

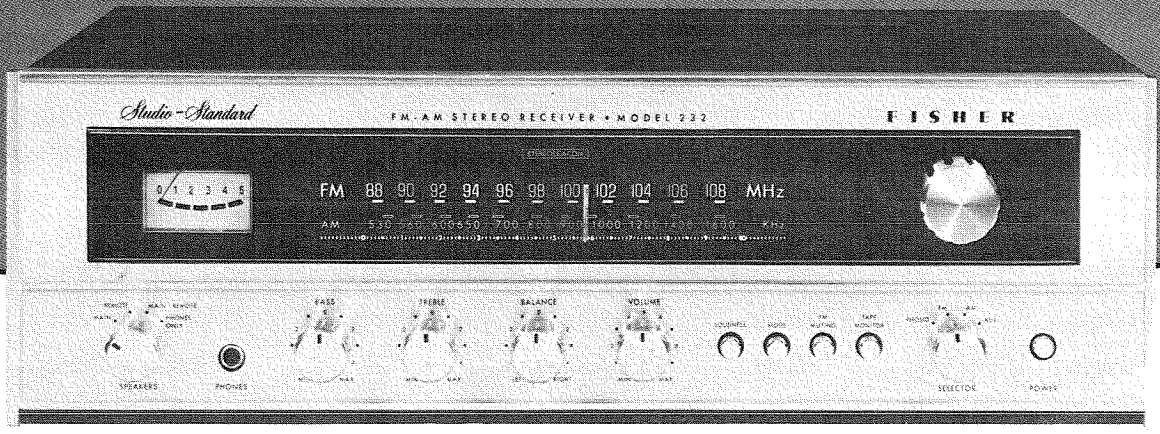
SERVICE MANUAL

The Fisher®

232

FM-AM

Stereo Receiver



WORLD LEADER IN HIGH QUALITY STEREO

CAUTION: This precision high-fidelity instrument should be serviced only by qualified personnel, trained in the repair of transistorized equipment and printed circuitry.

ALIGNMENT

REQUIRED EQUIPMENT

- Line Voltage Autotransformer or Voltage Regulator
- AC DC Multimeter
- Accurately Calibrated AC Voltmeter
- Oscilloscope (Flat to 100kHz Minimum)
- Low-Distortion Audio Sine-Wave Generator
- Harmonic Distortion Analyzer
- Two (2) Load Resistors, 8-ohms, 50 Watts (Minimum Rating)
- Low-Distortion AM-FM Signal Generator
- 10.7 MHz Sweep-Generator
- Multiplex Generator
- 455kHz Sweep Generator

FM-TUNER ALIGNMENT

FM MUTING OFF, TONE CONTROLS and BALANCE to center, SPEAKERS Switch to PHONES, MODE to STEREO, SELECTOR to FM, VOLUME to MIN, TAPE MONITOR OFF.

Maintain generator output as low as possible for suitable indication.

ITEM	GENERATOR	DIAL SETTING	INDICATOR	PROCEDURE
<p>Note: The FM IF circuit utilizes a non-tunable ceramic filter which establishes the IF bandpass. To insure symmetrical tuning and selectivity, the IF must be aligned precisely to the center of the filter bandpass, rather than to 10.7 MHz as in conventional LC circuits.</p>				
1. IF ALIGNMENT	Connect 10.7 MHz Sweep Generator to TP1 (FM IN). Markers are not required.	Position of non-interference.	Scope vertical input to TP2 (FM OUT). Ground lead to rear of chassis.	<p>Short FM oscillator variable capacitor (section nearest L4) with a clip lead as shown in alignment layout. Detune T9 by turning core up (CCW).</p> <p>Adjust T5, T3, T2, T1 for curve as shown in FIG. 1. Repeat as required to obtain best shape.</p> <p>Adjust T9 for best shape (widest bandpass, not for max amplitude).</p>
2. PRELIMINARY DETECTOR ALIGNMENT	Reduce output amplitude as much as possible throughout this procedure.		Connect scope vert input to TP3 (DISCRI).	Adjust T7 top and bottom for best gain and symmetry. S-curve should appear as shown in FIG. 2.

NOTE: 120-ohm composition resistors in series with each lead from the RF generator match the 50-ohm output to the 300-ohm input impedance. Generator output voltage is reduced to one-half at antenna terminals. Signal voltages specified in this table are generator output levels, not antenna voltages.

3. FRONT END ALIGNMENT		Tuning knob fully CCW.		Center dial pointer on 0 and cement it in place.
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ALIGNMENT

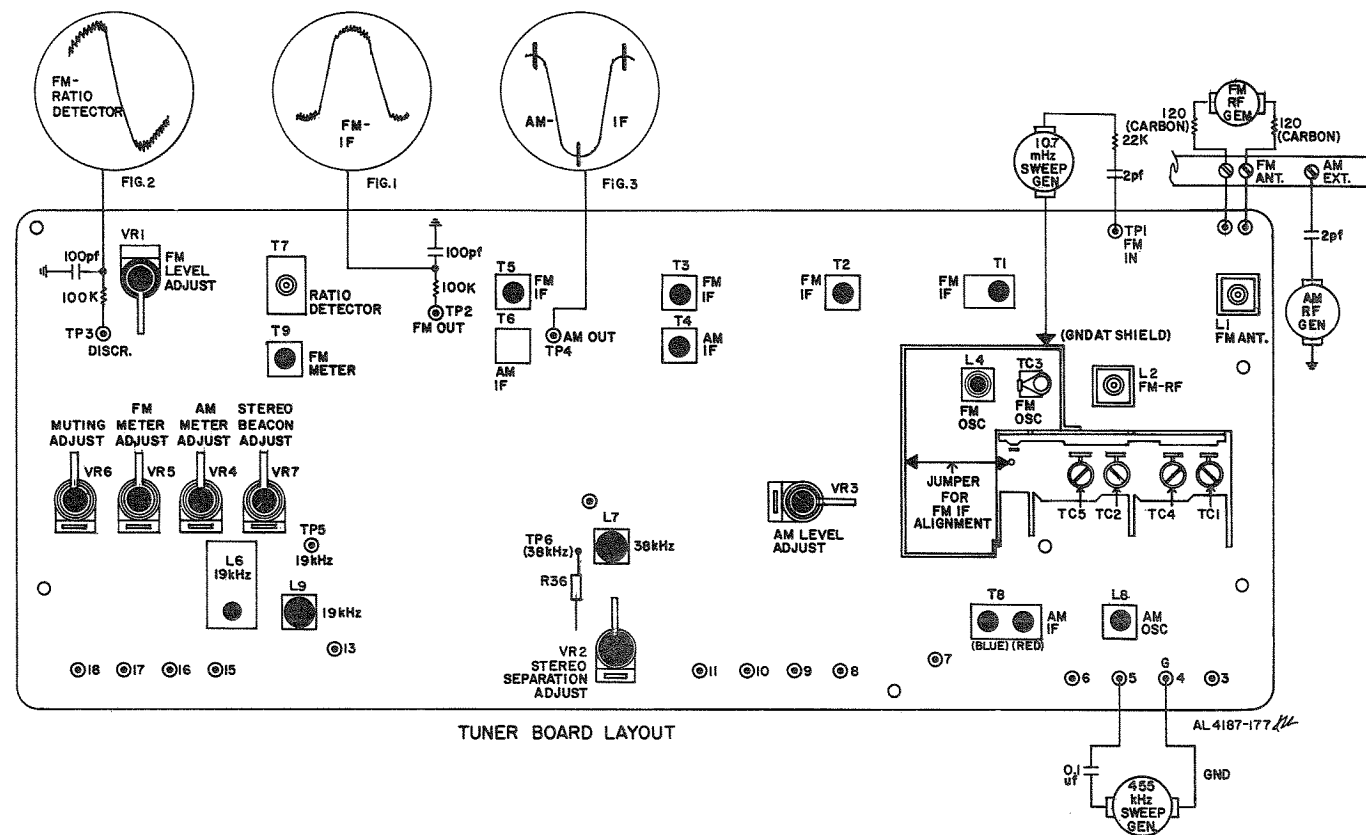
ITEM	GENERATOR	DIAL SETTING	INDICATOR	PROCEDURE
4.	Connect FM RF generator through two 120-ohm resistors to FM ANT screw terminals. Set generator to 90 MHz, modulate with 400 Hz to provide $\pm 75\text{kHz}$ deviation. Output amplitude should be sufficient to provide reading on receiver front panel meter of 3.	Center of 90 MHz calibration mark or dial.	Receiver front panel meter. Caution: To ensure that meter is not indicating a local broadcast station connect scope for step 6, below.	Adjust L4 for maximum gain. Adjust L2, then L1 for maximum gain. Repeat the two steps above as required.
5.	Change generator setting to 106 MHz.	Center of 106 MHz calibration mark on dial.		Adjust TC3 for maximum gain. Adjust TC2, then TC1 for maximum gain. Repeat the two steps above as required.
6. FM OUTPUT	Generator to 100 MHz, deviation $\pm 22.5\text{kHz}$, 1mV Output.	Position of non-interference near 100 MHz.	VTVM and scope to RCDR OUT jack.	Adjust VR1 (FM Level Adjust) for 350 mV RCDR OUT jack.
7. FINAL DETECTOR ALIGNMENT	As above STEP 6, except deviation $\pm 75\text{kHz}$.	Position of non-interference near 100 MHz.	Distortion meter to RCDR OUT jack. DC VTVM through 100K resistor to TP3 (DISCRI).	Adjust top core of T7 for zero point on 0.5V scale. Adjust bottom core of T7 for minimum distortion (should be below 1%) on distortion meter.
8. FM METER ADJUSTMENT	As above STEP 6.	Position of non-interference near 100 MHz.	Receiver front panel meter.	Adjust VR5 (FM Meter Drive Adjust) so the front panel meter reads 4.
9. MUTING LEVEL ADJUSTMENT	As above STEP 6, except generator output 16 μV .		VTVM and scope to RCDR OUT jack.	Set MUTING ON-OFF switch on receiver front panel to ON. Adjust VR6 (Muting Adjust) until generator output signal overcomes MUTING (until signal shows on scope).
10. MPX ALIGNMENT	Generator at 100mHz, output 1mV. Modulation: Modulate LEFT CHANNEL $\pm 75\text{kHz}$. 400Hz audio and $\pm 7.5\text{kHz}$ -19kHz pilot carrier.		Move VTVM and scope to TP5 (19kHz) and GND. Move VTVM and scope to TP6 (38kHz).	A. Set VR2 and VR7 to the middle of rotation. B. Adjust L6 and L9 (19kHz) for maximum output. Adjust L7 (38kHz) for maximum.
11. MPX ALIGNMENT	As above STEP 10, except generator output 20 μV .			Adjust VR7 (STEREO-BEACON adjust) until the STEREOBEACON lights. Decrease generator output slowly, STEREOBEACON should go out at lower output. Check by increasing and decreasing generator output slightly to turn STEREO-BEACON ON and OFF.

ALIGNMENT

ITEM	GENERATOR	DIAL SETTING	INDICATOR	PROCEDURE
12. STEREO SEPARATION	As above STEP 10.		Scope and VTVM to Right RCDR OUT jack.	Adjust VR2 for minimum.
13.	As above STEP 10, except modulation. $\pm 5\text{kHz}$ -19kHz pilot.			Check STEREO-BEACON ON.
AM ALIGNMENT – SAME FRONT PANEL SETTINGS as FM ALIGNMENT EXCEPT SELECTOR SET to AM <div style="border: 1px solid black; padding: 5px; margin: 5px auto; width: fit-content;"> Maintain generator output as low as possible for suitable indication. </div>				
ITEM	GENERATOR	DIAL SETTING	INDICATOR	PROCEDURE
1. AM IF	Connect 445kHz sweep generator to AM EXT ANT terminals. NOTE: After each adjustment reduce generator output as required to keep front panel meter near 2.5.	Position of non-interference.	Scope vertical input to TP4 (AM OUT).	Adjust T8 for maximum gain. Adjust T4 for maximum gain. Repeat above two steps as required. See FIG 3.
2. AM RF	Connect RF AM generator to antenna terminals and set output position to 600kHz, modulated 30% with 1kHz audio, amplitude 5mV.	Center of 600kHz calibration mark on dial.	Scope and VTVM to RCDR OUT jack.	Adjust L8 (Osc) and LA (Loop Ant.) for maximum.
3.	Change the RF output frequency to 1400 kHz.	Center of 1400kHz calibration mark on dial.		Adjust TC5 (Osc) and TC4 (Ant) for maximum. Repeat steps 2 and 3 until optimum alignment is reached.
4. AM OUTPUT AND METER ADJUSTMENT	Reset generator to 1,000kHz, amplitude 5mV.	Center of 1000kHz calibration mark on dial.		Adjust VR3 (AM Output) for 315mV. Adjust VR4 (AM Meter Adjust) for meter reading of 4.

TUNER LAYOUT

TUNER LAYOUT



TUNER BOARD LAYOUT

ALIGNMENT

POWER AMPLIFIER

IDLING CURRENT ADJUSTMENT

- Turn VOLUME control to minimum.
- (1) Connect ground of DC VTVM to TP1 and probe to R725L. **BE CAREFUL TO AVOID SHORTING ADJACENT PINS.** Set BIAS ADJUST pot. VR705L for 10mVDC.
 - (2) Connect ground of DC VTVM to TP2, and probe to R725R. **BE CAREFUL TO AVOID SHORTING ADJACENT PINS.** Set BIAS ADJUST pot. VR705R for 10mVDC.

NOTE: Idling current will increase and stabilize as amplifier temperature normalizes.
 (3) Allow unit to warm-up 15 minutes. Repeat (1) and (2), resetting BIAS ADJUST pots. for 10mVDC.

CENTER VOLTAGE TEST

- Turn VOLUME control to minimum.
 SPEAKERS switch to MAIN.
- (1) Connect DC VTVM across LEFT SPEAKERS MAIN and COMMon terminals. Meter should read OVDC ($\pm 100mV$).
 - (2) Connect DC VTVM across RIGHT SPEAKERS MAIN and COMMon terminals. Meter should read OVDC ($\pm 100mV$).

HARMONIC DISTORTION TEST

CAUTION: Limit the following tests to no more than ten minutes each. Use 8-ohm resistors with a minimum power rating of 50 watts when connecting a load across the speaker terminals. Short the SPKR FUSES on the receiver rear panel.

Control Settings: Unplug the AC power cord and set the front panel controls as follows:

BASS, TREBLE, and BALANCE controls to center positions.

SPEAKERS switch to MAIN.

POWER pushbutton not depressed.

SELECTOR switch to AUX.

MODE and TAPE MONITOR pushbuttons not depressed.

LOUDNESS pushbutton not depressed.

VOLUME control to MIN.

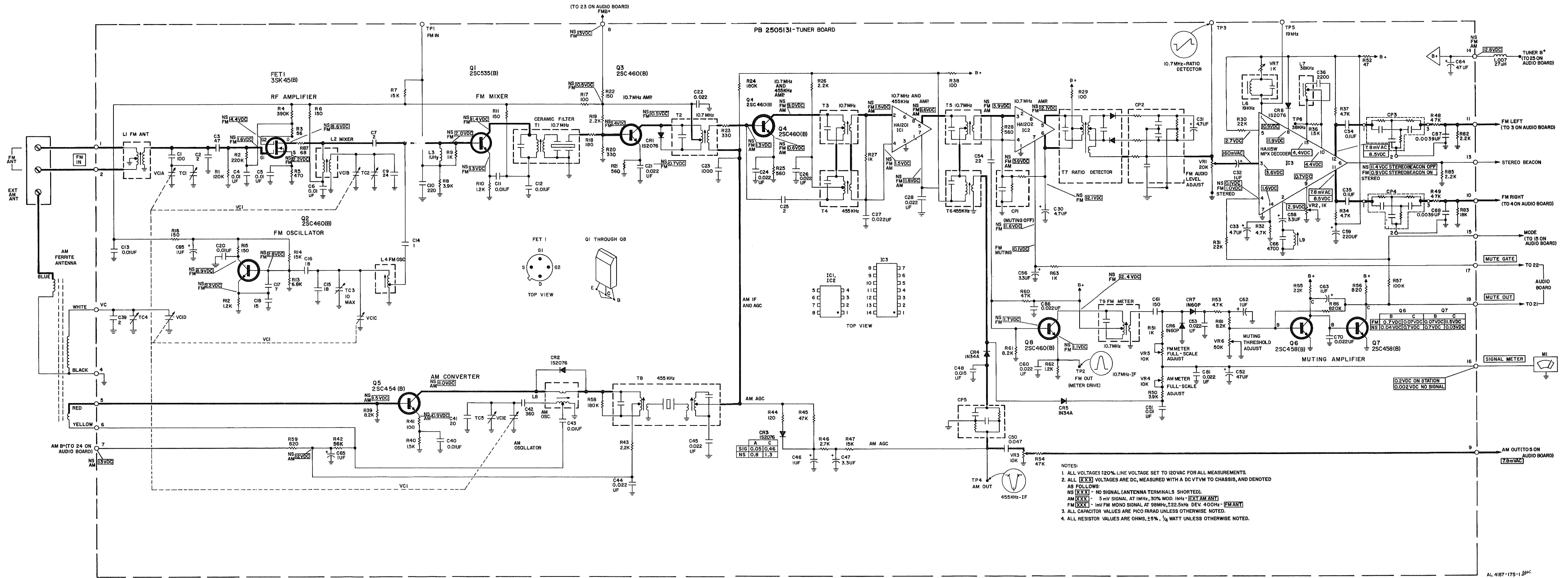
ONE CHANNEL DRIVEN:

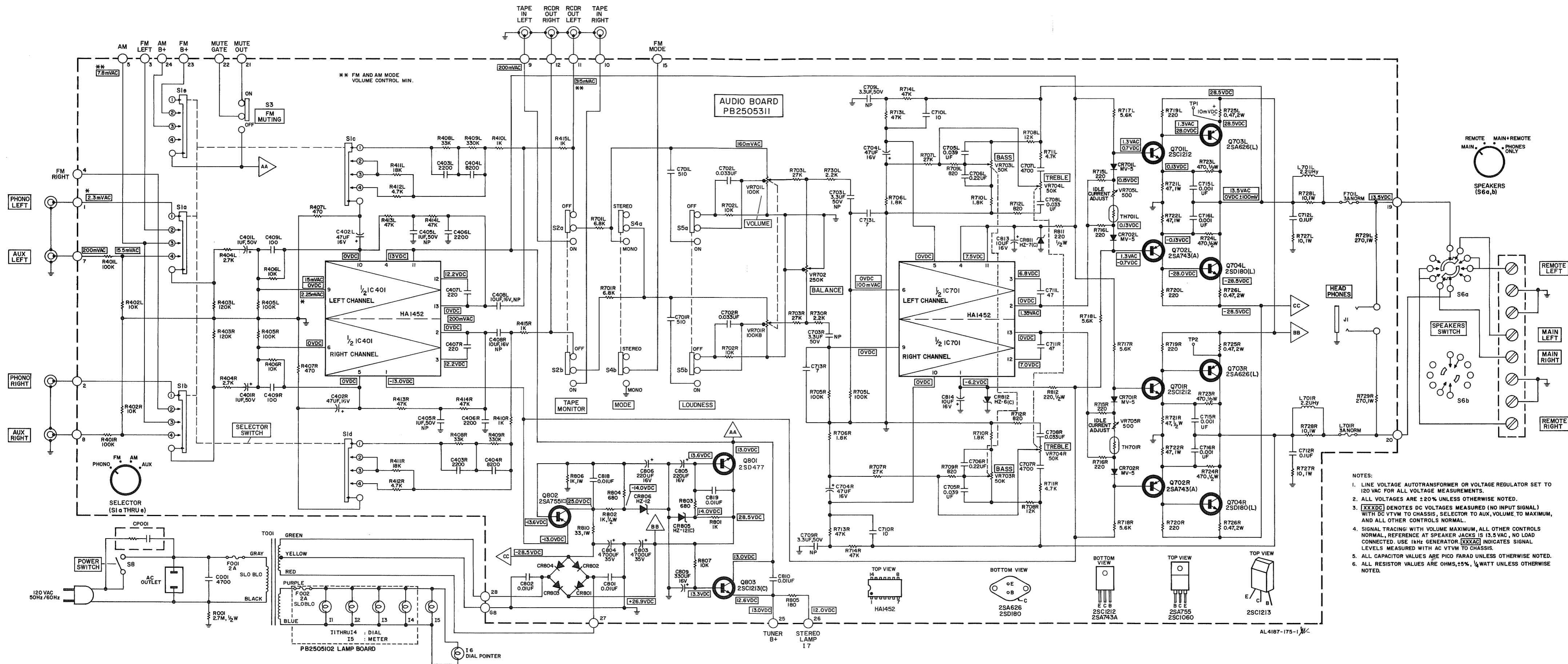
- 1) Connect a low distortion frequency generator to AUX IN LEFT jack. Set generator frequency to 1kHz and output to minimum.
- 2) Connect an 8-ohm load resistor between MAIN SPEAKERS LEFT and COM terminals. Connect a Harmonic Distortion Analyzer and an AC VTVM in parallel across the 8-ohm load.
- 3) Connect the AC power cord and set the POWER pushbutton in. Increase VOLUME control to MAX.
- 4) Increase generator to 24 watts RMS (13.9 volts RMS across the 8-ohm load.) The meter on the Harmonic Distortion Analyzer should read less than 1.0%.

- 5) Repeat steps 2 through 4 for MAIN SPEAKERS RIGHT.

ALL CHANNELS DRIVEN:

- 1) Connect an 8-ohm load resistor across all of the MAIN SPEAKER output terminals.
- 2) Depress the MODE SELECTOR "MONO" pushbutton.
- 3) Check for distortion of 1.0% or less at 24 watts RMS (13.9 volts RMS) on each channel with all channels driven simultaneously.
- 4) Disconnect all test equipment. Remove the short across SPKR FUSES installed at the beginning of the test.





PARTS LIST

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SYMBOL NO.	PART NUMBER	DESCRIPTION
	AN4384412	Tuning Shaft
	AP3386752	Dial Pointer with Lamp
	EK3282951	Knob, Tuning
	EK3282952	Knob, Speakers/Selector/Volume/Balance/Bass/Treble
	EK3282803	Knob Assembly Pushbutton, Loudness Contour/Mono/ FM Muting/Tape, Monitor, Power
M1	N4187-1	Dial Scale
	MC2577183	Signal Meter
I7	LM2767233	Lamp, Stereo Beacon, 8V, 30ma
	EA3916411	Leg with Pad
	AS3243731	Dress Panel Assembly
	KK9403037	Cabinet Assembly
	PB2505311	Audio Amp PCB
	PB2505131	AM/FM Tuner PCB
I6	LM21442-1	Lamp, Dial Pointer 6.3V, 250ma
T001	TD2217923	Power Transformer
R001	RC20BF275J	Resistor 2.7M ohm 1/2W
C003, C004	CK0245018	Capacitor Ceramic, 0.022uF 50V
L001	LC2227035	RF Choke 27uHy
	LA2757241	AM Ferrite Antenna
	EA51408	Fuse Holder
F001	FL51313-2	Fuse, 2A 125V Slow Blow
F701L, R	FL51313-44	Fuse, 3A 250V Norm Blow
C001	CK0243873	Capacitor Ceramic 4700pF 150V
	JK2657281	AC Outlet, Snap-in Type
CP001	EP0269014	Packaged Circuit
	JK2687642	8 Pin US Pin Jack-Phono/Aux/Tape/Recorder
	ET2687662	8 Pin Screw Terminals, Speakers
	ET2681353	3 Pin Screw Terminals, FM/AM Antenna
	ED3920111	Pulley, Tuning Gang
	PB2505102	Lamps PCB

PB2505102 – LAMP BOARD PARTS LIST

SYMBOL NO.	PART NUMBER	DESCRIPTION
I1, 2, 3, 4, 5	LM9253-1	Lamp, Dial 6.3V 250ma (Pigtail type)
F002	FL2727085	Fuse, 3A 125V SLO BLO(Pigtail type)

PARTS LIST

PB2505311 – AUDIO BOARD PARTS LIST

SYMBOL NO.	PART NUMBER	DESCRIPTION
S1	SR2617363	Switch, Selector
S2, 3, 4, 5	SP2637601	Pushbutton Switch, Tape Monitor/FM Muting/ Mode/Loudness Contour
S6	SR2617571	Rotary Switch, Speakers
S8	SP2637322	Pushbutton Switch, Power
J1	JK2677231	Head Phone Jack
IC401, 701	TR2367151	IC HA1452 Two Channel Amplifier
Q701L, R	TR2327603	Transistor 2SC1212WT (C), NPN
Q702L, R	TR2327393	Transistor 2SA743A (C), PNP
Q703L, R	TR2327841	Transistor 2SA626 (L), PNP
Q704L, R	TR2327574	Transistor 2SD180 (L), NPN
Q801	TR2327862	Transistor 2SD477 (C), NPN
Q802	TR2327723	Transistor 2SA755 (C), PNP
Q803	TR2327333	Transistor 2SC1213 (C), NPN
CR701L, R	TR2347041	Varistor MV-5
702L, R		
CR801, 802, 803, 804	TR2327031	Diode V03C
CR805, 806	TR2337103	Zener Diode HZ-12 (C)
CR811	TR2327733	Zener Diode HZ-7 (C)
CR812	TR2337123	Zener Diode HZ-6 (C)
TH701L, R	TR0576042	Thermistor 15-D-26
L701L, R	LC2227141	Audio Trap Coil 2.2uHy
VR701	RV0151705	Variable Resistor 100K ohm Volume
VR702	RV0151706	Variable Resistor 250K ohm Balance
VR703, 704	RV0151713	Variable Resistor 50K ohm Bass/Treble
VR705L, R	RV0151241	Variable Resistor 500 ohm Idling Current
R401L, R	RF25DC104J	Resistor 100K ohm 1/4W
405L, R		
705L, R		
R402L, R	RF25DC103J	Resistor 10K ohm 1/4W
406L, R		
702L, R		
807		
R403L, R	RF25DC124J	Resistor 120K ohm 1/4W
R404L, R	RF25DC272J	Resistor 2.7K ohm 1/4W
R407L, R	RF25DC471J	Resistor 470 ohm 1/4W
R408L, R	RF25DC333J	Resistor 33K ohm 1/4W
R409L, R	RF25DC334J	Resistor 330K ohm 1/4W
R410L, R	RF25DC102J	Resistor 1K ohm 1/4W
415L, R		
801		
R411L, R	RF25DC183J	Resistor 18K ohm 1/4W
R412L, R	RF25DC472J	Resistor 4.7K ohm 1/4W
711L, R		

PARTS LIST

PB2505311 – AUDIO BOARD PARTS LIST

SYMBOL NO.	PART NUMBER	DESCRIPTION
R413L, R	RF25DC473J	Resistor 47K ohm 1/4W
414L, R		
713L, R		
714L, R		
R701L, R	RF25DC682J	Resistor 6.8Kohm 1/4W
R703L, R	RF25DC273J	Resistor 27K ohm 1/4W
707L, R		
R706L, R	RF25DC182J	Resistor 1.8Kohm 1/4W
710L, R		
R708L, R	RF25DC123J	Resistor 12K ohm 1/4W
R709L, R	RF25DC821J	Resistor 820 ohm 1/4W
712L, R		
R715L, R	RF25DC221J	Resistor 220 ohm 1/4W
716L, R		
719L, R		
720L, R		
R717L, R	RF25DC562J	Resistor 5.6Kohm 1/4W
718L, R		
R721L, R	R50DC470J	Resistor 47 ohm 1/2W
722L, R		
R723L, R	RC20BF471J	Resistor 470 ohm 1/2W
724L, R		
R725L, R	RP0119127	Resistor 0.47 ohm 2W
726L, R		
R727L, R	RC30BF100K	Resistor 10 ohm 1W
728L, R		
R729L, R	RP0119426	Resistor 270 ohm 1W
R730L, R	RF25DC222J	Resistor 2.2Kohm 1/4W
R801, 802	RC20BF102J	Resistor 1K ohm 1/2W
R803, 804	RF25DC681J	Resistor 680 ohm 1/4W
R805	RF25DC181J	Resistor 180 ohm 1/4W
R806	RC30BF102K	Resistor 1K ohm 1W
R810	RP0119047	Resistor, 33 ohm 1W
R811, 812	RC20BF221J	Resistor 220 ohm 1/2W
C401L, R	CE1252811	Capacitor Electrolytic 1uF 50V
C402L, R	CE1252525	Capacitor Electrolytic 47uF 16V
704L, R		
C403L, R	CY1274013	Capacitor Mylar 2200pF 50V
406L, R		
C404L, R	CY22335-25	Capacitor Mylar 8200pF 100V
C405L, R	CE1252861	Capacitor Non-Polarized 1uF 50V
C407L, R	CK0248732	Capacitor Ceramic 220pF 50V
C408L, R	CE1252521	Capacitor Non-Polarized 10uF 16V
C409L, R	CK0248724	Capacitor Ceramic 100pF 50V
C701L, R	CPO228328	Capacitor Polystyrene 510pF 50V
C702L, R	CY1275014	Capacitor Mylar 0.033uF 50V
708L, R		
C703L, R	CE1252863	Capacitor Non-Polarized 3.3uF 50V
709L, R		
C705L, R	CY1275034	Capacitor Mylar 0.039uF 50V
C706L, R	CY1276013	Capacitor Mylar 0.22uF 50V
C707L, R	CY1274015	Capacitor Mylar 4700pF 50V

PARTS LIST

PB2505311 – AUDIO BOARD PARTS LIST

SYMBOL NO.	PART NUMBER	DESCRIPTION
C710L, R	CK0248650	Capacitor Ceramic 10pF 50V
C711L, R	CK0248676	Capacitor Ceramic 47pF 50V
C712L, R	CY1276011	Capacitor Mylar 0.1uF 50V
C713L, R	CK0246417	Capacitor Ceramic 7pF 50V
C715L, R	CY1274011	Capacitor Mylar 1000pF 50V
716L, R		
C801, 802	CK0245408	Capacitor Ceramic 0.01uF 50V
C803, 804	CE9253-2	Capacitor Electrolytic 4700uF 35V
C805, 806	CE1252532	Capacitor Electrolytic 220uF 16V
C809	CE1252633	Capacitor Electrolytic 330uF 16V
C810, 818, 819	CY1275011	Capacitor Mylar 0.01 uF 50V
C813, 814	CE1252521	Capacitor Electrolytic 10uF 16V

PB2505131 – AM/FM/MPX TUNER BOARD PARTS LIST

SYMBOL NO.	PART NUMBER	DESCRIPTION
VC1, TC1, 2, 4, 5	CV0281179	Variable Capacitor – Air
FET1	TR2327431	FET 3SK45(B)
Q1	TR5320326	Transistor 2SC535(B), NPN
Q2	TR0573507	Transistor 2SC461(B), NPN
Q3, 4, 8	TR0573486	Transistor 2SC460(B), NPN
Q5	TR0573491	Transistor 2SC454(B), NPN
Q6, 7	TR2320063	Transistor 2S458(C), NPN
CR1, 2, 3, 8	TR2337011	Diode 1S2076, Silicon
CR4, 5	TR0575002	Diode 1N34A, Germanium
CR6, 7	TR0575005	Diode 1N60P, Germanium
IC1	TR2327312	IC HA1201, IF Amplifier
IC2	TR2327411	IC HA1202, IF Amplifier
IC3	TR2327422	IC HA1115W, MPX Decoder
L1	LC2134411	FM Antenna Coil
L2	LC2134419	FM RF Coil
L3	LC2227081	Choke – 1uHy
L4	LC2134416	FM Osc Coil
L6	LC2134392	19kHz Coil, MPX
L7	LC2134373	38kHz Coil, MPX
L8	LC2134431	AM Osc Coil
L9	LC2134371	19kHz Coil, MPX
T1	ZZ2154172	FM IF Transformer/Ceramic Filter
T2, 5	ZZ0322203	FM IF Transformer 10.7mHz
T3	ZZ2154199	FM IF Transformer 10.7mHz
T4	ZZ2154161	AM IF Transformer 455kHz
T6	ZZ2154122	AM IF Transformer 455kHz
T7	ZZ2154201	FM Discriminator Transformer 10.7mHz
T8	ZZ2154183	AM IF Transformer 455kHz
T9	ZZ2154292	FM IF Transformer 10.7mHz
TC3	CT0283121	Trimmer Capacitor
CP1	EP0186022	Packaged Circuit (Filter Network)

PARTS LIST

PB2505131 – AM/FM/MPX TUNER BOARD PARTS LIST

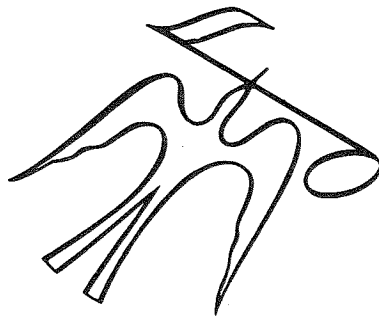
SYMBOL NO.	PART NUMBER	DESCRIPTION
CP2	EP0186041	Packaged Circuit (Filter Network)
CP3, 4	EP0186051	Packaged Circuit (Filter Network, Deemphasis)
CP5	EP0186031	Packaged Circuit (Filter Network, Audio)
C1	CK0246464	Capacitor Ceramic 100pF 50V NPO
C2	CK0248142	Capacitor Ceramic 2pF 50V
C3	CKO248676	Capacitor Ceramic 47pF 50V
C4, 5, 6, 11, 12, 13, 20	CK1245017	Capacitor Ceramic 0.01uF 25V
C7, 25, 39	CK0248632	Capacitor Ceramic 2pF 50V
C9	CK0246449	Capacitor Ceramic 24pF 50V
C10	CK0248362	Capacitor Ceramic 220pF 50V N470
C14	CK0248631	Capacitor Ceramic 1pF 50V
C15, 16	CK0248176	Capacitor Ceramic 18pF 50V N330
C17	CK0246417	Capacitor Ceramic 7pF 50V
C18	CK0245444	Capacitor Ceramic 15pF 50V
C21, 22, 24, 26, 27, 28, 44	CK1245018	Capacitor Ceramic 0.22uF 50V
C23	CY1274011	Capacitor Mylar 1000pF 50V
C30, 31, 33	CE1252815	Capacitor Electrolytic 4.7uF 50V
C32, 46, 62, 63, 65, 85	CE1252811	Capacitor Electrolytic 1uF 50V
C34, 35	CY1276011	Capacitor Mylar 0.1uF 50V
C36	CS0228343	Capacitor Polystyrene 2200pF 50V
C40, 43, 51	CY1275011	Capacitor Mylar 0.01uF 50V
C41	CK0248497	Capacitor Ceramic 20pF 50V
C42	CS0228324	Capacitor Polystyrene 360pF 50V
C45, 53, 60, 70, 81, 86	CK1245018	Capacitor Ceramic 0.022uF 50V
C47, 56, 58	CE1252813	Capacitor Electrolytic 3.3uF 50V
C48	CY1275012	Capacitor Mylar 0.015uF 50V
C50	CY1275015	Capacitor Mylar 0.047uF 50V
C52, 64	CE1252525	Capacitor Electrolytic 47uF 16V
C54	CK0248668	Capacitor Ceramic 22pF 50V
C59	CE1252532	Capacitor Electrolytic 220uF 16V
C61	CK0248728	Capacitor Ceramic 150pF 50V
C66	CS0221513	Capacitor Polystyrene 4700pF 50V
C87, 88	CY22335-4	Capacitor Mylar 3900pF 100V
VR1	RV0151281	Variable Resistor 20K ohm
VR2, 7	RV0151282	Variable Resistor 1K ohm
VR3, 4, 5	RV0151224	Variable Resistor 10K ohm
VR6	RV0151225	Variable Resistor 50K ohm

PARTS LIST

PB2505131 – AM/FM/MPX TUNER BOARD PARTS LIST

REF. NO.	PART NUMBER	DESCRIPTION
R1	RF25DC124J	Resistor 120K ohm 1/4W
R2	RF25DC224J	Resistor 220K ohm 1/4W
R3	RC07BF560J	Resistor 56 ohm 1/4W
R4	RF25DC394J	Resistor 390K ohm 1/4W
R5	RF25DC471J	Resistor 470 ohm 1/4W
R6, 11, 15, 16, 22	RF25DC151J	Resistor 150 ohm 1/4W
R7, 14, 47	RF25DC153J	Resistor 15K ohm 1/4W
R8, 50	RF25DC392J	Resistor 3.9K ohm 1/4W
R9, 27, 51, 63	RF25DC102J	Resistor 1K ohm 1/4W
R10, 12, 62	RF25DC122J	Resistor 1.2K ohm 1/4W
R13	RF25DC682J	Resistor 6.8K ohm 1/4W
R17, 29, 38, 41	RF25DC101J	Resistor 100 ohm 1/4W
R18	RF25DC181J	Resistor 180 ohm 1/4W
R19, 26, 43, 85	RF25DC222J	Resistor 2.2K ohm 1/4W
R20, 23	RF25DC331J	Resistor 330 ohm 1/4W
R21, 25, 28	RF25DC561J	Resistor 560 ohm 1/4W
R24, 58	RF25DC184J	Resistor 180K ohm 1/4W
R30, 31, 55	RF25DC223J	Resistor 22K ohm 1/4W
R32, 34, 37, 53	RF25DC472J	Resistor 4.7K ohm 1/4W
R36, 40	RF25DC152J	Resistor 1.5K ohm 1/4W
R39, 61, 81	RF25DC822J	Resistor 8.2K ohm 1/4W
R42	RF25DC563J	Resistor 56K ohm 1/4W
R44	RF25DC121J	Resistor 120 ohm 1/4W
R45, 48, 49, 54, 60	RF25DC473J	Resistor 47K ohm 1/4W
R46	RF25DC272J	Resistor 2.7K ohm 1/4W
R52	RF25DC470J	Resistor 47 ohm 1/4W
R56, 59	RF25DC821J	Resistor 820 ohm 1/4W
R57	RF25DC104J	Resistor 100K ohm 1/4W
R82, 83	RF25DC183J	Resistor 18K ohm 1/4W
R86	RF25DC824J	Resistor 820K ohm 1/4W
R87	RF25DC683J	Resistor 68K ohm 1/4W

NOTES



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