



MOTOROLA

**"SABER" SERIES
"Handie-Talkie" Portable Radios**

136-174 MHz

SPECIFICATIONS

GENERAL	TRANSMITTER	RECEIVER
<p>FREQUENCY RANGE: 136-174 MHz BANDSPLITS: 136-150.8MHz 146-162MHz- 157-174 MHz 146-174 MHz (LP Models)</p> <p>POWER SUPPLY: Rechargeable Nickel-Cadmium Battery or Primary Battery</p> <p>BATTERY VOLTAGE Nominal: 7.5 Vdc Range: 6 to 9 Vdc</p> <p>TEMPERATURE RANGE Operating: -30°C to +60°C Storage: -40°C to +85°C</p> <p>DIMENSIONS (H X W X D) Less Battery: 3.87" X 2.94" X 1.18" (98.29 X 74.67 X 29.97 mm) With Light-Capacity Battery: 6.13" X 2.94" X 1.18" (155.70 X 74.67 X 29.97 mm) With Medium-Capacity Battery: 7.01" X 2.94" X 1.18" (178.05 X 74.67 X 29.97 mm) With Ultra-High-Capacity Battery: 7.77" X 2.94" X 1.18" (197.35 X 74.67 X 29.97 mm)</p> <p>WEIGHT NON-KEYPAD Less Battery: 10.93 oz. (310 g) With Light-Capacity Battery: 17.06 oz. (484 g) With Medium-Capacity Battery: 22.68 oz. (643 g) With Ultra-High-Capacity Battery: 24.75oz. (702 g)</p> <p>KEYPAD Less Battery: 11.31 oz. (321 g) With Light-Capacity Battery: 17.44 oz. (495 g) With Medium-Capacity Battery: 23.05 oz. (654 g) With Ultra-High-Capacity Battery: 25.13 oz. (713 g)</p>	<p>RF POWER OUTPUT Low-Power Models: 1 - 2.5 Watts High-Power Models: 2.5 - 6 Watts</p> <p>FREQUENCY STABILITY (-30°C TO +60°C; +25°C REF.): ±.0005% (±.0002% optional)</p> <p>MODULATION: Type 16F3 (±5 kHz FOR 100% modulation @ 1000 Hz)</p> <p>FM HUM AND NOISE (COMPANION RECEIVER): -45dB</p> <p>SPURIOUS EMISSION (CONDUCTED AND RADIATED) 1.0W: -67dBC 2.5W: -71dBC 6.0W: -75dBC* * -61dBC for H43 models set to the 2.5-watt power level</p> <p>AUDIO DISTORTION: 3% Maximum</p> <p>AUDIO FREQUENCY RESPONSE: (6dB/OCTAVE PRE-EMPHASIS; 300 - 3000 Hz) +1, -3dB</p> <p>MAXIMUM FREQUENCY SEPARATION: (NO DEGRADATION) Full Bandsplit</p>	<p>SENSITIVITY 20dBQ: 0.45 uV 12dBS: 0.35 uV Squelch: Programmable</p> <p>USABLE BANDWIDTH: ±5kHz Minimum</p> <p>SELECTIVITY Adjacent channel: -80dB Fourth channel: -90dB</p> <p>INTERMODULATION: -78dB</p> <p>FM HUM AND NOISE: -45dB</p> <p>FREQUENCY STABILITY (-30°C TO +60°C; +25°C REF.): ±.0005% (±.0002% optional)</p> <p>AUDIO SPL (AT 30 cm WITH RATED AUDIO): Weighted, 300 - 3000Hz 90dB Nominal (NonSubmersible) 89dB Nominal (-SAK models)</p> <p>RATED AUDIO OUTPUT: 500 mW (At less than 5% distortion)</p> <p>CHANNEL SPACING: 30 kHz</p> <p>MAXIMUM FREQUENCY SEPARATION: (NO DEGRADATION) Full Bandsplit</p>
<p style="text-align: center;">RELATED PUBLICATIONS AVAILABLE SEPARATELY</p> <p>SABER I OPERATING INSTRUCTIONS..... 68P81043C80 SABER II OPERATING INSTRUCTIONS..... 68P81043C85 SABER III OPERATING INSTRUCTIONS..... 68P81048C30 SERVICE MANUAL (UHF)..... 68P81043C95 THEORY/MAINTENANCE MANUAL (AVAILABLE JUNE, 1988)..... 68P81044C05 FIELD PROGRAMMER USER'S GUIDE..... 68P81044C65</p>		

Specifications are Subject to Change Without Notice

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Manual Scan

I hope this service manual is of use to you. Motorola does not make this available as a PDF and all other available copies are of poor quality.

Each page is captured at 600 DPI, and as 24-bit color, 8-bit grayscale or black and white and at the proper page size, up to 11x34 inches in many cases. OCR has been performed on the document, even on the large pages. The document is condensed into one single PDF with text overlay. You should be able to print the larger sheets on 11x17 or tile them onto 8.5x11 if needed.

Please do not charge for access to this, or put it on a pay-wall site. Please don't pay for access to any such sites, they are against the ethos of hacking, and it only encourages them to profit off the hard work of others which has been shared openly. Please don't change this/recompress it; this defeats the point of capturing this at high resolution.

If something is incorrect here, or unreadable please reach out; I likely have the original lossless compressed images. In the final PDF that's color or grayscale will be JPEG 2000 format with highest quality selected. B&W images will be compressed using CCITT Group 4. This is quite close to the source material, but there may be some artifacts due to lossy compression. If there's a choice between file size and image quality, image quality will win. It's 2021 and storage and bandwidth is cheap.

This was captured on a Canon DR-G2140 scanner which is ~ 7500 USD unit circa 2021. You may note some artifacts and lines in on the scans, these are due to scratches on the sensor glass, and are minor. The replacement glass is about 250 USD if you're feeling generous :-)

If you have a hard to find/out of print manual and would like to make it available please reach out, I may be able to scan and return it to you.

Thank you,

Bryan Fields, W9CR
bryan@bryanfields.net



MOTOROLA INC.

manual revision

for 68P81043C90-O

"SABER" SERIES

"Handie-Talkie" Portable Radios

136-174 MHz



This information outlines changes that have occurred since the printing of your manual. Use this information to supplement your manual.

REVISION DETAILS

NO.	CHANGE AFFECTS
1	Specifications
2	Model Configuration
3	Specialized Tools and Test Equipment
4	SABER VHF Electrical Parts List
5	SABER 2K & SABER III Display Electrical Parts List
6	Exploded View Parts List
7	Torque Specifications
8	Electrical Parts List
9	Exploded View Parts Lists
10	Exploded View Parts Lists

CHANGES NO.

1 On the front cover, **SPECIFICATIONS**, change the following as indicated:

TRANSMITTER

FREQUENCY STABILITY (-30° C TO +60°C; +25°C REF.):

change to: $\pm 0.0005\%$ ($\pm 0.0003\%$ optional)

RECEIVER

FREQUENCY STABILITY (-30°C TO +60°C; +25°C REF.):

change to: ($\pm 0.0003\%$ optional)

AUDIO SPL (AT 30 cm WITH RATED AUDIO):

Weighted, 300-3000Hz

87dB Nominal (-SAJ, -SAK models)

technical publications

Radio Products Group

8000 W. Sunrise Blvd., Ft Lauderdale, FL 33322

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FMR1337-8

12-9-91

R.M.G.

2 On page 2, **MODEL CONFIGURATION**, add the following as indicated:

<u>FACTORY I.D</u>	<u>POWER LEVEL</u>	<u>FREQ.</u>	<u>SUBMERSIBLE</u>	<u>KEYPAD</u>	<u>DISPLAY</u>
H43SAK7139AN	2.5W-6W	136-174 MHz	No	3 x 5	LCD
H33SAG7139CN	1W-2.5W	146-174 MHz	No	None	None
H43SAG7139CN	2.5W-6W	136-174 MHz	No	None	None
H33YBG7139CN	1W-2.5W	146-174 MHz	Yes	None	None
H43YBG7139CN	2.5W-6W	136-174 MHz	Yes	None	None
H33SAN7139CN	1W-2.5W	146-174 MHz	No	None	None
H43SAN7139CN	2.5W-6W	136-174 MHz	No	None	None
H33YBN7139CN	1W-2.5W	146-174 MHz	Yes	None	None
H43YBN7139CN	2.5W-6W	136-174 MHz	Yes	None	None
H33SAJ7139CN	1W-2.5W	146-174 MHz	No	3 x 1	LCD
H43SAJ7139CN	2.5W-6W	136-174 MHz	No	3 x 1	LCD
H33SAK7139CN	1W-2.5W	146-174 MHz	No	3 x 5	LCD
H43SAK7139CN	2.5W-6W	136-174 MHz	No	3 x 5	LCD

3 On page 2, **SPECIALIZED TOOLS AND TEST EQUIPMENT**, and on page 8, **TORQUE SPECIFICATIONS**, change the following as indicated:

<u>PART NO.</u>	<u>ACTION</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
6680321B78	changed to	6680321B79	Phillips-Head Rotatorq Bit
6680370B90	changed to	6680371B34	Antenna Bushing Spanner Nut Rotatorq Bit

4

<u>PART NO.</u>	<u>ACTION</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
U301	changed to	NXN6269A	Oscillator, Reference, 16.8 MHz, 2 ppm
C49	changed to	2113740A28	9.1pF
L2	changed to	2405452C58	820nH±5%

5 For radios with Factory ID numbers ending with a 'CN' suffix, for example H33SAN7139CN, the following changes apply:

<u>PART NO.</u>	<u>ACTION</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
U502	changed to	0105954P48	Microcomputer, HCMOS

For radios with the H852 option, these units can only be addressed with field programmer software release R 04.00.00 or later. Do not attempt to reprogram radios with this option with any previous release of field programmer software. The hardware modifications are listed below for option H852:

<u>PART NO.</u>	<u>ACTION</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
U400	changed to	0105954S78	Microcomputer, MC68HC11
U700	changed to	0105954S90	Signal Filter, CMOS

6 SABER I, II, AND III

<u>PART NO.</u>	<u>ACTION</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
8	changed to	0305714J10	SCREW, Module; 2-56 x .400"
11	changed to	3205082E80	GASKET, O-Ring (part of item 13)
33	changed desc.	NTN4538A	BATTERY, FM/Submersible, 900mAh
		NTN4596A	BATTERY, FM/Submersible, 1500mAh
34	changed qty.	0305706Q02	SCREW, Baseplate; Ph Pan Hd; 2-56 x 3/32" (2 req'd)
35	changed qty.	3905453Q01	CONTACT, Power (2 req'd)
36	changed to	4205669T01	RETAINER, Baseplate
39	changed to	3205783T01	SEAL, Elastomer
40	changed to	3205472M02	SEAL, Vacuum Port
51	changed to	4205872S01	RETAINER, Speaker
	added	7505316J04	PAD, Microphone
	added	7505934Q05	PAD, Backshield (part of item 26)

SABER II AND III ONLY

<u>ITEM NO.</u>	<u>ACTION</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
50	changed to	8405937R01	FLEX CIRCUIT, LCD Interconnect
	added	7505316J03	PAD, Speaker Bracket
	added	1405888Q02	INSULATOR, Front Shield

For radios with Factory ID numbers ending with a 'CN' suffix (for example, H33SAN7139CN), the following changes apply:

<u>ITEM.NO.</u>	<u>ACTION</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
48)	changed to	8460999A65	ASSEMBLY, 8k Display PCB, SABER II (includes item
48)	or	8460999A67	ASSEMBLY, 2k Display PCB, SABER II (includes item

For radios with the H852 option: these units can only be addressed with field programmer software release R 04.00.00 or later. Do not attempt to reprogram radios with this option with any previous release of field programmer software. The hardware modifications for option H852 are listed below:

<u>ITEM.NO.</u>	<u>ACTION</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
42)	changed to	NLD8600A	ASSEMBLY, VHF Main PCB
42)	changed to	NHN6395A	ASSEMBLY, Housing, SABER I (includes items 34-
42)	or	NHN6422A	ASSEMBLY, Housing, SABER II (includes items 34-

SABER I ONLY

<u>ITEM.NO.</u>	<u>ACTION</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
42)	changed to	NHN6395A	ASSEMBLY, Housing, SABER I (includes items 34-
	or	NHN6393A	ASSEMBLY, Housing, SABER I Submersible (includes items 34-42)

SABER II ONLY

<u>ITEM.NO.</u>	<u>ACTION</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
42)	added	1305622Q28	ESCUTCHEON, SABER IE
	or	1305622Q29	ESCUTCHEON, SABER IE Submersible
42)	changed to	NHN6422A	ASSEMBLY, Housing, SABER II (includes items 34-
42)	or	NHN6395A	ASSEMBLY, Housing, SABER IE (includes items 34-
	or	NHN6393A	ASSEMBLY, Housing, SABER IE Submersible

44	added	or	3305183R27	(includes items 34 thru 42) LABEL, Nameplate, SABER IE
47	added	or	0705830N01	BRACKET, Speaker, SABER IE
50	changed to		8405937R01	FLEX CIRCUIT, LCD Interconnect
	added		7505316J03	PAD, Speaker Bracket
	added		1405888Q02	INSULATOR, Front Shield

SABER III ONLY

<u>ITEM NO.</u>	<u>ACTION</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
43	changed to	NHN6397A	ASSEMBLY, Housing, SABER III (includes items 34 - 42)

NO.

7 On page 8, **TORQUE SPECIFICATIONS**, change the following as indicated:

<u>APPLICATION</u>	<u>TORQUE (IN.LBS.)</u>	<u>TORQUE (N·m)</u>	<u>TORQUE BIT NO.</u>
Slotted-Spanner Nut (Baseplate)	6	0.68	6680321B79

NO.

8 On page 11, **SABER VHF Electrical Parts List**, change the following as indicated:

<u>ITEM NO.</u>	<u>MOTROROLA PART NO.</u>	<u>ACTION</u>	<u>MOTOROLA PART NO.</u>	<u>DESCRIPTION</u>
P5	3905445Q03	changed to	REX-4166A	Contact Antenna

9 On page 12, **EXPLODED VIEW DIAGRAMS AND PARTS LIST**

SABER II AND III ONLY

<u>ITEM NO.</u>	<u>ACTION</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
50	changed to	8405712U01	FLEX CIRCUIT, LCD Interconnect

10 On page 12, **EXPLODED VIEW DIAGRAMS AND PARTS LIST**

SABER II ONLY

<u>ITEM NO.</u>	<u>ACTION</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
29	changed to	REX4121A	BOOT, Reference Oscillator SABER II

SABER III ONLY

<u>ITEM NO.</u>	<u>ACTION</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
29	changed descp	1405387R01	BOOT, Oscillator SABER III



MOTOROLA INC.

MANUAL REVISION

for
**Manuals No. 68P81043C90-O, 68P81043C95-O, 68P81044C45-O,
68P81045C70-O, 68P81045C75-O, and 68P81055C25-O
SABER™, SABER SELECT 5™, and SABER SECURENET™
Portable Radios Service Manuals**

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

<u>NO.</u>	<u>CHANGE AFFECTS</u>
1	8405912T01, 8K DISPLAY CIRCUIT BOARD COMPONENT LOCATION DIAGRAMS
2	8405912T01, 8K DISPLAY BOARD SCHEMATIC DIAGRAM
3	8405912T01, 8K DISPLAY BOARD ELECTRICAL PARTS LIST

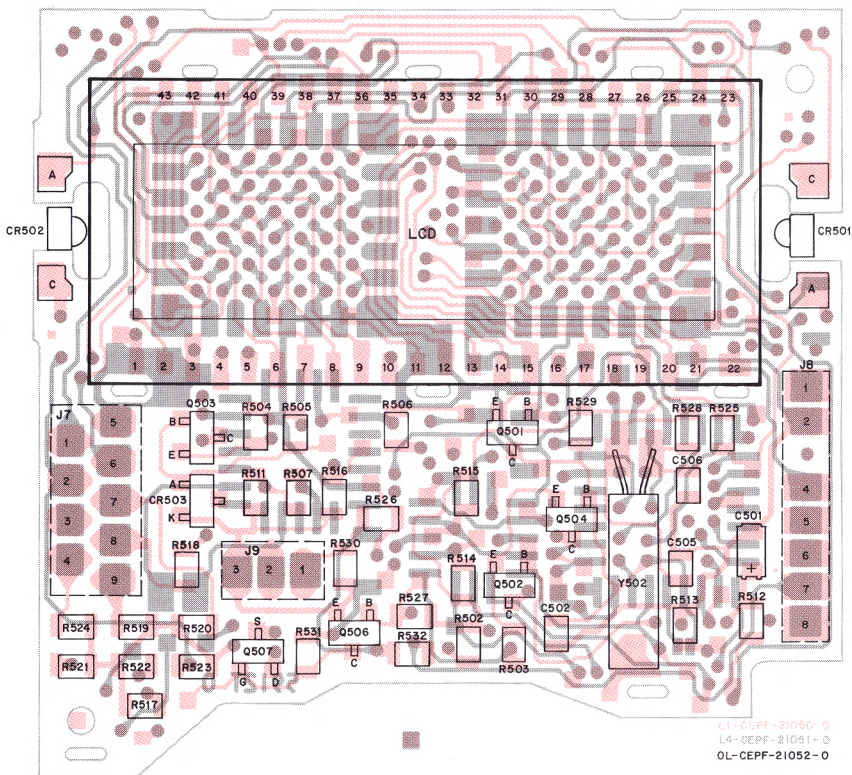
CHANGES

NO.

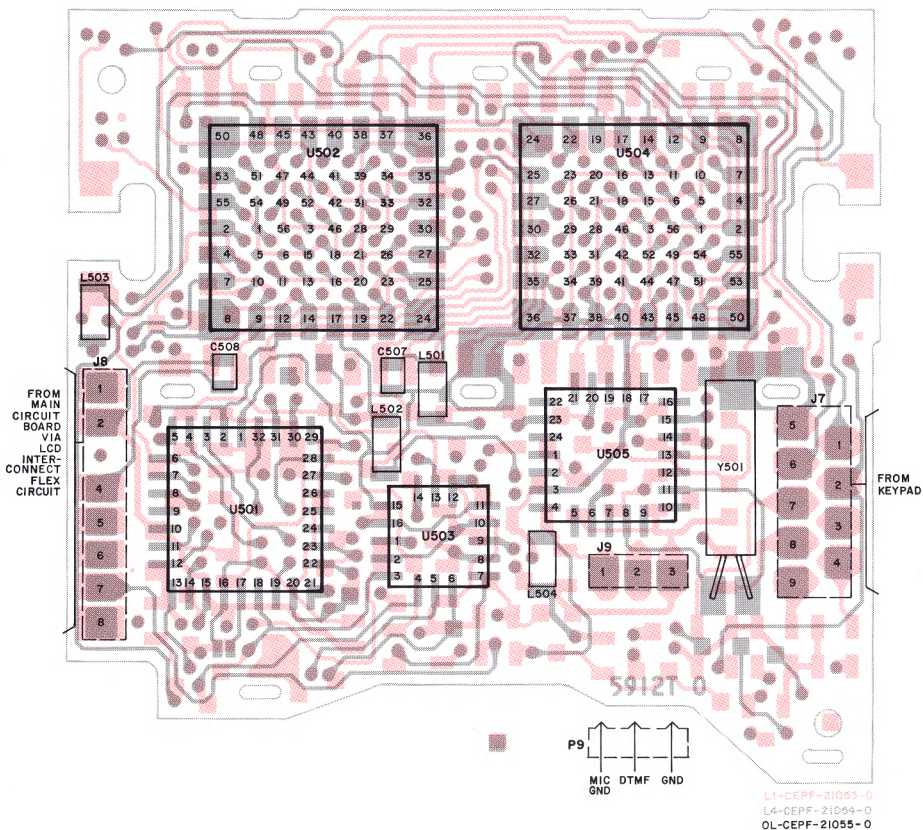
- 1 Add the following Component Location Diagrams for the 8405912T01, 8k Display Circuit Board:

8405912T01 8k DISPLAY CIRCUIT BOARD

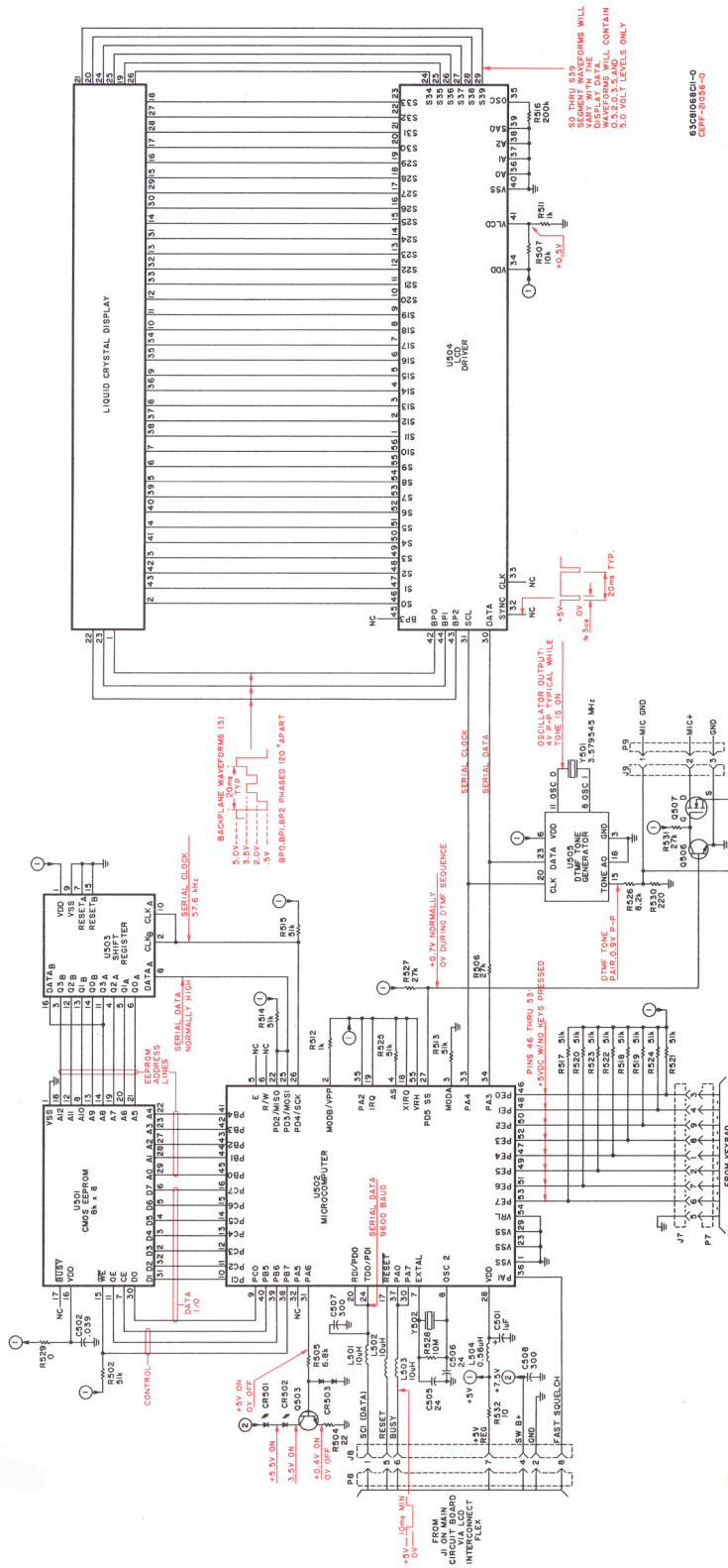
SIDE 1 VIEWED FROM SIDE 1



SIDE 2 VIEWED FROM SIDE 2



2 Add the following Schematic Diagram for the 8405912T01, 8k Display Circuit Board:



3 Add the following Electrical Parts List for the 8405912T01, 8k Display Circuit Board:

8405912T01

SABER 8k Display Circuit Board

Electrical Parts List

TPLF-3935-O

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION	
C501	2362998B59	CAPACITOR, Fixed: pF±5%; 50V unless stated 1µF±10%; 20V .039µF±10%; 25V Not Used 24 300	
C502	2160521C32		
C503,504	-----		
C505,506	2160520B10		
C507,508	2160520C12		
CR501,502	4805729G27	DIODE: See Note I LED, Yellow SOT-23	
CR503	4805129M06		
J7	0905287C05	JACK: Socket, Printed Circuit (Keypad Switch)(9 req'd) Socket, Printed Circuit (LCD Interconnect)(8 req'd) Socket, Printed Circuit (Speaker/Mic)(3 req'd)	
J8	0905287C05		
J9	0905287C05		
L501 thru 503	2462575A07	COIL, RF: unless stated Choke, 10µH Choke, 0.56µH	
L504	2462575A09		
Q501,502	-----	TRANSISTOR:See Note I Not Used NPN; BCW60B (RH) Not Used NPN; BCW60B (RH) TMOS; BST82	
Q503	4805128M12		
Q504,505	-----		
Q506	4805128M12		
Q507	4805218N11		
R501	-----	RESISTOR, Fixed: Ω±5%;1/8W unless stated Not Used 51k Not Used 22 6.8k 27k 10k Not Used 1k 51k 200k±1% 51k 8.2k 27k 10M±10% 0 220 27k 10	
R502	0660076A90		
R503	-----		
R504	0660076A09		
R505	0660076A69		
R506	0660076A83		
R507	0660076A73		
R508 thru 510	-----		
R511,512	0660076A49		
R513 thru 515	0660076A90		
R516	0660076F08		
R517 thru 525	0660076A90		
R526	0660076A71		
R527	0660076A83		
R528	0660076H49		
R529	0605021K01		
R530	0660076A33		
R531	0660076A83		
R532	0660076A01		
U501	0105954S37		CIRCUIT MODULE: See Note I EEPROM, CMOS; 8k x 8 Microcomputer, HCMOS Shift Register; CMOS LCD Driver, CMOS DTMF Tone Generator, CMOS
U502	0105953N07		
U503	0105953N09		
U504	0105953N10		
U505	0105953N18		
Y501	4805664G40	CRYSTAL: 3.579545MHZ 3.6864MHZ	
Y502	4805664G39		

NOTES:

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

MODEL CONFIGURATION

FACTORY I.D.	POWER LEVEL	FREQ.	SUBMERSIBLE	KEYPAD	DISPLAY
H33SAN7139AN	1W-2.5W	146-174MHz	No	None	None
H43SAN7139AN	2.5W-6W	136-174MHz	No	None	None
H33YBN7139AN	1W-2.5W	146-174MHz	Yes	None	None
H43YBN7139AN	2.5W-6W	136-174MHz	Yes	None	None
H33SAJ7139AN	1W-2.5W	146-174MHz	No	3x1	LCD
H43SAJ7139AN	2.5W-6W	136-174MHz	No	3x1	LCD
H33SAK7139AN	1W-2.5W	146-174MHz	No	3x5	LCD

FCC DESIGNATIONS

2.5-Watt Models.....AZ489FT3701 6-Watt Models.....AZ489FT3702

SPECIALIZED TOOLS AND TEST EQUIPMENT

SERVICE AIDS

RPX-4665A	Field Modification Kit/RTX4005A
RSX-4043A	Rotatorq Tool
RTK-4203A	Program/Test Cable
RTL-4208A	RF Coaxial Probe
RTL-4224A	Battery Eliminator
RTL-4225A	Housing Eliminator
RTL-4238A	SABER RF Cable
RTX-4005B	Portable Products Test Set
0180370B85 thru B86	Ungar Table Fixtures
0180386A81	Micro-Tip Soldering Iron
0180386A82	Static Protection Kit
5880348B33	SMA to BNC Adapter (for probe)
6680321B78	Phillips-Head Rotatorq Bit
6680334B48 thru B52	Ungar Service Heads
6680370B88	Frequency and On/Off Switch Spanner Nut Rotatorq Bit
6680370B89	Baseplate Spanner Nut Rotatorq Bit
6680370B90	Antenna Bushing Spanner Nut Rotatorq Bit
6680385A11	Module Extractor
6680387A59	Leadless Component Extractor
6680387A64	Heat Controller With Safety Stand
8407668M01	Display Extender Cable

TEST EQUIPMENT

R-1053A	Dual-Trace Oscilloscope
R-2001D	Communications System Analyzer
S-1339A	RF Millivoltmeter
S-1347D	Power Supply
RTL-4223A	Charger Tester
RTL-4237A	Battery Tester

FIELD PROGRAMMING EQUIPMENT

RVN-4002A	Field Programmer Software on 5 1/4-inch Disk
RVN-4003A	Field Programmer Software on 3 1/2-inch Disk
0180353A74	Radio Interface Box (RIB)
0180357A57	RIB Wall-Mounted Power Supply
3080369B71	Computer Interface Cable (PC-XT)
3080369B72	Computer Interface Cable (PC-AT)
68P81044C65	SABER Field Programmer User's Guide

CURRENT DRAINS (SEE NOTE)			
		SABER I	SABER II AND III
STANDBY		80	83
RECEIVE		210	213
H43 MODELS:	6-WATT	3300	3300
	2.5-WATT	2100	2100
H33 MODELS:	2.5-WATT	1600	1600
	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.

COMPUTER SOFTWARE COPYRIGHTS

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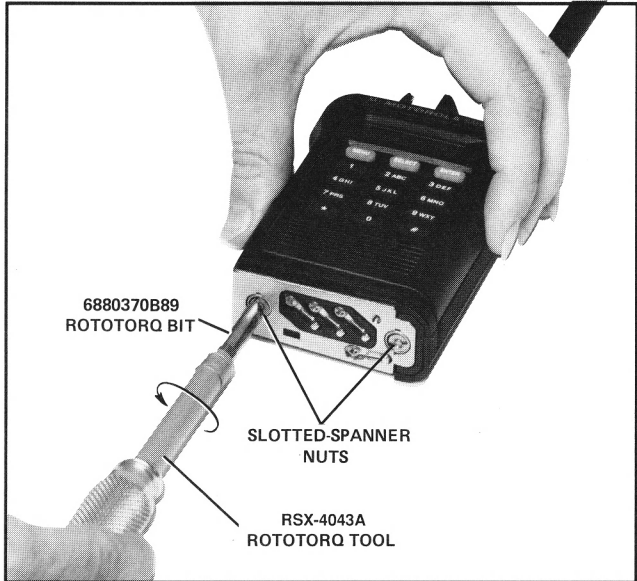
DISASSEMBLY/REASSEMBLY PROCEDURES

1. DISASSEMBLY

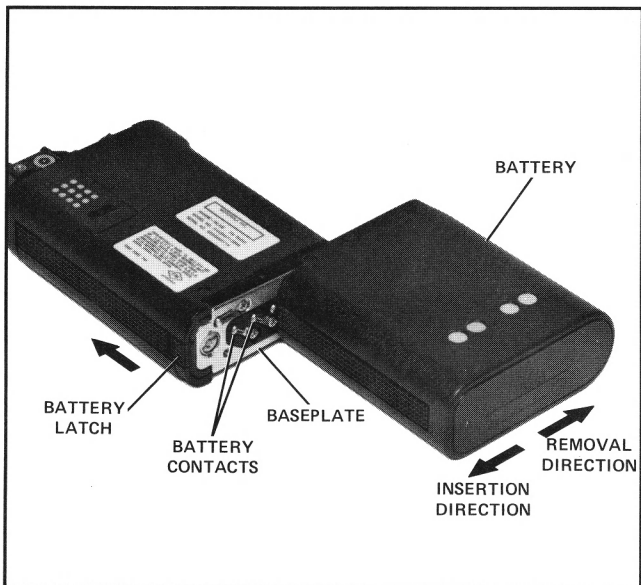
a. Turn off the radio by rotating the on/off/volume control knob fully counterclockwise until you hear a click. Remove the universal connector cover or any accessory connected to the radio before beginning disassembly.



c. Loosen the two slotted-spanner nuts on the bottom of the radio using Rotatorq tool bit No. 6880370B89. When loosened, the slotted-spanner nuts are captive and will spin freely without separating from the baseplate.



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.



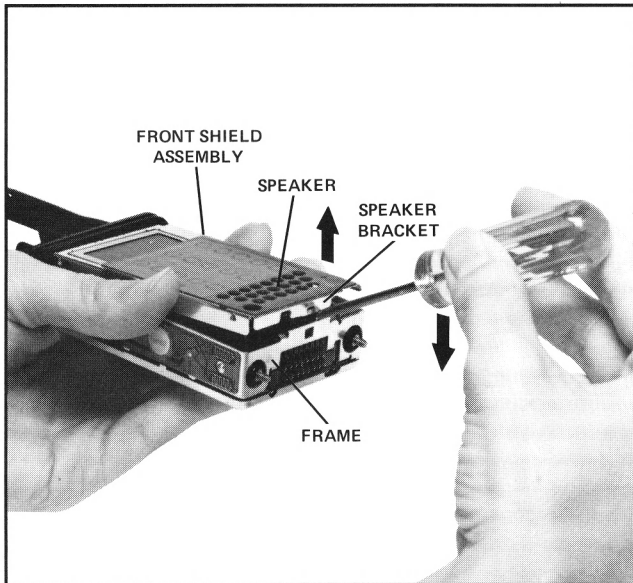
d. Remove the frame assembly from the radio housing by grasping the antenna at its base and pulling it gently upward. Do not depress the PTT switch during removal and do not push on the slotted-spanner nuts to lift the frame assembly.



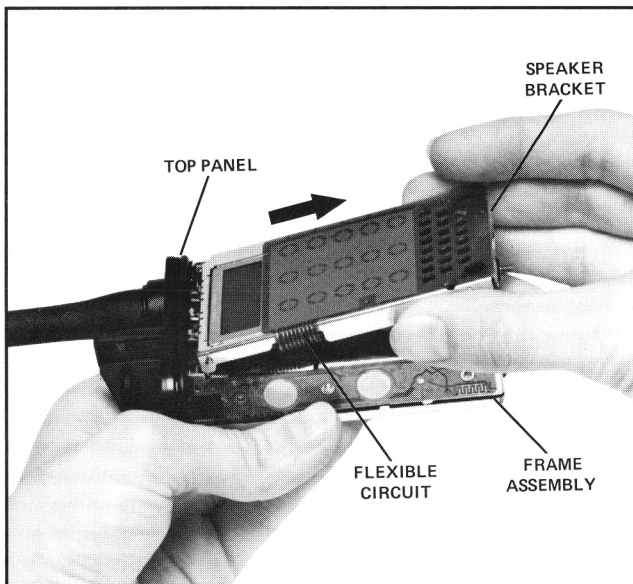
CAUTION

Ensure that all static electricity safeguards are in place.

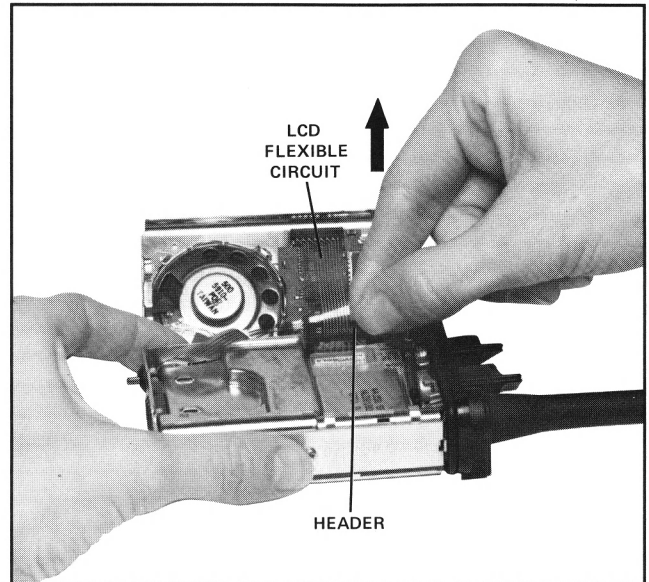
- e. With the speaker facing upward, **remove the speaker bracket assembly** by inserting a thin screwdriver blade between the frame and the bottom of the speaker bracket, and prying gently upward on the speaker bracket until it is disengaged from the frame.



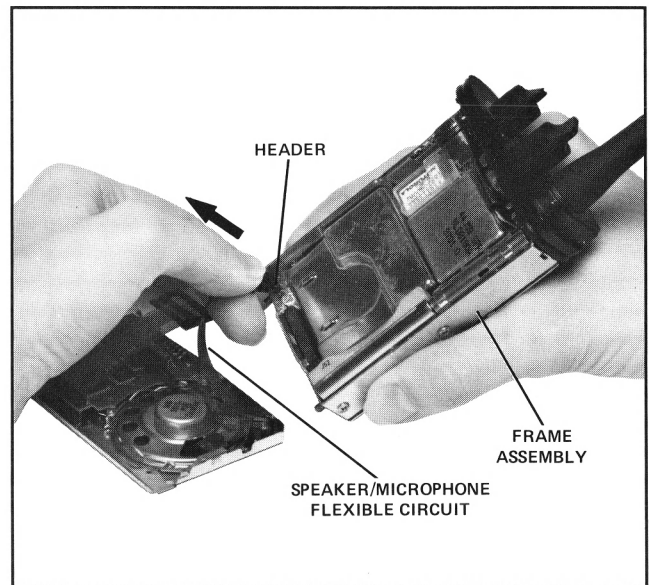
- f. **Lift the speaker bracket assembly** away from the bottom of the frame assembly, then pull it out from under the plastic top panel. Be careful not to pull against the flexible circuits connecting the speaker bracket to the frame assembly.



- 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 2) and the appropriate exploded view diagrams at the back of this manual before attempting further disassembly or repair.

2. 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/Speaker Bracket 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 speaker bracket **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.

- 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. *Applying all the force to a single guide pin will cause severe damage to the module.*
- 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 layout 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 the 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 the PTT/controls flex circuit must be lifted or removed for any reason, it must not be readhered 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.

3. 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 speaker bracket is reattached to the frame assembly.
- that the two extended tabs at the top of the speaker bracket are properly inserted into the slots between the frame and the control top panel.
- *that the PTT switch and monitor button are not depressed while the frame is being inserted into the housing.*
- 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.

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	2.5	0.28	6680321B79
Bottom Connector to Frame Screws	2.5	0.28	6680321B79
Frequency Switch Spanner Nut	8	0.91	6680370B88
All Module Screws	2.5	0.28	6680321B79
Power Contact Screws	2.5	0.28	6680321B79
Slotted-Spanner Nut (Baseplate)	4	0.45	6680370B89
Top Panel to Frame Screws	2	0.23	6680321B79
Volume Pot Spanner Nut	8	0.91	6680370B88

RADIO FUNCTIONAL TESTS (@ 7.5Vdc)

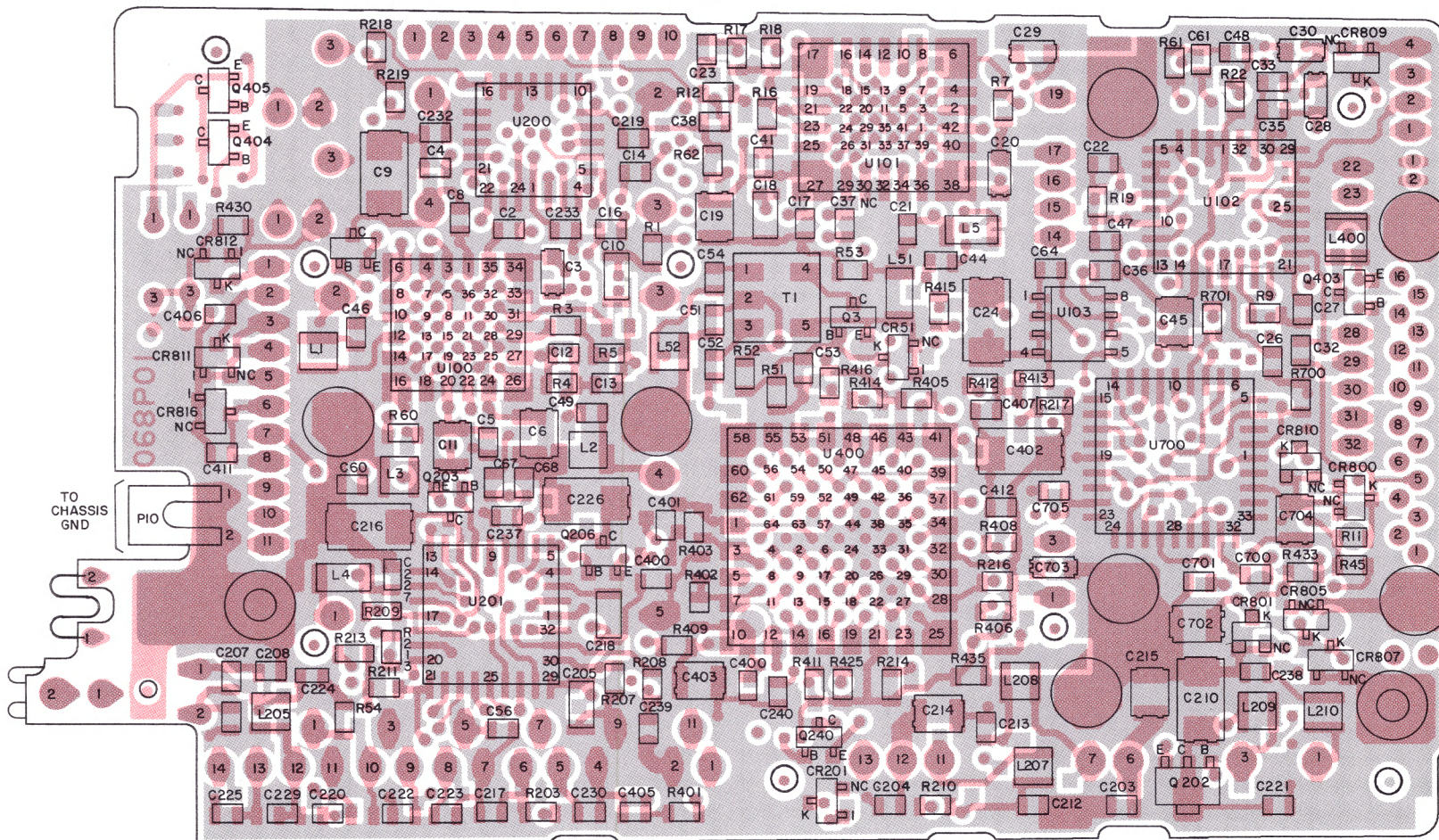
TRANSMITTER PERFORMANCE				
TEST	SERVICE MONITOR	RADIO	TEST BOX	COMMENTS
REFERENCE FREQUENCY	Set to POWER MONITOR, FREQ.ERROR ; frequency to radio transmit frequency; input to RF IN/OUT .	Set to channel corresponding to frequency of test.	PTT Continuous (during performance check).	Frequency error = ≤450 Hz (vhf) ≤750 Hz (uhf)
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.		Press radio's PTT switch and say "four" loudly into microphone. Deviation should be ≥4.0 kHz and ≤ 5.0 kHz.
RECEIVER PERFORMANCE				
RATED AUDIO	Set to GENERATOR ; frequency to radio receive frequency; 1 mV rf output; 1 kHz modulation; 3 kHz 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 12 dB SINAD; rf level ≤ published specs.

NOTES

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

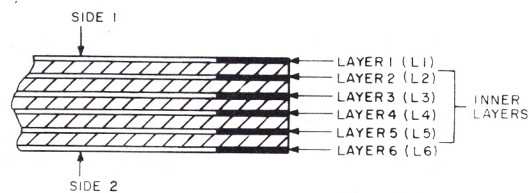
*RF power levels can be different for each individual channel; refer to Radio Information Sheet.

SIDE 1 - VIEWED FROM SIDE 1



L1-CEPF-17447-A
 L6-CEPF-17448-A
 OL-CEPF-17449-A

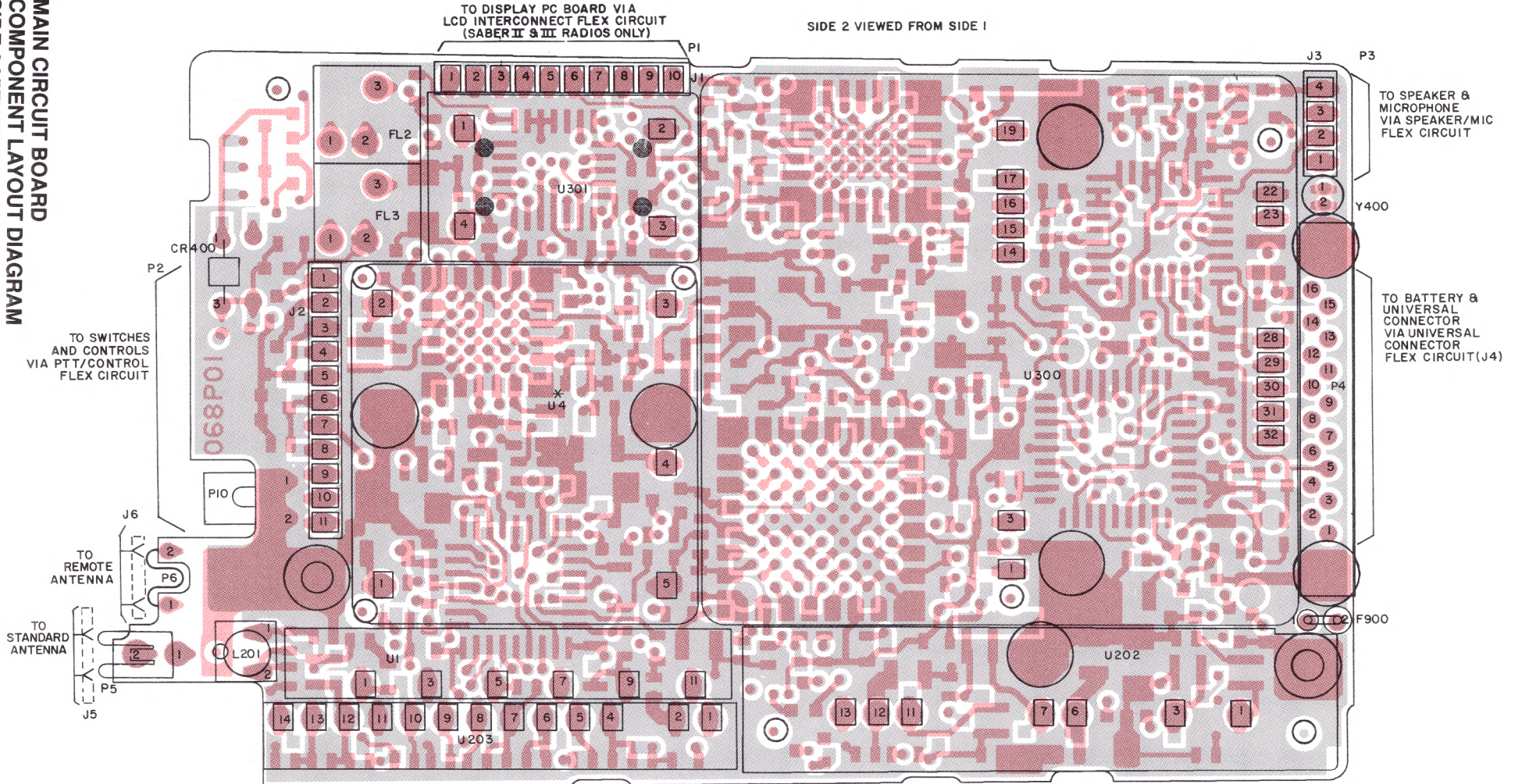
6-LAYER CIRCUIT BOARD COPPER DETAIL VIEWING COPPER STEPS AT EDGE OF BOARD IN PROPER LAYER SEQUENCE.



AEFF-18100-0

MAIN CIRCUIT BOARD
 COMPONENT LAYOUT DIAGRAM
 SIDE 1 VIEWED FROM SIDE 1

MAIN CIRCUIT BOARD
COMPONENT LAYOUT DIAGRAM
SIDE 2 VIEWED FROM SIDE 1

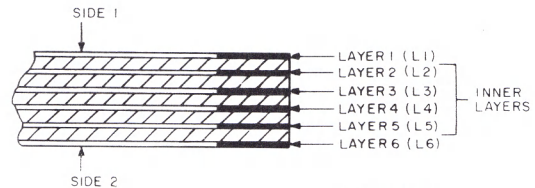


*MODULE U2 IS MOUNTED UNDER U4

LJ-CEPF-17447-A
L6-CEPF-17448-A

QL-CEPF-17450-A

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



SABER VHF Electrical Parts List TPLF-3350-A

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
C1	2160521A15	Not Used
C2	2362998B09	1500pF±5%
C3	2160521G37	1±10%; 16V
C4.5	2362998B68	0.1+80-20%
C6	2160521H41	4.7; 10V
C7	2160521G37	Not Used
C8	2362998B73	0.1+80-20%
C9	2362998B16	10; 16V
C10	2160521D37	0.1±10%
C11	2362998B64	2.2; 20V
C12	2160520C18	510pF±5%; 50V
C13	2160521E25	0.1
C14	2160521G37	0.1+80-20%
C15	2160521G37	Not Used
C16	2160520F15	39pF±5%
C17	2160521G37	0.1+80-20%
C18	2160521H41	22+80-20%
C19	2362998B16	3.3±10%; 16V
C20	2362998B59	1; 16V
C21	2160521A13	1000pF±5%
C22	2160521G37	0.1+80-20%
C23	2160521A19	3300pF±5%
C24	2362998B69	4.7; 20V
C25	2160521G37	Not Used
C26	2160521A21	4700pF±5%
C27	2160521A32	0.39±5%
C28 thru 30	2362998B59	1; 16V
C31	2160521G37	Not Used
C32	2160521A32	0.39±5%
C33	2160521H43	33+80-20%
C34	2160521E28	Not Used
C35	2160521H43	33+80-20%
C36.37	2160521G37	0.1+80-20%
C38	2160521E25	0.1
C39.40	2160520C01	Not Used
C41	2160520C01	100pF±5%; 50V; N150
C42.43	2160521G37	Not Used
C44	2160521G37	0.1+80-20%
C45	2362998B16	3.3±10%; 16V
C46	2160521E28	0.18
C47	2160521E25	0.1
C48	2160521A29	0.22±5%
C49	2160520A20	5.2pF±.25pF
C50	2160521G37	Not Used
C51 thru 53	2160521E28	0.18
C54	2160520C01	100pF±5%; 50V; N150
C55	2160521E28	Not Used
C56	2160521G37	0.18
C57 thru 60	2160521A29	Not Used
C61	2160521A29	0.22±5%
C62.63	2160521G37	Not Used

C64	2160521E28	0.18
C65.66	2160521G37	Not Used
C67	2160520C09	220pF
C68	2160521E28	0.18
C201.202	2160521E28	Not Used
C203.204	2160521E28	0.18
C205	2160521H41	22+80-20%
C206	2160520B05	15pF±5%; 50V; NPO
C207	2160520A09	2.2pF±0.25pF; NPO
C208	2160520B05	15pF±5%; 50V; NPO
C209	2160521E28	Not Used
C210	2362998B69	4.7; 20V
C211	2160521E28	Not Used
C212.213	2160521E28	0.18
C214	2160520P01	1000pF±5%
C215	2362998B16	3.3±10%; 16V
C216	2362998B73	10; 16V
C217	2160521E28	0.18
C218	2160521F33	0.04
C219	2160521C09	470pF±10%
C220	2160520C01	100pF±5%; 50V
C221 thru 223	2160521E28	0.18
C224	2160521G37	0.1+80-20%
C225	2160521E28	0.18
C226	2362998B73	10; 16V
C227	2160521E28	0.18
C228	2160521E28	Not Used
C229.230	2160521E28	0.18
C231	2160521C09	Not Used
C232	2160521E28	470pF±10%
C233	2160521E28	0.18
C234 thru 236	2160521E28	Not Used
C237	2160521E28	0.18
C238 thru 240	2160521C09	470pF±10%
C241	2160520A15	3.9pF±.25pF
C400.401	2160520B05	15pF±5%; 50V; NPO
C402	2362998B73	10; 16V
C403	2362998B68	4.7; 10V
C404	2160521E28	Not Used
C405	2160521G37	0.1+80-20%
C406.407	2160521G37	0.1+80-20%
C408 thru 410	2160521G37	0.1+80-20%
C411.412	2160521G37	0.1+80-20%
C700.701	2160521G37	0.1+80-20%
C702	2362998B16	3.3±10%; 16V
C703	2362998B05	47±10%
C704	2362998B68	4.7; 10V
C705	2160521G37	0.1+80-20%
CR1 thru 50	2160521G37	Not Used
CR51	4805129M64	Not Used
CR200	Not Used	Not Used
CR201	4805129M05	SOT-23
CR400	4805729G22	LED, Red
F900	0105955P27	5 Amp

FL1	Not Used
FL2	9105685Q02
FL3	9105685Q03
J1	0905287C07
J2	0905287C07
J3	0905287C07
L1	2405452C66
L2	2462575A03
L3	2405452C09
L4.5	2462575A08
L6 thru 50	Not Used
LS1	2462575A08
LS2	2405452C38
L200	Not Used
L201	2405855Q01
L202 thru 204	Not Used
L205	2405452C62
L206	Not Used
L207 thru 210	2405452C62
L400	2462585A40
LS1	Not Used
MK1	Not Used
P1 thru 3	Not Used
P4	2805520Q01
P5	3905445Q03
P6	3905445Q03
P7 thru 9	Not Used
P10	3905889R01
Q1	4805128M16
Q2	4805128N03
Q3	4805128M23
Q201	4805128M23
Q202	4805128M27
Q203.204	4805128M16
Q205	4805128M16
Q206	4805128M16
Q400 thru 402	4805128M44
Q403	4805128M44
Q404	4805128M44
Q405	4805128M44

R1	0660079V28
R2	Not Used
R3	066007E77
R4	0660078T24
R5	0660078T01
R6	Not Used
R7	0660078J80
R8	Not Used
R9	0660078G33
R10	Not Used
R11	0660078G33
R12	0660076A49
R13 thru 15	Not Used
R16	0660078L01
R17	0660076E73
R18	0660076E89
R19	0660076A49
R20.21	Not Used
R22	0660076A92
R23 thru 44	Not Used
R45	0660076A29
R46 thru 50	Not Used
R51.52	0660076A85
R53	0660076A41
R54	0660076A73
R55 thru 59	Not Used
R60	0660076A29
R61	0660076A77
R62	0660076B01
R200	Not Used
R201	0660076A89
R202	Not Used
R203	0660078G33
R204 thru 206	Not Used
R207	0660078J18
R208	Not Used
R209	0660076A48
R210	0660078J80
R211.212	0660078G33
R213	0660078J23
R214	0660076B01
R215	Not Used
R216.217	0660076A73
R218	0660076B01
R219	0660076B05
R220	0660076A49
R400	Not Used
R401	0660076A65
R402	0660078B25
R403	0660076B01
R404	Not Used
R405	0660076B01
R406	0660076A73
R407	Not Used
R408	0660076B01
R409	0660076A29
R410	Not Used
R411	0660076A80

R412.413	0660078L01
R414 thru 416	0660076B01
R417 thru 424	Not Used
R425	0660076A73
R426 thru 429	Not Used
R430	0660076A29
R431.432	Not Used
R433	0660076A21
R434	Not Used
R435	0660076A49
R700	0660078J80
R701	0660076A49
R800	RPX4690A
R801	Not Used
R802	Not Used
R803	Not Used
R804	Not Used
R805	Not Used
S800	RPX4690A
S801	4005221R01
S802	Not Used
S803	RPX4694A
S804	RPX4694A
S805	RPX4694A
S806 thru 822	Not Used
S823	RPX4689A
T1	2405548Q03
U1	NFD6111A
U2	NFD6112A
U3	NFD6091A
U4	NLD8180A
U100	0105953N02
U101	0105952N99
U102	0105958P74
U103	5105469E65

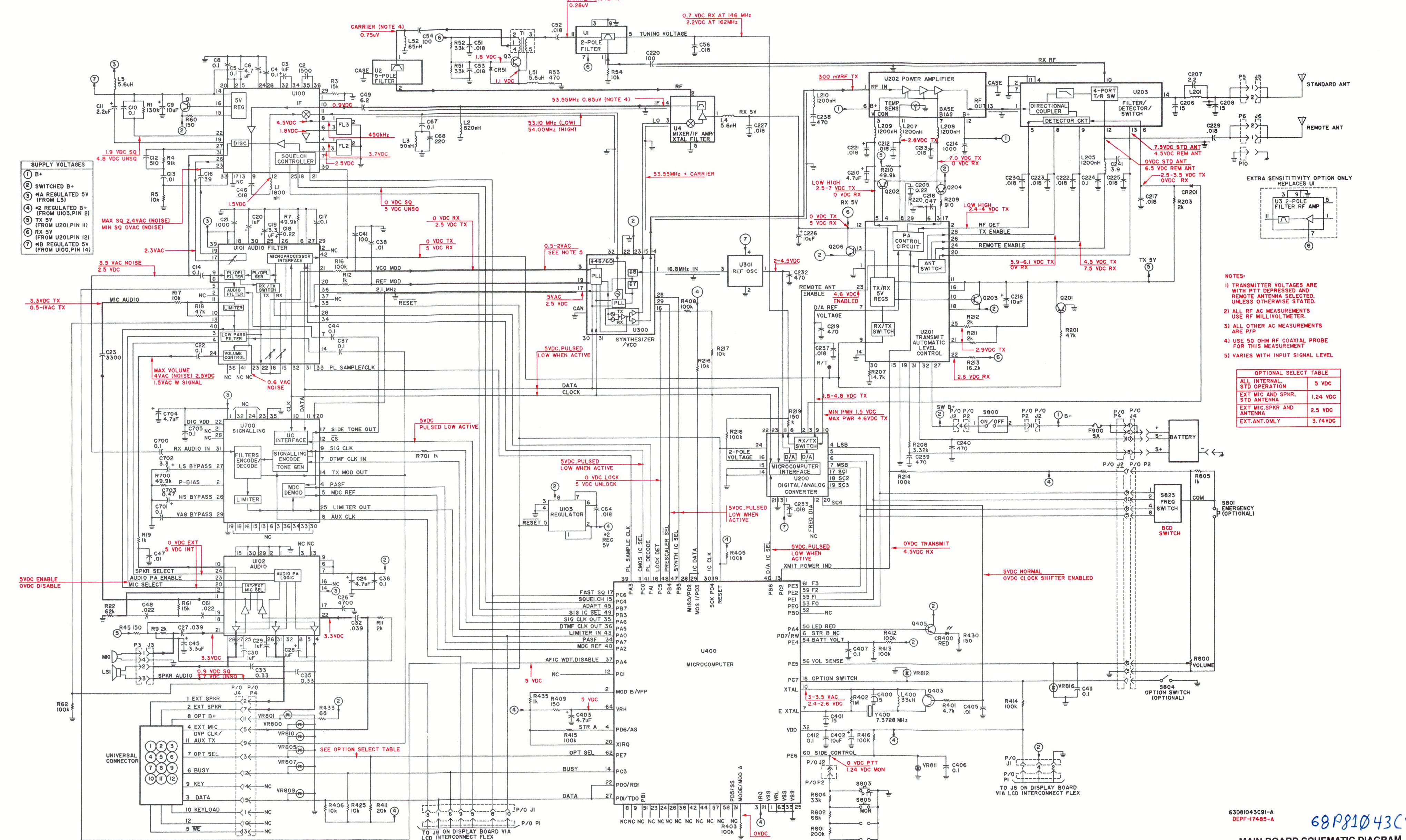
U200	0105953N05	IC, Digital/Analog Converter, CMOS
U201	0105953N06	IC, Transmit Automatic Level Control
U202	NLD8121A	Power Amplifier, High-Power (136-150.8MHz)
	or NLD8122A	Power Amplifier, High-Power (145-162MHz)
	or NLD8123A	Power Amplifier, High-Power (157-174MHz)
U203	NFD6131A	Filter/Detector/Switch (136-150.8MHz)
	or NFD6132A	Filter/Detector/Switch (146-174MHz)
U204	NLD8133A	Power Amplifier, Low-Power (146-174MHz)
U300	NLD8201A	Synthesizer/VCO (136-151MHz)
U301	NXN6268A	Synthesizer/VCO (146-174MHz)
U400	0105953N16	Microcomputer, MC68HC11; Binary Signal Filter, CMOS
U700	0105953N11	Signal Filter, CMOS
VR800	4805129M35	Zener, 5.6V
VR801	4805129M49	Zener, 5.6V
VR802 thru 804	Not Used	Not Used
VR805	4805129M35	Zener, 5.6V
VR806	Not Used	Not Used
VR807	4805129M35	Zener, 5.6V
VR808	Not Used	Not Used
VR809 thru 812	4805129M35	Zener, 5.6V
VR813 thru 815	Not Used	Not Used
VR816	4805129M35	Zener, 5.6V
Y400	CRYSTAL: 4805664G32	7.3728MHz

NONREFERENCED ITEMS	
0905287C07	SOCKET, Printed Circuit (for all modules) (49 req'd)
1405881R01	BOOT, Crystal (for Y400)
7505934Q01	PAD, Oscillator (for U301)

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. TEPF-17445-0



SABER I VHF
Exploded View Parts List

TPLF-3370-A

ITEM NO.	MOTOROLA PART NO.	DESCRIPTION
1	RPX4695A	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	0305714J09	SCREW, Module, Ph Pan Hd; 2-56x3/8" (7 req'd)
9	0305381L02	SCREW, Top Panel; 2-32 (2 req'd)
10	RPX4695A	KIT, Antenna Bushing (includes item 12)
11	3205082E71	GASKET, O-Ring (part of item 10)
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)
17	0405781Q03	WASHER, Detent (odd number of switch positions)
18	NAD6471A	ANTENNA, VHF Helical (136 - 150.8 MHz)
19	NAD6472A	ANTENNA, VHF Helical (146 - 162 MHz)
20	NAD6473A	ANTENNA, VHF Helical (157 - 174 MHz)
21	RPX4699A	KIT, Frequency Knob, Low Profile
22	REX4017A	KIT, On/Off/Volume Knob
23	REX4016A	KIT, Volume Knob, Low Profile
24	1305622Q01	ESCUOTCHEON, 12-Frequency
25	1305622Q01	ESCUOTCHEON, 12-Frequency Emergency
26	1305622Q04	ESCUOTCHEON, 12-Frequency Emergency, Submersible
27	0205916P01	NUT, Spanner (2 req'd)
28	3205082E51	GASKET, O-Ring (part of item 23)
29	RPX4691A	KIT, RF Connector (includes items 22,24)
30	4205852N01	CONTACT, Ground, RF (part of item 23)
31	NLD8160A	ASSEMBLY, VHF Main PC Board (includes item 27)
32	NTN4647A	ASSEMBLY, Back Shield (includes item 27)
33	0305706Q01	SCREW, Captive (4 req'd) (part of item 26)
34	420577Q01	CLIP, Ground
35	1405343S01	BOOT, Oscillator, SABER I
36	RPX4700A	KIT, PTT/Controls Flex (includes item 31)
37	RPX4701A	KIT, PTT/Controls Flex Assembly (includes items 2,3,31)
38	RPX4694A	KIT, Contact Snapdome (S803, 805) (2 req'd) (part of item 30)
39	4505022P02	LEVER, PTT
40	NTN4592A	BATTERY, 500 mAh
41	NTN4593A	BATTERY, 900 mAh
42	NTN4594A	BATTERY, 1250 mAh
43	NTN4595A	BATTERY, 1500 mAh
44	NTN4540A	BATTERY, 3600 mAh Primary
45	NTN4537A	BATTERY, FM, 500 mAh
46	NTN4538A	BATTERY, FM, 900 mAh
47	NTN4539A	BATTERY, FM, 1250 mAh
48	NTN4596A	BATTERY, FM, 1500 mAh
49	0305706Q02	SCREW, Baseplate Ph Pan Hd; 2-56x3/32" (4 req'd) (part of item 43)
50	3905453Q01	CONTACT, Power (4 req'd) (part of item 43)
51	4205437Q01	RETAINER, Baseplate (part of item 43)
52	RPX4696A	KIT, Slotted Spanner Nut (2 req'd) (part of item 43)
53	6405847N03	BASEPLATE (part of item 43)
54	3205701Q01	SEAL, Elastomer (part of item 43)
55	3205472M01	SEAL, Vacuum Port (part of item 43)
56	5505333Q01	LATCH, Battery (part of item 43)
57	4105775Q01	SPRING, Latch (part of item 43)
58	NHN6386A	ASSEMBLY, Housing, SABER I (includes items 34 thru 42)

44	or NHN6384A	ASSEMBLY, Housing, SABER I Submersible (includes item 34 thru 42)
45	3305183R01	LABEL, Bottom Nameplate, SABER I
46	3305183R01	LABEL, Top Nameplate, SABER I
47	1405490Q01	BOOT, Microphone
48	RPX4697A	KIT, Speaker Bracket, SABER I (includes item 48)
49	7505641N03	PAD, Speaker Bracket (part of item 47)
50	0105958M34	ASSEMBLY, Speaker/Microphone Flex, SABER I
51	4205604Q01	RETAINER, Speaker
52	1405182M03	INSULATOR, Universal Connector
53	0705319R02	BRACKET, Switch (optional)
54	4005221R02	SWITCH, Dual-Function (S801) (optional)
55	3205082E68	GASKET, O-Ring (optional)
56	NTN5076A	KIT, Push-Only Knob (includes item 54)
57	or NTN5068A	KIT, Push-and-Rotate Knob (includes item 54)
58	or NTN5069A	KIT, Rotate-Only Knob (includes item 54)
59	or 4305607S01	PLUG, Seal
60	NTN4741A	ASSEMBLY, Belt Clip
61	NTN5025A	COVER, Universal Connector

SABER II VHF
Exploded View Parts List

TPLF-3414-A

ITEM NO.	MOTOROLA PART NO.	DESCRIPTION
1	RPX4695A	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	0305714J09	SCREW, Module, Ph Pan Hd; 2-56x3/8" (7 req'd)
9	0305381L02	SCREW, Top Panel; 2-32 (2 req'd)
10	RPX4695A	KIT, Antenna Bushing (includes item 12)
11	3205082E71	GASKET, O-Ring (part of item 10)
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)
17	0405781Q03	WASHER, Detent (odd number of switch positions)
18	NAD6471A	ANTENNA, VHF Helical (136 - 150.8 MHz)
19	NAD6472A	ANTENNA, VHF Helical (146 - 162 MHz)
20	NAD6473A	ANTENNA, VHF Helical (157 - 174 MHz)
21	RPX4699A	KIT, Frequency Knob, Low Profile
22	REX4017A	KIT, On/Off/Volume Knob
23	REX4016A	KIT, Volume Knob, Low Profile
24	1305622Q01	ESCUOTCHEON, 12-Frequency
25	1305622Q01	ESCUOTCHEON, 12-Frequency Emergency
26	1305622Q04	ESCUOTCHEON, 12-Frequency Emergency, Submersible
27	0205916P01	NUT, Spanner (2 req'd)
28	3205082E51	GASKET, O-Ring (part of item 23)
29	RPX4691A	KIT, RF Connector (includes items 22,24)
30	4205852N01	CONTACT, Ground, RF (part of item 23)
31	NLD8160A	ASSEMBLY, VHF Main PC Board (includes item 27)
32	NTN4647A	ASSEMBLY, Back Shield (includes item 27)
33	0305706Q01	SCREW, Captive (4 req'd) (part of item 26)
34	4205577Q01	CLIP, Ground
35	1405343S01	BOOT, Oscillator, SABER II/III
36	RPX4700A	KIT, PTT/Controls Flex (includes item 31)
37	RPX4701A	KIT, PTT/Controls Flex Assembly (includes items 2,3,31)
38	RPX4694A	KIT, Contact Snapdome (2 req'd) (part of item 30)
39	4505022P02	LEVER, PTT
40	NTN4592A	BATTERY, 500 mAh
41	NTN4593A	BATTERY, 900 mAh
42	NTN4594A	BATTERY, 1250 mAh
43	NTN4595A	BATTERY, 1500 mAh
44	NTN4540A	BATTERY, 3600 mAh Primary
45	NTN4537A	BATTERY, FM, 500 mAh
46	NTN4538A	BATTERY, FM, 900 mAh
47	NTN4539A	BATTERY, FM, 1250 mAh
48	NTN4596A	BATTERY, FM, 1500 mAh
49	0305706Q02	SCREW, Baseplate Ph Pan Hd; 2-56x3/32" (4 req'd) (part of item 43)
50	3905453Q01	CONTACT, Power (4 req'd) (part of item 43)

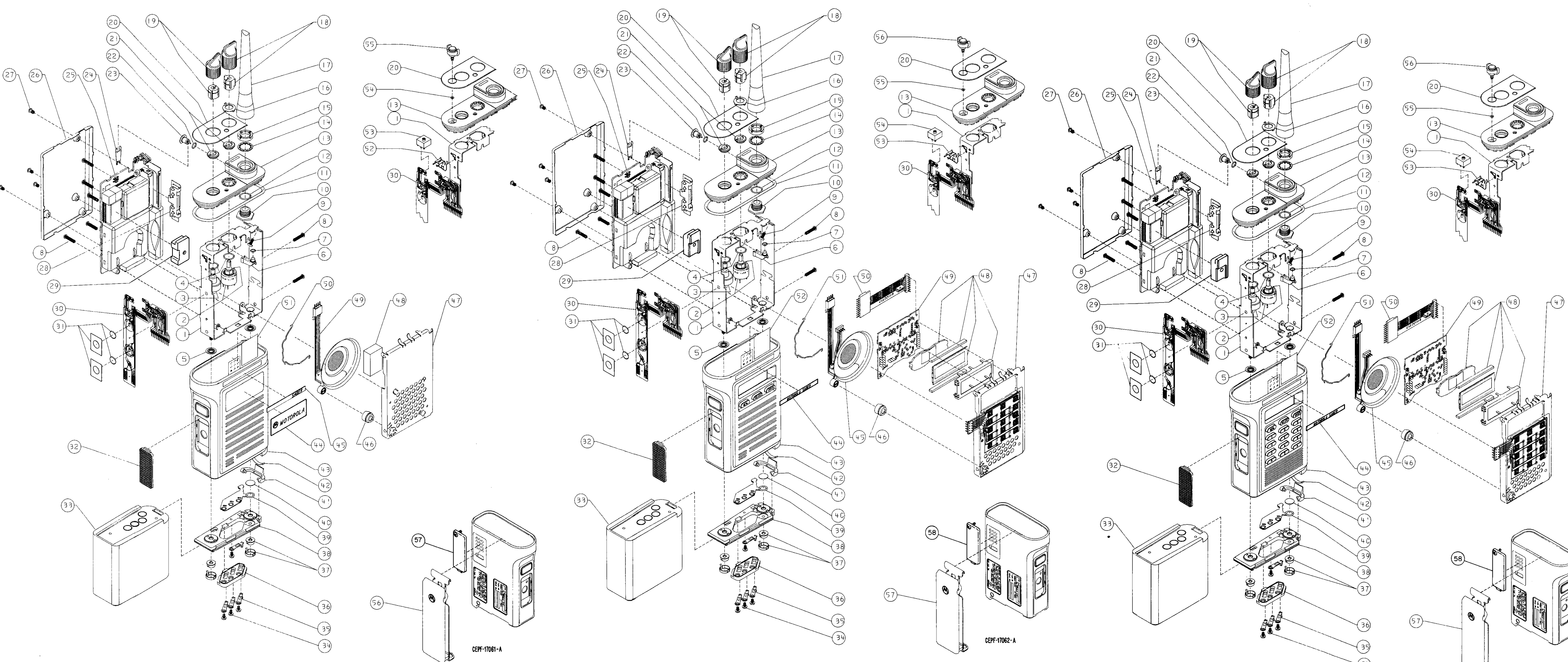
36	4205437Q01	RETAINER, Baseplate (part of item 43)
37	RPX4696A	KIT, Slotted Spanner Nut (2 req'd) (part of item 43)
38	6405847N03	BASEPLATE (part of item 43)
39	3205701Q01	SEAL, Vacuum Port
40	3205472M01	SEAL, Elastomer (part of item 43)
41	5505333Q01	LATCH, Battery (part of item 43)
42	4105775Q01	SPRING, Latch (part of item 43)
43	NHN6390A	ASSEMBLY, Housing, SABER II (includes items 34 thru 42)
44	3305183R02	LABEL, Nameplate, SABER II
45	0105958M24	ASSEMBLY, Speaker/Microphone Flex, SABER II (2k Display)
46	1405490Q01	BOOT, Microphone
47	RPX4702A	ASSEMBLY, LCD/Speaker Bracket
48	RPX4703A	KIT, LCD Assembly (part of item 49)
49	8460999A34	ASSEMBLY, 2k Display PC Board, SABER II (includes item 48)
50	8405532Q01	FLEX CIRCUIT, LCD Interconnect
51	4205604Q01	RETAINER, Speaker
52	1405182M03	INSULATOR, Universal Connector
53	0705319R02	BRACKET, Switch (optional)
54	4005221R02	SWITCH, Dual-Function (S801) (optional)
55	3205082E68	GASKET, O-Ring (optional)
56	NTN5076A	KIT, Push-Only Knob (includes item 54)
57	or NTN5068A	KIT, Push-and-Rotate Knob (includes item 54)
58	or NTN5069A	KIT, Rotate-Only Knob (includes item 54)
59	or 4305607S01	PLUG, Seal
60	NTN4741A	ASSEMBLY, Belt Clip
61	NTN5025A	COVER, Universal Connector

SABER III VHF
Exploded View Parts List

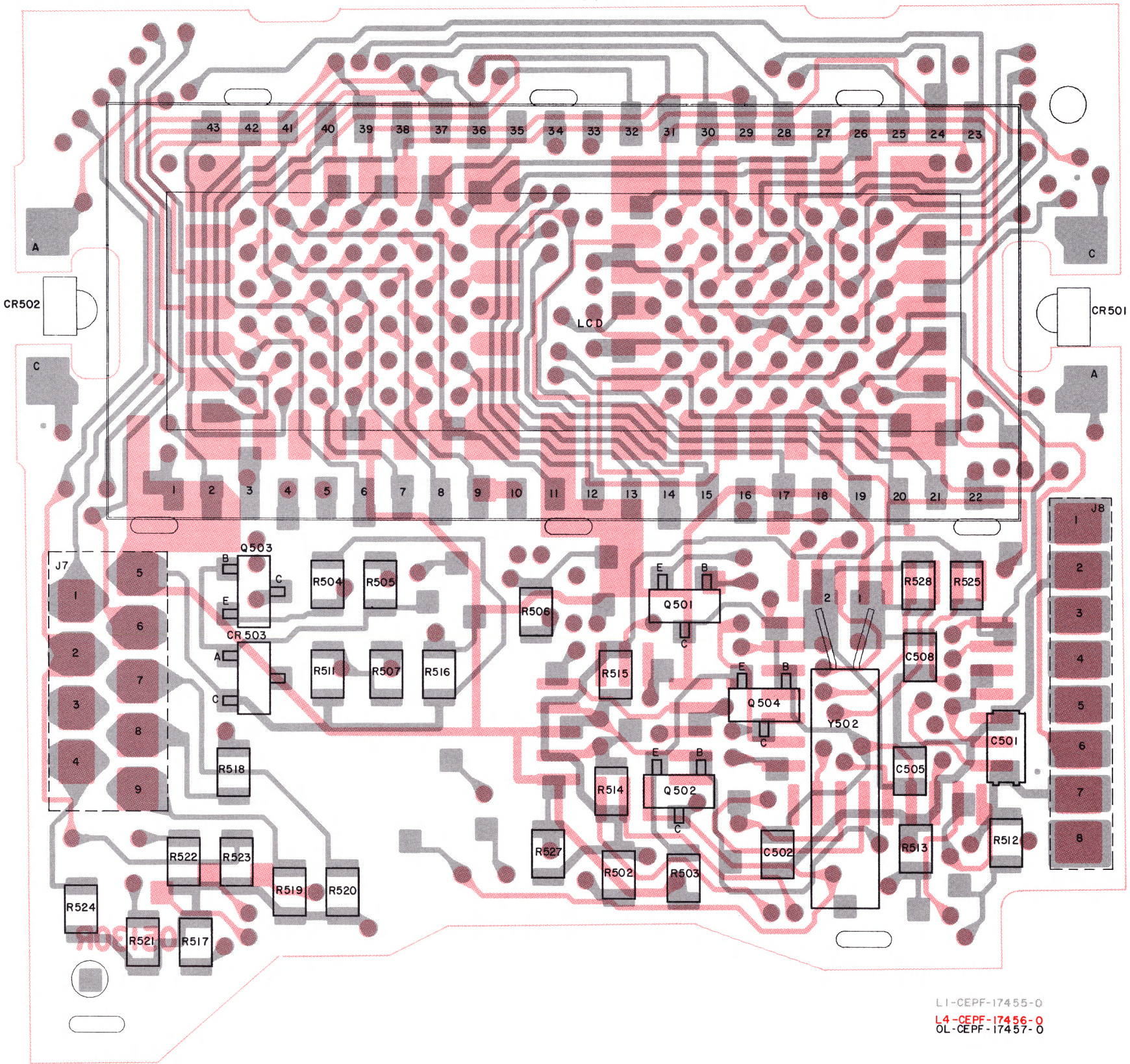
TPLF-3415-A

ITEM NO.	MOTOROLA PART NO.	DESCRIPTION
1	RPX4695A	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	0305714J09	SCREW, Module, Ph Pan Hd; 2-56x3/8" (7 req'd)
9	0305381L02	SCREW, Top Panel; 2-32 (2 req'd)
10	RPX4695A	KIT, Antenna Bushing (includes item 12)
11	3205082E71	GASKET, O-Ring (part of item 10)
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)
17	0405781Q03	WASHER, Detent (odd number of switch positions)
18	NAD6471A	ANTENNA, VHF Helical (136 - 150.8 MHz)
19	NAD6472A	ANTENNA, VHF Helical (146 - 162 MHz)
20	NAD6473A	ANTENNA, VHF Helical (157 - 174 MHz)
21	RPX4699A	KIT, Frequency Knob, Low Profile
22	REX4017A	KIT, On/Off/Volume Knob
23	REX4016A	KIT, Volume Knob, Low Profile
24	1305622Q01	ESCUOTCHEON, 12-Frequency
25	1305622Q01	ESCUOTCHEON, 12-Frequency Emergency
26	1305622Q04	ESCUOTCHEON, 12-Frequency Emergency, Submersible
27	0205916P01	NUT, Spanner (2 req'd)
28	3205082E51	GASKET, O-Ring (part of item 23)
29	RPX4691A	KIT, RF Connector (includes items 22,24)
30	4205852N01	CONTACT, Ground, RF (part of item 23)
31	NLD8160A	ASSEMBLY, VHF Main PC Board (includes item 27)
32	NTN4647A	ASSEMBLY, Back Shield (includes item 27)
33	0305706Q01	SCREW, Captive (4 req'd) (part of item 26)
34	4205577Q01	CLIP, Ground
35	1405343S01	BOOT, Oscillator, SABER III/III
36	RPX4700A	KIT, PTT/Controls Flex (includes item 31)
37	RPX4701A	KIT, PTT/Controls Flex Assembly (includes items 2,3,31)
38	RPX4694A	KIT, Contact Snapdome (2 req'd) (part of item 30)
39	4505022P02	LEVER, PTT
40	NTN4592A	BATTERY, 500 mAh
41	NTN4593A	BATTERY, 900 mAh
42	NTN4594A	BATTERY, 1250 mAh
43	NTN4595A	BATTERY, 1500 mAh
44	NTN4540A	BATTERY, 3600 mAh Primary
45	NTN4537A	BATTERY, FM, 500 mAh
46	NTN4538A	BATTERY, FM, 900 mAh
47	NTN4539A	BATTERY, FM, 1250 mAh
48	NTN4596A	BATTERY, FM, 1500 mAh
49	0305706Q02	SCREW, Baseplate Ph Pan Hd; 2-56x3/32" (4 req'd) (part of item 43)
50	3905453Q01	CONTACT, Power (4 req'd) (part of item 43)
51	4205437Q01	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	3205701Q01	SEAL, Vacuum Port
40	3205472M01	SEAL, Elastomer (part of item 43)
41	5505333Q01	LATCH, Battery (part of item 43)
42	4105775Q01	SPRING, Latch (part of item 43)
43	NHN6392A	ASSEMBLY, Housing, SABER III (includes items 34 thru 42)
44	3305183R02	LABEL, Nameplate, SABER III
45	0105958M24	ASSEMBLY, Speaker/Microphone Flex, SABER III
46	1405490Q01	BOOT, Microphone
47	RPX4702A	ASSEMBLY, LCD/Speaker Bracket
48	RPX4703A	KIT, LCD Assembly (part of item 49)
49	8460999A34	ASSEMBLY, 2k Display PC Board, SABER III (includes item 48)
50	8405532Q01	FLEX CIRCUIT, LCD Interconnect
51	4205604Q01	RETAINER, Speaker
52	1405182M03	INSULATOR, Universal Connector
53	0705319R02	BRACKET, Switch (optional)
54	4005221R02	SWITCH, Dual-Function (S801) (optional)
55	3205082E68	GASKET, O-Ring (optional)
56	NTN5076A	KIT, Push-Only Knob (includes item 54)
57	or NTN5068A	KIT, Push-and-Rotate Knob (includes item 54)
58	or NTN5069A	KIT, Rotate-Only Knob (includes item 54)
59	or 4305607S01	PLUG, Seal
60	NTN4741A	ASSEMBLY, Belt Clip
61	NTN5025A	COVER, Universal Connector

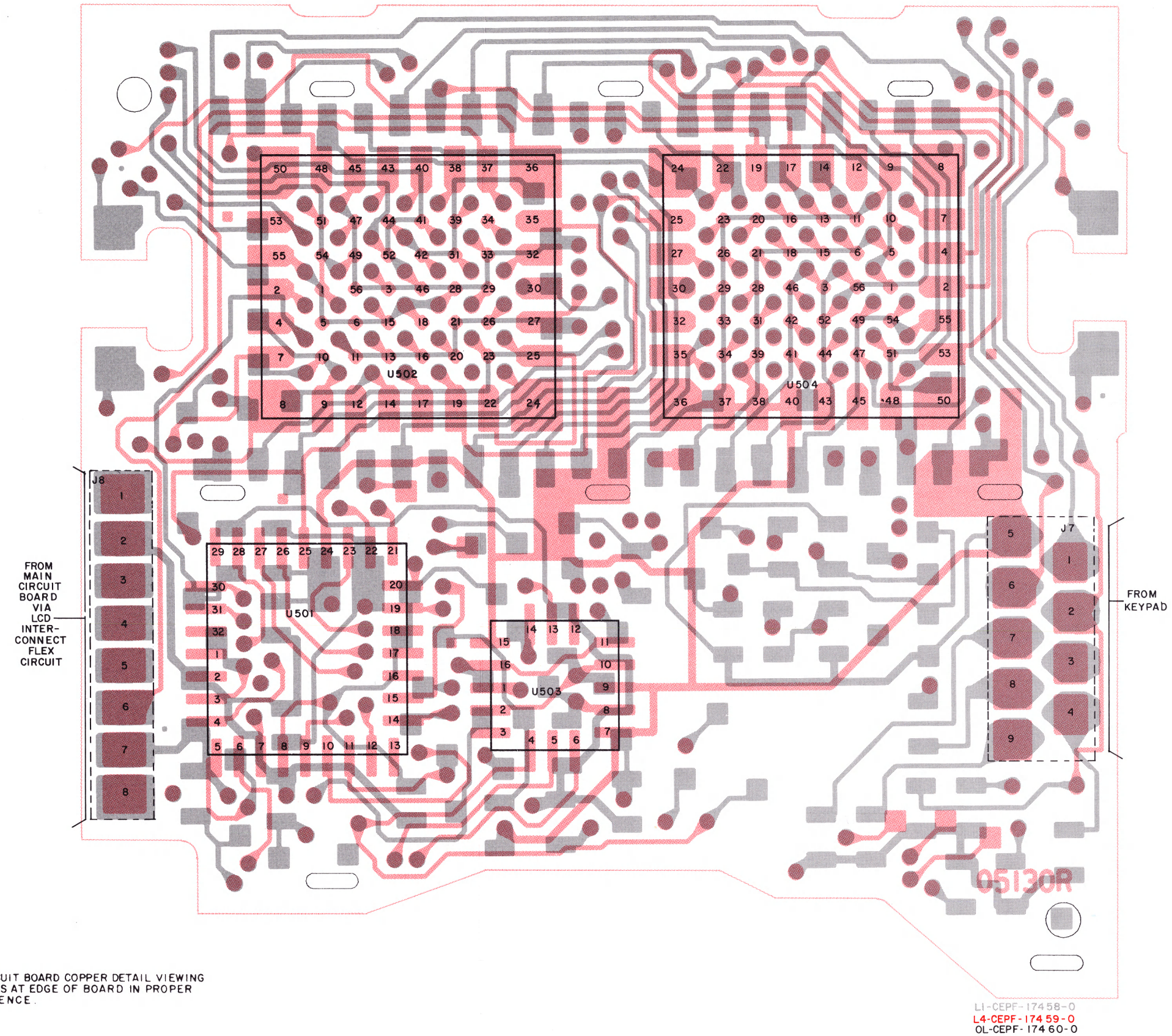


SIDE 1 VIEWED FROM SIDE 1



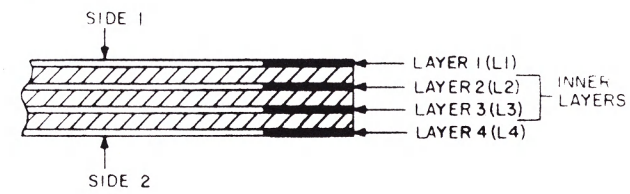
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L4-CEPF-17456-0
 OL-CEPF-17457-0

SIDE 2 VIEWED FROM SIDE 2

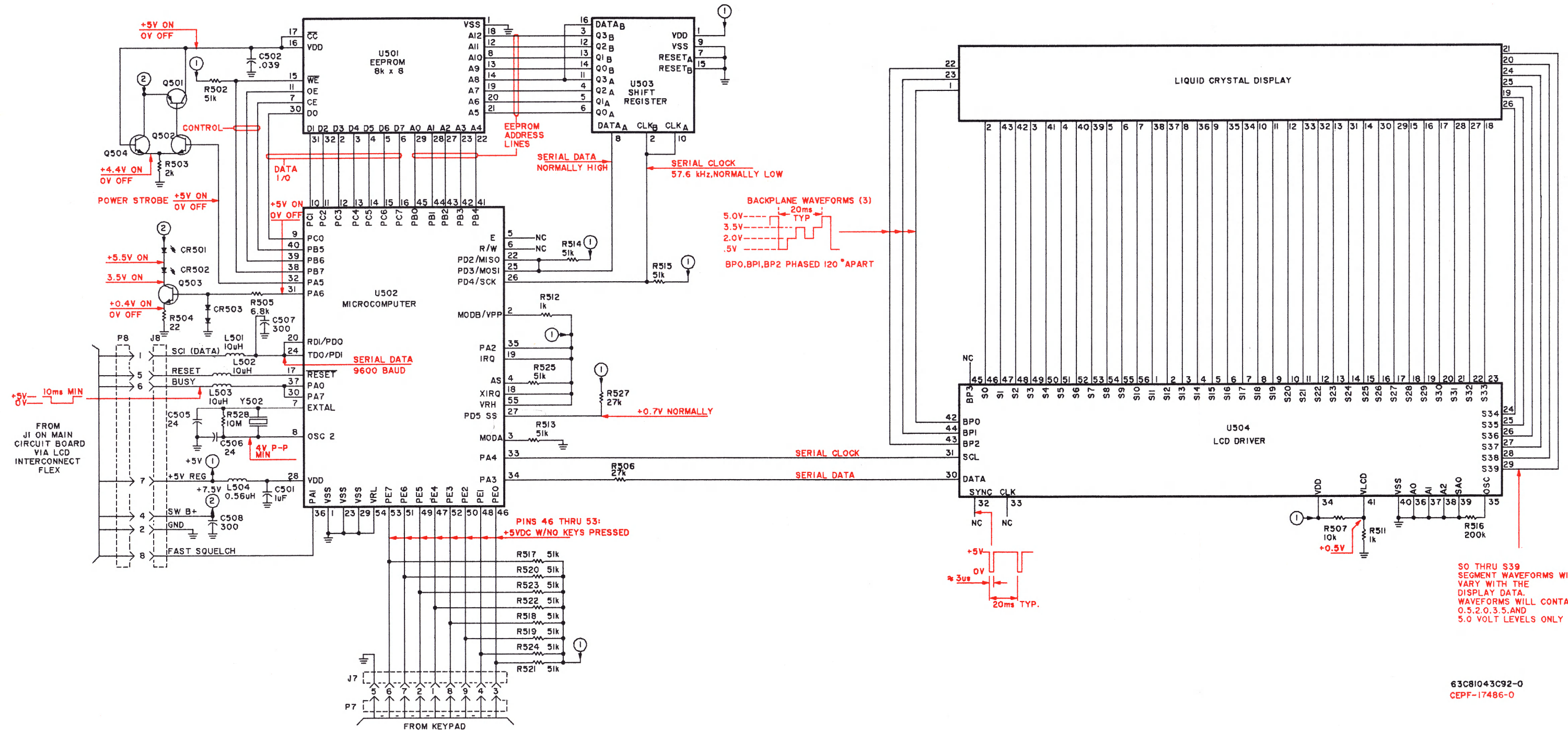


L1-CEPF-17458-0
L4-CEPF-17459-0
 OL-CEPF-17460-0

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



AEPF-18099-0



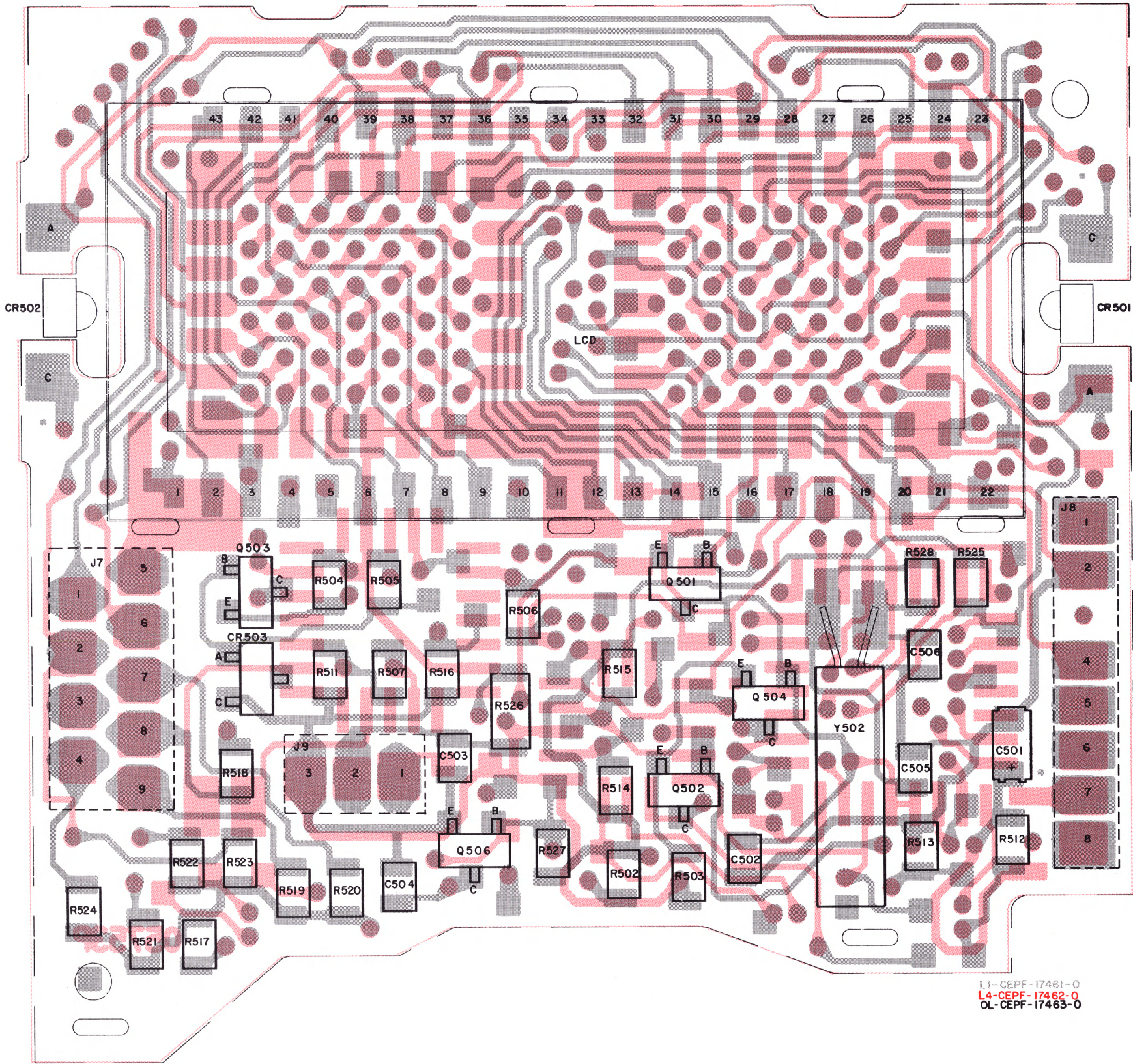
63C81043C92-0
CEPF-17486-0

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION	
C501	2362998B59	CAPACITOR, Fixed: pF±5%; 50V unless stated 1uF±10%; 20V .039uF±10%; 25V Not Used	
C502	2160521C32		
C503, 504	-----		
C505, 506	2160520B10		
C507, 508	2160520C12		
CR501, 502	4805729G27	DIODE: See Note 1 LED, Yellow Dual; SOT-23	
CR503	4805129M06		
J7	0905287C05	JACK: Socket, Printed Circuit (Keypad Switch)(9 req'd) Socket, Printed Circuit (LCD Interconnect)(8 req'd)	
J8	0905287C05		
L501 thru 503	2462575A07	COIL, RF: unless stated Choke, 10uH Choke, 0.56uH	
L504	2462575A09		
Q501	4805128M29	TRANSISTOR: See Note 1 PNP; BCX18 (LH) NPN; BCW60B (RH)	
Q502 thru 504	4805128M12		
R501	-----	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%	
R502	0660076A90		
R503	0660076A56		
R504	0660076A09		
R505	0660076A69		
R506	0660076A83		
R507	0660076A73		
R508 thru 510	-----		
R511, 512	0660076A49		
R513 thru 515	0660076A90		
R516	0660076F08		
R517 thru 525	0660076A90		
R526	-----		
R527	0660076A83		
R528	0660076H49		
U501	0105953N82		CIRCUIT MODULE: See Note 1 EEPROM; 2k x 8 Microcomputer, HCMOS Shift Register, CMOS LCD Driver
U502	0105953N07		
U503	0105953N09		
U504	0105953N10		
Y501	-----	CRYSTAL: Not Used 3.6864MHz	
Y502	4805664G39		
NONREFERENCED ITEMS			
	7505440S01	PAD, Display Board	

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

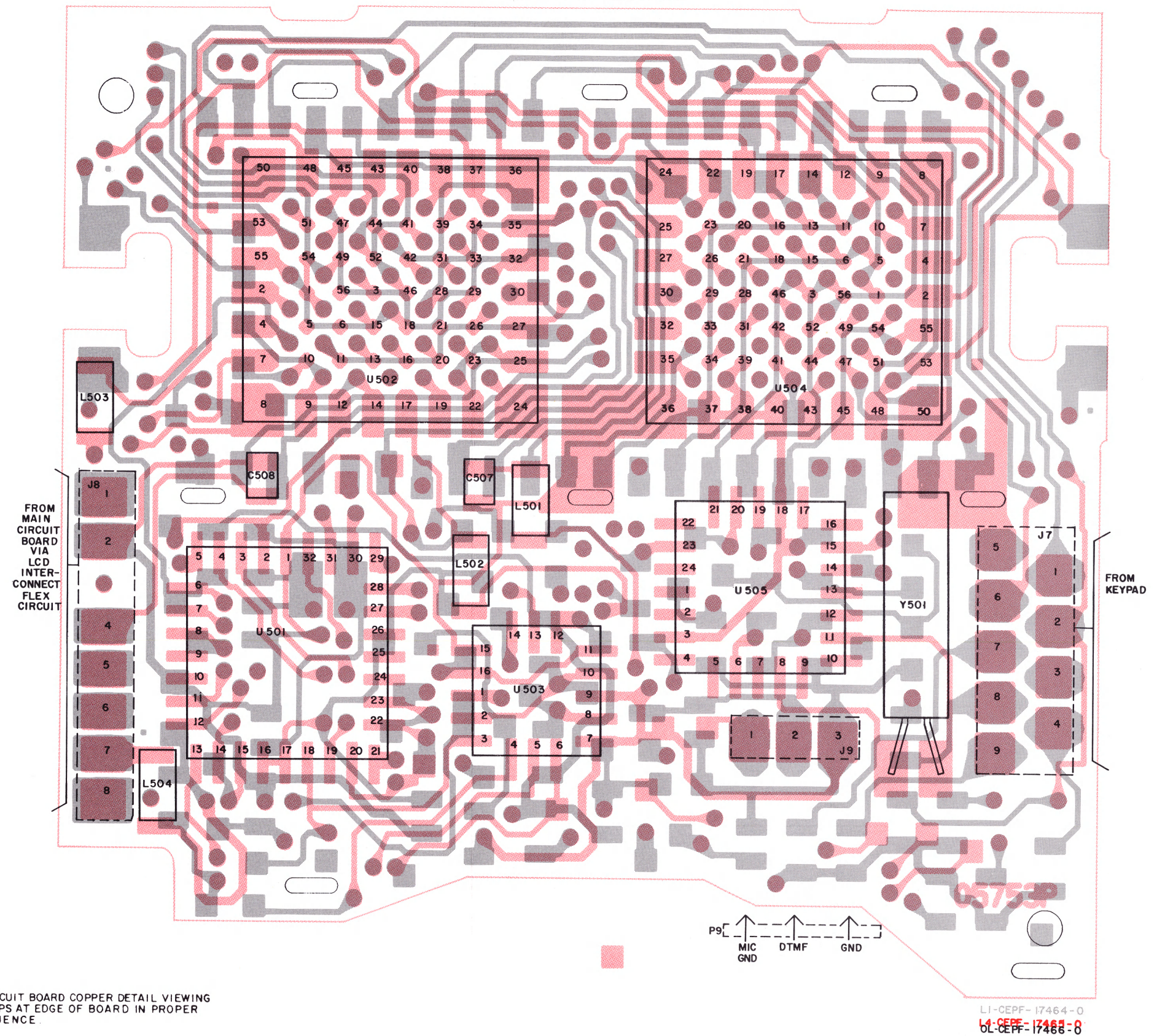
SCHEMATIC AND CIRCUIT BOARD NOTES
1. Unless otherwise stated, resistances are in ohms (k = 1000), capacitances less than 1 are in microfarads, and capacitances 1 or greater are in picofarads. TEPF=17455-0

SIDE 1 VIEWED FROM SIDE 1



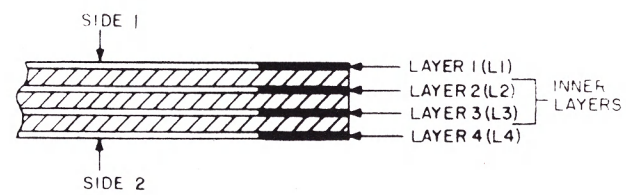
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L4-CEPF-17462-0
OL-CEPF-17463-0

SIDE 2 VIEWED FROM SIDE 2

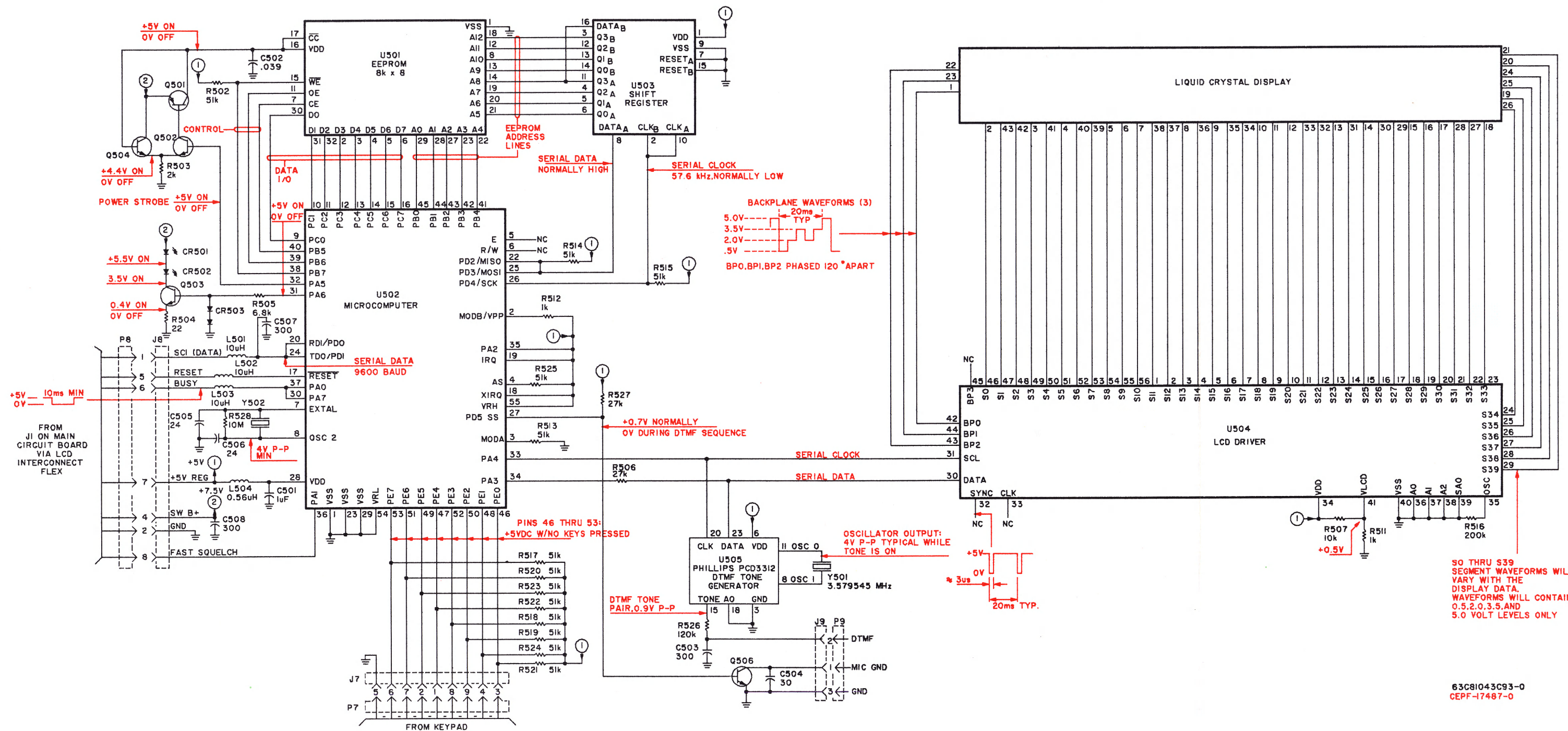


L1-CEPF-17464-0
L4-CEPF-17465-0
OL-CEPF-17466-0

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



AEPF-18099 0



REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
C501	2362998B59	CAPACITOR, Fixed: pF±5%; 50V unless stated
C502	2160521C32	1uF±10%; 20V
C503	2160520C12	.039uF±10%; 25V
C504	2160520B12	30
C505, 506	2160520B10	24
C507, 508	2160520C12	300
CR501, 502	4805729G27	DIODE: See Note 1
CR503	4805129M06	LED, Yellow Dual; SOT-23
J7	0905287C05	JACK: Socket, Printed Circuit (Keypad Switch)(9 req'd)
8	0905287C05	Socket, Printed Circuit (LCD Interconnect)(8 req'd)
J9	0905287C05	Socket, Printed Circuit (Speaker/Mic)(3 req'd)
L501 thru 503	2462575A07	COIL, RF: unless stated
L504	2462575A09	Choke, 10uH Choke, 0.56uH
Q501	4805128M29	TRANSISTOR: See Note 1
Q502 thru 504	4805128M12	PNP; BCX18 (LH)
Q505	-----	NPN; BCW60B (RH)
Q506	4805128M12	Not Used
R501	-----	RESISTOR, Fixed: Ω±5%; 1/8W unless stated
R502	0660076A90	Not Used
R503	0660076A56	51k
R504	0660076A09	2k
R505	0660076A69	22
R506	0660076A83	6.8k
R507	0660076A73	27k
R508 thru 510	-----	10k
R511, 512	0660076A49	Not Used
R513 thru 515	0660076A90	1k
R516	0660076F08	51k
R517 thru 525	0660076A90	200k±1%
R526	0611024A99	51k
R527	0660076A83	120k
R528	0660076H49	27k
U501	0105953N12	CIRCUIT MODULE: See Note 1
U502	0105953N07	EEPROM; 8k x 8
U503	0105953N09	Microcomputer, HCMOS
U504	0105953N10	Shift Register, CMOS
U505	0105953N18	LCD Driver
U506	0105953N18	Tone Encoder
Y501	4805664G40	CRYSTAL: 3.579545MHz
Y502	4805664G39	3.6864MHz
NONREFERENCED ITEMS		
	7505440S01	PAD, Display Board

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. TEPF=17455-0

