAPE MONITOR SWITCHES (1 and 2)

These switches are set to ON for checking the recording conditions or for playback with tape decks.

1. This switch is set to ON for monitoring a recording in progress or for playback with a tape deck plugged into the TAPE 1 MON and TAPE 1 REC jacks.
2. This switch is set to ON for checking the recording conditions or for playback with a tape deck plugged into the TAPE 2 MON jacks and TAPE 2 REC jacks.

NOTE: For a record playback or listening to broadcasts, leave these switches set to the OFF position. With the switches set to ON no sound will be heard.

MPX NOISE FILTER BUTTON

Push this button to ON to eliminate high-frequency noise during FM stereo reception.

FM MUTING BUTTON

In released position, the FM muting circuit cancels out noise on unused FM bands (inter-station noise), but it also rejects very weak, faint FM stations. To receive such a station, push the button to turn off the FM muting circuit.

MIC JACKS (LEFT and RIGHT)

The microphone should be of high impedance.

REVERBERATION MODE SWITCH

To add a reverberation effect, turn this switch to one of the following positions:

- FRONT Reverberation effect only in front channels.
- REAR Reverberation effect only in rear channels.
- MIC Reverberation added only to microphone sound.

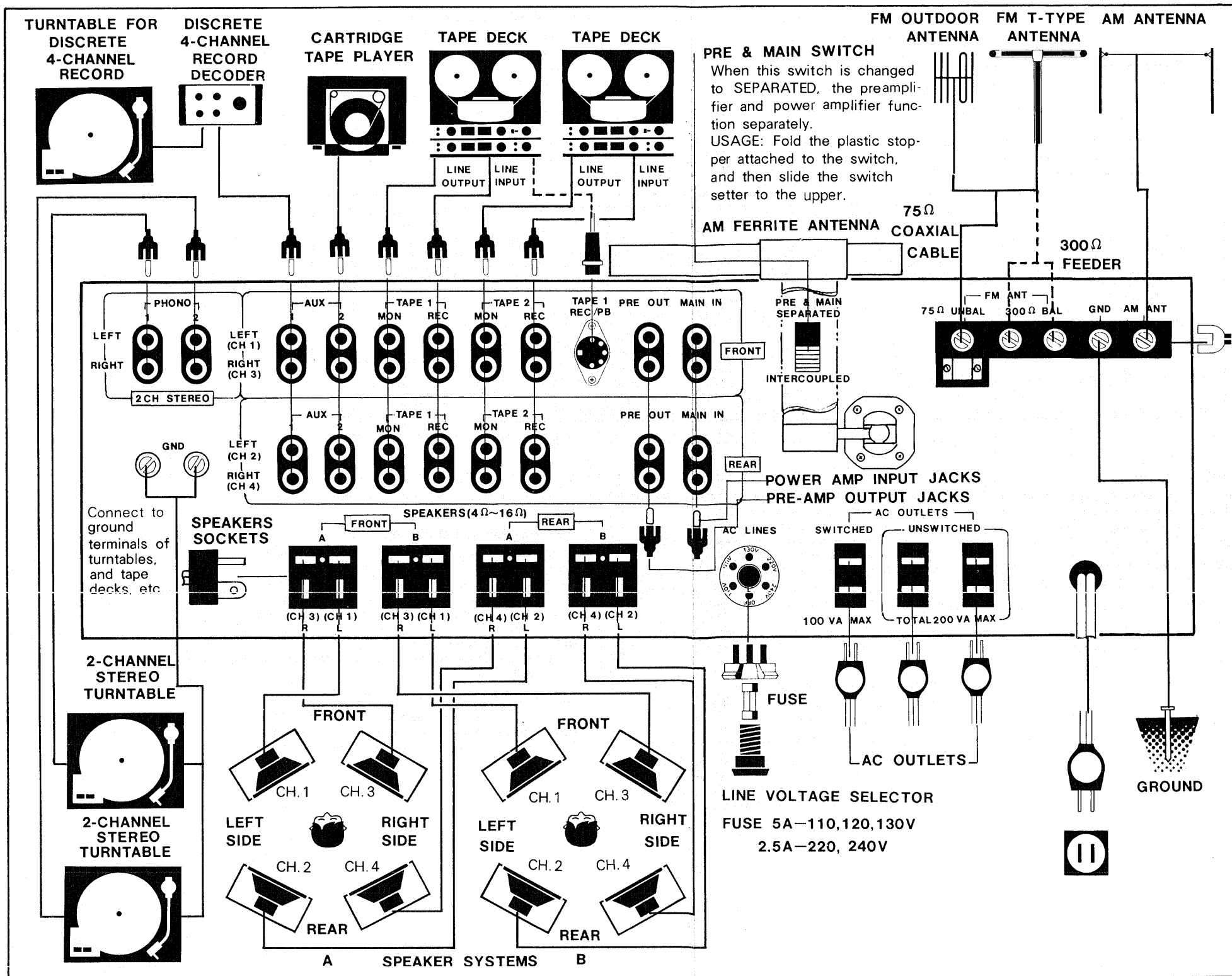
OFF No reverberation.

• No reverberation is added to the signals obtainable from the TAPE REC outputs.

REVERBERATION TIME CONTROL

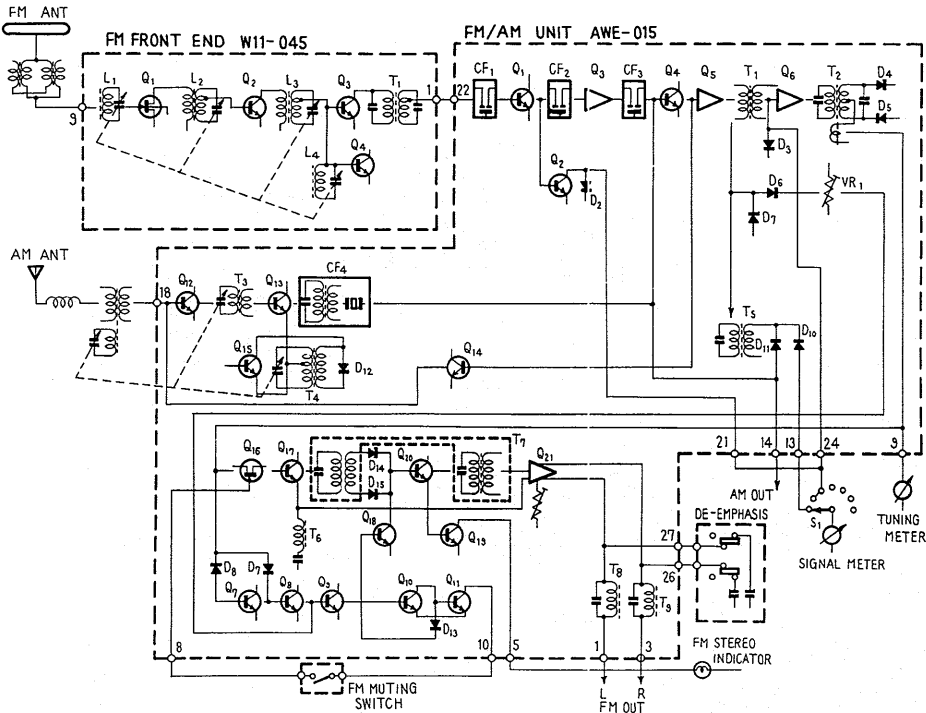
Used in combination with the REVERBERATION MODE switch. Clockwise rotation causes longer reverberation time, counterclockwise rotation shortens the reverberation time.

4. CONNECTION DIAGRAM



5. CIRCUIT DESCRIPTION

5.1 RF CIRCUITRY



- **Antenna Circuit**

FM: The antenna signal enters the receiver through the antenna terminals of 300Ω (for ribbon-type antenna feeder) or 75Ω (for coaxial antenna cable). The 75Ω input enters the front end directly, the 300Ω balanced input passes through impedance matching coil.

AM: The ferrite loopstick antenna coil serves as inductance for the top tuning circuit.

- **FM Front End**

The front end consists of two tuned RF amplifiers Q1 and Q2, converter Q3, and split-type local oscillator Q4. The oscillator frequency is varied from 98.7MHz to 118.7MHz and serves as source for the converter, Q3. There, the amplified 88MHz to 108MHz RF input signal is mixed with the 98.7MHz to 118.7MHz oscillator signal to produce an IF of 10.7MHz. The top RF amplifier utilizes a junction type FET (Q1).

- **FM IF Amplifier**

The 10.7MHz output from T1 of the front end is supplied to the 10.7MHz IF bandpass filter CF1 which consists of tuned ceramic elements. The output from this filter enters the next transistor, Q1. The signal amplified there is on its collector side to produce the current necessary for driving the signal strength meter, Q3 ~ Q6, the sharp bandpass ceramic filters CF2 and CF3, and the tuned circuit of T1 provide amplification and limiting of the 10.7MHz IF signal. (Q4 and Q5 also act as 455kHz IF amplifiers in AM reception mode.)

The trigger voltage for the FM muting circuit is taken from the DC voltage output of the ratio detector. This DC output also includes, in the case of an MPX program, the L + R, L - R and 19kHz pilot signals.

- **Muting Circuit**

This circuit consists of a gate circuit FET Q16, a block of DC-amplifier Q7, Q8, Q9, Schmitt circuits Q10 and Q11. Detector output enters Q16 and, through a rectifier, Q7 and Q8. The gate circuit of Q16 and the collector of Q11 are controlled by the FM MUTING switch.

When detuned, the ratio detector output has positive or negative DC voltage, which makes Q7 or Q8 conductive, depending on its polarity. On the other hand, voltage determined by IF strength is supplied to the Q5 and controlled by the semi-fixed 100k Ω VR (muting threshold control). These two kinds of trigger voltage, besides turning Q9 on and off, also alternately switch the Schmitt circuit of Q10 and Q11. This operation causes a voltage variation on pin 8 and opens and closes the FET Q16 gate when the muting switch is set to ON. The output of the gate circuit FET is taken from the source side of Q16 because there is no output to the MPX decoder circuit when Q16 is off.

D13 and the charge capacitor form a shunt circuit to eliminate bursts of noise which occur at the border between tuning and detuning.

- **MPX Decoder**

The composite signal of an FM MPX broadcast, containing L + R, L - R and 19kHz pilot signals, is supplied from the gate circuit to Q17 in the first stage of this circuit. This stage serves as a tuned amplifier for 19kHz and as an impedance changer to match the signal supplied to the switching circuit (IC Q21). The primary winding of the collector load of Q17 is tuned to 19kHz, the secondary winding is connected to the full-wave rectifiers D14, D15.

The 19kHz pilot carrier is converted into a 38kHz ripple current of double frequency. Q20 operates as a class B amplifier for this 38kHz ripple signal, and a 38kHz tuned transformer eliminates harmonics from the 38kHz ripple to obtain a clean sine wave for switching L and R. The Q19 circuit functions as a sensor that detects whether a broadcast is stereophonic or monophonic (when the selector switch is at FM AUTO position).

IC (Q21) works as an amplifier to cancel out crosstalk. The 330 Ω VR2 is for adjustment of channel separation.

- **AM Tuner Circuit**

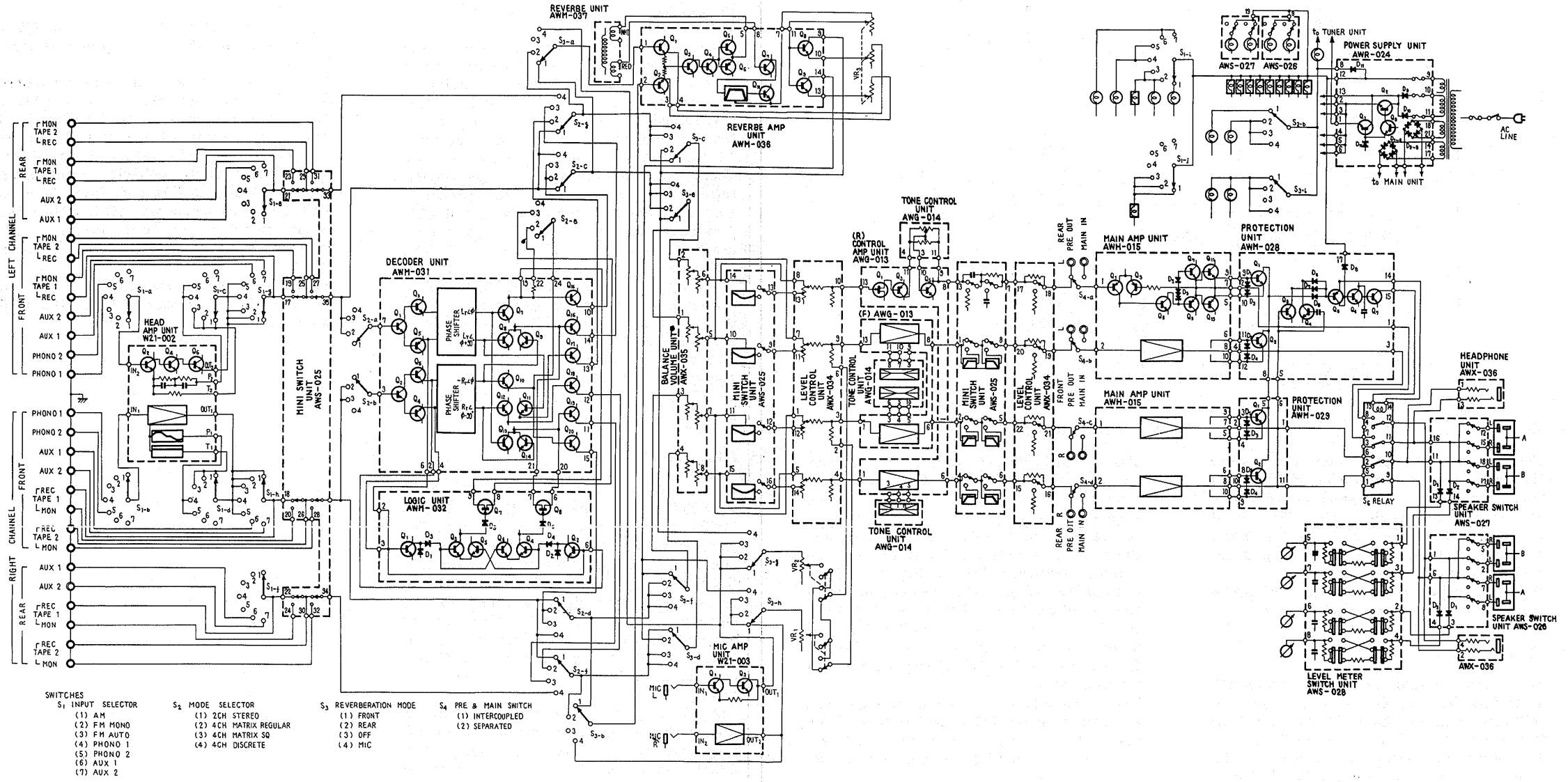
The AM tuner section consists of one RF amplifier Q12, converter Q13, local oscillator Q15, IF amplifiers Q4 and Q5 (which also function in FM mode), and the AM-exclusive 455kHz IF transformer T5, and a detector.

Input to the IF amplifier stage Q4, Q5 is obtained from the sharp tuned ceramic filter CF4.

AGC voltage, taken from the secondary side of T5 through rectifier diode D11, is delivered as reverse AGC to Q5. The signal from the junction of Q4 and Q5 passes through DC amplifier Q14 and from there to Q12. The variable collector voltage from Q12 is returned to Q14 and, from there, to Q13, acting as secondary AGC, D10 is the signal detector, but also produces DC current for driving the signal strength meter.

When the function selector is set at FM position, the +B voltage to Q12, Q13, Q15 is cut off.

BLOCK DIAGRAM (AUDIO & POWER SUPPLY)



5.2 AUDIO CIRCUITRY

- **Head Amplifier Section**

The signal from PHONO jacks selected with the SELECTOR switch passes through a three-stage direct coupled equalizer amplifier which provides low- and high-range compensation in compliance with RIAA specifications.

- **Microphone Amplifier Section**

The signal from MIC jacks are amplified with two-stage direct coupled amplifier which has flat frequency response. The output signal is mixed with the other program sources through the MIC MIXING control.

- **Control Amplifier Section**

The signals from the head amplifier, TAPE MON jack, AUX jack, or decoder section passes to VOLUME and BALANCE control, and to the control amplifier. The control amplifier consists of FET and PNP transistor in a direct coupled configuration, along with a negative feedback tone control stage consisting of one transistor.

A large amount of negative feedback is applied in the direct coupled amplifier to insure a high degree of stability and high input impedance. Low and high emphasis and attenuation are effected by changing the degree of feedback (with a potentiometer). Output of the control amplifier section passes to low-pass and high-pass filters and audio muting, and to main amplifier input.

- **Main Amplifier Section**

Signals from the control amplifier section are fed to the main amplifier circuits. PNP and NPN transistor pairs are used in the final output stages, providing completely complementary circuits. Supply power is balanced, eliminating the need for output capacitors.

Initial input stages are of the differential amplifier type, allowing perfect control of the output terminal potential at zero. Adjustment of the neutral point is effected with a potentiometer at the input of the differential amplifier. Adjustment of the idling current level for the power transistors is effected with a variable resistor in the collector circuit of the second stage. Temperature compensation is handled by a diode assembly connected in series with the variable resistor.

Output passes through contacts of the protective relay, and the speaker switch, and appears at the speaker connector terminals. Signals for level meter drive are derived from a part of the output rectified by diode and are fed to a voltage dividing circuit.

- **Protection Circuit**

The protective circuit consists of a stage for detecting the final amplifier stage current, a stage for detecting the drift voltage, and a relay drive stage.

There are four final amplifier current detecting circuits, one for each of the channels. Reference for these circuits is taken from the emitter stabilizing resistor in each case. When the voltage across this resistor rises beyond a certain point (as the result of an output short or excessive input), the relay in the output of the detector operates, thereby isolating the channel output terminal from the amplifier. Output terminal drift voltage is detected with a differential amplifier. One of the bases of the differential amplifier transistors is connected directly to the output terminal, while the other base is connected through capacitance. When DC voltage appears at an output terminal, a difference in base potentials arises, causing output of the differential amplifier. This output drives the relay drive circuit.

The relay drive circuit consists of three transistors. AC derived from the power supply is rectified by a diode and applied to the junction between the first and second transistors. With this arrangement, the relay is dropped immediately upon removal of AC power, thereby isolating the speaker output from the amplifier. A charge and discharge circuit (capacitance and resistance) is connected to the junction between the second and third transistors, creating delay in operation of the relay. This arrangement keeps the output terminals isolated for the length of time required for relay recovery and during the filter capacitor charging period following application of AC power.

5.3 POWER SUPPLY CIRCUIT

DC power except for the main amplifier unit is obtained from full-wave (diode) rectification of AC power.

Power for the head amplifier unit, decoder unit, logic unit, reverb amplifier unit, mic amplifier unit, control amplifier unit, and protection unit is derived same source through stabilizing circuit consisting of a zener diode and transistors are included.

The power for the tuner unit passes through another stabilizing circuit including a zener-diode and transistor.

Other bridge rectifier circuits are used for power supply to the main amplifier units.

5.4 DECODER CIRCUIT

The signal passing through the MODE switch is applied to the decoder unit.

When the MODE switch is set at MATRIX REGULAR or SQ, the decoder functions.

● At REGULAR (Fig. 1)

Signals applied to the decoder (L and R) are formed into L and -L signals (phase difference of 180°) with Q3 and Q5 and R and -R signals (phase difference of 180°) with Q4 and Q6. Outputs are applied to a pair of

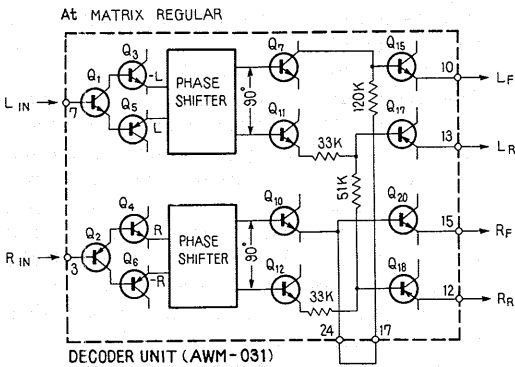


Fig. 1

phase shifters. Each phase shifter provides a pair of outputs. Thus, the four outputs are separated in terms of phase by 90° for each other.

These outputs are applied to Q7 through Q14, where addition and level adjustment take place. Subsequent output is taken from emitter followers Q15, Q17, Q18, and Q20. The bases of Q15 and Q20 are connected through resistance, providing for blending between the front left and right channels.

● At SQ (Fig. 2)

With the MODE switch set to SQ, Q7 through Q14 outputs are extracted from emitter followers Q15, Q16, Q19, and Q20. FET's in the logic unit are connected between the bases of Q15 and Q20 and Q16 and Q19, providing for blending between the front left and right channels and rear left and right channels.

The degree of blending and timing are controlled by two differential amplifiers in the logic unit. Sum (L + R) and difference (L - R) levels are compared. When the sum signal is the larger of the two, the FET between Q16 and Q19 conducts; when the difference signal is the larger of the two, the FET between Q15 and Q20 conducts.

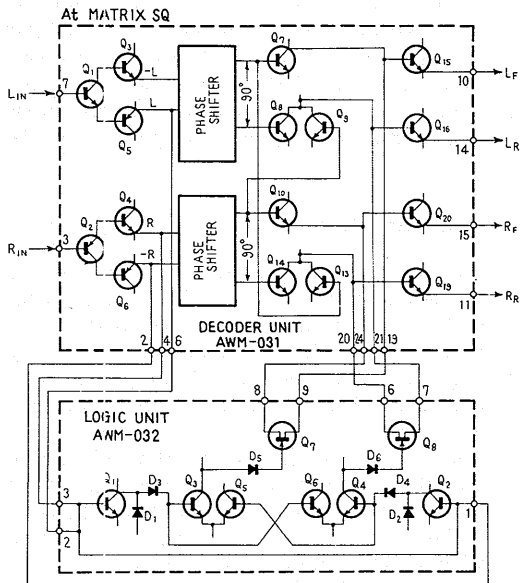
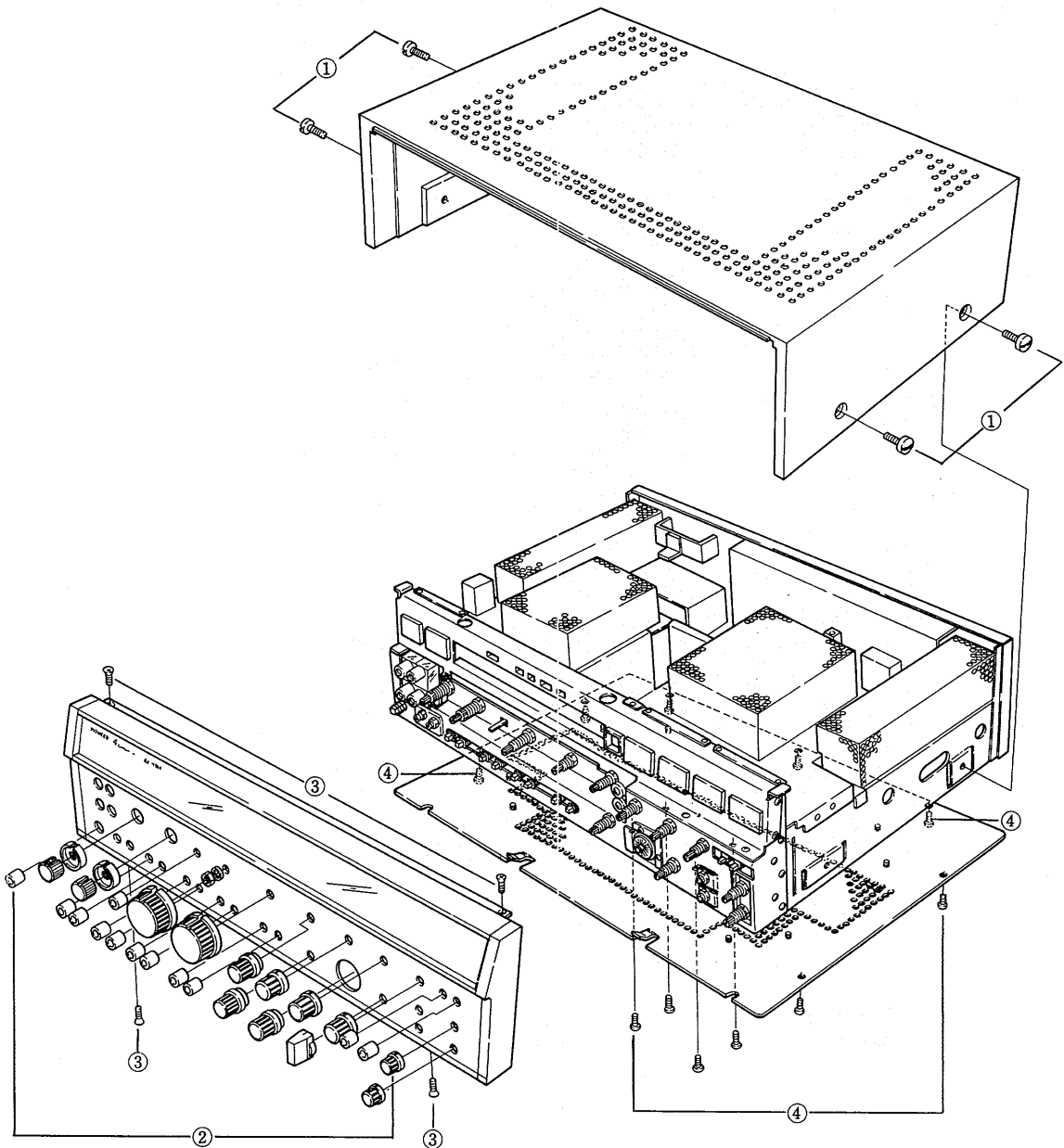


Fig. 2

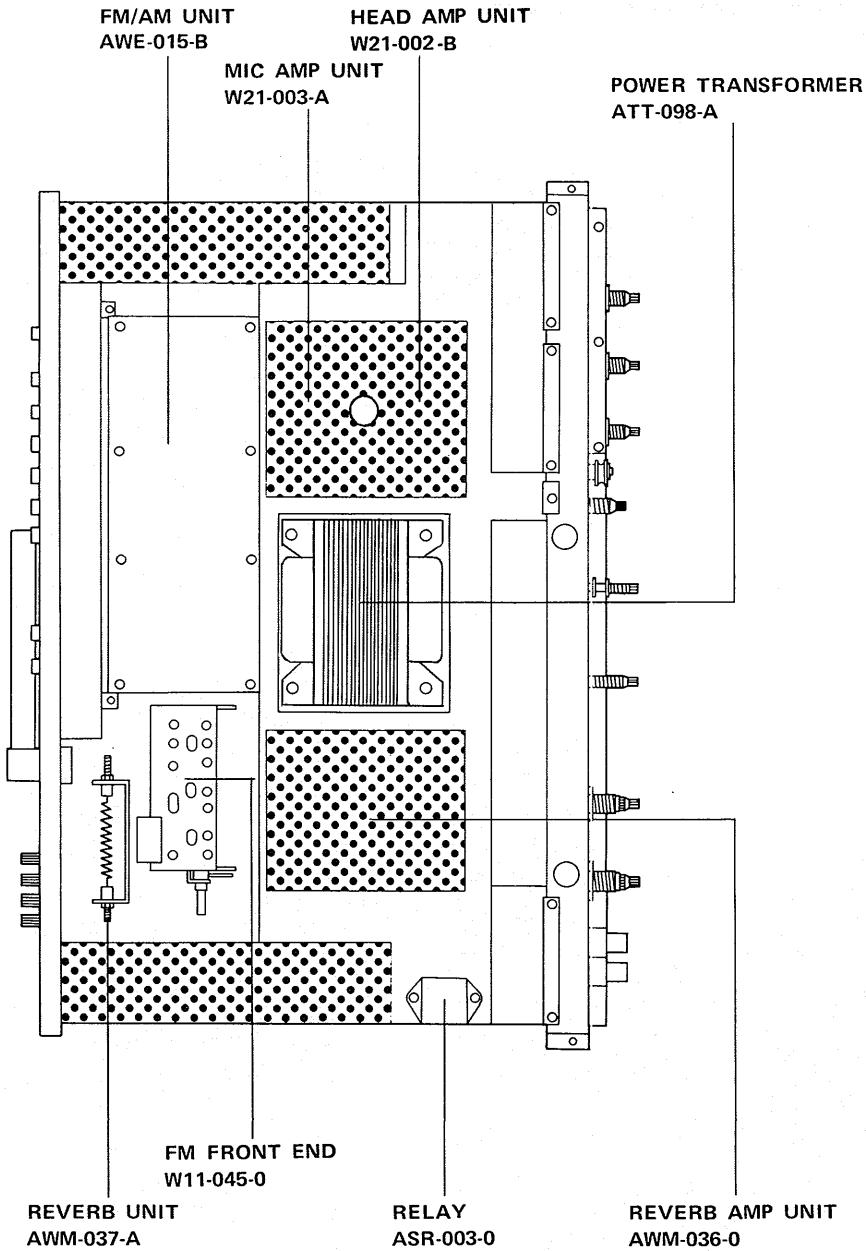
6. DISASSEMBLY

1. Remove 4 screws from the both sides of the wooden case.
2. Pull off all knobs from shafts, then remove nut and washer from the VOLUME shaft.
3. Remove 4 screws from top and bottom side of the front panel.
4. Remove 13 screws from the bottom plate.

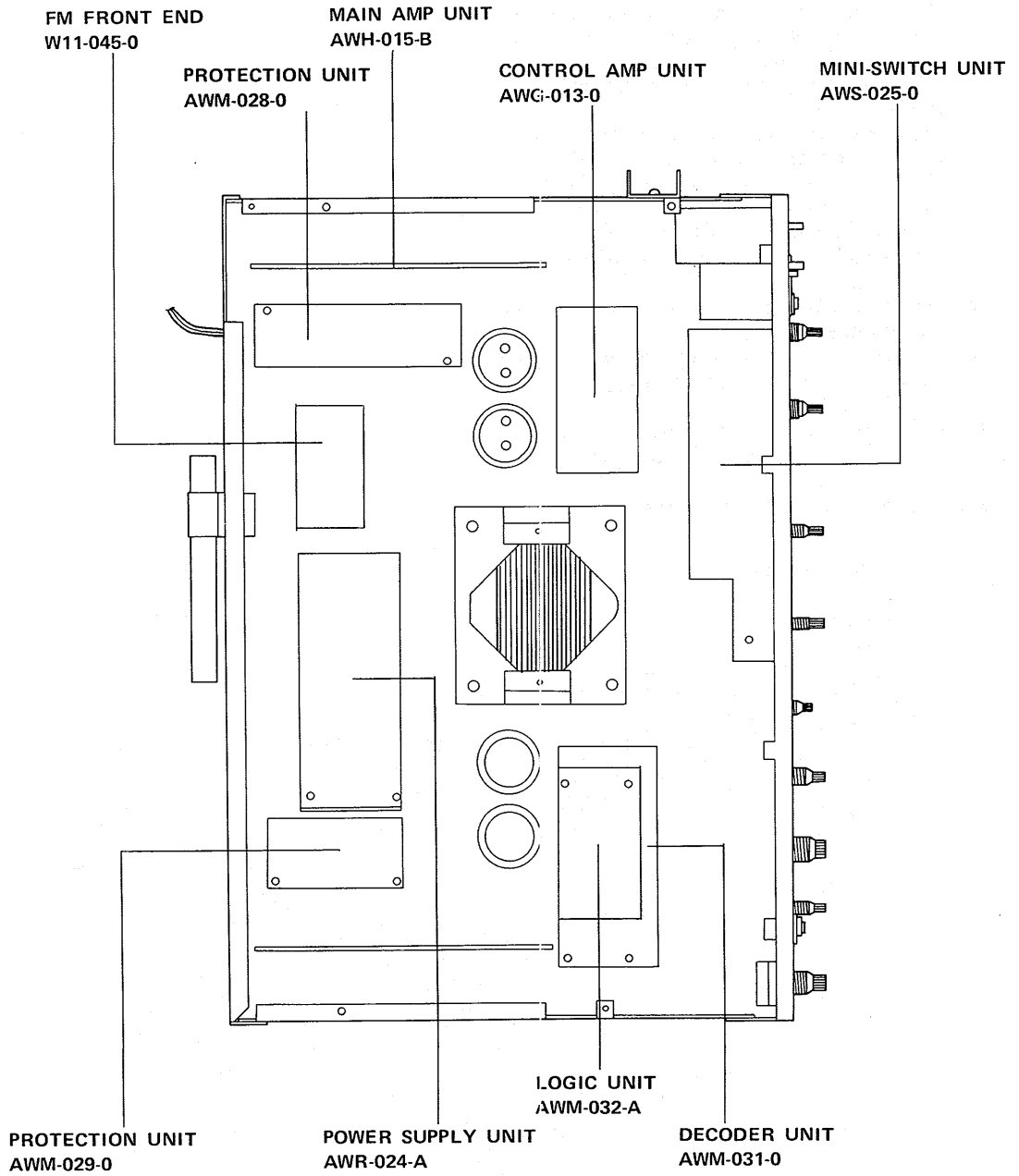


7. PARTS AND PCB LOCATION

7.1 TOP VIEW

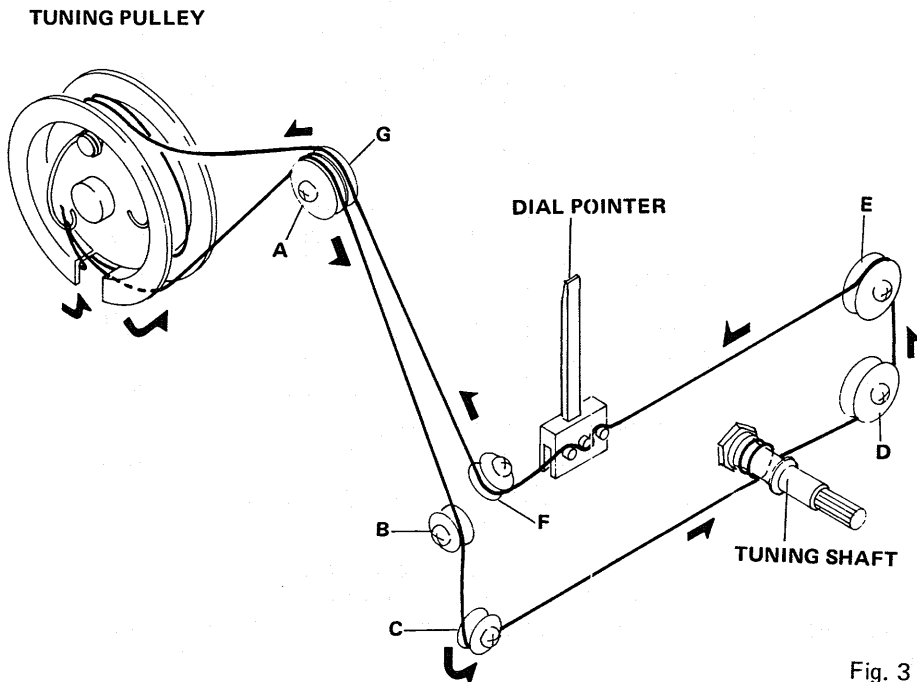


7.2 BOTTOM VIEW



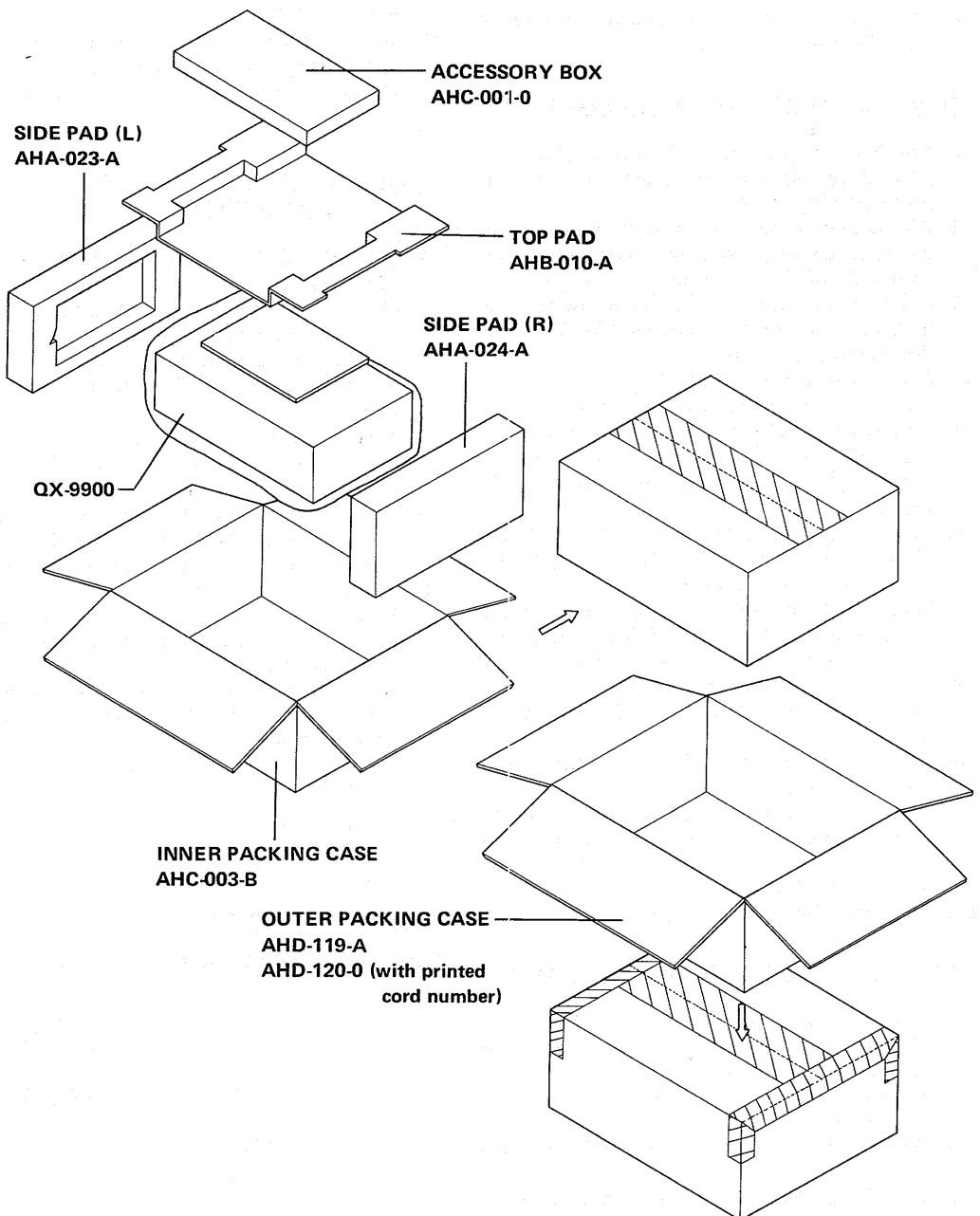
8. DIAL CORD STRINGING

1. Remove shield cover (left side) of the main amplifier and the front panel (Refer to page 15).
2. After the tuning capacitor is set to minimum capacitance, tie one end of string to the spring of the tuning pulley.
3. Cut string into a length of about 1.8m, then tie the string just cut to wire or the like which is helpful in stringing.
4. Wind the string around the small pulleys A and B.
5. Lead the string around the pulley C, then wind it two turns around the tuning shaft.
6. Wind the string around the pulleys D, E, F, and G in order with the aid of the wire.
7. Wind it one and a half turns around the tuning pulley, then remove the wire tied to the string.
8. Tie the remaining end of string around the tuning pulley.
9. Confirm that dial stringing moves smoothly. If so, cut the unnecessary portion of string.
10. After the tuning capacitor is set to minimum capacitance, fasten dial pointer to the string.
11. Lock stringing knots with paint.



9. PACKING METHOD AND PART NUMBERS

1. Put a vinyl bag, in which an operating instructions copy is contained, on the receiver covered with a cloth bag.
2. Place side pads both in the left and right sides of the receiver, then encase in cardboard case.
3. Put top pad on which the accessory box is placed, then close lids into taping them.
4. Finally, put inner packing case in outer packing case, then tape it.



10. ALIGNMENT PROCEDURE

The following alignments are required only in very rare cases and should never be attempted without the proper test equipment. Also, only non-metallic tools must be used.

10.1 REQUIRED INSTRUMENTS

- Sweep generator: Center marker frequencies 10.7MHz, 455kHz
- Oscilloscope
- AC VTVM
- AM/FM signal generator
- FM multiplex signal generator, preferably with RF output

10.2 FM 10.7 MHz ALIGNMENT

1. Confirm +B voltage and current for 12V $\pm 1V$ which should be 46mA to 50mA at pin 4 of FM/AM unit.
2. Disconnect leads from pins 22 (input) and 24, then connect resistor 2.2k Ω as shunted to pin 24 of FM/AM unit.
3. Connect 10.7MHz sweep generator to pins 22 (hot) and 23 (ground) of FM/AM unit. Set controls as follows:
Center frequency: 10.7MHz
Output: 55dB (500 μ V)
4. Connect vertical scope input to pin 24.
5. Align core of T1 for maximum gain and symmetry to obtain scope pattern as in Fig. 4.
6. Raise generator output gradually to 80dB (10mV), repeat step 5 realignment for each output level, if necessary.
7. Disconnect one side of C23. Disconnect oscilloscope and resistor 2.2k Ω from pin 24. Then reconnect lead to pin 24.
8. Connect scope input to pin 9.
9. Set generator output back to 55dB (500 μ V).
10. Adjust bottom core of T2 for maximum gain and linearity.
Adjust top core so that center frequency mark is located on zero-axis, as shown in Fig. 5.
11. Reconnect C23.
12. Reconnect input lead to pin 22.

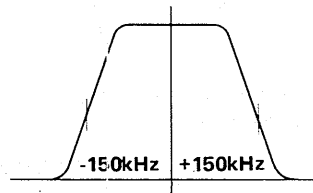
10.3 FM FRONT END ALIGNMENT

1. Confirm +B current (drain 11mA \pm 4mA).
2. Connect FM signal generator output to 300 Ω antenna input.
3. Connect AC VTVM to TAPE REC jack on rear panel.
4. Adjust generator for 400Hz, 100% modulation.
5. Set SELECTOR switch on front panel to FM MONO.

6. Adjust generator frequency and tuning dial to 90MHz.
During the following adjustments, keep the generator output as low as possible.
7. Adjust L4 core first, the adjust cores of L1, L2, L3 for maximum reading on VTVM and so that tuning meter indicates center position (Fig. 6).
8. Set generator frequency and tuning dial to 106MHz.
9. Adjust trimmer capacitor CT4 first, then adjust CT1, CT2, CT3 for maximum reading on VTVM.
10. Repeat these alignments a few times until satisfactory reading is obtained.
11. Finally, adjust T1 core for maximum reading on VTVM.

10.4 FM MPX DECODER ALIGNMENT

1. Set SELECTOR switch on front panel to FM AUTO.
2. Connect RF output of FM multiplex signal generator to 300 Ω antenna input.
3. Adjust MPX generator as follows:
Signal Mode Deviation
L+R 40.5kHz
19kHz (pilot) 7.5kHz
4. Connect AC VTVM to TAPE REC jack on rear panel.
5. Set generator signal mode to L-R (sub), adjust core of T6 (located on FM/AM unit) to obtain maximum reading on VTVM.
6. Set generator signal mode to L. Adjust VR2 (located on FM/AM unit) for minimum crosstalk on R channel TAPE REC output.
7. Set generator signal mode to R. Repeat above adjustment for minimum crosstalk on L channel.



CENTER FREQUENCY 10.7MHz Fig. 4

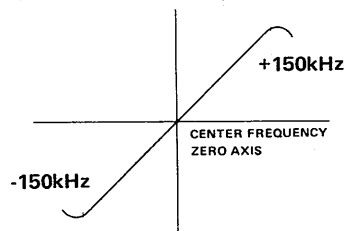


Fig. 5

10.5 MUTING THRESHOLD LEVEL ALIGNMENT

1. Set SELECTOR switch to FM MONO.
2. Turn FM MUTING switch to ON.
3. Connect FM signal generator to 300Ω antenna input.
4. Connect AC VTVM to TAPE REC jack.
5. Set output level of generator to 25dB (20μV), with ±22.5kHz deviation, and 400Hz or 1kHz modulation.
6. Tune receiver accurately to generator frequency.
7. Adjust VR1 on FM/AM unit exactly on the borderline between muting and non-muting.

10.6 AM 455kHz ALIGNMENT

1. Set SELECTOR switch on front panel to AM.
2. Connect 455kHz sweep generator to pin 15. Adjust generator output level to 60dB (1mV).
3. Connect vertical oscilloscope input to either L or R of TAPE REC jack.
4. Set tuning dial to high end position.
5. Adjust cores of CF4 and T5 for maximum gain and symmetrical pattern on oscilloscope.

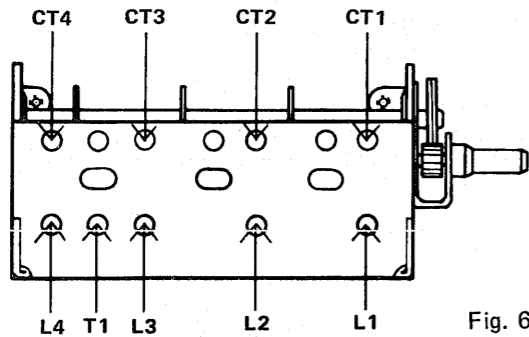


Fig. 6

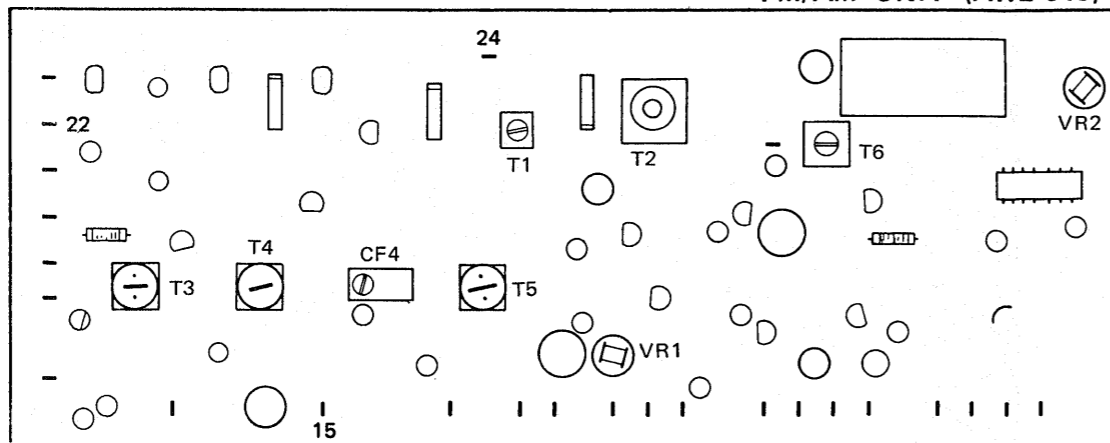


Fig. 9

10.7 AM TRACKING ALIGNMENT

1. Set SELECTOR switch to AM position.
2. For this alignment, bottom plate must be installed.
3. Set signal generator to AM function, 30% modulation with 400Hz. Connect loop antenna to generator RF output and place near receiver's ferrite antenna. See Fig. 7.
4. Connect VTVM to TAPE REC jack.
5. Keep generator as low as possible for minimum VTVM reading.
6. Tune generator and receiver to 600kHz. Adjust core of T4 on FM/AM unit for maximum VTVM reading, then adjust core of T3 and ferrite antenna.
7. Re-tune generator and receiver to 1,400kHz.
8. Adjust trimmers of tuning capacitor indicated in Fig. 8 to obtain maximum VTVM reading.

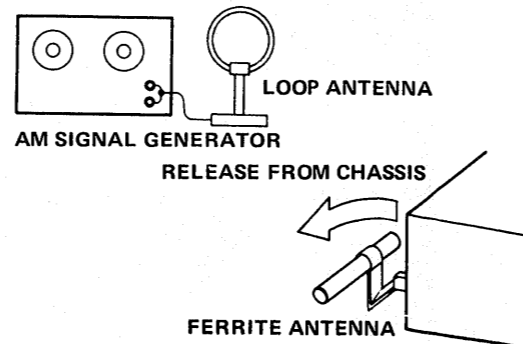
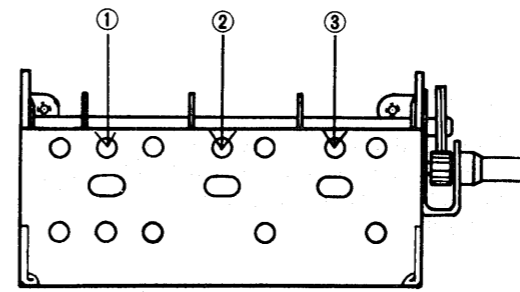


Fig. 7



• NUMBERS INDICATE ORDER OF ALIGNMENTS

Fig. 8

10.8 IDLE CURRENT ADJUSTMENT

- Set all controls as follows:

SPEAKER switches	OFF
POWER switch	OFF
BASS and TREBLE controls	center position
LOW and HIGH FILTER switches	OFF
AUDIO MUTING switch	OFF
LOUDNESS switches	OFF
VOLUME control	MIN
TAPE MON switches	OFF
SELECTOR switch	AUX 1
MODE switch	DISCRETE
BALANCE controls	center position
REVERB MODEL switch	OFF
MIC MIXING controls	OFF
METER LEVEL switches	OFF

 Then:
 - Connect AC power cord to AC outlet.
 - Set POWER switch to ON.
 - Allow a few minutes for amplifier to warm up.
- Set voltmeter near 0.1V full scale range, connect between pins 5 and 9 on PCB AWH-015.
- Adjust VR3 to obtain meter reading of 20 ~ 60mV.
- Connect voltmeter pins 6 and 10.
- Adjust VR4 as in step (c).

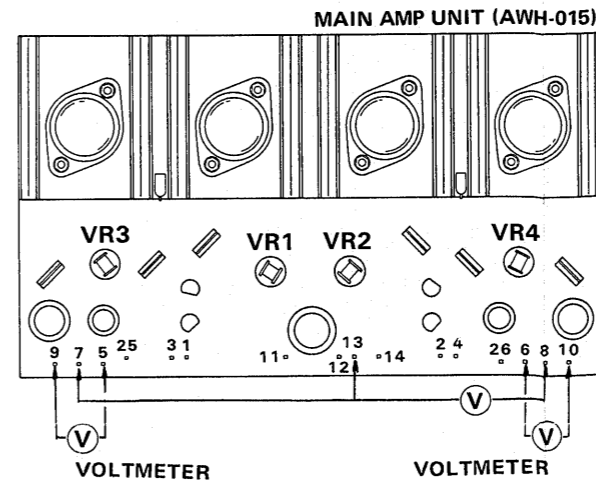


Fig. 12

10.9 DC NEUTRAL VOLTAGE ADJUSTMENT

- Set all controls as in 10.8 (a).
- Observe relay located at top of chassis. Turn power on. Relay should be activated, without chattering, about 3 ~ 8 seconds later.
- Connect voltmeter between pins 7 and 13 on PCB AWH-015.
- Adjust VR1 on power amplifier for 0V meter reading.
- Connect voltmeter between pins 8 and 13.
- Adjust VR2 as in step (d).

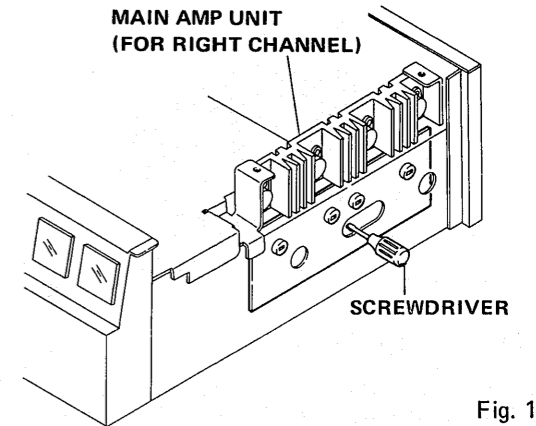


Fig. 10

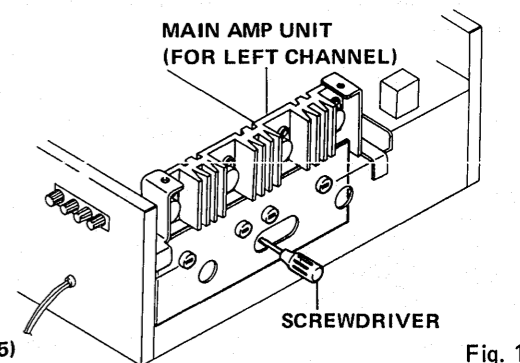


Fig. 11

11. PARTS REPLACEMENT

11.1 PILOT LAMPS

● Lamps Used for Speaker Switches

1. Remove the front panel (see page 15).
2. Pull off the speaker switches while turning the switches (protruding) ON.
3. Pull off the lamps and replace with new ones.

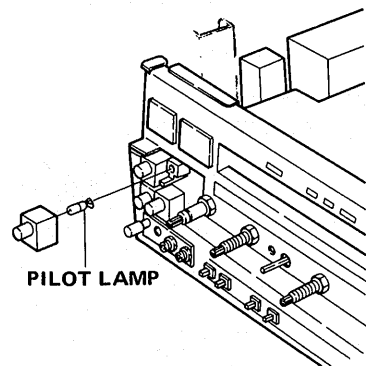


Fig. 13

● Dial Indicating Lamps

1. Remove the wooden case (see page 15).
2. Unscrew 3 screws, as shown in Fig. 14, to remove the lamp unit, then replace with a new one.

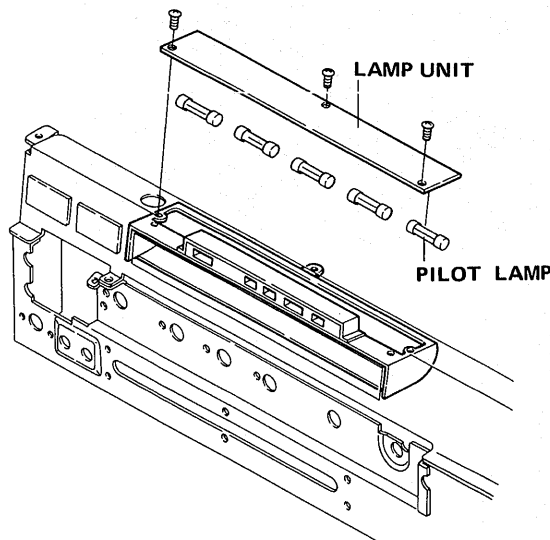


Fig. 14

● Level Meter Lamps

1. Remove the wooden case (see page 15).
2. Unscrew 2 screws, as shown in Fig. 15, to remove the lamp unit, then replace with a new one.

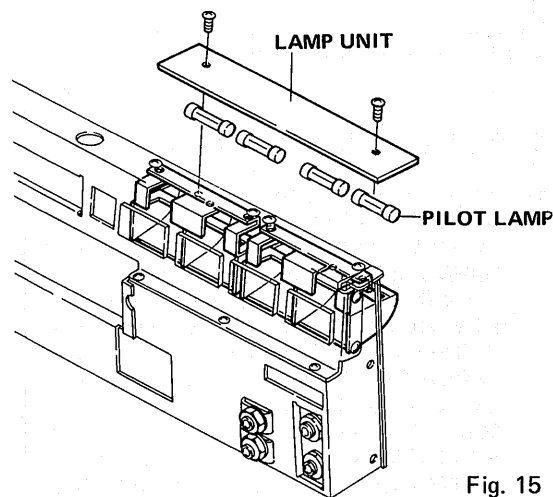


Fig. 15

● Signal and Tuning Meter Lamps

1. Remove the wooden case (see page 15).
2. Unscrew 2 screws, as shown in Fig. 16, to remove the lamp unit, then replace with a new one.

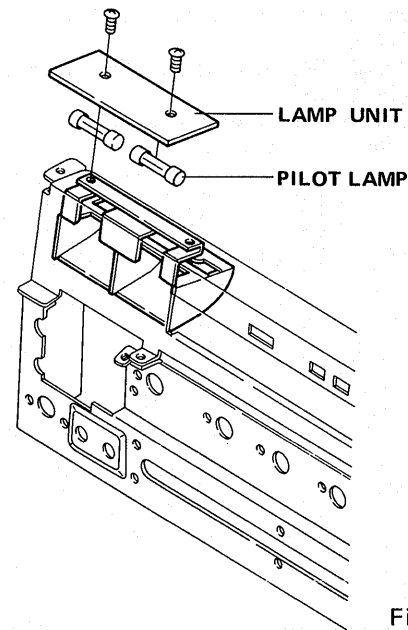


Fig. 16

11.2 FRONT GLASS

1. Remove the front panel (see page 15).
2. Remove the side panel attached to the front panel. To protect the side panel use a rubber hammer. The panel will be removed without being impaired.
3. Take the front glass away from its bezels by moving it sideways, then replace with a new one.
4. After inserting new front glass into the bezels, set the side panel in place. If the side panel wobbles, apply bonding agent (for metal bonding use) to stop wobbling.

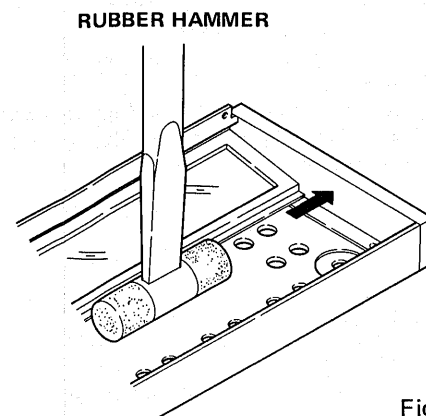


Fig. 17

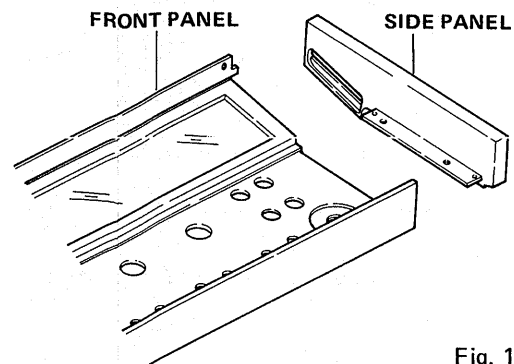


Fig. 18

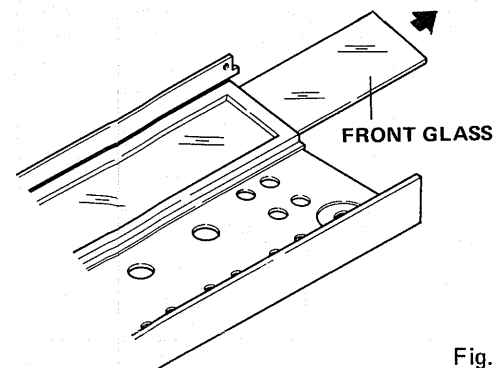


Fig. 19

11.3 LEVEL METERS

1. Remove the wooden case (see page 15).
2. Unscrew 2 screws fastening the lamp unit to remove it.
3. Unscrew 2 screws, as shown in Fig. 20, to remove meter-held metal, then replace with a new one.

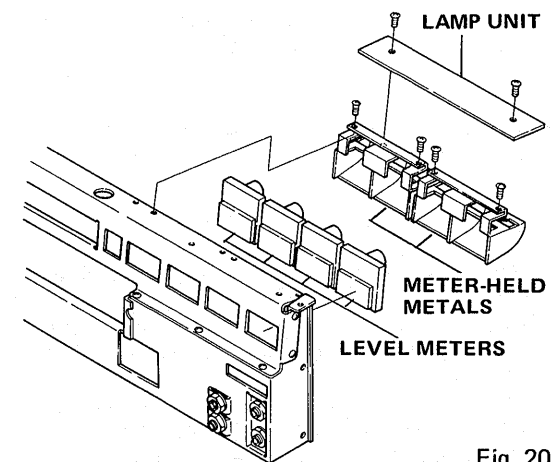


Fig. 20

11.4 TUNING AND SIGNAL METERS

1. Remove the wooden case (see page 15).
2. Unscrew 2 screws, as shown in Fig. 21, to remove meter-held metal, then replace with a new one.

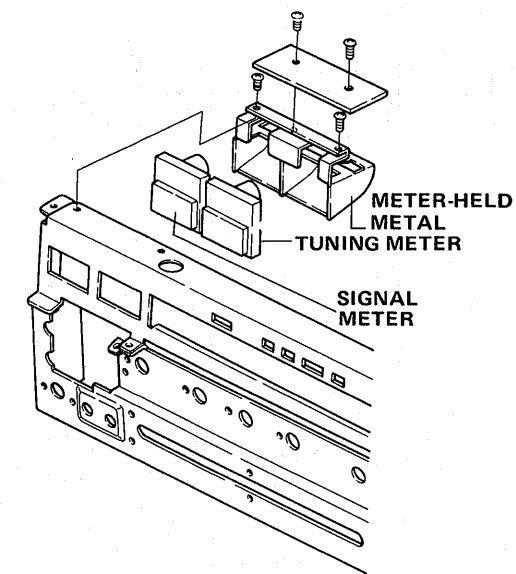
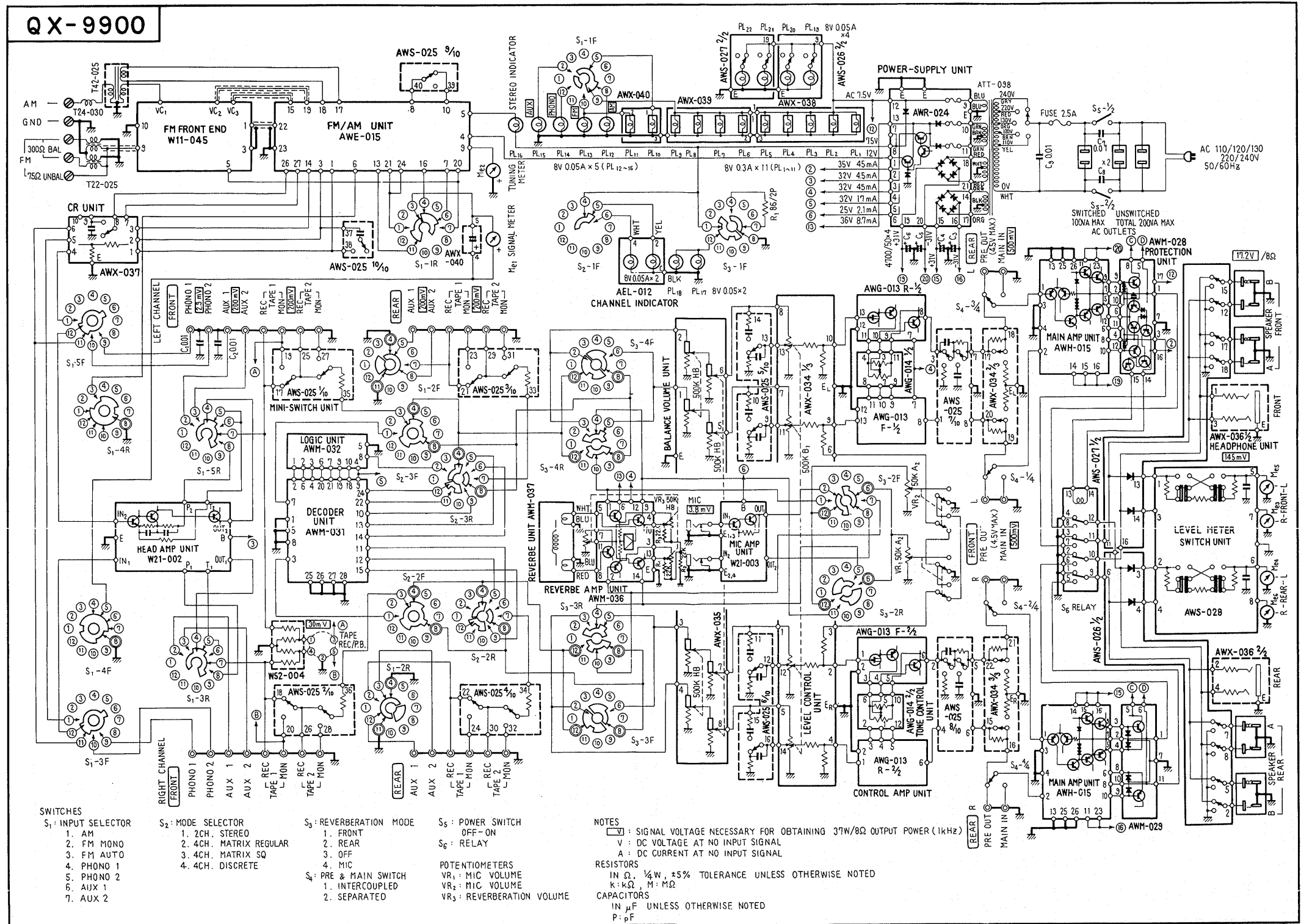


Fig. 21

13. SCHEMATIC DIAGRAMS, PCB PATTERNS, AND PARTS LIST

12.1 UNIT CONNECTION DIAGRAM, EXPLODED VIEWS, AND MISCELLANEOUS PARTS



MISCELLANEOUS PARTS

- CAPACITORS: IN μ F UNLESS OTHERWISE NOTED. p: pF.
- RESISTORS: IN Ω , $\frac{1}{2}$ W UNLESS OTHERWISE NOTED. k: k Ω , M: M Ω .

CAPACITORS

Symbol	Description	Part No.	
C1	Ceramic 0.01 25V	CKDYF 103Z 25	
C2	Ceramic 0.01 25V	CKDYF 103Z 25	
C3	Electrolytic 4700 50V	ACH-016-A	
C4	Electrolytic 4700 50V	ACH-016-A	
C5	Electrolytic 4700 50V	ACH-016-A	
C6	Electrolytic 4700 50V	ACH-016-A	
C7	Ceramic 0.01 250V	ACG-001-O	
C8	Ceramic 0.01 250V	ACG-001-O	
C9	Ceramic 0.01 250V	ACG-001-O	

RESISTORS

Symbol	Description	Part No.	
R1	Metal oxide 86 2W	RS2P 860K	
R2	Carbon film 22k	RD $\frac{1}{4}$ PS 223J	
R3	Carbon film 22k	RD $\frac{1}{4}$ PS 223J	
R4	Carbon film 22k	RD $\frac{1}{4}$ PS 223J	
VR1	50k-A2, Mic mixing control	C85-056-B	
VR2	50k-A2, Mic mixing control	C85-056-B	
VR3	50k-HB 3-gang, Reverberation time	ACV-506-A	

SWITCHES

Symbol	Description	Part No.	
S1	Selector switch	ASC-032-O	
S2	Mode switch	ASC-034-O	
S3	Reverberation mode switch	ASC-033-O	
S4	Pre and main switch	S41-025-O	
S5	Power switch	ASG-003-O	
S6	Relay	ASR-003-O	

COILS AND TRANSFORMERS

Symbol	Description	Part No.	
	Power transformer	ATT-098-A	
	AM ferrite loopstick antenna	T42-025-O	
	Choke coil	T24-030-O	
	Balune	T22-025-A	

OTHERS

Symbol	Description	Part No.	
	FM front end	W11-045-O	
	FM/AM unit	AWE-015-B	
	Head amp unit	W21-002-B	
	Mic amp unit	W21-003-A	
	Control amp unit	AWG-013-O	
	Tone control unit	AWG-014-O	
	Main amp unit	AWH-015-B	
	Protection unit	AWM-028-O	
	Protection unit	AWM-029-O	
	Decoder unit	AWM-031-O	
	Logic unit	AWM-032-A	
	Reverb amp unit	AWM-036-O	
	Reverb unit	AWM-037-A	
	Power supply unit	AWR-024-B	
	Mini-switch unit	AWS-025-O	
	Speaker switch unit A	AWS-026-O	
	Speaker switch unit B	AWS-027-O	
	Level meter switch unit	AWS-028-O	
	Level control unit	AWX-034-A	
	Balance volume unit	AWX-035-O	
	Headphone unit	AWX-036-O	
	CR unit	AWX-037-O	
	Lamp holder unit A	AWX-038-O	
	Lamp holder unit B	AWX-039-O	
	Lamp holder unit C	AWX-040-O	
	Front panel ass'y	ANB-155-C	
	Front glass	ANB-156-A	
	Wooden case	AMM-021-A	
	Tuning shaft ass'y	AXA-016-O	
	Foot	AEC-027-B	

Symbol	Description	Part No.	
	Tuning pulley	AXA-015-O	
	AM ferrite loopstick antenna holder ass'y	W72-092-B	
	Dial scale	AAG-038-B	
	Signal meter	AAW-011-O	
	Tuning meter	AAW-012-O	
	Level meter	AAW-013-O	
	Knob (TUNING)	AAA-014-O	
	Knob (VOLUME)	AAB-037-O	
	Knob (BALANCE)	AAB-025-O	
	Knob (MIC MIXING)	AAB-030-O	
	Knob (SELECTOR, MODE, and REVERB MODE)	AAB-035-O	
	Knob (REVERB TIME)	AAB-036-A	
	Knob (BASS and TREBLE-FRONT)	AAC-023-A	
	Knob (BASS and TREBLE-REAR)	AAC-024-O	
	Knob (PUSH SWITCH)	AAD-036-A	
	Knob (POWER)	AAD-037-O	
	Knob (AUDIO MUTING)	AAD-038-O	
	Knob (SPEAKER SWITCH A ass'y)	AAE-001-A	
	Knob (SPEAKER SWITCH B ass'y)	AAE-002-A	
	Dial pointer	AAF-024-A	
	Reverberation time indicator A	AAN-001-O	
	Reverberation time indicator B	AAN-001-O	
	Channel indicator	AEL-012-O	
	Antenna input terminal board	K11-043-D	
	4P input terminal board	AKB-005-O	
	4P input terminal board (A)	AKB-010-O	
	4P input terminal board	AKB-012-O	
	Pilot lamp for program indicator	AEL-007-O	
	Pilot lamp for speaker switch	AEL-011-O	
	Fuse 2.5A	AEK-020-O	

Symbol	Description	Part No.	
	Pilot lamp for dial scale and meter	E22-032-O	
	Compound part for REC jack	W52-004-O	
	Microphone jack	K72-024-O	
	Spare AC outlet	AKP-005-O	
	Speaker socket	K72-028-O	
	Line voltage selector	AKR-001-O	
	5P connector socket (DIN)	K93-003-B	
	Insulating spacer	E32-045-O	
	Insulating washer	E34-004-O	
	Screw for grounding	B11-012-A	
	Speaker to fix bottom plate	ABA-012-O	
	Insulating nut	B71-031-O	
	Screw to fix wooden case	ABA-010-O	
	AC power cord	ADG-002-O	
	Operating instructions copy	ARB-065-O	
	Polishing cloth	E33-009-B	
	Speaker plug	K72-007-B	
	Fuse 5A	AEK-021-O	
	FM T-type antenna	D52-013-O	
	Packing case (with printed code number)	AHD-119-A	
	Packing case	AHD-120-O	
	Inside packing	AHC-003-B	
	Side pad (L) ass'y	AHA-023-A	
	Side pad (R) ass'y	AHA-024-A	
	Top pad	AHB-010-A	
	Accessory box	AHC-001-O	

PARTS LIST OF EXPLODED VIEW-1

* This parts lists is for the EXPLODED VIEW-1 on pages 31 and 32.

Key No.	Description	Part No.	
1			
2	Shield cover	ANH-102-0	
3	Reverb amp unit	AWM-036-0	
4	Boss	B21-008-A	
5	Small pulleys shaft	M49-025-E	
6	Relay	ASR-003-0	
7	Wire clip	AEC-063-0	
8	_____		
9	Main amp cover L	ANH-104-A	
10	Small pulley	AEC-006-0	
11	_____		
12	_____		
13	Power transformer	ATT-098-A	
14	_____		
15	_____		
16	_____		
17	Main amp cover R	ANH-105-B	
18	_____		
19	Shield cover	ANH-101-0	
20	FM front end	W11-045-0	
21	_____		
22	Reverb unit	AWM-037-A	
23	_____		
24	Reverb unit-held metal	ANF-094-B	
25	_____		
26	4P lug terminal	AKC-016-0	
27	_____		
28	FM/AM unit	AWE-015-B	
29	_____		
30	Shield cover	ANH-103-A	

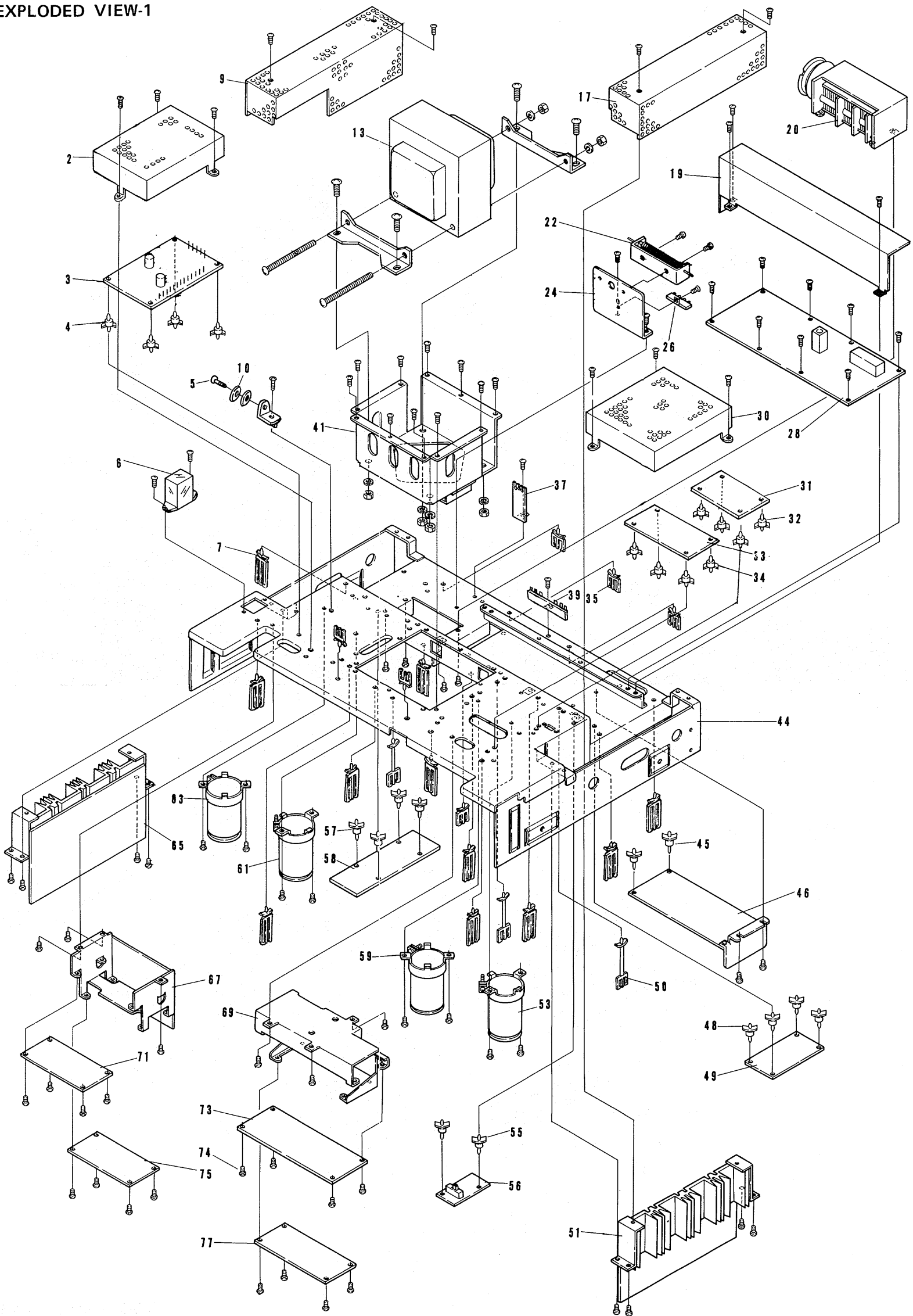
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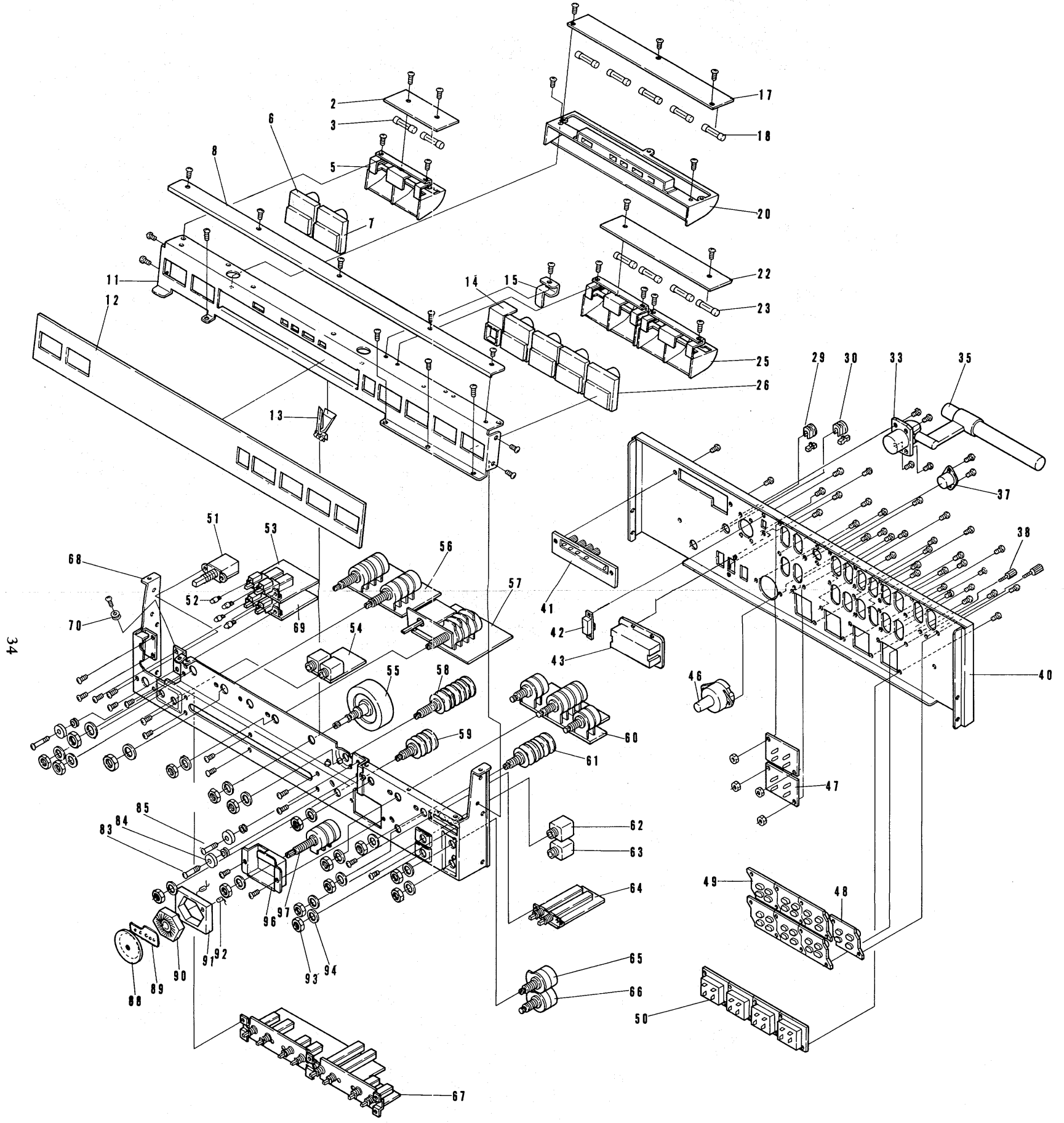
EXPLODED VIEW-1
 (continued)

Key No.	Description	Part No.
31	Mic amp unit	W21-003-A
32	Boss	B21-008-A
33	Head amp unit	W21-002-B
34	Boss	B21-008-A
35	Wire clip	AEC-004-0
36	_____	
37	Wire clip	
38	_____	
39	6 Plug terminal	AKC-017-0
40	_____	
41	Sub chassis	ANA-030-B
42	_____	
43	_____	
44	Chassis	ANA-028-A
45	Boss	B21-008-A
46	Power supply unit	AWR-024-B
47	_____	
48	Boss	B21-008-A
49	Protection unit	AWM-029-0
50	Wire clip	AEC-069-A
51	Main amp unit	AWH-015-B
52	_____	
53	Electrolytic capacitor 4700 μ F 50V	ACH-016-A
54	_____	
55	Boss	B21-008-A

Key No.	Description	Part No.
56	CR unit	AWX-037-0
57	Boss	B21-008-A
58	Protection unit	AWM-028-0
59	Electrolytic capacitor 4700 μ F 50V	ACH-016-A
60	_____	
61	Electrolytic capacitor 4700 μ F 50V	ACH-016-A
62	_____	
63	Electrolytic capacitor 4700 μ F 50V	ACH-016-A
64	_____	
65	Main amp unit	AWH-015-B
66	_____	
67	Unit-held metal	ANF-091-B
68	_____	
69	Unit-held metal	ANF-092-B
70	_____	
71	Control amp unit	AWG-013-0
72	_____	
73	Decoder unit	AWM-031-0
74	_____	
75	Control amp unit	AWG-013-0
76	_____	
77	Logic unit	AWM-032-A

EXPLODED VIEW-1





34

PARTS LIST OF EXPLODED VIEW-2

Key No.	Description	Part No.
1		
2	Lamp holder unit (C)	AWX-040-0
3	Pilot lamp	E22-032-0
4		
5	Meter-held metal	ANH-107-A
6	Signal meter	AAW-011-0
7	Tuning meter	AAW-012-0
8	Dial scale-held metal	ANK-027-0
9		
10		
11	Dial back panel	AND-046-0
12	Dial scale	AAG-038-B
13	Dial pointer	AAF-024-A
14	Channel indicator	AEL-012-0
15	Indicator panel held metal	ANF-090-0
16		
17	Lamp holder unit (A)	AWX-038-0
18	Pilot lamp	E22-032-0
19		
20	Lamp box	ANH-106-A
21		
22	Lamp holder unit (B)	AWX-039-0
23	Pilot lamp	E22-032-0
24		
25	Meter-held metal	ANH-107-A
26	Level meter	AAW-013-0
27		
28		
29	AC cord stopper	AEC-032-0
30	AC cord stopper	E32-056-0

Key No.	Description	Part No.
31		
32		
33	AM ferrite loopstick antenna holder ass'y	W72-092-B
34		
35	AM ferrite loopstick antenna	T42-025-0
36		
37	5P connector socket (DIN)	K93-003-B
38	Screw for grounding	B11-012-A
39		
40	Rear panel	ANC-063-A
41	Antenna input terminal board	K11-043-D
42	Pre & main switch	S41-025-0
43	Spare AC outlet	AKP-005-0
44		
45		
46	Line voltage selector	AKR-001-0
47	4P input terminal board	AKB-012-0
48	4P input terminal board (A)	AKB-010-0
49	4P input terminal board	AKB-005-0
50	Speaker socket	K72-028-0
51	Power switch	ASG-003-0
52	Pilot lamp for speaker switch	AEL-011-0
53	Speaker switch unit (B)	AWS-027-0
54	Headphone unit	AWX-036-0
55	Tuning shaft ass'y	ASX-016-0

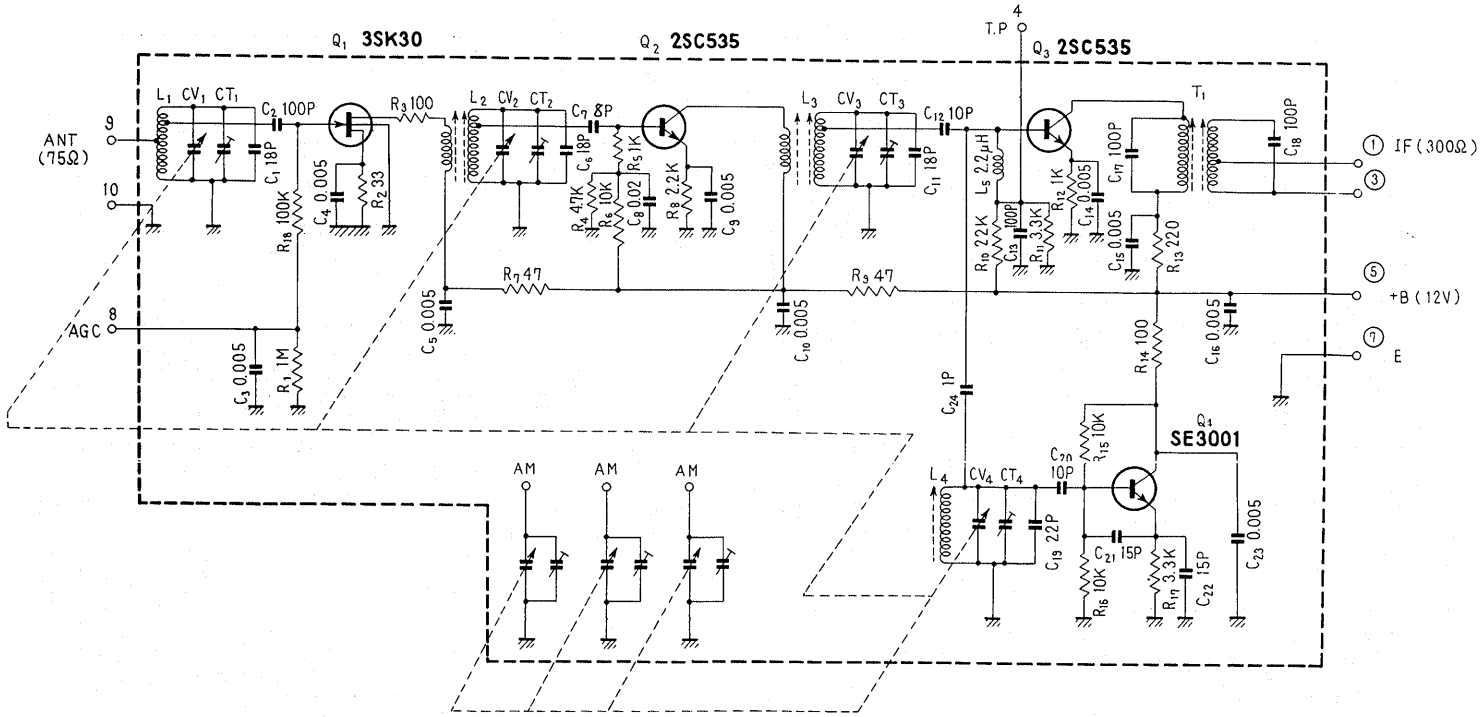
EXPLODED VIEW-2 (continued)

Key No.	Description	Part No.	
56	Tone control unit	AWG-014-0	
57	Level control unit	AWX-034-0	
58	Selector switch	ASC-032-0	
59	Mode switch	ASC-034-0	
60	Balance volume unit	AWX-035-0	
61	Reverberation mode switch	ASC-033-0	
62	Microphone jack	K72-024-0	
63	Microphone jack	K72-024-0	
64	Level meter switch unit	AWS-028-0	
65	Mic mixing control	C82-056-B	
66	Mic mixing control	C82-056-B	
67	Mini-switch unit	AWS-025-0	
68	Dial stay	AND-045-B	
69	Speaker switch unit (A)	AWS-026-0	
70	Small pulley	AEC-017-0	
71			
72			
73			
74			
75			
76			
77			
78			
79			
80			

Key No.	Description	Part No.	
81			
82			
83	Screw for small pulley	M49-025-E	
84	Pulley	AEC-006-0	
85	Screw for small pulley	M49-025-E	
86			
87			
88	Reverberation time indicator B	AAN-002-0	
89	Washer	ABF-003-0	
90	Reverberation time indicator A	AAN-001-0	
91	Cushion rubber	AEB-021-A	
92	Pilot lamp for reverberation indicator	AEL-007-0	
93	Insulating nut	B71-031-0	
94	Insulator washer	E34-004-0	
95			
96	Shaft-held metal	ANF-089-0	
97	Reverberation time control	ACV-506-A	

FM FRONT END

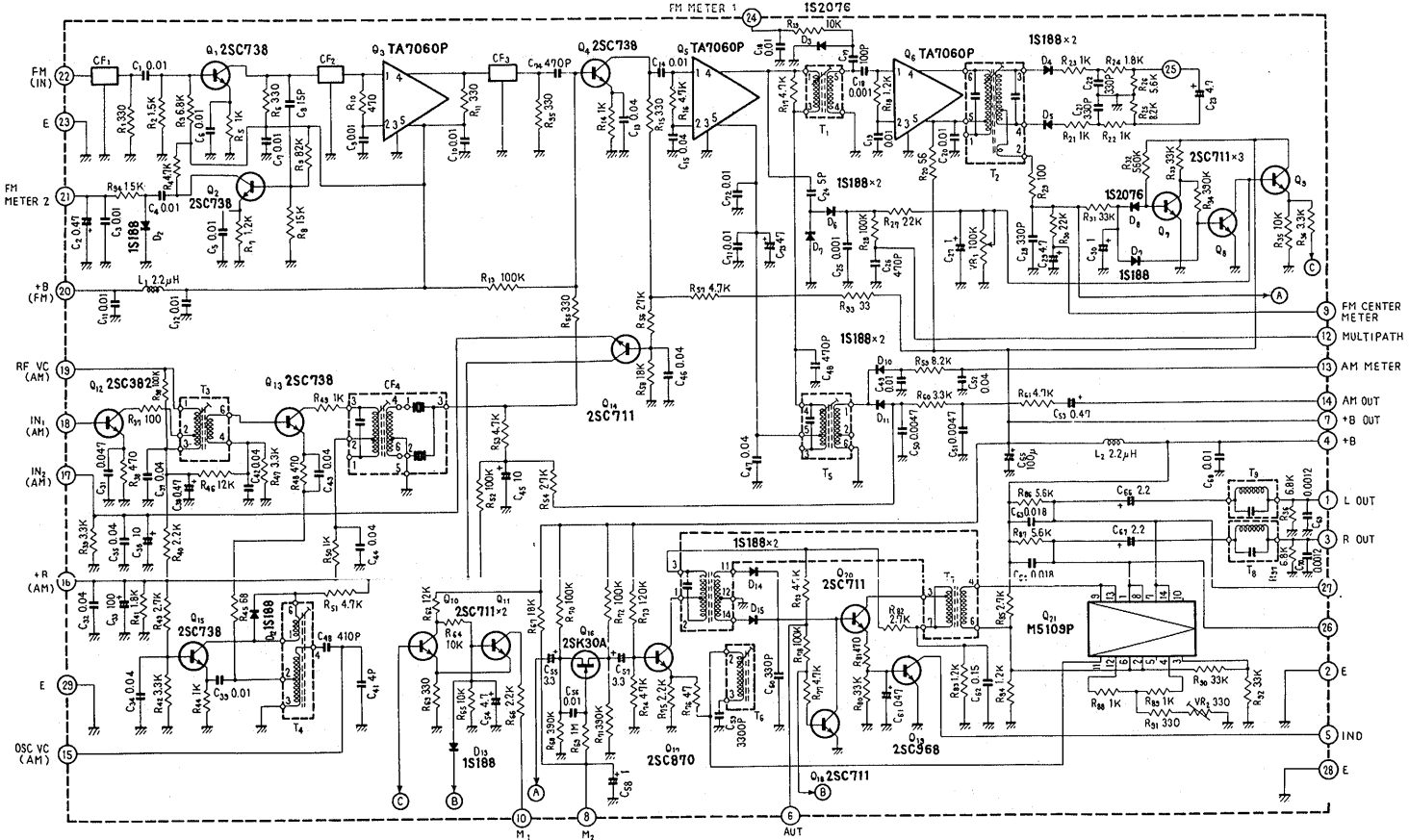
W11-045



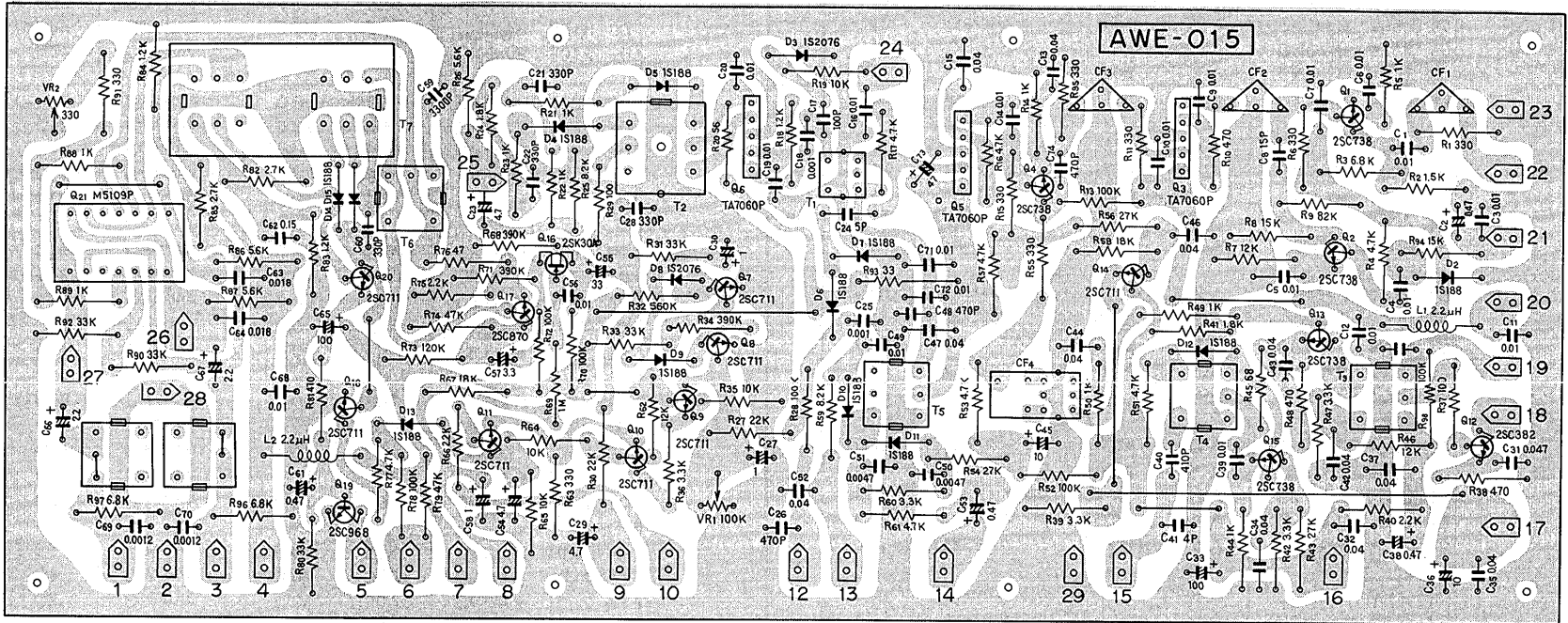
12.2 FM FRONT END (W11-045-0)

QX-9900

FM/AM UNIT
AWE-015



12.3 FM/AM UNIT (AWE-015-B)



PARTS LIST OF FM/AM UNIT

CAPACITORS

Symbol	Description			Part No.
C1	Ceramic	0.01	50V	CKDYF 103Z 50
C2	Electrolytic	0.47	50V	CEA R47P 50
C3	Ceramic	0.01	50V	CKDYF 103Z 50
C4	Ceramic	0.01	50V	CKDYF 103Z 50
C5	Ceramic	0.01	50V	CKDYF 103Z 50
C6	Ceramic	0.01	50V	CKDYF 103Z 50
C7	Ceramic	0.01	50V	CKDYB 103K 50
C8	Ceramic	15p	50V	CCDSL 150K 50
C9	Ceramic	0.01	50V	CKDYF 103Z 50
C10	Ceramic	0.01	50V	CKDYB 103K 50
C11	Ceramic	0.01	50V	CKDYF 103Z 50
C12	Ceramic	0.01	50V	CKDYB 103K 50
C13	Ceramic	0.04	50V	CKDYF 403Z 50
C14	Ceramic	0.01	50V	CKDYF 103Z 50
C15	Ceramic	0.04	50V	CKDYF 403Z 50
C16	Ceramic	0.01	50V	CKDYF 103Z 50
C17	Ceramic	100p	50V	CCDSL 101K 50
C18	Ceramic	0.001	50V	CKDYB 102K 50
C19	Ceramic	0.01	50V	CKDYF 103Z 50
C20	Ceramic	0.01	50V	CKDYF 103Z 50
C21	Ceramic	330p	50V	CKDYB 331K 50
C22	Ceramic	330p	50V	CKDYB 331K 50
C23	Electrolytic	4.7	25V	CEA 4R7P 25
C24	Ceramic	5p	50V	CCDSL 050D 50
C25	Ceramic	0.001	50V	CKDYB 102K 50

Symbol	Description			Part No.
C26	Ceramic	470p	50V	CKDYB 471K 50
C27	Electrolytic	1	50V	CEA 010P 50
C28	Ceramic	330p	50V	CKDYB 331K 50
C29	Electrolytic	4.7	25V	CEA 4R7P 25
C30	Electrolytic	1	50V	CEA 010P 50
C31	Ceramic	0.047	25V	CKDBC 473Z 25
C32	Ceramic	0.04	50V	CKDYF 403Z 50
C33	Electrolytic	100	16V	CEA 101P 16
C34	Ceramic	0.04	50V	CKDYF 403Z 50
C35	Ceramic	0.04	50V	CKDYF 403Z 50
C36	Electrolytic	10	16V	CEA 100P 16
C37	Ceramic	0.04	50V	CKDYF 403Z 50
C38	Electrolytic	0.47	50V	CEA R47P 50
C39	Mylar	0.01	50V	CQMA 103K 50
C40	Styrol	410p	50V	CQSA 411K 50
C41	Ceramic	4p	50V	CCDSL 040D 50
C42	Ceramic	0.04	50V	CKDYF 403Z 50
C43	Ceramic	0.04	50V	CKDYF 403Z 50
C44	Ceramic	0.04	50V	CKDYF 403Z 50
C45	Electrolytic	10	16V	CEA 100P 16
C46	Ceramic	0.04	50V	CKDYF 403Z 50
C47	Ceramic	0.04	50V	CKDYF 403Z 50
C48	Ceramic	470p	50V	CKDYB 471K 50
C49	Ceramic	0.01	50V	CKDYF 103Z 50
C50	Mylar	0.0047	50V	CQMA 472K 50
C51	Mylar	0.0047	50V	CQMA 472K 50
C52	Ceramic	0.04	50V	CKDYF 403Z 50
C53	Electrolytic	0.47	25V	CSSA R47X 25
C54	Electrolytic	4.7	25V	CEA 4R7P 25
C55	Electrolytic	3.3	16V	CSSA 3R3M 16

Symbol	Description			Part No.	
C56	Mylar	0.01	50V	CQMA	103K 50
C57	Electrolytic	3.3	16V	CSSA	3R3M 16
C58	Electrolytic	1	50V	CEA	010P 50
C59	Styrol	0.0033	50V	C15-011-A	
C60	Ceramic	330p	50V	CKDYB	331K 50
C61	Electrolytic	0.47	50V	CEA	R47P 50
C62	Mylar	0.15	50V	CQMA	154K 50
C63	Mylar	0.018	50V	CQMA	183K 50
C64	Mylar	0.018	50V	CQMA	183K 50
C65	Electrolytic	100	16V	CEA	101P 16
C66	Electrolytic	2.2	16V	CSSA	2R2M 16
C67	Electrolytic	2.2	16V	CSSA	2R2M 16
C68	Ceramic	0.01	50V	CKDYF	103Z 50
C69	Mylar	0.0012	50V	CQMA	122K 50
C70	Mylar	0.0012	50V	CQMA	122K 50
C71	Ceramic	0.01	50V	CKDYB	103K 50
C72	Ceramic	0.01	50V	CKDYB	103K 50
C73	Electrolytic	47	16V	CEA	470P 16
C74	Ceramic	470p	50V	CKDYB	471K 50

RESISTORS

Symbol	Description		Part No.
VR1	Semi-fixed	100k-B	C92-047-0
VR2	Semi-fixed	330-B	C92-065-A
R1	Carbon film	330	RD $\frac{1}{4}$ PS 331J
R2	Carbon film	1.5k	RD $\frac{1}{4}$ PS 152J
R3	Carbon film	6.8k	RD $\frac{1}{4}$ PS 682J
R4	Carbon film	4.7k	RD $\frac{1}{4}$ PS 472J
R5	Carbon film	1k	RD $\frac{1}{4}$ PS 102J

Symbol	Description		Part No.
R6	Carbon film	330	RD $\frac{1}{4}$ PS 331J
R7	Carbon film	1.2k	RD $\frac{1}{4}$ PS 122J
R8	Carbon film	15k	RD $\frac{1}{4}$ PS 153J
R9	Carbon film	82k	RD $\frac{1}{4}$ PS 823J
R10	Carbon film	470	RD $\frac{1}{4}$ PS 471J
R11	Carbon film	330	RD $\frac{1}{4}$ PS 331J
R13	Carbon film	100k	RD $\frac{1}{4}$ PS 104J
R14	Carbon film	1k	RD $\frac{1}{4}$ PS 102J
R15	Carbon film	330	RD $\frac{1}{4}$ PS 331J
R16	Carbon film	4.7k	RD $\frac{1}{4}$ PS 472J
R17	Carbon film	4.7k	RD $\frac{1}{4}$ PS 472J
R18	Carbon film	1.2k	RD $\frac{1}{4}$ PS 122J
R19	Carbon film	10k	RD $\frac{1}{4}$ PS 103J
R20	Carbon film	56	RD $\frac{1}{4}$ PS 560J
R21	Carbon film	1k	RD $\frac{1}{4}$ PS 102J
R22	Carbon film	1k	RD $\frac{1}{4}$ PS 102J
R23	Carbon film	1k	RD $\frac{1}{4}$ PS 102J
R24	Carbon film	1.8k	RD $\frac{1}{4}$ PS 182J
R25	Carbon film	8.2k	RD $\frac{1}{4}$ PS 822J
R26	Carbon film	5.6k	RD $\frac{1}{4}$ PS 562J
R27	Carbon film	22k	RD $\frac{1}{4}$ PS 223J
R28	Carbon film	100k	RD $\frac{1}{4}$ PS 104J
R29	Carbon film	100	RD $\frac{1}{4}$ PS 101J
R30	Carbon film	22k	RD $\frac{1}{4}$ PS 223J
R31	Carbon film	33k	RD $\frac{1}{4}$ PS 333J
R32	Carbon film	560k	RD $\frac{1}{4}$ PS 564J
R33	Carbon film	33k	RD $\frac{1}{4}$ PS 333J
R34	Carbon film	390k	RD $\frac{1}{4}$ PS 394J
R35	Carbon film	10k	RD $\frac{1}{4}$ PS 103J
R36	Carbon film	3.3k	RD $\frac{1}{4}$ PS 332J

FM/AM UNIT
 (continued)

Symbol	Description	Part No.
R37	Carbon film 100	RD¼PS 101J
R38	Carbon film 470	RD¼PS 471J
R39	Carbon film 3.3k	RD¼PS 332J
R40	Carbon film 2.2k	RD¼PS 222J
R41	Carbon film 1.8k	RD¼PS 182J
R42	Carbon film 3.3k	RD¼PS 332J
R43	Carbon film 27k	RD¼PS 273J
R44	Carbon film 1k	RD¼PS 102J
R45	Carbon film 68	RD¼PS 680J
R46	Carbon film 12k	RD¼PS 123J
R47	Carbon film 3.3k	RD¼PS 332J
R48	Carbon film 470	RD¼PS 471J
R49	Carbon film 1k	RD¼PS 102J
R50	Carbon film 1k	RD¼PS 102J
R51	Carbon film 4.7k	RD¼PS 472J
R52	Carbon film 100k	RD¼PS 104J
R53	Carbon film 4.7k	RD¼PS 472J
R54	Carbon film 27k	RD¼PS 273J
R55	Carbon film 330	RD¼PS 331J
R56	Carbon film 27k	RD¼PS 273J
R57	Carbon film 4.7k	RD¼PS 472J
R58	Carbon film 18k	RD¼PS 183J
R59	Carbon film 8.2k	RD¼PS 822J
R60	Carbon film 3.3k	RD¼PS 332J
R61	Carbon film 4.7k	RD¼PS 472J
R62	Carbon film 12k	RD¼PS 123J
R63	Carbon film 330	RD¼PS 331J
R64	Carbon film 10k	RD¼PS 103J
R65	Carbon film 10k	RD¼PS 103J
R66	Carbon film 2.2k	RD¼PS 222J

Symbol	Description	Part No.
R67	Carbon film 18k	RD¼PS 183J
R68	Carbon film 390k	RD¼PS 394J
R69	Carbon film 1M	RD¼PS 105J
R70	Carbon film 100k	RD¼PS 104J
R71	Carbon film 390k	RD¼PS 394J
R72	Carbon film 100k	RD¼PS 104J
R73	Carbon film 120k	RD¼PS 124J
R74	Carbon film 47k	RD¼PS 473J
R75	Carbon film 2.2k	RD¼PS 222J
R76	Carbon film 47	RD¼PS 470J
R77	Carbon film 4.7k	RD¼PS 472J
R78	Carbon film 100k	RD¼PS 104J
R79	Carbon film 47k	RD¼PS 473J
R80	Carbon film 33k	RD¼PS 333J
R81	Carbon film 470	RD¼PS 471J
R82	Carbon film 2.7k	RD¼PS 272J
R83	Carbon film 1.2k	RD¼PS 122J
R84	Carbon film 1.2k	RD¼PS 122J
R85	Carbon film 2.7k	RD¼PS 272J
R86	Carbon film 5.6k	RD¼PS 562J
R87	Carbon film 5.6k	RD¼PS 562J
R88	Carbon film 1k	RD¼PS 102J
R89	Carbon film 1k	RD¼PS 102J
R90	Carbon film 33k	RD¼PS 333J
R91	Carbon film 330	RD¼PS 331J
R92	Carbon film 33k	RD¼PS 333J
R93	Carbon film 33	RD¼PS 330J
R94	Carbon film 15k	RD¼PS 153J
R95	Carbon film 330	RD¼PS 331J
R96	Carbon film 6.8k	RD¼PS 682J
R97	Carbon film 6.8k	RD¼PS 682J

SEMICONDUCTORS

Symbol	Description	Part No.
Q1	2SC738-D Transistor	
Q2	2SC738-D Transistor	
Q3	TA7060P-GR or W IC	
Q4	2SC738-P Transistor	
Q5	TA7060P-BL IC	
Q6	TA7060P-BL IC	
Q7	2SC711-F or E Transistor	
Q8	2SC711-F or E Transistor	
Q9	2SC711-F or E Transistor	
Q10	2SC711-F or E Transistor	
Q11	2SC711-F or E Transistor	
Q12	2SC382 Transistor	
Q13	2SC738-P Transistor	
Q14	2SC711-F Transistor	
Q15	2SC738-D Transistor	
Q16	2SK30-A FET	
Q17	2SC870-F or E Transistor	
Q18	2SC711-F or E Transistor	
Q19	2SC968-Y Transistor	
Q20	2SC711-F or E Transistor	
Q21	M5109P IC	
D2	1S188 FM-1 Diode	
D3	1S2076 Diode	
D4	1S188 FM-1 Diode	
D5	1S188 FM-1 Diode	
D6	1S188 FM-1 Diode	
D7	1S188 FM-1 Diode	
D8	1S2076 Diode	
D9	1S2076 Diode	
D10	1S2076 Diode	
D11	1S188 FM-1 Diode	

Symbol	Description	Part No.
D12	1S188 FM-1 Diode	
D13	1S188 FM-1 Diode	
D14	1S188 FM-1 Diode	
D15	1S188 FM-1 Diode	

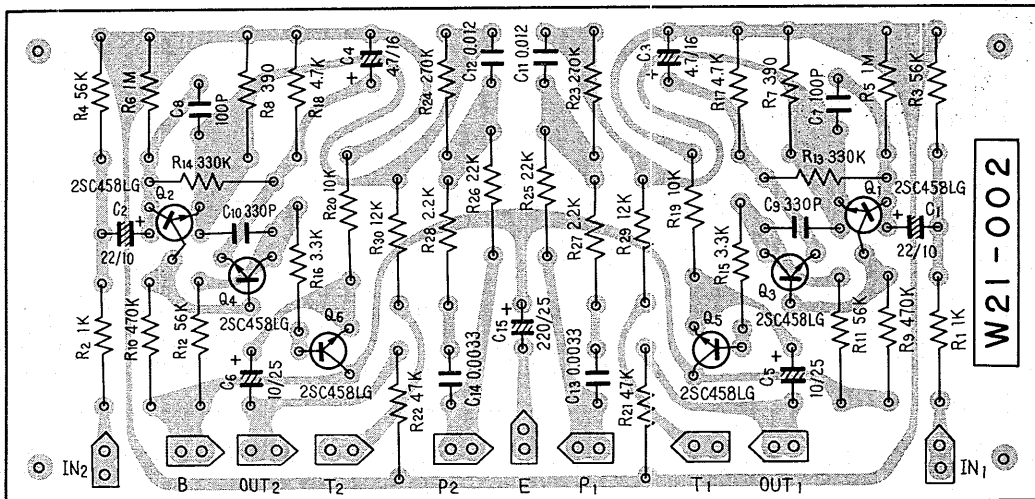
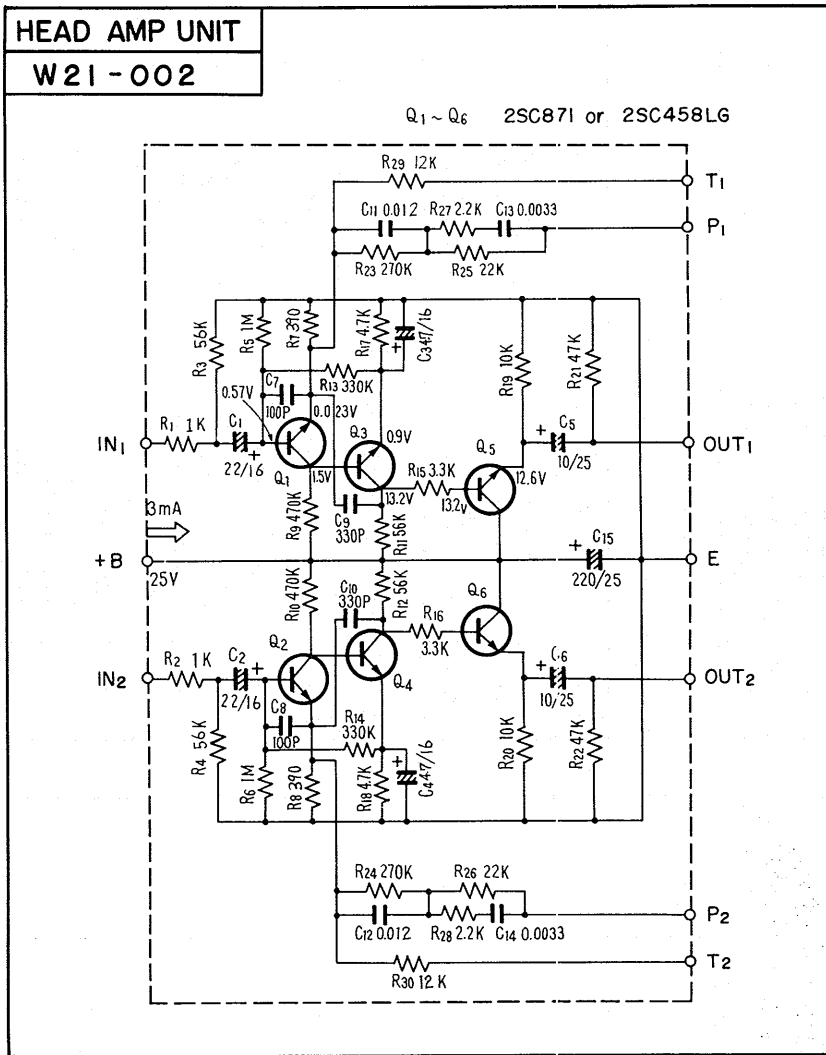
FILTERS

Symbol	Description	Part No.
CF1	FM Ceramic filter	ATF-003-0
CF2	FM Ceramic filter	ATF-001-0
CF3	FM Ceramic filter	ATF-001-0
CF4	AM Ceramic filter	ATF-002-A

COILS AND TRANSFORMERS

Symbol	Description	Part No.
T1	Matching transformer	ATE-002-0
T2	FM Det. transformer	T74-003-A
T3	AM RF transformer	ATB-003-A
T4	AM OSC transformer	ATB-004-B
T5	AM Det. transformer	ATE-003-B
T6	19kHz coil	T75-023-B
T7	MPX transformer	ATM-005-0
T8	38kHz leak filter	ATM-004-0
T9	38kHz leak filter	ATM-004-0
L1	RF choke coil	T24-028-A
L2	RF choke coil	T24-028-A

12.4 HEAD AMP UNIT (W21-002-B)



PARTS LIST OF HEAD AMP UNIT

CAPACITORS

Symbol	Description	Part No.
C1	Electrolytic 22 10V	CEA 220P 10
C2	Electrolytic 22 10V	CEA 220P 10
C3	Electrolytic 4.7 16V	CEA 4R7P 16
C4	Electrolytic 4.7 16V	CEA 4R7P 16
C5	Electrolytic 10 25V	CEA 100P 25
C6	Electrolytic 10 25V	CEA 100P 25
C7	Ceramic 100p 50V	CCDSL 101K 50
C8	Ceramic 100p 50V	CCDSL 101K 50
C9	Ceramic 330p 50V	CCDSL 331K 50
C10	Ceramic 330p 50V	CCDSL 331K 50
C11	Mylar 0.012 50V	QOMA 123K 50
C12	Mylar 0.01 50V	QOMA 103K 50
C13	Mylar 0.0033 50V	QOMA 332K 50
C14	Mylar 0.0033 50V	QOMA 332K 50
C15	Electrolytic 220 25V	CEA 221P 25

RESISTORS

Symbol	Description	Part No.
R1	Carbon film 1k	RD $\frac{1}{4}$ PS 102JNL
R2	Carbon film 1k	RD $\frac{1}{4}$ PS 102JNL
R3	Carbon film 56k	RD $\frac{1}{4}$ PS 563JNL
R4	Carbon film 56k	RD $\frac{1}{4}$ PS 563JNL
R5	Carbon film 1M	RD $\frac{1}{4}$ PS 105JNL
R6	Carbon film 1M	RD $\frac{1}{4}$ PS 105JNL
R7	Carbon film 390	RD $\frac{1}{4}$ PS 391JNL
R8	Carbon film 390	RD $\frac{1}{4}$ PS 391JNL
R9	Carbon film 470k	RD $\frac{1}{4}$ PS 474JNL
R10	Carbon film 470k	RD $\frac{1}{4}$ PS 474JNL

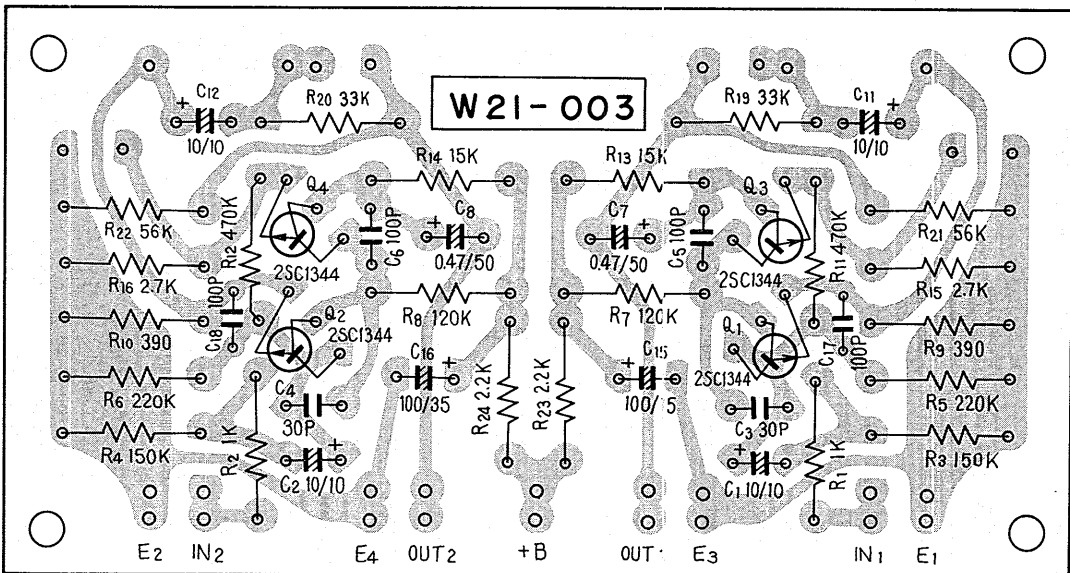
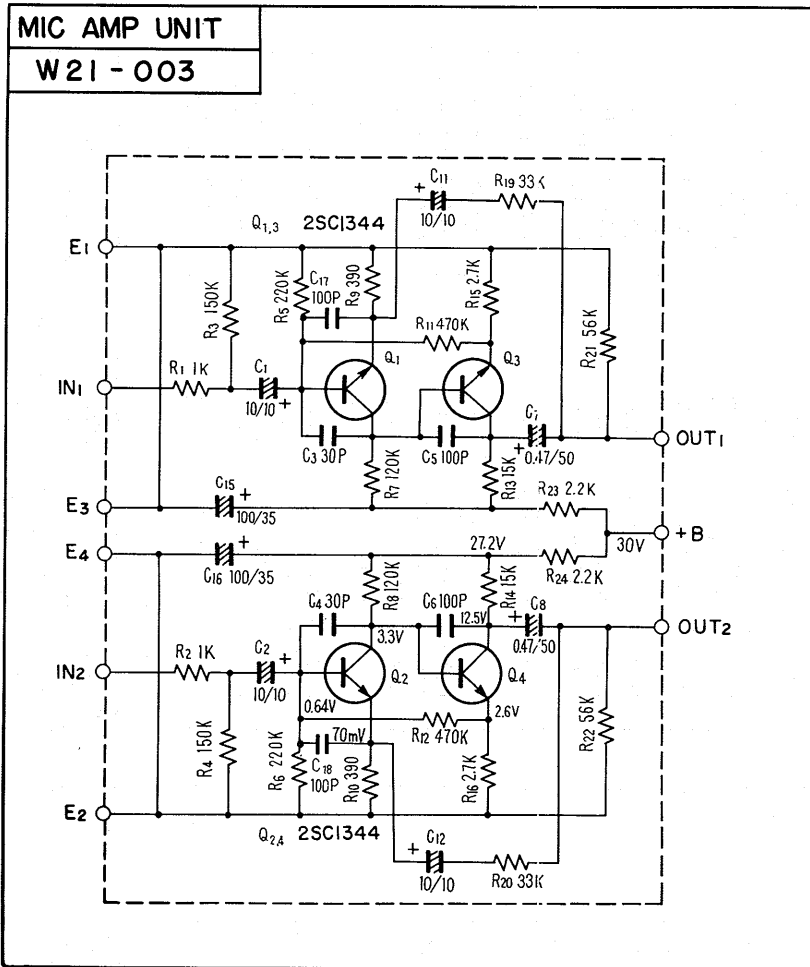
Symbol	Description	Part No.
R11	Carbon film 56k	RD $\frac{1}{4}$ PS 563JNL
R12	Carbon film 56k	RD $\frac{1}{4}$ PS 563JNL
R13	Carbon film 330k	RD $\frac{1}{4}$ PS 334JNL
R14	Carbon film 330k	RD $\frac{1}{4}$ PS 334JNL
R15	Carbon film 3.3k	RD $\frac{1}{4}$ PS 332JNL
R16	Carbon film 3.3k	RD $\frac{1}{4}$ PS 332JNL
R17	Carbon film 4.7k	RD $\frac{1}{4}$ PS 472JNL
R18	Carbon film 4.7k	RD $\frac{1}{4}$ PS 472JNL
R19	Carbon film 10k	RD $\frac{1}{4}$ PS 103JNL
R20	Carbon film 10k	RD $\frac{1}{4}$ PS 103JNL
R21	Carbon film 47k	RD $\frac{1}{4}$ PS 473JNL
R22	Carbon film 47k	RD $\frac{1}{4}$ PS 473JNL
R23	Carbon film 270k	RD $\frac{1}{4}$ PS 274JNL
R24	Carbon film 270k	RD $\frac{1}{4}$ PS 274JNL
R25	Carbon film 27k	RD $\frac{1}{4}$ PS 223JNL
R26	Carbon film 22k	RD $\frac{1}{4}$ PS 223JNL
R27	Carbon film 2.2k	RD $\frac{1}{4}$ PS 222JNL
R28	Carbon film 2.2k	RD $\frac{1}{4}$ PS 222JNL
R29	Carbon film 12k	RD $\frac{1}{4}$ PS 123JNL
R30	Carbon film 12k	RD $\frac{1}{4}$ PS 123JNL

SEMICONDUCTORS

Symbol	Description	Part No.
Q1	2SC458LG-B or C Transistor	
Q2	2SC458LG-B or C Transistor	
Q3	2SC458LG-B or C Transistor	
Q4	2SC458LG-B or C Transistor	
Q5	2SC458LG-B or C Transistor	
Q6	2SC458LG-B or C Transistor	

QX-9900

12.5 MIC AMP UNIT (W21-003-A)



PARTS LIST OF MIC AMP UNIT

CAPACITORS

Symbol	Description			Part No.		
C1	Electrolytic	10	10V	CEA	100P	10
C2	Electrolytic	10	10V	CEA	100P	10
C3	Ceramic	30p	50V	CCDSL	300K	50
C4	Ceramic	30p	50V	CCDSL	300K	50
C5	Ceramic	100p	50V	CCDSL	101K	50
C6	Ceramic	100p	50V	CCDSL	101K	50
C7	Electrolytic	0.47	25V	CSSA	R47M	25
C8	Electrolytic	0.47	25V	CSSA	R47M	25
C9						
C10						
C11	Electrolytic	10	10V	CEA	100P	10
C12	Electrolytic	10	10V	CEA	100P	10
C13						
C14						
C15	Electrolytic	100	35V	CEA	101P	35
C16	Electrolytic	100	35V	CEA	101P	35
C17	Ceramic	100p	50V	CCDSL	101K	50
C18	Ceramic	100p	50V	CCDSL	101K	50

RESISTORS

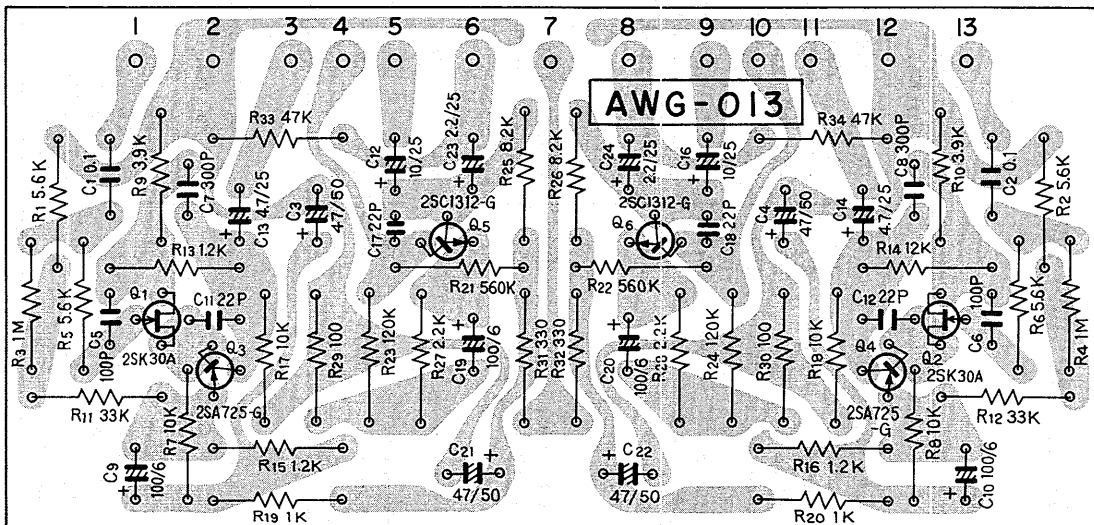
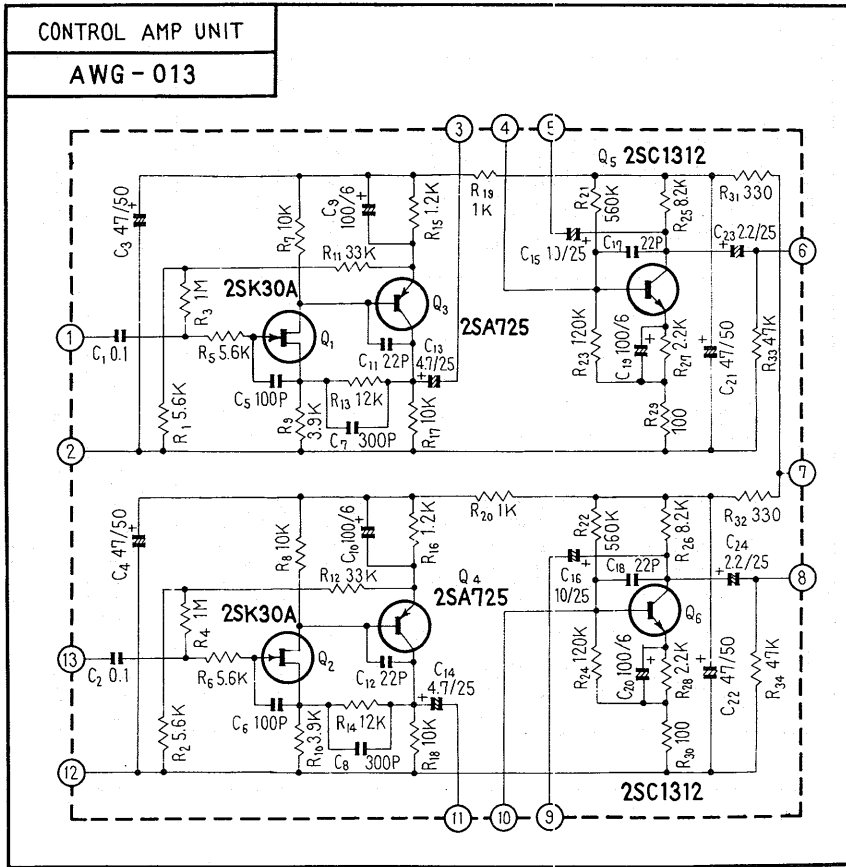
Symbol	Description			Part No.		
R1	Carbon film	1k		RD¼PS	102J	
R2	Carbon film	1k		RD¼PS	102J	
R3	Carbon film	150k		RD¼PS	154J	
R4	Carbon film	150k		RD¼PS	154J	
R5	Carbon film	220k		RD¼PS	224J	

Symbol	Description			Part No.		
R6	Carbon film	220k		RD¼PS	224J	
R7	Carbon film	120k		RD¼PS	124J	
R8	Carbon film	120k		RD¼PS	124J	
R9	Carbon film	390		RD¼PS	391J	
R10	Carbon film	390		RD¼PS	391J	
R11	Carbon film	470k		RD¼PS	474J	
R12	Carbon film	470k		RD¼PS	474J	
R13	Carbon film	15k		RD¼PS	153J	
R14	Carbon film	15k		RD¼PS	153J	
R15	Carbon film	2.7k		RD¼PS	272J	
R16	Carbon film	2.7k		RD¼PS	272J	
R17						
R18						
R19	Carbon film	33k		RD¼PS	333J	
R20	Carbon film	33k		RD¼PS	333J	
R21	Carbon film	56k		RD¼PS	563J	
R22	Carbon film	56k		RD¼PS	563J	
R23	Carbon film	2.2k		RD¼PS	222J	
R24	Carbon film	2.2k		RD¼PS	222J	

SEMICONDUCTORS

Symbol	Description			Part No.		
Q1	2SC1344 or 2SC1312	Transistor				
Q2	2SC1344 or 2SC1312	Transistor				
Q3	2SC1344 or 2SC1312	Transistor				
Q4	2SC1344 or 2SC1312	Transistor				

12.6 CONTROL AMP UNIT (AWG-013-0)



PARTS LIST OF CONTROL AMP UNIT

CAPACITORS

Symbol	Description			Part No.
C1	Mylar	0.1	50V	CQMA 104K 50
C2	Mylar	0.1	50V	CQMA 104K 50
C3	Electrolytic	47	50V	CEA 470P 50
C4	Electrolytic	47	50V	CEA 470P 50
C5	Ceramic	100p	50V	CCDSL 101K 50
C6	Ceramic	100p	50V	CCDSL 101K 50
C7	Ceramic	300p	50V	CKDYB 301K 50
C8	Ceramic	300p	50V	CKDYB 301K 50
C9	Electrolytic	100	6V	CEA 101P 6
C10	Electrolytic	100	6V	CEA 101P 6
C11	Ceramic	22p	50V	CCDSL 220K 50
C12	Ceramic	22p	50V	CCDSL 220K 50
C13	Electrolytic	4.7	25V	CEA 4R7P 25
C14	Electrolytic	4.7	25V	CEA 4R7P 25
C15	Electrolytic	10	25V	CEA 100P 25
C16	Electrolytic	10	25V	CEA 100P 25
C17	Ceramic	22p	50V	CCDSL 220K 50
C18	Ceramic	22p	50V	CCDSL 220K 50
C19	Electrolytic	100	6V	CEA 101P 6
C20	Electrolytic	100	6V	CEA 101P 6
C21	Electrolytic	47	50V	CEA 470P 50
C22	Electrolytic	47	50V	CEA 470P 50
C23	Electrolytic	2.2	25V	CSSA 2R2X 25
C24	Electrolytic	2.2	25V	CSSA 2R2X 25

RESISTORS

Symbol	Description		Part No.
R1	Carbon film	5.6k	RD $\frac{1}{4}$ PS 562J
R2	Carbon film	5.6k	RD $\frac{1}{4}$ PS 562J
R3	Carbon film	1M	RD $\frac{1}{4}$ PS 105JNL
R4	Carbon film	1M	RD $\frac{1}{4}$ PS 105JNL
R5	Carbon film	5.6k	RD $\frac{1}{4}$ PS 562J
R6	Carbon film	5.6k	RD $\frac{1}{4}$ PS 562J
R7	Carbon film	10k	RD $\frac{1}{4}$ PS 103J
R8	Carbon film	10k	RD $\frac{1}{4}$ PS 103J
R9	Carbon film	3.9k	RD $\frac{1}{4}$ PS 392J
R10	Carbon film	3.9k	RD $\frac{1}{4}$ PS 392J
R11	Carbon film	33k	RD $\frac{1}{4}$ PS 333J
R12	Carbon film	33k	RD $\frac{1}{4}$ PS 333J
R13	Carbon film	12k	RD $\frac{1}{4}$ PS 123J
R14	Carbon film	12k	RD $\frac{1}{4}$ PS 123J
R15	Carbon film	1.2k	RD $\frac{1}{4}$ PS 122J
R16	Carbon film	1.2k	RD $\frac{1}{4}$ PS 122J
R17	Carbon film	10k	RD $\frac{1}{4}$ PS 103J
R18	Carbon film	10k	RD $\frac{1}{4}$ PS 103J
R19	Carbon film	1k	RD $\frac{1}{4}$ PS 102J
R20	Carbon film	1k	RD $\frac{1}{4}$ PS 102J
R21	Carbon film	560k	RD $\frac{1}{4}$ PS 564JNL
R22	Carbon film	560k	RD $\frac{1}{4}$ PS 564JNL
R23	Carbon film	120k	RD $\frac{1}{4}$ PS 124JNL
R24	Carbon film	120k	RD $\frac{1}{4}$ PS 124JNL
R25	Carbon film	8.2k	RD $\frac{1}{4}$ PS 822J

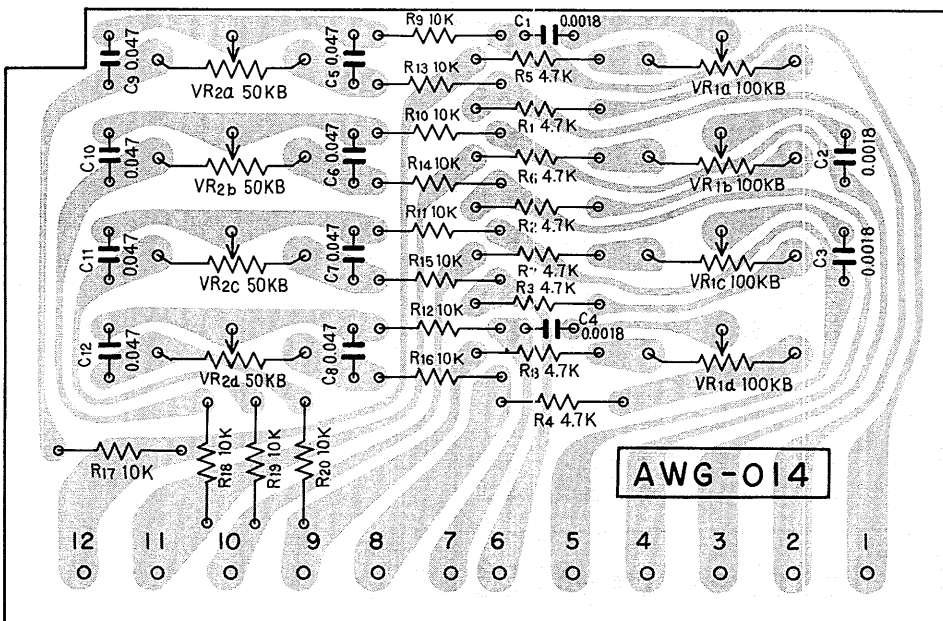
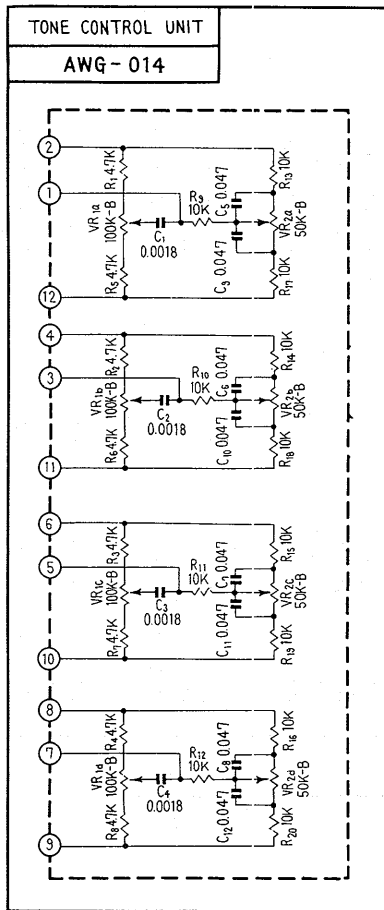
5 CONTROL AMP UNIT
(continued)

Symbol	Description	Part No.
R26	Carbon film 8.2k	RD¼PS 822J
R27	Carbon film 2.2k	RD¼PS 222J
R28	Carbon film 2.2k	RD¼PS 222J
R29	Carbon film 100	RD¼PS 101J
R30	Carbon film 100	RD¼PS 101J
R31	Carbon film 330	RD¼PS 331J
R32	Carbon film 330	RD¼PS 331J
R33	Carbon film 47k	RD¼PS 473J
R34	Carbon film 47k	RD¼PS 473J

SEMICONDUCTORS

Symbol	Description	Part No.
Q1	2SK30A-GR FET	
Q2	2SK30A-GR FET	
Q3	2SA725-G or F Transistor	
Q4	2SA725-G or F Transistor	
Q5	2SC1312-G or F Transistor	
Q6	2SC1312-G or F Transistor	

12.7 TONE CONTROL UNIT (AWG-014-0)



52 PARTS LIST OF TONE CONTROL UNIT

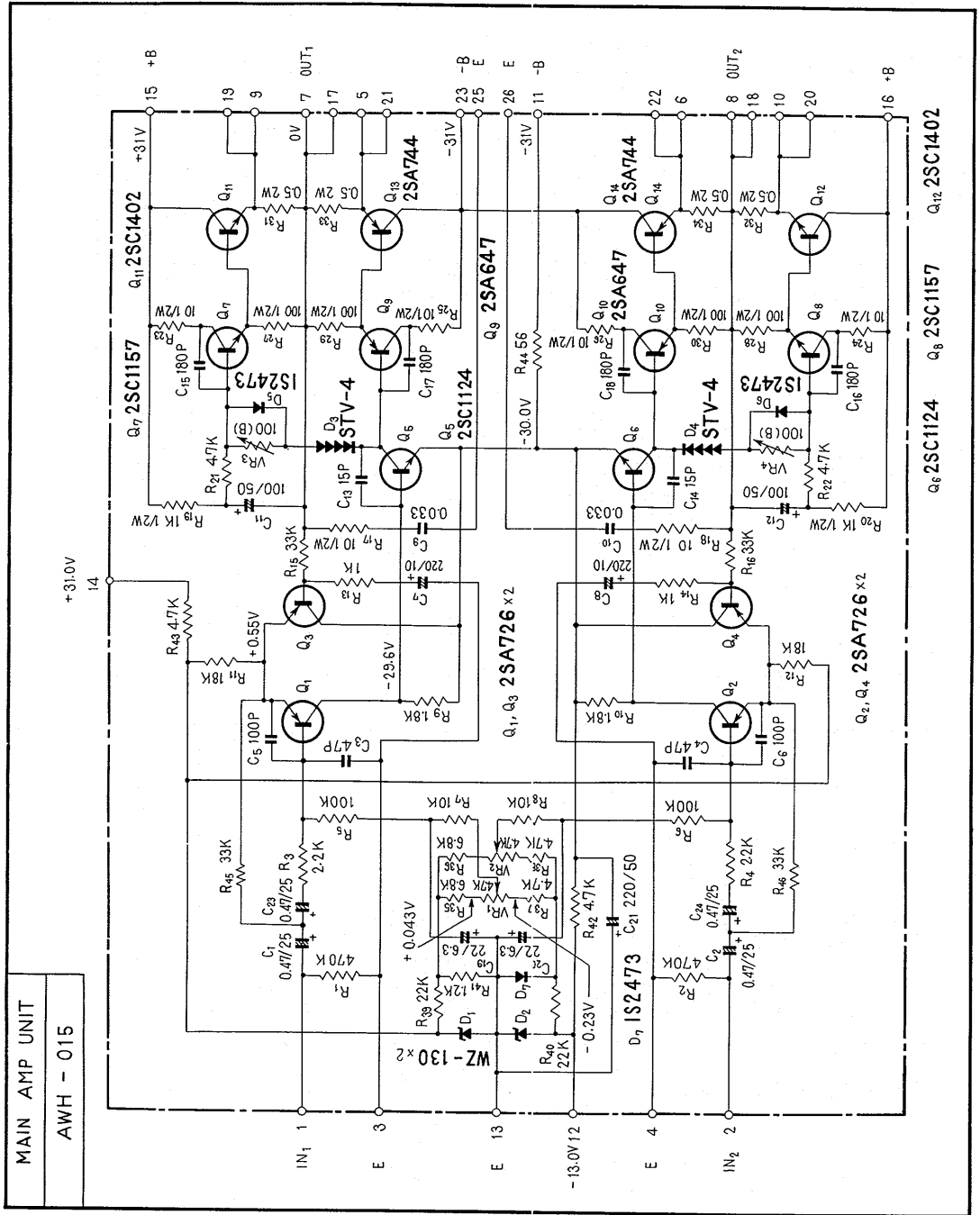
CAPACITORS

Symbol	Description			Part No.
C1	Mylar	0.0018	50V	CQMA 182K 50
C2	Mylar	0.0018	50V	CQMA 182K 50
C3	Mylar	0.0018	50V	CQMA 182K 50
C4	Mylar	0.0018	50V	CQMA 182K 50
C5	Mylar	0.047	50V	CQMA 473J 50
C6	Mylar	0.047	50V	CQMA 473J 50
C7	Mylar	0.047	50V	CQMA 473J 50
C8	Mylar	0.047	50V	CQMA 473J 50
C9	Mylar	0.047	50V	CQMA 473J 50
C10	Mylar	0.047	50V	CQMA 473J 50
C11	Mylar	0.047	50V	CQMA 473J 50
C12	Mylar	0.047	50V	CQMA 473J 50

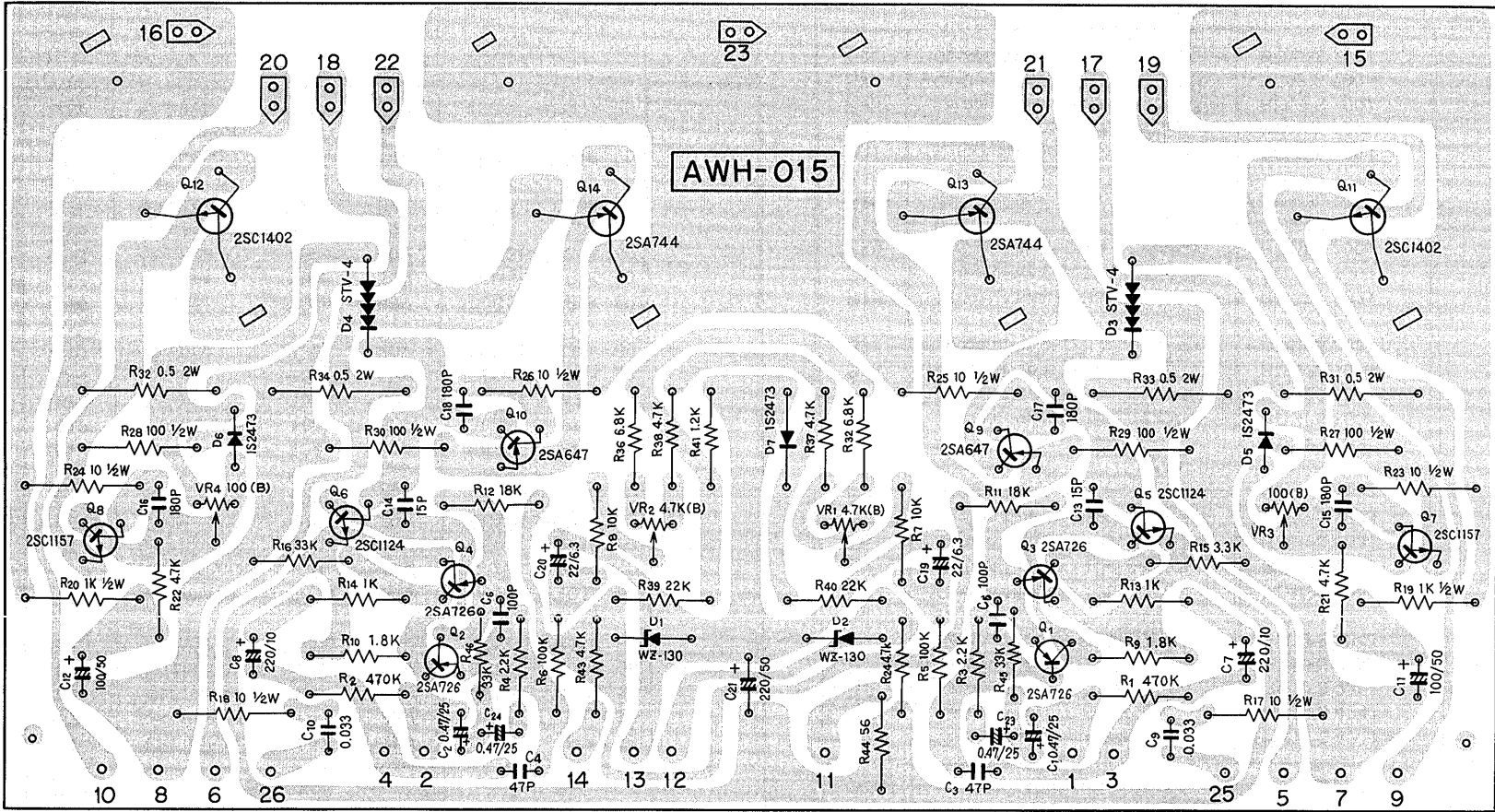
RESISTORS

Symbol	Description		Part No.
R1	Carbon film	4.7k	RD¼PS 472J
R2	Carbon film	4.7k	RD¼PS 472J
R3	Carbon film	4.7k	RD¼PS 472J
R4	Carbon film	4.7k	RD¼PS 472J
R5	Carbon film	4.7k	RD¼PS 472J
R6	Carbon film	4.7k	RD¼PS 472J
R7	Carbon film	4.7k	RD¼PS 472J
R8	Carbon film	4.7k	RD¼PS 472J
R9	Carbon film	10k	RD¼PS 103J
R10	Carbon film	10k	RD¼PS 103J
R11	Carbon film	10k	RD¼PS 103J
R12	Carbon film	10k	RD¼PS 103J
R13	Carbon film	10k	RD¼PS 103J
R14	Carbon film	10k	RD¼PS 103J
R15	Carbon film	10k	RD¼PS 103J
R16	Carbon film	10k	RD¼PS 103J
R17	Carbon film	10k	RD¼PS 103J
R18	Carbon film	10k	RD¼PS 103J
R19	Carbon film	10k	RD¼PS 103J
R20	Carbon film	10k	RD¼PS 103J
VR1	100k 4-gang, bass		ACV-402-0
VR2	50k-B 4-gang, treble		ACV-403-0

12.8 MAIN AMP UNIT (AWH-015-B)



AWH-015



5 PARTS LIST OF MAIN AMP UNIT

CAPACITORS

Symbol	Description			Part No.	
C1	Electrolytic	0.47	25V	CSSA	R47X 25
C2	Electrolytic	0.47	25V	CSSA	R47X 25
C3	Ceramic	47p	50V	CCDSL	470K 50
C4	Ceramic	47p	50V	CCDSL	470K 50
C5	Ceramic	100p	50V	CCDSL	101K 50
C6	Ceramic	100p	50V	CCDSL	101K 50
C7	Electrolytic	220	10V	CEA	221P 10
C8	Electrolytic	220	10V	CEA	221P 10
C9	Mylar	0.033	50V	CQMA	333K 50
C10	Mylar	0.033	50V	CQMA	333K 50
C11	Electrolytic	100	50V	CEA	101P 50
C12	Electrolytic	100	50V	CEA	101P 50
C13	Ceramic	15p	50V	CCDSL	150K 50
C14	Ceramic	15p	50V	CCDSL	150K 50
C15	Ceramic	180p	50V	CCDSL	181K 50
C16	Ceramic	180p	50V	CCDSL	181K 50
C17	Ceramic	180p	50V	CCDSL	181K 50
C18	Ceramic	180p	50V	CCDSL	181K 50
C19	Electrolytic	22	6V	CEA	220P 6
C20	Electrolytic	22	6V	CEA	220P 6
C21	Electrolytic	220	50V	CEA	221P 50
C23	Electrolytic	0.47	25V	CSSA	R47X 25
C24	Electrolytic	0.47	25V	CSSA	R47X 25

RESISTORS

Symbol	Description			Part No.	
R1	Carbon film	470k		RD½PS	474J
R2	Carbon film	470k		RD½PS	474J
R3	Carbon film	2.2k		RD½PS	222J
R4	Carbon film	2.2k		RD½PS	222J
R5	Carbon film	100k		RD½PS	104J
R6	Carbon film	100k		RD½PS	104J
R7	Carbon film	10k		RD½PS	103J
R8	Carbon film	10k		RD½PS	103J
R9	Carbon film	1.8k		RD½PS	182J
R10	Carbon film	1.8k		RD½PS	182J
R11	Carbon film	18k		RD½PS	183J
R12	Carbon film	18k		RD½PS	183J
R13	Carbon film	1k		RD½PS	102J
R14	Carbon film	1k		RD½PS	102J
R15	Carbon film	33k		RD½PS	333J
R16	Carbon film	33k		RD½PS	333J
R17	Carbon film	10	½W	RD½PS	100J
R18	Carbon film	10	½W	RD½PS	100J
R19	Carbon film	1k	½W	RD½PS	102J
R20	Carbon film	1k	½W	RD½PS	102J
R21	Carbon film	4.7k		RD½PS	472J
R22	Carbon film	4.7k		RD½PS	472J
R23	Carbon film	10	½W	RD½PS	100J
R24	Carbon film	10	½W	RD½PS	100J
R25	Carbon film	10	½W	RD½PS	100J

Symbol	Description	Part No.	
R26	Carbon film 10 ½W	RD½PS 100J	
R27	Carbon film 100 ½W	RD½PS 101J	
R28	Carbon film 100 ½W	RD½PS 101J	
R29	Carbon film 100 ½W	RD½PS 101J	
R30	Carbon film 100 ½W	RD½PS 101J	
R31	Metal oxide 0.5 2W	RN2H 0R5K	
R32	Metal oxide 0.5 2W	RN2H 0R5K	
R33	Metal oxide 0.5 2W	RN2H 0R5K	
R34	Metal oxide 0.5 2W	RN2H 0R5K	
R35	Carbon film 6.8k	RD¼PS 682J	
R36	Carbon film 6.8k	RD¼PS 682J	
R37	Carbon film 4.7k	RD¼PS 472J	
R38	Carbon film 4.7k	RD¼PS 472J	
R39	Carbon film 22k	RD¼PS 223J	
R40	Carbon film 22k	RD¼PS 223J	
R41	Carbon film 1.2k	RD¼PS 122J	
R42	Carbon film 4.7k	RD¼PS 472J	
R43	Carbon film 4.7k	RD¼PS 472J	
R44	Carbon film 56	RD¼PS 560J	
R45	Carbon film 33k	RD¼PS 333J	
R46	Carbon film 33k	RD¼PS 333J	
VR1	Semi-fixed 4.7k-B	C92-051-O	
VR2	Semi-fixed 4.7k-B	C92-051-O	
VR3	Semi-fixed 100-B	C92-063-O	
VR4	Semi-fixed 100-B	C92-063-O	

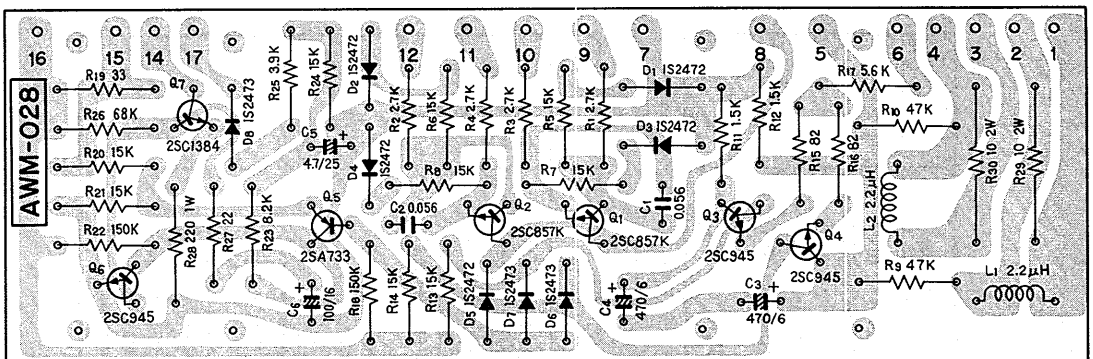
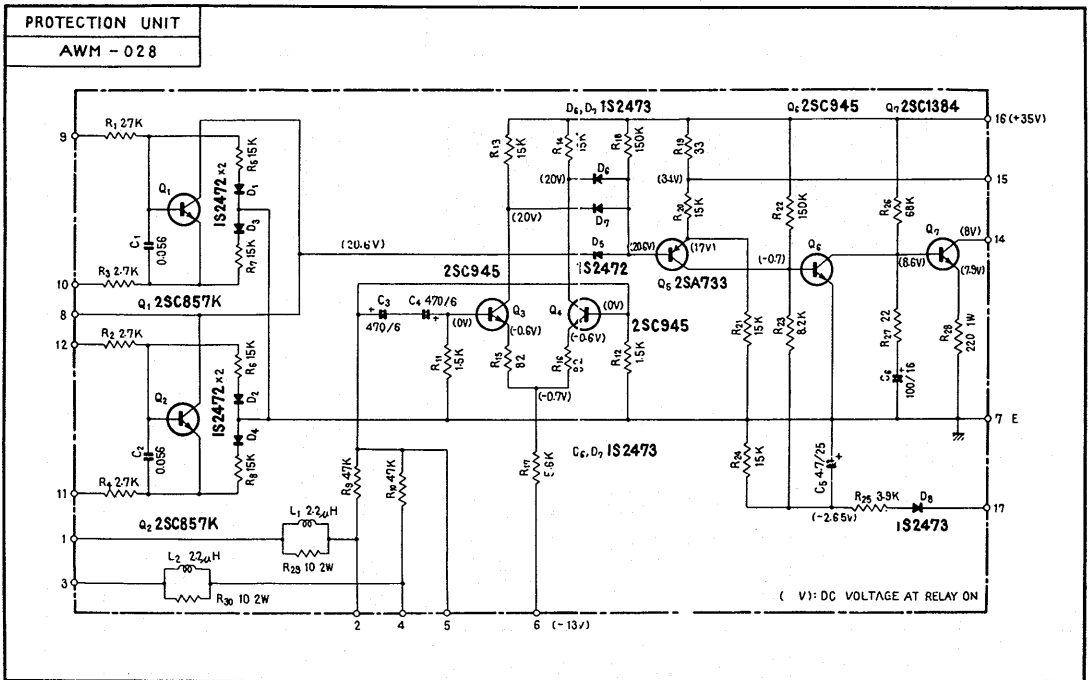
SEMICONDUCTORS

Symbol	Description	Part No.	
Q1	2SA726-GW or GY Transistor		
Q2	2SA726-GW or GY Transistor		
Q3	2SA726-GW or GY Transistor		
Q4	2SA726-GW or GY Transistor		
Q5	2SC1124-2 or 3 Transistor		
Q6	2SC1124-2 or 3 Transistor		
Q7	2SC1157-D or C Transistor		
Q8	2SC1157-D or C Transistor		
Q9	2SA647-D or C Transistor		
Q10	2SA647-D or C Transistor		
Q11	2SC1402-R or O Transistor		
Q12	2SC1402-R or O Transistor		
Q13	2SA744-R or O Transistor		
Q14	2SA744-R or O Transistor		
D1	WZ-130 Zener diode		
D2	WZ-130 Zener diode		
D3	STV-4 Varistor		
D4	STV-4 Varistor		
D5	1S2473 Diode		
D6	1S2473 Diode		
D7	1S2473 Diode		

OTHERS

Symbol	Description	Part No.	
	Insulating bushing	E32-039-O	
	Insulator spacer	E32-040-O	

12.9 PROTECTION UNIT-1 (AWM-028-0)



5 PARTS LIST OF PROTECTION UNIT-1.

CAPACITORS

Symbol	Description			Part No.	
C1	Mylar	0.056	50V	CQMA	563K 50
C2	Mylar	0.056	50V	CQMA	563K 50
C3	Electrolytic	470	6V	CEA	471P 6
C4	Electrolytic	470	6V	CEA	471P 6
C5	Electrolytic	4.7	25V	CEA	4R7P 25
C6	Electrolytic	100	16V	CEA	101P 16

RESISTORS

Symbol	Description			Part No.	
R1	Carbon film	2.7k		RD¼PS	272J
R2	Carbon film	2.7k		RD¼PS	272J
R3	Carbon film	2.7k		RD¼PS	272J
R4	Carbon film	2.7k		RD¼PS	272J
R5	Carbon film	15k		RD¼PS	153J
R6	Carbon film	15k		RD¼PS	153J
R7	Carbon film	15k		RD¼PS	153J
R8	Carbon film	15k		RD¼PS	153J
R9	Carbon film	47k		RD¼PS	473J
R10	Carbon film	47k		RD¼PS	473J
R11	Carbon film	1.5k		RD¼PS	152J
R12	Carbon film	1.5k		RD¼PS	152J
R13	Carbon film	15k		RD¼PS	153J
R14	Carbon film	15k		RD¼PS	153J
R15	Carbon film	82		RD¼PS	820J

Symbol	Description			Part No.	
R16	Carbon film	82		RD¼PS	820J
R17	Carbon film	5.6k		RD¼PS	562J
R18	Carbon film	150k		RD¼PS	154J
R19	Carbon film	33		RD¼PS	330J
R20	Carbon film	15k		RD¼PS	153J
R21	Carbon film	15k		RD¼PS	153J
R22	Carbon film	150k		RD¼PS	154J
R23	Carbon film	8.2k		RD¼PS	822J
R24	Carbon film	15k		RD¼PS	153J
R25	Carbon film	3.9k		RD¼PS	392J
R26	Carbon film	68k		RD¼PS	683J
R27	Carbon film	22		RD¼PS	220J
R28	Metal oxide	220	1W	RS1P	221J
R29	Metal oxide	10	2W	RS2P	100J
R30	Metal oxide	10	2W	RS2P	100J

SEMICONDUCTORS

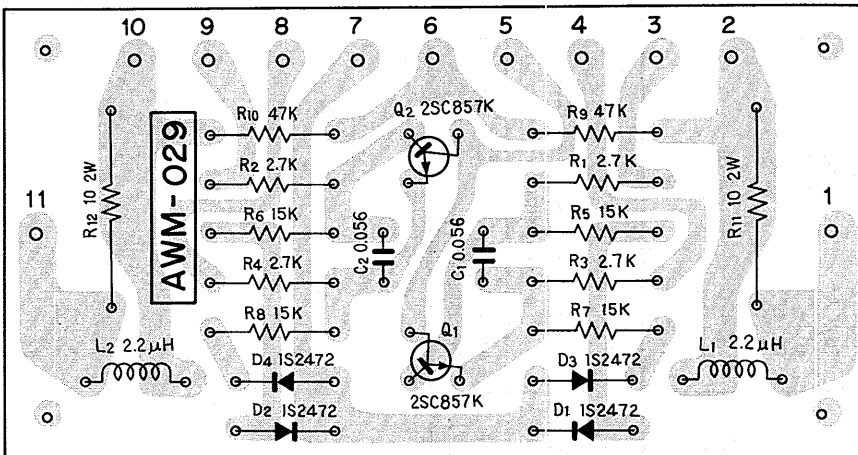
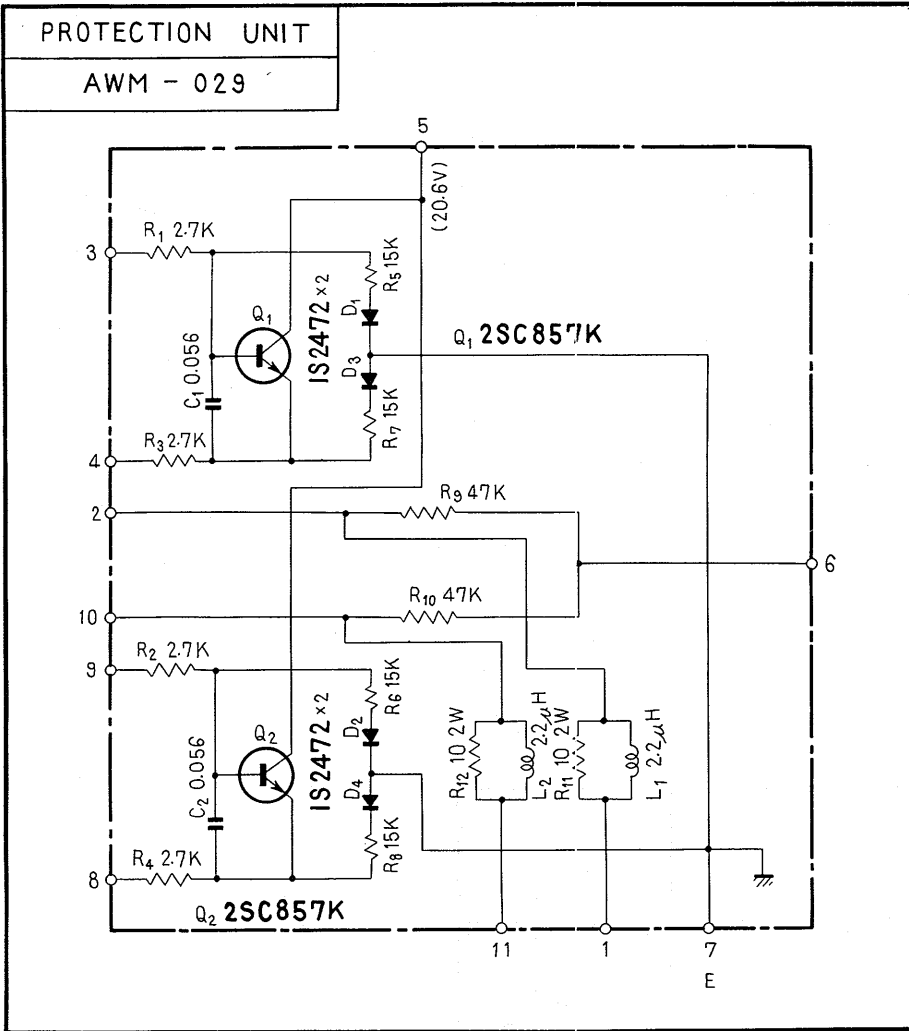
Symbol	Description		Part No.	
Q1	2SC857K-A	Transistor		
Q2	2SC857K-A	Transistor		
Q3	2SC945-Q or R	Transistor		
Q4	2SC945-Q or R	Transistor		
Q5	2SA733-Q or R	Transistor		
Q6	2SC945-Q or R	Transistor		
Q7	2SC1384-R or Q	Transistor		

Symbol	Description	Part No.	
D1	1S2472 Diode		
D2	1S2472 Diode		
D3	1S2472 Diode		
D4	1S2472 Diode		
D5	1S2472 Diode		
D6	1S2473 Diode		
D7	1S2473 Diode		
D8	1S2473 Diode		

COILS

Symbol	Description	Part No.	
L1	AF choke coil	T63-009-A	
L2	AF choke coil	T63-009-A	

12.10 PROTECTION UNIT-2 (AWM-029-0)



PARTS LIST OF PROTECTION UNIT-2

CAPACITORS

Symbol	Description			Part No.
C1	Mylar	0.056	50V	CQMA 563K 50
C2	Mylar	0.056	50V	CQMA 563K 50

RESISTORS

Symbol	Description			Part No.
R1	Carbon film	2.7k		RD½PS 272J
R2	Carbon film	2.7k		RD½PS 272J
R3	Carbon film	2.7k		RD½PS 272J
R4	Carbon film	2.7k		RD½PS 272J
R5	Carbon film	15k		RD½PS 153J
R6	Carbon film	15k		RD½PS 153J
R7	Carbon film	15k		RD½PS 153J
R8	Carbon film	15k		RD½PS 153J
R9	Carbon film	47k		RD½PS 473J
R10	Carbon film	47k		RD½PS 473J
R11	Metal oxide	10	2W	RS2P 100J
R12	Metal oxide	10	2W	RS2P 100J

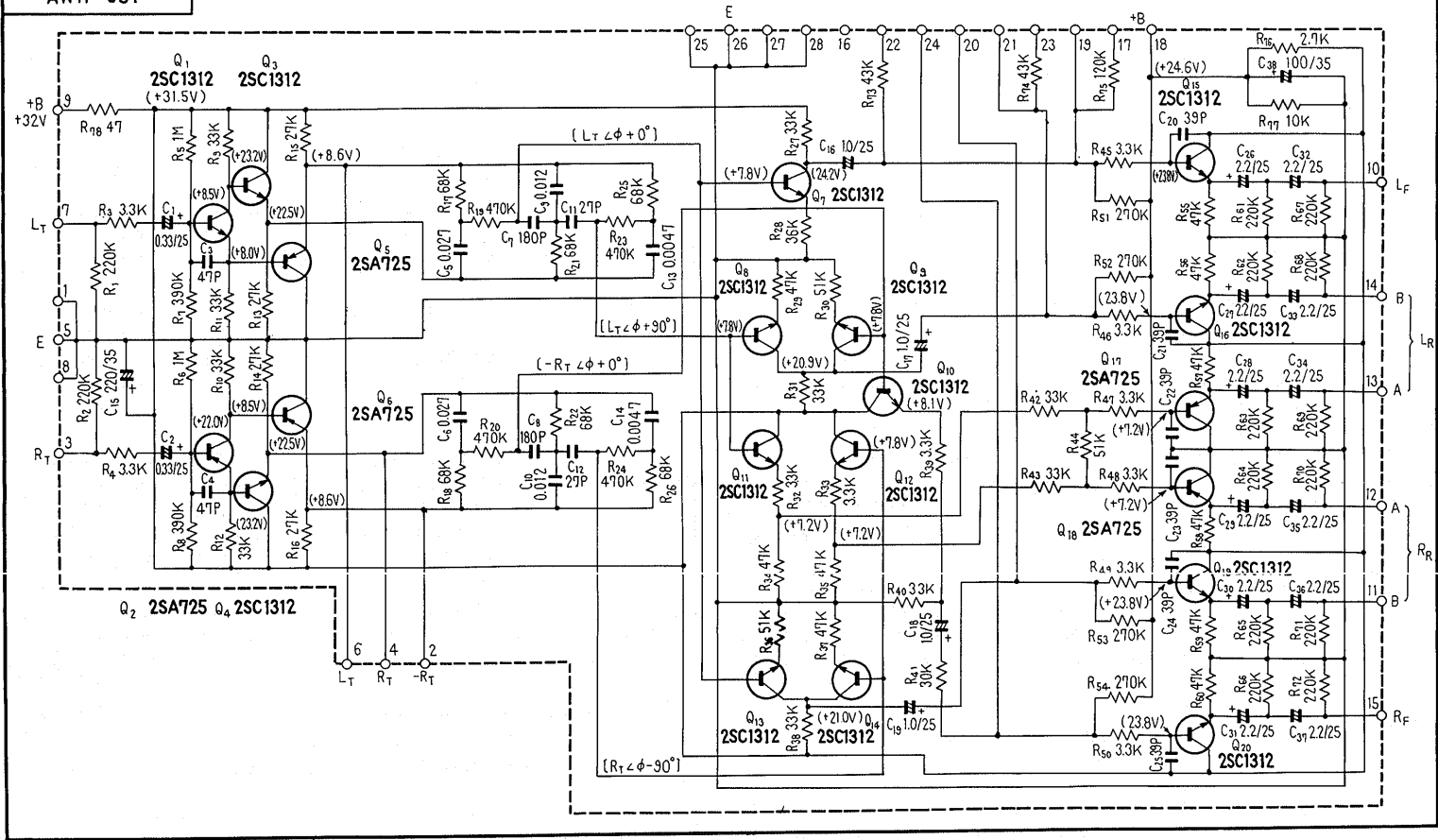
SEMICONDUCTORS

Symbol	Description		Part No.
Q1	2SC857K-A	Transistor	
Q2	2SC857K-A	Transistor	
D1	1S2472	Diode	
D2	1S2472	Diode	
D3	1S2472	Diode	
D4	1S2472	Diode	

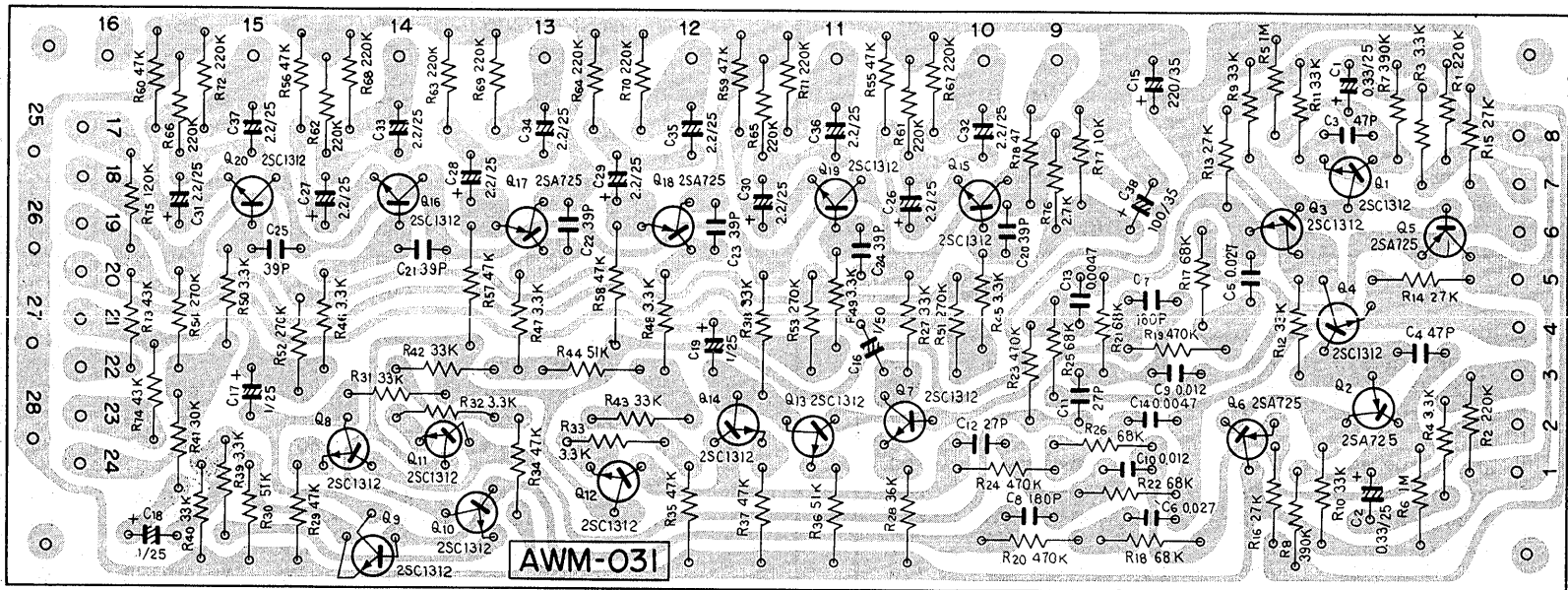
COILS

Symbol	Description	Part No.
L1	AF choke coil	T63-009-A
L2	AF choke coil	T63-009-A

DECODER UNIT
AWM-031



12.11 DECODER UNIT (AWM-031-0)



4 PARTS LIST OF DECODER UNIT

CAPACITORS

Symbol	Description			Part No.
C1	Electrolytic	0.33	25V	CSSA R33M 25
C2	Electrolytic	0.33	25V	CSSA R33M 25
C3	Ceramic	47p	50V	CCDSL 470K 50
C4	Ceramic	47p	50V	CCDSL 470K 50
C5	Mylar	0.027	50V	CQMA 273J 50
C6	Mylar	0.027	50V	CQMA 273J 50
C7	Ceramic	180p	50V	CCDSL 181J 50
C8	Ceramic	180p	50V	CCDSL 181J 50
C9	Mylar	0.012	50V	CQMA 123J 50
C10	Mylar	0.012	50V	CQMA 123J 50
C11	Ceramic	27p	50V	CCDSL 270J 50
C12	Ceramic	27p	50V	CCDSL 270J 50
C13	Mylar	0.0047	50V	CQMA 472J 50
C14	Mylar	0.0047	50V	CQMA 472J 50
C15	Electrolytic	220	35V	CEA 221P 35
C16	Electrolytic	1	25V	CEA 010M 25NP
C17	Electrolytic	1	25V	CSSA 010M 25
C18	Electrolytic	1	25V	CSSA 010M 25
C19	Electrolytic	1	25V	CSSA 010M 25
C20	Ceramic	39p	50V	CCDSL 390K 50
C21	Ceramic	39p	50V	CCDSL 390K 50
C22	Ceramic	39p	50V	CCDSL 390K 50
C23	Ceramic	39p	50V	CCDSL 390K 50
C24	Ceramic	39p	50V	CCDSL 390K 50
C25	Ceramic	39p	50V	CCDSL 390K 50

Symbol	Description			Part No.
C26	Electrolytic	2.2	25V	CSSA 2R2M 25
C27	Electrolytic	2.2	25V	CSSA 2R2M 25
C28	Electrolytic	2.2	25V	CSSA 2R2M 25
C29	Electrolytic	2.2	25V	CSSA 2R2M 25
C30	Electrolytic	2.2	25V	CSSA 2R2M 25
C31	Electrolytic	2.2	25V	CSSA 2R2M 25
C32	Electrolytic	2.2	25V	CEA 2R2M 25NP
C33	Electrolytic	2.2	25V	CEA 2R2M 25NP
C34	Electrolytic	2.2	25V	CEA 2R2M 25NP
C35	Electrolytic	2.2	25V	CEA 2R2M 25NP
C36	Electrolytic	2.2	25V	CEA 2R2M 25NP
C37	Electrolytic	2.2	25V	CEA 2R2M 25NP
C38	Electrolytic	100	35V	CEA 101P 35

RESISTORS

Symbol	Description			Part No.
R1	Carbon film	220k		RD¼PM 224J
R2	Carbon film	220k		RD¼PM 224J
R3	Carbon film	3.3k		RD¼PM 332J
R4	Carbon film	3.3k		RD¼PM 332J
R5	Carbon film	1M		RD¼PM 105J
R6	Carbon film	1M		RD¼PM 105J
R7	Carbon film	390k		RD¼PM 394J
R8	Carbon film	390k		RD¼PM 394J
R9	Carbon film	33k		RD¼PM 333J
R10	Carbon film	33k		RD¼PM 333J
R11	Carbon film	33k		RD¼PM 333J
R12	Carbon film	33k		RD¼PM 333J
R13	Carbon film	27k		RD¼PM 273J
R14	Carbon film	27k		RD¼PM 273J
R15	Carbon film	27k		RD¼PM 273J

Symbol	Description	Part No.
R16	Carbon film 27k	RD%PM 273J
R17	Carbon film 68k	RD%PM 683J
R18	Carbon film 68k	RD%PM 683J
R19	Carbon film 470k	RD%PM 474J
R20	Carbon film 470k	RD%PM 474J
R21	Carbon film 68k	RD%PM 683J
R22	Carbon film 68k	RD%PM 683J
R23	Carbon film 470k	RD%PM 474J
R24	Carbon film 470k	RD%PM 474J
R25	Carbon film 68k	RD%PM 683J
R26	Carbon film 68k	RD%PM 683J
R27	Carbon film 33k	RD%PM 333J
R28	Carbon film 36k	RD%PM 363J
R29	Carbon film 47k	RD%PM 473J
R30	Carbon film 51k	RD%PM 513J
R31	Carbon film 33k	RD%PM 333J
R32	Carbon film 3.3k	RD%PM 332J
R33	Carbon film 3.3k	RD%PM 332J
R34	Carbon film 47k	RD%PM 473J
R35	Carbon film 47k	RD%PM 473J
R36	Carbon film 51k	RD%PM 513J
R37	Carbon film 47k	RD%PM 473J
R38	Carbon film 33k	RD%PM 333J
R39	Carbon film 3.3k	RD%PM 332J
R40	Carbon film 33k	RD%PM 333J
R41	Carbon film 30k	RD%PM 303J
R42	Carbon film 33k	RD%PM 333J
R43	Carbon film 33k	RD%PM 333J
R44	Carbon film 51k	RD%PM 513J
R45	Carbon film 3.3k	RD%PM 332J

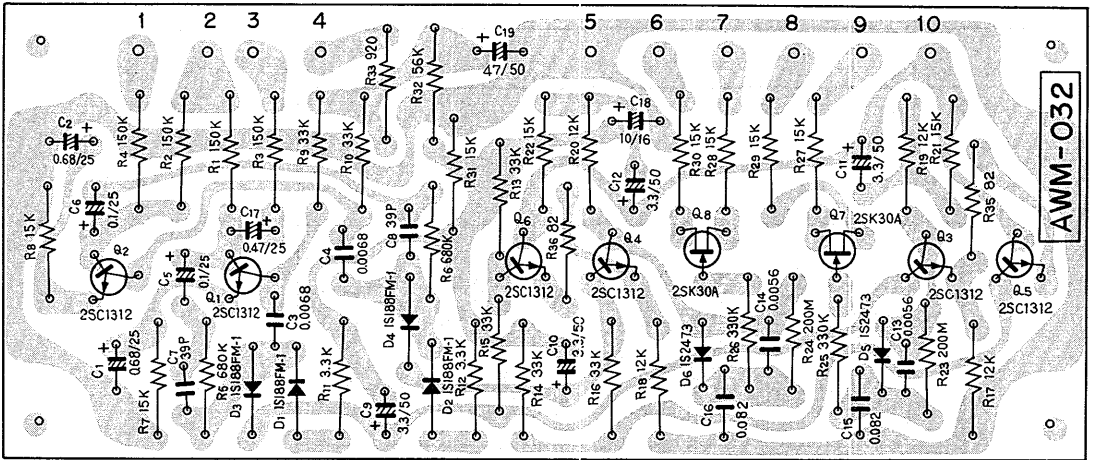
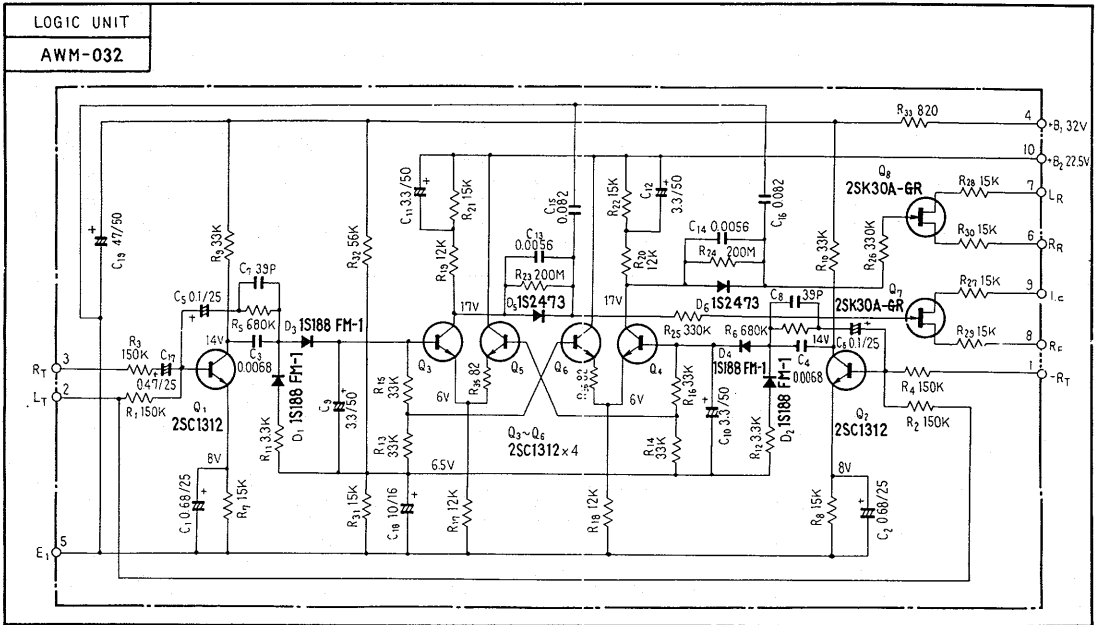
Symbol	Description	Part No.
R46	Carbon film 3.3k	RD%PM 332J
R47	Carbon film 3.3k	RD%PM 332J
R48	Carbon film 3.3k	RD%PM 332J
R49	Carbon film 3.3k	RD%PM 332J
R50	Carbon film 3.3k	RD%PM 332J
R51	Carbon film 270k	RD%PM 274J
R52	Carbon film 270k	RD%PM 274J
R53	Carbon film 270k	RD%PM 274J
R54	Carbon film 270k	RD%PM 274J
R55	Carbon film 47k	RD%PM 473J
R56	Carbon film 47k	RD%PM 473J
R57	Carbon film 47k	RD%PM 473J
R58	Carbon film 47k	RD%PM 473J
R59	Carbon film 47k	RD%PM 473J
R60	Carbon film 47k	RD%PM 473J
R61	Carbon film 220k	RD%PM 224J
R62	Carbon film 220k	RD%PM 224J
R63	Carbon film 220k	RD%PM 224J
R64	Carbon film 220k	RD%PM 224J
R65	Carbon film 220k	RD%PM 224J
R66	Carbon film 220k	RD%PM 224J
R67	Carbon film 220k	RD%PM 224J
R68	Carbon film 220k	RD%PM 224J
R69	Carbon film 220k	RD%PM 224J
R70	Carbon film 220k	RD%PM 224J
R71	Carbon film 220k	RD%PM 224J
R72	Carbon film 220k	RD%PM 224J
R73	Carbon film 43k	RD%PM 433J
R74	Carbon film 43k	RD%PM 433J
R75	Carbon film 120k	RD%PM 124J
R76	Carbon film 2.7k	RD%PM 272J
R77	Carbon film 10k	RD%PM 103J
R78	Carbon film 47	RD%PM 470J

89 DECODER UNIT
(continued)

SEMICONDUCTORS

Symbol	Description	Part No.
Q1	2SC1312-F or G Transistor	
Q2	2SA725-F or G Transistor	
Q3	2SC1312-F or G Transistor	
Q4	2SC1312-F or G Transistor	
Q5	2SA725-F or G Transistor	
Q6	2SA725-F or G Transistor	
Q7	2SC1312-G Transistor	
Q8	2SC1312-G Transistor	
Q9	2SC1312-G Transistor	
Q10	2SC1312-G Transistor	
Q11	2SC1312-G Transistor	
Q12	2SC1312-G Transistor	
Q13	2SC1312-G Transistor	
Q14	2SC1312-G Transistor	
Q15	2SC1312-F or G Transistor	
Q16	2SC1312-F or G Transistor	
Q17	2SA725-F or G Transistor	
Q18	2SA725-F or G Transistor	
Q19	2SC1312-F or G Transistor	
Q20	2SC1312-F or G Transistor	

12.12 LOGIC UNIT (AWM-032-A)



89 PARTS LIST OF LOGIC UNIT

CAPACITORS

Symbol	Description			Part No.
C1	Electrolytic	0.68	25V	CSSA R68M 25
C2	Electrolytic	0.68	25V	CSSA R68M 25
C3	Mylar	0.0068	50V	CQMA 682K 50
C4	Mylar	0.0068	50V	CQMA 682K 50
C5	Electrolytic	0.1	25V	CSSA 0R1M 25
C6	Electrolytic	0.1	25V	CSSA 0R1M 25
C7	Ceramic	39p	50V	CCDSL 390K 50
C8	Ceramic	39p	50V	CCDSL 390K 50
C9	Electrolytic	3.3	50V	CEA 3R3P 50
C10	Electrolytic	3.3	50V	CEA 3R3P 50
C11	Electrolytic	3.3	50V	CEA 3R3P 50
C12	Electrolytic	3.3	50V	CEA 3R3P 50
C13	Mylar	0.0056	50V	CQMA 562K 50
C14	Mylar	0.0056	50V	CQMA 562K 50
C15	Mylar	0.082	50V	CQMA 823K 50
C16	Mylar	0.082	50V	CQMA 823K 50
C17	Electrolytic	0.47	25V	CSSA R47M 25
C18	Electrolytic	10	16V	CEA 100P 16
C19	Electrolytic	47	50V	CEA 470P 50

RESISTORS

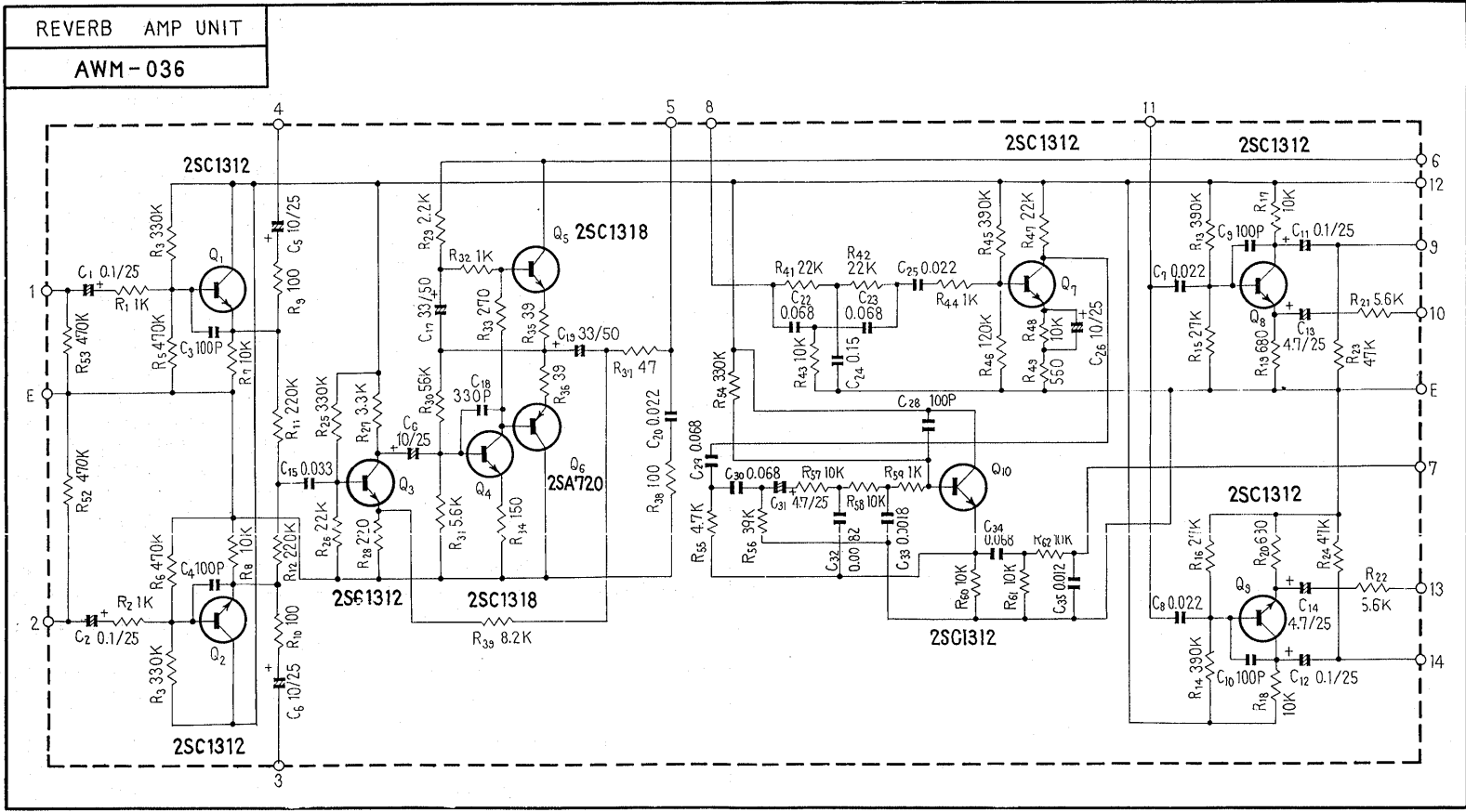
Symbol	Description	Part No.
R1	Carbon film 150k	RD¼PS 154J
R2	Carbon film 150k	RD¼PS 154J
R3	Carbon film 150k	RD¼PS 154J
R4	Carbon film 150k	RD¼PS 154J
R5	Carbon film 680k	RD¼PS 684J
R6	Carbon film 680k	RD¼PS 684J
R7	Carbon film 15k	RD¼PS 153J
R8	Carbon film 15k	RD¼PS 153J
R9	Carbon film 33k	RD¼PS 333J
R10	Carbon film 33k	RD¼PS 333J
R11	Carbon film 3.3k	RD¼PS 332J
R12	Carbon film 3.3k	RD¼PS 332J
R13	Carbon film 33k	RD¼PS 333J
R14	Carbon film 33k	RD¼PS 333J
R15	Carbon film 33k	RD¼PS 333J
R16	Carbon film 33k	RD¼PS 333J
R17	Carbon film 12k	RD¼PS 123J
R18	Carbon film 12k	RD¼PS 123J
R19	Carbon film 12k	RD¼PS 123J
R20	Carbon film 12k	RD¼PS 123J
R21	Carbon film 15k	RD¼PS 153J
R22	Carbon film 15k	RD¼PS 153J
R23	Composition 200M	ACN-001-0
R24	Composition 200M	ACN-001-0
R25	Carbon film 330k	RD¼PS 334J
R26	Carbon film 330k	RD¼PS 334J
R27	Carbon film 15k	RD¼PS 153J
R28	Carbon film 15k	RD¼PS 153J
R29	Carbon film 15k	RD¼PS 153J
R30	Carbon film 15k	RD¼PS 153J

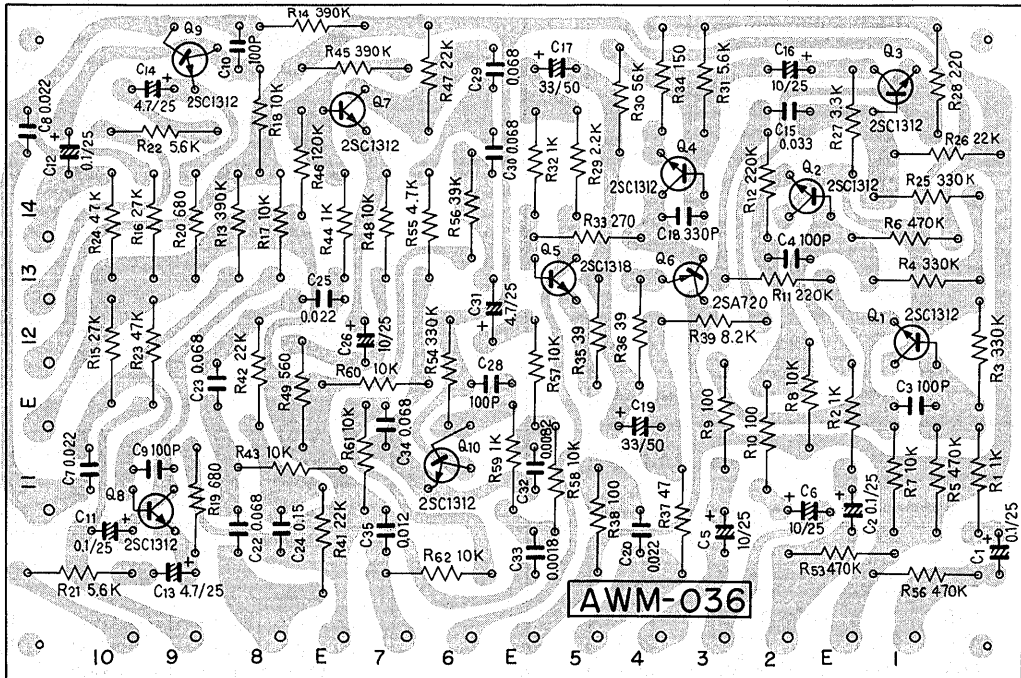
Symbol	Description	Part No.
R31	Carbon film 56k	RD¼PS 563J
R32	Carbon film 56k	RD¼PS 563J
R33	Carbon film 820	RD¼PS 821J
R34		
R35	Carbon film 82	RD¼PS 820J
R36	Carbon film 82	RD¼PS 820J

SEMICONDUCTORS

Symbol	Description	Part No.
Q1	2SC1312-G or 2SC1344-E Transistor	
Q2	2SC1312-G or 2SC1344-E Transistor	
Q3	2SC1312-G or 2SC1344-E Transistor	
Q4	2SC1312-G or 2SC1344-E Transistor	
Q5	2SC1312-G or 2SC1344-E Transistor	
Q6	2SC1312-G or 2SC1344-E Transistor	
Q7	2SK30A-GR FET	
Q8	2SK30A-GR FET	
D1	1S188 FM-1 Diode	
D2	1S188 FM-1 Diode	
D3	1S188 FM-1 Diode	
D4	1S188 FM-1 Diode	
D5	1S2473 Diode	
D6	1S2473 Diode	

12.13 REVERB AMP UNIT (AWM-036-0)





PARTS LIST OF REVERB AMP UNIT

CAPACITORS

Symbol	Description			Part No.
C1	Electrolytic	0.1	25V	CEA 0R1P 25
C2	Electrolytic	0.1	25V	CEA 0R1P 25
C3	Ceramic	100p	50V	CCDSL 101K 50
C4	Ceramic	100p	50V	CCDSL 101K 50
C5	Electrolytic	10	25V	CEA 100P 25
C6	Electrolytic	10	25V	CEA 100P 25
C7	Mylar	0.022	50V	CQMA 223K 50
C8	Mylar	0.022	50V	CQMA 223K 50
C9	Ceramic	100p	50V	CCDSL 101K 50
C10	Ceramic	100p	50V	CCDSL 101K 50
C11	Electrolytic	0.1	25V	CEA 0R1P 25
C12	Electrolytic	0.1	25V	CEA 0R1P 25
C13	Electrolytic	4.7	25V	CSSA 4R7M 25
C14	Electrolytic	4.7	25V	CSSA 4R7M 25
C15	Mylar	0.033	50V	CQMA 333K 50
C16	Electrolytic	10	25V	CEA 100P 25
C17	Electrolytic	33	50V	CEA 330P 50
C18	Ceramic	330p	50V	CCDSL 331K 50
C19	Electrolytic	33	50V	CEA 330P 50
C20	Mylar	0.022	50V	CQMA 223K 50
C22	Mylar	0.068	50V	CQMA 683K 50
C23	Mylar	0.068	50V	CQMA 683K 50
C24	Mylar	0.15	50V	CQMA 154K 50
C25	Mylar	0.022	50V	CQMA 223K 50
C26	Electrolytic	10	25V	CEA 100P 25

Symbol	Description			Part No.
C28	Ceramic	100p	50V	CCDSL 101K 50
C29	Mylar	0.068	50V	CQMA 683K 50
C30	Mylar	0.068	50V	CQMA 683K 50
C31	Electrolytic	4.7	25V	CSSA 4R7M 25
C33	Mylar	0.0018	50V	CQMA 182K 50
C34	Mylar	0.068	50V	CQMA 683K 50

RESISTORS

Symbol	Description		Part No.
R1	Carbon film	1k	RD $\frac{1}{2}$ PS 102J
R2	Carbon film	1k	RD $\frac{1}{2}$ PS 102J
R3	Carbon film	330k	RD $\frac{1}{2}$ PS 334J
R4	Carbon film	330k	RD $\frac{1}{2}$ PS 334J
R5	Carbon film	470k	RD $\frac{1}{2}$ PS 474J
R6	Carbon film	470k	RD $\frac{1}{2}$ PS 474J
R7	Carbon film	10k	RD $\frac{1}{2}$ PS 103J
R8	Carbon film	10k	RD $\frac{1}{2}$ PS 103J
R9	Carbon film	100	RD $\frac{1}{2}$ PS 101J
R10	Carbon film	100	RD $\frac{1}{2}$ PS 101J
R11	Carbon film	220k	RD $\frac{1}{2}$ PS 224J
R12	Carbon film	220k	RD $\frac{1}{2}$ PS 224J
R13	Carbon film	390k	RD $\frac{1}{2}$ PS 394J
R14	Carbon film	390k	RD $\frac{1}{2}$ PS 394J
R15	Carbon film	27k	RD $\frac{1}{2}$ PS 273J

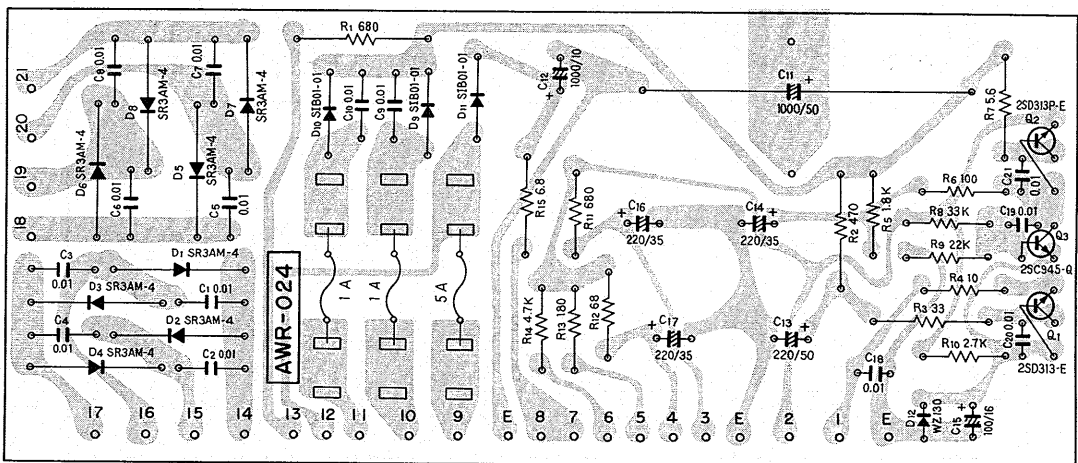
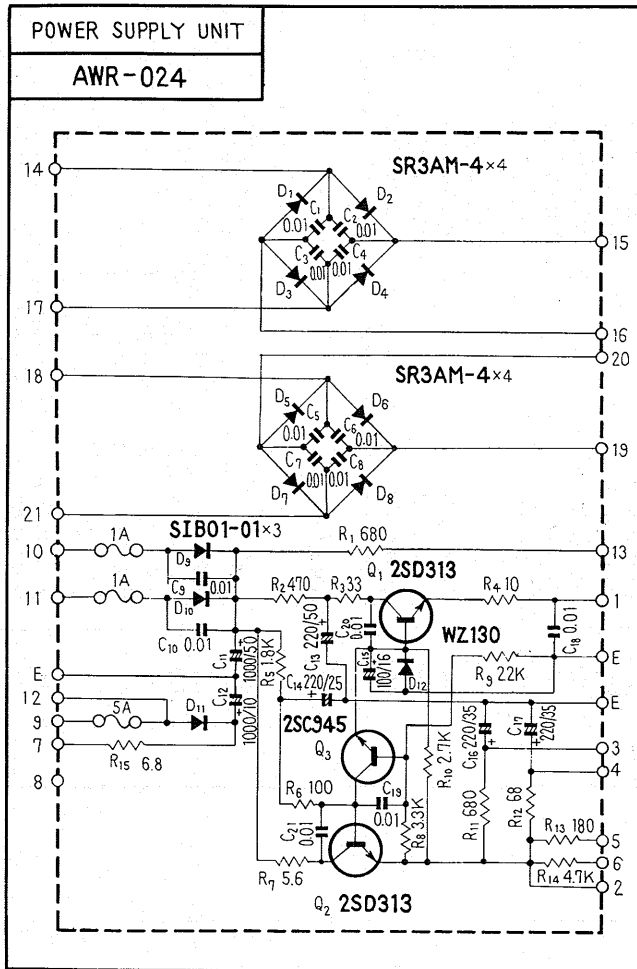
Symbol	Description	Part No.	
R16	Carbon film 27k	RD¼PS 273J	
R17	Carbon film 10k	RD¼PS 103J	
R18	Carbon film 10k	RD¼PS 103J	
R19	Carbon film 680	RD¼PS 681J	
R20	Carbon film 680	RD¼PS 681J	
R21	Carbon film 5.6k	RD¼PS 562J	
R22	Carbon film 5.6k	RD¼PS 562J	
R23	Carbon film 47k	RD¼PS 473J	
R24	Carbon film 47k	RD¼PS 473J	
R25	Carbon film 330k	RD¼PS 334J	
R26	Carbon film 22k	RD¼PS 223J	
R27	Carbon film 3.3k	RD¼PS 332J	
R28	Carbon film 220	RD¼PS 221J	
R29	Carbon film 2.2k	RD¼PS 222J	
R30	Carbon film 56k	RD¼PS 563J	
R31	Carbon film 5.6k	RD¼PS 562J	
R32	Carbon film 1k	RD¼PS 102J	
R33	Carbon film 270	RD¼PS 271J	
R34	Carbon film 150	RD¼PS 151J	
R35	Carbon film 39	RD¼PS 390J	
R36	Carbon film 39	RD¼PS 390J	
R37	Carbon film 47	RD¼PS 470J	
R38	Carbon film 100	RD¼PS 101J	
R39	Carbon film 8.2k	RD¼PS 822J	
R41	Carbon film 22k	RD¼PS 223J	
R42	Carbon film 22k	RD¼PS 223J	
R43	Carbon film 10k	RD¼PS 103J	
R44	Carbon film 1k	RD¼PS 102J	
R45	Carbon film 390k	RD¼PS 394J	
R46	Carbon film 120k	RD¼PS 124J	

Symbol	Description	Part No.	
R47	Carbon film 22k	RD¼PS 223J	
R48	Carbon film 10k	RD¼PS 103J	
R49	Carbon film 560	RD¼PS 561J	
R52	Carbon film 470k	RD¼PS 474J	
R53	Carbon film 470k	RD¼PS 474J	
R54	Carbon film 330k	RD¼PS 334J	
R55	Carbon film 4.7k	RD¼PS 472J	
R56	Carbon film 39k	RD¼PS 393J	
R57	Carbon film 10k	RD¼PS 103J	
R58	Carbon film 10k	RD¼PS 103J	
R59	Carbon film 1k	RD¼PS 102J	
R60	Carbon film 10k	RD¼PS 103J	
R61	Carbon film 10k	RD¼PS 103J	
R62	Carbon film 10k	RD¼PS 103J	

SEMICONDUCTORS

Symbol	Description	Part No.	
Q1	2SC1312-F or G Transistor		
Q2	2SC1312-F or G Transistor		
Q3	2SC1312-F or G Transistor		
Q4	2SC1318-R or Q Transistor		
Q5	2SC1318-R or Q Transistor		
Q6	2SA720-R or Q Transistor		
Q7	2SC1312-F or G Transistor		
Q8	2SC1312-F or G Transistor		
Q9	2SC1312-F or G Transistor		
Q10	2SC1312-F or G Transistor		

12.14 POWER SUPPLY UNIT (AWR-024-A)



PARTS LIST OF POWER SUPPLY UNIT

CAPACITORS

Symbol	Description	Part No.	
C1	Ceramic 0.01 150V	ACG-002-0	
C2	Ceramic 0.01 150V	ACG-002-0	
C3	Ceramic 0.01 150V	ACG-002-0	
C4	Ceramic 0.01 150V	ACG-002-0	
C5	Ceramic 0.01 150V	ACG-002-0	
C6	Ceramic 0.01 150V	ACG-002-0	
C7	Ceramic 0.01 150V	ACG-002-0	
C8	Ceramic 0.01 150V	ACG-002-0	
C9	Ceramic 0.01 150V	ACG-002-0	
C10	Ceramic 0.01 150V	ACG-002-0	
C11	Electrolytic 1000 50V	CEB 102P 50	
C12	Electrolytic 1000 10V	CEA 102P 10	
C13	Electrolytic 220 50V	CEA 221P 50	
C14	Electrolytic 220 35V	CEA 221P 35	
C15	Electrolytic 100 16V	CEA 101P 16	
C16	Electrolytic 220 35V	CEA 221P 35	
C17	Electrolytic 220 35V	CEA 221P 35	
C19	Mylar 0.001 50V	CQMA 102K 50	
C20	Mylar 0.001 50V	CQMA 102K 50	
C21	Mylar 0.001 50V	CQMA 102K 50	

RESISTORS

Symbol	Description	Part No.	
R1	Metal oxide 680 1W	RS1P 681K	
R2	Metal oxide 470 2W	RS2P 471K	
R3	Metal oxide 33 1W	RS1P 330K	
R4	Carbon film 10	RD $\frac{1}{4}$ PS 100J	
R5	Carbon film 1.8k	RD $\frac{1}{4}$ PS 182J	
R6	Carbon film 100	RD $\frac{1}{4}$ PS 101J	
R7	Carbon film 5.6 $\frac{1}{2}$ W	RD $\frac{1}{2}$ PS 5R6J	
R8	Carbon film 33k	RD $\frac{1}{4}$ PS 333J	
R9	Carbon film 22k	RD $\frac{1}{4}$ PS 223J	
R10	Carbon film 2.7k	RD $\frac{1}{4}$ PS 272J	
R11	Carbon film 680	RD $\frac{1}{4}$ PS 681J	
R12	Carbon film 68	RD $\frac{1}{4}$ PS 680J	
R13	Carbon film 180	RD $\frac{1}{4}$ PS 181J	
R14	Carbon film 4.7k	RD $\frac{1}{4}$ PS 472J	
R15	Carbon film 6.8 $\frac{1}{2}$ W	RD $\frac{1}{2}$ PS 6R8J	

SEMICONDUCTORS

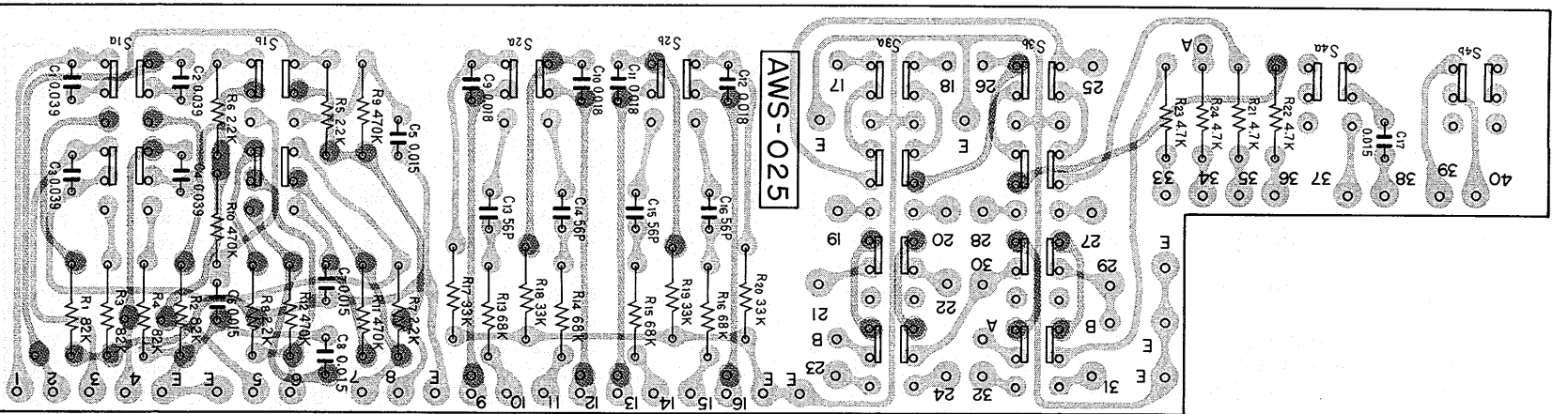
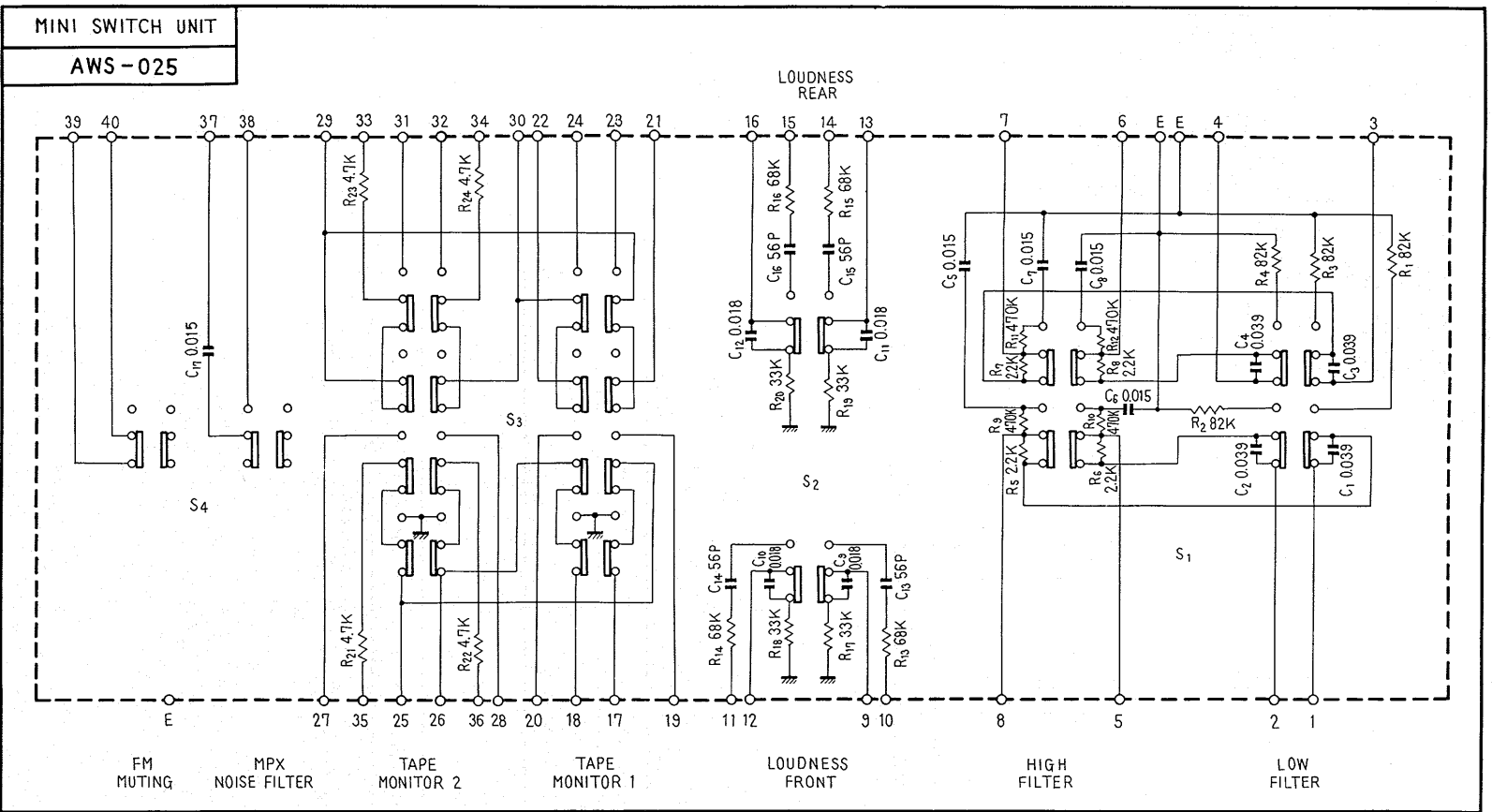
Symbol	Description	Part No.	
Q1	2SD313-E or R Transistor		
Q2	2SD313P-E or R Transistor		
Q3	2SC945-Q or R Transistor		
D1	SR3AM-4 Diode		
D2	SR3AM-4 Diode		
D3	SR3AM-4 Diode		
D4	SR3AM-4 Diode		
D5	SR3AM-4 Diode		

POWER SUPPLY UNIT
(continued)

Symbol	Description	Part No.	
D6	SR3AM-4 Diode		
D7	SR3AM-4 Diode		
D8	SR3AM-4 Diode		
D9	SIB01-01 Diode		
D10	SIB01-01 Diode		
D11	SIB01-01 Diode		
D12	WZ130 Zener diode		

OTHERS

Symbol	Description	Part No.	
	Fuse 1A	E21-004-0	
	Fuse 5A	E21-013-0	



79 PARTS LIST OF MINI-SWITCH UNIT

CAPACITORS

Symbol	Description			Part No.
C1	Mylar	0.039	50V	CQMA 3 93K 50
C2	Mylar	0.039	50V	CQMA 3 93K 50
C3	Mylar	0.039	50V	CQMA 3 93K 50
C4	Mylar	0.039	50V	CQMA 3 93K 50
C5	Mylar	0.015	50V	CQMA 153K 50
C6	Mylar	0.015	50V	CQMA 153K 50
C7	Mylar	0.015	50V	CQMA 153K 50
C8	Mylar	0.015	50V	CQMA 153K 50
C9	Mylar	0.018	50V	CQMA 183K 50
C10	Mylar	0.018	50V	CQMA 183K 50
C11	Mylar	0.018	50V	CQMA 183K 50
C12	Mylar	0.018	50V	CQMA 183K 50
C13	Ceramic	56p	50V	CCDSL 560K 50
C14	Ceramic	56p	50V	CCDSL 560K 50
C15	Ceramic	56p	50V	CCDSL 560K 50
C16	Ceramic	56p	50V	CCDSL 560K 50
C17	Mylar	0.015	50V	CQMA 153K 50

RESISTORS

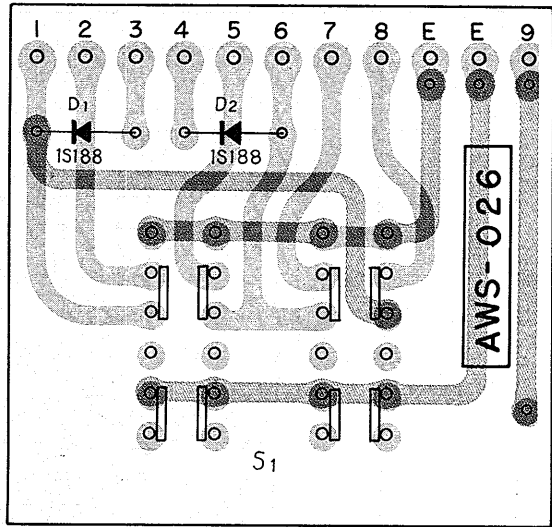
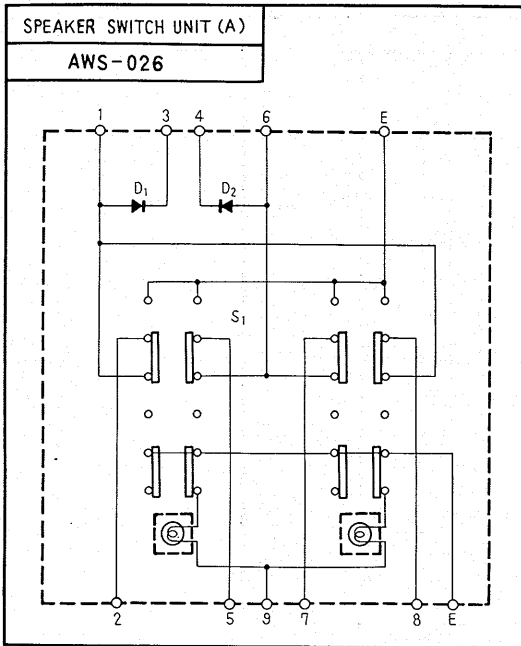
Symbol	Description		Part No.
R1	Carbon film	82k	RD¼PS 823J
R2	Carbon film	82k	RD¼PS 823J
R3	Carbon film	82k	RD¼PS 823J
R4	Carbon film	82k	RD¼PS 823J
R5	Carbon film	2.2k	RD¼PS 222J

Symbol	Description		Part No.
R6	Carbon film	2.2k	RD¼PS 222J
R7	Carbon film	2.2k	RD¼PS 222J
R8	Carbon film	2.2k	RD¼PS 222J
R9	Carbon film	470k	RD¼PS 474J
R10	Carbon film	470k	RD¼PS 474J
R11	Carbon film	470k	RD¼PS 474J
R12	Carbon film	470k	RD¼PS 474J
R13	Carbon film	68k	RD¼PS 683J
R14	Carbon film	68k	RD¼PS 683J
R15	Carbon film	68k	RD¼PS 683J
R16	Carbon film	68k	RD¼PS 683J
R17	Carbon film	33k	RD¼PS 333J
R18	Carbon film	33k	RD¼PS 333J
R19	Carbon film	33k	RD¼PS 333J
R20	Carbon film	33k	RD¼PS 333J
R21	Carbon film	4.7k	RD¼PS 472J
R22	Carbon film	4.7k	RD¼PS 472J
R23	Carbon film	4.7k	RD¼PS 472J
R24	Carbon film	4.7k	RD¼PS 472J

SWITCHES

Symbol	Description	Part No.
S1	Mini-switch	ASG-033-0
S2	Mini-switch	ASG-032-0
S3	Mini-switch	ASG-034-0
S4	Mini-switch	ASG-032-0

12.16 SPEAKER SWITCH UNIT (A) (AWS-026-0)



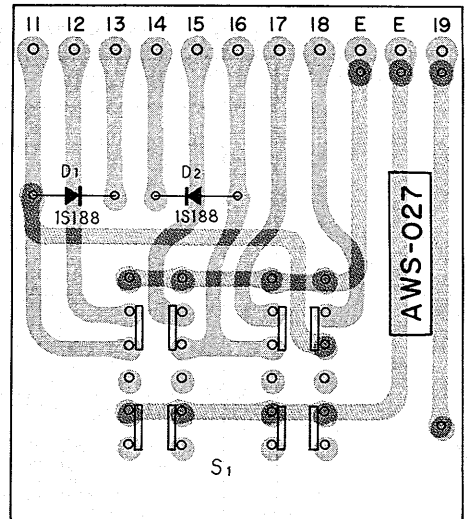
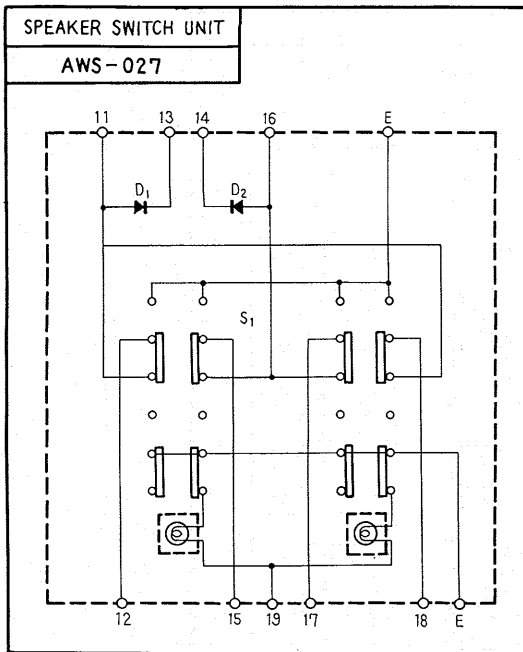
SEMICONDUCTORS

Symbol	Description	Part No.	
D1	1S188 FM-1 Diode		
D2	1S188 FM-1 Diode		

SWITCH

Symbol	Description	Part No.	
S1	Mini-switch	ASG-031-A	

12.17 SPEAKER SWITCH UNIT (B) (AWS-027-0)



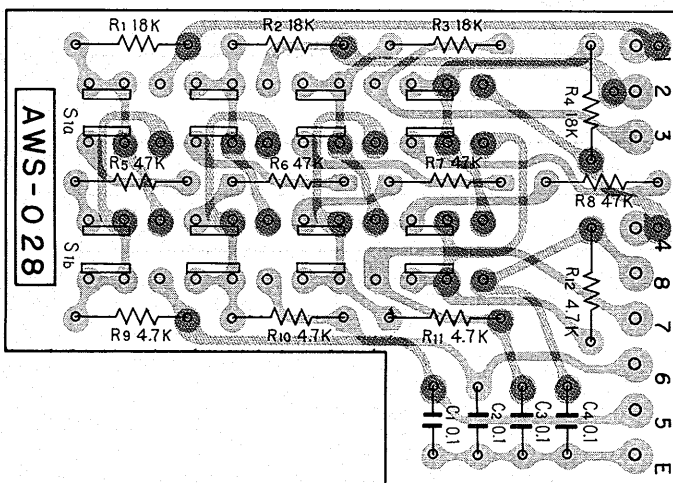
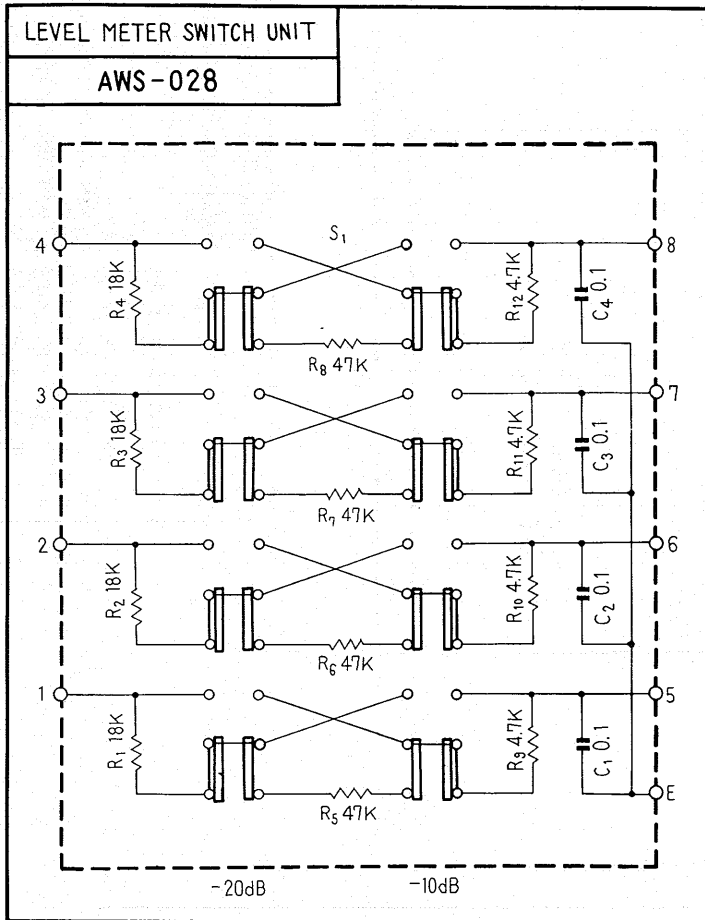
SEMICONDUCTORS

Symbol	Description	Part No.	
D1	1S188 FM-1 Diode		
D2	1S188 FM-1 Diode		

SWITCH

Symbol	Description	Part No.	
S1	Mini-switch	ASG-031-A	

12.18 LEVEL METER SWITCH UNIT (AWS-028-0)



PARTS LIST OF LEVEL METER SWITCH UNIT

CAPACITORS

Symbol	Description			Part No.
C1	Mylar	0.1	50V	CQMA 104K 50
C2	Mylar	0.1	50V	CQMA 104K 50
C3	Mylar	0.1	50V	CQMA 104K 50
C4	Mylar	0.1	50V	CQMA 104K 50

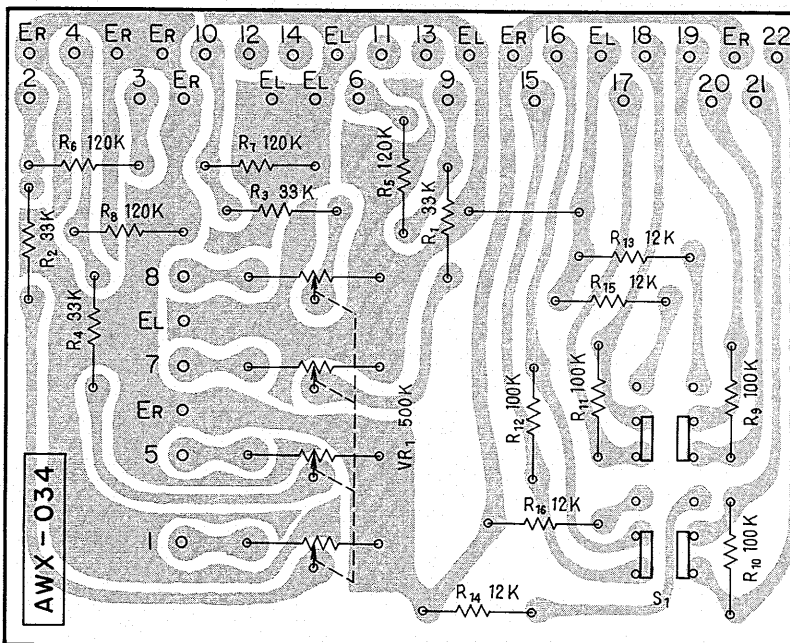
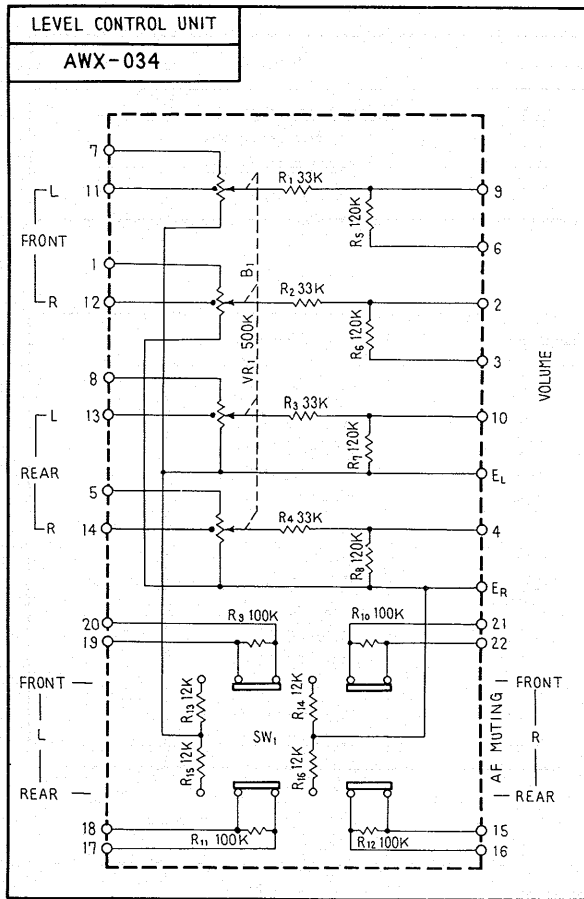
RESISTORS

Symbol	Description			Part No.
R1	Carbon film	18k		RD¼PS 183J
R2	Carbon film	18k		RD¼PS 183J
R3	Carbon film	18k		RD¼PS 183J
R4	Carbon film	18k		RD¼PS 183J
R5	Carbon film	47k		RD¼PS 473J
R6	Carbon film	47k		RD¼PS 473J
R7	Carbon film	47k		RD¼PS 473J
R8	Carbon film	47k		RD¼PS 473J
R9	Carbon film	4.7k		RD¼PS 472J
R10	Carbon film	4.7k		RD¼PS 472J
R11	Carbon film	4.7k		RD¼PS 472J
R12	Carbon film	4.7k		RD¼PS 472J

SWITCH

Symbol	Description	Part No.
S1	Mini-switch	ASG-030-0

12.19 LEVEL CONTROL UNIT (AWX-034-A)



PARTS LIST OF LEVEL CONTROL UNIT

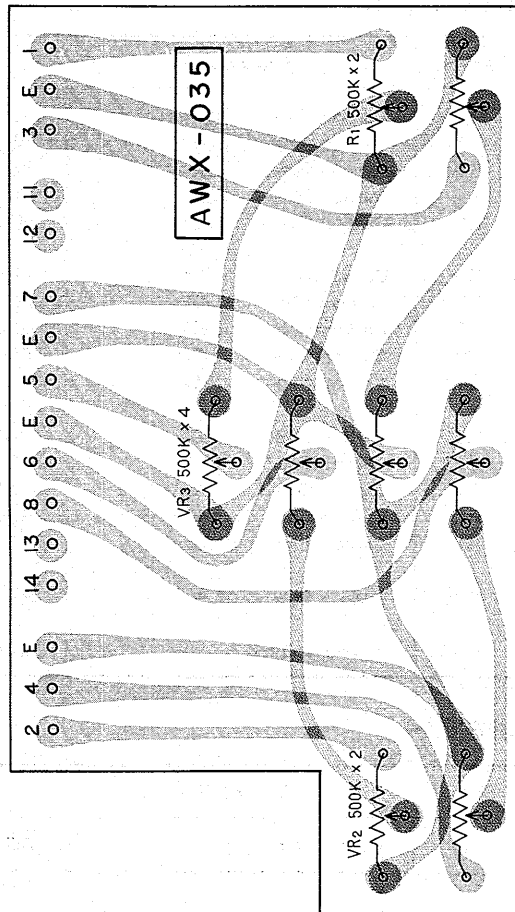
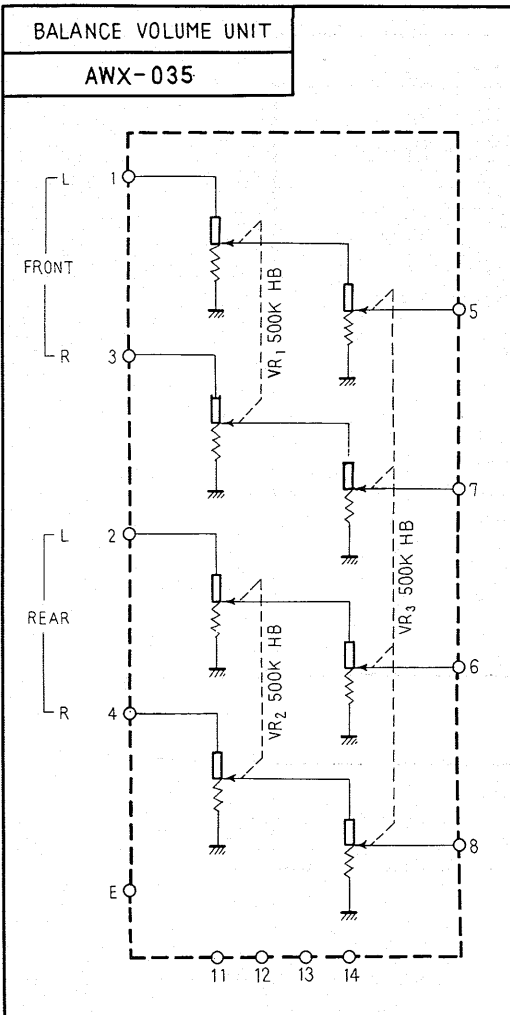
RESISTORS

Symbol	Description	Part No.
R1	Carbon film 33k	RD¼PS 333J
R2	Carbon film 33k	RD¼PS 333J
R3	Carbon film 33k	RD¼PS 333J
R4	Carbon film 33k	RD¼PS 333J
R5	Carbon film 120k	RD¼PS 124J
R6	Carbon film 120k	RD¼PS 124J
R7	Carbon film 120k	RD¼PS 124J
R8	Carbon film 120k	RD¼PS 124J
R9	Carbon film 100k	RD¼PS 104J
R10	Carbon film 100k	RD¼PS 104J
R11	Carbon film 100k	RD¼PS 104J
R12	Carbon film 100k	RD¼PS 104J
R13	Carbon film 12k	RD¼PS 123J
R14	Carbon film 12k	RD¼PS 123J
R15	Carbon film 12k	RD¼PS 123J
R16	Carbon film 12k	RD¼PS 123J
VR1	4-gang, volume	ACV-307-0

SWITCH

Symbol	Description	Part No.
S1	Push switch	ASG-029-0

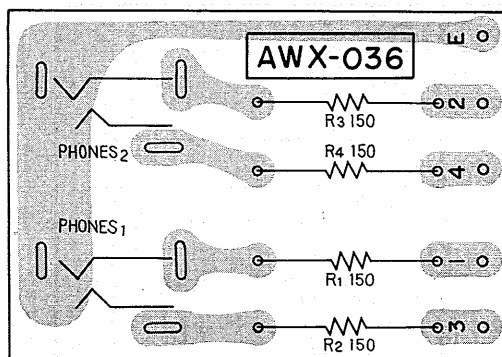
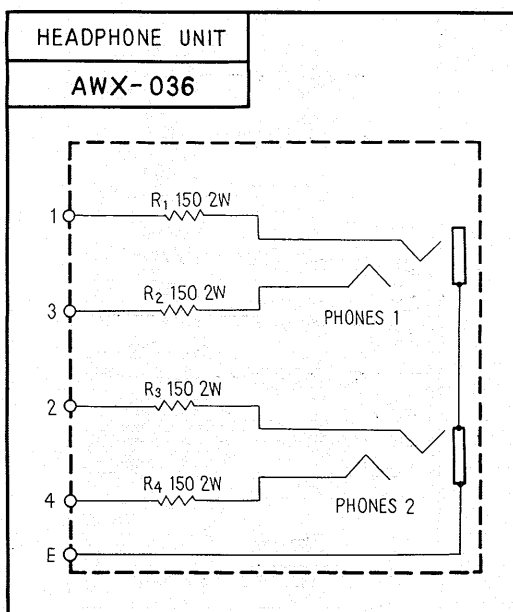
12.20 BALANCE VOLUME UNIT (AWX-035-0)



POTENTIOMETERS

Symbol	Description	Part No.	
VR1	500k-B dual, balance	C82-049-0	
VR2	500k-B dual, balance	C82-049-0	
VR3	500k-B 4-gang, balance	ACV-308-0	

12.21 HEADPHONE UNIT (AWX-036-0)



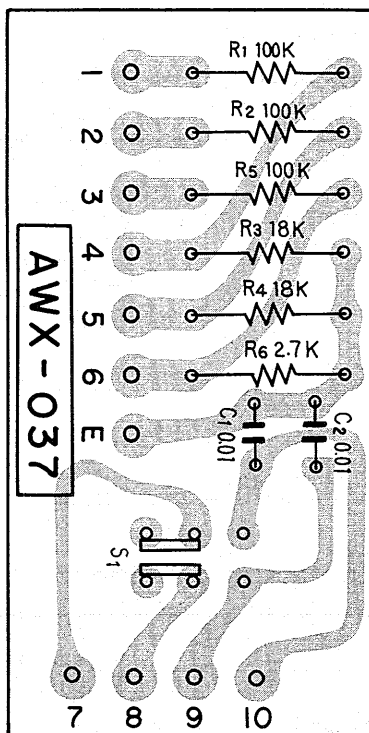
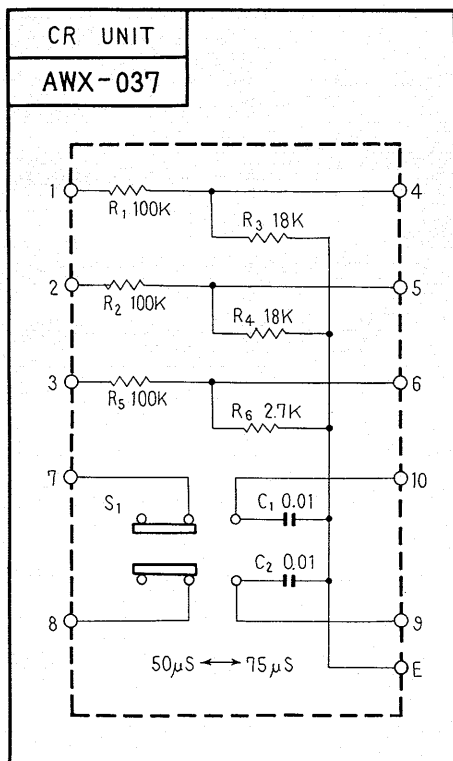
RESISTORS

Symbol	Description	Part No.
R1	Metal oxide 150 2W	RS2P 151K
R2	Metal oxide 150 2W	RS2P 151K
R3	Metal oxide 150 2W	RS2P 151K
R4	Metal oxide 150 2W	RS2P 151K

OTHER

Symbol	Description	Part No.
	Headphones jack	AKN-002-0

12.22 CR UNIT (AWX-037-0)



CAPACITORS

Symbol	Description			Part No.
C1	Mylar	0.01	50V	CQMA 103K 50
C2	Mylar	0.01	50V	CQMA 103K 50

RESISTORS

Symbol	Description			Part No.
R1	Carbon film	100k		RD¼PS 104J
R2	Carbon film	100k		RD¼PS 104J
R3	Carbon film	18k		RD¼PS 183J
R4	Carbon film	18k		RD¼PS 183J
R5	Carbon film	100k		RD¼PS 104J
R6	Carbon film	2.7k		RD¼PS 272J

SWITCH

Symbol	Description	Part No.
S1	Slide switch	ASH-002-0

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