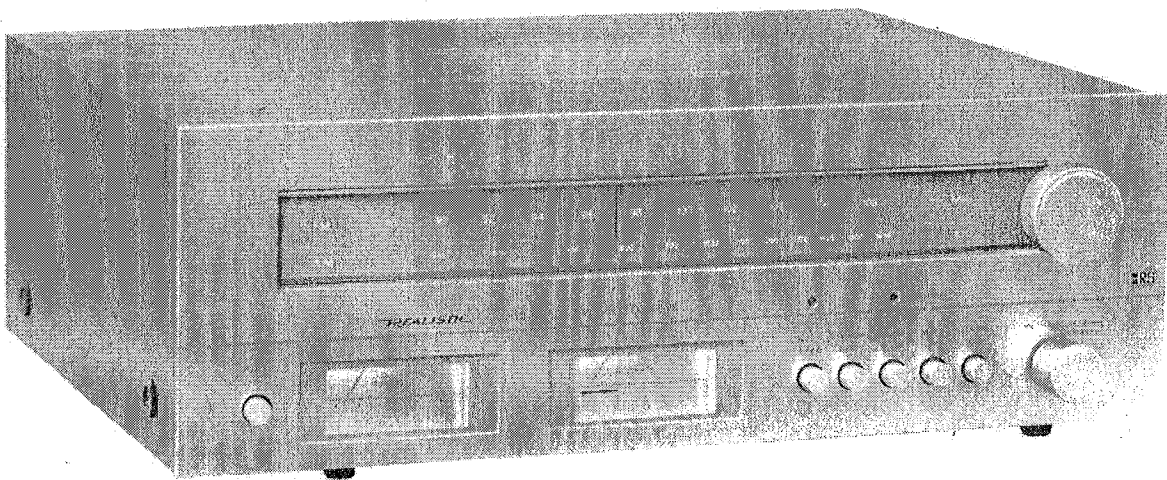


REALISTIC[®]

Service Manual

31-1961

TM-1001
AM/FM STEREO TUNER
Catalog Number : 31-1961



CUSTOM MANUFACTURED FOR RADIO SHACK  A DIVISION OF TANDY CORPORATION

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SPECIFICATIONS

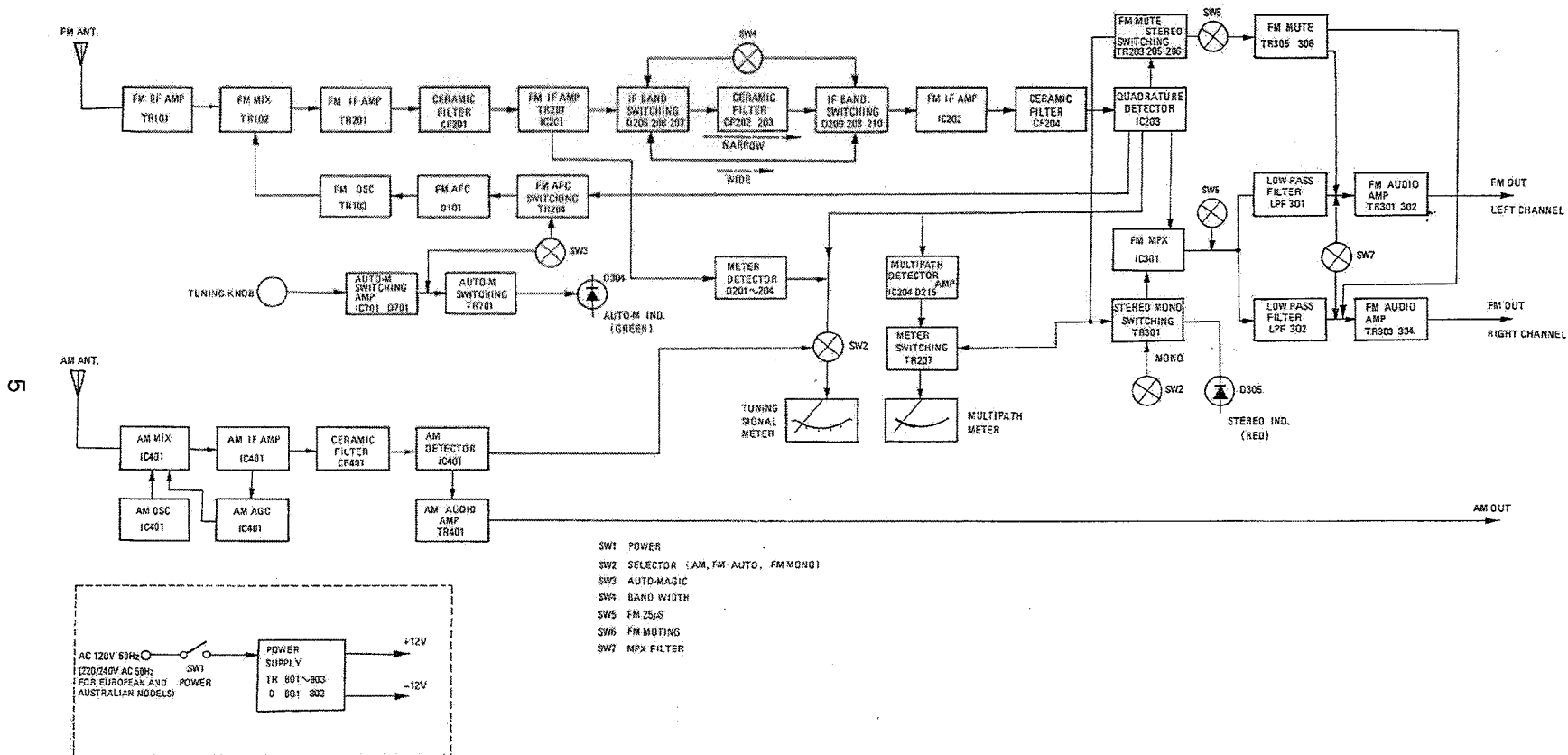
	NOMINAL	LIMIT	UNIT
FM SECTION			
1. TUNING COVERAGE	87.5—108.5	88—108	MHz
2. IHF USABLE SENSITIVITY	1.7	2.3	μ V
	8.8	13.5	dBf
3. IMAGE REJECTION RATIO (at 106 MHz)	78	70	dB
4. AFC HOLDING RANGE (with 1 mV input)			
	WIDE	\pm 800	kHz
	NARROW	\pm 500	kHz
5. DIAL CALIBRATION ACCURACY		\pm 250	kHz
	90 MHz	\pm 350	kHz
	98 MHz	\pm 250	kHz
	106 MHz	\pm 250	kHz
6. IF BANDWIDTH (6 dB down)		\pm 150	kHz
	WIDE	\pm 100	kHz
	NARROW	\pm 100	kHz
7. DISCRIMINATOR BANDWIDTH (peak-to-peak)	400	300	kHz
8. OUTPUT VOLTAGE (1 mV input) MONO 50 Kohm load	850	850 \pm 3dB	mV
9. SIGNAL-TO-NOISE RATIO (1mV input)	70	65	dB
10. FULL LIMITING (-3 dB)	1.2	1.8	μ V
11. CAPTURE RATIO 98 MHz (1 mV input)	1	2.5	dB
12. IHF SELECTIVITY			
	WIDE	45	dB
	NARROW	75	dB
13. OVERLOAD (at 98 MHz, 100 mV input)	0.2	0.5	%
14. IF REJECTION (at 90 MHz)	90	80	dB
15. DISTORTION (1 mV input, 400 Hz)			
	WIDE	0.1	%
	NARROW	0.2	%
16. MUTING THRESHOLD	8	4—16	μ V
17. AM REJECTION (AM 30%, FM 100% Mod.) at 98 MHz, 100 — 20,000 μ V input	45	40	dB
18. 50 dB QUIETING SENSITIVITY at 98 MHz	3	6	μ V
FM MPX SECTION			
1. STEREO SEPARATION			
	100 Hz WIDE/NARROW	38/30	dB
	(1 mV input)		
	1 kHz WIDE/NARROW	40/35	dB
	10 kHz WIDE/NARROW	32/28	dB
2. STEREO BEACON SENSITIVITY (Pilot 7 %)	7	4—16	μ V
3. DISTORTION 1 kHz (1 mV input)			
	WIDE	0.2	%
	NARROW	0.4	%
4. DE-EMPHASIS 75 μ Sec. (at 50—15,000 Hz)	\pm 1	\pm 2	dB
5. 38 kHz LEAKAGE (1 mV input)	-55	-45	dB
6. SCA REJECTION RATIO (1 mV input)	60	50	dB
7. OUTPUT VOLTAGE (1 mV input) at 1 kHz 50 Kohm Load	760	760 \pm 3dB	mV
AM SECTION			
1. TUNING COVERAGE	510—1660	520—1620	kHz
2. SENSITIVITY (for 20 dB S + N/N or 10 % THD)			
	Radiated, at 600, 1000 and 1400 kHz	250	400
	Terminal, at 600, 1000 and 1400 kHz	25	45
		40	35
3. IMAGE REJECTION RATIO (at 1,400 kHz)			dB
4. OUTPUT VOLTAGE (5 mV/m input) 50 Kohm Load	320	320 \pm 3dB	mV
5. DIAL CALIBRATION ACCURACY			
	600 kHz	\pm 15	kHz
	1,000 kHz	\pm 30	kHz
	1,400 kHz	\pm 40	kHz
6. AGC FIGURE OF MERIT (-10 dB) (from 100 mV/m at 1,000 kHz)	45	38	dB

	NOMINAL	LIMIT	UNIT
7. SELECTIVITY (at 1,000 kHz, 200 μ V/m input)	32	25	dB
8. IF REJECTION RATIO (at 600 kHz)	30	22	dB
9. SIGNAL-TO-NOISE RATIO (at 1,000 kHz, 100 mV/m input)	50	40	dB
10. BAND WIDTH (at 1,000 kHz, 5 mV/m input)		6-14	kHz
11. THD (at 1,000 kHz, 5 mV/m input)	0.8	2	%
12. AUDIO RESPONSE at 2 kHz (at 1,000 kHz, 5 mV/m input)		-6	dB
13. AM BEAT (at 2IF/3IF) 1-50 mV/m input	4	10	%
50-100 mV/m input	10	15	%
14. POWER REQUIREMENTS * AC 120V, 60 Hz, 18W.			

*AC 220/240V, 50 Hz for European and Australian Models.

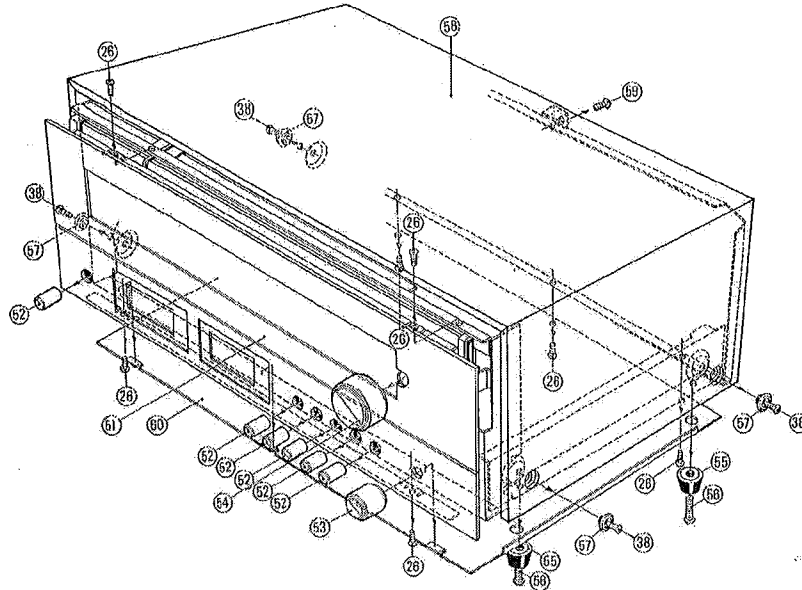
NOTE: Nominal Specs represent the design specs; all units should be able to approximate these—some will exceed and some may drop slightly below these specs. Limit Specs represent the absolute worst condition which still might be considered acceptable; in no case should a unit perform to less than within any Limit Spec.

BLOCK DIAGRAM



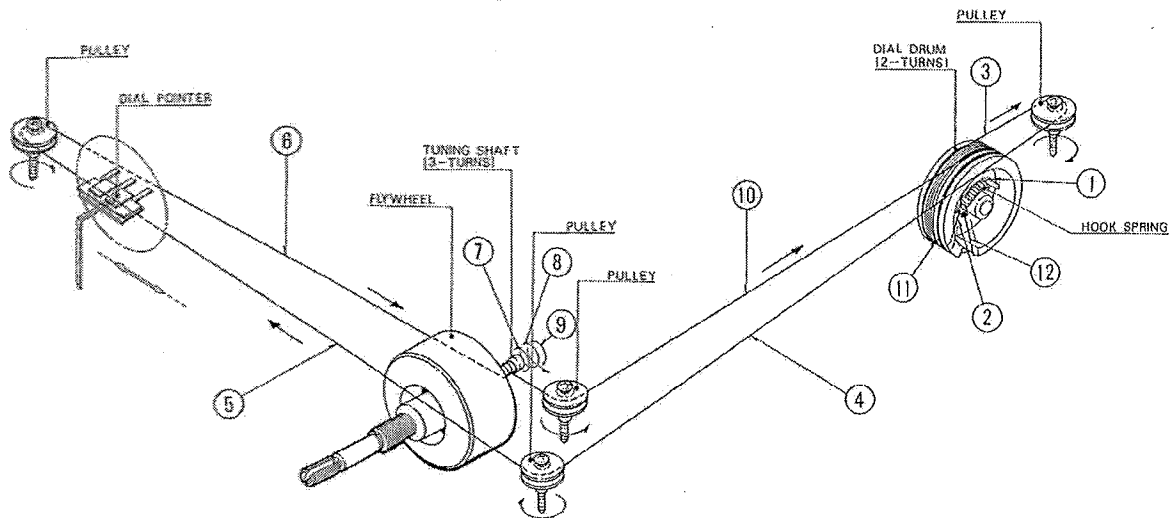
DISASSEMBLY INSTRUCTION

1. Removing chassis from wooden cabinet. (Refer to Fig. A)
Remove five screws (#38 & #59) from sides and back.
2. Removing the Front Panel. (Refer to Fig. A)
 - a) Pull off the Tuning and Selector knobs.
 - b) Remove four screws (#26) from top and bottom of Front Panel.



DIAL STRINGING DIAGRAM

Note: Tuning capacitor should be in fully closed position.



ALIGNMENT PROCEDURES

Do not attempt alignment unless the following equipment is available.

- | | | |
|------------------------|------------------------|----------------------|
| 1. AM Signal Generator | 4. FM Signal Generator | 7. Distortion meter |
| 2. Oscilloscope | 5. Stereo Modulator | 8. DC Voltmeter |
| 3. AC Voltmeter | 6. Audio Generator | 9. Frequency Counter |

Note: Remove line cord antenna from FM external antenna terminal when aligning.

AM IF & RF ALIGNMENT

Output of signal generator should be no higher than necessary to obtain an output reading. Signal Generator Modulation: 30%. Set SELECTOR switch SW1 to AM.						
STEP	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL SETTING	INDICATOR	ADJUSTMENT Refer Fig. 4.	REMARKS
1	Refer Fig. 1	600 kHz (400 Hz Mod.)	600 kHz	AC Voltmeter to OUTPUT jack	L401 (OSC Coil) L451 (ANT Coil) T401 (IFT)	Adjust for maximum reading.
2	Same as Step 1	1400 kHz (400 Hz Mod.)	1400 kHz	Same as Step 1	TC106 (OSC Trimmer) TC105 (ANT Trimmer)	Same as Step 1
3	Same as Step 1	1000 kHz (400 Hz Mod.)	1000 kHz	Same as Step 1	VR402	Adjust for 320 mV Audio output.
4	Same as Step 1	1000 kHz (400 Hz Mod.)	1000 kHz	Tuner's TUNING Meter	VR401	Adjust for 70% reading of full scale with input of 5 mV/m.

Note: Remove line cord antenna from FM external antenna terminal when aligning.

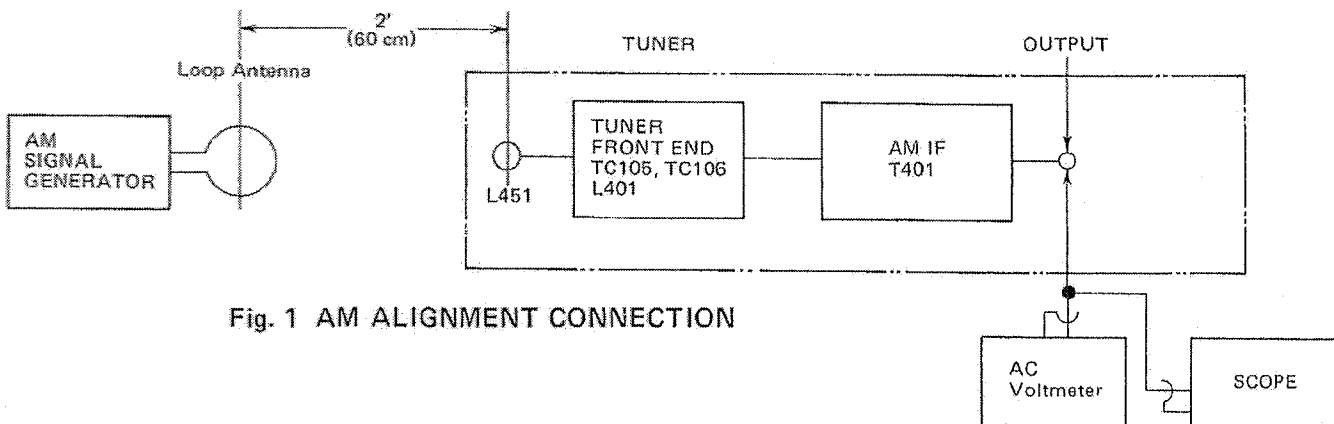


Fig. 1 AM ALIGNMENT CONNECTION

FM RF AND IF ALIGNMENT

Signal generator output should be no higher than necessary to obtain an output reading.

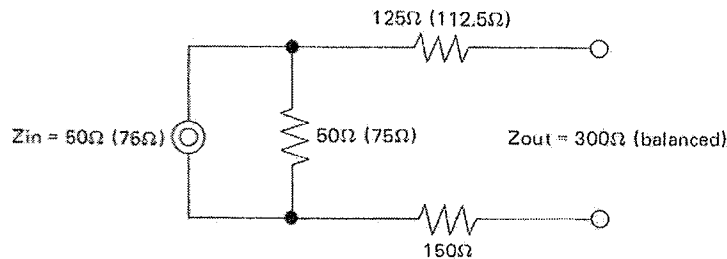
Set Selector switch to FM.

Signal Generator deviation: 75 kHz

NOTE: Be sure to disconnect FM line cord antenna and NARROW B/WIDTH & AUTO-M TUNING buttons should be in the "out" position during alignment.

STEP	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	TUNER DIAL SETTING	INDICATOR	ADJUSTMENT Refer Fig. 4	REMARKS
1	Connect to FM Antenna Terminal through FM Dummy Antenna (300Ω) Fig. 2	No Signal	(on or about 90 MHz)	DC Voltmeter connected to Pin 33 & 34	L202 (Discriminator)	Adjust for 0V reading on DC Voltmeter
2	Same as Step 1	90 MHz (400 Hz, Mod.)	90 MHz	AC Voltmeter connected to OUTPUT jack	L104 (FM OSC Coil) L101 (FM ANT Coil) L102, L103 (FM RF Coil)	Adjust for maximum reading on AC Voltmeter
3	Same as Step 1	106 MHz (400 Hz, Mod.)	106 MHz	Same as Step 2	TC104 (FM OSC Trimmer) TC101 (FM ANT Trimmer) TC102, TC103 (FM RF Trimmer)	Adjust for maximum reading
Repeat steps 2 & 3 until no further improvement is possible.						
4	Same as Step 1	90 MHz (400 Hz, Mod.)	90 MHz	Same as Step 2	T201 (FM IFT)	Adjust for maximum reading
5	Same as Step 1	98 MHz (400 Hz, Mod.)	98 MHz	Distortion Meter connected to OUTPUT jack	L203	Adjust for minimum distortion
6	Same as Step 1	98 MHz (400 Hz, Mod.)	98 MHz	Tuner's TUNING Meter	VR201	Adjust for 70% reading of full scale with input of 1 mV
7	Same as Step 1	98 MHz (400 Hz Mod.)	98 MHz (Press MUTING FM switch)	Oscilloscope connected to OUTPUT jack	VR202	Adjust so output just appears with an input signal level of 8 μV.

For European model, the lowest frequency of FM tuning range should not be below 87.5 MHz.



FM Dummy Antenna to 300Ω antenna terminal of Tuner.

Fig. 2 FM DUMMY ANTENNA

MPX ALIGNMENT

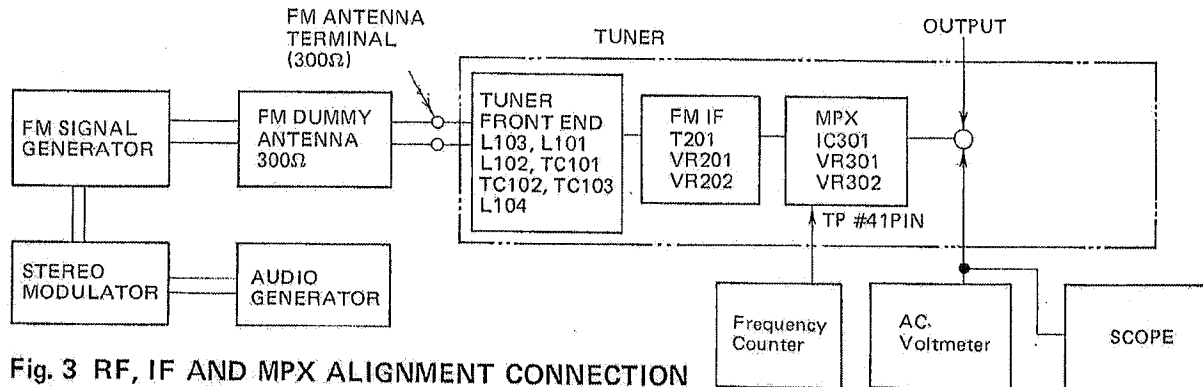


Fig. 3 RF, IF AND MPX ALIGNMENT CONNECTION

Note: Be sure to disconnect FM Line Cord Antenna and NARROW B/WIDTH button should be in the "out" position during alignment.

Set SELECTOR Switch to FM. Tune to center of band. Signal Generator output level: 1000 μ V. Deviation: 75 kHz, at 100 % modulation of composite signal. Connect Signal Generator to FM Antenna Terminal through FM Dummy Antenna (300 Ω).						
STEP	19 kHz (PILOT SIGNAL) MODULATION Level	SIGNAL GENERATOR Freq. Set to	OUTPUT INDICATOR Connected to	ADJUST Refer Fig. 4	ADJUST FOR	NOTE
1	PILOT OFF	Carrier only	Frequency Counter Connect to TP (#41 pin) of PCB 0063 and ground	VR301	19 kHz	
2	8%	Composite 1 kHz R channel	AC Voltmeter to OUTPUT jack of R channel			Adjust input for audio output of about 0.75 V
3	8%	Composite 1 kHz L channel	AC Voltmeter to OUTPUT jack of R channel	VR302	Minimum	AC Voltmeter reading should be at least 32 dB below reading in step 2.
4	8%	Composite 1 kHz R channel	AC Voltmeter to OUTPUT jack of L channel	VR302	Minimum	Same as Step 2.
If you did not obtain - 32 dB readings in steps 3 and 4 (compared with step 2), readjust VR302 until you obtain - 32 dB reading for both steps 3 and 4.						

ALIGNMENT & CHECK POINTS

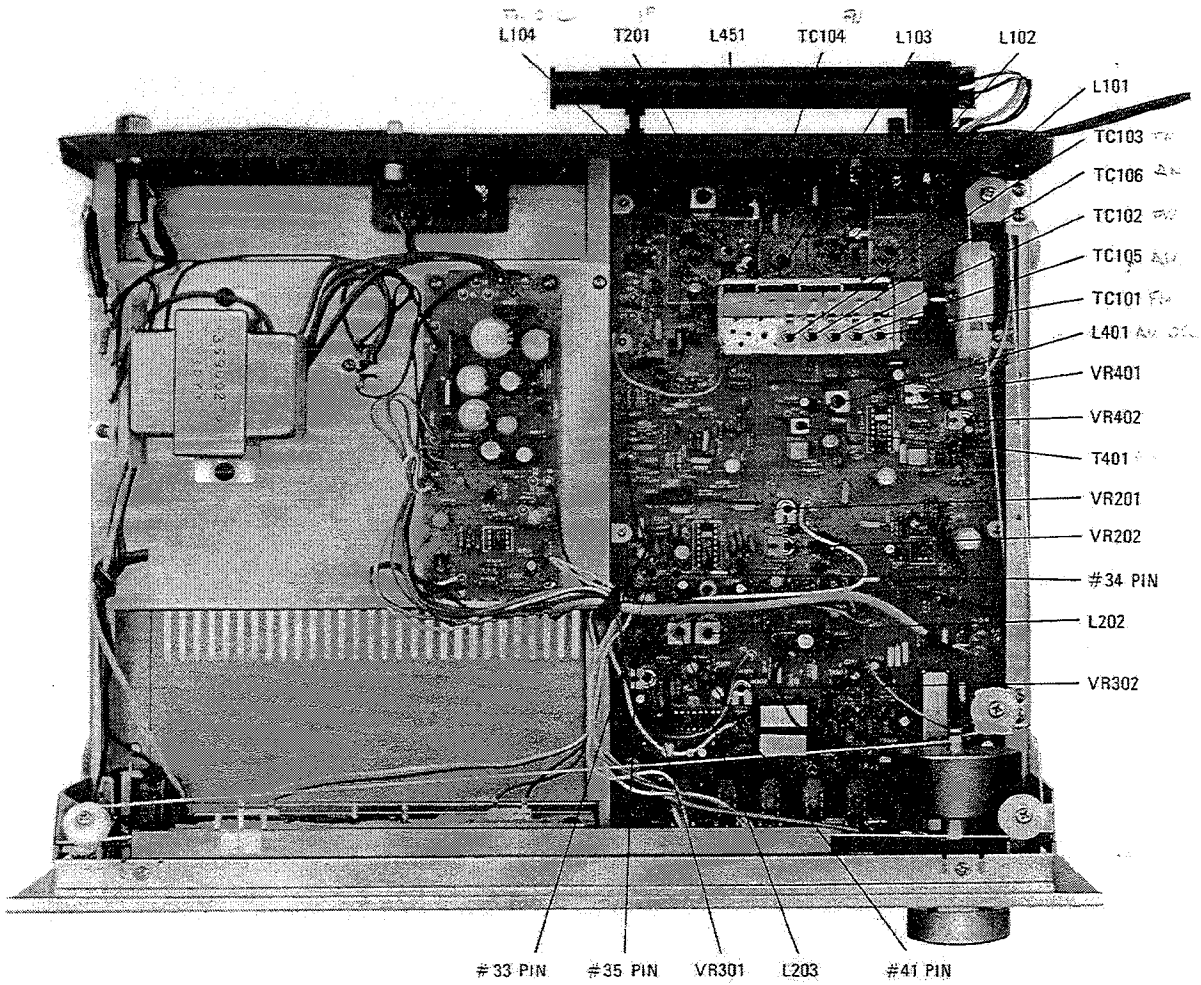


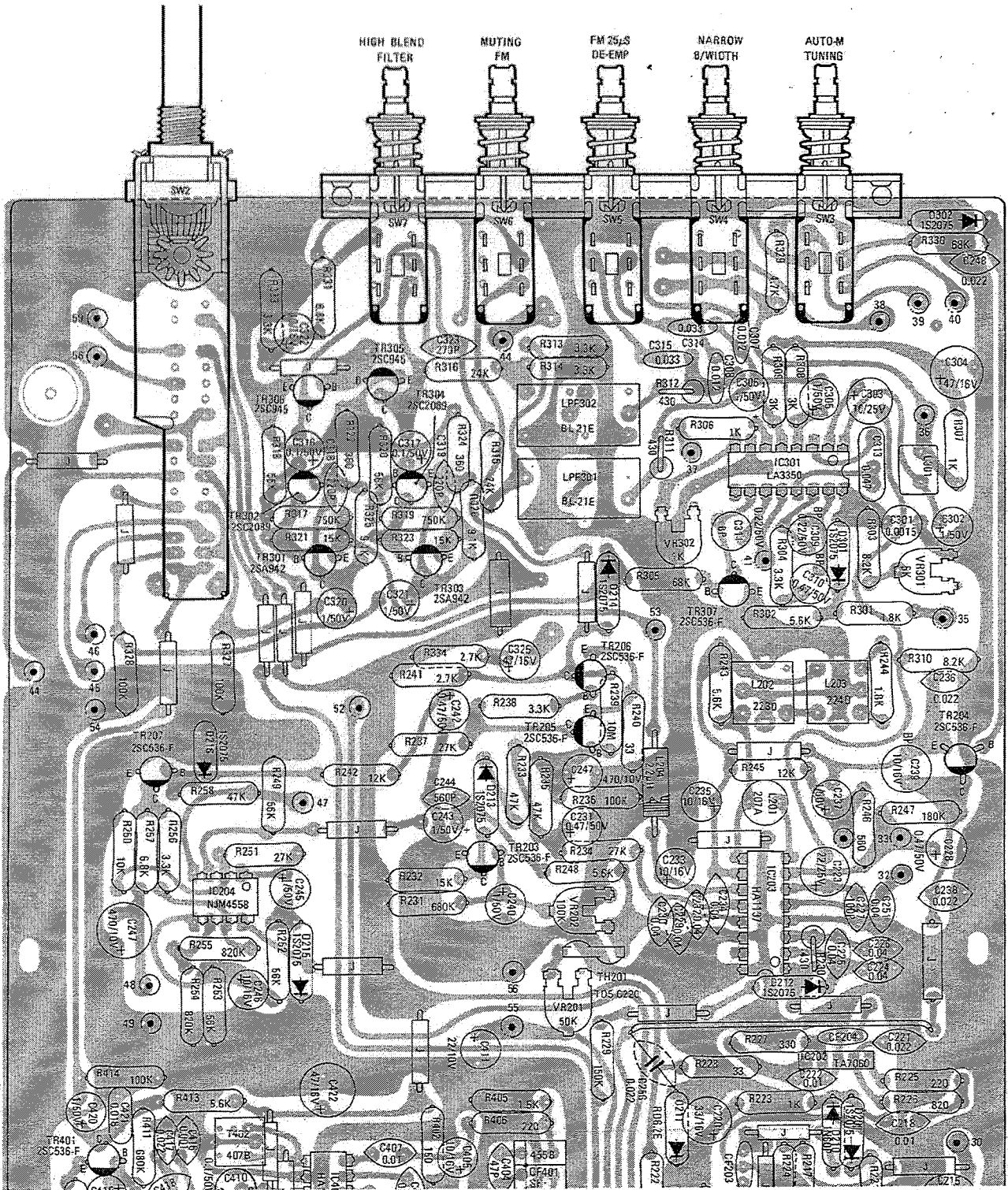
Fig. 4

TROUBLESHOOTING

Symptom	Cause and Remedy
1) Tuner not operative: Pilot lamp does not light.	<ul style="list-style-type: none"> A) Faulty AC power cord Replace the cord. B) Defect in the power switch SW1 Replace the switch. C) Broken wire in the power transformer T851 Replace transformer T851. D) Open power fuse Replace the fuse.
2) Fuse blows when power is turned on.	<ul style="list-style-type: none"> A) Power transformer T851 defective Replace the transformer. B) Short in the primary or secondary of the transformer circuitry Repair the short. C) Damaged rectifier D801 Replace the rectifier. D) Short in the rectifier circuit Repair the short. E) Defective C802 & C803 (short) Replace the capacitor(s).
3) Pilot lamp does not light.	<ul style="list-style-type: none"> A) Defective pilot lamp(s) Replace the lamp(s). B) Open circuit in the transformer T851 tertiary winding Replace the transformer.
4) Pilot lamp lights but no output from either channel.	<ul style="list-style-type: none"> A) Resistor R801, R804 damaged (open) Replace defective resistor(s). B) Capacitor C802, C803 defective (short) Replace the defective capacitor(s). C) Diode D801 damaged Replace the diode. D) Open in secondary winding of power transformer T851 Replace the transformer. E) Transistor TR801 & TR803 damaged (open). Replace the transistor(s).
5) FM does not operate.	<ul style="list-style-type: none"> A) Poor contact in Selector switch SW2 Repair or replace the switch. B) Resistor R307 defective Replace the resistor. C) Capacitor C302 defective Replace the capacitor. D) Defective transistor TR101-TR103, TR201-TR203, TR301-TR401 or IC IC201-IC203, IC301 Replace the defective component(s). E) Defective IFT T201 Replace the IFT. F) Defective resistor R104, R209, R214, R228, R321, R323 Replace the defective resistor(s).

Symptom	Cause and Remedy
	<p>G) Defective capacitor C104, C114, C205, C207, C219, C222, C233, C234 Replace the defective capacitor(s).</p> <p>H) Defective coil L101-L104, L201, L203, L204, L301 Replace the defective coil(s).</p> <p>I) Faulty lead-in Repair or replace the lead-in.</p> <p>J) Diode D207, D208, D209, D211 defective Replace defective diode(s).</p>
6) Multiplex separation not sufficient	<p>A) Deviation in adjustment Readjust VR301 and VR302. (Refer to MPX ALIGNMENT on page 9)</p> <p>B) Transistor TR301-TR304 or IC IC301 defective Replace the defective component(s).</p> <p>C) Variable resistor VR301 or VR302 defective Replace the defective component(s).</p>
7) Stereo indicator LED does not light.	<p>A) Defective indicator LED D305 Replace the LED.</p> <p>B) Deviation in adjustment VR301 Make readjustment. (Refer to MPX ALIGNMENT on page 9)</p> <p>C) Defective transistor TR307 or resistor R306 Replace the defective component(s).</p>
8) FM volume not sufficient	<p>A) If both L and R channels have low volume: Faulty transistor TR101-TR103, TR201, TR202 or IC IC201-IC203 Locate and replace the defective component(s).</p> <p>B) If only one channel has low volume: Defective IC301, TR301 or TR302 in case of L channel, or defective IC301, TR303 or TR304 in case of R channel Replace the defective component(s).</p>
9) AM does not operate.	<p>A) Transistor and IC in AM IF circuit (TR401 or IC401) defective Replace the defective transistor or IC.</p> <p>B) Defective L401, T401, CF401 or T402 in the IF circuit Replace the defective component(s).</p> <p>C) Defective resistor R401, R413 Replace the defective resistor(s).</p> <p>D) Defective capacitor C403, C405, C421 Replace the defective capacitor(s).</p> <p>E) Selector switch SW2 defective Repair or replace the switch.</p> <p>F) Defective Tuning capacitor VC101 Replace the VC101.</p> <p>G) Open in the bar antenna Repair or replace antenna.</p>

Symptom	Cause and Remedy
10) Stereo-mono not effective	A) Defective switch SW2 Replace the switch. B) Transistor TR307 defective Replace the transistor.
11) Muting does not operate.	A) Defective muting switch SW6 Replace the switch. B) Damaged transistor TR203, TR205, TR206, TR305 or TR306 Replace the defective transistor(s).
12) AUTO MAGIC AFC has no effect when AUTO-M switch is ON (Indicator LED does not go out when tuning knob is touched).	A) Transistor TR204, TR701, IC701 defective Replace the defective component(s). B) Resistor R705, R706 defective Replace the defective resistor(s). C) Diode D701, D702 defective Replace the defective diode(s). D) Capacitor C702, C704 defective Replace the defective capacitor(s). E) Defective switch SW3 Replace the switch.
13) Green LED does not light when the tuning control is released.	A) Defective R715 (open), D304 (open) TR701 (short) or IC701 Replace the defective component(s).
14) NARROW B/WIDTH not effective	A) Diode D205, D206, D210 defective Replace the defective diode(s). B) Defective switch SW4 Replace the switch. C) Defective ceramic filter CF202, CF203 Replace the filter(s).
15) MULTIPATH Meter does not function.	A) Defective meter M2 Replace the meter. B) Defective IC204, TR205-TR207 Replace the defective component(s). C) Capacitor C242, C243, C246, C247 defective Replace the defective capacitor(s). D) Diode D215, D216 defective Replace the defective diode(s).



0063 TUNER BOARD

BOARD (BOTTOM VIEW)

