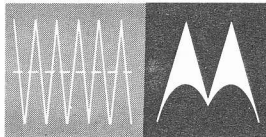


MODELS VWA64, VWM64

MOTOROLA

service manual

GENERAL INFORMATION

Automotive type all-transistor superheterodyne AM radios for standard broadcast reception; operate from 6 volt negative ground system. Designed for custom installation in the 1958 - 1964 Volkswagen. These receivers contain 7 transistors and 2 diodes.

SERVICE NOTES

1. Make certain the "A" lead is connected to the positive (+) side of the power source, otherwise, damage to receiver may result. If a battery eliminator is used as a power source in place of a battery, it must be well filtered and regulated.

2. When replacing a power output transistor, remember to use the transistor specified in the parts list; coat both sides of the transistor insulator with DC-4 grease (Motorola Part No. 11M490487) and securely tighten the transistor mounting screws. When replacing all other transistors, use long-nose pliers as a heat sink, i. e., grasp transistor leads close to transistor base with pliers to dissipate heat while soldering.

3. Servicing techniques applicable to these models can be found in the

following Motorola publications: "Profitable Transistor Radio Servicing" (Motorola Part Number 68P60011A53) and "A Discussion of Transistorized Car Radios" (Motorola Part No. 68P64980A51).

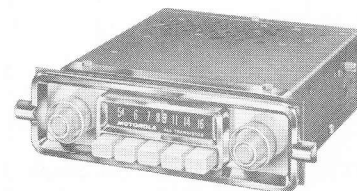
4. **POWER TRANSISTOR CURRENT ADJUSTMENT** - After replacing a power transistor, the collector current should be checked and adjusted for proper operation.

A. Insert a low range (0-1 or 0-2 amp) DC ammeter in the primary ground return lead of the output transformer (T-4). Connect the negative terminal of the meter to ground. **CAUTION:** Be sure the speaker ground lead is connected in common with the transformer ground lead to the positive terminal (see schematic diagram). Speaker must be connected.

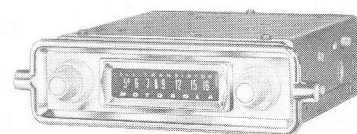
B. Turn the radio on and allow it to heat up for about 15 minutes.

C. Adjust the bias control (R-16) for a reading of 480 ma with 6.3 volts input to the radio "A" lead.

NOTE: Two values of radio input voltage are given as a convenience to service personnel in order to accommodate different power sources. The current value stated on the



MODEL VWA64



MODEL VWM64

schematic diagram is for 7 volts input to the radio "A" lead.

5. **REAR SPEAKER** - The RS-4 (with fader control - less speaker) or RS-7 (6 x 9 - 3.2 ohm with fader control) rear speaker kits can be used with these radios.

TO SET PUSHBUTTONS (VWA64 ONLY)

Unlock pushbutton by pulling it out about 1/2" forward of its normal position. Tune in station and lock the pushbutton to the station by pushing it in firmly.

MOTOROLA AUTO RADIO WARRANTY SERVICE STATION PROCEDURE

1. A Motorola Branded Model is one that has the Motorola name and is distributed to dealers through the Motorola Distributors.

2. These models are guaranteed for all parts and labor, including removal and re-installation (R & R) for a period of two years from the date of purchase. The following repairs are not covered under this guarantee: the elimination of motor noise, tire static, electrical interference and faulty installation. Charges for these repairs are to be paid by the customer.

3. Before performing a guarantee repair on a Motorola Branded Auto Radio, you must first receive the Customer's Car Radio Guarantee and Service Booklet. The installation and model information on the

booklet must be filled in by the selling dealer at the time of retail sale. The Customer's Car Radio Guarantee and Service Booklet must show that the radio is within the guarantee period to be repaired under the Motorola Auto Radio Guarantee.

4. To obtain your labor allowance for the servicing of the customers in-guarantee set, fill in the Motorola Guarantee Labor Claim, Part No. 68P60016A30. If you perform a R & R service, you are entitled to the R & R allowance. If you only repair the radio without R & R service, you are entitled to the labor allowance. However, if you perform both R & R and the repair, then be sure to indicate both on your claim form for both allowances. After the form has been filled in, mail the

pink and green copies to your Motorola Distributor for payment. The yellow copy is to be retained in the Service Station file.

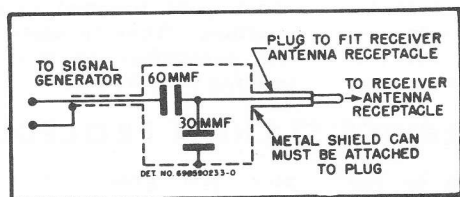
5. Defective parts for guarantee repairs made are to be sent to your Motorola Distributor for free replacement supported with the defective parts return tag, Part Number 54P591808.

6. Only those service stations authorized by their Motorola Distributor can perform repairs within the guarantee period on a no-charge basis to the customer. If you are not an Authorized Motorola Auto Radio Service Station and you are interested in handling this service, please contact your Motorola Distributor for complete details.

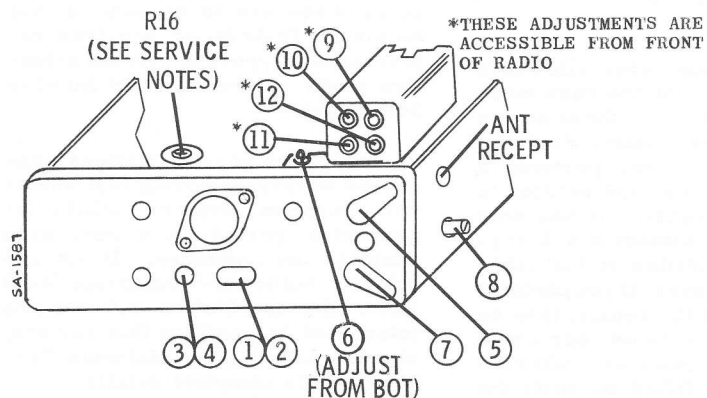
ALIGNMENT

Connect an output meter across the speaker voice coil. Set volume to maximum and tone to treble. Attenuate signal generator output to maintain 1 watt (1.79 volts across 3.2 ohm load) on output meter at all times.

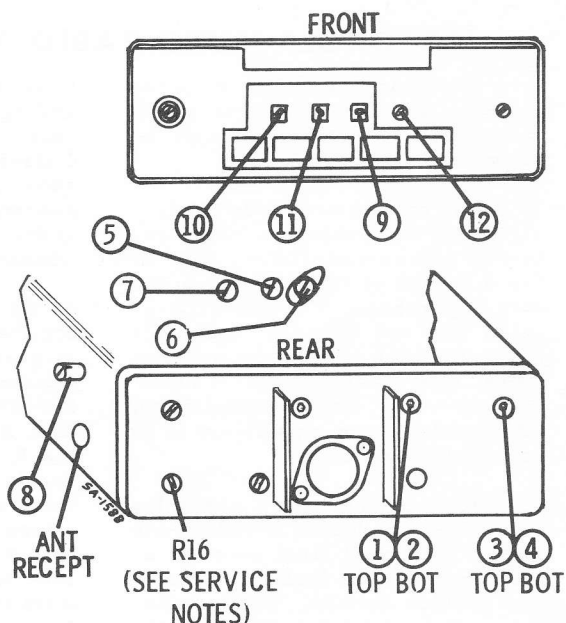
STEP	GENERATOR CONNECTION	GEN FREQ (400 cycle 30% mod)	TUNER SET TO	ADJUST	REMARKS
IF ALIGNMENT					
1.	To collector of RF amp thru .1mf & chassis	262.5 Kc	Hi end stop	1, 2, 3 & 4	Adjust for maximum
RF ALIGNMENT					
2.	Ant recept thru dummy (see figure)	1610 Kc	Hi end stop	5, 6, 7 & 8	Adjust for maximum
NOTE: Do not perform Steps 3, 4, 5 & 6 unless the tuner has been tampered with or associated components have been replaced. If necessary, remove the escutcheon, dial background and the pilot light socket to expose the core screws. Before proceeding with Step 3, back the tuning cores as far as possible out of the coils to eliminate their effect on trimmer adjustments.					
3.	Ant recept thru dummy (see figure)	1610 Kc	Hi end stop	5, 6, 7 & 8	Adjust for maximum
4.	"	1200 Kc (VWA64) 1020 Kc (VWM64)	Tuner carriage .285" (VWA64) or .298" (VWM64) from Hi end stop	9, 10, 11 & 12	Adjust for maximum
5.	"	1610 Kc	Hi end stop	5, 6, 7 & 8	Adjust for maximum
6.	Repeat Steps 4 and 5 until no further increase; Step 5 should be last step. Then, cement core screws in place.				
ANTENNA TRIMMER					
7.	-	-	Weak station around 1400 Kc	8	Adjust for maximum with radio installed in car and antenna fully extended.



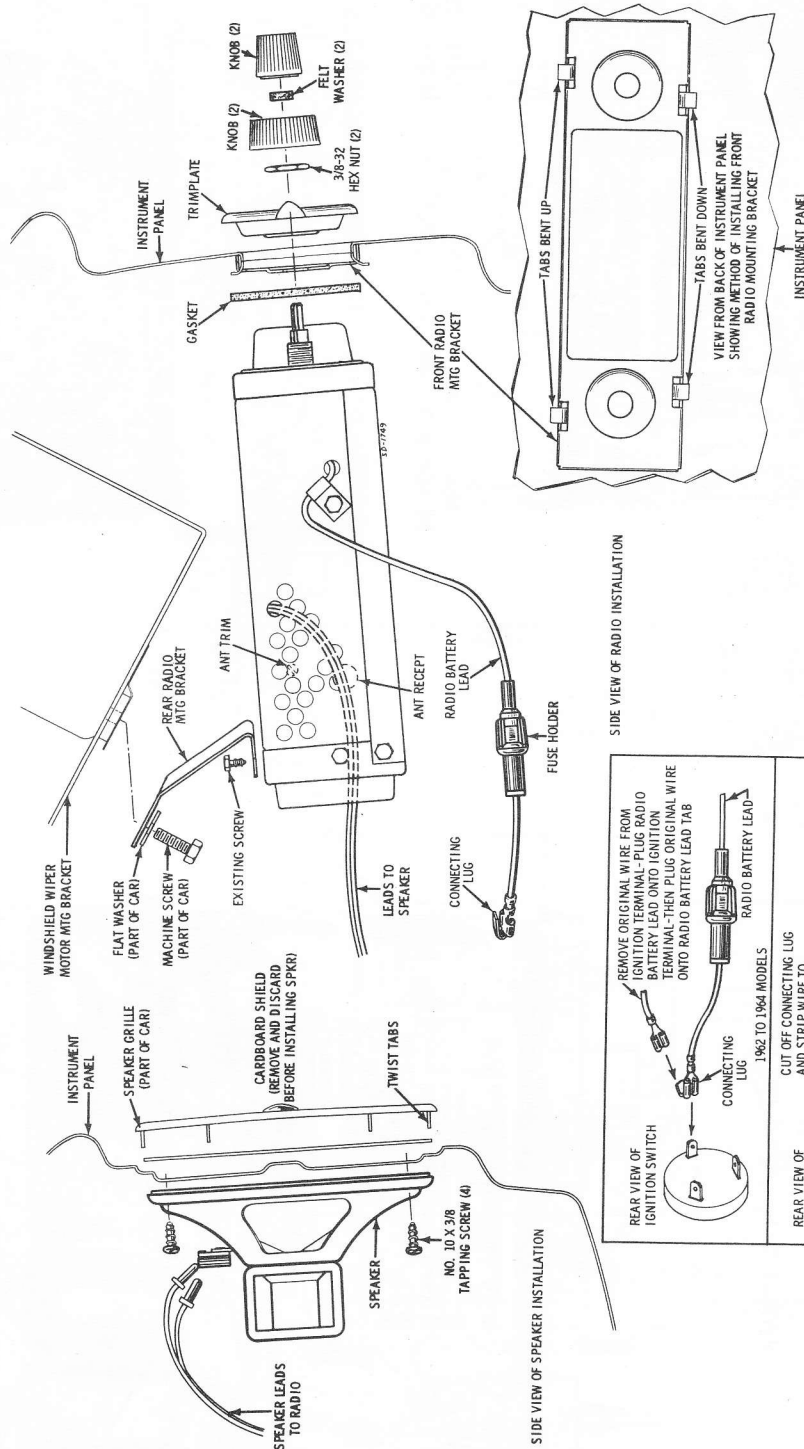
DUMMY ANTENNA DETAIL



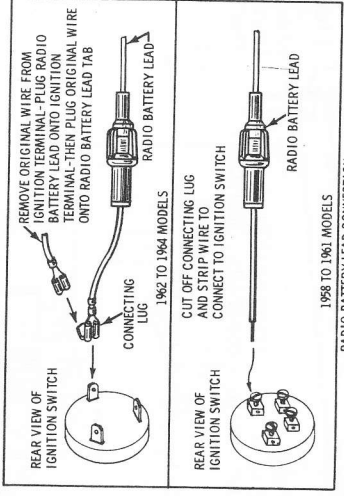
VWM64 ALIGNMENT LOCATION DETAIL



VWA64 ALIGNMENT LOCATION DETAIL

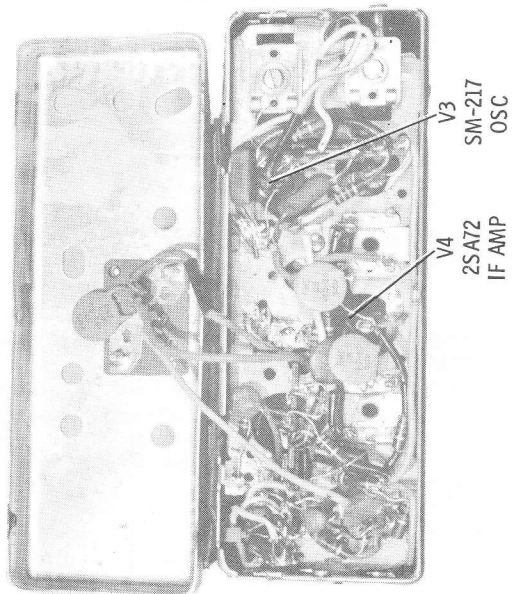
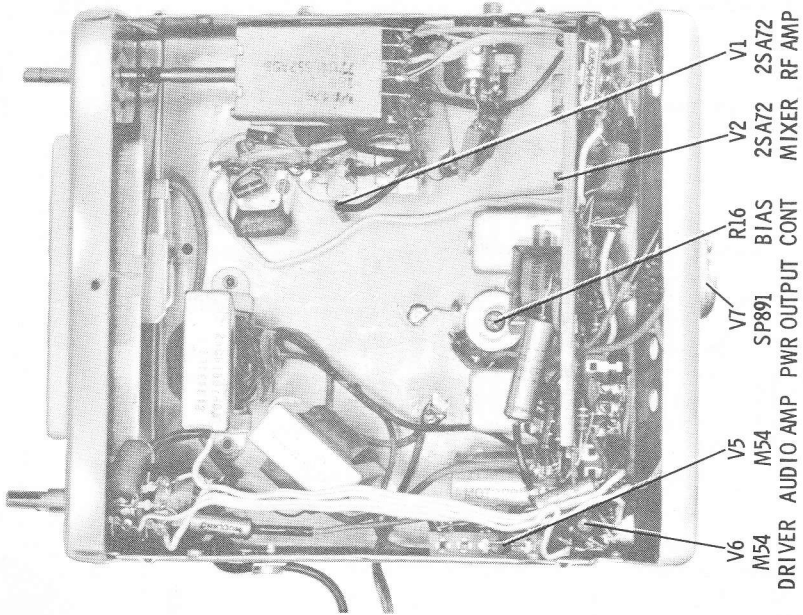


SIDE VIEW OF RADIO INSTALLATION

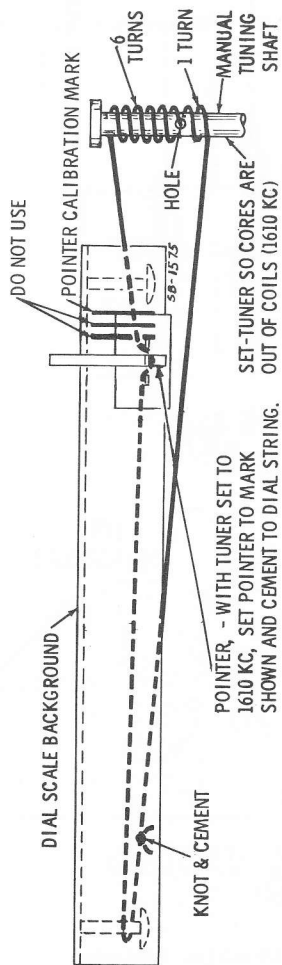


RADIO BATTERY LEAD CONNECTION

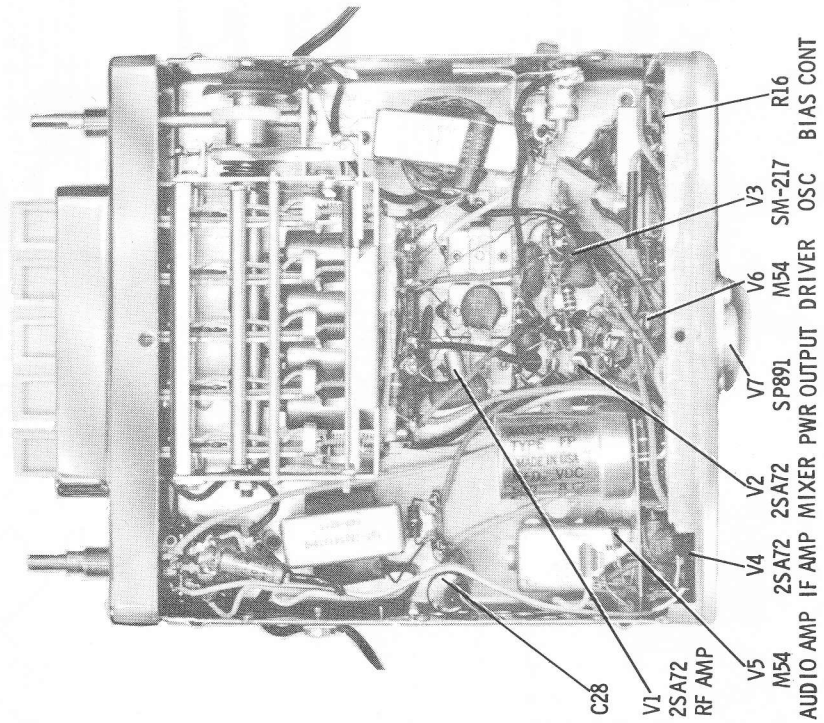
RADIO INSTALLATION DETAIL



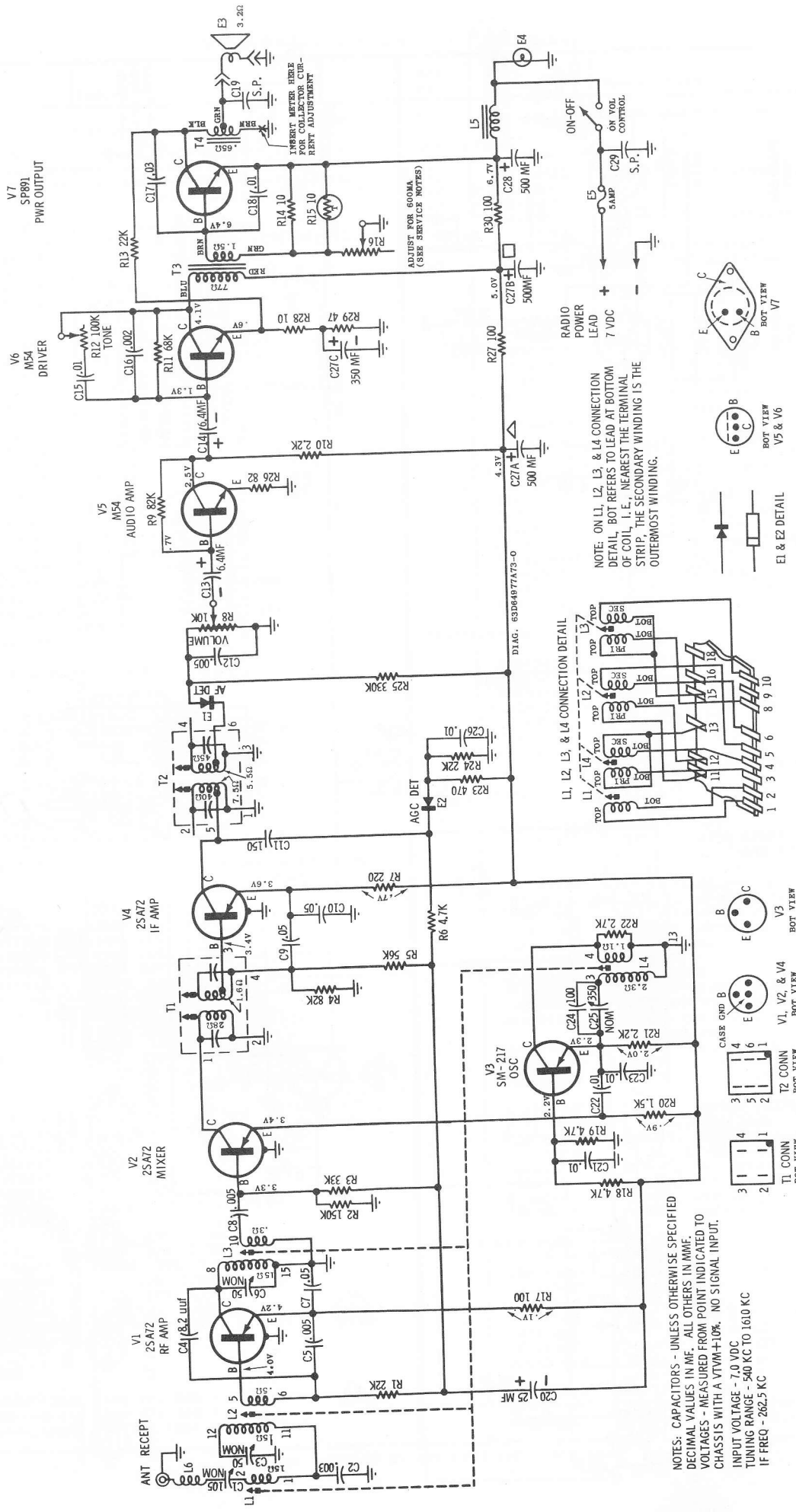
VWM64 PARTS LOCATION



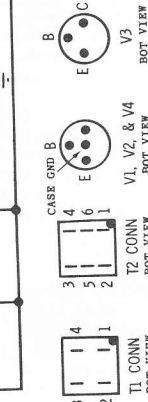
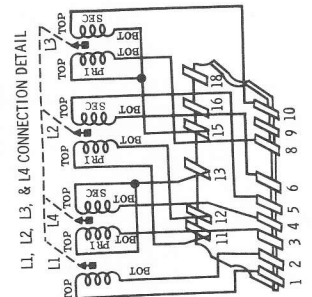
VWM64 DIAL STRINGING DETAIL



VWA64 PARTS LOCATION

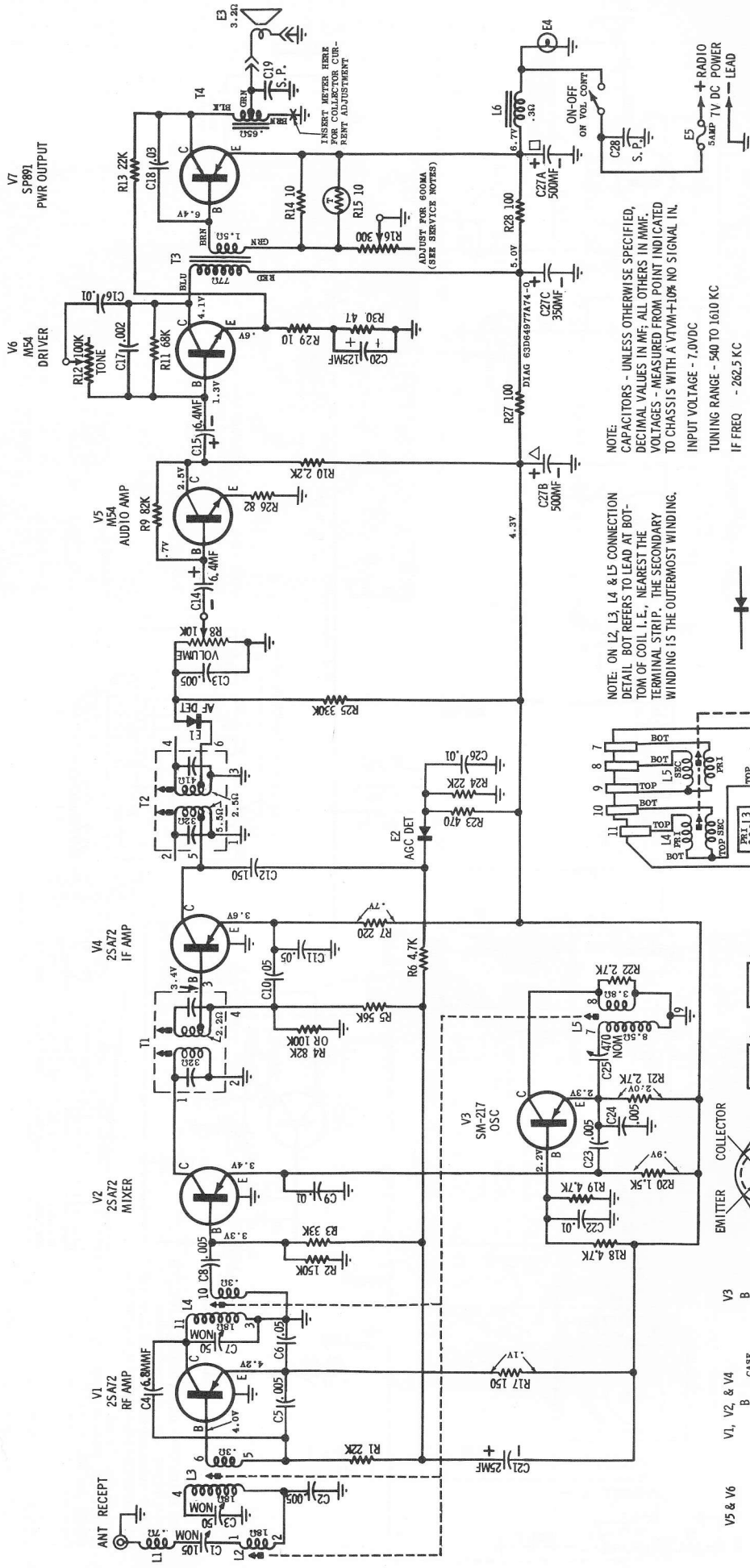


NOTE: ON L1, L2, L3, & L4 CONNECTION DETAIL, BOT REFERS TO LEAD AT BOTTOM OF COIL, I.E., NEAREST THE TERMINAL STRIP. THE SECONDARY WINDING IS THE OUTERMOST WINDING.

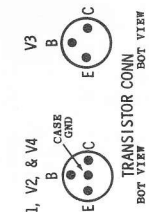
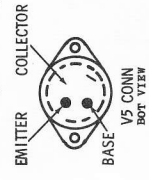
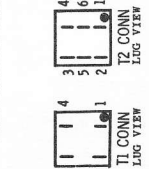
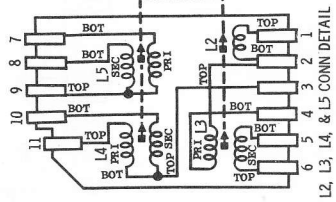


NOTES: CAPACITORS - UNLESS OTHERWISE SPECIFIED DECIMAL VALUES IN MF. ALL OTHERS IN MME. VOLTAGES - MEASURED FROM POINT INDICATED TO CHASSIS WITH A VTVM+10%. NO SIGNAL INPUT. INPUT VOLTAGE - 7.0 VDC TUNING RANGE - 540 KC TO 1610 KC IF FREQ - 262.5 KC

MODEL VWA64 SCHEMATIC DIAGRAM



NOTE: CAPACITORS - UNLESS OTHERWISE SPECIFIED, DECIMAL VALUES IN MF; ALL OTHERS IN MMF. VOLTAGES - MEASURED FROM POINT INDICATED TO CHASSIS WITH A VTVM±10% NO SIGNAL IN. INPUT VOLTAGE - 7.0VDC. TUNING RANGE - 540 TO 1610 KC IF FREQ - 262.5 KC



VWM64 SCHEMATIC DIAGRAM

VWA64 REPLACEMENT PARTS LIST

Ref. No.	Part Number	Description	Ref. No.	Part Number	Description
ELECTRICAL PARTS			TRANSISTORS		
CAPACITORS - NOTE: The capacitors in this list are recommended replacement types for the original equipment; all are ceramic disc type unless otherwise specified.			T-4	25C64607A01	OUTPUT (USE 25C64607A02)
C-1	20B544017	40 to 430 mmf trimmer	V-1	48K134602	2SA72 (USE 48K134601)
C-2	8R10064A34	.003 mf 200V mylar (USE 8R10110A02)	V-2	48K134601	2SA72
C-3	20K541014	20 to 120 mmf trimmer	V-3	48R134635	SM217
C-4	21R120159	8.2 mmf 500V FC	V-4	48K134600	2SA72 (USE 48K134601)
C-5	21S128634	.005 mf 500V	V-5	48R134654	M54
C-6	20K541014	20 to 120 mmf trimmer	V-6	48R134673	M54 (USE 48B134665)
C-7	8K129455	.05 mf 200V mylar	V-7	48R134647	SP891 (USE 48R134646)
C-8	8K131769	.005 mf 200V mylar	MECHANICAL PARTS		
C-9	21S131254	.05 mf 100V (USE 21A740805)	7K544712	BRACKET, dial bkgnd	
C-10	21S131254	.05 mf 100V (USE 21A740805)	42B733793	CLIP, coil shield	
C-11	21S121228	150 mmf 500V N750	15K544715	COVER, back	
C-12	21S122871	.005 mf 500V (USE 21R128634)	15K543815	COVER, bottom	
C-13	23K544697	6.4 mf 40V lytic	13C543880	ESCUTCHEON, dial	
C-14	23K544697	6.4 mf 40V lytic	14A543810	INSULATOR, trans.	
C-15	21S132103	.01 mf 100V	36K544747	KNOB, pendant	
C-16	21S132525	.002 mf 100V	36K544748	KNOB, tone	
C-17	21D40339A53	.03 mf 100V	36K544760	KNOB, vol & tuning	
C-18	21S132103	.01 mf 100V	29A64647A01	LUG, terminal ("A" lead)	
C-19	64K530177	PLATE, spark	*29S10134A02	LUG, terminal: spkr	
C-20	23K544540	25 mf 3V lytic	13K544668	MASK, dial	
C-21	8K131799	.01 mf 100V mylar	2S7051	NUT, pal (control mtg)	
C-22	8K131799	.01 mf 100V mylar	2S7087	NUT, speed (dial scale)	
C-23	8K131799	.01 mf 100V mylar	9A472148	RECEPTACLE, ant	
C-24	21S410036	100 mmf 500V N750	9K544713	RECEPTACLE, fuse (USE 9K534968)	
C-25	20K541700	310 to 390 mmf trimmer	34B64793A02	SCALE, dial	
C-26	21S132103	.01 mf 100V	3K560695	SCREW, trans mtg	
C-27	23C64722A03	350-500-500 mf/8V lytic	9A543879	SOCKET, pilot light	
C-28	23K544718	500 mf 8V lytic	9B542339	SOCKET, trans.	
C-29	64K530177	PLATE, spark	INSTALLATION PARTS & ACCESSORIES		
MISCELLANEOUS ELECTRICAL PARTS			7A543889	BRACKET, rec mtg	
E-1	48C134587	DIODE, 1N139	8B538244	CAP, generator	
E-2	48C134587	DIODE, 1N139	8B544383	CAP, ignition coil	
E-3	50C543225	SPEAKER, 5" PM: 3.2Ω VC	*29A64647A02	LUG, terminal (ignition coil)	
E-4	65R10867	LAMP, pilot	1V544036	MTG PARTS KIT	
E-5	65R122345	FUSE, 5 amp: 1 AG	2S1376	NUT: radio mtg	
COILS & CHOKES			6A4141	SUPPRESSOR, noise	
L-5	25B543338	CHOKO, filter	1V64961A22	TRIMPLATE: incl tubing	
L-6	24B64785A03	CHOKO, RF	TUNER PARTS		
RESISTORS - NOTE: All resistors are insulated composition type unless otherwise specified.			43K471633	BEARING, ball	
R-1	6R125568	22K 10% 1/2W	1V564641	CLUTCH & DISC ASSEM: incl setscrew	
R-2	6R125532	150K 10% 1/2W	1V41800A32	COILS & MTG PLATE ASSEM: incl L-1, L-2, L-3 & L-4	
R-3	6R127632	33K 10% 1/2W	76K563288	CORE, iron: osc	
R-4	6R125179	82K 10% 1/2W	76K563286	CORE, iron: RF & Ant	
R-5	6R127541	56K 10% 1/2W	1B563899	GEAR BUSHING & DISC ASSEM.	
R-6	6R121347	4700 10% 1/2W	5B562438	GROMMET, core mtg	
R-7	6R127099	220 10% 1/2W	45A41254A01	LINK, conn	
R-8, 12	18C64734A03	CONTROL, vol-tone-sw	*1B40875A02	POINTER	
R-9	6R125179	82K 10% 1/2W	38K565210	PUSHBUTTON	
R-10	6R129875	2200 10% 1/2W	49A562480	ROLLER, clutch release	
R-11	6R124507	68K 10% 1/2W	1V562830	SCREW & NUT ASSEM: adj	
R-12	-	PART OF R-8	3A563128	SCREW, set: 4-40 x 5/16; clutch & disc assem	
R-13	6R125568	22K 10% 1/2W	3S127896	SCREW, tpg: 4-40 x 1/4 (coils mtg)	
R-14	6R124668	10 10% 1/2W	44B563758	SHAFT, manual tuning	
R-15	6K543800	10 10% 1/2W FC	41A562449	SPRING, anti-rattle (clutch rel. bar)	
R-16	18C64735A08	CONTROL, bias	41A562447	SPRING, clutch release	
R-17	6R129221	100 10% 1/2W	41A41255A01	SPRING, conn link	
R-18	6R121847	4700 10% 1/2W	41B562503	SPRING, pointer tension	
R-19	6R121847	4700 10% 1/2W	77K565209	TUNER, AT-430: complete	
R-20	6R127513	1500 10% 1/2W	4K501364	WASHER, "C" (manual shaft ret)	
R-21	6R129875	2200 10% 1/2W	4K692188	WASHER, "C" (pointer ret)	
R-22	6R119926	2700 10% 1/2W	4A562431	WASHER, cup (clutch rel spring)	
R-23	6R127633	470 10% 1/2W	4K564253	WASHER, spring (manual shaft)	
R-24	6R125568	22K 10% 1/2W	RS-4 & RS-7 REAR SEAT SPEAKER KIT		
R-25	6R10053D43	330K 20% 1/2W	18B543088	CONTROL, fader: 15Ω 20% 1W WW	
R-26	6R127516	82 10% 1/2W	13C543043	GRILLE, spkr	
R-27	6R129221	100 10% 1/2W	1V530175	KNOB, control	
R-28	6R124668	10 10% 1/2W	1V543186	LUG, ground: incl lead	
R-29	6R127542	47 10% 1/2W	2S1376	NUT, hex: 3/8-32 (control mtg)	
R-30	6R129221	100 10% 1/2W	3S128262	SCREW, mach: 8-32 x 1" (spkr mtg)	
TRANSFORMERS			50C533088	SPEAKER, PM: 6 x 9; 3.2Ω VC (RS-7 ONLY)	
T-1	24B64613A01	1st IF: 262.5 Kc	31A533215	STRIP, terminal	
T-2	24B64613A02	2nd IF: 262.5 Kc	29A76280	TERMINAL, pin: black (spkr conn)	
T-3	25B64610A05	DRIVER (USE 25C64610A03)	29K76282	TERMINAL, pin: white (spkr conn)	

*NEW ITEM, APPEARS IN ANY LIST FOR FIRST TIME.

VWM64 REPLACEMENT PARTS LIST

Ref. No.	Part Number	Description	Ref. No.	Part Number	Description
ELECTRICAL PARTS					
<p>CAPACITORS - NOTE: The capacitors in this list are recommended replacement types for the original equipment; all are ceramic disc type unless otherwise specified.</p>					
C-1	20B64616A01	20 to 120 mmf trimmer	R-29	6R124668	10 10% 1/2W
C-2	8K131769	.005 mf 200V	R-30	6R127542	47 10% 1/2W
C-3	20K541014	20 to 120 mmf trimmer	TRANSFORMERS		
C-4	21R120157	6.8 mmf 500V FC	T-1	24B64613A01	1st IF: 262.5 Kc
C-5	8K131769	.005 mf 200V	T-2	24B64613A02	2nd IF: 262.5 Kc
C-6	8K129455	.05 mf 200V	T-3	25B64610A04	DRIVER (USE 25B64610A03)
C-7	20K544594	20 to 120 mmf trimmer	T-4	25C64607A02	OUTPUT
C-8	8K131769	.005 mf 200V	TRANSISTORS		
C-9	8K131799	.01 mf 100V mylar	V-1	48K134602	2SA72 (USE 48K134601)
C-10	21S129480	.05 mf 50V (USE 21A740805)	V-2	48K134601	2SA72
C-11	21S129480	.05 mf 50V (USE 21A740805)	V-3	48R134635	SM217
C-12	21S121228	150 mmf 500V N750	V-4	48K134600	2SA72 (USE 48K134601)
C-13	21S131999	.005 mf 500V	V-5	48R134654	M54
C-14	23K544697	6.4 mf 40V lytic	V-6	48R134673	M54 (USE 48B134665)
C-15	23K544697	6.4 mf 40V lytic	V-7	48R134647	SP891 (USE 48R134646)
C-16	8K131799	.01 mf 100V mylar	MECHANICAL PARTS		
C-17	21S132525	.002 mf 100V	7K544769	BRACKET, dial ret	
C-18	21D40339A53	.03 mf 100V	43A64749A10	BUSHING, tuner shaft	
C-19	64K561877	PLATE, spark	42B733793	CLIP, IF	
C-20	23K544707	125 mf 10V lytic	15C64626A02	COVER, back	
C-21	23K544540	25.0 mf 3V lytic	15D64751A09	COVER, bottom (USE 15D64751A05)	
C-22	21S132103	.01 mf 50V	13D64720A01	ESCUTCHEON, dial	
C-23	8K131769	.005 mf 200V	14A543810	INSULATOR, transistor	
C-24	8K131769	.005 mf 200V	36K544747	KNOB, pendant	
C-25	20K544696	400 to 520 mmf trimmer	36K544748	KNOB, tone	
C-26	21S132103	.01 mf 50V	36K544760	KNOB, vol & tuning	
C-27	23C64722A03	350-500-500 mf/8V lytic	29S10134A02	LUG, term: spkr	
C-28	64K530177	PLATE, spark	29A64647A01	LUG, term: ("A" lead)	
MISCELLANEOUS ELECTRICAL PARTS			2S7087	NUT: push-on (dial scale)	
E-1	48C134587	DIODE, 1N139	2S7051	PALNUT: (control mtg)	
E-2	48C134587	DIODE, 1N139	52A64748A01	POINTER, dial	
E-3	50C543225	SPEAKER, 5" PM	9A472148	RECEPTACLE, ant	
E-4	65R10867	LAMP, pilot (.25A-6.3V)	9K544723	RECEPTACLE, fuse (USE 9K534968)	
E-5	65R122345	FUSE, 5 amp: 1 AG	34B64524A01	SCALE, dial	
COILS & CHOKE			3K560695	SCREW, trans mtg	
L-1	24B64785A03	CHOKE, RF	9K543387	SOCKET, pil lt	
L-6	25B543338	CHOKE, filter	9B542339	SOCKET, trans.	
RESISTORS - NOTE: All resistors are insulated composition type unless otherwise specified.			INSTALLATION PARTS & ACCESSORIES		
R-1	6R129829	22K 20% 1/2W	7A543889	BRKT, rcvr mtg	
R-2	6R125532	150K 10% 1/2W	8B544383	CAP, ignition coil	
R-3	6R127632	33K 10% 1/2W	8B538244	CAPACITOR, generator	
R-4	6R125179	82K 10% 1/2W (in some sets)	29A64647A02	LUG, term: (ignition coil cap)	
	6R125534	100K 10% 1/2W (in some sets)	1V544036	MTG PARTS KIT	
R-5	6R127005	56K 10% 1/2W	2S1376	NUT, 3/8-32 (radio mtg)	
R-6	6R131667	4700 20% 1/2W	6A4141	SUPPRESSOR, noise	
R-7	6R127099	220 10% 1/2W	1V544037	TRIMPLATE: incl tubing	
R-8, 12	18C64734A04	CONTROL, vol-tone-sw	TUNER PARTS		
R-9	6R125179	82K 10% 1/2W	1V40800A77	COIL & MTG PLATE ASSEM: incl L-2, L-3, L-4, L-5 & mtg plate	
R-10	6R129875	2200 10% 1/2W	76C40647A02	CORE, iron (oscillator)	
R-11	6R124507	68K 10% 1/2W	76C40647A04	CORE, iron (RF & ant)	
R-12	-	PART OF R-8	3S127896	SCREW, tapping: #4-40 x 1/4 (coils mtg)	
R-13	6R125568	22K 10% 1/2W	47C40648A07	SHAFT, manual tuning	
R-14	6R124668	10 10% 1/2W	*41B40560A01	SPRING, ret. (manual shaft)	
R-15	6K543800	10 10% 1/2W FC	77D40632A03	TUNER, MT-425: complete	
R-16	18C64735A08	CONTROL, bias	4K721821	WASHER, "C" (manual shaft)	
R-17	6R124797	150 10% 1/2W	RS-4 & RS-7 REAR SEAT SPEAKER KIT		
R-18	6R121847	4700 10% 1/2W	18B543088	CONTROL, fader: 15Ω 20% 1W WW	
R-19	6R121847	4700 10% 1/2W	13C543043	GRILLE, spkr	
R-20	6R127513	1500 10% 1/2W	1V530175	KNOB, control	
R-21	6R119926	2700 10% 1/2W	1V543186	LUG, ground: incl lead	
R-22	6R128688	2700 10% 1/4W	2S1376	NUT, hex: 3/8-32 (control mtg)	
R-23	6R127633	470 10% 1/2W	3S128262	SCREW, mach: 8-32 x 1" (spkr mtg)	
R-24	6R129829	22K 20% 1/2W	50C533088	SPEAKER, PM: 6 x 9; 3.2Ω VC (RS-7 ONLY)	
R-25	6R10053D43	330K 20% 1/2W	31A533215	STRIP, terminal	
R-26	6R127516	82 10% 1/2W	29A76280	TERMINAL, pin: black (spkr conn)	
R-27	6R129221	100 10% 1/2W	29K76282	TERMINAL, pin: white (spkr conn)	
R-28	6R129221	100 10% 1/2W			

*NEW ITEM, APPEARS IN ANY LIST FOR FIRST TIME.