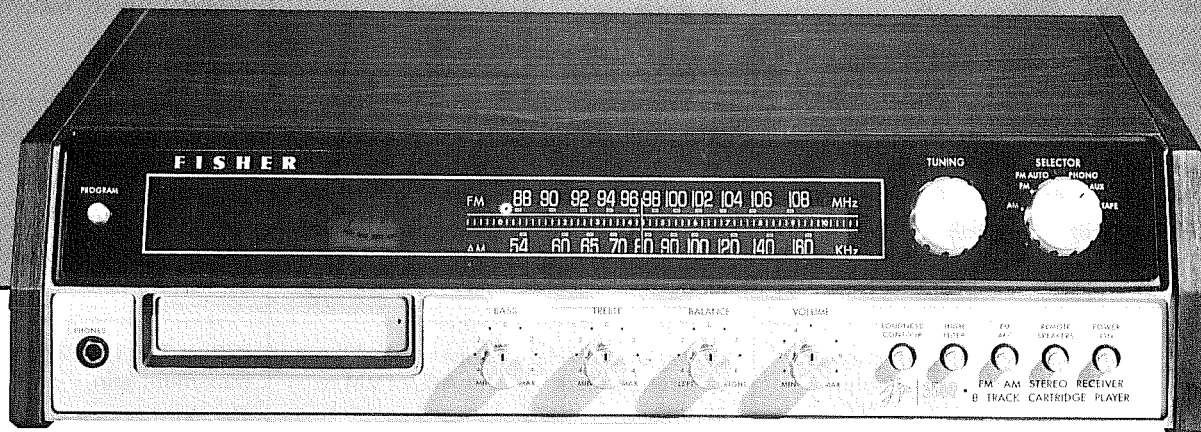


**SERVICE MANUAL**

# The Fisher® 3500

**Music Center Series FM-AM  
Stereo Receiver**



*WORLD LEADER IN HIGH QUALITY STEREO*

## REQUIRED EQUIPMENT

The following test equipment is required to align and to service the Receiver:

- 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

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

## FM-TUNER ALIGNMENT

SELECTOR to FM, VOLUME MINIMUM, AFC to OFF

.Maintain generator output as low as possible for suitable indication.

ITEM	GENERATOR	DIAL SETTING	INDICATOR	PROCEDURE
------	-----------	--------------	-----------	-----------

**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.

1. IF ALIGNMENT	Connect to 10.7 MHz sweep generator to TP1. Connect ground lead to chassis. Markers are not required.	Position of non-interference.	Scope vertical input to TP2 through 100k resistor and 100pF capacitor as shown. Connect ground lead to chassis.	Detune T109 by turning core up (ccw). Adjust in the following order: T108, T107, T106, T105 and T104 for maximum gain and symmetrical shape of curve as shown in FIGURE 1.
2. PRELIMINARY DETECTOR ALIGNMENT	As above	As above	As above	Adjust T109 for maximum gain symmetry. See FIGURE 2.

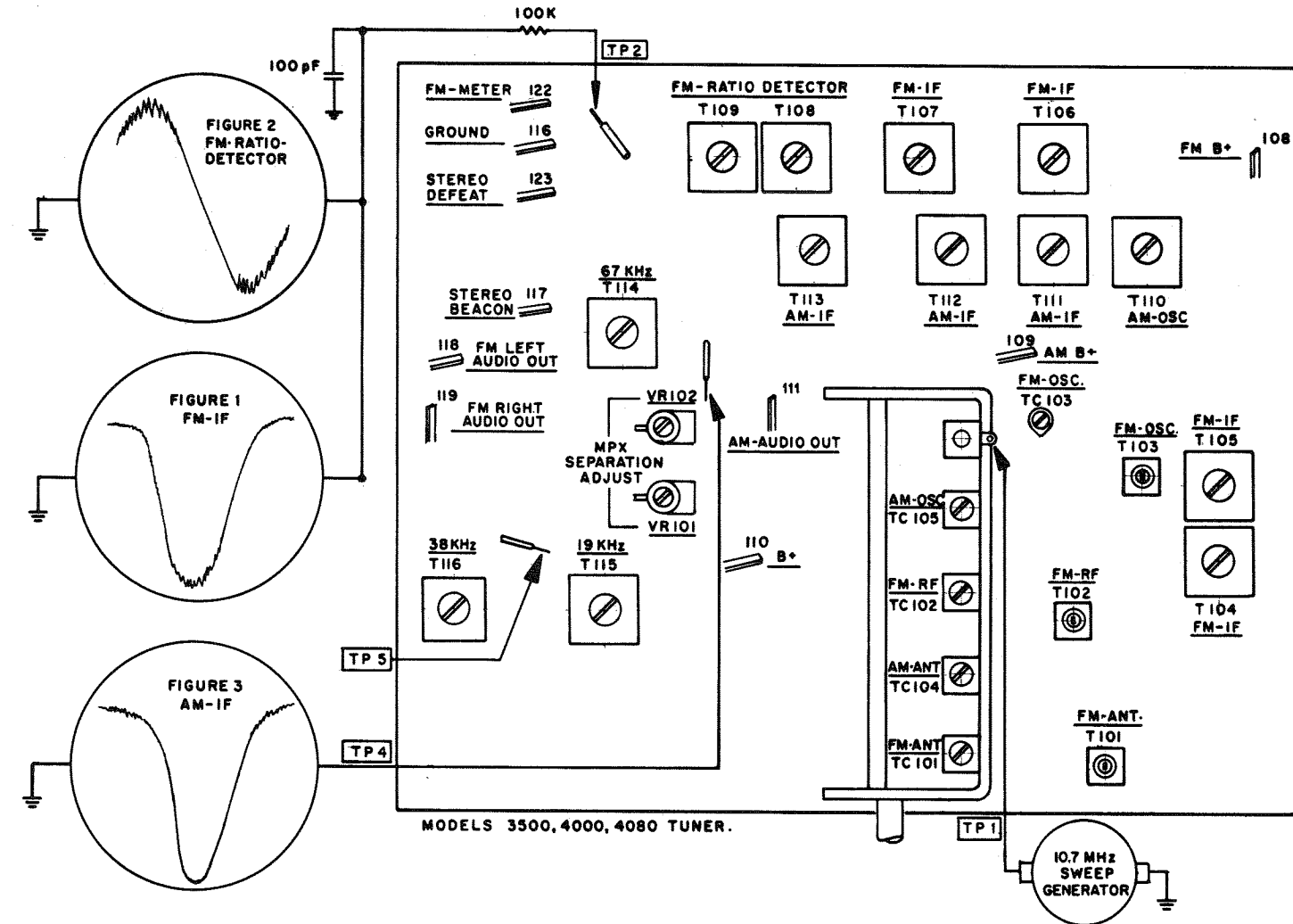
**Note:** 120-ohm composition resistors in series with each lead from the RF generator match the 50-ohm output to the 300-ohm input impedance. Generator output voltage is reduced to one-half at antenna terminals. Signal voltages specified in this table are generator output levels, not antenna voltages.

3. FRONT END ALIGNMENT		Tuning knob fully CCW.		Center dial pointer on 0 and cement it in place.
4.	Connect FM RF gneerator through two 120-ohm resistors to FM ANT screw terminals. Set generator to 90 MHz, modulate with 400 Hz to provide $\pm 75$ kHz deviation.  Set generator output attenuator as low as possible.	Center of 90 MHz calibration mark on dial.	Scope vertical input and AC-VTVM to 118.	Adjust T103, T102 and T101 for maximum gain. Repeat this step as required.

5.	Change generator setting to 106 MHz.	Center of 106 MHz calibration mark on dial.	As above	Adjust TC103, TC102 and TC101 for maximum gain. Repeat this step as required.
6. FINAL DETECTOR ALIGNMENT	As above, except set to position of non-interference near 100 MHz. Set generator output attenuator to 2mV.	Position of non-interference near 100 MHz.	Scope vertical input and distortion meter to 118.	Adjust T109 for minimum distortion.

SELECTOR to FM AUTO

7. MPX ALIGNMENT	As above STEP 6 except modulate LEFT CHANNEL $\pm 67.5$ kHz - 400 Hz audio and $\pm 7.5$ kHz - 19 kHz pilot carrier.	As above STEP 6.	Scope and AC-VTVM to 118.	Set VR101 and VR102 to mechanical center. Adjust T115 and T116 for maximum LEFT channel output.
8. STEREO SEPARATION	As above STEP 6.	As above STEP 6.	Scope and AC-VTVM to 119.	Adjust VR 102 for minimum output.
9. STEREO SEPARATION	As above except modulate RIGHT CHANNEL.	As above	Scope and AC-VTVM to 118.	Adjust VR101 for minimum output.
10. SCA REJECTION	Connect Audio-Generator to TP2. Set frequency to 67 kHz output level to 500mV.		Scope and AC-VTVM to TP5.	Adjust T114 for minimum.



## AM-TUNER ALIGNMENT

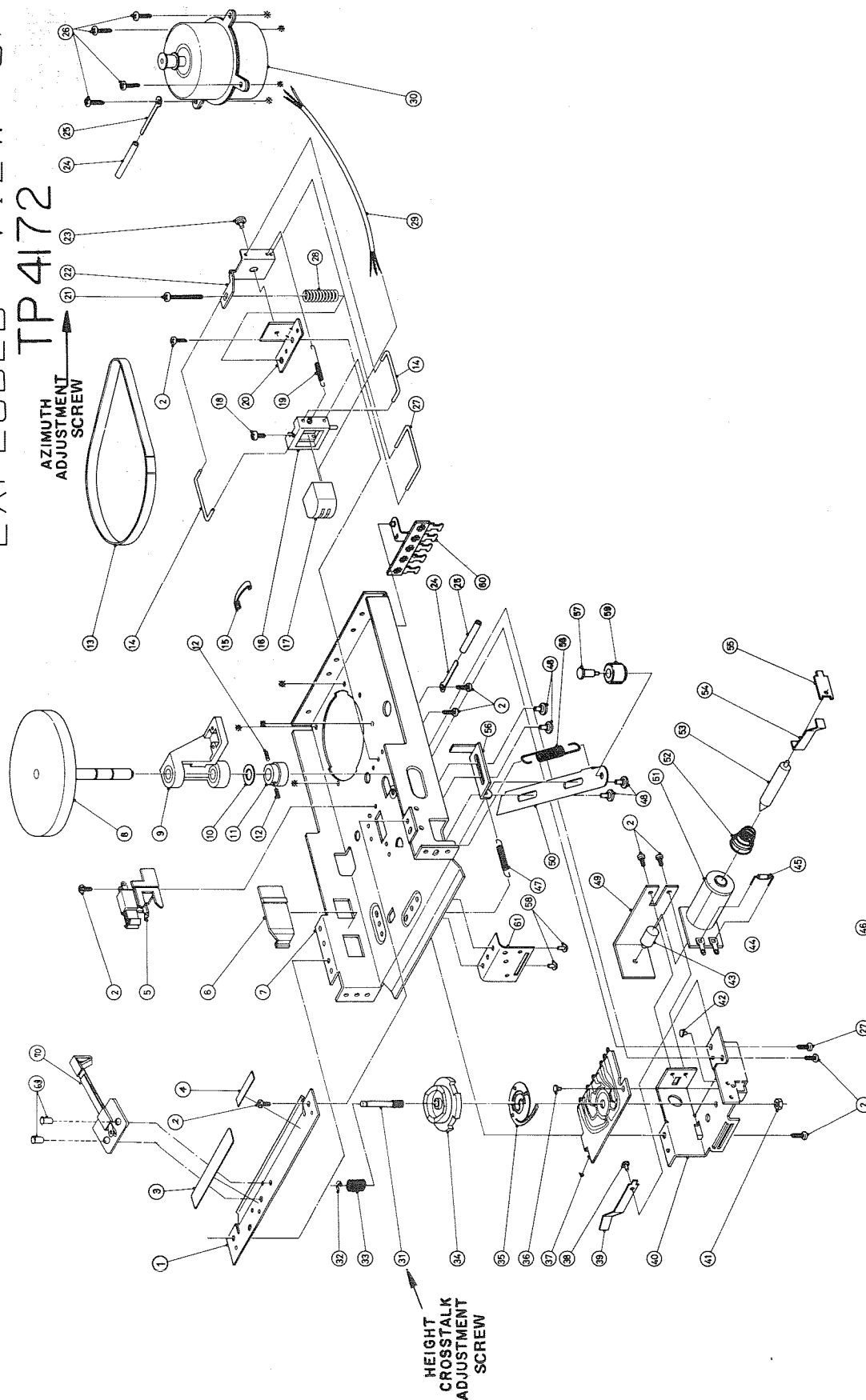
SELECTOR to AM, VOLUME MINIMUM.

Maintain generator output as low as possible for suitable indication.

ITEM	GENERATOR	DIAL SETTING	INDICATOR	PROCEDURE
1. AM IF	Connect 445 kHz sweep generator to AM EXT ANT terminals. Note: After each adjustment reduce generator output as required.	Position of non-interference.	Scope vertical input to TP4. See FIGURE 3.	Adjust T113, T112 and T111 for maximum gain and symmetry.
2. AM FRONT END ALIGNMENT	AM generator to EXT AM ANT and GND terminals. Set to 600 kHz. Modulate with 30%, 1kHz.	Center of 600 kHz calibration mark on dial.	Scope and VTVM to TP4.	Adjust T110 (osc.) and L901 (Loop Ant.) for maximum.
3. AM FRONT END ALIGNMENT	Change frequency to 1400 kHz.	Center of 1400 kHz calibration mark on dial.	As above	Adjust TC105 (osc.) TC104 (Ant.) for maximum. Repeat steps 2 and 3 until optimum alignment is reached.

EXPLODED VIEW OF

TP 4172



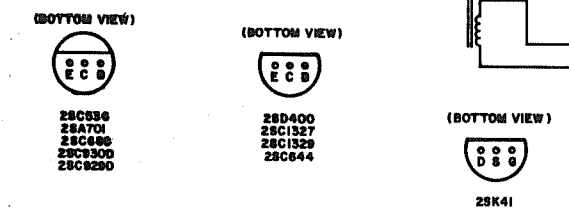
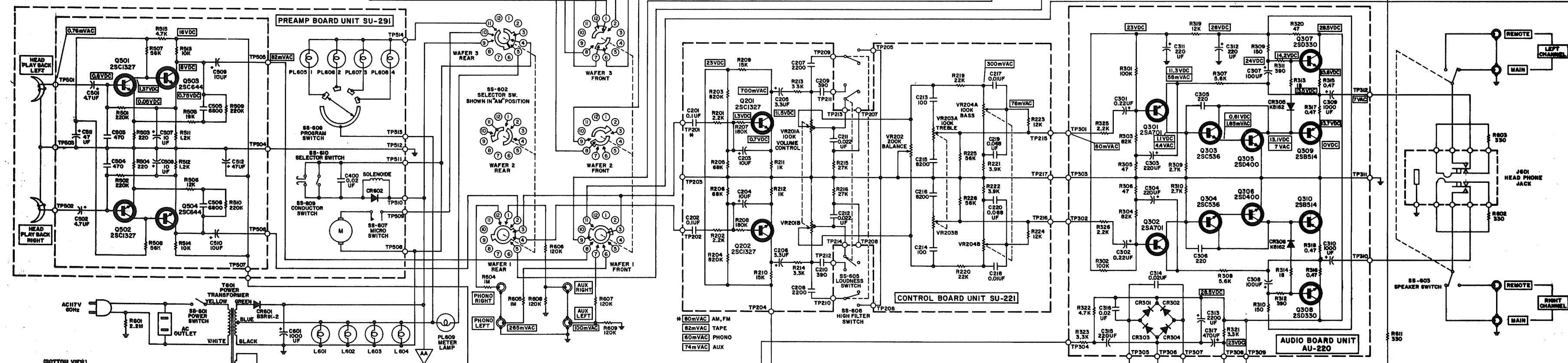
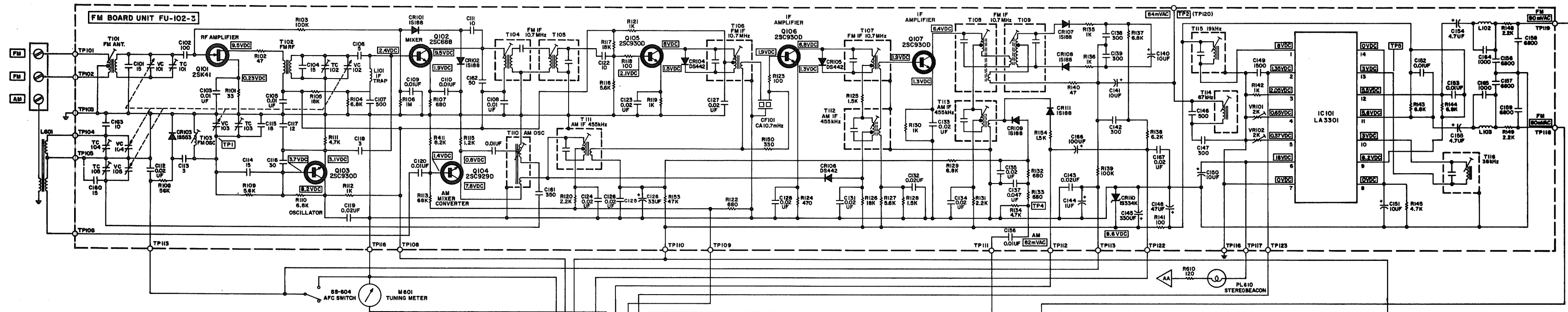
### TAPE DECK AZIMUTH AND HEAD HEIGHT ALIGNMENT

1. Preset Bass, Treble and Balance controls to their mechanical center position, Volume Control to 4.
2. Selector to Tape.
3. Connect Oscilloscope or AC-VTVM to the Main Left Speaker Output.
4. Insert prerecorded test tape, (RCA No. 378 or equivalent), into tape player.
5. Select Tape Program Number 2.
6. Adjust Head Height Crosstalk Adjustment screw for minimum output as indicated on VTVM or Oscilloscope.
7. Connect Oscilloscope or AC-VTVM to the Main Right Speaker Output.
8. Adjust Azimuth Adjustment Screw for maximum output as indicated on VTVM or Oscilloscope.
9. Repeat Head Height and Azimuth adjustment procedure until no further improvement is obtained.

### (TP4172) TAPE PLAYER PARTS LIST

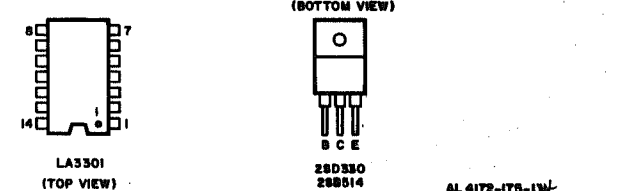
<u>Ref. No.</u>	<u>Parts Number</u>	<u>Description</u>	<u>Ref. No.</u>	<u>Parts Number</u>	<u>Description</u>
1	Not Available	Bracket Hold Down	33	TP4172-33	Spring, Cam
2	Not Available	Screw Tap Type (M3x6)	34	TP4172-34	Cam, Ratchet
3	Not Available	Label Model No.	35	TP4172-35	Clip, Slide
4	Not Available	Label Date Code	36	Not Available	Rivet (.122x3/16)
5	TP4174-5	Assy. Tape Guide & Switch	37	TP4172-37	Panel Etched Indicator
6	Not Available	Spacer Side	38	Not Available	Rivet (.122x5/32)
7	Not Available	Chassis, Tape Player	39	Not Available	Spring Stopper
8	TP4174-8	Assy. Flywheel & Shaft	40	Not Available	Bracket, Cam
9	TP4174-9	Assy. Housing & Bearings	41	TP4174-41	Nut (M4x0.5)
10	TP4174-10	Washer, Flat	42	TP4174-42	Spacer, Capstan
11	TP4174-11	Roller, Drive Cam	43	TP4174-43	Stop Solenoid
12	TP4174-12	Set Screw	44	TP4174-44	Leaf Switch
13	TP4174-13	Belt Drive, P.C.	45	TP4174-45	Rectifier, Silicon (10D2)
14	TP4174-14	Arm, Radius	46	Not Available	Machine Screw (M2.3x10)
15	TP4174-15	Spring Keeper	47	TP4174-47	Spring Slide
16	TP4174-16	Block Head	48	Not Available	Rivet, Shoulder
17	TP4172-17	Head Playback Stereo	49	Not Available	Bracket, Solenoid
18	TP4172-18	Machine Screw (M2.6x7)	50	Not Available	Bracket, Delatch
19	TP4172-19	Spring, Head Tension	51	TP4174-51	Solenoid Coil Assy.
20	Not Available	Bracket Head Assy. Mtg.	52	TP4174-52	Spring Solenoid
21	TP4172-21	Screw Machine (M3x2.8)	53	TP4174-53	Plunger Solenoid
22	TP4172-22	Bracket, Azimuth	54	Not Available	Spring, Push
23	Not Available	Rivet, Shoulder	55	TP4174-55	Guide, Plunger
24	Not Available	UL & CSA Tube	56	Not Available	Bracket Slide
25	Not Available	Lug, Wrap Around	57	Not Available	Rivet, Shoulder
26	TP4172-26	Screw, Tap Type (M3x8)	58	TP4174-58	Spring Delatch
27	TP4172-27	Arm, Radius	59	TP4174-59	Roller, Cartridge
28	TP4172-28	Spring Azimuth	60	Not Available	Assy. Strip Term
29	Not Available	C. W. Shield	61	Not Available	Spring P.C. Board Mtd.
30	TP4172-30	D. C. Motor Assy.	69	Not Available	Rivet
31	TP4172-31	Shaft Cam	70	TP4172-70	Leaf Switch
32	TP4172-32	Washer C Type			





NOTES:  
 1. LINE VOLTAGE AUTOTRANSFORMER OR VOLTAGE REGULATOR SET TO 120VAC FOR ALL VOLTAGE MEASUREMENTS.  
 2. ALL VOLTAGES ARE PLUS-MINUS 20% UNLESS OTHERWISE NOTED.  
 3. [XXXX] DENOTES DC VOLTAGES MEASURED WITH DCVTVM TO CHASSIS, AND DENOTES AS FOLLOWS:  
 FM [XXXX] NO SIGNAL (ANTENNA TERMINALS SHORTED)  
 AM [XXXX] NO SIGNAL (ANTENNA TERMINALS SHORTED)

4. SIGNAL TRACING: WITH VOLUME MAXIMUM, ALL OTHER CONTROLS NORMAL, REFERENCE AT SPEAKER JACKS IS 7V RMS, NO LOAD CONNECTED.  
 [V] [mV] INDICATES SIGNAL LEVELS MEASURED WITH AC VTVM TO CHASSIS.  
 FOR AUDIO AMPLIFIERS USE 1kHz GENERATOR. FOR TUNER SECTIONS SET FM AND AM SIGNAL GENERATORS AS SPECIFIED BELOW.  
 FM GENERATOR SIGNAL: 100 MHz, 1mV, ± 22.5kHz DEVIATION.  
 AM GENERATOR SIGNAL: 1MHz, 1mV, 25% MODULATION.  
 5. ALL CAPACITOR VALUES ARE PICO FARAD UNLESS OTHERWISE NOTED.  
 6. ALL RESISTOR VALUES ARE OHMS, ± 5%, 1/4 WATT UNLESS OTHERWISE NOTED.



**PBAU-220 POWER SUPPLY/AUDIO BOARD PARTS LIST**

**PBFU-102-3 AM/FM/MPX TUNER BOARD PARTS LIST**

**CHASSIS PARTS LIST**

Ref. No.	Part Number	Description	Ref. No.	Part Number	Description
	KKCFW250K	Backboard, Screened	Q307, 308	TR2SD330E	Transistor 2SD330E, NPN
	ASDLA221J	Pointer Assembly	Q309, 310	TR2SB514E	Transistor 2SB514E, PNP
	ASDLA223	Tuning Shaft Assembly	Q305, 306	TR2SD400E	Transistor 2SD400E, NPN
	NDLM210J	Dial Scale	Q301, 302	TR2SA701E	Transistor 2SA701E PNP
	EMMPM127	Feet, Cabinet	Q303, 304	TR2SC536G	Transistor 2SC536G, NPN
	EKMPM337-1	Push Knob, Power/Filt/ Loudness/Remote Speaker	CR305, 306	TRKB162	Diode KB-162
	EKMPM338H	Push Knob, Program	CR301, 302, 303, 304	BRSR1K-2	Rectifier SR1K-2
	EKMPM345A	Knob, Tuning	C313	CE1252742	Capacitor Electrolytic 2200uf 35V
	EKMPM345B	Knob, Selector	C311, 312	CE22342-14	Capacitor Electrolytic 220uf 25V
	EKMPM346B	Knob, Bass/Treble/Balance/Volume	C303, 304, 315, 317	CE22342-15	Capacitor Electrolytic 220uf 16V
	EDLM187H	Dial Wheel, Tuning Gang	C307, 308	CE22342-11	Capacitor Electrolytic 100uf 25V
L601	LAHTX241	AM Antenna with holder	C309, 310	CE22342-23	Capacitor Electrolytic 1000uf 25V
	PBSU300	Lamp Printed Circuit Board	C301, 302	CS22340-2	Capacitor Aluminum 0.22uf 16V
PL605, 606, 607, 608, 610	LMEPX179-2	Lamp, Meter and Dial 6.3V 220ma	C305, 306	CK22347-5	Capacitor Ceramic 220pf 50V
PL601, 602 603, 604, 609	LMEPX192	Lamp, Channel Indicator 6.3V 220ma	C314, 316	CY22335-12	Capacitor Mylar .02uf 50V
	JKEPX201	AC Outlet	R315, 316, 317, 318	RF0119127	Resistor 1W .47ohm Metal Oxide
TM601	MCEPX237-2	Tuning Meter, Blue	R320	RC30BF470K	Resistor 1W 47ohm
J601	JKEPX242	Headphone Jack	R309, 310	RC20BF151J	Resistor 1/2W 150ohm
SS610	SPSSX163	Push Switch, Program	R311, 312	RC20BF391J	Resistor 1/2W 390
SS602	SRSSX187-2M	Switch, Selector	R313, 314	RF25DC180J	Resistor 1/4W 5% 18
SS601, 603, 604, 605 606	SPSSX203	Push Switch, Remote Spkr/ Power/Loudness/Filter/FMAF	R321, 323	RF25DC332J	Resistor 1/4W 5% 3.3K
T601	PTX194H	Power Transformer	R319	RF25DC123J	Resistor 1/4W 5% 12K
R225, 226	RF25DC563J	Resistor 1/4W 5% 56K	R309, 310	RF25DC272J	Resistor 1/4W 5% 2.7K
R606, 607, 608, 609	RF25DC124J	Resistor 1/4W 5% 120K	R303, 304	RF25DC823J	Resistor 1/4W 5% 82K
R604, 605	RF25DC105J	Resistor 1/4W 5% 1M	R301, 302	RF25DC104J	Resistor 1/4W 5% 100K
R602, 603	RC20BF331J	Resistor 1/2W 5% 330	R325, 326	RC25DC222J	Resistor 1/4W 5% 2.2K
R601	RC20BF225J	Resistor 1/2W 5% 2.2M	R322	RF25DC472J	Resistor 1/4W 5% 4.7K
R611	RC30BF391J	Resistor 1W 390	R308, 308	RF25DC562J	Resistor 1/4W 5% 5.6K
CR601	BRSR1K-2	Silicon Rectifier	R305, 306	RF25DC470J	Resistor 1/4W 5% 47
C601	CE0256010	Capacitor Electrolytic 1000uf 16V			
C400	CY22335-12	Capacitor Mylar .022uf 100V			
R610	RC20BF121J	Resistor 1/2W 5% 120			

**PBAU-221 CONTROL BOARD PARTS LIST**

Ref. No.	Part Number	Description
VR201	RPVXR255	Pot RV16NP30KB 100K Volume
VR203, 204	RPVXR257	Pot 16GP30KA 100K Bass/Treble
VR202	PRVXR256	Pot RV16NP30KA Balance
Q201, 202	TR2SC1327T	Transistor 2SC1327T
C205, 206	CE1252813	Capacitor Electrolytic 3.3uf 50V
C203, 204	CE22342-4	Capacitor Electrolytic 10uf 25V
C213, 214	CY22335-3	Capacitor Mylar 0.001uf 50V
C207, 208	CY22335-21	Capacitor Mylar 0.0022uf 50V
C217, 218	CY22335-1	Capacitor Mylar 0.01uf 50V
C211, 212	CY22335-12	Capacitor Mylar 0.022uf 50V
C219, 220	CY22335-16	Capacitor Mylar 0.068uf 50V
C209, 210	CK22358-7	Capacitor Ceramic 390pf 50V
R211, 212	RF25DC102J	Resistor 1/4W 5% 1K
R201, 202	RF25DC222J	Resistor 1/4W 5% 2.2K
R213, 214	RF25DC333J	Resistor 1/4W 5% 3.3K
R221, 222	RF25DC392J	Resistor 1/4W 5% 3.9K
R223, 224	RF25DC123J	Resistor 1/4W 5% 12K
R209, 210	RF25DC153J	Resistor 1/4W 5% 15K
R219, 220	RF25DC223J	Resistor 1/4W 5% 22K
R215, 216	RF25DC273J	Resistor 1/4W 5% 27K
R205, 206	RF25DC683J	Resistor 1/4W 5% 68K
R207, 208	RF25DC184J	Resistor 1/4W 5% 180K
R203, 204	RF25DC105J	Resistor 1/4W 5% 1M
C215, C216	CY22335-25	Capacitor Mylar 0.0082uf 50V
C201, 202	CY22335-18	Capacitor Mylar 0.1uf 50V

**PBSU-291 PREAMP PARTS LIST**

Ref. No.	Part Number	Description
Q501, 502	TR2SC1327S	Transistor 2SC1327S, NPN
Q503, 504	TR2SC644R	Transistor 2SC644R, NPN
C503, 504	CK22358-8	Capacitor Ceramic 470pf 50V
C505, 506	CY22335-9	Capacitor Mylar 0.0068uf 50V
C501, 502	CE22342-3	Capacitor Electrolytic 4.7uf 10V
C507, 508, 509, 510	CE1252521	Capacitor Electrolytic 10uf 16V
C511	CE1252525	Capacitor Electrolytic 47uf 10V
C512	CE22342-8	Capacitor Electrolytic 47uf 16V
R503, 504	RF25DC221J	Resistor 1/4W 5% 220
R511, 512	RF25DC122J	Resistor 1/4W 5% 1.2K
R515	RF25DC472J	Resistor 1/4W 5% 4.7K
R513, 514	RF25DC103J	Resistor 1/4W 5% 10K
R505, 506	RF25DC123J	Resistor 1/4W 5% 12K
R507, 508	RF25DC563J	Resistor 1/4W 5% 56K
R501, 502, 509, 510	RF25DC224J	Resistor 1/4W 5% 220K

Ref. No.	Part Number	Description	Ref. No.	Part Number	Description
VC101-105	CVVC18	Variable Capacitor - Air	C115	CK22344-12	Capacitor Ceramic 18pf 50V
TC101, 102, 104, 105			VR101	RVVRX237	Variable Resistor 2KB
Q101	TR2SK41F	FET 2SK41F	TC103	TCVC-2	Trimmer Condenser
Q102	TR2SC668D	Transistor 2SC668D, NPN	C161	CK22347-7	Capacitor Ceramic 350pf 50V
Q104	TR2SC929D	Transistor 2SC929D, NPN	C164, 165	CY22335-3	Capacitor Mylar 1000pf 50V
Q103, 105, 106, 107	TR2SC930D	Transistor 2SC930D, NPN	C149	CY22335-24	Capacitor Mylar 1500pf 50V
CR109, 111	TR1S188 AM	Diode 1S188 AM Germanium	C156, 157, 158, 159	CY22335-9	Capacitor Mylar 6800pf 50V
CR101, 102, 107, 108	TR1S188 FM	Diode 1S188 FM Germanium	C137	CY22335-22	Capacitor Mylar 0.047pf 50V
CR104, 105, 106	TRDS442	Diode DS442, Silicon	C144	CE22342-2	Capacitor Electrolytic 1uf 50V
CR103	TR1S553	Diode 1S553, Germanium	C154, 155	CE1252615	Capacitor Electrolytic 4.7uf 25V
CR110	TR1S334K	Zener Diode 1S334K, 9.6V	C140, 141, 151	CE1252521	Capacitor Electrolytic 10uf 10V
IC101	TRLA3301S	IC LA3301S, I.C., MPX Decoder	C150	CE1252821	Capacitor Electrolytic 10uf 35V
T101	LCHTX237	FM Antenna Coil	C126	CE1252323	Capacitor Electrolytic 33uf 10V
T102	LCHTX238	FM RF Coil	C148	CE1252525	Capacitor Electrolytic 47uf 10V
T103	LCHTX275	FM Osc. Coil	C166	CE22342-13	Capacitor Electrolytic 100uf 6.3V
L101	LCHT47	FM Trap Coil	C145	CE22342-18	Capacitor Electrolytic 330uf 10V
T104	ZZHTX246	FM 1st P IFT	R101	RF25DC330J	Resistor 1/4W 5% 33ohm
T105	ZZHTX247	FM 1st IFT	R102, R140	RF25DC470J	Resistor 1/4W 5% 47ohm
T106	ZZHTX243	FM 2nd IFT	R118, 123, 141	RF25DC101J	Resistor 1/4W 5% 100ohm
T107	ZZHTX248	FM 3rd IFT	R150	RF25DC330J	Resistor 1/4W 5% 330ohm
T108	ZZHTX234	FM Discriminator Transformer	R124	RF25DC471J	Resistor 1/4W 5% 470ohm
T109	ZZHTX235	FM Discriminator Transformer	R107, 122, 132, 133	RF25DC681J	Resistor 1/4W 5% 680ohm
T110	LCHTX240	AM Osc. Coil	R112, 119, 121, 130, 135, 136, 142	RF25DC102J	Resistor 1/4W 5% 1K
T111	ZZHTX156	AM 1st IFT	R115	RF25DC122J	Resistor 1/4W 5% 1.2K
T112	ZZHTX236	AM 2nd IFT	R125, 128, 154	RF25DC152J	Resistor 1/4W 5% 1.5K
T113	ZZHTX158	AM 3rd IFT	R126	RF25DC182J	Resistor 1/4W 5% 1.8K
T114	LCHTX199	MPX Coil 67khz	R120, 131, 148, 149	RF25DC222J	Resistor 1/4W 5% 2.2K
T115	LCHTX215	MPX Coil 19khz	R111, 134, 145	RF25DC472J	Resistor 1/4W 5% 4.7K
T116	LCHTX216	MPX Coil 38khz	R109, 116, 127	RF25DC562J	Resistor 1/4W 5% 5.6K
CF101	CFHTX101	Ceramic Filter SFE 10.7ma5	R104, 110, 129, 137, 143, 144	RF25DC682J	Resistor 1/4W 5% 6.8K
L102, 103	LCHTX273	MPX Filter Coil	R114	RF25DC822J	Resistor 1/4W 5% 8.2K
VR102	RVVPX186	Variable Resistor 1K B	R105, 117	RF25DC183J	Resistor 1/4W 5% 18K
C106	CK22344-1	Capacitor Ceramic 5pf 50V	R139	RF25DC622J	Resistor 1/4W 5% 6.2K
C111, 122, 163	CK22344-32	Capacitor Ceramic 10pf 50V	R153	RF25DC473J	Resistor 1/4W 5% 47K
C102	CK22347-1	Capacitor Ceramic 100pf 50V	R108	RF25DC563J	Resistor 1/4W 5% 56K
C138, 139, 142, 147	CK23347-6	Capacitor Ceramic 300pf 50V	R113	RF25DC683J	Resistor 1/4W 5% 68K
C107, 146	CK22350-8	Capacitor Ceramic 500 pf 50V	R103	RF25DC104J	Resistor 1/4W 5% 100K
C103, 105, 108, 109, 110, 120, 121, 136, 152, 153	CY22335-1	Capacitor Ceramic .01uf 50V	R106	RF25DC105J	Resistor 1/4W 5% 1M
C112, 119, 123, 124, 125, 127, 128, 131, 132, 133, 134, 135, 143, 167	CY22355-3	Capacitor Ceramic .02uf 50V			
C118	CK22345-1	Capacitor Ceramic 3pf 50V			
C113	CK22346-5	Capacitor Ceramic 4pf 50V			
C117	CK22344-6	Capacitor Ceramic 12pf 50V			
C116	CK22345-7	Capacitor Ceramic 30pf 50V			

