MOTOROLA

GP300

Portable Radios

136-155 MHz

146-174 MHz

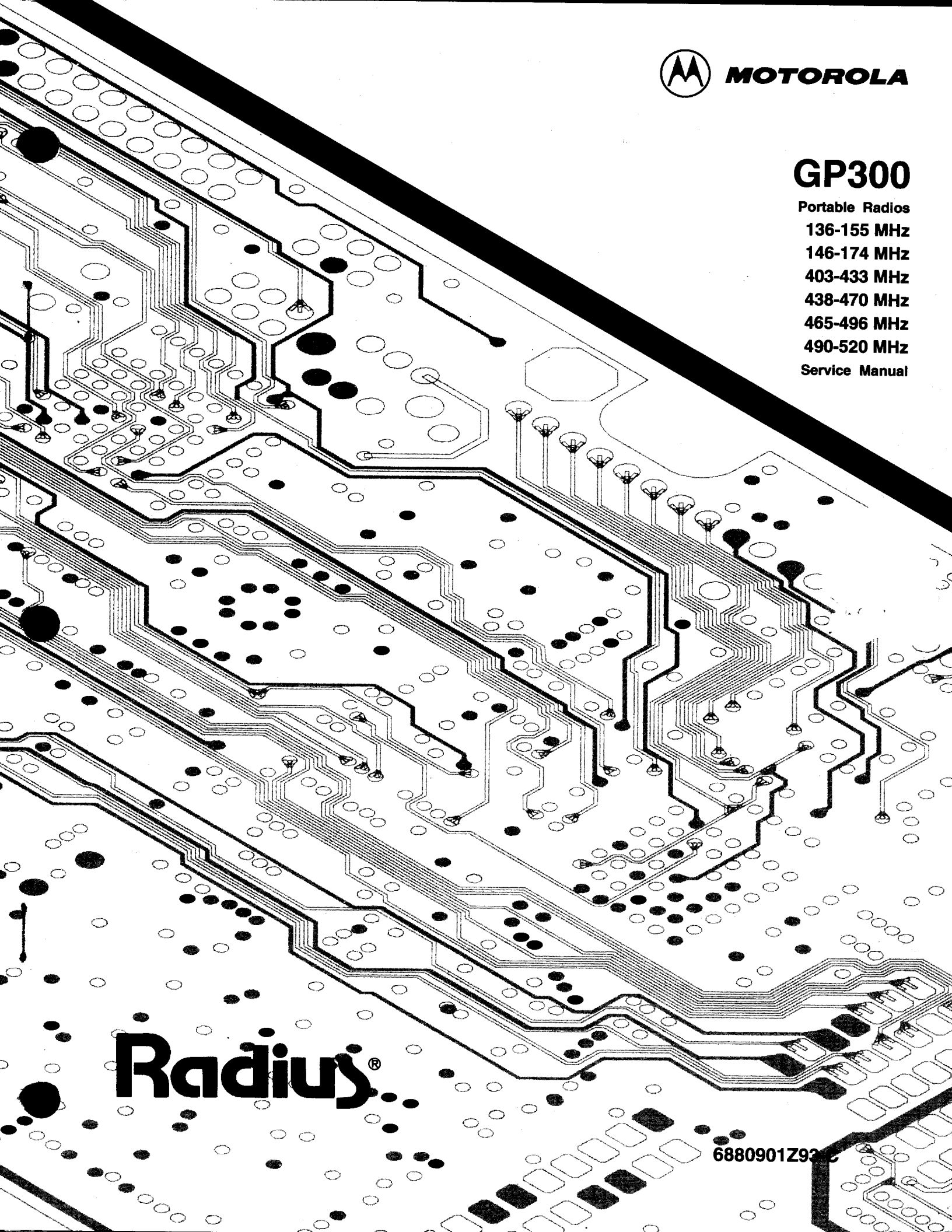
403-433 MHz

438-470 MHz

465-496 MHz

490-520 MHz

Service Manual



Radius®

6880901Z93

MOTOROLA

Table Of Contents

Foreword

Section 1
Radio Disassembly/Assembly

Section 2
Theory of Operation

Scope of Manual

This manual is intended for use by experienced technicians familiar with similar types of equipment. It contains all service information required for the equipment described and is current as of the printing date. Changes which occur after the printing date are incorporated by instruction manual revision. These revisions are added to the manuals as the engineering changes are incorporated into the equipment.

How to Use This Manual

This manual contains introductory material such as model charts, accessories, and specifications, as well as four sections that deal with specific service aspects of the GP300. Refer to the Table of Contents for a general overview of the manual, or to the "Overview" paragraph in each section for a specific overview of the information in that section.

Other Documentation

Table 1 lists other documentation for the GP300 Portable Radios.

Table 1. Other Documentations

Information	Location
Basic Use of GP300	GP300 Owner's Manual (6880901Z83)
Programming	GP300 RSS Manual (6880901Z81)

Technical Support

To obtain technical support, you may call Motorola's Radius Product Services. When you call, we ask that you have ready the model and serial numbers of the respective radio or its parts.

Service Policy

If malfunctions occur within 30 days that cannot be resolved over the phone with Radius Product Services, a defective major component should be returned. You must obtain authorization from Radius Product Services before returning the component.

Ordering Replacement Parts

You can order additional components and some piece parts directly through your Radius price pages. When ordering replacement parts, include the complete identification number for all chassis, kits, and components. If you do not know a part number, include with your order the number of the chassis or kit which contains the part, and a detailed description of the desired component. If a Motorola part number is identified on a parts list, you should be able to order the part through Motorola Parts. If only a generic part is listed, the part is not normally available through Motorola. If no parts list is shown, generally, no user serviceable parts are available for the kit.

Technical Support (U.S. and Canada)
Radius Product Services
Hwy. 34 West
Mt. Pleasant, IA 52641 USA
1-800-356-1520 (U.S. and Canada)
319-385-5395 (Outside U.S.)

Technical Support (Latin America, Mexico, Caribbean)
1-800-694-2161 (Latin America, Mexico, Caribbean)

Radius 30-Day Warranty
Motorola Radio Support Center
3761 South Central Avenue
Rockford, Il 61102 USA
1-800-227-6772
847-725-4830 (Outside U.S.)

Radius Major Component Repair
Motorola Radio Support Center
3761 South Central Avenue
Rockford, Il 61102 USA

Motorola Parts
Americas Parts Division
Attention: Order Processing
1313 E. Algonquin Road
Schaumburg, IL 60196

Customer Service Motorola Parts
1-800-422-4210
1-708-538-8198 (FAX)

Parts Identification
1-708-538-0021
1-708-538-8194 (FAX)

GP300 DTMF COSMETIC KIT REX4673A NCA
GP300 NO-DTMF " " REX4674A NCA

Model Charts

GP300
VHF
136 - 162 MHz
146 - 174 MHz

X = Indicates one of each required

Model	Description
P93YPC20C1A_	16-Chan., 20/25 kHz (136-162 MHz)
P93YPC20D1A_	8-Chan., 20/25 kHz (136-162 MHz)
P93YPC20A1A_	2-Chan., 20/25 kHz (136-162 MHz)
P93YPC00C1A_	16-Chan., 12.5 kHz (136-162 MHz)
P93YPC00D1A_	8-Chan., 12.5 kHz (136-162 MHz)
P93YPC00A1A_	2-Chan., 12.5 kHz (136-162 MHz)
P93YPC20C2A_	16-Chan., 2-/25 kHz (146-174 MHz)
P93YPC20D2A_	8-Chan., 20/25 kHz (146-174 MHz)
P93YPC20A2A_	2-Chan., 20/25 kHz (146-174 MHz)
P93YPC00C2A_	16-Chan., 12.5 kHz (146-174 MHz)
P93YPC00D2A_	8-Chan., 12.5 kHz (146-174 MHz)
P93YPC00A2A_	2-Chan., 12.5 kHz (146-174 MHz)

													Item	Description
			X	X									HLD8095_	RF Board, 12.5 kHz, (136-162 MHz)
X	X												HLD8094_	RF Board, 20/25 KHz, (136-162 MHz)
		X											HLD8338_	RF Board, 2-Chan., 20/25 kHz, (136-162 MHz)
					X								HLD8339_	RF Board., 2-Chan., 12.5 kHz, (136-162 MHz)
									X	X			HLD9675_	RF Board, 12.5 kHz, (146-174 MHz)
						X	X						HLD9677_	RF Board, 20/25 kHz, (146-174 MHz)
								X					HLD8335_	RF Board, 2-Chan., 20/25 kHz, (146-174 MHz)
												X	HLD8332_	RF Board, 2-Chan., 12.5 kHz, (146-174 MHz)
		X			X			X				X	HLN9668_	2-Channel Control Kit
	X			X			X			X			HLN9849_	8-Channel Control Kit
X			X			X			X				HLN9680_	16-Channel Control Kit
X	X	X	X	X	X	X	X	X	X	X	X	X	HLN9667_	Chassis Hardware Assembly
X	X	X	X	X	X	X	X	X	X	X	X	X	HHN9684_	Housing
X	X	X	X	X	X								HAD9338_	Antenna (136-162 MHz)
						X	X	X	X	X	X	X	NAD6502_	Antenna (146-174 MHz)
X	X	X	X	X	X	X	X	X	X	X	X	X	6880901Z83	Operator's Manual/Operator Card

GP300
UHF
403 - 433 MHz
438 - 470 MHz

X = Indicates one of each required

Model	Description	Item	Description
P94YPC20C1A_	16-Chan., 20/25 kHz (403-433 MHz)	HLE9673_	RF Board, 12.5 kHz, (403-433 MHz)
P94YPC20D1A_	8-Chan., 20/25 kHz (403-433 MHz)	HLE9670_	RF Board, 20/25 kHz, (403-470 MHz)
P94YPC20A1A_	2-Chan., 20/25 kHz (403-433 MHz)	HLE8336_	RF Board, 2-Chan., 20/25 kHz, (403-433 MHz)
P94YPC00C1A_	16-Chan., 12.5 kHz (403-433 MHz)	HLE8333_	RF Board, 2-Chan., 12.5 kHz, (403-433 MHz)
P94YPC00D1A_	8-Chan., 12.5 kHz (403-433 MHz)	HLE9674_	RF Board, 12.5 kHz, 12.5 kHz (438-470 MHz)
P94YPC00A1A_	2-Chan., 12.5 kHz (403-433 MHz)	HLE9676_	RF Board, 20/25KHz, (438-470 MHz)
P94YPC20C2A_	16-Chan., 20/25 kHz (438-470 MHz)	HLE8337_	RF Board, 2-Chan., 20/25 kHz (438-470 MHz)
P94YPC20D2A_	8-Chan., 20/25 kHz (438-470 MHz)	HLE8334_	RF Board, 2-Chan., 12.5 kHz (438-470 MHz)
P94YPC20A2A_	2-Chan., 20/25 kHz (438-470 MHz)	HLN9668_	2-Channel Control Kit
P94YPC00C2A_	16-Chan., 12.5 kHz (438-470 MHz)	HLN9849_	8-Channel Control Kit
P94YPC00D2A_	8-Chan., 12.5 kHz (438-470 MHz)	HLN9680_	16-Channel Control Kit
P94YPC00A2A_	2-Chan., 12.5 kHz (438-470 MHz)	HLN9667_	Chassis Hardware Assembly
		HHN9684_	Housing
		NAE6483_	Antenna
		6880901Z83	Operator's Manual/Operator Card

P94YPC20C1A_	P94YPC20D1A_	P94YPC20A1A_	P94YPC00C1A_	P94YPC00D1A_	P94YPC00A1A_	P94YPC20C2A_	P94YPC20D2A_	P94YPC20A2A_	P94YPC00C2A_	P94YPC00D2A_	P94YPC00A2A_
			X	X							
X	X										
		X									
					X						
									X	X	
						X	X				
								X			
											X
		X			X			X			X
	X			X			X			X	
X			X			X			X		
X	X	X	X	X	X	X	X	X	X	X	X
X	X	X	X	X	X	X	X	X	X	X	X
X	X	X	X	X	X	X	X	X	X	X	X
X	X	X	X	X	X	X	X	X	X	X	X

GP300
UHF
465 - 495 MHz
490 - 520 MHz

X = Indicates one of each required

Model	Description
P94YPC20C3A_	16-Chan., 20/25 kHz (465-495 MHz)
P94YPC20D3A_	8-Chan., 20/25 kHz (465-495 MHz)
P94YPC20A3A_	2-Chan., 20/25 kHz (465-495 MHz)
P94YPC00C3A_	16-Chan., 12.5 kHz (465-495 MHz)
P94YPC00D3A_	8-Chan., 12.5 kHz (465-495 MHz)
P94YPC00A3A_	2-Chan., 12.5 kHz (465-495 MHz)
P94YPC20C4A_	16-Chan., 20/25 kHz (490-520 MHz)
P94YPC20D4A_	8-Chan., 20/25 kHz (490-520 MHz)
P94YPC20A4A_	2-Chan., 20/25 kHz (490-520 MHz)
P94YPC00C4A_	16-Chan., 12.5 kHz (490-520 MHz)
P94YPC00D4A_	8-Chan., 12.5 kHz (490-520 MHz)
P94YPC00A4A_	2-Chan., 12.5 kHz (490-520 MHz)

C3A	D3A	A3A	C00	D00	A00	C4A	D4A	A4A	C00	D00	A00	Item	Description
			X	X								HLE8056_	RF Board, 12.5 kHz, (465-495 MHz)
X	X											HLE8054_	RF Board, 20/25 kHz, (465-495 MHz)
		X										HLE8340_	RF Board, 2-Chan., 20/25 kHz, (465-495 MHz)
					X							HLE8341_	RF Board, 2-Chan., 12.5 kHz, (465-495 MHz)
									X	X		HLE8057_	RF Board, 12.5 kHz, (490-520 MHz)
						X	X					HLE8055_	RF Board, 20/25 kHz, (490-520 MHz)
								X				HLE8342_	RF Board, 2-Chan., 20/25 kHz, (490-520 MHz)
											X	HLE8343_	RF Board, 2-Chan., 12.5 kHz, (490-520 MHz)
		X			X			X			X	HLN9668_	2-Channel Control Kit
	X			X			X			X		HLN9849_	8-Channel Control Kit
X			X			X			X			HLN9680_	16-Channel Control Kit
X	X	X	X	X	X	X	X	X	X	X	X	HLN9667_	Chassis Hardware Assembly
X	X	X	X	X	X	X	X	X	X	X	X	HHN9684_	Housing
X	X	X	X	X	X	X	X	X	X	X	X	NAE6483_	Antenna
X	X	X	X	X	X	X	X	X	X	X	X	6880901z83	Operator's Manual/Operator Card

Accessories

Antennas:

NAD6502 — Black	146-174 MHz VHF Antenna (Standard w/Unit)
HAD9338 — Yellow	136-162 MHz VHF Antenna (Standard w/Unit)
HAD9742 — Black	146-162 MHz VHF Stubby Antenna
HAD9743 — Blue	162-174 MHz VHF Stubby Antenna
HAD9934 — Pink	174-195 MHz VHF Antenna
HAD9935 — Purple	195-208 MHz VHF Antenna
NAE6483 — None	403-520 MHz UHF Antenna (Standard w/Unit)
NAE6521 — Red	400-440 MHz UHF Stubby Antenna
NAE6522 — Green	438-470 MHz UHF Stubby Antenna
NAE6523 — Black	470-520 MHz UHF Stubby Antenna
HAD9728 — None	Tunable Antenna Kit (136-174 MHz)

HAD9338BR 136-150.8 9.99

Note: Each of the color coded antennas listed is designed to cover only the frequency split indicated. Therefore, it is important to order the correct antenna (frequency split) to match a specific customer frequency.

Carrying Accessories:

HLN9149	Swivel Belt Loop Adapter (for use with HLN9720, HLN9721, HLN9750, HLN9970, and HLN9008)
HLN9720	Standard Leather Carry Case w/Belt Loop
HLN9873	Standard Leather Carry Case w/Swivel
HLN9721	Slim Leather Carry Case w/Belt Loop
HLN9076	Standard Molded Carry Holder w/Belt Clip
HLN9750	Standard Nylon Carry Case
HLN9970	DTMF Standard Leather Carry Case w/Belt Loop
HLN8411	DTMF Standard Leather Carry Case w/Swivel
HLN8412	DTMF LCD Standard Leather Carry Case w/Swivel
HLN9008	Leather Carry Case w/Belt Loop for fully approved FM 1200 mAH Battery
HLN9009	Leather Carry Case w/Swivel for fully approved FM 1200 mAH Battery
HLN9011	DTMF Carry Case w/Swivel for fully approved FM 1200 mAH Battery
HLN9017	Nylon Carry Case for fully approved FM 1200 mAH Battery
HLN9724	Replacement 2-1/2" Belt Clip
HLN8255	Spring Action 3" Belt Clip
HLN8052	Wrist Strap
NTN5243	Shoulder Strap (for all carry cases)
HLN8414	Chest Pack Carry Holder
NTN5629	Replacement 3" Swivel Belt Loop (for use with same carry accessories as 2-1/2" Belt Loop but with wider belts)
HLN9035	Replacement 2-1/2" Swivel Belt Loop (for use with HLN9873, HLN9411, HLN8412, HLN9009, and HLN9011)
HLN9084	Replacement Strap for Molded Carry Holder
HLN9973	Replacement Strap for Leather Carry Case
HLN9974	Replacement Strap for Nylon Carry Case
HLN9975	Replacement Strap for DTMF Carry Case
HLN9018	Replacement Strap for fully approved FM 1200 mAH Battery Leather Carry Case
HLN9019	Replacement Strap for fully approved FM 1200 mAH Battery Nylon Carry Case
HLN9985	Waterproof Bag

Nickel-Cadmium Battery Chargers:

HTN9630	110 Volt - 1 Hour Rapid Rate Chargert
HTN9702	110 Volt - 10 Hour Standard Rate Charger
HTN9748	110 Volt - 6 Unit - 1 Hour Rapid Rate Charger
HTN9886	100 Volt - 1 Hour Rapid Rate Charger
HTN9938	100 Volt - 6 Unit - 1 Hour Rapid Rate Charger
HTN9802	220 Volt - 1 Hour Rapid Rate Charger (European Plug)
HTN9804	220 Volt - 10 Hour Standard Rate Charger (European Plug)
HTN9811	220 Volt - 2 Unit - 1 Hour Rapid Rate Charger (European Plug)
HTN9803	240 Volt - 1 Hour Rapid Rate Charger (U.K. Plug)
HTN9805	240 Volt - 10 Hour Standard Rate Charger (U.K. Plug)
HTN9812	240 Volt - 6 Unit - 1 Hour Rapid Rate Charger (U.K. Plug)
HLN9719	1 Hour Vehicular Charger Adapter/Bracket (12 volt for use with HTN9630, HTN9802, or HTN9803 Rapid Rate Chargers)
HLN9944	Wall Mounting Bracket For Multi Unit Charger
HKN8036	Battery Eliminator

Batteries:

HNN9628	1200 mAH High Capacity Battery
HNN8133	1200 mAH Limited FM Battery
HNN8308	600 mAH Slimline Battery
HNN9808	600 mAH (Fully Approved FM Slim Battery)
HNN9701	1200 mAH (Fully Approved FM Battery)

Audio/RF Accessories:

HMN9725	Remote Speaker Microphone
HMN9727	Earpiece Without Volume Control (plastic earloop)
HMN9752	Earpiece With Volume Control (plastic earloop)
50-80386B90	Rubber Ear Inserts for Earpieces (with older metal earloop - pkg q. 25)
50-80371E73	Rubber Ear Inserts for Earpieces (with plastic earloop - pkg q. 25)
HMN9754	2 Piece Surveillance Microphone (plastic earloop)
HMN9787	Headset w/Swivel Boom Microphone
BDN6647	Medium Weight Headset w/Swivel Boom Microphone
BDN6648	Heavy Weight Headset w/Noise Cancelling Boom Microphone
BDN6646	Ear Microphone
BDN6706	Ear Microphone w/VOX Interface (External VOX Included)
HLN8096	Audio Accessory Clamp
HLN9756	BNC - RF Adapter (for use with GP300 models only) 5880166501

Prices And Availability Subject To Change Without Notice

99.25 HLN3748A DTMF Retrofit kit for 16-ch radios (appl to radios shipped after 15 Mar 92)

6880902Z45 Instructions 30¢

Performance Specifications

GENERAL

	VHF		UHF			
Model Series:	P93YPC		P94YPC			
Frequency:	136-162	146-174	403-433	438-470	465 - 495	490 - 520
Channel Capacity:	2, 8, 8+2, or 16 Channels					
Power Supply:	One (1) rechargeable Nickel-Cadmium battery (7.5V)					
Dimensions†:	5.5" X 2.34" X 1.65" (140 X 59 X 42mm)†					
Weight †:	17.8 oz. (509 g)†					
Average Battery Life (5-5-90 Duty Cycle): High Capacity: Low Capacity:	Low Power 10.5 Hours 5.2 Hours	High Power 8 Hours 4 hours	Low Power 10.5 Hours 5.2 Hours	High Power 8 Hours 4 hours		
Environmental:	Meets MIL-STD-810-C, D, and E & EIA RS-316B environmental specifications for vibration, shock, rain, dust, and humidity					

†Standard High Capacity Battery Model

TRANSMITTER

	VHF		UHF	
RF Output @ 7.5V:	High 5W	Low 1W	High 4W†	Low 1W
Freq. Separation:	26, 28 MHz		30, 32 MHz	
Freq. Stability (-30°C to +60°):	±0.0005%			
Modulation:	±5 kHz max. (25/30 kHz channel spacing) ±2.5 kHz max. (12.5 kHz channel spacing)			
Spurs/Harmonics:	0.25 µW < 2GHz			
Audio Response: (from 6 dB/oct. Pre-Emphasis, 300 to 3000Hz	+1, -3 dB			
Audio Distortion: @ 1000 Hz, 60% Rated Max. Dev.	<3%			
FCC Designation:	ABZ99FT301 ABZ99FT3011		ABZ99FT4010 ABZ99FT4011 ABZ99FT4012	
FM Noise:	-40 dB‡			

†Max.RF output is 3W for frequencies greater than 512 MHz
‡Typical level

RECEIVER

	VHF		UHF	
Channel Spacing:	25 kHz	12.5 kHz	25 kHz	12.5 kHz
Freq Separation:	26, 28 MHz		30, 32 MHz	
Sensitivity - 20 dB Quieting†: 12 dB EIA SINAD†: 20 dB SINAD†:	0.32 µV 0.22 µV 0.30 µV	0.38 µV N/A 0.35 µV	0.32 µV 0.22 µV‡ 0.30 µV	0.38 µV N/A 0.35 µV
Squelch Sensitivity:	10 dB SINAD			
Selectivity:	70dB	60dB	70dB	60dB
Intermodulation	70dB	60 dB	70 dB	60 dB
Freq. Stability (-30°C to +60°C): (-10°C to +50°C):	0.0005% 0.0003%			
Spur Rejection EIA: CEPT:	75 dB 70 dB			
Image Rejection EIA: CEPT:	75 dB 70 dB		70 dB 70 dB	
Audio Output at<10% Distortion (1 kHz)	500mW			

†Typical specification is 0.28mV on frequencies greater than 512 MHz

*All specifications subject to change without notice.

Service Aids

The following table lists service aids recommended for working on the GP300.

Motorola Part No.	Description	Application
HLN9214	Radio Interface Box	Enables communication between the radio and the computer's serial communications adapter.
HSN9412	RIB Power supply	Used to supply power to the RIB.
HKN9216	Computer Interface cable	Connects the computer's serial communications adapter to the RIB.
HLN9390	AT to XT Computer adapter	Allows HKN9216 to plug into a XT style communications port.
HKN9857 195.00	Programming / test cable	Connects radio to RIB. And can be used as a Battery Eliminator.
HVN9852	Radio Service Software	Software on 3-1/2 in. and 5-1/4 in. floppy disc.
HKN9755	Cloning Cable	Allows the radio to be duplicated from a master radio by transferring programmed data from one radio to another.
RTX4005	Portable Test Set	Enables connection to the audio / accessory jack. Allows switching for radio testing.
RKN4034 33.50	Test Set cable	Connects radio to RTX4005B Test Box.

Test Equipment

The following table lists test equipment required to service the GP300 and other two-way radios.

Motorola Model No.	Description	Characteristics	Application
R2200, R2400, or R2001D with trunking option	Service Monitor	This monitor will substitute for items with an asterisk *	Frequency/deviation meter and signal generator for wide-range troubleshooting and alignment
*R1049A	Digital Multimeter		Two meters recommended for ac/dc voltage and current measurements
*S1100A	Audio Oscillator	67 to 161.4Hz tones	Used with service monitor for injection of PL tones
*S1053D, *SKN6009A, *SKN6001A	AC Voltmeter, Power Cable for meter, Test leads for meter	1mV to 300V, 10-Megohm input impedance	Audio voltage measurements
R1053	Dual-trace Oscilloscope	20 Mhz bandwidth, 5mV/cm - 20V/cm	Waveform measurements
*S1350C, *ST1215B (VHF) *ST1223B (UHF) *T1013A	Wattmeter, Plug-in Elements (Vhf & Uhf), RF Dummy Load	50-ohm, ± 5% accuracy 10 Watts, maximum 0-1000 Mhz, 300W	Transmitter power output measurements
S1339A	RF Millivolt Meter	100uV to 3V rf, 10 khz to 1.2 Ghz	RF level measurements
*R1013A	SINAD Meter		Receiver sensitivity
S1347D or S1348D (prog)	DC Power Supply	0-20 Vdc, 0-5 Amps	Bench supply for 10Vdc

Test Set Service Cable

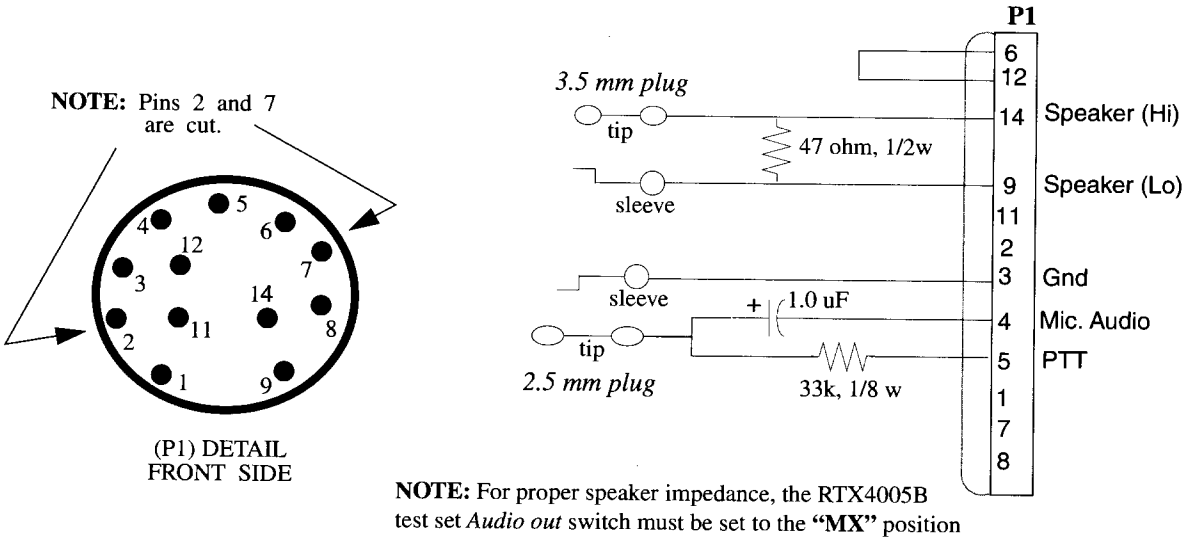


Figure 1. Service Cable (RKN4034A) for the Test Set (RTX4005B)

Radio Model Information

The model number, serial number, and Motorola FCC designation number are all on a label attached to the back of your radio. From this model number, you can determine the RF output power, frequency band, type of squelch, and number of channels. The table below outlines one portable radio model number and its specific characteristics.

All GP300 radio models are synthesized, two or four channel units that come standard with tone Private-Line (TPL) or Digital Private-Line (DPL) coded squelch, which may be enabled / disabled on a per channel basis. Programming changes can be made by your local Radius dealer.

Radio Model Number (Example: P94YPC20D2AA)

Type of Unit	Tx Power	Freq.	Model Series	Channel Spacing	Channel Capability	Frequency Sub-band	Version	Unique Model Variation
P	**9** 1-5 W VHF 1-4 W UHF	**3** VHF	**YPC** Universal	**00** 12.5 kHz	**A** 2 Channels	**1** Low Split	**A**	
		4 UHF		**20** 20/25 kHz	**D** 8 Channels	**2** High Split		**A**
					C 16 Channels			

P = Portable

A = Package Model with Battery, Antenna, etc.

Radio Service Software Information

To run the Radio Service Software, you will need the following equipment:

Required Equipment:

1. *IBM XT, AT, Convertible, or System/2 Model 30/50*™ with 512K RAM, Dual Floppy Disk Drives or on Floppy Disk and one Hard Disk.
2. *PCDOS*™ or *MSDOS*™ 3.0 or later.
3. Radio Interface Box (RIB) **HLN9214.**
4. RIB to *IBM AT* cable **HKN9216.**
5. *IBM AT* cable to *IBM XT* computer adapter (optional) **HLN9390.**
6. Programming/Test cable.
7. RIB power supply **HSN9412** (110 VAC) or 0180358A56 (220 VAC).
8. Power Supply R1011A or equivalent.

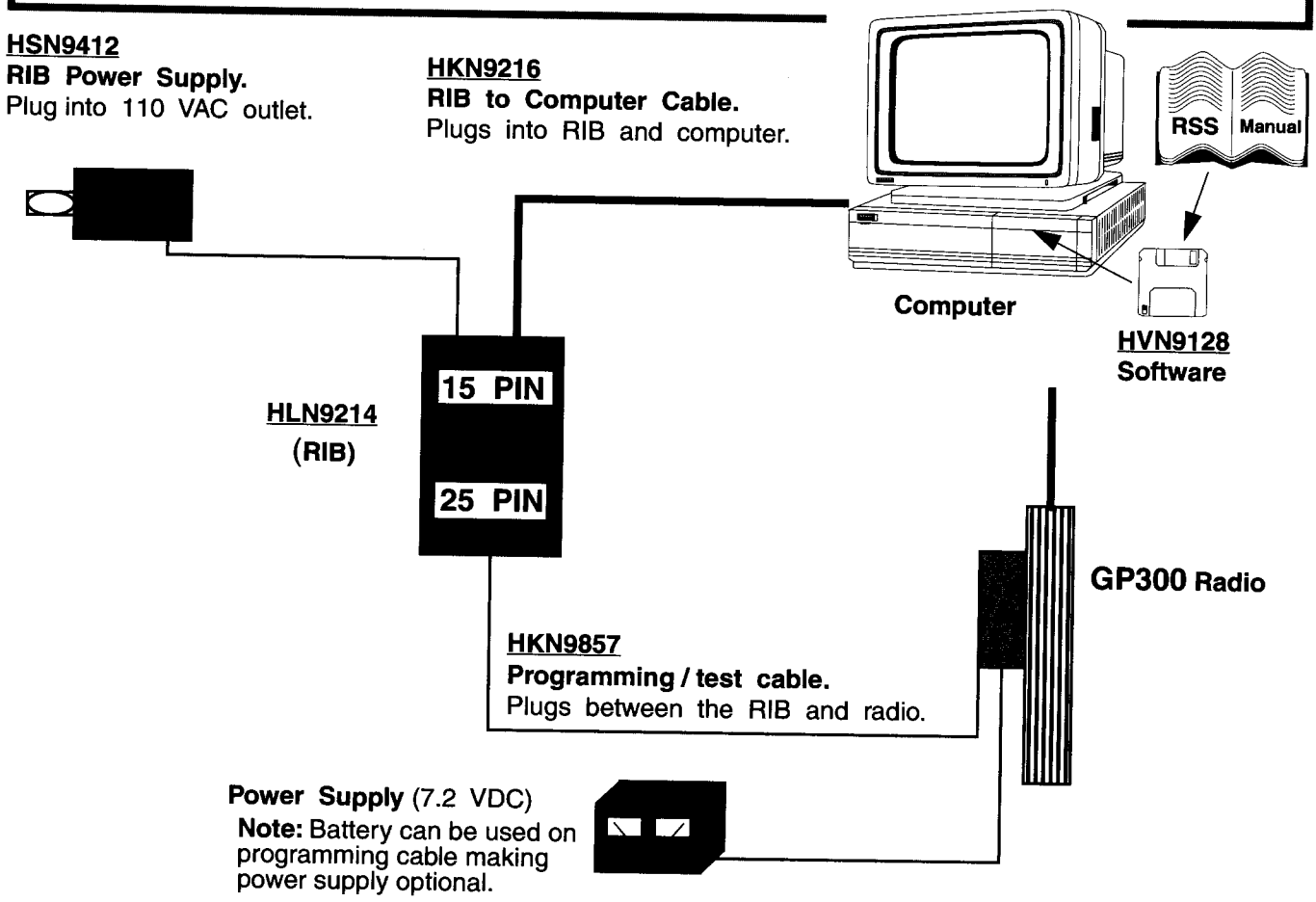


Figure 2. Equipment Setup

Configuring the RIB and Radio

1. Connect the RIB to the computer (Figure 2).
2. If your computer has an XT style communications port (25 pin connector), plug the HLN9390 adapter into the computer and plug the HKN9216 cable into the adapter. If you are unsure of which connection is on the back of your computer or the COM port, then please consult the computer manuals.
3. Plug the large 25 pin end of the HKN programming cable into the RIB. The other end of this cable has a "battery eliminator."
4. Slide the battery eliminator in place of the radio's battery.
5. Plug the HSN9412 power supply into a wall outlet, and connect the other end to the RIB.
6. Connect the radio to a power supply and turn the volume control clockwise to turn it on.

Section 1
Radio Disassembly/Assembly

Overview

This section explains, step by step, how to disassemble and reassemble the GP300 radio.

Disassemble Radio

Remove Battery

1. The battery latches are located at the bottom of the radio on each side (Figure 1-1). Press and hold both battery latches toward the front of the radio.

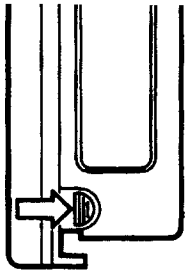


Figure 1-1. Press Battery Latches

2. Press the battery housing against the radio, while sliding it down until it is free of the chassis rails (Figure 1-2).
3. To remove the battery, pull it straight out and away from the radio.

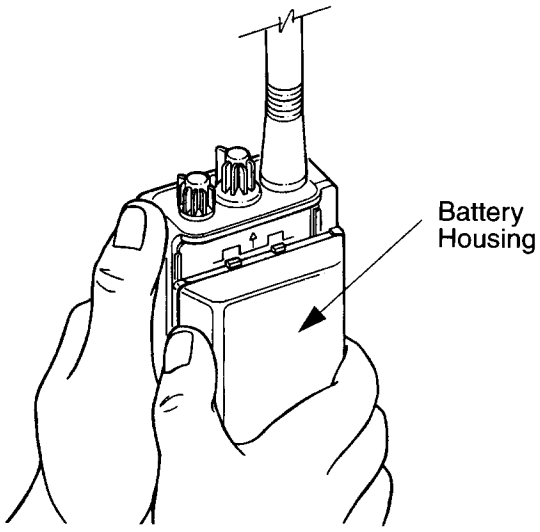


Figure 1-2. Slide Battery Housing

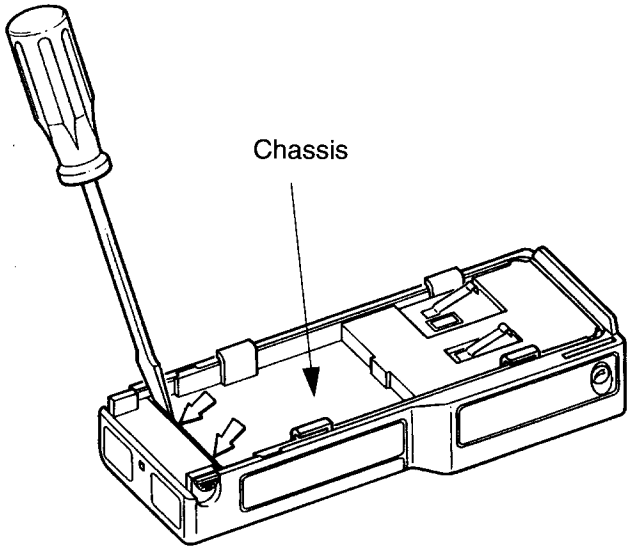


Figure 1-3. Remove Chassis

Remove Chassis

1. Pull the control knobs straight off.
2. Unscrew the antenna counter-clockwise until it is detached from the radio.
3. Carefully pry the chassis up on both sides, near the bottom, with a flat-blade screwdriver (Figure 1-3).
4. Lift the chassis approximately halfway out.

IMPORTANT
You must disconnect the ribbon cable before completely removing the chassis.

5. Remove the ribbon cable connector from the main board using pliers or a flat blade screwdriver (Figure 1-4).
6. Pull the chassis out and away from the housing as shown by the arrow (Figure 1-4).

Remove Main Board

The front shield holds the main board into the chassis. To remove the front shield:

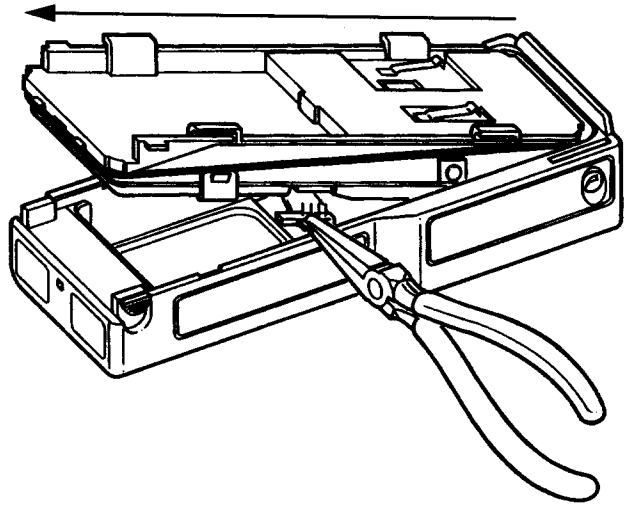


Figure 1-4. Remove Ribbon Cable Connector

1. Lay radio, shield side down, on a flat surface.
2. Apply downward pressure to chassis directly above one of the clips opposite PTT switch.
3. With a flat blade screwdriver, carefully move clip away from tab on chassis to release.

NOTE
Remove both clips opposite the PTT switch first, to ease remaining clip removal.

4. Repeat steps 2 and 3 for the remaining three clips.
5. Separate the main board from the chassis (Figure 1-5).

Reassemble Radio

1. Place chassis on a flat surface with the battery rails downward.
2. Insert main board into chassis using alignment pins as a guide (Figure 1-6).
3. Place front shield on main board using tabs as a guide (Figure 1-6).
4. Press down on front shield until chassis, main board, and front shield are seated tightly together.
5. Hook locking clips first to the chassis tab, then push clip over on shield with thumb until clip locks into front shield holes (Figure 1-7).
6. Replace chassis gasket (Figure 1-8).

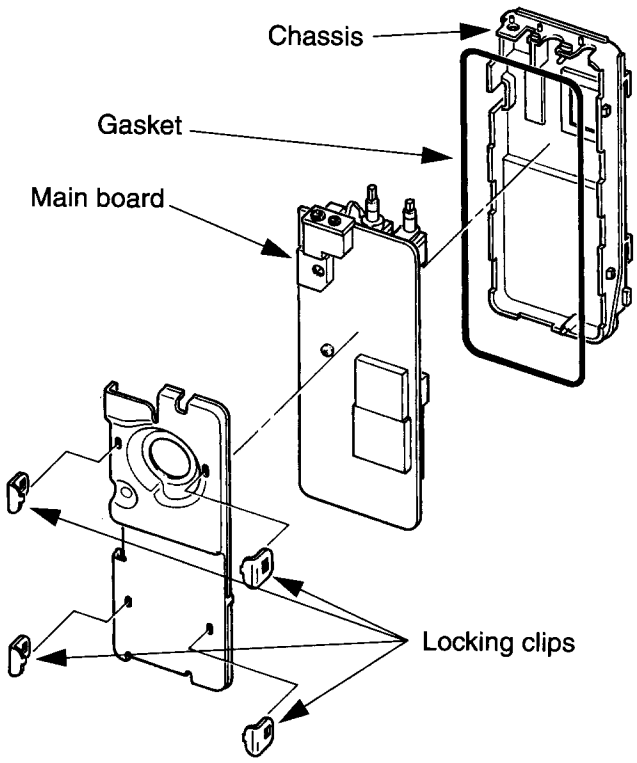


Figure 1-5. Separate Main Board From Chassis

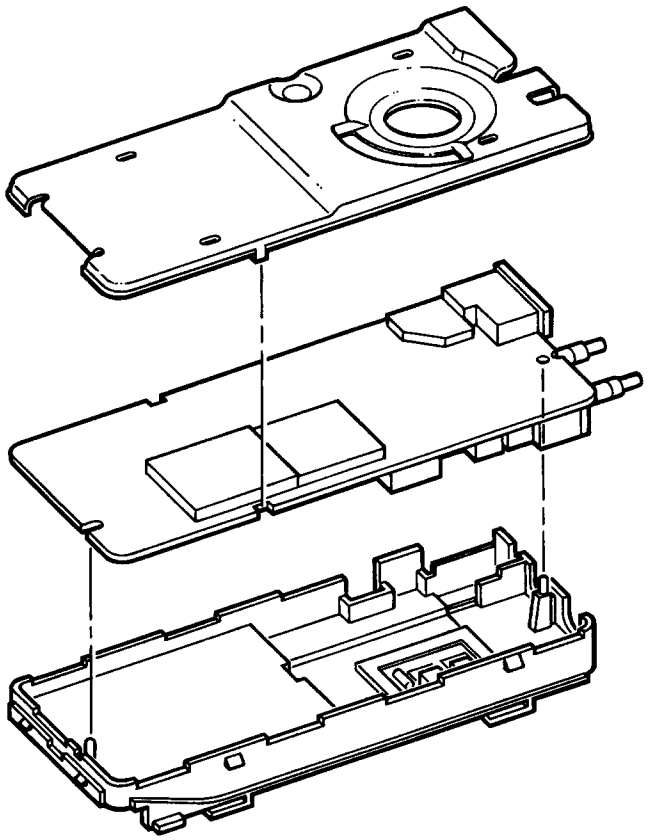


Figure 1-6. Align Pins

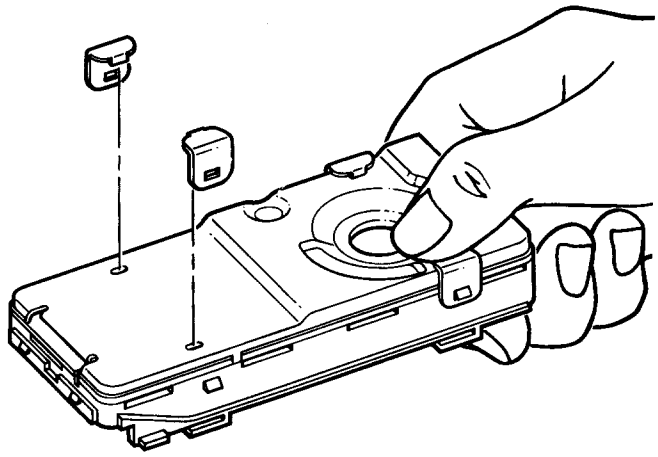


Figure 1-7. Reinsert Locking Clips

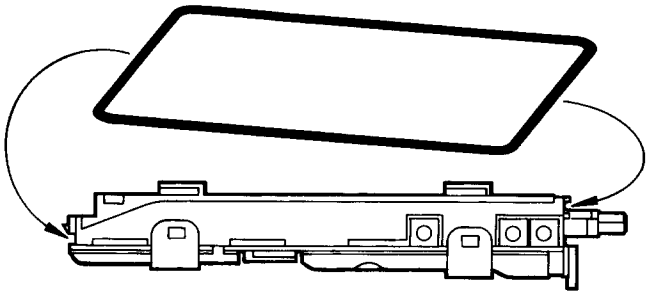


Figure 1-8. Replace Gasket

NOTE

The gasket helps keep the radio free of unwanted dirt, dust, and water. We recommend using a **new** lubricated gasket when reassembling the radio. Using an old gasket could impair the overall seal quality of the radio.

7. Insert assembled chassis, main board, and front shield into radio housing at approximately a 45-degree angle (Figure 1-9a.), using caution while inserting the volume and frequency controls through the housing top.

IMPORTANT

The main board must be inserted into chassis (Step 2) before you can secure chassis into radio housing.

8. Connect microphone/speaker ribbon cable (Figure 1-9b.).

9. While pressing chassis toward the housing top, press the bottom end down into the housing until the bottom housing wall snaps over the chassis retaining studs.

NOTE

The chassis should snap firmly into place.

10. Replace the battery, knobs, and antenna.

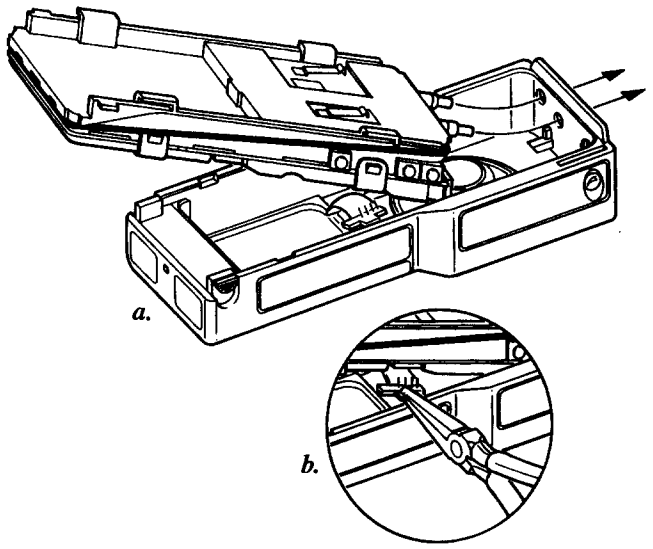


Figure 1-9. a. Insert Chassis into Housing
b. Reinsert Ribbon Cable

Section 2
Theory of Operation

Overview

This section provides a detailed theory of operation for the GP300 and its components: the microcomputer, the receiver, the transmitter, and the frequency generation circuitry.

NOTE

- U201 and U401 pin numbers **without** an asterisk (*) refer to VHF revision C and UHF revision B main board kits.
- U201 and U401 pin numbers **with** an asterisk (*) refer to VHF revision D and UHF revision C main board kits.

Microcomputer

The GP300 VHF and UHF radios use the Motorola 68HC11A8 microcomputer, U401, which utilizes:

- 7.9488 MHz clock rate
- Multiplexed 8-bit address/data lines
- 16-bit addressing
- Internal watchdog circuitry
- Analog to digital conversion input ports

The microcomputer's operating program is permanently written or "masked" within the microcomputer. Included in U401 is an EEPROM memory which stores channel, signalling, and scan list information.

Microcomputer Power-Up and Reset Routine

On power-up U401's reset line (pin 19; pin 43*) is held low by the AFIC (U402) until the synthesizer (U201) provides a stable 2.1 MHz output. When U402 releases its control, U401's hardware holds the reset line low until it verifies that clock Y401 is operational. When the reset line goes high, U401's hardware delays briefly to allow Y401 to stabilize, then the software begins executing port assignments, RAM checking, and initialization. A fixed delay of 100 ms is added to allow the audio circuitry to settle. Next, an alert beep is generated and the steady state software begins to execute (buttons are read, radio circuits are controlled).

U401's reset line can be controlled directly by the 5V regulator (U411), the AFIC, and the microcomputer, and indirectly by the synthesizer. U411 drives the reset line low (via pin 3) if it loses regulation. This prevents possible latch-up or overwriting of registers in the microcomputer because the reset line is higher in voltage than pin 32 (pin 55*) of U401 (VDD).

U401 can drive the reset line low if it detects a fault condition such as an expired watchdog timer, software stuck in an infinite loop, unplanned hardware inputs, static zaps, etc.

The AFIC and synthesizer can control the reset line during power-up, as outlined above.

Receiver

The receiver of the GP300 UHF and VHF radios consists of 4 major blocks each: the front-end module, the double balanced mixer, the 45.1 MHz IF and the back-end IF IC.

The UHF and VHF front-end modules consist of three blocks of circuitry each: **A pre-selector, RF amplifier and a post-selector filter.** These three items are located on a receiver module pc-board that stands perpendicular to the main radio pc-board. This module is enclosed in a shield to prevent radiation into and out of the module. All filters on the UHF and VHF modules are fixed tuned designs to eliminate the need for factory tuning and to provide wide-band operation.

The shunt and series coupled resonator topology. This topology yields a more symmetrical frequency response to guard against strong out of band signals that could produce IM products.

The worst case image frequency for this band is 90.2 MHz above the filter passband. The 3 db bandwidth is approximately 35 MHz, centered at 160 MHz. The center of the band insertion loss is approximately 1.9 db. The 4-pole filter is designed to operate with a 50 ohm input termination, while the output termination is the input impedance of the RF amplifier that follows it.

The UHF pre-selector filter is a 3-pole, .01 db Chebyshev bandpass design implemented in a shunt coupled resonator topology. This topology maximizes the attenuation at the worst case image frequency for this receiver, which is 90.2 MHz below the filter passband. The 3 db bandwidth is approximately 45 MHz, centered at 454 MHz. The center of the band insertion loss is approximately 2.2 db. The 3-pole filter is designed to operate with a 50 ohm input termination, while the output termination is the input impedance of the RF amplifier that follows it.

The RF amplifier, Q1, is a Motorola MMBR571 NPN device biased in a common emitter configuration. The amp is stabilized by the shunt feedback resistor R3, and has approximately 16.5 db of gain with a noise figure of about 3.0 db

Pin numbers with (*) refer to VHF revision D main board kits and UHF revision C main board kits.

(VHF) and 2.2 db (UHF). The amplifier draws 4 ma of current and is supplied by the receiver 5 volt supply (indicated as "5R" on the schematics and block diagrams).

Terminating the RF amp is the post-selector filter. This filter is a 3-pole for VHF and a 4-pole for UHF, .01 db Chebyshev design which is also implemented in a series coupled resonator topology for maximum image attenuation. The 3 db bandwidth is approximately 38 MHz centered at 160 MHz for VHF and 42.5 MHz centered at 454 MHz for UHF.

The insertion loss of this filter is approximately 1.9 db for VHF and 3.5 db for UHF. The filter is designed to be terminated with the amplifier output impedance on one side, and 50 ohm on the other.

The net gain from the receiver module is about (12.2 db VHF) (10.8 db UHF) in the center of the band and about (10.7 db VHF) (9.5 db UHF) at the band edges. The net center of the band noise figure is approximately (5.5 db VHF) (5.2 db UHF). This is sufficient to achieve a typical center of the band sensitivity of 12 dbs.

The double balanced mixer is composed of the two baluns, T1 and T2, and the ring diode IC, CR2. The mixer operates with an LO level of +6 dbm and the conversion loss is approximately 7.5 db. The double balanced type mixer provides excellent isolation between any two ports. And since a DBM can operate over a large bandwidth, the same mixer can be used for UHF and VHF radios. The DBM also provides excellent protection against receiver spurs due to nonlinearizes, such as IM and Half-IF. The received signal mixes down to the frequency of the first IF, 45.1 MHz, and enters the IF circuitry.

Intermediate Frequency (IF)

The Intermediate Frequency (IF) section of the portable radio consists of several sections including, the high IF, the second LO, the second IF, and the IF IC chip. The first LO signal and the RF signal mix to the IF frequency of 45.1 Mhz, and then enters the IF portion of the radio.

The signal first enters the high IF, passes through a crystal filter, is then amplified by the IF amp, and then passed through another crystal filter. The first crystal filter provides selectivity, second image protection, and intermodulation protection. The amplifier provides approximately 16 dB of gain to the signal. The signal then passes through the second crystal filter which provides further selectivity and second image protection. The high IF has an approximate 3 dB bandwidth of 7 KHz for 20/25/30 KHz models and 4 KHz for 12.5 KHz models.

The filtered and amplified IF signal then mixes with the second local oscillator at 44.645 MHz. The second LO uses an amplifier internal to the IF IC, an external crystal and some external chip parts. The oscillator presents an approximate level of -15 dBm to the second IF mixer, internal to the IF IC.

The output of the mixing of the IF signal and the second LO produces a signal at 455 KHz (second IF). This signal is then filtered by external ceramic filters and amplified. It is then passed back to the IF IC, sent to a phase-lock detector, and demodulated. The resulting detected audio output is then sent to the AFIC to recover the audio.

The IF IC also controls the squelch characteristics of the radio. With a few external parts the squelch tail, hysteresis, attack and delay were optimized for the radio. The AFIC allows the radio's squelch opening to be electronically adjusted.

Transmitter

The GP300 VHF and UHF transmitters contain five basic circuits: a power amplifier, an antenna switch, a harmonic filter, an antenna matching network, and a power control Refer to the block diagram and the schematic for more information.

The power amplifier consists of a module purchased from Motorola SPS. For VHF, the module (MHW607) contains three stages of amplification, while for UHF, the module (MHW707) contains four stages. Both modules require an input signal of 1 mW, a supply voltage of 7.5 Volts, and are capable of supplying, at least, 7 Watts of output. The power out of both modules can be varied by changing the voltage on their second stage

The antenna switch circuit consists of two PIN diodes (CR101 and CR102), a pi network (C119, L112, and part of C112), and at least, one current limiting resistor (R102 for UHF; and R102, R103, and R108 for VHF). In the transmit mode, TX B+ is applied to the circuit to bias the diodes "on". The shunt diode (CR102) shorts out the receiver port, and the pi network, which operates as a quarter wave transmission line, transforms the low impedance of the shunt diode to a high impedance at the input of the harmonic filter. In the receive mode, the diodes are both off, and hence, there exists a low attenuation path between the antenna and receiver ports.

The harmonic filter consists of part of C112, and L107, C113, L108, C114, L109, and C115. The design of the harmonic filter for both VHF and UHF is that of a Zolotarev design. This particular design is similar to that of a Chebyshev filter except for a large amplitude first ripple (near dc). This type of filter has the advantage that it can give greater attenuation in the stop-band for a given ripple level.

Another feature of this type of filter is that the coils tend to be smaller than with a Chebyshev design. The design of the VHF filter was modified from the Zolotarev design by slightly changing its capacitor values to yield a filter having an input impedance which optimized the efficiency of the power module.

To optimize the performance of the transmitter and receiver into an antenna, a network is used to match the antenna's impedance to the harmonic filter. For VHF the network consists of C117, L111, and C122. For UHF the network is

Pin numbers with (*) refer to VHF revision D main board kits and UHF revision C main board kits.

made up of C117 and L111. Note that, in order to measure the power out of the transmitter, one must remove the antenna and screw in its place a special BNC-to-Phono adapter.

The power control circuit consists of the networks associated with U151, Q156, Q151, Q152, Q155, and U152. The Op Amp U151A and Q156, along with resistor R101, make up a current-to-voltage amplifier whose gain is mainly dependent upon the ratio of R179 to R153. The current to the final stage of the power module is supplied through R101 (0.1 Ohms), which provides a voltage proportional to the current drain. This voltage is amplified and applied to the input of U151B. The resistors at the input of U151A (R151, R152, R154, and R155) keep the voltages at the inputs of U151A below its maximum allowable. These resistors are 1% tolerance parts to minimize the error produced at the emitter of Q156 resulting from the voltage offset at the input of U151A.

The voltage at the other input of the summing amp, U151B, is supplied from two DACs contained within U152. These DACs are controlled by the microprocessor, and provide the reference voltage for the control loop. One of the DACs, that connected to Pin 9 of U152, provides a coarse tune voltage, while the other provides a fine tune voltage. Since the output of the DACs is not zero when they are set to their lowest level, resistor R169 is provided to bias up the minus input of the summing amp to compensate for the bias resulting from the DACs.

The error voltage at the input of U151B produces a voltage at its output, which is in turn applied to the series pass transistor, Q152, through its driver, Q151. The voltage at the collector of Q152 is applied to the controlled stage of the power module, which for both VHF and UHF is the module's second stage. The feedback from the collector of Q152 to the emitter of Q151 through R166 is provided to keep the two stages stable. Likewise, the feedback from the collector of Q152 to the minus input of the summing amp is to keep the whole control loop stable.

The purpose of Q155 and its associated circuitry is to keep the control voltage on the module below 7.0 Volts, which is the maximum allowed for the UHF module.

The purpose of R173 was originally that of providing compensation to the control loop for changes in the supply voltage, TX B+. However, experimentation has shown that this compensation is not really required. Also, thermistor, R170, was provided to enable the shut back of the PA in the event that it would get too hot. This has also been shown to not be required

Frequency Generation Circuitry

The frequency generation circuitry is composed of two main IC's, the Fractional-N synthesizer (U201) and the VCO/ Buffer IC (U251). Designed in conjunction to maximize compatibility, the two IC's provide many of the functions which normally would require additional circuitry. The block diagram illustrates the interconnect and support circuitry used in the design. Refer to the schematic for reference designator.

The supply for the synthesizer is from Regulated 5 Volts which also serves the rest of the radio. The synthesizer in turn generates a superfiltered 5 Volts (*actually 4.65 Volts) which powers U251.

In addition to the VCO, the synthesizer must interface with the logic and AFIC circuitry. Programming for the synthesizer is accomplished through the data, clock, and chip enable lines (pins 2, 3, and 4; pins 5*, 6*, 7*)) from the microprocessor, U401. A serial stream of 98 bits is sent whenever the synthesizer is programmed. A 5 volt dc signal from pin 35 (pin 2*) indicates to the microprocessor that the synthesizer is locked while unlock is indicated by a low voltage on this pin. Transmit modulation from the AFIC is applied to pin 5 (pin 8*) of U201. Internally the audio is digitized by the Fractional-N and applied to the loop divider to provide the low-port modulation. The audio is also run through an internal attenuator for modulation balancing purposes before being outputted at pin 27 (pin 28*) to the VCO. A 2.1 MHz clock for the AFIC is generated by the Fractional-N and is routed to pin 9 (pin 11*) where it is filtered and attenuated from 2.5 Volts to approximately 2 Volts.

Synthesizer

The Fractional-N synthesizer uses a 16.8 MHz crystal (Y201) to provide the reference frequency for the system. The other reference oscillator components external to the IC are C205, C206, R207, and CR203. The 16.8 MHz signal is divided down signal from the VCO. The loop filter, comprised of R201, R202, R205, C201, C214, C215, and C216, provides the necessary dc steering voltage for the VCO as well as filtering of spurious signals from the phase detector. For achieving fast locking of the synthesizer, an internal adapt charge pump provides higher current capability at pin 29 (pin 31*) than when in the normal steady-state mode. Both the normal and adapt charge pumps receive their supply from the voltage multiplier which is made up of C202, C203, C204, C231, CR201, and CR202. By combining two 5 Volt square waves which are 180 out-of-phase along with Regulated 5 Volts, a supply of approximately 12.6 Volts is available at pin 31 (pin 32*) for the charge pumps. The current for the normal mode charge pumps is set by R203. The prescaler for the loop is internal to U201 with the value determined by the frequency band of operation.

VCO

The VCO (U251) in conjunction with the Fractional-N synthesizer (U201) generates rf in both the receive and the transmit modes of operation. The TRB line (U251 pin 5) determines which oscillator and buffer will be enabled. A sample of the rf signal from the enabled oscillator is routed from U251 pin 23, through a low pass filter, to the pre-scaler input (U201 pin 18; pin 20*). After frequency comparison in the synthesizer, a resultant CONTROL VOLTAGE is received at the VCO. This voltage is a DC voltage between 3 and 10 volts when the PLL is locked on frequency.

Pin numbers with (*) refer to VHF revision D main board kits and UHF revision C main board kits.

In the receive mode, U251 pin 5 is grounded. This activates the receive VCO by enabling the receive oscillator and the receive buffer of U251. The rf signal at U251 pin 2 is run through a low pass filter. The rf signal after the low pass filter is the LO RF INJECTION and it is applied to the first mixer at T2.

During the transmit condition, PTT depressed, five volts is applied to U251 pin 5. This activates the transmit VCO by enabling the transmit oscillator and the transmit buffer of U251. The rf signal at U251 pin 4 is run through a low pass filter and an attenuator to give the correct drive level to the input of the PA module (U101 pin 1). This rf signal is the TX RF INJECTION. Also in transmit mode, the audio signal to be frequency modulated onto the carrier is received by the transmit VCO modulation circuitry at AUDIO IN.

When a high impedance is applied to U251 pin 5, the VCO is operating in BATTERY SAVER mode. In this case, both the receive and transmit oscillators as well as the receive, transmit, and pre-scaler buffer are turned off. In the Fractional-N, the battery saver mode places the A/D and the modulation attenuator in the off state. This mode is used to reduce current drain on the radio.

GP300 receive (RX) and transmit (TX) circuits are common to both the VHF and UHF models. Most of the radio processing for RX and TX is accomplished in U402, the Audio Filter IC. The Audio Filter IC performs the following functions:

- Tone/Digital PL encoding and decoding
- PL rejection filter (RX audio)
- TX pre-emphasis amplifier
- Limiter
- Post-limiter filter
- TX deviation digital attenuators
- MIC gain attenuator
- Noise squelch digital attenuator
- Microcontroller port expanders (output only)
- 2.5 Vdc reference source

U402 parameters are programmed from U401 microcontroller ROM and EEPROM data via the serial CLOCK and DATA lines. Unless otherwise indicated, all signal levels refer to standard carrier modulation, 1kHz tone at +/-3kHz deviation.

TX Audio Path

Internal MIC Bias Switch and External PTT Sense Circuits

PNP switch transistor Q407, resistors R453, R454, and capacitor C463 control the operating bias for internal MIC MK401. Q407 is controlled by microcontroller U401 via U402-40, the Audio Filter IC expanded output port. On connecting an external MIC through connector J3, external PIT sense transistor Q408 switches "ON" when the external PTT switch is closed. Q408 collector voltage is monitored by U401-54 (U401-14*). When collector voltage is logic "HI" state, the microcontroller configures the radio for transmit mode. In PTT equipped accessories, the PTT switch is series connected with the external MIC element.

MIC Amplifier

MIC audio from internal MIC MK401 is coupled through C429, L404, J3, and L403 to the MIC amp circuit U407B. External MIC plug insertion mechanically disconnects the internal MIC. External MIC audio is coupled through L403 to the MIC amp input. Capacitors C425, C426 and C427, and resistors R447, R448 and R450 provide a low audio frequency roll off with a high-pass corner frequency of 1kHz to improve transmit audio clarity. Crossover gain is 12 dB (at 1kHz). Reference deviation is obtained with 11.0 mV rms input to the external MIC connector J3.

TX Audio Mute Gate

PNP transistor Q409, and resistors R462 and R463 comprise the TX audio mute gate. U402-40, Audio Filter IC expanded output port, controls Q409 as well as Q407, the internal MIC bias switch. When U402-40 is logic LO state, a small dc current flows from U407B-7 MIC amp output into Q409 emitter, through Q409, and out of the collector through R462. A fraction of the emitter current flows out of the base through R463 to ground (Vss of Audio Filter IC). MIC audio at U407B-7 passes through the TX audio mute gate. When U402-40 is logic "HI", Q409 base voltage is 4Vdc (typical) and emitter voltage is 2.4 Vdc, biasing the device well into cut-off. No current flows through emitter to base/collector, and not MIC audio passes. The mute function is enabled (Q409 is "OFF") when modulating DTMF or 5/6 tone (European) Signalling.

Pre-emphasis Amp (standard models)

U402, the Audio Filter IC, contains a TX audio pre-emphasis amp, with external gain setting resistor R504, and pre-emphasis elements R506 and C462. Connections are made at each end of resistor R506 to provide interconnection of "front cover" option board TX audio through connector P1 (below). Pre-emphasis is 6 dB/octave with a corner frequency of 6600Hz. Crossover gain is 0 dB at 1kHz, with passband gain (head-room) of 17.5 dB.

Option Interface Connector P1 (Keypad/Display models)

P1 provides interconnection of "front cover" option PC boards to the GP300 radio main board. MIC audio output is available from P1-5 at a level of 45 mVrms and 10k ohm output impedance. Option TX Audio input to the GP300 radio is available at P1-4 with sensitivity of 40 mV rms, pre-emphasized at 6 dB/octave, and less than 200 ohm output impedance (from option board). If "flat" audio response is required, the audio output from the option board must be de-

Pin numbers with (*) refer to VHF revision D main board kits and UHF revision C main board kits.

emphasized at a -6 dB/octave rate, 300Hz to 3kHz, with 0 dB gain at 1kHz. The low option board output impedance is required to achieve better than 40 dB isolation between main board input (P1-4) and output (P1-5) audio.

Limiter (Audio Filter IC)

The audio filter IC U402 contains the limiter circuit, which prevents over-deviation of the RF carrier by symmetrically clipping the peaks of the modulating voltage. Audio from the pre-emphasis amplifier circuit is coupled to the limiter. Gain of the limiter stage is adjustable in four 3 dB steps, from -3 dB to +6 dB. Therefore, TX audio path gain, or MIC gain, can be adjusted to compensate for different sound environments through the Radio Service Software.

Post-Limiter Filter (Audio Filter IC)

Clipped modulating voltage from the limiter output is coupled to the post-limiter filter. Filtering attenuates the spurious products generaged by the limiter. The post-limiter filter is programmable to operate in the following modes:

- CEPT/EIA mode
- Japan mode
- FTZ (Germany) mode

PL Encoder

Private Line (CTCSS) is generated by the PL encoder circuit in U402, the Audio Filter IC. Tone PL or Digital PL data is programmed for each mode from the Radio Service Software. On entering transmit mode, TPL or DPL data is programmed to U402 via the serial DATA and CLOCK lines. U401-35 (U401-67*) microcontroller output strobes &402-32 PL clock input at a constant rate during DPL encoding, or at a rate determined by the PL encoder algorithm in the microcontroller for TPL encoding corresponding to tone frequency. The encoded PL is summed with MIC audio at the post-limiter filter input. Digital attenuators are employed to adjust the balance of MIC radio and PL to prevent over-deviation of the carrier. PL deviation is adjustable in three "coarse" steps of 500 Hz, 750 Hz, and 1 kHz, for 25 KHz models and steps of 250 Hz, 375 Hz, and 500 Hz for 12.5KHz models with compensation of MIC audio level.

DTMF Encoder

Resistors R424, R425, R426, R428 and R484, and summer U405A form the DTMF encoder. U405A-1 is coupled to U402-13 Audio Filter IC auxiliary TX modulation input.

DTMF encoded signals pass from this input to the post-limiter filter input. U405A-1 is also coupled to U402-12 and coupled through RX audio path to the audio PA for sidetone audio.

Deviation Attenuators (Audio Filter IC)

Carrier deviation is set by programming the digital deviation attenuators of the Audio Filter IC. Deviation data for each mode is entered through the Radio Service Software, and then programmed into U402 from microcontroller U401 on entering transmit mode. U402-19 and U402-20 deviation attenuator outputs are combined through resistors R478 and R479 and dc-coupled to U201-5 (U201-8*), the synthesizer modulation input. Capacitor C218 provides a high frequency roll-off corner at 20 kHz to further attenuate spurious signals from U402. The dc voltage at the combined attenuator outputs sets the center frequency for the modulated carrier. Any transient (R x C) voltages in the TX audio path must settle within 1 millisecond of PTT activation to prevent center frequency offset.

RX Audio Path

PL Rejection Filter (Audio Filter IC)

The recovered RX audio from the IF detector IC U51 is coupled through capacitor C435 to U402-7 and U402-8 on the Audio Filter IC. RX audio at U402-7 is processed first by the PL rejection filter, which is characterized by a two pole, 300 Hz corner frequency high-pass response. Audio then passes through the digital volume attenuator and buffer amplifier output to U402-23. Unattenuated RX audio is coupled to U402-22 and fed to the center-slicer circuit for detection of 5/6 tone (European) signals. For standard test modulation, the audio level at U402-7 is 255 mVrms, and output audio level at U402-23 is 765 mVrms with the digital volume attenuator set to minimum attenuation.

PL Decoder

Recovered RX audio at U402-8, the PL decoder input, first passes through the Tone PL filter, or the Digital PL filter, depending on the PL option selected for the current operating mode. Filtered PL is then coupled to the PL detector circuit, with detected PL output at U402-27. The detected PL signal is coupled from U402-27 to microcontroller U401-41 where algorithms perform the final PL decoding. Data for the Tone PL frequency or Digital PL code for each mode is programmed through the Radio Service Software.

Center-Slicer

The center-slicer circuit U406A detects Quick-Call and 5/6 tone signals. Unattenuated RX audio from U402-22 is dc coupled to the two inputs of U406A. The non-inverting input U406A-3 is fed through resistor R433. Capacitor C415 sets a low-pass corner frequency of 3.3 kHz. The inverting input U406A-2 is fed through resistor R434. Capacitor C416 sets a low-pass corner frequency of 16 Hz. During operation, R434 / C416 establish an averaged dc offset level at U406A-2 dependent on the average dc level of the undetected signal to set the "trigger" threshold of U406A. R433 / C415 provide high audio frequency roll-off to improve falsing immunity. The detected output from the center slicer circuit is

Pin numbers with (*) refer to VHF revision D main board kits and UHF revision C main board kits.

coupled to microcontroller U401-43 (U401-1*) where algorithms perform the final data decoding.

Option Interface Connector P1 (Keypad/Display Models)

P1 provides interconnection of "front cover" option pc boards to the GP300 radio main board. Filtered "flat" RX audio output is available at P1-7, at a level of 765 mVrms at 15k-ohm impedance. P1-7 is always unmuted, not affected by the receiver with squelch circuit. Option RX audio input to the GP300 radio is available at P1-6, with a sensitivity of 100 mVrms at less than 200 ohm output impedance from option board.

RX Audio Mute Gate

PNP transistor Q406, the RX audio mute gate, with resistors R458 and R459, and capacitors C432 and C433, provide receiver audio muting. The RX audio mute gate circuit functions in a similar manner to Q409, the TX audio mute gate circuit. Muting is controlled by microcontroller U401 via U402-39, an Audio Filter IC expanded output port. Q406 is saturated and RX audio unmuted by programming U402-39 to a logic "LO" state. Q406 is placed well into cut-off and RX audio muted by programming U402-39 to a logic "HI" state.

Audio Power Amplifer

Variable resistor R460 and resistor R461 provide RX audio volume adjustment. R461 sets the minimum volume level. Resistor R466 sets the input impedance to U409-2 of the audio power amp. Fixed level Alert Tone audio is generated by microcontroller U401-34 (U401-56*) and coupled through capacitor C437 and resistor R465 to U409-2. The audio PA circuit is a bridged-tied-load (BTL) configuration with fixed gain of 40 dB, developing 500 mW (rated audio power) output at less than 5% harmonic distortion into the 16 ohm internal speaker LS401 with nominal 7.5 Vdc battery supply. Maximum audio power output is greater than 1.2 watts.

Audio PA Muting and Output Protection

PNP transistor Q410, the audio PA power switch, driven by NPN darlington transistor Q411, the PA mute amp, controls Vcc supply to Audio PA U409-1. U402-3, and Audio Filter IC expanded output port, is connected to Q411 base, controlling audio PA Vcc supply. Resistors R489 and R490, PNP transistor Q412, and the current sense circuit monitor current supplied to audio PA U409-1. Worst case audio PA current (at 9 Vdc battery voltage, maximum volume and full system deviation) does not exceed 450 mA at the nominal 16-ohm load. Resistor R488 and capacitor C461 provide an RC time delay for U405B, a monostable multivibrator circuit. A 2.5Vdc reference voltage is fed to U405B-6. On radio power-up, and in normal operation U405B-7 monostable multivibrator output is logic "LO" pulling Q411 emitter to Vee with the audio PA controlled by U402-3. Should U409-5 and/or U409-8 become shorted to each other or to ground (Vee), current consumption exceeds 500mA (approximately) and Q412 is forward biased. Switched battery supply voltage appears at Q412 collector. When U405B-5 voltage rises higher than the U405B-6 reference voltage (rise time is less than 50 usec), U405B is triggered and U405B-7 dc output voltage switches to 4 Vdc, effectively biasing Q411 into cut-off and turning off the audio PA power switch Q410. U405B-7 remains in this state for 15 msec, then resets to logic "LO" state. Average power dissipation in the audio PA circuit components is held to a low level by the low duty cycle (less than 0.3%) of the audio PA protection circuit. the cycle repeats until the audio PA output short is removed.

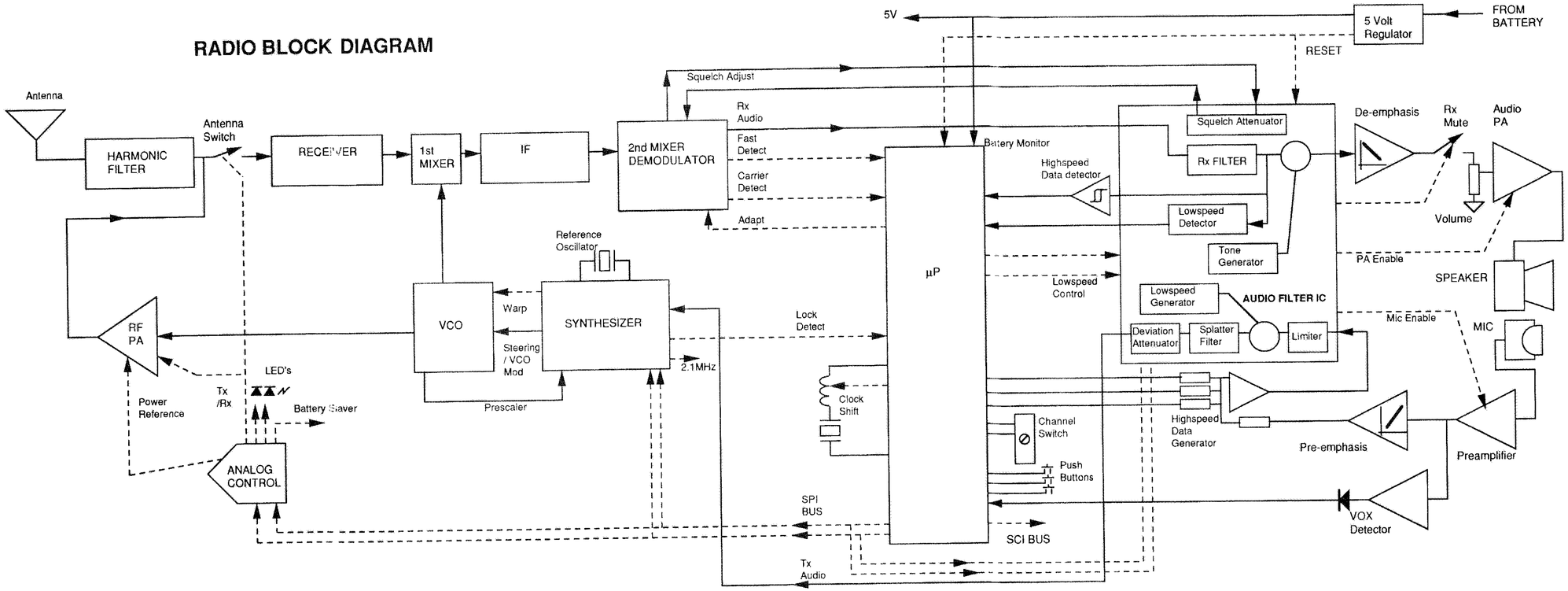
Noise Squelch Attenuator

The Audio Filter IC U402 contains a 16 step programmable digital squelch attenuator between U402-16 and U402-18. Noise squelch is set using the Radio Service Software, with open squelch at step 0, and tight squelch at step 15.

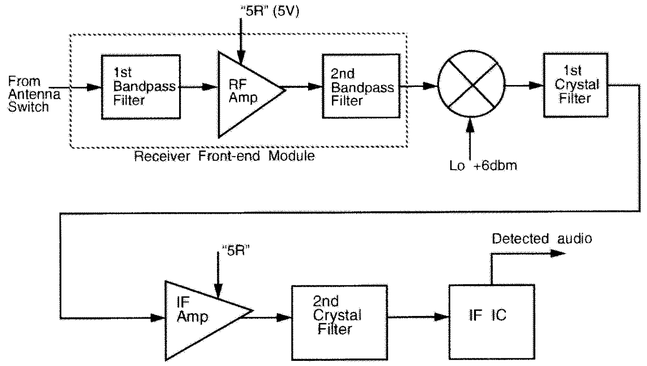
Vox Circuit Operation

As mentioned above, with VOX option enabled, a VOX (non-PTT) accessory can be plugged into connector J3 for voice activated transmit operation. The external MIC element is always supplied with operating bias through resistor R451 and external PTT sense transistor Q408. The external PTT sense at microcontroller U401-54 (U401-14*) is therefore, always "enabled." A second output circuit of MIC amplifier U407B couples MIC audio through capacitor C445 to U406B, the VOX detector circuit. Resistors R492 and R493, and capacitor C451 form a syllabic filter which reduces VOX circuit triggering by high frequency ambient noise. Resistors R442, R443, R444, R445, and R491, capacitor C423, rectifier diode CR404 and U406B form a linear peak detector circuit. MIC audio causes capacitor C423 to charge to a potential related to the relative amplitude of ambient noise. Microcontroller U401-61 (U401-19*) monitors the potential of C423 and establishes a threshold for non-voiced ambient noise. When a positive rise in potential above threshold or voice is detected by an algorithm in the microcontroller ROM, the radio is configured to transmit mode.

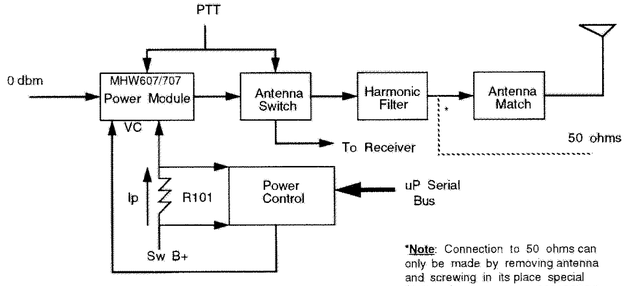
Pin numbers with (*) refer to VHF revision D main board kits and UHF revision C main board kits.


RADIO BLOCK DIAGRAM
Antenna
HARMONIC FILTER
Antenna Switch
RECEIVER
1st MIXER
IF
2nd MIXER DEMODULATOR
Squelch Adjust
Rx Audio
Fast Detect
Carrier Detect
Adapt
5V
5 Volt Regulator
FROM BATTERY
RESET
Battery Monitor
Highspeed Data detector
Squelch Attenuator
Rx FILTER
Lowspeed Detector
Tone Generator
Lowspeed Generator
AUDIO FILTER IC
Deviation Attenuator
Splatter Filter
Limiter
De-emphasis
Rx Mute
Audio PA
Volume
PA Enable
SPEAKER
Mic Enable
MIC
Pre-emphasis
Preamplifier
VOX Detector
Highspeed Data Generator
Channel Switch
Push Buttons
µP
Lowspeed Control
Reference Oscillator
VCO
SYNTHESIZER
Warp
Steering / VCO Mod
Lock Detect
2.1MHz
Prescaler
Clock Shift
RF PA
LED's
Tx /Rx
Power Reference
Battery Saver
ANALOG CONTROL
SPI BUS
SCI BUS
Tx Audio

RECEIVER BLOCK DIAGRAM

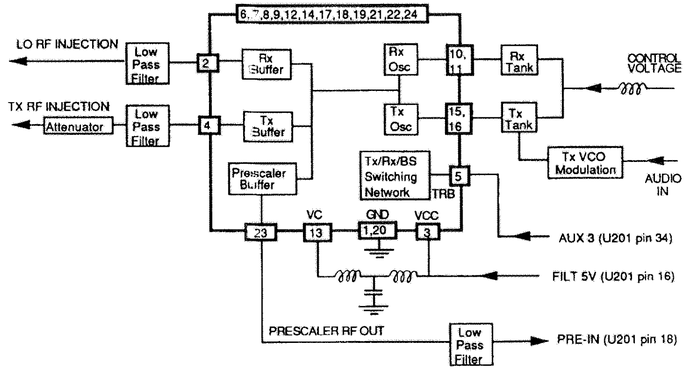


TRANSMITTER BLOCK DIAGRAM

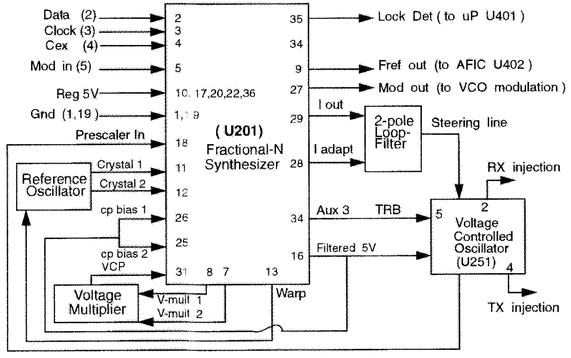


*Note: Connection to 50 ohms can only be made by removing antenna and screwing in its place special BNC-to-Phono adapter (5880166S01).

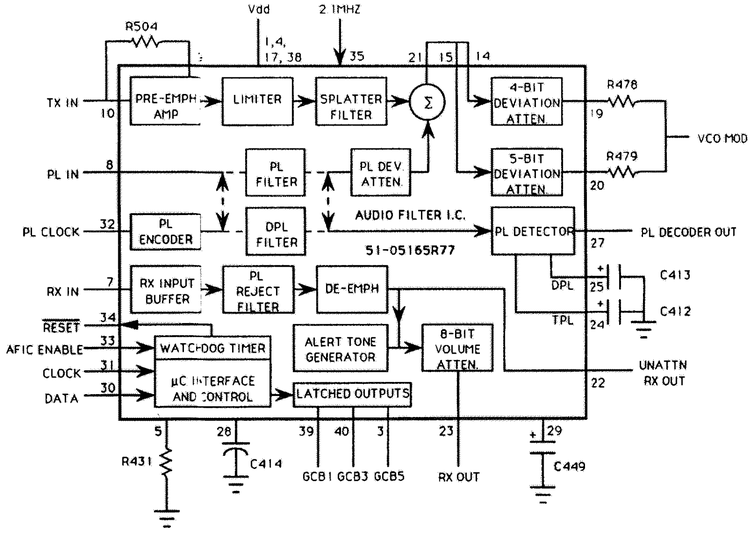
VCO BLOCK DIAGRAM



SYNTHESIZER BLOCK DIAGRAM



AFIC BLOCK DIAGRAM



Section 3
Accessory

Overview

The remote speaker microphone is an accessory available with the GP300 portable radio. This section provides a general description of the remote speaker microphone and describes the operation, handling precautions, and maintenance of this accessory.

Description

The Model HMN9725B Remote Speaker Microphone includes a speaker, a microphone, a push-to-talk (PTT) switch and associated circuitry. A cable, terminated with a special plug, is provided for attaching to the accessory connector on the portable radio.

When the remote speaker microphone is attached to the radio, the speaker in the radio is disabled, and receiver audio is connected to the accessory speaker. Similarly, the accessory microphone is connected to the transmitter, and the accessory PTT switch can now control the PTT function in the radio. The radio microphone and PTT switch are still operational, but you can listen to the radio only through the accessory speaker.

IMPORTANT

Observe safety information in the radio operating instructions.

Operation

1. Attach the microphone's accessory connector to the accessory connector on top of the radio.
2. While listening to the accessory speaker, turn the radio on.
3. Operate radio according to operating instructions supplied with the radio.

NOTE

The microphone will perform best if it is worn as shown in Figure 3-1.

Handling Precautions

To avoid damage to circuits, observe the following handling, shipping, and servicing precautions.

- Prior to and while servicing a remote speaker microphone, particularly after moving within the service area, momentarily place both hands on a bare metal, earth-grounded surface. This will discharge any static charge which may have accumulated on the person doing the service.

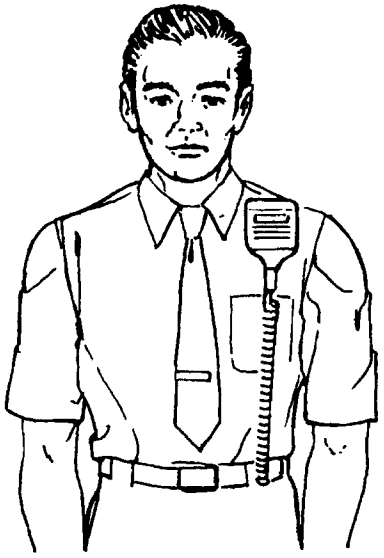


Figure 3-1. Ideal Microphone Position

- Whenever possible, avoid touching any electrically conductive part of the unit with your hands.

NOTE

Wearing a conductive wrist strap (Motorola No. RSX-4015A) will minimize static buildup during servicing.

WARNING

While wearing a conductive wrist strap, be careful near high voltage sources. The good ground provided by the wrist strap will also increase the danger of lethal shock from accidentally touching high voltage sources.

- When servicing a unit, avoid carpeted areas, dry environments, and certain types of clothing (silk, nylon, etc.) because they contribute to static buildup.
- All electrically powered test equipment should be grounded. Apply the ground lead from the test equipment to the unit before connecting the test probe. Similarly, disconnect the test probe prior to removing the ground lead.

- If the microphone cartridge is removed from the unit, place it on a conductive surface, such as a sheet of aluminum foil which is connected to ground through 100k ohms of resistance.

WARNING
If the aluminum foil is connected directly to ground, be cautious of possible electrical shock from contacting the foil at the same time as other electrical circuits.

- When soldering, be sure the soldering iron is grounded
- Prior to replacing circuit components or touching the microphone cartridge, be sure to discharge any static buildup. Since voltage differences can exist across the human body, it is recommended that only one hand be used if it is necessary to touch the microphone cartridge and associated wiring.
- Replacement microphone cartridges should be kept in conductive packaging until they are placed in unit.

Maintenance

Refer to the schematic diagram (shown in Figure 3-2), the exploded view (shown in Figure 3-3, on page 3-3), and the parts lists. Every part in the microphone is identified and illustrated for assistance in removal and replacement.

If necessary, the external surfaces of the remote speaker microphone may be cleaned with a 0.5% solution of mild dishwashing detergent in water (one teaspoon of detergent in a gallon of water).

Parts List

HMN9725B Electrical Parts List — PL-931023-O

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		capacitor, fixed: uF +/-10%; 100 V: unless otherwise stated
C1	2113740A53	Chip, 82 pF, +/- 5%, 50V
C2	2113740A67	Chip, 330 pF, +/- 5%, 50 V
C3	2113741A53	Chip, .022 uF, +/- 5%, 50V
C4	2113741B69	Chip, .1 uF, +/- 5%, 50V
L1	2462575A02	Chip Inductor, 680nH, +/- 10%
		coil, rf:
L2	2462575A02	Chip, 680nH, +/- 10%
L3	2462575A02	Chip, 680nH, +/- 10%
L4	2462575A02	Chip, 680nH, +/- 10%
		switch:
S1	3905834K06	Dome, PTT
		miscellaneous:
MK1	0180703Y69	Microphone assembly
LS1	5005910P05	Speaker

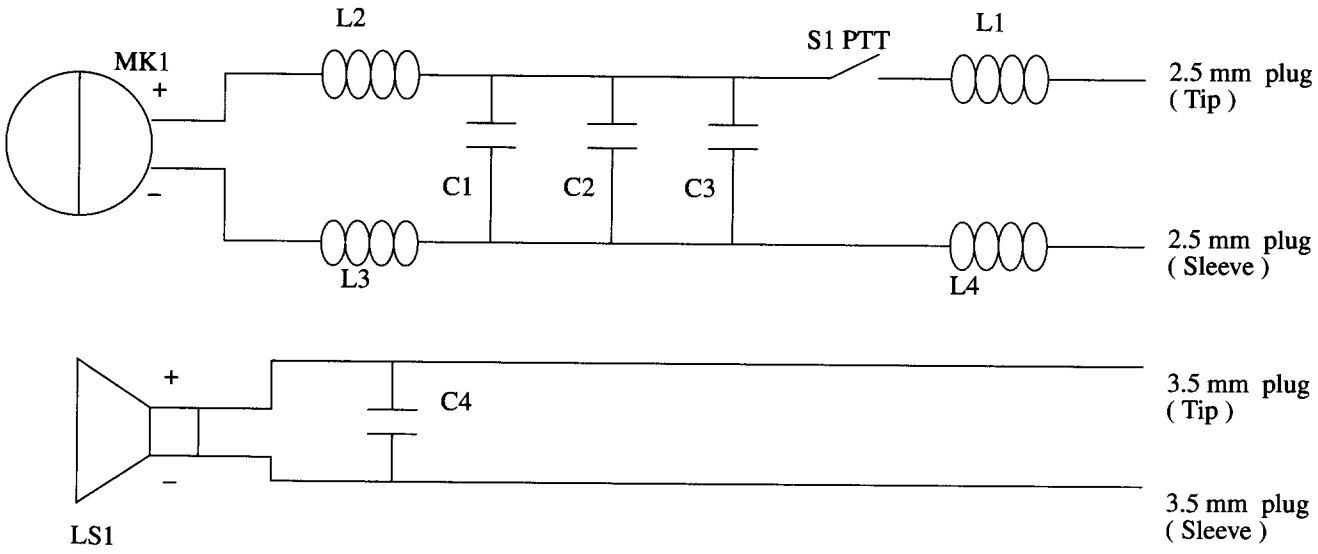


Figure 3-2. Schematic Diagram

Parts List

HMN9725B Remote Speaker Microphone PL-931024-O

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
1	0105953N42	Front housing, items 1 thru 5
2	3305259Q01	Nameplate, Motorola
3	4505182Q01	Lever, PTT
4	3505152J01	Grille, cloth
5	1105461R01	Adhesive
6	0180703Y70	Coil cord & connector
7	0180703Y67	PCB: includes electrical parts
8	3905834K06	Switch: dome. PTT (S1)
9	3205231Q01	Seal, dome
10	1405219Q01	Boot, microphone
11	0180703Y69	Microphone assembly
12	5005910P05	Speaker (LS1)
13	7505283Q02	Pad, speaker
14	3205690R01	Gasket
15	6405689R01	Plate, housing mounting
16	0300139982	Screw, Phillips; 2-56 x 5/32"
17	1505172Q01	Housing, back
18	0484345A06	Washer, 3 used
19	0305137Q02	Screw, Phillips, 3 used
20	0105959N54	Belt clip assembly
21	0300139982	Screw, Phillips, 4 used

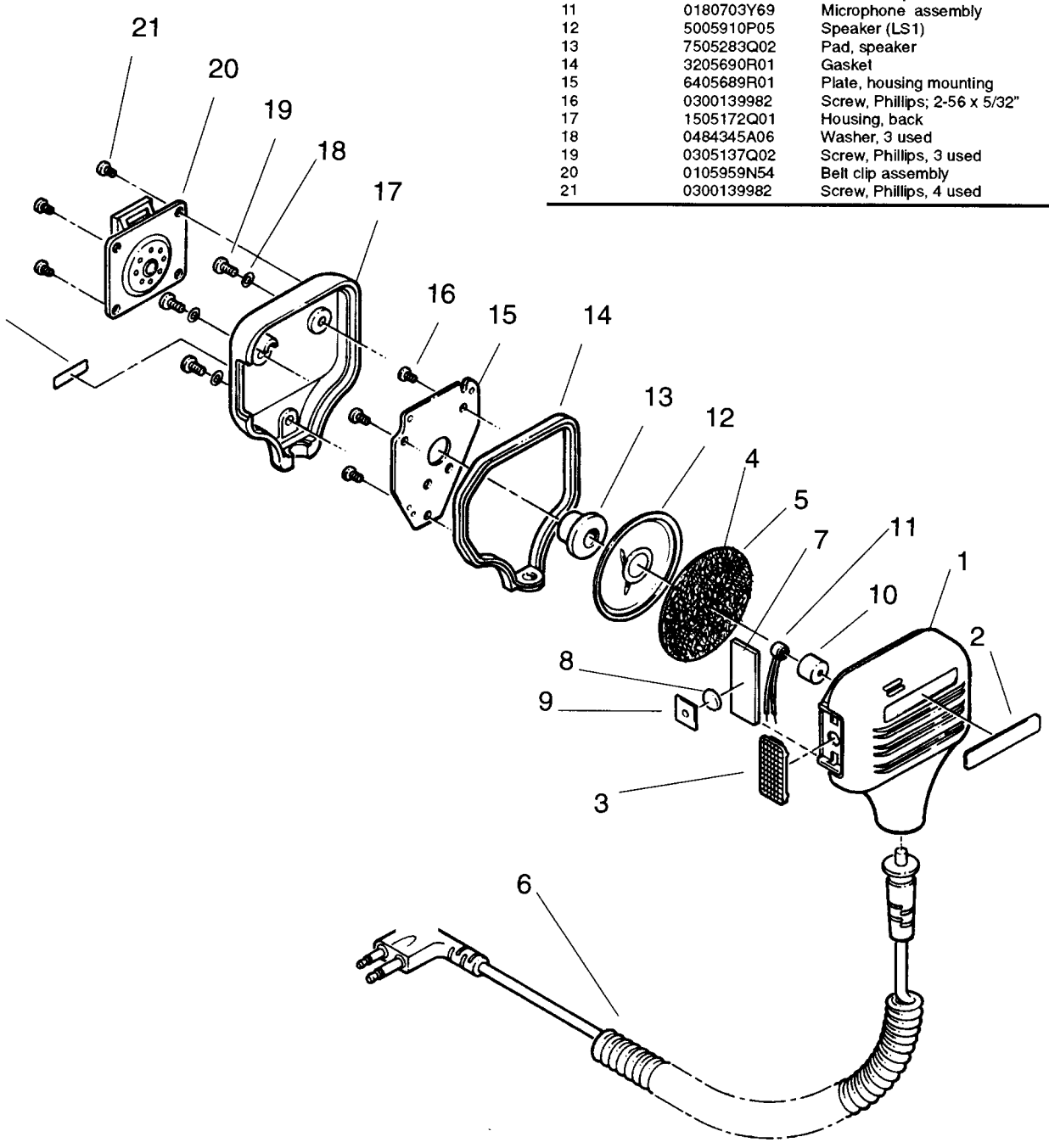


Figure 3-3. Exploded View

Section 4
Troubleshooting

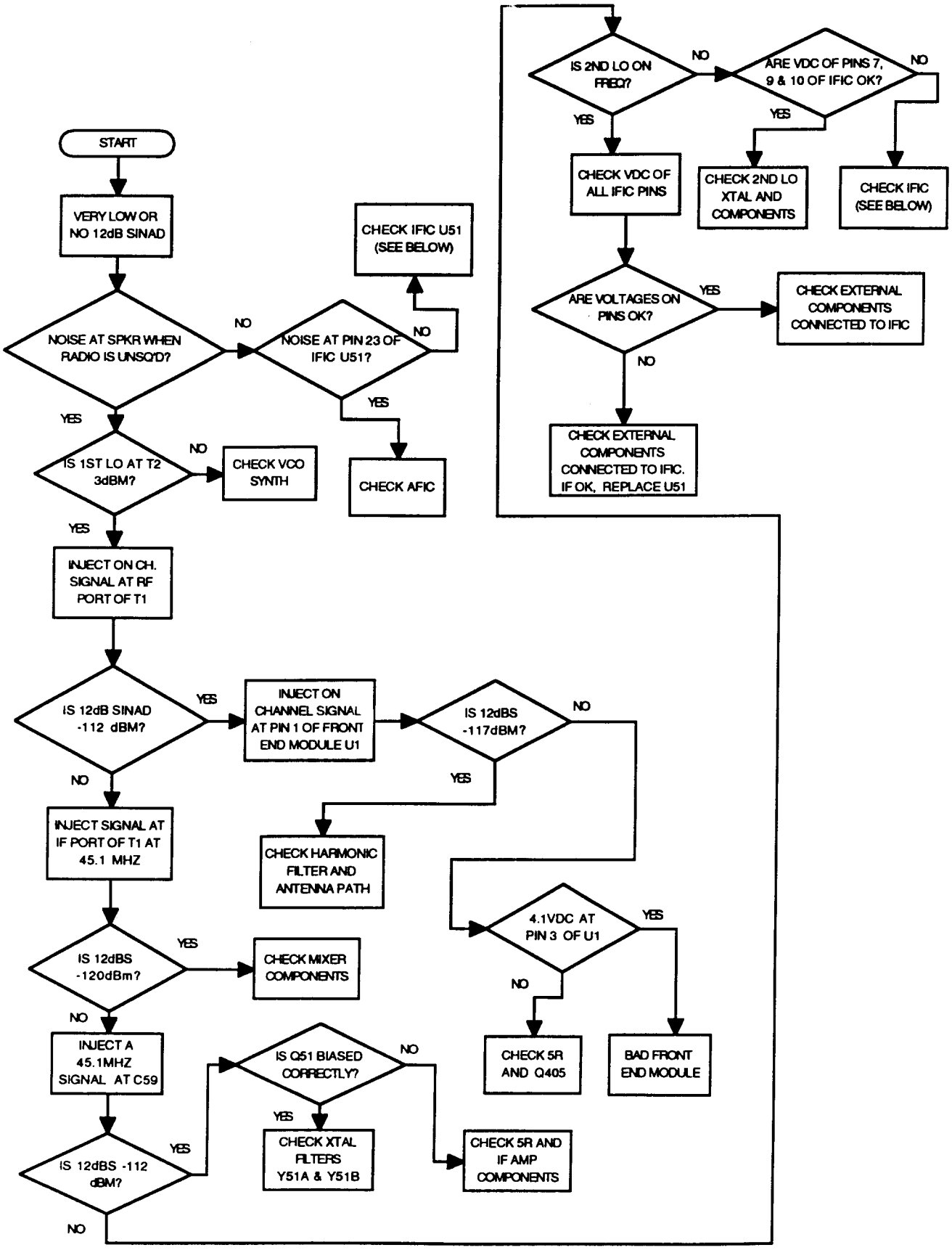
Overview

This section contains three troubleshooting tables for the following GP300 components:

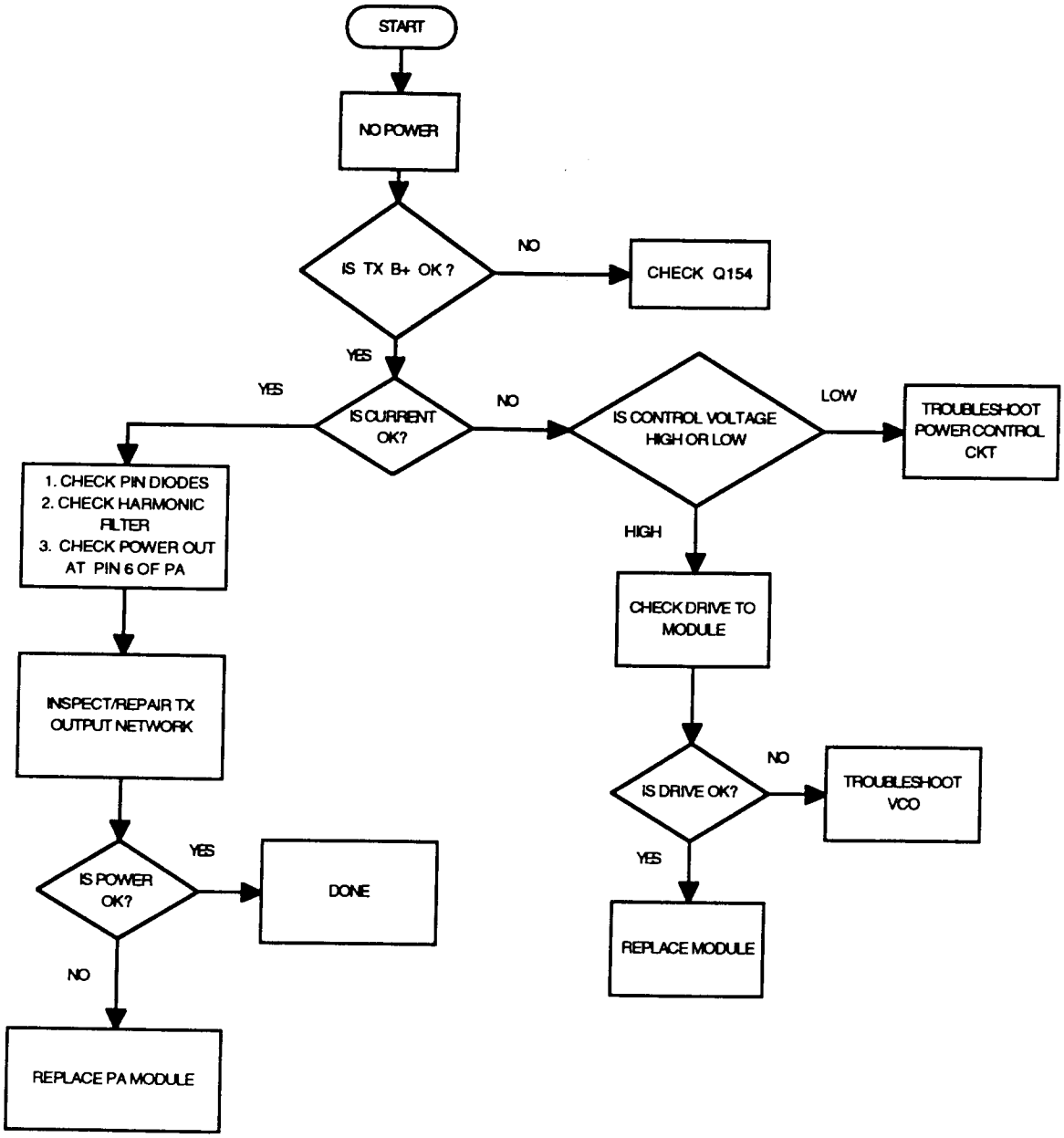
- Receiver
- Transmitter
- Synthesizer
- Microprocessor
- Voltage Controlled Oscillator (VCO)

Troubleshooting Charts

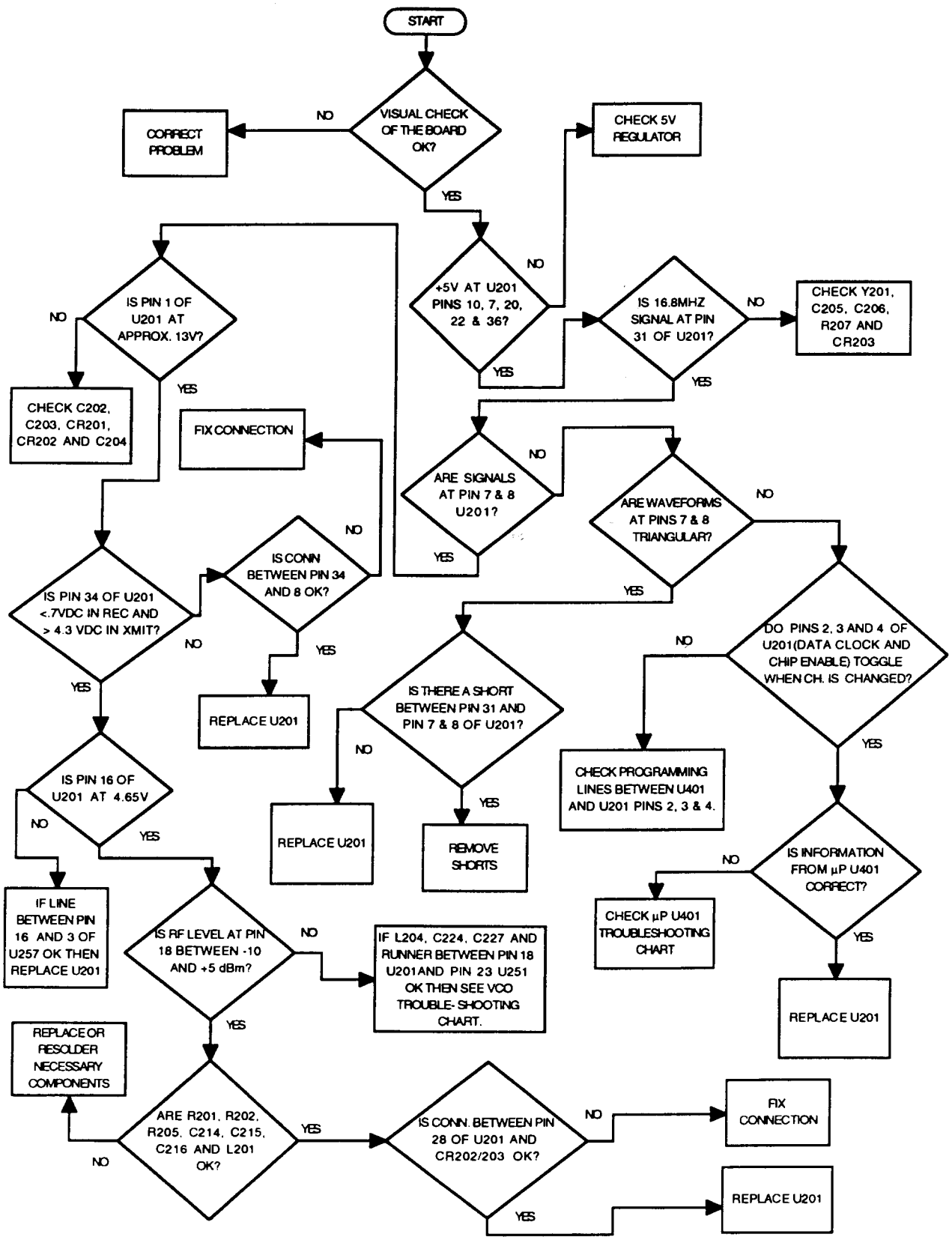
Refer to following pages.



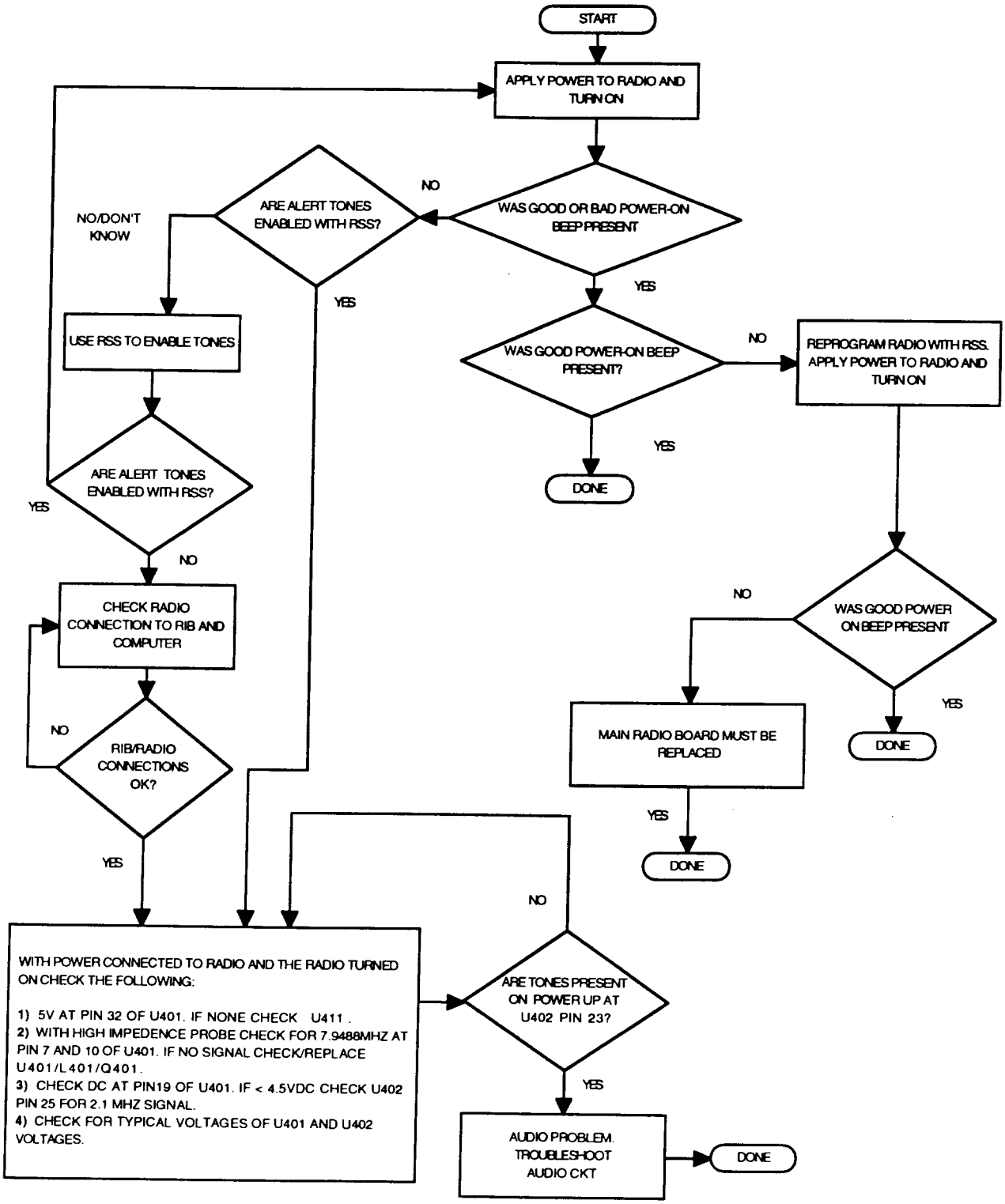
Troubleshooting Flow Chart for Receiver



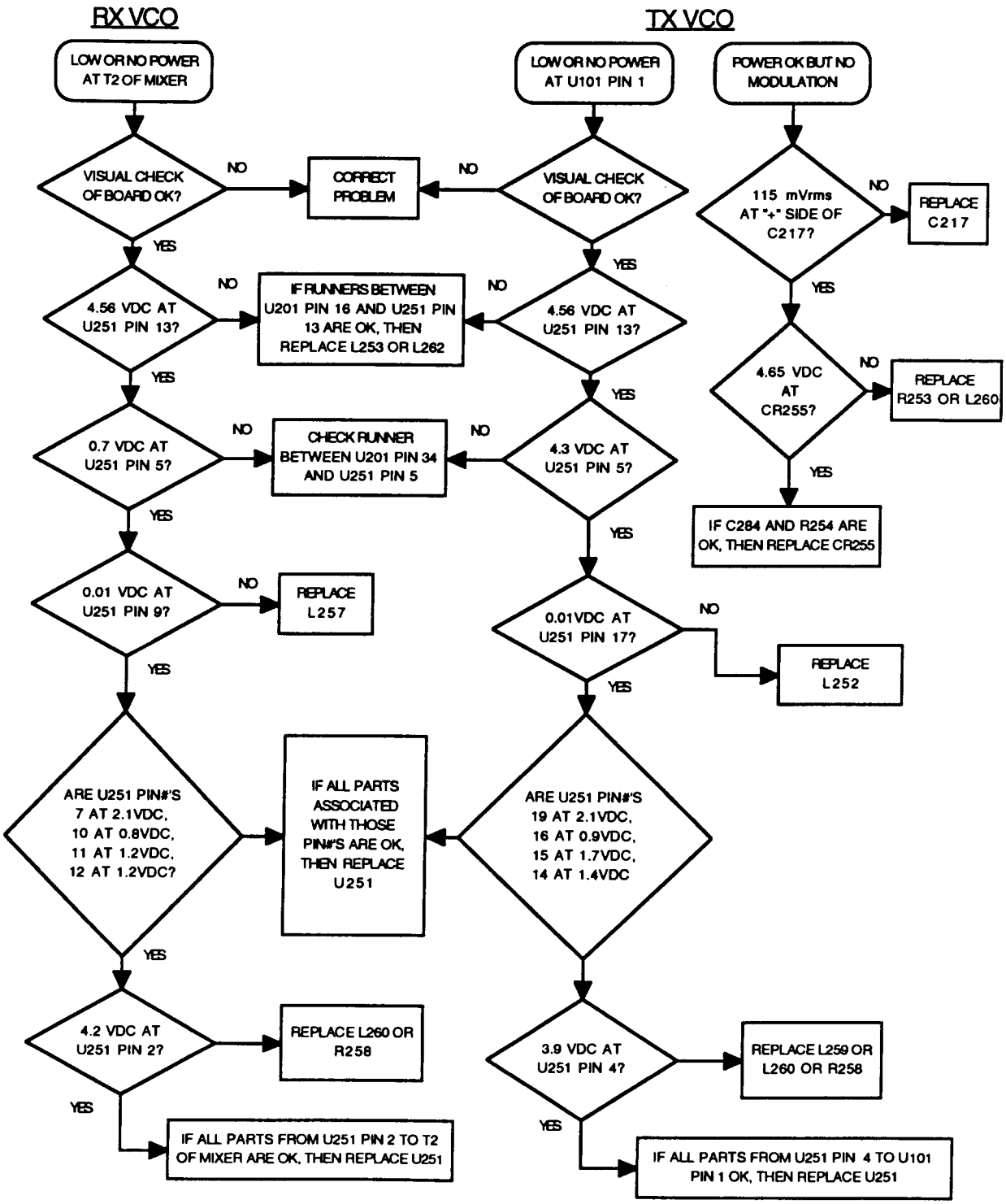
Troubleshooting Flow Chart for Transmitter



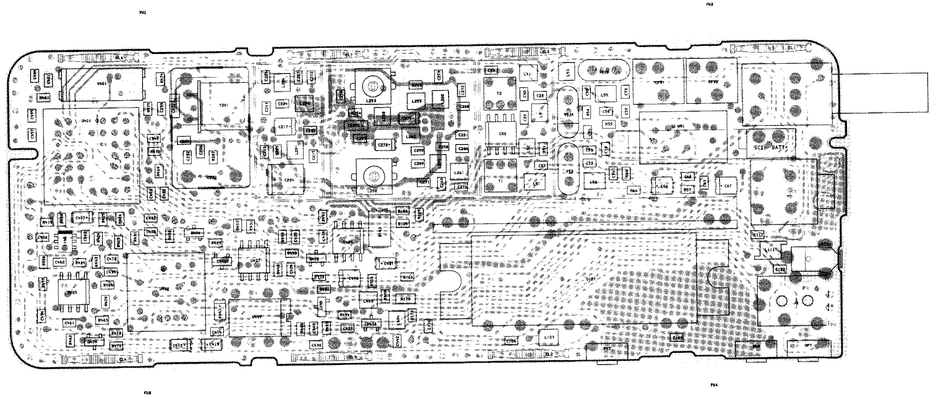
Troubleshooting Flow Chart for Synthesizer



Troubleshooting Flow Chart for Microprocessor

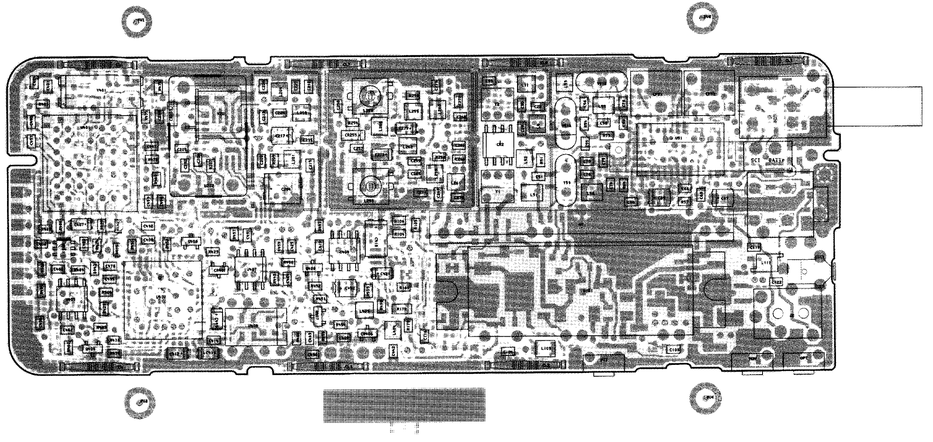


Troubleshooting Flow Chart for VCO



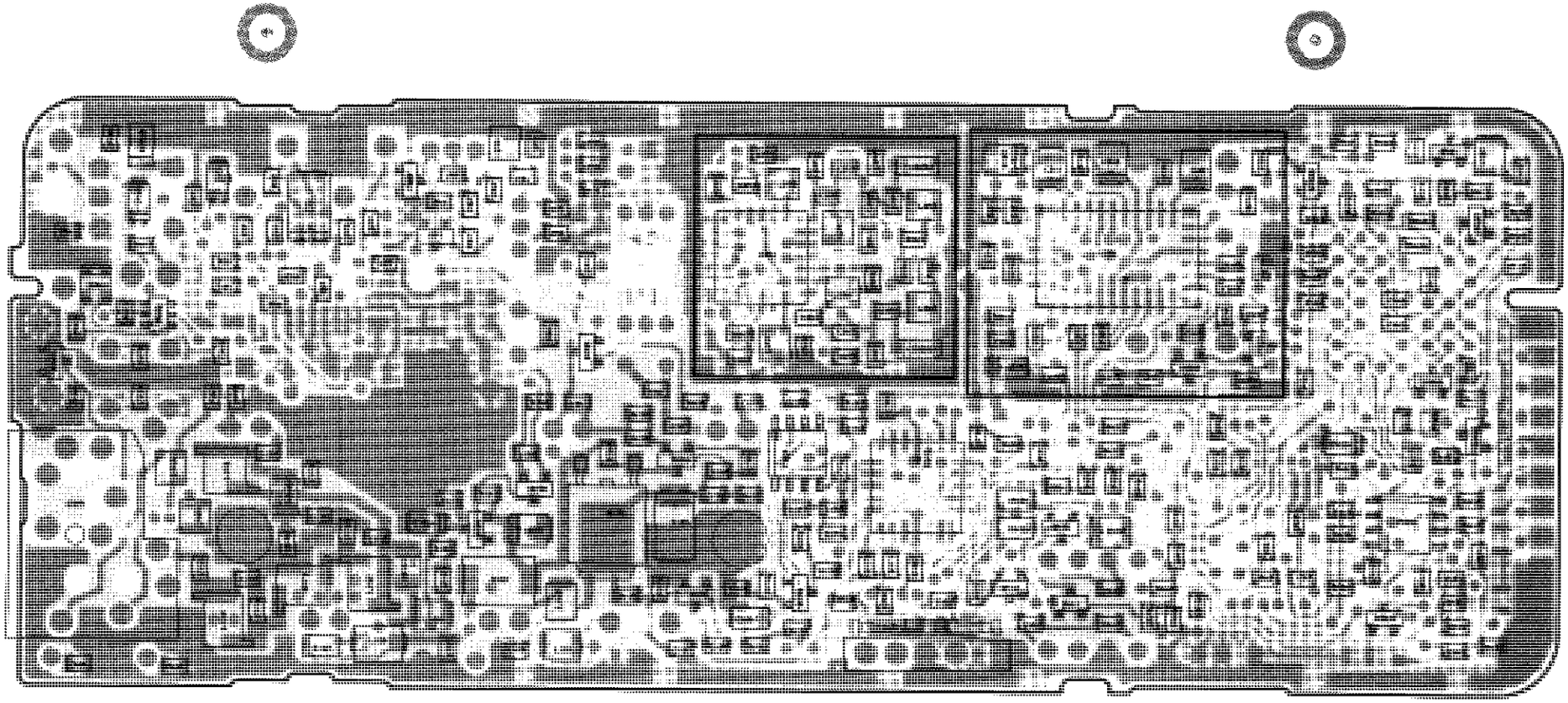
COMPONENT SIDE INNER LAYER (GRAY) RCB-93122-O
SOLDER SIDE INNER LAYER (PINK) RCB-93123-O
OVERLAY ----- RCB-93125-O

COMPONENT SIDE VIEW



COMPONENT SIDE (GRAY) RCB-93121-O
SOLDER SIDE (PINK) RCB-93124-O
OVERLAY ----- RCB-93125-O

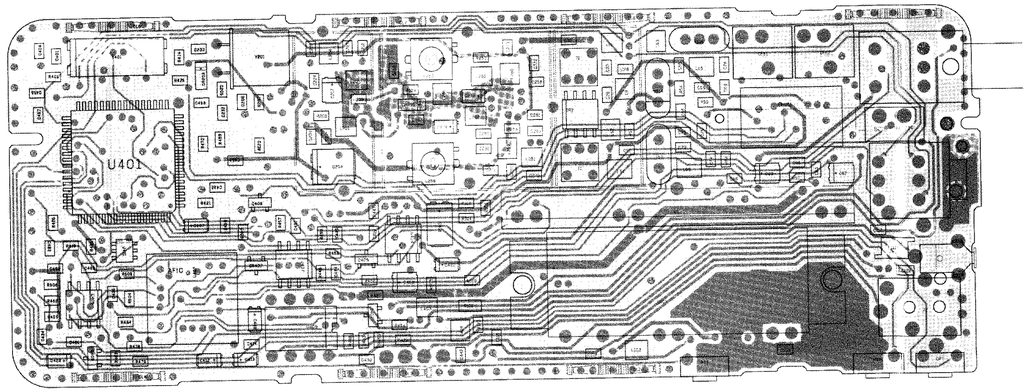
COMPONENT SIDE VIEW



PCB.8480501B04.G
10/27/93

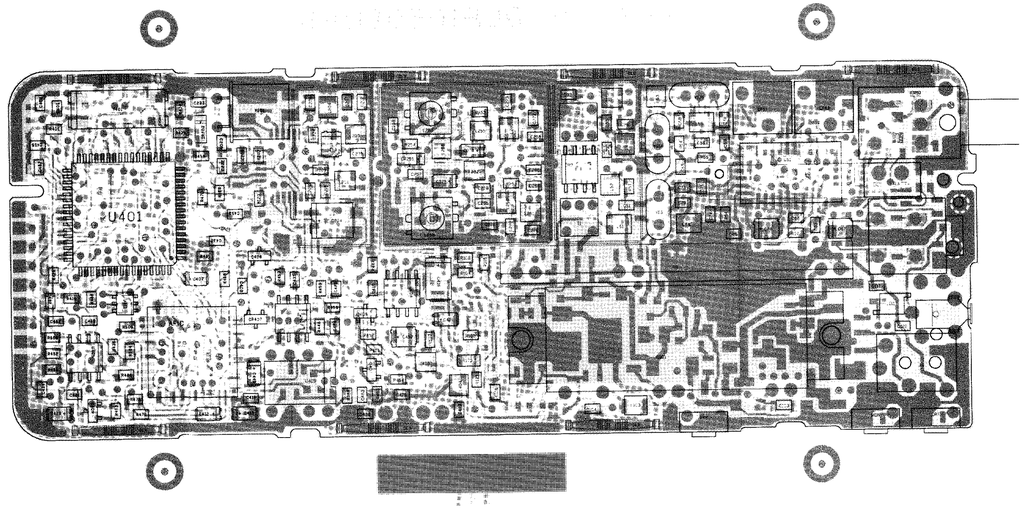
COMPONENT SIDE (GRAY) RCB-93121-O
SOLDER SIDE (PINK) RCB-93124-O
OVERLAY ----- RCB-93126-O

SOLDER SIDE VIEW



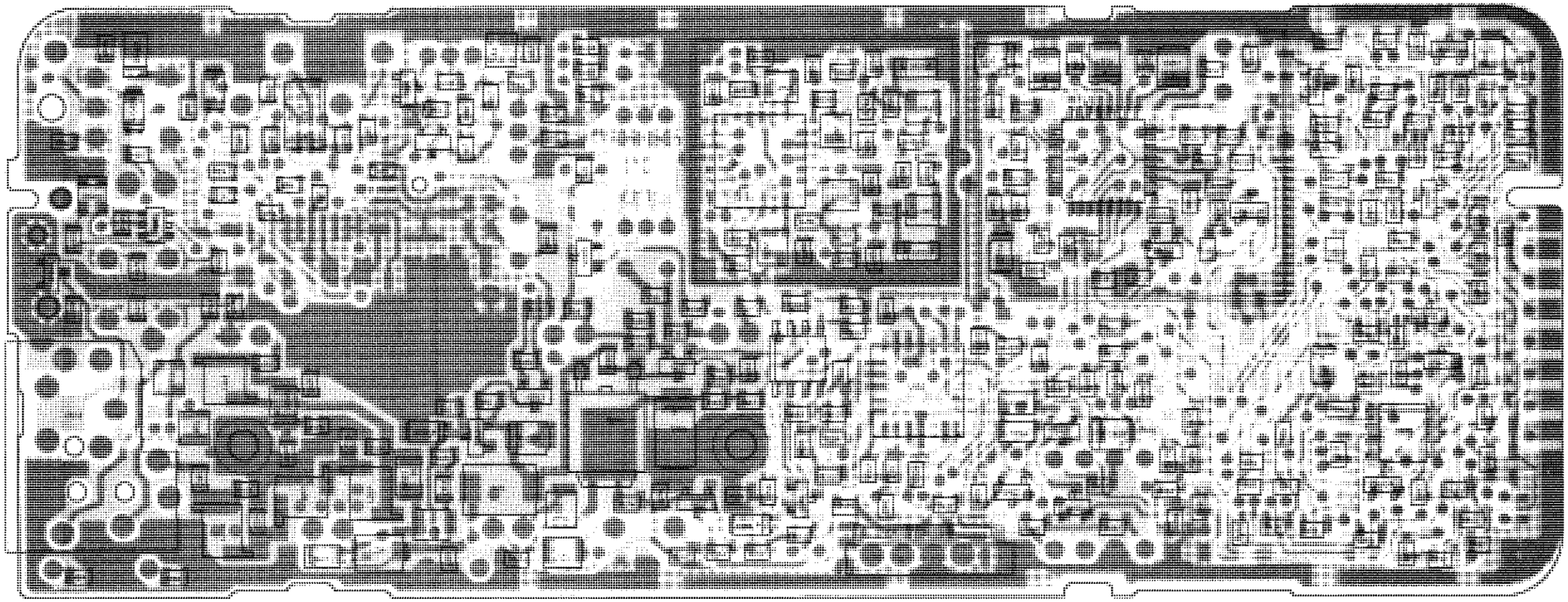
COMPONENT SIDE INNER LAYER (GRAY) RCB-93122-A
SOLDER SIDE INNER LAYER (PINK) RCB-93123-A
OVERLAY ----- RCB-93125-A

COMPONENT SIDE VIEW



COMPONENT SIDE (GRAY) RCB-93121-A
SOLDER SIDE (PINK) RCB-93124-A
OVERLAY ----- RCB-93125-A

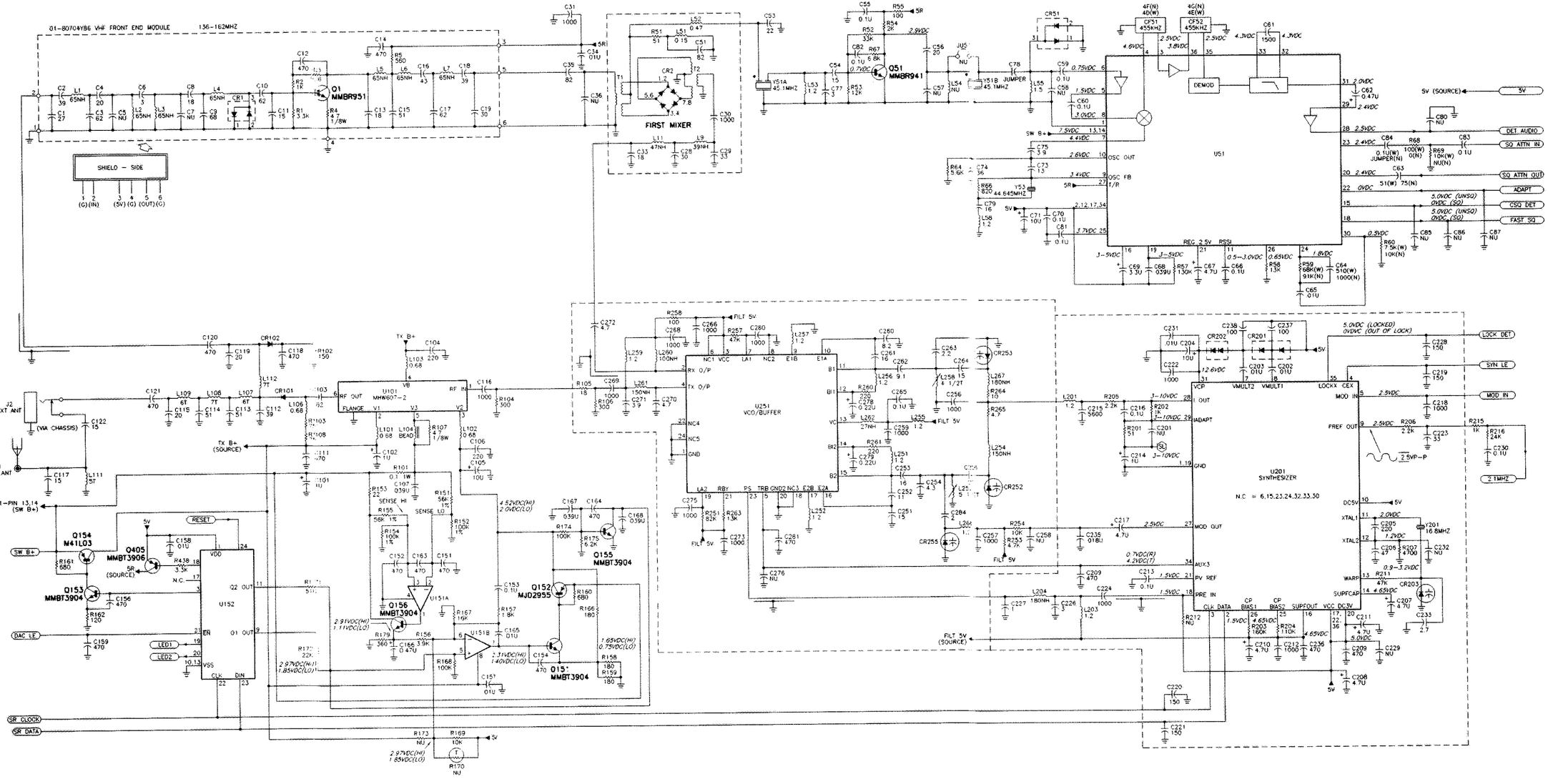
COMPONENT SIDE VIEW



COMPONENT SIDE (GRAY) RCB-93121-A (REV)
SOLDER SIDE (PINK) RCB-93124-A (REV)
OVERLAY ----- RCB-93126-A

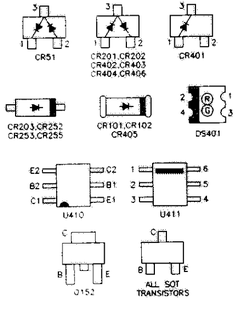
SOLDER SIDE VIEW

Circuit Board Details for HLD8094D, HLD8095D, HLD9675D, and HLD9677D VHF Main Boards
(sheet 2 of 2)



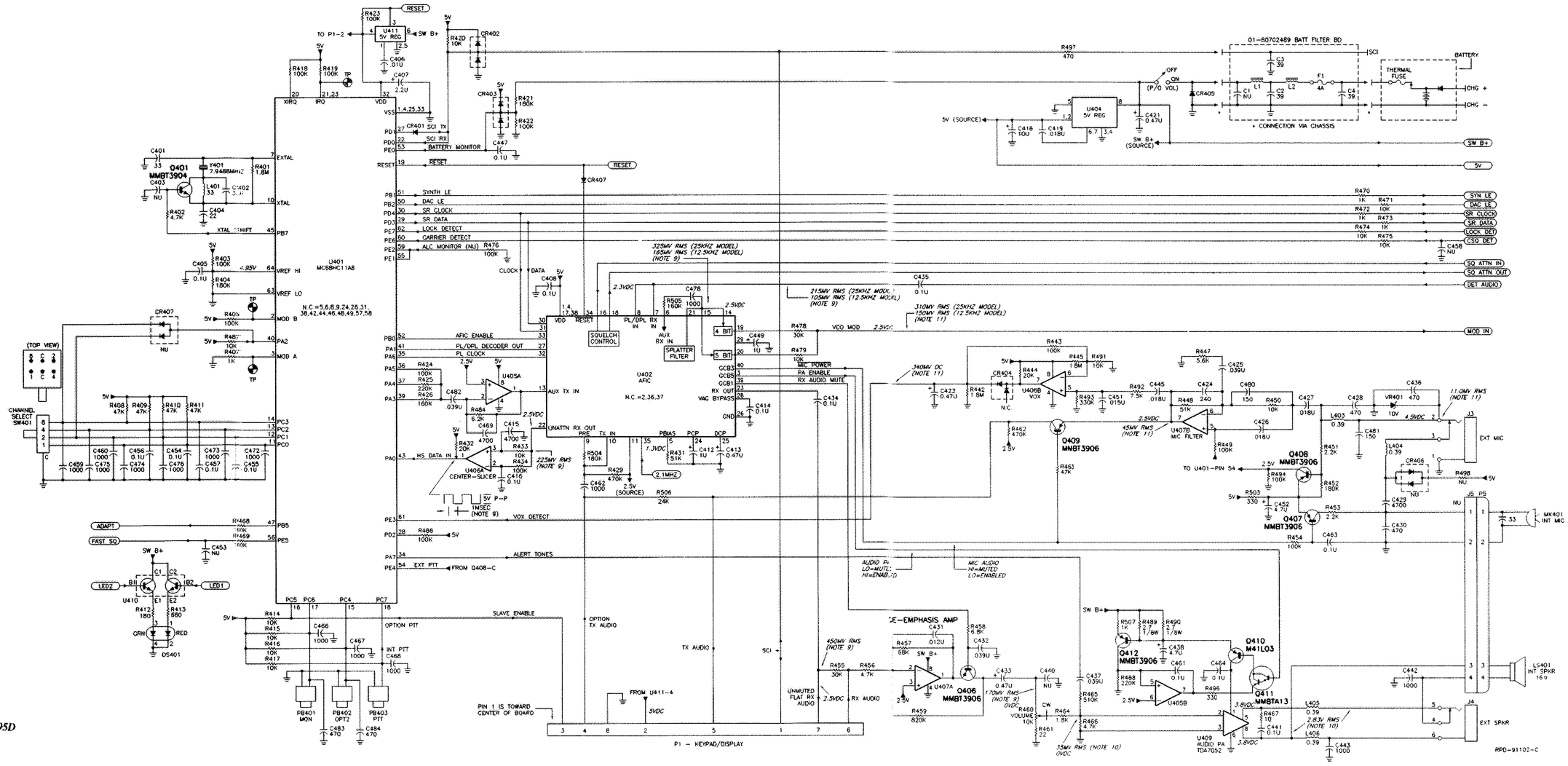
NOTES:

1. UNLESS OTHERWISE INDICATED, RESISTOR VALUES ARE IN OHMS, CAPACITOR VALUES ARE IN PICOFARADS. INDUCTOR VALUES ARE IN MICROHENRIES.
2. NON-POLARIZED CAPACITORS ARE CHIP-TYPE UNLESS OTHERWISE INDICATED.
3. POLARIZED CAPACITORS ARE CHIP-TANTALUM TYPE UNLESS OTHERWISE INDICATED.
4. "NU" MEANS COMPONENT IS NOT USED.
5. DC VOLTAGES ARE MEASURED WITH A HIGH IMPEDANCE (10 MEGOHM) DC VOLTMETER.
6. AC VOLTAGES ARE MEASURED WITH A HIGH IMPEDANCE AC RMS VOLTMETER.
7. ALL VOLTAGE MEASUREMENTS ARE IN THE RECEIVE MODE UNLESS INDICATED AS FOLLOWS:
   (R) RECEIVE MODE
   (T) TRANSMIT MODE
8. MEASURED IN THE RECEIVE MODE WITH AN ON-CHANNEL UNMODULATED SIGNAL AT A LEVEL OF -20 DBM.
9. MEASURED IN THE RECEIVE MODE WITH AN ON-CHANNEL SIGNAL AT A LEVEL OF -20 DBM, MODULATED WITH 1 KHZ AT 3 KHZ DEVIATION (FOR 20/25 KHZ MODELS) OR 1.5 KHZ DEVIATION (FOR 12.5 KHZ MODELS), MEASURED WITH AN AC RMS VOLTMETER.
10. SAME AS NOTE 8 EXCEPT WITH VOLUME CONTROL ADJUSTED FOR 500 MILLIWATTS (2.82 VOLTS RMS ACROSS 16-OHM LOAD CONNECTED TO THE EXT SPKR JACK).
11. MEASURED IN THE TRANSMIT MODE WITH A 1 KHZ, 11 MV RMS SIGNAL APPLIED TO THE EXTERNAL MICROPHONE INPUT.

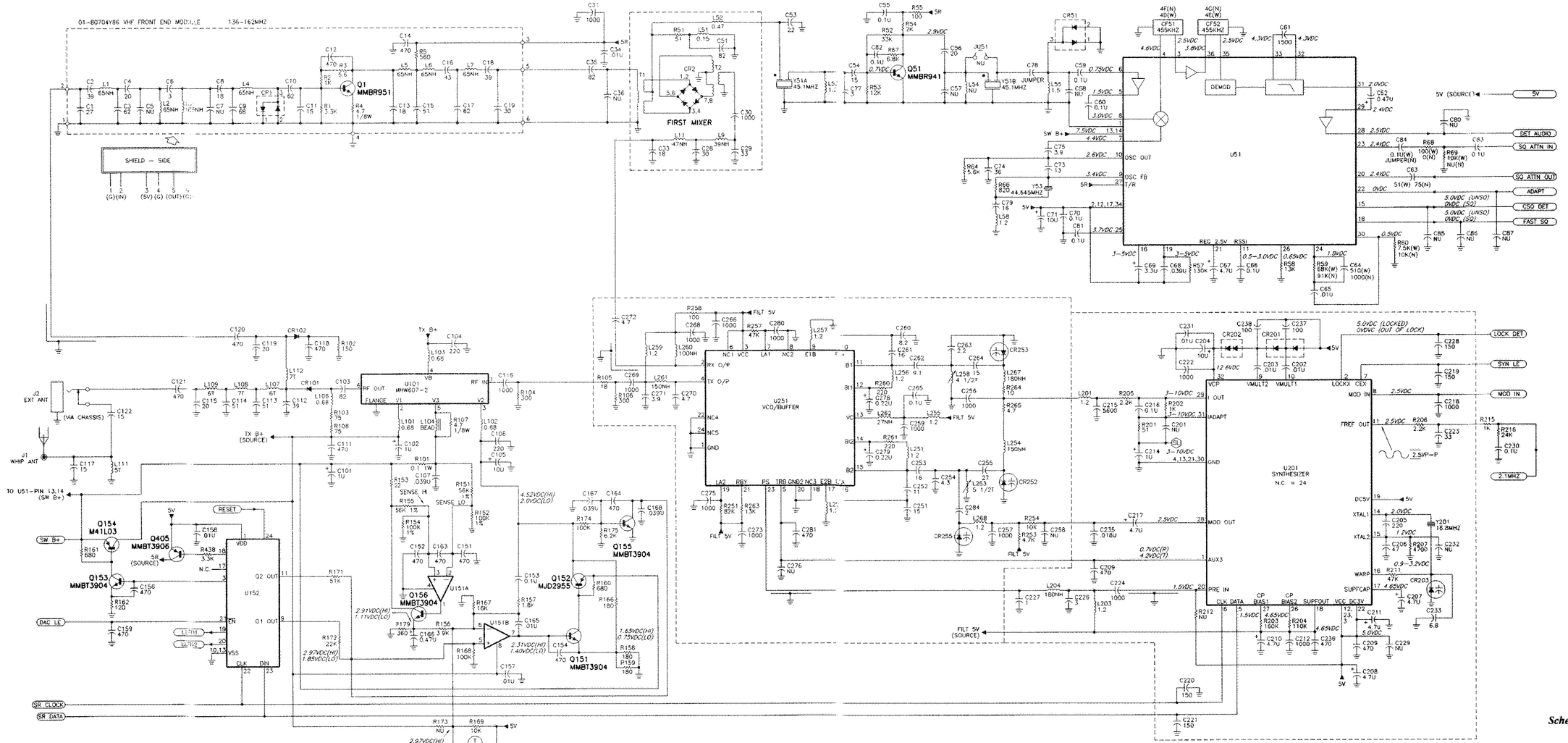


RPD-92101-B

Schematic Diagram for HLD8094C and HLD8095D VHF Main Boards, 136-162 MHz (sheet 1 of 2)



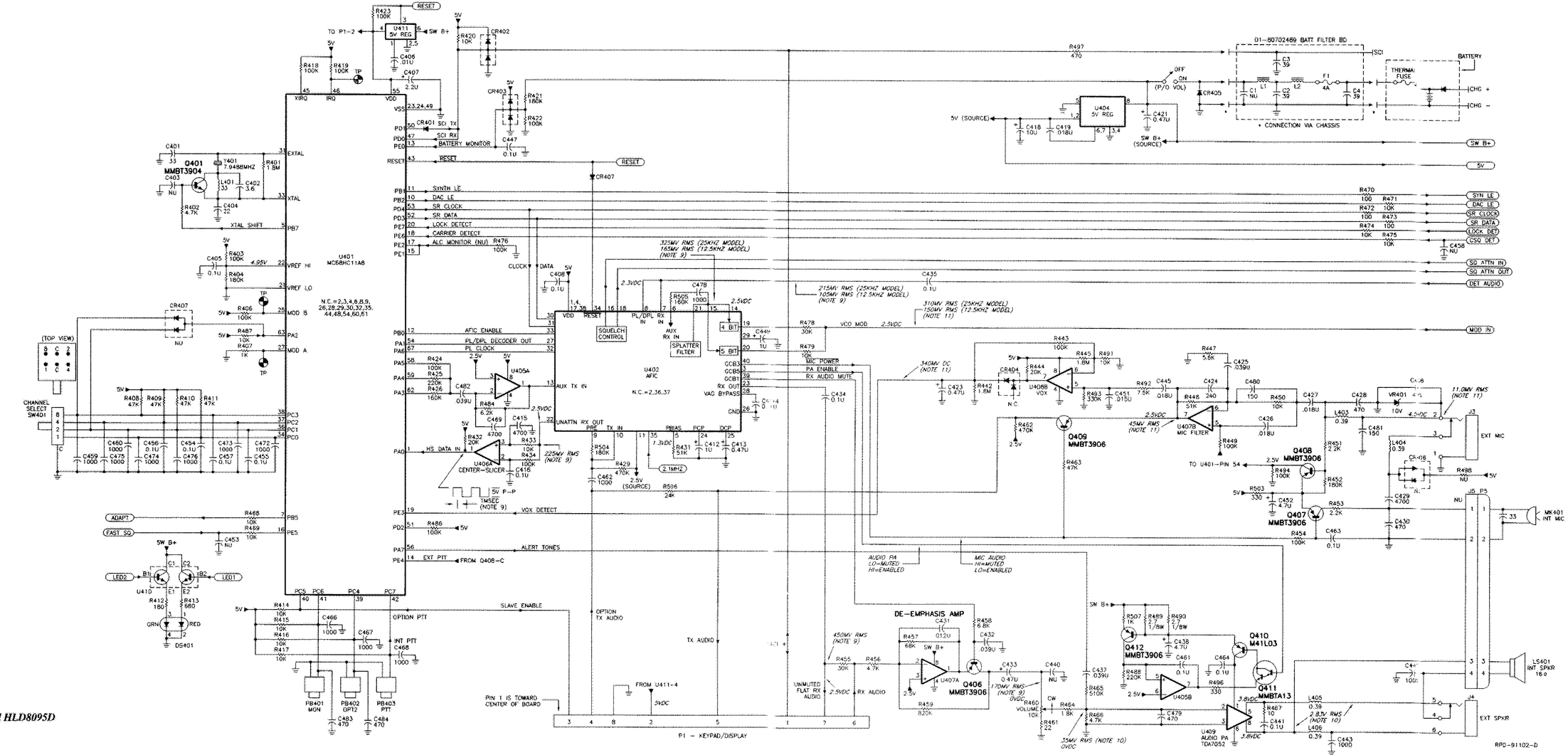
Schematic Diagram for HLD8094C and HLD8095D
VHF Main Boards, 136-162 MHz
(sheet 2 of 2)



NOTES:

1. UNLESS OTHERWISE INDICATED, RESISTOR VALUES ARE IN OHMS, CAPACITOR VALUES ARE IN PICOFARADS, INDUCTOR VALUES ARE IN MICROHENRIES.
2. NON-POLARIZED CAPACITORS ARE CHIP-TYPE UNLESS OTHERWISE INDICATED.
3. POLARIZED CAPACITORS ARE CHIP-TANTALUM TYPE UNLESS OTHERWISE INDICATED.
4. "NU" MEANS COMPONENT IS NOT USED.
5. DC VOLTAGES ARE MEASURED WITH A HIGH IMPEDANCE (10 MEGOHM) DC VOLTMETER.
6. AC VOLTAGES ARE MEASURED WITH A HIGH IMPEDANCE AC RMS VOLTMETER.
7. ALL VOLTAGE MEASUREMENTS ARE IN THE RECEIVE MODE UNLESS INDICATED AS FOLLOWS:
   (R) RECEIVE MODE
   (T) TRANSMIT MODE
8. MEASURED IN THE RECEIVE MODE WITH AN ON-CHANNEL UNMODULATED SIGNAL AT A LEVEL OF -20 DBM.
9. MEASURED IN THE RECEIVE MODE WITH AN ON-CHANNEL SIGNAL AT A LEVEL OF -20 DBM, MODULATED WITH 1 KHZ AT 3 KHZ DEVIATION (FOR 20/25 KHZ MODELS) OR 1.5 KHZ DEVIATION (FOR 12.5 KHZ MODELS), MEASURED WITH AN AC RMS VOLTMETER.
10. SAME AS NOTE 8 EXCEPT WITH VOLUME CONTROL ADJUSTED FOR 500 MILLIWATTS (2.82 VOLTS RMS ACROSS 16-OHM LOAD CONNECTED TO THE EXT SPKR JACK).
11. MEASURED IN THE TRANSMIT MODE WITH A 1 KHZ, 11 MV RMS SIGNAL APPLIED TO THE EXTERNAL MICROPHONE INPUT.

Schematic Diagram for HLD8094D and HLD8095D
VHF Main Boards, 136-162 MHz
(sheet 1 of 2)



Schematic Diagram for HLD8094D and HLD8095D
VHF Main Boards, 136-162 MHz
(sheet 2 of 2)

Parts List

HLD8095D Main Board, 136-162 MHz, 5 W, 12.5 kHz Channel Spacing (N)
HLD8094C Main Board, 136-162 MHz, 5 W, 25 kHz Channel Spacing (W) PL-921001-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		capacitor, fixed: pF +/-5%; 50V: unless otherwise stated
C1	2113740A39	27
C2	2113740A43	39
C3	2113740A50	62
C4	2113740A36	20
C6	2113740A34	3, 0.25 pF
C8	2113740A35	18
C9	2113740A51	68
C10	2113740A50	62
C11	2113740A33	15
C12	2113740A71	470
C13	2113740A35	18
C14	2113740A71	470
C15	2113740A48	51
C16	2113740A44	43
C17	2113740A50	62
C18	2113740A43	39
C19	2113740A40	30
C20	2113740A40	30
C29	2113740A41	33
C30	2113740A79	1000
C31	2113740A79	1000
C33	2113740A35	18
C34	2113741A45	0.01 uF
C35	2113740A50	62
C51	2113740A53	82
C53	2113740A37	22
C54	2113740A33	15
C55	2160521G37	0.1 uF, +80%/-20%; 25V
C56	2113740A36	20
C59	2160521G37	0.1 uF, +80%/-20%; 25V
C60	2160521G37	0.1 uF, +80%/-20%; 25V
C61	2113741A25	1500
C62	2311049A05	0.47 uF, 10%; 25V
C63	2113740A22	75 (12.5 kHz) or 2113740A48 51 (25 kHz)
C64	2113740A79	1000 (12.5 kHz) or 2113740A72 510
C65	2113741A45	0.01 uF
C66	2160521G37	0.1 uF, +80%/-20%; 25V
C67	2311049J11	4.7 uF, 10%; 16V
C68	2113741A59	0.039 uF
C69	2311049J07	3.3 uF, 10%; 20V
C70	2160521G37	0.1 uF, +80%/-20%; 25V
C72	2311049J25	10 uF, 10%; 16V
C73	2113740A22	12
C74	2113740A42	36
C75	2113740A17	3.9, 0.25
C77	2113740A14	3, 0.25
C78	0660076M01	0 ohms, 0%; 1/8W
C79	2113740A34	16
C81 thru 83	2160521G37	0.1 uF, +80%/-20%; 25V
C84	2660078M01	0 ohms, 0%; 1/8W (12.5 kHz) or 2160521G37 0.1 uF, +80%/-20%; 25V (25 kHz)
C101, 102	2311049A07	1 uF, 10%; 16V
C103	2113740A53	82
C104	2113740A63	220
C105	2311049J25	10 uF, 10%; 16V
C106	2113740A63	220
C107	2113741A59	0.039 uF, 5%; 50V
C111	2113740A71	470
C112	2113740A43	39
C113, 114	2113740A48	51
C115	2113740A36	20
C116	2113740A79	1000
C117	2113740A33	15
C118	2113740A71	470
C119	2113740A36	20
C120, 121	2113740A71	470
C127	2113740A33	15
C151, 152	2113740A71	470
C153	2160521G37	0.1 uF, +80%/-20%; 25V
C154	2113740A71	470
C156	2113740A71	470
C157, 158	2113741A45	0.01 uF
C159	2113740A71	470
C163, 164	2113740A71	470
C165	2113741A45	0.01 uF
C166	2311049A05	0.47 uF, 10%; 25V

HLD8095D Main Board, 136-162 MHz, 5 W, 12.5 kHz Channel Spacing (N)
HLD8094C Main Board, 136-162 MHz, 5 W, 25 kHz Channel Spacing (W) PL-921001-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
C167, 168	2113741A59	0.039 uF
C202, 203B	2113741A45	0.01 uF
C204T	2311049J27	10 uF, 10%; 25V
C205T	2113740A63	220
C206T	2113740G46	47 pF, 2%; 50V
C207, 208B	2311049J11	4.7 uF, 10%; 16V
C209T	2113740A71	470
C210, 211B	2311049J11	4.7 uF, 10%; 16V
C212T	2113741A21	1000
C213T	2160521G37	0.1 uF, +80%/-20%; 25V
C214B	2311049A07	1 uF, 10%; 16V
C215T	2113741A79	3600
C216B	2160521G37	0.1 uF, +80%/-20%; 25V
C217T	2311049J11	4.7 uF, 10%; 16V
C218B	2113741A21	1000
C219 thru 221B	2113740A59	150
C222B	2113741A21	1000
C223B	2113740A41	33
C224B	2113740A78	1000
C226T	2113740A03	3, 0.25
C227T	2113740A03	1, 0.25
C228B	2113740A59	150
C230B	2160521G37	0.1 uF, +80%/-20%; 25V
C231B	2113741A45	0.01 uF
C232T	2113740G13	2.7, 0.1
C235T	2113741A51	0.018 uF
C236B	2113740A71	470
C237, 238B	2113740A55	100
C251B	2113740A33	15
C252B	2113740A30	11
C253B	2113740A34	16
C254B	2113740A18	4.3, 0.25
C255B	2113740A39	27
C256B	2113740A79	1000
C257T	2113740A79	1000
C259T	2113740A79	1000
C260B	2113740A27	8.2, 0.25
C261B	2113740A34	16
C262B	2113740A28	9.1, 0.25
C263B	2113740A11	2.2, 0.25
C264B	2113740A33	15
C265T	2160521G37	0.1 uF, +80%/-20%; 25V
C266T	2113740A79	1000
C268, 269T	2113740A79	1000
C270T	2113740A18	4.7, 0.25
C271T	2113740A17	3.9, 0.25
C272T	2113740A18	4.7, 0.25
C273T	2113740A79	1000
C275B	2113740A79	1000
C279, 279T	2311049A09	0.22 uF, 10%; 35V
C280B	2113740A79	1000
C281T	2113740A71	470
C284B	2113740A10	2F, 0.25
C401T	2113740A41	33
C402B	2113740G16	2.2, 0.1
C404T	2113740A37	22
C405B	2160521G27	0.1 uF, +80%/-20%; 25V
C406T	2113741A45	0.01 uF; (12.5 KHz)
C407T	2311049A40	2.2 uF, 10%; 10V
C408T	2160521G37	0.1 uF, +80%/-20%; 25V
C412T	2311049A07	1 uF, 10%; 16V
C413T	2311049A05	0.47 uF, 10%; 25V
C414T	2160521G37	0.1 uF, +80%/-20%; 25V
C415B	2113741A57	4700
C416B	2160521G37	0.1 uF, +80%/-20%; 25V
C418T	2311049J25	10 uF, 10%; 16V
C419T	2113741A51	0.018 uF
C421T	2311049A05	0.47 uF, 10%; 25V
C423B	2311049A05	0.47 uF, 10%; 25V
C424T	2113740A40	240
C425T	2113741A59	0.039 uF
C426, 427B	2113741A51	0.018 uF
C428B	2113740A71	470
C429T	2113741A37	4700
C430T	2113740A71	470
C431T	2113741A47	0.012 uF
C432T	2113741A59	0.039 uF
C433B	2311049A05	0.47 uF, 10%; 25V
C434, 435T	2160521G37	0.1 uF, +80%/-20%; 25V
C436B	2113740A71	470
C437T	2113741A59	0.039 uF

HLD8095D Main Board, 136-162 MHz, 5 W, 12.5 kHz Channel Spacing (N)
HLD8094C Main Board, 136-162 MHz, 5 W, 25 kHz Channel Spacing (W) PL-921001-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
C438B	2311049J11	4.7 uF, 10%; 16V
C441B	2160521G37	0.1 uF, +80%/-20%; 25V
C442T	2113740A79	1000
C443B	2113740A79	1000
C445B	2113741A51	0.018 uF
C447T	2160521G37	0.1 uF, +80%/-20%; 25V
C448T	2311049A07	1 uF, 10%; 16V
C451B	2113741A49	0.015 uF
C452T	2311049J11	4.7 uF, 10%; 16V
C454, 455T	2160521G37	0.1 uF, +80%/-20%; 25V
C456B	2160521G37	0.1 uF, +80%/-20%; 25V
C457T	2160521G37	0.1 uF, +80%/-20%; 25V
C459T	2113741A21	1000
C460B	2113741A21	1000
C461T	2160521G37	0.1 uF, +80%/-20%; 25V
C462T	2113740A79	1000
C463, 464B	2160521G37	0.1 uF, +80%/-20%; 25V
C466 thru 468B	2113741A21	1000
C469T	2113741A37	4700
C472 thru 476B	2113741A21	1000
C478T	2113740A79	1000
C480, 481B	2113740A59	150
C482T	2113741A59	0.039 uF
C483, 484B	2113740A71	470
CF51T	9180098D04 or 9180098D06	**filter:** ceramic 3 WR (12.5 kHz) ceramic 3 WR (25 kHz)
CF52T	9180098D03 or 9180098D05	ceramic 3 WR (12.5 kHz) ceramic 3 WR (25 kHz)
CL1 thru 4	4280138R01	**clip:** butterfly
CL6 thru 8	4280138R01	butterfly
CR1	4880154K09	**diode: (see note)** Dual Schottky Mixer
CR2T	4880174R01	QUAD, 8-pin
CR51B	4880154K03	Dual Schottky Mixer
CR101, 102B	4809732D02	pin
CR201, 202B	4813833C07	dual 100 W
CR203T	4805649Q04	DIODE VCTR RH 1T33T
CR252, 253B	4805649Q04	DIODE VCTR RH 1T33T
CR255T	4805649Q04	DIODE VCTR RH 1T33T
CR401B	4880937T01	Schottky barrier diode
CR402, 403B	4813833C07	dual 100 W
CR404B	4913833C07	dual 100 W
CR405B	4880107R01	silicon
CR407B	4813833C07	dual 100 W
DS401B	4805729G49	**light emitting diode: (see note)** diode red/yel
H103	1405160A02	**mechanical:** crystal
J1T	3980515C02	**connector, receptacle:** ANT CONTACT
J5B	0180195R01	SPKR/MIC HEADER
J6T	0180965Z01	CONNECTOR B+
L1 thru 7	2480140E64	**coil, inductor:** chip 65 NH
L9T	2462587N48	chip 39 NH, 5%
L11T	2462587N49	47 nH, 5%
L51T	2483411E63	chip shielded
L52T	2462587N51	chip 470 NH, 5%
L53T	2462587N69	1200 NH, 5%
L56T	2483411T75	chip shielded
L58T	2483411T74	chip shielded
L101, 102B	2411087E24	coil chip 0.68 UH
L103T	2411087E24	coil chip 0.68 UH
L104B	2484657R01	ferrite bead
L106B	2411097E24	coil chip 0.68 UH
L107B	2405486C92	coil air wound. 6 turn
L108B	2405486C77	coil air wound 7 turn
L109B	2405486C94	coil air wound 6 turn
L111T	2405835C03	coil airwound .087 diameter
L112B	2405486C72	coil air wound 7 turn
L201T	2462587N69	1200 NH, 5%

HLD8095D Main Board, 136-162 MHz, 5 W, 12.5 kHz Channel Spacing (N)
HLD8094C Main Board, 136-162 MHz, 5 W, 25 kHz Channel Spacing (W) PL-921001-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
L203T	2462587N69	1200 NH, 5%
L204T	2462587N56	chip 180 NH, 5%
L251, 252B	2462587N69	1200 NH, 5%
L253T	2480145S05	coil 5-1/2 turn ferrite core
L254B	2462587N55	150 NH, 5%
L255T	2462587N69	1200 NH, 5%
L256, 257B	2462587N69	1200 NH, 5%
L258T	2480145S04	coil, 4.5 turns, ferrite core
L259T	2462587N69	1200 NH, 5%
L260T	2462587N53	chip 100 NH, 5%
L261T	2462587N55	150 nH, 5%
L262T	2462587N46	chip 27 NH, 5%
L267B	2462587N56	chip 180 NH, 5%
L268B	2462587N69	1200 NH, 5%
L401B	2462178C43	chip 33.0 UH, 10%
L403, 404T	2462587N22	chip 390 NH, 10%
L405, 406B	2462587N22	chip 390 NH, 10%
M2 thru 7	0780102S01	**meter:** leadframe
MS1	0705196A11	SUPR XTAL MTG
MS10	4280126R01	clip, PA
M600 thru 602	4080485C03	switch tactile
Q1	4880173R01	**transistor: (see note)** RF transistor
Q51B	4813823A10	PNP
Q151B	4880214G02	NPN
Q152B	4813823A10	PNP 60V 10A
Q153B	4880214G02	NPN
Q154B	4880141L03	PNP
Q155, 156B	4880214G02	NPN
Q401B	4880214G02	NPN
Q405B	4805128M16	SOT MMBT3906 (RH) 48G22
Q406, 407T	4805128M16	SOT MMBT3906 (RH) 48G22
Q408, 409T	4805128M16	SOT MMBT3906 (RH) 48G22
Q410B	4880141L03	PNP
Q411B	4905128M19	SOT-23
Q412B	4905128M16	SOT MMBT3906 (RH) 48G22
R1	0660076A61	**resistor, fixed: +/-5%; 1/8 W:** unless otherwise stated 3.3K
R2	0660076A49	1K
R3	0660076A57	5.6K
R4	0611077A18	4.7 ohms
R5B	0660076A43	560 ohms
R51T	0660076A18	51 ohms
R52B	0660076A85	33K
R53B	0660076A75	12K
R54T	0660076A56	2K
R55T	0660076A25	100 ohms
R57T	0660076B04	130K
R58B	0660076A76	13K
R59B	0660076A96 or 0660076A93	91K (12.5 kHz) 68K (25 kHz)
R60B	0660076A73 or 0660076A70	10K 12.5 kHz) 7.5K (25 kHz)
R64T	0660076A67	5.6K
R66B	0660076A47	820 ohms
R67B	0660076A69	6.8K
R68B	0660076M01	0 ohms, 0% (12.5 kHz)
R69B	0660076A73	10K
R101B	0680108R01	0.1 ohms, 1%; 1W
R102B	0660076A29	150 ohms
R103B	0660076A22	75 ohms
R104T	0660076A36	300 ohms
R105T	0660076A07	18 ohms
R106T	0660076B01	300 ohms
R107B	0611077A18	4.7 ohms
R108B	0660076A22	75 ohms
R151B	0660076E91	56K, 1%
R152B	0660076F01	100K, 1%
R153B	0660076A09	22 ohms
R154B	0660076F01	100K, 1%
R155B	0660076E91	56K, 1%
R156B	0660076A63	3.9K
R157B	0660076A55	1.8K
R158, 159B	0660076A31	180 ohms
R160, 161B	0660076A45	680 ohms

HLD8095D Main Board, 136-162 MHz, 5 W, 12.5 kHz Channel Spacing (N)
HLD8094C Main Board, 136-162 MHz, 5 W, 25 kHz Channel Spacing (W) PL-921001-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
R162B	0660076A27	120 ohms
R166B	0660076A31	180 ohms
R167B	0660076A78	16K
R168B	0660076B01	100K
R169T	0660076A73	10K
R171B	0660076A51	51K
R172B	0660076A81	22K
R174B	0690076B01	100K
R175B	0660076A68	6.2K, 4%
R179B	0660076A38	360 ohms
R201B	0660076A18	51 ohms
R202B	0660076A49	1K
R203B	0660076B06	160K
R204B	0660076B02	110K
R205T	0660076A57	2.2K
R206B	0660076A57	2.2K
R207T	0660076A41	470 ohms
R211B	0660076A89	47K
R215B	0660076A49	1K
R216B	0660076A82	24K
R251B	0660076A95	82K
R252T	0660076A65	4.7K
R254T	0660076A73	10K
R257B	0660076A89	47K
R258T	0660076A25	100 ohms
R260, 261B	0660076A33	220 ohms
R263B	0660076A76	13K
R264B	0660076A01	10 ohms
R265B	0660076L17	4.7 ohms, 10%
R401T	0660076H31	1.8 meg, 10%
R402B	0660076A65	4.7K
R403B	0660076B01	100K
R404B	0660076B07	180K
R406B	0660076B01	100K
R407B	0660076A89	47K
R408 thru 411B	0660076A89	47K
R412B	0660076A31	180 ohms
R413B	0660076A45	680 ohms
R414 thru 417B	0660076A73	10K
R416B	0660076B01	100K
R419T	0660076B01	100K
R420B	0660076A73	10K
R421B	0660076B07	180K
R422B	0660076B01	100K
R424T	0660076B01	100K
R425T	0660076B09	220K
R426B	0660076B06	160K
R427T	0660076B17	470K
R431T	0660076A90	51K
R432B	0660076A80	20K
R433B	0660076A73	10K
R434B	0660076B01	100K
R438B	0660076A61	3.3K
R442B	0660076H31	1.8 meg, 10%
R443B	0660076B01	100K
R444B	0660076A80	20K
R445B	0660076H31	1.8 meg, 10%
R447T	0660076A67	5.6K
R448T	0660076A90	51K
R449B	0660076B01	100K
R450B	0660076A73	10K
R451T	0660076A57	2.2K
R452T	0660076B07	180K
R453T	0660076A57	2.2K
R454T	0660076B01	100K
R455T	0660076A84	30K
R456T	0660076A65	4.7K
R457T	0660076A93	68K
R458T	0660076A69	6.8K
R459T	0660075B23	820K
R461B	0660076A09	22 ohms
R462T	0660076B17	470K
R463T	0660076A89	47K
R464B	0660076A55	1.8K
R465B	0660076B18	510K
R466B	0660076A65	4.7K
R467B	0660079A01	10 ohms
R468B	0660076A73	10K
R469T	0660076A73	10K
R470T	0660076A49	1K

HLD8095D Main Board, 136-162 MHz, 5 W, 12.5 kHz Channel Spacing (N)
HLD8094C Main Board, 136-162 MHz, 5 W, 25 kHz Channel Spacing (W) PL-921001-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
R471B	0660076A39	10K
R472, 473B	0660076A49	1K
R474, 475T	0660076A73	10K
R476B	0660076B01	100K
R478T	0660076A84	30K
R479T	0660076A73	10K
R484T	0660076A68	6.2K, 4%
R486T	0660076B01	100K
R487B	0660076A73	10K
R488T	0660076B09	220K
R489, 490B	0611077A18	2.7 ohms
R491B	0660076A73	10K
R492B	0660076A70	7.5K
R493B	0660076B02	110K
R494B	0660076B01	100K
R496B	0660076A37	330 ohms
R497B	0660076A41	470 ohms
R503T	0660076A37	330 ohms
R504T	0660076B07	180K
R505T	0660076B06	160K
R506T	0660076A82	24K
R507B	0660076A49	1K
SH100B	2680966Y01	**shield** synthetic, front
SH101B	2680970V01	VCO, front
SH102T	2680692C01	mixer back (12.5 kHz)
SH104T	2680968Z01	VCO, back
SH105T	2680972Z01	synthetic, back, TCXO
SW401T	4080502B01	**switch:** 16-position
U51T	5180207R01	**integrated circuit: (see note)** IF
U101T	5180111R02	RF power module (VHF)
U151B	1809329V01	linear vp amp
U201B*	5105414S55	synthesizer
U404T	5105468E65	voltage regulator
U405T	5180932V01	linear vp amp
U406B	5102198J23	compactor
U407T	5180932V01	linear vp amp
U409T	5180175R01	audio amplifier
U410B	5180159R01	dual trans NPN5
U411T	5180633C01	5V regulator w/reset
VR401B	4880140L15	**voltage regulator: (see note)** diode Zener 10V tape&reel (12.5 kHz)
Y51B	9180112R06 or 9180112R05	**crystal: (see note)** 45.1 MHz filter (12.5 kHz) 45.1 MHz filter (25 kHz)
Y53T	4880008R02	XTAL resonator 44.645 MHZ 10PPM
Y401T	4880113R01	7.9488

non-referenced items

	0180417C01	ASSEMBLY, option jack
	0180444C01	ASSEMBLY, RF jack
	0300136T83	SCREW, 2-56" x 5/16" Phillips; 2 used
	0580537C01	EYELET
	0580537C02	EYELET
	0780165R02	BOOT, crystal
	0780472C01	BATTERY, contact support
	0780511B01	BRACKET, freq switch, plated
	1480168S01	INS., XTAL; 2 used
	1580413C01	HOUSING, option jack
	1580414C01	HOUSING, cover option jack
	1580433C01	HOUSING, RF jack
	1880143S02	VOLUME, potentiometer
	2680183A03	COIL, transformer; 2 used
	2680412B01	SHIELD, RF jack
	2680416C01	SHIELD, option jack
	2680625B02	SHIELD, RECEIVER
	2680692C01	SHIELD, mixer, back (25 kHz)
	3180168R01	B+ HEADER
	3280415C01	SEAL, option jack
	3980169R01	PRIM B+ CONTACT
	3980179R01	PROG CONTACT
	3980405C01	CONTACT, spring #5
	3980406C01	CONTACT, spring #2

HLD8095D Main Board, 136-162 MHz, 5 W, 12.5 kHz Channel Spacing (N)
HLD8094C Main Board, 136-162 MHz, 5 W, 25 kHz Channel Spacing (W) PL-921001-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
	3980407C01	CONTACT, spring #4
	3980408C01	CONTACT, spring #3
	3980409C01	CONTACT, spring #6
	3980410C01	CONTACT, spring #1
	3980434C01	RF JACK, T2 contact
	3980435C01	RF JACK, T1 contact
	4880114R02	CRYSTAL, 16.8 MHZ
	5180633C01	REGULATOR, 5V w/reset (25 kHz)
	5480570B01	LABEL, thermal high temp
	7580411C01	BUMPER 2.5 MM; 2 used

note: For optimum performance, diodes, transistors, and integrated circuits must be ordered by Motorola part numbers.

Reference designator ending in "T" denotes component is located on top side of circuit board. **Reference** designator ending in "B" denotes component is located on bottom side of circuit board. Reference designators marked with an asterisk indicate components which are not field-replaceable.

HLD8095D Main Board, 136-162 MHz, 5 W, 12.5 kHz Channel Spacing (N)
HLD8094C Main Board, 136-162 MHz, 5 W, 25 kHz Channel Spacing (W) PL-921001-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
	3980407C01	CONTACT, spring #4
	3980408C01	CONTACT, spring #3
	3980409C01	CONTACT, spring #6
	3980410C01	CONTACT, spring #1
	3980434C01	RF JACK, T2 contact
	3980435C01	RF JACK, T1 contact
	4880114R02	CRYSTAL, 16.8 MHZ
	5180633C01	REGULATOR, 5V w/reset (25 kHz)
	5480570B01	LABEL, thermal high temp
	7580411C01	BUMPER 2.5 MM; 2 used

Parts List

01-80704Y86 Receiver Module, 136-162 MHz
(part of HLD8095D or HLD8094C Main Board): PL-921002-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		capacitor, fixed: pF +/-5%; 50 V: unless otherwise stated
C1	2113740A39	27
C2	2113740A43	39
C3	2113740A50	62
C4	2113740A36	20
C6	2113740A14	3, 0.25
C8	2113740A35	18
C9	2113740A51	68
C10	2113740A50	62
C11	2113740A33	15
C12	2113740A71	470
C13	2113740A35	18
C14	2113740A71	470
C15	2113740A48	51
C16	2113740A44	43
C17	2113740A50	62
C18	2113740A43	39
C19	2113740A40	30
CR1	4880154K03	**diode: (see note)** diode dual Schottky mixer
L1 thru 7	2480140E04	**coil, inductor:** CHIP 65 NH
M2 thru 7	0780102S01	**meter:** leadframe
Q1	4880173R01	**transistor: (see note)** RF transistor
R1	0660076A61	**resistor, fixed: +/-5%; 1/8 W:** unless otherwise stated 3.3K
R2	0660076A49	1K
R3	0660076A57	5.6K
R4	0611077A18	4.7 ohms
R5	0660076A43	560 ohms
SH100B	2680966Y01	**shield** synthetic, front
U51T	5180207R01	**integrated circuit: (see note)** IF
U201B*	5105414S55	synthesizer
VR401B	4880140L15	**voltage regulator: (see note)** diode Zener 10V tape&reel (12.5 kHz)
Y51B	9180112R06 or 9180112R05	**crystal: (see note)** 45.1 MHz filter (12.5 kHz) 45.1 MHz filter (25 kHz)
Y401T	4880113R01	XTAL resonator 44.645 MHZ 10PPM 7.9488

non-referenced items

	2680625B02	SHIELD, receiver

note: For optimum performance, diodes, transistors, and integrated circuits must be ordered by Motorola part numbers.

This module is not field-repairable.

Parts List

0180702Y89 Battery Filter Board PL-911016-A

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		capacitor, fixed: pF +/-5%; 50 V: unless otherwise stated
C2 thru 4	2113740A43	39
L1, 2	2484657R01	**coil, rf:** ferrite bead
F1	6505663R04	**fuse:** 4 A

non-referenced items

	3980165S01	CONTACT, battery

Parts Lists for HLD8094C and HLD8095D VHF Main Boards, 136-162 MHz

Parts List

01-80706Y81 Receiver Module, 136-162 MHz
(part of HLD8095D or HLD8094D Main Board) PL-921002-C

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		capacitor, fixed: pF +/-5%; 50 V: unless otherwise stated
C1		43, ±30%
C2		68, ±30%
C3		56, ±5%
C4		24, ±30%
C6		3.9, ±0.1
C8		27, ±30%
C9		47, ±30%
C10		62, ±30%
C11		20, ±30%
C12		470, ±30%
C13		20, ±30%
C14		470, ±30%
C15		62, ±30%
C16		33, ±30%
C17		62, ±30%
C18		68, ±30%
C19		30
		diode: (see note)
CR1		diode dual Schottky mixer
		meter:
M2 thru 4		leadframe
M1		shield, receiver
		transistor: (see note)
Q1		RF, transistor
		resistor, fixed: +/-5%; 1/8 W: unless otherwise stated
R1		3.3k
R2		820
R3		6.8k
R4		4.7 ohms
R5		560 ohms

note: For optimum performance, diodes, transistors, and integrated circuits must be ordered by Motorola part numbers.

This module is not field-repairable because it needs to be calibrated with specialized factory equipment after installation. Radios in which these parts have been replaced in the field will be off frequency at temperature extremes.

Parts List

0180702Y89 Battery Filter Board PL-911016-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		capacitor, fixed: pF +/-30%; 50 V: unless otherwise stated
C2 thru 4	2113740A43	39
		coil, inductors:
E1, 2	2484657R01	ferrite bead
		fuse:
F1	8580561D02	4 A
		non-referenced items
	3980165S01	CONTACT, battery: B+ pad

Parts Lists for HLD8094D and HLD8095D
VHF Main Boards, 136-162 MHz

Parts List

HLD8095D Main Board, 136-162 MHz, 5 W, 12.5 kHz Channel Spacing (N)
HLD8094D Main Board, 136-162 MHz, 5 W, 25 kHz Channel Spacing (W) PL-921001-C

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		capacitor, fixed: pF +/-5%; 50 V: unless otherwise stated
C28T	2113740A40	30, ±30%
C29T	2113740A41	33, ±30%
C30T	2113740A79	1000, ±30%
C31B	2113740A79	1000, ±30%
C33T	2113740A35	18, ±30%
C34B	2113741A45	0.01 uF
C35B	2113740A53	82, ±30%
C51T	2113740A53	82, ±30%
C53B	2113740A37	22, ±30%
C54B	2113740A33	15, ±30%
C55T	2160521G37	0.1 uF, +80%/-20%; 25 V
C56T	2113740A36	20, ±30%
C59T	2160521G37	0.1 uF, +80%/-20%; 25 V
C60B	2160521G37	0.1 uF, +80%/-20%; 25 V
C61B	2113741A25	1500
C62B	2311049A05	0.47 uF, ±10%; 25 V
C63T (N)	2113740A52	75, ±30%
C63T (W)	or 2113740A48	51, ±30%
C64B (N)	2113740A79	1000, ±30%
C64B (W)	2113740A72	510, ±30%
C65B	2113741A45	0.01 uF
C66T	2160521G37	0.1 uF, +80%/-20%; 25 V
C67T	2311049J11	4.7 uF, ±10%; 16 V
C68T	2113741A59	0.039 uF
C69T	2311049J07	3.3 uF, ±10%; 20 V
C70B	2160521G37	0.1 uF, +80%/-20%; 25 V
C71B	2311049J25	10 uF, ±10%; 16 V
C73T	2113740A32	13, ±30%
C74T	2113740A42	36, ±30%
C75T	2113740A17	3.9, ±30%
C77B	2113740A14	3, ±30%
C78T	0660076M01	0 ohms, ±5%; 1/8 W
C79T	2113740A34	16, ±30%
C81 thru 83B	2160521G37	0.1 uF, +80%/-20%; 25 V
C84B (N)	0660076M01	0 ohms, 50 jwy; 1/8 W
C84B (W)	or 2160521G37	0.1 uF, +80%/-20%; 25 V
C101, 102B	2311049A07	1 uF, ±10%; 16 V
C103T	2113740A53	82, ±30%
C104T	2113740A63	220, ±30%
C105B	2311049J25	10 uF, ±10%; 16 V
C106B	2113740A63	220, ±30%
C107B	2113741A59	0.039 uF
C111B	2113740A71	470, ±30%
C112B	2113740A43	39, ±30%
C113, 114B	2113740A48	51, ±30%
C115B	2113740A36	20, ±30%
C116T	2113740A79	1000, ±30%
C117T	2113740A33	15, ±30%
C118B	2113740A71	470, ±30%
C119B	2113740A58	20, ±30%
C120, 121B	2113740A71	470, ±30%
C122T	2113740A33	15, ±30%
C151, 152B	2113740A71	470, ±30%
C153B	2160521G37	0.1 uF, +80%/-20%; 25 V
C154B	2113740A71	470, ±30%
C156B	2113740A71	470, ±30%
C157, 158B	2113741A45	0.01 uF
C159B	2113740A71	470, ±30%
C163, 164B	2113740A71	470, ±30%
C165B	2113741A45	0.01 uF
C166B	2311049A05	0.47 uF, ±10%; 25 V
C167, 168B	2113741A59	0.039 uF
C202, 203B	2113741A45	0.01 uF
C204T	2311049J27	10 uF, ±10%; 25 V
C205T	2113740A63	220, ±30%
C206T	2113740G46	47, ±2%
C207, 208B	2311049J11	4.7 uF, ±10%; 16 V
C209T	2113740A07	470, ±30%
C210, 211B	2311049J11	4.7 uF, ±10%; 16 V
C212T	2113741A21	1000
C214B	2311049A07	1 uF, ±10%; 16 V
C215T	2113741A39	5600
C216B	2160521G37	0.1 uF, +80%/-20%; 25 V
C217T	2311049J11	4.7 uF, ±10%; 16 V
C218B	2113741A21	1000
C219 thru 221B	2113740A59	150, ±30%
C222B	2113741A21	1000
C223B	2113740A41	33, ±30%

HLD8095D Main Board, 136-162 MHz, 5 W, 12.5 kHz Channel Spacing (N)
HLD8094D Main Board, 136-162 MHz, 5 W, 25 kHz Channel Spacing (W) PL-921001-C

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
C224T	2113740A79	1000, ±30%
C226T	2113740A14	3, ±30%
C227T	2113740A53	82, ±30%
C228B	2113740A59	150, ±30%
C230B	2160521G37	0.1 uF, +80%/-20%; 25 V
C231B	2113741A45	0.01 uF
C233T	2113740G24	6.8, ±0.1
C235T	2113741A51	0.018 uF
C238B	2113740A71	470, ±30%
C237, 238B	2113740A55	100, ±30%
C251B	2113740A33	15, ±30%
C252B	2113740A30	11, ±30%
C253B	2113740A34	16, ±30%
C254B	2113740A18	4.3, ±30%
C255B	2113740A39	27, ±30%
C256B	2113740A79	1000, ±30%
C257T	2113740A79	1000, ±30%
C259T	2113740A79	1000, ±30%
C260B	2113740A27	8.2, ±30%
C261B	2113740A34	16, ±30%
C262B	2113740A28	8.2, ±30%
C263B	2113740A11	2.2, ±30%
C264B	2113740A33	15, ±30%
C265T	2160521G37	0.1 uF, +80%/-20%; 25 V
C266T	2113740A79	1000, ±30%
C268, 269T	2113740A79	1000, ±30%
C270T	2113740A19	4.7, ±30%
C271T	2113740A17	3.9, ±30%
C272T	2113740A19	4.7, ±30%
C273T	2113740A79	1000, ±30%
C275B	2113740A79	1000, ±30%
C278, 279T	2311049A03	0.22 uF, ±10%; 35 V
C280B	2113740A79	1000, ±30%
C281T	2113740A71	470, ±30%
C284B	2113740A10	2, ±30%
C401T	2113740A41	33, ±30%
C402B	2113740G16	3.6, ±0.1
C404T	2113740A37	22, ±30%
C405B	2160521G37	0.1 uF, +80%/-20%; 25 V
C406T (N)	2113741A45	0.01 uF
C407T	2311049A40	2.2 uF, ±10%; 10 V
C408T	2160521G37	0.1 uF, +80%/-20%; 25 V
C412T	2311049A07	1 uF, ±10%; 16 V
C413T	2311049A05	0.47 uF, ±10%; 25 V
C414T	2160521G37	0.1 uF, +80%/-20%; 25 V
C415B	2113741A37	4700
C418B	2160521G37	0.1 uF, +80%/-20%; 25 V
C418T	2311049J25	10 uF, ±10%; 16 V
C419T	2113741A51	0.018 uF
C421T	2311049A05	0.47 uF, ±10%; 25 V
C423B	2311049A05	0.47 uF, ±10%; 25 V
C424T	2113740A64	240, ±30%
C425T	2113741A59	0.039 uF
C426, 427B	2113741A51	0.018 uF
C428B	2113740A71	470, ±30%
C429T	2113741A37	4700
C430T	2113740A71	470, ±30%
C431T	2113741A47	0.012 uF
C432T	2113741A59	0.039 uF
C433B	2311049A05	0.47 uF, ±10%; 25 V
C434, 435T	2160521G37	0.1 uF, +80%/-20%; 25 V
C438B	2113740A71	470, ±30%
C437B	2113741A59	0.039 uF
C439B	2311049J11	4.7 uF, ±10%; 16 V
C440B	2113740A71	470, ±30%
C441B	2160521G37	0.1 uF, +80%/-20%; 25 V
C442T	2113740A79	1000, ±30%
C443B	2113740A79	1000, ±30%
C445B	2113741A51	0.018 uF
C447T	2160521G37	0.1 uF, +80%/-20%; 25 V
C449T	2311049A07	1 uF, ±10%; 16 V
C451B	2113741A49	0.015 uF
C452T	2311049J11	4.7 uF, ±10%; 16V
C454B	2160521G37	0.1 uF, +80%/-20%; 25 V
C455T	2160521G37	0.1 uF, +80%/-20%; 25 V
C456B	2160521G37	0.1 uF, +80%/-20%; 25 V
C457T	2160521G37	0.1 uF, +80%/-20%; 25 V
C459, 460B	2113741A21	1000
C461T	2160521G37	0.1 uF, +80%/-20%; 25 V
C462T	2113740A79	1000, ±30%
C463, 464B	2160521G37	0.1 uF, +80%/-20%; 25 V

HLD8095D Main Board, 136-162 MHz, 5 W, 12.5 kHz Channel Spacing (N)
HLD8094D Main Board, 136-162 MHz, 5 W, 25 kHz Channel Spacing (W) PL-921001-C

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
C468 thru 468B	2113741A21	1000
C469	2113741A37	4700
C472 thru 476B	2113741A21	1000
C47[illegible]T	2113740A79	1000, ±30%
C479[illegible]B	2113740A71	470, ±30%
C48[illegible]T, 481B	2113740A59	150, ±30%
C482[illegible]T	2113741A59	0.039 uF
C483, 484B	2113740A71	470, ±30%
CR5[illegible]T (N)	9180098D04	ceramic 3 WR
CR5[illegible]T (W)	or 9180098D06	ceramic 3 WR
CR52[illegible]T (N)	9180098D03	ceramic 3 WR
CR52[illegible]T (W)	or 9180098D05	ceramic 3 WR
CL1 thru 4T	4280138R02	clip: butterfly
CL6 thru 8T	4280138R02	butterfly
CL9E	4280138R02	butterfly
CR2[illegible]T	4880174R01	diode: (see note) QUAD 8-pin
CR5[illegible]B	4880154K03	Dual Schottky Mixer
CR101, 102B	4880973Z02	pin
CR201, 202B	4813833C07	dual 100 W
CR203T	4805649O04	VCTR RH 1T33T
CR502, 253B	4805649O04	VCTR RH 1T33T
CR255T	4805649O04	VCTR RH 1T33T
CR401B	4880937T01	Schottky barrier
CR402, 403B	4813833C07	dual 100 W
CR404B	4813633C07	dual 100 W
CR405B	4880107T01	rectifier
CR407T	4813833C07	dual 100 W
DS401B	4805729G49	light emitting diode: (see note) diode red/yel
H100T	1480168S01	mechanical: INS., XTAL: 2 used
H102T	1405160A02	crystal
J1T	3980515C02	connector, receptacle: antenna contact
J2T	0180117S05	assembly, RF jack
J3B	0180417C01	assembly, option jack
J5B	0180195R03	speaker microphone header
J6T	0180965Z01	connector B+
L9T	2462587X48	coil, inductor: +/-5% chip: unless otherwise stated 39 nH
L11T	2462587X49	47 nH
L51T	2483411T63	shielded
L52T	2462587X61	470 nH
L53T	2462587N69	1200 nH
L55T	2483411T75	shielded
L58T	2483411T74	shielded
L101, 102B	2411087B24	0.68 uH
L102T	2411087B24	0.68 uH
L104B	2484657R01	ferrite bead
L108B	2411087B24	0.68 uH
L107B	2405486C36	coil air wound 6 turn
L108B	2405486C77	coil air wound 7 turn
L109B	2405486C94	coil air wound 8 turn
L110T	2405835C03	coil airwound .087 diameter
L112B	2405486C73	coil air wound 7 turn
L201T	2462587N69	1200 nH
L202T	2462587N69	1200 nH
L204T	2462587X56	180 nH
L251, 252B	2462587N69	1200 nH
L253T	2480145S05	5-1/2 turns, ferrite core
L254B	2462587X55	150 nH
L255T	2462587N69	1200 nH
L256, 257B	2462587N69	1200 nH
L258T	2480145S04	4.5 turns, ferrite core
L259T	2462587N69	1200 nH
L260T	2462587X53	100 nH
L261T	2462587X55	150 nH
L262T	2462587X46	27 nH
L263B	2462587X56	180 nH

HLD8095D Main Board, 136-162 MHz, 5 W, 12.5 kHz Channel Spacing (N)
HLD8094D Main Board, 136-162 MHz, 5 W, 25 kHz Channel Spacing (W) PL-921001-C

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
L268B	2462587N69	1200 nH
L401B	2460578C43	33.0 uH, ±10%
L403, 404T	2462587X22	390 nH, ±10%
L405, 406B	2462587X22	390 nH, ±10%
T1, 2T	2580183M03	transformer
M51T	0705196A11	meter: SUPR XTAL MTG
M510T	4280126S01	clip, PA
M600 thru 602T	4080485C08	switch, tactile
M700	0780511B01	bracket, freq. switch, plated
M702	0780165R02	boot, crystal
Q51B	4813827A07	transistor: (see note) NPN
Q151B	4880214G02	NPN
Q152B	4813822A10	PNP, 60 V, 10A
Q153B	4880214G02	NPN
Q154B	4880141L03	PNP
Q155, 156B	4880214G02	NPN
Q401B	4880214G02	NPN
Q405B	4805128M16	SOT MMBT3906 (RH) 48G22
Q406, 407T	4805128M16	SOT MMBT3906 (RH) 48G22
Q408, 409T	4805128M16	SOT MMBT3906 (RH) 48G22
Q410B	4880141L03	PNP
Q411B	4805128M19	SOT-23 MMBTA13 (RH)
Q412B	4805128M16	SOT MMBT3906 (RH) 48G22
R51T	0660076A18	resistor, fixed: +/-5%; 1/8 W: unless otherwise stated 51 ohms
R52B	0660076A85	53k
R53B	0660076A75	12k
R54T	0660076A56	2k
R55T	0660076A25	100 ohms
R57T	0660076B04	130k
R58B	0660076A76	13k
R59B (N)	0660076A96	91k
R59B (W)	or 0660076A93	68k
R60B (N)	0660076A73	10k
R60B (W)	or 0660076A70	7.5k
R64T	0660076A67	5.6k
R66B	0660076A47	820 ohms
R67B	0660076A69	6.8k
R68B (N)	0660076A25	100 ohms
R68B (W)	or 0660076M01	0 ohms, 50 meg., 1/8 W
R69B	0660076A73	10k
R101B	0880106R01	0.1 ohms, ±1%; 1 W
R102B	0660076A29	150 ohms
R103B	0660076A22	75 ohms
R104T	0660076A36	300 ohms
R105T	0660076A07	18 ohms
R106T	0660076A36	300 ohms
R107B	0811077A18	4.7 ohms
R108B	0660076A22	75 ohms
R151B	0660076E91	56k, ±1%
R152B	0660076F01	100k, ±1%
R153B	0660076A09	22 ohms
R154B	0660076F01	100k, ±1%
R155B	0660076E91	56k, ±1%
R156B	0660076A63	3.9k
R157B	0660076A55	1.8k
R158, 159B	0660076A31	180 ohms
R160, 161B	0660076A45	680 ohms
R162B	0660076A27	120 ohms
R166B	0660076A31	180 ohms
R167B	0660076A78	16k
R168B	0660076B01	100k
R169T	0660076A73	10k
R171B	0660076A90	51k
R172B	0660076A56	2k
R174B	0660076B01	100k
R175B	0660076A68	6.2k, ±4%
R179B	0660076A38	360 ohms
R201B	0660076A18	51 ohms
R202B	0660076A49	1k
R203B	0660076B06	160k
R204B	0660076B02	110k
R205T	0660076A57	2.2k
R206B	0660076A57	2.2k
R207T	0660076A65	4.7k
R211B	0660076A89	47k

HLD8095D Main Board, 136-162 MHz, 5 W, 12.5 kHz Channel Spacing (N)
HLD8094D Main Board, 136-162 MHz, 5 W, 25 kHz Channel Spacing (W) PL-921001-C

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
R215B	0660076A49	1k
R216B	0660076A82	24k
R251B	0660076A95	82k
R253T	0660076A65	4.7k
R254T	0660076A73	10k
R257B	0660076A89	47k
R258T	0660076A25	100 ohms
R260, 261B	0660076A33	220 ohms
R263B	0660076A76	13k
R264B	0660076A01	10 ohms
R265B	0660076L17	4.7 ohms, ±10%
R401T	0660076H31	1.8 meg, ±10%
R402B	0660076A85	4.7k
R403B	0660076B01	100k
R404B	0660076B07	180k
R406B	0660076B01	100k
R407B	0660076A49	1k
R408 thru 410B	0660076A89	47k
R412B	0660076A31	180 ohms
R413B	0660076A45	680 ohms
R414 thru 416B	0660076A73	10k
R418B	0660076B01	100k
R419T	0660076B01	100k
R420B	0660076A73	10k
R421B	0660076B07	180k
R422B	0660076B01	100k
R423, 424T	0660076B01	100k
R425T	0660076B09	220k
R426T	0660076B06	160k
R429T	0660076B17	470k
R431T	0660076A90	51k
R432B	0660076A89	47k
R433B	0660076A73	10k
R434B	0660076B01	100k
R435B	0660076A61	3.3k
R442B	0660076H31	1.8 meg, ±10%
R443B	0660076B01	100k
R444B	0660076A80	20k
R445B	0660076H31	1.8 meg, ±10%
R447T	0660076A67	5.6k
R448T	0660076A90	51k
R449B	0660076B01	100k
R450B	0660076A73	10k
R451T	0660076A57	2.2k
R452T	0660076B07	180k
R453T	0660076A57	2.2k
R454T	0660076B01	100k
R455T	0660076A84	30k
R456T	0660076A65	4.7k
R457T	0660076A39	68k
R458T	0660076A69	6.8k
R459T	0660076B23	820k
R461B	0660076A09	22 ohms
R460T	1880143S02	volume, potentiometer
R462T	0660076H17	470k
R463T	0660076A89	47k
R464B	0660076A55	1.8k
R465B	0660076B18	510k
R466B	0660076A65	4.7k
R467B	0660076A01	10 ohms
R468B	0660076A73	10k
R469T	0660076A73	10k
R470T	0660076A25	100 ohms
R471B	0660076A73	10k
R472, 473B	0660076A25	100 ohms
R474, 475T	0660076A73	10k
R476B	0660076B01	100k
R478T	0660076A84	30k
R479T	0660076A73	10k
R484T	0660076A68	6.2k, ±4%
R486T	0660076B01	100k
R487B	0660076A73	10k
R488T	0660076B09	220k
R489, 490B	0611077A12	2.7 ohms
R491B	0660076A73	10k
R492B	0660076A70	7.5k
R493B	0660076B13	330k
R494B	0660076B01	100k
R496B	0660076A37	330 ohms
R497B	0660076A41	470 ohms

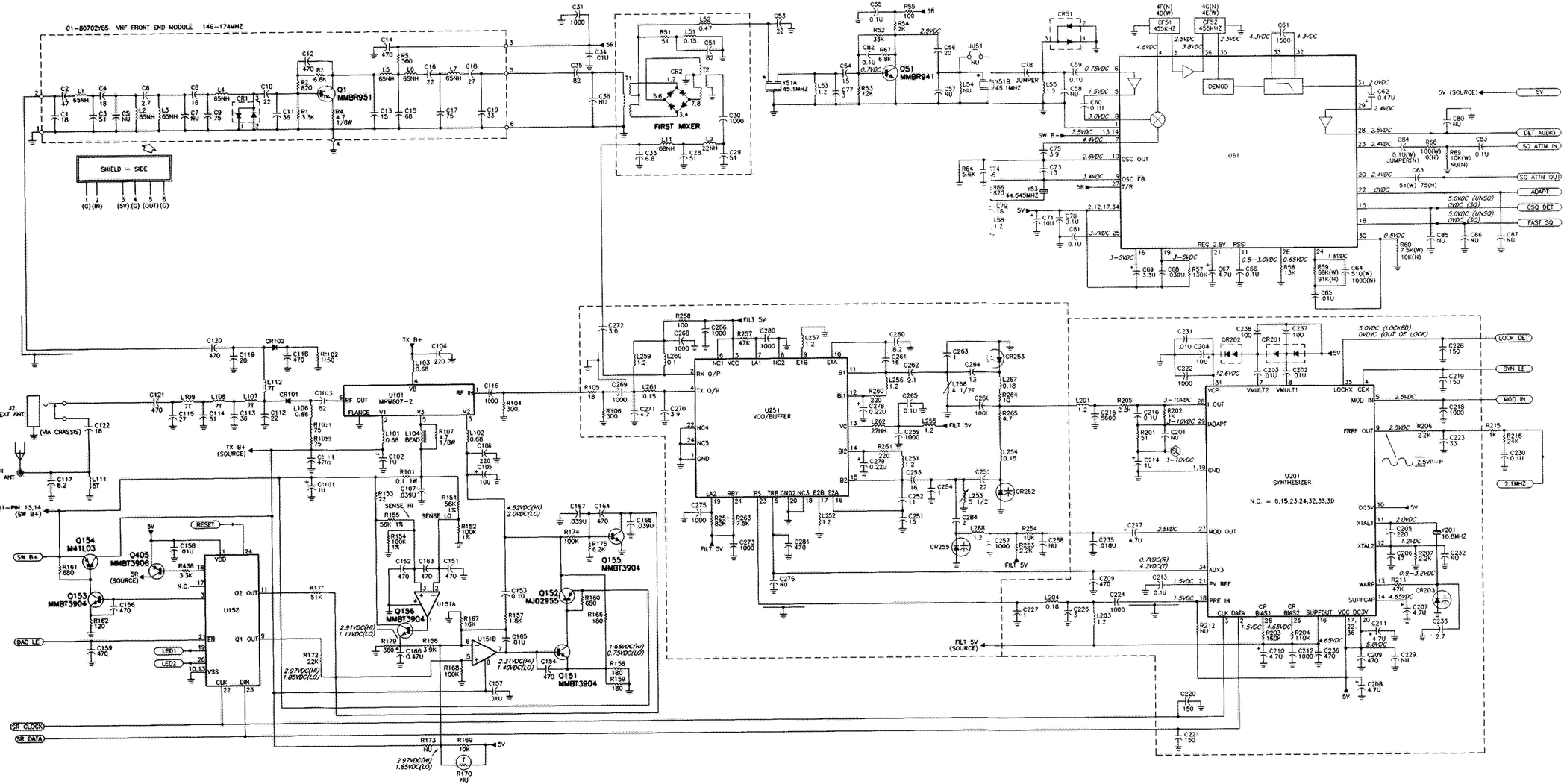
HLD8095D Main Board, 136-162 MHz, 5 W, 12.5 kHz Channel Spacing (N)
HLD8094D Main Board, 136-162 MHz, 5 W, 25 kHz Channel Spacing (W) PL-921001-C

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
R503T	0660076A37	330 ohms
R504T	0660076B07	180k
R505T	0660076B06	160k
R506T	0660076A82	24k
R507B	0660076A49	1k
SH100B	2680521D01	shield: synthetic, front
SH101B	2680520D02	VCO, front
SH103T	2680692D03	mixer, back
SH104T	2680519D01	VCO, back
SH105T	2680518D01	synthetic, back, TCXO
SW401T	4080502B01	switch: freq., 16-position
SW401T	4080650D01	freq., 16-position, rotary
U51T	5180207R01	integrated circuit: (see note) IF
U101T	5180111R02	RF power module (VHF)
U151B	5180932W01	linear op amp
U152B	5105216P38	DAC IC
U201B*		synthesizer
U251B	5105414S84	VCO buffer
U401B*		microprocessor, 2 channel uP only microprocessor
U402T	5105165R77	AFIC
U404T	5105469E65	voltage regulator
U405T	5180932W01	linear op amp
U406B	5102186J23	compactor
U407T	5180932W01	linear op amp
U409T	5180175R01	audio amplifier
U410B	5180159R01	dual trans NPNS
U411T	5180533C01	5 V regulator w/reset
VR401B	4880140L15	voltage regulator: (see note) diode Zener, 10 V tape & reel
Y51T (N)	9180112R06	crystal: (see note) 45.1 MHz filter
Y51T (W)	or 9180112R05	45.1 MHz filter
Y53T	4880208K02	XTAL resonator 44.645 MHz 10PPM
Y201T*		16.8 MHz
Y401T	4880113R01	7.9488
		non-referenced items
	0300136783	SCREW, 2-56" x 5/16" Phillips; 2 used
	0580537C01	EYELET
	0580537C02	EYELET
	0780432C01	BATTERY, contact support
	1580413C01	HOUSING, option jack
	1580414C01	HOUSING, cover option jack
	1580433C01	HOUSING, RF jack
	2680412B01	SHIELD, RF jack
	2680416C01	SHIELD, option jack
	2680525B02	SHIELD, RECEIVER
	3180168R01	B+ HEADER
	3980415C01	SEAL, option jack
	3980169R01	PRIM B+ CONTACT
	3980170R01	PROG CONTACT
	3980405C01	CONTACT, spring #5
	3980406C01	CONTACT, spring #2
	3980407C01	CONTACT, spring #4
	3980408C01	CONTACT, spring #3
	3980409C01	CONTACT, spring #6
	3980410C01	CONTACT, spring #1
	3980434C01	RF JACK, T2 contact
	3980435C01	RF JACK, T1 contact
	5480570B01	LABEL, thermal high temp
	7580411C01	BUMPER 2.5 MM: 2 used

note: For optimum performance, diodes, transistors, and integrated circuits must be ordered by Motorola part numbers.

Reference designator ending in "T" denotes component is located on top side of circuit board. Reference designator ending in "B" denotes component is located on bottom side of circuit board.

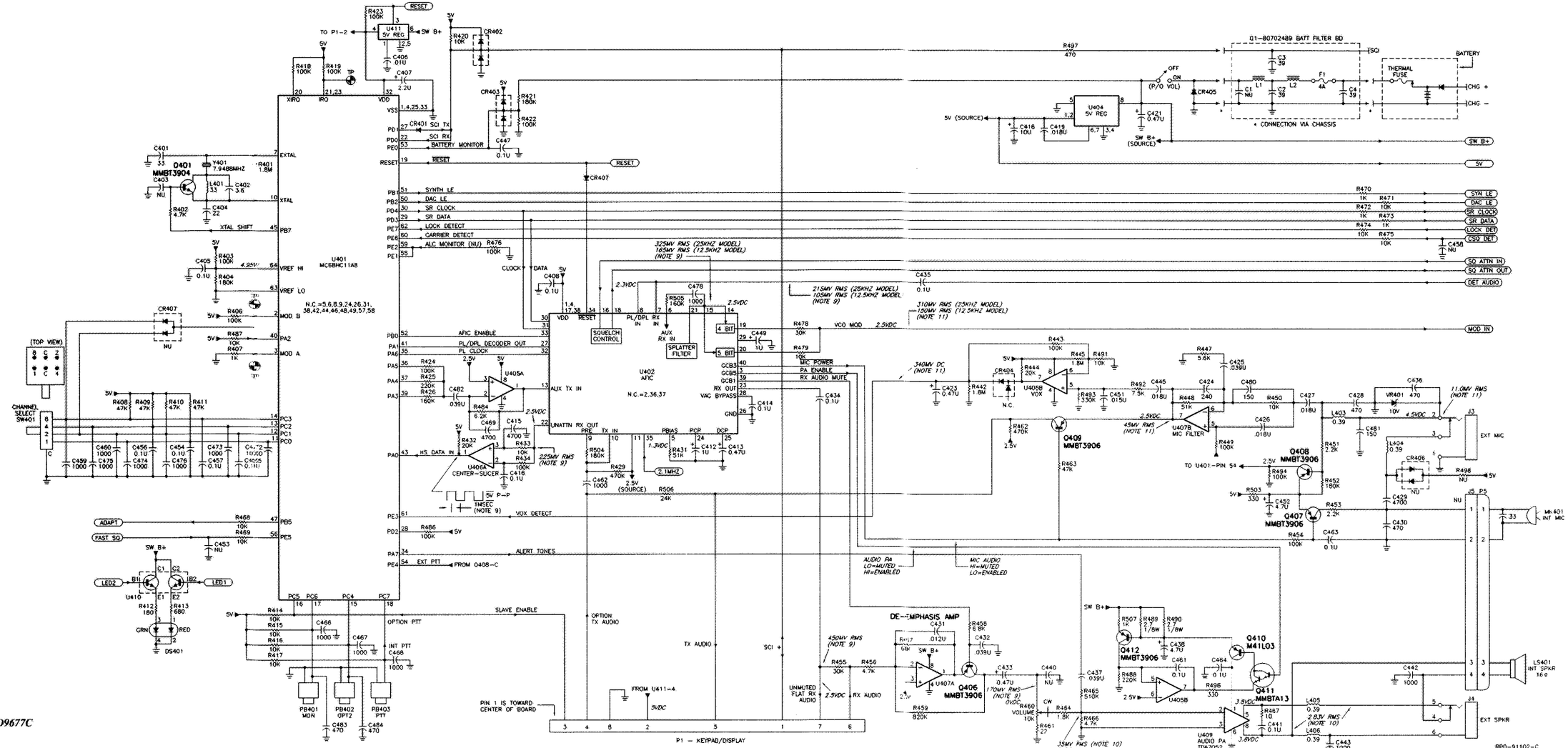
Reference designators marked with an asterisk "*" indicate components which are not field-replaceable because they need to be calibrated with specialized factory equipment after installation. Radios in which these parts have been replaced in the field will be off frequency at temperature extremes.



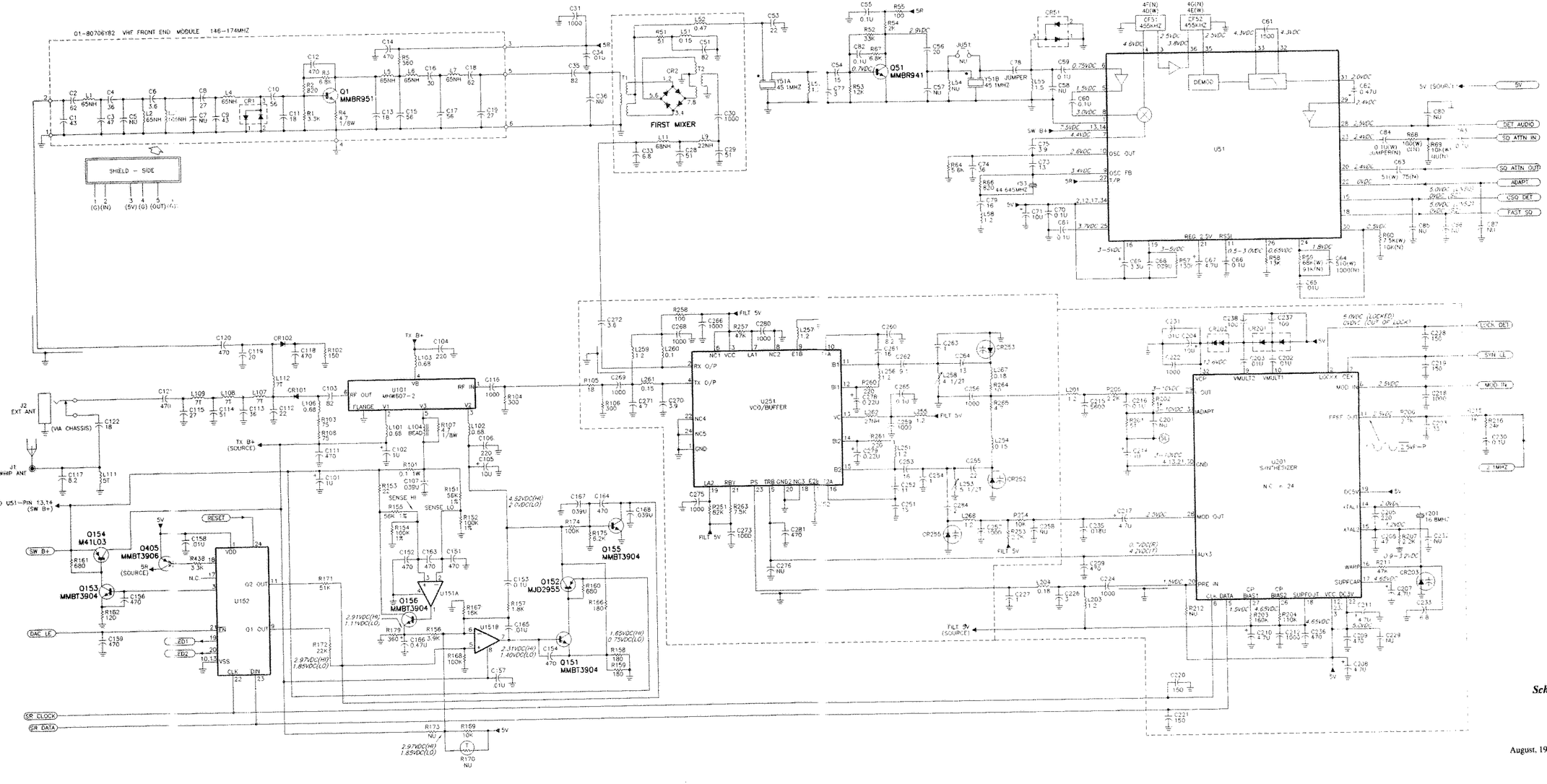
NOTES:

1. UNLESS OTHERWISE INDICATED, RESISTOR VALUES ARE IN OHMS, CAPACITOR VALUES ARE IN PICOFARADS; INDUCTOR VALUES ARE IN MICROHENRIES.
2. NON-POLARIZED CAPACITORS ARE CHIP-TYPE UNLESS OTHERWISE INDICATED.
3. POLARIZED CAPACITORS ARE CHIP-TANTALUM TYPE UNLESS OTHERWISE INDICATED.
4. "NU" MEANS COMPONENT IS NOT USED.
5. DC VOLTAGES ARE MEASURED WITH A HIGH IMPEDANCE (10 MEGOHM) DC VOLTMETER.
6. AC VOLTAGES ARE MEASURED WITH A HIGH IMPEDANCE AC RMS VOLTMETER.
7. ALL VOLTAGE MEASUREMENTS ARE IN THE RECEIVE MODE UNLESS INDICATED AS FOLLOWS:
   (R) RECEIVE MODE
   (T) TRANSMIT MODE
8. MEASURED IN THE RECEIVE MODE WITH AN ON-CHANNEL UNMODULATED SIGNAL AT A LEVEL OF -20 DBM.
9. MEASURED IN THE RECEIVE MODE WITH AN ON-CHANNEL SIGNAL AT A LEVEL OF -20 DBM, MODULATED WITH 1 KHZ AT 3 KHZ DEVIATION (FOR 20/25 KHZ MODELS) OR 1.5 KHZ DEVIATION (FOR 12.5 KHZ MODELS), MEASURED WITH AN AC RMS VOLTMETER.
10. SAME AS NOTE 8 EXCEPT WITH VOLUME CONTROL ADJUSTED FOR 500 MILLIVOLTS (2.82 VOLTS RMS ACROSS 16-OHM LOAD CONNECTED TO THE EXT SPKR JACK).
11. MEASURED IN THE TRANSMIT MODE WITH A 1 KHZ, 11 MV RMS SIGNAL APPLIED TO THE EXTERNAL MICROPHONE INPUT.

Schematic Diagram for HLD9675C and HLD9677C VHF Main Boards, 146-174 MHz (sheet 1 of 2)



Schematic Diagram for HLD9675C and HLD9677C
VHF Main Boards, 146-174 MHz
(sheet 2 of 2)



NOTES:

1. UNLESS OTHERWISE INDICATED, RESISTOR VALUES ARE IN OHMS, CAPACITOR VALUES ARE IN PICOFARADS, INDUCTOR VALUES ARE IN MICROHENRIES.
2. NON-POLARIZED CAPACITORS ARE CHIP-TYPE UNLESS OTHERWISE INDICATED.
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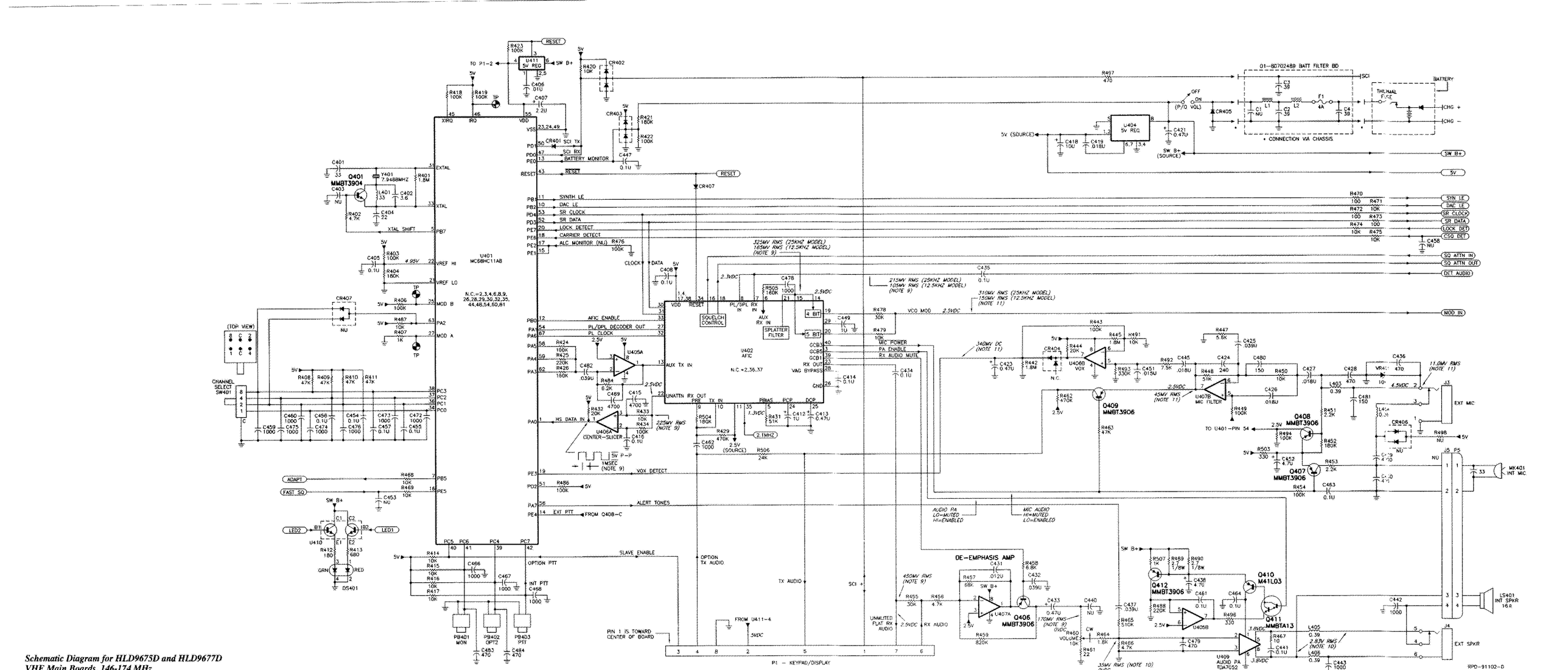
6. AC VOLTAGES ARE MEASURED WITH A HIGH IMPEDANCE AC RMS VOLTMETER.
7. ALL VOLTAGE MEASUREMENTS ARE IN THE RECEIVE MODE UNLESS INDICATED AS FOLLOWS:
   (R) RECEIVE MODE
   (T) TRANSMIT MODE
8. MEASURED IN THE RECEIVE MODE WITH AN ON-CHANNEL UNMODULATED SIGNAL AT A LEVEL OF -20 DBM.
9. MEASURED IN THE RECEIVE MODE WITH AN ON-CHANNEL SIGNAL AT A LEVEL OF -23 DBM, MODULATED WITH 1 KHZ AT 3.0 KHZ DEVIATION (FOR 20/25 KHZ MODELS) OR 1.5 KHZ DEVIATION (FOR 12.5 KHZ MODELS), MEASURED WITH AN AC RMS VOLTMETER.
10. SAME AS NOTE 8 EXCEPT WITH VOLUME CONTROL ADJUSTED FOR 500 MILLIWATTS (2.82 VOLTS RMS ACROSS 16-OHM LOAD CONNECTED TO THE EXT SPKR JACK).
11. MEASURED IN THE TRANSMIT MODE WITH A 1 KHZ, 11 MV RMS SIGNAL APPLIED TO THE EXTERNAL MICROPHONE INPUT.

RPD-9110I-D

Schematic Diagram for HLD9675D and HLD9677D VHF Main Boards, 146-174 MHz (sheet 1 of 2)



Schematic Diagram for HLD9675D and HLD9677D
VHF Main Boards, 146-174 MHz
(sheet 2 of 2)

Parts List

HLD9675C Main Board, 146-174 MHz, 5 W, 12.5 kHz
Channel Spacing (N)
HLD9677C Main Board, 146-174 MHz, 5 W, 25 kHz
Channel Spacing (W) PL-911005-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		capacitor, fixed: pF +/-5%; 50 V: unless otherwise stated
C1	2113740A35	18
C2	2113740A46	47
C3	2113740A48	51
C4	2113740A35	18
C6	2113740A13	2.7, 0.25
C8	2113740A34	16
C9	2113740A52	75
C10	2113740A37	22
C11	2113740A42	36
C12	2113740A71	470
C13B	2113740A33	15
C14	2113740A71	470
C15	2113740A51	68
C16	2113740A37	22
C17	2113740A52	75
C18	2113740A39	27
C19	2113740A41	33
C28, 29T	2113740A48	51
C30T	2113740A79	1000
C31B	2113740A79	1000
C33T	2113740A24	6.8, 0.25
C34B	2113741A45	0.01 uF
C35B	2113740A53	82
C51T	2113740A53	82
C53B	2113740A37	22
C54B	2113740A33	15
C55T	2160521G37	0.1 uF, +80%/-20%; 25V
C56T	2113740A36	20
C59T	2160521G37	0.1 uF, +80%/-20%; 25V
C60B	2160521G37	0.1 uF, +80%/-20%; 25V
C61B	2113741A25	1500
C62B	2311049A05	0.47 uF, 10%; 25V
C63T	2113740A52	75 (12.5 kHz)
	or 2113740A48	51 (25 kHz)
C64B	2113740A79	1000 (12.5 kHz)
	or 2113740A72	510 (25 kHz)
C65B	2113741A45	0.01 uF
C66T	2160521G37	0.1 uF, +80%/-20%; 25V
C67T	2311049J11	4.7 uF, 10%; 16V
C68T	2113741A59	0.039 uF, 5%; 50V
C69T	2311049J07	3.3 uF, 10%; 20V
C70B	2160521G37	0.1 uF, +80%/-20%; 25V
C71B	2311049J25	10 uF, 10%; 16V
C73T	2113740A32	13
C74T	2113740A42	36
C75T	2113740A17	3.9, 0.25
C77B	2113740A14	3, 0.25
C78T	0660076M01	0 ohms, 0%; 1/8W
C79T	2113740A34	16
C81T	2160521G37	0.1 uF, +80%/-20%; 25V
C82, 83B	2160521G37	0.1 uF, +80%/-20%; 25V
C84B	0660076M01	0 ohms, 0%; 1/8W (12.5 kHz)
	or 2160521G37	0.1 uF, +80%/-20%; 25V (25 kHz)
C101, 102B	2311049A07	1 uF, 10%; 16V
C103T	2113740A53	82
C104T	2113740A63	220
C105B	2311049J25	10 uF, 10%; 16V
C106B	2113740A63	220
C107B	2113741A59	0.039 uF
C111B	2113740A71	470
C112B	2113740A37	22
C113B	2113740A42	36
C114B	2113740A48	51
C115B	2113740A39	27
C116T	2113740A79	1000
C117T	2113740A27	8.2, 0.25
C118B	2113740A71	470
C119B	2113740A36	20
C120, 121B	2113740A71	470
C122T	2113740A35	18
C151, 152B	2113740A71	470
C153B	2160521G37	0.1 uF, +80%/-20%; 25V
C154B	2113740A71	470
C156B	2113740A71	470
C157, 158B	2113741A45	0.01 uF, 5%; 50V
C159B	2113740A71	470
C163, 164B	2113740A71	470
C165B	2113741A45	0.01 uF, 5%; 50V

HLD9675C Main Board, 146-174 MHz, 5 W, 12.5 kHz
Channel Spacing (N)
HLD9677C Main Board, 146-174 MHz, 5 W, 25 kHz
Channel Spacing (W) PL-911005-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
C166B	2311049A05	0.47 uF, 10%; 25V
C167, 168B	2113741A59	0.039 uF, 5%; 50V
C202, 203B	2113741A45	0.01 uF, 5%; 50V
C204T	2311049J27	10 uF, 10%; 25V
C205T	2113740A63	220
C206T	2113740G46	47, 2%
C207, 208B	2311049J11	4.7 uF, 10%; 16V
C209T	2113740A71	470
C210, 211B	2311049J11	4.7 uF, 10%; 16V
C212T	2113741A21	1000
C213T	2160521G37	0.1 uF, +80%/-20%; 25V
C214B	2311049A07	1 uF, 10%; 16V
C215T	2113741A39	5600
C216B	2160521G37	0.1 uF, +80%/-20%; 25V
C217T	2311049J11	4.7 uF, 10%; 16V
C218B	2113741A21	1000
C219 thru 221B	2113740A59	150
C222B	2113741A21	1000
C223B	2113740A41	33
C224B	2113740A79	1000
C226T	2113740A14	3, 0.25
C227T	2113740A03	1, 0.25
C228B	2113740A59	150
C230B	2160521G37	0.1 uF, +80%/-20%; 25V
C231B	2113741A45	0.01 uF
C233T	2113740G13	2.7, 0.1
C235T	2113741A51	0.018 uF
C236B	2113740A71	470
C237, 238B	2113740A55	100
C251B	2113740A33	15
C252B	2113740A30	11
C253B	2113740A34	16
C254B	2113740A03	1, 0.25
C255B	2113740A37	22
C256B	2113740A79	1000
C257T	2113740A79	1000
C259T	2113740A79	1000
C260B	2113740A27	8.2, 0.25
C261B	2113740A34	16
C262B	2113740A28	9.1, 0.25
C263B	2113740A03	1, 0.25
C264B	2113740A32	13
C265T	2160521G37	0.1 uF, +80%/-20%; 25V
C266T	2113740A79	1000
C268, 269T	2113740A79	1000
C270T	2113740A17	3.9, 0.25
C271T	2113740A19	4.7, 0.25
C272T	2113740A16	3.6, 0.25
C273T	2113740A79	1000
C275B	2113740A79	1000
C278, 279T	2311049A03	0.22 uF, 10%; 35V
C280B	2113740A79	1000
C281T	2113740A71	470
C284B	2113740A10	2, 0.25
C401T	2113740A41	33
C402B	2113740G16	3.6, 0.1
C404T	2113740A37	22
C405B	2160521G37	0.1 uF, +80%/-20%; 25V
C406T	2113741A45	0.01 uF, (12.5 kHz)
C407T	2311049A40	2.2 uF, 10%; 10V
C408T	2160521G37	0.1 uF, +80%/-20%; 25V
C412T	2311049A07	1 uF, 10%; 16V
C413T	2311049A05	0.47 uF, 10%; 25V
C414T	2160521G37	0.1 uF, +80%/-20%; 25V
C415B	2113741A37	4700
C416B	2160521G37	0.1 uF, +80%/-20%; 25V
C418T	2311049J25	10 uF, 10%; 16V
C419T	2113741A51	0.018 uF
C421T	2311049A05	0.47 uF, 10%; 25V
C423B	2311049A05	0.47 uF, 10%; 25V
C424T	2113740A64	240
C425T	2113741A59	0.039 uF
C426, 427B	2113741A51	0.018 uF
C428B	2113740A71	470
C429T	2113741A37	4700
C430T	2113740A71	470
C431T	2113741A47	0.012 uF
C432T	2113741A59	0.039 uF
C433B	2311049A05	0.47 uF, 10%; 25V
C434, 435T	2160521G37	0.1 uF, +80%/-20%; 25V

HLD9675C Main Board, 146-174 MHz, 5 W, 12.5 kHz
Channel Spacing (N)
HLD9677C Main Board, 146-174 MHz, 5 W, 25 kHz
Channel Spacing (W) PL-911005-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
C436B	2113740A71	470
C437B	2113741A59	0.039 uF
C438B	2311049J11	4.7 uF, 10%; 16V
C441B	2160521G37	0.1 uF, +80%/-20%; 25V
C442T	2113740A79	1000
C443B	2113740A79	1000
C445B	2113741A51	0.018 uF
C447T	2160521G37	0.1 uF, +80%/-20%; 25V
C449T	2311049A07	1 uF, 10%; 16V
C451B	2113741A49	0.015 uF
C452T	2311049J11	4.7 uF, 10%; 16V
C454B	2160521G37	0.1 uF, +80%/-20%; 25V
C455T	2160521G37	0.1 uF, +80%/-20%; 25V
C456B	2160521G37	0.1 uF, +80%/-20%; 25V
C457T	2160521G37	0.1 uF, +80%/-20%; 25V
C459, 460B	2113741A21	1000
C461T	2160521G37	0.1 uF, +80%/-20%; 25V
C462T	2113740A79	1000
C463, 464B	2160521G37	0.1 uF, +80%/-20%; 25V
C466 thru 468B	2113741A21	1000
C469T	2113741A37	4700
C472 thru 476B	2113741A21	1000
C478T	2113740A79	1000
C480, 481B	2113740A59	150
C482T	2113741A59	0.039 uF, 5%; 50V
C483, 484B	2113740A71	470
		filter:
CF51T	9180098D04	ceramic 3 WR (12.5 kHz)
	or 9180098D06	ceramic 3 WR (25 kHz)
CF52T	9180098D03	ceramic 3 WR (12.5 kHz)
	or 9180098D05	ceramic 3 WR (25 kHz)
		clip:
CL1 thru 4	4280138R01	butterfly
CL6 thru 9	4280138R01	butterfly
		diode: (see note)
CR1	4880154K03	dual Schottky mixer
CR2T	4880174R01	QUAD 8-pin
CR51B	4880154K03	dual Schottky ,ixer
CR101, 102B	4880973Z02	pin
CR201, 202B	4813833C07	dual 100 W
CR203T	4805649Q04	VCTR RH 1T33T
CR252, 253B	4805649Q04	VCTR RH 1T33T
CR255T	4805649Q04	VCTR RH 1T33T
CR401B	4880939T01	Schottky barrier
CR402, 403B	4813833C07	dual 100 W
CR404B	4813833C07	dual 100 W
CR405B	4880107R01	silicon
CR407B	4813833C07	dual 100 W
		light emitting diode: (see note)
DS401B	4805729G49	red/yel
		mechanical:
H103	1405160A02	crystal
		connector, receptacle:
J1T	3980515C02	antenna contact
J5B	0180195R01	speaker microphone header
J6T	0180965Z01	connector B+
		coil, inductor:
L1 thru 7	2480140E04	chip 65 NH
L9T	2462587N45	chip 22 NH 5%
L11T	2462587N51	68 NH, 5%
L51T	2483411T63	chip shielded
L52T	2462587N61	chip 470 NH 5% (25 kHz)
L53T	2462587N89	1200 NH, 5%
L55T	2483411T75	chip shielded
L58T	2483411T74	chip shielded
L101, 102B	2411087B24	chip 0.68 UH 5 A/I
L103T	2411087B24	chip 0.68 UH 5 A/I
L104B	2484657R01	ferrite bead
L106B	2411087B24	chip 0.68 UH 5 A/I
L107B	2405486C76	air wound, 7 turns
L108B	2405318D12	air wound
L109B	2405486C76	air wound, 7 turns
L111T	2405835C03	air wound .087 diameter
L112B	2405486C77	air wound, 7 turns

HLD9675C Main Board, 146-174 MHz, 5 W, 12.5 kHz
Channel Spacing (N)
HLD9677C Main Board, 146-174 MHz, 5 W, 25 kHz
Channel Spacing (W) PL-911005-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
L201T	2462587N69	1200 NH, 5%
L203T	2462587N69	1200 NH, 5%
L204T	2462587N56	chip 180 NH 5% (25 kHz)
L251, 252B	2462587N69	1200 NH, 5%
L253T	2480145S05	5-1/2 turns, ferrite core
L254B	2462587N55	150 nH, 5%
L255, 256T	2462587N69	1200 NH, 5%
L257B	2462587N69	1200 NH, 5%
L258T	2480145S04	4.5 turns, ferrite core
L259T	2462587N69	1200 NH, 5%
L260T	2483411T62	chip shielded
L261T	2462587N55	150 nH, 5% (25 kHz)
L262T	2462587N46	chip 27 NH 5% (25 kHz)
L267B	2462587N56	chip 180 NH 5%
L268T	2462587N69	1200 NH, 5% (25 kHz)
L401B	2460578C43	chip 33.0 UH 10%
L403, 404T	2462587N22	chip 390 NH 10% (25 kHz)
L405, 406B	2462587N22	chip 390 NH 10%
		meter:
M2 thru 7	0780102S01	leadframe
M51	0705196A11	super XTAL mounting
M510	4280126S01	clip, PA
M600 thru 602	4080485C03	switch tactile
		transistor: (see note)
Q1	4880173R01	rf transistor
Q51B	4813827A07	NPN SML SIG
Q151B	4880214G02	NPN
Q152B	4813822A10	PNP 60 10A
Q153B	4880214G02	NPN
Q154B	4880141L03	PNP
Q155, 156B	4880214G02	NPN
Q401B	4880214G02	NPN
Q405B	4805128M16	TSTR SOT MMBT3906 (RH) 48G22
Q406 thru 409T	4805128M16	TSTR SOT MMBT3906 (RH) 48G22
Q410B	4880141L03	PNP
Q411B	4805128M19	SOT-23
Q412B	4805128M16	TSTR SOT MMBT3906 (RH) 48G22
		resistor, fixed: +/-5%; 1/8 W: unless otherwise stated
R1	0660076A61	3.3K
R2	0660076A47	820 ohms
R3	0660076A69	6.8K
R4	0611077A18	4.7 ohms
R5B	0660076A43	560 ohms
R51T	0660076A18	51 ohms
R52B	0660076A85	33K
R53B	0860076A75	12K
R54T	0660076A56	2K
R55T	0660076A25	100 ohms
R57T	0660076B04	130K
R58B	0660076A76	13K
R59B	0660076A96	91K (12.5 kHz)
	or 0660076A93	68K (25 kHz)
R60B	0660076A73	10K (12.5 kHz)
	or 0660076A70	7.5K (25 kHz)
R64T	0660076A67	5.6K
R66B	0660076A47	820 ohms
R67B	0660076A69	6.8K
R68B	0660076M01	0 ohms, 0%; (12.5 kHz)
	or 0660076A25	100 ohms (25 kHz)
R69B	0660076A73	10k
R101B	0680106R01	0.1 ohms, 1%; 1W
R102B	0660076A29	150 ohms
R103B	0660076A22	75 ohms
R104T	0660076A36	300 ohms
R105T	0660076A07	18 ohms
R106T	0660076A36	300 ohms
R107B	0611077A18	4.7 ohms
R108B	0660076A22	75 ohms
R151B	0660076E91	56K, 1%
R152B	0660076F01	100K, 1%
R153B	0660076A09	22 ohms
R154B	0660076F01	100K, 1%
R155B	0660076E91	56K, 1%
R156B	0660076A63	3.9K
R157B	0660076A55	1.8K
R158, 159B	0660076A31	180 ohms
R160, 161B	0660076A45	680 ohms

HLD9675C Main Board, 146-174 MHz, 5 W, 12.5 kHz
Channel Spacing (N)
HLD9677C Main Board, 146-174 MHz, 5 W, 25 kHz
Channel Spacing (W) PL-911005-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
R162B	0660076A27	120 ohms
R166B	0660076A31	180 ohms
R167B	0660076A78	16K
R168B	0660076B01	100K
R169T	0660076A73	10K
R171B	0660076A90	51K
R172B	0660076A81	22K
R174B	0660076B01	100K
R175B	0660076A68	6.2K, 4%
R179B	0660076A38	360 ohms
R201B	0660076A18	51 ohms
R202B	0660076A49	1K
R203B	0660076B06	160K
R204B	0660076B02	110K
R205T	0660076A57	2.2K
R206B	0660076A57	2.2K
R207T	0660076A65	4.7k
R211B	0660076A89	47K
R215B	0660076A49	1K
R216B	0660076A82	24K
R251B	0660076A95	82K
R253T	0660076A60	3K
R254T	0660076A73	10K
R257B	0660076A89	47K
R258T	0660076A25	100 ohms
R260, 261B	0660076A33	220 ohms
R263B	0660076A70	7.5K
R264B	0660076A01	10 ohms
R265B	0660076L17	4.7 ohms, 10%
R401T	0660076H31	1.8 meg, 10%
R402B	0660076A65	4.7K
R403B	0660076B01	100K
R404B	0660076B07	180K
R406B	0660076B01	100K
R407B	0660076A49	1K
R408 thru 411B	0660076A89	47K
R412B	0660076A31	180 ohms
R413B	0660076A45	680 ohms
R414 thru 417B	0660076A73	10K
R418B	0660076B01	100K
R419T	0660076B01	100K
R420B	0660076A73	10K
R421B	0660076B07	180K
R422B	0660076B01	100K
R424T	0660076B01	100K
R425T	0660076B09	220K
R426T	0660076B06	160K
R429T	0660076B17	470K
R431T	0660076A90	51K
R432B	0660076A80	20K
R433B	0660078A73	10K
R434B	0660076B01	100K
R438B	0660076A61	3.3K
R442B	0660076H31	1.8 meg, 10%
R443B	0660076B01	100K
R444B	0660076A80	20K
R445B	0660076H31	1.8 meg, 10%
R447T	0660076A67	5.6K
R448T	0660076A90	51K
R449B	0660076B01	100K
R450B	0660076A73	10K
R451T	0660076A57	2.2K
R452T	0660076B07	180K
R453T	0660076A57	2.2K
R454T	0660076B01	100K
R455T	0660076A84	30K
R456T	0660076A65	4.7K
R457T	0660076A93	68K
R458T	0660076A69	6.8K
R459T	0660076B23	820K
R461T	0660076A09	22 ohms
R462T	0660076B17	470K
R463T	0660076A89	47K
R464B	0660076A55	1.8K
R465B	0660076B18	510K
R466B	0660076A65	4.7K
R467B	0660076A01	10 ohms
R468B	0660076A73	10K
R469T	0660076A73	10K
R470T	0660076A49	1K
R471B	0660076A73	10K

HLD9675C Main Board, 146-174 MHz, 5 W, 12.5 kHz
Channel Spacing (N)
HLD9677C Main Board, 146-174 MHz, 5 W, 25 kHz
Channel Spacing (W) PL-911005-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
R472, 473B	0660076A49	1K
R474, 475T	0660076A73	10K
R476B	0660076B01	100K
R478T	0660076A84	30K
R479T	0660076A73	10K
R484T	0660076A68	6.2K, 4%
R486T	0660076B01	100K
R487B	0660076A73	10K
R488T	0660076B09	220K
R489, 490B	0611077A12	2.7 ohms
R491B	0660076A73	10K
R492B	0660076A70	7.5K
R493B	0660076B13	330K
R494B	0660076B01	100K
R496B	0660076A37	330 ohms
R497B	0660076A41	470 ohms
R503T	0660076A37	330 ohms
R504T	0660076B07	180K
R505T	0660076B06	160K
R506T	0660076A82	24K
R507B	0660076A49	1K
		shield:
SH100B	2680966Y01	SYN, front
SH101B	2680970Y01	VCO, front
SH103T	2680692C01	mixer, back (12.5 kHz)
SH104T	2680968Z01	VCO, back
SH105T	2680970Z01	SYN, back, TCXO
		switch:
SW401T	4080502B01	16-position
		integrated circuit: (see note)
U51T	5180207R01	IF
U101T	5180111R02	RF power module (VHF)
U151B	5180932W01	linear op amp
U201B*	5105414S55	synthesizer
U404T	5105469E65	voltage regulator
U405T	5180932W01	linear op amp
U406B	5102198J23	compactor
U407T	5180932W01	linear op amp
U409T	5180175R01	audio amplifier
U410B	5180159R01	dual trans NPNS
U411T	5180633C01	5V regulator w/reset (12.5 kHz)
		voltage regulator: (see note)
VR401B	4880140L15	diode, Zener 10V tape&reel
		crystal: (see note)
Y51T	9180112R06	45.1 MHz, filter (12.5 kHz)
	or 9180112R05	45.1 MHZ, filter (25 kHz)
Y53T	4880008K02	XTAL resonator 44.645 MHz 10PPM
Y401T	4880113R01	7.9488
	non-referenced items	
	0180417C01	ASSY, option jack
	0180444C01	JACK, RF assembly
	0300136783	SCREW, 2-56 x 5/16; 2 used
	0580537C01	EYELET
	0580537C02	EYELET
	0780165R02	BOOT, crystal
	0780432C01	CONTACT, battery support
	0780511B01	BRACKET, freq switch, plated
	1480168S01	INSULATOR, XTAL; 2 used
	1580413C01	HOUSING, option jack
	1580414C01	HOUSING, cover optionjack
	1580433C01	HOUSING, RF jack
	1880143S02	VOLUME, potentiometer
	2462587N46	INDUCTOR, chip 27 NH 5% (12.5 kHz)
	2462587N61	INDUCTOR, chip 470 NH 5% (12.5 kHz)
	2580163M03	COIL, XFMR ;2 used
	2680412B01	SHIELD, RF jack
	2680416C01	SHIELD, option jack
	2680625B02	SHIELD, receiver
	2680692C01	SHIELD, mixer, back (25 kHz)
	3180168R01	B+ HEADER
	3280415C01	SEAL, option jack
	3980169R01	PRIM B+ CONTACT
	3980170R01	PROG CONTACT
	3980405C01	CONTACT, spring #5

HLD9675C Main Board, 146-174 MHz, 5 W, 12.5 kHz
Channel Spacing (N)
HLD9677C Main Board, 146-174 MHz, 5 W, 25 kHz
Channel Spacing (W) PL-911005-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
	3980406C01	CONTACT, spring #2
	3980407C01	CONTACT, spring #4
	3980408C01	CONTACT, spring #3
	3980409C01	CONTACT, spring #6
	3980410C01	CONTACT, spring #1
	3980434C01	RF JACK, T2 contact
	3980435C01	RF JACK, T1 contact
	4880114R02	CRYSTAL, 16.8 MHz
	5180633C01	5V regulator w/reset (25 kHz)
	5480570B01	LABEL, thermal high temp
	7580411C01	BUMPER, 2.5 MM; 2 used

note: For optimum performance, diodes, transistors, and integrated circuits must be ordered by Motorola part numbers.

Reference designator ending in "T" denotes component is located on top side of circuit board. Reference designator ending in "B" denotes component is located on bottom side of circuit board. Reference designators marked with an asterisk indicate components which are not field-replaceable.

Parts List

01-80702Y85 Receiver Module, 146-174 MHz
(part of HLD9675C or HLD9677C Main Board) PL-911012-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		capacitor, fixed: pF +/-5%; 50 V: unless otherwise stated
C1	2113740A35	18
C2	2113740A46	47
C3	2113740A48	51
C4	2113740A35	18
C6	2113740A13	2.7, 0.25
C8	2113740A34	16
C9	2113740A52	75
C10	2113740A37	22
C11	2113740A42	36
C12	2113740A71	470
C13	2113740A33	15
C14	2113740A71	470
C15	2113740A51	68
C16	2113740A37	22
C17	2113740A52	75
C18	2113740A39	27
C19	2113740A41	33
		diode: (see note)
CR1	4880154K03	diode dual Schottky mixer
		coil, inductor:
L1 thru 7	2480140E04	chip, 65 NH
		meter:
M2 thru 7	0760102S01	leadframe
		transistor: (see note)
Q1	4880173R01	RF, transistor
		resistor, fixed: +/-5%; 1/8 W: unless otherwise stated
R1	0660076A61	3.3K
R2	0660076A47	820 ohms
R3	0660076A69	6.8K
R4	0611077A18	4.7 ohms
R5	0660076A43	560 ohms
	non-referenced items	
	2680625B02	SHIELD, receiver

note: For optimum performance, diodes, transistors, and integrated circuits must be ordered by Motorola part numbers.

This module is not field-repairable.

Parts List

0180702Y89 Battery Filter Board PL-911016-A

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		capacitor, fixed: pF +/-5%; 50 V: unless otherwise stated
C2 thru 4	2113740A43	39
		coil, rf:
L1, 2	2484657R01	ferrite bead
		fuse:
F1	6505663R04	4 A
	non-referenced items	
	3980165S01	CONTACT, battery

Parts Lists for HLD9675C and HLD9677C VHF Main Boards, 146-174 MHz

Parts List

01-80706Y82 Receiver Module, 146-174 MHz
(pan of HLD9675D or HLD9677D Main Board) PL-9110I2-C

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		capacitor, fixed: pF +/-5%; 50 V: unless otherwise stated
C1		43, ±30%
C2		62, ±30%
C3		47, ±30%
C4		20, ±30%
C5		3.6, ±0.1
C8		27, ±30%
C9		43, ±30%
C10		56, ±30%
C11		18, ±30%
C12		470, ±30%
C13		18, ±30%
C14		470, ±30%
C15		56, ±30%
C16		30, ±30%
C17		56, ±30%
C18		82, ±30%
C19		27, ±30%
		diode: (see note)
CR1		diode dual Schottky mixer
		meter:
M1		shield, receiver
M2 thru 4		leadframe
		transistor: (see note)
Q1		RF, transistor
		resistor, fixed: +/-5%; 1/8 W: unless otherwise stated
R1		3.3k
R2		820 ohms
R3		6.8k
R4		4.7 ohms
R5		560 ohms

note: For optimum performance, diodes, transistors, and integrated circuits must be ordered by Motorola part numbers.

This module is not field-repairable because it needs to be calibrated with specialized factory equipment after installation. Radios in which these parts have been replaced in the field will be off frequency at temperature extremes.

Parts List

0180702Y89 Battery Filter Board PL-9110I6-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		capacitor, fixed: pF +/-30%; 50 V: unless otherwise stated
C2 thru 4	2113740A43	39
		coil, inductors:
E1, 2	24B4657R01	ferrite bead
		fuse:
F1	6580561D02	4 A
		non-referenced items
	3980165S01	CONTACT, battery; B+ pad

Parts Lists for HLD9675D and HLD9677D VHF Main Boards, 146-174 MHz

Parts List

HLD9675D Main Board, 146-174 MHz, 5 W, 12.5 kHz Channel Spacing (N)
HLD9677D Main Board, 146-174 MHz, 5 W, 25 kHz Channel Spacing (W) PL-9110I5-C

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		capacitor, fixed: pF +/-5%; 50 V: unless otherwise stated
C28, 29T	2113740A48	51, ±30%
C30T	2113740A79	1000, ±30%
C31B	2113740A79	1000, ±30%
C33T	2113740A24	6.8, ±30%
C34B	2113741A45	0.01 uF
C35B	2113740A53	82, ±30%
C51T	2113740A53	82, ±30%
C53B	2113740A37	22, ±30%
C54B	2113740A33	15, ±30%
C55T	2160521G37	0.1 uF, +80%/-20%; 25 V
C56T	2113740A36	20, ±30%
C59T	2160521G37	0.1 uF, +80%/-20%; 25 V
C60B	2160521G37	0.1 uF, +80%/-20%; 25 V
C61B	2113741A25	1500
C62B	2311049A05	0.47 uF, ±10%; 25 V
C63T (N)	2113740A52	75, ±30%
C63T (W)	or 2113740A48	51, ±30%
C64B (N)	2113740A79	1000, ±30%
C64B (W)	or 2113740A72	510, ±30%
C65B	2113741A45	0.01 uF
C66T	2160521G37	0.1 uF, +80%/-20%; 25 V
C67T	2311049J11	4.7 uF, ±10%; 16 V
C68T	2113741A59	0.039 uF
C69T	2311049J07	3.3 uF, ±10%; 20 V
C70B	2160521G37	0.1 uF, +80%/-20%; 25 V
C71B	2311049J25	10 uF, ±10%; 16 V
C73T	2113740A32	13, ±30%
C74T	2113740A42	36, ±30%
C75T	2113740A19	3.9, ±30%
C77B	2113740A14	3, ±30%
C78T	0660076M01	0 ohms, 50 meg.; 1/8 W
C79T	2113740A34	16, ±30%
C81T	2160521G37	0.1 uF, +80%/-20%; 25 V
C82, 83B	2160521G37	0.1 uF, +80%/-20%; 25 V
C84B (N)	0660076M01	0 ohms, 50 meg.; 1/8 W
C84B (W)	or 2160521G37	0.1 uF, +80%/-20%; 25 V
C101, 102B	2311049A07	1 uF, ±10%; 16 V
C103T	2113740A53	82, ±30%
C104T	2113740A63	220, ±30%
C105B	2311049J25	10 uF, ±10%; 16 V
C106B	2113740A63	220, ±30%
C107B	2113741A59	0.039 uF
C111B	2113740A71	470, ±30%
C112B	2113740A37	22, ±30%
C113B	2113740A42	36, ±30%
C114B	2113740A48	51, ±30%
C115B	2113740A39	27, ±30%
C116T	2113740A79	1000, ±30%
C117T	2113740A27	8.2, ±30%
C118B	2113740A71	470, ±30%
C119B	2113740A36	20, ±30%
C120, 121B	2113740A71	470, ±30%
C122T	2113740A55	18, ±30%
C151, 152B	2113740A71	470, ±30%
C153B	2160521G37	0.1 uF, +80%/-20%; 25 V
C154B	2113740A71	470, ±30%
C156B	2113740A71	470, ±30%
C157, 158B	2113741A45	0.01 uF
C159B	2113740A71	470, ±30%
C163, 164B	2113740A71	470, ±30%
C165B	2113741A45	0.01 uF
C166B	2311049A05	0.47 uF, ±10%; 25 V
C167, 168B	2113741A59	0.039 uF
C202, 203B	2113741A45	0.01 uF
C204T	2311049J27	10 uF, ±10%; 25 V
C205T	2113740A63	220, ±30%
C206T	2113740G46	47, ±2%
C207, 208B	2311049J11	4.7 uF, ±10%; 16 V
C209T	2113740A71	470, ±30%
C210, 211B	2311049J11	4.7 uF, ±10%; 16 V
C212T	2113741A21	1000
C214B	2311049A07	1 uF, ±10%; 16 V
C215T	2113741A39	5600
C216B	2160521G37	0.1 uF, +80%/-20%; 25 V
C217T	2311049J11	4.7 uF, ±10%; 16 V
C218B	2113741A21	1000
C219 thru 221B	2113740A59	150, ±30%
C222B	2113741A21	1000

HLD9675D Main Board, 146-174 MHz, 5 W, 12.5 kHz Channel Spacing (N)
HLD9677D Main Board, 146-174 MHz, 5 W, 25 kHz Channel Spacing (W) PL-9110I5-C

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
C223B	2113740A41	33, ±30%
C224T	2113740A79	1000
C226T	2113740A14	3, ±30%
C227T	2113740A03	1, ±30%
C228B	2113740A59	150, ±30%
C230B	2160521G37	0.1 uF, +80%/-20%; 25 V
C231B	2113741A45	0.01 uF
C233T	2113740G24	6.8, ±0.1
C235T	2113741A51	0.018 uF
C236B	2113740A71	470, ±30%
C237, 238B	2113740A55	100, ±30%
C251B	2113740A33	15, ±30%
C252B	2113740A30	11, ±30%
C253B	2113740A34	16, ±30%
C254B	2113740A03	1, ±30%
C255B	2113740A37	22, ±30%
C256B	2113740A79	1000, ±30%
C257T	2113740A79	1000, ±30%
C259T	2113740A79	1000, ±30%
C260B	2113740A27	8.2, ±30%
C261B	2113740A34	16, ±30%
C262B	2113740A28	9.1, ±30%
C263B	2113740A03	1, ±30%
C284B	2113740A32	13, ±30%
C265T	2160521G37	0.1 uF, +80%/-20%; 25 V
C266T	2113740A79	1000, ±30%
C268, 269T	2113740A79	1000, ±30%
C270T	2113740A17	3.9, ±30%
C271T	2113740A19	4.7, ±30%
C272T	2113740A16	3.6, ±30%
C273T	2113740A79	1000, ±30%
C275B	2113740A79	1000, ±30%
C277	2113740A03	1, ±30%
C278, 279T	2311049A02	0.22 uF, ±10%; 35 V
C280B	2113740A79	1000, ±30%
C281T	2113740A71	470, ±30%
C284B	2113740A10	2, ±30%
C401T	2113740A41	33, ±30%
C402B	2113740G16	3.6, ±0.1
C404T	2113740A37	22, ±30%
C405B	2160521G37	0.1 uF, +80%/-20%; 25 V
C406T (N)	2113741A45	0.01 uF
C407T	2311049A40	2.2 uF, ±10%; 10V
C408T	2160521G37	0.1 uF, +80%/-20%; 25 V
C412T	2311049A07	1 uF, ±10%; 16 V
C413T	2311049A05	0.47 uF, ±10%; 25 V
C414T	2160521G37	0.1 uF, +80%/-20%; 25 V
C415B	2113741A37	4700
C416B	2160521G37	0.1 uF, +80%/-20%; 25 V
C418T	2311049J25	10 uF, ±10%; 16 V
C419T	2113741A51	0.018 uF
C421T	2311049A05	0.47 uF, ±10%; 25 V
C423B	2311049A05	0.47 uF, ±10%; 25 V
C424T	2113740A64	240, ±30%
C425T	2113741A59	0.039 uF
C426, 427B	2113741A51	0.018 uF
C428B	2113740A71	470, ±30%
C429T	2113741A37	4700
C430T	2113740A71	470, ±30%
C431T	2113741A47	0.012 uF
C432T	2113741A59	0.039 uF
C433B	2311049A05	0.47 uF, ±10%; 25 V
C434, 435T	2160521G37	0.1 uF, +80%/-20%; 25 V
C436B	2113740A71	470, ±30%
C437B	2113741A59	0.039 uF
C438B	2311049J11	4.7 uF, ±10%; 16 V
C440B	2113740A71	470, ±30%
C441B	2160521G37	0.1 uF, +80%/-20%; 25 V
C442T	2113740A79	1000, ±30%
C443B	2113740A79	1000, ±30%
C445B	2113741A51	0.018 uF
C447T	2160521G37	0.1 uF, +80%/-20%; 25 V
C449T	2311049A07	1 uF, ±10%; 16 V
C451B	2113741A49	0.015 uF
C452T	2311049J11	4.7 uF, ±10%; 16 V
C454B	2160521G37	0.1 uF, +80%/-20%; 25 V
C455T	2160521G37	0.1 uF, +80%/-20%; 25 V
C456B	2160521G37	0.1 uF, +80%/-20%; 25 V
C457T	2160521G37	0.1 uF, +80%/-20%; 25 V
C459, 460B	2113741A21	1000

HLD9675D Main Board, 146-174 MHz, 5 W, 12.5 kHz Channel Spacing (N)
HLD9677D Main Board, 146-174 MHz, 5 W, 25 kHz Channel Spacing (W) PL-9110I5-C

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
:461T	2160521G37	0.1 uF, +80%/-20%; 25 V
:462T	2113740A79	1000, ±30%
:463T	2160521G37	0.1 uF, +80%/-20%; 25 V
:464B	2160521G37	0.1 uF, +80%/-20%; 25 V
:466 thru 468B	2113741A21	1000
:469T	2113741A37	4700
:472 thru 476B	2113741A21	1000
:478T	2113740A79	1000, ±30%
:479B	2113740A71	470, ±30%
:480, 481B	2113740A59	150
:482T	2113741A59	0.039 uF
:483, 484B	2113740A71	470, ±30%
		filter:
:F51T (N)	9180098D04	ceramic 3 WR
:F51T (W)	or 9180098D06	ceramic 3 WR
:F52T (N)	9180098D03	ceramic 3 WR
:F52T (W)	or 9180098D05	ceramic 3 WR
		clip:
:L1 thru 4T	4280138R02	butterfly
:L6 thru 8T	4280138R02	butterfly
:L9B	4280138R02	butterfly
		diode: (see note)
:R2T	4880174R01	QUAD 8-pin
:R51B	4880154K03	dual Schottky, mixer
:R101, 102B	4880973Z02	pin
:R201, 202B	4813833C07	dual 100 W
:R203T	4805649Q04	VCTR RH 1T33T
:R252, 253B	4805649Q04	VCTR RH 1T33T
:R255T	4805649Q04	VCTR RH 1T33T
:R401B	4880939T01	Schottky barrier
:R402, 403B	4813833C07	dual 100 W
:R404B	4813833C07	dual 100 W
:R405B	4880107R01	rectifier
:R407T	4813833C07	dual 100 W
:S401B	4805729G49	**light emitting diode: (see note)** red/yel
		mechanical:
:*100T	1480168S01	insulator, XTAL; 2 used
:*101T	0300136783	screw, 2-56 x 5/16; 2 used
:*103T	1405160A02	crystal
:1T	3980515C02	**connector, receptacle:** antenna contact
:J2T	0180117S05	assembly, RF jack
:J3B	0180417C01	assembly, option jack
:J5B	0180195R03	speaker microphone header
:J6T	0180965Z01	connector B+
		coil, inductor: +/-5% chip: unless otherwise stated
:L9T	2462587X45	22 nH
:L11T	2462587X51	68 nH
:L51T	2483411T63	shielded
:L52T	2462587X61	470 nH
:L53T	2462587N69	1200 nH
:L55T	2483411T75	shielded
:L58T	2483411T74	shielded
:L101, 102B	2411087B24	0.68 uH
:L103T	2411087B24	0.68 uH
:L104B	2484577R01	ferrite bead
:L106B	2411087B24	0.68 uH
:L107B	2405486C76	air wound, 7 turns
:L108B	2405318D12	air wound
:L109B	2405486C76	air wound, 7 turns
:L111T	2405835C03	air wound .087 diameter
:L112B	2405486C77	air wound, 7 turns
:L201T	2462587N69	1200 nH
:L203T	2462587N69	1200 nH
:L204T	2462587X56	180 nH
:L251, 252B	2462587N69	1200 nH
:L253T	2480145S05	5-1/2 turns, ferrite core
:L254B	2462587X55	150 nH
:L255T	2462587N69	1200 nH
:L256, 257B	2462587N69	1200 nH
:L258T	2480145S04	4.5 turns, ferrite core
:L259T	2462587N69	1200 nH

HLD9675D Main Board, 146-174 MHz, 5 W, 12.5 kHz Channel Spacing (N)
HLD9677D Main Board, 146-174 MHz, 5 W, 25 kHz Channel Spacing (W) PL-9110I5-C

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
L260T	2483411T62	shielded
L261T	2462587X55	150 nH
L262T	2462587N48	27 nH
L267B	2462587X56	180 nH
L268T	2462587N69	1200 nH
L401B	2460579C43	33.0 uH, ±10%
L403, 404T	2462587X22	390 nH, ±10%
L405, 406B	2462587X22	390 nH, ±10%
T1 2T	2580163M03	XFMR; 2 used
		meter:
M51T	0705196A11	super XTAL mounting
M510T	4280126S01	clip, PA
M600 thru 602T	4080485C08	switch tactile
M700T	0780165R02	boot, crystal
M702T	0780511B01	bracket, freq. switch, plated
		transistor: (see note)
Q51B	4813827A07	NPN SML SIG
Q151B	4880214G02	NPN
Q152B	4813822A10	PNP 60. 10A
Q153B	4880214G02	NPN
Q154B	4880411L03	PNP
Q155, 156B	4880214G02	NPN
Q401B	4880214G02	NPN
Q405B	4805128M16	SOT MMBT3906 (RH) 48G22
Q406 thru 409T	4805128M16	SOT MMBT3906 (RH) 48G22
Q410B	4880411L03	PNP
Q411B	4805128M19	SOT-23 MMBTA13 (RH)
Q412B	4805128M16	SOT MMBT3906 (RH) 48G22
		resistor, fixed: +/-5%; 1/8 W: unless otherwise stated
R51T	0660076A18	51 ohms
R52B	0660076A85	33k
R53B	0660076A75	12k
R54T	0660076A56	2k
R55T	0660076A25	100 ohms
R57T	0660076B04	130k
R58B	0660076A76	13k
R59B (N)	0660076A96	91k
R59B (W)	or 0660076A93	68k
R60B (N)	0660076A73	10k
R60B (W)	or 0660076A70	7.5k
R64T	0660076A67	5.6k
R66B	0660076A47	820 ohms
R67B	0660076A89	6.8k
R68B (N)	0660076M01	0 ohms, 50 meg.
R68B (W)	or 0660076A25	100 ohms
R69B (W)	0660076A73	10k
R101B	0680108R01	0.1 ohms, ±1%; 1 W
R102B	0660076A29	150 ohms
R103B	0660076A22	75 ohms
R104T	0660076A36	300 ohms
R105T	0660076A07	18 ohms
R106T	0660076A36	300 ohms
R107B	0611077A18	4.7 ohms
R108B	0660076A22	75 ohms
R151B	0660076E91	56k, ±1%
R152B	0660076F01	100k, ±1%
R153B	0660076A09	22 ohms
R154B	0660076F01	100k, ±1%
R155B	0660076E91	56k, ±1%
R156B	0660076A63	3.9k
R157B	0660076A55	1k
R158, 159B	0660076A31	180 ohms
R160, 161B	0660076A45	680 ohms
R162B	0660076A27	120 ohms
R166B	0660076A31	180 ohms
R167B	0660076A78	16k
R168B	0660076B01	100k
R169T	0660076A73	10k
R171B	0660076A90	51k
R172B	0660076A81	22k
R174B	0660076B01	100k
R175B	0660076A68	6.2k, ±1%
R179B	0660076A38	360 ohms
R201B	0660076A18	51 ohms
R202B	0660076A49	1k
R203B	0660076B06	160k
R204B	0660076B02	110k
R205T	0660076A57	2.2k

HLD9675D Main Board, 146-174 MHz, 5 W, 12.5 kHz Channel Spacing (N)
HLD9677D Main Board, 146-174 MHz, 5 W, 25 kHz Channel Spacing (W) PL-9110I5-C

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
R206B	0660076A57	2.2k
R207T	0660076A65	4.7k
R211B	0660076A89	47k
R215B	0660076A49	1k
R216B	0660076A82	24k
R251B	0660076A95	82k
R253T	0660076A60	3k
R254T	0660076A73	10k
R257B	0660076A95	82k
R258T	0660076A25	100 ohms
R260, 261B	0660076A33	220 ohms
R263B	0660076A70	7.5k
R264B	0660076A01	10 ohms
R265B	0660076L17	4.7 ohms, ±10%
R401T	0660076H31	1.8 meg, ±10%
R402B	0660076A65	4.7k
R403B	0660076B01	100k
R404B	0660076B07	180k
R406B	0660076B01	100k
R407B	0660076A49	1k
R408 thru 411B	0660076A89	47k
R412B	0660076A31	180 ohms
R413B	0660076A45	680 ohms
R414 thru 417B	0660076A73	10k
R418B	0660076B01	100k
R419T	0660076B01	100k
R420B	0660076A73	10k
R421B	0660076B07	180k
R422B	0660076E01	100k
R423, 424T	0660076B01	100k
R425T	0660076B09	220k
R426T	0660076B06	160k
R429T	0660076B17	470k
R431T	0660076A90	51k
R432B	0660076A80	20k
R433B	0660076A73	10k
R434B	0660076B01	100k
R438B	0660076A61	3.3k
R442B	0660076H31	1.8 meg, ±10%
R443B	0660076B01	100k
R444B	0660076A80	20k
R445B	0660076H31	1.8 meg, ±10%
R447T	0660076A67	5.6k
R448T	0660076A90	51k
R449B	0660076B01	100k
R450B	0660076A73	10k
R451T	0660076A57	2.2k
R452T	0660076B07	180k
R453T	0660076A57	2.2k
R454T	0660076E01	100k
R455T	0660076A84	30k
R456T	0660076A65	4.7k
R457T	0660076A93	68k
R458T	0660076A69	6.8k
R459T	0660076B23	820k
R460T	1880143S02	volume, potentiometer
R461B	0660076A09	22 ohms
R462T	0660076B17	470k
R463T	0660076A89	47k
R464B	0660076A55	1.8k
R465B	0660076B18	510k
R466B	0660076A65	4.7k
R467B	0660076A01	10 ohms
R468B	0660076A73	10k
R469T	0660076A31	180 ohms
R470T	0660076A25	100 ohms
R471B	0660076A73	10k
R472, 473B	0660076A25	100 ohms
R474, 475T	0660076A73	10k
R476B	0660076B01	100k
R478T	0660076A84	30k
R479T	0660076A73	10k
R484T	0660076A68	6.2k, ±4%
R486T	0660076B01	100k
R487B	0660076A73	10k
R488T	0660076B09	220k
R489 thru 490B	0611077A12	2.7 ohms
R491B	0660076A73	10k
R492B	0660076A70	7.5k
R493B	0660076B13	330k
R494B	0660076B01	100k

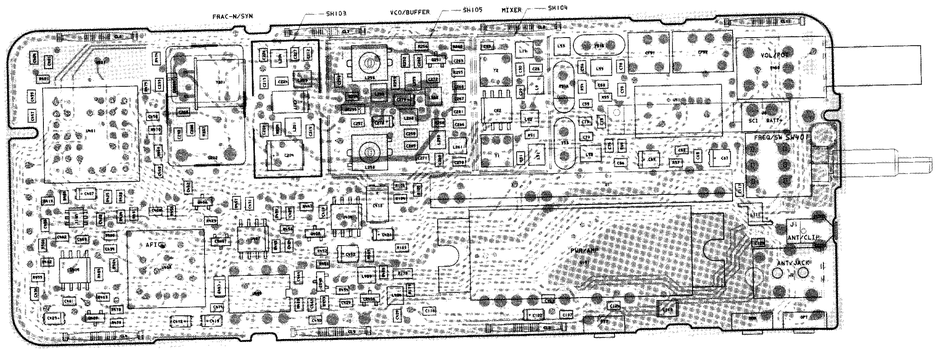
HLD9675D Main Board, 146-174 MHz, 5 W, 12.5 kHz Channel Spacing (N)
HLD9677D Main Board, 146-174 MHz, 5 W, 25 kHz Channel Spacing (W) PL-9110I5-C

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
R496B	0660076A37	330 ohms
R497B	0660076A41	470 ohms
R503T	0660076A37	330 ohms
R504T	0660076B07	180k
R505T	0660076B06	160k
R506T	0660076A82	24k
R507B	0660076A49	1k
		shield:
SH100B	2680521D01	SYN, front
SH101B	2680520D01	VCO, front
SH103T	2680692C02	mixer, back
SH104T	2680518D01	VCO, back
SH105T	2680518D01	SYN, back, TCXO
		switch:
SW401T	4080502B01	freq., 16-position
SW401T	4080650D01	freq., 16-position, rotary
		integrated circuit: (see note)
U51T	5180207R01	IF
U101T	5180111R02	RF power module (VHF)
U151B	5180992W01	linear op amp
U152B	5105226P38	DAC IC
U201B*		synthesizer
U251B	5105414S84	VCO buffer
U401B*		microprocessor; 2 channel uP only microprocessor
U402T	5105165R77	AFIC
U404T	5105469E65	voltage regulator
U405T	5180932W01	linear op amp
U406B	5102198J23	comparator
U407T	5180932W01	linear op amp
U409T	5180175R01	audio amplifier
U410B	5180159R01	dual trans NPNS
U411T	5180633C01	5 V regulator w/reset
VR401B	4880140L15	**voltage regulator: (see note)** diode, Zener 10 V tape & reel
		crystal: (see note)
Y51T (N)	9180112R06	45.1 MHz, filter
Y51T (W)	or 9180112R05	45.1 MHZ, filter
Y53T	4880008K02	XTAL resonator 44.645 MHz 10PPM
Y201T*		16.8 MHz
Y401T	4880113R01	7.9488
		non-referenced items
	0580537C01	EYELET
	0580537C02	EYELET
	0780432C01	CONTACT, battery support
	1580413C01	HOUSING, option jack
	1580414C01	HOUSING, cover optionjack
	1580433C01	HOUSING, RF jack
	2680412B01	SHIELD, RF jack
	2680416C01	SHIELD, option jack
	2680625B02	SHIELD, receiver
	3180168R01	B+ HEADER
	3280415C01	SEAL, option jack
	3980169R01	PRIM B+ CONTACT
	3980170R01	PROG CONTACT
	3980405C01	CONTACT, spring #5
	3980406C01	CONTACT, spring #2
	3980407C01	CONTACT, spring #4
	3980408C01	CONTACT, spring #3
	3980409C01	CONTACT, spring #6
	3980410C01	CONTACT, spring #1
	3980435C01	RF JACK, T2 contact
	3980435C01	RF JACK, T1 contact
	5480570B01	LABEL, thermal high temp
	7580411C01	BUMPER, 2.5 MM; 2 used

note: For optimum performance, diodes, transistors, and integrated circuits must be ordered by Motorola part numbers.

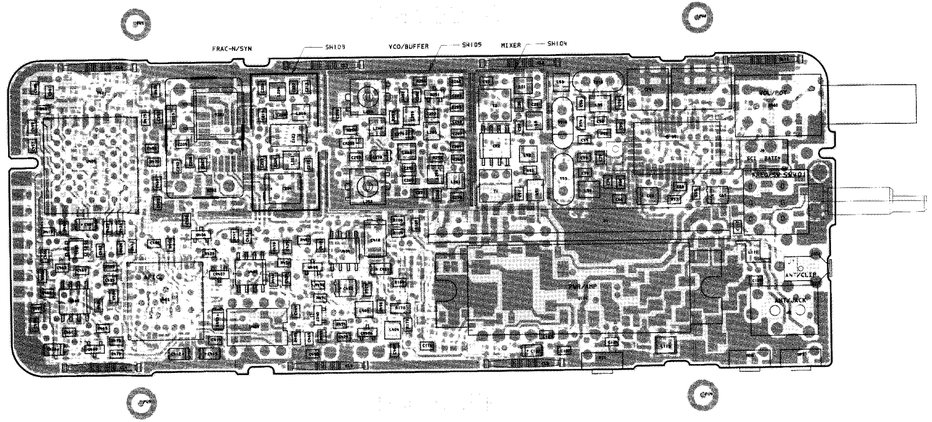
Reference designator ending in "T" denotes component is located on top side of circuit board. Reference designator ending in "B" denotes component is located on bottom side of circuit board.

Reference designators marked with an asterisk "*" indicate components which are not field-replaceable because they need to be calibrated with specialized factory equipment after installation. Radios in which these parts have been replaced in the field will be off frequency at temperature extremes.



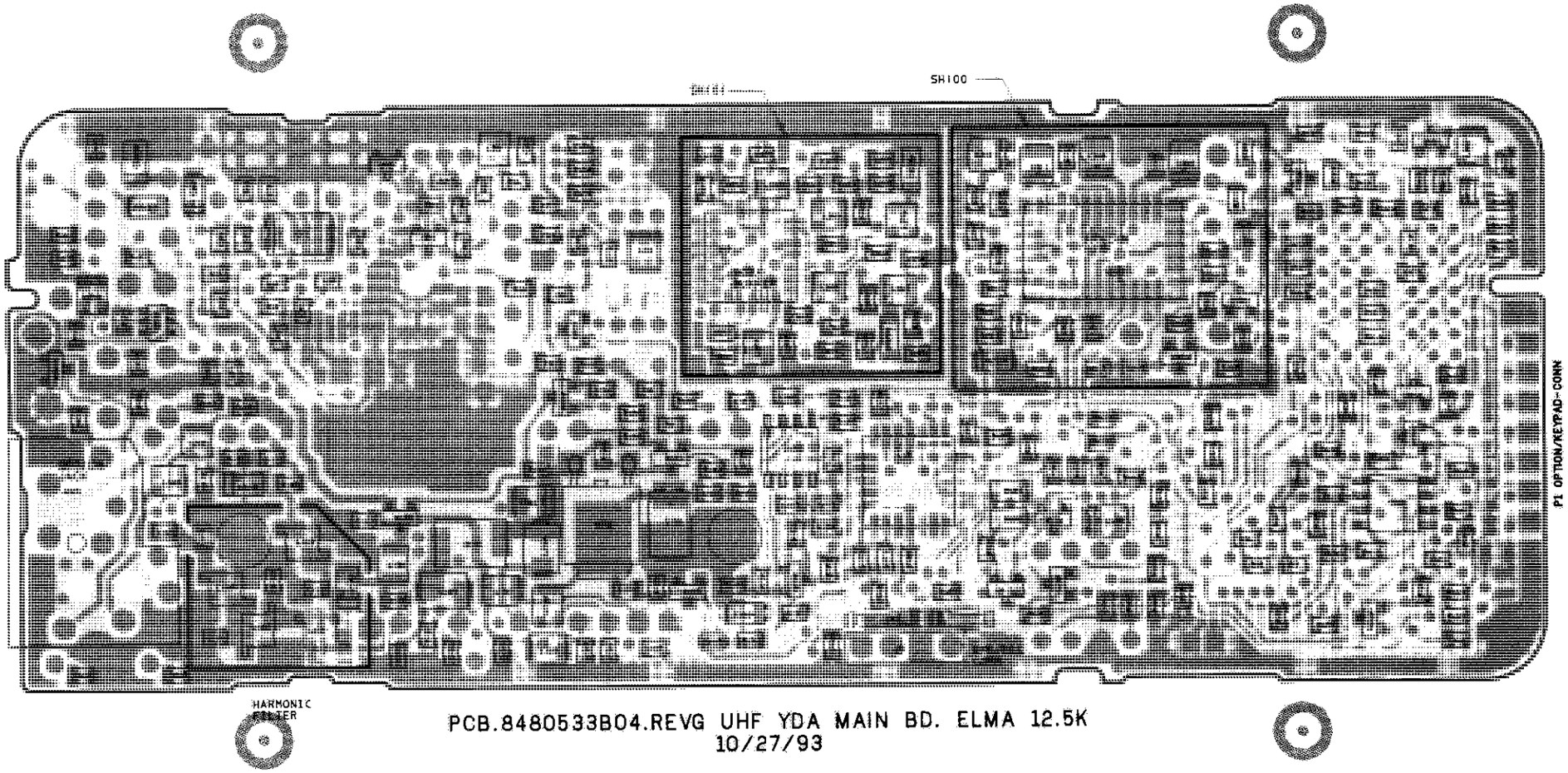
COMPONENT SIDE INNER LAYER (GRAY) RCB-93128-O
SOLDER SIDE INNER LAYER (PINK) RCB-93129-O
OVERLAY ----- RCB-93131-O

COMPONENT SIDE VIEW



COMPONENT SIDE (GRAY) RCB-93127-O
SOLDER SIDE (PINK) RCB-93130-O
OVERLAY ----- RCB-93131-O

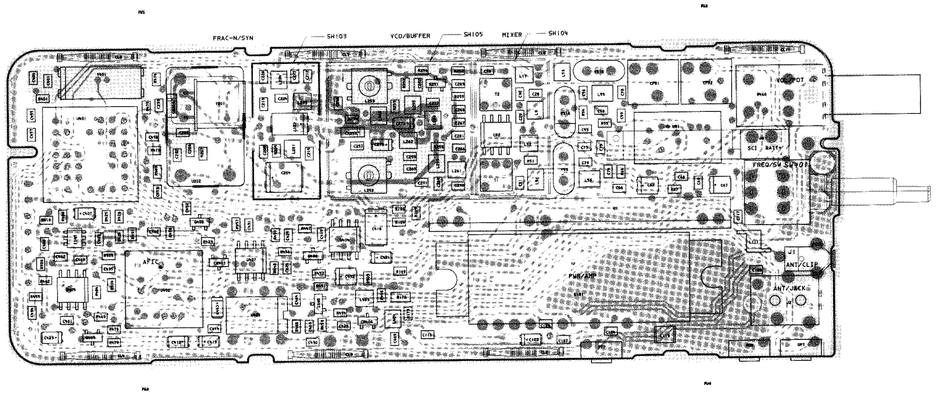
COMPONENT SIDE VIEW



PCB.8480533B04.REVG UHF YDA MAIN BD. ELMA 12.5K
10/27/93

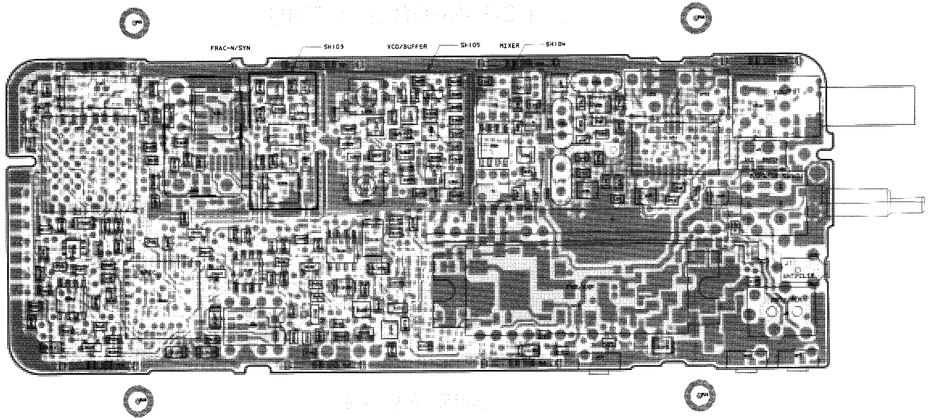
COMPONENT SIDE (GRAY)	RCB-93127-O
SOLDER SIDE (PINK)	RCB-93130-O
OVERLAY -----	RCB-93132-O

SOLDER SIDE VIEW



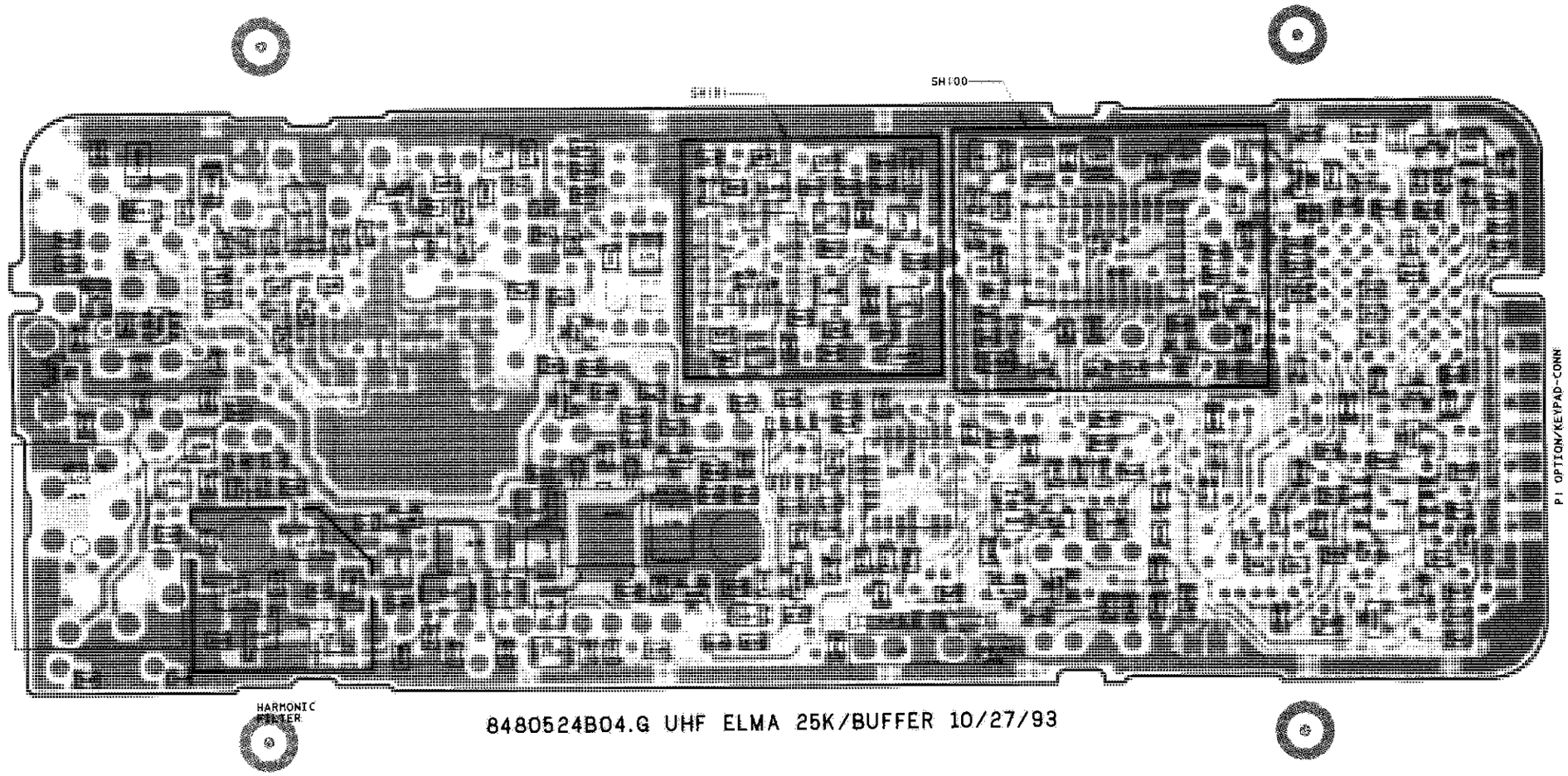
COMPONENT SIDE INNER LAYER (GRAY) RCB-93134-O
SOLDER SIDE INNER LAYER (PINK) RCB-93135-O
OVERLAY ----- RCB-93137-O

COMPONENT SIDE VIEW



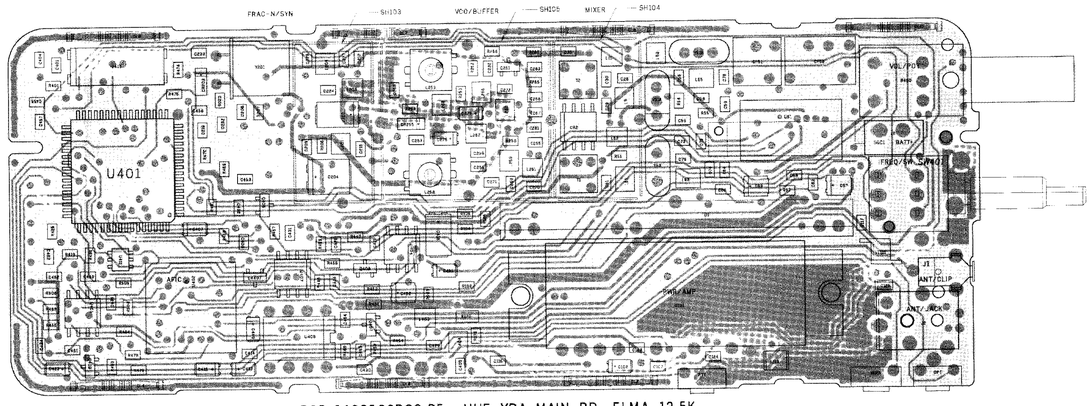
COMPONENT SIDE (GRAY) RCB-93133-O
SOLDER SIDE (PINK) RCB-93136-O
OVERLAY ----- RCB-93137-O

COMPONENT SIDE VIEW



COMPONENT SIDE (GRAY)	RCB-93133-O
SOLDER SIDE (PINK)	RCB-93136-O
OVERLAY -----	RCB-93138-O

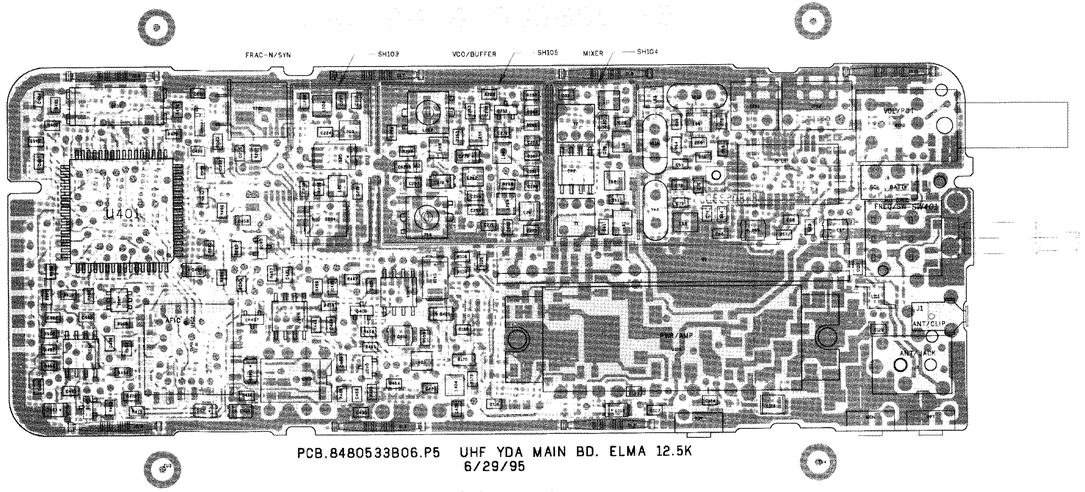
SOLDER SIDE VIEW



PCB.8480533B06.P5 UHF YDA MAIN BD. ELMA 12.5K
6/29/95

COMPONENT SIDE INNER LAYER (GRAY) RCB-93128-A
SOLDER SIDE INNER LAYER (PINK) RCB-93129-A
OVERLAY ----- RCB-93131-A

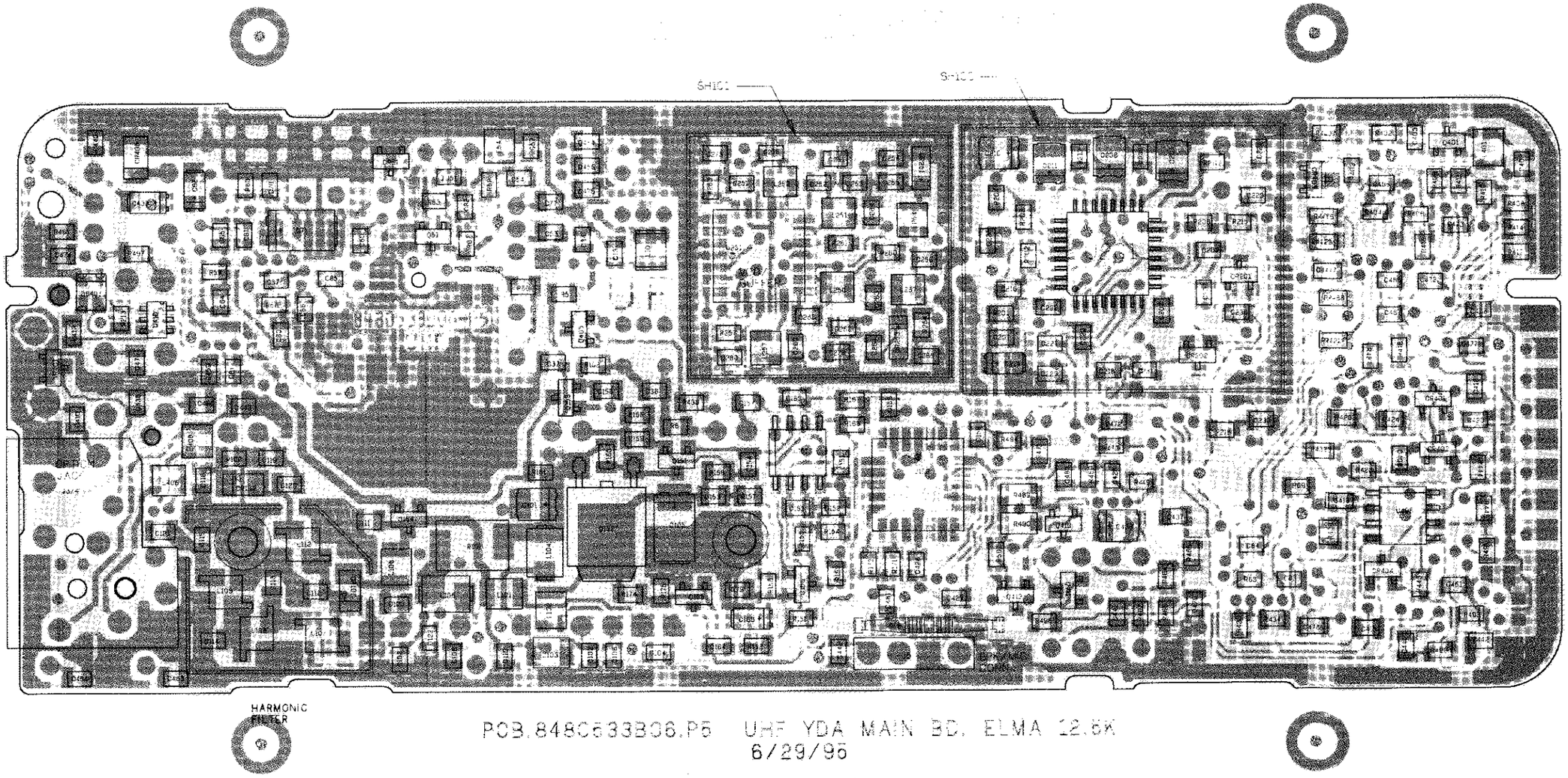
COMPONENT SIDE VIEW



PCB.8480533B06.P5 UHF YDA MAIN BD. ELMA 12.5K
6/29/95

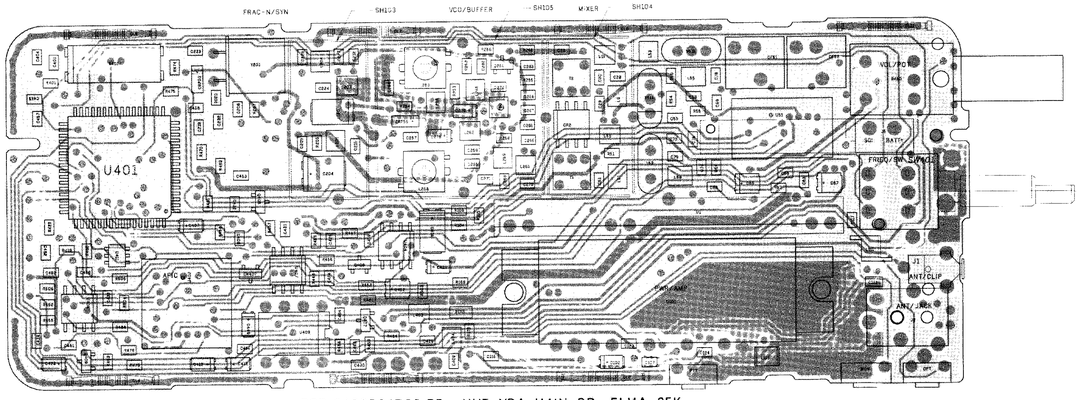
COMPONENT SIDE (GRAY) RCB-93127-A
SOLDER SIDE (PINK) RCB-93130-A
OVERLAY ----- RCB-93131-A

COMPONENT SIDE VIEW



COMPONENT SIDE (GRAY) RCB-93127-A (REV)
SOLDER SIDE (PINK) RCB-93130-A (REV)
OVERLAY ----- RCB-93132-A (REV)

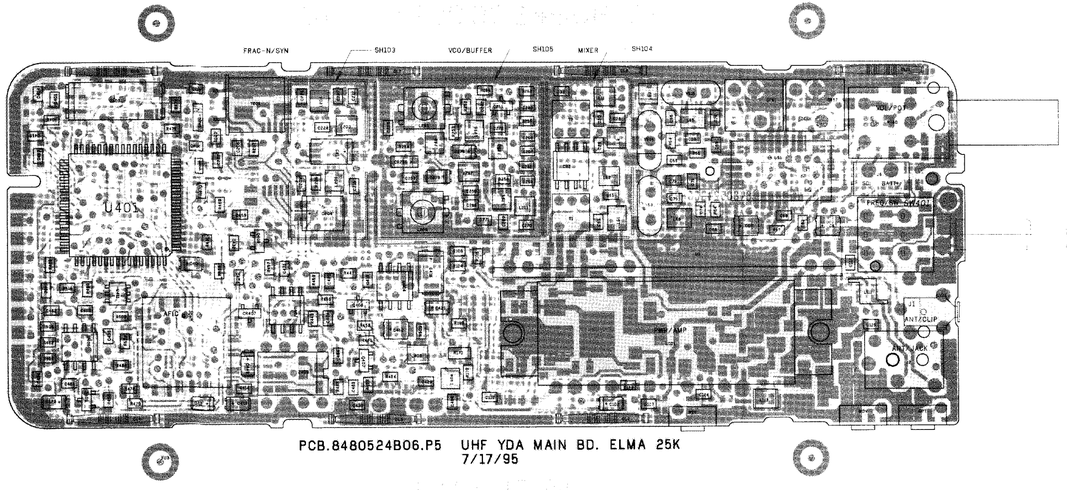
SOLDER SIDE VIEW



PCB.8480524B06.P5 UHF YDA MAIN BD. ELMA 25K
7/17/95

COMPONENT SIDE INNER LAYER (GRAY) RCB-93134-A
SOLDER SIDE INNER LAYER (PINK) RCB-93135-A
OVERLAY ----- RCB-93137-A

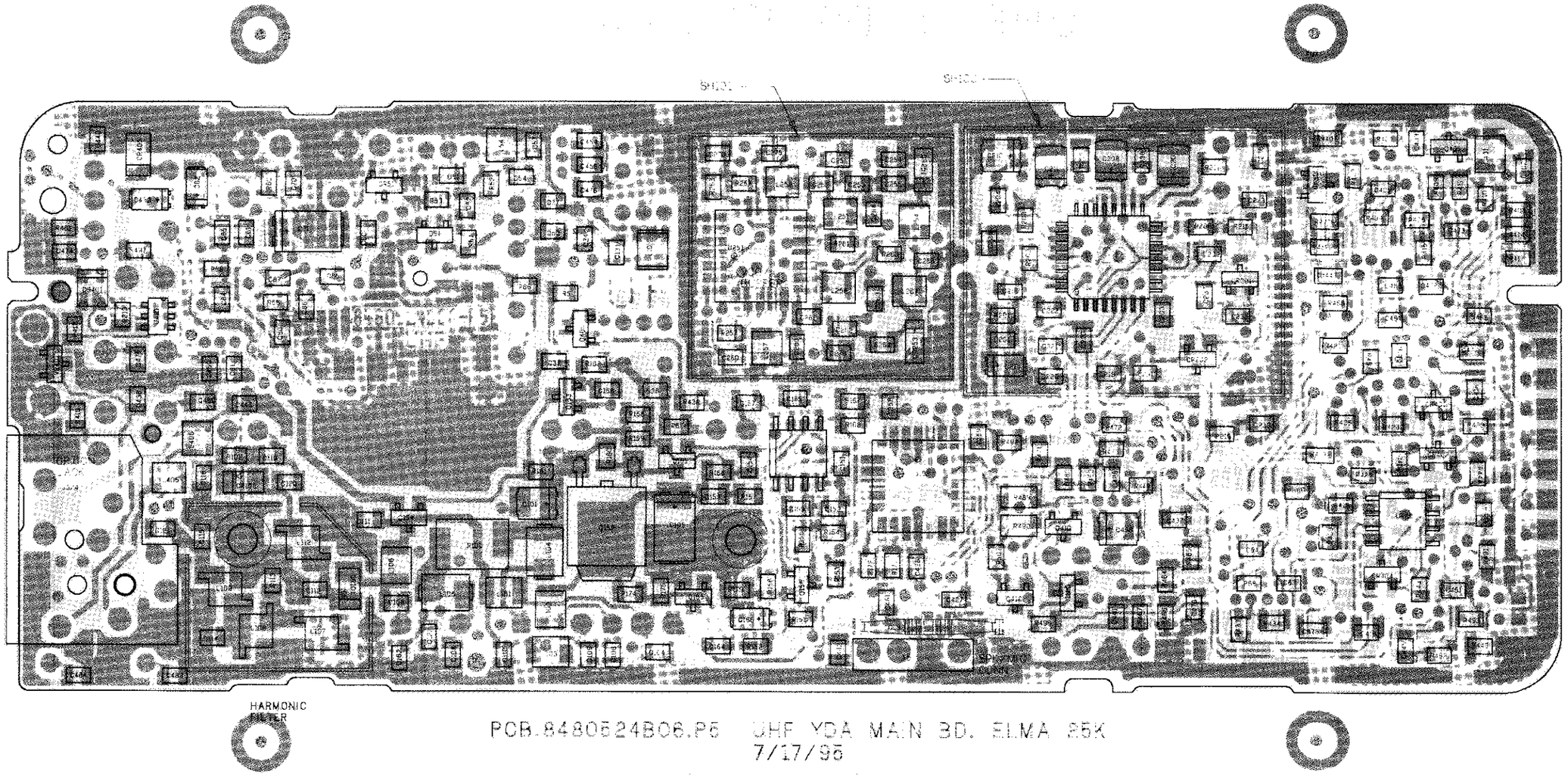
COMPONENT SIDE VIEW



PCB.8480524B06.P5 UHF YDA MAIN BD. ELMA 25K
7/17/95

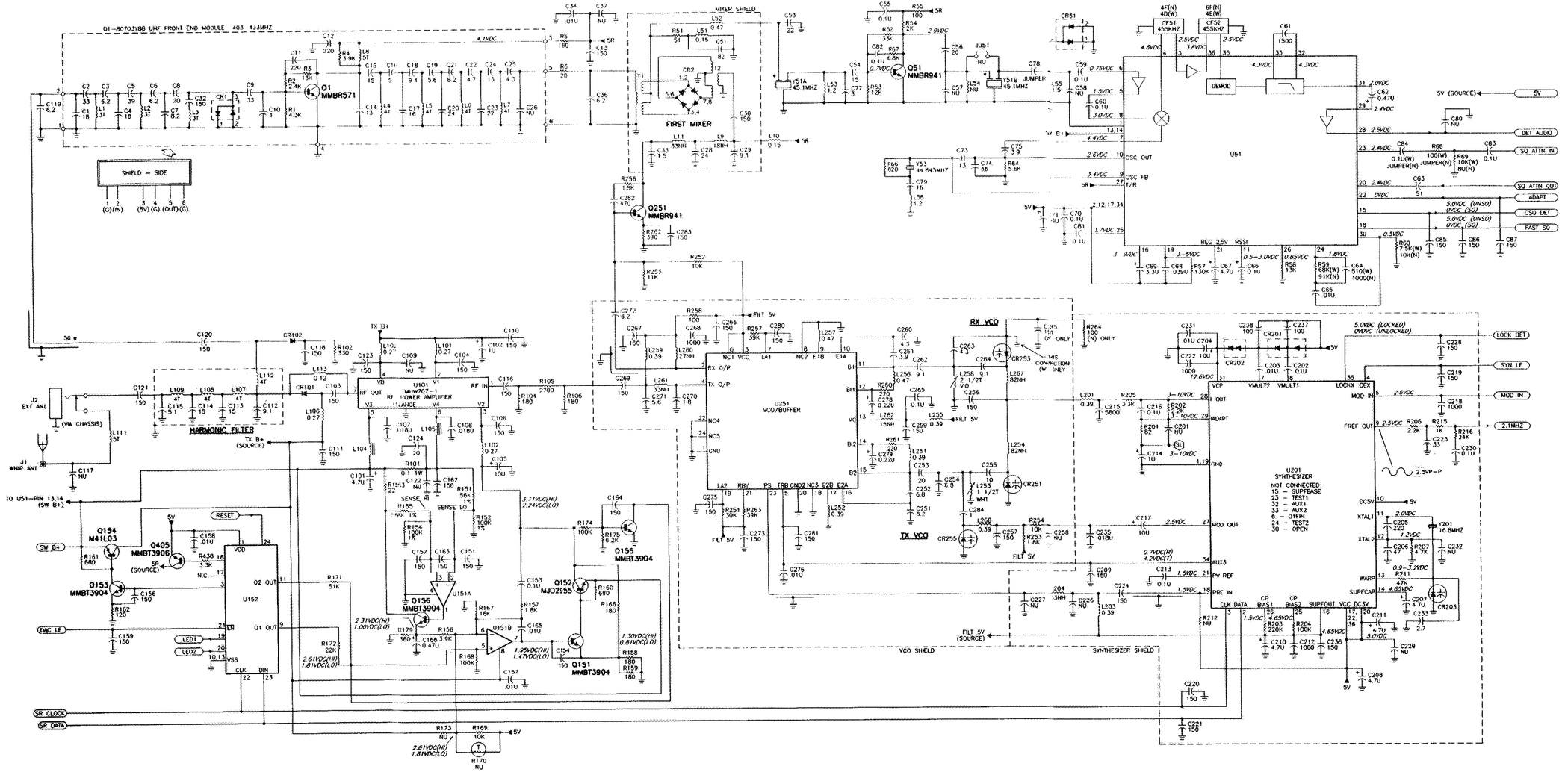
COMPONENT SIDE (GRAY) RCB-93133-A
SOLDER SIDE (PINK) RCB-93136-A
OVERLAY ----- RCB-93137-A

COMPONENT SIDE VIEW



COMPONENT SIDE (GRAY) RCB-93133-A (REV)
SOLDER SIDE (PINK) RCB-93136-A (REV)
OVERLAY ----- RCB-93138-A (REV)

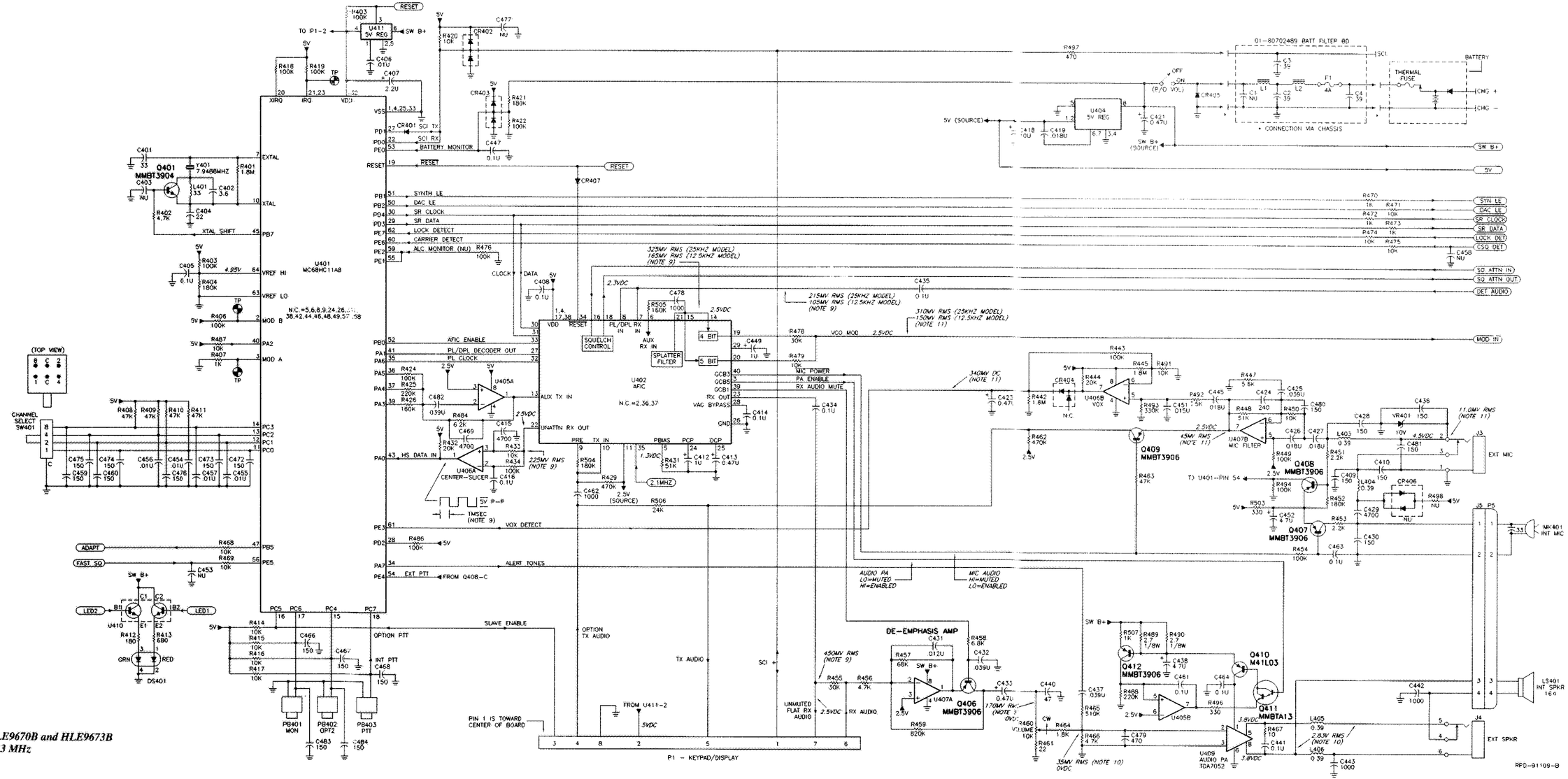
SOLDER SIDE VIEW



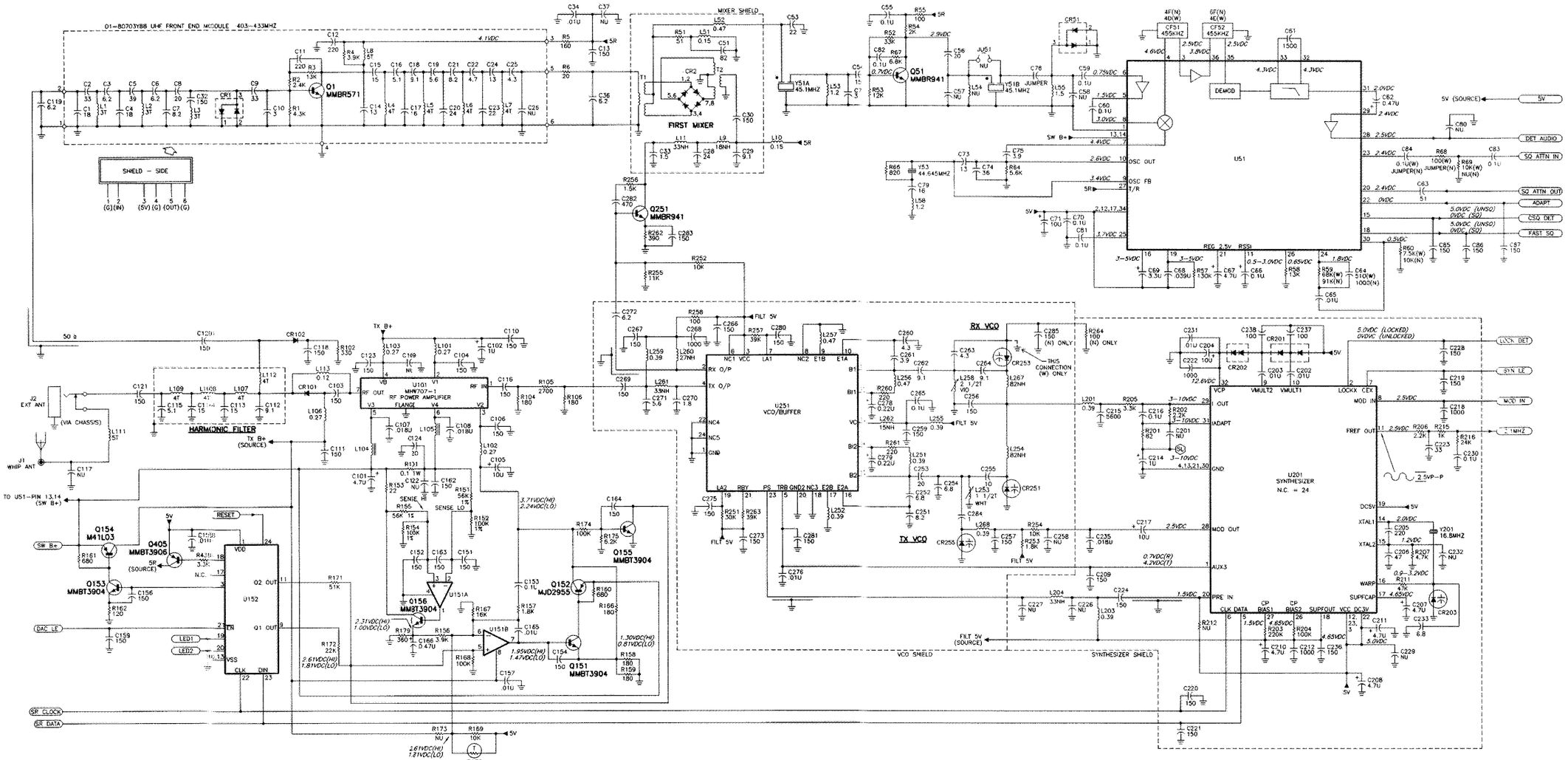
NOTES:

1. UNLESS OTHERWISE INDICATED, RESISTOR VALUES ARE IN OHMS, CAPACITOR VALUES ARE IN PICOFARADS, INDUCTOR VALUES ARE IN MICROHENRIES.
2. NON-POLARIZED CAPACITORS ARE CHIP-TYPE UNLESS OTHERWISE INDICATED.
3. POLARIZED CAPACITORS ARE CHIP-TANTALUM TYPE UNLESS OTHERWISE INDICATED.
4. "NU" MEANS COMPONENT IS NOT USED.
5. DC VOLTAGES ARE MEASURED WITH A HIGH IMPEDANCE (10 MEGOHM) DC VOLTMETER.
6. AC VOLTAGES ARE MEASURED WITH A HIGH IMPEDANCE AC RMS VOLTMETER.
7. ALL VOLTAGE MEASUREMENTS ARE IN THE RECEIVE MODE UNLESS INDICATED AS FOLLOWS:
   (R) RECEIVE MODE
   (T) TRANSMIT MODE
8. MEASURED IN THE RECEIVE MODE WITH AN ON-CHANNEL UNMODULATED SIGNAL AT A LEVEL OF -20 DBM.
9. MEASURED IN THE RECEIVE MODE WITH AN ON-CHANNEL SIGNAL AT A LEVEL OF -20 DBM, MODULATED WITH 1 KHZ AT 3 KHZ DEVIATION (FOR 20/25 KHZ MODELS) OR 1.5 KHZ DEVIATION (FOR 12.5 KHZ MODELS). MEASURED WITH AN AC RMS VOLTMETER.
10. SAME AS NOTE 8 EXCEPT WITH VOLUME CONTROL ADJUSTED FOR 500 MILLIWATTS (2.82 VOLTS RMS ACROSS 16-OHM LOAD CONNECTED TO THE EXT SPKR JACK).
11. MEASURED IN THE TRANSMIT MODE WITH A 1 KHZ, 11 MV RMS SIGNAL APPLIED TO THE EXTERNAL MICROPHONE INPUT.

Schematic Diagram for HLE9670B and HLE9673B UHF Main Boards, 403-433 MHz (sheet 1 of 2)



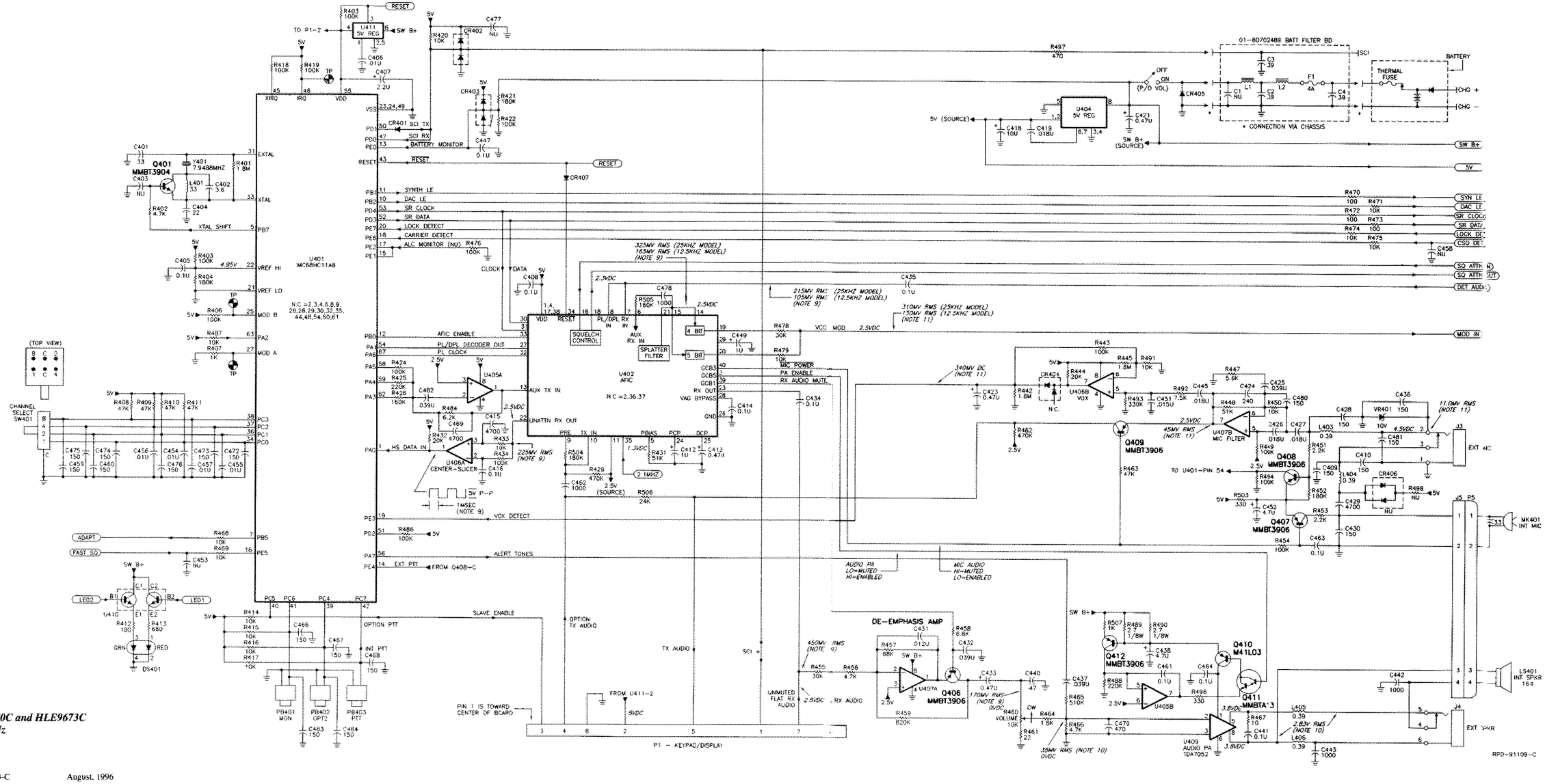
Schematic Diagram for HLE9670B and HLE9673B
UHF Main Boards, 403-433 MHz
(sheet 2 of 2)



NOTES:

1. UNLESS OTHERWISE INDICATED, RESISTOR VALUES ARE IN OHMS, CAPACITOR VALUES ARE IN PICOFARADS, INDUCTOR VALUES ARE IN MICROHENRIES.
2. NON-POLARIZED CAPACITORS ARE CHIP-TYPE UNLESS OTHERWISE INDICATED.
3. POLARIZED CAPACITORS ARE CHIP-TANTALUM TYPE UNLESS OTHERWISE INDICATED.
4. "NU" MEANS COMPONENT IS NOT USED.
5. DC VOLTAGES ARE MEASURED WITH A HIGH IMPEDANCE (10 MEGOHM) DC VOLTMETER.
6. AC VOLTAGES ARE MEASURED WITH A HIGH IMPEDANCE AC RMS VOLTMETER.
7. ALL VOLTAGE MEASUREMENTS ARE IN THE RECEIVE MODE UNLESS INDICATED AS FOLLOWS:
   (R) RECEIVE MODE
   (T) TRANSMIT MODE
8. MEASURED IN THE RECEIVE MODE WITH AN ON-CHANNEL UNMODULATED SIGNAL AT A LEVEL OF -20 DBM.
9. MEASURED IN THE RECEIVE MODE WITH AN ON-CHANNEL SIGNAL AT A LEVEL OF -20 DBM, MODULATED WITH 1 KHZ AT 3 KHZ DEVIATION (FOR 20/25 KHZ MODELS) OR 1.5 KHZ DEVIATION (FOR 12.5 KHZ MODELS), MEASURED WITH AN AC RMS VOLTMETER.
10. SAME AS NOTE 8 EXCEPT WITH VOLUME CONTROL ADJUSTED FOR 500 MILLIWATTS (2.82 VOLTS RMS ACROSS 16-OHM LOAD CONNECTED TO THE EXT SPKR JACK).
11. MEASURED IN THE TRANSMIT MODE WITH A 1 KHZ, 11 MV RMS SIGNAL APPLIED TO THE EXTERNAL MICROPHONE INPUT.

Schematic Diagram for HLE9670C and HLE9673C UHF Main Boards, 403-433 MHz (sheet 1 of 2)



Schematic Diagram for HLE9670C and HLE9673C UHF Main Boards, 403-433 MHz (sheet 2 of 2)

Parts List

HLE9673B Main Board, 403-433 MHz, 12.5 kHz Channel Spacing, CEPT (N)
HLE9670B Main Board, 403-433 MHz, 20/25 kHz Channel Spacing, CEPT (W) PL-911011-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		capacitor, fixed: pF +/-5%; 50 V; unless otherwise stated
C1, 2	2113740G27	8.2F, 0.1
C3	2113740G23	6.2, 0.1
C4	2113740G35	18, 2%
C5, 7	2113740G21	5.6, 0.1
C6	2113740G24	6.8, 0.1
C7	2113740G33	15, 2%
C8	2113740G31	12, 2%
C9	2113740G35	18, 2%
C11, 12	2113740A59	220
C13b	2113740A59	150
C15	2113740G12	2.4, 0.1
C16	2113740G43	47, 0.1
C17, 16	2113740G27	8.2, 0.1
C19	2113740G19	4.3, 0.1
C20	2113740G34	16, 2
C21	2113740G24	6.8, 0.1V
C22	2113740G21	5.6, 0.1
C23	2113740G34	16, 2
C24	2113740G24	6.8, 0.1
C25	2113740G27	8.2, 0.1
C26	2113740G28	9.1, 0.1
C28f	2113740A39	24
C29f	2113740A28	9.1, 0.25
C30f	2113740A59	150
C32	2113740G35	18, 2%
C33f	2113740A07	1.5, 0.25
C34b	2113741A45	0.01 uF
C36b	2113740A23	6.2, 0.25
C51f	2113740A53	82
C53b	2113740A37	22
C54b	2113740A33	15
C55f	2160521G37	0.1 uF, +80%/-20%; 25V
C56f	2113740A36	20
C59f	2160521G37	0.1 uF, +80%/-20%; 25V
C60b	2160521G37	0.1 uF, +80%/-20%; 25V
C61b	2113741A25	1500
C62b	2311049A05	0.47 uF, 10%; 25V
C63f	2113740A48	51
C64b	2113740A79	1000 (12.5 kHz) or 2113740A29 510 (25 kHz)
C65b	2113741A45	0.01 uF
C66f	2160521G37	0.1 uF, +80%/-20%; 25V
C67f	2311049J11	4.7 uF, 10%; 16V
C68f	2113741A59	0.039 uF
C69f	2311049J07	3.3 uF, 10%; 20V
C70b	2160521G37	0.1 uF, +80%/-20%; 25V
C71b	2311049J25	10 uF, 10%; 16V
C72f	2113740A32	13
C74f	2113740A42	38
C75f	2113740A17	3.9, 0.25
C77b	2113740A14	3, 0.25
C78f	0660378M01	0 ohms, 0%; 1/8W
C79f	2113740A34	16
C81 thru 83b	2160521G37	0.1 uF, +80%/-20%; 25V
C84b	0660376M01	0 ohms, 0%, 1/8W (12.5 kHz) or 2160521G37 0.1 uF, +80%/-20%; 25V (25 kHz)
C85 thru 87b	2113740A59	150
C101b	2311049J11	4.7 uF, 10%; 16V
C102f	2311049A07	1 uF, 10%; 16V
C103, 104B	2113740A59	150
C105b	2311049J25	10 uF, 10%; 16V
C106B	2113740A59	150
C107f	2113741A51	0.018 uF
C108B	2113741A51	0.018 uF
C110, 111B	2113740A59	150
C112B	2113740A28	9.1, 0.25
C113, 114B	2113740A33	15
C115B	2113740A05	5.1, 0.25
C116f	2113740A59	150
C118B	2113740A59	150 (12.5 kHz)
C119B	2113740A23	6.2, 0.25
C120, 121B	2113740A59	150
C122f	2113740A59	150
C124f	2113740A36	20
C151, 152B	2113740A59	150
C153B	2160521G37	0.1 uF, +80%/-20%; 25V
C154B	2113740A59	150
C156B	2113740A59	150
C157, 158B	2113741A45	0.01

HLE9673B Main Board, 403-433 MHz, 12.5 kHz Channel Spacing, CEPT (N)
HLE9670B Main Board, 403-433 MHz, 20/25 kHz Channel Spacing, CEPT (W) PL-911011-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
C159B	2113740A59	150
C162 thru 164B	2113740A59	150
C165B	2113741A45	0.01 uF
C166B	2311049A05	0.47 uF, 10%; 25V
C202, 203B	2113741A45	0.01 uF
C204f	2311049J27	10 uF, 10%; 25V
C205f	2113740A64	240 (12.5 kHz) or 2113740A63 220 (25 kHz)
C206f	2113740A46	47, 2%
C207, 208B	2311049J11	4.7 uF, 10%; 16V
C209f	2113740A59	150
C210, 211B	2311049J11	4.7 uF, 10%; 16V
C212f	2113741A21	1000
C213f	2160521G37	0.1 uF, +80%/-20%; 25V
C214B	2311049A07	1 uF, 10%; 16V
C215f	2113741A39	560
C216B	2160521G37	0.1 uF, +80%/-20%; 25V
C217f	2311049J25	10 uF, 10%; 16V
C218B	2113741A21	1000
C219 thru 221B	2113740A59	150
C222B	2113741A21	1000
C223B	2113740A41	33
C224B	2113740A59	150
C226B	2113740A59	150
C230B	2160521G37	0.1 uF, +80%/-20%; 25V
C231B	2113741A45	0.01 uF
C233f	2113740G13	2.7, 0.1
C235B	2113741A51	0.018 uF, 5%
C236B	2113740A59	150
C237, 238B	2113740A55	100
C251B	2113740A27	8.2, 0.25
C252B	2113740A24	6.8, 0.25
C253B	2113740A36	20
C254B	2113740A24	6.8, 0.25
C255B	2113740A29	10
C256B	2113740A59	150
C257T	2113740A58	150
C259T	2113740A59	150
C260B	2113740A18	4.3, 0.25
C281B	2113740A17	3.9, 0.25
C262B	2113740A28	9.1, 0.25
C263B	2113740A18	4.3, 0.25
C264B	2113740A28	9.1, 0.25
C265T	2160521G37	0.1 uF, +80%/-20%; 25V
C266, 267T	2113740A59	150
C268T	2113741A21	1000
C269T	2113740A59	150
C270T	2113740A09	1.8, 0.25
C271T	2113740A21	5.6, 0.25
C272T	2113740A23	6.2, 0.25
C273B	2113740A59	150
C275B	2113740A59	150
C276B	2113741A45	0.01 uF
C278, 279T	2311049J01	0.22 uF, 10%; 35V
C280B	2113740A59	150
C281T	2113740A59	150
C282T	2113740A71	470
C283T	2113740A59	150
C284B	2113740A59	150
C285B	2113740A59	150 (12.5 kHz)
C401T	2113740A41	33
C402B	2113740A26	3.6, 0.1
C404T	2113740A37	22
C405B	2160521G37	0.1 uF, +80%/-20%; 25V
C407T	2311049A40	2.2 uF, 10%; 10V
C408T	2160521G37	0.1 uF, +80%/-20%; 25V
C409T	2113740A59	150
C410B	2113740A59	150
C412T	2311049A07	1 uF, 10%; 16V
C413T	2113740A05	0.47 uF, 10%; 25V
C414T	2160521G37	0.1 uF, +80%/-20%; 25V
C415B	2113741A37	4700
C416B	2160521G37	0.1 uF, +80%/-20%; 25V
C418T	2311049J25	10 uF, 10%; 16V
C419T	2113741A51	0.018 uF
C421T	2311049A05	0.47 uF, 10%; 25V
C423T	2311049A05	0.47 uF, 10%; 25V
C424T	2113740A84	240
C425T	2113741A59	0.039 uF
C426, 427B	2462587N61	chip 470 NH, 5%
C428B	2113740A59	150

HLE9673B Main Board, 403-433 MHz, 12.5 kHz Channel Spacing, CEPT (N)
HLE9670B Main Board, 403-433 MHz, 20/25 kHz Channel Spacing, CEPT (W) PL-911011-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
C429T	2113741A37	4700
C430T	2113740A59	150
C431T	2113741A47	0.012 uF
C432T	2113741A59	0.039 uF
C433B	2311049A05	0.47 uF, 10%; 25V
C434, 435T	2160521G37	0.1 uF, +80%/-20%; 25V
C436B	2113740A59	150
C437B	2113741A59	0.039 uF
C438B	2311049J15	4.7 uF, 10%; 16V
C440B	2113740A46	47
C441B	2160521G37	0.1 uF, +80%/-20%; 25V
C442, 443B	2113740A79	1000
C445B	2113741A51	0.018 uF
C447B	2160521G37	0.1 uF, +80%/-20%; 25V (12.5 kHz)
C449T	2311049A07	1 uF, 10%; 16V
C451B	2113741A49	0.015 uF, 5%
C452T	2311049J11	4.7 uF, 10%; 16V
C454B	2113741A45	0.01 uF
C455T	2113741A45	0.01 uF
C456B	2113741A45	0.01 uF
C457T	2113741A45	0.01 uF
C458, 460B	2113740A59	150
C461T	2160521G37	0.1 uF, +80%/-20%; 25V
C462T	2113740A79	1000
C463T	2160521G37	0.1 uF, +80%/-20%; 25V
C464B	2160521G37	0.1 uF, +80%/-20%; 25V
C466 thru 468B	2113740A59	150
C469T	2113741A37	4700
C472 thru 476B	2113740A59	150
C478T	2113740A79	1000
C479B	2113740A71	470
C480, 481B	2113740A59	150
C482T	2113741A59	0.039 uF (12.5 kHz)
C483, 484B	2113740A59	150 (12.5 kHz)
CR51T	9180453B04 or 9180908D06	**filter, ceramic:** mini - 6 pole (12.5 kHz) 3 WR (25 kHz)
CR52f	9180454B04 or 9180908D05	filter - 4 pole (12.5 kHz) 3 WR (25 kHz)
CL1 thru 4	4280138R01	**clip:** butterfly
CL6 thru 9	4280138R01	clip, battery
CR2T	4880174R01	**diode: (see note)** QUAD 8-pin
CR51B	4880154K03	dual Schottky mixer
CR101, 102B	4880973Z02	pin
CR201, 202B	4813830D07	dual 100 W
CR203T	4805649Q04	VCTR RH 1T33T
CR251B	4805649Q22	VCTR RH 1T32T
CR252B	4805649Q02	VCTR RH 1T32T
CR255T	4805649Q02	VCTR RH 1T32T
CR401B	4805939T01	Schottky barrier
CR402, 403B	4813833C07	dual 100 W
CR404B	4813833C07	dual 100 W
CR405B	4880107R01	silicon
CR407B	4813833C07	dual 100 W
DS401B	4805729G49	**light emitting diode: (see note)** diode red/yel
H101	0300136783	**mechanical:** screw 2-56" x 5/16"; 2 used (12.5 kHz)
H102	1405160A02	insulator, crystal
H103	0780511B01	bracket, freq switch, plated (12.5 kHz)
J1T	3990515C02	**connector, receptacle:** antenna contact
J3B	0180417C01	assembly option jack
J5B	0160195R01	speaker microphone header
L9T	2462587N44	**coil, inductor:** 18 nH, 5%
L10	2483411T63	chip shielded
L11T	2462587N47	chip 33 NH, 5%
L51T	2483411T63	chip shielded
L52T	2462587N61	chip 470 NH, 5%
L53T	2462587N69	1200 NH, 5%

HLE9673B Main Board, 403-433 MHz, 12.5 kHz Channel Spacing, CEPT (N)
HLE9670B Main Board, 403-433 MHz, 20/25 kHz Channel Spacing, CEPT (W) PL-911011-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
L55T	2483411775	chip shielded
L58T	2483411774	chip shielded
L101 thru 103B	2411087A19	.27 UH
L104, 105B	2484657R01	ferrite bead
L106B	2411087A19	.27 UH
L107 thru 109B	2483033N76	coil airwound
L111T	2483035N13	coil air 24AWG 5TNS
L112B	2483035N76	coil airwound
L201T	2462587N27	chip 390 NH, 10%
L203T	2462587N22	chip 390 NH, 10%
L204T	2462587N47	chip 33 NH, 5%
L251, 252B	2462587N22	chip 390 NH,10%
L253T	2484155S07	RF coil 1-1/2 T- brass core whi
L254B	2462587N52	chip 82 NH, 5%
L255T	2462587N22	chip 390 NH, 10%
L258, 257B	2462587N61	chip 470 NH, 5%
L258T	2480145S08	2-1/2 violet toko
L259T	2462587N22	chip 390 NH, 10%
L260T	2462587N46	chip27 NH, 5%
L261T	2462587N47	chip33 NH, 5%
L262T	2462587N43	15 NH, 5%
L267B	2462587N52	chip 82 NH, 5%
L268T	2462587N22	chip 390 NH, 10%
L401B	2462587N23	chip 33.0 UH, 10%
L403, 404T	2462587N22	chip 390 NH, 10%
L405, 406T	2462587N22	chip 390 NH, 10%
M51	0705196A11	**meter:** SUPR XTAL mounting (25 kHz)
M501	4280126S01	clip, PA
M600 thru 602	4080485C03	switch tactile
Q51B	4813827A07	**transistor: (see note)** NPN SML SIG
Q151B	4880214G02	NPN
Q152B	4813822A10	PNP 60V 10A
Q153B	4880214G02	NPN
Q154B	4880141L03	PNP
Q155, 156B	4880214G02	NPN
Q251T	4813827A07	NPN SML SIG
Q401B	4880214G02	NPN
Q405B	4813828M16	SOT MMBT3906 (RH) 48G22
Q406 thru 409T	4805128M16	SOT MMBT3906 (RH) 48G22
Q410B	4880141L03	PNP
Q411B	4805128M10	SOT-23
Q412B	4805128M16	SOT MMBT3906 (RH) 48G22
R5B	0660376A30	**resistor, fixed: +/-5%; 1/8 W:** unless otherwise stated chip, 160
R6B	2113740A36	20
R51T	0660076A18	51 ohms
R52B	0660076A35	33K
R53B	0660076A75	12K
R54T	0660076A80	2K
R55T	0660076A25	100 ohms
R57T	0660076B04	130K
R58B	0660076A76	13K
R59B	0660076A96 or 0660076A03	91K (12.5 kHz) 68K (25 kHz)
R60B	0660076A73 or 0660076A70	10K (12.5 kHz) 7.5K (25 kHz)
R64T	0660076A67	5.6K
R66B	0660076A47	820 ohms
R67B	0660076A69	6.8K
R68B	0660076A91	0 ohms, 0% (12.5 kHz) or 0660076A25 100 ohms (25 kHz)
R69B	0660076A73	10k
R101B	0680106R01	0.1 ohms, 1%; 1W
R102B	0660076A37	330 ohms
R104T	0660076A31	180 ohms
R105T	0660076A11	27 ohms
R106T	0660076A33	180 ohms
R151B	0660076E91	56K, 1%
R152B	0660076F01	100K, 1%
R153B	0660076A09	22 ohms
R154B	0660076F01	100K, 1%
R155B	0660076E91	56K, 1%
R156B	0660076A83	3.9K
R157B	0660076A55	1.8K

HLE9673B Main Board, 403-433 MHz, 12.5 kHz Channel Spacing, CEPT (N)
HLE9670B Main Board, 403-433 MHz, 20/25 kHz Channel Spacing, CEPT (W) PL-911011-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
R158, 159B	0660076A31	180 ohms
R160, 161B	0660076A45	680 ohms
R162B	0660076A27	120 ohms
R166B	0660076A31	180 ohms
R167B	0660076A78	16K
R168B	0660076A93	68K
R169T	0660076A73	10K
R171B	0660076A90	51K
R172B	0660076A22	82K
R174B	0660076B01	100K
R175B	0660076A68	6.2K, 4%
R179B	0660076A38	360 ohms
R201B	0660076A23	82 ohms
R202B	0660076A57	2.2K
R203B	0660076B09	220K
R204B	0660076B07	180K
R205T	0660076A61	3.3K
R206B	0660076A57	2.2K
R207B	0660076A67	4.7K
R211B	0660076A89	47K
R215B	0660076A49	1K
R216B	0660076A84	24K
R251B	0660076A84	30K
R252T	0660076A73	10K
R253T	0660076A55	1.8K
R254T	0660076A73	10K
R255T	0660076A74	11K
R256T	0660076A53	1.5K
R257B	0660076A87	39K
R258T	0660076A25	100 ohms
R280, 261B	0660076A33	220 ohms
R262T	0660076A29	390 ohms
R263B	0660076A87	39K
R264B	0660076A25	100 ohms (12.5 kHz)
R401T	0660076H31	1.8 meg, 10%
R402T	0660076A65	4.7K
R403T	0660076B01	100K
R404T	0660076B07	180K
R406T	0660076B01	100K
R407T	0660076A49	1K
R408 thru 411T	0660076A89	47K
R412T	0660076A31	180 ohms
R413T	0660076A84	680 ohms
R414 thru 417T	0660076A73	10K
R418B	0660076B01	100K
R419T	0660076B01	100K
R420B	0660076A73	10K
R421B	0660076B07	180K
R422B	0660076B01	100K
R424T	0660076B01	100K
R425T	0660076B09	220K
R426T	0660076B06	160K
R429B	0660076B17	470K
R431T	0660076A90	51K
R432B	0660076A80	20K
R433B	0660076A73	10K
R434B	0660076B01	100K
R438B	0660076A76	13K
R442B	0660076H31	1.8 meg, 10%
R443B	0660076B01	100K
R444B	0660076A80	20K
R445B	0660076H31	1.8 meg, 10%
R447T	0660076A67	5.6K
R448T	0660076A90	51K
R449B	0660076B01	100K
R450B	0660076A73	10K
R451T	0660076A57	2.2K
R452T	0660076B07	180K (12.5 kHz)
R453T	0660076A57	2.2K
R454T	0660076B01	100K
R455T	0660076A84	30K
R456T	0660076A65	4.7K (12.5 kHz)
R457B	0660076A93	68K
R458T	0660076A69	6.8K
R459T	0660076B23	820K
R461B	0660076A09	22 ohms
R462T	0660076B17	470K
R463T	0660076A89	47K
R464B	0660076A55	1.8K
R465B	0660076B18	510K

HLE9673B Main Board, 403-433 MHz, 12.5 kHz Channel Spacing, CEPT (N)
HLE9670B Main Board, 403-433 MHz, 20/25 kHz Channel Spacing, CEPT (W) PL-911011-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
R466B	0660076A65	4.7K
R467B	0660076A01	10 ohms
R468B	0660076A73	10K
R469T	0660076A73	10K
R470T	0660076A49	1K
R471B	0660076A49	1K
R472, 473B	0660076A49	1K
R474, 475T	0660076A73	10K
R476B	0660076B01	100K
R478T	0660076A84	30K
R479T	0660076A73	10K
R484T	0660076A68	6.2K, 4%
R485T	0660076B01	100K
R487B	0660076A73	10K
R488T	0660076B09	220K
R489, 490B	0811077A13	2.7 ohms, 5%
R491B	0660076A73	10K
R492B	0660076A70	7.5K
R493B	0660076A37	330K
R494B	0660076B01	100K
R496B	0660076A37	330 ohms
R497B	0660076A41	470 ohms
R503T	0660076A37	330 ohms
R504T	0660076A73	10K
R505T	0660076B06	160K
R506T	0660076A82	24K
R507B	0660076A49	1K
SH100B	2660986V01	**shield:** syn front
SH101B	2660970V01	VCO front
SH102B	2660136B01	harmonic filter UHF
SW401T	4080502B01	**switch:** freq, 16-position
U51T	5160207R01	**integrated circuit: (see note)** IF
U101T	5113829D03	UHF, 7W; 7.5V 403-440 MHz
U151B	5160932W01	linear op amp
U201B*	5105414S55	synthesizer
U404T	5105469E65	voltage regulator
U405T	5160932W01	linear op amp
U406B	5102198L23	compactor LM2903D 50 T/R
U407T	5160932W01	linear op amp
U409T	5180175R01	audio amplifier
U410B	5160159R01	dual trans NPNS
U411T	5180633C01	5V regulator w/reset (12.5 kHz)
VR401B	4880140L15	**voltage regulator: (see note)** diode Zener 10V tape&reel
Y51T	9180112R06 or 8180112R05	**crystal: (see note)** 45.1 MHz filter (12.5 kHz) 45.1 MHz filter (25 kHz)
Y51AT	0705196A11	SUPR XTAL mounting (12.5 kHz)
Y53T	4880008K02	XTAL resonator 44.645 MHz 10PPM
Y401T	4880113R01	CRYSTAL 7.9488

non-references items

	0180444C01	ASSEMBLY, RF jack
	0300136783	SCREW, 2-56 x 5/16 Phillip; 2 used (25 kHz)
	0580537C01	EYELET
	0580537C02	EYELET
	0660078A64	4.3K
	0705026S01	LEADFRAME
	0780165R02	BOOT, crystal
	0780432C01	BATTERY, contact support
	0780511B01	BRACKET, freq switch, plated (25 kHz)
	1480168S01	INSULATOR, XTAL; 2 used
	1580433C01	HOUSING, option jack
	1580434C01	HOUSINGs, cover option jack
	1580433C01	HOUSING, RF jack
	1680143S02	VOLUME, potentiometer
	2580163M03	COIL, XFMR; 2 used
	2680425B01	SHIELD, RF jack
	2680416C01	SHIELD, option jack
	2680625B02	SHIELD, receiver
	2680682C01	SHIELD, mixer, back
	2680968Z01	SHIELD, VCO, back

HLE9673B Main Board, 403-433 MHz, 12.5 kHz Channel Spacing, CEPT (N)
HLE9670B Main Board, 403-433 MHz, 20/25 kHz Channel Spacing, CEPT (W) PL-911011-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
	2680970Z01	SHIELD, syth, back, TCXO
	9280415C01	SEAL, option jack
	3980405C01	CONTACT, spring #5
	3980406C01	CONTACT, spring #2
	3980407C01	CONTACT, spring #4
	3980408C01	CONTACT, spring #3
	3990409C01	CONTACT, spring #6
	3990410C01	CONTACT, spring #1
	3990434C01	CONTACT, RF jack T2
	3990435C01	CONTACT, RF jack T1
	4800114R02	CRYSTAL, 16.8 MHZ
	4882022N67	TSTR NPN 2SN67 AMPL
	5485703B01	LABEL, thermal high temp
	7580411C01	BUMPER 2.5 MM; 2 used
	7580611B01	PAD, front shield; 2 used

note: For optimum performance, diodes, transistors, and integrated circuits must be ordered by Motorola part numbers.

Reference designator ending in "T" denotes component is located on top side of circuit board. Reference designator ending in "B" denotes component is located on bottom side of circuit board. Reference designators marked with an asterisk indicate components which are not field-replaceable.

Parts List

01-607037Y68 Receiver Module, 403-433 MHz (part of HLE9673B or HLE9670B Main Board) PL-911014-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		capacitor, fixed: pF +/-5%; 50 V; unless otherwise stated
C1	2113740G35	18, 2%
C2	2113740G41	33, 1%
C3	2113740G16	3.6, 0.1
C4	2113740G35	18, 2%
C5	2113740G43	ceramic chip, 39; 2%
C6	2113740G23	6.2, 0.1
C7	2113740G27	8.2, 0.1
C8	2113740G36	20, 2%
C9	2113740G41	33, 1%
C10	2113740G14	3, 0.1
C11, 12	2113740A63	220, 5%
C14	2113740G32	13, 2%
C15	2113740G33	15, 2%
C16	2113740G20	5.1, 0.1
C17	2113740G34	16, 2%
C18	2113740G28	9.1, 0.1
C19	2113740G21	5.6, 0.1
C20	2113740G38	24, 2%
C21	2113740G27	8.2, 0.
C22	2113740G19	4.7, 0.1
C23	2113740G37	22, 2%
C24	2113740G32	13, 2%
C25	2113740G18	4.3, 0.1
C26	2113740G20	5.1pF, 0.1 pF; 50V
C32	2113740A59	150
CR1	4880154K03	**diode: (see note)** dual Schottky mixer
L1 thru 3	2405486C22	**coil, inductor:** air wound, 3 turns
L4 thru 7	2405486C10	air wound, 4 turns
L8	2405486C20	air wound, 5 turns
M1 thru 6	0780102S01	**meter:** leadframe
Q1	4882022N67	**integrated circuit: (see note)** IF
R1	0660076A64	4.3K
R2	0660076A58	2.4K, 5%; 1/8W
R3	0660076A76	13K
R4	0660076A63	3.9K

non-references items

	2113740G23	6.2 pF, 0.1 pF; 50V
	2680625B02	SHIELD, receiver

note: For optimum performance, diodes, transistors, and integrated circuits must be ordered by Motorola part numbers.

Parts List

0180702Y89 Battery Filter Board PL-911016-A

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		capacitor, fixed: pF +/-5%; 50 V; unless otherwise stated
C2 thru 4	2113740A43	39
L1, 2	2484657R01	**coil, rf:** ferrite bead
F1	6505663R04	**fuse:** 4 A

non-references items

	3980165S01	CONTACT, battery

Parts Lists for HLE9670B and HLE9673B UHF Main Boards, 403-433 MHz

Parts List

01-8070Y49 Receiver Module, 403-433 MHz
(part of HLE9673C or HLE9670C Main Board) PL-911014-C

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		capacitor, fixed: pF +/-5%; 50 V: unless otherwise stated
C1		6.8 ±0.1
C2		10, ±2%
C3		8.2, ±0.1
C4		12, ±2%
C5		6.8, ±0.1
C6		8.2 ±0.1
C7		12, ±2%
C8		3.6, ±0.1
C9		8.2, ±0.1
C10		20, ±2%
C11		15, ±2%
C12		20, ±2%
C13		12, ±2%
C14		150, ±30%
C15		2.2, ±0.1
C16		5.1 ±0.1
C17		5.2, ±0.1
C18		9.1, ±0.1
C19		4.7, ±0.1
C20		20, ±2%
C21		6.8, ±0.1
C22		6.2, ±0.1
C23		13, ±2%
C24		5.6, ±0.1
C25, 26		11, ±2%
C27		3.9, ±0.1
C28		150, ±30%
C32		150, ±30%
		diode: (see note)
CR1		dual Schottky mixer
		transistor: (see note)
Q1		NPN
		resistor, fixed: +/-5%; 1/8 W: unless otherwise stated
R1		4.7k
R2		3.9k
R3		13k
		non-referenced items
		SHIELD, receiver
		LEADFRAME

note: For optimum performance, diodes, transistors, and integrated circuits must be ordered by Motorola part numbers.

This module is not field-repairable because it needs to be calibrated with specialized factory equipment after installation. Radios in which these parts have been replaced in the field will be off frequency at temperature extremes.

Parts List

0180702Y89 Battery Filter Board PL-911016-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		capacitor, fixed: pF +/-30%; 50 V: unless otherwise stated
C2 thru 4	2113740A43	39
		coil, inductors:
E1, 2	2484657R01	ferrite bead
		fuse:
F1	6580561D02	4 A
		non-referenced items
	3980165S01	CONTACT, battery: B+ pad

Parts Lists for HLE9670C and HLE9673C UHF Main Boards, 403-433 MHz

Parts List

HLE9673C Main Board, 403-433 MHz, 12.5 kHz Channel Spacing, CEPT (N)
HLE9670C Main Board, 403-433 MHz, 20/25 kHz Channel Spacing, CEPT (W) PL-911011-C

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		capacitor, fixed: pF +/-5%; 50 V: unless otherwise stated
C13B	2113740A59	150, ±30%
C28T	2113740A38	24, ±30%
C29T	2113740A28	9.1, ±30%
C30T	2113740A59	150, ±30%
C33T	2113740A39	1.5, ±30%
C34B	2113741A45	0.01 uF
C36B	2113740A23	6.2, ±30%
C51T	2113740A53	82, ±30%
C53B	2113740A36	22, ±30%
C54B	2113740A33	15, ±30%
C55T	2160521G37	0.1 uF, +80%/-20%, 25 V
C56T	2113740A36	20, ±30%
C59T	2160521G37	0.1 uF, +80%/-20%, 25 V
C60B	2160521G37	0.1 uF, +80%/-20%, 25 V
C61B	2113741A25	1500
C62B	2311048A05	0.47 uF, ±10%, 25 V
C63T	2113740A46	51, ±30%
C64B (N)	2113740A79	1000, ±30%
C64B (W)	or 2113740A72	510, ±30%
C65B	2113741A45	0.01 uF
C66T	2160521G37	0.1 uF, +80%/-20%, 25 V
C67T	2311049J11	4.7 uF, ±10%, 16 V
C68T	2113741A59	0.039 uF
C69T	2311049J07	3.3 uF, ±10%, 20 V
C70B	2160521G37	0.1 uF, +80%/-20%, 25 V
C71B	2311049J25	10 uF, ±10%, 16 V
C72T	2113740A32	13, ±30%
C74T	2113740A42	36, ±30%
C75T	2113740A17	3.9, ±30%
C77B	2113740A04	5, ±30%
C78T	0660076M01	0 ohms,50 meg., 1/8 W
C79T	2113740A34	16, ±30%
C81 thru 83B	2160521G37	0.1 uF, +80%/-20%, 25 V
C84B (N)	0660076M01	0 ohms, 50 meg., 1/8 W
C84B (W)	or 2160521G37	0.1 uF, +80%/-20%, 25 V
C85 thru 87B	2113740A59	150, ±30%
C101B	2311049J11	4.7 uF, ±10%, 16 V
C102T	2311049A07	1 uF, ±10%, 16 V
C103, 104B	2113740A59	150, ±30%
C105B	2311049J25	10 uF, ±10%, 16 V
C106B	2113740A59	150, ±30%
C107T	2113741A51	0.018 uF
C108B	2113741A51	0.018 uF
C110, 111B	2113740A59	150, ±30%
C112B	2113740A28	9.1, ±30%
C113, 114B	2113740A33	15, ±30%
C115B	2113740A20	5.1, ±30%
C116T	2113740A59	150, ±30%
C118B	2113740A59	150, ±30%
C119B	2113740A23	6.2, ±30%
C120, 121B	2113740A59	150, ±30%
C123T	2113740A59	150, ±30%
C124T	2113740A36	20, ±30%
C151, 152B	2113740A59	150, ±30%
C153B	2160521G37	0.1 uF, +80%/-20%, 25 V
C154B	2113740A59	150, ±30%
C156B	2113740A59	150, ±30%
C157, 158B	2113741A45	0.01
C159B	2113740A59	150, ±30%
C162 thru 164B	2113740A59	150, ±30%
C165B	2113741A45	0.01 uF
C166B	2311049A05	0.47 uF, ±10%, 25 V
C202, 203B	2113741A45	0.01 uF
C204T	2311049J27	10 uF, ±10%, 25 V
C205T (N)	2113740A64	240
C205T (W)	or 2113740A63	220
C206T	2113740G46	47, ±2%
C207, 208B	2311049J11	4.7 uF, ±10%, 16 V
C209T	2113740A59	150, ±30%
C210, 211B	2311049J11	4.7 uF, ±10%, 16 V
C212T	2113741A21	1000
C214B	2311049A07	1 uF, ±10%, 16 V
C215T	2113741A39	5600
C216B	2160521G37	0.1 uF, +80%/-20%, 25 V
C217T	2311049J25	10 uF, ±10%, 16 V
C218B	2113741A21	1000
C219 thru 221B	2113740A59	150, ±30%
C222B	2113741A21	1000
C223B	2113740A41	33, ±30%

HLE9673C Main Board, 403-433 MHz, 12.5 kHz Channel Spacing, CEPT (N)
HLE9670C Main Board, 403-433 MHz, 20/25 kHz Channel Spacing, CEPT (W) PL-911011-C

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
C224T	2113740A59	150, ±30%
C228B	2113740A59	150, ±30%
C230B	2160521G37	0.1 uF, +80%/-20% 25 V
C231B	2113741A45	0.01 uF
C233T	2113740G24	6.8, ±0.1
C235B	2113741A51	0.018 uF
C236B	2113740A59	150, ±30%
C237, 238B	2113740A55	100, ±30%
C251B	2113740A27	8.2, ±30%
C252B	2113740A24	6.8, ±30%
C253B	2113740A36	20, ±30%
C254B	2113740A24	6.8, ±30%
C255B	2113740A29	10, ±30%
C256B	2113740A59	150, ±30%
C257T	2113740A59	150, ±30%
C259T	2113740A59	150, ±30%
C260B	2113740A18	4.3, ±30%
C261B	2113740A17	3.9, ±30%
C262B	2113740A28	9.1, ±30%
C263B	2113740A17	3.9, ±30%
C264B	2113740A26	9.1, ±30%
C265T	2160521G37	0.1 uF, +80%/-20%, 25 V
C266, 267T	2113740A59	150, ±30%
C268T	2113741A21	1000
C269T	2113740A59	150, ±30%
C270T	2113740A09	1.8, ±30%
C271T	2113740A21	5.6, ±30%
C272T	2113740A23	6.2, ±30%
C273B	2113740A59	150, ±30%
C275B	2113740A59	150, ±30%
C276B	2113741A45	0.01 uF
C278, 279T	2311049A03	0.22 uF, ±10%, 35 V
C280B	2113740A59	150, ±30%
C281T	2113740A59	150, ±30%
C282T	2113740A71	470, ±30%
C283T	2113740A59	150, ±30%
C284B	2113740A03	1, ±30%
C285B (N)	2113740A59	150, ±30%
C401T	2113740A41	33, ±30%
C402B	2113740G16	3.6, ±0.1
C404T	2113740A37	22, ±30%
C405B	2160521G37	0.1 uF, +80%/-20%, 25 V
C406T	2113741A45	0.01 uF
C407T	2311049A40	2.2 uF, ±10%, 10 V
C408T	2160521G37	0.1 uF, +80%/-20%, 25 V
C409T (W)	2113740A59	150, ±30%
C410B	2113740A59	150, ±30%
C412T	2311049A07	1 uF, ±10%, 16 V
C413T	2311049A05	0.47 uF, ±10%, 25 V
C414T	2160521G37	0.1 uF, +80%/-20%, 25 V
C415B	2113741A37	4700
C416B	2160521G37	0.1 uF, +80%/-20%, 25 V
C418T	2311049J25	10 uF, ±10%, 16 V
C419T	2113741A51	0.018 uF
C421T	2311049A05	0.47 uF, ±10%, 25 V
C423T	2311049A05	0.47 uF, ±10%, 25 V
C424T	2113740A64	240, ±30%
C425T	2113741A59	0.039 uF
C426, 427B	2113741A51	0.018 uF
C428B	2113740A59	150, ±30%
C429T	2113741A37	4700
C430T	2113740A59	150, ±30%
C431T	2113741A47	0.012 uF
C432T	2113741A59	0.039 uF
C433B	2311049A05	0.47 uF, ±10%, 25 V
C434, 435T	2160521G37	0.1 uF, +80%/-20%, 25 V
C436B	2113740A59	150, ±30%
C437B	2113741A59	0.039 uF
C438B	2311049J11	4.7 uF, ±10%, 16 V
C440B	2113740A46	47, ±30%
C441B	2160521G37	0.1 uF, +80%/-20%, 25 V
C442, 443B	2113740A79	1000, ±30%
C445B	2113741A51	0.018 uF
C447B	2160521G37	0.1 uF, +80%/-20%, 25 V
C448T	2311049A07	1 uF, ±10%, 16 V
C451B	2113741A49	0.015 uF
C452T	2311049J11	4.7 uF, ±10%, 16 V
C454B	2113741A45	0.01 uF
C455T	2113741A45	0.01 uF
C456B	2113741A45	0.01 uF
C457T	2113741A45	0.01 uF

HLE9673C Main Board, 403-433 MHz, 12.5 kHz Channel Spacing, CEPT (N)
HLE9670C Main Board, 403-433 MHz, 20/25 kHz Channel Spacing, CEPT (W) PL-911011-C

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
C468, 469B	2113740A59	150, ±30%
C471T	2160521G37	0.1 uF, +80%/-20%, 25 V
C472T	2113740A79	1000, ±30%
C473, 474T	2160521G37	0.1 uF, +80%/-20%, 25 V
C476 thru 478B	2113740A59	150, ±30%
C479B	2113740A79	1000, ±30%
C479B	2113740A71	470, ±30%
C480, 481B	2113740A59	150, ±30%
C482T	2113741A59	0.039 uF
C483, 484B	2113740A59	150, ±30%
		filter, ceramic:
CR1T (N)	9180453B04	mini - 6 pole
CR1T (W)	or 9180098D06	3 WR
CR2T (N)	9180454B04	filter - 4 pole
CR2T (W)	or 9180098D05	3 WR
		clip:
CR thru 4T	4280138R02	butterfly
CR thru 8T	4280138R02	butterfly
CR9B	4280138R02	butterfly
		diode: (see note)
CR2T	4880174R01	QUAD 8-pin
CR51B	4880154K03	dual Schottky mixer
CR101, 102B	4806973Z02	pin
CR201, 202B	4813833C07	dual 100 W
CR203T	4805849Q04	VCTR RH 1T33T
CR251B	4805849Q02	VCTR RH 1T32T
CR253B	4805849Q02	VCTR RH 1T32T
CR255T	4805849Q02	VCTR RH 1T32T
CR401B	4880393T01	Schottky barrier
CR402, 403B	4813833C07	dual 100 W
CR404B	4813833C07	dual 100 W
CR405B	4880107R01	rectifier
CR407B	4813833C07	dual 100 W
		light emitting diode: (see note)
DS401B	4805729G49	diode red/yel
		mechanical:
E100T	1480168S01	insulator, XTAL; 2 used
E101T	0300136783	screw 2-56" x 5/16"; 2 used
E102T	1405160A02	insulator, crystal
J1T	3980515C02	**connector, receptacle:** antenna contact
J2T	0180444C01	assembly, RF jack
J3B	0180417C01	assembly option jack
J5B	0180195R03	speaker microphone header
L5T	2462587X44	**coil, inductor: +/-5%, chip:** unless otherwise stated 18 nH
L10B	2483411T63	shielded
L11T	2462587X47	33 nH
L51T	2483411T63	shielded
L52T	2462587X61	470 nH
L53T	2462587N69	1200 nH
L55T	2483411T75	shielded
L58T	2483411T74	shielded
L101 thru 103B	2411087A19	0.27 uH, ±10%
L104, 105B	2484657R01	ferrite bead
L106B	2411087A19	0.27 uH, ±10%
L107 thru 109B	2483035N76	coil airwound
L111T	2483035N13	coil airwound, 5-turns
L112B	2483035N76	coil airwound
L201T	2462587X22	390 nH, ±10%
L203T	2462587X22	390 nH, ±10%
L204T	2462587X47	33 nH
L251, 252B	2462587X22	390 nH, ±10%
L253T	2480145S07	RF coil 1-1/2 T- brass core wh
L254B	2462587X52	82 nH
L255T	2462587X22	390 nH, ±10%
L256, 257B	2462587X61	470 nH
L258T	2480145S08	2-1/2 violet toko
L259T	2462587X22	390 nH, ±10%
L260T	2462587X46	27 nH
L261T	2462587X47	33 nH
L262T	2462587X43	15 nH,
L267B	2462587X52	82 nH
L268T	2462587X22	390 nH, ±10%

HLE9673C Main Board, 403-433 MHz, 12.5 kHz Channel Spacing, CEPT (N)
HLE9670C Main Board, 403-433 MHz, 20/25 kHz Channel Spacing, CEPT (W) PL-911011-C

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
L401B	2460578C43	33.0 uH, ±10%
L403, 404T	2462587X22	390 nH, ±10%
L405, 406T	2462587X22	390 nH, ±10%
T1, 2T	2580163M03	XFMR; 2 used
		meter:
M51T (W)	0705196A11	SUPR XTAL mounting
M501T	4280126B01	clip, PA
M600 thru 602T	4080485C08	switch, tactile
M700T	0780165R02	boot, crystal
		transistor: (see note)
Q51B	4813827A07	NPN SML SIG
Q151B	4892014G02	NPN
Q152B	4813822A10	PNP 60V 10A
Q153B	4880214G02	NPN
Q154B	4880141L03	PNP
Q155, 156B	4880214G02	NPN
Q251T	4813827A07	NPN SML SIG
Q401B	4880214G02	NPN
Q405B	4805128M16	SOT MMBT3906 (RH) 48G22
Q406 thru 409T	4805128M16	SOT MMBT3906 (RH) 48G22
Q410B	4880141L03	PNP
Q411B	4805128M19	SOT-23 MMBTA13 (RH)
Q412B	4805128M16	SOT MMBT3906 (RH) 48G22
		resistor, fixed: +/-5%; 1/8 W: unless otherwise stated
R5B	0660076A30	160
R6B	2113740A36	20, ±30%
R51T	0660076A18	51 ohms
R52B	0660076A85	33k
R53B	0660076A75	12k
R54T	0660076A56	2k
R55T	0660076A25	100 ohms
R57T	0660076B04	130k
R58B	0660076A76	13k
R59B (N)	0660076A96	91k
R59B (W)	or 0660076A93	68k
R60B (N)	0660076A73	10k
R60B (W)	or 0660076A70	7.5k
R64T	0660076A67	5.6k
R66B	0660076A47	820 ohms
R67B	0660076A69	6.8k
R68B (N)	0660076M01	0 ohms, 50 meg.
R68B (W)	or 0660076A25	100 ohms
R69B (W)	0660076A73	10k
R101B	0680106R01	0.1 ohms, ±1%; 1W
R103B	0660076A37	330 ohms
R104T	0660076A31	180 ohms
R105T	0660076A11	27 ohms
R106T	0660076A31	180 ohms
R151B	0660076E91	56k, ±1%
R152B	0660076F01	100k, ±1%
R153B	0660076A09	22 ohms
R154B	0660076F01	100k ±1%
R155B	0660076E91	56k, ±1%
R156B	0660076A63	3.9k
R157B	0660076A55	1.8k
R158, 159B	0660076A31	180 ohms
R160, 161B	0660076A54	680 ohms
R162B	0660076A27	120 ohms
R163B	0660076A31	180 ohms
R167B	0660076A78	16k
R168B	0660076B01	100k
R169T	0660076A73	10k
R171B	0660076A90	51k
R172B	0660076A81	22k
R174B	0660076B01	100k
R175B	0660076A68	6.2k ±4%
R179B	0660076A38	360 ohms
R201B	0660076A23	82 ohms
R202B	0660076A57	2.2k
R203B	0660076B09	220k
R204B	0660076B01	100k
R205T	0660076A61	3.3k
R206B	0660076A57	2.2k
R207T	0660076A65	4.7k
R211B	0660076A89	47k
R215B	0660076A49	1k
R216B	0660076A82	24k
R251B	0660076A84	30k

HLE9673C Main Board, 403-433 MHz, 12.5 kHz Channel Spacing, CEPT (N)
HLE9670C Main Board, 403-433 MHz, 20/25 kHz Channel Spacing, CEPT (W) PL-911011-C

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
R252T	0660076A73	10k
R253T	0660076A55	1.8k
R254T	0660076A73	10k
R255T	0660076A74	11k
R256T	0660076A53	1.5k
R257B	0660076A97	39k
R258T	0660076A25	100 ohms
R260, 261B	0660076A33	220 ohms
R262T	0660076A39	390 ohms
R263B	0660076A87	39k
R264B	0660076A25	100 ohms
R401T	0660076H31	1.8 meg, ±10%
R402B	0660076A65	4.7k
R403B	0660076B01	100k
R404B	0660076B07	180k
R406B	0660076B01	100k
R407B	0660076A49	1k
R408 thru 411B	0660076A89	47k
R412B	0660076A31	180 ohms
R413B	0660076A45	680 ohms
R414 thru 417B	0660076A73	10k
R418B	0660076B01	100k
R419T	0660076B01	100k
R420B	0660076A73	10k
R421B	0660076B07	180k
R422B	0660076B01	100k
R423, 424T	0660076B01	100k
R425T	0660076B09	220k
R426T	0660076B06	160k
R429B	0660076B17	470k
R431T	0660076A49	51k
R432B	0660076A80	20k
R433B	0660076A73	10k
R434B	0660076B01	100k
R439B	0660076A61	3.3k
R442B	0660076H31	1.8 meg, ±10%
R443B	0660076B01	100k
R444B	0660076A80	20k
R445B	0660076H31	1.8 meg, ±10%
R447T	0660076A67	5.6k
R448T	0660076A90	51k
R449B	0660076B01	100k
R450B	0660076A73	10k
R451T	0660076A57	2.2k
R452T	0660076B17	470k
R452T	0660076B07	180k
R453T	0660076A57	2.2k
R454T	0660076B01	100k
R455T	0660076A84	30k
R456T	0660076A65	4.7k
R457T	0660076A93	68k
R458T	0660076A69	6.8k
R459T	0660076B23	820k
R460T	1880143S02	volume, potentiometer
R461B	0660076A09	22 ohms
R462T	0660076B17	470k
R463T	0660076A65	4.7k
R464B	0660076A55	1.8k
R465B	0660076B18	510k
R466B	0660076A65	4.7k
R467B	0660076A01	10 ohms
R468B	0660076A73	10k
R469T	0660076A73	10k
R470T	0660076A25	100 ohms
R471E	0660076A73	10k
R472, 473B	0660076A25	100 ohms
R474, 475T	0660076A73	10k
R476B	0660076B01	100k
R476T	0660076A84	30k
R479T	0660076A73	10k
R484T	0660076A68	6.2k, ±4%
R486T	0660076B01	100k
R487B	0660076A73	10k
R488T	0660076B09	220k
R489, 490B	0611077A12	2.7 ohms
R491B	0660076A73	10k
R492E	0660076A70	7.5k
R493B	0660076B13	330k
R494B	0660076B01	100k
R496B	0660076A37	330 ohms

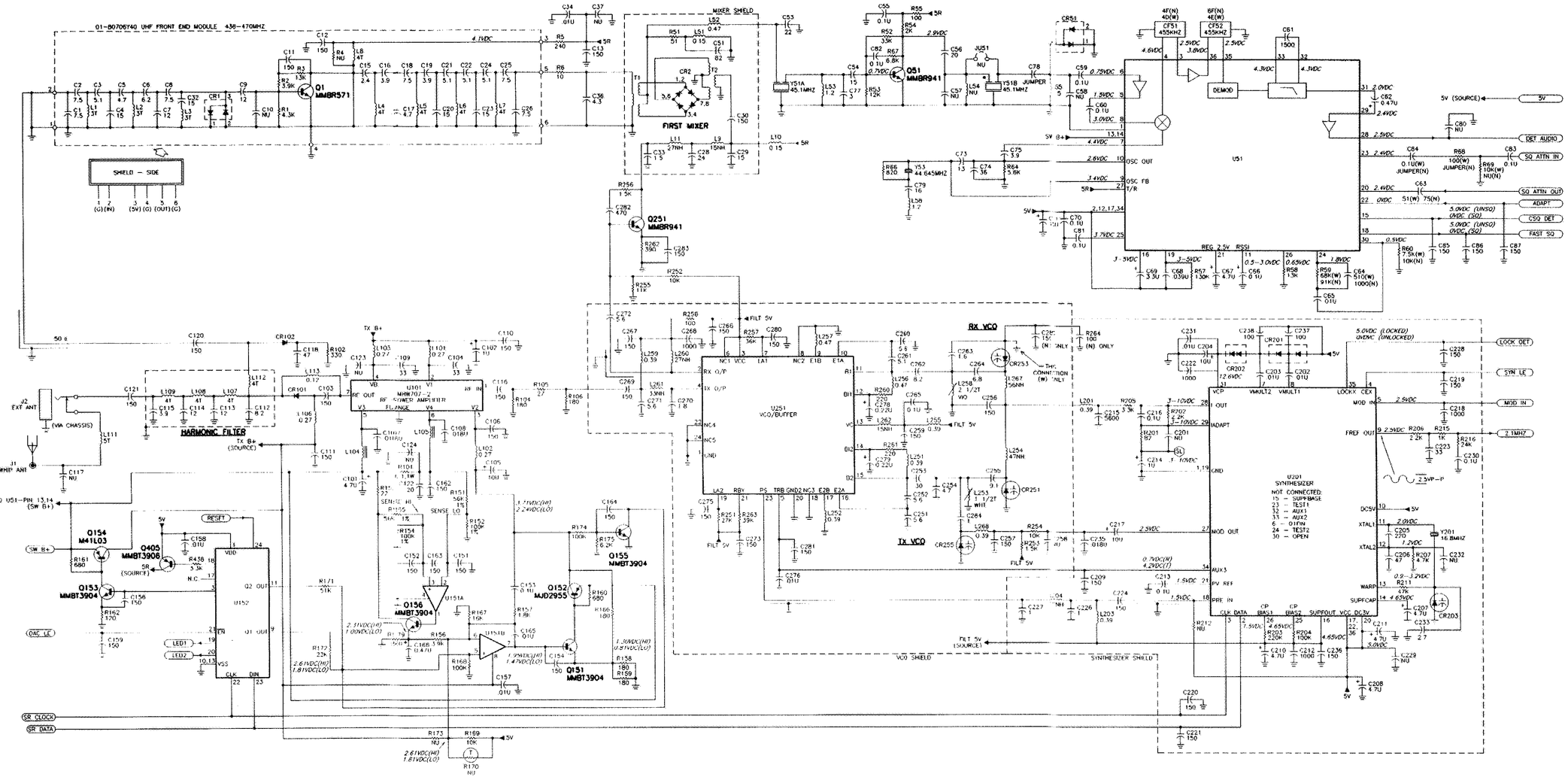
HLE9673C Main Board, 403-433 MHz, 12.5 kHz Channel Spacing, CEPT (N)
HLE9670C Main Board, 403-433 MHz, 20/25 kHz Channel Spacing, CEPT (W) PL-911011-C

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
R497B	0660076A41	470 ohms
R502T	0660076A37	330 ohms
R504T	0660076B07	180k
R505T	0660076B06	160k
R506T	0660076A82	24k
R507B	0660076A49	1k
		shield:
SH100B	2680521D01	syn front
SH101B	2680520D01	VCO front
SH102B	2680522D01	harmonic filter UHF
SH103T	2580692C03	mixer, back
SH104T	2580519D01	VCO, back
SH105T	2580518D01	syn, back, TCXO
		switch:
SW401T	4080502B01	freq., 16-position
SW401T	4080650D01	freq., 16-position, rotary
		integrated circuit: (see note)
U51T	5180207R01	IF
U101T	5113829D03	UHF, 7 W; 7.5 V, 403-440 MHz
U151B	5180932W01	linear op amp
U152B	5105226P38	DAC IC
U201B*		synthesizer
U251B	5105414S84	VCO buffer
U401B*		microprocessor; 2 channel uP only microprocessor
U402T	5105165R77	AFIC
U404T	5105469E65	voltage regulator
U405T	5180932W01	linear op amp
U406B	5102198J23	compactor
U407T	5180932W01	linear op amp
U409T	5180175R01	audio amplifier
U410B	5180169R01	dual trans NPNS
U411T	5180633C01	5 V regulator w/reset
		voltage regulator: (see note)
VR401B	4880140L15	diode Zener; 10 V, taps & reel
		crystal: (see note)
Y51T (N)	9180112R06	45.1 MHz filter
Y51T (W)	or 9180112R05	45.1 MHz filter
Y51AT	0705196A11	SUPR XTAL mounting
Y53T	4880008K02	XTAL resonator 44.645 MHz 10PPM
Y201T*		16.8 MHz
Y401T	4880113R01	7.9488
		non-referenced items
	0580537C01	EYELET
	0580537C02	EYELET
	0780432C01	BATTERY, contact support
	0780511B01	BRACKET, freq switch, plated
	1580413C01	HOUSING, option jack
	1580414C01	HOUSING, cover option jack
	1580433C01	HOUSING, RF jack
	2680412B01	SHIELD, RF jack
	2680410C01	SHIELD, option jack
	2680625B02	SHIELD, receiver
	3280415C01	SEAL, option jack
	3980405C01	CONTACT, spring #5
	3980406C01	CONTACT, spring #2
	3980407C01	CONTACT, spring #4
	3980408C01	CONTACT, spring #3
	3980409C01	CONTACT, spring #6
	3980410C01	CONTACT, spring #1
	3980434C01	CONTACT, RF jack T2
	3980435C01	CONTACT, RF jack T1
	5480570B01	LABEL, thermal high temp
	7580411C01	BUMPER 2.5 MM; 2 used
	7580611B01	PAD, front shield; 2 used

note: For optimum performance, diodes, transistors, and integrated circuits must be ordered by Motorola part numbers.

Reference designator ending in "T" denotes component is located on top side of circuit board. Reference designator ending in "B" denotes component is located on bottom side of circuit board.

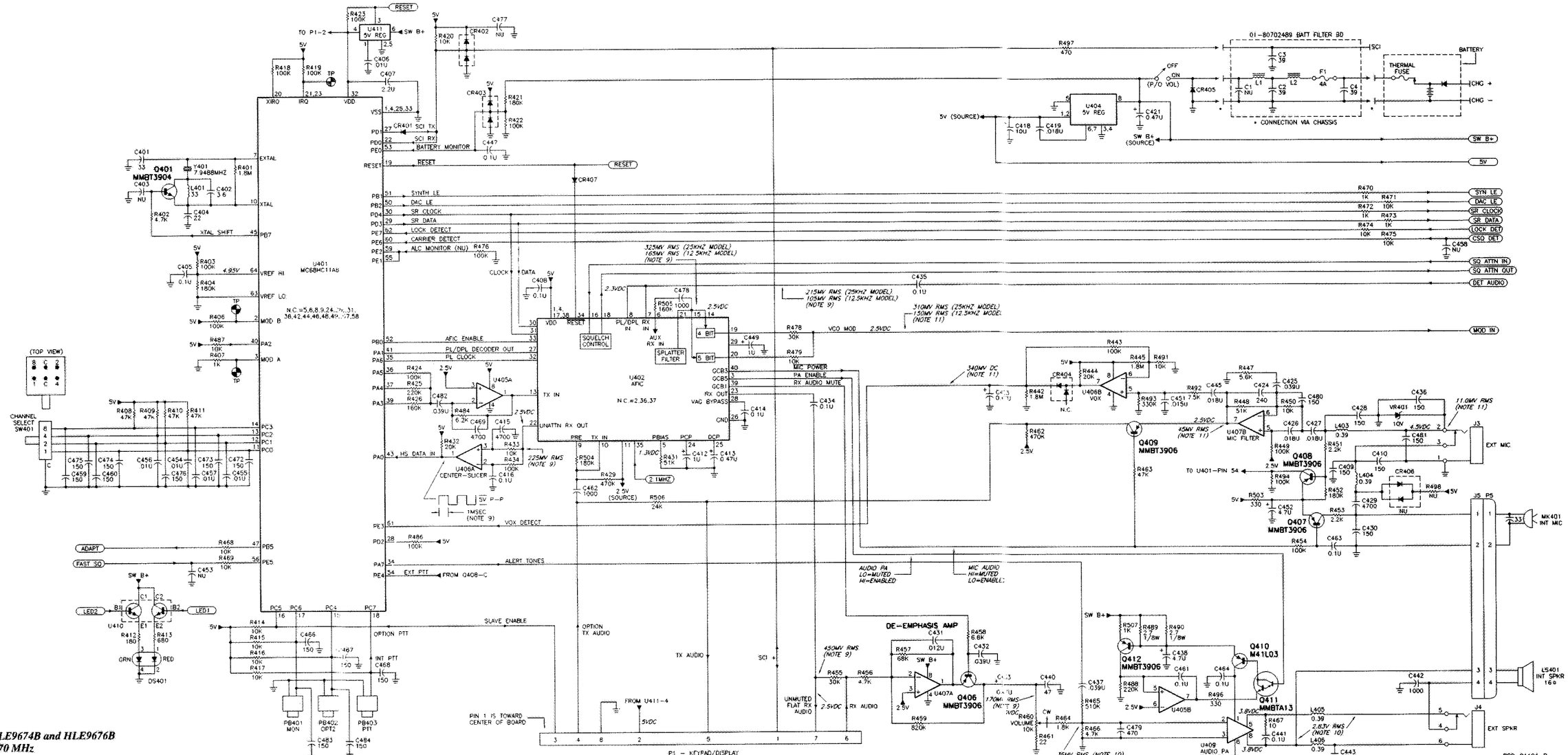
Reference designators marked with an asterisk "*" indicate components which are not field-replaceable because they need to be calibrated with specialized factory equipment after installation. Radios in which these parts have been replaced in the field will be off frequency at temperature extremes.



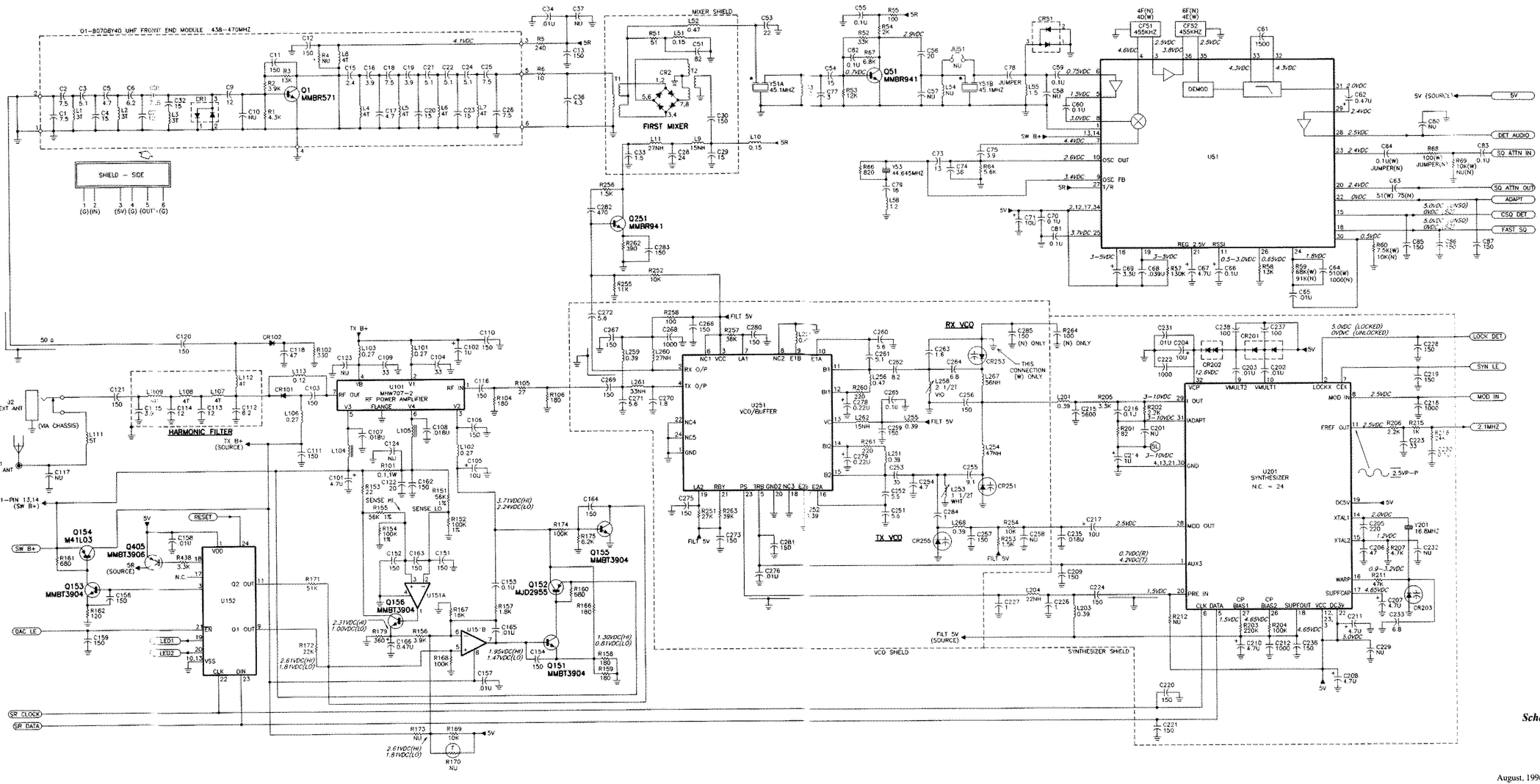
NOTES:

1. UNLESS OTHERWISE INDICATED, RESISTOR VALUES ARE IN OHMS, CAPACITOR VALUES ARE IN PICOFARADS, INDUCTOR VALUES ARE IN MICROHENRIES.
2. NON-POLARIZED CAPACITORS ARE CHIP-TYPE UNLESS OTHERWISE INDICATED.
3. POLARIZED CAPACITORS ARE CHIP-TANTALUM TYPE UNLESS OTHERWISE INDICATED.
4. "NU" MEANS COMPONENT IS NOT USED.
5. DC VOLTAGES ARE MEASURED WITH A HIGH IMPEDANCE (10 MEGOHM) DC VOLTMETER.
6. AC VOLTAGES ARE MEASURED WITH A HIGH IMPEDANCE AC RMS VOLTMETER.
7. ALL VOLTAGE MEASUREMENTS ARE IN THE RECEIVE MODE UNLESS INDICATED AS FOLLOWS:
   (R) RECEIVE MODE
   (T) TRANSMIT MODE
8. MEASURED IN THE RECEIVE MODE WITH AN ON-CHANNEL UNMODULATED SIGNAL AT A LEVEL OF -20 DBM.
9. MEASURED IN THE RECEIVE MODE WITH AN ON-CHANNEL SIGNAL AT A LEVEL OF -20 DBM, MODULATED WITH 1 KHZ AT 3 KHZ DEVIATION (FOR 20/25 KHZ MODELS) OR 1.5 KHZ DEVIATION (FOR 12.5 KHZ MODELS), MEASURED WITH AN AC RMS VOLTMETER.
10. SAME AS NOTE 8 EXCEPT WITH VOLUME CONTROL ADJUSTED FOR 500 MILLIWATTS (2.82 VOLTS RMS ACROSS 16-OHM LOAD CONNECTED TO THE EXT SPKR JACK).
11. MEASURED IN THE TRANSMIT MODE WITH A 1 KHZ, 11 MV RMS SIGNAL APPLIED TO THE EXTERNAL MICROPHONE INPUT.

Schematic Diagram for HLE9674B and HLE9676B UHF Main Boards, 438-470 MHz (sheet 1 of 2)



Schematic Diagram for HLE9674B and HLE9676B
UHF Main Boards, 438-470 MHz
(sheet 2 of 2)

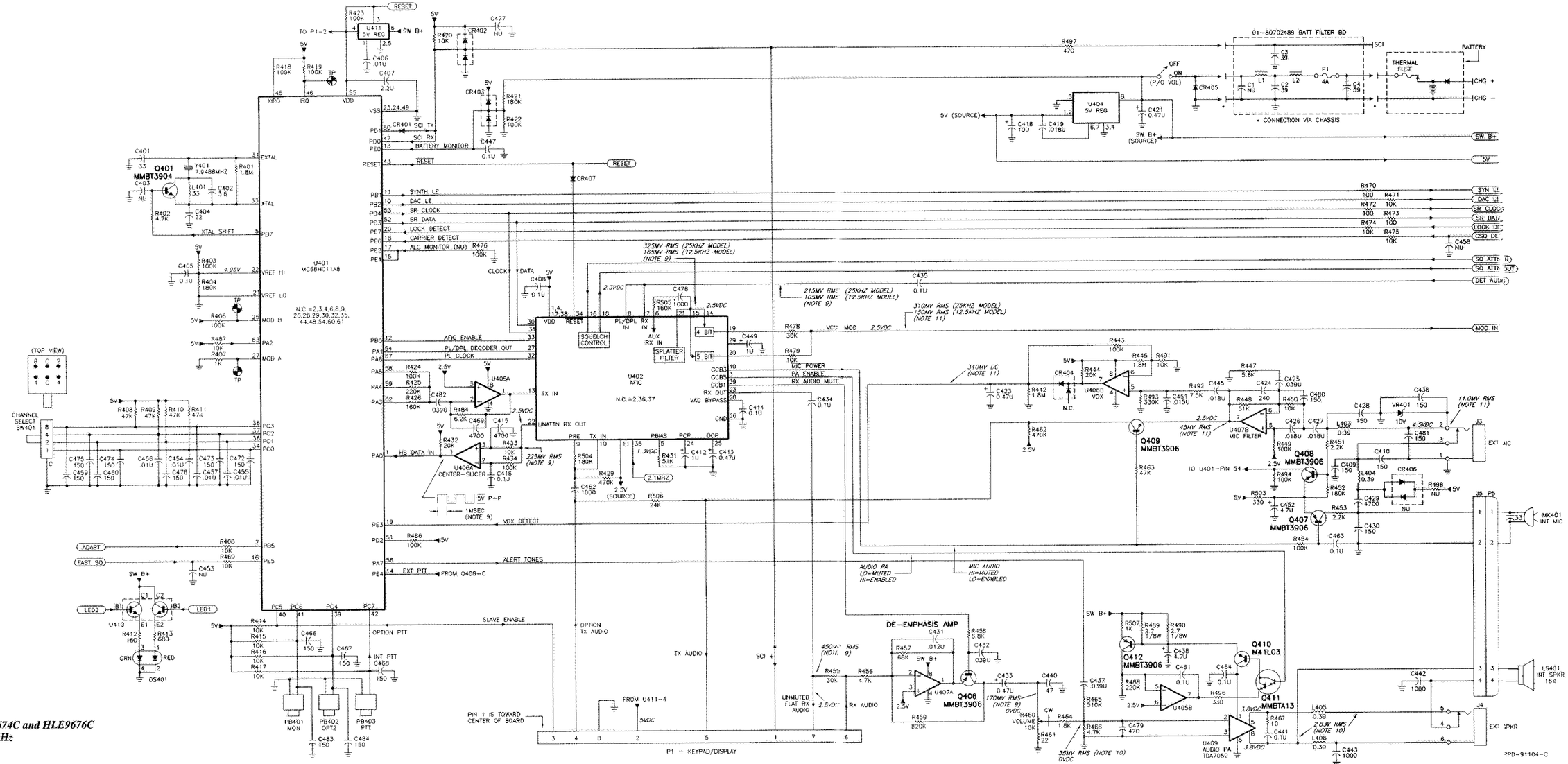


NOTES:

1. UNLESS OTHERWISE INDICATED, RESISTOR VALUES ARE IN OHMS, CAPACITOR VALUES ARE IN PICOFARADS, INDUCTOR VALUES ARE IN MICROHENRIES.
2. NON-POLARIZED CAPACITORS ARE CHIP-TYPE UNLESS OTHERWISE INDICATED.
3. POLARIZED CAPACITORS ARE CHIP-TANTALUM TYPE UNLESS OTHERWISE INDICATED.
4. "NU" MEANS COMPONENT IS NOT USED.
5. DC VOLTAGES ARE MEASURED WITH A HIGH IMPEDANCE (10 MEGOHM) DC VOLTMETER.
6. AC VOLTAGES ARE MEASURED WITH A HIGH IMPEDANCE AC RMS VOLTMETER.
7. ALL VOLTAGE MEASUREMENTS ARE IN THE RECEIVE MODE UNLESS INDICATED AS FOLLOWS:
   (R) RECEIVE MODE
   (T) TRANSMIT MODE
8. MEASURED IN THE RECEIVE MODE WITH AN ON-CHANNEL UNMODULATED SIGNAL AT A LEVEL OF -20 DBM.
9. MEASURED IN THE RECEIVE MODE WITH AN ON-CHANNEL SIGNAL AT A LEVEL OF -20 DBM, MODULATED WITH 1 KHZ AT 3 KHZ DEVIATION (FOR 20/25 KHZ MODELS) OR 1.5 KHZ DEVIATION (FOR 12.5 KHZ MODELS), MEASURED WITH AN AC RMS VOLTMETER.
10. SAME AS NOTE 8 EXCEPT WITH VOLUME CONTROL ADJUSTED FOR 500 MILLIWATTS (2.82 VOLTS RMS ACROSS 16-OHM LOAD CONNECTED TO THE EXT SPKR JACK).
11. MEASURED IN THE TRANSMIT MODE WITH A 1 KHZ, 11 MV RMS SIGNAL APPLIED TO THE EXTERNAL MICROPHONE INPUT.

RPO-91103-C

Schematic Diagram for HLE9674C and HLE9676C UHF Main Boards, 438-470 MHz (sheet 1 of 2)



Schematic Diagram for HLE9674C and HLE9676C
UHF Main Boards, 438-470 MHz
(sheet 2 of 2)

Parts List

HLE6674B Main Board, 438-470 MHz, 12.5 kHz Channel Spacing, CEPT (N)
HLE6676B Main Board, 438-470 MHz, 20/25 kHz Channel Spacing, CEPT (W) — PL-911006-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		capacitor, fixed: pF +/-5%; 50 V: unless otherwise stated
C1	2113740G28	9.1, 0.1
C3	2113740G19	4.7, 0.1
C7	2113740G33	15, 0.1
C8	2113740G28	9.1, 0.1
C9	2113740G32	13, 2
C10B	2113740A59	150
C15	2113740G09	1.8, 0.1
C18	2113740G28	9.1, 0.1
C20	2113740G32	13, 2
C23	2113740G35	18, 2%
C24, 25	2113740G28	9.1, 0.1
C26	2113740G24	6.8, 0.1
C28T	2113740A38	24
C29T	2113740A33	15
C30T	2113740A59	150
C32	2113740G44	16, 2
C33T	2113740A07	1.5, 0.25
C34T	2113741A45	0.01 uF
C36B	2113740A18	4.3, 0.25
C51T	2113740A53	82
C53B	2113740A37	22
C54B	2113740A33	15
C55T	2160521G37	0.1 uF, +80%/-20%; 25V
C56T	2113740A36	20
C59T	2160521G37	0.1 uF, +80%/-20%; 25V
C60B	2160521G37	0.1 uF, +80%/-20%; 25V
C61B	2113741A25	1500
C62B	2311049A05	0.47 uF, 10%; 25V
C63T	2113740A48	51
C64B	2113740A79 or 2113740A72	1000 (12.5 kHz) 510 (25 kHz)
C65B	2113741A45	0.01 uF
C66T	2160521G37	0.1 uF, +80%/-20%; 25V
C67T	2311049J11	4.7 uF, 10%; 16V
C68T	2113741A59	0.039 uF
C69T	2311049J07	3.3 uF, 10%; 20V
C70B	2160521G37	0.1 uF, +80%/-20%; 25V
C71B	2311049J25	10 uF, 10%, 16V
C73T	2113740A32	13
C74T	2113740A42	36
C75T	2113740A17	3.9, 0.25
C77B	2113740A14	3, 0.25
C78T	0660076M01	0 ohms, 0%; 1/8W
C79T	2113740A34	16
C81 thru 83B	2160521G37	0.1 uF, +80%/-20%; 25V
C84B	0660076M01 or 1605213G37	0 ohms, 0%; 1/8W (12.5 kHz) 0.1 uF, +80%/-20%; 25V (25 kHz)
C85 thru 87B	2113740A58	150
C101B	2311049J17	4.7 uF, 10%; 16V
C102T	2311049A07	1 uF, 10%; 16V
C103B	2113740A59	150
C104B	2113740A41	33
C105B	2311049J25	10 uF, 10%; 16V
C106B	2113740A59	150
C107T	2113741A51	0.018 uF
C108B	2113741A51	0.018 uF
C109B	2113740A41	33
C110, 111B	2113740A59	150
C112B	2113740A27	8.2, 0.25
C113, 114B	2113740A31	12
C115B	2113740A17	3.9, 0.25
C116T	2113740A59	150
C118B	2113740A46	47
C120, 121B	2113740A59	150
C122B	2113740A36	20
C151, 152B	2113740A59	150
C153B	2160521G37	0.1 uF, +80%/-20%; 25V
C154B	2113740A59	150
C156B	2113740A59	150
C157, 158B	2113741A45	0.01 uF
C159B	2113740A59	150
C162 thru 164B	2113740A59	150
C165B	2113741A45	0.01 uF
C166B	2311049A05	0.47 uF, 10%; 25V
C202, 203B	2113741A45	0.01 uF
C204T	2311049J27	10 uF, 10%; 25V
C205T	2113740A63	220
C206T	2113740G46	47, 2%

HLE6674B Main Board, 438-470 MHz, 12.5 kHz Channel Spacing, CEPT (N)
HLE6676B Main Board, 438-470 MHz, 20/25 kHz Channel Spacing, CEPT (W) — PL-911006-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
C207, 208B	2311049J11	4.7 uF, 10%, 16V
C209T	2113740A59	150
C210, 211B	2311049J11	4.7 uF, 10%; 16V
C212T	2113741A21	1000
C213T	2160521G37	0.1 uF, +80%/-20%; 25V
C214B	2311049A07	1 uF, 10%; 16V
C215T	2113741A39	5600
C216B	2160521G37	0.1 uF, +80%/-20%; 25V
C217T	2311049J25	10 uF, 10%; 16V
C218B	2113741A21	1000
C219 thru 221B	2113740A59	150
C222B	2113741A21	1000
C223B	2113740A41	33
C224B	2113740A59	150 (25 kHz)
C226, 227T	2113740A03	1, 0.25
C228B	2113740A59	150
C230B	2160521G37	0.1 uF, +80%/-20%; 25V
C231B	2113741A45	0.01 uF
C233T	2113740A13	2.7, 0.1
C235B	2113741A51	0.018 uF
C236B	2113740A59	150
C237, 238B	2113740A55	100
C251, 252B	2113740A21	5.6, 0.25
C253B	2113740A40	30
C255B	2113740A28	9.1, 0.25
C256B	2113740A59	150
C257T	2113740A59	150
C259T	2113740A59	150
C260B	2113740A21	5.6, 0.25
C261B	2113740A20	5.1, 0.25
C262B	2113740A27	8.2, 0.25
C263B	2113740A31	12, 0.25 (25 kHz)
C264B	2113740A24	6.8, 0.25
C265T	2160521G37	0.1 uF, +80%/-20%; 25V
C266, 267T	2113740A59	150
C268T	2113741A21	1000
C269T	2113740A59	150
C270T	2113740A09	1.8, 0.25
C271, 272T	2113740A21	5.6, 0.25
C273B	2113740A59	150
C275B	2113740A59	150
C276B	2113741A45	0.01 uF
C277B, 279T	2311049A03	0.22 uF, 10%; 35V
C280B	2113740A59	150
C281T	2113740A59	150
C282T	2113740A71	470
C283T	2113740A59	150
C284B	2113740A03	1, 0.25
C285B	2113740A59	150 (12.5 kHz)
C401T	2113740A41	33
C402B	2113740G16	3.6, 0.1
C404T	2113740A37	22
C405B	2160521G37	0.1 uF, +80%/-20%; 25V
C407T	2311049A40	2.2 uF, 10%, 10V
C408T	2160521G37	0.1 uF, +80%/-20%; 25V
C409T	2113740A59	150
C410B	2113740A59	150
C412T	2311049A07	1 uF, 10%; 16V
C413T	2311049A05	0.47 uF, 10%; 25V
C414T	2160521G07	0.1 uF, +80%/-20%; 25V
C415B	2113741A37	4700
C416B	2160521G37	0.1 uF, +80%/-20%; 25V
C418T	2311049J25	10 uF, 10%; 16V
C419T	2113741A51	0.018 uF
C421T	2311049A05	0.47 uF, 10%; 25V
C423T	2311049A05	0.47 uF, 10%; 25V
C424T	2113740A64	240
C425T	2113741A59	0.039 uF
C426, 427B	2113741A51	0.018 uF
C428B	2113740A59	150
C429T	2113741A37	4700
C430T	2113740A59	150
C431T	2113741A47	0.012 uF
C432T	2113741A59	0.039 uF
C433B	2311049A05	0.47 uF, 10%; 25V
C434, 435T	2160521G37	0.1 uF, +80%/-20%; 25V
C436B	2113740A59	150
C437B	2113741A59	0.039 uF
C438B	2311049J11	4.7 uF, 10%; 16V
C440B	2113740A46	47

HLE6674B Main Board, 438-470 MHz, 12.5 kHz Channel Spacing, CEPT (N)
HLE6676B Main Board, 438-470 MHz, 20/25 kHz Channel Spacing, CEPT (W) — PL-911006-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
C441B	2160521G37	0.1 uF, +80%/-20%; 25V
C442, 443B	2113740A79	1000
C445B	2113741A51	0.018 uF
C447B	2160521G37	0.1 uF, +80%/-20%; 25V (12.5 kHz)
C449T	2311049A07	1 uF, 10%; 16V
C451B	2113741A49	0.015 uF
C452T	2311049J11	4.7 uF, 10%; 16V
C455T	2113741A45	0.01 uF
C459T	2113741A45	0.01 uF
C459B	2113741A45	0.01 uF
C457T	2113741A45	0.01 uF
C459, 460B	2113740A59	150
C462B	2160521G37	0.1 uF, +80%/-20%; 25V
C462T	2113740A79	1000
C463T	2160521G37	0.1 uF, +80%/-20%; 25V
C464B	2160521G37	0.1 uF, +80%/-20%; 25V
C466 thru 468B	2113740A59	150
C466T	2113741A37	4700
C472 thru 476B	2113740A59	150
C478T	2113740A73	1060 (25 kHz)
C479B	2113740A71	470
C480, 481B	2113740A59	150
C482T	2113741A59	0.039 uF (12.5 kHz)
C483, 484B	2113740A59	150 (12.5 kHz)
CF51T	9180453B04 or 9180088D06	**filter, ceramic:** mini - 6 pole (12.5 kHz) 3 WR (25 kHz)
CF52T	9180454B04 or 9180098D05	mini - 4 pole (12.5 kHz) 3 WR (25 kHz)
CL1 thru 4	4280138R01	**clip:** butterfly
CL6 thru 8	4280138R01	butterfly
CR2T	4880174R01	**diode: (see note)** QUAD SOIC 8-pin
CR51B	4880154K03	dual Schottky mixer
CR101, 102B	4880973Z02	pin
CR201, 202B	4813833C07	dual 100 W
CR203T	4805649Q04	VCTR RH TT3PT
CR251B	4805649Q02	VCTR RH TT3ZT
CR252B	4805649Q02	VCTR RH TT3PT
CR255T	4805649Q02	VCTR RH TT3ZT
CR401B	4880939T01	Schottky barrier
CR402, 403B	4813833C07	dual 100 W
CR404B	4813833C07	dual 100 W
CR405B	4880107R01	silicon
CR407T	4813833C07	dual 100 W
D5401B	4805729G49	**light emitting diode: (see note)** diode red/yel
H102	1405160A02	**mechanical:** insulator, crystal
H108	0780511B01	bracket freq switch, plated (25 kHz)
J1T	3980515C02	**connector, receptacle:** antenna contact
J3B	0180417C01	assembly, option jack
J5B	0180195R01	speaker/microphone header
J6T	0180965Z01	connector B+
L9T	2462587N43	**coil, inductor:** 15 NH, 5%
L10B	2462411T63	chip shielded
L11T	2462587N46	chip 27 NH, 5%
L51T	2483411T63	chip shielded
L52T	2462587N61	chip 470 NH, 5%
L53T	2462587N69	1200 NH, 5%
L57T	2483411T75	chip shielded
L58T	2483411T74	chip shielded
L101 thru 103B	2411087A19	0.27 UH
L104,105B	2484657R01	ferrite bead
L106B	2411087A19	0.27 UH
L107 thru 109B	2483035N76	coil airwound
L111T	2483035N13	coil air 24AWG 5TNS
L112B	2483035N76	coil airwound
L113T	2462587N24	120 nH, 5%
L201T	2462587N22	chip 390 NH, 10%
L209T	2462587N22	chip 390 NH, 10%

-LE6674B Main Board, 438-470 MHz, 12.5 kHz Channel Spacing, CEPT (N)
-LE6676B Main Board, 438-470 MHz, 20/25 kHz Channel Spacing, CEPT (W) — PL-911006-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
L204T	2462587N07	chip 22 NH, 20%
L251, 252B	2462587N22	chip 390 NH, 10%
L253T	2180145S07	RF COIL 1-1/2 T brass core whi
L254B	2462587N47	47 NH, 5%
L255T	2462587N22	chip 390 NH, 10%
L256, 257B	2462587N61	chip 470 NH, 5%
L258T	2480145S08	2-1/2 violet TOKO E358ANA
L259T	2462587N22	chip 390 NH, 10%
L260T	2462587N46	chip 27 NH, 5%
L261T	2462587N47	chip 33 NH, 5%
L262T	2462587N43	15 NH, 5%
L267B	2462587N50	chip 56 NH, 5%
L268T	2462587N22	chip 390 NH, 10%
L401B	2460578C43	chip 33.0 UH, 0%
L403, 404T	2462587N22	chip 390 NH, 10%
L405, 406B	2462587N22	chip 390 NH, 10%
M51	0705196A11	**meter:** SUPR XTAL mounting
M501	4280102B01	clip, PA
M600 thru 602	4080485C03	switch tactile
Q51B	4813827A07	**transistor: (see note)** NPN SML SIG
Q151B	4880214G02	NPN
Q152B	4813822A10	PNP 60V 10A
Q153B	4880214G02	NPN
Q154B	4880141L03	PNP
Q155, 156B	4880214G02	NPN
Q251T	4813827A07	NPN SML SIG
Q401B	4880214G02	NPN
Q405B	4805128M16	SOT MMBT3906 (RH) 48G22
Q406 thru 409T	4805128M16	SOT MMBT3906 (RH) 48G22
Q410B	4880141L03	PNP
Q411B	4805128M19	SOT-23
Q412B	4805128M16	SOT MMBT3906 (RH) 48G22
R4	2113740A01	**resistor, fixed: +/-5%; 1/8 W:** unless otherwise stated 0.5, 0.1
R5B	0660076A30	chip 160
R6B	0660076A01	10 ohms
R51T	0660076A15	51 ohms
R52B	0680076A85	93K
R57B	0660076A75	12K
R64T	0660076A56	2K
R55T	0660076A25	100 ohms,
R57T	0660076B04	130K
R58B	0660076A76	13K
R59B	0660076A06 or 0660076A93	1.8 meg, 10% (12.5 kHz) 68K, (25 kHz)
R60B	0660076A73 or 0660076A70	10K, (12.5 kHz) 7.5K, (25 kHz)
R64T	0660076A67	5.6K
R66B	0660076A47	820 ohms
R67B	0660076A69	6.8K
R68B	0660076M01 or 0660076A25	0 ohms, 0% (12.5 kHz) 100 ohms, (25 kHz)
R69B	0660076A73	10K
R101B	0680108R01	0.1 ohms, 1%; 1W
R102B	0660076A37	330 ohms
R104T	0650076A91	100 ohms
R105T	0660076A11	27 ohms
R106T	0660076A31	180 ohms
R151B	0660076E91	56K, 1%
R152B	0660076E01	100K, 1%
R153B	0660076A09	22 ohms
R154B	0660076E01	100K, 1%
R155B	0660076E91	56K, 1%
R156B	0660076A63	3.9K
R157B	0660076A55	1.8K
R158, 159B	0660076A31	180 ohms
R160, 161B	0680076A45	680 ohms
R162B	0660076A27	120 ohms
R166B	0660076A31	180 ohms
R167B	0660076A78	16K
R168B	0660076B01	100K
R169T	0660076A73	10K
R171B	0660076A90	51K
R172B	0660076A81	22K
R174B	0660076B01	100K

HLE6674B Main Board, 438-470 MHz, 12.5 kHz Channel Spacing, CEPT (N)
HLE6676B Main Board, 438-470 MHz, 20/25 kHz Channel Spacing, CEPT (W) — PL-911006-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
R175B	0660076A68	6.2K, 4%
R179B	0660076A38	360 ohms
R201B	0660076A23	82 ohms
R202B	0660076A57	2.2K
R203B	0660076B09	220K
R204B	0660076B01	100K
R205T	0660076A61	3.3K
R206B	0660076A57	2.2K
R207T	0660076A67	4.7K
R211B	0660076A89	47K
R215B	0660076A47	1K
R216B	0660076A82	24K
R251B	0660076A83	27K
R252T	0660076A73	10K
R253T	0660076A53	1.5K
R254T	0660076A73	10K
R255T	0660076A74	11K
R256T	0660076A53	1.5K, (25 kHz)
R257B	0660076A85	36K
R258T	0660076A25	100 ohms
R260, 261B	0660076A33	220 ohms
R262B	0660076A39	390 ohms
R263B	0660076A87	39K
R264B	0660076A25	100 ohms, (12.5 kHz)
R401T	0660076H31	1.8 meg, 10%
R402B	0660076A55	1.8K
R403B	0660076B01	100K
R404B	0660076B07	180K
R406B	0660076B01	100K
R407B	0660076A49	1K
R408 thru 411B	0660076A89	47K
R412B	0660076A31	180 ohms
R413B	0660076A45	680 ohms
R414 thru 417B	0660076A73	10K
R418B	0660076B01	100K
R419T	0660076B01	100K
R420B	0660076A73	10K
R421B	0660076B07	180K
R422B	0660076B01	100K
R424T	0660076B01	100K
R425T	0660076B09	220K
R426T	0660076B06	160K
R429B	0660076B17	470K
R431T	0660076A90	51K
R432B	0660076A80	20K
R433B	0660076A73	10K
R434B	0660076B01	100K
R436B	0660076A61	3.3K
R442B	0660076H31	1.8 meg, 10%
R443B	0660076B01	100K
R444B	0660076A80	20K
R445B	0660076H31	1.8 meg, 10%
R447T	0660076A67	5.6K
R448T	0660076A90	51K
R449B	0660076B01	100K
R450B	0660076A73	10K
R451T	0660076A57	2.2K
R452T	0660076B07	180K
R453T	0660076A57	2.2K
R454T	0660076B01	100K
R455T	0660076A84	30K
R456T	0660076A65	4.7K
R457T	0660076A93	68K
R458T	0660076A69	6.8K
R459T	0660076B23	820K
R461B	0650076A09	22 ohms
R462T	0660076B17	470K
R463T	0660076A89	47K
R464B	0660076A55	1.8K
R465B	0660076B18	510K
R466B	0660076A65	4.7K
R467B	0660076A01	10 ohms
R468B	0650076A73	10K
R469T	0660076A73	10K
R470T	0660076A49	1K
R471B	0660076A73	10K
R472, 473B	0660076A49	1K
R474, 475T	0660076A73	10K
R476B	0650076B01	100K
R478T	0660076A84	30K
R479T	0660076A73	10K

HLE6674B Main Board, 438-470 MHz, 12.5 kHz Channel Spacing, CEPT (N)
HLE6676B Main Board, 438-470 MHz, 20/25 kHz Channel Spacing, CEPT (W) — PL-911006-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
R484T	0660076A68	6.2K, 4%
R486T	0660076B01	100K
R487B	0660076A73	10K
R488T	0660076B09	220K
R489, 490B	0611077A12	2.7 ohms
R491B	0660076A73	10K
R492B	0660076A70	7.5K
R493B	0660076B12	300K
R494B	0660076B01	100K
R496B	0660076A37	330 ohms
R497B	0660076A41	470 ohms
R503T	0660076A37	330 ohms
R504T	0660076B07	180K
R505T	0660076B06	160K
R506T	0660076A82	24K
R507B	0660076A49	1K
SH100B	2680966Y01	**shield:** syn front
SH101B	2680970Y01	VCO front
SH102B	2680136S01	harmonic filter UHF
SH103T	2680970Z01	syn, back, TCXO
SH105T	2680968Z01	VCO, back
SW401T	4080502B01	**switch:** freq, 16-position
U51T	5180207R01	**integrated circuit: (see note)** IF
U101T	5113826D04	UHF 7W 7.5V 440-470MHZ
U151B	5180923Y01	linear op amp
U201B*	5105414S55	synthesizer
U404T	5105469E65	voltage regulator
U405T	5180923W01	linear op amp
U406B	5102198J23	compactor LM2903D 50 T/R
U407T	5180923W01	linear op amp
U409T	5180175R01	audio amplifier
U410B	5180158R01	dual trans NPNS
U411T	5180633C01	5V regulator w/reset (12.5 kHz)
VR401B	4880140L15	**voltage regulator: (see note)** diode Zener 10V tape&reel
Y51T	9180112R06 or 9180112R05	**crystal: (see note)** 45.1 MHz crystal filter (12.5 kHz) 45.1 MHz crystal filter (25 kHz)
Y53T	4880008K02	XTAL resonator 44.645 MHz 10 PPM
Y201T*	4880114K02	crystal 16.8 MHz (25 kHz)
Y401T	4880113R01	crystal 7.9488

non-referenced items

	0180444C01	ASSEMBLY, RF jack
	0200136T83	SCREW, 2-56 x 5/16 Phillip; 2 used
	0580537C01	EYELET
	0580537C02	EYELET
	0660076A64	4.3K,
	0780102S01	LEADFRAME
	0780165R02	BOOT, crystal
	0780432C01	BATTERY, contact support
	0780511B01	BRACKET, freq switch, plated (12.5 kHz)
	1480168S01	INS., XTAL - 2 used
	1580413C01	HOUSING, option jack
	1580414C01	HOUSING, cover option jack
	1580433C01	HOUSING, RF jack
	1880143S02	VOLUME, potentiometer
	2113740A08	1.6, 0.25 (12.5 Hz)
	2113740A17	3.9, 0.1; 2 used
	2113740G20	5.1, 0.1; 2 used
	2113740G25	7.5, 0.1
	2113740G33	15, 2%
	2590163M03	COIL, transformer; 2 used
	2680412B01	SHIELD, RF jack
	2680416C01	SHIELD, option jack
	2680625B02	SHIELD, receiver
	2680692C01	SHIELD, mixer, back
	3180168R01	B+ HEADER
	3980415C01	SEAL, option jack
	3980169R01	CONTACT, PRIM B+
	3980170R01	CONTACT, program
	3980548A84	CONTACT, spring #5
	3980406C01	CONTACT, spring #2

HLE6674B Main Board, 438-470 MHz, 12.5 kHz Channel Spacing, CEPT (N)
HLE6676B Main Board, 438-470 MHz, 20/25 kHz Channel Spacing, CEPT (W) — PL-911006-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
	3980407C01	CONTACT, spring #4
	3980408C01	CONTACT, spring #3
	3980409C01	CONTACT, spring #1
	3980410C01	CONTACT, RF jack T2
	3980435C01	CONTACT, RF jack T1
	4880114R02	CRYSTAL, 16.8 MHz (12.5 kHz)
	4882022N67	NPN 22N67 amplifier
	5180633C01	REGULATOR, w/reset; 5V
	5480570B01	LABEL, thermal high temp
	7580411C01	BUMPER 2.5 MM; 2 used
	7580611B01	PAD, front shield; 2 used

note: For optimum performance, diodes, transistors, and integrated circuits must be ordered by Motorola part numbers.

Reference designator ending in "T" denotes component is located on top side of circuit board. Reference designator ending in "B" denotes component is located on bottom side of circuit board. Reference designators marked with an asterisk indicate components which are not field-replaceable.

Parts List

0180702Y82 Receiver Module, 438-470 MHz (part of HLE6674B or HLE6676B Main Board) — PL-911015-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		capacitor, fixed: pF +/-5%; 50 V:
C1	2113740G34	16, 2
C2	2113740G38	24, 2%
C3	2113740G23	6.2, 0.1
C4	2113740G24	16, 2
C5, 6	2113740G30	11, 2
C7	2113740G40	30, 2%
C8	2113740G30	11, 2
C9	2113740G28	9.1, 0.1
C11, 12	2113740A59	150
C14	2113740G28	1.6, 0.1
C15	2113740G12	2.4, 0.1
C16	2113740G23	6.2, 0.1
C17	2113740G29	10, 0.1
C18	2113740G21	5.6, 0.1
C19	2113740G24	6.8, 0.1
C20	2113740G37	22, 2
C21	2113740G20	5.1, 0.1
C22	2113740G24	6.8, 0.1
C23	2113740G37	22, 2
C24	2113740G23	6.2, 0.1
C25	2113740G28	9.1, 0.1
C26	2113740G33	15, 2%
C32	2113740A52	75, 5%
CR1	4880154K03	**diode: (see note)** dual Schottky mixer
U1	5180207R01	**coil, inductor:** air wound tin plated 3-turns
L1 thru 3	2405486C22	air wound tin plated 4-turns
L4 thru 8	2405486C10	**transistor: (see note)** NPN 22N67 amplifier.
Q1	4882022N67	**resistor, fixed: +/-5%; 1/8 W:**
R1	0660076A64	4.3K
R2	0660076A63	3.9K
R3	0660076A76	13K

non-referenced items

	0780102S01	LEADFRAME: 6 used
	2680625B02	SHIELD, receiver

note: For optimum performance, diodes, transistors, and integrated circuits must be ordered by Motorola part numbers.

This module is not field-repairable.

Parts List

0180702Y89 Battery Filter Board — PL-911016-A

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		capacitor, fixed: pF +/-5%; 50 V: unless otherwise stated
C2 thru 4	2113740A43	39
L1, 2	2484657R01	**coil, rf:** ferrite bead
F1	6505663R04	**fuse:** 4 A

non-referenced items

	3980165S01	CONTACT, battery

Parts List for HLE9674B and HLE9676B UHF Main Boards, 438-470 MHz

Parts List

018077Y42 Receiver Module, 438-470 MHz
(part of HLE9674C or HLE9676C Main Board) PL-911015-C

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		capacitor, fixed: pF +/-5%; 50 V:
C1		5.1, ±0.1
C2		8.2, ±0.1
C3		5.6, ±0.1
C4		9.1, ±0.1
C5		6.2, ±0.1
C6		4.7, ±0.1
C7		10, ±2%
C8		3.6, ±0.1
C9		5.6, ±0.1
C10		13, ±2%
C11		16, ±2%
C12		15, ±2%
C13		11, ±30%
C14		150, ±30%
C15		3, ±0.1
C16		24, ±30%
C17		5.1, ±0.1
C18		6.2, ±0.1
C19		5.6, ±0.1
C20		22, ±2%
C21		4.7, ±0.1
C22		5.1, ±0.1
C23		16, ±2%
C24		4.7, ±0.1
C25		9.1, ±0.1
C26		8.2, ±0.1
C28		150, ±30%
CR1		**diode: (see note)** dual Schottky mixer
		transistor: (see note)
Q1		NPN
		resistor, fixed: +/-5%; 1/8 W:
R1		4.7k
R2		3.9k
R3		13k
		non-referenced items
		LEADFRAME; 6 used
		SHIELD, receiver

note: For optimum performance, diodes, transistors, and integrated circuits must be ordered by Motorola part numbers.

This module is not field-repairable because it needs to be calibrated with specialized factory equipment after installation. Radios in which these parts have been replaced in the field will be off frequency at temperature extremes.

Parts List

0180702Y89 Battery Filter Board PL-911016-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		capacitor, fixed: pF +/-30%; 50 V:
C2 thru 4	2113740A43	unless otherwise stated 39
		coil, inductors:
E1, 2	2484657R01	ferrite bead
		fuse:
F1	6580561D02	4 A
		non-referenced items
	3980165S01	CONTACT, battery; B+ pad

Parts Lists for HLE9674C and HLE9676C UHF Main Boards, 438-470 MHz

Parts List

HLE9674C Main Board, 438-470 MHz, 12.5 kHz Channel Spacing, CEPT (N)
HLE9676C Main Board, 438-470 MHz, 20/25 kHz Channel Spacing, CEPT (W) PL-911006-C

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		capacitor, fixed: pF +/-5%; 50 V:
C226, 227T	2113740A03	unless otherwise stated 1, ±30%
C228B	2113740A59	150, ±30%
C230B	2160521G37	0.1 uF, +80%/-20%, 25 V
C231B	2113741A45	0.01 uF
C233T	2113740A24	6.8, ±0.1
C235B	2113741A51	0.018 uF
C236B	2113740A59	150, ±30%
C237, 238B	2113740A55	100, ±30%
C251, 252B	2113740A21	5.6, ±30%
C253B	2113740A40	30, ±30%
C254B	2113740A17	3.9, ±30%
C255B	2113740A28	9.1, ±30%
C256B	2113740A59	150, ±30%
C257T	2113740A59	150, ±30%
C259T	2113740A59	150, ±30%
C260B	2113741A25	5.6, ±30%
C261B	2113740A20	5.1, ±30%
C262B	2113740A27	8.2, ±30%
C263B (N)	2113740A08	1.6, ±30%
C263B (W)	2113740A11	2.2, ±30%
C264B	2113740A24	6.8, ±30%
C265T	2160521G37	0.1 uF, +80%/-20%, 25 V
C266, 267T	2113740A59	150, ±30%
C268T	2113741A21	1000
C269T	2113740A59	150, ±30%
C270T	2113740A09	1.8, ±30%
C271, 272T	2113740A21	5.6, ±30%
C273B	2113740A59	150, ±30%
C275B	2113740A59	150, ±30%
C276B	2113741A45	0.01 uF
C278, 279T	2311049A03	0.22 uF, ±10%; 35 V
C280B	2113740A59	150, ±30%
C281T	2113740A59	150, ±30%
C282T	2113740A71	470, ±30%
C283T	2113740A59	150, ±30%
C284B	2113740A03	1, ±30%
C285B (N)	2113740A59	150, ±30%
C401T	2113740A41	33, ±30%
C402B	2113740G16	3.6, ±0.1
C404T	2113740A37	22, ±30%
C405B	2160521G37	0.1 uF, +80%/-20%, 25 V
C406T	2113741A45	0.01 uF
C407T	2311049A40	2.2 uF, ±10%; 10 V
C408T	2160521G37	0.1 uF, +80%/-20%, 25 V
C409T	2113740A59	150, ±30%
C410B	2113740A59	150, ±30%
C412T	2311049A07	1 uF, ±10%; 16 V
C413T	2311049A05	0.47 uF, ±10%; 25 V
C414T	2160521G37	0.1 uF, +80%/-20%, 25 V
C415B	2113741A37	4700
C416B	2160521G37	0.1 uF, +80%/-20%, 25 V
C418T	2311049J25	10 uF, ±10%; 16 V
C419T	2113741A51	0.018 uF
C421T	2311049A05	0.47 uF, ±10%; 25 V
C423T	2311049A05	0.47 uF, ±10%; 25 V
C424T	2113740A64	240, ±30%
C425T	2113741A59	0.039 uF
C426, 427B	2113741A51	0.018 uF
C428B	2113740A59	150, ±30%
C429T	2113741A37	4700
C430T	2113740A59	150, ±30%
C431T	2113741A47	0.012 uF
C432T	2113741A59	0.039 uF
C433B	2311049A05	0.47 uF, ±10%; 25 V
C434, 435T	2160521G37	0.1 uF, +80%/-20%, 25 V
C436B	2113740A59	150, ±30%
C437B	2113741A59	0.039 uF
C438B	2311049J11	4.7 uF, ±10%; 16 V
C440B	2113740A46	47
C441B	2160521G37	0.1 uF, +80%/-20%, 25 V
C442, 443B	2113740A79	1000, ±30%
C445B	2113741A51	0.018 uF
C447B	2160521G37	0.1 uF, +80%/-20%, 25 V
C449T	2311049A07	1 uF, ±10%; 16 V
C451B	2113741A49	0.015 uF
C452T	2311049J11	4.7 uF, ±10%; 16 V
C454B	2113741A45	0.01 uF
C455T	2113741A45	0.01 uF
C456B	2113741A45	0.01 uF

HLE9674C Main Board, 438-470 MHz, 12.5 kHz Channel Spacing, CEPT (N)
HLE9676C Main Board, 438-470 MHz, 20/25 kHz Channel Spacing, CEPT (W) PL-911006-C

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
C457T	2113741A45	0.01 uF
C459, 460B	2113740A59	150, ±30%
C461T	2160521G37	0.1 uF, +80%/-20%, 25 V
C462T	2113740A79	1000, ±30%
C463, 464T	2160521G37	0.1 uF, +80%/-20%, 25 V
C466 thru 468B	2113740A59	150, ±30%
C469T	2113741A37	4700
C472 thru 476B	2113740A59	150, ±30%
C478B	2113740A79	1000, ±30%
C479B	2113740A21	5.6, ±30%
C480, 481B	2113740A59	150, ±30%
C482T	2113741A59	0.039 uF
C483, 484B	2113740A59	150, ±30%
		filter, ceramic:
CF51T (N)	9180453B04	mini - 6 pole
CF51T (W)	or 9180098D06	3 WR
CF52T (N)	9180454B04	mini - 4 pole
CF52T (W)	or 9180098D05	3 WR
		clip:
CL1 thru 4T	4280138R02	butterfly
CL6 thru 8T	4280138R02	butterfly
CL9B	4280138R02	butterfly
		diode: (see note)
CR2T	4880174R01	QUAD 6-pin
CR51B	4880154K03	dual Schottky mixer
CR101, 102B	4809973C02	pin
CR201, 202B	4813833C07	dual 100 W
CR2035	4805649Q04	VCTR RH 1T33T
CR2515	4805649Q02	VCTR RH 1T32T
CR2535	4805649Q02	VCTR RH 1T32T
CR2557	4805649Q02	VCTR RH 1T32T
CR4015	4880939T01	Schottky barrier
CR402, 403B	4813833C07	dual 100 W
CR404B	4813833C07	dual 100 W
CR405B	4880107R01	rectifier
CR407T	4813833C07	dual 100 W
DS401B	4805729G49	**light emitting diode: (see note)** diode red/yel
		mechanical:
H100T	1486168S01	INS., XTAL; 2 used
H101T	0300136783	screw, 2-56 x 5/16 Phillip; 2 used
H102T	1405160A02	insulator, crystal
H108T	0780511B01	bracket freq switch, plated
J1T	3980515C02	**connector, receptacle:** antenna contact
J2T	0180117S05	assembly, RF jack
J3B	0180417C01	assembly, option jack
J5B	0180195F03	speaker/microphone header
J6T	0180965Z01	connector B+
L9T	2462587X43	**coil, inductor: +/-5%, chip:** unless otherwise stated 15 nH
L10B	2483411T63	shielded
L11T	2462587X46	27 nH
L51T	2483411T63	shielded
L52T	2462587X61	470 nH
L53T	2462587X69	1200 nH
L55T	2483411T75	shielded
L58T	2483411T74	shielded
L101 thru 103B	2411087A19	0.27 uH, ±10%
L104, 105B	2484657R01	ferrite bead
L106B	2411087A19	0.27 uH, ±10%
L107 thru 109B	2483035N76	coil airwound
L111T	2483035N13	coil air 5-turns
L112B	2483035N76	coil airwound
L113T	2462587X54	120 nH
L201T	2462587X22	390 nH, ±10%
L203T	2462587X22	390 nH, ±10%
L204T	2462587X07	22 nH, ±20%
L251, 252B	2462587X22	390 nH, ±10%
L253T	2480145S07	RF 1-1/2 T brass core whi
L254B	2462587X49	47 nH
L255T	2462587X22	390 nH, ±10%
L256, 257B	2462587X61	470 nH
L258T	2480145S08	2-1/2 violet TOKO
L259T	2462587X22	390 nH, ±10%
L260T	2462587X46	27 nH
L261T	2462587X47	33 nH

HLE9674C Main Board, 438-470 MHz, 12.5 kHz Channel Spacing, CEPT (N)
HLE9676C Main Board, 438-470 MHz, 20/25 kHz Channel Spacing, CEPT (W) PL-911006-C

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
L262T	2462587X43	15 nH
L267B	2462587X50	56 nH
L268T	2160521G37	0.1 uF, +80%/-20%, 25 V
L401B	2460578C43	33.0 uH, ±10%
L403, 404T	2462587X22	390 nH, ±10%
L405, 406B	2462587X22	390 nH, ±10%
T1 2T	2580163M03	transformer
		meter:
M51T	0705196A11	SUPR XTAL mounting
M501T	4280126S01	clip, PA
M600 thru 602T	4080485C08	switch, tactile
M700T	0780165P02	boot, crystal
		transistor: (see note)
Q51B	4813827A07	NPN SML SIG
Q151B	4880214G02	NPN
Q152B	4813822A10	PNP 60V 10A
Q153B	4880214G02	NPN
Q154B	4880141L03	PNP
Q155, 156B	4880214G02	NPN
Q251T	4813827A07	NPN SML SIG
Q401B	4880214G02	NPN
Q405B	4808128M16	SOT MMBT3906 (RH) 48G22
Q406 thru 409T	4808128M16	SOT MMBT3906 (RH) 48G22
Q410B	4880141L03	PNP
Q411B	4808128M19	SOT-23 MMBTA13 (RH)
Q412B	4805128M16	SOT MMBT3906 (RH) 48G22
		resistor, fixed: +/-5%; 1/8 W:
		unless otherwise stated
R5B	0660076A30	160 ohms
R6B	0660076A01	10 ohms
R51T	0660076A18	51 ohms
R52B	0660076A85	33k
R53B	0660076A75	12k
R54T	0660076A56	2k
R55T	0660076A01	10 ohms,
R57T	0660076B04	130k
R58B	0660076A76	13k
R59B (N)	0660076A96	91k
R59B (W)	or 0660076A93	68k
R60B (N)	0660076A73	10k
R60B (W)	or 0660076A70	7.5k
R64T	0660076A67	5.6k
R66B	0660076A47	820 ohms
R67B	0660076A69	6.8k
R68B (N)	0660076M01	0 ohms, 50 meg.
R68B (W)	or 0660076A25	100 ohms
R69B (W)	0660076A73	10k
R101B	0680108R01	0.1 ohms, ±1%; 1 W
R102B	0660076A37	330 ohms
R104T	0660076A31	180 ohms
R105T	0660076A11	27 ohms
R106T	0660076A31	180 ohms
R151B	0660076E91	56k, ±1%
R152B	0660076F01	100k, ±1%
R153B	0660076A09	22 ohms
R154B	0660076F01	100k, ±1%
R155B	0660076E91	56k, ±1%
R156B	0660076A69	3.9k
R157B	0660076A55	1.8k
R158, 159B	0660076A31	180 ohms
R160, 161B	0660076A45	680 ohms
R162B	0660076A47	820 ohms
R166B	0660076A31	180 ohms
R167B	0660076A78	16k
R168B	0660076R01	100k
R169T	0660076A73	10k
R171B	0660076A90	51k
R172B	0660076A81	22k
R174B	0660076B01	100k
R175B	0660076A68	6.2k, ±4%
R179B	0660076A38	360 ohms
R201B	0660076A23	82 ohms
R202B	0660076A57	2.2k
R203B	0660076B09	220k
R204B	0660076B01	100k
R205T	0660076A61	3.3k
R206B	0660076A57	2.2k
R207T	0660076A65	4.7k
R211B	0660076A89	47k

HLE9674C Main Board, 438-470 MHz, 12.5 kHz Channel Spacing, CEPT (N)
HLE9676C Main Board, 438-470 MHz, 20/25 kHz Channel Spacing, CEPT (W) PL-911006-C

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
R215B	0660076A49	1k
R216B	0660076A82	24k
R251B	0660076A83	27k
R252T	0660076A73	10k
R253T	0660076A53	1.5k
R254T	0660076A73	10k
R255T	0660076A74	11k
R256T	0660076A53	1.5k
R257B	0660076A86	36k
R258T	0660076A25	100 ohms
R260, 261B	0660076A33	220 ohms
R262T	0660076A39	390 ohms
R263B	0660076A87	39k
R264B (N)	0660076A25	100 ohms
R401T	0660076H31	1.8 meg, ±10%
R402B	0660076A65	4.7k
R403B	0660076B01	100k
R404B	0660076B07	180k
R406B	0660076B01	100k
R407B	0660076A49	1k
R408 thru 411B	0660076A89	47k
R412B	0660076A31	180 ohms
R413B	0660076A45	680 ohms
R414 thru 417B	0660076A73	10k
R418B	0660076B01	100k
R419T	0660076B01	100k
R420B	0660076A73	10k
R421B	0660076B07	180k
R422B	0660076B01	100k
R423, 424T	0660076B01	100k
R425T	0660076B09	220k
R426T	0660076B06	160k
R429B	0660076B17	470k
R431T	0660076A90	51k
R432B	0660076A60	20k
R433B	0660076A73	10k
R434B	0660076B01	100k
R438B	0660076A61	3.3k
R442B	0660076H31	1.8 meg, ±10%
R443B	0660076B01	100k
R444B	0660076A80	20k
R445B	0660076H31	1.8 meg, ±10%
R447T	0660076A67	5.6k
R448T	0660076A90	51k
R449B	0660076B01	100k
R450B	0660076A73	10k
R451T	0660076A57	2.2k
R452T	0660076B07	180k
R453T	0660076A57	2.2k
R454T	0660076B01	100k
R455T	0660076A84	30k
R456T	0660076A65	4.7k
R457T	0660076A93	68k
R458T	0660076A69	6.8k
R459T	0660076B23	820k
R460T	1880143S02	volume, potentiometer
R461B	0660076A09	22 ohms
R462T	0660076B17	470k
R463T	0660076A89	47k
R464B	0660076A55	1.8k
R465B	0660076B18	510k
R466B	0660076A65	4.7k
R467B	0660076A01	10 ohms
R468B	0660076A73	10k
R469T	0660076A73	10k
R470T	0660076A25	100 ohms
R471B	0660076A73	10k
R472, 473B	0660076A25	100 ohms
R474, 475T	0660076A73	10k
R476B	0660076B01	100k
R478T	0660076A84	30k
R479T	0660076A73	10k
R484T	0660076A68	6.2k
R486T	0660076B01	100k
R487B	0660076A73	10k
R488T	0660076B09	220k
R489, 490B	0611077A12	2.7 ohms
R491B	0660076A73	10k
R492B	0660076A70	7.5k
R493B	0660076B13	330k
R494B	0660076B01	100k

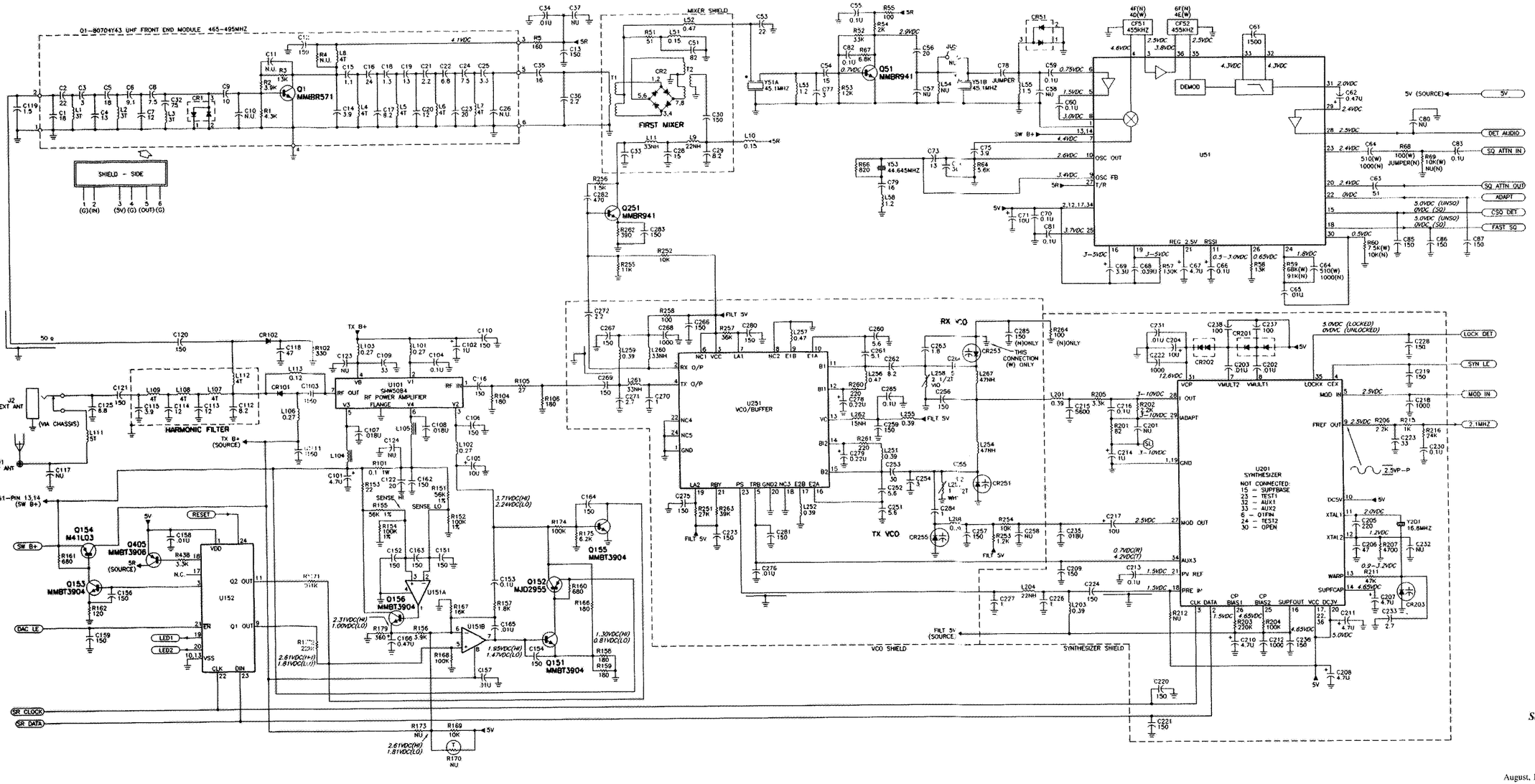
HLE9674C Main Board, 438-470 MHz, 12.5 kHz Channel Spacing, CEPT (N)
HLE9676C Main Board, 438-470 MHz, 20/25 kHz Channel Spacing, CEPT (W) PL-911006-C

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
R496B	0660076A37	330 ohms
R497B	0660076A41	470 ohms
R503T	0660076A37	330 ohms
R504T	0660076B07	180k
R505T	0660076B06	160k
R506T	0660076A82	24k
R507B	0660076A49	1k
		shield:
SH100B	2680521D01	syn, front
SH101B	2680520D01	VCO, front
SH102B	2680522D01	harmonic filter UHF
SH103T	2680692C03	mixer, back
SH104T	2680519D01	syn, back, TCXO
SH105T	2680518D01	VCO, back
		switch:
SW401T	4080502B01	freq., 16-position
SW401T	4080502B01	freq., 16-position, rotary
		integrated circuit: (see note)
U51T	5180207R01	IF
U101T	5113829D04	UHF 7W, 7.5 V; 440-470 MHz
U151B	5180932W01	linear op amp
U152B	5105226P38	DAC IC
U201B*		synthesizer
U251B	5105414S84	VCO buffer
U401B*		microprocessor; 2 channel uP only microprocessor
U402T	5105165R77	AFIC
U404T	5105469E65	voltage regulator
U405T	5180932W01	linear op amp
U406B	5109128Z03	comparator
U407T	5180932W01	linear op amp
U409T	5180175R01	audio amplifier
U410B	5180155R01	dual trans NPNS
U411T	5180633C01	5 V regulator w/reset
		voltage regulator: (see note)
VR401B	4880140L15	diode Zener, 10 V tape & reel
		crystal: (see note)
Y51T (N)	9180112R06	45.1 MHz crystal filter
Y51T (W)	or 9180112R05	45.1 MHz crystal filter
Y53T	4880008K02	XTAL resonator 44.645 MHz 10 PPM
Y201T*		16.8 MHz
Y401T	4880113R01	7.9488
		non-referenced items
	0580537C01	EYELET
	0580537C02	EYELET
	0780432C01	BATTERY, contact support
	1580413C01	HOUSING, option jack
	1580414C01	HOUSING, cover option jack
	2680301D01	HOUSING, RF jack
	2680412B01	SHIELD, RF jack
	2680416C01	SHIELD, option jack
	2680625B02	SHIELD, receiver
	3180168F01	B+ HEADER
	3280415C01	SEAL, option jack
	3980169R01	CONTACT, PRIM B+
	3980170R01	CONTACT, program
	3980405C01	CONTACT, spring #5
	3980406C01	CONTACT, spring #2
	3980407C01	CONTACT, spring #4
	3980408C01	CONTACT, spring #3
	3980409C01	CONTACT, spring #6
	3980410C01	CONTACT, RF jack T2
	3980434C01	CONTACT, RF jack T1
	5480570B01	LABEL, thermal high temp
	7580411C01	BUMPER 2.5 MM; 2 used
	7580611B01	PAD, front shield; 2 used

note: For optimum performance, diodes, transistors, and integrated circuits must be ordered by Motorola part numbers.

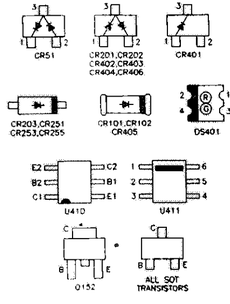
Reference designator ending in "T" denotes component is located on top side of circuit board. Reference designator ending in "B" denotes component is located on bottom side of circuit board.

Reference designators marked with an asterisk "*" indicate components which are not field-replaceable because they need to be calibrated with specialized factory equipment after installation. Radios in which these parts have been replaced in the field will be off frequency at temperature extremes.



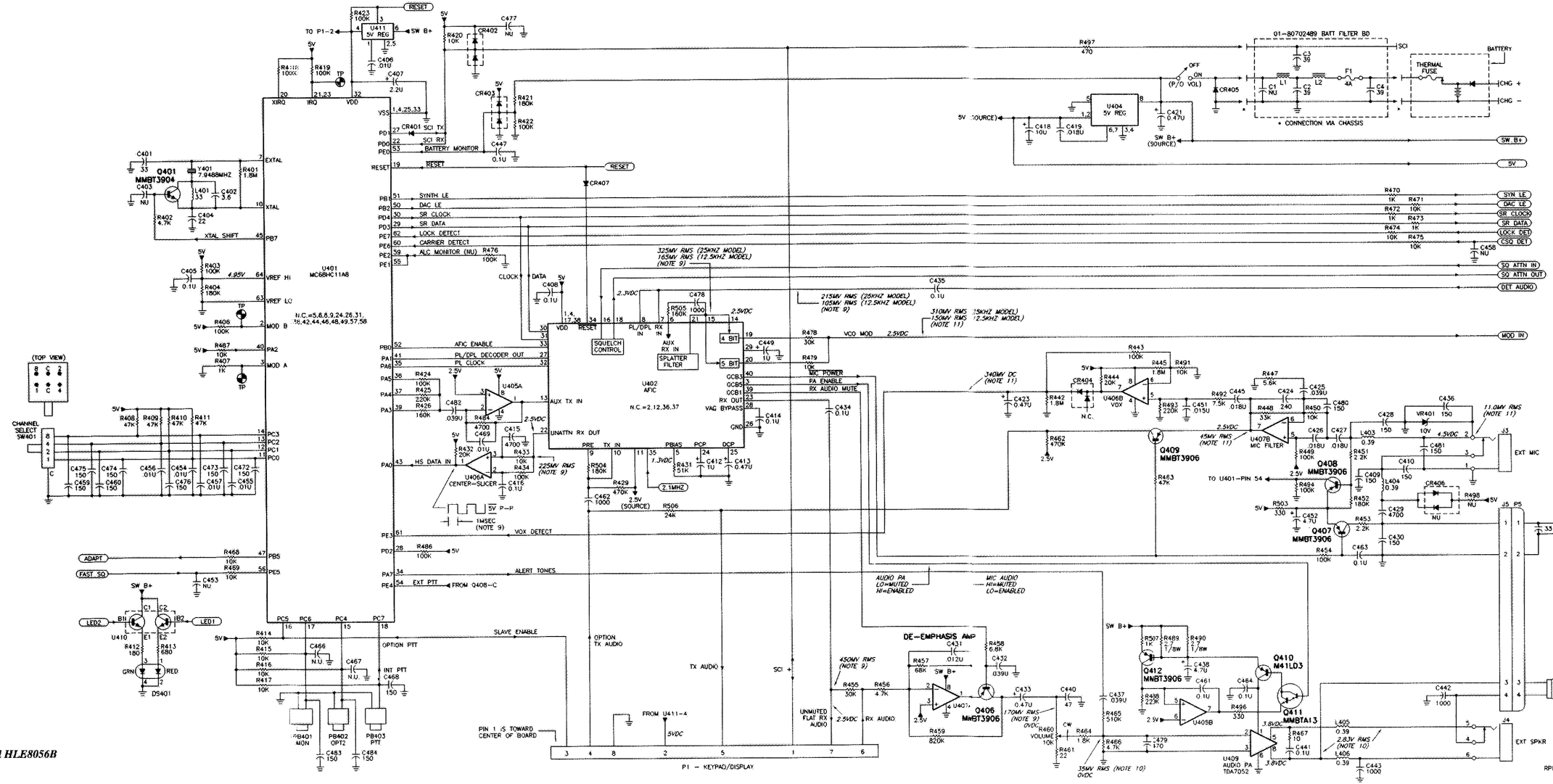
NOTES:

1. UNLESS OTHERWISE INDICATED, RESISTOR VALUES ARE IN OHMS, CAPACITOR VALUES ARE IN PICOFARADS, INDUCTOR VALUES ARE IN MICROHENRIES.
2. NON–POLARIZED CAPACITORS ARE CHIP–TYPE UNLESS OTHERWISE INDICATED.
3. POLARIZED CAPACITORS ARE CHIP–TANTALUM TYPE UNLESS OTHERWISE INDICATED.
4. "NU" MEANS COMPONENT IS NOT USED.
5. DC VOLTAGES ARE MEASURED WITH A HIGH IMPEDANCE (10 MEGOHM) DC VOLTMETER.
6. AC VOLTAGES ARE MEASURED WITH A HIGH IMPEDANCE AC RMS VOLTMETER.
7. ALL VOLTAGE MEASUREMENTS ARE IN THE RECEIVE MODE UNLESS INDICATED AS FOLLOWS:
   (R) RECEIVE MODE
   (T) TRANSMIT MODE
8. MEASURED IN THE RECEIVE MODE WITH AN ON–CHANNEL UNMODULATED SIGNAL AT A LEVEL OF –20 DBM.
9. MEASURED IN THE RECEIVE MODE WITH AN ON–CHANNEL SIGNAL AT A LEVEL OF –20 DBM, MODULATED WITH 1 KHZ AT 3 KHZ DEVIATION (FOR 20/25 KHZ MODELS) OR 1.5 KHZ DEVIATION (FOR 12.5 KHZ MODELS), MEASURED WITH AN AC RMS VOLTMETER.
10. SAME AS NOTE 9 EXCEPT WITH VOLUME CONTROL ADJUSTED FOR 500 MILLIWATTS (2.82 VOLTS RMS ACROSS 16–OHM LOAD CONNECTED TO THE EXT SPKR JACK).
11. MEASURED IN THE TRANSMIT MODE WITH A 1 KHZ, 11 MV RMS SIGNAL APPLIED TO THE EXTERNAL MICROPHONE INPUT.

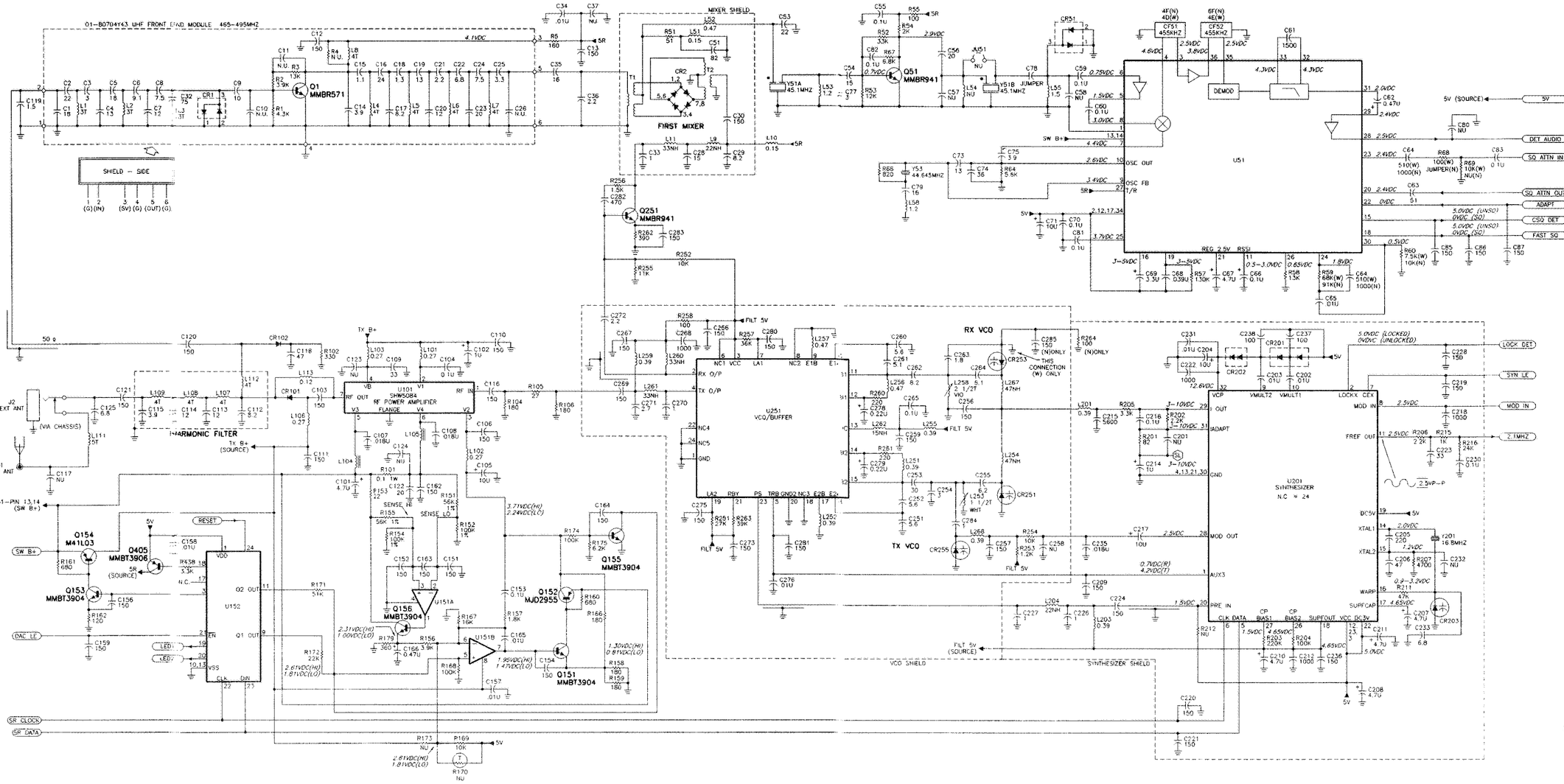


RPD–92102–B

Schematic Diagram for HLE8054B and HLE8056B UHF Main Boards, 465–495 MHz (sheet 1 of 2)

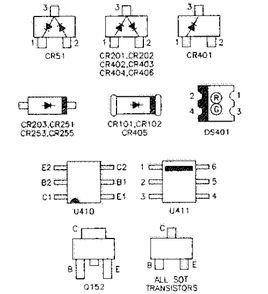


Schematic Diagram for HLE8054B and HLE8056B UHF Main Boards, 465-495 MHz (sheet 2 of 2)



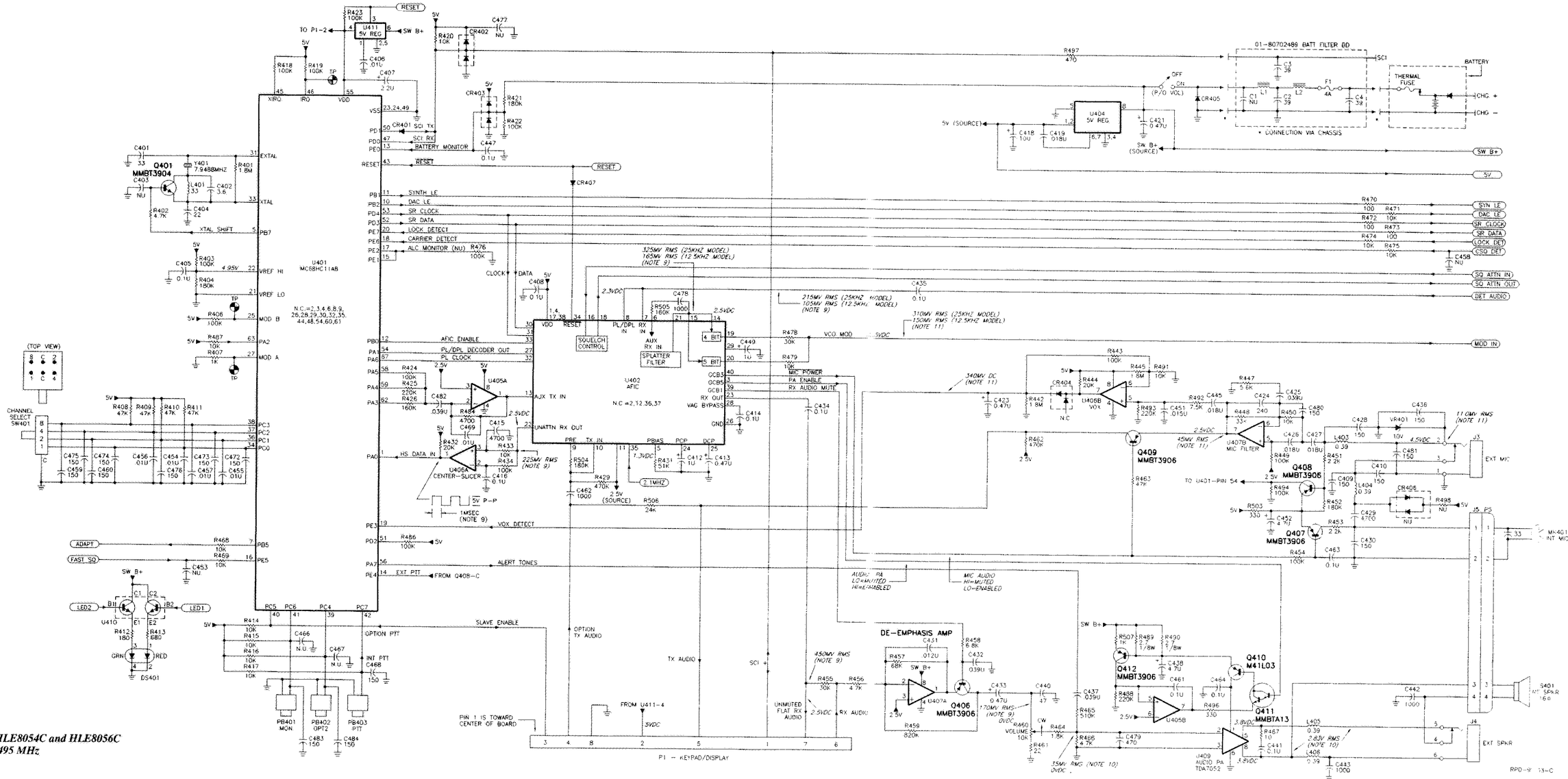
NOTES:

1. UNLESS OTHERWISE INDICATED, RESISTOR VALUES ARE IN OHMS, CAPACITOR VALUES ARE IN PICOFARADS, INDUCTOR VALUES ARE IN MICROHENRIES.
2. NON-POLARIZED CAPACITORS ARE CHIP-TYPE UNLESS OTHERWISE INDICATED.
3. POLARIZED CAPACITORS ARE CHIP-TANTALUM TYPE UNLESS OTHERWISE INDICATED.
4. "NU" MEANS COMPONENT IS NOT USED.
5. DC VOLTAGES ARE MEASURED WITH A HIGH IMPEDANCE (10 MEGOHM) DC VOLTMETER.
6. AC VOLTAGES ARE MEASURED WITH A HIGH IMPEDANCE AC RMS VOLTMETER.
7. ALL VOLTAGE MEASUREMENTS ARE IN THE RECEIVE MODE UNLESS INDICATED AS FOLLOWS:
   (R) RECEIVE MODE
   (T) TRANSMIT MODE
8. MEASURED IN THE RECEIVE MODE WITH AN ON-CHANNEL UNMODULATED SIGNAL AT A LEVEL OF -20 DBM.
9. MEASURED IN THE RECEIVE MODE WITH AN ON-CHANNEL SIGNAL AT A LEVEL OF -20 DBM, MODULATED WITH 1 KHZ AT 3 KHZ DEVIATION (FOR 20/25 KHZ MODELS) OR 1.5 KHZ DEVIATION (FOR 12.5 KHZ MODELS), MEASURED WITH AN AC RMS VOLTMETER.
10. SAME AS NOTE 9 EXCEPT WITH VOLUME CONTROL ADJUSTED FOR 500 MILLIWATTS (2.02 VOLTS RMS ACROSS 16-OHM LOAD CONNECTED TO THE EXT SPKR JACK).
11. MEASURED IN THE TRANSMIT MODE WITH A 1 KHZ, 11 MV RMS SIGNAL APPLIED TO THE EXTERNAL MICROPHONE INPUT.



RPD-92102-C

Schematic Diagram for HLE8054C and HLE8056C UHF Main Boards, 465-495 MHz (sheet 1 of 2)



Schematic Diagram for HLE8054C and HLE8056C
UHF Main Boards, 465-495 MHz
(sheet 2 of 2)

Parts List

HLE8056B Main Board, 465-495 MHz, 12.5 kHz
Channel Spacing (N)
HLE8054B Main Board, 465-495 MHz, 25 kHz
(Channel Spacing (W) PL-921003-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		capacitor, fixed: pF +/-5%; 50 V: unless otherwise stated
C12, 13B	2113740A59	150
C18	2113740G06	1.3, 0.1
C21	2113740G11	2.2, 0.1
C22	2113740G24	6.8, 0.1
C23	2113740G36	20, 2%
C24	2113740G25	7.5, 0.1
C28T	2113740A33	15 (25 kHz)
C29T	2113740A27	8.2, 0.25 (25 kHz)
C30T	2113740A59	150
C32	2113740A52	75
C33T	2113740A03	1, 0.25 (25 kHz)
C34B	2113741A45	0.01 uF
C35B	2113740A34	16 (25 kHz)
C36B	2113740A11	2.2, 0.25 (25 kHz)
C51T	2113740A53	82
C53B	2113740A37	22
C54B	2113740A33	15
C55T	2160521G37	0.1 uF, +80%/-20%; 25V
C56T	2113740A36	20
C59T	2160521G37	0.1 uF, +80%/-20%; 25V
C60B	2160521G37	0.1 uF, +80%/-20%; 25V
C61B	2113741A25	1500
C62B	2311049A05	0.47 uF, 10%; 25V
C63T	2113740A48	51
C64B	2113740A79	1000 (12.5 kHz)
	or 2113740A72	510 (25 kHz)
C65B	2113741A45	0.01 uF
C66T	2160521G37	0.1 uF, +80%/-20%; 25V
C67T	2311049J11	4.7 uF, 10%; 16V
C68T	2113741A59	0.039 uF
C69T	2311049J07	3.3 uF, 10%; 20V
C70B	2160521G37	0.1 uF, +80%/-20%; 25V
C71B	2311049J25	10 uF, 10%; 16V
C73T	2113740A32	13
C74T	2113740A42	36
C75T	2113740A17	3.9, 0.25
C77B	2113740A14	3, 0.25
C78T	0660076M01	0 ohms, 0%; 1/8W
C79T	2113740A34	16
C81 thru 83B	2160521G37	0.1 uF, +80%/-20%; 25V
C84B	0660076M01	0 ohms, 0%; 1/8W (12.5 kHz)
	or 2160521G37	0.1 uF, +80%/-20%; 25V (25 kHz)
C85 thru 87B	2113740A59	150
C101B	2311049J11	4.7 uF, 10%; 16V
C102T	2311049A07	1 uF, 10%; 16V
C103B	2113740A59	150
C104B	2160521G37	0.1 uF, +80%/-20%; 25V
C105B	2311049J25	10 uF, 10%; 16V
C106B	2113740A59	150
C107T	2113741A51	0.018 uF
C108B	2113741A51	0.018 uF
C109B	2113740A41	33
C110, 111B	2113740A59	150
C112B	2113740A27	8.2, 0.25
C113, 114B	2113740A31	12
C115B	2113740A17	3.9, 0.25
C116T	2113740A59	150
C118B	2113740A46	47
C119B	2113740A07	1.5, 0.25 (25 kHz)
C120, 121B	2113740A59	150
C122B	2113740A36	20
C125T	2113740A24	6.8, 0.25
C151, 152B	2113740A59	150
C153B	2160521G37	0.1 uF, +80%/-20%; 25V
C154B	2113740A59	150
C156B	2113740A59	150
C157, 158B	2113741A45	0.01 uF
C159B	2113740A59	150
C162 thru 164B	2113740A59	150
C165B	2113741A45	0.01 uF
C166B	2311049A05	0.47 uF, 10%; 25V
C202, 203B	2113741A45	0.01 uF
C204T	2311049J27	10 uF, 10%; 25V
C205T	2113740A63	220
C206T	2113740G46	47 pF, 2%
C207, 208T	2311049J11	4.7 uF, 10%; 16V
C209T	2113740A59	150
C210, 211B	2311049J11	4.7 uF, 10%; 16V

HLE8056B Main Board, 465-495 MHz, 12.5 kHz
Channel Spacing (N)
HLE8054B Main Board, 465-495 MHz, 25 kHz
(Channel Spacing (W) PL-921003-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
C212T	2113741A21	1000
C213T	2160521G37	0.1 uF, +80%/-20%; 25V
C214B	2311049A07	1 uF, 10%; 16V
C215T	2113741A39	5600
C216B	2160521G37	0.1 uF, +80%/-20%; 25V
C217T	2311049J25	10 uF, 10%; 16V
C218B	2113741A21	1000
C219 thru 221B	2113740A59	150
C222B	2113741A21	1000
C223B	2113740A41	33
C224B	2113740A59	150
C226, 227T	2113740A03	1, 0.25
C228B	2113740A59	150
C230B	2160521G37	0.1 uF, +80%/-20%; 25V
C231B	2113741A45	0.01 uF
C233T	2113740G13	2.7, 0.1
C235B	2113741A51	0.018 uF
C236B	2113740A59	150
C237, 238B	2113740A55	100
C251, 252B	2113740A21	5.6, 0.25
C253B	2113740A40	30
C256B	2113740A59	150
C257T	2113740A59	150
C259T	2113740A59	150
C260B	2113740A21	5.6, 0.25
C261B	2113740A20	5.1, 0.25
C262B	2113740A27	8.2, 0.25
C263B	2113740A09	1.8, 0.25 (25 kHz)
C264B	2113740A20	5.1, 0.25 (25 kHz)
C265T	2160521G37	0.1 uF, +80%/-20%; 25V
C266, 267T	2113740A59	150
C268T	2113741A21	1000
C269T	2113740A59	150
C270T	2113740A03	1, 0.25 (25 kHz)
C271T	2113740A13	2.7, 0.25 (25 kHz)
C272T	2113740A11	2., 0.25 (25 kHz)
C273B	2113740A59	150
C275B	2113740A59	150
C276B	2113741A45	0.01 uF
C278, 279T	2311049A03	0.22 uF, 10%; 35V
C280B	2113740A59	150
C281T	2113740A59	150
C282T	2113740A71	470
C283T	2113740A59	150
C284B	2113740A03	1, 0.25
C285B	2113740A59	150 (12.5 kHz)
C401T	2113740A41	33
C402B	2113740G16	3.6, 0.1
C404T	2113740A37	22
C405B	2160521G37	0.1 uF, +80%/-20%; 25V
C407T	2311049A40	2.2 uF, 10%; 10V
C408T	2160521G37	0.1 uF, +80%/-20%; 25V
C409T	2113740A59	150
C410B	2113740A59	150
C412T	2311049A07	1 uF, 10%; 16V
C413T	2311049A05	0.47 uF, 10%; 25V
C414T	2160521G37	0.1 uF, +80%/-20%; 25V
C415B	2113741A37	4700
C416B	2160521G37	0.1 uF, +80%/-20%; 25V
C418T	2311049J25	10 uF, 10%; 16V
C419T	2113741A51	0.018 uF
C421T	2311049A05	0.47 uF, 10%; 25V
C423T	2311049A05	0.47 uF, 10%; 25V
C424T	2113740A64	240
C425T	2113741A59	0.039 uF
C426, 427B	2113741A51	0.018 uF
C428B	2113740A59	150
C429T	2113741A37	4700
C430T	2113740A59	150
C431T	2113741A47	0.012 uF
C432T	2113741A59	0.039 uF
C433B	2311049A05	0.47 uF, 10%; 25V
C434, 435T	2160521G37	0.1 uF, +80%/-20%; 25V
C436B	2113740A59	150
C437B	2113741A59	0.039 uF
C438B	2311049J11	4.7 uF, 10%; 16V
C440B	2113740A46	47
C441B	2160521G37	0.1 uF, +80%/-20%; 25V
C442, 443B	2113740A79	1000
C445B	2113741A59	0.039 uF (12.5 kHz)

HLE8056B Main Board, 465-495 MHz, 12.5 kHz
Channel Spacing (N)
HLE8054B Main Board, 465-495 MHz, 25 kHz
(Channel Spacing (W) PL-921003-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
C455B	2113741A51	0.018 uF (25 kHz)
C447B	2160521G37	0.1 uF, +80%/-20%; 25V (12.5 kHz)
C449T	2311049A07	1 uF, 10%; 16V
C451B	2113741A45	0.01 uF
C452T	2311049J11	4.7 uF, 10%; 16V
C454B	2113741A45	0.01 uF
C455T	2113741A45	0.01 uF
C456B	2113741A45	0.01 uF
C457T	2113741A45	0.01 uF
C459, 460B	2113740A59	150
C461T	2160521G37	0.1 uF, +80%/-20%; 25V
C462T	2113740A79	1000
C463T	2160521G37	0.1 uF, +80%/-20%; 25V
C464B	2160521G37	0.1 uF, +80%/-20%; 25V
C466 thru 468B	2113740A59	150
C469T	2113741A37	4700
C472 thru 476B	2113740A59	150
C478B	2113740A79	1000
C479B	2113740A71	470
C480, 481B	2113740A59	150
C482T	2113741A59	0.039 uF (12.5 kHz)
C483, 484B	2113740A59	150 (12.5 kHz)
		filter, ceramic:
CF51T	9180453B04	mini - 6 pole (12.5 kHz)
	or 9180098D06	3 WR (25 kHz)
CF52T	9180454B04	mini - 4 pole (12.5 kHz)
	or 9180098D05	3 WR (25 kHz)
		clip:
CL1 thru 4	4280138R01	butterfly
CL6 thru 9	4280138R01	butterfly
		diode: (see note)
CR1	4880154K03	dual Schottky mixer
CR2T	4880174R01	QUAD 8-pin
CR51B	4880154K03	dual Schottky mixer
CR101, 102B	4880973Z02	pin
CR201, 202B	4813833C07	dual 100 W
CR203T	4805649Q04	VCTR RH 1T33T
CR251B	4805649Q02	VCTR RH 1T32T
CR253B	4805649Q02	VCTR RH 1T32T
CR255T	4805649Q02	VCTR RH 1T32T
CR401B	4880939T01	Schottky barrier
CR402, 403B	4813833C07	dual 100 W
CR404B	4813833C07	dual 100 W
CR405B	4860107R01	silicon
CR407T	4813833C07	dual 100 W
		light emitting diode: (see note)
DS401B	4805729G49	diode red/yel
		mechanical:
H102	1405160A02	insulator, crystal
H108	0780511B01	bracket freq switch, plated (25 kHz)
		connector, receptacle:
J1T	3980515C02	antenna contact
J3B	0180417C01	assembly, option jack
J5B	0180195R01	speaker/mic header
		coil, inductor:
L1 thru 3	2405486C22	air wound tin plated 3 turn
L4 thru 8	2405486C10	air wound tin plated 4 turn
L9T	2462587N45	chip 22 NH, 5%
L10B	2483411T63	chip shielded
L11T	2462587N47	chip 33 NH, 5%
L51T	2483411T63	chip shielded
L52T	2462587N61	chip 470 NH, 5%
L53T	2462587N69	1200 NH, 5%
L55T	2483411T75	chip shielded
L58T	2483411T74	chip shielded
L101 thru 103B	2411087A19	0.27 UH
L104, 105B	2484657R01	ferrite bead
L106B	2411087A19	0.27 UH
L107 thru 109B	2483035N76	air wound
L111T	2405318D24	air wound tin plated
L112B	2483035N76	air wound
L113T	2462587N54	120 NH, 5%
L201T	2462587N22	chip 390 NH, 10%
L203T	2462587N22	chip 390 NH, 10%

HLE8056B Main Board, 465-495 MHz, 12.5 kHz
Channel Spacing (N)
HLE8054B Main Board, 465-495 MHz, 25 kHz
(Channel Spacing (W) PL-921003-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
L204T	2462587N07	chip 22 NH, 20%
L251, 252B	2462587N22	chip 390 NH, 10%
L253T	2480145S07	RF, 1-1/2 T brass core WHT
L254B	2462587N49	47 NH, 5%
L255T	2462587N22	chip 390 NH,10%
L256, 257B	2462587N61	chip 470 NH, 5%
L258T	2480145S08	2-1/2 VIOLET TOKO
L259T	2462587N22	chip 390 NH, 10%
L260, 261T	2462587N47	chip 33 NH, 5%
L262T	2462587N43	15 NH, 5%
L267B	2462587N49	47 NH, 5%
L268T	2462587N22	chip 390 NH, 10%
L401B	2460578C43	chip 33.0 UH, 10%
L403 thru 406B	2462587N22	chip 390 NH, 10%
		meter:
M51	0705196A11	super XTAL mounting (25 kHz)
M501	4280126S01	clip, PA
M600 thru 602	4080485C03	switch tactile
		transistor: (see note)
Q1	4882022N67	NPN amplifier
Q51B	4813827A07	NPN SML SIG
Q151B	4880214G02	NPN
Q152B	4813822A10	PNP 60V 10A
Q153B	4880214G02	NPN
Q154B	4880141L03	PNP
Q155, 156B	4880214G02	NPN
Q251T	4813827A07	NPN SML SIG
Q401B	4880214G02	NPN
Q405 thru 409T	4805128M18	SOT MMBT3906 (RH) 48G22
Q410B	4880141L03	PNP
Q411B	4805128M19	SOT-23
Q412B	4805128M16	SOT MMBT3906 (RH) 48G22
		resistor, fixed: +/-5%; 1/8 W: unless otherwise stated
R1	0660076A64	4.3K
R2	0660076A63	3.9K
R3	0660076A76	13K
R5B	0660076A30	chip 160
R6B	2113740A34	16 (12.5 kHz)
R51T	0660076A18	51 ohms
R52B	0660076A85	33K
R53B	0660076A75	12K
R54T	0660076A56	2K
R55T	0660076A25	100 ohms
R57T	0660076B04	130K
R58B	0660076A76	13K
R59B	0660076A96	91K (12.5 kHz)
	or 0660076A93	68K (25 kHz)
R60B	0660076A73	10K (12.5 kHz)
	or 0660076A70	7.5K (25 kHz)
R64T	0660076A67	5.6K
R66B	0660076A47	820 ohms
R67B	0660076A69	6.8K
R68B	0660076M01	0 ohms, 0% (12.5 kHz)
	or 0660076A25	100 ohms (25 kHz)
R69B	0660076A73	10K
R101B	0680106R01	0.1 ohms, 1%; 1W
R102B	0660076A37	330 ohms
R104T	0660076A31	180 ohms
R105T	0660076A11	27 ohms
R106T	0660076A31	180 ohms
R151B	0660076E91	56K, 1%
R152B	0660076F01	100K, 1%
R153B	0660076A09	22 ohms
R154B	0660076F01	100K, 1%
R155B	0660076E91	56K, 1%
R156B	0660076A63	3.9K
R157B	0660076A55	1.8K
R158, 159B	0660076A31	180 ohms
R160, 161B	0660076A45	680 ohms
R162B	0660076A27	120 ohms
R166B	0660076A31	180 ohms
R167B	0660076A78	16K
R168B	0660076B01	100K
R169T	0660076A73	10K
R171B	0660076A90	51K
R172B	0660076A81	22K

HLE8056B Main Board, 465-495 MHz, 12.5 kHz
Channel Spacing (N)
HLE8054B Main Board, 465-495 MHz, 25 kHz
(Channel Spacing (W) PL-921003-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
R174B	0660076B01	100K
R175B	0660076A68	6.2K, 4%
R179B	0660076A38	360 ohms
R201B	0660076A23	82 ohms
R202B	0660076A57	2.2K
R203B	0660076B09	220K
R204B	0660076B01	100K
R205T	0660076A61	3.3K
R206B	0660076A57	2.2K
R207T	0660076A65	4.7K
R211B	0660076A89	47K
R212B	0660076A73	10K
R215B	0660076A49	1K
R216B	0660076A82	24K
R251B	0660076A83	27K
R252T	0660076A73	10K
R253T	0660076A51	1.2K
R254T	0660076A73	10K
R255T	0660076A74	11K
R256T	0660076A53	1.5K (25 kHz)
R257B	0660076A86	36K
R258T	0660076A25	100 ohms
R260, 261B	0660076A33	220 ohms
R262T	0660076A39	390 ohms
R263B	0660076A87	39K
R264B	0660076A25	100 ohms (12.5 kHz)
R401T	0660076H31	1.8 meg, 10%
R402B	0660076A65	4.7K
R403B	0660076B01	100K
R404B	0660076B07	180K
R406B	0660076B01	100K
R407B	0660076A49	1K
R408 thru 411B	0660076A89	47K
R412B	0660076A31	180 ohms
R413B	0660076A45	680 ohms
R414 thru 417B	0660076A73	10K
R418B	0660076B01	100K
R419T	0660076B01	100K
R420B	0660076A73	10K
R421B	0660076B07	180K
R422B	0660076B01	100K
R424T	0660076B01	100K
R425T	0660076B09	220K
R426T	0660076B06	160K
R429B	0660076B17	470K
R431T	0660076A90	51K
R432B	0660076A80	20K
R433B	0660076A73	10K
R434B	0660076B01	100K
R436B	0660076A61	3.3K
R442B	0660076H31	1.8 meg, 10%
R443B	0660076B01	100K
R444B	0660076A80	20K
R445B	0660076H31	1.8 meg, 10%
R447T	0660076A67	5.6K
R448T	0660076A85	33K (12.5 kHz)
	or 0660076A90	51K (25 kHz)
R449B	0660076B01	100K
R450B	0660076A73	10K (12.5 kHz)
R451T	0660076A57	2.2K
R452T	0660076B07	180K
R453T	0660076A57	2.2K
R454T	0660076B01	100K
R455T	0660076A84	30K
R456T	0660076A65	4.7K
R457T	0660076A93	68K
R458T	0660076A69	6.8K
R459T	0660076B23	820K
R461B	0660076A09	22 ohms
R462T	0660076B17	470K
R463T	0660076A89	47K
R464B	0660076A55	1.8K
R465B	0660076B18	510K
R466B	0660076A65	4.7K
R467B	0660076A01	10 ohms
R468B	0660076A73	10K
R469T	0660076A73	10K
R470T	0660076A49	1K
R471B	0660076A73	10K
R472, 473B	0660076A49	1K
R474, 475T	0660076A73	10K

HLE8056B Main Board, 465-495 MHz, 12.5 kHz
Channel Spacing (N)
HLE8054B Main Board, 465-495 MHz, 25 kHz
(Channel Spacing (W) PL-921003-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
R476B	0660076B01	100K
R478T	0660076A84	30K
R479T	0660076A73	10K
R484T	0660076A68	6.2K, 4%
R486T	0660076B01	100K
R487B	0660076A73	10K
R488T	0660076B09	220K
R489, 490B	0611077A12	2.7 ohms
R491B	0660076A73	10K
R492B	0660076A70	7.5K
R493B	0660076B09	220K (12.5 kHz)
	or 0660076B13	330K (25 kHz)
R494B	0660076B01	100K
R496B	0660076A37	330 ohms
R497B	0660076A41	470 ohms
R503T	0660076A37	330 ohms
R504T	0660076B07	180K
R505T	0660076B06	160K
R506T	0660076A82	24K
R507B	0660076A49	1K
		shield:
SH100B	2680966Y01	SYN front
SH101B	2680970Y01	VCO front
SH102B	2680136S01	harmonic filter UHF
		switch:
SW401T	4080502B01	freq. 16-position
		integrated circuit: (see note)
U51T	5180207R01	IF
U101T	5180110R03	RF power module (UHF)
U151B	5180932W01	linear op amp
U201B*	5105414S55	synthesizer
U404T	5105469E65	voltage regulator
U405T	5180932W01	linear op amp
U406B	5102198J23	compactor 50 T/R
U407T	5180932W01	linear op amp
U409T	5180175R01	audio amplifier
U410B	5180159R01	dual trans NPNS
U411T	5180633C01	5V regulator w/reset (12.5 kHz)
		voltage regulator: (see note)
VR401B	4880140L15	diode Zener 10V tape&reel
		crystal: (see note)
Y51T	9180112R06	45.1 MHz filter (12.5 kHz)
	or 9180112R05	45.1 MHz filter (25 kHz)
Y51AT	0705196A11	SUPR XTAL mounting (12.5 kHz)
Y53T	4880008K02	XTAL resonator 44.645MHZ 10PPM
Y401T	4880113R01	7.9488
		non-referenced items
	0180444C01	ASSEMBLY, RF jack
	0300136783	SCREW, 2-56" x 5/16" Phillips; 2 used
	0580537C01	EYELET
	0580537C02	EYELET
	0660076A53	1.5K (12.5 kHz)
	0780102S01	LEADFRAME; 6 used
	0780165R02	BOOT, crystal
	0780432C01	BATTERY, contact support
	0780511B01	BRACKET, freq switch, plated (12.5 kHz)
	1480168S01	INSULATION, XTAL; 2 used
	1580413C01	HOUSING, OPTION JACK
	1580414C01	HOUSING, COVER OPTIONJACK
	1580433C01	HOUSING, RF jack
	1880143S02	VOLUME, potentiometer
	2113740A07	1.5 pF, 0.25 pF; 50V (12.5 kHz)
	2113740A09	1.8 pF, 0.25 pF; 50V (12.5 kHz)
	2113740A10	2 pF, 0.25 pF; 50V
	2113740A11	2.2 pF, 0.25 pF;50V ; 2 used (12.5 kHz)
	2113740A13	2.7 pF, 0.25 pF; 50V (12.5 kHz)
	2113740A23	6.2 pF, 0.25 pF; 50V (12.5 kHz)
	2113740G04	1.1 pF, 0.1 pF; 50V
	2113740G14	3 pF, 0.1 pF; 50V
	2113740G15	3.3 pF, 0.1 pF; 50V
	2113740G17	3.9 pF, 0.1 pF; 50V
	2113740G27	8.2 pF, 0.1 pF; 50V
	2113740G28	9.1 pF, 0.1 pF; 50V

HLE8056B Main Board, 465-495 MHz, 12.5 kHz
Channel Spacing (N)
HLE8054B Main Board, 465-495 MHz, 25 kHz
(Channel Spacing (W) PL-921003-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
	2113740G29	10 pF, 0.1 pF; 50V
	2113740G31	12 pF, 2%; 50V ; 2 used
	2113740G32	13 pF, 2 pF; 50V ; 2 used
	2113740G35	18 pF, 2%; 50V ; 2 used
	2113740G37	22 pF, 2 pF; 50V
	2113740G38	24 pF, 2%; 50V
	2580163M03	TRANSFORMER, coil; 2 used
	2680412B01	SHIELD, RF jack
	2680416C01	SHIELD, option jack
	2680625B02	SHIELD, receiver
	2680692C01	SHIELD, mixer, back
	2680968Z01	SHIELD, VCO, back
	2680970Z01	SHIELD, SYN, back, TCXO
	3280415C01	SEAL, option jack
	3980405C01	CONTACT, spring #5
	3980406C01	CONTACT, spring #2
	3980407C01	CONTACT, spring #4
	3980408C01	CONTACT, spring #3
	3980409C01	CONTACT, spring #6
	3980410C01	CONTACT, spring #1
	3980434C01	CONTACT, RF jack T2
	3980435C01	CONTACT, RF jack T1
	4880114R02	CRYSTAL 16.8 MHz
	5180633C01	REGULATOR w/reset; 5V
	5480570B01	LABEL, thermal high temp
	7580411C01	BUMPER 2.5 MM; 2 used
	7580811B01	PAD, front shield; 2 used

note: For optimum performance, diodes, transistors, and integrated circuits must be ordered by Motorola part numbers.

Reference designator ending in "T" denotes component is located on top side of circuit board. Reference designator ending in "B" denotes component is located on bottom side of circuit board. Reference designators marked with an asterisk indicate components which are not field-replaceable.

Parts List

01-80704Y43 Receiver Module, 465-495 MHz
(part of HLE8054B or HLE8056B Main Board) PL-921004-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		capacitor, fixed: pF +/-5%; 50 V: unless otherwise stated
C1	2113740G35	18 pF, 2%; 50V (2 used)
C2	2113740G37	22 pF, 2 pF; 50V
C3	2113740G14	3 pF, 0.1 pF; 50V
C4	2113740G32	13 pF, 2 pF; 50V (2 used)
C6	2113740G28	9.1 pF, 0.1 pF; 50V
C7	2113740G31	12 pF, 2%; 50V (2 used)
C9	2113740G29	10 pF, 0.1 pF; 50V
C12	2113740A59	150
C14	2113740G17	3.9 pF, 0.1 pF; 50V
C15	2113740G04	1.1 pF, 0.1 pF; 50V
C16	2113740G38	24 pF, 2%; 50V
C17	2113740G27	8.2 pF, 0.1 pF; 50V
C18	2113740G06	1.3, 0.1
C20	2113740G31	12 pF, 2%; 50V (2 used)
C21	2113740G11	2.2, 0.1
C22	2113740G24	6.8, 0.1
C23	2113740G36	20, 2%
C24	2113740G25	7.5, 0.1
C25	2113740G15	3.3 pF, 0.1 pF; 50V
C32	2113740A52	75
		diode: (see note)
CR1	4880154K03	dual Schottky mixer
		coil, inductor:
L1 thru 3	2405486C22	air wound, tin plated, 3 turn
L4 thru 8	2405486C10	air wound, tin plated, 4 turn
		transistor: (see note)
Q1	4882022N67	NPN 22N67 amplifier
		resistor, fixed: +/-5%; 1/8 W: unless otherwise stated
R1	0660076A64	4.3K
R2	0660076A63	3.9K
R3	0660076A76	13K
		non-referenced items
	0780102S01	LEADFRAME (6 used)
	2680625B02	SHIELD, receiver

note: For optimum performance, diodes, transistors, and integrated circuits must be ordered by Motorola part numbers.

Parts List

0180702Y89 Battery Filter Board PL-911016-A

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		capacitor, fixed: pF +/-5%; 50 V: unless otherwise stated
C2 thru 4	2113740A43	39
		coil, rf:
L1, 2	2484657R01	ferrite bead
		fuse:
F1	6505663R04	4 A
		non-referenced items
	3980165S01	CONTACT, battery

Parts List

01-80707Y50 Receiver Module, 465-495 MHz
(part of HLE8054C or HLE8056C Main Board) PL-921004-C

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		capacitor, fixed: pF +/-5%; 50 V: unless otherwise stated
C1		6.2, ±0.1
C2		9.1, ±0.1
C3		6.8, ±0.1
C4		7.5, ±0.1
C5, 6		5.6, ±0.1
C7		11, ±2%
C8		3.6, ±0.1
C9		5.1, ±0.1
C10		8.2, ±0.1
C11		20, ±2%
C12		11, ±2%
C13		27, ±30%
C14		150, ±30%
C15		2.4, ±0.1
C16		2.7, ±0.1
C17		9.1, ±0.1
C18		6.8, ±0.1
C19		3.6, ±0.1
C20		15, ±2%
C21		5.1, ±0.1
C22		4.3, ±0.1
C23		12, ±2%
C24		4.7, ±0.1
C25		6.8, ±0.1
C26		8.2, ±0.1
C28		150, ±30%
		diode: (see note)
CR1		dual Schottky mixer
		transistor: (see note)
Q1		NPN amplifier
		resistor, fixed: +/-5%; 1/8 W: unless otherwise stated
R1		4.7k
R2		3.9k
R3		13k
		non-referenced items
		LEADFRAME (6 used)
		SHIELD, receiver

note: For optimum performance, diodes, transistors, and integrated circuits must be ordered by Motorola part numbers.

This module is not field-repairable because it needs to be calibrated with specialized factory equipment after installation. Radios in which these parts have been replaced in the field will be off frequency at temperature extremes.

Parts List

0180702Y89 Battery Filter Board PL-911016-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		capacitor, fixed: pF +/-30%; 50 V: unless otherwise stated
C2 thru 4	2113740A43	39
		coil, inductors:
E1, 2	2484657R01	ferrite bead
		fuse:
F1	6580561D02	4 A
		non-referenced items
	3980165S01	CONTACT, battery: B+ pad

Parts Lists for HLE8054C and HLE8056C UHF Main Boards, 465-495 MHz

Parts List

HLE8056C Main Board, 465-495 MHz, 12.5 kHz Channel Spacing (N)
HLE8054C Main Board, 465-495 MHz, 25 kHz (Channel Spacing (W) PL-921003-C

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		capacitor, fixed: pF +/-5%; 50 V: unless otherwise stated
C13B	2113740A59	150, ±30%
C28T	2113740A33	15, ±30%
C29T	2113740A27	8.2, ±30%
C30T	2113740A59	150, ±30%
C33T	2113740A03	1, ±30%
C34B	2113741A45	0.01 uF
C35B	2113740A34	16, ±30%
C36B	2113740A11	2.2, ±30%
C51T	2113740A53	82, ±30%
C53B	2113740A37	22, ±30%
C54B	2113740A33	15, ±30%
C55T	2160521G37	0.1 uF, +80%/-20%, 25 V
C56T	2113740A36	20, ±30%
C59T	2160521G37	0.1 uF, +80%/-20%, 25 V
C60B	2160521G37	0.1 uF, +80%/-20%, 25 V
C61B	2113741A25	1500
C62B	2311049A05	0.47 uF, ±10%, 25V
C63T	2113740A48	51, ±30%
C64B (N)	2113740A79	1000, ±30%
C64B (W)	or 2113740A72	510, ±30%
C65B	2113741A45	0.01 uF
C66T	2160521G37	0.1 uF, +80%/-20%, 25 V
C67T	2311049J11	4.7 uF, ±10%, 16 V
C68T	2113741A59	0.039 uF
C69T	2311049J07	3.3 uF, ±10%, 20 V
C70B	2160521G37	0.1 uF, +80%/-20%, 25 V
C71B	2311049J25	10 uF, ±10%, 16 V
C73T	2113740A32	13, ±30%
C74T	2113740A42	36, ±30%
C75T	2113740A17	3.9, ±30%
C77B	2113740A14	3, ±30%
C78T	0660076M01	0 ohms, 50 meg.; 1/8 W
C79T	2113740A34	16, ±30%
C81 thru 83B	2160521G37	0.1 uF, +80%/-20%, 25 V
C84B (N)	0660076M01	0 ohms, 50 meg.; 1/8 W
C84B (W)	or 2160521G37	0.1 uF, +80%/-20%, 25 V
C85 thru 87B	2113740A59	150, ±30%
C101B	2311049J11	4.7 uF, ±10%, 16 V
C102T	2311049A07	1 uF, ±10%, 16 V
C103B	2113740A51	33, ±30%
C104B	2160521G37	0.1 uF, +80%/-20%, 25 V
C105B	2311049J25	10 uF, ±10%, 16 V
C106B	2113740A59	150, ±30%
C107T	2113741A51	0.018 uF
C108B	2113741A51	0.018 uF
C109B	2113740A41	33, ±30%
C110, 111B	2113740A59	150, ±30%
C112B	2113740A27	8.2, ±30%
C113, 114B	2113740A31	12, ±30%
C115B	2113740A17	3.9, ±30%
C116T	2113740A59	150, ±30%
C118B	2113740A46	47, ±30%
C119B	2113740A07	1.5, ±30%
C120, 121B	2113740A59	150, ±30%
C122B	2113740A36	20, ±30%
C125T	2113740A24	6.8, ±30%
C151, 152B	2113740A59	150, ±30%
C153B	2160521G37	0.1 uF, +80%/-20%, 25 V
C154B	2113740A59	150, ±30%
C156B	2113740A59	150, ±30%
C157, 158B	2113741A45	0.01 uF
C159B	2113740A59	150, ±30%
C162 thru 164B	2113740A59	150, ±30%
C165B	2113741A45	0.01 uF
C166B	2311049A05	0.47 uF, ±10%, 25 V
C202, 203B	2113741A45	0.01 uF
C204T	2311049J27	10 uF, ±10%, 25 V
C205T	2113740A63	220, ±30%
C206T	2113740G46	47 pF, ±2%
C207, 208T	2311049J11	4.7 uF, ±10%, 16 V
C209T	2113740A59	150, ±30%
C210, 211B	2311049J11	4.7 uF, ±10%, 16 V
C212T	2113741A21	1000
C214B	2311049A07	1 uF, ±10%, 16 V
C215T	2113741A39	5600
C216B	2160521G37	0.1 uF, +80%/-20%, 25 V
C217T	2311049J25	10 uF, ±10%, 16 V
C218B	2113741A21	1000

HLE8056C Main Board, 465-495 MHz, 12.5 kHz Channel Spacing (N)
HLE8054C Main Board, 465-495 MHz, 25 kHz (Channel Spacing (W) PL-921003-C

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
C219 thru 221B	2113740A59	150, ±30%
C222B	2113741A21	1000
C223B	2113740A41	33, ±30%
C224T	2113740A59	150, ±30%
C226, 227T	2113740A03	1, ±30%
C228B	2113740A59	150, ±30%
C230B	2160521G37	0.1 uF, +80%/-20%, 25 V
C231B	2113741A45	0.01 uF
C232T	2113740A79	1000, ±30%
C235B	2113741A51	0.018 uF
C236B	2113740A59	150, ±30%
C237, 238B	2113740A55	100, ±30%
C251, 252B	2113740A21	5.6, ±30%
C253B	2113740A40	30, ±30%
C254	2113740A10	2, ±30%
C255	2113740A24	6.8, ±30%
C256B	2113740A59	150, ±30%
C257T	2113740A59	150, ±30%
C259T	2113740A59	150, ±30%
C260B	2113740A21	5.6, ±30%
C261B	2113740A20	5.1, ±30%
C262B	2113740A27	8.2, ±30%
C263B	2113740A05	1.2, ±30%
C264B	2113740A20	5.1, ±30%
C265T	2160521G37	0.1 uF, +80%/-20%, 25 V
C266, 267T	2113740A59	150, ±30%
C268T	2113741A21	1000
C269T	2113740A59	150, ±30%
C270T	2113740A03	1, ±30%
C271T	2113740A13	2.7, ±30%
C272T	2113740A11	2.2, ±30%
C273B	2113740A59	150, ±30%
C275B	2113740A59	150, ±30%
C276B	2113741A45	0.01 uF
C278, 279T	2311049A03	0.22 uF, ±10%, 35 V
C280B	2113740A59	150, ±30%
C281T	2113740A59	150, ±30%
C282T	2113740A71	470, ±30%
C283T	2113740A59	150, ±30%
C284B	2113740A03	1, ±30%
C285B (N)	2113740A59	150, ±30%
C401T	2113740A41	33, ±30%
C402B	2113740G16	3.6, ±0.1
C404T	2113740A37	22, ±30%
C405B	2160521G37	0.1 uF, +80%/-20%, 25 V
C406T	2113741A45	0.1 uF
C407T	2311049A40	2.2 uF, ±10%, 10 V
C408T	2160521G37	0.1 uF, +80%/-20%, 25 V
C409T	2113740A59	150, ±30%
C410B	2113740A59	150, ±30%
C412T	2311049A07	1 uF, ±10%, 16 V
C413T	2311049A05	0.47 uF, ±10%, 25 V
C414T	2160521G37	0.1 uF, +80%/-20%, 25 V
C415B	2113741A37	4700
C416B	2160521G37	0.1 uF, +80%/-20%, 25 V
C418T	2311049J25	10 uF, ±10%, 16 V
C419T	2113741A51	0.018 uF
C421T	2311049A05	0.47 uF, ±10%, 25 V
C423T	2311049A05	0.47 uF, ±10%, 25 V
C424T	2113740A64	240, ±30%
C425T	2113741A59	0.039 uF
C426, 427B	2113741A51	0.018 uF
C428B	2113740A59	150, ±30%
C429T	2113741A37	4700
C430T	2113740A59	150, ±30%
C431T	2113741A47	0.012 uF
C432T	2113741A59	0.039 uF
C433B	2311049A05	0.47 uF, ±10%, 25 V
C434, 435T	2160521G37	0.1 uF, +80%/-20%, 25 V
C436B	2113740A59	150, ±30%
C437B	2113741A59	0.039 uF
C438B	2311049J11	4.7 uF, ±10%, 16 V
C440B	2113740A46	47, ±30%
C441B	2160521G37	0.1 uF, +80%/-20%, 25 V
C442, 443B	2113740A79	1000, ±30%
C445B (N)	2113741A59	0.039 uF
C445B (W)	or 2113741A51	0.018 uF
C447B	2160521G37	0.1 uF, +80%/-20%, 25 V
C449T	2311049A07	1 uF, ±10%, 16 V
C451B (N)	2113741A45	0.01 uF

HLE8056C Main Board, 465-495 MHz, 12.5 kHz Channel Spacing (N)
HLE8054C Main Board, 465-495 MHz, 25 kHz (Channel Spacing (W) PL-921003-C

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
C451B (W)	2113741A49	0.015 uF
C452T	2311049J11	4.7 uF, ±10%, 16 V
C454B	2113741A45	0.01 uF
C455T	2113741A45	0.01 uF
C456B	2113741A45	0.01 uF
C457T	2113741A45	0.01 uF
C459, 460B	2113740A59	150, ±30%
C461T	2160521G37	0.1 uF, +80%/-20%, 25 V
C462T	2113740A79	1000, ±30%
C463, 464T	2160521G37	0.1 uF, +80%/-20%, 25 V
C468 thru 468B	2113740A59	150, ±30%
C469T	2113741A37	4700
C471 thru 476B	2113740A59	150, ±30%
C477B	2113740A79	1000, ±30%
C479B	2113740A71	470, ±30%
C480, 481B	2113740A59	150, ±30%
C482T	2113741A59	0.039 uF
C483, 484B	2113740A59	150, ±30%
CR5T	9180453B04	**filter, ceramic:** mini - 6 pole
CR6T thru 9T	or 9180908B06	3 WR
CR52T (N)	9180454B04	mini - 4 pole
CR52T (W)	or 9180906B05	3 WR
CL1 thru 4T	4280138R02	**clip:** butterfly
CL5 thru 8T	4280138R02	butterfly
CL9B	4280138R02	butterfly
CR2T	4880174R01	**diode: (see note)** QUAD 8-pin
CR3, 4B	4880154K03	dual Schottky mixer
CR101, 102B	4880973Z02	pin
CR201, 202B	4813833C07	dual 100 W
CR203T	4805649Q04	VCTR RH 1T33T
CR204B	4805649Q02	VCTR RH 1T32T
CR205B	4805649Q02	VCTR RH 1T32T
CR255T	4805649Q02	VCTR RH 1T32T
CR401B	4880939T01	Schottky barrier
CR402, 403B	4813833C07	dual 100 W
CR404B	4813833C07	dual 100 W
CR405B	4880107R01	rectifier
CR407T	4813833C07	dual 100 W
DS401B	4805729G49	**light emitting diode: (see note)** diode red/yel
H102T	1480168S01	**mechanical:** insulation, XTAL; 2 used
H103T	0300136783	screw, 2-56" x 5/16" Phillips; 2 used
H102T	1405180A02	insulator, crystal
H103B	0780511B01	bracket freq switch, plated
J1T	3980515C02	**connector, receptacle:** antenna contact
J2T	0180117S05	assembly, RF jack
J3B	0180117C01	assembly, option jack
J5B	0180195R03	speaker/mic header
L9T	2462587X45	**coil, inductor: +/-5%, chip:** unless otherwise stated 22 nH
L10B	2483411T63	shielded
L11T	2462587X47	33 nH
L51T	2483411T63	shielded
L52T	2462587X61	470 nH
L53T	2462587N69	1200 nH
L55T	2483411T75	shielded
L58T	2483411T74	shielded
L101 thru 103B	2411087A19	0.27 uH, ±10%
L104, 105B	2484657R01	ferrite bead
L106B	2411087A19	0.27 uH, ±10%
L107 thru 109B	2483035N76	air wound
L111T	2405318D24	air wound tin plated
L112B	2483035N76	air wound
L113T	2462587X54	120 nH
L201T	2462587X22	390 nH, ±10%
L203T	2462587X22	390 nH, ±10%
L204T	2462587X07	22 nH, ±20%
L251, 252B	2462587X22	390 nH, ±10%
L253T	2480145S07	RF, 1-1/2 T brass core WHT
L254B	2462587X49	47 nH
L255T	2462587X22	390 nH, ±10%
L256, 257B	2462587X61	470 nH

HLE8056C Main Board, 465-495 MHz, 12.5 kHz Channel Spacing (N)
HLE8054C Main Board, 465-495 MHz, 25 kHz (Channel Spacing (W) PL-921003-C

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
L258T	2480145S08	2-1/2 VIOLET TOKO
L259T	2462587X22	390 nH, ±10%
L260, 261T	2462587X47	33 nH
L262T	2462587X43	15 nH
L267B	2462587X49	47 nH
L268T	2462587X22	390 nH, ±10%
L401B	2480578C43	33.0 uH, ±10%
L403 thru 406T	2462587X22	390 nH, ±10%
T1, 2T	2580163M03	transformer: 2 used
		meter:
M51T (W)	0705196A11	super XTAL mounting
M501T	4280126S01	clip, PA
M500 thru 502T	4080485C03	switch tactile
M700T	0780165R02	boot, crystal
		transistor: (see note)
Q51B	4813827A07	NPN SML SIG
Q151B	4880214G02	NPN
Q152B	4813822A10	PNP 60V 10A
Q153B	4880214G02	NPN
Q154B	4880141L03	PNP
Q155, 156B	4880214G02	NPN
Q251T	4813827A07	NPN SML SIG
Q401B	4880214G02	NPN
Q405B	4805128M16	SOT MMBT3906 (RH) 48G22
Q406 thru 409T	4805128M16	SOT MMBT3906 (RH) 48G22
Q410B	4880141L03	PNP
Q411B	4805128M19	SOT-23 MMBTA13 (RH)
Q412B	4805128M16	SOT MMBT3906 (RH) 48G22
R5B	0660076A30	**resistor, fixed: +/-5%; 1/8 W:** unless otherwise stated 160
R6B (N)	2113740A34	16
R51T	0660076A18	51 ohms
R52B	0660076A85	33k
R53B	0660076A75	12k
R54T	0660076A56	2k
R55T	0660076A25	100 ohms
R57T	0660076B04	130k
R58B	0660076A76	13k
R59B (N)	0660076A96	91k
C59B (W)	or 0660076A93	68k
R60B (N)	0660076A73	10k
R60B (W)	or 0660076A70	7.5k
R64T	0660076A67	5.6k
R66B	0660076A47	820 ohms
R67B	0660076A69	6.8k
R68B (N)	0660076M01	0 ohms, 50 meg.
R68B (W)	or 0660076A25	100 ohms
R69B (W)	0660076A73	10k
R101B	0680106R01	0.1 ohms, ±1%; 1 W
R102B	0660076A37	330 ohms
R104T	0660076A31	180 ohms
R105T	0660076A11	27 ohms
R106T	0660076A31	180 ohms
R151B	0660076E91	56k, ±1%
R152B	0660076F01	100k, ±1%
R153B	0660076A09	22 ohms
R154B	0660076F01	100k, ±1%
R155B	0660076E91	56k, ±1%
R156B	0660076A63	3.9k
R157B	0660076A55	1.8k
R158, 159B	0660076A31	180 ohms
R160, 161B	0660076A45	680 ohms
R162B	0660076A27	120 ohms
R166B	0660076A31	180 ohms
R167B	0660076A78	16k
R168B	0660076B01	100k
R169T	0660076A73	10k
R171B	0660076A90	51k
R172B	0660076A81	22k
R174B	0660076B01	100k
R175B	0660076A68	6.2k
R179B	0660076A38	380 ohms
R201B	0660076A23	82 ohms
R202B	0660076A57	2.2k
R203B	0660076B09	220k
R204B	0660076B01	100k
R205T	0660076A61	3.3k
R206B	0660076A57	2.2k

HLE8056C Main Board, 465-495 MHz, 12.5 kHz Channel Spacing (N)
HLE8054C Main Board, 465-495 MHz, 25 kHz (Channel Spacing (W) PL-921003-C

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
R207T	0660076A65	4.7k
R211B	0660076A89	47k
R212B	0660076A73	10k
R215B	0660076A49	1k
R216B	0660076A82	24k
R251B	0660076A83	27k
R252T	0660076A73	10k
R253T	0660076A51	1.2k
R254T	0660076A73	10k
R255T	0660076A74	11k
R256T	0660076A53	1.5kk
R257B	0660076A86	36k
R258T	0660076A25	100 ohms
R260, 261B	0660076A33	220 ohms
R262T	0660076A39	390 ohms
R263B	0660076A87	39k
R264B (N)	0660076A25	100 ohms
R401T	0660076H31	1.8 meg, ±10%
R402B	0660076A65	4.7k
R403B	0660076B01	100k
R404B	0660076B07	180k
R406B	0660076B01	100k
R407B	0660076A49	1k
R408 thru 411B	0660076A89	47k
R412B	0660076A31	180 ohms
R413B	0660076A45	680 ohms
R414 thru 417B	0660076A73	10k
R418B	0660076B01	100k
R419T	0660076B01	100k
R420B	0660076A73	10k
R421B	0660076B07	180k
R422B	0660076B01	100k
R423, 424T	0660076B01	100k
R425T	0660076B09	220k
R426T	0660076B06	160k
R429B	0660076B17	470k
R431T	0660076A90	51k
R432B	0660076A80	20k
R433B	0660076A73	10k
R434B	0660076B01	100k
R436B	0660076A61	3.3k
R442B	0660076H31	1.8 meg, ±10%
R443B	0660076B01	100k
R444B	0660076A80	20k
R445B	0660076H31	1.8 meg, ±10%
R447T	0660076A67	5.6k
R448T (N)	0660076A85	33
R448T (W)	or 0660076A90	51k
R449B	0660076B01	100k
R450B	0660076A73	10k
R451T	0660076A57	2.2k
R452T	0660076B07	180k
R453T	0660076A57	2.2k
R454T	0660076B01	100k
R455T	0660076A84	30k
R456T	0660076A65	4.7k
R457T	0660076A93	68k
R458T	0660076A69	6.8k
R459T	0660076B23	820k
R461B	0660076A09	22 ohms
R460T	1880143S02	volume, potentiometer
R462T	0660076B17	470k
R463T	0660076A59	4.7k
R464B	0660076A55	1.8k
R465B	0660076B18	510k
R466B	0660076A65	4.7k
R467B	0660076A01	10 ohms
R468B	0660076A73	10k
R469T	0660076A73	10k
R470T	0660076A25	100 ohms
R471B	0660076A73	10k
R472, 473B	0660076A25	100 ohms
R474, 477T	0660076A73	10k
R478B	0660076B01	100k
R478T	0660076A84	30k
R479T	0660076A73	10k
R484T	0660076A68	6.2k
R486T	0660076B01	100k
R487B	0660076A73	10k
R488T	0660076B09	220k
R489, 490B	0611077A12	2.7 ohms

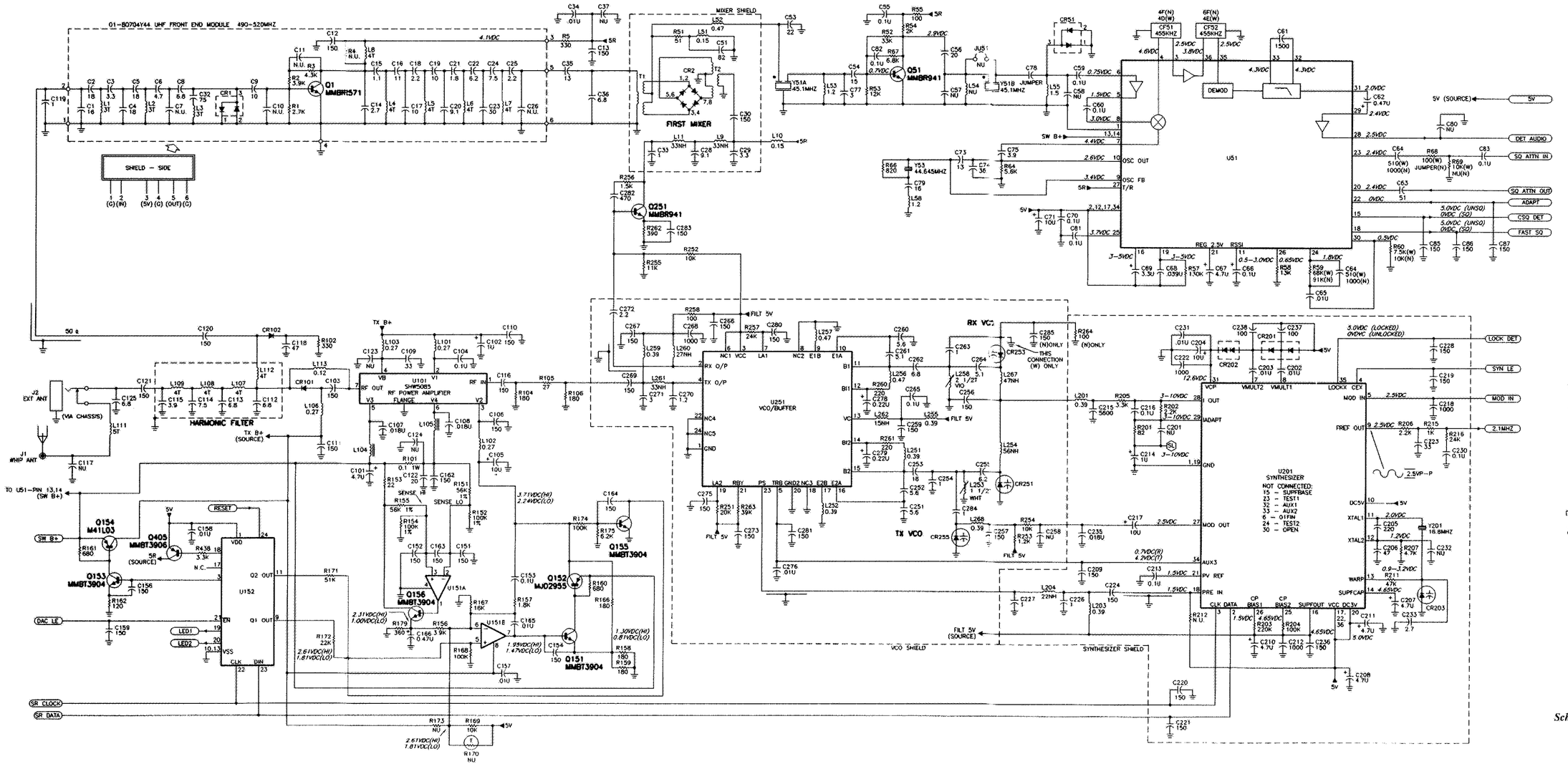
HLE8056C Main Board, 465-495 MHz, 12.5 kHz Channel Spacing (N)
HLE8054C Main Board, 465-495 MHz, 25 kHz (Channel Spacing (W) PL-921003-C

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
R491B	0660076A73	10k
R492B	0660076A70	7.5k
R493B (N)	0660076B09	220k
R493B (W)	or 0660076B13	330k
R494B	0660076B01	100k
R496B	0660076A37	330 ohms
R497B	0660076A41	470 ohms
R503T	0660076A37	330 ohms
R504T	0660076B07	180k
R505T	0660076B06	160k
R506T	0660076A82	24k
R507B	0660076A49	1k
SH100B	2680521D01	**shield:** syn, front
SH101B	2680520D01	VCO, front
SH102B	2680522D01	harmonic filter UHF
SH103T	2680692C03	mixer, back
SH104T	2680519D01	VCO, back
SH105T	2680518D01	syn, back, TCXO
SW401T	4080502B01	**switch:** freq., 16-position
SW401T	4080650D01	freq., 16-position, rotary
U51T	5180207R01	**integrated circuit: (see note)** IF
U101T	5180110R03	RF power module (UHF)
U151B	5185932W01	linear op amp
U152B	5105226P38	DAC IC
U201B*		synthesizer
U251B	5105414S84	VCO buffer
U401B*		microprocessor; 2 channel uP only microprocessor
U402T	5105165R77	APIC
U404T	5105469E65	voltage regulator
U405T	5180932W01	linear op amp
U406B	5102198J23	compactor
U407T	5180932W01	linear op amp
U409T	5180178R01	audio amplifier
U410B	5180159R01	dual trans NPNS
U411T	5180833C01	5 V regulator w/reset
VR401B	4880140L15	**voltage regulator: (see note)** diode Zener, 10 V tape & reel
Y51T (N)	9180112R06	**crystal: (see note)** 45.1 MHz filter
Y51T (W)	or 9180112R05	45.1 MHz filter
Y51AT (N)	0705196A11	SUPR XTAL mounting
Y53T	4880008K02	XTAL resonator 44.645 MHz 10PPM
Y201T*		16.8 MHz
Y401T	4880113R01	7.9488
		non-referenced items
	0580537C01	EYELET
	0580537C02	EYELET
	0780432C01	BATTERY, contact support
	1580413C01	HOUSING, option jack
	1580414C01	HOUSING, cover option jack
	1580433C01	HOUSING, RF jack
	2680412B01	SHIELD, RF jack
	2680416C01	SHIELD, option jack
	2680625B02	SHIELD, receiver
	3280415C01	SEAL, option jack
	3980405C01	CONTACT, spring #5
	3980406C01	CONTACT, spring #2
	3980407C01	CONTACT, spring #4
	3980408C01	CONTACT, spring #3
	3980409C01	CONTACT, spring #6
	3980410C01	CONTACT, spring #1
	3980434C01	CONTACT, RF jack T2
	3980435C01	CONTACT, RF jack T1
	5480570B01	LABEL, thermal high temp
	7580411C01	BUMPER 2.5 MM; 2 used
	7580611B01	PAD, front shield; 2 used

note: For optimum performance, diodes, transistors, and integrated circuits must be ordered by Motorola part numbers.

Reference designator ending in "T" denotes component is located on top side of circuit board. Reference designator ending in "B" denotes component is located on bottom side of circuit board.

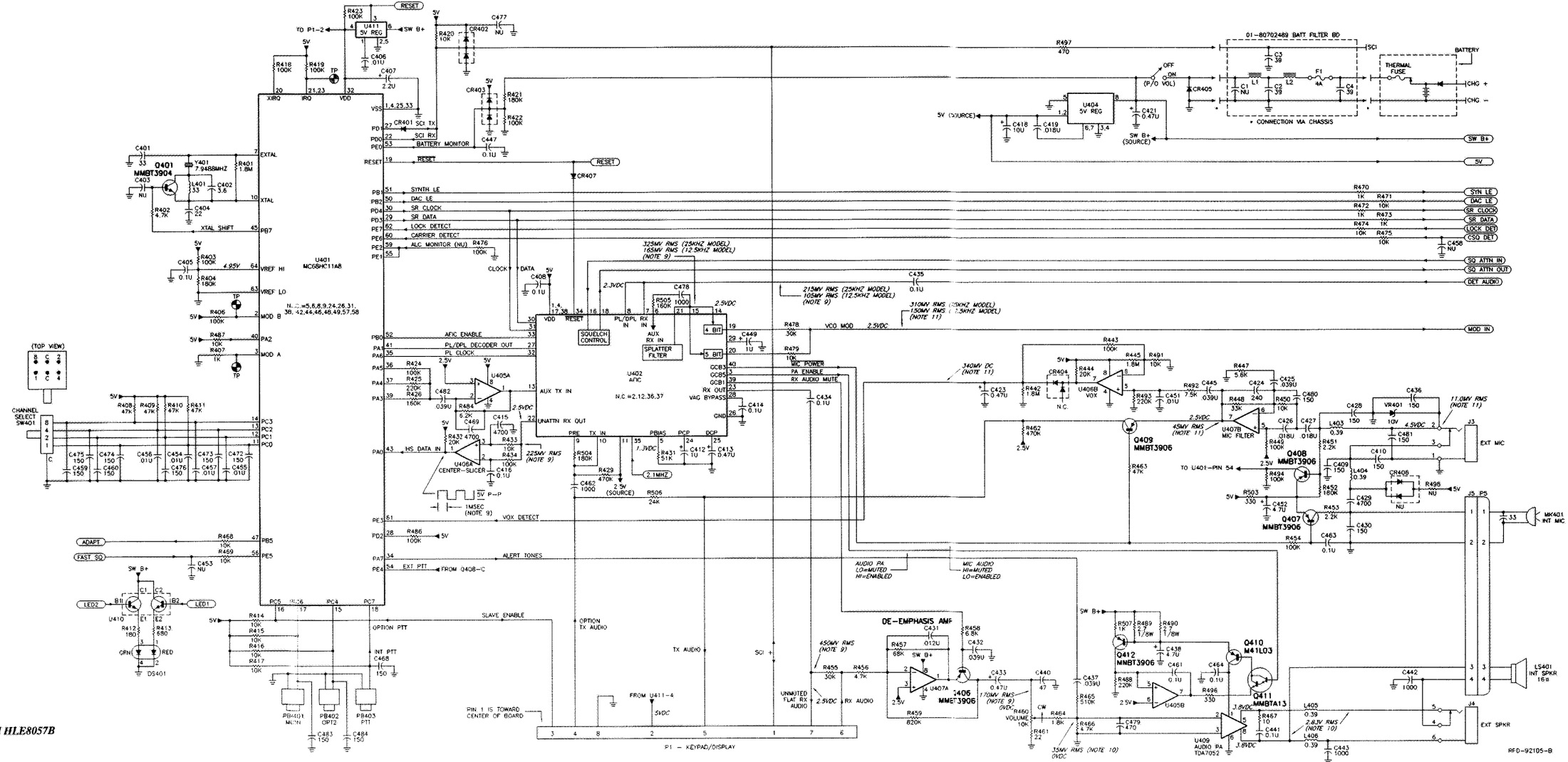
Reference designators marked with an asterisk "*" indicate components which are not field-replaceable because they need to be calibrated with specialized factory equipment after installation. Radios in which these parts have been replaced in the field will be off frequency at temperature extremes.



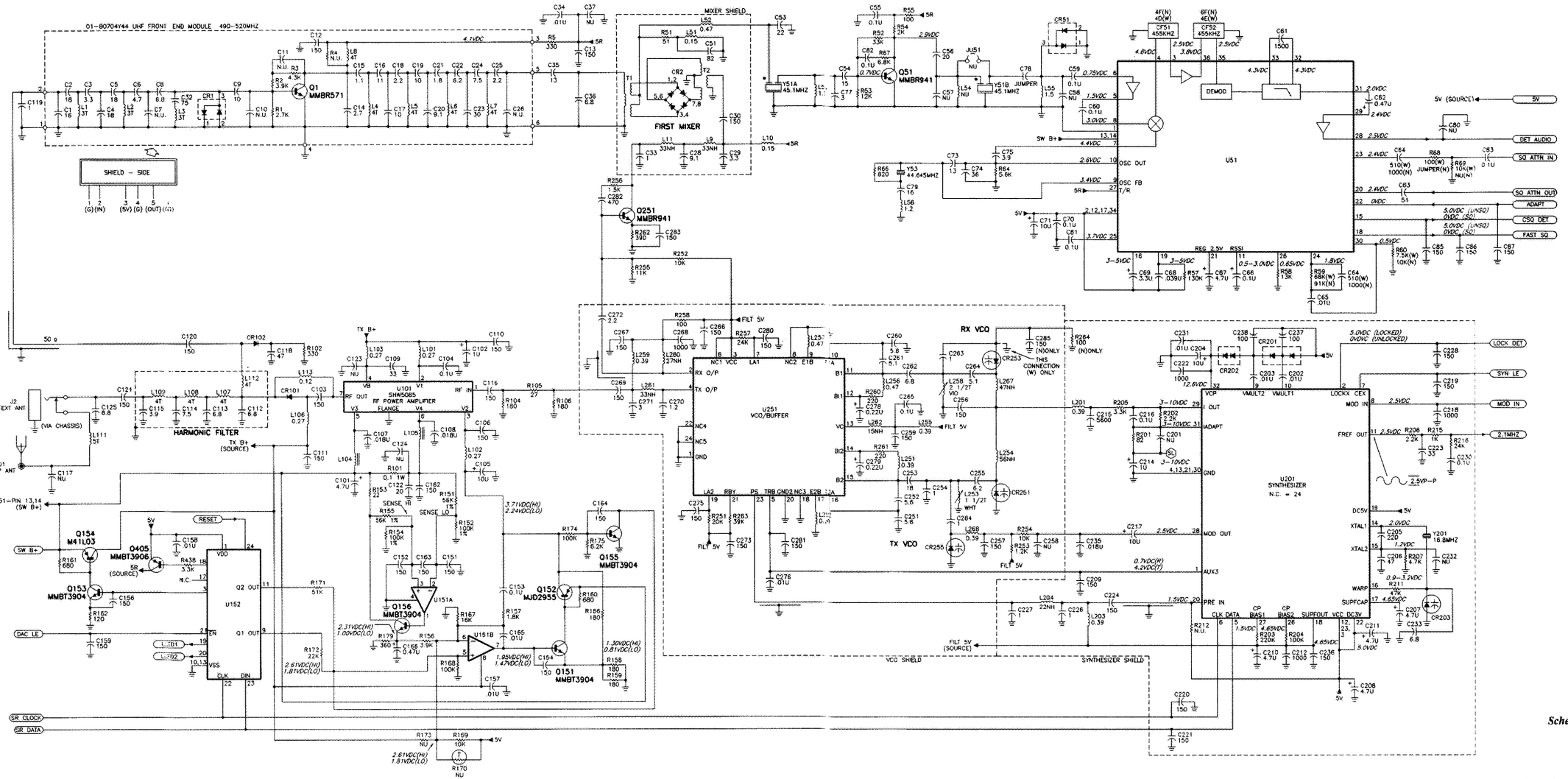
NOTES:

1. UNLESS OTHERWISE INDICATED, RESISTOR VALUES ARE IN OHMS, CAPACITOR VALUES ARE IN PICOFARADS, INDUCTOR VALUES ARE IN MICROHENRIES.
2. NON-POLARIZED CAPACITORS ARE CHIP-TYPE UNLESS OTHERWISE INDICATED.
3. POLARIZED CAPACITORS ARE CHIP-TANTALUM TYPE UNLESS OTHERWISE INDICATED.
4. "NU" MEANS COMPONENT IS NOT USED.
5. DC VOLTAGES ARE MEASURED WITH A HIGH IMPEDANCE (10 MEGOHM) DC VOLTMETER.
6. AC VOLTAGES ARE MEASURED WITH A HIGH IMPEDANCE AC RMS VOLTMETER.
7. ALL VOLTAGE MEASUREMENTS ARE IN THE RECEIVE MODE UNLESS INDICATED AS FOLLOWS:
   (R) RECEIVE MODE
   (T) TRANSMIT MODE
8. MEASURED IN THE RECEIVE MODE WITH AN ON-CHANNEL UNMODULATED SIGNAL AT A LEVEL OF -20 DBM.
9. MEASURED IN THE RECEIVE MODE WITH AN ON-CHANNEL SIGNAL AT A LEVEL OF -20 DBM, MODULATED WITH 1 KHZ AT 3 KHZ DEVIATION (FOR 20/25 KHZ MODELS) OR 1.5 KHZ DEVIATION (FOR 12.5 KHZ MODELS), MEASURED WITH AN AC RMS VOLTMETER.
10. SAME AS NOTE 9 EXCEPT WITH VOLUME CONTROL ADJUSTED FOR 500 MILLIWATTS (2.82 VOLTS RMS ACROSS 16-OHM LOAD CONNECTED TO THE EXT SPKR JACK).
11. MEASURED IN THE TRANSMIT MODE WITH A 1 KHZ, 11 MV RMS SIGNAL APPLIED TO THE EXTERNAL MICROPHONE INPUT.

Schematic Diagram for HLE8055B and HLE8057B
UHF Main Boards, 490-520 MHz
(sheet 1 of 2)



Schematic Diagram for HLE8055B and HLE8057B
UHF Main Boards, 490-520 MHz
(sheet 2 of 2)



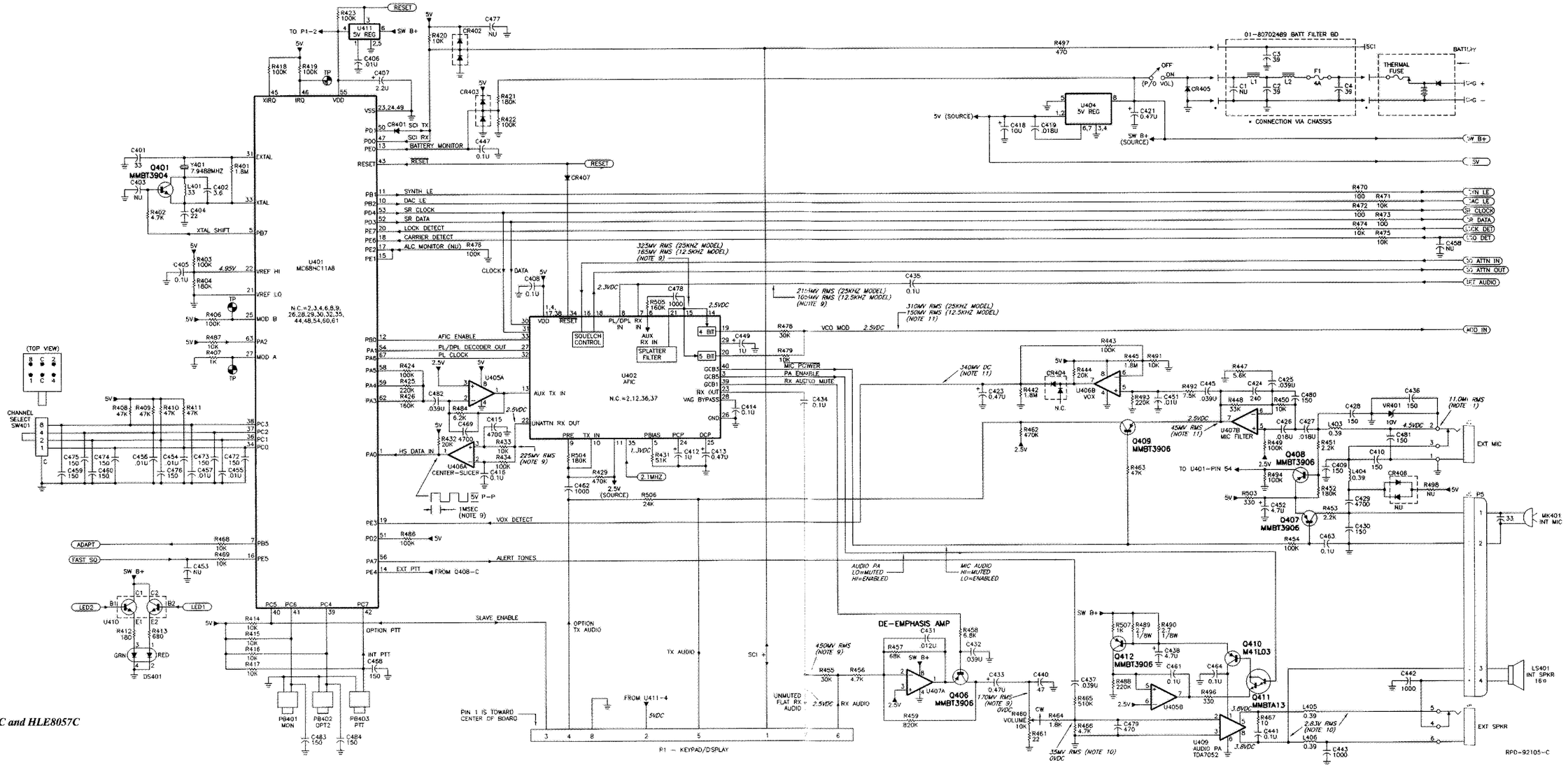
NOTES:

1. UNLESS OTHERWISE INDICATED, RESISTOR VALUES ARE IN OHMS, CAPACITOR VALUES ARE IN PICOFARADS, INDUCTOR VALUES ARE IN MICRONENRIES.
2. NON-POLARIZED CAPACITORS ARE CHIP-TYPE UNLESS OTHERWISE INDICATED.
3. POLARIZED CAPACITORS ARE CHIP-TANTALUM TYPE UNLESS OTHERWISE INDICATED.
4. "NU" MEANS COMPONENT IS NOT USED.
5. DC VOLTAGES ARE MEASURED WITH A HIGH IMPEDANCE (10 MEGOHM) DC VOLTMETER.
6. AC VOLTAGES ARE MEASURED WITH A HIGH IMPEDANCE AC RMS VOLTMETER.
7. ALL VOLTAGE MEASUREMENTS ARE IN THE RECEIVE MODE UNLESS INDICATED AS FOLLOWS:

   (R) RECEIVE MODE
   (T) TRANSMIT MODE
8. MEASURED IN THE RECEIVE MODE WITH AN ON-CHANNEL UNMODULATED SIGNAL AT A LEVEL OF −20 DBM.
9. MEASURED IN THE RECEIVE MODE WITH AN ON-CHANNEL SIGNAL AT A LEVEL OF −20 DBM, MODULATED WITH 1 KHZ AT 3 KHZ DEVIATION (FOR 20/25 KHZ MODELS) OR 1.5 KHZ DEVIATION (FOR 12.5 KHZ MODELS), MEASURED WITH AN AC RMS VOLTMETER.
10. SAME AS NOTE 8 EXCEPT WITH VOLUME CONTROL ADJUSTED FOR 500 MILLIWATTS (2.82 VOLTS RMS ACROSS 16-OHM LOAD CONNECTED TO THE EXT SPKR JACK).
11. MEASURED IN THE TRANSMIT MODE WITH A 1 KHZ, 11 MV RMS SIGNAL APPLIED TO THE EXTERNAL MICROPHONE INPUT.

RPD-92104-C

Schematic Diagram for HLE8055C and HLE8057C UHF Main Boards, 490-520 MHz (sheet 1 of 2)



Schematic Diagram for HLE8055C and HLE8057C UHF Main Boards, 490-520 MHz (sheet 2 of 2)

Parts List

HLE8057B Main Board, 490-520 MHz, 12.5 kHz Channel Spacing (N)
HLE8055B Main Board, 490-520 MHz, 20/25 kHz Channel Spacing (W) PL-921005-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		capacitor, fixed: pF +/-5%; 50 V: unless otherwise stated
C2	2113740G20	5.1, 0.1
C3	2113740G18	4.3, 0.1
C4	2113740G30	11, 2
C5	2113740G15	3.3, 0.1
C6	2113740G20	5.1, 0.1
C7, 8	2113740G28	9.1, 0.1
C9	2113740G32	13, 2
C11, 12	2113740A63	220
C13B	2113740A59	150
C15	2113740G08	1.5, 0.1
C16, 17	2113740G15	3.3, 0.1
C18	2113740G21	5.6, 0.1
C19	2113740G15	3.3, 0.1
C20	2113740G32	13, 2
C21	2113740G18	4.3, 0.1
C22	2113740G17	3.9, 0.1
C23	2113740G31	12, 2%
C24	2113740G18	4.3, 0.1
C25, 26	2113740G21	5.6, 0.1
C27	2113740A28	9.1, 0.25
C29T	2113740A15	3.3, 0.25
C30T	2113740A59	150
C32	2113740G29	10, 0.1
C33T	2113740A03	1, 0.25
C34B	2113741A45	0.01 uF
C35B	2113740A34	16
C36B	2113740A24	6.8, 0.25
C51T	2113740A53	82
C53B	2113740A37	22
C54B	2113740A33	15
C55T	2160521G37	0.1 uF, +80%-20%; 25V
C56T	2113740A36	20
C59T	2160521G37	0.1 uF, +80%-20%; 25V
C60B	2160521G37	0.1 uF, +80%-20%; 25V
C61B	2113741A25	1500
C62B	2113049A05	0.47 uF, 10%; 25V
C63T	2113740A68	51
C64B	2113740A79	1000 (12.5 kHz) or 2113740A72 510 (25 kHz)
C65B	2113741A45	0.01 uF
C66T	2160521G37	0.1 uF, +80%-20%; 25V
C67T	2311049J11	4.7 uF, 10%; 16V
C68T	2113741A59	0.039 uF
C69T	2311049J07	3.3 uF, 10%; 20V
C70B	2160521G37	0.1 uF, +80%-20%; 25V
C71B	2311049J25	10 uF, 10%; 16V
C73T	2113740A32	13
C74T	2113740A42	36
C75T	2113740A17	3.9, 0.25
C77B	2113740A14	3, 0.25
C78T	2160746M01	0 ohms, 0%
C79T	2113740A34	16
C81 thru 83B	2160521G37	0.1 uF, +80%-20%; 25V
C84B	2160746M01	0 ohms, 0% (12.5 kHz) or 2160521G37 0.1 uF, +80%-20%; 25V (25 kHz)
C85 thru 87B	2113740A59	150
C101B	2311049J11	4.7 uF, 10%; 16V
C102T	2311049J07	1 uF, 10%; 16V
C103B	2113740A59	150
C104B	2160521G37	0.1 uF, +80%-20%; 25V
C105B	2311049J25	10 uF, 10%; 16V
C106B	2113740A59	150
C107T	2113741A51	0.018 uF
C108B	2113741A51	0.018 uF
C109B	2113740A41	33
C110, 111B	2113740A59	150
C112, 113B	2113740A24	6.8, 0.25
C114B	2113740A25	7.54, 0.25 (12.5 kHz)
C115B	2113740A17	3.9, 0.25
C116T	2113740A59	150
C118B	2113740A46	47
C119B	2113740A03	1, 0.25
C120, 121B	2113740A59	150
C122B	2113740A36	20
C125T	2113740A24	6.8, 0.25
C151, 152B	2113740A59	150
C153B	2160521G37	0.1 uF, +80%-20%; 25V
C154B	2113740A59	150

HLE8057B Main Board, 490-520 MHz, 12.5 kHz Channel Spacing (N)
HLE8055B Main Board, 490-520 MHz, 20/25 kHz Channel Spacing (W) PL-921005-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
C156B	2113740A59	150
C157, 158B	2113741A45	0.01 uF
C159B	2113740A59	150
C162 thru 164B	2113740A58	100
C165B	2113741A45	0.01 uF
C166B	2311049A05	0.47 uF, 10%; 25V
C202, 203B	2113741A45	0.01 uF
C204T	2311049J27	10 uF, 10%; 25V
C205T	2113740A63	220
C206T	2113740G46	47, 2%
C207, 208B	2311049J11	4.7 uF, 10%; 16V
C209T	2113740A59	150
C210, 211B	2311049J11	4.7 uF, 10%; 16V
C212T	2113741A52	1000
C213T	2160521G37	0.1 uF, +80%-20%; 25V
C214B	2311049A07	1 uF, 10%; 16V
C215T	2113741A09	5600
C216B	2160521G37	0.1 uF, +80%-20%; 25V
C217T	2311049J25	10 uF, 10%; 16V
C218B	2113741A21	1000
C219 thru 221B	2113740A59	150
C222B	2113741A21	1000
C223B	2113740A41	33
C224B	2113740A59	150
C226, 227T	2113740A03	1, 0.25
C228B	2113740A59	150
C230B	2160521G37	0.1 uF, +80%-20%; 25V
C231B	2113741A45	0.01 uF
C232T	2113740G13	2.7, 0.1
C235B	2113741A51	0.018 uF
C236B	2113740A59	150
C237, 238B	2113740A55	100
C251, 252B	2113740A21	5.6, 0.25
C253B	2113740A35	18
C255B	2113740A23	6.2, 0.25
C256B	2113740A59	150
C257T	2113740A59	150
C259T	2113740A59	150
C260B	2113740A24	6.8, 0.25
C261B	2113740A20	5.1, 0.25
C262B	2113740A24	6.8, 0.25
C263B	2113740A03	1, 0.25
C264B	2113740A20	5.1, 0.25
C265T	2160521G37	0.1 uF, +80%-20%; 25V
C266, 267T	2113740A59	150
C268T	2113741A21	1000
C269T	2113740A59	150
C270T	2113740A05	1.2, 0.25
C271T	2113740A14	3, 0.25
C272T	2113740A11	2.2, 0.25
C273B	2113740A59	150
C275B	2113740A59	150
C276B	2113741A45	0.01 uF
C278, 279T	2311049A63	0.22 uF, 10%; 50V
C280B	2113740A59	150
C281T	2113740A59	150
C282T	2113740A71	470
C283T	2113740A59	150
C284B	2113740A03	1, 0.25
C285B	2113740A59	150 (12.5 kHz)
C401T	2113740A41	33
C402B	2113740G16	3.6, 0.1
C404T	2113740A37	22
C405B	2160521G37	0.1 uF, +80%-20%; 25V
C406T	2311049A60	2.2 uF, 10%; 10V
C408T	2160521G37	0.1 uF, +80%-20%; 25V
C409T	2113740A59	150
C412T	2311049A07	1 uF, 10%; 16V
C413T	2311049A05	0.47 uF, 10%; 25V
C414T	2160521G37	0.1 uF, +80%-20%; 25V
C415B	2113741A37	4700
C416B	2160521G37	0.1 uF, +80%-20%; 25V
C418T	2311049J25	10 uF, 10%; 16V
C419T	2113741A51	0.018 uF
C421T	2311049A05	0.47 uF, 10%; 25V
C423T	2311049A05	0.47 uF, 10%; 25V
C424T	2113740A84	240
C425T	2113741A59	0.039 uF
C426, 427B	2113741A51	0.018 uF
C428B	2113740A59	150
C429T	2113741A37	4700

HLE8057B Main Board, 490-520 MHz, 12.5 kHz Channel Spacing (N)
HLE8055B Main Board, 490-520 MHz, 20/25 kHz Channel Spacing (W) PL-921005-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
C430T	2113740A59	150
C431T	2113741A47	0.012 uF
C432T	2113741A59	0.039 uF
C433B	2311049A05	0.47 uF, 10%; 25V
C434, 435T	2160521G37	0.1 uF, +80%-20%; 25V
C436B	2113740A59	150
C437B	2113741A59	0.039 uF
C438B	2311049J11	4.7 uF, 10%; 16V
C440B	2113740A46	47
C441B	2160521G37	0.1 uF, +80%-20%; 25V
C442, 443B	2113740A79	1000
C445B	2113741A59	0.039 uF
C447B	2160521G37	0.1 uF, +80%-20%; 25V (12.5 kHz)
C449T	2311049A07	1 uF, 10%; 16V
C451B	2113741A45	0.01 uF
C452T	2311049J11	4.7 uF, 10%; 16V
C454B	2113741A45	0.01 uF
C455T	2113741A45	0.01 uF
C456B	2113741A45	0.01 uF
C457T	2113741A45	0.01 uF
C459, 460B	2113740A59	150
C461T	2160521G37	0.1 uF, +80%-20%; 25V
C462T	2113740A79	1000
C463T	2160521G37	0.1 uF, +80%-20%; 25V
C464B	2160521G37	0.1 uF, +80%-20%; 25V
C468B	2113740A59	150
C466T	2113741A37	4700
C472 thru 476B	2113740A59	150
C479B	2113740A79	1000
	or 2113741A37	4700
C479B	2113740A71	470
C480, 481B	2113740A59	150
C482T	2113741A59	0.039 uF (12.5 kHz)
C483, 484B	2113740A59	150 (12.5 kHz)
CF51T	9180453B04	**filter, ceramic:** mini -4 pole (12.5 kHz) 3 WR (25 kHz)
	or 9180098E06	
CF52T	9180454B04	mini -4 pole (12.5 kHz) 3 WR (25 kHz)
	9180098D05	
CL1 thru 4	4280138R01	**clip:** butterfly
CL6 thru 9	4280138R01	butterfly
CL11	4280138R01	butterfly (25 kHz)
CR2T	4880174R01	**diode: (see note)** quad 8-pin
CR51B	4800154K03	dual Schottky mixer
CR101, 102B	4880975Z02	pin
CR201, 202B	4813830C07	dual 100 W
CR203T	4805849Q04	VCTR RH 1T33T
CR251B	4805849Q02	VCTR RH 1T32T
CR253B	4805849Q02	VCTR RH 1T32T
CR255T	4805849Q02	VCTR RH 1T32T
CR401B	4809397T01	dual 100 W
CR402, 403B	4813833C07	dual 100 W
CR404B	4813833C07	dual 100 W
CR405B	4880107R01	silicon
CR407T	4813833C07	dual 100 W
DS401B	4805729G49	**light emitting diode: (see note)** diode red/yel
H102	1405160A02	**mechanical:** insulator, vertical
H108	0780511B01	bracket freq switch, plated (25 kHz)
J1T	3980515C02	**connector, receptacle:** antenna contact
J3B	0180417C01	assembly, option jack
J5B	0180195R01	speaker/mic header
L9T	2462587N47	**coil, inductor:** chip 33 NH, 5%
L10B	2483411T63	chip shielded
L11T	2462587N47	chip 33 NH, 5%
L51T	2483411T63	chip shielded
L52T	2462587N81	chip 470 NH, 5%
L53T	2462587N69	1200 NH, 5%

HLE8057B Main Board, 490-520 MHz, 12.5 kHz Channel Spacing (N)
HLE8055B Main Board, 490-520 MHz, 20/25 kHz Channel Spacing (W) PL-921005-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
L55T	2483411T75	chip shielded
L58T	2483411T74	chip shielded
L101 thru 103B	2411087A19	0.27 UH
L104, 105B	2484657R01	ferrite bead
L106B	2411087A19	0.27 UH
L107 thru 109B	2462587N53	120 nH
L111T	2405318D24	coil air wound tin plated
L112B	2483035N76	coil airwound
L113T	2462587N53	120 nH
L201T	2462587N22	chip 390 NH, 10%
L203T	2462587N22	chip 390 NH, 10%
L204T	2462587N07	chip 22 NH, 20%
L251, 252B	2462587N22	chip 390 NH, 10%
L253T	2480145S07	IFT 1-1/2 T brass core WHT
L254B	2462587N50	chip 56 NH, 5%
L255T	2462587N22	chip 390 NH, 10%
L256, 257B	2462587N61	chip 470 NH, 5%
L258T	2480145S08	2-1/2 VIOLET TOKO
L259T	2462587N53	chip 120 NH, 5%
L260T	2462587N46	chip 27 NH, 5%
L261T	2462587N47	chip 33 NH, 5%
L262T	2462587N43	15 nH
L267B	2462587N49	47 nH
L268T	2462587N22	chip 390 NH, 10%
L401B	2460578C43	chip 33.0 UH, 10%
L403, 404T	2462587N22	chip 390 NH, 10%
L405, 406B	2462587N22	chip 390 NH, 10%
M51	0705198A11	**motor:** SUPR XTAL MTG (25 MHz)
M501	4280126S01	clip, PA
ME60 thru 602	4080485C03	switch tactile
Q51B	4813827A07	**transistor: (see note)** NPN SML SIG
Q151B	4880214G02	NPN
Q152B	4813822A10	PWP 60V 10A
Q153B	4880214G02	NPN
Q154B	4880141L03	PNP
Q155, 156B	4880214G02	NPN
Q251B	4813827A07	NPN SML SIG
Q401B	4880214G02	NPN
Q405B	4805128M16	SOT MMBT3906 (PH) 48G22
Q406 thru 409T	4805128M16	SOT MMBT3906 (PH) 48G22
Q410B	4880141L03	PNP
Q411B	4805128M19	SOT-23
Q412B	4805128M16	SOT MMBT3906 (PH) 48G22
R5B	0660076A37	**resistor, fixed: +/-5%; 1/8 W:** 330 ohms
R6B	2113740A32	13
R51T	0660076A18	51 ohms
R52B	0660076A39	33K
R53B	0660076A75	12K
R54T	0660076A54	2K
R55T	0660076A25	100 ohms
R57T	0660076B04	130K
R58B	0660076A76	13K
R59B	0660076A96	91K (12.5 kHz) or 0660076A93 68K (25 kHz)
R60B	0660076A73	10K (12.5k) or 0660076A70 7.5K (25 kHz)
R64T	0660076A67	5.6K
R66B	0660076A47	820 ohms
R67B	0660076A69	6.8K
R68B	0660076M01	0 ohms, 0% (12.5 kHz) or 0660076A25 100 ohms (25 kHz)
R69B	0660076A73	10K
R101B	0680106R01	0.1 ohms, 1%; 1W
R102B	0660076A37	330 ohms
R104T	0660076A31	180 ohms
R105T	0660076A11	27 ohms
R106T	0660076A31	180 ohms
R151B	0660078E91	56K, 1%
R152B	0660076F01	100K, 1%
R153B	0660076A09	22 ohms
R154B	0660076F01	100K, 1%
R155B	0660076E91	56K, 1%
R156B	0660076A63	3.9K
R157B	0660076A55	1.8K

HLE8057B Main Board, 490-520 MHz, 12.5 kHz Channel Spacing (N)
HLE8055B Main Board, 490-520 MHz, 20/25 kHz Channel Spacing (W) PL-921005-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
R158, 159B	0660076A31	180 ohms
R160, 161B	0660076A45	680 ohms
R162B	0660076A27	120 ohms
R166B	0660076A31	180 ohms
R167B	0660076A78	16K
R168B	0660076B01	100K
R169T	0660076A73	10K
R171B	0660076A49	1K
R172B	0660076A81	22K
R174B	0660076B01	100K
R175B	0660076A84	6.2K, 4%
R179B	0660076A38	360 ohms
R201B	0660076A92	82 ohms
R202B	0660076B07	2.2K
R203B	0660076B09	220K
R204B	0660076B07	180K
R205T	0660076A61	3.3K
R206B	0660076A57	2.2K
R207T	0660076A65	4.7K
R211B	0660076A89	47K
R212B	0660076B01	100K
R215B	0660076A49	1K
R216B	0660076A82	24K
R251B	0660076A39	390 ohms
R252T	0660076A73	10K
R253T	0660076A51	1.2K
R254T	0660076A73	10K
R255T	0660076A74	11K
R256T	0660076A53	1.5K (25 kHz)
R257B	0660076A82	24K
R258T	0660076A25	100 ohms
R260, 261B	0660076A33	220 ohms
R262T	0660076A39	390 ohms
R263B	0660076A87	39K
R264B	0660076A25	100 ohms (12.5 kHz)
R401T	0660076H31	1.8 meg, 10%
R402B	0660076A85	4.7K
R403B	0660076B01	100K
R404B	0660076B07	180K
R406B	0660076B01	100K
R407B	0660076A49	1K
R408 thru 411B	0660076A73	10K
R412B	0660076A31	180 ohms
R413B	0660076A45	680 ohms
R414 thru 417B	0660076A73	10K
R418B	0660076B01	100K
R419T	0660076B01	100K
R420B	0660076A73	10K
R421B	0660076B07	180K
R422B	0660076B01	100K
R424T	0660076B01	100K
R425T	0660076B09	220K
R426T	0660076B06	160K
R429B	0660076B17	470K
R431T	0660076A50	51K
R432B	0660076A80	20K
R433B	0660076A73	10K
R434B	0660076B01	100K
R438B	0660076A61	3.3K
R442B	0660076H31	1.8 meg, 10%
R443B	0660076B01	100K
R444B	0660076A90	20K
R445B	0660076H31	1.8 meg, 10%
R447T	0660076A67	5.6K
R448T	0660076A85	33K
R449B	0660076B01	100K
R450B	0660076A73	10K
R451T	0660076A57	2.2K
R452T	0660076B07	180K
R453T	0660076A57	2.2K
R454T	0660076B01	100K
R455T	0660076A84	30K
R456T	0660076A65	4.7K
R457T	0660076A93	68K
R458T	0660076A69	6.8K
R459T	0660076B23	820K
R461B	0660076A09	22 ohms
R462T	0660076B17	470K
R463T	0660076A89	47K
R464B	0660076A55	1.8K

HLE8057B Main Board, 490-520 MHz, 12.5 kHz Channel Spacing (N)
HLE8055B Main Board, 490-520 MHz, 20/25 kHz Channel Spacing (W) PL-921005-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
R465B	0660076B18	510K
R466B	0660076A65	4.7K
R467B	0660076AA01	10 ohms
R468B	0660076A73	10K
R469T	0660076A73	10K
R470T	0660076A49	1K
R471B	0660076A73	10K
R472, 473B	0660076A49	1K
R474, 475T	0660076A73	10K
R476B	0660076B01	100K
R478T	0660076A84	30K
R479T	0660076A73	10K
R484T	0660076A68	6.2K, 4%
R486T	0660076B01	100K
R487B	0660076A73	10K
R488T	0660076B09	220K
R489, 490B	0611077A12	2.4K, 1%
R491B	0660076A73	10K
R492B	0660076B07	180K
R493B	0660076B09	220K
R494B	0660076B01	100K
R496B	0660076A37	330 ohms
R497B	0660076A61	470 ohms
R500T	0660076A37	330 ohms
R504T	0660076B07	180K
R505T	0660076B06	160K
R506T	0660076A82	24K
R507B	0660076A49	1K
SH100B	2880966Y01	**shield:** SYN front
SH101B	2880970Y01	VCO front
SH102B	2680136S01	harmonic filter, UHF
SW401T	4080502B01	**switch:** frequency, 16-position
U51T	5180207R01	**integrated circuit: (see note)** IF
U101T	5180102R04	RF power module (UHF)
U151B	5180932W01	linear op amp
U201B*	5105414S55	synthesizer
U404T	5105486E65	voltage regulator
U405T	5180932W01	linear op amp
U406B	5102198J23	comparator LM2903D SO T/R
U407T	5180932W01	linear op amp
U409T	5180175R01	audio amplifier
U410B	5180155R01	dual trans NPN/S
U411T	5180633C01	5V regulator w/reset (12.5 kHz)
VR401B	4880140L15	**voltage regulator: (see note)** diode Zener 10V tape/reel
Y51T	9180112R06	**crystal: (see note)** 45.1 MHz filter (12.5 kHz)
	or 9180112R05	45.1 MHz filter (25 kHz)
Y51AT	0705196A11	SUPR XTAL MTG
Y53T	4840006N02	XTAL resonator 44.645MHZ 10PPM
Y401T	4880113R01	CRYSTAL 7.9488

non-referenced items

	0185444C01	ASSEMBLY, RF jack
	0300136783	SCREW, 2-56* x 5/16* Phillips; 2 used
	0580537C01	EYELET
	0580537C02	EYELET
	0660078A53	1.5K (12.5 kHz)
	0660076A64	4.5K
	0780102S01	HEADFRAME
	0780165R02	BOOT, crystal
	0780432C01	CONTACT, battery support
	0780511B01	BRACKET, freq switch, plated (12.5 kHz)
	1480168S01	INS., XTAL (2 used)
	1580413C01	HOUSING, option jack
	1580414C01	HOUSING, cover option jack
	1580433C01	HOUSING, RF jack
	1880143Q02	VOLUME POT
	2113740G25	7.5, 0.1 pF
	2580163M03	XFMR COI; 2 used
	2880412B01	BRACKET
	2880416C01	SHIELD; option jack
	2880625B02	SHIELD, receiver

HLE8057B Main Board, 490-520 MHz, 12.5 kHz Channel Spacing (N)
HLE8055B Main Board, 490-520 MHz, 20/25 kHz Channel Spacing (W) PL-921005-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		capacitor, fixed: pF +/-5%; 50 V: unless otherwise stated
C1	2113740G34	16, 2
C2	2113740G35	18, 2%
C3	2113740G15	3.3, 0.1
C6	2113740G19	4.7, 0.1
C8	2113740G24	6.8, 0.1
C12	2113740A59	150
C14	2113740G13	2.7, 0.1
C16	2113740G30	11, 2
C17	2113740G29	10, 0.1
C18	2113740G11	2.2, 0.1
C19	2113740G29	10, 0.1
C20	2113740G28	9.1, 0.1
C21	2113740G09	1.8, 0.1
C22	2113740A29	10 uF
C23	2113740G40	30, 2%
C24	2113740G25	7.5, 0.1
C25	2113740A11	2.2, 0.1
C32	2113740A52	75
CR1	4880154K03	**diode: (see note)** dual Schottky mixer
L1 thru 3	2405488C22	**coil, inductor:** air wound tin plated 3 turn
L4 thru 8	2405488C10	air wound tin plated 4 turn
Q1	4882022N67	**transistor: (see note)** NPN amplifier
R1	0680076A59	**resistor, fixed: +/-5%; 1/8 W:** unless otherwise stated 2.7K
R2	0660076A63	3.9K
R3	0660076A64	4.3K

non-referenced items

	0780102S01	LEADFRAME (6 used)
	2113740G04	1.1 pF, 0.1 pF; 50V
	2680625B02	SHIELD, receiver

note: For optimum performance, diodes, transistors, and integrated circuits must be ordered by Motorola part numbers.

Reference designator ending in "T" denotes component is located on top side of circuit board. Reference designator ending in "B" denotes component is located on bottom side of circuit board. Reference designators marked with an asterisk indicate components which are not field-replaceable.

Parts List

0180702Y89 Battery Filter Board PL-911016-A

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		capacitor, fixed: pF +/-5%; 50 V: unless otherwise stated
C2 thru 4	2113740A43	39
L1, 2	2484657R01	**coil, rf:** ferrite bead
F1	6505663R04	**fuse:** 4 A

non-referenced items

	3980165S01	CONTACT, battery

Parts List

0180702Y44 Receiver Module, 490-520 MHz (part of HLE8055B or HLE8057B Main Board) PL-921006-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		capacitor, fixed: pF +/-5%; 50 V: unless otherwise stated
C1	2113740G34	16, 2
C2	2113740G35	18, 2%
C3	2113740G15	3.3, 0.1
C6	2113740G19	4.7, 0.1
C8	2113740G24	6.8, 0.1
C12	2113740A59	150
C14	2113740G13	2.7, 0.1
C16	2113740G30	11, 2
C17	2113740G29	10, 0.1
C18	2113740G11	2.2, 0.1
C19	2113740G29	10, 0.1
C20	2113740G28	9.1, 0.1
C21	2113740G09	1.8, 0.1
C22	2113740A29	10 uF
C23	2113740G40	30, 2%
C24	2113740G25	7.5, 0.1
C25	2113740A11	2.2, 0.1
C32	2113740A52	75
CR1	4880154K03	**diode: (see note)** dual Schottky mixer
L1 thru 3	2405488C22	**coil, inductor:** air wound tin plated 3 turn
L4 thru 8	2405488C10	air wound tin plated 4 turn
Q1	4882022N67	**transistor: (see note)** NPN amplifier
R1	0680076A59	**resistor, fixed: +/-5%; 1/8 W:** unless otherwise stated 2.7K
R2	0660076A63	3.9K
R3	0660076A64	4.3K

non-referenced items

	0780102S01	LEADFRAME (6 used)
	2113740G04	1.1 pF, 0.1 pF; 50V
	2680625B02	SHIELD, receiver

note: For optimum performance, diodes, transistors, and integrated circuits must be ordered by Motorola part numbers.

This module is not field-repairable.

Parts Lists for HLE8055B and HLE8057B UHF Main Boards, 490-520 MHz

Parts List

0180707Y51 Receiver Module, 490-520 MHz
(part of HLE8055C or HLE8057C Main Board) PL-921006-C

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		capacitor, fixed: pF +/-5%; 50 V: unless otherwise stated
C1		6.8, ±0.1
C2, 3		9.1, ±0.1
C5, 4		6.2, ±0.1
C6		4.7, ±0.1
C7		15, ±2%
C8		3.3, ±0.1
C9		4.3, ±0.1
C10		8.2, ±0.1
C11		15, ±2%
C12		10, ±2%
C13		18, ±2%
C14		150, ±5%
C15		1.8, ±0.1
C16		2, ±0.1
C17		3.3, ±0.1
C18		7.5, ±0.1
C19		3.6, ±0.1
C20		16, ±2%
C21, 22		3.3, ±0.1
C23		13, ±2%
C24		4.3, ±0.1
C25		5.6, ±0.1
C26		6.8, ±0.1
C27		1.8, ±0.1
C28		150, ±30%
		diode: (see note)
CR1		dual Schottky mixer
		transistor: (see note)
Q1		NPN amplifier
		resistor, fixed: +/-5%; 1/8 W: unless otherwise stated
R1		4.7k
R2		3.9k
R3		13k
		non-referenced items
		LEADFRAME (6 used)
		SHIELD, receiver

note: For optimum performance, diodes, transistors, and integrated circuits must be ordered by Motorola part numbers.

This module is not field-repairable because it needs to be calibrated with specialized factory equipment after installation. Radios in which these parts have been replaced in the field will be off frequency at temperature extremes.

Parts List

0180702Y89 Battery Filter Board PL-911016-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		capacitor, fixed: pF +/-30%; 50 V: unless otherwise stated
C2 thru 4	2113740A43	39
		coil, inductors:
E1, 2	2484657R01	ferrite bead
		fuse:
F1	6580561D02	4 A
		non-referenced items
	3980165S01	CONTACT, battery; B+ pad

Parts Lists for HLE8055C and HLE8057C UHF Main Boards, 490-520 MHz

Parts List

HLE8057C Main Board, 490-520 MHz, 12.5 kHz Channel Spacing (N)
HLE8055C Main Board, 490-520 MHz, 20/25 kHz Channel Spacing (W) PL-921005-C

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		capacitor, fixed: pF +/-5%; 50 V: unless otherwise stated
C13B	2113740A59	150, ±30%
C29T	2113740A28	9.1, ±30%
C29T	2113740A15	3.3, ±30%
C30T	2113740A59	150, ±30%
C33T	2113740A03	1, ±30%
C34B	2113741A45	0.01 uF
C35B	2113740A34	16, ±30%
C36B	2113740A24	6.8, ±30%
C51T	2113740A53	82, ±30%
C53B	2113740A57	22, ±30%
C54B	2113740A33	15, ±30%
C55T	2160521G37	0.1 uF, +80%/-20%, 25 V
C56T	2113740A36	20, ±30%
C59T	2160521G37	0.1 uF, +80%/-20%, 25 V
C60B	2160521G37	0.1 uF, +80%/-20%, 25 V
C61B	2113741A25	1500
C62B	2311049A05	0.47 uF, ±10%, 25 V
C63T	2113740A48	51, ±30%
C64B (N)	2113740A79	1000, ±30%
C64B (W)	or 2113740A72	510, ±30%
C65B	2113741A45	0.01 uF
C66T	2160521G37	0.1 uF, +80%/-20%, 25 V
C67T	2311049J11	4.7 uF, ±10%, 16 V
C68T	2113741A59	0.039 uF
C69T	2311049J07	3.3 uF, ±10%, 20 V
C70B	2160521G37	0.1 uF, +80%/-20%, 25 V
C71B	2311049J25	10 uF, ±10%, 16 V
C73T	2113740A32	13, ±30%
C74T	2113740A42	36, ±30%
C75T	2113740A17	3.9, ±30%
C77B	2113740A14	3, ±30%
C78T	0660076M01	0 ohms,50 meg., 1/8 W
C79T	2113740A34	16, ±30%
C81 thru 83B	2160521G37	0.1 uF, +80%/-20%, 25 V
C84B (N)	0660076M01	0 ohms, 50 meg.
C84B (W)	or 2160521G37	0.1 uF, +80%/-20%, 25 V
C85 thru 87B	2113740A59	150, ±30%
C101B	2311049J11	4.7 uF, ±10%, 16 V
C102T	2311049A07	1 uF, ±10%, 16 V
C103B	2113740A59	150, ±30%
C104B	2160521G37	0.1 uF, +80%/-20%, 25 V
C105B	2311049J25	10 uF, ±10%, 16 V
C106B	2113740A59	150, ±30%
C107T	2113741A51	0.018 uF
C108B	2113741A51	0.018 uF
C109B	2113740A41	33, ±30%
C110, 111B	2113740A59	150, ±30%
C112, 113B	2113740A24	6.8, ±30%
C114B	2113740A25	7.5, ±30%
C115B	2113740A17	3.9, ±30%
C116T	2113740A59	150, ±30%
C118B	2113740A46	47, ±30%
C119B	2113740A03	1, ±30%
C120, 121B	2113740A59	150, ±30%
C122B	2113740A26	20, ±30%
C125T	2113740A24	6.8, ±30%
C151, 152B	2113740A59	150, ±30%
C153B	2160521G37	0.1 uF, +80%/-20%, 25 V
C154B	2113740A59	150, ±30%
C156B	2113740A59	150, ±30%
C157, 158B	2113741A45	0.01 uF
C159B	2113740A59	150, ±30%
C162 thru 164B	2113740A59	150, ±30%
C165B	2113741A45	0.01 uF
C166B	2311049A05	0.47 uF, ±10%, 25 V
C202, 203B	2113741A45	0.01 uF
C204T	2311049J27	10 uF, ±10%, 25 V
C205T	2113740A53	220, ±30%
C206T	2113740G46	47, ±2%
C207, 208B	2311049J11	4.7 uF, ±10%, 16 V
C209T	2113740A59	150, ±30%
C210, 211B	2311049J11	4.7 uF, ±10%, 16 V
C212T	2113741A21	1000
C214B	2311049A07	1 uF, ±10%, 16 V
C215T	2113741A39	5600
C216B	2160521G37	0.1 uF, +80%/-20%, 25 V
C217T	2311049J25	10 uF, ±10%, 16 V
C218B	2113741A21	1000

HLE8057C Main Board, 490-520 MHz, 12.5 kHz Channel Spacing (N)
HLE8055C Main Board, 490-520 MHz, 20/25 kHz Channel Spacing (W) PL-921005-C

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
C219 thru 221B	2113740A59	150, ±30%
C222B	2113741A21	1000
C223B	2113740A41	33, ±30%
C224T	2113740A59	150, ±30%
C226, 227T	2113740A03	1, ±30%
C228B	2113740A59	150, ±30%
C230B	2160521G37	0.1 uF, +80%/-20%, 25 V
C231B	2113741A45	0.01 uF
C233T	2113740G24	6.8, ±0.1
C235B	2113741A51	0.018 uF
C236B	2113740A59	150, ±30%
C237, 238B	2113740A55	100, ±30%
C251, 252B	2113740A21	5.6, ±30%
C253B	2113740A35	16, ±30%
C254B	2113740A03	1, ±30%
C255B	2113740A23	6.2, ±30%
C256B	2113740A59	150, ±30%
C257T	2113740A59	150, ±30%
C259T	2113740A59	150, ±30%
C260B	2113740A21	5.6, ±30%
C261B	2113740A20	5.1, ±30%
C262B	2113740A24	6.8, ±30%
C263B	2113740A03	1, ±30%
C264B	2113740A20	5.1, ±30%
C265T	2160521G37	0.1 uF, +80%/-20%, 25 V
C266, 267T	2113740A59	150, ±30%
C268T	2113741A21	1000
C269T	2113740A59	150, ±30%
C270T	2113740A05	1.2, ±30%
C271T	2113740A14	3, ±30%
C272T	2113740A11	2.2, ±30%
C273B	2113740A59	150, ±30%
C275B	2113740A59	150, ±30%
C276B	2113741A45	0.01 uF
C278, 279T	2311049A03	0.22 uF, ±10%, 35 V
C280B	2113740A59	150, ±30%
C281T	2113740A59	150, ±30%
C282T	2113740A71	470, ±30%
C283T	2113740A59	150, ±30%
C284B	2113740A03	1, ±30%
C285B (N)	2113740A59	150, ±30%
C401T	2113740A41	33, ±30%
C402B	2113740G16	3.6, ±0.1
C404T	2113740A37	22, ±30%
C405B	2160521G37	0.1 uF, +80%/-20%, 25 V
C406T	2113741A45	0.01 uF
C407T	2311049A40	2.2 uF, ±10%, 10 V
C408T	2160521G37	0.1 uF, +80%/-20%, 25 V
C409, 410T	2113740A59	150, ±30%
C412T	2311049A07	1 uF, ±10%, 16 V
C413T	2311049A05	0.47 uF, ±10%, 25 V
C414T	2160521G37	0.1 uF, +80%/-20%, 25 V
C415B	2113741A37	4700
C416B	2160521G37	0.1 uF, +80%/-20%, 25 V
C418T	2311049J25	10 uF, ±10%, 16 V
C419T	2113741A51	0.018 uF
C421T	2311049A05	0.47 uF, ±10%, 25 V
C423T	2311049A05	0.47 uF, ±10%, 25 V
C424T	2113740A64	240
C425T	2113741A59	0.039 uF
C428, 427B	2113741A51	0.018 uF
C428B	2113740A59	150, ±30%
C429T	2113741A37	4700
C430T	2113740A59	150, ±30%
C431T	2113741A47	0.012 uF
C432T	2113741A59	0.039 uF
C433B	2311049A05	0.47 uF, ±10%, 25 V
C434, 435T	2160521G37	0.1 uF, +80%/-20%, 25 V
C436B	2113740A59	150, ±30%
C437B	2113741A59	0.039 uF
C438B	2311049J11	4.7 uF, ±10%, 16 V
C440B	2113740A48	47, ±30%
C441B	2160521G37	0.1 uF, +80%/-20%, 25 V
C442, 443B	2113740A79	1000, ±30%
C445B	2113741A59	0.039 uF
C447B	2160521G37	0.1 uF, +80%/-20%, 25 V
C449T	2311049A07	1 uF, ±10%, 16 V
C451B	2113741A45	0.01 uF
C452T	2311049J11	4.7 uF, ±10%, 16 V
C454B	2113741A45	0.01 uF
C455T	2113741A45	0.01 uF

HLE8057C Main Board, 490-520 MHz, 12.5 kHz Channel Spacing (N)
HLE8055C Main Board, 490-520 MHz, 20/25 kHz Channel Spacing (W) PL-921005-C

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
C458B	2113741A45	0.01 uF
C457T	2113741A45	0.01 uF
C459, 460B	2113740A59	150, ±30%
C461T	2160521G37	0.1 uF, +80%/-20%, 25 V
C462T	2113740A79	1000, ±30%
C463, 464T	2160521G37	0.1 uF, +80%/-20%, 25 V
C468B	2113740A59	150, ±30%
C469T	2113741A37	4700
C472 thru 476B	2113740A59	150, ±30%
C476B (N)	2113740A79	1000
C476B (W)	or 2113741A37	4700
C479B	2113740A71	470, ±30%
C480, 481B	2113740A59	150, ±30%
C482T	2113741A59	0.039 uF
C483, 484B	2113740A59	150, ±30%
		filter, ceramic:
CF51T (N)	9180453B04	mini - 6 pole
CF51T (W)	or 9180908D06	3 WR
CF52T (N)	9180454B04	mini - 4 pole
CF52T (W)	9180908D05	3 WR
		clip:
CL1 thru 4T	4280138R02	butterfly
CL5 thru 8T	4280138R02	butterfly
CL9B	4280138R02	butterfly
		diode: (see note)
CR2T	4880174R01	quad 8-pin
CR51B	4880154K03	dual Schottky mixer
CR101, 102B	4880973Z02	pin
CR201, 202B	4813833C07	dual 100 W
CR203	4805649O04	VCTR RH 1T33T
CR251B	4805649Q02	VCTR RH 1T32T
CR253B	4805649Q02	VCTR RH 1T32T
CR255	4805649Q02	VCTR RH 1T32T
CR401B	4880939T01	Schottky barrier
CR402, 403B	4813833C07	dual 100 W
CR404B	4813833C07	dual 100 W
CR405B	4880107R01	rectifier
CR407	4813833C07	dual 100 W
		light emitting diode: (see note)
DS401B	4805729G49	diode red/yel
		mechanical:
H100T	1480168S01	insulator, XTAL (2 used)
H101T	0330136T83	screw, 2-56" x 5/16" Phillips; 2 used
H102T	1405160A02	insulator, crystal
H108T	0780511B01	bracket freq switch, plated
		connector, receptacle:
J1T	3980155C02	antenna contact
J2T	0180444C01	assembly, RF jack
J3B	0180417C01	assembly, option jack
J5B	0180195R03	speaker/mic header
		coil, inductor: +/-5%, chip: unless otherwise stated
L9T	2462587X47	33 nH
L10B	2483411T63	shielded
L11T	2462587X47	33 nH
L51T	2483411T63	shielded
L52T	2462587X61	470 nH
L53T	2462587N69	1200 nH
L55T	2483411T75	shielded
L58T	2483411T74	shielded
L101 thru 103B	2411087A19	0.27 uH, ±10%
L104, 105B	2484657R01	ferrite bead
L106B	2411087A19	0.27 uH, ±10%
L107 thru 109B	2483035N76	coil airwound
L111T	2405318D24	coil air wound tin plated
L112B	2483035N76	coil airwound
L113T	2462587X54	120 nH
L201T	2462587X22	390 nH, ±10%
L203T	2462587X22	390 nH, ±10%
L204T	2462587X07	22 nH, ±20%
L251, 252B	2462587X22	390 nH, ±10%
L253T	2480145S07	RF 1-1/2 T brass core WHT
L254B	2462587X50	56 nH
L255T	2462587X22	390 nH, ±10%
L256, 257B	2462587X61	470 nH
L258T	2480145S08	2-1/2 violet TOKO
L259T	2462587X22	390 nH, ±10%

HLE8057C Main Board, 490-520 MHz, 12.5 kHz Channel Spacing (N)
HLE8055C Main Board, 490-520 MHz, 20/25 kHz Channel Spacing (W) PL-921005-C

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
L260T	2462587X46	27 nH
L261T	2462587X47	33 nH
L262T	2462587X43	15 nH
L267B	2462587X49	47 nH
L268T	2462587X22	390 nH, ±10%
L401B	2460578C43	33.0 uH, ±10%
L403, 404T	2462587X22	390 nH, ±10%
L405, 406B	2462587X22	390 nH, ±10%
T1 2T	2580163M03	XFMR; 2 used
		meter:
M51T (W)	0705196A11	SUPR XTAL MTG
M501T	4280126S01	clip, PA
M600 thru 602T	4080485C08	switch, tactile
M700T	0780165R02	bpot, crystal
		transistor: (see note)
Q51B	4813827A07	NPN SML SIG
Q151B	4880214G02	NPN
Q152B	4813822A10	PNP 60 V, 10A
Q153B	4880214G02	NPN
Q154B	4880141L03	PNP
Q155, 156B	4880214G02	NPN
Q251T	4813827A07	NPN SML SIG
Q401B	4880214G02	NPN
Q405B	4805128M16	SOT MMBT3906 (RH) 48G22
Q408 thru 409T	4805128M16	SOT MMBT3906 (RH) 48G22
Q410B	4880141L03	NPN
Q411B	4805128M19	SOT-23 MBTA13 (RH)
Q412B	4805128M16	SOT MMBT3906 (RH) 48G22
		resistor, fixed: +/-5%; 1/8 W:
R5B	0660076A37	330 ohms
R6B	2113740A32	13, ±30%
R51T	0660076A18	51 ohms
R52B	0660076A85	33k
R53B	0660076A75	12k
R54T	0660076A56	2k
R55T	0660076A25	100 ohms
R57T	0660076B04	130k
R58B	0660076A76	13k
R59B (N)	0660076A96	91k
R59B (W)	or 0660076A93	68k
R60B (N)	0660076A73	10k
R60B (W)	or 0660076A70	7.5k
R641	0660076A67	5.6k
R66B	0660076A47	820 ohms
R67B	0660076A69	6.8k
R68B (N)	0660076M01	0 ohms, 50 meg.
R68B (W)	or 0660076A25	100 ohms
R69B (W)	0660076A73	10k
R101B	0680106R01	0.1 ohms, ±1%; 1 W
R102B	0660076A37	330 ohms
R104T	0660076A31	180 ohms
R105T	0660076A11	27 ohms
R106T	0660076A31	180 ohms
R151B	0660076E91	56k, ±1%
R152B	0660076F01	100k, ±1%
R153B	0660076A09	22 ohms
R154B	0660076F01	100k, ±1%
R155B	0660076E91	56k, ±1%
R156B	0660076A63	3.9k
R157B	0660076A55	1.8k
R158, 159B	0660076A31	180 ohms
R160, 161B	0660076A45	680 ohms
R162B	0660076A27	120 ohms
R166B	0660076A31	180 ohms
R167B	0660076A78	16k
R168B	0660076B01	100k
R169T	0660076A73	10k
R171B	0660076A90	51k
R172B	0660076A81	22k
R174B	0660076B01	100k
R175B	0660076A68	6.2k
R179B	0660076A38	360 ohms
R201B	0660076A23	82 ohms
R202B	0660076A57	2.2k
R203B	0660076B09	220k
R204B	0660076B01	100k
R205T	0660076A61	3.3k
R206B	0660076A57	2.2k
R207T	0660076A65	4.7k

HLE8057C Main Board, 490-520 MHz, 12.5 kHz Channel Spacing (N)
HLE8055C Main Board, 490-520 MHz, 20/25 kHz Channel Spacing (W) PL-921005-C

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
R211B	0660076A89	47k
R212B	0660076A73	10k
R215B	0660076A49	1k
R216B	0660076A82	24k
R251B	0660076A60	20k
R252T	0660076A73	10k
R253T	0660076A51	1.2k
R254T	0660076A73	10k
R255T	0660076A74	11k
R256T	0660076A53	1.5k
R257B	0660076A82	24k
R258T	0660076A25	100 ohms
R260, 261E	0660076A33	220 ohms
R262T	0660076A39	390 ohms
R263B	0660076A87	39k
R264B (N)	0660076A25	100 ohms
R401T	0660076H31	1.8 meg, ±10%
R402B	0660076A65	4.7k
R403B	0660076B01	100k
R404B	0660076B07	180k
R406B	0660076B01	100k
R407B	0660076A49	1k
R408 thru 410B	0660076A89	47k
R412B	0660076A31	180 ohms
R413B	0660076A45	680 ohms
R414 thru 416B	0660076A73	10k
R418B	0660076B01	100k
R419T	0660076B01	100k
R420B	0660076A73	10k
R421B	0660076B07	180k
R422B	0660076B01	100k
R423, 424T	0660076B01	100k
R425T	0660076B09	220k
R426T	0660076B06	160k
R429B	0660076B17	470k
R431T	0660076A91	51k
R432B	0660076A80	20k
R433B	0660076A73	10k
R434B	0660076B01	100k
R438B	0660076A61	3.3k
R442B	0660076H31	1.8 meg, ±10%
R443B	0660076B01	100k
R444B	0660076A80	20k
R445B	0660076H31	1.8 meg, ±10%
R447T	0660076A67	5.6k
R448T	0660076A85	33k
R449B	0660076B01	100k
R450B	0660076A73	10k
R451T	0660076A57	2.2k
R452T	0660076B07	180k
R453T	0660076A57	2.2k
R454T	0660076B01	100k
R455T	0660076A84	30k
R456T	0660076A65	4.7k
R457T	0660076A93	68k
R458T	0660076A69	6.8k
R459T	0660076B23	820k
R460T	1880143S02	volume, potentiometer
R461B	0660076A09	22 ohms
R462T	0660076B17	470k
R463T	0660076A89	47k
R464B	0660076A55	1.8k
R465B	0660076B18	510k
R466B	0660076A65	4.7k
R467B	0660076A01	10 ohms
R468B	0660076A87	39k
R469T	0660076A73	10k
R470T	0660076A25	100 ohms
R471B	0660076A73	10k
R472, 473E	0660076A25	100 ohms
R474, 475T	0660076A73	10k
R476B	0660076B01	100k
R478T	0660076A84	30k
R479T	0660076A73	10k
R484T	0660076A68	6.2k
R486T	0660076B01	100k
R487B	0660076A73	10k
R488T	0660076B09	220k
R489, 490E	0811077A12	2.7 ohms
R491B	0660076A73	10k

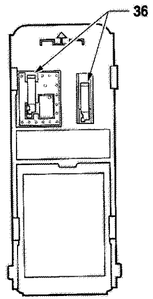
HLE8057C Main Board, 490-520 MHz, 12.5 kHz Channel Spacing (N)
HLE8055C Main Board, 490-520 MHz, 20/25 kHz Channel Spacing (W) PL-921005-C

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
R492B	0660076A70	7.5k
R493B	0660076B09	220k
R494B	0660076B01	100k
R496B	0660076A33	330 ohms
R497B	0660076A41	470 ohms
R503T	0660076A37	330 ohms
R504T	0660076B07	180k
R505T	0660076B06	160k
R506T	0660076A82	24k
R507B	0660076A49	1k
		shield:
SH100B	2680966Y01	syn front
SH101B	2680970Y01	VCO front
SH102B	2680136S01	harmonic filter, UHF
SH103T	2680592C03	mixer, back
SH104T	2680518D01	VCO, back
SH105T	2680518D01	syn, back, TCXO
		switch:
SW401T	4080502B01	frequency, 16-position
SW401T	4080650D01	frequency, 16-position, rotary
		integrated circuit: (see note)
U51T	5182027R01	IF
U101T	5180110R04	RF power module (UHF)
U151B	5180932W01	linear op amp
U152B	5105226P38	DAC IC
U201B*		synthesizer
U251B	5105414S84	VCO buffer
U401B*		microprocessor; 2 channel uP only microprocessor
U402T	5195165R77	A-FIC
U404T	5105469E65	voltage regulator
U405T	5180932W01	linear op amp
U406B	5102198J23	comparator
U407T	5180932W01	linear op amp
U409T	5180175R01	audio amplifier
U410B	5180159R01	dual trans NPNS
U411T	5180533C01	5 V regulator w/reset
		voltage regulator: (see note)
VR401B	4880140L15	diode Zener, 10 V tape & reel
		crystal: (see note)
Y51T (N)	9180112R06	45.1 MHz filter
Y51T (W)	or 9180112R05	45.1 MHz filter
Y51AT (N)	0705196A11	SUPR XTAL MTG
Y53T	4880008K02	XTAL resonator 44.645 MHz 10PPM
Y201T*		16.8 MHz
Y401T	4880113R01	7.9488
		non-referenced items
	0580537C01	EYELET
	0580537C02	EYELET
	0780432C01	CONTACT, battery support
	1580413C01	HOUSING, option jack
	1580414C01	HOUSING, cover option jack
	1580433C01	HOUSING, RF jack
	2680412B01	SHIELD, RF jack
	2680416C01	SHIELD, option jack
	2680625B02	SHIELD, receiver
	3280415C01	SEAL, option jack
	3980405C01	CONTACT, spring #5
	3980406C01	CONTACT, spring #2
	3980407C01	CONTACT, spring #4
	3980408C01	CONTACT, spring #3
	3980409C01	CONTACT, spring #6
	3980410C01	CONTACT, spring #1
	3980434C01	CONTACT, RF jack T2
	3980435C01	CONTACT, RF jack T1
	5480670B01	LABEL, thermal high temp
	7580411C01	BUMPER 2.5 MM; 2 used
	7580611B01	PAD, front shield; 2 used

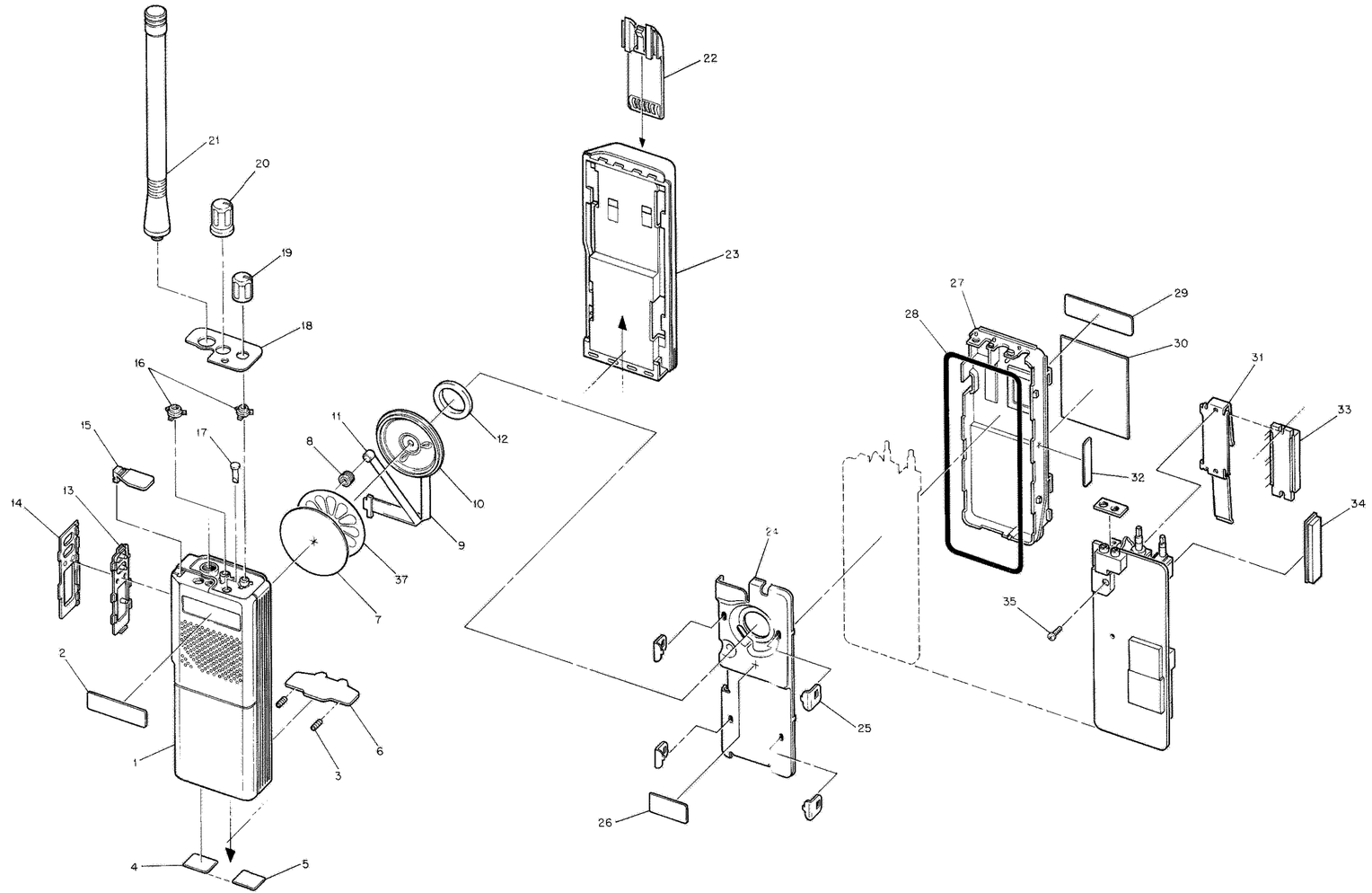
note: For optimum performance, diodes, transistors, and integrated circuits must be ordered by Motorola part numbers.

Reference designator ending in "T" denotes component is located on top side of circuit board. Reference designator ending in "B" denotes component is located on bottom side of circuit board.

Reference designators marked with an asterisk "*" indicate components which are not field-replaceable because they need to be calibrated with specialized factory equipment after installation. Radios in which these parts have been replaced in the field will be off frequency at temperature extremes.



RPD-94103-O



Parts List

GP300 Basic Mechanical — PL-941002-B

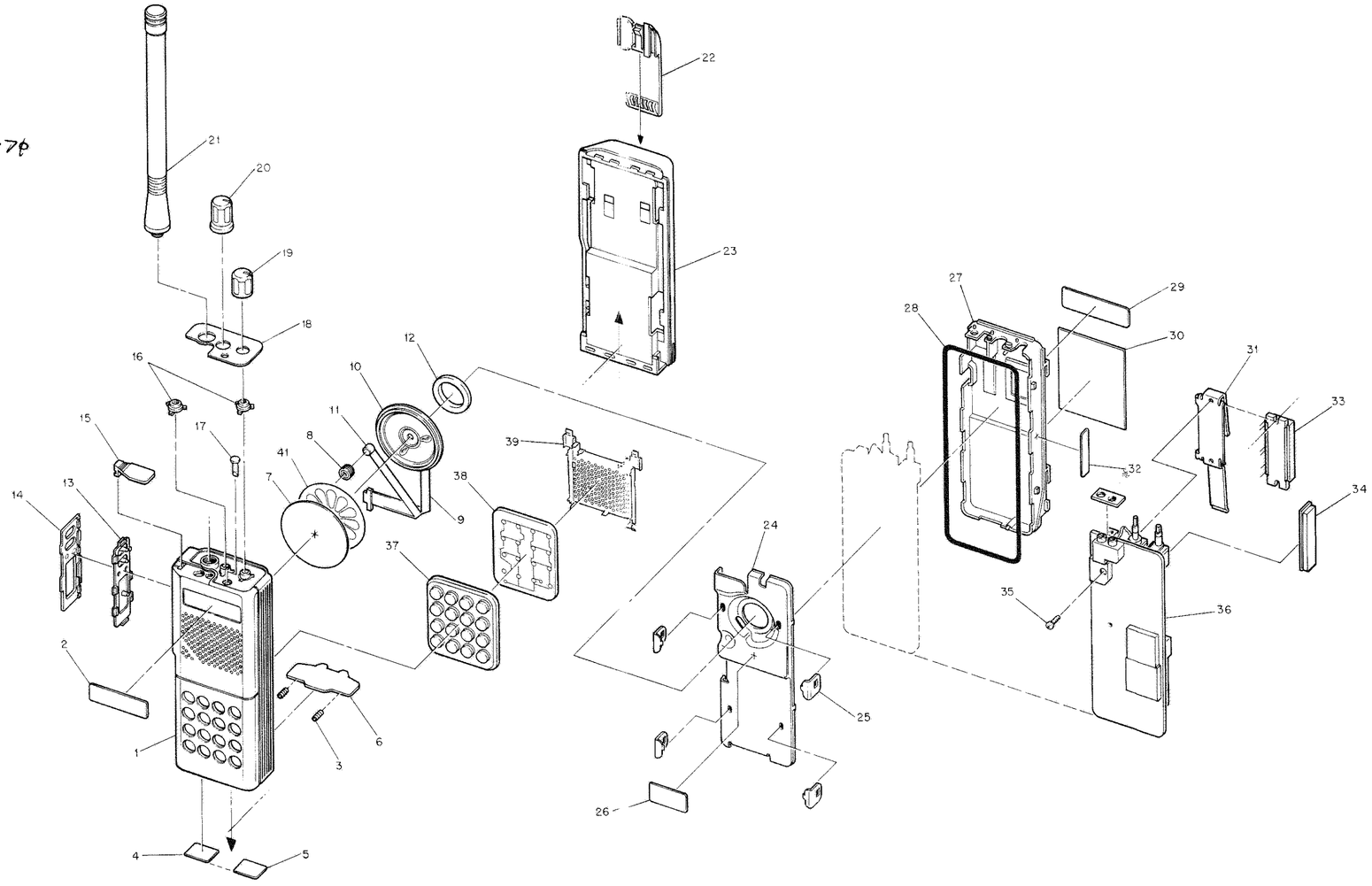
REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
1	15-80562C01	HOUSING, radio
2	13-80992Z03	LABEL, name
3	41-05944K01	SPRING, coil; 2 used
4	30-80490C11	LABEL, FM intrinsic
5	30-80490C18	LABEL, FM non-incendive
6	55-80438B01	LATCH, battery
7	35-80998Z05	FELT, speaker
8	14-80577C01	BOOT, microphone
9	30-80560D01	CABLE, speaker/microphone
10	50-05589U05	SPEAKER
11	50-13920A03	MICROPHONE
12	75-80508C02	PAD, speaker
13	75-80437C01	KEYPAD, PTT
14	13-80159S01	BEZEL, PTT
15	38-80428C01	DUST CAP
16	32-80960Y01	SEAL; 2 used
17	61-80969Y01	LIGHT-PIPE
18	13-80507B01	ESCUTCHEON, 0-position
	13-80507B02	ESCUTCHEON, 2-position
	13-80507B03	ESCUTCHEON, 8-position
	13-80507B04	ESCUTCHEON, 16-position
19	36-80146S01	KNOB, volume
20	36-80147S01	KNOB, freq, 16-position
	36-80147S02	KNOB, freq, 8-position
	36-80147S06	KNOB, freq, 2-position
21	--------	ANTENNA, (see accessories)
22	HLN9724	CLIP, belt
23	--------	BATTERY, (see accessories)
24	26-80532C01	SHIELD, front
25	42-80190R04	CLIP, locking; 4 used
26	33-80446B01	LABEL, patent
27	01-80702Y88	CHASSIS
28	32-80545C01	GASKET, chassis
29	33-80184R01	LABEL, FCC
30	33-80408B01	LABEL, reseller
31	42-80126S01	CLIP, P.A.
32	33-08001X01	LABEL, tamper
33	--------	P.A. MODULE, (see electrical parts list)
34	--------	RECEIVER MODULE (see electrical parts list)
35	03-00136783	SCREW
36	39-80188R01	CONTACT, battery B+/B-; 2 used
37	35-02018X01	DISC, magnetic shield
	non-referenced items	
	21-13740A41	33 pF chip capacitor soldered across the leads of the microphone (item 11)
	39-80546B02	SHIELD, bill; located on speaker magnet behind item 12

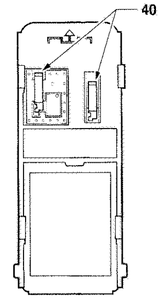
Exploded Mechanical View and Parts List (Basic)

Parts List

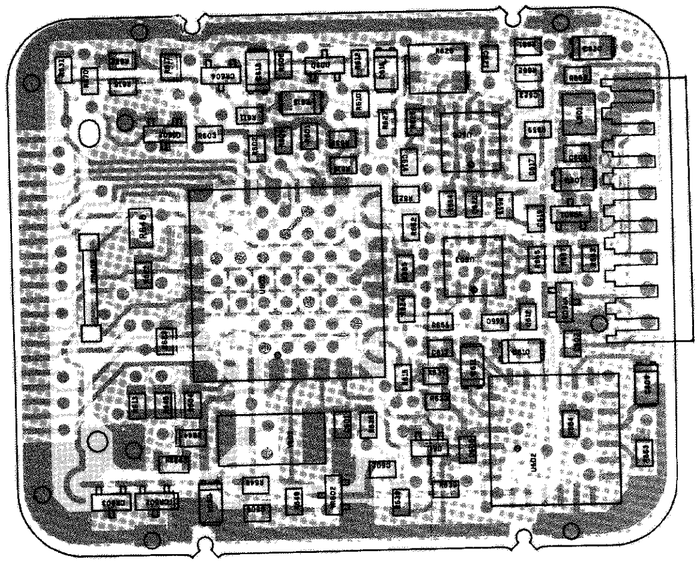
GP300 Basic Mechanical PL-941003-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
1	15-80563C03	HOUSING, radio — 1380992Z03 776
2	13-80992Z03	LABEL, name
3	41-05944K01	SPRING, coil; 2 used
4	30-80490C11	LABEL, FM intrinsic
5	30-80490C16	LABEL, FM non-intrinsic
6	55-80438B01	LATCH, battery
7	35-80998Z05	FELT, speaker
8	14-80577C01	BOOT, microphone
9	30-80560D01	CABLE, speaker/microphone
10	50-05589U05	SPEAKER
11	50-01392A03	MICROPHONE
12	75-80508C02	PAD, speaker
13	75-80437C01	KEYPAD, PTT
14	13-80159S01	BEZEL, PTT
15	38-80428C01	DUST CAP
16	32-80960Y01	SEAL; 2 used
17	61-80968Y01	LIGHT PIPE
18	13-80507B02	ESCUTCHEON, 2-channel
	13-80507B03	ESCUTCHEON, 8-channel
	13-80507B04	ESCUTCHEON, 16-channel
19	36-80146S01	KNOB, volume
20	36-80147S01	KNOB, frequency
21	--------	ANTENNA, (see accessories)
22	HLN9724	CLIP, belt
23	--------	BATTERY, (see accessories)
24	26-80193R01	SHIELD, front
25	42-80190R04	CLIP, locking; 4 used
26	33-80446B01	LABEL, patent
27	01-80702Y88	CHASSIS
28	32-80545C01	GASKET, chassis
29	33-80184R01	LABEL, FCC
30	33-80408B01	LABEL, reseller
31	42-80126S01	CLIP, PA
32	30-08001X01	LABEL, tamper
33	--------	P.A. MODULE, (see electrical parts list)
34	--------	RECEIVER MODULE (see electrical parts list)
35	03-00136783	SCREW
36	--------	RF BOARD, (see model charts)
37	75-80952Y01	KEYPAD, front panel
38	01-80704Y27	BOARD, option
39	26-80953Y01	SHIELD, option board
40	39-80198R01	CONTACT, battery B+/B-; 2 used
41	35-02018X01	DISC, magnetic shield



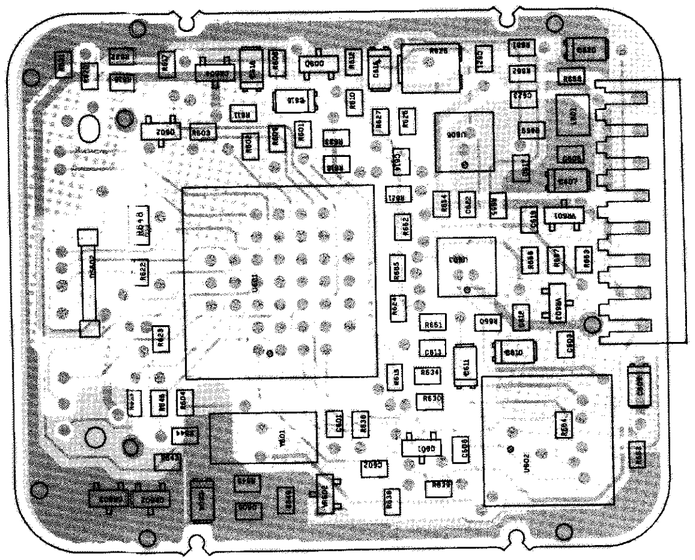


Exploded Mechanical View and Parts List (DTMF)



Component Side
Solder Side

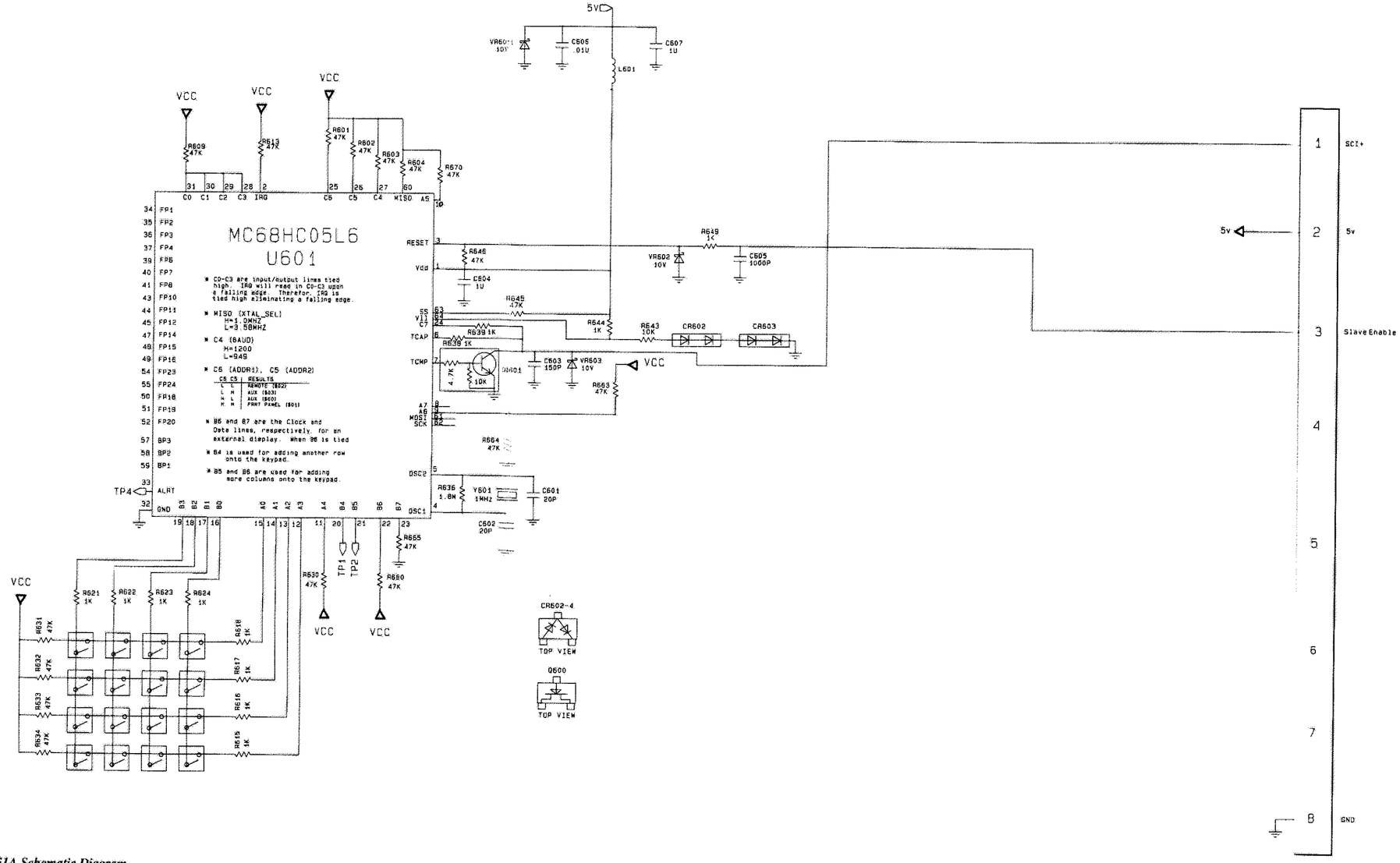
Component Side View



Component Side Inner layer
Solder Side Inner layer

Component Side View

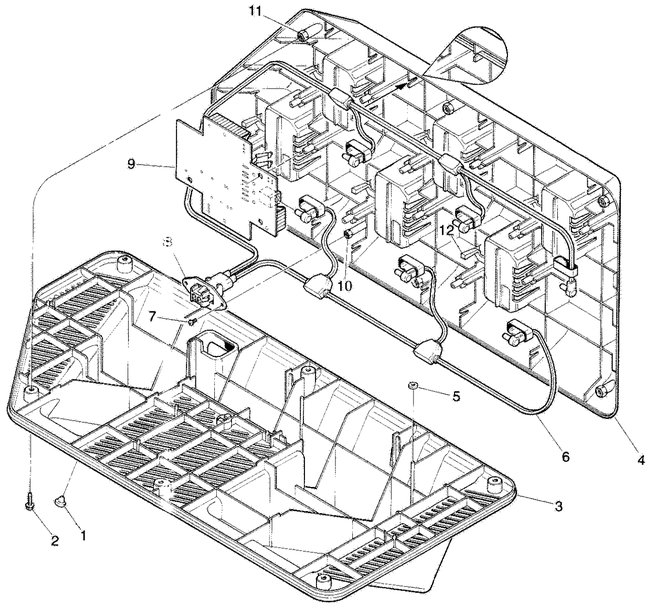
HLN9951A Circuit Board Detail
DTMF Board



HLN9951A Schematic Diagram
and Parts List
DTMF Board

HLN9951A Keypad / DTMF board electrical parts list

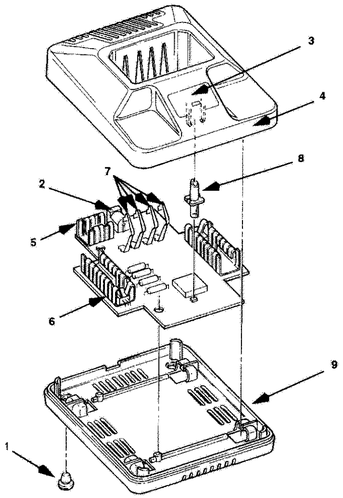
Reference Symbol	Motorola Part No.	Description
Capacitors, chip, 5%, 50V unless otherwise indicated		
C601	21-13740A36	20pF
C602	21-13740A36	20pF
C603	21-13740A59	150pF
C604	23-11049A07	tantalum 1uF 10% 16V
C605	21-13741A21	1000pF
C606	21-13741A45	.01uF
C607	23-11049A07	tantalum 1uF 10% 16V
Coils		
L601	24-60578C43	33uH
Diodes		
CR602	48-84336R03	dual silicon SOT
CR603	48-84336R03	dual silicon SOT
Transistors		
Q601	48-80440B01	digital NPN; type DTC143X
Resistors, chip, 5%, 1/10 Watt, unless otherwise specified		
R601	06-60076A89	47k
R602	06-60076A89	47k
R603	06-60076A89	47k
R604	06-60076A89	47k
R609	06-60076A89	47k
R613	06-60076A89	47k
R615	06-60076A49	1k
R616	06-60076A49	1k
R617	06-60076A49	1k
R618	06-60076A49	1k
R621	06-60076A49	1k
R622	06-60076A49	1k
R623	06-60076A49	1k
R624	06-60076A49	1k
R630	06-60076A89	47k
R631	06-60076A89	47k
R632	06-60076A89	47k
R633	06-60076A89	47k
R634	06-60076A89	47k
R636	06-60076H31	1.8Meg, 10%
R638	06-60076A49	1k
R639	06-60076A49	1k
R643	06-60076A78	16k
R644	06-60076A53	3.9k
R645	06-60076A89	47k
R646	06-60076A89	47k
R649	06-60076A49	1k
R664	06-60076A89	47k
R665	06-60076A89	47k
R670	06-60076A89	47k
Integrated Circuits		
U601	51-05329V49	MCU with LCD driver
Voltage Regulators		
VR601	48-80140L15	Zener: 10V, 5%, SOT23
VR602	48-80140L15	Zener: 10V, 5%, SOT23
VR603	48-80140L15	Zener: 10V, 5%, SOT23
Crystal		
Y601	48-80418B01	1.0 MHz



parts list

Multi Unit, 1 Hour Rapid Rate Charger, Mechanical

REF NO.	MOTOROLA PART NUMBER	DESCRIPTION	QTY. USED
1	05-00812634	Rubber feet	4
2	03-00132095	Screws, housing, 8-32 x 1/2	7
3	15-80416B01	Base, housing	1
4	15-80415B01	Housing, top	1
5	04-80631B01	Spacer	1
6	30-80430B01	Cable, DC	1
7	03-00139047	Screw, retainer	2
8	07-80487B01	Bracket, cable	1
9	----------	Charging Board	6
10	42-05722C01	Clip, fastener	2
11	42-05722C02	Clip, fastener	7
12	61-80437B01	Light-pipe	6



parts list

1 Hour Rapid Rate Charger, Mechanical

REF NO.	MOTOROLA PART NUMBER	DESCRIPTION	QTY. USED
1	05-00812634	Rubber feet	4
2	09-80163R02	DC Power Jack	1
3	13-80403B04	Escutcheon - Rapid charger	1
4	15-80952Z01	Housing, top	1
5	26-83472R03	Heatsink 1.5 in	1
6	26-83472R04	Heatsink 1.5 in w / Tab	2
7	39-80953Z01	Contact, Charging	4
8	61-80966Z01	Lightpipe, charger	1
9	64-80951Z01	Base, charger	1
--	33-60154S02	Charger label	1

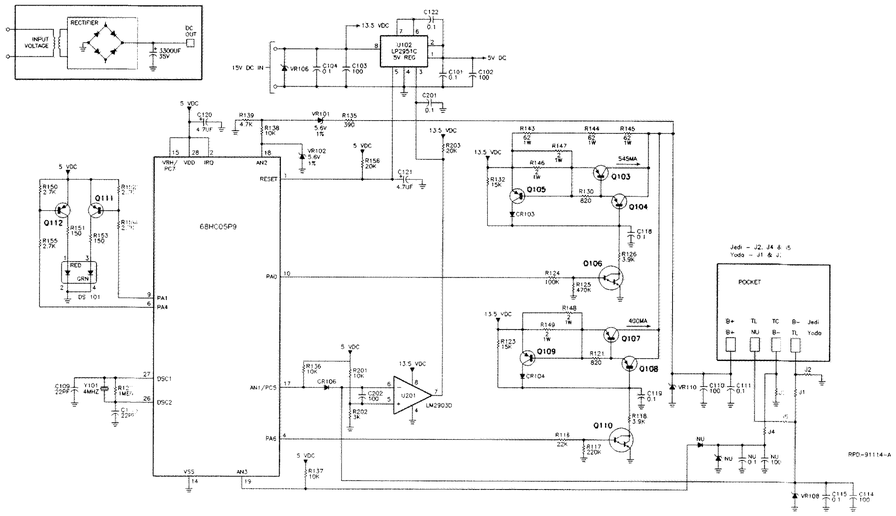
GP300 Chargers & Power Supplies		
Battery Charger	Rate/Voltage	Power Supply
HTN9630	1 Hour / 120 V	25-80162R01
HTN9702	10 Hour / 120 V	25-80955Z02
HTN9748 (6 unit)	1 Hour / 120 V	25-80427B01
HTN9938 (6 unit)	1 Hour / 100 V	25-80427B01
HTN9802	1 Hour / 220 V	25-80162R092 (European Plug)
HTN9804	10 Hour / 220 V	25-80955Z03 (European Plug)
HTN9811 (6 unit)	1 Hour / 220 V	25-80427B01 (European Plug)
HTN9803	1 Hour / 240 V	25-80162R03 (U.K. Plug)
HTN9805	10 Hour / 240 V	25-80955Z04 (U.K. Plug)
HTN9812 (6 unit)	1 Hour / 240 V	25-80427B01 (U.K. Plug)

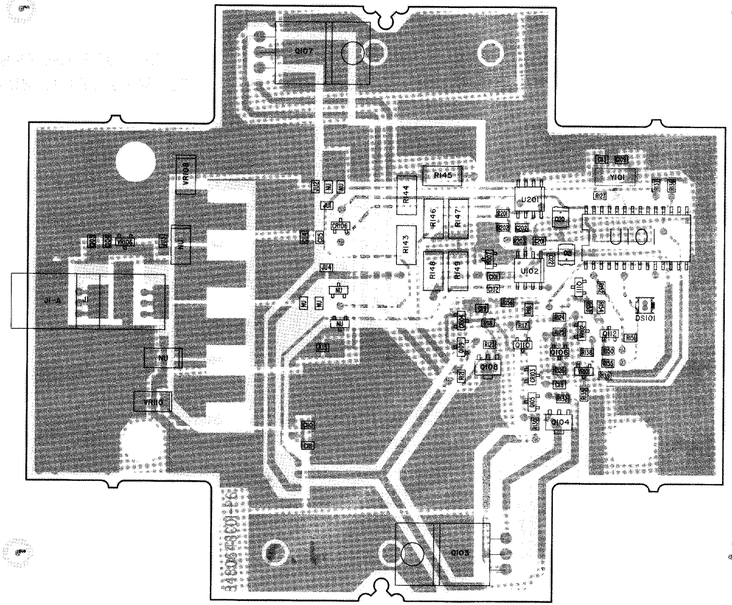
Parts List

1 Hour Rapid Rate Charger, Electrical — PL-941005-O

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		capacitor, chip: uF +80/-20; 25 V: unless otherwise stated
C101	2160521G37	0.1; 2 used
C102, 103	2113740A55	100 pF, 5%; 50 V ; 5 used
C104	2160521G37	0.1; 8 used
C109	2113740A37	22 pF, 5%; 50 V ; 2 used
C110	2113740A55	100 pF, 5%; 50 V ; 5 used
C111	2160521G37	0.1; 2 used
C113	2113740A37	22 pF, 5%; 50 V ; 2 used
C114	2113740A55	100 pF, 5%; 50 V ; 5 used
C115	2160521G37	0.1; 2 used
C118, 119	2160521G37	0.1; 2 used
C120, 121	2311049J11	4.7; 10%; 16 V ; 2 used
C122	2160521G37	0.1; 2 used
C201	2160521G37	0.1; 2 used
C202	2113740A55	100 pF, 5%; 50 V ; 5 used
		diode: (see note)
CR103, 104	4805129M43	silicon; 3 used
CR106	4805129M43	silicon; 3 used
DS101	4805729A49	red/yellow
VR101, 102	4880628C02	Zener; 2 used
VR106	4811058B05	Zener
VR108	4813832A18	Zener, 6.8 V
VR110	4813832A33	Zener, 20 V
		connector, receptacle:
J1	0905708B05	jack, power
		jumper:
JU1, 3	0660078M01	0 ohms, 0%; 1/8 W ; 2 used
		resistor, chip: +/-5%; 1/8 W: unless otherwise stated
R116	0660076A81	22K
R117	0660077B09	220K
R118	0660076A83	4.7K; 2 used
R121	0660076A47	820 ohms; 2 used
R123	0660076A77	15K; 2 used
R124	0660076B01	100K
R125	0660076B17	470K
R126	0660076A63	4.7K; 2 used
R127	0660076B25	1 meg.
R130	0660076A47	820 ohms; 2 used
R132	0660076A77	15K; 2 used
R135	0660076A38	860 ohms
R136, thru 138	0660076A73	10K; 4 used
R139	0660076A65	4.7K
R143, thru 145	0683962T44	62 ohms, 1 W; 3 used
R146 thru 149	0683962T08	2 ohms, 1 W; 4 used
R150	0660076A59	2.7K; 5 used
R151	0660076A29	150 ohms; 2 used
R152	0660076A59	2.7K; 5 used
R153	0660076A29	150 ohms; 2 used
R154, 155	0660076A59	2.7K; 5 used
R156	0660076A80	20K; 2 used
R201	0660076A73	10K; 4 used
R202	0660076A59	2.7K; 5 used
R203	0660076A80	20K; 2 used
		transistor: (see note)
Q103	4884413L05	PNP
Q104	4805128M27	PNP
Q105	4813824A22	PNP
Q106	4805128M19	NPN
Q107	4884413L05	PNP
Q108	4805128M27	PNP
Q109	4813824A22	PNP
Q110	4805128M19	NPN
Q111, 112	4805128M94	PNP
		integrated circuit: (see note)
U101	5180507D01	masked micor controller
U102	5105469E85	regulator
U201	5102198J23	compactor
		filter:
Y101	4880643C01	ceramic resinator
		non-referenced items
	2685472R04	HEATSINK; 2 used
	3980953Z01	CONTACT, charging; 3 used

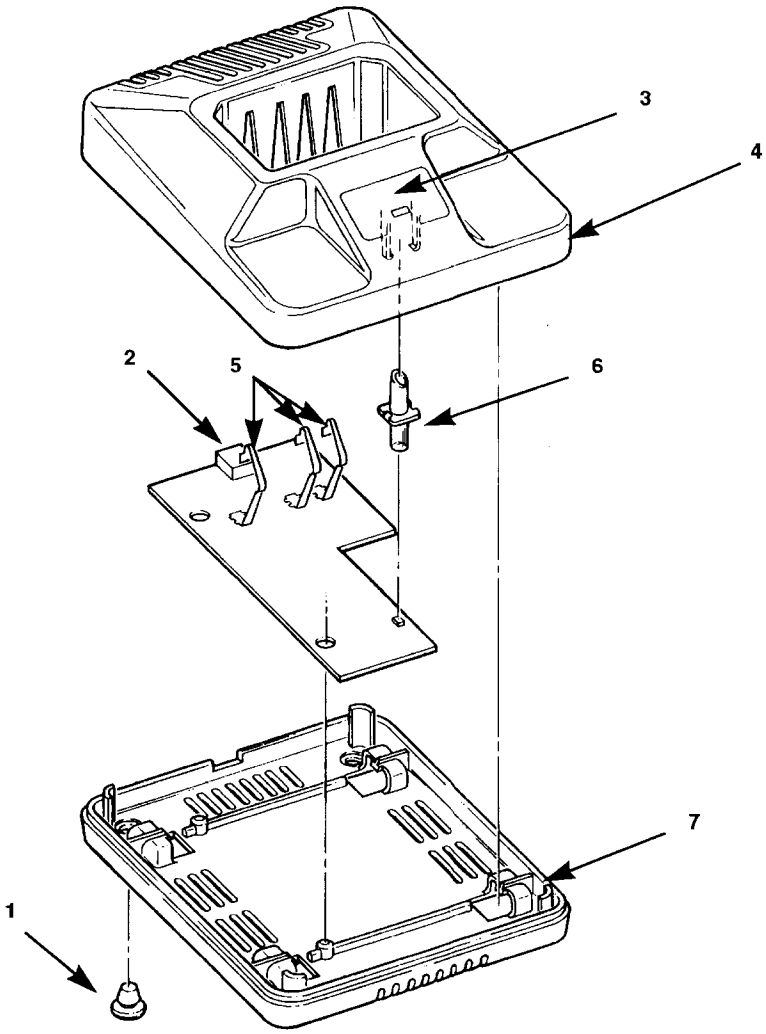
note: For optimum performance, diodes, transistors, and integrated circuits must be ordered by Motorola part numbers.





COMPONENT SIDE (GRAY) RCB-94101-O
SOLDER SIDE (PINK) RCB-94102-O
OVERLAY ----- RCB-94103-O

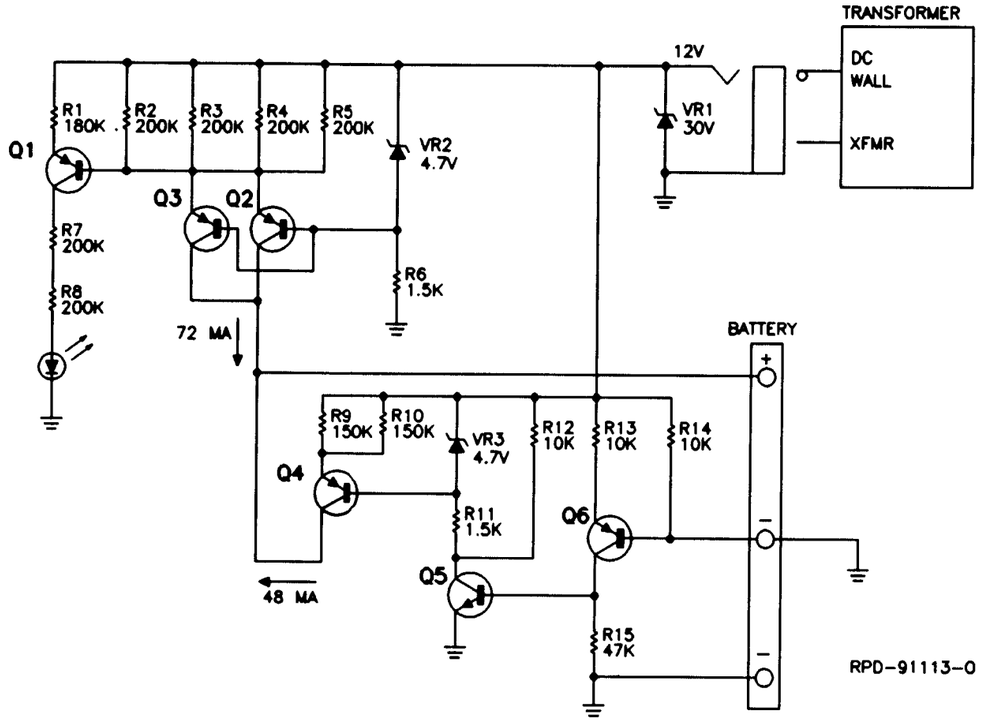
COMPONENT SIDE VIEW



Parts List

10 Hour Standard Rate Charger, Mechanical PL-941004-O

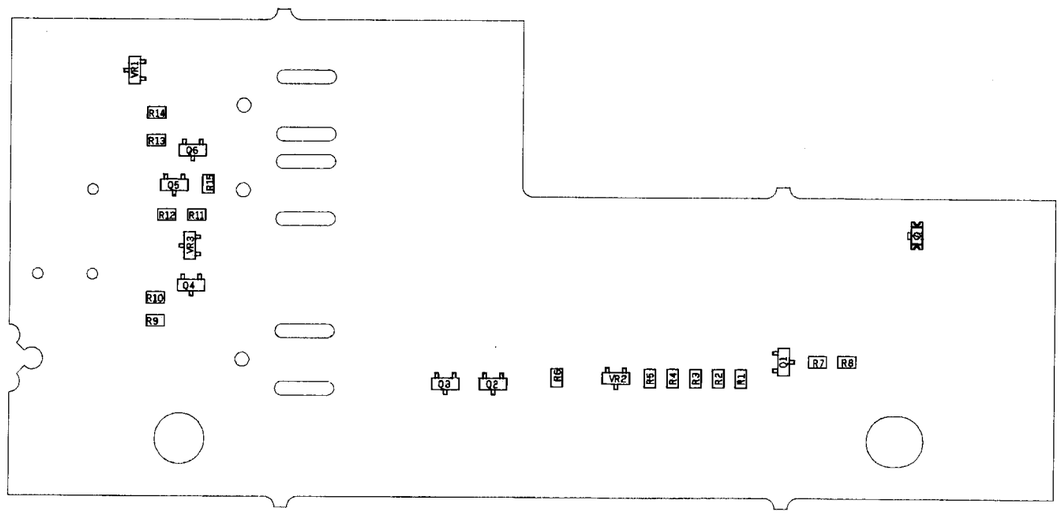
REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
1	05-00812634	Rubber feet; 4 used
2	09-02157J01	DC Power Jack; 1 used
3	13-80403B03	Escutcheon - slow charger; 1 used
4	15-80952Z01	Housing, top; 1 used
5	39-80953Z01	Contact, charging; 3 used
6	61-80966Z01	Lightpipe, charger; 1 used
7	64-80951Z01	Base, charger; 1 used
--	33-80154S01	Charger label; 1 used



parts list

(16/Hr Standard rate charger, Electrical)

REF SYMBOL	MOTOROLA PART NUMBER	DESCRIPTION
		Resistors, chip, 5%, 1/8W, unless otherwise specified
R1	06-60076A31	180 k
R2 - R5	06-60076A32	200 k
R6	06-60076A53	1.5 k
R7 - R8	06-60076A32	200 k
R9 - R10	06-60076A29	150 k
R11	06-60076A53	1.5 k
R12 - R14	06-60076A73	10 k
R15	06-60076A89	47 k
		Diodes
VR1	48-11058B05	ZENER, 30V
VR2	48-80140L05	ZENER, 4.7V
VR3	48-80140L05	ZENER, 4.7V
		Transistors
Q1	48-05128M94	PNP
Q2 - Q4	48-11056B02	PNP
Q5	48-80214G02	NPN
Q6	48-05128M94	PNP



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