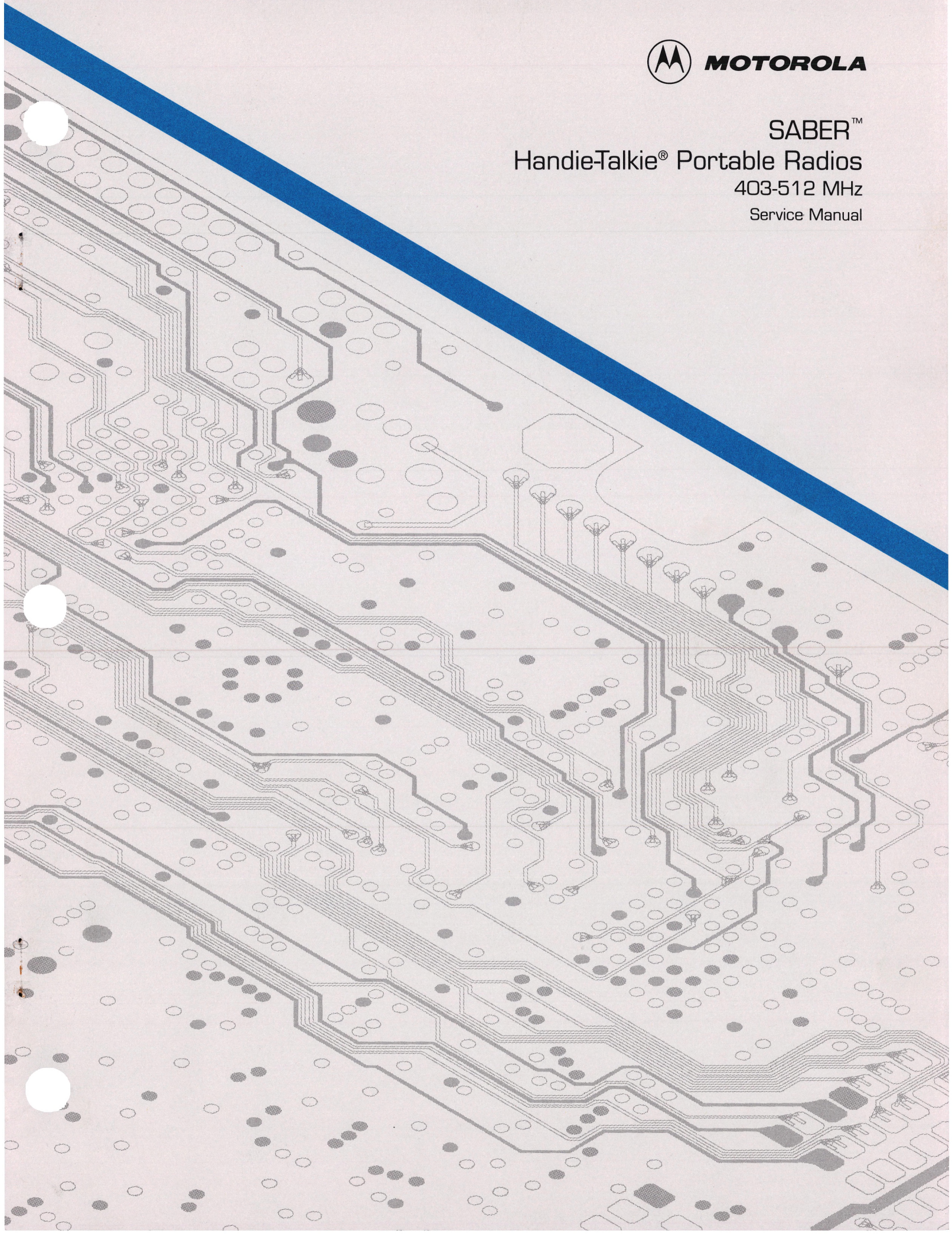
MOTOROLA

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



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 preformed 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

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.

COMPUTER SOFTWARE COPYRIGHTS

MOTOROLA

MANUAL REVISION
for SABER™ Handie-Talkie® Portable Radios
68P81043C95-A
Service Manual

This revision consists of changes that have occurred since your manual was printed. Please add the following information to your manual.

REVISION CHANGES

1. After page 9 in your manual, insert the attached SABER UHF Main Circuit Board, Schematic, and associated Parts List.

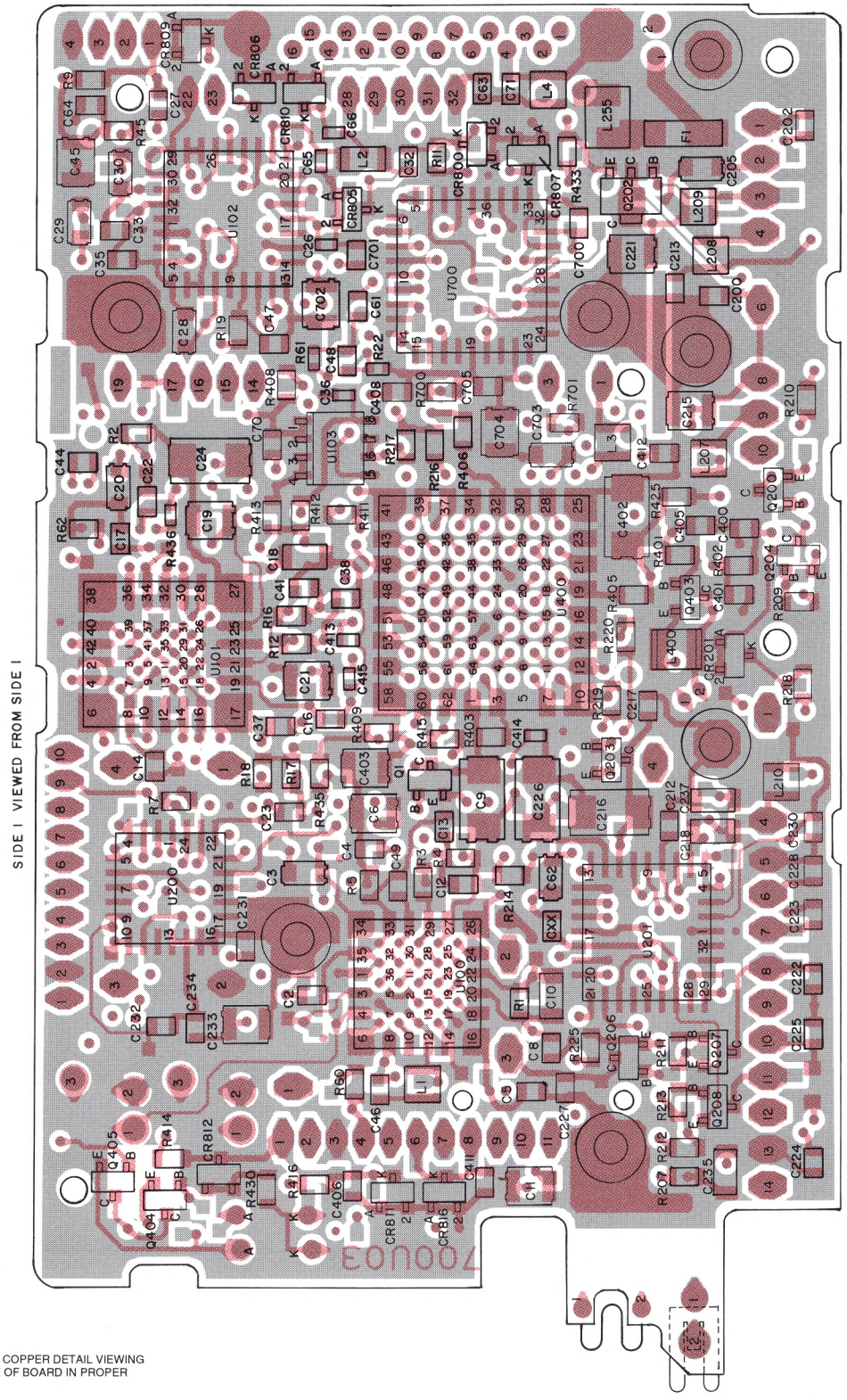
2. On pages 7 and 8, Main Board Schematic Diagrams, change the resistor value of R17 from 10k to 5.6k.

3. On pages 10 and 11, SABER UHF Electrical Parts Lists, change the following resistor part number and value.

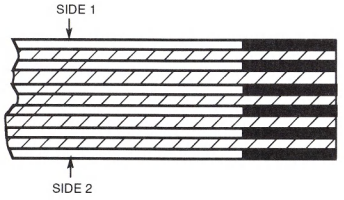
   From
   R17 0660076E73 10k±1%

   To
   R17 0660076A67 5.6k

FMR1639A-2
4/7/93



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



LAYER 1 (L1)
LAYER 2 (L2)
LAYER 3 (L3)
LAYER 4 (L4)
LAYER 5 (L5)
LAYER 6 (L6)

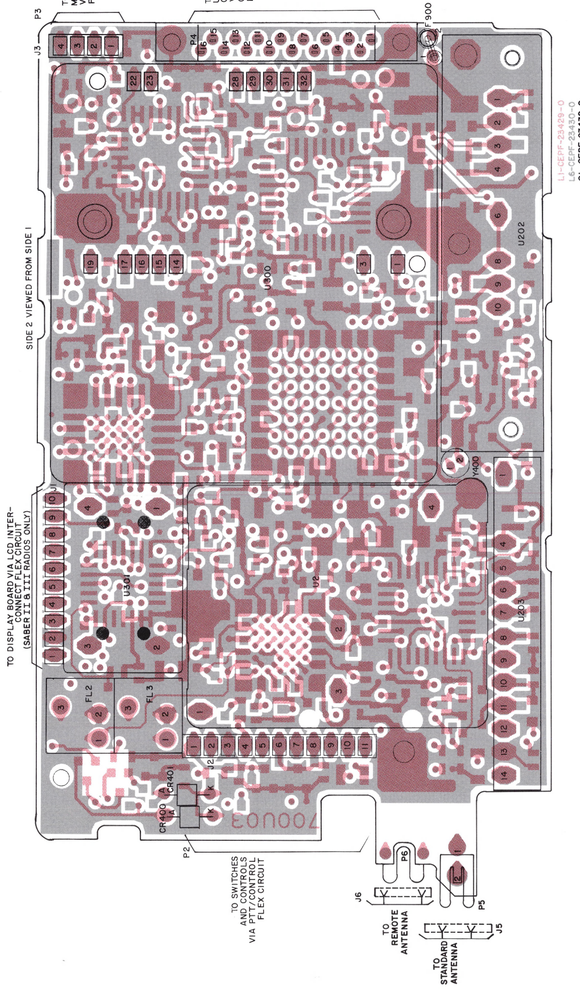
INNER LAYERS

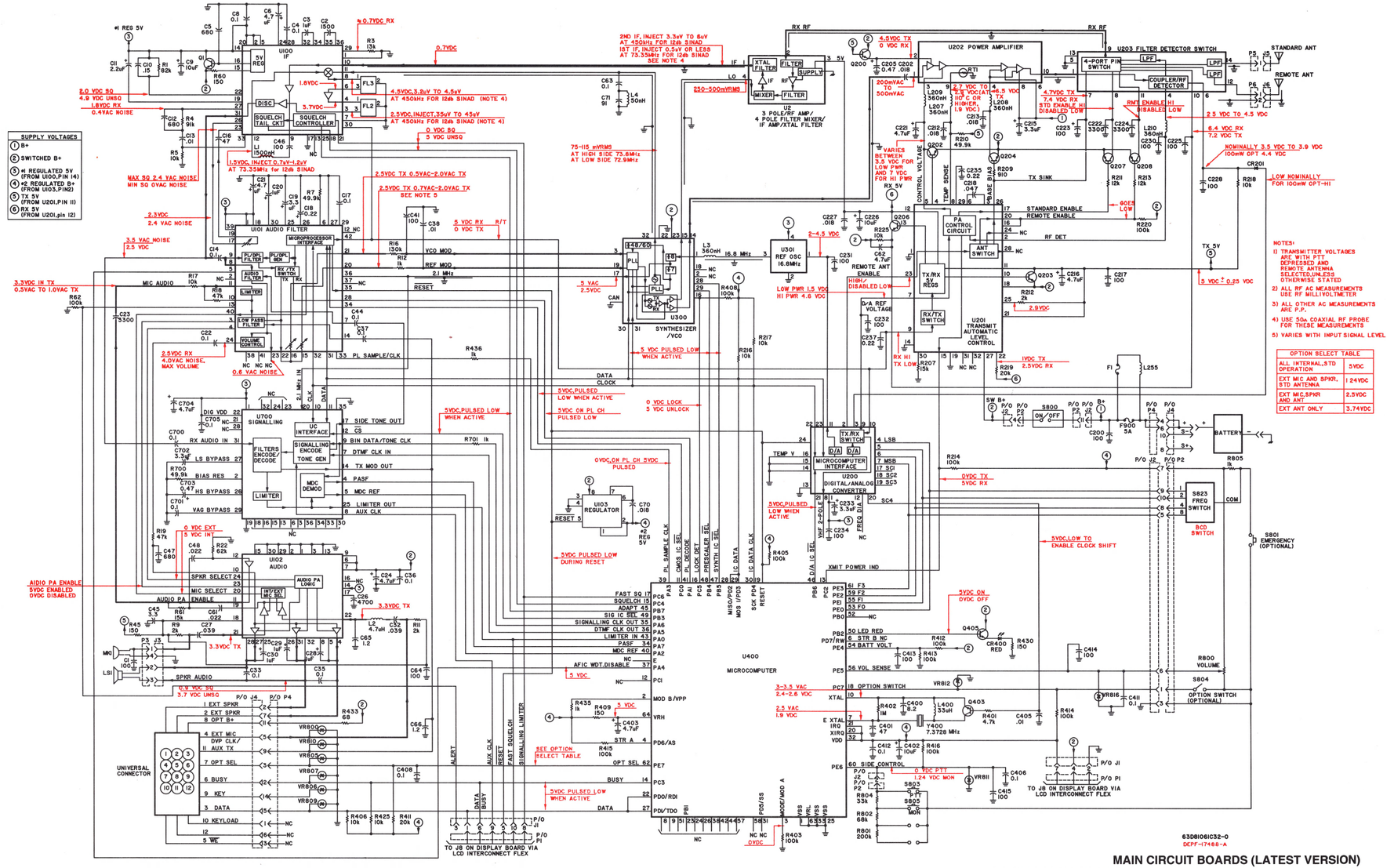
MAEPF-18100-O

SCHEMATIC AND CIRCUIT BOARD NOTES

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

MAIN CIRCUIT BOARD (LATEST VERSION) COMPONENT LAYOUT DIAGRAM
SIDE 1 VIEWED FROM SIDE 1





MAIN CIRCUIT BOARDS (LATEST VERSION)
COMPONENT LAYOUT DIAGRAMS (SIDE 2 VIEWED FROM SIDE 1)
AND MAIN BOARD SCHEMATIC DIAGRAM (LATEST VERSION)

SABER UHF (Latest Version) TPLF-4133-O
Electrical Parts List

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		CAPACITOR, Fixed: uF±20%; 25V unless stated
C1	2113740A40	30±30% part of Speaker/Microphone Flex Assembly (0105958M34)
C2	2113741A25	1500pF±5%
C3	2311049A07	1; 10%; 16V
C4	2160521G37	0.1+80-20%
C5	2113744A17	680pF
C6	2311049J12	4.7±20%; 16V
C7	-----	Not Used
C8	2113743F01	0.1+80-20%
C9	2311049J26	10; 16V
C10	2311049A02	.15±10%; 35V
C11	2311049J04	2.2; 20V
C12	2113741A17	680pF
C13	2113741A45	.01
C14	2160521G37	0.1+80-20%
C15	-----	Not Used
C16	2113740A46	47±30%
C17	2160521G37	0.1+80-20%
C18	2160521H41	.22+80-20%
C19	2311049J07	3.3±10%; 20V
C20	2311049A37	1; 20V
C21	2311049J12	4.7±20%; 16V
C22	2160521G37	0.1+80-20%
C23	2113741A33	3300pF±5%
C24	2311049J14	4.7
C25	-----	Not Used
C26	2113741F41	4700pF±5%
C27	2113741A59	.039±5%
C28 thru C30	2311049A37	1; 20V
C31	-----	Not Used
C32	2113741A59	.039±5%
C33	2160521G37	0.1+80-20%
C34	-----	Not Used
C35	2160521G37	0.1+80-20%
C36	2113743K15	.100
C37	2160521G37	0.1+80-20%
C38	2113741A45	.01
C39, C40	-----	Not Used
C41	2113740A55	100pF±30%
C42, C43	-----	Not Used
C44	2160521G37	0.1+80-20%
C45	2311049J07	3.3±10%; 20V
C46	2113740A55	100pF±30%
C47	2113740A75	680
C48	2113741A53	.022±5%
C49 thru C60	-----	Not Used
C61	2113741A53	.022±5%
C62	2311049A44	4.7±10%; 6V
C63	2160521G37	0.1+80-20%
C64	2113740A55	100pF±30%
C65, C66	2113740F05	1.2±30%
C67	2113740A54	Not Used
C68, C69	-----	Not Used
C70	2113741A51	.018
C71	2113740A54	91pF±30%
C72 thru C74	-----	Not Used
C200	2113740A55	100pF±30%
C201	-----	Not Used
C202	2113741A51	.018
C203, C204	-----	Not Used
C205	2311049A05	.47±10%
C206 thru C211	-----	Not Used
C212, C213	2113741A51	.018
C214	-----	Not Used
C215	2311049J07	3.3±10%; 20V
C216	2311049J14	4.7;
C217	2113740A55	100pF±30%
C218	2113741B61	.047
C219, C220	-----	Not Used
C221	2311049J12	4.7±20%; 16V
C222	2113741A33	3300pF±5%
C223	2113740A55	100pF±30%
C224	2113741A33	3300pF±5%
C225	2113740A55	100pF±30%
C226	2311049J26	10; 16V
C227	2113741A51	.018
C228	2113740A55	100pF±30%
C229	-----	Not Used
C230 thru C232	2113740A55	100pF±30%
C233	2311049J07	3.3±10%; 20V
C234	2113740A55	100pF±30%
C235	2160521H41	0.22+80-20%
C236	-----	Not Used
C237	2160521H41	0.22+80-20%
C238	-----	Not Used
C400	2113740A27	8.2±30%
C401	2113740A46	47±30%
C402	2311049J26	10; 16V
C403	2311049J12	4.7; 16V
C404	-----	Not Used
C405	2113741A45	.01
C406 thru C408	2160521G37	0.1+80-20%
C409 thru C410	-----	Not Used
C411, C412	2160521G37	0.1+80-20%
C413 thru C415	2113740F51	100pF± 5%
C700, C701	2160521G37	0.1+80-20%
C702	2311049J07	3.3±10%; 20V
C703	2311049A05	.47±10%
C704	2311049J12	4.7, 16V
C705	2160521G37	0.1+80-20%
		DIODE: See Note I
CR200	-----	Not Used
CR201	4805129M05	SOT
CR400	4805729G22	LED, Red
CR401	-----	Not Used
CR800	4805129M35	
CR805 thru CR807	4805129M35	
CR809 thru CR812	4805129M35	
CR816	4805129M35	
		FUSE:
F1	6505663R03	5 Amp (use with L255)
or		
F900	0105955P27	Assembly, 5 Amp (in place of F1 and L255)
		FILTER:
FL1	-----	Not Used
FL2	9105685Q08	Ceramic; 450kHz; 20kHz BW
FL3	9105685Q09	Ceramic; 450kHz; 15kHz BW
		JACK:
J1	0905287C05	Socket, Printed Circuit (LCD Interconnect)(10 req'd)
J2	0905287C05	Socket, Printed Circuit (PTT/Controls Flex) (10 req'd)
J3	0905287C05	Socket, Printed Circuit (Speaker/Mic Connector) (10 req'd)
		COIL, RF: unless stated
L1	2405452C64	1500nH±5%
L2	2462575A05	Choke; 4.7uH
L3	2405452C49	360nH±5%
L4	2405452C09	50nH±5%
L200 thru L206	-----	Not Used
L207 thru L210	2405452C49	360nH±5%
L255	2484657R01	Inductor Bead (use with F1)
L400	2462585A40	33uH
		SPEAKER:
LS1	-----	28Ω±10% part of Speaker/Microphone Flex Assembly 0105958M34)
		MICROPHONE:
MK1	-----	(part of Speaker/Microphone Flex Assembly 0105958M34)
		PLUG:
P1	-----	Not Used
P2	2805520Q01	Connector, Main Compression
P3	3905460V01	Connector
P4	3905445Q03	Connector
P5	REX4166A	Contact, Antenna
P6	3905445Q03	Contact, RF Wireform
P7 thru P9	-----	Not Used
		TRANSISTOR: See Note I
Q1	4805128M16	PNP; SOT-23; MMBT3906
Q200	4805128M12	NPN; SOT-23
Q201	-----	Not Used
Q202	4805128M27	PNP; SOT-89
Q203	4805128M16	PNP; SOT-23; MMBT3906
Q204	4805218N13	PNP; SOT; MMBTA63
Q205	-----	Not Used
Q206	4805128M16	PNP; SOT-23; 48G13
Q207, Q208	4805128M29	PNP; SOT-23
Q400 thru Q402	-----	Not Used
Q403	4805218N03	NPN; SOT-23; 48G13
Q404	-----	Not Used
Q405	4805128M12	NPN; SOT-23
		RESISTOR, Fixed: Ω±5%;1/8W
R1	0660079V23	82k
R2	-----	Not Used
R3	0660076E76	13k
R4	0660078T24	91k
R5	0660076E73	10k±1%
R6	-----	Not Used
R7	0660078J80	49.9k±1%
R8	-----	Not Used
R9	0660078G33	2k±1%
R10	-----	Not Used
R11	0660078G33	2k±1%
R12	0660076A49	1k
R13 thru R15	-----	Not Used
R16	0660079V28	130k
R17	0660076A67	5.6k
R18, R19	0660076E89	47k±1%
R20, R21	-----	Not Used
R22	0660076N92	62k
R23 thru R44	-----	Not Used
R45	0660076A29	150
R46 thru R59	-----	Not Used
R60	0660076A29	150
R61	0660076N77	15k
R62	0660076B01	100k
R200 thru R206	-----	Not Used
R207	0660076A77	15k
R209	0660076A48	910
R210	0660078J80	49.9k±1%
R211	0660076A75	12k
R212	0660078G33	2k±1%
R213	0660076A75	12k
R214	0660076B01	100k
R215	-----	Not Used
R216 thru R218	0660076E73	10k±1%
R219	0660079J33	20k±1%
R220	0660076B01	100k
R221 thru R224	-----	Not Used
R225	0660076E73	10k±1%
R400	-----	Not Used
R401	0660076A65	4.7k
R402	0660076B25	1M
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	0660079J33	20k±1%
R412, R413	0660078L01	100k±1%
R414 thru R416	0660076B01	100k
R417 thru R424	-----	Not Used
R425	0660076E73	10k±1%
R426 thru R429	-----	Not Used
R430	0660076A29	150
R431, R432	-----	Not Used
R433	0660076A21	68
R434	-----	Not Used
R435	0660076A49	1k
R436	0660076N49	1k
R700	0660078J80	49.9k±1%
R701	0660076A49	1k
R800	RPX4690A	Kit, Potentiometer, On/Off/Volume (includes S800)
R801	-----	200k (part of PTT/Controls Flex (RPX4700A or RPX4701A))
R802	-----	68k (part of PTT/Controls Flex (RPX4700A or RPX4701A))
R803	-----	Not Used
R804	-----	33k (part of PTT/Controls Flex (RPX4700A or RPX4701A))
R805	-----	1k (part of PTT/Controls Flex (RPX4700A or RPX4701A))
		SWITCH:
S800	RPX4690A	Kit, On/Off/Volume (includes R800)
S801	4005221R01	Dual Function, Emergency (optional)
S802	-----	Not Used
S803	RPX4694A	Kit, Contact Snapdome, PTT
S804	RPX4694A	Kit, Contact Snapdome, Option (optional)
S805	RPX4694A	Kit, Contact Snapdome, Monitor
S806 thru S822	-----	Not Used
S823	RPX4689A	Kit, Frequency Switch
		CIRCUIT MODULE: See Note I
U1	-----	Not Used
U2	NLE9431A	Filter/Amp/Mixer (403-433MHz)
	or NLE9432A	Filter/Amp/Mixer (440-470MHz)
	or NLE9433A	Filter/Amp/Mixer (460-490MHz)
	or NLE9434A	Filter/Amp/Mixer (482-512MHz)
U100	0105958P77	IC, I-F
U101	0105958P80	IC, Audio Filter,
CMOS		
U102	0105958P74	IC, Audio, Bipolar
U103	5105469E65	IC, Regulator
U200	0105953N05	IC, Digital/Analog Converter, CMOS
U201	0105959P66	IC, Transmit Automatic Level Control
U202	NLE9471A	5W Power Amplifier (403-433MHz)
	or NLE9472A	5W Power Amplifier (440-470MHz)
	or NLE9473A	5W Power Amplifier (460-490MHz)
	or NLE9474A	5W Power Amplifier (482-512MHz)
	or NLE9483A	2W Power Amplifier (440-470MHz)
	or NLE9741A	2W Power Amplifier (403-433MHz)
U203	NFE6061A	FDS (403-470 MHz)
	or NFE6062A	FDS (470-512 MHz)
U300	NLE9461A	VCO/Synthesizer (403-433 MHz)
	or NLE9462A	VCO/Synthesizer (440-470 MHz)
	or NLE9463A	VCO/Synthesizer (460-490 MHz)
	or NLE9464A	VCO/Synthesizer (482-512 MHz)
U301	NXN6268A	Oscillator, Reference; 16.8MHz; 5ppm
	or NXN6269A	Oscillator, Reference; 16.8MHz; 2ppm
U400	0105957R86	Microcomputer, MC68HC11; Binary
	or 0105958P05	for option H852)
U700	0105953N11	Signal Filter, CMOS
	or 0105954S43	for option H852)
		DIODE: See Note I
VR800	4805129M35	Zener, 5.6V
VR801 thru V804	-----	Not Used
VR805 thru V807	4805129M35	Zener, 5.6V
VR808	-----	Not Used
VR809 thru V812	4805129M35	Zener, 5.6V
VR813 thru V815	-----	Not Used
VR816	4805129M35	Zener, 5.6V
		CRYSTAL: See Note II
Y400	4805664G32	7.3728MHz
		NONREFERENCED ITEMS
	0905287C07	SOCKET, Printed Circuit (for all modules)(66 req'd)
	1405881R01	BOOT, Crystal (for Y400)
	7505934Q01	PAD, Oscillator (for U301)

NOTES:

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

II. When ordering crystal units, specify carrier frequemcy, crystal frequemcy, crystal type number, and Motorola part number.

MOTOROLA

SABER™
Handie-Talkie® Portable Radios
403-512 MHz

SPECIFICATIONS

GENERAL

FREQUENCY RANGE: 403-512 MHz
BANDSPLITS: 403-433 MHz
448-470 MHz
458-490 MHz
482-512 MHz
403-433 MHz (LP Models)
448-470 MHz (LP Models)

POWER SUPPLY:
Rechargeable Nickel-Cadmium Battery or Primary Battery

BATTERY VOLTAGE
Nominal: 7.5 Vdc
Range: 6 to 9 Vdc

TEMPERATURE RANGE
Operating: -30°C to +60°C
Storage: -40°C to +85°C

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)

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)

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)

TRANSMITTER

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.):
±.0005% (±.0003% optional)

MODULATION: Type 16F3
(±5 kHz FOR 100% modulation @ 1000 Hz)

FM HUM AND NOISE (COMPANION RECEIVER): -45dB

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 - 3000 Hz)

MAXIMUM FREQUENCY SEPARATION: Full Bandsplit
(NO DEGRADATION)

RECEIVER

SENSITIVITY
20dBQ: 0.40 uV
12dBS: 0.35 uV
Squelch: Programmable

USABLE BANDWIDTH: ±5kHz Minimum

SELECTIVITY
Adjacent channel: -75dB
Fourth channel: -80dB

INTERMODULATION: -72dB

FM HUM AND NOISE: -40dB

FREQUENCY STABILITY (-30°C TO +60°C; +25°C REF.):
±.0005% (±.0003% optional)

AUDIO SPL (AT 30 cm WITH RATED AUDIO):
Weighted, 300 - 3000Hz
90dB Nominal
87dB Nominal (-SAJ, -SAK models)

RATED AUDIO OUTPUT:
500 mW (At less than 5% distortion)

CHANNEL SPACING: 25 kHz

MAXIMUM FREQUENCY SEPARATION: Full Bandsplit
(NO DEGRADATION)

Specifications are Subject to Change Without Notice.

RELATED PUBLICATIONS AVAILABLE SEPARATELY

SABER I OPERATING INSTRUCTIONS 68P81065C60
SABER II/III OPERATING INSTRUCTIONS 68P81065C65
SERVICE MANUAL (VHF) 68P81043C90
THEORY/MAINTENANCE MANUAL 68P81044C05

Service Manual
68P81043C95-A

MODEL CONFIGURATION

MODEL NUMBER	POWER LEVEL	FREQ.	SUBMERSIBLE	KEYPAD	DISPLAY
H34SAN7139AN	1W-2W	403-470MHz	No	None	None
H44SAN7139AN	2W-5W	403-512MHz	No	None	None
H34YBN7139AN	1W-2W	403-470MHz	Yes	None	None
H44YBN7139AN	2W-5W	403-512MHz	Yes	None	None
H34SAJ7139AN	1W-2W	403-470MHz	No	3x1	LCD
H44SAJ7139AN	2W-5W	403-512MHz	No	3x1	LCD
H34SAK7139AN	1W-2W	403-470MHz	No	3x5	LCD
H44SAK7139AN	2W-5W	403-512MHz	No	3x5	LCD
H34SAG7139CN	1W-2W	403-470MHz	No	None	None
H44SAG7139CN	2W-5W	403-512MHz	No	None	None
H34SAN7139CN	1W-2W	403-470MHz	No	None	None
H44SAN7139CN	2W-5W	403-512MHz	No	None	None
H34YBG7139CN	1W-2W	403-470MHz	Yes	None	None
H44YBG7139CN	2W-5W	403-512MHz	Yes	None	None
H34YBN7139CN	1W-2W	403-470MHz	Yes	None	None
H44YBN7139CN	2W-5W	403-512MHz	Yes	None	None
H34SAJ7139CN	1W-2W	403-470MHz	No	3x1	LCD
H44SAJ7139CN	2W-5W	403-512MHz	No	3x1	LCD
H34SAK7139CN	1W-2W	403-470MHz	No	3x5	LCD
H44SAK7139CN	2W-5W	403-512MHz	No	3x5	LCD

CURRENT DRAINS (SEE NOTE)			
		SABER I	SABER II AND III
STANDBY		80	83
RECEIVE		210	213
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.

FCC DESIGNATIONS	
2-Watt Models AZ489FT4702	5-Watt Models AZ489FT4703

SPECIALIZED TOOLS AND TEST EQUIPMENT

SERVICE AIDS	
RPX-4665A	Field Modification Kit/RTX4005A
RSX-4043A	Rototorq 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)
6680321B79	Phillips-Head Rototorq Bit
6680334B48 thru B52	Ungar Service Heads
6680370B88	Frequency and On/Off Switch Spanner Nut Rototorq Bit
6680370B89	Baseplate Spanner Nut Rototorq Bit
6680371B34	Antenna Bushing Spanner Nut Rototorq 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)

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.

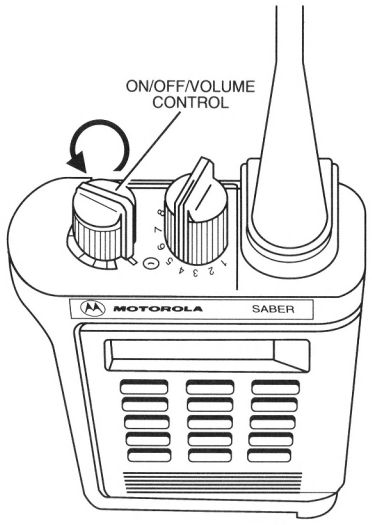
- Clean internal surfaces with water-activated optical wipes.

NOTES

DISASSEMBLY/REASSEMBLY PROCEDURES

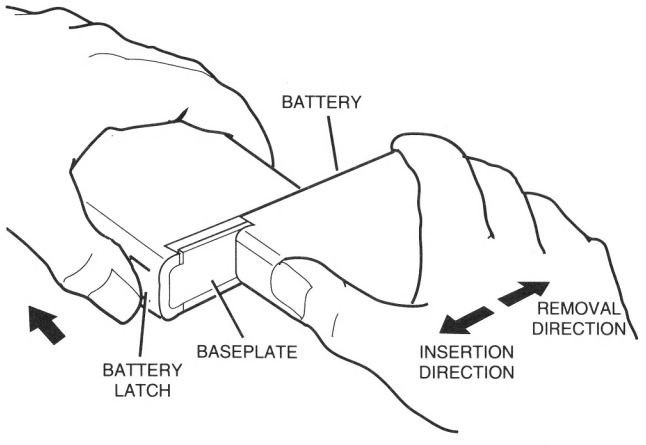
I. DISASSEMBLY

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 any accessory connected to the radio before beginning disassembly.



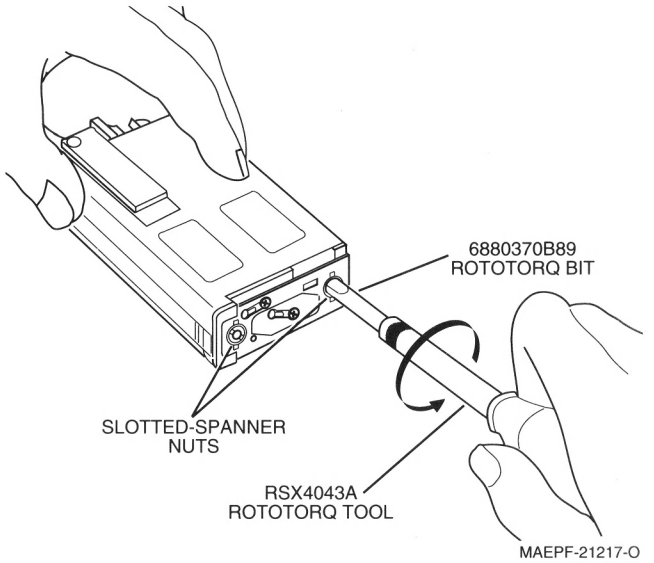
MAEPF-21216-O

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.



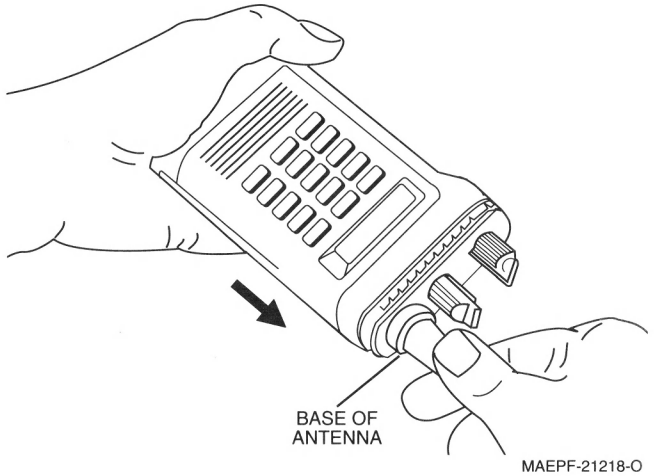
MAEPF-20185-O

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



MAEPF-21217-O

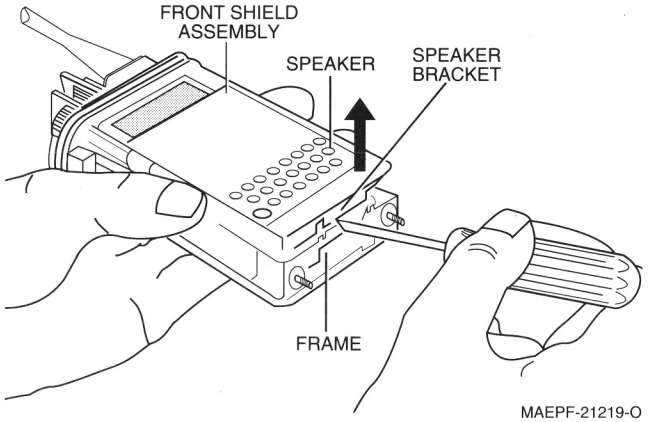
D. Remove the frame assembly from the radio housing by grasping the antenna at its base and pulling it gently upward. *Do not depress the PTT switch during removal and do not push on the slotted-spanner nuts to lift the frame assembly.*



MAEPF-21218-O

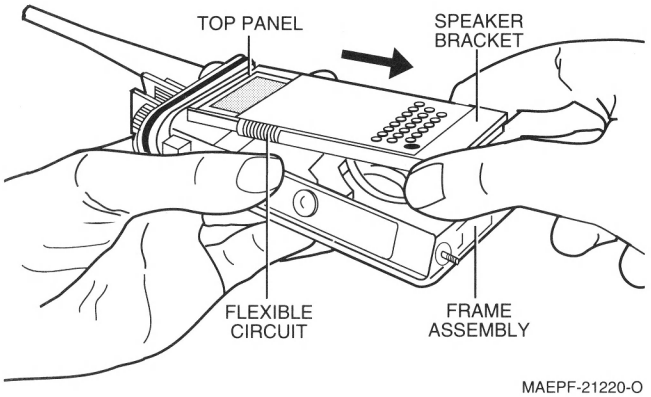
CAUTION
Ensure that all static electricity safeguards are in place.

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.



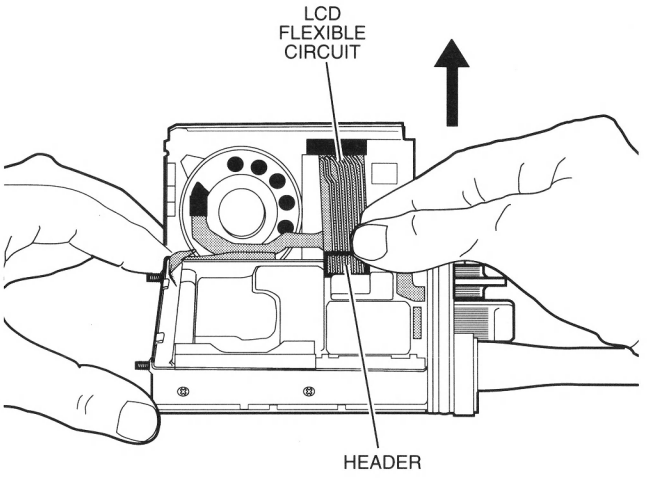
MAEPF-21219-O

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.



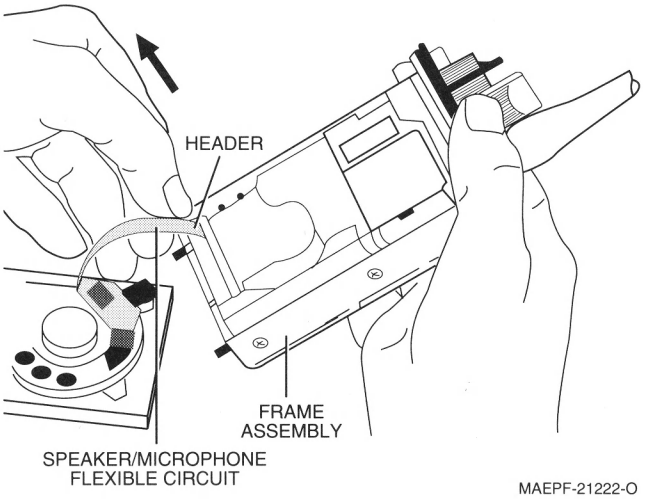
MAEPF-21220-O

G. *ON SABER IE, II AND 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.



MAEPF-21221-O

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.



MAEPF-21222-O

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 screw.
- 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 portion of the elastomer seal must be fully seated on the threaded bushings before the baseplate is reassembled (the bushing is 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 IE, 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 reused; 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 II) and making certain of the following:

- 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.
- 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.
- *The PTT switch and monitor button are not depressed while the frame is being inserted into the housing.*
- Tighten all hardware loosened or removed during disassembly per the torque specifications listed in the Torque Specifications table. Use the recommended torque driver (Motorola RSX4043A Rototorq Tool or equivalent).
- 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.

- Properly orient the completed frame assembly before inserting it into the radio housing.

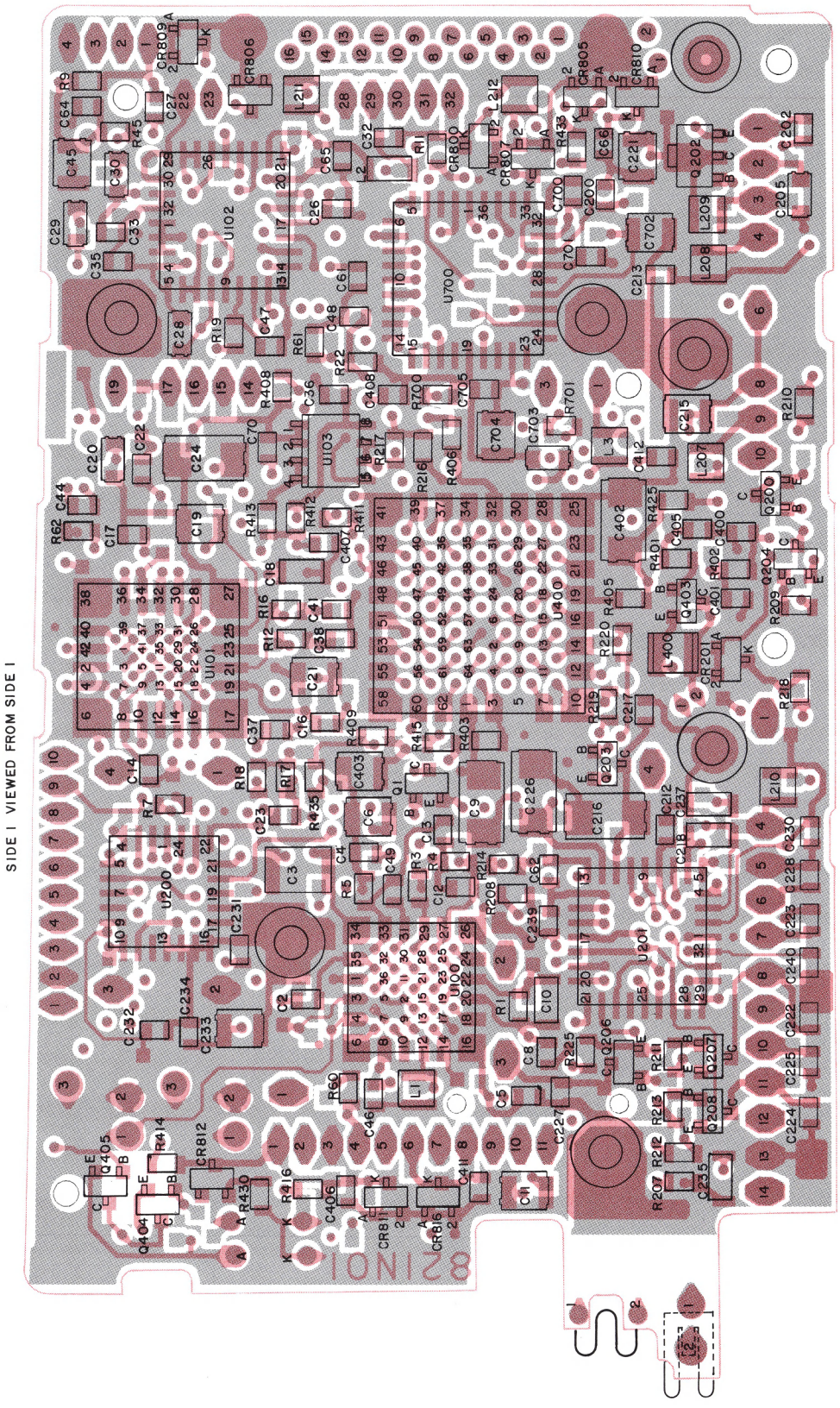
TORQUE SPECIFICATIONS

APPLICATION	TORQUE (IN. LBS.)	TORQUE (N•m)	TORQUE BIT NO.
Antenna Bushing Spanner Nut	20	2.27	6680371B34
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	0.68	6680370B89
Top Panel to Frame Screws	2	0.23	6680321B79
Volume Pot Spanner Nut	8	0.91	6680370B88

RADIO FUNCTIONAL TESTS (@ 7.5Vdc)

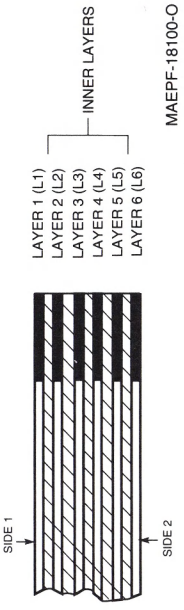
TRANSMITTER PERFORMANCE				
TEST	**SERVICE MONITOR**	**RADIO**	**TEST BOX**	**COMMENTS**
REFERENCE FREQUENCY	Set to **POWER MONITOR**, **FREQ.ERROR**; frequency to radio transmit frequency; input to **RF IN/OUT.**	Set to channel corresponding to frequency of test.	PTT Continuous (during performance check).	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 achieve12 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.



L1-CEPF-17451-O
L6-CEPF-17452-O
OL-CEPF-17453-O

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



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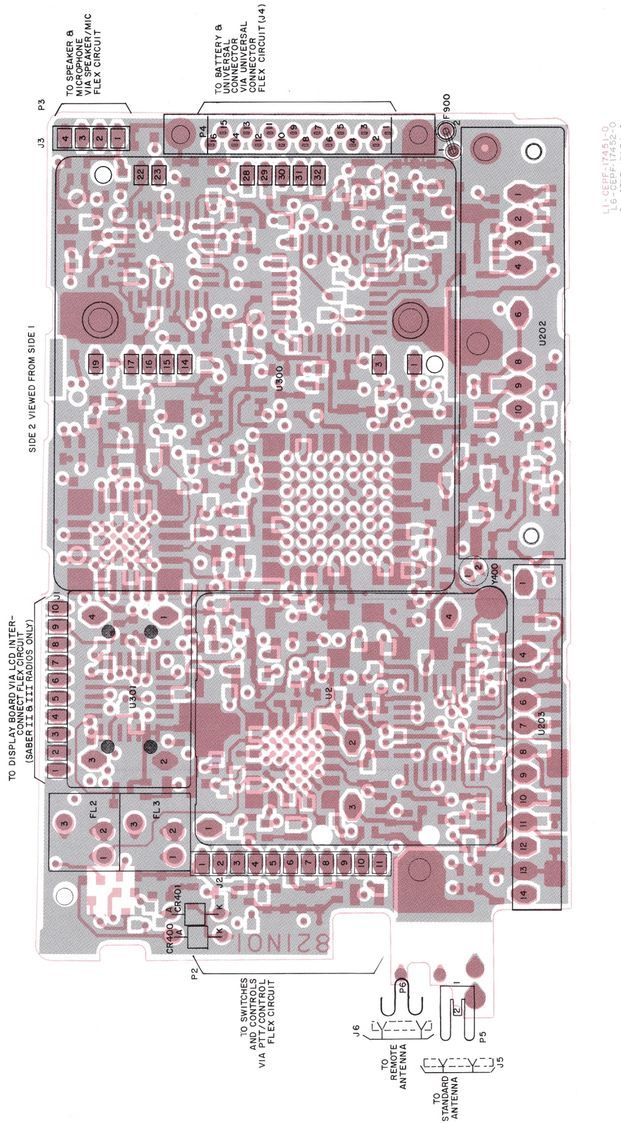
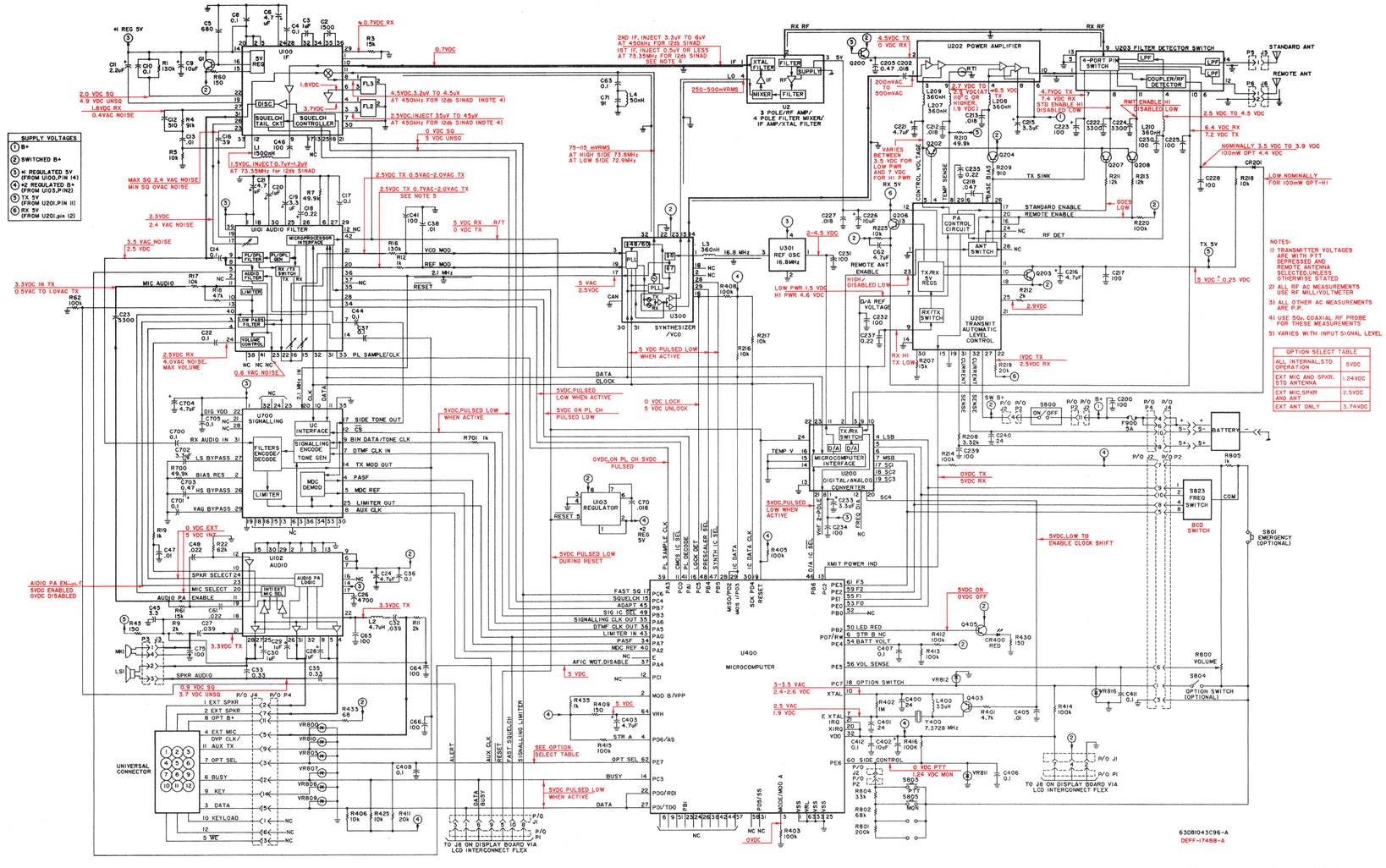
SCHEMATIC AND CIRCUIT BOARD NOTES

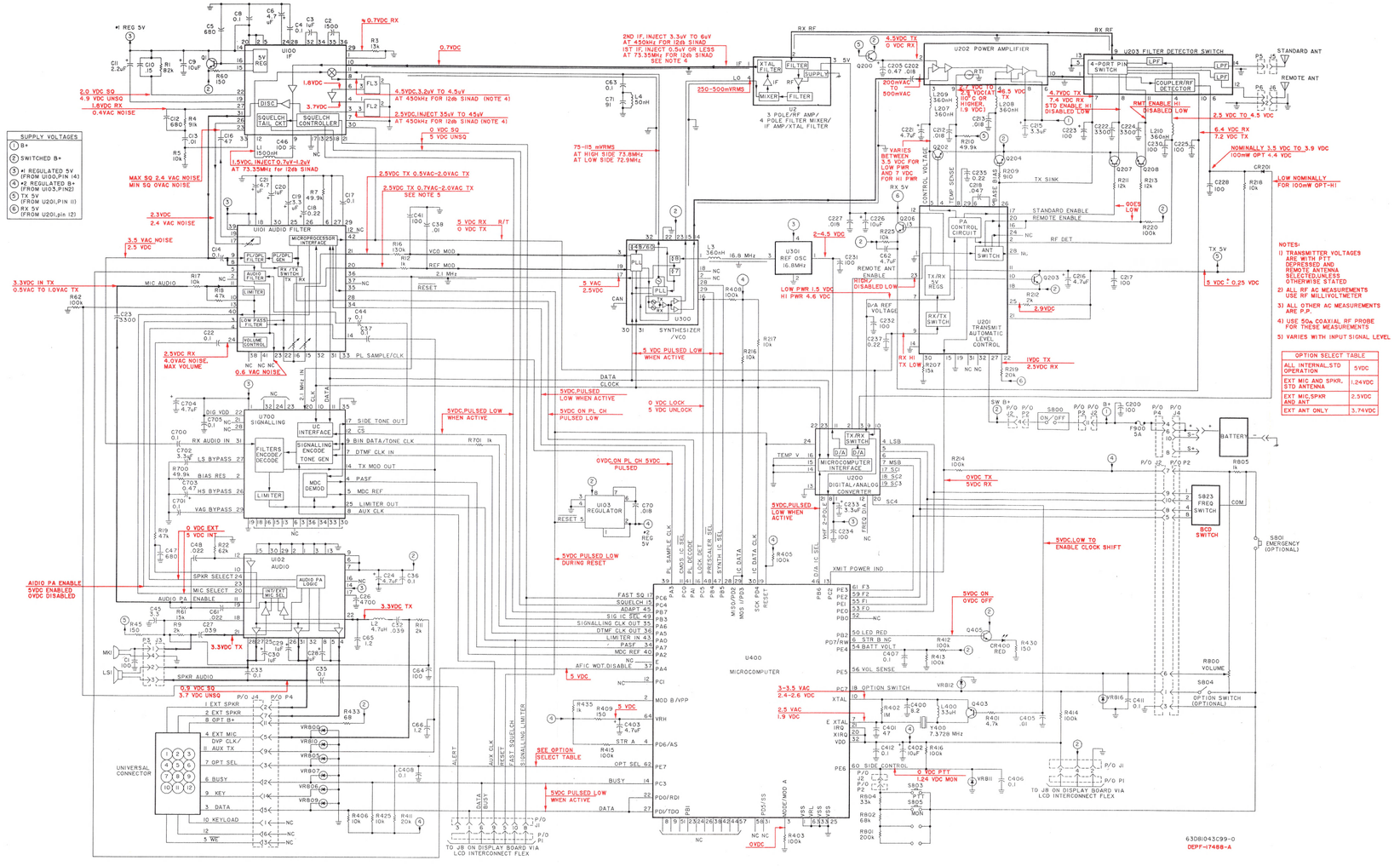
Unless otherwise stated, resistances are in ohms (k = 1000), capacitances less than 1 are in microfarads, and capacitances 1 or greater are in picofarads.

MAIN CIRCUIT BOARD (EARLY VERSION) COMPONENT LAYOUT DIAGRAM
SIDE 1 VIEWED FROM SIDE 1

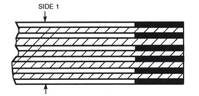




MAIN CIRCUIT BOARD (EARLY VERSION)
COMPONENT LAYOUT DIAGRAM (SIDE 2 VIEWED FROM SIDE 1),
AND MAIN BOARD SCHEMATIC DIAGRAM (EARLY VERSION)



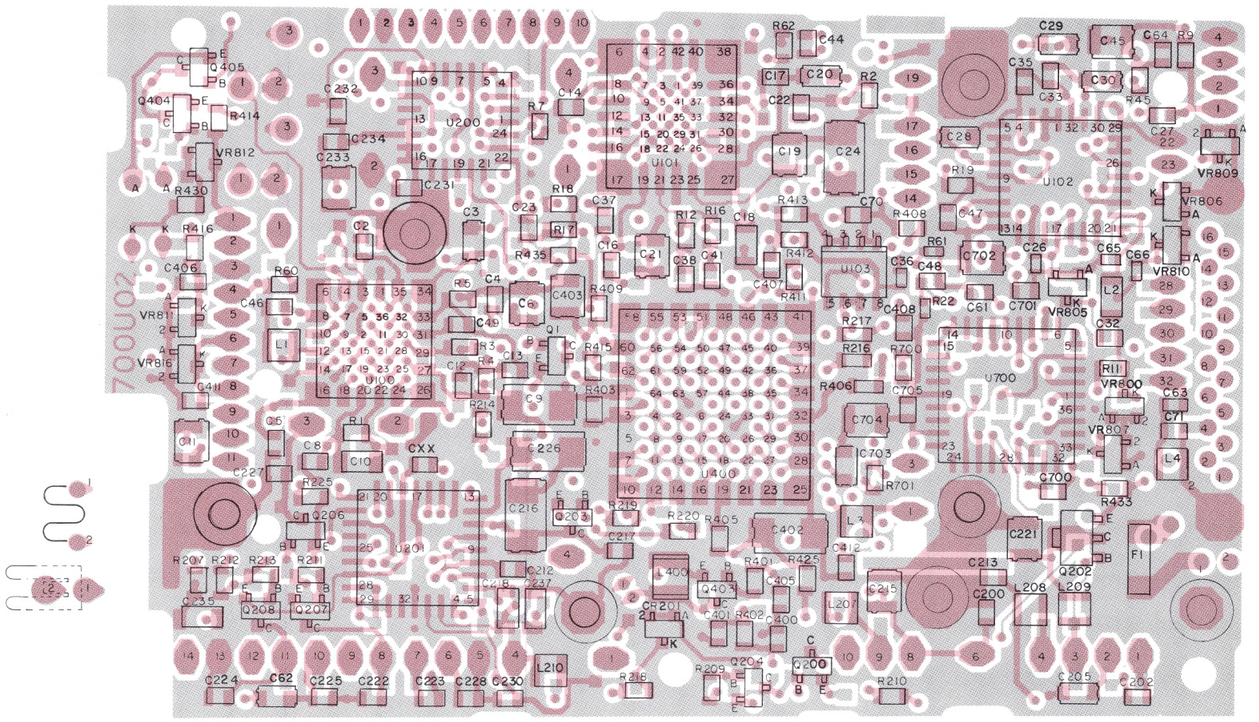
6-LAYER CIRCUIT BOARD COPPER DETAIL VIEWING COPPER STEPS AT EDGE OF BOARD IN PROPER LAYER SEQUENCE.



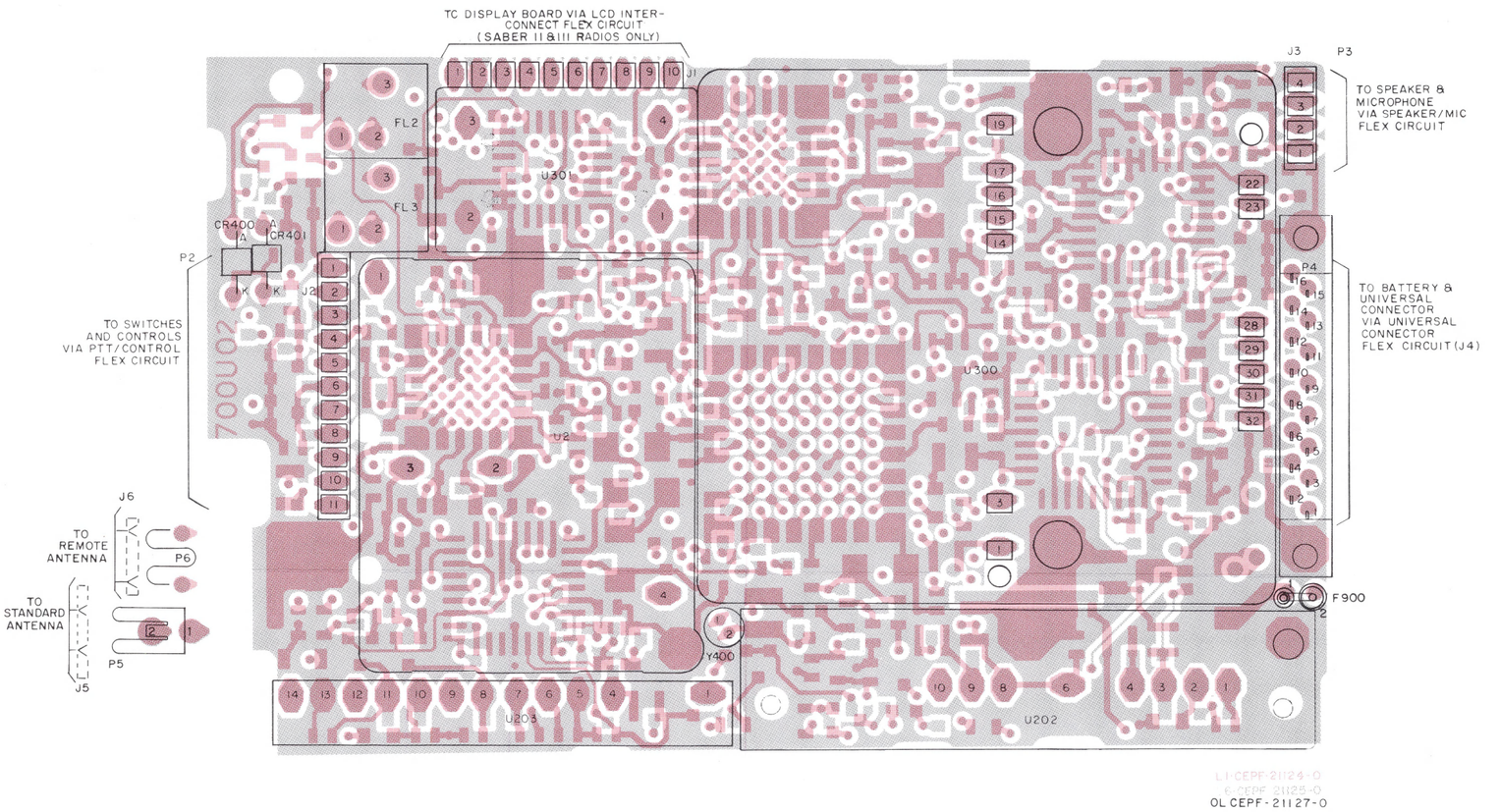
MAEPF-18100-O

SCHEMATIC AND CIRCUIT BOARD NOTES

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 1

SABER UHF **TPLF-3351-A**
Electrical Parts List

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		CAPACITOR, Fixed: uF±20%; 25V unless stated
C1	-----	Not Used
C2	2160521A15	1500pF±5%
C3	2305265B14	1; 10V
C4	2160521G37	0.1+80-20%
C5	2160521A11	680pF
C6	2362998B68	4.7; 10V
C7	-----	Not Used
C8	2160521G37	0.1+80-20%
C9	2362998B73	10; 16V
C10	2160521D37	0.1±10%
C11	2362998B64	2.2; 20V
C12	2160520C18	510pF±5%; 50V
C13	2160521E25	.01
C14	2160521G37	0.1+80-20%
C15	-----	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	2362998B68	4.7; 10V
C22	2160521G37	0.1+80-20%
C23	2160521A19	3300pF±5%
C24	2362998B69	4.7; 20V
C25	-----	Not Used
C26	2160521A21	4700pF±5%
C27	2160521A32	.039±5%
C28 thru 30	2362998B59	1; 16V
C31	-----	Not Used
C32	2160521A32	.039±5%
C33	2160521H43	.33
C34	-----	Not Used
C35	2160521H43	.33
C36,37	2160521G37	0.1+80-20%
C38	2160521E25	.01
C39,40	-----	Not Used
C41	2160520C01	100pF±5%; 50V
C42,43	-----	Not Used
C44	2160521G37	0.1+80-20%
C45	2362998B16	3.3±10%; 16V
C46	2160520C01	100pF±5%; 50V
C47	2160521E25	.01
C48	2160521A29	.022±5%
C49 thru 60	-----	Not Used
C61	2160521A29	.022±5%
C62	2362998D76	4.7; 4V
C63	2160521G37	0.1+80-20%
C64 thru 66	2160520G01	100pF±5%
C67 thru 69	-----	Not Used
C70	2160521E28	.018
C71	2160520B24	91pF
C72 thru 74	-----	Not Used
C75	2160520G01	100pF±5%
C200	2160520G01	100pF±5%
C201	-----	Not Used
C202	2160521E28	.018
C203,204	-----	Not Used
C205	2362998B05	.47±10%
C206 thru 211	-----	Not Used
C212,213	2160521E28	.018
C214	-----	Not Used
C215	2362998B16	3.3±10%; 16V
C216	2362998B69	4.7; 20V
C217	2160520G01	100pF±5%
C218	2160521F33	.047
C219,220	-----	Not Used
C221	2362998B68	4.7; 10V
C222	2160521A19	3300pF±5%
C223	2160520G01	100pF±5%
C224	2160521A19	3300pF±5%
C225	2160520G01	100pF±5%
C226	2362998B73	10; 16V
C227	2160521E28	.018
C228	2160520G01	100pF±5%
C229	-----	Not Used
C230 thru 232	2160520G01	100pF±5%
C233	2362998B16	3.3±10%; 16V
C234	2160520G01	100pF±5%
C235	2160521H41	0.22+80-20%
C236	-----	Not Used
C237	2160521H41	0.22+80-20%
C238	-----	Not Used
C239	2160520G01	100pF±5%
C240	2160520B10	24pF±5%; 50V; NP0
C400,401	2160520B10	24pF±5%; 50V; NP0
C402	2362998B73	10; 16V
C403	2362998B68	4.7; 10V
C404	-----	Not Used
C405	2160521E25	.01
C406 thru 408	2160521G37	0.1+80-20%
C409 thru 411	-----	Not Used
C412	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%
		DIODE: See Note I
CR200	-----	Not Used
CR201	4805129M05	SOT
CR400	4805729G22	LED, Red
		FUSE:
F900	0105955P27	Assembly, 5 Amp
		FILTER:
FL1	-----	Not Used
FL2	9105685Q02	Ceramic; 450kHz; 20kHz BW
FL3	9105685Q03	Ceramic; 450kHz; 15kHz BW
J1	0905287C05	Socket, Printed Circuit (LCD Interconnect)(10 req'd)
J2	0905287C05	Socket, Printed Circuit (PTT/Controls Flex)(10 req'd)
J3	0905287C05	Socket, Printed Circuit (Speaker/Mic Connector)(10 req'd)
		COIL, RF: unless stated
L1	2405452C64	1500nH±5%
L2	2462575A05	Choke; 4.7uH
L3	2405452C49	360nH±5%
L4	2405452C09	50nH±5%
L200 thru 206	-----	Not Used
L207 thru 210	2405452C49	360nH±5%
L400	2462585A40	33uH
		SPEAKER:
LS1	-----	28Ω±10% (part of Speaker/Microphone Flex Assembly)
		MICROPHONE:
MK1	-----	(part of Speaker/Microphone Flex Assembly)
		PLUG:
P1 thru 3	-----	Not Used
P4	2805520Q01	Connector, Bottom
P5	3905446Q03	Contact, Antenna
P6	3905445Q03	Contact, RF Wireform
P7 thru 9	-----	Not Used
		TRANSISTOR: See Note I
Q1	4805128M16	PNP; SOT-23; MMBT3906
Q200	4805128M44	NPN; SOT-23
Q201	-----	Not Used
Q202	4805128M27	PNP; SOT-89
Q203	4805128M16	PNP; SOT-23; MMBT3906
Q204	4805218N13	PNP; SOT; MMBTA63
Q205	-----	Not Used
Q206	4805128M16	PNP; SOT-23; MMBT3906
Q207,208	4805128M29	PNP; SOT-23
Q400 thru 402	-----	Not Used
Q403	4805218N03	NPN; SOT-23; MMBR901
Q404	-----	Not Used
Q405	4805128M44	NPN; SOT-23
		RESISTOR, Fixed: Ω±5%;1/8W
R1	0660079V28	130k
R2	-----	Not Used
R3	0660076A77	15k
R4	0660078T24	91k
R5	0660078T01	10k
R6	-----	Not Used
R7	0660078J80	49.9k±1%
R8	-----	Not Used
R9	0660078G33	2k±1%
R10	-----	Not Used
R11	0660078G33	2k±1%
R12	0660076A49	1k
R13 thru 15	-----	Not Used
R16	0660079V28	130k
R17	0660076E73	10k±1%
R18	0660076E89	47k±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	0660076A77	15k
R208	0660078G58	3.32k±1%
R209	0660076A48	910
R210	0660078J80	49.9k±1%
R211	0660076A75	12k
R212	0660078G33	2k±1%
R213	0660076A75	12k
R214	0660076B01	100k
R215	-----	Not Used
R216,217	0660076A73	10k
R218	0660076E73	10k±1%
R219	0660076A80	20k
R220	0660076B01	100k
R221 thru 224	-----	Not Used
R225	0660076A73	10k
R400	-----	Not Used
R401	0660076A65	4.7k±1%
R402	0660076B25	1M
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	0660078L01	100k±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
R700	0660078J80	49.9k±1%
R701	0660076A49	1k
R800	RPX4690A	Kit, Potentiometer, On/Off/Volume (includes S800)
R801	-----	200k (part of PTT/Controls Flex (RPX4700A or RPX4701A))
R802	-----	68k (part of PTT/Controls Flex (RPX4700A or RPX4701A))
R803	-----	Not Used
R804	-----	33k (part of PTT/Controls Flex
R805	-----	(RPX4700A or RPX4701A)) 1k (part of PTT/Controls Flex (RPX4700A or RPX4701A))
		SWITCH:
S800	RPX4690A	Kit, On/Off/Volume (includes R800)
S801	4005221R01 (optional)	Dual Function, Emergency
S802	-----	Not Used
S803	RPX4694A	Kit, Contact Snapdome, PTT
S804	RPX4694A	Kit, Contact Snapdome, Option (optional)
S805	RPX4694A	Kit, Contact Snapdome, Monitor
S806 thru 822	-----	Not Used
S823	RPX4689A	Kit, Frequency Switch
		CIRCUIT MODULE: See Note I
U1	-----	Not Used
U2	NLE9431A	Filter/Amp/Mixer (403-433MHz)
	or NLE9432A	Filter/Amp/Mixer (440-470MHz)
	or NLE9433A	Filter/Amp/Mixer (460-490MHz)
	or NLE9434A	Filter/Amp/Mixer (482-512MHz)
U100	0105953N02	IC, I-F
U101	0105952N99	IC, Audio Filter, CMOS
U102	0105958P74	IC, Audio, Bipolar
U103	5160870A16	IC, Regulator
U200	0105953N05	IC, Digital/Analog Converter, CMOS
U201	0105959P66	IC, Transmit Automatic Level Control
U202	NLE9471A	5W Power Amplifier (403-433 MHz)
	or NLE9472A	5W Power Amplifier (440-470 MHz)
	or NLE9473A	5W Power Amplifier (460-490 MHz)
	or NLE9474A	5W Power Amplifier (482-512 MHz)
	or NLE9483A	2W Power Amplifier (440-470 MHz)
U203	NFE6061A	FDS (403-470 MHz)
	or NFE6062A	FDS (470-512 MHz)
U300	NLE9461A	VCO/Synthesizer (403-433 MHz)
	or NLE9462A	VCO/Synthesizer (440-470 MHz)
	or NLE9463A	VCO/Synthesizer (460-490 MHz)
	or NLE9464A	VCO/Synthesizer (482-512 MHz)
U301	5105706L84	Oscillator, Reference; 16.8MHz
U400	0105953N16	Microcomputer, MC68HC11; Binary
U700	0105953N11	Signal Filter, CMOS
		DIODE: See Note I
VR800	4805129M35	Zener, 5.6V
VR801 thru 804	-----	Not Used
VR805 thru 812	4805129M35	Zener, 5.6V
VR813 thru 815	-----	Not Used
VR816	4805129M35	Zener, 5.6V
		CRYSTAL: See Note II
Y400	4805664G32	7.3728MHz
		NONREFERENCED ITEMS
	0905287C05	SOCKET, Printed Circuit (for all modules)(51 req'd)
	1405881R01	BOOT, Crystal (for Y400)
	7505934Q01	PAD, Oscillator (for U301)

NOTES:

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

II. When ordering crystal units, specify carrier frequemcy, crystal frequemcy, crystal type number, and Motorola part number.

SABER UHF (Later Version) TPLF-4119-O
Electrical Parts List

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		CAPACITOR, Fixed: uF±20%; 25V unless stated
C1	2113740A40	30±30% part of Speaker/Microphone Flex Assembly 0105958M34)
C2	2113741A25	1500pF±5%
C3	2311049A07	1; 10%; 16V
C4	2160521G37	0.1+80-20%
C5	2113744A17	680pF
C6	2311049J12	4.7±20%; 16V
C7	-----	Not Used
C8	2113743F01	0.1+80-20%
C9	2311049J26	10; 16V
C10	2311049A02	.15±10%; 35V
C11	2311049J04	2.2; 20V
C12	2113741A17	680pF
C13	2113741A45	.01
C14	2160521G37	0.1+80-20%
C15	-----	Not Used
C16	2113740A46	47±30%
C17	2160521G37	0.1+80-20%
C18	2160521H41	.22+80-20%
C19	2311049J07	3.3±10%; 20V
C20	2311049A37	1; 20V
C21	2311049J12	4.7±20%; 16V
C22	2160521G37	0.1+80-20%
C23	2113741A33	3300pF±5%
C24	2311049J14	4.7
C25	-----	Not Used
C26	2113741F41	4700pF±5%
C27	2113741A59	.039±5%
C28 thru 30	2311049A37	1; 20V
C31	-----	Not Used
C32	2113741A59	.039±5%
C33	2160521G37	0.1+80-20%
C34	-----	Not Used
C35	2160521G37	0.1+80-20%
C36	2113743K15	.100
C37	2160521G37	0.1+80-20%
C38	2113741A45	.01
C39,40	-----	Not Used
C41	2113740A55	100pF±30%
C42,43	-----	Not Used
C44	2160521G37	0.1+80-20%
C45	2311049J07	3.3±10%; 20V
C46	2113740A55	100pF±30%
C47	2113740A75	680
C48	2113741A53	.022±5%
C49 thru 60	-----	Not Used
C61	2113741A53	.022±5%
C62	2311049A44	4.7±10%; 6V
C63	2160521G37	0.1+80-20%
C64	2113740A55	100pF±30%
C65,C66	2113740F05	1.2±30%
C67	2113740A54	Not Used
C68, 69	-----	Not Used
C70	2113741A51	.018
C71	2113740A54	91pF±30%
C72 thru 74	-----	Not Used
C200	2113740A55	100pF±30%
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%; 20V
C216	2311049J14	4.7;
C217	2113740A55	100pF±30%
C218	2113741B61	.047
C219,220	-----	Not Used
C221	2311049J12	4.7±20%; 16V
C222	2113741A33	3300pF±5%
C223	2113740A55	100pF±30%
C224	2113741A33	3300pF±5%
C225	2113740A55	100pF±30%
C226	2311049J26	10; 16V
C227	2113741A51	.018
C228	2113740A55	100pF±30%
C229	-----	Not Used
C230 thru 232	2113740A55	100pF±30%
C233	2311049J07	3.3±10%; 20V
C234	2113740A55	100pF±30%
C235	2160521H41	0.22+80-20%
C236	-----	Not Used
C237	2160521H41	0.22+80-20%
C238	-----	Not Used
C400	2113740A27	8.2±30%
C401	2113740A46	47±30%
C402	2311049J26	10; 16V
C403	2311049J12	4.7; 16V
C404	-----	Not Used
C405	2113741A45	.01
C406 thru 408	2160521G37	0.1+80-20%
C409 thru 410	-----	Not Used
C411,412	2160521G37	0.1+80-20%
C700,701	2160521G37	0.1+80-20%
C702	2311049J07	3.3±10%; 20V
C703	2311049A05	.47±10%
C704	2311049J12	4.7, 16V
C705	2160521G37	0.1+80-20%
		DIODE: See Note I
CR200	-----	Not Used
CR201	4805129M05	SOT
CR400	4805729G22	LED, Red
CR401	-----	Not Used
CR800	4805129M35	
CR805 thru CR807	4805129M35	
CR809 thru CR812	4805129M35	
CR816	4805129M35	
		FUSE:
F1	6505663R03	5 Amp
F900	0105955P27	Assembly, 5 Amp
		FILTER:
FL1	-----	Not Used
FL2	9105685Q08	Ceramic; 450kHz; 20kHz BW
FL3	9105685Q09	Ceramic; 450kHz; 15kHz BW
		JACK:
J1	0905287C05	Socket, Printed Circuit (LCD Interconnect)(10 req'd)
J2	0905287C05	Socket, Printed Circuit (PTT/Controls Flex) (10 req'd)
J3	0905287C05	Socket, Printed Circuit (Speaker/Mic Connector) (10 req'd)
		COIL, RF: unless stated
L1	2405452C64	1500nH±5%
L2	2462575A05	Choke; 4.7uH
L3	2405452C49	360nH±5%
L4	2405452C09	50nH±5%
L200 thru 206	-----	Not Used
L207 thru 210	2405452C49	360nH±5%
L400	2462585A40	33uH
		SPEAKER:
LS1	-----	28Ω±10% part of Speaker/Microphone Flex Assembly 0105958M34)
		MICROPHONE:
MK1	-----	(part of Speaker/Microphone Flex Assembly 0105958M34)
		PLUG:
P1	-----	Not Used
P2	2805520Q01	Connector, Main Compression
P3	3905460V01	Connector
P4	3905445Q03	Connector
P5	REX4166A	Contact, Antenna
P6	3905445Q03	Contact, RF Wireform
P7 thru 9	-----	Not Used
		TRANSISTOR: See Note I
Q1	4805128M16	PNP; SOT-23; MMBT3906
Q200	4805128M12	NPN; SOT-23
Q201	-----	Not Used
Q202	4805128M27	PNP; SOT-89
Q203	4805128M16	PNP; SOT-23; MMBT3906
Q204	4805218N13	PNP; SOT; MMBTA63
Q205	-----	Not Used
Q206	4805128M16	PNP; SOT-23; 48G13
Q207,208	4805128M29	PNP; SOT-23
Q400 thru 402	-----	Not Used
Q403	4805218N03	NPN; SOT-23; 48G13
Q404	-----	Not Used
Q405	4805128M12	NPN; SOT-23
		RESISTOR, Fixed: Ω±5%;1/8W
R1	0660079V23	82k
R2	-----	Not Used
R3	0660076E76	13k
R4	0660078T24	91k
R5	0660076E73	10k±1%
R6	-----	Not Used
R7	0660078J80	49.9k±1%
R8	-----	Not Used
R9	0660078G33	2k±1%
R10	-----	Not Used
R11	0660078G33	2k±1%
R12	0660076A49	1k
R13 thru 15	-----	Not Used
R16	0660079V28	130k
R17	0660076E73	10k±1%
R18, R19	0660076E89	47k±1%
R20,21	-----	Not Used
R22	0660076N92	62k
R23 thru 44	-----	Not Used
R45	0660076A29	150
R46 thru 59	-----	Not Used
R60	0660076A29	150
R61	0660076N77	15k
R62	0660076B01	100k
R200 thru 206	-----	Not Used
R207	0660076A77	15k
R209	0660076A48	910
R210	0660078J80	49.9k±1%
R211	0660076A75	12k
R212	0660078G33	2k±1%
R213	0660076A75	12k
R214	0660076B01	100k
R215	-----	Not Used
R216 thru R218	0660076E73	10k±1%
R219	0660079J33	20k±1%
R220	0660076B01	100k
R221 thru 224	-----	Not Used
R225	0660076E73	10k±1%
R400	-----	Not Used
R401	0660076A65	4.7k
R402	0660076B25	1M
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	0660079J33	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
R700	0660078J80	49.9k±1%
R701	0660076A49	1k
R800	RPX4690A	Kit, Potentiometer, On/Off/Volume (includes S800)
R801	-----	200k (part of PTT/Controls Flex (RPX4700A or RPX4701A))
R802	-----	68k (part of PTT/Controls Flex (RPX4700A or RPX4701A))
R803	-----	Not Used
R804	-----	33k (part of PTT/Controls Flex (RPX4700A or RPX4701A))
R805	-----	1k (part of PTT/Controls Flex (RPX4700A or RPX4701A))
		SWITCH:
S800	RPX4690A	Kit, On/Off/Volume (includes R800)
S801	4005221R01	Dual Function, Emergency (optional)
S802	-----	Not Used
S803	RPX4694A	Kit, Contact Snapdome, PTT
S804	RPX4694A	Kit, Contact Snapdome, Option (optional)
S805	RPX4694A	Kit, Contact Snapdome, Monitor
S806 thru 822	-----	Not Used
S823	RPX4689A	Kit, Frequency Switch
		CIRCUIT MODULE: See Note I
U1	-----	Not Used
U2	NLE9431A	Filter/Amp/Mixer (403-433MHz)
	or NLE9432A	Filter/Amp/Mixer (440-470MHz)
	or NLE9433A	Filter/Amp/Mixer (460-490MHz)
	or NLE9434A	Filter/Amp/Mixer (482-512MHz)
U100	0105958P77	IC, I-F
U101	0105958P80	IC, Audio Filter, CMOS
U102	0105958P74	IC, Audio, Bipolar
U103	5105469E65	IC, Regulator
U200	0105953N05	IC, Digital/Analog Converter, CMOS
U201	0105959P66	IC, Transmit Automatic Level Control
U202	NLE9471A	5W Power Amplifier (403-433MHz)
	or NLE9472A	5W Power Amplifier (440-470MHz)
	or NLE9473A	5W Power Amplifier (460-490MHz)
	or NLE9474A	5W Power Amplifier (482-512MHz)
	or NLE9483A	2W Power Amplifier (440-470MHz)
	or NLE9741A	2W Power Amplifier (403-433MHz)
U203	NFE6061A	FDS (403-470 MHz)
	or NFE6062A	FDS (470-512 MHz)
U300	NLE9461A	VCO/Synthesizer (403-433 MHz)
	or NLE9462A	VCO/Synthesizer (440-470 MHz)
	or NLE9463A	VCO/Synthesizer (460-490 MHz)
	or NLE9464A	VCO/Synthesizer (482-512 MHz)
U301	NXN6268A	Oscillator, Reference; 16.8MHz; 5ppm
	or NXN6269A	Oscillator, Reference; 16.8MHz; 2ppm
U400	0105957R86	Microcomputer, MC68HC11; Binary
	or 0105958R05	for option H852)
U700	0105953N11	Signal Filter, CMOS
	or 0105954S43	for option H852)
		DIODE: See Note I
VR800	4805129M35	Zener, 5.6V
VR801 thru 804	-----	Not Used
VR805 thru 807	4805129M35	Zener, 5.6V
VR808	-----	Not Used
VR809 thru 812	4805129M35	Zener, 5.6V
VR813 thru 815	-----	Not Used
VR816	4805129M35	Zener, 5.6V
		CRYSTAL: See Note II
Y400	4805664G32	7.3728MHz

NONREFERENCED ITEMS

	0905287C07	SOCKET, Printed Circuit (for all modules)(66 req'd)
	1405881R01	BOOT, Crystal (for Y400)
	7505934Q01	PAD, Oscillator (for U301)

NOTES:

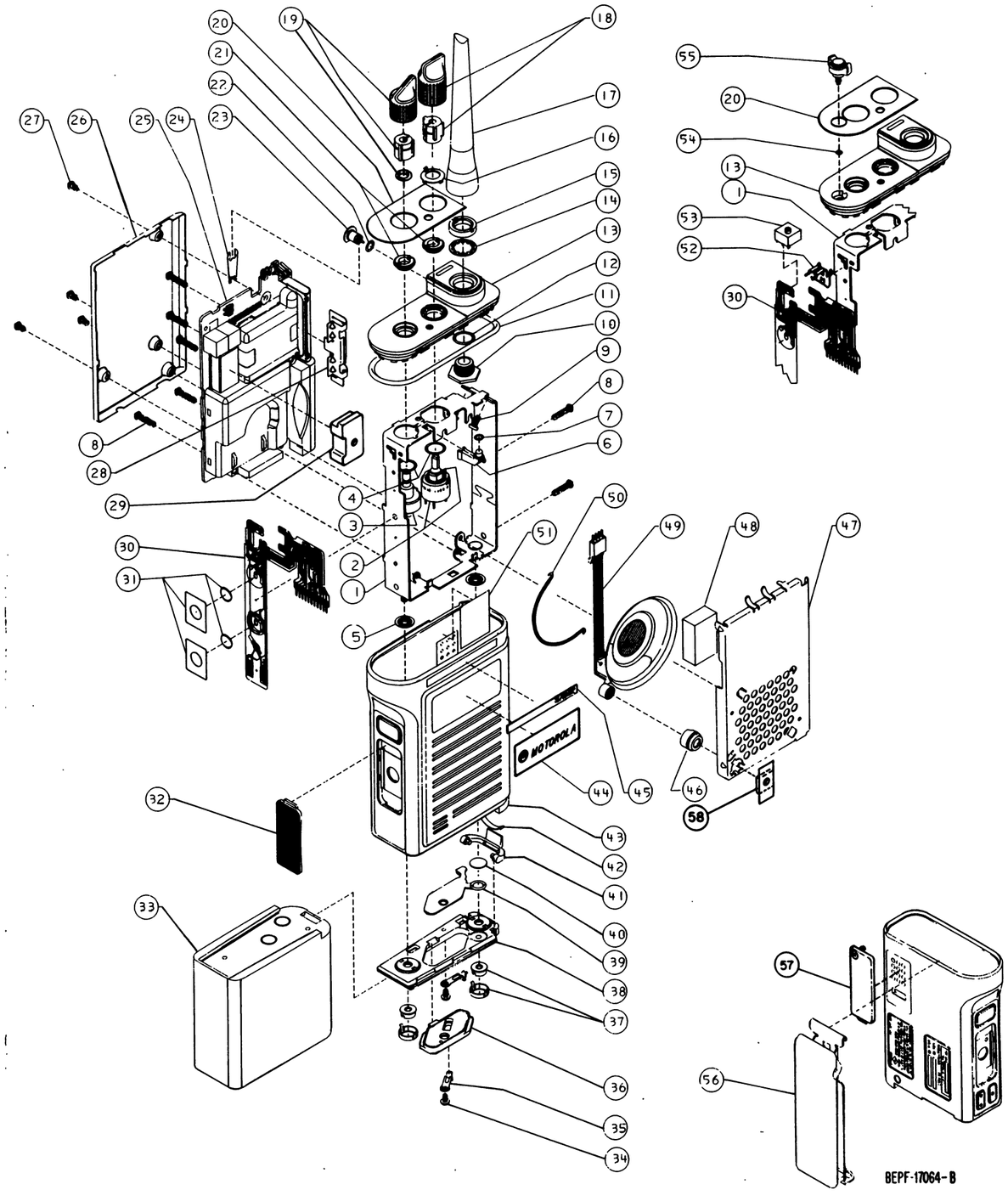
I. For optimum performance, order replacement diodes, transistors, and circuit modules by Motorola part number only.

II. When ordering crystal units, specify carrier frequemcy, crystal frequemcy, crystal type number, and Motorola part number.

SABER I UHF TPLF-3371-B

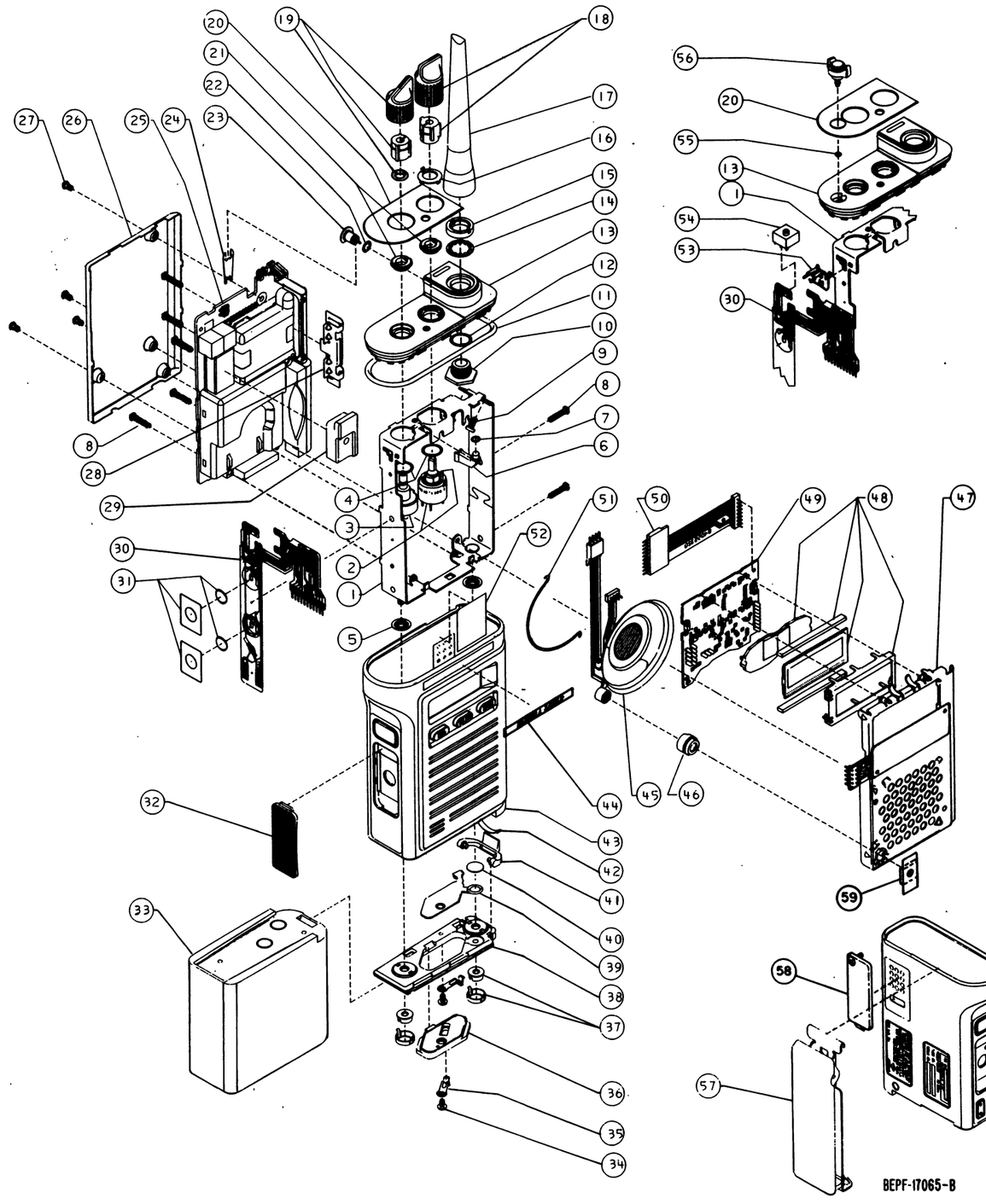
Exploded View Parts List

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	0305714J10	SCREW, Module, Ph Pan Hd; 2-56x.400" (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 item11)
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	8505816K07	ANTENNA, UHF Helical (403 - 432 MHz)
	or 8505816K08	ANTENNA, UHF Helical (440 - 470 MHz)
	or 8505816K09	ANTENNA, UHF Helical (470 - 512 MHz)
	or 8505247K04	ANTENNA, UHF Whip (403 - 512 MHz)
18	RPX4699A	KIT, Frequency Knob
	or REX4017A	KIT, Frequency Knob, Low Profile
19	REX4105B	KIT, On/Off/Volume Knob
	or REX4016B	KIT, Volume Knob, Low Profile
20	1305622Q01	ESCUTCHEON, 12-Frequency
	or 1305622Q11	ESCUTCHEON, 12-Frequency Emergency
	or 1305622Q04	ESCUTCHEON, 12-Frequency, Submersible
	or 1305622Q13	ESCUTCHEON, 12-Frequency Emergency, Submersible
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	NLE9450A	ASSEMBLY, UHF Main PC Board
26	NTN4647A	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 RPX4701A	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
33	NTN4595C	BATTERY, 1500 mAh
34	0305706Q02	SCREW, Baseplate Ph Pan Hd;2-56x3/32" (2 req'd) (part of item 43)
35	3905453Q01	CONTACT, Power (2 req'd) (part of item 43)
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	3205783T01	SEAL, Elastomer (part of item 43)
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	NHN6395A	ASSEMBLY, Housing, SABER I (part of item 43)
	or NHN6393A	ASSEMBLY, Housing SABER I Submersible (includes items 34 thru 42)
44	3305183R01	LABEL, Bottom Nameplate, SABER I
45	3305183R03	LABEL, Top Nameplate, SABER I
46	1405490Q01	BOOT, Microphone
47	RPX4697A	KIT, Speaker Bracket, SABER I (includes item 48)
48	7505641N03	PAD, Speaker Bracket (part of item 47)
49	0105958M34	ASSEMBLY, Speaker/ Microphone Flex, SABER I
50	4205872S01	RETAINER, Speaker
51	1405182M03	INSULATOR, Universal Connector
52	0705319R02	BRACKET, Switch (optional)
53	4005221R02	SWITCH, Dual-Function (S801) (optional)
54	3205082E83	GASKET, O-Ring (optional)
55	NTN5076B	KIT, Push-Only Knob (includes item 54)
	or NTN5068A	KIT, Push-and-Rotate Knob (includes item 54)
	or NTN5069A	KIT, Rotate-Only Knob (includes item 54)
	or 4305607S01	PLUG, Seal
56	NTN4741B	ASSEMBLY, Belt Clip
57	NTN5025A	COVER, Universal Connector
58	1405182M12	INSULATOR, Microphone



SABER II UHF TPLF-3416-B
Exploded View Parts List

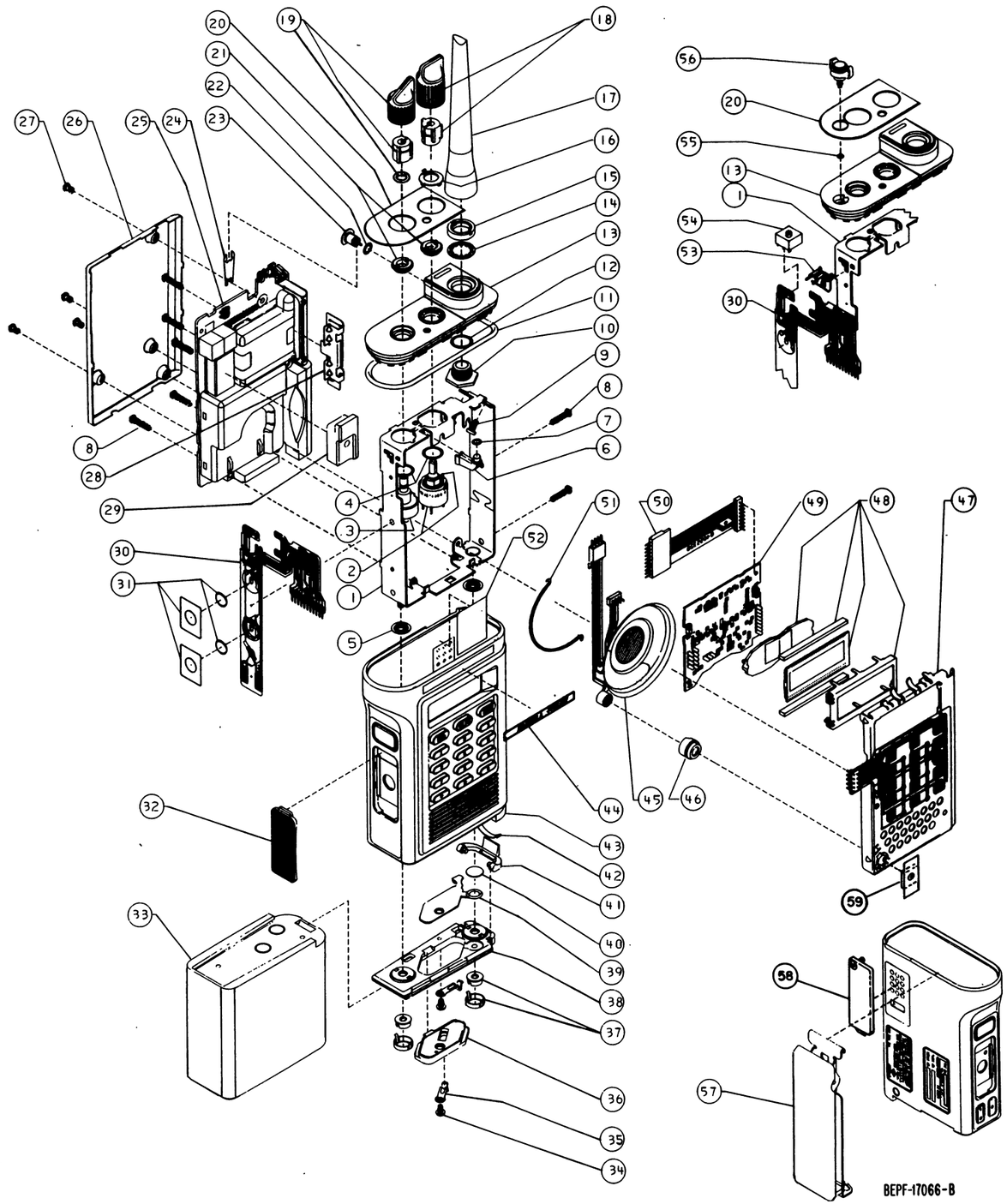
ITEM NO.	MOTOROLA PART NO.	DESCRIPTION
1	RPX4695A	ASSEMBLY, Frame Stud (includes item 5)
2	RPX4689A	KIT, Frequency Switch (S823) (includes item 4)
3	RPX4690A	KIT, On/Off Switch (S800)/Volume Control (R800) (includes item 4)
4	3205082E62	GASKET, O-Ring (2 req'd) (part of items 2 and 3)
5	3205422Q01	SEAL, Stud (2 req'd) (part of item 1)
6	6105436Q01	LIGHTPIPE, LED
7	3205082E59	GASKET, O-Ring
8	0305714J10	SCREW, Module, Ph Pan Hd; 2-56x.400" (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 item11)
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	8505816K07	ANTENNA, UHF Helical (403 - 432 MHz)
	or 8505816K08	ANTENNA, UHF Helical (440 - 470 MHz)
	or 8505816K09	ANTENNA, UHF Helical (470 - 512 MHz)
	or 8505247K04	ANTENNA, UHF Whip (403 - 512 MHz)
18	RPX4699A	KIT, Frequency Knob
	or REX4017A	KIT, Frequency Knob, Low Profile
19	REX4105B	KIT, On/Off/Volume Knob
	or REX4016B	KIT, Volume Knob, Low Profile
20	1305622Q01	ESCUTCHEON, 12-Frequency
	or 1305622Q11	ESCUTCHEON, 12-Frequency Emergency
	or 1305622Q28	ESCUTCHEON, SABER IE
	or 1305622Q29	ESCUTCHEON, SABER IE Submersible
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	NLE9450A	ASSEMBLY, UHF Main PC Board (6d)
	or NLE9970	
26	NTN4647A	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 RPX4701A	KIT, PTT/Controls Flex Assembly (includes items2,3,31)
31	RPX4694A	KIT, Contact Snapdome (2 req'd) (part of item 30)
32	4505022P02	LEVER, PTT
33	NTN4595C	BATTERY, 1500 mAh
34	0305706Q02	SCREW, Baseplate Ph Pan Hd; 2-56x3/32" (2 req'd) (part of item 43)
35	3905453Q01	CONTACT, Power (2 req'd) (part of item 43)
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	3205783T01	SEAL, Elastomer (part of item 43)
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	NHN6422A	ASSEMBLY, Housing, SABER II (includes items 34 thru 42)
44	3305183R02	LABEL, Nameplate, SABER II
45	0105958M24	ASSEMBLY, Speaker/Microphone Flex, SABER II (8k Display)
	or 0105958M34	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	8460999A58	ASSEMBLY, 8k Display PC Board, SABER II (includes item 48)
	or 8460999A67	ASSEMBLY, 2k 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 (optional)
54	4005221R02	SWITCH, Dual-Function (S801) (optional)
55	3205082E83	GASKET, O-Ring (optional)
56	NTN5076B	KIT, Push-Only Knob (includes item 54)
	or NTN5068A	KIT, Push-and-Rotate Knob (includes item 54)
	or NTN5069A	KIT, Rotate-Only Knob (includes item 54)
	or 4305607S01	PLUG, Seal
57	NTN4741B	ASSEMBLY, Belt Clip
58	NTN5025A	COVER, Universal Connector
59	1405182M12	INSULATOR, Microphone



SABER III UHF
Exploded View Parts List

TPLF-3417-B

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	0305714J10	SCREW, Module, Ph Pan Hd; 2-56x.400" (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 item11)
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	8505816K07	ANTENNA, UHF Helical (403 - 432 MHz)
	or 8505816K08	ANTENNA, UHF Helical (440 - 470 MHz)
	or 8505816K09	ANTENNA, UHF Helical (470 - 512 MHz)
	or 8505247K04	ANTENNA, UHF Whip (403 - 512 MHz)
18	RPX4699A	KIT, Frequency Knob
	or REX4017A	KIT, Frequency Knob, Low Profile
19	REX4105B	KIT, On/Off/Volume Knob
	or REX4016B	KIT, Volume Knob, Low Profile
20	1305622Q01	ESCUTCHEON, 12-Frequency
	or 1305622Q11	ESCUTCHEON, 12-Frequency Emergency
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	NLE9450A	ASSEMBLY, UHF Main PC Board
	or NLE9970A	
26	NTN4647A	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 RPX4701A	KIT, PTT/Controls Flex Assembly (includes items2,3,31)
31	RPX4694A	KIT, Contact Snapdome (2 req'd) (part of item 30)
32	4505022P02	LEVER, PTT
33	NTN4595C	BATTERY, 1500 mAh
34	0305706Q02	SCREW, Baseplate Ph Pan Hd; 2-56x3/32"(2 req'd) (part of item 43)
35	3905453Q01	CONTACT, Power (2 req'd) (part of item 43)
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	3205783T01	SEAL, Elastomer (part of item 43)
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	NHN6397B	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	RPX4702B	ASSEMBLY, LCD/Speaker Bracket
48	RPX4703A	KIT, LCD Assembly (part of item 49)
49	8460999A58	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 (optional)
54	4005221R02	SWITCH, Dual-Function (S801) (optional)
55	3205082E83	GASKET, O-Ring (optional)
56	NTN5076B	KIT, Push-Only Knob (includes item 55)
	or NTN5068A	KIT, Push-and-Rotate Knob (includes item 55)
	or NTN5069A	KIT, Rotate-Only Knob (includes item 55)
	or 4305607S01	PLUG, Seal
57	NTN4741B	ASSEMBLY, Belt Clip
58	NTN5025A	COVER, Universal Connector
59	1405182M12	INSULATOR, Microphone



SABER 2K Display
TPLF-3406-A

Electrical Parts List

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		CAPACITOR, Fixed: pF±5%; 50V unless stated
C501	2362998B59	1uF±10%; 20V
C502	2160521C32	.039uF±10%; 25V
C503, 504	- - - - -	Not Used
C505, 506	2160520B10	24
C507, 508	2160520C12	300
		DIODE: See Note I
CR501, 502	4805729G27	LED, Yellow
CR503	4805129M06	Dual; SOT-23
		JACK:
J7	0905287C05	Socket, Printed Circuit (Keypad Switch)(9 req'd)
J8	0905287C05	Socket, Printed Circuit (LCD Interconnect)(8 req'd)
		COIL, RF: unless stated
L501 thru 503	2462575A07	Choke, 10uH
L504	2462575A09	Choke, 0.56uH
		TRANSISTOR: See Note I
Q501	4805128M29	PNP; BCX18 (LH)
Q502 thru 504	4805128M12	NPN; BCW60B (RH)
		RESISTOR, Fixed: Ω±5%;1/8W unless stated
R501	- - - - -	Not Used
R502	0660076A90	51k
R503	0660076A56	2k
R504	0660076A09	22
R505	0660076A69	6.8k
R506	0660076A83	27k
R507	0660076E73	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	- - - - -	Not Used
R527	0660076A83	27k
R528	0660076H49	10M±10%
		CIRCUIT MODULE: See Note I
U501	0105953N82	EEPROM; 2k x 8
U502	0105953N07	Microcomputer, HCMOS
U503	0105953N09	Shift Register, CMOS
U504	0105953N10	LCD Driver
		CRYSTAL: See Note II
Y501	- - - - -	Not Used
Y502	4805664G39	3.6864MHz
NONREFERENCED ITEMS		
	7505440S01	PAD, Display Board

NOTES:

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

II. When ordering crystal units, specify carrier frequemcy, crystal frequemcy, crystal type number, and Motorola part number.

SABER 8K Display (Early Version)
TPLF-3407-A

Electrical Parts List

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

NOTES:

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

II. When ordering crystal units, specify carrier frequemcy, crystal frequemcy, crystal type number, and Motorola part number.

8405912T01 (Later Version)
TPLF-3935-A

SABER 8K Display Circuit Board

Electrical Parts List

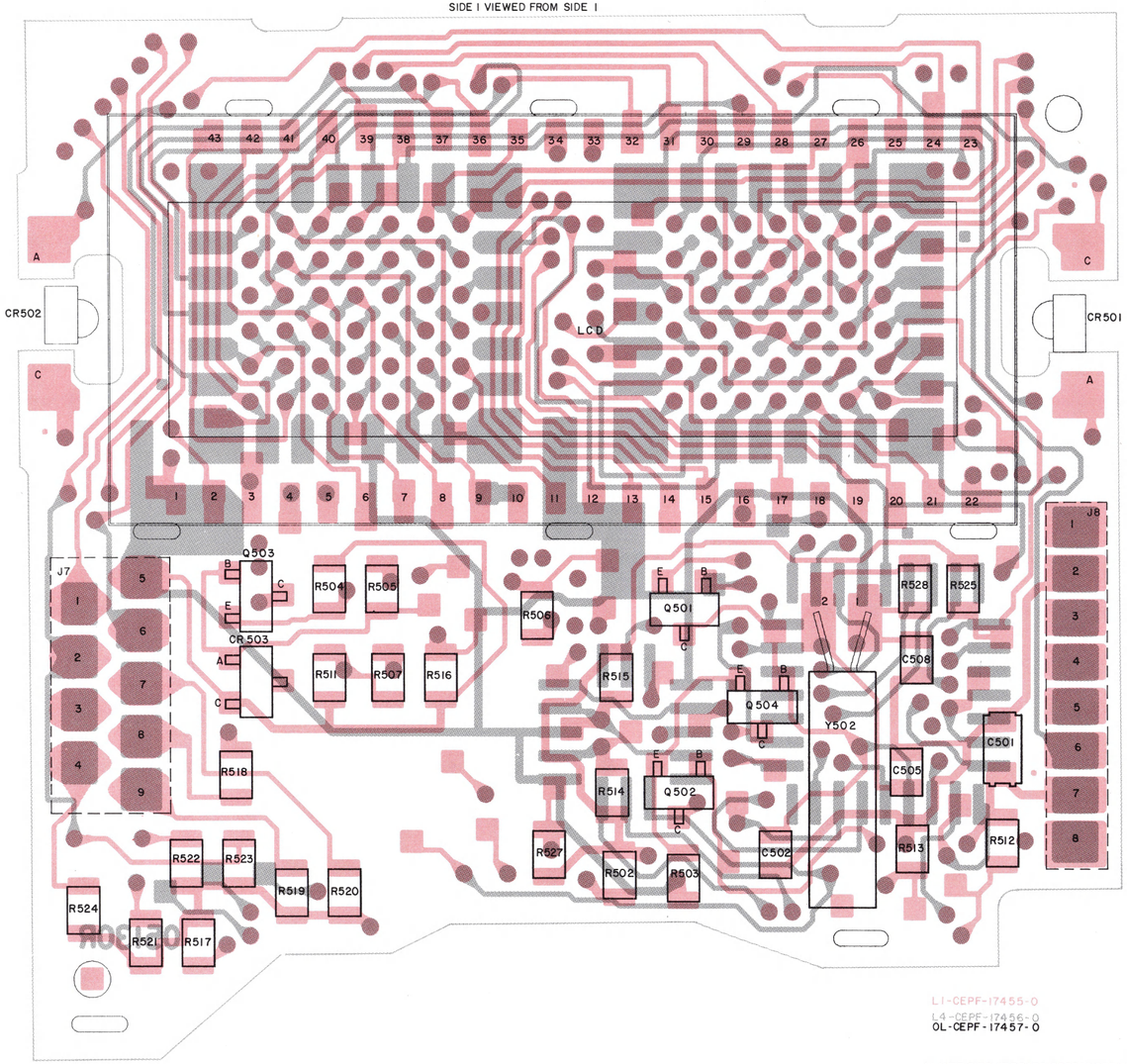
REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		CAPACITOR, Fixed: pF±5%; 50V unless stated
C501	2311049A37	1µF±10%; 20V
C502	2113741A59	.039µF±10%; 25V
C503,504	- - - - -	Not Used
C505,506	2113740A38	24
C507,508	2113740A66	300
		DIODE: See Note I
CR501,502	4883636N11	LED, Yellow
CR503	4805129M06	SOT-23
		JACK:
J7	0905287C05	Socket, Printed Circuit (Keypad Switch)(9 req'd)
J8	0905287C05	Socket, Printed Circuit (LCD Interconnect)(8 req'd)
J9	0905287C05	Socket, Printed Circuit (Speaker/Mic)(3 req'd)
		COIL, RF: unless stated
L501 thru 503	2462575A07	Choke, 10µH
L504	2462575A09	Choke, 0.56µH
		TRANSISTOR: See Note I.
Q501,502	- - - - -	Not Used
Q503	4805128M12	NPN; BCW60B (RH)
Q504,505	- - - - -	Not Used
Q506	4805128M12	NPN; BCW60B (RH)
Q507	4805218N11	TMOS; BST82
		RESISTOR, Fixed: Ω±5%;1/8W unless stated
R501	- - - - -	Not Used
R502	0660076A90	51k
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	0660076B25	1M±10%
R529	0605021K01	0
R530	0660076A33	220
R531	0660076A83	27k
R532	0660076A01	10
		CIRCUIT MODULE: See Note I.
U501	0105959R12	EEPROM, CMOS; 8k x 8
U502	0105957R95	Microcomputer, HCMOS
U503	0105953N09	Shift Register; CMOS
U504	0105953N10	LCD Driver, CMOS
U505	0105953N18	DTMF Tone Generator, CMOS
		CRYSTAL: See Note II.
Y501	4805664G40	3.579545MHz
Y502	4805664G39	3.6864MHz

NOTES:

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

II. When ordering crystal units, specify carrier frequemcy, crystal frequemcy, crystal type number, and Motorola part number.

SIDE 1 VIEWED FROM SIDE 1



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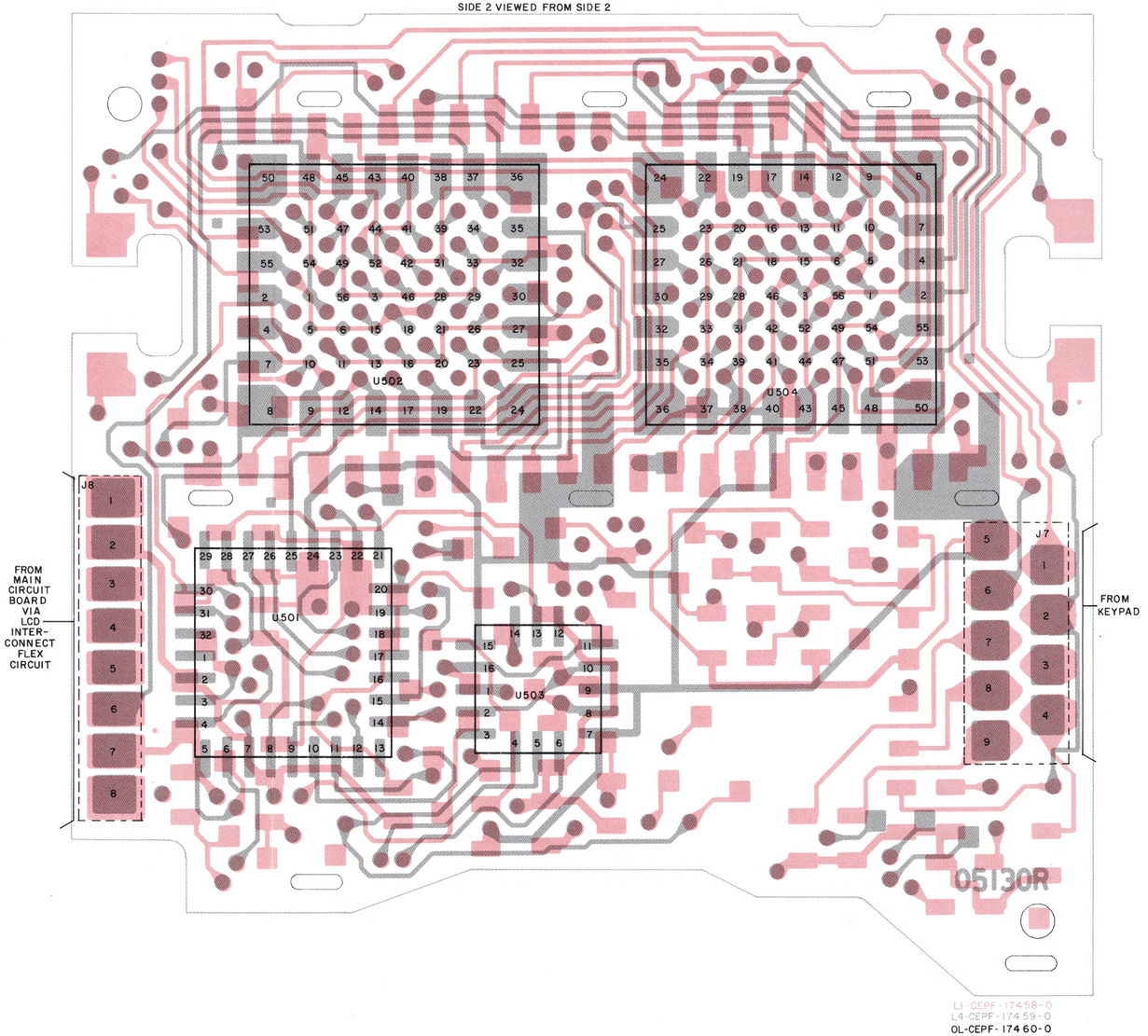
L4-CEPF-17456-0
OL-CEPF-17457-0

SIDE 2 VIEWED FROM SIDE 2



LI-CEPF-17458-0
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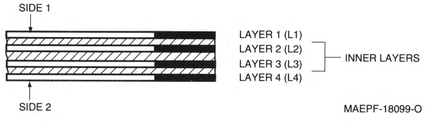
4-LAYER CIRCUIT BOARD COPPER DETAIL VIEWING COPPER STEPS AT EDGE OF BOARD IN PROPER LAYER SEQUENCE.



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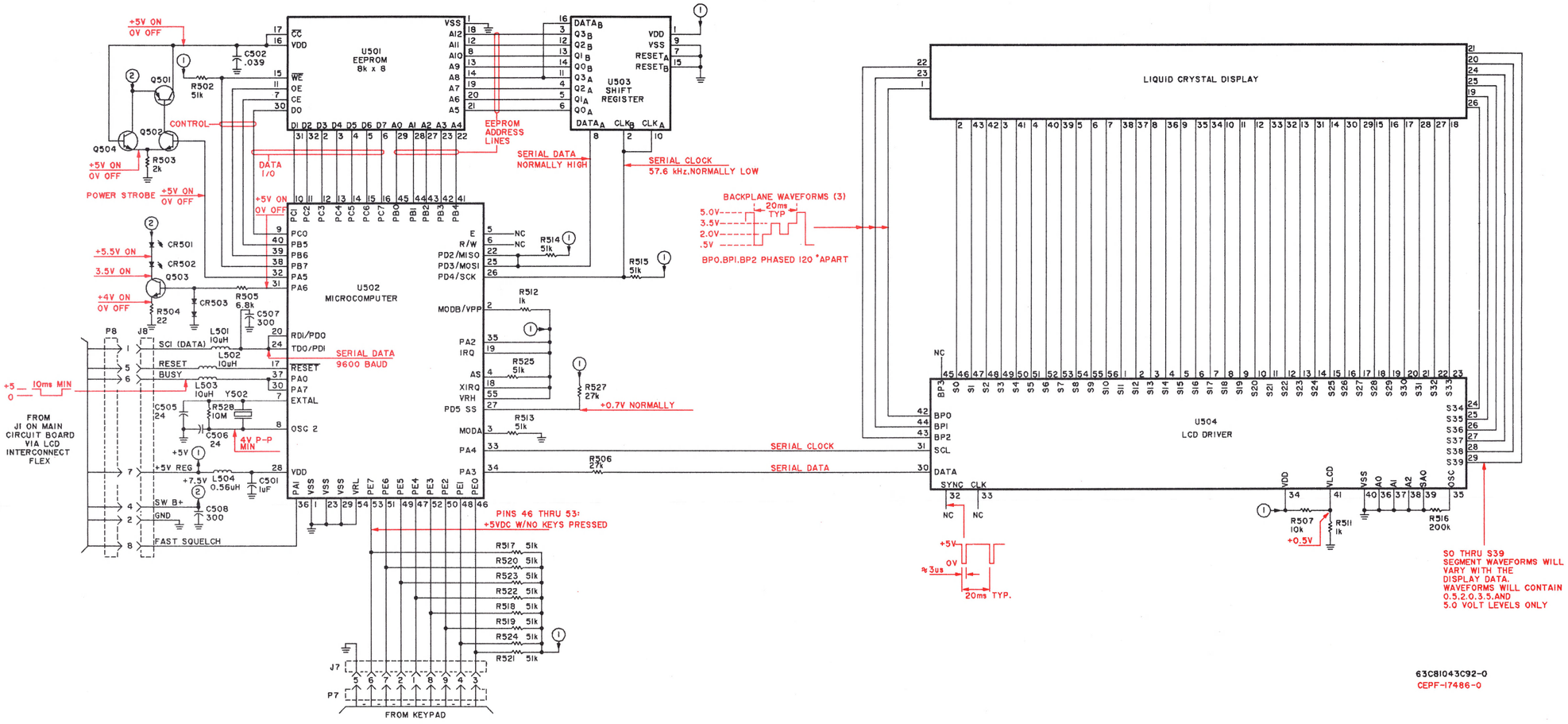
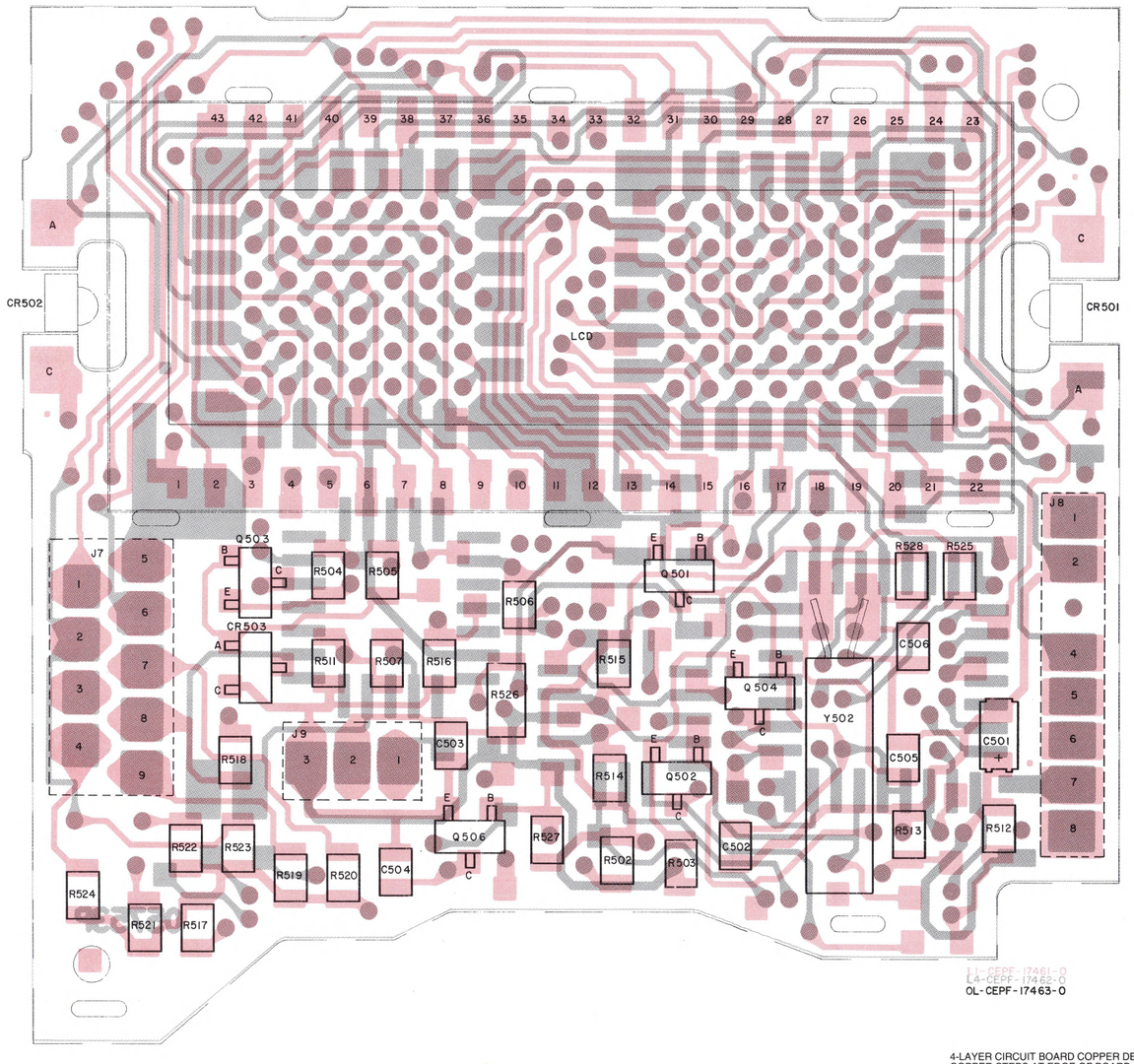


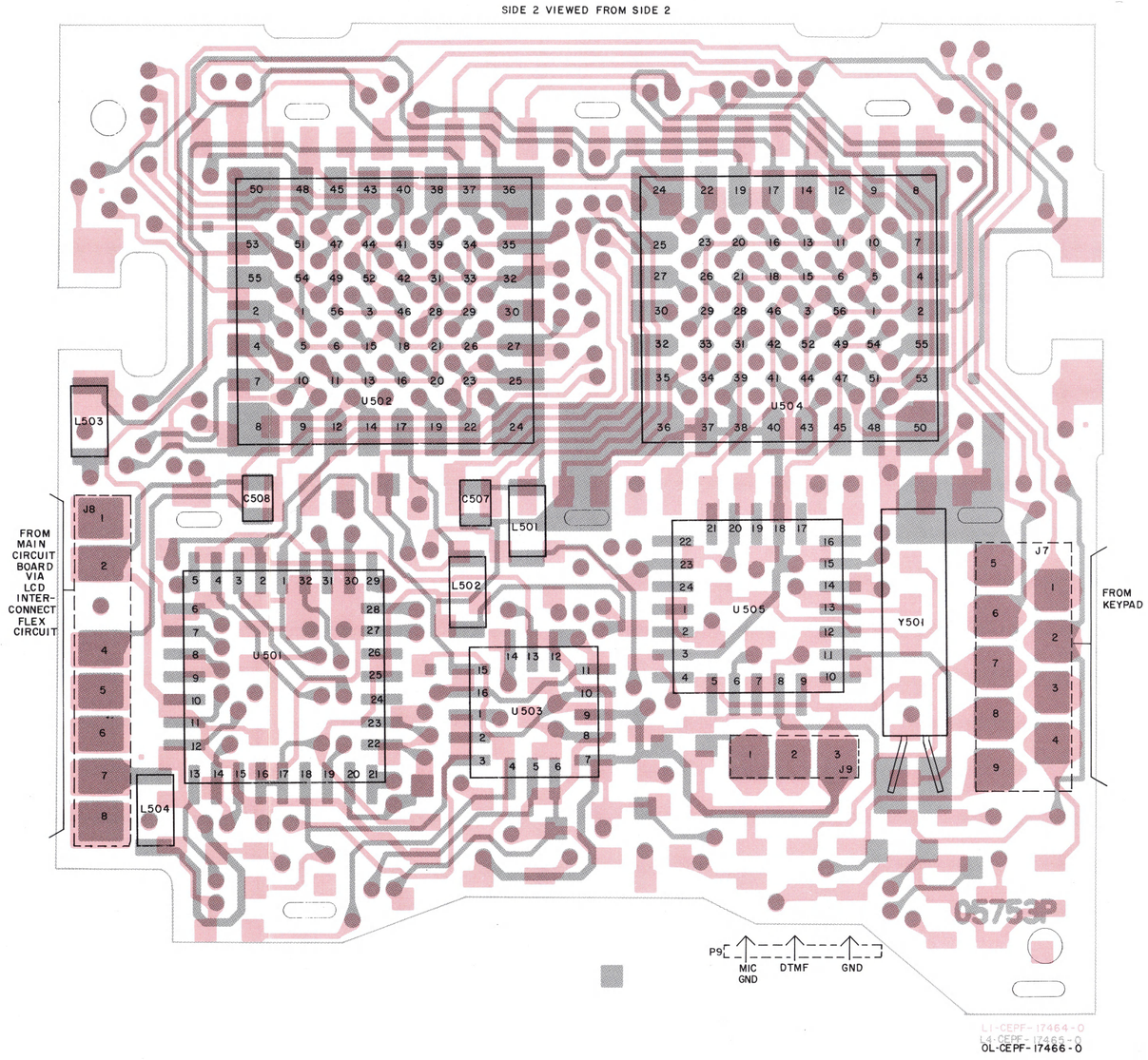
SCHEMATIC AND CIRCUIT BOARD NOTES

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

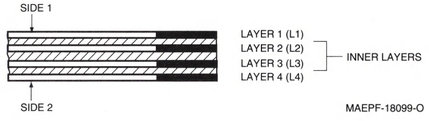
SIDE 1 VIEWED FROM SIDE 1



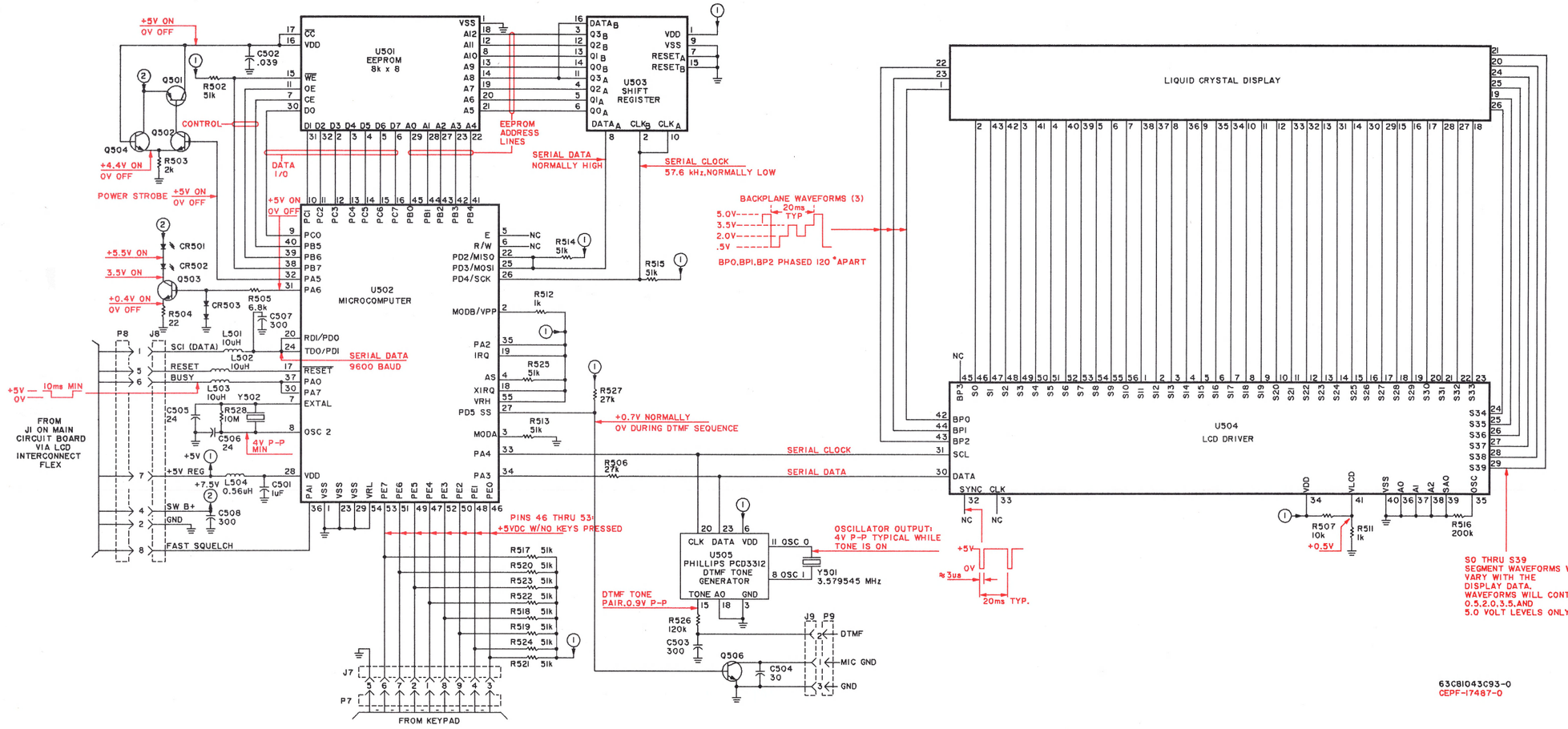
SIDE 2 VIEWED FROM SIDE 2



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



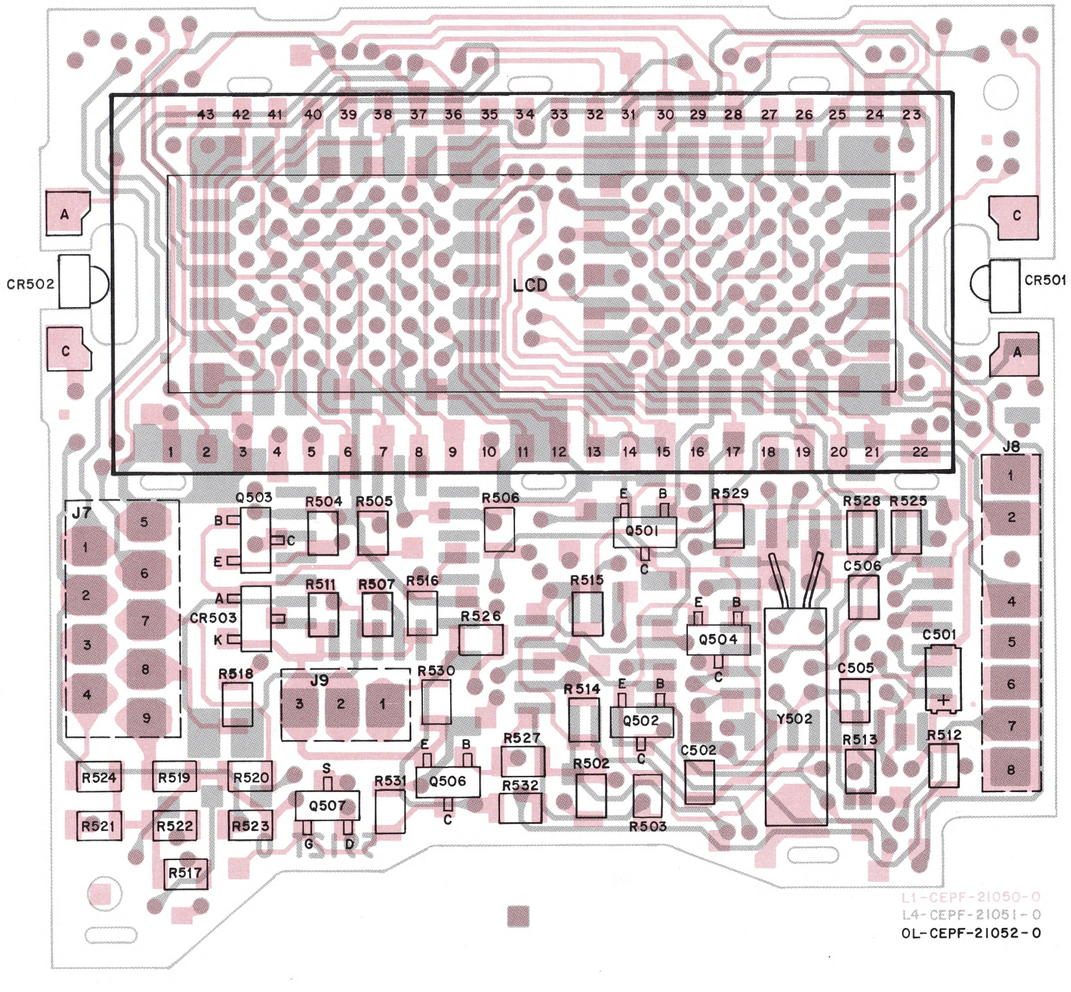
MAEPF-18099-O



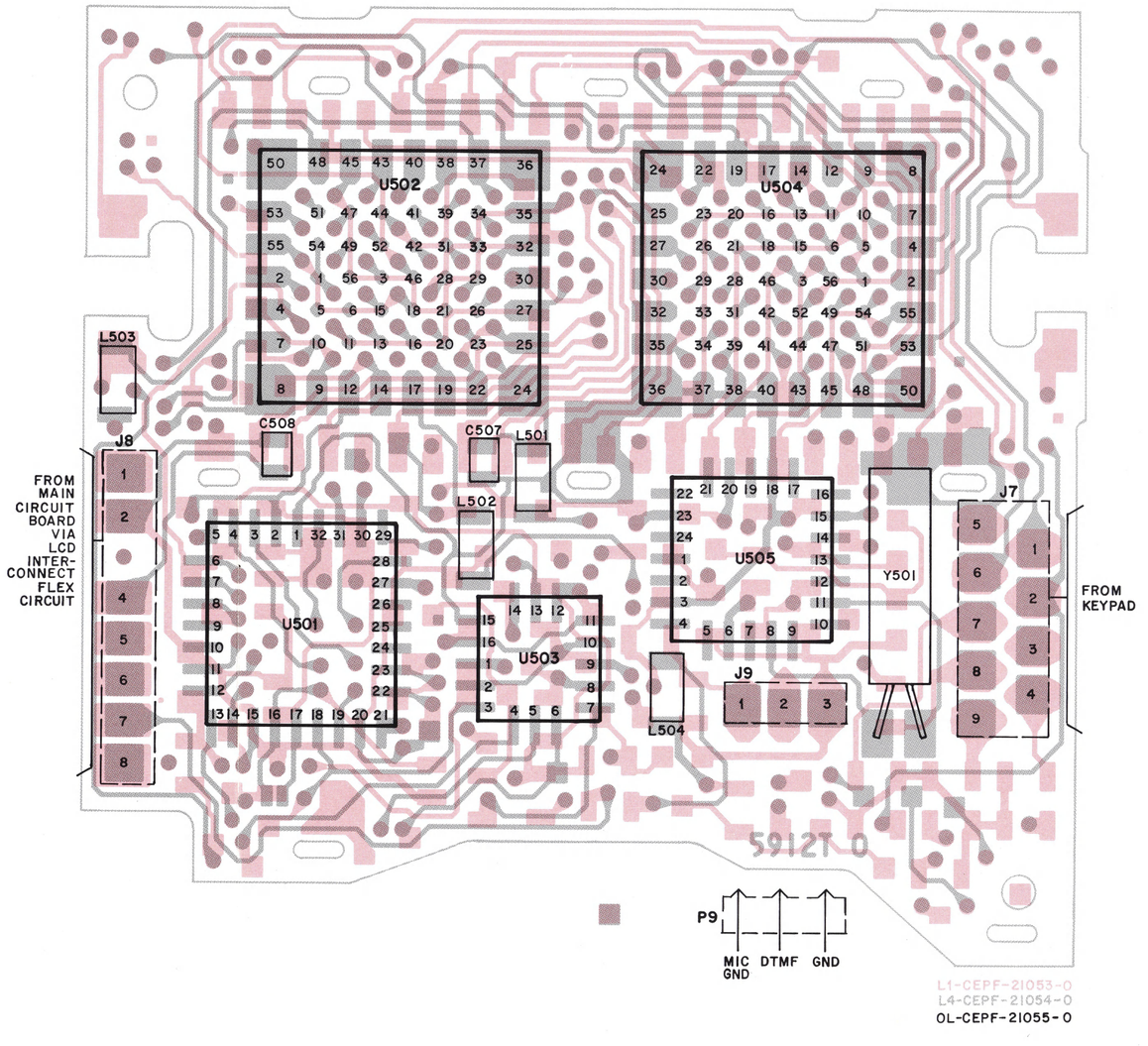
SCHEMATIC AND CIRCUIT BOARD NOTES

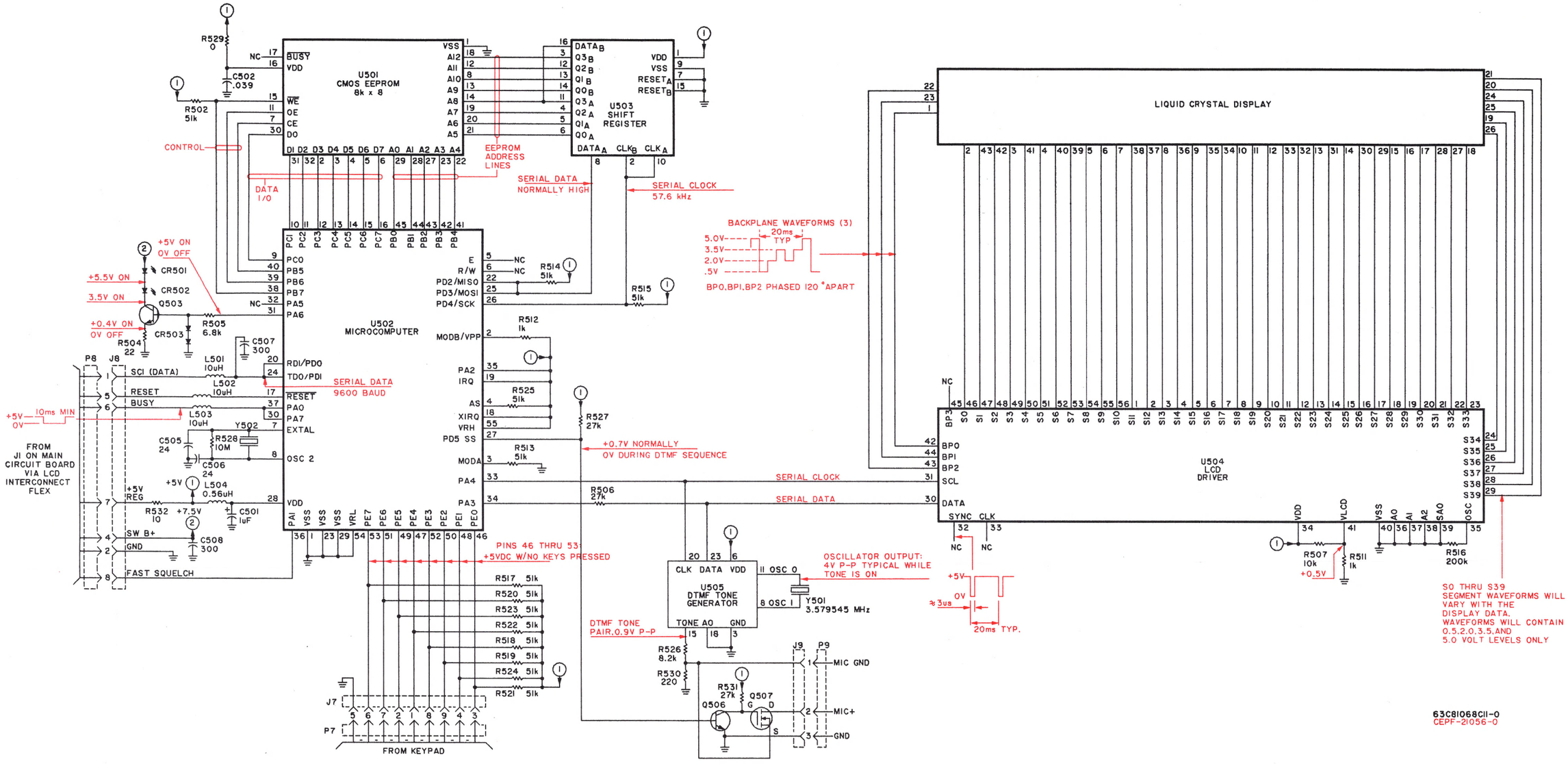
Unless otherwise stated, resistances are in ohms (k = 1000), capacitances less than 1 are in microfarads, and capacitances 1 or greater are in picofarads.

SIDE 1 VIEWED FROM SIDE 1



SIDE 2 VIEWED FROM SIDE 2




U501
CMOS EEPROM
8k x 8
U503
SHIFT
REGISTER
U502
MICROCOMPUTER
U504
LCD
DRIVER
LIQUID CRYSTAL DISPLAY
U505
DTMF TONE
GENERATOR
CONTROL
EEPROM
ADDRESS
LINES
DATA
I/O
SERIAL DATA
NORMALLY HIGH
SERIAL CLOCK
57.6 kHz
SERIAL DATA
9600 BAUD
BACKPLANE WAVEFORMS (3)
20ms
TYP
5.0V
3.5V
2.0V
.5V
BP0,BP1,BP2 PHASED 120 °APART
+5V ON
0V OFF
+5.5V ON
3.5V ON
+0.4V ON
0V OFF
CR501
CR502
CR503
Q503
R504
22
R505
6.8k
C507
300
L501
10uH
L502
10uH
L503
10uH
Y502
C505
24
C506
24
R528
10M
L504
0.56uH
C501
1uF
R532
10
C508
300
+5V
REG
+7.5V
SW B+
GND
FAST SQUELCH
10ms MIN
+5V
0V
FROM
J1 ON MAIN
CIRCUIT BOARD
VIA LCD
INTERCONNECT
FLEX
P8
J8
SCI (DATA)
RESET
BUSY
R529
0
C502
.039
R502
51k
R514
51k
R515
51k
R512
1k
R525
51k
R527
27k
R513
51k
R506
27k
+0.7V NORMALLY
0V DURING DTMF SEQUENCE
SERIAL CLOCK
SERIAL DATA
PINS 46 THRU 53
+5VDC W/NO KEYS PRESSED
R517 51k
R520 51k
R523 51k
R522 51k
R518 51k
R519 51k
R524 51k
R521 51k
J7
P7
FROM KEYPAD
DTMF TONE
PAIR,0.9V P-P
R526
8.2k
R530
220
R531
27k
Q506
Q507
J9
P9
MIC GND
MIC+
GND
OSCILLATOR OUTPUT:
4V P-P TYPICAL WHILE
TONE IS ON
Y501
3.579545 MHz
+5V
0V
≈3us
20ms TYP.
R507
10k
+0.5V
R511
1k
R516
200k
S0 THRU S39
SEGMENT WAVEFORMS WILL
VARY WITH THE
DISPLAY DATA.
WAVEFORMS WILL CONTAIN
0.5,2.0,3.5,AND
5.0 VOLT LEVELS ONLY
63C81068C11-O
CEPF-21056-O

NOTES

NOTES

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: **68P81043C95-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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Company: _____

❒ Customer ❒ COSC ❒ MSS ❒ FTR ❒ Other

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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.

Orders for active filters, Vibrasender and Vibrasponder resonant reeds should specify type number and frequency, should identify the owner/operator of the communications system in which these items are to be used; and should include any serial numbers stamped on the components being replaced.

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Parts Identification:

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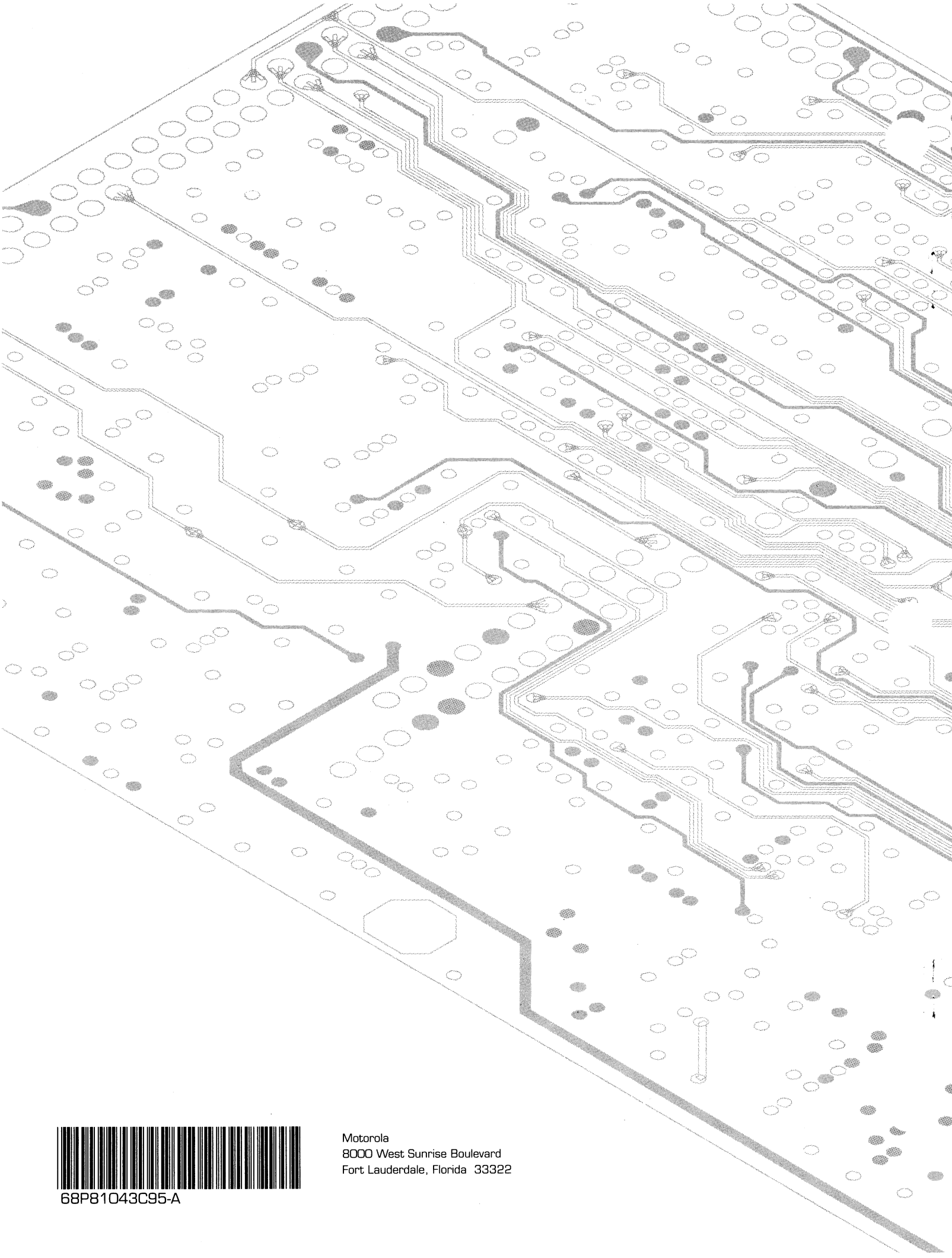

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