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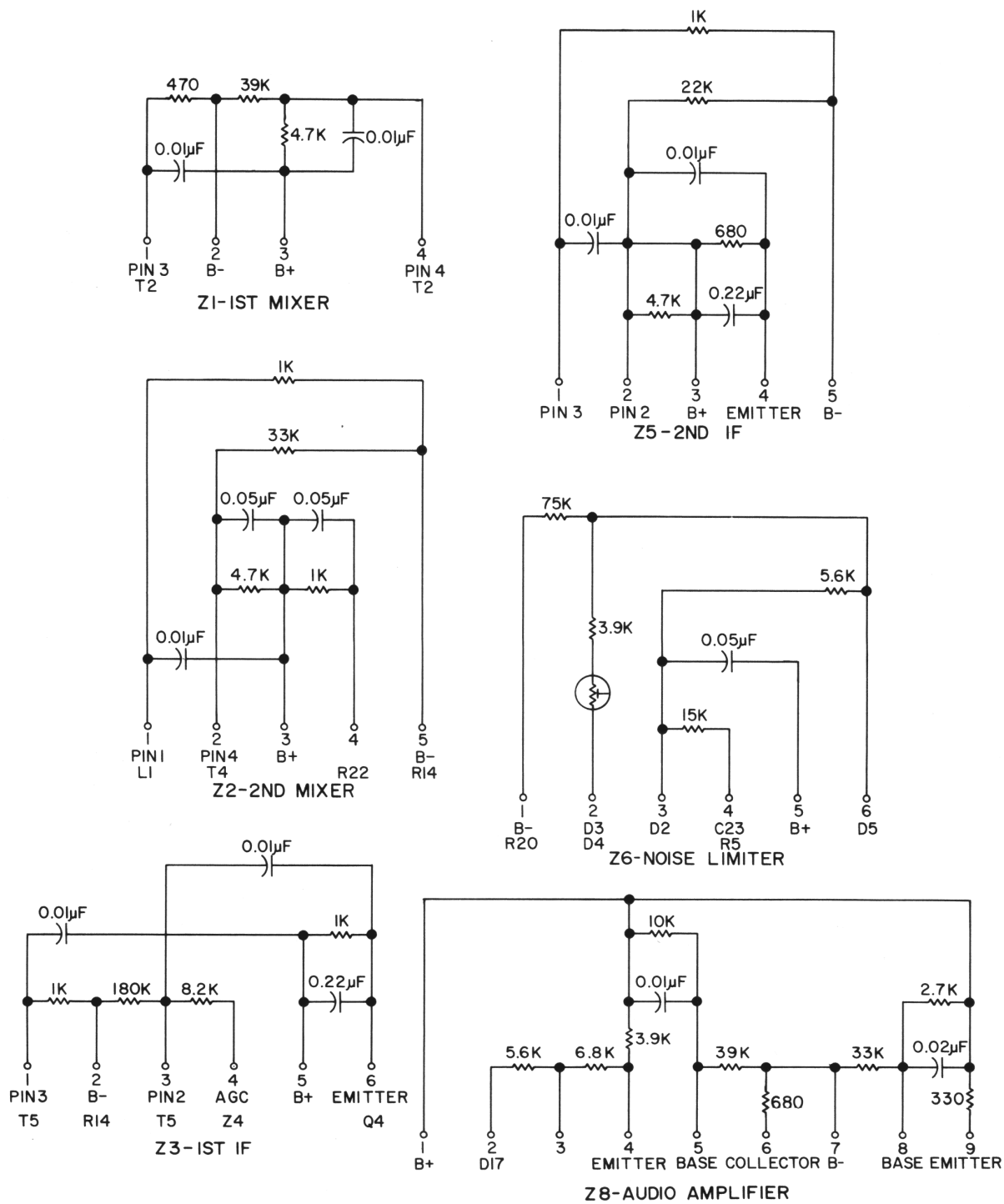
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PEC CIRCUIT SCHEMATICS
 FIGURE 5-12

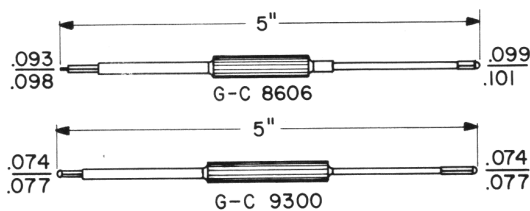
SECTION 6 ALIGNMENT

6.1 GENERAL

NOTES

1. Use care and the proper tuning tool when adjusting transformers to prevent core damage. Refer to Table 5-2 for test instrument information, Figure 6-1 for tuning tools required, and Figure 6-4 for alignment points.
2. Keep all coaxial cables as short as possible.
3. All receiver RF input levels listed in the receiver alignment section are numbers into a 6 dB pad connected between the generator and transceiver.

TABLE 6-1 ALIGNMENT TOOLS REQUIRED		
TOOL	TYPE	USE
GC-8606	Delrin Hex Tool	Aligning T1, T2, T5, T6, T7, L11, L10, T14, T13
GC-9300		T8, T9 and T12



ALIGNMENT TOOLS REQUIRED
FIGURE 6-1

6.2 RECEIVER ALIGNMENT

455 kHz IF

- a. Connect the test instruments as illustrated in Figure 6-2.
Set power supply to 13.8 VDC.
Turn volume control just enough clockwise to turn the transceiver on.
Turn squelch control fully counterclockwise.
- b. Set the scope to the DC mode and 1 V/cm range.
Connect a .01 μ F capacitor or 100 ohm 1/4 watt resistor from the base of Q8 to ground.

- c. Connect the RF signal generator to the base of Q3 through a .01 μ F capacitor. Set the signal generator to 455 kHz, no modulation.
Increase the output level of the signal generator to obtain a trace on the scope of 3 to 4 cm high.
- d. Reduce signal generator output level to maintain 3 to 4 cm height on the oscilloscope while adjusting T5, T6, T7 for maximum peak.
- e. Disconnect capacitor or resistor from the base of Q8 when adjustment is completed.

Crystal Filter

Crystal filter tuning requires a precision sweep generator and exacting alignment procedures. No tuning should be performed in the field. Replacement of certain components* affects crystal filter tuning. If any of these components requires replacement, the transceiver should be returned to the factory for crystal filter tuning.

* L1, T3, T4, C9, C10, C11, Y11, Y12, Y13, Y14

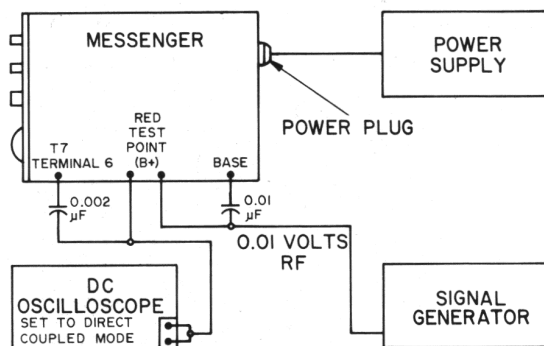
Synthesizer

- a. Connect an RF voltmeter between the emitter of Q2 and ground.
Set channel selector to channel 23.
Turn T9 core clockwise until it is flush with the top of the can. Then, turn T9 core clockwise for 1st peak (the 1st maximum RF reading on the voltmeter).
- b. Advance T9 core clockwise 1/4 turn beyond peak.
- c. Set channel selector to channel 11.
Adjust T8 for maximum reading on the RF voltmeter (50 mV minimum).
- d. Set channel selector to channels 1, 6, 11, 16, 20, 23.
Observe the RF voltmeter for approximately the same reading as above. Re-adjust T8 if necessary.

RF, 1st Mixer

- a. Connect an RF signal generator through a 6 dB pad to the antenna jack.
Adjust volume control until a 0.9 volt reading is obtained on the audio VTVM.
- b. Connect an audio voltmeter and oscilloscope across the speaker.
Adjust T1 and T2 for a peak on the audio voltmeter. Once a clean signal can be observed on the oscilloscope, T1 and T2 adjustments become very broad.

- c. Set the signal generator to $1\ \mu\text{V}$, modulated 30% at 1000 Hz on channel 11 (27.085 MHz). Peak T2 for a maximum indication on the audio voltmeter. For Messenger 320, adjust T1 and T4 for peak reading. Adjust T1 for clearest sine wave (best S+N/N ratio) as viewed on the oscilloscope. (Retune T1 approximately 10% from the peak on the maximum S+N/N side of resonance.) Check for uniform receiver gain on channels 1, 11 and 21. Adjust T1 and T2 for uniform gain and best S+N/N ratio.



TEST INSTRUMENT CONNECTIONS
FOR IF ALIGNMENT
FIGURE 6-2

AGC Rolloff Test

- Reset channel selector to channel 11. Adjust volume control for a reading of 0.9 volts on the audio voltmeter.
- Set RF signal generator to $100\ \mu\text{V}$, 30% modulation at 1000 Hz.
- Reset RF signal generator to $1\ \mu\text{V}$, 30% modulation at 1000 Hz. Audio voltmeter indication should drop 50 to 87% of $100\ \mu\text{V}$ reading.
- If AGC does not drop as indicated, adjust R22 between limits of 0 ohm and 47 ohms and adjust R1 between limits of 22 k ohms and 39 k ohms.
- Increase volume control to maximum.
- Readjust volume control to give an indication of 0.9 volts on the audio voltmeter. Audio voltmeter should read 0.9 volts minimum. R44 may be reduced to increase audio output. R44 should not be less than 2200 ohms. Continue with S+N/N adjustment.

S+N/N Test

Remove modulation from RF signal generator signal. Audio voltmeter indication should drop at least 8 dB. If this drop is not attained, re-align T1 and T2.

S-Meter Calibration

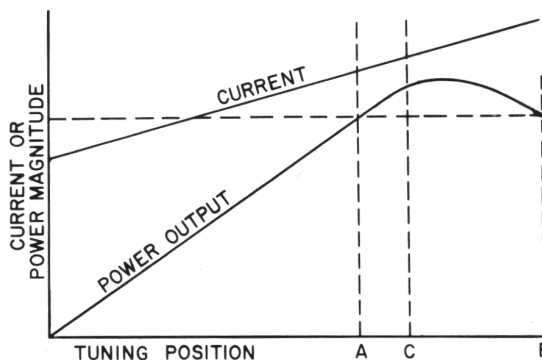
- Set signal generator for $1\ \mu\text{V}$ unmodulated output on channel 11. Zero S-meter by adjusting R48.
- Reset RF signal generator to $100\ \mu\text{V}$ unmodulated. Set S-meter to S9 by adjusting R47.

6.3 TRANSMITTER ALIGNMENT

Connect the test instruments as illustrated in Figure 5-7.

T12 (mixer)

- Monitor the output frequency with a frequency meter.
- Set the channel selector to channel 11.
- Key the transmitter. Adjust T12 for maximum final current. The transmitter should be keyed for only short periods of time. Check the transmitter output frequency. It should be 27.085 MHz.



TRANSMITTER
CURRENT-POWER CURVE
FIGURE 6-3

T13 and T14 (RF Amp and Driver)

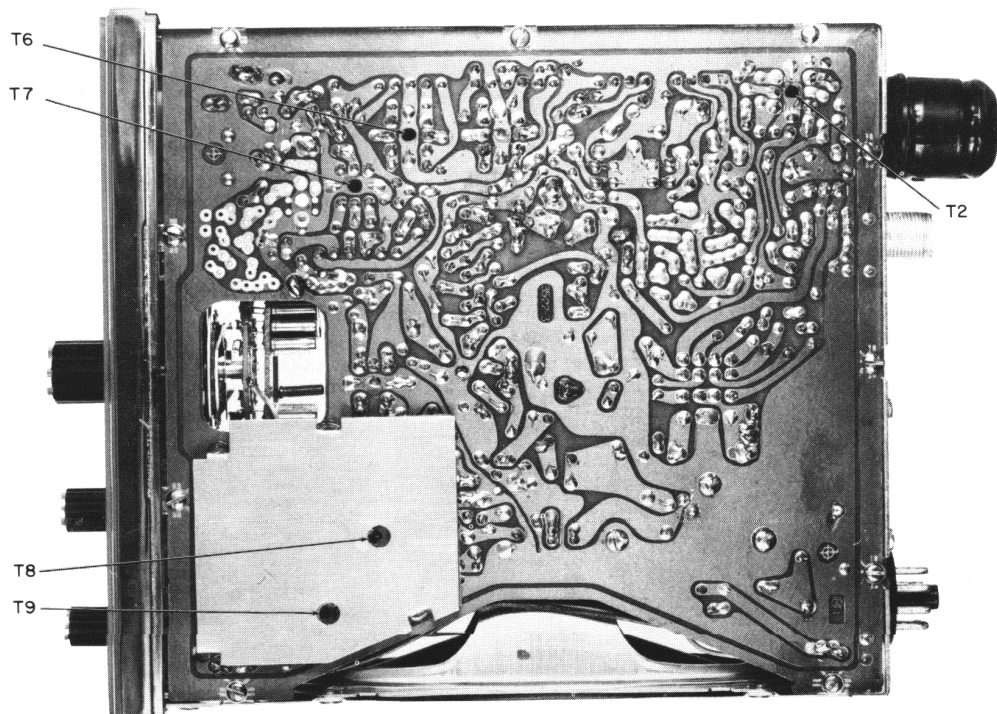
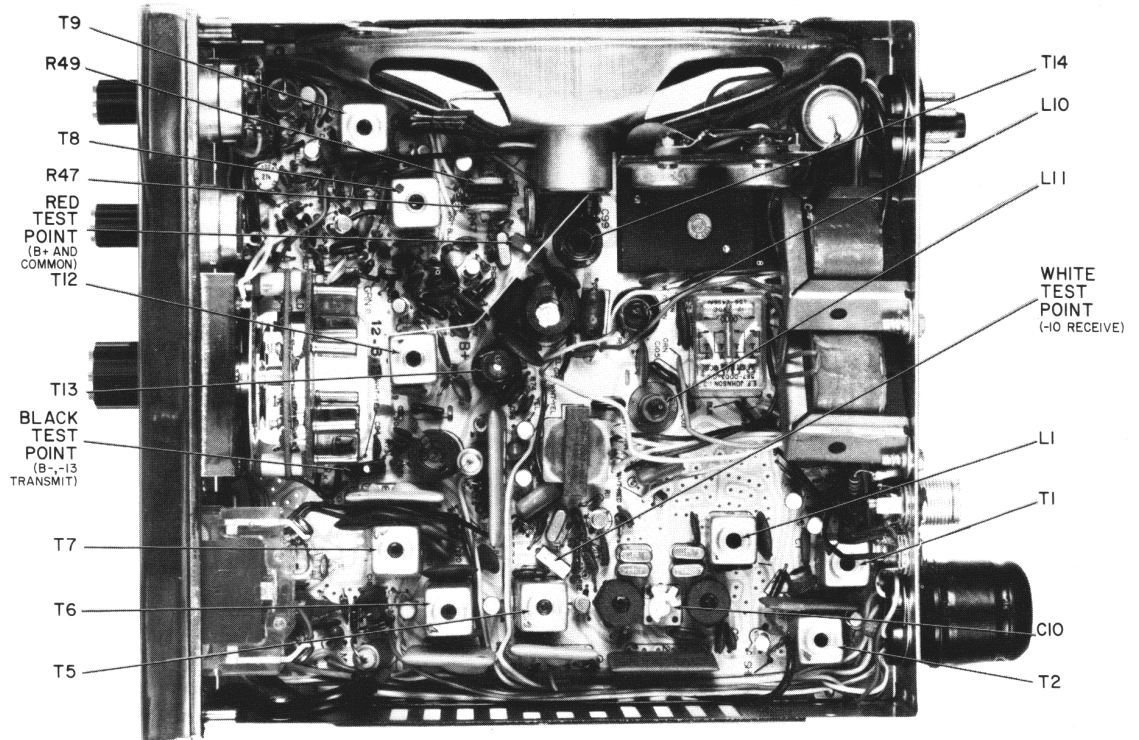
Adjust T13 and T14 for maximum final current. The primary of T13 (top core) and T14 are very broad in their tuning. The adjustments should be at the center of the maximum final current reading.

L10 and L11 (RF Output)

- Adjust L10 and L11 for 410 mA final current. Refer to Figure 6-3 for transmitter current-power curve. Power output should be 2.8 watts minimum and 4.0 watts maximum.
- Recheck the channel 11 frequency.

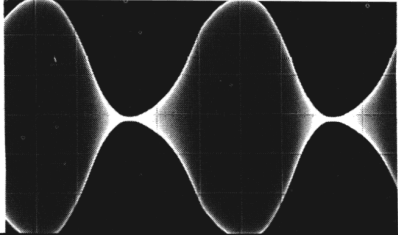
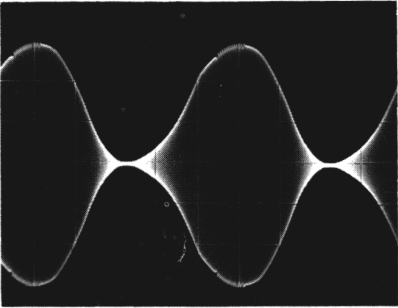
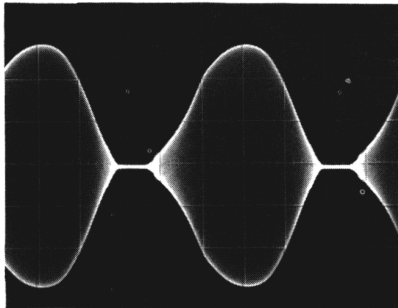
Relative Power Output Meter Adjustment

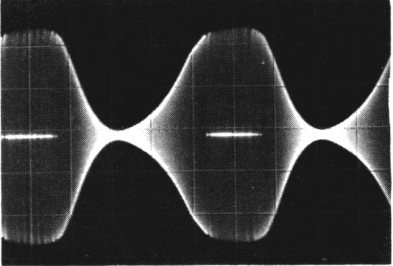
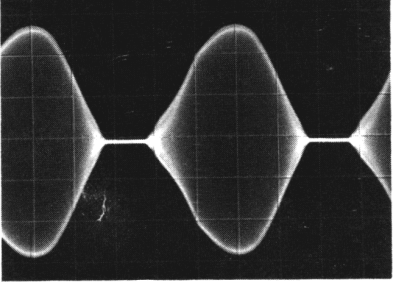
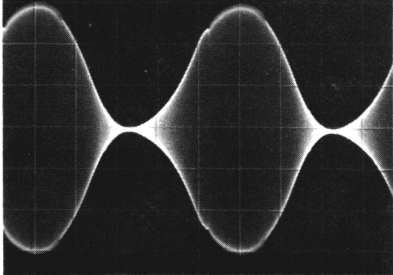
Key the transmitter.
Adjust R49 for a near mid-scale meter reading.



ALIGNMENT POINTS
FIGURE 6-4

6.4 REMEDIES FOR RF DISTORTION

RF DISTORTION	ADJUSTMENT	ILLUSTRATION
<p>Normal RF Waveform 100% modulated with 1000 Hz sine wave</p>	<p style="text-align: center;">NOTE</p> <p>Slight bumps are caused by the conduction of D14, D15 (metering circuit voltage doublers).</p>	
<p>Small ripple on or near audio envelope peak</p> <ul style="list-style-type: none"> - occurring at one end of CB band near channel 1 or 23 - occurring at both ends of CB band 	<p>Slight adjustment of T12 primary (top core). If major adjustment of T12 is required (one turn or more) use approximately 1/2 correction on T12 primary and remaining 1/2 correction on T12 secondary (bottom core).</p> <p>Adjust T12 and T13, both slugs on channel 11, then check across remaining channels. Adjust receiver synthesizer injection voltage: Connect a voltmeter and frequency meter to the emitter of Q2 and to ground. Set channel selector to channel 23. Adjust T9 1/4 turn beyond oscillator starting point. The reading on the frequency meter should be 22.955 MHz. Set channel selector to channel 11. Adjust T8, primary and secondary, for maximum RF voltmeter reading (50 mV minimum). Tune on outside peaks. The reading on the frequency meter should be 22.785 MHz.</p>	
<p>"Bubble" occurring near the valley of the audio envelope</p> <ul style="list-style-type: none"> - occurring at one end of the CB band (near channel 1 or 23) - occurring at both ends of the CB band 	<p>Adjust T13 secondary or primary.</p> <p>Adjust transmitter tuning (T14, L10, L11). Adjust T13.</p>	

RF DISTORTION	ADJUSTMENT	ILLUSTRATION
Distortion occurring on audio envelope	Adjust T13, T14, L10, L11.	
Small ripple on all of audio waveforms (appears as improper oscilloscope focus).	Check 4.3 MHz crystal. Check L10, L11 tuning.	
"Fuzz" on audio waveform peak	Adjust L12 primary or secondary slightly.	

SECTION 7 PARTS LIST

SYMBOL NO.	DESCRIPTION	PART NO.	SYMBOL NO.	DESCRIPTION	PART NO.
BRACKETS					
BK4	Mounting bracket	017-1363-001	C66	22 pF J 50V N750 disc	510-3020-220
BK100	Meter bracket	017-0439-001	C67	0.010 μ F M 16V Y5S disc	510-3010-103
CAPACITORS					
C1	100 pF J 50V N750 disc	510-3020-101	C68	0.010 μ F M 50V Y5U disc	510-3002-103
C2	0.010 μ F M 50V Y5U disc	510-3002-103	C69	Same as C68	
C3	Same as C2		C70	1000 μ F 16V aluminum	510-4006-005
C4	Same as C2		C71	0.010 μ F M 16V Y5S disc	510-3010-103
C5	100 pF J 50V N750 disc	510-3020-101	C72	4700 pF M 1.4KV Z5U	510-3001-472
C6	100 pF J 50V NPO disc	510-3013-101	C73	22 μ F M 15V tubular	510-2003-220
C7	0.010 μ F M 50V Y5U disc	510-3002-103	C74	150 μ F 25V aluminum	510-4006-006
C8*	1 pF \pm 5%, NPO, ceramic disc	510-9002-109	C75	6.8 μ F M 35V dipped	510-2045-689
C8**	10 pF J 50V NPO disc	510-3013-100	C76	1.0 μ F M 35V dipped	510-2045-109
C9*	130 pF \pm 5%, N150, ceramic disc	510-3016-131	C77	56 μ F M 6V tubular	510-2001-560
C9**	68 pF J 50V N150 disc	510-3016-680	C78	0.22 μ F M 250V flat foil	510-1004-224
C10	5.1 pF J 500V 4DM15	510-0004-519	C79	0.02 μ F \pm 20%, 50 VDC, ceramic disc	510-3002-203
C11**	68 pF J 50V N150 disc	510-3016-680	C80	Same as C79	
C12	270 pF J 100V 1DM15	510-0001-271	C81	330 pF J 100V 1DM15	510-0001-331
C13	Same as C12		C82	82 pF J 50V N150 disc	510-3016-820
C14	210 pF J 50V N080 disc	510-3015-211	C83	10 pF J 50V NPO disc	510-3013-100
C15	Same as C14		C84	0.010 μ F M 16V Y5S disc	510-3010-103
C16	0.010 μ F M 16V Y5S disc	510-3010-103	C85	0.010 μ F M 50V Y5U disc	510-3002-103
C17	6.8 μ F M 35V dipped	510-2045-689	C86	Same as C85	
C18*	150 pF, NPO, ceramic disc	510-3027-151	C87	180 pF J 100V 1DM15	510-0001-181
C18**	150 pF J 50V N3300 disc	510-3023-151	C88	15 pF J 50V N150 disc	510-3016-150
C19	190 pF J 50V N080 disc	510-3015-191	C89	68 pF J 50V N150 disc	510-3016-680
C20	0.10 μ F M 16V Y5S disc	510-3010-104	C90	1000 pF M 50V Y5U disc	510-3002-102
C21	190 pF J 50V N080 disc	510-3015-191	C91	22 pF J 100V 1DM15	510-0001-220
C22	1.0 μ F M 35V dipped	510-2045-109	C92	22 pF J 50V N150 disc	510-3016-220
C23	Same as C22		C93	1000 pF M 1KV Y5S disc	510-3061-102
C24	0.047 μ F M 16V Y5S disc	510-3010-473	C94	Same as C93	
C25	0.010 μ F M 50V Y5U disc	510-3002-103	C95	4700 pF K 1KV Y5S disc	510-3061-472
C26	0.010 μ F M 16V Y5S disc	510-3010-103	C96	1000 pF M 50V Y5U disc	510-3002-102
C27	Same as C26		C97	47 pF J 50V NPO disc	510-3013-470
C28*	150 pF, NPO, ceramic disc	510-3027-151	C98	33 pF J 50V N150 disc	510-3016-330
C28**	22 pF J 50V NPO disc	510-3013-220	C99	1000 pF M 1KV Y5S disc	510-3061-102
C29	0.010 μ F M 50V Y5U disc	510-3002-103	C100	4700 pF M 50V Y5U disc	510-3002-472
C30	330 pF J 100V 1DM15	510-0001-331	C101	27 pF J 50V NPO disc	510-3013-270
C31*	150 pF, NPO, ceramic disc	510-3027-151	C102	390 pF J 100V 1DM15	510-0001-391
C31**	150 pF J 100V 1DM15	510-0001-151	C103	100 pF J 50V N150 disc	510-3016-101
C32	0.010 μ F M 50V Y5U disc	510-3002-103	C105	330 pF J 100V 1DM15	510-0001-331
C33	0.010 μ F M 16V Y5S disc	510-3010-103	C106	0.047 μ F M 16V Y5S disc	510-3010-473
C34	0.010 μ F M 50V Y5U disc	510-3002-103	C107	47 pF J 100V 1DM15	510-0001-470
C35	150 μ F 25V aluminum	510-4006-006	C109	0.010 μ F M 50V Y5U disc	510-3002-103
C36	0.010 μ F M 16V Y5S disc	510-3010-103	C110	33 pF J 50V N150 disc	510-3016-330
C37	470 μ F 4V aluminum	510-4001-006	C111**	100 pF M 50V Y5U disc	510-3002-102
C43	0.010 μ F M 50V Y5U disc	510-3002-103	C112	Same as C111**	
C50	220 pF J 100V 1DM15	510-0001-221	C113	0.047 μ F M 50V Y5U disc	510-3002-473
C51	5.1 pF D50V NPO disc	510-3013-519	C114	470 pF M 500V Y5U disc	510-3004-471
C52	0.010 μ F M 16V Y5S disc	510-3010-103	CHASSIS PARTS		
C53	15 pF J 50V NPO disc	510-3013-150	CH1*	Chassis rail	017-1462-012
C54	150 pF J 50V N750 disc	510-3020-121	CH1**	Chassis rail	017-1462-002
C55	0.010 μ F M 50V Y5U disc	510-3002-103	CH2*	Front panel assembly	023-2212-011
C56	82 pF J 50V N150 disc	510-3016-820		includes:	
C57	100 pF J 50V N150 disc	510-3016-101		Front Panel	015-0757-002
C59	0.010 μ F M 16V Y5S disc	510-3010-103		Feedthru "Rib Loc"	260-0202-901
C60	Same as C59			Clip, component	016-1749-001
C62	6.8 μ F M 35V dipped	510-2045-689		Lamp	549-3001-007
C63	0.22 μ F M 250V flat foil	510-1004-224		Overlay**	559-2015-001
C64	6.8 pF D 50V N750 disc	510-3020-689		Meter**	554-0009-001
C65	18 pF J 50V N750 disc	510-3020-180		Dial	032-0154-001
				Knob (channel selector**)	013-1052-013
				Ring nut, 3/8-32	012-0508-002

* Messenger 320 only
 ** Messenger 323 only

PARTS LIST (cont'd)

SYMBOL NO.	DESCRIPTION	PART NO.	SYMBOL NO.	DESCRIPTION	PART NO.
	Knob (squelch and volume**)	013-1086-005		HARDWARE	
	Potentiometer with rotary switch (R16)	562-0001-004		Top shield	017-0577-001
	Potentiometer with rotary switch (R41)	562-0001-005		Heat sink for TO-39	013-1074-001
	Crystal switch assembly	583-2009-102		Clip	016-1749-001
	Bracket	017-0439-001		Heat sink	023-2213-001
	Setscrew, #6-32 C.P.	011-0112-004		Clamp	017-1434-001
	Setscrew, #8-32 C.P.	011-0122-006		Channel indicator dial	032-0154-001
	Resistor, 1/2 W, 1000 Ω (R17)	569-1004-102		0.750 knob 0.250 shaft	013-1052-013
	Resistor, 1/2 W, 120 Ω (R19)	569-1004-121		0.500 knob 0.188 shaft	013-1086-005
	Knob (without ind. mark)	547-0005-001		Disc	018-0813-004
	Knob (with ind. mark)	547-0005-002		INDICATORS	
	Meter*	554-0009-021	I1**	2193D 14.4V 0.12A red	549-3001-004
	Disc for overlay	018-0813-004	I2	2157D 6.3V 0.15 clear	549-3001-007
	Overlay*	559-2015-011	I3	Same as DS2	
	Knob (channel selector*)	013-1052-016		JACKS	
	Knob (squelch and volume*)	013-1086-006			
CH3	Cabinet assembly	023-2211-002			
CH4	Bracket, dash mounting	017-1363-001			
	DIODES				
D1	1N67A 80V 30 mA germ.	523-1000-067	J1**	11 pin, male	515-0005-011
D2	Same as D1		J2	8 pin, male	515-0005-008
D3	1N67A (in early models)	523-1000-067	J3	Coax receptacle	142-0101-002
D4	Same as D3		J4	OC tini-jax S-C 41	515-2001-002
D5	1N881 silicon diode	523-1000-881	J5	CC tini-jax NTT312	515-2001-001
D6	Same as CR5			INDUCTORS	
D7	1N67A 80V 30 mA germ.	523-1000-067	L1	10-16 μH var. ind.	542-1002-001
D10	10V J 2W zener	523-2004-100	L2	20 μH choke	542-3002-002
D13	1N881 silicon diode	523-1000-881	L3	Same as L2	
D14	1N4149 75V 75 mA S1 SW	523-0006-002	L4	Same as L2	
D15	Same as CR14		L6	Same as L2	
D16	1N881 silicon diode	523-1000-881	L7	18 mH 500 mA filter choke	542-5007-001
D17	Same as CR16		L8	13 μH choke	542-3003-001
D18	1N2326	523-1002-326	L9	Same as L8	
D20	10V J 1W zener	523-2003-100	L10	10 1/2T ind. 0.75-1.0 μH	542-1005-010
DZ1	Zener, 10 V ±5%, 2 watt	523-2004-100	L11	4 1/2T ind. 0.24-0.32 μH	542-1005-004
DZ2	Zener, 10 V ±5%, 1 watt	523-2003-100	L14	30 μH choke	542-3002-004
	ELECTRICAL PARTS			SPEAKER	
E1	Heat sink, TO-39	013-1074-001	LS1	Speaker 2x6, 3.2 ohm, 3W	589-1002-002
E2	Heat sink assembly includes: Heat sink Diode clamp (for D18) Diode 1N2326, D18 Resistor, 1 Ω 1/2 W, R61 Capacitor, 0.02 μF, C79, C80 Transistor, 2002, Q18, Q19 Mica transistor insulator Nylon transistor bushing	023-2213-001 017-1463-001 017-1288-001 523-1002-326 569-2003-109 510-3002-203 576-0040-051 018-0829-001 018-0036-011		METER	
E3	Heat sink clamp	017-1434-001	M100	Messenger 323 Meter	554-0009-001
E4	Insulator (speaker, SH2)	018-0817-006		MICROPHONE	
E5	Insulator (SH1)	018-0817-051	MK1	Microphone Assembly includes: Case, front Case, back (ASY) Actuator Interior cup (ASY) Switch, slide Grille cloth Resonator, bakelite Cord clamp Nameplate Viking head Case, front	032-0216-001 023-2701-001 032-0218-001 023-2707-001 583-3001-011 018-0919-001 018-0918-001 016-1798-001 559-0036-001 559-0037-001 032-0216-002
E6	Insulator (CH3)	018-0817-009			
E7	Insulator	018-0817-004			
	GROMMET				
G1	Rubber (between mic cord and chassis rail)	574-0002-007			

* Messenger 320 only
** Messenger 323 only

PARTS LIST (cont'd)

SYMBOL NO.	DESCRIPTION	PART NO.	SYMBOL NO.	DESCRIPTION	PART NO.
	Case, back (ASY)	023-2701-002	R15	470 ohm K 1/2 W CC	569-1004-471
	Cable, microphone	597-2001-004	R16	Potentiometer with rotary switch, 5K ohms (squelch control)	562-0001-004
	Case, back (ASY)	023-2701-003			
	Strain relief	032-0238-001	R17	1K ohms ±10%, 1/4 watt	569-1002-102
	Resonator, bakelite	018-0918-002	R18	56K ohm K 1/2 W CC	569-1004-563
	Cushion	018-0920-002	R19	120 ohms ±10%, 1/2 watt	569-1004-121
ML5	Accessory package	023-2217-001	R20	47 ohm K 1/4 W CC	569-1002-470
	OVERLAYS		R21	3.3K ohm K 1/4 W CC	569-1002-332
NP100	Messenger 323	559-2015-001	R22	22 ohm K 1/4 W CC	569-1002-220
	Messenger 320	559-2015-011	R31	4.7K ohm K 1/4 W CC	569-1002-472
	PLUGS		R32	15K ohm K 1/4 W CC	569-1002-153
P1	Jumper plug	023-1659-001	R33	3.3K ohm K 1/4 W CC	569-1002-332
P1	11-pin plug 86-CP11	515-0005-011	R34	2.2K ohm K 1/2 W CC	569-1004-222
P2	8-pin plug 86-CP8	515-0005-008	R35	120 ohm K 1/4 W CC	569-1002-121
	POWER CABLE		R36	Same as R35	
P2	P2 (for 12 VDC negative ground vehicles)	023-1657-001	R37	39K ohm K 1/4 W CC	569-1002-393
P2	P2 (for 12 VDC positive ground vehicles)	023-1658-001	R38	6.8K ohm K 1/4 W CC	569-1002-582
	TRANSISTORS		R39	2.2K ohm K 1/2 W CC	569-1004-222
Q1	GE PNP 50 MHz amp TO18	576-0003-008	R40	1.2K ohm K 1/4 W CC	569-1002-122
Q2	Same as Q1		R41	Potentiometer with rotary switch, 10,000 ohms (volume control)	562-0001-005
Q3	Same as Q1				
Q4	GE PNP 30 MHz amp TO18	576-0003-009	R42	120 ohm K 1/2 W CC	569-1004-121
Q5	Same as Q4		R43	2.2K ohm K 1/2 W CC	569-1004-222
Q6	Same as Q4		R45	47 ohm K 1/4 W CC	569-1002-470
Q7	Same as Q4		R46	220 ohm K 1/2 W CC	569-1004-221
Q8	GE PNP 50 MHz amp TO18	576-0003-008	R47	2K 1/8 W PC trim pot.	562-0004-202
Q9	GE PNP switch TO72	576-0001-016	R48	100 1/8 W PC trim pot.	562-0004-101
Q10	Same as Q9		R49	25K 1/8 W PC trim pot.	562-0004-253
Q12	GE PNP 50 MHz amp TO18	576-0003-008	R50	6.8K ohm K 1/4 W CC	569-1002-682
Q13	Same as Q12		R51	470 ohm K 1/2 W CC	569-1004-471
Q14	GE PNP switch TO72	576-0001-016	R52	1.8K ohm K 1/4 W CC	569-1002-182
Q15	GE PNP 50 MHz amp TO18	576-0003-008	R53	120 ohm K 1/4 W CC	569-1002-121
Q16	GE PNP audio amp TO1	576-0001-017	R54	680 ohm K 1/4 W CC	569-1002-681
Q17	Same as Q16		R55	1.0K ohm K 1/4 W CC	569-1002-102
Q18	2002	576-0002-002	R56	62 ohm J 1/2 W CC	569-1003-620
Q19	Same as Q18		R57	22 ohm K 1/4 W CC	569-1002-220
Q20	GE PNP 50 MHz amp TO18	576-0003-008	R59	470 ohm K 1/2 W CC	569-1004-471
Q21	Same as Q20		R60	1.5K ohm K 1/4 W CC	569-1002-152
Q22	0.4W 27 MHz amp TO39	576-0004-004	R62	15K ohm K 1/4 W CC	569-1002-153
Q23	Same as Q22		R63	4.7K ohm K 1/4 W CC	569-1002-472
Q24	3.4W 27 MHz amp TO39	576-0004-005	R64	27 ohm J 1/2 W CC	569-1003-270
	RESISTORS		R65	680 ohm K 1/4 W CC	569-1002-681
R1	33K ohm K 1/2 W	569-1004-333	R66	3.3K ohm K 1/4 W CC	569-1002-332
R2	3.9K ohm K 1/4 W	569-1002-392	R67	1.0K ohm K 1/4 W CC	569-1002-102
R3	6.8K ohm K 1/4 W	569-1002-682	R68	39K ohm K 1/4 W CC	569-1002-393
R4	5.6K ohm K 1/4 W	569-1002-562	R69	6.8K ohm K 1/4 W CC	569-1002-682
R5	10K ohm K 1/2 W	569-1004-103	R70	2.2K ohm K 1/2 W CC	569-1004-222
R6	680 ohm K 1/4 W	569-1002-681	R71	470 ohm K 1/2 W CC	569-1004-471
R7	39K ohm K 1/4 W	569-1002-393	R72	3.3K ohm K 1/4 W CC	569-1002-332
R8	1.0K ohm K 1/4 W CC	569-1002-102	R73	47 ohm K 1/4 W CC	569-1002-470
R9	4.7K ohm K 1/4 W	569-1002-472	R74	120 ohm K 1/2 W CC	569-1004-121
R10	1.0K ohm K 1/4 W CC	569-1002-102	R75	2.2K ohm K 1/2 W CC	569-1004-222
R11	12K ohm K 1/4 W CC	569-1002-123	R76	68 ohm K 1/4 W CC	569-1002-680
R12	47 ohm K 1/4 W CC	569-1002-470	R77	1.0K ohm K 1/4 W CC	569-1002-102
R13	3.3K ohm K 1/4 W CC	569-1002-332	R78	39K ohm K 1/4 W CC	569-1002-393
R14	47 ohm K 1/4 W CC	569-1002-470	R79	47K ohm K 1/2 W CC	569-1004-473
			R80	6.8K ohm K 1/4 W CC	569-1002-682
			R100	5K 1/4 W J 15/16 SPDT	562-0001-004
			R101	10K 1/4 W A 15/16 SPST	562-0001-005
			R102	820 ohm K 1/2 W CC	569-1004-821
			R103	120 ohm K 1/2 W CC	569-1004-121
				RELAY	
			RY1	Relay 4 PDT 12V PC Type C	567-0003-013

* Messenger 320 only
 ** Messenger 323 only

PARTS LIST (cont'd)

SYMBOL NO.	DESCRIPTION	PART NO.	SYMBOL NO.	DESCRIPTION	PART NO.
SHIELDS			NOTE		
SH1	Bottom	017-0578-001	The Messenger 323 crystal filter is a high Q selective circuit which produces a narrow peaked, very steep-sided, IF selectivity curve. The filter consists of crystals Y11-Y14 which make up two half lattices in series.		
SH2	Top	017-0577-001			
TRANSFORMERS			Y11**	Quartz filter crystal set, 4.2947 and 4.3010 MHz	519-0007-001
T1	RF transformer	592-5016-001	Y12**	Same as Y11**	
T2	RF transformer	592-5016-002	Y13**	Same as Y11**	
T3	RF transformer	592-9002-010	Y14**	Same as Y11**	
T4	RF transformer	592-9002-015	Y15	4.755 MHz	519-0012-001
T5	455 KC transformer	592-5016-005	Y16	4.300 MHz	519-0008-001
T6	455 KC transformer	592-5016-006	NETWORKS		
T7	455 KC transformer	592-5015-007	Z1	PEC, first mixer	544-0002-001
T8	HF transformer	592-5008-001	Z2	PEC, second mixer	544-0002-002
T9	33MH2 transformer	592-5010-001	Z3	PEC, first I.F.	544-0002-003
T10	Input/driver transformer	592-1007-004	Z4	Thermistor assembly	023-2042-003
T11	Out/mod transformer 29/3.2	592-1013-002	Z5	PEC, second I.F.	544-0002-004
T12	Transformer	592-5008-002	Z6	PEC, noise limiter	544-0002-015
T13	Double tuned transformer	592-5021-001	Z7	Thermistor assembly	023-2042-008
T14	25-50 MHz driver transformer	592-5014-002	Z8	PEC, audio amplifier	544-0002-006
TEST POINTS			Z9	Thermistor assembly	023-2042-004
TP1*	Red	105-0752-001	ACCESSORY PACKAGE ITEMS		
TP1**	White	105-0751-001	Operating manual		
TP2**	Red	105-0752-001	002-0058-001		
TP3**	Black	105-0753-001	Part 95 - FCC Rules - Citizens Radio Service		
CRYSTALS			022-1635-001		
S100	Crystal switch assembly, 4.3 IF	583-2009-103	FCC Form 505 - License Appli- cation form		
	Includes:		FCC identification card		
	Wafer switch	583-2009-011	564-1001-001		
	P.C. board	035-0070-001	Warranty registration card		
Y1	10.180	519-0006-014	(attached to outside)		
Y2	10.170	519-0006-013	Microphone holder (with extra 1/4" dia. hole)		
Y3	10.160	519-0006-012	537-9004-002		
Y4	10.140	519-0006-011	Screws for microphone holder		
Y5	32.845	519-0005-011	(#4 sheet metal)		
Y6	32.895	519-0005-012	011-0807-006		
Y7	32.945	519-0005-013	Mounting bracket hardware		
Y8	32.995	519-0005-014	package		
Y9	33.045	519-0005-015	Reduced schematic		
Y10	33.095	519-0005-016	564-3001-153		
NOTE			VSWR Warning Notice		
When ordering a replacement crystal for Y1 through Y10, specify if the crystal being replaced is painted with a red or green date code.			004-0022-001		
			Tap Connector package		
			023-2209-001		
			Battery cable		
			023-1657-001		

* Messenger 320 only
** Messenger 323 only

ENGINEERING CHANGES

(B REVISION)

MESSENGER 323

<u>Components Changed</u>	<u>From</u>	<u>To</u>	<u>New Part Number</u>
C61	0.05 μ F	0.22 μ F	510-1004-224
Z8	544-0002-016		544-0002-006
R18	120 K	100 K	569-1002-104
C103	82 pF	100 pF	510-2016-101
C105	270 pF	330 pF	510-0001-331

<u>Components Added</u>	<u>Description</u>	<u>Part Number</u>
R78	Resistor, 5600 ohms \pm 10%, 1/4 watt	569-1002-562
R79	Resistor, 47,000 ohms \pm 10%, 1/2 watt	569-1004-473
C113	Capacitor, 0.047 μ F +80%/-20%, 50 VDC ceramic disc, Y5U	510-3003-503

<u>Components Deleted</u>	<u>Reason</u>
R44	To increase modulation level
L12	
L13	
D3	Improve noise limiter, temperature compensation
D4	" " " " "

MESSENGER 320

<u>Components Changed</u>	<u>From</u>	<u>To</u>	<u>New Part Number</u>
Z6	PN 544-0002-005		544-0002-015
C17	5.6 μ F	6.8 μ F	*510-2045-689
C62	5.6 μ F	6.8 μ F	*510-2045-689
C65	5.6 μ F	6.8 μ F	*510-2045-689
C24	0.05 μ F	0.047 μ F	*510-3007-473
C106	0.05 μ F	0.047 μ F	*510-3007-473
C35	50 μ F	150 μ F	510-4006-006
C74	50 μ F	150 μ F	510-4006-006
C72	0.005 μ F	0.0047 μ F	*510-3001-472
C77	56 μ F	68 μ F	*510-2042-680
C95	0.005 μ F	0.0047 μ F	*510-3002-472
C100	0.005 μ F	0.0047 μ F	*510-3002-472
C113	0.05 μ F	0.047 μ F	*510-3003-473
C103	820 pF	100 pF	510-3016-101
C105	270 pF	330 pF	510-0001-331
C14	190 pF	210 pF	510-3015-211
C15	190 pF	210 pF	510-3015-211
C19	190 pF	210 pF	510-3015-211
C21	190 pF	210 pF	510-2015-211

* Changed to EIA Standard value

<u>Components Added</u>	<u>Description</u>	<u>Part Number</u>
R17	Resistor, 1000 ohms \pm 10%, 1/2 watt	569-1004-102
R19	Resistor, 120 ohms \pm 10%, 1/2 watt	569-1004-101

<u>Components Deleted</u>	<u>Reason</u>
D3	Replaced with thermistor
D4	To improve noise limiter temperature compensation

ENGINEERING CHANGES

Serial number stickers can be used as a guide to unit revisions, but should not be considered absolutely accurate in every instance. For example, a D model unit might not include every D model revision, or an E model might include an F model change. The following changes are listed only as a servicing aid; they should not be considered absolutely accurate in all cases.

REVISION C

<u>Components Changed</u>	<u>Schematic Location</u>	<u>From</u>	<u>To</u>	<u>New Part Number</u>	<u>Reason for Change</u>
C12	A5	330 pF	270 pF	510-0001-271	Availability
C13	A5	330 pF	270 pF	510-0001-271	Availability
C14	A6	190 pF	210 pF	510-3015-211	Availability
C15	A7	190 pF	210 pF	510-3015-211	Availability
C77	D3	68 μ F	56 μ F	510-2001-560	Availability
R35	B2	1K Ω	120 Ω	569-1002-121	Availability
R36	B3	1K Ω	120 Ω	569-1002-121	Availability
R49	B8	100 Ω pot.	25K Ω pot.	562-0004-253	Availability
R53	C2	1K Ω	120 Ω	569-1002-121	Availability

PC1 printed circuit board changed from 035-0022-002 to 035-0022-003.

Microphone changed from 589-0006-004 to 250-0709-001.

REVISION D

<u>Components Changed</u>	<u>Schematic Location</u>	<u>From</u>	<u>To</u>	<u>New Part Number</u>	<u>Reason for Change</u>
C93	D7	0.001 μ F, Y5U	0.001 μ F, Y5S	510-3061-102	Cold temperature
C94	D7	0.001 μ F, Y5U	0.001 μ F, Y5S	510-3061-102	reliability
C10	A4	1.4-7.3 pF	5.1 pF	510-0004-519	Squelch delay

<u>Components Deleted</u>	<u>Schematic Location</u>
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C61 B5

REVISION E

<u>Components Changed</u>	<u>Schematic Location</u>	<u>From</u>	<u>To</u>	<u>New Part Number</u>	<u>Reason for Change</u>
Q4	A6	3010	3009	576-0003-009	Availability
Q5	A7	3010	3009	576-0003-009	Availability
Q6	B1	3010	3009	576-0003-009	Availability
Q7	B2	3010	3009	576-0003-009	Availability
Q9	D2	1002	1016	576-0001-016	Availability
Q10	D2	1003	1016	576-0001-016	Availability
Q14	B7	1003	1016	576-0001-016	Availability
Q16	D1	1003	1017	576-0001-017	Availability
Q17	D2	1009	1017	576-0001-017	Availability
R15	D1	1K Ω	470 Ω	569-1004-471	Squelch Range
R18	C2	100K Ω	39K Ω	569-1004-393	Squelch Range
R78	D3	5.6K Ω	39K Ω	569-1004-393	PA and Ext. Speaker oscillations
Z5	A7	2004	2014	544-0002-014	Physical Dimensions
Z7	C2	2001	2008	023-2042-008	Improve temp. stability

<u>Components Added</u>	<u>Schematic Location</u>	<u>Description</u>	<u>New Part Number</u>	<u>Reason for Change</u>
C114	C6	Capacitor, 470 pF, 20%, 500V, Y5U	510-3004-471	New microphone
R80	D1	Resistor, 6.8K, 10%, 1/4 W	569-1002-682	Self-modulation

PARTS LIST CORRECTIONS

DIODES		
D13	Diode, 1N881	523-1000-881
RESISTORS		
R62	Resistor, 15K, 10%, 1/4 W	569-1002-153

COMPONENTS LOCATION CHANGES

R80 added between pin 1 and pin 5 of Z8.
R78 added between pin 2 and pin 3 of Z8