

15165



MOTOROLA

**SABER™
SECURENET™**

Handie-Talkie® Portable Radios
403-512MHz
Service Manual



FOREWORD

SCOPE OF THIS MANUAL

This manual offers only theory and maintenance information for the equipment listed. Service diagrams, parts lists, and printed circuit board details are either a part of this instruction manual, or contained in a supplementary service manual.

NOMENCLATURE

Motorola equipment is specifically identified by the model number on the nameplate.

NOTE

Be sure to use the entire model number when making inquiries about your equipment.

Identifiers have been assigned to chassis and kits. Use these identifiers when requesting information or ordering replacements.

INSTRUCTION MANUAL REVISIONS

Changes which occur after a manual is printed are described in the Instruction Manual Revision. These "FMRs" give the reader complete information on the change including pertinent parts listing data.

NATIONAL SERVICE ORGANIZATION

Motorola provides a nationwide service organization. Through its maintenance and installation program, Motorola makes available the finest service to those desiring reliable continuous communications on a contract basis.

Motorola's National Service Organization is the largest service organization specializing in mobile communications. It includes over 900 authorized or company owned stations. In addition, our products are serviced throughout the world by a wide network of company or authorized independent distributor service organizations.



The area administrative staff, district service managers and district service representatives are in the direct employ of Motorola.

For your contract service requirements, please contact your local Motorola representative or write to:

National Service Manager

Motorola Communications & Electronics, Inc.
1301 E. Algonquin Road, Schaumburg, IL 60196

SAFETY INFORMATION

The Federal Communications Commission (FCC) with its action in General Docket 79-144, March 13, 1985 has adopted a safety standard for the human exposure to radio frequency (rf) electromagnetic energy emitted by FCC regulated equipment. Motorola subscribes to the same safety standard for use of its products. Proper operation of this radio will result in user exposure substantially below the FCC recommended limits.

DO NOT hold the radio with the antenna 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 transmitter near unshielded electrical blasting caps or in an explosive atmosphere unless it is a type especially qualified for such use.

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CONTENTS

FOREWORD	<i>inside front cover</i>
SPECIFICATIONS	<i>ii</i>
MODEL CONFIGURATION	<i>iii</i>
FCC DESIGNATIONS	<i>iii</i>
SPECIALIZED TOOLS AND TEST EQUIPMENT	<i>iii</i>
CURRENT DRAINS	<i>iv</i>
RELATED PUBLICATIONS AVAILABLE SEPARATELY	<i>iv</i>

DISASSEMBLY/REASSEMBLY PROCEDURES

I. DISASSEMBLY	<i>1</i>
II. SERVICING MAJOR SUBASSEMBLIES	<i>3</i>
III. REASSEMBLY	<i>4</i>
TORQUE SPECIFICATIONS	<i>5</i>
SECURENET RADIO FUNCTIONAL TESTS @ 7.5Vdc)	<i>5</i>
8405102R01 MAIN CIRCUIT BOARD COMPONENT LOCATION DIAGRAMS EARLY VERSION (SIDE 1 VIEWED FROM SIDE 1)	<i>6</i>
8405102R01 MAIN CIRCUIT BOARD COMPONENT LOCATION DIAGRAMS (SIDE 2 VIEWED FROM SIDE 1), 8405302U01 MAIN CIRCUIT BOARD COMPONENT LOCATION DIAGRAMS (LATER VERSION), AND MAIN BOARD SCHEMATIC DIAGRAM (EARLY AND LATER VERSION)	<i>7</i>
SABER UHF SECURENET (EARLY VERSION) ELECTRICAL PARTS LIST, 8405302U02 MAIN CIRCUIT BOARD COMPONENT LOCATION DIAGRAMS (LATEST VERSION)	<i>8</i>
8405302U02 MAIN CIRCUIT BOARD SCHEMATIC DIAGRAM	<i>9</i>
8405302U02 MAIN BOARD ELECTRICAL PARTS LIST	<i>10</i>
SABER I SECURENET UHF EXPLODED VIEW DIAGRAM AND PARTS LIST	<i>11</i>
SABER II SECURENET UHF EXPLODED VIEW DIAGRAM AND PARTS LIST	<i>12</i>
SABER III SECURENET UHF EXPLODED VIEW DIAGRAM AND PARTS LIST	<i>13</i>
SABER 2K DISPLAY BOARD COMPONENT LOCATION DIAGRAMS	<i>14</i>
SABER 2K DISPLAY BOARD SCHEMATIC AND PARTS LIST	<i>15</i>
SABER 8K DISPLAY CIRCUIT BOARD COMPONENT LOCATION DIAGRAMS	<i>16</i>
SABER 8K DISPLAY BOARD SCHEMATIC AND PARTS LIST	<i>17</i>
SABER 8K DISPLAY CIRCUIT BOARD COMPONENT LOCATION DIAGRAMS (LATER VERSION)	<i>18</i>
SABER 2K AND 8K DISPLAY BOARD SCHEMATIC AND PARTS LIST (LATER VERSION)	<i>19</i>
REPLACEMENT PARTS ORDERING	<i>inside back cover</i>

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SPECIFICATIONS

GENERAL	TRANSMITTER	RECEIVER
FREQUENCY RANGE: 403-433MHz BANDSPLITS: 440-470MHz (High Power Models) 458-490MHz (High Power Models) 482-512MHz POWER SUPPLY: Rechargeable Nickel-Cadmium Battery or Primary Battery BATTERY VOLTAGE: Nominal: 7.5Vdc Range: 6 to 9Vdc TEMPERATURE RANGE Operating: -30°C to +60°C Storage: -40°C to +85°C DIMENSIONS (HXWXD) Less Battery: 4.42"x2.94"x1.18" (112.27x74.67x29.97 mm) With Light-Capacity Battery: 6.68"x2.94"x1.18" (169.67x74.67x29.97 mm) With Medium-Capacity Battery: 7.56"x2.94"x1.18" (192.02x74.67x29.97 mm) With Ultra-High-Capacity Battery: (or Primary Battery) 8.32"x2.94"x1.18" (211.33x74.67x29.97 mm) WEIGHT NON-KEYPAD Less Battery: 12.22 oz. (347 g) With Light-Capacity Battery: 18.63 oz. (529 g) With Medium-Capacity Battery: 23.87 oz. (678 g) With Ultra-High-Capacity Battery: 25.49 oz. (724 g) KEYPAD Less Battery: 12.57 oz. (357 g) With Light-Capacity Battery: 18.98 oz. (539 g) With Medium-Capacity Battery: 24.23 oz. (688 g) With Ultra-High-Capacity Battery: 25.85 oz. (734 g)	RF POWER OUTPUT Low-Power Models: 1-2 Watts High-Power Models: 2-5 Watts FREQUENCY STABILITY (-30°C to +60°C; +25°C REF): ±.0003% MODULATION: Types 20K0F3E (±5kHz for 100% 20K0F1D modulation @ 1000Hz) 20K0F2D FM HUM AND NOISE (COMPANION RECEIVER): -40dB SPURIOUS EMISSION (CONDUCTED AND RADIATED) 1.0W: -67dBc 2.0W: -70dBc 5.0W: -74dBc AUDIO DISTORTION: 3% Maximum AUDIO FREQUENCY RESPONSE: +1, -3dB (6dB/OCTAVE PRE-EMPHASIS; 300-3000Hz) MAXIMUM FREQUENCY SEPARATION: Full Bandsplit (NO DEGRADATION)	SENSITIVITY 20dBQ: 0.4uV Max. 12dBS: 0.35uV Max. Squelch (Programmable) USEABLE BANDWIDTH±5kHz: SELECTIVITY Adjacent channel: -75dB Fourth channel: -80dB INTERMODULATION: -72dB FM HUM AND NOISE: -40dB FREQUENCY STABILITY (-30°C to +60°C; +25°C REF.): ±.0002% AUDIO SPL (AT 30 cm WITH RATED AUDIO): Weighted, 300-3000Hz 90dB Nominal (Non-Submersible) 87dB Nominal (QXK Models) RATED AUDIO OUTPUT: 500mW (At less than 5% distortion) CHANNEL SPACING: 25kHz MAXIMUM FREQUENCY SEPARATION: Full Bandsplit (NO DEGRADATION)
SECURENET		
SCRAMBLE TYPE: Digital ENCRYPTION METHOD: Multi-Register, Non-Linear Combiner ENCRYPTION KEY INITIALIZATION: Random ENCRYPTION KEY GENERATION: External, Hand-Held, Microprocessor-Controlled Key loader KEY STORAGE: Volatile Electronic Memory NUMBER OF KEYS PER RADIO: One ANALOG-TO-DIGITAL CONVERSION: Continuously-Variable Slope Delta Modulation (CVSD) VOICE SAMPLE RATE: 12 Kilobits/Second		

SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE

MODEL CONFIGURATION

FACTORY I.D.	POWER LEVEL	FREQ.	SUBMERSIBLE	KEYPAD	DISPLAY
H34QXN7139AN	1W-2W	440-470MHz	No	None	None
H44QXN7139AN	2W-5W	403-512MHz	No	None	None
H34YXN7139AN	1W-2W	440-470MHz	Yes	None	None
H44YXN7139AN	2W-5W	403-512MHz	Yes	None	None
H34QXJ7139AN	1W-2W	448-470MHz	No	3x1	LCD
H44QXJ7139AN	2W-5W	403-512MHz	No	3x1	LCD
H34QXK7139AN	1W-2W	448-470MHz	No	3x5	LCD
H44QXK7139AN	2W-5W	403-512MHz	No	3x5	LCD

FCC DESIGNATIONS

2-Watt Models.....AZ489FT4714

5-Watt Models.....AZ489FT4715

SPECIALIZED TOOLS AND TEST EQUIPMENT

SERVICE AIDS

NTN4720A
REN-4001A•
RPX-4665A
RSX-4043A
RTK-4203A
RTL-4208A
RTL-4224A
RTL-4238A
RTX-4005B
TKN8506A
0180358A60
0180370B85 thru B86
0180386A81
0180386A82
5880348B33
6680321B79
6680334B48 thru B52
6680370B88
6680370B89
6680370B90
6680385A11
6680387A59
6680387A64
8407668M01

SECURENET Bypass Module
Housing Eliminator
Field Modification Kit/RTX-4005A
Rotatorq Tool
Program/Test Cable
RF Coax Probe
Battery Eliminator
SABER RF Cable (RTL-4200A to Radio)
Portable Products Test Set
Keyload Cable (Hand-Held Keyloader to Radio)
Keyload Cable (RTL-4200A to Radio)
Ungar Table Fixtures
Micro-Tip Soldering Iron
Static Protection Kit
SMA-BNV Adaptor (for Probe RTL-4200A)
Phillips-Head Rotatorq Bit
Ungar Service Heads
Frequency and On/Off Switch Spanner Nut Rotatorq Bit
Baseplate Spanner Nut Rotatorq Bit
Antenna Bushing Spanner Nut Rotatorq Bit
Module Extractor
Leadless Component Extractor
Heat Controller With Safety Stand
Display Extender Cable

•If Housing Eliminator RTL4225A is used, it will not be possible to keyload a SABER SECURENET Radio through the cable.

TEST EQUIPMENT

R-1053A
R-2045D
S-1339A
S-1347D
RTL-4223A
RTK-4237A

Dual-Trace Oscilloscope
Communications Systems Analyzer with Secure Voice Option
RF Millivoltmeter
Power Supply
Charger Tester
Battery Tester

FIELD PROGRAMMING EQUIPMENT

NTN-5375A
NTN-5376A

NTN-5377A

0180353A74
0180357A57
3080369B71
3080369B72
68P81044C65

SECURENET Field Programmer Software on 3 1/2-inch Disk
SECURENET Field Programmer Software on 5 1/4-inch 360k
Double - Density Disk
SECURENET Field Programmer Software on 1.2 Megabyte
High - Density Disk
Radio Interface Box (RIB)
RIB Wall-Mounted Power Supply
Computer Interface Cable (PC-AT)
Computer Interface Cable (PC-XT)
SABER Field Programmer User's Guide

CURRENT DRAINS (See Note)

		SABER I	SABER I AND III
STANDBY		90	93
RECEIVE		220	223
H44 MODELS:	5-WATT	3300	3300
	2-WATT	2100	2100
H34 MODELS:	2-WATT	1400	1400
	1-WATT	1200	1200

NOTE: Drain specifications are in milliamperes at 7.5Vdc. These current drains apply to test mode, with the radio operating through the external antenna port. Current drains decrease in normal operation due to antenna switch drains and antenna loading.

CLEANING

- Clean all external radio surfaces with a 0.5% solution of a mild dishwashing detergent in water (one teaspoon of detergent per gallon of water).
- Stronger cleaning agents may only be used to remove soldering flux from circuit boards after making repairs.



CAUTION

Never allow any alcohol- or solvent-based product to contact any plastic or rubber radio part.

- Clean internal surfaces with water-activated optical wipes.

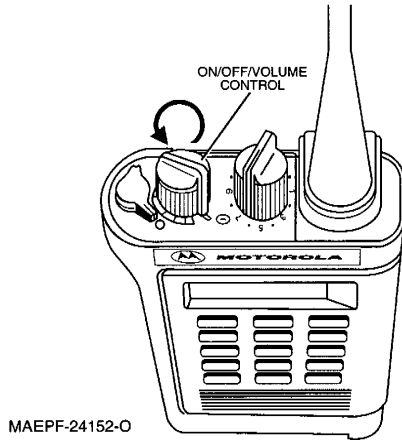
RELATED PUBLICATIONS AVAILABLE SEPARATELY

SABER I SECURENET OPERATING INSTRUCTIONS	68P81045C60
SABER II SECURENET OPERATING INSTRUCTIONS	68P81045C65
SABER III SECURENET OPERATING INSTRUCTIONS	68P81048C40
SECURENET SERVICE MANUAL (VHF)	68P81045C70
SECURENET THEORY/ MAINTENANCE MANUAL.....	68P81045C85
FIELD PROGRAMMER USER'S GUIDE.....	68P81044C65

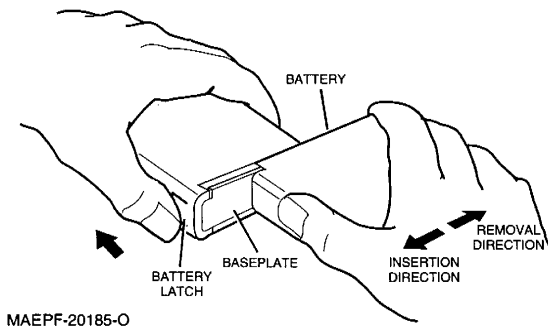
DISASSEMBLY/REASSEMBLY PROCEDURES

I. DISASSEMBLY

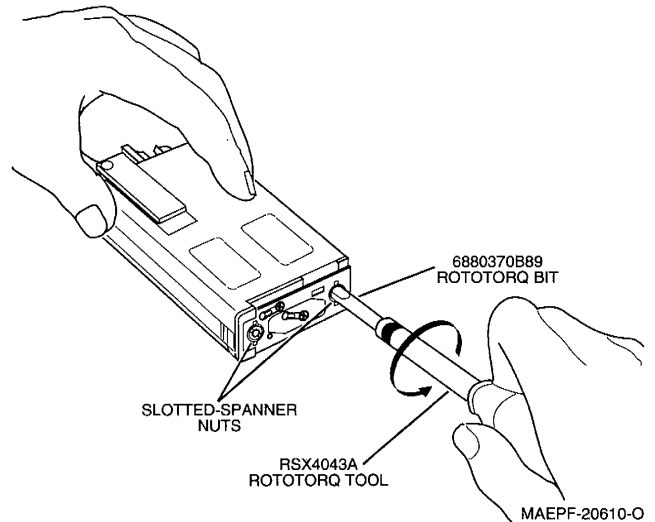
- A. Turn off the radio** by rotating the on/off/volume control knob fully counterclockwise until you hear a click. Remove the universal connector cover or an accessory connected to the radio before beginning disassembly.



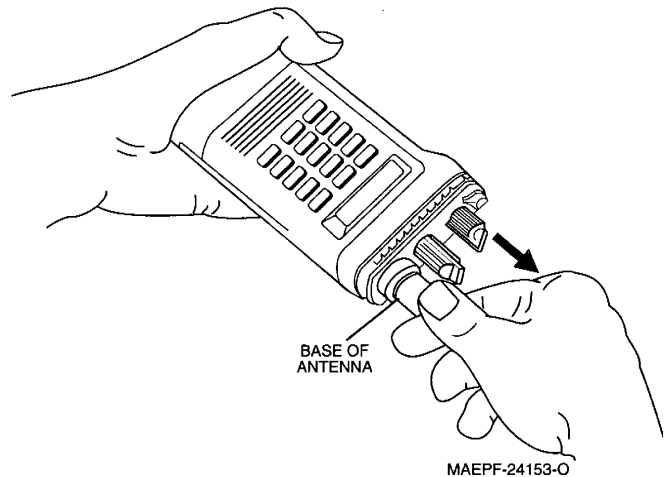
- B. Remove the battery** from the baseplate on the bottom of the radio housing by pushing the spring-loaded battery latch toward the top of the radio, and sliding the battery away from the latch until it clears the baseplate.



- C. Loosen the two slotted-spanner nuts** on the bottom of the radio using Rotatorq tool bit No. 6680370B89. When loosened, the slotted-spanner nuts are captive and will spin freely without separating from the baseplate.



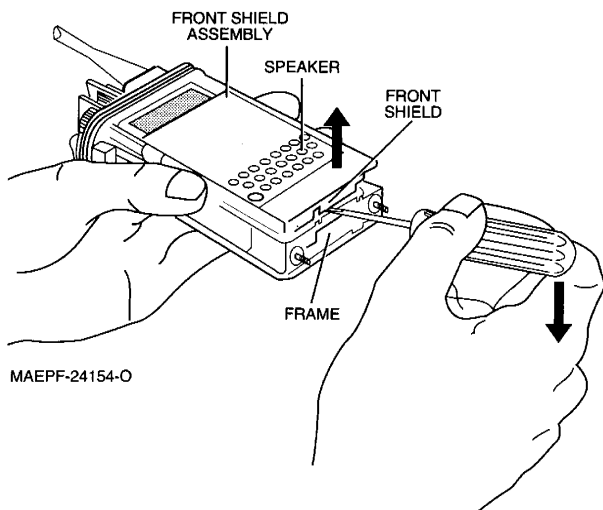
- D. Remove the frame assembly** from the radio housing by grasping the antenna at its base and pulling it gently upward. *Do not depress the PTT switch during removal and do not push on the slotted-spanner nuts to lift the frame assembly.*



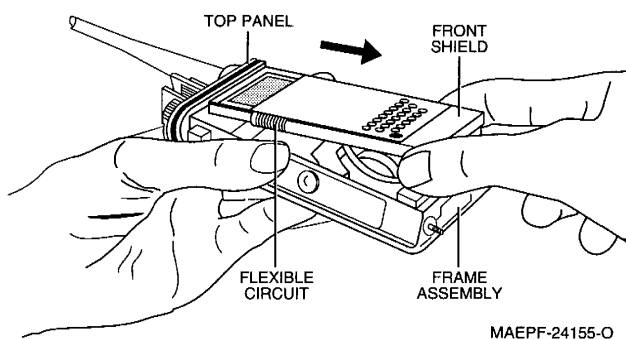
CAUTION

Ensure that all static electricity safeguards are in place.

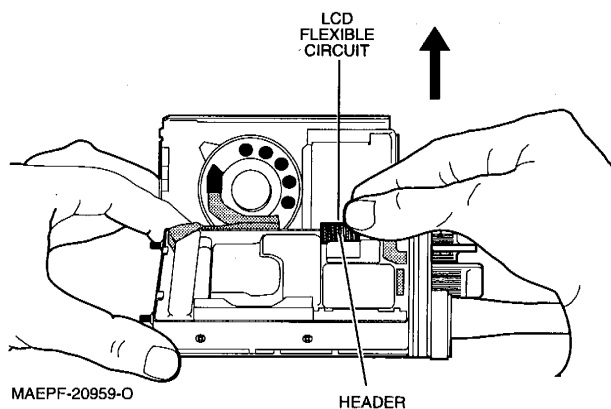
- E. With the speaker facing upward, **remove the front shield assembly** by inserting a thin screwdriver blade between the frame and the bottom of the front shield, and prying gently upward on the front shield until it is disengaged from the frame.



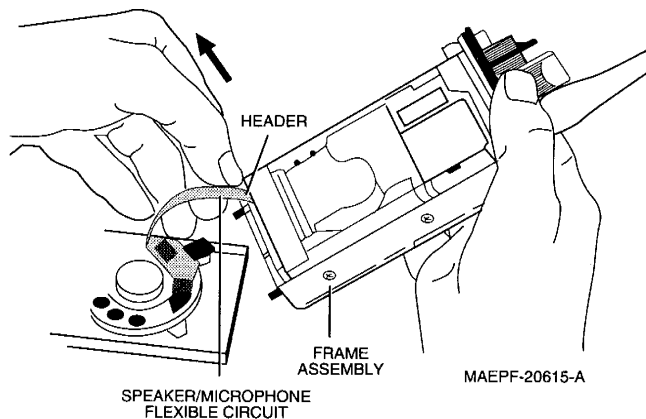
- F. **Lift the front shield assembly** away from the bottom of the frame assembly, then pull it out from under the plastic top panel. Be careful not to pull against the flexible circuits connecting the front shield to the frame assembly.



- G. **ON SABER II AND SABER III RADIOS ONLY:** **Disconnect the LCD interconnect flexible circuit** from the frame assembly by pulling the header straight out and away from the main printed circuit board.



- H. **Disconnect the speaker/microphone flexible circuit** from the frame assembly by pulling the connector straight out and away from the main printed circuit board.



CAUTION

Refer to "SERVICING MAJOR SUBASSEMBLIES" (Section II) and the appropriate exploded view diagrams at the back of this manual before attempting further disassembly or repair.

II. SERVICING MAJOR SUBASSEMBLIES

A. Baseplate

- All repairs to the baseplate assembly can, and should, be made with the radio chassis inside the radio.
- After the slotted-spanner nuts are loosened, the baseplate is held in place by the power contact screws.
- The retainers holding the slotted-spanner nuts in place are not reusable. Replacement of the retainers requires special insertion procedures; refer to the instruction sheet provided with the slotted-spanner nut kit.
- The O-ring portions of the elastomer seal must be fully seated on the threaded bushings before the baseplate is reassembled (the bushings are part of the housing assembly).

B. Housing Assembly

- The housing assembly includes many parts that are not replaceable or repairable.
- The insulator on the universal connector can, and should, be replaced if the old insulator has been torn. When replacing the insulator take care to keep it out of the main seal O-ring's seating area.
- The PTT lever can be replaced by prying out the old part with a soft plastic tool. The plastic housing around the lever may be damaged if a harder tool is used.

C. Control Top Panel

- The control top panel is fastened to the frame by the on/off/volume and frequency switches, and two self-tapping screws; it should be removed from the frame only if absolutely necessary. If repair is required, always start the screws into the control top panel by hand before tightening them with a torque wrench; this will help avoid cross-threading and stripping of the plastic panel.
- The on/off/volume and frequency knobs are 2-part kits; each kit consists of a knob and an insert. Once an insert is removed, it cannot be used again; therefore, remove an insert only if the on/off/volume control or frequency switch must be replaced, or if the control top must be removed from the frame.
- The number of frequency switch positions can be changed by removing the frequency knob and insert, and aligning the top tab on the detent washer with the number on the escutcheon that is equal to the desired number of frequency positions minus three. For example, a 12-position frequency switch would have the top tab aligned with the "9" on the

escutcheon. A new frequency knob and insert must be used each time this change is made.

NOTE

There are different detent washers for even or odd numbers of switch positions; see the appropriate exploded view parts list.

D. LCD/Front Shield Assembly

- The LCD assembly can be replaced on SABER II and III radio PC board assemblies, but the instructions on the replacement kit's instruction sheet must be strictly followed.
- The microphone boot must be properly oriented and seated in the front shield **before** the microphone is pressed into place.

E. Backshield Assembly

- Before removing the backshield, ensure that all static electricity safeguards are in place.
- For best results, loosen/tighten all four screws lightly before loosening/tightening any single screw completely.
- The backshield screws are held captive in the shield after being loosened.

F. Circuit Boards and Modules

- All modules plug into sockets on the main circuit board.
- Some modules are fastened to the main board and frame with screws; remove these screws before attempting to unplug a module. **Never** substitute any screw.
- Several of the modules are designed to be removed with a standard DIP extractor tool (OK-1 or equivalent). Always use the extractor tool when removing these modules to avoid damaging their leads. *Applying all the force to a single guide pin will cause severe damage to the module.*
- Some modules have guide pins to assist in insertion or removal. Pressure may be applied to these guide pins to aid removal of a module if, and only if, it is distributed evenly over all guide pins on the module.
- The U900 module is not serviceable.
- Before reinserting any module, always check its leads for damage. Gently straighten any leads that may be bent; replace any modules with severely damaged leads.
- Before reinserting reference oscillator module U301 into the main circuit board, be certain that its squared (pin 1) corner is correctly oriented per the main circuit board component location diagram.

- When electrically testing and/or probing the main circuit board with the back shield removed, always use the three finger screws on the SABER housing eliminator service aid to provide grounding to VCO synthesizer module U300 (two places), and the rf ground clip (one place).
- When removing the main circuit board from the frame assembly, do the following:
 1. Remove the back shield assembly.
 2. Unplug the PTT/controls flexible circuit.
 3. Remove power amplifier module U202.
 4. Remove the two main compression connector screws.
 5. Lift the board at the bottom and pull out from under the control top panel.
- The rf and ground contacts at the top of the main circuit board are exposed when the board is removed from the frame. Special care must be taken to avoid accidental damage to these contacts.

G. Frame Assembly

- The tapped tabs on the frame can be stripped if excessive screw tightening torques are used (see Torque Specifications table). The frame is not repairable.
- If you must lift or remove the PTT/controls flex circuit for any reason, do not readhere it to the frame; the flex must be replaced.

H. Dual-Function Switch (S801) and Actuator Assembly

- Before removing the switch, remove the knob by gently separating the two arms of the switch bracket (located between the switch and the main O-ring seal) and pulling upward on the knob.
- Before reinserting the knob, ensure that the slot in the switch is properly aligned with the blade on the knob's shaft.

- When the knob is properly inserted, the arms of the switch bracket will snap into position (approximately 0.2 inches apart), the knob will not be loose in the switch bracket, and the bracket will hold the switch firmly against the inside of the top control panel. If this is not the case, replace the switch bracket.

III. REASSEMBLY

Reassemble the radio in the reverse order of disassembly, referring to "SERVICING MAJOR SUBASSEMBLIES" (Section 2) and making certain:

- that the speaker/microphone connector (and the LCD interconnect header on SABER II and III radios) is correctly aligned so that no twisting or pinching of the flexible circuit occurs when the front shield is reattached to the frame assembly.
- that the two extended tabs at the top of the front shield are properly inserted into the slots between the frame and the control top panel.
- to tighten all hardware loosened or removed during disassembly per the torque specifications listed in the Torque Specifications table. Use recommended torque driver (Motorola RSX4043A Rotatorq Tool or equivalent).
- that there is no foreign material on the main O-ring or stud seals.



CAUTION

Inspect the frame stud seals and the top panel O-ring and replace if any damage exists.

- to properly orient the completed frame assembly before inserting it into the radio housing.
- *that the PTT switch and monitor button are not depressed while the frame is being inserted into the housing.*

TORQUE SPECIFICATIONS

APPLICATION	TORQUE (IN.LBS.)	TORQUE (N-m)	TORQUE BIT NO.
Antenna Bushing Spanner Nut	20	2.27	6680370B90
Back Shield to Frame Screws	> 2.8	0.28	6680321B79
Bottom Connector to Frame Screws	> 2.8	0.28	6680321B79
Frequency Switch Spanner Nut	8	0.91	6680370B88
All Module Screws	> 2.8	0.28	6680321B79
Power Contact Screws	> 2.8	0.28	6680321B79
Slotted-Spanner Nut (Baseplate)	- 6	0.45	6680370B89
Top Panel to Frame Screws	2	0.23	6680321B79
Volume Pot Spanner Nut	8	0.91	6680370B88

SECURENET RADIO FUNCTIONAL TESTS @ 7.5Vdc)

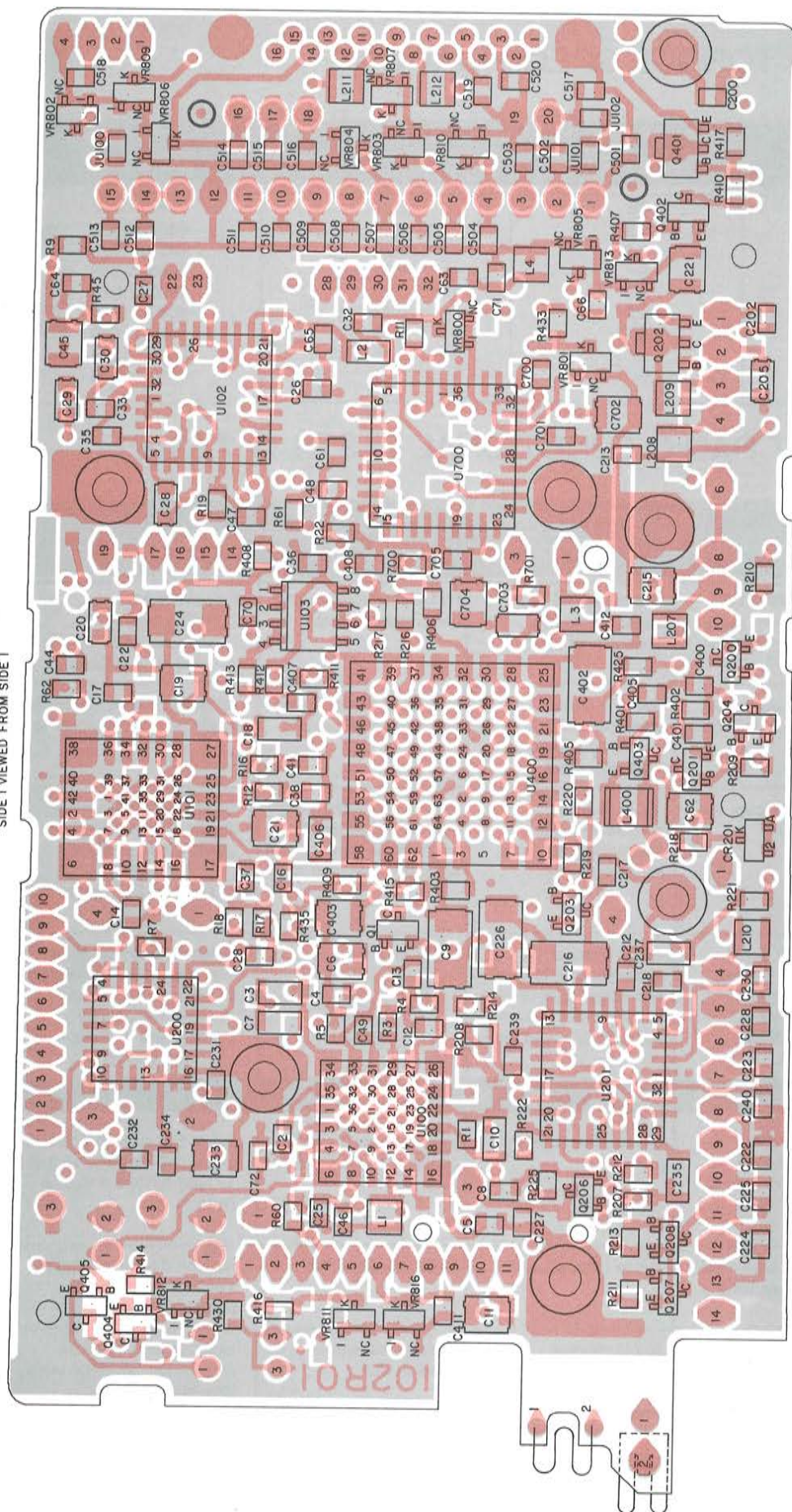
TRANSMITTER PERFORMANCE				
TEST	SERVICE MONITOR	RADIO	TEST BOX	COMMENTS
REFERENCE FREQUENCY	Set to POWER MONITOR , FREQ. ERROR ; frequency to radio transmit frequency; input to RF IN/OUT .	Set to channel corresponding to frequency of test.	PTT Continuous (during performance check).	Frequency error = ≤450 Hz (vhf) ≤750 Hz (uhf) ≤150 Hz Mid-Band)
RF POWER OUT	Same as above, except set monitor to measure POWER .	Set to channel corresponding to frequency and power level under test.	PTT Continuous (during performance check).	RF power output ≥ published specs for channel under test.*
VOICE MODULATION	Same as above, except set monitor to measure DEVIATION .	Set to channel corresponding to frequency and power level under test.	Input a 1kHz tone @ ~50 mVrms to radio's microphone (through test box). PTT continuous	Listen for 1kHz tone from monitor. Deviation should be ≥4.0kHz and ≤5.0kHz - (for 25kHz) ≥3.0kHz and ≤4.0kHz - (for 20kHz)
CODED VOICE MODULATION	Load monitor with same key used in radio. Select proper algorithm and DEVIATION test with SECURE COM TEST MENU on screen.	Set to channel corresponding to freq. and power level under test. With key loaded, set radio to coded mode.	Same as above.	Listen for decoded 1kHz tone from monitor. Deviation should be ≥3.5kHz and ≤4.5kHz. (for 25kHz) ≥2.5kHz and ≤3.5kHz - (for 20kHz)
RECEIVE PERFORMANCE				
RATED AUDIO	Set to GENERATOR ; frequency to radio receive frequency; 1 mV rf output; 1kHz modulation; 3kHz deviation.	Set to open squelch.	Speaker selector on position "A"; switch to load.	Verify that audio is present; adjust radio volume control to read 3.7 to 3.9 Vac on DVM.
12dB SINAD	Same as above, except set monitor to measure SINAD .	Set to open squelch.	Set to speaker load.	Reduce rf level to achieve 12dB SINAD; rf level ≤ published specs.
RECEIVE CODED VOICE	Load monitor with same key used in radio; make sure 1kHz level and all other modulation are turned off when switching to GENERATE . Select TEST under SECURE COM MENU .	Set to channel corresponding to freq. and power level under test. Make sure key is loaded into radio.	Speaker selector on position "A."	Increase 1kHz level on monitor and listen for 1kHz tone from test box.

NOTES:

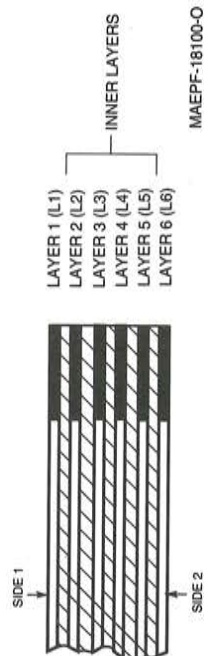
Tests should be performed with Test Box RTX-4005B, and associated Test Cable RTK-4203A.

*RF power levels can be different for each individual channel; refer to Radio Information Sheet.

EARLY VERSION (SIDE 1 VIEWED FROM SIDE 1)

LI-CEPF-17658-0
LI-CEPF-17659-0
OLI-CEPF-17670-0

6-LAYER CIRCUIT BOARD COPPER DETAIL VIEWING
COPPER STEPS AT EDGE OF BOARD IN PROPER
LAYER SEQUENCE.



8405102R01 MAIN CIRCUIT BOARD COMPONENT LOCATION DIAGRAMS (SIDE 2 VIEWED FROM SIDE 1),
8405302U01 MAIN CIRCUIT BOARD COMPONENT LOCATION DIAGRAMS (LATER VERSION), AND
MAIN BOARD SCHEMATIC DIAGRAM (EARLY AND LATER VERSION)

SABER UHF SECURENET (EARLY VERSION)
Electrical Parts List TPLF-3496-A

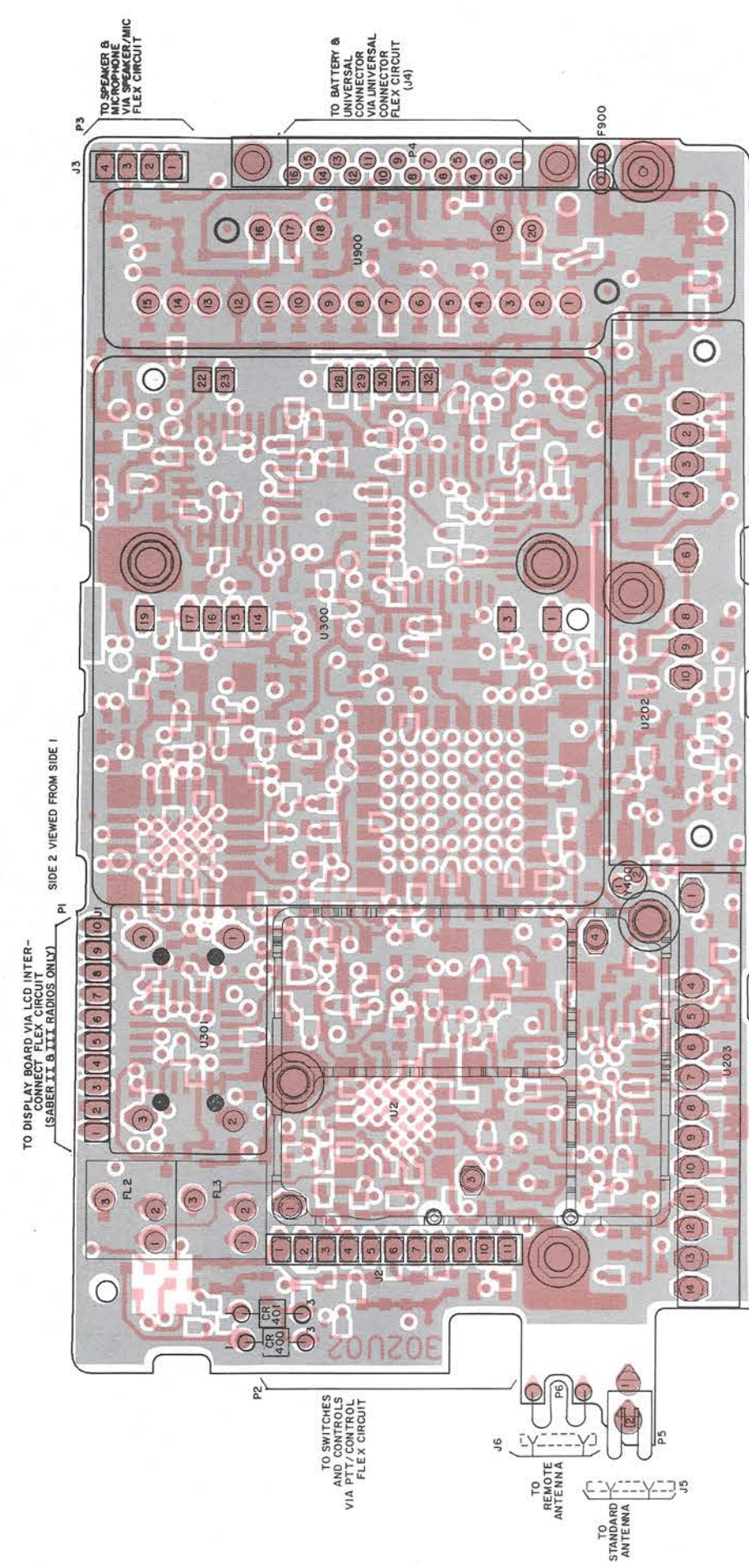
REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
C1	2113740A40	CAPACITOR, Fixed: μ F $\pm$ 20%; 25V unless stated
C2	2113741A25	
C3	2160521H41	1500pF $\pm$ 5%
C4	2160521G37	.22+80-20%
C5	2160521A11	0.1+80-20%
C6	2362998B68	680pF
C7	2160521H41	4.7; 10V
C8	2160521G37	.22+80-20%
C9	2362998B73	0.1+80-20%
C10	2362998D51	10; 16V
C11	2362998B64	0.15 +10%; 35V
C12	2160521A11	2.2; 20V
C13	2160521E25	680pF $\pm$ 5%
C14	2160521G37	.01
C15	-----	0.1+80-20%
C16	2160520B17	Not Used
C17	2160521G37	47pF $\pm$ 5%
C18	2160521H41	0.1+80-20%
C19	2362998B16	.22+80-20%
C20	2362998B59	3.3 $\pm$ 10%; 16V
C21	2362998B68	1; 16V
C22	2160521A21	4.7; 10V
C23	2160521G37	0.1+80-20%
C24	2160521A19	3300pF $\pm$ 5%
C25	2362998B69	4.7; 20V
C26	2160521A21	Not Used
C27	2160521A32	4700pF $\pm$ 5%
C28 thru 30	2362998B59	.039 $\pm$ 5%
C31	-----	1; 16V
C32	2160521A32	Not Used
C33	2160521H43	.039 $\pm$ 5%
C34	-----	.33+80-20%
C35	2160521H43	Not Used
C36,37	2160521G37	.33+80-20%
C38	2160520C01	100pF $\pm$ 5%
C39,40	-----	Not Used
C41	2160520C01	100pF $\pm$ 5%; 50V
C42,43	-----	Not Used
C44	2160521G37	0.1+80-20%
C45	2362998B16	3.3 $\pm$ 10%; 16V
C46	2160520C01	100pF $\pm$ 5%; 50V
C47	2160521E25	.01
C48	2160521A29	.022 $\pm$ 5%
C49 thru 60	-----	Not Used
C61	2160521A29	.022 $\pm$ 5%
C62	2362998B68	4.7 $\pm$ 20%; 10V
C63	2160521G37	0.1+80-20%
C64 thru 66	2160520C01	100pF $\pm$ 5%; 50V
C67 thru 69	-----	Not Used
C70	2160521E28	.018
C71	2160520B24	91pF $\pm$ 25%; NPO
C200	2160520C01	100pF $\pm$ 5%; 50V
C201	-----	Not Used
C202	2160521E28	.018
C203,204	-----	Not Used
C205	2362998B05	47 $\pm$ 10%
C206 thru 211	-----	Not Used
C212,213	2160521E28	.018
C214	-----	Not Used
C215	2362998B16	3.3 $\pm$ 10%; 16V
C216	2362998B73	10; 16V
C217	2160520C01	100pF $\pm$ 5%; 50V
C218	2160521C21	4700pF $\pm$ 10%
C219,220	-----	Not Used
C221	2362998B68	4.7; 10V
C222	2160521A19	3300pF $\pm$ 5%
C223	2160520C01	100pF $\pm$ 5%; 50V
C224	2160521A19	3300pF $\pm$ 5%
C225	2160520C01	100pF $\pm$ 5%; 50V
C226	2362998B73	10; 16V
C227	2160521E28	.018
C228	2160520C01	100pF $\pm$ 5%; 50V
C229	-----	Not Used
C230 thru 232	2160520C01	100pF $\pm$ 5%; 50V
C233	2362998B16	3.3 $\pm$ 10%; 16V
C234	2160520C01	100pF $\pm$ 5%; 50V
C235	2160521H41	Not Used
C236	-----	Not Used
C237	2160521H41	.22+80-20%

C238	-----	Not Used
C239	2160520C01	100pF $\pm$ 5%; 50V
C240	2160520B10	24pF $\pm$ 5%; 50V; NPO
C400,401	2160520B10	24pF $\pm$ 5%; 50V; NPO
C402	2362998B73	10; 16V
C403	2362998B68	4.7; 10V
C404	-----	Not Used
C405	2160521E25	.01
C406	2160521H41	.22+80-20%
C407,408	2160521G37	0.1+80-20%
C409,410	-----	Not Used
C411,412	2160521G37	0.1+80-20%
C501 thru 514	2160520C01	100pF $\pm$ 5%; 50V
C515	-----	Not Used
C516 thru 520	2160520C01	100pF $\pm$ 5%; 50V
C700,701	2160521G37	0.1+80-20%
C702	2362998B16	3.3 $\pm$ 10%; 16V
C703	2362998B05	.47 $\pm$ 10%
C704	2362998B68	4.7; 10V
C705	2160521G37	0.1+80-20%
CR200	-----	DIODE: See Note I
CR201	4805129M05	Not Used
CR400	4805729G22	SOT
-----	-----	LED, Red
F900	0105955P27	FUSE: ASSEMBLY, 5 Amp
FL1	-----	FILTER:
FL2	9105685Q05	Not Used
FL3	9105685Q06	Ceramic; 450kHz; 20kHz BW
-----	-----	Ceramic; 450kHz; 15kHz BW
J1	0905287C05	JACK: Socket, Printed Circuit
J2	0905287C05	(LCD Interconnect)(10 req'd)
J3	0905287C05	Socket, Printed Circuit
-----	-----	(PTT Controls Flex)(11 req'd)
-----	-----	Socket, Printed Circuit
-----	-----	(Speaker/Mic Connector)(4 req'd)
L1	2405452C64	COIL, RF: unless stated
L2	2462575A05	1500nH $\pm$ 5%
L3	2405452C49	Choke; 4.7uH
L4	2405452C09	360nH $\pm$ 5%
L200 thru 206	-----	50nH $\pm$ 5%
L207 thru 210	2405452C49	Not Used
L400	2462585A40	360nH $\pm$ 5%
-----	-----	33uH
LS1	-----	SPEAKER: 28 Ω $\pm$ 10% (Part of Speaker/Microphone Flex Assembly)
P1 thru 3	-----	-----
P4	2805520Q01	-----
P5	3905446Q03	-----
P6	3905445Q03	-----
P7 thru 9	-----	-----
Q1	4805128M16	TRANSISTOR: See Note I
Q2	-----	PNP; SOT-23
Q200,201	4805128M44	Not Used
Q202	4805128M27	PNP; SOT-23
Q203	4805128M16	PNP; SOT-89
Q204	4805218N13	PNP; SOT-23
Q205	-----	PNP; SOT
Q206	4805128M16	Not Used
Q207,208	4805128M29	PNP; SOT-23
Q400 thru 402	-----	PNP; SOT-23
Q403	4805218N03	Not Used
Q404	-----	PNP; SOT-23
Q405	4805128M44	Not Used
-----	-----	PNP; SOT-23
R1	0660079V23	RESISTOR, Fixed: Ω $\pm$ 5%; 1/8W unless stated
R2	-----	Not Used
R3	0660076E76	62k
R4	0660078T24	3.3 $\pm$ 10%; 16V
R5	0660078T01	10k
R6	-----	Not Used

R7	0660078J80	49.9k $\pm$ 1%
R8	-----	Not Used
R9	0660078G33	2k $\pm$ 1%
R10	-----	Not Used
R11	0660078G33	2k $\pm$ 1%
R12	0660076A49	1k
R13 thru 15	-----	Not Used
R16	0660079V28	130k
R17	0660076E73	10k $\pm$ 1%
R18	0660076E89	47k $\pm$ 1%
R19	0660076A49	1k
R20,21	-----	Not Used
R22	0660076A92	62k
R23 thru 44	-----	Not Used
R45	0660076A29	150
R46 thru 59	-----	Not Used
R60	0660076A29	150
R61	0660076A77	15k
R62	0660076B01	100k
R200 thru 206	-----	Not Used
R207	0660076E77	15k $\pm$ 1%
R208	0660078G58	3.32k $\pm$ 1%
R209	0660076A48	910
R210	0660078J80	49.9k $\pm$ 1%
R211	0660076A75	12k
R212	0660078G33	2k $\pm$ 1%
R213	0660078A75	12k
R214	0660076B01	100k
R215	-----	Not Used
R216,217	0660076A73	10k
R218	0660076E73	10k $\pm$ 1%
R219	0660076A80	20k
R220	0660076B01	100k
R221	0660076E89	47k $\pm$ 1%
R222	0660076A73	10k
R223,224	-----	Not Used
R225	0660076A73	10k
R400	-----	Not Used
R401	0660076A65	4.7k
R402	0660076B25	1M $\pm$ 5%
R403	0660076B01	100k
R404	-----	Not Used
R405	0660076B01	100k
R406	0660076A73	10k
R407	-----	Not Used
R408	0660076B01	100k
R409	0660076A29	150
R410	-----	Not Used
R411	0660076A80	20k
R412,413	0660078J01	100k $\pm$ 1%
R414 thru 416	0660076B01	100k
R417 thru 424	-----	Not Used
R425	0660076A73	10k
R426 thru 429	-----	Not Used
R430	0660076A29	150
R431,432	-----	Not Used
R433	0660076A21	68
R434	-----	Not Used
R435	0660076A49	1k
R500	0660076A73	10k
R700	0660078J80	49.9k $\pm$ 1%
R701	0660076A49	1k
R800	RPX4690A	Potentiometer, Kit, On/Off/Volume (includes S800)
R801	0660076B08	200k
R802	0660076A93	68k
R803	-----	Not Used
R804	0660076A85	33k
R805	0660076A49	1k
S800	RPX4690A	SWITCH: Kit, On/Off/Volume (includes R800)
S801/S804	4005221R01	Dual-Function, Clear/Code (S804)(Standard) and Emergency (S801)(Optional)
S802	-----	Not Used
S803	RPX4694A	Kit, Contact Snapdome, PTT
S805	RPX4694A	Kit, Contact Snapdome, Monitor
S806 thru 822	-----	Not Used
S823	RPX4689A	Kit, Frequency
U1	-----	CIRCUIT MODULE: See Note I
U2	NLE9431A	Not Used
or	NLE9432A	Filter/Amp/Mixer (403-432 MHz)
or	NLE9433A	Filter/Amp/Mixer (440-470 MHz)
or	NLE9434A	Filter/Amp/Mixer (470-500 MHz)
U100	0105958P77	Filter/Amp/Mixer (490-512 MHz)
U101	0105958P80	IC, I-F
-----	-----	IC, Audio Filter, CMOS

U102	0105958P74	IC, Audio, Bipolar
U103	5105469E65	IC, Regulator
U200	0105953N05	IC, Digital/Analog Converter, CMOS
U201	0105959P66	Transmit Automatic Level Control
U202	NLE9471A	5W-Power Amplifier (403-432 MHz)
or	NLE9472A	5W-Power Amplifier (440-470 MHz)
or	NLE9473A	5W-Power Amplifier (470-500 MHz)
or	NLE9474A	5W-Power Amplifier (490-512 MHz)
U300	NLE9483A	2W-Power Amplifier (440-470 MHz)
or	NLE9461A	Synthesizer (403-432 MHz)
or	NLE9462A	Synthesizer (440-470 MHz)
or	NLE9463A	Synthesizer (470-500 MHz)
or	NLE9464A	Synthesizer (490-512 MHz)
U301	NXN6269A	Oscillator, Reference; 16.8MHz
U400	0105953N16	Microcomputer, MC68HC11; Binary
U700	0105953N11	Signal Filter, Phase 1, CMOS
U900	NTN4720A	SECURENET Bypass Module
or	-----	Optional Encryption Module
VR800	4805129M35	DIODE: See Note I
VR801	4805129M49	Zener, 5.6V
VR802	4880140L11	Zener, 16V
VR803 thru 807	4805129M35	Zener, 7.5V
VR808	-----	Zener, 5.6V
VR809 thru 812	4805129M35	Not Used
VR813	4880140L11	Zener, 5.6V
VR814,815	-----	Zener, 7.5V
VR816	4805129M35	Not Used
Y400	4805664G32	Zener, 5.6V
-----	-----	CRYSTAL: 7.3728MHz
NONREFERENCED ITEMS		
-----	0905287C05	SOCKET, Printed Circuit
-----	1405881R01	(for all modules)(71 req'd)
-----	7505934Q01	BOOT, Crystal (For Y400)
-----	-----	PAD, Oscillator (For U301)

NOTE:
I. For optimum performance, order replacement diodes, transistors, and circuit modules by Motorola part number only.



REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
C1	2113740A40	CAPACITOR, Fixed: uF±20%; 25V unless stated 30pF±30% part of Speaker/Microphone Flex Assembly (0105958M34)
C2	2113741A25	1500pF±5%
C3	2160521H41	.22+80-20%
C4	2160521G37	0.1+80-20%
C5	2113741A17	680pF
C6	2311049J12	4.7; 10V
C7	2160521H41	.22+80-20%
C8	2160521G37	0.1+80-20%
C9	2311049J26	10; 16V
C10	2311049J02	0.15 +10%; 35V
C11	2311049J04	2.2; 20V
C12	2113741A17	680pF ±5%
C13	2113741A45	.01
C14	2160521G37	0.1+80-20%
C15	-----	Not Used
C16	2113741A46	47pF±5%
C17	2160521G37	0.1+80-20%
C18	2160521H41	.22+80-20%
C19	2311049J07	3.3±10%; 16V
C20	2160521G37	1; 16V
C21	2311049J12	4.7; 10V
C22	2160521G37	0.1+80-20%
C23	2113741A31	3300pF±5%
C24	2311049J14	4.7; 20V
C25	-----	Not Used
C26	2113741A37	4700pF±5%
C27	2113741A59	.039±5%
C28 thru 30	2113741A37	1; 16V
C31	-----	Not Used
C32	2113741A59	.039±5%
C33	2160521H43	.33+80-20%
C34	-----	Not Used
C35	2160521H43	.33+80-20%
C36,37	2160521G37	0.1+80-20%
C38	2113740A55	100pF ±5%
C39,40	-----	Not Used
C41	2113740A55	100pF±5%; 50V
C42,43	-----	Not Used
C44	2160521G37	0.1+80-20%
C45	2311049J07	3.3±10%; 16V
C46	2113740A55	100pF±5%; 50V
C47	2113740A75	680pf
C48	2113740A53	.022±5%
C49 thru 60	-----	Not Used
C61	2113740A53	.022±5%
C62	2311049J12	4.7±20%;10V
C63	2160521G37	0.1+80-20%
C64 thru 66	2113740A55	100pF±5%; 50V
C67 thru 69	-----	Not Used
C70	2113740A51	.018
C71	2113740A54	91pF±25%; NPO
C200	2113740A55	100pF±5%; 50V
C201	-----	Not Used
C202	2113741A51	.018
C203,204	-----	Not Used
C205	2311049A05	.47±10%
C206 thru 211	-----	Not Used
C212,213	2113741A51	.018
C214	-----	Not Used
C215	2311049J07	3.3±10%; 16V
C216	2311049J26	10; 16V
C217	2113740A55	100pF±5%; 50V
C218	2113741A37	4700pF±10%
C219,220	-----	Not Used
C221	2311049J12	4.7; 10V
C222	2113741A33	3300pF±5%
C223	2113740A55	100pF±5%; 50V
C224	2113741A33	3300pF±5%
C225	2113740A55	100pF±5%; 50V
C226	2311049J26	10; 16V
C227	2113741A51	.018
C228	2113740A55	100pF±5%; 50V
C229	-----	Not Used
C230 thru 232	2113740A55	100pF±5%; 50V
C233	2311049J07	3.3±10%; 16V
C234	2113740A55	100pF±5%; 50V
C235	2160521H41	.22+80-20%

C236	-----	Not Used
C237	2160521H41	.22+80-20%
C238	-----	Not Used
C239	2113740A55	100pF±5%; 50V
C240	2113740A38	24pF±5%; 50V; NPO
C400	2113740A27	8.2pF
C401	2113740A46	47pF
C402	2311049J26	10; 16V
C403	2311049J12	4.7; 10V
C404	-----	Not Used
C405	2113741A45	.01
C406	-----	Not Used
C407,408	2160521G37	0.1+80-20%
C409,410	-----	Not Used
C411,412	2160521G37	0.1+80-20%
C413 thru 415	2113740F51	100pF±5%; 50V
C501 thru 520	2113740A55	100pF±5%; 50V
C700,701	2160521G37	0.1+80-20%
C702	2311049J07	3.3±10%; 16V
C703	2311049A05	.47±10%
C704	2311049J12	4.7; 10V
C705	2160521G37	0.1+80-20%
CR200	-----	DIODE: See Note I
CR201	4805129M05	Not Used
CR400	4805729G34	SOT
CR401	-----	LED, Red
F1	6505663R03	Not Used
F900	-----	FUSE: 5 Amp (use with L255)
FL1	-----	Not Used
FL2	9105685Q11	Ceramic; 450kHz; 20kHz BW
FL3	9105685Q12	Ceramic; 450kHz; 15kHz BW
J1	0905287C05	JACK: Socket, Printed Circuit (LCD Interconnect)(10 req'd)
J2	0905287C05	Socket, Printed Circuit (PTT Controls Flex)(11 req'd)
J3	0905287C05	Socket, Printed Circuit (Speaker/Mic Connector)(4 req'd)
L1	2405452C64	COIL, RF: unless stated
L2	2462575A05	1500nH±5%
L3	2405452C49	Choke; 4.7µH
L4	2405452C09	360nH±5%
L207 thru 210	2405452C49	50nH±5%
L211, 212	-----	360nH±5%
L255	2484657R01	Not Used
L400	2462585A40	Bead 33µH
LS1	-----	SPEAKER: 28Ω±10% (Part of Speaker/Microphone Flex Assembly)
MK1	-----	MICROPHONE: Microphone (Part of Speaker/Microphone Flex Assembly)
P1 thru 3	-----	PLUG: Not Used
P4	2805520Q01	Connector
P5	3905446V01	Contact, Antenna
P6	3905445Q03	Contact, RF Wireform
P7 thru 9	-----	Not Used
Q1	4805128M16	TRANSISTOR: See Note I
Q2	-----	PNP; SOT-23
Q200,201	4805128M12	Not Used
Q202	4805128M27	NPN; SOT-23
Q203	4805128M16	PNP; SOT-23
Q204	4805218N13	PNP; SOT
Q205	-----	Not Used
Q206	4805128M16	PNP; SOT-23
Q207,208	4805128M29	PNP; SOT-23
Q400 thru 402	-----	Not Used
Q403	4805218N03	NPN; SOT-23
Q404	-----	Not Used
Q405	4805128M12	NPN; SOT-23

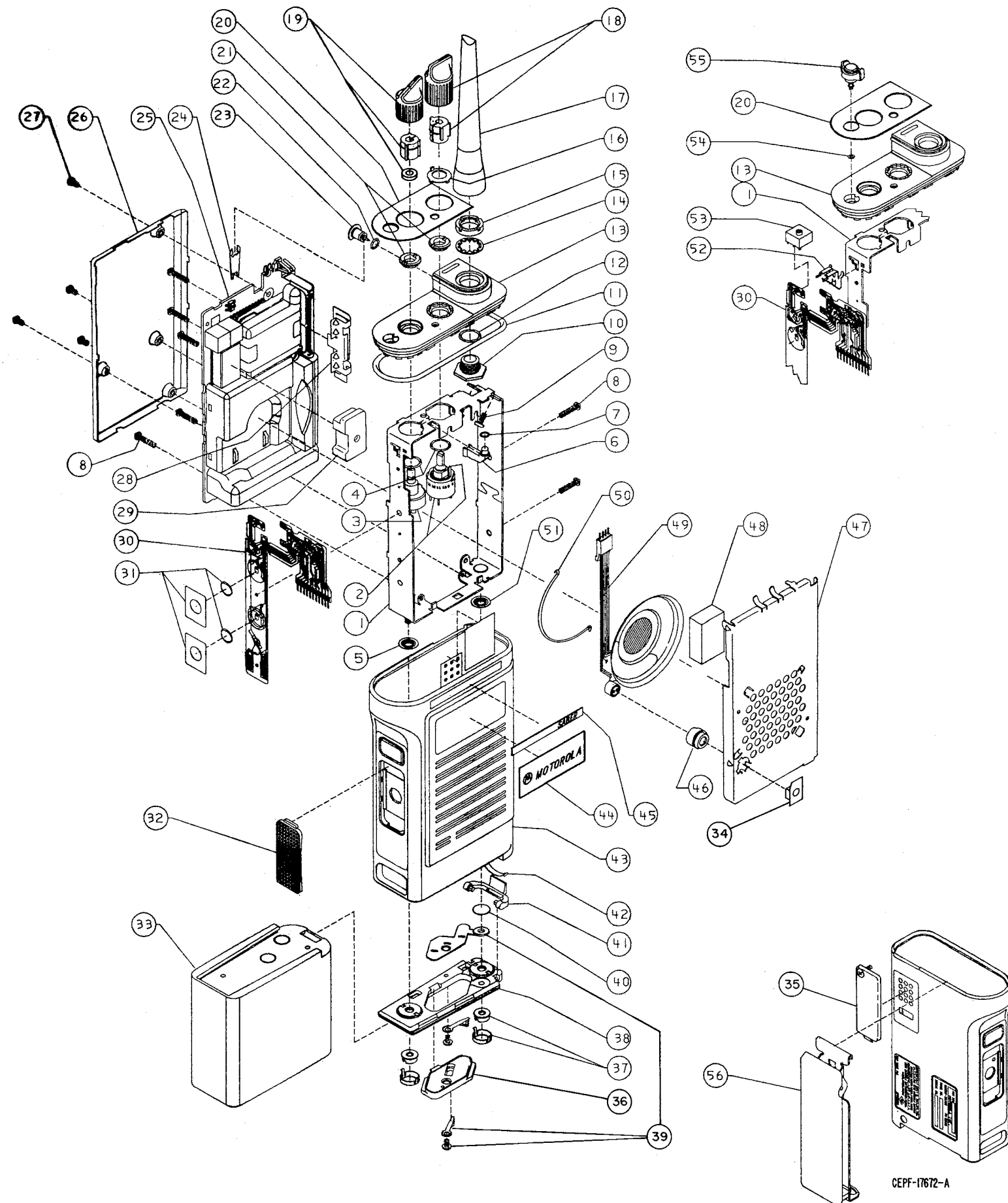
R1	0660079V23	RESISTOR, Fixed: Ω±5%;1/8W
R2	-----	unless stated
R3	0660076E76	82k
R4	0660078T24	Not Used
R5	0660076E73	13k±1%
R6	-----	91k
R7	0660078J80	10k
R8	-----	Not Used
R9	0660078G33	49.9k±1%
R10	-----	Not Used
R11	0660078G33	2k±1%
R12	0660076A49	1k
R13 thru 15	-----	Not Used
R16	0660079V28	130k
R17	0660076E73	10k±1%
R18, 19	0660076E89	47k±1%
R20,21	-----	Not Used
R22	0660076A92	62k
R23 thru 44	-----	Not Used
R45	0660076A29	150
R46 thru 59	-----	Not Used
R60	0660076A29	150
R61	0660076A77	15k
R62	0660076B01	100k
R200 thru 206	-----	Not Used
R207	0660076E77	15k±1%
R208	0660078G58	3.32k±1%
R209	0660076A49	1k
R210	0660078J80	49.9k±1%
R211	0660076A75	12k
R212	0660078G33	2k±1%
R213	0660076A75	12k
R214	0660076B01	100k
R215	-----	Not Used
R216 thru 218	0660076E73	10k±1%
R219	0660079J33	20k
R220	0660076B01	100k
R221	0660076E89	47k±1%
R222	0660076E73	10k±1%
R223,224	-----	Not Used
R225	0660076E73	10k±1%
R400	-----	Not Used
R401	0660076A65	4.7k
R402	0660076B25	1M±5%
R403	0660076B01	100k
R404	-----	Not Used
R405	0660076B01	100k
R406	0660076E73	10k±1%
R407	-----	Not Used
R408	0660076B01	100k
R409	0660076A29	150
R410	-----	Not Used
R411	0660076J33	20k±1%
R412,413	0660078L01	100k±1%
R414 thru 416	0660076B01	100k
R417 thru 424	-----	Not Used
R425	0660076E73	10k±1%
R426 thru 429	-----	Not Used
R430	0660076A29	150
R431,432	-----	Not Used
R433	0660076A21	68
R434	-----	Not Used
R435	0660076A49	1k
R500	0660076E73	10k±1%
R507	0660076B01	100k
R508	0605021K01	0 Ω
R700	0660078J80	49.9k±1%
R701	0660076A49	1k
R800	RPX4690A	Potentiometer, Kit, On/Off/Volume (includes S800)
R801	0660076B08	200k
R802	0660076A93	68k
R803	-----	Not Used
R804	0660076A85	33k
R805	0660076A49	1k
S800	RPX4690A	SWITCH: Kit, On/Of/Volume (includes R800)
S801/S804	4005221R01	Dual-Function, Clear/Code (S804)(Standard) and Emergency (S801)(Optional)
S802	-----	Not Used
S803	RPX4694A	Kit, Contact Snapdome, PTT
S805	RPX4694A	Kit, Contact Snapdome, Monitor
S806 thru 822	-----	Not Used
S823	RPX4689A	Kit, Frequency

U1	-----	CIRCUIT MODULE: See Note I
U2	NLE9431A	Not Used
	or NLE9432A	Filter/Amp/Mixer (403-433 MHz)
	or NLE9433A	Filter/Amp/Mixer (440-470 MHz)
	or NLE9434A	Filter/Amp/Mixer (458-500 MHz)
U100	0105165P77	Filter/Amp/Mixer (482-512 MHz)
U101	0105958P80	IC, I-F
U102	0105958P74	IC, Audio Filter, CMOS
U103	5105449E65	IC, Audio, Bipolar
U200	0105953N05	IC, Regulator
U201	0105959P66	IC, Digital/Analog Converter, CMOS
U202	NLE9471A	Transmit Automatic Level Control
	or NLE9472A	5W-Power Amplifier (403-433 MHz)
	or NLE9473A	5W-Power Amplifier (440-470 MHz)
	or NLE9474A	5W-Power Amplifier (458-500 MHz)
	or NLE9741A	5W-Power Amplifier (482-512 MHz)
U203	or NLE9483A	2W-Power Amplifier (403-433 MHz)
	.NFE6061A	2W-Power Amplifier (440-470 MHz)
U300	or NFE6062A	Filter/Detector/Switch (403-470 MHz)
	NLE9461A	Filter/Detector/Switch (458-512 MHz)
	or NLE9462A	Synthesizer (403-433 MHz)
	or NLE9463A	Synthesizer (440-470 MHz)
U301	or NLE9464A	Synthesizer (458-500 MHz)
	NXN6268A	Synthesizer (482-512 MHz)
	or NXN6269A	Oscillator, Reference; 16.8MHz; (5ppm)
U400	0105957R86	Oscillator, Reference; 16.8MHz (2ppm)
	or 0105958R05	Microcomputer, MC68HC11; Binary
U700	0105953N11	(for option H852)
	or 0105954S43	Signal Filter, Phase 1, CMOS
U900	NTN4720A	(for option H852)
	or -----	SECURENET Bypass Module
		Optional Encryption Module
VR800	4805129M35	DIODE: See Note I
VR801	4805129M49	Zener, 5.6V
VR802	-----	Zener, 16V
VR803 thru 807	4805129M35	Zener, 7.5V
VR808	-----	Zener, 5.6V
VR809 thru 811	4805129M35	Not Used
VR812	4805129M35	Zener, 5.6V
VR813	4880140L11	Zener, 5.6V
VR814,815	-----	Zener, 7.5V
VR816	4805129M35	Not Used
		Zener, 5.6V
Y400	4805664G32	CRYSTAL: See Note II 7.3728MHz

NONREFERENCED ITEMS

	0905287C07	SOCKET, Printed Circuit (for all modules)(71 req'd)
	1405881R01	BOOT, Crystal (For Y400)
	7505934Q01	PAD, Oscillator (For U301)

NOTE:
I. For optimum performance, order replacement diodes, transistors, and circuit modules by Motorola part number only.
II. When ordering crystal units, specify carrier frequency, crystal frequency, crystal type number, and Motorola part number.

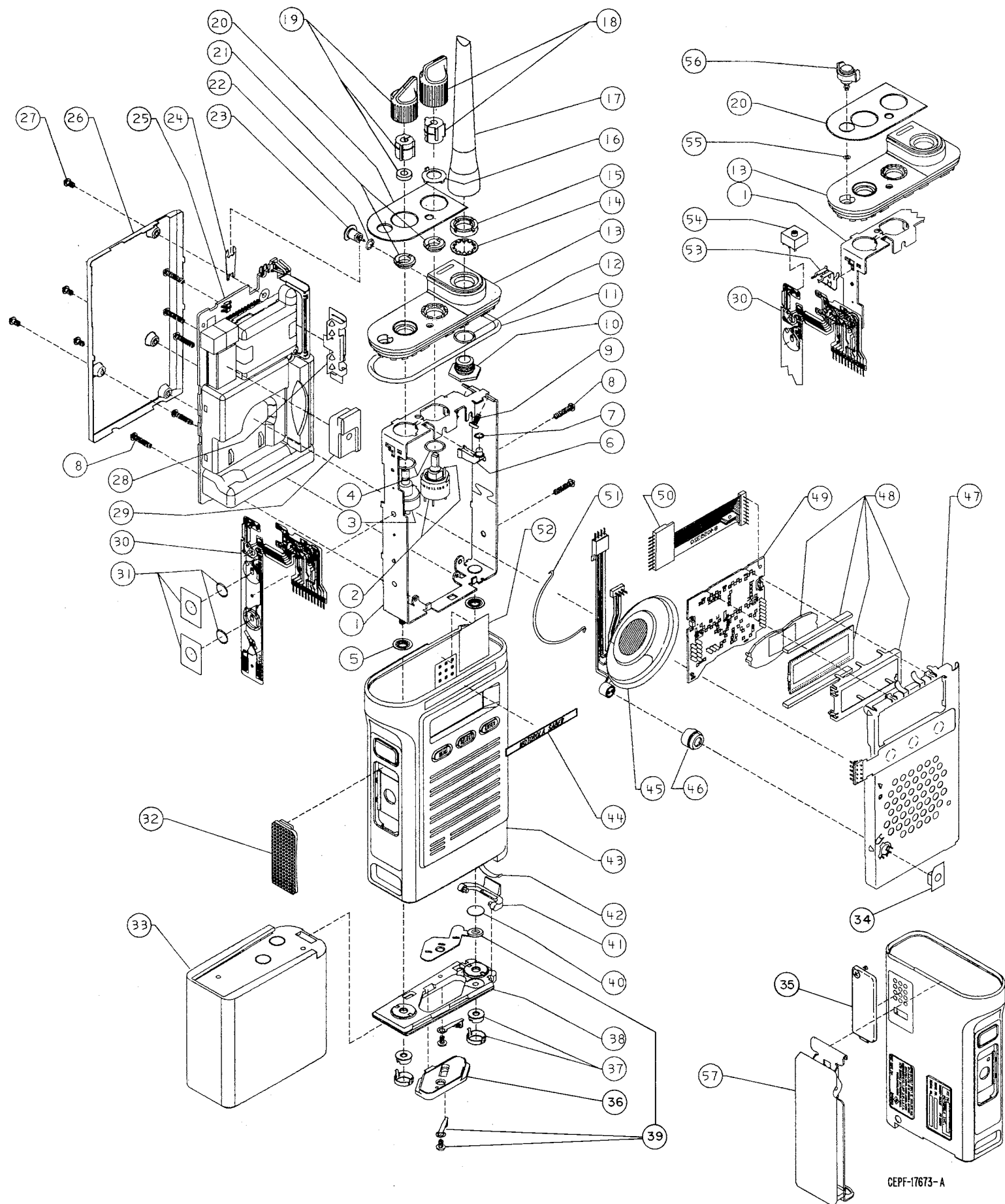


SABER I SECURENET UHF Exploded View Parts List

TPLF-3497-A

ITEM NO.	MOTOROLA PART NO.	DESCRIPTION
1	RPX4720A	ASSEMBLY, Frame Stud (includes item 5)
2	RPX4689A	KIT, Frequency Switch (S823) (includes item 4)
3	RPX4690A	KIT, On/Off Switch (S800)/Volume Control (R800) (includes item 4)
4	3205082E62	GASKET, O-Ring (2 req'd) (part of items 2 and 3)
5	3205422Q01	SEAL, Stud (2 req'd) (part of item 1)
6	6105436Q01	LIGHTPIPE, LED
7	3205082E59	GASKET, O-Ring
8	0305714J10	SCREW, Module, Ph Pan Hd; 2-56x3/8" (7 req'd)
9	0300140332	SCREW, Top Panel; 2-32 (2 req'd)
10	RPX4693A	KIT, Antenna Bushing (includes item 12)
11	3205082E80	GASKET, O-Ring (part of item 13)
12	3205082E58	GASKET, O-Ring (part of item 10)
13	RPX4692A	KIT, Control Top Panel (includes item 11)
14	0400139731	LOCKWASHER, Internal Tooth
15	0205591R01	NUT, Antenna Bushing
16	0405781Q01	WASHER, Detent (even number of switch positions)
	or 0405781Q03	WASHER, Detent (odd number of switch positions)
17	NAE6431A	ANTENNA, UHF Helical (403 - 433 MHz)
	or NAE6432A	ANTENNA, UHF Helical (438 - 470 MHz)
	or NAE6434A	ANTENNA, UHF Helical (470 - 512 MHz)
	or NAE6440B	ANTENNA, UHF Whip (403 - 512 MHz)
18	RPX4699A	KIT, Frequency Knob
19	RPX4698A	KIT, On/Off/Volume Knob
20	1305622Q09	ESCUTCHEON, SECURENET, No Knob
	or 1305622Q07	ESCUTCHEON, SECURENET, Push-Only
	or 1305622Q03	ESCUTCHEON, SECURENET, Rotate-Only or Push-and-Rotate
	or 1305622Q16	ESCUTCHEON, SECURENET, Submersible, No Knob
	or 1305622Q17	ESCUTCHEON, SECURENET, Submersible, Push-Only
	or 1305622Q15	ESCUTCHEON, SECURENET, Submersible, Rotate-Only or Push-and-Rotate
21	0205916P01	NUT, Spanner (2 req'd)
22	3205082E61	GASKET, O-Ring (part of item 23)
23	RPX4691A	KIT, RF Connector (includes items 22,24)
24	4205852N01	CONTACT, Ground, RF (part of item 23)
25	NLE9610A	ASSEMBLY, UHF Main PC Board
26	NTN4726A	ASSEMBLY, Back Shield (includes item 27)
27	0305706Q01	SCREW, Captive (4 req'd) (part of item 26)
28	4205577Q01	CLIP, Ground
29	1405343S01	BOOT, Oscillator, SABER I
30	RPX4700A	KIT, PTT/Controls Flex (includes item 31)
	or RPX4723A	KIT, PTT/Controls Flex Assembly (includes items 2,3,31)
31	RPX4694A	KIT, Contact Snapdome (S803, 805) (2 req'd) (part of item 30)
32	4505022P02	LEVER, PTT (part of item 43)
33	NTN4592_	BATTERY, Medium

	or NTN4593_	BATTERY, High
	or NTN4595_	BATTERY, Ultra High
	or NTN4540_	BATTERY, Primary
	or NTN4537_	BATTERY, FM, Medium
	or NTN4538_	BATTERY, FM, High
	or NTN4596_	BATTERY, FM, Ultra High
	or NTN7014	BATTERY, Ni-MH
	or NTN7426	BATTERY, FM, Ni-MH
34	1405182M12	INSULATOR, Microphone (4 req'd) (part of item 43)
35	NTN5025A	Cover, Universal Connector
36	4205669T01	RETAINER, Baseplate (part of item 43)
37	RPX4696A	KIT, Slotted Spanner Nut (2 req'd) (part of item 43)
38	6405847N03	BASEPLATE (part of item 43)
39	REX4317A	KIT, Contact
40	3205472M02	SEAL, Vacuum Port (part of item 43)
41	5505333Q01	LATCH, Battery (part of item 43)
42	4105775Q01	SPRING, Latch (part of item 43)
43	NHN6410A	ASSEMBLY, Housing, SABER I (includes items 32,36 thru 42)
	or NHN6408A	ASSEMBLY, Housing, SABER I Submersible (includes items 32, 36 thru 42)
44	3305183R03	LABEL, Bottom Nameplate, SABER I
45	3305183R01	LABEL, Top Nameplate, SABER I
46	1405490Q02	BOOT, Microphone
47	RPX4721A	KIT, Speaker Bracket, SABER I (includes item 48)
48	7505641N03	PAD, Speaker Bracket (part of item 47)
49	0105950T06	ASSEMBLY, Speaker/ Microphone Flex, SABER I
50	4205872S01	RETAINER, Speaker
51	1405182M03	INSULATOR, Universal Connector
52	0705319R02	BRACKET, Switch
53	4005221R02	SWITCH, Dual-Function (S801, 804)
54	3205082E83	GASKET, O-Ring, Emergency
55	NTN5069A	KIT, Rotate-Only Knob (includes item 54)
	or NTN5068A	KIT, Push-and-Rotate Knob (optional) (includes item 54)
	or NTN5076B	KIT, Push-Only Knob (optional) (includes item 54)
	or 4305607S01	PLUG, Seal (optional)
56	NTN4788B	ASSEMBLY, Belt Clip

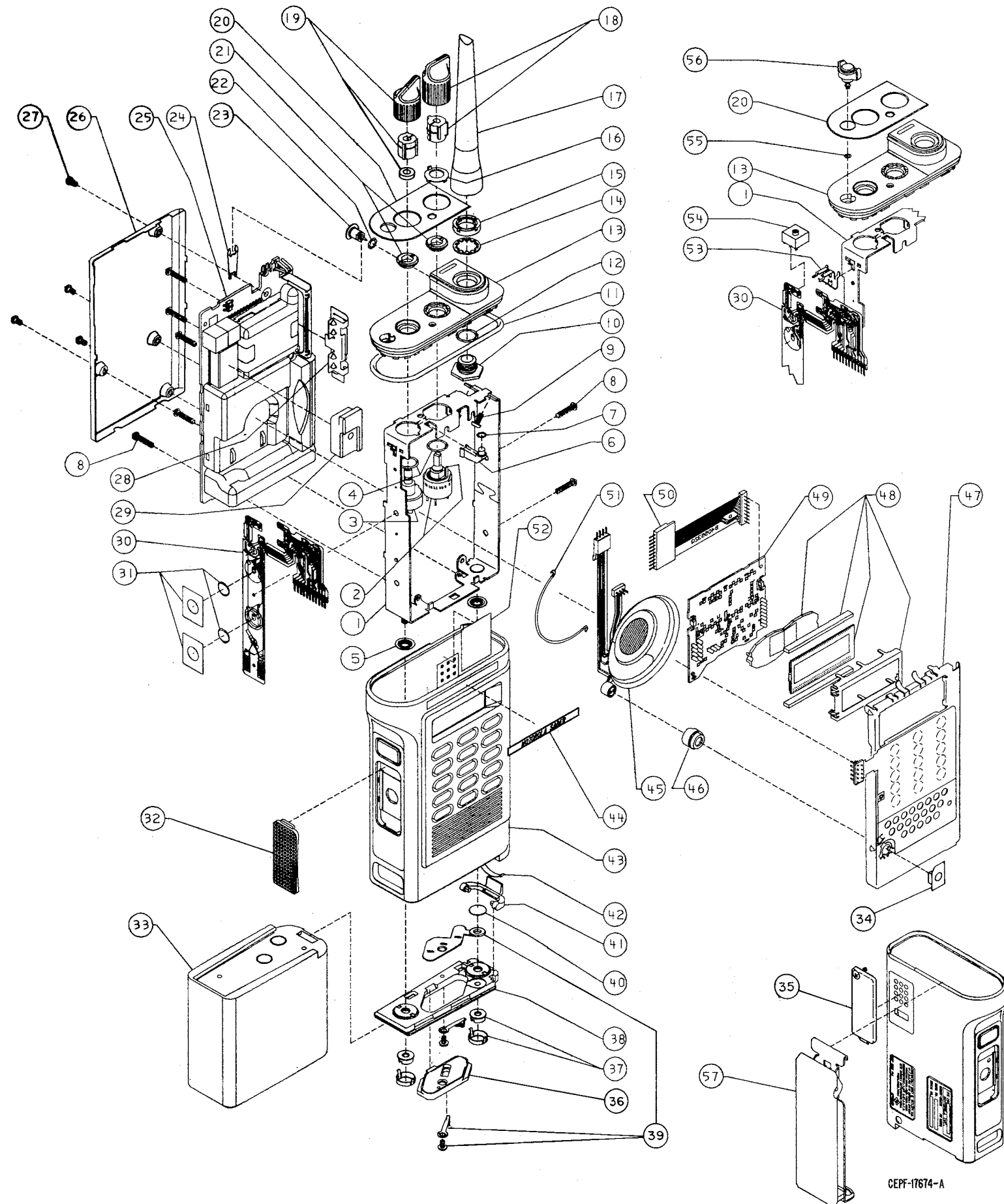


**SABER II SECURENET UHF
Exploded View Parts List**

TPLF-3498-A

ITEM NO.	MOTOROLA PART NO.	DESCRIPTION
1	RPX4720A	ASSEMBLY, Frame Stud (includes item 5)
2	RPX4689A	KIT, Frequency Switch (S823) (includes item 4)
3	RPX4690A	KIT, On/Off Switch (S800)/Volume Control (R800) (includes item 4)
4	3205082E62	GASKET, O-Ring (2 req'd) (part of items 2 and 3)
5	3205422Q01	SEAL, Stud (2 req'd) (part of item 1)
6	6105436Q01	LIGHTPIPE, LED
7	3205082E59	GASKET, O-Ring
8	0305714J10	SCREW, Module, Ph Pan Hd; 2-56x3/8" (7 req'd)
9	0300140332	SCREW, Top Panel; 2-32 (2 req'd)
10	RPX4693A	KIT, Antenna Bushing (includes item 12)
11	3205082E80	GASKET, O-Ring (part of item 13)
12	3205082E58	GASKET, O-Ring (part of item 10)
13	RPX4692A	KIT, Control Top Panel (includes item 11)
14	0400139731	LOCKWASHER, Internal Tooth
15	0205591R01	NUT, Antenna Bushing
16	0405781Q01	WASHER, Detent (even number of switch positions)
	or 0405781Q03	WASHER, Detent (odd number of switch positions)
17	NAE6431A or NAE6432A or NAE6434A or NAE6440B	ANTENNA, UHF Helical (403-433MHz) ANTENNA, UHF Helical (438-470 MHz) ANTENNA, UHF Helical (470- 512 MHz) ANTENNA, UHF Whip (403 - 512 MHz)
18	RPX4699A	KIT, Frequency Knob
19	RPX4698A	KIT, On/Off/Volume Knob
20	1305622Q09	ESCUTCHEON, SECURENET, No Knob
	or 1305622Q07	ESCUTCHEON, SECURENET, Push-Only
	or 1305622Q03	ESCUTCHEON, SECURENET, Rotate-Only or Push-and-Rotate
21	0205916P01	NUT, Spanner (2 req'd)
22	3205082E61	GASKET, O-Ring (part of item 23)
23	RPX4691A	KIT, RF Connector (includes items 22,24)
24	4205852N01	CONTACT, Ground, RF (part of item 23)
25	NLE9610A	ASSEMBLY, UHF Main PC Board
26	NTN4726A	ASSEMBLY, Back Shield (includes item 27)
27	0305706Q01	SCREW, Captive (4 req'd) (part of item 26)
28	4205577Q01	CLIP, Ground
29	1405387R01	BOOT, Oscillator, SABER II/III
30	RPX4700A	KIT, PTT/Controls Flex (includes item 31)
	or RPX4723A	KIT, PTT/Controls Flex Assembly (includes items 2,3,31)
31	RPX4694A	KIT, Contact Snapdome (S803, 805) (2 req'd) (part of item 30)
32	4505022P02	LEVER, PTT (part of item 43)
33	NTN4592_	BATTERY, Medium
	or NTN4593_	BATTERY, High
	or NTN4595_	BATTERY, Ultra High
	or NTN4540_	BATTERY, Primary
	or NTN4537_	BATTERY, FM, Medium
	or NTN4538_	BATTERY, FM, High
	or NTN4596_	BATTERY, FM, Ultra High
	or NTN7014	BATTERY, Ni-MH
	or NTN7426	BATTERY, FM, Ni-MH
34	1405182M12	INSULATOR, Microphone
35	NTN5025A	Cover, Universal Connect)
36	4205669T01	RETAINER, Baseplate (part of item 43)
37	RPX4696A	KIT, Slotted Spanner Nut (2 req'd) (part of item 43)
38	6405847N03	BASEPLATE (part of item 43)
39	REX4317A	KIT, Contact
40	3205472M01	SEAL, Vacuum Port (part of item 43)
41	5505333Q01	LATCH, Battery (part of item 43)
42	4105775Q01	SPRING, Latch (part of item 43)

43	NHN6440A	ASSEMBLY, Housing, SABER II (includes items 32, 36 thru 42)
44	3305183R02	LABEL, Nameplate, SABER II
45	0105950T07	ASSEMBLY, Speaker/Microphone Flex, SABER II (8k Display)
46	1405490Q02	BOOT, Microphone
47	RPX4722A	ASSEMBLY, LCD/Speaker Bracket
48	RPX4703A	KIT, LCD Assembly (part of item 49)
49	8460999A58	ASSEMBLY, 8k Display PC Board, SABER II (includes item 48)
50	8405712U01	FLEX CIRCUIT, LCD Interconnect
51	4205872S01	RETAINER, Speaker
52	1405182M03	INSULATOR, Universal Connector
53	0705319R02	BRACKET, Switch
54	4005221R02	SWITCH, Dual-Function (S801, 804)
55	3205082E83	GASKET, O-Ring, Emergency
56	NTN5069A	KIT, Rotate-Only Knob (includes item 55)
	or NTN5068A	KIT, Push-and-Rotate Knob (optional) (includes item 55)
	or NTN5076B	KIT, Push-Only Knob (optional) (includes item 55)
	or 4305607S01	PLUG, Seal (optional)
57	NTN4788B	ASSEMBLY, Belt Clip



CEPF-17674-A

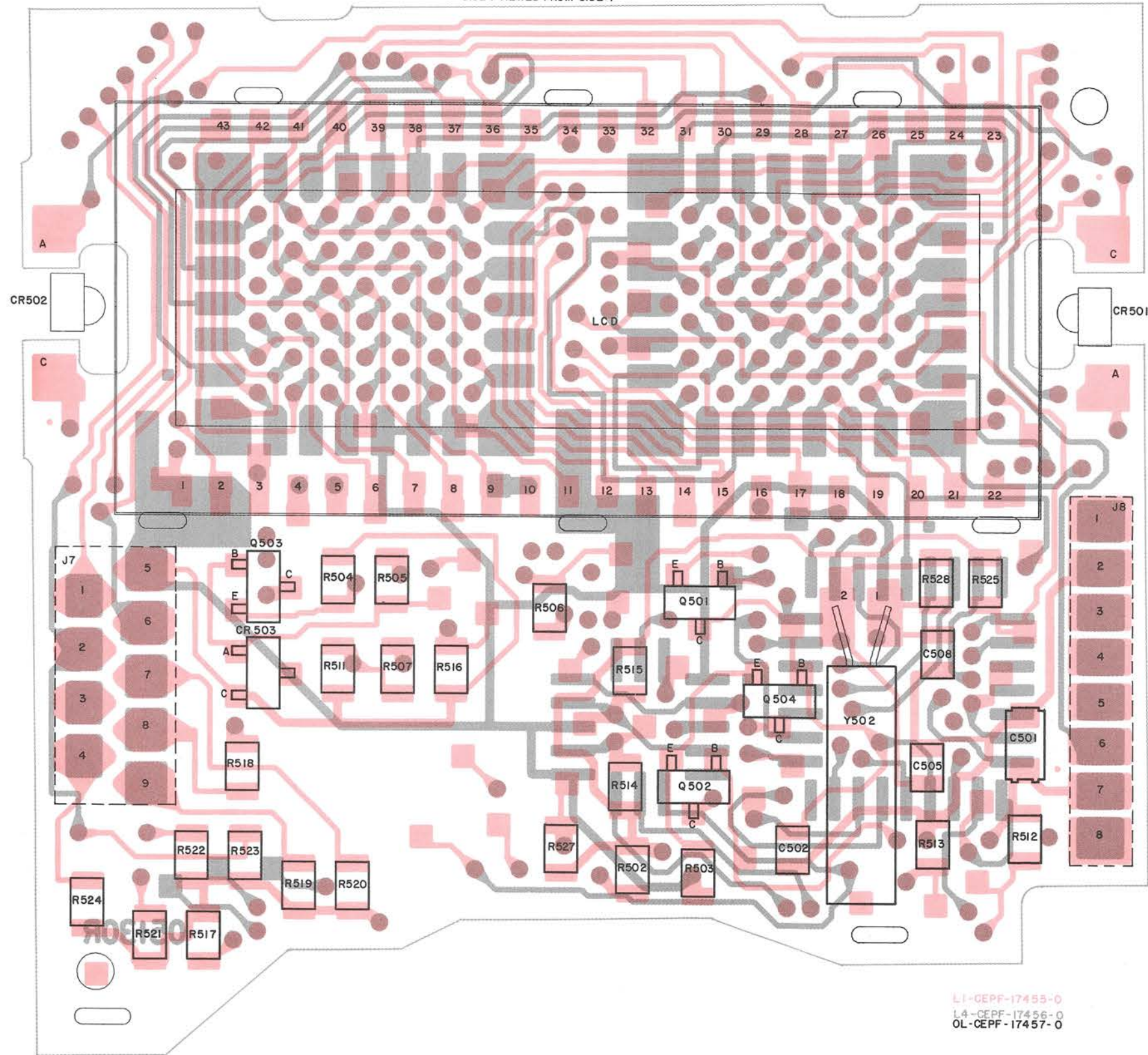
SABER III SECURENET UHF Exploded View Parts List

TPLF-3499-A

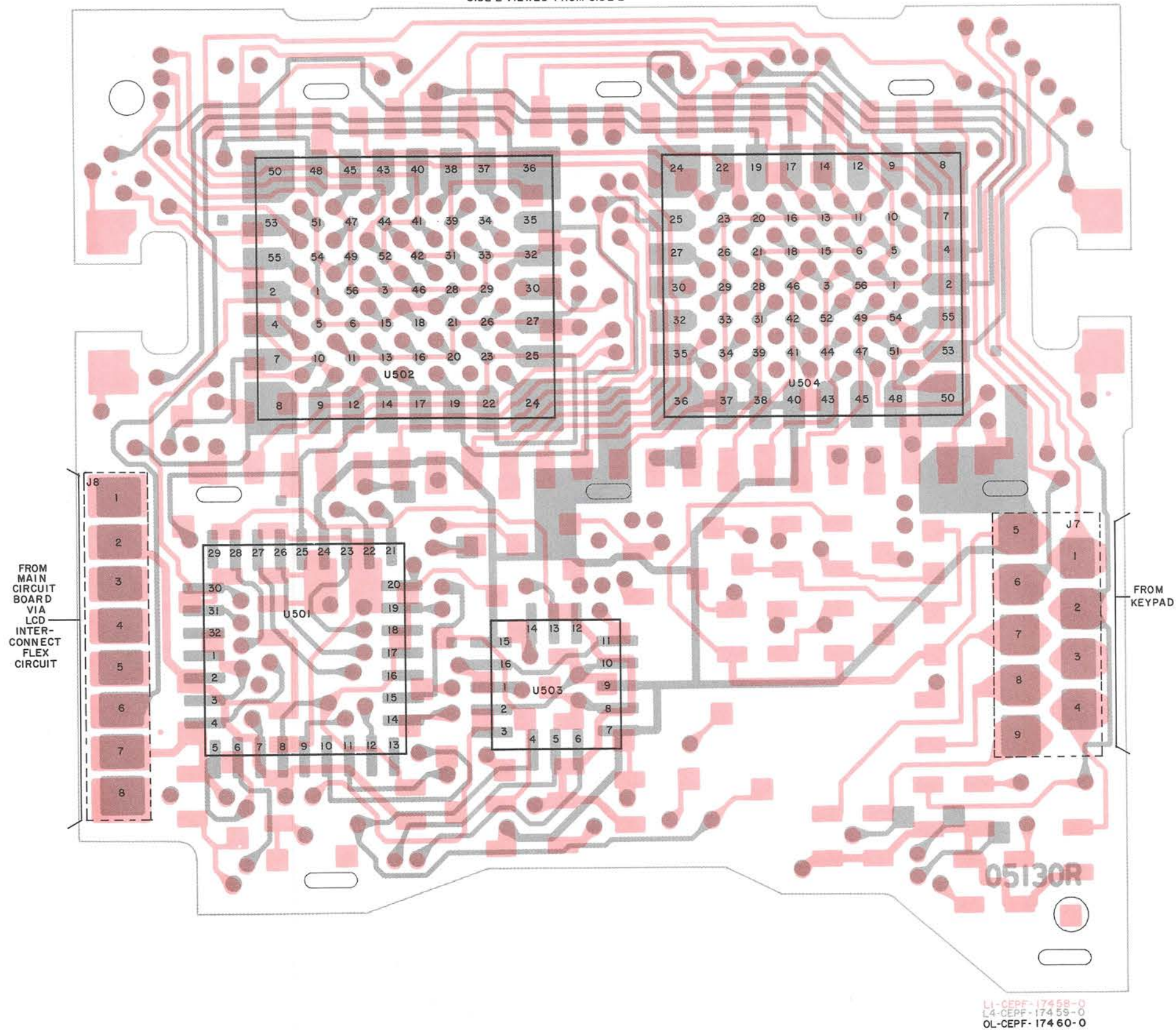
ITEM NO.	MOTOROLA PART NO.	DESCRIPTION
1	RPX4720A	ASSEMBLY, Frame Stud (includes item 5)
2	RPX4689A	KIT, Frequency Switch (S823) (includes item 4)
3	RPX4690A	KIT, On/Off Switch (S800)/Volume Control (R800) (includes item 4)
4	3205082E62	GASKET, O-Ring (2 req'd) (part of items 2 and 3)
5	3205422Q01	SEAL, Stud (2 req'd) (part of item 1)
6	6105436Q01	LIGHTPIPE, LED
7	3205082E59	GASKET, O-Ring
8	0305714J10	SCREW, Module, Ph Pan Hd; 2-56x3/8" (7 req'd)
9	0300140332	SCREW, Top Panel; 2-32 (2 req'd)
10	RPX4693A	KIT, Antenna Bushing (includes item 12)
11	3205082E80	GASKET, O-Ring (part of item 13)
12	3205082E58	GASKET, O-Ring (part of item 10)
13	RPX4692A	KIT, Control Top Panel (includes item 11)
14	0400139731	LOCKWASHER, Internal Tooth
15	0205591R01	NUT, Antenna Bushing
16	0405781Q01	WASHER, Detent (even number of switch positions)
	or 0405781Q03	WASHER, Detent (odd number of switch positions)
17	NAE6431A or NAE6432A or NAE6434A or NAE6440B	ANTENNA, UHF Helical (403-433 MHz) ANTENNA, UHF Helical (438-470 MHz) ANTENNA, UHF Helical (470-512 MHz) ANTENNA, UHF Whip (403 - 512 MHz)
18	RPX4699A	KIT, Frequency Knob
19	RPX4698A	KIT, On/Off/Volume Knob
20	1305622Q09	ESCUTCHEON, SECURENET, No Knob
	or 1305622Q07	ESCUTCHEON, SECURENET, Push-Only
	or 1305622Q03	ESCUTCHEON, SECURENET, Rotate-Only or Push-and-Rotate
21	0205916P01	NUT, Spanner (2 req'd)
22	3205082E61	GASKET, O-Ring (part of item 23)
23	RPX4691A	KIT, RF Connector (includes items 22,24)
24	4205852N01	CONTACT, Ground, RF (part of item 23)
25	NLE9610A	ASSEMBLY, UHF Main PC Board
26	NTN4726A	ASSEMBLY, Back Shield (includes item 27)
27	0305706Q01	SCREW, Captive (4 req'd) (part of item 26)
28	4205577Q01	CLIP, Ground
29	1405387R01	BOOT, Oscillator, SABER II/III
30	RPX4700A	KIT, PTT/Controls Flex (includes item 31)
	or RPX4723A	KIT, PTT/Controls Flex Assembly (includes items 2,3,31)
31	RPX4694A	KIT, Contact Snapdome (S803, 805) (2 req'd) (part of item 30)
32	4505022P02	LEVER, PTT (part of item 43)
33	NTN4592_	BATTERY, Medium
	or NTN4593_	BATTERY, High
	or NTN4595_	BATTERY, Ultra High
	or NTN4540_	BATTERY, Primary
	or NTN4537_	BATTERY, FM, Medium
	or NTN4538_	BATTERY, FM, High
	or NTN4596_	BATTERY, FM, Ultra High
	or NTN7014	BATTERY, Ni-MH
	or NTN7426	BATTERY, FM, Ni-MH
34	1405182M12	INSULATOR, Microphone
35	NTN5025A	Cover, Universal Connector
36	4205669T01	RETAINER, Baseplate (part of item 43)
37	RPX4696A	KIT, Slotted Spanner Nut (2 req'd) (part of item 43)
38	6405847N03	BASEPLATE (part of item 43)
39	REX4317A	KIT, Contact
40	3205472M01	SEAL, Vacuum Port (part of item 43)
41	5505333Q01	LATCH, Battery (part of item 43)
42	4105775Q01	SPRING, Latch (part of item 43)

43	NHN6412A	ASSEMBLY, Housing, SABER III (includes items 32, 36 thru 42)
44	3305183R02	LABEL, Nameplate, SABER III
45	0105950T07	ASSEMBLY, Speaker/Microphone Flex, SABER III
46	1405490Q02	BOOT, Microphone
47	RPX4722A	ASSEMBLY, LCD/Speaker Bracket
48	RPX4703A	KIT, LCD Assembly (part of item 49)
49	8460999A34	ASSEMBLY, Display PC Board, SABER III (includes item 48)
50	8405712U01	FLEX CIRCUIT, LCD Interconnect
51	4205872S01	RETAINER, Speaker
52	1405182M03	INSULATOR, Universal Connector
53	0705319R02	BRACKET, Switch
54	4005221R02	SWITCH, Dual-Function (S801, 804)
55	3205082E83	GASKET, O-Ring, Emergency
56	NTN5069A	KIT, Rotate-Only Knob (includes item 55)
	or NTN5068A	KIT, Push-and-Rotate Knob (optional) (includes item 55)
	or NTN5076B	KIT, Push-Only Knob (optional) (includes item 55)
	or 4305607S01	PLUG, Seal (optional)
57	NTN4788B	ASSEMBLY, Belt Clip

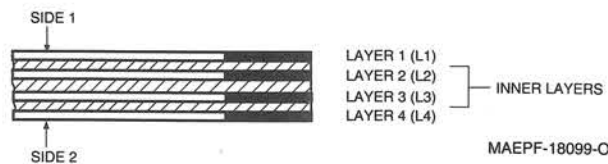
SIDE 1 VIEWED FROM SIDE 1

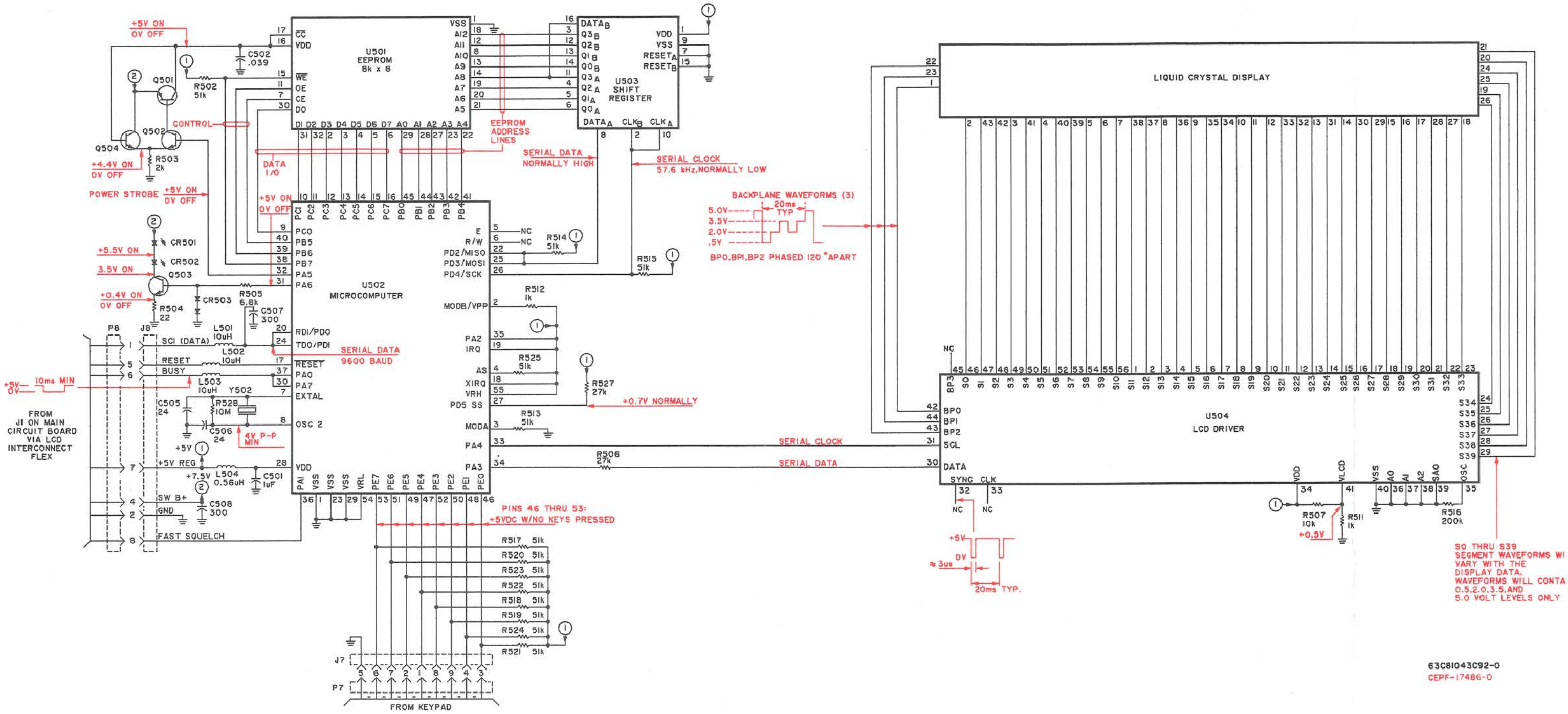


SIDE 2 VIEWED FROM SIDE 2



4-LAYER CIRCUIT BOARD COPPER DETAIL VIEWING
COPPER STEPS AT EDGE OF BOARD IN PROPER
LAYER SEQUENCE.



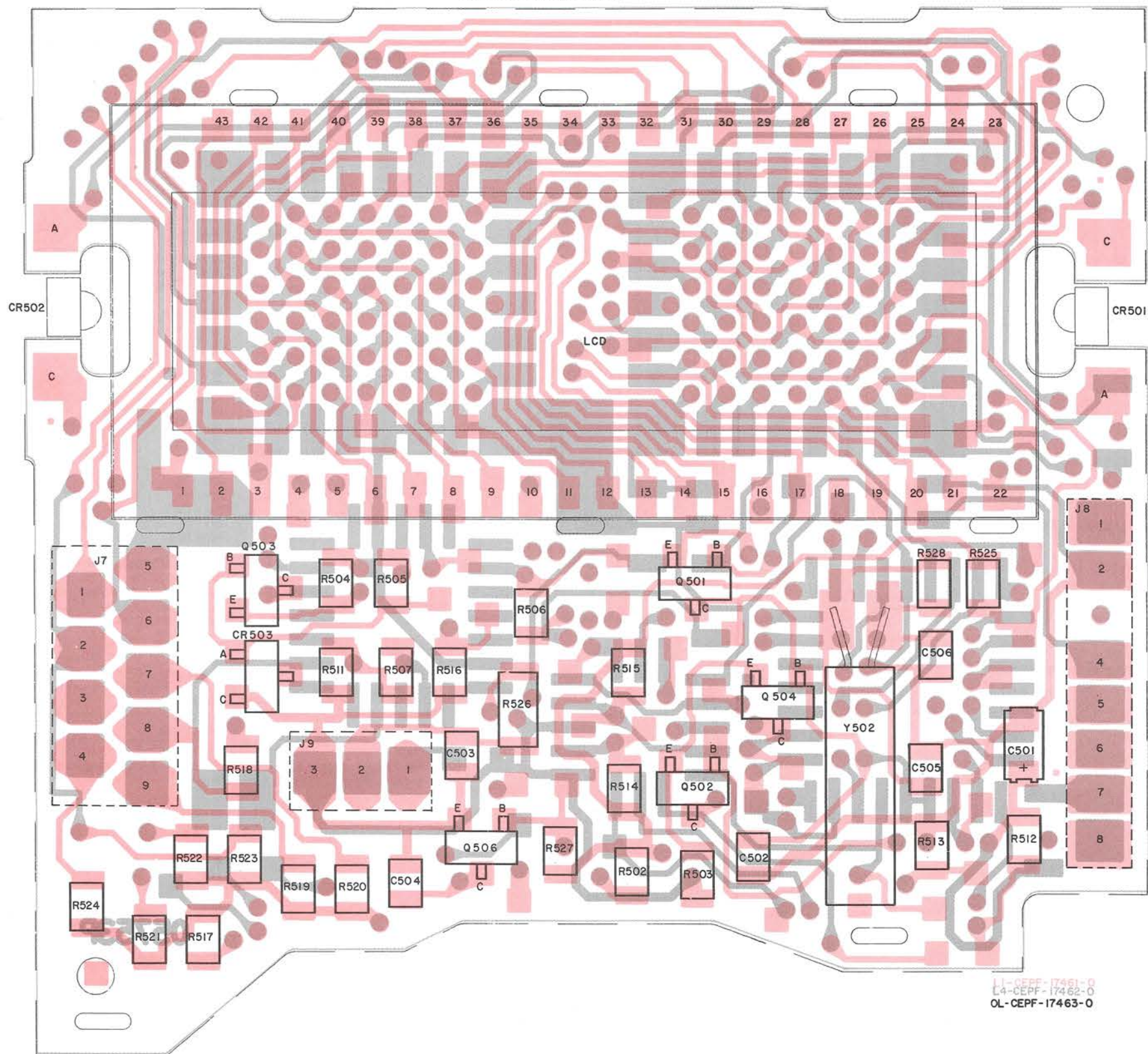


REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
C501 C502 C503, 504 C505, 506	2362998B59 2160521C32 ----- 2160520B10	CAPACITOR, Fixed: pF±5%; 50V unless stated 1uF±10%; 20V .039uF±10%; 25V Not Used 24
CR501, 502 CR503	4805729G27 4805129M06	DIODE: See Note 1 LED, Yellow Dual; SOT-23
Q501 Q502 thru 504	4805128M29 4805128M12	TRANSISTOR: See Note 1 PNP; BCX18 (LH) NPN; BCW60B (RH)
R501 R502 R503 R504 R505 R506 R507 R508 thru 510 R511, 512 R513 thru 515 R516 R517 thru 525 R526 R527 R528	----- 0660076A90 0660076A56 0660076A09 0660076A69 0660076A83 0660076A73 ----- 0660076A49 0660076A90 0660076F08 0660076A90 ----- 0660076A83 0660076H49	RESISTOR, Fixed: Ω±5%; 1/8W unless stated Not Used 51k 2k 22 6.8k 27k 10k Not Used 1k 51k 200k±1% 51k Not Used 27k 10M±10%
U501 U502 U503 U504	5105165R22 0105953N07 0105953N09 0105953N10	CIRCUIT MODULE: See Note 1 EEPROM; 2k x 8 Microcomputer, HCMOS Shift Register, CMOS LCD Driver
Y501 Y502	----- 4805664G39	CRYSTAL: Not Used 3.6864MHz
NONREFERENCED ITEMS		
	NTN5421A	PAD, Shock

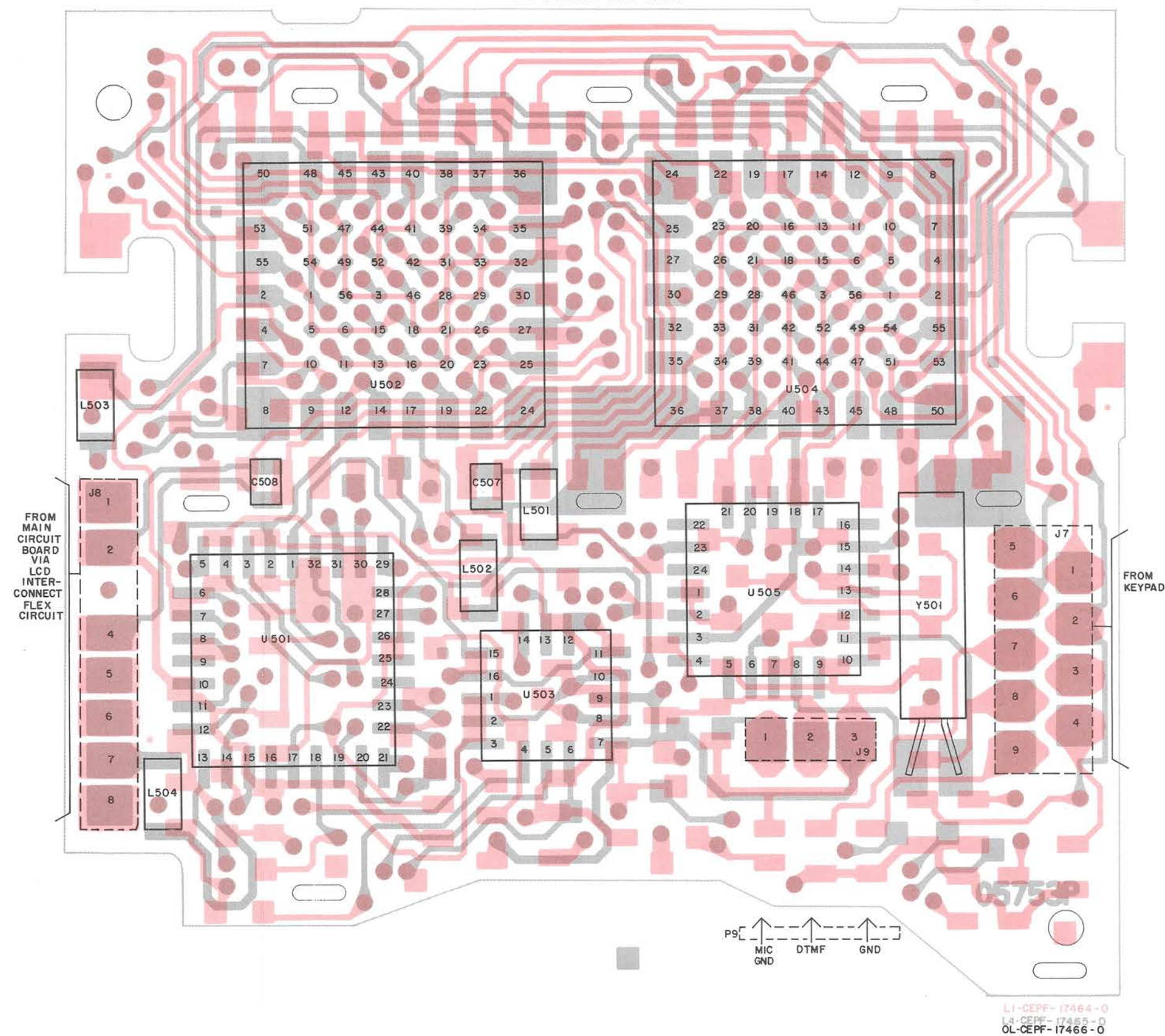
NOTES:
1. For optimum performance, order replacement diodes, transistors, and circuit modules by Motorola part number only.

SCHEMATIC AND CIRCUIT BOARD NOTES
1. Unless otherwise stated, resistances are in ohms (k = 1000), capacitances less than 1 are in microfarads, and capacitances 1 or greater are in picofarads.

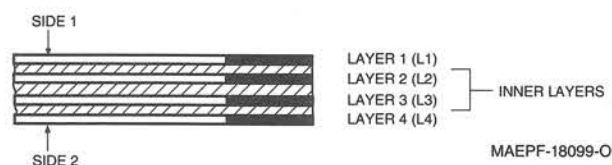
SIDE 1 VIEWED FROM SIDE 1



SIDE 2 VIEWED FROM SIDE 2

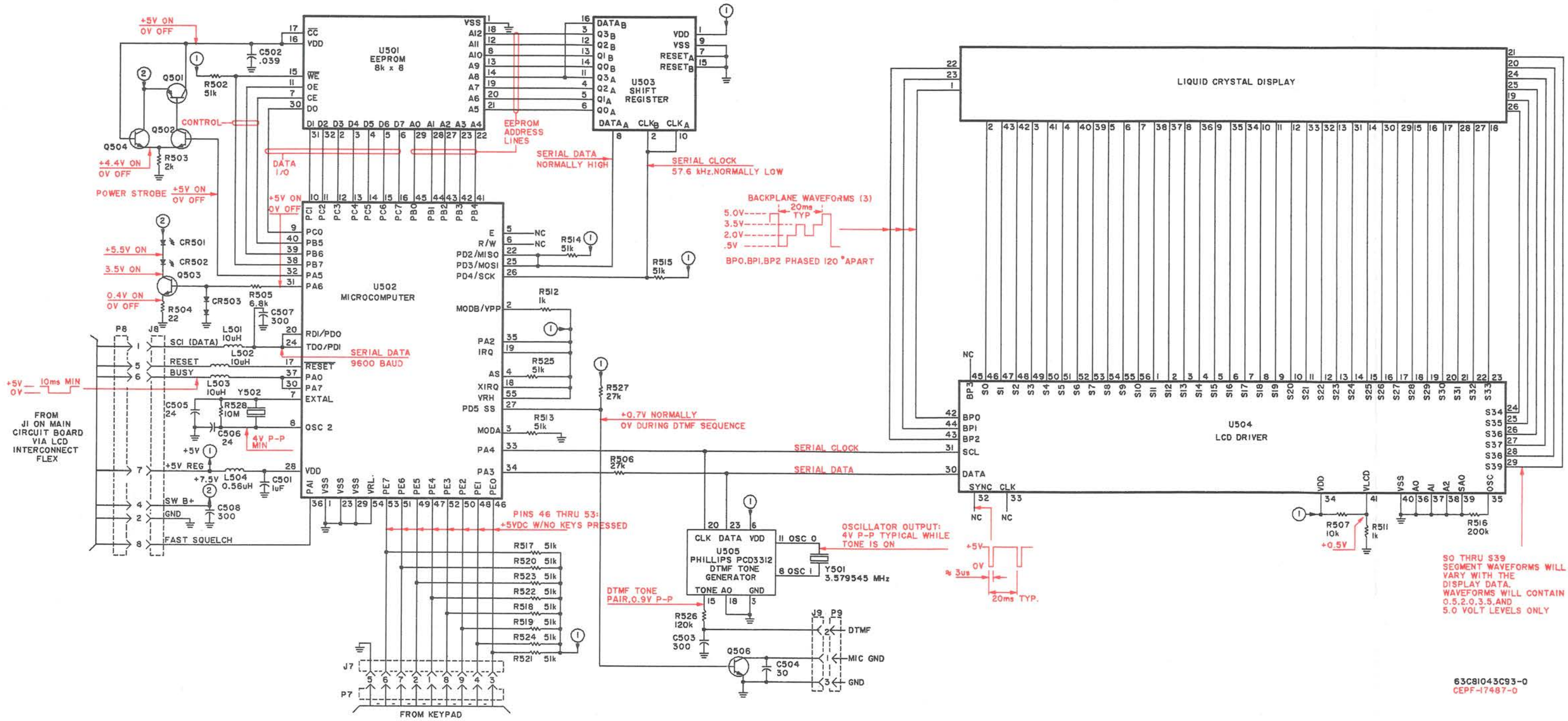


4-LAYER CIRCUIT BOARD COPPER DETAIL VIEWING
COPPER STEPS AT EDGE OF BOARD IN PROPER
LAYER SEQUENCE.

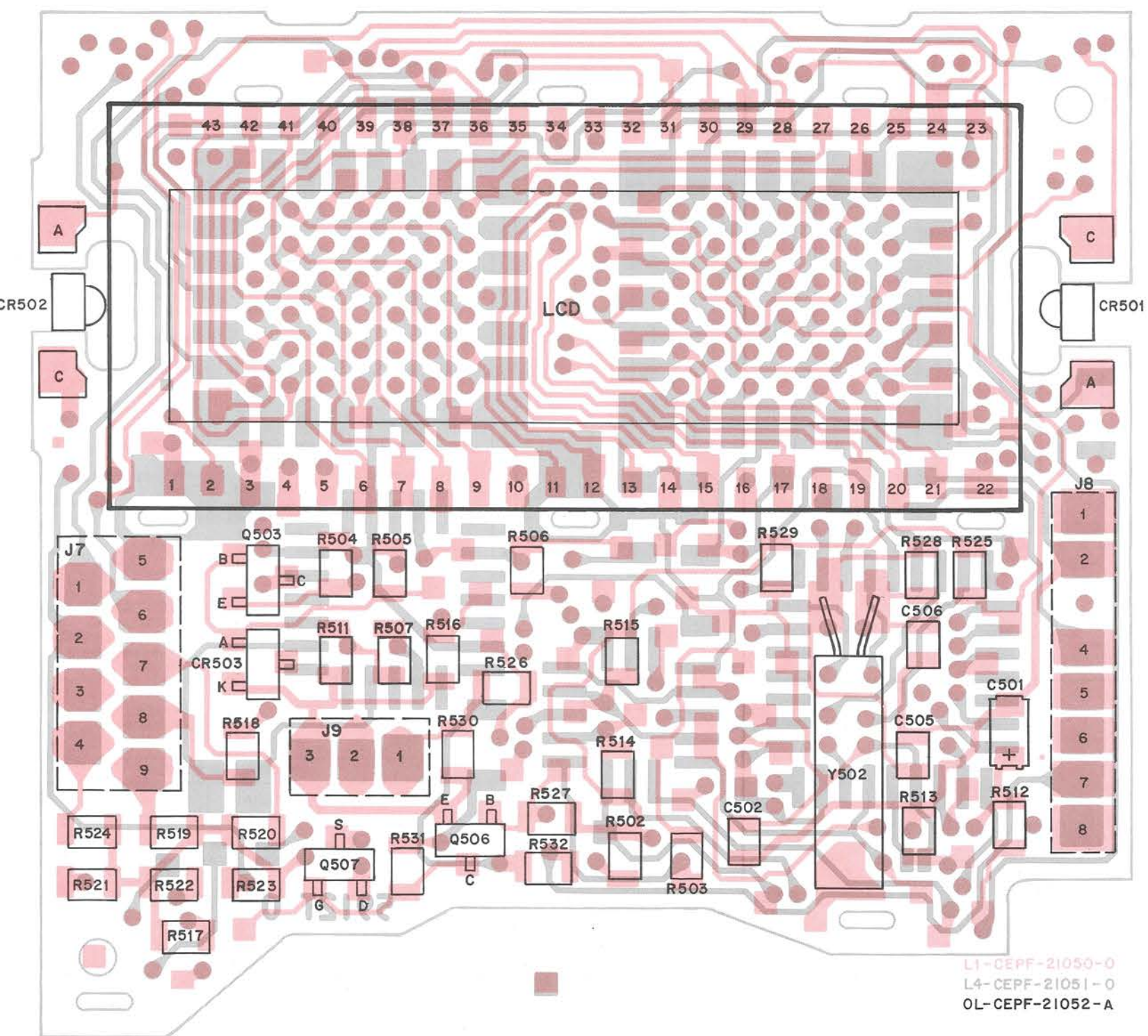


REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
C501 C502 C503 C504 C505, 506	2362998B59 2160521C32 2160520C12 2160520B12 2160520B10	CAPACITOR, Fixed: pF±5%; 50V unless stated 1uF±10%; 20V .039uF±10%; 25V 300 30 24
CR501, 502 CR503	4805729G27 4805129M06	DIODE: See Note I LED, Yellow Dual; SOT-23
Q501 Q502 thru 504 Q505 Q506	4805128M29 4805128M12 ----- 4805128M12	TRANSISTOR: See Note I PNP; BCX18 (LH) NPN; BCW60B (RH) Not Used NPN; BCW60B (RH)
R501 R502 R503 R504 R505 R506 R507 R508 thru 510 R511, 512 R513 thru 515 R516 R517 thru 525 R526 R527 R528	----- 0660076A90 0660076A56 0660076A09 0660076A69 0660076A83 0660076A73 ----- 0660076A49 0660076A90 0660076F08 0660076A90 0611024A99 0660076A83 0660076H49	RESISTOR, Fixed: Ω±5%; 1/8W unless stated Not Used 51k 2k 22 6.8k 27k 10k Not Used 1k 51k 200k±1% 51k 120k 27k 10M±10%
U501 U502 U503 U504 U505	0105953N12 0105953N07 0105953N09 0105953N10 0105953N18	CIRCUIT MODULE: See Note I EEPROM; 8k x 8 Microcomputer, HCMOS Shift Register, CMOS LCD Driver Tone Encoder
Y501 Y502	4805664G40 4805664G39	CRYSTAL: 3.579545MHz 3.6864MHz
NONREFERENCED ITEMS		
	NTN5421A	PAD, Shock

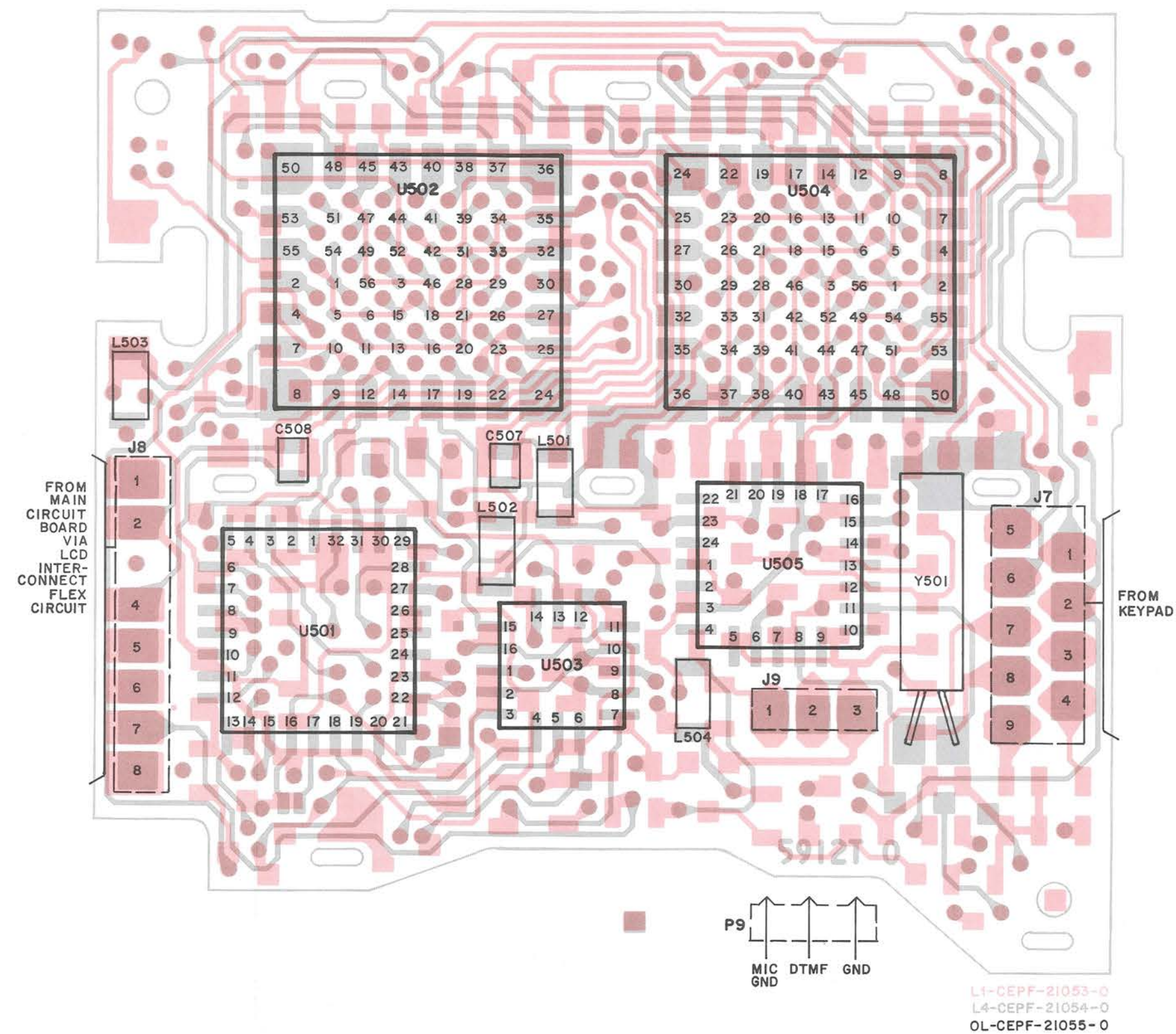
NOTES:
I. For optimum performance, order replacement diodes, transistors, and circuit modules by Motorola part number only.

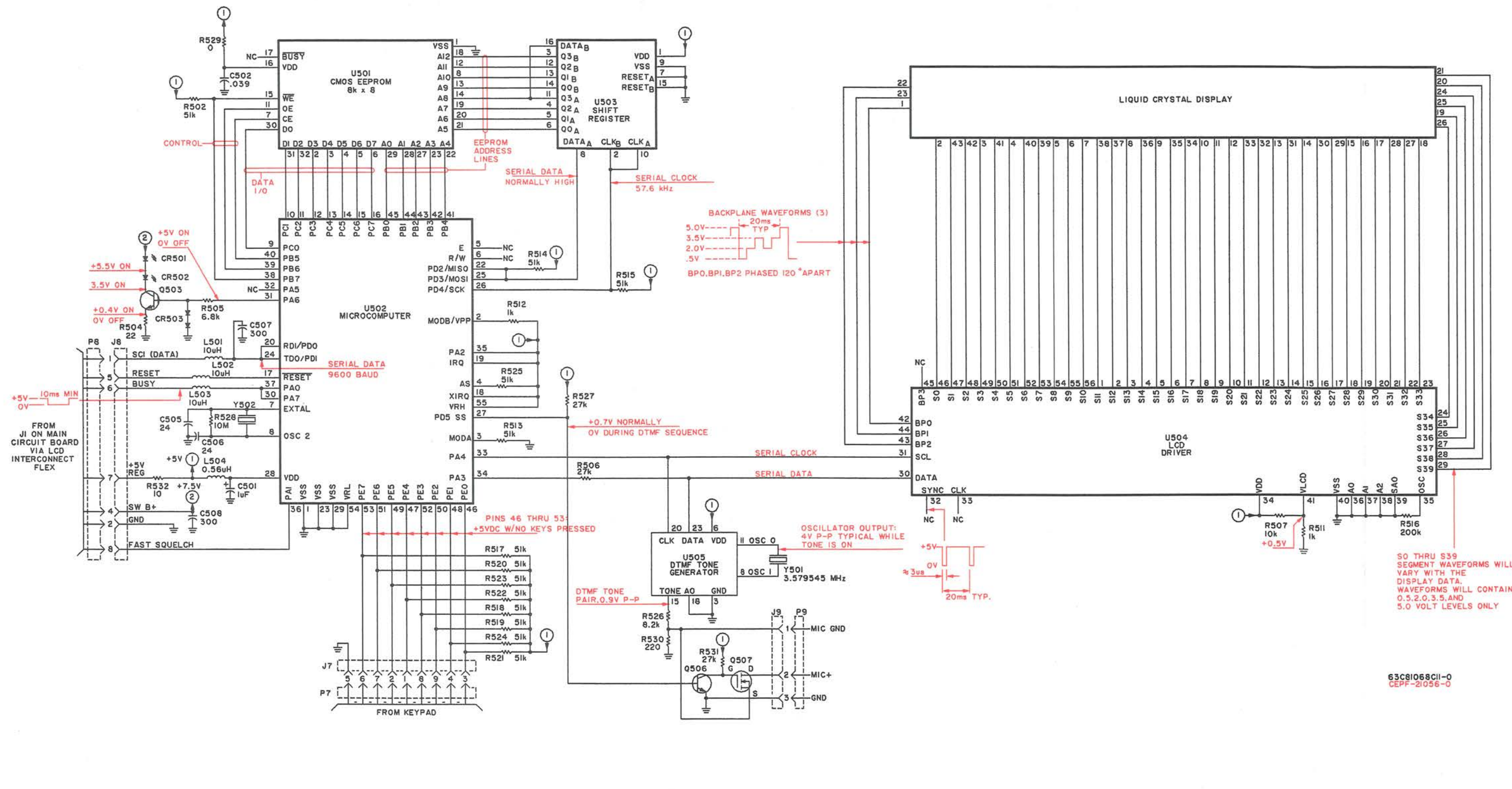


SIDE 1 VIEWED FROM SIDE 1



SIDE 2 VIEWED FROM SIDE 2





REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
C501	2362998B59	CAPACITOR, Fixed: pF±5%; 50V unless stated
C502	2160521C32	1µF±10%; 20V
C503,504	-----	.039µF±10%; 25V
C505,506	2160520B10	Not Used
C507,508	2160520C12	24
		300
CR501,502	4883636N11	DIODE: See Note 1
CR503	4805129M06	LED, Yellow
		SOT-23
J7	0905287C05	JACK:
J8	0905287C05	Socket, Printed Circuit (Keypad Switch)(9 req'd)
J9	0905287C05	Socket, Printed Circuit (LCD Interconnect)(8 req'd)
		Socket, Printed Circuit (Speaker/Mic)(3 req'd)
L501 thru 503	2462575A07	COIL, RF: unless stated
L504	2462575A09	Choke, 10µH
		Choke, 0.56µH
Q501,502	-----	TRANSISTOR: See Note 1
Q503	4805128M12	Not Used
Q504,505	-----	NPN; BCW60B (RH)
Q506	4805128M12	Not Used
Q507	4805218N11	NPN; BCW60B (RH)
		TMOS; BST82
R501	-----	RESISTOR, Fixed: Ω±5%; 1/8W unless stated
R502	0660076A90	Not Used
R503	-----	Not Used
R504	0660076A09	22
R505	0660076A69	6.8k
R506	0660076A83	27k
R507	0660076A73	10k
R508 thru 510	-----	Not Used
R511,512	0660076A49	1k
R513 thru 515	0660076A90	51k
R516	0660076F08	200k±1%
R517 thru 525	0660076A90	51k
R526	0660076A71	8.2k
R527	0660076A83	27k
R528	0660076H49	1.0M±10%
R529	0605021K01	0
R530	0660076A33	220
R531	0660076A83	27k
R532	0660076A01	10
U501	0105959R12	CIRCUIT MODULE: See Note 1
U502	0105957R95	EEPROM, CMOS; 8k x 8
U503	0105953N09	Microcomputer, HCMOS
U504	0105953N10	Shift Register; CMOS
U505	0105953N18	LCD Driver, CMOS
		DTMF Tone Generator, CMOS
Y501	4805664G40	CRYSTAL:
Y502	4805664G39	3.579545MHz
		3.6864MHz

NOTES:
1. For optimum performance, order replacement diodes, transistors, and circuit modules by Motorola part number only.

NOTES

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.



SERVICE MANUAL QUESTIONNAIRE

We believe that reports from users provide valuable information for producing quality manuals. By taking a few moments to answer the following questions as they relate to this specific manual, you can take an active role in the continuing effort to ensure that our manuals contain the most accurate and complete information of benefit to you. Thank you for your cooperation.

In reference to Manual Number: **68P81045C75-A**

SABER™ Handie-Talkie® Portable Radios

1. Please check all the appropriate boxes:

	Complete	Incomplete	Correct	Incorrect	Clear	Confusing	Size Adequate	Size Too Small	Not Covered in This Manual
Disassembly Procedures									
Alignment Procedures									
Exploded Views									
Schematic Diagrams									
Circuit Board Details									
Electrical Parts Lists									
Exploded View Parts List									

2. How would you rate the overall organization of this manual?

☐ excellent ☐ very good ☐ good ☐ fair ☐ poor

3. Did this Service manual provide you with the information necessary to service and maintain the specific equipment?

☐ very much so ☐ generally yes ☐ to some extent ☐ no

4. How do you rate this particular Service Manual?

☐ excellent ☐ very good ☐ good ☐ fair ☐ poor

5. We would appreciate any corrections or recommendations for improving this manual. Please include the specific page number(s) of the diagram or procedure in question.

a. Disassembly Procedures: (Page No. _____)

b. Alignment Procedures: (Page No. _____)

c. Exploded Views: (Page No. _____)

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(Continued)

Please specify the page number along with any corrections or recommendations for improvement.

d. Schematic Diagrams: (Page No. _____)

e. Component Location Details: (Page No. _____)

f. Electrical Parts List: (Page No. _____)

g. Exploded View Parts List: (Page No. _____)

6. General comments/suggestions:

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When ordering replacement parts or equipment information, the complete identification number should be included. This applies to all components, kits, and chassis. If the component part number is not known, the order should include the number of the chassis or kit of which it is a part, and sufficient description of the desired component to identify it.

Crystal and channel element orders should specify the crystal or channel element type number,

crystal and carrier frequency, and the model number in which the part is used.

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1-800-537-7007 (for Illinois Residents)

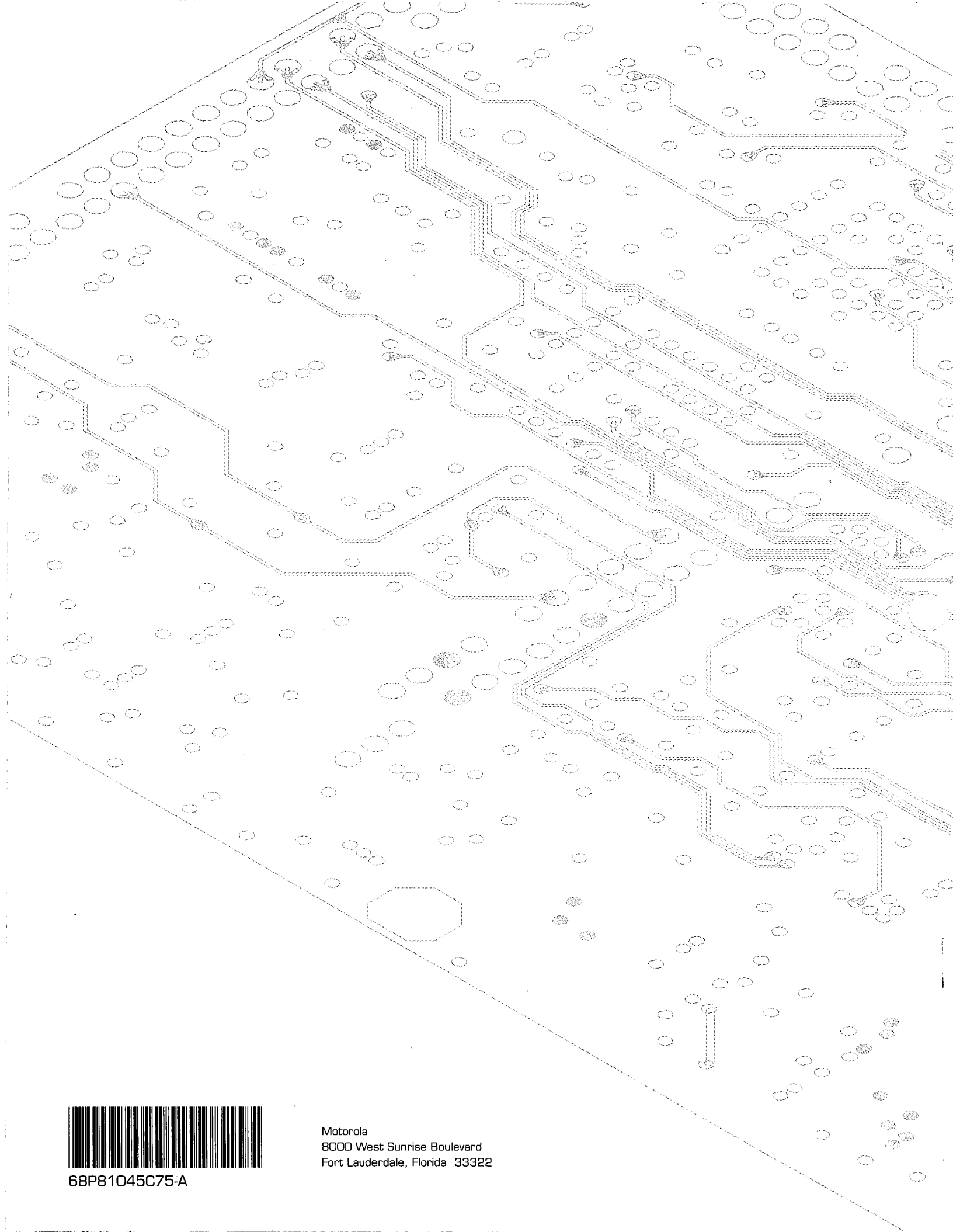
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