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Scope of Manual

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 SM50 and SM120 Mobile Radios. 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 SM Series Mobile Radios.

Table 1. Other Documentations

Information	Location
Basic Use of SM50	SM50 Operator Card (6880903Z74)
SM50 Accessory Feature Sheet	6880903Z46
Basic Use of SM120	SM120 Operator Card (6880903Z89)
SM120 Accesory Feature Sheet	6880903Z88
SM Series Installation	SM Series Installation/Licensing Guide (6880904Z10)
Programming	SM Series RSS Manual (6880903Z78)

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 Radius Product Services Hwy. 34 West Mt. Pleasant, IA 52641 USA

Radius 30-Day Warranty Radius Repair Depot Attention: Warranty Return 3760 South Central Avenue Rockford, IL 61102 USA 1-800-227-6772 (U.S. & Canada) 1-800-694-2161 (Latin America)

Radius Major Component Repair Radius Repair Depot 3760 South Central Avenue Rockford, IL 61102 USA

Motorola Parts Worldwide System and Aftermarket Products Division Attention: Order Processing 1313 E. Algonquin Road Schaumburg, IL 60196

Customer Service 1-800-422-4210 1-847-538-8198 (FAX)

Worldwide System and Aftermarket Products Division Attention: International Order Processing 1313 E. Algonquin Road Schaumburg, IL 60196

Customer Service 1-800-422-4210 1-847-538-8198 (FAX)

Parts Identification 1-847-538-8023 1-847-576-3023 (FAX) **Model Charts**

Model Charts

DESCRIPTION	12.5 kHz, 10-25 W (Cencelled)	20/25/30 kHz, 10-25 W		SM50 VHF Mobile Radio	DESCRIPTION	Display Board (2-Freq.)	Gt	Main Board, 12.5 kHz, 10-25 W (Cancelled)	Main Board, 20/25/30 kHz, 10-25 W
FREQ.	2	2	10	136 - 156 MHz 10-25 Watts RF Power		Display Boa	Hardware Kit	Main Board	Main Board
MODEL	M33DGC00A1AA	M33DGC20A1AA			ITEM	PMLN4022_	PMLN4006_	(See Note)	(See Note)
			item	Description					
	Х		PMUD1024_	Radio, 12.5 kHz, 10-25 W (Cancelled)		Х	Х	X	
7	· ·	X	PMUD1025_	Radio, 20/25/30 kHz, 10-25 W		Х	X		X
	X	X	HMN3174_	Microphone			_		Н
	X	X	HLN9154_ HKN4137_	Non-Locking Bracket Power Cable					$\vdash\vdash$
	$\hat{\mathbf{x}}$	x	HLN9335	SM50 Operator's Kit	\dashv				Н

Model Charts

EL FREG. DESCRIPTION	2 12.	2 20/25/30 kHz, 10-25 W	00A2AA 2 12.5 kHz, 40 W	2 20/25/30 kHz, 40 W	10 -	SM50 VHF Mobile Radio 150 - 170 MHz 10 - 25 Watts RF Power & 40 Watts RF Power		2_ Display Board (2-Freq.)	5_ Hardware Kit	Main Board, 12.5 kHz, 10-25 W	Main Board, 20/25/30 kHz, 10-25 W	Main Board, 12.5 kHz, 40 W	Main Board, 20/25/30 kHz, 40 W
MODEL	M33DGC00A2AA	M33DGC20A2AA	M43DGC00A2AA	M43DGC20A2AA			ITEM	PMLN4022	PMLN4006	(See Note)	(See Note)	(See Note)	(See Note)
					Item	Description							
	Х				PMUD1030_	Radio, 12.5 kHz, 10-25 W		Х	Х	X			
		Х			PMUD1031_	Radio, 20/25/30 kHz, 10-25 W		Х	Х		Х		
			Х	\vdash	PMUD1067_	Radio, 12.5 kHz, 40 W		X	Х			Х	
				Х	PMUD1068_	Radio, 20/25/30 kHz, 40 W		X	Х				Х
	X		X		HMN3174_	Microphone			<u> </u>				\square
	X		ί×	-	HLN9154_	Non-Locking Bracket							\square
	X		X	\dashv	HKN4137_	Power Cable				<u> </u>			
	Х	Х	X	X	HLN9335	SM50 Operator's Kit							

MODEL FREQ. DESCRIPTION	M34DGC00A2AA 2 12.5 kHz, 10-25 W		M44DGC00A2AA 2 12.5 kHz, 40 W	M44DGC20A2AA 2 20-25 kHz, 40 W	SM50 UHF Mobile Radio 450 - 470 MHz 10 - 25 Watts RF Power & 40 Watts RF Power		ITEM DESCRIPTION	PMLN4022_ Display Board (2-Freq.)	PMLN4006_ Hardware Kit	(See Note) Main Board, 12.5 kHz, 10-25 W	(See Note) Main Board, 20-25 kHz, 10-25 W	(See Note) Main Board, 12.5 kHz, 40 W	(See Note) Main Board, 20-25 kHz, 40 W
	Х	Х	_	\vdash	PMUE1006_	Radio, 12.5 kHz, 10-25 W		X	X	Х	Ļ		\vdash
	<u> </u>	-^	X	Н	PMUE1007_	Radio, 20-25 kHz, 10-25 W Radio, 12.5 kHz, 40 W		X	X	ļ	X	X	Н
			-^	X	PMUE1039_ PMUE1040_	Radio, 12.5 kHz, 40 W		X	X	<u> </u>		<u> </u>	X
	Х	X	Х	X	HMN3174	Microphone		^	^				屵싀
	Ŷ	X	x	x	HLN9154_	Non-Locking Bracket		<u> </u>	_	_			Н
	^	X	x	X	HKN4137_	Power Cable		 			ļ		\vdash
	x	X	X	x	HLN9335	SM50 Operator's Kit							

MODEL FREQ. DESCRIPTION	M44DGC00A4AA 2 12.5 kHz, 40 W	M44DGC20A4AA 2 20-25 kHz, 40 W		SM50 HF Mobile Radio 470 - 490 MHz) Watts RF Power	ITEM DESCRIPTION	PMLN4022_ Display Board (2-Freq.)	PMLN4006_ Hardware Kit	(See Note) Main Board, 12.5 kHz, 40 W	(See Note) Main Board, 20-25 kHz, 40 W
			Item	Description					
	X		HUE3761_	Radio, 12.5 kHz, 40 W		Х	X	_	
		X	HUE3762_	Radio, 20-25 kHz, 40 W		X	X	<u> </u>	Х
	X	Х	HMN3174_	Microphone		<u> </u>		L	
	X	Х	HLN9154_	Non-Locking Bracket		_	lacksquare	<u> </u>	
	X	X	HKN4137_	Power Cable		$oxed{oxed}$	$oxed{oxed}$	lacksquare	
	Х	Х	HLN9335	SM50 Operator's Kit		<u> </u>	<u></u>		

Model Charts

FREQ. DESCRIPTION	16 12.5 kHz, 10-25 W (Cancelled)	16 20/25/30 kHz, 10-25 W		SM120 HF Mobile Radio 136 - 156 MHz 25 Watts RF Power	DESCRIPTION	Display Board (16-Freq.)	Hardware Kit	Main Board, 12.5 kHz, 10-25 W (Cancelled)	Main Board, 20/25/30 kHz, 10-25 W
MODEL	M33DGC00C1AA	M33DGC20C1AA			ITEM	PMLN4023_ Disp	PMLN4006_ Har	(See Note) Mair	(See Note) Main
			Item	Description					
	Χ		PMUD1042_	Radio, 12.5 kHz, 10-25 W (Cancelled)		Χ	Х	Χ	
		X	PMUD1043_	Radio, 20/25/30 kHz, 10-25 W		Х	Х		Х
	Х	Х	HMN3174_	Microphone					
	Х	Х	HLN9154	Non-Locking Bracket					
	Х	Х	HKN4137	Power Cable (10-25 W)					
	Х	Х	HLN9336	SM120 Operator's Kit					

Model Charts

DESCRIPTION	12.5 kHz, 10-25 W	20/25/30 kHz, 10-25 W	12.5 kHz, 40 W	20/25/30 kHz, 40 W	V	SM120 VHF Mobile Radio		Display Board (16-Freq.)	5	Main Board, 12.5 kHz, 10-25 W	Main Board, 20/25/30 kHz, 10-25 W	Main Board, 12.5 kHz, 40 W	, 20/25/30 kHz, 40 W
FREQ.	16	16	16	16		150 - 170 MHz 25 Watts RF Power &) Watts RF Power	DESCRIPTION	Display Boa	Hardware Kit	Main Board	Main Board	Main Board	Main Board,
MODEL	M33DGC00C2AA	M33DGC20C2AA	M43DGC00C2AA	M43DGC20C2AA		40 Watts RF Power					(See Note)	(See Note)	(See Note)
					Item	Description							
	Х				PMUD1086_	Radio, 12.5 kHz, 10-25 W		Х	Х	X			Ш
		Х			PMUD1087_	Radio, 20/25/30 kHz, 10-25 W		X	X		Х		Щ
		ļ	X		PMUD1088_	Radio, 12.5 kHz, 40 W		X	Х	ļ		Х	Щ
		L-	L.	X	PMUD1089_	Radio, 20/25/30 kHz, 40 W		Х	Х	L-			Х
	$\frac{x}{x}$	X	X	X	HMN3174_	Microphone		_	<u> </u>				\sqcup
	X	X	X	X	HLN9154_ HKN4137_	Non-Locking Bracket Power Cable		<u> </u>	_				Н
	Ŷ	x	$\frac{\cdot}{x}$	X	HLN9336	SM120 Operator's Kit							$\vdash\vdash$
	^	L^	_^		11119330	SW120 Operators Nit				L	L		

MODEL FREQ. DESCRIPTION	M34DGC00C2AA 16 12.5 kHz, 10-25 W	M34DGC20C2AA 16 20-25 kHz, 10-25 W	M44DGC00C2AA 16 12.5 kHz, 40 W	M44DGC20C2AA 16 20-25 kHz, 40 W	10 -	SM120 HF Mobile Radio 450 - 470 MHz 25 Watts RF Power & Watts RF Power	ITEM DESCRIPTION	PMLN4023_ Display Board (16-Freq.)	PMLN4006_ Hardware Kit	(See Note) Main Board, 12.5 kHz, 10-25 W	(See Note) Main Board, 20-25 kHz, 10-25 W	(See Note) Main Board, 12.5 kHz, 40 W	(See Note) Main Board, 20-25 kHz, 40 W
					Item	Description							
	Х				PMUE1054_	Radio, 12.5 kHz, 10-25 W		X	X	X			
		Х		Щ	PMUE1055_	Radio, 20-25 kHz, 10-25 W		Х	Х		Х		
			Х		PMUE1056_	Radio, 12.5 kHz, 40 W		Х	Х			Х	
	Щ			X	PMUE1057_	Radio, 20-25 kHz, 40 W		Х	Х				Х
	Х	Х	X	X	HMN3174_	Microphone							
	Х	Χ	X	Х	HLN9154_	Non-Locking Bracket							
	Х	Х	Х	X	HKN4137_	Power Cable (10-25 W)							
	Х	X	X	X	HLN9336	SM120 Operator's Kit							

Model Charts

FREQ. DESCRIPTION	16 12.5 kHz, 40 W	16 20-25 kHz, 40 W	U	SM120 JHF Mobile Radio			Hardware Kit	Main Board, 12.5 kHz, 40 W	Main Board, 20-25 kHz, 40 W
Œ		·	4(470 - 490 MHz) Watts RF Power		Display Board (16-Freq.	Hard	Mair	Mair
MODEL	M44DGC00C4AA	M44DGC20C4AA			ITEM	PMLN4023_	PMLN4006_	(See Note)	(See Note)
			Item Description		<u> </u>				
	Х		HUE3611_ Radio, 12.5 kHz, 40 W				Х	Х	
		Х	HUE3612_ Radio, 20-25 kHz, 40 W				X		X
	X	Х	HMN3174_ Microphone						
	Х	X	HLN9154_ Non-Locking Bracket						
	Х	Х	HKN4137_ Power Cable (10-25 W)						
	Х	Х	HLN9336	SM120 Operator's Kit					

Accessories

Accessories

Radius offers several accessories to increase communications efficiency. Many of the accessories available are listed below, but for a complete list, consult your Radius dealer.

```
Antennas:
HAD4007_R
                    VHF 146-150.8 MHz, 1/4 Wave Roof Mount
HAD4008_R
                    VHF 150.8-162 MHz, 1/4 Wave Roof Mount
                    VHF 162-174 MHz, Antenna Roof Mount
HAD4009 R
                    VHF 146-172 MHz, 3 dB Gain Roof Mount
HAD4014 R
HAE4003_R
                    UHF 450-470 MHz, 1/4 Wave Roof Mount
                    UHF 450-470 MHz, 3.5 dB Gain Roof Mount
HAE4011_R
                    UHF 450-470 MHz, 5 dB Gain Roof Mount
RAE4004AR
HKN9557_R
                    PL259/Mini-U Antenna Adapter with 8 in. Cable
HLN5282 R
                    Mini-U Connector
                    Mini - UHF to BNC Adapter
HLN8027_
                    Microphones:
HMN1035 R
                    Compact Microphone with Tx LED, 7 ft. cord STANDARD
HMN3174
                    Compact Microphone with Tx LED, 10 ft. cord - $55.00 50.39 04
HMN3001 A
                    Compact Touch-Code<sup>TM</sup> Microphone with 7 ft. cord -\frac{3}{2}/37.00
HMN3175_ C
                    10.5 ft. Extended Coil Cord - $13,25 HIN 9560A 7.78 OL 7 ft. Coil Cord
                    Handset w/Hang-up Cup
HMN3141_R
HLN9073_R
HLN9414_
HLN9560_R /4
HLN9559_R
Installation Accessories:
HLN9162_
                    5 in. Goose Neck Mounting Bracket
                    8 in. Goose Neck Mounting Bracket
HLN9227_
HLN9408_
                    Gooseneck Decor Sleeve
HLN9228_
                    Clam Shell Swivel Mounting Bracket
HLN9179_
                    Quick Release Mounting Bracket
HLN9617_
                    Key Lock Mounting Bracket
HLN9573_R A
                    Shorting Plug
HLN9534_
                    Right Angle Mini - UHF Connector
Control Station Accessories:
HLN9226_
                    Mobile Holder
HLN9415_
                    Mobile Holder with Power Supply
HMN3000
                    Black Desk Microphone
                    Beige Desk Microphone
HMN1038_R
HLN3053
                    Control Station Package (10-25 W)
                    Control Station Cable 8.93
HKN9018_A
                    16-pin Conductor Cable 11.69
HKN9019_ A
                    GR300/GR400 Power Supply (45 W)
HPN8393_
Accessories / Kits Interfacing with the 16-Pin Connector:
                    16-pin Accessory Kit with Expanded Connector
16-pin 7.5 W External Speaker for Received Audio
HKN9242_
HSN9008_
HKN9327_R
                    16-pin Ignition Switch Cable 🖚
                    External Alarm Relay and Cable for Horn & Lights — 4 56.00
HLN9328_R (
                    Cigarette Lighter Adapter (25 W models only) — $ 13,00
HKN9407_
Manuals/Kits:
L1547A
                    DC Remote Adapter Manual
L1475A
                    Tone Remote Adapter Manual
6880904Z05
                    DTMF Microphone Service Manual
HLN9335
                    SM50 Manual Kit
HLN9336
                    SM120 Manual Kit
                                                          CANK OL
                    Quik-Call™ Advantage™ Option Board
HLN3096 🖪
                    SmarTrunk™ Advantage™ Option Board
HLN9247
```

Specifications

Specifications

GENERAL

	VHF		UHF			
Model Series:	M33DGC,	M33DGC, M43DGC		M34DGC, M44DGC		
Frequency Range:	136-156 MHz 8	136-156 MHz & 150-170 MHz		₹ 470-490 MHz		
RF Output:		10-25 W or 40 W				
Channel Spacing:	12.5 kHz	20/25/30 kHz	12.5 kHz	20/25/30 kHz		
Dimensions:	H 1.73" X V	H 1.73" X W 6.61" X D 4.25" (H 44mm X W 168mm X D 108mm)				
Weight:		36 oz. (1.02kg)				
Channel Capacity:	2 or 16 Channels					
Freq. Seperation:	20 MHz					
Input Voltage:	13.6 ±10%					
Current Drain: Standby Rx @Rated Audio	300 mA 1.5 A					
Transmit		7 A @ 10-25 W 8 A @ 10-25 W 12.5 A @ 40 W				
Squelch Capabilities:	Tone Coded, Digital Coded and/or Carrier Squelch					

TRANSMITTER

	v i	HF	U	HF	
Freq. Stability:		±0.00025%			
Spurs/Harmonics:		-16 dBm (25 μW)			
Audio Response:*		+1/-3 dB*			
Audio Distortion:	<3% TIA (@1000 Hz, 60% of Rated Max. Deviation)				
FCC Designation:	ABZ99FT30	34 (10-25 W) 35 (10-25 W) 3036 (40 W)	ABZ99FT4038 (10-25 W) ABZ99FT4039 (40 W) ABZ99FT4040 (40 W)		
FCC Modulation: 20/25/30 kHz 12.5 kHz		16K0F2D & 16K0Ff3E 11K0F2D & 11K0F3D			
Output Impedance:		50 ohms			
Modulation Sensitivity:		80 mV rms for 60% deviation @ 1000 Hz			
FM Noise:	40 dB	45 dB	35 dB	40 dB	

^{*}Relative to 6 dB/octave pre-emphasis, 300-3000 Hz (2550 Hz @ 12.5 kHz)

RECEIVER

	VHF		UHF		
Sensitivity EIA @ 12 dB SINAD:	0.35 μV	0.30 μV	0.35 μV	0.30 μV	
Selectivity TIA:	65 dB	75 dB	60 dB	70 dB	
Intermodulation TIA*:	65 dB	75 dB	60 dB	70 dB	
Spur & Image Rejection:	75 dB		70 dB		
Audio Output: 8 ohms (external) 22 ohms (internal)	7.5 W @ 5% distortion 3.0 W Nominal				
Input impedance:	50 ohms				
Squelch (internally pre-set):	10 dB SINAD				
TIA Usable Bandwidth:	1.2 kHz	2.0 kHz	1.2 kHz	2.0 kHz	

^{*} Local mode adds 10 dB protection against wideband interference.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

Service Aids

Service Aids

The following table lists service aids recommended for working on the SM Series Mobile Radio.

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 HKN9215	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.		
HKN9217	Program Test Cable	RIB to Radio Cable		
HKN9402	Power Supply Cable	Connects the power supply to the radio.		
HVN9007	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.		

Test Equipment

The following table lists test equipment required to service the SM Series Mobile Radio and other two-way radios.

Motorola Model No.	Description	Characteristics	Application		
R2200, R2400, or R2001 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		
*R1049	Digital Multimeter		Two meters recommended for ac/dc voltage and current measurements		
*S1100	Audio Oscillator	67 to 200 Hz tones	Used with service monitor for injection of PL tones		
*S1053, *SKN6009, *SKN6001	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		
*S1350, *ST1215 (VHF) *ST1223 (UHF) *T1013	Wattmeter, Plug-in El- ements (VHF & UHF), RF Dummy Load	50-ohm, ± 5% accuracy 10 Watts, maximum 0-1000 Mhz, 300W	Transmitter power output measurements		
S1339	RF Millivolt Meter	100uV to 3V RF, 10 kHz to 1.2 GHz	RF level measurements		
*R1013	SINAD Meter		Receiver sensitivity		
S1347 or S1348 (prog)	DC Power Supply	0-20 Vdc, 0-5 Amps	Bench supply for 12.5Vdc		

Section 1 Radio Disassembly/Assembly

Overview

This section explains, step-by-step, how to disassemble and reassemble the SM Series radio.

Disassembling the Radio

Removing the Housing

- 1. Pull the volume control knob straight off.
- 2. Remove the housing cover by pushing down on the release latch with one finger while sliding the cover off with the other hand (Figure 1-1).

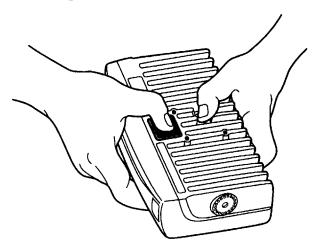


Figure 1-1. Removing the Housing

Removing the Front Panel Display Board

- Disconnect the flex cable from the black header on the main board by gently lifting upwards.
- 2. Remove the display board by tilting it forward slightly and gently lifting upwards.

Removing the Mechanical Components from the Main Board

Refer to Figure 1-2 for steps 1 through 7 for the removal of the mechanical components from the main board. Refer to the exploded mechanical view diagram for more details.

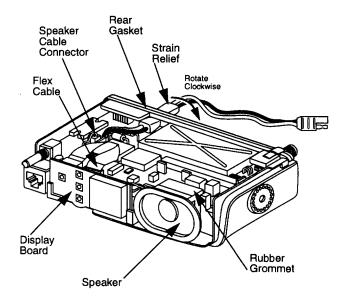


Figure 1-2. Mechanical Components

1. Pull the 2-pin speaker cable connector upwards to disconnect it from the main board.

CAUTION

In order to avoid damage to the speaker, **Do Not** grasp the speaker cone when removing the rubber gasket/speaker from the heatsink.

- Grasp the speaker at its edges and slide the rubber gasket/speaker upwards to remove it from the heatsink.
- 3. Pry the plug of the rear gasket out of the square pocket of the heatsink.
- 4. Lift and peel off the rear gasket from the heat-sink.
- 5. Disengage the power cable from double-D slot of the heatsink by rotating the strain relief towards the PA shield (clockwise) and sliding it upwards.
- 6. Remove the shroud by unsnapping the catchtabs, located on the inside wall of the heatsink, using a thin bladed screwdriver and pulling the shroud away from the heatsink.
- 7. Pry off the PA shield cover using a thin bladed screwdriver.

Reassembling the Radio

Removing the Main Board

- 1. Remove the hex nut from the underside of the heatsink using a 5/16" nut driver.
- 2. Remove all 12 mounting screws from the main board using a T10 Torx® driver.
- Loosen the antenna connection using a 1/2" nut driver.
- 4. Remove the main board. Using thumb and forefingers of both hands, grasp the edges of the main board, the antenna connector, the microphone connector, and the 16-pin connector and lift upwards and away from the heatsink.

CAUTION

Avoid damaging the PA stud on the underside of the main board when lifting away from the heatsink.

Reassembling the Radio

Replacing the Main Board

1. Carefully place the main board into the heatsink, making sure that the PA stud clears the hole on the underside of the main board.

NOTE

Make sure that the internal tooth washer and nut of the mini-U connector are on the outside of the heatsink wall.

- 2. Tighten the antenna connection using a 1/2" nut driver and torque at 20-24 in-lbs.
- 3. Replace the 12 mounting screws into the main board using a T10 Torx® driver and torque the 3 screws attaching to the plastic devices at 6-8 in-lbs. and the remaining 9 screws at 8-10 in-lbs.

Replacing the Mechanical Components to the Main Board

- 1. Rotate the strain relief towards the PA shield (clockwise) and insert it into the double-D slot located on the heatsink
- 2. Slide the strain relief downward, and rotate it away from the PA shield until it's fully seated.
- 3. Insert the shroud into the heatsink and press the catch-tabs onto the snaps.
- 4. Place the rear gasket onto the heatsink, making sure it fits between the wall of the heatsink and the PA frame, while firmly pressing the five ribs into the five teardrop indentations on the heatsink.

- 5. Insert the plug on the rear gasket into the square pocket of the heatsink.
- 6. Attach the hex nut to the underside of the heatsink, using a 5/16" nut driver and torque to 5 in-lbs.
- 7. Snap the PA shield cover into place on the PA shield frame, making sure not to pinch the rear gasket.
- 8. Slide the rubber gasket/speaker downwards onto the posts on the heatsink with the word TOP facing up.

CAUTION

The speaker cable should be routed around the 10-position black header and the 8-position black header on the main board to prevent the housing's rear hook from dislodging and damaging the speaker connector when replacing the housing (Figure 1-3).

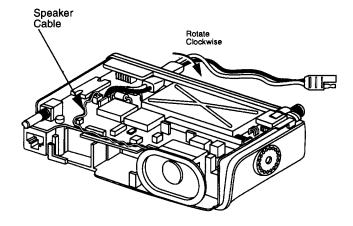


Figure 1-3. Position of Speaker Cable

9. Attach the 2-pin speaker cable connector to the connector on the main board.

Replacing the Front Panel Display Board

1. Insert the display board into the slide rails and gently push downward until it's fully seated.

NOTE

Make sure that the tab on the main board is locked into the slot on the display board

2. Connect the flex cable to the black header on the main board.

Reassembling the Radio

Replacing the Housing

NOTE

Before replacing the housing, make sure that all four buttons on the keypad are protruding properly through the housing.

- 1. With the radio on a flat surface, place the housing approximately halfway onto the heat-sink (Figure 1-4).
- 2. Using both hands, press downward on both sides of the housing to assure that the heat-sink and the housing rails are properly aligned (Figure 1-4).
- Slide the housing forward on the heatsink rails, making sure that the power cord and the rear gasket clear the housing.
- 4. Continue to slide the housing forward on the heatsink rails until the housing is flush with the rear of the heatsink.

NOTE

Verify that the outside corners of the gasket are properly inserted and aligned with the corners of the housing. 5. Insert the volume control knob by aligning it to the "D" shaft and pushing it inward while twisting it onto the volume control shaft.

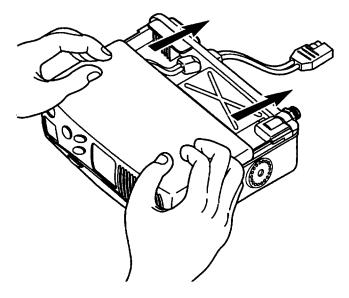


Figure 1-4. Aligning the Heatsink to the Housing Rails

Section 2 Theory of Operation

Overview

This section provides detailed theory of operation for the components of the SM Series radio.

Receiver Circuitry

VHF Receiver Front End

The received signal applied to the radio's antenna input connector is routed through the harmonic filter and PIN diode antenna switch. In the receive mode, PIN diodes CR2650 and CR2651 are both off, allowing the signal to pass unattenuated to the receiver front end filter. The insertion loss of the harmonic filter/antenna switch is less than 1 dB. The harmonic filter provides 19 dB attenuation for image protection at 240 MHz, with increased attenuation at higher frequencies.

The signal is routed to a fixed-tuned 4 pole capacitive-coupled resonator filter having a 3 dB bandwidth of 55 MHz and a 1 dB bandwidth of 50 MHz centered at 160 MHz. Insertion loss is 1.5 dB. Attenuation for image protection is 41 dB at 240 MHz, with increasing attenuation at higher frequencies.

The output of the filter is matched to the base of RF amplifier Q1, which provides 15 dB of gain and has a noise figure of 3.5 dB. Current source Q2 is used to maintain the collector current of Q1 constant at 30 mA. Transistors Q1 and Q2 are supplied from the 5R source. This source is switched by transistor Q412 which is controlled by an auxiliary output from DAC U403. 5R is only present in the receive mode. This reduces dissipation in Q1 during transmit. Diode CR1 clamps excessive input signals, protecting Q1.

The output of Q1 is applied to a fixed-tuned 3 pole series- coupled resonator filter having a 3 dB bandwidth of 68 MHz and a 1 dB bandwidth of 55 MHz centered at 160 MHz. Insertion loss is 1.3 dB. Attenuation for image protection is 34 dB at 240 MHz, with increasing attenuation at higher frequencies.

A pin diode attenuator is located between the 4 pole filter and the first mixer. The bias current through this diode is switched by dual-composite transistor switch Q3. In the Distance mode, Q3 is turned on by a logic high at Q3-4 from U403-19. CR2 is forward-biased which bypasses R10, and no loss is introduced. In the Local mode, Q3 and CR2 are off (U403-19 is low),

inserting 10 dB of attenuation due to R10. Because the attenuator is located after the RF amplifier, receiver sensitivity is reduced only by 5 dB, while the overall third order input intercept is raised by 15 dB. Thus, the Local mode significantly reduces the susceptibility to IM-related interference.

The first mixer, U1, is a passive, double-balanced type. This mixer provides all of the necessary rejection of the half-IF spurious response, since the improvement due to filter selectivity is negligible at 150 MHz. High-side injection at +6 dBm is delivered to the first mixer from the injection buffer in the VCO/Buffer IC (U251).

The mixer output is connected to a diplexer network which matches its output to the first two pole crystal filter, Y51A, at the IF frequency of 45.1 MHz, and terminates it in a 51 ohm resistor, R51, at all other frequencies.

UHF Receiver Front End

The received signal applied to the radio's antenna input connector is routed through the harmonic filter and PIN diode antenna switch. In the receive mode, PIN diodes CR2650 and CR2651 are both off, allowing the signal to pass unattenuated to the receiver front end filter. The insertion loss of the harmonic filter/antenna switch is less than 1 dB.

The signal is routed to a fixed-tuned 3 pole shunt resonator filter having a 3 dB bandwidth of 70 MHz and a 1 dB bandwidth of 50 MHz centered at 460 MHz. Insertion loss is 1.8 dB. Attenuation for image protection is 33 dB at 380 MHz, with increasing attenuation at lower frequencies.

The output of the filter is matched to the base of RF amplifier Q1, which provides 17 dB of gain and has a noise figure of 3 dB. Current source Q2 is used to maintain the collector current of Q1 constant at 30 mA. Transistors Q1 and Q2 are supplied from the 5R source. This source is switched by transistor Q412 which is controlled by an auxiliary output from DAC U403. 5R is only present in the receive mode. This reduces dissipation in Q1 during transmit. Diode CR1 clamps excessive input signals, protecting Q1.

The output of Q1 is applied to a fixed-tuned 4 pole shunt resonator filter having a 3 dB bandwidth of 45 MHz and a 1 dB bandwidth of 27.5 MHz centered at 460 MHz. Insertion loss is 2.6 dB. Attenuation for

Frequency Generation System

image protection is 57 dB at 380 MHz, with increasing attenuation at lower frequencies.

A pin diode attenuator is located between the 4 pole filter and the first mixer. The bias current through this diode is switched by dual-composite transistor switch U2. In the Distance mode, U2 is turned on by a logic high at U2-4 from U403-19. CR2 is forward- biased which bypasses R11, and no loss is introduced. In the Local mode, U2 and CR2 are off (U403-19 is low), inserting 10 dB of attenuation due to R11. Because the attenuator is located after the RF amplifier, receiver sensitivity is reduced only by 5 dB, while the overall third order input intercept is raised by 15 dB. Thus, the Local mode significantly reduces the susceptibility to IM-related interference.

The first mixer, U1, is a passive, double-balanced type. This mixer provides all of the necessary rejection of the half-IF spurious response, since the improvement due to filter selectivity is negligible at 470 MHz. Low-side injection at +6 dBm is delivered to the first mixer from the injection buffer, Q271, in the VCO/buffer circuit.

The mixer output is connected to a diplexer network which matches its output to the first two pole crystal filter, Y51A, at the IF frequency of 45.1 MHz, and terminates it in a 51 ohm resistor, R51, at all other frequencies.

Receiver Back End

Q51 amplifies the IF signal from Y51A by approximately 17 dB. The output of Q51 is matched to a second two pole crystal filter, Y51B. The overall 3 dB bandwidth of the crystal filters is 18 kHz for 20/25/30 kHz channel spacing models, and 10 kHz for 12.5 kHz channel spacing models. The signal from Y51B is applied to the input of the receiver system IC U51-6. Diode CR51 prevents overload of the amplifier and second mixer in the receiver system IC.

The 45.1 MHz first IF signal is applied to the second mixer section of U51. A 44.645 MHz crystal oscillator in U51 provides the low side injection signal, which is applied to U51-7. The output of the second mixer is a 455 kHz second IF signal which is filtered by ceramic filter FL51, amplified, filtered by ceramic filter FL52, and applied to the audio detector. As with the crystal filter, the bandwidth of the ceramic filters are narrower for 12.5 kHz channel spacing models than for 20/25/30 kHz.

The audio detector is a phase-locked loop type. The free-running oscillator frequency is determined by capacitor C61. Detected audio from U51-28 is routed to the RX IN and PL IN ports on the Audio Filter IC (AFIC) U402 (pins 7 and 8 respectively), and also via CMOS switch U553B to op-amp U551A, whose output is routed to the accessory connector J3-11.

U51 also contains the carrier-squelch circuitry. When an on-channel signal is present, the amount of highfrequency audio noise at the detector output is reduced. This change in noise level is sensed to indicate the presence of an on-channel signal. The bandwidth of the sampled noise is determined by R59, R60, C64 and C65. Squelch sensitivity is adjusted electronically by an attenuator in U402. Squelch noise is routed from U51-23 to U402- 16, and the adjusted noise level is returned from U402-18 back to U51-20. This noise level is detected in U51 and compared to a preset threshold. Noise levels greater than a preset threshold, indicating weak or no signal present, cause U51-15 to go low. This is routed to microcomputer port PE6 (U401-18). When the noise level decreases below the threshold, due to on-channel quieting, U51-15 and therefore U401-18 go high. This indicates an on-channel signal is present, and the microcomputer unmutes the audio path.

Components R57, C68 and C69 determine squelch time constants as a function of the charging currents supplied by U51. These charging currents vary from weak to strong signal conditions, providing a variable squelch closing time-constant. For weak signals the time constant is long to minimize "chattering" or rapid muting and unmuting of the audio. For strong signals, where the carrier-absent to carrier-present conditions are substantial, the closing time-constant is shortened to minimize the length of the "squelch-tail".

Frequency Generation System

The frequency generation system utilizes two IC's, the Fractional-N Synthesizer (U201) and the VCO/Buffer (U251). Designed to maximize compatibility, the two IC's provide many functions which would normally require additional circuitry.

The frequency generation circuitry is supplied from the analog 5 V supply regulated by U405. The synthesizer IC further filters this voltage (SUPFOUT, U201-18, 4.65 Vdc) and supplies it to the VCO/Buffer IC.

The synthesizer also interfaces with the logic and AFIC circuitry. Synthesizer programming is accomplished through the SR DATA (U201-5), SR CLOCK (U201-6), and SYN LE (U201-7) lines by microcomputer U401. A serial stream of 98 bits is sent whenever the synthesizer is programmed. Synthesizer lock is indicated by a logic high at LOCK DET pin U201-2, and a logic low indicates out- of-lock.

In the transmit mode, modulation from the attenuators in the AFIC (U402-19 and 20) is resistively summed and applied to U201-8. The audio is digitized within U201 and applied to the loop divider to provide the low-port modulation. The audio is also routed through an internal attenuator for balancing of the high and low port modulation, before being applied to the VCO from U201-28.

Transmit and Receive Audio Circuitry

The AFIC employs switched-capacitor filters which require an external 2.1 MHz clock signal. This clock is generated in U201 by dividing the 16.8 MHz reference oscillator. The signal, at U201- 11, is filtered, attenuated, and applied to U402-35 at a level of approximately 2 Vp-p.

Synthesizer

The Fractional-N synthesizer uses a 16.8 MHz crystal (Y201) to provide the reference frequency for the system. External components C201-3, R201-2, and CR201 are also part of the temperature-compensated oscillator circuit. The dc voltage applied to varactor CR201 is determined by a temperature-compensation algorithm within U201, and is specific to each crystal Y201 based on a unique code assigned to the crystal.

The divided frequencies of the reference oscillator and the VCO signal (as applied to U201-20) are compared to generate the necessary correction voltage, or steering line voltage, which maintains the proper VCO frequency. The steering line voltage from U201-29 is filtered and applied to varactors CR241 and CR251 to control the frequencies of the receive and transmit VCOs respectively. To achieve fast lock time, an internal adaptive charge pump provides higher momentary current capability at U201-31 than in the normal steady-state mode. The normal and adapt charge pumps receive their dc supply from a voltage-multiplier circuit which includes CR211, CR212 and associated capacitors C210-C216. By combining two 5 V square waves which are 180 degrees out-of-phase and adding this to the regulated 5 V supply, a source of approximately 12.6 Vdc is available at U201-32. The current for the normal mode charge pumps is set by R242. The pre-scaler for the loop is internal to U201 with the value determined by the frequency band of operation.

VCO

The VCO (U251) used in conjunction with the Fractional-N synthesizer (U201) generates an RF signal for both receive and transmit modes. The TRB line (U251-5) determines which oscillator and buffer is enabled, as described below. A sample of the RF signal from the enabled oscillator is routed from U251-23 to the prescaler input U201-20 via a matching network. After frequency comparison with the reference in the synthesizer, a resultant control voltage is applied to the varactors CR241 and CR251. This voltage, when locked, is between 3 and 10 V depending on VCO frequency.

In the receive mode, U251-5 is low, enabling the receive VCO and buffer in U251. The RF output signal at U251-2 is further amplified by Q271 (in UHF models only), low-pass filtered, and matched to the 50 ohm injection port of first mixer U1 at a level of +6 dBm.

During transmit, U251-5 is high, activating the transmit VCO and buffer. The RF output signal at U251-4 is low-pass filtered and matched into Q281 for further amplification before being applied to the RF power amplifier. A resistive attenuator (R284 through R286) isolates the VCO and buffer from impedance variations presented by the power amplifier for improved stability. The power output presented to the first stage (Q2610) of the RF power amplifier is +13 dBm.

Transmit and Receive Audio Circuitry

The majority of Rx and Tx audio processing is performed by U402, the Audio Filter IC (AFIC), which provides the following functions:

- Tone/Digital PL encoding and decoding
- PL rejection filter in Rx audio path
- Tx pre-emphasis amplifier
- Tx audio limiter
- Post-limiter (splatter) filter
- Tx deviation adjust digitally-controlled attenuators
- Programmable microphone gain attenuator
- Carrier squelch digitally-controlled attenuator
- Microcomputer output port expansion
- 2.5 Vdc reference source

The parameters of U402 which are programmable are selected by the microcomputer via the SR CLOCK (U402-31), SR DATA (U402-30) and chip enable (U402-33) lines.

Rx Audio Path

Low-Level Rx Audio

Detected audio from the IFIC U51-28 is routed via C551 to the AFIC Rx input (U402-7) and PL input (U402-8) and also, via CMOS switch U553B, to op-amp U551A.

The audio applied to U402-7 is sharply high-pass filtered to remove all PL and DPL tones below 300 Hz. Audio is then routed through a digitally controlled attenuator which is set to approximately 6 dB attenuation. This attenuation is intended to be non-adjustable, since it is desirable for the output at U402-23 to be at a fixed and known level, since this level is applied to the internal option board via connector J6-4. Level adjustment is accomplished at a later point via the volume control R554. The internal de-emphasis characteristic is normally enabled within U402, with the result that audio at U402-23 is de-emphasized but otherwise unmuted.

This audio signal is routed via R551 to op-amp gain stage U551B, through mute gate U554A, and applied to the top of the volume control R554. The signal at the top of the volume control is also routed to two other paths, the Handset Audio path and the Accessory Connector Rx Audio path.

Transmit and Receive Audio Circuitry

Handset Audio Path

Rx audio from U551B via mute gate U554A is amplified by op-amp U551D and applied to the microphone connector J5-8 for use with a telephone-type handset. This audio is de-emphasized and muted (by U554A). When the radio has been programmed for handset operation, the audio power amplifier is muted whenever the handset is off-hook by a logic high from U402-3. Therefore, speaker audio is muted whenever the handset is in use.

Accessory Connector RX Audio Path

Rx audio from U551B via mute gate U554A is also routed via CMOS switch U553B-2 to op-amp gain stage U551A, whose output is routed to accessory connector J3-11. The audio at J3-11 is may be either de-emphasized and muted (U401-36 low, U553B-2 connected to 15) or flat and unmuted (U401-36 high, U553B-1 connected to 15). The flat, unmuted signal applied to U553B-1 comes directly from the IFIC detected audio output. In this path, the gain adjustment for 12.5 kHz vs. 20/25/30 kHz is accomplished by resistor R563. In a similar manner, IFIC detected audio output is supplied via R555 to the internal option connector J6-5.

Audio Power Amplifier

Audio from the wiper of the volume control is amplified by the audio power amplifier IC U501. This is a bridge amplifier delivering without distortion 7.8 Vrms between pins 4 and 6. This is sufficient to develop 7.5 watts of audio power into an external 8 ohm load, or approximately 3 watts of audio power into an internal 22 ohm speaker (under this condition, undistorted audio output voltage swing exceeds 8.2 Vrms). The audio power amplifier is muted whenever speaker audio is not required, to reduce current drain and eliminate all noise in the speaker. The audio amp is muted when U501-8 is low, which is accomplished when Q416 is saturated (U402-3 high) or when the radio is turned off. The current drain into supply pin U501-7 is negligible when U501-8 is low.

Because the power amplifier is a bridge-type, neither speaker terminal is grounded. Care should be taken that any test equipment used to measure the speaker audio voltage does not ground either speaker output terminal, otherwise damage to the audio power amplifier IC may result. If the test equipment input is not isolated from ground, voltage measurements may be made from either one of the speaker output terminals (J3-1 or J3-16) to ground, in which case the voltage indicated will be one half of the voltage applied to the speaker or load resistor. In any case when a load resistor is used, it should be connected from J3-1 to J3-16. Neither side of the load resistor should be grounded.

PL Decoder

Detected Rx Audio at U402-8, the PL Decoder input, first passes through the Tone PL filter or 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 output at U402-27. The detected PL signal is coupled from U402-27 to microcomputer U401-64 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 U601A is used for detection of high-speed signalling on radio models equipped with this capability. Unattenuated Rx audio from U402-22 is dc-coupled to the two inputs of U601A. The noninverting input U601A-3 is fed through resistor R603, with C602 providing a 3.3 kHz low-pass corner. The inverting input U601A-2 is fed through resistor R602, with C601 setting a low-pass corner frequency of 16 Hz. During operation, R602 and C601 establish an averaged dc offset level at U601A-2 dependent on the average dc level of the undetected signal to set the "trigger" threshold of U601A. R603 and C602 provide high- frequency roll-off to improve falsing immunity. The detected output from the center-slicer is coupled from to microcomputer U401-1 where algorithms perform the final data decoding.

RadiusPort™ Internal Option Board Rx Audio Path

De-emphasized, unmuted audio is available at J6-4 for use by an internally installed option board. If this audio is processed and returned to the receive audio path, for an option such as a scrambler, the processed audio is returned from a low-impedance source to J6-2. The unprocessed audio through R551 is shunted due to the low source impedance of the option board at J6-2.

Non-de-emphasized, unmuted audio is also available at J6-5. Options requiring non-de-emphasized audio may use this, or may re-pre-emphasize the audio at J6-4, depending on the design of the option.

Noise Squelch Attenuator

The AFIC contains a 16 step programmable digital squelch attenuator whose input is U402-16 and output is U402-18. Noise squelch sensitivity is set using RSS, with open squelch at step 0 and maximum (tight) squelch at step 15.

Tx Audio Path

Voice Path via Front Panel

Microphone audio from the front panel mic jack J5-5 is attenuated from 80 mV rms (for 60% deviation at

Transmitter Circuitry

1 kHz) to 65 mV by R658 and R659. When mic PTT is sensed from J5-6, CMOS gate U554B is enabled by a logic high at U402-40. Audio passes R654 through preemphasis network R653 and C651 to the summing junction of an inverting op-amp gain stage within U402 (pin 10). Audio processing, including limiting, splatter filtering, and level adjustment are performed within U402. The outputs of the two programmable deviation-adjustment attenuators (U402-19 and 20) are resistively summed and applied to the VCO modulation input of the frequency generation system.

Voice Path via Accessory Connector

Microphone audio from an accessory such as a desk set applied to External Mic Audio input J3-2 is attenuated from 80 mV rms (for 60% deviation at 1 kHz) to 65 mV by R666 and R665. When External Mic PTT is sensed at J3-3 (or from any programmable input to which Ext Mic PTT has been assigned), CMOS gate U554C is enabled by a logic high at U401-37. Audio passes R654 through pre-emphasis network R653 and C651 to the summing junction of an inverting op-amp gain stage within U402 (pin 10). Audio processing, including limiting, splatter filtering, and level adjustment are performed within U402. The outputs of the two programmable deviation-adjustment attenuators (U402-19 and 20) are resistively summed and applied to the VCO modulation input of the frequency generation system.

Flat (Non-Pre-Emphasized) Tx Audio Path via Accessory Connector

Audio applied at J3-5 may be routed to the transmitter either before (PRE-LIM) or after (POST-LIM) the limiter. This is chosen by RSS one time and not changed subsequently. The path is controlled by CMOS gate U553C, as determined by the dc level of U402-2. Logic low provides PRE-LIM, logic high provides POST-LIM. When the POST-LIM path is chosen, audio is routed via R671 and op-amp U551C to the AUX TX INPUT (U402-13), therefore this input of the AFIC must be enabled whenever an accessory connector PTT is sensed at J3-3 (or from any programmable input to which Accessory PTT has been assigned).

If the PRE-LIM path is chosen, audio is coupled by C655 and R670 to the summing input of an op-amp within U402 (pin 10). Because R670 is significantly larger than R671, R669 provides a faster charging path for C655 when the PRE-LIM route is selected.

RadiusPort™ Internal Option Board Tx Audio Path

Microphone audio which is attenuated to a level of 65 mV rms for 60% deviation at 1 kHz is applied to the option board via J6-3. After processing by the option board, audio is returned via J6-1 from a low-impedance source on the option board. This effectively shorts out the direct audio path through resistor R654.

Transmitter Circuitry

VHF 10-25 Watt Transmitter RF Power Amplifier

The 10-25 watt VHF power amplifier is designed to cover the range of 150-170 MHz. It consists of three stages. The first stage, Q2610, operates in Class A with base bias supplied by the 8T source. The collector voltage is supplied from controlled B+. The output level of this stage (i.e. the gain of this device) is varied by changes in the controlled B+ voltage. The magnitude of the control voltage depends on the PA output power, temperature and also antenna load mismatch.

The second stage of the PA, Q2630, is the driver which amplifies the output of low level amplifier to a level sufficient to drive the final stage device. This device operated in Class C delivers up to 3 watts output power. Collector voltage is supplied by UNSWB+.

The third stage, Q2640, is the final RF power amplifier, which operates in Class C directly from UNSWB+. It provides up to 30 watts output power.

A directional coupler, located between the final power amplifier and the harmonic filter, monitors the forward and reflected power. The sampled RF is rectified by diodes CR2601 (forward power) and CR2602 (reflected power), and the resulting dc voltage is routed to the power control circuit. The HI/LO power line (U451-3) offsets the voltage reference for the forward power rectifier by 5 V to allow separating the power adjustment range into two overlapping segments, if required for greater power set resolution. This capability is presently not used.

Antenna switch consists of a pair of PIN diodes, CR2650 and CR2651, a pi-network and current limiting resistors. A voltage at the bias terminal 8T forward biases both diodes, so that there is a low impedance path from transmitter to antenna while shorting out the receiver input. When this voltage is absent, both diodes look like high impedances and transmitter is effectively disconnected from the antenna, while antenna signal appears across the receiver front-end input terminals.

During transmit mode, 8T is present and both diodes are forward biased into conduction. The transmitter RF from Q2640 via the directional coupler is routed through CR2650, and via the harmonic filter to the antenna jack J1. The PIN diode CR2651 in the shunt-leg conducts, shunting RF power and preventing it from reaching the sensitive receiver front-end. The impedance inverter network contributes approximately 30 dB to transmit/receive isolation. Whereas, during receive mode, both the PIN diodes are non-conducting. Thus, the signal applied at the antenna jack J1 are routed via the harmonic filter, through C2658, L2652 and C2659 to the receiver input.

Transmitter Circuitry

The harmonic filter is a seven pole 0.1 dB ripple Chebychev low- pass filter with a 3 dB frequency of approximately 200 MHz and less than 1 dB insertion loss in the passband. The filter's primary function is to attenuate harmonic spurs generated by the transmitter. It also adds low-pass selectivity for the receiver. L2663 protects the power amplifier from static discharge.

VHF 40 Watt Transmitter RF Power Amplifier

The 40 watt VHF power amplifier is designed to cover the range of 150-170 MHz and has four stages. The first stage, Q2410, operates in Class A from the 8T source. It provides 13 dB of gain and an output of 400 mW.

The second stage, Q2420, has a nominal gain of 9.4 dB and power output of up to 3.5 watts. The output of this stage is adjusted by the controlled B+ voltage which supplies its collector. (VB+ max = 6.55 V).

The third stage, Q2430, operates in Class C with 8.1 dB gain and a power output of up to 22 watts. Collector voltage is directly from UNSW B+.

The fourth stage, Q2440, is the final RF power amplifier, which operates Class C directly from UNSW B+. It provides up to 65 watts output.

A directional coupler, located between the final power amplifier and the harmonic filter, monitors the forward and reflected power. The sampled RF is rectified by diodes CR2480 (forward power) and CR2481 (reflected power) and the resulting dc voltage is routed to the power control circuit.

The antenna switch consists of two pin diodes, CR2450 and CR2451. L2452 and C2450, combined with the "on" inductance of CR2451, form a series resonant circuit to lower the shunt impedance presented by CR2651 when it is turned on. In the receive mode, both diodes are off. Signals applied at the antenna jack J1 are routed, via the harmonic filter, through L2451 and C2453 to the receiver input. In the transmit mode, 8T is present and both diodes are forward-biased into conduction. The transmitter RF from Q2440 via the directional coupler is routed through CR2450, and via the harmonic filter to the antenna jack. CR2451 conducts, shunting RF power and preventing it from reaching the receiver. L2451 is selected to appear as a 1/4 wave at VHF, so that the low impedance of CR2451 appears as a high impedance at the junction of CR2450 and the harmonic filter input. This provides a high series impedance and low shunt impedance divider between the power amplifier output and receiver input.

The harmonic filter is a seven pole 0.1 dB ripple Chebychev low pass filter with a 3 dB frequency of approximately 200 MHz and less than 1 dB insertion loss in the passband.

UHF 10-25 Watt Transmitter RF Power Amplifier

The 10-25 watt UHF power amplifier is designed to cover the range of 450-470 MHz and has four stages. The first stage, Q2610, operates in Class A from the 8T source. It provides 11.8 dB of gain and an output of 300 mW.

The second stage, Q2620, has a nominal gain of 8.2 dB and power output of up to 2 watts. The output of this stage is adjusted by the controlled B+ voltage which supplies its collector.

The third stage, Q2630, operates in Class C with 8.1 dB gain and a power output of up to 13 watts. Collector voltage is directly from UNSW B+.

The fourth stage, Q2640, is the final RF power amplifier, which operates Class C directly from UNSW B+. It provides up to 30 watts output.

A directional coupler, located between the final power amplifier and the harmonic filter, monitors the forward and reflected power. The sampled RF is rectified by diodes CR2680 (forward power) and CR2681 (reflected power) and the resulting dc voltage is routed to the power control circuit. The HI/LO power line (U403-20) offsets the voltage reference for the forward power rectifier by 5 V to allow separating the power adjustment range into two overlapping segments, if required for greater power set resolution. This capability is presently not used.

The antenna switch consists of two pin diodes, CR2650 and CR2651. L2652 and C2650, combined with the "on" inductance of CR2651, form a series resonant circuit to lower the shunt impedance presented by CR2651 when it is turned on. In the receive mode, both diodes are off. Signals applied at the antenna jack J1 are routed, via the harmonic filter, through L2651 and C2653 to the receiver input. In the transmit mode, 8T is present and both diodes are forward-biased into conduction. The transmitter RF from Q2640 via the directional coupler is routed through CR2650, and via the harmonic filter to the antenna jack. CR2651 conducts, shunting RF power and preventing it from reaching the receiver. L2651 is selected to appear as a 1/4 wave at UHF, so that the low impedance of CR2651 appears as a high impedance at the junction of CR2650 and the harmonic filter input. This provides a high series impedance and low shunt impedance divider between the power amplifier output and receiver input.

The harmonic filter is a seven pole 0.1 dB ripple Chebychev low pass filter with a 3 dB frequency of approximately 600 MHz and less than 1 dB insertion loss in the passband.

Transmitter Circuitry

UHF 40 Watt Transmitter RF Power Amplifier

The 40 watt UHF power amplifier is designed to cover the range of 450-470 MHz and has four stages. The first stage, Q2610, operates in Class A from the 8T source. It provides 11.8 dB of gain and an output of 300 mW.

The second stage, Q2620, has a nominal gain of 8.2 dB and power output of up to 2 watts. The output of this stage is adjusted by the controlled B+ voltage which supplies its collector.

The third stage, Q2630, operates in Class C with 8.1 dB gain and a power output of up to 13 watts. Collector voltage is directly from UNSW B+.

The fourth stage, Q2640, is the final RF power amplifier, which operates Class C directly from UNSW B+. It provides up to 50 watts output.

A directional coupler, located between the final power amplifier and the harmonic filter, monitors the forward and reflected power. The sampled RF is rectified by diodes CR2680 (forward power) and CR2681 (reflected power) and the resulting dc voltage is routed to the power control circuit.

The antenna switch consists of two pin diodes, CR2650 and CR2651. L2652 and C2650, combined with the "on" inductance of CR2651, form a series resonant circuit to lower the shunt impedance presented by CR2651 when it is turned on. In the receive mode, both diodes are off. Signals applied at the antenna jack J1 are routed, via the harmonic filter, through L2651 and C2653 to the receiver input. In the transmit mode, 8T is present and both diodes are forward-biased into conduction. The transmitter RF from Q2640 via the directional coupler is routed through CR2650, and via the harmonic filter to the antenna jack. CR2651 conducts, shunting RF power and preventing it from reaching the receiver. L2651 is selected to appear as a 1/4 wave at UHF, so that the low impedance of CR2651 appears as a high impedance at the junction of CR2650 and the harmonic filter input. This provides a high series impedance and low shunt impedance divider between the power amplifier output and receiver input.

The harmonic filter is a seven pole 0.1 dB ripple Chebychev low pass filter with a 3 dB frequency of approximately 600 MHz and less than 1 dB insertion loss in the passband.

VHF Power Control Circuit

The VHF power control circuit is a dc-coupled amplifier whose output is the controlled voltage to Q2610 collector circuit. Comparator U451A is configured as a current source and maintains the reference current setting at the collector of Q451. Under steady-state conditions, the reference current is the sum of detected current by the rectified forward power and reflected

power at the bi-directional coupler. The reference current level varies proportionally with the desired output power level.

By changing the DAC settings, and thus varying dc current from DAC U403 pin 9 and 11, the desired output power between 10-25 watts can be obtained. The power control loop varies the collector voltage of Q2610 as necessary to maintain equal current at the collector of Q451.

Under conditions of poor antenna match resulting in high reflected power, the control voltage at the collector of Q455 is reduced due to lowering of the detected current by the forward power detector. The output power is reduced to maintain the reference current at the collector of Q451 (due to increase in detected current by reflected power detector).

The temperature-sensing circuit protects the PA devices from excessively high temperature. As the PA temperature increases, the resistance of thermistor RT460 decreases. When the temperature-sensing circuit triggers into operation, the voltage at pin 3 of comparator U451 increases. Since the DAC values remain unchanged, the reference current level at pin 1 of current source amplifier, U451, is lowered. This is interpreted by the power control circuit as a lowering of desired output power. When the power output is reduced, the generated heat is reduced to a safe level. If temperature falls below the cutback temperature, the output power of the PA is increased to its nominal value.

Under severe environmental conditions, more than one circuit may be attempting to reduce power output at the same time (i.e., during high VSWR conditions, the high reflected power may initially reduce power, but eventually heat build-up will cause further power reduction by the thermal cut-back circuitry).

UHF Power Control Circuit

The UHF power control circuit is a dc-coupled amplifier whose output is the controlled voltage applied to Q2620 collector circuit. The input voltage to U451A-2 is a dc voltage from the direction coupler forward power detector, and is proportional to RF power output. This is compared to a dc voltage from DAC U403 pins 9 and 11, which is proportional to the desired output power setting. The power control loop varies the output of stage Q2620 as necessary to keep equal voltages at U451A pins 2 and 3. Under conditions of poor antenna match resulting in high reflected power, or under excessively high temperatures near the RF final amplifier, the dc voltage at U451A-3 is reduced due to a lowering of the voltage at U451B-7 (mismatch) or decreasing resistance of thermistor R462 at high temperatures. These two voltages are summed via diode CR451, and are interpreted by the power control circuit as a lowering of the desired output power. The loop

PTT Circuit

reduces Q2620's output until equal voltages at U451A-2 and 3 are again achieved.

PTT Circuit

The logic system uses a single microcomputer A/D input port PE1 (U401-15) to distinguish between three different types of PTT information. This is done by assigning different voltage levels to the different PTT functions as follows:

0 to 2.1 Vdc, Microphone PTT 2.2 to 3.6 Vdc, Accessory PTT 3.9 to 4.5 Vdc, Reserved for Special Applications

A microphone connected via the front panel jack J5 must present a low of less than 2.1 Vdc to be correctly interpreted as MIC PTT and causing the appropriate audio paths to be enabled. Similarly, an accessory whose PTT output is connected to J3-3 must present a low of less than approximately 2.1 V to be interpreted as an accessory PTT. This voltage is shifted to the range between 2.2 and 3.6 V by series resistor R432.

Special applications may require a microphone with an additional button for some specialized function. A series resistor within the microphone is chosen to present between 3.9 and 4.5 Vdc at port PE1 when the button is activated.

DC Regulation and Distribution

Unswitched B+ supplies operating voltage directly to the RF power amplifier third and fourth stages, the power control series pass device Q451-E, the RAM keep-alive constant supply to U401-25, the audio power amplifier supply pin U501-7 and, via fuse F401, to the external alarm switch transistor Q409-E. All of these circuits draw negligible current when the radio is turned off (less than 15 mA total).

When the on-off switch is "on," battery voltage is applied to 8 V regulator U406, whose regulated output is routed to the display board for backlighting, to 8T transistor switch Q414, to U51 pins 13 and 14, to opamp U551 supply pin 4, and to the inputs of the 5 V regulators U404 (digital) and U405 (analog). Separate analog and digital regulators are used to minimize microcomputer noise from being introduced into sensitive VCO and receiver circuits. The digital 5 V regulator includes a reset timer which hold the reset line

U404-3 low for a predetermined time after the radio is turned on. Zener diodes on the 8 V and digital 5 V lines minimize susceptibility to ESD damage.

Front Panel Circuits

2-Frequency Display Board

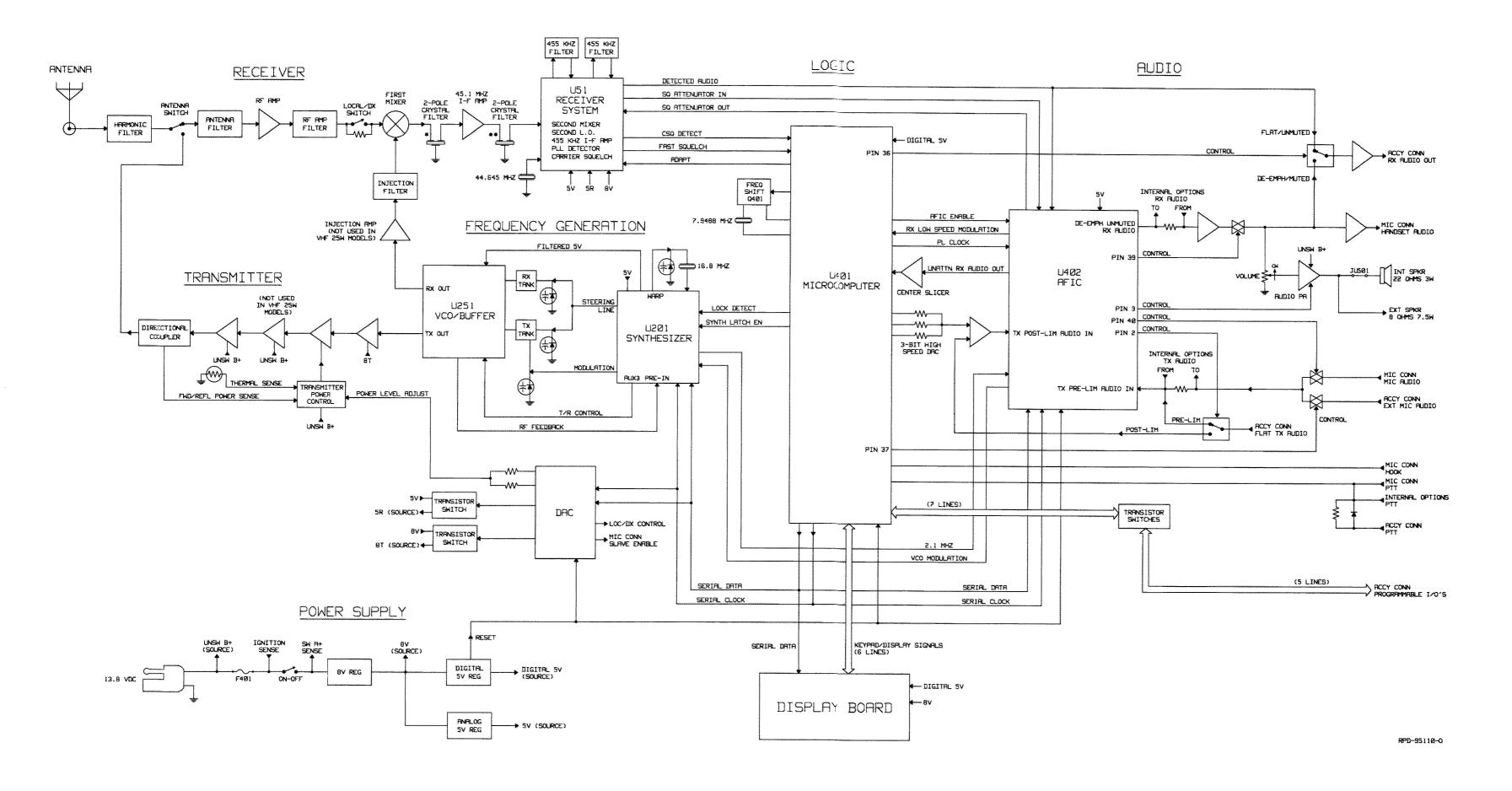
The 2-frequency display board contains backlighting LEDs, Option and Monitor LEDs controlled by transistor switches Q1006 and Q1007 respectively, and Red (Tx) and Green (Rx) LED indicators for each channel, controlled by transistors Q1001-Q1004. To function as a "channel busy" indicator, the appropriate channel Red LED is illuminated and the base drive to Q1005 is toggled on and off, causing the LED to blink.

The four pushbuttons apply voltage to the bases of four digital transistors Q1008-Q1011. The appropriate transistor, in turn, grounds a tap on the series resistor ladded R1015-R1017, producing a different dc level depending on which button is pressed. These dc levels are interpreted by an A/D input of the microcomputer (U401-17) and the corresponding function is enabled. The transistors ensure than the dc ladder voltage is consistent although the series resistance of the keypad contact may vary.

16-Frequency Display Board

The 16-frequency display board contains backlighting LEDs, and an LCD driven by LCD driver IC U1101. The desired display information is loaded serially into U1101 from the microcomputer via the SR Data and Display Clock lines. Because a dedicated clock line is used, no chip-select line is needed.

The four pushbuttons apply voltage to the bases of four digital transistors Q110-Q1104. The appropriate transistor, in turn, grounds a tap on the series resistor ladded R1106-R1108, producing a different dc level depending on which button is pressed. These dc levels are interpreted by an A/D input of the microcomputer (U401-17) and the corresponding function is enabled. The transistors ensure than the dc ladder voltage is consistent although the series resistance of the keypad contact may vary.



SM Series Radio Functional Block Diagram

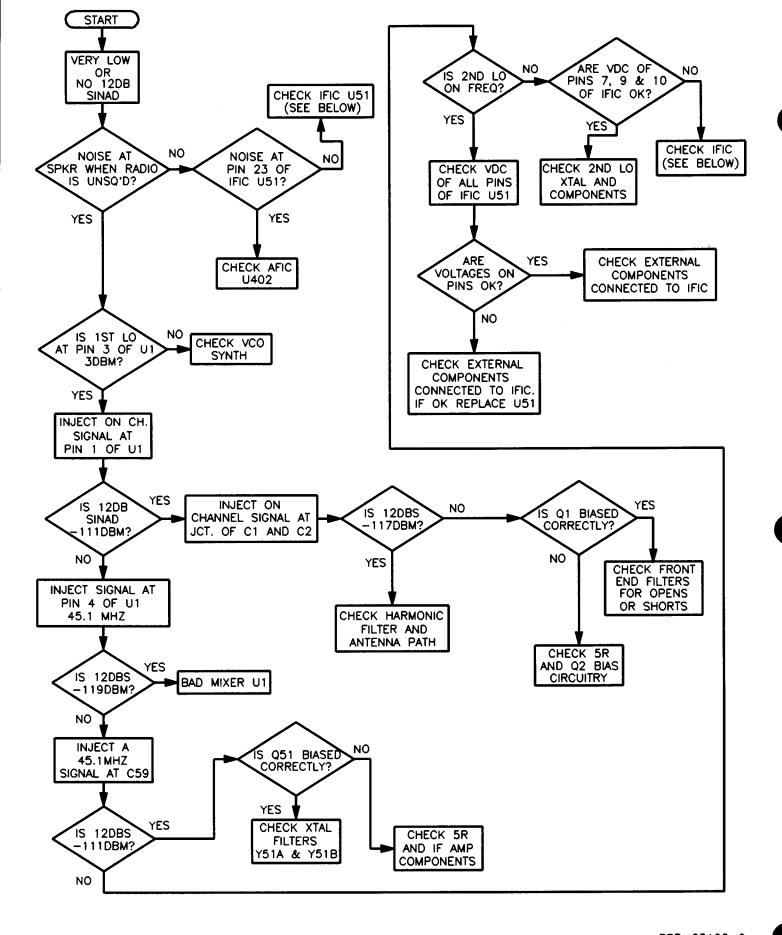
2-9

Section 3 Troubleshooting

Overview

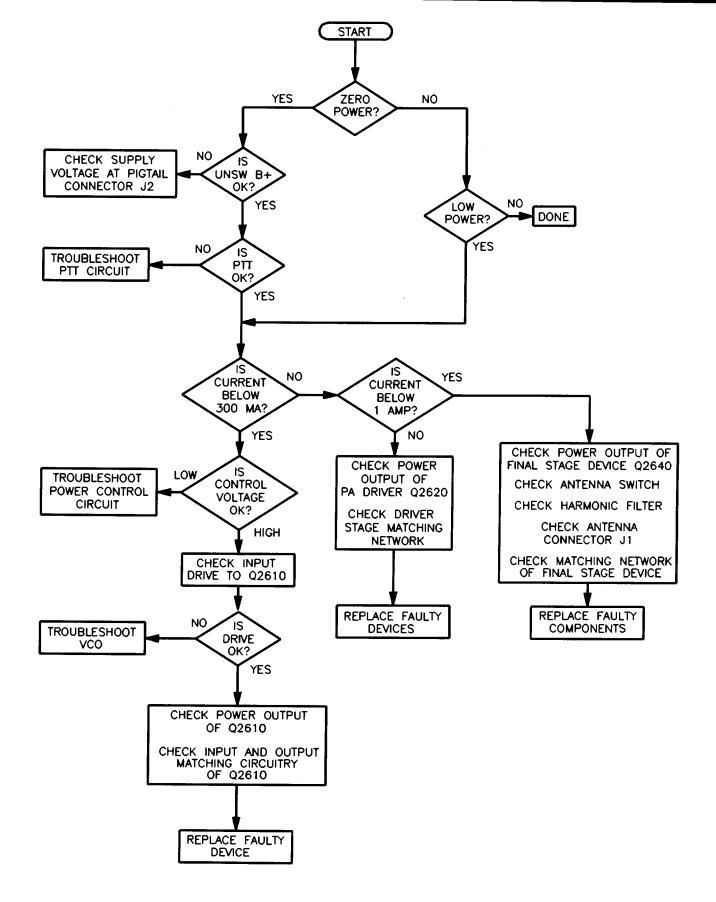
This section contains 9 troubleshooting tables for the following SM Series components:

- Receiver (all models)
- Transmitter (VHF 25 W models)
- Transmitter (VHF 40 W, UHF 25 W, and UHF 40 W models)
- Synthesizer (VHF 25 W models)
- Synthesizer (VHF 40 W, UHF 25 W, and UHF 40 W models)
- Voltage Controlled Oscillator (VCO) (VHF 25 W models)
- Voltage Controlled Oscillator (VCO) (VHF 40 W, UHF 25 W, and UHF 40 W models)
- Microprocessor (all models)



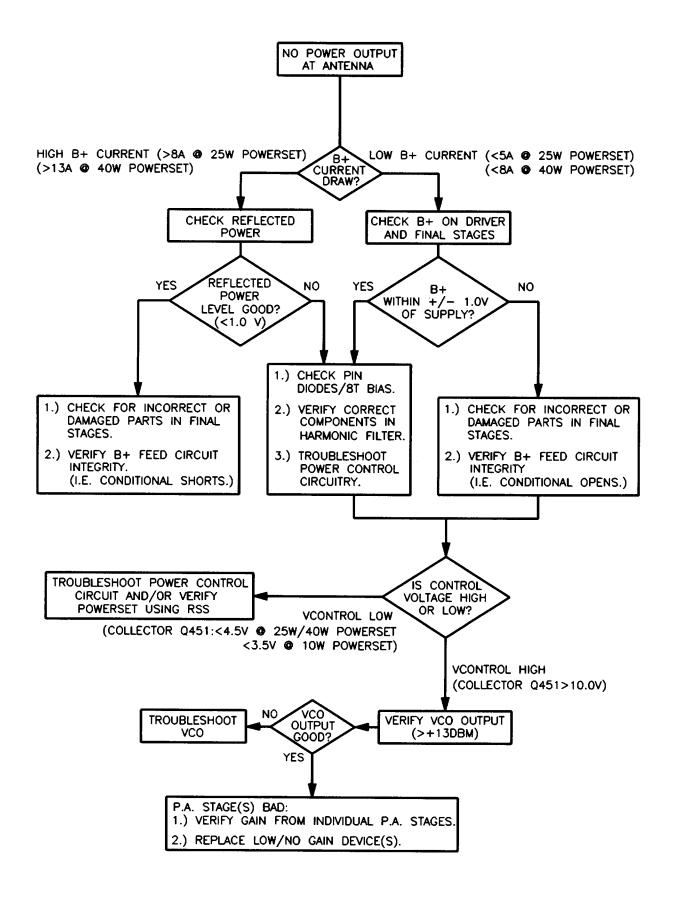
RPD-95102-0

Troubleshooting Flow Chart for Receiver (all models)



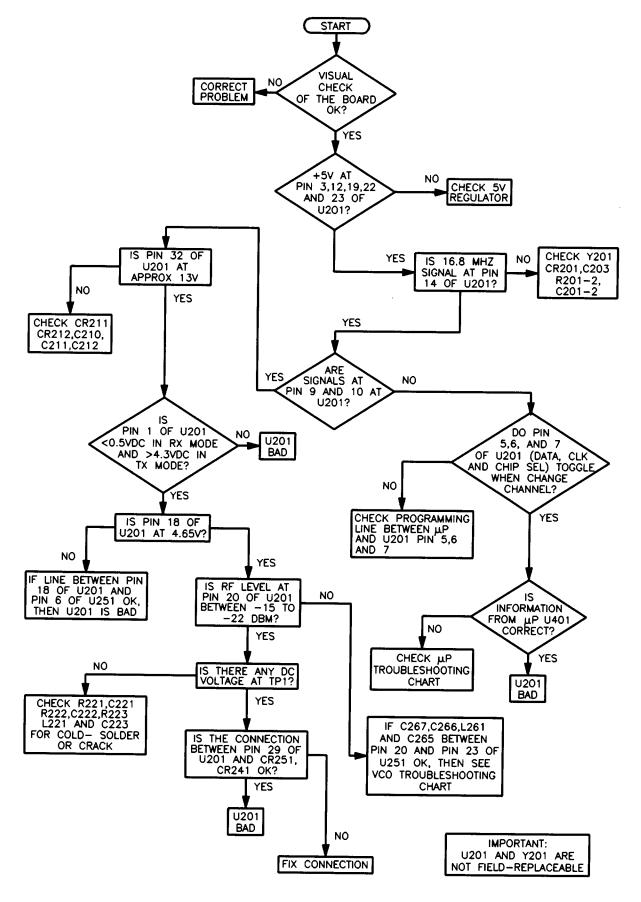
RPD-95103-0

Troubleshooting Flow Chart for Transmitter (VHF 25 W Models)



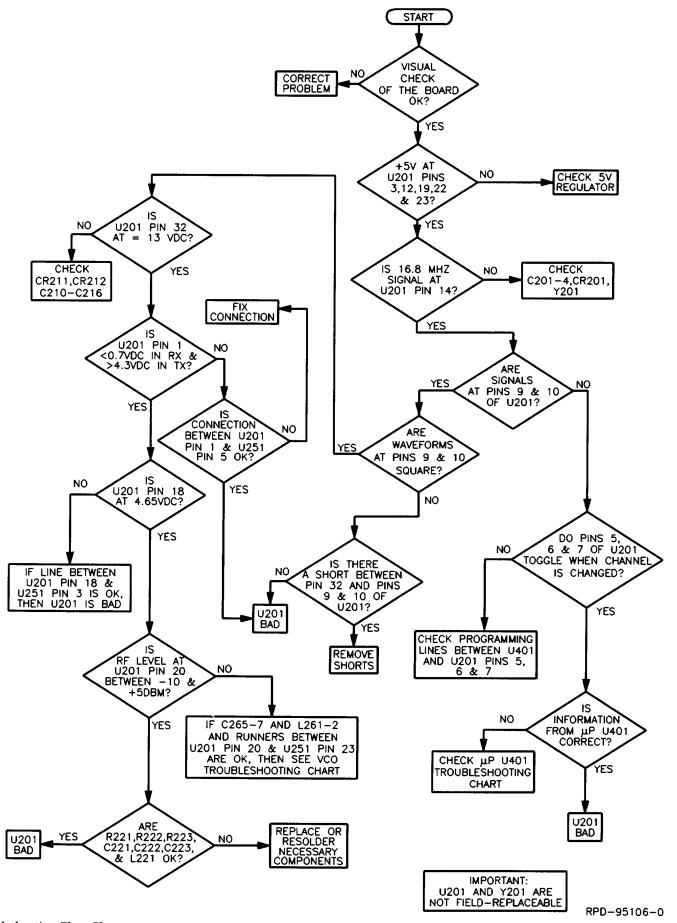
RPD-95104-0

Troubleshooting Flow Chart for Transmitter (VHF 40 W, UHF 25 W, and UHF 40 W Models)

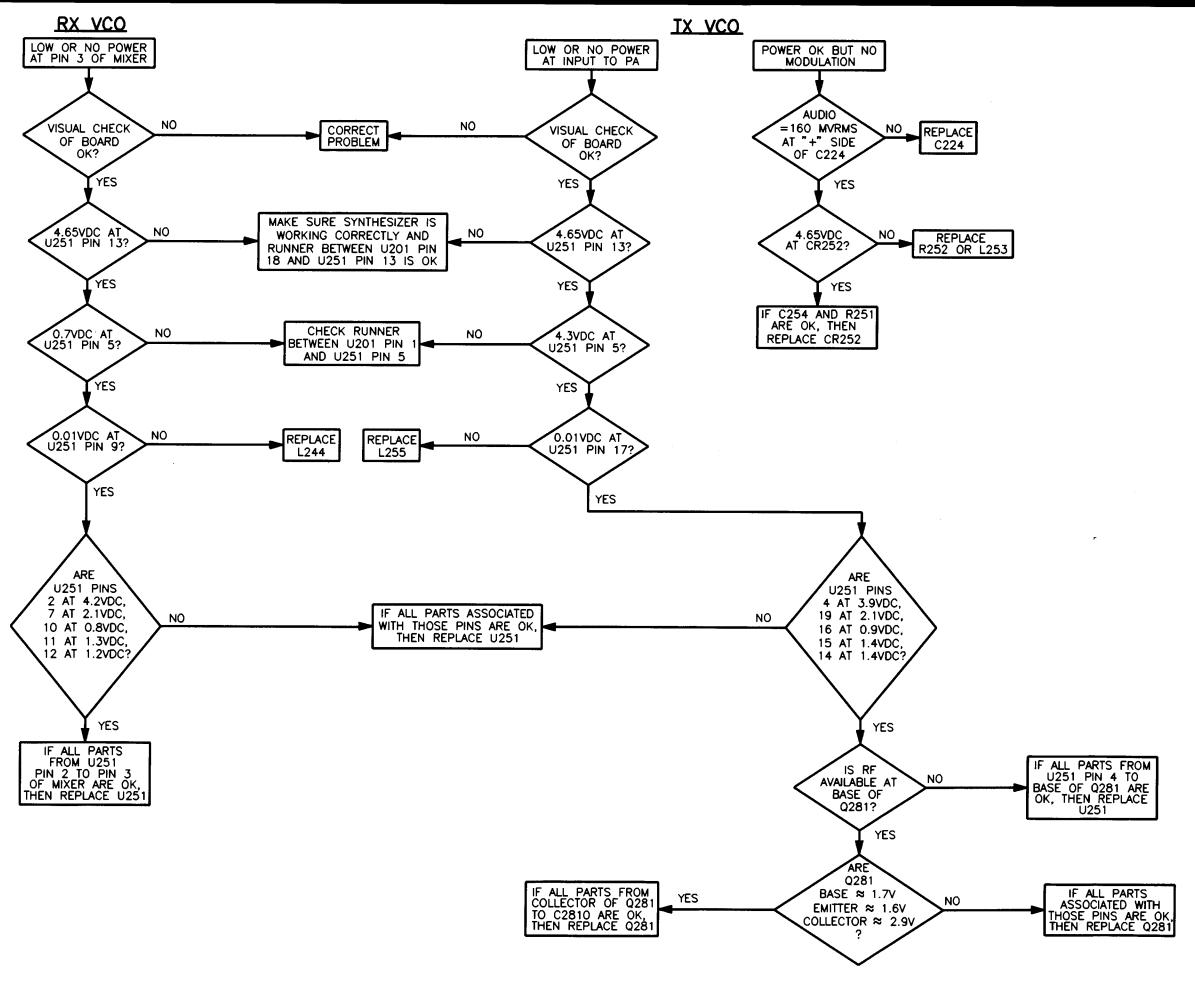


RPD-95105-0

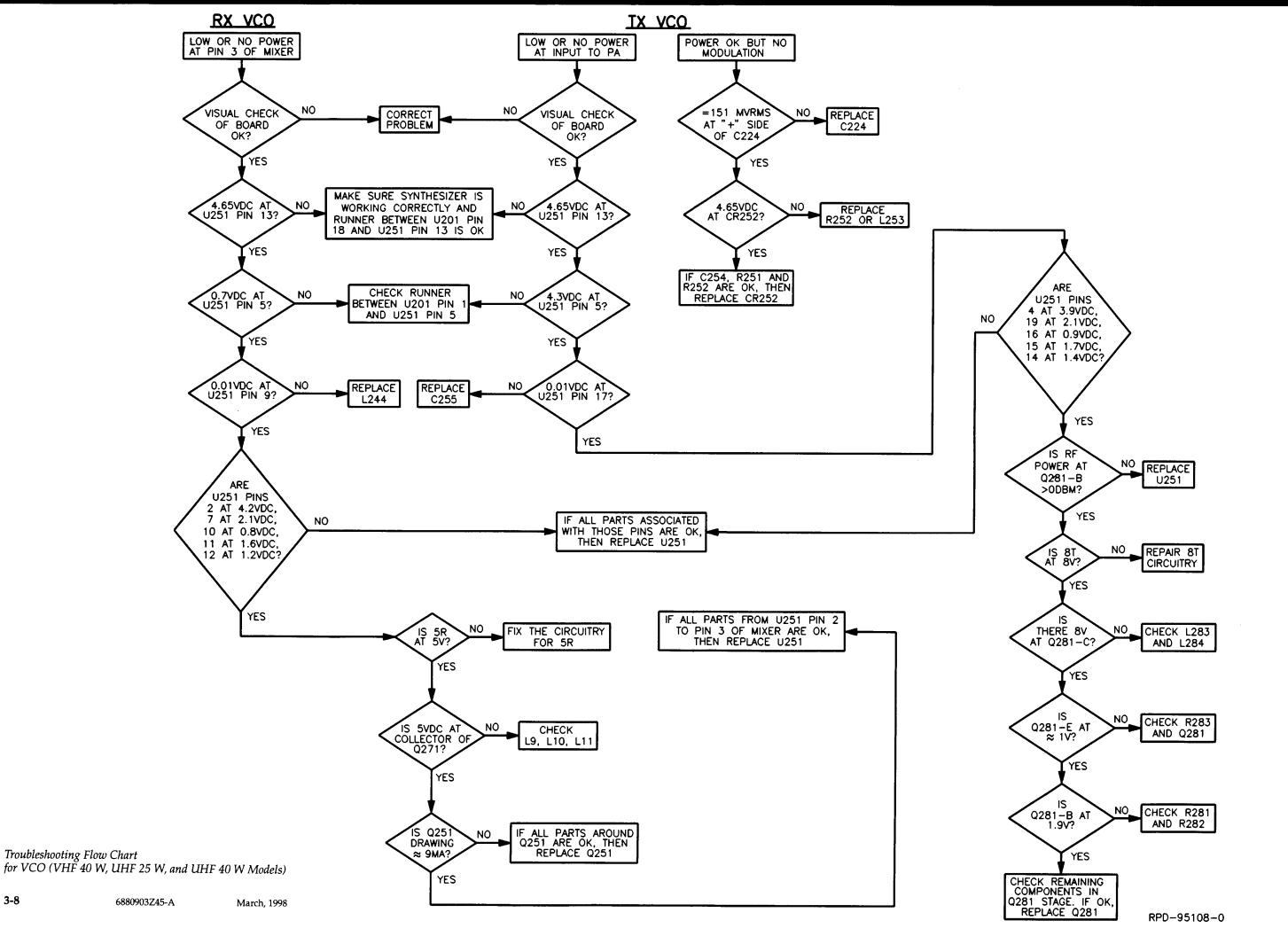
Troubleshooting Flow Chart for Synthesizer (VHF 25 W Models)



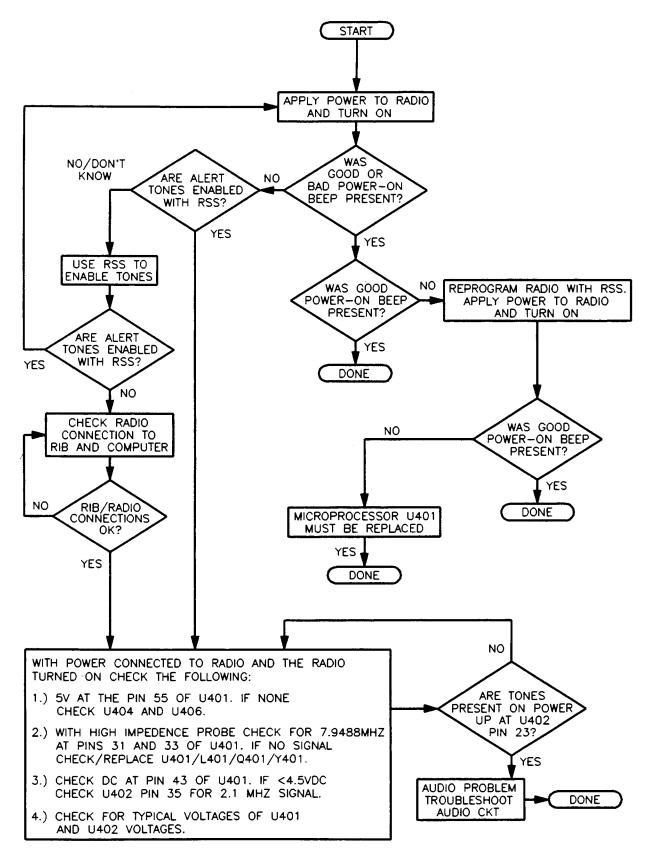
Troubleshooting Flow Chart for Synthesizer (VHF 40 W, UHF 25 W, and UHF 40 W Models)



Troubleshooting Flow Chart for VCO (VHF 25 W Models)



3-8



RPD-95109-0

Troubleshooting Flow Chart for Microprocessor (all models)

MOTOROLA P/N 8404787J01 REV O **21 DECEMBER 1995** U501 COMPONENT SIDE (GRAY) SOLDER SIDE (PINK) OVERLAY -----RCB-96115-O RCB-96118-O RCB-96119-O

COMPONENT SIDE VIEW

MOTOROLA P/N 8404787J01 REV O 21 DECEMBER 1995 U501 COMPONENT SIDE INNER LAYER (GRAY)
SOLDER SIDE INNER LAYER (PINK)
OVERLAY -----RCB-96116-O RCB-96117-O

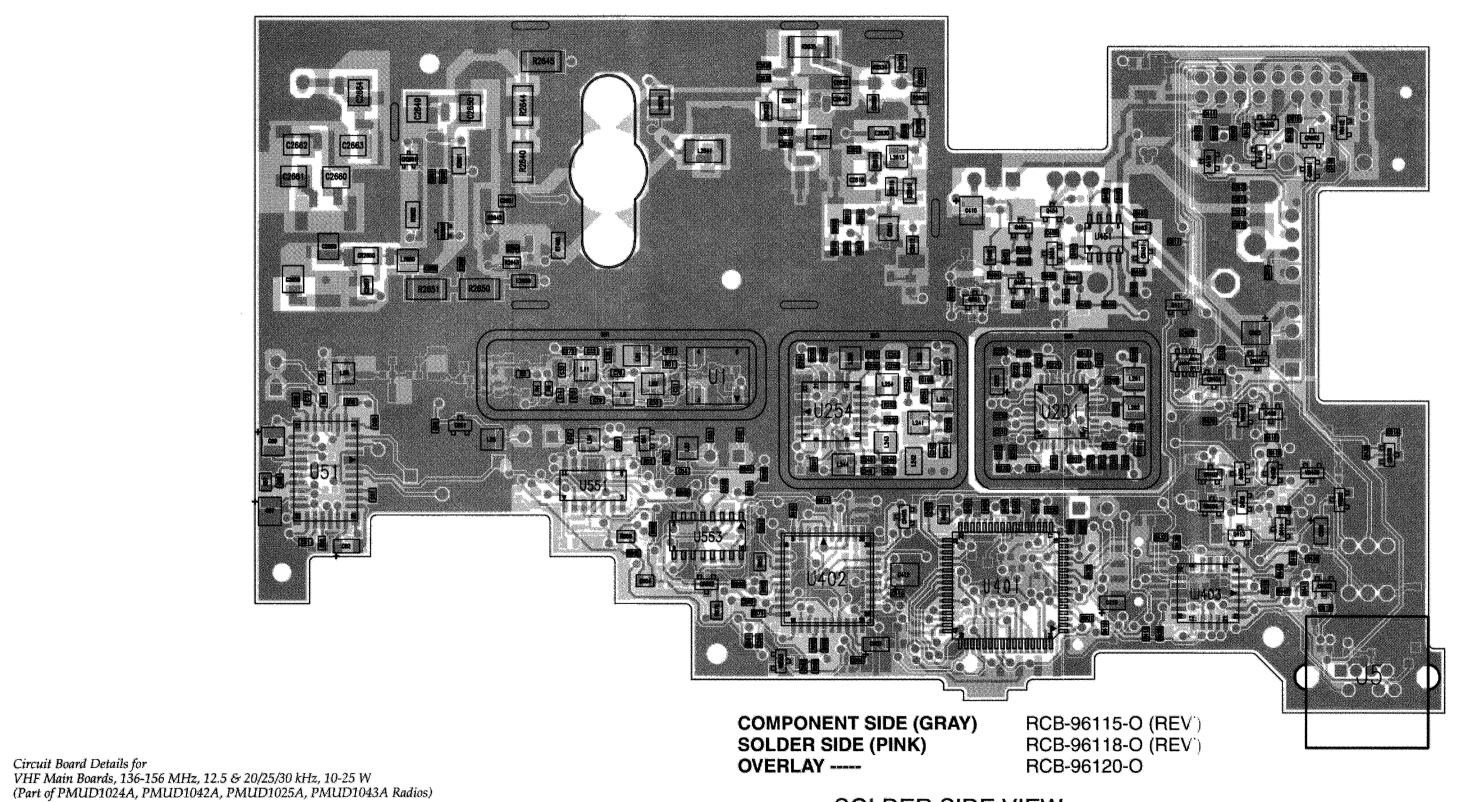
COMPONENT SIDE VIEW

Circuit Board Details for VHF Main Boards, 136-156 MHz, 12.5 & 20/25/30 kHz, 10-25 W (Part of PMUD1024A, PMUD1042A, PMUD1025A, PMUD1043A Radios)

RCB-96119-O

MOTOROLA P/N 8404787J01 REV O 21 DECEMBER 1995

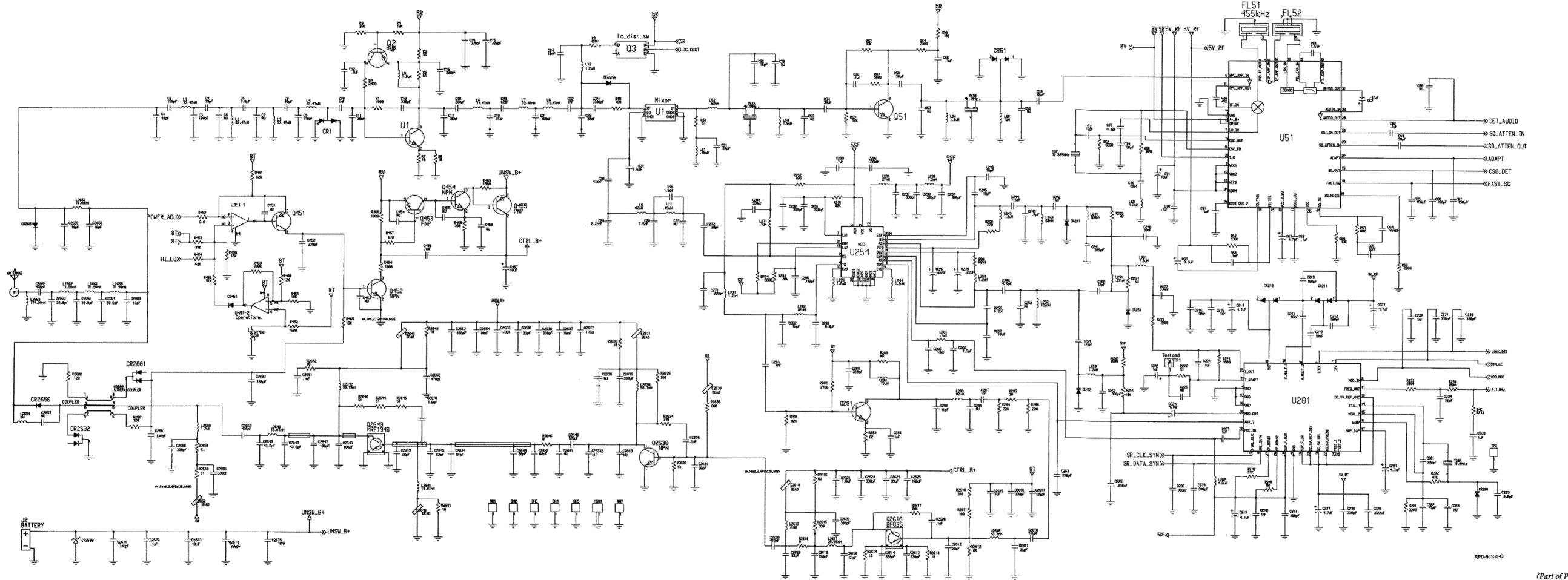
MOTOROLA P/N 8404787J01 REV O 21 DECEMBER 1995



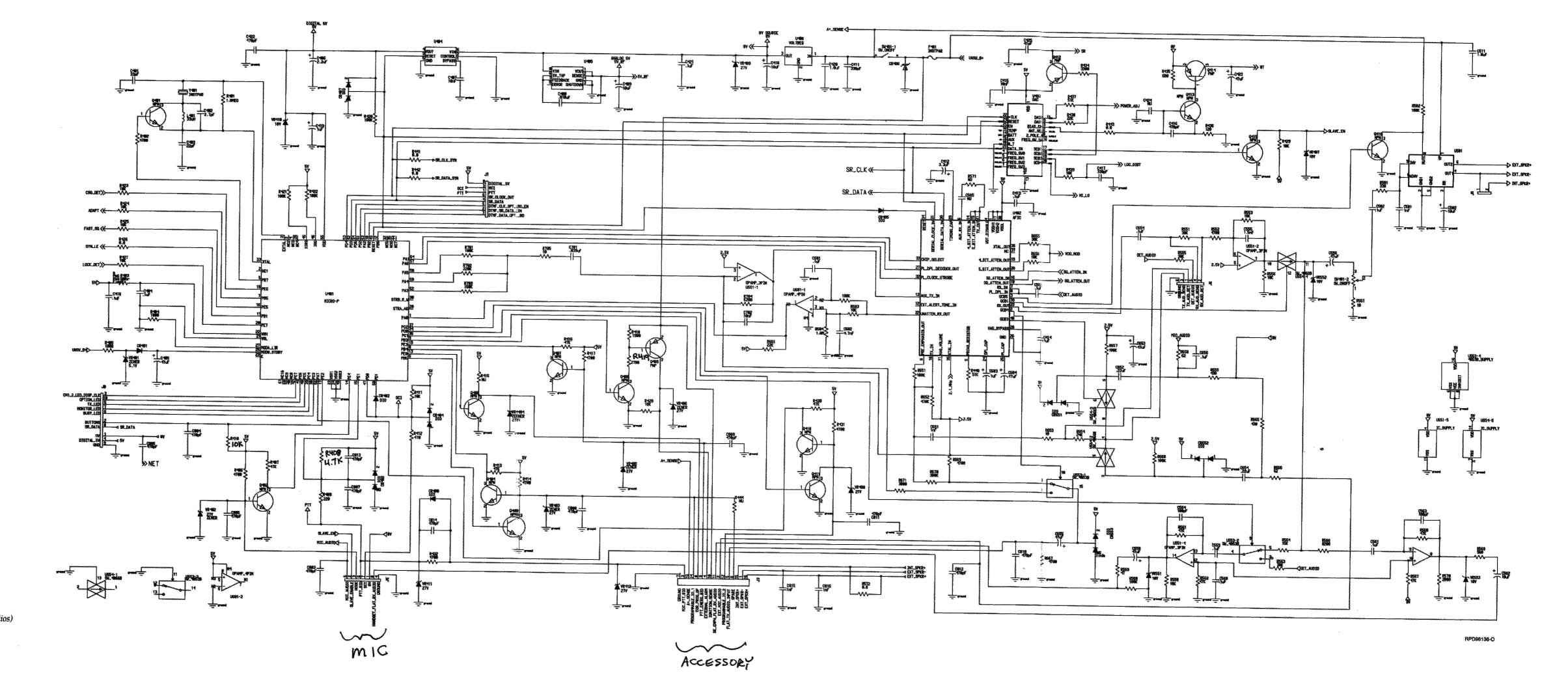
RCB-96116-O (REV) RCB-96117-O (REV) RCB-996120-O COMPONENT SIDE INNER LAYER (GRAY) SOLDER SIDE INNER LAYER (PINK)
OVERLAY ----

SOLDER SIDE VIEW

SOLDER SIDE VIEW



Schematic Diagram for VHF Main Boards, 136-156 MHz, 12.5 & 20/25/30 kHz, 10-25 W (Part of PMUD1024A, PMUD1042A, PMUD1025A, PMUD1043A Radios) (Sheet 1 of 2)



Schematic Diagram for VHF Main Boards, 136-156 MHz, 12.5 & 20/25/30 kHz, 10-25 W (Part of PMUD1024A, PMUD1042A, PMUD1025A, PMUD1043A Radios) (Sheet 2 of 2)

6880903Z45-A

March, 1998

Parts List

SM50/SM120 VHF Main Board, 136-156 MHz, 10-25 W, 12.5 kHz (N) (used in PMUD1024 and PMUD1142) SM50/SM120 VHF Main Board, 136-156 MHz, 10-25 W, 20/25/30 kHz (W)

PL-961020-A (used in PMUD1025 and PMUD1143) REFERENCE MOTOROLA DESCRIPTION SYMBOL PART NO. apacitor, fixed: +/-5%; 50 V: unless otherwise stated 21-13740F42 21-13740F55 21-13740F51 21-13740F41 21-13740F24 7.5 uF ±0.25 pF 91-19740F41 21-13740F52 1-19741F25 21-13740F38 0.1 uF ±10%: 16 V 11-13743K15 1-13741F13 C13 thru 16 1-13740F40 21-13750F58 200 n 21-13740F50 21-13740F46 21-13740F51 21-13741F25 21-13740F39 21-13741F29 21-13741F13 7.5 uF ±0.25 pF 21-13740F24 2.2 uF +0.25 pl 21-13740F11 21-13740F42 5.6 uF ±0.25 p 21-13740F21 21-13740F03 1.0 uF ±0.25 p C33 21-13740F49 C52 (N) 21-13740F31 15 pF 21-13740F32 16 pF C52 (W) C54 (N) C54 (W) 21-13740F46 21-13740F41 21-13741K15 0.1 uF ±10%; 16 V 21-13740F52 21-13740F38 21-13740F51 C59 (N) C59 (W) 21-13740F49 0.1 uF ±10%; 16 V 21-13743K15 1500 pF 21-13741F29 tantalum 0.47 uF ±10%; 25 V 23-11049A05 21-13740F40 C63 (N) C63 (W) 21-13740F45 C64 (N 21-13740A79 C64 (W 21-13740A73 21-13741F49 0.1 uF ±10%; 16 V 21-13743K15 tantalum 4.7 uF ±10%; 16 V 23-11049J11 0.1 uF ±10%; 16 V 21-13743K15 tantalum 3.3 uF ±10%; 20 V 23-11049J07 91-13743K15 0.1 uF ±10%: 16 V tantalum 10 uF ±10%; 16 \ 23-11049A57 21-13740F31 21-13740F40 4.3 uF ±0.25 pF 21-13740F18

21-13740F34

21-13743K15

21-13740F55

21-13740F29

21-13740F59

21-13740F43

21-13740L14

23-11049J11

21-13741F49

21-13740F51

23-11049J11

21-13741F25

21-13741F49

21-13741F13

21-13741F25

23-11049J11

21-13743K15

23-11049A07

21-13741F43

23-11049J11

C85 thru 87

C212, 213

C215

C216

C217

C218

C219

C221

C222

C223

C224

20 pF

0.1 uF ±10%: 16 V

6.8 uF ±0.1 pF

100 pF

tantalum 4.7 uF ±10%; 16 V

tantalum 4.7 uF ±10%; 16 V

tantalum 4.7 uF ±10%; 16 V

tantalum 1 uF ±10%; 16 V

tantalum 4.7 uF ±10%; 16 V

0.1 uF ±10%; 16 V

5.6 uF ±0.25 pF

C456 C457 C458 C501 C502 C503 C511

C551 C554

C555

21-13743A19

23-80090M24

21-13741F25

21-13743K15

21-13741W01

21-13743K15

21-13743K15

21-13741F29

23-11049A57

0.1 uF ±10%; 16 V

0.1 uF ±10%; 16 V

1 uF ±10%; 25 V

0.1 uF ±10%; 16 V

0.1 uF ±10%; 16 V

1500 pF

tantalum 10 uF ±10%; 16 V

SM50/SM120 VHF Main Board, 136-156 MHz, 10-25 W, 12.5 kHz (N) (used in PMUD1024 and PMUD1142) SM50/SM120 VHF Main Board, 136-156 MHz, 10-25 W, 20/25/30 kHz (W) (used in PMUD1025 and PMUD1143)

PI -961020-/ DESCRIPTION SYMBOL PART NO. 21-13741A51 tantalum 4.7 uF ±10%; 16 V 23-11049J11 21-13743E07 .022 uF ±10%; 16 V 21-13741F13 21-13741F25 0.1 uF±10%; 16 V 21-13743K15 21-13740F39 C236 C237 C238, 239 21-13741F13 tantalum 4.7 uF ±10%; 16 V 23-11049J1 21-13741F13 C240 C241 C242 C243 C244 21-13741F49 21-13741F13 21-13740F28 21-13740F01 7.5 uF ±0.25 pF 21-13740F24 C245 C246 C247 C252 C253 C254 21-13740F29 21-13740F33 tantalum 0.22 uF ±10%; 35 V 23-11049A03 330 pF 21-13741F13 21-13740F10 2 uF ±0.25 pl 21-13740F21 6.2 uF ±0.25 pl 21-13740F22 21-13740F33 330 nF 21-13741F13 C264 C265 C266 C267 21-13740F30 7.5 uF ±0.25 pF 21-13740F24 21-13741F25 C271 C272 330 pF 21-13741F13 21-13740F38 tantalum 0.22 uF ±10%; 35 V C279 C281 23-11049A03 6.8 uF ±0.25 pF 21-13740F23 C281 C282 C283 C284 C285 C286 C287 C288 C289 C291, 292 21-13740F29 21-13741F25 330 pF 21-13741F13 21-13741F25 21-13740F28 11 pF 21-13741F25 330 pF 21-13741F13 21-13741F13 330 pF 21-13741F13 C294 thru 2 0.1 uF ±10%; 16 V 21-13743K15 C299 C299 C401 C402 C403 C404 C405 C406 C407 C408 C409, 410 C411 C412 C413, 414 21-13740F39 2.7 uF ±0.25 pF 21-13740F13 21-13740F35 tantalum 1 uF ±10%; 16 V 21-13743K15 tantalum 47 uF ±10%; 10 V 23-11049J43 tantalum 2.2 uF ±10%; 10 V 23-11049A40 21-13741F49 21-13741A51 .018 uF tantalum 10 uF ±10%; 16 V 23-11049A57 21-13741F13 tantalum 3.3 uF ±10%; 20 \ 23-11049J07 21-13743K15 tantalum 1 uF ±10%; 16 V C415 21-13741F49 C416 C417 C418 C419 C420 21-13741F17 330 pf 21-13741F13 .01 uF 21-13743K15 tantalum 1 uF ±10%; 16 V 23-11049A07 21-13741W01 1 uF ±10%; 25 V C421 C422 C423 21-13743K15 21-13741F17 23-11049J43 tantalum 47 uF ±10%; 10 V C424 C425 C451 21-13740F43 47 pF C452 C453 thru 45 21-13741F13 330 pF

SM50/SM120 VHF Main Board, 136-156 MHz, 10-25 W, 12.5 kHz (N) (used in PMUD1024 and PMUD1142)

C556

C562 C563, 564

C2611

C2612

C2616 C2617

C2618 C2619 C2620 C2621 C2622,

C2624 C2625 C2626 C2630 C2631 C2632 C2633 C2635

C2636 C2637 C2638 C2639 C2640 C2641 C2642 C2643 C2644 C2645 C2646 C2647

C2648, 2

C2651

C2652 C2653 C2654

C2657 C2658 C2659 C2660

C2672

C2674

SM50/SM120 VHF Main Board, 136-156 MHz, 10-25 W, 20/25/30 kHz (W) (used in PMUD1025 and PMUD1143) REFERENCE MOTOROLA

PL-961020-A DESCRIPTION PART NO. SYMBOL tantalum 0.47 uF ±10%; 25 V 23-11049A05 tantalum 47 uF ±10%; 10 V C559 thru 561 21-13743K15 0.1 uF ±10%; 16 V antalum 10 uF ±10%: 16 V 21-13740F51 100 pF 21-13743K15 0.1 uF ±10%; 16 V 21-13741F41 tantalum 1 uF ±10%; 16 V 23-11049A07 23-11049A05 tantalum 0.47 uF ±10%; 25 V 21-13741F25 21-13743F08 0.22 uF +80/-20%; 16 V tantalum 47 uF ±10%; 10 V 23-11049J43 0.22 uF +80/-20%; 16 V 21-13743F08 23-11049J43 tantalum 47 uF ±10%; 10 V 0.1 uF ±10%; 16 V 21-13743K15 21-13741A59 C702 C803 thru 814 21-13741F49 21-13741F17 470 pF 21-13741F25 C815, 816 21-13741F13 C2601, 2602 21-13740A4 1-13740A36 C2613, 2614 21-13741F13 0.1 uF ±10%; 16 V 1-13743k15 21-13741F13 21-13740F53 21-13740A50 21-13740A59 21-13740A37 1 uF ±10%; 25 V 1-13741W01 1-13741F13 1-13740F39 21-13740F53 21-13743A19 0.1 uF ±10%; 16 V 21-13740A71 21-13740A40 21-13741W01 1 uF ±10%; 25 V 21-13741F13 21-13741F49 21-13741F13 21-13740F39 21-13740A57 21-13740A51 21-13740A42 21-13740A54 21-13740A50 62 pF 21-11078B49 180 pF: 100 V 43 pF: 100 V 21-11078B33 470 pF; 100 V 21-11078859 0.1 uF ±10%; 16 V 21-13743A19 21-13740A71 21-13741F13 21-13741F49 C2655, 2656 21-13741F13 21-11078B19 16 pF: 100 V 21-80060M25 21-80060M22 13 pF 500 V 21-11078B32 1-11078B22 22 pF: 100 V 21-11078B59 470 pF; 100 V 21-13741F13 21-13743K15 21-13741F49 1-13741F13 21-13741F49 1-13743A19 1 uF ±10%; 25 V -13741W01

dual Schottky SOT

dual Schottky SOT

silicon varactor IT363

silicon PIN SOT MMBV3401

48-80142L01

48-80154K03

48-02245J22

SM50/SM120 VHF Main Board, 136-156 MHz, 10-25 W, 12.5 kHz (N) SM50/SM120 VHF Main Board, 136-156 MHz, 10-25 W, 12.5 kHz (N) (jused in PMUD1024 and PMUD1142) (used in PMUD1024 and PMUD1142) SM50/SM120 VHF Main Board, 136-156 MHz, 10-25 W, 20/25/30 kHz (W)

06-62057A47

06-62057A59

06-62057A23

R280 R281 R282 R283

chip 0.1 uH 5%

chip 1.2 uH 5%

NPN, type MMBR941

PNP, type MMBT3906

NPN, type MMBR941

NPN, type MMBR941

PNP; type M41L03

NPN, type MMBT3904

NPN, type MMBT3904

NPN, type MMBT3904

PNP: type 2SB1142S

unless otherwise stated

NPN; type BFG35

NPN: type BFQ43S

NPN: tupe M25C22

PNP type

51 ohms

10 ohms

430 ohms

100 ohms

200k; 1/10 W

130k; 1/10 W

820 ohms

5.6k

2.2k

2 2k

Not Used

2.7k

PNP; type M41L03

NPN, type MMBT3904

digital NPN; type DTC144W

digital NPN; type DTC144W

digital NPN; type DTC144W

digital NPN; type DTC144W

resistor, fixed: +/-5%; 1/16 W:

dual transistor switch UMC3TL

6 turns

4 turns

6 turns

9 turns

9 turns

12 turns

SM50/SM120 VHF Main Board, 136-156 MHz, 10-25 W, 20/25/30 kHz (W)

REFERENCE	MOTOROLA		REFERENCE	MOTOROLA
SYMBOL	PART NO.	DESCRIPTION	SYMBOL	PART NO.
CR211	48-13833C07	dual silicon SOT MMBD7000	L2611	24-60591E69
CR212	48-13833C07	dual silicon SOT MMBD7000	L2613	24-62587N53
CR241	48-62824C03	silicon varactor ISV232	L2630	24-60591R29
CR251	48-62824C03	silicon varactor ISV232	L2641	24-60591D69
OR252	48-62824C01	silicon varactor ISV229	L2642	24-60591M77
			L2643	24-60591D69
CR401	48-05129M76	silicon SOT		
CR402	48-13833C07	dual silicon SOT MMBD7000	L2650	24-62587X69
CR403	48-80939T01	Schottky SOT	L2651	***
CR404	48-13833C07	dual silicon SOT MMBD7000	L2652	24-60591S61
CR405	48-05129M76	silicon SOT	L2660, 2661	24-60591S61
CR406	48-83553T02	4A 200 PIV MUR420	L2662	24-60591S61
	48-13833C07	dual silicon SOT MMBD7000	L2663	24-60591V77
CR407		silicon SOT	12000	g. 4402
CR408	48-05129M76			
CR451	48-05129M76	silicon SOT		40 40007307
CR651, 2652	48-13833C07	dual silicon SOT MMBD7000	Q1	48-13827A07
CR653	48-13833C07	dual silicon SOT MMBD7000	Q2	48-05128M6
CR2601, 2602	48-05218N57	dual silicon SOT	Q3	48-09939C04
CR2650, 2651	48-02482J02	silicon PIN MA4P1250	Q51	48-13827A07
CR2670	48-80236E07	transient suppressor	Q281	48-13827A07
CHZO/U	40-00230EU1	transierit suppressor	Q401	48-80214G02
		**-*		
		ferrite bead:	Q402	48-80947V01
E2610	24-80067M01	ferrite bead	Q404 thru 408	48-80947V01
E2630	24-80067M01	ferrite bead	Q409	48-80141L03
E2631	24-80132N01	ferrite bead	Q410, 411	48-80947V01
E2640	24-80067M01	ferrite bead	Q412	48-05128M6
		1961 10 00 0	Q413	48-80214G0
E2641	24-80132N01	ferrite bead		
E2650	24-80067M01	ferrite bead	Q414	48-80141L03
			Q415, 416	48-80947V0
		fuse:	Q451	48-05128M6
F401	65-05214E04	2 amp axial lead	Q452	48-80214G0
1 401			Q453	48-05128M6
		filter:	Q454	48-80214G0
	N4 MAMAMAN 1		Q455	48-02245J25
FL51 (N)	91-80098D04	455 kHz 4F		
FL51 (W)	91-80098D06	455 kHz 4D	Q2610	48-02245J24
FL52 (N)	91-80097D04	455 kHz 6F	Q2630	48-02245J28
FL52 (M)	91-80097D06	455 kHz 6D	Q2640	48-80225C2
		connector, receptacle:		
J1	09-83228R01	mini UHF coax		
J2	30-04510J01	power cable assembly (includes J2)	R1	06-62057A4
J3	28-04503J01	16-pin, accessories	R2	06-62507A5
J5	09-04426J01	telephone type, 8 contact, microphone	R3	06-62057A8
	09-04424J05	6 pin, internal options audio	R4	06-62057A7
J6			R5. 6	06-62057A1
J7	09-04424J06	8-pin, internal options digital		
J8	09-04422J01	10 pin, display board	R7, 8	06-62507A0
J9	28-04423J01	2-pin, internal speaker	R9	06-62057A4
		•	R10	06-62057A2
		resistor, jumper:	R51	06-62057A1
R444	***	Not Used	R52	06-62057A8
		0 ohm	R53	06-62057A7
R572	06-62057B47	V VIIII		06-62057A5
		W 2	R54	
		coll, rf:	R55	06-62057A2
L1 thru 4	24-60591G24	9 turns	R57 (N)	06-62057D3
L5	24-62587N69	chip 1.2 uH 5%	R57 (W)	06-62057D2
L6 thru 8	24-60591G24	9 turns	R58	06-62057A7
	24-62587N52	chip 82 nH 5%	R59 (N)	06-62057A9
L9				06-60257A9
Lii	24-62587N55	chip 0.15 uH 5%	R59 (W)	1 0 0 1 100 4 40
L12	24-62587N69	chip 1.2 uH 5%	R60 (N)	06-62057A8
L51	24-83411T63	chip 0.15 uH 5% shielded	R60 (W)	06-62057A5
L52 (N)	24-62587N65	chip 0.75 uH 5%	R64	06-62057A6
L52 (W)	24-62587N63	chip 0.62 uH 5%	R66	06-62057A4
	24-62587N71	chip 1.8 uH 5%	R67	06-62057A6
L53, 54				06-62057A5
L55	24-62587N68	chip 1.0 uH 5%	R201	
L58	24-62587N69	chip 1.2 uH 5%	R202	06-62057A8
L221	24-62587N69	chip 1.2 uH 5%	R221	06-62057A4
L241	24-62587N54	chip0 .12 uH 5%	R222	06-62057A1
L242	24-62587T13	chip 68 nH 5%	R223	06-62057A5
			R231	06-62057A4
L243, 244	24-62587N69	chip 1.2 uH 5%		M. C
L251	24-62587N57	chip 0.22 uH 5%	R232	06-62057A5
L252	24-62587N54	chip 0.12 uH 5%	R233	06-62057A8
L253 thru 255	24-62587N69	chip 1.2 uH 5%	R241	***
L261	24-62587N53	chip 0.1 uH 5%	R242	06-62057A9
			R251	06-62057A7
L262	24-62587N69	chip 1.2 uH 5%		
L271	24-62587N53	chip 0.1 uH 5%	R252	06-62057A4
L281	24-62587N69	chip 1.2 uH 5%	R253	06-62057A3
L282, 283	24-62587N52	chip 82 nH 5%	R254, 255	
		chip 0.75 uH 5%	R260	06-62057A3
L284	24-62587N65			

24-62587N69

24-60578C43

24-60591G77

chip 27 nH 5%

chip 1.2 µH 5%

chip 33 uH

9 turns

SM50/SM120 YHF Main Board, 136-156 MHz, 10-25 W, 12.5 kHz (N) (used in PMUDI024 and PMUDI142)

PL-961020-A

REFERENCE	MOTOROLA	
SYMBOL	PART NO.	DESCRIPTION
R284 R285	06-62057C59 06-62057A12	220 ohms 30 ohms
R286	06-62057A33	220 ohms
R291	06-62057A80	20k
R292	06-62057A25	100 ohms
R293 R294	06-62057A84 06-62057A67	30k 5.6k
R401	06-62057D54	1.8 meg; 1/10 W
R402	06-62057A65	4.7k
R403	06-62057A73	10k
R404	06-62057A49 06-62057A55	1k
R405 R406	06-62057A65	1.8k 4.7k
R407	06-62057A89	47k
R408	06-62057A65	4.7k
R409 R410, 411	06-62057A33	220
R412	06-62057A73 06-62057C67	10k 470 ohms; 1/10 W
R413	06-62057A89	47k
R414	06-62057A65	4.7k
R415	 00 00057480	Not Used
R416 R417	06-62057A89 06-62057A65	47k 4.7k
R418	06-62057A53	1.5k
R419	06-62057A59	2.7k
R420	06-62057A73	10k
R421, 422 R423 thru 425	06-62057A97 06-62057A73	100k 10k
R426	06-62057B47	0 ohms
R427	06-62057A73	10k
R428	06-62057A97	100k
R429	06-62057A73	10k
R430 R431, 432	06-62057A89 06-62057A65	47k 4.7k
R434	06-62057A61	3.3k
R435	06-62057A45	680 ohms
R436	06-62057A27	120 ohms
R437 R438	06-62057A90 06-62057A81	51k 22k
R439	06-62057A51	10k
R440	06-62057A90	51k
R441 thru 443	06-62057B47	0 ohms
R451	06-62057D19	62k; 1/10 W
R452 R453	06-62057B47 06-62057A87	0 ohms 39k
R454	06-62057A92	62k
R455	06-62057A77	15k
R456	06-62057A90	51k
R460	06-62057A75	12k 10k
R461 R462	06-62057A73 06-62057A70	7.5k
R463	06-62057D35	300k; 1/10 W
R464	06-62057A49	1k
R465	06-62057A79	18k
R466 R467	06-62057A49 06-62057B47	1k 0 ohms
R468	06-80195M37	330 ohms; 1/2 W
R469	06-62057A49	1k
R501	06-62057A37	330 ohms
R502	06-62057A97 06-62057A84	100k 30k
R551 R552, 553	06-62057A84 06-62057A75	12k
R555 (N)	06-62057A77	15k
R555 (W)	06-62057A84	30k
R556	06-62057A73	10k
R557 R558	06-62057A01 06-62057A73	10 ohms 10k
R559	06-62057A73	47 ohms
R560	06-62057A97	100k
R561, 562	06-62057A89	47k
R563 (N)	06-62057A77	15k
R563 (W) R564	06-62057A84 06-62057A77	30k 15k
R566	06-62057A77	8.2k
R567, 568	06-62057A89	47k
R569	06-62057A43	560 ohms
R570	06-62057A56	2k
R571 R601	06-62057A81	Not Used 22k
R602	06-62057A97	100k

06-62057A73

SM50/SM120 VHF Main Board, 136-156 MHz, 10-25 W, 12.5 kHz (N) used in PMUD1024 and PMUD1142)

SM50/SM120 VHF Main Board, 136-156 MHz, 10-25 W, 20/25/30 kHz (W)

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
R604	06-62057B22	1.0 meg
R651	06-62057D30	180k; 1/10 W
R652	06-62057B14	470k
R653	06-62057A01	10 ohms
R654	06-62057A82	24k
R655	06-62057A84	30k
R656	06-62057A73	10k
R657	06-62057A97	100k
R658	06-62057C46	62 ohms; 1/10 W
R659	06-62057A40	430 ohms
R665	06-62057A40	430 ohms
R666	06-62057C46	62 ohms
R667	06-62057A65	4.7k
R668	06-62057A97	100k
R669	06-62057A65	4.7k
R670	06-62057D35	300k; 1/10 W
R671	06-62057A60	3k
R701	06-62057A97	100k
R702	06-62057B06	220k
R703	06-62057B03	160k
R704	06-62057A68	6.2k
R705	06-62057A01	10 ohms
R2601, 2602	06-11077A52	120 ohms
R2610	06-62057A37	330 ohms
R2611	06-62057A25	100 ohms
R2612	06-62057A21	68 ohms
R2613, 2614	06-62057A01	10 ohms
R2615	06-62057C63	330 ohms; 1/10 W
R2616	***	Not Used
R2617	06-62057C63	330 ohms; 1/10 W
	06-62057C01	0 ohms; 1/10 W
R2618	4 4 4000 40 4	680
R2630	06-62057A45	
R2631	06-62057C44	51 ohms; 1/10 W
R2633	06-62057C27	10 ohms; 1/10 W
R2634	06-62057C63	330 ohms; 1/10 W
R2635	06-80195M25	100 ohms; 1/2 W
R2640	06-80195M18	51 ohms; 1/2 W
R2641, 2642	06-62057C27	10 ohms; 1/10 W
R2643	06-62057C27	10 ohms; 1/10 W
R2644, 2645	06-80195M18	51 ohms; 1/2 W
R2646	06-62057C01	0 ohms; 1/10 W
R2650, 2651	06-80195M18	51 ohms; 1/2 W
RT460	06-05621T02	thermistor, 50k @ 25C
U1	51-80505D01	integrated circuit: (see note) double balance mixer
U51	51-80207R01	receiver system
U201*	(see note)	synthesizer
U251	51-05414\$84	VCO/buffer
U401*	(see note)	microcomputer MC68HC7711E9
U402	51-02227J35	audio filter
U403	51-05226P38	DAC
	51-80633C01	5 V regulator TK11950
U404	51-80633C01 51-05469E65	5 V regulator LP2951C
U405		8 V regulator MC7808BT
U406	51-13816D03	dual op-amp LM2904 SOIC
U451	51-80932W01	common with annual control of the co
U501	51-80147R01	audio power amp TDA1519AB
U551	51-02198J28	quad op-amp LM2902D SOIC
U553	51-84704M60	tripple 2-channel switch 4053B
U554	51-05663U35	quad bilateral switch
U601	51-02198J23	dual comparator LM2903 SOIC
VIDAN	40.00 AN OS	voltage regulator: (see note)
VR401	48-80140L06	Zener diode 5.1 V SOT
VR402 thru 406		Zener diode 27 V SOT
VR407	48-80140L15	Zener diode 10 V SOT
VR408, 409	48-80948V01	Zener diode 27 V SOT
VR410	48-80140L15	Zener diode 10 V SOT
VR411, 412	48-80948V01	Zener diode 27 V SOT
VR551 thru 553	48-8014UL15	Zener diode 10 V SOT
Y51 (N)	91-80112R06	crystal: (see note) filter 45.1 MHz 12.5 kHz (includes Y51A & Y51B)
Y51 (W)	91-80112R05	filter 45.1 MHz 30.0 kHz (includes Y51A & Y51B)
Y52	48-80606B02	44.645 MHz
Y201*	(see note)	16.8 MHz

SM50/SM120 VHF Main Board, 136-156 MHz, 10-25 W, 12.5 kHz (N) (used in PMUD1024 and PMUD1142)

SM50/SM120 VHF Main Board, 136-156 MHz, 10-25 W, 20/25/30 kHz (W) used in PMUD1025 and PMUD1143) PL-961020-4

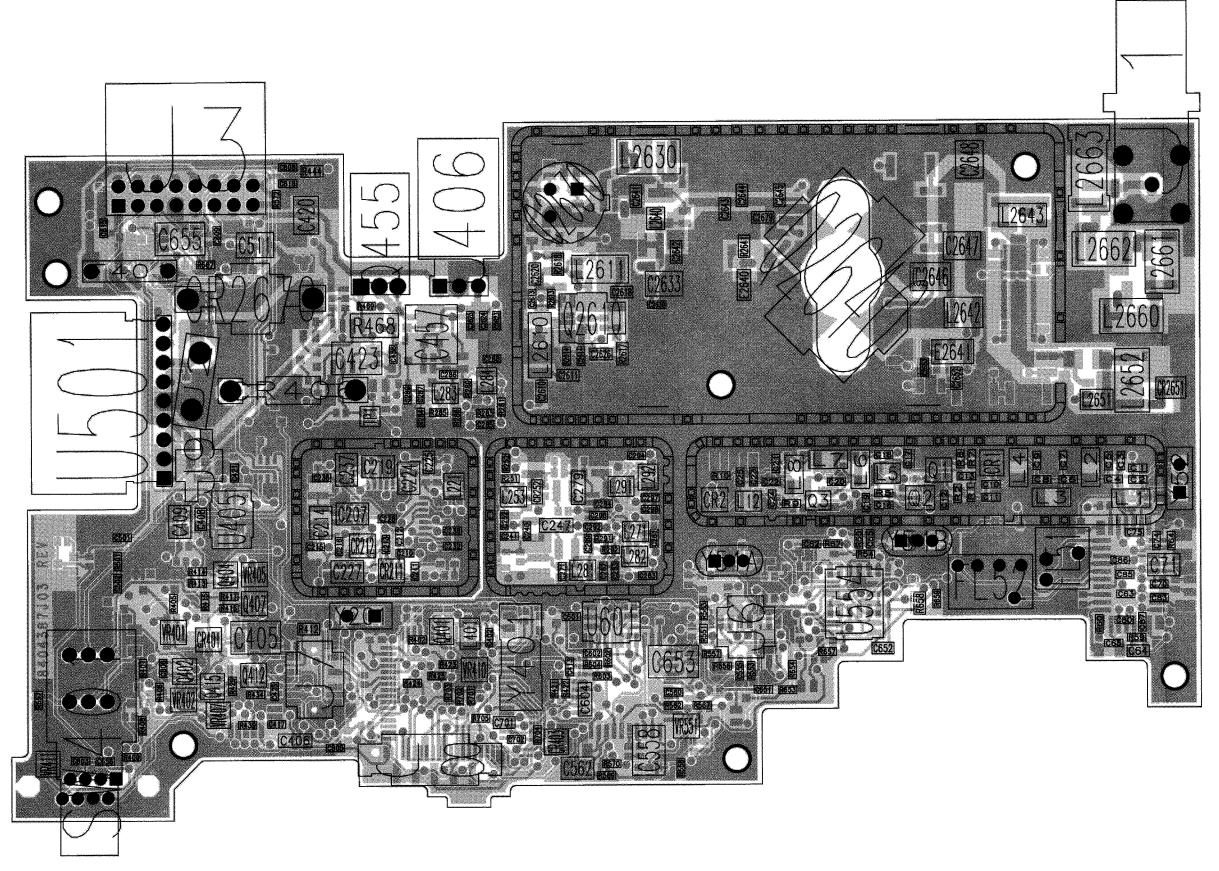
REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
	non-refe	erenced items
	14-05160A02	crystal insulator (used for Y201)
	26-04398J01	VCO/synthesizer shield (4 used)
	26-04399J01	receiver mixer bottom shield
	26-04400J01	receiver front end top shield
	26-04419J01	PA shield frame
	26-04420J01	PA shield cover

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

Designators marked with an (*) denote parts which are not field serviceable Recalibration of the radio using specialized factory equipment is mandatory when these components are replaced in order to guarantee the specified frequency stability of the radio at temperature extremes

> VHF Main Boards, 136-156 MHz, 12.5 & 20/25/30 kHz, 10-25 W (Part of PMUD1024A, PMUD1042A, PMUD1025A, PMUD1043A Radios)

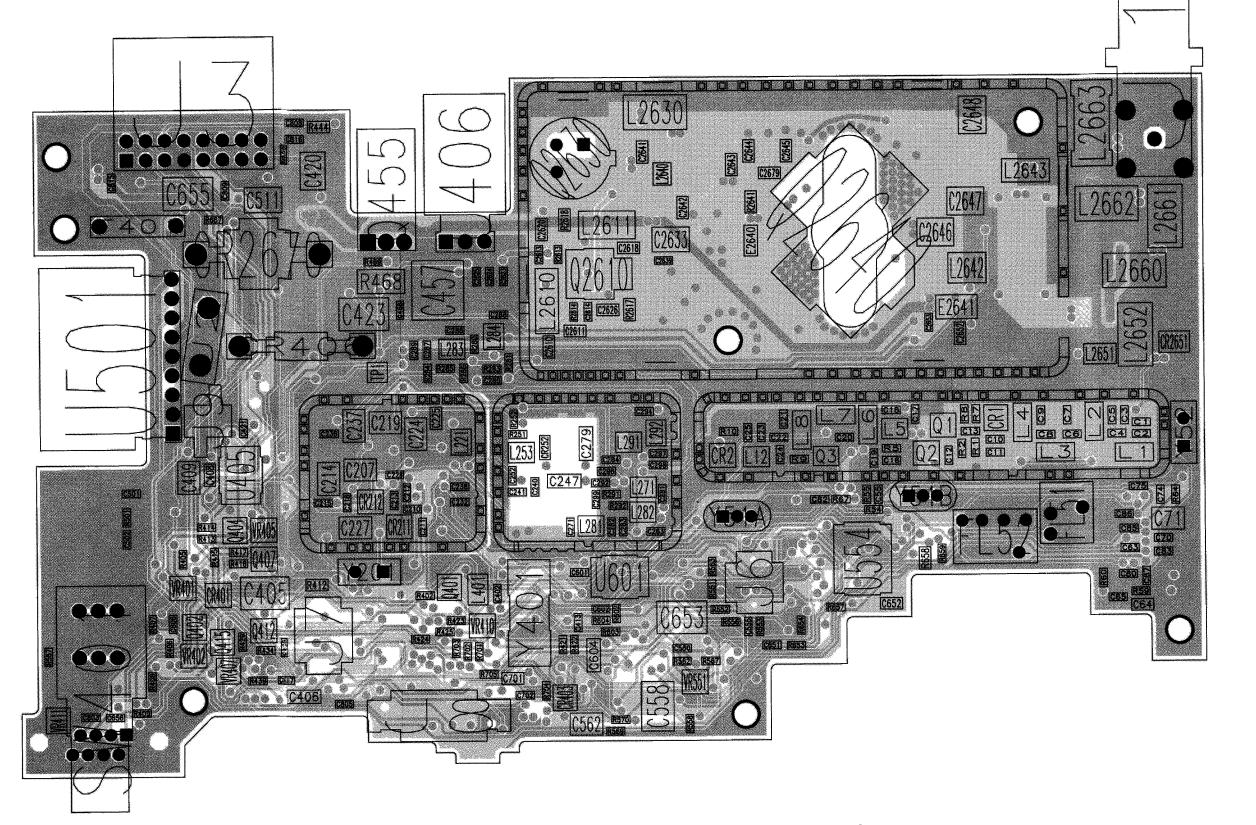
March, 1998



COMPONENT SIDE (GRAY) SOLDER SIDE (PINK) OVERLAY -----

RCB-95108-O RCB-95111-O RCB-95112-O

COMPONENT SIDE VIEW

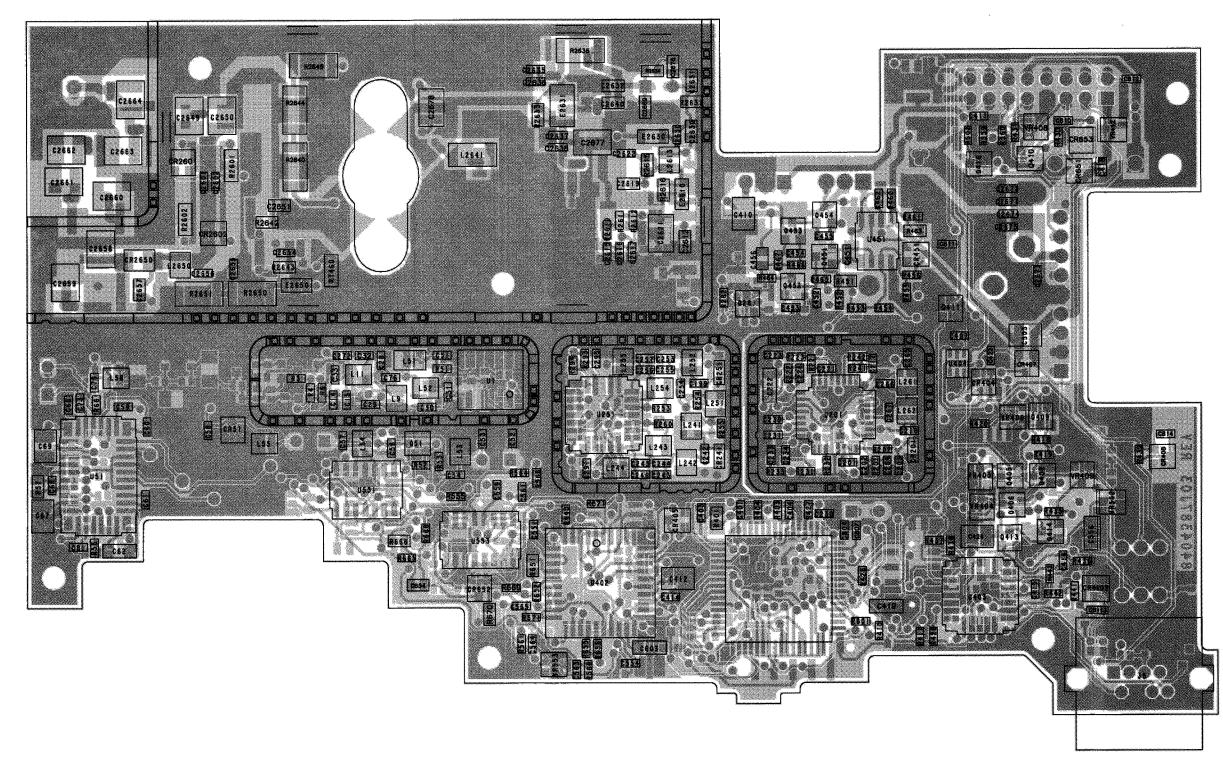


COMPONENT SIDE INNER LAYER (GRAY)
SOLDER SIDE INNER LAYER (PINK)
OVERLAY ----

RCB-95109-O RCB-95110-O RCB-95112-O

Circuit Board Details for VHF Main Boards, 150-170 MHz, 12.5 & 20/25/30 kHz, 10-25 W (Part of PMUD1030A, PMUD1031A, PMUD1086A, and PMUD1087A Radios)

COMPONENT SIDE VIEW

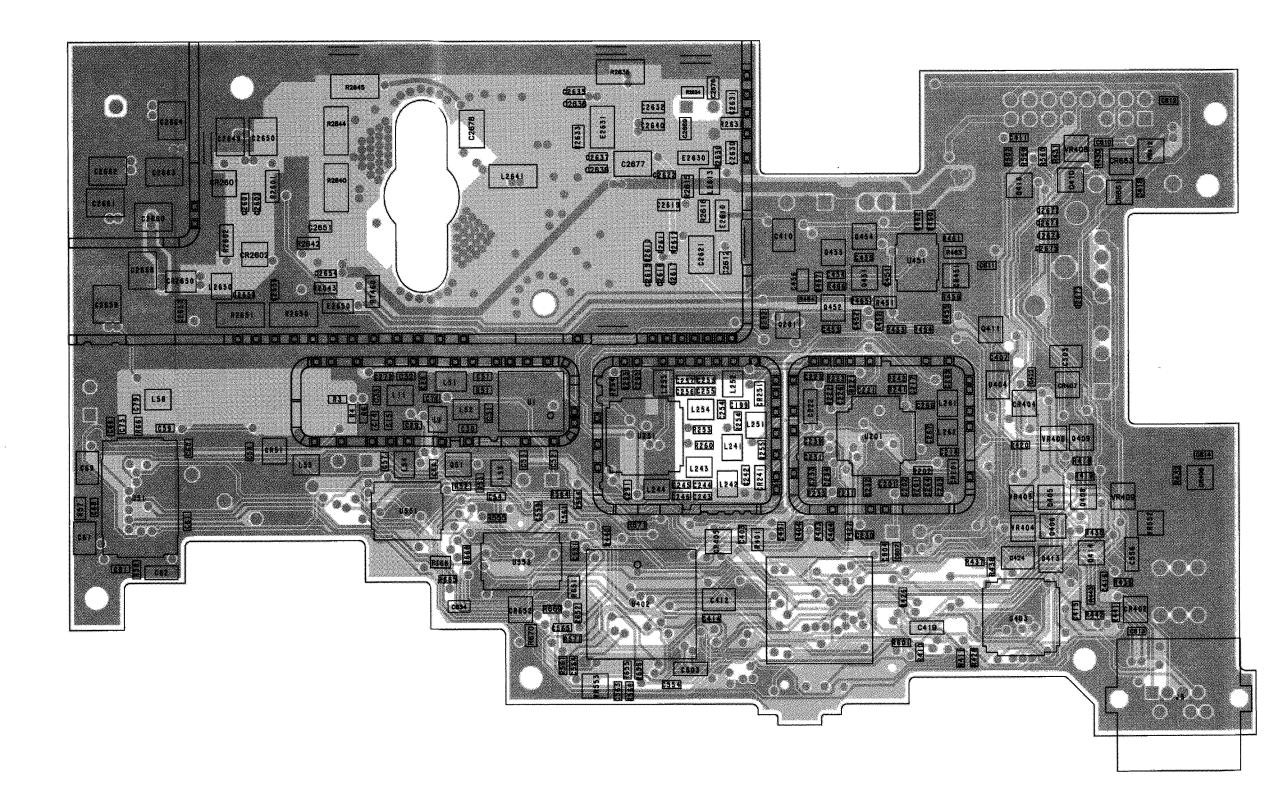


COMPONENT SIDE (GRAY)
SOLDER SIDE (PINK)
OVERLAY ----

RCB-95108-O (REV) RCB-95111-O (REV) RCB-95113-O

SOLDER SIDE VIEW

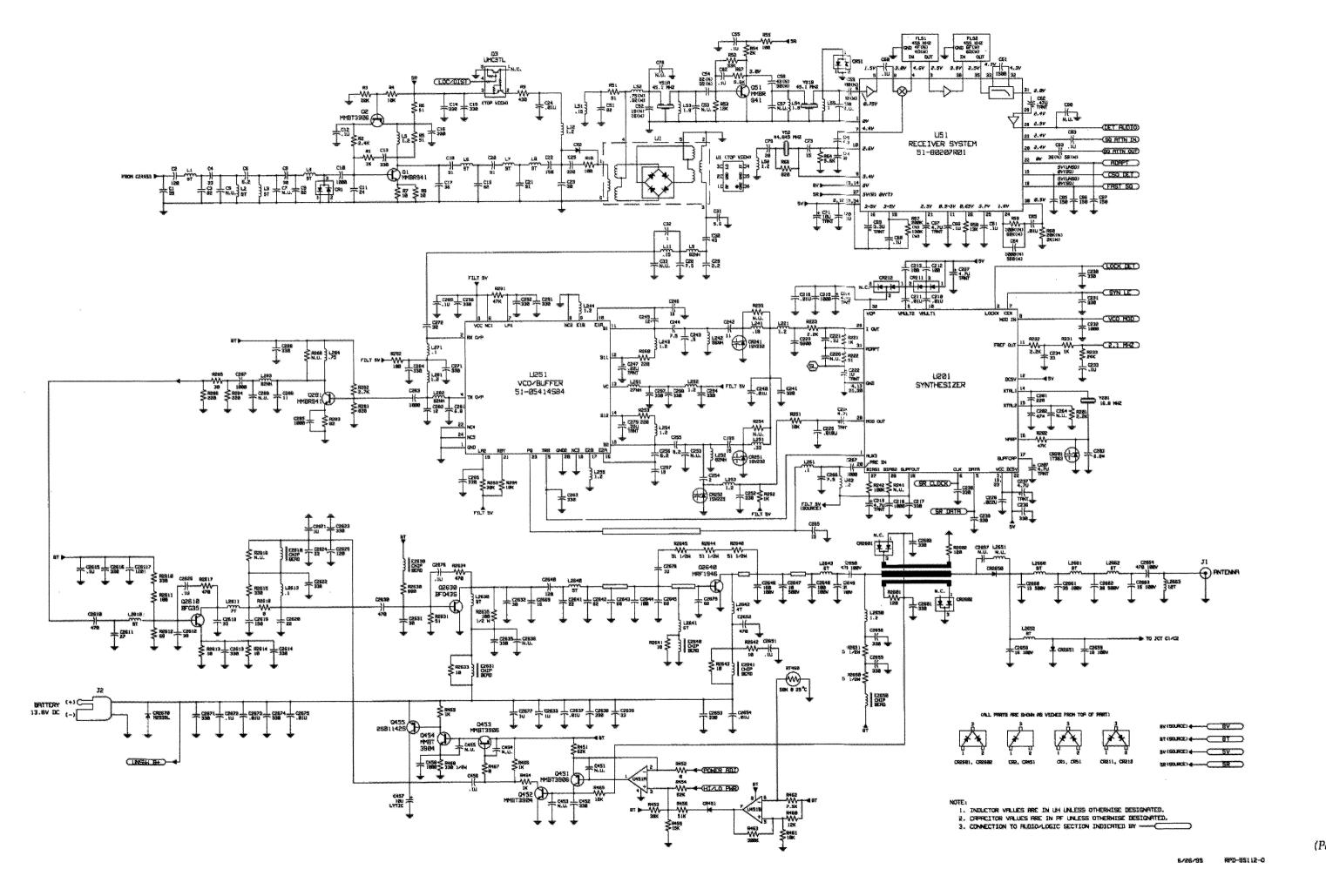
Circuit Board Details for VHF Main Boards, 150-170 MHz, 12.5 & 20/25/30 kHz, 10-25 W (Part of PMUD1030A, PMUD1031A, PMUD1086A, and PMUD1087A Radios)



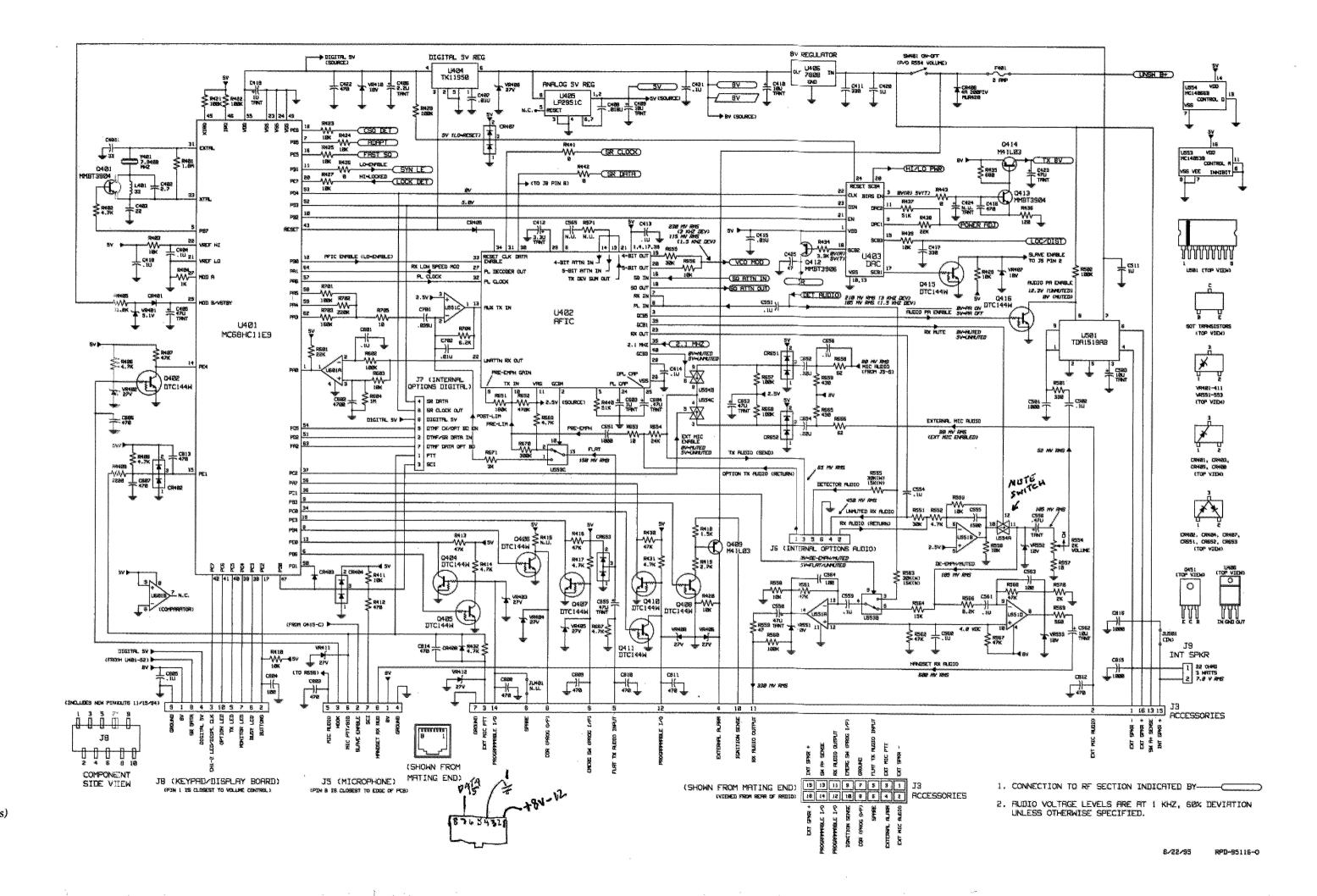
COMPONENT SIDE INNER LAYER (GRAY)
SOLDER SIDE INNER LAYER (PINK)
OVERLAY -----

RCB-95109-O (REV) RCB-95110-O (REV) RCB-95113-O

SOLDER SIDE VIEW



Schematic Diagram for VHF Main Boards, 150-170 MHz, 12.5 & 20/25/30 kHz, 10-25 W (Part of PMUD1030A, PMUD1031A, PMUD1086A, and PMUD1087A Radios) (Sheet 1 of 2)



Schematic Diagram for VHF Main Boards, 150-170 MHz, 12.5 & 20/25/30 kHz, 10-25 W (Part of PMUD1030A, PMUD1031A, PMUD1086A, and PMUD1087A Radios) (Sheet 2 of 2)

Parts List

SM50/SM120 VHF Main Board, 150-170 MHz, 10-25 W 12.5 kHz (N) (used in PMUD1030 & PMUD1086) SM50/SM120 VHF Main Board, 150-170 Mhz, 10-25 W

21-19740F41

21-13740F53

20/25/30 kHz (W) (used in PMUD1031 & PMUD1087)

SYMBOL PART NO.

capacitor, fixed; uF +/-5%; 50 V;

unless otherwise stated

12.5 kHz (N) (used in PMUD1030 & PMUD1086) SM50/SM120 VHF Main Board, 150-170 Mhz, 10-25 W 20/25/30 kHz (W) (used in PMUD1031 & PMUD1087) REFERENCE MOTOROLA

SYMBOL

SM50/SM120 VHF Main Board, 150-170 MHz, 10-25 W

PART NO.

23-11049J11

21-13743E07

21-13741A51 .018 uF

PL-951009-A

DESCRIPTION

tantalum 4.7 uF 10%; 16 V

.022 uF 10%; 16 V

SM50/SM120 VHF Main Board, 150-170 MHz, 10-25 W 12.5 kHz (N) (used in PMUD1030 & PMUD1086) SM50/SM120 VHF Main Board, 150-170 Mhz, 10-25 W IUD1087)

PL-951009-A

SM50/SM120 VHF Main Board, 150-170 MHz, 10-25 W 12.5 kHz (N) (used in PMUD1030 & PMUD1086) SM50/SM120 VHF Main Board, 150-170 Mhz, 10-25 W

12.5 kHz (N) (used in PMUD1030 & PMUD1086) SM50/SM120 VHF Main Board, 150-170 Mhz, 10-25 W 20/25/30 kHz (W) (used in PMUD1031 & PMUD1087)

L282, 283

SYMBOL PART NO.

SM50/SM120 VHF Main Board, 150-170 MHz, 10-25 W

24-62587X65

24-62587X46

24-62587X69

24-60578C43

24-60591G77

24-60591E69

24-62587X53

24-60591R29

24-60591C40

24-60591D69

24-60591M77

24-60591D69

24-62587X69

24-60591R29

24-60591V77

48-13827A07

48-13824A17

48-09939C04

48-13827A07

48-13827A07 48-80214G02

48-80947V01

48-80947V01

48-80141L03

48-80947V01

48-13824A17

48-80214G02

48-801411.03

48-80947V01

48-13824A17

48-13824A17

48-80214G02

48-02245J25

48-02245J24

48-02245J28

48-80225C22

06-62057A49

06-62057A58

06-62057A80

06-62057A73

06-62057A18

06-62057A18

06-62057A01

06-62057A40

06-62057A25

06-62057A18

06-62057485

06-62057A75

06-62057A56

06-62057A25

06-62057D31 06-62057D27

06-62057A76

06-62057A97

06-62057A93

06-62057A80

06-62057A56

06-62057A67

06-62057A47

06-62057A67

06-62057A57

06-62057A89

06-62057A49 06-62057A18

06-62057A57

06-62057A49

06-62057A57

06-62057A82

06-62057A97

06-62057A73

06-62057A49 1k

L2660 thru 2662 24-60591R29

Q404 thru 408

0410.411

Q415, 416

Q412

Q413 Q414

Q452 Q453 Q454

Q455 Q2610

R7.8

R55

R57(N) R57(W)

R59(N) R59(W)

R60(N)

R202

R221 R222 R223

R231

R232 R233

R241

R242

R251

R252

24-62587X52 chip 82 nH 5%

48-80214G02 NPN; type MMBT3904

PL-951009-A

SM50/SM120 VHF Main Board, 150-170 MHz, 10-25 W REFERENCE MOTOROLA

12.5 kHz (N) (used in PMUD1030 & PMUD1086) M50/SM120 VHF Main Board, 150-170 Mhz, 10-25 W 20/25/30 kHz (W) (used in PMUD1031 & PMUD1087)

variable 2k with switch

REFERENCE MOTOROLA DESCRIPTION SYMBOL PART NO. R567, 568 R569 R570 R571 R601 R602 R603 R651

SM50/SM120 VHF Main Board, 150-170 MHz, 10-25 W 12.5 kHz (N) (used in PMUD1030 & PMUD1086) SM50/SM120 VHF Main Board, 150-170 Mhz, 10-25 W 20/25/30 kHz (W) (used in PMUD1031 & PMUD1087)

06-62057489

06-62057A43

06-62057A56

06-62057A81

06-62057A97

06-62057A73

06-62057B22

47k

06-62057D30 180k 1/10 watt

Not Used

DESCRIPTION

PL-951009-A

SM50/SM120 VHF Main Board, 150-170 Mhz, 10-25 W 20/25/30 kHz (W) (used in PMUD1031 & PMUD1087) PL-951009-A REFERENCE MOTOROLA SYMBOL PART NO. DESCRIPTION crystal: (see note) filter 45.1 MHz 12.5 kHz Y51(N) 91-80112R06 (includes Y51A and Y51B Y51(W) 91-80112R05 filter 45.1 MHz 25 kHz (includes Y51A and Y51B) 48-80008K02 44.645 MHz Y201* Y401 (see note) 16.8 MHz 48-80113R01 7.9488 MHz non-referenced items 26-04398J01 VCO/synthesizer shield (4 used) 26-04399J01 receiver mixer bottom shield 26-04400J01 receiver front end top shield 26-04419J01 PA shield frame 26-04420J01 PA shield cover note: For optimum performance, diodes, transistors, and integrated circuits

SM50/SM120 VHF Main Board, 150-170 MHz, 10-25 W

12.5 kHz (N) (used in PMUD1030 & PMUD1086)

Designators marked with an (*) denote parts which are not field serviceable. Recalibration of the radio using specialized factory equipment is mandatory when these components are replaced in order to guarantee the specified frequency stability of the radio at temperature extremes.

C3	C2	21-13/40/03	120 pr	C230, 231	21-13741F13	330 pF
Not Used C233						
Case						
Total						
Case		Z1-10/40/ZZ				
Color		21.127/0520				
C11						
C119						
C13 thru 15 2 -1-374/R15						
C19						
21-1374/P60						
C18						
C26						
C21						
C21 21-13740F80 91 pF C247 23-11049A03 antalaum 22 uF 10%; 35 V C262 21-13740F81 S0 pF C262 21-13740F81 S0 pF C263 21-13740F81 S0 pF C263 C263						
222						
C25						
C25					21-10/41/10	
C25					91-197/0510	
C29			and the state of t			
C29						
C30						
C32						
C32						
C35						
CS2(N)					2 1 MM2 NO. A	
CS2(N) 21-13740F31 15 pF C271 21-13741F13 330 pF C32(N) 21-13740F38 15 pF C272 21-13740F38 330 pF C34(N) 21-13740F34 21-13740F			177			
CS2 21-13740F38						
CS34 N					1000 1 0	
CS4(N) 21-13740F46 82 pF C288 21-13740F28 21 pF						
CSA(W)					to the second of the second of the	
CSS						
CSB(N)						
CSR(W)		1/40				
CS9 CS9						
CS9(N)						
C89 W 21-13749F49 82 pF		100				
CSC						
C61						
C82					21-13741F13	
C83(N) 21-13740F40 36 pF C294 thru 298 21-1374F13 330 pF						
CS3(W) 21-3740F45 56 pF C299 21-13743F15 0.1 uF 10%; 16 V						
C64(N) 21-13740A73 1000 pF				C299	21-13743K15	0.1 uF 10%; 16 V
C64(W) 21-13740F33 560 pF				C401	21-13740F39	33 pF
C65				C402	21-13740F13	2.7 ±0.25 pF
C67 23-11049J11 tantalum 4.7 uF 10%; 16 V C405 23-11049J43 tantalum 4.7 uF 10%; 10 V C68 21-13743K15 0.1 uF 10%; 16 V C406 23-11049J40 tantalum 3.0 uF 10%; 20 V C407 21-13741F49 .01 uF 10%; 10 V C408 21-13741F49 .01 uF 10%; 10 V C408 21-13741F49 .01 uF 10%; 16 V C409, 410 23-11049A57 tantalum 10 uF 10%; 16 V C411 21-13741F13 330 pF C412 23-11049J07 tantalum 3.3 uF 10%; 20 V C75 21-13740F13 4.3 ±0.25 pF C412 23-11049J07 tantalum 3.3 uF 10%; 20 V C75 21-13740F13 4.3 ±0.25 pF C413, 414 21-13743K15 1.1 uF 10%; 16 V C76 Not Used C415 21-13741F49 .01 uF C77 21-13740F3 20 pF C416 21-13741F19 30 pF C416 21-13741F19 30 pF C418 21-13749F3 20 pF C418 21-13749F3 20 pF C418 21-13749F3 20 pF C419 23-11049J07 tantalum 1 uF 10%; 16 V C418 21-13749F3 20 pF C419 23-11049J07 tantalum 1 uF 10%; 16 V C419 23-11049J07 tantalum 1 uF 10%; 16 V C419 23-11049J07 tantalum 1 uF 10%; 16 V C420 21-13740F3 47 pF C422 21-13741F17 470 pF C420 21-13740F43 47 pF C422 21-13741F17 470 pF C420 21-13740F43 47 pF C422 21-13741F17 470 pF C421 21-13741F19 20 pF C421 21-13741F19 20 pF C422 21-13741F19 20 pF C421 21-13741F19 20 pF C422 21-13741F19 20 pF C422 21-13741F19 20 pF C422 21-13741F19 20 pF C424 21-13741F19 20 pF C424 21-13741F19 20 pF C425 21-13741F19 20 pF C426 21-13741F19 20 pF C427 21-13741F19 20 pF C428 21-13741F19 20 pF C429 21-		21-13741F49	.01 úF	C403	21-13740F35	22 pF
C67 23-11049J11 tantalum 4.7 uF 10%; 16 V C405 23-11049J43 tantalum 4.7 uF 10%; 10 V C68 21-13743K15 0.1 uF 10%; 16 V C406 23-11049J40 tantalum 3.0 uF 10%; 20 V C407 21-13741F49 .01 uF 10%; 10 V C408 21-13741F49 .01 uF 10%; 10 V C408 21-13741F49 .01 uF 10%; 16 V C409, 410 23-11049A57 tantalum 10 uF 10%; 16 V C411 21-13741F13 330 pF C412 23-11049J07 tantalum 3.3 uF 10%; 20 V C75 21-13740F13 4.3 ±0.25 pF C412 23-11049J07 tantalum 3.3 uF 10%; 20 V C75 21-13740F13 4.3 ±0.25 pF C413, 414 21-13743K15 1.1 uF 10%; 16 V C76 Not Used C415 21-13741F49 .01 uF C77 21-13740F3 20 pF C416 21-13741F19 30 pF C416 21-13741F19 30 pF C418 21-13749F3 20 pF C418 21-13749F3 20 pF C418 21-13749F3 20 pF C419 23-11049J07 tantalum 1 uF 10%; 16 V C418 21-13749F3 20 pF C419 23-11049J07 tantalum 1 uF 10%; 16 V C419 23-11049J07 tantalum 1 uF 10%; 16 V C419 23-11049J07 tantalum 1 uF 10%; 16 V C420 21-13740F3 47 pF C422 21-13741F17 470 pF C420 21-13740F43 47 pF C422 21-13741F17 470 pF C420 21-13740F43 47 pF C422 21-13741F17 470 pF C421 21-13741F19 20 pF C421 21-13741F19 20 pF C422 21-13741F19 20 pF C421 21-13741F19 20 pF C422 21-13741F19 20 pF C422 21-13741F19 20 pF C422 21-13741F19 20 pF C424 21-13741F19 20 pF C424 21-13741F19 20 pF C425 21-13741F19 20 pF C426 21-13741F19 20 pF C427 21-13741F19 20 pF C428 21-13741F19 20 pF C429 21-	C66	21-13743K15	0.1 uF 10%; 16 V	C404	21-13743K15	0.1 uF 10%; 16 V
C89	C67	23-11049J11	tantalum 4.7 uF 10%; 16 V		23-11049J43	
C70 21-13743K15 0.1 uF 10%; 16 V C408 21-13741A51 .018 uF C71 23-11049A57 tantalum 10 uF 10%; 16 V C409, 410 23-11049A57 tantalum 10 uF 10%; 16 V C411 21-13741F13 330 pF C411 21-13741F13 330 pF C412 23-11049A07 tantalum 3.3 uF 10%; 20 V .1 uF 10%; 16 V C502 21-13740F40 36 pF C412 23-11049A07 tantalum 3.3 uF 10%; 20 V .1 uF 10%; 16 V C75 21-13740F40 4.3 ±0.25 pF C413, 414 21-13743K15 .1 uF 10%; 16 V C415 21-13741F49 .01 uF C79 21-13740F34 20 pF C416 21-13741F17 470 pF C80 Not Used C417 21-13741F17 470 pF C81 thru 83 21-13740F35 0.1 uF 10%; 16 V C418 21-13743K15 0.1 uF 10%; 16 V C418 21-13743K15 0.1 uF 10%; 16 V C418 21-13740F35 0.1 uF 10%; 16 V C419 23-11049A07 tantalum 1 uF 10%; 16 V C419 23-11049A07 tantalum 1 uF 10%; 16 V C200 21-13740F31 470 pF C420 21-13741F17 470 pF C420 21-13740F43 47 pF C422 21-13741F17 470 pF C423 23-11049J11 tantalum 4.7 uF 10%; 16 V C424 Not Used C210, 211 21-13741F49 .01 uF C425 21-13740F43 C456 21-13740F43 C456 21-13741F13 330 pF C457 23-80090M24 by 10 10 uF C456 21-13741F13 330 pF C457 23-80090M24 by 10 10 uF 20%; 25 V C218 21-13741F15 1000 pF C458 21-13741F25 1000 pF C459 23-11049A07 tantalum 4.7 uF 10%; 16 V C503 23-11049A67 tantalum 4.7 uF 10%; 16 V C503 23-11049A67 tantalum 1 uF 1	C68	21-13743K15	0.1 uF 10%; 16 V		23-11049A40	
C71 23-11049A57 tantalum 10 uF 10%; 16 V C73 21-13740F31 15 pF C74 21-13740F31 15 pF C75 21-13740F31 36 pF C76	C69	23-11049J07	tantalum 3.3 uF 10%; 20 V	C407	21-13741F49	
C73	C70	21-13743K15		C408	21-13741A51	.018 uF
C74	C71	23-11049A57	tantalum 10 uF 10%; 16 V		23-11049A57	tantalum 10 uF 10%; 16 V
C75	C73	21-13740F31	15 pF	C411	21-13741F13	330 pF
C75	C74					
C79		21-13740F18				
C80 Not Used C417 21-13741F13 330 pF C81 thru 83 21-13743K15 0.1 uF 10%; 16 V C418 21-13743K15 0.1 uF 10%; 16 V C85 thru 87 21-13740F55 150 pF C419 23-11049A07 tantalum 1 uF 10%; 16 V C199 21-13740F31 15 pF C420 21-13741W01 1 uF 10%; 25 V C201 21-13740F59 220 pF C421 21-13743K15 0.1 uF 10%; 16 V C202 21-13740F43 47 pF C422 21-13741F17 470 pF C203 21-13740F43 47 pF C422 21-13741F17 470 pF C204 21-13740F44 6.8 ± 0.1 pF C423 23-11049J43 tantalum 47 uF 10%; 10 V C207 23-11049J11 tantalum 4.7 uF 10%; 16 V C424 Not Used C210, 211 21-13741F49 .01 uF C425 21-13740F43 47 pF C212, 213 21-13740F51 100 pF C451 Not Used C214 23-11049J11 tantalum 4.7 uF 10%; 16 V C452 21-13741F13 330 pF C216 21-13741F25 1000 pF C453 thru 455 Not Used C216 21-13741F49 .01 uF C456 21-13743A19 0.1 uF 10%; 16 V C217 21-13741F49 .01 uF C456 21-13741F25 1000 pF C218 21-13741F25 1000 pF C458 21-13741F25 1000 pF C219 23-11049J11 tantalum 4.7 uF 10%; 16 V C501 21-13741F25 1000 pF C219 23-11049J11 tantalum 4.7 uF 10%; 16 V C501 21-13741F25 1000 pF C221 21-13743K15 0.1 uF 10%; 16 V C502 21-13743K15 0.1 uF 10%; 16 V C222 23-11049A07 tantalum 1 uF 10%; 16 V C503 23-11049A57 tantalum 10 uF 10%; 16 V C223 21-13741F43 5600 pF C511 21-13741W01 1 uF 10%; 25 V						
C81 thru 83		21-13740F34				
C85 thru 87						
C199 21-13740F31 15 pF						
C201 21-13740F59 220 pF C421 21-13743K15 0.1 uF 10%; 16 V C202 21-13740F43 47 pF C422 21-13741F17 470 pF C423 23-11049J43 tantalum 47 uF 10%; 10 V C424		977				
C202 21-13740F43 47 pF						
C203 21-13740L14 6.8 ± 0.1 pF C423 23-11049J43 tantalum 47 uF 10%; 10 V C207 23-11049J11 tantalum 4.7 uF 10%; 16 V C424 Not Used C210, 211 21-13741F49 .01 uF C425 21-13740F43 47 pF C451 Not Used C212, 213 21-13740F51 100 pF C451 Not Used C214 23-11049J11 tantalum 4.7 uF 10%; 16 V C452 21-13741F13 330 pF C453 thru 455 Not Used C216 21-13741F49 .01 uF C456 21-13743A19 0.1 uF 10%; 16 V C217 21-13741F13 330 pF C457 23-80090M24 lytic 10 uF 20%; 25 V C218 21-13741F25 1000 pF C458 21-13741F25 1000 pF C458 21-13741F25 1000 pF C219 23-11049J11 tantalum 4.7 uF 10%; 16 V C501 21-13741F25 1000 pF C21 21-13743K15 0.1 uF 10%; 16 V C502 21-13743K15 0.1 uF 10%; 16 V C22 23-11049A07 tantalum 1 uF 10%; 16 V C503 23-11049A57 tantalum 10 uF 10%; 16 V C223 21-13741F43 5600 pF C511 21-13741W01 1 uF 10%; 25 V						
C207 23-11049J11 tantalum 4.7 uF 10%; 16 V C424 Not Used C210, 211 21-13741F49 .01 uF C425 21-13740F43 47 pF C212, 213 21-13740F51 100 pF C451 Not Used C214 23-11049J11 tantalum 4.7 uF 10%; 16 V C452 21-13741F13 330 pF C215 21-13741F25 1000 pF C458 21-13743A19 0.1 uF 10%; 16 V C217 21-13741F13 330 pF C456 21-13743A19 0.1 uF 10%; 16 V C218 21-13741F25 1000 pF C458 21-13741F25 1000 pF C218 21-13741F25 1000 pF C458 21-13741F25 1000 pF C219 23-11049J11 tantalum 4.7 uF 10%; 16 V C221 21-13743K15 0.1 uF 10%; 16 V C222 23-11049A07 tantalum 1 uF 10%; 16 V C223 21-13741F43 5600 pF C501 21-13741W01 1 uF 10%; 16 V C223 21-13741F43 5600 pF C511 21-13741W01 1 uF 10%; 25 V		A CONTRACTOR OF THE PARTY OF TH				
C210, 211 21-13741F49 .01 uF						
C212, 213 21-13740F51 100 pF C451 Not Used C214 23-11049J11 tantalum 4.7 uF 10%; 16 V C452 21-13741F13 330 pF C215 21-13741F25 1000 pF C456 21-13743A19 0.1 uF 10%; 16 V C216 21-13741F49 .01 uF C456 21-13743A19 0.1 uF 10%; 16 V C217 21-13741F13 330 pF C457 23-80090M24 lytic 10 uF 20%; 25 V C218 21-13741F25 1000 pF C458 21-13741F25 1000 pF C219 23-11049J11 tantalum 4.7 uF 10%; 16 V C501 21-13741F25 1000 pF C221 21-13743K15 0.1 uF 10%; 16 V C502 21-13743K15 0.1 uF 10%; 16 V C222 23-11049A07 tantalum 1 uF 10%; 16 V C503 23-11049A67 tantalum 10 uF 10%; 16 V C223 21-13741F43 5600 pF C511 21-13741W01 1 uF 10%; 25 V						
C214 23-11049J11 tantalum 4.7 uF 10%; 16 V C452 21-13741F13 330 pF C215 21-13741F25 1000 pF C453 thru 455 Not Used C216 21-13741F49 .0.1 uF C456 21-13743A19 0.1 uF 10%; 16 V C217 21-13741F13 330 pF C457 23-80090M24 lytic 10 uF 20%; 25 V C218 21-13741F25 1000 pF C458 21-13741F25 1000 pF C219 23-11049J11 tantalum 4.7 uF 10%; 16 V C501 21-13741F25 1000 pF C221 21-13743K15 0.1 uF 10%; 16 V C502 21-13743K15 0.1 uF 10%; 16 V C222 23-11049A07 tantalum 1 uF 10%; 16 V C503 23-11049A57 tantalum 10 uF 10%; 16 V C223 21-13741F43 5600 pF C511 21-13741W01 1 uF 10%; 25 V					21-13/40F43	
C215 21-13741F25 1000 pF C453 thru 455 Not Used C216 21-13741F49 .01 uF C456 21-13743A19 0.1 uF 10%; 16 V C217 21-13741F13 330 pF C457 23-80090M24 lytic 10 uF 20%; 25 V C218 21-13741F25 1000 pF C458 21-13741F25 1000 pF C219 23-11049J11 tantalum 4.7 uF 10%; 16 V C221 21-13743K15 0.1 uF 10%; 16 V C222 23-11049A07 tantalum 1 uF 10%; 16 V C223 21-13741F43 5600 pF C511 21-13741W01 1 uF 10%; 25 V						
C216 21-13741F49 .01 uF C456 21-13743A19 0.1 uF 10%; 16 V C217 21-13741F13 330 pF C457 23-80090M24 lytic 10 uF 20%; 25 V C218 21-13741F25 1000 pF C458 21-13741F25 1000 pF C219 23-11049J11 tantatum 4.7 uF 10%; 16 V C221 21-13743K15 0.1 uF 10%; 16 V C222 23-11049A07 tantalum 1 uF 10%; 16 V C223 21-13741F43 5600 pF C511 21-13741W01 1 uF 10%; 25 V		W. 1 MAN 1			21-13/41F13	
C217 21-13741F13 330 pF C457 23-80090M24 lytic 10 uF 20%; 25 V C218 21-13741F25 1000 pF C458 21-13741F25 1000 pF C219 23-11049J11 tantalum 4.7 uF 10%; 16 V C501 21-13741F25 1000 pF C221 21-13743K15 0.1 uF 10%; 16 V C502 21-13743K15 0.1 uF 10%; 16 V C222 23-11049A07 tantalum 1 uF 10%; 16 V C503 23-11049A57 tantalum 10 uF 10%; 16 V C223 21-13741F43 5600 pF C511 21-13741W01 1 uF 10%; 25 V					A. 4044A44A	
C218 21-13741F25 1000 pF C458 21-13741F25 1000 pF C219 23-11049J11 tantalum 4.7 uF 10%; 16 V C501 21-13741F25 1000 pF C221 21-13743K15 0.1 uF 10%; 16 V C502 21-13743K15 0.1 uF 10%; 16 V C502 23-11049A07 tantalum 1 uF 10%; 16 V C503 23-11049A57 tantalum 10 uF 10%; 16 V C223 21-13741F43 5600 pF C511 21-13741W01 1 uF 10%; 25 V						
C219 23-11049J11 tantalum 4.7 uF 10%; 16 V C501 21-13741F25 1000 pF C221 21-13743K15 0.1 uF 10%; 16 V C502 21-13743K15 0.1 uF 10%; 16 V C222 23-11049A07 tantalum 1 uF 10%; 16 V C503 23-11049A57 tantalum 10 uF 10%; 16 V C223 21-13741F43 5600 pF C511 21-13741W01 1 uF 10%; 25 V		5.16	*			
C221 21-13743K15 0.1 uF 10%; 16 V C502 21-13743K15 0.1 uF 10%; 16 V C222 23-11049A07 tantalum 1 uF 10%; 16 V C503 23-11049A57 tantalum 10 uF 10%; 16 V C23 21-13741F43 5600 pF C511 21-13741W01 1 uF 10%; 25 V						
C222 23-11049A07 tantalum 1 uF 10%; 16 V C503 23-11049A57 tantalum 10 uF 10%; 16 V C223 21-13741F43 5600 pF C511 21-13741W01 1 uF 10%; 25 V						
C223 21-13741F43 5600 pF C511 21-13741W01 1 uF 10%; 25 V						
0224 23*11049011 (attaign14.7 ur 10%, 10 V 0301 21*13/43N13 U.1 ur 10%, 10 V						
	UZZ4	23-11049311	Idilianum 4.7 UF 1076; 10 V	U001	Z1-13/43N13	U. F.U.F. 1U.70, 152 V

REFERENCE	MOTOROLA	31 & PMUD1087) PL-
SYMBOL	PART NO.	DESCRIPTION
C554	21-13743K15	0.1 uF 10% 16 V
C555	21-13741F25	1000 pF
C556 C558	23-11049A05 23-11049J43	tantalum 0.47 uF 10%; 25 V tantalum 47 uF 10%; 10 V
C559 thru 561	21-13743K15	0.1 uF 10%; 16V
C562	23-11049A57	tantalum 10 uF 10%; 16 V
C563, 564	21-13740F51	100 pF Not Used
C565 C601	21-13743K15	0.1 uF 10%; 16 V
C602	21-13741F41	4700 pF
C603	23-11049A07	tantalum 1 uF 10%; 16 V
C604 C651	23-11049A05 21-13741F25	tantalum 0.47 uF 10%; 25 V 1000 pF
C652	21-13743F08	0.22 uF +80/-20%; 16 V
C653	23-11049J43	tantalum 47 uF 10%; 10 V
C654 C655	21-13743F08 23-11049J43	0.22 uF +80/-20%; 16 V tantalum 47 uF 10%; 10 V
C656	21-13743K15	0.1 uF 10%; 16 V
C701	21-13741A59	.039 uF
C702 C803	21-13741F49 21-13741F17	.01 uF 470 pF
C804	21-13740F51	100 pF
C805	21-13743K15	0.1 uF 10%; 16 V
C806 thru 814 C815, 816	21-13741F17 21-13741F25	470 pF 1000 pF
C2601, 2602	21-13741F13	330 pF
C2610	21-13740A71	470 pF
C2611	21-13740A39	27 pF
C2612 C2613, 2614	21-13740A43 21-13741F13	39 pF 330 pF
C2615	21-13743K15	0.1 uF 10%; 16 V
C2616	21-13741F13	330 pF
C2617 C2618	21-13740F53 21-13740A41	120 pF 33 pF
C2619	21-13740A59	150 pF
C2620	21-13740A37	22 pF
C2621 C2622, 2623	21-13741W01 21-13741F13	1 uF 10%; 25 V 330 pF
C2624	21-13740F39	33 pF
C2625	21-13740F53	120 pF
C2626 C2630	21-13743A19 21-13740A71	0.1 uF 10%; 16 V 470 pF
C2631	21-13740A40	30 pF
C2632	21-13740A40	30 pF
C2633 C2635	21-13741W01 21-13741F13	1 uF 10%; 25 V 330 pF
C2636		Not Used
C2637	21-13741F49	.01 uF
C2638 C2639	21-13741F13 21-13740F39	330 pF 33 pF
C2640	21-13740A57	12Ó pF
C2641	21-13740A37	22 pF
C2642 C2643	21-13740A48 21-13740A51	51 pF 68 pF
C2644	21-13740A55	100 pF
C2645	21-13740A51	68 pF
C2646 C2647	21-11078B48 21-80060M19	160 pF 100 V 10 pF 500 V
C2648	21-11078B42	100 pF 100 V
C2649	21-11078B32	39 pF 100 V
C2650 C2651	21-11078B59 21-13743A19	470 pF 100 V 0.1 uF 10%: 16 V
C2652	21-13740A71	470 pF
C2653	21-13741F13	330 pF
C2654 C2655	21-13741F49 21-13741F13	.01 uF 330 pF
C2656	21-13741F13	330 pF
C2657		Not Used
C2658, 2659	21-11078B19 21-80060M22	16 pF 100 V 13 pF 500 V
C2660 C2661	21-11078B32	39 pF 100 V
C2662	21-80060M32	36 pF 500 V
C2663	21-11078B19	16 pF 100 V
C2664 C2669	21-11078B59 21-13740A34	470 pF 100 V 16 pF
C2671	21-13741F13	330 pF
C2672	21-13743K15	0.1 uF 10%; 16 V
C2673 C2674	21-13741F49 21-13741F13	.01 uF 330 pF
C2675	21-13741F49	.01 uF
C2676	21-13743A19	0.1 uF 10%; 16 V

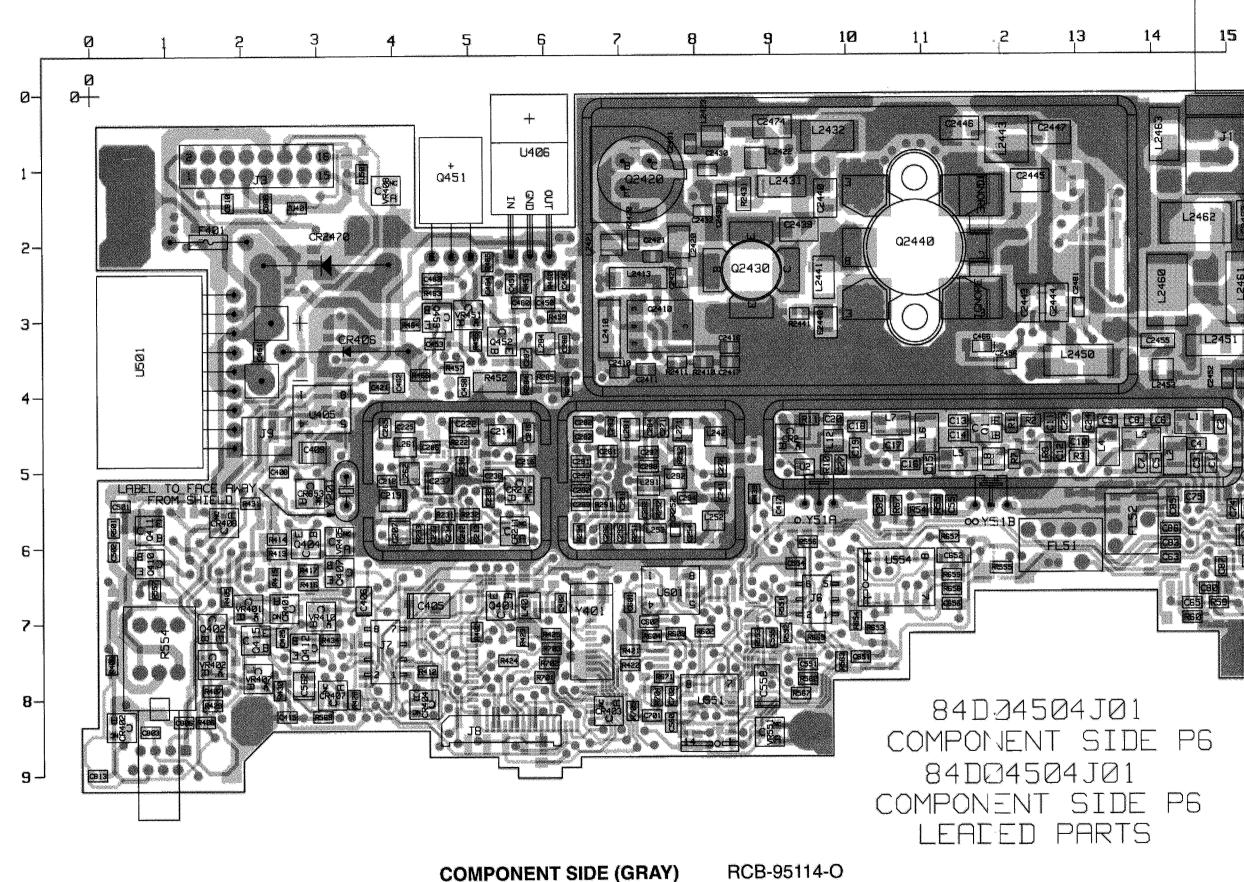
REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
C2677, 2678	21-13741W01	1 uF 10%; 25 V
C2679	21-13740A51	68 pF
		diode: (see note)
CR1	48-80154K03	dual Schottky SOT
CR2	48-80142L01	silicon PIN SOT MMBV3401
CR51	48-80154K03	dual Schottky SOT
CR201	48-02245J22	silicon varactor SOT 1T363
CR211, 212	48-13833C07	dual silicon SOT MMBD7000
CR241	48-62824C03	silicon varactor SOT 1SV232
CR251	48-62824C03	silicon varactor SOT 1SV232
CR252	48-62824C01	silicon varactor SOT 1SV229
CR401 CR402	48-05129M76 48-13833C07	silicon SOT dual silicon SOT MMBD7000
CR402 CR403	48-80939T01	Schottky SOT
CR404	48-13833C07	dual silicon SOT MMBD7000
CR405	48-05129M76	silicon SOT
CR406	48-83553T02	4A 200 PIV MUR420
CR407	48-13833C07	dual silicon SOT MMBD7000
CR408	48-05129M76	silicon SOT
CR451	48-05129M76	silicon SOT
CR651 thru 653	48-13833C07	dual silicon SOT MMBD7000
CR2601, 2602	48-05218N57	dual silicon SOT
CR2650, 2651	48-02482J02	silicon PIN MA4P1250
CR2670	48-80236E07	transient suppressor
		ferrite beads:
E2610	24-80067M01	ferrite bead
E2630	24-80067M01	ferrite bead
E2631	24-80132N01	ferrite bead
E2640	24-80067M01	ferrite bead
E2641	24-80132N01	ferrite bead
E2650	24-80067M01	ferrite bead

Fana	AE AEA44EA4	fuse:
F401	65-05214E04	2 amp axial lead
		filter:
FL51(N)	91-80098D04	455 kHz 4F
FL51(W)	91-80098D06	455 kHz 4D
FL52(N)	91-80097D04	455 kHz 6F
FL52(W)	91-80097D06	455 kHz 6D
• •		
		connector, receptacle:
J1	09-09006C01	mini UHF coax
J2 ·	30-04510J01	power cable assembly (includes J2)
J3	28-04503J01	16-pin, accessories
J5 J6	09-04426J01 09-04424J05	telephone type, 8 contact, microphone 6-pin, internal options audio
J7	09-04424306	8-pin, internal options digital
J8	09-04422J02	10-pin, display board
J9	28-04423J01	2-pin, internal speaker
		m lead account affections
		jumper:
JU401		Not Used
JU501	06-62057B47	jumper
		and of
I i Hone I	SA BOSONO	coil, rf:
L1 thru 4	24-60591G24	9 turns chin 1.2 nH 5%
L5 L6 thru 8	24-62587X69 24-60591G24	chip 1.2 uH 5% 9 turns
LO unu o	24-62587X52	chip 82 nH 5%
L11	24-62587X55	chip 0.15 uH 5%
L12	24-62587X69	chip 1.2 uH 5%
L51	24-83411T63	0.15 uH 5% shielded
L52(N)	24-62587X65	chip 0.75 uH 5%
L52(W)	24-62587X63	chip 0.62 uH 5%
L53, 54	24-62587N71	chip 1.8 uH 5%
L55	24-62587X68	chip 1 uH 5%
L58	24-62587X69	chip 1.2 uH 5%
L221	24-62587XN69	
L241	24-62587X56	chip 0.18 uH 5%
L242	24-62587X50	chip 56 nH 5%
L243, 244	24-62587X69	chip 1.2 uH 5%
L251	24-62587X63	chip 0.33 uH 5%
L252	24-62587X52 24-62587X69	chip 82 nH 5% chip 1.2 uH 5%
L253 thru 255 L261	24-62587X53	chip 0.1 uH 5%
	ET UEUU! AUU	uniquitation (a)
		chin 1.2 nH 5%
L262 L271	24-62587X69 24-62587X53	chip 1.2 uH 5% chip 0.1 uH 5%

DESCRIPTION	SYMBOL	MOTOHOLA	neéco
DESCRIPTION		PART NO.	DESCR
chip 82 nH 5%	R253	06-62057A33	220
chip 0.75 uH 5%	R254, 255	00 00057400	Not Used
chip 27 nH 5%	R260 R280	06-62057A33	220
chip 1.2 uH 5%			Not Used
chip 33 uH	R281 R282	06-62057A47	820 2.7k
9 turns	R283	06-62057A59	2.7k 82
7 turns chip 0.1 uH 5%	R284	06-62057A23 06-62057A33	220
	R285	06-62057A12	30
8 turns 5 turns	R286	06-62057A33	220
6 turns	R291	06-62057A89	47k
4 turns	R292	06-62057A25	100
6 turns	R293	06-62057A84	30k
chip 1.2 uH 5%	R294	06-62057A73	10k
Not Used	R401	06-62057D54	1.8 meg 1/10 watt
8 turns	R402	06-62057A65	4.7k
8 turns	R403	06-62057A73	10k
12 turns	R404	06-62057A49	1k
(m. 34-178	R405	06-62057A55	1.8k
transistor: (see note)	R406	06-62057A65	4.7k
NPN; type MMBR941	R407	06-62057A89	47k
PNP: type MMBT3906	R408	06-62057A65	4.7k
dual transistor switch UMC3TL	R409	06-62057A33	220
NPN; type MMBR941	R410, 411	06-62057A73	10k
NPN; type MMBR941	R412	06-62057C67	470 1/10 watt
NPN; type MMBT3904	R413	06-62057A89	47k
digital NPN; type DTC144W	R414	06-62057A65	4.7k
digital NPN; type DTC144W	R415	***	Not Used
PNP, type M41L03	R416	06-62057A89	47k
digital NPN; type DTC144W	R417	06-62057A65	4.7k
PNP; type MMBT3906	R418	06-62057A53	1.5k
NPN; type MMBT3904	R419	06-62057A59	2.7k
PNP, type M41L03	R420	06-62057A73	10k
digital NPN; type DTC144W	R421, 422	06-62057A97	100k
PNP; type MMBT3906	R423 thru 425	06-62057A73	10k
NPN; type MMBT3904	R426	06-62057B47	O
PNP; type MMBT3906	R427	06-62057A73	10k
NPN; type MMBT3904	R428	06-62057A97	100k
PNP; type 2SB1142S	R429	06-62057A73	10k
NPN; type BFG35	R430	06-62057A89	47k
NPN; type BFQ43S	R431, 432	06-62057A65	4.7k
NPN; type M25C22	R434	06-62057A61	3.3k
The state of the s	R435	06-62057A45	680
resistor, fixed: +/-5%; 1/16 W:	R436	06-62057A27	120
unless otherwise stated	R437	06-62057A90	51k
1k	R438	06-62057A81	22k
2.4k	R439	06-62057A73	10k
20k	R440	06-62057A90	51k
10k	R441 thru 443	06-62057B47	0
51	R451	06-62057D19	62k 1/10 watt
51	R452	06-62057B47	0
10	R453	06-62057A87	39k
430	R454	06-62057A92	62k
100	R455	06-62057A77	15k
51	R456	06-62057A90	51k
33k	R460	06-62057A75	12k
12k	R461	06-62057A73	10k
2k	R462	06-62057A70	7.5k
100	R463	06-62057D35	300k 1/10 watt
200k 1/10 watt	R464	06-62057A49	1k
130k 1/10 watt	R465	06-62057A79	18k
13k	R466	06-62057A49	1k
100K	R467	06-62057B47	Ö
68k	R468	06-80195M37	330 1/2 watt
20k	R469	06-62057A49	1k
2k	R501	06-62057A37	330
5.6k	R502	06-62057A97	100k
820	R551	06-62057A84	30k
5.6k	R552, 553	06-62057A75	12k
2.2k	R554	18-04405J02	variable 2k with sw
47k	R555(N)	06-62057A01	10
1k	R555(W)	06-62057A84	30k
51	R556	06-62057A73	10k
2.2k	R557	06-62057A01	10
1k	R558	06-62057A73	10k
2.2k	R559	06-62057A17	47
24k	R560	06-62057A97	100k
Not Used	R561, 562	06-62057A89	47k
100k	R563(N)	06-62057A77	15k
10k	R563(W)	06-62057A84	30k
1k	R564	06-62057A77	15k

R652	06-62057B14	470k
R653	06-62057A01	10
R654	06-62057A82	24k
R655	06-62057A84	30k
R656	06-62057A73	10k
R657	06-62057A97	100k
R658	06-62057C46	62 1/10 watt
R659	06-62057A40	430
R665	06-62057A40	430
R666	06-62057C46	62 1/10 watt
R667	06-62057A65	4.7k
R668	06-62057A97	100k
R669	06-62057A65	4.7k
R670	06-62057D35	300k 1/10 watt
R671	06-62057A60	3k
R701	06-62057A97	100k
R702	06-62057B06	220k
R703	06-62057B03	160k
R704	06-62057A68	6.2k
R705	06-62057A01	10
R2601, 2602	06-11077A52	120
•		330
R2610	06-62057A37	46. 46.
R2611	06-62057A25	100
R2612	06-62057A21	68 10
R2613, 2614	06-62057A01	
R2615	06-62057C63	330 1/10 walt
R2616	***	Not Used
R2617	06-62057C67	470 1/10 watt
R2618	06-62057C01	0 1/10 watt
R2630	06-62057A45	680
R2631	06-62057C44	51 1/10 watt
R2633	06-62057C27	10 1/10 watt
R2634	06-62057C67	470 1/10 walt
R2635	06-80195M25	100 1/2 watt
R2640	06-80195M18	51 1/2 watt
R2641, 2642	06-62057C27	10 1/10 watt
R2642, 2643	06-62057C27	10 1/10 watt
R2644, 2645	06-80195M18	51 1/2 watt
R2650, 2651	06-80195M18	51 1/2 watt
RT460	06-05621T02	thermistor 50k @ 25°C
		integrated circuit: (see note)
U1	51-80505D01	double-balanced mixer
U51	51-80207R01	receiver system
U201*	(see note)	synthesizer
U251	51-02227566	VCO/buffer
U401	51-99010D01	microcomputer MC68HC711E9
U402	51-02227J35	audio filter
U403	51-05226P38	DAC
U404	51-80633C01	5 V regulator TK11950
U405	51-05469E65	5 V regulator LP2951C
U406	51-13816D03	8 V regulator MC7808BT
U451	51-80932W01	dual op-amp LM2904 SOIC
U501	51-80147R01	audio power amp TDA1519AB
U551	51-02198J28	quad op-amp LM2902D SOIC
U553	51-84704M60	triple 2-channel switch 4053B
U554	51-84704M50 51-84704M52	guad bilateral switch 4066B
U601	51-02198J23	dual comparator LM2903 SOIC
0001	31-02190020	
1777 - 64	** ***	voltage regulator: (see note)
VR401	48-80140L06	zener diode 5.1 V SOT
VR402 thru 406	48-80948V01	zener diode 27 V SOT
VR407	48-80140L15	zener diode 10 V SOT
VR408, 409	48-80948V01	zener diode 27 V SOT
VR410	48-80140L15	zener diode 10 V SOT
	48-80948V01	zener diode 27 V SOT
VR411, 412 VR551 thru 553	48-80140L15	zener diode 10 V SOT

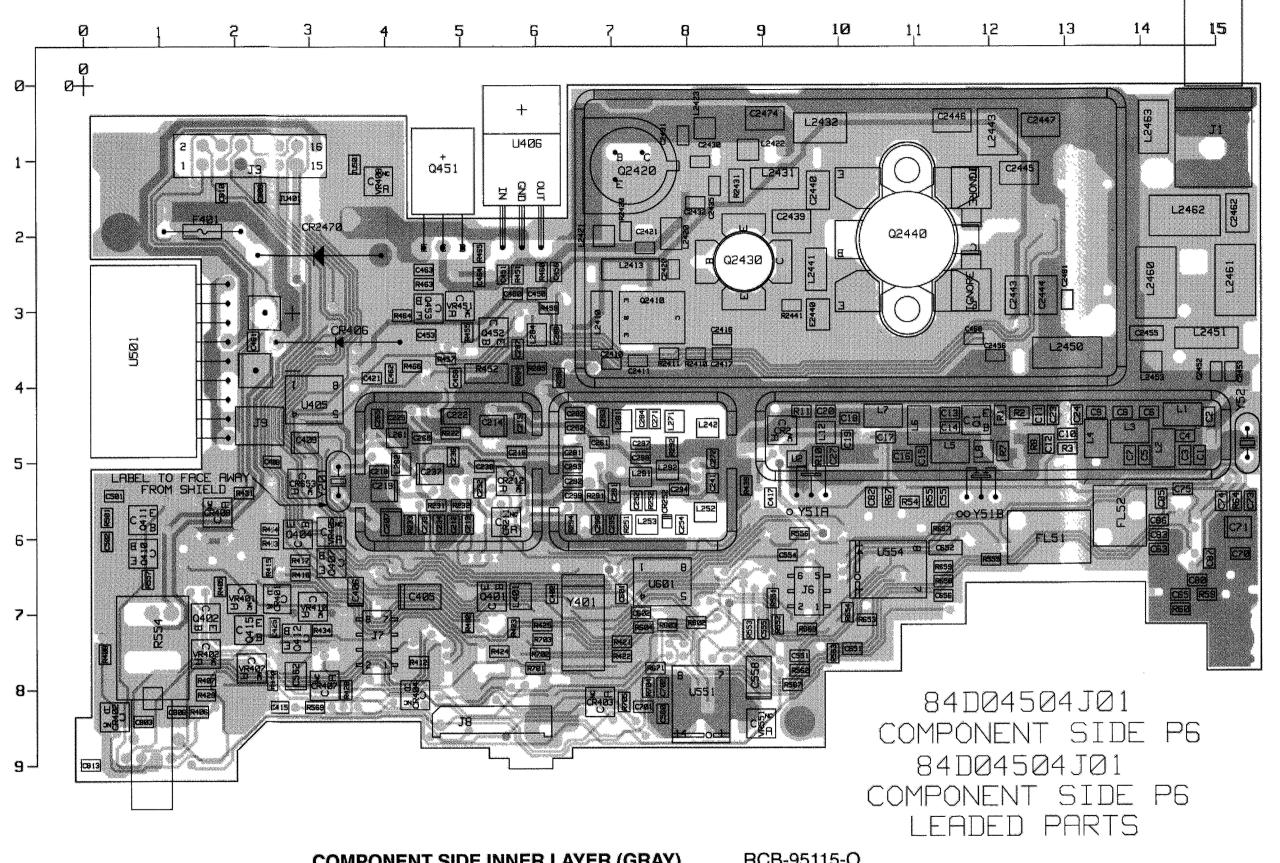
Parts List for VHF Main Boards, 150-170 MHz, 12.5 & 20/25/30 kHz, 10-25 W (Part of PMUD1030A, PMUD1031A, PMUD1086A, and PMUD1087A Radios)



COMPONENT SIDE (GRAY) SOLDER SIDE (PINK) OVERLAY ----

RCB-95117-O RCB-95118-O

COMPONENT SIDE VIEW

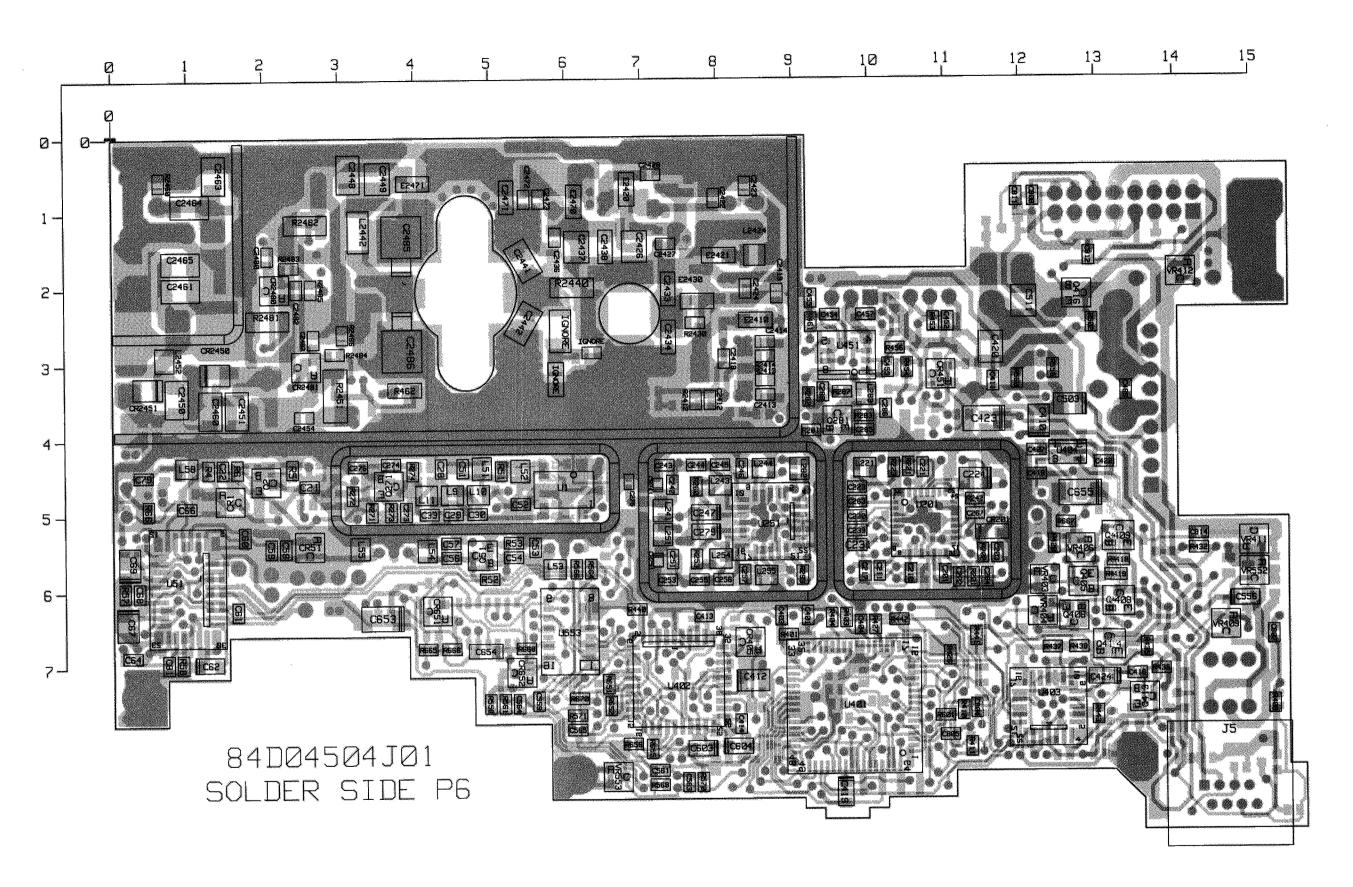


COMPONENT SIDE INNER LAYER (GRAY) SOLDER SIDE INNER LAYER (PINK) OVERLAY ----

RCB-95115-O RCB-95116-O RCB-95118-O

Circuit Board Details for VHF Main Boards, 150-170 MHz, 12.5 & 20/25/30 kHz, 40 W (Part of PMUD1067A, PMUD1068A, PMUD1088A, PMUD1089A Radios)

COMPONENT SIDE VIEW



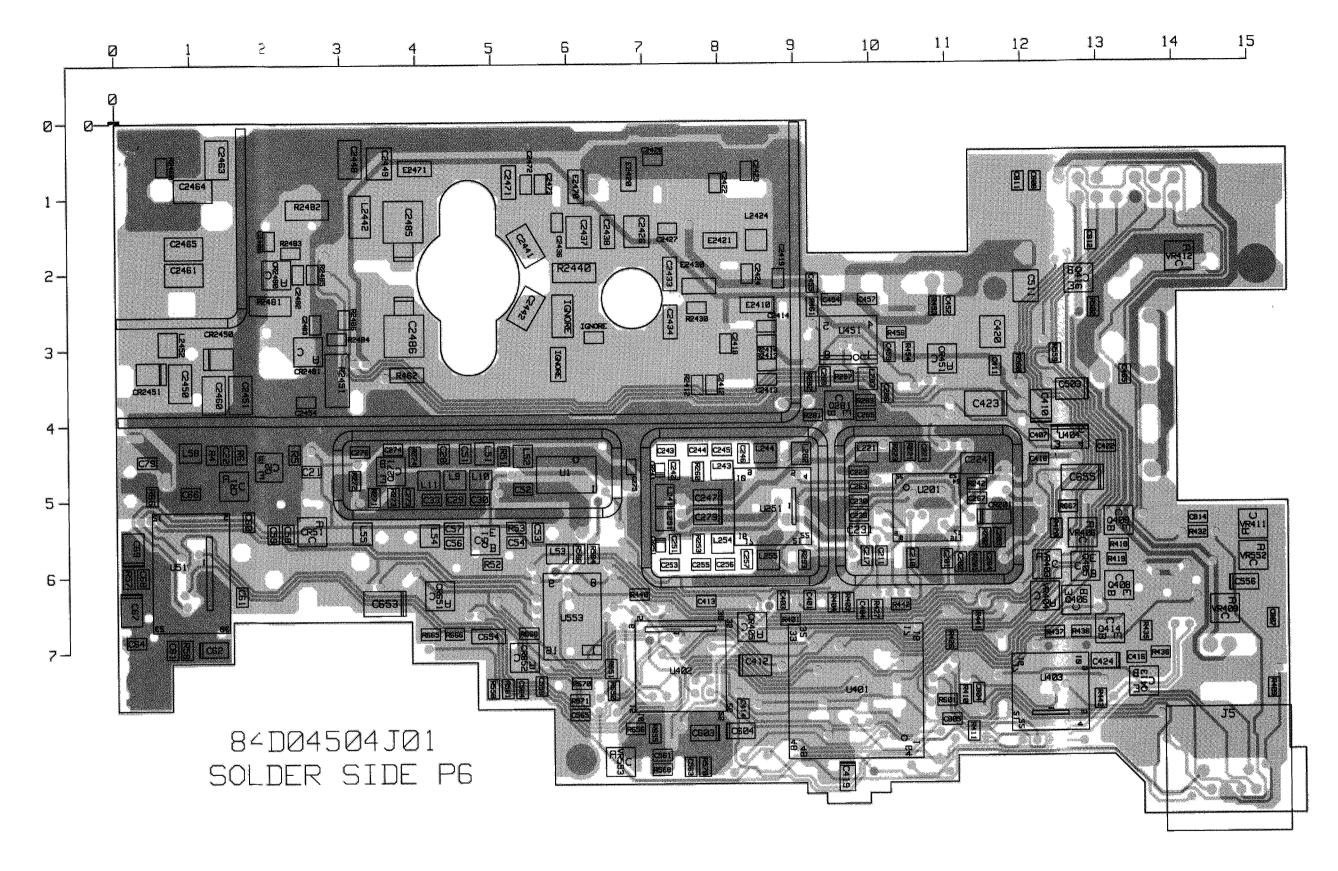
COMPONENT SIDE (GRAY)
SOLDER SIDE (PINK)
OVERLAY -----

RCB-95114-O (REV) RCB-95117-O (REV) RCB-95119-O (REV)

SOLDER SIDE VIEW

Circuit Board Details for VHF Main Boards, 150-170 MHz, 12.5 & 20/25/30 kHz, 40 W (Part of PMUD1067A, PMUD1068A, PMUD1088A, PMUD1089A Radios)

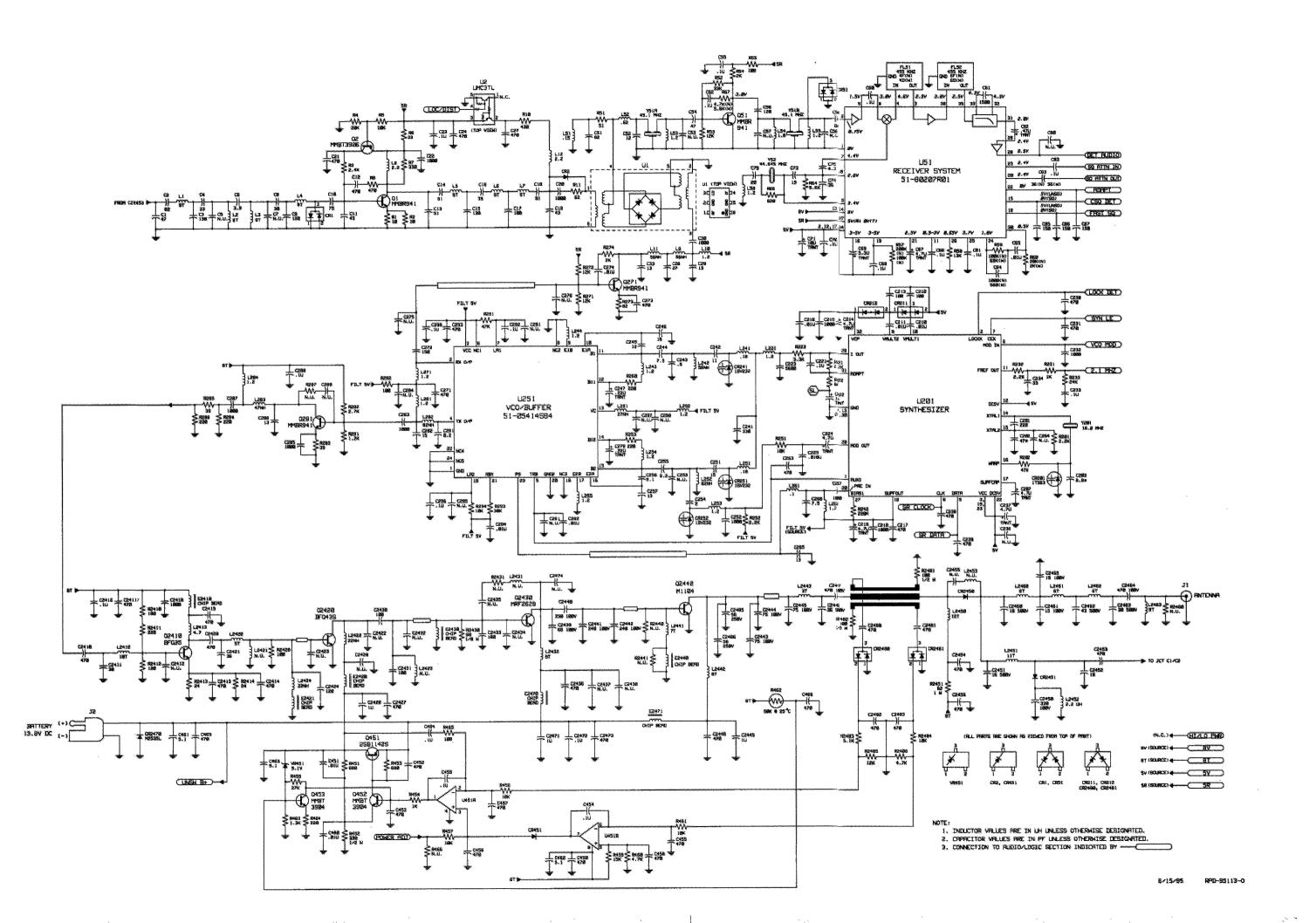
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COMPONENT SIDE INNER LAYER (GRAY) SOLDER SIDE INNER LAYER (PINK) OVERLAY -----

RCB-95115-O (REV) RCB-95116-O (REV) RCB-95119-O (REV)

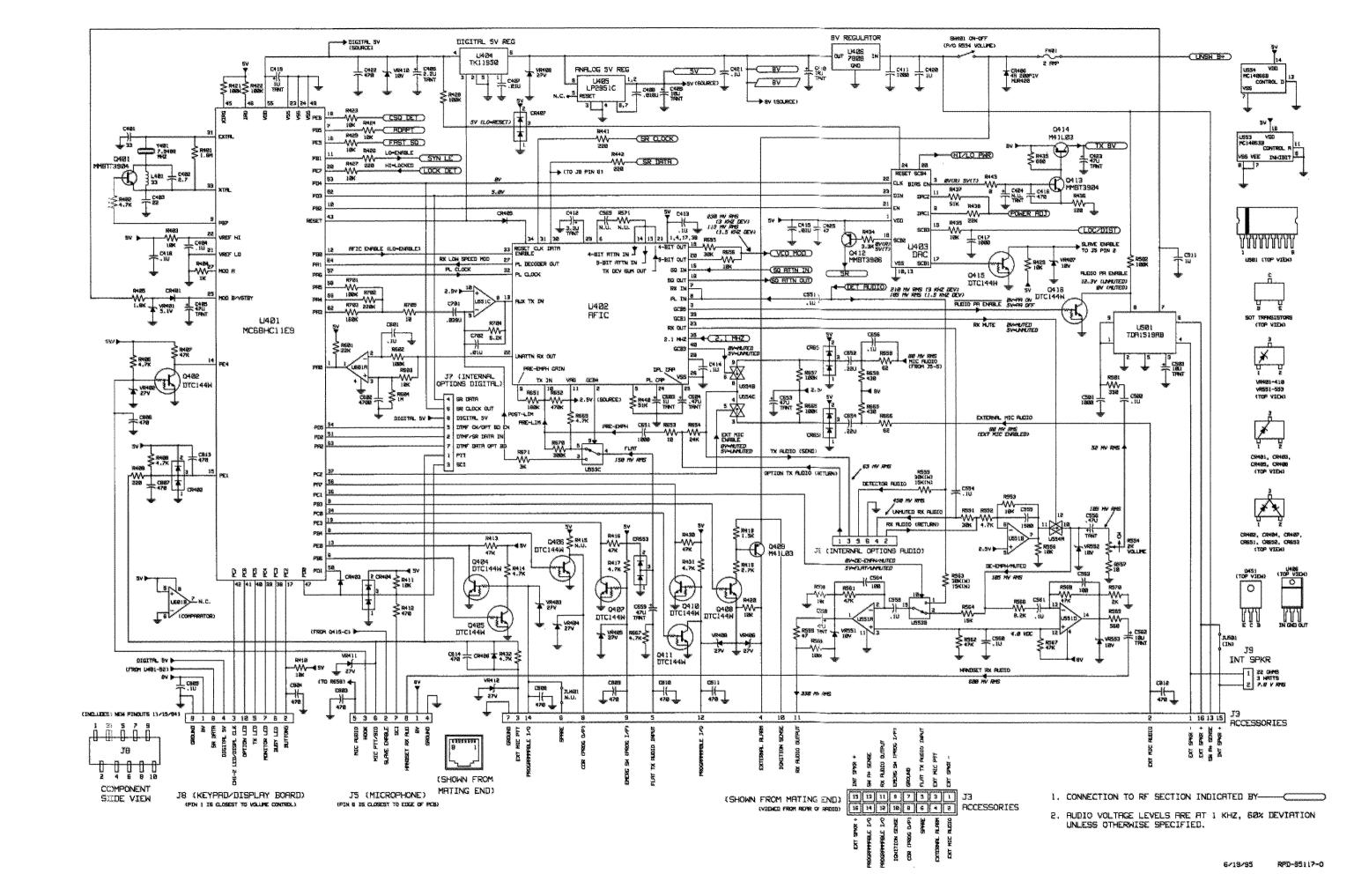
SOLDER SIDE VIEW



Schematic Diagrams for VHF Main Boards, 150-170 MHz, 12.5 & 20/25/30 kHz, 40 W (Part of PMUD1067A, PMUD1068A, PMUD1088A, PMUD1089A Radios) (Sheet 1 of 2)

March, 1998

6880903Z45-A



Schematic Diagrams for VHF Main Boards, 150-170 MHz, 12.5 & 20/25/30 kHz, 40 W (Part of PMUD1067A, PMUD1068A, PMUD1088A, PMUD1089A Radios) (Sheet 2 of 2)

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6880903Z45-A

March, 1998

Parts List

SM50/SM120 VHF Main Board, 150-170 MHz, 40 Watts 12.5 kHz (N) (used in PMUD1067 & PMUD1088) SM50/SM120 VHF Main Board, 150-170 MHz, 40 Watts

SM50/SM120 VHF Main Board, 150-170 MHz, 40 Watts 12.5 kHz (N) (used in PMUD1067 & PMUD1088) SM50/SM120 VHF Main Board, 150-170 MHz, 40 Watts 20/25/30 kHz, 40// (used in PMI) 1068 & PMUD1089)

SM50/SM120 VHF Main Board, 150-170 MHz, 40 Watts 12.5 kHz (N) (used in PMUD1067 & PMUD1088) SM50/SM120 VHF Main Board, 150-170 MHz, 40 Watts

SM:50/SM:120 VHF Main Board, 150-170 MHz, 40 Watts 12..5 kHz (N) (used in PMUD1067 & PMUD1088) SM:50/SM:120 VHF Main Board, 150-170 MHz, 40 Watts

SM50/SM120 VHF Main Board, 150-170 MHz, 40 Watts 12.5 kHz (N) (used in PMUD1067 & PMUD1088) SM50/SM120 VHF Main Board, 150-170 MHz, 40 Watts 20/25/30 kHz (W) (used in PMUD1068 & PMUD1089)

PL-951010-A

SM50/SM120 VHF Main Board, 150-170 MHz, 40 Watts 12.5 kHz (N) (used in PMUD1067 & PMUD1088) SM50/SM120 VHF Main Board, 150-170 MHz, 40 Watts 20/25/30 kHz (W) (used in PMUD1068 & PMUD1089)

PL-951010-A REFERENCE MOTOROLA SYMBOL PART NO.

SM50/SM120 VHF Main Board, 150-170 MHz, 40 Watts 12.5 kHz (N) (used in PMUD1067 & PMUD1088) SM50/SM120 VHF Main Board, 150-170 MHz, 40 Watts 20/25/30 kHz (W) (used in PMUD1068 & PMUD1089)

DESCRIPTION

PL-951010-A

SM50/SM120 VHF Main Board, 150-170 MHz, 40 Watts 20/25/30 kHz (W) (used in PMUD1068 & PMUD1089) PL-951010-A REFERENCE MOTOROLA SYMBOL PART NO. 48-80113R01 7.9488 MHz non-referenced items

SM50/SM120 VHF Main Board, 150-170 MHz, 40 Watts 12.5 kHz (N) (used in PMUD1067 & PMUD1088)

14-80168S01 crystal insulator (2 used for Y52, Y201)
26-04398J01 VCO/synthesizer shield (4 used)
26-04399J01 receiver mixer bottom shield 26-04400J01 receiver front end top shield 26-04419J01 PA shield frame 26-04420J01 PA shield cover 42-80281L01 ground clip (2 used for Q2440)

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

Designators marked with an (*) denote parts which are not field serviceable. Recalibration of the radio using specialized factory equipment is mandatory when these components are replaced in order to guarantee the specified frequency stability of the radio at temperature extremes.

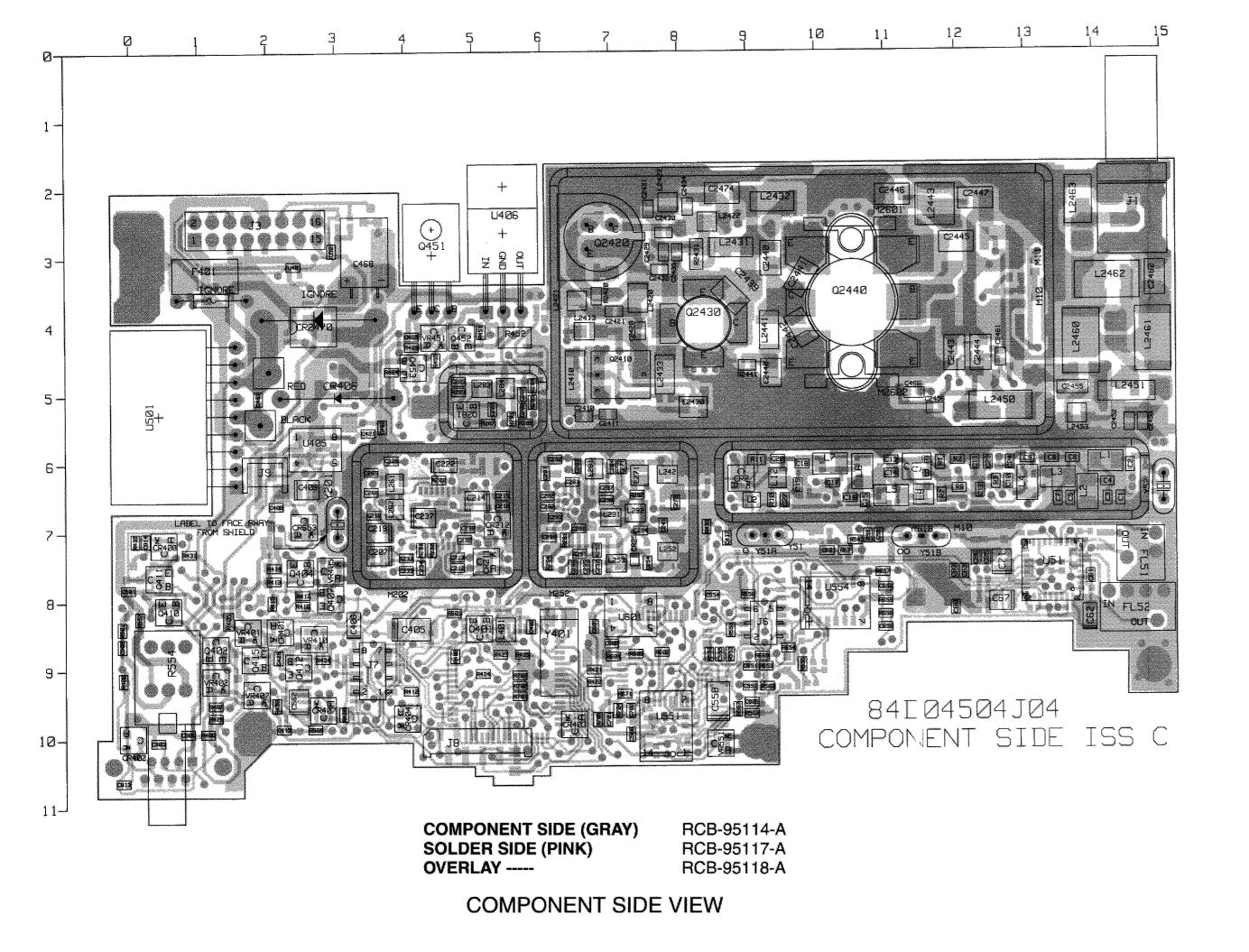
REFERENCE	MOTOROLA		REFERENCE	MOTOROLA	DESCRIPTION
SYMBOL	PART NO.	DESCRIPTION	SYMBOL	PART NO.	
w.:		capacitor, fixed: uF +/-5%; 50 V:	C236		Not Used
		unless otherwise stated	C237	23-11049J11	tantalum 4.7 uF 10%; 16 V
i a	21-13740A41	33 pF	C238, 239	21-13740A71	470 pF
51		150 pF	C241	21-13740A67	330 pF
2	21-13740A59		C242	21-13740A30	11 pF
23	21-13740A54	91 pF	C243	21-13740A01	0.5 ±0.1 pF
24	21-13740A41	39 pF	C244, 245	21-13740A27	8.2 ±0.25 pF
55		Not Used		21-13740A29	10 pF
26	21-13740A23	6.2 ±0.25 pF	C246		tantalum 0.22 uF 10%; 35 V
7	****	Not Used	C247	23-11049A03	
28	21-13740A40	30 pF	C251	21-13740A33	15 pF
39	21-13740A54	91 pF	C252	21-13740A79	1000 pF
210	21-13740A79	100 pF	C253		Not Used_
Ž11	21-13740A38	24 pF	C254	21-13740A10	2 ±0.25 pF
512	21-13740A71	470 pF	C255	21-13740A27	8.2 ±0.25 pF
213	21-13740A41	33 pF	C256	21-13740A28	9.1 ±0.25 pF
214	21-13740A58	130 pF	C257	21-13740A32	13 pF
	21-13740A54	91 pF	C261		Not Used
215			C262	21-13741A45	.01 uF
216	21-13740A48	51 pF	C263	21-13740A71	470 pF
C17	21-13740A53	82 pF		#1161.461.41	Not Used
218	21-13740A58	130 pF	C264		13 pF
C19	21-13740A42	36 pF	C265	21-13740A32	7.5±0.25 pF
C20	21-13740A79	1000 pF	C266	21-13740A25	
221	21-13740A71	470 pF	C267	21-13740A79	1000 pF
222	21-13740A79	1000 pF	C271	21-13740A71	470 pF
	21-13743A19	0.1 uF 10%; 16 V	C272	21-13740A59	150 pF
C24	21-13740A71	470 pF	C273	21-13740A71	470 pF
C27	21-13740A71	470 pF	C274	21-13741A45	.01 uF
C28	21-13740A39	27 pF	C275	2113740F29	12 pF
	21-13740A32	13 pF	C276		Not Used
C29	21-13740A79	1000 pF	C279	23-11049A03	tantalum 0.22 uF 10%; 35 V
C30		and the second s	C275	21-13740A27	8.2 ±0.25 pF
C33	21-13740A32	13 pF		A CONTRACTOR OF THE PARTY OF TH	15 pF
C51	21-13740A53	82 pF	C282	21-13740A33	
C52	21-13740A31	12 pF	C283	21-13740A79	1000 pF
C53	***	Not Used	C284	Name	Not Used
C54	21-13740A46	47 pF	C285	21-13740A79	1000 pF
C55	21-13743A19	0.1 uF 10%; 16 V	C286	21-13740A32	13 pF _
C56	21-13740A57	120 pF	C287	21-13740A79	1000 pF
C57, 58	THE	Not Used	C288	21-13743A19	0.1 uF 10%; 16 V
C59	21-13740A53	82 pF	C289	***	Not Used
C60	21-13743A19	0.1 uF 10%; 16 V	C291	***	Not Used
C61	21-13741A25	1500 pF	C292	21-13743A19	0.1 uF 10%; 16 V
	23-11049A05	tantalum 0.47 uF 10%; 25 V	C293	21-13740A71	470 pF
C62		36 pF		21-13741A45	.01 uF
C63(N)	21-13740A42		C294		Not Used
C63(W)	21-13740A49	56 pF	C295	ma ma ammandanh	0.1 uF 10%; 16 V
C64(N)	21-13740A79	1000 pF	C296	21-13743A19	
C64(W)	21-13740A73	560 pF	C297, 298	www.	Not Used
C65	21-13741A45	.01 uF	C299	21-13743A19	0.1 uF 10%; 16 V
C66	21-13743A19	0.1 uF 10%; 16 V	C401	21-13740A41	33 pF
C67	23-11049J11	tantalum 4.7 uF 10%; 16 V	C402	21-13740A13	2.7 ±0.25 pF
C68	21-13743A19	0.1 uF 10%; 16 V	C403	21-13740A37	22 pF
C69	23-11049J07	tantalum 3.3 uF 10%; 20 V	C404	21-13743A19	0.1 uF 10%; 16 V
C70	21-13743A19	0.1 uF 10%; 16 V	C405	23-11049J43	tantalum 47 uF 10%; 10 V
C71	23-11049A57	tantalum 10 uF 10%; 16 V	C405 C406	23-11049A40	tantalum 2.2 uF 10%; 10 V
C73	21-13740A33	15 pF			.01 uF
	21-13740A33	36 pF	C407	21-13741A45	
C74	21-13740A42 21-13740A18	4.3 ±0.25 pF	C408	21-13741A51	.018 uF
C75			C409, 410	23-11049A57	tantalum 10 uF 10%; 16 V
C79	21-13740A36	20 pF	C411	21-13740A79	1000 pF
C80	سمد معدد مسموری میش	Not Used	C412	23-11049J07	tantalum 3.3 uF 10%; 20 V
C81 thru 83	21-13743A19	0.1 uF 10%; 16 V	C413, 414	21-13743A19	0.1 uF 10%; 16 V
C85 thru 87	21-13740A59	150 pF	C415	21-13741A45	.01 uF
C201	21-13740A63	220 pF	C416	21-13740A71	470 pF
C202	21-13740G46	47 pF 2%	C417	21-13740A79	1000 pF
C203	21-13740G24	6.8 ±0.1 pF	C418	21-13743A19	0.1 uF 10%; 16 V
C207	23-11049J11	tantalum 4.7 uF 10%; 16 V		23-11049A07	tantalum 1 uF 10%; 16 V
C210, 211	21-13741A45	.01 uF	C419	21-13741W01	1 uF 10%; 25 V
C212, 213	21-13740A55	100 pF	C420		
C214	23-11049J11	tantalum 4.7 uF 10%; 16 V	C421	21-13743A19	0.1 uF 10%; 16 V
	21-13740A79	1000 pF	C422	21-13740A71	470 pF
C215			C423	23-11049J43	tantalum 47 uF 10%; 10 V
C216	21-13741A45	.01 uF	C424	www	Not Used
C217	21-13740A71	470 pF	C425	21-13740A46	47 pF
C218	21-13740A79	1000 pF	C450	21-13740A71	470 pF
C219	23-11049J11	tantalum 4.7 uF 10%; 16 V	C451	21-13743A21	0,22 uF, 10%; 16 V
C221	21-13743A19	0.1 uF 10%; 16 V	C452	21-13740A71	470 pF
C222	23-11049A07	tantalum 1 uF 10%; 16 V			0.1 uF, 10%; 16 V
C223	21-13741A39	5600 pF	C453	21-13743A19	
		tantalum 4.7 uF 10%; 16 V	C454	21-13743A19	0.1 uF 10%; 16 V
C224	23-11049J11		C455 thru 458	21-13740A71	470 pF
C225	21-13741A51	.018 uF	C459	21-13743A19	0.1 uF 10%; 16 V
C230, 231	21-13740A71	470 pF_	C460		Not Used
C232	21-13740A79	1000 pF	C461 thru 463	21-13740A20	5.1 ±0.25 pF
C233	21-13743A19	0.1 uF 10%; 16 V	and the second s	21-13743A19	0.1 uF 10%; 16 V
C234	21-13740A41	33 pF	C464	E 1 194 496115	*** *** ***** ** **

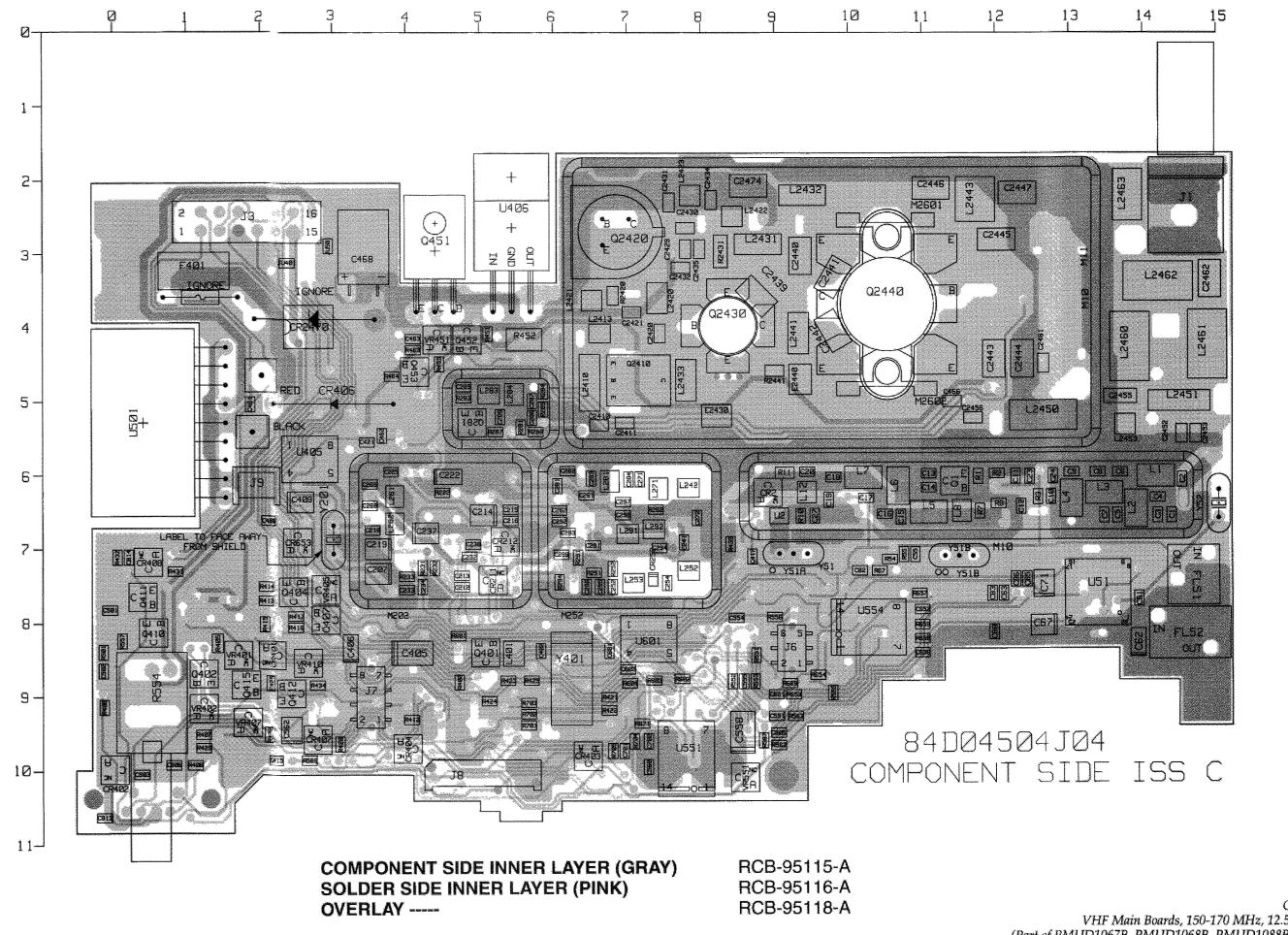
C501	PART NO.	DESCRIPTION			
C501		470 ×C	(CR51	48-80154K03	dual Schottky SOT
	21-13740A71	470 pF	©R201	48-02245J22	silicon varactor SOT 1T363
	21-13740A79	1000 pF	©R211, 212	48-13833C07	dual silicon SOT MMBD7000
	21-13743A19	0.1 uF 10%; 16 V	CR241	48-62824C03	silicon varactor SOT 1SV232
	23-11049A57	tantalum 10 uF 10%; 16 V	(CR251, 252	48-62824C03	silicon varactor SOT 1SV232
	21-13741W01	1 uF 10%; 25 V	(3R401	48-05129M76	silicon SOT
C551	21-13743A19	0.1 uF 10%; 16 V	(CR402	48-13833C07	dual silicon SOT MMBD7000
C554	21-13743A19	0.1 uF 10%; 16 V	€CR403	48-80939T01	Schottky SOT
	21-13741A79	1000 pF	(CR404	48-13833C07	dual silicon SOT MMBD7000
C556	23-11049A05	tantalum .47 uF 10%; 25 V		48-05129M76	silicon SOT
C558	23-11049J43	tantalum 47 uF 10%; 10 V	CR405	48-83553T02	4A 200 PIV MUR420
C559 thru 561	21-13743A19	0.1 uF 10% 16V	(CR406	48-13833C07	dual silicon SOT MMBD7000
C562	23-11049A57	tantalum 10 uF 10%; 16 V	(CR407		silicon SOT
C563, 564	21-13740A55	100 pF	CR408	48-05129M76	silicon SOT
C565		Not Used	CR451	48-05129M76	dual silicon SOT MMBD7000
C601	21-13743A19	0.1 uF 10%; 16 V	CR651 thru 653	48-13833C07	silicon PIN MA4P1250
C602	21-13741A37	4700 pF	CR2450, 2451	48-02482J02	
C603	23-11049A07	tantalum 1 uF 10%; 16 V	CR2470	48-80236E07	transient suppressor
	23-11049A05	tantalum 0.47 uF 10%; 25 V	CR2480, 2481	48-82290T02	dual Schottky SOT HSMS-280
C604		1000 pF			
C651	21-13740A79	0.22 uF +80/-20%			ferrite beads:
C652	21-11032B15		E2410	24-84657R01	ferrite bead
C653	23-11049J43	tantalum 47 uF 10%; 10 V	E2420, 2421	24-84657R01	ferrite bead
C654	21-11032B15	0.22 uF +80/-20%	E2430	24-84657R01	ferrite bead
C655	23-11049J43	tantalum 47 uF 10%; 10 V	E2440	24-84657R01	ferrite bead
C656	21-13743A19	0.1 uF 10%; 16 V	E2470, 2471	24-84657R01	ferrite bead
C701	21-13741A59	.039 uF	E210, 2411	war warmed kittle i	· · · · · · · · · · · · · · · · · · ·
C702	21-13741A45	.01 uF			fuse:
C803, 804	21-13740A71	470 pF	F-286.2	SE DESTACOA	
C805	21-13743A19	0.1 uF 10%; 16 V	F401	65-05214E04	2 amp axial lead
C806 thru 814	21-13740A71	470 pF			4114 www.
C2410	21-13740A71	470 pF	<u></u>	د ساسد در مومومومومو	filter:
C2410	21-13740A40	30 pF	FL51(N)	91-80098D04	455 kHz 4F
	21-101-40/40	Not Used	FL51(W)	91-80098D06	455 kHz 4D
C2412		470 pF	FL52(N)	91-80097D04	455 kHz 6F
C2413, 2414	21-13740A71	0.1 uF 10%; 16 V	FL52(W)	91-80097D06	455 kHz 6D
C2416	21-13743A19				
C2417	21-13740A71	470 pF			connector, receptacle:
C2418	21-13740A79	1000 pF	J1	09-09006C01	mini UHF coax
C2419, 2420	21-13740A71	470 pF	J2	30-04510J01	power cable assembly (includ-
C2421	21-13740A42	36 pF	J2 J3	28-04503J01	16-pin, accessories
C2422, 2423	16,600	Not Used		09-04426J01	telephone type, 8 contact, mic
C2424	21-13740A57	120 pF	J <u>5</u>		6-pin, internal options audio
C2426	21-13741W01	1 uF 10%; 25 V	J6	09-04424J05	6-pin, internal options digital
C2427	21-13740A71	470 pF	J7	09-04424J06	10-pin, display board
C2428	***	Not Used	J8	09-04422J02	
C2429	21-13740A79	1000 pF	J9	28-04423J01	2-pin, internal speaker
C2430, 2431	21-13740A55	100 pF			*
C2430, 2401	***	Not Used			jumper:
C2433	21-13740B55	180 pF	JU401	***	Not Used
	21-101-10000	Not Used	JU501	06-62057C01	jumper
C2434, 2435	21-13740A71	470 pF			
C2436	21-13/4UM/1	Not Used			coil, rf:
C2437		0,22 uF +80/-20%	L1 thru 7	24-60591G24	9 turns
C2438	21-11032B15		Ľ8	24-62587X69	chip 1.2 uH 5%
C2439	21-11078B42	100 pF 100 V	Ĺ9	24-62587X50	chip 56 nH 5%
C2440	21-11078B55	330 pF 100 V	L10	24-62587X69	chip 1.2 uH 5%
C2441, 2442	21-11078B52	240 pF 100 V	L11	24-62587X50	chip 56 nH 5%
C2443 thru 2445		75 pF 100 V	L12	24-62587N72	chip 2.2 uH 5%
C2446	21-80060M32	36 pF 500 V		24-62587X55	chip 0.15 uH 5%
C2447	21-11078B59	470 pF 100 V	L51		
C2448	21-13740B65	470 pF	L52	24-62587X63	chip 0.62 uH 5%
C2449	21-13741W01	1 uF 10%; 25 V	L53	24-62587X69	chip 1.2 uH 5%
C2450	21-11078B55	330 pF 100 V	L54	24-62587N71	ohip 1.8 uH 5%
C2450 C2451	21-80060M24	16 pF 500 V	L55	24-62587X69	chip 1.2 uH 5%
	21-13740A38	24 pF	L58	24-62587X69	chip 1.2 uH 5%
C2452		470 pF	L221	24-62587X69	chip 1.2 uH 5%
C2453, 2454	21-13740A71		L241	24-62587V37	chip 0.18 uH 5%
C2455	**** *********************************	Not Used	L242	24-62587V36	chip 0.15 nH 5%
C2456	21-13740A71	470 pF	L243, 244	24-62587X69	chip 1.2 uH 5%
C2460	21-80060M25	18 pF 500 V		24-62587X56	chip 0.18 uH 5%
C2461	21-11078B18	15 pF 100 V	L251		chip 82 nH 5%
C2462	21-80060M34		L252	24-62587X52	
C2463	21-80060M30	30 pF 500 V	L253 thru 255	24-62587X69	chip 1.2 uH 5%
C2464	21-11078B59	470 pF 100 V	L261	24-62587X53	chip 0.1 uH 5%
C2465	21-11078B18	15 pF 100 V	L262	24-62587X69	chip 1.2 uH 5%
C2471	21-13741W01	. Šas valsa sasa va	L271	24-62587X69	chip 1.2 uH 5%
	21-13743A19	0.1 uF 10%; 16 V	L281	24-62587X69	chip 1.2 uH 5%
C2472		470 pF	L282	24-62587X52	chip 82 nH 5%
C2473	21-13740A71	Not Used	L283	24-62587X49	
C2474	*** * *** 40740Å74		L284	24-62587X69	
C2480 thru 248:		470 pF	L291	24-62587X46	
C2485, 2486	21-80964X35	clamped mica 39 pF 250 V			chip 1.2 uH 5%
-			L292	24-62587X69	
		diode: (see note)	L401	24-60578C43 24-60591H77	
			L2410		

	SECTOROL A		REFERENCE	MOTOROLA	
REFERENCE	MOTOROLA	DESCRIPTION	SYMBOL.	PART NO.	DESCRIPTION
SYMBOL	PART NO.	V-2000000000000000000000000000000000000			
L2420	24-60591C73	5 turns	R273	06-62057C49	82
L2421	***	Not Used	R274	06-62057C82	2k
L2422	24-62587X45	chip 22 nH 5%	R281	06-62057C77	1.2k
L2423		Not Used	R282	06-62057C85	2.7k
L2424	24-62587X45	chip 22 nH 5%	R283	06-62057C41	39
L2431		Not Used	R284	06-62057C59	220
L2432	24-60591F77	8 turns	R285	06-62057C41	39
	24-60591E77	7 turns	R286	06-62057C59	220
L2441	144	**	R287	***	Not Used
L2442	24-60591F77	8 turns	R291	06-62057D16	47k
L2443	24-60591X01	3 turns			
L2450	24-60591V77	12 turns	R292	06-62057C51	100
L2451	24-60591J77	11 turns	R293	06-62057D11	30k
L2452	24-11087B30	chip 2.2 uH	R294	06-62057D11	30k
L2453	www.	Not Used	R401	06-62057D54	1,8 meg
L2460 thru 2462	24-60591X04	6 turns	R402	06-62057C91	4.7k
L2463	24-60591577	9 turns	R403	06-62057C99	10k
			R404	06-62057C75	1k
		transistor: (see note)	R405	06-62057C81	1.8k
en a	48-13827A07	NPN; type MMBR941	R406	06-62057C91	4.7k
Q1			R407	06-62057D16	47k
Q2	48-13824A17	PNP; type MMBT3906	R408	06-62057C91	4.7k
Q51	48-13827A07	NPN; type MMBR941	R409		220
Q271	48-13827A07	NPN; type MMBR941		06-62057C59	
Q281	48-13827A07	NPN; type MMBR941	R410, 411	06-62057C99	10k
Q401	48-80214G02	NPN; type MMBT3904	R412	06-62057C67	470
Q402	48-80947V01	digital NPN; type DTC144W	R413	06-62057D16	47k
Q404 thru 408	48-80947V01	digital NPN; type DTC144W	R414	06-62057C91	4.7k
Q409	48-80141L03	PNP, type M41L03	R415		Not Used
Q410, 411	48-80947V01	digital NPN; type DTC144W	R416	06-62057D16	47k
Q412	48-13824A17	PNP; type MMBT3906	R417	06-62057C91	4.7k
	48-80214G02	NPN; type MMBT3904	R418	06-62057C79	1.5k
Q413	48-80141L03	PNP, type M41L03	R419	06-62057C85	2.7k
Q414			R420	06-62057C99	10k
Q415, 416	48-80947V01	digital NPN; type DTC144W	R421, 422	06-62057D24	100k
Q451	48-02245J25	PNP; type 2SB1142S	R423 thru 425	06-62057C99	10k
Q452, 453	48-80214G02	NPN; type MMBT3904			10
Q2410	48-02245J24	NPN, type BFG35	R426	06-62057C27	
Q2420	48-02245J28	NPN; type BFQ43S	R427	06-62057C99	10k
Q2430	48-80225C18	NPN; type MRF2628	R428	06-62057D24	100k
Q2440	48-84411L04	NPN; type M1104	R429	06-62057C99	10k
		, 1	R430	06-62057D16	47k
		resistor, fixed: +/-5%; 1/10 W:	R431, 432	06-62057C91	4.7k
		unless otherwise stated	R434	06-62057C87	3.3k
ma n	06-62057C01	0	R435	06-62057C71	680
R1, 2			R436	06-62057C53	120
R3	06-62057C84	2.4k	R437	06-62057D17	51k
R4	06-62057D07	20k			
R5	06-62057C99	10k	R438	06-62057D08	22k
R6	06-62057C39	33	R439	06-62057C99	10k
R7	06-62057C49	82	R440	06-62057D17	51k
R8	06-62057C73	820	R441, 442	06-62057C27	220
R10	06-62057C66	430	R443	06-62057C01	0
R11	06-62057C46	62	R451	06-62057C71	10
R51	06-62057C44	51	R452	06-80195M37	330 1/2 watt
	06-62057D12	33k	R453	06-62057C71	680
R52		12k	R454	06-62057C75	1k
R53	06-62057D02		R455	06-62057D10	27k
R54	06-62057C82	2k	R456, 457	06-62057C99	10k
R55	06-62057C51	100	R459	06-62057D04	15k
R57(N)	06-62057D31	200k			
R57(W)	06-62057D24	100k	R460	06-62057C91	4,7k
R58	06-62057D03	13k	R461	06-62057C99	10k
R59(N)	06-62057D24	100k	R462	06-05621T02	thermistor 50k @ 25oC
R59(W)	06-62057D20	68k	R463	06-62057C78	1.3k
R60(N)	06-62057D07	20k	R464	06-62057C59	220
R60(W)	06-62057C82	2k	R465	06-62057C51	100
	06-62057C93	5.6k	R466		Not Used
R64		820	R501	06-62057C63	330
R66	06-62057C73		R502	06-62057D24	100k
R67(N)	06-62057C91	4.7k	R551	06-62057D11	30k
R67(W)	06-62057C93	5.6k			
R201	06-62057C83	2.2k	R552, 553	06-62057D02	12k
R202	06-62057D16	47k	R554	18-04405J02	variable 2k with switch
R221	06-62057C83	2.2k	R555(N)	06-62057C27	10.
R222	06-62057C49	82	R555(W)	06-62057D11	30k
R223	06-62057C87	3.3k	R556	06-62057C99	10k
R231	06-62057C75	1k	R557	06-62057C27	10
		na saran	R558	06-62057C99	10k
R232	06-62057C83		R559	06-62057C43	47
R233	06-62057D09		R560	06-62057D24	100k
R241	06-62057A65	4.7k, 1/16 W			
DOVO	06-62057D32		R561, 562	06-62057D16	47k
R242	06-62057C99	10k	R563(N)	06-62057D04	15k
R251	OU OHOU! WYY		R563(W)	06-62057D11	30k
R251		2.2k			
R251 R252	06-62057C83		R564	06-62057D04	15k
R251		220		06-62057D04 06-62057C97	15k 8.2k

R569 R570 R571	06-62057C69	
R570	OO OZUGI LICO	560
	06-62057C82	2k
H5/1		
	***	Not Used
R601	06-62057D08	22k
R602	06-62057D24	100k
15		
R603	06-62057C99	10k
R604	06-62057D48	1 meg
R651	06-62057D30	180k
R652	06-62057D40	470k
R653	06-62057C27	10
R654	06-62057D09	24k
R655	06-62057D11	30k
R656	06-62057C99	10k
R657	06-62057D24	100k
R658	06-62057C46	62
R659	06-62057C66	430
	the state of the state of the	
R665	06-62057C66	430
R666	06-62057C46	62
R667	06-62057C91	4.7k
R668	06-62057D24	100k
R669	06-62057C91	4.7k
R670	06-62057D35	300k
R671	06-62057C86	3k
	06-62057D24	100k
R701		
R702	06-62057D32	220k
R703	06-62057D29	160k
MV.		6.2k
R704	06-62057C94	
R705	06-62057C27	10
R2410	06-62057C57	180
	44 4	
R2411	06-62057C59	220
R2412	06-62057C53	120
R2413, 2414	06-62057C36	24
R2420	06-62057C51	100
R2430	06-11077A46	68
R2431	***	Not Used
R2440	***	Not Used
R2441	06-62057C27	10
R2451	06-80194M23	82 1 watt
R2460	***	Not Used
R2481, 2482	06-80195M25	100 1/2 watt
R2483	06-62057C92	5.1k
R2484	06-62057C96	7.5k
R2485	06-62057D02	12k
R2486	06-62057C96	7.5k
		integrated circuit: (see note)
W A.,	and the second second second	
Ų1	51-80505D01	double-balanced mixer
110	48-09939C04	dual transistor switch UMC3TL
X1X		
U2	51-80207R01	receiver system
U51		synthesizer
	(see note)	
U51 U201*		VCO/buffer
U51 U201* U251	51-02227566	VCO/buffer
U51 U201* U251 U401	51-02227S66 51-99010D01	microcomputer MC68HC711E9
U51 U201* U251 U401	51-02227566	
U51 U201* U251 U401 U402	51-02227S66 51-99010D01 51-02227J35	microcomputer MC68HC711E9 audio filter
U51 U201* U251 U401 U402 U403	51-02227\$66 51-99010D01 51-02227J35 51-05226P38	microcomputer MC68HC711E9 audio filter DAC
U51 U201* U251 U401 U402	51-02227S66 51-99010D01 51-02227J35	microcomputer MC68HC711E9 audio filter
U51 U201* U251 U401 U402 U403 U404	51-02227S66 51-99010D01 51-02227J35 51-05226P38 51-80633C01	microcomputer MC68HC711E9 audio filter DAC 5 V regulator TK11950
U51 U201* U251 U401 U402 U403 U404 U405	51-02227S66 51-99010D01 51-02227J35 51-05226P38 51-80633C01 51-05469E65	microcomputer MC68HC711E9 audio filter DAC 5 V regulator TK11950 5 V regulator LP2951C
U51 U201* U251 U401 U402 U403 U404 U405 U406	51-02227S66 51-99010D01 51-02227J35 51-05226P38 51-80633C01 51-05469E65 51-13816D03	microcomputer MC68HC711E9 audio filter DAC 5 V regulator TK11950 5 V regulator LP2951C 8 V regulator MC7808BT
U51 U201* U251 U401 U402 U403 U404 U405	51-02227S66 51-99010D01 51-02227J35 51-05226P38 51-80633C01 51-05469E65	microcomputer MC68HC711E9 audio filter DAC 5 V regulator TK11950 5 V regulator LP2951C
U51 U201* U251 U401 U402 U403 U404 U405 U406 U451	51-02227S66 51-99010D01 51-02227J35 51-05226P38 51-80633C01 51-05469E65 51-13816D03 51-80932W01	microcomputer MC68HC711E9 audio filter DAC 5 V regulator TK11950 5 V regulator LP2951C 8 V regulator MC7808BT dual op-amp LM2904 SOIC
U51 U201* U201* U401 U402 U403 U404 U405 U406 U406 U401	51-02227S66 51-99010D01 51-02227J35 51-05226P38 51-80633C5 51-13816D03 51-80932W01 51-80147R01	microcomputer MC68HC711E9 audio filter DAC 5 V regulator TK11950 5 V regulator LP2951C 8 V regulator MC7808BT dual op-amp LM2904 SOIC audio power amp TDA1519AB
U51 U201* U251 U401 U402 U403 U404 U405 U406 U451 U451 U501	\$1-02227\$66 51-99010D01 51-02227J35 51-05226P38 51-80633C01 51-05469E65 51-13816D03 51-80932W01 51-80147R01 51-02198J28	microcomputer MC68HC711E9 audio filter DAC 5 V regulator TK11950 5 V regulator LP2951C 8 V regulator MC7808BT dual op-amp LM2904 SOIC audio power amp TDA1519AB quad op-amp LM2902D SOIC
U51 U201* U201* U401 U402 U403 U404 U405 U406 U406 U401	51-02227S66 51-99010D01 51-02227J35 51-05226P38 51-80633C5 51-13816D03 51-80932W01 51-80147R01	microcomputer MC68HC711E9 audio filter DAC 5 V regulator TK11950 5 V regulator LP2951C 8 V regulator MC7808BT dual op-amp LM2904 SOIC audio power amp TDA1519AB
U51 U201* U251 U401 U402 U403 U404 U405 U406 U451 U501 U501 U551	\$1-02227\$66 51-99010D01 51-02227J35 51-05226P38 51-80633C01 51-05469E65 51-13816D03 51-80932W01 51-80932W01 51-80147R01 51-02198J28 51-84704M60	microcomputer MC68HC711E9 audio filter DAC 5 V regulator TK11950 5 V regulator LP2951C 8 V regulator MC7808BT dual op-amp LM2904 SOIC audio power amp TDA1519AB quad op-amp LM2902D SOIC triple 2-channel switch 4053B
U51 U201* U251 U401 U402 U403 U404 U405 U406 U451 U551 U551 U553 U554	51-02227S66 51-99010D01 51-02227J35 51-05226P38 51-80633C01 51-05469E65 51-13816D03 51-80932W01 51-80147R01 51-02198J28 51-84704M60 51-84704M52	microcomputer MC68HC711E9 audio filter DAC 5 V regulator TK11950 5 V regulator LP2951C 8 V regulator MC7808BT dual op-amp LM2904 SOIC audio power amp TDA1519AB quad op-amp LM2902D SOIC triple 2-channel switch 4053B quad bilateral switch 4066B
U51 U201* U251 U401 U402 U403 U404 U405 U406 U451 U501 U501 U551	\$1-02227\$66 51-99010D01 51-02227J35 51-05226P38 51-80633C01 51-05469E65 51-13816D03 51-80932W01 51-80932W01 51-80147R01 51-02198J28 51-84704M60	microcomputer MC68HC711E9 audio filter DAC 5 V regulator TK11950 5 V regulator LP2951C 8 V regulator MC7808BT dual op-amp LM2904 SOIC audio power amp TDA1519AB quad op-amp LM2902D SOIC triple 2-channel switch 4053B
U51 U201* U251 U401 U402 U403 U404 U405 U406 U451 U551 U551 U553 U554	51-02227S66 51-99010D01 51-02227J35 51-05226P38 51-80633C01 51-05469E65 51-13816D03 51-80932W01 51-80147R01 51-02198J28 51-84704M60 51-84704M52	microcomputer MC68HC711E9 audio filter DAC 5 V regulator TK11950 5 V regulator LP2951C 8 V regulator MC7808BT dual op-amp LM2904 SOIC audio power amp TDA1519AB quad op-amp LM2902D SOIC triple 2-channel switch 4053B quad bilateral switch 4066B
U51 U201* U251 U401 U402 U403 U404 U405 U406 U451 U551 U551 U553 U554	51-02227S66 51-99010D01 51-02227J35 51-05226P38 51-80633C01 51-05469E65 51-13816D03 51-80932W01 51-80147R01 51-02198J28 51-84704M60 51-84704M52	microcomputer MC68HC711E9 audio filter DAC 5 V regulator TK11950 5 V regulator LP2951C 8 V regulator MC7808BT dual op-amp LM2904 SOIC audio power amp TDA1519AB quad op-amp LM2902D SOIC triple 2-channel switch 4053B quad bilateral switch 4066B dual comparator LM2903 SOIC
U51 U201* U201* U401 U402 U403 U404 U405 U406 U451 U501 U551 U553 U554	\$1-02227\$66 51-99010D01 51-02227J35 51-05226P38 51-80633C01 51-05469E65 51-13816D03 51-80932W01 51-80932W01 51-80147R01 51-02198J28 51-84704M60 51-84704M52 51-02198J23	microcomputer MC68HC711E9 audio filter DAC 5 V regulator TK11950 5 V regulator LP2951C 8 V regulator MC7808BT dual op-amp LM2904 SOIC audio power amp TDA1519AB quad op-amp LM2902D SOIC triple 2-channel switch 4053B quad bilateral switch 4066B dual comparator LM2903 SOIC voltage regulator: (see note)
U51 U201* U251 U401 U402 U403 U404 U405 U406 U451 U551 U551 U553 U554	51-02227S66 51-99010D01 51-02227J35 51-05226P38 51-80633C01 51-05469E65 51-13816D03 51-80932W01 51-80147R01 51-02198J28 51-84704M60 51-84704M52	microcomputer MC68HC711E9 audio filter DAC 5 V regulator TK11950 5 V regulator LP2951C 8 V regulator MC7808BT dual op-amp LM2904 SOIC audio power amp TDA1519AB quad op-amp LM2902D SOIC triple 2-channel switch 4053B quad bilateral switch 4066B dual comparator LM2903 SOIC
U51 U201* U251 U401 U402 U403 U404 U405 U406 U451 U501 U551 U553 U553 U554 U601	\$1-02227\$66 51-99010D01 51-02227J35 51-05226P38 51-80633C01 51-05469E65 51-13816D03 51-80932W01 51-80932W01 51-80147R01 51-02198J28 51-84704M60 51-84704M52 51-02198J23	microcomputer MC68HC711E9 audio filter DAC 5 V regulator TK11950 5 V regulator LP2951C 8 V regulator MC7808BT dual op-amp LM2904 SOIC audio power amp TDA1519AB quad op-amp LM2902D SOIC triple 2-channel switch 4053B quad bilateral switch 4066B dual comparator LM2903 SOIC voltage regulator: (see note) zener diode 5.1 V SOT
U51 U201* U401 U402 U403 U404 U405 U406 U451 U501 U551 U553 U554 U601 VR401 VR401 VR402 thru 406	\$1-02227\$66 51-99010D01 51-02227J35 51-05226P38 51-80633C01 51-05469E65 51-13816D03 51-80932W01 51-80147R01 51-02198J28 51-84704M60 51-84704M52 51-02198J23 48-80140L06 48-80948V01	microcomputer MC68HC711E9 audio filter DAC 5 V regulator TK11950 5 V regulator LP2951C 8 V regulator MC7808BT dual op-amp LM2904 SOIC audio power amp TDA1519AB quad op-amp LM2902D SOIC triple 2-channel switch 4053B quad bilateral switch 4066B dual comparator LM2903 SOIC voltage regulator: (see note) zener diode 5.1 V SOT zener diode 27 V SOT
U51 U201* U251 U401 U402 U403 U404 U405 U406 U451 U501 U551 U553 U553 U554 U601	\$1-02227\$66 51-99010D01 51-02227J35 51-05226P38 51-80633C01 51-05469E65 51-13816D03 51-80932W01 51-80147R01 51-02198J28 51-84704M60 51-84704M52 51-02198J23 48-80140L06 48-80948V01 48-80140L15	microcomputer MC68HC711E9 audio filter DAC 5 V regulator TK11950 5 V regulator LP2951C 8 V regulator MC7808BT dual op-amp LM2904 SOIC audio power amp TDA1519AB quad op-amp LM2902D SOIC triple 2-channel switch 4053B quad bilateral switch 4066B dual comparator LM2903 SOIC voltage regulator: (see note) zener diode 5.1 V SOT zener diode 10 V SOT
U51 U201* U251 U401 U402 U403 U404 U405 U406 U451 U501 U551 U553 U554 U601 VR401 VR401 VR401 VR407	\$1-02227\$66 51-99010D01 51-02227J35 51-05226P38 51-80633C01 51-05469E65 51-13816D03 51-80932W01 51-80147R01 51-02198J28 51-84704M60 51-84704M52 51-02198J23 48-80140L06 48-80948V01	microcomputer MC68HC711E9 audio filter DAC 5 V regulator TK11950 5 V regulator LP2951C 8 V regulator MC7808BT dual op-amp LM2904 SOIC audio power amp TDA1519AB quad op-amp LM2902D SOIC triple 2-channel switch 4053B quad bilateral switch 4066B dual comparator LM2903 SOIC voltage regulator: (see note) zener diode 5.1 V SOT zener diode 27 V SOT
U51 U201* U251 U401 U402 U403 U404 U405 U406 U451 U501 U551 U553 U554 U601 VR401 VR401 VR402 thru 406 VR407 VR408, 409	\$1-02227\$66 51-99010D01 51-02227J35 51-05226P38 51-80633C01 51-05469E65 51-13816D03 51-80932W01 51-80147R01 51-90198J28 51-84704M60 51-84704M52 51-02198J23 48-80140L06 48-80948V01 48-80140L15 48-80948V01	microcomputer MC68HC711E9 audio filter DAC 5 V regulator TK11950 5 V regulator LP2951C 8 V regulator MC7808BT dual op-amp LM2904 SOIC audio power amp TDA1519AB quad op-amp LM2902D SOIC triple 2-channel switch 4053B quad bilateral switch 4066B dual comparator LM2903 SOIC voltage regulator: (see note) zener diode 5.1 V SOT zener diode 27 V SOT zener diode 27 V SOT
U51 U201* U251 U401 U402 U403 U404 U405 U406 U451 U501 U551 U553 U554 U601 VR401 VR401 VR402 thru 406 VR407 VR408, 409 VR410	\$1-02227\$66 51-99010D01 51-02227J35 51-05226P38 51-80633C01 51-05469E65 51-13816D03 51-80932W01 51-80932W01 51-80147R01 51-02198J28 51-84704M60 51-84704M52 51-02198J23 48-80140L06 48-80948V01 48-80948V01 48-80140L15	microcomputer MC68HC711E9 audio filter DAC 5 V regulator TK11950 5 V regulator LP2951C 8 V regulator MC7808BT dual op-amp LM2904 SOIC audio power amp TDA1519AB quad op-amp LM2902D SOIC triple 2-channel switch 4053B quad bilateral switch 4066B dual comparator LM2903 SOIC voltage regulator: (see note) zener diode 5.1 V SOT zener diode 27 V SOT zener diode 27 V SOT zener diode 27 V SOT zener diode 10 V SOT
U51 U201* U251 U401 U402 U403 U404 U405 U406 U451 U501 U551 U553 U554 U601 VR401 VR401 VR402 thru 406 VR407 VR408, 409 VR410	\$1-02227\$66 51-99010D01 51-02227J35 51-05226P38 51-80633C01 51-05469E65 51-13816D03 51-80932W01 51-80147R01 51-90198J28 51-84704M60 51-84704M52 51-02198J23 48-80140L06 48-80948V01 48-80140L15 48-80948V01	microcomputer MC68HC711E9 audio filter DAC 5 V regulator TK11950 5 V regulator LP2951C 8 V regulator MC7808BT dual op-amp LM2904 SOIC audio power amp TDA1519AB quad op-amp LM2902D SOIC triple 2-channel switch 4053B quad bilateral switch 4066B dual comparator LM2903 SOIC voltage regulator: (see note) zener diode 5.1 V SOT zener diode 27 V SOT zener diode 27 V SOT
U51 U201* U251 U401 U402 U403 U404 U405 U406 U451 U501 U551 U553 U553 U554 U601 VR401 VR402 thru 406 VR407 VR408, 409 VR410 VR411, 412	\$1-02227\$66 51-99010D01 51-02227J35 51-05226P38 51-80633C01 51-05469E65 51-13816D03 51-80932W01 51-80147R01 51-02198J28 51-84704M60 51-84704M52 51-02198J23 48-80140L06 48-80948V01 48-80948V01 48-80948V01 48-80948V01 48-80948V01	microcomputer MC68HC711E9 audio filter DAC 5 V regulator TK11950 5 V regulator LP2951C 8 V regulator MC7808BT dual op-amp LM2904 SOIC audio power amp TDA1519AB quad op-amp LM2902D SOIC triple 2-channel switch 4053B quad bilateral switch 4066B dual comparator LM2903 SOIC voltage regulator: (see note) zener diode 5.1 V SOT zener diode 27 V SOT zener diode 27 V SOT zener diode 10 V SOT zener diode 20 V SOT zener diode 27 V SOT zener diode 27 V SOT
U51 U201* U251 U401 U402 U403 U404 U405 U406 U451 U501 U551 U553 U554 U601 VR401 VR402 thru 406 VR407 VR408, 409 VR410 VR411, 412 VR451	\$1-02227\$66 51-99010D01 51-02227J35 51-05226P38 51-80633C01 51-05469E65 51-13816D03 51-80932W01 51-80147R01 51-02198J28 51-84704M50 51-84704M50 51-84704M50 51-02198J23 48-80140L06 48-80948V01 48-80948V01 48-80948V01 48-80948V01 48-80948V01 48-80948V01 48-80948V01	microcomputer MC68HC711E9 audio filter DAC 5 V regulator TK11950 5 V regulator LP2951C 8 V regulator LP2951C 8 V regulator MC7808BT dual op-amp LM2904 SOIC audio power amp TDA1519AB quad op-amp LM2902D SOIC triple 2-channel switch 4053B quad bilateral switch 4066B dual comparator LM2903 SOIC voltage regulator: (see note) zener diode 5.1 V SOT zener diode 27 V SOT zener diode 5.1 V SOT zener diode 5.1 V SOT
U51 U201* U251 U401 U402 U403 U404 U405 U406 U451 U501 U551 U553 U553 U554 U601 VR401 VR402 thru 406 VR407 VR408, 409 VR410 VR411, 412	\$1-02227\$66 51-99010D01 51-02227J35 51-05226P38 51-80633C01 51-05469E65 51-13816D03 51-80932W01 51-80147R01 51-02198J28 51-84704M60 51-84704M52 51-02198J23 48-80140L06 48-80948V01 48-80948V01 48-80948V01 48-80948V01 48-80948V01	microcomputer MC68HC711E9 audio filter DAC 5 V regulator TK11950 5 V regulator LP2951C 8 V regulator LP2951C 8 V regulator MC7808BT dual op-amp LM2904 SOIC audio power amp TDA1519AB quad op-amp LM2902D SOIC triple 2-channel switch 4053B quad bilateral switch 4066B dual comparator LM2903 SOIC voltage regulator: (see note) zener diode 5.1 V SOT zener diode 27 V SOT zener diode 27 V SOT zener diode 10 V SOT zener diode 20 V SOT zener diode 27 V SOT zener diode 27 V SOT
U51 U201* U251 U401 U402 U403 U404 U405 U406 U451 U501 U551 U553 U554 U601 VR401 VR402 thru 406 VR407 VR408, 409 VR410 VR411, 412 VR451	\$1-02227\$66 51-99010D01 51-02227J35 51-05226P38 51-80633C01 51-05469E65 51-13816D03 51-80932W01 51-80147R01 51-02198J28 51-84704M50 51-84704M50 51-84704M50 51-02198J23 48-80140L06 48-80948V01 48-80948V01 48-80948V01 48-80948V01 48-80948V01 48-80948V01 48-80948V01	microcomputer MC68HC711E9 audio filter DAC 5 V regulator TK11950 5 V regulator LP2951C 8 V regulator LP2951C 8 V regulator MC7808BT dual op-amp LM2904 SOIC audio power amp TDA1519AB quad op-amp LM2902D SOIC triple 2-channel switch 4053B quad bilateral switch 4066B dual comparator LM2903 SOIC voltage regulator: (see note) zener diode 5.1 V SOT zener diode 27 V SOT zener diode 5.1 V SOT zener diode 5.1 V SOT
U51 U201* U251 U401 U402 U403 U404 U405 U406 U451 U501 U551 U553 U554 U601 VR401 VR402 thru 406 VR407 VR408, 409 VR410 VR411, 412 VR451	\$1-02227\$66 51-99010D01 51-02227J35 51-05226P38 51-80633C01 51-05469E65 51-13816D03 51-80932W01 51-80147R01 51-02198J28 51-84704M50 51-84704M50 51-84704M50 51-02198J23 48-80140L06 48-80948V01 48-80948V01 48-80948V01 48-80948V01 48-80948V01 48-80948V01 48-80948V01	microcomputer MC68HC711E9 audio filter DAC 5 V regulator TK11950 5 V regulator LP2951C 8 V regulator MC7808BT dual op-amp LM2904 SOIC audio power amp TDA1519AB quad op-amp LM2902D SOIC triple 2-channel switch 4053B quad bilateral switch 4066B dual comparator LM2903 SOIC voltage regulator: (see note) zener diode 5.1 V SOT zener diode 27 V SOT zener diode 5.1 V SOT
U51 U201* U251 U401 U402 U403 U404 U405 U406 U451 U551 U551 U553 U554 U601 VR401 VR402 thru 406 VR407 VR408, 409 VR410 VR411, 412 VR451 VR551 thru 553	\$1-02227\$66 51-99010D01 51-02227J35 51-05226P38 51-80633C01 51-05469E65 51-13816D03 51-80932W01 51-80932W01 51-80147R01 51-02198J28 51-84704M60 51-84704M52 51-02198J23 48-80140L06 48-80948V01 48-80140L15 48-80140L15 48-80140L15	microcomputer MC68HC711E9 audio filter DAC 5 V regulator TK11950 5 V regulator LP2951C 8 V regulator LP2951C 8 V regulator MC7808BT dual op-amp LM2904 SOIC audio power amp TDA1519AB quad op-amp LM2902D SOIC triple 2-channel switch 4053B quad bilateral switch 4066B dual comparator LM2903 SOIC voltage regulator: (see note) zener diode 5.1 V SOT zener diode 27 V SOT zener diode 27 V SOT zener diode 10 V SOT zener diode 27 V SOT zener diode 5.1 V SOT zener diode 5.1 V SOT zener diode 10 V SOT zener diode 5.1 V SOT zener diode 10 V SOT
U51 U201* U251 U401 U402 U403 U404 U405 U406 U451 U501 U551 U553 U554 U601 VR401 VR402 thru 406 VR407 VR408, 409 VR410 VR411, 412 VR451	\$1-02227\$66 51-99010D01 51-02227J35 51-05226P38 51-80633C01 51-05469E65 51-13816D03 51-80932W01 51-80147R01 51-02198J28 51-84704M50 51-84704M50 51-84704M50 51-02198J23 48-80140L06 48-80948V01 48-80948V01 48-80948V01 48-80948V01 48-80948V01 48-80948V01 48-80948V01	microcomputer MC68HC711E9 audio filter DAC 5 V regulator TK11950 5 V regulator LP2951C 8 V regulator MC7808BT dual op-amp LM2904 SOIC audio power amp TDA1519AB quad op-amp LM2902D SOIC triple 2-channel switch 4053B quad bilateral switch 4066B dual comparator LM2903 SOIC voltage regulator: (see note) zener diode 5.1 V SOT zener diode 27 V SOT zener diode 5.1 V SOT
U51 U201* U251 U401 U402 U403 U404 U405 U406 U451 U551 U551 U553 U554 U601 VR401 VR402 thru 406 VR407 VR408, 409 VR410 VR411, 412 VR451 VR551 thru 553	\$1-02227\$66 51-99010D01 51-02227J35 51-05226P38 51-80633C01 51-05469E65 51-13816D03 51-80932W01 51-80932W01 51-80147R01 51-02198J28 51-84704M60 51-84704M52 51-02198J23 48-80140L06 48-80948V01 48-80140L15 48-80140L15 48-80140L15	microcomputer MC68HC711E9 audio filter DAC 5 V regulator TK11950 5 V regulator LP2951C 8 V regulator LP2951C 8 V regulator MC7808BT dual op-amp LM2904 SOIC audio power amp TDA1519AB quad op-amp LM2902D SOIC triple 2-channel switch 4053B quad bilateral switch 4066B dual comparator LM2903 SOIC voltage regulator: (see note) zener diode 5.1 V SOT zener diode 27 V SOT zener diode 27 V SOT zener diode 27 V SOT zener diode 5.1 V SOT zener diode 5.1 V SOT zener diode 5.1 V SOT zener diode 10 V SOT zener diode 5.1 V SOT
U51 U201* U251 U401 U402 U403 U404 U405 U406 U451 U501 U553 U554 U601 VR401 VR402 thru 406 VR407 VR408, 409 VR410 VR411, 412 VR451 VR551 thru 553 VS51(N)	\$1-02227\$66 51-99010D01 51-02227J35 51-05226P38 51-80633C01 51-05469E65 51-13816D03 51-80932W01 51-80147R01 51-92198J28 51-84704M60 51-84704M52 51-02198J23 48-80140L06 48-80948V01 48-80948V01 48-80948V01 48-80948V01 48-80948V01 48-80948V01 48-80948V01 48-80948V01 48-80948V01 48-80948V01 48-80948V01 48-80948V01 48-80948V01 48-80140L15	microcomputer MC68HC711E9 audio filter DAC 5 V regulator TK11950 5 V regulator LP2951C 8 V regulator LP2951C 8 V regulator MC7808BT dual op-amp LM2904 SOIC audio power amp TDA1519AB quad op-amp LM2902D SOIC triple 2-channel switch 4053B quad bilateral switch 4066B dual comparator LM2903 SOIC voltage regulator: (see note) zener diode 5.1 V SOT zener diode 27 V SOT zener diode 5.1 V SOT
U51 U201* U251 U401 U402 U403 U404 U405 U406 U451 U551 U551 U553 U554 U601 VR401 VR402 thru 406 VR407 VR408, 409 VR410 VR411, 412 VR451 VR551 thru 553	\$1-02227\$66 51-99010D01 51-02227J35 51-05226P38 51-80633C01 51-05469E65 51-13816D03 51-80932W01 51-80932W01 51-80147R01 51-02198J28 51-84704M60 51-84704M52 51-02198J23 48-80140L06 48-80948V01 48-80140L15 48-80140L15 48-80140L15	microcomputer MC68HC711E9 audio filter DAC 5 V regulator TK11950 5 V regulator LP2951C 8 V regulator LP2951C 8 V regulator MC7808BT dual op-amp LM2904 SOIC audio power amp TDA1519AB quad op-amp LM2902D SOIC triple 2-channel switch 4053B quad bilateral switch 4066B dual comparator LM2903 SOIC voltage regulator: (see note) zener diode 5.1 V SOT zener diode 27 V SOT zener diode 5.1 V SOT
U51 U201* U251 U401 U402 U403 U404 U405 U406 U451 U501 U553 U554 U601 VR401 VR402 thru 406 VR407 VR408, 409 VR410 VR411, 412 VR451 VR551 thru 553 VS51(N)	\$1-02227\$66 51-99010D01 51-02227J35 51-05226P38 51-80633C01 51-05469E65 51-13816D03 51-80932W01 51-80147R01 51-92198J28 51-84704M60 51-84704M52 51-02198J23 48-80140L06 48-80948V01 48-80948V01 48-80948V01 48-80948V01 48-80948V01 48-80948V01 48-80948V01 48-80948V01 48-80948V01 48-80948V01 48-80948V01 48-80948V01 48-80948V01 48-80140L15	microcomputer MC68HC711E9 audio filter DAC 5 V regulator TK11950 5 V regulator LP2951C 8 V regulator LP2951C 8 V regulator MC7808BT dual op-amp LM2904 SOIC audio power amp TDA1519AB quad op-amp LM2902D SOIC triple 2-channel switch 4053B quad bilateral switch 4066B dual comparator LM2903 SOIC voltage regulator: (see note) zener diode 5.1 V SOT zener diode 27 V SOT zener diode 5.1 V SOT
U51 U201* U251 U401 U402 U403 U404 U405 U406 U451 U501 U553 U554 U601 VR401 VR402 thru 406 VR407 VR408, 409 VR410 VR411, 412 VR451 VR551 thru 553 VS51(N)	\$1-02227\$66 51-99010D01 51-02227J35 51-05226P38 51-80633C01 51-05469E65 51-13816D03 51-80932W01 51-80147R01 51-92198J28 51-84704M60 51-84704M52 51-02198J23 48-80140L06 48-80948V01 48-80948V01 48-80948V01 48-80948V01 48-80948V01 48-80948V01 48-80948V01 48-80948V01 48-80948V01 48-80948V01 48-80948V01 48-80948V01 48-80948V01 48-80140L15	microcomputer MC68HC711E9 audio filter DAC 5 V regulator TK11950 5 V regulator LP2951C 8 V regulator LP2951C 8 V regulator MC7808BT dual op-amp LM2904 SOIC audio power amp TDA1519AB quad op-amp LM2902D SOIC triple 2-channel switch 4053B quad bilateral switch 4066B dual comparator LM2903 SOIC voltage regulator: (see note) zener diode 5.1 V SOT zener diode 27 V SOT zener diode 5.1 V SOT

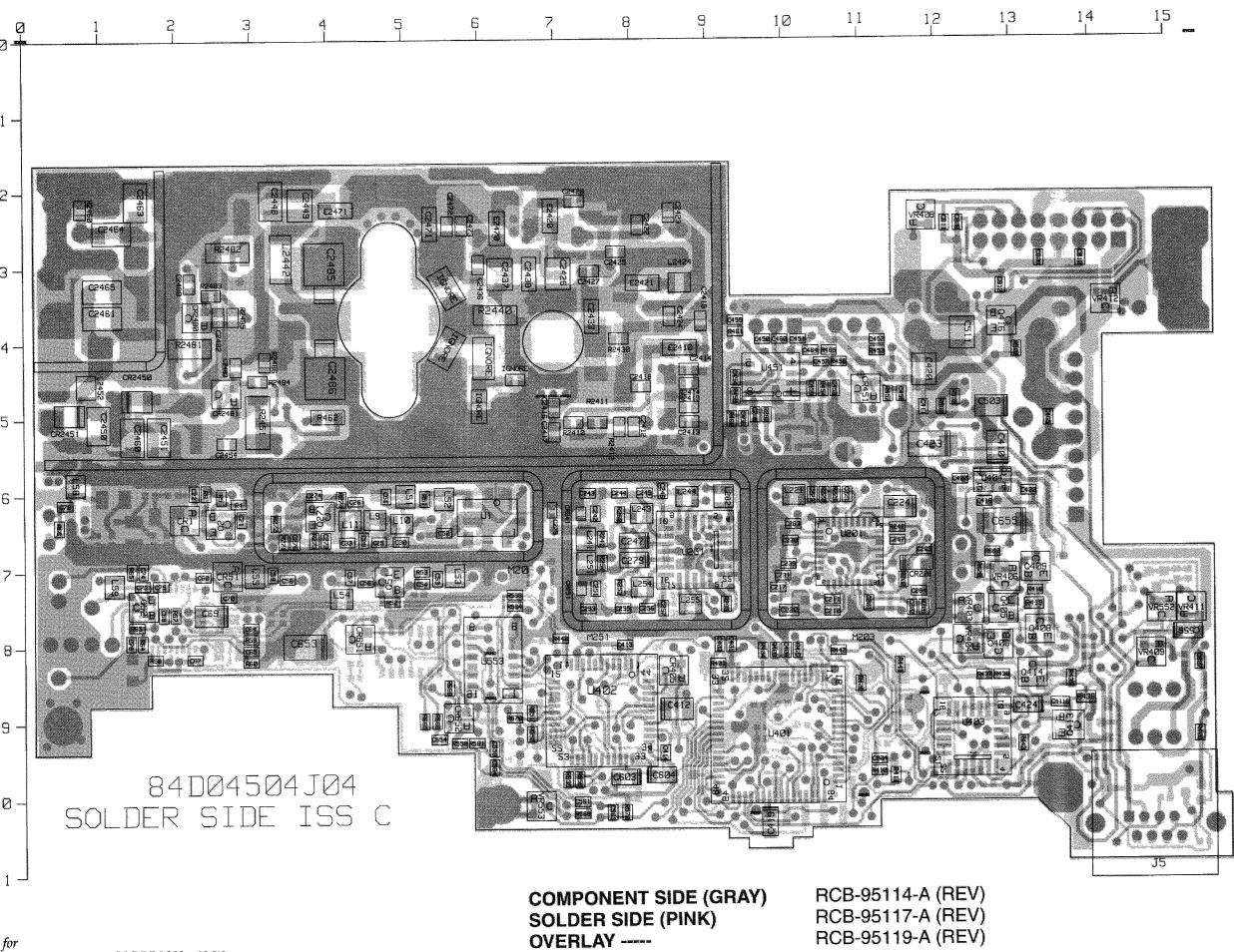
Parts List for VHF Main Boards, 150-170 MHz, 12.5 & 20/25/30 kHz, 40 W (Part of PMUD1067A, PMUD1068A, PMUD1088A, PMUD1089A Radios)





COMPONENT SIDE VIEW

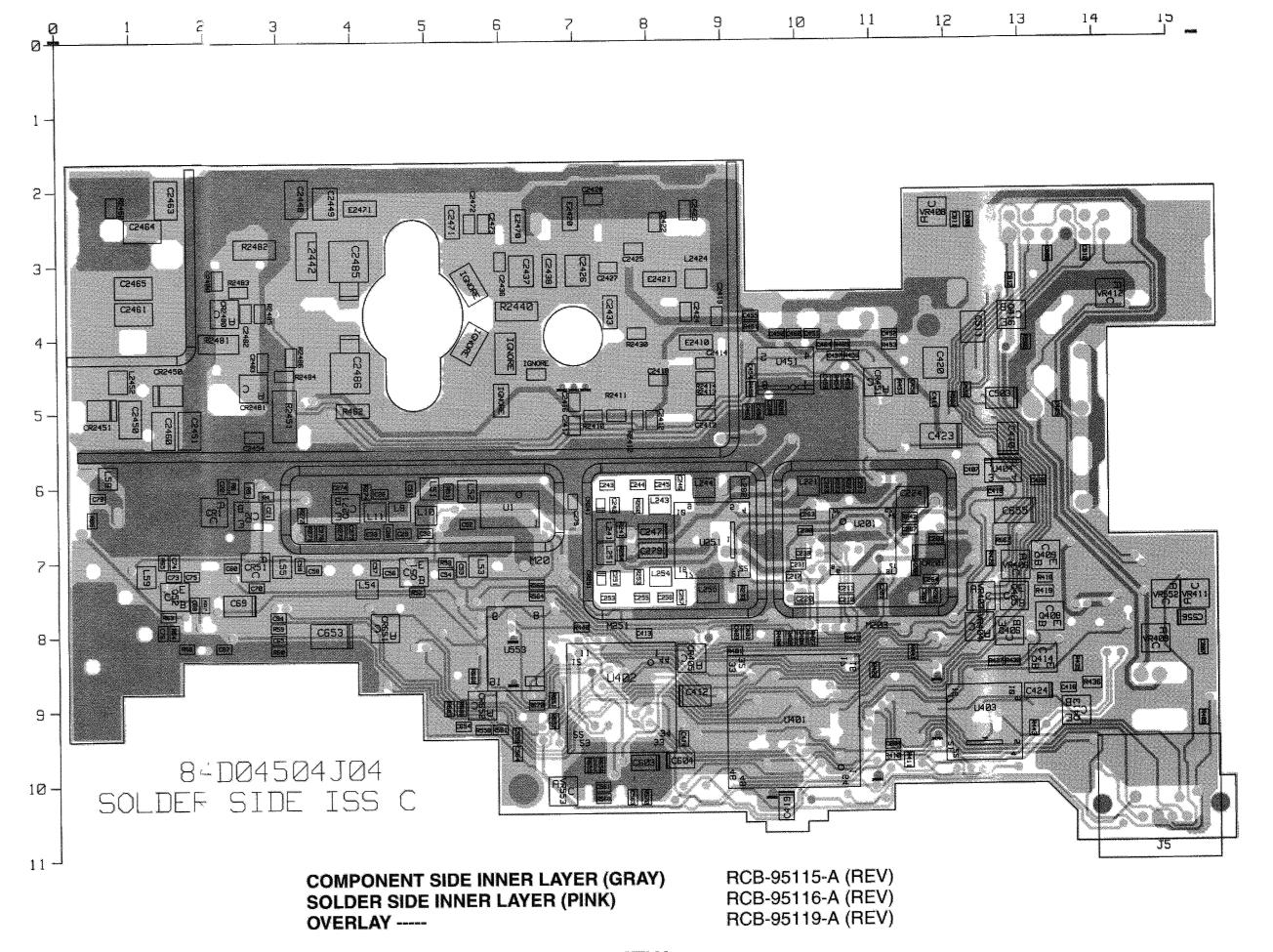
Circuit Board Details for VHF Main Boards, 150-170 MHz, 12.5 & 20/25/30 kHz, 40 W (Part of PMUD1067B, PMUD1068B, PMUD1088B, PMUD1089B Radios)



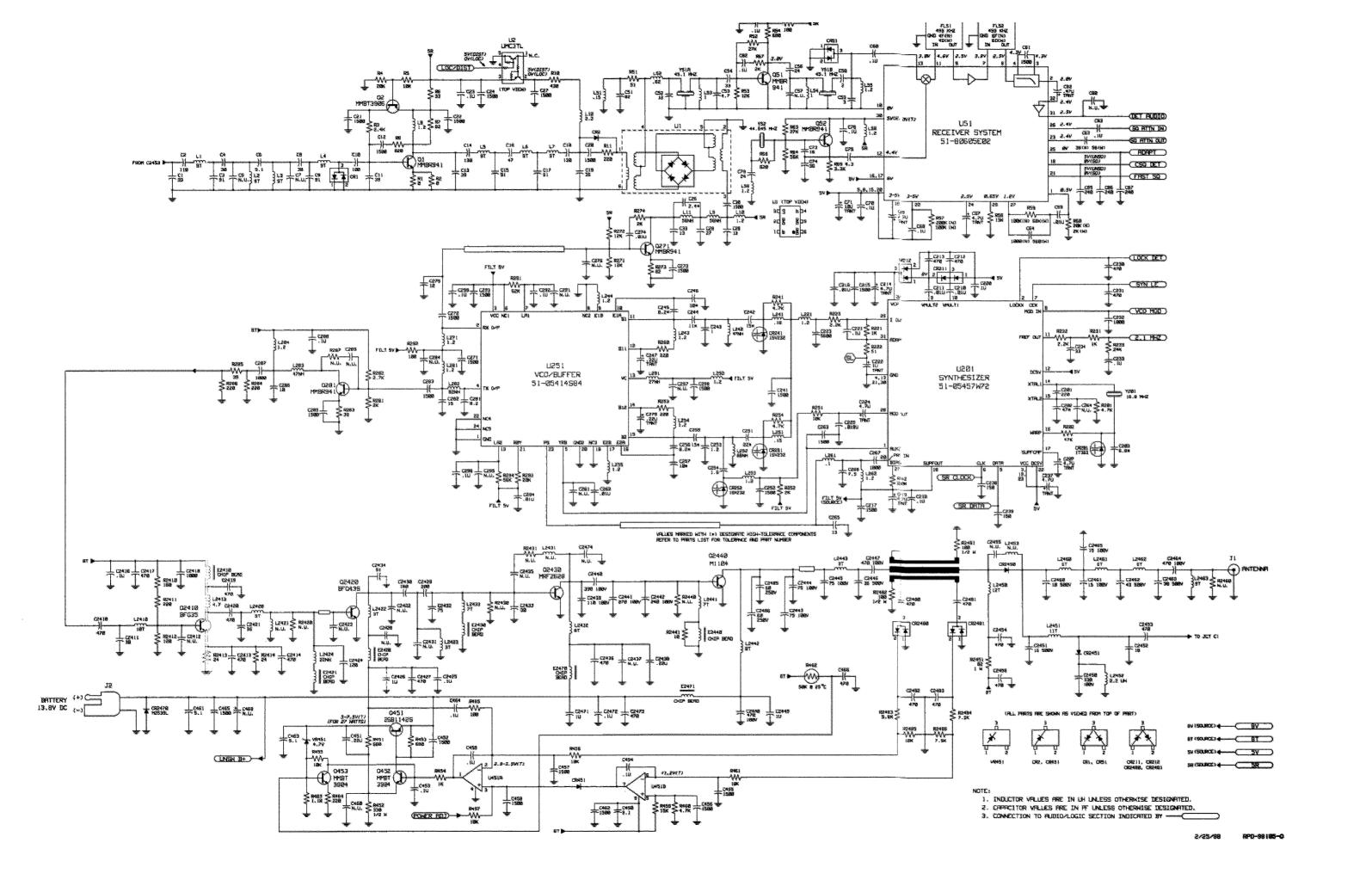
Circuit Board Details for VHF Main Boards, 150-170 MHz, 12.5 & 20/25/30 kHz, 40 W (Part of PMUD1067B, PMUD1068B, PMUD1088B, PMUD1089B Radios)

OVERLAY ----

SOLDER SIDE VIEW

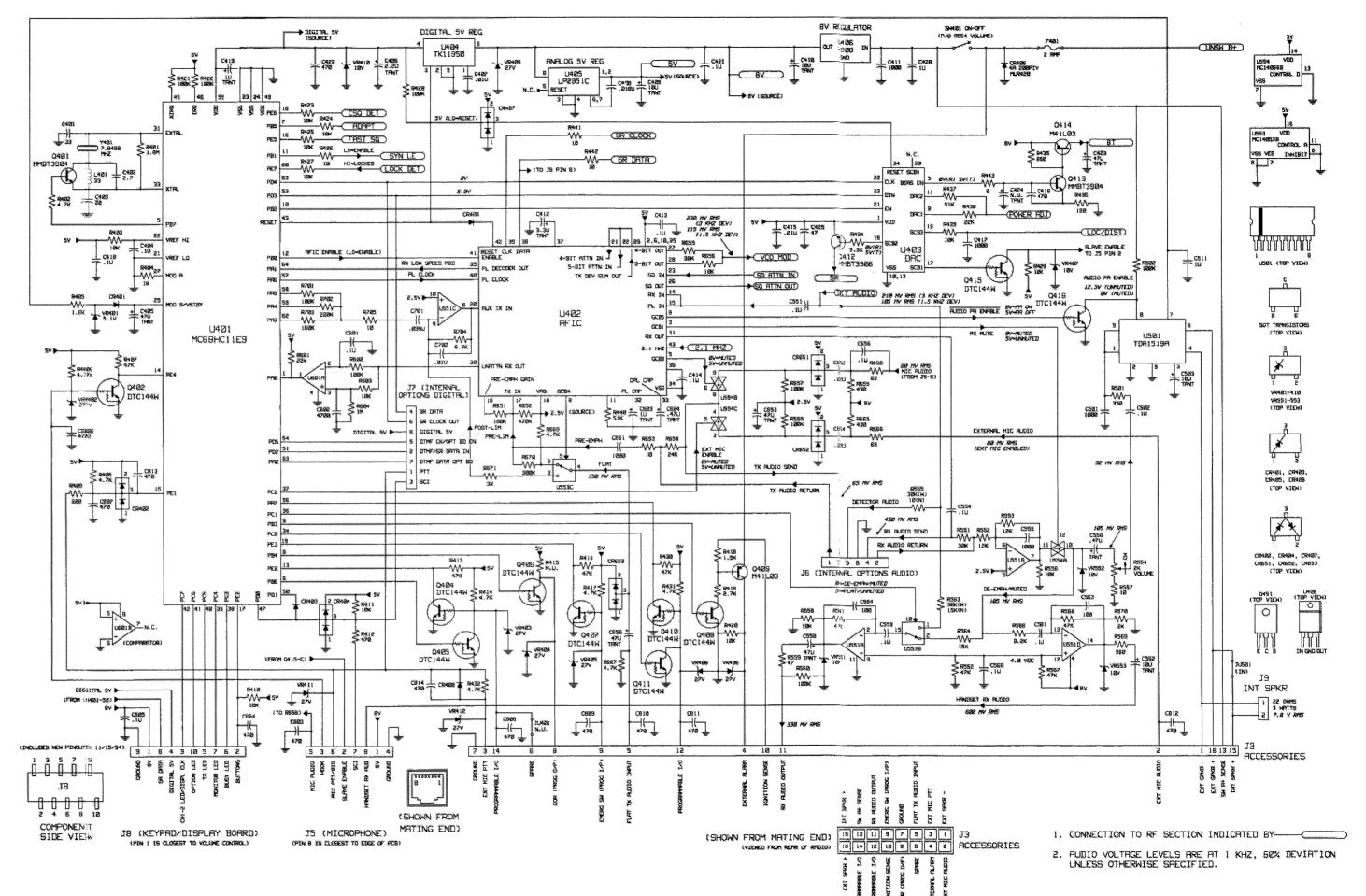


SOLDER SIDE VIEW



Schematic Diagrams for VHF Main Boards, 150-170 MHz, 12.5 & 20/25/30 kHz, 40 W (Part of PMUD1067B, PMUD1068B, PMUD1088B, PMUD1089B Radios) (Sheet 1 of 2)

March, 1998 6880903Z45-A



Schematic Diagrams for VHF Main Boards, 150-170 MHz, 12.5 & 20/25/30 kHz, 40 W (Part of PMUD1067B, PMUD1068B, PMUD1088B, PMUD1089B Radios) (Sheet 2 of 2)

March, 1998

22 688090

6880903Z45-A

2/25/98 RPD-98187-0

Parts List

SM50/SM120 VHF Main Board, 150-170 MHz, 40 W, 12.5 kHz (N) (later version) (used in PMUD1067 & PMUD1088) SM50/SM120 VHF Main Board, 150-170 MHz 40 W, 20/25/30 kHz (W) (later version) (used in PMUD1068 & PMUD1089) REFERENCE MOTOROLA

SM50/SM120 VHF Main Board, 150-170 MHz, 40 W, 12.5 kHz (N) (later version) (used in PMUD1067 & PMUD1088) SM50/SM120 VHF Main Board, 150-170 MHz 40 W, 20/25/30 kHz (W) PL-981003-O (later version) (used in PMUD1068 & PMUD1089) PL-981003-O REFERENCE MOTOROLA

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION	REFERENCE SYMBOL	PART NO.	DESCRIPTION
STRIBUL	rani av.	capacitor, fixed: uF +/-5%; 50 V:	C233	21-13743E20	0.1 uF 10%; 16 V
		unless otherwise stated	C234	21-13740F39	33 pF
C1	21-13740L15	7.5±0.1 pF	C237	23-11049J11	tantalum 4.7 uF 10%; 16 V
C2	21-13740L14	6.8 ±0.1 pF	C238, 239	21-13740F60 21-13740F60	240 pF 240 pF
C3	21-13740L06	3.3 ±0.1 pF	C241 C242	21-13740F60 21-13740L15	7.5 ±0.1 pF
C4	21-13740L19 21-13740L07	11 pF 2% 3.6 ±0.1 pF	C243	21-13740L03	2.4 ±0.1 pF
C5 C6	21-13740L07	6.2 ±0.1 pF	C244	21-13740L16	8.2 ±0.1 pF
C7	21-13740L19	11 pF 2%	C245	21-13740L12	5.6±0.1 pF
C8	21-13740L03	2.4 ±0.1 pF	C246	21-13740L13 23-11049A03	6.2 ±0.1 pF tantalum .22 uF 10%; 35 V
C9	21-13740L07	3.6 ±0.1 pF	C247 C251	21-13740L16	8.2 ±0.1 pF
C10 C11, 12	21-13740L15 21-13740F60	7.5 ±0.1 pF 240 pF	C252	21-13740F60	240 pF
C14	21-13740L05	3.0 ±0.1 pF	C253	21-13740F07	1.5 ±0.25 pF
C15	21-13740L15	7.5 ±0.1 pF	G254	21-13740F03	1 ±0.25 pF
C16	21-13740L10	4.7 ±0.1 pF	C255 C256, 257	21-13740L24 21-13740L13	18 pF 2% 6.2 ±0.1 pF
C17	21-13740L21 21-13740L09	13 pF 2% 4.3 ±0.1 pF	G250, 257 G261	21-13740F60	240 pF
C18 C19	21-13740L10	4.7±0.1 pF	C262	21-13741F49	.01 uF
C20	21-13740L23	16 pF 2%	C263	21-13740F60	240 pF
C21	21-13740L09	4.3 ±0.1 pF	C264 thru 266	21-13740F60	Not Used 240 pF
C22	21-13740L08	3.9 ±0.1 pF	C267 C271, 272	21-13740F60	240 pF
C23 C24	21-13740L21 21-13740L10	13 pF 2% 4.7 ±0.1 pF	C273	21-13740F41	39 pF
C25	21-13740L08	3.9 ±0.1 pF	C274	21-13741F49	.01 uF
C26	21-13740L01	2.0 ±0.1 pF	C275	21-13740F18	4.3 ±0.25 pF
C27	21-13740F60	240 pF	C276 C279	21-13740F25 23-11049A03	8.2 ±0.25 pF tantalum 0.22 uF 10%; 35 V
C28	21-13740F29	12 pF 15 pF	C279	21-13740F22	6.2 ±0.25 pF
C29 C30	21-13740F31 21-13740F60	240 pF	C282	21-13740F34	20 pF
C33	21-13740F05	1.2 ±0.25 pF	C283	21-13740F60	240 pF
C51	21-13740F49	82 pF	C284	21-13741F49	.01 uF
C52	21-13740F29	12 pF	C285 C286	21-13740F47	68 pF Not Used
C53	21-13740F19 21-13740F39	4,7 ±0.25 pF 33 pF	C287	21-13740F47	68 pF
C54 C55	21-13743E20	0.1 uF 10%; 16 V	C288	21-13743E20	0.1 uF 10%; 16 V
C56	21-13740F36	24 pF	C289	***	Not Used
C57		Not Used	C291	21-13740F60	Not Used 240 pF
C58	21-13740F10	2 ±0.25 pF 3 ±0.25 pF	C292, 293 C294	21-13741F49	.01 uF
C59 C60	21-13740F14 21-13743E20	0.1 uF 10%; 16 V	C295	21-13740F60	240 pF
C61	21-13741F29	1500 pF	C296		Not Used
C62	23-11049A05	tantalum 0.47 uF 10%; 25 V	C297	21-13740F60	240 pF 0.1 uF 10%; 16 V
C63(N)	21-13740F40	36 pF	C298, 299 C401	21-13743E20 21-13740F39	33 pF
C63(W) C64(N)	21-13740F45 21-13740F69	56 pF 560 pF	C402	21-13740F13	2.7 ±.25 pF
C64(W)	21-13741F25	1000 pF	C403	21-13740F35	22 pF
C65	21-13741F49	.01 uÈ	C404	21-13743E20	0.1 uF 10%; 16 V tantalum 47 uF 10%; 10 V
C67	23-11049J11	tantalum 4.7 uF 10%; 16 V	C405 C406	23-11049J43 23-11049A40	tantalum 2.2 uF 10%; 10 V
C68	21-13743E20 23-11049J07	0.1 uF 10%; 16 V tantalum 3.3 uF 10%; 20 V	C407	21-13741F49	.01 uF
C69 C70	21-13743E20	0.1 uF 10%; 16 V	C408	21-13743E05	.018 uF 10%; 16 V
C71	23-11049A57	tantalum 10 uF 10%; 16 V	C409	23-11049A57	tantalum 10 uF 10%; 16 V
C73	21-13740F32	16 pF	C410	23-11049A57 21-13741F25	tantalum 10 uF 10%; 16 V 1000 pF
C74	21-13740F40 21-13740F18	36 pF 4.3 ±0.25 pF	C411 C412	23-11049J07	tantalum 3.3 uF 10%; 20 V
C75 C76	21-13743E20	0.1 uF 10%; 16 V	C413, 414	21-13743E20	0.1 uF 10%; 16 V
C79	21-13740F36	24 pF	C415	21-13741F49	.01 uF
C80		Not Used	C416	21-13741F17	470 pF 1000 pF
C82, 83	21-13743E20	0.1 uF 10%; 16 V	C417 C418	21-13741F25 21-13743E20	0.1 uF 10%; 16 V
C85 thru 87 C201	21-13740F60 21-13740F59	240 pF 220 pF	C419	23-11049A07	tantalum 1 uF 10%; 16 V
C202	21-13740L34	47 pF 2%	C420	21-13741W01	1 uF 10%; 25 V
C203	21-13740L14	6.8 ±0.1 pF	C421	21-13743E20	0.1 uF 10%; 16 V
C207	23-11049J11	tantalum 4.7 uF 10%; 16 V	C422 C423	21-13741F17 23-11049J43	470 pF tantalum 47 uF 10%; 10 V
C210, 211	21-13741F49	.01 uF 470 pF	C424	***	Not Used
C212, 213 C214	21-13741F17 23-11049J11	tantalum 4.7 uF 10%; 16 V	C425	21-13740F43	47 pF
C215	21-13741F25	1000 pF	C450	21-13740F26	9.1 ±0.25 pF
C216	21-13741F49	.01 uF	C451	21-13740F60	Not Used 240 pF
C217	21-13740F60	240 pF	C452 C453, 454	21-13743E20	0.1 uF 10%; 16 V
C218 C219	21-13741F25 23-11049J11	1000 pF tantalum 4.7 uF 10%; 16 V	C455 thru 457	21-13740F60	240 pF
C220	21-13928E01	1 uF 10%; 10 V	C458	21-13741F25	1000 pF
C221	21-13743E20	0.1 uF 10%; 16 V	C459	21-13743E20	0.1 uF 10% 16V
C222	23-11049A07	tantalum 1 uF 10%; 16 V	C460 C461	21-13740F20	Not Used 5.1 ±0.25 pF
C223 C224	21-13741F43 23-11049J11	5600 pF tantalum 4.7 uF 10%; 16 V	C462	21-13740F60	240 pF
C225	21-13743E05	.018 uF 10%; 16 V	C463	21-13740F20	5.1 ±0.25 pF
C230, 231	21-13740F60	240 pF	C464	21-13743E20	0.1 uF 10%; 16 V
C232	21-13741F25	1000 pF	C465	21-13741F17	470 pF

SM50/SM120 VHF Main Board, 150-170 MHz, 40 W, 12.5 kHz (N) (later version) (used in PMUD1067 & PMUD1088) SM50/SM120 VHF Main Board, 150-170 MHz 40 W, 20/25/30 kHz (W) (later version) (used in PMUD1068 & PMUD1089)

1000 pF

21-13743E20 0.1 uF 10%; 16 V

21-13743E20 0.1 uF 10%; 16 V

21-13743A19 0.1 uF 10%; 16 V

21-13741W01 1 uF 10%; 25 V

21-13741W01 1 uF 10%; 25 V

21-11078B32 39 pF 100V 21-11078B35 51 pF 100 V

150 pF

27 pF

21-80964X35 clamped mica 39 pF 250 V 21-11078B16 13 pF 100 V 21-80060M15 8 ±0.5pF 500 V 21-80060M34 43 pF 500 V 21-13740B49 100 pF 21-13741W01 1 uF 10%; 25 V 21-80060M33 39 pF 500 V

2 ±0.25 pF

4.7 ±0.25 pF 100 V

silicon varactor SOT 1T363

dual silicon SOT

48-62824C01 silicon varactor SOT 1SV229

dual silicon SOT MMBD7000

silicon varactor SOT 1SV229

L2622 L2630

21-80060M13 7 ±0.5 pF 500 V

48-80154K03 dual Schottky SOT 48-80142L01 silicon PIN SOT MMBV3401

48-80154K03 dual Schottky SOT

21-80060M22 13 pF 500 V 21-80060M11 6 ±0.5 pF 500 V 21-80060M43 100 pF 100 V 21-11078B05 4.7 ±0.25 pF 100 V 1000 pF 150 pF 150 pF

4700 pF

0.1 uF 10%; 16 V

1 uF 10%; 25 V

0.1 uF 10%; 16 V

0.1 uF 10%; 16 V

tantalum 10 uF 10%; 16 V

tantalum 0.47 uF 10%; 25 V

tantalum 47 uF 10%; 10 V 0.1 uF 10%; 16 V

tantalum 10 uF 10%; 16 V

tantalum 1 uF 10%; 16 V

0.22 uF +80/-20%; 16 V

0.22 uF +80/-20%; 16 V

0.1 uF 10%: 16 V

6.8 ±0.25 pF

.039 uF 10%; 16 V

tantalum 47 uF 10%; 10 V

tantalum 47 uF 10%; 10 V

tantalum .47 uF 10%; 25 V

PART NO.

21-13740A59

21-13741F25

23-11049A57

21-13743E20

21-13741W01

21-13743E20

21-13743E20

21-13741F25

21-13743E20

23-11049A57 21-13740F51

21-13741F41

23-11049A07

23-11049A05 21-13741F25

21-13743K16

23-11049,143

21-13743K16

21-13743E20

21-13743E11 21-13741F49 21-13741F17

21-13741F17

21-13740A30 21-13740A29 21-13740A33 21-13740A79 21-13740A24

21-13740A59

21-13740A59 21-13740A33 21-13740A39

21-13740A79

21-13740A59 21-13740A39

21-13740B32 21-13740A59

21-13740A10

21-13740A36 656 21-13740849

21-11078B05

48-02245J22

48-13833C07

48-05218N57

48-62824C01

C2680 thru 2683 21-13740A59

23-11049.143

23-11049A05 23-11049J43

SYMBOL

C466 C468 C501 C502 C503

C511

C554 C555 C556 C558 C559 thru 56

C559 thru
C562
C563, 564
C601
C602
C603
C604
C651
C652
C653
C654
C655
C656
C701
C702
C803, 804

C805 C806 thru 814

C2610 C2611 C2612 C2613, 2614 C2615 C2616 C2617, 2618

C2619
C2620
C2621
C2622, 2623
C2626
C2627
C2628
C2629
C2630
C2631, 2632
C2636
C2637
C2639
C2640
C2641, 2644
C2645
C2645
C2648
C2646
C2647
C2648
C2652
C2653
C2660
C2661
C2662
C2663
C2664
C2665
C26671
C2672
C2673

CR51 CR201 CR211 CR212 CR241 CR251

SIM50/SM120 VHF Main Board, 150-170 MHz, 40 W, 12.5 kHz (N) (leater version) (used in PMUD1067 & PMUD1088) SIM50/SM120 VHF Main Board, 150-170 MHz 40 W, 20/25/30 kHz (W) (latter version) (used in PMUD1068 & PMUD1089) PL-981003-O DESCRIPTION

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
CR252	48-62824C01	silicon varactor SOT 1\$V229
CR401	48-05129M76	silicon SOT
CR402	48-13833C07	dual silicon SOT MMBD7000
CR403	48-80939T01	Schottky SOT
CR404	48-13833C07	dual silicon SOT MMBD7000
	48-05129M76	silicon SOT
CR405		4A 200 PIV MUR420
CR406	48-83553T02	4A 200 PTV MUN420
CR407	48-13833C07	dual silicon SOT MMBD7000
CR408	48-05129M76	silicon SOT
CR451	48-05129M76	silicon SOT
CR651 thru 653	48-13833C07	dual silicon SOT MMBD7000
CR2650, 2651	48-02482J02	silicon PIN MA4P1250
CR2670	48-80236E07	transient suppressor
CR2680, 2681	48-82290T02	dual Schottky SOT HSMS-2802
	AND 10 to	ferrite beads:
E2610	24-84657R01	ferrite bead
E2620, 2621	24-84657R01	ferrite bead
E2630	24-84657R01	ferrite bead
E2640	24-84657R01	ferrite bead
E2670, 2671	24-84657R01	ferrite bead
LEGIO, MAR	m. r m. cm m. r	
F401	65-05214E04	fuse: 2 ampaxial lead
		*
*** - 4.75.55	04 000000004	filter:
FL51(N)	91-80098D04	455 kHz 4F
FL51(W)	91-80098D06	455 kHz 4D
FL52(N)	91-80097D04	455 kHz 6F
FL52(W)	91-80097D06	455 kHz 6D
		connector, receptacle:
J1	09-80627E01	mini UHF coax
J2	30-04510J01	power cable assembly (includes J2)
J3	28-04503J01	16-pin, accessories
J5	09-04426J01	telephone type, 8 contact, microphone
J6	09-04424J01	6-pin, internal options audio
J7	09-04424J03	8-pin, internal options digital
J8	09-04422J01	10-pin, display board
J9	28-04423J01	2 pin, internal speaker
		jumper:
JU401	***	Not Used
JU501	06-62057B47	jumper
		coil, rf:
L1 thru 7	24-84562T11	4 turns airwound 2%
L8	24-62587X55	chip 0.15 uH 5%
L9	24-62587X43	chip 15 nH 5%
L10	24-83411T63	0.15 uH 5% shielded
L11	24-62587X49	chip 47 nH 5%
		chip 0.15 uH 5%
L12	24-62587X55	
L51	24-62587X55	chip 0.15 uH 5%
L52	24-62587X63	chip 0.62 uH 5%
L53, 54	24-62587X68	chip 1 uH 5%
L55	24-62587X69	chip 1.2 uH 5%
L58, 69	24-62587X69	chip 1.2 uH 5%
L221	24-62587X60	chip 0.39 uH 5%
L241	24-62587X50	chip 56 nH 5%
L242	24-84562T11	4 turns airwound 2%
L243, 244	24-62587X61	chip 0.47 uH 5%
L251	24-62587X49	chip 47 nH 5%
L252	24-84562T13	3 turns airwound 2%
		chip 0.39 uH 5%
L253 thru 255	24-62587X60	
L261	24-62587X45	chip 22 nH 5%
L262	24-62587X60	chip 0.39 uH 5%
L271	24-62587X61	chip 0.47 uH 5%
L281	24-62587X60	chip 0.39 uH 5%
L282	24-62587X43	chip 15 nH 5%
L283	24-62587X47	chip 33 nH 5%
L284	24-62587X60	chip 0.39 uH 5%
L291	24-62587X43	chip 15 nH 5%
L292	24-62587X60	chip 0.39 uH 5%
	24-60578C43	chip 33 uH
L401		
L2610	24-60591A01	3 turns
L2611	24-60591C73	5 turns
L2612	24-60591B17	4 turns
L2613	24-60591B73	4 turns
		5 5 A.A 5 5 A.S.
L2620	24-62587T40	chip 33 nH 5%

24-62587T40 chip 33 nH 5%

24-60591E73 7 turns

SM50/SM120 VHF Main Board, 150-170 MHz, 40 W, 12.5 kHz (N) (later version) (used in PMUD1067 & PMUD1088)

SM50/SM120 VHF Main Board, 150-170 MHz 40 W, 20/25/30 kHz (W)
(later version) (used in PMUD1068 & PMUD1089)
PL-9810

ater version) (used in PMUD1068 & PMUD1089) PL-981003-0				
REFERENCE Symbol	MOTOROLA PART NO.	DESCRIPTION		
L2632	24-60591G73	9 turns		
L2641	24-60591E73	7 turns		
L2642	24-60591E69	7 turns 3 turns		
L2643	24-60591A13 24-60591V77	12 turns		
L2650 L2651	24-60591B77	4 turns		
L2652	24-11087B22	chip 0,47 uH		
L2653	24-60591R53	8 turns		
L2660	24-60591X01	3 turns		
L2661, 2662	24-60591X01	3 turns		
L2663	24-60591R53	8 turns		
		transistor: (see note)		
Q1	48-13827A07	NPN; type MMBR941		
Q2	48-13824A17	PNP; type MMBT3906		
Q51, 52	48-13827A07	NPN; type MMBR941		
Q271	48-13827A07	NPN; type MMBR941		
Q281	48-13827A07	NPN; type MMBR941		
Q401	48-80214G02	NPN; type MMBT3904		
Q402	48-80947V01	digital NPN; type DTC144W		
Q404 thru 408	48-80947V01	digital NPN; type DTC144W		
Q409	48-80141L03	PNP; type BCW68G		
Q410, 411	48-80947V01	digital NPN; type DTC144W		
Q412	48-13824A17	PNP; type MMBT3906		
Q413	48-80214G02	NPN; type MMBT3904		
Q414	48-80141L03	PNP; type BCW68G digital NPN; type DTC144W		
Q415, 416	48-80947V01	PNP; type 2SB1142S		
Q451	48-02245J25	NPN; type MMBT3904		
Q452, 453	48-80214G02			
Q2610	48-02245J24	NPN; type BFG35 NPN; type MRF630		
Q2620	48-80225C09	NPN; type MRF654		
Q2630 Q2640	48-80225C19 48-80225C24	NPN; type MRF650		
		resistor, fixed: +/-5%; 1/16 W:		
		unless otherwise stated		
R3	06-62057A59	2.7k		
R4	06-62057A80	20k		
A5	06-62057A73	10k		
R6	06-62057A13	33		
R7	06-62057A37	330		
R8	06-62057A40	430		
R11	06-62057C63	330 1/10 watt		
R51	06-62057A18	51		
R52	06-62057A83	27k		
R53	06-62057A75	12k		
R54	06-62057A45	680		
R55	06-62057A25	100		
R57(N)	06-62057B05	200k		
R57(W)	06-62057A97	100k		
R58	06-62057A76	13k		
R59(N)	06-62057A97	100k		
R59(W)	06-62057A93 06-62057A80	68k 20k		
R60(N)	06-62057A56	2k		
R60(W)	06-62057ASS	2% 27k		
R63	06-62057A91	56k		
R64	06-62057A61	3.3k		
R65 R66	06-62057A47	820		
R67	06-62057A56	2k		
R201	06-62057A57	2.2k		
R201	06-62057AS7	47k		
R221	06-62057A57	2.2k		
R222	06-62057A37	82		
R223	06-62057A61	3,3k		
R231	06-62057A49	1k		
B232	06-62057A57	2.2k		
R233	06-62057A82	24k		
R242	06-62057B06	220k		
R251	06-62057A77	15k		
R252	06-62057A52	1.3k		
R253	06-62057A33	220		
R260	06-62057A33	220		
R271	06-62057A75	12k		
R272	06-62057A69	6.8k		
R273	06-62057A32	200		
R274	06-62057A49	1k		
R281	06-62057A47	820		
Doon	DE CODETARO	9.74		

R282 R283 R284

06-62057A59 2.7k

06-62057415 39

06-62057A37 330

SM50/SM120 VHF Main Board, 150-170 MHz, 40 W, 12.5 kHz (N) (later version) (used in PMUD1067 & PMUD1088)

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
R285	06-62057A05	15
R286	06-62057A37	330
R287 R291	**** ****	Not Used 30k
R292	06-62057A84 06-62057A25	100
R293	06-62057A81	22k
R294	06-62057A84	30k
R401	06-62057B28	1.8 meg
R402	06-62057A65	4.7k
R403	06-62057A73	10k
R404	06-62057A49	1k
R405	06-62057C81	1.8k 1/10 watt
R406	06-62057A65	4.7k
R407	06-62057A89	47k
R408 R409	06-62057A65	4.7k 220
R410, 411	06-62057A33 06-62057A73	10k
R412	06-62057A41	470
R413	06-62057A89	47k
R414	06-62057A65	4.7k
R415	***	Not Used
R416	06-62057A89	47k
R417	06-62057A65	4.7k
R418	06-62057A53	1.5k
R419	06-62057C85	2.7k 1/10 watt
R420 R421, 422	06-62057A73	10k 100k
R423 thru 425	06-62057A97 06-62057A73	10k
R426	06-62057A01	10
R427	06-62057A73	10k
R428	06-62057A97	100k
R429	06-62057A73	10k
R430	06-62057A89	47k
R431, 432	06-62057A65	4,7k
R434	06-62057A61	3.3k
R435	06-62057A45	680
R436	06-62057A27	120
R437 R438	06-62057A90 06-62057A81	51k 22k
R439	06-62057A73	10k
R440	06-62057A90	51k
R441, 442	06-62057A01	10
R443	06-62057B47	0
R451	06-62057A45	680
R452	06-80195M37	330 1/2 watt
R453	06-62057A45	680
R454	06-62057A49	1k
R455 thru 457	06-62057A73 06-62057A77	10k 15k
R459 R460	06-62057A65	4.7k
R461	06-62057A73	10k
R462	06-05621T02	thermistor 50k @ 25 degrees C
R463	06-62057A45	680
R464	06-62057A33	220
R465	06-62057A25	100
R501	06-62057A37	330
R502	06-62057A97	100k
R551	06-62057A84	30k
R552	06-62057A75	12k 12k
R553 R554	06-62057A75 18-04405J01	variable 2k with switch
R555(N)	06-62057A01	10
R555(W)	06-62057A01	30k
R556	06-62057A73	10k
R557	06-62057A01	10
R558	06-62057A73	10k
R559	06-62057A17	47
R560	06-62057A97	100k
R561, 562	06-62057A89	47k
R563(N)	06-62057A77	15k
R563(W)	06-62057A84	30k
R564	06-62057A77	15k 8.2k
R566 R567, 568	06-62057A71 06-62057A89	8.2k 47k
R569	06-62057A43	560
R570	06-62057A56	2k
R601	06-62057A81	22k
R602	06-62057A97	100k
R603	06-62057A73	10k
R604	06-62057B22	1 meg.
		180k

SM50/SM120 VHF Main Board, 150-170 MHz, 40 W, 12.5 kHz (N) (later version) (used in PMUD1067 & PMUD1088)

SM50/SM120 VHF Main Board, 150-170 MHz 40 W, 20/25/30 kHz (W)

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
R652	06-62057B14	470k
R653	06-62057A01	10
R654	06-62057A82	24k
R655	06-62057A84	30k
R656	06-62057A73	10k
R657	06-62057A97	100k
R658	06-62057A20	62
R659	06-62057A40	430
R665	06-62057A40	430
R666	06-62057A20	62
R667	06-62057A65	4.7k
R668	06-62057A97	100k
R669	06-62057A65	4.7k
R670	06-62057B09	300k
R671	06-62057A60	3k
R701	06-62057A97	100k
R702	06-62057B06	220k
R703	06-62057B03	160k
R704	06-62057A68	6.2k
R705	06-62057A01	10
R2610	06-62057C57	180 1/10 watt
R2611	06-62057C59	220 1/10 watt
R2612	06-62057C53	120 1/10 watt
R2613, 2614	06-62057C36	24 1/10 watt
R2615, 2616		Not Used
R2620, 2621	***	Not Used
R2640	06-62057C27	10 1/10 watt
R2651	06-80194M23	82 1 watt
R2660	***	Not Used
R2675	06-62057C27	10 1/10 watt
R2681, 2682	06-80195M25	100 1/2 watt
R2683	06-62057C99	10k 1/10 watt
R2684	06-62057C96	7.5k 1/10 watt
R2685	06-62057C89	3.9k 1/10 watt
R2686	06-62057C96	7.5k 1/10 watt
		integrated circuit: (see note)
U1	51-80505D01	double-balanced mixer
U2	48-09939C04	dual transistor switch UMC3TL
Ú51	51-80605E02	receiver system
Ú201*	(see note)	synthesizer
U251	\$1-05414S84	VCO/buffer
U401	51-99010D01	microcomputer MC68HC11E9
U402	51-80604E01	audio filter
U403	51-05226P38	DAC
U404	51-80633C01	5 V regulator TK11950
U405	51-05469E65	5 V regulator LP2951C
U406	51-13816D03	8 V regulator MC7808BT
U451	51-80932W01	dual op-amp LM2904 SOIC
U501	51-80147R01	audio power amp TDA1519C
U551	51-02198J28	quad op-amp LM2902D SOIC
U553	51-84704M60	triple 2-channel switch 4053B
U554	51-05663U35	quad analog switch 4066B
U601	51-02198J23	dual comparator LM2903 SOIC
VR401	48-80140L06	voltage regulator: (see note) zener diode 5.1 V SOT
VR401 VR402 thru 406	48-80140L06 48-80948V01	zener diode 5.1 V SOT zener diode 27 V SOT
VR402 tritu 406 VR407	48-80140L15	zener diode 27 V SOT zener diode 10 V SOT
	48-80948V01	zener diode 10 V SOT zener diode 27 V SOT
VR408, 409 VR410	48-80140L15	zener diode 27 V SOT zener diode 10 V SOT
VR410 VR411, 412	48-80948V01	zener diode 10 V SOT zener diode 27 V SOT
	48-80948V01 48-80140L15	zener diode 27 V SOT zener diode 10 V SOT
VR451 VR551 thru 553	48-80140L15	zener diode 10 V SOT
vece mini i cenv	48-8014UL13	
Y51(N)	91-80112R06	crystal: (see note) filter 45.1 MHz 12.5 kHz
* 1		(includes Y51A and Y51B)
Y51(W)	91-80112R05	filter 45.1 MHz 25 kHz
		(includes Y51A and Y51B)
Y52	48-80606B02	44.645 MHz
Y201*	(see note)	16.8 MHz
Y401	48-80113F01	7.9488 MHz
	non-refe 14-05160A02	renced items crystal insulator (for Y201)
	26-04398J01	VCO/synthesizer shield (4 used)
	26-04399J01	receiver mixer bottom shield
	26-04399J01 26-04400J01	receiver front end top shield
	26-04400301 26-04419J01	PA shield frame
	26-04420J01	PA shield cover

26-04420J01 PA shield cover

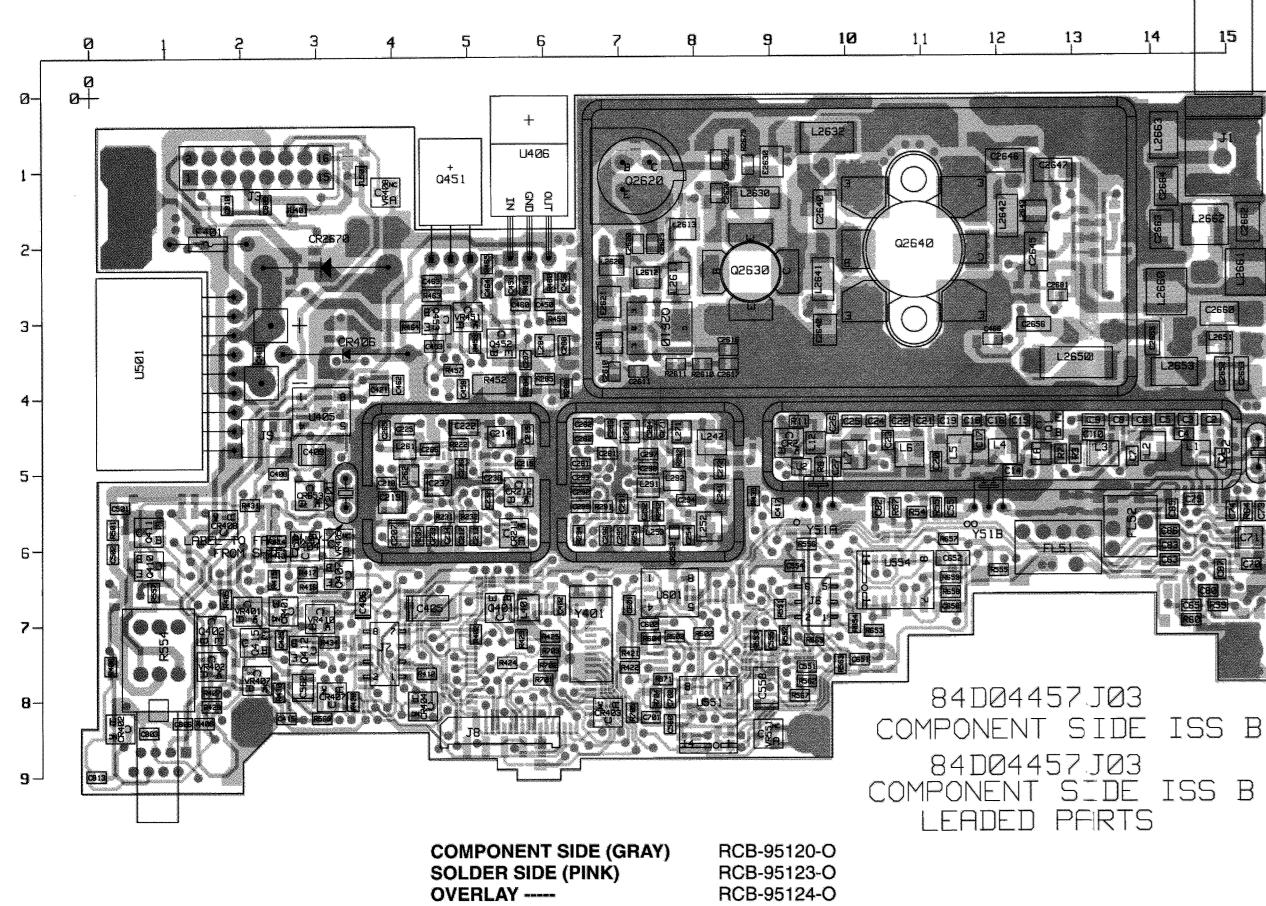
SM50/SM120 VHF Main Board, 150-170 MHz, 40 W, 12.5 kHz (N) (later version) (used in PMUD1067 & PMUD1088) SM50/SM120 VHF Main Board, 150-170 MHz 40 W, 20/25/30 kHz (W) (later version) (used in PMUD1068 & PMUD1089)

SYMBOL PART NO. DESCRIPTION 42-80281L01 ground clip (2 used for Q2640)

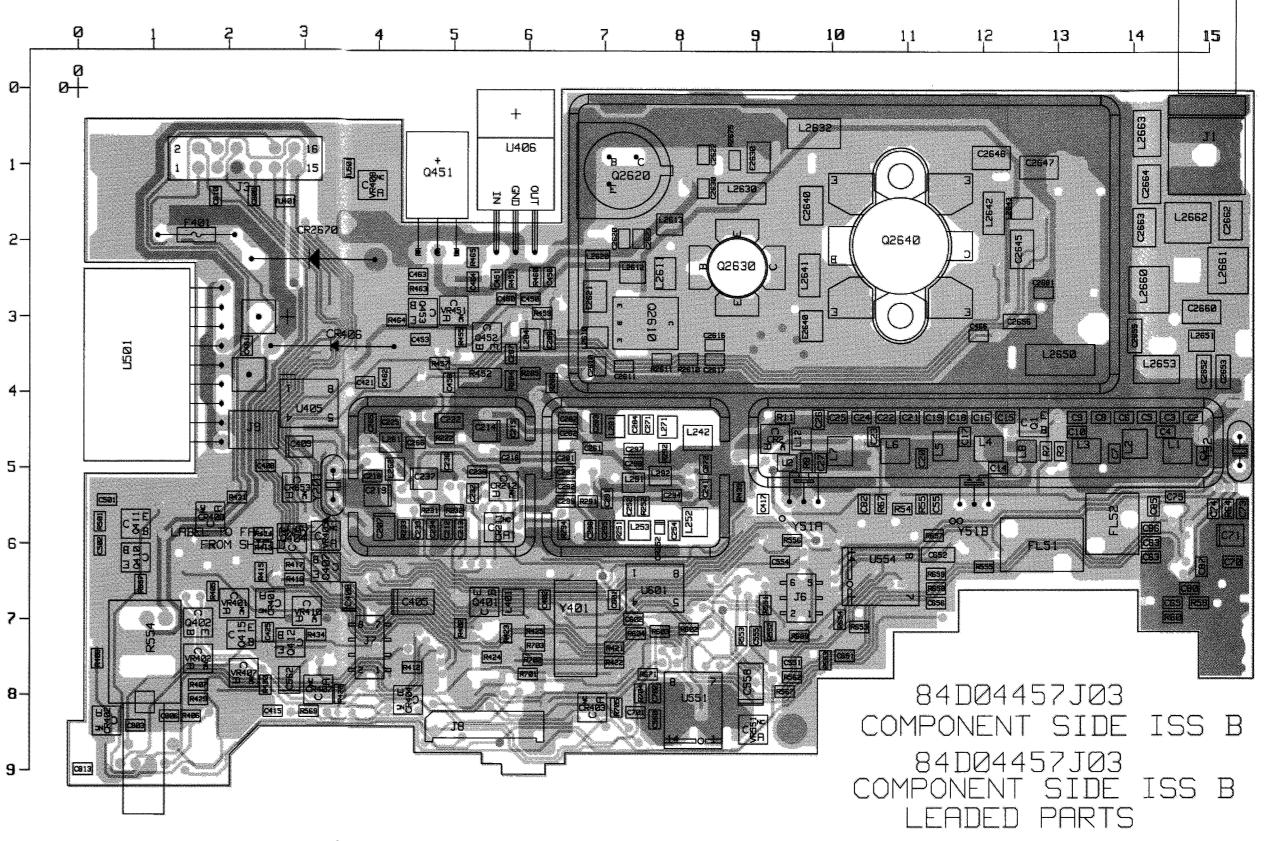
note: For optimum performance, diodes, transistors, and integrated circuits must be ordered by Motorola part numbers. Designators marked with an (*) denote parts which are not field serviceable. Recalibration of the radio using specialized factory equipment is mandatory

when these components are replaced in order to guarantee the specified frequency stability of the radio at temperature extremes.

> VHF Main Boards, 150-170 MHz, 12.5 & 20/25/30 kHz, 40 W (Part of PMUD1067B, PMUD1068B, PMUD1088B, PMUD1089B Radios)



COMPONENT SIDE VIEW

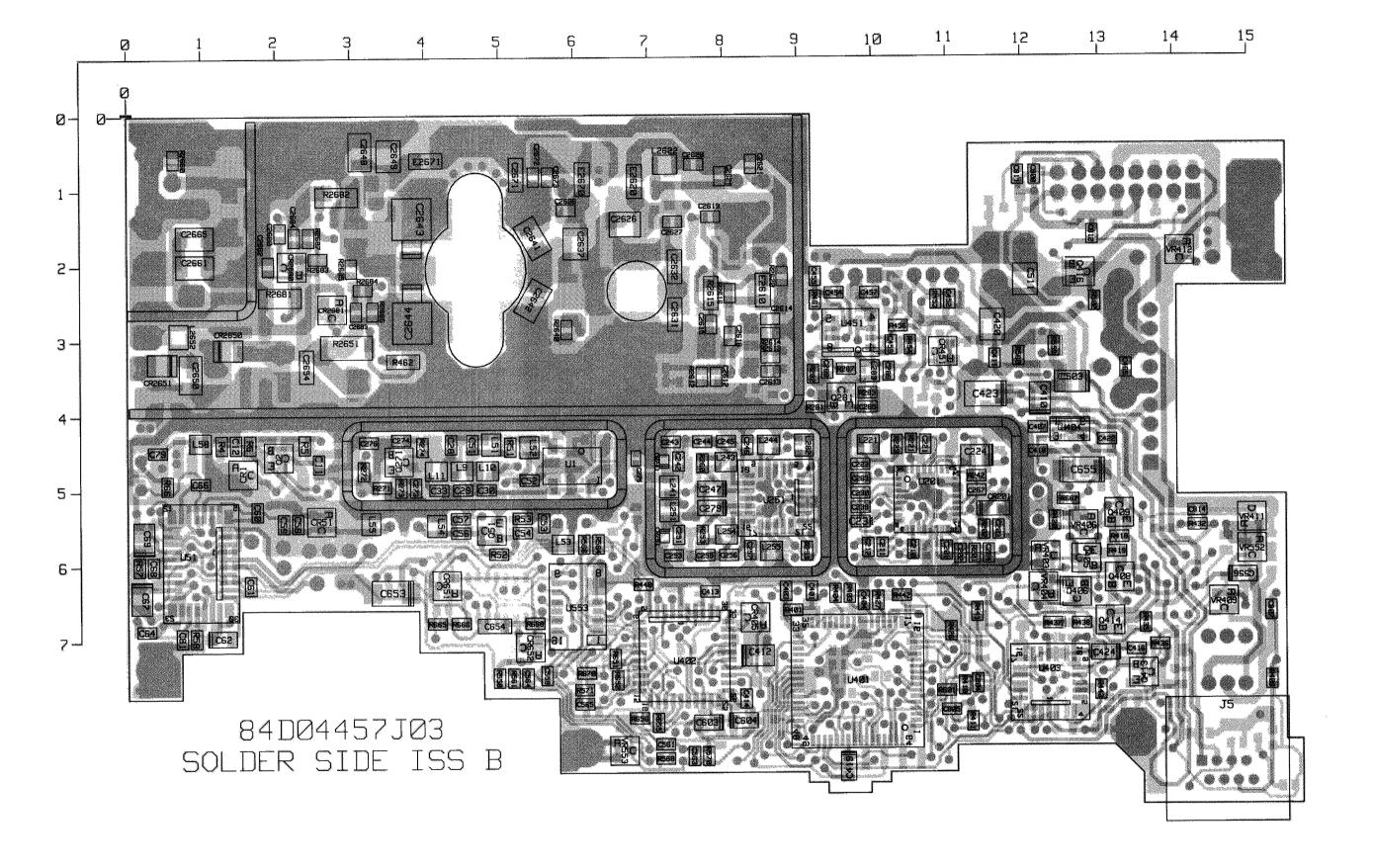


COMPONENT SIDE INNER LAYER (GRAY)
SOLDER SIDE INNER LAYER (PINK) OVERLAY ----

RCB-95121-O RCB-95122-O RCB-95124-O

Circuit Board Details for UHF Main Boards, 450-470 MHz, 12.5 & 20-25 kHz, 10-25 W (Part of PMUE1006A, PMUE1007A, PMUE1054A, and PMUE1055A Radios)

COMPONENT SIDE VIEW



84D04457J03 SOLDER SIDE ISS B

COMPONENT SIDE (GRAY)
SOLDER SIDE (PINK)
OVERLAY -----

RCB-95120-O (REV) RCB-95123-O (REV) RCB-95125-O (REV)

SOLDER SIDE VIEW

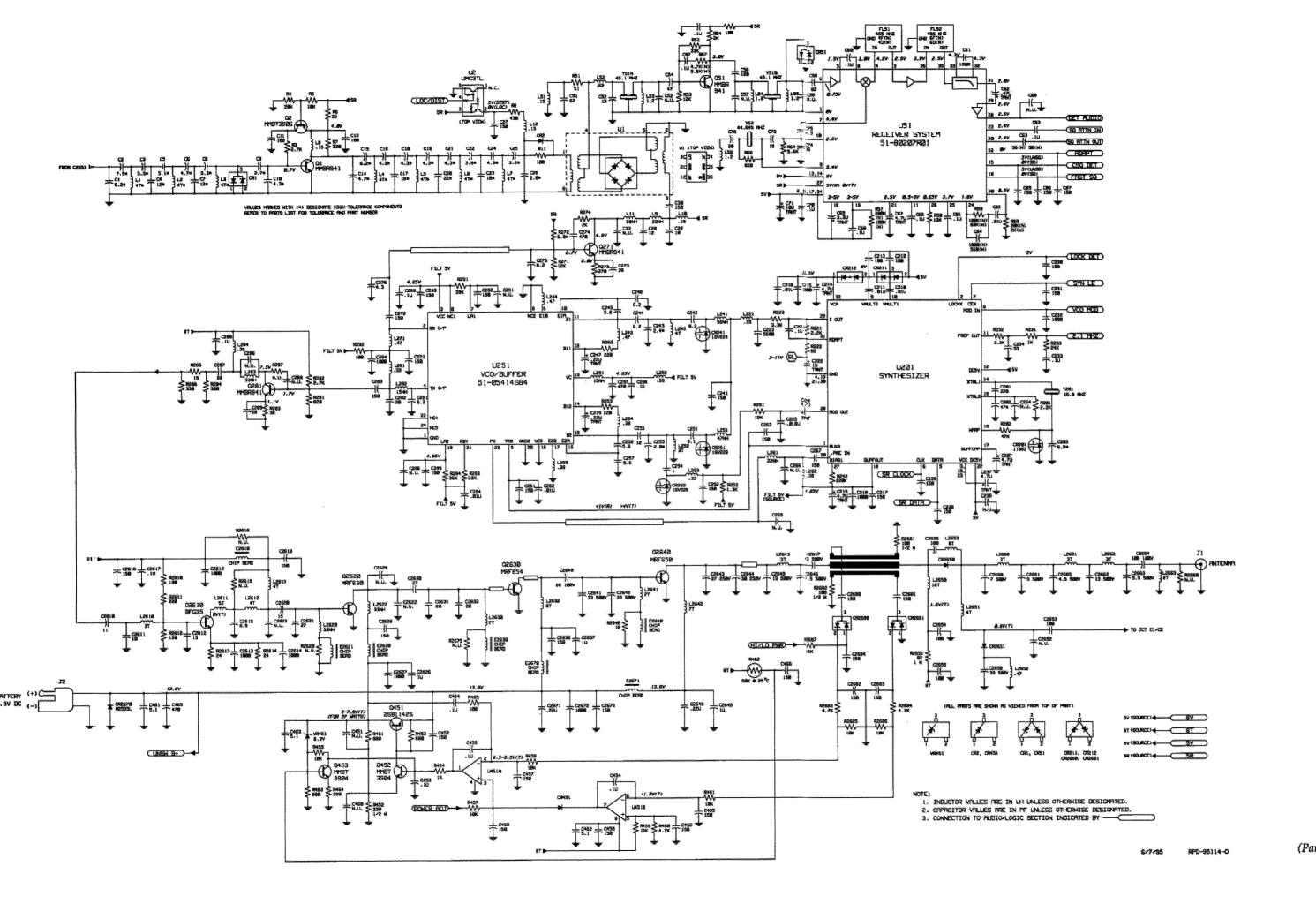
Circuit Board Details for UHF Main Boards, 450-470 MHz, 12.5 & 20-25 kHz, 10-25 W (Part of PMUE1006A, PMUE1007A, PMUE1054A, and PMUE1055A Radios)

March, 1998

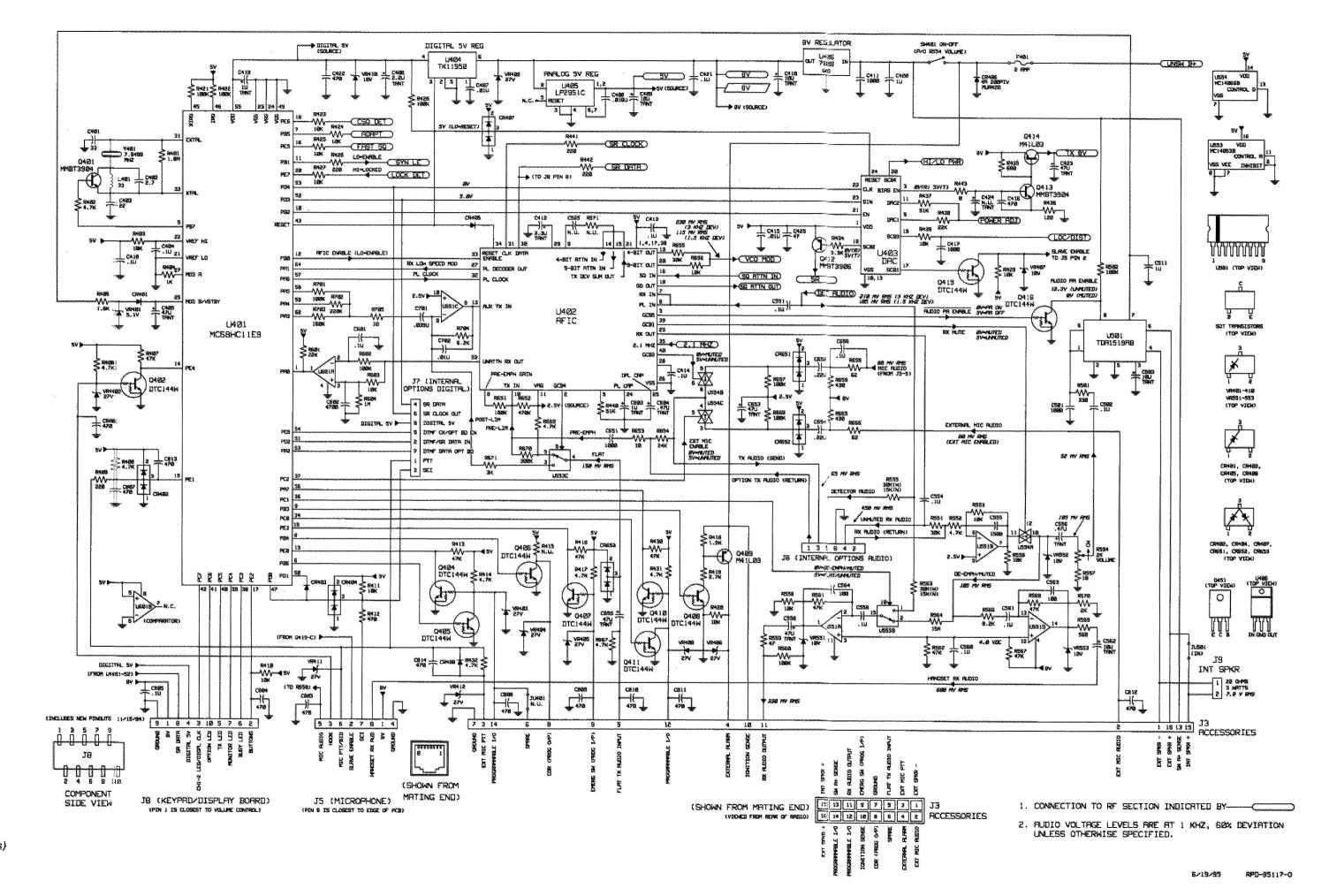
SOLDER SIDE VIEW

COMPONENT SIDE INNER LAYER (GRAY)
SOLDER SIDE INNER LAYER (PINK)
OVERLAY -----

RCB-95121-O (REV) RCB-95122-O (REV) RCB-95125-O (REV)



Schematic Diagram for UHF Main Boards, 450-470 MHz, 12.5 & 20-25 kHz, 10-25 W (Part of PMUE1006A, PMUE1007A, PMUE1054A. and PMUE1055A Radios) (Sheet 1 of 2)



Schematic Diagram for UHF Main Boards, 450-470 MHz, 12.5 & 20-25 kHz, 10-25 W (Part of PMUE1006A, PMUE1007A, PMUE1054A, and PMUE1055A Radios) (Sheet 2 of 2)

SM50/SM120 UHF Main Board, 450-470 MHz, 10-25 Watts 12.5 kHz (N) (used in PMUE1006 & PMUE1054) SM50/SM120 UHF Main Board, 450-470 MHz, 10-25 Watts 20/25 kHz (W) (used in PMUE1007 & PMUE1055)

12.5 kHz (N) (used in PMUE1006 & PMUE1054) SM50/SM120 UHF Main Board, 450-470 MHz, 10-25 Watts 20/25 kHz (W) (used in PMUE1007 & PMUE1055)

SM50/SM120 UHF Main Board, 450-470 MHz, 10-25 Watts

	REFERENCE MOTOROLA		REFERENCE	MOTOROLA		
REFERENCE SYMBOL	PART NO.	DESCRIPTION	SYMBOL	PART NO.	DESCRIPTION	
Jimou.		capacitor, fixed: uF +/-5%; 50 V:	C237	23-11049J11	tantalum 4.7 uF 10%; 16 V	
•		unless otherwise stated	C238, 239	21-13740A59	150 pF	
C1	21-13740G21	5.6 ±0.1 pF	C241	21-13740A59	150 pF	
Ĉ2	21-13740G24	6.8 ±0.1 pF	C242	21-13740A27	8.2 ±0.25 pF 2.4 ±0.1 pF	
C3	21-13740G16	3.6 ±0.1 pF	C243 C244	21-13740G12 21-13740A23	6.2 ±0.25 pF	
C4	21-13740G30	11 pF 2%	C245	21-13740A21	5.6 ±0.25 pF	
C5	21-13740G17	3.9 ±0.1 pF 6.2 ±0.1 pF	C246	21-13740A23	6.2 ±0.25 pF	
C6 C7	21-13740G23 21-13740G28	9.1 pF 2%	C247	23-11049A03	tantalum 0.22 uF 10%; 35 V	
C8	21-13740G12	2.4 ±0.1 pF	C251	21-13740A27	8.2 ±0.25 pF	
C9	21-13740G13	2.7 ±0.1 pF	C252	21-13740G09	1.8 ±0.1 pF	
G10	21-13740G12	2.4 ±0.1 pF	C253	21-13740G10	2.0 ±0.1 pF 1 ±0.25 pF	
C11, 12	21-13740A55	100 pF	C254 C255	21-13740A03 21-13741A79	1000 pF	
C14	21-13740L05	3.0 ±0.1 pF	C256, 257	21-13740A21	5.6 ±0.25 pF	
C15	21-13740G25	7.5 ±0.1 pF 4.3 ±0.1 pF	C261	21-13740A59	150 pF	
C16	21-13740G18 21-13740G32	13 pF 2%	C262	21-13741A45	.01 uF	
C17 C18, 19	21-13740G18	4.3 ±0.1 pF	C263	21-13740A59	150 pF	
C20	21-13740G34	16 pF 2%	C264 thru 266	***	Not Used	
C21	21-13740G18	4.3 ±0.1 pF	C267	21-13740A59	150 pF	
C22	21-13740G17	3.9 ±0.1 pF	C271, 272	21-13740A59	150 pF 39 pF	
C23	21-13740G32	13 pF 2%_	C273	21-13740A43 21-13740A71	470 pF	
C24, 25	21-13740G18	4.3 ±0.1 pF	C274 C275	21-13740F18	4.3 ±0.25 pF	
C26	21-13740G10	2.0 ±0.1 pF 150 pF	C276	21-13740A27	8.2 ±0.25 pF	
C27 C28	21-13740A59 21-13740A31	12 pF	C279	23-11049A03	tantalum 0.22 uF 10%; 35 V	
C29	21-13740A35	18 pF	C281	21-13740A23	6.2 ±0.25 pF	
C30	21-13740A59	150 pF	C282	21-13740A36	20 pF	
C33	***	Not Used	C283	21-13740A59	150 pF	
C51	21-13740A53	82 pF	C284	21-13740A79	1000 pF	
C52	21-13740A31	12 pF	C285	21-13740A51	68 pF Not Used	
C53		Not Used	C286 C287	21-13740A51	68 pF	
C54	21-13740A46	47 pF	C288	21-13743A19	0.1 uF 10%; 16 V	
C55	21-13743A19	0.1 uF 10%; 16 V 120 pF	C289		Not Used	
C56	21-13740A57	Not Used	C291	www.	Not Used	
C57, 58 C59	21-13740A53	82 pF	C292, 293	21-13740A59	150 pF	
C60	21-13743A19	0.1 uF 10%; 16 V	C294	21-13741A45	.01 uF_	
C61	21-13741A25	1500 pF	C295	21-13740A59	150 pF	
C62	23-11049A05	tantalum 0.47 uF 10%; 25 V	C296	***	Not Used	
C63(N)	21-13740A42	36 pF	C297	21-13740A71 21-13743A19	470 pF 0.1 uF 10%; 16 V	
C63(W)	21-13740A49	56 pF	C298, 299 C401	21-13740A41	33 pF	
C64(N)	21-13740A79	1000 pF	C401	21-13740A13	2.7 ±0.25 pF	
C64(W)	21-13740A73 21-13741A45	560 pF .01 uF	C403	21-13740A37	22 pF	
C65 C66	21-13743A19	0.1 uF 10%; 16 V	C404	21-13743A19	0.1 uF 10%; 16 V	
C67	23-11049J11	tantalum 4.7 uF 10%; 16 V	C405	23-11049J43	tantalum 47 uF 10%; 10 V	
C68	21-13743A19	0.1 uF 10%; 16 V	C406	23-11049A40	tantalum 2.2 uF 10%; 10 V	
C69	23-11049J07	tantalum 3.3 uF 10%; 20 V	C407	21-13741A45	.01 uF	
C70	21-13743A19	0.1 uF 10%; 16 V	C408	21-13741A51 23-11049A57	.018 uF tantatum 10 uF 10%; 16 V	
C71	23-11049A57	tantalum 10 uF 10%; 16 V	C409, 410 C411	21-13740A79	1000 pF	
C73	21-13740A33 21-13740A42	15 p F 36 pF	C412	23-11049J07	tantalum 3.3 uF 10%; 20 V	
C74 C75	21-13740A18	4.3 ±0.25 pF	C413, 414	21-13743A19	0.1 uF 10%; 16 V	
C79	21-13740A36	20 pF	C415	21-13741A45	.01 uF	
C80	***	Not Used	C416	21-13740A71	470 pF	
C81 thru 83	21-13743A19	0.1 uF 10%; 16 V	C417	21-13740A79	1000 pF	
C85 thru 87	21-13740A59	150 pF	C418	21-13743A19	0.1 uF 10%; 16 V tantalum 1 uF 10%; 16 V	
C201	21-13740A63	220 pF	C419 C420	23-11049A07 21-13741W01	1 uF 10%; 25 V	
C202	21-13740G46		C420 C421	21-13743A19	0.1 uF 10%; 16 V	
C203	21-13740G24	6.8 ±0.1 pF tantalum 4.7 uF 10%; 16 V	C422	21-13740A71	470 pF	
C207	23-11049J11 21-13741A45	**************************************	C423	23-11049J43	tantalum 47 uF 10%; 10 V	
C210, 211 C212, 213	21-13740A55		C424	www.	Not Used	
C214	23-11049J11	tantalum 4.7 uF 10%; 16 V	C425	21-13740A46	47 pF_	
C215	21-13740A79	1000 pF	C450	21-13740A59	150 pF	
C216	21-13741A45		C451	A4 407404ED	Not Used	
G217	21-13740A59		C452 C453, 454	21-13740A59 21-13743A19	150 pF 0.1 uF 10%; 16 V	
C218	21-13740A79	1000 pF	C453, 454 C455 thru 458		150 pF	
C219	23-11049J11	tantalum 4.7 uF 10%; 16 V	C459	21-13743A19	0.1 uF 10%; 16 V	
C221	21-13743A19		C460	man.	Not Used	
C222 C223	23-11049A07 21-13741A39		C461 thru 463	21-13740A20	5.1 ±.025 pF	
C223 C224	23-11049J11	tantalum 4,7 uF 10%; 16 V	C464	21-13743A19	0.1 uF 10%; 16 V	
C225	21-13741A51		C465	21-13740A71	470 pF	
C230, 231	21-13740A59	150 pF	C466	21-13740A59		
C232	21-13740A79		C501	21-13740A79		
C233	21-13743A19		C502 C503	21-13743A19 23-11049A57		
C234	21-13740A41		C503	21-13741W01	AND CONTROL OF THE PARTY OF	
C236		Not Used	- COLI	— 1 4 MAY TARREST		

SM50/SM120 UHF Main Board, 450-470 MHz, 10-25 Watts 12.5 kHz (N) (used in PMUE1006 & PMUE1054) SM50/SM120 UHF Main Board, 450-470 MHz, 10-25 Watts 20/25 kHz (W) (used in PMUE1007 & PMUE1055)

21-13741A25

23-11049J43

1-13743A19 0.1 uF 10% 16V

21-13743A19 0.1 uF 10% 16 V

21-13743A19 0.1 uF 10% 16 V

21-13743A19 0.1 uF 10%; 16 V

21-11032B15 0.22 uF +80/-20%

91-11039R15 0.22 HF +80/-20%

21-13743A19 0.1 uF 10%; 16 V

21-13743A19 0.1 uF 10%; 16 V

21-13740A24 6.8 ±0.25 pF

21-13743A19 0.1 uF 10%; 16 V

21-13741W01 1 uF 10%; 25 V

21-13741W01 1 uF 10%: 25 V

21-80464E42 clamped mica 27 pF 250 V

21-80464E40 clamped mica 30 pF 250 V

21-11078B38 68 pF 100 V

21-80060M31 33 pF 500 V

21-80060M22 13 pF 500 V

21-80060M34 43 pF 500 V

21-80060M33 39 pF 500 V

21-13740B08

21-13740B32 20 pF

21-80060M14 7.5 ±0.5 pF 500 V

21-11032B15 0.22 uF +80/-20%

2.0 pF

21-13741W01 1 uF 10%; 25 V

21-80060M13 7±0.5 pF 500 V

21-80060M09 5 ±0.5 pF 500 V

21-80060M10 5.5 ±0.5 pF 500 V

21-80060M08 4.5 ±0.5 pF 500 V

21-11032B15 0.22 uF +80/-20%

150 p

48-80142L01 silicon PIN SOT MMBV3401

48-62824C01 silicon varactor SOT 1SV229

48-62824C01 silicon varactor SOT 1SV229

48-13833C07 dual silicon SOT MMBD7000

48-13833C07 dual silicon SOT MMBD7000

silicon varactor SOT 1T363

dual silicon SOT MMBD700

48-80154K03 dual Schottky SOT

48-90154K03 dual Schottky SOT

48-80939T01 Schottky SOT

48-83553T02 4A 200 PIV MUR420

48-05129M76 silicon SOT

21-80060M22 13 pF 500 V

21-80060M43 100 pF 100 V

21-13740A79 1000 pF

21-13740A59 150 pl

21-13740A59

48-02245J22

48-05129M76

21-13740A59 150 pF

21-13740A79 1000 pF

21-13740A59 150 pl

21-13740A39 27 pF

21-13740A79 1000 p

21-13740A59 150 pF

21-13740A39 27 pF

21-13740B32 20 pF

21-13740A59 150 pF

470 pF

21-13740A55 100 pF

21-13741A37 4700 DF

21-13740A79 1000 pF

21-13741A59 .039 uF

21-13741A45 .01 uF

21-13740A71 470 pF

21-13740A71

21-13740A30

21-13740A29

21-13740A33

21-13740A79

21-13740A33

23-11049A05 tantalum 0.47 uF 10%; 25 V

23-11049A57 tantalum 10 uF 10%; 16 V

23-11049A07 tantalum 1 uF 10%; 16 V

23-11049A05 tantalum 0.47 uF 10%; 25 V

23-11049J43 tantalum 47 uF 10%; 10 V

23-11049J43 tantalum 47 uF 10%; 10 V

tantalum 47 uF 10%; 10 V

PART NO.

REFERENCE MOTOROLA

SYMBOL

C2612 C2613, 2614

C2619
C2620
C2621
C2621
C2622, 2623
C2626
C2627
C2628
C2629
C2630
C2631, 2632
C2636
C2637
C2640
C2641, 2642
C2643
C2644
C2645
C2644
C2645
C2647
C2648
C2649
C2649
C2650
C2652
C2653 thru 2656

CR1 CR2 CR51 CR201 CR201 CR211, 212 CR241 CR251, 252 CR401 CR402 CR403 CR404 CR405 CR406

DESCRIPTION

(D/25 kHz (W) (use	AL DEBUGATOR	70 MHz, 10-25 Watts PMUE1055) PL-951011-A
REFERENCE	MOTOROLA	
SYMBOL	PART NO.	DESCRIPTION
CR407	48-13833C07	dual silicon SOT MMBD7000 silicon SOT
CR408 CR451	48-05129M76 48-05129M76	silicon SOT
CR651 thru 653	48-13833C07	dual silicon SOT MMBD7000
CR2650, 2651	48-02482J02	silicon PIN MA4P1250
CR2670	48-80236E07	transient suppressor
CR2680, 2681	48-82290T02	dual Schottky SOT HSMS-2802
		ferrite beads:
E2610	24-84657R01 24-84657R01	ferrite bead ferrite bead
E2620, 2621 E2630	24-84657R01	ferrite bead
E2640	24-84657R01	ferrite bead
E2670, 2671	24-84657FI01	ferrite bead
		fuse:
F401	65-05214E04	2 amp axial lead
#1 #4/AI	91-80098D04	filter: 455 kHz 4F
FL51(N) FL51(W)	91-80098D06	455 kHz 4D
FL52(N)	91-80097D04	455 kHz 6F
FL52(W)	91-80097D06	455 kHz 6D
	*	connector, receptacle:
J1	09-09006C01	mini UHF coax
J2	30-04510J01	power cable assembly (includes J2) 16-pin, accessories
J3	28-04503J01 09-04426J01	telephone type, 8 contact, microphone
J5 J6	09-04424J05	6 pin, internal options audio
J7	09-04424J06	8 pin, internal options digital
J8	09-04422J02	10 pin, display board
J9	28-04423J01	2 pin, internal speaker
ti kand		jumper: Not Used
JU401 JU501	06-62057C01	jumper
		coil, rf:
L1 thru 7	24-84562T11	4 turns airwound 2%
L8	24-62587X55	chip 0.15 uH 5%
L9	24-62587X45	chip 22 nH 5%
L10	24-83411T63	0.15 uH 5% shielded
Lii	24-62587X51 24-62587X55	chip 68 nH 5% chip 0.15 uH 5%
L12 L51	24-62587X55	chip 0.15 uH 5%
L52	24-62587X63	chip 0.62 uH 5%
L53	24-62587X69	chip 1.2 uH 5%
L54	24-62587N71	chip 1.8 uH 5%
L55	24-62587X69	chip 1.2 uH 5%
L58	24-62587X69	chip 1.2 uH 5% chip 0.39 uH 5%
L221 L241	24-62587N60 24-62587X50	chip 56 nH 5%
L242	24-84562T11	4 turns airwound 2%
L243, 244	24-62587X61	chip 0.47 uH 5%
L251	24-62587X49	chip 47 nH 5%
L252	24-84562T13	3 turns airwound 2%
L253 thru 255	24-62587X60	chip 0.39 uH 5%
L261	24-62587X45	chip 22 nH 5%
L262	24-62587X60 24-62587X61	chip 0.39 uH 5% chip 0.47 uH 5%
L271 L281	24-62587X60	chip 0.39 uH 5%
L282	24-62587X43	chip 15 nH 5%
L283	24-62587X47	chip 33 nH 5%
L284	24-62587X60	chip 0.39 uH 5%
L291	24-62587X43	chip 15 nH 5%
L292	24-62587X60	chip .39 uH 5%
L401	24-60578C43	chip 33 uH 3 turns
L2610 L2611	24-60591A01 24-60591C73	
	24-60591B17	4 turns
L2612	#4-0000 ID 11	
L2612 L2613	24-60591B73	4 turns
L2613 L2620	24-60591B73 24-62587T40	4 turns chip 33 nH 5%
L2613	24-60591B73	4 turns

24-60591E73 7 turns

24-60591A33 3 turns

24-60591V77 12 turns

24-11087B22 chip 0.47 uH

24-60591S77 9 turns

24-60591E73

24-60591E69

L2632 L2641 L2642 L2643

L2650, 2651

SM50/SM120 UHF Main Board, 450-470 MHz, 10-25 Watts 12.5 kHz (N) (used in PMUE1006 & PMUE1054)

SM50/SM120 UHF Main Board, 450-470 MHz, 10-25 Watts 20/25 kHz (W) (used in PMUE1007 & PMUE1055)

L2660 thru 2662 24-60591X01 3 turns

24-60591R53 8 turns

24-60591R53 8 turns

48-13827A07

48-13827A07

48-80947V01

48-80947V01

48-80214G02

48-80141L03

48-80947V01

48-02245J25

48-02245-124

48-80225C09

06-62057C85

06-62057D07

06-62057C99

06-62057C39

06-62057C63

06-62057C66

06-62057C51

06-62057C44

06-62057C82

06-62057024

06-62057C82

06-62057D12 33k

06-62057D02 12k

06-62057C51 100

06-62057D31 2001

06-62057D24 100k

06-62057D03 13k

06-62057020 688

06-62057D07 20k

ne-e2057C93 5.6k

06-62057C91 4.7k

06-62057C73 820

06-62057093 5.6

06-62057C83 2.2k

06-62057D16 47k

06-62057C83 2.2k

06-62057C87 3.3k

06-62057C83 2.2k

06-62057C78 1.3k

06-62057C95 6.8k

06-62057061 270

06-62057C73 820

06-62057C85 2.7k

06-62057C40 36

06-62057C63 330

06-62057C31 15

06-62057C63 330

06-62057D14 39k

06-62057C51 100

06-62057D13 36k

06-62057C91 4.7k

06-62057D54 1.8 meg.

06-62057D12 33k

06-62057C82

06-62057A65 4.6k, 1/16 W

06-62057C49

06-62057C75

06-62057D09

06-62057D04

06-62057C59

06-62057C59

06-62057D02

48-13824A17

48-80214G02

48-13827A07 NPN; type MMBR94

48-13824A17 PNP; type MMBT3900

48-13827A07 NPN; type MMBR941

48-80214G02 NPN; type MMBT3904

48-80225C19 NPN; type MRF654

48-80225C24 NPN; type MRF650

NPN; type MMBR941

NPN; type MMBR941

PNP, type M41L03

NPN; type MMBT3904

PNP, type M41L03

NPN; type BFG35

NPN: type MRF630

unless otherwise state

NPN; type MMBT3904

digital NPN; type DTC144W

digital NPN; type DTC144W

digital NPN; type DTC144W

digital NPN; type DTC144W

resistor, fixed: +/-5%; 1/10 W:

REFERENCE MOTOROLA

L2653

Q415, 416

R59(N) R59(W)

R283 R284 R285 R286 R287 R291 R292 R293 R294 R401 R402

SYMBOL PART NO.

SYMBOL PART NO. R405 R410, 41 06-62057C79 R421, 422 R430 R431, 432 R451 R452 R453 R454 R455 thru R460 R461 R462 R463 R464 R465 R501 R502 R551 R552, 553 R554 R555(N) R555(W) R560 R561, 562

SM50/SM120 U-IF Main Board, 450-470 MHz, 10-25 Watts 12.5 kHz (N) (used in PMUE1006 & PMUE1054)

SM50/SM120 U-IF Main Board, 450-470 MHz, 10-25 Watts 20/25 kHz (W) (sed in PMUE1007 & PMUE1055) DESCRIPTION 06-62057099 10 06-62057C75 06-62057C81 1.8k 06-62057C91 4.7k 06-62057D16 06-62057C91 4.7k 06-62057C59 220 06-62057C99 06-62057C67 06-62057D16 47k 06-62057C91 06-62057D16 06-62057C91 06-62057C85 06-62057C99 06-62057D24 100k 06-62057C99 10 06-62057C99 10 06-62057C27 06-62057C99 10I 06-62057D24 1001 06-62057C99 10I 06-62057016 47 06-62057C91 4.7k 06-62057C87 3.3k 06-62057C71 68 06-62057C53 120 06-62057D17 511 06-62057D08 22 06-62057C99 06-62057D17 51k 06-62057C27 06-62057C01 06-62057C71 680 06-80195M37 330 1/2 watt 06-62057C71 06-62057075 1 06-62057C99 10k 06-69057D04 15k 06-62057C91 4.7k 06-62057C99 10k 06-05621T02 thermistor 50k @ 25"0 06-62057071 680 06-62057059 220 06-62057C51 100 06-62057C63 330 06-62057D24 100k 06-62057D11 30k 06-62057D02 12k 18-04405J02 variable 2k with switch 06-62057C27 06-62057D11 06-62057C99 06-62057C27 06-62057C99 10k 06-62057C43 06-62057D24 06-62057D16 47k R563(N) R563(W) 06-62057D04 15I 06-62057D11 30k R564 R566 06-62057D04 15k 06-62057C97 8.2k R567, 56 06-62057D16 47k R569 06-62057C69 560 R570 R571 06-62057C82 2k 06-62057D08 22k 06-62057D24 100k 06-62057C99 10k 06-62057D48 1 med 06-62057D30 180k 06-62057D40 470k 06-62057C27 10 06-62057D09 24k 06-62057D11 30k 06-62057C99 10k

06-62057D24 100k

06-62057C46 62

06-62057C66 430

SM50/SM120 UHF Main Board, 450-470 MHz, 10-25 Watts 12.5 kHz (N) (used in PMUE1006 & PMUE1054) SM50/SM120 UHF Main Board, 450-470 MHz, 10-25 Watts

20/25 kHz (W) (used in PMUE1007 & PMUE1055) REFERENCE MOTOROLA SYMBOL PART NO. 06-62057C66 430 06-62057046 62 06-62057C91 4.7k 06-62057D24 100k 06-62057C91 4.7k 06-62057D35 300k 06-62057C86 3k R701 06-62057D24 100k R702 06-62057D32 220k 06-62057D29 160k R704 R705 06-62057C94 6.2k 06-62057027 10 R2610 R2611 06-62057C57 180 06-62057059 220 R2612 06-62057C53 120 06-62057C36 24 R2615, 261 R2620 R2640 06-62057C27 R2651 R2660 R2675 06-80194M23 82 1 watt Not Used Not Used 06-80195M25 100 1/2 watt R2681 2682 06-62057C91 4.7k R2683, 2684 06-62057C99 10k 06-62057D04 15k ntegrated circuit: (see note) 51-80505D01 double-balanced mixer 48-09939C04 dual transistor switch UMC3TL 51-80207R01 receiver system U51 U201* U251 (see note) 51-02227S66 VCO/buffer 51-99010D01 microcomputer MC68HC711E9 U402 51-02227J35 audio filter 51-05226P38 51-80633C01 5 V regulator TK11950 U405 U406 51-05469E65 5 V regulator LP2951C 51-13816D03 8 V regulator MC7808BT U451 U501 51-80932W01 dual op-amp LM2904 SOIC 51-80147R01 audio power amp TDA1519AE 51-02198J28 quad op-amp LM2902D SOIC U551 51-84704M60 triple 2-channel switch 4053B U553 U554 51-84704M52 quad bilateral switch 4066B 51-02198J23 dual comparator LM2903 SOIC 48-80140L06 zener diode 5.1V SOT VR402 thru 406 48-80948V01 zener diode 27V SOT 48-80140L15 zener diode 10V SOT VR408, 409 48-80948V01 zener diode 27V SOT 48-80140L15 zener diode 10V SOT 48-80948V01 zener diode 27V SOT VR411, 412 48-80140L12 zener diode 8.2V SOT VR551 thru 553 48-80140L15 zener diode 10V SOT crystal: (see note) filter 45.1 MHz 12.5 kHz includes Y51A and Y51B filter 45.1 MHz 25 kHz ncludes Y51A and Y51B) 48-80008K02 44.645 MHz (see note) 16.8 MHz 48-80113R01 7.9488 MHz 14-80168S01 crystal insulator (2 used for Y52, Y201 26-04398J01 VCO/synthesizer shield (4 used) 26-04399J01 receiver mixer bottom shield receiver front end top shield 26-04419J01 PA shield frame 26-04420J01 PA shield cover 42-80281L01 ground clip (2 used for Q2640)

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

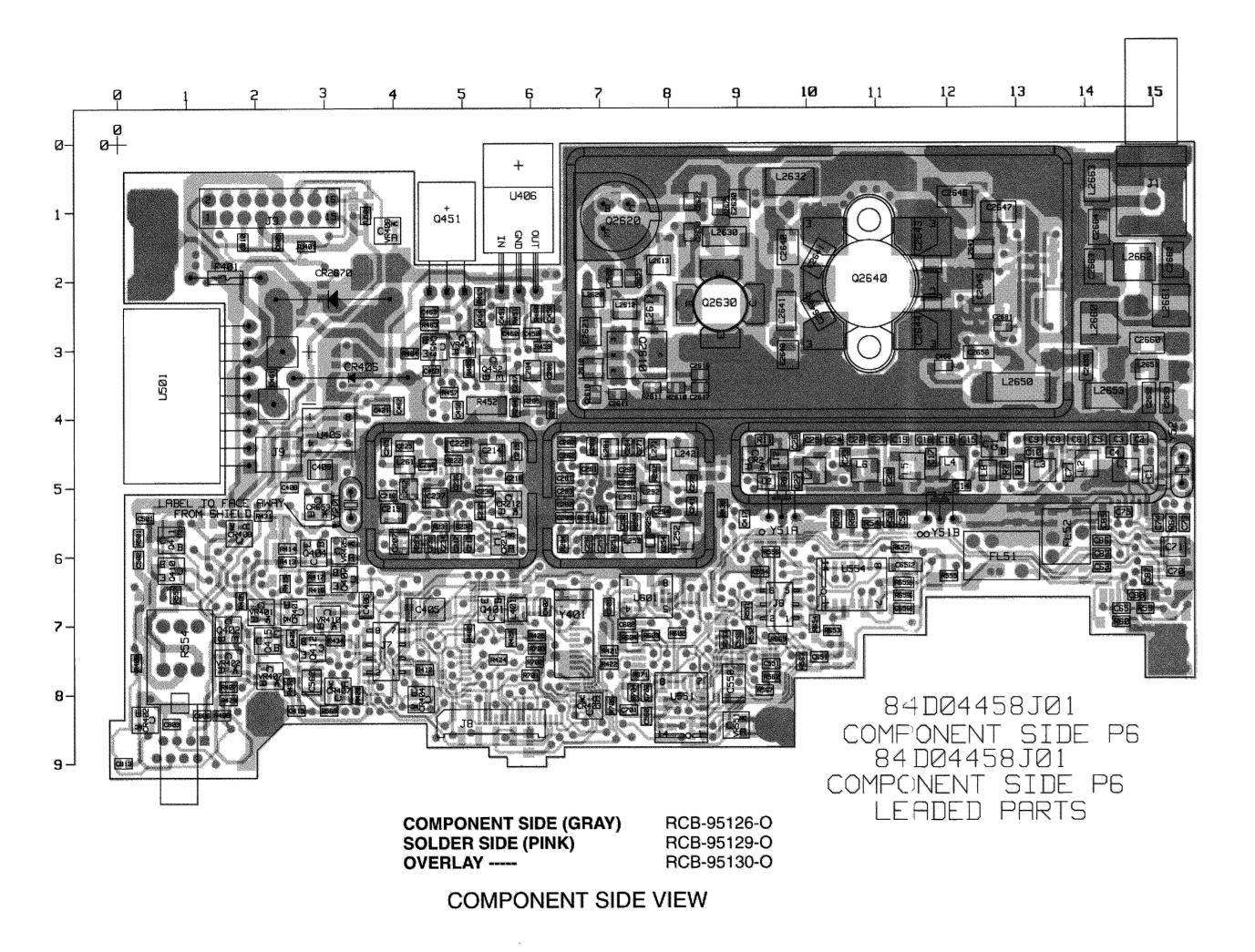
frequency stability of the radio at temperature extremes.

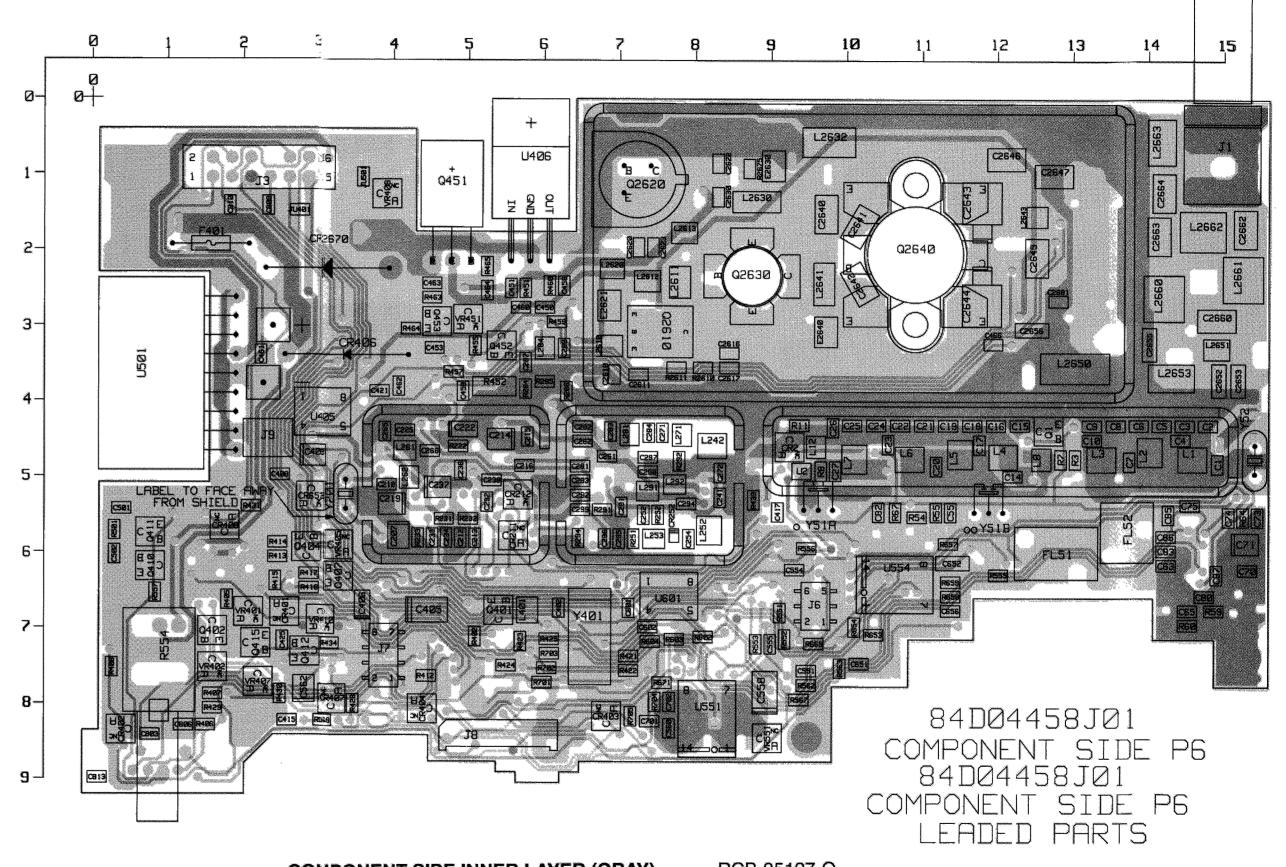
Designators marked with an (*) denote parts which are not field serviceable. Recalibration of the radio using specialized factory equipment is mandatory when these components are replaced in order to guarantee the specified

UHF Main Boards, 450-470 MHz, 12.5 & 20-25 kHz, 10-25 W (Part of PMUE1006A, PMUE1007A, PMUE1054A, and PMUE1055A Radios)

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6880903Z45-A

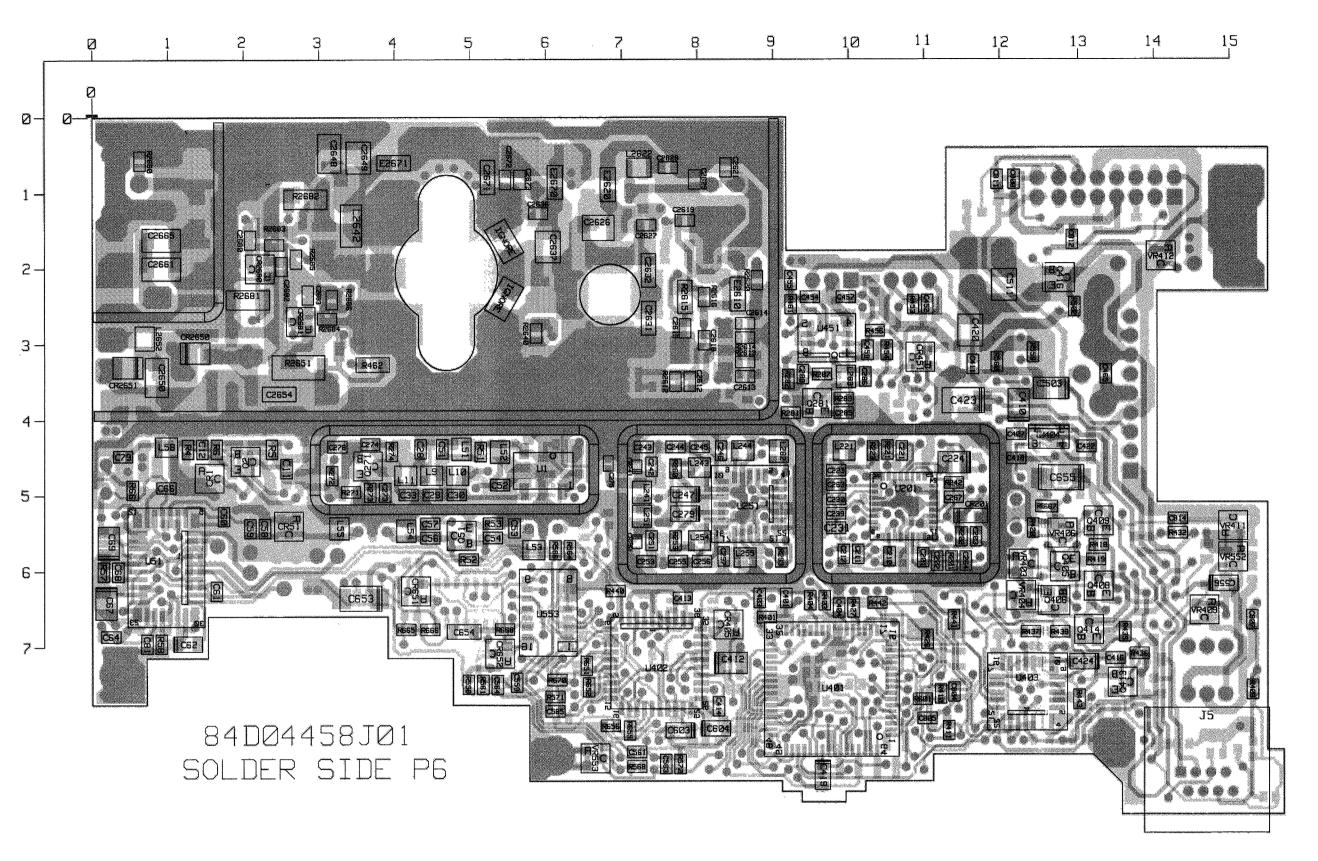




COMPONENT SIDE INNER LAYER (GRAY)
SOLDER SIDE INNER LAYER (PINK)
OVERLAY -----

RCB-95127-O RCB-95128-O RCB-95130-O

Circuit Board Details for UHF Main Boards, 450-470 MHz, 12.5 & 20-25 kHz, 40 W (Part of PMUE1039A, PMUE1040A, PMUE1056A, and PMUE1057A Radios)

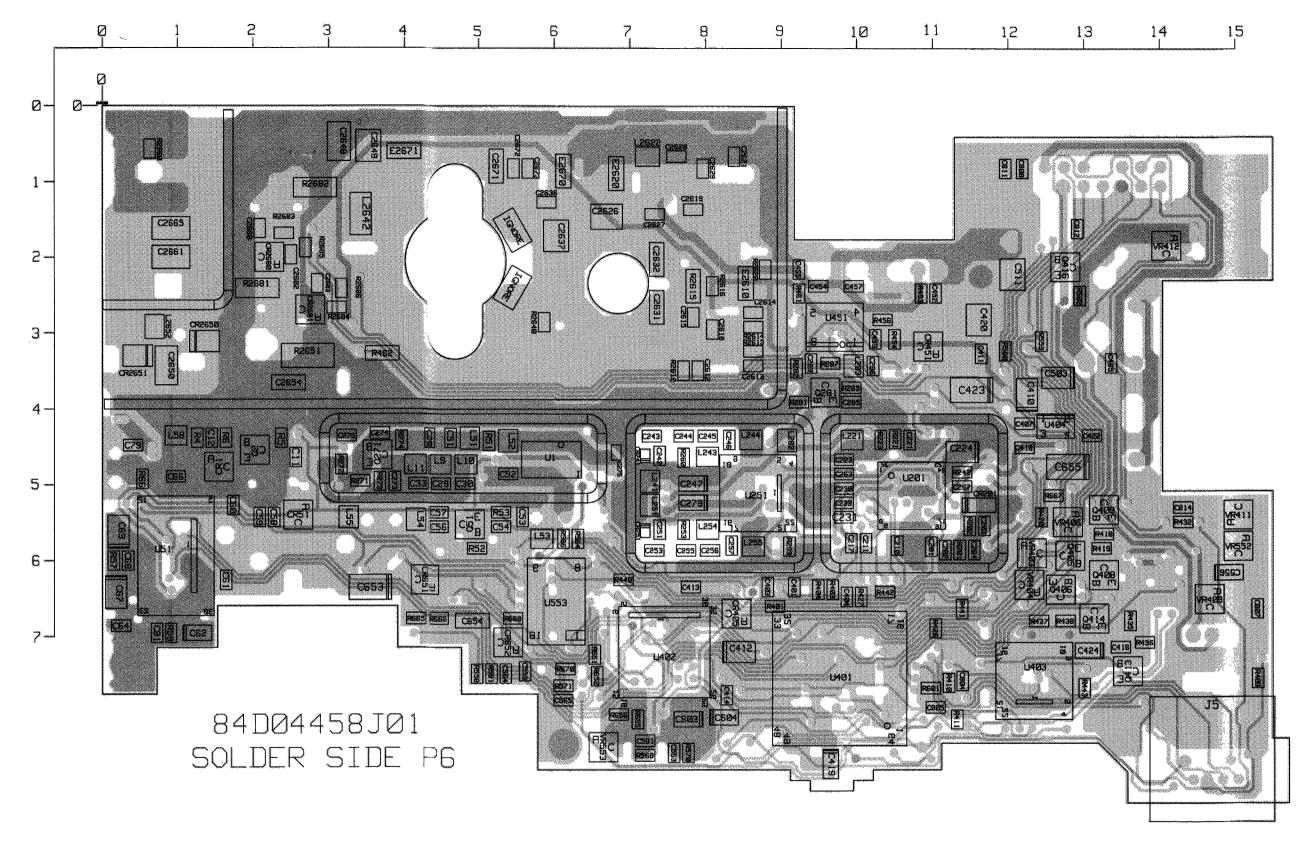


COMPONENT SIDE (GRAY) SOLDER SIDE (PINK) OVERLAY -----

RCB-95126-O (REV) RCB-95129-O (REV) RCB-95131-O (REV)

Circuit Board Details for UHF Main Boards, 450-470 MHz, 12.5 & 20-25 kHz, 40 W (Part of PMUE1039A, PMUE1040A, PMUE1056A, and PMUE1057A Radios)

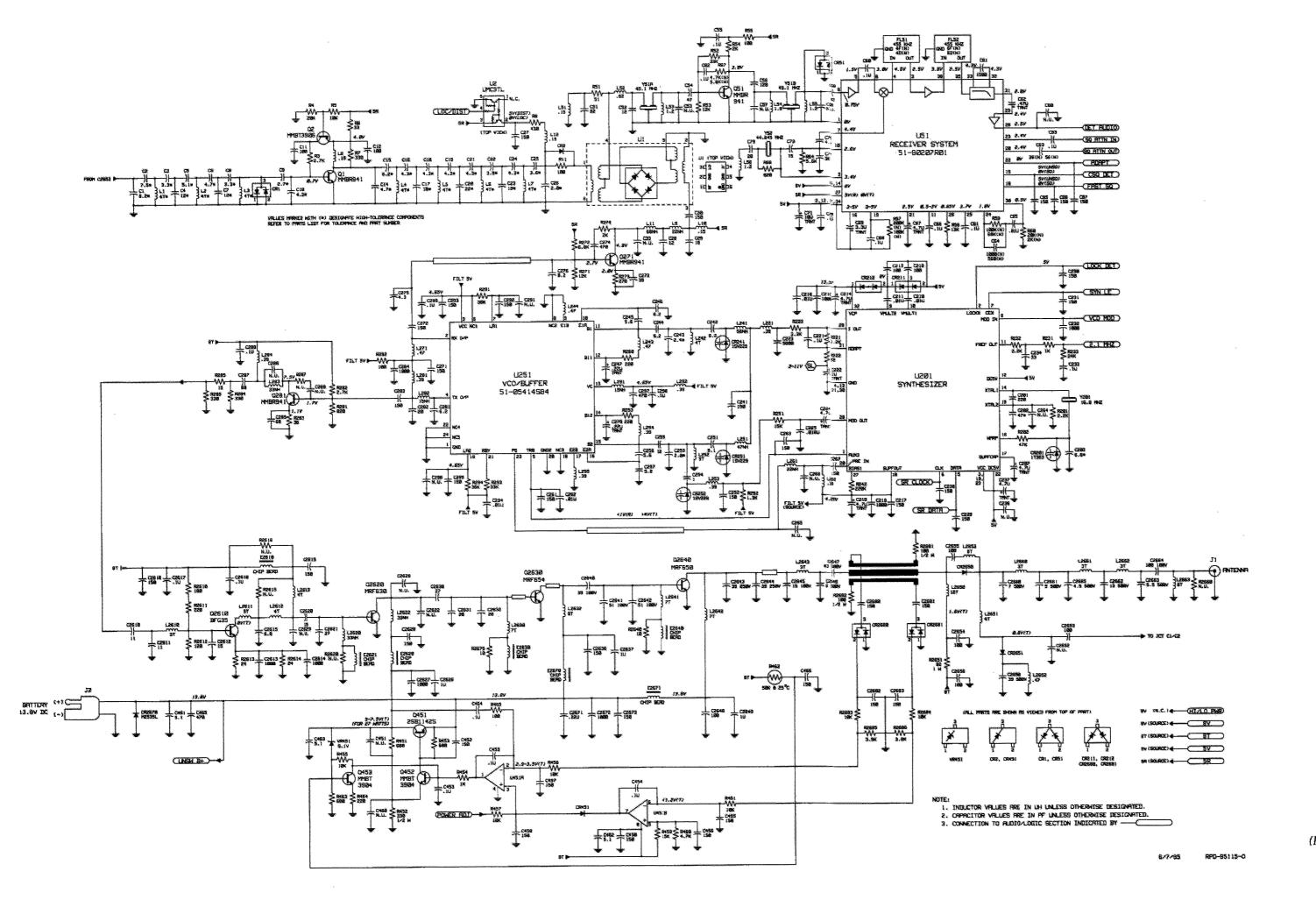
SOLDER SIDE VIEW



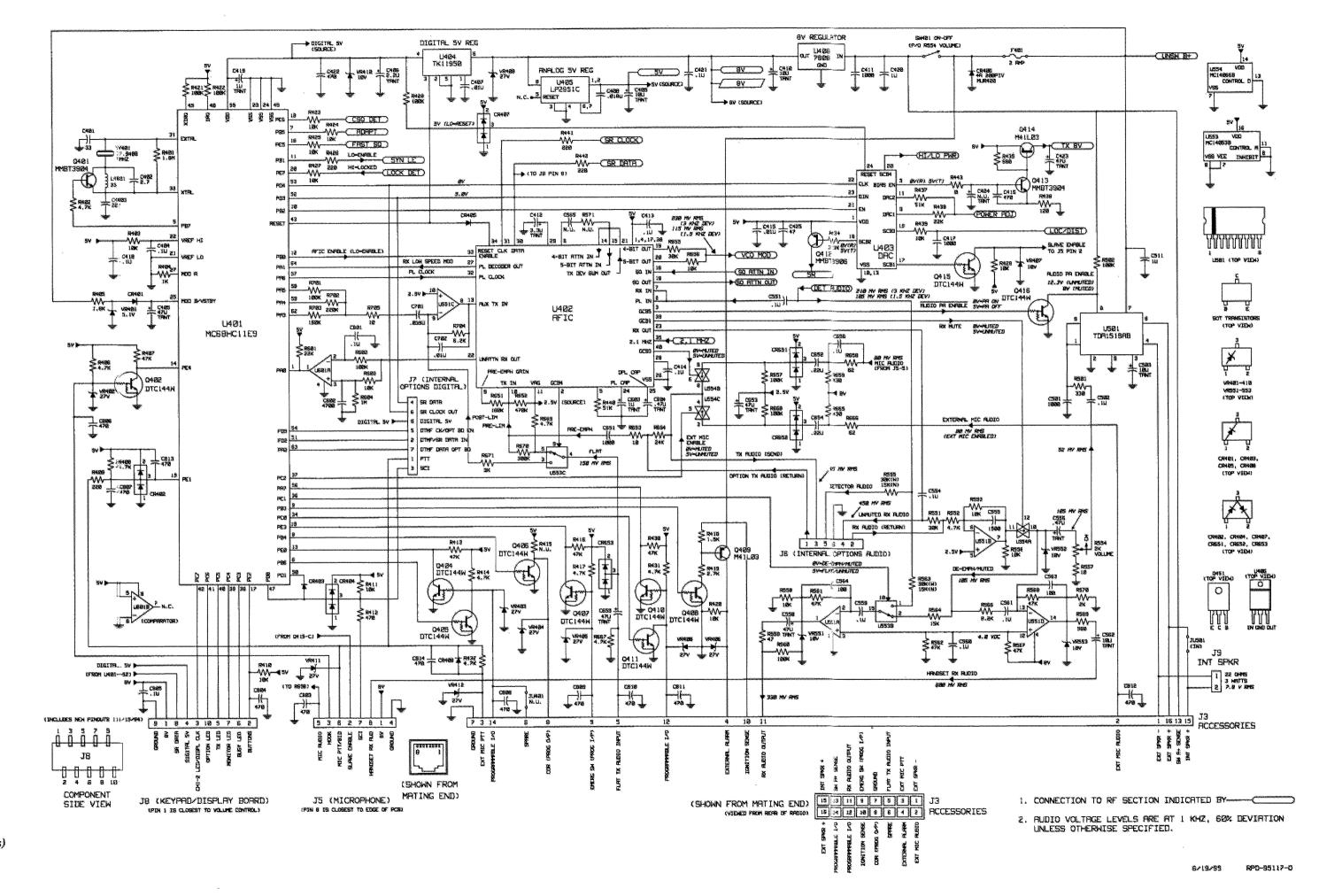
COMPONENT SIDE INNER LAYER (GRAY) SOLDER SIDE INNER LAYER (PINK) OVERLAY ----

RCB-95127-O (REV) RCB-95128-O (REV) RCB-95131-O (REV)

SOLDER SIDE VIEW



Schematic Diagram for UHF Main Boards, 450-470 MHz, 12.5 & 20-25 kHz, 40 W (Part of PMUE1039A, PMUE1040A, PMUE1056A, and PMUE1057A Radios) (Sheet 1 of 2)



Schematic Diagram for UHF Main Boards, 450-470 MHz, 12.5 & 20-25 kHz, 40 W (Part of PMUE1039A, PMUE1040A, PMUE1056A, and PMUE1057A Radios) (Sheet 2 of 2)

4 68809032

6880903Z45-A

March, 1998

Parts List

REFERENCE MOTOROLA

SYMBOL PART NO.

SM50/SM120 LIHE Main Board, 450-470 MHz, 40 Watts. 12.5 kHz (N) (Used in PMUE1039 & PMUE1056)

SM50/SM120 UHF Main Board, 450-470 MHz, 40 Watts, 20/25 kHz (W) (used in PMUE1040 & PMUE1057)

21-13740G21 5.6 ±0.1 pF

21-13740G24 6.8 ±0.1 pF

21-13740G16 3.6 ±0.1 pF

21-13740G30 11 pF 2%

21-13740G27 3.9 ±0.1 pF

21-13740G23 6.2 ±0.1 pl

21-13740G28 9.1 pF 2%

21-13740G12 2.4 ±0.1 pl

21-13740G13 2.7 ±0.1 pl

21-13740G12 2.4 ±0.1 pl

21-13740A55 100 pF

21-13740L05 3.0 ±0.1 pF

21-13740G18 4.3 ±0.1 pl

21-13740G18 4.3 ±0.1 pl

21-13740G18 4.3 ±0.1 pl

21-13740G34 16 pF 2%

21-13740G18 4.3 ±0.1 pl

21-13740G17 3.9 ±0.1 pl

21-13740G18 4.3 ±0.1 pl

21-13740G10 2.0 ±0.1 pl

7.5 ±0.1 pl

13 pF 2%

13 pF 2%

0.1 uF 10%; 16 V

0.1 uF 10%; 16 V

tantalum 0.47 uF 10%; 25 V

tantalum 4.7 uF 10%; 16 V

tantalum 3.3 uF 10%; 20 1

tantalum 10 uF 10%; 16 V

21-13740A55

21-13740G25

21-13740G32

1-13740G32

21-13740A59

21-13740A31

21-13740A35

21-13740A59

21-13743A19

21-13740A57

21-13743A19

23-11049A05

21-13740A42

21-13740A49

1-13740A79

23-11049J11

23-11049J07

23-11049A57

21-13740A42

21-13740A59

1-13740A63

21-13741A45

1-13740A59

21-13740479

23-11049407

21-13741A51

21-13740A59

21-13740A79

21-13740A41

C85 thru 8

C210, 211

C212, 213

C230, 231

C218 C219

21-13740A53 82 pF

21-13740A31 12 pF

21-13740A46 47 oF

1-13740A53 82 pF

21-13741A25 1500 pF

21-13740A73 560 pF

21-13741A45 .01 uF

21-13740A33 15 pF

21-13740A36 20 pF

21-13740G46 47 pF 2%

21-13740G24 6.8 ± 01 nF

21-13741A45 01 uF

21-13740A55 100 pF

21-13740A79 1000 pl

21-13741A39 5600 pF

21-13740A18 4.3 ±0.25 pF

21-13743A19 0.1 uF 10%; 16 V

150 nF

23-11049J11 tantalum 4.7 uF 10%; 16 V

23-11049J11 tantalum 4.7 uF 10%; 16 V

.01 ul

1000 pF

21-13743A19 0.1 uF 10%: 16 V

23-11049J11 tantalum 4.7 uF 10%: 16 V

23-11049J11 tantalum 4.7 uF 10%; 16 V

.018 uF

1000 pl

21-13743A19 0.1 uF 10%; 16 V

tantalum 1 uF 10%; 16 V

21-13743A19 0.1 uF 10%; 16 V

21-13743A19 0.1 uF 10%: 16 V

21-13743A19 00.1 uF 10%; 16 V

PL-951012-A

DESCRIPTION

capacitor, fixed: uF +/-5%; 50 V:

inless otherwise stated

12 5 kHz (N) (Lead in PMLIF1039 & PMLIF1056) SM50/SM120 UHF Main Board, 450-470 MHz, 40 Watts, 20/25 kHz (W) (used in PMUE1040 & PMUE1057)

SYMBOL

C236

C254

C256, 257

C264 thru 266

C271, 272

C281 C282 C283 C284 C285 C286 C287 C288 C289

C292, 293

C404 C405 C406 C407 C408 C409, 410

C413, 414

C421 C422 C423 C424 C425 C450 C451 C452

C455 thru 458

C238, 239

SM50/SM120 LIHE Main Board, 450-470 MHz, 40 Watts.

PART NO.

23-11049.111

21-13740A59

21-13740A59

23-11049A03

21-13740A59

21-13740A03

21-13740A31

21-13740A21

21-13740A59

21-13741A45

21-13740A59

21-13740A59

21-13740A59

21-13740A49

21-13740A71

21-13740A23

21-13740A36

21-13740A59

21-13740A79

21-13740A51

21-13743A19

21-13740A59

21-13741A45

21-13740A59

21-13740A71

1-13740A41

21-13740A37

23-11049J43

23-11049A40

21-13741A45

23-11049J07

21-13741A45

21-13740A79

21-13741A51 .018 uF

21-13740A79 1000 pF

21-13740A71 470 nF

21-13740A71 470 nF

21-13740A46 47 pF

21-13740A59 150 pF

21-13740A59

21-13740A59

21-13740A71

21-13740A59

21-13740A28 9.1 ±0.25 pF

21-13740A20 5.1 ±0.25 pF

21-13740A20 5.1 ±0.25 pF

21-13740A79 1000 pF

21-13743A19 0.1 uF 10%; 16 V

150 pF

21-13743A19 0.1 uF 10%; 16 V

21-13743A19 0.1 uF 10% 16 V

21-13743A19 0.1 uF 10%; 16 V

21-13743Å19 0.1 uF 10%: 16 V

21-13741W01 1 uF 10%: 25 V

21-13743Å19 0.1 uF 10%: 16 V

.01 uF

23-11049A07 tantalum 1 uF 10%: 16 V

23-11049J43 tantalum 47 uF 10%; 10 V

23-11049A57 tantalum 10 uF 10%; 16 V

21-13740A13 2.7 ±0.25 pF

21-13740A51 68 pF

PL-951012-A

tantalum 4.7 uF 10%; 16 V

tantalum 0.22 uF 10%; 35 V

tantalum 0.22 uF 10%; 35 V

150 oF

150 nF

1+0.25 pl

5.6.±0.25 pl

6.2 +0.25 pF

0.1 uF 10%; 16 V

tantalum 47 uF 10%: 10 V

tantalum 2.2 uF 10%: 10 V

tantalum 3.3 uF 10%; 20 V

21-13740A27 8.2 +0.25 pF

21-13740A23 6.2 ±0.25 pF

21-13740A21 5.6 ±0.25 pF

21-13740A23 6.2 ±0.25 pF

21-13740A27 8.2 ±0.25 pF

21-13740F18 4.3±0.25 pF

21-13740A27 8.2 ±0.25 pF

21-13740G09 1.8±0.1 pF

21-13740G12 24+01 nl

SM50/SM120 UHF Main Board, 450-470 MHz, 40 Watts. 12.5 kHz (N) (Used in PMI IE1039 & PMI IE1056) SM50/SM120 UHF Main Board, 450-470 MHz, 40 Watts. 20/25 kHz (W) (used in PMUE1040 & PMUE1057)

PART NO.

23-11049A57 tantalum 10 uF 10%: 16 V

23-11049A05 tantalum .47 uF 10%: 25 V

23-11049J43 tantalum 47 uF 10%: 10 V

23-11049A07 tantalum 1 uF 10%; 16 V

23-11049A05 tantalum 0.47 uF 10%; 25 V

23-11049J43 tantalum 47 uF 10%; 10 V

0.1 uF 10%; 16 V

tantalum 10 uF 10%; 16 V

tantalum 47 uF 10%: 10 V

21-13741W01 1 uF 10%: 25 V

21-13741A79 1000 nF

21-13740A55 100 pF

23-11049A57

21-13741A37

21-13740A79

23-11049J43

21-13741A45

21-13740A71

21-13740A30

21-13740A33

21-13740A79

21-13740A59

21-13743A19

21-13740A59

C2617, 2618
C2619
C2620
C2620
C2621
C2621
C2622, 2623
C2626
C2627
C2627
C2627
C2628
C2628
C2628
C2628
C2629
C2629
C2630
C2631, 2632
C2630
C2631, 2632
C2631

21-13740A29

21-13743A19 0.1 uF 10%: 16 V

21-13743A19 0.1 uF 10%; 16 V

21-13743A19 0.1 uF 10% 16 V

21-13743A19 0.1 uF 10%; 16V

21-11032B15 0.22 uF +80/-20%

21-13743A19 0.1 uF 10%; 16 V

21-13743A19 0.1 uF 10%; 16 V

21-13740A24 6.8 ±0.25 pF

21-13741W01 1 uF 10%; 25 V

21-19741W01 1 HF 10% 25 V

21-11078B18 15 pF: 100 V

21-11078B34 47 pF 100 V

21-11078B35 51 pF 100 V

21-11078B36 56 pF; 100 V

21-80060M15 8 ±0 55F 500 V

21-13741W01 1 uF 10%: 25 V

21-90060M13 7+0 5 nF 500 W

21-11078B05 4.7+0.2 pF 100 \

21-80060M22 13 oF 500 V

21-80060M11 6+0.5 pF 500 \

21-80060M43 100 nF 100 V

21-13740A79

21-13740A59

48-02245J22

2683 21-13740A59

21-11078B05 4.7±0.25 pF 100 \

21-11032B15 0.22 uF +80/-20%

48-80154K03 dual Schottky SOT

48-05129M76 silicon SQT

48-80939T01 Schottky SOT

48-80154K03 dual Schottky SOT

1000 pF

48-80142L01 silicon PIN SOT MMBV3401

48-62824C01 silicon varactor SOT 1SV229

48-62824C01 silicon varactor SOT 1SV229

48-13833C07 dual silicon SOT MMBD7000

silicon varactor SOT 1T363

dual silicon SOT MMBD7000

150 pF

150 pF

21-80060M33 39 pF 500 V

21-80060M34 43 pF 500 V

21-80964X35 clamped mica 39 pF 250 V 21-11078B18 15 pF 100 V

21-13741A59 .039 uF

21-13740A71 470 pF

SYMBOL

C503

C551 C554 C555 C556 C558 C559 thru 5

C562 C563, 564

C803, 804

C806 thru 81

C2613, 2614

C2680 thru:

CR201 CR211, 21

C511

SM50/SM120 UHF Main Board, 450-470 MHz, 40 Watts, PL-951012-A 20/25 kHz (W) (used in PMUE1040 & PMUE1057)

SYMBOL

CR2650, 2651

E2620, 2621

E2670, 2671

F401

FL51(N)

FL52(N)

FL52(W)

JU501

L1 thru 7

L221 L241

L242

L292

L2610

L2612

L253 thru 255

SM50/SM120 UHF Main Board, 450-470 MHz, 40 Watts.

PART NO

12.5 kHz (N) (Used in PMUF1039 & PMUF1056) PL-951012-A

48-13833C07 dual silicon SOT MMBD7000

48-13833C07 dual silicon SOT MMBD7000

48-82290T02 dual Schottky SOT HSMS-2802

ferrite beads:

connector, receptacle:

telephone type, 8 contact, microphone

30-04510J01 power cable assembly (includes J2)

16-pin, accessories

10-pin, display board

2-pin, internal speake

09-04424J05 6-pin, internal options audio

09-04424J06 8-pin, internal options digital

Not Used

jumper

24-84562T11 4 turns airwound 2%

24-83411T63 0.15 pH 5% shielder

24-62587X55 chip 0.15 uH 5%

24-62587X45 chip 22 nH 5%

24-62587X51 chip 68 nH 5%

24-62587X55 chip 0 15 nH 5%

24-62587X55 chip 0.15 µH 5%

24-62587X69 chip 1.2 uH 5%

24-62587N71 chip 1.8 µH 5%

24-62587X69 chip 1.2 uH 5%

24-62587X69 chip 1.2 uH 5%

24-62587X50 chip 56 nH 5%

24-62587X60 chip 0.39 uH 5%

24-62587X61 chip 0.47 uH 5%

24-62587X60 chip 0.39 uH 5%

24-62587X45 chip 22 nH 5%

24-62587X61 chip 0.47 uH 59

24-62587X60 chip 0.39 uH 5%

24-62587X43 chip 15 nH 5%

24-62587X47 chip 33 nH 5%

24-62587X60 chip 0.39 uH 5%

24-62587X60 chip 0.39 uH 5%

24-62587X43 chip 15 nH 5%

24-62587T40 chin 33 nH 5%

24-62587T40 chip 33 nH 5%

24-60578C43 chip 33 uH

24-60591A01 3 turns

24-60591C73 5 turns

24-60591B17 4 turns

24-60591B73 4 turns

24-60591E73 7 turns

24-60591S77 9 turns

24-60591E73 7 turns

24-62587X60 chip 0.39 uH 5%

24-62587X49 chip 47 nH 5%

24-84562T11 4 turns airwound 2%

24-84562T13 3 turns airwound 2%

24-62587X63 chip 0.62 uH 5%

ferrite bead

48-83553T02 44 200 PIV MURA20

48-02482J02 silicon PIN MA4P1250

48-80236E07 transient suppressor

48-05129M76 silicon SOT

48-05129M76 silicon SOT

48-05129M76 silicon SOT

24-84657R01 ferrite bead

24-84657R01 ferrite bear

24-84657R01 ferrite bear

24-84657R01 ferrite bead

91-80098D04 455 kHz 4F

91-80098D06 455 kHz 4D

91-80097D04 455 kHz 6F

91-80097D06 455 kHz 6D

28-04503.101

09-04426J01

09-04422J02

28-04423J01

06-62057C01

09-09006C01 mini UHF coax

65-05214E04 2 amp axial lead

24-84657R01

CR651 thru 653 48-13833C07 dual silicon SQT MMRD7000

12.5 kHz (N) (Used in PMUE1039 & PMUE1056) SM50/SM120 UHF Main Board, 450-470 MHz, 40 Walls 20/25 kHz (W) (used in PMUE1040 & PMUE1057) REFERENCE MOTOROLA

PART NO.

SYMBOL

Q404 thru 408

Q410, 411

O415, 416

R60(W)

R67(N) R67(W)

R202

R222

R223 R231

R260 R271

R272 R273

R274 R281

R282 R283 R284

R285 R286

R287

SM50/SM120 UHF Main Board, 450-470 MHz, 40 Watts.

24-60591E69

24-60591R53

24-60591X01

24-60591X01

48-80947V01

48-80947V01

48-13824A17

48-80947V01

48-02245J25

06-62057C85

06-62057D07

06-62057C99

06-62057C39

06-62057C63

06-62057066

06-62057C51

06-62057C44

06-62057D12

06-62057D02

06-62057C82

06-62057D31

06-62057D24

06-62057C82

06-62057C91

06-62057D03 13k

06-62057D24 100k

06-62057D20 68k

06-62057D07 20k

06-62057C93 5.6k

06-62057C73 820

06-62057C93 5.6k

06-62057C83 2.2k

06-62057D16 47k

06-62057C83 2.2k

06-62057C49 82

06-62057C87 3.3k

06-62057C83 2 2kg

06-62057D09 24k

06-62057C78 1.3k

06-62057059 220

06-62057C59 220

06-62057D02 12k

06-62057095 6.8

06-62057C61 270

06-62057073 820

06-62057C85 2.7k

06-62057C47 68

06-62057C63 330

06-62057C63 330

Not Used

06-62057C31

06-62057C82 2k

06-62057D32 220k

06-62057C75

06-62057004

24-60591A13 3 turns

24-60591B77 4 turns

24-60591R53 8 turns

24-60591V77 12 turns

24-11087B22 chip 0.47 uH

8 turns

3 turns

3 turns

48-13827A07 NPN: type MMBR941

48-13824A17 PNP: type MMBT3906

48-13827A07 NPN; type MMBR941

48-13827A07 NPN: type MMBR94

48-13827A07 NPN; type MMBR94

48-80141L03 PNP type M41L03

48-80214G02 NPN-type MMRT390

48-80214G02 NPN: type MMBT390

48-02245-124 NPN: type RFG35

48-80225C09 NPN: type MRF638

48-80225C19 NPN: type MRF65

48-80225C24 NPN: type MRF65

48-80141L03 PNP type M41L03

48-80214G02 NPN; type MMBT3904

48-80947V01 digital NPN: type DTC144W

digital NPN: type DTC144V

digital NPN: type DTC144V

digital NPN; type DTC144W PNP: type 2SB1142S

resistor, fixed: +/-5%; 1/10 W:

unless otherwise stated

PNP: type MMBT3906

DESCRIPTION

REFERENCE	MOTOROLA	
SYMBOL	PART NO.	DESCRIPTION
R291	06-62057D14	39k
R292 R293	06-62057C51	100
R294	06-62057D12	33k
R401	06-62057D13 06-62057D54	36k
R402	06-62057C91	1.8 meg. 4.7k
R403	06-62057C99	10k
R404	06-62057C75	1k
R405	06-62057C81	1.8k
R406	06-62057C91	4.7k
R407	06-62057D16	47k
R408 R409	06-62057C91	4.7k
R410, 411	06-62057C59 06-62057C99	220 10k
R412	06-62057C67	470
R413	06-62057D16	47k
R414	06-62057C91	4.7k
R415		Not Used
R416	06-62057D16	47k
R417 R418	06-62057C91	4.7k
R419	06-62057C79 06-62057C85	1,5k 2.7k
R420	06-62057C99	10k
R421, 422	06-62057D24	100k
R423 thru 425	06-62057C99	10k
R426	06-62057C27	10
R427	06-62057C99	10k
R428 R429	06-62057D24	100k
R430	06-62057C99 06-62057D16	10k
R431, 432	06-62057D16 06-62057C91	47k 4.7k
R434	06-62057C87	4.7k 3.3k
R435	06-62057C71	680
R436	06-62057C53	120
R437	06-62057D17	51k
R438 R439	06-62057D08	22k
R440	06-62057C99	10k
R441, 442	06-62057D17 06-62057C27	51k 10
R443	06-62057C01	0
R451	06-62057C71	680
R452	06-80195M37	330 1/2 watt
R453	06-62057C71	680
R454	06-62057C75	1k
R455 thru 457	06-62057C99	10k
R459 R460	06-62057D04	15k
R461	06-62057C91 06-62057C99	4.7k 10k
R462	06-05621T02	thermistor 50k @ 25°C
R463	06-62057C71	680
R464	06-62057C59	220
R465	06-62057C51	100
R501	06-62057C63	330
R502	06-62057D24	100k
R551 R552, 553	06-62057D11	30k
H552, 553 R554	06-62057D02	12k
R555(N)	18-04405J02 06-62057C27	variable 2k with switch
R555(W)	06-62057D11	30k
R556	06-62057C99	10k
R557	06-62057C27	10
R558	06-62057C99	1 0 k
R559	06-62057C43	47
R560	06-62057D24	100k
R561, 562 R563(N)	06-62057D16	47k
H563(N)	06-62057D04 06-62057D11	15k
R564	06-62057D11	30k 15k
R566	06-62057C97	8.2k
R567, 568	06-62057D16	47k
R569	06-62057C69	560
R570	06-62057C82	2k
R571		Not Used
R601	06-62057D08	22k
R602	06-62057D24	100k
R603 R604	06-62057C99 06-62057D48	10k
R651	06-62057D48 06-62057D30	1 meg 180k
R652	06-62057D40	470k
- 11 11 11 11		
R653	06-62057C27	10

06-62057D09 24k

SM50/SM120 UHF Main Board, 450-470 MHz, 40 Watts,

12.5 kHz (N) (Used in PMI IF1039 & PMI IF1056)

SM50/SM120 UHF Main Board, 450-470 MHz, 40 Watts 12.5 kHz (N) (Used in PMUE1039 & PMUE1056) 50/SM120 UHF Main Board, 450-470 MHz, 40 Watts, 20/25 kHz (W) (used in PMUE1040 & PMUE1057)

PL-951012-A

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
R655	06-62057D11	30k
R656	06-62057C99	10k
R657	06-62057D24	100k
R658	06-62057C46	62
R659	06-62057C66	430
R665	06-62057C66	430
R666	06-62057C46	62
R667	06-62057C91	4.7k
R668	06-62057D24	100k
R669	06-62057C91	4.7k
R670	06-62057D35	300k
R671	06-62057C86	3k
R701	06-62057D24	100k
R702	06-62057D32	220k
R703	06-62057D29	160k
R704	06-62057C94	6.2k
R705	06-62057C27	10
R2610	06-62057C57	180
R2611	06-62057C59	220
R2612		
	06-62057C53	120
R2613, 2614 R2615, 2616	06-62057C36	24
	***	Not Used
R2620, 2621	***	Not Used
R2640	06-62057C27	10
R2651	06-80194M23	82 1 watt
R2660	***	Not Used
R2675	06-62057C27	10
R2681, 2682	06-80195M25	100 1/2 watt
R2683, 2684	06-62057C99	10k
R2685, 2686	06-62057C89	3.9k
		integrated circuit: (see no
U1	51-80505D01	double-balanced mixer
U2	48-09939C04	dual transistor switch UMC3
U51	51-80207R01	receiver system
U201*	(see note)	synthesizer
U251	51-02227566	VCO/buffer
U401	51-99010D01	microcomputer MC68HC71
U402	51-02227J35	audio filter
U403	51-05226P38	DAC
U404	51-80633C01	5 V regulator TK11950
U405	51-05469E65	5 V regulator LP2951C
U406	51-13816D03	8 V regulator MC7808BT
U451	51-80932W01	dual op-amp LM2904 SOIC
U501	51-80147R01	audio power amp TDA1519/
U551	51-02198J28	
U553	51-84704M60	quad op-amp LM2902D SOI
U554		triple 2-channel switch 4053
U601	51-84704M52	quad bilateral switch 4066B
0001	51-02198J23	dual comparator LM2903 SC
		voltage regulator: (see not
VR401	48-80140L06	zener diode 5.1 V SOT
VR402 thru 406	48-80948V01	zener diode 27 V SOT
VR407	48-80140L15	zener diode 10 V SOT
VR408, 409	48-80948V01	zener diode 27 V SOT
VR410	48-80140L15	zener diode 10 V SOT
VR411, 412	48-80948V01	zener diode 27 V SOT
VR451	48-80140L14	zener diode 9.1 V SOT
VR551 thru 553	48-80140L15	zener diode 10 V SOT
		crystal: (see note)
Y51(N)	91-80112R06	crystal: (see note) filter 45.1 MHz 12.5 kHz
. 22/11/	31-00112MU0	
VETAKA	DI BAZZAMAN	(includes Y51A and Y51B)
Y51(W)	91-80112R05	filter 45.1 MHz 25 kHz
Ven	40.00000000	(includes Y51A and Y51B)
Y52	48-80008K02	44.645 MHz
Y201*	(see note)	16.8 MHz
Y401	48-80113R01	7.9488 MHz
	*****	enced items
	14-80168501	crystal insulator (2 used for)
	26-04398J01	VCO/synthesizer shield (4 us
	26-04399J01	receiver mixer bottom shield
	26-04400J01	receiver front end top shield
	26-04419J01	PA shield frame
	26-04420J01	PA shield cover
	26-04420J01 42-80281L01	PA shield cover ground clip (2 used for Q264

frequency stability of the radio at temperature extremes.

Designators marked with an (*) denote parts which are not field serviceable. lecalibration of the radio using specialized factory equipment is mandator

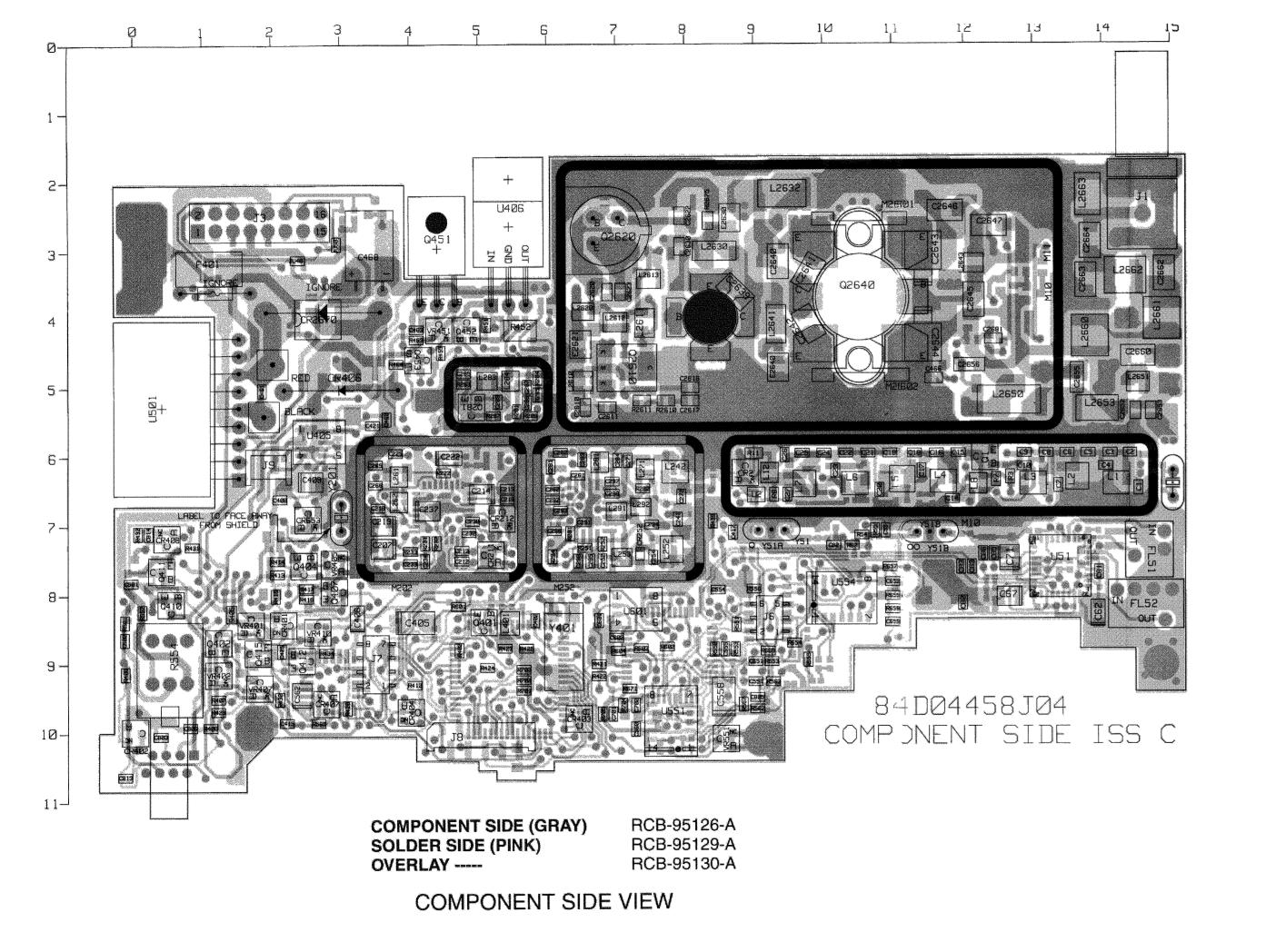
when these components are replaced in order to guarantee the specified

Parts List for UHF Main Boards, 450-470 MHz, 12.5 & 20-25 kHz, 40 W (Part of PMUE1039A, PMUE1040A, PMUE1056A, and PMUE1057A Radios)

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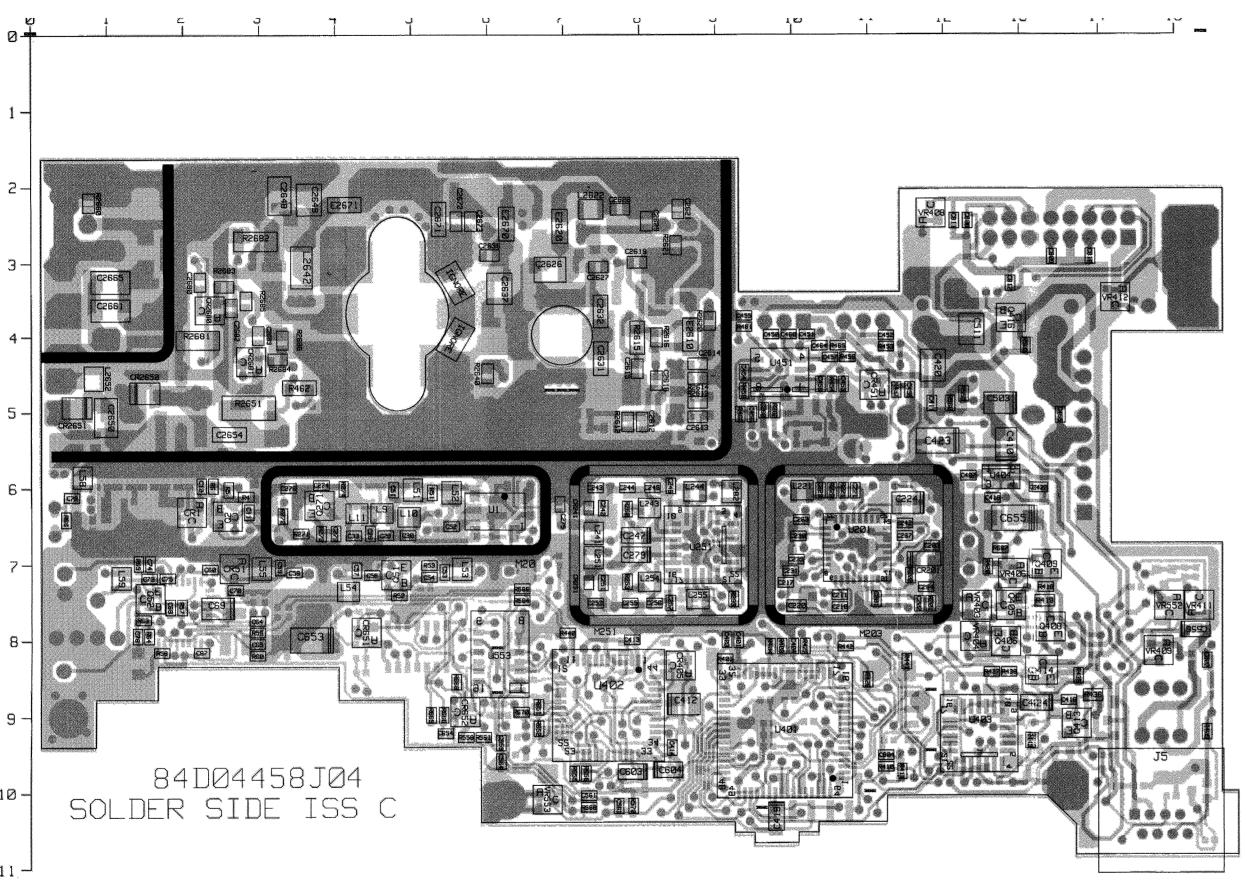
6880903Z45-A



84D04458J04 COMPONENT SIDE ISS C RCB-95127-A RCB-95128-A COMPONENT SIDE INNER LAYER (GRAY)
SOLDER SIDE INNER LAYER (PINK) RCB-95130-A OVERLAY ----

COMPONENT SIDE VIEW

Circuit Board Details for UHF Main Boards, 450-470 MHz, 12.5 & 20-25 kHz, 40 W (Part of PMUE1039B, PMUE1040B, PMUE1056B, and PMUE1057B Radios)



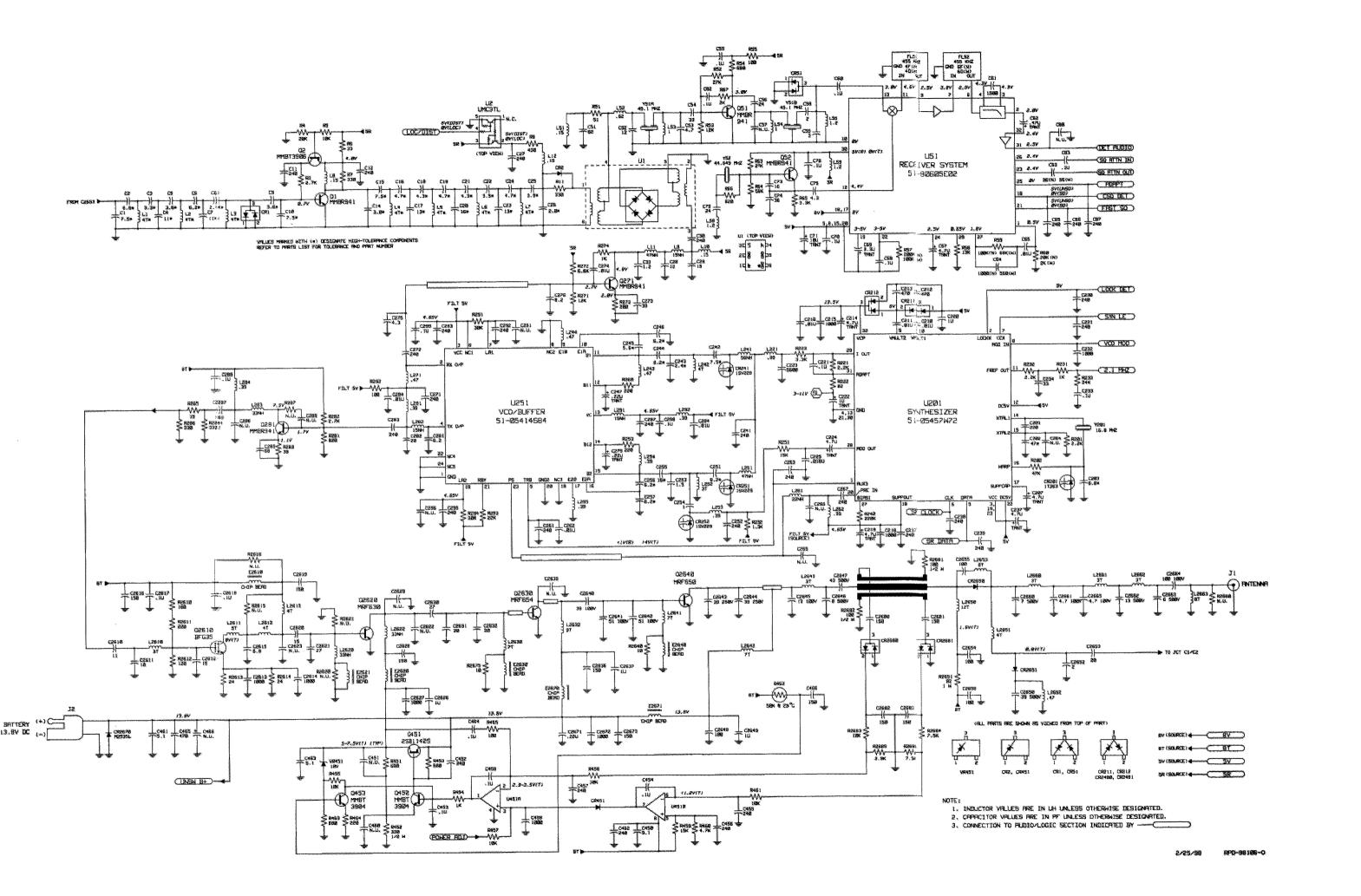
COMPONENT SIDE (GRAY)
SOLDER SIDE (PINK)
OVERLAY -----UHF Main Boards, 450-470 MHz, 12.5 & 20-25 kHz, 40 W (Part of PMUE1039B, PMUE1040B, PMUE1056B, and PMUE1057B Radios)

RCB-95126-A (REV) RCB-95129-A (REV) RCB-95131-A (REV)

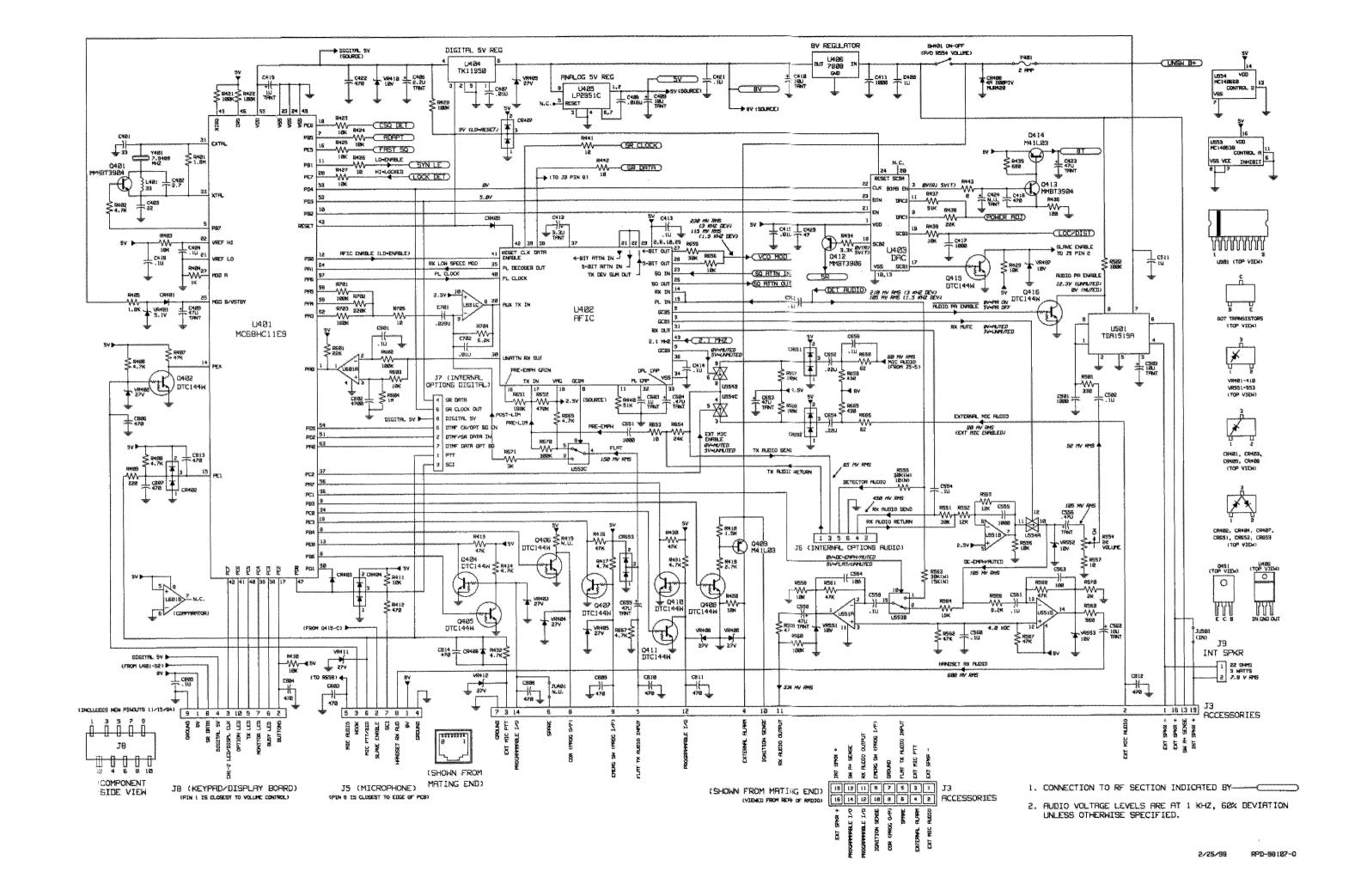
SOLDER SIDE VIEW

84D04458J04 SOLDER SIDE ISS C COMPONENT SIDE INNER LAYER (GRAY)
SOLDER SIDE INNER LAYER (PINK)
OVERLAY -----SOLDER SIDE VIEW

RCB-95127-A (REV) RCB-95128-A (REV) RCB-95131-A (REV)



Schematic Diagram for UHF Main Boards, 450-470 MHz, 12.5 & 20-25 kHz, 40 W (Part of PMUE1039B, PMUE1040B, PMUE1056B, and PMUE1057B Radios) (Sheet 1 of 2)



Schematic Diagram for UHF Main Boards, 450-470 MHz, 12.5 & 20-25 kHz, 40 W (Part of PMUE1039B, PMUE1040B, PMUE1056B, and PMUE1057B Radios) (Sheet 2 of 2)

40

6880903Z45-A

March, 1998

Parts List

C20 thru 22

C63(W)

C210, 211

C212, 213

C215

C218

C219

C230, 231

(later version) (used in PMUE1039 & PMUE1056)

21-13740F50 91 pF

21-13740F38 30 pF

21-13740F38 30 pF

21-13740F50 91 pF

21-13740F51 100 pF

21-13740F41 39 pF

21-13741F29 1500 p

21-13740F41 39 pF

21-13740F54 130 p

21-13740F50 91 pF

21-13740F43 47 pf

21-13740F50 91 pF

21-13740F54 130 p

21-13740F40 36 pF

21-13741F29 1500 n

21-13741F29 1500 of

21-13741F29 1500 p

21-13740F37 27 pF

21-13741F29 1500 p

21-13740F30 13 p8

21-13740F30 13 pF

21-13740F49 82 pF

21-13740F29 12 nF

21-13740F39 33 nF

21-13740F36 24 pF

21-13740F10 2±0.25 pF

21-13740F14 3+0.25 bF

21-13741F29 1500 pF

21-13740F40 36 pF

21-13740F45 56 pF

21-13741F25 1000 pl

21-13740F69 560 pF

21-13740F32 16 pF

21-13740F40 36 pF

21-13740F36 24 pF

21-13740F60 240 pF

21-13740F59 220 bl

21-13741F49 .01 uF

21-13741F17 470 pF

21-13741F29 1500 pF

21-13741F49 .01 uF

21-13741F29 1500 pl

21-13741F43 5600 pF

21-13741F17 470 pF

21-13741F25 1000 oF

21-13743F20 0.1 uF 10%: 16 V

21-13928E01 1 uF 10%: 10 V

21-13743F20 0.1 pF 10%: 16 V

21-13740L34 47 pF 2%

21-13740L14 6.8 ±0.1 pF

21-13740F18 4.3 ±0.25 pF

21-13743E20 0.1 uF 10%: 16 V

21-13743E20 0.1 uF 10%; 16 V

21-13741F49 0.01 uF

21-13740L03 2.4 ±0.1 pF

21-13740F19 4.7 ±0.25 pF

21-13743E20 0.1 uF 10%; 16 V

21-13743E20 0.1 uF 10%: 16 V

23-11049A05 tantalum 0.47 uF 10%; 25 V

23-11049J11 tantalum 4.7 uF 10%; 16 V

23-11049J07 tantalum 3.3 uF 10%; 20 V

23-11049A57 tantalum 10 uF 10%; 16 V

23-11049J11 tantalum 4.7 uF 10%; 16 V

23-11049J11 tantalum 4.7 uF 10%: 16 V

23-11049J11 tantalum 4.7 uF 10%: 16 V

23-11049A07 tantalum 1 uF 10%; 16 V

21-13743E05 .018 uF 10%; 16 V

21-13743E20 0.1 pF 10%: 16 V

23-11049.111 tantalum 4.7 uF 10%- 16 V

21-13743E20 0.1 uF 10% 16V

21-13743E20 0.1 uF 10%; 16 V

21-13743E20 0.1 uF 10%; 16 V

21-13740F20 5.1 ±0.25 pF

SM50/SM120 UHF Main Board, 450-470 MHz 40 W, 20/25/30 kHz (W) (later version) (used in PMUE1040 & PMUE1057)

SM50/SM120 UHF Main Board, 450-470 MHz, 40 W, 12.5 kHz (N) REFERENCE MOTOROLA SYMBOL PART NO. capacitor, fixed: uF +/-10%; 100 V: unless otherwise stated 21-13740F39 21-13740F52

SM50/SM120 UHF Main Board, 450-470 MHz, 40 W, 12.5 kHz (N) (later version) (used in PMUF1039 & PMUF1056) M50/SM120 UHF Main Board, 450-470 MHz 40 W, 20/25/30 kHz (W (later version) (used in PMUE1040 & PMUE1057)

23-11049J11 tantalum 4.7 uF 10%; 16 V

23-11049A03 tantalum 0.22 uF 10%; 35 V

15 pF 2%

82+01n

23-11049A03 tantalum 0.22 uF 10%; 35 V

21-13740F39 33 pF

21-13740F55 150 pF

21-13741F29 1500 nF

21-13740L22 15 pF 2%

21-13740F03 1 ± 025 pF

21-13740L19 11 pF 2%

21-13740L18 10 pF 2%

21-13740L26 22 pF 2%

21-13740F05 1.2 ±0.25 pF

21-13740F08 1.6 ±0.25 pF

21-13740L18 10 pF 2%

21-13741F49 .01 uF

21-13741F29 1500 pF

21-13740F30 13 pF

21-13741F25 1000 pF

21-13741F29 1500 pl

21-13741F49 .01 uF

21-13740F29 12 pF

21-13740F31 15 pF

21-13741F29 1500 pF

21-13741F29 1500 pf

21-13741F25 1000 pl

21-13741F29 1500 pF

21-13741F49 .01 uF

21-13741F29 1500 pF

21-13740F39 33 pF

21-13740F35 22 nF

21-13741F49 .01 uF

21-13741F25 1000 pF

21-13741F49 .01 uF

21-13741F17 470 pF

21-13741F25 1000 pF

21-13741F17 470 pF

21-13740F43 47 pF

21-13741F29 1500 pF

21-13741F29 1500 pF

21-13741F29 1500 pF

21-13740F26 9.1 ±.025 pF

21-13743E20 0.1 uF 10%: 16 V

21-13743E20 0.1 uF 10%; 16 V

21-13740F20 5.1 ±0.25 pF

21-13740F20 5.1 +0.25 nF

21-13743E20 0.1 uF 10%: 16 V

21-13743E20 0.1 uF 10%: 16 V

21-13743E20 0.1 uF 10%; 16 V

21-13743E20 0.1 uF 10%; 16 V

21-13743E20 0.1 uF 10%; 16 V

21-13743E20 0.1 uF 10%: 16 V

21-13743E05 .018 uF 10%; 16 V

21-13743E20 0.1 uF 10%; 16 V

21-13743E20 0.1 uF 10%; 16 V

21-13741W01 1 uF 10%; 25 V

21-13743E20 0.1 uF 10%; 16 V

23-11049A07 tantalum 1 uF 10%; 16 V

23-11049J43 tantalum 47 uF 10%; 10 V

21-13743K16 0.22 uF +80/-20%: 16 V

23-11049J43 tantalum 47 uF 10%: 10 V

23-11049A57 tantalum 10 uF 10%; 16 V

23-11049J07 tantalum 3.3 uF 10%; 20 V

23-11049A40 tantalum 2.2 uF 10%: 10 V

21-13740F13 2.7+0.25 pF

21-13740F27

21-13740F24 7.5 ±0.25 pF

21-13740F25 8.2 ±0.25 pF

21-13741F29 1500 pF

21-13740L22

21-13740L16

21-13740L16 8.2 ±0.1 pF

SYMBOL PART NO.

C234 C237

C242 C243

C244

C246

C251

C253 C254 C255 C256 C257 C261

C271 thru 273

C274

C275

C276

C279

C281 C282 C283

C284 C285 C286

C287 C288

C289 C291 C292 C293 C294 C295

C296 C297 C298 C299 C401 C402

C403 C404 C405

C406

C407

C409, 410

C413, 414

C421 C422 C423

C424 C425

C460 C461

C462 C463

C452 C453, 454

C455 thru 458

C238, 239

SM50/SM120 UHF Main Board, 450-470 MHz, 40 W, 12.5 kHz (N) (later version) (used in PMUE1039 & PMUE1056) 150/SM120 UHF Main Board, 450-470 MHz 40 W, 20/25/30 kHz (W) (later version) (used in PMUE1040 & PMUE1057) PL-981004-O REFERENCE MOTOROLA

PART NO.

C559 thru 56

CROS thru 814

C2432

C2433 C2434

C2435 C2436

C2472

C2473

C2474

1-13741F29

21-13740A71 470 pF

21-13741F25 1000 pF

21-13741F25 1000 pF

21-13740F51 100 pF

21-13741F41 4700 pF

21-13741F25 1000 pF

11-13741F49 01 uF

21-13741F17 470 nF

21-13741F17 470 pF

21-13740A71 470 pF

21-13740A40 30 pF

21-13740A71 470 pF

21-13740A71 470 pF

21-13740A79 1000 pF

21-13740A71 470 pF

21-13740A42 36 pF

21-13740A57 120 pF

21-13740A71 470 pF

21-13740A62 200 pF

21-13740A61 180 pF

21-13740A52 75 pF

21-13740B36 30 of

21-13740A48 51 pF

21-13740A71 470 pF

21-11032B15 0.22 uF +80/-20%

21-11078B43 110 pF 100 V

21-11078B55 330 pF 100 V

21-11078B53 270 pF 100 \

21-11078B52 240 pF 100 V

1-11078B39 75 pF 100 V

21-11078R39 75 nF 100 V

21-80060M32 36 pF 500 V

21-11078R59 470 nF 100 V

21-11078B55 330 pF 100 V

21-80060M24 16 pF 500 V

21-13740A35 18 pF

21-13740A71 470 pF

21-13740A71 470 pF

21-80060M25 18 pF 500 V

21-11078B18 15 pF 100 V

21-80060M30 30 pF 500 V

21-11078B59 470 pF 100 V

21-11078B18 15 pF 100 V

21-13740A71 470 pF

21-13740A71 470 pF

21-13741W01 1 uF 10%: 25 \

21-13743A19 0.1 uF 10%: 16 V

Not Used

21-13741W01 1 nF 10%: 25 \

21-13743E20 0.1 uF 10%; 16 V

21-13741W01 1 uF 10%; 25 V

21-13743E20 0.1 uF 10%; 16 V

21-13743E20 0.1 uF 10%; 16 V

21-13743E20 0.1 uF 10%: 16 V

21-13743E20 0.1 uF 10%: 16 V

23-11049A57 tantalum 10 uF 10%; 16 V

23-11049A05 tantalum 0.47 uF 10%; 25 V

23-11049J43 tantalum 47 uF 10%; 10 V

23-11049A57 tantalum 10 uF 10%; 16 V

23-11049A07 tantalum 1 uF 10%: 16 V

21-13743K16 0.22 uF +80/-20%: 16 V

21-13743K16 0.22 HF +80/-20%: 16 V

21-13743E20 0.1 uF 10%: 16 V

1-13743E11 .039 uF 10%: 16 V

1-13743E20 0 1 uF 10%: 16 V

21-13743A19 0.1 uF 10%: 16 V

21-13743A19 0.1 uF 10%: 16 \

21-13741W01 1 uF 10%: 25 \

23-11049J43 tantalum 47 uF 10%; 10 V

23-11049.I43 tantalum 47 uF 10%: 10 V

23-11049A05 tantalum 0.47 uF 10%; 25 V

DESCRIPTION

S3M50/SM120 UHF Main Board, 450-470 MHz, 40 W, 12.5 kHz (N) (tater version) (used in PMUE1039 & PMUE1056) SM50/SM120 UHF Main Board, 450-470 MHz 40 W, 20/25/30 kHz (W) (liater version) (used in PMUE1040 & PMUE1057)

C2481 thru 2483 21-13740A71 470 pF

C2485, 2486

CR212 CR241 CR251 CR252 CR401

CR402 CR403 CR404 CR405 CR406 CR407

CR2450, 2451

E2420, 2421

E2470, 2471

E2430

FL51(N) FL51(W) FL52(N) FL52(W)

L1 thru 7

21-80464E52 clamped mica 60 pF 250V

48-80154K03 dual Schottky SOT

48-80154K03 dual Schottky SOT

48-05218N57 dual silicon SOT

48-05129M76 silicon SOT

48-05129M76 silicon SOT

48-05129M76 silicon SOT

48-05129M76 silicon SOT

24-84657R01 ferrite bead

24-84657R01 ferrite bead

91-80098D04 455 kHz 4F

91-80097D04 455 kHz 6F

91-80097D06 455 kHz 6D

09-80627E01 mini UHF coax

09-04422J01 10-pin, display board

28-04423J01 2-pin, internal speake

Not Used

iumper

16-pin, accessories

91-80098D06 455 kHz 4D

65-05214E04 2 amp axial lead

24-84657R01

24-84657R01

24-84657R01

28-04503 101

06-62057B47

24-60591G24 9 turns

24-62587X69 chip 1.2 uH 5%

24-62587X50 chip 56 pH 5%

24-62587X69 chip 1.2 uH 5%

24-62587X50 chip 56 nH 5%

24-62587N72 chip 2.2 uH 5%

24-62587X63 chip .62 uH 5%

24-62587X68 chip 1 uH 5%

24-62587X69 chip 1.2 uH 5%

24-62587X69 chip 1.2 uH 5%

24-62587X69 chip 1.2 uH 5%

24-62587X49 chip 47 nH 5%

24-62587X69 chip 1.2 uH 5%

24-62587V36 chip 0.15 uH 5%

24-62587X51 chip 68 nH 5%

24-62587X69 chip 1.2 uH 5%

24-62587X53 chip 0.1 uH 5%

24-62587X69 chip 1.2 uH 5%

24-62587X69 chip 1.2 uH 5%

24-62587X69 chip 1.2 uH 5%

24-62587X52 chip 82 nH 5%

24-62587V37 chip 0.18 uH 5%

24-62587X55 chip 0.15 uH 5%

48-80939T01 Schottky SOT

48-83553T02 4A 200 PIV MUR420

48-02482J02 silicon PIN MA4P1250

48-80236E07 transient suppressor

ferrite beads

ferrite bead

ferrite bead

ferrite bead

diode: (see note)

SYMBOL PART NO.

48-80142L01 silicon PIN SOT MMBV3401 48-02245J22 silicon varactor SOT 1T363 L2420 48-13833C07 dual silicon SOT MMRD7000 L2421 L2422, 2423 48-62824C03 silicon varactor SOT 1SV232 48-62824C03 silicon varactor SOT 1SV232 L2431 48-62824C03 silicon varactor SOT 1SV232 L2432 L2433 48-13833C07 dual silicon SOT MMBD7000 L2441 L2442 48-13833C07 dual silicon SOT MMBD7000 L2443 L2450 L2451 L2452 48-13833C07 dual silicon SOT MMBD7000 CR651 thru 653 48-13833C07 dual silicon SOT MMED7000 48-82290T02 dual Schottky SOT HSMS-2802 Q281 Q401 Q402 Q404 thru 408 Q410, 411 Q415, 416 Q451 Q452, 453 Q2420 Q2430 Q2440 30-04510J01 power cable assembly (includes J2) 09-04426J01 telephone type, 8 contact, microphone 09-04424J01 6-pin, internal options audio R1. 2 09-04424J03 8-pin, internal options digital

R223

R231 R232

06-62057A57 2.2k

06-62057A57 2.2k

06-62057A49 1k

SM50/SM120 UHF Main Board, 450-470 MHz, 40 W, 12.5 kHz (N) (later version) (used in PMUE1039 & PMUE1056) SM50/SM120 UHF Main Board, 450-470 MHz 40 W, 20/25/30 kHz (W) (later version) (used in PMUE1040 & PMUE1057) PL-981004-0 REFERENCE MOTOROLA

PART NO. R233 24-62587X49 chip 47 nH 5% 24-62587X69 chip 1.2 uH 5% R241 24-62587X46 chip 27 nH 5% R242 24-62587X69 chip 1.2 uH 5% R251 R252 R253 24-60578C43 chip 33 uH 24-60591H77 10 turns 24-62587N76 chip 4.7 uH 5% 24-60591C73 5 turns **R260** R271, 2 24-60591A49 3 turns R273 R274 R281 24-62587X45 chip 22 nH 5% 24-60591F77 8 turns R282 R283 R284 R285 R286 R287 R291 R292 R293 R294 R401 R402 R403 R404 R405 24-60591E77 7 turns 24-60591E77 7 turns 24-60591F77 8 turns 24-60591X01 3 turns 24-60591V77 12 turns 24-60591,J77 11 turns 24-11087B30 chip 2.2 uH L2460 thru 2462 24-60591X04 6 turns 24-60591S77 9 turns 48-13827A07 NPN; type MMBR941 48-13824A17 PNP: type MMBT390 'R406 R407 48-13827A07 NPN: type MMBR94 48-13827A07 NPN; type MMBR941 R408 48-13827A07 NPN; type MMBR941 48-80214G02 NPN; type MMBT3904 R409 48-80947V01 digital NPN; type DTC144W R410, 4 48-80947V01 digital NPN; type DTC144W R412 R413 48-80141L03 PNP: type BCW68G 48-80947V01 digital NPN; type DTC144W R414 48-13824A17 PNP; type MMBT3906 R415 48-80214G02 NPN: type MMBT3904 R416 R417 48-80141L03 PNP; type BCW68G 48-80947V01 digital NPN; type DTC144W R418 R420 48-80214G02 NPN; type MMBT3904 R421, 42 48-02245J24 NPN; type BFG35 48-02245J28 NPN; type BFQ43S R423 thr 48-80225C18 NPN; type MRF2628 R427 48-84411L04 NPN; type M1104 resistor, fixed: +/-5%; 1/16 W: R429 R430 unless otherwise stated 06-62057B47 R431, 4 R434 R435 06-62057A58 06-62057A80 R436 R437 R438 06-62057A73 06-62057A13 33 06-62057A23 06-62057A47 820 R439 06-62057A40 430 R441, 44 06-62057C59 220 1/10 W R443 R451 06-62057A18 51 06-62057A83 27k R452 R453 06-62057475 06-62057445 680 R454 R455 thi 06-62057A25 100 06-62057R05 200k R459 R460 R461 R462 06-62057A97 100k 06-62057A76 13F 06-62057A97 100k 06-62057A93 68 R463 R464 06-62057A80 20k 06-62057A56 2k R465 06-62057A83 27k 06-62057A91 56I 06-62057A61 3.3k R502 06-62057A47 820 R552 R553 R554 06-62057A56 2k 06-62057A65 4.7k R202 06-62057A89 47k 06-62057A49 1k 06-62057A01 R555(W) R556 R557 R558 R222 06-62057A18 06-62057A84 30k

SM50/SM120 U-IF Main Board, 450-470 MHz, 40 W, 12.5 kHz (N) (later version) (used in PMUE1039 & PMUE1056) M50/SM120 U-IF Main Board, 450-470 MHz 40 W, 20/25/30 kHz (W)

06-62057A73 10k

06-62057A01 10

06-62057A73 10k

RENCE IBOL	MOTOROLA	DECOMPTION .	REFERENCE	MOTOROLA	
HOUL	PART NO.	DESCRIPTION	SYMBOL	PART NO.	DESCRIPTION
	06-62057A82	24k	R559	06-62057A17	47
	06-62057A65	4.7k	R560	06-62057A97	100k
	06-62057806	220k	R561, 562	06-62057A89	47k
	06-62057A73	10k	R563(N)	06-62057A77	15k
	06-62057A56	2k	R563(W)	06-62057A84	30k
	06-62057A33	220	R564	06-62057A77	15k
	06-62057A65	4.7k	R566	06-62057A71	8.2k
272	06-62057A33 06-62057A75	220 12k	R567	06-62057A89	47k
	06-62057A23	82	R568	06-62057A89	47k
	06-62057A56	2k	R569	06-62057A43	560
	06-62057A56	2k	R570	06-62057A56	2k
	06-62057A59	2.7k	R601	06-62057A81	22k
	06-62057A15	39	R602	06-62057A97	100k
	06-62057A33	220	R603 R604	06-62057A73	10k
	06-62057A15	39	R651	06-62057B22 06-62057B04	1 meg. 180k
	06-62057A33	220	R652	06-62057B14	470k
	***	Not Used	R653	06-62057A01	10
	06-62057A92	62k	R654	06-62057A82	24k
	06-62057A25	100	R655	06-62057A84	30k
	06-62057A80	20k	R656	06-62057A73	10k
	06-62057A91	56k	R657	06-62057A97	100k
	06-62057B28	1.8 meg	R658	06-62057A20	62
	06-62057A65	4.7k	R659	06-62057A40	430
	06-62057A73	10k	R665	06-62057A40	430
	06-62057A49	1k	R666	06-62057A20	62
	06-62057C81	1.8k 1/10 W	R667	06-62057A65	4.7k
	06-62057A65	4.7k	R668	06-62057A97	100k
	06-62057A89	47k	R669	06-62057A65	4.7k
	06-62057A65	4.7k	R670	06-62057B09	300k
444	06-62057A33	220	R671	06-62057A60	3k
411	06-62057A73	10k	R701	06-62057A97	100k
	06-62057A41	470	R702	06-62057B06	220k
	06-62057A89	47k	R703	06-62057B03	160k
	06-62057A65	4.7k	R704	06-62057A68	6.2k
	00.00007480	Not Used	R705	06-62057A01	10
	06-62057A89	47k	R2410	06-62057C57	180 1/10 W
	06-62057A65 06-62057A53	4.7k 1.5k	R2411	06-62057C59	220 1/10 W
	06-62057Č85	2.7k 1/10 W	R2412	06-62057C53	120 1/10 W
	06-62057A73	10k	R2413, 2414	06-62057C36	24 1/10 W
422	06-62057A97	100k	R2420		Not Used
hru 425	06-62057A73	10k	R2430, 2431	***	Not Used
	06-62057A01	10	R2440		Not Used
	06-62057A73	10k	R2441	06-62057C27	10 1/10 W
	06-62057A97	100k	R2451	06-80194M23	82 1 W
	06-62057A73	10k	R2460	***	Not Used
	06-62057A89	47k	R2481, 2482	06-80195M25	100 1/2 W
432	06-62057A65	4.7k	R2483	06-62057C93	5.6k 1/10 W
	06-62057A61	3.3k	R2484	06-62057C96	7.5k 1/10 W
	06-62057A45	680	R2485	06-62057D02	12k 1/10 W
	06-62057A27	120	R2486	06-62057C96	7.5k 1/10 W
	06-62057A90	51k			
	06-62057A81	22k			integrated circuit: (see note)
	06-62057A73	10k	U1	51-80505D01	double-balanced mixer
	06-62057A90	51k	U2	48-09939C04	dual transistor switch UMC3TL
442	06-62057A01	10	U51	51-80605E02	receiver system
	06-62057B47	0	U201*	(see note)	synthesizer
	06-62057A45	680	U251	51-05414\$84	VCO/buffer
	06-80195M37	330 1/2 W	U401	51-99010D01	microcomputer MC68HC11E9
	06-62057A45	680	U402	51-80604E01	audio filter
	06-62057A49	1k	U403	51-05226P38	DAC
nru 457	06-62057A73	10k	U404	51-80633C01	5 V regulator TK11950
	06-62057A77	15k	U405	51-05469E65	5 V regulator LP2951C
	06-62057A65	4.7k	U406	51-13816D03	8 V regulator MC7808BT
	06-62057A73	10k	U451	51-80932W01	dual op-amp LM2904 SOIC
	06-05621T02	thermistor 50k @ 25 degrees C	U501	51-80147R01	audio power amp TDA1519C
	06-62057A50	1.1k	U551	51-02198J28	quad op-amp LM2902D SOIC
	06-62057A33	220	U553	51-84704M60	triple 2-channel switch 4053B
	06-62057A25	100	U554	51-05663U35	quad analog switch 4066B
	06-62057A37	330	U601	51-02198J23	dual comparator LM2903 SOIC
	06-62057A97	100k			and Marine and proposed and are a second and a second
	06-62057A84	30k	1/52%2	40 004 201 04	voltage regulator: (see note)
	06-62057A75	12k	VR401	48-80140L06	Zener diode 5.1 V SOT
	06-62057A75	12k	VR402 thru 406	48-80948V01	Zener diode 27 V SOT
d)	18-04405J01 06-62057A01	variable 2k with switch	VR407 VR408 409	48-80140L15	Zener diode 10 V SOT
3-1	1.07 - COV. 1.25 / ALL 7				

VR408, 409

VR411, 412

VR410

SM50/SM120 UHF Main Board, 450-470 MHz, 40 W, 12.5 kHz (N) SM50/SM120 UHF Main Board, 450-470 MHz, 40 W, 12.5 kHz (N) (later version) (used in PMUE1039 & PMUE1056) (later version) (used in PMLIE1039 & PMLIE1056). M50/SM120 UHF Main Board, 450-470 MHz 40 W, 20/25/30 kHz (W) SM50/SM120 UHF Main Board, 450-470 MHz 40 W, 20/25/30 kHz (W) PL-981004-0

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		crystal: (see note)
Y51(N)	91-80112R06	filter 45.1 MHz 12.5 kHz (includes Y51A and Y51B)
Y51(W)	91-80112R05	filter 45.1 MHz 25 kHz (includes Y51A and Y51B)
Y52	48-80606B02	44.645 MHz
Y201*	(see note)	16.8 MHz
Y401	48-80113R01	7.9488 MHz
· · · · · · · · · · · · · · · · · · ·	non-refer	enced items
	14-05160A02	crystal insulator (for Y201)
	26-04398J01	VCO/synthesizer shield (4 used)
	26-04399J01	receiver mixer bottom shield
	26-04400J01	receiver front end top shield
	26-04419J01	PA shield frame
	26-04420J01	PA shield cover
	42-80281L01	ground clip (2 used for Q2440)

Designators marked with an (*) denote parts which are not field serviceable. Recalibration of the radio using specialized factory equipment is mandatory when these components are replaced in order to guarantee the specified frequency stability of the radio at temperature extremes.

UHF Main Boards, 450-470 MHz, 12.5 & 20-25 kHz, 40 W

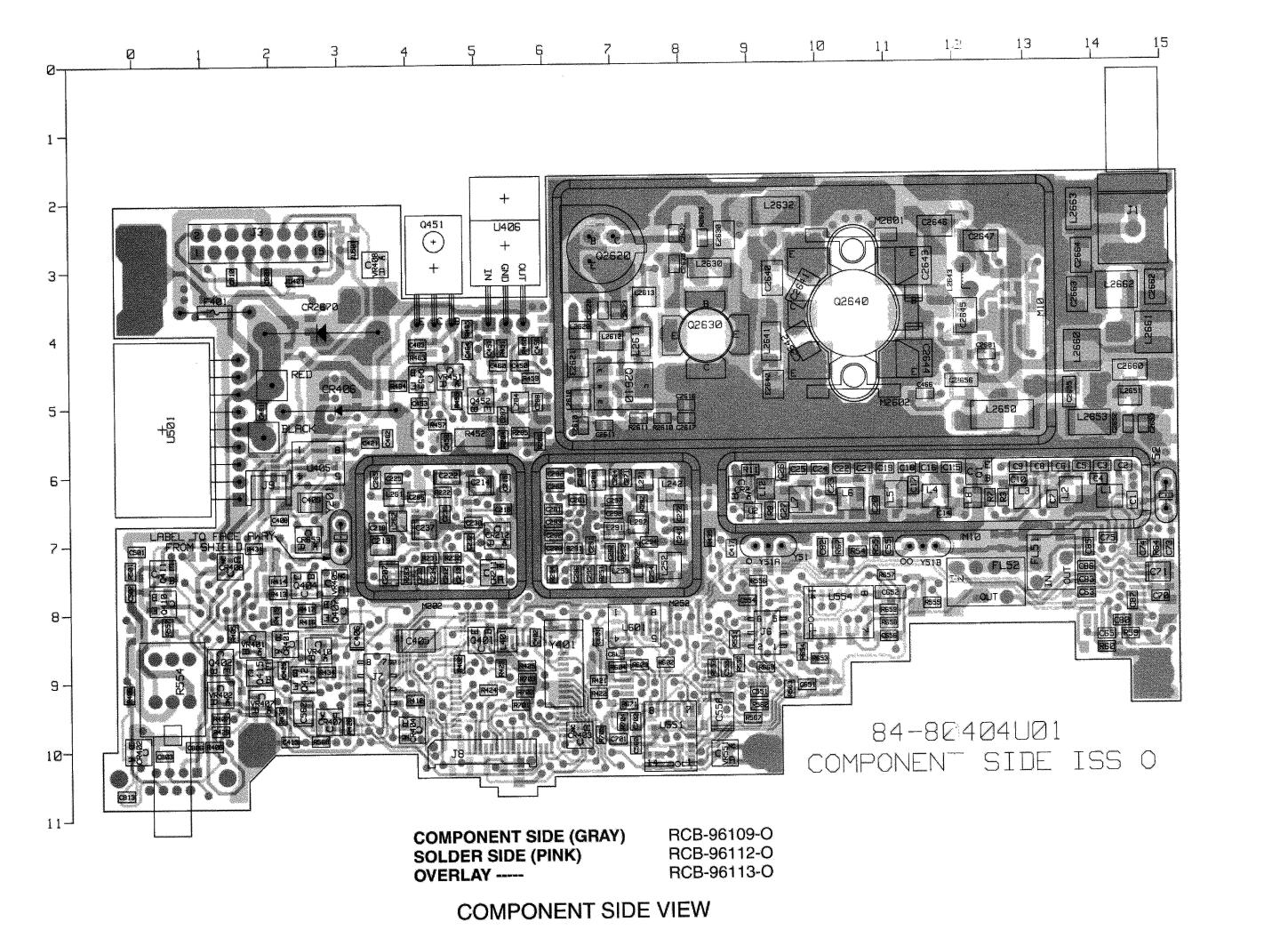
48-80140L05 Zener diode 4.7 V SOT VR551 thru 553 48-80140L15 Zener diode 10 V SOT (Part of PMUE1039B, PMUE1040B, PMUE1056B, and PMUE1057B Radios)

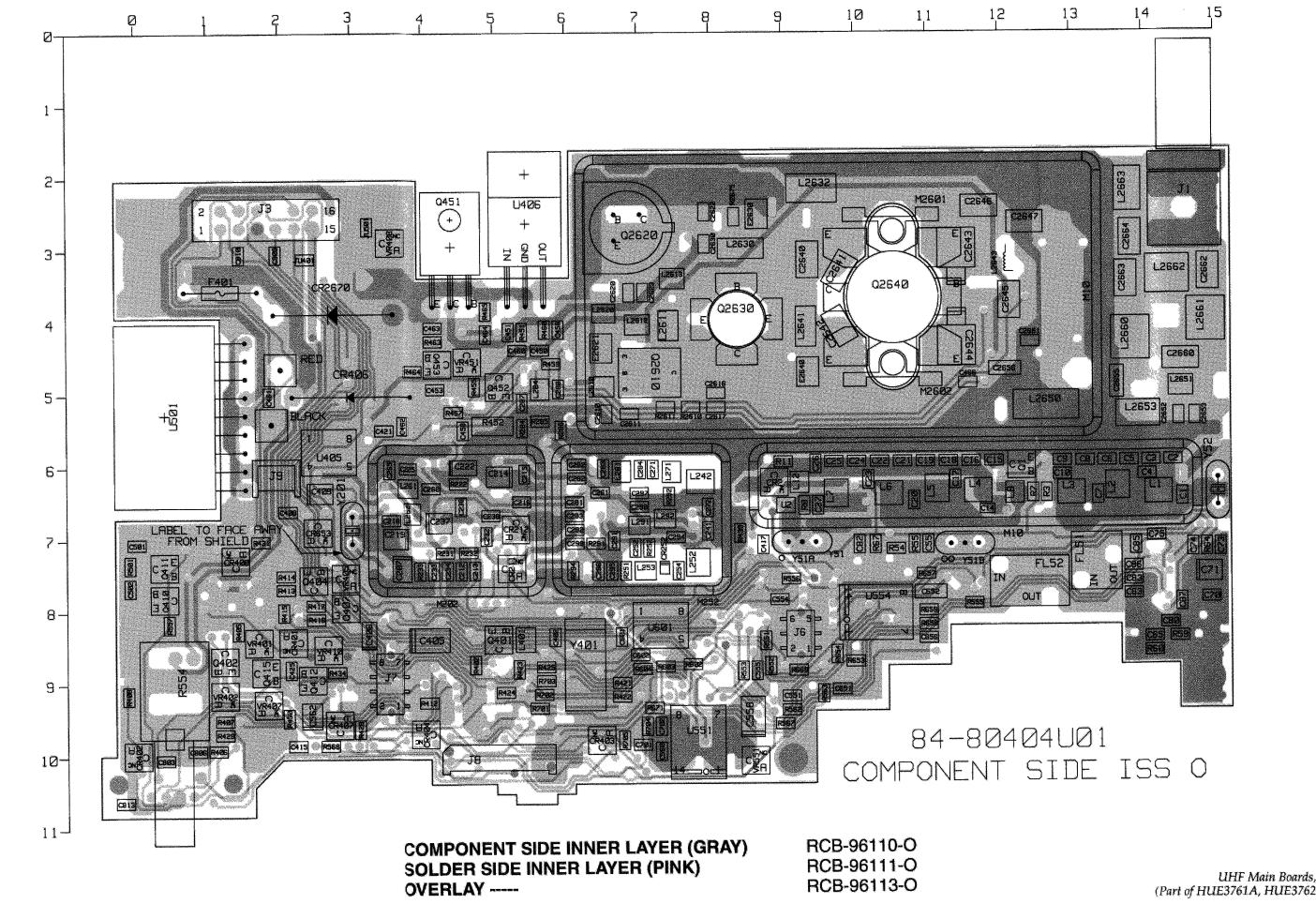
March, 1998

48-80948V01 Zener diode 27 V SOT

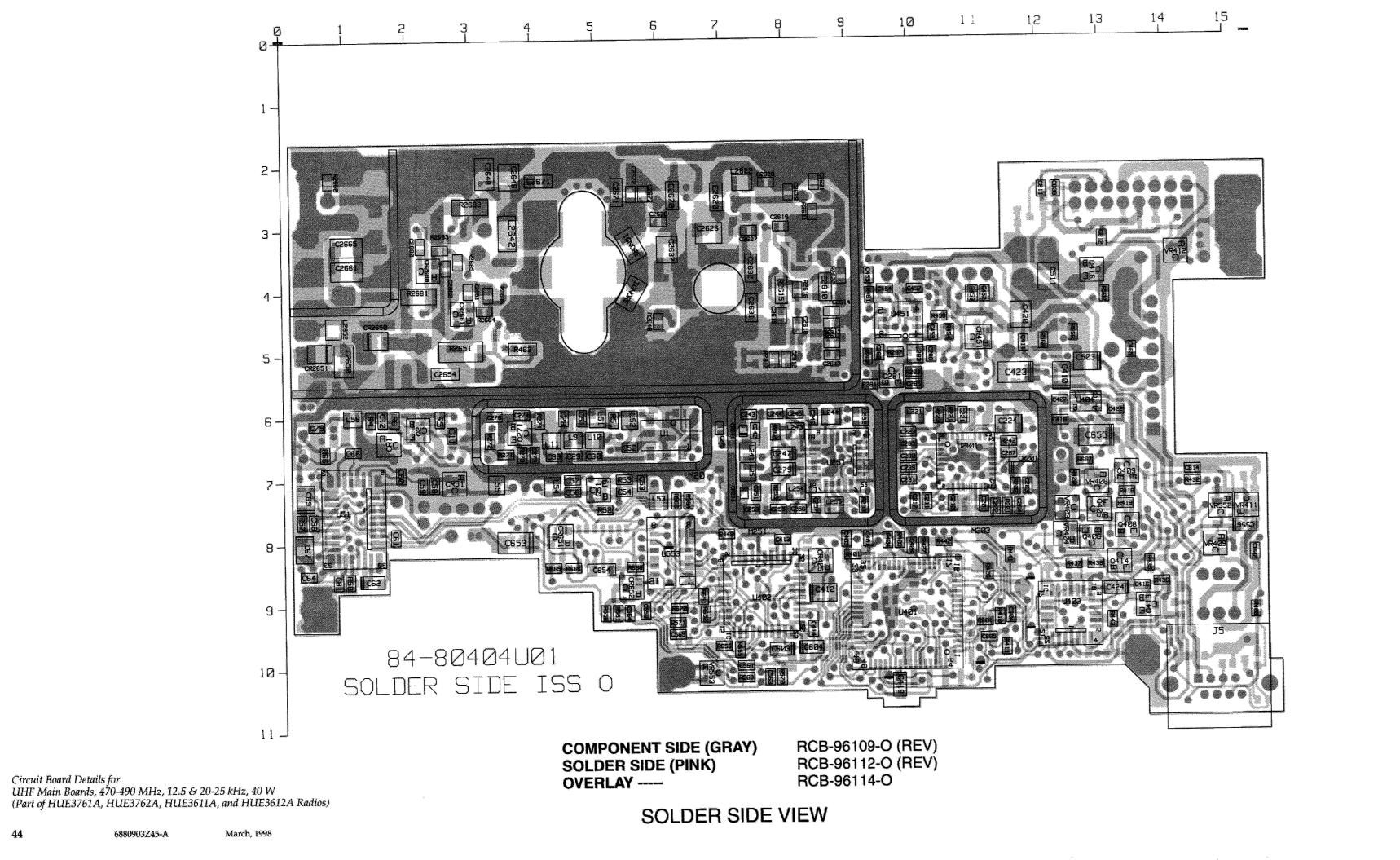
48-80140L15 Zener diade 10 V SOT

48-80948V01 Zener diode 27 V SOT

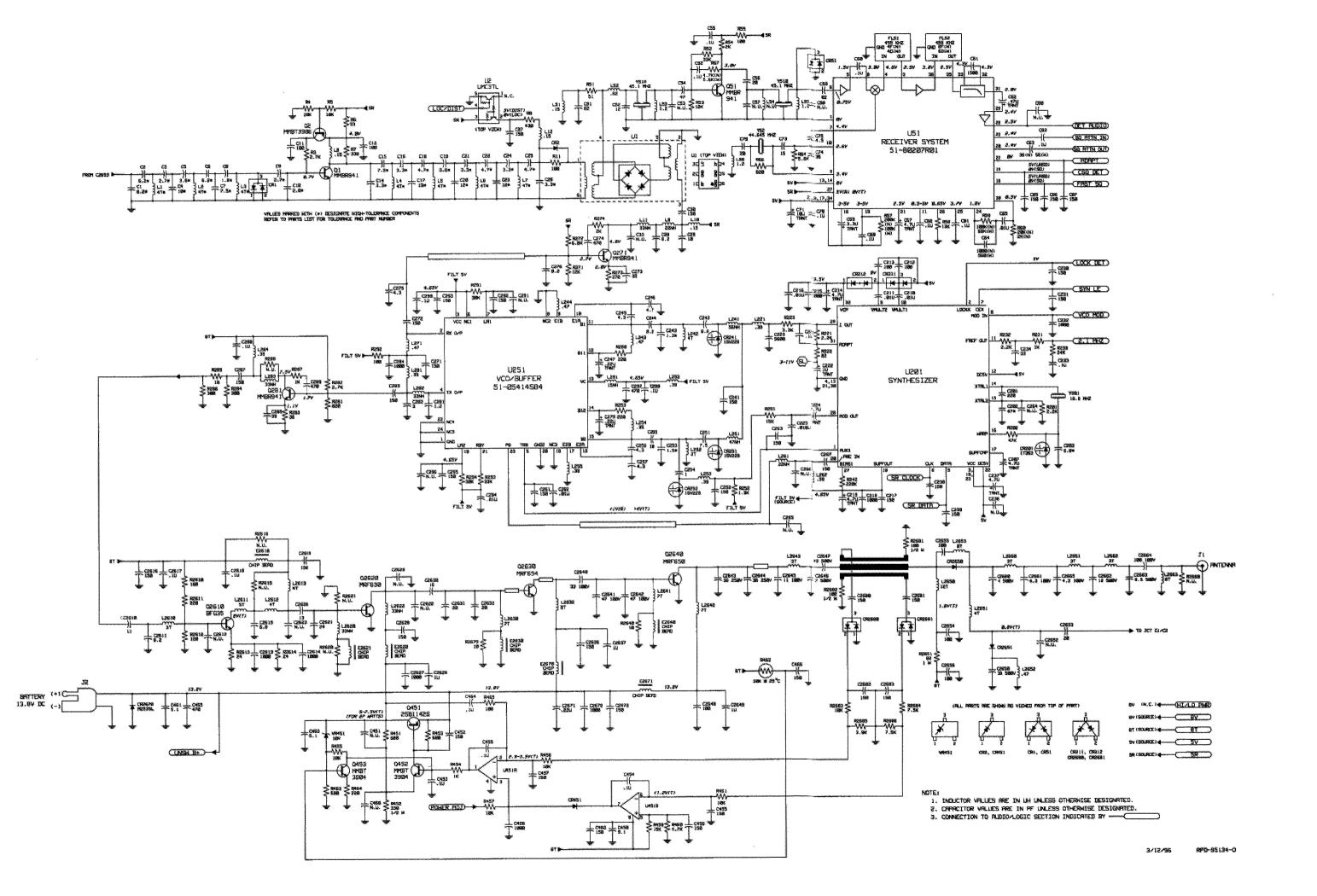




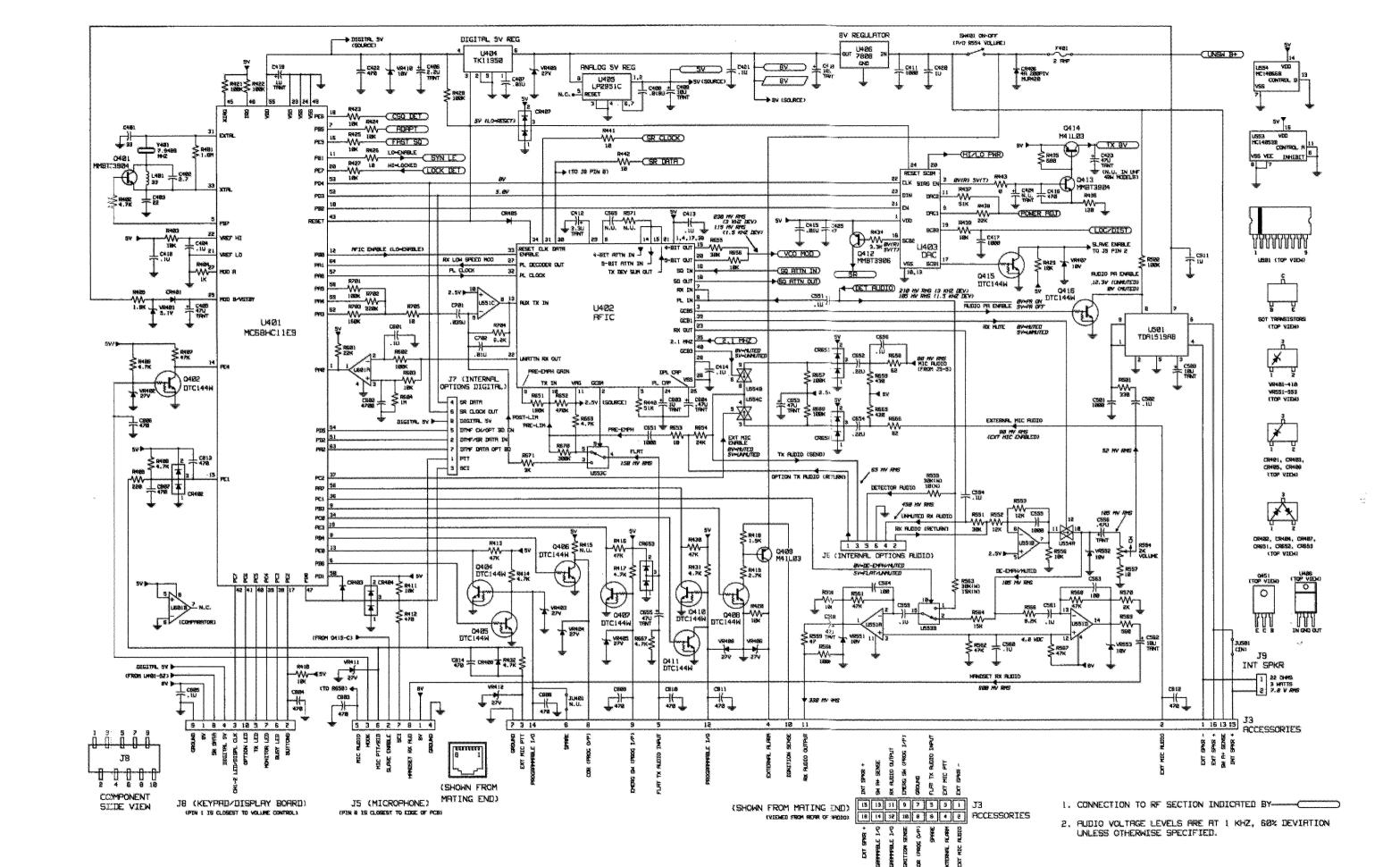
Circuit Board Details for UHF Main Boards, 470-490 MHz, 12.5 & 20-25 kHz, 40 W (Part of HUE3761A, HUE3762A, HUE3611A, and HUE3612A Radios)



84-80404U01 SOLDER SIDE ISS 0 RCB-96110-O (REV) RCB-96111-O (REV) RCB-96114-O COMPONENT SIDE INNER LAYER (GRAY)
SOLDER SIDE INNER LAYER (PINK)
OVERLAY -----SOLDER SIDE VIEW



Schematic Diagram for UHF Main Boards, 470-490 MHz, 12.5 & 20-25 kHz, 40 W (Part of HUE3761A, HUE3762A, HUE3611A, and HUE3612A Radios) (Sheet 1 of 2)



4/15/96

Schematic Diagram for UHF Main Boards, 470-490 MHz, 12.5 & 20-25 kHz, 40 W (Part of HUE3761A, HUE3762A, HUE3611A, and HUE3612A Radios) (Sheet 2 of 2)

46

6880903Z45-A

March, 1998

Parts List

REFERENCE MOTOROL

SYMBOL PART NO.

SM50/SM120 UHF Main Board, 470-490 MHz, 40 Watts 12.5 kHz (N) (used in HUE3761 & HUE3611)

SM50/SM120 UHF Main Board, 470-490 MHz, 40 Watts 20/25 kHz (W) (used in HUE3762 & HUE36121)

21-13740G27 8 2+0 1 nF

91-19740G09 69+01 nF

21-13740G13 2.7 ±0.1 p

21-13740G29 10 pF 2%

21-13740G16 3.6 ±0.1 pF

21-13740G23 6.2 ±0.1 pF

21-13740G25 7.5 ±0.1 pF

21-13740G09 1.8 ±0.1 p

21-13740G10 2.0 ±0.1 p

21-13740L06 3.3 ±0.1 pF

21-13740G15 3.3 ±0.1 p

21-13740G19 4.7 ±0.1 pF

21-13740G16 3.6±0.1 n

21-13740G31 12 pF 2%

21-13740G15 3.3 ±0.1 p

21-19740019 47+011

21-13740G31 12 pF 2%

21-13740G19 4.7 +0.1 nl

21-19740G15 3.3 ±0.1 p

21-13740A27 8.2 ±0.25 pF

2.7 ±0.1 p

7.5 ±0.1 pl

13 pF 2%

3.3 +0.1 pl

0.1 uF 10%; 16 V

tantalum 0.47 uF 10%; 25 V

21-13740G13

21-13740A55

21-13740G25

21-13740G32

21-197400:15

21-13740A59

21-13740A29

21-13740A59

21-13740A53

21-13740A31

21-13740A46

21-13740A36

23-11049A05

21-13740A42

21-13740A53 82 pF

21-13741A25 1500 pF

21-13740A49 56 oF

21-13740A79 1000 pF

21-13740A73 560 oF

21-13741A45 01 nF

21-13740A33 15 nF

21-13740A42

21-13740A18

21-13740A36

21-13740A59

21-13740A63

21-13743A19 0.1 uF 10%; 16 V

21-13743A19 0 1 uF 10%: 16 V

21-13743A19 0.1 (F 10%: 16 V

21-13743A19 0.1 HF 10%: 16 V

21-13743A19 0.1 uF 10%; 16 V

21-13740G46 47 pF 2%

21-13740G24 6.8 ±0.1 pl

21-13741A45 .01 uF

21-13740A55 100 pF

21-13740A79 1000 pF

21-13741A45 .01 uF

21-13740A59 150 nF

21-13740A79 1000 nF

21-13741A39 5600 nF

21-13741A51 .018 uF

21-13740A79 1000 pF

21-13740A59 150 pF

21-13743A19 0.1 uF 10%: 16V

21-13743A19 0.1 uF 10%: 16 V

23-11049.111 tantalum 4.7 uF 10%: 16 V

23-11049J07 tantalum 3.3 uF 10%; 20 V

23-11049A57 tantalum 10 uF 10%: 16 \

4.3 ±0.25 pF

23-11049J11 tantalum 4.7 uF 10%: 16 V

23-11049J11 tantalum 4.7 uF 10%: 16 V

23-11049J11 tantalum 4.7 uF 10%: 16 V

23-11049J11 tantalum 4.7 uF 10%; 16 V

23-11049A07 tantalum 1 uF 10%; 16 V

21-13743A19

C57, 58

C62

C63(W)

C64(N) C64(W)

C212, 21

C216

C218

C219

C221

C223

C224

C230, 231

capacitor, fixed: uF +/-5%; 50 V:

inless otherwise stated

SM50/SM120 UHF Main Board, 470-490 MHz, 40 Watts 12.5 kHz (N) (used in HUE3761 & HUE3611) SM50/SM120 UHF Main Board, 470-490 MHz, 40 Watts 20/25 kHz (W) (used in HUE3762 & HUE36121)

23-11049J11

21-13740A59

1-13740A59

21-13740/309

1-13740425

21-13740A18

23-11049A03

1-13740A25

21-13740A59

21-13740403

21-13740A29

21-13740A18

21-13740450

21-13741445

21-13740A59

21-13740A59

21-13740450

21.12740443

21-19740A05

21-13740A59

21-13740A79

21-13740443

21-13740459

21-13740A59

21-13741A45

21-13740A41

23-11049A40

21-13741A45

21-13740A71 470 pF

21-13740F18 4.3 ±0.25 pt

21-13740A27 8.2 ±0.25 pf

21-13740A14 3+0.25 pl

21-13740A71 470 pF

21-13740A59 150 pF

21-13740A59 150 pF

21-13740A37 22 pF

21-13741A51 .018 uF

21-13740A79 1000 pF

21-13741A45 .01 uF

21-13740A71 470 pF

21-13740A79 1000 pF

21-13740A71 470 pF

21-13740A46 47 pF

21-13740A79 1000 pF

21-13740A59 150 pF

21-13740A59 150 nF

21-13740A79 1000 nF

21-13740A20 5.1 ±0.25 pF

21-13740A20 5.1 ±0.25 pF

21-13740A59

21-13740A59

21-13740A71

21-13740A28 9.1 ±0.25 pF

21-13743A19 0.1 uF 10%; 16 V

21-13741W01 1 uF 10%: 25 V

21-13743A19 0.1 uF 10%; 16 V

150 pF

21-13743A19 0.1 uF 10%: 16 V

21-13743A19 0.1 uF 10%; 16 V

21-13743A19 0.1 uF 10%; 16 V

21-13743A19 0.1 uF 10%: 16 V

470 nF

23-11049A07 tantalum 1 uF 10%; 16 V

23-11049A57 tantalum 10 uF 10%; 16 V

23-11049J07 tantalum 3.3 uF 10%; 20 V

tantalum 47 uF 10%; 10 V

tantalum 2.2 uF 10%: 10 V

21-13740A13 2.7 ±0.25 pF

150 pF

21-13740A41 33 pF

21-13740A24 6.8 +0.25 pl

21-13740A19 4 7 +0 25 of

21-13740G05 1.2 ±0.1 nl

150 pF

18+016

7.5 ±0.25 pF

4.3 ±0.25 of

7.5 ±0.25 of

1 +0 25 0

4.3 ±0.25 pF

23-11049A03 tantalum 0.22 uF 10%; 35 V

1.2 ±0.25 pf

150 pF

150 nF

REFERENCE MOTOROLA

C238, 239

C256, 257

C264 thru 266

C271, 272

C283 C284 C285

C288 C289 C291

C295 C296

C405 C406

C409, 410

C413, 414

C418

C419

C420

C421

C422

C450

C452

C459 C460

C461

C465

C501 C502

C453, 454

C455 thru 457

C423, 424

C292, 293

C298, 299

SYMBOL PART NO.

12.5 kHz (N) (used in HUE3761 & HUE3611) M50/SM120 UHF Main Board, 470-490 MHz, 40 Watts 0/25 kHz (W) (used in HUE3762 & HUE36121)

SYMBOL

C803, 804

C806 thru 814

C2613, 2614

C2617, 2618

C2620 C2621 C2622, 2623

C2626 C2627 C2628 C2629 C2630 C2631, 2632 C2636 C2637 C2640 C2641, 2642 C2643, 2644

C2653 C2654 th

CR251, 252

CR402 CR403 CR404 CR405

C2619

REFERENCE MOTOROLA

PL-951030-A

DESCRIPTION

tantalum 4.7 uF 10%; 16 V

tantalum 0.22 uF 10%: 35 V

SM50/SM120 UHF Main Board, 470-490 MHz, 40 Watts

PART NO.

21-13741W01

21-13743A19

21-13743A19

21-13740A79

23-11049A05

23-11049A57 21-13740A55

23-11049A07

21-13740A79

23-11049J43

21-13741A59

21-13741445

21-13740A71

21-13740A71

21-13740A30

21-13740A27

21-13740A79

1-13740A59

21-13743A19

21-13740459

21-13740A32

21-13740A38

21-13740A79

21-13740A59

21-13740A34

21-13740B32

21-13740A59

21-13741W01

21-11078B29

21-11078B34

21-80964X37

21-11078B14

1-80060M13

21-80060M34

21-13740B49

1-13741W01

21-80060M33

21-13740A36

1-13740B49

1-11078B04

1-80060M21

21-80060M12

21-11078B04

21-11032B15

21-13740A79

1-13740A59

21-13740A59

48-80142L01

48-13833C07

48-62824C01

48-05129M76

48-13833C07

48-80939T01

48-05129M76 silicon SOT

48-62824C01

DESCRIPTION

1 HF 10%- 25 V

0.1 uF 10%: 16 V

21-13743A19 0.1 uF 10%; 16 V

21-13743A19 0.1 uF 10%: 16 V

21-11032B15 0.22 uF +80/-20%

21-11032B15 0.22 uF +80/-20%

21-13743A19 0.1 uF 10%; 16 V

21-13743A19 0.1 uF 10%; 16 V

21-13741A37 4700 pF

100 pF

23-11049A05 tantalum 0.47 uF 10%; 25 V

23-11049J43 tantalum 47 uF 10%: 10 V

8.2 ±0.25 pF

0.1 uF 10%: 16 V

1000 bl

13 pF

150 pF

1 uF 10%: 25 \

7 +0.5 nF 500 \

1 uF 10%; 25 V

4.3 ±0.25 pF 100 \

6.5 ±0.5 pF 500 V

4.3 ±0.25 pF 100 V

diode: (see note)

dual Schottky SOT

silicon SOT

Schottky SOT

48-13833C07 dual silicon SOT MMBD7000

silicon PIN SOT MMBV340

silicon varactor SOT 1T363

dual silicon SOT MMBD700

silicon varactor SOT 1SV229

dual silicon SOT MMBD7000

silicon varactor SOT 1SV22

dual Schottky SO

0.22 uF +80/-20%

43 pF 500 V

1-80060M07 4 ±0.5 pF 500 V

21-80060M43 100 pF 100 V

clamped mica 36 pF 250 V

47 pF 100V

21-13741W01 1 uF 10%; 25 V

21-13740A24 68+0.25 n

0.1 uF 10%: 16 V

tantalum .47 uF 10%; 25 \

tantalum 47 uF 10%: 10 V

tantalum 10 uF 10%; 16 V

tantalum 1 uF 10%; 16 V

tantalum 47 uF 10%; 10 V

20/25 kHz (W) (used in HUE3762 & HUE36121)

SYMBOL

CR2650, 2651

F401

FL51(W)

FL52(N)

FL52(W)

JU401

JU501

L1 thru 7

L2610

L2612

L2613 L2620 L2622 L2630

L2632 L2641

L2642 L2643

L2650

12 5 kHz (N) forced in HEE2761 & HEE3611) SM50/SM120 UHF Main Board, 470-490 MHz, 40 Watts REFERENCE MOTOROLA

48-05129M76 silicon SOT

48-05129M76 silicon SOT

24-84657R01 ferrite bead

24-84657R01 ferrite bead

91-80098D04 455 kHz 4F

91-80097D04 455 kHz 6F

91-80097D06 455 kHz 6D

09-80627E01 mini UHF coax

28-04503.I01 16-pin accessories

09-04424J05 6-oin, internal options audio

09-04424J06 8-pin, internal options digital

09-04422.J02 10-pin display board

28-04423J01 2-pin, internal speake

24-62587X55 chip 0.15 uH 5%

24-83411T63 0.15 uH 5% shielded

24-62587X45 chip 22 nH 5%

24-62587X47 chip 33 nH 5%

24-62587X55 chip 0.15 uH 5%

24-62587X55 chip 0.15 uH 59

24-62587X63 chip 0.62 uH 59

24-62587X69 chip 1.2 uH 5%

24-62587X69 chip 1.2 uH 59

24-84562T13 3 turns airwound 2%

24-62587X60 chip 0.39 uH 5%

24-62587X60 chip 0.39 uH 5%

24-62587X61 chip 0.47 uH 5%

24-62587X60 chip 0.39 uH 59

24-62587X60 chip 0.39 uH 59

24-62587X47 chip 33 nH 59

24-62587X43 chip 15 nH 59

24-60578C43 chip 33 uH

24-60591A01 3 turns

24-60591C73 5 turns

24-60591B17 4 turns

24-60591B73 4 turns

24-60591E73 7 turns

24-60591G73 9 turns

24-60591F73 7 turns

24-60591E69 7 turns

24-60591V77 12 turns

24-60591B73 4 turns

24-62587T40 chip 33 nH 59

24-80908T03 1-1/2 turns RED

24-62587X49 chip 47 nH 5%

Not Used

4 turns airwound 2%

chip 1.2 uH 5%

chip 0.39 uH 59

chip 47 nH 5%

chip 0.39 uH 5%

chip 33 nH 5%

4 turns airwound 2%

91-80098D06 455 kHz 4D

65-05214E04 2 amp axial lead

24-84657R01 ferrite bead

24-84657R01

24-84657R01

09-04426.101

06-62057C01

24-84562T11

24-62587X69

24-62587X60

24-62587X50

24-84562T11

24-62587X49

24-62587X60

24-62587T40

CR651 thru 653 48-13833C07 dual silicon SOT MMBD7000

48-83553T02 4A 200 PIV MUR420

48-02482J02 silicon PIN MA4P1250

48-80236E07 transient suppressor

48-13833C07 dual silicon SOT MMBD7000

48-82290T02 dual Schottky SOT HSMS-2802

ferrite bead

onnector, receptacle:

telephone type. 8 contact, microphone

30-04510.101 nower cable assembly (includes 42)

ferrite bead

SM50/SM120 UHF Main Board, 470-490 MHz, 40 Watts

PART NO

PL-951030-A

DESCRIPTION

SM50/SM120 UHF Main Board, 470-490 MHz, 40 Watts 20/25 kHz (W) (used in HUE3762 & HUE36121)

24-11087B22 chip 0.47 uH

3 turns

48-80214G02 NPN: type MMBT3904

48-80225C09 NPN; type MRF630

48-80225C19 NPN; type MRF654

NPN: type MMBR94

PNP: type MMRT390

NPN: type MMBR94

NPN: type MMRR94

NPN: type MMBR94

PNP type M41I 03

PNP: type MMBT3906

NPN: time MMRT3902

PNP: N/ne 25811425

NPN: type MMBT3904

unless otherwise stated

NPN; type BFG35

PNP type M41L03

digital NPN: type DTC144\

digital NPN: type DTC144V

digital NPN: type DTC144W

digital NPN; type DTC144W

resistor, fixed: +/-5%; 1/10 W:

24-60591R53 8 turns

24-60591R53 8 turns

48-13827407

AR-12824A17

48-13827A07

48-13827A07

48-13827A07

48-80947V01

48-80947V01

48-801411.03

48-80947V01

48-13824A17

48-80914609

48-80141L03

48-80947\/01

48-02245-125

48-80214G02

AR DODA'S IDA

48-80225C24

06-62057C85

06-62057C63

06-62057C66

06-62057D12

06-62057D02

06-62057C51

06-62057D24

06-62057D24

06-62057D20

06-62057D07

06-62057C82

06-62057C93

06-62057C73

06-62057C93

06-62057C83

06-62057D16

06-62057C49

06-62057C75

06-62057C83

06-62057D09

06-62057D32

06-62057078

06-62057C59

06-62057059

06-62057D02

06-62057095

06-62057C82

06-62057C73

06-62057C85

06-62057C40

06-62057062

06-62057C62

06-62057C75

06-62057D11

06-62057C51

06-62057D12

06-62057D11

06-62057C33

06-62057C61

R271 R272

06-62057D04

06-62057C87

06-62057C83

06-62057C91 4.7k

SM50/SM120 UHF Main Board, 470-490 MHz, 40 Watts

12.5 kHz (N) (used in HUE3761 & HUE3611)

SYMBOL PART NO.

L2660 thru 2662 24-60591X01

Q281 Q401 Q402 Q404 thru 408

Q409 Q410, 411

Q415, 416

12.5 kHz (N) (used in HUE3761 & HUE3611) SM50/SM120 LHF Main Board, 470-490 MHz, 40 Watts 20/25 kHz (W) used in HUE3762 & HUE36121)

SM50/SM120 UHF Main Board, 470-490 MHz, 40 Watts

PL-951030-A SYMBOL PART NO DESCRIPTION 06-62057D54 1.8 med 06-62057C91 4.7k 06-62057C99 10k 06-62057075 R405 R406 06-62057C81 1.8k 06-62057C91 4.7k R407 R408 R409 06-62057D16 47k 06-62057C91 4.7k 06-62057C59 220 R410, 411 06-62057C99 R412 R413 06-62057C67 470 06-62057D16 47k R414 R415 06-62057C91 4.7k R416 R417 06-62057D16 47k 06-62057C91 R418 R419 06-62057C79 06-62057C85 06-62057C99 R421, 422 R423 thru 4 06-62057D24 06-62057C99 R426 06-62057C27 R427 R428 06-62057C99 06-62057D24 R429 R430 06-62057C99 10k 06-62057D16 47k R431, 432 06-62057C91 4.7k 06-62057C87 3.3k 06-62057C71 680 06-62057C53 120 R437 R438 06-62057D17 51k 06-62057D08 22k R439 R440 06-62057C99 10k 06-62057D17 51k R441, 44 R443 06-62057C27 06-62057C01 R451 R452 R453 06-62057C71 06-80195M37 330 1/2 wat 06-62057C71 06-62057C75 1k R455 thi 06-62057C99 10k 06-62057D04 15k 06-62057C91 4.7k 06-62057C99 10k 06-05621T02 thermistor 50k @ 25oC 06-62057C71 06-62057C59 220 06-62057051 100 06-62057C63 330 06-62057D24 100k 06-62057D11 30k 06-62057D02 12k R554 R555(N) R555(W) 18-04405J02 variable 2k with switch 06-62057C27 06-62057D11 30F R556 R557 R558 R559 R560 R561, 562 06-62057C99 10k 06-62057C27 06-62057C99 06-62057C43 06-62057D24 06-62057D16 47k R563(N) R563(W) 06-62057D04 06-62057D11 30k R564 R566 R567, 56 R569 06-62057D04 06-62057C97 8.2k 06-62057D16 47k R570 R571 06-62057C82 2k R601 R602 R603 R604 06-62057D08 06-62057D24 06-62057C99 R651, 65 R653 06-62057D30 06-62057C27 R654 06-62057D09 R655 R656 R657 06-62057D11 30k 06-62057C99 10k

06-62057D24 100k

06-62057C46 62

06-62057C66 430

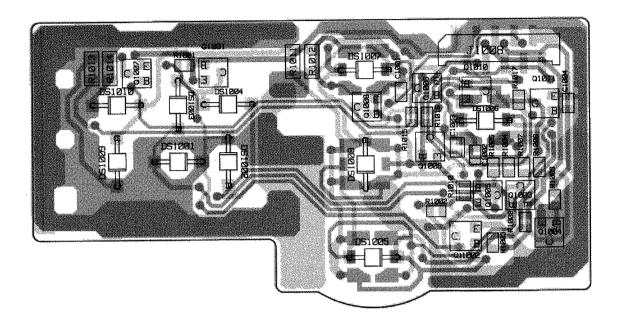
SM50/SM120 UHF Main Board, 470-490 MHz, 40 Watts 12.5 kHz (N) (used in HUE3761 & HUE3611) SM50/SM120 UHF Main Board, 470-490 MHz, 40 Watts 20/25 kHz (W) (used in HUE3762 & HUE36121)

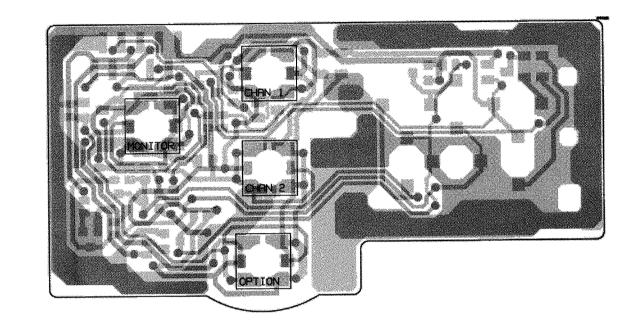
SYMBOL	MOTOROLA PART NO.	DESCRIPTION
R665	06-62057C66	430
R666	06-62057C46	62
R667	06-62057C91	4.7k
R668	06-62057D24	100k
R669	06-62057C91	4.7k
R670	06-62057D35	300k
R671	06-62057C86	3k
R701	06-62057D24	161011
44		100k
R702	06-62057D32	220k
R703	06-62057D29	160k
R704	06-62057C94	6.2k
R705	06-62057C27	10
R2610	06-62057C57	180
R2611	06-62057C59	220
R2612	06-62057C53	120
R2613, 2614	06-62057C36	24
R2615, 2616		Not Used
R2620, 2621	~~~	Not Used
R2640	06-62057C27	10
R2651	06-80194M23	82 1 watt
R2660	***	Not Used
R2675	06-62057C27	10
R2681, 2682	06-80195M25	100 1/2 watt
R2683	06-62057C99	10k
R2684	06-62057C96	7.5k
R2685	06-62057C89	3.9k
R2686	06-62057C96	7.5k
		integrated circuit: (see note)
U1	51-80505D01	double-balanced mixer
U2		dual transistor switch UMC3TL
	48-09939C04	The state of the s
U51	51-80207R01	receiver system
U201*	(see note)	synthesizer
U251	51-05414584	VCO/buffer
U401	51-99010D01	microcomputer MC68HC711E9
U402	51-02227J35	audio filter
U403	51-05226P38	DAC
U404	51-80633C01	5 V regulator TK11950
U405	51-05469E65	5 V regulator LP2951C
U406	51-13816D03	8 V regulator MC7808BT
U451	51-80932W01	dual op-amp LM2904 SOIC
U501	51-80147R01	audio power amp TDA1519C
U551	51-02198J28	quad op-amp LM2902D SOIC
U553	51-84704M60	triple 2-channel switch 4053B
U554	51-05663U35	quad bilateral switch 4066B
U601	51-05063035 51-02198J23	
0601	31-02130323	dual comparator LM2903 SOIC
		voltage regulator: (see note)
VR401	48-80140L06	zener diode 5.1 V SOT
VR402 thru 406	48-80948V01	zener diode 27 V SOT
VR407	48-80140L15	zener diode 10 V SOT
VR408, 409	48-80948V01	zener diode 10 V SOT zener diode 27 V SOT
VR410		
	48-80140L15	zener diode 10 V SOT
VR411, 412	48-80948V01	zener diode 27 V SOT
VR451	48-80140L15	zener diode 10 V SOT
VR551 thru 553	48-80140L15	zener diode 10 V SOT
		Amentals (non-mate)
Y51(N)	91-80112R06	crystal: (see note) filter 45.1 MHz 12.5 kHz
r == 13/143	Ø1-00112MUD	(includes Y51A and Y51B)
Y51(W)	91-80112R05	
em (Éss)	31-00112N03	filter 45.1 MHz 25 kHz
ven	40 00000max	(includes Y51A and Y51B)
Y52	48-80606B02	44.645 MHz
Y201*	(see note)	16.8 MHz
Y401	48-80113R01	7.9488 MHz
	non-refe	enced items
	14-80168501	crystal insulator (for Y201)
	26-04398J01	VCO/synthesizer shield (4 used
		receiver mixer bottom shield
	26-04399.101	
	26-04399J01 26-04400.i01	
	26-04400J01	receiver front end top shield
	26-04400J01 26-04419J01	receiver front end top shield PA shield frame
	26-04400J01 26-04419J01 26-04420J01	receiver front end top shield PA shield frame PA shield cover
	26-04400J01 26-04419J01	receiver front end top shield PA shield frame

Designators marked with an (*) denote parts which are not field serviceable Recalibration of the radio using specialized factory equipment is mandatory when these components are replaced in order to guarantee the specified

frequency stability of the radio at temperature extremes.

UHF Main Boards, 470-490 MHz, 12.5 & 20-25 kHz, 40 W (Part of HUE3761A, HUE3762A, HUE3611A, and HUE3612A Radios)





COMPONENT SIDE 84-04430J03 ISS B

COMPONENT SIDE (GRAY) RCB-95132-O SOLDER SIDE (PINK) RCB-95133-O OVERLAY ----- RCB-95134-O

COMPONENT SIDE VIEW

SOLDER SIDE 84-04430J03 ISS B

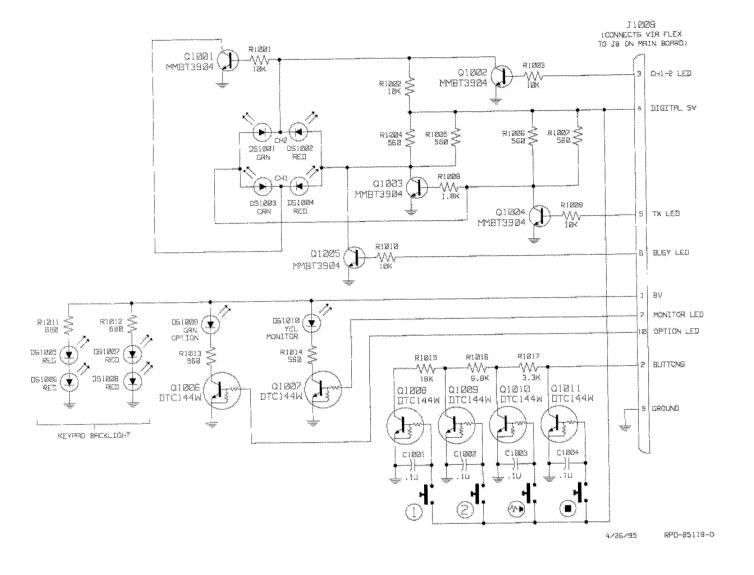
COMPONENT SIDE (GRAY)
SOLDER SIDE (PINK)
OVERLAY ----

SOLDER SIDE VIEW

RCB-95132-O (REV)

RCB-95133-O (REV)

RCB-95135-O (REV)



Parts List

PMLN4022 SM50 Display Board, 2-Frequency

PL-951013-A

	REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
•			capacitor, fixed: uF +/-5%; 50 V:
			unless otherwise stated
	C1001 thru 1004	21-13743A19	0.1 uF 10%; 16 V
			displays and indicators:
	DS1001	48-82565T07	diode LED GRN
	DS1002	48-82565T05	diode LED RED
	DS1003	48-82565T07	diode LED GRN
	DS1004 thru 1008	48-82565T05	diode LED RED
	DS1009	48-82565T07	diode LED GRN
	DS1010	48-82565T06	diode LED YEL
			connector, receptacle:
	J1008	09-04422J01	10 pin, main board
			*
	A	10 0001 1000	transistor: (see note) NPN: type MMBT3904
	Q1001 thru 1005	48-80214G02	digital NPN; type DTC144W
	Q1006 thru 1011	48-80947V01	digital NFM; type DTC14444
			resistor, fixed: +/-5%; 1/10 W:
			unless otherwise stated
	R1001 thru 1003	06-62057C99	10k
	R1004 thru 1007	06-62057C69	560
	R1008	06-62057C81	1.8k
	R1009, 1010	06-62057C99	10k
	R1011, 1012	06-11077A70	680
	R1013, 1014	06-11077A68	560
	R1015	06-62057D06	18k
	R1016	06-62057C95	6.8k
	R1017	06-62057C87	3.3k
			sNon-referenced items
	1831		
		61-04731J01	Assembly, lightpipe
		28-04431J01	Cable, flat flexible, 10-position

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

Circuit Board Details, Schematic Diagram, and Parts List for PMLN4022A Display Board, 2-Frequency

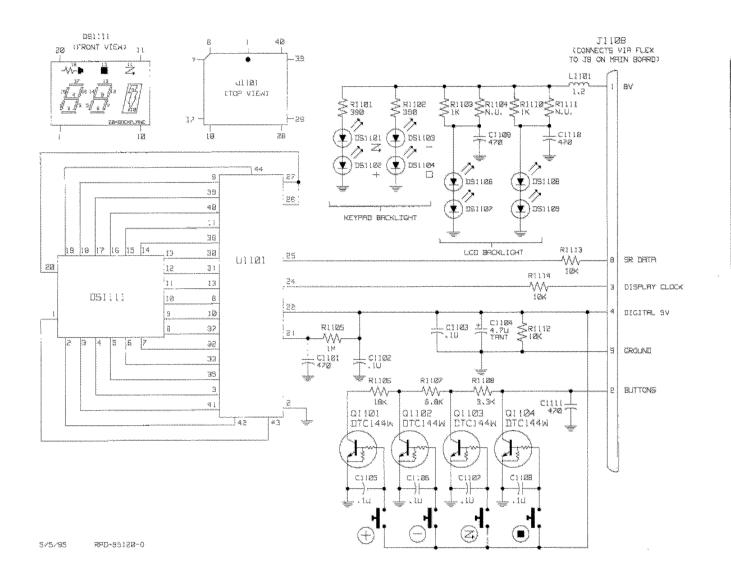
n 1998 6880903*74*!

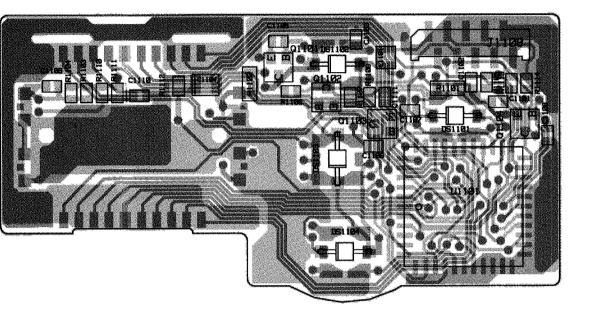
49

Parts List

PMLN4023 SM120 Display Board, 16-Frequency REFERENCE MOTOROLA SYMBOL PART NO. DESCRIPTION capacitor, fixed: uF +/-5%; 50 V: unless otherwise stated 21-13740A71 470 pF C1101 21-13740A71 470 pF C1102, 1103 21-13743A19 0.1 uF 10%; 16 V C1104 23-11049J11 tantalum 4.7 uF 10%; 16 V C1105 thru 1108 21-13743A19 0.1 uF 10%; 16 V C1109 thru 1111 21-13740A71 470 pF DS1101 thru 1104 48-82565T05 diode LED RED right-angle 48-80947V01 digital NPN; type DTC144W 06-11077A64 R1103 R1104 R1105 R1106 R1107 R1108 R1110 06-62057D48 1 meg. 06-62057D06 18k 06-62057C95 6.8k 06-62057C87 3.3k 06-62057C75 06-62057C99 10k 07-04435J02 BRACKET, display bezel 28-04431J01 Cable, flat flexible, 10-position

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

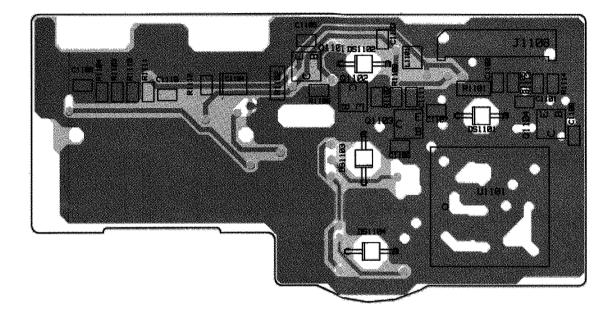




COMPONENT SIDE 84-04429J03 ISS B

COMPONENT SIDE (GRAY)
SOLDER SIDE (PINK)
OVERLAY ---RCB-95136-O
RCB-95139-O
RCB-95140-O

COMPONENT SIDE VIEW



COMPONENT SIDE 84-04429J03 ISS B

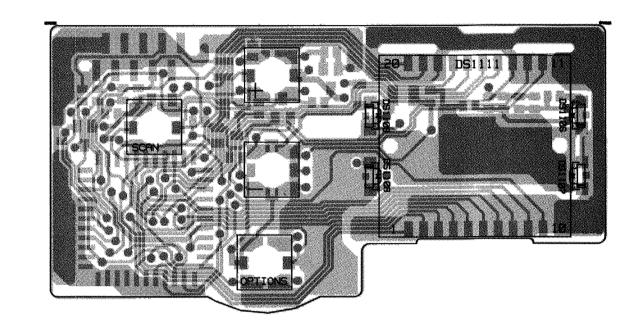
COMPONENT SIDE INNER LAYER (GRAY)
SOLDER SIDE INNER LAYER (PINK)
OVERLAY -----

COMPONENT SIDE VIEW

RCB-95137-O

RCB-95138-O

RCB-95140-O



SOLDER SIDE 84-04429J03 ISS B

COMPONENT SIDE (GRAY)
SOLDER SIDE (PINK)
OVERLAY -----

RCB-95136-O (REV) RCB-95139-O (REV) RCB-95141-O (REV)

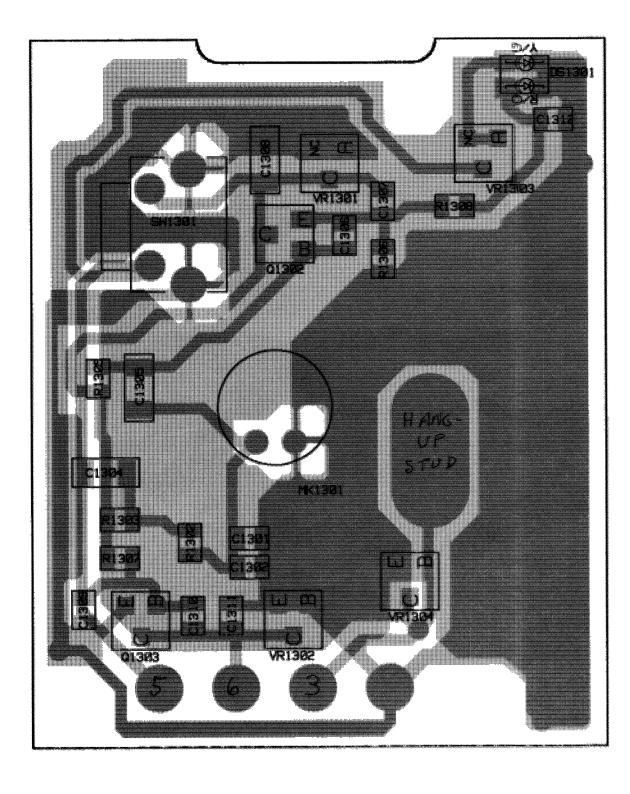
SOLDER SIDE VIEW

Circuit Board Details Diagram, Schematic, and Parts List for PMLN4023A Display Board, 16-Frequency

50 688090

6880903Z45-A

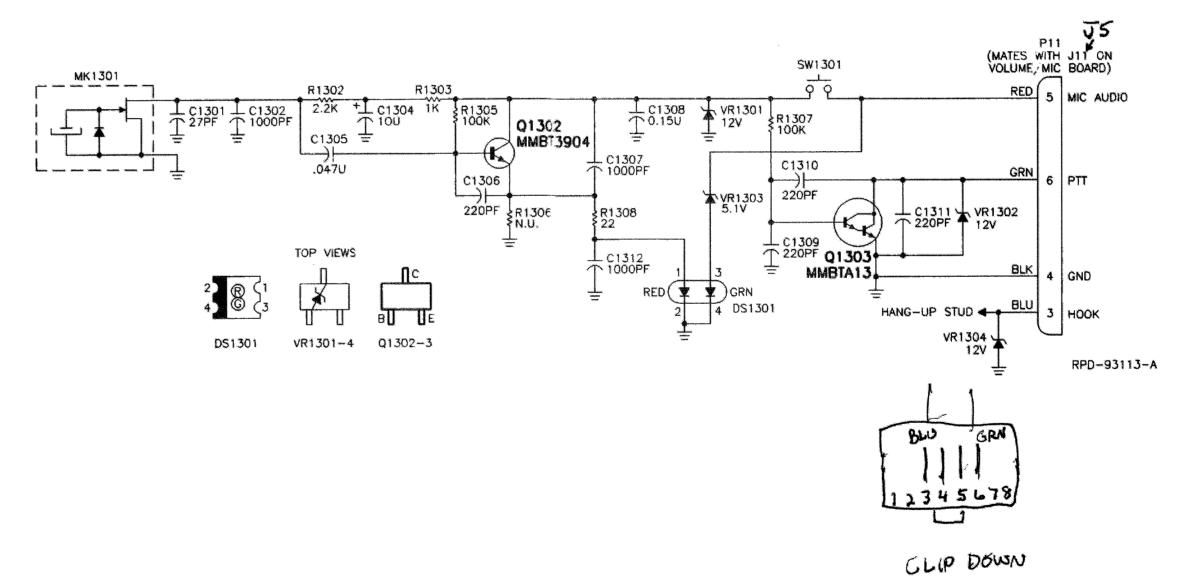
March, 199



COMPONENT SIDE (GRAY) SOLDER SIDE (PINK) OVERLAY ----

RCB-95101-O RCB-95102-O RCB-95103-0

COMPONENT SIDE VIEW



Parts List
01-80446E01 Microphone Board with Cord
(Used in HMN3174B Compact Microphone w

REFERENCE NUMBER	MOTOROLA PART NO.	DESCRIPT	ION
		capacitor, chip, uF +/-	1 mar 12 m.
		unless otherwise stated	
C1301	21-13740A39	27 pF	
C1302	21-13740A79	1000 pF	
C1304	23-11049A59	tantalum 10 uF, ±10%; (6 V
C1305	21-13741A61	.047 uF	
C1306	21-13740A59	150 pF	
C1307	21-13740A79	1000 pF	
C1308	21-11032B14	0.15 uF	
C1309 thru 1311	21-13740A59	150 pF	
C1312	21-13740A79	1000 pF	
		display:	
DS1301	48-05729G49	dual LED red/grn	
		microphone:	
MK1301	50-80258E04	cartridge electret	
		transistor: see note	
Q1302	48-80214G02	NPN; type MMBT3904	
Q1303	48-05128M19	NPN Darlington; type M	IMBTA13
		resistor, chip: uF +/-59	
***		unless otherwise stated	
R1302	06-60076A57	2.2k	
R1303	06-60076A49	1k	
R1305	06-60076B01	100k	
R1306	***	Not Used	
R1307	06-60076801	100k	
R1308	06-60076A09	22	
		switch:	
SW1301	40-80164501	momentary pushbutton	
		voltage regulator: see	
VR1301, 1302	48-80140L17	Zener diode SOT 12 V I	
VR1303	48-80140L06	Zener diode SOT 5.1 V	
VR1304	48-80140L17	Zener diode SOT 12 V I	MMBZ5242L
		renced items	
	30-80978Z03	coiled cord	

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

Circuit Board Details, Schematic Diagram, and Parts List for HMN3174B Compact Microphone

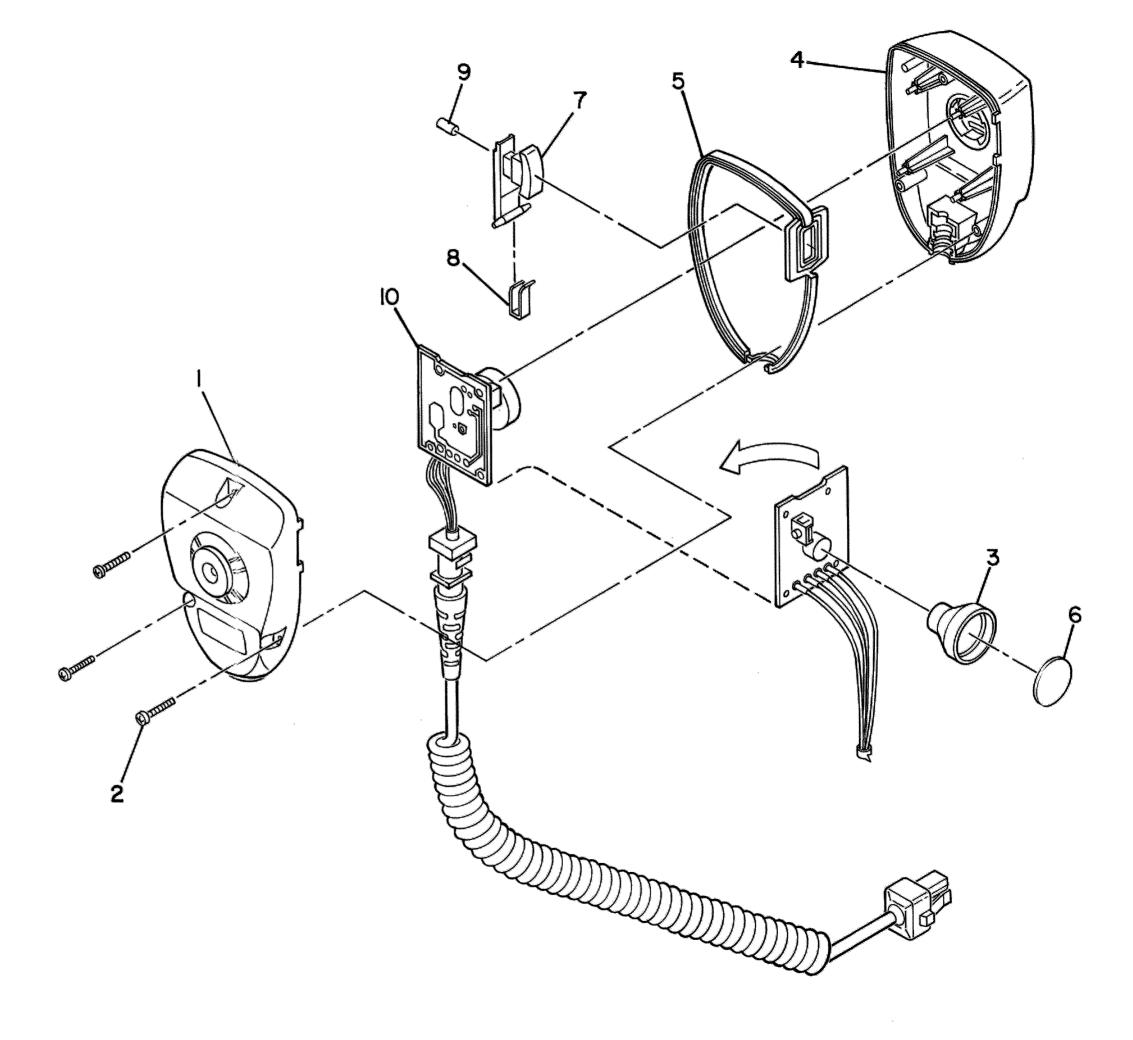
March, 1998 6880903Z45-A

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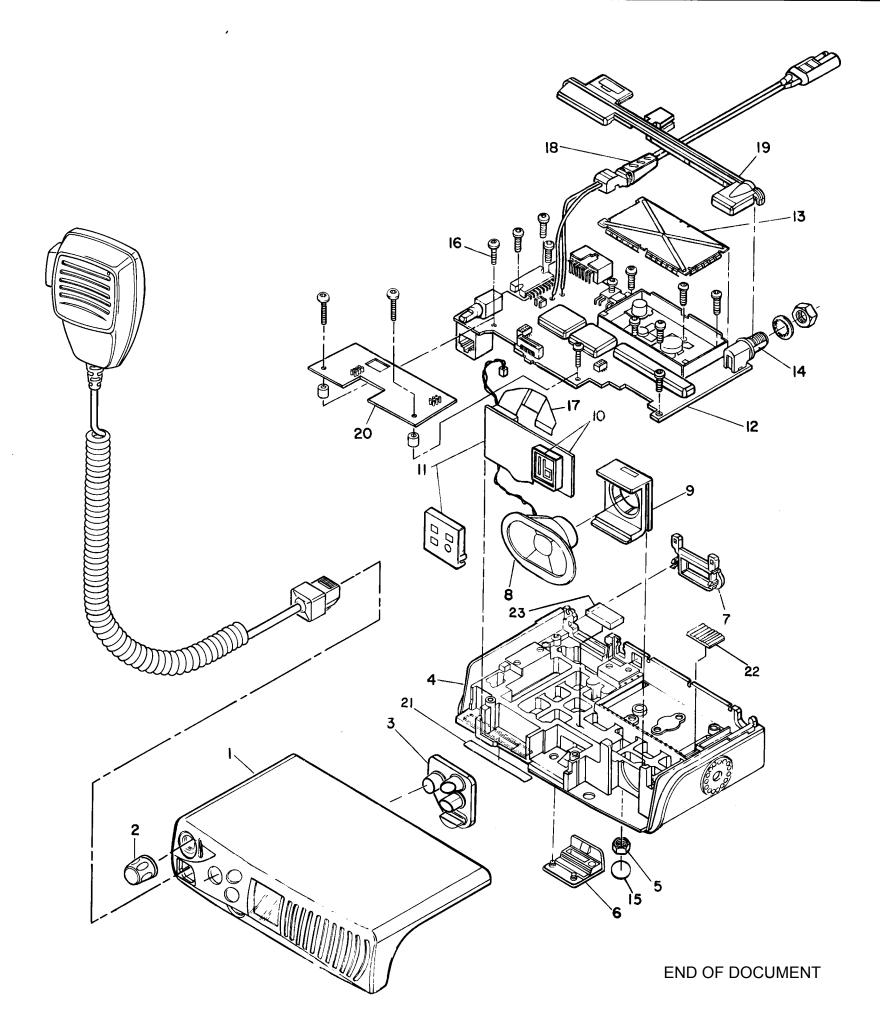
Parts List
HMN3174B Compact Microphone w/LED Indicator

PL-951005-A

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
1	0180669D01	Assembly, HOUSING, rear
2	03139959	SCREW, 5-20 x 5/8; 3 used
3	0580149R01	GROMMET, microphone
4	1580443E01	HOUSING, front
5	3280565B01	GASKET, microphone
6	3580132R02	BAFFLE, leit
7	3880654D01	BUTTON, PTT
8	4180658D01	SPRING, PTT
9	7580983Z01	RUBBER SPACER, switch



Exploded Mechanical View and Parts List for HMN3174B Compact Microphone



Parts List
SM Series Exploded View, Mechanical

PL-951001-A

REFERENCE	MOTOROLA	. 2 00 100
SYMBOL	PART NO.	DESCRIPTION
1	1504606J01	HOUSING, cover assembly, SM50
	1504606J02	HOUSING, cover assembly, SM120
2	3604414J02	KNOB, volume control
3	7504436J03	KEYPAD, SM50
	7504436J02	KEYPAD, SM120
4	2680424U01	HEATSINK
5	0200007003	NUT, 8-32 x 5/16 x 1/8 hex, UHF
6	3204502J02	GASKET, release latch
7	1504501J01	SHROUD, spacer, snap-on
8	5004410J01	SPEAKER, w/wire assembly
9	3204411J01	GASKET, speaker retaining
10	PMLN4023	ASSY, front panel display, SM120
11	PMLN4022	ASSY, front panel display, SM50
12		Main Board
13	2604420J01	SHIELD, PA frame cover
14	0980627E01	CONNECTOR, Mini-U antenna
15	3880603U01	PLUG BUTTON, VHF 10-25 W
16	0310943J11	SCREW, 3mm x 10; 12 used
17	2804431J01	CABLE, folded; 10 position
18	3004510J01	CABLE, power w/strain relief
19	3204412J02	GASKET, rear
20		Option Board
21	5404605J01	LABEL, warning
22	3204416J01	GASKET, thermal conductive pad
23	7504682J01	PAD, pullout VCO
	non-refe	renced items
	4280654E01	CLIP, PA

SM Series Radio Exploded Mechanical View and Parts List