



# SERVICE MANUAL

## MODEL "ROYAL 3000-1"

### ALL TRANSISTOR TRANSOCEANIC PORTABLE RECEIVER

**CHASSIS 12KT40Z8**

*To the Serviceman*

#### GENERAL

Royal 3000-1 Transistor Portable covers a wide range of frequencies; FM, Longwave, Standard Broadcast, and six shortwave bands. It operates on eight 1½ volt "D" cells which give up to 300 hours of performance under normal operating conditions. A 4" x 6" oval speaker (voice coil impedance 3.2 ohms) is used for excellent reproduction and delivers undistorted power output of 500 milliwatts. This instrument can also be used as an FM-AM tuner in conjunction with high-fidelity audio equipment.

An earphone jack has been provided so that one can use a set of Zenith low impedance headphones, or a Zenith hearing aid type low impedance earphone.

A monopole antenna which is concealed in the handle, is used on both the FM and Shortwave bands. The Standard Broadcast and Longwave band have a built-in Wavemagnet in the top of the cabinet which eliminates the need for an external antenna under average conditions.

#### FM SECTION

A separate tuner is used on the FM band which consists of a Tuned RF stage, and an autodyne stage (converter - oscillator).

The circuitry for FM operation is as follows: RF amplifier, autodyne stage, three I.F. stages, Ratio detector, first audio, audio driver, and push-pull class B audio output. The R.F. and autodyne stages operate with common base circuits. The three I.F. stages have

common emitter circuits and are neutralized. The I.F. transformers operate at 10.7 megacycles and are slug tuned. To eliminate overloading and resultant distortion in the I.F. pass band and the S curve of the Ratio Detector, AGC is obtained from the collector of the 2nd I.F. thru a 6 mmf. capacitor to diode detector and is fed to the base of the RF transistor. The I.F. signal is reduced to audio with a conventional Ratio Detector incorporating two matched solid state diodes (Part of Ratio Detector Assembly)

As with all high frequency oscillators, stability is important and as a feature, it is desirable to provide automatic frequency control, which is guided by voltages, directly related to oscillator frequency shift. This is accomplished by taking D.C. voltage from the tertiary winding of the Ratio Detector and feeding it back to the X101 diode which is a voltage sensitive variable capacitor. This diode is connected across the oscillator portion of the autodyne circuit and acts as a frequency controlling device. If the oscillator shifts frequency, this causes ratio detector unbalance and a D.C. voltage is fed back to the diode, so its changing capacity will automatically adjust the frequency of the oscillator circuit to compensate for original oscillator shift. In this manner, we have continuous automatic oscillator frequency control.

The lock-in range of the AFC circuit is approximately 700 KC at 100 micro-volts. Should you desire to receive a weak FM station within the AFC pull-in range of a strong FM station, an AFC disabling switch has been provided in the receiver circuitry. The AFC voltage is removed from the oscillator when the AFC switch is in FM position.

To obtain proper AFC action, place AFC switch in FM position and tune to the exact desired station frequency, then put the AFC switch to AFC-FM position..this will insure proper AFC action.

### AM SECTION

On AM operation this instrument utilizes a conventional superheterodyne circuit using an individual mixer and oscillator to produce the 455 KC intermediate frequency. The I.F. frequency amplifiers are conventional. It is necessary to use neutralization in the I.F. amplifier stages as in circuits using a triode tube. The diode (part of T11 assembly) is used as a detector and AGC voltage source. This is then followed by a first audio amplifier and a driver stage for the class B push-pull output.

The RF and Oscillator transistors use common base circuitry, while the mixer and the I.F. transistors have common emitter circuitry.

AGC voltage is supplied from the AM diode detector to the base of the RF transistor. The AGC voltage is then taken from the RF emitter and fed to the base of the mixer and first I.F. transistor.

### AUDIO SYSTEM

The audio system is common to both FM and AM. The output from either the Ratio Detector or the Am Detector is fed directly to the base of the first audio, and then on through the driver and into the push-pull class "B" output stage.

Provision has been made, for use of this receiver as a tuner in conjunction with high-fidelity equipment through the use of an output jack on the back of the chassis. The volume control on the Royal 3000-1 must be at minimum position to eliminate sound from the receiver's speaker.

### OUTPUT TRANSISTORS

MATCHING GROUP
A
B-D
C-E-G
F-H-J
I-K-M
L-N-P
O-Q

The output transistor matching identification will be letters. Transistors in any one chassis must be matched according to group chart.

Letters can be intermixed but must be from the same group.

### COMPONENT REPLACEMENT

When soldering components at the base of a transistor socket, it is suggested that the transistor be removed to avoid any possibility of excessive heat transfer through the pin connection to the transistor. When soldering the low voltage electrolytics and germanium

diodes, the wire should be held with a pair of long nose pliers. The long nose pliers will act as a heat sink.

### SIGNAL TRACING

A technique used in radio repair commonly known as "Screw driver testing" in which the B plus at the plate of the tube or collector of a transistor is shorted to ground to check for "clicks" in the speaker, is definitely not recommended. This practice would be comparable to shorting the collector of a transistor to ground which could damage the transistor. Standard point to point signal checking with the proper RF, IF and audio signals, should only be used.

Wrenches Zenith part number 68-32 and 68-37 may be used for aligning this receiver.

Power Supply.....Eight Zenith Z4NL 1½ volt or standard "D" type flashlight batteries. Approximate battery life 300 hours. One Zenith Z4NL battery is used for the dial lights. Normal no signal current drain is approximately 25 milliamperes.

### AC OPERATION

This receiver may be operated from the standard 120 volt alternating current (50/60 cycle) supply. To operate this receiver from an AC outlet Zenith engineers have created a 12 volt DC power supply (part number S-64352 for 120 volts - part number S-65074 for 230/115 volts), which can be obtained through your Zenith dealer.

To connect this unit, insert its output plug into the Jack (J-5) on the side of the receiver cabinet. The battery will be automatically disconnected when the plug is inserted.

**IMPORTANT: IF THE RECEIVER IS NOT TO BE OPERATED ON BATTERIES FOR SEVERAL WEEKS, THE BATTERIES SHOULD BE REMOVED.**

### Tuning Ranges

BAND	METERS (M)	MEGACYCLES (Mc)	KILOCYCLES (Kc)
FM	3.4 to 2.8	88 to 108	88000 to 108000
LW	2000 to 750	.15 to .4	150 to 400
BC	555 to 188	.54 to 1.6	540 to 1600
2-4	150 to 75	2 to 4	2000 to 4000
4-9	75 to 33	4 to 9	4000 to 9000
31	31	9.4 to 10.1	9400 to 10100
25	25	11.4 to 12.3	11400 to 12300
19	19	14.6 to 15.8	14600 to 15800
16	16	17.1 to 18.5	17100 to 18500

Intermediate Frequency.....AM-(455 KC)  
FM-(10.7 MC)

PART NO.	DESCRIPTION	PRICE	PART NO.	DESCRIPTION	PRICE
MODEL 3000-1					
12KT40Z8 CHASSIS PARTS					
12-3515	Slide Stop Bracket	.03	63-4262	68K Ohm Resistor - 1/4 W 10%	.17
12-3517	Tuner Slide Bracket	.35	63-4273	120K Ohm Resistor - 1/4 W 10%	
19-322	Coil Mounting Clip (5 req'd.)	.05	63-4537	6.8 Ohm Resistor - 1/2 W 20%	
19-442	Coil Mounting Clip (18 req'd.)	.05	63-5020	Volume Control & Switch	2.05
20-1256	10.7 MC Trap Coil (2 req'd.)	.50	63-5021	Tone Control	1.40
22-1392	25 Pf. Disc Capacitor - 500 V (2 req'd.)	.33	68-32	Adjusting Wrench	.60
22-1665	5 Pf. Ceramic Capacitor - 500 V	.25	73-24	8-32 x 1/4 Slotted Hex Hd. Set Screw - Cuppoint (2 part of S-58124)	
22-1761	50 Pf. Ceramic Capacitor - 500 V (2 req'd.)	.25	78-644	Connector Socket	.15
22-2381	6 Mmfd. Disc Capacitor - 500 V	.25	78-1063	Transistor Socket - 3 Contact (4 req'd.)	.35
22-2549	4 Pf. Disc Capacitor - 500 V	.25	78-1096	Transistor Socket - 4 Contact (6 req'd.)	.35
22-2594	17 Pf. Disc Capacitor - 500 V (3 req'd.)	.25	78-1346	Transistor Socket - 4 Contact (2 req'd.)	.30
22-2596	2.4 Pf. Gimmick Capacitor - 500 V (2 req'd.)	.25	78-1528	Wavemagnet Socket (part of S-58151)	.20
22-2883	50 Mf. Electrolytic Capacitor - 12 V	1.10	80-209	Drive Cord Tension Spring	.10
22-2979	60 Pf. Ceramic Capacitor - 500 V	.30	80-1189	Drive Cord Tension Spring (Pointer)	.15
22-2981	2700 Pf. Mica Capacitor - 100 V	1.00	80-1772	Drive Cord Tension Spring (Pointer)	.05
22-2982	4300 Pf. Mica Capacitor - 100 V	1.50	83-2770	Seven Lug Terminal Strip (part of S-58087)	.20
22-2983	Trimmer Capacitor	.35	83-2822	Antenna Terminal Strip (part of S-58087)	.50
22-2985	500 Mf. Electrolytic Capacitor - 12 V	2.00	83-2918	Four Lug Terminal Strip	.15
22-2987	.1 Mf. Mylar Capacitor - 50 V	.35	83-2975	Three Lug Terminal Strip (2 req'd.)	.10
22-3066	10 Pf. Gimmick Capacitor	.20	83-3024	Rubber Strip	.03
22-3113	120 Pf. Ceramic Capacitor - 500 V	.50	83-3586	Twelve Lug Terminal Strip	.20
22-3256	10 Mf. Electrolytic Capacitor - 6 V	1.00	83-3641	Five Lug Terminal Strip	.10
22-3326	2 x .001 Mf. Disc Capacitor - 25 V	.40	83-4604	Blanking Strip	.10
22-3538	125 Pf. Mica Capacitor - 100 V	.25	85-756	Slide Switch - Momentary Contact (part of S-58147)	.50
22-3621	22 Pf. Disc Capacitor	.25	85-747	Slide Switch - AFC (part of S-58147)	.50
22-3743	Three Section Variable Capacitor	5.50	85-758	Bandswitch	11.00
22-3744	Five Section Trimmer Capacitor	3.25	86-306	Terminal (3 req'd.)	.03
22-3745	Six Section Trimmer Capacitor	4.00	86-329	Connector Terminal (1 used on ea. yellow and black wires)	.03
22-3749	1000 Pf. Mica Capacitor - 100 V	.90	93-966	Lockwasher (3 used on S-69066)	.03
22-3752	38 Pf. Disc Capacitor	.25	93-1043	Spring Washer (used on S-58152)	.10
22-3787	Trimmer Capacitor	.50	94-334	Capacitor Mounting Bushing (3 req'd.)	.03
22-3791	42 Pf. Disc Capacitor	.25	94-613	Iron Core Bushing (3 req'd.)	.10
22-3902	Single Section Trimmer Capacitor	1.00	95-2002	1st I.F. Transformer (Primary)	2.50
22-3955	.1 Mfd. Capacitor - 50 V	.30	95-2003	1st I.F. Transformer (Secondary)	2.50
54-139	3/8-32 x 9/16 Hex Nut (1 used on ea. 63-5021, 63-5020 & S-69066)	.03	95-2004	2nd I.F. & 3rd I.F. Transformer - AM - Primary (2 req'd.)	3.50
54-227	4-40 x 1/4 x 3/32 Hex Nut (2 used on S-69066)	.03	95-2005	2nd I.F. & 3rd I.F. Transformer - AM - Secondary (2 req'd.)	3.50
54-421	Transistor Socket Retaining Nut (10 req'd.)	.03	95-2006	4th I.F. Transformer (Primary)	3.50
54-476	1/4-32 x 3/8 Hex Nut - Brass (used on 344-1 or 44-34)	.03	95-2010	Ratio Detector Transformer (FM)	5.35
57-2385	Switch Mounting Plate	.20	95-2028	Output Transformer	
58-235	Three Prong Plug	.15	95-2029	Driver Transformer	
59-330	Dial Pointer	.50	95-2247	2nd & 3rd I.F. Transformer - FM (2 req'd.)	
63-1719	27 Ohm Resistor - 1/2 W 10%	.17	100-218	Dial Light Lamp - GE No. 123 (2 req'd.)	.17
63-1740	82 Ohm Resistor - 1/2 W 10% (2 req'd.)	.17	103-31	Crystal Diode (part of S-52650)	.75
63-1743	100 Ohm Resistor - 1/2 W 10% (2 req'd.)	.17	105-96	Integnet	
63-1761	270 Ohm Resistor - 1/2 W 10%	.17	113-8	6-32 x 1/4 x 1/4 Hex Hd. Mach. Screw - Internal Shakeproof Lockwasher (1 used on 22-3744 & 2 used on 22-3745)	.03
63-1764	330 Ohm Resistor - 1/2 W 10%	.17	113-9	8-32 x 1/4 x 1/4 Hex Hd. Mach. Screw - Internal Shakeproof Lockwasher (3 used on S-58147)	.03
63-1771	470 Ohm Resistor - 1/2 W 10% (4 req'd.)	.17	113-10	6-32 x 3/16 x 1/4 Hex Hd. Mach. Screw - Internal Shakeproof Lockwasher (2 used on S-58151)	.03
63-1772	470 Ohm Resistor - 1/2 W 20%	.17	113-13	6-32 x 7/16 x 1/4 Hex Hd. Mach. Screw - External Shakeproof Lockwasher (3 used on 22-3743)	.03
63-1775	560 Ohm Resistor - 1/2 W 10% (3 req'd.)	.17	113-121	6-32 x 7/32 Phillips Rd. Hd. Mach. Screw - Internal Lockwasher Attached (used on 22-3902)	.03
63-1778	680 Ohm Resistor - 1/2 W 10%	.17	113-123	4-40 x 3/16 Phillips Rd. Hd. Mach. Screw - Cadmium - Internal Shakeproof Lock- washer (joins 12-3515 & 12-3517)	.03
63-1779	680 Ohm Resistor - 1/2 W 20%	.17	114-39	8-32 x 1/4 x 1/4 Hex Hd. Self-tap. Screw - Cadmium (16 req'd.)	.03
63-1786	1000 Ohm Resistor - 1/2 W 20%	.17	114-193	8-32 x 3/16 x 1/4 Hex Hd. Self-tap. Screw - Cadmium	.03
63-1793	1500 Ohm Resistor - 1/2 W 20% (2 req'd.)	.17	114-456	8-32 x 1/4 Hex Hd. Mach. Screw - Cadmium Flat Washer Attached (2 used on S-58155)	.03
63-1796	1800 Ohm Resistor - 1/2 W 10% (2 req'd.)	.17	114-571	4-24 x 3/16 x 3/16 Hex Slotted Hd. Self- tap. Screw - St. Bronze (2 used on S-58152)	.03
63-1799	2200 Ohm Resistor - 1/2 W 10% (5 req'd.)	.17	121-349	Transistor - R.F. (AML)	
63-1806	3300 Ohm Resistor - 1/2 W 10%	.17	121-350	Transistor - Oscillator (AM)	
63-1817	5600 Ohm Resistor - 1/2 W 10%	.17	121-351	Transistor - Mixer (AM)	
63-1820	6800 Ohm Resistor - 1/2 W 10%	.17	121-352	Transistor - 1st - 2nd - 3rd I.F.	
63-1824	10K Ohm Resistor - 1/2 W 10% (2 req'd)	.17	121-373	Transistor - Output - Matched (2 req'd.)	
63-1834	15K Ohm Resistor - 1/2 W 10%	.17	121-374	Transistor - Audio	
63-1879	180K Ohm Resistor - 1/2 W 5%	.34	121-375	Transistor - Driver	
63-1897	470K Ohm Resistor - 1/2 W 10%	.17	125-94	Rubber Grommet (3 used on 22-3743)	.03
63-3392	1500 Ohm Resistor - 1/10 W 10%	.17	126-857	Coil Shield (part of S-69066)	.05
63-4157	220 Ohm Resistor - 1/4 W 10% (2 req'd.)	.17	126-983	Coil Shield (part of S-52650)	.15
63-4161	270 Ohm Resistor - 1/4 W 10%	.17			
63-4171	470 Ohm Resistor - 1/4 W 10% (3 req'd.)	.17			
63-4178	680 Ohm Resistor - 1/4 W 10% (2 req'd.)	.17			
63-4182	820 Ohm Resistor - 1/4 W 10%	.17			
63-4185	1000 Ohm Resistor - 1/4 W 10%	.17			
63-4186	1000 Ohm Resistor - 1/4 W 20%	.17			
63-4189	1200 Ohm Resistor - 1/4 W 10%	.17			
63-4196	1800 Ohm Resistor - 1/4 W 10%	.17			
63-4217	5600 Ohm Resistor - 1/4 W 10% (2 req'd.)	.17			
63-4224	8200 Ohm Resistor - 1/4 W 10%	.17			
63-4234	15K Ohm Resistor - 1/4 W 10%	.17			
63-4238	18K Ohm Resistor - 1/4 W 10% (2 req'd.)	.17			
63-4241	22K Ohm Resistor - 1/4 W 10% (part of S-69066)	.17			
63-4259	56K Ohm Resistor - 1/4 W 10%	.17			

# ROYAL 3000-1 CHASSIS 12KT40Z8 PARTS LIST

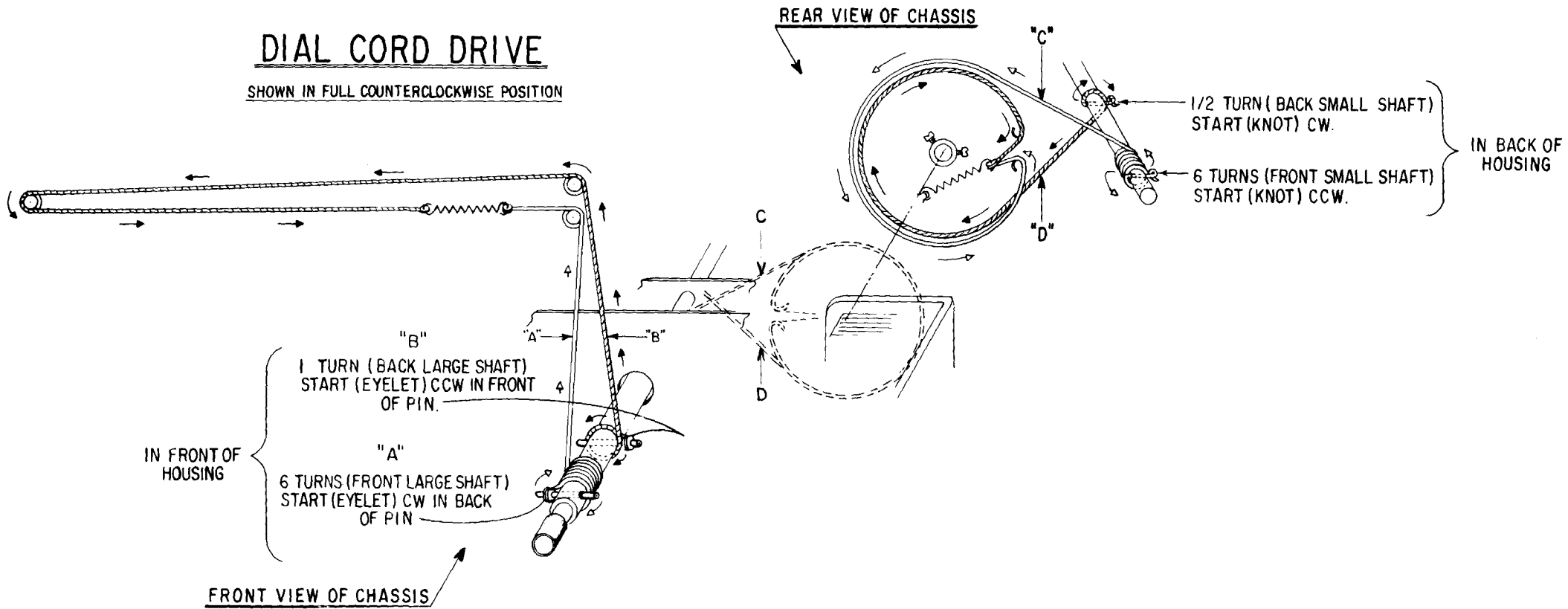
PART NO.	DESCRIPTION	PRICE	PART NO.	DESCRIPTION	PRICE	PART NO.	DESCRIPTION
126-1027	Interstage Shield (2 req'd.)	.15	S-58095	FM Tuning Coil Assembly (3 req'd.)	.60	57-2380	Trir
126-1028	Coil Shield (part of S-69066)	.10	S-58151	Wave Magnet Socket & Bracket Assembly	.50	57-23 86	Hin
149-74	Iron Core (1 part of ea. S-45000)		S-68075	Oscillator Coil Assembly (2-4 M.C.)		S-4	
149-86	Iron Core (part of S-42080)	.10	S-68076	Oscillator Coil Assembly (4-9 M.C.)		57-2416	Trir
149-211	Iron Core (part of ea. S-42084, S-42085, S-42086, S-42087, S-42089, S-42090, S-42091, S-42092, S-42093, S-42094, S-42097, S-42098, S-42099, S-42100, S-42101, S-42102, S-68075, & S-68076 and 2 part of ea. S-43363 & S-43364)	.10	S-69067	FM Tuner		57-4019	Nan
149-316	Iron Core & Spring (3 req'd.)	.25		22-2731 10 Pf. Disc Capacitor (2 req'd.)	.25	57-4022	Nan
184-26	Wooden Bead (2 req'd.)	.05		22-2732 1000 Pf. Feed-Thru Capacitor (4 req'd.)	.30	57-4023	Esc
188-232	Clamping Ring (3 req'd.)	.03		24-1170 FM Tuner Cover	.25	57-4024	Esc
199-330	Paper Sleeve (part of S-52650)	.03		63-4157 220 Ohm Resistor 1/4 W 10%	.17	57-4461	Emt
322-3	.01 Mf. Disc Capacitor - 25 V (2 req'd.)	.15		63-4168 390 Ohm Resistor 1/4 W 10%	.17	58-233	Sev
22-3393	.01 Mf. Disc Capacitor - 25 V (2 req'd.)	.25		63-4175 560 Ohm Resistor 1/4 W 10%	.17	S-4	
322-9	.001 Mf. Disc Capacitor - 25 V (2 req'd.)			63-4192 1500 Ohm Resistor 1/4 W 10%	.17	69-312	6-32
22-2729	.001 Mf. Disc Capacitor - 25 V (2 req'd.)	.25		63-4224 8200 Ohm Resistor 1/4 W 10% (2 req'd.)	.17	(1	
322-19	.02 Mf. Disc Capacitor - 25 V			80-1467 Retaining Spring	.05	69-348	6-32
22-3394	.02 Mf. Disc Capacitor - 25 V	.40		80-1672 Spring	.20	Br	
322-20	.05 Mf. Disc Capacitor - 25V (17 req'd.)			86-331 Insulated Feed-Thru (3 req'd.)	.05	76-954	Rel
22-3689	.05 Mf. Disc Capacitor - 25 V (17 req'd.)	.30		95-2246 1st I.F. Transformer (FM)		Sh	
322-22	5 Mf. Electrolytic Capacitor - 12 V (4 req'd.)	.35		103-39 Silicon Diode	3.00	78-1101	Thru
22-2884	5 Mf. Electrolytic Capacitor - 12 V (4 req'd.)	1.50		112-1467 2-56 x 5/16 Phillips Pan Hd. Mach Screw (used on S-64842)	.03	80-1094	Con
322-27	.0033 Mf. Disc Capacitor - 500 V (2 req'd.)			113-10 6-32 x 3/16 x 1/4 Hex Hd. Mach Screw - Internal Shakeproof Lockwasher	.03	80-1176	Sele
22-13	.0033 Mf. Disc Capacitor (2 req'd.)	.25		113-33 4-40 x 1/4 x 7/32 Hex Hd. Mach. Screw - Internal Shakeproof Lockwasher	.03	80-1181	Ten
322-37	20 Mf. Electrolytic Capacitor - 3 V	.75		121-294 Transistor - R.F. (FM)		80-1228	Spr
22-3753	20 Mf. Electrolytic Capacitor			121-295 Transistor - Oscillator-Mixer (FM)		83-2741	Trin
322-40	.001 Mf. Disc Capacitor - 1000 V			322-3 .01 Mf. Disc Capacitor - 25 V. (3 req'd.)	.15	83-2742	Sup
22-17	.001 Mf. Disc Capacitor - 1000 V	.25		or		S-4	
322-75	.33 Mfd. Mylar Capacitor - 50M			22-3393 .01 Mf. Disc Capacitor - 25 V (2 req'd.)	.25	83-2780	Doo
22-3897	.33 Mfd. Mylar Capacitor	.50		322-45 2.2 Pf. Gimmick Capacitor	.25	83-2781	Doo
322-76	.22 Mfd. Mylar Capacitor - 50 V			22-2468 2.2 Pf. Gimmick Capacitor	.25	83-2785	Rub
22-3267	.22 Mfd. Mylar Capacitor	.60		Pulley & Bushing Assembly	.80	83-2855	Spa
322-82	.0022 Mfd. Disc Capacitor			Control Mounting Bracket Assembly	1.50	83-2903	Prot
22-18	.0022 Mfd. Disc Capacitor - 500 V	.25		Dial Drum Assembly	5.00	83-3234	Pap
344-1	Miniature Jack	.35		Pulley & Bracket Assembly	.75	83-3235	Pap
44-34	Miniature Jack	.90		Drive Cord & Eyelet Assembly - Pointer 11 3/4"	.15	83-3289	Felt
403-1	Diode	.35		Drive Cord & Eyelet Assembly - Pointer 20"	.15	83-4328	Ret
103-44	Diode	.50		Drive Cord & Eyelet Assembly - 14 1/4" (2 req'd.)	.15	83-4354	Trin
S-42080	Antenna Loading Coil Assembly	.60		S-58142		83-4355	Trin
S-42084	Oscillator Coil Assembly (31M)	1.25		S-58147		83-4819	Pap
S-42085	Oscillator Coil Assembly (25M)	1.25		S-58152		86-149	Ter
S-42086	Oscillator Coil Assembly (19M)	1.25		S-58155		86-221	Shal
S-42087	Oscillator Coil Assembly (16M)	1.25		S-58159		86-306	Wire
S-42089	Antenna Coil Assembly (2-4 M.C.)	1.00		S-58160		86-310	Ter
S-42090	Antenna Coil Assembly (4-9 M.C.)	1.00		S-58179		86-323	Spa
S-42091	Antenna Coil Assembly (31M)	1.00		S-64842		93-166	Loc
S-42092	Antenna Coil Assembly (25M)	1.00		S-69066		93-565	.29C
S-42093	Antenna Coil Assembly - 18M (part of S-69066)	1.00				(1	
S-42094	Antenna Coil Assembly - 16M (part of S-69066)	1.00				93-1289	Fibr
S-42097	Mixer Coil Assembly (2-4 M.C.)	1.25				93-1572	Spa
S-42098	Mixer Coil Assembly (4-9 M.C.)	1.25				93-1606	Stee
S-42099	Mixer Coil Assembly (31M)	1.25				94-985	Spa
S-42100	Mixer Coil Assembly (25M)	1.00				101-158	Trar
S-42101	Mixer Coil Assembly - 19 M (part of S-69066)	1.25				110-348	Viny
S-42102	Mixer Coil Assembly - 16M (part of S-69066)	1.25				S-4	
S-42148	Dial Light Socket & Wire Assembly	1.25				110-352	Viny
S-42653	Drive Cord, Eyelet & Spring Assembly Pointer - Approx. 20 1/2"	.35				(pa	
S-43363	Oscillator Coil Assembly (B.C. & L.W.)	2.75				110-451	Viny
S-43364	Mixer Coil Assembly (B.C. & L.W.)	2.00				(pa	
S-45000	Series Antenna Coupling Coil Assembly (2 req'd.)	.75				110-452	Viny
S-49339	Antenna Coil Assembly					110-528	Viny
S-50171	Base & Terminal Assembly	.35				S-4	
S-52650	Diode & Filter Assembly	2.50				112-1113	4-40
S-58087	R.F. Shelf Bracket & Terminal	1.25				Sc	
						12	
						112-1123	2-32
						(5	
						112-1124	4-24
						ta	
						112-1150	4-40
						Sc	
						S-4	
						112-1156	4-24
						ta	
						112-1190	5-20
						Sc	
						112-1205	2-56
						Sc	
						112-1215	4-24
						ta	
						112-1225	4-40
						Sc	
						112-1332	8-18
						Sc	
						112-1451	6-20
						Sc	
						43	

### CABINET PARTS

DESCRIPTION	PRICE	PART NO.	DESCRIPTION	PRICE
Trim Plate (part of S-64592)	1.50	112-1509	Special Screw (Retains 54-578 part of S-69029)	.05
Hinge Plate (1 part of ea. S-41853 & S-64592)	.25	113-136	6-20 x 1/4 x 1/4 Hex Hd. Self-tap. Screw External Shakeproof Lockwasher (used on 46-1810)	.03
Trim Plate - Tuning (part of S-56299)	.80	113-152	8-32 x 1/4 x 1/4 Hex Hd. Self-tap. Screw - Cadmium - Internal Shakeproof Lockwasher (used on 12-3697)	.03
Nameplate Overlay (part of S-58122)	.50	114-68	8-32 x 1/4 x 1/4 Hex Hd. Self-tap. Screw - Stat. Bronze (used on 12-3697)	
Nameplate - Escutcheon (part of S-58122)	1.25	114-77	6-20 x 5/16 x 1/4 Hex Hd. Self-tap. Screw Stat. Bronze (used on 12-3233)	.03
Escutcheon Plate	1.50	114-87	8-18 x 1/2 x 1/4 Hex Hd. Self-tap. Screw - Stat. Bronze (2 used on 12KT40Z8)	.03
Escutcheon Plate Overlay	.85	114-615	6-20 x 5/16 x 1/4 Hex Hd. Self-tap. Screw - Cadmium (2 used on S-56299)	.03
Emblem Plate (part of S-58124)	.50	114-770	8-32 x 1/4 x 1/4 Slotted Hex Hd. Mach. Screw - Cadmium (used on S-58033)	.03
Seven Prong Connector Plug (used on S-58117)	.55	114-775	4-24 x 5/32 x 3/16 Hex Hd. Self-tap. Screw - Cadmium (1 part of ea. S-41853 & S-64592)	.03
6-32 x 5/16 Phillips Rd. Hd. Mach. Screw (1 used on ea. 166-97)	.03	114-785	6-32 x 5/16 x 1/4 Special Hex Hd. Mach. Screw (3 part of ea. S-50774 & S-64592)	.03
6-32 x 3/16 Phillips Rd. Hd. Mach. Screw Bright Chrome (used on 166-97)	.03	114-911	6-32 x 5/16 Slotted Hex Hd. Mach. Screw - Flat Washer Attached - Cadmium (2 used on 12K T40Z8)	.05
Release Lever & Antenna Pivot Housing Shaft (2 req'd.)	.15	117-206	Handle Release Lever	1.75
Three Contact Socket (part of S-48171)	.20	138-433	Background Grille	1.50
Contact Spring (part of S-48171)	.20	138-434	Grille	3.25
Selector Knob Spring (part of S-58033)	.10	152-292	Handle Support Block	.60
Tension Spring (used on 76-954)	.15	166-97	Plastic Bumper (4 req'd.)	.05
Spring (Handle)	.30	166-105	Rubber Bumper (6 required)	.03
Trim Strip	.50	166-106	Bumper (2 req'd.)	.03
Support Strip (1 part of ea. S-41853 & S-64592)	.25	188-177	Knob Clamping Ring (1 part of ea. S-58423 & S-65523)	.03
Door Mounting Strip - Left	1.60	189-276	Plastic Bag	2.50
Door Mounting Strip - Right	1.60	192-236	Dial Crystal	6.00
Rubber Strip (2 req'd.)	.05	196.302	Trim Plate Gasket (part of S-56299)	.15
Spacer Strip (5 req'd.)	.03	202-2402	Instruction Book	1.00
Protective Cover Strip	.40	202-2595	Shortwave Chart Book	3.05
Paper Strip (1 part of ea. S-41853 & S-64592)	.10	S-41778	Spring & Stud Assembly - R.H. (part of S-41853)	.30
Paper Strip (part of S-41853)	.40	S-41780	Spring & Stud Assembly - L.H. (part of S-64592)	.30
Felt Strip (2 used on 12KT40Z8)	.10	S-41853	End Plate Assembly (Right)	
Retaining Strip	.03	S-42206	Antenna Pivot Housing, Sleeve & Shaft Assembly	2.50
Trim Strip - Trans-Oceanic (part of S-58124)	2.50	S-42207	Telescopic Antenna Assembly	5.50
Trim Strip	1.50	S-43259	Handle & Pin Assembly	1.00
Paper Strip (part of S-64592)	.35	S-43594	Wavemagnet Winding Assembly	4.50
Terminal	.05	S-48171	Battery Case & Wire Assembly	4.25
Shakeproof Terminal (part of S-48171)	.03	S-56299	Trim Plate (Tuning) & Gasket Assembly	1.25
Wire Retaining Terminal	.03	S-58033	Band Selector Knob Assembly	3.35
Terminal	.05	S-58115	Cabinet Support Bracket Assembly	5.00
Spade Terminal	.03	S-58117	Wavemagnet Mounting Strip & Latch Spring Assembly	.80
Lockwasher (1 used on ea. 54-12)	.03	S-58120	Log Chart Retaining Plate & Compass Disc Assembly	5.00
.290 x 9/16 x .031 Washer - Cadmium (1 used on ea. 112-1451)	.03	S-58122	Lower Door Assembly	12.50
Fibre Washer (part of S-48171)	.03	S-58124	Top Door Assembly	7.50
Spacer Washer (2 req'd.)	.05	S-58423	Knob & Ring Assembly - Volume & Tone (2 req'd.)	1.25
Steel Washer (used on 344-1 or 44-34)	.03	S-64592	End Plate Assembly (Left)	
Spacer Bushing (4 used on 57-2371)	.05	S-65523	Tuning Knob & Ring Assembly	1.75
Transistor Layout Label		S-69029	Rear Door Assembly	
Vinyl Material - End Plates (part of S-41853)	.30			
Vinyl Material - Inside Top Door (part of S-58124)	.55			
Vinyl Material - Lower Front Door (part of S-58122)	1.25			
Vinyl Material - Cabinet Support Bracket	1.50			
Vinyl Material - End Plates (part of S-64592)	.50			
4-40 x 7/32 Phillips Truss Hd. Mach. Screw - Bright Chrome (2 used on ea. 12-2604 & 76-954)	.03			
2-32 x 11/32 Fillister Hd. Self-tap. Screw (5 req'd.)	.03			
4-24 x 11/32 Special Fillister Hd. Self-tap. Screw - Black Zinc Plate (4 req'd.)	.03			
4-40 x 1/4 Special Phillips Rd. Hd. Mach. Screw - Brass (1 used on ea. S-58122 & S-58124)	.03			
4-24 x 1/4 Special Phillips Flat Hd. Self-tap. Screw (4 part of S-58122)	.05			
5-20 x 3/16 Phillips Pan Hd. Self-tap. Screw (6 used on S-69029)	.03			
2-56 x 3/16 Slotted Pan Hd. Self-tap. Screw (4 Mount S-58120)	.03			
4-24 x 3/8 Phillips Fillister Hd. Self-tap. Screw (5 used on 83-2741)	.03			
4-40 x 3/16 Special Phillips Hd. Mach. Screw (2 part of ea. S-41853 & S-64592)	.03			
8-18 x 1/4 Phillips Rd. Hd. Self-tap. Screw (4 used on S-58117)	.05			
6-20 x 1/2 Phillips Pan Hd. Self-tap. Screw - Cadmium (4 join S-58117 & 43-311)	.03			

# DIAL CORD DRIVE

SHOWN IN FULL COUNTERCLOCKWISE POSITION



Chassis 12KT40Z8	F.M.-RF.	FM-Osc. Mixer	AM-RF	AM-Mixer	AM- Oscillator	AM-FM 1st IF.	AM-FM 2nd IF.	AM-FM 3rd IF.	1st Audio	Driver	Output Matched Pair	Supplier
Zenith Part No.	121-294	121-295	121-44	121-351	121-350	121-352	121-352	121-352	121-374	121-375	121-373	Amperex
EIA No.	2N2654	2N2654	2N2089	2N2092	2N2089	2N2089	2N2089	2N2089	2N2439	2N2438	2N2431	

**FM (88 - 108 MC) ALIGNMENT PROCEDURE**

OPER.	INPUT SIGNAL FREQUENCY	CONNECT GENERATOR TO	SET DIAL AT	ADJUST TRIMMERS	PURPOSE	PLACE V.T.V.M. METER
1.	10.7 MC modulated	* Test Point "B"	98 MC	L105, L106, L28, L29, L32, L33, L-36	For I.F. alignment	Across voice coil & reduce input so output is not greater than .4 volts.
2.	10.7 MC modulated	* Test Point "B"	98 MC	Adjust L37 for zero DC reading on center indicating DC VTVM	Align ratio detector	Place probe on pin 6 of Ratio Detector & adjust L37 to zero after determining that there is a symmetrical swing around this zero point.
3.	98 MC modulated	** FM antenna terminals	98 MC	L103	Set oscillator to dial scale.	Across voice coil
4.	98 MC modulated	** FM antenna terminals	98 MC	L101, L102	Align antenna & detector stages	Across voice coil.

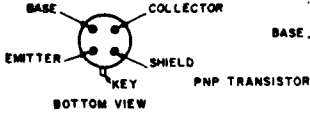
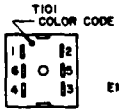
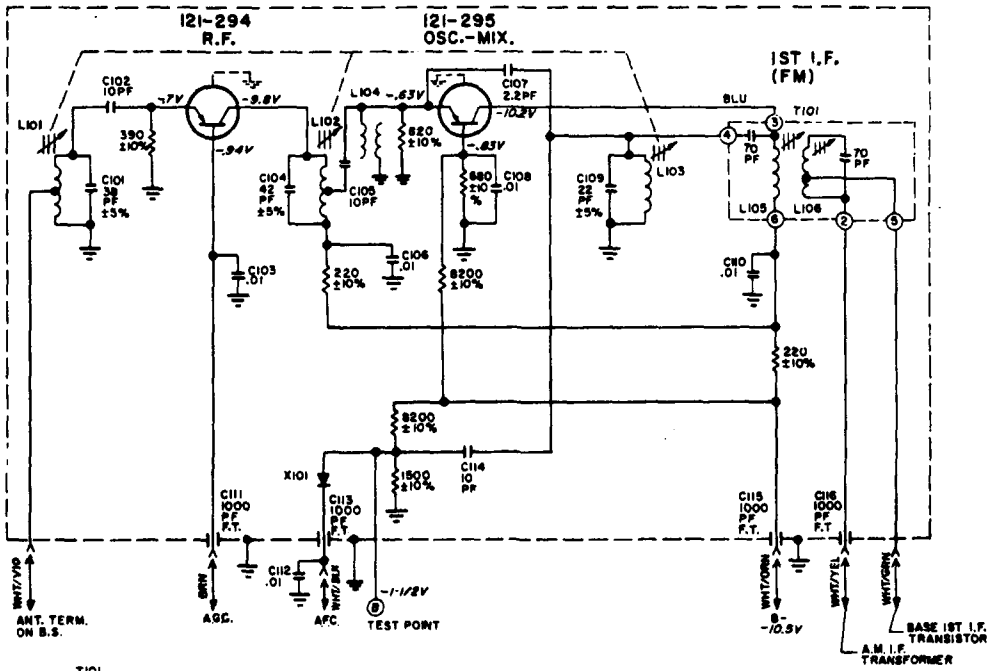
\* Probe from generator should be isolated through A .05 MFD. capacitor.

\*\* Probe from generator should be terminated with proper resistor to match 72 ohm line impedance.

**AM ALIGNMENT PROCEDURE**

OPER.	CONNECT GEN. TO DUMMY ANTENNA	INPUT SIG. FREQUENCY	BAND	SET DIAL AT	TRIMMERS	PURPOSE
1	One turn loop coupled loosely to Broadcast Wavemagnet	455 Kc	BC	1600 Kc	T1, T2, T4, T5, T7, T8, T10	Align LF.
*2	One turn coupled loosely to Long Wave Wavemagnet	160 Kc	LW	160 Kc	Rock Gang, Adjust 5E	Alignment of LW at 160 Kc
*3	One Turn Loop Loosely to Long Wave Wavemagnet	400 Kc	LW	400 Kc	5D	Set osc. to scale
4		<b>REPEAT OPERATIONS 2 &amp; 3</b>				
*5		160 Kc	LW	160 Kc	Rock, adjust L17B	Alignment LW mixer at 160 Kc
*6		375 Kc	LW	375 Kc	5A	Alignment LW mixer
7		<b>REPEAT OPERATIONS 5 &amp; 6</b>				
*8	375 Kc	LW	375 Kc	C33	Alignment of LW antenna	
*9	One turn loop coupled loosely to Broadcast Wavemagnet	600 Kc	BC	600 Kc	Rock Gang, Adjust C47	Alignment of BC at 600 Kc
10	One Turn Loop Coupled Loosely to Broadcast Wavemagnet	1600 Kc	BC	1600 Kc	5C	Set osc. to scale
11		<b>REPEAT OPERATIONS 9 &amp; 10</b>				
*12		600 Kc	BC	600 Kc	Rock, adjust L17A	Alignment of BC mixer at 600 Kc
13		1400 Kc	BC	1400 Kc	5B	Alignment BC mixer
14		<b>REPEAT OPERATIONS 12 &amp; 13</b>				
15	1400 Kc	BC	1400 Kc	C32	Alignment of BC antenna	
*16	3 Feet of Wire Approximately 1 Foot and Parallel from Extended Waverod	2.1 Mc	2-4 Mc	2.1 Mc	Rock L23, L17, L6	Alignment of SW osc., mixer & antenna
17		3.9 Mc	2-4 Mc	3.9 Mc	6F, 6D, 6B	Alignment of SW osc., mixer & antenna
18		<b>REPEAT OPERATIONS 17 &amp; 18</b>				
*19		4.25 Mc	4-9 Mc	4.25 Mc	Rock L22, L15, L5	Alignment of Short Wave Oscillator, Mixer and Antenna
20		8.75 Mc	4-9 Mc	8.75 Mc	6E, 6C, 6A	
21	<b>REPEAT OPERATIONS 20 &amp; 21</b>					
22	9.7 Mc	31 meters	9.7 Mc	L21, L14, L4		
23	11.8 Mc	25 meters	11.8 Mc	L20, L13, L3		
24	15.2 Mc	19 meters	15.2 Mc	L19, L12, L2		
25	17.8 Mc	16 meters	17.8 Mc	L18, L11, L1		

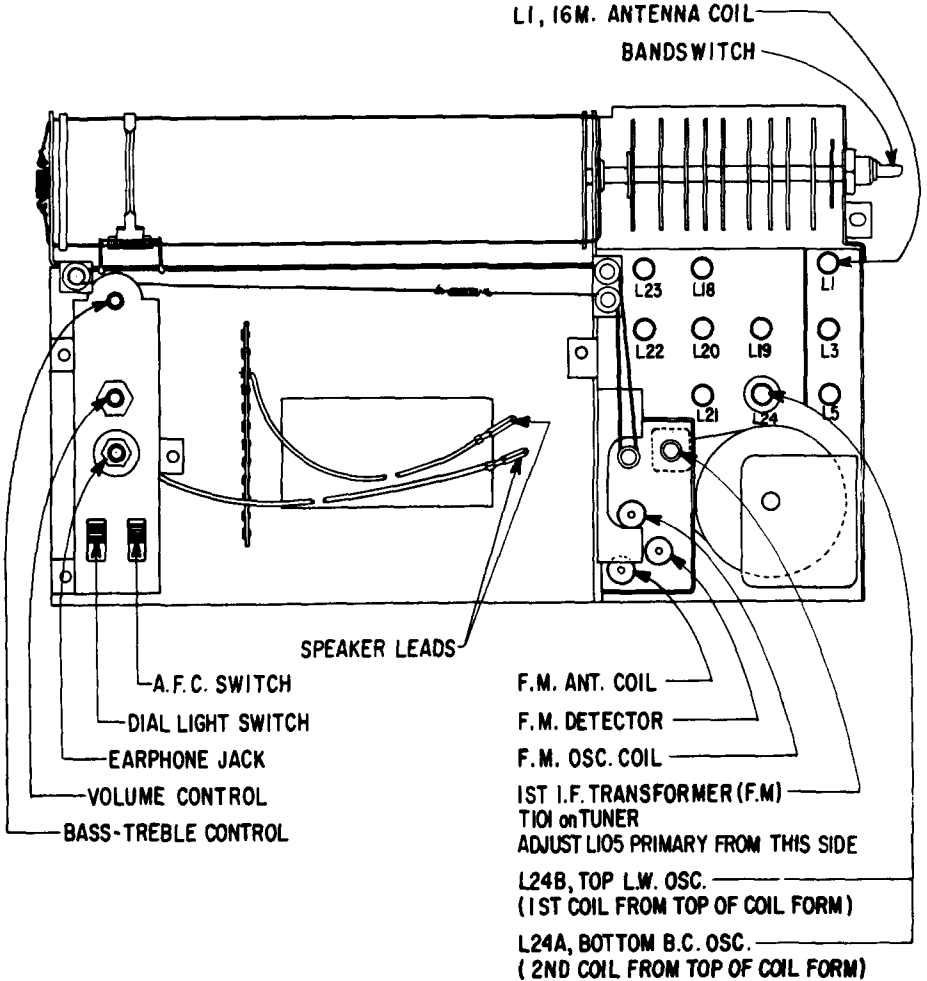
\* NOTE: Rock tuning condenser when making alignment under Operations 2, 3, 5, 6, 8, 9, 12, 16 & 19.



NOTES:

1. ALL RESISTORS 20% TOLERANCE, 1/4 WATT, CARBON UNLESS OTHERWISE SPECIFIED.
2. RESISTANCE VALUES IN OHMS, CAPACITANCE IN MICROFARADS UNLESS OTHERWISE SPECIFIED.
3. ALL VOLTAGES ARE D.C. UNLESS OTHERWISE SPECIFIED.
4. D.C. VOLTAGES SHOWN ARE MEASURED WITH NO SIGNAL USING A VACUUM TUBE VOLT METER.
5. NO SIGNAL DRAIN IS 5 mA.

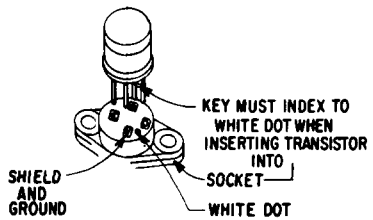
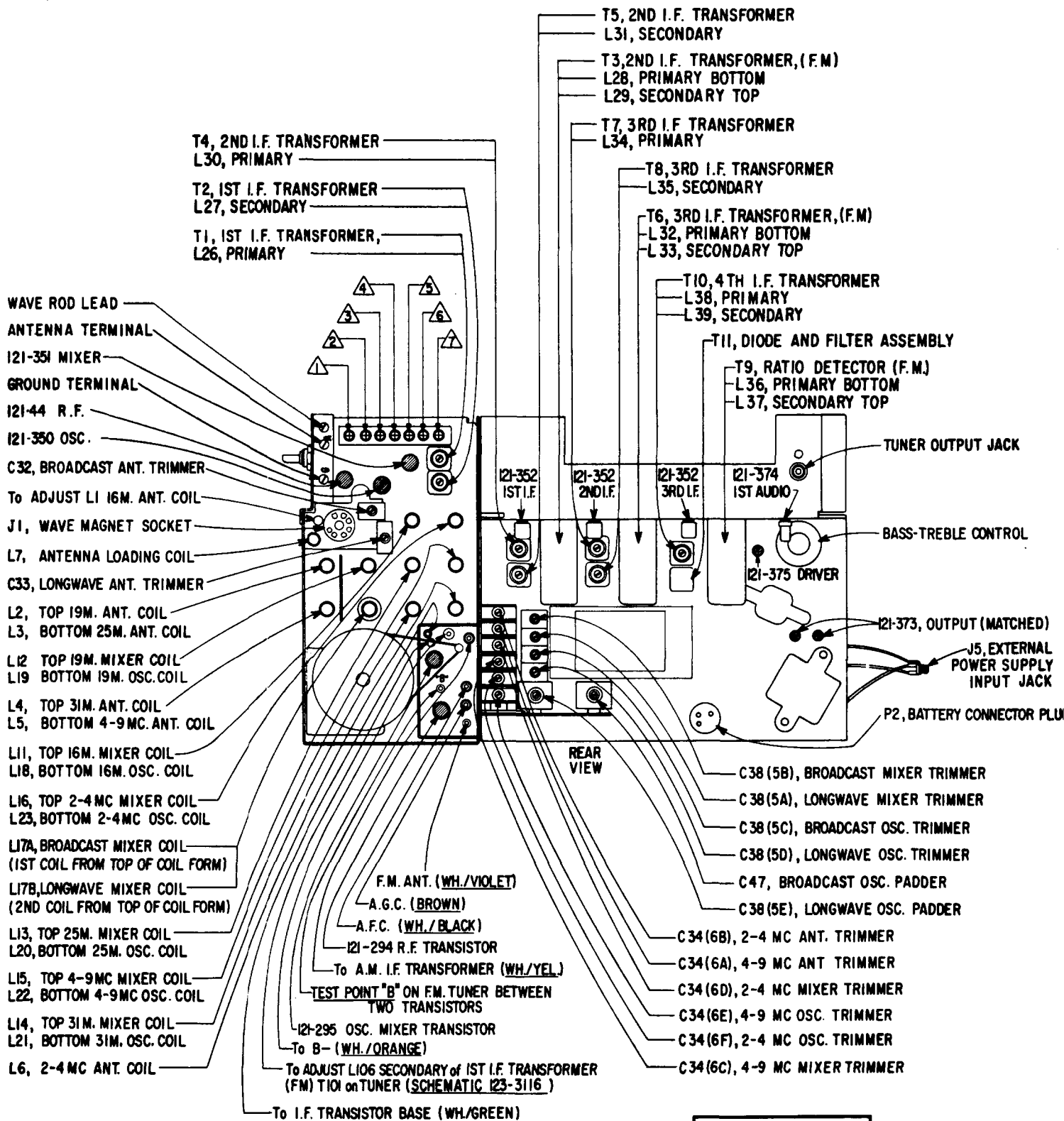
⊕ DENOTES CHASSIS



L1, 16M. ANTENNA COIL  
BANDSWITCH

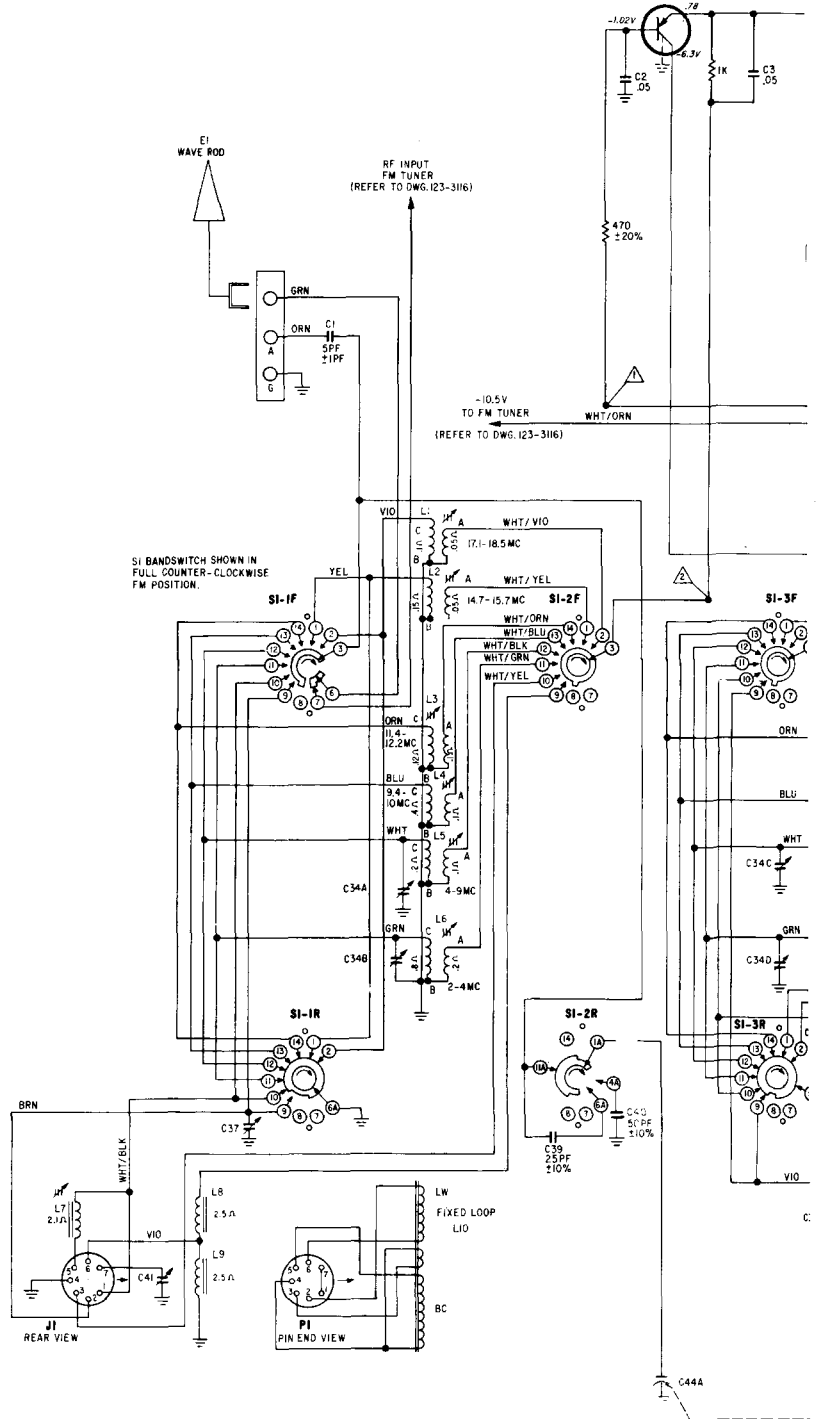
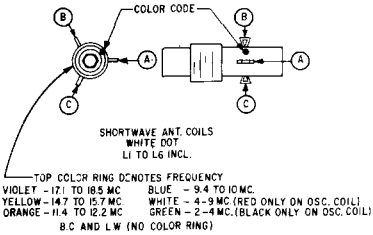
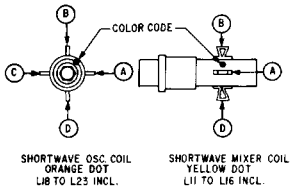
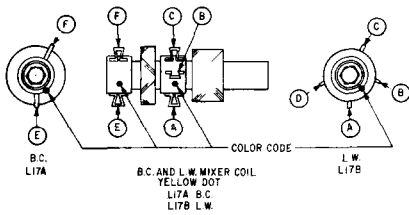
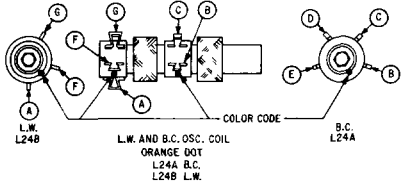
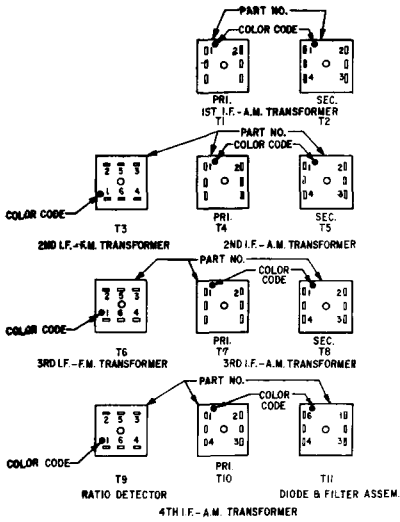
F.M. ANT. COIL  
F.M. DETECTOR  
F.M. OSC. COIL  
1ST I.F. TRANSFORMER (F.M.)  
T101 on TUNER  
ADJUST L105 PRIMARY FROM THIS SIDE  
L24B, TOP L.W. OSC.  
(1ST COIL FROM TOP OF COIL FORM)  
L24A, BOTTOM B.C. OSC.  
(2ND COIL FROM TOP OF COIL FORM)





TEST POINT VOLTAGES (NO SIGNAL)		
	F.M	AM
△1	-.08	-1.06
△2	-.88	0
△3	-.88	-.78
△4	0	-.05
△5	-.38	10.2
△6	-.41	-6.9
△7	-.55	-6.7

12I-44  
A.M.-R.F.



14 R.F.

AM-IF SEC. IN FM TUNER (REFER TO DWG.123-316)

IF SEC. OUT FM TUNER (REFER TO DWG.123-316)

AGL TO RF TRANSISTOR FM TUNER (REFER TO DWG.123-316)

### I21-351 A.M.-MIXER

### I21-352 A.M.-F.M. 1ST I.F.

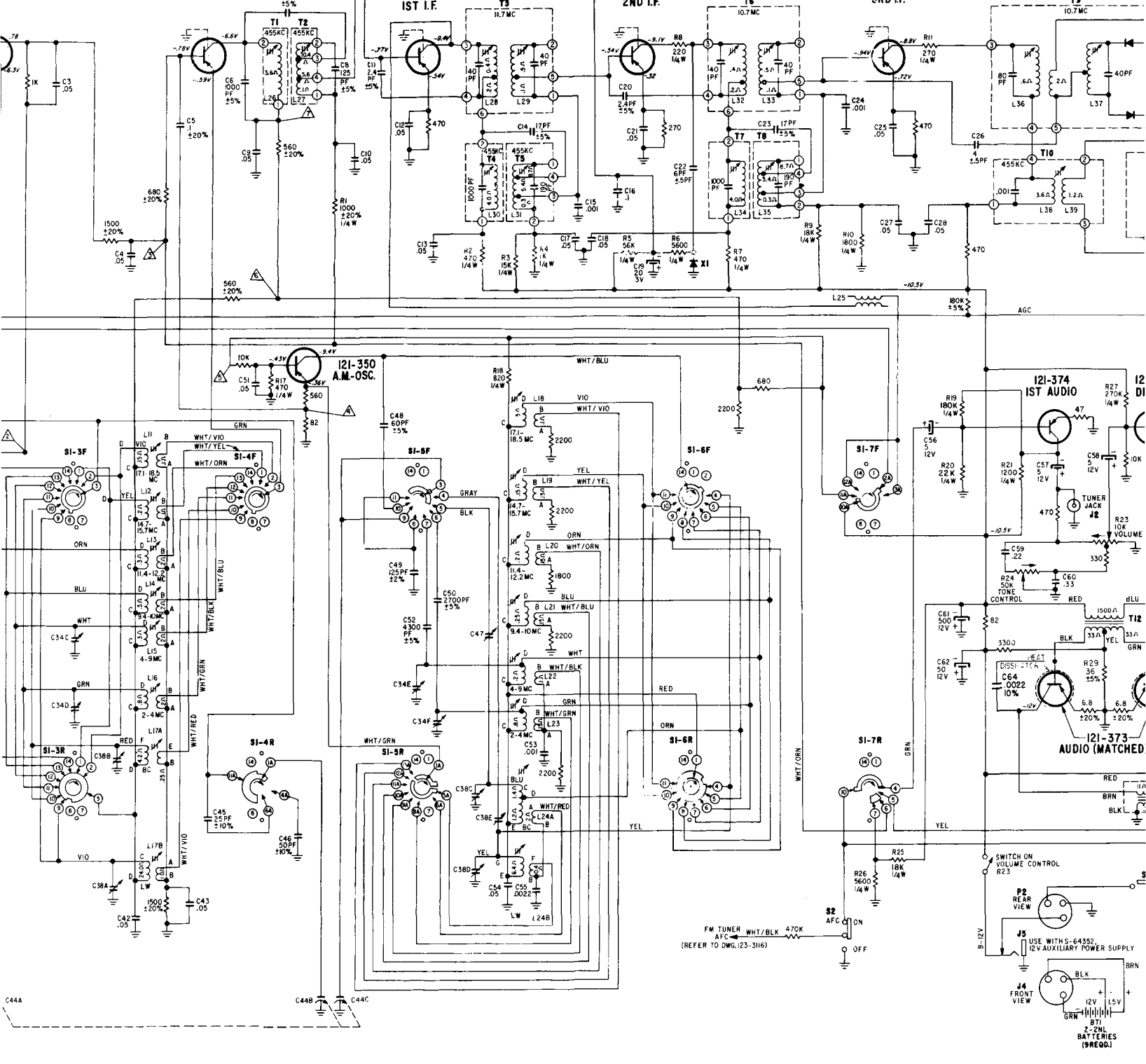
### I21-352 A.M.-F.M. 2ND I.F.

### I21-352 A.M.-F.M. 3RD I.F.

### I21-350 A.M.-OSC.

### I21-374 1ST AUDIO

### I21-373 AUDIO (MATCHED)



C44A

C44B C44C

FM TUNER AFC (REFER TO DWG.123-316)

SWITCH ON VOLUME CONTROL

P2 REAR VIEW

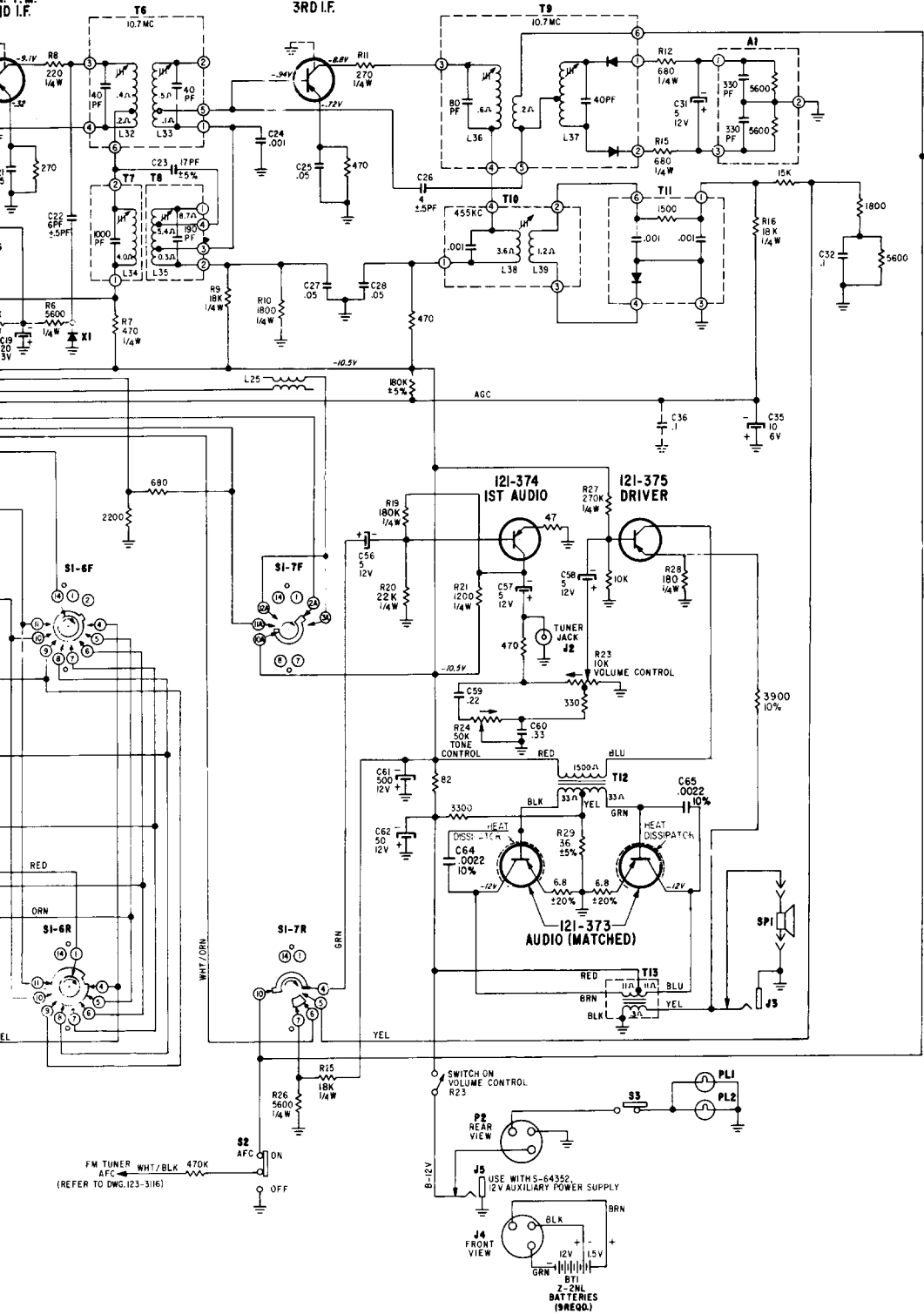
J5 USE WITHS-64352 12V AUXILIARY POWER SUPPLY

J4 FRONT VIEW

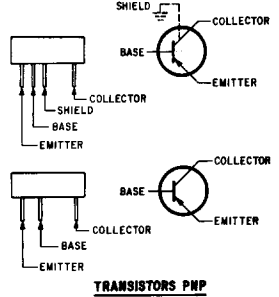
B1 2-2N1 BATTERIES (9REQ.)

121-352  
L-F.M.  
10 I.F.

121-352  
A.M.-F.M.  
3RD I.F.



MATCHING GROUP	
A	THE OUTPUT TRANSISTOR MATCHING IDENTIFICATION WILL BE LETTERS.
B-D	TRANSISTORS USED IN ANY ONE CHASSIS MUST BE MATCHED ACCORDING TO GROUP CHART.
C-E-G	LETTERS CAN BE INTERMIXED, BUT MUST BE FROM THE SAME GROUP.
F-H-J	
I-K-M	
L-N-P	
O-Q	



- NOTES:
1. ALL RESISTORS  $\pm 10\%$  TOLERANCE,  $1/2$  WATT, CARBON UNLESS OTHERWISE SPECIFIED.
  2. RESISTANCE VALUES IN OHMS, CAPACITANCE IN MICROFARADS UNLESS OTHERWISE SPECIFIED.
  3. ALL VOLTAGES ARE D.C. UNLESS OTHERWISE SPECIFIED.
  4. D.C. VOLTAGES SHOWN ARE MEASURED WITH NO SIGNAL USING A VACUUM TUBE VOLTMETER.
  5.  $\Delta$  NUMBERS IN TRIANGLES INDICATE VOLTAGE TEST POINTS. REFER TO NUMBERS IN TRIANGLES ON 123-310, TRANSISTOR AND TRIMMER LAYOUT.
  6. NO SIGNAL CURRENT DRAIN IS 25 MA.
  7. USE ONLY 12V WITH NON-INDUCTIVE ELECTROLYTIC CONDENSERS FOR REPLACEMENT. IF ANY OTHER TYPE OF ELECTROLYTIC IS USED, IT WILL BE NECESSARY TO ADD C16 AND C36, SHOWN IN DOTTED LINES.
- ⊥ DENOTES CHASSIS

123-3125