



# MOTOROLA

## "MT500" SERIES "Handie-Talkie" Portable Radios

30 - 50 MHz

### PERFORMANCE SPECIFICATIONS

GENERAL	TRANSMITTER	RECEIVER
<b>FREQUENCY RANGE:</b> 30 - 50 MHz  <b>POWER SUPPLY:</b> (1) Mercury battery, or (1) Nickel-Cadmium battery  <b>BATTERY DRAIN — *</b> @ 15 V dc Standby: 11.5 mA Receive: 70 mA Transmit: H31BBB Series 1000 mA H31BBU Series 1020 mA  <b>BATTERY LIFE —</b> (Based on 5% transmit, 5% receive with rated af output, 90% standby) Mercury battery, 25 hours Nickel-cadmium battery, 8 hours/charge  <b>DIMENSIONS —</b> Height: 7.62 in. (193 mm) Width: 2.73 in. (69 mm) Depth: 1.85 in. (47 mm)  <b>WEIGHT — *</b> Mercury battery: 26.8 oz. Nickel-Cadmium battery: 25.3 oz.  <b>FCC DESIGNATIONS:</b> Xmit: CC1164, CC1165 CC1167, CC1168 Rcvr: RC0237  * For "Private-Line" squelch version of any model, add: 1 oz. to weight, 4 mA to drain.	<b>RF OUTPUT —</b> Mercury battery: 3 W at 12.7 V dc Nickel-cadmium battery: 6 W at 15.0 V dc  <b>FREQUENCY STABILITY:</b> ± .002% from -30° C to +60° C (25° C ref.)  <b>MODULATION:</b> Type 16F3, ± 5 kHz for 100% modulation at 1000 Hz  <b>SPURIOUS &amp; HARMONICS:</b> More than 51 dB below carrier  <b>FM NOISE:</b> At least 55 dB below ± 3.3 kHz deviation at 1000 Hz  <b>AUDIO RESPONSE:</b> +1, -3 dB from 6 dB/octave pre-emphasis characteristic from 300 - 3000 Hz  <b>AUDIO DISTORTION:</b> Less than 3% at 1000 Hz 60% max rated deviation  <b>MAX PERMISSIBLE CHAN SEPARATION:</b> 0.5 MHz, no degradation	<b>AUDIO OUTPUT:</b> 500 mW at less than 5% distortion  <b>FREQUENCY STABILITY:</b> ± .001% (± .0005% option) from -30° C to +60° C (25° C ref.)  <b>MODULATION ACCEPTANCE:</b> ± 7 kHz  <b>SPURIOUS &amp; IMAGE REJECTION:</b> More than 70 dB below carrier  <b>SENSITIVITY:</b> 0.25 uV (12 dB SINAD), 0.35 uV max (20 dB quieting)  <b>SELECTIVITY:</b> More than 75 dB at ± 20 kHz (EIA SINAD)  <b>NOISE SQUELCH SENSITIVITY:</b> Noise compensated type, adjustable, will open at less than 0.18 uV  <b>MAX PERMISSIBLE CHAN SEPARATION:</b> 0.5 MHz (no degradation)  <b>INTERMODULATION:</b> 70 dB (EIA SINAD)  <b>CHANNEL SPACING:</b> 20 kHz

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

NOTE: The below-listed publications have all been discontinued, and are NLA.

#### RELATED PUBLICATIONS AVAILABLE SEPARATELY:

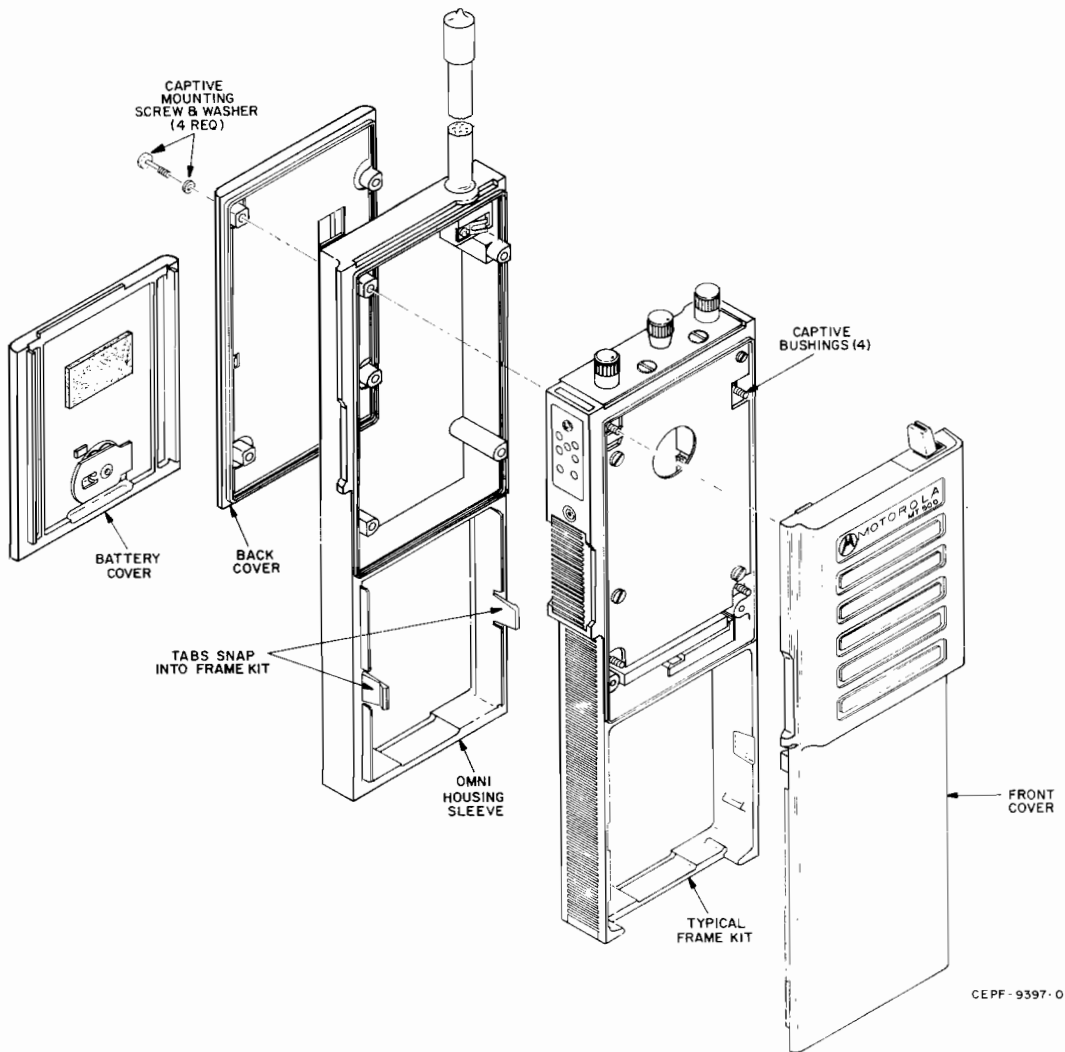
Operating Instructions . . . . . 68P81012C50  
Theory/Maintenance Manual . . . . . 68P81012C55  
Digital PL (Model C) Supplement . . . . . 68P81020C40

MODEL TYPES H31BBB & H31BBU	NUMBER OF CHANNELS	TYPE OF SQUELCH
1114A	1	Carrier
1124A	2	
1144A	4	
1164A	6	
3114A	1	Tone PL
3124A	2	
3144A	4	
3164A	6	

THIS MANUAL HAS BEEN  
DISCONTINUED

Service Manual  
68P81017C55-B

## DISASSEMBLY PROCEDURE

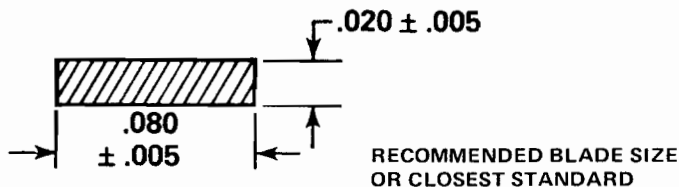


## PROCEDURE

1. TURN THE SLOTTED SCREW HEAD ON THE BATTERY COVER ONE QUARTER TURN COUNTER-CLOCKWISE AND REMOVE THE BATTERY COVER.
2. REMOVE THE BATTERY.
3. LOOSEN THE FOUR CAPTIVE SCREWS HOLDING THE BACK COVER AND REMOVE THE BACK COVER.
4. REMOVE SNAP-ON SLEEVE.
5. LOOSEN THE FOUR CAPTIVE BUSHINGS HOLDING THE CHASSIS FRAME TO THE FRONT COVER.
6. SEPARATE THE FRONT COVER FROM THE FRAME.
7. UNPLUG THE WIRES CONNECTING THE FRONT COVER TO THE CHASSIS FRAME.

### CAUTION

8. WHEN REMOVING OR INSTALLING THE TRANSMITTER-RECEIVER CIRCUIT BOARD, USE A JEWELER'S SCREWDRIVER. THE RECOMMENDED SCREWDRIVER BLADE SIZE IS ILLUSTRATED BELOW. WHEN TIGHTENING, USE 17-TO 22-INCH-OUNCES TORQUE.



EPF-9399-A

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# MOTOROLA

## MANUAL REVISION

for  
Manual No. 68P81017C55-B  
"MT500" SERIES  
30-50 MHz

This revision outlines changes that have occurred since the printing of your manual. Use this information to supplement your manual. Installation of these changes in earlier equipment is not necessary except as recommended in Motorola Service and Repair Notes (SRN's).

### REVISION DETAILS

NO.	CHANGE AFFECTS	ITEM NO.	SUFFIX
1	Transmitter Alignment	-----	---

### CHANGES

#### NO.

- 1 On page 3, **TRANSMITTER ALIGNMENT**, add the following information to **STEP 2**, **NOTE**:
  - a. The tuning sense antenna connected to the field strength meter should be a PT500 whip with loading coil for the various splits instead of a broadband antenna structure (30-36 MHz/NAB6011A; 36-42 MHz/NAB6012A; 42-46 MHz/NAB6013A; 46-50MHz/NAB6014A). Each antenna should be tuned at the center frequency of each split.
  - b. A ground plane of adequate area approximately 1 (meter)<sup>2</sup> is required beneath the field strength meter. The bottom of the field strength meter should be bare in order that a good contact can be made with the ground plane.
  - c. Tuning must be done at least 10 feet from the field strength meter away from metal surfaces.
  - d. The radio and antenna must be vertically oriented at all times.
  - e. While tuning for a peak reading, the hand and tuning tool must not be in close proximity to the antenna when the reading (deflection level) is being made. Tuning will be most accurate if the microphone is two to three inches away from the mouth and the radio is vertical.
  - f. Since tuning is done with the cap off, compensation must be made in the slug position when the cap is placed on. It appears that by rotating the slug one full turn down after the peak has been attained is adequate, but may vary depending upon antenna type. The deflection level should be noted from both conditions (cap off/cap on) and their difference should be consistent from antenna to antenna.

## GENERAL

This radio has been factory aligned and does not require any adjustments. Realignment may be required if components are replaced or have aged. If it is necessary to realign the radio, perform the following procedures:

1. Remove the battery and disassemble the radio as shown in the "Disassembly Procedure." Do not disconnect the front cover receptacle from the interconnect board plug.
2. Connect a dc power supply to the front cover battery contacts: power supply negative to radio negative charging contact and power supply positive to radio positive charging contact (see "Disassembly Procedure").
3. Adjust the power supply output for 15 volts dc.
4. Perform either the "Receiver Alignment" procedure or "Transmitter Alignment" procedure or both procedures as required.


## TRANSMITTER ALIGNMENT

Preliminary Adjustments:

1. Connect a 50-ohm load to external antenna jack J202.
2. Set frequency switch S201 to the highest frequency channel. Frequency allocations for each channel are on the back-cover label.
3. Set each slug (L201 through L206) at the top of its coil form.
4. Set slugs L102, L103, L105, and L107 flush with the solder side of the circuit board.
5. Set "Instantaneous Deviation Control" (IDC) potentiometers R201 through R206 to midrange.
6. Make all measurements with radio "keyed" (i.e., PTT switch S202 depressed).

STEP	ADJUST	FOR	MEASURED AT	USING	NOTE
1	Warp coil for channel with highest carrier frequency F1-L201, F2-L202, F3-L203, F4-L204, F5-L205, F6-L206)	Maximum current drain	Ammeter on power supply	RF Wattmeter, Tuneup Cable NKN6157A	Maximum may be very broad.
2	L102, L103	Second peak in power output	External Antenna Jack J202	RF Wattmeter, Tuneup Cable NKN6157A	Repeat at least once to ensure that a maximum has been obtained. (See FMR-1223-1)
3	L105, L107	Maximum power output	External Antenna Jack J202	RF Wattmeter, Tuneup Cable NKN6157A	Repeat steps 2 and 3.
4	L107	Specified power output	External Antenna Jack J202	RF Wattmeter, Tuneup Cable NKN6157A	On multiple-frequency radios, balancing tuning of L105 and L107 may be necessary to achieve power and current balance between channels.
5	Repeat steps 2, 3, and 4.				
6	F1 IDC Control R201	$\pm 5\text{kHz}$ deviation	External Antenna Jack J202	Audio Oscillator Connected to IDC Module U201-4, Deviation Meter thru a 30dB pad, and Tuneup Cable NKN6157A	Set audio oscillator for an output of 50mVrms at 1000Hz.
7	Repeat steps 1 and 6 for each channel in the radio; be sure to set the frequency switch to the channel being aligned (R202-F2, R203-F3, R204-F4, R205-F5, R206-F6).				
8	Repeat steps 4 through 8 on each channel.				
9	Antenna Loading Coil	Maximum field strength	Antenna	Field Strength Meter	Cap of antenna must be removed to access antenna loading coil. Radio must be in a vertical position for an accurate meter indication of antenna radiation. Replace antenna cap when alignment is complete.

# **RECEIVER ALIGNMENT** (Preferred Method)

- Preliminary Adjustments:
1. Set PL switch S401 to its off (  ) position (if applicable).
  2. Set squelch (~~AM~~) control R201 to its maximum counterclockwise position.
  3. Set frequency switch S201 to the lowest frequency channel.
  4. Preposition slugs of L1, L2, L3, L4, L5, and T1 flush with the circuit board solder side.

## **NOTE**

If a frequency counter and a SINAD meter are available, perform the Preferred Method of Alignment (steps 1 through 6); otherwise, perform the Alternate Method (steps 1A through 5A).

STEP	ADJUST	FOR	MEASURED AT	USING	NOTE
1 (See Note Above)	Second oscillator frequency	Correct conversion of first i-f frequency	Pin 24 of U1 (M3)	8.4 MHz Oscillator, AC Voltmeter, Frequency Counter	Determine second i-f frequency as follows: 1. Connect an ac voltmeter to pin 24 of U1 and a frequency counter to the output of the ac voltmeter. 2. Inject a signal from an 8.4 MHz $\pm$ 100 Hz crystal oscillator into pin 19 of U1 to produce at least a -30 dBm output at pin 19 of U1; then adjust voltmeter to peg the needle for full-scale deflection by turning the range selector down two levels. This is necessary in order to drive the frequency counter in the following step. 3. Count the second i-f frequency through the ac voltmeter and frequency counter at pin 24 of U1. Record the reading within $\pm$ 10 Hz; this reference must read 455 kHz $\pm$ 1.5 kHz. Then turn off the 8.4 MHz oscillator.
2	L7	Noise balance	Pin 5 of U1 (M2)	Oscilloscope	Adjust the oscilloscope so the trace is centered with the vertical mode in ac position. Adjust L7 until the noise seen at pin 5 of U1 is equally distributed around the center line.
3	L1, L2, L3, L4, L5	Nearest resonant point that results in a -30 dBm reading on meter	Pin 24 of U1 (M3)	Service Monitor or Signal Generator, AC Voltmeter, Frequency Counter	Adjust signal generator for maximum output. If level of signal at pin 24 of U1 on ac meter is not -30 dBm, adjust L1 through L5 until it is; then adjust meter to peg the needle for full-scale deflection by turning range selector down two levels.
4	L213, L214, L215, L216, L217, L218	Reference-frequency recorded in step 1	Pin 24 of U1 (M3)	Service Monitor or Signal Generator, AC Voltmeter, Frequency Counter	Adjust the warp coil for the selected radio channel (L213-F1, L214-F2, L215-F3, L216-F4, L217-F5, L218-F6) until the frequency on the counter indicates the same as the reference frequency recorded in step 1. Repeat this step until all channels of the radio are warped onto frequency.
5	T1	Maximum dc voltage	Junction of T1 and R24 (M1)	DC Multimeter, Signal Generator or Service Monitor	Set signal generator to rf signal frequency of radio and reduce output to minimum. Tune T1 until the dc voltage at the junction of T1 and R24 is peaked. On multi-frequency radios, use a mid-range frequency.
6	L1, L2, L3, L4, L5	Proper bandwidth using 12 dB SINAD method	External Speaker Jack J201	SINAD Meter, Signal Generator or Service Monitor, AC Voltmeter	1. Adjust the audio output at the external speaker jack to approximately 4.41 Vrms at 15 V supply. 2. With the signal generator set at a middle frequency of the radio being tested and 3 kHz deviation with 1 kHz modulation frequency applied, turn the generator output up until a tone is heard. 3. Connect the SINAD meter to the external speaker jack. In consecutive order, adjust L1, L2, L3, L4, and L5 for the best SINAD meter indication, reducing the signal generator output as required. This completes the receiver tuning procedure.

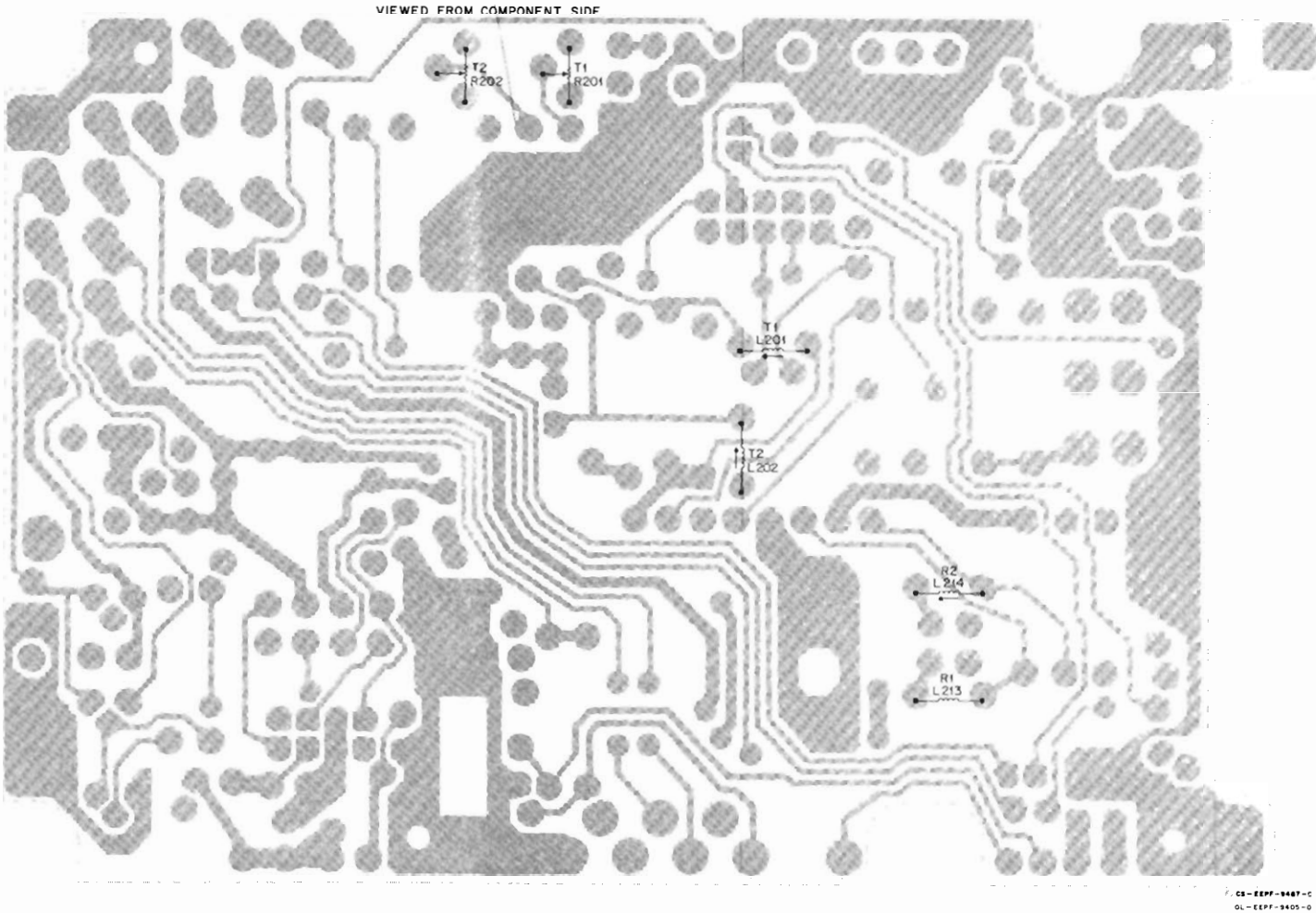
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(Page 1 of 2)

RECEIVER ALIGNMENT  
(Alternate Method)

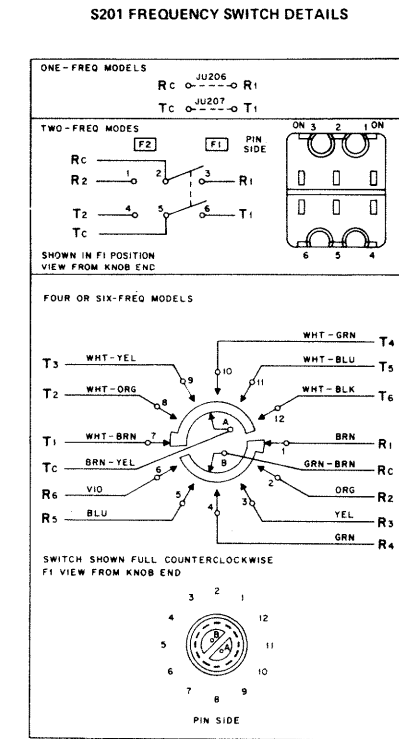
NOTE  
If a frequency counter and a SINAD meter are not available, perform the Alternate Method of Alignment (steps 1A through 5A)

STEP	ADJUST	FOR	MEASURED AT	USING	NOTE
1A	L7	Noise balance	Pin 5 of U1 (M2)	Oscilloscope	Adjust the oscilloscope so the trace is centered with the vertical mode in ac position. Adjust L7 until the noise seen at pin 5 of U1 is equally distributed around the center line.
2A	L1, L2, L3, L4, L5	Nearest resonant point that results in a -30 dBm reading on meter	Pin 24 of U1 (M3)	Signal Generator or Service Monitor, AC Voltmeter, Frequency Counter	Adjust signal generator for maximum output. If level of signal at pin 24 of U1 on ac meter is not -30 dBm, adjust L1 through L5 until it is; then adjust meter to peg the needle for full-scale deflection by turning range selector down two levels. This is necessary in order to drive the frequency counter in the following step.
3A	L213, L214, L215, L216, L217, L218	Zero beat at 455 kHz second i-f	Pin 24 of U1 (M3)	8.4 MHz Oscillator, Signal Generator or Service Monitor, AC Voltmeter	<ol style="list-style-type: none"><li>Adjust warp coil for the selected radio channel (L213-F1, L214-F2, L215-F3, L216-F4, L217-F5, L218-F6) as follows: Reduce signal generator output to minimum and inject a signal from the 8.4 MHz <math>\pm</math> 100 Hz crystal oscillator at pin 19 of U1. Adjust the output level for a -30 dBm reading.</li><li>Use one of the following methods for zero beat measurement.<ol style="list-style-type: none"><li>Using an Oscilloscope<ol style="list-style-type: none"><li>Connect the output of the ac voltmeter to the oscilloscope and set the time base to 5 ms per division and gain to display signal amplitude of approximately 3 divisions.</li><li>Set the signal generator to the exact carrier frequency and increase the output until the waveform on the oscilloscope appears as an amplitude modulated signal. This signal is the result of the 8.4 MHz crystal oscillator mixing with the first i-f signal, which will not be exactly 8.4 MHz until the oscillator is warped to the precise frequency by adjusting the channel warp coil.</li><li>Adjust warp coil while viewing the signal on the oscilloscope for a zero beat or the lowest possible amplitude modulating frequency. This method will provide an accuracy of <math>\pm</math> 100 Hz adjustment of the channel warp coil.</li></ol></li><li>Listening for an Audio Tone<ol style="list-style-type: none"><li>Adjust volume control to listen to the audio output.</li><li>Set the signal generator to the exact carrier frequency and increase the output until an audio tone is heard. This tone is the product of the mixing signals described in step 3A, Note 2.a.(2).</li><li>Adjust warp coil for a zero beat (no audio tone is heard when properly adjusted).</li></ol></li></ol></li><li>Repeat Notes 1 and 2 of this step until all channels of the radio are warped onto frequency.</li></ol>
4A	T1	Maximum dc voltage	Junction of T1 and R24 (M1)	DC Multimeter, Signal Generator or Service Monitor	Set signal generator to rf signal frequency of radio and reduce output to minimum. Tune T1 until the dc voltage at the junction of T1 and R24 is peaked. On multi-frequency radios, use a mid-range frequency.
5A	L1, L2, L3, L4, L5	Peak indication using best quieting method	External Speaker Jack J201	Signal Generator or Service Monitor, AC Voltmeter	<ol style="list-style-type: none"><li>Adjust audio output at the external speaker jack to approximately 2.2 volts ac.</li><li>Increase signal generator output until audio output starts to quiet.</li><li>In consecutive order, adjust L1, L2, L3, L4, and L5 for the best quieting, reducing the signal generator output as required. This completes the tuning procedure.</li></ol>

TWO-FREQUENCY INTERCONNECT BOARD ALIGNMENT POINTS







**DERIVATION OF FIRST OSCILLATOR FREQUENCIES**

TRANSMITTER	
L	First Oscillator Frequency (15.000 - 18.000)
$f_o = f_c/2$	
$f_o$	Oscillator Frequency
$f_c$	Carrier Frequency
RECEIVER	
(L)	High Side Injection $f_c = f_o + f_1$ $f_1$ = High IF Frequency (8.4MHz) $f_o$ = First Oscillator Frequency (38.4 - 44.4)
(M)	Low Side Injection $f_c = f_o - f_1$ $f_o$ = First Oscillator Frequency (27.6 - 33.6)
(H)	Low Side Injection $f_c = f_o - f_1$ $f_o$ = First Oscillator Frequency (33.6 - 41.6)

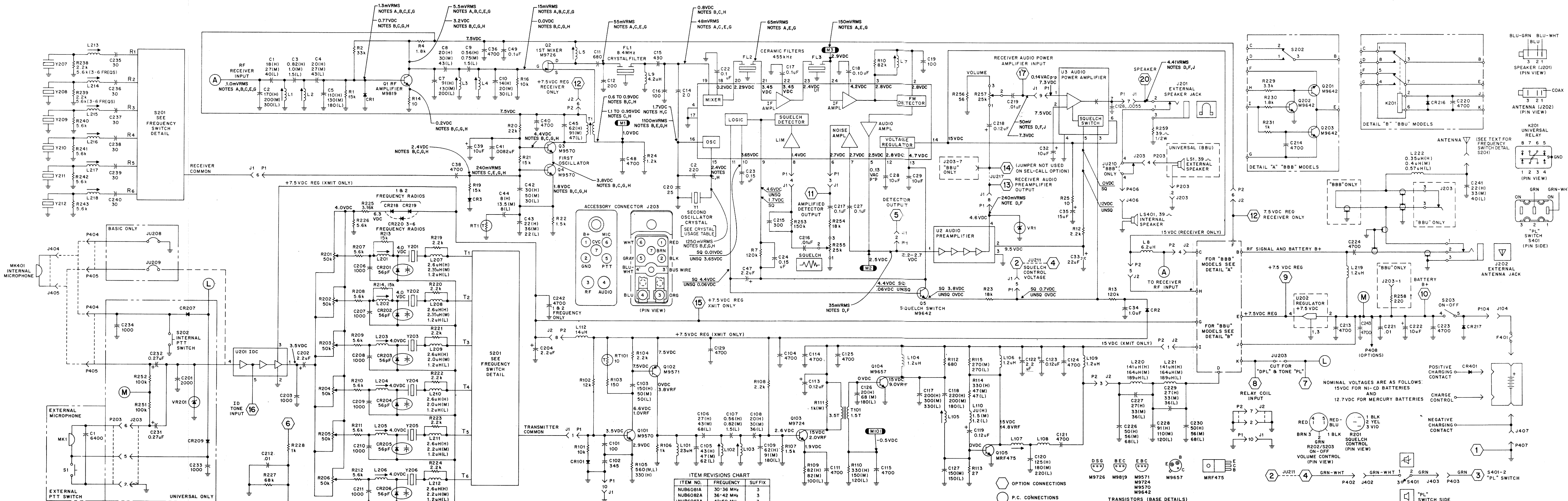
**NOTES:**  
 $f_2$  = Low IF Frequency (455kHz) =  $f_1 - f_2$   
 $f_2$  = Second Oscillator Frequency (7.945 or 8.855MHz)  
 L = Low Split (30 - 36MHz)  
 M = Mid Split (36 - 42MHz)  
 H = High Split (42 - 50MHz)

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**DPL JUMPERS**

SPLIT	FREQUENCY	1ST	2ND	ADD/DELETE	JUMPERS
L	30-35MHz	HIGH	HIGH	-	JU203, 204, 204
L	35-36MHz	HIGH	LOW	+	JU203, 204
M	36-39.2MHz	LOW	LOW	+	JU203, 204
M	39.2-42MHz	LOW	HIGH	-	JU203, 204
H	42-45MHz	LOW	LOW	+	JU203, 204
H	45-50MHz	LOW	HIGH	+	JU203, 204

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**SECOND OSCILLATOR CRYSTAL USAGE**

FREQUENCY (MHz)	TYPE OF INJECTION	ITEM NUMBER *
30	LOW-SIDE	NUB6088A
35	LOW-SIDE	NUB6088A
36	LOW-SIDE	NUB6088A
39.2	LOW-SIDE	NUB6088A
42	HIGH-SIDE	NUB6088A
42.45	LOW-SIDE	NUB6088A
45	HIGH-SIDE	NUB6088A

\* NUB6088A 2nd OSC XTAL, LOW SIDE (7.945MHz)  
 \* NUB6089A 2nd OSC XTAL, HIGH SIDE (8.855MHz)

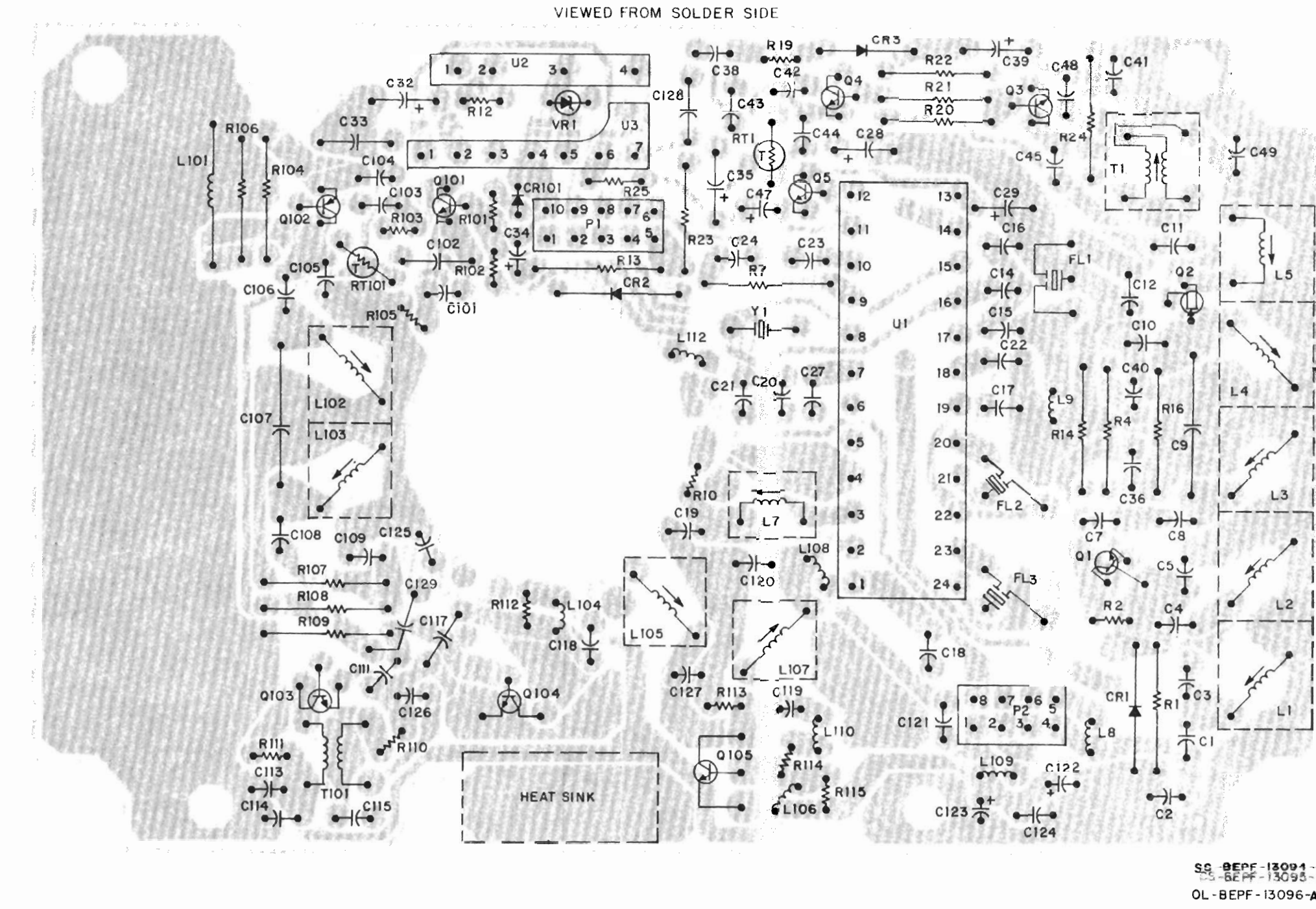
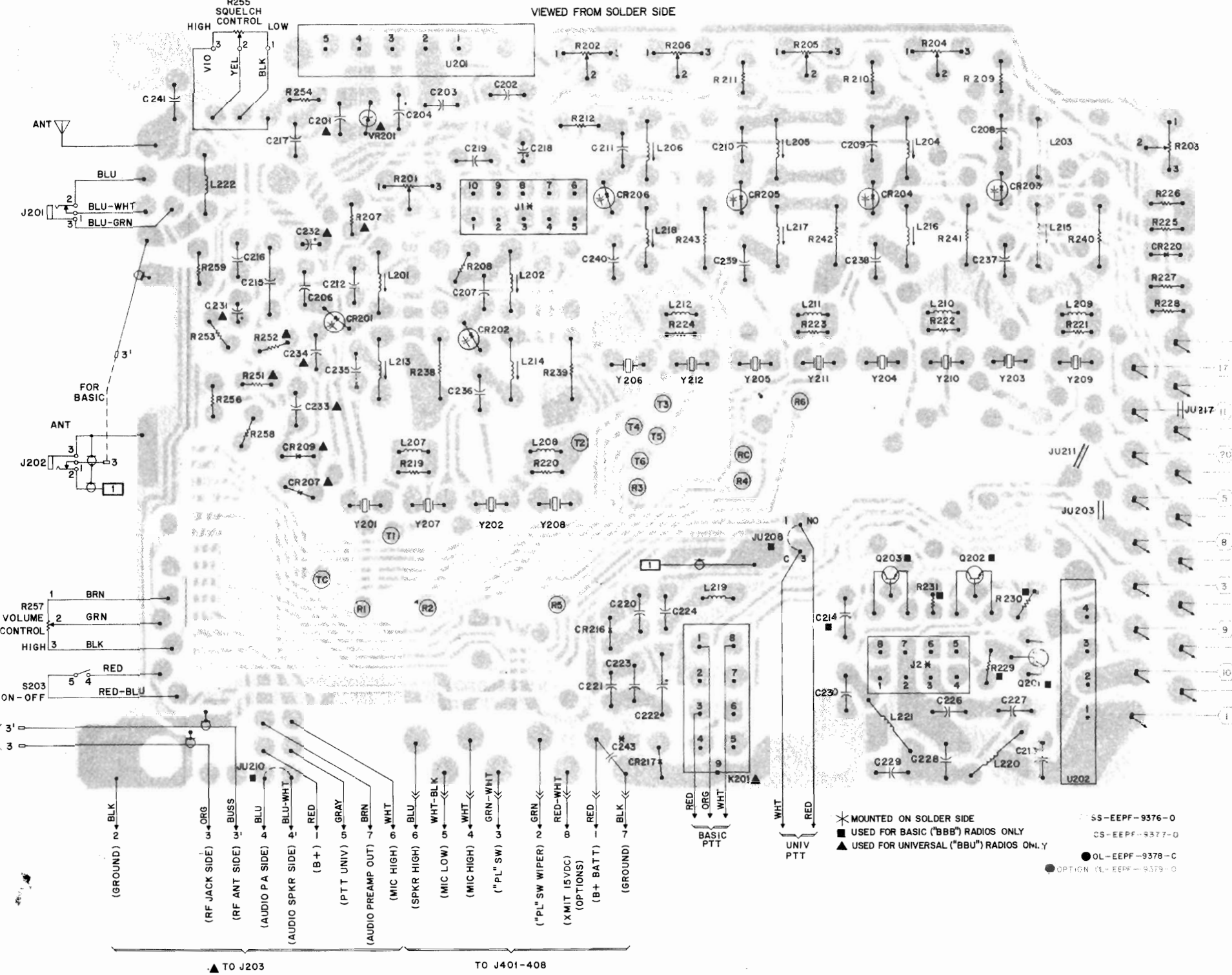
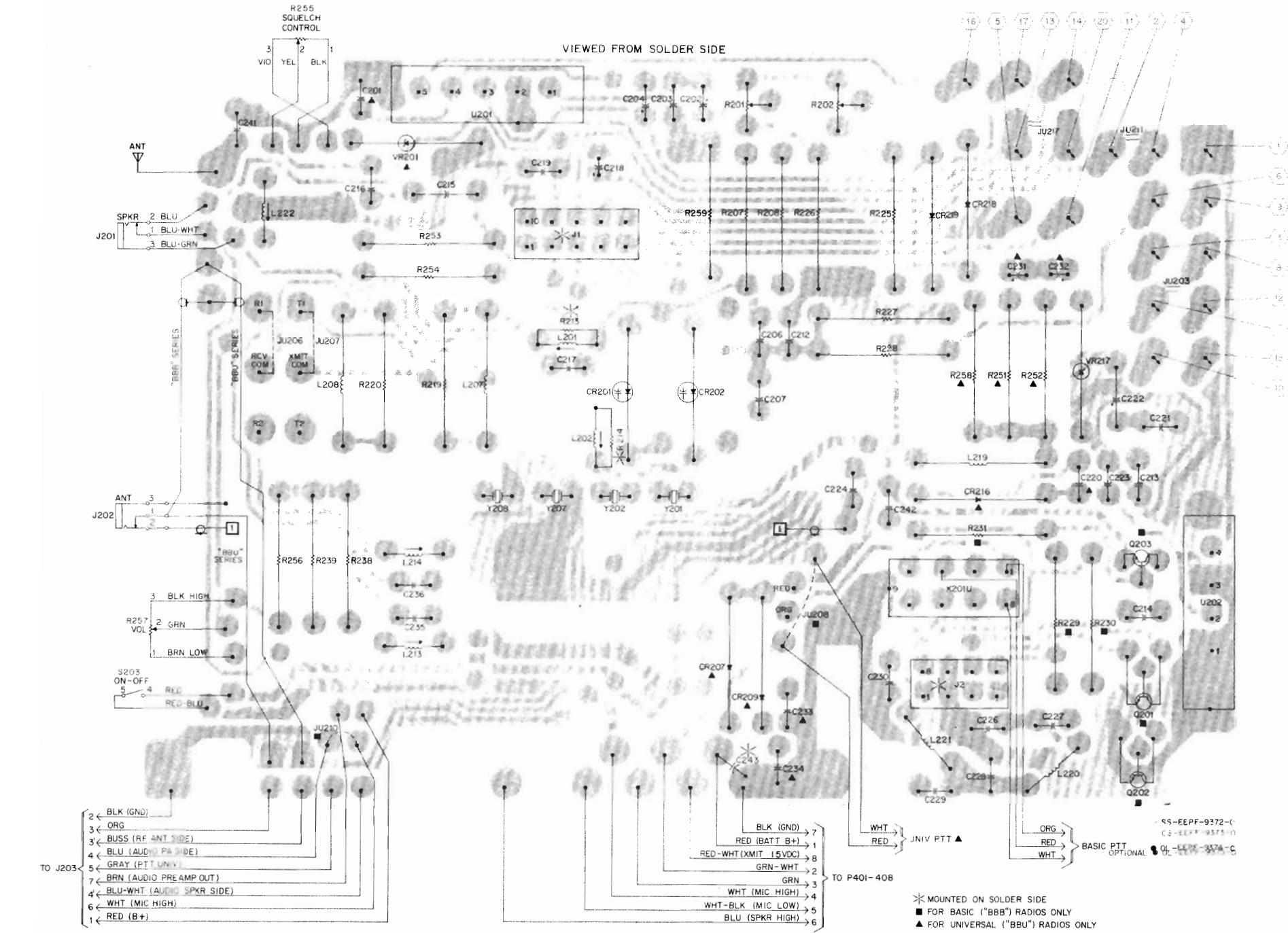
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NOTE: Use low-side injection in the 50-54 MHz 6m band.

# TWO-FREQUENCY INTERCONNECT CIRCUIT BOARD

# SIX-FREQUENCY INTERCONNECT CIRCUIT BOARD

# TRANSMITTER-RECEIVER CIRCUIT BOARD



## INTERCONNECT BOARD OPTION TIE POINTS

1. GND
2. SQUELCH CONTROL VOLTAGE
3. "PL" SWITCH S401.2
4. "PL" SWITCH S401.1
5. DETECTOR OUTPUT
6. TRANSMIT "PL"
7. PTT (UNIVERSAL RADIOS ONLY)
8. RELAY COIL INPUT (UNIVERSAL RADIOS ONLY)
9. +7.5 VDC REGULATED
10. BATTERY B+

11. DETECTOR LIMITER OUTPUT
12. +7.5 VDC REGULATED (RECEIVE ONLY)
13. RECEIVER AUDIO PREAMPLIFIER OUTPUT
14. VOLUME CONTROL, R202.3
15. +7.5 VDC REGULATED (TRANSMIT ONLY)
16. ID TONE INPUT
17. RECEIVER AUDIO POWER AMPLIFIER INPUT
18. (TIE POINT WITH 19)
19. (TIE POINT WITH 18)
20. SPEAKER, J201.2

EPF-7877-0

NUB6081A-3  
NUB6082A-4  
NUB6083A-3



NUB6081A-2 and earlier  
NUB6082A-2 and earlier  
NUB6083A-2 and earlier

PLF-1573-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		CAPACITOR, Fixed; pF $\pm 5\%$ 50 V unless stated
C1	2105667G29 or 2105667G14 or 2105667G22	40 (L) 27 (M) 18 (H)
C2	2105667G35 or 2105667G05 or 2105667G27	300 (L) 200 (M) 170 (H)
C3	2182450B13 or 2182450B47 or 2182450B44	1.5; 500 V (L) 1.0; 500 V (M) 0.82; 500 V (H)
C4	2105667G17 or 2105667G14 or 2105667G02	43 (L) 27 (M) 20 (H)
C5	2105667G11 or 2105667G25 or 2105667G24	180 (L) 130 (M) 110 (H)
C7	2105667G05 or 2105667G25 or 2105667G20	200 (L) 130 (M) 91 (H)
C8	2105667G17 or 2105667G15 or 2105667G02	43 (L) 30 (M) 20 (H)
C9	2182450B13 or 2182450B48 or 2182450B33	1.5; 500 V (L) 0.75; 500 V (M) 0.56; 500 V (H)
C10	2105667G15 or 2105667G02 or 2105667G21	30 (L) 20 (M) 14 (H)
C11	2105311E55	680
C12	2105667G05	200
C14	2182450B18	2; 500 V.
C15	2105668G02	430
C16	2105668G03	100
C17, 18	2105693G01	0.1 $\mu$ F $\pm 10\%$
C19	2182877B55	100 $\pm 10\%$
C20	2105311E39	25; 25 V
C21	2105668G01	220
C22	2105693G01	0.1 $\mu$ F $\pm 10\%$
C23, 24	2184008H03	0.5 $\mu$ F $\pm 20\%$
C27	2105693G01	0.1 $\mu$ F $\pm 10\%$
C28, 29	2305612E06	10 $\mu$ F $\pm 20\%$ ; 15 V
C32	2382397D15	10 $\mu$ F $\pm 20\%$ ; 20 V
C33	2382397D16	22 $\mu$ F $\pm 20\%$ ; 15 V
C34	2382397D36	1 $\mu$ F $\pm 10\%$ ; 20 V
C35	2382397D17	15 $\mu$ F $\pm 20\%$ ; 20 V
C36	2182213E06	4700 $\pm 20\%$ ; 100 V
C38	2182213E06	47 $\pm 20\%$ ; 100 V
C39	2382397D15	10 $\mu$ F $\pm 20\%$ ; 20 V
C40	2182213E06	4700 $\pm 20\%$ ; 100 V
C41	2184008H04	8200 $\pm 10\%$
C42	2182877B06 or 2182877B51	30 $\pm 10\%$ ; 150 V (H, L) 50 (M)
C43	2105667G16	36 (M)
C44	2184511B11 or 2100867B07 or 2182358G61	22 $\pm 10\%$ (L, H) 87.75 V (L, H) 13.5; 75 V (M)
C45	2105667G18 or 2105667G20 or 2105667G19	47 (L) 91 (M) 62 (H)
C47	2382397D19	2.2 $\mu$ F $\pm 20\%$ ; 10 V
C48	2182213E06	4700 $\pm 20\%$ ; 100 V
C49	2105693G01	0.1 $\mu$ F $\pm 10\%$
C101	2182877B55	10 $\mu$ F $\pm 20\%$ ; 20 V
C39	2100861439	395 $\pm 10\%$ ; 75 V
C103	2105667G23 or 2183162H26	50 (L, M) 150 $\pm 10\%$ (H)
C104	2182213E06	4700 $\pm 20\%$ ; 100V
C105	2105667G19 or 2105667G18	62 (L) 47 (M)
C106	2105667G17 or 2105667G13 or 2105667G17	43 (H) 68 (L) 43 (M)
C107	2105667G14 or 2182450B13 or 2182450B44 or 2182450B33	27 (H) 1.5; 500 V (L) 0.82 (M) 0.56; 500 V (H)
C108	2105667G16 or 2105667G15 or 2105667G02	36 (L) 30 (M) 20 (H)
C109	2105667G11 or 2105667G20 or 2105667G19	180 (L) 91 (M) 62 (H)
C111	2182213E06 2382397D12	4700 $\pm 20\%$ ; 100 V 0.12 $\pm 10\%$ ; 20 V

C114, 115	2182213E06	4700 ±20%; 100 V
C117	2105667G33 or 2105667G35 or 2105667G05	330 (L) 300 (M) 200 (H)
C118	2105667G11 or 2105667G05 or 2105668G01	180 (L) 200 (M) 225 (H)
C119	2382397D12	0.12 uF ±10%; 20 V
C120	2105668G01 or 2105667G11 or 2182358G29	220 (L) 180 (M) 125 (H)
C121	2182213E06	4700 ±20%; 100 V
C122	2384762H04	2.2 uF ±20%; 25 V
C123	2382397D12	0.12 uF ±10%; 20 V
C124, 125	2182213E06	4700 ±20%; 100 V
C126	2105667G11 or 2105667G33 or 2105667G02	180 (L) 68 (M) 20 (H)
C127	21813162H6	150 ±10% (L, M)
C128	2182213E06	0.0055 uF - 0 + 100% 75V
C129	2182213E06	4700 ±20%; 100V
C201	2182213E15	2000; 100 V (BBU only)
C202	2382397D19	2.2 uF ±20%; 10 V
C203	2182213E08	1000; 100 V
C204	2382397D19	2.2 uF ±20%; 10 V
C206 thru 211	2182213E08	1000; 100 V
C212	2184008H24	.01 uF ±20%; 25 V
C213, 214	2182213E06	4700 ±20%; 100 V
C215	2182877B53	500 ±10%
C216	2184008H24	0.1 uF ±20%; 25 V
C217	2105693G01	0.1 uF ±10%
C218	2382397D12	0.12 uF ±10%; 20 V
C219	2184008H24	.01 uF ±20%; 25 V
C220	2182213E06	4700 ±20%; 100 V
C221	2184008H24	.01 uF ±20%; 25 V
C222	2382397D15	10 uF ±20%; 20 V
C223, 224	2182213E06	4700 ±20%; 100 V
C226	2105668G05 or 2105311E37 or 2182877B51	68 (L) 56; 25 V (M) 50 (H)
C227	2105667G16 or 2105667G03 or 2105667G14	36 (L) 33 (M) 27 (H)
C228	2105668G08 or 2105668G07 or 2105668G06	120 (L) 110 (M) 91 (H)
C229	2105667G16 or 2105667G03 or 2105667G14	36 (L) 33 (M) 27 (H)
C230	2105668G05 or 2105311E37 or 2182877B51	68 (L) 56; 25 V (M) 50 (H)
C231, 232	2382397D25	0.27 uF ±10%; 20 V
C233, 234	2182213E08	1000; 100 V
C235 thru 240	2105311E56	30
C241	2105667G29 or 2105667G07 or 2184511B11	40 uF (L) 33 pF (M) 22 pF (H)
C242	2182213E06	4700 ±20%; 100 V
C243	2182213E06	4700 ±20%; 100 V (≠BU only) NOTE: See Note 1
CR1	4882363E03	Silicon
CR2	4883654H06	Silicon
CR3	4882363E04	Silicon
CR101	4882363E03	Silicon
CR201 thru 206	4882190H12	Varactor
CR207	4882363E04	Silicon
CR209	4882363E04	Silicon
CR216	4882363E03	Silicon
CR217	4882466H13	Silicon
CR218, 219	4882363E04	Silicon
CR220	4805562A01	Silicon
CR401	4882466H13	Silicon
F401	6505214E01	FUSE: 2-Amp
FL1	4805703G01	FILTER: See Note 1
FL2	4805368G04	Crystal, 8.4 MHz
FL3	4805368G03	Ceramic 455 kHz
		Ceramic 455 kHz
J1	0105959CA0	JACK: Interconnect Block Connector Blocks, 10-pin (female)
J2	0105950D32	Interconnect Block Connector Blocks, 8-pin (female)
J201	0905657G01	Micro, speaker
J202	0905657G01	Micro, antenna
K201	8005300E01	RELAY: 1/6th Crystal Can, .0PT

L1 thru 4	2405444F07	COIL, RF, unless stated Coded: RED, 10-1/4 turns circuit; includes: 7682451B09 CORE Coded: GRN, 21-1/4 turns circuit; includes: 7605374B02 CORE 455 kHz Transformer 6.2 uH choke 4.2 uH choke 23 uH choke
L5	2482944J05	Coded: RED, 10-1/4 turns circuit; includes: 7682451B09 CORE Coded: VIOLET, 7-1/2 turns circuit; includes: 7605374B01 CORE (L) Coded: GRN, 5-1/2 turns circuit; includes: 7605374B01 CORE (M) Coded: YEL, 4-1/2 turns circuit; includes: 7605374B01 CORE (H) 1.2 uH choke Coded: VIOLET, 7-1/2 turns circuit; includes: 7605374B01 CORE (L) Coded: BLU, 6-1/2 turns circuit; includes: 7605374B01 CORE (M, H) 0.2 uH choke (L) 0.168 uH choke (M) 0.23 uH choke (H) 1.2 uH choke 1.2 uH choke (M) 1.5 uH choke (M) 14 uH choke Coded: ORG, 22-1/4 turns circuit; includes: 7605374B01 CORE (L) Coded: YEL, 32-1/4 turns circuit; includes: 7605374B01 CORE (M) Coded: GRN, 25-1/4 turns circuit; includes: 7605374B01 CORE (H) 1.2 uH choke (L) 2.35 uH choke (M) 2.6 uH choke (H) 1.2 uH choke (L) 2 uH choke (M) 2.6 uH choke (H) 1.2 uH choke (L) 2.6 uH choke (M) 2.6 uH choke (H) Coded: CLEAR, 12-3/4 turns circuit; includes: 7605374B05 CORE (L) Coded: BLK, 23-3/4 turns circuit; includes: 7605374B01 CORE (M) Coded: BRN, 17-3/4 turns circuit; includes: 7605374B05 CORE (H) 1.2 uH choke 0.189 uH choke (L) 0.164 uH choke (M) 0.141 uH choke (H) Coded: VIO, 14-1/4 turns, 0.57 uH (L) Coded: GRAY, 11-1/4 turns, 0.40 uH (M) Coded: WHT, 10-1/4 turns, 0.35 uH (H)
L7	2405892C07	
L8	2482723H06	
L9	2482723H30	
L101	2482723H03	
L102, 103	2405444F07	
L104	2482723H27	
L105	2405669G04	
	or 2405669G02	
	or 2405669G01	
L106	2405691G06	
L107	2405669G04	
	or 2405669G03	
L108	2405691G05	
	or 2405691G04	
	or 2405691G03	
L109	2405691G06	
L110	2482723H27	
	or 2405691G07	
L112	2482723H33	
L201 thru 206	2405444F11	
	or 2405444F12	
	or 2405444F13	
L207, 208	2482723H27	
	or 2405691G02	
	or 2482723H19	
L209, 210	2482723H27	
	or 2405691G08	
	or 2482723H19	
L211, 212	2482723H27	
	or 2405691G02	
	or 2482723H19	
L213 thru 218	2405444F08	
	or 2405444F09	
	or 2405444F10	
L219	2405691G06	
L220, 221	2405715G03	
	or 2405715G02	
	or 2405715G01	
L222	2405444F14	
	or 2405444F15	
	or 2405444F16	
LS401	5005334D01	<b>SPEAKER:</b> Dynamic, 2", frequency response: 300 to 3500 Hz
MK401	5982575J02	<b>MICROPHONE:</b> Cartridge, res: 700, ±20%; Impedance: 5000 ±30%
P1	0105958C97	<b>PLUG:</b> Interconnect Board Connector Block, 10-pin (male)
P2	0105958C96	Interconnect Board Connector Block, 8-pin (male)
Q1	4800869819	<b>TRANSISTOR:</b> See Note i
Q2	4800869726	NPN; type M9819 PNP; type M9726

Q3, 4	4800869570	NPN; type M9570
Q5	4800869642	NPN; type M9642
Q101	4800869570	NPN; type M9570
Q102	4800869571	PNP; type M9571
Q103	4800869724	NPN; type M9724
Q104	4800869657	NPN; type M9657
Q105	4805474G02	NPN; type MRF475
Q201, 202,	1800869642	NPN; type M9642
<b>RESISTOR, Fixed: <math>\pm 5\%</math> 1/8 W unless stated</b>		
R1	0660075A77	15 k
R2	0660075A85	33 k
R4	0660075A55	1.8 k
R7	0660075A99	120 k
R10	0660075A95	82 k
R12	0660075A57	2.2 k
R13	0660075A99	120 k
R14	0660075A01	10
R16	0660075A73	10 k
R17	0660075A77	15 k
R20	0660075A81	22 k
R21	0660075A77	15 k
R22	0660075A53	1.5 k
R23	0660075A79	18 k
R24	0660075A51	1.2 k
R25	06600185B55	10 $\pm 10\%$
R101	0660075A73	10 k
R102	0660075A75	12 k
R103	0660075A29	150
R104	0660075A57	2.2 k
R105	0660075A43	560 (L, M)
	or 0660075A37	330 (H)
R106	0660075A49	1 k
R107	0660075A53	1.5 k
R108	0660075A57	2.2 k
	or 0660075A25	100 (L)
R110	or 0600185B66	82 $\pm 10\%$ (M, H)
	0600185B68	120 $\pm 10\%$ (L)
	or 0660075A29	150 (M)
	or 0660075A37	330 (H)
R111	0660075A49	1 k
R112	0660075A45	680
R113	0600185B60	27 $\pm 10\%$
R114	0600124C17	47 $\pm 10\%$ ; 1/4 W (L, M)
	or 0611009C37	330; 1/4 W (H)
R115	0611009C35	270; 1/4 W (H)
R201 thru 206	1805501C04	270; 1/4 W (L, M)
R207 thru 212	0611009C67	Pot., 50 k
R213, 214	0660075A77	5.6 k; 1/4 W
R219 thru 224	0660075A57	1.5k (H) & 2 Freq. only
R225	0684444A39	2.2 k
R226	0684444A45	3.16 k $\pm 1\%$
R227	0660075A93	5.62 $\pm 1\%$
R228	0660075A49	68 k
R229	0660075A61	1 k
R230	0660075A55	3.3 k
R231	0660075A49	1.8 k
R238 thru 243	0660075A57	1 k
	or 0660075A67	2.2 k (1- or 2-freq.)
R251, 252	0611009C97	5.6 k (3-, 4-, 5-, or 6-freq.)
R253	0611009D02	100 k; 1/4 W
R254	0611009C79	150 k; 1/4 W
R255	1805333E01	18 k; 1/4 W
R256	0600124C19	Pot., 25k, squelch control
R257	1805488L03	56 $\pm 10\%$ ; 1/4 W
R258	0611009C33	Pot., 25k, volume control
R259	1705787D01	220; 1/4 W
RT1	0605796B02	30, 2 $\pm 4\%$ ; 1/2 W
RT101	0605796B03	<b>THERMISTOR</b>
		50 $\Omega$
		10 $\Omega$
<b>SWITCH:</b>		
S201	4005120E01	Toggle, DPDT (2-freq. models)
	or 4005639G01	Rotary, DPDT (4-freq. or 6-freq. models)
S202	4005265E01	Micro (Push-To-Talk) - $\mu$ SW
S401	4005061E01	Toggle, SPDT, "PL"
S410	4005255F01	Toggle, Selective Call
<b>TRANSFORMER:</b>		
T1	24842435H03	Coded GRN; Pri: 6-1/2 turns, Sec: 6-1/2 turns; includes 7682451B08 CORE
T101	2405689G01	Pri: 3-1/2 turns, Sec: 1-1/2 turns; includes 7683960B01 CORE

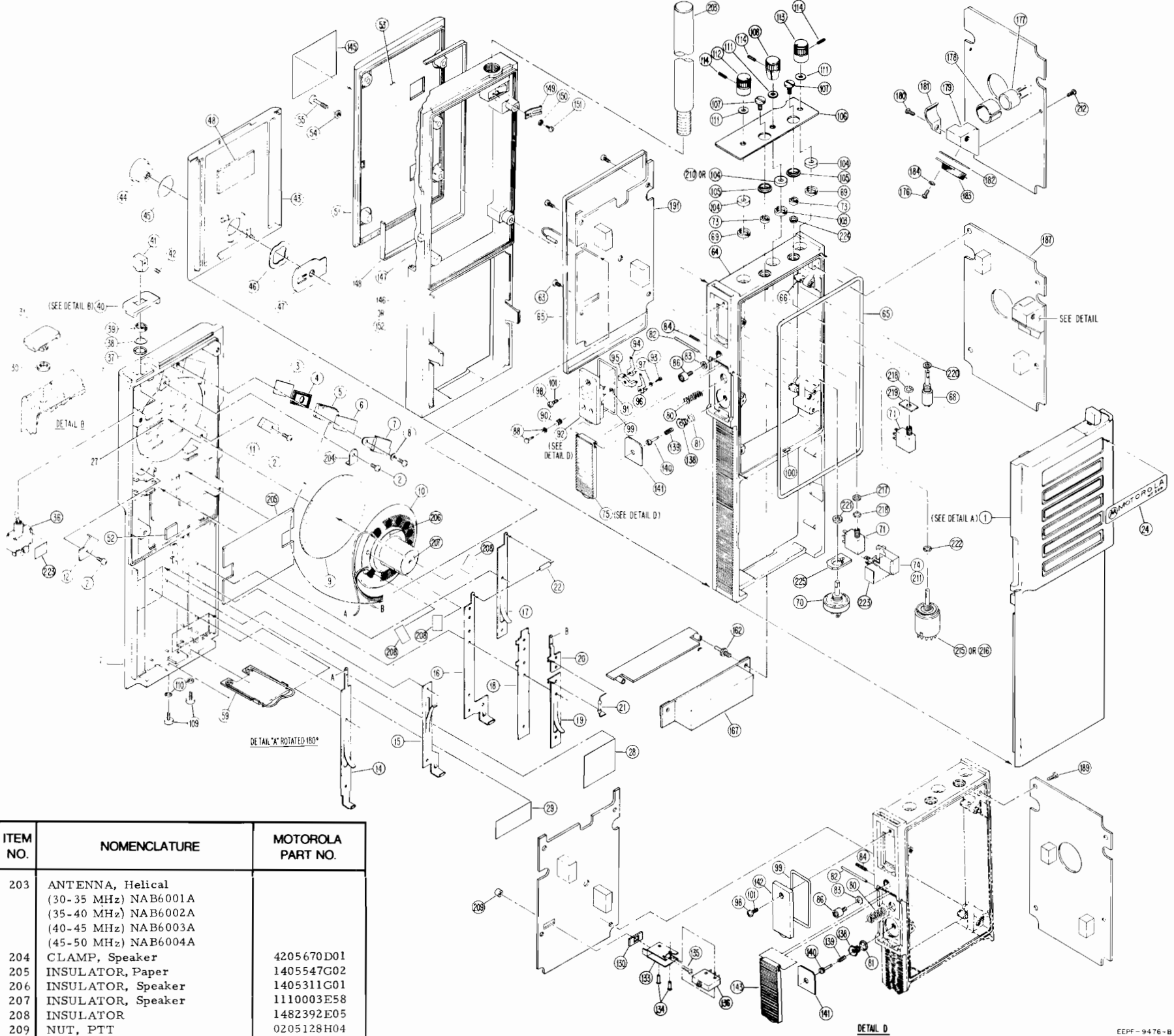
U1	5105479G05	MODULE: SC77701, 1C Audio Preamplifier Audio Power Amplifier Hybrid Module "1DC" Hybrid Module, 7.5 V, Voltage Regulator
U2	5105177D73	
U3	5105177D05	
U201	5105177D04	
U202	5105177D20	
VR1	4883461E26	<u>DIOE</u> : See Note 1 Zener, 27 V
VR201	4883461E12	
Y1	4805697G01 or 4805697G02	<u>CRYSTAL</u> : See Note 11 7.945 MHz (NXN6088A) 8.855 MHz (NXN6088A)  Transmitter, used as required depending on model  Receiver, used as required depending on model  Receiver, used as required depending on model
Y201 thru 206	KXN6194AA 10 ppm	
Y207 thru 212	KXN6193AA 10 ppm	
	or KXN6197AA 5 ppm	

NOTES: I. For optimum performance order replacement diodes and transistors by Motorola part number only.  
II. When ordering crystal units specify carrier frequency(ies), crystal frequency(ies), crystal type number and Motorola part number.

ITEM NO.	REF. SYMBOL/CHANGES	CHANGED TO
NUB6081A	R105 Added	NUB6081A-1
NUB6082A	C14 Changed (was	NUB6082A-1
NUB6083A	2182450B27, 1.5pF)	NUB6083A-1
NUB6081A-1	Circuit Board Changed	NUB6081A-2
NUB6082A-1	was 8405803G01	NUB6082A-2
NUB6083A-1		NUB6083A-2
NUB6082A-2	C126 Changed (was	NUB6082A-3
	2105667C25, 130pF)M	
NUB6081A-2	C128, C129 Added	NUB6081A-3
NUB6083A-2		NUB6083A-3
NUB6082A-3	C128, C129 Added	NUB6082A-4
NUB6081A-3	Q6, R16 Added	NUB6081A-4
NUB6082A-4		NUB6082A-5
NUB6083A-3	As Shown	NUB6083A-4
NHB6023A		NHB6023A-1
NHB6033A	R213, R214 Added	NHB6033A-1
NHB6063A		NHB6063A-1
NHB6073A		NHB6073A-1
NHB6021A	C243 Added	NHB6021A-1
NHB6022A		NHB6022A-1
NHB6023A-1	As Shown	NHB6023A-2
NHB6031A	C243 Added	NHB6031A-1
NHB6032A		NHB6032A-1
NHB6033A-1		NHB6033A-2
NHB6061A	C243 Added	NHB6061A-1
NHB6062A		NHB6062A-1
NHB6063A-1	As Shown	NHB6063A-2
NHB6071A	C243 Added	NHB6071A-1
NHB6072A		NHB6072A-1
NHB6073A-1		NHB6073A-1
NHB6031A-1	C201 was 2182213E08,	NHB6031A-2
NHB6032A-1	1000 pF	NHB6032A-2
NHB6033A-2		NHB6033A-3
NHB6071A-1		NHB6071A-2
NHB6072A-1	As Shown	NHB6072A-2
NHB6073A-2		NHB6073A-3
NHB6091A		NHB6091A-1
NHB6092A		NHB6092A-1
NHB6093A		NHB6093A-1
NHB6111A		NHB6111A-1
NHB6112A		NHB6112A-1
NHB6113A		NHB6113A-1

ITEM NO.	NOMENCLATURE	MOTOROLA PART NO.
1	COVER, Front, Extended	1505660D01
2	SCREW, Machine (2-56x1/8 Phl Pan)	0300138651
3	CLOTH, Felt, Mic	3505450B01
4	PAD, Mic	7505577F01
5	CARTRIDGE, Mic	5982575J02
6	PAD, Clamp	7582745J01
7	BRACKET, Mic	0705672D01
8	WASHER, Spring	0405314E01
9	CLOTH, Felt Grill	3505370C01
10	SPEAKER	5005334D01
11	CLAMP, Speaker	4205883G01
12	CLAMP, Speaker	4205671D01
13	PAD	7505083E06
14	STRAP, Contact, Neg	4205573A01
15	STRAP, Contact, Sen	4205575A01
16	STRAP, Contact, Charge	4205283E01
17	STRAP, Contact	4205576A01
18	INSULATOR, Contact	4205282E01
19	STRAP, Contact, Pos	4205269G01
20	STRAP, Contact, Pos	4205270G01
21	FUSE	6505214E01
22	RECTIFIER, Silicon	4882466H13
23	Not Used	
24	NAMEPLATE	3305537E02
25	Not Used	
26	ADHESIVE, Silicone Rubber	1110019A53
27	ADHESIVE, Silicone Rubber	1110019A88
28	LABEL, Patent	1300868710
29	LABEL, FCC	0540865436
30	GASKET, Plug	3205315E01
31	PLUG, Cover	3805115E01
32	Not Used	
33	Not Used	
34	Not Used	
35	Not Used	
36	SWITCH, Toggle, SPDT	4005061E01
37	GASKET, "O" Ring	3205082E01
38	WASHER, Special	0405081E01
39	NUT, Mtg	0205050E03
40	ESCUTCHEON, Switch	1305057E01
41	KNOB, Switch	3605114E01
42	SCREW, Set	0383174C04
43	COVER, Battery	1505697D01
44	BUTTON	3805908D01
45	WASHER	0405910D01
46	WASHER, Spring	0405316E01
47	LATCH	5505907D01
48	PAD	3805908D01
49	Not Used	
50	Not Used	
51	COVER, Rear	1505943D01
52	Not Used	
53	PAD	7505886G01
54	WASHER, Seal	0484345A06
55	SCREW, Captive	0305662D11
56	Not Used	
57	Not Used	
58	Not Used	
59	LATCH Assembly	NLN4182A
60	Not Used	
61	Not Used	
62	Not Used	
63	SCREW, Machine (2-56x3/16 Phl Pan)	0300138661
64	FRAME, Long	0705640D01
65	GASKET, Frame	3282172J01
66	BUSHING, Cover Mtg	4305661D01
67	Not Used	
68	POT, Cermet	1805333E01
69	NUT, Special	0282653D03
70	POTENTIOMETER, Control Sw.	1805488L03
71	JACK, Micro	0905786J01
72	NUT, Special	0282653D09
73	NUT, Special	0205050E01
74	SHIELD, Antenna	2605054E01
75	LEVER & SPRING ASSEMBLY	0105951D70
76	Not Used	
77	Not Used	
78	Not Used	
79	Not Used	
80	SPRING, Compression (PTT)	4105267E01
81	SEAL "O" Ring	3205082E02
82	PIN, Spring	2205084E01

ITEM NO.	NOMENCLATURE	MOTOROLA PART NO.
83	SEAL, "O" Ring	3205082E30
84	SCREW, Set	0305770L01
85	NOT USED	
86	STUD, P.A.	4605189M01
87	NOT USED	
88	CONTACT, Pin/"O" Ring Assy.	0105952G47
89	Not Used	
90	SPRING, Compression	4105424F03
91	RING, Retaining	4205463E02
92	RECEPTACLE, Assembly	0105952G29
93	SCREW, Machine (0-80x1/8 Phl Pan)	0300139684
94	CONTACT	4105197G01
95	BLOCK	4605072E01
96	CONTACT	4105197G01
97	WASHER	0400134190
98	SCREW, Machine (2-56x5/32 Phl Pan)	0300139444
99	SEAL, "O" Ring	3205661G02
100	ADHESIVE, RTV Silicone Rubber	1110019A88
101	SEALANT, Compound	1110019A63
102	SWITCH, Multi PL	0105955E40
103	NUT, Special	0282653D05
104	SEAL, Switch	3205599M01
105	BUSHING, Insulator	4305051E01
106	ESCUTCHEON or ESCUTCHEON (2-Freq) or ESCUTCHEON (6-Freq)	1305621D01 1305621D03 1305621D15
107	SCREW, Jack	0305129A24
108	KNOB, Control	3605926D01
109	SCREW, Latch	0300139982
110	WASHER, Latch	0400120581
111	WASHER, Teflon	0405935F02
112	KNOB, Volume	3605900K02
113	KNOB, Squelch	3605900K01
114	SCREW, Set	0383174C02
115	DECAL, Insert	3305884M01
116	thru 129 Not Used	
130	INSULATOR, PTT	1405362E01
131	Not Used	
132	NUT, PTT	0205128H04
133	BRACKET, Switch	0705261E01
134	EYELET	0505095E09
135	SCREW, PTT	0305525G01
136	SWITCH, Micro	4005265E01
137	Not Used	
138	NUT, PTT	0205250E01
139	SPRING, PTT	4105252E01
140	ACTUATOR, PTT	4705251E01
141	GASKET, Switch	3205077E01
142	COVER, Receptacle	1505212E02
143	LEVER & SPRING, ASSEMBLY	0105951D71
144	Not Used	
145	PLATE, Information	6405538E01
146	HOUSING, Sleeve	1505858D23
147	ADHESIVE, RTV Silicone Rubber	1110019A76
148	GASKET, Frame	3282172J01
149	CLIP, Antenna	4205860D01
150	WASHER, Spring	0405314E03
151	SCREW, Special	0305044E01
152	HOUSING, Sleeve	1505858D22
153	thru 175 Not Used	
176	SCREW, Machine (2-56 x 3/16)	0300138661
177	TRANSISTOR, M9657	4800869657
178	SLEEVE, Insulator TO-39	1405882G01
179	HEATSINK	2605815G01
180	SCREW, Machine (2-56 x 1/8)	0300138651
181	CLIP, Transistor	4205881G01
182	INSULATOR, TO-220	1405884G01
183	TRANSISTOR, MRF 475	4805474G02
184	WASHER, Shoulder	0410057A16
185	Not Used	
186	Not Used	
187	TRANSCIEIVER, Bd Assembly (30-36 MHz) NUB6081A (36-42 MHz) NUB6082A (42-50 MHz) NUB6083A	
188	Not Used	
189	SCREW, Special	0305864D01
190	Not Used	
191	CIRCUIT BOARD ASSEMBLY	3205077E01
192	thru 202 Not Used	



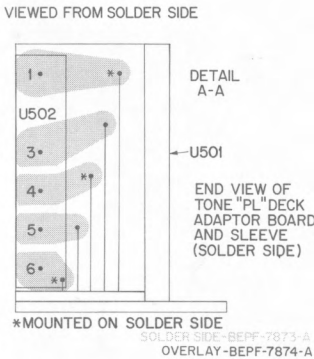
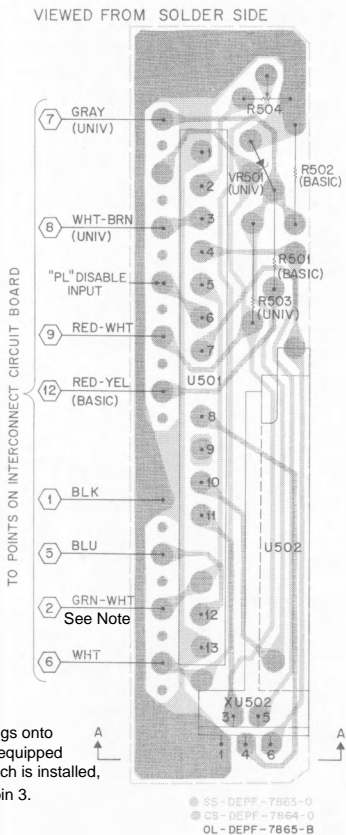
ITEM NO.	NOMENCLATURE	MOTOROLA PART NO.
203	ANTENNA, Helical (30-35 MHz) NAB6001A (35-40 MHz) NAB6002A (40-45 MHz) NAB6003A (45-50 MHz) NAB6004A	
204	CLAMP, Speaker	4205670D01
205	INSULATOR, Paper	1405547G02
206	INSULATOR, Speaker	1405311G01
207	INSULATOR, Speaker	1110003E58
208	INSULATOR	1482392E05
209	NUT, PTT	0205128H04
210	PAD, Rubber	7583562H01
211	COAX, Strain Relief	4205890G01
212	SCREW, Machine (2-56 x 3/16)	0300138661
213	Not Used	
214	Not Used	
215	SWITCH, 4- & 6-Freq	4005695G01
216	SWITCH, 2-Freq	4005120E01
217	Not Used	
218	"O" Ring	3205082E14
219	WASHER, Insulator	0405216L03
220	WASHER, Reinforced	0405157M01
221	PAD, Sealing	7505748L03
222	Not Used	
223	INSULATOR	1405209L04
224	BUSHING, Shoulder	4305052E02
225	SPACER	4305881M01

ITEM(S)	P/O KIT NO.
1 thru 31	NLN5489A
1 thru 30, 36 thru 42	NLN5490A
43 thru 48	NLN4180A
49 thru 55	NLN4179A
59	NLN4182A
61 thru 74, 83 thru 86, 98 thru 103, 130 thru 144, & 218 thru 225	NHB6081A
61 thru 103, 218 thru 225	NHB6091A
104 thru 115	NLN5510A

3021-0715



NLN5487A, NLN5696A

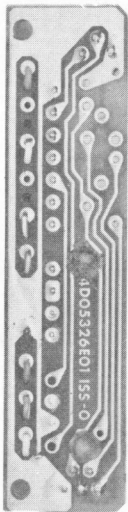


**Tone PL Decks**  
NLN5487A "BBB" Series Extended Frame  
NLN5696A "BBU" Series Extended Frame

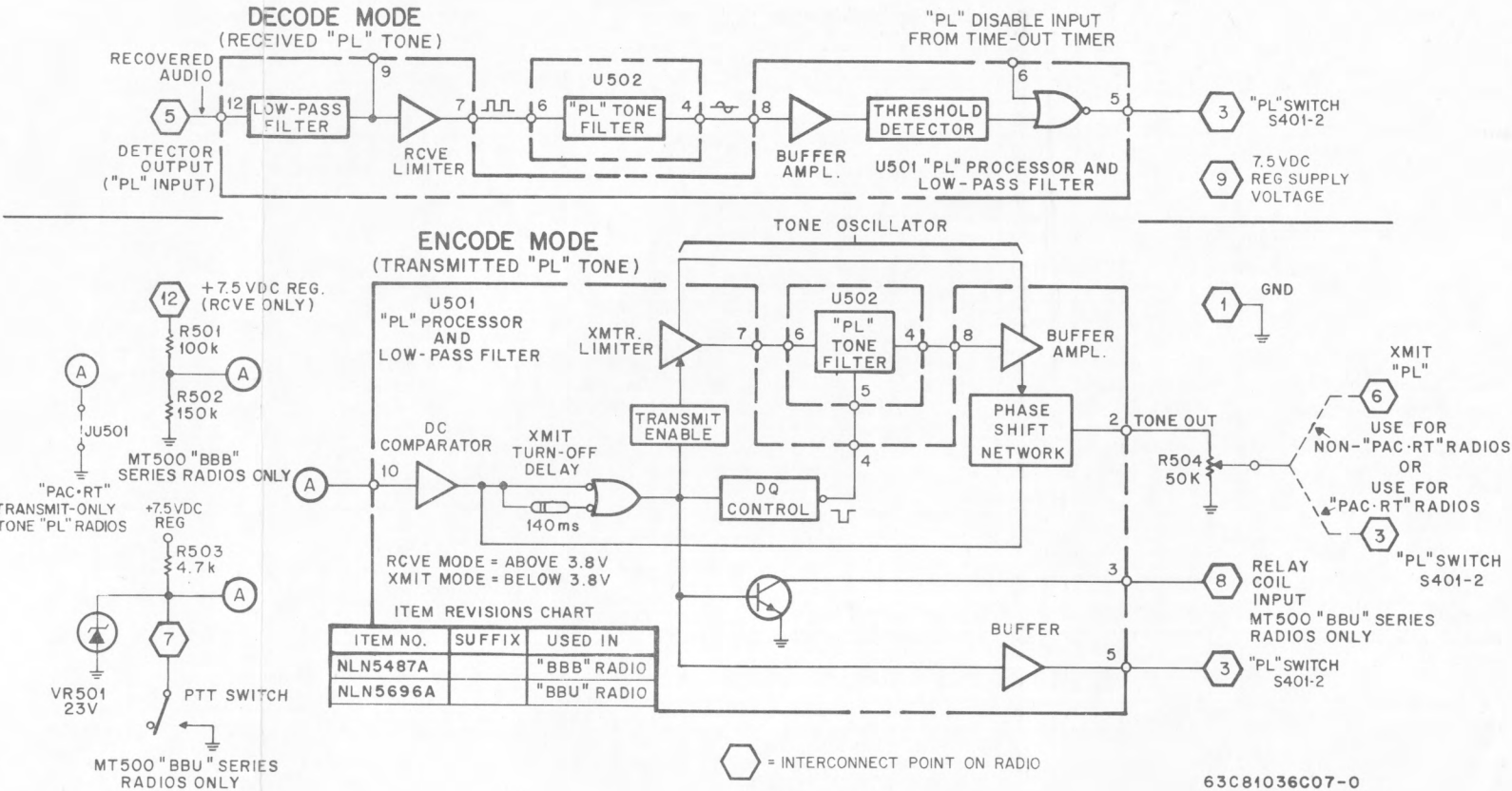
TPLF-3203-0

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
R501 R502 R503 R504	0660075A97 0660075B02 0660075A65 1805501C04	<b>RESISTOR, Fixed:</b> $\Omega$ 100k $\pm$ 5%; $\frac{1}{8}$ W (NLN5487A) 150k $\pm$ 5%; $\frac{1}{8}$ W (NLN5487A) 4.7k $\pm$ 5%; $\frac{1}{8}$ W (NLN5696A) Pot., 50k
U501 U502	5105177D23 NFN6010A	<b>INTEGRATED CIRCUIT:</b> PL Processor & Low Pass Filter PL Tone Filter (not part of Tone PL Decks)
VR501	4883461E26	<b>DIODE:</b> See Note 23V Zener (NLN5696A)
<b>NONREFERENCED ITEMS</b>		
	0105959C02 0905287C07 0905604C06 0905646N01 8405335E01 2982204J02	ASSEMBLY, Adapter; contains circuit board & bracket SOCKET, Berg; circuit board SOCKET, Spring SOCKET, Spring CIRCUIT, Module mounting WIRE LUGS (NLN5487A, NLN5696A)

**NOTE:** For optimum performance, order replacement diodes by Motorola part number only.



**EXTENDED FRAME**



**"PL" SQUELCH SENSITIVITY CHECK**

("PL" MODELS ONLY)

- SET THE SQUELCH CONTROL (R201) TO THE UNSQUELCHED POSITION WITH THE "PL" SWITCH OFF ( ).
  - TURN THE "PL" SWITCH ON ( ), AND APPLY AN ON-FREQUENCY CARRIER SIGNAL FROM THE SIGNAL GENERATOR. MODULATE THE SIGNAL GENERATOR WITH THE PROPER "PL" TONE, AT  $\pm 0.5$  kHz DEVIATION.
  - THE SQUELCH CIRCUIT SHOULD "OPEN" WHEN THE SIGNAL GENERATOR OUTPUT IS INCREASED ABOVE 0.18  $\mu$ V (VHF) OR 0.25  $\mu$ V (UHF).
- EPF-7867-0

**TEST MEASUREMENTS**

PIN NO.	ENCODE		DECODE	
	DC VOLTS	AC VOLTS	DC VOLTS	AC VOLTS
<b>PL Processor and Low Pass Filter U501</b>				
2	...	250 mV (3)	...	...
3	<1.5	...	15	...
5	...	...	4 (open) > 0.6 (closed) (1)	...
7	7.4	100 mV rms (< 15 dBm)	7.2 (2)	350 mV rms (> 15 dBm)
8	1.7	80 mV rms (3)	1.7	160 mV rms (3)
9	...	...	...	280 mV rms (typical)
10	<3.8	...	>3.8	...
11	7.5	...	7.5	...
<b>PL Tone Filter U502</b>				
3	7.5	...	7.5	...
4	1.7	...	1.7	...
5	>6	...	>6	...
6	7.4	...	7.2 (2)	...

Test measurements are nominal. DC voltages are with 15 VDC power supply, and AC voltages are with radio fully quieted and 500 Hz deviation on generator (proper PL tone).

Numbers in ( ) refer to the following notes:

- PL switch on ( )
- No modulation; radio fully quieted
- Depends upon PL Tone Filter U502

EPF-7866-0

1. DESCRIPTION

These external speaker-microphones contain a hand-held speaker, microphone, and push-to-talk switch. A cable, terminated with a special plug, is provided for attaching to the accessory connector on the side of the MT500 universal series "Handie-Talkie" FM portable radios.

When the external speaker-microphone is attached to the radio, the internal speaker in the radio is disabled, and receiver audio output is connected to the external speaker. Similarly, the external microphone is connected to the transmitter and the external push-to-talk switch will energize the PTT relay in the radio.

With the external speaker-microphone attached to the radio, the internal microphone and push-to-talk switch are still operational, but you must always listen at the external speaker.

A spring clip on the back of the external speaker-microphone can be rotated for convenience when securing it to clothing.

2. OPERATION

- Place the lip of the external speaker-microphone plug (P1) in the slot on top of the radio (above the accessory connector) and pivot the plug into the accessory connector on the radio.
- Tighten the threaded stud on the plug into the threaded hole on the radio.
- While listening to the external speaker, turn the radio on and operate as explained in the operating manual supplied with the radio.

NOTE

NMN6089A is used with the NLN4477A Adapter Cable.

3. MAINTENANCE

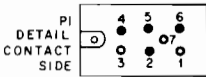
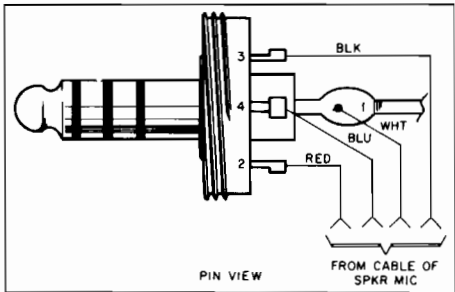
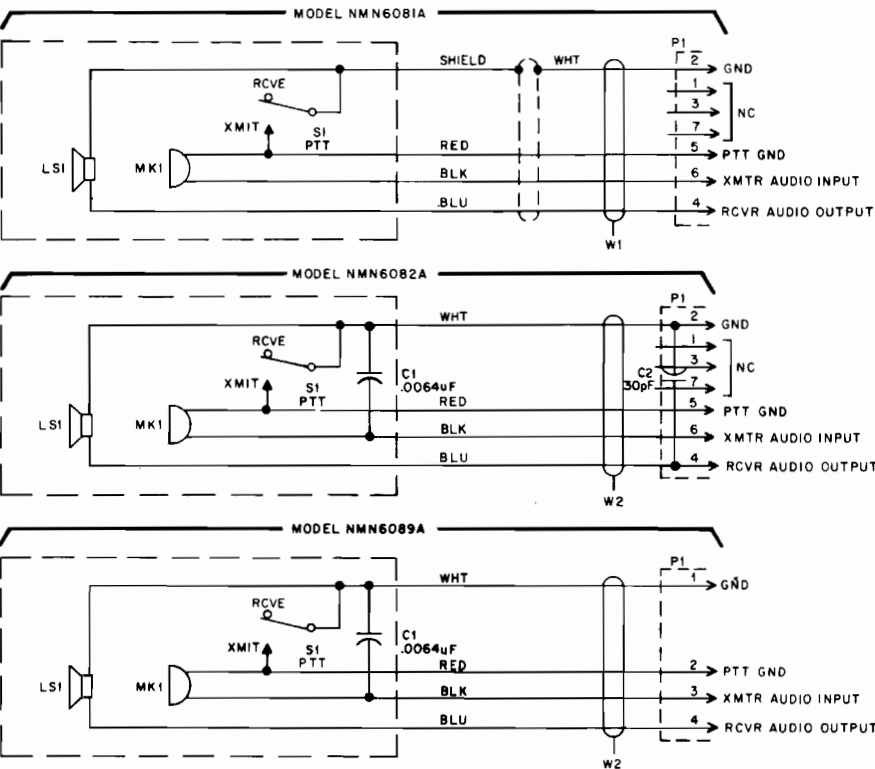
Refer to the schematic diagram, the exploded view, and the parts lists. Every part in the speaker-microphone is identified and illustrated for assistance in removal and replacement.

Speaker-Microphone Kits:

NMN6081A, Straight Cord  
NMN6082A, Coiled Cord  
NMN6089A, Coiled Cord "Quick Disconnect"

PLF-1238-C

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
C1	2184008H05	CAPACITOR, Fixed: .0064 uF ±10%; 50 V (NMN6082A only)
C2	2182358G95	30 pF ±10%; 75 V; N750
LS1	5005334D01	SPEAKER, Dynamic: 39 Ω, 2-inch diameter
MK1	5982575J02	MICROPHONE: Miniature; Res: 700 Ω, Imped: 5000 Ω ±30%
P1	2805646F02 or 2805780G02	PLUG: Connector, 7-contact (NMN6081A, NMN6082A) Connector (NMN6089A)
S1	4082159D01	SWITCH: Micro; PTT, SPDT
W1	3084048H02	CORD: Straight, 48"
W2	3084123H02	Coiled



MODELS	SUFFIX
NMN6081A	1
NMN6082A	1
NMN6089A	-

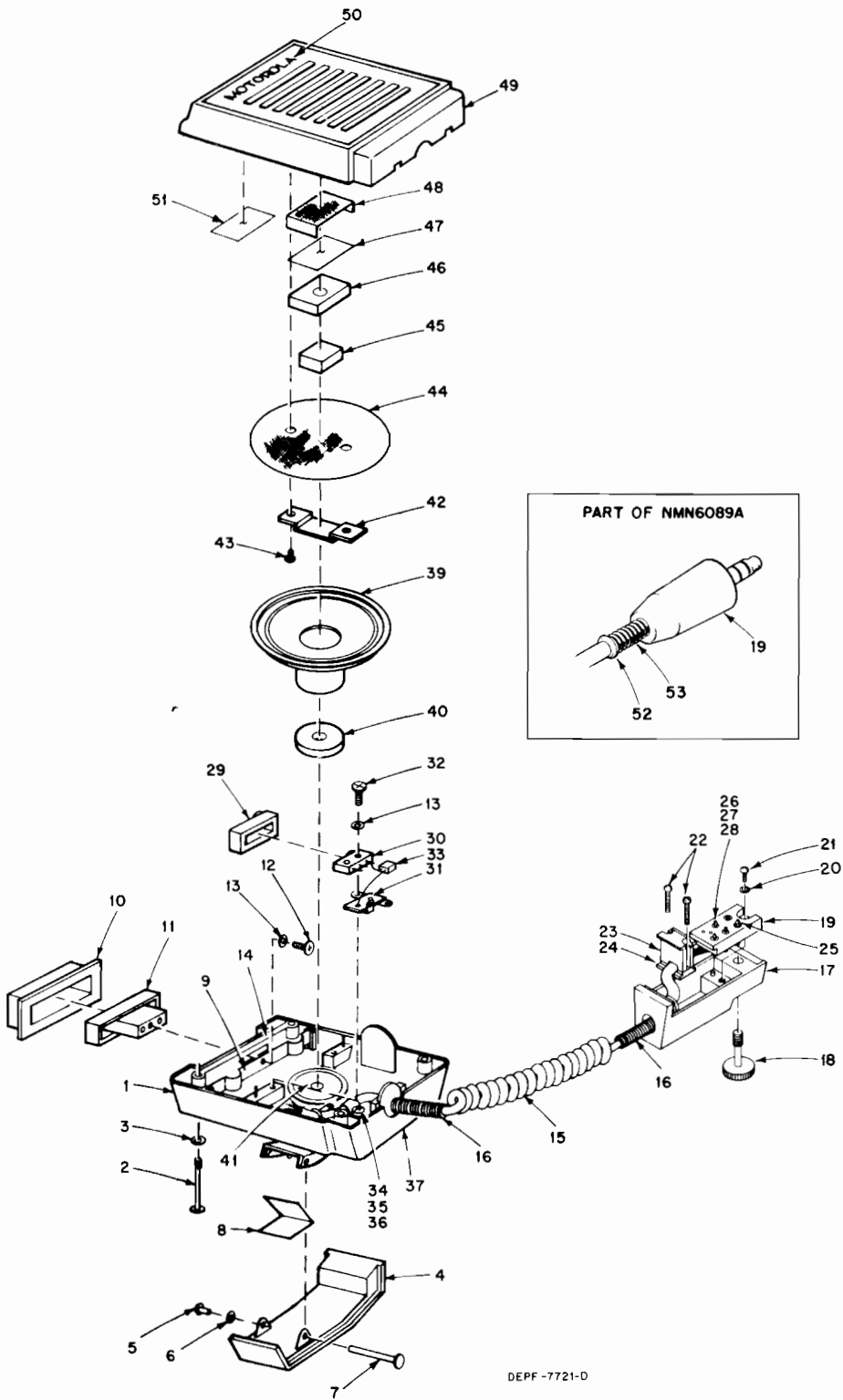
PARTS LOCATION AND IDENTIFICATION

Speaker-Microphone Exploded View  
NMN6081A Straight Cord  
NMN6082A Coiled Cord

PLF-1239-C

ITEM NO.	NOMENCLATURE	MOTOROLA PART NO.
1	HOUSING, Back	0105958B64
2	SCREW, Captive	0382210E03
3	WASHER, Insulator	0482418B09
4	CLIP, Pocket	4284416H05
5	SCREW, Tapping	0300115043
6	WASHER, Flat	0400001793
7	PIN, Clip	2282395B29
8	SPRING, Clip	4105942A01
9	SPRING, Actuator	4184491H01
10	BOOT	3205720B01
11	PUSHBUTTON	3805718B01
12	SCREW, Tapping; 2-56 x 5/16"	0300136914
13	LOCKWASHER, #2	0400008406
14	INSERT, Microphone	4305721B01
15	CORD (W1) or (W2), See Note	-
16	SPRING, Strain Relief (NMN6081A, NMN6082A)	4105466B02
17	HOUSING, Connector (NMN6081A, NMN6082A)	1505710D01
18	SCREW, Thumb (NMN6081A, NMN6082A)	0305822D03
19	PLUG, Connector; (P1) See Note	-
20	LOCKWASHER	0400115361
21	SCREW, Phillips; 2-56 x 1/4"	0300132342
22	SCREW, Phillips; 2-56 x 3/8" (NMN6081A, NMN6082A)	0300139750
23	STRAP, Cable (NMN6081A, NMN6082A)	4205591E01
24	CLAMP, Cable (NMN6081A, NMN6082A)	4205590E01
25	CONTACT, Stud	3905533E01
26	PIN, Contact (NMN6081A, NMN6082A)	3905767D01
27	SPRING, Contact (NMN6081A, NMN6082A)	4105768D01
28	RING, Retaining	4205463E01
29	BOOT	3205719B01
30	SWITCH (S1), See Note	-
31	STRIP, Terminal	3100125063
32	SCREW, Phillips; 2-56 x 5/16"	0300129074
33	CAPACITOR (C1), See Note	-
34	CLAMP, Cable	4284409H01
35	SCREW, Phillips; 4-40 x 1/4"	0300120621
36	LOCKWASHER, #4	0400007683
37	NAMEPLATE	3305150B19
38	NOT USED	-
39	SPEAKER (LS1), See Note	-
40	PAD	7505771B01
41	INSULATOR	1405922A01
42	BRACKET	0782158J01
43	SCREW, Slotted, 5/32"	0300139205
44	GRILLE, Cloth; felt	3505715B01
45	MICROPHONE (MK1), See Note	-
46	GASKET	3205735B01
47	SCREEN	3505450B01
48	GRILL	1382159J01
49	HOUSING, Front	1505722B03
50	NAMEPLATE	3305159D01
51	INSULATOR	1482392E05
52	SLEEVE, Strain Relief (NMN6089A)	3784379H01
53	SPRING, Strain Relief (NMN6089A)	4105275B01

NOTE: For part value and description, refer to electrical parts list contained in this manual.



DEPF-7721-D



## SAFETY INFORMATION

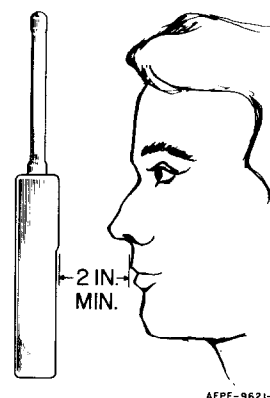
United States Department of Labor, through the provisions of the Occupational Safety and Health Act of 1970 (OSHA), has established an electromagnetic energy safety standard which applies to the use of this equipment. Proper use of this radio will result in exposure below the OSHA limit.

DO NOT hold the radio such that the antenna is very close to, or touching, exposed parts of the body, especially the face or eyes, while transmitting. The radio will perform best if the microphone is two or three inches away from the lips and the radio is vertical.

DO NOT hold the transmit (PTT) switch on when not actually desiring to transmit.

DO NOT allow children to play with any radio equipment containing a transmitter.

DO NOT operate a portable transmitter near unshielded electrical blasting caps or in an explosive atmosphere unless it is a type especially qualified for such use.



AEPP-9621-0

## GENERAL RADIO CARE

1. Avoid physical abuse of the radio such as carrying it by the antenna.
2. Wipe the battery contacts with a lint-free cloth to remove dirt, grease, or other material which may prevent good electrical connections.
3. The external speaker and antenna jacks are fitted with protective caps which should be left in place when the jacks are not being used.
4. Clean the radio exterior using a cloth moistened with water, mild dishwashing liquid, or isopropyl alcohol.

## WARNING

Certain combinations of chemical environments can adversely affect thermosplastic resins. For this reason lubricants, cleaning agents, solvents or any other material which may come in contact with the finished part should be carefully evaluated for compatibility.

We recommend a mild dishwashing soap for cleaning the exterior of the product.

TEPF-13170-0

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