

# Service Manual

FM/AM Stereo Receiver

SA-222

[M], [MC]

**Areas**

- \* [M] is available in U.S.A.  
\* [MC] is available in Canada.

## TECHNICAL SPECIFICATIONS

Specifications are subject to change without notice for further improvement.

(IHF '78)

### ■ AMPLIFIER SECTION

**Rated minimum sine wave RMS power output**  
20 Hz~20 kHz both channels driven  
0.04% total harmonic distortion  
30W per channel (8 ohms)

**1 kHz continuous power output**  
both channels driven  
0.04% total harmonic distortion

33W per channel (8 ohms)  
35W per channel (4 ohms)

**Dynamic headroom** 0.7 dB (8 ohms)

**Total harmonic distortion**  
rated power at 20 Hz~20 kHz 0.04% (8 ohms)  
half power at 20 Hz~20 kHz 0.025% (8 ohms)  
half power at 1 kHz 0.009% (8 ohms)

**SMPTE intermodulation distortion** 0.04% (8 ohms)

**PHONO** RIAA standard curve  $\pm 0.8$  dB  
**TUNER, AUX, TAPE** 5 Hz~70 kHz, -3 dB  
20 Hz~20 kHz, +0.2 dB, -0.2 dB

**Input sensitivity**  
**PHONO** 0.5 mV (2.5 mV, IHF '66)  
**TAPE** 30 mV (150 mV, IHF '66)

**S/N (IHF, A)**  
**PHONO** 75 dB (80 dB, IHF '66)  
**TUNER, AUX, TAPE** 80 dB (95 dB, IHF '66)

**Maximum input voltage**  
**PHONO** 120 mV (130 mV, 1 kHz)

**Input impedance**  
**PHONO** 47 kilohms  
**TAPE** 22 kilohms

**Tone controls**  
**BASS** 50 Hz, +10 dB~ -10 dB  
**TREBLE** 20 kHz, +10 dB~ -10 dB

**Subsonic filter** 30 Hz, -6 dB/oct.  
**Loudness control (volume at -30 dB)** 50 Hz, +9 dB  
**Low frequency damping factor** 30 (8 ohms)  
15 (4 ohms)

**Load impedance**  
**MAIN or REMOTE** 4~16 ohms  
**MAIN and REMOTE** 8~16 ohms

### ■ FM TUNER SECTION

**Frequency range** 87.9~107.9 MHz  
**Sensitivity** 10.8 dBf (1.9  $\mu$ V, IHF '58)

**50 dB quieting sensitivity**  
**MONO** 13.7 dBf (2.7  $\mu$ V IHF '58)  
**STEREO** 37.2 dBf (39.7  $\mu$ V IHF '58)

**Total harmonic distortion**  
**100 Hz** 0.15% (MONO), 0.2% (STEREO)  
**1 kHz** 0.15% (MONO), 0.2% (STEREO)  
**6 kHz** 0.3% (MONO), 0.3% (STEREO)

**S/N**  
**MONO** 75 dB  
**STEREO** 70 dB

**Frequency response** 20 Hz~15 kHz, +1 dB, -2 dB  
**Alternate channel selectivity** 70 dB

**Capture ratio** 1.2 dB

**Image rejection at 98 MHz** 55 dB

**IF rejection at 98 MHz** 75 dB

**Spurious response rejection at 98 MHz** 82 dB

**AM suppression** 55 dB

**Stereo separation**  
**1 kHz** 42 dB  
**10 kHz** 32 dB

**Carrier leak**  
**19 kHz** -38 dB  
**38 kHz** -50 dB

**Antenna terminals** 300 ohms (balanced)  
75 ohms (unbalanced)

# Technics

Panasonic Company  
Division of Matsushita Electric  
Corporation of America  
One Panasonic Way, Secaucus,  
New Jersey 07094

Panasonic Hawaii, Inc.  
320 Waiakamilo Road, Honolulu,  
Hawaii 96817

Panasonic Canada  
Division of Matsushita Electric,  
of Canada Ltd.  
5770 Ambler Drive,  
Mississauga, Ontario L4W 2T3

## ■ AM TUNER SECTION

Frequency range	530~1620 kHz
Sensitivity	30 $\mu$ V, 300 $\mu$ V/m
Selectivity	55 dB
Image rejection at 1000 kHz	50 dB
IF rejection at 1000 kHz	40 dB

## ■ GENERAL

Power consumption	185W
Power supply	AC 120V, 60 Hz

## Dimensions (W×H×D)

430 × 120 × 300 mm  
(16-15/16" × 4-23/32" × 11-13/16")

## Weight

5.9 kg  
(13 lb.)

## Note:

This unit is equipped with an FM/AM allocation selector on the rear panel. The specifications shown above are correct with this selector set to the "FM 0.2 MHz/AM 10 kHz" position. If it is set to the "FM 0.05 MHz/AM 9 kHz" position, however, the FM frequency range becomes 87.50~108.00 MHz, and the AM frequency becomes 522~1611 kHz.

Weights and dimensions shown are approximate.

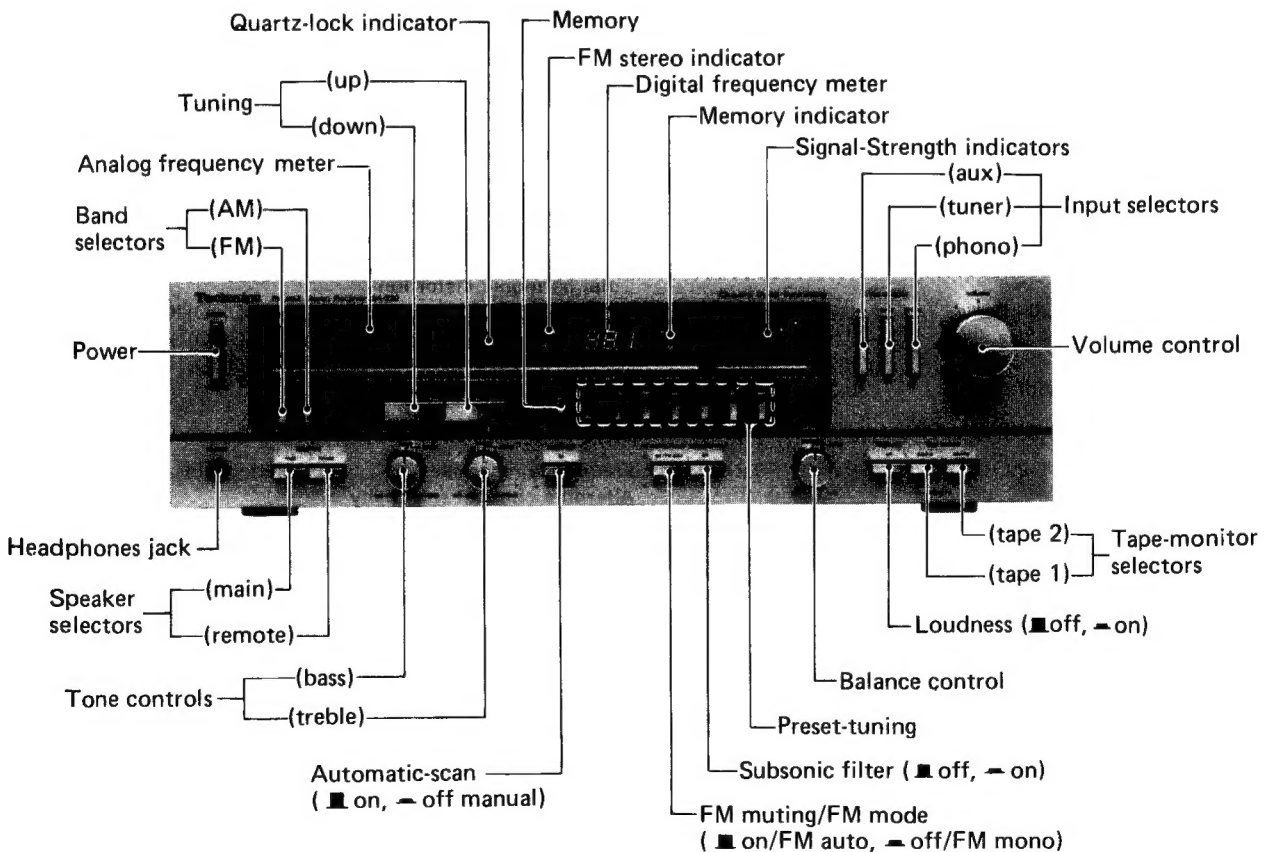
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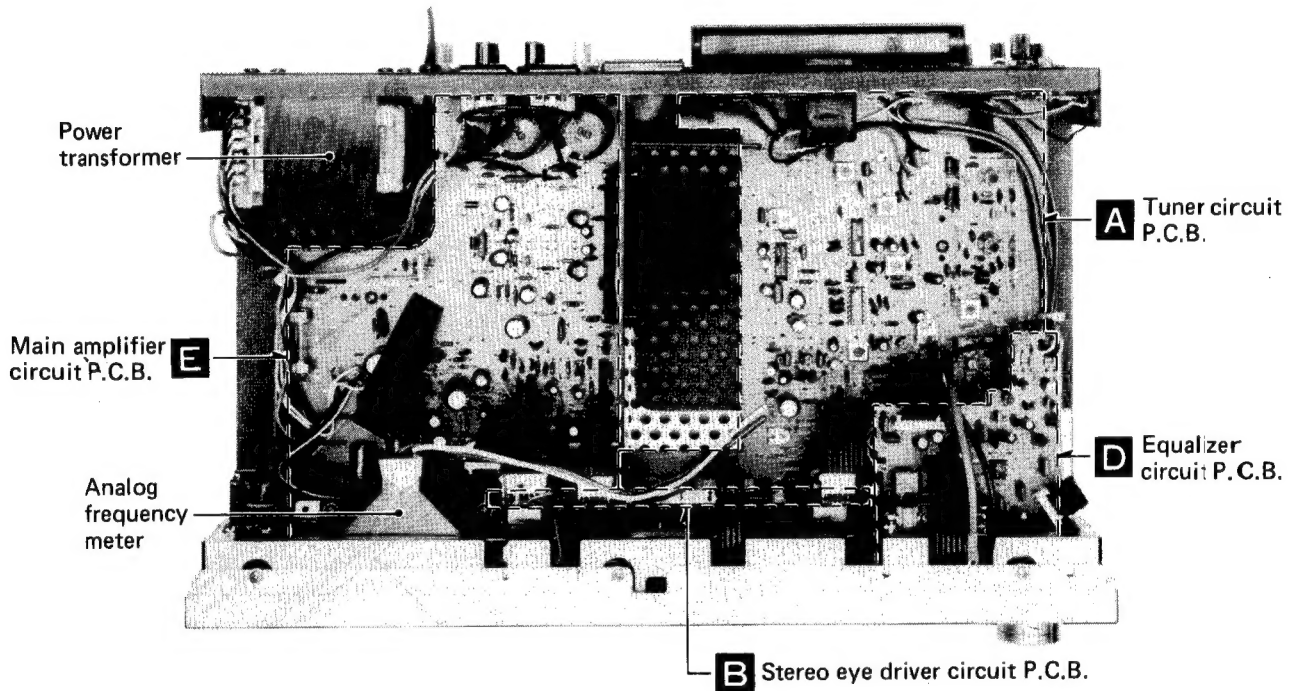
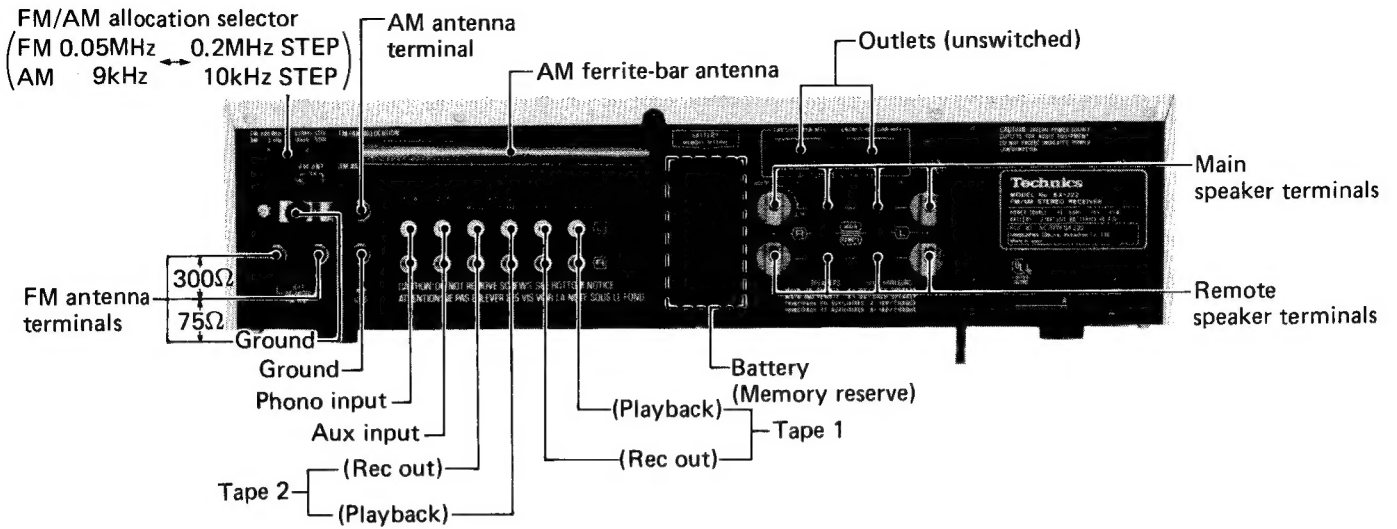
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## ■ LOCATION OF CONTROLS

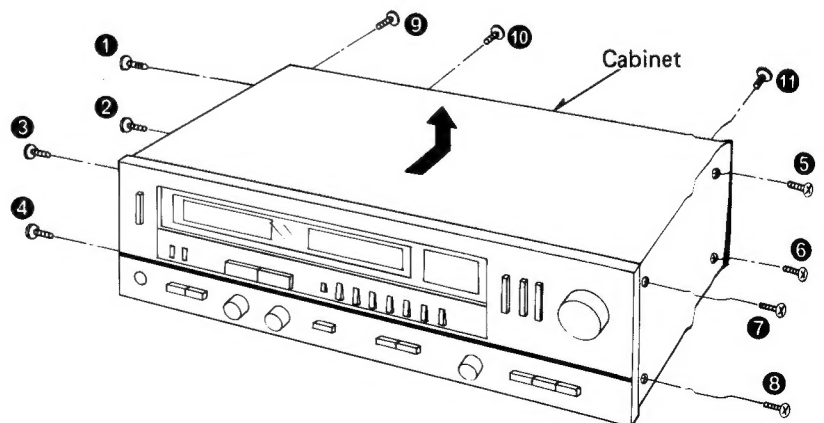




## DISASSEMBLY INSTRUCTIONS

### How to remove the cabinet

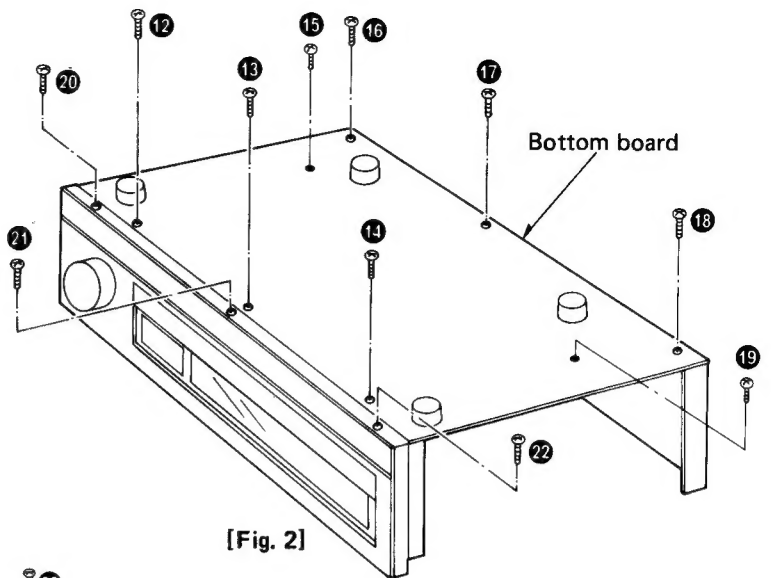
1. Remove the 8 setscrews (Fig. 1 : ①~⑧) on the side and 3 setscrews (Fig. 1 : ⑨~⑪) on the back of the cabinet.
2. Remove the cabinet.



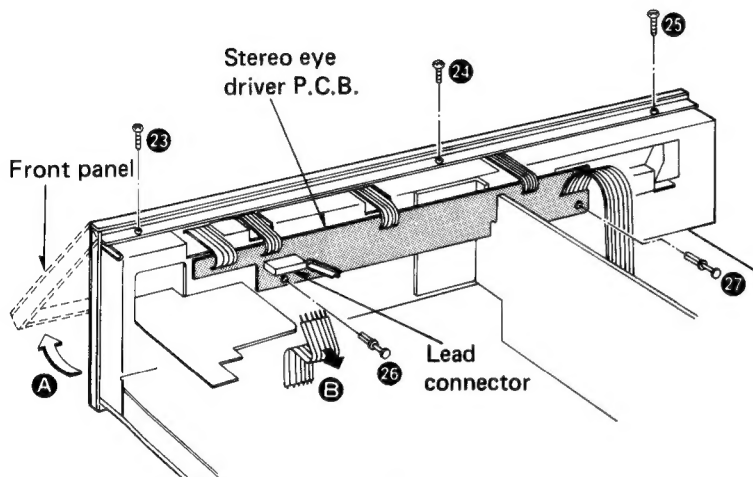
[Fig. 1]

## • How to remove the bottom board

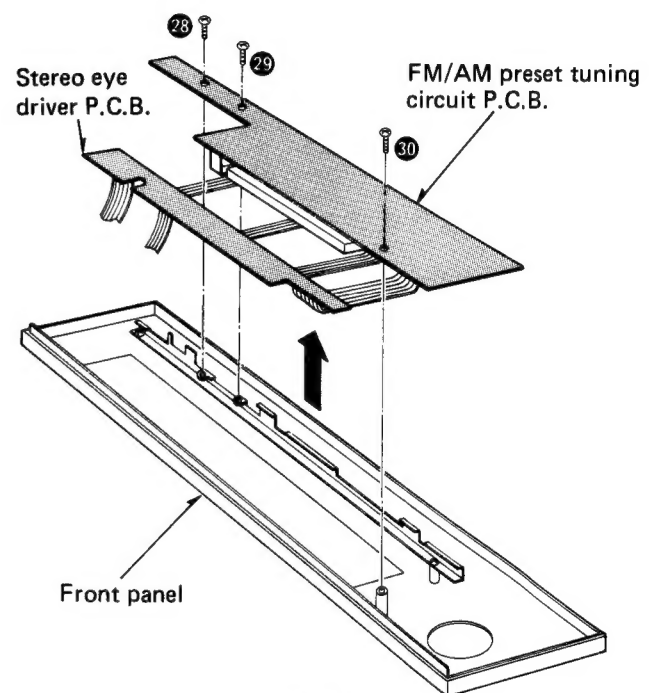
1. Remove the 8 setscrews (Fig. 2 : 12 ~ 19) of the bottom board.
2. Remove the bottom board.



[Fig. 2]



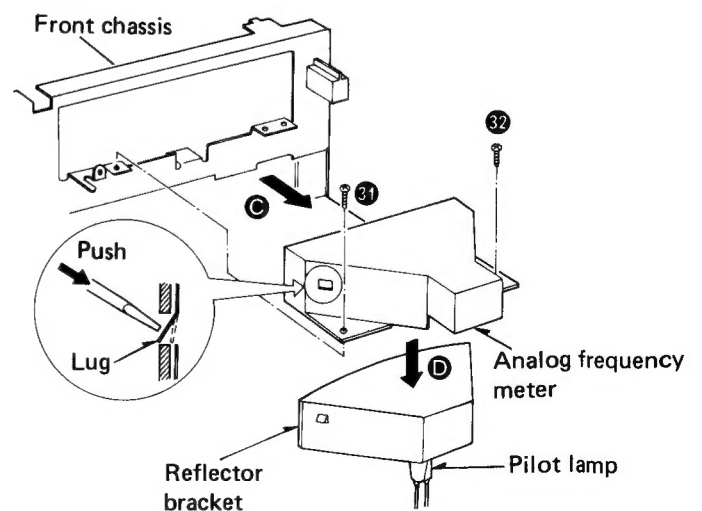
[Fig. 3]



[Fig. 4]

## • How to remove the FM/AM preset tuning printed circuit board and the analog frequency meter

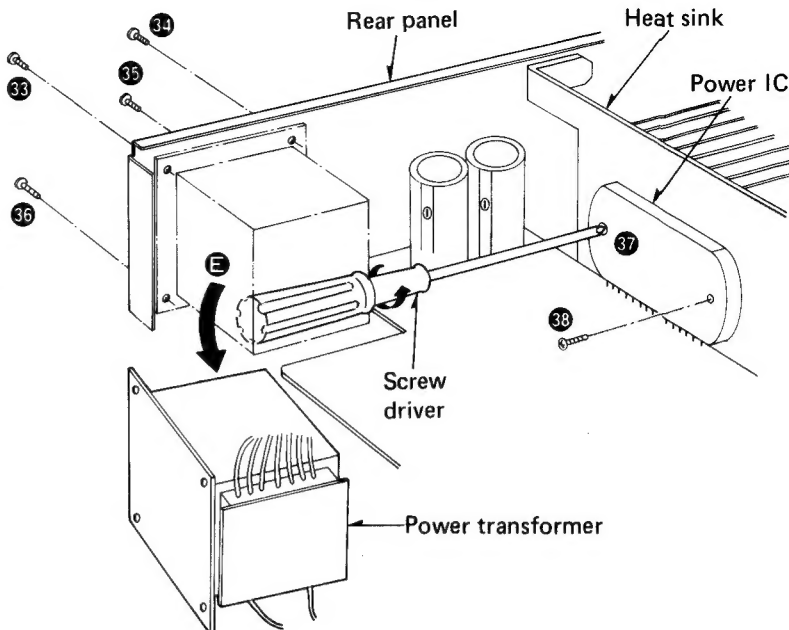
1. Remove the cabinet.
2. Remove the 6 setscrews (Fig. 2 and 3 : 20 ~ 25) of the front panel.
3. Move the front panel in the direction of the arrow A in Fig. 3.
4. Open the "lead holder" of the lead connector and pull out the lead wire of the arrow B in Fig. 3.
5. Remove the 2 lock pins (Fig. 3 : 26 , 27) to detach the stereo eye driver printed circuit board.
6. Remove the 3 setscrews (Fig. 4 : 28 ~ 30) to detach the FM/AM preset tuning printed circuit board.
7. Remove the 2 setscrews (Fig. 5 : 31 , 32) to detach the analog frequency meter in direction of the arrow C, and 2 lugs (Reflector bracket of left and right side) to detach the reflector bracket from the analog frequency meter in direction of the arrow D.



[Fig. 5]

## ● How to remove the power IC

1. Remove the cabinet and bottom board. (Refer to "How to remove the cabinet," and "How to remove the bottom board.")
2. Remove the 4 setscrews (Fig. 6 : 33 ~ 36) to detach the power transformer from rear panel in the direction of the arrow **E**.
3. Unsolder of power IC.
4. Remove the 2 setscrews (Fig. 6 : 37 , 38) used to secure the power IC on the heat sink, and then pull the power IC.
5. When mounting the power IC, apply silicone compound (or equivalent heat diffuser) to the rear side of power IC, and then follow the steps 1 ~ 4 reversely.



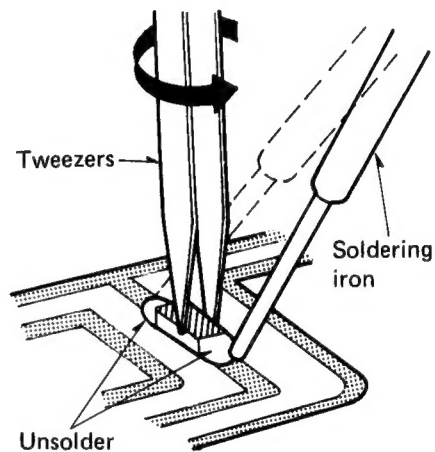
[Fig. 6]

## ● How to replace chips (resistor, capacitor and jumper)

1. Unsolder from chip by using solder sucker.
2. Remove chip with tweezers by rotating it while removing solder as shown in Fig. 7.
3. Solder circuit board first and then solder chip in the direction of the arrow as shown in Fig. 8.

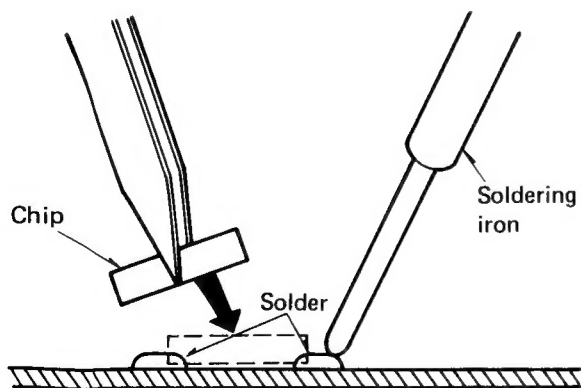
### Notes:

1. Do not use chip again which is removed from printed circuit board.
2. Use lead wire with insulator for replacement instead of chip jumper.



[Fig. 7]

Color	Original Parts Name
Black	Chip Resistor and Jumper
Brown, White or Green	Chip Capacitor



[Fig. 8]

## ● Note for replacing chips

1. Do not heat chips more than three (3) seconds.
2. Be careful not to damage the electrode of chips.
3. Use soldering iron (less than 60W) and tweezers for replacing chips.

## ● Precautions for repair

When frequency is not indicated, FL (display tube), FL driver, digit circuit, and micro-computer must be checked by oscilloscope.

In this case, take care not to allow short circuit between IC terminals or application of voltage from measuring instrument to IC terminals.

\* Since standardized parts are mentioned in the parts list, they are sometimes different in Part No. and Color from the product parts.

Screw No.	Type	Color	Product Part No.	Figure No.
① ~ ③	⊕ 4 x 8 mm, Tapping	Silver	XTB4+8FFN	Fig. 1
④ ~ ⑥	⊕ 3 x 10 mm, Tapping	Black	XTB3+10BFZ	Fig. 1
⑦ ~ ⑨	⊕ 3 x 12 mm, Tapping (With plain washer)	Red	XTW3+12HFYR	Fig. 2
⑩ ~ ⑫	⊕ 3 x 8 mm, Tapping	Black	XTB3+8BFZ	Fig. 2 and 3
⑬ ~ ⑮	⊕ 3 x 10 mm, Tapping	Gold	XTB3+10B	Fig. 4
⑯, ⑰	⊕ 3 x 10 mm, Tapping (With plain washer)	Gold	XTW3+10H	Fig. 5
⑱ ~ ㉑	⊕ 4 x 10 mm, (With spring washer & plain washer)	Black	XYA4+FF10FZ	Fig. 6
㉒, ㉓	⊕ 3 x 16 mm, Tapping (With plain washer)	Gold	XTW3+16H	Fig. 6

## ADJUSTING INSTRUCTIONS

Note: AM OSC Coil (L202) and AM 2nd IFT (T202) have been already adjusted, and require no adjustment.

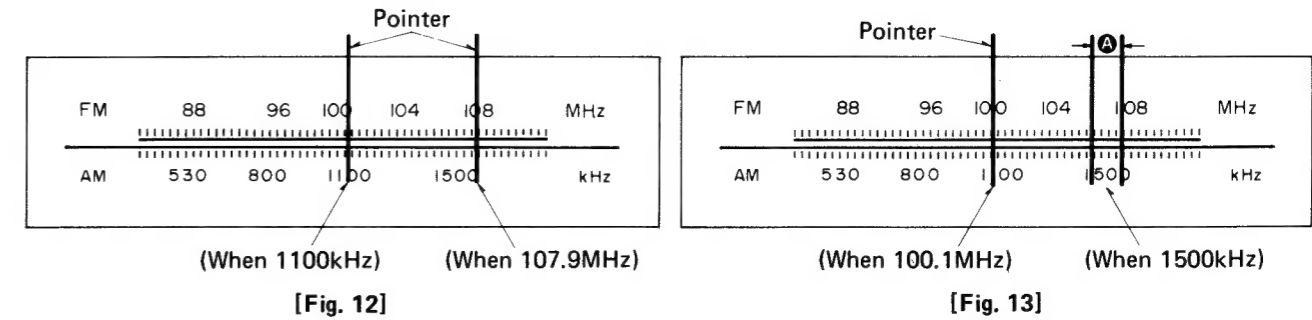
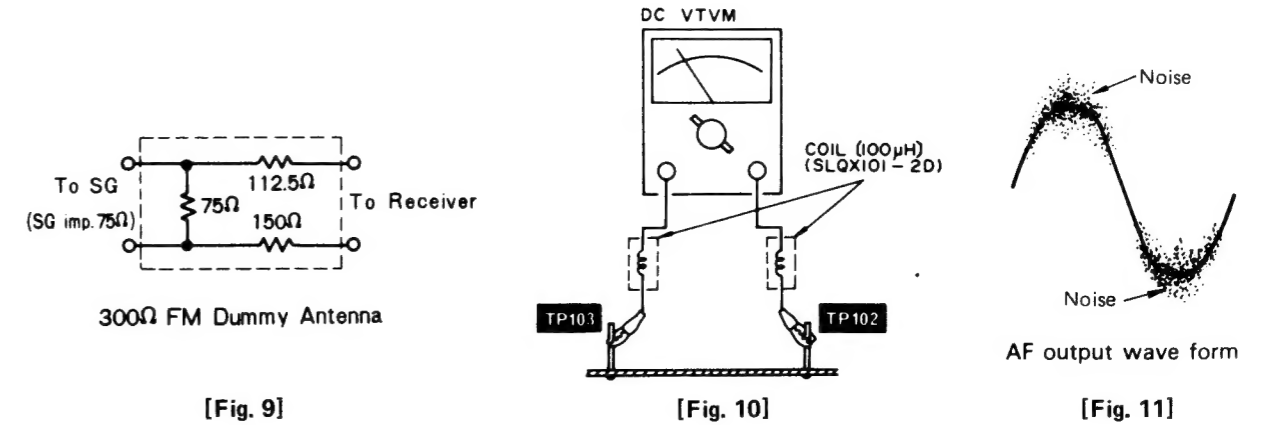
### AM TUNER ADJUSTMENT

* Setting and Equipment used							
<ol style="list-style-type: none"> <li>AC and DC electronic voltmeters (VTVM)</li> <li>AM signal generator (AM-SG)</li> <li>Maintain line voltage at 120 volts.</li> <li>Output of signal generator should be no higher than necessary to obtain an output reading.</li> <li>Pull the AM ferrite-bar antenna (L201) outward.</li> <li>Set input selector to "tuner" position.</li> <li>Use a non-metal screwdriver for the adjustment.</li> <li>Set FM-AM muting/mode switch to "on/FM auto" position.</li> <li>Set band selector to "AM" position.</li> <li>Set tape monitor switch to "source" position.</li> <li>Set speaker selector to "main" position.</li> <li>Set automatic-scan switch to "off" position.</li> <li>Set FM/AM allocation selector to "0.2MHz/10kHz" position.</li> </ol>							
AM SIGNAL GENERATOR		DISPLAY FREQUENCY	PREPARATIONS	PARTS ADJUSTED	ADJUSTING PROCEDURE		
CONNECTION	FREQUENCY						
<b>AM-IF ADJUSTMENT</b>							
Step No.	1	Connect AM-SG to AM antenna terminal through 220pF capacitor. Common to chassis. (Powerful input)	450kHz (30% mod. with 400Hz)	Frequency of non-interference	Connect AC VTVM or scope to "Speaker" terminals of the set.	T201 (1st IFT)	1. Adjust the input frequency and adjustment points so that the output becomes maximum.
<b>ANALOG FREQUENCY METER ADJUSTMENT</b> * Set band selector to "FM" position.							
2	—	No-Signal	90.1MHz	Connect DC VTVM to TP1 terminal.	L4 (FM OSC Coil)	1. Adjust L4 so that voltage measured by DC voltmeter is $4.49 \pm 0.05V$ .	
3	—	No-Signal	106.1MHz	Connect DC VTVM to TP1 terminal.	CT1 (FM OSC Trimmer)	1. Adjust CT1 so that voltage measured by DC voltmeter is $10.71 \pm 0.05V$ .	
4	—	No-Signal	100.1MHz	—————	VR102 (Frequency meter)	1. Adjust VR102 so that the frequency meter indicates 100.1MHz. (Refer to Fig. 13)	
5	—	No-Signal	107.9MHz	—————	VR102 (Frequency meter)	1. Adjust VR102 so that the frequency meter indicates 107.9MHz. (Refer to Fig. 12) 2. Repeat steps (4) and (5).	
<b>AM-RF ADJUSTMENT</b> * Set band selector to "AM" position.							
6	—	No-Signal	1100kHz	Connect DC VTVM to TP1 terminal.	CT202 (AM OSC Trimmer)	1. Adjust CT202 so that the frequency meter indicates 1100kHz. (Refer to Fig. 12) 2. If it is not adjustable, set the frequency to 530kHz and adjust L202 (AM OSC Coil) so that the voltage of TP1 is $1.2 \pm 0.05V$ . 3. Next, set the frequency to 1500kHz and make sure that the range is within A of Fig. 13. If it is not within the range, perform the adjustments of steps 1 and 3 again.	

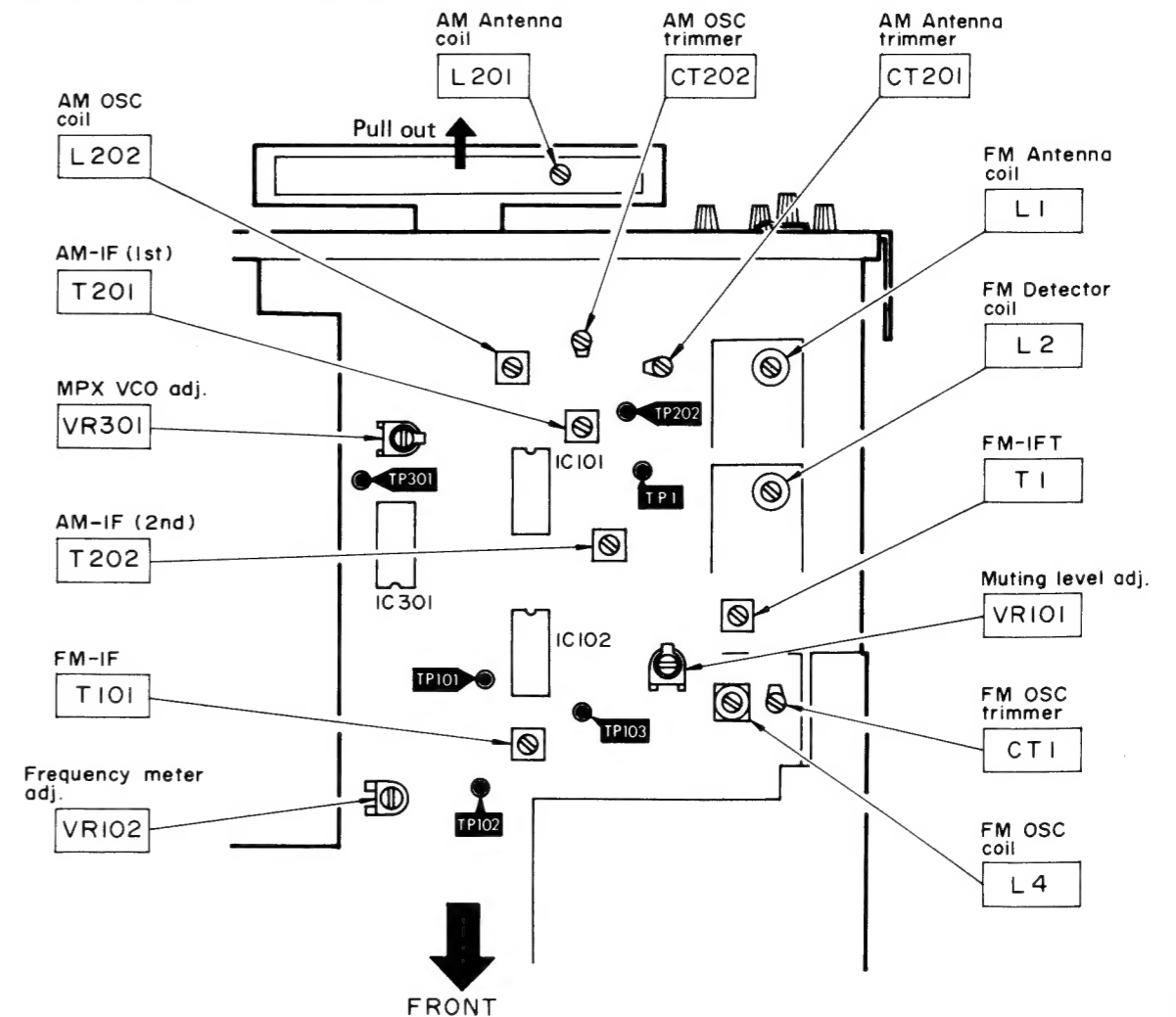
AM SIGNAL GENERATOR		DISPLAY FREQUENCY	PREPARATIONS	PARTS ADJUSTED	ADJUSTING PROCEDURE	
CONNECTION	FREQUENCY					
<b>AM-RF ADJUSTMENT</b>						
7	Connect AM-SG to AM antenna terminal through 200pF capacitor. Common to chassis. (Weak input)	610kHz (30% Mod. with 400Hz)	610kHz	Connect AC VTVM to scope to "Speaker" terminals of the set.	L201 (ANT Coil)	1. Adjust for maximum output. 2. Adjust ferrite core of L201 by screwdriver.
		1500kHz (30% Mod. with 400Hz)	1500kHz	Connect AC VTVM to scope to "Speaker" terminals of the set.	CT201 (ANT Trimmer)	1. Adjust for maximum output. 2. Repeat step (7) until the frequency correctly matches the dial display.

**FM TUNER ADJUSTMENT**

<p><b>* Equipment used</b></p> <ol style="list-style-type: none"> <li>1. FM signal generator (FM-SG)</li> <li>2. Stereo modulator</li> <li>3. Distortion analyser</li> <li>4. Oscilloscope</li> <li>5. AC and DC electronic voltmeters (VTVM).</li> <li>6. Frequency counter (19kHz and 108MHz measurable).</li> <li>7. FM 300Ω dummy antenna (Fig. 9)</li> </ol>		<p><b>* Preparation of FM signal generator (FM-SG)</b></p> <ol style="list-style-type: none"> <li>1. Connect stereo modulator to FM-SG.</li> <li>2. Apply SG output to antenna terminal of the set through 300Ω FM dummy antenna.</li> <li>3. The standard input of the set is 60dB (1mV), 400Hz 100% modulation (Because of using dummy antenna, SG output must be 12dB plus (IHF). That is, when input is 60dB, SG output is to be 72dB.</li> </ol>				
<p><b>* Setting</b></p> <ol style="list-style-type: none"> <li>1. Set band selector to "FM" position.</li> <li>2. Other setting are the same as in AM tuner adjustment.</li> </ol>						
<p><b>AM SIGNAL GENERATOR</b></p>		DISPLAY FREQUENCY	PREPARATIONS	PARTS ADJUSTMENT	ADJUSTING PROCEDURE	
CONNECTION	FREQUENCY					
<b>FM-IF ADJUSTMENT</b>						
8	No-Signal	100.1MHz	Connect DC VTVM between TP102 and TP103 through choke coil. (Refer to Fig. 10)	T101 (Discr. IFT)	Adjust T101 core so that voltage measured in signal mode is 0V in 300mV range.	
<b>FM RF ADJUSTMENT</b>						
9	Connect FM-SG to FM antenna terminal through 300Ω FM dummy antenna.	90.1MHz (100% Mod. with 400Hz) Weak input	90.1MHz	Connect scope to "Speaker" terminals of the set.	L1 (FM ANT Coil) L2 (FM DET Coil) T1 (FM IFT)	<ol style="list-style-type: none"> <li>1. Check step (2) and if it is deflected readjust of L4.</li> <li>2. Add weak input so that noise is included in the output wave form.</li> <li>3. Make the adjustment so that the output wave form is vertically symmetrical. (Refer to Fig. 11)</li> <li>4. Check step (3) and if it is deflected readjust of CT1.</li> </ol>
<b>FM MUTING LEVEL ADJUSTMENT</b>						
10	Connect FM-SG to FM antenna terminal through 300Ω FM dummy antenna. (Apply 16dB to antenna terminal)	100.1MHz (100% Mod. with 400Hz)	100.1MHz	Connect AC VTVM or scope to "Speaker" terminals of the set.	VR101 (Muting level)	<ol style="list-style-type: none"> <li>1. Set the FM muting/FM mode switch to "off/mono".</li> <li>2. With the FM muting/FM mode switch set to "on/auto" adjust VR101 so that the output is given with muting condition released.</li> </ol>
<b>FM MPX PILOT (VCO) ADJUSTMENT</b>						
11	Connect FM-SG to FM antenna terminal through 300Ω FM dummy antenna.	100.1MHz (Non-modulated)	100.1MHz	Connect frequency counter to TP301 terminal through resistor (100kΩ)	VR301 (VCO)	<ol style="list-style-type: none"> <li>1. Set the FM muting/FM mode switch to "on/auto".</li> <li>2. Adjust VR301 to 19kHz ± 30Hz.</li> </ol>
<b>STEREO DISTORTION ADJUSTMENT</b>						
12	Connect FM-SG to FM antenna terminal through 300Ω FM dummy antenna. (Pilot 10% Mod. stereo signal)	100.1MHz (100% Mod. with 400Hz) (L mode)	100.1MHz	Connect distortion analyser to "Speaker" terminals of the set.	T1 (IFT)	<ol style="list-style-type: none"> <li>1. Set the FM muting/FM mode switch to "on/auto".</li> <li>2. Re-adjust the already adjusted T1 within ± 90° from the preset core position so that the distortion of L ch is minimized.</li> </ol>

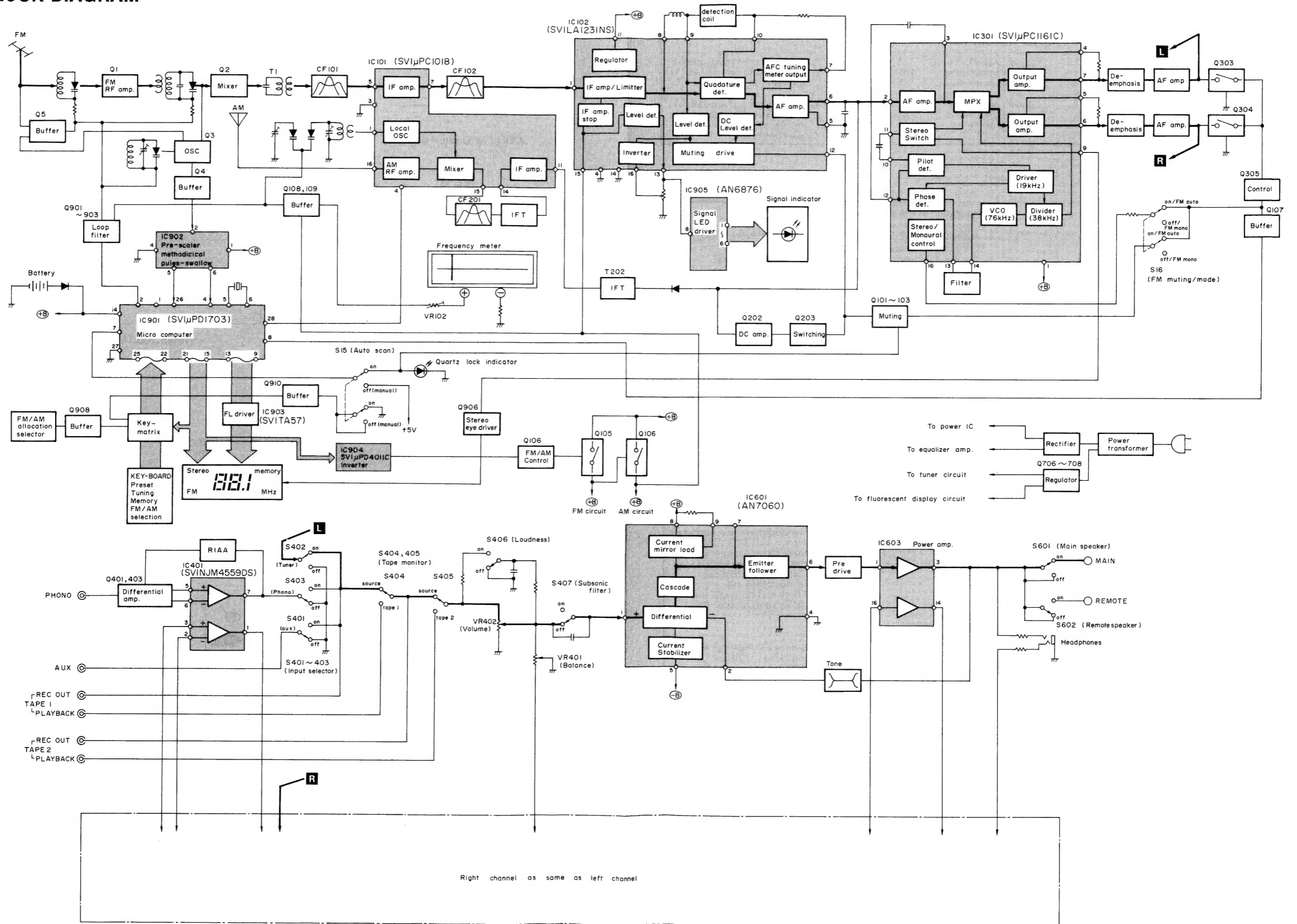


**ADJUSTING POINTS**



# SA-222 SA-222

## ■ BLOCK DIAGRAM



REPLACEMENT PARTS LIST... Electric Parts

Notes: 1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.  
 2.  $\Delta$  indicates that only parts specified by the manufacture be used for safety.  
 3. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.

Areas

\* [M] is available in U.S.A.  
 \* [MC] is available in Canada.

Ref. No.	Part No.	Part Name & Description
<b>INTEGRATED CIRCUITS</b>		
IC101	RVIUPC1018CF	IC, FM IF Amp. AM RF Amp. and AM Converter
IC102	SVILA1231NS	IC, FM IF Detector
IC301	SVIUPC1161C	IC, FM Multiplex
IC401	SVINJM4559DD	IC, Equalizer Amplifier
IC601, 602	AN7060F	IC, Differential Amplifier
IC603	SVISTK2028	IC, 2 Channel Power Amplifier
IC901	SVID1703CO16	IC, Micro-Computer
IC902	SVIUPB553C-E	IC, Pre-Scaler
IC903	SVITA57	IC, FL Driver
IC904	SVIUPD4011C	IC, Nand Gate
IC905	AN6876	IC, Signal LED Driver
<b>TRANSISTORS</b>		
Q1	2SK195-H1	Transistor, FM RF Amplifier [FET]
Q2	2SC1674-M	Transistor, FM Mixer
Q3, 4	2SC1675-L1	Transistor, FM Oscillator and Buffer (Use in ranks L1 or L2)
Q5, 303, 304	2SC945-P2	Transistor, Muting (Use in ranks P1 or P2)
Q101, 102, 106, 107, 108, 109, 203, 405, 701, 707, 708, 904, 905	2SC1815-Y	Transistor, Switching, regulator (Use in ranks Y or O)
Q103, 104, 105, 202, 301, 302, 305, 406, 702, 703, 704, 906 ~ 910	2SA1015-Y	Transistor, Switching, AF Amplifier & Regulator (Use in ranks Y or O)
Q401 ~ 404	2SC2320L-F	Transistor, Differential Amplifier (Use in ranks F or G)
Q601, 602	2SA992	Transistor, Pre-Driver
Q706	2SD880-Y	Transistor, Regulator (Use in ranks Y or GR)
Q901, 902, 903	2SC1815-G	Transistor, Loop Filter
<b>DIODES</b>		
D1 ~ 3	MA320G1-N	Diode, Variable Capacitor (for FM)
D101 ~ 104, 202, 204, 205, 709, 710, 901, 902, 904 ~ 917, 918, 920, 926	MA162A	Diode
D105, 203	20A90	Diode, Detector
D201	SVDBB312	Diode, Variable Capacitor (for AM)
D701 ~ 704	SVDS2V20	Rectifier
D705, 706	SVDMZ316B	Diode, 16V Zener
D707, 708, 713, 714, 715	SVDSR1K2	Rectifier
D711, 919, D716	SVDMZ306B	Diode, 6V Zener
D717	SVDMZ333B	Diode, 33V Zener
D718	SVDMZ327B	Diode, 27V Zener
D921, 922, 923	SVDMZ306C1	Diode, 6V Zener
D924, 925	LN213RP	Light Emitting Diode, Red
D927	LN313GP	Light Emitting Diode, Green
	LN220RP	Light Emitting Diode, Red
<b>COILS and TRANSFORMERS</b>		
L1	SLA4P55-P	Coil, FM Antenna
L2	SLD4P53-P	Coil, FM Detector
L3	RLQY15G5	Coil, Choke
L4	SLO4N21	Coil, FM Local Oscillator
L5	RLQY25S2	Coil, Choke
L201	SLE2C33	Coil, AM Ferrite Bar Antenna
L202	SLO2C29-P	Coil, AM Local Oscillator
L601, 602	SLQY15G-30	Coil, Choke
T1	SLI4C109	Transformer, FM IF
T101	SLI4C527-Z	Transformer, FM IF, Discriminator
T201	SLI2C127	Transformer, AM IF
T202	SLI2C413R	Transformer, AM IF
T701	SLT5M135	Transformer, Power Source

Ref. No.	Part No.	Part Name & Description
<b>CERAMIC FILTERS</b>		
CF101	SVFE107MM-A	Ceramic Filter, FM 10.7MHz, Red
CF102	SVFE107MZ2-A	Ceramic Filter, FM 10.7MHz, Red
CF201	SVFSP450HT	Ceramic Filter, AM 450kHz
<b>VARIABLE RESISTORS</b>		
VR101	EVTS3MA00B54	Muting Level Adjustment, 50k $\Omega$ (B)
VR102	EVNM4AA00B53	Frequency Meter Adjustment, 5k $\Omega$ (B)
VR301	EVTS3MA00B14	PLL MPX Adjustment, 10k $\Omega$ (B)
VR401	EVHMA551G25	Balance Control, 200k $\Omega$ (G)
VR402	EWJFHA066BF5	Volume Control 250k $\Omega$ (B)
VR501	EWJFCY066530	Bass Control, 100k $\Omega$
VR502	EWJFCO066C15	Treble Control 100k $\Omega$ (C)
<b>VARIABLE CAPACITORS</b>		
CT1	ECV1ZW06X53N	Trimmer, FM Local Oscillator
CT201, 202	ECV1ZW20X53N	Trimmer, AM Antenna
<b>COMPONENT COMBINATIONS</b>		
Z201	EXAF203Z471C	Component Combination, 0.01 $\mu$ F, (X2), 470 $\Omega$
Z301	EXPP182K104C	Component Combination, 0.0018 $\mu$ F, 100k $\Omega$
Z601, 602 [MC] only	ECQJ0517	Component Combination 0.047 $\mu$ F, 10 $\Omega$
Z701, 702	RXAF103P22HD	Component Combination 0.01 $\mu$ F (X2)
Z901	EXFP7331MW	Component Combination 330pF (X7)
Z902, 903	EXBP87104K	Component Combination, 100k $\Omega$ (X7)
<b>FUSE</b>		
F1	$\Delta$ XBA1F25NU14	Fuse, 2.5A (125V)
<b>CRYSTAL</b>		
X901	SVQ43U452	Crystal, 4.5MHz, Counter Oscillator
<b>LAMP</b>		
PL1	XAMR73S200A	Lamp, Frequency Meter, 6.3V, 0.25A
<b>FLUORESCENT DISPLAY TUBE</b>		
FL	SAD7MT29ZA	Fluorescent Display Tube
<b>SWITCHES</b>		
S1 ~ 12	SSG1	Switch, Memory/Preset/FM-AM/Manual
S14	SSS43	Switch, FM/AM Allocation
S15, 16, 407	SSH399	Switch, Subsonic, FM Muting, Auto Scan
S401 ~ 403	SSH397	Switch, Input Selector
S404 ~ 406	SSH3005	Switch, Tape Monitor & Loudness
S601, 602	SSH2001	Switch, Speakers Selector
S701	$\Delta$ ESB90144T	Switch, Power
<b>RESISTORS</b>		
R1	$\Delta$ ERD50TJ823	Carbon, 82k $\Omega$ , 1/2W, $\pm$ 5%
R2	RRD18XK472	Chip, 4.7k $\Omega$ , 1/8W, $\pm$ 10%
R3	RRD18XK104	Chip, 100k $\Omega$ , 1/8W, $\pm$ 10%
R4	RRD18XK100	Chip, 10 $\Omega$ , 1/8W, $\pm$ 10%
R5	RRD18XK101	Chip, 100 $\Omega$ , 1/8W, $\pm$ 10%
R6	RRD18XK472	Chip, 4.7k $\Omega$ , 1/8W, $\pm$ 10%

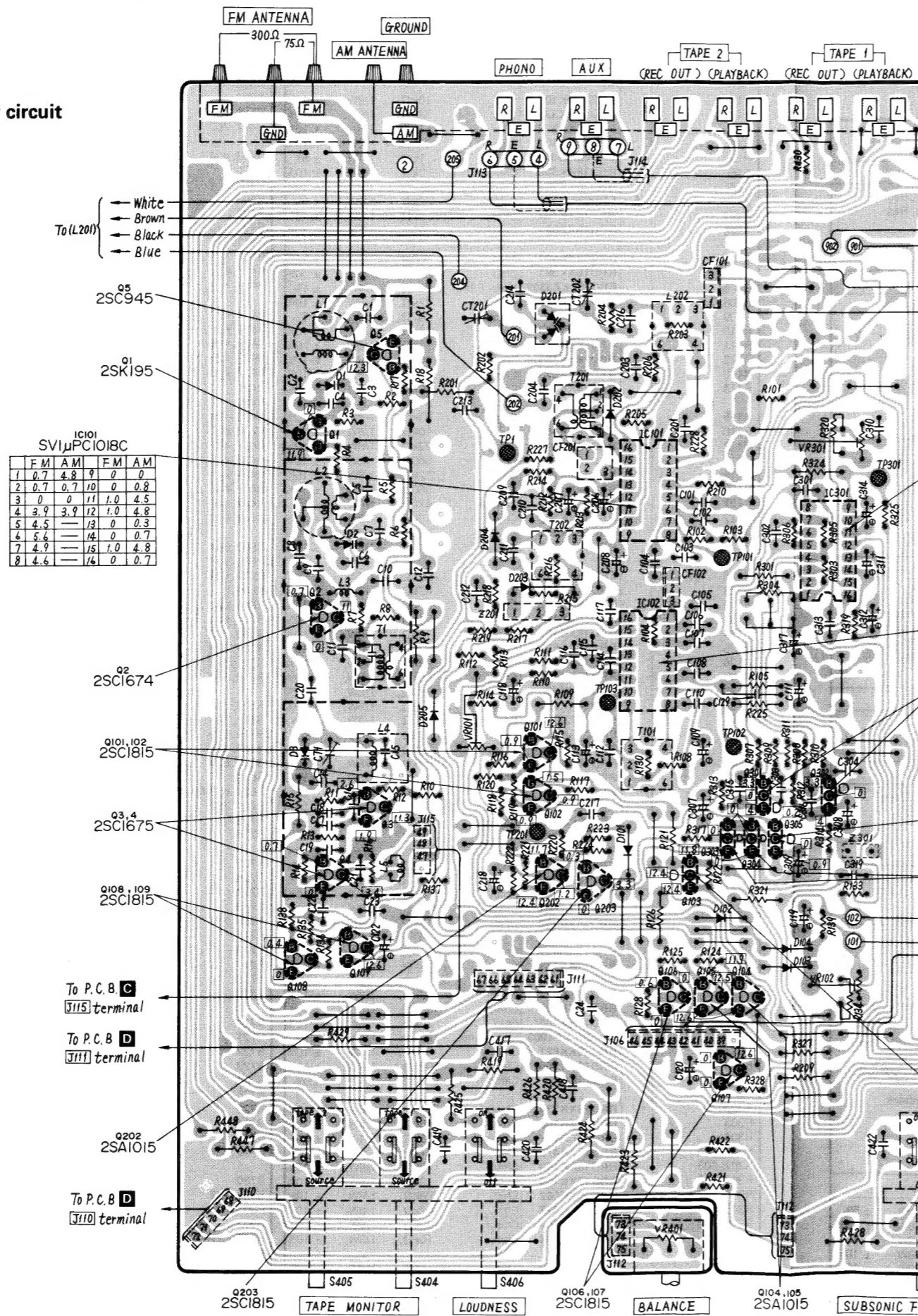
Ref. No.	Part No.	Part Name & Description
R7	RRD18XK474	Chip, 470k $\Omega$ , 1/8W, $\pm$ 10%
R8	RRD18XK102	Chip, 1k $\Omega$ , 1/8W, $\pm$ 10%
R9	ERD25FJ331	Carbon, 330 $\Omega$ , 1/4W, $\pm$ 5%
R10	RRD18XK331	Chip, 330 $\Omega$ , 1/8W, $\pm$ 10%
R11	RRD18XK103	Chip, 10k $\Omega$ , 1/8W, $\pm$ 10%
R12	RRD18XK333	Chip, 33k $\Omega$ , 1/8W, $\pm$ 10%
R13	RRD18XK272	Chip, 2.7k $\Omega$ , 1/8W, $\pm$ 10%
R14	RRD18XK104	Chip, 100k $\Omega$ , 1/8W, $\pm$ 10%
R15	ERD25FJ102	Carbon, 1k $\Omega$ , 1/4W, $\pm$ 5%
R16	RRD18XK332	Chip, 3.3k $\Omega$ , 1/8W, $\pm$ 10%
R17	RRD18XK273	Chip, 27k $\Omega$ , 1/8W, $\pm$ 10%
R18	ERD50FJ472	Carbon, 4.7k $\Omega$ , 1/2W, $\pm$ 5%
R101	RRD18XK102	Chip, 1k $\Omega$ , 1/8W, $\pm$ 10%
R102	RRD18XK391	Chip, 390 $\Omega$ , 1/8W, $\pm$ 10%
R103	RRD18XK561	Chip, 560 $\Omega$ , 1/8W, $\pm$ 10%
R104	RRD18XK391	Chip, 390 $\Omega$ , 1/8W, $\pm$ 10%
R105	ERO25CKF3302	Metal Film, 33k $\Omega$ , 1/4W, $\pm$ 1%
R108	RRD18XK273	Chip, 27k $\Omega$ , 1/8W, $\pm$ 10%
R109	ERD25FJ470	Carbon, 47 $\Omega$ , 1/8W, $\pm$ 5%
R110	RRD18XK103	Chip, 10k $\Omega$ , 1/8W, $\pm$ 10%
R111	RRD18XK102	Chip, 1k $\Omega$ , 1/8W, $\pm$ 10%
R112	RRD18XK153	Chip, 15k $\Omega$ , 1/8W, $\pm$ 10%
R113	RRD18XK223	Chip, 22k $\Omega$ , 1/8W, $\pm$ 10%
R114	RRD18XK103	Chip, 10k $\Omega$ , 1/8W, $\pm$ 10%
R115	RRD18XK333	Chip, 33k $\Omega$ , 1/8W, $\pm$ 10%
R116	RRD18XK103	Chip, 10k $\Omega$ , 1/8W, $\pm$ 10%
R117	RRD18XK223	Chip, 22k $\Omega$ , 1/8W, $\pm$ 10%
R118	RRD18XK561	Chip, 560 $\Omega$ , 1/8W, $\pm$ 10%
R119	RRD18XK222	Chip, 2.2k $\Omega$ , 1/8W, $\pm$ 10%
R120	RRD18XK561	Chip, 560 $\Omega$ , 1/8W, $\pm$ 10%
R121	ERD25TJ473	Carbon, 47k $\Omega$ , 1/4W, $\pm$ 5%
R122	RRD18XK103	Chip, 10k $\Omega$ , 1/8W, $\pm$ 10%
R123	RRD18XK332	Chip, 3.3k $\Omega$ , 1/8W, $\pm$ 10%
R124, 125	RRD18XK333	Chip, 33k $\Omega$ , 1/8W, $\pm$ 10%
R126	ERD25FJ472	Carbon, 4.7k $\Omega$ , 1/4W, $\pm$ 5%
R128	RRD18XK473	Chip, 47k $\Omega$ , 1/8W, $\pm$ 10%
R130	RRD18XK472	Chip, 4.7k $\Omega$ , 1/8W, $\pm$ 10%
R133	RRD18XK102	Chip, 1k $\Omega$ , 1/8W, $\pm$ 10%
R134	RRD18XK153	Chip, 15k $\Omega$ , 1/8W, $\pm$ 10%
R135	RRD18XK823	Chip, 82k $\Omega$ , 1/8W, $\pm$ 10%
R136	RRD18XK393	Chip, 39k $\Omega$ , 1/8W, $\pm$ 10%
R137	RRD18XK104	Chip, 100k $\Omega$ , 1/8W, $\pm$ 10%
R138	RRD18XK683	Chip, 68k $\Omega$ , 1/8W, $\pm$ 10%
R139	RRD18XK272	Chip, 2.7k $\Omega$ , 1/8W, $\pm$ 10%
R199	ERD25TJ224	Carbon, 220k $\Omega$ , 1/4W, $\pm$ 5%
R201	ERD25FJ331	Carbon, 330 $\Omega$ , 1/4W, $\pm$ 5%
R202	RRD18XK331	Chip, 330 $\Omega$ , 1/8W, $\pm$ 10%
R203	RRD18XK103	Chip, 10k $\Omega$ , 1/8W, $\pm$ 10%
R204	RRD18XK104	Chip, 100k $\Omega$ , 1/8W, $\pm$ 10%
R205	RRD18XK153	Chip, 15k $\Omega$ , 1/8W, $\pm$ 10%
R206	RRD18XK123	Chip, 12k $\Omega$ , 1/8W, $\pm$ 10%
R209	ERD25FJ102	Carbon, 1k $\Omega$ , 1/4W, $\pm$ 5%
R210	RRD18XK101	Chip, 100 $\Omega$ , 1/8W, $\pm$ 10%
R212	RRD18XK104	Chip, 100k $\Omega$ , 1/8W, $\pm$ 10%
R213	RRD18XK101	Chip, 100 $\Omega$ , 1/8W, $\pm$ 10%
R214, 215	RRD18XK103	Chip, 10k $\Omega$ , 1/8W, $\pm$ 10%
R216	RRD18XK562	Chip, 5.6k $\Omega$ , 1/8W, $\pm$ 10%
R217	RRD18XK682	Chip, 6.8k $\Omega$ , 1/8W, $\pm$ 10%
R218	RRD18XK153	Chip, 15k $\Omega$ , 1/8W, $\pm$ 10%
R219	RRD18XK331	Chip, 330 $\Omega$ , 1/8W, $\pm$ 10%
R220	RRD18XK183	Chip, 18k $\Omega$ , 1/8W, $\pm$ 10%
R221	RRD18XK122	Chip, 1.2k $\Omega$ , 1/8W, $\pm$ 10%
R222	RRD18XK822	Chip, 8.2k $\Omega$ , 1/8W, $\pm$ 10%
R223	RRD18XK333	Chip, 33k $\Omega$ , 1/8W, $\pm$ 10%
R224	RRD18XK103	Chip, 10k $\Omega$ , 1/8W, $\pm$ 10%
R225	ERO25CKF1003	Metal Film, 100k $\Omega$ , 1/4W, $\pm$ 1%
R227	RRD18XK821	Chip, 820 $\Omega$ , 1/8W, $\pm$ 10%
R228	RRD18XK104	Chip, 100k $\Omega$ , 1/8W, $\pm$ 10%
R301	ERD25FJ220	Carbon, 22 $\Omega$ , 1/4W, $\pm$ 5%
R302	RRD18XK334	Chip, 330k $\Omega$ , 1/8W, $\pm$ 10%
R303	RRD18XK153	Chip, 15k $\Omega$ , 1/8W, $\pm$ 10%
R304	ERD25TJ153	Carbon, 15k $\Omega$ , 1/4W, $\pm$ 5%
R305, 306	RRD18XK473	Chip, 47k $\Omega$ , 1/8W, $\pm$ 10%
R307, 308	RRD18XK103	Chip, 10k $\Omega$ , 1/8W, $\pm$ 10%
R309, 310	RRD18XK103	Chip, 10k $\Omega$ , 1/8W, $\pm$ 10%
R311, 312	RRD18XK562	Chip, 5.6k $\Omega$ , 1/8W, $\pm$ 10%
R313, 314	RRD18XK472	Chip, 4.7k $\Omega$ , 1/8W, $\pm$ 10%
R315, 316	RRD18XK104	Chip, 100k $\Omega$ , 1/8W, $\pm$ 10%
R317	RRD18XK103	Chip, 10k $\Omega$ , 1/8W, $\pm$ 10%
R319	RRD18XK102	Chip, 1k $\Omega$ , 1/8W, $\pm$ 10%
R320	RRD18XK153	Chip, 15k $\Omega$ , 1/8W, $\pm$ 10%

Ref. No.	Part No.	Part Name & Description
R321	ERD25FJ562	Carbon, 5.6k $\Omega$ , 1/4W, $\pm$ 5%
R322	RRD18XK124	Chip, 120k $\Omega$ , 1/8W, $\pm$ 10%
R323	RRD18XK392	Chip, 3.9k $\Omega$ , 1/8W, $\pm$ 10%
R324	ERD25FJ103	Carbon, 10k $\Omega$ , 1/4W, $\pm$ 5%
R325	RRD18XK473	Chip, 47k $\Omega$ , 1/8W, $\pm$ 10%
R327	ERD25FJ472	Carbon, 4.7k $\Omega$ , 1/4W, $\pm$ 5%
R328	RRD18XK102	Chip, 1k $\Omega$ , 1/8W, $\pm$ 10%
R401, 402	RRD18XK221	Chip, 220 $\Omega$ , 1/8W, $\pm$ 10%
R403, 404	ERO25CKF1003	Metal Film, 100k $\Omega$ , 1/4W, $\pm$ 1%
R405	ERO25CKF8202	Metal Film, 82k $\Omega$ , 1/4W, $\pm$ 1%
R406	ERO25CKF8202	Metal Film, 82k $\Omega$ , 1/4W, $\pm$ 1%
R407	RRD18XK271	Chip, 270 $\Omega$ , 1/8W, $\pm$ 10%
R408	ERD25FJ271	Carbon, 270 $\Omega$ , 1/4W, $\pm$ 5%
R409, 410	RRD18XK680	Chip, 68 $\Omega$ , 1/8W, $\pm$ 10%
R411, 412	RRD18XK184	Chip, 180k $\Omega$ , 1/8W, $\pm$ 10%
R413, 414	RRD18XK123	Chip, 12k $\Omega$ , 1/8W, $\pm$ 10%
R415, 416	RRD18XK104	Chip, 100k $\Omega$ , 1/8W, $\pm$ 10%
R417, 418	RRD18XK221	Chip, 220k $\Omega$ , 1/8W, $\pm$ 10%
R419, 420	ERD25TJ124	Carbon, 120k $\Omega$ , 1/4W, $\pm$ 5%
R421, 422	RRD18XK222	Chip, 2.2k $\Omega$ , 1/8W, $\pm$ 10%
R423, 424	ERD25TJ104	Carbon, 100k $\Omega$ , 1/4W, $\pm$ 5%
R425, 426	ERD25TJ393	Carbon, 39k $\Omega$ , 1/4W, $\pm$ 5%
R427, 428	ERD25TJ124	Carbon, 120k $\Omega$ , 1/4W, $\pm$ 5%
R429	ERD25FJ331	Carbon, 330 $\Omega$ , 1/4W, $\pm$ 5%
R430	RRD18XK331	Chip, 330 $\Omega$ , 1/8W, $\pm$ 10%
R433, 434	RRD18XK822	Chip, 8.2k $\Omega$ , 1/8W, $\pm$ 10%
R435, 436	RRD18XK822	Chip, 8.2k $\Omega$ , 1/8

PRINTED CIRCUIT BOARD

Ground (Earth) lines

**A** Tuner circuit



- White
- Brown
- Black
- Blue

IC101 SV1μPC1018C

	FM	AM	FM	AM
1	0.7	4.8	9	0
2	0.7	0.7	10	0.8
3	0	0	11	1.0
4	3.9	3.9	12	1.0
5	4.5	—	13	0.3
6	5.6	—	14	0.7
7	4.9	—	15	1.0
8	4.6	—	16	0.7

IC301 SV1μPC1161C

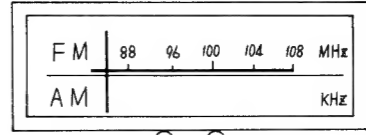
1	12.0	9	11.9
2	2.3	10	2.4
3	5.7	11	2.4
4	9.9	12	2.4
5	9.9	13	2.4
6	3.2	14	2.4
7	3.2	15	3.2
8	0	16	3.0

IC102 SV1A123INS

1	3.0	9	5.7
2	3.0	10	5.7
3	3.0	11	11.6
4	0	12	5.0
5	0	13	1.5
6	5.7	14	0
7	5.8	15	5.0
8	5.7	16	0.5

IC401 SV1NJM4559DS

1	-1.2	5	7.1
2	7.1	6	7.1
3	7.1	7	-1.2
4	-13.6	8	13.6



ANALOG FREQUENCY METER

To P.C.B. C J115 terminal

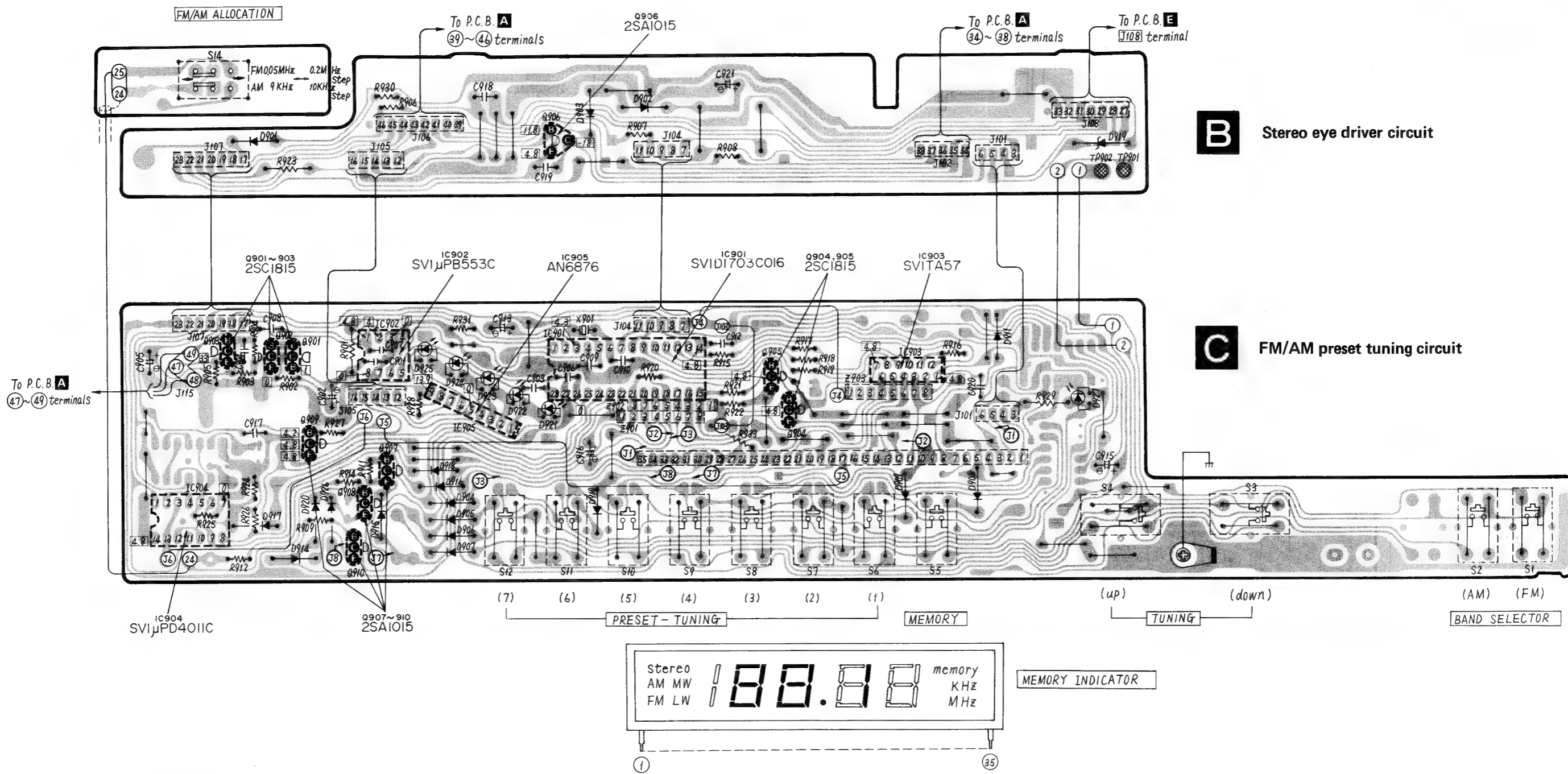
To P.C.B. D J111 terminal

To P.C.B. D J110 terminal

To P.C.B. B J110 terminal (39) ~ (46) terminals

To P.C.B. B (34) ~ (38) terminals

To P.C.B. E J109 terminal

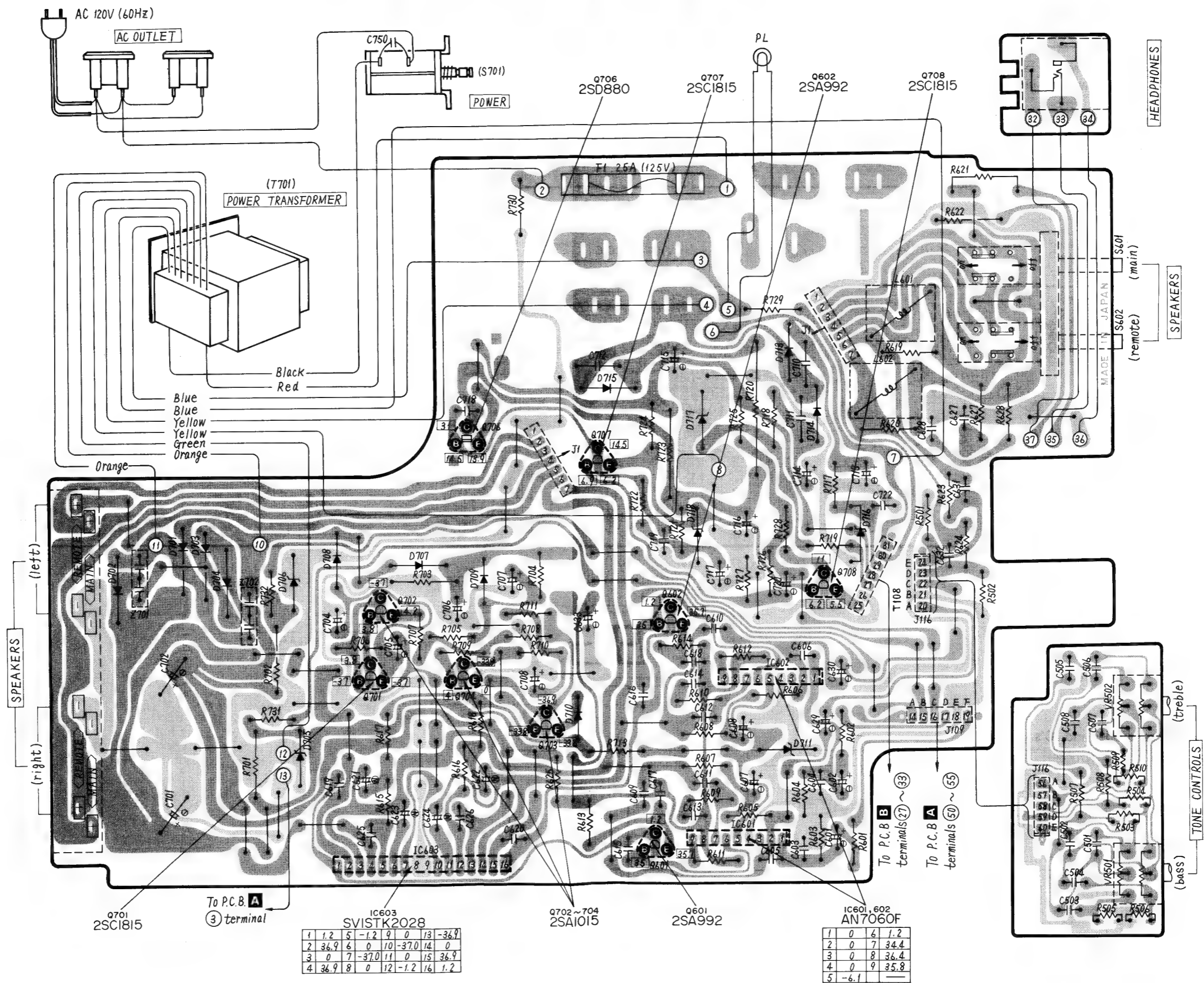


• Terminal guide of transistors, diodes and IC's

SV1μPC1018C, SV1LA123INS SV1μPC1161C	SVINJM4559DS	AN7060F, AN6876	SVISTK2028	SVIDI703C016	SV1μPB553C	MA320GI-N
SVITA57	SV1μPD401C	2SK195	2SD880	2SC1674, 2SC1675 2SC945, 2SC1815 2SA1015, 2SC2320 2SA992, 2SC1815	SVDMZ	LN2I3RP, LN3I3GP LN220RP

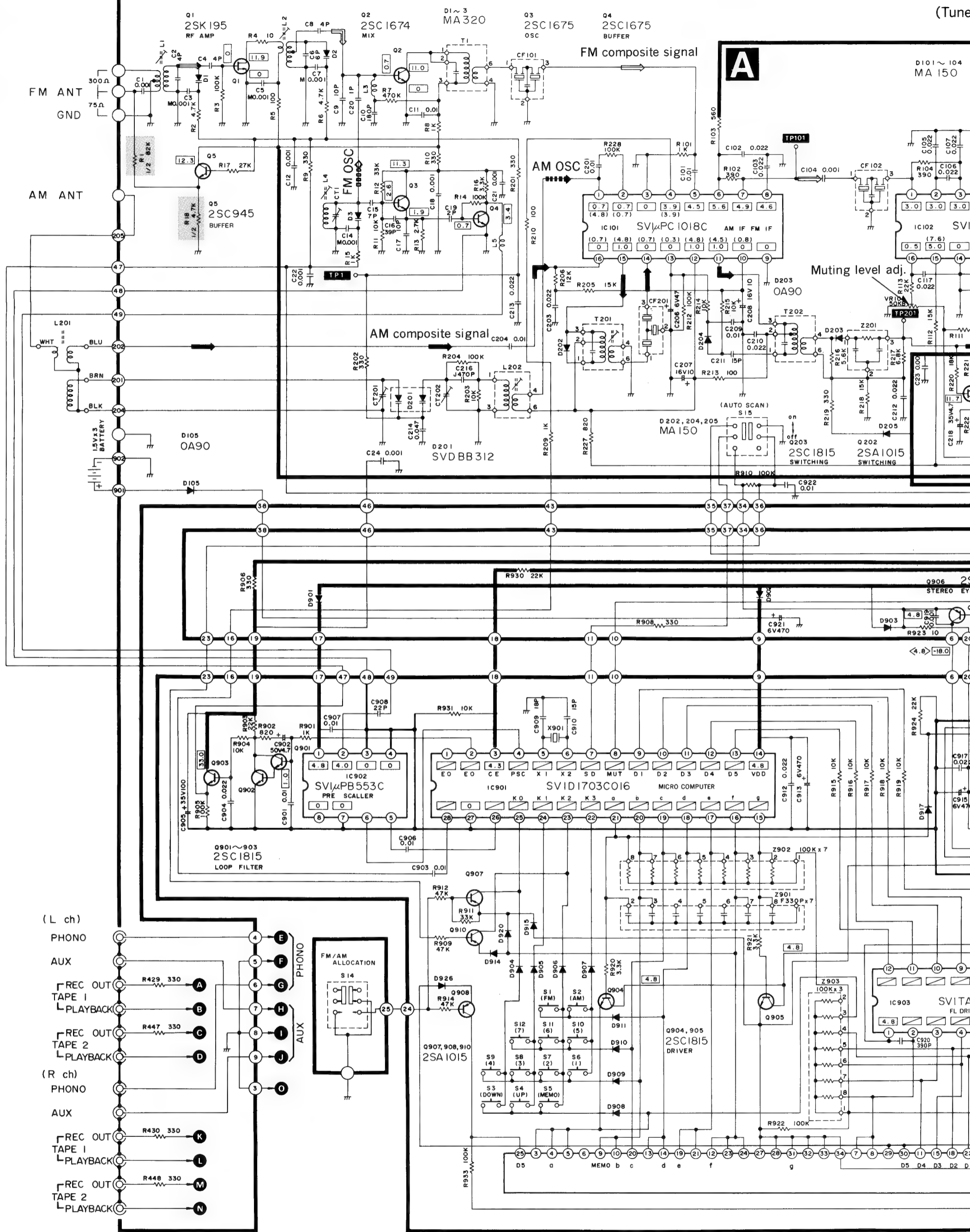
**SA-222 SA-222**

Main amplifier circuit



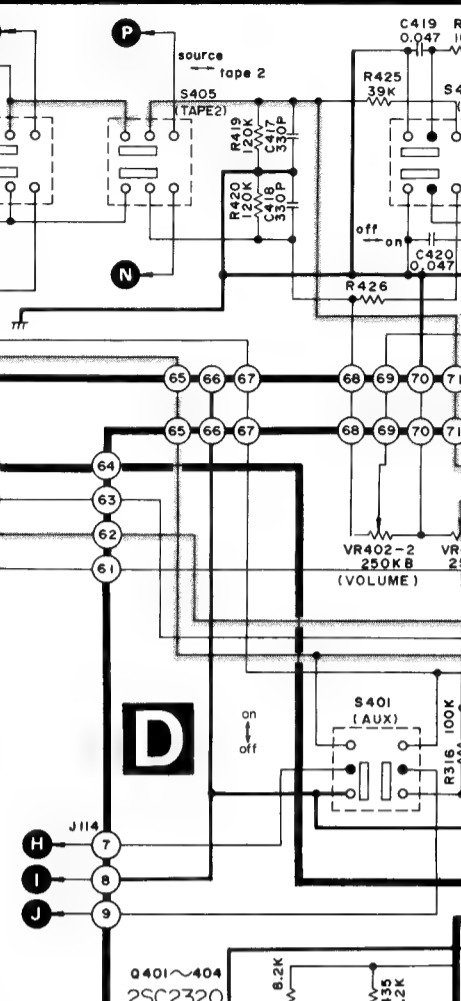
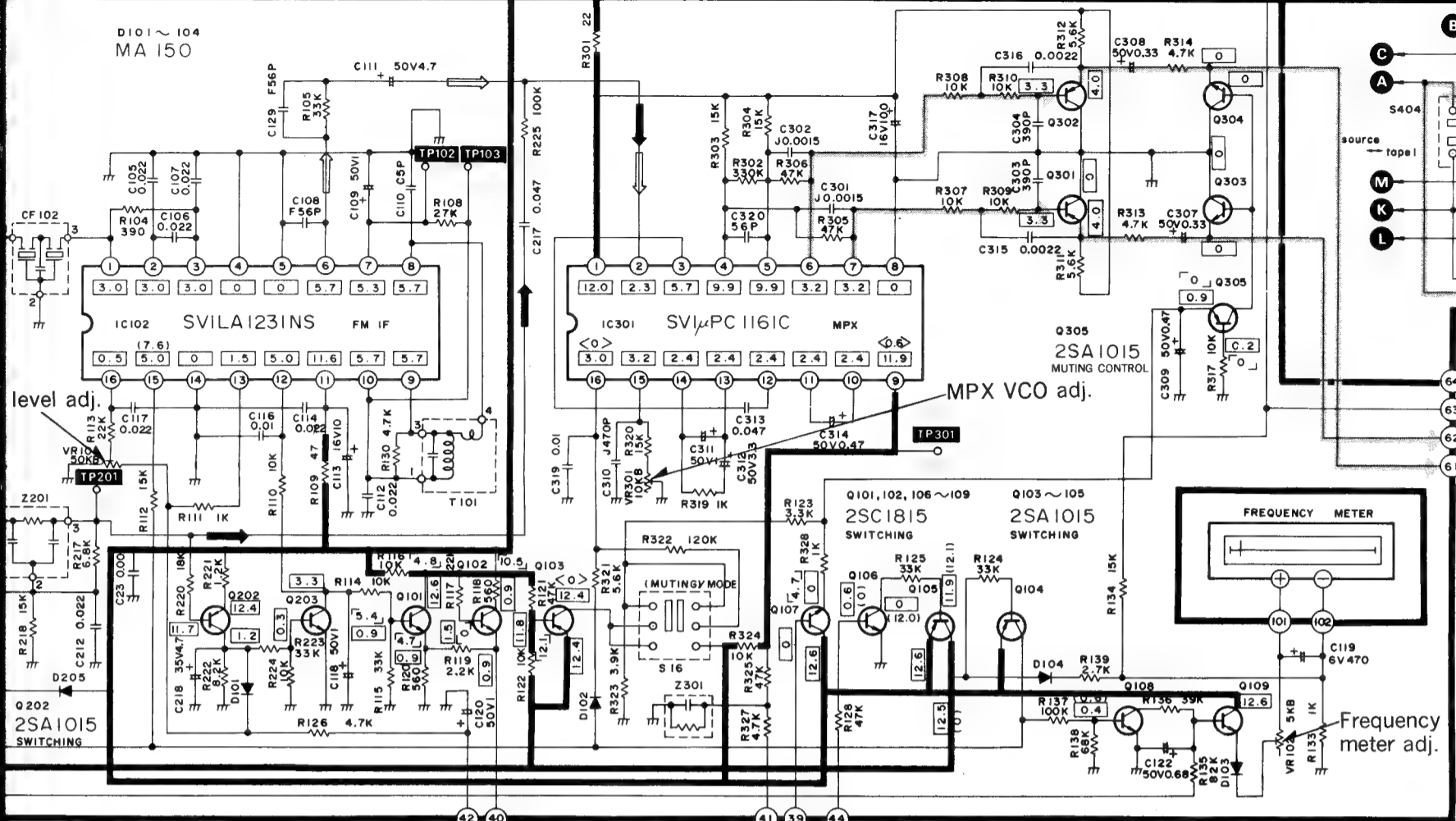
A  
B  
C  
D  
E  
F  
G  
H  
I

(Tuner)

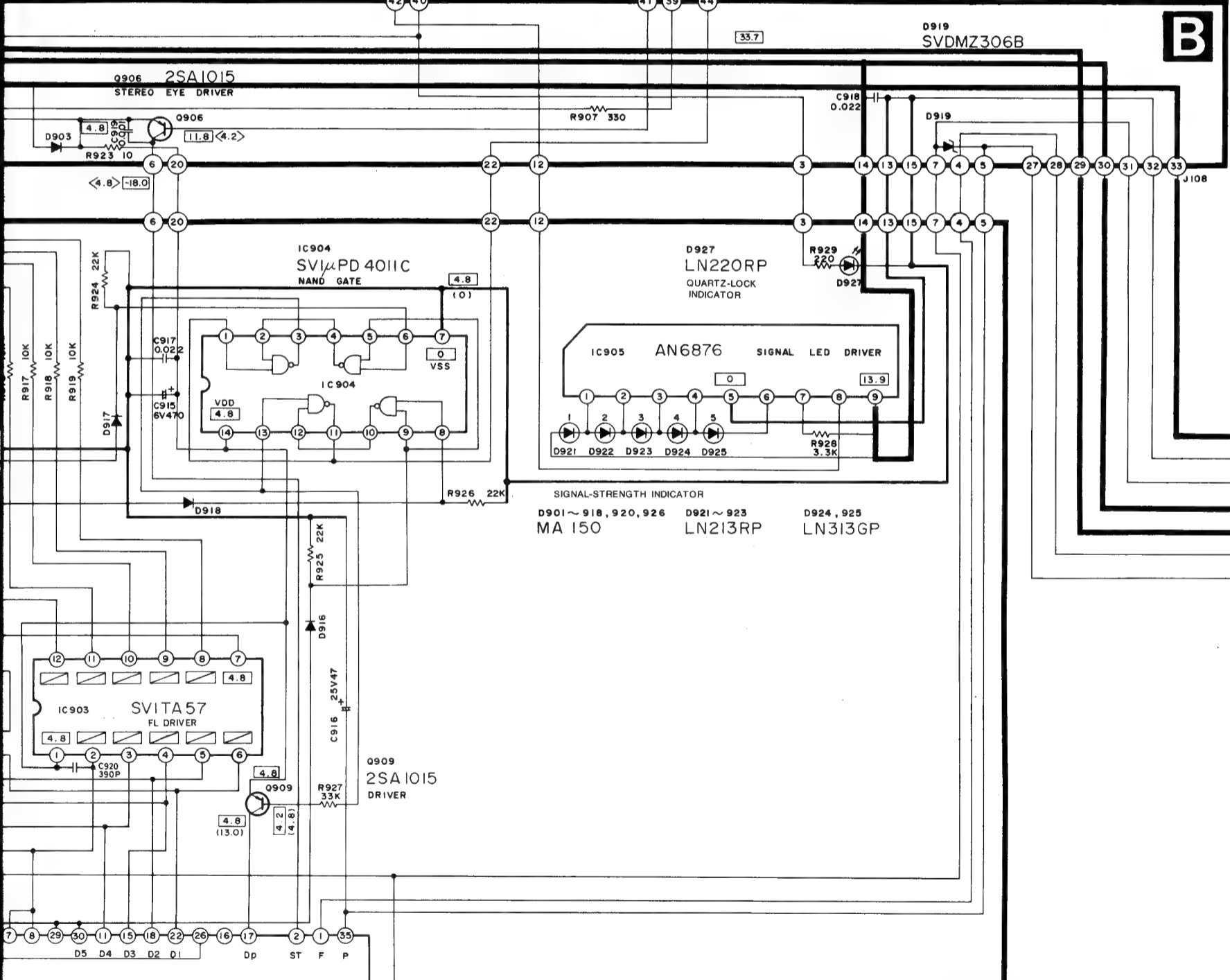


(Tuner circuit)

Q301, 302 2SA1015 AF AMP  
Q303, 304 2SC945 MUTING

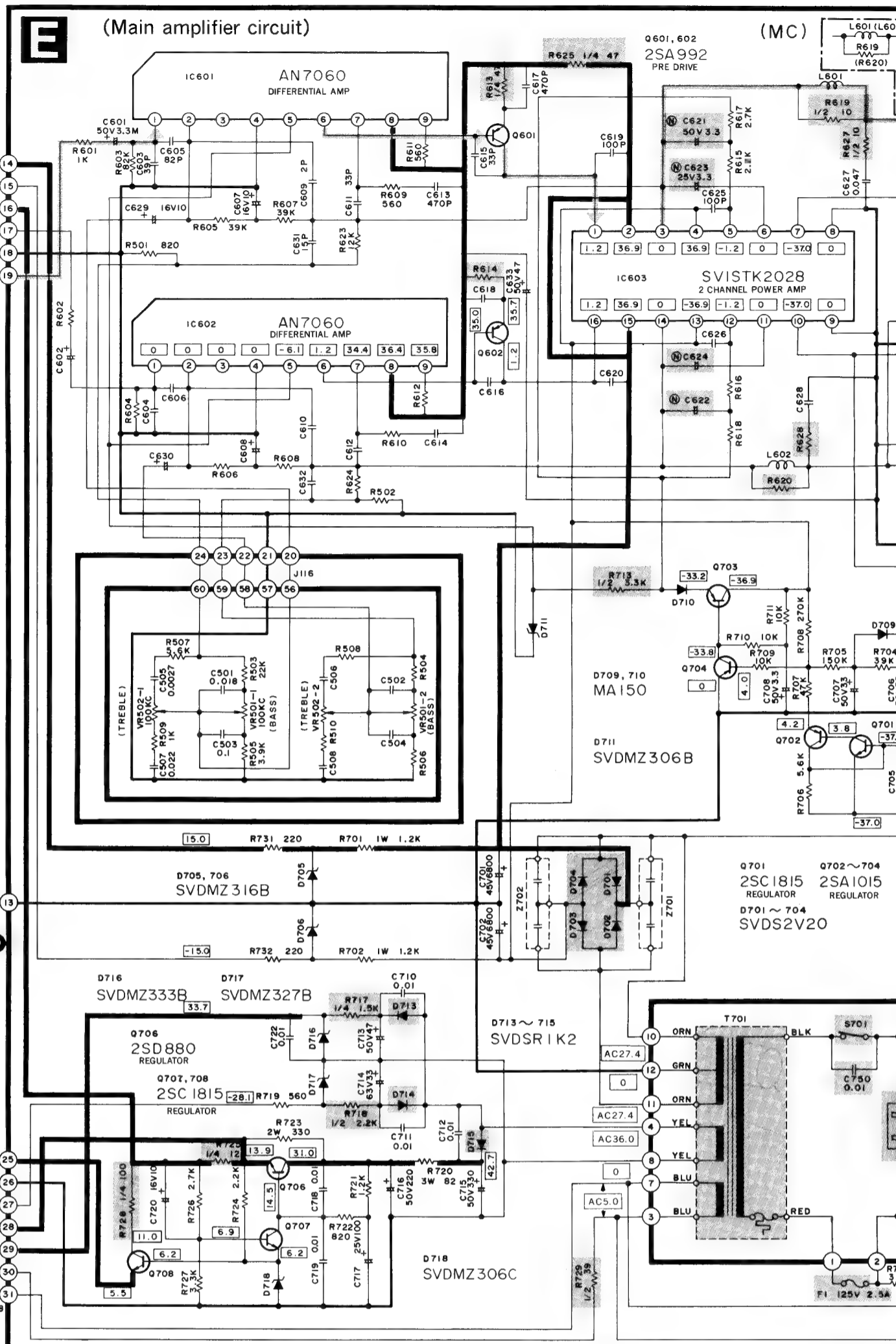
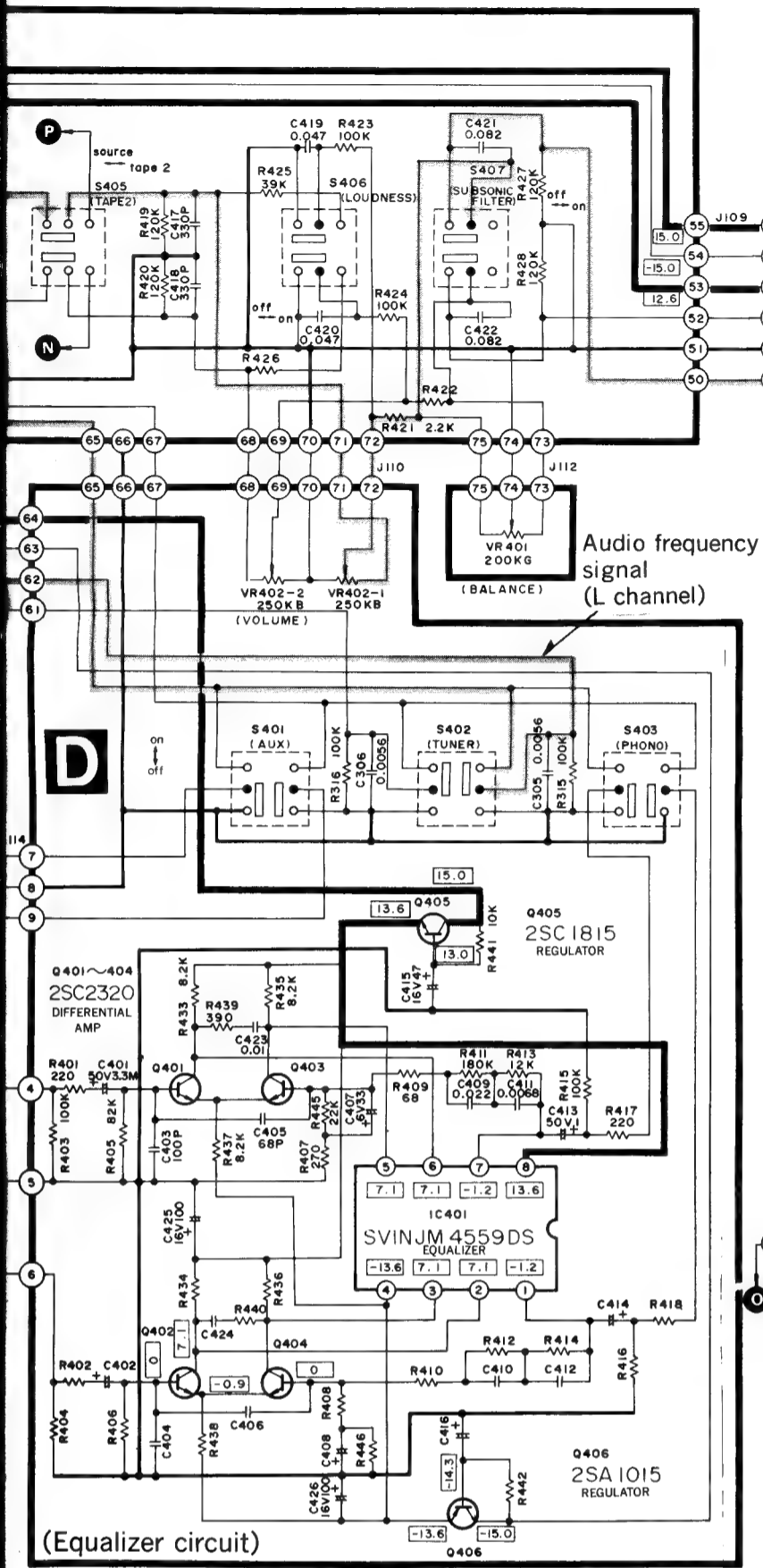


**B**

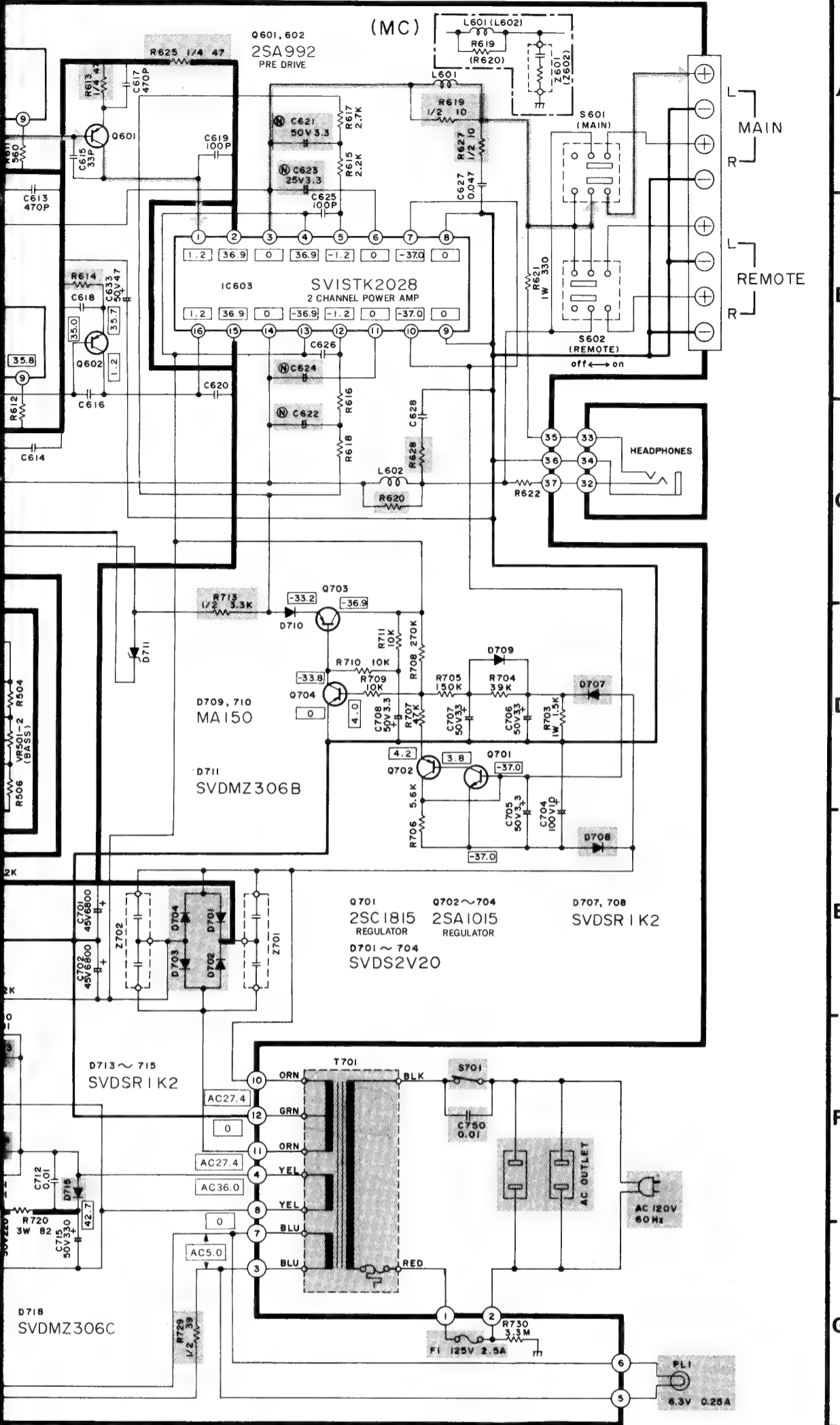


(FM/AM preset tuning circuit)

**C**



SCHEMATIC DIAGRAM

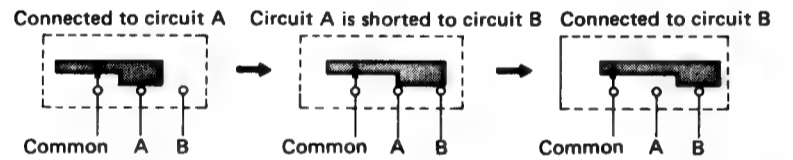


Note:

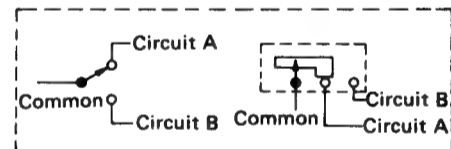
1. **S1, 2 :** Band selectors switch.  
[S1 - FM  
S2 - AM]
2. **S3, 4 :** Tuning switch  
[S3 - down  
S4 - up]
3. **S5 :** Memory switch.
4. **S6 ~ 12 :** Preset-tuning switch.  
[S6 - 1 ch, S7 - 2 ch, S8 - 3 ch, S9 - 4 ch,  
S10 - 5 ch, S11 - 6 ch, S12 - 7 ch]
5. **S14 :** FM/AM allocation switch in "FM 0.2MHz/AM 10kHz step" position,  
FM 0.05MHz/AM 9kHz step → FM 0.2MHz/AM 10kHz step
6. **S15 :** Automatic-scan switch in "on" position.  
on → off (manual)
7. **S16 :** FM muting/FM mode switch in "on/FM auto" position.  
on/FM auto → off/FM mono
8. **S401 ~ 403 :** Input selectors switch in "tuner" position.  
[S401 - aux, S402 - tuner, S403 - phono]
9. **S404, 405 :** Tape-monitor selectors switch in "source" position.  
[S404 - tape 1, S405 - tape 2]
10. **S406 :** Loudness switch in "off" position.
11. **S407 :** Subsonic filter switch in "off" position.
12. **S601, 602 :** Speaker selectors switch in "main" position.  
[S601 - main, S602 - remote]
13. **S701 :** Power switch in "on" position.
14. Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high-impedance) with the chassis taken as standard. Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.  
\* Figures in   stand for DC voltage in FM/AM reception mode.  
\* Figures in   stand for DC voltage in FM stereo signal reception mode.  
\* Figures in   stand for DC voltage in FM (no signal) muting to on mode.  
\* Figures in ( ) stand for DC voltage with the band selectors circuit set at AM.
15. Transistor and IC terminals which carry no voltage indication emit 5V pulse waveforms or are subject to change according to the frequency or input signal levels.
16. Signal lines  
 FM composite signal  
 Audio frequency signal  
 Positive voltage lines  
→ / ...→ AM signal

Shorting Switch (S401, 402, 403, 406 and 407)

This unit uses a shorting switch. As illustrated below, the circuit is shorted to the next circuit without being opened. In the circuit diagram, the shaded area represents the common terminal.



An example of circuit diagram



IMPORTANT SAFETY NOTICE

The shaded area on this schematic diagram incorporates special features important for safety. When servicing it is essential that only manufacturer's specified parts be used for the critical components in the shaded areas of the schematic.

Continued from page 12

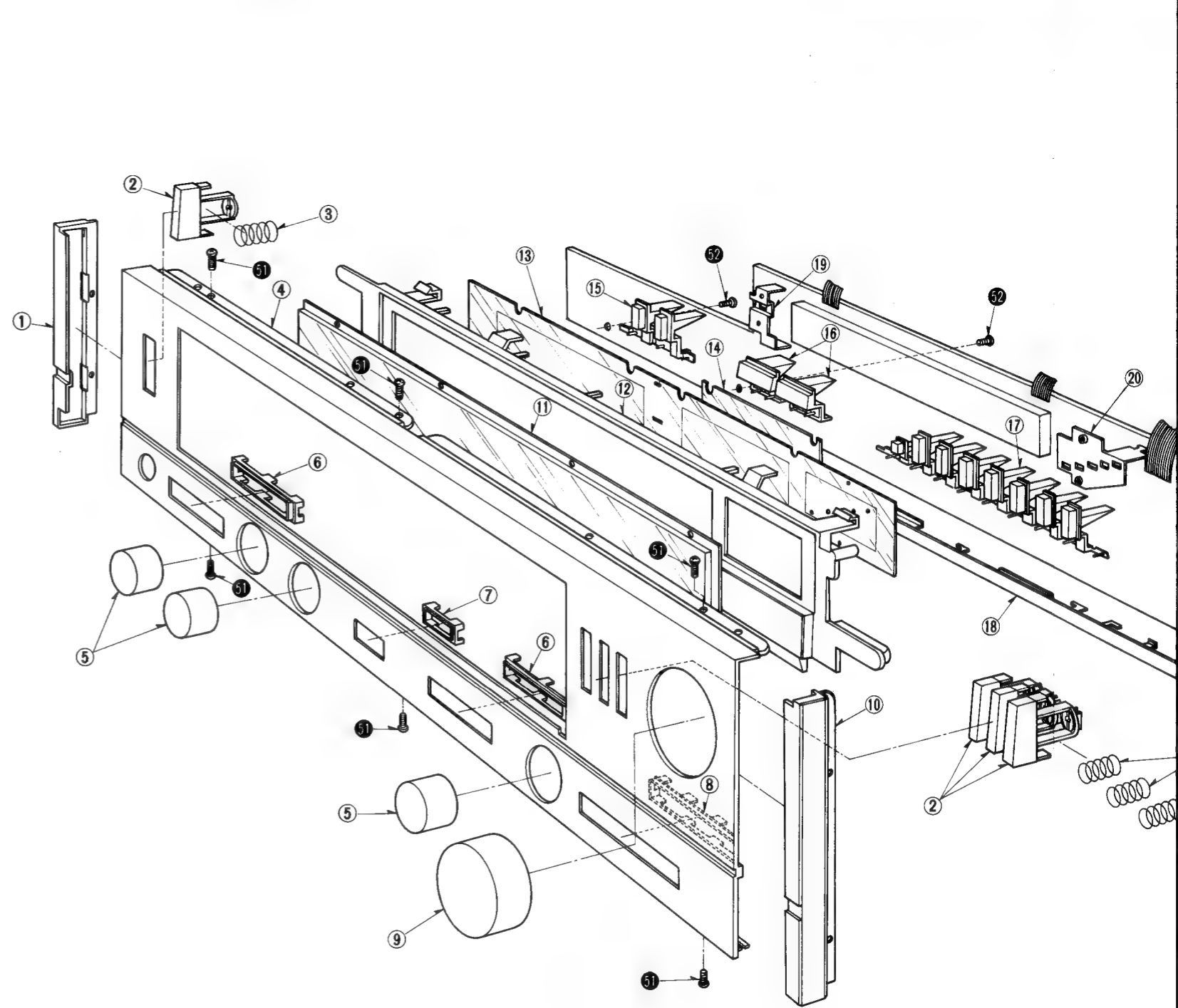
Ref. No.	Part No.	Part Name & Description
R908	RRD18XK331	Chip, 330Ω, 1/8W, ± 10%
R909	RRD18XK473	Chip, 47kΩ, 1/8W, ± 10%
R910	RRD18XK104	Chip, 100kΩ, 1/8W, ± 10%
R911	RRD18XK333	Chip, 33kΩ, 1/8W, ± 10%
R912	RRD18XK473	Chip, 47kΩ, 1/8W, ± 10%
R914	RRD18XK473	Chip, 47kΩ, 1/8W, ± 10%
R915, 916	RRD18XK103	Chip, 10kΩ, 1/8W, ± 10%
R917, 918	RRD18XK103	Chip, 10kΩ, 1/8W, ± 10%
R919	RRD18XK103	Chip, 10kΩ, 1/8W, ± 10%
R920, 921	RRD18XK332	Chip, 3.3kΩ, 1/8W, ± 10%
R922	RRD18XK104	Chip, 100kΩ, 1/8W, ± 10%
R923	ERD25FJ100	Carbon, 10Ω, 1/4W, ± 5%
R924, 925	RRD18XK223	Chip, 22kΩ, 1/8W, ± 10%
R926	RRD18XK223	Chip, 22kΩ, 1/8W, ± 10%
R927	RRD18XK333	Chip, 33kΩ, 1/8W, ± 10%
R928	RRD18XK332	Chip, 3.3kΩ, 1/8W, ± 10%
R929	ERD25FJ221	Carbon, 220Ω, 1/4W, ± 5%
R930	RRD18XK223	Chip, 22kΩ, 1/8W, ± 10%
R931	RRD18XK103	Chip, 10kΩ, 1/8W, ± 10%
R933	ERD25TJ104	Carbon, 100kΩ, 1/4W, ± 5%

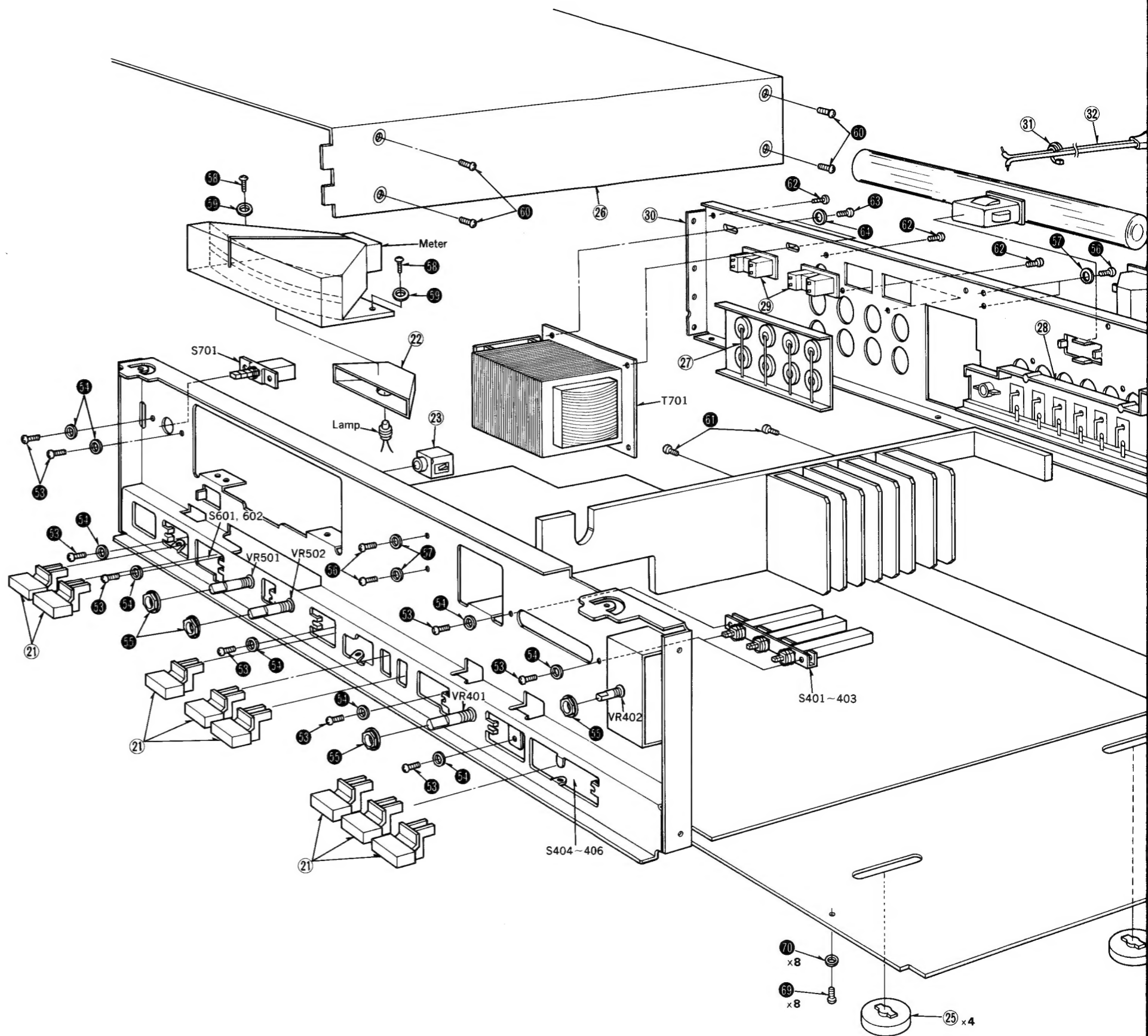
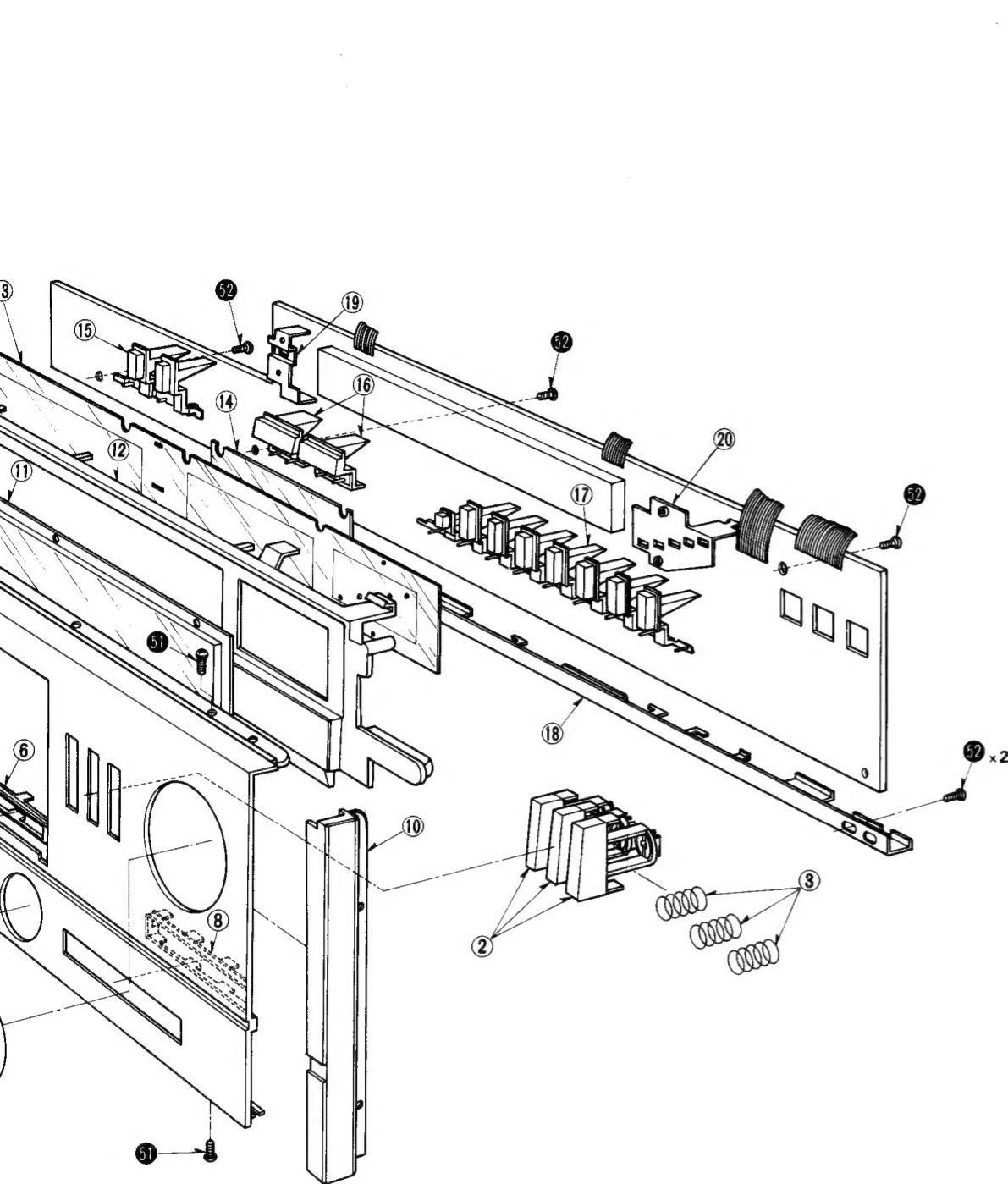
CAPACITORS

C1	ECKD1H102ZF	Ceramic, 0.001μF, 50V, +80%
C2	ECCD1H040CC	Ceramic, 4pF, 50V, ±0.25pF
C3	ECKD1H102MD	Ceramic, 0.001μF, 50V, ±20%
C4	ECCD1H040CC	Ceramic, 4pF, 50V, ±0.25pF
C5	ECKD1H102ZF	Ceramic, 0.001μF, 50V, +80%
C6	ECCD1H060CC	Ceramic, 6pF, 50V, ±0.25pF
C7	ECKD1H102MD	Ceramic, 0.001μF, 50V, ±20%
C8	ECCD1H040CC	Ceramic, 4pF, 50V, ±0.25pF
C9	ECCD1H100KC	Ceramic, 100pF, 50V, ±10%
C10	ECCD1H181K	Ceramic, 180pF, 50V, ±10%
C11	ECKD1H103ZF	Ceramic, 0.01μF, 50V, +80%
C12	ECKD1H102ZF	Ceramic, 0.001μF, 50V, +80%
C14	ECKD1H102MD	Ceramic, 0.001μF, 50V, ±20%
C15	ECUX1H070DC	Chip, 7pF, 50V, ±0.5pF
C16	ECUX1H390KC	Chip, 39pF, 50V, ±10%
C17	ECUX1H100KC	Chip, 10pF, 50V, ±10%
C18	ECUX1H102ZF	Chip, 0.001μF, 50V, +80%
C19	ECUX1H020CC	Chip, 2pF, 50V, ±0.25pF
C20	ECUX1H010CC	Chip, 1pF, 50V, ±0.25pF
C21, 22	ECUX1H102ZF	Chip, 0.001μF, 50V, +80%
C23, 24	ECKD1H102ZF	Ceramic, 0.001μF, 50V, +80%
C101	ECKD1H103ZF	Ceramic, 0.01μF, 50V, +80%
C102	ECKD1H223ZF	Ceramic, 0.022μF, 50V, +80%
C103	ECUX1H223ZF	Chip, 0.022μF, 50V, +80%
C104	ECKD1H102MD	Ceramic, 0.001μF, 50V, ±20%
C105, 106	ECKD1H223ZF	Ceramic, 0.022μF, 50V, +80%
C107	ECKD1H223ZF	Ceramic, 0.022μF, 50V, +80%
C108	ECCD1H560K	Ceramic, 56pF, 50V, ±10%
C109	ECEA50Z1	Electrolytic, 1μF, 50V
C110	ECCD1H050CC	Ceramic, 5pF, 50V, ±0.25pF
C111	ECEA50M4R7R	Electrolytic, 4.7μF, 50V
C112	ECKD1H223ZF	Ceramic, 0.022μF, 50V, +80%
C113	ECEA1HS100	Electrolytic, 10μF, 50V
C114	ECKD1H223ZF	Ceramic, 0.022μF, 50V, +80%
C116	ECKD1H103ZF	Ceramic, 0.01μF, 50V, +80%
C117	ECUX1H223ZF	Chip, 0.022μF, 50V, +80%
C118	ECEA50Z1	Electrolytic, 1μF, 50V
C119	ECEA0JS471	Electrolytic, 470μF, 6.3V
C120	ECEA50Z1	Electrolytic, 1μF, 50V
C122	ECEA50ZR68	Electrolytic, 0.68μF, 50V
C129	ECCD1H560K	Ceramic, 56pF, 50V, ±10%
C201	ECKD1H103ZF	Ceramic, 0.01μF, 50V, +80%
C203	ECKD1H223ZF	Ceramic, 0.022μF, 50V, +80%
C204	ECKD1H103ZF	Ceramic, 0.01μF, 50V, +80%
C206	ECEA1AS470	Electrolytic, 47μF, 10V
C207, 208	ECEA1HS100	Electrolytic, 10μF, 50V
C209	ECKD1H103ZF	Ceramic, 0.01μF, 50V, +80%
C210	ECKD1H223ZF	Ceramic, 0.022μF, 50V, +80%
C211	ECCD1H150KC	Ceramic, 15pF, 50V, ±10%
C212, 213	ECKD1H223ZF	Ceramic, 0.022μF, 50V, +80%
C214	ECQM1H473KZ	Polyester, 0.047μF, 50V, ±10%
C216	ECQP1471JZ	Polypropylene, 470pF, 100V, ±5%
C217	ECQM1H473KZ	Polyester, 0.047μF, 50V, ±10%
C218	ECEA1JS4R7	Electrolytic, 4.7μF, 63V
C301, 302	ECQM1H152JZ	Polyester, 0.0015μF, 50V, ±5%
C303, 304	ECUX1H391KR	Chip, 390pF, 50V, ±10%

Ref. No.	Part No.	Part Name & Description
C305, 306	ECQM1H562KZ	Polyester, 0.0056μF, 50V, ±10%
C307, 308	ECEA50ZR33	Electrolytic, 0.33μF, 50V
C309	ECEA50ZR47	Electrolytic, 0.47μF, 50V
C310	ECQP1471JZ	Polypropylene, 470pF, 100V, ±5%
C311	ECEA50Z1	Electrolytic, 1μF, 50V
C312	ECEA50ZR33	Electrolytic, 0.33μF, 50V
C313	ECQM1H473KZ	Polyester, 0.047μF, 50V, ±10%
C314	ECEA50ZR47	Electrolytic, 0.47μF, 50V
C315, 316	ECQM1H222KZ	Polyester, 0.0022μF, 50V, ±10%
C317	ECEA1HS100	Electrolytic, 10μF, 50V
C319	ECKD1H103ZF	Ceramic, 0.01μF, 50V, +80%
C320	ECCD1H560K	Ceramic, 56pF, 50V, ±10%
C401, 402	ECEA50M3R3R	Electrolytic, 3.3μF, 50V
C403, 403	ECCD1H101K	Ceramic, 100pF, 50V, ±10%
C405, 406	ECCD1H680K	Ceramic, 68pF, 50V, ±10%
C407, 408	ECEA1CS330	Electrolytic, 33μF, 16V
C409, 410	ECQM1H223JZ	Polyester, 0.022μF, 50V, ±5%
C411, 412	ECQM1H682JZ	Polyester, 0.0068μF, 50V, ±5%
C413, 414	ECEA50Z1	Electrolytic, 1μF, 50V
C415, 416	ECEA1ES470	Electrolytic, 47μF, 25V
C417, 418	ECKD1H331KB	Ceramic, 330pF, 50V, ±10%
C419, 420	ECQM1H473KZ	Polyester, 0.047μF, 50V, ±10%
C421, 422	ECQM1H823KZ	Polyester, 0.082μF, 50V, ±10%
C423, 424	ECKD1H103MD	Ceramic, 0.01μF, 50V, ±20%
C425, 426	ECEA1ES101	Electrolytic, 100μF, 25V
C501, 502	ECQM1H183KZ	Polyester, 0.018μF, 50V, ±10%
C503, 504	ECQM1H104KS	Polyester, 0.1μF, 50V, ±10%
C505, 506	ECQM1H272KZ	Polyester, 0.0027μF, 50V, ±10%
C507, 508	ECQM1H223KZ	Polyester, 0.022μF, 50V, ±10%
C601, 602	ECEA50M3R3R	Electrolytic, 3.3μF, 50V
C603, 604	ECCD1H390K	Ceramic, 39pF, 50V, ±10%
C605, 606	ECCD1H820K	Ceramic, 82pF, 50V, ±10%
C607, 608	ECEA1HS100	Electrolytic, 10μF, 50V
C609, 610	ECCD1H020C	Ceramic, 2pF, 50V, ±0.25pF
C611, 612	ECCD1H330K	Ceramic, 33pF, 50V, ±10%
C613, 614	ECKD1H471KB	Ceramic, 470pF, 50V, ±10%
C615, 616	ECCD1H330K	Ceramic, 33pF, 50V, ±10%
C617, 618	ECKD1H471KB	Ceramic, 470pF, 50V, ±10%
C619, 620	ECCD1H101K	Ceramic, 100pF, 50V, ±10%
C621, 622	ECEA1HN3R3S	Non-Polar Electrolytic, 3.3μF, 50V
C623, 624	ECEA1EN3R3S	Non-Polar Electrolytic, 3.3μF, 25V
C625, 626	ECCD1H101K	Ceramic, 100pF, 50V, ±10%
C627, 628	ECQM1H473KZ	Polyester, 0.047μF, 50V, ±10%
C629, 630	ECEA1HS100	Electrolytic, 10μF, 50V
C631, 632	ECCD1H150K	Ceramic, 15pF, 50V, ±10%
C633	ECEA1HS470	Electrolytic, 47μF, 50V
C701, 702	ECEA1S45V682U	Electrolytic, 6800μF, 45V
C704	ECEA2AS100	Electrolytic, 10μF, 100V
C705	ECEA50Z3R3	Electrolytic, 3.3μF, 50V
C706, 707	ECEA1JS330	Electrolytic, 33μF, 63V
C708	ECEA50Z3R3	Electrolytic, 3.3μF, 50V
C710, 711	ECKD2H103PE	Ceramic, 0.01μF, 500V, +100%
C712	ECKD2H103PE	Ceramic, 0.01μF, 500V, +100%
C713	ECEA1HS470	Electrolytic, 47μF, 50V
C714	ECEA1JS330	Electrolytic, 33μF, 63V
C715	ECEA1HS331	Electrolytic, 330μF, 50V
C716	ECEA1HS221	Electrolytic, 220μF, 50V
C717	ECEA1ES101	Electrolytic, 100μF, 25V
C718, 719	ECKD1H103ZF	Ceramic, 0.01μF, 50V, +80%
C720	ECEA1HS100	Electrolytic, 10μF, 50V
C722	ECKD1H103ZF	Ceramic, 0.01μF, 50V, +80%
C750	ECKDMY103PF	Ceramic, 0.01μF, 125VAC, +100%
C901	ECUX1H103ZF	Chip, 0.01μF, 50V, +80%
C902	ECEA50M4R7R	Electrolytic, 4.7μF, 50V
C903	ECUX1H103ZF	Chip, 0.01μF, 50V, +80%
C904	ECUX1H223ZF	Chip, 0.022μF, 50V, +80%
C905	ECEA1VS101	Electrolytic, 100μF, 35V
C906, 907	ECUX1H103ZF	Chip, 0.01μF, 50V, +80%
C908	ECUX1H220KC	Chip, 22pF, 50V, ±10%
C909	ECUX1H180KC	Chip, 18pF, 50V, ±10%
C910	ECUX1H150KC	Chip, 15pF, 50V, ±10%
C912	ECUX1H223ZF	Chip, 0.022μF, 50V, +80%
C913	ECEA0JS471	Electrolytic, 470μF, 6.3V
C915	ECEA0JS471	Electrolytic, 470μF, 6.3V
C916	ECEA1ES470	Electrolytic, 47μF, 25V
C917	ECUX1H223ZF	Chip, 0.022μF, 50V, +80%
C918	ECKD1H223ZF	Ceramic, 0.022μF, 50V, +80%
C919	ECKD1H102ZF	Ceramic, 0.001μF, 50V, +80%
C920	ECUX1H391KR	Chip, 390pF, 50V, ±10%
C921	ECEA0JS471	Electrolytic, 470μF, 6.3V
C922	ECKD1H103ZF	Ceramic, 0.01μF, 50V, +80%

EXPLODED VIEWS

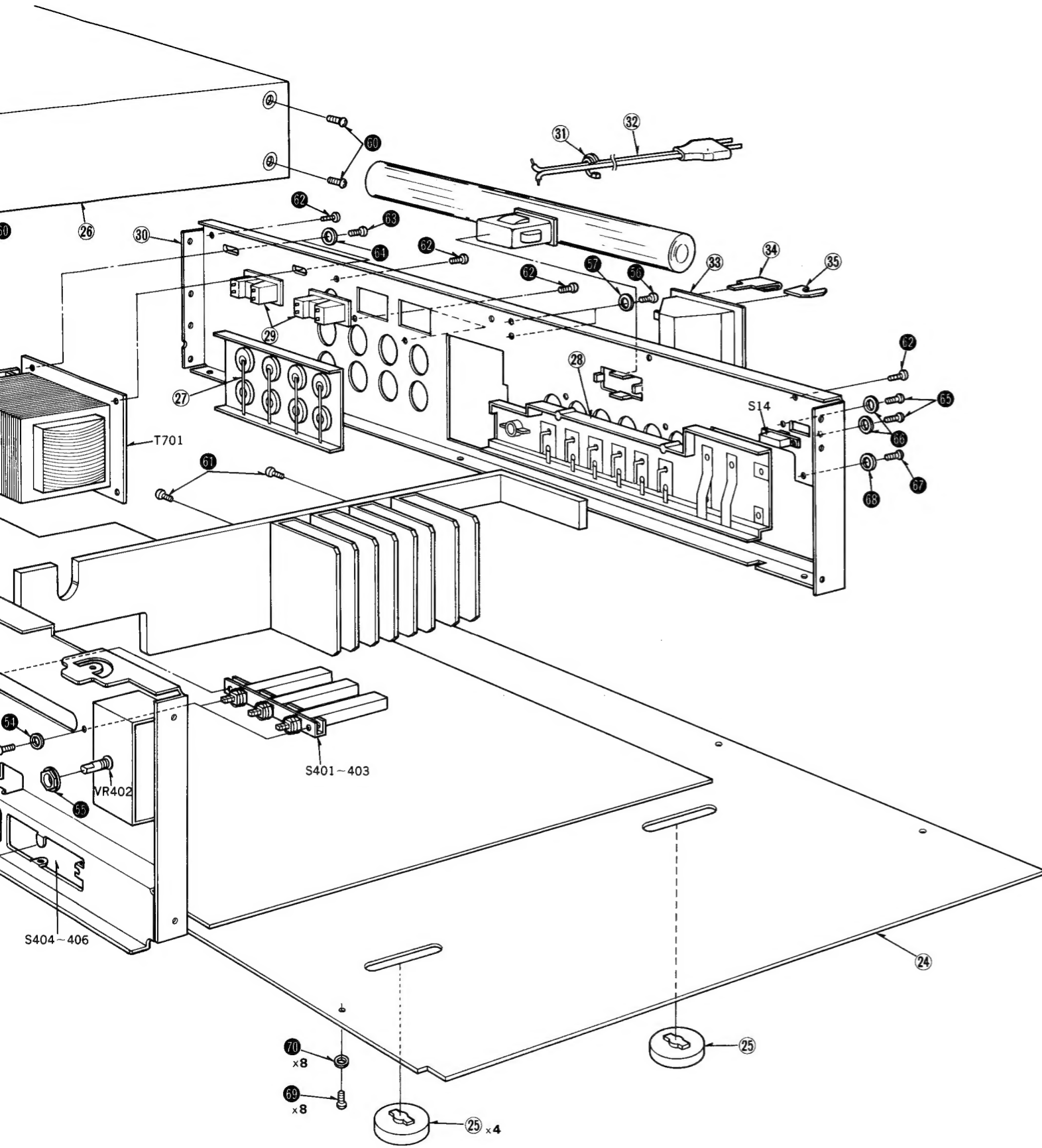




REPLACEMENT PARTS LIST (Cabinet and Chassis Parts)

- Notes: 1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.  
 2.  $\Delta$  indicates that only parts specified by the manufacture be used for safety.  
 3. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.

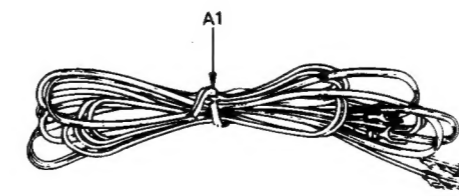
\* [M] is available in U.S.A.  
 \* [MC] is available in Canada.



Ref. No.	Part No.	Part Name & Description
<b>CABINET and CHASSIS PARTS</b>		
1	SGX6967	Ornament, Left Side
2	SBC321	Button, Power Input Selector
3	SUS163	Spring, Power Input Selector
4	SGWA222M	Front Panel
5	SBN973	Knob, Tone, Balance Control
6	SGX6957	Sleeve, Button
7	SGX6959	Sleeve, Button
8	SGX7001	Sleeve, Button
9	SBN971	Knob, Volume Control
10	SGX6969	Ornament, Right Side
11	SGU195	Transparent Cover
12	SGX6971	Ornament Plate
13	SDU51	Plate, Ornament
14	SDU53	Tinted Plate
15	SBC329	Button, FM, AM
16	SBC327	Button, Tuning
17	SBC325	Button, FM/AM Preset
18	SUW1735	Bracket, P.C.B.
19	SHR9539	Holder, L.E.D. (Quartz Lock)
20	SHR9537	Holder, L.E.D. (Signal Strength)
21	SBC323	Button, Push Switch
22	SMP301	Cover, Lamp
23	SJJ61	Jack, Headphone
24	SYU265	Bottom Cover
25	SKL255	Foot
26	SKC630S1	Cabinet Cover
27	SJF4813-1	Terminal Board, Speaker
28	SJF8029-4N	Terminal Board
29	SJSA66-2	Socket, AC Outlet
30	SGP2510A	Rear Panel
31	RHR111	Bushing, AC Cord
32	RJA9YA	AC Cord
33	SJB3005	Battery Case
34	SJC7	Battery Terminal
35	SJC9	Battery Terminal
	SSM173-1	Meter

Ref. No.	Part No.	Part Name & Description
<b>SCREWS, WASHERS and NUTS</b>		
	<b>XTB3+8BFZ</b>	Screw, Tapping, $\oplus$ 3 x 8
	<b>XTB3+10B</b>	Screw, Tapping, $\oplus$ 3 x 10
	<b>XSN3+6S</b>	Screw, $\oplus$ 3 x 6
	<b>XWA3B</b>	Washer, Spring, $\phi$ 3
	<b>SNE4021</b>	Nut, (Volume)
	<b>XTB3+8BFZ</b>	Screw, Tapping, $\oplus$ 3 x 8
	<b>XWC3B</b>	Washer, External Toothed Lock, $\phi$ 3
	<b>XTN3+10</b>	Screw, Tapping, $\oplus$ 3 x 10
	<b>XWG3</b>	Washer, Plain, $\phi$ 3
	<b>XTB4+8BFZ</b>	Screw, Tapping, $\oplus$ 4 x 8
	<b>XTB3+16B</b>	Screw, Tapping, $\oplus$ 3 x 16
	<b>XTB3+10BFZ</b>	Screw, Tapping, $\oplus$ 3 x 10
	<b>XSN4+10BVS</b>	Screw, $\oplus$ 4 x 10
	<b>XWA4BFZ</b>	Washer, Spring, $\phi$ 4
	<b>XSN26+8BV</b>	Screw, $\oplus$ 26 x 6
	<b>XWA26</b>	Washer, Spring, $\phi$ 26
	<b>XTB3+8BFZ</b>	Screw, Tapping, $\oplus$ 3 x 8
	<b>XWC3B</b>	Washer, External Toothed Lock, $\phi$ 3
	<b>XTN3+12B</b>	Screw, Tapping, $\oplus$ 3 x 12
	<b>XWG3</b>	Washer, Plain, $\phi$ 3
<b>ACCESSORY</b>		
A1	SSA267	Cord, FM Indoor Antenna
<b>PACKING PARTS</b>		
P1	SPP649	Polyethylene Bag
P2	SPS2997	Pad, Left Side
P3	SPS2999	Pad, Right Side
P4 [M]	SPG2829	Carton Box
P4 [MC]	SPG2831	Carton Box
P5 [M]	SQF 10655-2	Instructions Book, Printed Matter
P5 [MC]	SQF 10657-1	Instructions Book, Printed Matter

• Accessory



# Service Manual

FM/AM Stereo Receiver

## SA-222

[PA], [PE]

## Areas

- \* [PA] is available in for East PX.
- \* [PE] is available in European Military.

Please use this manual together with the service manual for Model No. SA-222 [M, MC]  
Order No. SD8012-1811.

### CHANGES

#### REPLACEMENT PARTS LIST

Ref. No.	Change of Part No.		Part Name & Description	Per Set (Pcs.)	Remarks
	SA-222 [M, MC] (ORDER NO. SD8012-1811)	→ SA-222 [PA, PE]			
<b>COILS and TRANSFORMERS</b>					
T701	SLT5M137	SLT5P217-W	Transformer, Power Source	1	
<b>VARIABLE RESISTORS</b>					
R136	RRD18XK393	<b>EVNK0AA00B54</b>	Frequency Meter Adjustment, 50k $\Omega$ (B)	1	
<b>COMPONENT COMBINATIONS</b>					
Z601, 602	Addition	ECQJ0517	Component Combination, 0.047 $\mu$ F, 10 $\Omega$	2	
<b>FUSES</b>					
F1	XBA1F25NU14	XBA2C20TR0	Fuse, T 2A (250V)	1	
F2	Addition	XBA2C10TR0	Fuse, T 1A (250V)	1	
F3, 4	Addition	XBA2C06TR0	Fuse, T 630mA (250V)	2	
<b>SWITCHES</b>					
S701	ESB90144T	ESB90159S	Switch, Power	1	
S702	Addition	ESE37200	Switch, Voltage Selector	1	
<b>RESISTORS</b>					
R105	ERO25CKF3302	ERO25CKF2702	Metal Film, 27k $\Omega$ , 1/4W, $\pm$ 1%	1	
R136	RRD18XK393	Deletion	.....	0	
R199	ERD25TJ224	Deletion	.....	0	
R303	RRD18XK153	<b>RRD18XK223</b>	Chip, 22k $\Omega$ , 1/8W, $\pm$ 10%	1	
R304	ERD25TJ153	<b>ERD25TJ223</b>	Carbon, 22k $\Omega$ , 1/4W, $\pm$ 5%	1	
R455, 456 457, 458	Addition	<b>RRD18XK472</b>	Chip, 4.7k $\Omega$ , 1/8W, $\pm$ 10%	4	
R459, 460	Addition	<b>ERD25TJ394</b>	Carbon, 390k $\Omega$ , 1/4W, $\pm$ 5%	2	
R461, 462	Addition	<b>ERD25TJ104</b>	Carbon, 100k $\Omega$ , 1/4W, $\pm$ 5%	2	
R609, 610	Addition	<b>ERD25FJ102</b>	Carbon, 1k $\Omega$ , 1/4W, $\pm$ 5%	2	
<b>CAPACITORS</b>					
C301, 302	ECQM1H152JZ	ECQM1H122JZ	Polyester, 0.0012 $\mu$ F, 50V, $\pm$ 5%	2	
C305, 306	ECQM1H562KZ	ECQM1H472KZ	Polyester, 0.0047 $\mu$ F, 50V, $\pm$ 10%	2	
C320	ECCD1H560K	ECCD1H121K	Ceramic, 120pF, 50V, $\pm$ 10%	1	
C750	ECKDMY103PF	ECKDKC103PF	Ceramic, 0.01 $\mu$ F, 400VAC, $\pm$ 10%	1	

# Technics

Panasonic Tokyo  
Matsushita Electric Industrial Co., Ltd.  
1-2, 1-chome, Shiba-koen, Minato-ku, Tokyo 105 Japan

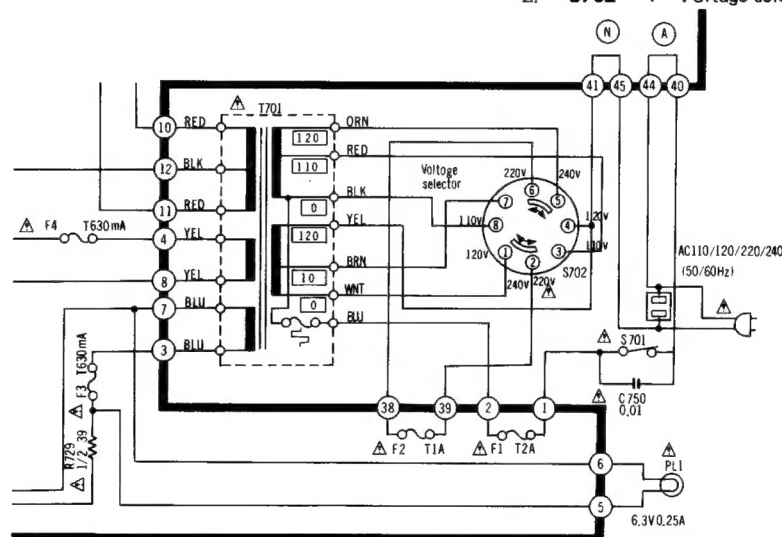
Matsushita Electric Trading Co., Ltd.  
P.O. Box 288, Central Osaka Japan

Ref. No.	Change of Part No.		Part Name & Description	Per Set (Pcs.)	Remarks
	SA-222 [M, MC] (ORDER NO. SD8012-1811)	SA-222 [PA, PE]			
<b>CABINET and CHASSIS PARTS</b>					
28	SJF8029-4N	SJF8029N	Terminal Board	1	
30	SGP2510A	SGP2510-2C	Rear Panel	1	
31	RHR111	SHR127	Bushing, AC Cord	1	
32	RJA9YA	<b>RJA52Z</b>	AC Cord	1	
33	SJB3005	SJB3005-1	Battery Case	1	
<b>ACCESSORY</b>					
A2	Addition	RJP120ZBS	Plug Adapter, Power Source	1	
<b>PACKING PARTS</b>					
P4	SPG2829	SPG2899	Carton Box	1	○
	SPG2831				
P5	SQF10655-2	SQF10961	Instructions Book, Printed Matter	1	○
	SQF10657-1				

## CHANGE OF SCHEMATIC DIAGRAM

### Power source circuit

- Notes: 1. **S701** : Power source switch in "on" position.  
2. **S702** : Voltage selector switch in "240V" position.



### REC/PLAY circuit

