FT–600

HITACHI
Hitachi, Ltd. Tokyo Japan

HITACHI HI-FI COMPONENT

AM/FM STEREO TUNER

MODEL FT-600

SERVICE MANUAL

NO. 41 1972

I. SPECIFICATIONS

- **Circuitry** ..... AM/FM 2 Band Super-heterodyne
- **Semi-conductor** ..... FET : 1
  IC : 3
  Transistor : 28
  Diode : 29
- **FM section**
  - **Frequency range:** ..... 88 – 108 MHz
  - **Usable sensitivity (IHF):** 1.8μV
  - **Distortion:** ..... Monaural 0.3%
    Stereo 0.5%
  - **Image rejection:** ..... more than 70dB (98MHz)
  - **Signal-to-noise ratio:** ..... more than 70dB
  - **Capture ratio:** ..... less than 1.5dB
  - **IF rejection:** ..... more than 90dB
  - **AM suppression** ..... more than 50dB
  - **Spurious response:** ..... more than 90dB
  - **Selectivity (Alt.channel IHF):** ..... more than 50dB
  - **Channel separation:** ..... more than 40dB (1kHz)
  - **Antenna input impedance:** ..... 75/300 ohm
  - **Output voltage:** ..... 1.5V (Fix)
    0–0.5V (Variable)
- **AM section**
  - **Frequency range:** ..... 530 – 1,605 kHz
  - **Usable sensitivity (IHF):** 15μV
  - **Image rejection:** ..... more than 60dB
  - **Selectivity:** ..... more than 40dB
  - **Signal-to-noise ratio:** ..... more than 50dB
  - **Output voltage:** ..... 0.5V (Fix)
    0–0.5V (Variable)
- **Output impedance** 4kΩ
- **Power requirements** ..... AC 120V, 60Hz
- **Power consumption** 15W
- **Dimensions** ..... 16(W) x 5(H) x 12(D) in.
  (412 x 122.5 x 315mm)
- **Weight** ..... 16.4 lbs. (7.6 kg)
- **Accessory circuits** ..... FM muting switch, Noise filter switch, Multipath terminal, Just tune, stereo-monaural auto change-over, FM stereo indicator lamp, tuning meter, output level control, AM bar antenna, FM sensitivity change-over switch.

2. FEATURES

1. **"Just Tune" System offering easy tuning**
   FM broadcast reception has been further simplified. Within the range where the pointer lamp stays lit, dependable reception with the least noise can be enjoyed.
2. **FM Tuner section adopting FET and IC**
   The high-performance FET (field effect transistors) in the FM FRONT END section and the four variable condensers improve the high sensitivity and low noise characteristics. The image ratio and spurious response ratio also have been enhanced.
   By adopting an IC (integrated circuit) and a high-performance IFT (intermediate frequency transformer) in the Intermediate Frequency Amplifier section, selection performance has been improved, and the capture ratio has been hiked.
3. **Interstation noise sharply cut by FM muting switch**
4. **Disagreeable noise killed by noise filter switch**
5. **FM sensitivity transfer switch**
6. **Multipath terminal**
   By simply connecting an oscilloscope to the Multipath terminal, the Multipath reflected by a hill or a building can be observed.
7. **AM Tuner section equipped with ferrite antenna**
8. **Large tuning meter and dial scale of uniform graduation**

3. FRONT AND REAR PANEL

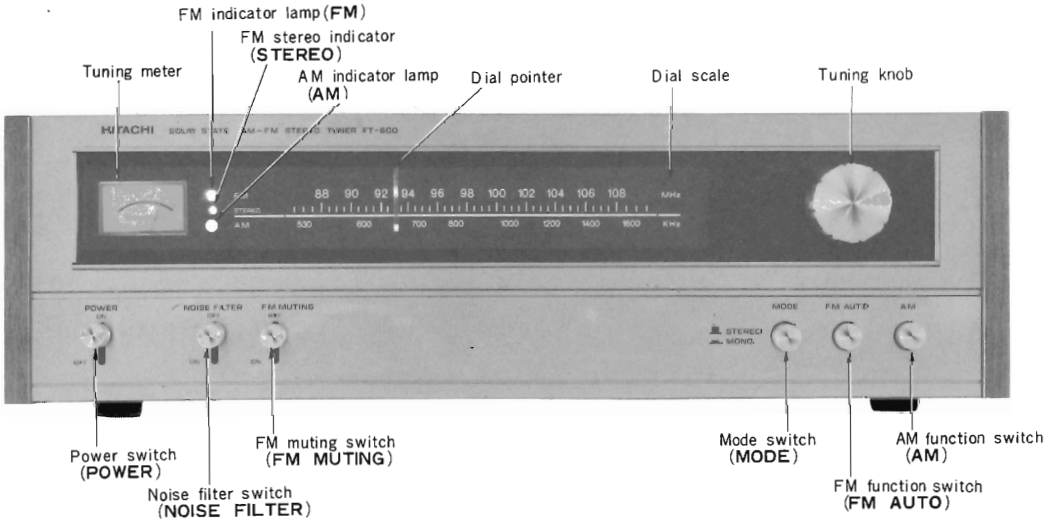


Fig. 1

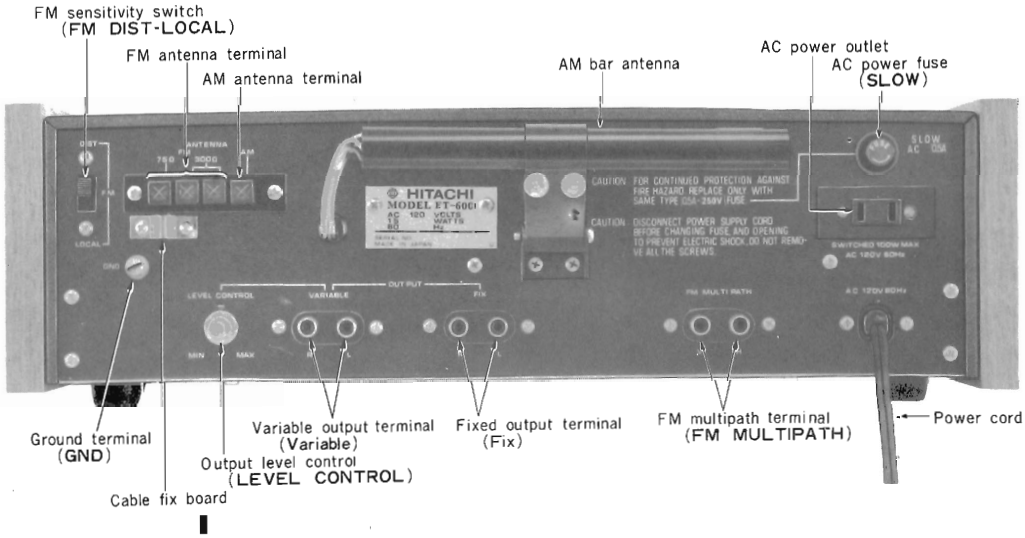


Fig. 2

4. DESCRIPTION OF NEW SYSTEM

4 - 1 ABOUT MULTIPATH TERMINAL

Multipath signifies the FM signal coming into an antenna through various paths, getting reflections from hill or buildings, etc. See Fig. 3.

If this multipath phenomenon occurs, the compound wave which consists of direct wave and reflected wave a phase modulation and an amplitude modulation.

In this case, the amplitude modulation can be removed by a limiter, but it is not easy to remove the phase modulation, which increases distortion or makes the separation degree worse. As the phase modulation and the amplitude modulation made by the compound wave occurs simultaneously, the degree of phase modulation can be presumed by that of the amplitude modulation. Accordingly, the detection of multipath can be fulfilled by the detection of AM (amplitude modulation) component, but AM component should be detected from where the limiter does not work.

Multipath cannot be always detected in every electric field.

In addition to this, it is difficult to detect multipath in a strong electric field.

Pick up FM-IF signal from IF amplification final stage which contains comparatively larger AM component and apply this signal to the vertical axis (V) of an oscilloscope applying the output signal of a tuner to the horizontal axis (H) in order to make them draw a resurgence, then, a multipath waveform shown in Fig. 4 can be obtainable.

Observe the multipath waveform and change direction or height of the FM antenna for best reception position.

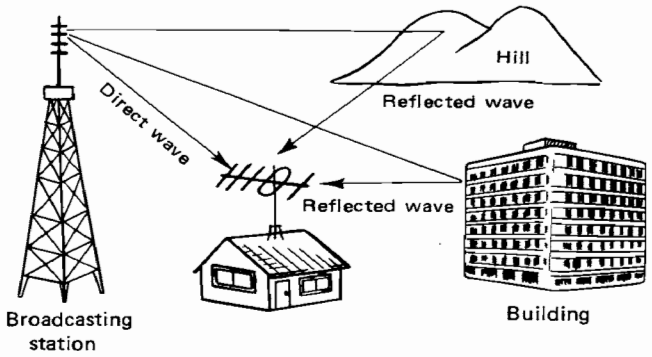
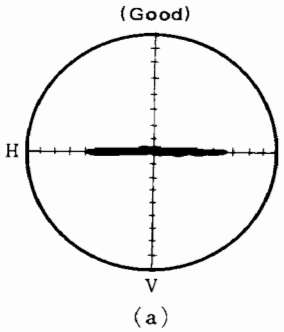


Fig. 3 Multipath generation paths



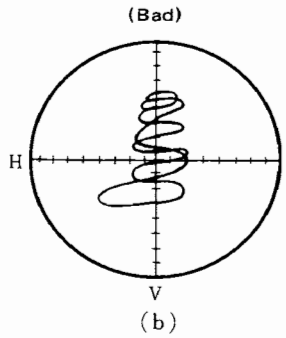


Fig. 4 Multipath wave form (This is an example.)

4 - 2 JUST TUNE SYSTEM

In this model, we have adopted a just tune circuit using five transistors following the FM detection circuit.
The most dominant feature of this circuit is the perfect tuning system that this turns indication lamp "on" at the tuning point where distortion is minimum. In the tuning system, the output voltage of discriminator is utilized. The circuit is shown in Fig.5.

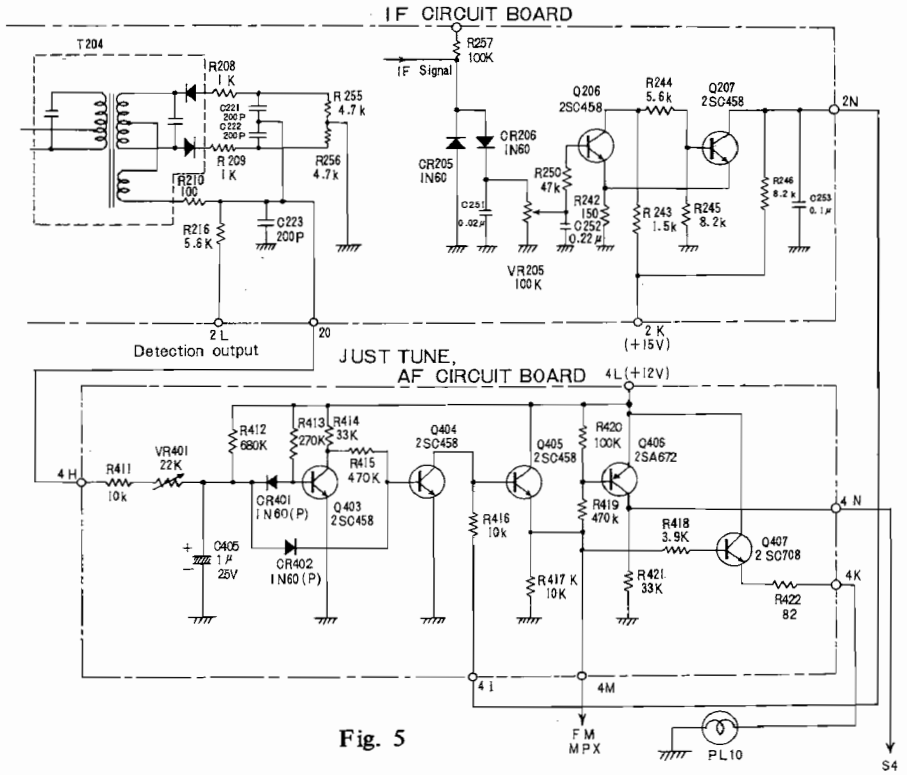


Fig. 5

The output waveform (S curve) of IF discriminator is shown in Fig.6. As shown in Fig.6, the just tune circuit works and makes the indication lamp turn "on" only between Ⓐ and Ⓑ.
The output voltage shall be within approx. ±0.3V, and the frequency shall be within ±55kHz (The lighting range is its double value, 110kHz).
Owing to the characteristic of S curve, noise voltage will be within ±0.3V at the portion below Ⓐ′ and Ⓑ′.

Under this condition, however, the output of IF schmitt circuit (2N terminal in Fig.5) will be O V, and the just tune circuit operation will be placed under OFF condition.
Therefore, the just tune system takes advantage of the straight line portion where S curve has the minimum distortion in the operation mentioned above, and makes it possible to turn the indication lamp "on" only when it is tuned in this portion. In Fig.7, the lighting range of the just tune at that time is shown.

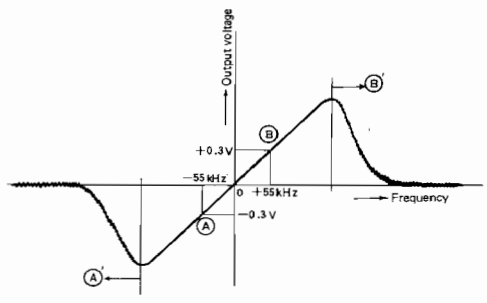


Fig. 6

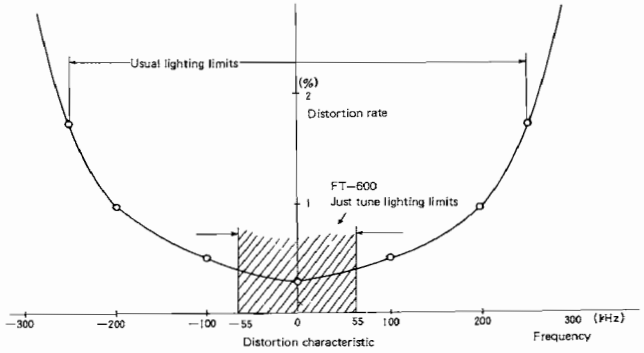
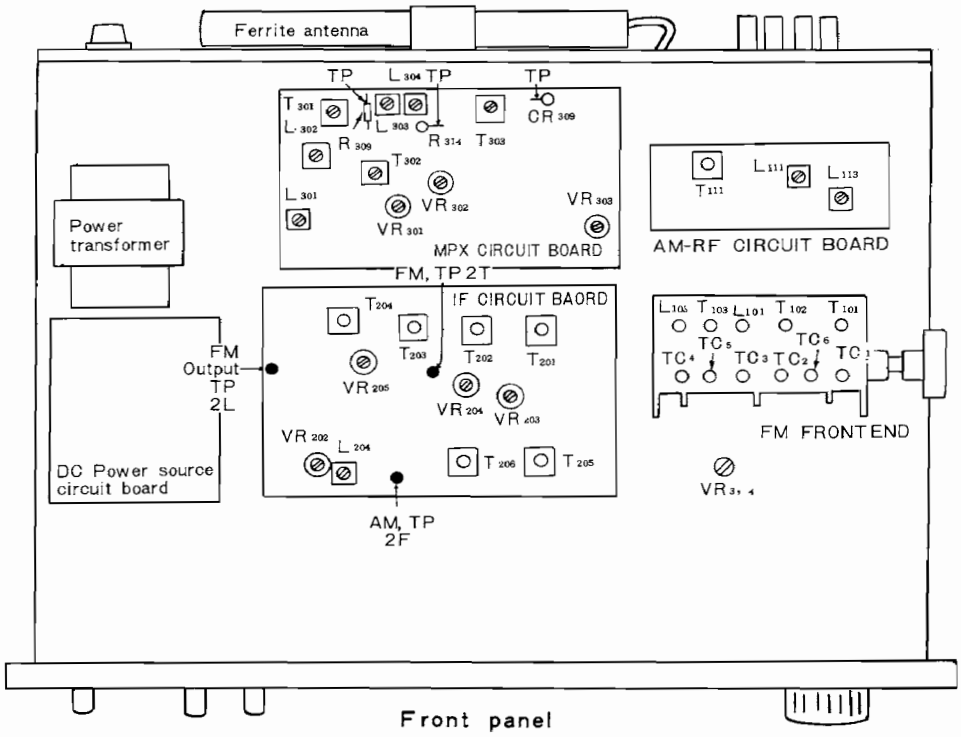


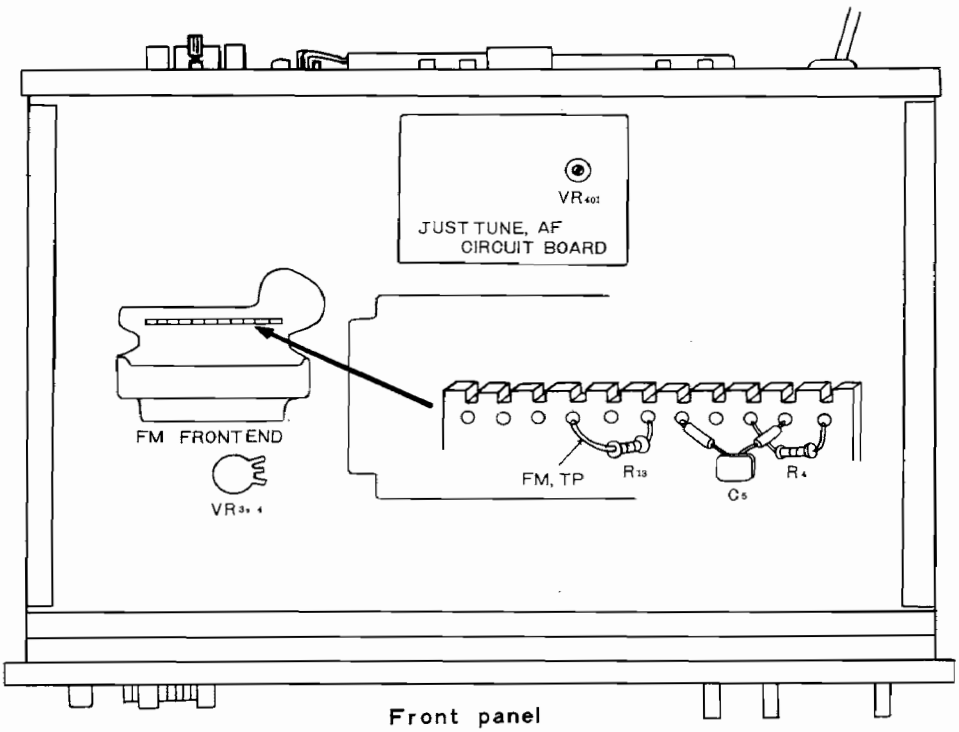
Fig. 7

5. CHASSIS LAYOUT

TOP VIEW



BOTTOM VIEW



6. ALIGNMENT INSTRUCTION

6-1 FM·IF SECTION ALIGNMENT

ORDER	ITEM	MEASURING INSTRUMENT	INPUT TERMINAL	OUTPUT TERMINAL	MEASURING FREQUENCY	ALIGNMENT POINT	WAVEFORM AND ALIGNMENT METHOD
1	IF alignment	10.7MHz±800kHz sweep generator	R13 at the FM FRONT-END Section	TP, 2T on FM PCB		T103, T201 T202, T203	Fig. 8 MAX. GAIN
	S curve alignment			2L on FM PCB		T204	Fig. 9 MAX. GAIN
2	Covering alignment	(2-1) FM signal generator 90MHz, 400Hz 100% modulation 20dB input	Antenna terminal	Output terminal (Fixed)	90MHz (Set the indicator of the tuner to 90MHz)	L103	MAX. OUTPUT
		(2-2) FM signal generator 106MHz, 400Hz 100% modulation 20dB input, Repeat (2-1), (2-2)			106MHz (Set the indicator of the tuner to 106MHz)	TC4	
3	Tracking alignment	(3-1) FM signal generator 90MHz, 400Hz 100% modulation 10dB input	Antenna terminal	Output terminal (Fixed)	90MHz	T101, T102 L101	MAX. OUTPUT
		(3-2) FM signal generator 106MHz, 400Hz 100% modulation 10dB input, (3-1), (3-2) shall be repeated.			106MHz	TC1 TC2 TC3	
4	Output alignment (Do this after the alignment of MPX section)	FM signal generator 98MHz, 400Hz 30% modulation 60dB input	Antenna terminal	Output terminal (Fixed)	98MHz	VR3, VR4	Align the output to obtain 0.5V±2dB
5	Muting level alignment (Do this after the alignment of MPX Section)	FM signal generator 98MHz, 400Hz 20–21dB input	Antenna terminal	Output terminal (Fixed)	98MHz	VR205	Align VR205 by turning FM muting SW ON to obtain stronger output.

Note:

1. If you do the above alignments except for the order 1, observe waveforms using a vacuum tube volt meter (VTVM) and an oscilloscope in order not to receive signal from a broadcasting station mistakenly.
2. If the output waveform should become distorted during the covering (order 2) and tracking (order 3) alignments, align VR3 and 4 to make above alignments within the range where the waveform doesn't become distorted.

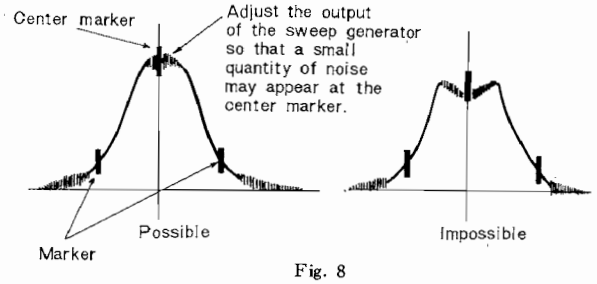


Fig. 8

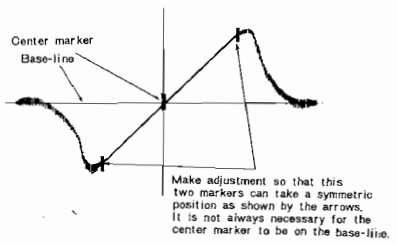


Fig. 9

6-2 MPX SECTION ALIGNMENT

(Prior to making alignment of the MPX section, turn VR301 extremely clockwise, and VR302 extremely counterclockwise.)

ORDER	ITEM	MEASURING INSTRUMENT	INPUT TERMINAL	OUTPUT TERMINAL	MEASURING FREQUENCY	ALIGNMENT POINT	ALIGNMENT METHOD
1	67kHz Trap alignment	FM signal generator 98MHz, 67kHz (100% modulation by an audio oscillator) 60dB input	Antenna terminal	R314 of MPX PCB (Connect VTVM)	98MHz	L301	MIN. OUTPUT
2	71kHz Trap alignment	FM signal generator 98MHz, 71kHz (100% modulation by an audio oscillator) 60dB input	Antenna terminal	R314 of MPX PCB (Connect VTVM)	98MHz	L303	MIN. OUTPUT
3	19kHz Trap alignment	FM signal generator 98MHz, 19kHz 10% modulation 60dB input	Antenna terminal	R314 of MPX PCB (Connect VTVM and oscilloscope)	98MHz	L304	MIN. OUTPUT
4	19kHz, 38kHz Tuning coil alignment	FM signal generator 98MHz, 19kHz 10%modulation 60dB input	Antenna terminal	CR309 of MPX PCB (Connect VTVM and oscilloscope)	98MHz	T301, T303, L302	① Align T301, L302 alternately to obtain max. output. ② Take the output out of CR309 on MPX PCB, and align T303 to obtain max. output.
5	Alignment of MPX output & separation	(5-1) FM signal generator 98MHz, 1kHz 60dB input (5-2) Stereo signal generator 19kHz10% modulation MAIN90% modulation (5-3) VTVM (5-4) oscilloscope	Antenna terminal	Output terminal (Fixed)	98MHz	T302 T303 VR303	① Set the stereo signal to L-ch and align T302, 303 alternately to produce max. output. Secondly, change it to R-ch and align VR303 to obtain max. separation. ② Measure the R-ch separation and make fine alignment of VR303 to obtain the same separation as ①. Finally, the same separation shall be obtainable both in ① and ② .
6	Lighting level alignment of a stereo indicator lamp	FM signal generator 98MHz, 19kHz 5.3% (4kHz) modulation 60dB input	Antenna terminal		98MHz	VR301 VR302	① Turn VR301 extremely counterclockwise to turn the stereo indicator lamp "OFF". Then, start turning clockwise and stop it at a position where the lamp lights. ② Turn VR302 extremely clockwise to turn the stereo indicator lamp "OFF". Then, start turning counterclockwise and stop it at a position where the lamp lights.

Note: Confirm that the stereo indicator lamp lights by pushing AM function switch (after the lighting level alignment of a stereo indicator lamp in order 6) and by changing it to FM AUTO again. (If it does not light, turn VR301 a little clockwise.)

6-3 AM SECTION ALIGNMENT

ORDER	ITEM	MEASURING INSTRUMENT	INPUT TERMINAL	OUTPUT TERMINAL	MEASURING FREQUENCY	ALIGNMENT POINT	WAVEFORM AND ALIGNMENT METHOD
1	IF alignment	455kHz±10kHz Sweep generator	Ferrite antenna (Wind the lead wire 2 or 3 times and hang it on the antenna)	2F IF PCB		T205 T206 L111	① Pull out the whole cores of L111. ② Align T205, 206 to obtain max. gain as shown in Fig. 10. ③ Turn L111 core to minimize the waveform as shown in Fig. 11.
2	Covering alignment	(2-1) AM signal generator 600kHz, 400Hz 60dB input 30% modulation	Ferrite antenna	Output terminal (Fixed)	600kHz (Adjust the indicator of the set to 600kHz)	L113	MAX. OUTPUT
		(2-2) AM signal generator 1400kHz, 400Hz 60dB input 30% modulation Repeat (2-1), (2-2)			1400kHz (Adjust the indicator of the set to 1400kHz)	TC6	
3	Tracking alignment	(3-1) AM signal generator 600kHz, 400Hz 60dB input 30% modulation	Ferrite antenna	Output terminal (Fixed)	600kHz (Adjust the indicator of the set to 600kHz)	Ferrite antenna	MAX. OUTPUT
		(3-2) AM signal generator 1400kHz, 400Hz 60dB input 30% modulation Repeat (3-1), (3-2)			1400kHz (Adjust the indicator of the set to 1400kHz)	TC5	
4	Output alignment	AM signal generator 1000kHz, 400Hz 30% modulation 74dB input	Ferrite antenna	Output terminal (Fixed)	1000kHz	VR202	Align the output to 0.5V±2dB
5	10kHz Trap alignment	Audio oscillator, AM signal generator 1000kHz, 10kHz 30% modulation 74dB input	Ferrite antenna	Output terminal (Fixed)	1000kHz	L204	MIN. output

Note:
1. If you do the above alignments except for the order 1, observe waveforms using a vacuum tube volt meter (VTVM) and an oscilloscope in order not to receive a signal from a broadcasting station mistakenly.
2. If you go on making alignments of covering and tracking mentioned above, the sensitivity will be higher and the waveform will begin to get saturated.
   At this time, it is recommended to align the output of AM signal generator so that the alignment can be done within the unsaturated range.
3. As the output of the set becomes smaller in the 10kHz trap alignment mentioned above (order 5), raise the input sensitivity of the VTVM until it becomes easy to read the output.

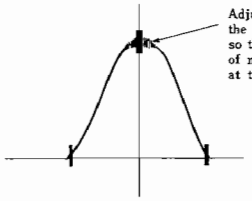


Fig. 10

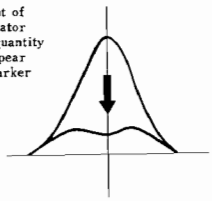


Fig. 11

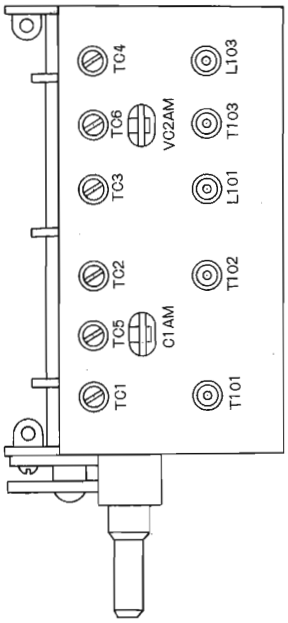
6-4 SENSITIVITY ALIGNMENT OF THE TUNING METER

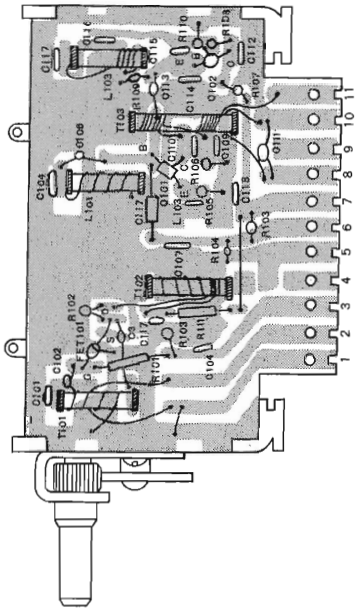
ORDER	ITEM	MEASURING INSTRUMENT	INPUT TERMINAL	OUTPUT TERMINAL	MEASURING FREQUENCY	ALIGNMENT POINT	ALIGNMENT METHOD
1	Alignment of FM tuning meter	FM signal generator 98MHz, 400Hz 100% modulation 60dB input	Antenna terminal		98MHz	VR204	Align VR204 so that the indicator of meter may come to 4th reading.
2	Alignment of AM tuning meter	AM signal generator 1000kHz, 400Hz 30% modulation 74dB input	Ferrite Antenna		1000kHz	VR203	Align VR203 so that the indicator of meter may come to 4th reading.

Note: Observe the output waveforms in an oscilloscope in order not to receive a signal from a broadcasting station mistakenly.

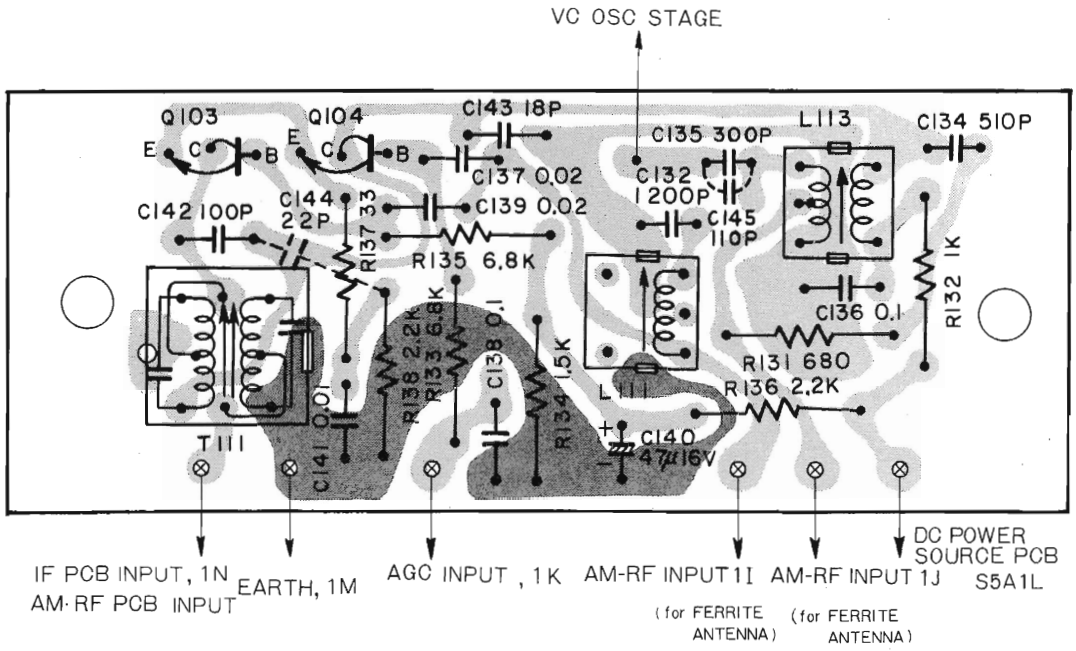
7. CIRCUIT BOARD

FM FRONTEND

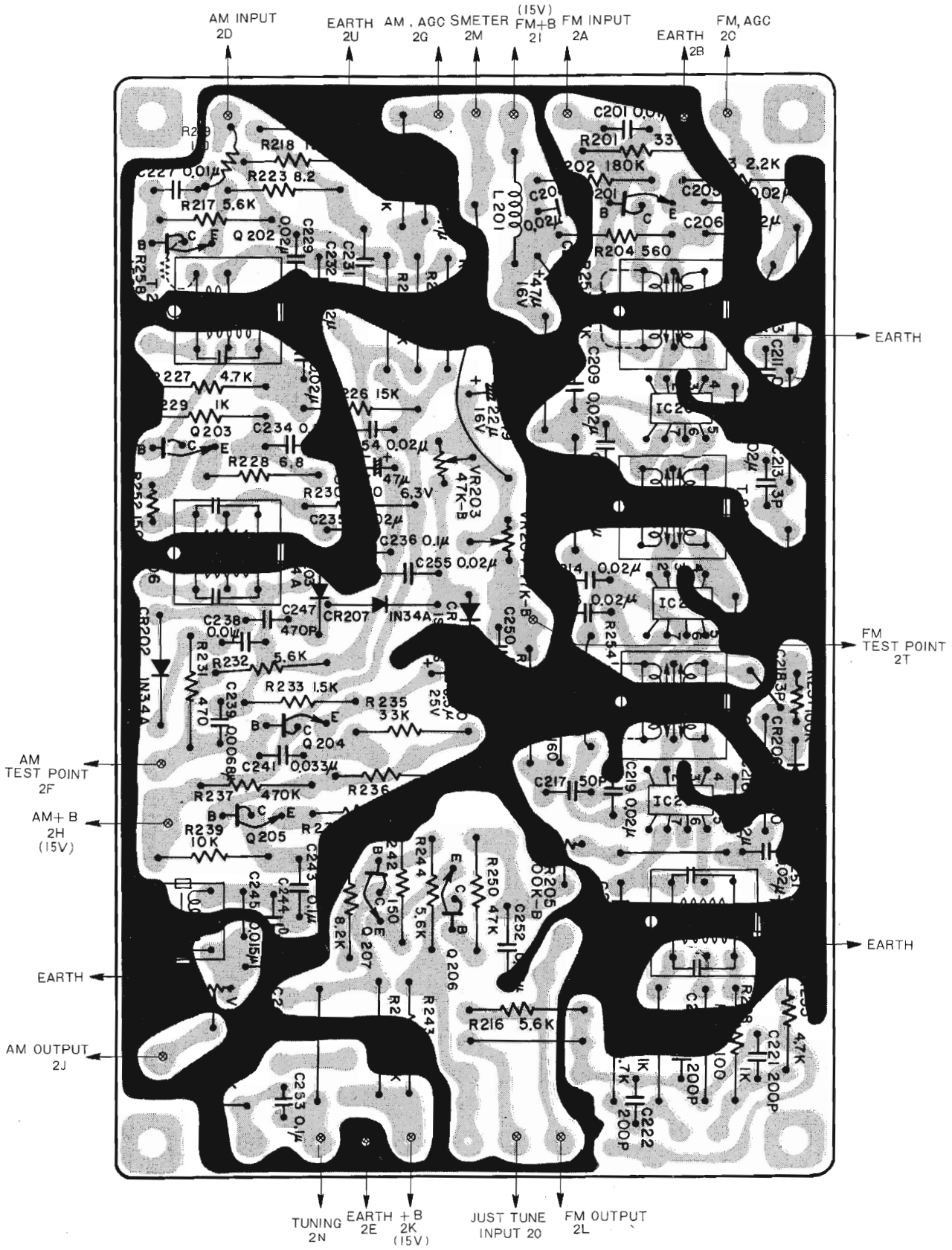




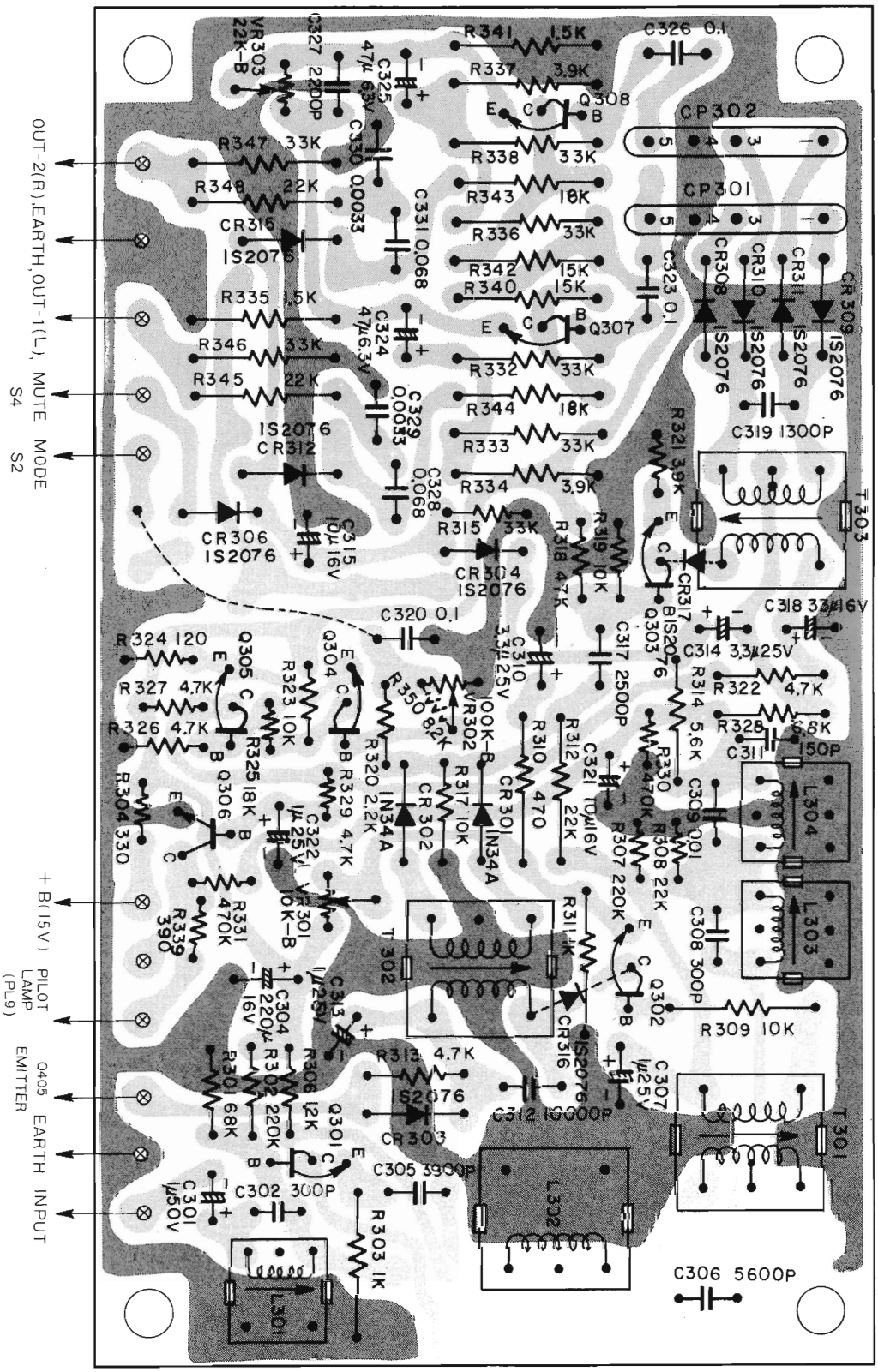
AM-RF CIRCUIT BOARD



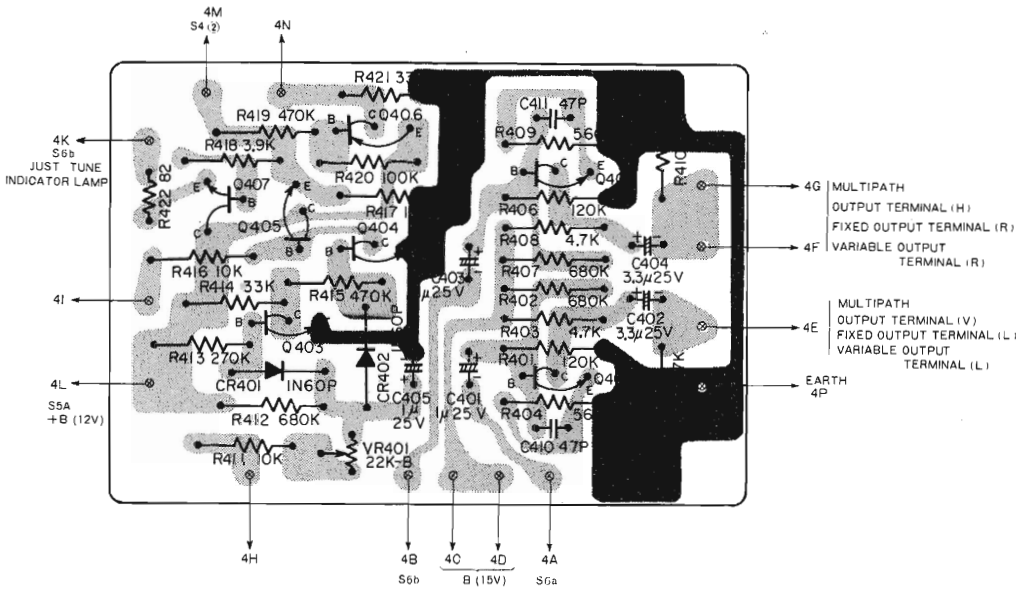
IF CIRCUIT BOARD



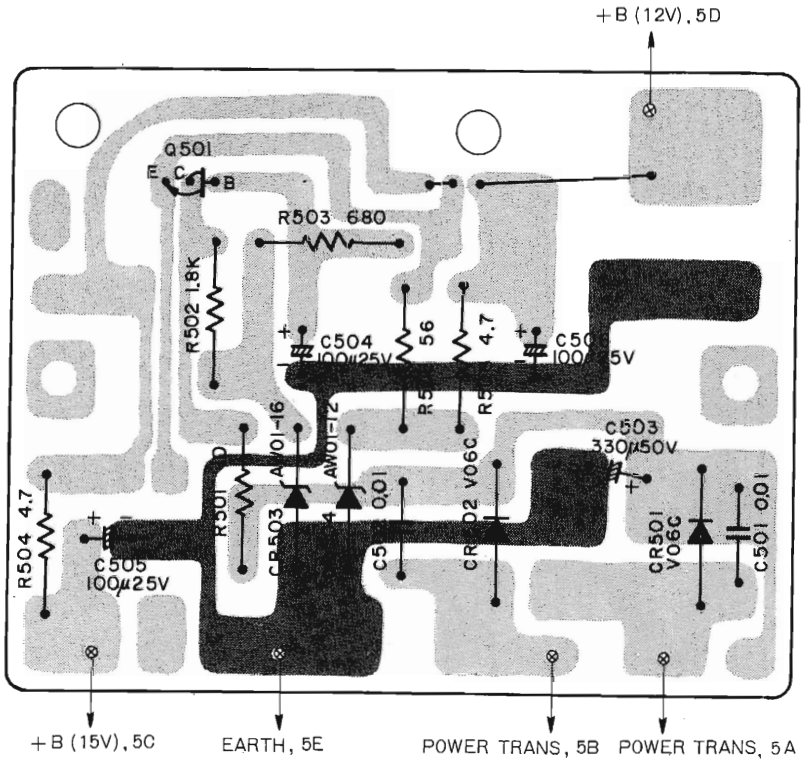
MPX CIRCUIT BOARD



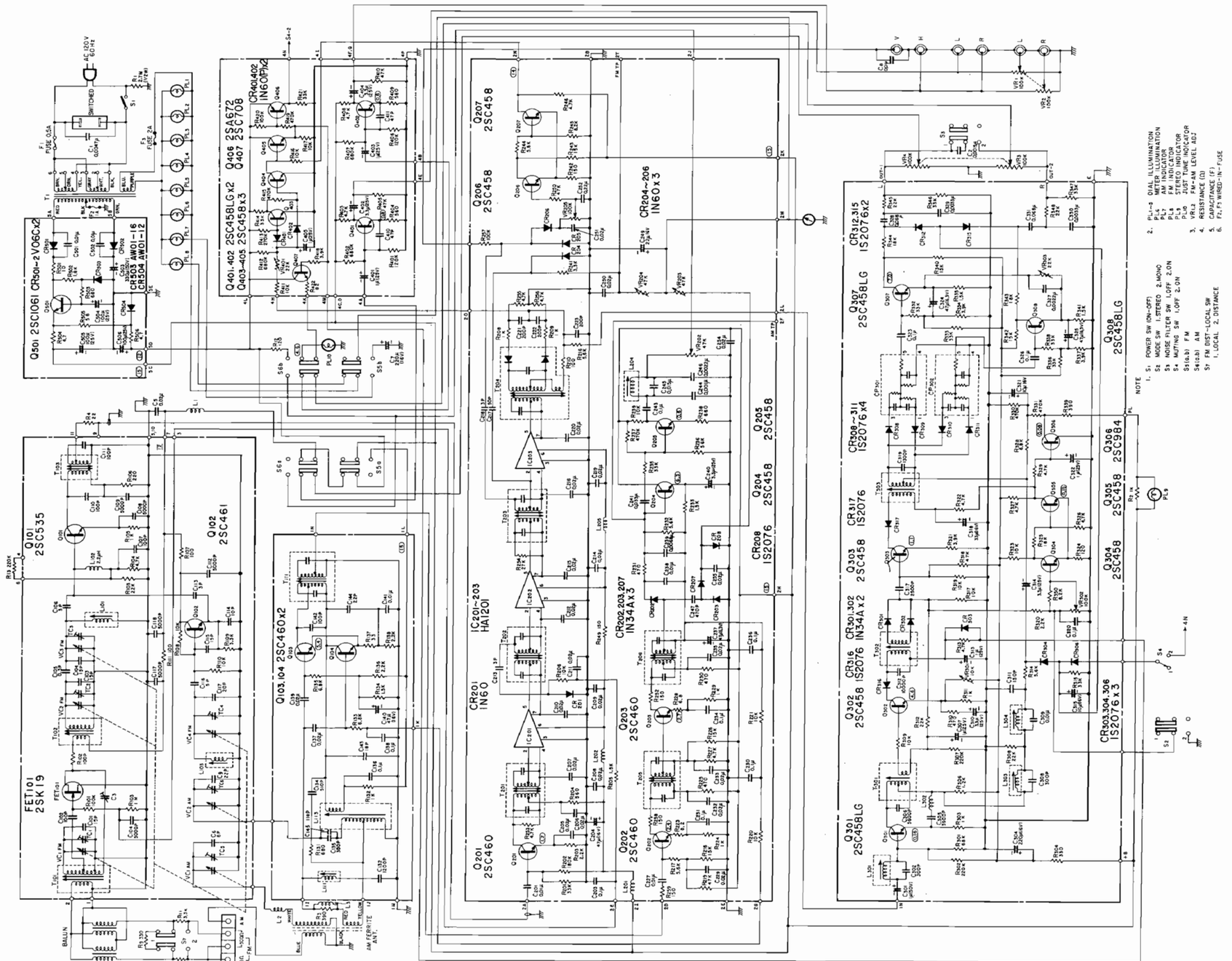
JUST TUNE, AF CIRCUIT BOARD

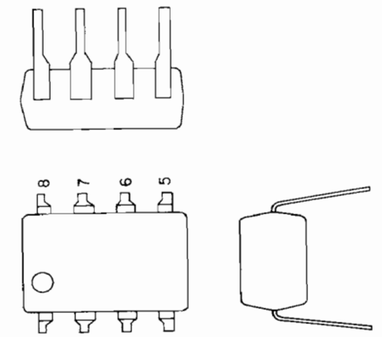


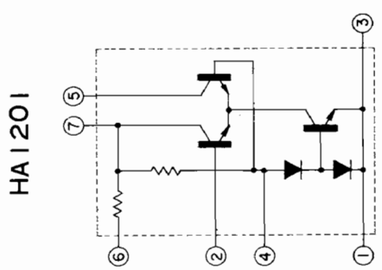
DC POWER SOURCE CIRCUIT BOARD



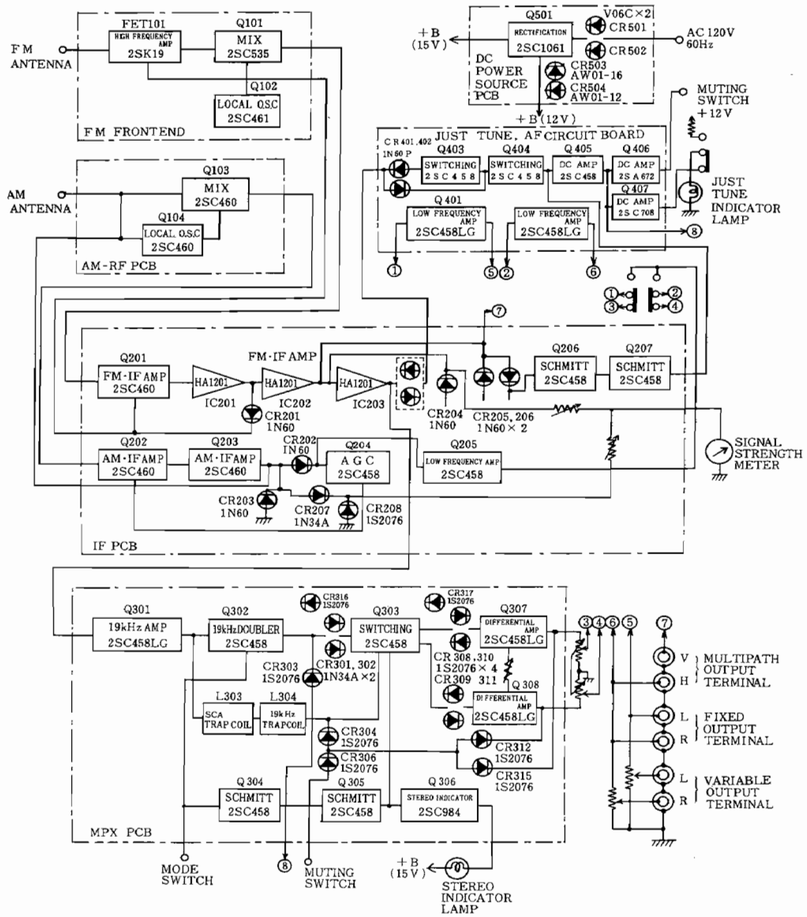
8. CIRCUIT DIAGRAM



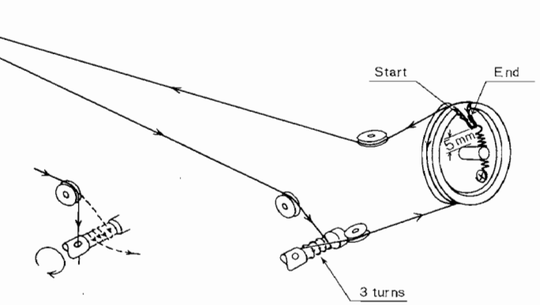




9. BLOCK DIAGRAM



10. DIAL CORD SETTING



Detail of dial cord setting

Notes:

1. Turn the variable capacitor fully counterclockwise (open condition) to perform the dial cord setting.
2. When winding the dial cord three times on the tuning shaft, let the dial cord go through the shaft hole as shown in the figure and turn the shaft three times, then take off the cord.
3. Wind the dial cord a time on the pulley at the end of the dial cord setting and tie the cord to the spring.

11. REPLACEMENT PARTS LIST

SYMBOL NO.	STOCK NO.	DESCRIPTION		
CAPACITORS				
for AM-RF CIRCUIT BOARD				
C132	0221337	stylol	1200pF J	
C134	0221328	stylol	510pF J	
C135	0221322	stylol	300pF J	
C136	0246007	ceramic, discal	0.1μF	
C137	0245018	ceramic, discal	0.02μF	
C138	0246007	ceramic, discal	0.1μF	
C139	0245018	ceramic, discal	0.02μF	
C140	0252525	electrolytic	47μF	16V
C141	0275011	mylar, film	0.01μF	
C142	0248724	ceramic, discal	100pF	
C143	0248176	ceramic, discal	18pF J	
C144	0248708	ceramic, discal	22pF	
C145	0221312	stylol	110pF J	
for IF CIRCUIT BOARD				
C201	0245017	ceramic, discal	0.01μF	
C203	0246007	ceramic, discal	0.1μF	
C204	0252525	electrolytic	47μF	16V
C205	0245018	ceramic, discal	0.02μF	
C206	0245018	ceramic, discal	0.02μF	
C207	0245018	ceramic, discal	0.02μF	
C208	0245018	ceramic, discal	0.02μF	
C209	0245018	ceramic, discal	0.02μF	
C210	0245018	ceramic, discal	0.02μF	
C212	0245018	ceramic, discal	0.02μF	
C213	0248633	ceramic, discal	3pF	
C214	0245018	ceramic, discal	0.02μF	
C215	0245018	ceramic, discal	0.02μF	
C216	0245018	ceramic, discal	0.02μF	
C217	0242016	ceramic, discal	50pF	
C218	0248633	ceramic, discal	3pF	
C219	0245018	ceramic, discal	0.02μF	
C220	0245018	ceramic, discal	0.02μF	
C221	0248691	ceramic, discal	200pF	
C222	0248691	ceramic, discal	200pF	
C223	0248691	ceramic, discal	200pF	
C227	0245017	ceramic, discal	0.01μF	
C229	0245018	ceramic, discal	0.02μF	
C230	0246007	ceramic, discal	0.1μF	
C231	0246007	ceramic, discal	0.1μF	
C232	0245018	ceramic, discal	0.02μF	
C233	0245018	ceramic, discal	0.02μF	
C234	0246007	ceramic, discal	0.1μF	
C235	0245018	ceramic, discal	0.02μF	
C236	0246007	ceramic, discal	0.1μF	
C237	0252225	electrolytic	47μF	6.3V
C238	0275011	mylar, film	0.01μF	
C239	0274016	mylar, film	0.0068μF	
C240	0252613	electrolytic	3.3μF	25V
C241	0275014	mylar, film	0.033μF	
C243	0276011	mylar, film	0.1μF	
C244	0274011	mylar, film	0.001μF	
C245	0275012	mylar, film	0.015μF	
C246	0274013	mylar, film	0.0022μF	
C247	0221327	stylol	470pF	50V
C249	0252522	electrolytic	22μF	16V

SYMBOL NO.	STOCK NO.	DESCRIPTION		
C250	0245018	ceramic, discal	0.02μF	
C251	0245018	ceramic, discal	0.02μF	
C252	0276013	mylar, film	0.22μF	
C254	0245018	ceramic, discal	0.02μF	
C255	0245018	ceramic, discal	0.02μF	
for MPX CIRCUIT BOARD				
C301	0252811	electrolytic	1μF	50V
C302	0221322	stylol	300pF J	50V
C304	0252532	electrolytic	220μF	16V
C305	0221516	stylol	3900pF J	50V
C306	0221517	stylol	5600pF J	50V
C307	0252611	electrolytic	1μF	25V
C308	0221322	stylol	300μF J	50V
C309	0275011	mylar, film	0.01μF	50V
C310	0252613	electrolytic	3.3μF	25V
C311	0248728	ceramic, discal	150pF K	50V
C312	0221385	stylol	10000pF J	50V
C313	0252611	electrolytic	1μF	25V
C314	0252613	electrolytic	3.3μF	25V
C315	0252521	electrolytic	10μF	16V
C317	0221512	stylol	2500pF J	50V
C318	0252523	electrolytic	33μF	16V
C319	0221338	stylol	1300pF	50V
C320	0276011	mylar, film	0.1μF K	50V
C321	0252521	electrolytic	10μF	16V
C322	0252611	electrolytic	1μF	25V
C323	0276011	mylar, film	0.1μF K	50V
C324	0252225	electrolytic	47μF	6.3V
C325	0252225	electrolytic	47μF	6.3V
C326	0276011	mylar, film	0.1μF K	50V
C327	0274013	mylar, film	0.0022μF K	50V
C328	0275016	mylar, film	0.068μF K	50V
C329	0274014	mylar, film	0.0033μF K	50V
C330	0274014	mylar, film	0.0033μF K	50V
C331	0275016	mylar, film	0.068μF K	50V
for JUST TUNE, AF CIRCUIT BOARD				
C401	0252611	electrolytic	1μF	25V
C402	0252613	electrolytic	3.3μF	25V
C403	0252611	electrolytic	1μF	25V
C404	0252613	electrolytic	3.3μF	25V
C405	0252611	electrolytic	1μF	25V
C410	0248676	ceramic, discal	47pF J	
C411	0248676	ceramic, discal	47pF J	
for DC POWER SOURCE CIRCUIT BOARD				
C501	0245408	ceramic, discal	0.01μF	500V
C502	0245408	ceramic, discal	0.01μF	500V
C503	0252833	electrolytic	330μF	50V
C504	0252631	electrolytic	100μF	25V
C505	0252631	electrolytic	100μF	25V
C506	0252631	electrolytic	100μF	25V
for CHASSIS ASSEMBLY				
C 1	0214474	oil	0.0047μF	
C 2	0274012	mylar, film	0.0015μF	
C 5	0245018	ceramic, discal	0.02μF	50V

SYMBOL NO.	STOCK NO.	DESCRIPTION			
C 6	0248636	ceramic, discal	6pF		16V
C 7	0252532	electrolytic	220μF		
C 8	0245017	ceramic, discal	0.01μF		
C 9	0248498	ceramic, discal	22pF		
RESISTORS					
for AM·RF CIRCUIT BOARD					
R131	0114451	carbon, film	680Ω	K	SRD¼P
R132	0114461	carbon, film	1kΩ	K	SRD¼P
R133	0114471	carbon, film	6.8kΩ	K	SRD¼P
R134	0114463	carbon, film	1.5kΩ	K	SRD¼P
R135	0114471	carbon, film	6.8kΩ	K	SRD¼P
R136	0114465	carbon, film	2.2kΩ	K	SRD¼P
R137	0114377	carbon, film	33Ω	K	SRD¼P
R138	0114465	carbon, film	2.2kΩ	K	SRD¼P
for IF CIRCUIT BOARD					
R201	0114527	carbon, film	33kΩ	K	SRD¼P
R202	0114544	carbon, film	180kΩ	K	SRD¼P
R203	0114465	carbon, film	2.2kΩ	K	SRD¼P
R204	0114450	carbon, film	560kΩ	K	SRD¼P
R205	0114463	carbon, film	1.5kΩ	K	SRD¼P
R206	0114521	carbon, film	10kΩ	K	SRD¼P
R208	0114461	carbon, film	1kΩ	K	SRD¼P
R209	0114461	carbon, film	1kΩ	K	SRD¼P
R210	0114441	carbon, film	100Ω	K	SRD¼P
R216	0114470	carbon, film	5.6kΩ	K	SRD¼P
R217	0114470	carbon, film	5.6kΩ	K	SRD¼P
R218	0114523	carbon, film	15kΩ	K	SRD¼P
R219	0114529	carbon, film	47kΩ	K	SRD¼P
R220	0114521	carbon, film	10kΩ	K	SRD¼P
R221	0114521	carbon, film	10kΩ	K	SRD¼P
R223	0114368	carbon, film	8.2Ω	K	SRD¼P
R224	0114461	carbon, film	1kΩ	K	SRD¼P
R225	0114449	carbon, film	470Ω	K	SRD¼P
R226	0114523	carbon, film	15kΩ	K	SRD¼P
R227	0114469	carbon, film	4.7kΩ	K	SRD¼P
R228	0114367	carbon, film	6.8Ω	K	SRD¼P
R229	0114461	carbon, film	1kΩ	K	SRD¼P
R230	0114449	carbon, film	470Ω	K	SRD¼P
R231	0114449	carbon, film	470Ω	K	SRD¼P
R232	0114470	carbon, film	5.6kΩ	K	SRD¼P
R233	0114521	carbon, film	1.5kΩ	K	SRD¼P
R235	0114527	carbon, film	33kΩ	K	SRD¼P
R236	0114530	carbon, film	56kΩ	K	SRD¼P
R237	0114549	carbon, film	470kΩ	K	SRD¼P
R238	0114451	carbon, film	680Ω	K	SRD¼P
R239	0114521	carbon, film	10kΩ	K	SRD¼P
R241	0114467	carbon, film	3.3kΩ	K	SRD¼P
R242	0114443	carbon, film	150Ω	K	SRD¼P
R243	0114523	carbon, film	15kΩ	K	SRD¼P
R244	0114470	carbon, film	5.6kΩ	K	SRD¼P
R245	0114472	carbon, film	8.2kΩ	K	SRD¼P
R246	0114470	carbon, film	5.6kΩ	K	SRD¼P
R249	0114443	carbon, film	150Ω	K	SRD¼P
R250	0114529	carbon, film	47kΩ	K	SRD¼P
R252	0137803	carbon, film	150Ω	K	SRD¼SD
R253	0114469	carbon, film	4.7kΩ	K	SRD¼P
R254	0114526	carbon, film	27kΩ	K	SRD¼P
R255	0114469	carbon, film	4.7kΩ	K	SRD¼P
R256	0114469	carbon, film	4.7kΩ	K	SRD¼P
R257	0137951	carbon, film	100kΩ	K	SRD¼SD
R258	0114443	carbon, film	150Ω	K	SRD¼P
R259	0114443	carbon, film	150Ω	K	SRD¼P
for MPX CIRCUIT BOARD					
R301	0137911	carbon, film	68kΩ	K	SRD¼SD
R302	0137955	carbon, film	220kΩ	K	SRD¼SD
R303	0114461	carbon, film	1kΩ	K	SRD¼P
R304	0137807	carbon, film	330Ω	K	SRD¼SD
R306	0137852	carbon, film	1.2kΩ	K	SRD¼SD
R307	0137955	carbon, film	220kΩ	K	SRD¼SD
R308	0137905	carbon, film	22kΩ	K	SRD¼SD
R309	0114521	carbon, film	10kΩ	K	SRD¼P
R310	0114449	carbon, film	470Ω	K	SRD¼P
R311	0114461	carbon, film	1kΩ	K	SRD¼P
R312	0114525	carbon, film	22kΩ	K	SRD¼P
R313	0137859	carbon, film	4.7kΩ	K	SRD¼SD
R314	0114470	carbon, film	5.6kΩ	K	SRD¼P
R315	0137907	carbon, film	33kΩ	K	SRD¼SD
R317	0114521	carbon, film	10kΩ	K	SRD¼P
R318	0137909	carbon, film	47kΩ	K	SRD¼SD
R319	0137901	carbon, film	10kΩ	K	SRD¼SD
R320	0137909	carbon, film	2.2kΩ	K	SRD¼SD
R321	0137858	carbon, film	3.9kΩ	K	SRD¼SD
R322	0137859	carbon, film	4.7kΩ	K	SRD¼SD
R323	0137901	carbon, film	10kΩ	K	SRD¼SD
R324	0137802	carbon, film	120Ω	K	SRD¼SD
R325	0137904	carbon, film	18kΩ	K	SRD¼SD
R326	0137859	carbon, film	4.7kΩ	K	SRD¼SD
R327	0137859	carbon, film	4.7kΩ	K	SRD¼SD
R328	0137861	carbon, film	6.8kΩ	K	SRD¼SD
R329	0137859	carbon, film	4.7kΩ	K	SRD¼SD
R330	0137959	carbon, film	470kΩ	K	SRD¼SD
R331	0137959	carbon, film	470kΩ	K	SRD¼SD
R332	0114527	carbon, film	33kΩ	K	SRD¼P
R333	0114527	carbon, film	33kΩ	K	SRD¼P
R334	0114468	carbon, film	3.9kΩ	K	SRD¼P
R335	0114463	carbon, film	1.5kΩ	K	SRD¼P
R336	0114527	carbon, film	33kΩ	K	SRD¼P
R337	0114468	carbon, film	3.9kΩ	K	SRD¼P
R338	0114527	carbon, film	33kΩ	K	SRD¼P
R339	0134368	composition	390Ω	K	RC½GF
R340	0114523	carbon, film	15kΩ	K	SRD¼P
R341	0114463	carbon, film	1.5kΩ	K	SRD¼P
R342	0114523	carbon, film	15kΩ	K	SRD¼P
R343	0114524	carbon, film	18kΩ	K	SRD¼P
R344	0114524	carbon, film	18kΩ	K	SRD¼P
R345	0114525	carbon, film	22kΩ	K	SRD¼P
R346	0114527	carbon, film	33kΩ	K	SRD¼P
R347	0114527	carbon, film	33kΩ	K	SRD¼P
R348	0114525	carbon, film	22kΩ	K	SRD¼P
R350	0114472	carbon, film	8.2kΩ	K	SRD¼P
for JUST TUNE, AF CIRCUIT BOARD					
R401	0114542	carbon, film	120kΩ	K	SRD¼P
R402	0114551	carbon, film	680kΩ	K	SRD¼P
R403	0114469	carbon, film	4.7kΩ	K	SRD¼P
R404	0114450	carbon, film	560Ω	K	SRD¼P
R405	0114529	carbon, film	47kΩ	K	SRD¼P
R406	0114542	carbon, film	120kΩ	K	SRD¼P

SYMBOL NO.	STOCK NO.	DESCRIPTION			
R407	0114551	carbon, film	680kΩ	K	SRD¼P
R408	0114469	carbon, film	4.7kΩ	K	SRD¼P
R409	0114450	carbon, film	560Ω	K	SRD¼P
R410	0114529	carbon, film	47kΩ	K	SRD¼P
R411	0114521	carbon, film	10kΩ	K	SRD¼P
R412	0114551	carbon, film	680kΩ	K	SRD¼P
R413	0114546	carbon, film	270kΩ	K	SRD¼P
R414	0114527	carbon, film	33kΩ	K	SRD¼P
R415	0114549	carbon, film	470kΩ	K	SRD¼P
R416	0114521	carbon, film	10kΩ	K	SRD¼P
R417	0114521	carbon, film	10kΩ	K	SRD¼P
R418	0114468	carbon, film	3.9kΩ	K	SRD¼P
R419	0114549	carbon, film	470kΩ	K	SRD¼P
R420	0114541	carbon, film	100kΩ	K	SRD¼P
R421	0114527	carbon, film	33kΩ	K	SRD¼P
R422	0134300	composition	82Ω	K	RC½GF
for DC POWER SOURCE CIRCUIT BOARD					
R501	0134289	composition	10Ω	K	RC½GF
R502	0134376	composition	1.8kΩ	K	RC½GF
R503	0134371	composition	680Ω	K	RC½GF
R504	0114365	carbon, film	4.7Ω	K	SRD¼P
R505	0134298	composition	56Ω	K	RC½GF
R506	0114365	carbon, film	4.7Ω	K	SRD¼P
for CHASSIS ASSEMBLY					
R 1	0139005	composition	2.7MΩ	K	RC½GF
R 2	0114461	carbon, film	1kΩ	K	SRD¼P
R 3	0114448	carbon, film	390Ω	K	SRD¼P
R 4	0114375	carbon, film	22Ω	K	SRD¼P
R 9	0134367	composition	330Ω	K	RC½GF
R 10	0134379	composition	3.3kΩ	K	RC½GF
R 11	0134379	composition	3.3kΩ	K	RC½GF
R 12	0134362	composition	120Ω	K	RC½GF
R 13	0114545	carbon, film	220kΩ	K	SRD¼P

TRANSISTORS

for AM·RF CIRCUIT BOARD

Q103	0573486	2SC460 Ⓑ
Q104	0573486	2SC460 Ⓑ

for IF CIRCUIT BOARD

Q201	0573486	2SC460 Ⓑ
Q202	0573486	2SC460 Ⓑ
Q203	0573486	2SC460 Ⓑ
Q204	2320063	2SC458 Ⓒ
Q205	2320063	2SC458 Ⓒ
Q206	2320063	2SC458 Ⓒ
Q207	2320063	2SC458 Ⓒ
IC201	2327311	HA1201
IC202	2327311	HA1201
IC203	2327311	HA1201

for MPX CIRCUIT BOARD

Q301	2320073	2SC458LG Ⓒ
Q302	2320063	2SC458 Ⓒ
Q303	2320063	2SC458 Ⓒ
Q304	2320063	2SC458 Ⓒ
Q305	2320063	2SC458 Ⓒ
Q306	2327022	2SC984 Ⓑ
Q307	2320073	2SC458LG Ⓒ
Q308	2320073	2SC458LG Ⓒ

for JUST TUNE, AF CIRCUIT BOARD

Q401	2320073	2SC458LG Ⓒ
Q402	2320073	2SC458LG Ⓒ
Q403	2320063	2SC458 Ⓒ
Q404	2320063	2SC458 Ⓒ
Q405	2320063	2SC458 Ⓒ
Q406	2327262	2SA672 Ⓑ
Q407	2327403	2SC708 Ⓒ

for DC POWER SOURCE CIRCUIT BOARD

Q501	5320433	2SC1061 Ⓒ

DIODES

for IF CIRCUIT BOARD

CR201	0575005	1N60
CR202	0575002	1N34A
CR203	0575002	1N34A
CR204	0575005	1N60
CR205	0575005	1N60
CR206	0575005	1N60
CR207	0575002	1N34A
CR208	2337011	1S2076

for MPX CIRCUIT BOARD

CR301	0575002	1N34A
CR302	0575002	1N34A
CR303	2337011	1S2076
CR304	2337011	1S2076
CR306	2337011	1S2076
CR308	2337011	1S2076
CR309	2337011	1S2076
CR310	2337011	1S2076
CR311	2337011	1S2076
CR312	2337011	1S2076
CR315	2337011	1S2076
CR316	2337011	1S2076
CR317	2337011	1S2076

for JUST TUNE, AF CIRCUIT BOARD

CR401	0575019	1N60 (P)
CR402	0575019	1N60 (P)

for DC POWER SOURCE CIRCUIT BOARD

CR501	2327041	V06C
CR502	2327041	V06C
CR503	2327077	AW01-16
CR504	2327071	AW01-12

VARIABLE RESISTORS

VR 1, 2	0153644	Level	100kΩ-(B)×2
VR 3, 4	0152033	FM output level	100kΩ-(B)×2

SYMBOL NO.	STOCK NO.	DESCRIPTION	
VR202	0151243	AM output level	47kΩ-(B)
VR203	0151243	AM meter deviation	47kΩ-(B)
VR204	0151243	FM meter deviation	47kΩ-(B)
VR205	0151244	Muting level	100kΩ-(B)
VR301	0151251	Stereo lamp lighting range	22kΩ- (B)
VR302	0151244	Stereo lamp lighting range	100kΩ-(B)
VR303	0151251	Separation	22kΩ-(B)
VR401	0151251	Just tune lamp lighting range	22kΩ-(B)

COILS & TRANSFORMERS

for AM-RF CIRCUIT BOARD

L111	2140441	AM-IF coil
L113	2134202	AM O.S.C coil
T111	2154101	AM-IF transformer

for IF CIRCUIT BOARD

L201	2227035	Choke coil
L202	2227035	Choke coil
L204	5120145	71kHz trap coil
L205	2227035	Choke coil
T201	2140234	FM transformer
T202	2140238	FM transformer
T203	2140238	FM transformer
T204	2140242	FM discrimination
T205	2154102	AM transformer
T206	2154103	AM transformer

for MPX CIRCUIT BOARD

L301	5120145	71kHz trap coil
L302	0313052	19kHz trap coil
L303	5120145	71kHz trap coil
L304	0324005	19kHz trap coil
T301	0313062	19kHz tuning coil
T302	0313062	19kHz tuning coil
T303	0313062	19kHz tuning coil

for CHASSIS ASSEMBLY

L 1	2227035	Choke coil (27μH)
L 2	2227032	Choke coil (2.2μH)
L 3	2227032	Choke coil (2.2μH)
	2120871	Balun transformer
T 1	2213792	Power transformer

SYMBOL NO.	STOCK NO.	DESCRIPTION
		MISCELLANEOUS
	2518471	AM-RF circuit board assembly
	2518521	IF circuit board assembly
	2518582	MPX circuit board assembly
	2518501	JUST TUNE, AF circuit board assembly
	2518461	DC POWER SOURCE circuit board assembly
	2518571	Lamp holder circuit board assembly
	2405012	FM FRONTEND
S1	2637144	Switch – lever switch
S2	2637221	Switch – push button switch
S3	2637061	Switch – lever switch
S4	2637061	Switch – lever switch
S5	2637221	Switch – push button switch
S6	2637221	Switch – push button switch
S7	2627012	Switch – slide switch
	2727015	Fuse – fuse (0.5A)
	2727083	Fuse – wired in fuse (1.0A)
	2727081	Fuse – wired in fuse (2.0A)
	2727062	Holder – fuse holder
	4784101	3 x 8φbaind tapping screw (for scale board, ASS fixing)
	4562401	Screw – earth screw
	4703102	Nut –3φnut with washer (for ferrite antenna fixing)
	4370161	Dial pointer
	3346081	Pully
	0662084	Spring
	0666704	Dial cord holding fixture
	4565001	Tuning shaft assembly
	3914911	Scale board
	3913553	Spot indicator (orange)
	3913554	Spot indicator (red)
	3910252	Antenna arm assembly
	0043793	Bushing
	4369881	Cable holder
	2577102	Signal meter
	2740241	Cord – AC cord
	2657051	Socket – AC socket
	2687262	4 pin output terminal board
	0544404	6 pin terminal board
	0544384	4 pin terminal board
	2670061	Pin – 2P US Pin
	2134213	Ferrite antenna
	2720022	Socket – pilot lamp socket
PL1–6	2767201	Pilot lamp (6.3V, 0.25A)
PL 7, 8	2767116	Pilot lamp (6.3V, 65mA)
PL 9	2767081	Pilot lamp (5.5V, 22mA)
PL 10	2767093	Pilot lamp (5.0V, 60mA)
CP301	0186007	CR combination component
CP302	0186007	CR combination component

FOR FINAL ASSEMBLY

	3241291	Escutcheon assembly
	3280881	Tuning knob assembly
	3280702	Knob – lever knob
	4366112	Cover assembly
	4564271	Screw – M4 baind screw (for side board fixing)
	4680751	Leg

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