

AM/FM STEREO TUNER

# TX-9500II

## SERVICE MANUAL



MODEL TX-9500II COMES IN FOUR VERSIONS DISTINGUISHED AS FOLLOWS:

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

- Service informations for TX-9500II/KU is described on page 5 through 52 in this manual.
- For servicing of KC, S and HG types please refer to TX-9500II/KU manual with the exception of descriptions in the "Additional Service Manual" (p.53–p.86).

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# 1. SPECIFICATIONS

## Semiconductors

|             |    |
|-------------|----|
| FETs        | 5  |
| ICs         | 15 |
| Transistors | 12 |
| Diodes      | 19 |

## FM Section

Circuitry . . . . . MOS FET 2-stage RF amplifier, 5-gang variable capacitor, IF Band Selector, Wide-band linear detector, doublebalanced NFB type PLL MPX built-in pilot signal auto canceller.

Usable Sensitivity . . . . . MONO: 8.8dBf (1.5 $\mu$ V)  
 50dB Quieting Sensitivity . . MONO: 13.2dBf (2.5 $\mu$ V)  
 STEREO: 36.1dBf (35 $\mu$ V)

Signal-to-Noise Ratio  
 at 65dBf . . . . . MONO: 82dB  
 STEREO: 77dB

|                               |         |             |       |
|-------------------------------|---------|-------------|-------|
| Distortion at 65dBf . . . . . | MONO:   | WIDE NARROW |       |
|                               |         |             |       |
|                               | 100Hz   | 0.05%       | 0.07% |
|                               | 1kHz    | 0.05%       | 0.07% |
|                               | 10kHz   | 0.07%       | 0.1%  |
|                               | 15kHz   | 0.12%       | —     |
|                               | STEREO: |             |       |
|                               | 100Hz   | 0.1%        | 0.3%  |
|                               | 1kHz    | 0.07%       | 0.25% |
|                               | 10kHz   | 0.2%        | 0.5%  |
|                               | 15kHz   | 0.5%        | —     |

Capture Ratio . . . . . 0.8dB 2.0dB  
 Alternate Channel Selectivity . . . . . 35dB 85dB  
 Stereo Separation . . . . . 1kHz: 50dB 45dB  
 50Hz to 15kHz: 35dB 30dB

Frequency Response . . . . . 20Hz to 10kHz $\pm$ 0.2dB  
 20Hz to 15kHz $^{+0.2}_{-0.5}$  dB

Spurious Response Ratio . . 110dB  
 Image Response Ratio . . . 120dB  
 IF Response Ratio . . . . . 105dB  
 AM Suppression Ratio . . . 65dB  
 Muting Threshold . . . . . 19.2dBf(5 $\mu$ V), 34.1dBf(28 $\mu$ V)  
 Subcarrier Product Ratio . . 77dB  
 SCA Rejection Ratio . . . . 62dB  
 Antenna Input . . . . . 300ohms balanced  
 75ohms unbalanced

## AM Section

Circuitry . . . . . 1 stage RF amplifier 3-gang variable capacitor

### Sensitivity

IHF, ferrite antenna . . . 300 $\mu$ V

IHF, external antenna . . 15 $\mu$ V

Selectivity . . . . . 30dB

Signal-to-Noise Ratio . . . 55dB

Image Response Ratio . . . 70dB

IF Response Ratio . . . . . 65dB

Antenna . . . . . Built-in ferrite loopstick antenna

## Audio Section

### Output (Level/Impedance)

FM (100% MOD.) . . . . . FIXED: 650mV/4.2k $\Omega$

VARIABLE: 50mV to  
 1.3V/3.6k $\Omega$

AM (30% MOD.) . . . . . FIXED: 200mV/4.2k $\Omega$

VARIABLE: 15mV to  
 400mV/3.6k $\Omega$

## Miscellaneous

Power Requirements . . . . . 120V 60Hz only.

Power Consumption . . . . . 25W

Dimensions . . . . . 420(W)x150(H)x395(D) mm  
 16-9/16x5-7/8x15-9/16 in

Weight . . . . . Without Package:  
 9.5kg (20lb 15oz)  
 With Package:  
 11.0kg (24lb 4 oz)

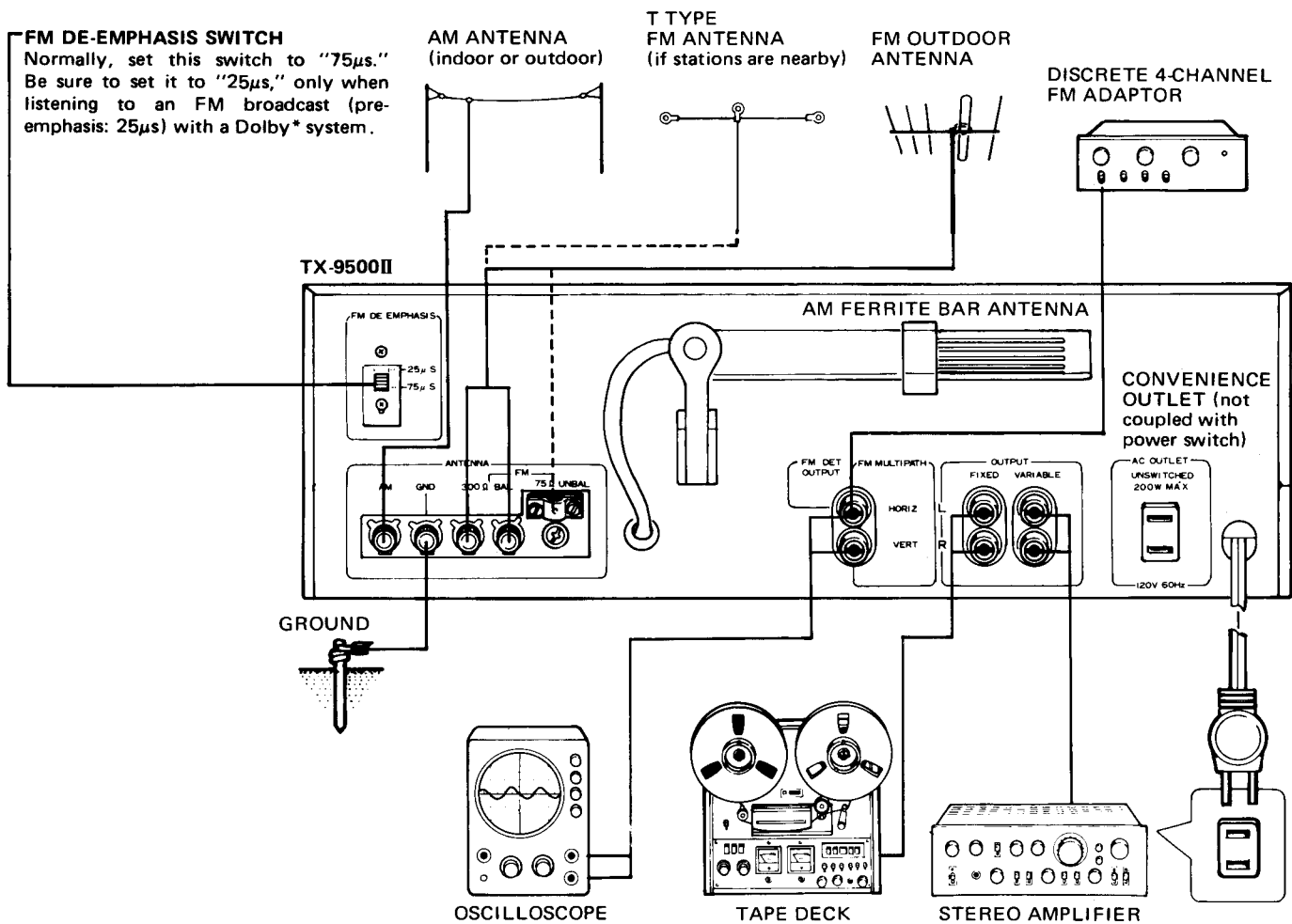
## Furnished Parts

FM T-type antenna . . . . . 1  
 Operating Instructions . . . . . 1  
 Connection Cord with Pin Plugs . . . . . 1  
 Hex. Wrench (used for fastening Tuning knob) . . . . . 1

### NOTE:

*Specifications and the design subject to possible modification without notice.*

## 2. CONNECTION DIAGRAM



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

### 3. FRONT PANEL FACILITIES

#### POWER SWITCH

Set to ON position to turn on power. Pilot lamp will light.

#### IF BAND SWITCH

FM IF (intermediate frequency) passband can be set to for wide or narrow.

**WIDE:** Normally set switch to this position.

**NARROW:** If adjacent station interference is a problem at the WIDE setting, set switch to this position.

#### MULTIPATH/REC LEVEL CHECK SWITCH

Single lever operates both MULTIPATH and REC LEVEL CHECK switches. With the FUNCTION switch at FM, set as required for the application. Be sure to return it to the OFF position when it is not being used.

**MULTIPATH ON:** Multipath sound becomes audible from speakers. When installing FM antenna, select antenna location and direction so as to minimize this sound.

**OFF:** Normally set switch to this position.

**REC LEVEL CHECK ON:** Use this position for setting recording levels of tape deck. A 440Hz signal (level corresponding to 50% FM modulation) is produced at approximately 1.7 second intervals.

#### SIGNAL METER

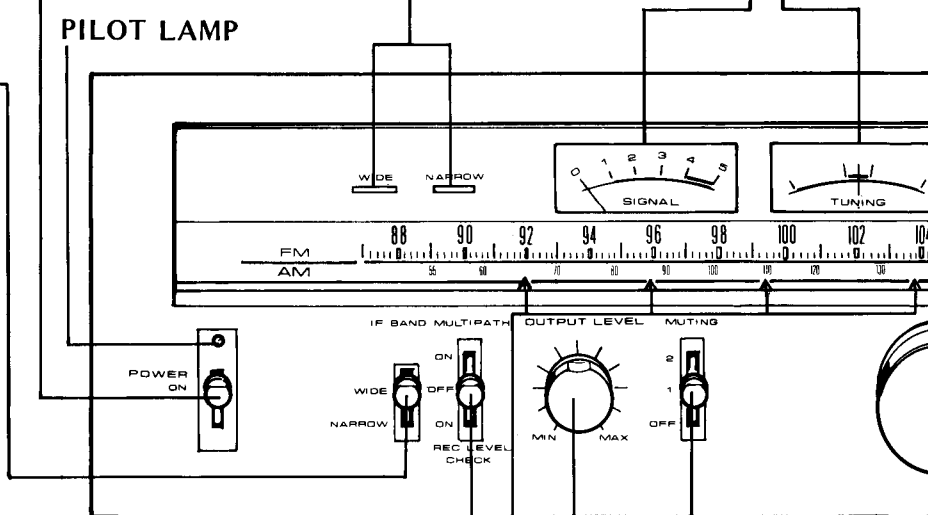
Employ when tuning AM and FM stations. Optimum tuning point occurs when maximum meter deflection toward the right is obtained.

#### TUNING

Use when deflection tune carefully (optimum)

#### PILOT LAMP

#### IF BAND INDICATOR



#### MEMORY MARKERS

Convenient for designating most often tuned in stations. Slide markers with fingertip to desired positions.

#### OUTPUT LEVEL CONTROL

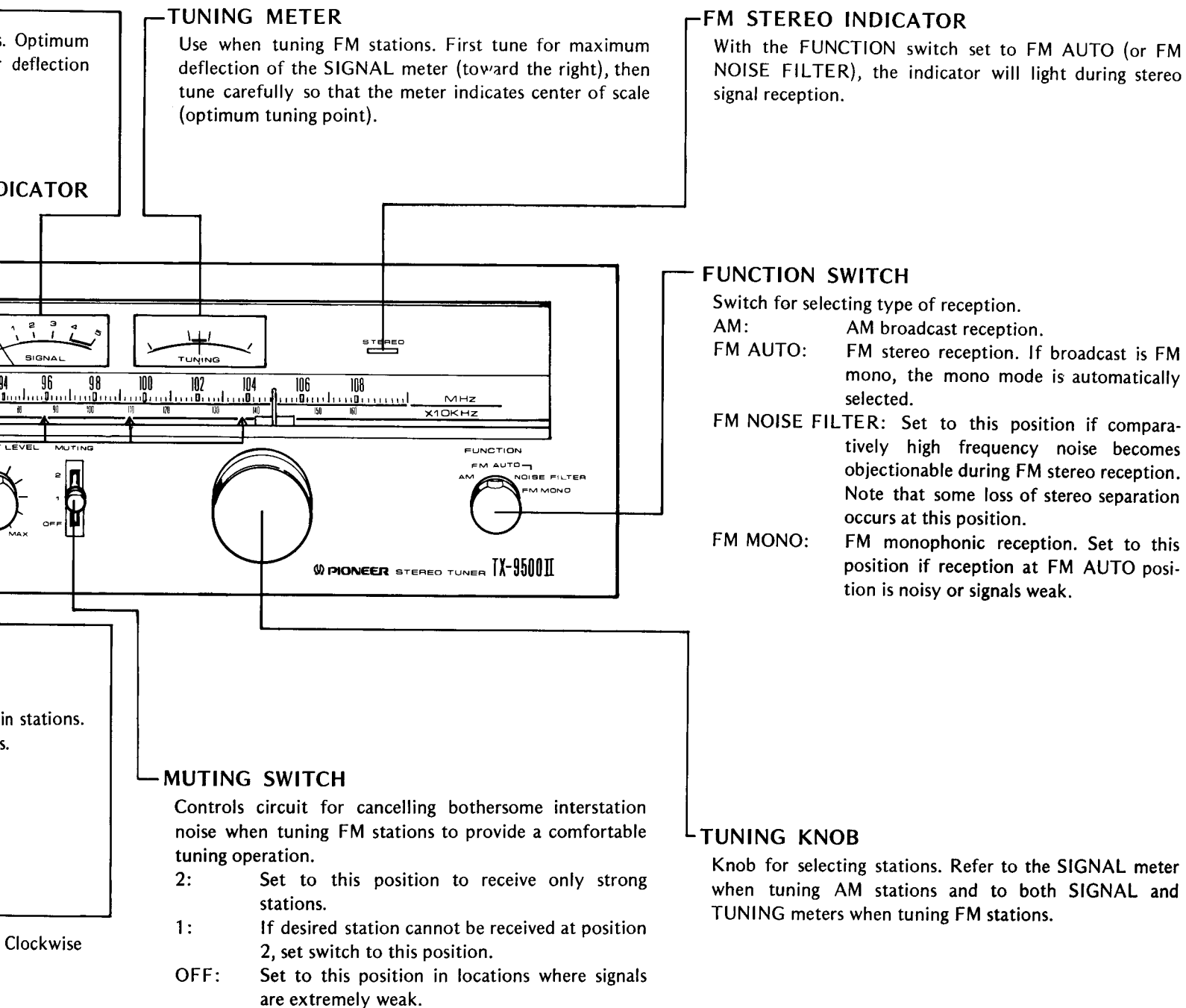
Adjusts level at OUTPUT (VARIABLE) jacks. Clockwise rotation increases output level.

#### MUTING

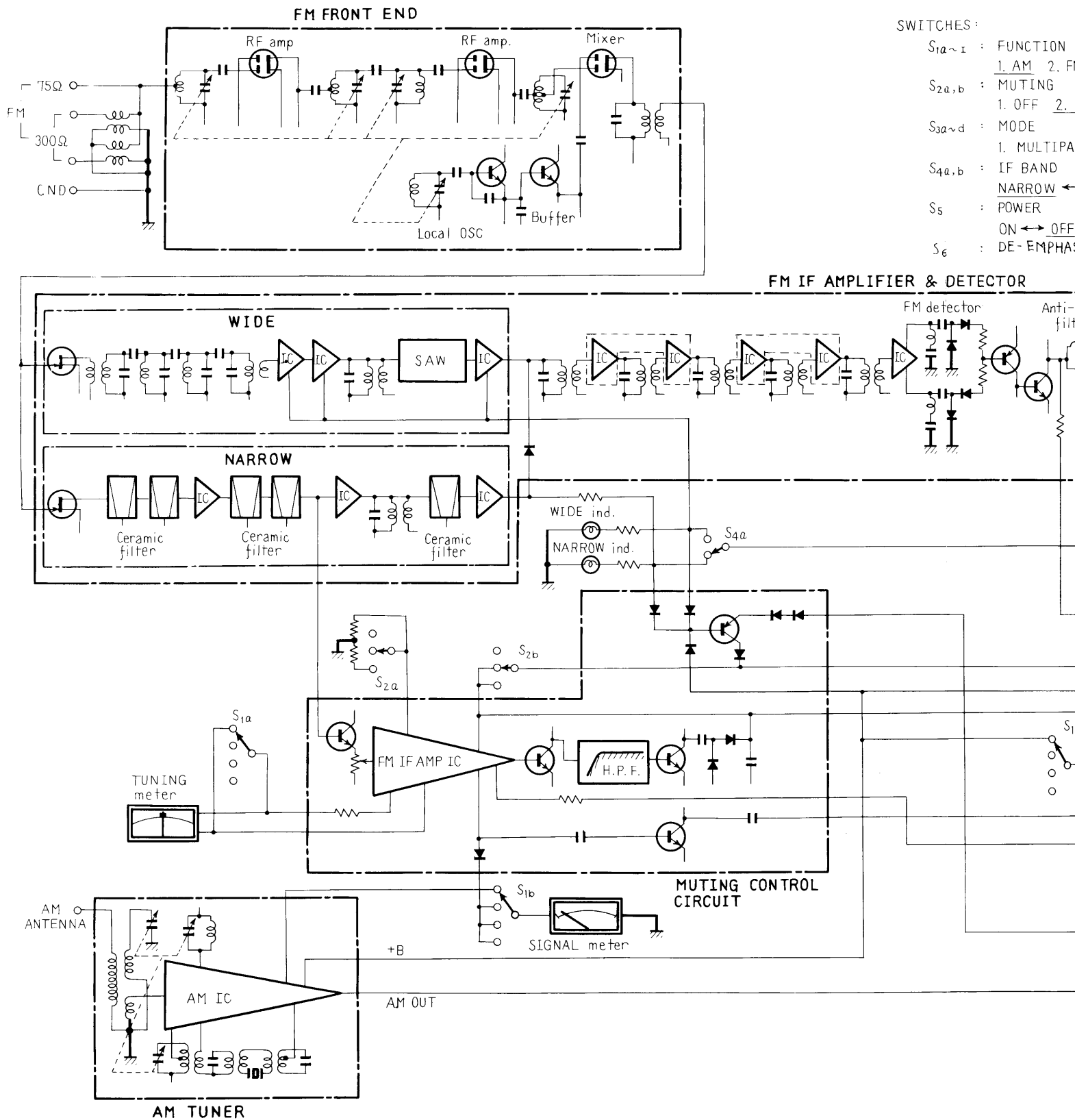
Controls noise when tuning operation:

1:

OFF:

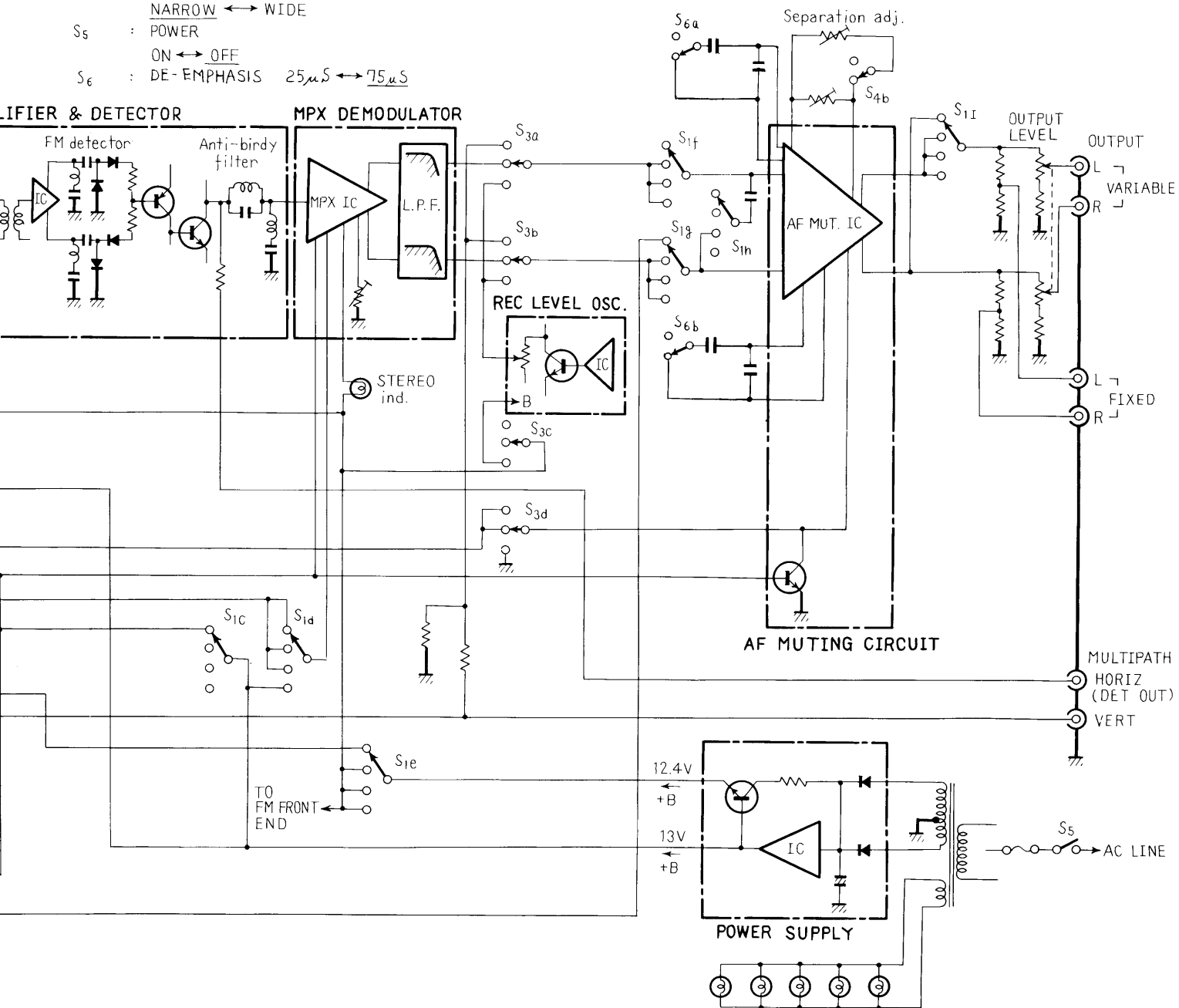


## 4. BLOCK DIAGRAM



SWITCHES:

- $S_{1a \sim i}$  : FUNCTION  
 1. AM 2. FM AUTO 3. FM MPX NOISE FILTER 4. FM MONO
- $S_{2a, b}$  : MUTING  
 1. OFF 2. 1 3. 2
- $S_{3a \sim d}$  : MODE  
 1. MULTIPATH ON 2. OFF 3. REC LEVEL CHECK ON
- $S_{4a, b}$  : IF BAND  
 NARROW  $\longleftrightarrow$  WIDE
- $S_5$  : POWER  
 ON  $\longleftrightarrow$  OFF
- $S_6$  : DE-EMPHASIS  $25\mu S \longleftrightarrow 75\mu S$



## 5. CIRCUIT DESCRIPTIONS

### 5.1 AM TUNER

The major components of the AM tuner are the 3-ganged variable capacitor, a newly developed IC (HA1197), and an AM ceramic filter. A block diagram of the HA1197 is shown in Fig. 1.

This IC consists of an RF amplifier first stage, followed by a mixer stage which also includes a self-oscillating local oscillator, the IF amplifier 3rd and 4th stages, and a detector circuit final stage. The AGC (Automatic Gain Control) receives an AGC voltage from the output of the detector circuit, and applies it to the RF amplifier and IF amplifier stages. The advantage of the HA1197 is a large reduction in the distortion at low frequencies. Whereas the distortion at 100Hz was 1.5% in the previous HA1138, this figure has been reduced to 0.4% (100Hz) in the HA1197.

### 5.2 FM TUNER

#### FM Front-end

The FM front end is composed of a tuning circuit employing a 5-gang variable capacitor, a 2-stage RF amplifier a mixer employing dual gate MOS FETs, and a local oscillator with buffer. An equivalent of a cascode amplifier is produced by AC grounding gate-2 of the dual gate MOS FET, allowing stable RF amplification at high gain.

The output signal of the RF amplifier is applied to gate-1 of the mixer stage MOS FET, while the local oscillator output signal is applied to gate-2. This technique minimizes input power from the local oscillator, resulting in low mutual interference even if the received signal input level is high.

A variation of a Clapp circuit forms the local oscillator. Inclusion of a buffer amplifier between local oscillator and mixer reduces local oscillator load, eliminating distortion of the oscillation waveform. Drawing effect of the local oscillator is also eliminated.

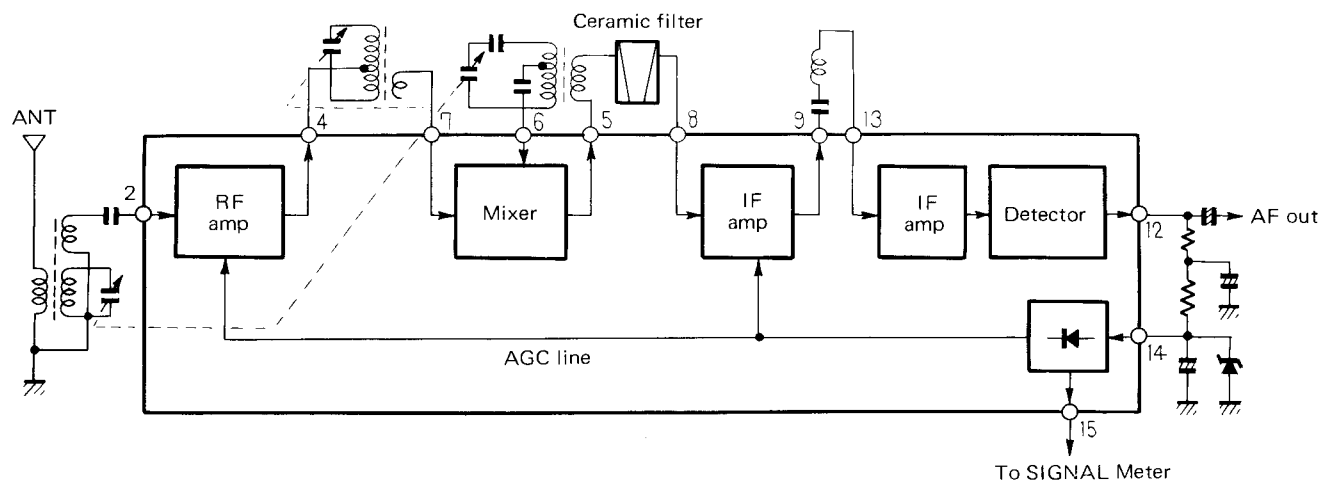


Fig. 1 Block diagram of HA1197

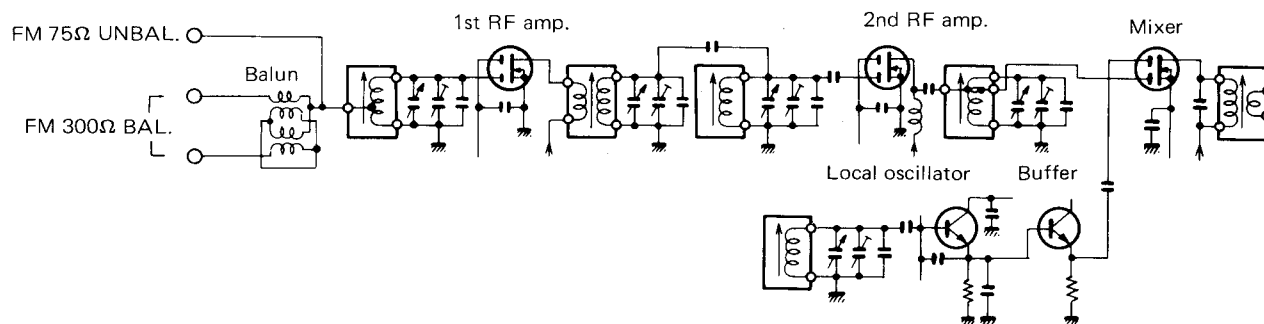


Fig. 2 Circuit of FM front end

## FM IF Amplifier

In this FM IF amplifier, there are two selectable IF frequency pass bands, viz. WIDE band and NARROW band, selected by the IF BAND switch.

This circuit is shown in Fig. 3.

The SAW (Surface Acoustic Wave) filter used in the WIDE band circuit, is a filter which works on entirely new principles. Signals are carried across the piezoelectric element surface by mechanical vibrations. The advantages of this SAW filter in comparison with a 2-element ceramic filter, is that the group delay time flatness characteristics cover more than twice (500Hz) the band width while still maintaining the same degree of selectivity.

The tetra-polar phase linear filter makes use of the SAW filter characteristics to further improve the degree of selectivity. Consequently, the WIDE band circuit has been designed with the aim of even further improving the distortion factor.

The NARROW band circuit employs 5 2-element ceramic filters for very good selectivity. This circuit is outstanding in its ability to reject interfering signals, and is particularly suitable for areas where adjacent stations are crowded very close together on the FM band. The distortion factor too, is very close to the value obtained in the WIDE band.

Switching between the WIDE and NARROW bands is accomplished by switching a +B voltage supply ON and OFF. But since the IF amplifier in the NARROW band circuit is the same IF amplifier used to operate the meters and the muting function, the +B voltage supply for the final stage IC and diode ( $D_1$ ) would also be turned ON and OFF. Switching the +B voltage supply for  $D_1$  ON and OFF will cause  $D_1$  to act as a switch. When the +B voltage is applied to the anode of  $D_1$ ,  $D_1$  is put into

a conducting state, with the signal passing into the next stage.

Following the IF amplifier in NARROW band, or following the WIDE band circuit there is a 5-stage wide-band IF amplifier which produces sufficient limiter effect.

## FM Detector

The detector circuit used in the TX-9500II is a super wide band linear detector circuit, a product resulting from the study of distributed constant type detectors.

The circuit is shown in Fig. 4.

M5109PR included in this circuit is an IC incorporating 2 pairs of differential amplifiers. The loads of each differential amplifier are connected to a series resonance circuit where the  $L_{16}$ ,  $C_{32}$  resonance frequency is higher than the intermediate frequency (10.7MHz), and the  $L_{15}$ ,  $C_{33}$  resonance frequency is lower. The IF outputs from each of these differential amplifiers are modulated to the AM components which are then detected by  $D_3 - D_6$ .

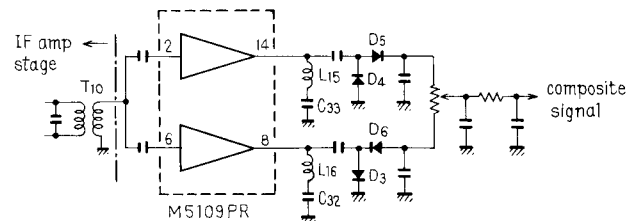


Fig. 4 Circuit of FM detector

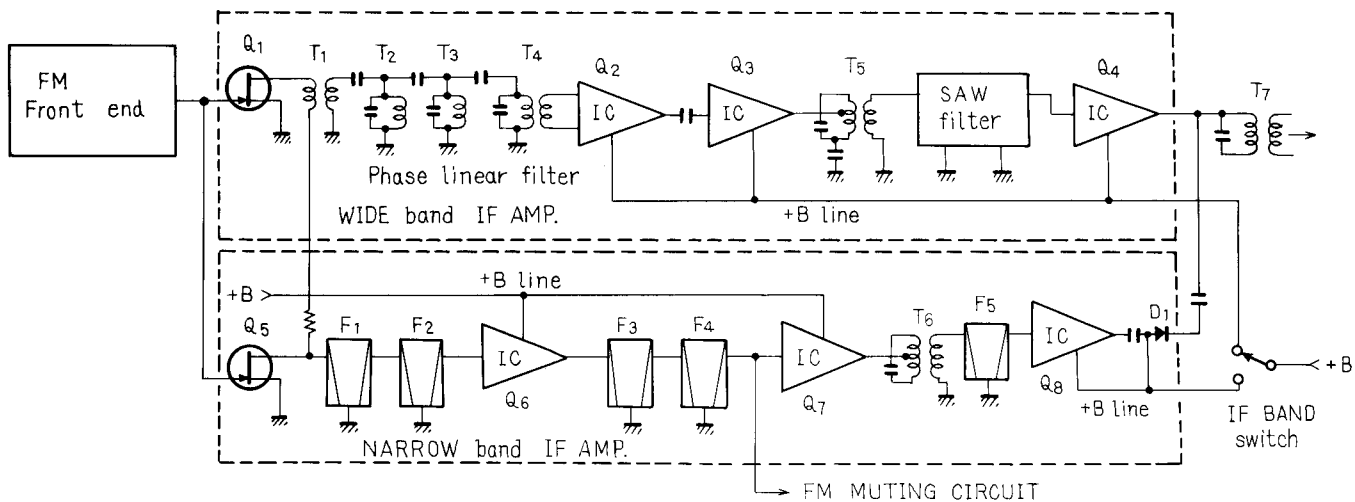


Fig. 3 Circuit of FM IF amplifier

### Anti-birdy Filter

The function of this filter is to remove any component signals belonging to adjacent stations within 200kHz of the tuned station which are still contained in the signal after detection. If it were not for this filter, beating in resonance with the 10th and 11th harmonics of the 19kHz pilot signal generated in the MPX IC of the final stage would occur, and appear as noise in the reproduced signal.

### FM Multiplex Decoder

This section includes another IC recently developed by Pioneer, the PA1001. See Fig. 5 for the block diagram.

This IC, an improvement over a previous IC (HA1196), incorporates a pilot auto-canceller circuit. This circuit filters out the leak carrier (19kHz) contained in the demodulated signal without any loss in the frequency characteristics of the audio signal. This filtering action is a considerable improvement over the previous low pass filter method. Other features include a wider input dynamic range, and the ability to perform well even when a 300% modulated input signal is applied to the IC. S/N ratio and distortion factor have also been improved by the incorporation of a NFB circuit in the decoder amplifier. Distortion has also been improved in the case of MONO signals by connecting together the output circuits of the L and R channels, and thus cancelling the out-of-phase distortion components contained in the L and R channel audio signals.

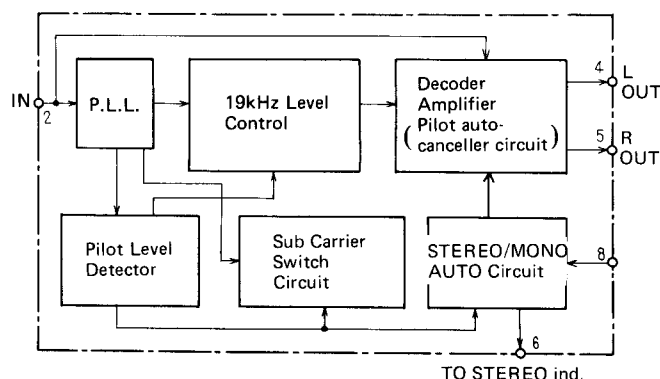


Fig. 5 Block diagram of PA1001

### AF Amplifier and Muting

This circuit employs the Pioneer developed IC (PA1002). The block diagram is shown in Fig. 6.

This AF amplifier is a direct coupled amplifier used as a differential NFB amplifier providing

outstanding dynamic range, S/N ratio, and distortion factor. De-emphasis is provided by inserting a time constant circuit in the NFB loop of the AF amplifier. The elements in this time constant circuit include a metal film resistor (1% tolerance) and a polystyrene film capacitor (2% tolerance) which have made it possible to reduce de-emphasis deviation to within +0.2dB to -0.5dB in the 20Hz to 15kHz range.

The switching circuit for the muting function is activated when a DC voltage from the power ON/OFF detector section or from terminal no.8, is received. The signal circuit is then connected to ground, thus preventing the output of any signals. This power ON/OFF detector circuit detects the instantaneous change when the POWER switch is turned ON or OFF, sending a trigger signal to the switching circuit, and thus activating the muting function. As a result, the popping noise usually generated when the POWER switch is turned ON or OFF, plus the residual noise, is eliminated.

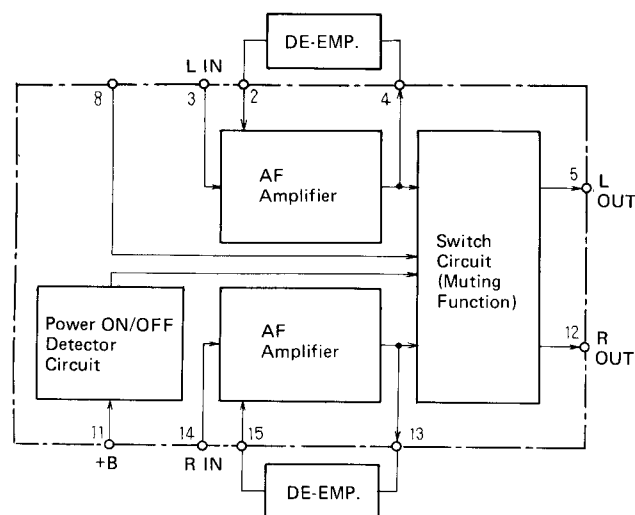


Fig. 6 Block diagram of PA1002

### FM Control Circuit

The FM control circuit used to control the meter drive and FM muting circuits, is independent of the audio signal circuitry. This circuit, too, incorporates an IC (PA3001) recently developed by Pioneer. The block diagram is shown in Fig. 8.

The PA3001 is very similar to the previous IC (HA1137) in function and operation. It differs in that the FM muting level can be controlled external to the IC. The input signal is supplied by the IF amplifier in NARROW band (See Fig. 7).

The FM muting function in the TX-9500II works in 5 different ways:

1. Muting of the noise contained in the received signal.
2. Muting at a specific antenna input level.
3. Muting when not tuned to any station.
4. Muting when the IF BAND switch is switched.
5. Muting when the FUNCTION switch is switched.

The disconnection of the signal circuitry during all of the above mentioned muting actions, is performed by means of a switch circuit incorporated inside the PA1002 IC.

#### 1. Muting of the noise contained in the received signal

Detection of this noise component is performed in the NOISE amplifier ( $Q_{17}$ , high pass filter,  $Q_{18}$ ) shown in Fig. 7. After detection, the audio signal appears at terminal no.6 of PA3001, with the noise components above 100kHz contained within this audio signal being detected and amplified by the NOISE amplifier. The output of this NOISE amplifier (noise component) is rectified at  $D_{13}$  and  $D_{14}$ , and then removed as a DC voltage.

This DC voltage is passed via  $S_{2-b}$  (MUTING switch) and  $S_3$  (MODE switch), finally being applied to terminal no.8 of PA1002. When the audio signal contains a high level of high frequency noise, the PA1002 switch circuit is activated, resulting in the signal circuit being shorted to ground.

#### 2. Muting at a specific antenna input level

The DC voltage at terminal no.12 of PA3001 is set to read at least 1.3V when the antenna input is less than 14dB ( $5\mu V$ ) with the MUTING switch in position 1, and less than 29dB ( $28\mu V$ ) in position

two. The adjustments are made by the semi-variable resistors  $VR_4$  and  $VR_5$  respectively. The output of terminal no.12 of PA3001 is connected via  $S_{2-b}$  and  $S_3$  to terminal no.8 of PA1002, so that when an output voltage in excess of 1.3V appears at terminal no.12 of PA3001, the switch circuit in PA1002 is activated, thus bringing the muting circuit into operation.

#### 3. Muting when not tuned to any station

When the tuned frequencies separated by about  $\pm 70\text{kHz}$  from the broadcasting frequency, a DC voltage appears at terminal no.12 of PA3001. This voltage activates the switch circuit incorporated inside PA1001, thus bring the muting circuit into operation.

#### 4. Muting when the IF BAND switch is switched

The  $Q_{19}$  base voltage is designed to drop to 0V during the instant the IF BAND switch ( $S_4$ ) is changed. (both contacts open during the switching action). Consequently,  $Q_{19}$  is turned ON, resulting in +B passing via  $Q_{19}$  to charge  $C_{75}$ , as well as passing via  $D_{12}$  to terminal no.8 of PA1002, whose switch circuit is then activated.

#### 5. Muting when the FUNCTION switch is switched

The  $Q_{19}$  base voltage drops to 0V during the instant when the FUNCTION switch ( $S_1$ ) is turned from AM to FM, resulting in the momentary opening of the +B switching section of the FUNCTION switch. This results in  $Q_{19}$  turning ON, with all consequent steps being the same as when the IF BAND switch was changed.

Furthermore,  $Q_2$  has been added to the circuit in

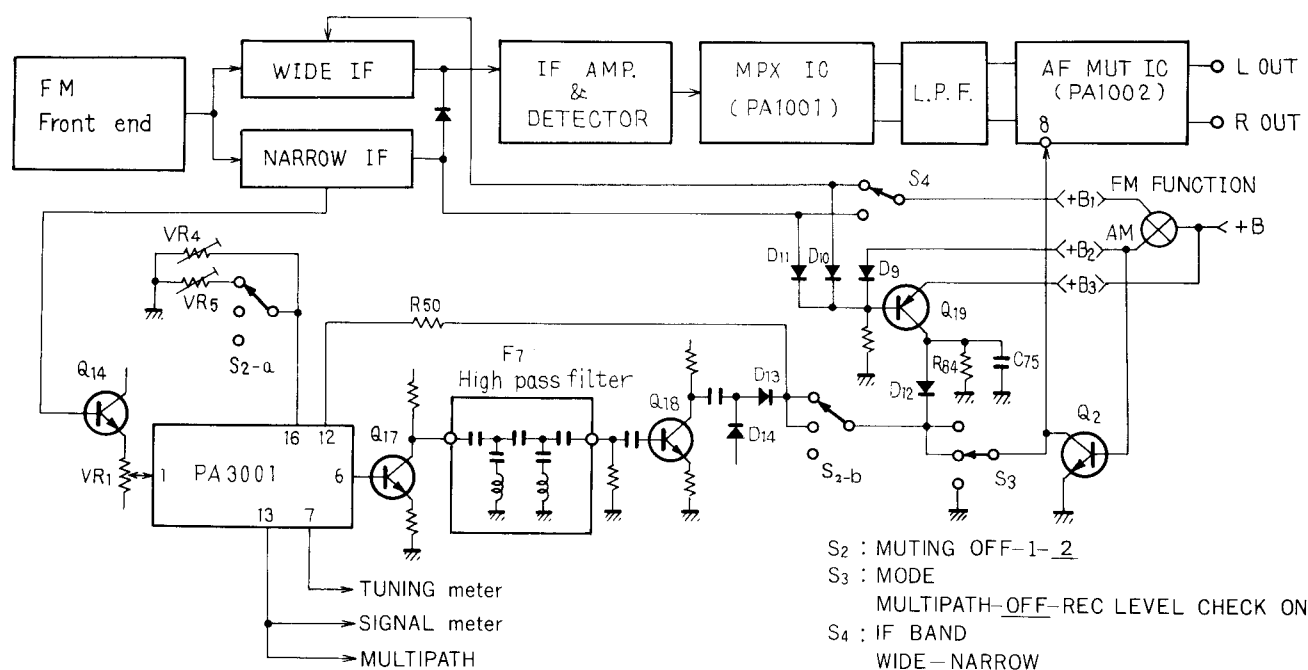


Fig. 7 FM control circuit

order to prevent muting when the FUNCTION switch is turned to the AM position. In this case +B<sub>2</sub> is applied to the bases of both Q<sub>19</sub> and Q<sub>2</sub>, turning Q<sub>19</sub> OFF, and Q<sub>2</sub> ON. Therefore, terminal no.8 of PA1002 is connected to ground, thus preventing the muting circuit from operating.

The muting action is also inhibited when the MODE switch (S<sub>3</sub>) is turned to the REC LEVEL CHECK position. In this case, the MODE switch shorts terminal no.8 directly to ground.

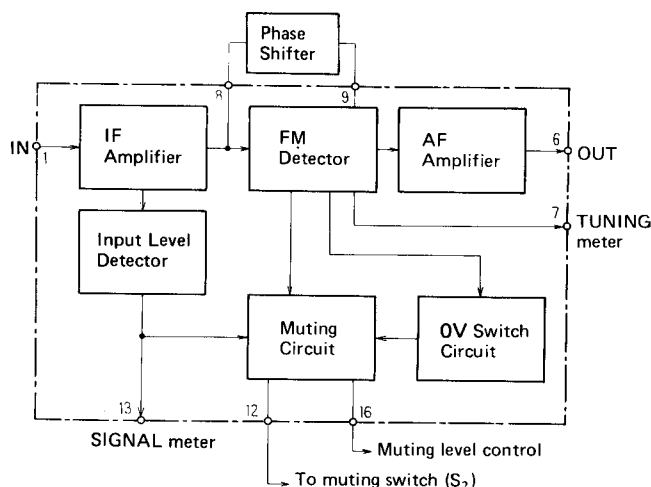


Fig. 8 Block diagram of PA3001

### 5.3 REC LEVEL CHECK SIGNAL GENERATOR CIRCUIT

This circuit, consisting of one transistor and an IC

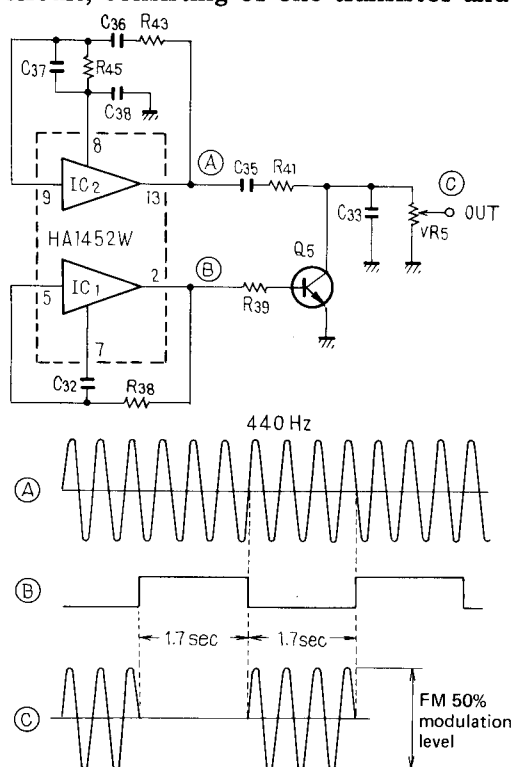


Fig. 9

(HA1452W), produces tone bursts every 3.4 sec. for 1.7 sec. intervals by means of a 440Hz signal. The output level corresponds to a value equivalent to an FM broadcast with 50% modulation. The circuit is outlined in Fig. 9.

The IC HA1452W incorporates two pairs of operational amplifiers, one being used as a 440Hz sine wave oscillator circuit, and the other as square wave oscillator, which cycles on and off every 3.4 sec. for 1.7 sec. The switching action of Q<sub>5</sub> converts this square wave into tone bursts. When the square wave is applied to the base of Q<sub>5</sub>, Q<sub>5</sub> is turned ON and OFF, thus converting into a 440Hz tone bursts.

### 5.4 POWER SUPPLY CIRCUIT

This circuit, too, employs one of Pioneer's recently developed ICs (PA2002), resulting in better S/N ratio, stability, and a greater degree of reliability. PA2002 is an IC used to provide constant voltages, and incorporates a protection circuit. A block diagram is outlined in Fig. 10.

The protection circuit is composed of control circuits activated by overcurrents, and control circuits activated by overvoltages. The protection circuit is activated when either a current in excess of 760mA (resulting from an overload) flows through the IC output (terminal no.10), or a voltage in excess of 27V is applied to the IC input (terminal no.1). Once this protection circuit is activated, no output voltage will appear at terminal no.10.

Fig. 11 is an outline of the power supply circuit used in TX-9500II. The Q<sub>1</sub> has been included in this circuit in order to take up any excess currents above the maximum current for the PA2002.

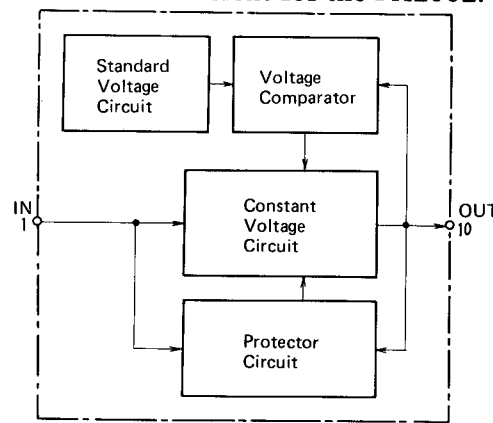


Fig. 10 Block diagram of PA2002

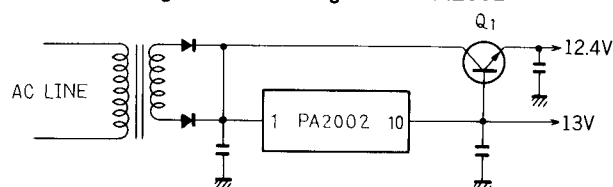


Fig. 11 Power supply circuit

## 6. DISASSEMBLY

1. Remove the 4 screws (A) securing both sides of the bonnet case.
2. Remove the 9 screws (B) securing the bottom plate.
3. Remove all the knobs from the front panel. In the case of the TUNING knob, a securing screw must first be loosened. Now remove the 3 nuts (C) and the 2 screws (D) securing the top of the front panel, which may now be taken off.

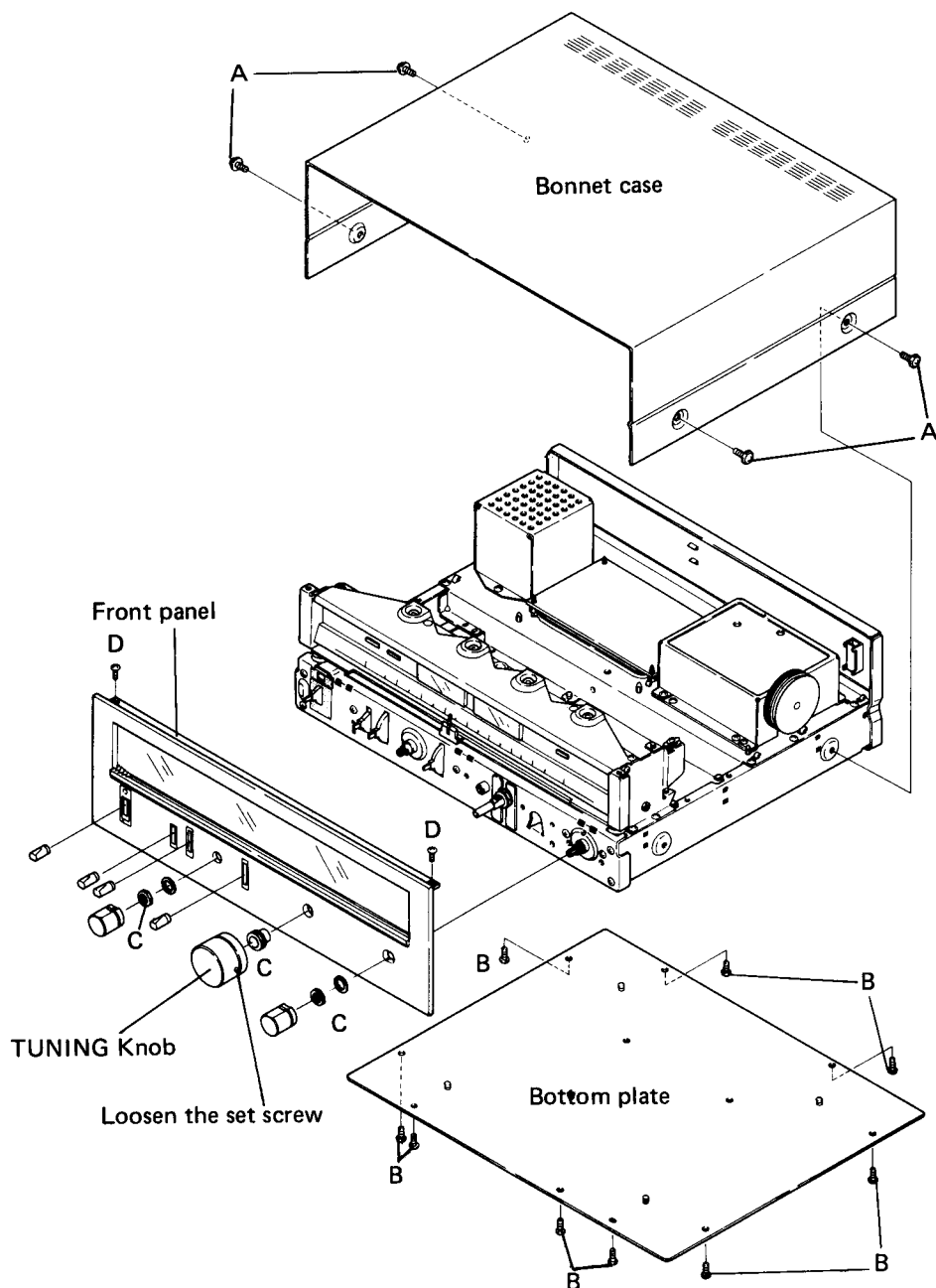
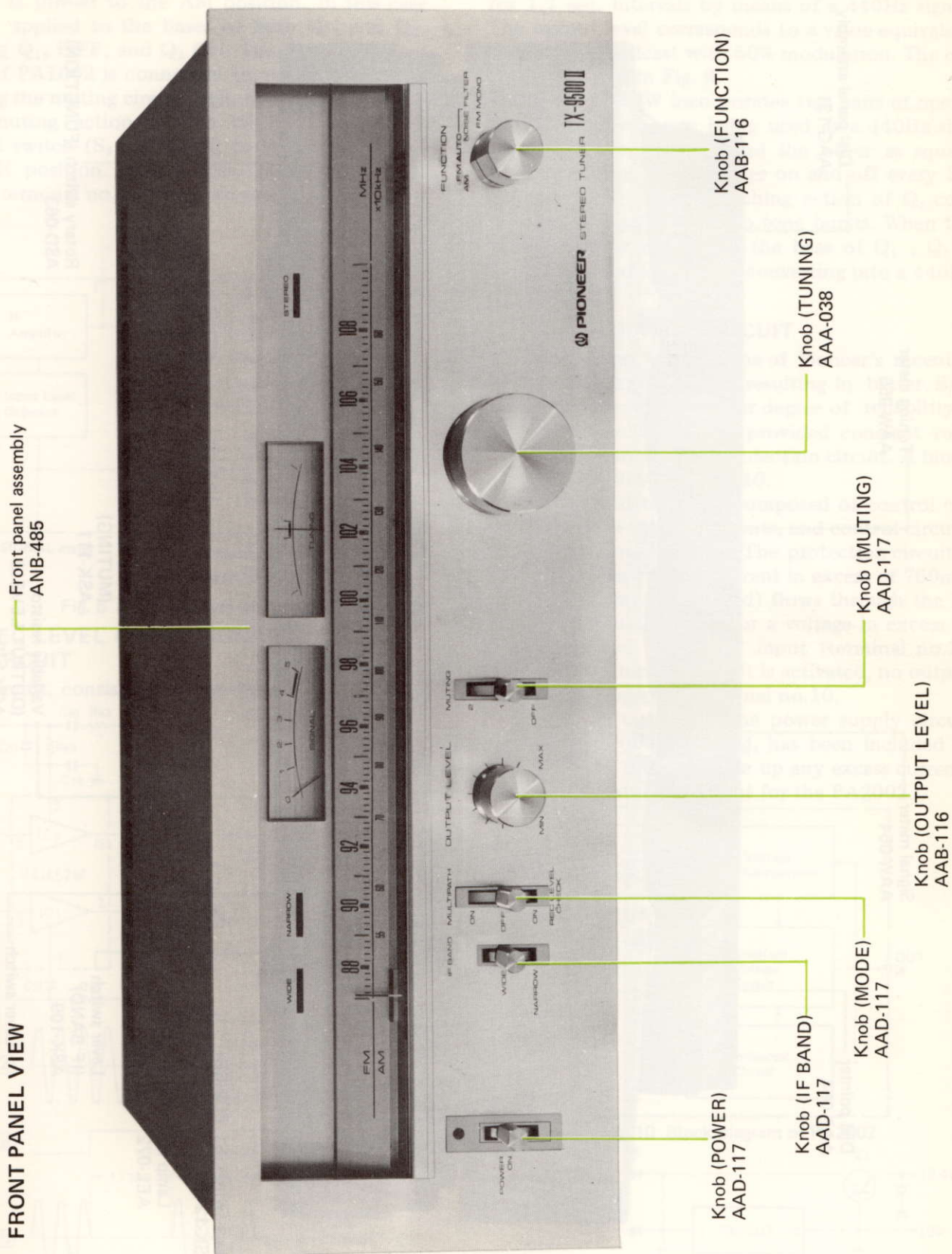


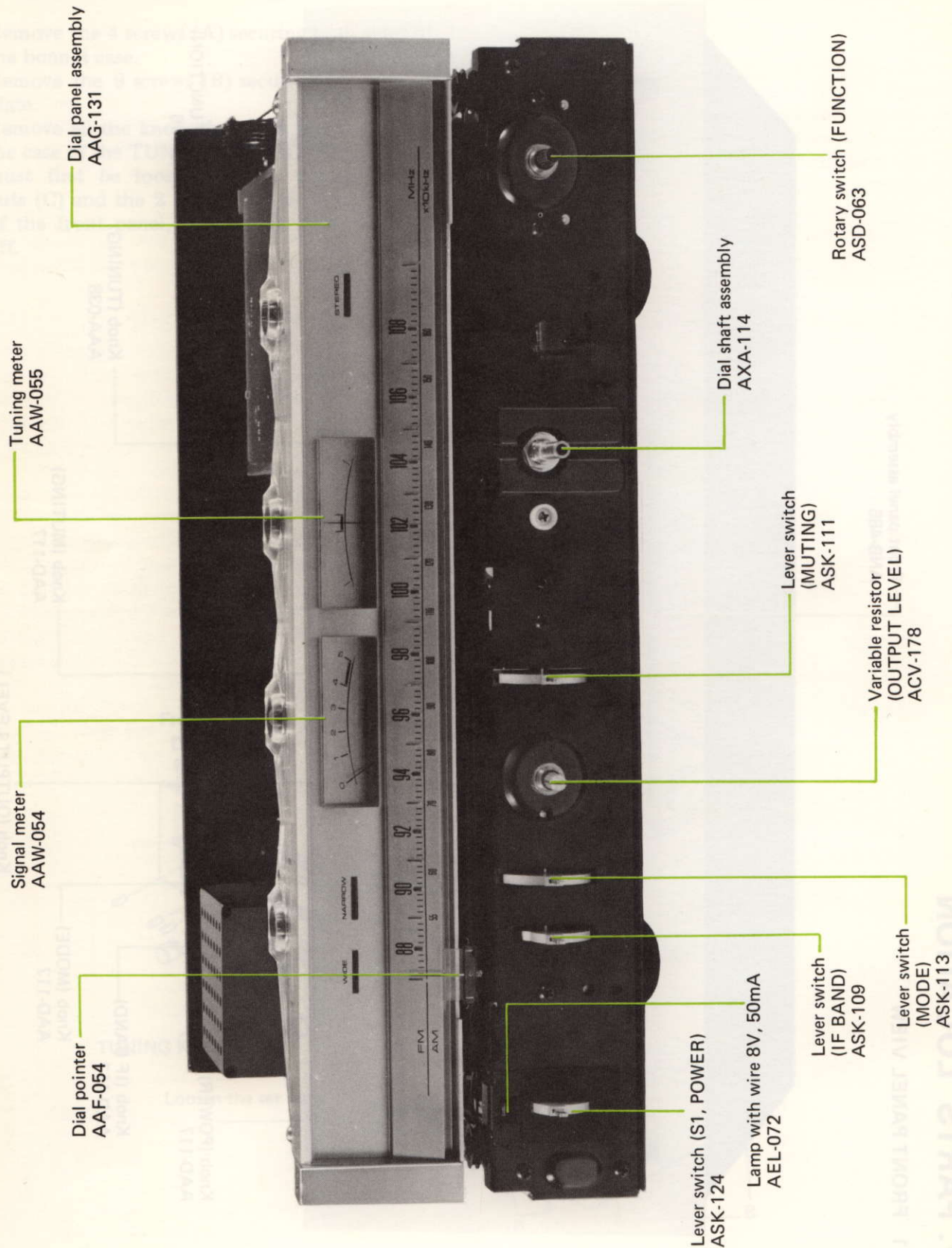
Fig. 12

## 7. PARTS LOCATION

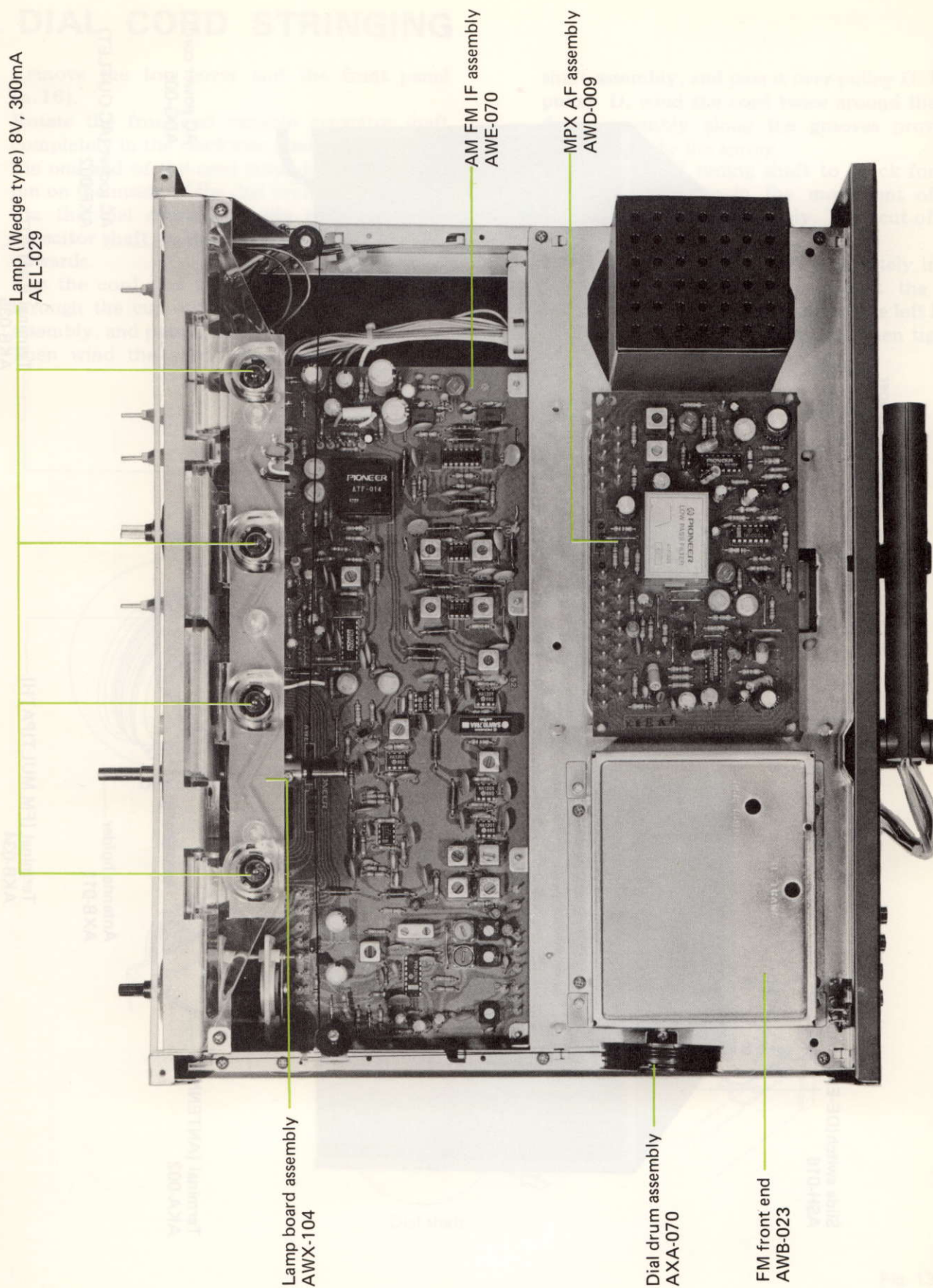
### 7.1 FRONT PANEL VIEW



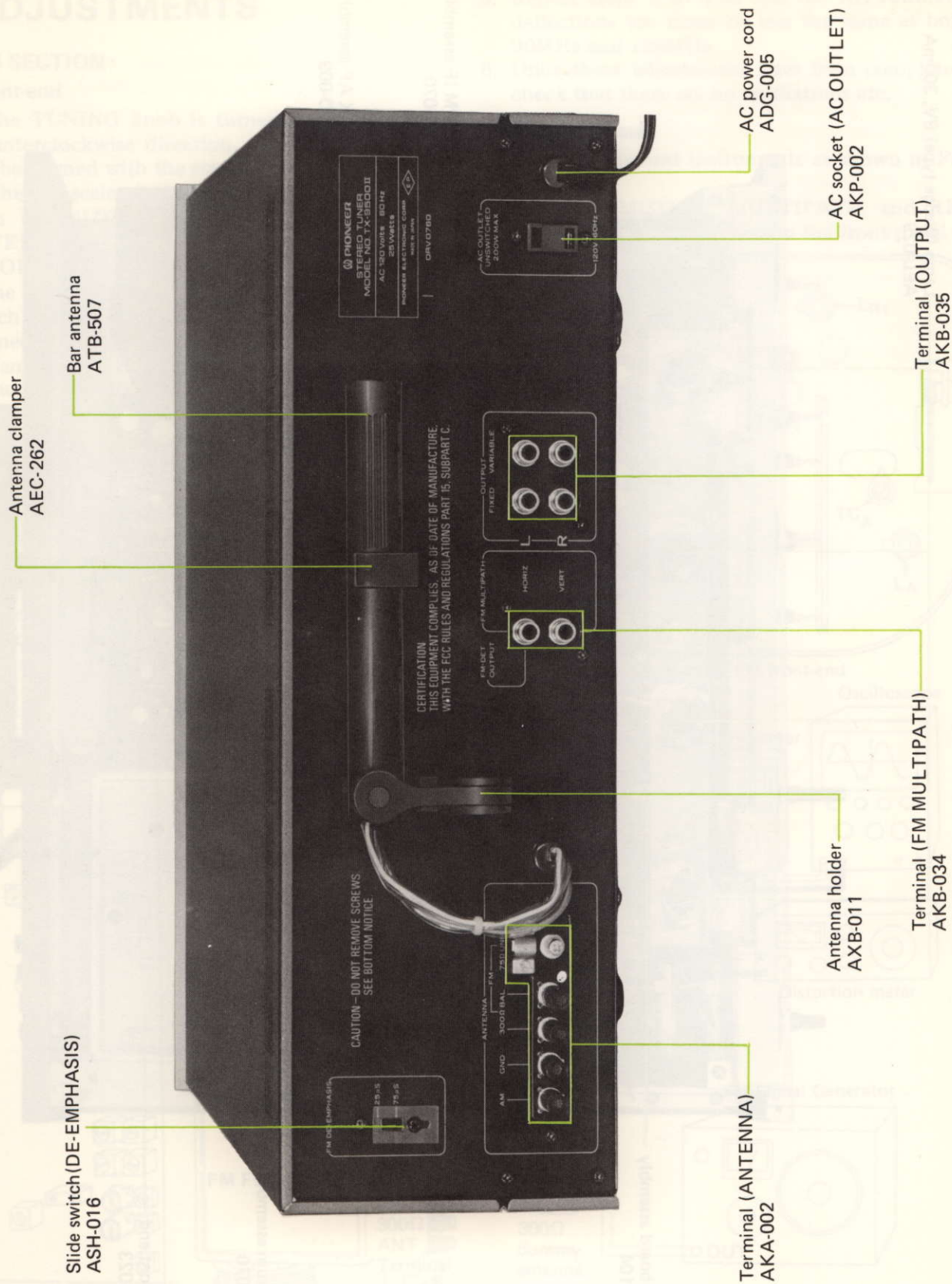
## 7.2 FRONT VIEW WITH PANEL REMOVED



### 7.3 TOP VIEW



#### 7.4 REAR PANEL VIEW



## 8. DIAL CORD STRINGING

1. Remove the top cover and the front panel (p. 16).
2. Rotate the front-end variable capacitor shaft completely in the clockwise direction.
3. Tie one end of the cord around the protruding pin on the inside of the dial drum assembly.
4. Fix the dial drum assembly to the variable capacitor shaft so that the set screw is pointing upwards.
5. Pass the cord tied to the dial drum assembly through the cut out section of the dial drum assembly, and pass it over pulley A, B and C.
6. Then wind the cord 3 times around the dial shaft assembly, and pass it over pulley D. From pulley D, wind the cord twice around the dial drum assembly along the grooves provided, and then tie to the spring.
7. Rotate the dial tuning shaft to check for any abnormal behavior in the movement of the cord and dial drum assembly. Then cut off the remaining cord.
8. Rotate the dial tuning shaft completely in the counterclockwise direction. Adjust the dial indicator to the starting point on the left hand side of the tuning dial scale, and then tighten the cord.

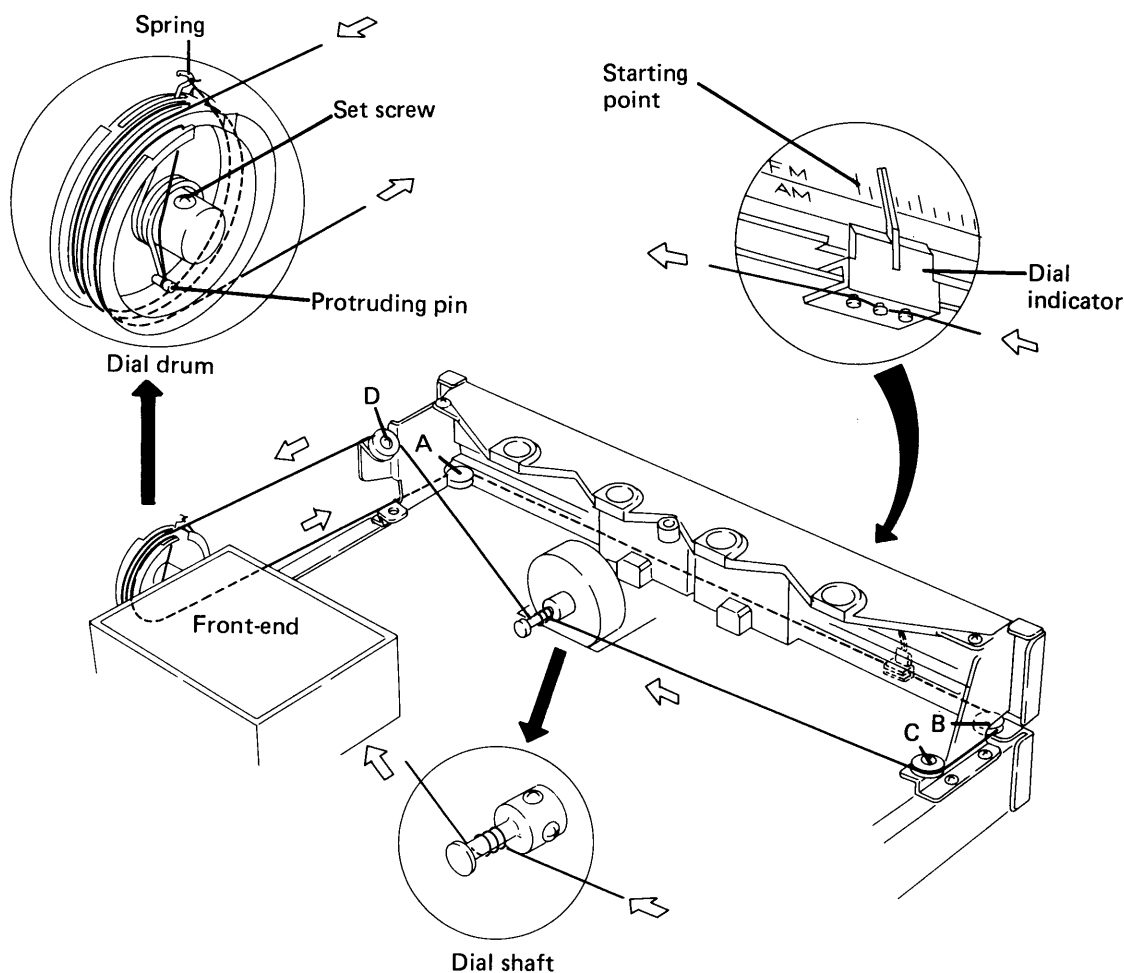


Fig. 13

## 9. ADJUSTMENTS

### 9.1 FM SECTION

#### FM Front-end

When the TUNING knob is turned completely in the counterclockwise direction, the dial indicator should be aligned with the starting point on the far left of the dial scale.

1. Turn the MUTING, MULTIPATH, and REC LEVEL CHECK switches on the front panel to the OFF positions. Turn the IF BAND switch to the NARROW position, and the FUNCTION switch to the FM MONO position.
2. Connect the test instruments as shown in Fig. 14, and adjust FM SG to 90MHz, modulation frequency to 400Hz, 100% modulation, and output of 10dB.
3. Set the dial indicator of the TX-9500II to 90MHz, and adjust each of the cores  $L_O$ ,  $L_A$ ,  $L_{R1}$ ,  $L_{R2}$ , and  $L_{R3}$  in the front-end for maximum deflection on the AC voltmeter.
4. Now set the dial indicator of TX-9500II and FM SG to 106MHz, and adjust each of the trimmers  $TC_O$ ,  $TC_A$ ,  $TC_{R1}$ ,  $TC_{R2}$ , and  $TC_{R3}$  in the FM front-end (Fig. 15) to give maximum deflection on the AC voltmeter.

5. Repeat steps 2 to 4 so that the AC voltmeter deflections are more or less the same at both 90MHz and 106MHz.
6. Once these adjustments have been completed, check that there are no oscillations etc.

#### FM Muting Circuit

1. Connect the test instruments as shown in Fig. 16.
2. Turn the MUTING, MULTIPATH, and REC LEVEL CHECK switches on the front panel to

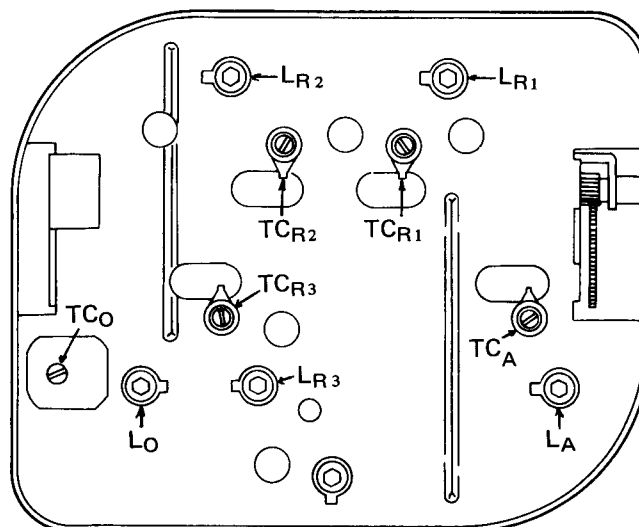


Fig. 15 Bottom view of FM front-end

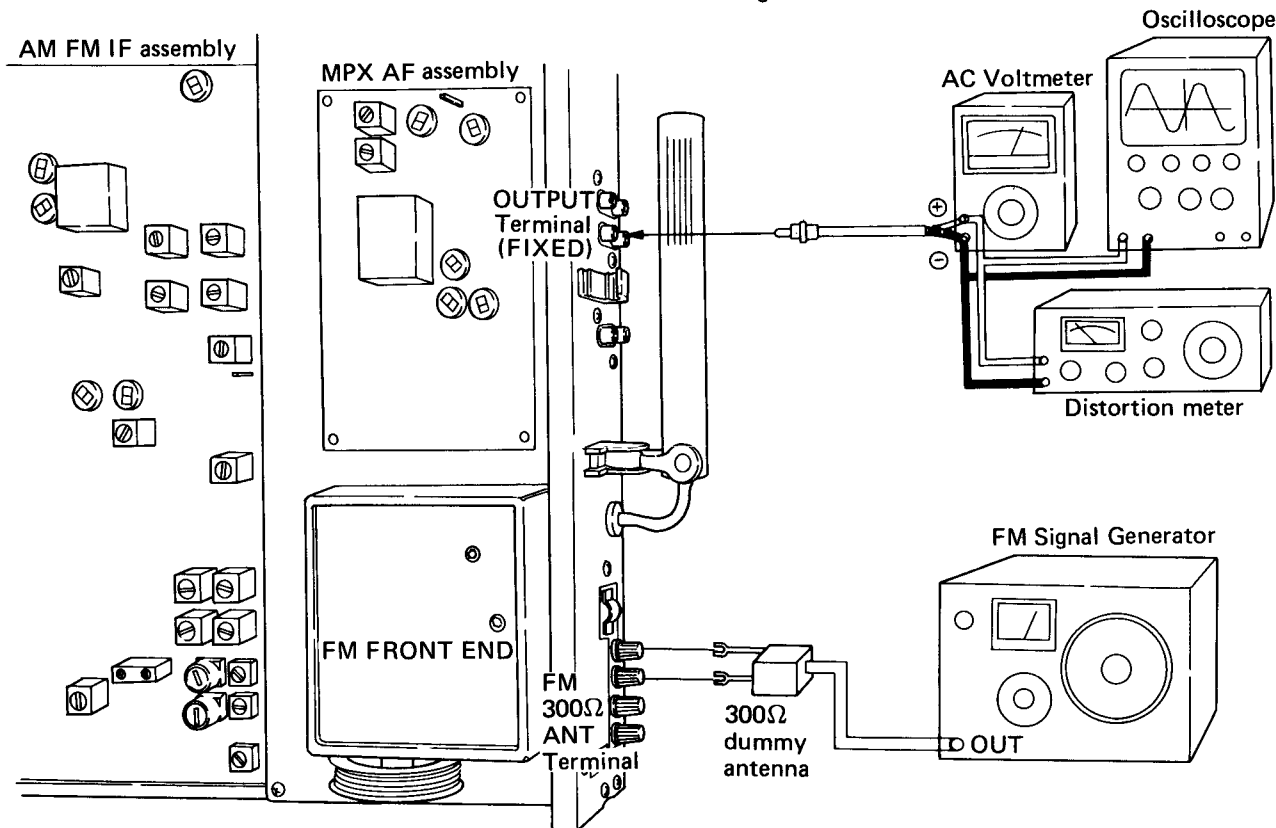


Fig. 14

- the OFF positions, turn the IF BAND switch to the NARROW position, and the FUNCTION switch to the FM AUTO position..
- Set the semi-variable resistors ( $VR_2 - VR_5$ ) of the AM FM IF assembly to the mechanical center points, but turn  $VR_1$  in the maximum clockwise direction.
  - Set FM SG to modulation frequency of 400Hz, 100% modulation, and output of 60dB.
  - Tune the dial indicator of TX-9500II and FM SG to 98MHz (maximum SIGNAL meter deflection).
  - Lower the output of the FM SG to a level (about 10dB) where the SIGNAL meter is no longer effected by the limiter.
  - Adjust the FM front-end IF TRANS to give maximum SIGNAL meter deflection.
  - Turn the FM SG output level down until only the noise level remains, and adjust the core of  $T_{12}$  to bring the TUNING meter needle to the center marker.
  - Set the IF BAND switch to the WIDE position, and the FM SG output level to 60dB.
  - Tune the TX-9500II to 98MHz with the TUNING meter needle at the center marker.
  - Reduce the FM SG output down to a level (about 20–30dB) where the DC voltmeter is no longer effected by the limiter (point just below where any increase in FM SG output stops producing a change in DC voltmeter reading.).
  - Adjust the cores of  $T_1$  to  $T_5$  until the DC voltmeter gives maximum reading.
  - Return the FM SG output level to 60dB, and adjust the cores of  $T_{11}$ ,  $T_{10}$ ,  $T_8$ ,  $T_9$ , and  $T_7$  consecutively in this order to reduce distortion to a minimum use a distortion meter for this measurement. Repeat the process until the minimum is reached. Then adjust further with  $VR_2$ .
  - Set the FM SG output to 80dB, and then adjust  $VR_3$  so that the SIGNAL meter reads 4.8 on the scale.
  - Reset the FM SG output to 50dB, and adjust (by  $VR_1$ ) the SIGNAL meter to read 4.
  - Repeat steps 14 and 15 until the required SIGNAL meter readings are attained.
  - Set the FM SG output to 14dB, and turn the MUTING switch to position 1.
  - Adjust  $VR_4$  to the point where the muting circuit is activated.
  - Reset the FM SG output to 29dB, and turn the MUTING switch to position 2.
  - Adjust  $VR_5$  to the point where the muting circuit is

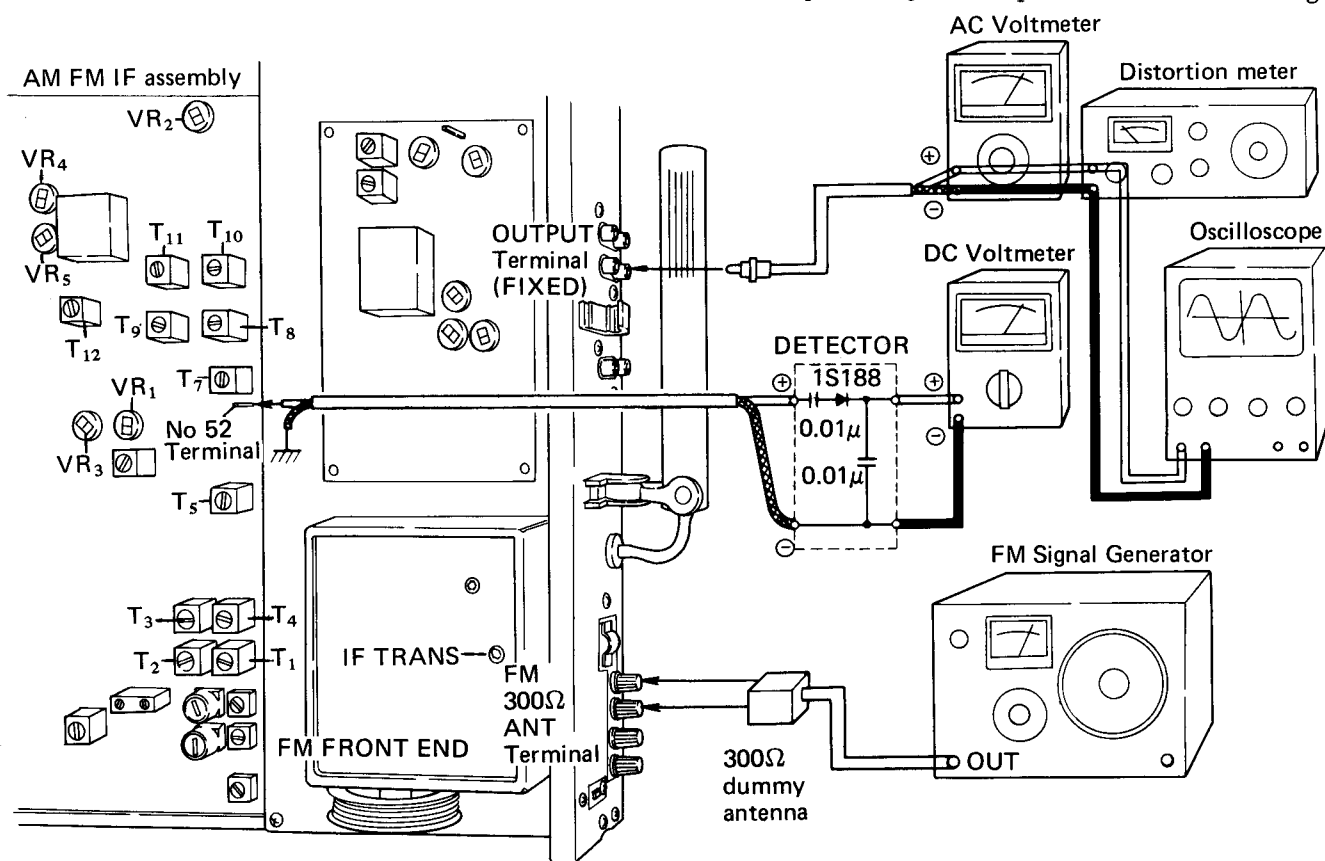


Fig. 16

cuit is activated.

21. Turn the FM SG output level down until there is only noise, and check that the TUNING meter is still at the center marker. If it is not aligned correctly, repeat the above procedure starting from step 8.

### FM MPX Circuit

1. Connect the test instruments as shown in Fig. 17.
2. Turn the MUTING, MULTIPATH, and REC LEVEL CHECK switches on the front panel to the OFF positions, turn the IF BAND switch to the WIDE position, and the FUNCTION switch to FM AUTO.
3. Set FM SG to zero modulation, and 60dB, at 98MHz.
4. Tune the dial indicator of TX-9500II to 98MHz.
5. Connect the PILOT OUT terminal of MPX SG to the HORIZONTAL input terminal of an oscilloscope, and terminal no.27 of the MPX AF assembly (via a 10:1 probe) to the VERTICAL input terminal.
6. Adjust VR<sub>1</sub> of the MPX AF assembly to stop the Lissajous waveform in the oscilloscope (see Fig. 18).

7. With the FM SG as external modulation, and the MPX SG output as the pilot signal (19kHz) only, this signal is applied with 7.5kHz deviation (10%) to the external modulation input terminal of the FM SG.
8. Adjust VR<sub>2</sub> of the MPX AF assembly to reduce the pilot signal leakage appearing at the output terminal of TX-9500II to a minimum.
9. The 67.5kHz deviation L + R (1kHz) and the 7.5kHz deviation pilot signal (19kHz) are taken as the MPX SG output signal.

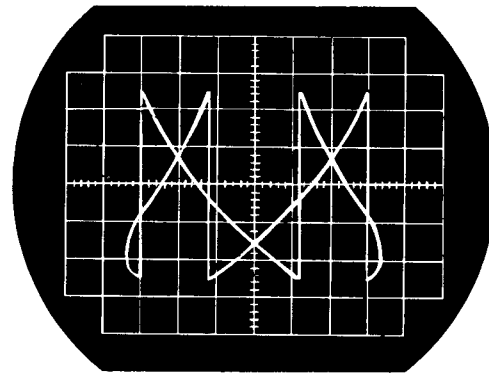


Fig. 18 Lissajous waveform

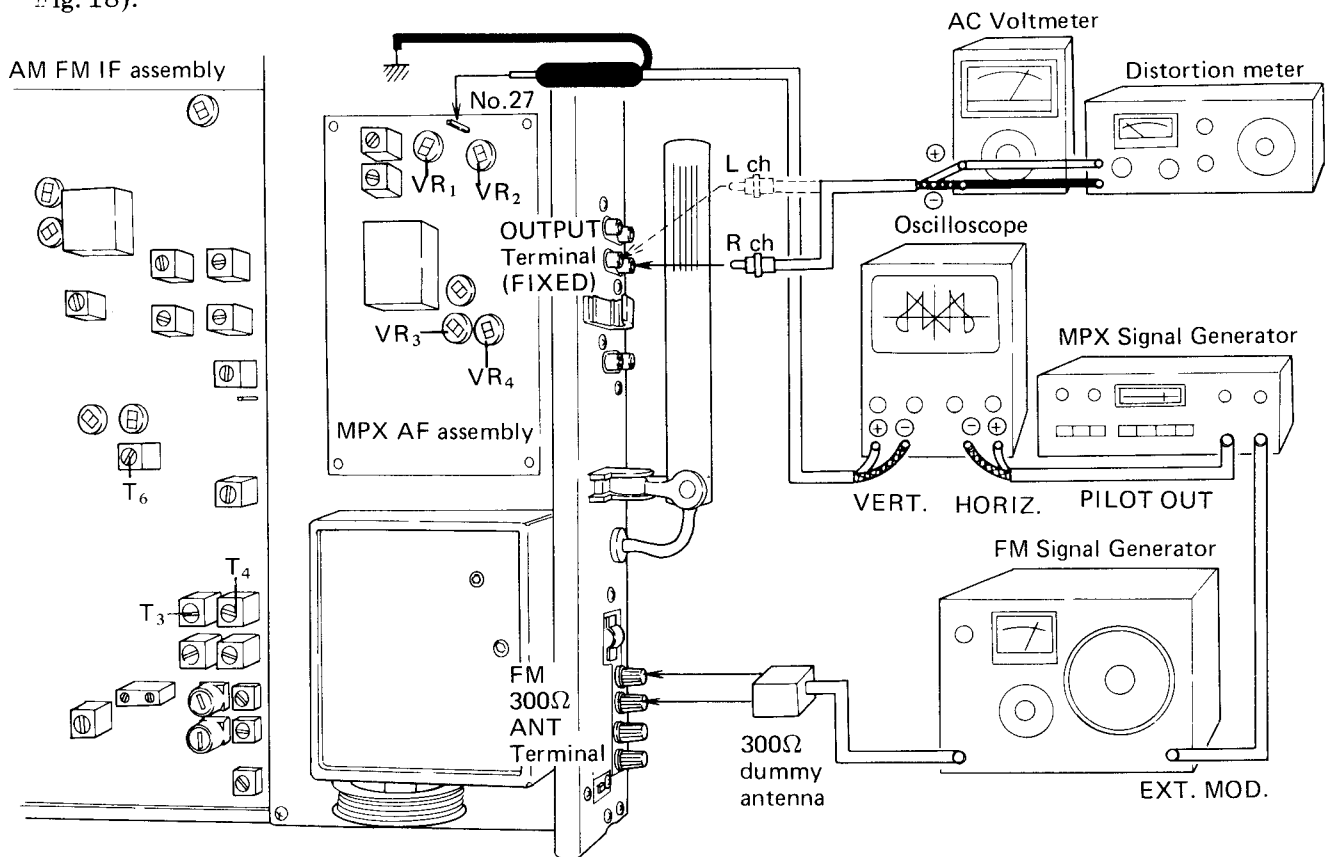


Fig. 17

10. Set the FM SG output level to 80dB, and reduce the distortion to a minimum by adjusting  $T_3$  and  $T_4$  of the AM FM IF assembly repeatedly.
11. Set the IF BAND switch to the NARROW position, and again reduce the distortion to a minimum by adjusting  $T_6$  of the AM FM IF assembly.
12. Return the IF BAND switch back to the WIDE position, and pass the MPX SG main signal through either L or R.
13. Adjust  $VR_3$  of the MPX AF assembly to get optimum channel separation.
14. Again set the IF BAND switch to the NARROW position, and adjust  $VR_4$  of the MPX AF assembly to get optimum channel separation a second time.
15. Turn the FUNCTION switch to NOISE FILTER position, and check that a channel separation of  $18\text{dB} \pm 3\text{dB}$  is obtained. When turned to the FM MONO position, the STEREO indicator lamp should go out, and a monaural signal be received.

#### Adjustment of the REC LEVEL CHECK Oscillation Level

1. Connect up the test instruments as shown in Fig. 19.
2. Turn the FUNCTION switch to FM AUTO.
3. With the FM SG at modulation frequency of 400Hz, 100% modulation, and an output of 60dB, check the output level of TX-9500II.
4. Turn the REC LEVEL CHECK to the ON position, and adjust  $VR_5$  of the MPX AF assembly so that the output level is -6dB below the level found in step 3 above.

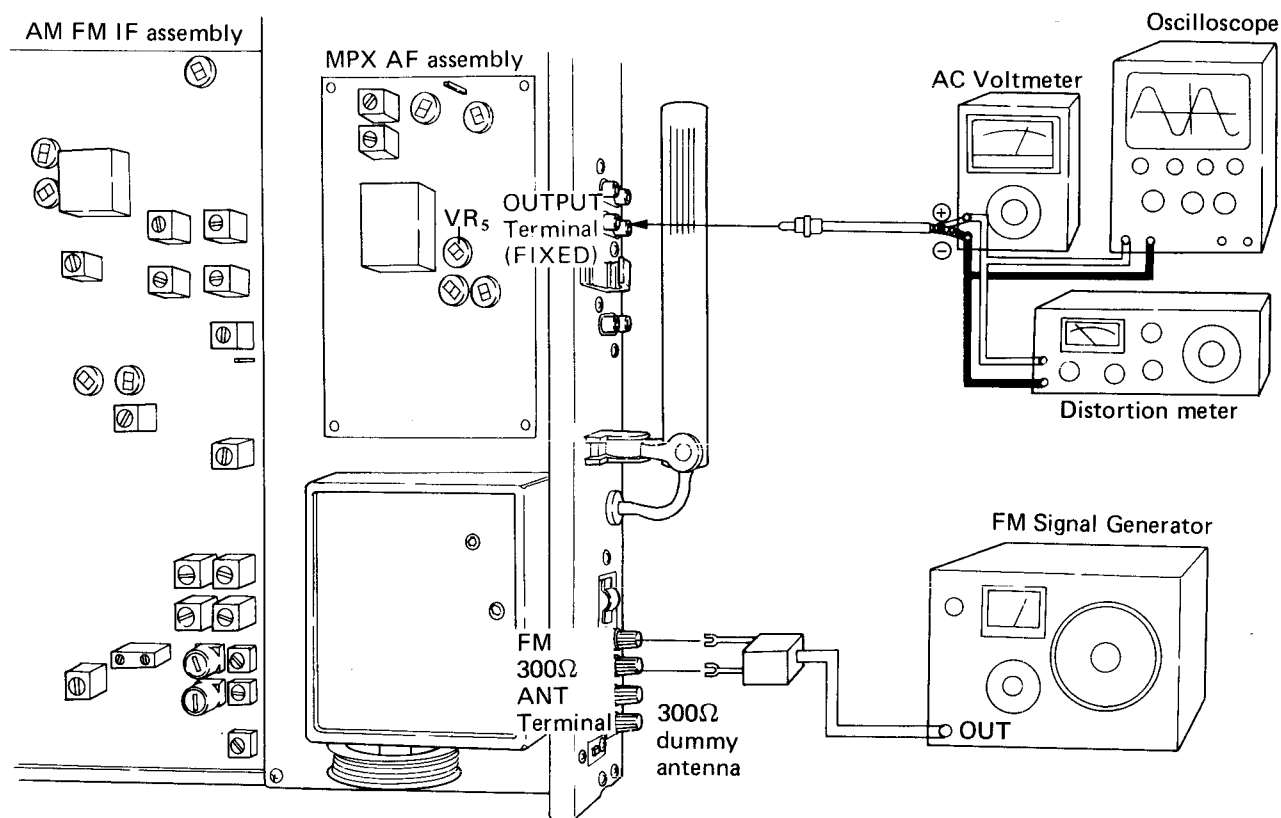


Fig. 19

## 9.2 AM SECTION

### AM Tracking

Check that the dial indicator has been adjusted correctly to the starting point.

1. Turn the FUNCTION switch to the AM position.
2. Connect the test instruments as shown in Fig. 20, and adjust the AM Signal Generator (AM SG) to 400Hz modulation frequency, 30% modulation, and 30dB output.
3. Set the dial indicator of TX-9500II and AM SG to 600kHz, and adjust cores of  $T_{14}$  and  $T_{13}$  on the AM FM IF assembly then the core of the bar antenna to produce the maximum output from TX-9500II.
4. Now set the dial indicator and AM SG to 1400kHz, and again adjust for maximum output, but by means of the  $TC_3$ ,  $TC_2$ , and  $TC_1$  trimmers.
5. With complete reception of the 600kHz and 1400kHz signals, repeat steps 3 and 4 to (minimize the amount of deviation between the two outputs.
6. Reset the dial indicator of TX-9500II and AM SG to 600kHz, and adjust to maximum output level by means of the  $T_{15}$  core.

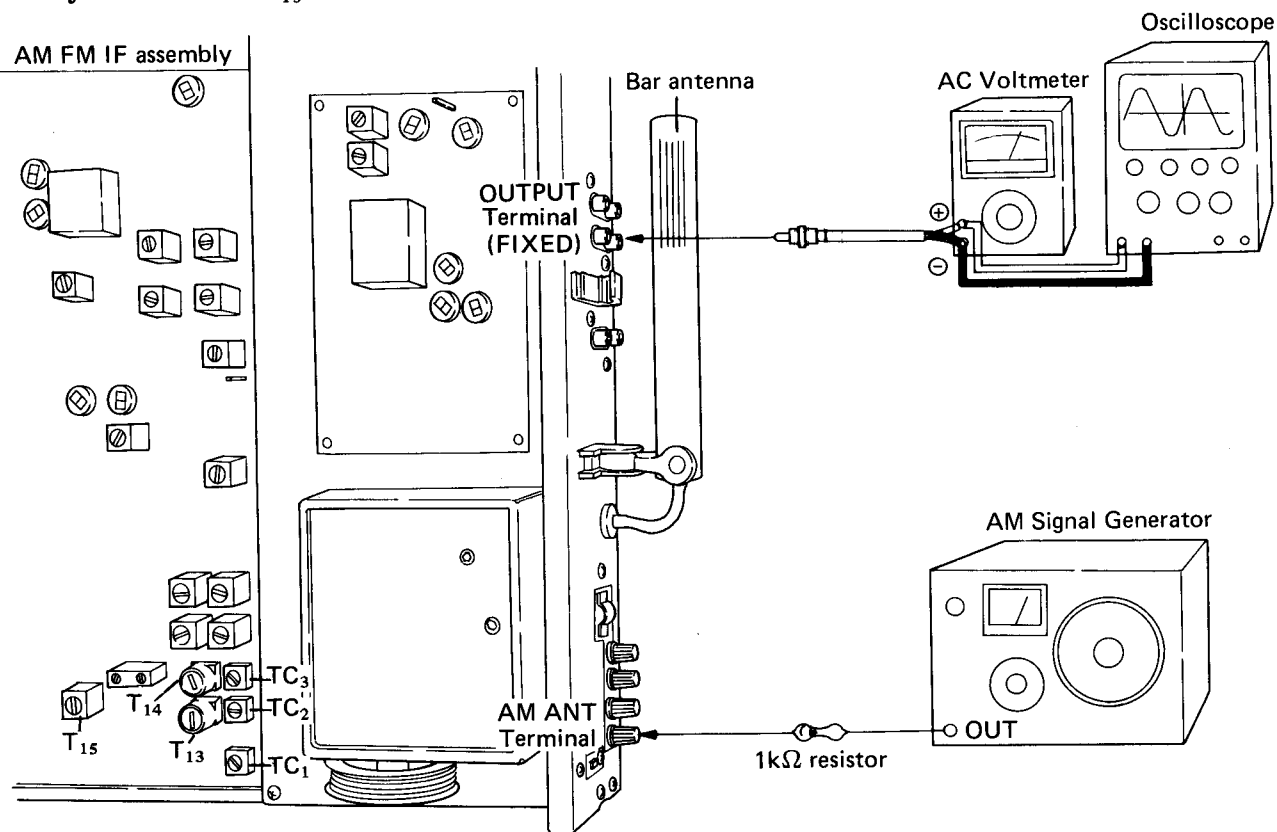
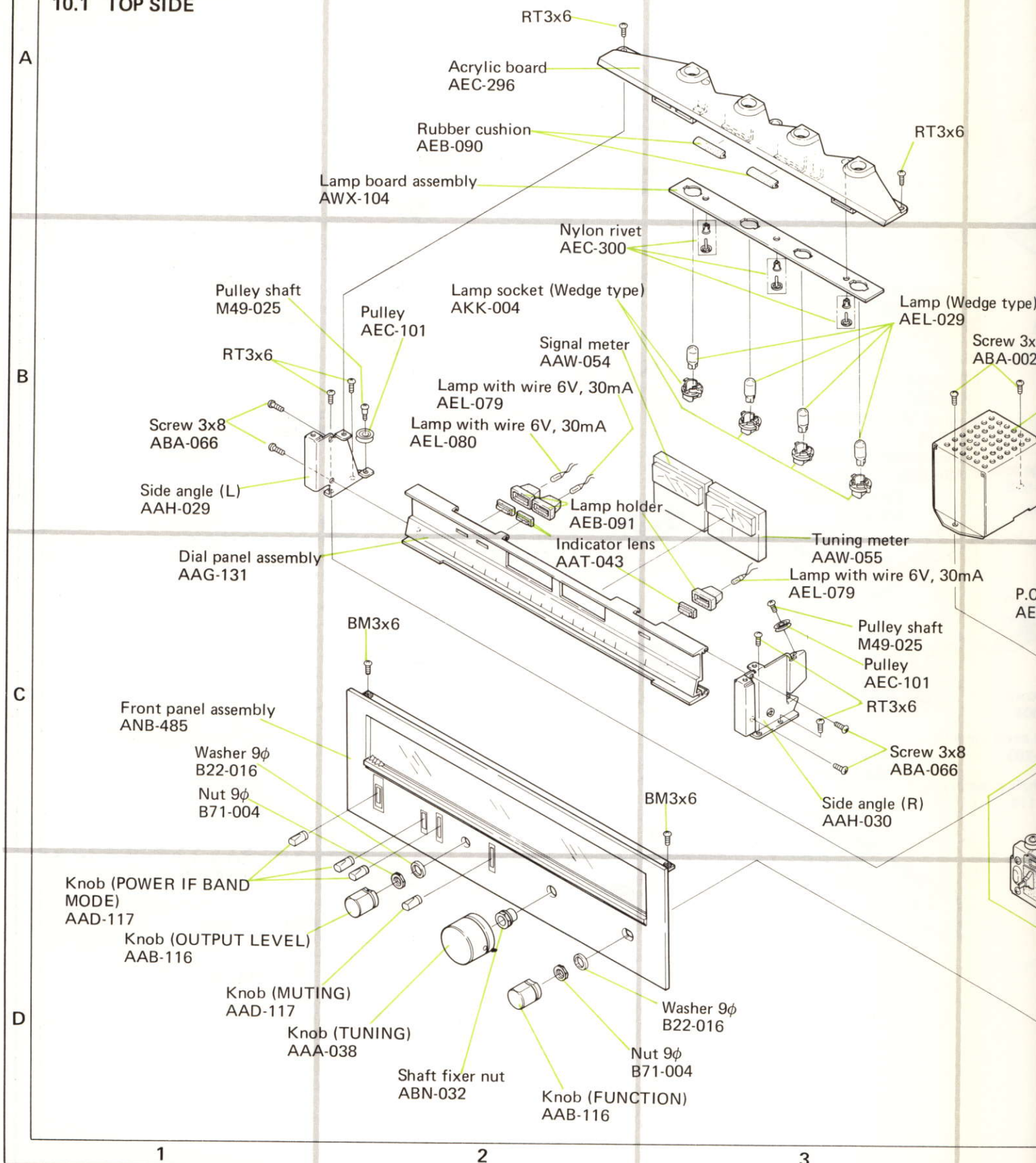
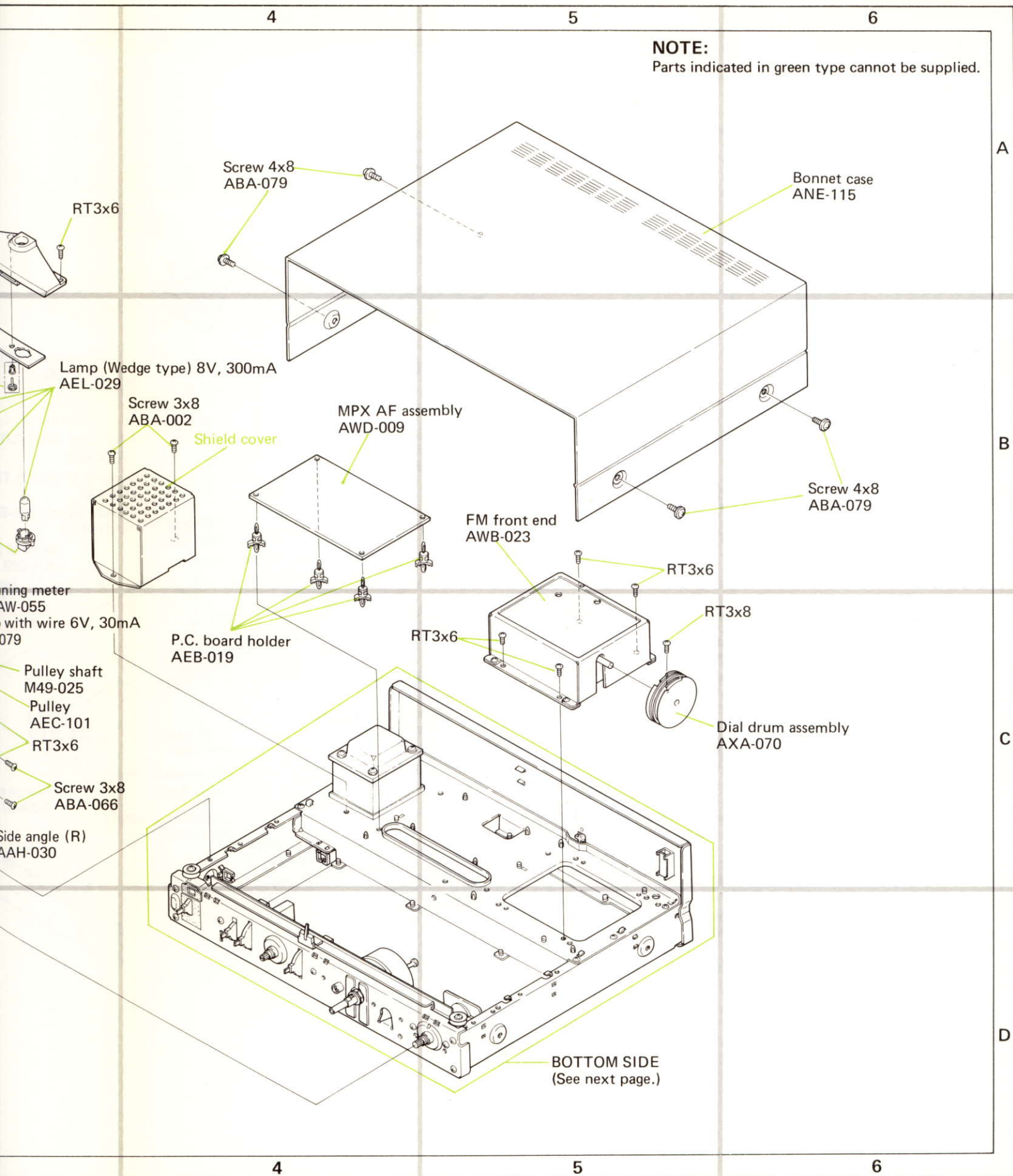


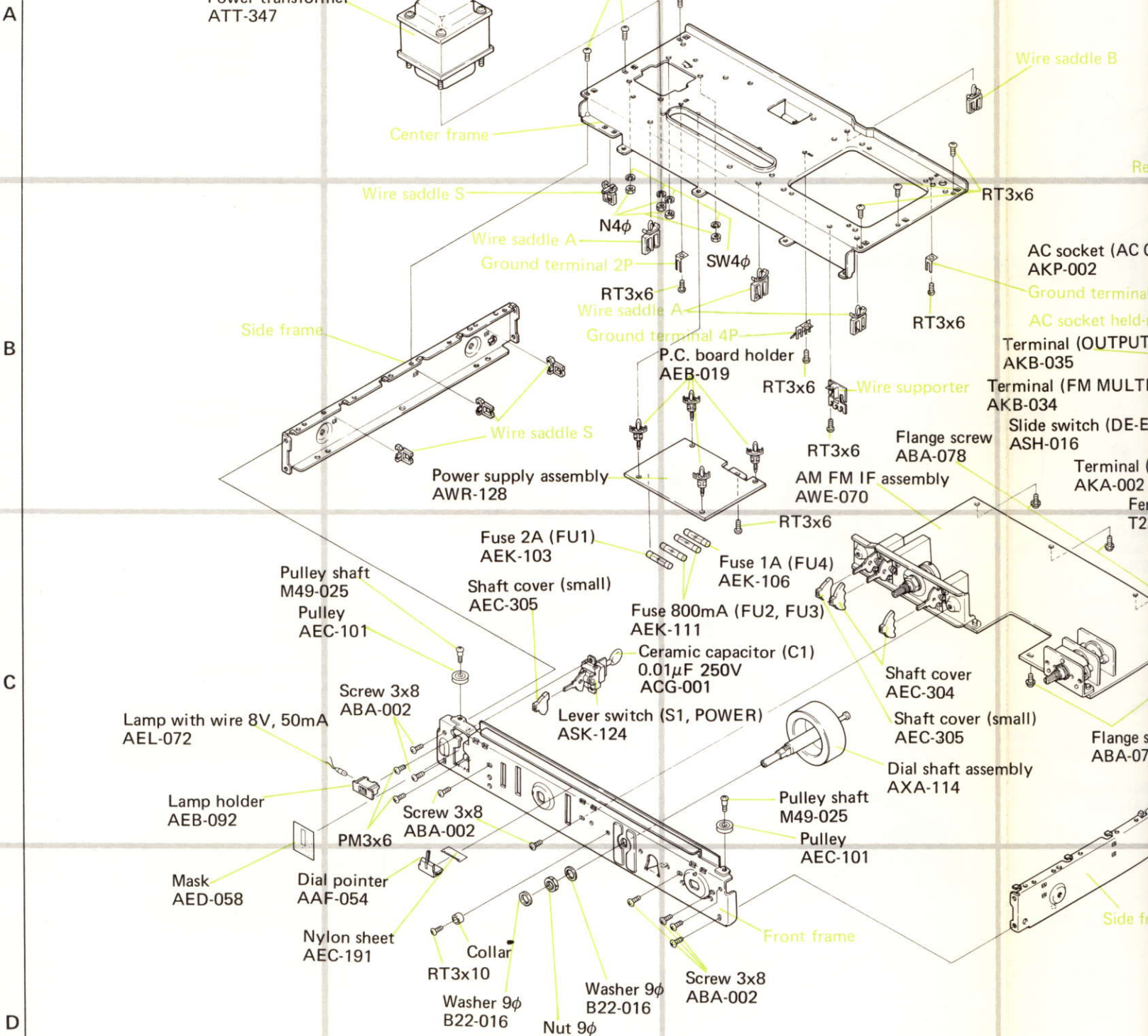
Fig. 20

# 10. EXPLODED VIEWS

## 10.1 TOP SIDE







6

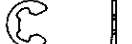
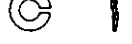
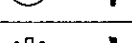
Parts indicated in green type cannot be supplied.



### 10.3 NOMENCLATURE OF SCREWS, WASHERS AND NUTS

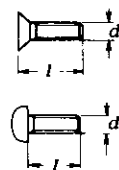
The following symbols stand for screws, washers and nuts as shown in exploded view.

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

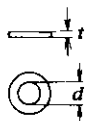
| Symbol | Description                       | Shape                                                                                 |
|--------|-----------------------------------|---------------------------------------------------------------------------------------|
| EW     | E type washer      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

#### EXAMPLE

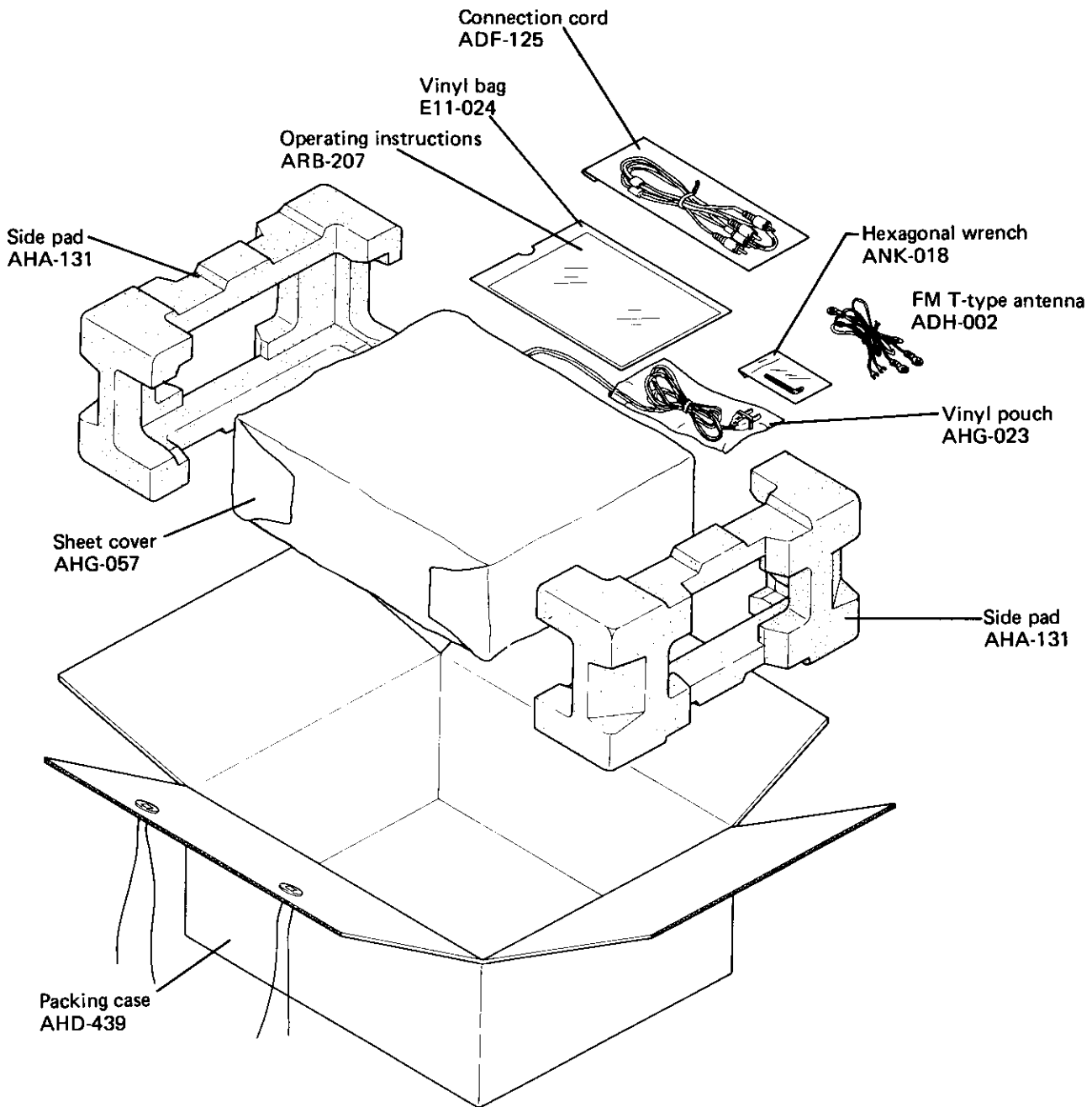
PM • 3x8  
 length in mm (  $l$  )  
 diameter in mm (  $d$  )  
 Symbol



FW • 9φ x 1'  
 thickness in mm (  $t$  )  
 diameter in mm (  $d$  )  
 Symbol

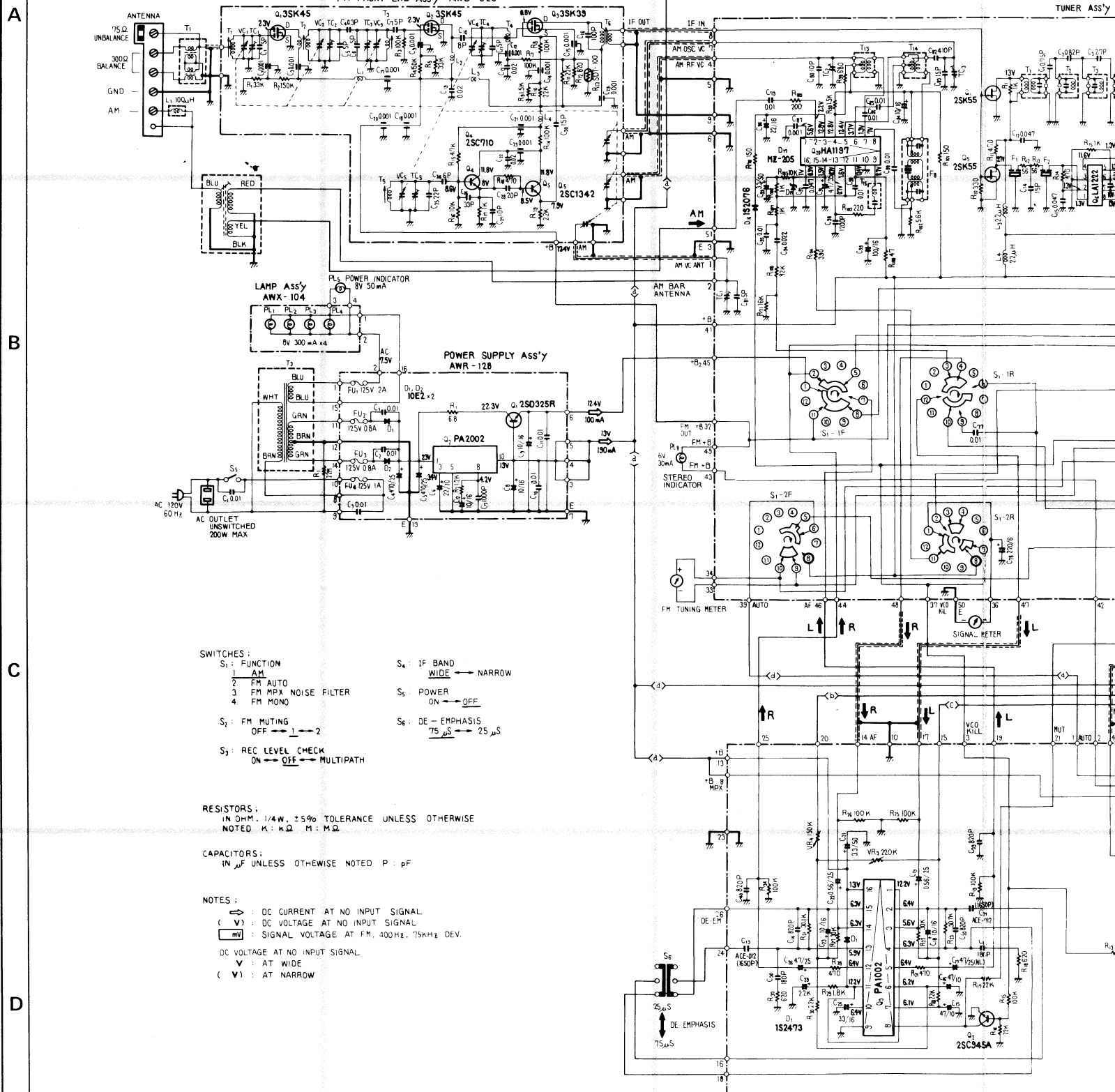


# 11. PACKING



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

## 12.1 SCHEMATIC DIAGRAM AND MISCELLANEOUS PARTS LIST



**f**

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



## Miscellaneous Parts List

### NOTE:

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

## SWITCHES

| Symbol | Description                | Part No. |
|--------|----------------------------|----------|
| S5     | Lever switch (POWER)       | ASK-124  |
| S6     | Slide switch (DE-EMPHASIS) | ASH-016  |

## TRANSFORMERS AND COIL

| Symbol | Description       | Part No. |
|--------|-------------------|----------|
| T1     | Ferrite balun     | T22-025  |
| T2     | Bar antenna       | ATB-507  |
| T3     | Power transformer | ATT-347  |
| L1     | RF choke coil     | T24-030  |

## LAMPS

| Symbol | Description                 | Part No. |
|--------|-----------------------------|----------|
| PL1    | Lamp (Wedge type) 8V, 300mA | AEL-029  |
| PL2    | Lamp (Wedge type) 8V, 300mA | AEL-029  |
| PL3    | Lamp (Wedge type) 8V, 300mA | AEL-029  |
| PL4    | Lamp (Wedge type) 8V, 300mA | AEL-029  |
| PL5    | Lamp with wire 8V, 50mA     | AEL-072  |
| PL6    | Lamp with wire 6V, 30mA     | AEL-080  |
| PL7    | Lamp with wire 6V, 30mA     | AEL-079  |
| PL8    | Lamp with wire 6V, 30mA     | AEL-079  |

## FUSES

| Symbol | Description            | Part No. |
|--------|------------------------|----------|
| FU1    | Fuse 2A (Secondary)    | AEK-103  |
| FU2    | Fuse 800mA (Secondary) | AEL-111  |
| FU3    | Fuse 800mA (Secondary) | AEK-111  |
| FU4    | Fuse 1A (Primary)      | AEK-106  |

## RESISTOR

| Symbol | Description                     | Part No.                 |
|--------|---------------------------------|--------------------------|
| R1     | Carbon film 2.2M $\frac{1}{4}W$ | RD $\frac{1}{2}$ PS 225J |

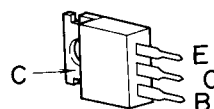
## CAPACITORS

| Symbol | Description       | Part No.      |
|--------|-------------------|---------------|
| C1     | Ceramic 0.01 250V | ACG-001       |
| C2     | Ceramic 0.04 50V  | CKDYF 403Z 50 |

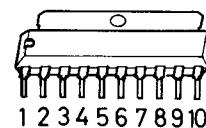
## External Appearances of Transistors

2SD325R

2SD325R



PA2002

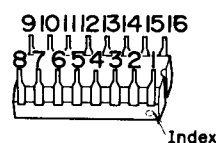


PA1001

PA1002

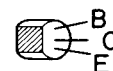
PA3001

HA1197



2SC945

2SA733

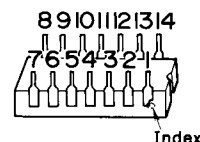


2SK55

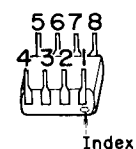


HA1452W

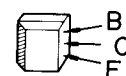
M5109PR



HA1201

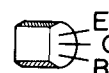


2SC461

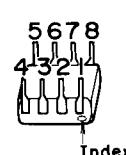


2SA725

2SC1312

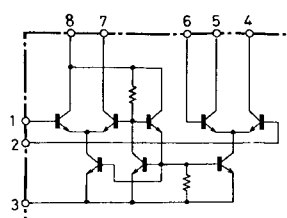


LA1222

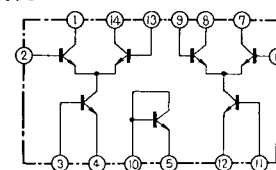


## Circuit Diagrams of ICs

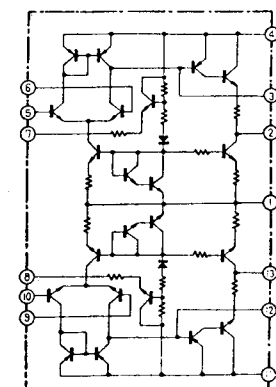
LA1222



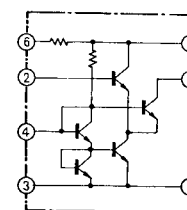
M5109PR



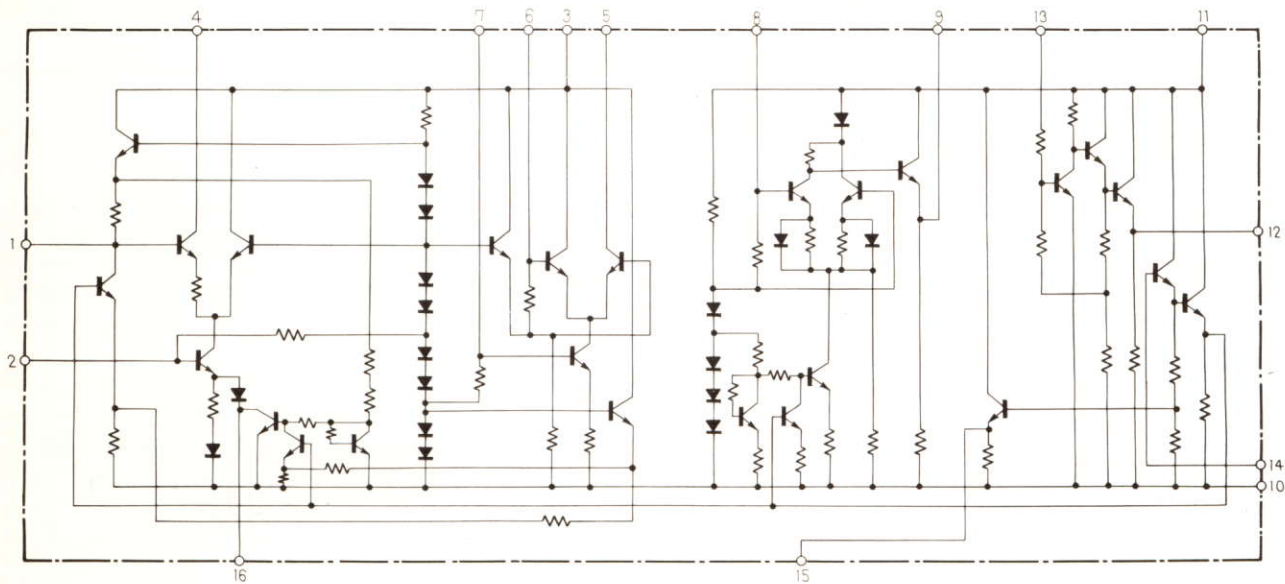
HA1452W



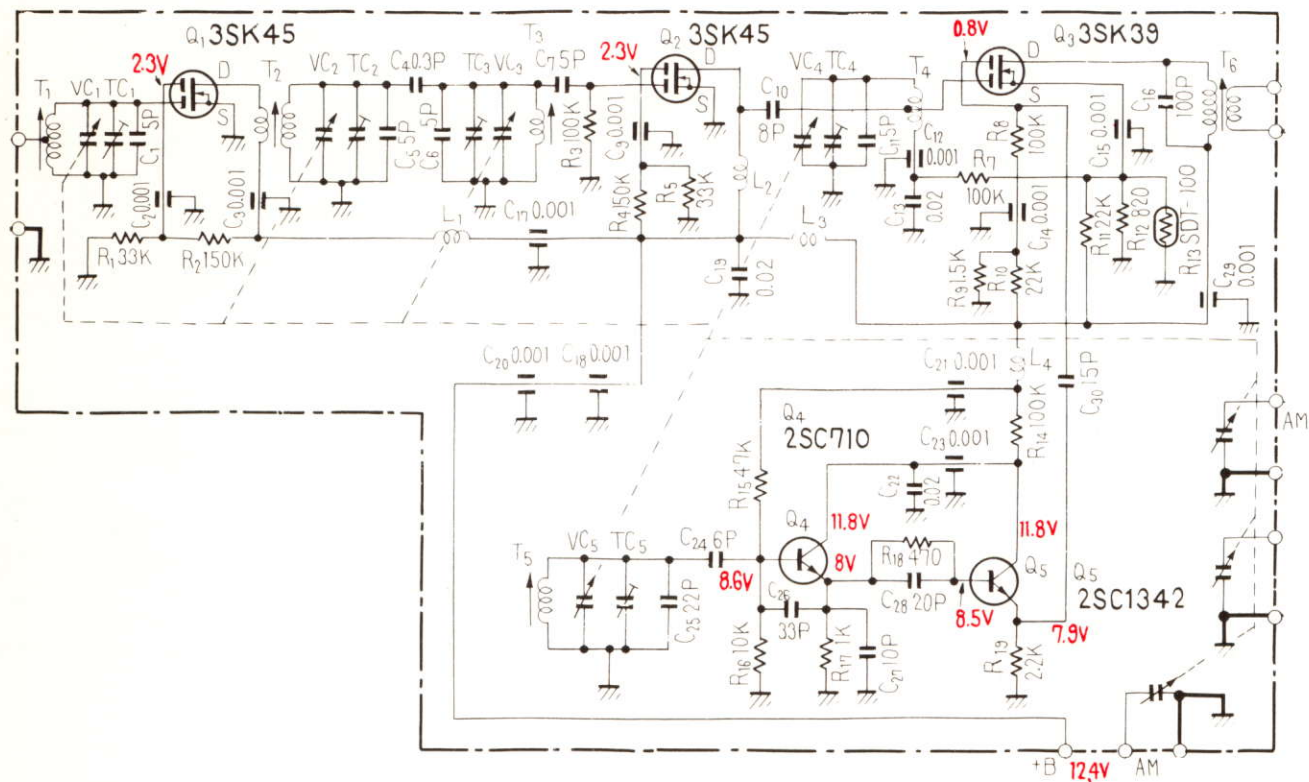
HA1201



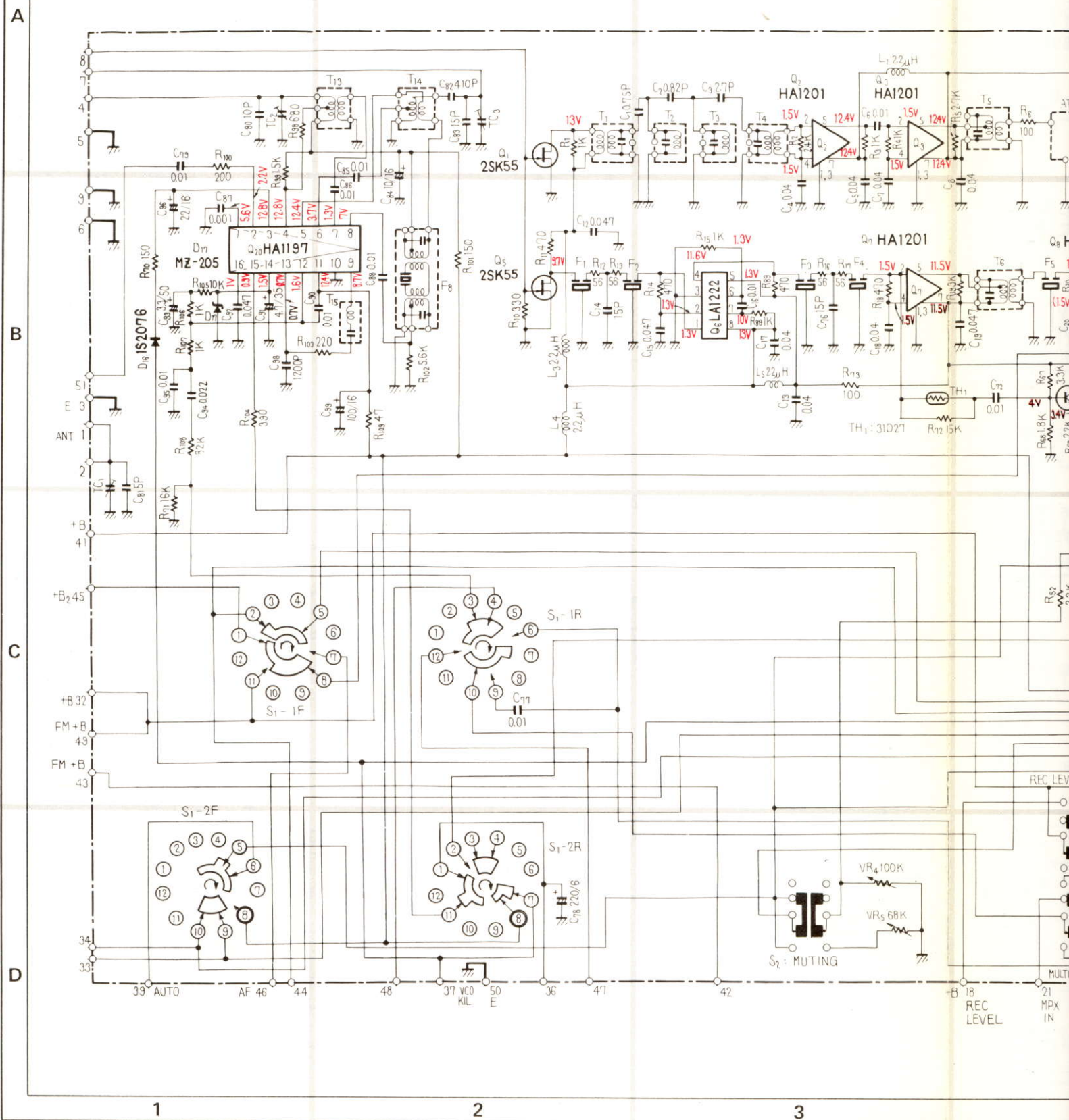
## HA1197 (AM IC)

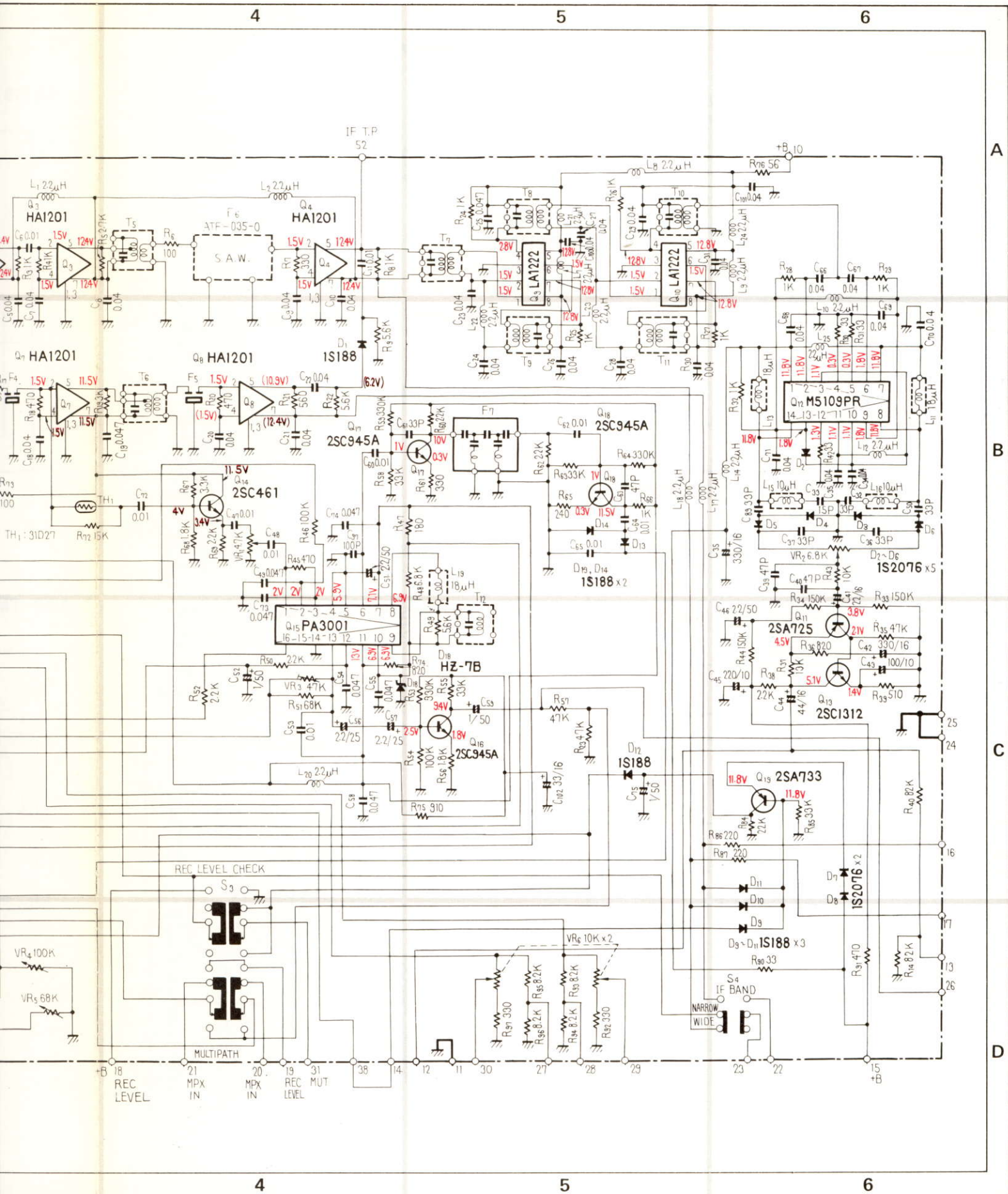


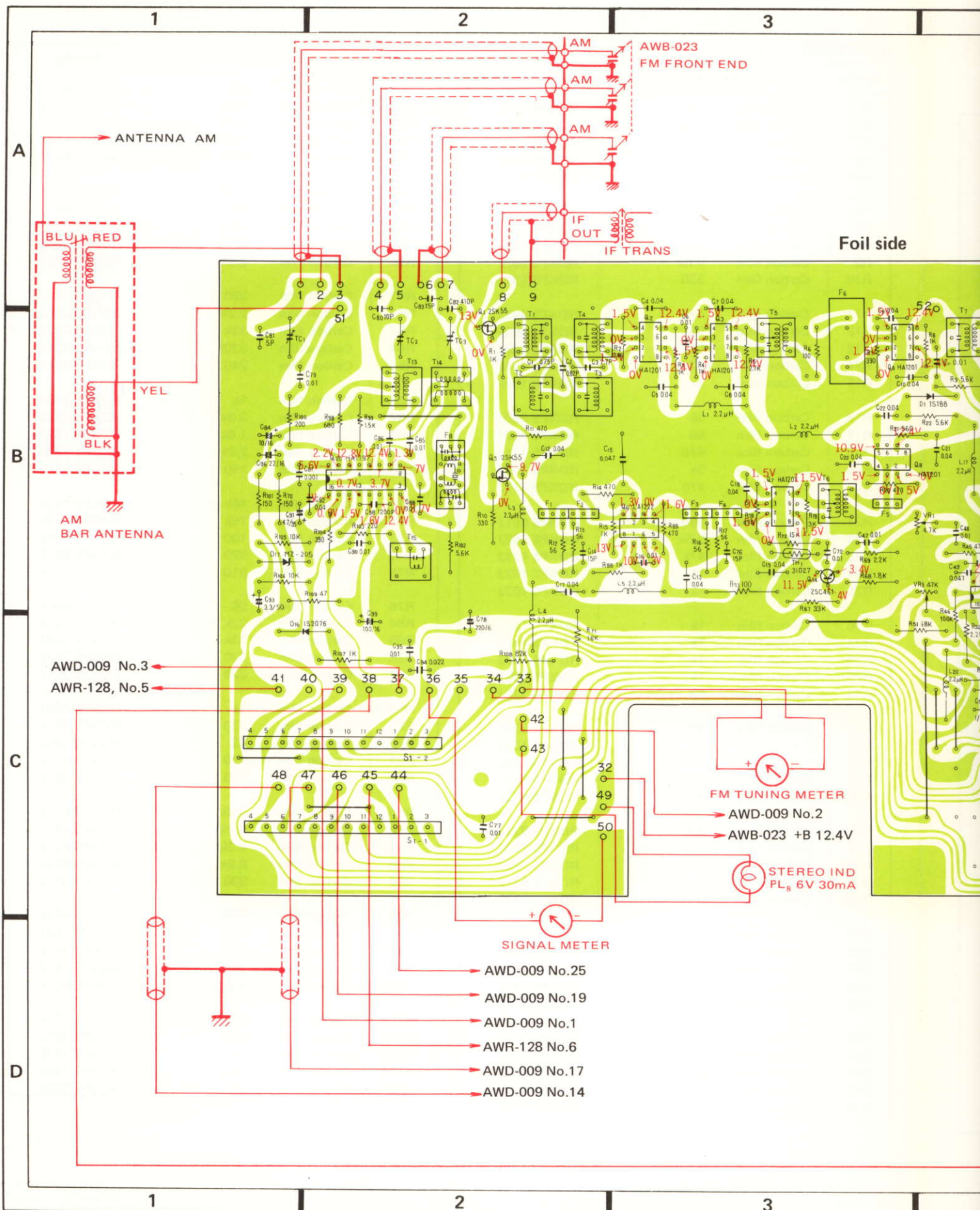
## 12.2 FM FRONT END (AWB-023)



# 12.3 AM FM IF ASSEMBLY (AWE-070)







AWD-009 No.2

## Parts List of AM FM IF Assembly (AWE-070)

### SEMICONDUCTORS

| Symbol | Description | Part No.                   |
|--------|-------------|----------------------------|
| Q1     | FET         | 2SK55-D<br>(2SK19-W or GR) |
| Q2     | IC          | HA1201                     |
| Q3     | IC          | HA1201                     |
| Q4     | IC          | HA1201                     |
| Q5     | FET         | 2SK55-D<br>(2SK19-W or GR) |
| Q6     | IC          | LA1222                     |
| Q7     | IC          | HA1201                     |
| Q8     | IC          | HA1201                     |
| Q9     | IC          | LA1222                     |
| Q10    | IC          | LA1222                     |
| Q11    | Transistor  | 2SA725-G or H              |
| Q12    | IC          | M5109PR                    |
| Q13    | Transistor  | 2SC1312-G or H             |
| Q14    | Transistor  | 2SC461-B, A or C           |
| Q15    | IC          | PA3001                     |
| Q16    | Transistor  | 2SC945A-Q or R             |
| Q17    | Transistor  | 2SC945A-Q or R             |
| Q18    | Transistor  | 2SC945A-Q or R             |
| Q19    | Transistor  | 2SA733-Q or R              |
| Q20    | IC          | HA1197                     |
| D1     | Diode       | 1S188FM-1                  |
| D2     | Diode       | 1S2076<br>(1S2473)         |
| D3     | Diode       | 1S2076<br>(1S2473)         |
| D4     | Diode       | 1S2076<br>(1S2473)         |
| D5     | Diode       | 1S2076<br>(1S2473)         |
| D6     | Diode       | 1S2076<br>(1S2473)         |
| D7     | Diode       | 1S2076<br>(1S2473)         |
| D8     | Diode       | 1S2076<br>(1S2473)         |
| D9     | Diode       | 1S188FM-1                  |
| D10    | Diode       | 1S188FM-1                  |
| D11    | Diode       | 1S188FM-1                  |
| D12    | Diode       | 1S188FM-1                  |
| D13    | Diode       | 1S188FM-1                  |
| D14    | Diode       | 1S188FM-1                  |
| D16    | Diode       | 1S2076<br>(1S2473)         |
| D17    | Zener diode | MZ 205-26A                 |
| D18    | Zener diode | HZ7-B                      |
| TH1    | Thermistor  | 31D27                      |

### TRANSFORMERS, COILS AND FILTERS

| Symbol | Description             | Part No. |
|--------|-------------------------|----------|
| T1     | FM filter coil          | ATE-031  |
| T2     | FM filter coil          | ATE-032  |
| T3     | FM filter coil          | ATE-032  |
| T4     | FM filter coil          | ATE-033  |
| T5     | FM IF transformer       | ATE-034  |
| T6     | FM IF transformer       | ATE-035  |
| T7     | FM IF transformer       | ATE-023  |
| T8     | FM IF transformer       | ATE-023  |
| T9     | FM IF transformer       | ATE-023  |
| T10    | FM IF transformer       | ATE-023  |
| T11    | FM IF transformer       | ATE-023  |
| T12    | FM detector transformer | ATE-027  |
| T13    | AM RF coil              | ATB-052  |
| T14    | AM OSC coil             | ATB-019  |
| T15    | 455kHz filter           | ATF-039  |
| *F1~F6 | FM combination filter   | ATF-041  |
| *F1    | FM ceramic filter       | ATF-040  |
| *F2    | FM ceramic filter       | ATF-040  |
| *F3    | FM ceramic filter       | ATF-040  |
| *F4    | FM ceramic filter       | ATF-040  |
| *F5    | FM ceramic filter       | ATF-040  |
| *F6    | FM SAW filter           | ATF-035  |
| F7     | High pass filter        | ATF-014  |
| F8     | AM ceramic filter       | ATF-034  |
| L1     | RF choke coil 2.2μH     | T24-028  |
| L2     | RF choke coil 2.2μH     | T24-028  |
| L3     | RF choke coil 2.2μH     | T24-028  |
| L4     | RF choke coil 2.2μH     | T24-028  |
| L5     | RF choke coil 2.2μH     | T24-028  |
| L7     | RF choke coil 2.2μH     | T24-028  |
| L8     | RF choke coil 2.2μH     | T24-028  |
| L9     | RF choke coil 2.2μH     | T24-028  |
| L10    | RF choke coil 2.2μH     | T24-028  |
| L11    | RF choke coil 18μH      | ATH-007  |
| L12    | RF choke coil 2.2μH     | T24-028  |
| L13    | RF choke coil 18μH      | ATH-007  |
| L14    | RF choke coil 2.2μH     | T24-028  |
| L15    | RF choke coil 10μH      | ATH-010  |
| L16    | RF choke coil 10μH      | ATH-010  |
| L17    | RF choke coil 2.2μH     | T24-028  |
| L18    | RF choke coil 2.2μH     | T24-028  |
| L19    | RF choke coil 18μH      | ATH-007  |
| L20    | RF choke coil 2.2μH     | T24-028  |
| L21    | RF choke coil 2.2μH     | T24-028  |
| L22    | RF choke coil 2.2μH     | T24-028  |
| L23    | RF choke coil 2.2μH     | T24-028  |
| L24    | RF choke coil 2.2μH     | T24-028  |
| L25    | RF choke coil 2.2μH     | T24-028  |

# RESISTORS

| Symbol | Description      | Part No.   |
|--------|------------------|------------|
| R1     | Carbon film 1k   | RD%PS 102J |
| R2     | Carbon film 2.4k | RD%PS 242J |
| R3     | Carbon film 1k   | RD%PS 102J |
| R4     | Carbon film 1k   | RD%PS 102J |
| R5     | Carbon film 2.7k | RD%PS 272J |
| R6     | Carbon film 100  | RD%PS 101J |
| R7     | Carbon film 330  | RD%PS 331J |
| R8     | Carbon film 1k   | RD%PS 102J |
| R9     | Carbon film 5.6k | RD%PS 562J |
| R10    | Carbon film 330  | RD%PS 331J |
| R11    | Carbon film 470  | RD%PS 471J |
| R12    | Carbon film 56   | RD%PS 560J |
| R13    | Carbon film 56   | RD%PS 560J |
| R14    | Carbon film 470  | RD%PS 471J |
| R15    | Carbon film 1k   | RD%PS 102J |
| R16    | Carbon film 56   | RD%PS 560J |
| R17    | Carbon film 56   | RD%PS 560J |
| R18    | Carbon film 470  | RD%PS 471J |
| R19    | Carbon film 3k   | RD%PS 302J |
| R20    | Carbon film 470  | RD%PS 471J |
| R21    | Carbon film 560  | RD%PS 561J |
| R22    | Carbon film 5.6k | RD%PS 562J |
| R23    | Carbon film 47k  | RD%PS 473J |
| R24    | Carbon film 1k   | RD%PS 102J |
| R25    | Carbon film 1k   | RD%PS 102J |
| R26    | Carbon film 1k   | RD%PS 102J |
| R27    | Carbon film 1k   | RD%PS 102J |
| R28    | Carbon film 1k   | RD%PS 102J |
| R29    | Carbon film 1k   | RD%PS 102J |
| R30    | Carbon film 33   | RD%PS 330J |
| R31    | Carbon film 33   | RD%PS 330J |
| R32    | Carbon film 1k   | RD%PS 102J |
| R33    | Carbon film 150k | RD%PS 154J |
| R34    | Carbon film 150k | RD%PS 154J |
| R35    | Carbon film 47k  | RD%PS 473J |
| R36    | Carbon film 820  | RD%PS 821J |
| R37    | Carbon film 13k  | RD%PS 133J |
| R38    | Carbon film 2.2k | RD%PS 222J |
| R39    | Carbon film 510  | RD%PS 511J |
| R40    | Carbon film 8.2k | RD%PS 822J |
| R41    | Carbon film 82k  | RD%PS 823J |
| R42    | Carbon film 33   | RD%PS 330J |
| R43    | Carbon film 10k  | RD%PS 103J |
| R44    | Carbon film 150k | RD%PS 154J |
| R45    | Carbon film 470  | RD%PS 471J |
| R46    | Carbon film 100k | RD%PS 104J |
| R47    | Carbon film 180  | RD%PS 181J |
| R48    | Carbon film 6.8k | RD%PS 682J |
| R49    | Carbon film 5.6k | RD%PS 562J |
| R50    | Carbon film 2.2k | RD%PS 222J |

| Symbol | Description      | Part No.   |
|--------|------------------|------------|
| R51    | Carbon film 68k  | RD%PS 683J |
| R52    | Carbon film 2.2k | RD%PS 222J |
| R53    | Carbon film 330k | RD%PS 334J |
| R54    | Carbon film 100k | RD%PS 104J |
| R55    | Carbon film 3.3k | RD%PS 332J |
| R56    | Carbon film 1.8k | RD%PS 182J |
| R57    | Carbon film 47k  | RD%PS 473J |
| R58    | Carbon film 33k  | RD%PS 333J |
| R59    | Carbon film 330k | RD%PS 334J |
| R60    | Carbon film 2.2k | RD%PS 222J |
| R61    | Carbon film 330  | RD%PS 331J |
| R62    | Carbon film 2.2k | RD%PS 222J |
| R63    | Carbon film 33k  | RD%PS 333J |
| R64    | Carbon film 330k | RD%PS 334J |
| R65    | Carbon film 240  | RD%PS 241J |
| R66    | Carbon film 1k   | RD%PS 102J |
| R67    | Carbon film 3.3k | RD%PS 332J |
| R68    | Carbon film 1.8k | RD%PS 182J |
| R69    | Carbon film 2.2k | RD%PS 222J |
| R70    | Carbon film 150  | RD%PS 151J |
| R71    | Carbon film 16k  | RD%PS 163J |
| R72    | Carbon film 15k  | RD%PS 153J |
| R73    | Carbon film 100  | RD%PS 101J |
| R74    | Carbon film 820  | RD%PS 821J |
| R75    | Carbon film 910  | RD%PS 911J |
| R76    | Carbon film 56   | RD%PS 560J |
| R84    | Carbon film 22k  | RD%PS 223J |
| R85    | Carbon film 33k  | RD%PS 333J |
| R86    | Carbon film 220  | RD%PS 221J |
| R87    | Carbon film 220  | RD%PS 221J |
| R88    | Carbon film 1k   | RD%PS 102J |
| R89    | Carbon film 470  | RD%PS 471J |
| R90    | Carbon film 33   | RD%PS 330J |
| R91    | Carbon film 470  | RD%PS 471J |
| R92    | Carbon film 330  | RD%PS 331J |
| R93    | Carbon film 8.2k | RD%PS 822J |
| R94    | Carbon film 8.2k | RD%PS 822J |
| R95    | Carbon film 8.2k | RD%PS 822J |
| R96    | Carbon film 8.2k | RD%PS 822J |
| R97    | Carbon film 330  | RD%PS 331J |
| R98    | Carbon film 680  | RD%PS 681J |
| R99    | Carbon film 1.5k | RD%PS 152J |
| R100   | Carbon film 200  | RD%PS 201J |
| R101   | Carbon film 150  | RD%PS 151J |
| R102   | Carbon film 5.6k | TD%PS 562J |
| R103   | Carbon film 220  | RD%PS 221J |
| R104   | Carbon film 390  | RD%PS 391J |
| R105   | Carbon film 10k  | RD%PS 103J |
| R106   | Carbon film 10k  | RD%PS 103J |
| R107   | Carbon film 1k   | RD%PS 102J |

| Symbol | Description       |      |  | Part No.   |
|--------|-------------------|------|--|------------|
| R108   | Carbon film       | 82k  |  | RD4PS 823J |
| R109   | Carbon film       | 47   |  | RD4PS 470J |
| VR1    | Semi-fixed        | 4.7k |  | C92-051    |
| VR2    | Semi-fixed        | 6.8k |  | ACP-023    |
| VR3    | Semi-fixed        | 47k  |  | C92-048    |
| VR4    | Semi-fixed        | 100k |  | C92-047    |
| VR5    | Semi-fixed        | 68k  |  | ACP-002    |
| VR6    | Variable resistor | 10k  |  | ACV-178    |
|        | (OUTPUT LEVEL)    |      |  |            |

## CAPACITORS

| Symbol | Description  |       |      |  | Part No.      |
|--------|--------------|-------|------|--|---------------|
| C1     | Ceramic      | 0.75p | 500V |  | CGB R75J 500  |
| C2     | Ceramic      | 0.82p | 500V |  | CGB R82J 500  |
| C3     | Ceramic      | 2.7p  | 500V |  | CGB 2R7J 500  |
| C4     | Ceramic      | 0.04  | 25V  |  | CKDYF 403Z 25 |
| C5     | Ceramic      | 0.04  | 25V  |  | CKDYF 403Z 25 |
| C6     | Ceramic      | 0.01  | 50V  |  | CKDYF 103Z 50 |
| C7     | Ceramic      | 0.04  | 50V  |  | CKDYF 403Z 50 |
| C8     | Ceramic      | 0.04  | 50V  |  | CKDYF 403Z 50 |
| C9     | Ceramic      | 0.04  | 50V  |  | CKDYF 403Z 50 |
| C10    | Ceramic      | 0.04  | 50V  |  | CKDYF 403Z 50 |
| C11    | Ceramic      | 0.01  | 50V  |  | CKDYF 103Z 50 |
| C12    | Ceramic      | 0.047 | 25V  |  | CKDBC 473Z 25 |
| C13    | Ceramic      | 0.04  | 50V  |  | CKDYF 403Z 50 |
| C14    | Ceramic      | 15p   | 50V  |  | CCDSL 150K 50 |
| C15    | Ceramic      | 0.047 | 25V  |  | CKDBC 473Z 25 |
| C16    | Ceramic      | 0.01  | 50V  |  | CKDYF 103Z 50 |
| C17    | Ceramic      | 0.04  | 50V  |  | CKDYF 403Z 50 |
| C18    | Ceramic      | 0.04  | 50V  |  | CKDYF 403Z 50 |
| C19    | Ceramic      | 0.047 | 25V  |  | CKDBC 473Z 25 |
| C20    | Ceramic      | 0.04  | 50V  |  | CKDYF 403Z 50 |
| C21    | Ceramic      | 0.04  | 50V  |  | CKDYF 403Z 50 |
| C22    | Ceramic      | 0.04  | 50V  |  | CKDYF 403Z 50 |
| C23    | Ceramic      | 0.04  | 50V  |  | CKDYF 403Z 50 |
| C24    | Ceramic      | 0.04  | 50V  |  | CKDYF 403Z 50 |
| C25    | Ceramic      | 0.04  | 50V  |  | CKDYF 403Z 50 |
| C26    | Ceramic      | 0.04  | 50V  |  | CKDYF 403Z 50 |
| C27    | Ceramic      | 0.04  | 50V  |  | CKDYF 403Z 50 |
| C28    | Ceramic      | 0.04  | 50V  |  | CKDYF 403Z 50 |
| C29    | Ceramic      | 0.04  | 50V  |  | CKDYF 403Z 50 |
| C30    | Ceramic      | 0.04  | 50V  |  | CKDYF 403Z 50 |
| C31    | Ceramic      | 0.04  | 50V  |  | CKDYF 403Z 50 |
| C32    | Ceramic      | 33    | 50V  |  | CCDCH 330J 50 |
| C33    | Ceramic      | 15    | 50V  |  | CCDCH 150J 50 |
| C34    | Ceramic      | 0.04  | 50V  |  | CKDYF 403Z 50 |
| C35    | Ceramic      | 0.04  | 50V  |  | CKDYF 403Z 50 |
| C36    | Ceramic      | 33p   | 50V  |  | CCDSL 330K 50 |
| C37    | Ceramic      | 33p   | 50V  |  | CCDSL 330K 50 |
| C38    | Electrolytic | 330   | 16V  |  | CEA 331P 16   |

| Symbol | Description  |       |     |  | Part No.      |
|--------|--------------|-------|-----|--|---------------|
| C39    | Ceramic      | 47p   | 50V |  | CCDSL 470K 50 |
| C40    | Ceramic      | 47p   | 50V |  | CCDSL 470K 50 |
| C41    | Electrolytic | 22    | 16V |  | CEANL 220P 16 |
| C42    | Electrolytic | 330   | 16V |  | CEA 331P 16   |
| C43    | Electrolytic | 100   | 10V |  | CEA 101P 10   |
| C44    | Electrolytic | 47    | 16V |  | CEANL 470P 16 |
| C45    | Electrolytic | 220   | 16V |  | CEA 221P 16   |
| C46    | Electrolytic | 2.2   | 50V |  | CEA 2R2P 50   |
| C47    | Ceramic      | 0.01  | 50V |  | CKDYF 103Z 50 |
| C48    | Ceramic      | 0.01  | 50V |  | CKDYF 103Z 50 |
| C49    | Ceramic      | 0.047 | 25V |  | CKDBC 473Z 25 |
| C50    | Ceramic      | 33p   | 50V |  | CCDSL 330K 50 |
| C51    | Electrolytic | 2.2   | 50V |  | CEA 2R2P 50   |
| C52    | Electrolytic | 1     | 50V |  | CEA 010P 50   |
| C53    | Ceramic      | 0.01  | 50V |  | CKDYF 103Z 50 |
| C54    | Ceramic      | 0.047 | 25V |  | CKDBC 473Z 25 |
| C55    | Ceramic      | 0.047 | 50V |  | CKDBC 473Z 25 |
| C56    | Electrolytic | 2.2   | 50V |  | CEA 2R2P 50   |
| C57    | Electrolytic | 2.2   | 50V |  | CEA 2R2P 50   |
| C58    | Ceramic      | 0.047 | 25V |  | CKDBC 473Z 25 |
| C59    | Electrolytic | 1     | 50V |  | CEA 010P 50   |
| C60    | Ceramic      | 0.01  | 50V |  | CKDYF 103Z 50 |
| C61    | Ceramic      | 33p   | 50V |  | CCDSL 330K 50 |
| C62    | Ceramic      | 0.01  | 50V |  | CKDYF 103Z 50 |
| C63    | Ceramic      | 47p   | 50V |  | CCDSL 470K 50 |
| C64    | Ceramic      | 0.01  | 50V |  | CKDYF 103Z 50 |
| C65    | Ceramic      | 0.01  | 50V |  | CKDYF 103Z 50 |
| C66    | Ceramic      | 0.04  | 50V |  | CKDYF 403Z 50 |
| C67    | Ceramic      | 0.04  | 50V |  | CKDYF 403Z 50 |
| C68    | Ceramic      | 0.04  | 50V |  | CKDYF 403Z 50 |
| C69    | Ceramic      | 0.04  | 50V |  | CKDYF 403Z 50 |
| C70    | Ceramic      | 0.04  | 50V |  | CKDYF 403Z 50 |
| C71    | Ceramic      | 0.04  | 50V |  | CKDYF 403Z 50 |
| C72    | Ceramic      | 0.01  | 50V |  | CKDYF 103Z 50 |
| C73    | Ceramic      | 0.047 | 25V |  | CKDBC 473Z 25 |
| C74    | Ceramic      | 0.047 | 25V |  | CKDBC 473Z 25 |
| C75    | Electrolytic | 1     | 50V |  | CEA 010P 50   |
| C76    | Ceramic      | 15p   | 50V |  | CCDSL 150K 50 |
| C77    | Mylar        | 0.01  | 50V |  | CQMA 103J 50  |
| C78    | Electrolytic | 220   | 6V  |  | CEA 221P 6    |
| C79    | Ceramic      | 0.01  | 50V |  | CKDYF 103Z 50 |
| C80    | Ceramic      | 10    | 50V |  | CCDSH 100F 50 |
| C81    | Ceramic      | 5p    | 50V |  | CCDSH 050D 50 |
| C82    | Polystyrene  | 410p  | 50V |  | CQSA 411J 50  |
| C83    | Ceramic      | 15p   | 50V |  | CCDWK 150K 50 |
| C84    | Electrolytic | 10    | 16V |  | CEA 100P 16   |
| C85    | Ceramic      | 0.01  | 50V |  | CKDYF 103Z 50 |
| C86    | Ceramic      | 0.01  | 50V |  | CKDYF 103Z 50 |
| C87    | Ceramic      | 0.001 | 50V |  | CKDYF 102Z 50 |
| C88    | Ceramic      | 0.01  | 50V |  | CKDYF 103Z 50 |
| C89    | Ceramic      | 33p   | 50V |  | CCDSL 330K 50 |
| C90    | Ceramic      | 0.01  | 50V |  | CKDYF 103Z 50 |

| Symbol | Description  |        |     | Part No.             |
|--------|--------------|--------|-----|----------------------|
| C91    | Electrolytic | 4.7    | 35V | CEA 4R7P 35          |
| C92    | Ceramic      | 0.047  | 25V | CKDBC 473Z 25        |
| C93    | Electrolytic | 3.3    | 50V | CEA 3R3P 50          |
| C94    | Mylar        | 0.022  | 50V | CQMA 223J 50         |
| C95    | Mylar        | 0.01   | 50V | CQMA 103J 50         |
| C96    | Electrolytic | 22     | 16V | CEA 220P 16          |
| C97    | Ceramic      | 100p   | 50V | CCDSL 101K 50        |
| C98    | Ceramic      | 0.0012 | 50V | CKDYB 122K 50        |
| C99    | Electrolytic | 100    | 16V | CEA 101P 16          |
| C100   | Ceramic      | 0.04   | 50V | CKDYF 403Z 50        |
| C101   | Ceramic      | 0.04   | 50V | CKDYF 403Z 50        |
| C102   | Electrolytic | 33     | 16V | CEA 330P 16          |
| TC1    | Film trimmer |        |     | ACM-008<br>(ACH-002) |
| TC2    | Film trimmer |        |     | ACM-008<br>(ACH-002) |
| TC3    | Film trimmer |        |     | ACM-008<br>(ACH-002) |

## SWITCHES

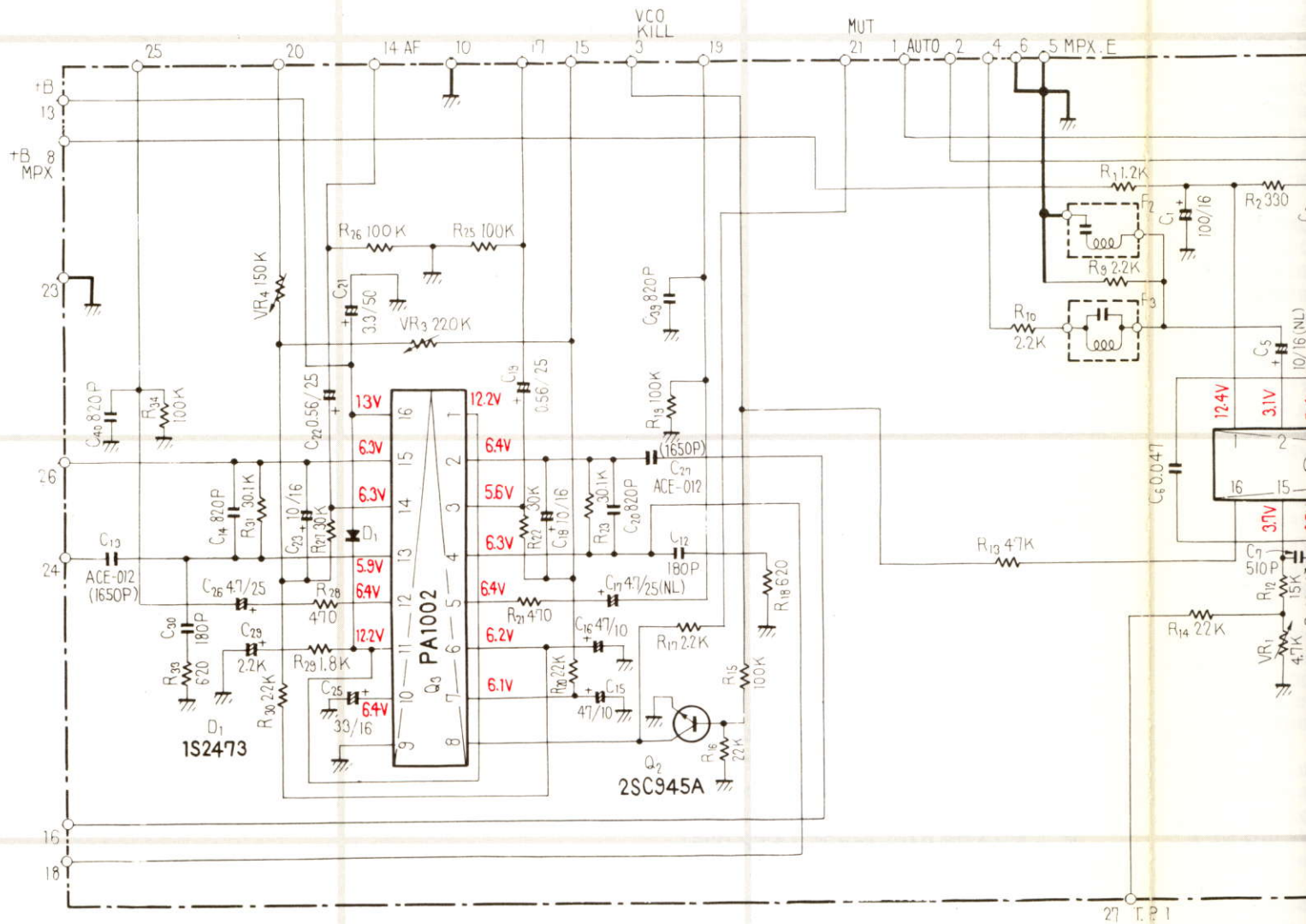
| Symbol | Description              | Part No. |
|--------|--------------------------|----------|
| S1     | Rotary switch (FUNCTION) | ASD-063  |
| S2     | Lever switch (FM MUTING) | ASK-111  |
| S3     | Lever switch (MODE)      | ASK-113  |
| S4     | Lever switch (IF BAND)   | ASK-109  |

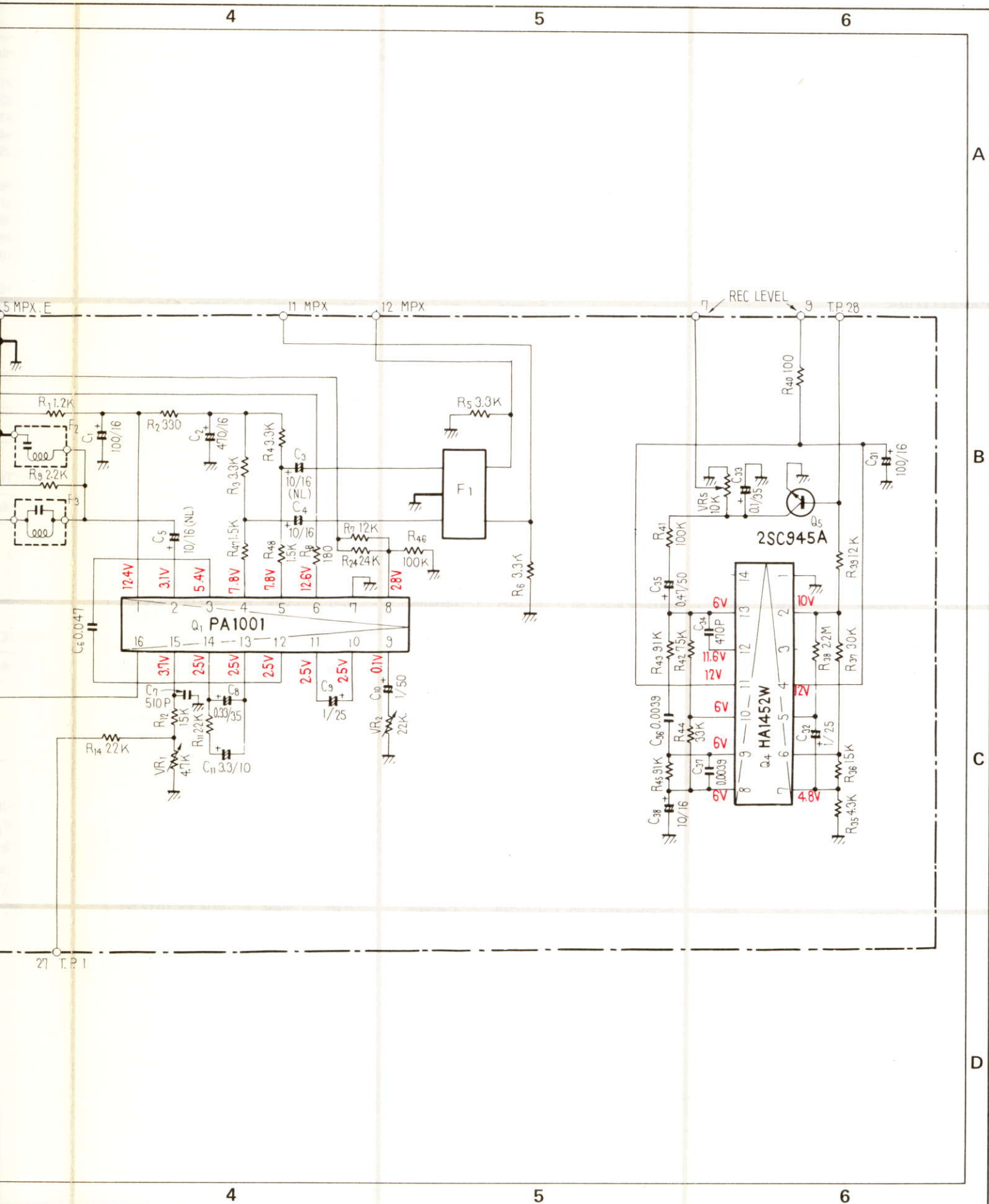
## OTHERS

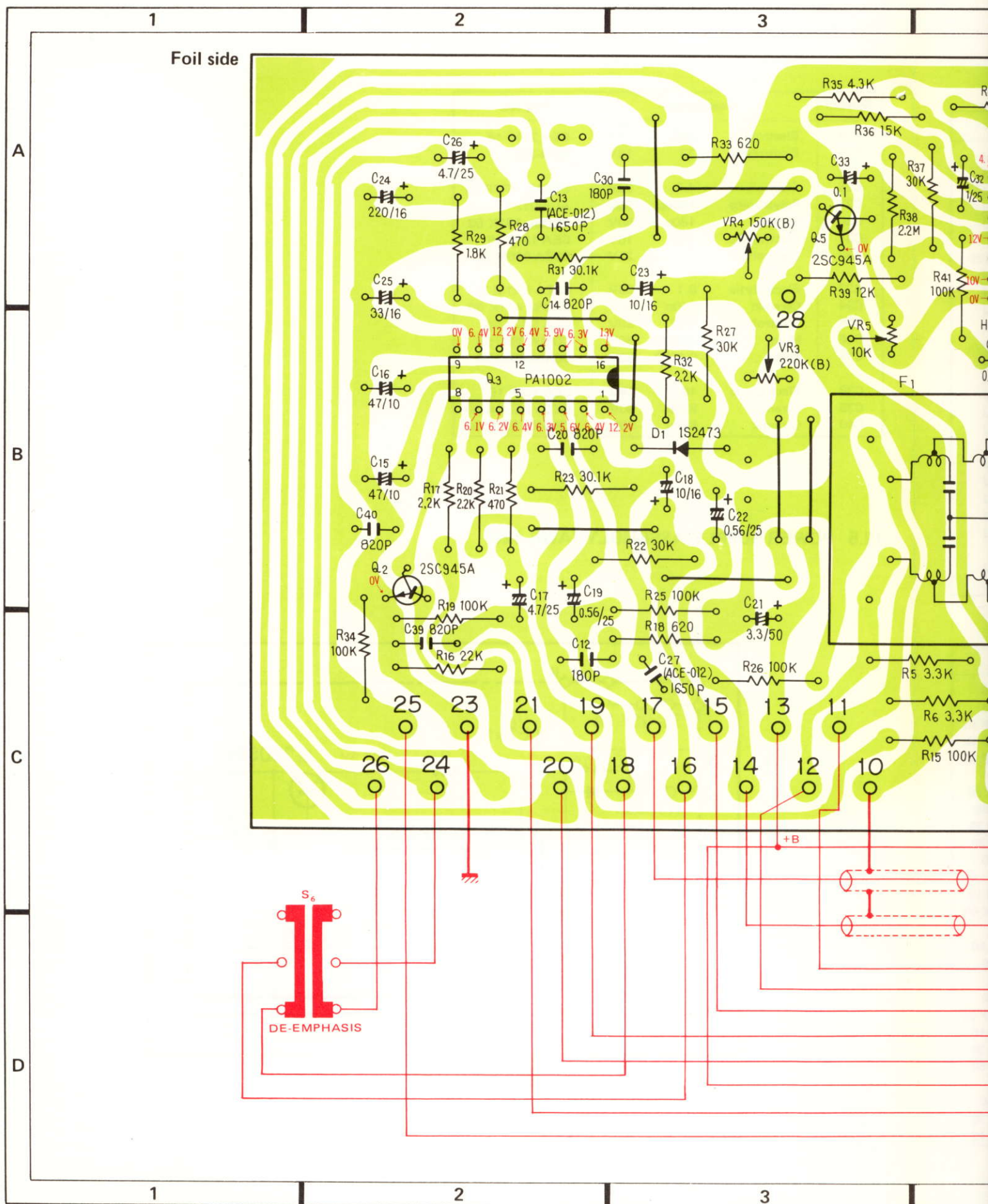
| Symbol | Description  | Part No. |
|--------|--------------|----------|
|        | Flange screw | ABA-078  |
|        | Screw 3x6    | ABA-116  |
|        | Nut          | ABN-027  |
|        | Nut          | ABN-026  |

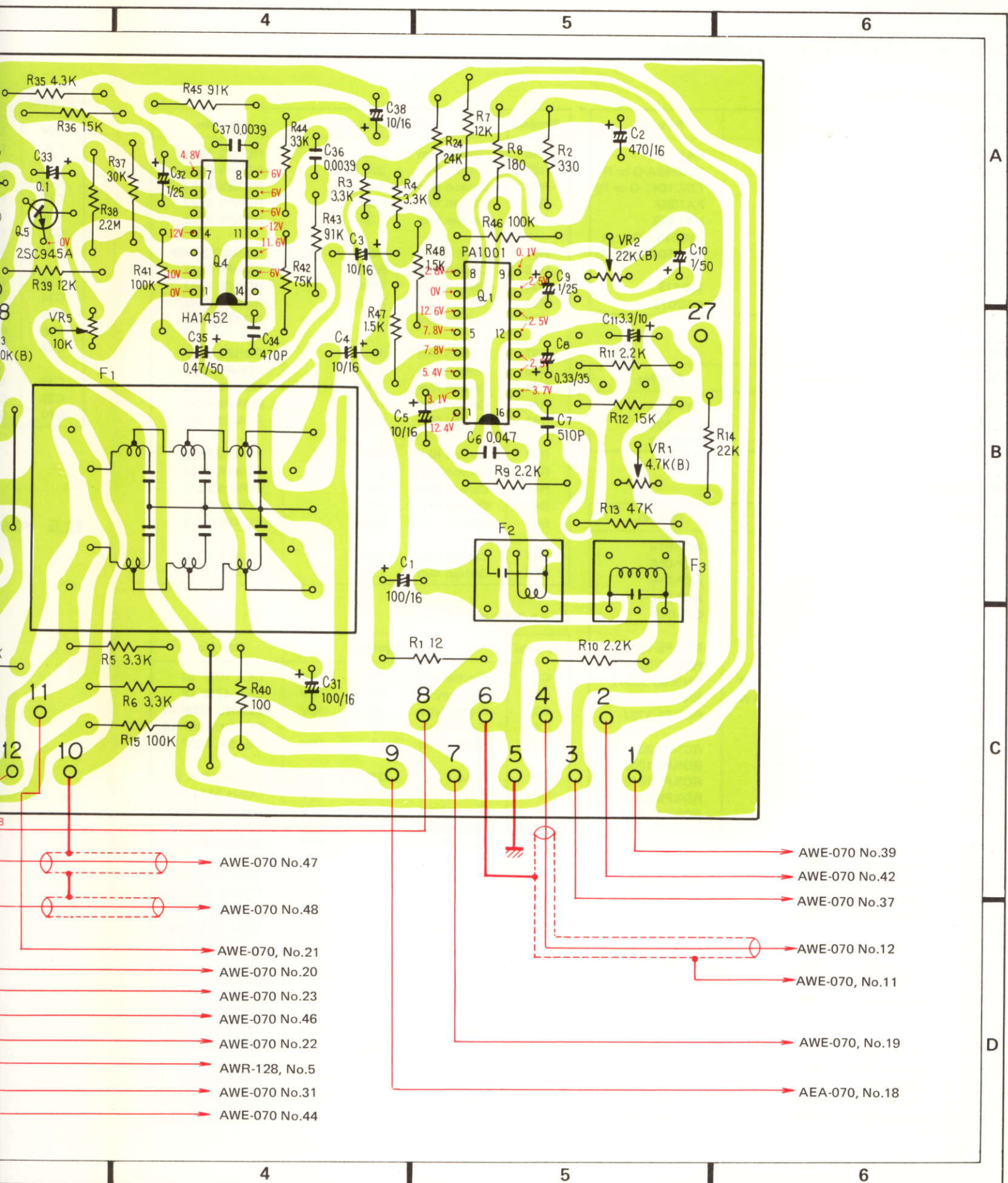
\* Within the same assembly, use FM ceramic filters ( $F_1 - F_5$ ) and SAW filters with identical ranks. The ranks are indicated in red, blue, orange, black, and white. The FM combination filter (ATF-041) is a combination of identically ranked  $F_1 - F_5$  (ATF-040) and  $F_6$  (ATF-035).

# 12.4 MPX AF ASSEMBLY (AWD-009)









## Parts List of MPX AF Assembly (AWD-009)

### SEMICONDUCTORS

| Symbol | Description | Part No.                           |
|--------|-------------|------------------------------------|
| Q1     | IC          | PA1001                             |
| Q2     | Transistor  | 2SC945A-Q or R<br>(2SC1647-Q or R) |
| Q3     | IC          | PA1002                             |
| Q4     | IC          | HA1452                             |
| Q5     | Transistor  | 2SC945A-Q or R<br>(2SC1647-Q or R) |
| D1     | Diode       | 1S2473<br>(1S2076)                 |

### FILTERS

| Symbol | Description       | Part No. |
|--------|-------------------|----------|
| F1     | Low pass filter   | ATF-028  |
| F2     | Anti-birdy filter | ATF-024  |
| F3     | Anti-birdy filter | ATF-023  |

### RESISTORS

| Symbol | Description                     | Part No.      |
|--------|---------------------------------|---------------|
| VR1    | Semi-fixed (4.7k)               | ACP-018       |
| VR2    | Semi-fixed (22k)                | ACP-056       |
| VR3    | Semi-fixed (220k)               | ACP-016       |
| VR4    | Semi-fixed (150k)               | ACP-057       |
| VR5    | Semi-fixed (10k)                | C92-049       |
| R1     | Carbon film 12                  | RD4PS 120J    |
| R2     | Carbon film 330                 | RD4PS 331J    |
| R3     | Metal film 3.3k $\frac{1}{2}W$  | RN1/2SQ 3301F |
| R4     | Metal film 3.3k $\frac{1}{2}W$  | RN1/2SQ 3301F |
| R5     | Carbon film 3.3k                | RD4PS 332J    |
| R6     | Carbon film 3.3k                | RD4PS 332J    |
| R7     | Carbon film 12k                 | RD4PS 123J    |
| R8     | Carbon film 180                 | RD4PS 181J    |
| R9     | Carbon film 2.2k                | RD4PS 222J    |
| R10    | Carbon film 2.2k                | RD4PS 222J    |
| R11    | Carbon film 2.2k                | RD4PS 222J    |
| R12    | Carbon film 15k                 | RD4PS 153J    |
| R13    | Carbon film 47k                 | RD4PS 473J    |
| R14    | Carbon film 22k                 | RD4PS 223J    |
| R15    | Carbon film 100k                | RD4PS 104J    |
| R16    | Carbon film 22k                 | RD4PS 223J    |
| R17    | Carbon film 2.2k                | RD4PS 222J    |
| R18    | Carbon film 620                 | RD4PS 621J    |
| R19    | Carbon film 100k                | RD4PS 104J    |
| R20    | Carbon film 2.2k                | RD4PS 222J    |
| R21    | Carbon film 470                 | RD4PS 471J    |
| R22    | Carbon film 30k                 | RD4PS 303J    |
| R23    | Metal film 30.1k $\frac{1}{2}W$ | RN1/2SQ 3012F |
| R24    | Carbon film 24k                 | RD4PS 243J    |
| R25    | Carbon film 100k                | RD4PS 104J    |

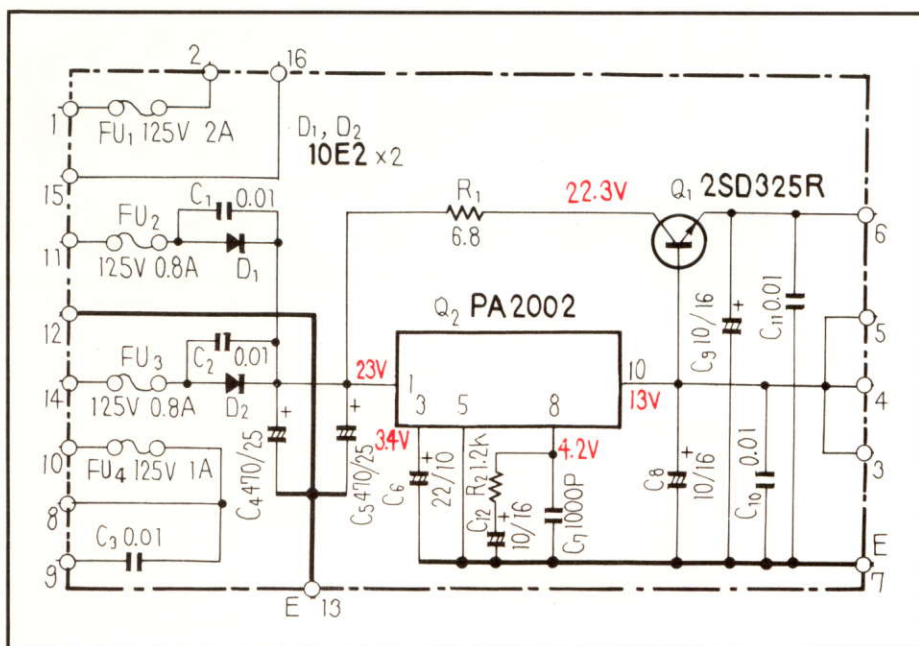
| Symbol | Description                     | Part No.      |
|--------|---------------------------------|---------------|
| R26    | Carbon film 100k                | RD4PS 104J    |
| R27    | Carbon film 30k                 | RD4PS 303J    |
| R28    | Carbon film 470                 | RD4PS 471J    |
| R29    | Carbon film 1.8k                | RD4PS 182J    |
| R30    | Carbon film 2.2k                | RD4PS 222J    |
| R31    | Metal film 30.1k $\frac{1}{2}W$ | RN1/2SQ 3012F |
| R33    | Carbon film 620                 | RD4PS 621J    |
| R34    | Carbon film 100k                | RD4PS 104J    |
| R35    | Carbon film 4.3k                | RD4PS 432J    |
| R36    | Carbon film 15k                 | RD4PS 153J    |
| R37    | Carbon film 30k                 | RD4PS 303J    |
| R38    | Carbon film 2.2M                | RD4PS 225J    |
| R39    | Carbon film 12k                 | RD4PS 123J    |
| R40    | Carbon film 100                 | RD4PS 101J    |
| R41    | Carbon film 100k                | RD4PS 104J    |
| R42    | Carbon film 75k                 | RD4PS 753J    |
| R43    | Carbon film 91k                 | RD4PS 913J    |
| R44    | Carbon film 33k                 | RD4PS 333J    |
| R45    | Carbon film 91k                 | RD4PS 913J    |
| R46    | Carbon film 100k                | RD4PS 104J    |
| R47    | Carbon film 1.5k                | RD4PS 152J    |
| R48    | Carbon film 1.5k                | RD4PS 152J    |

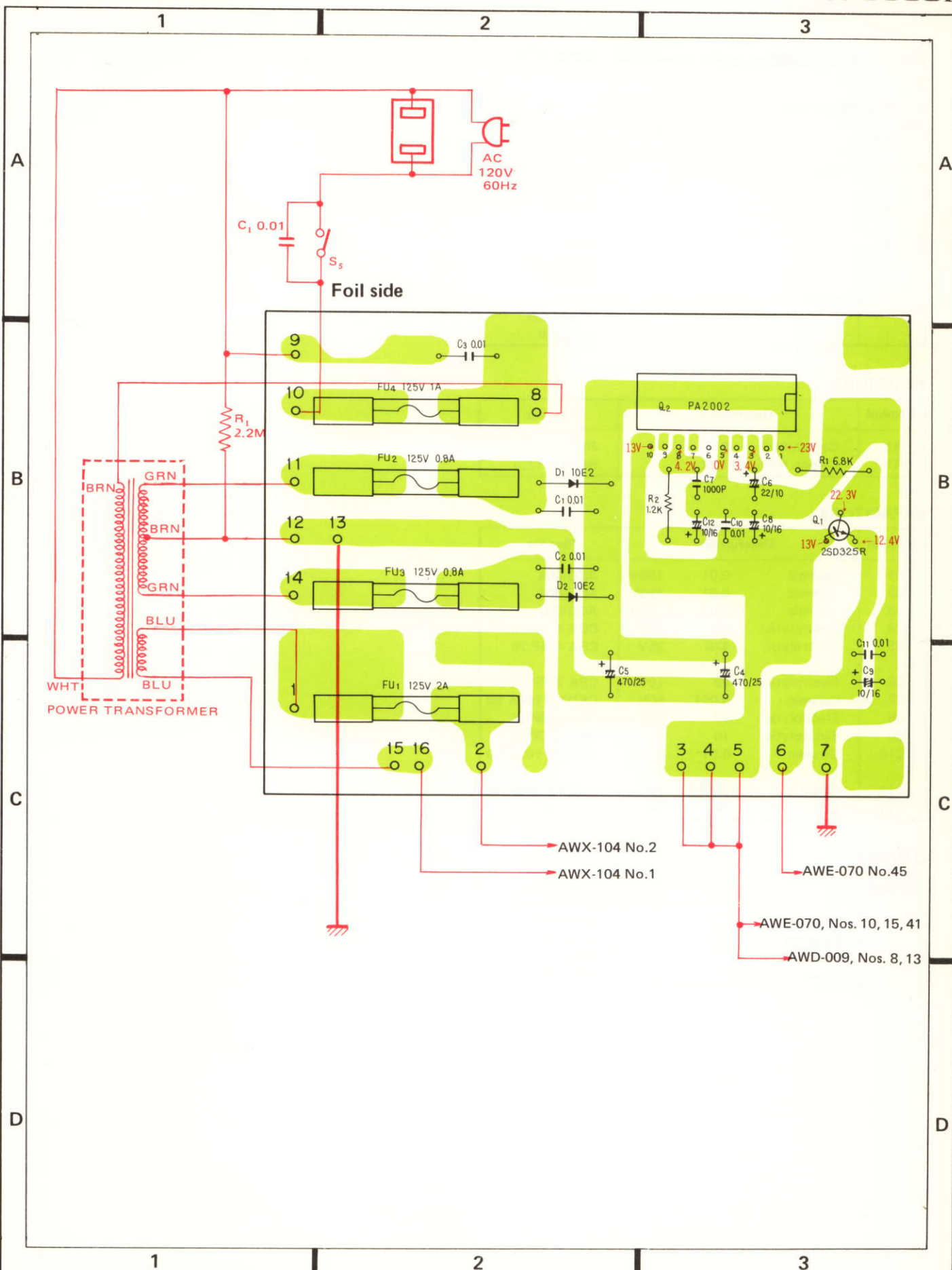
### CAPACITORS

| Symbol | Description           | Part No.      |
|--------|-----------------------|---------------|
| C1     | Electrolytic 100 16V  | CEA 101P 16   |
| C2     | Electrolytic 470 16V  | CEA 471P 16   |
| C3     | Electrolytic 10 16V   | CEANL 100P 16 |
| C4     | Electrolytic 10 16V   | CEANL 100P 16 |
| C5     | Electrolytic 10 16V   | CEANL 100P 16 |
| C6     | Mylar 0.047 50V       | CQMA 473K 50  |
| C7     | Polystyrene 510p 50V  | CQSH 511J 50  |
| C8     | Electrolytic 0.33 35V | CSZA R33M 35  |
| C9     | Electrolytic 1 25V    | CSZA 010M 25  |
| C10    | Electrolytic 1 50V    | CEA 010P 50   |
| C11    | Electrolytic 3.3 10V  | CSZA 3R3M 10  |
| C12    | Ceramic 180p 50V      | CCDSL 181K 50 |
| C13    | Polystyrene 1650p 50V | ACE-012       |
| C14    | Polystyrene 820p 50V  | CQSA 821G 50  |
| C15    | Electrolytic 47 10V   | CEA 470P 10   |
| C16    | Electrolytic 47 10V   | CEA 470P 10   |
| C17    | Electrolytic 4.7 25V  | CEANL 4R7P 25 |
| C18    | Electrolytic 10 16V   | CSZA 100M 16  |
| C19    | Electrolytic 0.56 35V | CSZA R56K 35  |
| C20    | Polystyrene 820p 50V  | CQSA 821G 50  |
| C21    | Electrolytic 3.3 50V  | CEA 3R3P 50   |
| C22    | Electrolytic 0.56 35V | CSZA R56K 35  |
| C23    | Electrolytic 10 16V   | CSZA 100M 16  |

| Symbol | Description  |        |     |               | Part No.      |
|--------|--------------|--------|-----|---------------|---------------|
| C24    | Electrolytic | 220    | 16V | CEA 221P 16   | ACH-321       |
| C25    | Electrolytic | 33     | 16V |               |               |
| C26    | Electrolytic | 4.7    | 25V | CEANL 4R7P 25 | ACE-012       |
| C27    | Polystyrene  | 1650p  | 50V | ACE-012       |               |
| C30    | Ceramic      | 180p   | 50V | CCDSL 181K 50 | CEA 101P 16   |
| C31    | Electrolytic | 100    | 16V | CEA 101P 16   |               |
| C32    | Electrolytic | 1      | 25V | CSZA 010M 25  | CSZA 0R1M 35  |
| C33    | Electrolytic | 0.1    | 35V | CSZA 0R1M 35  |               |
| C34    | Ceramic      | 470p   | 50V | CCDSL 471K 50 | CEA R47P 50   |
| C35    | Electrolytic | 0.47   | 50V | CEA R47P 50   |               |
| C36    | Mylar        | 0.0039 | 50V | CQMA 392J 50  | CQMA 392J 50  |
| C37    | Mylar        | 0.0039 | 50V | CQMA 392J 50  |               |
| C38    | Electrolytic | 10     | 16V | CEA 100P 16   | CKDYB 821K 50 |
| C39    | Ceramic      | 820p   | 50V | CKDYB 821K 50 |               |
| C40    | Ceramic      | 820p   | 50V | CKDYB 821K 50 |               |

## 12.5 POWER SUPPLY ASSEMBLY (AWR-128)





## Parts List of Power Supply Assembly (AWR-128)

### SEMICONDUCTORS

| Symbol | Description | Part No.                          |
|--------|-------------|-----------------------------------|
| Q1     | Transistor  | 2SD325R-E or D<br>(2SD234-O or R) |
| Q2     | IC          | PA2002                            |
| D1     | Diode       | 10E2<br>(S1B01-02)<br>(1S1886)    |
| D2     | Diode       | 10E2<br>(S1B01-02)<br>(1S1886)    |

### RESISTORS

| Symbol | Description      | Part No.   |
|--------|------------------|------------|
| R1     | Carbon film 6.8  | RD¼PS 6R8J |
| R1     | Carbon film 1.2k | RD¼PS 122J |

### CAPACITORS

| Symbol | Description          | Part No.      |
|--------|----------------------|---------------|
| C1     | Ceramic 0.01 150V    | ACG-004       |
| C2     | Ceramic 0.01 150V    | ACG-004       |
| C3     | Ceramic 0.01 125V    | ACG-003       |
| C4     | Electrolytic 470 25V | CEA 471P 25   |
| C5     | Electrolytic 470 25V | CEA 471P 25   |
| C6     | Electrolytic 22 10V  | CEA 220P 10   |
| C7     | Ceramic 0.001 50V    | CKDYB 102K 50 |
| C8     | Electrolytic 10 16V  | CEA 100P 16   |
| C9     | Electrolytic 10 16V  | CEA 100P 16   |
| C10    | Ceramic 0.01 50V     | CKDYB 103K 50 |
| C11    | Ceramic 0.01 50V     | CKDYB 103K 50 |
| C12    | Electrolytic 10 16V  | CEA 100P 16   |

### OTHERS

| Symbol | Description | Part No. |
|--------|-------------|----------|
|        | Fuse clip   | AKR-013  |
|        | Fuse clip   | AKR-030  |
|        | Heat sink   | ANH-117  |
|        | Cover       | AEC-279  |

AM/FM STEREO TUNER  
**TX-9500II**  
KC, HG, S

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Additional

*Service Manual*

NOTES:

- This leaflet provides the description of the parts applies only to the TX-9500II/KC, HG, S types. For detailed please refer to the service manual of TX-9500II/KU type (p.5~p.52).
- The specifications for "KC", "HG" and "S" types are same as "KU" type except for following sections.

Power Requirements:

|         |       |                                                |
|---------|-------|------------------------------------------------|
| KC type | ..... | Same as KU type                                |
| HG type | ..... | 220V and 240V (Switchable) 50Hz                |
| S type  | ..... | 110V, 120V, 220V and 240V (Switchable) 50/60Hz |

 **PIONEER®**

# 1. CONTRAST OF MISCELLANEOUS PARTS

## P.C. BOARD ASSEMBLIES

| Symbol | Description           | Part No.                     |         |         | Remarks |
|--------|-----------------------|------------------------------|---------|---------|---------|
|        |                       | KU, KC types                 | S type  | HG type |         |
|        | MPX AF assembly       | AWD-009                      | AWD-010 | AWD-008 |         |
|        | Power supply assembly | AWR-128 (KU)<br>AWR-129 (KC) | AWR-131 | AWR-130 |         |
|        | Switch assembly       | .....                        | AWX-113 | .....   |         |

## TRANSFORMER

| Symbol | Description       | Part No.     |         |         | Remarks |
|--------|-------------------|--------------|---------|---------|---------|
|        |                   | KU, KC types | S type  | HG type |         |
| T3     | Power transformer | ATT-347      | ATT-349 | ATT-348 |         |

## FUSES

| Symbol | Description            | Part No.     |         |         | Remarks |
|--------|------------------------|--------------|---------|---------|---------|
|        |                        | KU, KC types | S type  | HG type |         |
| FU1    | Fuse 2A (Secondary)    | AEK-103      | .....   | AEK-017 |         |
|        | Fuse 500mA (Primary)   | .....        | AEK-107 | .....   |         |
| FU2    | Fuse 800mA (Secondary) | AEK-111      | .....   | AEK-031 |         |
| FU3    | Fuse 800mA (Secondary) | AEK-111      | .....   | AEK-031 |         |
| FU4    | Fuse 1A (Primary)      | AEK-106      | .....   | .....   |         |
|        | Fuse 500mA (Primary)   | .....        | .....   | AEK-401 |         |

## SWITCHES

| Symbol | Description                | Part No.     |         |         | Remarks    |
|--------|----------------------------|--------------|---------|---------|------------|
|        |                            | KU, KC types | S type  | HG type |            |
| S5     | Lever switch (POWER)       | ASK-124      | ASK-128 | ASK-127 |            |
| S6     | Slide switch (DE-EMPHASIS) | ASH-016      | ASH-017 | .....   |            |
|        | Plug in selector           | .....        | AKR-031 | .....   | 4 position |
|        | (Line voltage selector)    | .....        | .....   | AKX-037 | 2 position |

## CAPACITORS

| Symbol | Description |      |      | Part No.     |         |         | Remarks |
|--------|-------------|------|------|--------------|---------|---------|---------|
|        |             |      |      | KU, KC types | S type  | HG type |         |
| C1     | Ceramic     | 0.01 | 125V | ACG-014 (KC) | .....   | .....   |         |
|        | Ceramic     | 0.01 | 250V | ACG-001 (KU) | ACG-001 | .....   |         |

## RESISTOR

| Symbol | Description |      |    | Part No.     |        |         | Remarks |
|--------|-------------|------|----|--------------|--------|---------|---------|
|        |             |      |    | KU, KC types | S type | HG type |         |
| R1     | Carbon film | 2.2M | ½W | RD½PS 225J   | .....  | .....   |         |

## OTHERS

| Symbol | Description                                |  |  | Part No.                     |         |         | Remarks |
|--------|--------------------------------------------|--|--|------------------------------|---------|---------|---------|
|        |                                            |  |  | KU, KC types                 | S type  | HG type |         |
|        | Terminal (ANTENNA)                         |  |  | AKA-002                      | AKA-002 | AKA-007 |         |
|        | AC socket (OUTLET)                         |  |  | AKP-002                      | AKP-002 | .....   |         |
|        | AC socket (INLET)                          |  |  | .....                        | .....   | AKP-008 |         |
|        | AC power cord                              |  |  | ADG-005                      | ADG-016 | .....   |         |
|        | Packing case                               |  |  | AHD-439 (KU)<br>AHD-440 (KC) | AHD-439 | AHD-441 |         |
|        | Vinyl pouch                                |  |  | AHG-023                      | AHG-023 | .....   |         |
|        | Operating instructions<br>(English)        |  |  | ARB-207                      | ARB-219 | ARB-218 |         |
|        | Operating instructions<br>(Germany/French) |  |  | .....                        | .....   | ARD-107 |         |
|        | Accessory fuse 1A                          |  |  | .....                        | AEK-106 | .....   |         |
|        | Accessory fuse 500mA                       |  |  | .....                        | AEK-107 | .....   |         |
|        | Vinyl pouch                                |  |  | .....                        | E11-033 | .....   |         |

## 2. KC TYPE

### 2.1 SCHEMATIC DIAGRAM AND MISCELLANEOUS PARTS LIST

#### Miscellaneous Parts List

##### NOTE:

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

#### SWITCHES

| Symbol | Description                | Part No. |
|--------|----------------------------|----------|
| S5     | Lever switch (POWER)       | ASK-124  |
| S6     | Slide switch (DE-EMPHASIS) | ASH-016  |

#### TRANSFORMERS AND COIL

| Symbol | Description       | Part No. |
|--------|-------------------|----------|
| T1     | Ferrite balun     | T22-025  |
| T2     | Bar antenna       | ATB-507  |
| T3     | Power transformer | ATT-347  |
| L1     | RF choke coil     | T24-030  |

#### LAMPS

| Symbol | Description                 | Part No. |
|--------|-----------------------------|----------|
| PL1    | Lamp (Wedge type) 8V, 300mA | AEL-029  |
| PL2    | Lamp (Wedge type) 8V, 300mA | AEL-029  |
| PL3    | Lamp (Wedge type) 8V, 300mA | AEL-029  |
| PL4    | Lamp (Wedge type) 8V, 300mA | AEL-029  |
| PL5    | Lamp with wire 8V, 50mA     | AEL-072  |
| PL6    | Lamp with wire 6V, 30mA     | AEL-080  |
| PL7    | Lamp with wire 6V, 30mA     | AEL-079  |
| PL8    | Lamp with wire 6V, 30mA     | AEL-079  |

#### FUSES

| Symbol | Description            | Part No. |
|--------|------------------------|----------|
| FU1    | Fuse 2A (Secondary)    | AEK-103  |
| FU2    | Fuse 800mA (Secondary) | AEK-111  |
| FU3    | Fuse 800mA (Secondary) | AEK-111  |
| FU4    | Fuse 1A (Primary)      | AEK-106  |

#### RESISTOR

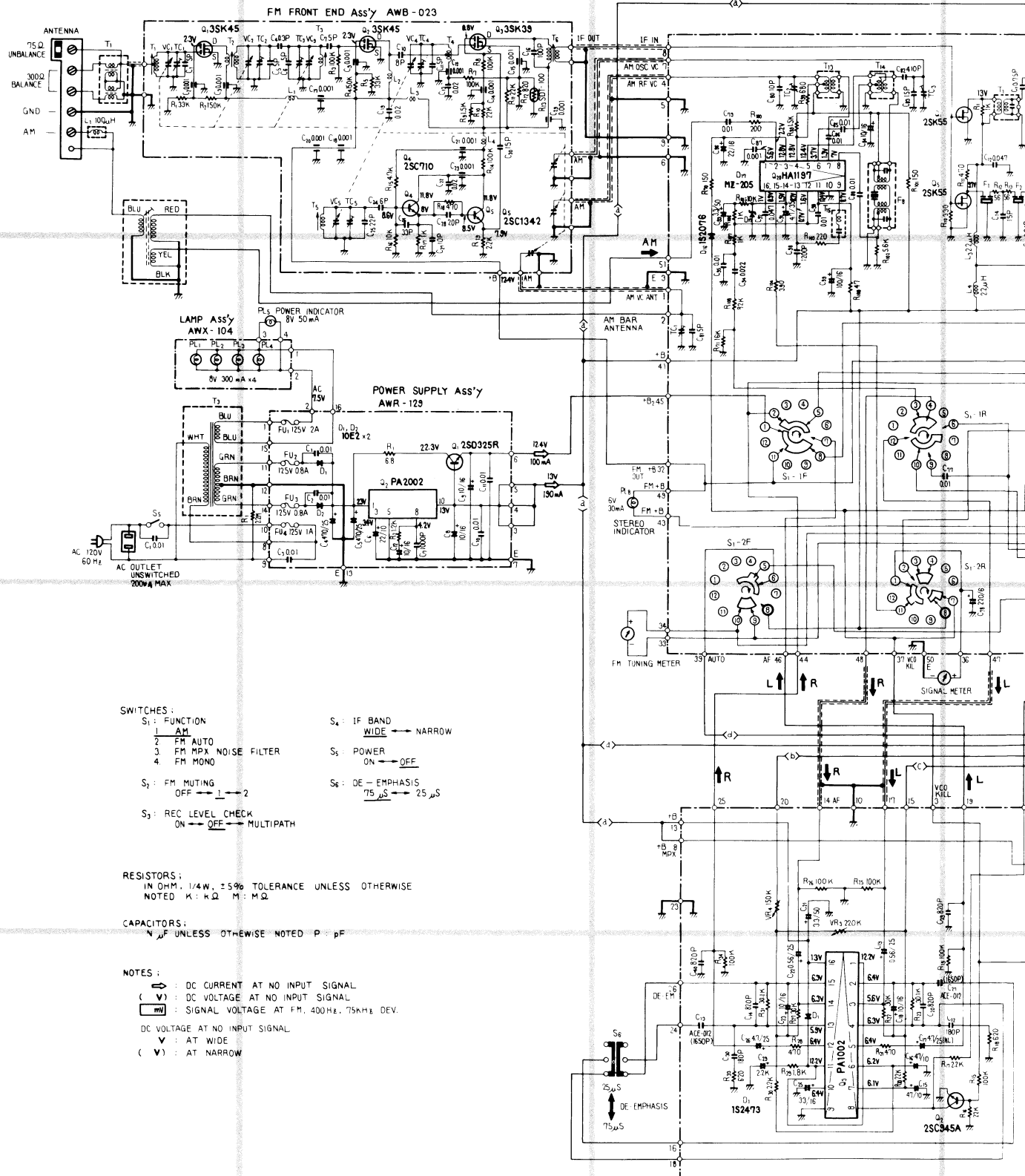
| Symbol | Description                     | Part No.                 |
|--------|---------------------------------|--------------------------|
| R1     | Carbon film 2.2M $\frac{1}{2}W$ | RD $\frac{1}{2}$ PS 225J |

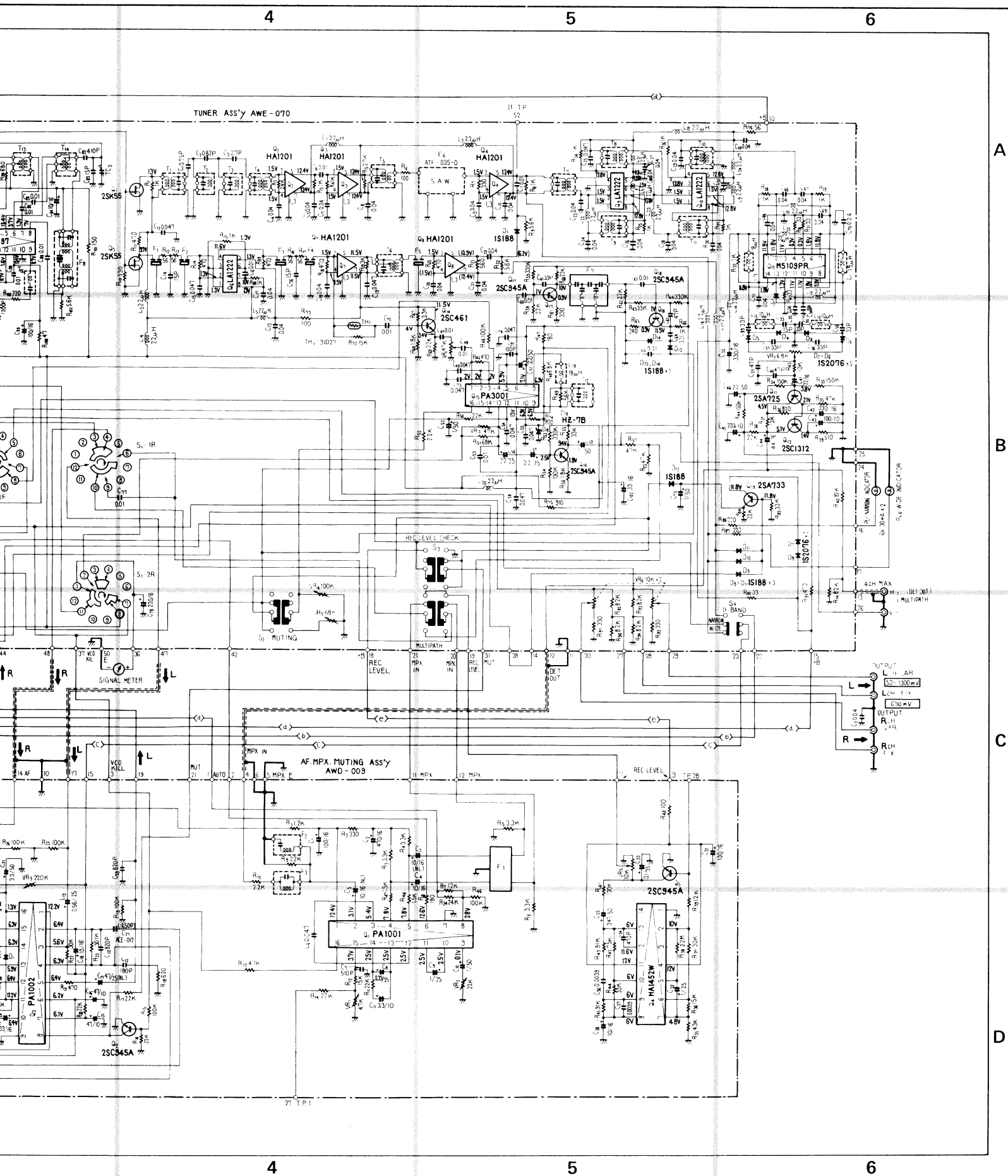
#### CAPACITORS

| Symbol | Description       | Part No.      |
|--------|-------------------|---------------|
| C1     | Ceramic 0.01 125V | ACG-014       |
| C2     | Ceramic 0.04 50V  | CKDYF 403Z 50 |

# NOTE:

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





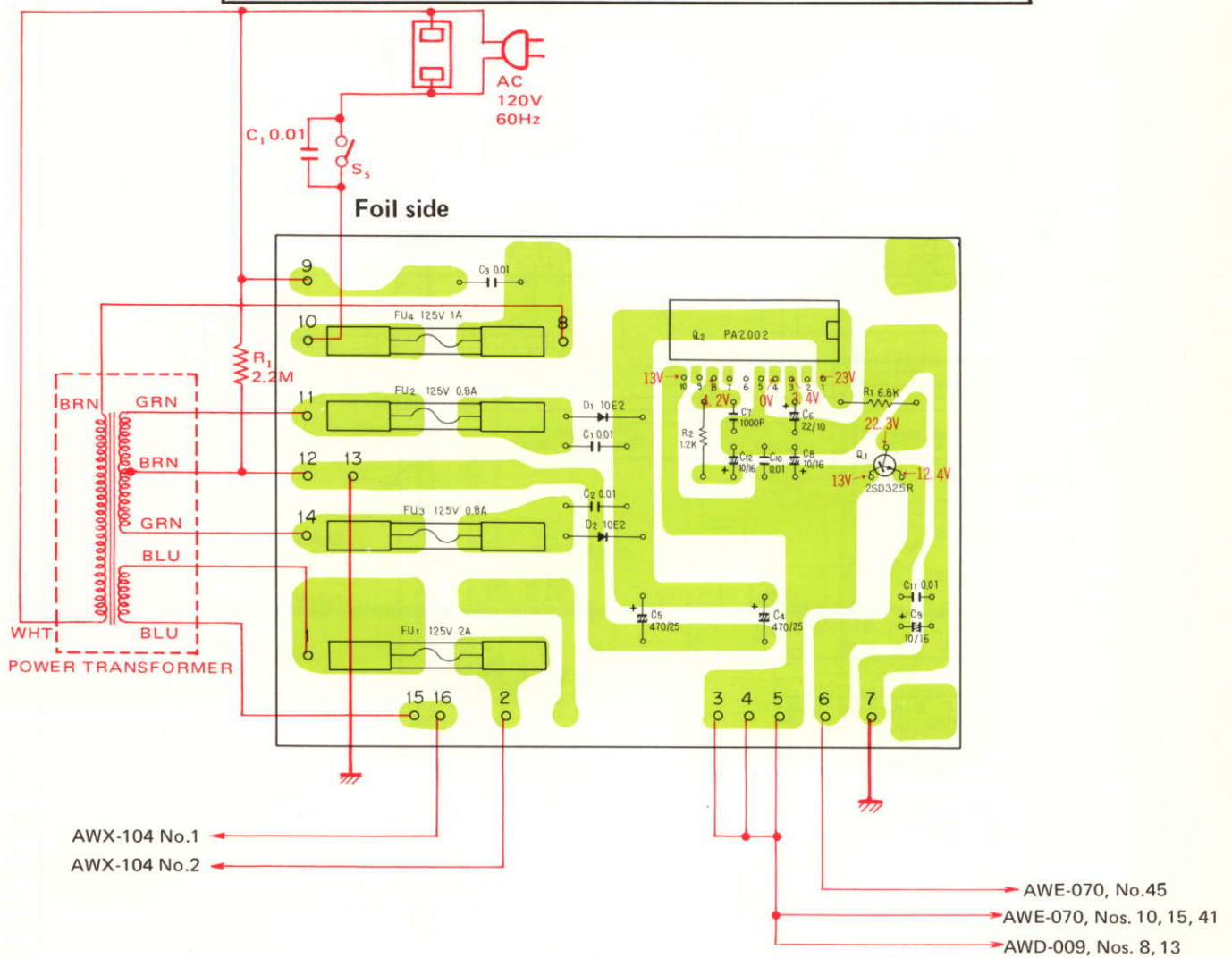
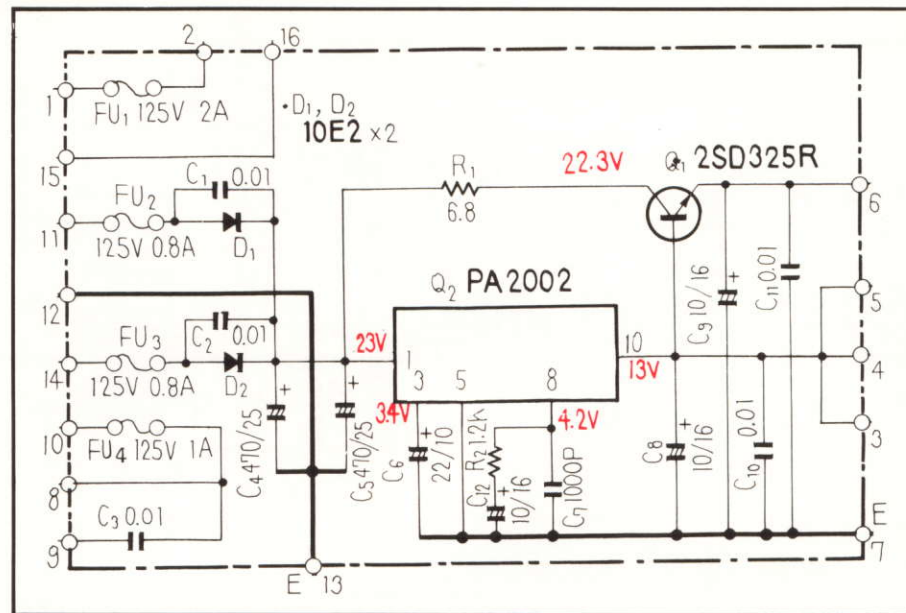
A

B

C

D

## 2.2 POWER SUPPLY ASSEMBLY (AWR-129)



## Parts List of Power Supply Assembly (AWR-129)

### SEMICONDUCTORS

| Symbol | Description | Part No.                          |
|--------|-------------|-----------------------------------|
| Q1     | Transistor  | 2SD325R-E or D<br>(2SD234-O or R) |
| Q2     | IC          | PA 2002                           |
| D1     | Diode       | 10E 2<br>(S1B01-02)<br>(1S1886)   |
| D2     | Diode       | 10E 2<br>(S1B01-02)<br>(1S1886)   |

### RESISTORS

| Symbol | Description      | Part No.   |
|--------|------------------|------------|
| R1     | Carbon film 6.8  | RD¼PS 6R8J |
| R2     | Carbon film 1.2k | RD¼PS 122J |

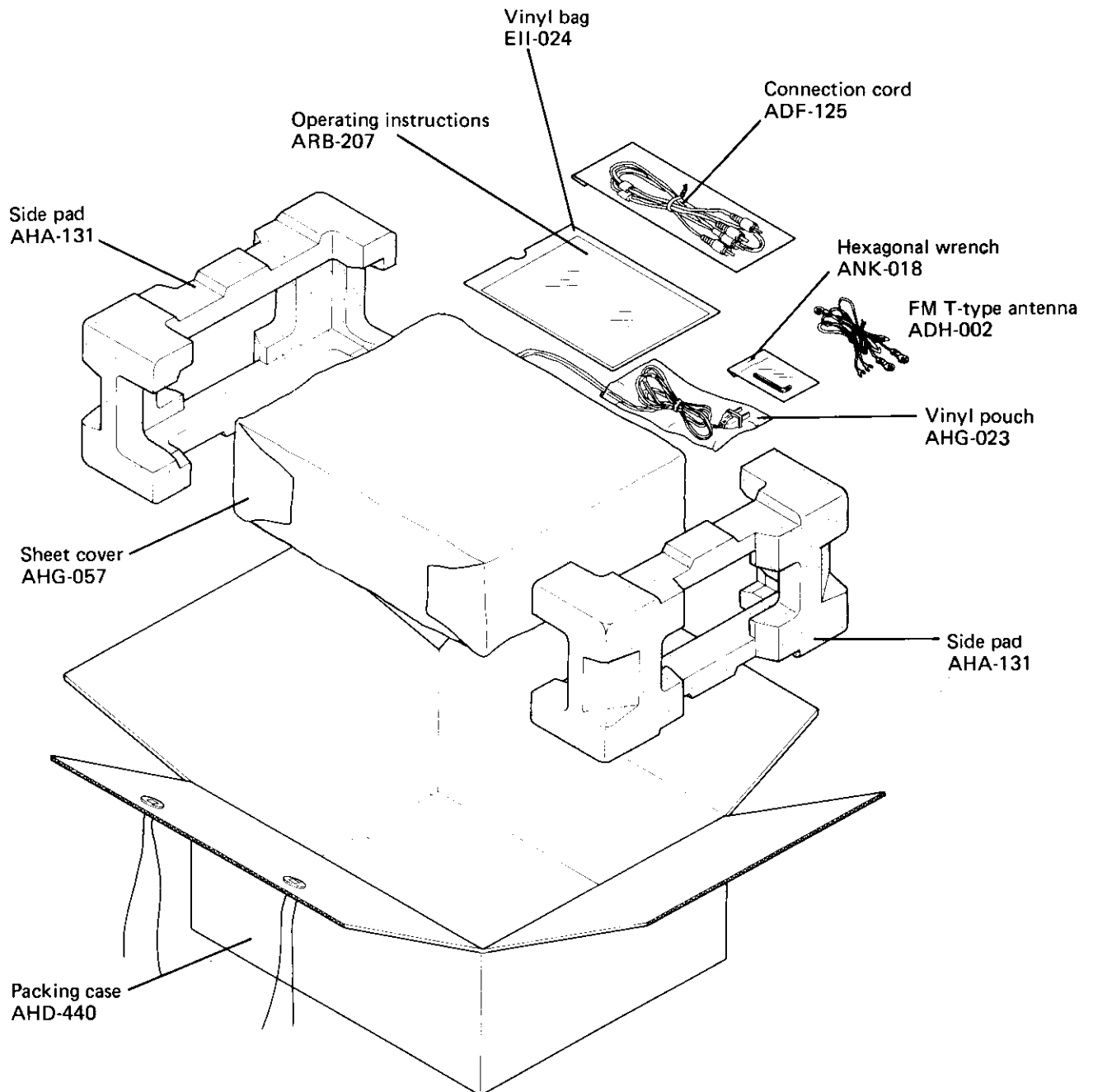
### CAPACITORS

| Symbol | Description          | Part No.      |
|--------|----------------------|---------------|
| C1     | Ceramic 0.01 150V    | ACG-004       |
| C2     | Ceramic 0.01 150V    | ACG-004       |
| C3     | Ceramic 0.01 125V    | ACG-014       |
| C4     | Electrolytic 470 25V | CEA 471P 25   |
| C5     | Electrolytic 470 25V | CEA 471P 25   |
| C6     | Electrolytic 22 10V  | CEA 220P 10   |
| C7     | Ceramic 0.001 50V    | CKDYB 102K 50 |
| C8     | Electrolytic 10 16V  | CEA 100P 16   |
| C9     | Electrolytic 10 16V  | CEA 100P 16   |
| C10    | Ceramic 0.01 50V     | CKDYB 103K 50 |
| C11    | Ceramic 0.01 50V     | CKDYB 103K 50 |
| C12    | Electrolytic 10 16V  | CEA 100P 16   |

### OTHERS

| Symbol | Description | Part No. |
|--------|-------------|----------|
|        | Fuse clip   | AKR-013  |
|        | Fuse clip   | AKR-030  |
|        | Heat sink   | ANH-117  |
|        | Cover       | AEC-279  |

**2.3 PACKING**



## 3. HG TYPE

### 3.1 SCHEMATIC DIAGRAM AND MISCELLANEOUS PARTS LIST

#### Miscellaneous Parts List

**NOTE:**

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

#### SWITCHES

| Symbol | Description                                                         | Part No.           |
|--------|---------------------------------------------------------------------|--------------------|
| S5     | Lever switch (POWER)<br>Plug in selector<br>(Line voltage selector) | ASK-127<br>AKX-037 |

#### TRANSFORMERS AND COIL

| Symbol | Description       | Part No. |
|--------|-------------------|----------|
| T1     | Ferrite balun     | T22-025  |
| T2     | Bar antenna       | ATB-507  |
| T3     | Power transformer | ATT-348  |
| L1     | RF choke coil     | T24-030  |

#### LAMPS

| Symbol | Description                 | Part No. |
|--------|-----------------------------|----------|
| PL1    | Lamp (Wedge type) 8V, 300mA | AEL-029  |
| PL2    | Lamp (Wedge type) 8V, 300mA | AEL-029  |
| PL3    | Lamp (Wedge type) 8V, 300mA | AEL-029  |
| PL4    | Lamp (Wedge type) 8V, 300mA | AEL-029  |
| PL5    | Lamp with wire 8V, 50mA     | AEL-072  |
| PL6    | Lamp with wire 6V, 30mA     | AEL-080  |
| PL7    | Lamp with wire 6V, 30mA     | AEL-079  |
| PL8    | Lamp with wire 6V, 30mA     | AEL-079  |

#### FUSES

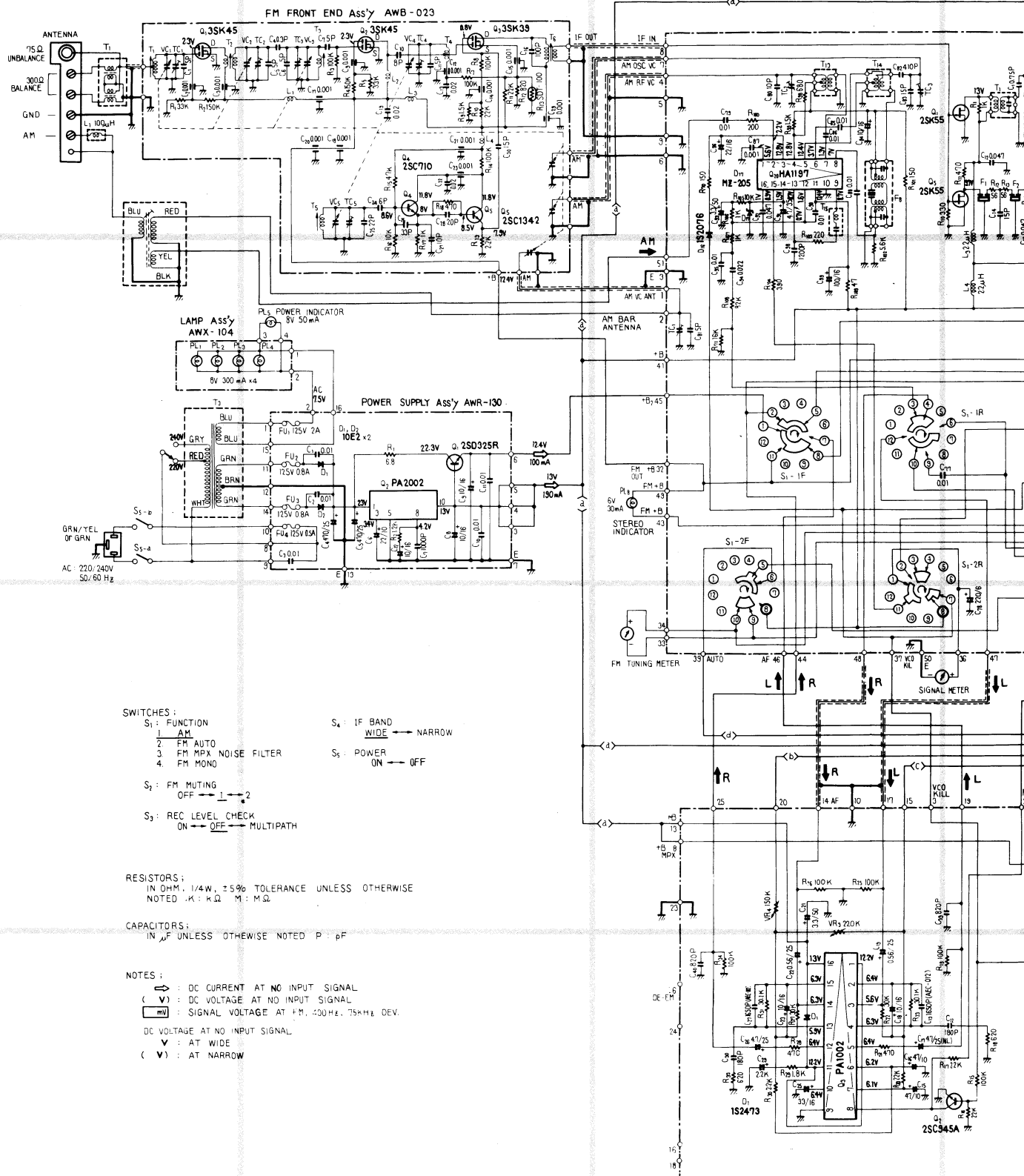
| Symbol | Description            | Part No. |
|--------|------------------------|----------|
| FU1    | Fuse 2A (Secondary)    | AEK-017  |
| FU2    | Fuse 800mA (Secondary) | AEK-031  |
| FU3    | Fuse 800mA (Secondary) | AEK-031  |
| FU4    | Fuse 500mA (Primary)   | AEK-401  |

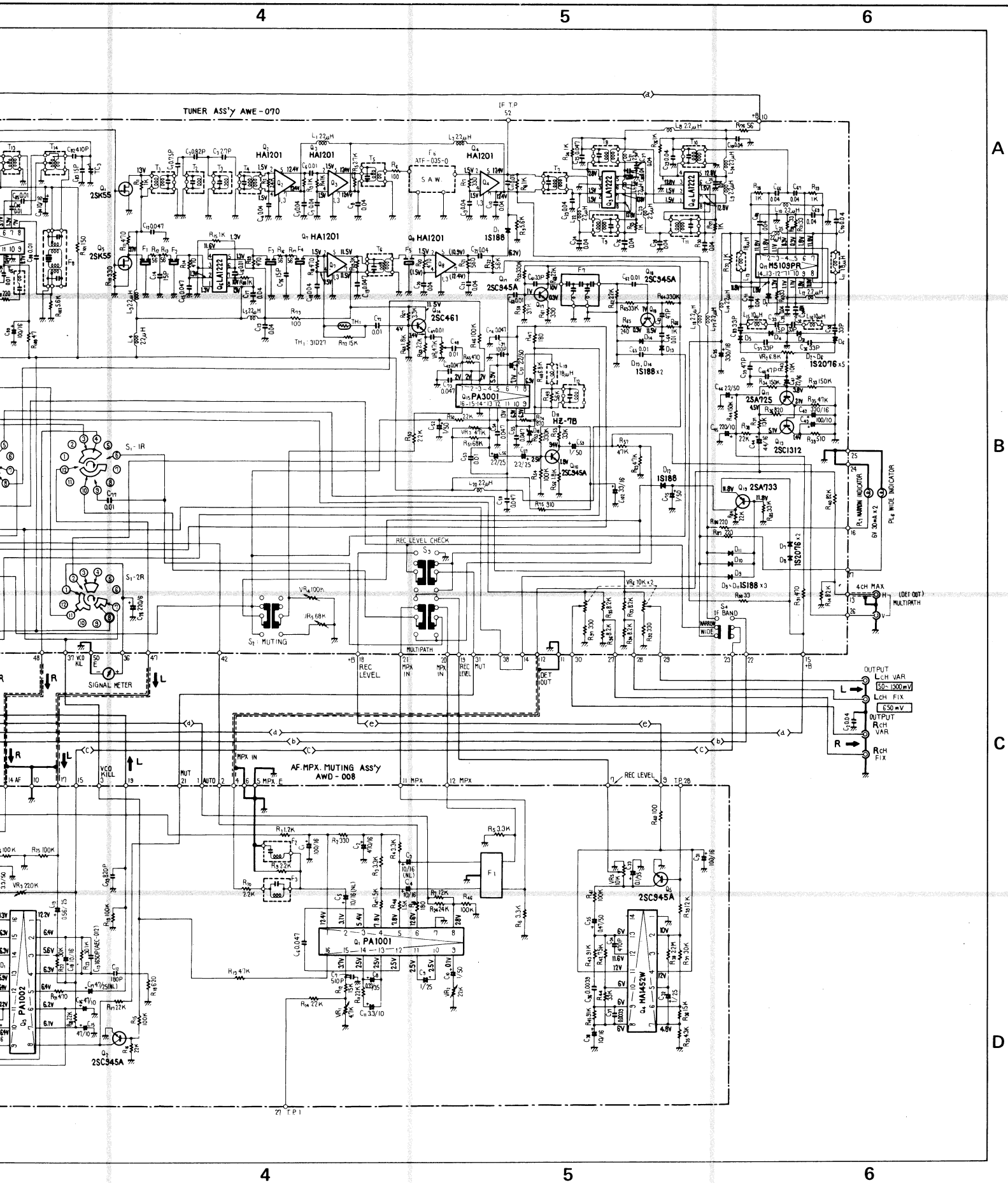
#### CAPACITOR

| Symbol | Description      | Part No.      |
|--------|------------------|---------------|
| C2     | Ceramic 0.04 50V | CKDYF 403Z 50 |

# NOTE:

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





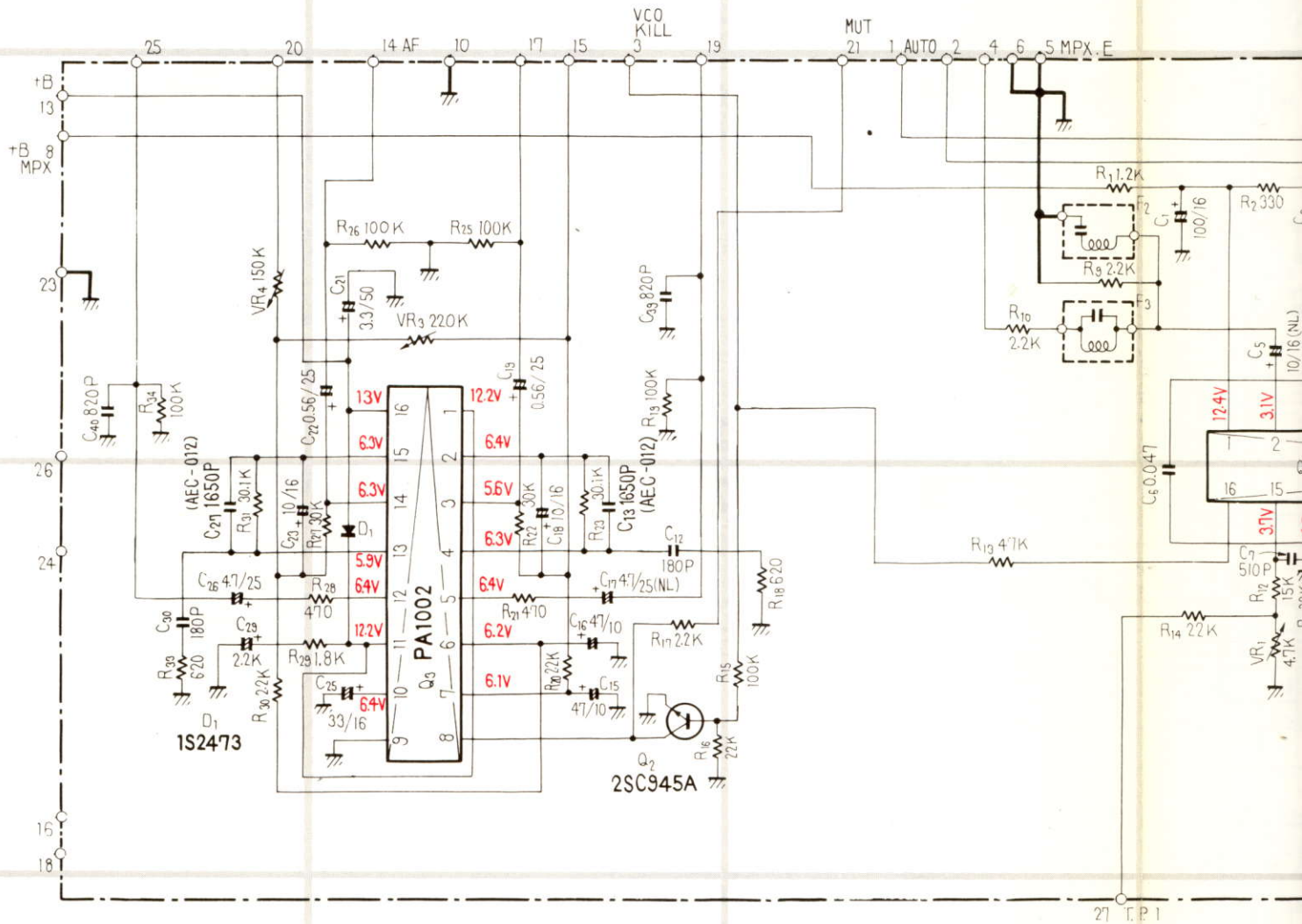
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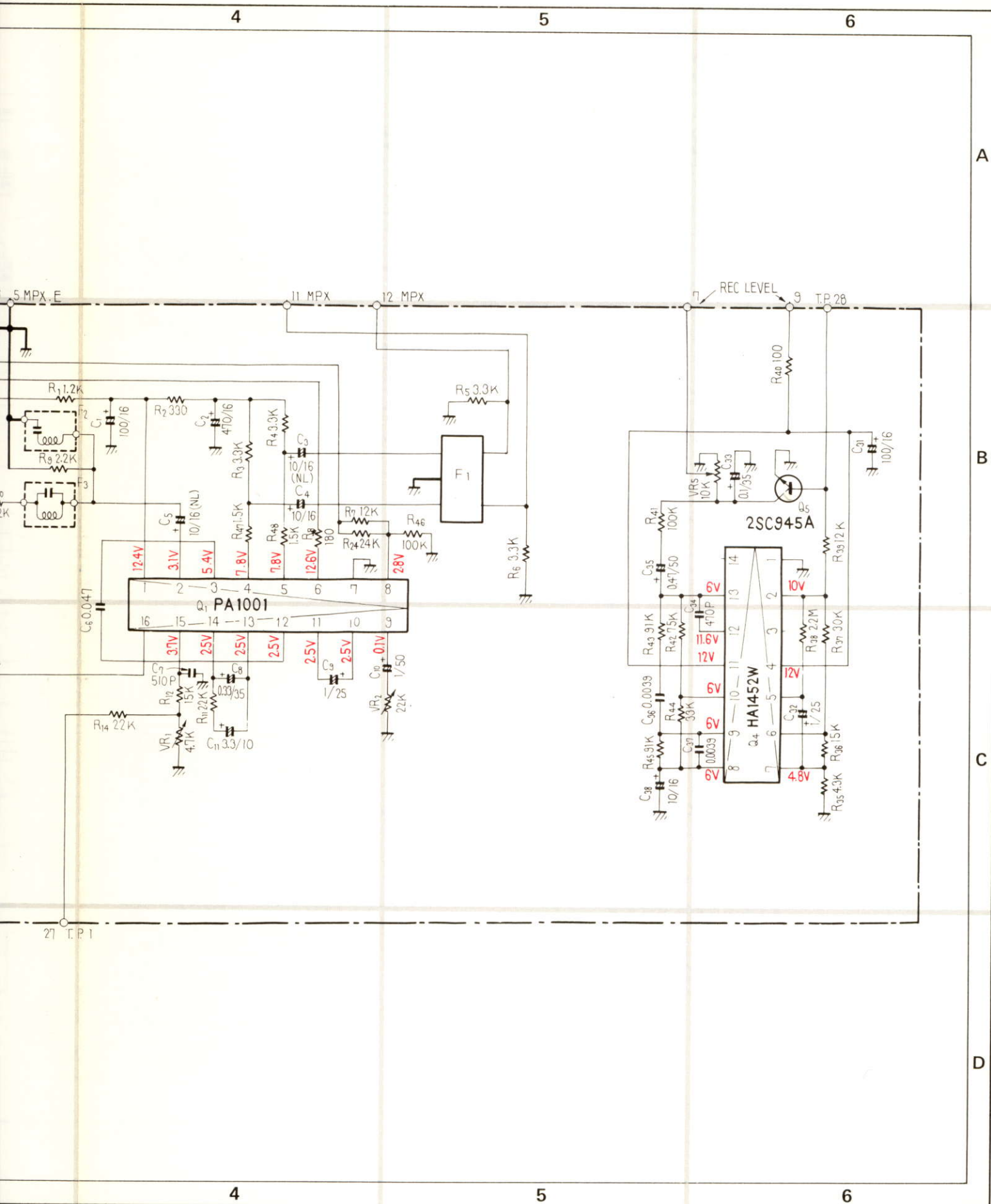
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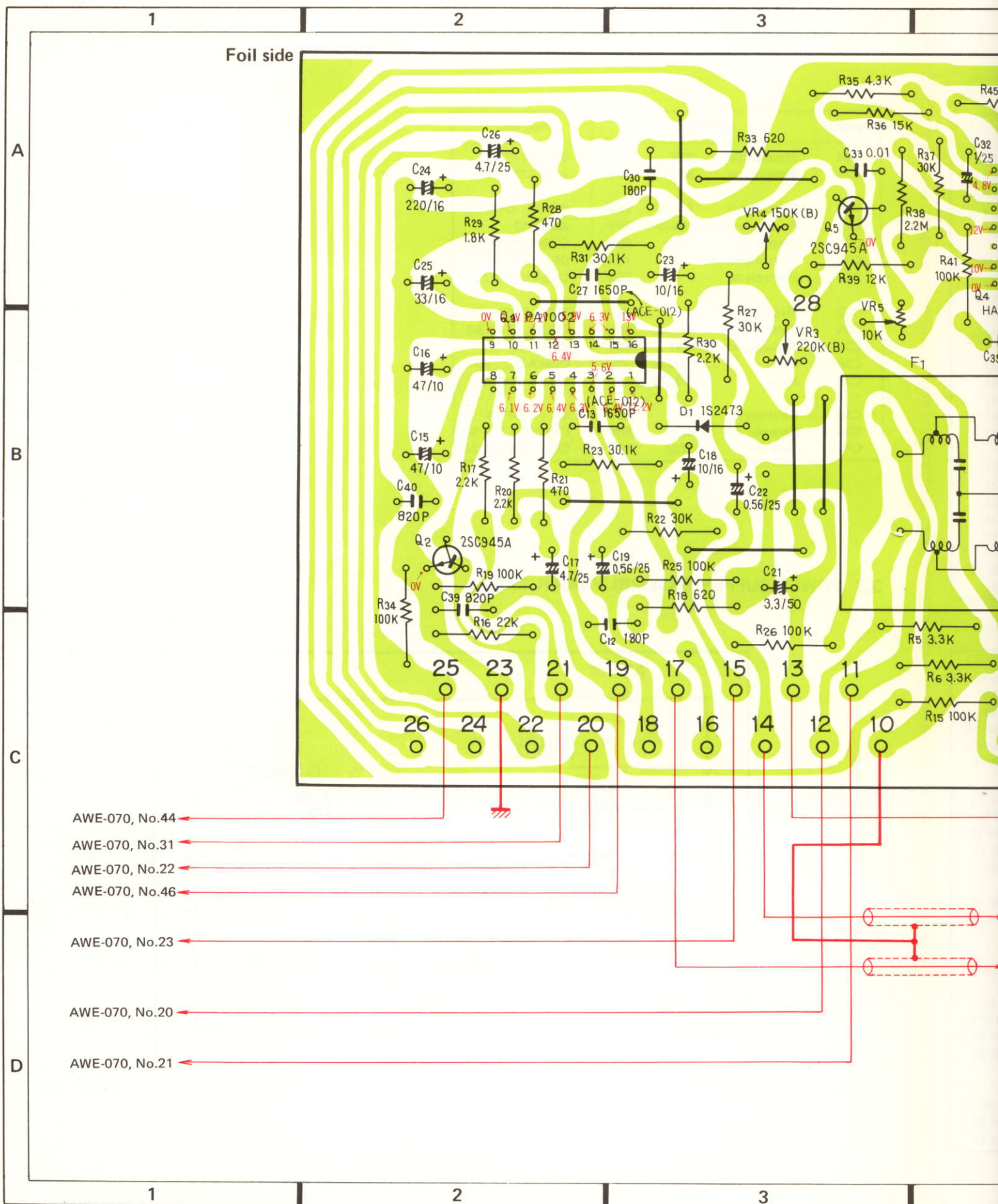
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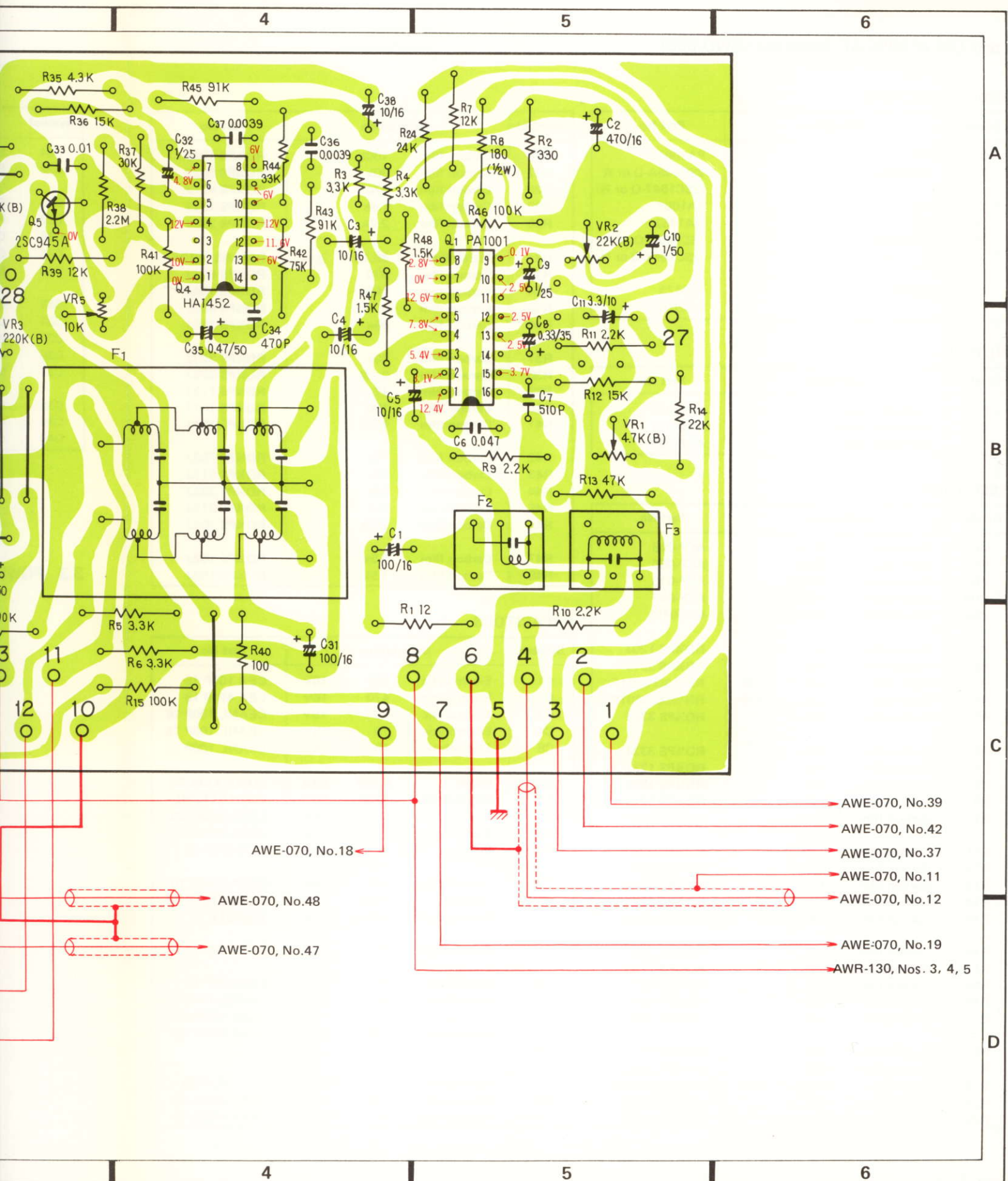
D

## 3.2 MPX AF ASSEMBLY (AWD-008)









## Parts List of MPX AF Assembly (AWD-008)

## SEMICONDUCTORS

| Symbol | Description | Part No.                           |
|--------|-------------|------------------------------------|
| Q1     | IC          | PA1001                             |
| Q2     | Transistor  | 2SC945A-Q or R<br>(2SC1647-Q or R) |
| Q3     | IC          | PA1002                             |
| Q4     | IC          | HA1452                             |
| Q5     | Transistor  | 2SC945A-Q or R<br>(2SC1647-Q or R) |
| D1     | Diode       | 1S2473<br>(1S2076)                 |

## FILTERS

| Symbol | Description       | Part No. |
|--------|-------------------|----------|
| F1     | Low pass filter   | ATF-028  |
| F2     | Anti-birdy filter | ATF-024  |
| F3     | Anti-birdy filter | ATF-023  |

## RESISTORS

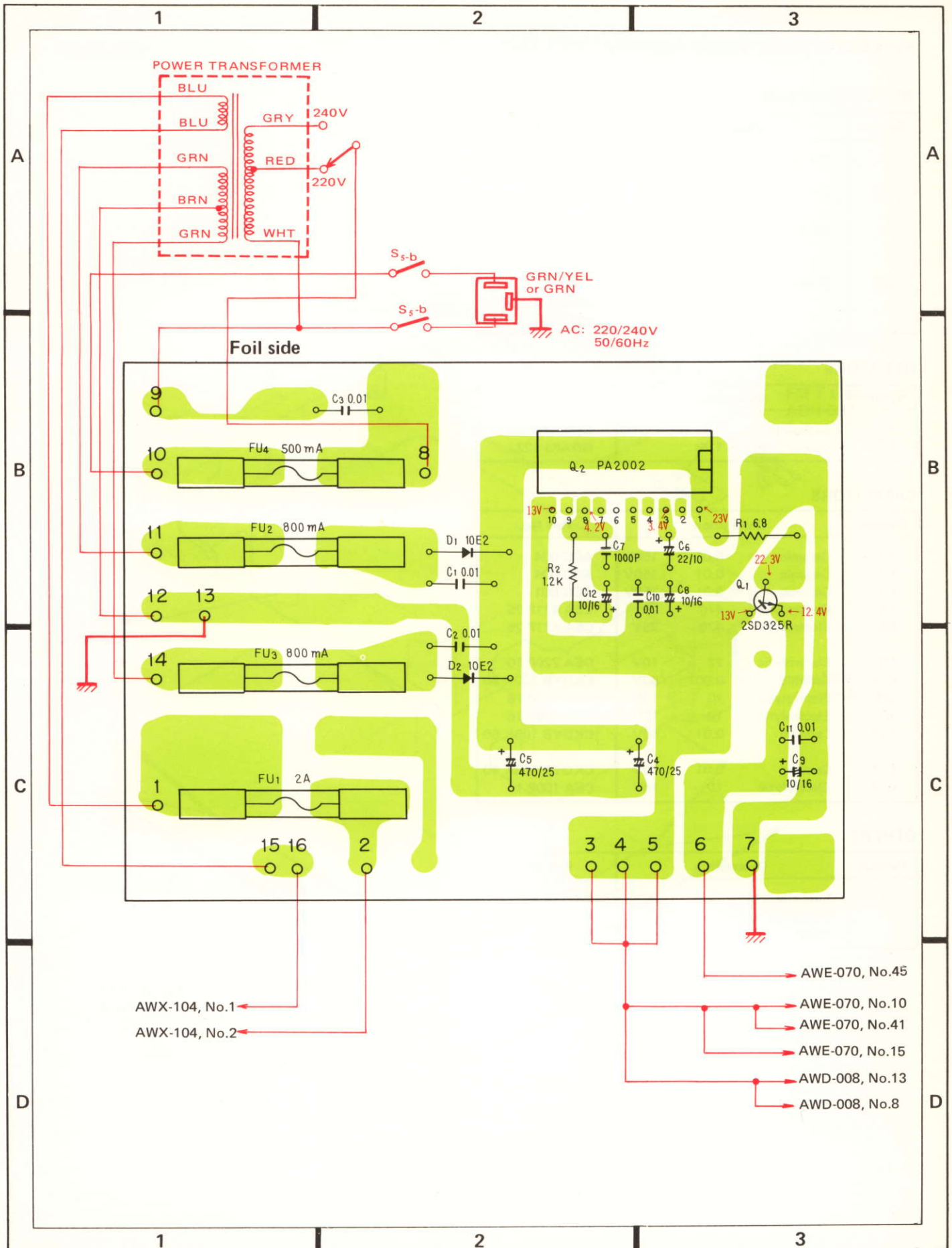
| Symbol | Description                     | Part No.      |
|--------|---------------------------------|---------------|
| VR1    | Semi-fixed (4.7k)               | ACP-018       |
| VR2    | Semi-fixed (22k)                | ACP-056       |
| VR3    | Semi-fixed (220k)               | ACP-016       |
| VR4    | Semi-fixed (150k)               | ACP-057       |
| VR5    | Semi-fixed (10k)                | C92-049       |
| R1     | Carbon film 12                  | RD4PS 120J    |
| R2     | Carbon film 330                 | RD4PS 331J    |
| R3     | Metal film 3.3k $\frac{1}{5}W$  | RN1/5SQ 3301F |
| R4     | Metal film 3.3k $\frac{1}{5}W$  | RN1/5SQ 3301F |
| R5     | Carbon film 3.3k                | RD4PS 332J    |
| R6     | Carbon film 3.3k                | RD4PS 332J    |
| R7     | Carbon film 12k                 | RD4PS 123J    |
| R8     | Carbon film 180                 | RD4PS 181J    |
| R9     | Carbon film 2.2k                | RD4PS 222J    |
| R10    | Carbon film 2.2k                | RD4PS 222J    |
| R11    | Carbon film 2.2k                | RD4PS 222J    |
| R12    | Carbon film 15k                 | RD4PS 153J    |
| R13    | Carbon film 47k                 | RD4PS 473J    |
| R14    | Carbon film 22k                 | RD4PS 223J    |
| R15    | Carbon film 100k                | RD4PS 104J    |
| R16    | Carbon film 22k                 | RD4PS 223J    |
| R17    | Carbon film 2.2k                | RD4PS 222J    |
| R18    | Carbon film 620                 | RD4PS 621J    |
| R19    | Carbon film 100k                | RD4PS 104J    |
| R20    | Carbon film 2.2k                | RD4PS 222J    |
| R21    | Carbon film 470                 | RD4PS 471J    |
| R22    | Carbon film 30k                 | RD4PS 303J    |
| R23    | Metal film 30.1k $\frac{1}{5}W$ | RN1/5SQ 3012F |
| R24    | Carbon film 24k                 | RD4PS 243J    |
| R25    | Carbon film 100k                | RD4PS 104J    |

| Symbol | Description                     | Part No.      |
|--------|---------------------------------|---------------|
| R26    | Carbon film 100k                | RD4PS 104J    |
| R27    | Carbon film 30k                 | RD4PS 303J    |
| R28    | Carbon film 470                 | RD4PS 471J    |
| R29    | Carbon film 1.8k                | RD4PS 182J    |
| R30    | Carbon film 2.2k                | RD4PS 222J    |
| R31    | Metal film 30.1k $\frac{1}{5}W$ | RN1/5SQ 3012F |
| R33    | Carbon film 620                 | RD4PS 621J    |
| R34    | Carbon film 100k                | RD4PS 104J    |
| R35    | Carbon film 4.3k                | RD4PS 432J    |
| R36    | Carbon film 15k                 | RD4PS 153J    |
| R37    | Carbon film 30k                 | RD4PS 303J    |
| R38    | Carbon film 2.2M                | RD4PS 225J    |
| R39    | Carbon film 12k                 | RD4PS 123J    |
| R40    | Carbon film 100                 | RD4PS 101J    |
| R41    | Carbon film 100k                | RD4PS 104J    |
| R42    | Carbon film 75k                 | RD4PS 753J    |
| R43    | Carbon film 91k                 | RD4PS 913J    |
| R44    | Carbon film 33k                 | RD4PS 333J    |
| R45    | Carbon film 91k                 | RD4PS 913J    |
| R46    | Carbon film 100k                | RD4PS 104J    |
| R47    | Carbon film 1.5k                | RD4PS 152J    |
| R48    | Carbon film 1.5k                | RD4PS 152J    |

## CAPACITORS

| Symbol | Description           | Part No.      |
|--------|-----------------------|---------------|
| C1     | Electrolytic 100 16V  | CEA 101P 16   |
| C2     | Electrolytic 470 16V  | CEA 471P 16   |
| C3     | Electrolytic 10 16V   | CEANL 100P 16 |
| C4     | Electrolytic 10 16V   | CEANL 100P 16 |
| C5     | Electrolytic 10 16V   | CEANL 100P 16 |
| C6     | Mylar 0.047 50V       | CQMA 473K 50  |
| C7     | Polystyrene 510p 50V  | CQSH 511J 50  |
| C8     | Electrolytic 0.33 35V | CSZA R33M 35  |
| C9     | Electrolytic 1 25V    | CSZA 010M 25  |
| C10    | Electrolytic 1 50V    | CEA 010P 50   |
| C11    | Electrolytic 3.3 10V  | CSZA 3R3M 10  |
| C12    | Ceramic 180p 50V      | CCDSL 181K 50 |
| C13    | Polystyrene 1650p 50V | ACE-012       |
| C14    |                       |               |
| C15    | Electrolytic 47 10V   | CEA 470P 10   |
| C16    | Electrolytic 47 10V   | CEA 470P 10   |
| C17    | Electrolytic 4.7 25V  | CEANL 4R7P 25 |
| C18    | Electrolytic 10 16V   | CSZA 100M 16  |
| C19    | Electrolytic 0.56 35V | CSZA R56K 35  |
| C20    |                       |               |
| C21    | Electrolytic 3.3 50V  | CEA 3R3P 50   |
| C22    | Electrolytic 0.56 35V | CSZA R56K 35  |
| C23    | Electrolytic 10 16V   | CSZA 100M 16  |





## Parts List of Power Supply Assembly (AWR-130)

### SEMICONDUCTORS

| Symbol | Description | Part No.                          |
|--------|-------------|-----------------------------------|
| Q1     | Transistor  | 2SD325R-E or D<br>(2SD234-O or R) |
| Q2     | IC          | PA2002                            |
| D1     | Diode       | 10E2<br>(S1B01-02)<br>(1S1886)    |
| D2     | Diode       | 10E2<br>(S1B01-02)<br>(1S1886)    |

### RESISTORS

| Symbol | Description      | Part No.   |
|--------|------------------|------------|
| R1     | Carbon film 6.8  | RD¼PS 6R8J |
| R2     | Carbon film 1.2k | RD¼PS 122J |

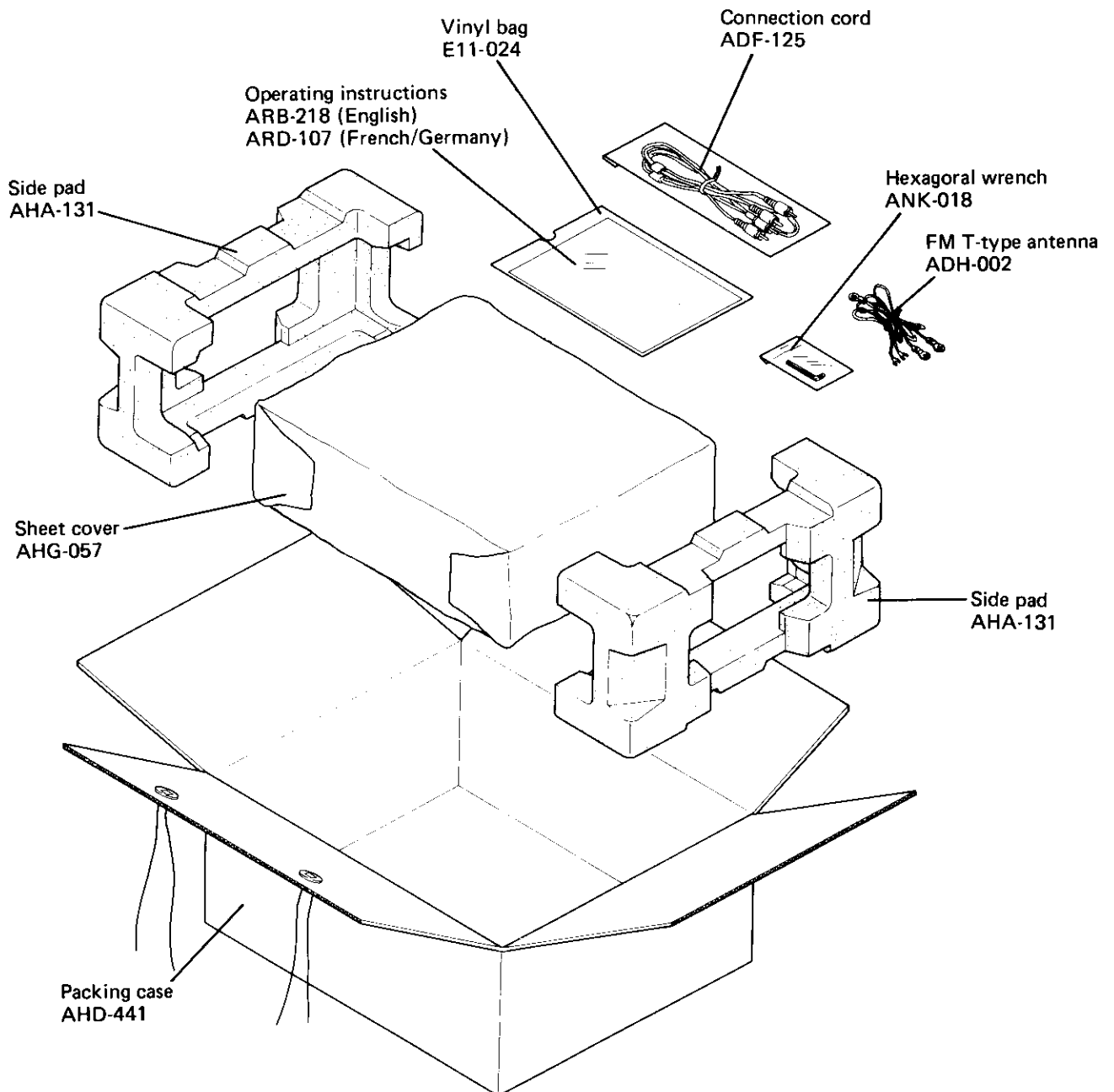
### CAPACITORS

| Symbol | Description          | Part No.      |
|--------|----------------------|---------------|
| C1     | Ceramic 0.01 150V    | ACG-004       |
| C2     | Ceramic 0.01 150V    | ACG-004       |
| C3     | Ceramic 0.01 250V    | ACG-001       |
| C4     | Electrolytic 470 25V | CEA 471P 25   |
| C5     | Electrolytic 470 25V | CEA 471P 25   |
| C6     | Electrolytic 22 10V  | CEA 220P 10   |
| C7     | Ceramic 0.001 50V    | CKDYB 102K 50 |
| C8     | Electrolytic 10 16V  | CEA 100P 16   |
| C9     | Electrolytic 10 16V  | CEA 100P 16   |
| C10    | Ceramic 0.01 50V     | CKDYB 103K 50 |
| C11    | Ceramic 0.01 50V     | CKDYB 103K 50 |
| C12    | Electrolytic 10 16V  | CEA 100P 16   |

### OTHERS

| Symbol | Description | Part No. |
|--------|-------------|----------|
|        | Fuse clip   | AKR-010  |
|        | Heat sink   | ANH-117  |
|        | Cover       | AEC-279  |

### 3.4 PACKING



## 4. S TYPE

### 4.1 SCHEMATIC DIAGRAM AND MISCELLANEOUS PARTS LIST

#### Miscellaneous Parts List

NOTE:

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

#### SWITCHES

| Symbol | Description                                 | Part No. |
|--------|---------------------------------------------|----------|
| S5     | Lever switch (POWER)                        | ASK-128  |
| S7     | Plug in selector<br>(Line voltage selector) | AKR-031  |

#### TRANSFORMERS AND COIL

| Symbol | Description       | Part No. |
|--------|-------------------|----------|
| T1     | Ferrite balun     | T22-025  |
| T2     | Bar antenna       | ATB-507  |
| T3     | Power transformer | ATT-349  |
| L1     | RF choke coil     | T24-030  |

#### LAMPS

| Symbol | Description                 | Part No. |
|--------|-----------------------------|----------|
| PL1    | Lamp (Wedge type) 8V, 300mA | AEL-029  |
| PL2    | Lamp (Wedge type) 8V, 300mA | AEL-029  |
| PL3    | Lamp (Wedge type) 8V, 300mA | AEL-029  |
| PL4    | Lamp (Wedge type) 8V, 300mA | AEL-029  |
| PL5    | Lamp with wire 8V, 50mA     | AEL-072  |
| PL6    | Lamp with wire 6V, 30mA     | AEL-080  |
| PL7    | Lamp with wire 6V, 30mA     | AEL-079  |
| PL8    | Lamp with wire 6V, 30mA     | AEL-079  |

#### FUSE

| Symbol | Description          | Part No. |
|--------|----------------------|----------|
| FU1    | Fuse 500mA (Primary) | AEK-107  |

#### CAPACITORS

| Symbol | Description       | Part No.      |
|--------|-------------------|---------------|
| C1     | Ceramic 0.01 250V | ACG-001       |
| C2     | Ceramic 0.04 50V  | CKDYF 403Z 50 |

# NOTE:

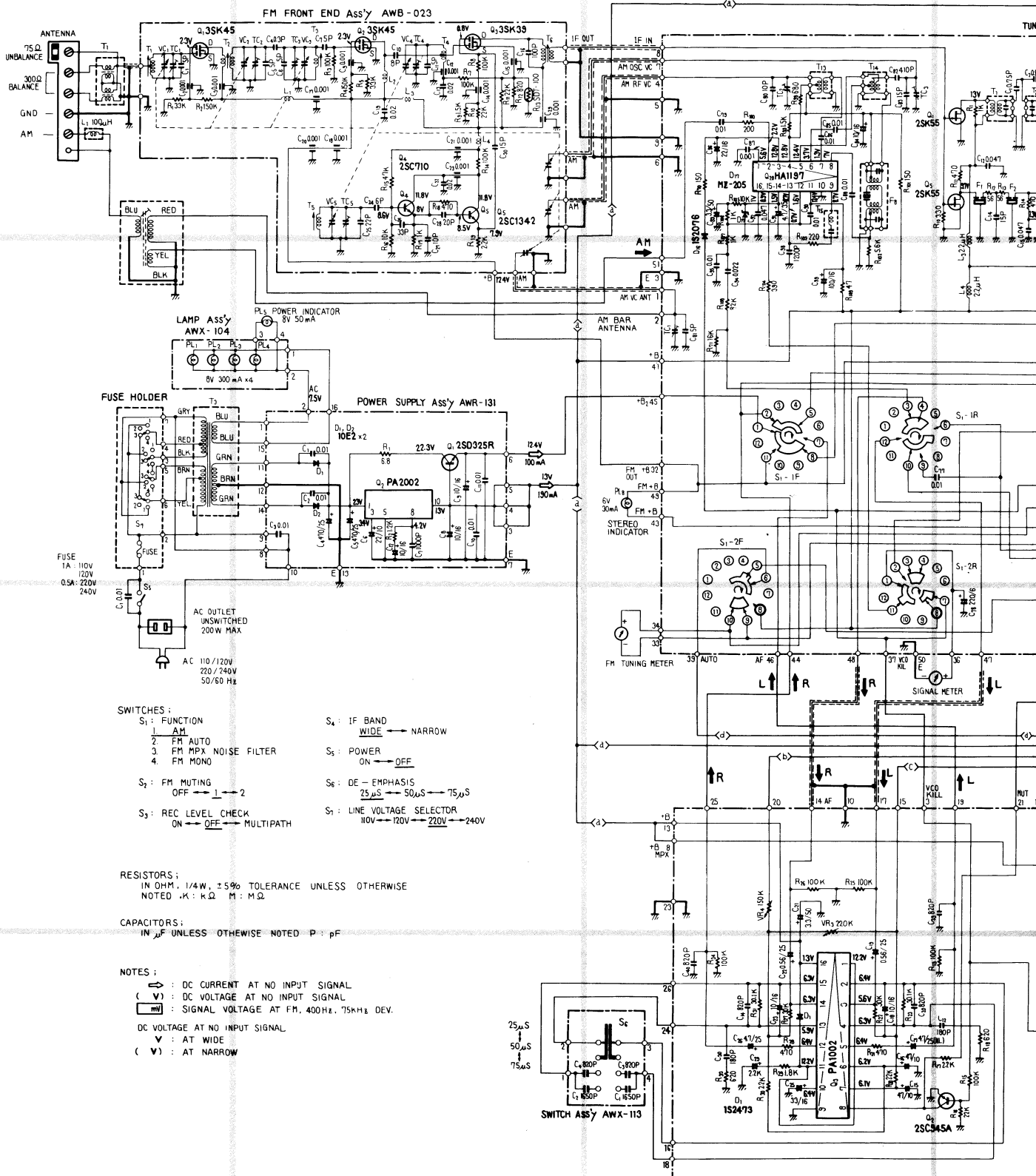
The indicated semiconductors are representative ones only. Other alternative semiconductors may be used and are listed in the parts list.

A

B

C

D





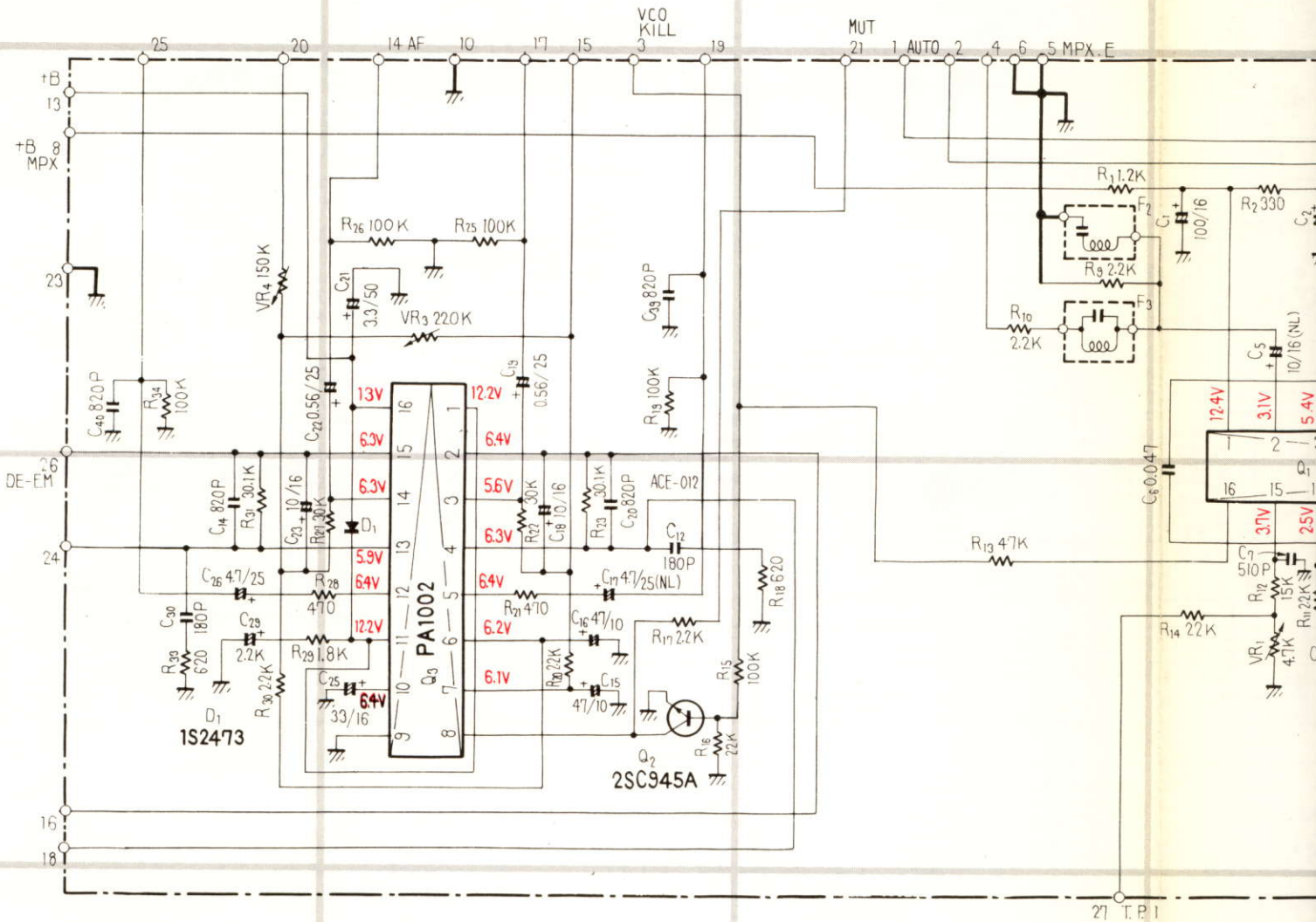
## 4.2 MPX AF ASSEMBLY (AWD-010)

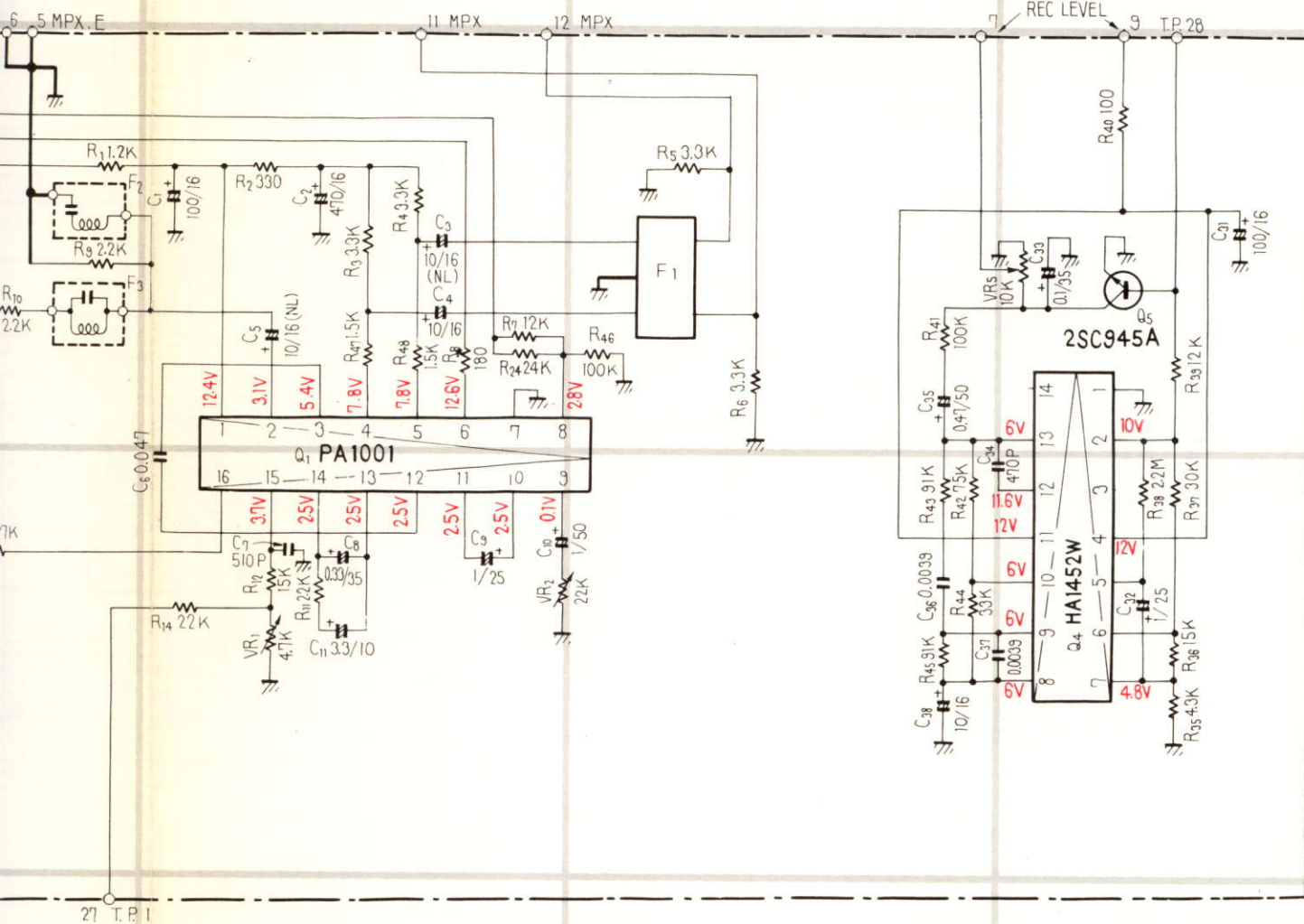
A

B

C

D





1

2

3

Foil side

A

B

C

D

AWE-070, No.44

AWX-113, No.1

AWX-113, No.2

AWE-070, No.31

AWE-070, No.22

AWE-070, No.46

AWX-113, No.4

AWX-113, No.3

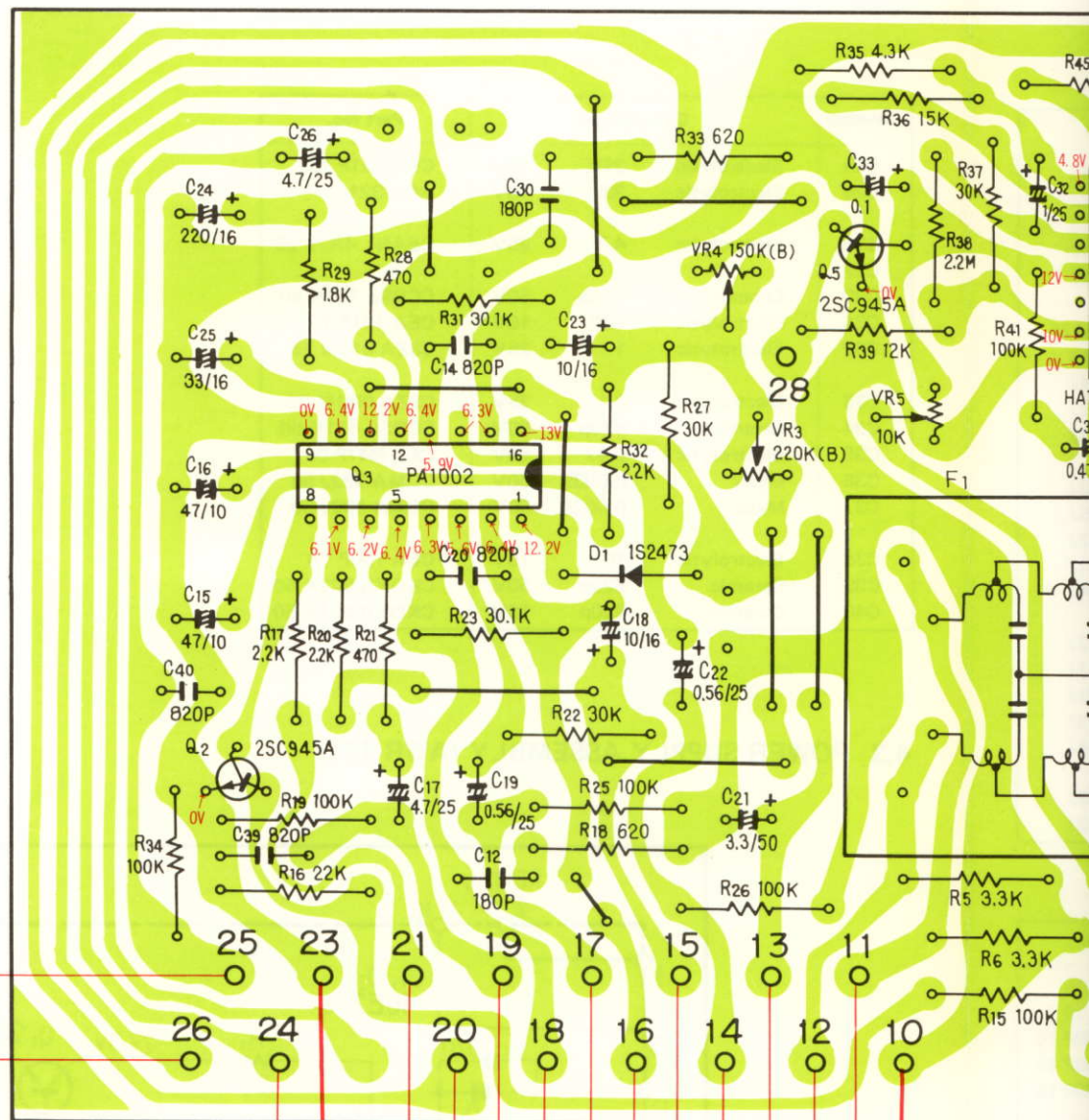
AWE-070, No.23

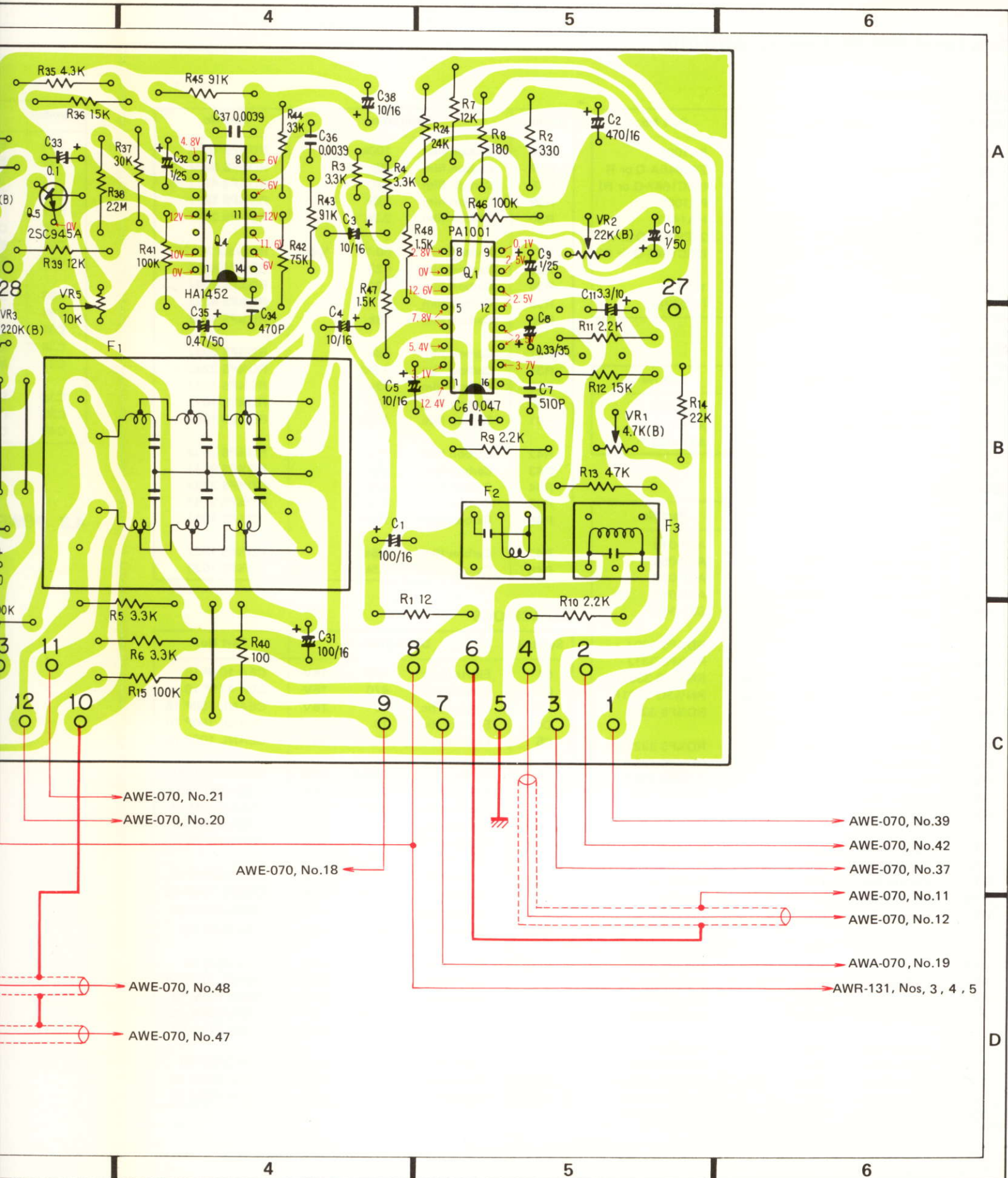
AWE-070, No.

AWE-070, No.

AWE-070, N

AWE-070, N





## Parts List of MPX AF Assembly (AWD-010)

## SEMICONDUCTORS

| Symbol | Description | Part No.                           |
|--------|-------------|------------------------------------|
| Q1     | IC          | PA1001                             |
| Q2     | Transistor  | 2SC945A-Q or R<br>(2SC1647-Q or R) |
| Q3     | IC          | PA1002                             |
| Q4     | IC          | HA1452                             |
| Q5     | Transistor  | 2SC945A-Q or R<br>(2SC1647-Q or R) |
| D1     | Diode       | 1S2473<br>(1S2076)                 |

## FILTERS

| Symbol | Description       | Part No. |
|--------|-------------------|----------|
| F1     | Low pass filter   | ATF-028  |
| F2     | Anti-birdy filter | ATF-024  |
| F3     | Anti-birdy filter | ATF-023  |

## RESISTORS

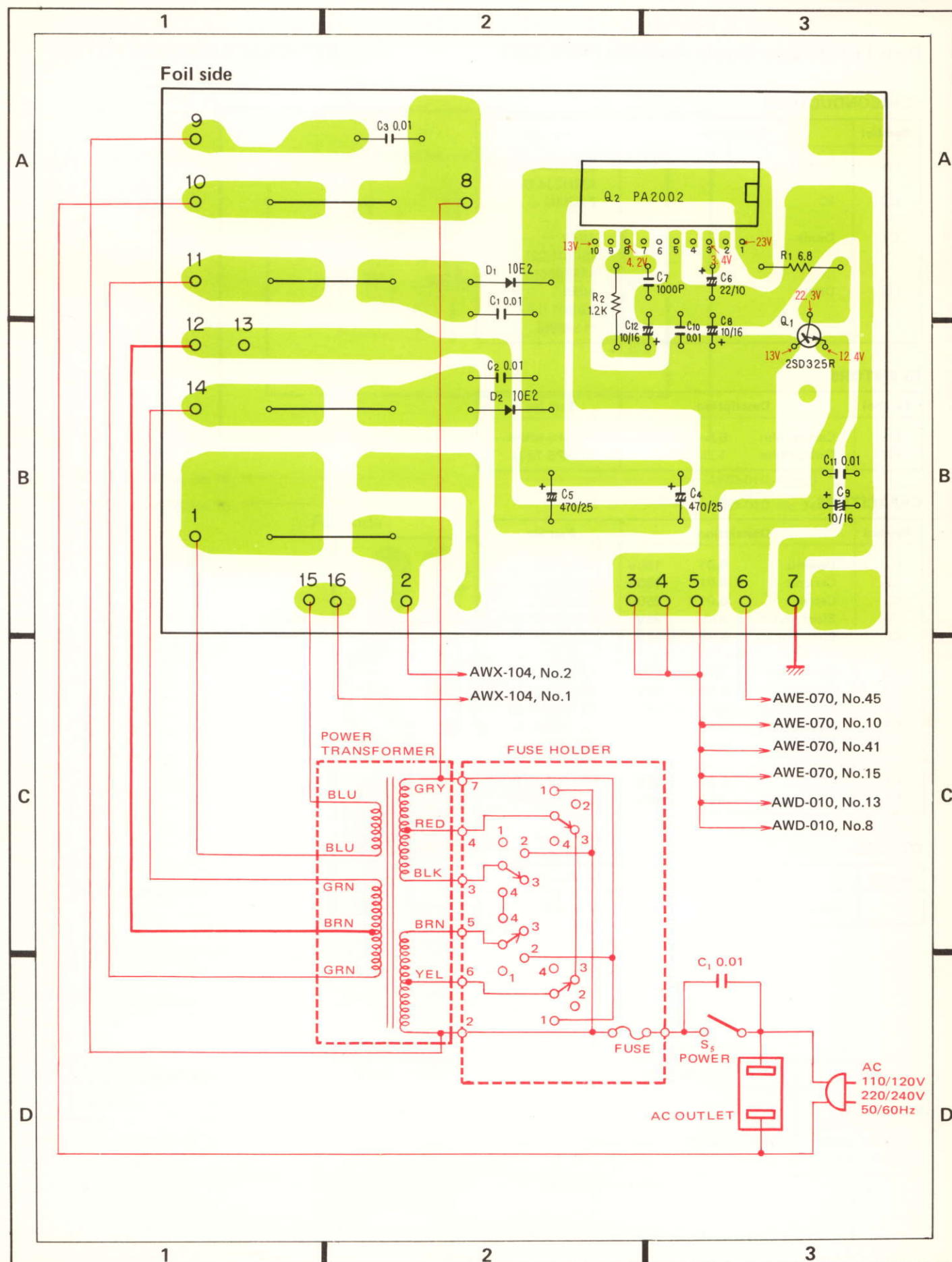
| Symbol | Description                     | Part No.                  |
|--------|---------------------------------|---------------------------|
| VR1    | Semi-fixed (4.7k)               | ACP-018                   |
| VR2    | Semi-fixed (22k)                | ACP-056                   |
| VR3    | Semi-fixed (220k)               | ACP-016                   |
| VR4    | Semi-fixed (150k)               | ACP-057                   |
| VR5    | Semi-fixed (10k)                | C92-049                   |
| R1     | Carbon film 12                  | RD%PS 120J                |
| R2     | Carbon film 330                 | RD%PS 331J                |
| R3     | Metal film 3.3k $\frac{1}{2}W$  | RN $\frac{1}{2}$ SQ 3301F |
| R4     | Metal film 3.3k $\frac{1}{2}W$  | RN $\frac{1}{2}$ SQ 3301F |
| R5     | Carbon film 3.3k                | RD%PS 332J                |
| R6     | Carbon film 3.3k                | RD%PS 332J                |
| R7     | Carbon film 12k                 | RD%PS 123J                |
| R8     | Carbon film 180                 | RD%PS 181J                |
| R9     | Carbon film 2.2k                | RD%PS 222J                |
| R10    | Carbon film 2.2k                | RD%PS 222J                |
| R11    | Carbon film 2.2k                | RD%PS 222J                |
| R12    | Carbon film 15k                 | RD%PS 153J                |
| R13    | Carbon film 47k                 | RD%PS 473J                |
| R14    | Carbon film 22k                 | RD%PS 223J                |
| R15    | Carbon film 100k                | RD%PS 104J                |
| R16    | Carbon film 22k                 | RD%PS 223J                |
| R17    | Carbon film 2.2k                | RD%PS 222J                |
| R18    | Carbon film 620                 | RD%PS 621J                |
| R19    | Carbon film 100k                | RD%PS 104J                |
| R20    | Carbon film 2.2k                | RD%PS 222J                |
| R21    | Carbon film 470                 | RD%PS 471J                |
| R22    | Carbon film 30k                 | RD%PS 303J                |
| R23    | Metal film 30.1k $\frac{1}{2}W$ | RN $\frac{1}{2}$ SQ 3012F |
| R24    | Carbon film 24k                 | RD%PS 243J                |
| R25    | Carbon film 100k                | RD%PS 104J                |

| Symbol | Description                     | Part No.                  |
|--------|---------------------------------|---------------------------|
| R26    | Carbon film 100k                | RD%PS 104J                |
| R27    | Carbon film 30k                 | RD%PS 303J                |
| R28    | Carbon film 470                 | RD%PS 471J                |
| R29    | Carbon film 1.8k                | RD%PS 182J                |
| R30    | Carbon film 2.2k                | RD%PS 222J                |
| R31    | Metal film 30.1k $\frac{1}{2}W$ | RN $\frac{1}{2}$ SQ 3012F |
| R33    | Carbon film 620                 | RD%PS 621J                |
| R34    | Carbon film 100k                | RD%PS 104J                |
| R35    | Carbon film 4.3k                | RD%PS 432J                |
| R36    | Carbon film 15k                 | RD%PS 153J                |
| R37    | Carbon film 30k                 | RD%PS 303J                |
| R38    | Carbon film 2.2M                | RD%PS 225J                |
| R39    | Carbon film 12k                 | RD%PS 123J                |
| R40    | Carbon film 100                 | RD%PS 101J                |
| R41    | Carbon film 100k                | RD%PS 104J                |
| R42    | Carbon film 75k                 | RD%PS 753J                |
| R43    | Carbon film 91k                 | RD%PS 913J                |
| R44    | Carbon film 33k                 | RD%PS 333J                |
| R45    | Carbon film 91k                 | RD%PS 913J                |
| R46    | Carbon film 100k                | RD%PS 104J                |
| R47    | Carbon film 1.5k                | RD%PS 152J                |
| R48    | Carbon film 1.5k                | RD%PS 152J                |

## CAPACITORS

| Symbol | Description           | Part No.      |
|--------|-----------------------|---------------|
| C1     | Electrolytic 100 16V  | CEA 101P 16   |
| C2     | Electrolytic 470 16V  | CEA 471P 16   |
| C3     | Electrolytic 10 16V   | CEANL 100P 16 |
| C4     | Electrolytic 10 16V   | CEANL 100P 16 |
| C5     | Electrolytic 10 16V   | CEANL 100P 16 |
| C6     | Mylar 0.047 50V       | CQMA 473K 50  |
| C7     | Polystyrene 510p 50V  | CQSH 511J 50  |
| C8     | Electrolytic 0.33 35V | CSZA R33M 35  |
| C9     | Electrolytic 1 25V    | CSZA 010M 25  |
| C10    | Electrolytic 1 50V    | CEA 010P 50   |
| C11    | Electrolytic 3.3 10V  | CSZA 3R3M 10  |
| C12    | Ceramic 180p 50V      | CCDSL 181K 50 |
| C14    | Polystyrene 820p 50V  | CQSA 821G 50  |
| C15    | Electrolytic 47 10V   | CEA 470P 10   |
| C16    | Electrolytic 47 10V   | CEA 470P 10   |
| C17    | Electrolytic 4.7 25V  | CEANL 4R7P 25 |
| C18    | Electrolytic 10 16V   | CSZA 100M 16  |
| C19    | Electrolytic 0.56 35V | CSZA R56K 35  |
| C20    | Polystyrene 820p 50V  | CQSA 821G 50  |
| C21    | Electrolytic 3.3 50V  | CEA 3R3P 50   |
| C22    | Electrolytic 0.56 35V | CSZA R56K 35  |
| C23    | Electrolytic 10 16V   | CSZA 100M 16  |





## Parts List of Power Supply Assembly (AWR-131)

### SEMICONDUCTORS

| Symbol | Description | Part No.                          |
|--------|-------------|-----------------------------------|
| Q1     | Transistor  | 2SD325R-D or R<br>(2SD234-O or R) |
| Q2     | IC          | PA2002                            |
| D1     | Diode       | 10E2<br>(S1B01-02)<br>(1S1886)    |
| D2     | Diode       | 10E2<br>(S1B01-02)<br>(1S1886)    |

### RESISTORS

| Symbol | Description      | Part No.   |
|--------|------------------|------------|
| R1     | Carbon film 6.8  | RD¼PS 6R8J |
| R2     | Carbon film 1.2k | RD¼PS 122J |

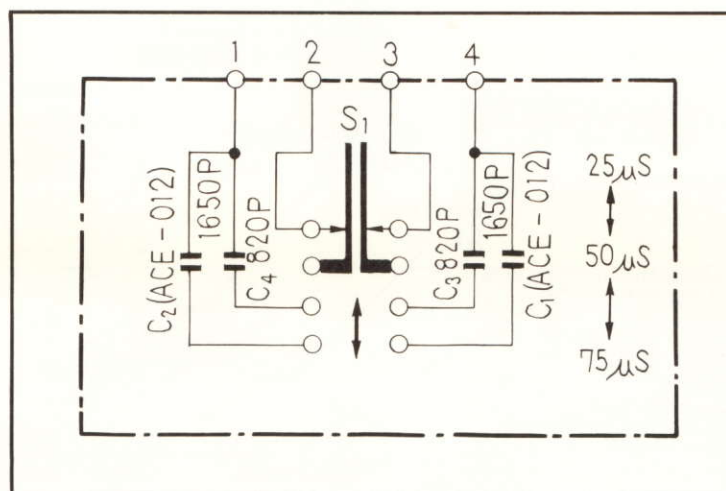
### CAPACITORS

| Symbol | Description          | Part No.      |
|--------|----------------------|---------------|
| C1     | Ceramic 0.01 150V    | ACG-004       |
| C2     | Ceramic 0.01 150V    | ACG-004       |
| C3     | Ceramic 0.01 250V    | ACG-001       |
| C4     | Electrolytic 470 25V | CEA 471P 25   |
| C5     | Electrolytic 470 25V | CEA 471P 25   |
| C6     | Electrolytic 22 10V  | CEA 220P 10   |
| C7     | Ceramic 0.001 50V    | CKDYB 102K 50 |
| C8     | Electrolytic 10 16V  | CEA 100P 16   |
| C9     | Electrolytic 10 16V  | CEA 100P 16   |
| C10    | Ceramic 0.01 50V     | CKDYB 103K 50 |
| C11    | Ceramic 0.01 50V     | CKDYB 103K 50 |
| C12    | Electrolytic 10 16V  | CEA 100P 16   |

### OTHERS

| Symbol | Description | Part No. |
|--------|-------------|----------|
|        | Heat sink   | ANH-117  |

## 4.4 SWITCH ASSEMBLY (AWX-113)



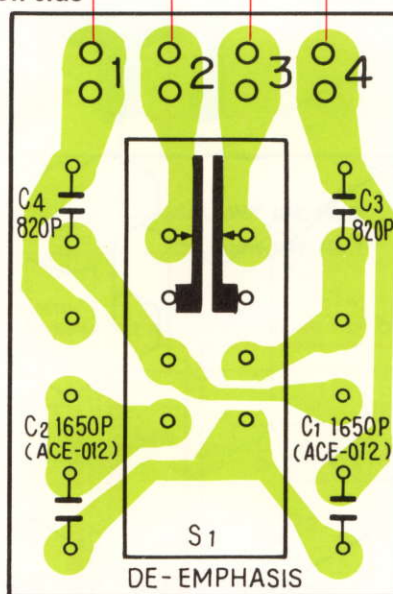
AWD-010, No.18

AWD-010, No.16

Foil side

AWD-010, No.26

AWD-010, No.24



## Parts List

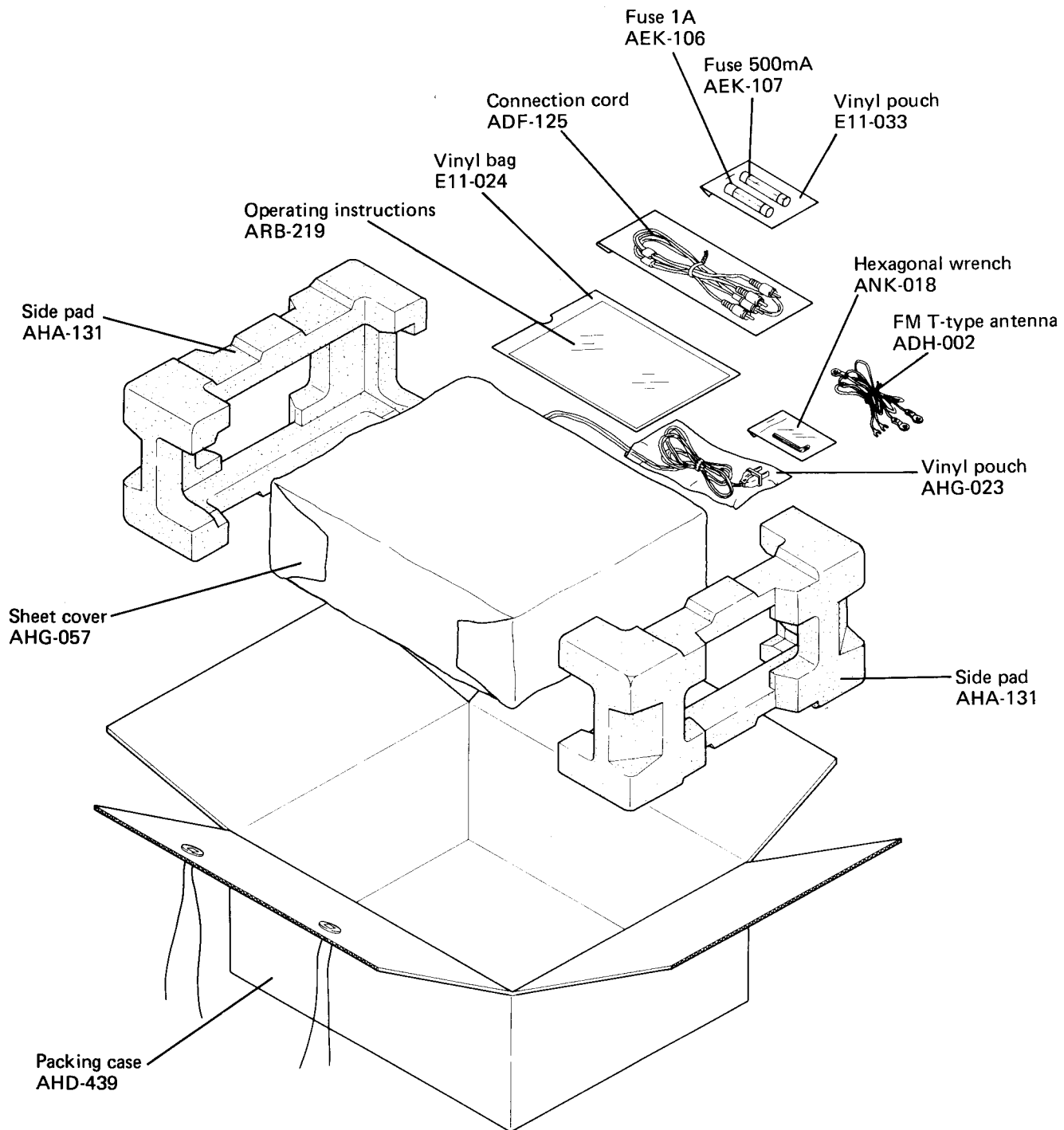
## SWITCH

| Symbol | Description                | Part No. |
|--------|----------------------------|----------|
| S1     | Slide switch (DE-EMPHASIS) | ASH-017  |

## CAPACITORS

| Symbol | Description           | Part No.     |
|--------|-----------------------|--------------|
| C1     | Polystyrene 1650p 50V | ACE-012      |
| C2     | Polystyrene 1650p 50V | ACE-012      |
| C3     | Polystyrene 820p 50V  | CQSA 821G 50 |
| C4     | Polystyrene 820p 50V  | CQSA 821G 50 |

## 4.5 PACKING



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