MOTOROLA

Professional Radio
GP Series

Detailed Service Manual

6866558D04-O

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Contents

KTT EMEA Publications Department, Jays Close, Viables Industrial Estate, Basingstoke, Hampshire, RG22 4PD, UK.
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SAFETY INFORMATION

Read this information before using the radio.

PRODUCT SAFETY AND RF EXPOSURE FOR PORTABLE TWO-WAY RADIOS.

This document provides information and instructions for the safe and efficient operation of Motorola Portable Two-Way Radios. The information provided in this document supersedes information contained in user guides published prior to **February 2002.**

RF Energy Exposure Awareness and Control Information and Operational Instructions for Occupational Use

Note: This Radio is intended for use in occupational/controlled applications, where users have been made aware of the potential for exposure and can exercise control over their exposure. This radio device is NOT authorized for general population, consumer or similar use.

This two-way radio uses electromagnetic energy in the radio frequency (RF) spectrum to provide communications between two or more users over a distance. It uses radio frequency (RF) energy or radio waves to send and receive calls. RF energy is one form of electromagnetic energy. Other forms include, but are not limited to, sunlight and x-rays. RF energy, however, should not be confused with these other forms of electromagnetic energy, which when used improperly, can cause biological damage. Very high levels of x-rays, for example, can damage tissues and genetic material.

Experts in science, engineering, medicine, health, and industry work with organizations to develop standards for safe exposure to RF energy. These standards provide recommended levels of RF exposure for both workers and the general public. These recommended RF exposure levels include substantial margins of protection.

All Motorola two-way radios are designed, manufactured, and tested to ensure they meet government-established RF exposure levels. In addition, manufacturers also recommend specific operating instructions to users of two-way radios. These instructions are important because they inform users about RF energy exposure and provide simple procedures on how to control it.

Please refer to the following websites for more information on what RF energy exposure is and how to control your exposure to assure compliance with established RF exposure limits:

http://www.fcc.gov/oet/rfsafety/rf-faqs.html
http://www.osha.gov/SLTC/radiofrequencyradiation/index.html

Federal Communication Commission (FCC) Regulations (US markets only)

The FCC rules require manufacturers to comply with the FCC RF energy exposure limits for portable two-way radios before they can be marketed in the U.S. When two-way radios are used as a consequence of employment, the FCC requires users to be fully aware of and able to control their exposure to meet occupational requirements. Exposure awareness can be facilitated by the use of a product label directing users to specific user awareness information. Your Motorola two-way radio has a RF Exposure Product Label. Do not remove this RF Exposure Label from the device. Also, your Motorola user manual, or separate safety booklet includes information and operating instructions required to control your RF exposure and to satisfy compliance requirements.

Compliance with RF Exposure Standards

Your Motorola two-way radio is designed and tested to comply with a number of national and International standards and guidelines (listed below) for human exposure to radio frequency electromagnetic energy. **This radio complies with the IEEE (FCC) and ICNIRP exposure limits for occupational/controlled RF exposure environments at operating duty factors of up to 50% talk-50% listen and is authorized by the IEEE/ICNIRP for occupational use only.**

In terms of measuring RF energy for compliance with these exposure guidelines, **your radio generates measurable RF energy only while it is transmitting (during talking), not when it is receiving (listening) or in standby mode.**

Note: The approved batteries, supplied with this radio, are rated for a 5-5-90 duty cycle (5% talk–5% listen–90% standby), even though this radio complies with IEEE/ICNIRP occupational exposure limits at usage factors of up to 50% talk.

Your Motorola two-way radio complies with the following RF energy exposure standards and guidelines:

- United States Federal Communications Commission, Code of Federal Regulations; 47 CFR part 2 sub-part J
- American National Standards Institute (ANSI) / Institute of Electrical and Electronic Engineers (IEEE) C95. 1-1992
- Institute of Electrical and Electronic Engineers (IEEE) C95.1-1999 Edition
- International Commission on Non-Ionizing Radiation Protection (ICNIRP) 1998
- Ministry of Health (Canada) Safety Code 6. Limits of Human Exposure to Radiofrequency Electromagnetic Fields in the Frequency Range from 3 kHz to 300 GHz, 1999
- Australian Communications Authority Radiocommunications (Electromagnetic Radiation - Human Exposure) Standard 2003
- ANATEL ANNEX to Resolution No. 303 of July 2, 2002 "Regulation of limitation of exposure to electrical, magnetic and electromagnetic fields in the radio frequency range between 9 KHz and 300 GHz" and "Attachment to resolution # 303 from July 2, 2002"

RF Exposure Compliance and Control Guidelines and Operating Instructions

To control your exposure and ensure compliance with the occupational/controlled environment exposure limits, always adhere to the following procedures:

Guidelines:

- User awareness instructions should accompany device when transferred to other users.
- Do not use this device if the operational requirements described herein are not met.

Operating Instructions

- Transmit no more than the rated duty factor of 50% of the time. To transmit (talk), push the Push-To-Talk (PTT) button. To receive calls, release the PTT button.
  Transmitting 50% of the time, or less, is important because this radio generates measurable RF energy exposure only when transmitting (in terms of measuring for standards compliance).
- When worn on the body, always place the radio in a Motorola-approved clip, holder, holster, case, or body harness for this product. Using approved body-worn accessories is important because the use of non-Motorola-approved accessories may result in exposure levels, which exceed the IEEE/ICNIRP occupational/controlled environment RF exposure limits.
- If you are not using a body-worn accessory and are not using the radio in the intended use position, along side the head in the phone mode (TETRA only), in front of the face in the hand held mode, then ensure the antenna and the radio are kept 2.5 cm (one inch) from the body when transmitting. Keeping the radio at a proper distance is important because RF exposures decrease with increasing distance from the antenna.

Hand-held Mode - Operating Instructions

- Hold the radio in a vertical position in front of the face with the microphone (and other parts of the radio including the antenna) at least 2.5 cm (one inch) away from the nose or lips. Antenna should be kept away from the eye. Keeping the radio at a proper distance is important since RF exposures decrease with increasing distance from the antenna.

Phone Mode (TETRA only) - Operating Instructions

- When placing or receiving a phone call, hold your radio product as you would a wireless telephone. Speak directly into the microphone.

Approved Accessories

- Use only Motorola-approved supplied or replacement antennas, batteries, and accessories. Use of non–
  Motorola - approved antennas, batteries and accessories may exceed IEEE/ICNIRP RF exposure guidelines.
  For a list of Motorola-approved antennas, batteries, and other accessories please see your dealer or local Motorola contact. Your nearest dealer can be found at the following web site:

http://www.motorola.com/cgiss/emea/dealerlocator.html

Additional Information

For additional information on exposure requirements or other training information, visit http://www.motorola.com/rfhealth.

ELECTROMAGNETIC INTERFERENCE/COMPATIBILITY

NOTE: Nearly every electronic device is susceptible to electromagnetic interference (EMI) if inadequately shielded, designed or otherwise configured for electromagnetic compatibility.

Facilities

To avoid electromagnetic interference and/or compatibility conflicts, turn off your radio in any facility where posted notices instruct you to do so. Hospitals or health care facilities may be using equipment that is sensitive to external RF energy.

Aircraft

When instructed to do so, turn off your radio when on board an aircraft. Any use of a radio must be in accordance with applicable regulations per airline crew instructions.

Medical Devices

Pacemakers

The Advanced Medical Technology Association (AdvaMed) recommends that a minimum separation of 15 cms (6 inches) be maintained between a handheld wireless radio and a pacemaker.These recommendations are consistent with those of the U.S. Food and Drug Administration.

Persons with pacemakers should:

- ALWAYS keep the radio more than 15 cms from their pacemaker when the radio is turned ON.
- Not carry the radio in the breast pocket.
- Use the ear opposite the pacemaker to minimize the potential for interference.
- Turn the radio OFF immediately if you have any reason to suspect that interference is taking place.

Hearing Aids

Some digital wireless radios may interfere with some hearing aids. In the event of such interference, you may want to consult your hearing aid manufacturer to discuss alternatives.

Other Medical Devices

If you use any other personal medical device, consult the manufacturer of your device to determine if it is adequately shielded from RF energy. Your physician may be able to assist you in obtaining this information.

Use of Communication Devices While Driving

Always check the laws and regulations on the use of radios in the areas where you drive.

- Give full attention to driving and to the road.
- Use hands-free operation, if available.
- Pull off the road and park before making or answering a call, if driving conditions or regulations so require.

OPERATIONAL WARNINGS

Vehicles with an air bag

Refer to vehicle manufacturer's manual prior to installation of electronic equipment to avoid interference with air bag wiring.

WARNING: Do not place a portable radio in the area over an air bag or in the air bag deployment area. Air bags inflate with great force. If a portable radio is placed in the air bag deployment area and the air bag inflates, the radio may be propelled with great force and cause serious injury to occupants of the vehicle.

Potentially explosive atmospheres

WARNING: Turn off your radio prior to entering any area with a potentially explosive atmosphere, unless it is a radio type especially qualified for use in such areas as "Intrinsically Safe" (for example, Factory Mutual, CSA, UL, CENELEC or ATEX Approved). Do not remove, install, or charge batteries in such areas. Sparks in a potentially explosive atmosphere can cause an explosion or fire resulting in bodily injury or even death.

NOTE The areas with potentially explosive atmospheres referred to above include fuelling areas such as below decks on boats, fuel or chemical transfer or storage facilities, areas where the air contains chemicals or particles, such as grain, dust or metal powders. Areas with potentially explosive atmospheres are often but not always posted.

Blasting caps and areas

WARNING: To avoid possible interference with blasting operations, turn off your radio when you are near electrical blasting caps, in a blasting area, or in areas posted: "Turn off two-way radio". Obey all signs and instructions.

OPERATIONAL CAUTIONS

Antennas

CAUTION: Do not use any portable radio that has a damaged antenna. If a damaged antenna comes into contact with your skin, a minor burn can result.

Batteries

CAUTION: All batteries can cause property damage and/or bodily injury such as burns if a conductive material such as jewellery, keys, or beaded chains touch exposed terminals. The conductive material may complete an electrical circuit (short circuit) and become quite hot. Exercise care in handling any charged battery, particularly when placing it inside a pocket, purse, or other container with metal objects.

INTRINSICALLY SAFE RADIO INFORMATION

The Intrinsically safe approval unit refers to a product that has been approved as intrinsically safe by an approval agency (for example FM Approvals, CSA, UL, CENELEC or ATEX) and certifies that a particular product meets the Agency's applicable intrinsic safety standards for specific types of hazardous classified locations. A portable radio that has been approved for intrinsic safety will have Approval label attached to the radio to identify the unit as being Approved for specified hazardous atmospheres. This label specifies the hazardous Class/Division/Group along with the part number of the battery that must be used. The Intrinsically Safe Approval Label will be located on the portable radio unit.

Operational Cautions for Intrinsic Safe Equipment

- Do not operate radio communications equipment in a hazardous atmosphere unless it is a type especially qualified (for example, FM, UL, CSA, or CENELEC or ATEX approved). An explosion or fire may result.
- Do not operate a radio unit that has been approved as intrinsically safe product in a hazardous atmosphere if it has been physically damaged (for example, cracked housing). An explosion or fire may result.
- Do not replace or charge batteries in a hazardous atmosphere. Contact sparking may occur while installing or removing batteries and cause an explosion or fire.

Warnings for Radios Approved as Intrinsically Safe

Radios must ship from the Motorola manufacturing facility with the hazardous atmosphere capability and the intrinsic safety approval labelling (FM, UL, CSA, CENELEC or ATEX). Radios will not be upgraded to this capability and labeled once they have been shipped to the field.

A modification changes the unit’s hardware from its original design configuration. Modifications can only be made by the original product manufacturer.

- **Do not replace or changeaccessories in a hazardous atmosphere. Contact sparking may occur while installing or removing accessories and cause an explosion or fire.**
- **Turn the radio off before removing or installing a battery or accessory**.
- **Do not disassemble an intrinsically safe product in any way that exposes the internal circuits of the unit.**
- **Failure to use an intrinsically safe approved battery or Approved accessories specifically approved for the radio unit may result in the dangerously unsafe condition of an unapproved radio combination being used in a hazardous location.**
- **Unauthorized or incorrect modification of the intrinsically safe approved Product will negate the approval rating of the product.**
- **Incorrect repair or relabeling of any intrinsically safe Agency-approved radio could adversely affect the Approval rating of the unit.**
- **Use of a radio that is not intrinsically safe in a hazardous atmosphere could result in serious injury or death.**

Repair

REPAIRS FOR MOTOROLA PRODUCTS WITH INTRINSICALLY SAFE APPROVAL ARE THE RESPONSIBILITY OF THE USER.

- **Repairs to a Motorola FM approved radio product should only be done at a location that has been FM audited under the FM 3605 repairs and service standard.**
- **Contact Motorola for assistance regarding repairs and service of Motorola intrinsically safe equipment.**

A repair constitutes something done internally to the unit that would bring it back to its original condition.

Items not considered as repairs are those in which an action is performed on a unit which does not require the outer casing of the unit to be opened in a manner which exposes the internal electrical circuits of the unit.

Do Not Substitute Options or Accessories

The Motorola communications equipment certified as intrinsically safe by the approving agency, (FM, UL, CSA, CENELEC or ATEX) is tested as a complete system which consists of the listed agency Approved portable, Approved battery, and Approved accessories or options, or both. This Approved portable and battery combination must be strictly observed. There must be no substitution of items, even if the substitute has been previously Approved with a different Motorola communications equipment unit. Approved configurations are listed by the Approving Agency (FM, UL, CSA, CENELEC or ATEX).

The Intrinsically Safe Approval Label affixed to radio refers to the intrinsically safe classification of that radio product, and the approved batteries that can be used with that system.

The manual PN referenced on the Intrinsically Safe Approval Label identifies the approved Accessories and or options that can be used with that portable radio unit.

Using a non Motorola intrinsically safe battery and or accessory with the Motorola approved radio unit will void the intrinsically safe approval of that radio unit.

MOTOROLA

Professional Radio

GP Series

300R1 (300 - 350MHz)

Service Information

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Computer Software Copyrights

Table of Contents

Chapter 1

MODEL CHART AND TECHNICAL SPECIFICATIONS

1.0 GP340 Model Chart

Professional GP300 Series (300-350MHz)			
Model			Description
MDH25EDC9AN3_E			GP340 300R1 300-350 MHz 4W 16 CH
		Item	Description
X		PMLD4141_	GP340 Back Cover Kit
X		6864110B13_	GP340 Basic User Guide
X		PMAD4022_	9cm (300-344 MHz) Antenna
X		HNN9008_	Battery, NiMH Standard

x = Indicates one of each is required.

2.0 GP640 / GP680 Model Chart

Professional GP600 Series (300-350MHz)				
Model				Description
MDH25EDC9CK3_E				GP640 300R1 300-350 MHz 4W
	MDH25EDH9CK6_E			GP680 300R1 300-350 MHz 4W
			Item	Description
X			PMLD4125_	GP640 300R1 Back Cover Kit
	X		PMLD4126_	GP680 300R1 Back Cover Kit
X			6864110B14_	GP640 Basic User Guide
	X		6864110B19_	GP680 Basic User Guide
X	X		PMAD4022_	9cm (300-344 MHz) Antenna
X	X		HNN9008_	Battery, NiMH Standard

x = Indicates one of each is required.

3.0 Technical Specifications

Data is specified for +25°C unless otherwise stated.

General Specifications		
Channel Capacity		
GP340	16	
GP640	16 (Conventional)	
GP680	16 (Conventional)	
Power Supply	Rechargeable battery 7.5v	
Dimensions: H x W x D (mm) Height excluding knobs		
With standard high capacity NiMH battery	137 x 57.5 x 37.5	
With ultra high capacity NiMH battery	137 x 57.5 x 40.0	
With NiCD battery	137 x 57.5 x 40.0	
With Lilon battery	137 x 57.5 x 33.0	
Weight: (gm)		
	GP340/GP640	**GP680**
With Standard high capacity NiMH battery	420	428
With Ultra high capacity NiMH battery	500	508
With NiCD battery	450	458
With Lilon battery	350	358
Average Battery Life @5/5/90 Cycle:	Low Power	High Power
With Standard high capacity NiMH battery	11 hours	8 hours
With Ultra high capacity NiMH battery	14 hours	11 hours
With NiCD battery	12 hours	9 hours
With Lilon battery	11 hours	8 hours
Sealing:	Withstands rain testing per MIL STD 810 C/D /E and IP54	
Shock and Vibration:	Protection provided via impact resistant housing exceeding MIL STD 810-C/D /E and TIA/EIA 603	
Dust and Humidity:	Protection provided via environment resistant housing exceeding MIL STD 810 C/D /E and TIA/EIA 603	

Transmitter	300R1
*Frequencies - Full Bandsplit	300-350 MHz
Channel Spacing	12.5/20/25 kHz
Frequency Stability (-25°C to +55°C, +25° Ref.)	±2.5 ppm @ 12.5kHz ±5ppm @ 25 kHz
Power	1-4W
Modulation Limiting	±2.5 @ 12.5 kHz ±4.0 @ 20 kHz ±5.0 @ 25 kHz
FM Hum & Noise	-40 dB typical
Conducted/Radiated Emission	-36 dBm <1 GHz -30 dBm >1 GHz
Adjacent Channel Power	-60 dB @ 12.5 kHz -70 dB @ 25 kHz
Audio Response (300 - 3000 Hz)	+1 to -3 dB
Audio Distortion	<5% typical

Receiver	300R1
*Frequencies - Full Bandsplit	300-350 MHz
Channel Spacing	12.5/20/25 kHz
Sensitivity (12 dB SINAD) EIA Sensitivity (20 dB SINAD) ETS	0.35 µV typical 0.50 µV typical
Intermodulation ETS	-65 dB
Adjacent Channel Selectivity	-60 dB @ 12.5 kHz -70 dB @ 25 kHz
Spurious Rejection	-70 dB
Rated Audio	0.5W
Audio Distortion @ Rated Audio	<3% typical
Hum & Noise	-45 dB @ 12.5 kHz -50 dB @ 20/25 kHz
Audio Response (300 - 3000 Hz)	+1 to -3 dB
Conducted Spurious Emission	-57 dBm <1 GHz -47 dBm >1 GHz ETS 300 086

*Availability subject to the laws and regulations of individual countries.

Chapter 2

THEORY OF OPERATION

1.0 Introduction

This Chapter provides a detailed theory of operation for the 300-350MHz circuits in the radio. For details of the theory of operation and trouble shooting for the the associated Controller circuits refer to the Controller Section of this manual.

2.0 Transmitter

(Refer to Figure 2-1 and the Transmitter schematic diagram)

The transmitter contains five basic circuits:

1. power amplifier,
2. antenna switch,
3. harmonic filter,
4. antenna matching network,
5. power control integrated circuit (PCIC).

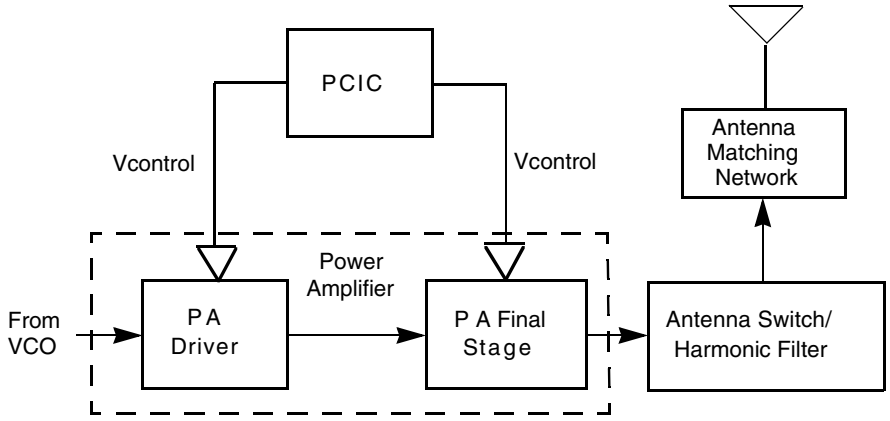


Figure 2-1 Transmitter Block Diagram.

2.1 Power Amplifier

The power amplifier consists of two devices:

1. 9Z67 LDMOS driver IC (U101) and
2. PRF1507 LDMOS PA (Q110).

The 9Z67 LDMOS driver IC contains 2 stages of amplification with a supply voltage of 7.3V.

This RF power amplifier is capable of supplying an output power of 0.3W (pin 6 and 7) with an input signal of 2mW (3dBm) (pin16). The current drain would typically be 160mA while operating in the frequency range of 300-350MHz.

The PRF1507 LDMOS PA is capable of supplying an output power of 7W with an input signal of 0.3W. The current drain would typically be 1300mA while operating in the frequency range of 300-350MHz. The power output can be varied by changing the biasing voltage.

2.2 Antenna Switch

The antenna switch circuit consists of two PIN diodes (CR101 and CR102), a pi network (C107, L104 and C106), and two current limiting resistors (R101, R170). In the transmit mode, B+ at PCIC (U102) pin 23 will go low and turn on Q111 where a B+ bias is applied to the antenna switch circuit to bias the diodes "on". The shunt diode (CR102) shorts out the receiver port, and the pi network, which operates as a quarter wave transmission line, transforms the low impedance of the shunt diode to a high impedance at the input of the harmonic filter. In the receive mode, the diodes are both off, and hence, there exists a low attenuation path between the antenna and receiver ports.

2.3 Harmonic Filter

The harmonic filter consists of C104, L102, C103, L101 and C102. The design of the harmonic filter for VHF is that of a modified Zolotarev design. It has been optimized for efficiency of the power module. This type of filter has the advantage that it can give a greater attenuation in the stop-band for a given ripple level. The harmonic filter insertion loss is typically less than 1.2dB.

2.4 Antenna Matching Network

A matching network which is made up of L116 is used to match the antenna's impedance to the harmonic filter. This will optimize the performance of the transmitter and receiver into an antenna.

2.5 Power Control Integrated Circuit (PCIC)

The transmitter uses the Power Control IC (PCIC), U102 to regulate the power output of the radio. The current to the final stage of the power module is supplied through R101, which provides a voltage proportional to the current drain. This voltage is then fedback to the Automatic Level Control (ALC) within the PCIC to regulate the output power of the transmitter.

The PCIC has internal digital to analog converters (DACs) which provide the reference voltage of the control loop. The reference voltage level is programmable through the SPI line of the PCIC.

There are resistors and integrators within the PCIC, and external capacitors (C133, C134 and C135) in controlling the transmitter rising and falling time. These are necessary in reducing the power splatter into adjacent channels.

CR105 and its associated components are part of the temperature cut back circuitry. It senses the printed circuit board temperature around the transmitter circuits and output a DC voltage to the PCIC. If the DC voltage produced exceeds the set threshold in the PCIC, the transmitter output power will be reduced so as to reduce the transmitter temperature.

3.0 Receiver

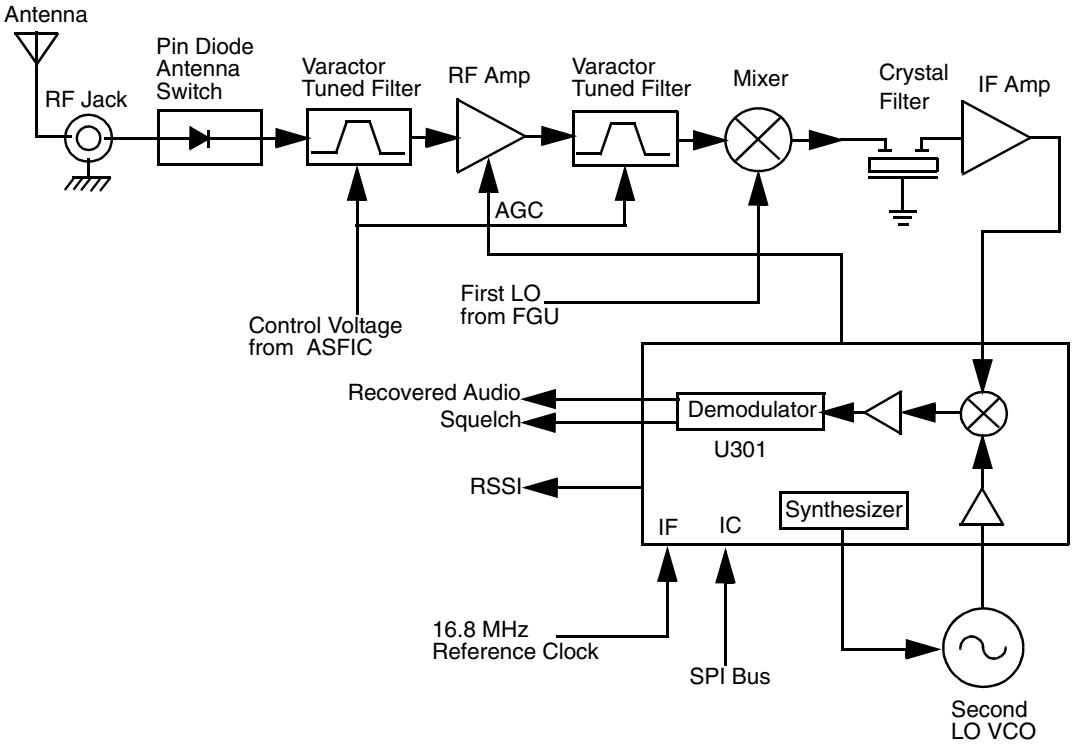


Figure 2-2 Receiver Block Diagram

3.1 Receiver Front-End

(Refer to Figure 2-2 and the Receiver Front End schematic diagram)

The RF signal is received by the antenna and applied to a low-pass filter. For 300R1, the filter consists of L101, L102, C102, C103, C104. The filtered RF signal is passed through the antenna switch. The antenna switch circuit consists of two PIN diodes (CR101 and CR102) and a pi network (C106, L104 and C107). The signal is then applied to a varactor tuned bandpass filter. The VHF bandpass filter comprises of L301, L302, C302, C303, C304, CR301 and CR302. The bandpass filter is tuned by applying a control voltage to the varactor diodes (CR301 and CR302) in the filter.

The bandpass filter is electronically tuned by the DACRx from U404 which is controlled by the microprocessor. Depending on the carrier frequency, the DACRx will supply the tuned voltage to the varactor diodes in the filter. Wideband operation of the filter is achieved by shifting the bandpass filter across the band.

The output of the bandpass filter is coupled to the RF amplifier transistor Q301 via C307. After being amplified by the RF amplifier, the RF signal is further filtered by a second varactor tuned bandpass filter, consisting of L306, L307, C313, C317, CR304 and CR305.

Both the pre and post-RF amplifier varactor tuned filters have similar responses. The 3dB bandwidth of the filter is about 50 MHz. This enables the filters to be electronically controlled by using a single control voltage which is DACRx .

The output of the post-RF amplifier filter which is connected to the passive double balanced mixer consists of T301, T302 and CR306. Matching of the filter to the mixer is provided by C381. After mixing with the first LO signal from the voltage controlled oscillator (VCO) using low side injection, the RF signal is down-converted to the 45.1 MHz IF signal.

The IF signal coming out of the mixer is transfered to the crystal filter (FL301) through a resistor pad and a diplexer (C322 and L310). Matching to the input of the crystal filter is provided by C324 and L311. The crystal filter provides the necessary selectivity and intermodulation protection.

3.2 Receiver Back-End

(Refer to Figure 2-2 and the Receiver Back-End schematic diagram)

The output of crystal filter FL301 is matched to the input of IF amplifier transistor Q302 by components R352 and C325. Voltage supply to the IF amplifier is taken from the receive 5 volts (R5). The IF amplifer provides a gain of about 7dB. The amplified IF signal is then coupled into U301(pin 3) via C330, C338 and L330 which provides the matching for the IF amplifier and U301.

The IF signal applied to pin 3 of U301 is amplified, down-converted, filtered, and demodulated, to produce the recovered audio at pin 27 of U301. This IF IC is electronically programmable, and the amount of filtering (which is dependent on the radio channel spacing) is controlled by the microprocessor. Additional filtering, once externally provided by the conventional ceramic filters, is replaced by internal filters in the IF module (U301).

The IF IC uses a type of direct conversion process, whereby the externally generated second LO frequency is divided by two in U301 so that it is very close to the first IF frequency. The IF IC (U301) synthesizes the second LO and phase-locks the VCO to track the first IF frequency. The second LO is designed to oscillate at twice the first IF frequency because of the divide-by-two function in the IF IC.

In the absence of an IF signal, the VCO will “search” for a frequency, or its frequency will vary close to twice the IF frequency. When an IF signal is received, the VCO will lock onto the IF signal. The second LO/VCO is a Colpitts oscillator built around transistor Q320. The VCO has a varactor diode, CR310, to adjust the VCO frequency. The control signal for the varactor is derived from a loop filter consisting of C362, C363, C364, R320 and R321.

The IF IC (U301) also performs several other functions. It provides a received signal-strength indicator (RSSI) and a squelch output. The RSSI is a dc voltage monitored by the microprocessor, and used as a peak indicator during the bench tuning of the receiver front-end varactor filter. The RSSI voltage is also used to control the automatic gain control (AGC) circuit at the front-end.

The demodulated signal on pin 27 of U301 is also used for squelch control. The signal is routed to U404 (ASFIC) where squelch signal shaping and detection takes place. The demodulated audio signal is also routed to U404 for processing before going to the audio amplifier for amplification.

3.3 Automatic Gain Control Circuit

(Refer to the Receiver Front End and Receiver Back End schematic diagrams)

The front end automatic gain control circuit is to provide automatic gain reduction of the front end RF amplifier via feedback. This action is necessary to prevent overloading of backend circuits. This is achieved by drawing some of the output power from the RF amplifier's output. At high radio frequencies, capacitor C331 provides the low impedance path to ground for this purpose. CR308 is a PIN diode used for switching the path on or off. A certain amount of forward biasing current is needed to turn the PIN diode on. Transistors Q315 provides this current where upon saturation, current will flow via R347, PIN diode, collector and emitter of Q315 and R319 before going to ground. Q315 is an NPN transistor used for switching here. Maximum current flowing through the PIN is mainly limited by the resistor R319.

Radio signal strength indicator, RSSI, a voltage signal, is used to drive Q315 to saturation hence turning it on. RSSI is produced by U301 and is proportional to the gain of the RF amplifier and the input RF signal power to the radio.

Resistor network at the input to the base of Q315 is scaled to turn on Q315, hence activating the AGC, at certain RSSI levels. In order to turn on Q315, the voltage across the transistor's base to ground must be greater or equal to the voltage across R319, plus the base-emitter voltage (Vbe) present at Q315. The resistor network with thermistor RT300 is capable of providing temperature compensation to the AGC circuit, as RSSI generated by U301 is lower at cold temperatures compared to normal operation at room temperature. Resistor R300 and capacitor C397 form an R-C network used to dampen any transient instability while the AGC is turning on.

4.0 Frequency Generation Circuitry

(Refer to Figure 2-3 and the Frequency Synthesizer schematic diagram)

The Frequency Generation Circuitry is composed of two main ICs, the Fractional-N synthesizer (U201), and the VCO/Buffer IC (U241). Designed in conjunction to maximize compatibility, the two ICs provide many of the functions that normally would require additional circuitry. The synthesizer block diagram illustrates the interconnect and support circuitry used in the region. Refer to the relevant schematics for the reference designators.

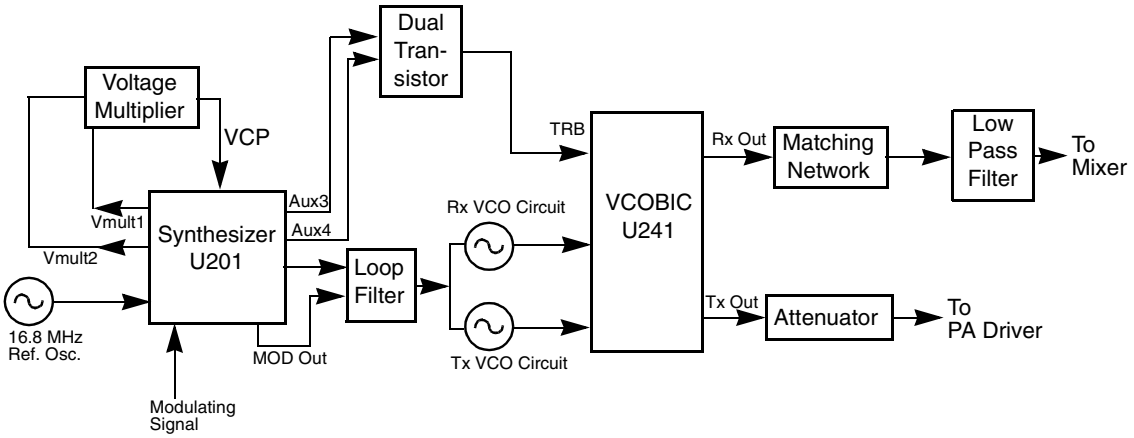


Figure 2-3 Frequency Generation Unit Block Diagram

The synthesizer is powered by regulated 5V and 3.3V which come from U247 and U248 respectively. The synthesizer in turn generates a superfiltered 4.5V which powers U241.

In addition to the VCO, the synthesizer must interface with the logic and ASFIC circuitry. Programming for the synthesizer is accomplished through the data , clock and chip select lines from the microprocessor. A 3.3V dc signal from synthesizer lock detect line indicates to the microprocessor that the synthesizer is locked.

Transmit modulation from the ASFIC is supplied to pin10 of U201. Internally the audio is digitized by the Fractional-N and applied to the loop divider to provide the low-port modulation. The audio runs through an internal attenuator for modulation balancing purposes before going out to the VCO.

4.1 Synthesizer

(Refer to Figure 2-4 and the Synthesizer schematic diagram)

The Fractional-N Synthesizer uses a 16.8MHz crystal (FL201) to provide a reference for the system. The LVFractN IC (U201) further divides this to 2.1MHz, 2.225MHz, and 2.4MHz as reference frequencies. Together with C206, C207, C208, R204 and CR203 , they build up the reference oscillator which is capable of 2.5ppm stability over temperatures of -30 to 85°C. It also provides 16.8MHz at pin 19 of U201 to be used by ASFIC and LVZIF.

The loop filter which consist of C231, C232, C233, R231, R232 and R233 provides the necessary dc steering voltage for the VCO and determines the amount of noise and spur passing through.

In achieving fast locking for the synthesizer, an internal adapt charge pump provides higher current at pin 45 of U201 to put synthesizer within the lock range. The required frequency is then locked by normal mode charge pump at pin 43 .

Both the normal and adapt charge pumps get their supply from the capacitive voltage multiplier which is made up of C258, C259, C228, triple diode CR201 and level shifters U210 and U211. Two 3.3V square waves (180 deg out of phase) are first shifted to 5V, then along with regulated 5V , put through arrays of diodes and capacitors to build up 13.3V at pin 47 of U201.

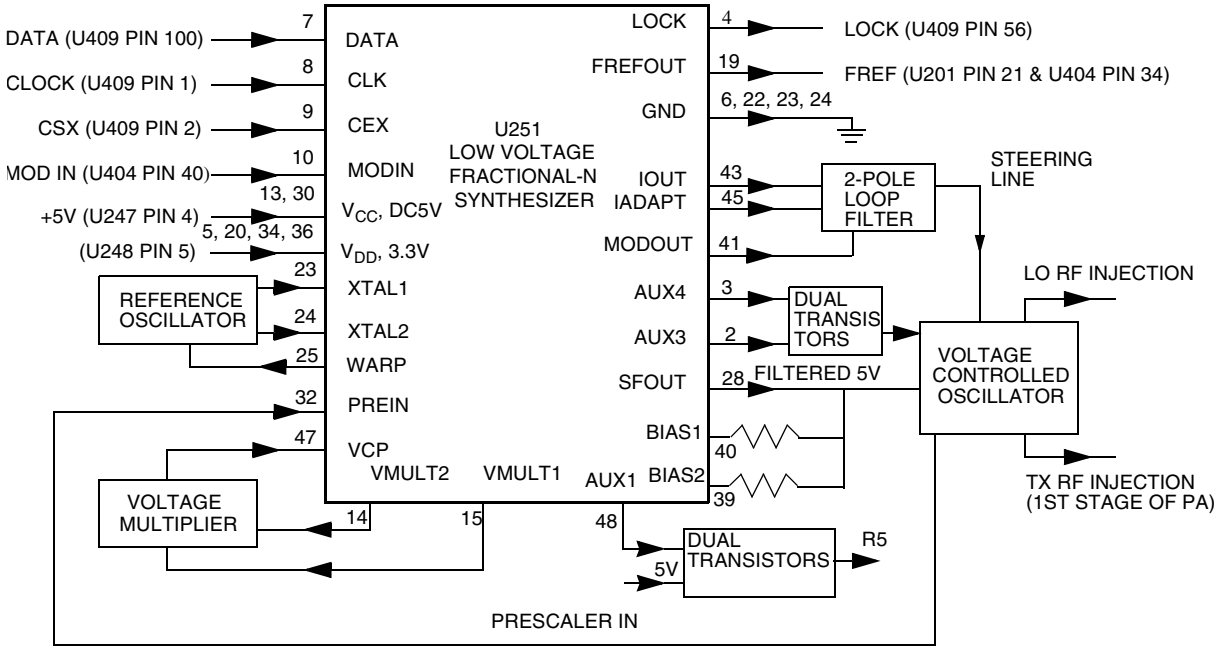


Figure 2-4 Synthesizer Block Diagram

4.2 Voltage Controlled Oscillator (VCO)

(Refer to Figure 2-5 and the Voltage Controlled Oscillator schematic diagram)

The VCOBIC (U241) in conjunction with the Fractional-N synthesizer (U201) generates RF in both the receive and the transmit modes of operation. The TRB line (U241 pin 19) determines which oscillator and buffer will be enabled. A sample of the RF signal from the enabled oscillator is routed from U241 pin 12, through a low pass filter, to the prescaler input (U201 pin 32). After frequency comparison in the synthesizer, a resultant CONTROL VOLTAGE is received at the VCO. This voltage is a DC voltage between 3.5V and 9.5V when the PLL is locked on frequency.

The VCOBIC(U241) is operated at 4.54 V (VSF) and Fractional-N synthesizer (U201) at 3.3V. This difference in operating voltage requires a level shifter consisting of Q260 and Q261 on the TRB line.

The operation logic is shown in Table 2-1.

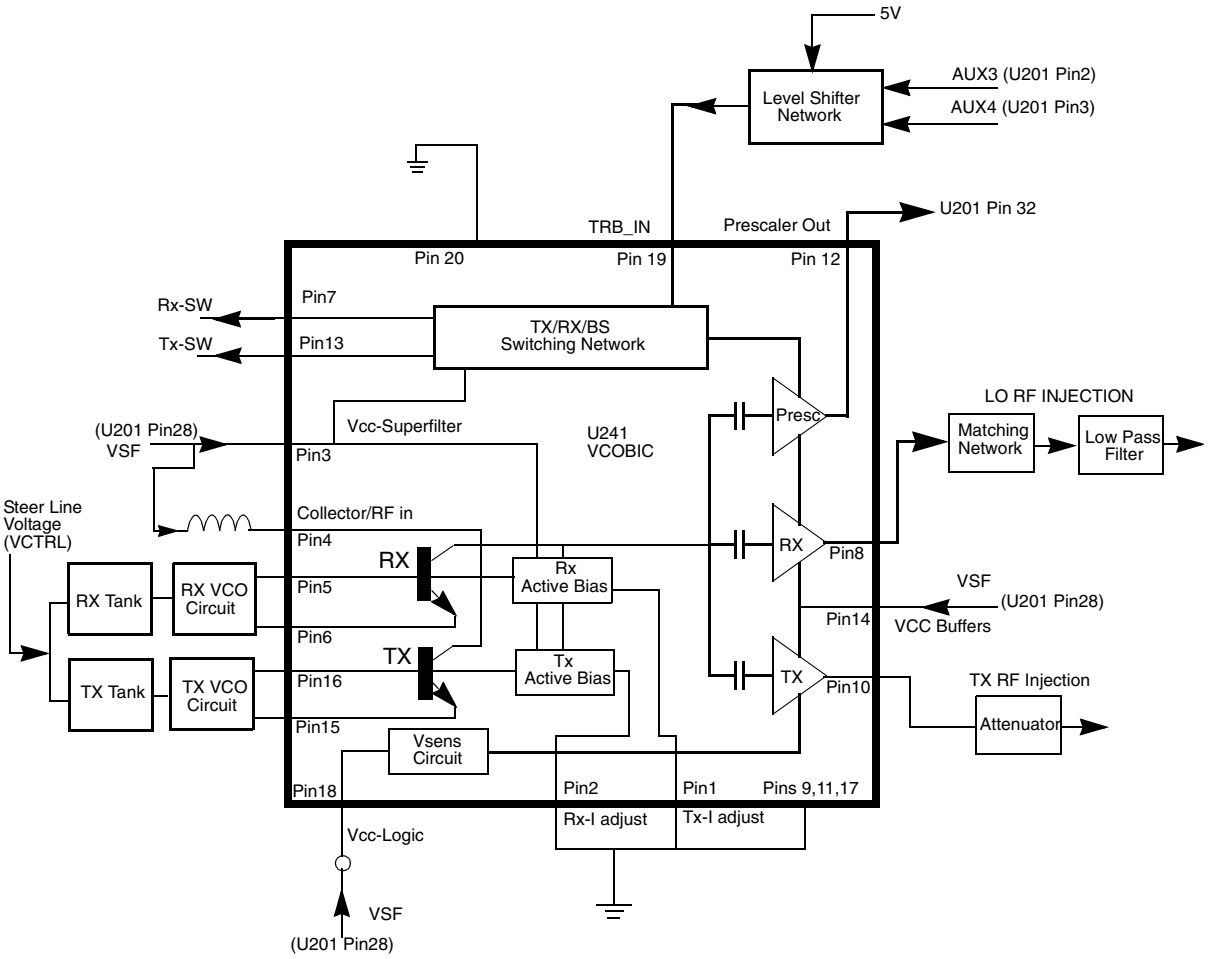


Figure 2-5 VCO Block Diagram

Table 2-1 Level Shifter Logic

Desired Mode	AUX 4	AUX 3	TRB
Tx	Low	High (@3.2V)	High (@4.8V)
Rx	High	Low	Low
Battery Saver	Low	Low	Hi-Z/Float (@2.5V)

In the receive mode, U241 pin 19 is low or grounded. This activates the receive VCO by enabling the receive oscillator and the receive buffer of U241. The RF signal at U241 pin 8 is run through a matching network. The resulting RF signal is the LO RF INJECTION and it is applied to the mixer at T302.

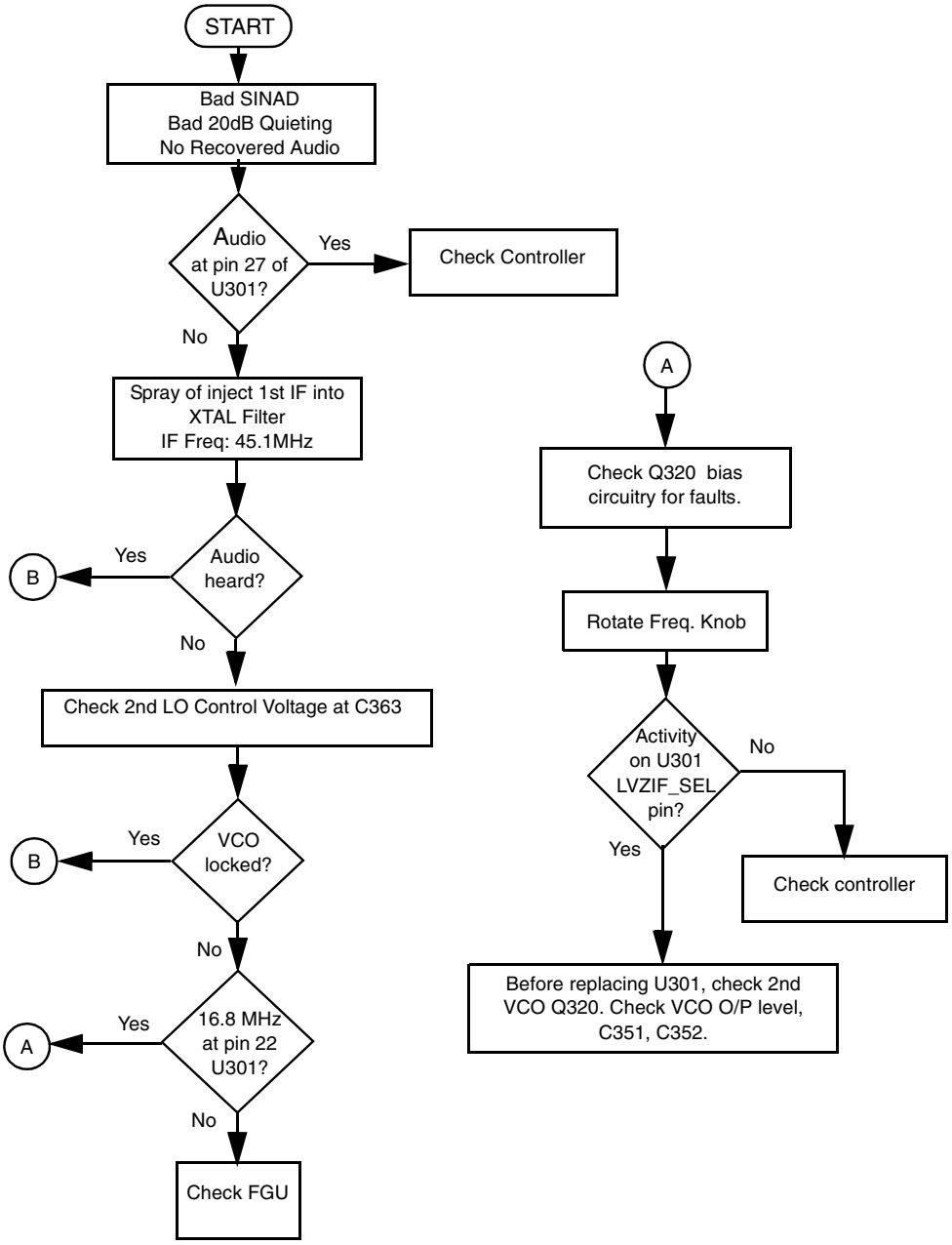
During the transmit condition, when PTT is depressed, five volts is applied to U241 pin 19. This activates the transmit VCO by enabling the transmit oscillator and the transmit buffer of U241. The RF signal at U241 pin 10 is injected into the input of the PA module (U101 pin16). This RF signal is the TX RF INJECTION. Also in transmit mode, the audio signal to be frequency modulated onto the carrier is received through the U201 pin 41.

When a high impedance is applied to U241 pin19, the VCO is operating in BATTERY SAVER mode. In this case, both the receive and transmit oscillators as well as the receive transmit and prescaler buffer are turned off.

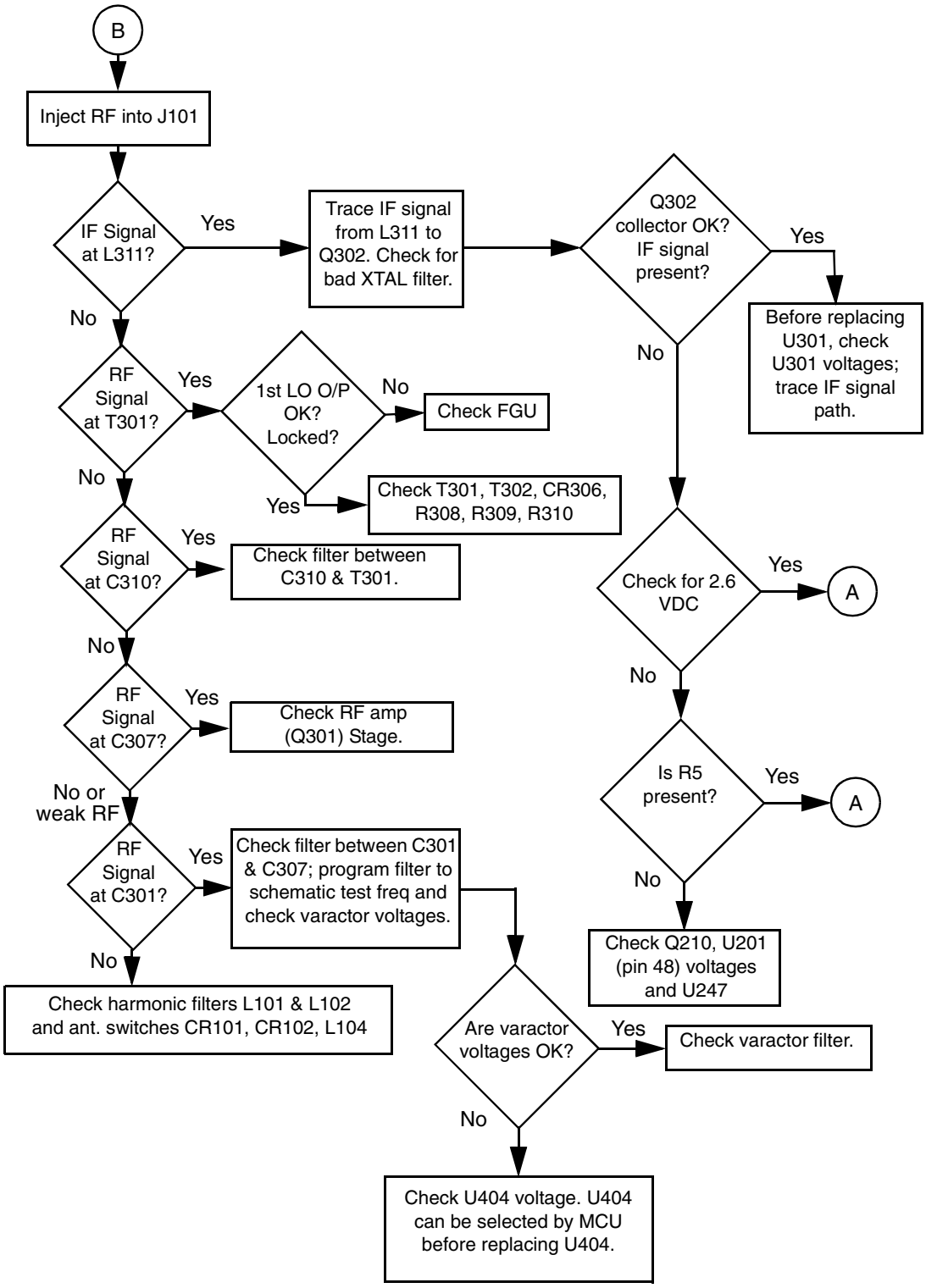
Chapter 3

TROUBLESHOOTING CHARTS

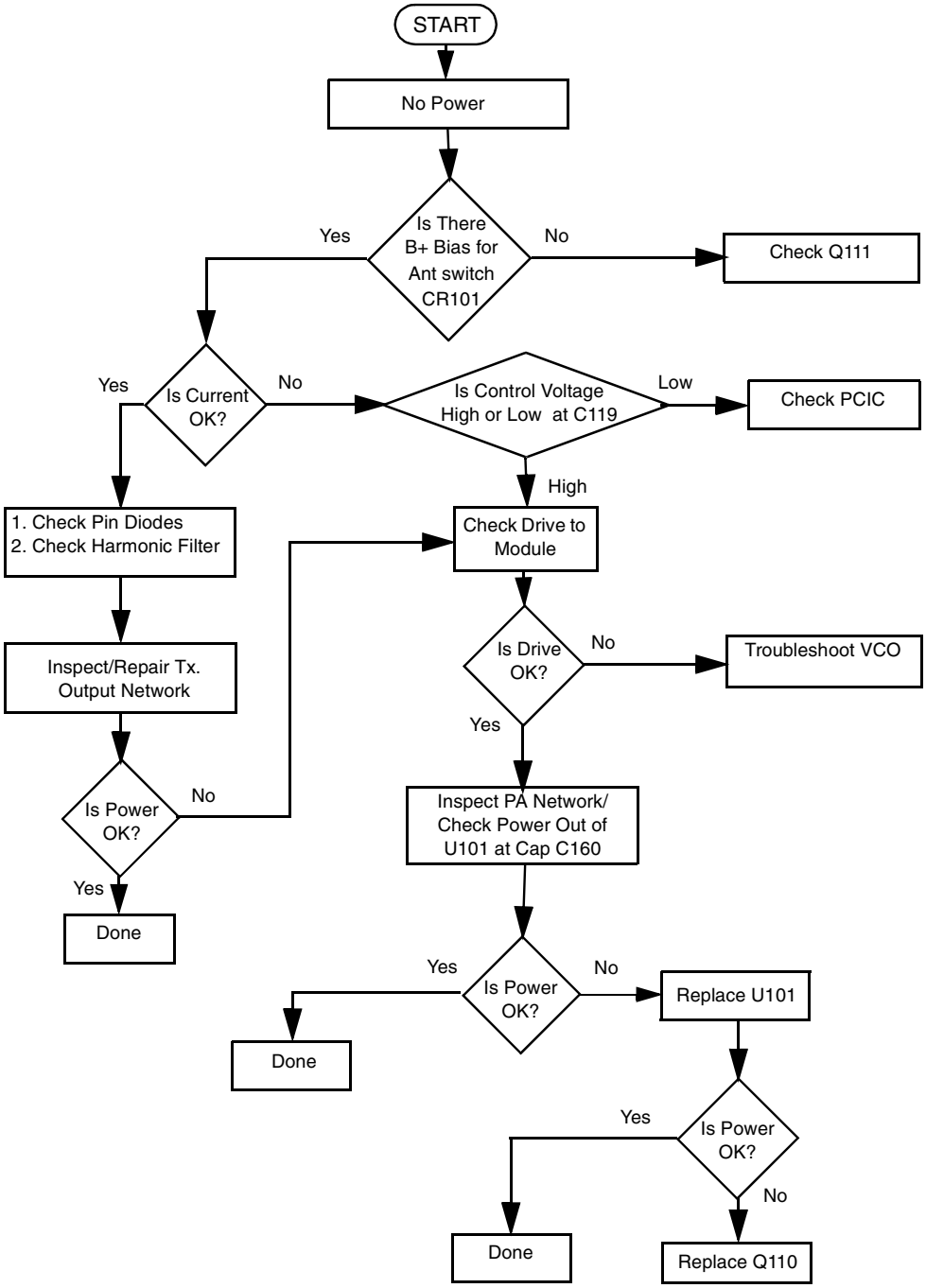
1.0 Troubleshooting Flow Chart for Receiver (Sheet 1 of 2)



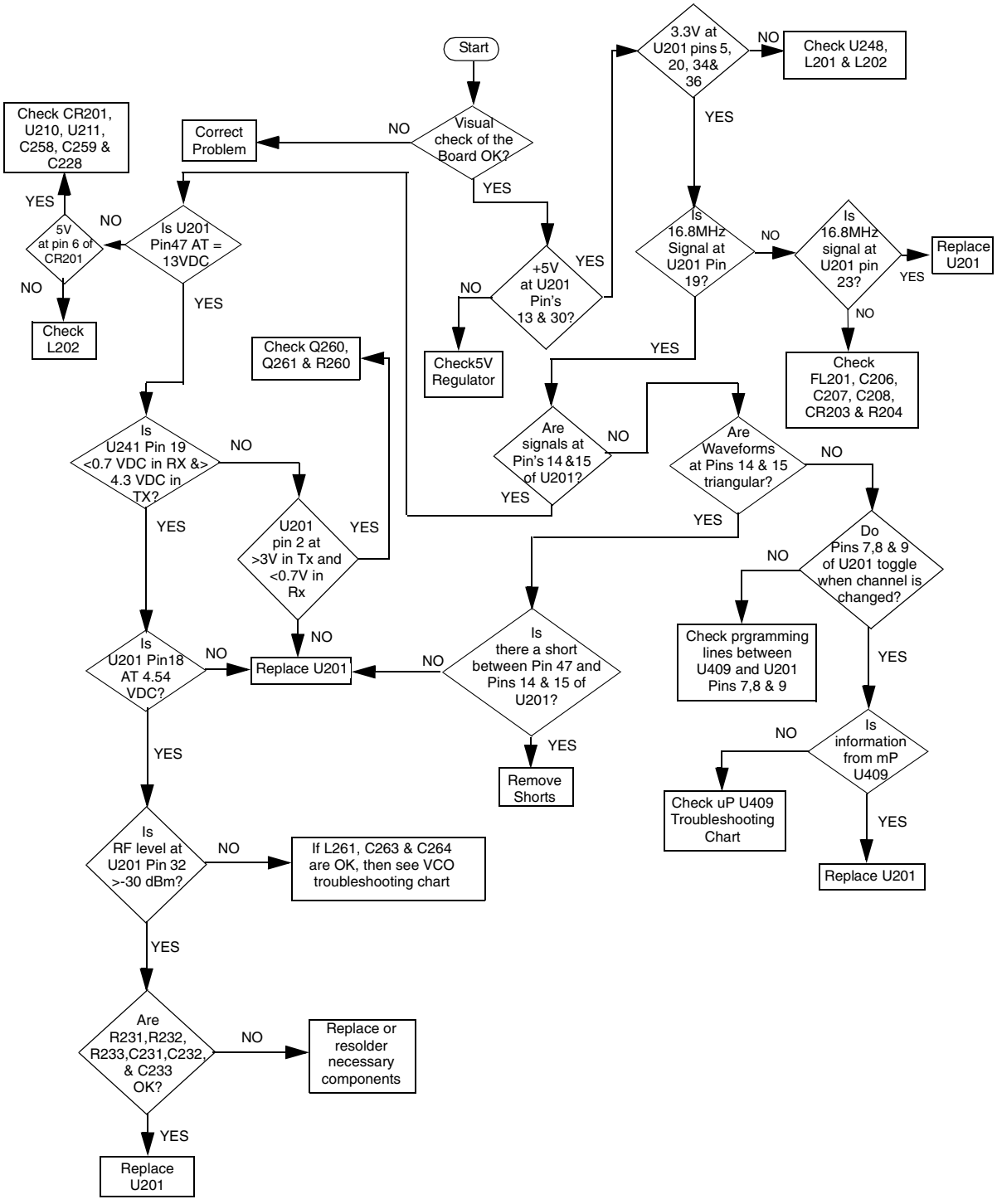
2.0 Troubleshooting Flow Chart for Receiver (Sheet 2 of 2)



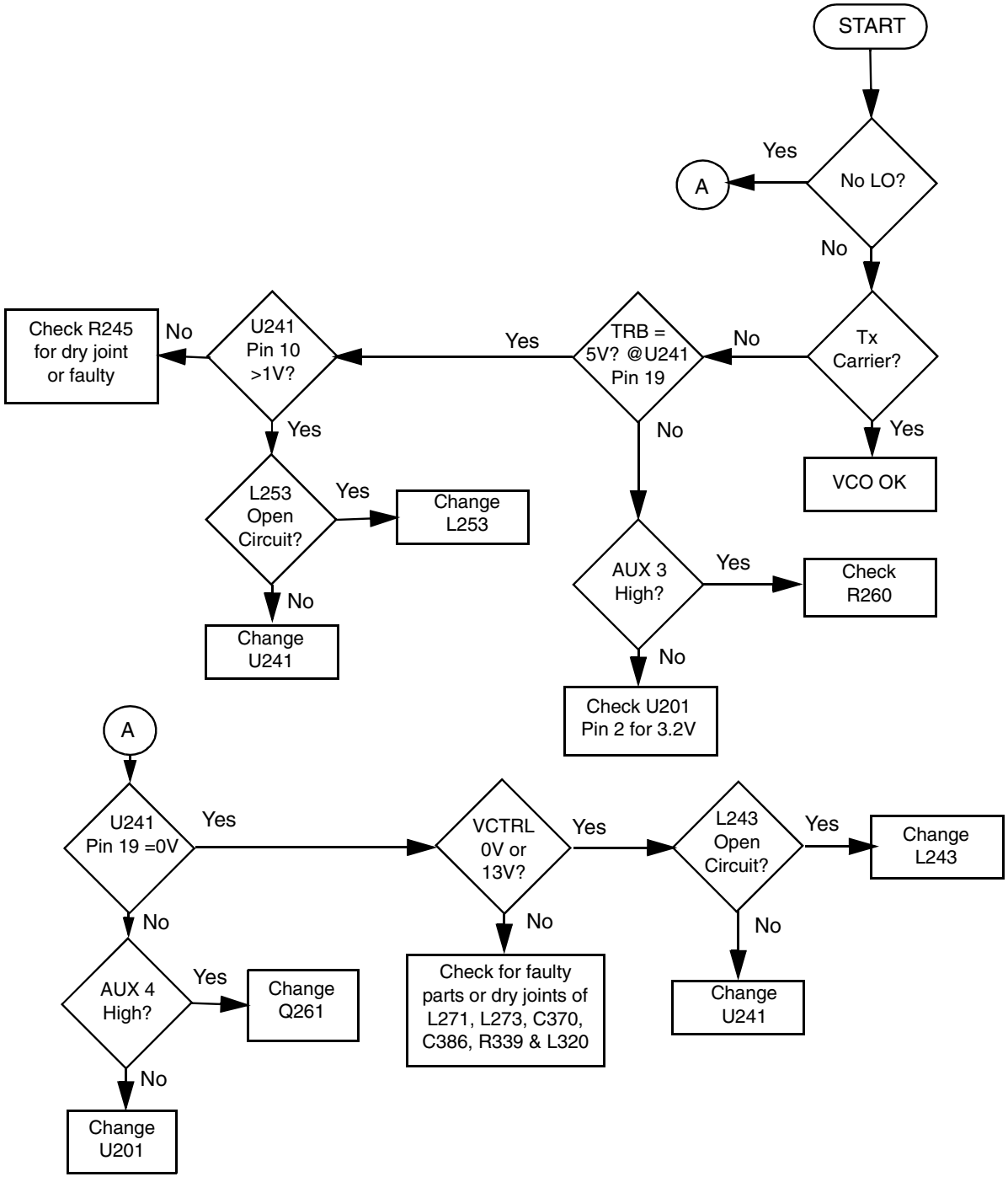
3.0 Troubleshooting Flow Chart for Transmitter



4.0 Troubleshooting Flow Chart for Synthesizer



5.0 Troubleshooting Flow Chart for VCO



Chapter 4

PCB/SCHEMATICS/PARTS LISTS

1.0 Allocation of Schematics and Circuit Boards

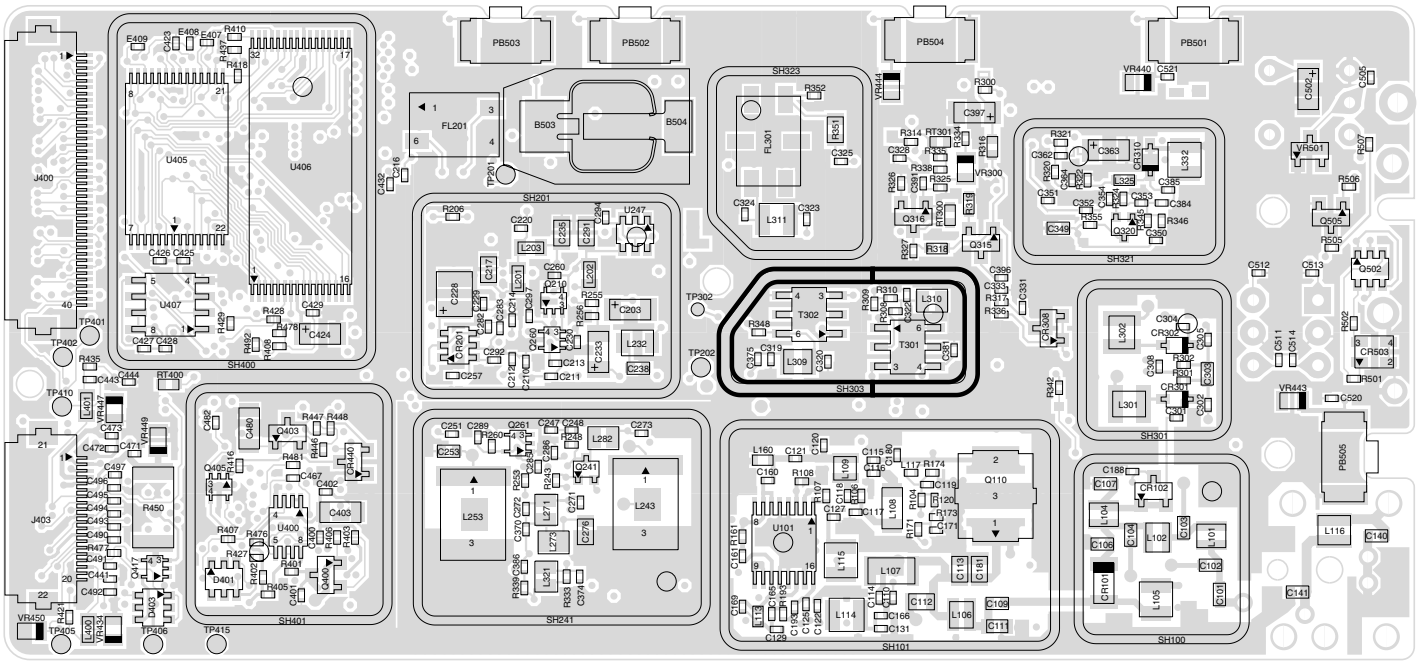
1.1 Controller Circuits

The 300-350MHz circuits are contained on the printed circuit board (PCB) which also contains the Controller circuits. This Chapter shows the schematics for the 300R1 circuits only, refer to the Controller section for details of the related Controller circuits.The PCB component layouts and the Parts Lists in this Chapter show both the Controller and 300R1 circuit components. The 300R1 schematics and the related PCB and parts list are shown in the tables below.

Table 4-1 Diagrams and Parts Lists

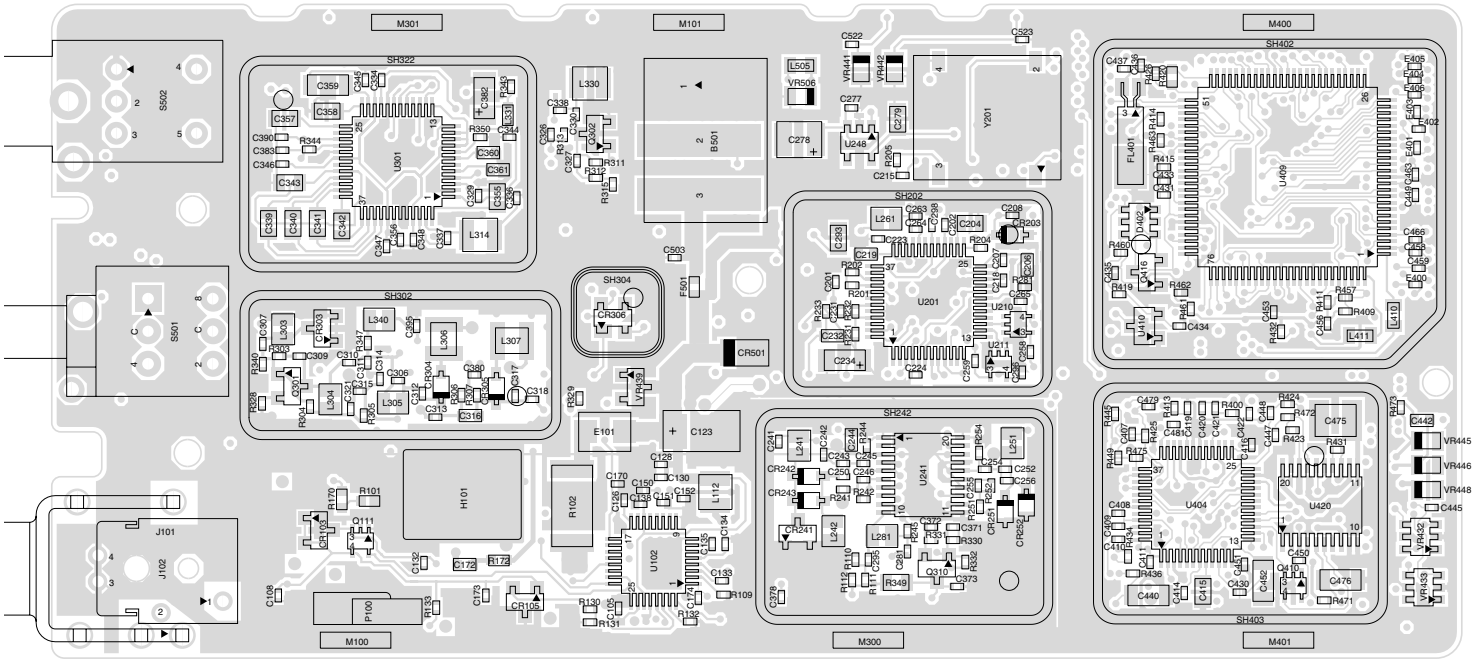
Table 4-2 Diagrams and Parts Lists

2.0 PCB 8485726Z01 - Schematics



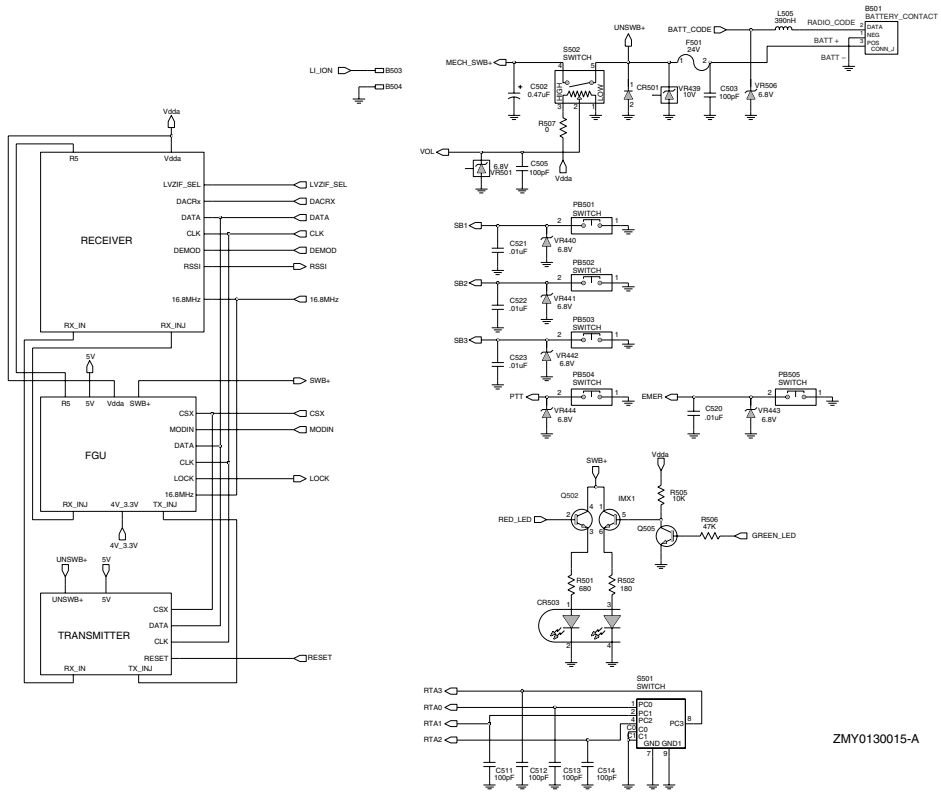
ZMY0130348-O

300R1 (300-350MHz) Main Board Component Side



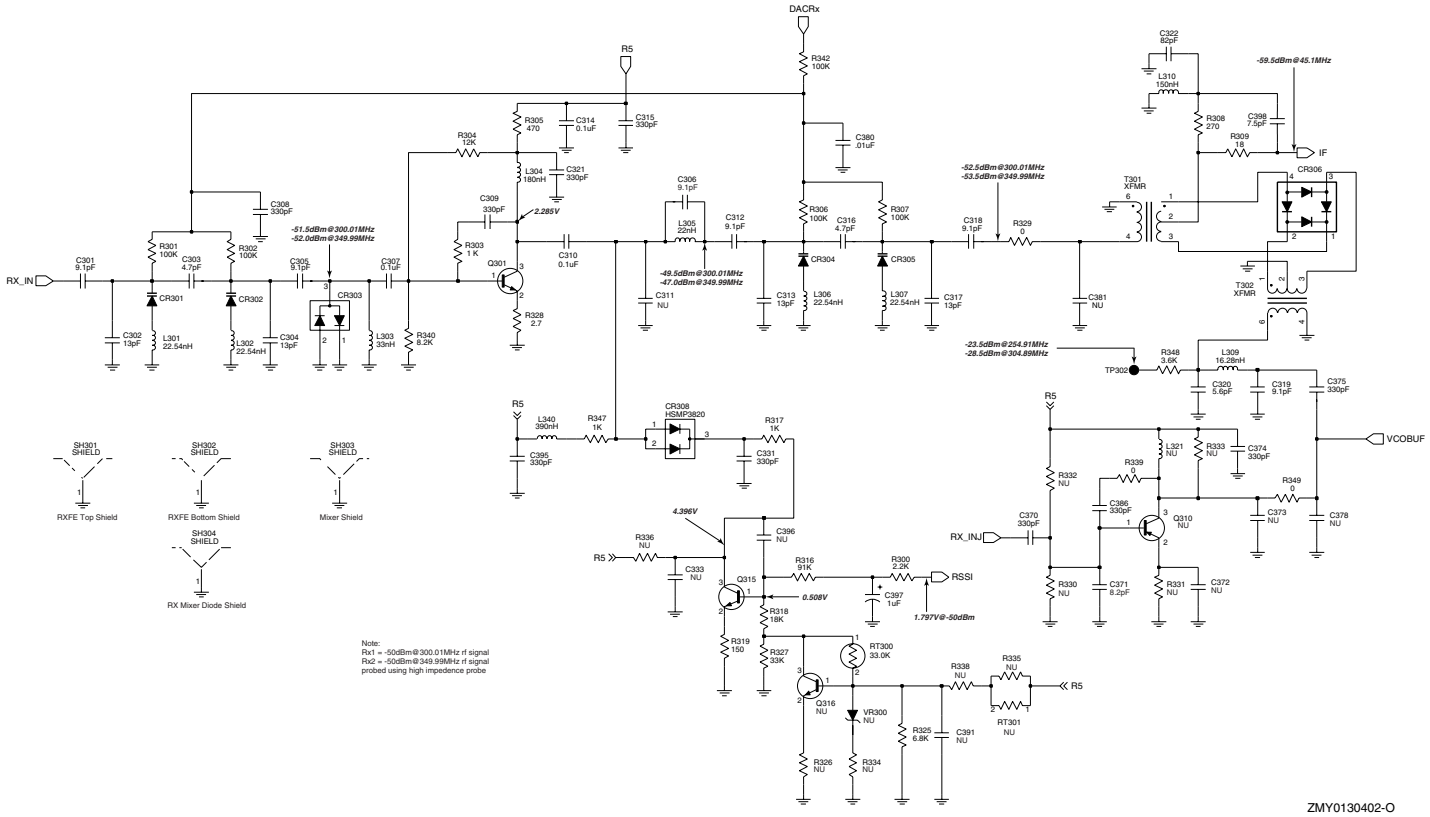
ZMY0130347-O

300R1 (300-350MHz) Main Board Solder Side

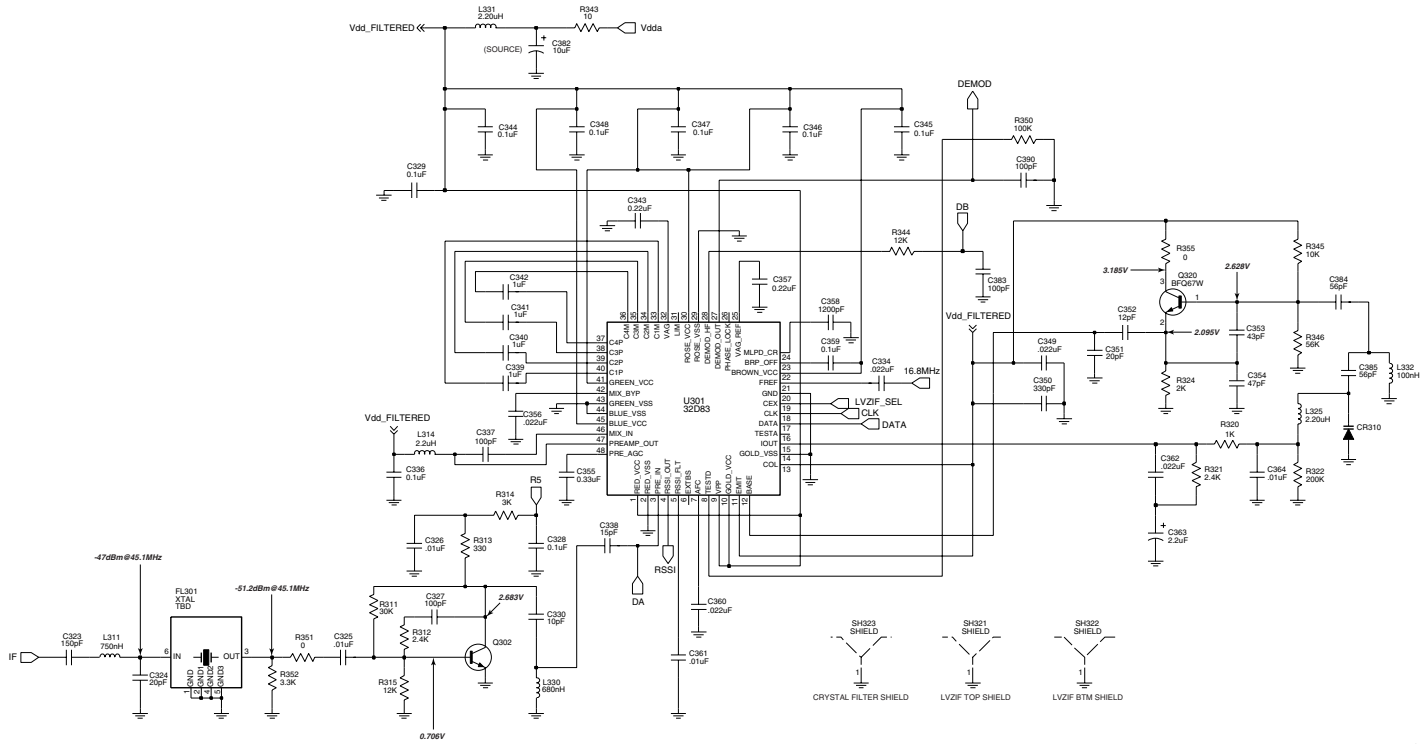


ZMY0130015-A

300R1 (300-350MHz) Controls and Switches

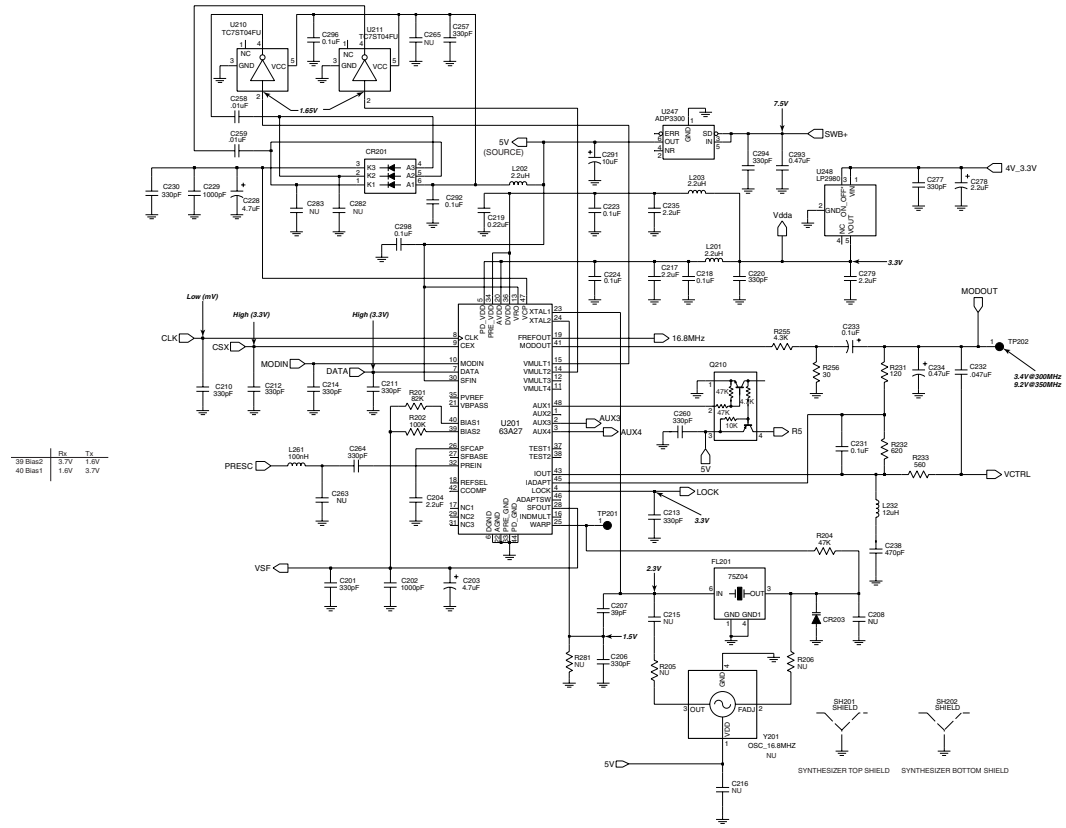


300R1 (300-350MHz) Receiver Front End



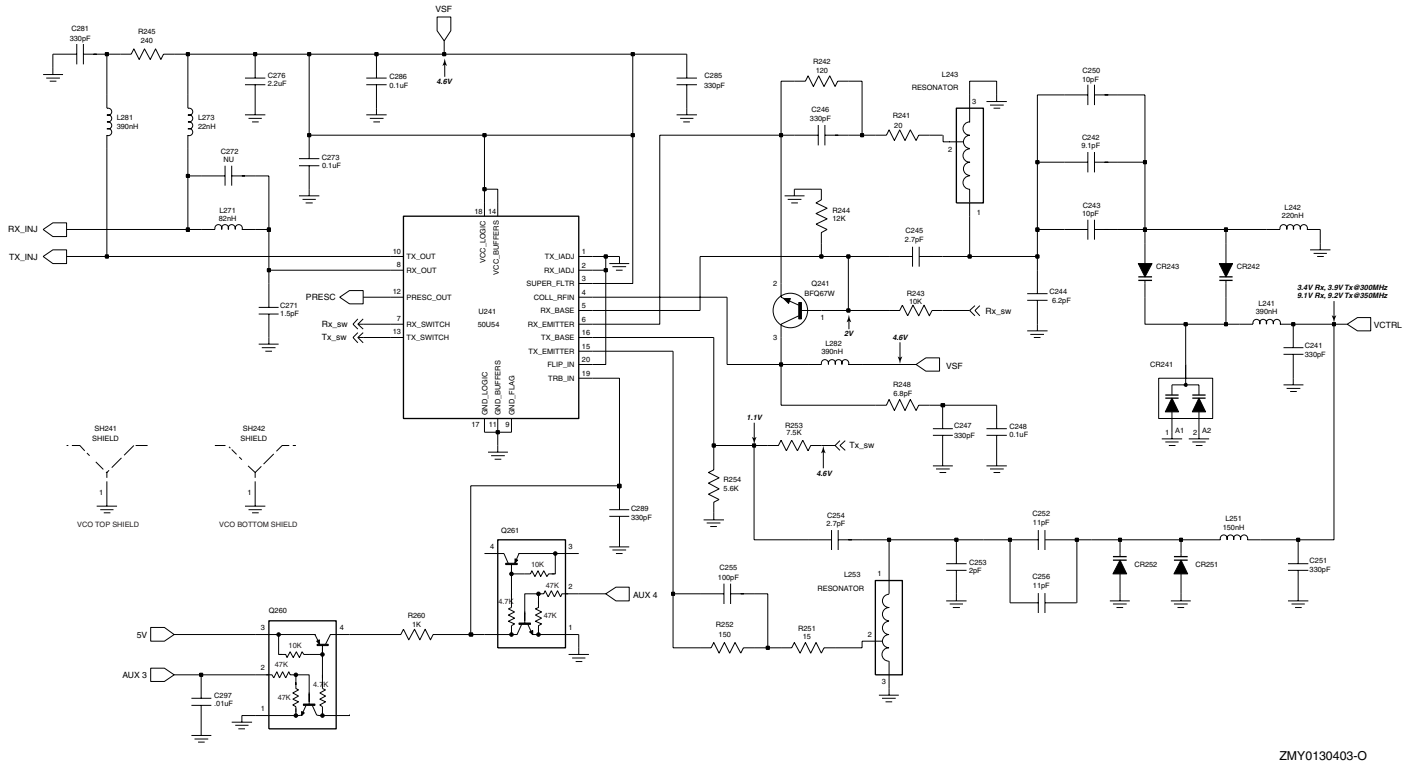
ZMY0130349-O

300R1 (300-350MHz) Receiver Back End



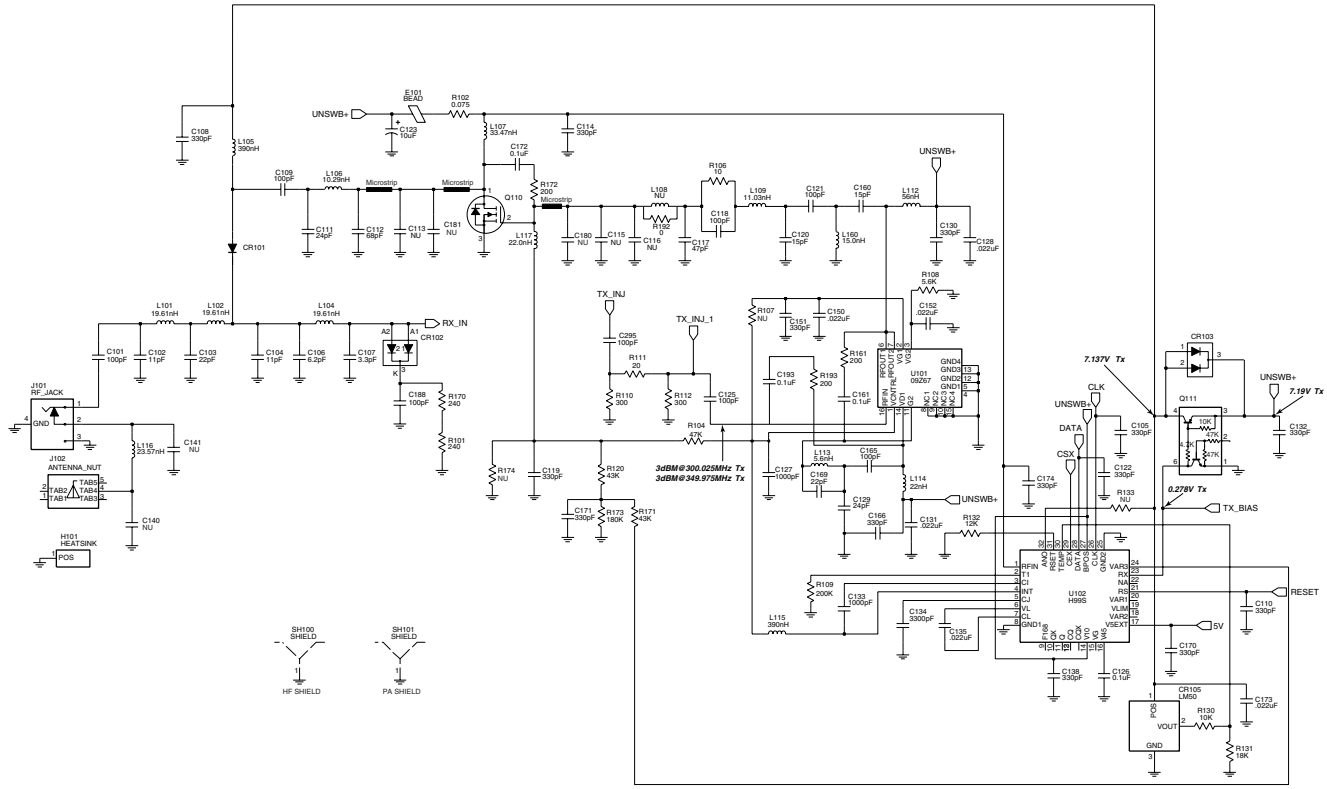
300R1 (300-350MHz) Synthesizer

ZMY0130404-O



ZMY0130403-O

300R1 (300-350MHz) Voltage Controlled Oscillator



ZMY0130401-O

300R1 (300-350MHz) Transmitter

3.0 PCB 8485726Z01 - Parts List

Circuit Ref	Motorola Part No.	Description
B501	0986237A02	CONNECTOR (CONTACT BATTERY)
B503	3980502Z01	CONTACT, BACKUP B+
B504	3980501Z01	CONTACT, BACKUP B-
C101	2113740F51	CAP CHIP REEL CL1 +/-30 100
C102	2113740F28	CAP CHIP REEL CL1+/-30 11
C103	2113740F35	CAP CHIP REEL CL1 +/-30 22
C104	2113740F28	CAP CHIP REEL CL1+/-30 11
C105	2113743L05	CAP CHIP 330 PF 10% X7R
C106	2113740F22	CAP CHIP REEL CL1 +/-30 6.2
C107	2113740F15	CAP CHIP REEL CL1 +/-30 3.3
C108	2113743L05	CAP CHIP 330 PF 10% X7R
C109	2113740F51	CAP CHIP REEL CL1 +/-30 100
C110	2113743L05	CAP CHIP 330 PF 10% X7R
C111	2103689A47	SL240J HIGH - Q CAP, UCNO
C112	2180605Z35	HIGH Q CHIP CAPACITOR, 68PF
C114	2113743L05	CAP CHIP 330 PF 10% X7R
C117	2113743N42	CAP CHIP 47.0 PF 5% COG
C118	2113743N50	CAP CHIP 100 PF 5% COG
C119	2113743L05	CAP CHIP 330 PF 10% X7R
C120	2113743N30	CAP CHIP 15.0PF 5% COG
C121	2113743N50	CAP CHIP 100 PF 5% COG
C122	2113743L05	CAP CHIP 330 PF 10% X7R
C123	2311049A18	CAP. TANT 10% 10UF
C125	2113743N50	CAP CHIP 100 PF 5% COG
C126	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C127	2113743L17	CAP CHIP 1000 PF 10% X7R
C128	2113743M08	CAP CHIP 22000PF +80-20% Y5V
C129	2113743N35	CAP CHIP 24.0 PF 5% COG
C130	2113743L05	CAP CHIP 330 PF 10% X7R
C131	2113743M08	CAP CHIP 22000PF +80-20% Y5V
C132	2113743L05	CAP CHIP 330 PF 10% X7R
C133	2113743L17	CAP CHIP 1000 PF 10% X7R
C134	2113743L29	CAP CHIP 3300PF 10% X7R
C135	2113743M08	CAP CHIP 22000PF +80-20% Y5V
C138	2113743L05	CAP CHIP 330 PF 10% X7R
C150	2113743M08	CAP CHIP 22000PF +80-20% Y5V
C151	2113743L05	CAP CHIP 330 PF 10% X7R
C152	2113743M08	CAP CHIP 22000PF +80-20% Y5V
C160	2113743N50	CAP CHIP 100 PF 5% COG
C161	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C165	2113743N50	CAP CHIP 100 PF 5% COG
C166	2113743L05	CAP CHIP 330 PF 10% X7R
C169	2113743N34	CAP CHIP 22.0 PF 5% COG
C170	2113743L05	CAP CHIP 330 PF 10% X7R
C171	2113743L05	CAP CHIP 330 PF 10% X7R
C172	2113743E20	CAP CHIP. 10 UF 10%
C173	2113743M08	CAP CHIP 22000PF +80-20% Y5V
C174	2113743L05	CAP CHIP 330 PF 10% X7R
C188	2113743N50	CAP CHIP 100 PF 5% COG
C193	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C201	2113743L05	CAP CHIP 330 PF 10% X7R
C202	2113743L17	CAP CHIP 1000 PF 10% X7R
C203	2311049A56	CAP TAN CHIP A/P 4.7 20 10
C204	2104993J02	CAP MONO. CERAMIC (2.2UF)
C206	2113740F63	CAP CHIP CL1 +/-30 330 5%
C207	2113743N40	CAP CHIP 39.0 PF 5% COG
C210	2113743L05	CAP CHIP 330 PF 10% X7R
C211	2113743L05	CAP CHIP 330 PF 10% X7R
C212	2113743L05	CAP CHIP 330 PF 10% X7R
C213	2113743L05	CAP CHIP 330 PF 10% X7R
C214	2113743L05	CAP CHIP 330 PF 10% X7R
C217	2104993J02	CAP MONO. CERAMIC (2.2UF)
C218	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C219	2113743K16	CAP CHIP .220 UF +80-20% 16V
C220	2113743L05	CAP CHIP 330 PF 10% X7R
C223	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C224	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C228	2311049J11	CAPACITOR TANT 10% 4.7UF
C229	2113743L17	CAP CHIP 1000 PF 10% X7R
C230	2113743L05	CAP CHIP 330 PF 10% X7R
C231	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C232	2113743E12	CAP CHIP .047UF 10% X7R
C233	2311049A01	CAP TANT CHIP A/P .1 10 35
C234	2311049A05	CAP TANT 10% 0.47UF
C235	2104993J02	CAP MONO. CERAMIC (2.2UF)
C238	2113741F17	CAP CHIP CL2 X7R REEL 470
C241	2113743L05	CAP CHIP 330 PF 10% X7R
C242	2113743N25	CAP CHIP 9.1 PF +-.5PF COG
C243	2113743N26	CAP CHIP 10.0 PF 5% COG
C244	2113740F22	CAP CHIP REEL CL1 +/-30 6.2
C245	2113743N12	CAP CHIP 2.7 PF +-.25PF COG
C246	2113743L05	CAP CHIP 330 PF 10% X7R
C247	2113743L05	CAP CHIP 330 PF 10% X7R
C248	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C250	2113743N26	CAP CHIP 10.0 PF 5% COG
C251	2113743L05	CAP CHIP 330 PF 10% X7R
C252	2113743N27	CAP CHIP 11.0 PF 5% COG
C253	2113740F10	CAP CHIP REEL CL1+/-30 2.0
C254	2113743N12	CAP CHIP 2.7 PF +-.25PF COG
C255	2113743L05	CAP CHIP 330 PF 10% X7R
C256	2113743N27	CAP CHIP 11.0 PF 5% COG
C257	2113743L05	CAP CHIP 330 PF 10% X7R
C258	2113743L41	CAP CHIP 10000 PF 10% X7R
C259	2113743L41	CAP CHIP 10000 PF 10% X7R
C260	2113743L05	CAP CHIP 330 PF 10% X7R
C264	2113743L05	CAP CHIP 330 PF 10% X7R
C271	2113743N07	CAP CHIP 1.5PF +-.25PF COG
C273	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C276	2104993J02	CAP MONO. CERAMIC (2.2UF)
C277	2113743L05	CAP CHIP 330 PF 10% X7R
C278	2311049A09	TANT CAP 2.2 UF 10%
C279	2104993J02	CAP MONO. CERAMIC (2.2UF)
C281	2113743L05	CAP CHIP 330 PF 10% X7R
C285	2113743L05	CAP CHIP 330 PF 10% X7R
C286	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C289	2113743L05	CAP CHIP 330 PF 10% X7R
C291	2311049A69	CAP TAN CHIP 10.0 UF 20% 6.3V
C292	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C293	2113743A27	CAP CHIP .470 UF 10% 16V
C294	2113743L05	CAP CHIP 330 PF 10% X7R
C295	2113743N50	CAP CHIP 100 PF 5% COG
C296	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C297	2113743L41	CAP CHIP 10000 PF 10% X7R
C298	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C301	2113743N25	CAP CHIP 9.1 PF +-.5PF COG
C302	2113743N29	CAP CHIP 13.0 PF 5% COG
C303	2113740L10	CAP CER CHIP 4.7 PF +-0.1PF
C304	2113743N29	CAP CHIP 13.0 PF 5% COG
C305	2113743N25	CAP CHIP 9.1 PF +-.5PF COG
C306	2113743N25	CAP CHIP 9.1 PF +-.5PF COG
C307	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C308	2113743L05	CAP CHIP 330 PF 10% X7R
C309	2113743L05	CAP CHIP 330 PF 10% X7R
C310	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C312	2113743N25	CAP CHIP 9.1 PF +-.5PF COG
C313	2113743N29	CAP CHIP 13.0 PF 5% COG
C314	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C315	2113743L05	CAP CHIP 330 PF 10% X7R
C316	2113740L10	CAP CER CHIP 4.7 PF +-0.1PF
C317	2113743N29	CAP CHIP 13.0 PF 5% COG
C318	2113743N25	CAP CHIP 9.1 PF +-.5PF COG
C319	2113743N25	CAP CHIP 9.1 PF +-.5PF COG
C320	2113743N20	CAP CHIP 5.6 PF +-.5PF COG
C321	2113743L05	CAP CHIP 330 PF 10% X7R
C322	2113743N48	CAP CHIP 82.0 PF 5% COG
C323	2113743N54	CAP CHIP 150 PF 5% COG
C324	2113743N33	CAP CHIP 20.0 PF 5% COG
C325	2113743L41	CAP CHIP 10000 PF 10% X7R
C326	2113743L41	CAP CHIP 10000 PF 10% X7R
C327	2113743N50	CAP CHIP 100 PF 5% COG
C328	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C329	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C330	2113743N26	CAP CHIP 10.0 PF 5% COG
C331	2113743L05	CAP CHIP 330 PF 10% X7R
C334	2113743M08	CAP CHIP 22000PF +80-20% Y5V
C336	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C337	2113743N50	CAP CHIP 100 PF 5% COG
C338	2113743N30	CAP CHIP 15.0PF 5% COG
C339	2180478Z20	CAP MONO. CERAMIC (1.0UF)
C340	2180478Z20	CAP MONO. CERAMIC (1.0UF)
C341	2180478Z20	CAP MONO. CERAMIC (1.0UF)
C342	2180478Z20	CAP MONO. CERAMIC (1.0UF)
C343	2113743A23	CAP CHIP .220UF 10% X7R
C344	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C345	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C346	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C347	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C348	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C349	2113743E07	CER CHIP CAP .022UF
C350	2113743L05	CAP CHIP 330 PF 10% X7R
C351	2113743N33	CAP CHIP 20.0 PF 5% COG
C352	2113743N28	CAP CHIP 12.0 PF 5% COG
C353	2113743N41	CAP CHIP 43.0 PF 5% COG
C354	2113743N42	CAP CHIP 47.0 PF 5% COG
C355	2113743A24	CAP CHIP .330 UF 10% 16V
C356	2113743M08	CAP CHIP 22000PF +80-20% Y5V
C357	2113743A23	CAP CHIP .220UF 10% X7R
C358	2113741A23	CHIP CAPACITORS 1200PF +-5%
C359	2109720D14	CAP CER CHIP LOW DIST 0.1UF
C360	2113743E07	CER CHIP CAP .022UF
C361	2113741F49	CHIP CAP, CER 10NF
C362	2113743M08	CAP CHIP 22000PF +80-20% Y5V
C363	2311049A40	GLOBAL CAP TANT 10% 2.2 UF
C364	2113743L41	CAP CHIP 10000 PF 10% X7R
C370	2113743L05	CAP CHIP 330 PF 10% X7R
C371	2113743N24	CAP CHIP 8.2 PF + -.5PF COG
C374	2113743L05	CAP CHIP 330 PF 10% X7R
C375	2113743L05	CAP CHIP 330 PF 10% X7R
C380	2113743L41	CAP CHIP 10000 PF 10% X7R
C382	2311049A59	CAP TANT CHIP A/P 10UF 10% 6V
C383	2113743N50	CAP CHIP 100 PF 5% COG
C384	2113743N44	CAP CHIP 56.0 PF 5% COG
C385	2113743N44	CAP CHIP 56.0 PF 5% COG
C386	2113743L05	CAP CHIP 330 PF 10% X7R
C390	2113743N50	CAP CHIP 100 PF 5% COG
C395	2113743L05	CAP CHIP 330 PF 10% X7R
C397	2311049A07	CAP TANT 10% 1.0UF
C398	2113743N23	CAP CHIP 7.5 PF +-.5PF COG
C400	2113743L41	CAP CHIP 10000 PF 10% X7R
C401	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C402	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C403	2113928D08	CAP CERAMIC CHIP 10.0UF
C407	2113928N01	CAP CER CHIP 0.1UF 10% 6.3
C408	2113743N50	CAP CHIP 100 PF 5% COG
C409	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C410	2113928N01	CAP CER CHIP 0.1UF 10% 6.3
C411	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C414	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C415	2109720D01	CAP CER CHIP LOW DIS T .01UF
C416	2113928N01	CAP CER CHIP 0.1UF 10% 6.3
C420	2113743L41	CAP CHIP 10000 PF 10% X7R
C421	2113928N01	CAP CER CHIP 0.1UF 10% 6.3
C422	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C423	2113743N50	CAP CHIP 100 PF 5% COG
C424	2311049A59	CAP TANT CHIP A/P 10UF 10% 6V
C425	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C426	2113743N50	CAP CHIP 100 PF 5% COG
C427	2113743N50	CAP CHIP 100 PF 5% COG
C428	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C429	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C430	2113928N01	CAP CER CHIP 0.1UF 10% 6.3
C431	2113743N50	CAP CHIP 100 PF 5% COG
C433	2113743L41	CAP CHIP 10000 PF 10% X7R
C434	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C435	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C436	2113743N34	CAP CHIP 22.0 PF 5% COG
C437	2113743N34	CAP CHIP 22.0 PF 5% COG
C440	2113743G26	CAP CHIP 4.7UF 16V + 80-20%
C441	2113743N50	CAP CHIP 100 PF 5% COG
C442	2113743E20	CAP CHIP. 10 UF 10%
C443	2113928N01	CAP CER CHIP 0.1UF 10% 6.3

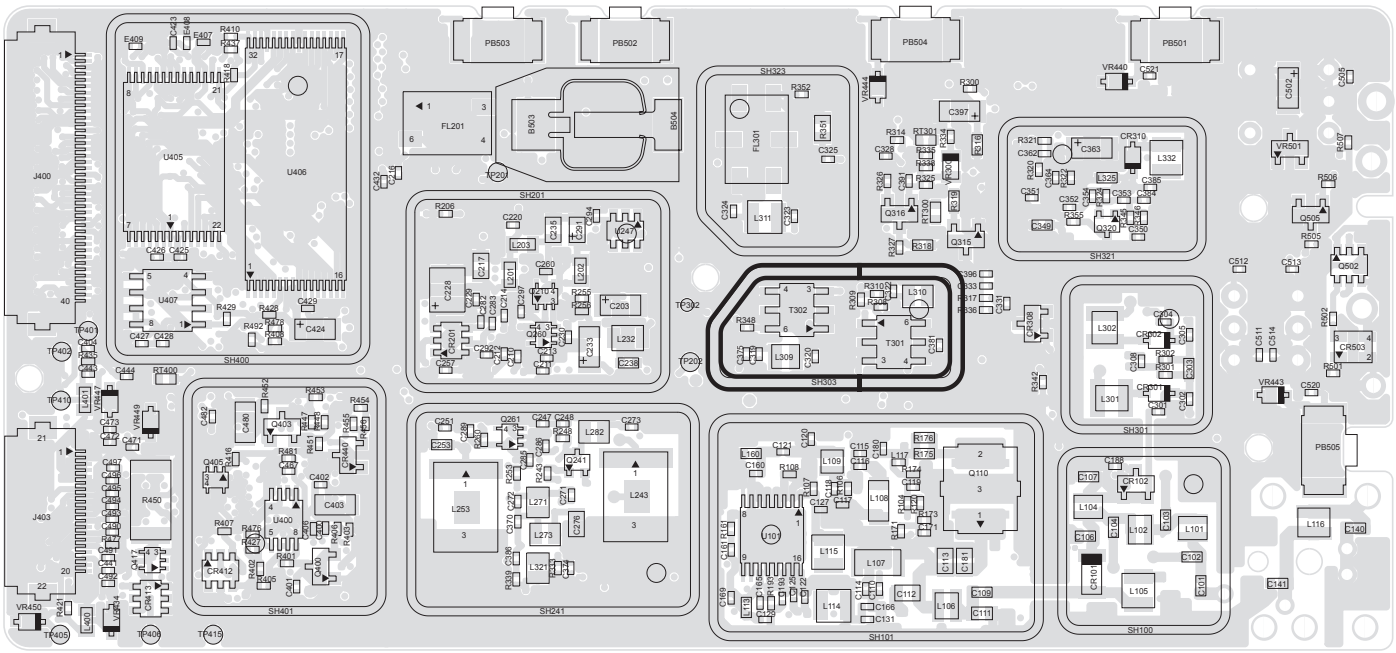
Circuit Ref	Motorola Part No.	Description
C444	2113743N50	CAP CHIP 100 PF 5% COG
C445	2113743N50	CAP CHIP 100 PF 5% COG
C447	2113743M08	CAP CHIP 22000PF +80-20% Y5V
C448	2113928N01	CAP CER CHIP 0.1UF 10% 6.3
C449	2113743N50	CAP CHIP 100 PF 5% COG
C451	2113743M08	CAP CHIP 22000PF +80-20% Y5V
C452	2113743B29	CAP CHIP 1.00 UF 10% 16V
C453	2113743N50	CAP CHIP 100 PF 5% COG
C456	2113743N50	CAP CHIP 100 PF 5% COG
C458	2113743N50	CAP CHIP 100 PF 5% COG
C459	2113743N50	CAP CHIP 100 PF 5% COG
C463	2113743N50	CAP CHIP 100 PF 5% COG
C466	2113743N50	CAP CHIP 100 PF 5% COG
C467	2113928N01	CAP CER CHIP 0.1UF 10% 6.3
C471	2113743N50	CAP CHIP 100 PF 5% COG
C472	2113743L09	CAP CHIP 470 PF 10% X7R
C473	2113743L09	CAP CHIP 470 PF 10% X7R
C475	2113743H14	CAP CHIP 10.0 UF 16V +80-20%
C476	2113928D08	CAP CERAMIC CHIP 10.0UF
C479	2113928N01	CAP CER CHIP 0.1UF 10% 6.3
C480	2113928D08	CAP CERAMIC CHIP 10.0UF
C481	2113928N01	CAP CER CHIP 0.1UF 10% 6.3
C482	2113928N01	CAP CER CHIP 0.1UF 10% 6.3
C490	2113743N50	CAP CHIP 100 PF 5% COG
C491	2113743N50	CAP CHIP 100 PF 5% COG
C492	2113743N50	CAP CHIP 100 PF 5% COG
C493	2113743N50	CAP CHIP 100 PF 5% COG
C494	2113743N50	CAP CHIP 100 PF 5% COG
C495	2113743N50	CAP CHIP 100 PF 5% COG
C496	2113743N50	CAP CHIP 100 PF 5% COG
C497	2113743N50	CAP CHIP 100 PF 5% COG
C502	2311049A05	CAP TANT 10% 0.47UF
C503	2113743N50	CAP CHIP 100 PF 5% COG
C505	2113743N50	CAP CHIP 100 PF 5% COG
C511	2113743N50	CAP CHIP 100 PF 5% COG
C512	2113743N50	CAP CHIP 100 PF 5% COG
C513	2113743N50	CAP CHIP 100 PF 5% COG
C514	2113743N50	CAP CHIP 100 PF 5% COG
C520	2113743L41	CAP CHIP 10000 PF 10% X7R
C521	2113743L41	CAP CHIP 10000 PF 10% X7R
C522	2113743L41	CAP CHIP 10000 PF 10% X7R
C523	2113743L41	CAP CHIP 10000 PF 10% X7R
CR101	4880973Z02	PIN DIODE
CR102	4802245J41	SURFACE MOUNT PIN DIODES
CR103	4802245J41	SURFACE MOUNT PIN DIODES
CR105	5185963A15	IC TEMP. SENSOR 1M50C
CR201	4802233J09	DIODE TRIPLE SOT25-RH
CR203	4862824C03	DIODE VARACTOR
CR241	4805649Q13	DIODE VCTR ISV 228
CR242	4802245J22	DIODE VARACTOR IT363
CR243	4802245J22	DIODE VARACTOR IT363
CR251	4802245J22	DIODE VARACTOR IT363
CR252	4802245J22	DIODE VARACTOR IT363
CR301	4862824C01	DIODE VARACTOR
CR302	4862824C01	DIODE VARACTOR
CR303	4880154K03	SOT MMBD353 RH DIODE DUAL SCHT
CR304	4862824C01	DIODE VARACTOR
CR305	4862824C01	DIODE VARACTOR
CR306	4802245J42	RING QUAD DIODE SOT-143 PKG
CR308	4802245J41	SURFACE MOUNT PIN DIODES
CR310	4862824C01	DIODE VARACTOR
CR411	4802245J47	DIODE SCHOTTKY BARRIER (RB471E)
CR412	4802245J47	DIODE SCHOTTKY BARRIER (RB471E)
CR413	4802245J47	DIODE SCHOTTKY BARRIER (RB471E)
CR440	4813833C02	DIODE DUAL 70V '5B' COMM CATH
CR501	4880107R01	RECTIFIER
CR503	4805729G49	DIODE RED/YEL
D401	4802245J62	DIODE SCHOTTKY, RB731U
D402	4802245J62	DIODE SCHOTTKY, RB731U
D403	4802245J62	DIODE SCHOTTKY, RB731U
E101	2484657R01	INDUCTOR BEAD CHIP
E400	2480640Z01	C/IND BK1005HM471 BEAD
E401	2480640Z01	C/IND BK1005HM471 BEAD
E402	2480640Z01	C/IND BK1005HM471 BEAD
E403	2480640Z01	C/IND BK1005HM471 BEAD
E404	2480640Z01	C/IND BK1005HM471 BEAD
E405	2480640Z01	C/IND BK1005HM471 BEAD
E406	2480640Z01	C/IND BK1005HM471 BEAD
E407	2480640Z01	C/IND BK1005HM471 BEAD
E408	2480640Z01	C/IND BK1005HM471 BEAD
E409	2480640Z01	C/IND BK1005HM471 BEAD
F501	6580542Z01	FUSE CHIP SMT TR/1608FF 3A
FL201	*4805875Z04	WM TCXO APEX-4
FL301	4802245J43	MONO. S/MOUNT XTAL FILTER
FL401	4870368G02	REFLOWABLE CLOCK OSC XTAL
H101	2680499Z01	HEAT SPREADER
J101	0985613Z01	JACK,RF
J102	0280519Z02	NUT, ANTENNA
J400	0905505Y04	CONN ZIF HORIZONTAL
J403	0905505Y02	CONN MALE 20 PIN ZIF
L101	2479990B02	AIR WOUND COIL/GREN 19.61NH
L102	2479990B02	AIR WOUND COIL/GREN 19.61NH
L104	2479990B02	AIR WOUND COIL/GREN 19.61NH
L105	2462587N22	CHIP IND 390 NH 10%
L106	2460591A67	COILD AIR WOUND INDUC 10.29
L107	2479990G01	AIR WOUND COIL/GREN 33.47NH
L108	0611077A01	RES CHIP JUMPER
L109	2460591B04	COIL AIR WOUND INDUC 11.03
L112	2462587N50	CHIP IND 56 NH 5%
L113	2413926H09	IND CHIP 5.6 NH +/- 0.3NH
L114	2462587N45	CHIP IND 22 NH 5%
L115	2462587N22	CHIP IND 390 NH 10%
L116	2460591C56	COIL AIR WOUND INDUC 23.57
L117	2409154M17	IND CER MLTILYR 22.0NH 1005
L160	2413926H14	IND CHIP 15.0 NH 5%
L201	2462587Q20	IND CHIP 2,200NH 20%
L202	2462587Q20	IND CHIP 2,200NH 20%
L203	2462587Q20	IND CHIP 2,200NH 20%
L232	2462587P25	CHIP IND 12000 NH 5%
L241	2462587V41	IND CHIP 390 NH 10%
L242	2462587V38	CHIP IND 220 NH 5% 0805
L243	2460593C02	COIL MULT. LAYRD. TAP TEF RESN
L251	2462587V36	CHIP IND 150NH 5% 0805
L253	2460593C02	COIL MULT. LAYRD. TAP TEF RESN
L261	2462587V34	CHIP IND 100NH 5% 0805
L271	2462587V33	CHIP IND 82 NH 5% 0805
L273	2462587V26	CHIP IND 22 NH 5% 0805
L281	2462587V41	IND CHIP 390 NH 10%
L282	2462587V41	IND CHIP 390 NH 10%
L301	2460591D60	COIL AIR WOUND INDUC 22.54
L302	2460591D60	COIL AIR WOUND INDUC 22.54
L303	2462587V28	CHIP IND 33 NH 5% 0805
L304	2462587V37	CHIP IND 180 NH 5% 0805
L305	2462587V23	CHIP IND 12 NH 5% 0805
L306	2460591D60	COIL AIR WOUND INDUC 22.54
L307	2460591D60	COIL AIR WOUND INDUC 22.54
L309	2479990C02	AIR WOUND COIL/GREN 16.28NH
L310	2462587V36	CHIP IND 150NH 5% 0805
L311	2462587N65	CHIP IND 750 NH 5%
L314	2462587N72	CHIP IND 2200 NH 5%
L325	2480646Z20	COIL MULTI-LAYER CHIP(2.20UH)
L330	2462587N64	CHIP IND 680 NH 5%
L331	2480646Z20	COIL MULTI-LAYER CHIP(2.20UH)
L332	2462587N53	CHIP IND 100 NH 5%
L340	2462587V41	IND CHIP 390 NH 10%
L400	2462587Q42	IND CHIP 390NH 10%
L401	2462587Q42	IND CHIP 390NH 10%
L410	2462587Q42	IND CHIP 390NH 10%
L411	2462587Q42	IND CHIP 390NH 10%
L505	2462587Q42	IND CHIP 390NH 10%
P100	3905643V01	CONTACT ANT GRD
PB501	4080523Z01	SWITCH, TACT
PB502	4080523Z01	SWITCH, TACT
PB503	4080523Z01	SWITCH, TACT
PB504	4080523Z01	SWITCH, TACT
PB505	4080523Z01	SWITCH, TACT
Q110	4802245J55	TRAN. POWER FIELD EFFECT
Q111	4802245J50	TRAN. DUAL NPN/PNP UMC5N
Q210	4802245J50	TRAN. DUAL NPN/PNP UMC5N
Q241	4805218N63	RF TRANS SOT 323 BFQ67W
Q260	4802245J50	TRAN. DUAL NPN/PNP UMC5N
Q261	4802245J50	TRAN. DUAL NPN/PNP UMC5N
Q301	4802245J44	NPN SILICON BIPOLAR TRAN.
Q302	4802245J44	NPN SILICON BIPOLAR TRAN.
Q315	4880214G02	TSTR MMBT3904
Q320	4805218N63	RF TRANS SOT 323 BFQ67W
Q400	4809579E18	TSTR MOSFET P-CHAN TP010IT
Q403	4880214G02	TSTR MMBT3904
Q405	4802245J54	UMG5N DIGITAL TRANSISTOR
Q410	4802245J54	UMG5N DIGITAL TRANSISTOR
Q416	4809579E18	TSTR MOSFET P-CHAN TP010IT
Q417	4802245J50	TRAN. DUAL NPN/PNP UMC5N
Q502	5180159R01	DUAL TRANS NPNS
Q505	4880214G02	TSTR MMBT3904
R101	0662057A34	CHIP RES 240 OHMS 5%
R102	0680539Z01	PWR. METAL STRIP RESISTORS
R104	0662057N15	RES. CHIP 47K 5% 20X40
R106	0662057M26	RES. CHIP 10 5% 20X40
R108	0662057M92	RES. CHIP 5600 5% 20X40
R109	0662057N30	RES CHIP 200K 5% 20X40
R110	0662057M61	RES. CHIP 300 5% 20X40
R111	0662057M33	RES. CHIP 20 5% 20X40
R112	0662057M61	RES. CHIP 300 5% 20X40
R120	0662057N14	RES. CHIP 43K 5% 20X40
R130	0662057M98	RES CHIP 10K 5% 20X40
R131	0662057N05	RES. CHIP 18K 5% 20X40
R132	0662057N33	RES. CHIP 270K 5% 20X40
R161	0662057M57	RES. CHIP 200 5% 20X40
R170	0662057A34	CHIP RES 240 OHMS 5%
R171	0662057N14	RES. CHIP 43K 5% 20X40
R172	0662057A32	CHIP RES 200 OHMS 5%
R173	0662057N29	RES. CHIP 180K 5% 20X40
R193	0662057M57	RES. CHIP 200 5% 20X40
R201	0662057N21	RES. CHIP 82K 5% 20X40
R202	0662057N23	RES CHIP 100K 5% 20X40
R204	0662057N15	RES. CHIP 47K 5% 20X40
R231	0662057M52	RES. CHIP 120 5% 20X40
R232	0662057M69	RES. CHIP 620 5% 20X40
R233	0662057M68	RES. CHIP 560 5% 20X40
R241	0662057M33	RES. CHIP 20 5% 20X40
R242	0662057M52	RES. CHIP 120 5% 20X40
R243	0662057M98	RES CHIP 10K 5% 20X40
R244	0662057N01	RES. CHIP 12K 5% 20X40
R245	0662057M59	RES. CHIP 240 5% 20X40
R248	0662057M37	RES. CHIP 30 5% 20X40
R251	0662057M30	RES. CHIP 15 5% 20X40
R252	0662057M54	RES. CHIP 150 5% 20X40
R253	0662057N03	RES. CHIP 15K 5% 20X40
R254	0662057M92	RES. CHIP 5600 5% 20X40
R255	0662057M89	RES. CHIP 4300 5% 20X40
R256	0662057M37	RES. CHIP 30 5% 20X40
R260	0662057M74	RES. CHIP 1000 5% 20X40
R300	0662057M82	RES. CHIP 2200 5% 20X40
R301	0662057N23	RES CHIP 100K 5% 20X40
R302	0662057N23	RES CHIP 100K 5% 20X40
R303	0662057M74	RES. CHIP 1000 5% 20X40
R304	0662057N01	RES. CHIP 12K 5% 20X40
R305	0662057M66	RES. CHIP 470 5% 20X40
R306	0662057N23	RES CHIP 100K 5% 20X40
R307	0662057N23	RES CHIP 100K 5% 20X40
R308	0662057M60	RES. CHIP 270 5% 20X40
R309	0662057M32	RES. CHIP 18 5% 20X40
R311	0662057N10	RES. CHIP 30K 5% 20X40
R312	0662057M83	RES. CHIP 2400 5% 20X40
R313	0662057M62	RES. CHIP 330 5% 20X40
R314	0662057M85	RES. CHIP 3000 5% 20X40

Circuit Ref	Motorola Part No.	Description
R315	0662057N01	RES. CHIP 12K 5% 20X40
R316	0662057A96	CHIP RES 91K OHMS 5%
R317	0662057M74	RES. CHIP 1000 5% 20X40
R318	0662057A79	CHIP RES 18K OHMS 5%
R319	0662057A29	CHIP RES 150 OHMS 5%
R320	0662057M74	RES. CHIP 1000 5% 20X40
R321	0662057M83	RES. CHIP 2400 5% 20X40
R322	0662057N30	RES CHIP 200K 5% 20X40
R324	0662057M81	RES. CHIP 2000 5% 20X40
R325	0662057M94	RES. CHIP 6800 5% 20X40
R327	0662057N11	RES. CHIP 33K 5% 20X40
R328	0662057M12	RES. CHIP 2.7 5% 20X40
R329	0662057M01	RES. CHIP 0 5% 20X40
R339	0662057M01	RES. CHIP 0 5% 20X40
R340	0662057M96	RES. CHIP 8200 5% 20X40
R342	0662057N23	RES CHIP 100K 5% 20X40
R343	0662057M26	RES. CHIP 10 5% 20X40
R344	0662057N01	RES. CHIP 12K 5% 20X40
R345	0662057M98	RES CHIP 10K 5% 20X40
R346	0662057N17	RES. CHIP 56K 5% 20X40
R347	0662057M74	RES. CHIP 1000 5% 20X40
R348	0662057M87	RES. CHIP 3600 5% 20X40
R349	0662057C01	CHIP RES 0 OHMS .050 OHMS
R350	0662057N23	RES CHIP 100K 5% 20X40
R351	0662057C01	CHIP RES 0 OHMS .050 OHMS
R352	0662057M86	RES. CHIP 3300 5% 20X40
R355	0662057M01	RES. CHIP 0 5% 20X40
R400	0662057N15	RES. CHIP 47K 5% 20X40
R401	0662057M01	RES. CHIP 0 5% 20X40
R405	0662057M01	RES. CHIP 0 5% 20X40
R406	0662057N20	RES. CHIP 75K 5% 20X40
R407	0662057N19	RES. CHIP 68K 5% 20X40
R409	0662057M98	RES CHIP 10K 5% 20X40
R410	0662057N23	RES CHIP 100K 5% 20X40
R411	0662057M98	RES CHIP 10K 5% 20X40
R413	0662057M01	RES. CHIP 0 5% 20X40
R414	0662057V34	RES CHIP 180K 1% 1/16W
R415	0662057V26	RES CHIP 91K 1% 1/16W
R416	0662057N13	RES. CHIP 39K 5% 20X40
R418	0662057M01	RES. CHIP 0 5% 20X40
R419	0662057M67	RES. CHIP 0 5% 20X40
R420	0662057B46	CHIP RES 10.0 MEG OHMS 5%
R421	0662057M81	RES. CHIP 2000 5% 20X40
R423	0662057N39	RES. CHIP 470K 5% 20X40
R424	0662057N12	RES. CHIP 36K 5% 20X40
R425	0662057N10	RES. CHIP 30K 5% 20X40
R426	0662057N35	RES. CHIP 330K 5% 20X40
R427	0662057M84	RES. CHIP 2700 5% 20X40
R428	0662057M10	RES. CHIP 2.2 5% 20X40
R429	0662057M98	RES CHIP 10K 5% 20X40
R431	0662057N39	RES. CHIP 470K 5% 20X40
R432	0662057N16	RES. CHIP 51K 5% 20X40
R434	0662057M62	RES. CHIP 330 5% 20X40
R435	0662057M81	RES. CHIP 2000 5% 20X40
R436	0662057M01	RES. CHIP 0 5% 20X40
R445	0662057N08	RES. CHIP 24K 5% 20X40
R446	0662057N31	RES, CHIP 220K 5% 20X40
R447	0662057N51	RES, CHIP 1.5 MEG 5% 20X40
R448	0662057N33	RES. CHIP 270K 5% 20X40
R449	0662057N08	RES. CHIP 24K 5% 20X40
R450	0683962T45	RES CHIP 68 5-1
R457	0662057M98	RES CHIP 10K 5% 20X40
R460	0662057M90	RES. CHIP 4700 5% 20X40
R461	0662057M56	RES. CHIP 180 5% 20X40
R462	0662057M98	RES CHIP 10K 5% 20X40
R463	0662057M61	RES. CHIP 300 5% 20X40
R471	0662057M92	RES. CHIP 5600 5% 20X40
R472	0662057N12	RES. CHIP 36K 5% 20X40
R473	0662057M26	RES. CHIP 10 5% 20X40
R475	0662057M01	RES. CHIP 0 5% 20X40
R476	0662057N08	RES. CHIP 24K 5% 20X40
R477	0662057M74	RES. CHIP 1000 5% 20X40
R478	0662057M98	RES CHIP 10K 5% 20X40
R481	0662057N08	RES. CHIP 24K 5% 20X40
R492	0662057M01	RES. CHIP 0 5% 20X40
R501	0662057M70	RES. CHIP 680 5% 20X40
R502	0662057M56	RES. CHIP 180 5% 20X40
R505	0662057M98	RES CHIP 10K 5% 20X40
R506	0662057N15	RES. CHIP 47K 5% 20X40
R507	0662057M01	RES. CHIP 0 5% 20X40
RT300	0680590Z01	THERMISTOR_33K
RT400	0680590Z01	THERMISTOR_33K
S501	4080710Z02	SWITCH (FREQUENCY)
S502	1880619Z01	POTENTIOMETER, VOLUME
SH100	2680507Z01	SHIELD, HARMONIC FILTER
SH101	2680510Z01	SHIELD, PA
SH201	2680511Z01	SHIELD, SYNTHESIZER
SH202	2680511Z01	SHIELD, SYNTHESIZER
SH241	2680513Z01	SHIELD, VCO TOP
SH242	2680514Z01	SHIELD, VCO BOTTOM/LVZIF
SH301	2680554Z01	SHIELD,REC. FRONT END TOP
SH302	2680555Z01	SHIELD, REC. F/END BOTTOM
SH303	2680509Z01	SHIELD, MIXER
SH304	2680624Z01	SHIELD, MIXER DIODE
SH321	2680508Z01	SHIELD,LVZIF 2ND LO
SH322	2680514Z01	SHIELD, VCO BOTTOM/LVZIF
SH323	2680553Z01	SHIELD, CRYSTAL FILTER
SH400	2680505Z01	SHIELD,CONTROLLER TOP LEFT
SH401	2680506Z01	SHIELD,CONTROLLER TOP RIGHT
SH402	2680515Z01	SHIELD, CONT. BOTTOM LEFT
SH403	2680516Z01	SHIELD, CONT. BTM RIGHT
T301	2580541Z01	BALUN TRANSFORMER
T302	2580541Z01	BALUN TRANSFORMER
U101	5105109Z67	IC LDMOS DRIVER VHF/UHF
U102	5185765B01	IC POWER CONTROL PASS 2.3
U201	5185963A27	IC TESTED AT25016 48 PIN GFP
U210	5102463J61	INVERTER TC7ST04FU SS0P5-P-A
U211	5102463J61	INVERTER TC7ST04FU SS0P5-P-A
U241	5105750U54	IC PKG DIE VCO BUFFER
U247	5105739X05	IC SOT 5V HI-PREC. REGULATOR
U248	5102463J58	3.3V REGULATOR IN SOT23-5 PKG
U301	5109632D83	IC CUST LVZIF 2.2 H60G 48TQFP
U400	5102463J40	REG., 3.3V, LP2951CMM-3.3
U404	5185963A53	IC ASFIC CMP TQFP 48 PIN PKG
U405	5102463J36	STATIC_RAM_32KX8 I
U406	*5102463J60	IC 512KX8 FLASH ROM (AT49LV040)
U407	*5102463J64	16KX8 SPI SERIAL EEPROM
U409	5102226J56	68HC11FLO_PASS5 100P IN TQFP
U410	5102463J57	REGULATOR 3.3V, ILC7062CM-33
U420	5102463J44	AUDIO AMPLIFIER TDA8547TS
VR432	4805656W08	DIODE ZENER QUAD
VR433	4805656W08	DIODE ZENER QUAD
VR434	4802245J51	ZENER DIODE; BZX284-C6V8
VR439	4880140L17	DIODE SOT ZENER 12V
VR440	4802245J51	ZENER DIODE; BZX284-C6V8
VR441	4802245J51	ZENER DIODE; BZX284-C6V8
VR442	4802245J51	ZENER DIODE; BZX284-C6V8
VR443	4802245J51	ZENER DIODE; BZX284-C6V8
VR444	4802245J51	ZENER DIODE; BZX284-C6V8
VR445	4802245J53	ZENER_DIODE; BZX284-C10
VR446	4802245J53	ZENER_DIODE; BZX284-C10
VR447	4802245J53	ZENER_DIODE; BZX284-C10
VR448	4802245J53	ZENER_DIODE; BZX284-C10
VR449	4802245J53	ZENER_DIODE; BZX284-C10
VR450	4802245J53	ZENER_DIODE; BZX284-C10
VR501	4813830A18	DIODE 6.8V 5% 225MWMMBZ5235B_
VR506	4802245J51	ZENER DIODE; BZX284-C6V8
	8485726Z01	PC BOARD UHF BAND 3

* Motorola Depot Servicing only

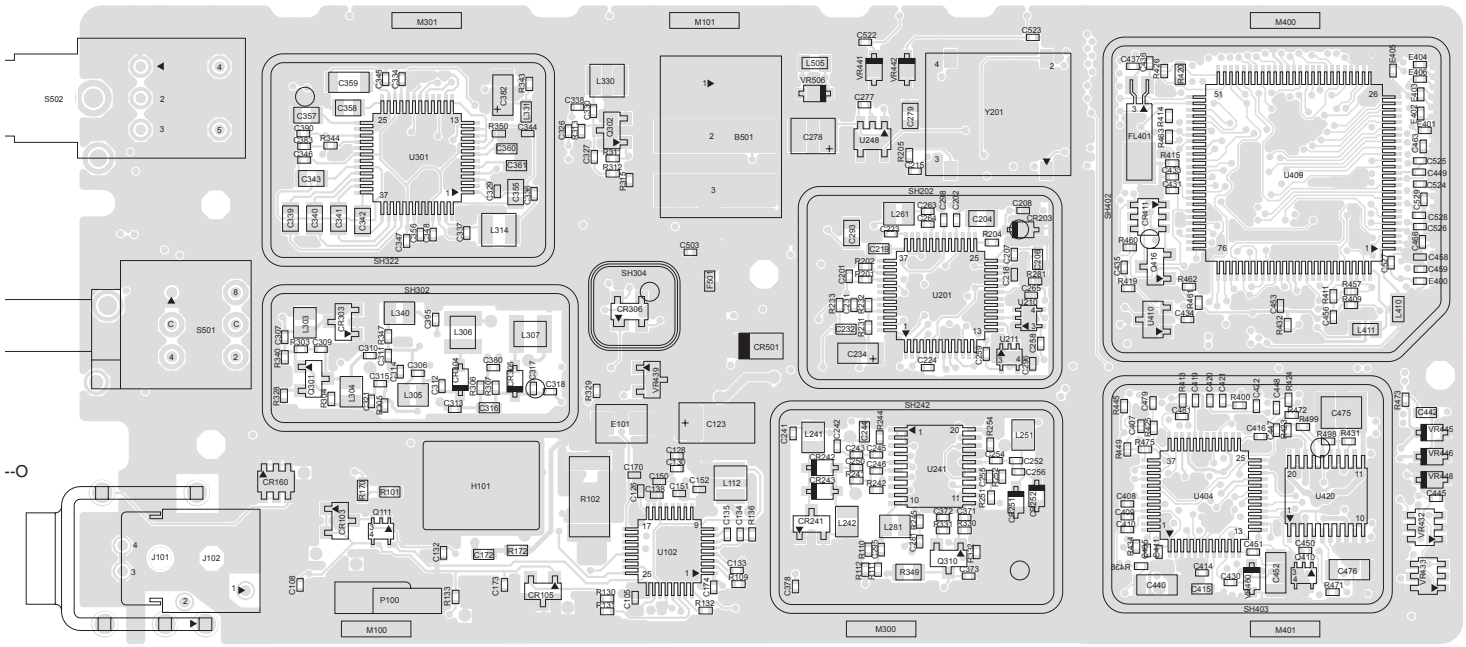
Reference designators with an asterisk indicate components which are not field replaceable because they need to be calibrated with specialized factory equipment after installation. Radios in which these parts have been replaced in the field will be off frequency at temperature extremes.

4.0 PCB 8485726Z04 - Schematics

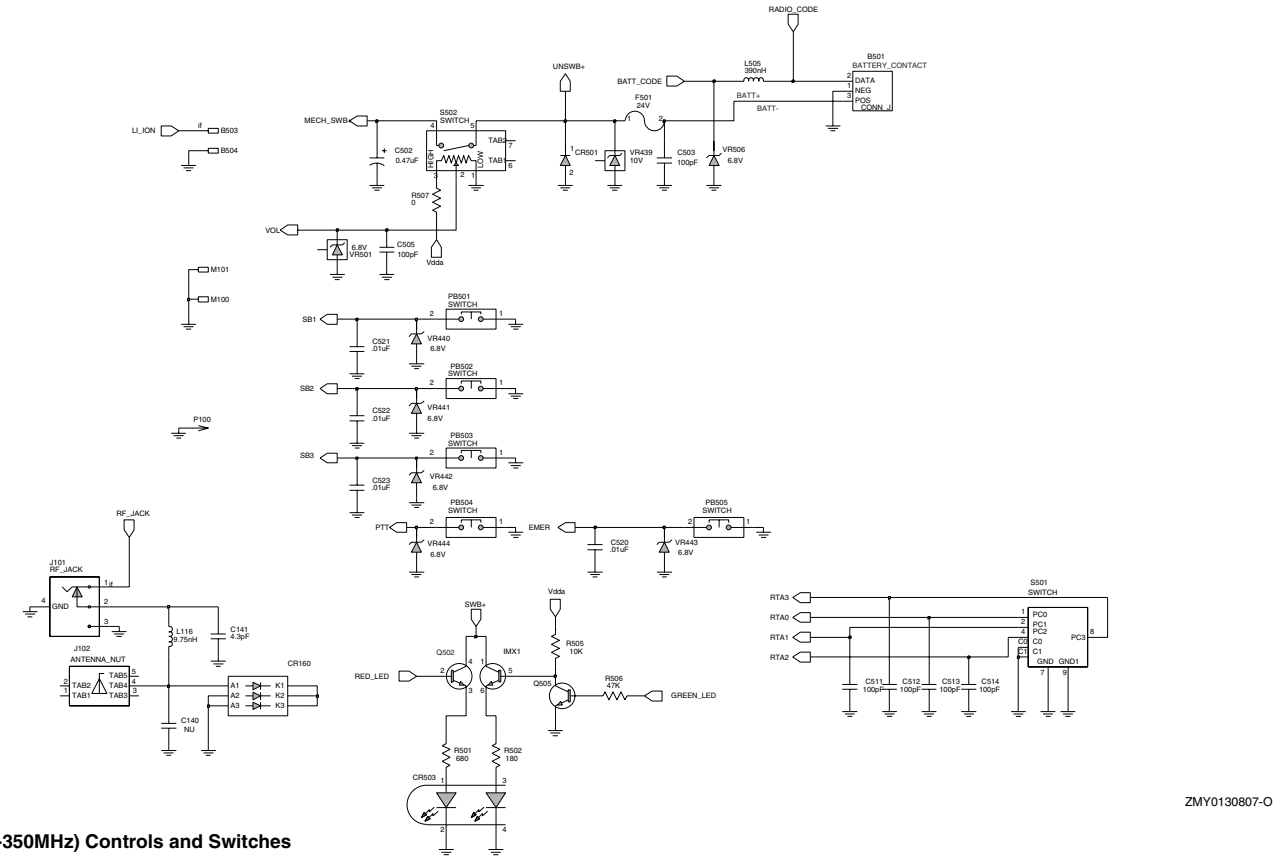


ZMY0130348-A

300R1 (300-350MHz) Main Board Component Side

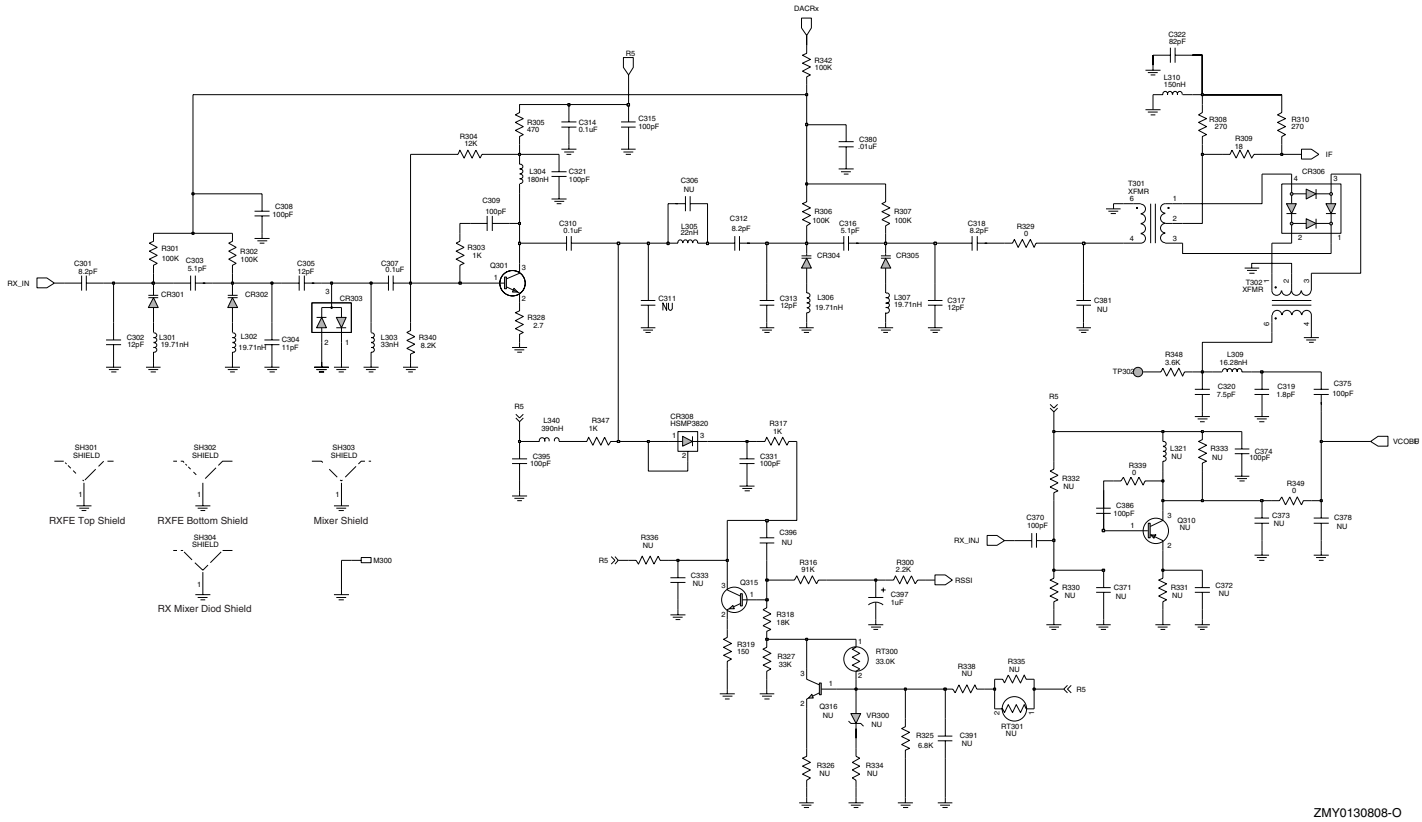


300R1 (300-350MHz) Main Board Solder Side



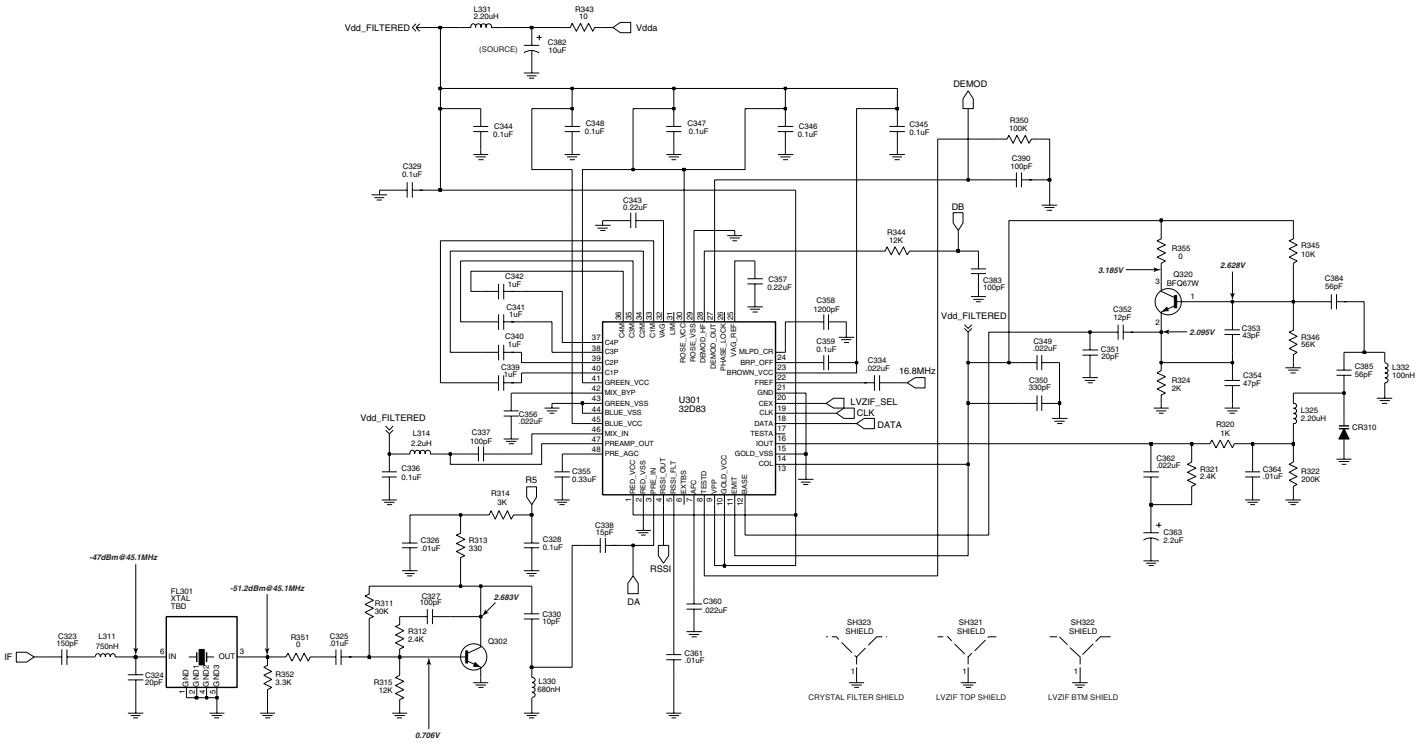
ZMY0130807-O

300R1 (300-350MHz) Controls and Switches



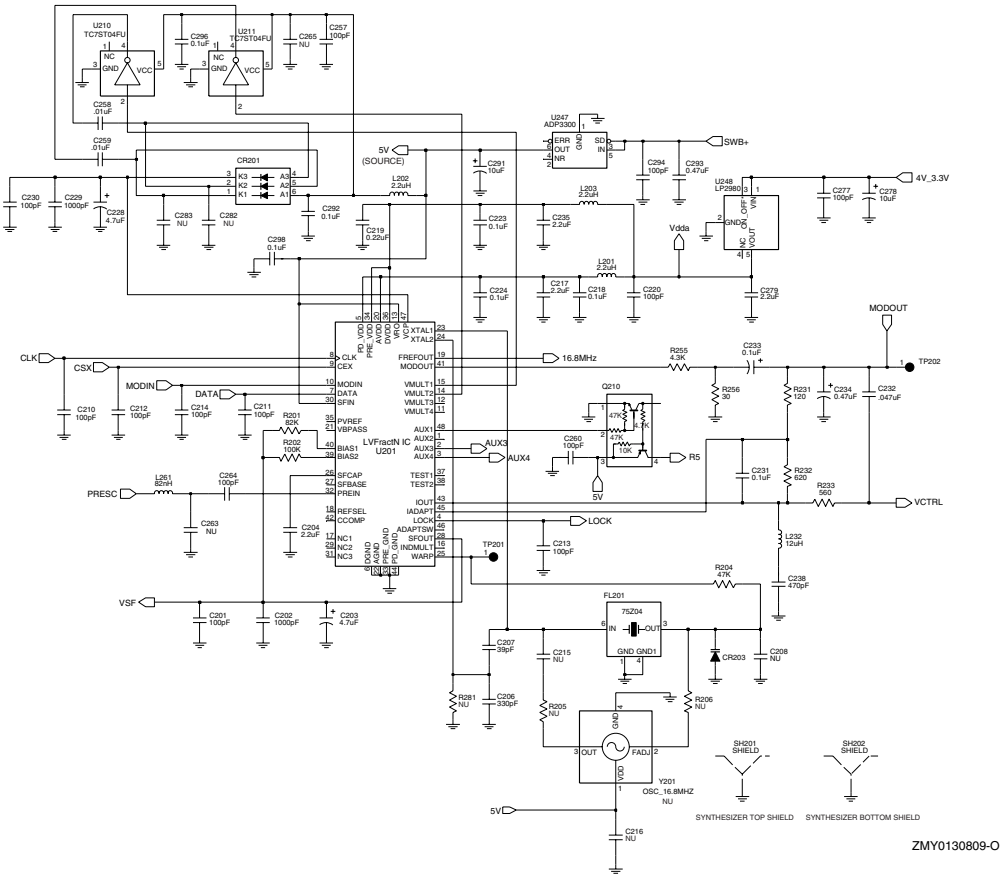
ZMY0130808-O

300R1 (300-350MHz) Receiver Front End



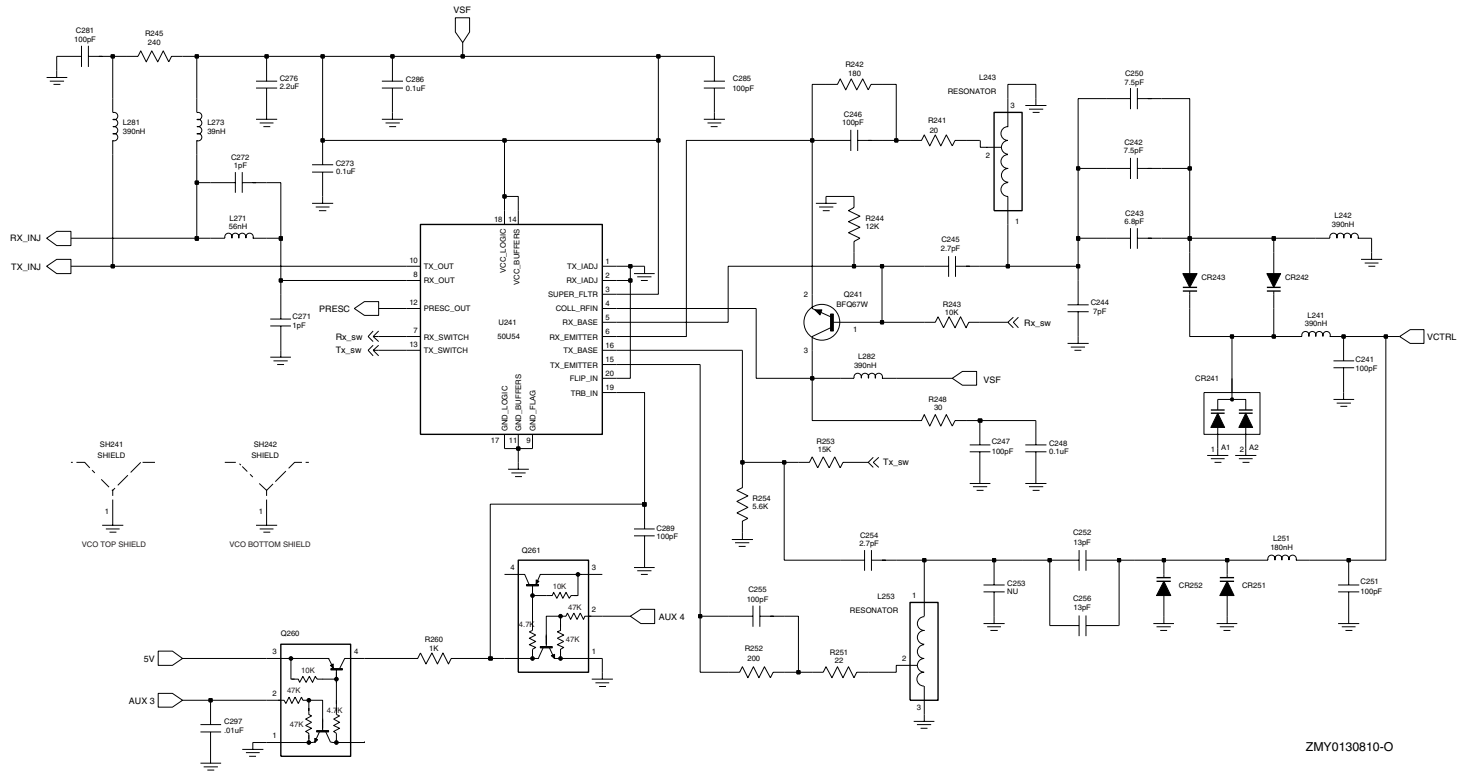
ZMY0130349-O

300R1 (300-350MHz) Receiver Back End

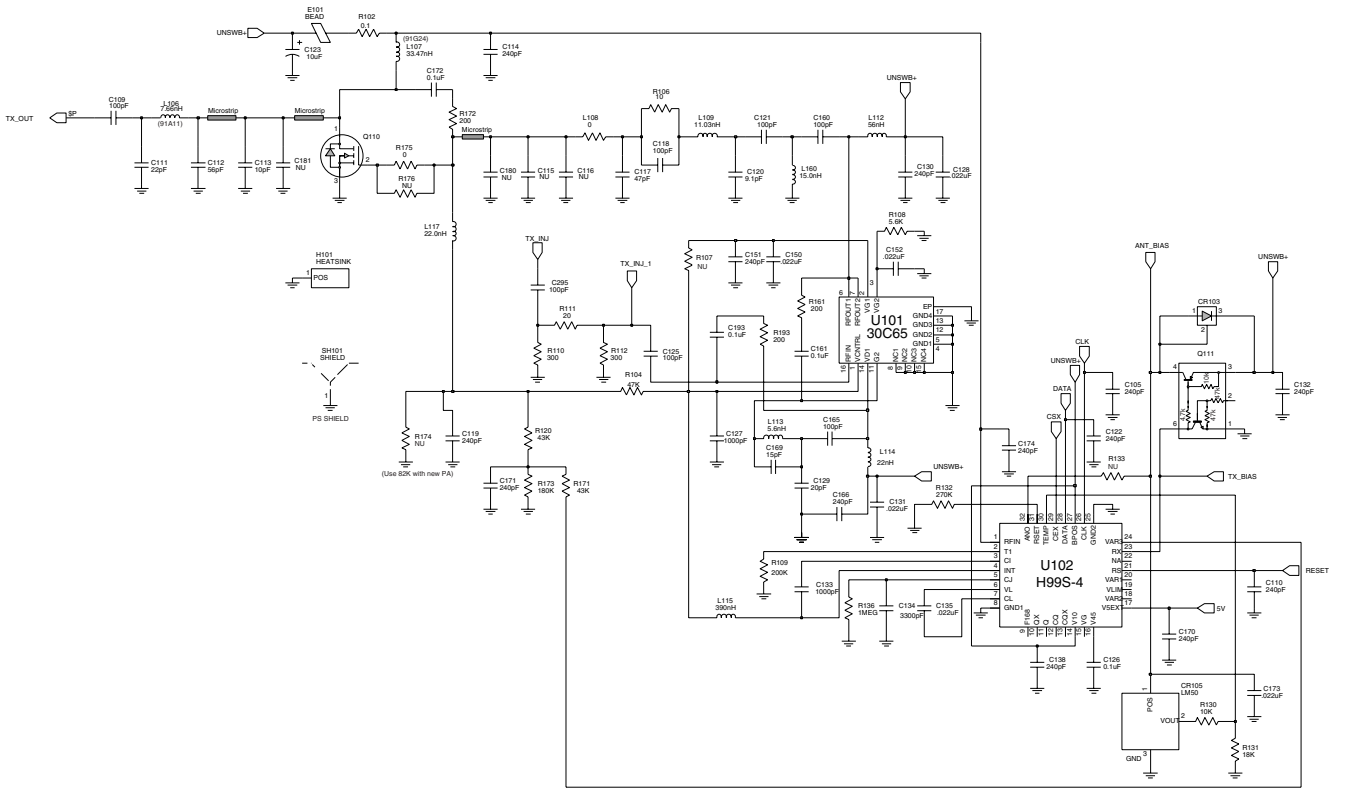


ZMY0130809-O

300R1 (300-350MHz) Synthesizer



300R1 (300-350MHz) Voltage Controlled Oscillator



ZMY0130811-O

300R1 (300-350MHz) Transmitter

5.0 PCB 8485726Z04 - Parts List

Circuit Ref	Motorola Part No.	Description
B501	0986237A02	CONNECTOR (CONTACT BATTERY)
B503	3980502Z01	CONTACT, BACKUP B+
B504	3980501Z01	CONTACT, BACKUP B-
C101	2113740F51	CAP CHIP REEL CL1 +/-30 100
C102	2113740F27	CAP CHIP REEL CL1+/-30 10
C103	2113740F32	CAP CHIP REEL CL1 +/-30 16
C104	2113740F27	CAP CHIP REEL CL1+/-30 10
C105	2113743L05	CAP CHIP 330 PF 10% X7R
C106	2113740F19	CAP CHIP REEL CL1 +/-30 4.7
C107	2113740F15	CAP CHIP REEL CL1 +/-30 3.3
C108	2113743L05	CAP CHIP 330 PF 10% X7R
C109	2113740F51	CAP CHIP REEL CL1 +/-30 100
C110	2113743L05	CAP CHIP 330 PF 10% X7R
C111	2103689A46	22pF
C112	2180605Z34	HIGH Q CHIP CAPACITOR, 56PF
C114	2113743L05	CAP CHIP 330 PF 10% X7R
C117	2113743N36	CAP CHIP 27.0 PF 5% COG
C118	2113743N50	CAP CHIP 100 PF 5% COG
C119	2113743L05	CAP CHIP 330 PF 10% X7R
C120	2113743N25	CAP CHIP 9.1PF 5% COG
C121	2113743N50	CAP CHIP 100 PF 5% COG
C122	2113743L05	CAP CHIP 330 PF 10% X7R
C123	2311049A18	CAP, TANT 10% 10UF
C125	2113743N50	CAP CHIP 100 PF 5% COG
C126	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C127	2113743L17	CAP CHIP 1000 PF 10% X7R
C128	2113743M08	CAP CHIP 22000PF +80-20% Y5V
C129	2113743N33	CAP CHIP 20.0 PF 5% COG
C130	2113743L05	CAP CHIP 330 PF 10% X7R
C131	2113743M08	CAP CHIP 22000PF +80-20% Y5V
C132	2113743L05	CAP CHIP 330 PF 10% X7R
C133	2113743L17	CAP CHIP 1000 PF 10% X7R
C134	2113743L29	CAP CHIP 3300PF 10% X7R
C135	2113743M08	CAP CHIP 22000PF +80-20% Y5V
C138	2113743L05	CAP CHIP 330 PF 10% X7R
C150	2113743M08	CAP CHIP 22000PF +80-20% Y5V
C151	2113743L05	CAP CHIP 330 PF 10% X7R
C152	2113743M08	CAP CHIP 22000PF +80-20% Y5V
C160	2113743N50	CAP CHIP 100 PF 5% COG
C161	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C165	2113743N50	CAP CHIP 100 PF 5% COG
C166	2113743L05	CAP CHIP 330 PF 10% X7R
C169	2113743N30	CAP CHIP 15.0 PF 5% COG
C170	2113743L05	CAP CHIP 330 PF 10% X7R
C171	2113743L05	CAP CHIP 330 PF 10% X7R
C172	2113743E20	CAP CHIP. 10 UF 10%
C173	2113743M08	CAP CHIP 22000PF +80-20% Y5V
C174	2113743L05	CAP CHIP 330 PF 10% X7R
C188	2113743N50	CAP CHIP 100 PF 5% COG
C193	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C201	2113743N50	CAP CHIP 100 PF 10% X7R
C202	2113743L17	CAP CHIP 1000 PF 10% X7R
C203	2311049A56	CAP TAN CHIP A/P 4.7 20 10
C204	2104993J02	CAP MONO. CERAMIC (2.2UF)
C206	2113740F63	CAP CHIP CL1 +/-30 330 5%
C207	2113743N40	CAP CHIP 39.0 PF 5% COG
C210	2113743N50	CAP CHIP 100 PF 10% X7R
C211	2113743N50	CAP CHIP 100 PF 10% X7R
C212	2113743N50	CAP CHIP 100 PF 10% X7R
C213	2113743N50	CAP CHIP 100 PF 10% X7R
C214	2113743N50	CAP CHIP 100 PF 10% X7R
C217	2104993J02	CAP MONO. CERAMIC (2.2UF)
C218	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C219	2113743K16	CAP CHIP .220 UF +80-20% 16V
C220	2113743N50	CAP CHIP 100 PF 10% X7R
C223	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C224	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C228	2311049J11	CAPACITOR TANT 10% 4.7UF
C229	2113743L17	CAP CHIP 1000 PF 10% X7R
C230	2113743N50	CAP CHIP 100 PF 10% X7R
C231	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C232	2113743E12	CAP CHIP .047UF 10% X7R
C233	2311049A01	CAP TANT CHIP A/P .1 10 35
C234	2311049A05	CAP TANT 10% 0.47UF
C235	2104993J02	CAP MONO. CERAMIC (2.2UF)
C238	2113741F17	CAP CHIP CL2 X7R REEL 470
C241	2113743N50	CAP CHIP 100 PF 10% X7R
C242	2113743N23	CAP CHIP 7.5 PF +-.5PF COG
C243	2113743N22	CAP CHIP 6.8 PF 5% COG
C244	2113740F13	CAP CHIP REEL CL1 +/-30 6.8
C245	2113743N12	CAP CHIP 2.7 PF +-.25PF COG
C246	2113743N50	CAP CHIP 100 PF 10% X7R
C247	2113743N50	CAP CHIP 100 PF 10% X7R
C248	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C250	2113743N23	CAP CHIP 7.5 PF 5% COG
C251	2113743N50	CAP CHIP 100 PF 10% X7R
C252	2113743N29	CAP CHIP 13.0 PF 5% COG
C254	2113743N12	CAP CHIP 2.7 PF +-.25PF COG
C255	2113743N50	CAP CHIP 100 PF 10% X7R
C256	2113743N29	CAP CHIP 13.0 PF 5% COG
C257	2113743N50	CAP CHIP 100 PF 10% X7R
C258	2113743L41	CAP CHIP 10000 PF 10% X7R
C259	2113743L41	CAP CHIP 10000 PF 10% X7R
C260	2113743N50	CAP CHIP 100 PF 10% X7R
C264	2113743N50	CAP CHIP 100 PF 10% X7R
C271	2113743N03	CAP CHIP 1PF +-.25PF COG
C273	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C276	2104993J02	CAP MONO. CERAMIC (2.2UF)
C277	2113743N50	CAP CHIP 100 PF 10% X7R
C278	2311049A57	TANT CAP 10 UF 10%
C279	2104993J02	CAP MONO. CERAMIC (2.2UF)
C281	2113743N50	CAP CHIP 100 PF 10% X7R
C285	2113743N50	CAP CHIP 100 PF 10% X7R
C286	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C289	2113743N50	CAP CHIP 100 PF 10% X7R
C291	2311049A69	CAP TAN CHIP 10.0 UF 20% 6.3V
C292	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C293	2113743A27	CAP CHIP .470 UF 10% 16V
C294	2113743N50	CAP CHIP 100 PF 10% X7R
C295	2113743N50	CAP CHIP 100 PF 5% COG
C296	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C297	2113743L41	CAP CHIP 10000 PF 10% X7R
C298	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C301	2113743N24	CAP CHIP 8.2 PF +-.5PF COG
C302	2113743N28	CAP CHIP 12.0 PF 5% COG
C303	2113740L11	CAP CER CHIP 5.1 PF +-0.1PF
C304	2113743N27	CAP CHIP 11.0 PF 5% COG
C305	2113743N28	CAP CHIP 12 PF +-.5PF COG
C306	2113743N22	CAP CHIP 6.8 PF +-.5PF COG
C307	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C308	2113743N50	CAP CHIP 100 PF 10% X7R
C309	2113743N50	CAP CHIP 100 PF 10% X7R
C310	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C312	2113743N24	CAP CHIP 8.2 PF +-.5PF COG
C313	2113743N27	CAP CHIP 11.0 PF 5% COG
C314	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C315	2113743N50	CAP CHIP 100 PF 10% X7R
C316	2113740L11	CAP CER CHIP 5.1 PF +-0.1PF
C317	2113743N27	CAP CHIP 11.0 PF 5% COG
C318	2113743N24	CAP CHIP 8.2 PF +-.5PF COG
C319	2113743N21	CAP CHIP 6.2 PF +-.5PF COG
C320	2113743N20	CAP CHIP 5.6 PF +-.5PF COG
C321	2113743N50	CAP CHIP 100 PF 10% X7R
C322	2113743N48	CAP CHIP 82.0 PF 5% COG
C323	2113743N54	CAP CHIP 150 PF 5% COG
C324	2113743N33	CAP CHIP 20.0 PF 5% COG
C325	2113743L41	CAP CHIP 10000 PF 10% X7R
C326	2113743L41	CAP CHIP 10000 PF 10% X7R
C327	2113743N50	CAP CHIP 100 PF 5% COG
C328	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C329	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C330	2113743N26	CAP CHIP 10.0 PF 5% COG
C331	2113743N50	CAP CHIP 100 PF 10% X7R
C334	2113743M08	CAP CHIP 22000PF +80-20% Y5V
C336	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C337	2113743N50	CAP CHIP 100 PF 5% COG
C338	2113743N30	CAP CHIP 15.0PF 5% COG
C339	2180478Z20	CAP MONO. CERAMIC (1.0UF)
C340	2180478Z20	CAP MONO. CERAMIC (1.0UF)
C341	2180478Z20	CAP MONO. CERAMIC (1.0UF)
C342	2180478Z20	CAP MONO. CERAMIC (1.0UF)
C343	2113743A23	CAP CHIP .220UF 10% X7R
C344	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C345	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C346	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C347	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C348	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C349	2113743E07	CER CHIP CAP .022UF
C350	2113743L05	CAP CHIP 330 PF 10% X7R
C351	2113743N33	CAP CHIP 20.0 PF 5% COG
C352	2113743N28	CAP CHIP 12.0 PF 5% COG
C353	2113743N41	CAP CHIP 43.0 PF 5% COG
C354	2113743N42	CAP CHIP 47.0 PF 5% COG
C355	2113743A24	CAP CHIP .330 UF 10% 16V
C356	2113743M08	CAP CHIP 22000PF +80-20% Y5V
C357	2113743A23	CAP CHIP .220UF 10% X7R
C358	2113741A23	CHIP CAPACITORS 1200PF +-5%
C359	2109720D14	CAP CER CHIP LOW DIST 0.1UF
C360	2113743E07	CER CHIP CAP .022UF
C361	2113741F49	CHIP CAP, CER 10NF
C362	2113743M08	CAP CHIP 22000PF +80-20% Y5V
C363	2311049A40	GLOBAL CAP TANT 10% 2.2 UF
C364	2113743L41	CAP CHIP 10000 PF 10% X7R
C370	2113743N50	CAP CHIP 100 PF 10% X7R
C374	2113743N50	CAP CHIP 100 PF 10% X7R
C375	2113743N50	CAP CHIP 100 PF 10% X7R
C380	2113743L41	CAP CHIP 10000 PF 10% X7R
C382	2311049A59	CAP TANT CHIP A/P 10UF 10% 6V
C383	2113743N50	CAP CHIP 100 PF 5% COG
C384	2113743N44	CAP CHIP 56.0 PF 5% COG
C385	2113743N44	CAP CHIP 56.0 PF 5% COG
C386	2113743N50	CAP CHIP 100 PF 10% X7R
C390	2113743N50	CAP CHIP 100 PF 5% COG
C395	2113743N50	CAP CHIP 100 PF 10% X7R
C397	2311049A07	CAP TANT 10% 1.0UF
C400	2113743L41	CAP CHIP 10000 PF 10% X7R
C401	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C402	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C403	2113743G24	CAP 2.2UF
C407	2113928N01	CAP CER CHIP 0.1UF 10% 6.3
C408	2113743N50	CAP CHIP 100 PF 5% COG
C409	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C410	2113928N01	CAP CER CHIP 0.1UF 10% 6.3
C411	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C414	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C415	2185895Z01	CAP CER CHIP LOW DIS T .01UF
C416	2113928N01	CAP CER CHIP 0.1UF 10% 6.3
C420	2113743L41	CAP CHIP 10000 PF 10% X7R
C421	2113928N01	CAP CER CHIP 0.1UF 10% 6.3
C422	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C423	2113743N50	CAP CHIP 100 PF 5% COG
C424	2311049A59	CAP TANT CHIP A/P 10UF 10% 6V
C425	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C426	2113743N50	CAP CHIP 100 PF 5% COG
C427	2113743N50	CAP CHIP 100 PF 5% COG
C428	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C429	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C430	2113928N01	CAP CER CHIP 0.1UF 10% 6.3
C431	2113743N50	CAP CHIP 100 PF 5% COG
C433	2113743L41	CAP CHIP 10000 PF 10% X7R
C434	2113928N01	CAP CHIP 100000 PF +80-20% Y5V (not used in GP640)
C435	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C436	2113743N34	CAP CHIP 22.0 PF 5% COG (not used in GP640)
C437	2113743N34	CAP CHIP 22.0 PF 5% COG (not used in GP640)
C440	2113743G26	CAP CHIP 4.7UF 16V + 80-20%
C441	2113743N50	CAP CHIP 100 PF 5% COG
C442	2113743E20	CAP CHIP. 10 UF 10%
C443	2113928N01	CAP CER CHIP 0.1UF 10% 6.3

Circuit Ref	Motorola Part No.	Description
C444	2113743N50	CAP CHIP 100 PF 5% COG
C445	2113743N50	CAP CHIP 100 PF 5% COG
C447	2113743M08	CAP CHIP 22000PF +80-20% Y5V
C448	2113928N01	CAP CER CHIP 0.1UF 10% 6.3
C449	2113743N50	CAP CHIP 100 PF 5% COG
C451	2113743M08	CAP CHIP 22000PF +80-20% Y5V
C452	2113743B29	CAP CHIP 1.00 UF 10% 16V
C453	2113743N50	CAP CHIP 100 PF 5% COG
C456	2113743N50	CAP CHIP 100 PF 5% COG
C458	2113743N50	CAP CHIP 100 PF 5% COG
C459	2113743N50	CAP CHIP 100 PF 5% COG
C463	2113743N50	CAP CHIP 100 PF 5% COG
C466	2113743N50	CAP CHIP 100 PF 5% COG
C467	2113928N01	CAP CER CHIP 0.1UF 10% 6.3
C471	2113743N50	CAP CHIP 100 PF 5% COG
C472	2113743L09	CAP CHIP 470 PF 10% X7R
C473	2113743L09	CAP CHIP 470 PF 10% X7R
C475	2113743H14	CAP CHIP 10.0 UF 16V +80-20%
C476	2113928D08	CAP CERAMIC CHIP 10.0UF
C479	2113928N01	CAP CER CHIP 0.1UF 10% 6.3
C480	2113928D08	CAP CERAMIC CHIP 10.0UF
C481	2113928N01	CAP CER CHIP 0.1UF 10% 6.3
C482	2113928N01	CAP CER CHIP 0.1UF 10% 6.3
C490	2113743N50	CAP CHIP 100 PF 5% COG
C491	2113743N50	CAP CHIP 100 PF 5% COG
C492	2113743N50	CAP CHIP 100 PF 5% COG
C493	2113743N50	CAP CHIP 100 PF 5% COG
C494	2113743N50	CAP CHIP 100 PF 5% COG
C495	2113743N50	CAP CHIP 100 PF 5% COG
C496	2113743N50	CAP CHIP 100 PF 5% COG
C497	2113743N50	CAP CHIP 100 PF 5% COG
C502	2311049A05	CAP TANT 10% 0.47UF
C503	2113743N50	CAP CHIP 100 PF 5% COG
C505	2113743N50	CAP CHIP 100 PF 5% COG
C511	2113743N50	CAP CHIP 100 PF 5% COG
C512	2113743N50	CAP CHIP 100 PF 5% COG
C513	2113743N50	CAP CHIP 100 PF 5% COG
C514	2113743N50	CAP CHIP 100 PF 5% COG
C520	2113743L41	CAP CHIP 10000 PF 10% X7R
C521	2113743L41	CAP CHIP 10000 PF 10% X7R
C522	2113743L41	CAP CHIP 10000 PF 10% X7R
C523	2113743L41	CAP CHIP 10000 PF 10% X7R
C524	2113743N50	CAP CHIP 100 PF 5% COG
C525	2113743N50	CAP CHIP 100 PF 5% COG
C526	2113743N50	CAP CHIP 100 PF 5% COG
C527	2113743N50	CAP CHIP 100 PF 5% COG
C528	2113743N50	CAP CHIP 100 PF 5% COG
CR101	4880973Z02	PIN DIODE
CR102	4802245J41	SURFACE MOUNT PIN DIODES
CR103	4802245J41	SURFACE MOUNT PIN DIODES
CR105	5185963A15	IC TEMP. SENSOR 1M50C
CR201	4802233J09	DIODE TRIPLE SOT25-RH
CR203	4862824C03	DIODE VARACTOR
CR241	4805649Q13	DIODE VCTR ISV 228
CR242	4802245J22	DIODE VARACTOR IT363
CR243	4802245J22	DIODE VARACTOR IT363

Circuit Ref	Motorola Part No.	Description
CR251	4862824C01	DIODE VARACTOR IT363
CR252	4862824C01	DIODE VARACTOR IT363
CR301	4862824C01	DIODE VARACTOR
CR302	4862824C01	DIODE VARACTOR
CR303	4880154K03	SOT MMBD353 RH DIODE DUAL SCHT
CR304	4862824C01	DIODE VARACTOR
CR305	4862824C01	DIODE VARACTOR
CR306	4802245J42	RING QUAD DIODE SOT-143 PKG
CR308	4802245J41	SURFACE MOUNT PIN DIODES
CR310	4862824C01	DIODE VARACTOR
CR411	4802245J62	DIODE SCHOTTKY BARRIER
CR412	4802245J62	DIODE SCHOTTKY BARRIER
CR413	4802245J62	DIODE SCHOTTKY BARRIER
CR440	4813833C02	DIODE DUAL 70V '5B' COMM CATH
CR501	4880107R01	RECTIFIER
CR503	4805729G49	DIODE RED/YEL
E101	2484657R01	INDUCTOR BEAD CHIP
E400	2480640Z01	C/IND BK1005HM471 BEAD
E401	2480640Z01	C/IND BK1005HM471 BEAD
E402	2480640Z01	C/IND BK1005HM471 BEAD
E403	2480640Z01	C/IND BK1005HM471 BEAD
E404	2480640Z01	C/IND BK1005HM471 BEAD
E405	2480640Z01	C/IND BK1005HM471 BEAD
E406	2480640Z01	C/IND BK1005HM471 BEAD
E407	2480640Z01	C/IND BK1005HM471 BEAD
E408	2480640Z01	C/IND BK1005HM471 BEAD
E409	2480640Z01	C/IND BK1005HM471 BEAD
F501	6580542Z01	FUSE CHIP SMT TR/1608FF 3A
FL201	*4805875Z04	16.8 MHz WM TCXO APEX-4
FL301	9186153B01	45.1 MHz XTAL FILTER
FL401	4870368G02	REFLOWABLE CLOCK OSC XTAL (not used in GP640)
H101	2680499Z01	HEAT SPREADER
J101	0985613Z01	JACK,RF
J102	0280519Z02	NUT, ANTENNA
J400	0905505Y04	CONN ZIF HORIZONTAL
J403	0905505Y02	CONN MALE 20 PIN ZIF
L101	2479990B02	AIR WOUND COIL/GREN 19.61NH
L102	2479990B02	AIR WOUND COIL/GREN 19.61NH
L104	2479990B02	AIR WOUND COIL/GREN 19.61NH
L105	2462587N22	CHIP IND 390 NH 10%
L106	2479990A02	COILD AIR WOUND INDUC 7.66NH
L107	2479990G01	AIR WOUND COIL/GREN 33.47NH
L108	0611077A01	RES CHIP JUMPER
L109	2479990B01	COIL AIR WOUND INDUC 11.03
L112	2462587N50	CHIP IND 56 NH 5%
L113	2413926H09	IND CHIP 5.6 NH +/- 0.3NH
L114	2462587N45	CHIP IND 22 NH 5%
L115	2462587N22	CHIP IND 390 NH 10%
L116	2460591C56	COIL AIR WOUND INDUC 23.57
L117	2409154M17	IND CER MLTILYR 22.0NH 1005
L160	2413926H14	IND CHIP 15.0 NH 5%
L201	2462587Q20	IND CHIP 2,200NH 20%
L202	2462587Q20	IND CHIP 2,200NH 20%

Circuit Ref	Motorola Part No.	Description
L203	2462587Q20	IND CHIP 2,200NH 20%
L232	2462587P25	CHIP IND 12000 NH 5%
L241	2462587V41	IND CHIP 390 NH 10%
L242	2462587V41	IND CHIP 390 NH 10%
L243	2460593C02	COIL MULT. LAYRD. TAP TEF RESN
L251	2462587V37	CHIP IND 180NH 5% 0805
L253	2460593C02	COIL MULT. LAYRD. TAP TEF RESN
L261	2462587V33	CHIP IND 82 NH 5% 0805
L271	2462587V31	CHIP IND 56 NH 5% 0805
L273	2462587V29	CHIP IND 39 NH 5% 0805
L281	2462587V41	IND CHIP 390 NH 10%
L282	2462587V41	IND CHIP 390 NH 10%
L301	2460591D24	COIL AIR WOUND INDUC 19.71
L302	2460591D24	COIL AIR WOUND INDUC 19.71
L303	2462587V28	CHIP IND 33 NH 5% 0805
L304	2462587V37	CHIP IND 180 NH 5% 0805
L305	2462587V23	CHIP IND 12 NH 5% 0805
L306	2460591D24	COIL AIR WOUND INDUC 19.71
L307	2460591D24	COIL AIR WOUND INDUC 19.71
L309	2479990C02	AIR WOUND COIL/GREN 16.28NH
L310	2462587V36	CHIP IND 150NH 5% 0805
L311	2462587N65	CHIP IND 750 NH 5%
L314	2462587N72	CHIP IND 2200 NH 5%
L325	2480646Z20	COIL MULTI-LAYER CHIP(2.20UH)
L330	2462587N64	CHIP IND 680 NH 5%
L331	2480646Z20	COIL MULTI-LAYER CHIP(2.20UH)
L332	2462587N53	CHIP IND 100 NH 5%
L340	2462587V41	IND CHIP 390 NH 10%
L400	2462587Q42	IND CHIP 390NH 10%
L401	2462587Q42	IND CHIP 390NH 10%
L410	2462587Q42	IND CHIP 390NH 10%
L411	2462587Q42	IND CHIP 390NH 10%
L505	2462587Q42	IND CHIP 390NH 10%
P100	3905643V01	CONTACT ANT GRD
PB501	4080523Z01	SWITCH, TACT
PB502	4080523Z01	SWITCH, TACT
PB503	4080523Z01	SWITCH, TACT
PB504	4080523Z01	SWITCH, TACT
PB505	4080523Z01	SWITCH, TACT
Q110	4813828A09	RF POWER Amplifier
Q111	4809939C05	TRAN. DUAL NPN/PNP
Q210	4809939C05	TRAN. DUAL NPN/PNP
Q241	4805218N63	RF TRANS SOT 323 BFQ67W
Q260	4809939C05	TRAN. DUAL NPN/PNP
Q261	4809939C05	TRAN. DUAL NPN/PNP
Q301	4802245J44	NPN SILICON BIPOLAR TRAN.
Q302	4802245J44	NPN SILICON BIPOLAR TRAN.
Q315	4880214G02	TSTR MMBT3904
Q320	4805218N63	RF TRANS SOT 323 BFQ67W
Q400	4809579E18	TSTR MOSFET P-CHAN TP010IT
Q403	4813824A17	TSTR PNP
Q405	4802245J54	UMG5N DIGITAL TRANSISTOR
Q410	4802245J54	UMG5N DIGITAL TRANSISTOR
Q416	4809579E18	TSTR MOSFET P-CHAN TP010IT

Circuit Ref	Motorola Part No.	Description
Q417	4809939C05	TRAN. DUAL NPN/PNP
Q502	5180159R01	DUAL TRANS NPNS
Q505	4880214G02	TSTR MMBT3904
R101	0662057A34	CHIP RES 240 OHMS 5%
R102	0680539Z01	PWR. METAL STRIP RESISTORS
R104	0662057N15	RES. CHIP 47K 5% 20X40
R106	0662057M26	RES. CHIP 10 5% 20X40
R108	0662057M92	RES. CHIP 5600 5% 20X40
R109	0662057N30	RES CHIP 200K 5% 20X40
R110	0662057M61	RES. CHIP 300 5% 20X40
R111	0662057M33	RES. CHIP 20 5% 20X40
R112	0662057M61	RES. CHIP 300 5% 20X40
R120	0662057N14	RES. CHIP 43K 5% 20X40
R130	0662057M98	RES CHIP 10K 5% 20X40
R131	0662057N05	RES. CHIP 18K 5% 20X40
R132	0662057N33	RES. CHIP 270K 5% 20X40
R136	0662057N47	RES. CHIP 1M 5% 20X40
R161	0662057M57	RES. CHIP 200 5% 20X40
R170	0662057A34	CHIP RES 240 OHMS 5%
R171	0662057N14	RES. CHIP 43K 5% 20X40
R172	0662057A32	CHIP RES 200 OHMS 5%
R173	0662057N29	RES. CHIP 180K 5% 20X40
R193	0662057M57	RES. CHIP 200 5% 20X40
R201	0662057N21	RES. CHIP 82K 5% 20X40
R202	0662057N23	RES CHIP 100K 5% 20X40
R204	0662057N15	RES. CHIP 47K 5% 20X40
R231	0662057M52	RES. CHIP 120 5% 20X40
R232	0662057M69	RES. CHIP 620 5% 20X40
R233	0662057M68	RES. CHIP 560 5% 20X40
R241	0662057M33	RES. CHIP 20 5% 20X40
R242	0662057M56	RES. CHIP 180 5% 20X40
R243	0662057M98	RES CHIP 10K 5% 20X40
R244	0662057N01	RES. CHIP 12K 5% 20X40
R245	0662057M59	RES. CHIP 240 5% 20X40
R248	0662057M37	RES. CHIP 30 5% 20X40
R251	0662057M34	RES. CHIP 22 5% 20X40
R252	0662057M57	RES. CHIP 200 5% 20X40
R253	0662057N03	RES. CHIP 15K 5% 20X40
R254	0662057M92	RES. CHIP 5600 5% 20X40
R255	0662057M89	RES. CHIP 4300 5% 20X40
R256	0662057M37	RES. CHIP 30 5% 20X40
R260	0662057M74	RES. CHIP 1000 5% 20X40
R300	0662057M82	RES. CHIP 2200 5% 20X40
R301	0662057N23	RES CHIP 100K 5% 20X40
R302	0662057N23	RES CHIP 100K 5% 20X40
R303	0662057M74	RES. CHIP 1000 5% 20X40
R304	0662057N01	RES. CHIP 12K 5% 20X40
R305	0662057M66	RES. CHIP 470 5% 20X40
R306	0662057N23	RES CHIP 100K 5% 20X40
R307	0662057N23	RES CHIP 100K 5% 20X40
R308	0662057M60	RES. CHIP 270 5% 20X40
R309	0662057M32	RES. CHIP 18 5% 20X40
R310	0662057N23	RES CHIP 100K 5% 20X40
R311	0662057N10	RES. CHIP 30K 5% 20X40
R312	0662057M83	RES. CHIP 2400 5% 20X40
R313	0662057M62	RES. CHIP 330 5% 20X40

Circuit Ref	Motorola Part No.	Description
R314	0662057M85	RES. CHIP 3000 5% 20X40
R315	0662057N01	RES. CHIP 12K 5% 20X40
R316	0662057A96	CHIP RES 91K OHMS 5%
R317	0662057M74	RES. CHIP 1000 5% 20X40
R318	0662057A79	CHIP RES 18K OHMS 5%
R319	0662057A29	CHIP RES 150 OHMS 5%
R320	0662057M74	RES. CHIP 1000 5% 20X40
R321	0662057M83	RES. CHIP 2400 5% 20X40
R322	0662057N30	RES CHIP 200K 5% 20X40
R324	0662057M81	RES. CHIP 2000 5% 20X40
R325	0662057M94	RES. CHIP 6800 5% 20X40
R327	0662057N11	RES. CHIP 33K 5% 20X40
R328	0662057M12	RES. CHIP 2.7 5% 20X40
R329	0662057M01	RES. CHIP 0 5% 20X40
R339	0662057M01	RES. CHIP 0 5% 20X40
R340	0662057M96	RES. CHIP 8200 5% 20X40
R342	0662057N23	RES CHIP 100K 5% 20X40
R343	0662057M26	RES. CHIP 10 5% 20X40
R344	0662057N01	RES. CHIP 12K 5% 20X40
R345	0662057M98	RES CHIP 10K 5% 20X40
R346	0662057N17	RES. CHIP 56K 5% 20X40
R347	0662057M74	RES. CHIP 1000 5% 20X40
R348	0662057M87	RES. CHIP 3600 5% 20X40
R349	0662057C01	CHIP RES 0 OHMS .050 OHMS
R350	0662057N23	RES CHIP 100K 5% 20X40
R351	0662057C01	CHIP RES 0 OHMS .050 OHMS
R352	0662057M86	RES. CHIP 3300 5% 20X40
R355	0662057M01	RES. CHIP 0 5% 20X40
R400	0662057N15	RES. CHIP 47K 5% 20X40
R401	0662057M01	RES. CHIP 0 5% 20X40
R405	0662057M01	RES. CHIP 0 5% 20X40
R406	0662057N20	RES. CHIP 75K 5% 20X40
R407	0662057N19	RES. CHIP 68K 5% 20X40
R409	0662057M98	RES CHIP 10K 5% 20X40
R410	0662057N23	RES CHIP 100K 5% 20X40
R411	0662057M98	RES CHIP 10K 5% 20X40
R413	0662057M01	RES. CHIP 0 5% 20X40
R414	0662057V34	RES CHIP 180K 1% 1/16W
R415	0662057V26	RES CHIP 91K 1% 1/16W
R416	0662057M98	RES. CHIP 10K 5% 20X40
R418	0662057M01	RES. CHIP 0 5% 20X40
R419	0662057M67	RES. CHIP 0 5% 20X40 (not used in GP640)
R420	0662057B46	CHIP RES 10.0 MEG OHMS 5% (not used in GP640)
R421	0662057M81	RES. CHIP 2000 5% 20X40
R423	0662057N39	RES. CHIP 470K 5% 20X40
R424	0662057N12	RES. CHIP 36K 5% 20X40
R425	0662057N10	RES. CHIP 30K 5% 20X40
R426	0662057N35	RES. CHIP 330K 5% 20X40 (not used in GP640)
R427	0662057M84	RES. CHIP 2700 5% 20X40
R428	0662057M10	RES. CHIP 2.2 5% 20X40
R429	0662057M98	RES CHIP 10K 5% 20X40
R431	0662057N39	RES. CHIP 470K 5% 20X40
R432	0662057N16	RES. CHIP 51K 5% 20X40

Circuit Ref	Motorola Part No.	Description
R434	0662057M62	RES. CHIP 330 5% 20X40
R435	0662057M81	RES. CHIP 2000 5% 20X40
R436	0662057M01	RES. CHIP 0 5% 20X40
R445	0662057N08	RES. CHIP 24K 5% 20X40
R446	0662057N31	RES, CHIP 220K 5% 20X40
R447	0662057N23	RES, CHIP 100K 5% 20X40
R448	0662057N98	RES. CHIP 10K 5% 20X40
R449	0662057N08	RES. CHIP 24K 5% 20X40
R450	0683962T45	RES CHIP 68 5-1
R451	0662057N03	RES, CHIP 15K 5% 20X40
R452	0662057N23	RES, CHIP 100K 5% 20X40
R456	0662057M01	RES. CHIP 0 5% 20X40
R457	0662057M98	RES CHIP 10K 5% 20X40
R460	0662057M90	RES. CHIP 4700 5% 20X40
R461	0662057M56	RES. CHIP 180 5% 20X40 (not used in GP640)
R462	0662057M98	RES CHIP 10K 5% 20X40 (not used in GP640)
R463	0662057M61	RES. CHIP 300 5% 20X40
R471	0662057N06	RES. CHIP 20K 5% 20X40
R472	0662057N12	RES. CHIP 36K 5% 20X40
R473	0662057M26	RES. CHIP 10 5% 20X40
R475	0662057M01	RES. CHIP 0 5% 20X40
R476	0662057N35	RES. CHIP 330K 5% 20X40
R477	0662057M74	RES. CHIP 1000 5% 20X40
R478	0662057M98	RES CHIP 10K 5% 20X40
R481	0662057N08	RES. CHIP 24K 5% 20X40
R492	0662057M01	RES. CHIP 0 5% 20X40
R501	0662057M70	RES. CHIP 680 5% 20X40
R502	0662057M56	RES. CHIP 180 5% 20X40
R505	0662057M98	RES CHIP 10K 5% 20X40
R506	0662057N15	RES. CHIP 47K 5% 20X40
R507	0662057M01	RES. CHIP 0 5% 20X40
RT300	0680590Z01	THERMISTOR_33K
RT400	0680590Z01	THERMISTOR_33K
S501	4080710Z01	SWITCH (FREQUENCY)
S502	1880619Z02	POTENTIOMETER, VOLUME
SH100	2680507Z01	SHIELD, HARMONIC FILTER
SH101	2680510Z01	SHIELD, PA
SH201	2680511Z01	SHIELD, SYNTHESIZER
SH202	2680511Z01	SHIELD, SYNTHESIZER
SH241	2680513Z01	SHIELD, VCO TOP
SH242	2680514Z01	SHIELD, VCO BOTTOM/LVZIF
SH301	2680554Z01	SHIELD,REC. FRONT END TOP
SH302	2680555Z01	SHIELD, REC. F/END BOTTOM
SH303	2680509Z01	SHIELD, MIXER
SH304	2680624Z01	SHIELD, MIXER DIODE
SH321	2680508Z01	SHIELD,LVZIF 2ND LO
SH322	2680514Z01	SHIELD, VCO BOTTOM/LVZIF
SH323	2680553Z01	SHIELD, CRYSTAL FILTER
SH400	2680505Z01	SHIELD,CONTROLLER TOP LEFT
SH401	2680506Z01	SHIELD,CONTROLLER TOP RIGHT
SH402	2680515Z01	SHIELD, CONT. BOTTOM LEFT
SH403	2680516Z01	SHIELD, CONT. BTM RIGHT
T301	2580541Z02	BALUN TRANSFORMER

Circuit Ref	Motorola Part No.	Description
T302	2580541Z02	BALUN TRANSFORMER
U101	5185130C65	IC LDMOS DRIVER
U102	5185765B26	IC POWER CONTROL PASS 2.3
U201	5185963A27	IC TESTED AT25016 48 PIN GFP
U210	5102463J61	INVERTER TC7ST04FU SS0P5-P-A
U211	5102463J61	INVERTER TC7ST04FU SS0P5-P-A
U241	5105750U54	IC PKG DIE VCO BUFFER
U247	5105739X05	IC SOT 5V HI-PREC. REGULATOR
U248	5102463J58	3.3V REGULATOR IN SOT23-5 PKG
U301	5109632D83	IC CUST LVZIF 2.2 H60G 48TQFP
U400	5102463J40	REG., 3.3V, LP2951CMM-3.3
U404	5185963A53	IC ASFIC CMP TQFP 48 PIN PKG
U406	*5102463J60	IC 512KX8 FLASH ROM (AT49LV040)
U407	*5102463J64	16KX8 SPI SERIAL EEPROM
U409	5102226J56	68HC11FLO_PASS5 100P IN TQFP
U410	5102463J57	REGULATOR 3.3V, ILC7062CM-33
U420	5102463J44	AUDIO AMPLIFIER TDA8547TS
VR432	4805656W08	DIODE ZENER QUAD
VR433	4805656W08	DIODE ZENER QUAD
VR434	4802245J73	ZENER DIODE; BZX284-C6V8
VR439	4880140L17	DIODE SOT ZENER 12V
VR440	4802245J73	ZENER DIODE; BZX284-C6V8
VR441	4802245J73	ZENER DIODE; BZX284-C6V8
VR442	4802245J73	ZENER DIODE; BZX284-C6V8
VR443	4802245J73	ZENER DIODE; BZX284-C6V8
VR444	4802245J73	ZENER DIODE; BZX284-C6V8
VR445	4802245J74	ZENER_DIODE; BZX284-C10
VR446	4802245J74	ZENER_DIODE; BZX284-C10
VR447	4802245J74	ZENER_DIODE; BZX284-C10
VR448	4802245J74	ZENER_DIODE; BZX284-C10
VR449	4802245J74	ZENER_DIODE; BZX284-C10
VR450	4802245J75	ZENER_DIODE; BZX284-C10
VR501	4813830A18	DIODE 6.8V 5% 225MWMMBZ5235B_
VR506	4802245J73	ZENER DIODE; BZX284-C6V8
	8485726Z04	PC BOARD UHF BAND 3

* Motorola Depot Servicing only

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

MOTOROLA

Professional Radio
GP Series

Service Maintainability

Issue: November 2004

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Table of Contents

Chapter 1 INTRODUCTION

Chapter 2 MAINTENANCE

Chapter 3 SERVICE AIDS

Chapter 1
INTRODUCTION

1.0 Scope of Manual

This manual is intended for use by service technicians familiar with similar types of equipment. It contains service information required for the equipment described and is current as of the printing date. Changes which occur after the printing date may be incorporated by a complete Manual revision or alternatively as additions.

NOTE Before operating or testing these units, please read the Safety Information Section in the front of this manual.

2.0 Warranty and Service Support

Motorola offers long term support for its products. This support includes full exchange and/or repair of the product during the warranty period, and service/ repair or spare parts support out of warranty. Any "return for exchange" or "return for repair" by an authorised Motorola Dealer must be accompanied by a Warranty Claim Form. Warranty Claim Forms are obtained by contacting an Authorised Motorola Dealer.

2.1 Warranty Period and Return Instructions

The terms and conditions of warranty are defined fully in the Motorola Dealer or Distributor or Reseller contract. These conditions may change from time to time and the following notes are for guidance purposes only.

In instances where the product is covered under a "return for replacement" or "return for repair" warranty, a check of the product should be performed prior to shipping the unit back to Motorola. This is to ensure that the product has been correctly programmed or has not been subjected to damage outside the terms of the warranty.

Prior to shipping any radio back to the appropriate Motorola warranty depot, please contact Customer Resources (Please see page 2 and page 3 in this Chapter). All returns must be accompanied by a Warranty Claim Form, available from your Customer Services representative. Products should be shipped back in the original packaging, or correctly packaged to ensure no damage occurs in transit.

2.2 After Warranty Period

After the Warranty period, Motorola continues to support its products in two ways.

1. Motorola's Radio Aftermarket and Accessory Division (AAD) offers a repair service to both end users and dealers at competitive prices.
2. AAD supplies individual parts and modules that can be purchased by dealers who are technically capable of performing fault analysis and repair.

2.3 European Radio Support Centre (ERSC)

The ERSC Customer Information Desk is available through the following service numbers:

Austria:	08 00 29 75 41	Italy:	80 08 77 387
Belgium:	08 00 72 471	Luxemburg:	08 00 23 27
Denmark:	80 88 05 72	Netherlands:	08 00 22 45 13
Finland:	08 00 11 49 910	Norway:	80 01 11 15
France:	08 00 90 30 90	Portugal:	08 00 84 95 70
Germany:	08 00 18 75 240	Spain:	90 09 84 902
Greece:	00 80 04 91 29 020	Sweden:	02 07 94 307
UK :	08 00 96 90 95	Switzerland:	08 00 55 30 82
Ireland:	18 00 55 50 21	Iceland:	80 08 147

Or dial the European Repair and Service Centre:

Tel: +49 30 6686 1555

Please use these numbers for repair enquiries only

2.4 Piece Parts

Some replacement parts, spare parts, and/or product information can be ordered directly. If a complete Motorola part number is assigned to the part, it is available from Motorola Radio Aftermarket and Accessory Division (AAD). If no part number is assigned, the part is not normally available from Motorola. If the part number is appended with an asterisk, the part is serviceable by Motorola Depot only. If a parts list is not included, this generally means that no user-serviceable parts are available for that kit or assembly.

All part orders should be directed to :

Motorola GmbH
Customer Care
AM Borsigturm 130
13507 Berlin
Germany.

EMEA Test Equipment Support

Information related to support and service of Motorola Test Equipment is available via Motorola Online (Extranet), through the Customer Care organisation of Motorola's local area representation or by calling the the European Repair and Service Centre: Tel: +49 30 6686 1555.

2.5 Technical Support

Motorola Product Services is available to assist the dealer/distributors in resolving any malfunctions which may be encountered.

UK/Ireland - Richard Russell
Telephone: +44 (0) 1256 488 082
Fax: +44 01256 488 080
Email: BRR001@email.mot.com

Central/East Europe
Siggy Punzenberger
Telephone: +49 (0) 6128 70 2342
Fax: +49 (0) 6128 95 1096
Email: TFG003@email.mot.com

Scandinavia
Telephone: +46 8 735 9282
Fax: +46 8 735 9280
Email: C14749@email.mot.com

Germany - Customer Connect Team
Telephone: +49 (0) 30 6686 1539
Fax: +49 (0) 30 6686 1916
Email: cgiss.emea@europe.mot.com

France - Lionel Lhermitte
Telephone: +33 1 6929 5722
Fax: +33 1 6929 5904
Email: TXE037@email.mot.com

Italy - Ugo Gentile
Telephone: +39 0 2822 0325
Fax: +39 0 2822 0334
Email: C13864@email.mot.com

Africa & Middle East - Armand Roy
Telephone: +33 1 6929 5715
Fax: +33 1 6929 5778
Email: armand.roy@Motorola.com

2.6 Related Documents

The following documents are directly related to the use and maintainability of this product.

Title	Language	Part Number
GP140 Product Manual	English Russian	ENLN4071 ENLN4072
GP300 Series Product Manual	English German French Italian Spanish Russian	ENLN4073 ENLN4074 ENLN4075 ENLN4076 ENLN4130 ENLN4077
GP600 Series Product Manual	English German French Russian	ENLN4078 ENLN4079 ENLN4080 ENLN4081
GP1280 Product Manual	English German French	ENLN4082 ENLN4083 ENLN4084
GP240/280/540/580 Service Kit	English	ENLN5000

3.0 Radio Model Information

The model number and serial number are located on a label attached to the back of your radio. You can determine the RF output power, frequency band, protocols, and physical packages. The example below shows one portable radio model number and its specific characteristics.

Table 1-1 Radio Model Number (Example: MDH25KDC9AA3AE)

	Type of Unit	Model Series	Freq. Band	Power Level	Physical Packages	Channel Spacing	Protocol	Feature Level	Model Revision	Model Package
MD = Motorola Internal Use	**H** = Portable	**25**	**K** VHF (136-174MHz)	**D** 4-5W	**C** GP140, GP320, GP240, GP340, GP540. GP640.	**9** Program-mable	**AA** Conventional MDC	**O** GP320	**A**	**E**
			R UHF 1 (403-470MHz)	**E** 5-6W	**H** GP280, GP380, GP580, GP680	**6** Non Program-mable	**AN** Conventional 5 Tone	**3** GP140, GP240 GP340, GP540 GP640.		
			S UHF 2 (450-527MHz)	C 2-2.5W	**N** GP1280		**CK** MPT	**5** GP360		
			B LB1 29-42MHz		**F** GP360		**PW** MPT/5T	**6** GP280 GP380, GP580 GP680		
			C LB2 35-50MHz				**FB** Privacy Plus	**8** GP1280		
			E 300R1 (300-350MHz)				**FC** SmartZone			
			U 800 MHz (806-870MHz)							

Chapter 2

MAINTENANCE

1.0 Introduction

This chapter of the manual describes:

- ❏ preventive maintenance
- ❏ safe handling of CMOS devices
- ❏ repair procedures and techniques

2.0 Preventive Maintenance

The radios do not require a scheduled preventive maintenance program; however, periodic visual inspection and cleaning is recommended.

2.1 Inspection

Check that the external surfaces of the radio are clean, and that all external controls and switches are functional. It is not recommended to inspect the interior electronic circuitry.

2.2 Cleaning

The following procedures describe the recommended cleaning agents and the methods to be used when cleaning the external and internal surfaces of the radio. External surfaces include the front cover, housing assembly, and battery case. These surfaces should be cleaned whenever a periodic visual inspection reveals the presence of smudges, grease, and/or grime.

NOTE Internal surfaces should be cleaned only when the radio is disassembled for servicing or repair.

The only recommended agent for cleaning the external radio surfaces is a 0.5% solution of a mild dishwashing detergent in water. The only factory recommended liquid for cleaning the printed circuit boards and their components is isopropyl alcohol (70% by volume).

CAUTION: The effects of certain chemicals and their vapors can have harmful results on certain plastics. Aerosol sprays, tuner cleaners, and other chemicals should be avoided.

1. Cleaning External Plastic Surfaces
   The detergent-water solution should be applied sparingly with a stiff, non-metallic, short-bristled brush to work all loose dirt away from the radio. A soft, absorbent, lintless cloth or tissue should be used to remove the solution and dry the radio. Make sure that no water remains entrapped near the connectors, cracks, or crevices.
2. Cleaning Internal Circuit Boards and Components
   Isopropyl alcohol may be applied with a stiff, non-metallic, short-bristled brush to dislodge embedded or caked materials located in hard-to-reach areas. The brush stroke should direct the dislodged material out and away from the inside of the radio. Make sure that controls or tunable components are not soaked with alcohol. Do not use high-pressure

air to hasten the drying process since this could cause the liquid to collect in unwanted places. Upon completion of the cleaning process, use a soft, absorbent, lintless cloth to dry the area. Do not brush or apply any isopropyl alcohol to the frame, front cover, or back cover.

NOTE Always use a fresh supply of alcohol and a clean container to prevent contamination by dissolved material (from previous usage).

3.0 Safe Handling of CMOS and LDMOS

Complementary metal-oxide semiconductor (CMOS) devices are used in this family of radios. CMOS characteristics make them susceptible to damage by electrostatic or high voltage charges. Damage can be latent, resulting in failures occurring weeks or months later. Therefore, special precautions must be taken to prevent device damage during disassembly, troubleshooting, and repair.

Handling precautions are mandatory for CMOS circuits and are especially important in low humidity conditions. DO NOT attempt to disassemble the radio without first referring to the CMOS CAUTION paragraph in the Disassembly and Reassembly section of the manual.

4.0 General Repair Procedures and Techniques

Parts Replacement and Substitution

When damaged parts are replaced, identical parts should be used. If the identical replacement component is not locally available, check the parts list for the proper Motorola part number and order the component from the nearest Motorola Communications parts center listed in the “Piece Parts” section of this manual.

Rigid Circuit Boards

The family of radios uses bonded, multi-layer, printed circuit boards. Since the inner layers are not accessible, some special considerations are required when soldering and unsoldering components. The through-plated holes may interconnect multiple layers of the printed circuit. Therefore, care should be exercised to avoid pulling the plated circuit out of the hole.

When soldering near the 20-pin and 40-pin connectors:

- ❏ avoid accidentally getting solder in the connector.
- ❏ be careful not to form solder bridges between the connector pins
- ❏ closely examine your work for shorts due to solder bridges.

Flexible Circuits

The flexible circuits are made from a different material than the rigid boards and different techniques must be used when soldering. Excessive prolonged heat on the flexible circuit can damage the material. Avoid excessive heat and excessive bending.

For parts replacement, use the ST-1087 Temperature-Controlled Solder Station with a 600-700 degree tip, and use small diameter solder such as ST-633. The smaller size solder will melt faster and require less heat to be applied to the circuit.

To replace a component on a flexible circuit:

1. grasp the edge of the flexible circuit with seizers (hemostats) near the part to be removed
2. pull gently
3. apply the tip of the soldering iron to the component connections while pulling with the seizers.

NOTE Do not attempt to puddle out components. Prolonged application of heat may damage the flexible circuit.

Chip Components

Use either the RLN4062 Hot-Air Repair Station or the Motorola 0180381B45 Repair Station for chip component replacement. When using the 0180381B45 Repair Station, select the TJ-65 mini-thermojet hand piece. On either unit, adjust the temperature control to 370 °C (700 °F), and adjust the airflow to a minimum setting. Airflow can vary due to component density.

❑ **To remove a chip component**:

1. Use a hot-air hand piece and position the nozzle of the hand piece approximately 0.3 cm (1/8") above the component to be removed.
2. Begin applying the hot air. Once the solder reflows, remove the component using a pair of tweezers.
3. Using a solder wick and a soldering iron or a power desoldering station, remove the excess solder from the pads.

❑ **To replace a chip component using a soldering iron**:

1. Select the appropriate micro-tipped soldering iron and apply fresh solder to one of the solder pads.
2. Using a pair of tweezers, position the new chip component in place while heating the fresh solder.
3. Once solder wicks onto the new component, remove the heat from the solder.
4. Heat the remaining pad with the soldering iron and apply solder until it wicks to the component. If necessary, touch up the first side. All solder joints should be smooth and shiny.

❑ **To replace a chip component using hot air**:

1. Use the hot-air hand piece and reflow the solder on the solder pads to smooth it.
2. Apply a drop of solder paste flux to each pad.
3. Using a pair of tweezers, position the new component in place.
4. Position the hot-air hand piece approximately 0.3 cm (1/8”) above the component and begin applying heat.
5. Once the solder wicks to the component, remove the heat and inspect the repair. All joints should be smooth and shiny.

Shields

Removing and replacing shields will be done with the R1070 station with the temperature control set to approximately 215°C (415°F) [230°C (445°F) maximum].

❑ **To remove the shield**:

1. Place the circuit board in the R1070 circuit board holder.
2. Select the proper heat focus head and attach it to the heater chimney.
3. Add solder paste flux around the base of the shield.
4. Position the shield under the heat-focus head.
5. Lower the vacuum tip and attach it to the shield by turning on the vacuum pump.
6. Lower the focus head until it is approximately 0.3 cm (1/8”) above the shield.
7. Turn on the heater and wait until the shield lifts off the circuit board.
8. Once the shield is off, turn off the heat, grab the part with a pair of tweezers, and turn off the vacuum pump.
9. Remove the circuit board from the R1070 circuit board holder.

❑ **To replace the shield:**

1. Add solder to the shield if necessary, using a micro-tipped soldering iron.
2. Next, rub the soldering iron tip along the edge of the shield to smooth out any excess solder. Use solder wick and a soldering iron to remove excess solder from the solder pads on the circuit board.
3. Place the circuit board back in the R1070 circuit board holder.
4. Place the shield on the circuit board using a pair of tweezers.
5. Position the heat-focus head over the shield and lower it to approximately 0.3 cm (1/8”) above the shield.
6. Turn on the heater and wait for the solder to reflow.
7. Once complete, turn off the heat, raise the heat-focus head and wait approximately one minute for the part to cool.
8. Remove the circuit board and inspect the repair. No cleaning should be necessary.

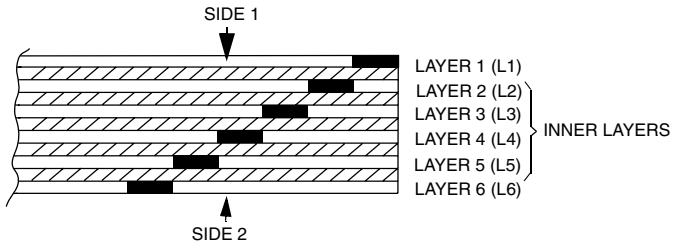
5.0 Notes For All Schematics and Circuit Boards

* Component is frequency sensitive. Refer to the Electrical Parts List for value and usage.

1. Unless otherwise stated, resistances are in Ohms (k = 1000), and capacitances are in picofarads (pF) or microfarads (µF).
2. DC voltages are measured from point indicated to chassis ground using a Motorola DC multimeter or equivalent. Transmitter measurements should be made with a 1.2 µF choke in series with the voltage probe to prevent circuit loading.
3. Interconnect Tie Point Legend:

UNSWB+	=	Unswitch Battery Voltage (7.5V)
SWB+	=	Switch Battery Voltage (7.5V)
R5	=	Receiver Five Volts
CLK	=	Clock
Vdda	=	Regulated 3.3 Volts (for analog)
Vddd	=	Regulated 3.3 Volts (for digital)
CSX	=	Chip Select Line (not for LVZIF)
SYN	=	Synthesizer
DACRX	=	Digital to Analog Voltage (For Receiver Front End Filter)
VSF	=	Voltage Super Filtered (5 volts)
VR	=	Voltage Regulator

6-LAYER CIRCUIT BOARD DETAIL VIEWING
COPPER STEPS IN PROPER LAYER SEQUENCE



Chapter 3

SERVICE AIDS

1.0 Recommended Test Tools

Table 3-1 lists the service aids recommended for working on the radio. While all of these items are available from Motorola, most are standard workshop equipment items, and any equivalent item capable of the same performance may be substituted for the item listed.

Table 3-1 Service Aids

Motorola Part Number	Description	Application
RLN4460_	Portable & Mobile Test Set	Enables connection to the audio/ accessory jack. Allows switching for radio testing.
RKN4074_	RIB/Radio/Test Set Interconnect Cable (for all Models except GP1280).	Connects radio to Computer.
RKN4075_	Programming Cable with internal RIB (for all Models except GP1280).	Connects radio to Computer.
RLN4008_	Radio Interface Box (RIB).	Enables communications between the radio and the computer's serial communications adapter.
5885705M01	BNC Adaptor	Adapts radio's antenna port to BNC cabling of test equipment.
5880384G68	SMA to BNC Adaptor	Adapts radio's antenna port to BNC cabling of test equipment, 800MHz only.
HKN9743_	MAP27 Cable (for GP1280 only).	Connects radio to computer for MAP27 applications in MPT requirements.
HLN9742_	Flash Upgrade Adapter	Provides connections to the computer or RIB programming /test cable.
RLN4510_	Battery Elliminator 7.5 VDC	Includes protection circuit.
0180305G54	Battery Adapter to RLN4510	Connects radio to Battery Elliminator.
8180384F68	Bench Test Housing Eliminator (for all Models except GP1280).	Provides for troubleshooting of the radio when the housing is removed.
8180384F66	Bench Test Housing Eliminator (long housing, GP1280 only).	Provides for troubleshooting of the radio when the housing is removed.
EPN4040_	Wall-Mounted Power Supply (UK).	for RLN4008
EPN4041_	Wall-Mounted Power Supply (220VAC).	for RLN4008
3080369B71	Computer Interface Cable	25 to 9 pin (RLN4008_ to IBM PC).
3080369B72	Computer Interface Cable	9 to 9 pin (RLN4008_ to IBM PC).

Table 3-2 lists the recommended tools used for maintaining this family of radios. These tools are also available from Motorola..

Table 3-2 Recommended Test Tools

Motorola Part Number	Description	Application
6680702Z01	Chassis opener and knob removal tool.	Disassembly tool
RSX4043_	Torx Driver	Tighten and remove chassis screws.
6680387A70	T-6 Torx Bit	Removable Torx driver bit (2 pcs).
WADN4055_ 6604008K01 6604008K02	Portable soldering station 0.4mm replacement tip 0.8mm replacement tip	Digitally controlled For WADN4055_ soldering Iron For WADN4055_ soldering Iron
1010041A86	Solder (RMA type), 63/37, 0.5mm diameter 1 lb. spool.	
0180386A78	Illuminated magnifying glass with lens attachment.	
0180386A82	Anti-static grounding kit.	Used during all radio assembly and disassembly procedures.
0180303E45	SMD tool kit incl. probers and brush.	
R1321_	Shields and surface-mounted component and IC removal/rework station (order all heat-focus heads separately).	Removal and assembly of surface-mounted integrated circuits and shields.
6680332E82 6680332E84 6680333E55 6680332E90	Nozzle 20.3 x 20.3 mm Nozzle 12.7 x 12.7 mm Nozzle 16.5 x 25.4 mm Nozzle 24.1 x 24.1 mm	Heat-focus heads for R1321_ work station.

2.0 Test Equipment

Table 3-3 lists test equipment required to service the radio and other two-way radios.

Table 3-3 Recommended Test Equipment

Motorola Part Number	Description	Characteristics	Application
R2600_	Comms System Analyzer (non MPT).	This monitor will substitute for items with an asterisk*	Frequency/deviation meter and signal generator for widerange troubleshooting and alignment.
RLN5069_	Tracking Generator Option.		Option for R2600_
RLN4361_	CCITT Filter.	with 600 Ohm Meter Load.	Option for R2600_
RLN4423_	Spectrum Analyzer and Oscilloscope with Markers.	High Performance option.	Option for R2600_
RLN4485_	Test Set Ups Memory.	Programmable	Allows storage of complete screen values.
1580357B77	Canvas Case	Protects Units	When used in the Field.
or			
R2680_HS	Comms System Analyzer (MPT1327)	This monitor will substitute for items with an asterisk*.	Frequency/deviation meter and signal generator for widerange troubleshooting and alignment.
RLN1022_	MPT1327 Hardware		Option for R2680_HS
RLN1023_	MPT1327 Software		Option for R2680_HS
RLN4361_	CCITT Filter	with 600 ohm Meter Load	Option for R2680_HS
RLN4423_	Spectrum Analyzer and Oscilloscope with Markers	High Performance option.	Option for R2680_HS
1580357B77	Canvas Case	Protects Units	When used in the Field.
or			
R2670_	Comms System Analyzer with FDMA.	This monitor will substitute for items with an asterisk*.	Frequency/deviation meter and signal generator for widerange troubleshooting and alignment.
RLN4498_	Analog Trunking Smartnet/Zone.		Option for R2670_
1580357B77	Canvas Case	Protects Units	When used in the Field.
* WADN4133_	Oscilloscope	Analog 2 Channel 40MHz bandwidth, 5mV/cm - 20 V/cm.	Waveform measurements.
* R1072_	Digital Multimeter		AC/DC voltage and current measurements.
* R1377_	AC Voltmeter	100µV to 300V, 5Hz - 1MHz, 10Mohm input impedance.	Audio voltage measurements.

Motorola Part Number	Description	Characteristics	Application
* R1440_ * 0180305F14 * 0180305F29 * 0180305F38 * 0180305F46 * RLN5417 * T1013_	Wattmeter, Plug-in Element Plug-in Element Plug-in Element Plug-in Element Carry case for Wattmeter RF Dummy Load	Thruline 50-Ohm, ±5% accuracy 10W, 25 - 60MHz 5W, 100-250MHz 5W, 200-500MHz 5W, 400-1000MHz plus elements	Transmitter power output measurements.
WADN4243_	Power Supply (220V)	Bench top	Programmable
S1339_/220	RF Millivolt Meter	100mV to 3 V RF. 10kHz to 1.2GHz	RF level measurements.
0100855414	RF Cable	2 male BNC Conn. 1.5m (3 pcs needed)	

MOTOROLA

Professional Radio
GP Series

Keypad and Flex
Service Information

Issue: November 2004

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Table of Contents

Chapter 1 THEORY OF OPERATION

Chapter 2 PCB / SCHEMATICS / PARTS LISTS

Chapter 1

THEORY OF OPERATION

1.0 Keypad and Flexible Connectors

1.1 Keypad

The keypad block diagram is shown in Figure 1-1. U602 is a comparator that will compare the voltage when any one of the keypad row or keypad column keys is being pressed. Therefore when a key is being pressed, it will send a message to the microprocessor through the output (KEY_INT) telling it that a key has been pressed. The microprocessor then sample the analog to digital voltages at the keypad row and keypad column and map it with a table so that the key pressed being can be identified. Once the key has been identified, the message that corresponds to the key will show up at the display.

The LED_EN setting is set by the codeplug. When the value is set to high, the LED does not light up during power up and vice versa.

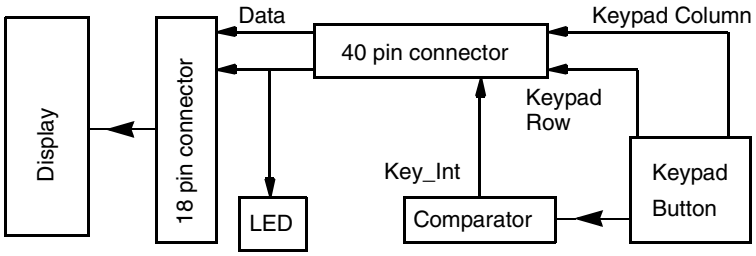


Figure 1-1 Keypad Block Diagram

1.2 Flexible Connectors

Flexible ribbon circuits (flexes) are used to connect the keypad and radio front panel components with the circuit boards. The flexes are locked into place in their connectors by latches which must be released before the flexes may be disconnected during maintenence disassembly.

Two types of flexible ribbon circuits are used in the radios:

- Keypad/Controller Interconnect flex - used for connecting the keypad with the main board circuits.
- Universal Flex connector - used to make connections to the Speaker, Microphone and accessory connector.

2.0 Troubleshooting Chart

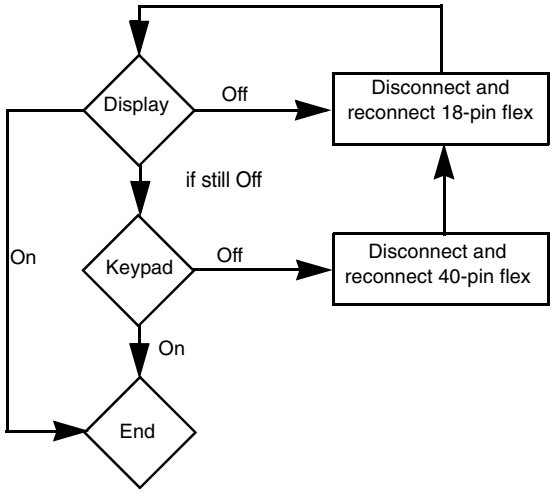


Figure 1-2 Keypad Board Troubleshooting Chart

Chapter 2

PCB / SCHEMATICS / PARTS LISTS

1.0 Allocation of Schematics and Circuit Boards

The printed circuit boards (PCB) and schematic diagrams related to the Flexible Connectors and the Keypads are shown in the tables below:

1.1 Flexible Connectors

Table 2-1: Keypad /Controller Flex

Flex : 8480475Z02	
Flex	Page 2-3
Schematic	Page 2-3

Table 2-2: Universal Speaker/Microphone Flex

Flex : 8480549Z05	
Flex	Page 2-4
Schematic	Page 2-4

1.2 Keypad PCBs

Table 2-3: Standard Keypad

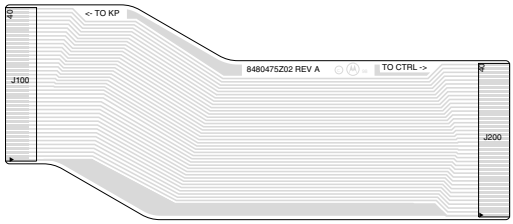
PCB : 8480574Z06	
PCB Layout	Page 2-5
Schematic	Page 2-6
Parts List	Page 2-7

Table 2-4: GP1280 Keypad

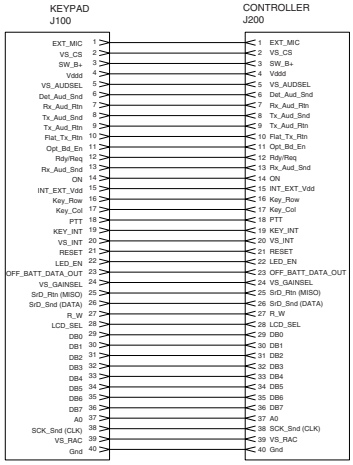
PCB : 8480682Z04	
Flex	Page 2-8
Schematic	Page 2-9
Parts List	Page 2-10

2.0 PCB/Schematic Diagrams and Parts List: Flexes

2.1 Keypad - Controller Flex



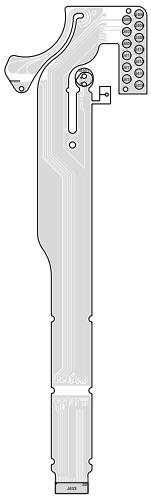
Keypad/Controller Interconnect Flex - Assembly



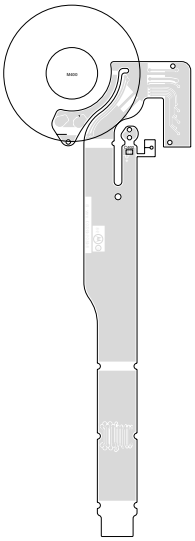
Keypad/Controller Interconnect Flex - Schematic Diagram

Keypad - Controller Interconnect Flex (PCB No. 8480475Z02)

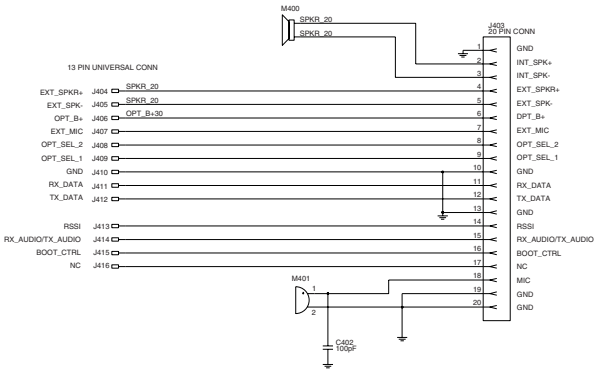
2.2 Universal Connector Flex



View from Top Side



View from Bottom Side

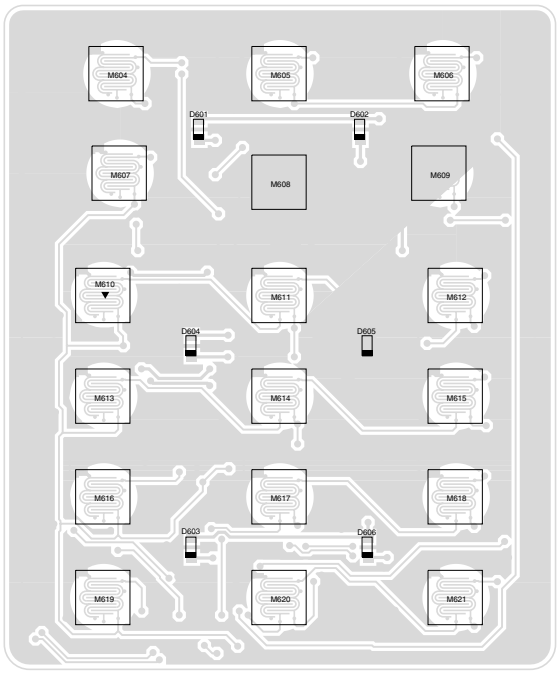


Universal Connector Flex - Schematic Diagram

Universal Connector Flex (8480549Z05)

3.0 PCB/Schematic Diagrams and Parts List: Keypad

3.1 PCB 8480574Z06 - Diagram



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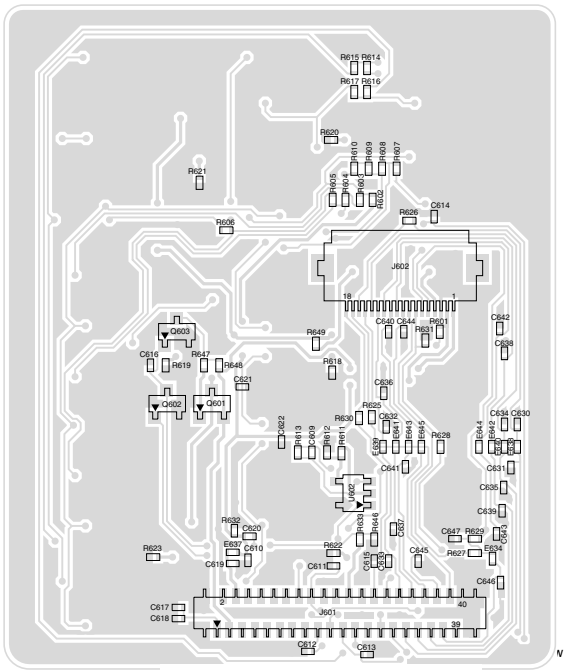

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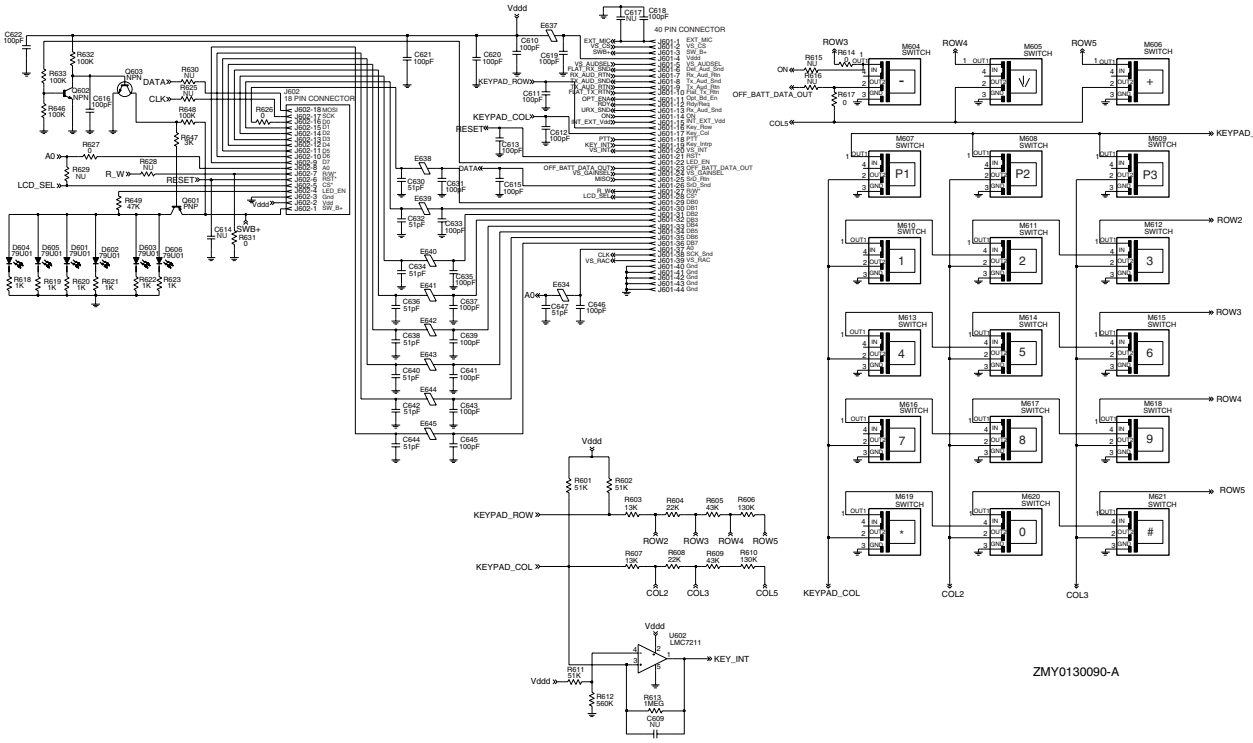
Keypad Board (PCB No. 8480574Z06)

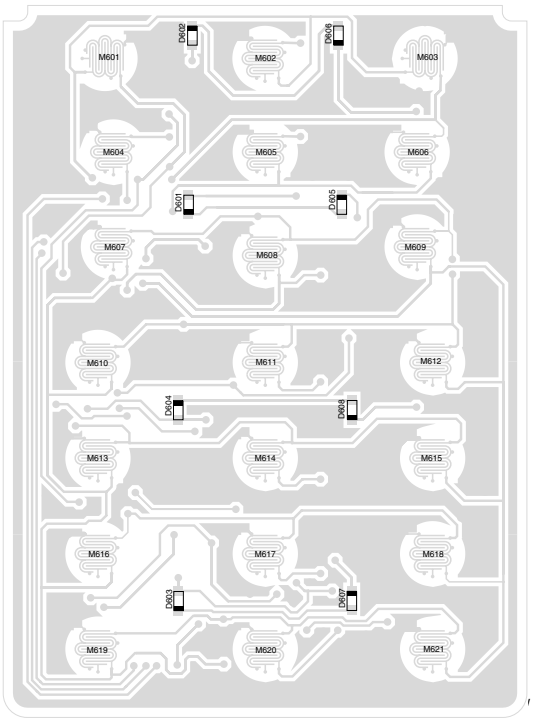


Keypad Schematic Diagram (PCB No. 8480574Z06)

3.2 PCB 8480574Z06 - Parts List

Circuit Ref	Motorola Part No.	Description
C610	2113743N50	100 PF 5% COG
C611	2113743N50	100 PF 5% COG
C612	2113743N50	100 PF 5% COG
C613	2113743N50	100 PF 5% COG
C615	2113743N50	100 PF 5% COG
C616	2113743N50	100 PF 5% COG
C618	2113743N50	100 PF 5% COG
C619	2113743N50	100 PF 5% COG
C620	2113743N50	100 PF 5% COG
C621	2113743N50	100 PF 5% COG
C622	2113743N50	100 PF 5% COG
C630	2113743N43	51.0 PF 5% COG
C631	2113743N50	100 PF 5% COG
C632	2113743N43	51.0 PF 5% COG
C633	2113743N50	100 PF 5% COG
C634	2113743N43	51.0 PF 5% COG
C635	2113743N50	100 PF 5% COG
C636	2113743N43	51.0 PF 5% COG
C637	2113743N50	100 PF 5% COG
C638	2113743N43	51.0 PF 5% COG
C639	2113743N50	100 PF 5% COG
C640	2113743N43	51.0 PF 5% COG
C641	2113743N50	100 PF 5% COG
C642	2113743N43	51.0 PF 5% COG
C643	2113743N50	100 PF 5% COG
C644	2113743N43	51.0 PF 5% COG
C645	2113743N50	100 PF 5% COG
C646	2113743N50	100 PF 5% COG
C647	2113743N43	51.0 PF 5% COG
D601	4880479U01	LED
D602	4880479U01	LED
D603	4880479U01	LED
D604	4880479U01	LED
D605	4880479U01	LED
D606	4880479U01	LED
E634	2480640Z01	C/IND BK1005HM471 BEAD
E637	2480640Z01	C/IND BK1005HM471 BEAD
E638	2480640Z01	C/IND BK1005HM471 BEAD
E639	2480640Z01	C/IND BK1005HM471 BEAD
E640	2480640Z01	C/IND BK1005HM471 BEAD
E641	2480640Z01	C/IND BK1005HM471 BEAD
E642	2480640Z01	C/IND BK1005HM471 BEAD
E643	2480640Z01	C/IND BK1005HM471 BEAD
E644	2480640Z01	C/IND BK1005HM471 BEAD
E645	2480640Z01	C/IND BK1005HM471 BEAD
J601	0980521Z01	ZIF VERTICAL,40 PIN
J602	0905505Y03	ZIF HORIZONTAL
Q601	4805128M67	SOT STR RH LOW PROFILE MMBT
Q602	4880214G02	TSTR MMBT3904
Q603	4880214G02	TSTR MMBT3904
R601	0662057V20	51K 1% 1/16W
R602	0662057V20	51K 1% 1/16W
R603	0662057V05	13K 1% 1/16W
R604	0662057V11	22K 1% 1/16W
R605	0662057V18	43K 1% 1/16W
R606	0662057V30	130K 1% 1/16W
R607	0662057V05	13K 1% 1/16W
R608	0662057V11	22K 1% 1/16W
R609	0662057V18	43K 1% 1/16W
R610	0662057V30	130K 1% 1/16W
R611	0662057N16	51K 5% 20X40
R612	0662057N41	560K 5% 20X40
R613	0662057N47	1.0 MEG 5% 20X40
R614	0662057M01	0 5% 20X40
R617	0662057M01	0 5% 20X40
R618	0662057M74	1000 5% 20X40
R619	0662057M74	1000 5% 20X40
R620	0662057M74	1000 5% 20X40
R621	0662057M74	1000 5% 20X40
R622	0662057M74	1000 5% 20X40
R623	0662057M74	1000 5% 20X40
R626	0662057M01	0 5% 20X40
R627	0662057M01	0 5% 20X40
R631	0662057M01	0 5% 20X40
R632	0662057N23	100K 5% 20X40
R633	0662057N23	100K 5% 20X40
R646	0662057N23	100K 5% 20X40
R647	0662057M85	3000 5% 20X40
R648	0662057N23	100K 5% 20X40
R649	0662057N15	47K 5% 20X40
U602	5102463J49	COMPARATOR CMOS LM7211
	8480574Z06	BOARD, P.C. KEYPAD

3.3 PCB 8480682Z04 - Diagrams



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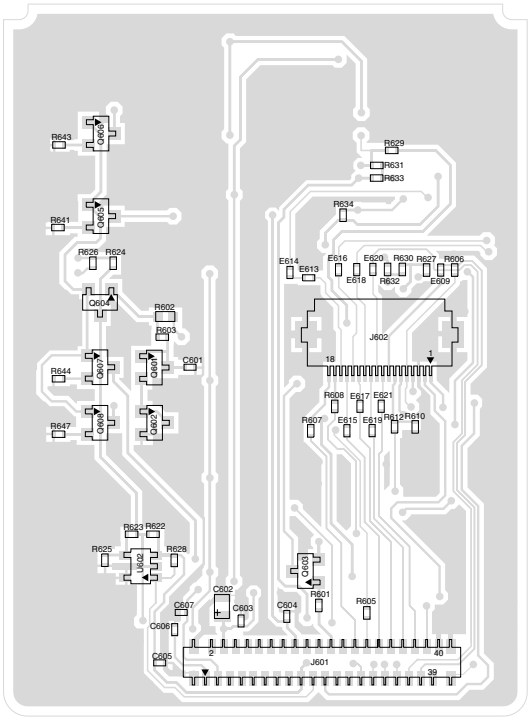
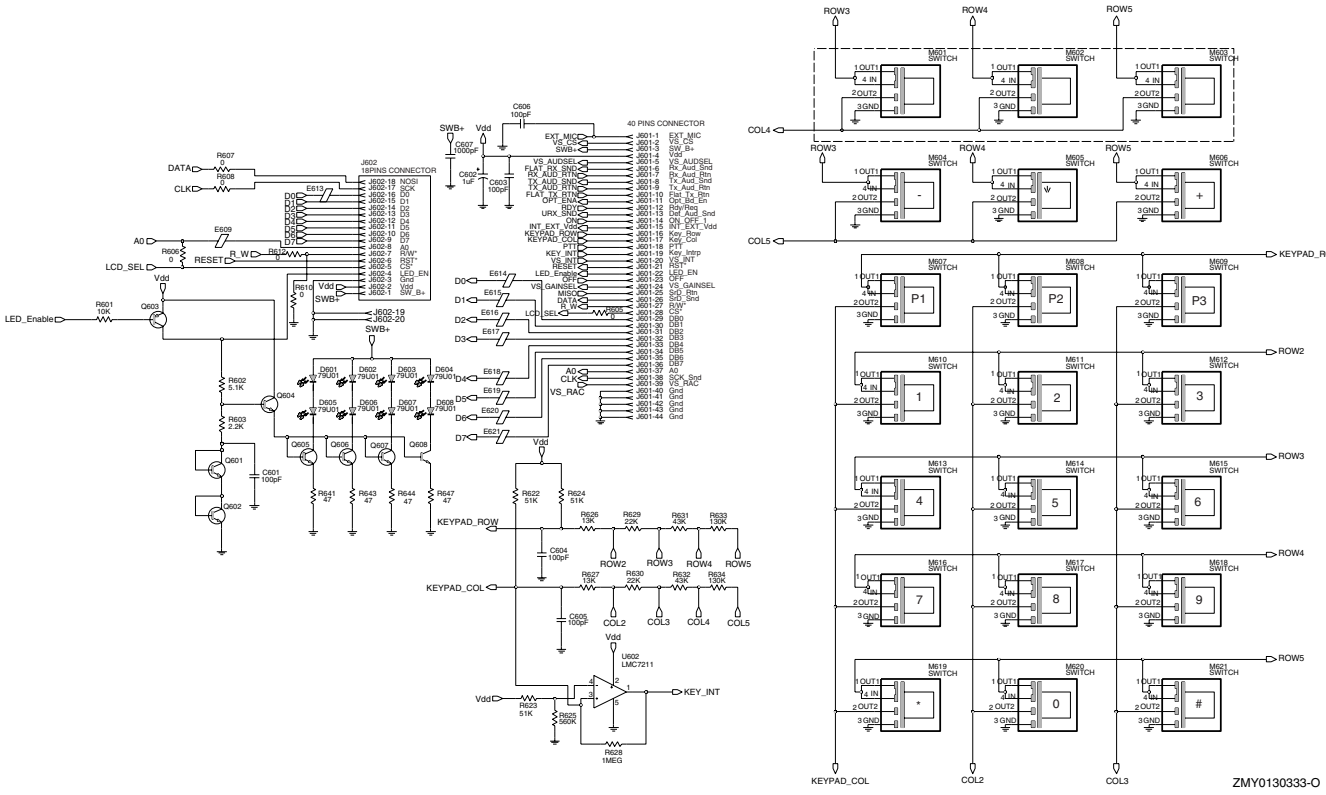


ZMY0130335-O

Keypad Board (PCB No. 8480682Z04)



Keypad Schematic Diagram (PCB No. 8480682Z04)

3.4 PCB 8480682Z04 - Parts List

Circuit Ref	Motorola Part No.	Description
C601	2113743N50	100 PF 5%
C602	2311049A86	1UF 20% 10V
C603	2113743N50	100 PF 5%
C604	2113743N50	100 PF 5%
C605	2113743N50	100 PF 5%
C606	2113743N50	100 PF 5%
C607	2113743L17	1000 PF 10%
C608	2113743N50	100 PF 5%
C609	2113743N50	100 PF 5%
C610	2113743N50	100 PF 5%
C611	2113743N50	100 PF 5%
C612	2113743N50	100 PF 5%
C613	2113743N50	100 PF 5%
D601	4880479U01	LED
D602	4880479U01	LED
D603	4880479U01	LED
D604	4880479U01	LED
D605	4880479U01	LED
D606	4880479U01	LED
D607	4880479U01	LED
D608	4880479U01	LED
E609	2480640Z01	C/IND BK1005HM471 BEAD
E613	2480640Z01	C/IND BK1005HM471 BEAD
E614	2480640Z01	C/IND BK1005HM471 BEAD
E615	2480640Z01	C/IND BK1005HM471 BEAD
E616	2480640Z01	C/IND BK1005HM471 BEAD
E617	2480640Z01	C/IND BK1005HM471 BEAD
E618	2480640Z01	C/IND BK1005HM471 BEAD
E619	2480640Z01	C/IND BK1005HM471 BEAD
E620	2480640Z01	C/IND BK1005HM471 BEAD
E621	2480640Z01	C/IND BK1005HM471 BEAD
J601	0980521Z01	ZIF VERTICAL,40 PIN
J602	0905505Y03	ZIF HORIZONTAL
Q601	4813824A10	NPN 40V .2A GEN PURP
Q602	4813824A10	NPN 40V .2A GEN PURP
Q603	4813824A17	PNP40V .2A GENPB=100-300
Q604	4813824A10	NPN 40V .2A GEN PURP
Q605	4813824A10	NPN 40V .2A GEN PURP
Q606	4813824A10	NPN 40V .2A GEN PURP
Q607	4813824A10	NPN 40V .2A GEN PURP
Q608	4813824A10	NPN 40V .2A GEN PURP
R601	0662057M98	10K 5% 20X40
R602	0662057A66	5100 5 1/8
R603	0662057M82	2200 5% 20X40
R605	0662057M01	0 5% 20X40
R610	0662057M01	0 5% 20X40
R622	0662057V20	51K 1% 1/16W
R623	0662057N16	51K 5% 20X40
R624	0662057V20	51K 1% 1/16W
R625	0662057N41	560K 5% 20X40
R626	0662057V05	13K 1% 1/16W
R627	0662057V05	13K 1% 1/16W
R628	0662057N47	1.0 MEG 5% 20X40
R629	0662057V11	22K 1% 1/16W
R630	0662057V11	22K 1% 1/16W
R631	0662057V18	43K 1% 1/16W
R632	0662057V18	43K 1% 1/16W
R633	0662057V30	130K 1% 1/16W
R634	0662057V30	130K 1% 1/16W
R641	0662057M42	47 5% 20X40
R643	0662057M42	47 5% 20X40
R644	0662057M42	47 5% 20X40
R647	0662057M42	47 5% 20X40
U602	5102463J49	COMPARATOR CMOS LM7211
	8480682Z04	PCB, KEYPAD

MOTOROLA

Professional Radio
GP Series

Power Distribution and Controller
Service Information

Issue: November 2004

Computer Software Copyrights

Table of Contents

Chapter 1 THEORY OF OPERATION

Chapter 2 TROUBLESHOOTING CHARTS

Chapter 3 CONTROLLER SCHEMATICS

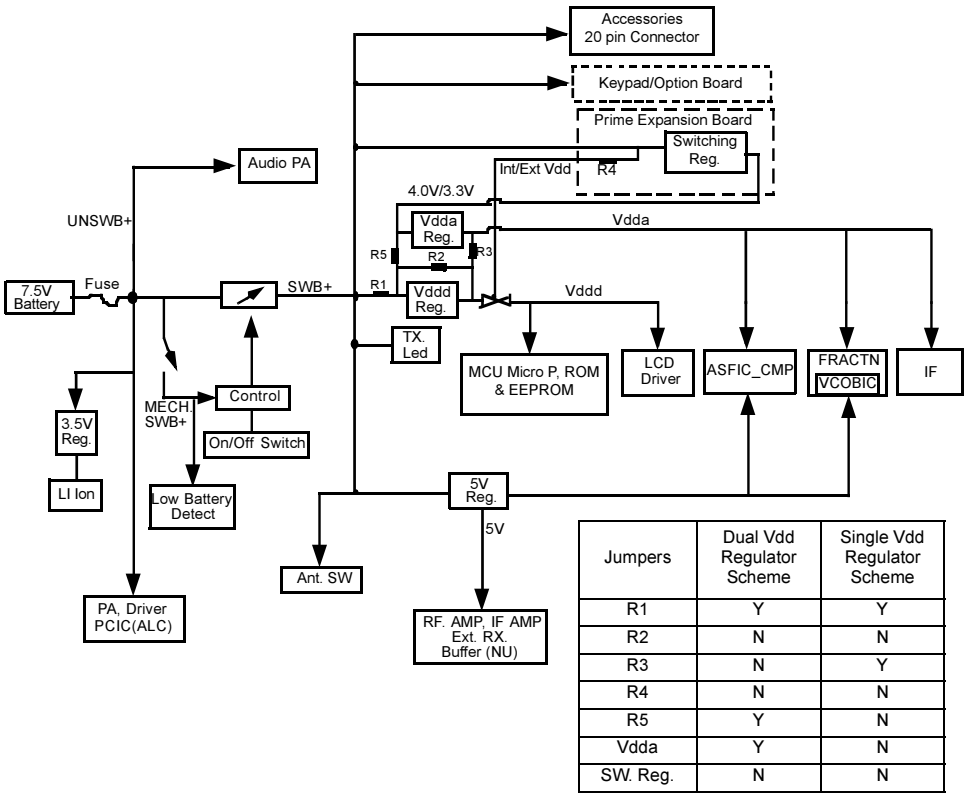
Chapter 1

THEORY OF OPERATION

1.0 Overview

This Chapter provides a detailed theory of operation for the power distribution and controller circuits in the radio. The components for these circuits are contained on the Main Board. Refer to the RF sections of this manual for the component location details and the parts lists for these circuits.

2.0 Radio Power Distribution



Jumpers	Dual Vdd Regulator Scheme	Single Vdd Regulator Scheme
R1	Y	Y
R2	N	N
R3	N	Y
R4	N	N
R5	Y	N
Vdda	Y	N
SW. Reg.	N	N

Figure 1-1 DC Power Distribution Block Diagram

Figure 1-1 illustrates the DC distribution throughout the radio board. A 7.5V battery (BATT 7.5V) supplies power directly to the electronic on/off control as UNSWB+. When the radio is turned on, MECH_SWB+ (on/off/volume control) will trigger the electronic on/off control (momentary-on path), then SWB+ is distributed as shown in Figure1-1. Vdda from 3.3V Vdda regulator will then supply the microprocessor. Data is then sent to ASFIC_CMP to turn on GCB4(DAC). GCB4 will take over the momentary-on path within 12ms. SWB+ will continue to support the whole board until the radio is turned off.

Radio will be turned-off on two conditions;

1. MECH_SWB+ turned off
2. Low battery

When low battery level is detected by the microprocessor through both conditions above, it will store the radio personality data to EEPROM before turning off.

3.0 Controller Circuits

3.1 Controller Architecture

The controller board is the central interface between the various subsystems of the radio. It is separated into MCU digital and audio/signalling architectures as shown in Figure 1-2.

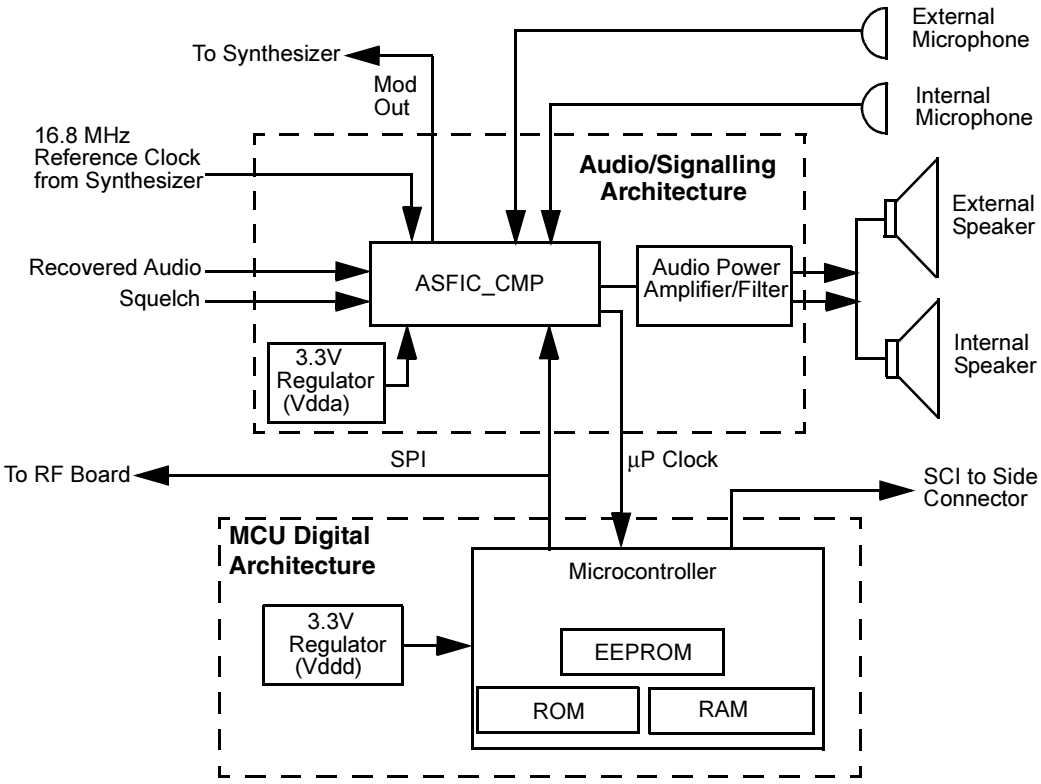


Figure 1-2 Controller Block Diagram

3.2 MCU Digital Architecture

(*Refer to Figure 1-2, the Microprocessor and the Memory schematic diagrams*)

The digital architecture portion consists of a microcontroller and associated EEPROM, RAM, and ROM memories. The architecture is commonly used for both low-tier and high-tier products and also includes conventional and trunking portables. Combinations of different size RAM and ROM are available to support various application software. RAM supports 8KB and 32KB sizes. ROM supports 128KB, 256KB, and 512KB sizes. Table 1-1 shows the ROM, RAM and EEPROM requirements for different applications.

Table 1-1 Radio Memory Requirements

RADIO		ROM (KB)	EXT RAM (KB)	EEPROM (KB)
Conventional MDC	GP140	128K	-	8K
Conventional 5 Tone	GP320, GP340	512K	16K	16K
Conventional 5 Tone	GP360, GP380	512K	16K	16K
Privacy Plus	GP240, GP280	512K	16K	16K
SmartZone	GP540, GP580	512K	16K	16K
MPT	GP640, GP680	512K	16K	16K
MPT	GP1280	512K	16K	16K

3.3 Real Time Clock

(*Refer to Figure 1-3 and the Microprocessor schematic diagram*)

Radios with displays support a Real Time Clock (RTC) module for purposes of message time stamping and time keeping. The RTC module resides in the microcontroller.The clock uses a back-up Lithium Ion battery for operating power when the primary battery is removed.

3.3.1 Circuit Description

The RTC module circuit, shown in Figure 1-3, is powered by the ModB/Vstby pin and PI6/PI7 from the crystal oscillator circuit. A clock frequency of 38.4kHz from a crystal oscillator provides the reference signal which is divided down to 1 Hz in the processor.

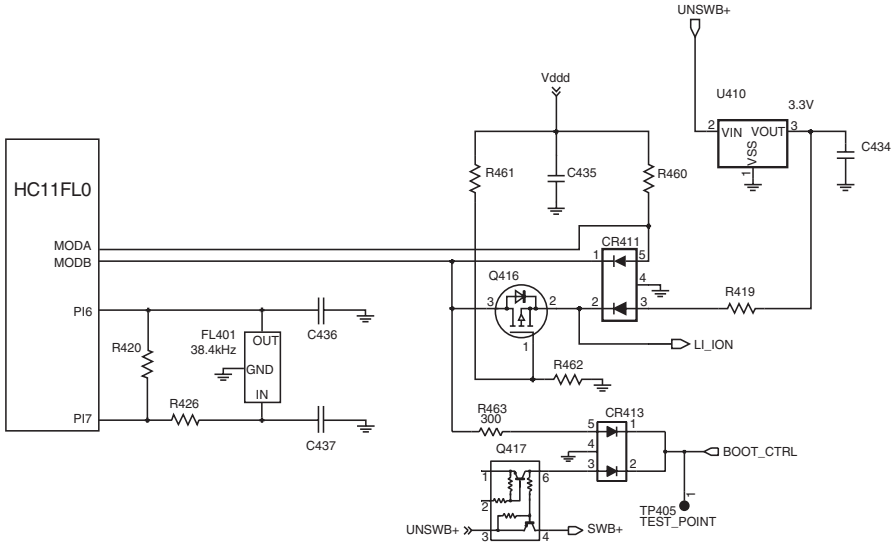


Figure 1-3 RTC Circuit

As the RTC module is powered separately from the processor Vdd, the RTC is kept active through the ModB / Vstby pin which provides the Lithium battery back-up power when the radio is switched off.

A MOSFET Q416 switches in the LiO supply when Vdd is removed. Q416 also provides isolation from BOOT_CTRL function in the event of radio program flashing. The 3.3V regulator charges the Lithium battery.

3.4 ModB/Vstby Supply

The supply to the ModB/Vstby pin varies depending on the conditions listed in Table 1-2.

Table 1-2 ModB/Vstby Supply Modes

Condition	Circuit Operation
Radio On	Vdd supply voltage via CR411
Radio Off	• Vdd turned off • Q416 gate pulled low by R462 • Q416 switched on • U410 supplies 3.2V to ModB/Vstby
Primary battery removed	• Vdd turned off • Q416 gate pulled low by R462 • Q416 switched on • Lithium battery provides 3.2V to ModB/Vstby
Flash Mode	• Boot_Ctrl line pulled low • ModA & ModB go low • Processor in boot-strap mode

3.5 Audio/Signaling Architecture

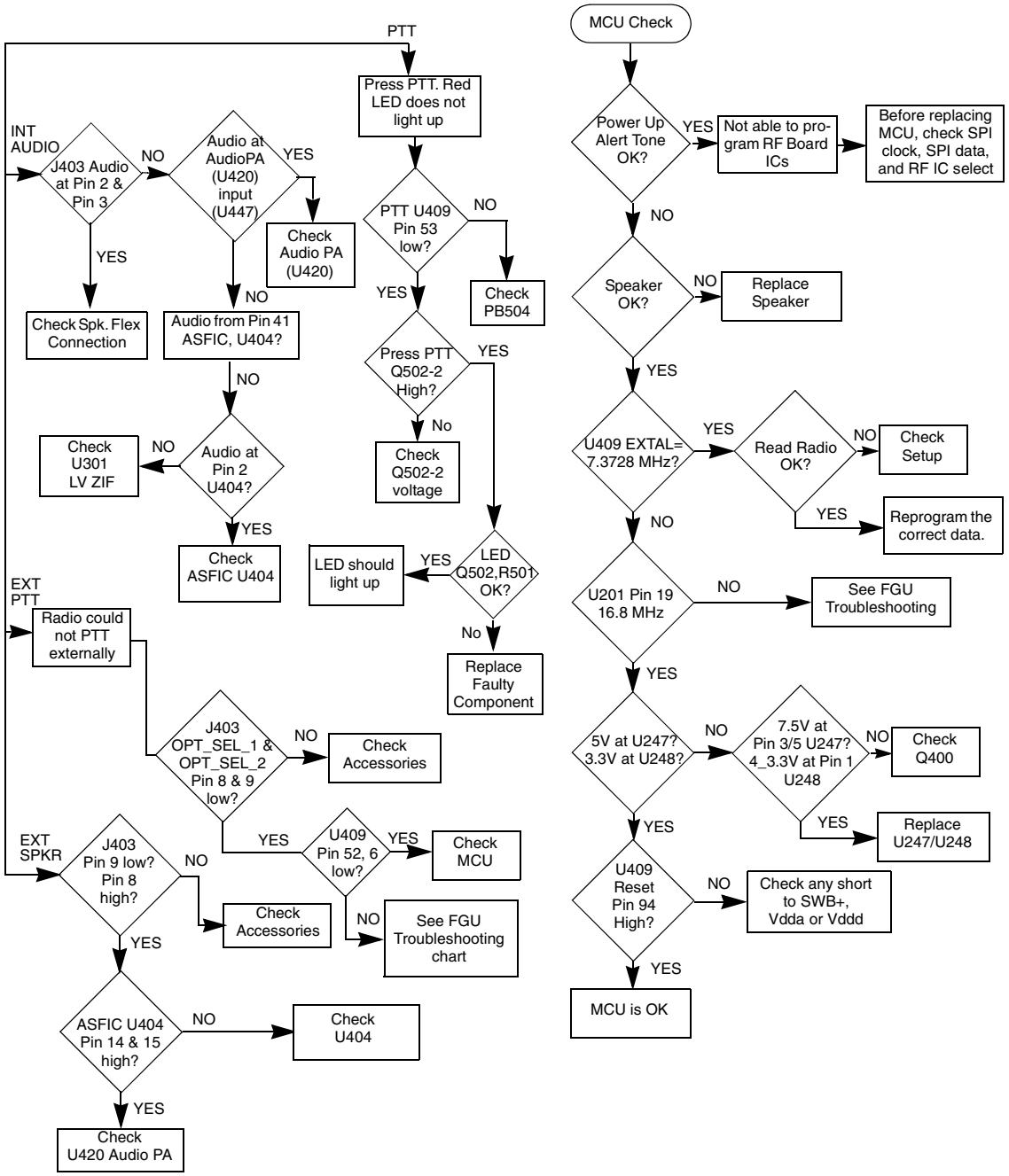
(*Refer to Figure 1-2 and the ASFIC/ON_OFF and Audio Power Amplifier schematic diagrams*)

The audio/signalling/filter/companding IC (ASFIC_CMP) and the audio power amplifier, shown in Figure 1-2, form the main components of the audio/signalling architecture section of the controller board. Inputs include a 16.8 MHz clock from the synthesizer, recovered audio and squelch, MCU control signals, and external or internal microphones. Outputs include a microprocessor clock (uP), modulator output to the synthesizer, and amplified audio signals to an internal or external speaker.

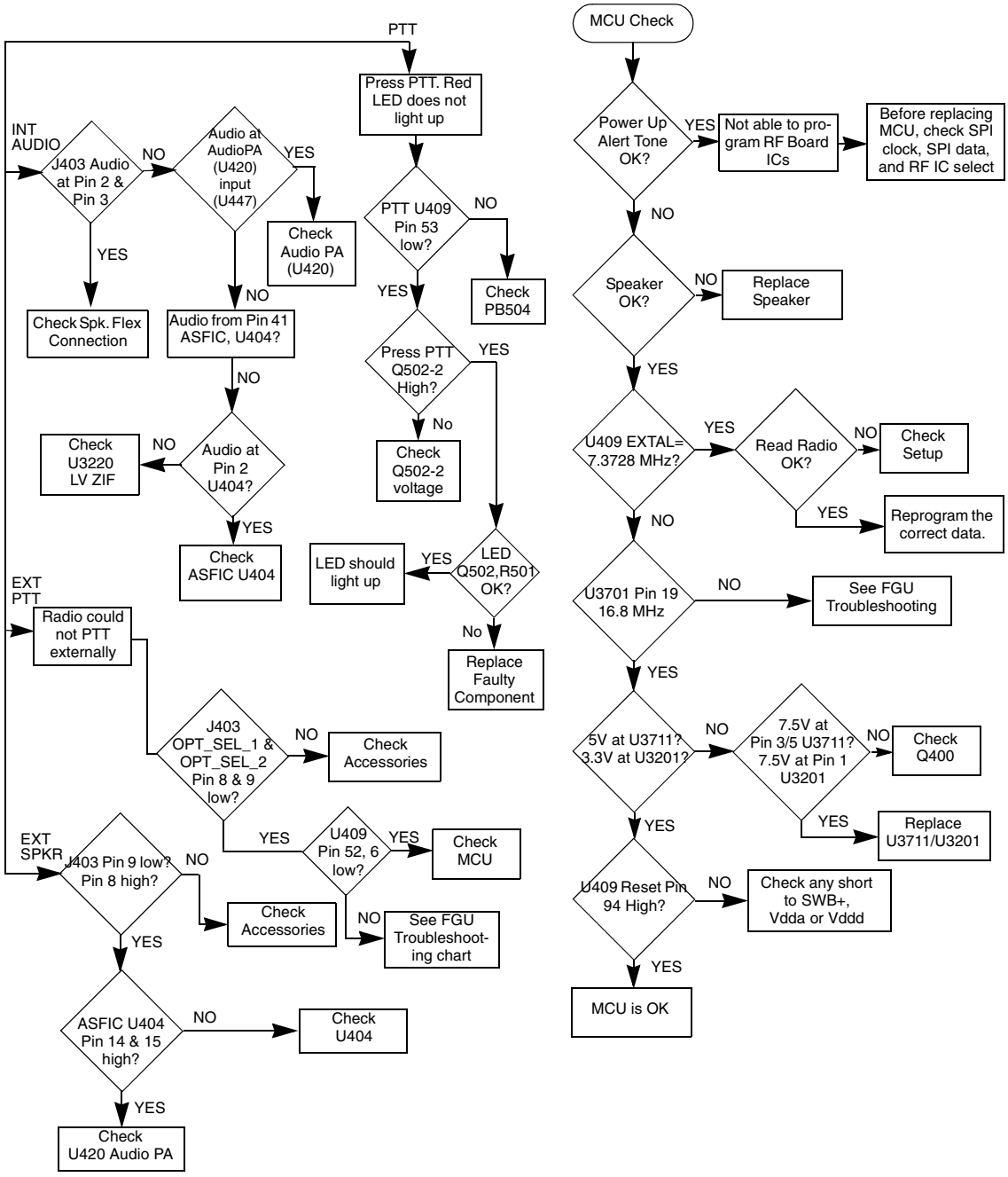
Chapter 2

TROUBLESHOOTING CHARTS

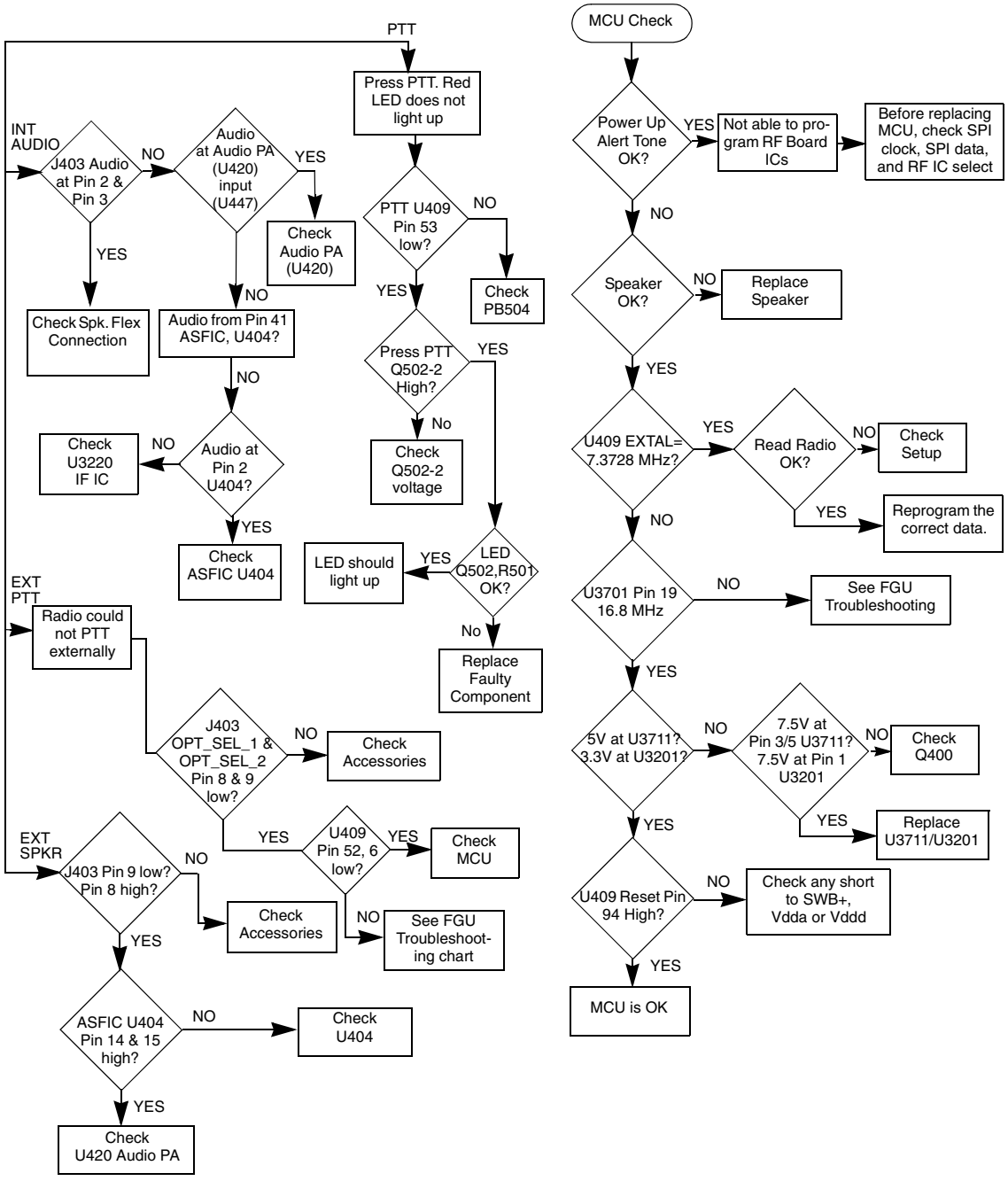
1.0 300R1 Controller



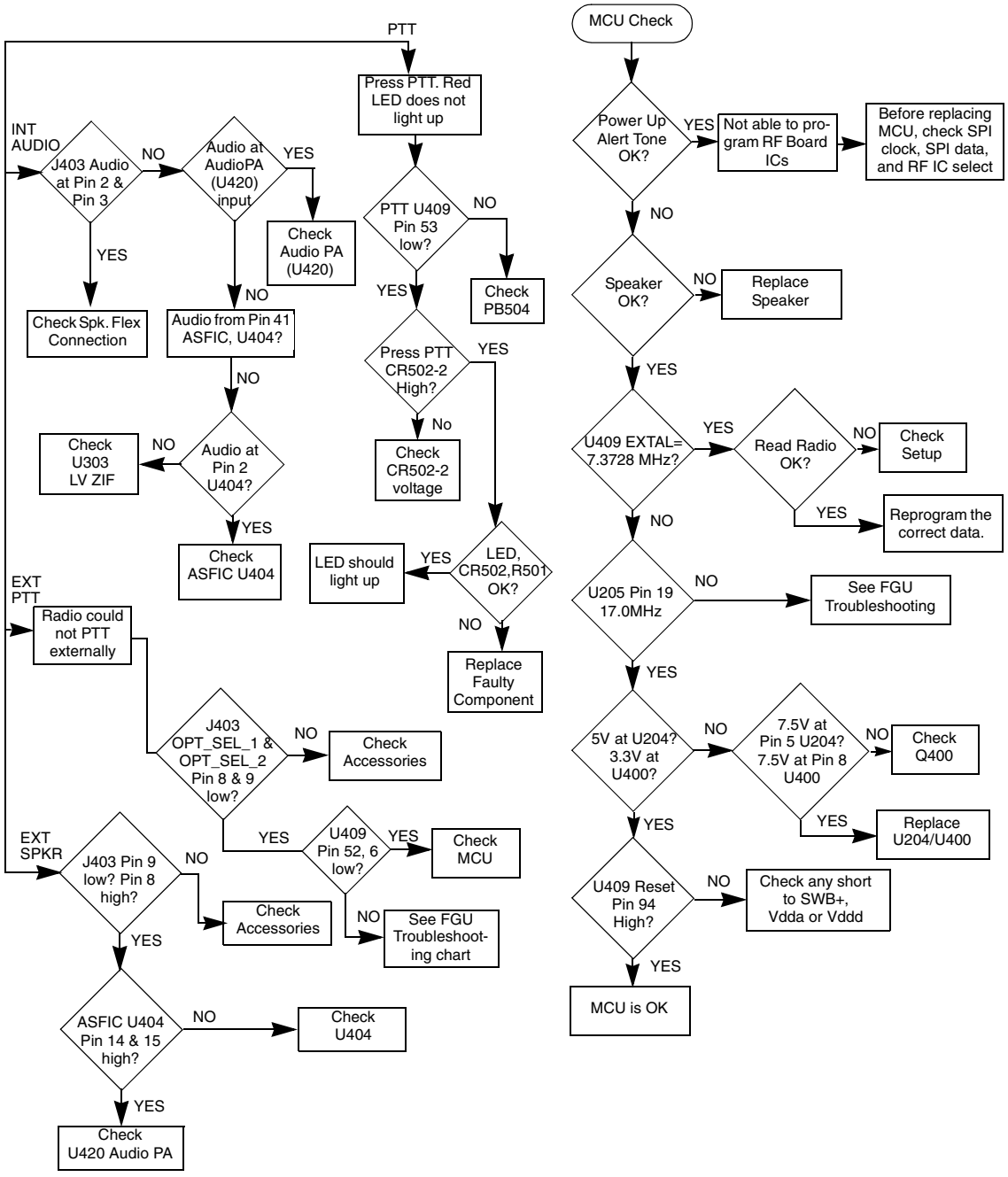
2.0 VHF Controller (except models with PCB 8486473Z04)



3.0 VHF Controller (for models with PCB 8486473Z04)



4.0 Lowband Controller



Chapter 3

CONTROLLER SCHEMATICS

1.0 Allocation of Schematics and Circuit Boards

The Controller circuits are contained on the printed circuit board (PCB) containing the RF circuits. This Chapter shows the schematics for the Controller circuits only, refer to the relevant RF section for details of the related RF circuits, the PCB component layouts and the Parts Lists. The Controller schematic diagrams and the related PCB and parts list are shown in the tables below:

Table 3-1 Schematics - Set 1

PCBs : **8486062B12/ B14** **8485726Z01**	**VHF** **300 R1**
SCHEMATICS	
Overall Controller Schematic	Page 3-5
ASFIC/ ON_OFF	Page 3-6
Microprocessor	Page 3-7
Interface	Page 3-8
Memory	Page 3-8
Audio Power Amplifer	Page 3-9

Table 3-2 Schematics - Set 2

PCBs : **8486101B09/ B10**	**VHF GP1280**
SCHEMATICS	
Overall Controller Schematic	Page 3-11
ASFIC ON_OFF	Page 3-12
Memory	Page 3-12
Microprocessor	Page 3-13
Interface	Page 3-14
Audio Power Amplifer	Page 3-15/16

Table 3-3 Schematics - Set 3

PCBs : **8485658Z01**	**Lowband**
SCHEMATICS	
Overall Controller Schematic	Page 3-17
ASFIC ON_OFF	Page 3-18
Microprocessor	Page 3-19
Interface	Page 3-20
Memory	Page 3-20
Audio Power Amplifer	Page 3-21

Table 3-4 Schematics - Set 4

PCBs : **8486062B16/17** **8486101B11**	**VHF** **VHF GP1280**
SCHEMATICS	
Overall Controller Schematic	Page 3-23
ASFIC ON_OFF	Page 3-24
Microprocessor	Page 3-25
Memory	Page 3-26
Interface	Page 3-26
Audio Power Amplifer	Page 3-27

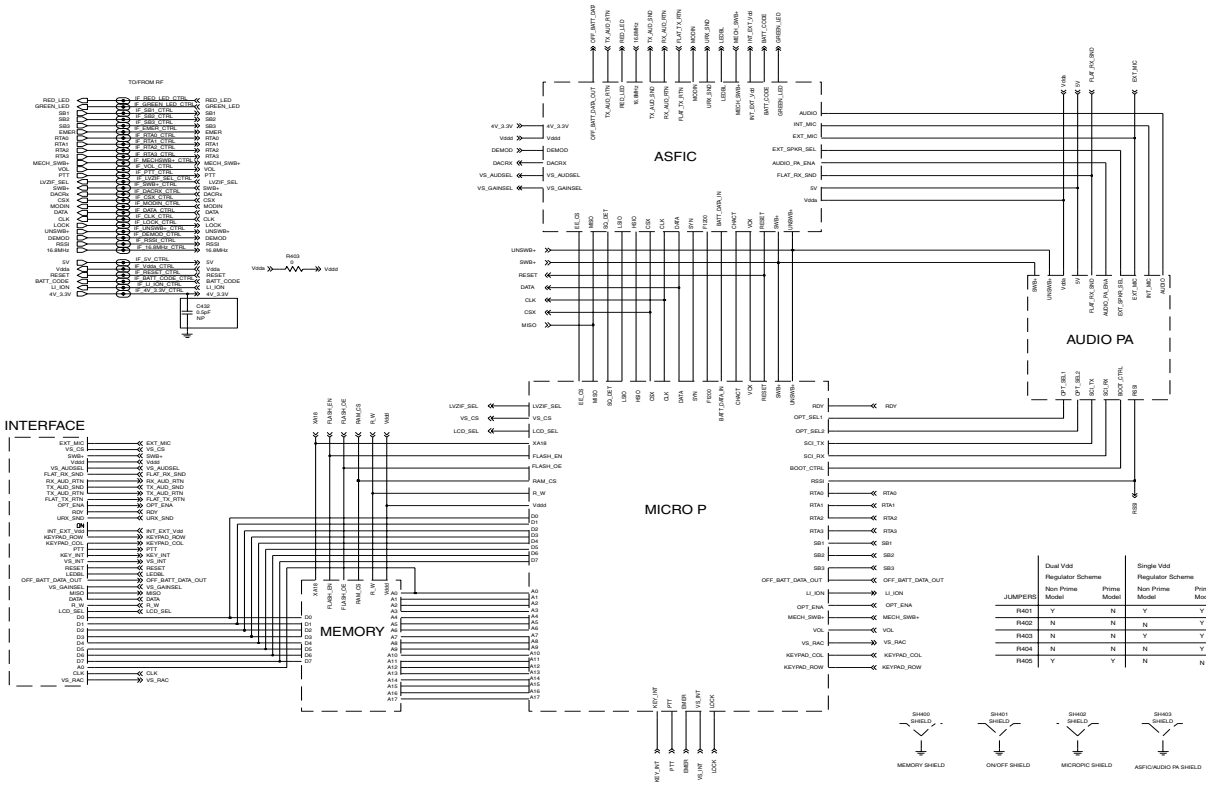
Table 3-5 Schematics - Set 5

PCBs : **8485726Z04**	**300 R1**
SCHEMATICS	
Overall Controller Schematic	Page 3-29
ASFIC ON_OFF	Page 3-30
Microprocessor	Page 3-31
Memory	Page 3-32
Interface	Page 3-32
Audio Power Amplifer	Page 3-33

Table 3-6 Schematics - Set 6

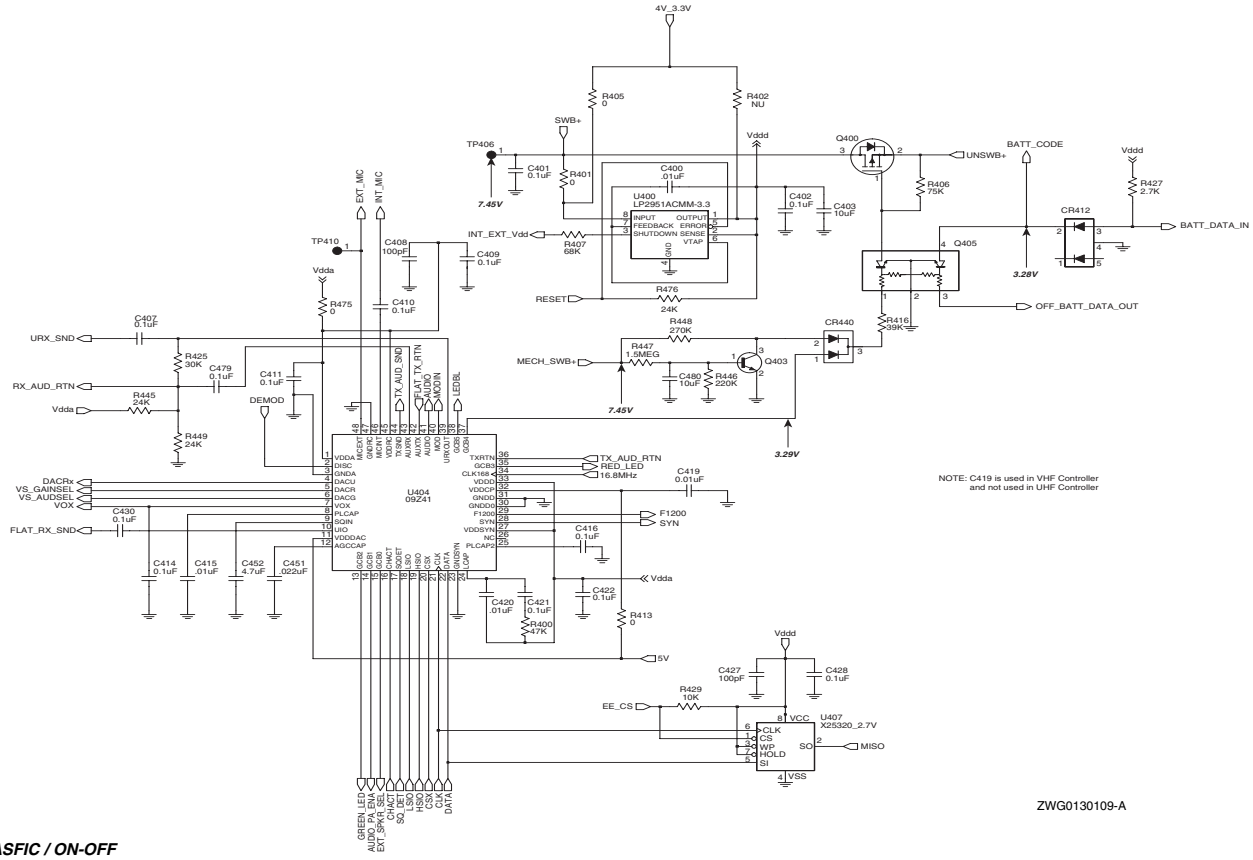
PCBs : **8486473Z04**	**VHF**
SCHEMATICS	
Overall Controller Schematic	Page 3-35
ASFIC ON_OFF	Page 3-36
Microprocessor	Page 3-37
Memory	Page 3-38
Interface	Page 3-38
Audio Power Amplifer	Page 3-39

2.0 Controller - Set 1 (8486062B12/B14, 8485726Z01)

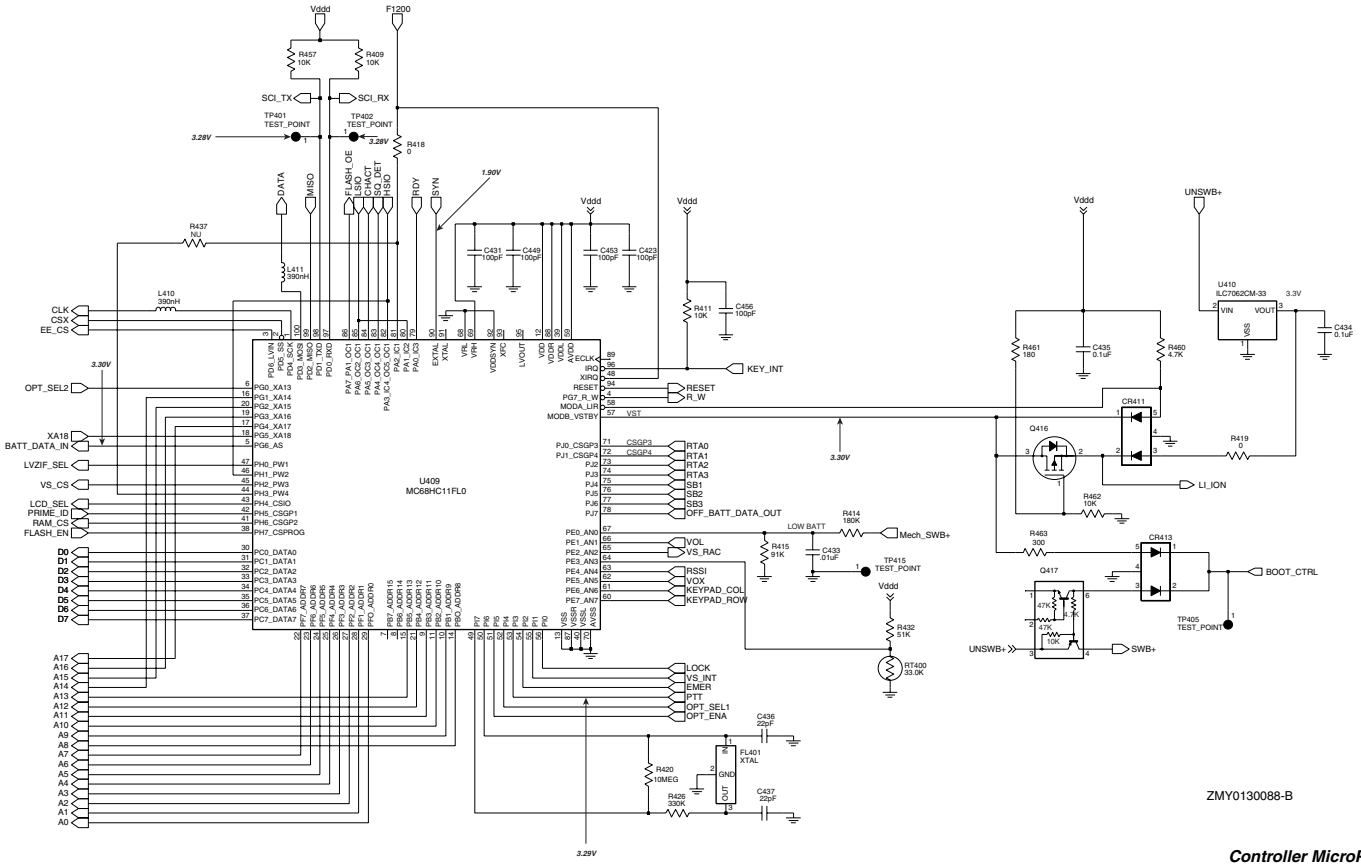


FL0830275-O

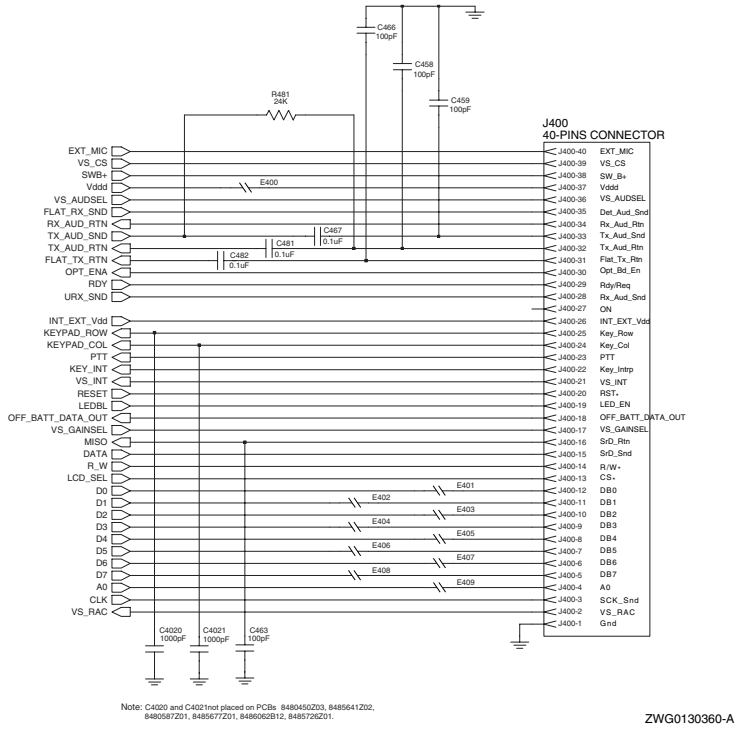
Overall Controller Schematic



Controller ASFIC / ON-OFF



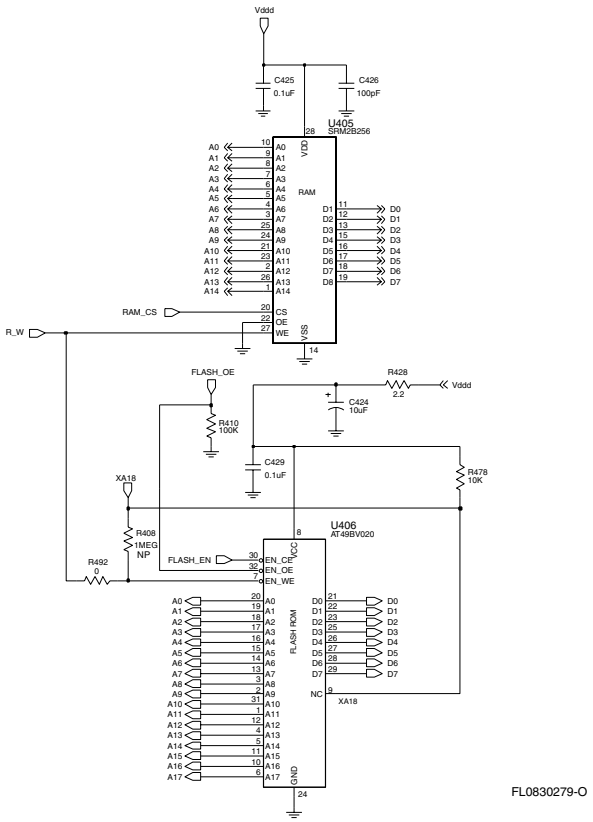
Controller MicroProcessor



Note: C4020 and C4021not placed on PCBs 8480450Z03, 8485641Z02, 8480587Z01, 8485677Z01, 8486062B12, 8485726Z01.

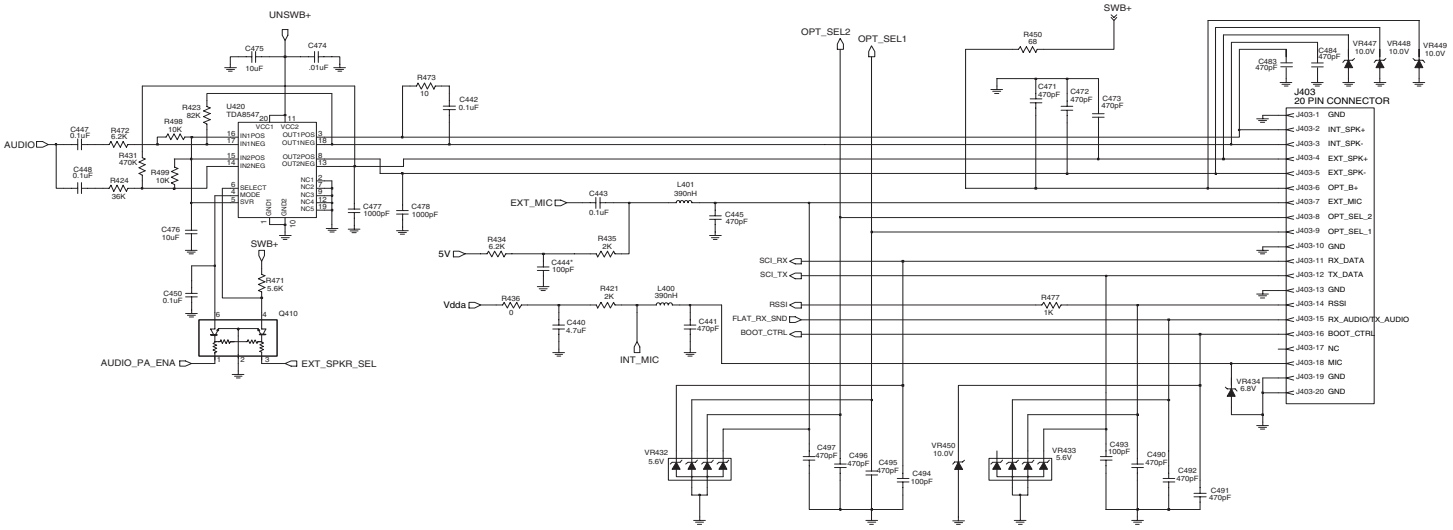
ZWG0130360-A

Controller Interface



FL0830279-O

Controller Memory



Band	PCB	R472	R423	C474	C477	C478	C445	C441	C471	C472	C473	C483	C484	C490	C491	C492	C495	C496	C497	VR445	VR446	R498	R499
UHF B1 UHF B2	8480450Z03 8485641Z02	36K	470K	not placed	not placed	not placed	100pF	100pF	100pF	470pF	470pF	not placed	not placed	100pF	100pF	100pF	100pF	100pF	100pF	10.0V	10.0V	not placed	not placed
300R1 GP1280 UHF B1 UHF B2	8485726Z04 8480587Z01 8485677Z01	36K	470K	not placed	not placed	not placed	100pF	100pF	100pF	470pF	470pF	not placed	not placed	100pF	100pF	100pF	100pF	100pF	100pF	10.0V	10.0V	not placed	not placed
VHF	8486062B12	6.2K	82K	.01uF	1000pF	1000pF	470pF	470pF	470pF	470pF	470pF	470pF	470pF	470pF	470pF	470pF	470pF	470pF	470pF	not placed	not placed	not placed	not placed
VHF	8486062B14	6.2K	82K	.01uF	1000pF	1000pF	470pF	470pF	470pF	470pF	470pF	470pF	470pF	470pF	470pF	470pF	470pF	470pF	470pF	not placed	not placed	10K	10K
300R1	8485726Z01	3.6K	47K	not placed	not placed	not placed	100pF	100pF	100pF	100pF	100pF	not placed	not placed	100pF	100pF	100pF	100pF	100pF	100pF	10.0V	10.0V	not placed	not placed
800 MHz	8480641Z03	36K	470K	not placed	not placed	not placed	68pF	68pF	68pF	68pF	68pF	not placed	not placed	68pF	68pF	68pF	68pF	68pF	68pF	10.0V	10.0V	not placed	not placed
UHF B1	8480450Z13 8480450Z14	36K	470K	not placed	not placed	not placed	100pF	100pF	100pF	470pF	470pF	not placed	not placed	100pF	100pF	100pF	100pF	100pF	100pF	10.0V	10.0V	10K	10K

ZWG0130110-D

Controller Audio Power Amplifier

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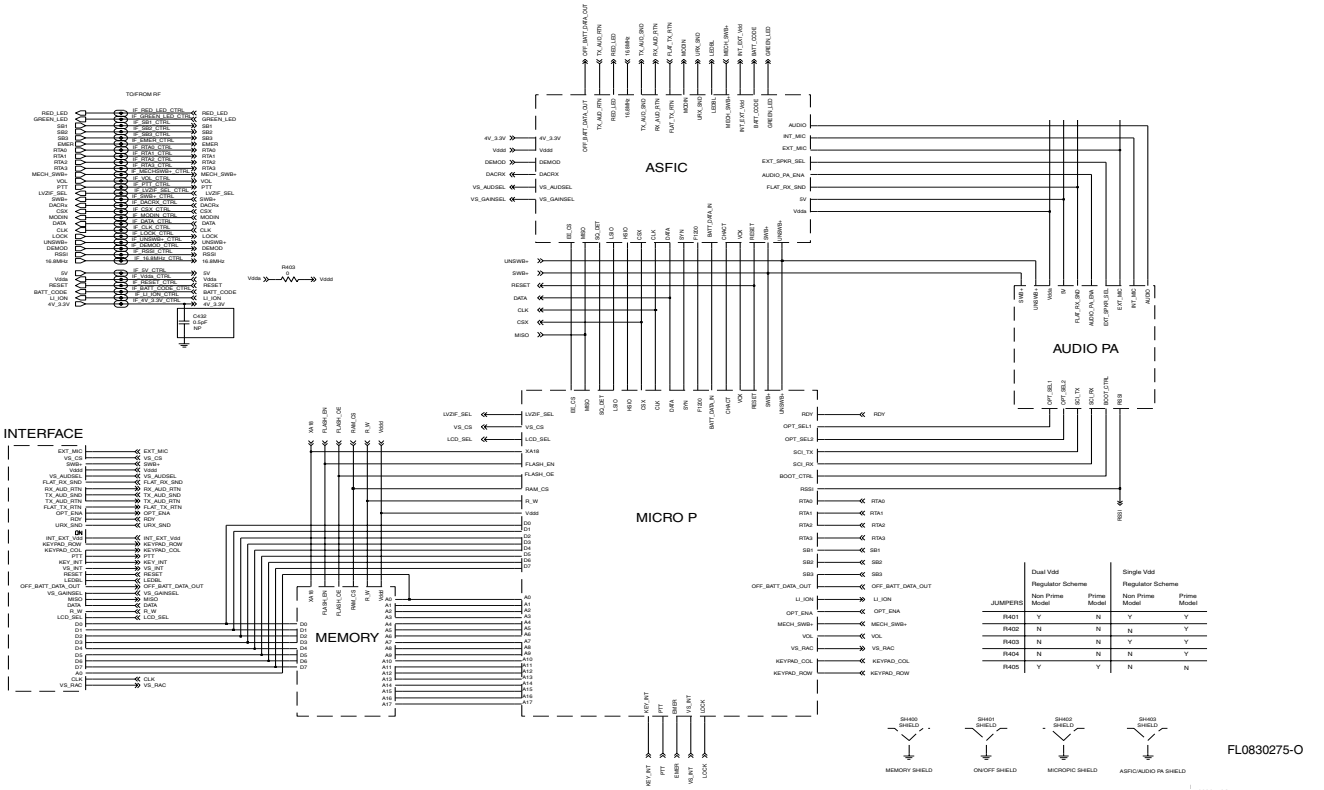
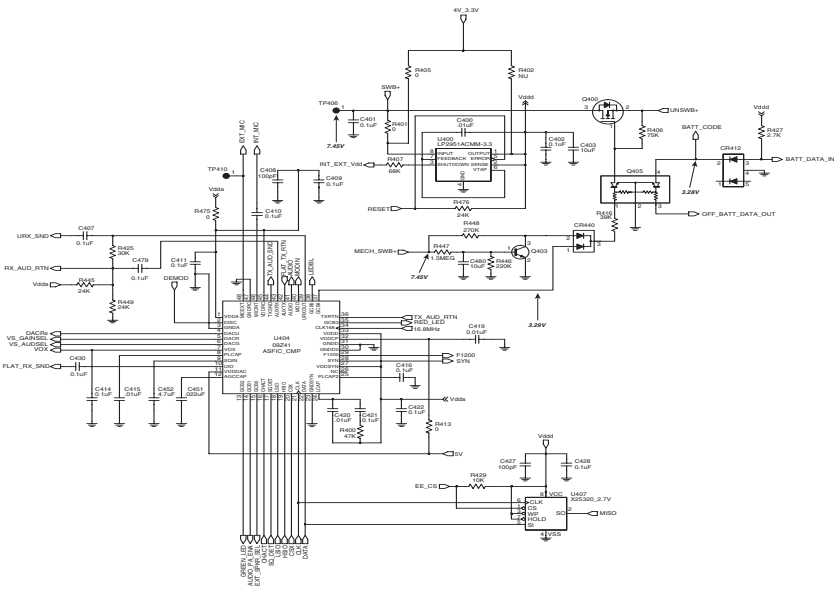
3.0 Controller - Set 2 (PCB 8486101B09/B10)



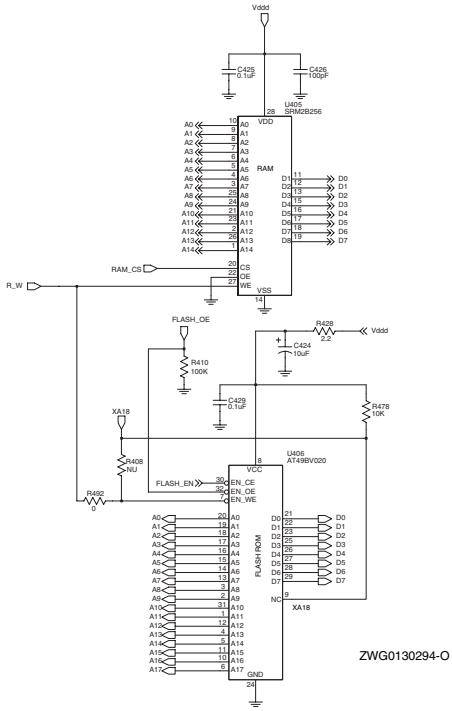
FL0830275-O

Overall Controller Schematic



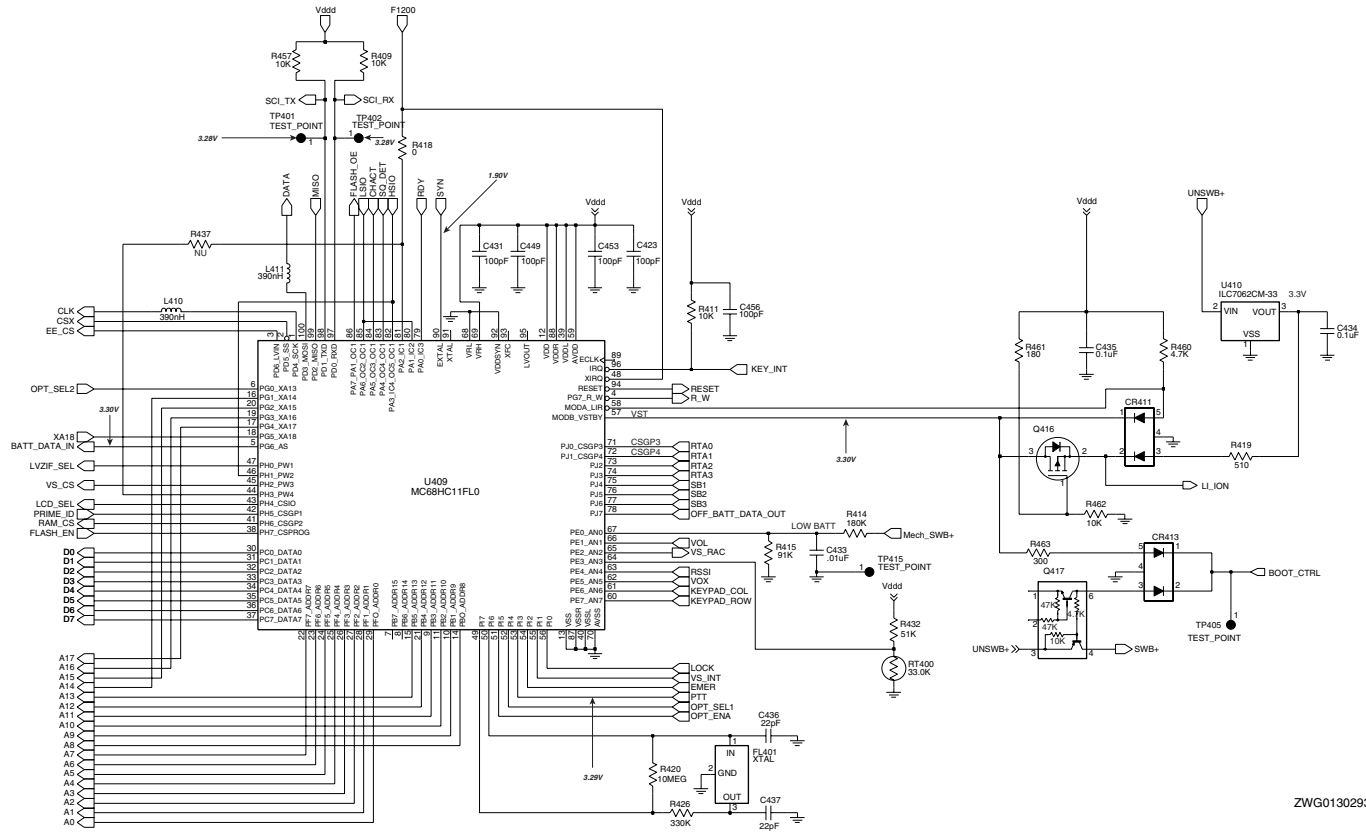
ZWG0130292-A

Controller ASFIC / ON-OFF

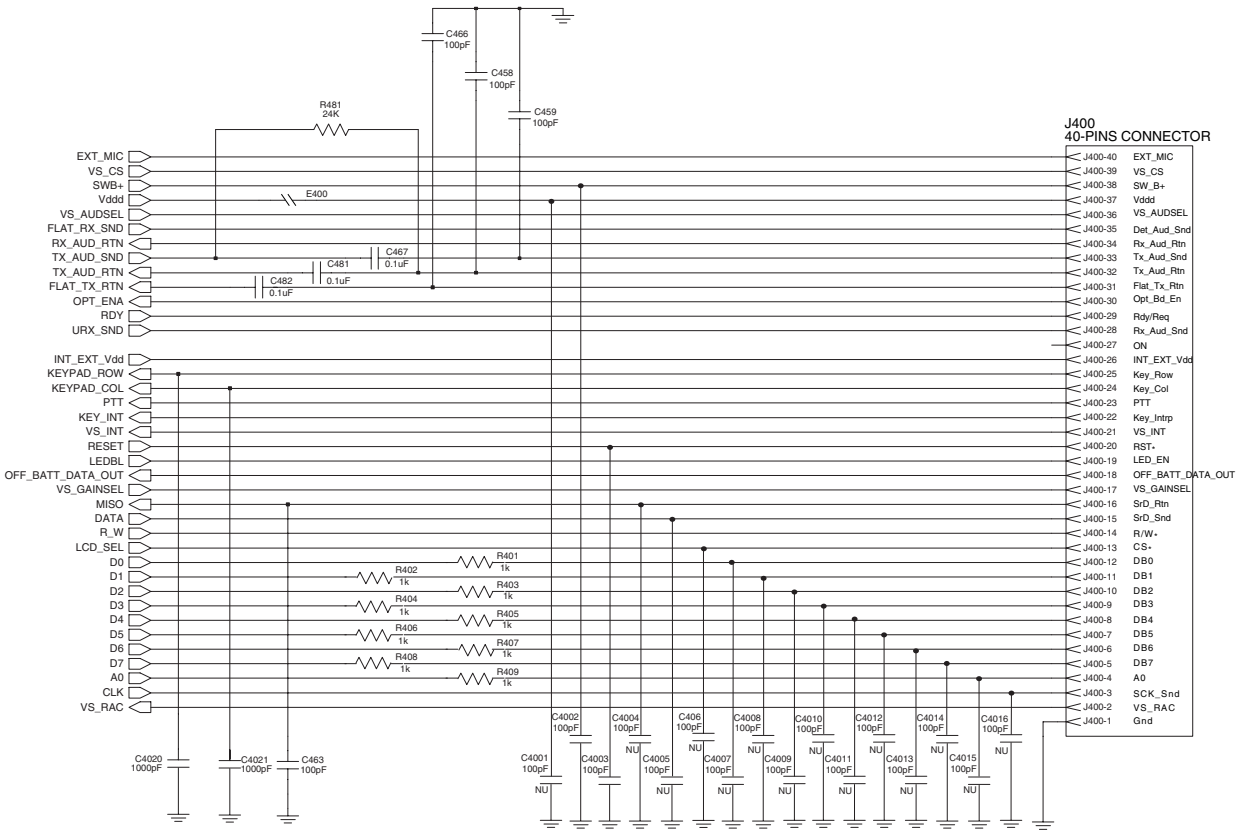


ZWG0130294-O

Controller Memory

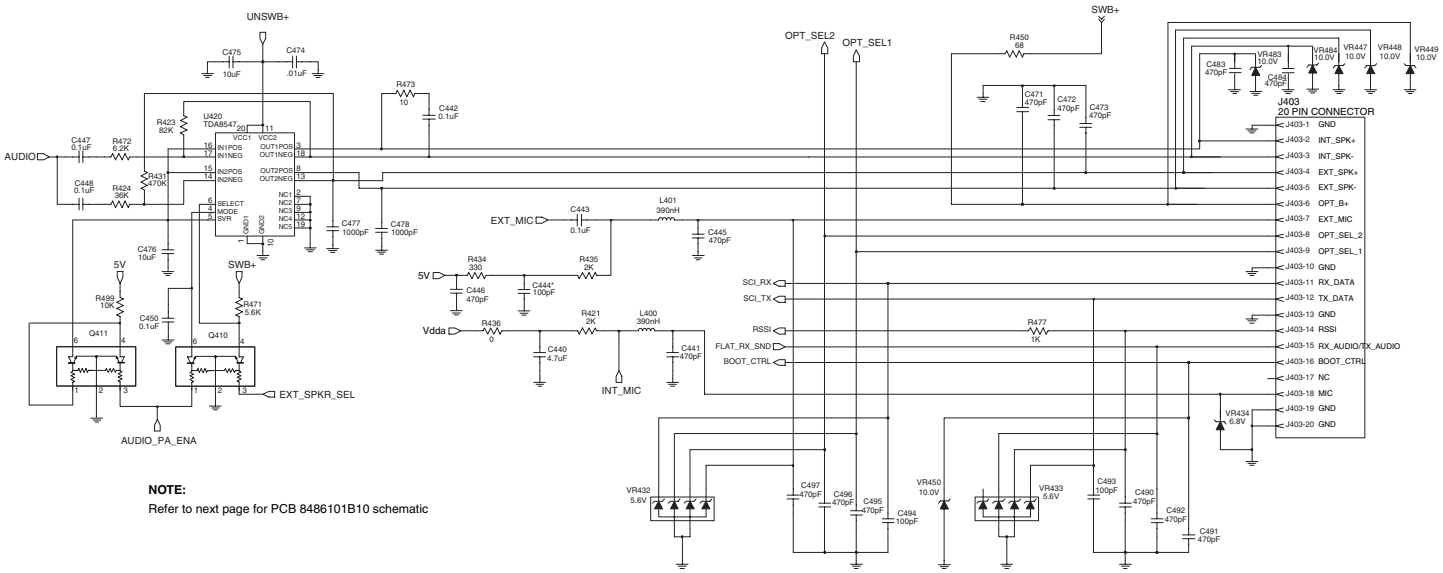


Controller Microprocessor



Controller Interface

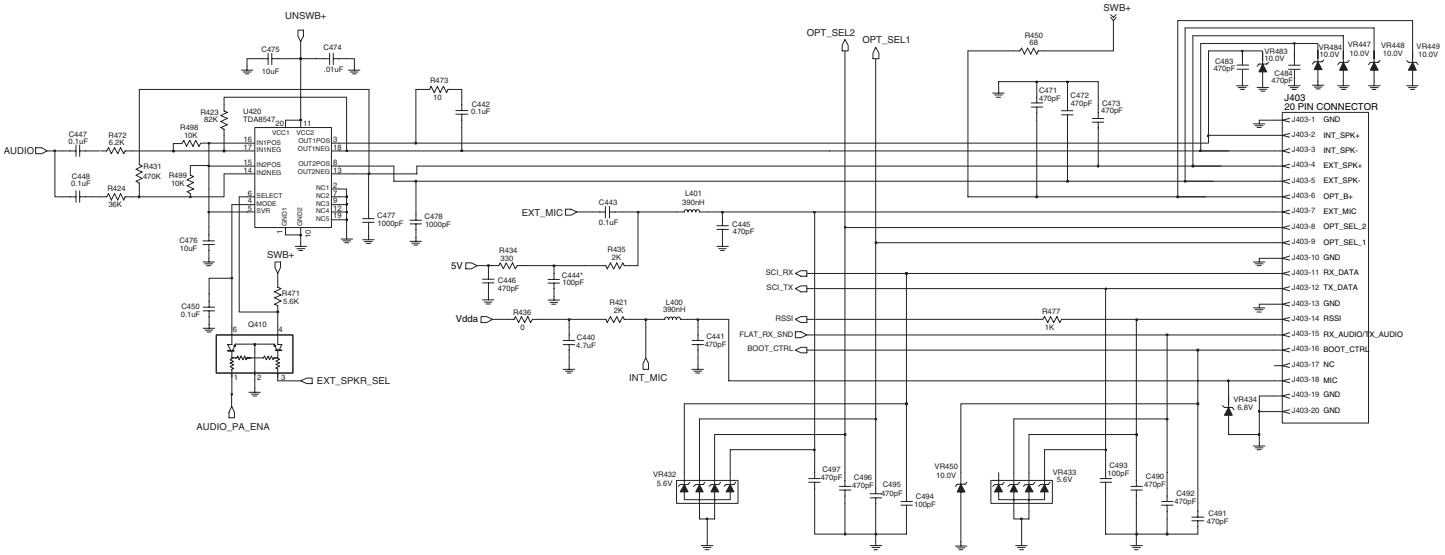
ZWG0130295-O



NOTE:
Refer to next page for PCB 8486101B10 schematic

ZWG0130291-O

Controller Audio Power Amplifier (8486101B09)



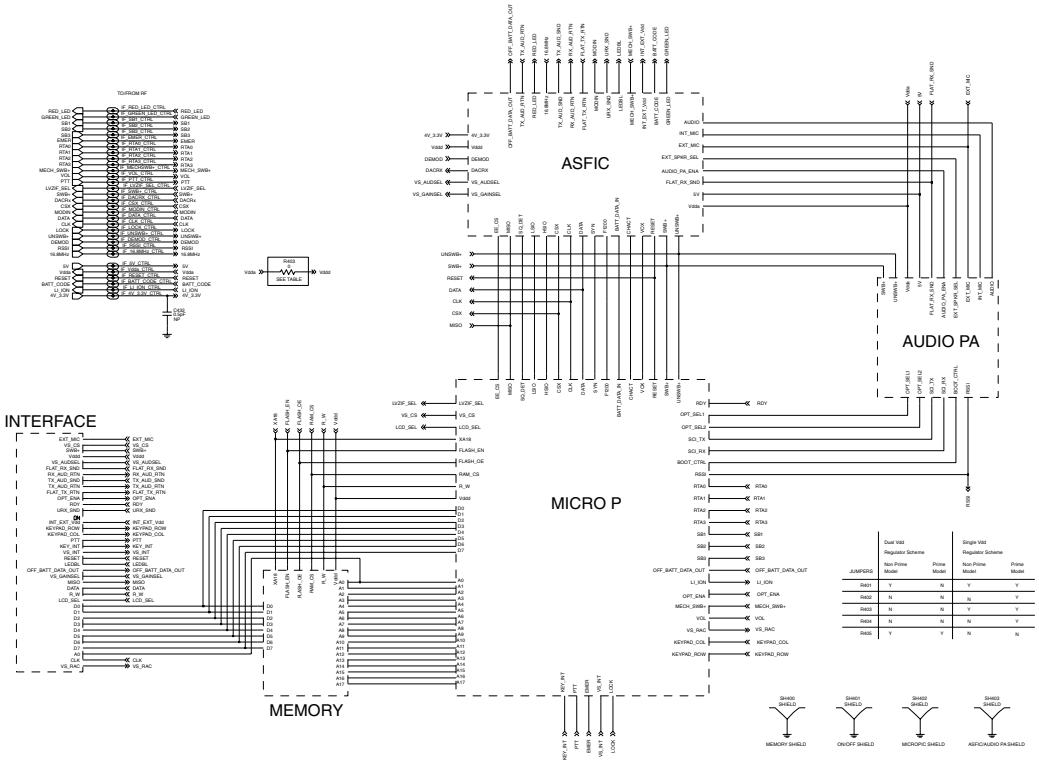
ZWG0130359-O

NOTE:

Refer to previous page for PCB 8486101B09 schematic

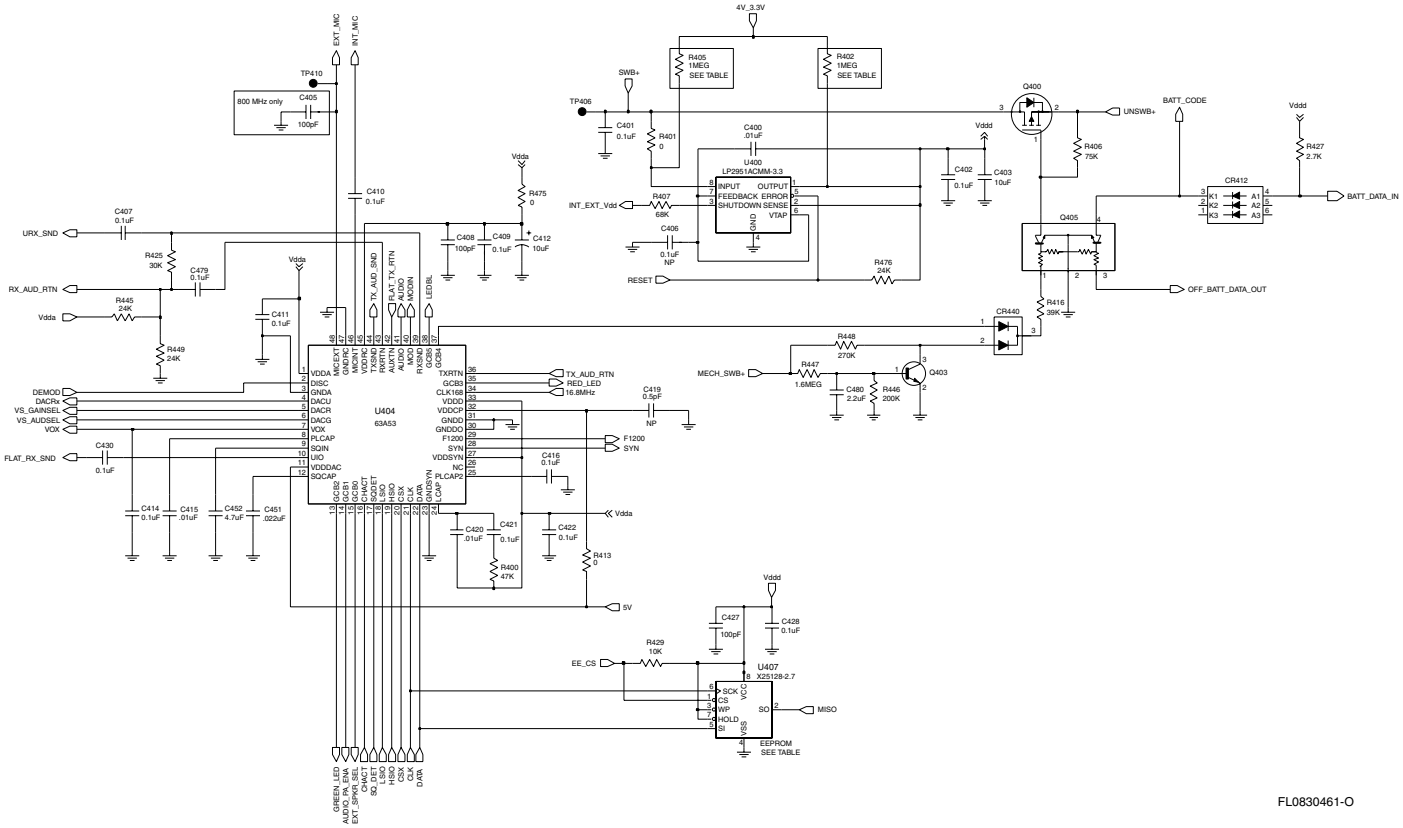
Controller Audio Power Amplifier (8486101B10)

4.0 Controller - Set 3 (PCB 8485658Z01)



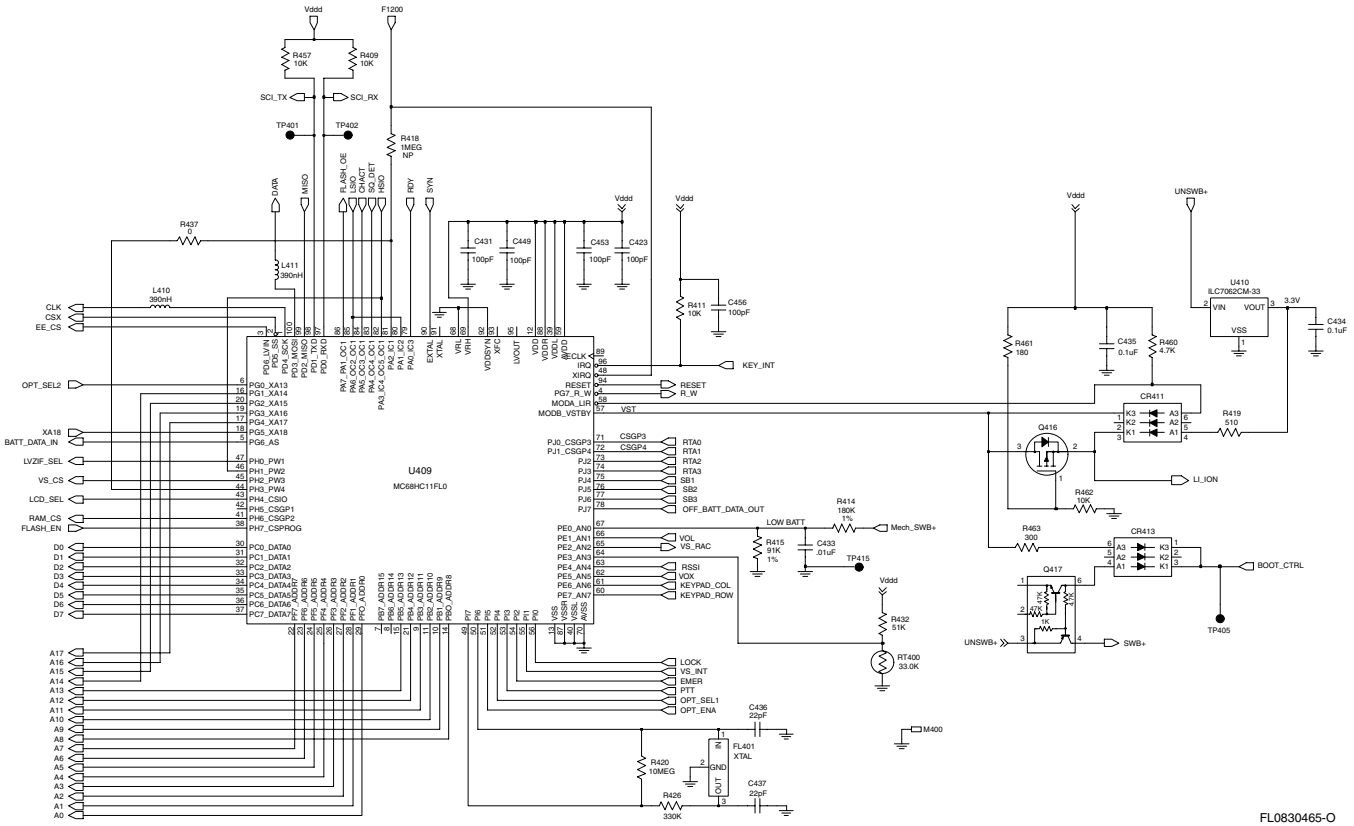
FL0830460-O

Overall Controller Schematic

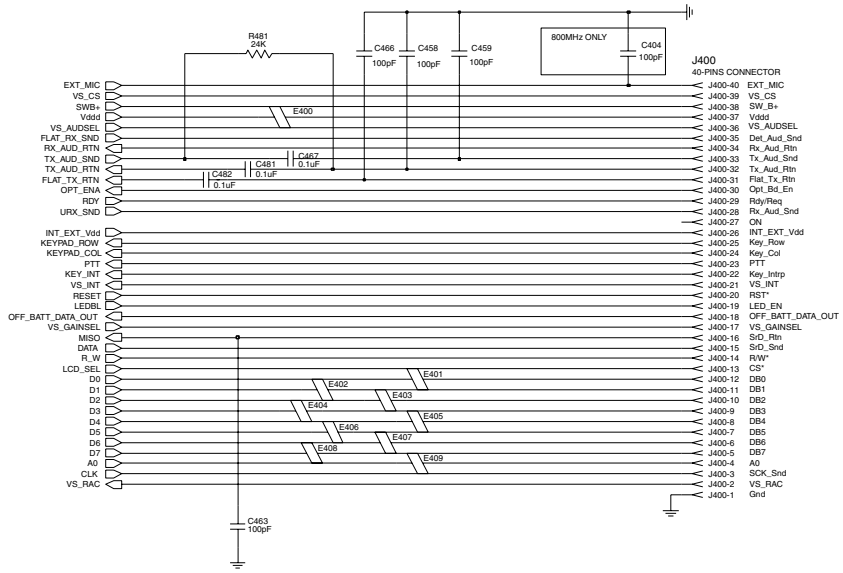


FL0830461-O

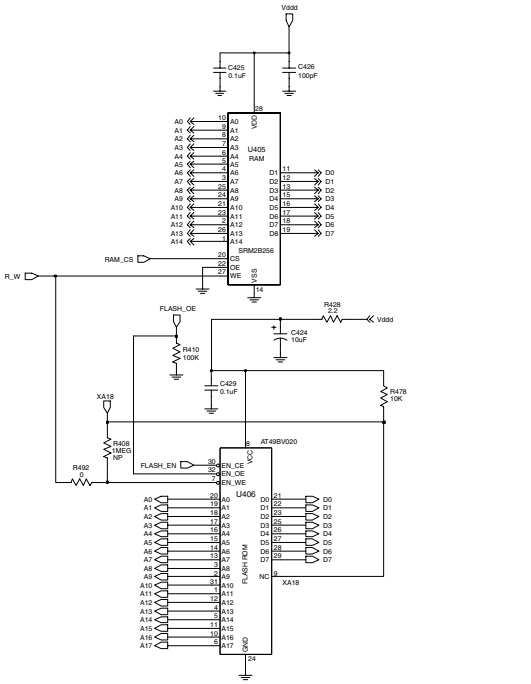
Controller ASFIC / ON-OFF



Controller Microprocessor



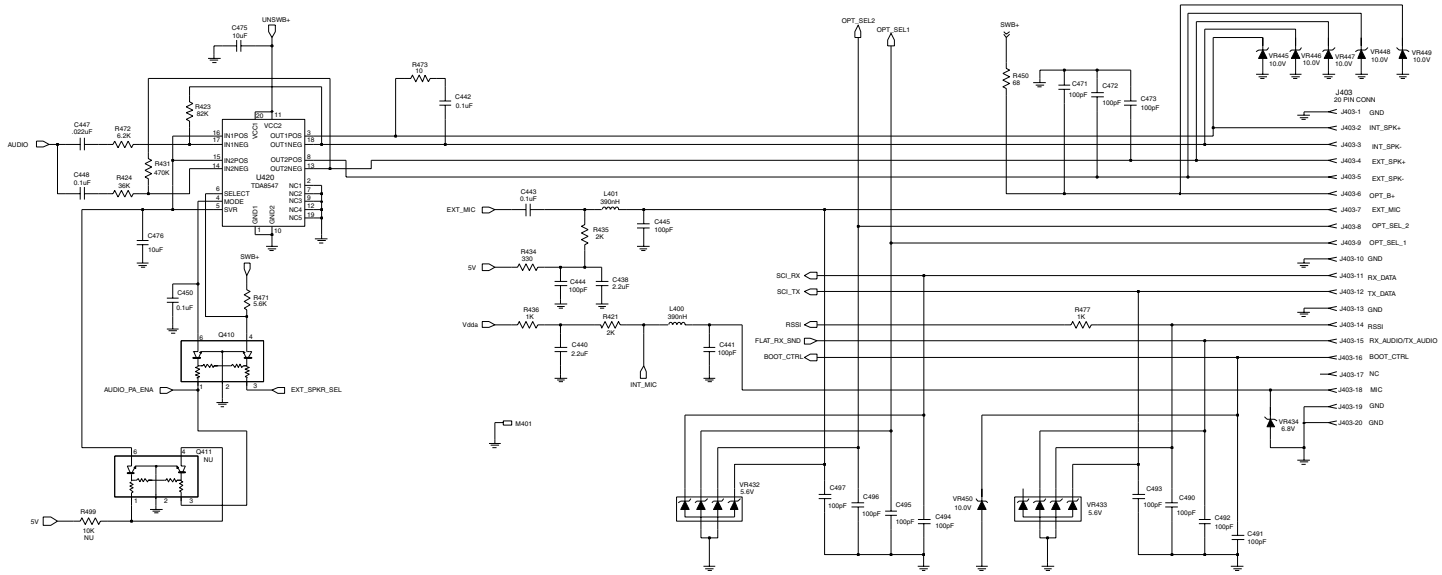
FL0830280-O



FL0830464-O

Controller Interface

Controller Memory



FL0830462-O

Controller Audio Power Amplifier

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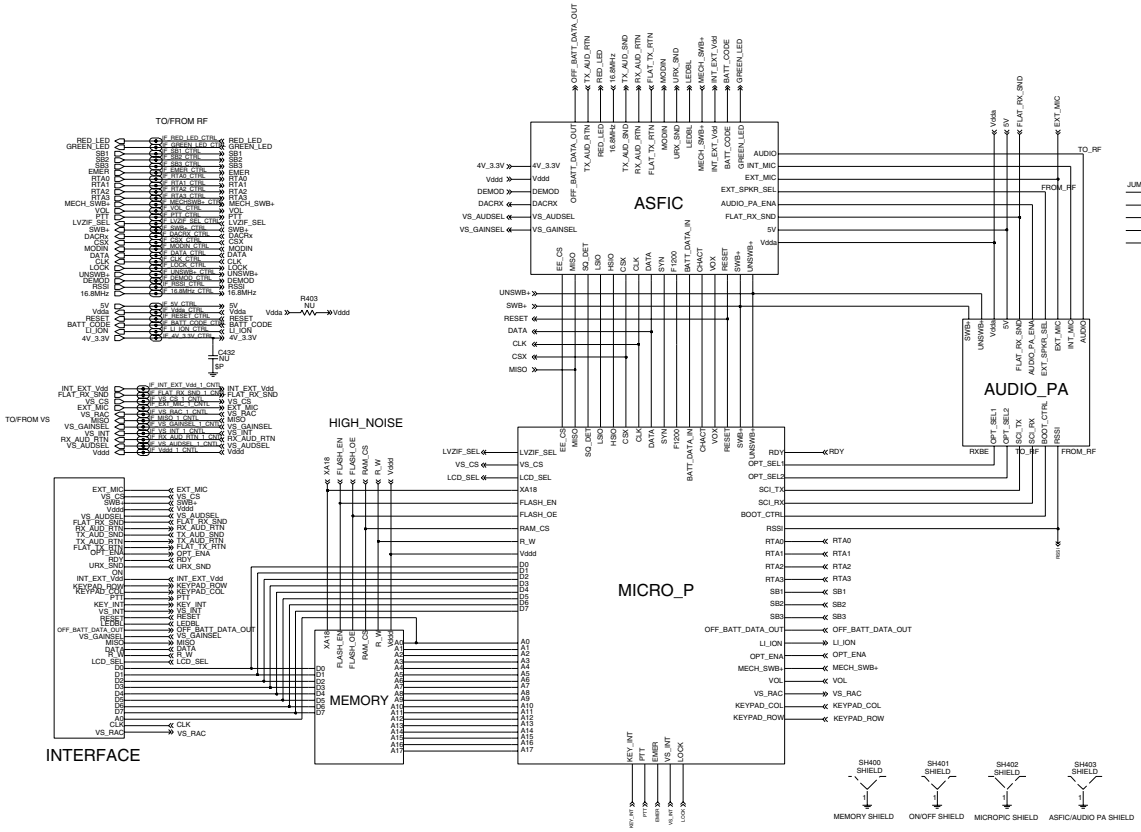
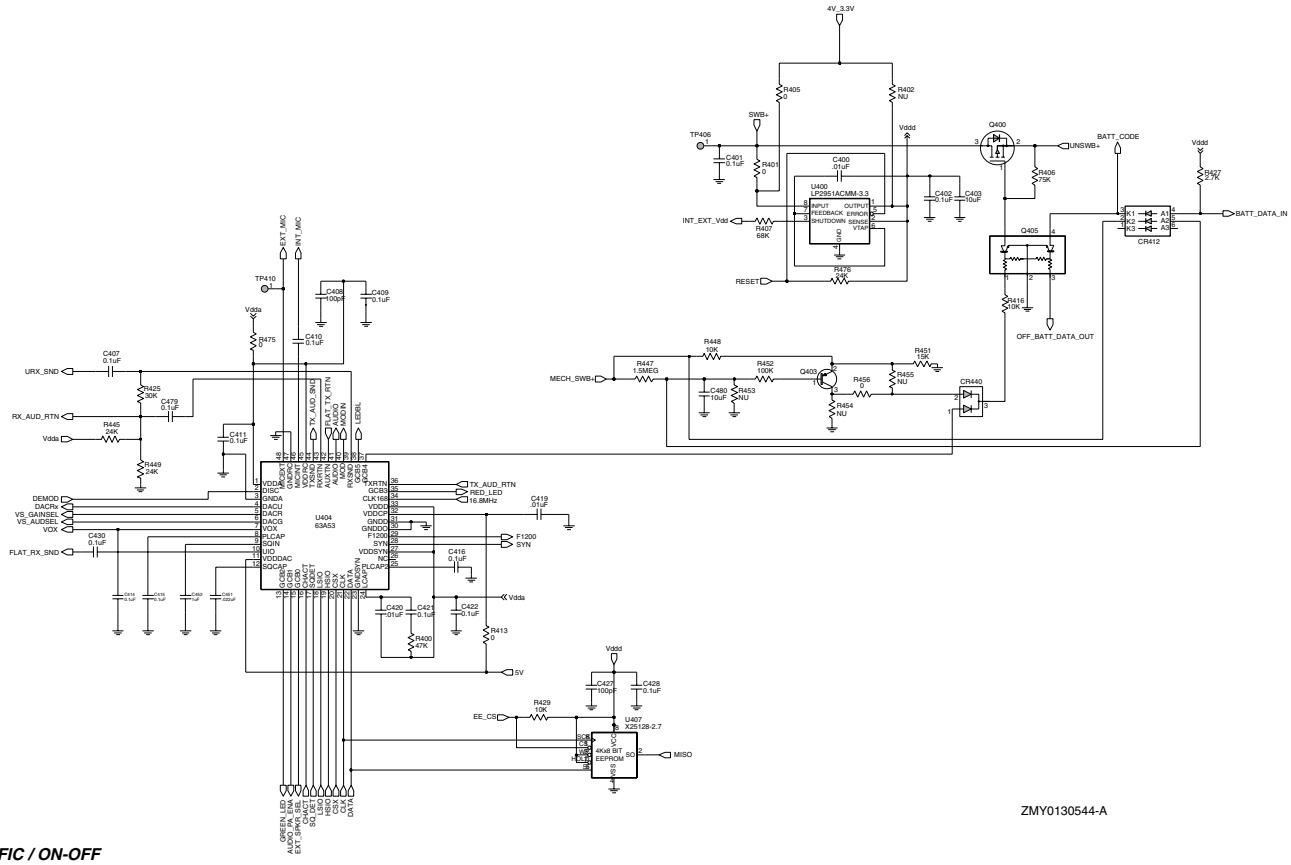
5.0 Controller - Set 4 (PCB 8486062B16/8486062B17/8486101B11)



JUMPERS	Dual Vdd Regulator Scheme: Non Prime Model	Dual Vdd Regulator Scheme: Prime Model	Single Vdd Regulator Scheme: Non Prime Model	Single Vdd Regulator Scheme: Prime Model
R401	Y	N	Y	Y
R402	N	N	N	Y
R403	N	N	Y	Y
R404	N	N	N	Y
R405	Y	Y	N	N

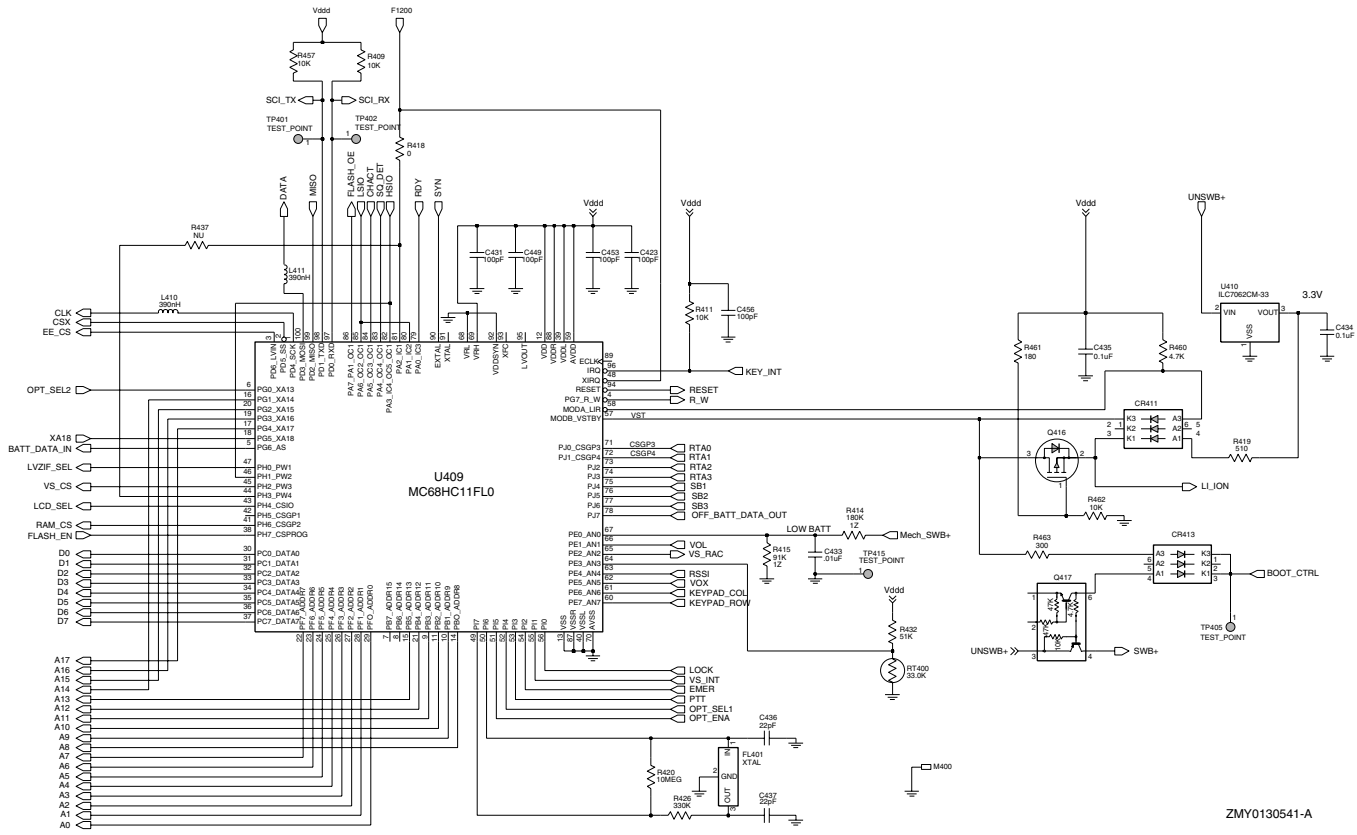
ZMY0130540-A

Overall Controller Schematic

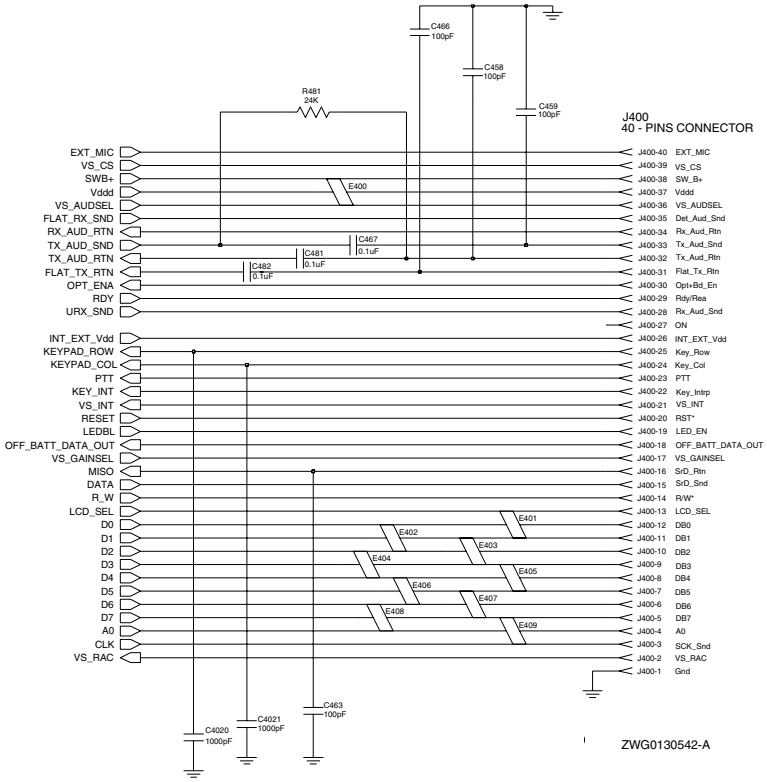


ZMY0130544-A

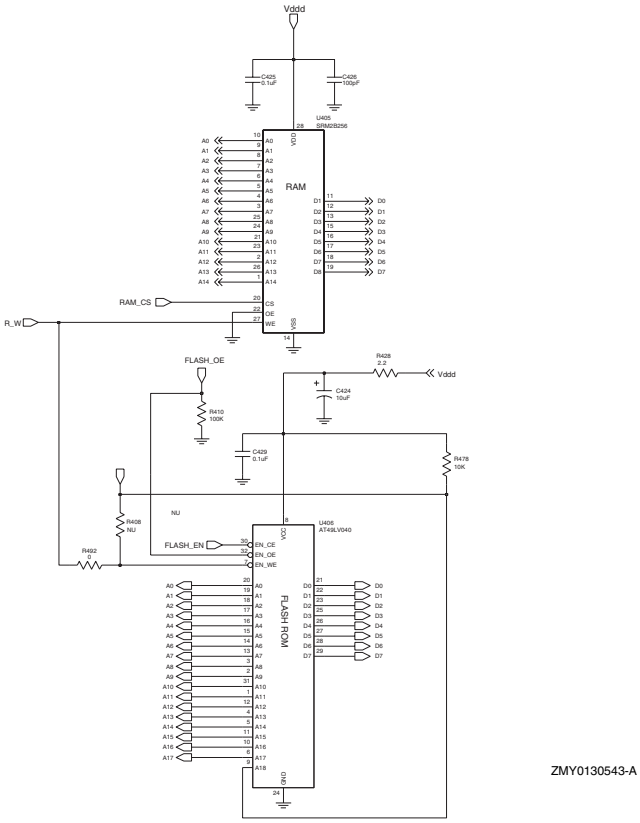
Controller ASFIC / ON-OFF



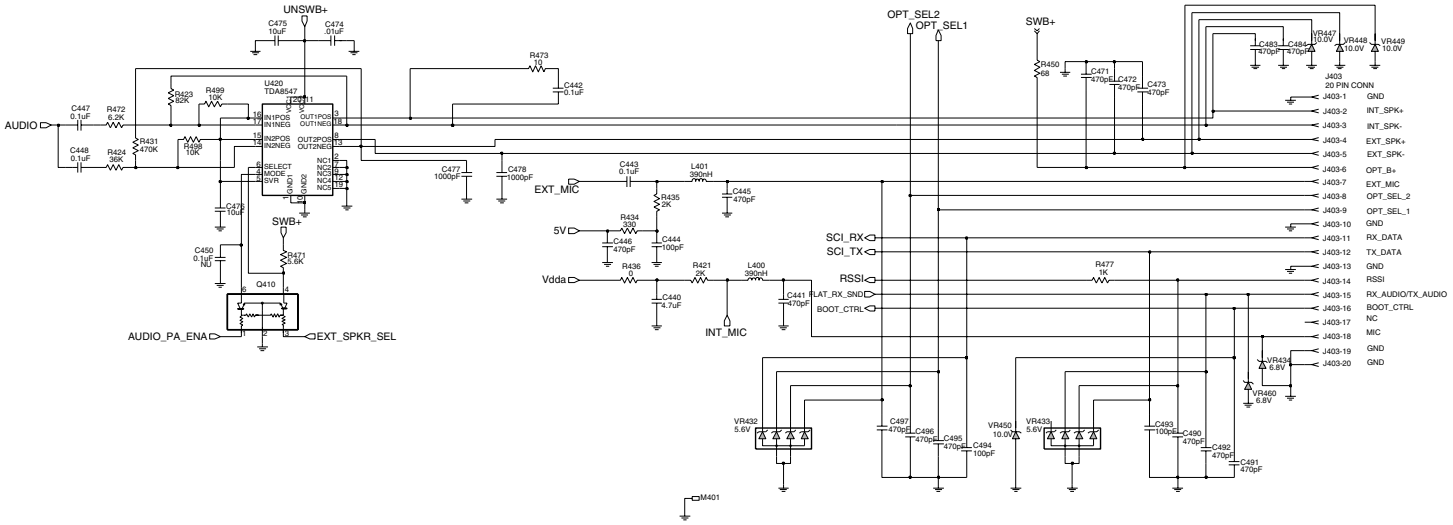
Controller Micro Processor



Controller Interface



Controller Memory



ZMY0130545-A

Controller Audio Power Amplifier

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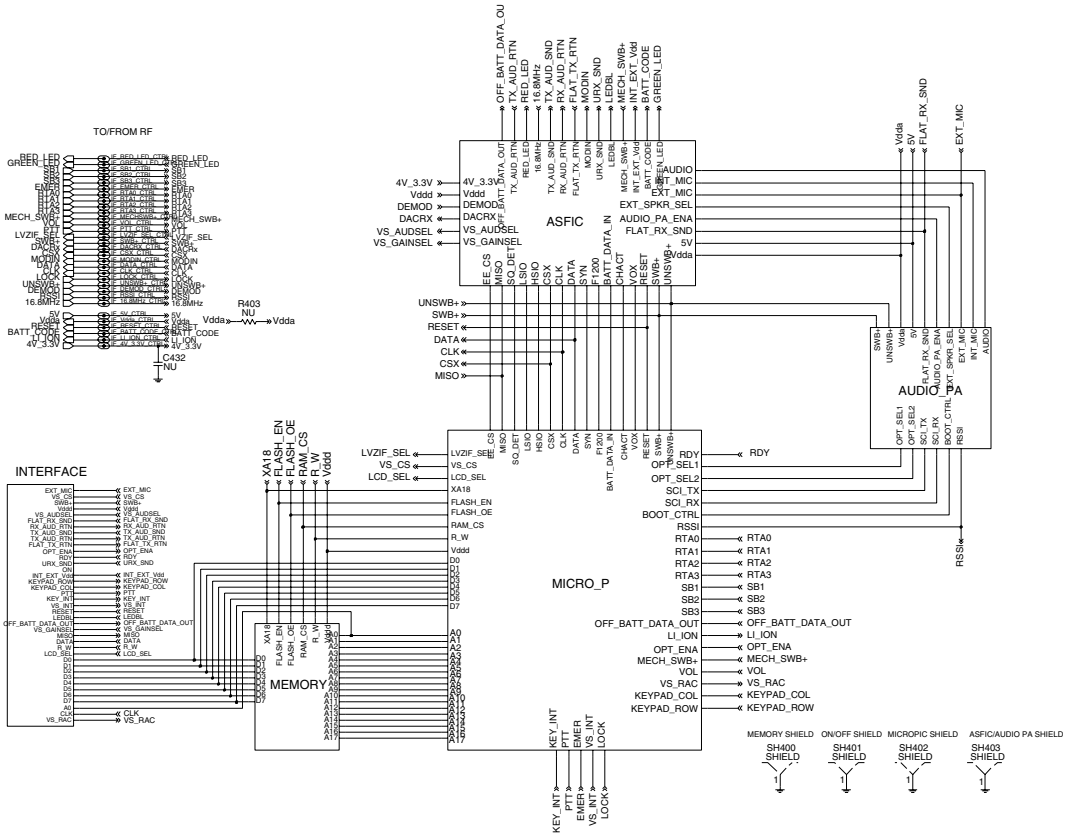
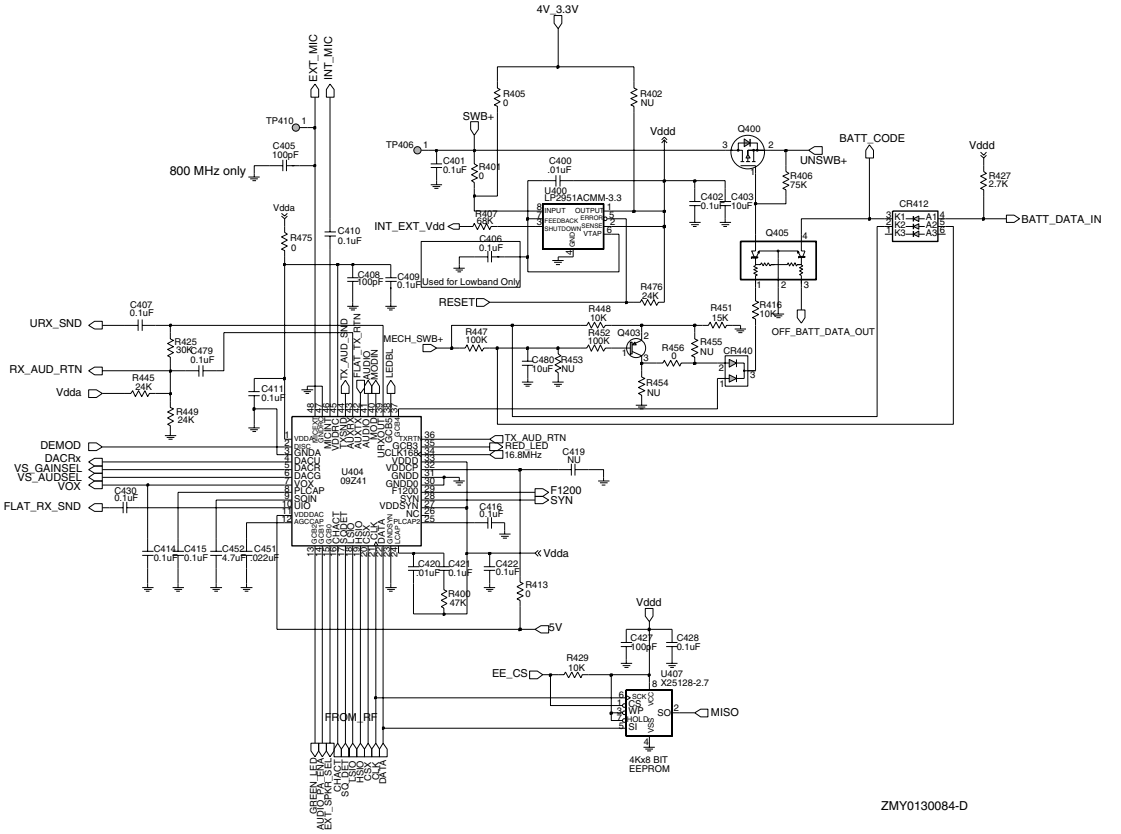
6.0 Controller - Set 5 (PCB 8485726Z04)

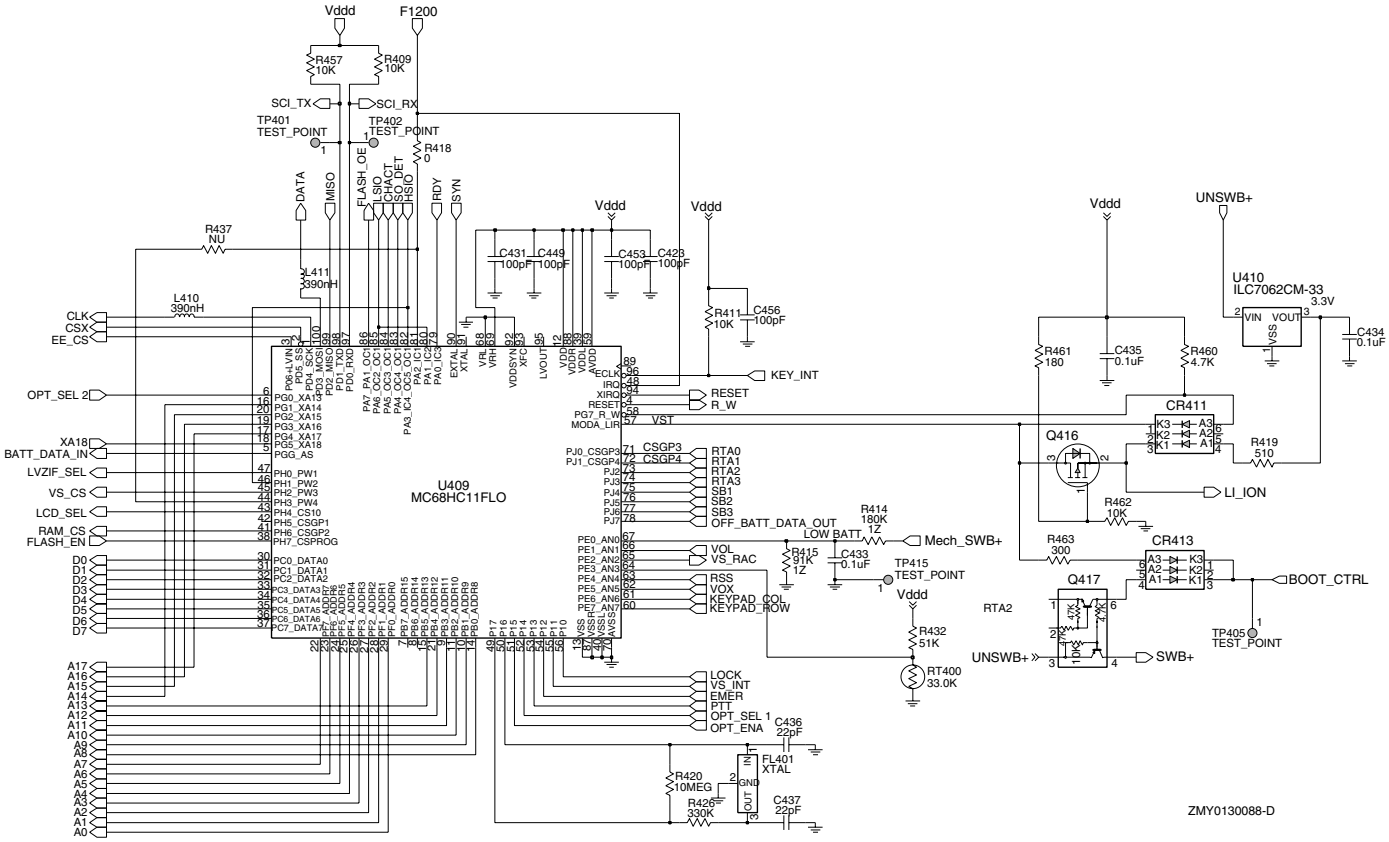


ZMY0130086-B

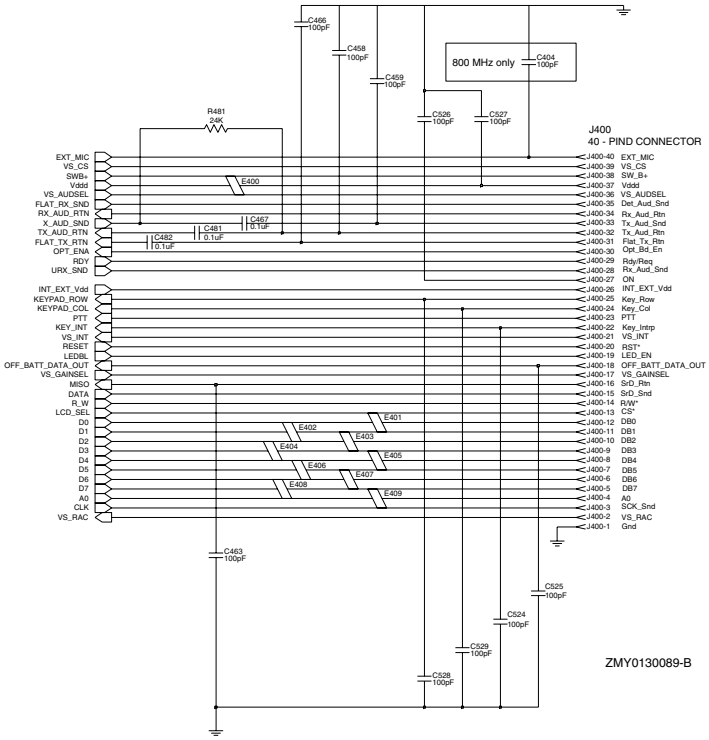
Overall Controller Schematic



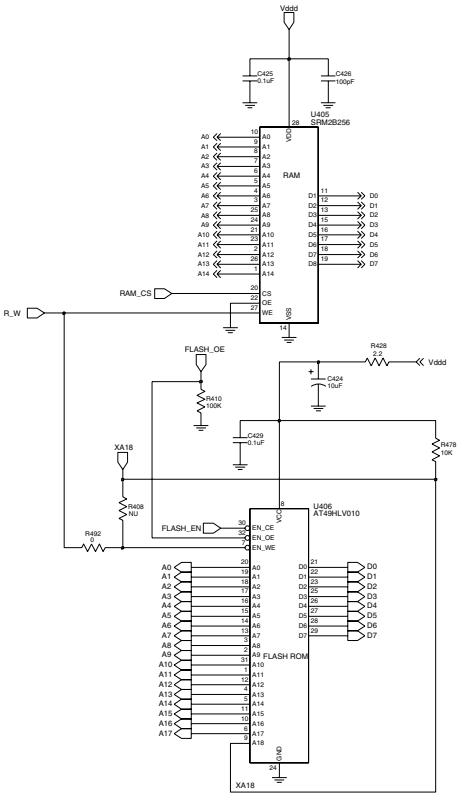
Controller ASFIC / ON-OFF



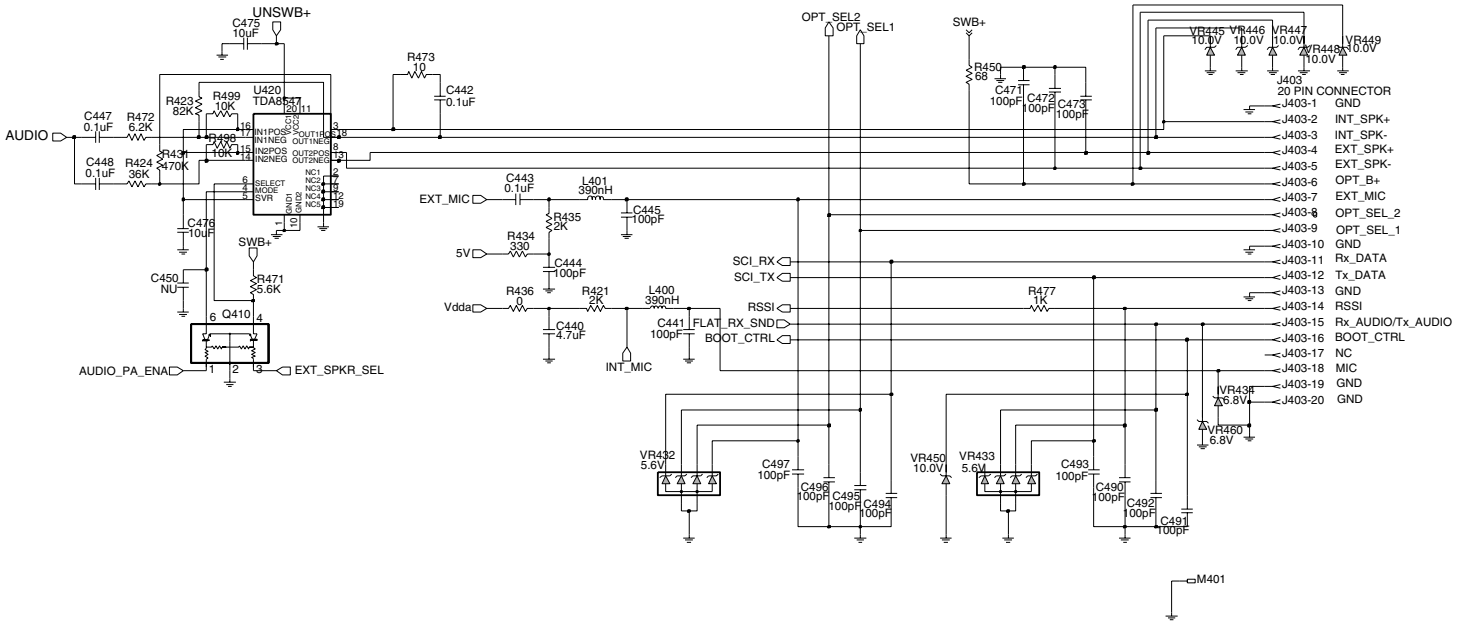
Controller Micro Processor



Controller Interface



Controller Memory



ZMY0130079-D

Controller Audio Power Amplifier

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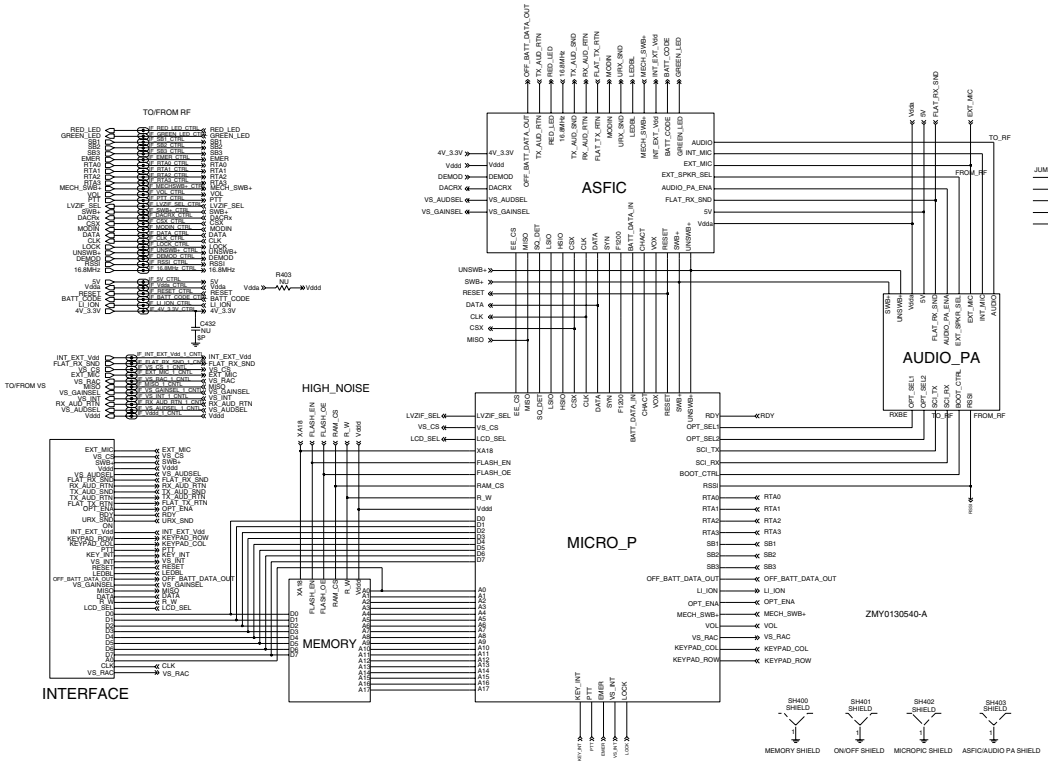
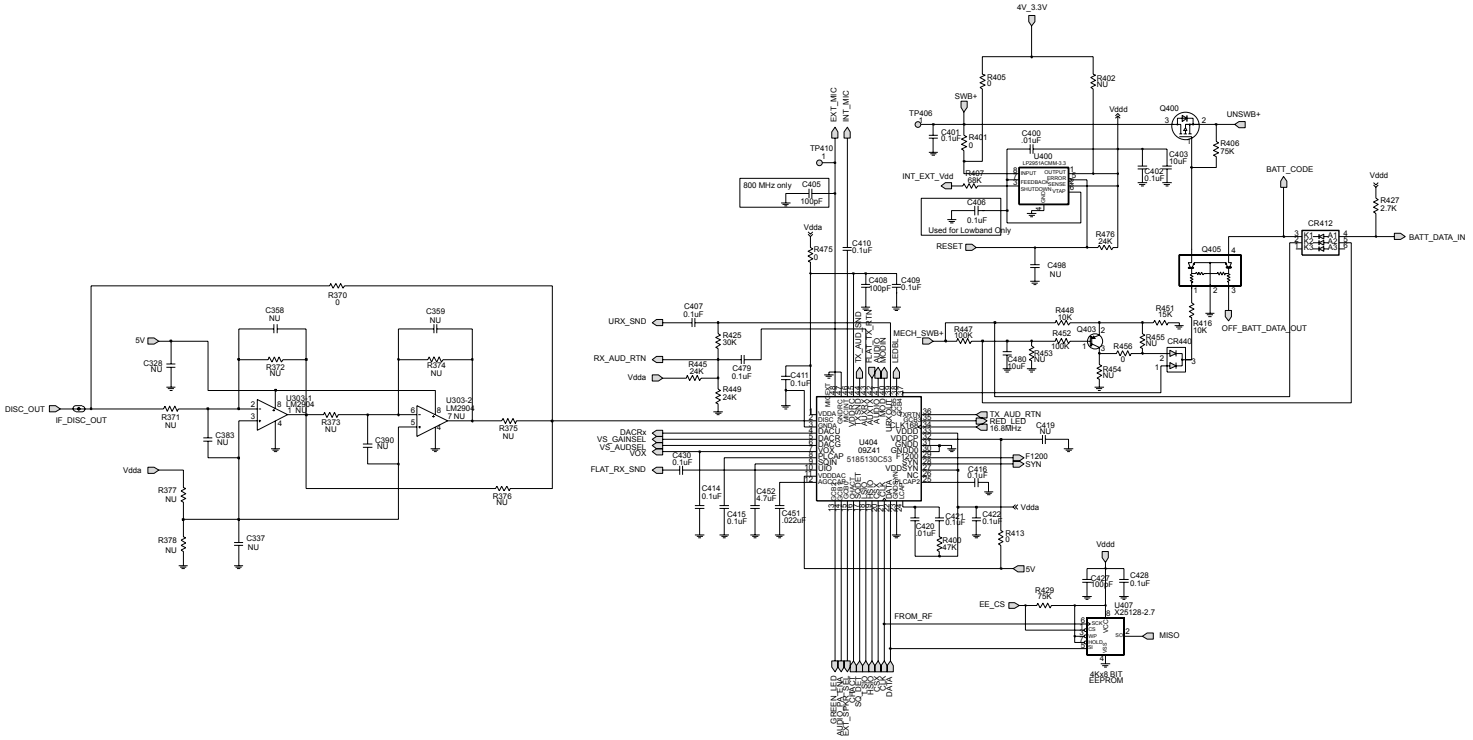
7.0 Controller - Set 6 (PCB 8486473Z04)



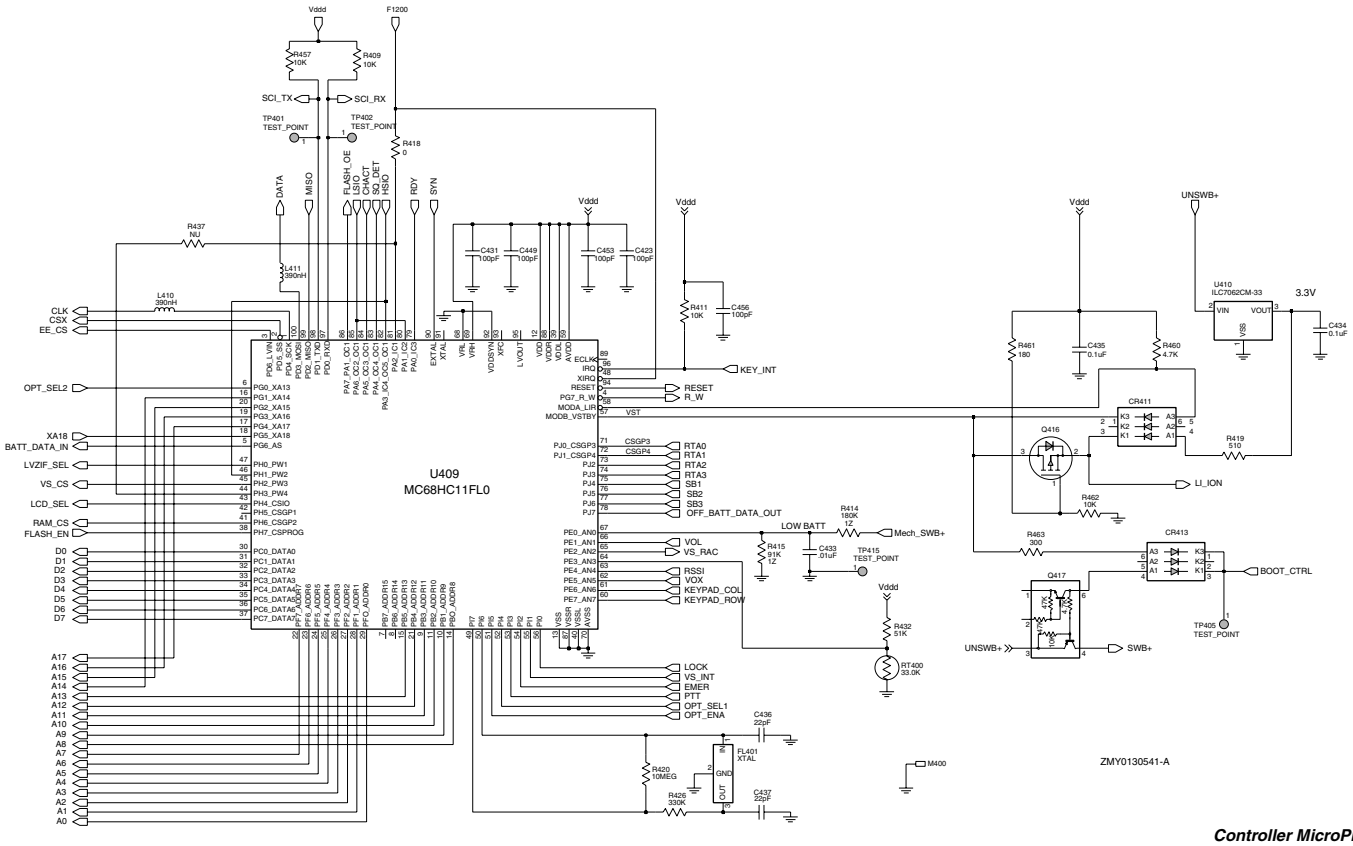
JUMPERS	Dual Vdd Regulator Scheme		Single Vdd Regulator Scheme	
	Non Prime Model	Prime Model	Non Prime Model	Prime Model
R401	Y	N	Y	Y
R402	N	N	N	Y
R403	N	N	Y	Y
R404	N	N	N	Y
R405	Y	Y	N	N

Overall Controller Schematic

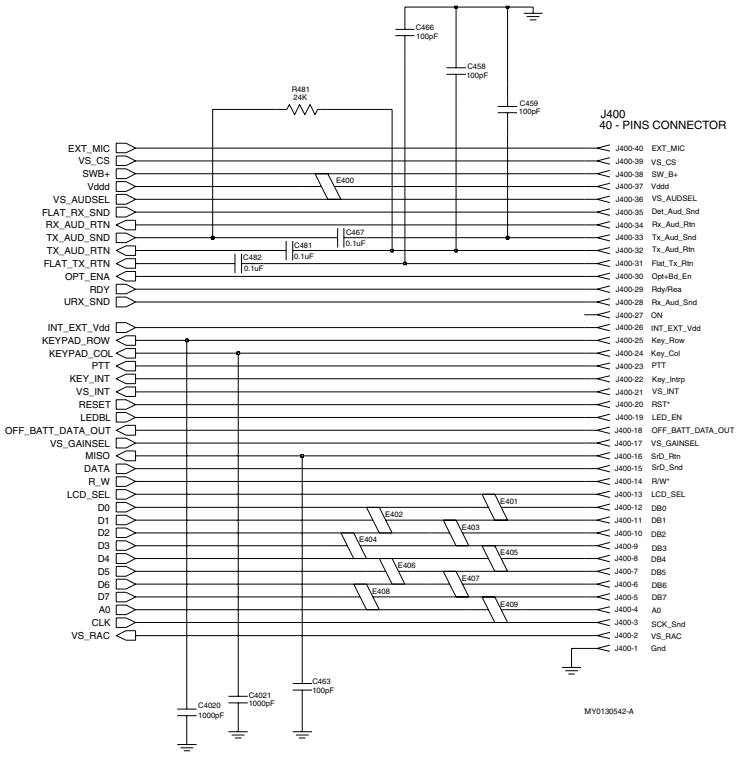


ZMY0130084-D

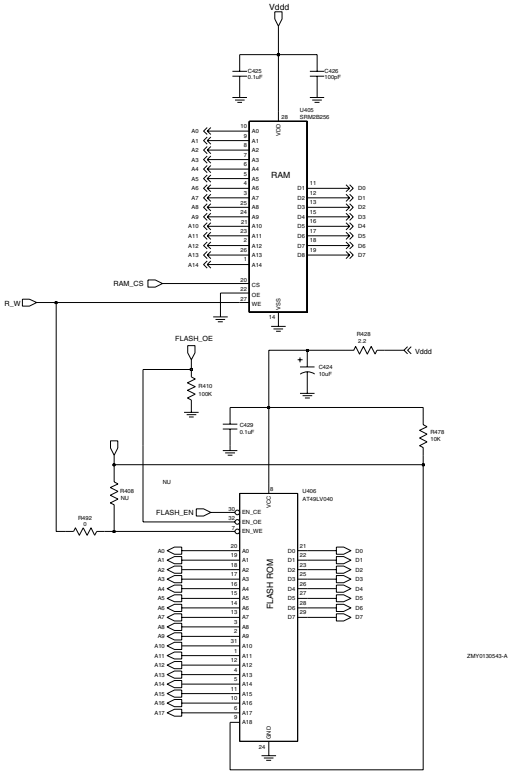
Controller ASFIC / ON-OFF



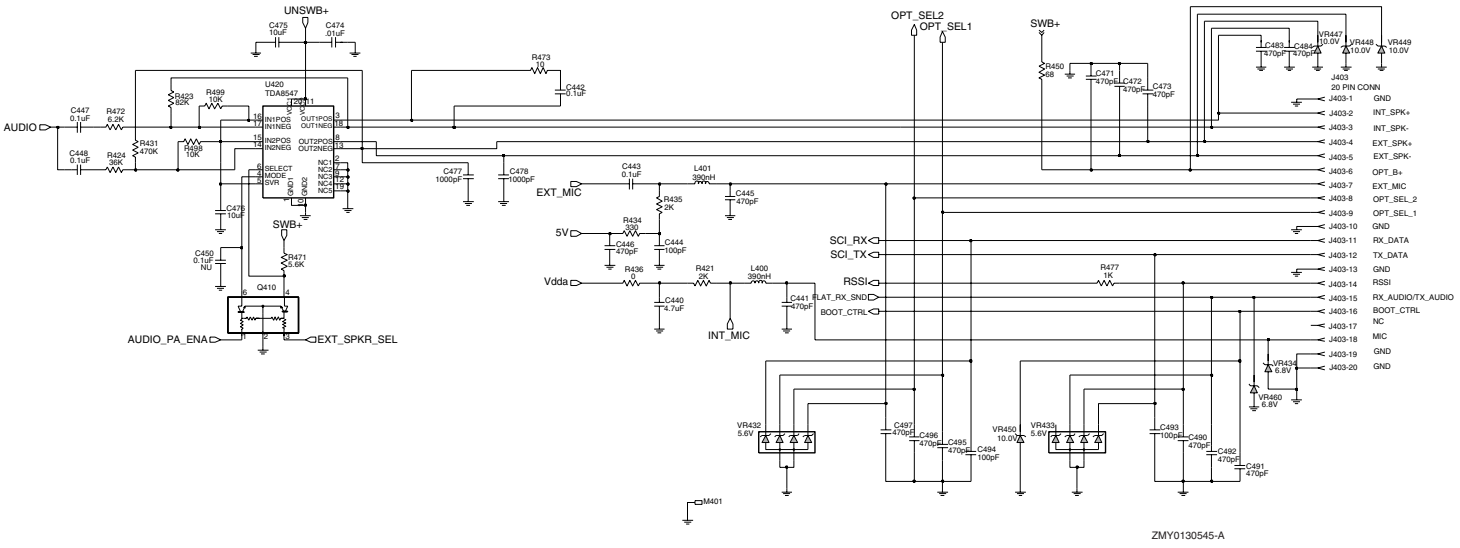
Controller MicroProcessor



Controller Interface



Controller Memory



Controller Audio Power Amplifier

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MOTOROLA

Professional Radio

GP Series

VHF (136-174MHz)

Service Information

Issue: November 2004

Computer Software Copyrights

Table of Contents

Chapter 1 MODEL CHART AND TECHNICAL SPECIFICATIONS

Chapter 2 THEORY OF OPERATION

Chapter 3 TROUBLESHOOTING CHARTS

Chapter 4 VHF PCB/SCHEMATICS/PARTS LISTS

Chapter 1

MODEL CHART AND TECHNICAL SPECIFICATIONS

1.0 GP320/GP340/GP360/GP380 Model Chart

Professional GP300 Series (VHF)						
Model						**Description**
MDH25KDC9AN0_E						GP320 VHF 136-174MHz 5W 1-Ch
	MDH25KDC9AN3_E					GP340 VHF 136-174MHz 5W 16-Ch
		MDH25KDF9AN5_E				GP360 VHF 136-174MHz 5W 255-Ch
			MDH25KDH9AN6_E			GP380 VHF 136-174MHz 5W 255-Ch
					Item	**Description**
X					PMLD4121_	*GP320 VHF Back Cover Kit
	X				PMLD4117_	*GP340 VHF Back Cover Kit
		X			PMLD4119_	*GP360 VHF Back Cover Kit
			X		PMLD4118_	*GP380 VHF Back Cover Kit
X					6864110B12	GP320 Basic User Guide
	X				6864110B13	GP340 Basic User Guide
		X			6864110B16	GP360 Basic User Guide
			X		6864110B18	GP380 Basic User Guide
X	X	X	X		PMAD4023_	VHF 14cm (150-161 MHz) Antenna
X	X	X	X		HNN9008_	Battery, NiMH Standard

x = Indicates one of each is required.

* = Service replacement boards

2.0 GP140 Model Chart

Professional GP140 (VHF)			
Model			**Description**
MDH25KDC9AA3_E			GP140 VHF 136-174 MHz 5W 16 Ch
		Item	**Description**
X		PMLE4109_	*GP140 UHF Back Cover Kit
X		6864110B25	GP140 Basic User Guide
X		PMAD4023_	VHF 14cm (150-161 MHz) Antenna
X		HNN9008_	Battery, NiMH Standard

x = Indicates one of each is required.

* = Service replacement boards

3.0 GP640/GP680 Model Chart

Professional GP600 Series (VHF)				
Model				**Description**
MDH25KDC9ACK3_E				GP640 VHF 136-174 MHz 5W
	MDH25KDH9CK6_E			GP680 VHF 136-174 MHz 5W
			Item	**Description**
X			PMLD4113_	*GP640 VHF Back Cover Kit
	X		PMLD4114_	*GP680 VHF Back Cover Kit
X			6864110B14	GP640 Basic User Guide
	X		6864110B19	GP680 Basic User Guide
X	X		PMAD4023_	VHF 14cm (150-161 MHz) Antenna
X	X		HNN9008_	Battery, NiMH Standard

x = Indicates one of each is required.

* = Service replacement boards

4.0 GP1280 Model Chart

Professional GP1280 (VHF)			
Model			**Description**
MDH25KDN9CK8_E			GP1280 VHF 136-174 MHz 5W
		Item	**Description**
X		PMLD4120_	*GP1280 VHF Back Cover Kit
X		6864110B20	GP1280 Basic User Guide
X		PMAD4023_	VHF 14cm (150-161 MHz) Antenna
X		HNN9008_	Battery, NiMH Standard

x = Indicates one of each is required.

* = Service replacement boards.

5.0 GP240/GP540/GP280/GP580 Model Chart

Professional GP200/GP500 Series (VHF)						
Model						Description
MDH25KDC9GC3						GP540 VHF 136-174MHz 5W
	MDH25KDH9GC6					GP580 VHF 136-174MHz 5W
		MDH25KDC9GB3				GP240 VHF 136-174MHz 5W
			MDH25KDH9GB6			GP280 VHF 136-174MHz 5W
					Item	Description
X		X			*PMLD4170_	GP240/GP540 VHF Back Cover Kit
	X		X		*PMLD4171_	GP280/GP580 VHF Back Cover Kit
X		X			*PMLD4216_	GP240/GP540 VHF Front Housing Kit
	X		X		*PMLD4373_	GP280/GP580 VHF Front Housing Kit
		X	X		6864120B15	GP240/GP280 User Guide (English)
		X	X		6864120B16	GP240/GP280 User Guide (ENG, RUS, FR, TUR)
		X	X		6864120B17	GP240/GP280 User Guide (GER, SPA, POR, IT)
		X	X		6864120B18	GP240/GP280 User Guide (SWE,NL, DAN, FIN)
		X	X		6864120B19	GP240/GP280 User Guide (CZ, PL, HU, RO)
X	X				6864120B20	GP540/GP580 User Guide (English)
X	X				6864120B21	GP540/GP580 User Guide (ENG, RUS, FR, TUR)
X	X				6864120B22	GP540/GP580 User Guide (GER, SPA, POR, IT)
X	X				6864120B23	GP540/GP580 User Guide (SWE,NL, DAN, FIN)
X	X				6864120B24	GP540/GP580 User Guide (CZ, PL, HU, RO)
X	X	X	X		NAD6502_	Antenna (146-174 MHz) HELIFLEX
X	X	X	X		HNN9008_	Battery, NiMH Standard

One user guide is selectable via option.

x = Indicates one of each is required.

* = Service replacement boards.

6.0 Technical Specifications

Data is specified for +25°C unless otherwise stated.

General Specifications		
Channel Capacity		
GP140	16	
GP240, GP280	128 in conventional Mode	
GP320	1	
GP340	16	
GP360, GP380	255	
GP540, GP580	128 in conventional Mode	
GP640, GP680, GP1280	16 (Conventional)	
Power Supply	Rechargeable battery 7.5v	
Dimensions: H x W x D (mm) Height excluding knobs	**GP140/GP240/320/340/360/380/ GP580/640/680**	
With standard high capacity NiMH battery	137 x 57.5 x 37.5	
With ultra high capacity NiMH battery	137 x 57.5 x 40.0	
With NiCD battery	137 x 57.5 x 40.0	
With Lilon battery	137 x 57.5 x 33.0	
	GP1280	
With standard high capacity NiMH battery	152 x 57.5 x 37.5	
With ultra high capacity NiMH battery	152 x 57.5 x 37.5	
With NiCD battery	152 x 57.5 x 37.5	
With Lilon battery	152 x 57.5 x 37.5	
Weight: (gm)	**GP140/GP240/ GP320/GP340/ GP540/GP640**	**GP360/GP280 GP380/GP580 GP680**
With Standard high capacity NiMH battery	420	428
With Ultra high capacity NiMH battery	500	508
With NiCD battery	450	458
With Lilon battery	350	358
	GP1280	
With Standard high capacity NiMH battery	460	
With Ultra high capacity NiMH battery	535	
With NiCD battery	485	
With Lilon battery	390	
Average Battery Life @5/5/90 Cycle:	Low Power	High Power
With Standard high capacity NiMH battery	11 hours	8 hours
With Ultra high capacity NiMH battery	14 hours	11 hours
With NiCD battery	12 hours	9 hours
With Lilon battery	11 hours	8 hours
Sealing:	Withstands rain testing per MIL STD 810 C/D /E and IP54	
Shock and Vibration:	Protection provided via impact resistant housing exceeding MIL STD 810-C/D /E and TIA/EIA 603	
Dust and Humidity:	Protection provided via environment resistant housing exceeding MIL STD 810 C/D /E and TIA/EIA 603	

Transmitter	VHF
*Frequencies - Full Bandsplit	VHF 136-174 MHz
Channel Spacing	12.5/20/25 kHz
Frequency Stability (-25°C to +55°C, +25° Ref.)	±2.5 ppm
Power	136 - 174 MHz:1-5W
Modulation Limiting	±2.5 @ 12.5 kHz ±4.0 @ 20 kHz ±5.0 @ 25 kHz
FM Hum & Noise	-40 dB typical
Conducted/Radiated Emission	-36 dBm <1 GHz -30 dBm >1 GHz
Adjacent Channel Power	-60 dB @ 12.5 kHz -70 dB @ 25 kHz
Audio Response (300 - 3000 Hz)	+1 to -3 dB
Audio Distortion	<5% typical

Receiver	VHF
*Frequencies - Full Bandsplit	VHF 136-174 MHz
Channel Spacing	12.5/20/25 kHz
Sensitivity (12 dB SINAD) EIA Sensitivity (20 dB SINAD) ETS	0.35 µV typical 0.50 µV typical
Intermodulation EIA	-65 dB
Adjacent Channel Selectivity	-60 dB @ 12.5 kHz -70 dB @ 25 kHz
Spurious Rejection	-70 dB
Rated Audio	0.5W
Audio Distortion @ Rated Audio	<3% typical
Hum & Noise	-45 dB @ 12.5 kHz -50 dB @ 20/25 kHz
Audio Response (300 - 3000 Hz)	+1 to -3 dB
Conducted Spurious Emission	-57 dBm <1 GHz -47 dBm >1 GHz ETS 300 086

*Availability subject to the laws and regulations of individual countries.

Chapter 2

THEORY OF OPERATION

1.0 Introduction

This Chapter provides a detailed theory of operation for the VHF circuits in the radio. For details of the theory of operation and trouble shooting for the the associated Controller circuits refer to the Controller Section of this manual.

2.0 VHF Transmitter

(*Refer to Figure 2-1 and the VHF Transmitter schematic diagram*)

The VHF transmitter consists of the following basic circuits:

1. Power amplifier (PA).
2. Antenna switch/harmonic filter.
3. Antenna matching network.
4. Power Control Integrated Circuit (PCIC).

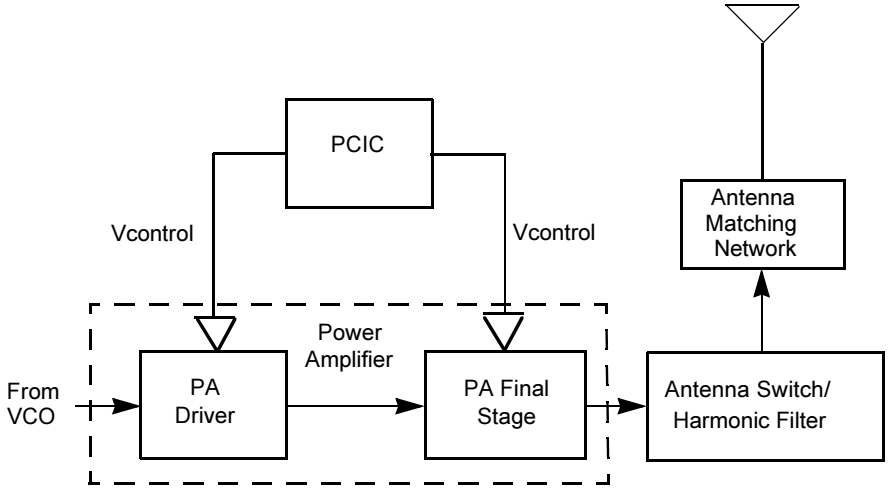


Figure 2-1 VHF Transmitter Block Diagram.

2.1 Power Amplifier

The power amplifier consists of two devices:

1. LDMOS driver IC (U3501)
2. LDMOS PA (Q3501)

The LDMOS driver IC contains two stages of amplification with a supply voltage of 7.3V.

This RF power amplifier is capable of supplying an output power of 0.3W (pin 6 and 7) with an input signal of 2mW (3dBm) (pin16). The current drain is typically around 130mA while operating in the frequency range of 136-174MHz.

The LDMOS PA is capable of supplying an output power of 7W with an input signal of 0.3W. The current drain is typically around 1800mA while operating in the frequency range of 136-174MHz. The power output is varied by changing the bias voltage.

2.2 Antenna Switch

The antenna switch circuit consists of two pin diodes, D3521 and D3551, a pi network (C3531, L3551 and C3550), and three current limiting resistors (R3571, R3572, R3573). In the transmit mode, B+ at PCIC (U3502) pin 23 goes low to turn on Q3561 where a B+ bias is applied to the antenna switch circuit to bias the diodes "on". The shunt diode (D3551) shorts out the receiver port, and the pi network, which operates as a quarter wave transmission line, transforms the low impedance of the shunt diode to a high impedance at the input of the harmonic filter. In the receive mode, the diodes are both off, creating a low attenuation path between the antenna and receiver ports.

2.3 Harmonic Filter

The harmonic filter consists of C3532 to C3536, L3531 and L3532. This network forms a low-pass filter to attenuate harmonic energy of the transmitter to specifications level. The harmonic filter insertion loss is typically less than 1.2dB.

2.4 Antenna Matching Network

A matching network made up of L3538 and C3537/C3539 is used to match the antenna impedance to the harmonic filter. This optimizes the performance of the transmitter and receiver into the antenna.

2.5 Power Control Integrated Circuit (PCIC)

The transmitter uses the PCIC, U3502 to control the power output of the radio by maintaining the radio current drain. The current to the final stage of the power module is supplied through R3519, which provides a voltage proportional to the current drain. This voltage is then fedback to the Automatic Level Control (ALC) within the PCIC to provide loop stability.

The PCIC also contains internal digital to analog converters (DACs) that provide the reference voltage of the control loop. The voltage level is controlled by the microprocessor through the data line of the PCIC.

The resistors and integrators within the PCIC, and external capacitors (C3562, C3563 and C3565) control the transmitter rise and fall times. These are necessary to reduce the power splatter into adjacent channels.

U3503 and its associated components act as a temperature cut back circuit. This provides the necessary voltage to the PCIC to cut the transmitter power if the radio temperature gets too high.

3.0 VHF Receiver (for all models except those with PCB8486473Z04)

The VHF receiver consists of a front end, back end, and automatic gain control circuits. A block diagram of the VHF receiver is shown in Figure 2-2. Detailed descriptions of these features are contained in the paragraphs that follow.

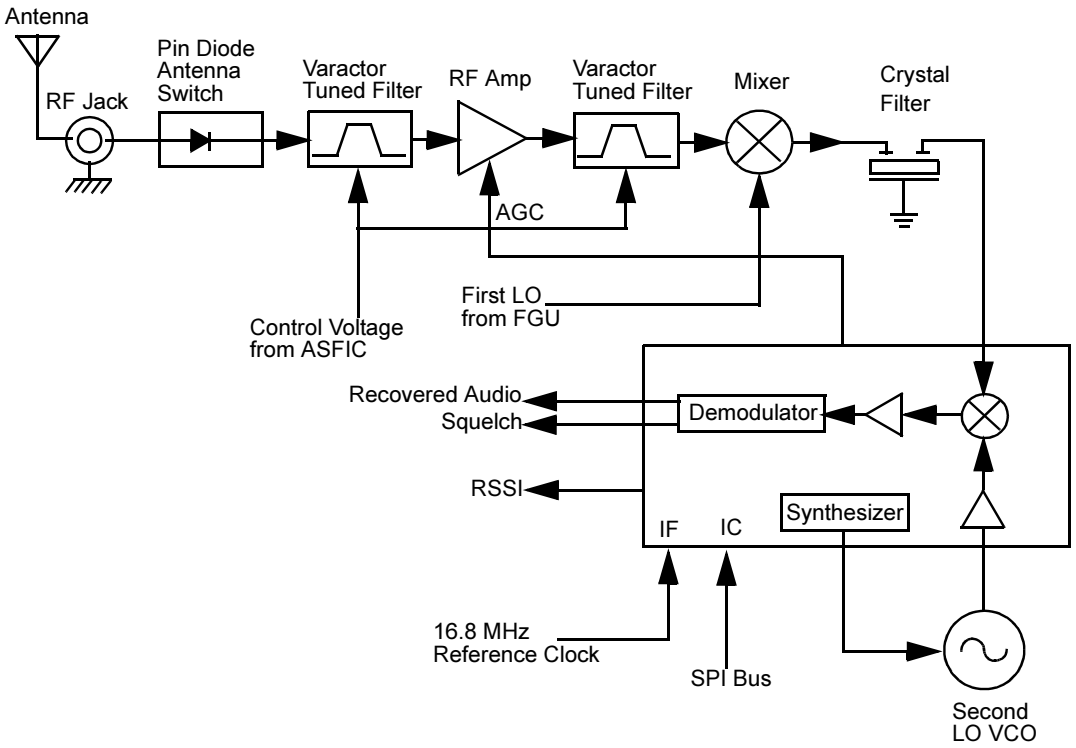


Figure 2-2 VHF Receiver Block Diagram.

3.1 Receiver Front-End

(*Refer to Figure 2-2 and the VHF Receiver Front End schematic diagram*)

The RF signal is received by the antenna and applied to a low-pass filter consisting of L3531, L3532, C3532 to C3563. The filtered RF signal is passed through the antenna switch. The antenna switch circuit consists of two pin diodes (D3521 and D3551) and a pi network (C3531, L3551, and C3550).The RF signal is then applied to a varactor tuned bandpass filter which consists of L3301, L3303, C3301 to C3304, and D3301. The filter is tuned by applying a control voltage to the varactor diode (D3301) in the filter.

The bandpass filter is electronically tuned by the DACRx from IC 404 which is controlled by the microprocessor. Depending on the carrier frequency, the DACRx supplies the tuned voltage to the varactor diodes in the filter. Wideband operation of the filter is achieved by shifting the bandpass filter across the band.

The output of the bandpass filter is coupled to the RF amplifier transistor Q3302 via C3306. After being amplified by the RF amplifier, the RF signal is further filtered by a second varactor tuned bandpass filter, consisting of L3305, L3306, C3311 to C3314 and D3302.

Both the pre and post-RF amplifier varactor tuned filters have similar responses. The 3 dB bandwidth of the filter is about 12 MHz. This enables the filters to be electronically controlled by using a single control voltage which is DACRx.

The output of the post-RF amplifier filter is connected to the passive double balanced mixer which consists of T3301, T3302, and CR3301. Matching of the filter to the mixer is provided by C3317, C3318 and L3308. After mixing with the first LO signal from the voltage controlled oscillator (VCO) using high side injection, the RF signal is down-converted to the 45.1 MHz IF signal.

The IF signal coming out of the mixer is transferred to the crystal filter (Y3200) through a resistor pad (R3321 - R3323) and a diplexer (C3320 and L3309). Matching to the input of the crystal filter is provided by C3200 and L3200. The crystal filter provides the necessary selectivity and intermodulation protection.

3.2 Receiver Back-End

(*Refer to Figure 2-2 and the VHF Receiver Back End schematic diagram*)

The output of crystal filter Y3200 is matched to the input of IF amplifier transistor Q3200 by capacitor C3203. Voltage supply to the IF amplifier is taken from the receive 5 volts (R5). The gain controlled IF amplifier provides a maximum gain of about 10dB. The amplified IF signal is then coupled into U3220 pin 3 via L3202, C3207, and C3230 which provides impedance matching for the IF amplifier and U3220.

The IF signal applied to pin 3 of U3220 is amplified, down-converted, filtered, then demodulated to produce the recovered audio at pin 27 of U3220. This IF IC is electronically programmable, and the amount of filtering, which is dependent on the radio channel spacing, is controlled by the microprocessor. Additional filtering, once externally provided by the conventional ceramic filters, is replaced by internal filters in the IF module (U3220).

The IF IC uses a type of direct conversion process, whereby the externally generated second LO frequency is divided by two in U3220 so that it is very close to the first IF frequency. The IF IC (U3220) synthesizes the second LO and phase-locks the VCO to track the first IF frequency. The second LO is designed to oscillate at twice the first IF frequency because of the divide-by-two function in the IF IC.

In the absence of an IF signal, the VCO “searches” for a frequency, or its frequency will vary close to twice the IF frequency. When an IF signal is received, the VCO will lock onto the IF signal. The second LO/VCO is a Colpitts oscillator built around transistor Q3270. The VCO has a varactor diode, D3270, to adjust the VCO frequency. The control signal for the varactor is derived from a loop filter consisting of C3278 to C3280, R3274 and R3275.

The IF IC (U3220) also provides a received signal-strength indicator (RSSI) and a squelch output. The RSSI is a dc voltage monitored by the microprocessor and is used as a peak indicator during the bench tuning of the receiver front-end varactor filter. The RSSI voltage is also used to control the automatic gain control (AGC) circuit at the front-end.

The demodulated signal on pin 27 of U3220 is also used for squelch control. The signal is routed to U404 (ASFIC) where squelch signal shaping and detection takes place. The demodulated audio signal is also routed to U404 for processing before going to the audio amplifier for amplification.

3.3 Automatic Gain Control (AGC)

(*Refer to the Receiver Front End and Receiver Back End schematic diagrams*)

The front end automatic gain control circuit provides automatic reduction of gain of the front end RF amplifier via feedback. This prevents overloading of backend circuits and is achieved by drawing some of the output power from the RF amplifier output. At high radio frequencies, capacitor C3327 provides the low impedance path to ground for this purpose. CR3302 is a pin diode used for switching the path on or off. A certain amount of forward biasing current is needed to turn the pin diode on. Transistor Q3301 provides this current.

Radio signal strength indicator, RSSI, a voltage signal, is used to drive Q3301 to saturation i.e. turned on. RSSI is produced by U3220 and is proportional to the gain of the RF amplifier and the input power to the radio.

Resistors R3304 and R3305 are voltage dividers designed to turn on Q3301 at certain RSSI levels. To turn on Q3301 the voltage across R3305 must be greater or equal to the voltage across R3324 + Vbe. Capacitor C3209 is used to dampen any instability while the AGC is turning on. The current flowing into the collector of Q3301, a high current gain NPN transistor, is drawn through the pin diode to turn it on. Maximum current flowing through the pin is limited by resistors R3316, R3313, R3306 and R3324. Feedback capacitor C3326 used to provide some stability to this high gain stage.

An additional gain control circuit is formed by Q3201 and associated components. Resistors R3206 and R3207 are voltage dividers designed to turn on Q3201 at a significantly higher RSSI level than the level required to turn on pin diode control transistor Q3301. In order to turn on Q3201 the voltage across R3207 must be greater or equal to the voltage across R3208 + Vbe. As current starts flowing into the collector of Q3201, it reduces the bias voltage at the base of IF amplifier transistor Q3200 and in turn, the gain of the IF amplifier. The gain is then controlled in a range of -30dB up to +10dB.

4.0 Receiver (for models with PCB 8486473Z04)

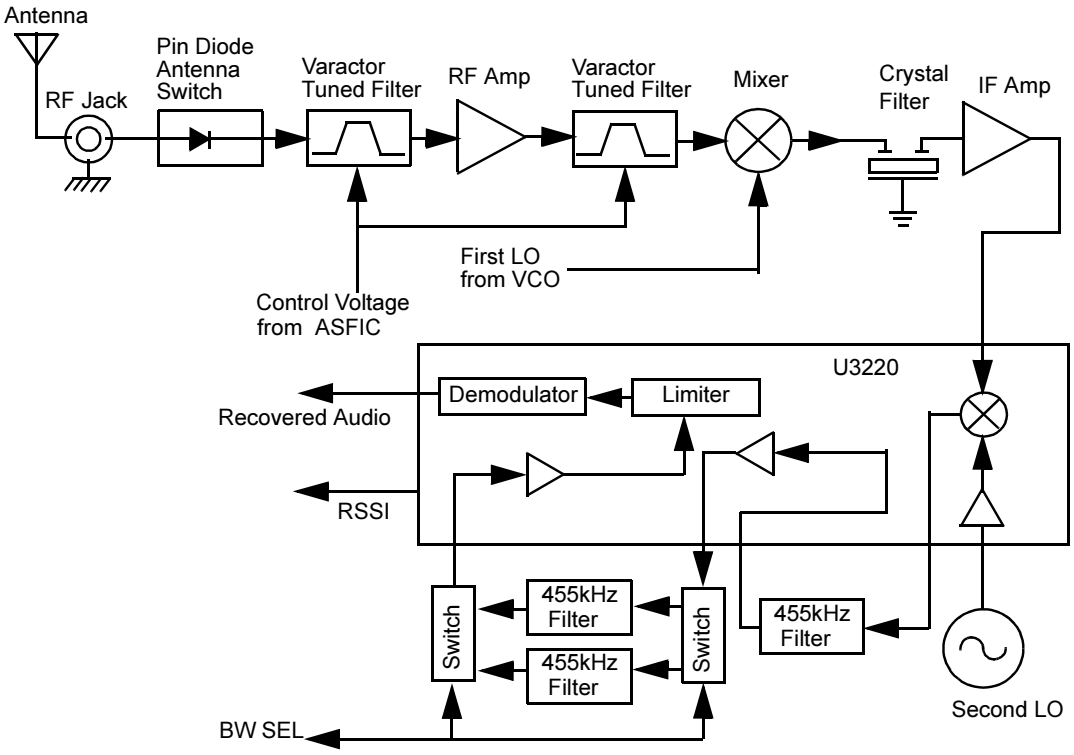


Figure 2-3 VHF Receiver Block Diagram

4.1 Receiver Front-End

(*Refer to Figure 2-3 and the VHF Receiver Front End, VHF Receiver Back End and VHF Transmitter schematic diagrams*)

The RF signal is received by the antenna and applied to a low-pass filter. For VHF, the filter consists of L3531, L3532, C3532 to C3563. The filtered RF signal is passed through the antenna switch consisting of two pin diodes (D3521 and D3551) and a pi network (C3531, L3551 and C3550).The signal is then applied to a varactor tuned bandpass filter. The VHF bandpass filter comprises of L3301, L3303, C3301 to C3304 and D3301. The bandpass filter is tuned by applying a control voltage to the varactor diode (D3301) in the filter.

The bandpass filter is electronically tuned by the DACRx from IC404 which is controlled by the microprocessor. Depending on the carrier frequency, the DACRx will supply the tuned voltage to the varactor diodes in the filter. Wideband operation of the filter is achieved by shifting the bandpass filter across the band.

The output of the bandpass filter is coupled to the RF amplifier transistor Q3302 via C3306. After being amplified by the RF amplifier, the RF signal is further filtered by a second varactor tuned bandpass filter, consisting of L3305, L3306, C3311 to C3314 and D3302.

Both the pre and post-RF amplifier varactor tuned filters have similar responses. The 3 dB bandwidth of the filter is about 12 MHz. This enables the filters to be electronically controlled by using a single control voltage which is DACRx .

The output of the post-RF amplifier filter is connected to the passive double balanced mixer which consists of T3301, T3302 and CR3301. Matching of the filter to the mixer is provided by C3317, C3318 and L3308. After mixing with the first LO signal from the voltage controlled oscillator (VCO) using high side injection, the RF signal is down-converted to the 44.85 MHz IF signal.

The IF signal coming out of the mixer is transfered to the crystal filter (Y3200) through a resistor pad (R3321 - R3323) and a diplexer (C3320 and L3309). Matching to the input of the crystal filter is provided by C3201 and L3200. The crystal filter provides the necessary selectivity and intermodulation protection.

4.2 Receiver Back-End

(*Refer to Figure 2-3 and the VHF Receiver Back End schematic diagram*)

The output of crystal filter Y3200 is matched to the input of IF amplifier transistor Q3200 by L3203. Voltage supply to the IF amplifier is taken from the receive 5 volts (R5). The IF amplifier Q3200 is actively biased by a collector base feedback provided by R3202 and R3203. The gain controlled IF amplifer provides a maximum gain of about 16dB. A dual hot carrier diode (CR3201) limits the filter output voltage swing to reduce overdrive effects at RF levels above -27dBm. The amplified IF signal is then coupled into U3220 (pin 1) via L3202, C3207, and C3200 which provides the matching for the IF amplifier and U3220.

The IF signal applied to pin 1 of U3220 is amplified, down-converted, filtered, and demodulated, to produce the recovered audio at pin 7 of U3220.

Within U3220, the first IF 44.85 MHz signal mixes with the 44.395 MHz second local oscillator (2nd LO) to produce the second IF signal at 455 kHz. The 2nd LO signal frequency is determined by crystal Y3201. The second IF signal (455 kHz) is then filtered by an external ceramic filter Y3205 before being amplified by the second IF amplifier within U3220. Again, the signal is filtered by a second external ceramic filter Y3203 or Y3204 depending on the selected channel spacing. Y3203 is used for 20/25 kHz channel spacing whereas Y3204, for 12.5 kHz channel spacing. The simple circuit consisting of U3221, CR3202, CR3203 and resistors R3209, R3212, R3211 and R3205 divert the second IF signal according to the BW_SEL line. The filtered output of the second IF signal is applied to the limiter input pin of U3220 (Pin 14).

The IF IC (U3220) contains a quadrature detector using a ceramic phase-shift element (Y3202) to provide audio detection. Internal amplification provides an audio output level around 120mVrms (@60% deviation) from pin 8 of U3220. This demodulated audio is fed to the ASFIC_CMP IC (U404) in the controller section.

The IF IC (U3220) also performs several other functions. It provides a received signal-strength indicator (RSSI) with a dynamic range of 70 dB. The RSSI is a dc voltage monitored by the microprocessor, and used as a peak indicator during the bench tuning of the receiver front-end varactor filter.

4.3 Automatic Gain Control (AGC)

(*Refer to the Receiver Front End and Receiver Back End schematic diagrams*)

The front end automatic gain control circuit provides automatic reduction of gain of the front end RF amplifier via feedback. This prevents overloading of backend circuits and is achieved by drawing some of the output power from the RF amplifier output. At high radio frequencies, capacitor C3327 provides the low impedance path to ground for this purpose. CR3302 is a pin diode used for switching the path on or off. A certain amount of forward biasing current is needed to turn the pin diode on. Transistor Q3301 provides this current.

Radio signal strength indicator, RSSI, a voltage signal, is used to drive Q3301 to saturation i.e. turned on. RSSI is produced by U3220 and is proportional to the gain of the RF amplifier and the input power to the radio.

Resistors R3304 and R3305 are voltage dividers designed to turn on Q3301 at certain RSSI levels. To turn on Q3301 the voltage across R3305 must be greater or equal to the voltage across R3324 + Vbe. Capacitor C3209 is used to dampen any instability while the AGC is turning on. The current flowing into the collector of Q3301, a high current gain NPN transistor, is drawn through the pin diode to turn it on. Maximum current flowing through the pin is limited by resistors R3316, R3313, R3306 and R3324. Feedback capacitor C3326 used to provide some stability to this high gain stage.

5.0 Frequency Generation Circuit

(*Refer to Figure 2-4 and the VHF Frequency Synthesizer schematic diagram*)

The Frequency Generation Circuit, shown in Figure 2-4, is composed of two main ICs, the Fractional-N synthesizer (U3701), and the VCO/Buffer IC (U3801). Designed in conjunction to maximize compatibility, the two ICs provide many of the functions that normally would require additional circuits. The synthesizer block diagram illustrates the interconnect and support circuit used in the region. Refer to the schematic for the reference designator.

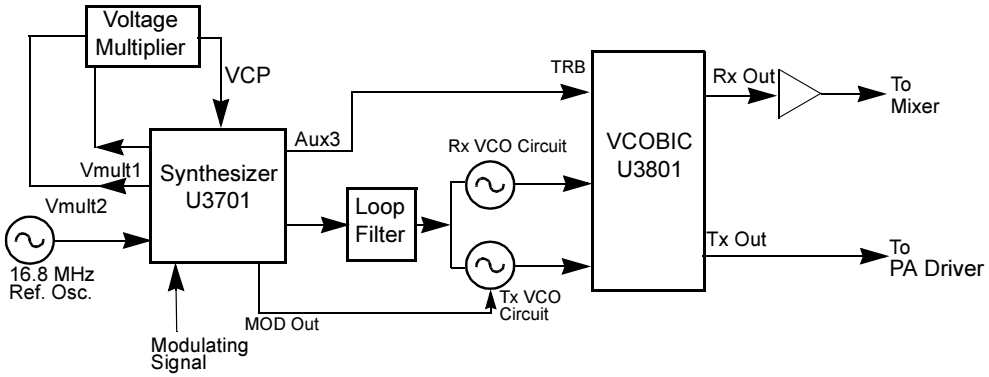


Figure 2-4 VHF Frequency Generation Unit Block Diagram

The synthesizer is powered by regulated 5V and 3.3V which is provided from ICs U3711 and U3201 respectively. The 5V signal is supplied to pins 13 and 30 and the 3.3V signal is applied to pins 5, 20, 34 and 36 of U3701. The synthesizer in turn generates a superfiltered 5V which powers U3801.

In addition to the VCO, the synthesizer must interface with the logic and ASFIC circuitry. Programming for the synthesizer is accomplished through the data, clock and chip select lines (pins 7, 8 and 9) from the microprocessor, U409. A 3.3V dc signal from pin 4 indicates to the microprocessor that the synthesizer is locked.

Transmit modulation from the ASFIC is supplied to pin10 of U3701. Internally the audio is digitized by the Fractional-N and applied to the loop divider to provide low-port modulation. The audio runs through an internal attenuator for modulation balancing purposes before going out at pin 41 to the VCO.

5.1 Synthesizer

The Fractional-N Synthesizer, shown in Figure 2-5, uses a 16.8MHz crystal (Y3761) to provide a reference for the system. The LVFractN IC (U3701) further divides this to 2.1MHz, 2.225MHz, and 2.4MHz as reference frequencies. Together with C3761, C3762, C3763, R3761, and D3761, they build up the reference oscillator that is capable of 2.5 ppm stability over temperatures of -30 to 85°C. A 16.8MHz signal at pin 19 of U3701 is also provided for use by ASFIC and LVZIF (for all models except those with PCB8486473Z04).

The loop filter which consist of C3721, C3722, R3721, R3722 and R3723 provides the necessary dc steering voltage for the VCO and determines the amount of noise and spur passing through.

In achieving fast locking for the synthesizer, an internal adapt charge pump provides higher current at pin 45 of U3701 to put the synthesizer within lock range. The required frequency is then locked by normal mode charge pump at pin 43.

Both the normal and adapt charge pumps get their supply from the capacitive voltage multiplier made up of C3701 to C3704 and triple diodes D3701, D3702. Two 3.3V square waves (180 degrees out of phase) are first multiplied by four and then shifted, along with regulated 5V, to build up 13.5V at pin 47 of U3701.

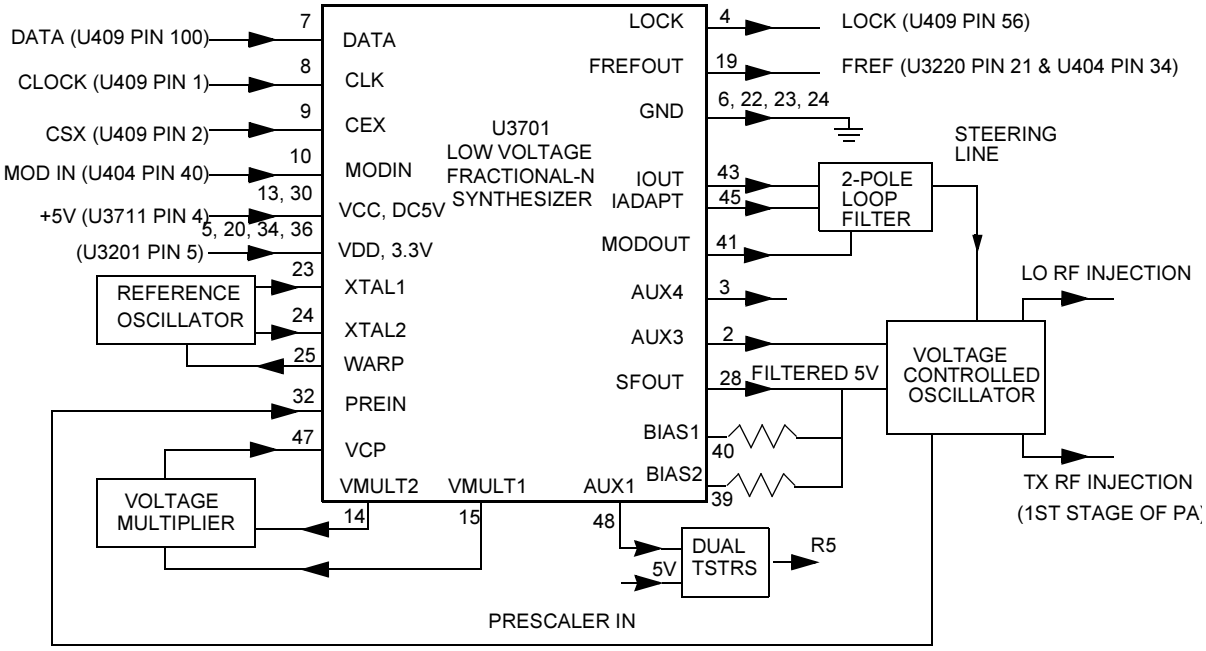


Figure 2-5 VHF Synthesizer Block Diagram.

5.2 Voltage Controlled Oscillator (VCO)

(*Refer to Figure 2-6 and the VHF Voltage Controlled Oscillator schematic diagram)*

The VCOB IC (U3801), shown in Figure 2-6, in conjunction with the Fractional-N synthesizer (U3701) generates RF in both the receive and the transmit modes of operation. The TRB line (U3801 pin 19) determines which oscillator and buffer are enabled. A sample of the RF signal from the enabled oscillator is routed from U3801 pin 12, through a low pass filter, to the prescaler input (U3701 pin 32). After frequency comparison in the synthesizer, a resultant CONTROL VOLTAGE is received at the VCO. This voltage is a DC voltage typically between 3.5V and 9.5V when the PLL is locked on frequency.

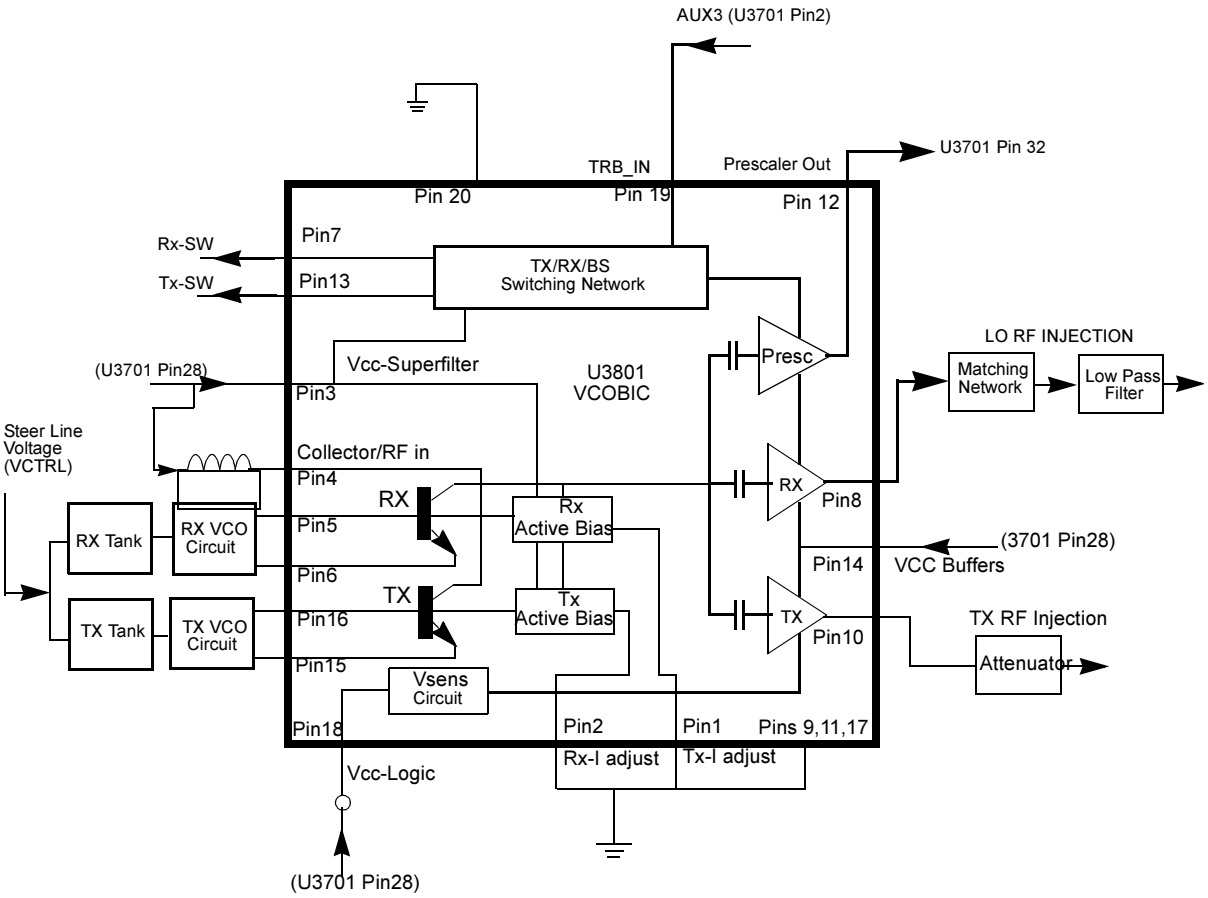


Figure 2-6 VHF VCO Block Diagram

Table 2-1 Level Shifter Logic

Desired Mode	AUX 4	AUX 3	TRB
Tx	n.u.	High (@3.2V)	High (@3.2V)
Rx	n.u.	Low	Low
Battery Saver	n.u.	Hi-Z/Float (@1.6V)	Hi-Z/Float (@1.6V)

In the receive mode, U3801 pin 19 is low or grounded. This activates the receive VCO by enabling the receive oscillator and the receive buffer of U3801. The RF signal at U3801 pin 8 is routed through a matching network. The resulting LO RF INJECTION signal is applied to the mixer at T3302.

During the transmit condition, when PTT is pressed, 3.2 volts is applied to U3801 pin 19. This activates the transmit VCO by enabling the transmit oscillator and the transmit buffer of U3801. The RF signal at U3801 pin 10 is injected into the input of the PA module (U3501 pin16). This RF signal is the TX RF INJECTION. Also in transmit mode, the audio signal to be frequency modulated onto the carrier is received through U3701, pin 41.

When a high impedance is applied to U3801 pin19, the VCO is operating in battery saver mode. In this case, both the receive and transmit oscillators as well as the receive, transmit and prescaler buffer are turned off.

6.0 Voice Storage (GP1280)

(*Refer to Figure 2-7 and the VHF Voice Storage schematic diagram)*

The Voice Storage feature is offered as standard in the GP1280 and as an Option board for GP340/GP360/GP380 and GP640/GP680.

The Voice Storage feature enables users to:

- Record and Playback Personal Memo (Reminders, Notes, etc.).
- Send over-the-air an “Out-Of-Office” message when an incoming call is received but is not available to take up call.
- Over-the-air recording of important voice message being received.

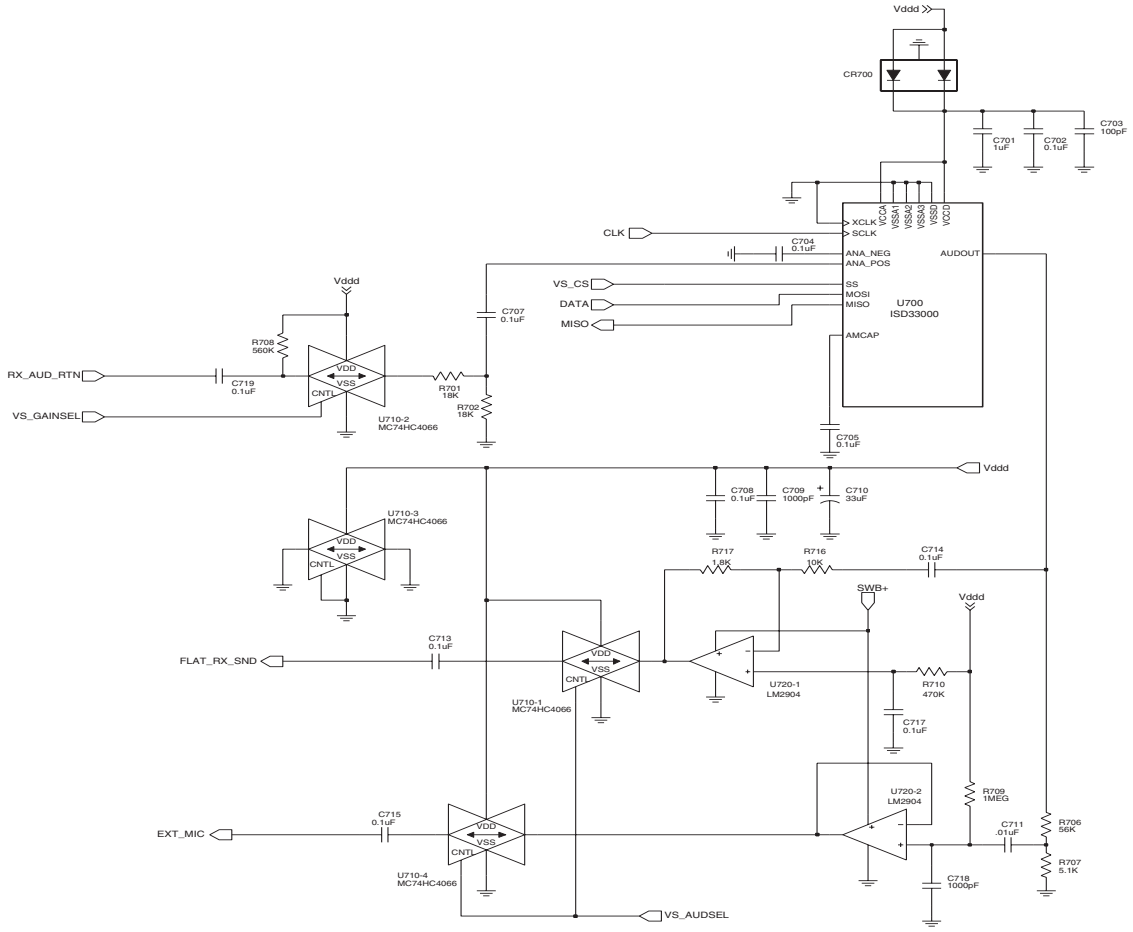


Figure 2-7 Audio path for voice storage connection to interface connector

Audio routing to the Voice Storage circuitry during receive message recording, message playback, personal memo recording and voice prompt transmit over the air are as follows:

Received Message Recording

The receive audio is tapped from the Rx_Aud_Rtn pin of the ASFIC_CMP during receive mode.

Message Playback

Message playback is via the FLAT_RX_SND pin of ASFIC_CMP. In the ASFIC_CMP, the signal is routed via the Side-Tone path to the Receive path where playback audio is routed to the speaker.

Personal Memo Recording

In this mode, voice is pick-up at the Mic. and via the Side-Tone path will be directed to the Rx_Aud_Rtn pin, which is then routed to the voice recording chip.

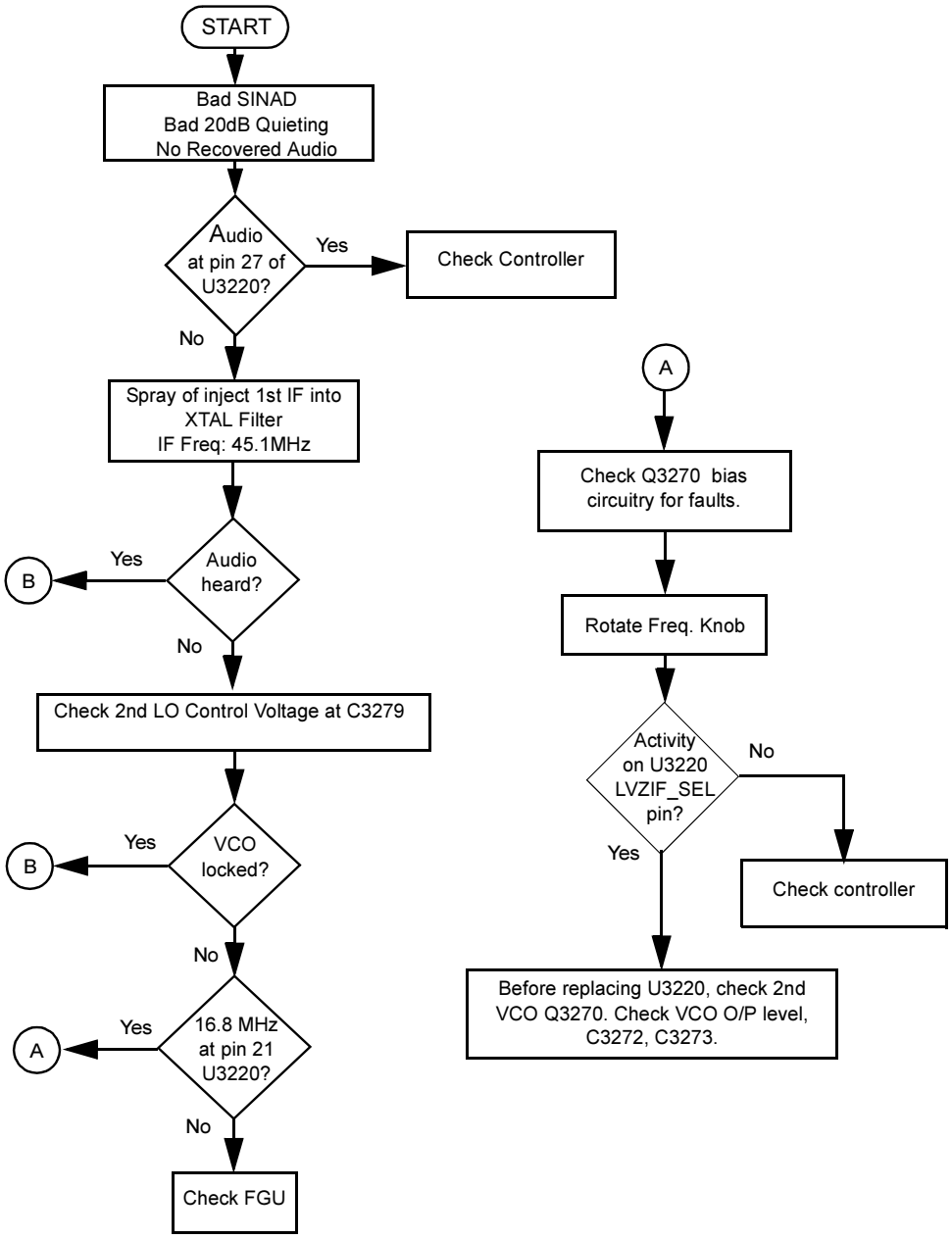
Voice Prompt transmit over the air

A personal voice prompt or Out-Of-Office Message which is stored in the IC can be transmitted over the air through mic path in the ASFIC_CMP to the calling party. This feature is similar to the Telephone Answering Machine feature when the person called is not available to attend the call.

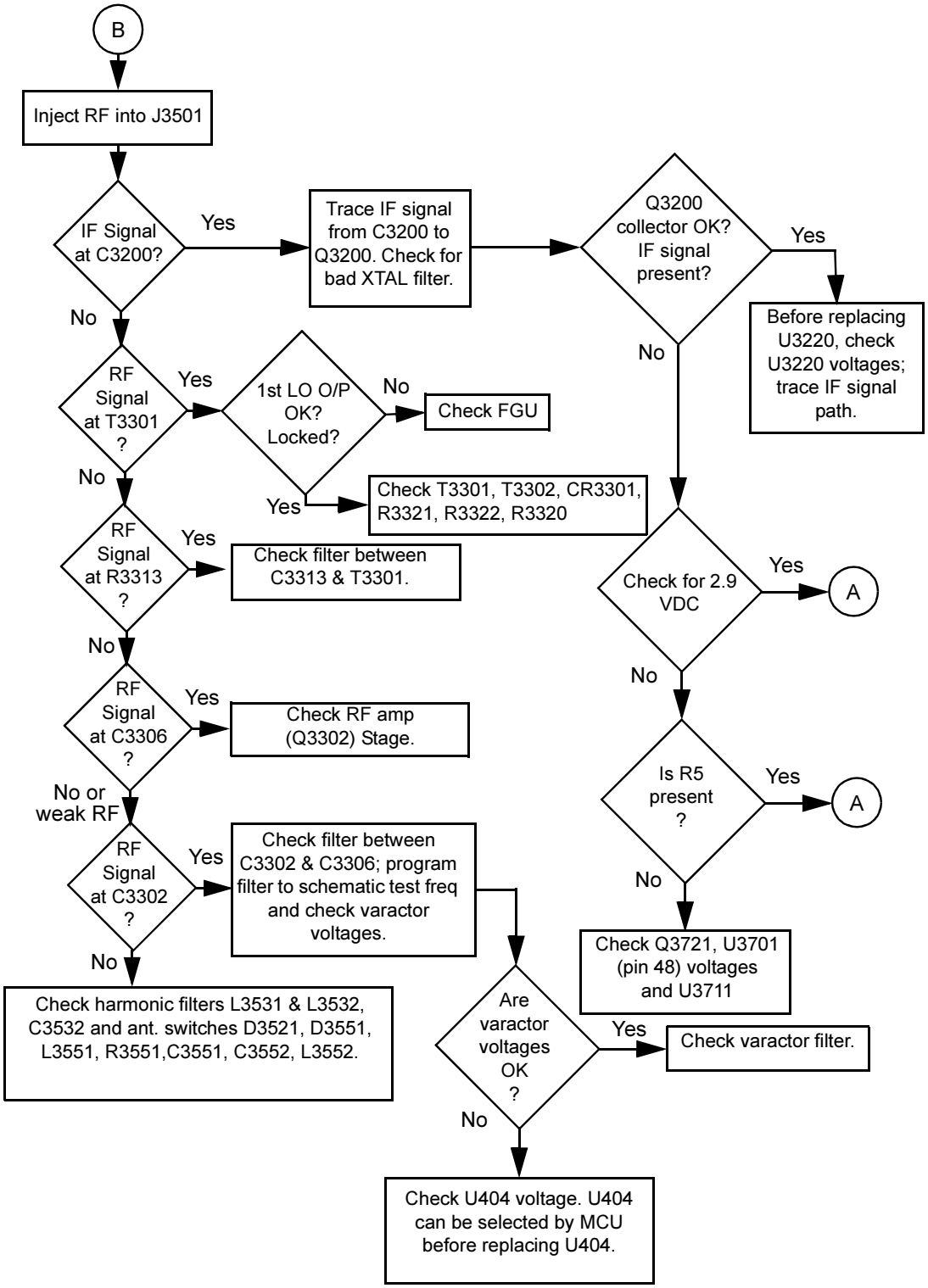
Chapter 3

TROUBLESHOOTING CHARTS

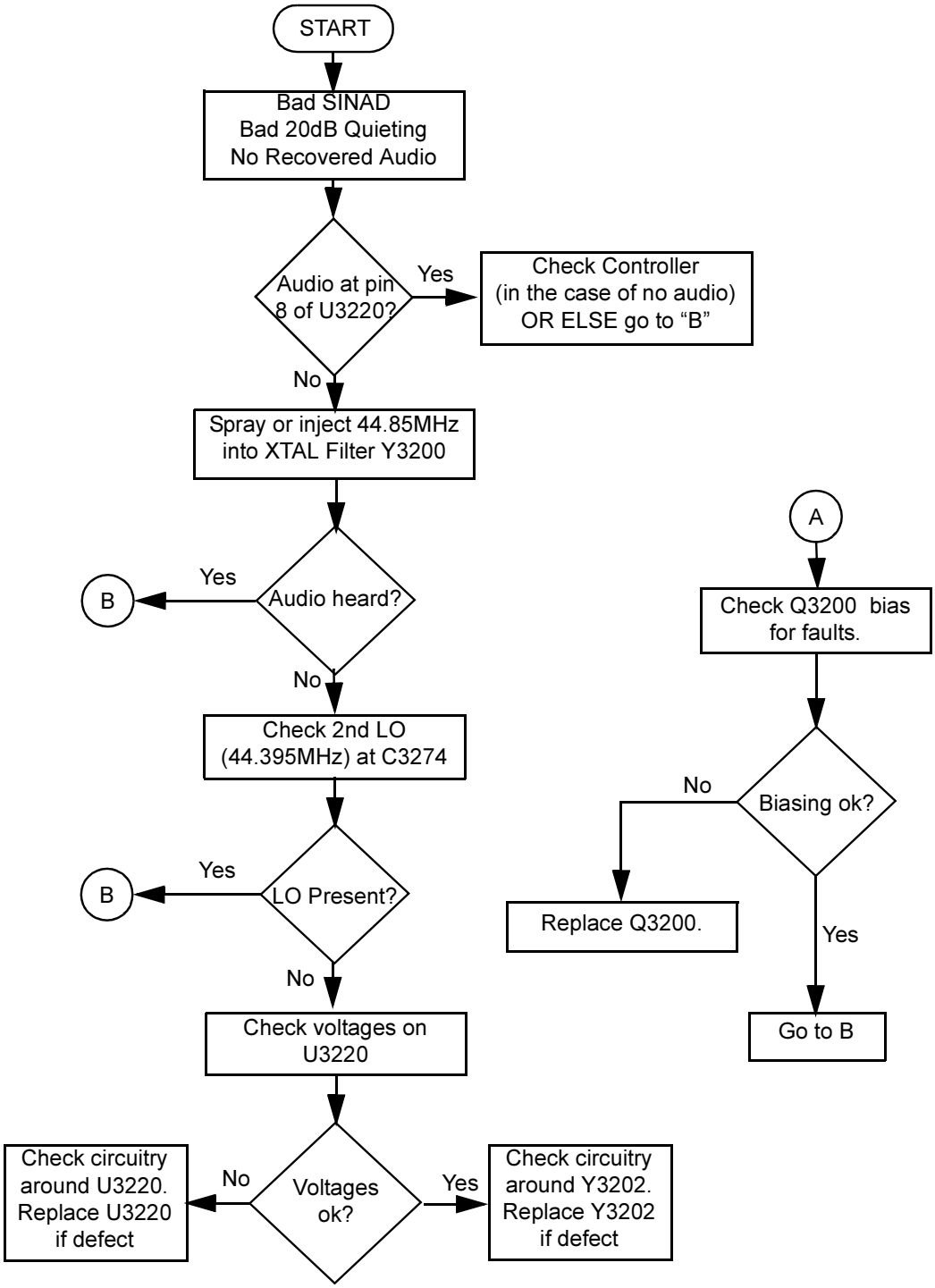
1.0 Troubleshooting Flow Chart for Receiver, for all models except those with PCB 8486473Z04 (Sheet 1 of 2)



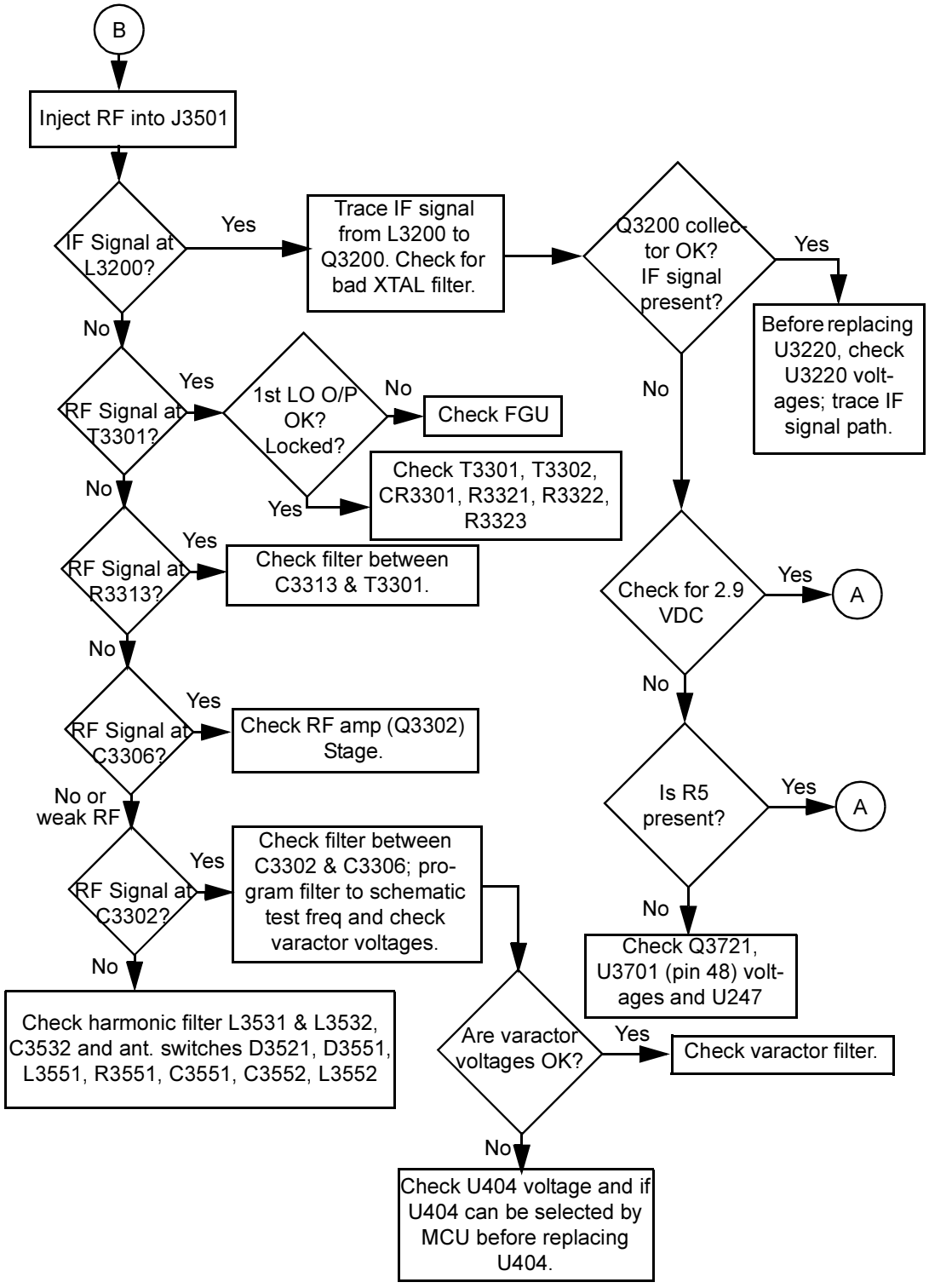
Troubleshooting Flow Chart for Receiver for all models except those with PCB 8486473Z04 (Sheet 2 of 2)



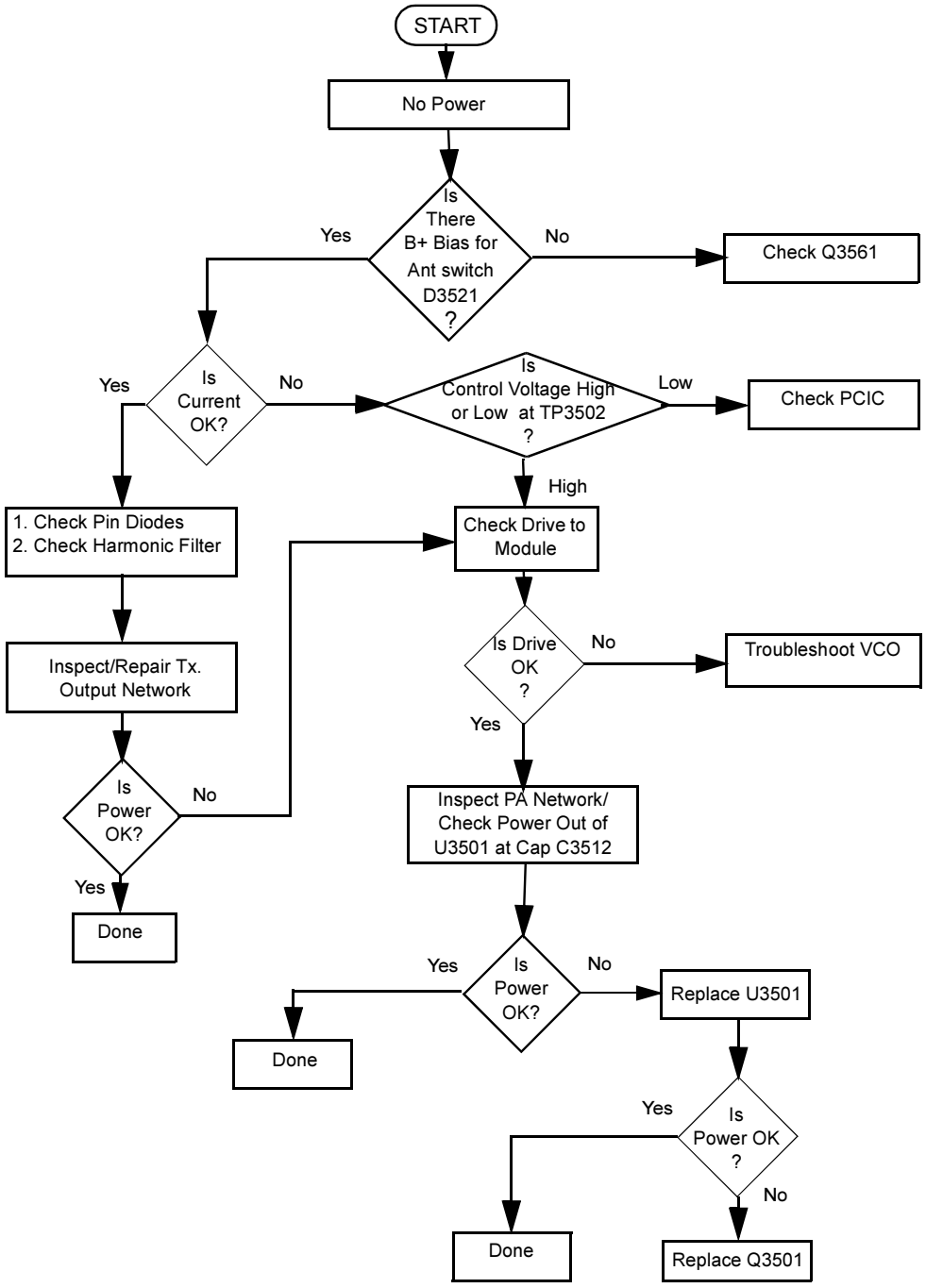
2.0 Troubleshooting Flow Chart for Receiver, for models with PCB 8486473Z04 (Sheet 1 of 2)



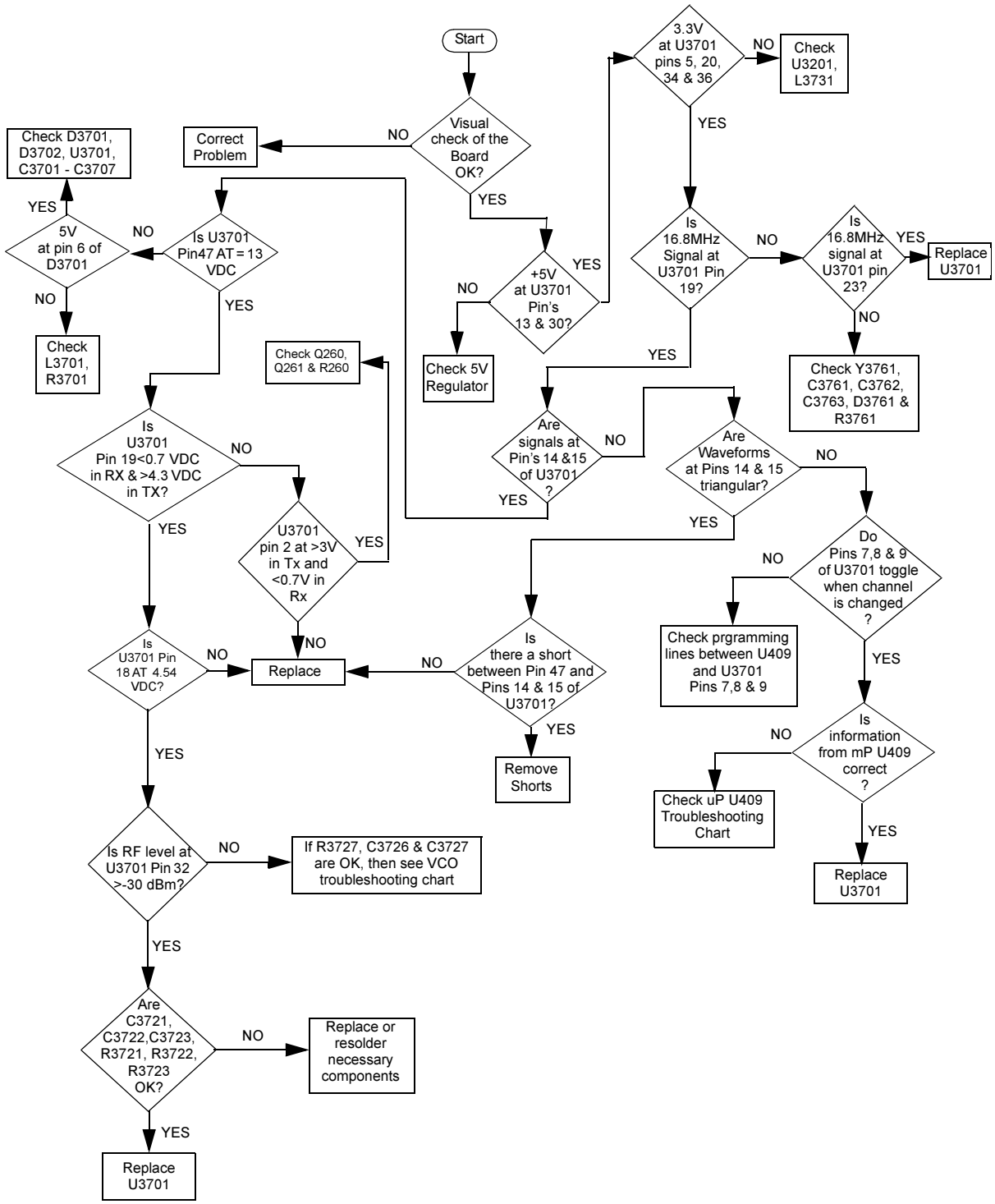
Troubleshooting Flow Chart for Receiver, for models with PCB 8486473Z04 (Sheet 2 of 2)



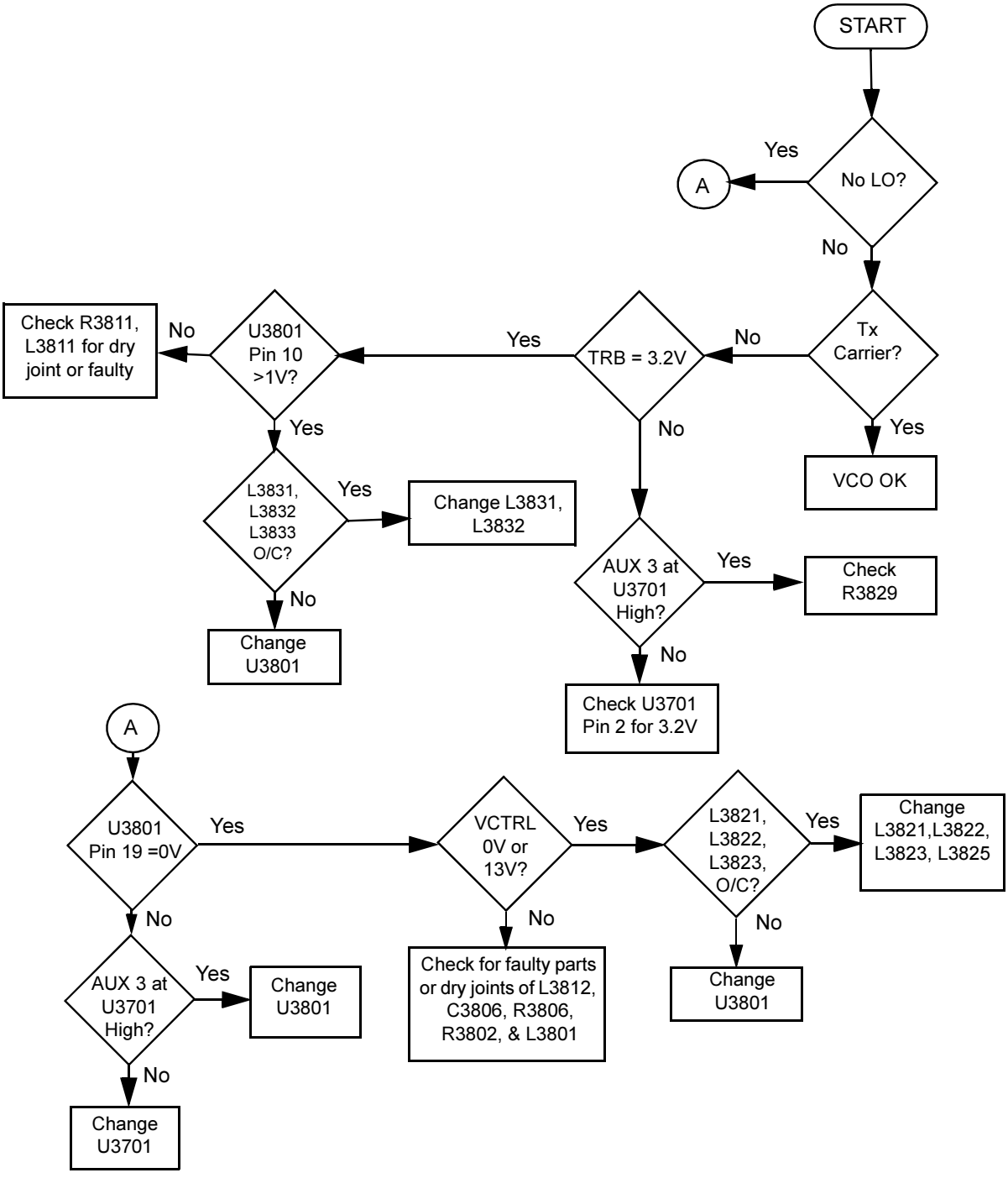
3.0 Troubleshooting Flow Chart for Transmitter



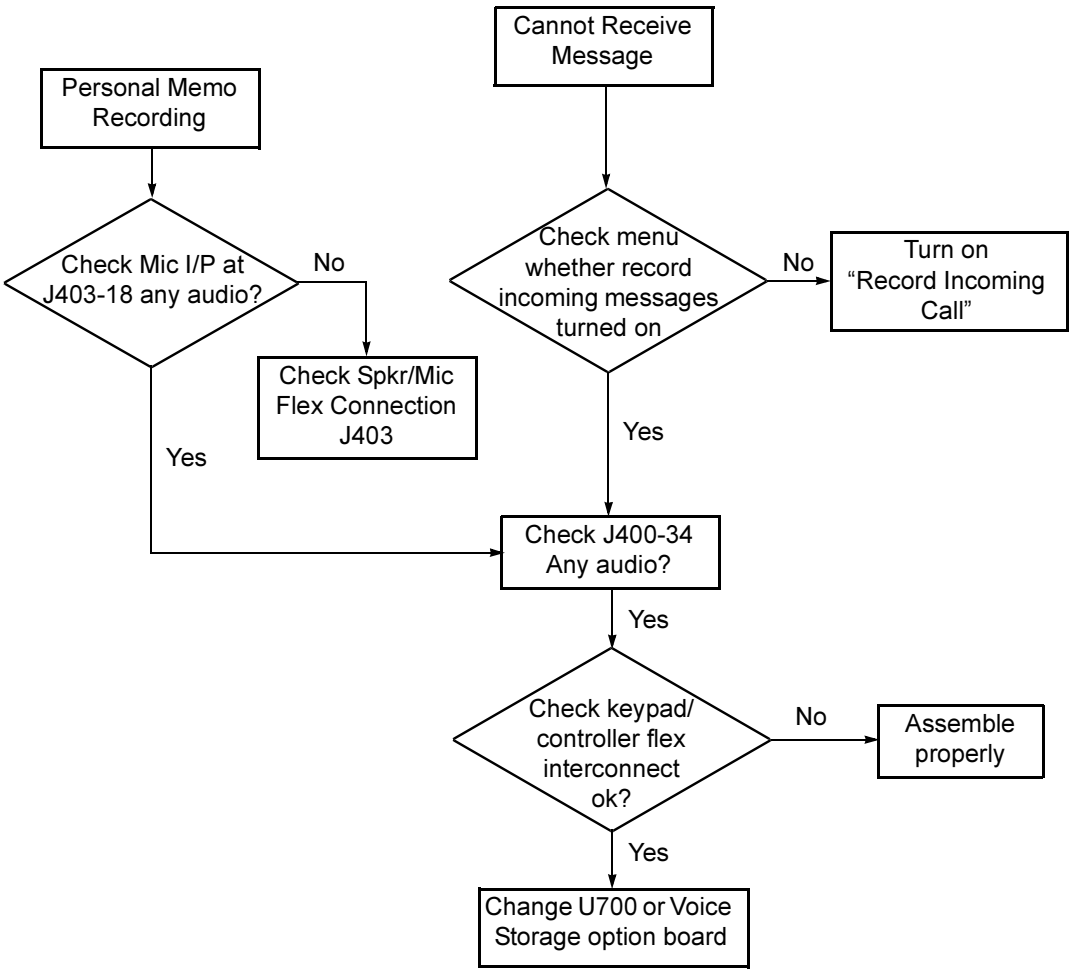
4.0 Troubleshooting Flow Chart for Synthesizer



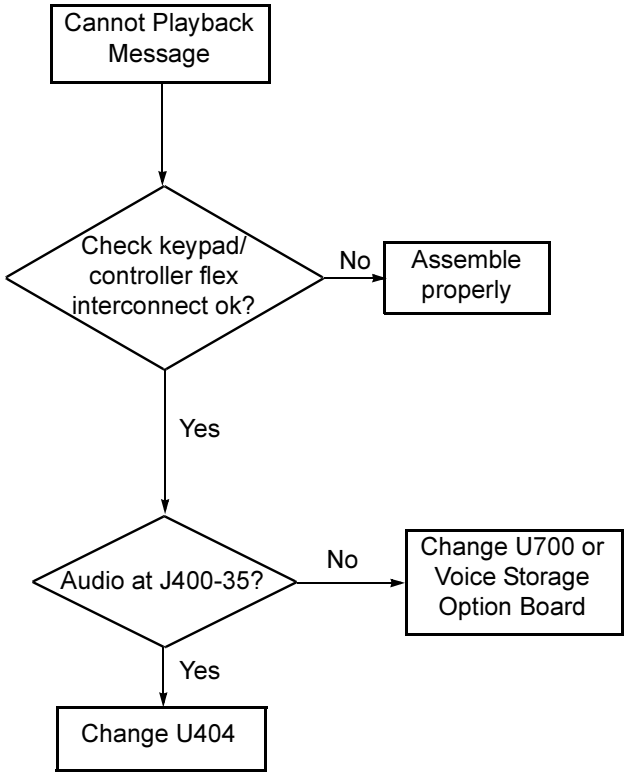
5.0 Troubleshooting Flow Chart for VCO



6.0 Troubleshooting Flow Chart for Receive Message/Personal Memo Recording



7.0 Troubleshooting Flow Chart for Message Playback



Chapter 4

VHF PCB/SCHEMATICS/PARTS LISTS

1.0 Allocation of Schematics and Circuit Boards

1.1 Controller Circuits

The VHF circuits are contained on the printed circuit board (PCB) which also contains the Controller circuits. This Chapter shows the schematics for the VHF circuits only, refer to the Controller section for details of the related Controller circuits . The PCB component layouts and the Parts Lists in this Chapter show both the Controller and VHF circuit components. The VHF schematics and the related PCB and parts list are shown in the tables below.

1.2 Voice Storage Facility

The Voice Storage facility is fitted to the GP1280 radio as standard and the schematics, component layout and parts list for these circuits are shown in this Chapter. The Voice Storage facility may be fitted to other radios in the GP Series as an option board; reference must be made to the Option Board manual in this case. The Voice Storage schematic and the related PCB is shown in Tables 4-2 and 4-4 below.

Table 4-1 VHF Diagrams and Parts Lists

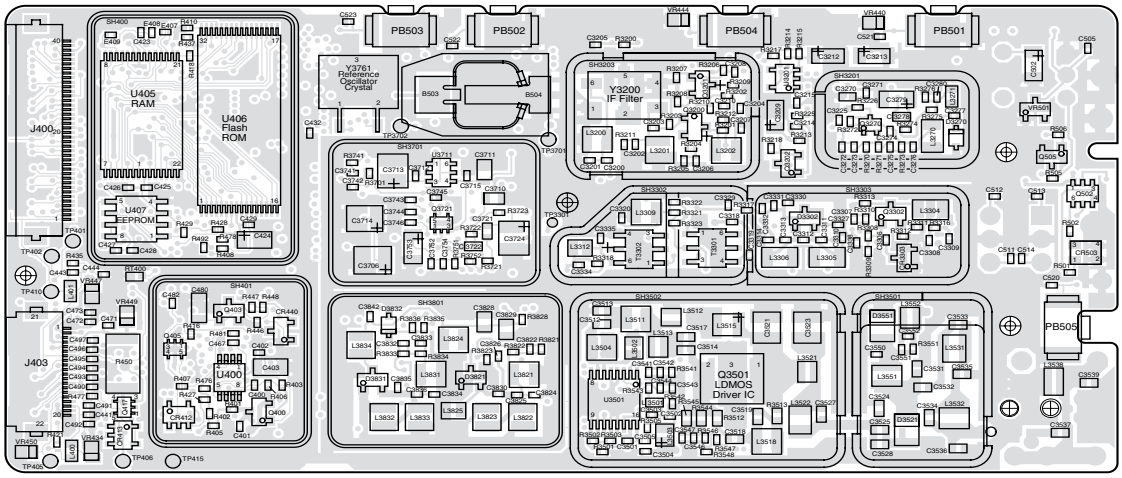
Table 4-2 VHF GP1280 Diagrams and Parts Lists

Table 4-3 VHF Diagrams and Parts Lists

Table 4-4 VHF GP1280 Diagrams and Parts Lists

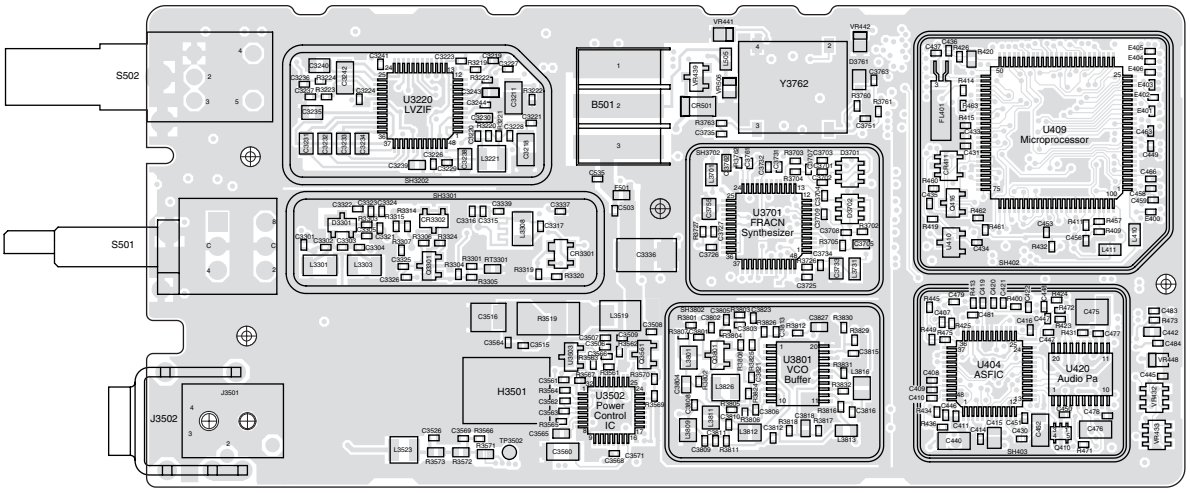
Table 4-5 VHF Diagrams and Parts Lists

2.0 VHF PCB 8486062B12 / Schematics



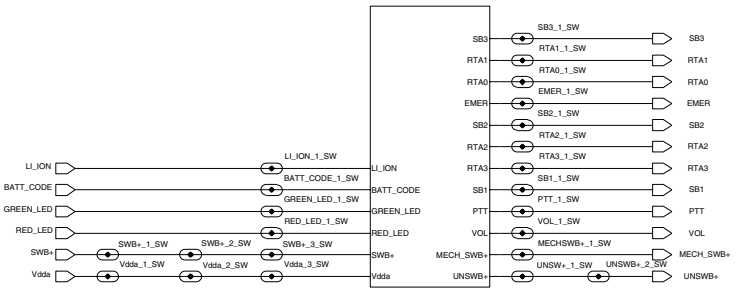
ZWG0130072-D

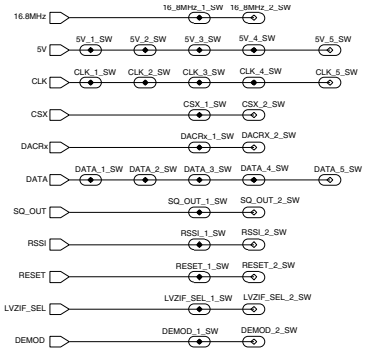
VHF (136-174 MHz) Main Board Top Side



ZWG01300073-C

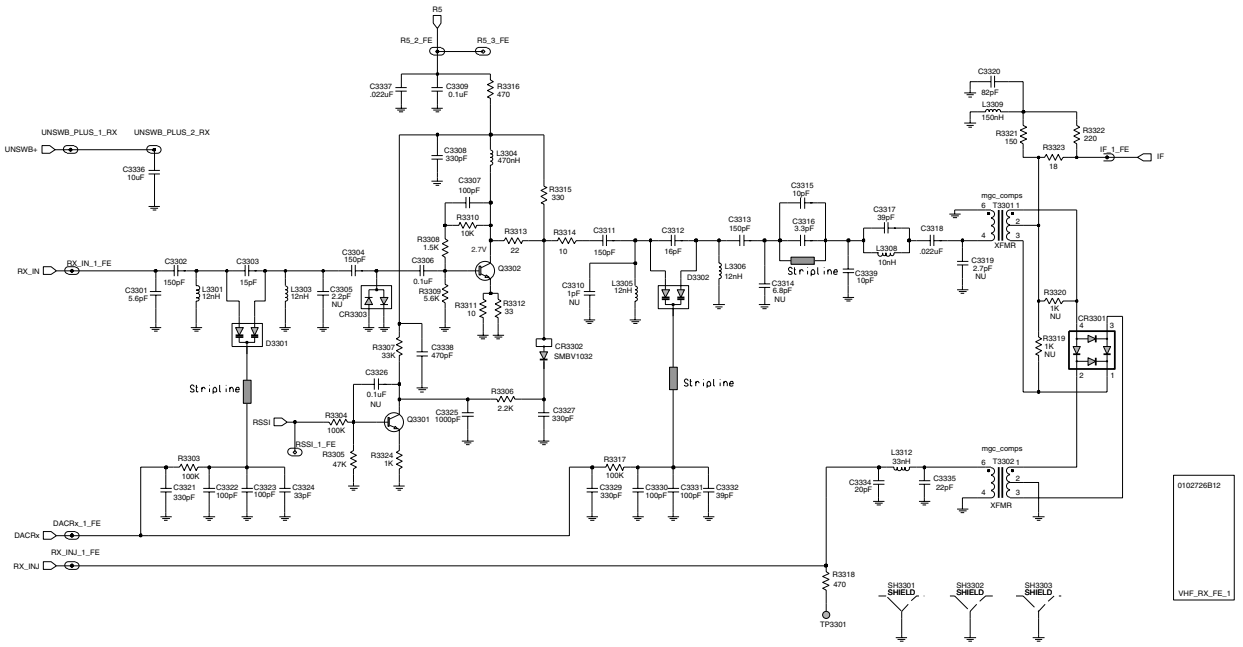
VHF (136-174 MHz) Main Board Bottom Side





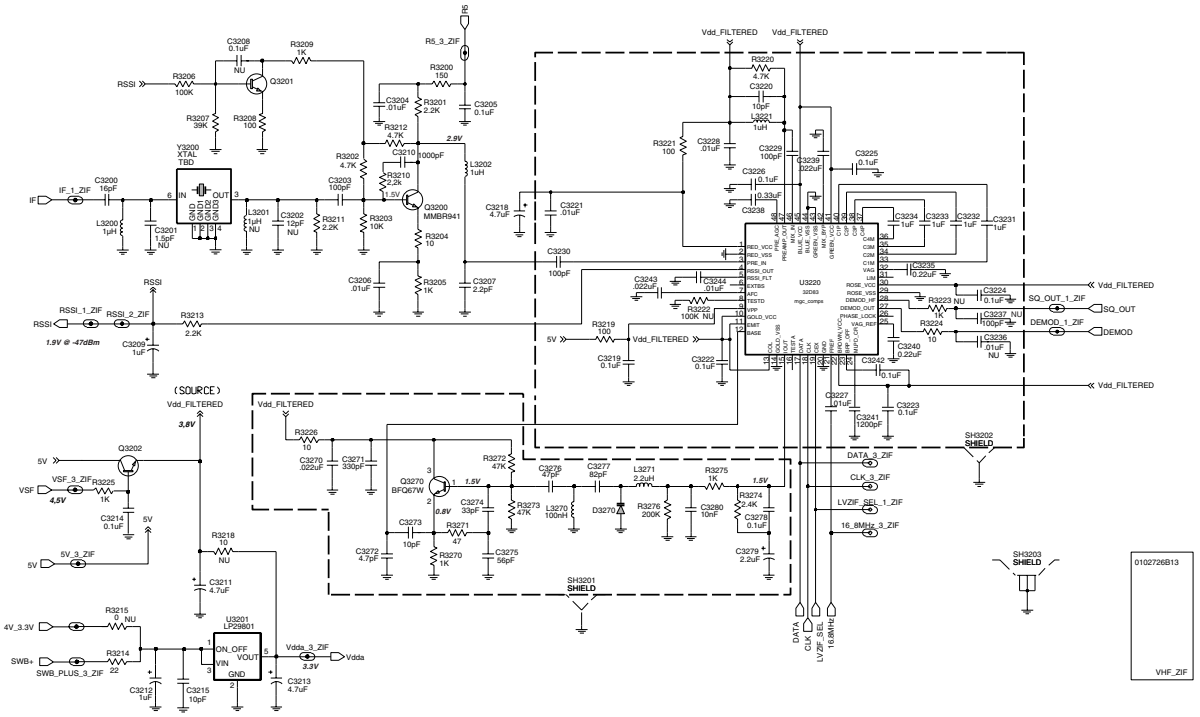
ZWG0130024-A

VHF (136-174 MHz) Controls and Switches



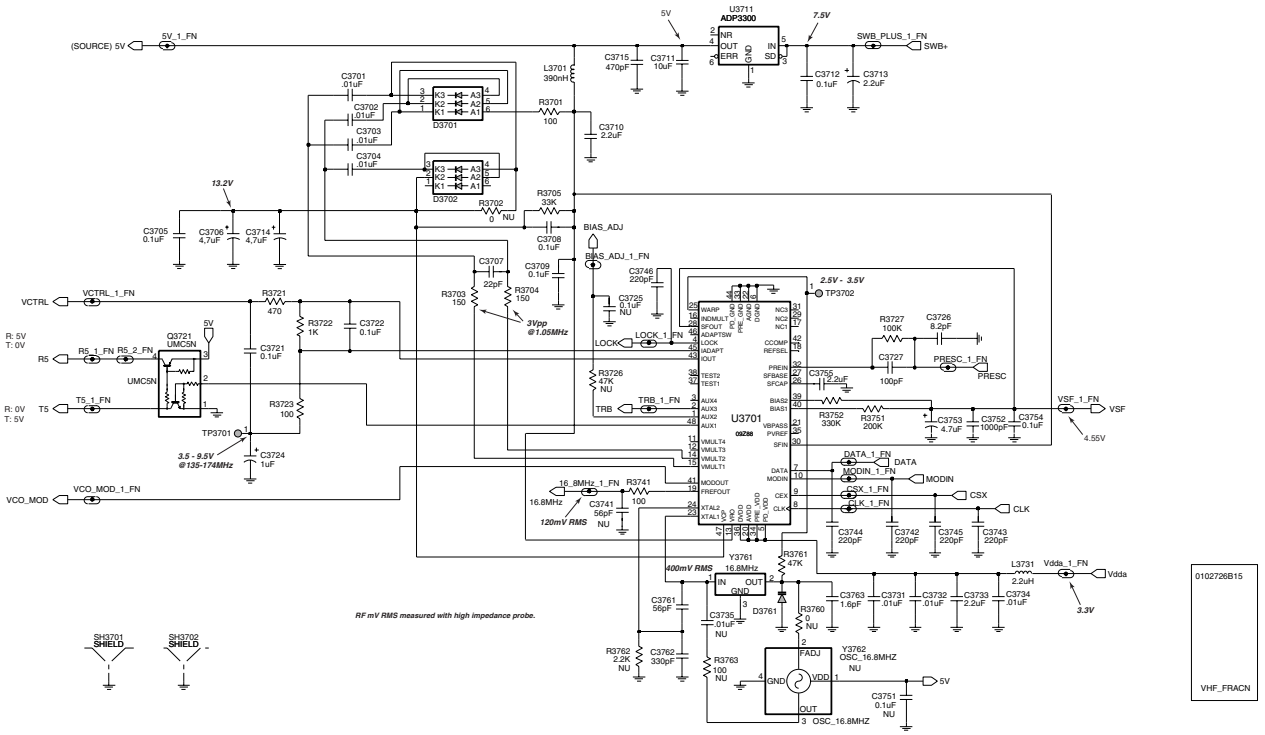
ZWG0130023-B

VHF (136-174 MHz) Receiver Front End



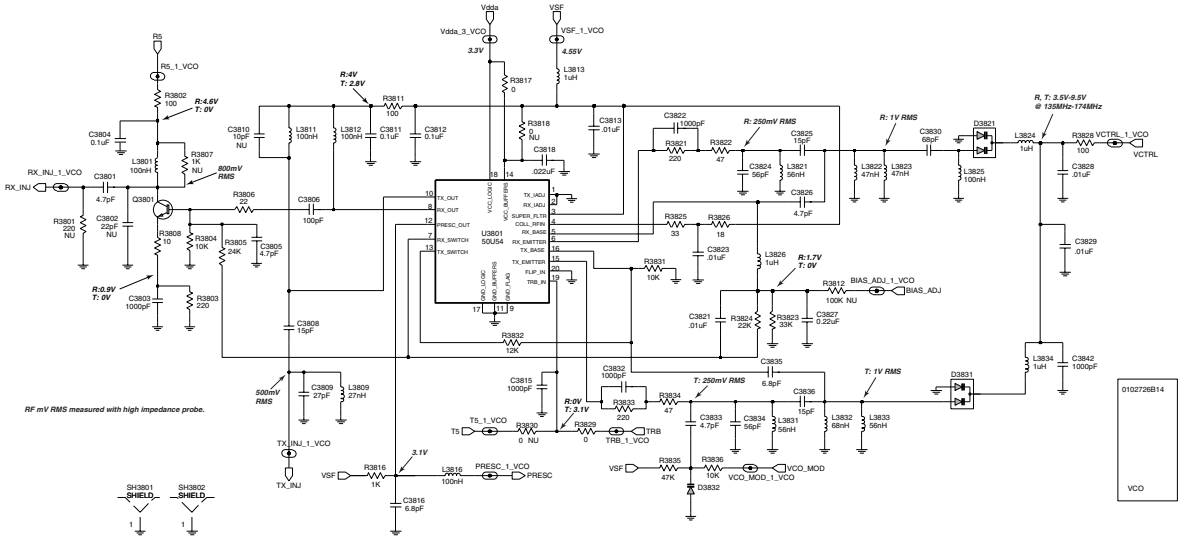
ZWG0130025-B

VHF (136-174 MHz) Receiver Back End



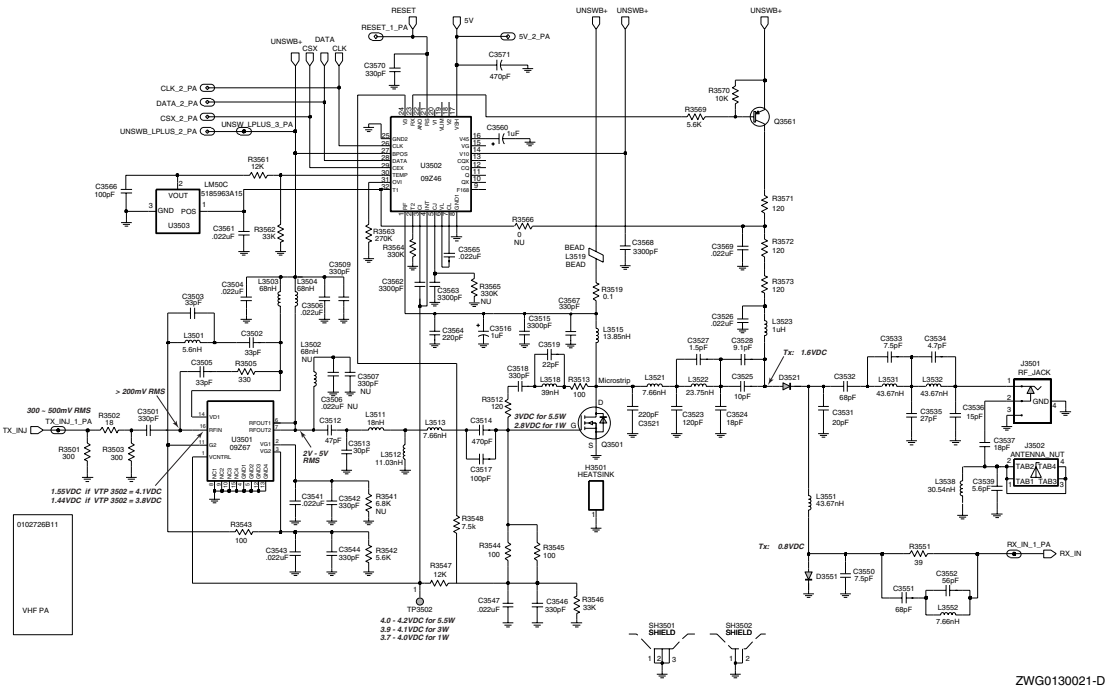
ZWG0130022-C

VHF (136-174 MHz) Synthesizer



ZWG0130020-B

VHF (136-174 MHz) Voltage Controlled Oscillator



VHF (136-174 MHz) Transmitter

3.0 VHF PCB 8486062B12 Parts List

Circuit Ref	Motorola Part No	Description
B501	0986237A02	CONN, CONTACT BATT
B503	3980502Z01	CONTACT, BACKUP B+ only GP360, GP380, GP680
B504	3980501Z01	CONTACT, BACKUP B- only GP360, GP380, GP680
C3200	2113743N31	16.0 PF 5% COG
C3203	2113743N50	100 PF 5% COG
C3204	2113743L41	10000 PF 10%
C3205	2113928N01	CER CHIP 0.1UF 10% 6.3
C3206	2113743L41	10000 PF 10%
C3207	2113743N10	2.2 PF +-.25PF COG
C3209	2311049A07	TANT 10% 1.0UF
C3210	2113743L17	1000 PF 10%
C3211	2311049A56	TAN CHIP A/P 4.7 20 10
C3212	2311049A07	TANT 10% 1.0UF
C3213	2311049A56	TAN CHIP A/P 4.7 20 10
C3214	2113928N01	CER CHIP 0.1UF 10% 6.3
C3215	2113743N26	10.0 PF 5% COG
C3218	2311049A56	TAN CHIP A/P 4.7 20 10
C3219	2113928N01	CER CHIP 0.1UF 10% 6.3
C3220	2113743N26	10.0 PF 5% COG
C3221	2113743L41	10000 PF 10%
C3222	2113928N01	CER CHIP 0.1UF 10% 6.3
C3223	2113928N01	CER CHIP 0.1UF 10% 6.3
C3224	2113928N01	CER CHIP 0.1UF 10% 6.3
C3225	2113928N01	CER CHIP 0.1UF 10% 6.3
C3226	2113928N01	CER CHIP 0.1UF 10% 6.3
C3227	2113743L41	10000 PF 10%
C3228	2113743L41	10000 PF 10%
C3229	2113743N50	100 PF 5% COG
C3230	2113740F51	REEL CL1 +/-30 100
C3231	2180478Z20	MONOLITHIC CERAMIC (1.0UF)
C3232	2180478Z20	MONOLITHIC CERAMIC (1.0UF)
C3233	2180478Z20	MONOLITHIC CERAMIC (1.0UF)
C3234	2180478Z20	MONOLITHIC CERAMIC (1.0UF)
C3235	2113743A23	.220UF 10%
C3238	2113743A24	.330 UF 10% 16V
C3239	2113743E07	CER CHIP .022UF
C3240	2113743A23	.220UF 10%
C3241	2113743L19	1200 PF 10%
C3242	2109720D14	CER CHIP LOW DIST 0.1UF
C3243	2113743E07	CER CHIP .022UF
C3244	2113743L41	10000 PF 10%
C3270	2113743E07	CER CHIP .022UF
C3271	2113743L05	330 PF 10%
C3272	2113743N18	4.7 PF +-.25PF COG
C3273	2113743N26	10.0 PF 5% COG
C3274	2113743N38	33.0 PF 5% COG
C3275	2113743N44	56.0 PF 5% COG
C3276	2113743N42	47.0 PF 5% COG
C3277	2113743N48	82.0 PF 5% COG
C3278	2113743E07	CER CHIP .022UF
C3279	2311049A40	GLOBAL TANT 10% 2.2 UF
C3280	2113743L41	10000 PF 10%
C3301	2113743N20	5.6 PF +-.5PF COG
C3302	2113743N54	150 PF 5% COG
C3303	2113743N30	15.0PF 5% COG
C3304	2113743N54	150 PF 5% COG
C3306	2113928N01	CER CHIP 0.1UF 10% 6.3
C3307	2113743N50	100 PF 5% COG
C3308	2113743L05	330 PF 10%
C3309	2113928N01	CER CHIP 0.1UF 10% 6.3
C3311	2113743N54	150 PF 5% COG
C3312	2113743N31	16.0 PF 5% COG
C3313	2113743N54	150 PF 5% COG
C3315	2113743N26	10.0 PF 5% COG
C3316	2113743N14	3.3 PF +-.25PF COG
C3317	2113743N40	39.0 PF 5% COG
C3318	2113743M08	22000PF +80-20% Y5V
C3320	2113743N48	82.0 PF 5% COG
C3321	2113743L05	330 PF 10%
C3322	2113743N50	100 PF 5% COG
C3323	2113743N50	100 PF 5% COG
C3324	2113743N38	33.0 PF 5% COG
C3325	2113743L17	1000 PF 10%
C3327	2113743L05	330 PF 10%
C3329	2113743L05	330 PF 10%
C3330	2113743N50	100 PF 5% COG
C3331	2113743N50	100 PF 5% COG
C3332	2113743N40	39.0 PF 5% COG
C3334	2113743N33	20.0 PF 5% COG
C3335	2113743N34	22.0 PF 5% COG
C3336	2311049A18	TANT 10% 10UF
C3337	2113743M08	22000PF +80-20% Y5V
C3338	2113743L09	470 PF 10%
C3339	2113743N26	10.0 PF 5% COG
C3501	2113743L05	330 PF 10%
C3502	2113743N38	33.0 PF 5% COG
C3503	2113743N38	33.0 PF 5% COG
C3504	2113743M08	22000PF +80-20% Y5V
C3505	2113743N38	33.0 PF 5% COG
C3508	2113743M08	22000PF +80-20% Y5V
C3509	2113743L05	330 PF 10%
C3512	2113740F43	REEL CL1 +/-30 47
C3513	2113740F38	REEL CL1 +/-30 30
C3514	2113740F67	CL1 +/-30 470 5%
C3515	2113743L29	3300PF 10%
C3516	2311049A08	KEMET CAPS
C3517	2113740F51	REEL CL1 +/-30 100
C3518	2113740F63	CL1 +/-30 330 5%
C3519	2113740F35	REEL CL1 +/-30 22
C3521	2111078B51	RF 220 5 NPO 100V
C3523	2111078B44	RF 120 5 NPO 100V
C3524	2113740F33	REEL CL1 +/-30 18
C3525	2113740F27	REEL CL1 +/-30 10
C3526	2113743M08	22000PF +80-20% Y5V
C3528	2113740F26	REEL CL1 +/-30 9.1
C3531	2113740F34	REEL CL1 +/-30 20
C3532	2113740F47	REEL CL1 +/-30 68
C3533	2113740F24	REEL CL1+/-30 7.5
C3534	2113740F19	CHIP CAP, CER 4.7PF
C3535	2113740F37	REEL CL1+/-30 27
C3536	2113740F31	REEL CL1 +/-30 15
C3537	2113740F33	REEL CL1 +/-30 18
C3539	2113740F21	REEL CL1+/-30 5.6
C3541	2113743M08	22000PF +80-20% Y5V
C3542	2113743L05	330 PF 10%
C3543	2113743M08	22000PF +80-20% Y5V
C3544	2113743L05	330 PF 10%
C3546	2113743L05	330 PF 10%
C3547	2113743M08	22000PF +80-20% Y5V
C3550	2113743N23	7.5 PF +-.5PF COG
C3551	2113743N46	68.0 PF 5% COG
C3552	2113743N44	56.0 PF 5% COG
C3560	2311049A07	TANT 10% 1.0UF
C3561	2113743M08	22000PF +80-20% Y5V
C3562	2113743L29	3300PF 10%
C3563	2113743L29	3300PF 10%
C3564	2113743L01	220 PF 10%
C3565	2113743E07	CER CHIP .022UF
C3566	2113743N50	100 PF 5% COG
C3567	2113743L05	330 PF 10%
C3568	2113743L29	3300PF 10%
C3569	2113743M08	22000PF +80-20% Y5V
C3570	2113743L05	330 PF 10%
C3571	2113743L09	470 PF 10%
C3701	2113743L41	10000 PF 10%
C3702	2113743L41	10000 PF 10%
C3703	2113743L41	10000 PF 10%
C3704	2113743L41	10000 PF 10%
C3705	2113743E20	CHIP. 10 UF 10%
C3706	2311049J11	CAPACITOR TANT 10% 4.7UF
C3707	2113743N34	22.0 PF 5% COG
C3708	2113743M24	100000 PF +80-20% Y5V
C3709	2113743M24	100000 PF +80-20% Y5V
C3710	2104993J02	MONOLITHIC CERAMIC (2.2UF)
C3711	2311049A69	TAN CHIP 10.0 UF 20% 6.3V
C3712	2113743M24	100000 PF +80-20% Y5V
C3713	2311049A09	TANT 2.2 UF 10%
C3714	2311049J11	CAPACITOR TANT 10% 4.7UF
C3715	2113743L09	470 PF 10%
C3721	2113743E20	CHIP. 10 UF 10%
C3722	2113743E20	CHIP. 10 UF 10%
C3724	2311049A08	KEMET CAPS
C3726	2113743N24	8.2 PF + -.5PF COG
C3727	2113743N50	100 PF 5% COG
C3731	2113743L41	10000 PF 10%
C3732	2113743L41	10000 PF 10%
C3733	2104993J02	MONOLITHIC CERAMIC (2.2UF)
C3734	2113743L41	10000 PF 10%
C3742	2113743L01	220 PF 10%
C3743	2113743L01	220 PF 10%
C3744	2113743L01	220 PF 10%
C3745	2113743L01	220 PF 10%
C3746	2113743L01	220 PF 10%
C3752	2113743L17	1000 PF 10%
C3753	2311049A56	TAN CHIP A/P 4.7 20 10
C3754	2113743M24	100000 PF +80-20% Y5V
C3755	2104993J02	MONOLITHIC CERAMIC (2.2UF)
* C3761	2113743N44	56.0 PF 5% COG
* C3762	2113740F63	CL1 +/-30 330 5%
* C3763	2113743N08	1.6 PF +-.25PF COG
C3801	2113743N18	4.7 PF +-.25PF COG
C3803	2113743L17	1000 PF 10%
C3804	2113743E20	CHIP. 10 UF 10%
C3805	2113743N18	4.7 PF +-.25PF COG
C3806	2113743N50	100 PF 5% COG
C3808	2113743N30	15.0PF 5% COG
C3809	2113743N36	27.0 PF 5% COG
C3811	2113743M24	100000 PF +80-20% Y5V
C3812	2113743M24	100000 PF +80-20% Y5V
C3813	2113743L41	10000 PF 10%
C3815	2113743L17	1000 PF 10%
C3816	2113743N22	6.8 PF +-.5PF COG
C3818	2113743E07	CER CHIP .022UF
C3821	2113743L41	10000 PF 10%
C3822	2113743L17	1000 PF 10%
C3823	2113743L41	10000 PF 10%
C3824	2113743N44	56.0 PF 5% COG
C3825	2113743N30	15.0PF 5% COG
C3826	2113743N18	4.7 PF +-.25PF COG
C3827	2113743E07	CER CHIP .022UF
C3828	2109720D01	CER CHIP LOW DIS T .01UF
C3829	2109720D01	CER CHIP LOW DIS T .01UF
C3830	2113743N46	68.0 PF 5% COG
C3832	2113743L17	1000 PF 10%
C3833	2113743N18	4.7 PF +-.25PF COG
C3834	2113743N44	56.0 PF 5% COG
C3835	2113743N22	6.8 PF +-.5PF COG
C3836	2113743N30	15.0PF 5% COG
C3842	2113743L17	1000 PF 10%
C400	2113743L41	10000 PF 10%
C401	2113743M24	100000 PF +80-20% Y5V
C402	2113743M24	100000 PF +80-20% Y5V
C403	2113928D08	CERAMIC CHIP 10.0UF
C407	2113928N01	CER CHIP 0.1UF 10% 6.3
C408	2113743N50	100 PF 5% COG
C409	2113743M24	100000 PF +80-20% Y5V
C410	2113928N01	CER CHIP 0.1UF 10% 6.3
C411	2113743M24	100000 PF +80-20% Y5V
C414	2113743M24	100000 PF +80-20% Y5V
C415	2109720D01	CER CHIP LOW DIS T .01UF
C416	2113928N01	CER CHIP 0.1UF 10% 6.3
C419	2113743L41	10000 PF 10%
C420	2113743L41	10000 PF 10%
C421	2113928N01	CER CHIP 0.1UF 10% 6.3
C422	2113743M24	100000 PF +80-20% Y5V
C423	2113743N50	100 PF 5% COG
C424	2311049A59	TANT CHIP A/P 10UF 10% 6V
C425	2113743M24	100000 PF +80-20% Y5V
C426	2113743N50	100 PF 5% COG
C427	2113743N50	100 PF 5% COG

Circuit Ref	Motorola Part No	Description
C428	2113743M24	100000 PF +80-20% Y5V
C429	2113743M24	100000 PF +80-20% Y5V
C430	2113928N01	CER CHIP 0.1UF 10% 6.3
C431	2113743N50	100 PF 5% COG
C433	2113743L41	10000 PF 10%
C434	2113743M24	100000 PF +80-20% Y5V
		only GP360, GP380, GP680
C435	2113743M24	100000 PF +80-20% Y5V
C436	2113743N34	22.0 PF 5% COG
		only GP360, GP380, GP680
C437	2113743N34	22.0 PF 5% COG
		only GP360, GP380, GP680
C440	2113743G26	4.7UF 16V + 80-20%
C441	2113743L09	470 PF 10%
C442	2113743E20	CHIP. 10 UF 10%
C443	2113928N01	CER CHIP 0.1UF 10% 6.3
C444	2113743N50	100 PF 5% COG
C445	2113743L09	470 PF 10%
C446	2113743L09	470 PF 10%
C447	2113928N01	CER CHIP 0.1UF 10% 6.3
C448	2113928N01	CER CHIP 0.1UF 10% 6.3
C449	2113743N50	100 PF 5% COG
C451	2113743M08	22000PF +80-20% Y5V
C452	2113743G26	4.7UF 16V + 80-20%
C453	2113743N50	100 PF 5% COG
C456	2113743N50	100 PF 5% COG
C458	2113743N50	100 PF 5% COG
C459	2113743N50	100 PF 5% COG
C463	2113743N50	100 PF 5% COG
C466	2113743N50	100 PF 5% COG
C467	2113928N01	CER CHIP 0.1UF 10% 6.3
C471	2113743L09	470 PF 10%
C472	2113743L09	470 PF 10%
C473	2113743L09	470 PF 10%
C474	2113743L41	10000 PF 10%
C475	2113743H14	10.0 UF 16V +80-20%
C476	2113928D08	CERAMIC CHIP 10.0UF
C477	2113743L17	1000 PF 10%
C478	2113743L17	1000 PF 10%
C479	2113928N01	CER CHIP 0.1UF 10% 6.3
C480	2113928D08	CERAMIC CHIP 10.0UF
C481	2113928N01	CER CHIP 0.1UF 10% 6.3
C482	2113928N01	CER CHIP 0.1UF 10% 6.3
C483	2113743L09	470 PF 10%
C484	2113743L09	470 PF 10%
C490	2113743L09	470 PF 10%
C491	2113743L09	470 PF 10%
C492	2113743L09	470 PF 10%
C493	2113743N50	100 PF 5% COG
C494	2113743N50	100 PF 5% COG
C495	2113743L09	470 PF 10%
C496	2113743L09	470 PF 10%
C497	2113743L09	470 PF 10%
C502	2311049A05	TANT 10% 0.47UF
C503	2113743N50	100 PF 5% COG
C505	2113743N50	100 PF 5% COG

Circuit Ref	Motorola Part No	Description
C511	2113743N50	100 PF 5% COG
C512	2113743N50	100 PF 5% COG
C513	2113743N50	100 PF 5% COG
C514	2113743N50	100 PF 5% COG
C520	2113743L41	10000 PF 10%
C521	2113743L41	10000 PF 10%
C522	2113743L41	10000 PF 10%
C523	2113743L41	10000 PF 10%
C535	2113743L17	1000 PF 10%
CR3301	4802245J42	RING QUAD SOT-143 PKG
CR3302	4805129M96	DIODE SMBV1032
CR3303	4880154K03	SOT MMBD353 DUAL SCHKY
CR411	4802245J47	SCHOTTKY BARRIER(RB471E)
CR412	4802245J62	SCHOTTKY BARRIER(RB471E)
CR413	4802245J62	SCHOTTKY BARRIER(RB471E)
CR440	4813833C02	DUAL 70V '5B' COMM CATH
CR501	4880107R01	RECTIFIER
CR503	4805729G49	LED RED/YEL
D3270	4862824C01	VARACTOR
D3301	4802081B58	DUAL SILCON (VARICAP)
D3302	4802081B58	DUAL SILCON (VARICAP)
D3521	4880973Z02	PIN DIODE
D3551	4880973Z02	PIN DIODE
D3701	4802233J09	TRIPLE SOT25-RH
D3702	4802233J09	TRIPLE SOT25-RH
* D3761	4862824C03	VARACTOR
D3821	4805649Q13	VCTR ISV 228
D3831	4805649Q13	VCTR ISV 228
D3832	4862824C01	VARACTOR
E400	2480640Z01	C/IND BK1005HM471 BEAD
E401	2480640Z01	C/IND BK1005HM471 BEAD
E402	2480640Z01	C/IND BK1005HM471 BEAD
E403	2480640Z01	C/IND BK1005HM471 BEAD
E404	2480640Z01	C/IND BK1005HM471 BEAD
E405	2480640Z01	C/IND BK1005HM471 BEAD
E406	2480640Z01	C/IND BK1005HM471 BEAD
E407	2480640Z01	C/IND BK1005HM471 BEAD
E408	2480640Z01	C/IND BK1005HM471 BEAD
E409	2480640Z01	C/IND BK1005HM471 BEAD
F501	6580542Z01	FUSE CHIP SMT TR/1608FF 3A
FL401	4870368G02	CLOCK OSC XTAL
		only GP360, GP380, GP680
H3501	2680499Z01	HEAT SPREADER
J3501	0180117S05	RF JACK ASSEMBLY
J3502	0280519Z02	NUT, ANTENNA
J400	0905505Y04	CONN ZIF 40Pin
		not in GP320
J403	0905505Y02	CONN ZIF MALE 20 PIN
L3200	2462587N68	CHIP IND 1000 NH 5%
L3202	2462587N68	CHIP IND 1000 NH 5%
L3221	2462587N68	CHIP IND 1000 NH 5%
L3270	2462587T15	IND CHIP 100NH 5% LOW PRO
L3271	2462587Q20	IND CHIP 2,200NH 20%
L3301	2462587T35	IND CHIP 12NH 5% LOW PRO
L3303	2462587T35	IND CHIP 12NH 5% LOW PRO
L3304	2462587T23	IND CHIP 470NH 5% LOW PRO

Circuit Ref	Motorola Part No	Description
L3305	2462587T35	IND CHIP 12NH 5% LOW PRO
L3306	2462587T35	IND CHIP 12NH 5% LOW PRO
L3308	2462587T34	IND CHIP 10NH 5% LOW PRO
L3309	2462587N55	CHIP IND 150 NH 5%
L3312	2462587V28	CHIP IND 33 NH 5% 0805
L3501	2413926H09	IND CHIP 5.6 NH +/- 0.3NH
L3503	2462587V32	CHIP IND 68NH 5% 0805
L3504	2462587N51	CHIP IND 68 NH 5%
L3511	2462587N44	CHIP IND 18 NH 5%
L3512	2479990B01	AIR WOUND GREEN 11.03NH
L3513	2479990A02	AIR WOUND GREEN 7.66NH
L3515	2479990C03	AIR WOUND GREEN 13.85NH
L3518	2462587N48	CHIP IND 39 NH 5%
L3519	2484657R01	INDUCTOR BEAD CHIP
L3521	2479990A02	AIR WOUND GREEN 7.66NH
L3522	2479990E01	COIL AIR WOUND GREEN 23.75
L3523	2462587N68	CHIP IND 1000 NH 5%
L3531	2479990N01	AIR WOUND GREEN 43.67NH
L3532	2479990N01	AIR WOUND GREEN 43.67NH
L3538	2479990M01	AIR WOUND GREEN 30.54NH
L3551	2479990N01	AIR WOUND GREEN 43.67NH
L3552	2479990A02	AIR WOUND GREEN 7.66NH
L3701	2462587Q42	IND CHIP 390NH 10%
L3731	2462587Q20	IND CHIP 2,200NH 20%
L3801	2462587V34	CHIP IND 100NH 5% 0805
L3809	2462587V27	CHIP IND 27 NH 5% 0805
L3811	2462587V34	CHIP IND 100NH 5% 0805
L3812	2462587V34	CHIP IND 100NH 5% 0805
L3813	2462587Q47	IND CHIP 1000 NH 10%
L3816	2462587V34	CHIP IND 100NH 5% 0805
L3821	2462587N50	CHIP IND 56 NH 5%
L3822	2462587N49	CHIP IND 47 NH 5%
L3823	2462587N49	CHIP IND 47 NH 5%
L3824	2462587N68	CHIP IND 1000 NH 5%
L3825	2462587V34	CHIP IND 100NH 5%
L3826	2462587N68	CHIP IND 1000 NH 5%
L3831	2462587N50	CHIP IND 56 NH 5%
L3832	2462587N51	CHIP IND 68 NH 5%
L3833	2462587N50	CHIP IND 56 NH 5%
L3834	2462587N68	CHIP IND 1000 NH 5%
L400	2462587Q42	IND CHIP 390NH 10%
L401	2462587Q42	IND CHIP 390NH 10%
L410	2462587Q42	IND CHIP 390NH 10%
L411	2462587Q42	IND CHIP 390NH 10%
L505	2462587Q42	IND CHIP 390NH 10%
PB501	4080523Z01	SWITCH, TACT
PB502	4080523Z01	SWITCH, TACT
PB503	4080523Z01	SWITCH, TACT
		not in GP320
PB504	4080523Z01	SWITCH, TACT
PB505	4080523Z01	SWITCH, TACT
		not in GP320
Q3200	4813827A07	TSTR NPN SML SIG MMBR941LT1
Q3201	4880214G02	TSTR MMBT3904
Q3202	4880214G02	TSTR MMBT3904

Circuit Ref	Motorola Part No	Description
Q3270	4805218N63	RF TRANS SOT 323 BFQ67W
Q3301	4880214G02	TSTR MMBT3904
Q3302	4813827A07	TSTR NPN MMBR941LT1
Q3501	4802245J55	TSTR POWER FIELD EFFECT
Q3561	4813824A17	XSTR PNP40V .2A B=100-300
Q3721	4802245J50	TSTR DUAL NPN/PNP UMC5N
Q3801	4813827A07	TSTR NPN MMBR941LT1
Q400	4809579E18	MOSFET P-CHAN TP010IT
Q403	4880214G02	TSTR MMBT3904
Q405	4802245J54	UMG5N DIGITAL TRANSISTOR
Q410	4802245J54	UMG5N DIGITAL TRANSISTOR
Q416	4809579E18	MOSFET P-CHAN TP010IT
		only GP360, GP380, GP680
Q417	4802245J50	TSTR DUAL NPN/PNP UMC5N
Q502	5180159R01	DUAL TRANS NPNS
Q505	4880214G02	TSTR MMBT3904
R3200	0662057M54	150 5% 20X40
R3201	0662057M82	2200 5% 20X40
R3202	0662057M90	4700 5% 20X40
R3203	0662057M98	10K 5% 20X40
R3204	0662057M26	10 5% 20X40
R3205	0662057M74	1000 5% 20X40
R3206	0662057N23	100K 5% 20X40
R3207	0662057N13	39K 5% 20X40
R3208	0662057M50	100 5% 20X40
R3209	0662057M74	1000 5% 20X40
R3210	0662057M82	2200 5% 20X40
R3211	0662057M82	2200 5% 20X40
R3212	0662057M90	4700 5% 20X40
R3213	0662057M82	2200 5% 20X40
R3214	0662057M34	22 5% 20X 40
R3219	0662057M50	100 5% 20X40
R3220	0662057M90	4700 5% 20X40
R3221	0662057M50	100 5% 20X40
R3224	0662057M26	10 5% 20X40
R3225	0662057M74	1000 5% 20X40
R3226	0662057M26	10 5% 20X40
R3270	0662057M74	1000 5% 20X40
R3271	0662057M42	47 5% 20X40
R3272	0662057N15	47K 5% 20X40
R3273	0662057N15	47K 5% 20X40
R3274	0662057M83	2400 5% 20X40
R3275	0662057M74	1000 5% 20X40
R3276	0662057N30	200K 5% 20X40
R3303	0662057N23	100K 5% 20X40
R3304	0662057N23	100K 5% 20X40
R3305	0662057N19	68K 5% 20X40
R3306	0662057M82	2200 5% 20X40
R3307	0662057N11	33K 5% 20X40
R3308	0662057M78	1500 5% 20X40
R3309	0662057M92	5600 5% 20X40
R3310	0662057M98	10K 5% 20X40
R3311	0662057M26	10 5% 20X40
R3312	0662057M38	33 5% 20X40
R3313	0662057M34	22 5% 20X 40
R3314	0662057M26	10 5% 20X40

Circuit Ref	Motorola Part No	Description
R3315	0662057M62	330 5% 20X40
R3316	0662057M66	470 5% 20X40
R3317	0662057N23	100K 5% 20X40
R3318	0662057M66	470 5% 20X40
R3321	0662057M54	150 5% 20X40
R3322	0662057M58	220 5% 20X40
R3323	0662057M32	18 5% 20X40
R3324	0662057M58	220 5% 20X40
R3501	0662057M61	300 5% 20X40
R3502	0662057M32	18 5% 20X40
R3503	0662057M61	300 5% 20X40
R3505	0662057M62	330 5% 20X40
R3512	0662057A27	120 OHMS 5%
R3513	0662057A25	100 OHMS 5%
R3519	0680539Z01	POWER METAL STRIP
R3542	0662057M92	5600 5% 20X40
R3543	0662057M50	100 5% 20X40
R3544	0662057A25	100 OHMS 5%
R3545	0662057A25	100 OHMS 5%
R3546	0662057N11	33K 5% 20X40
R3547	0662057N01	12K 5% 20X40
R3548	0662057M95	7500 55 20X40
R3551	0662057M40	39 5% 20X40
R3561	0662057N01	12K 5% 20X40
R3562	0662057N11	33K 5% 20X40
R3563	0662057N33	270K 5% 20X40
R3564	0662057N35	330K 5% 20X40
R3569	0662057M92	5600 5% 20X40
R3570	0662057M98	10K 5% 20X40
R3571	0662057A27	120 OHMS 5%
R3572	0662057A27	120 OHMS 5%
R3573	0662057A27	120 OHMS 5%
R3701	0662057M50	100 5% 20X40
R3703	0662057M54	150 5% 20X40
R3704	0662057M54	150 5% 20X40
R3705	0662057N11	33K 5% 20X40
R3721	0662057M66	470 5% 20X40
R3722	0662057M74	1000 5% 20X40
R3723	0662057M50	100 5% 20X40
R3727	0662057N23	100K 5% 20X40
R3741	0662057M50	100 5% 20X40
R3751	0662057N30	200K 5% 20X40
R3752	0662057N35	330K 5% 20X40
R3761	0662057N15	47K 5% 20X40
R3802	0662057M50	100 5% 20X40
R3803	0662057M58	220 5% 20X40
R3804	0662057M98	10K 5% 20X40
R3805	0662057N08	24K 5% 20X40
R3806	0662057M34	22 5% 20X 40
R3808	0662057M26	10 5% 20X40
R3811	0662057M50	100 5% 20X40
R3816	0662057M74	1000 5% 20X40
R3817	0662057M01	0 5% 20X40
R3821	0662057M58	220 5% 20X40
R3822	0662057M42	47 5% 20X40
R3823	0662057N11	33K 5% 20X40

Circuit Ref	Motorola Part No	Description
R3824	0662057N07	22K 5% 20X40
R3825	0662057M38	33 5% 20X40
R3826	0662057M32	18 5% 20X40
R3828	0662057M50	100 5% 20X40
R3829	0662057M01	0 5% 20X40
R3831	0662057M98	10K 5% 20X40
R3832	0662057N01	12K 5% 20X40
R3833	0662057M58	220 5% 20X40
R3834	0662057M42	47 5% 20X40
R3835	0662057N15	47K 5% 20X40
R3836	0662057M98	10K 5% 20X40
R400	0662057N15	47K 5% 20X40
R401	0662057M01	0 5% 20X40
R405	0662057M01	0 5% 20X40
R406	0662057N20	75K 5% 20X40
R407	0662057N19	68K 5% 20X40
R409	0662057M98	10K 5% 20X40
R410	0662057N23	100K 5% 20X40
R411	0662057M98	10K 5% 20X40
R413	0662057M01	0 5% 20X40
R414	0662057V34	180K 1% 1/16W
R415	0662057V26	91K 1% 1/16W
R416	0662057N13	39K 5% 20X40
R418	0662057M01	0 5% 20X40
R419	0662057M67	0 5% 20X40
		only GP360, GP380, GP680
R420	0662057B46	10.0 MEG OHMS 5%
		only GP360, GP380, GP680
R421	0662057M81	2000 5% 20X40
R423	0662057N21	82K 5% 20X40
R424	0662057N12	36K 5% 20X40
R425	0662057N10	30K 5% 20X40
R426	0662057N35	330K 5% 20X40
		only GP360, GP380, GP680
R427	0662057M84	2700 5% 20X40
R428	0662057M10	2.2 5% 20X40
R429	0662057M98	10K 5% 20X40
R431	0662057N39	470K 5% 20X40
R432	0662057N16	51K 5% 20X40
R434	0662057M62	330 5% 20X40
R435	0662057M81	2000 5% 20X40
R436	0662057M01	0 5% 20X40
R445	0662057N08	24K 5% 20X40
R446	0662057N31	RES, CHIP 220K 5% 20X40
R447	0662057N51	RES, CHIP 1.5 MEG 5% 20X40
R448	0662057N33	270K 5% 20X40
R449	0662057N08	24K 5% 20X40
R450	0683962T45	68 5-1
R457	0662057M98	10K 5% 20X40
R460	0662057M90	4700 5% 20X40
R461	0662057M56	180 5% 20X40
		only GP360, GP380, GP680
R462	0662057M98	10K 5% 20X40
		only GP360, GP380, GP680
R463	0662057M61	300 5% 20X40
R471	0662057M92	5600 5% 20X40

Circuit Ref	Motorola Part No	Description
R472	0662057M93	6200 5% 20X40
R473	0662057M26	10 5% 20X40
R475	0662057M01	0 5% 20X40
R476	0662057N08	24K 5% 20X40
R477	0662057M74	1000 5% 20X40
R478	0662057M98	10K 5% 20X40
R481	0662057N08	24K 5% 20X40
R492	0662057M01	0 5% 20X40
R501	0662057M70	680 5% 20X40
R502	0662057M56	180 5% 20X40
R505	0662057M98	10K 5% 20X40
R506	0662057N15	47K 5% 20X40
RT400	0680590Z01	THERMISTOR_33K
S501	4080710Z01	SWITCH (FREQUENCY)
		only GP340, GP640
S501	4080710Z02	SWITCH (FREQUENCY)
		only GP360, GP380, GP680
S502	1880619Z01	POTENTIOMETER, VOLUME
SH3201	2602023X08	SHIELD
SH3202	2686081B02	SHIELD
SH3203	2686081B03	SHIELD
SH3301	2686081B01	SHIELD
SH3302	2686081B05	SHIELD
SH3303	2686081B06	SHIELD
SH3501	2686081B03	SHIELD
SH3502	2686081B04	SHIELD
SH3701	2680511Z01	SHIELD SYNTHESIZER
SH3702	2680511Z01	SHIELD SYNTHESIZER
SH3801	2680513Z01	SHIELD VCO TOP
SH3802	2680514Z01	SHIELD VCO BOTTOM/LVZIF
SH400	2680505Z01	CONTROLLER TOP LEFT
SH401	2680506Z01	CONTROLLER TOP RIGHT
SH402	2680515Z01	CONTROLLER BOTTOM LEFT
SH403	2680516Z01	CONTROLLER BTM RIGHT
T3301	2580541Z01	BALUN TRANSFORMER
T3302	2580541Z01	BALUN TRANSFORMER
U3201	5102463J58	3.3V REG IN SOT23-5 PKG
U3220	5109632D83	IC LVZIF 2.2 H60G 48TQFP
U3501	5105109Z67	IC LDMOS DRIVER VHF/UHF
U3502	5185765B01	IC POWER CONTROL PASS 2.3
U3503	5185963A15	IC TEMP SENSOR 1M50C
U3701	5185963A27	IC FRACN AT25016 48 PIN GFP
U3711	5105739X05	IC 5V REGULATOR
U3801	5105750U54	IC VCO BUFFER
U400	5102463J40	REG 3.3V, LP2951CMM-3.3
U404	5185963A53	IC ASFIC CMP TQFP 48PIN PKG
U405	5102463J36	STATIC_RAM_32KX8
* U406	5102463J60	IC 512KX8 FLASH ROM
* U407	5102463J64	16KX8 SPI SERIAL EEPROM
U409	5102226J56	68HC11FLO_PASS5 TQFP
U410	5102463J57	REG 3.3V, ILC7062CM-33
		only GP360, GP380, GP680
U420	5102463J44	AUDIO AMPLIFIER TDA8547TS
VR432	4805656W08	ZENER QUAD
VR433	4805656W08	ZENER QUAD
VR434	4802245J51	ZENER DIODE; BZX284-C6V8*

Circuit Ref	Motorola Part No	Description
VR439	4880140L15	10V ZENER
VR447	4802245J53	ZENER_DIODE; BZX284-C10
VR448	4802245J53	ZENER_DIODE; BZX284-C10
VR449	4802245J53	ZENER_DIODE; BZX284-C10
VR450	4802245J53	ZENER_DIODE; BZX284-C10
VR501	4813830A18	6.8V 5% 225MWMMBZ5235B_
VR506	4802245J51	ZENER DIODE; BZX284-C6V8
Y3200	9186153B01	XTAL FILTER, SMD 45.1MHz
Y3761	4802245J49	CRYSTL 16.8MHZ WITH CLIP

* Motorola Depot Servicing only

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

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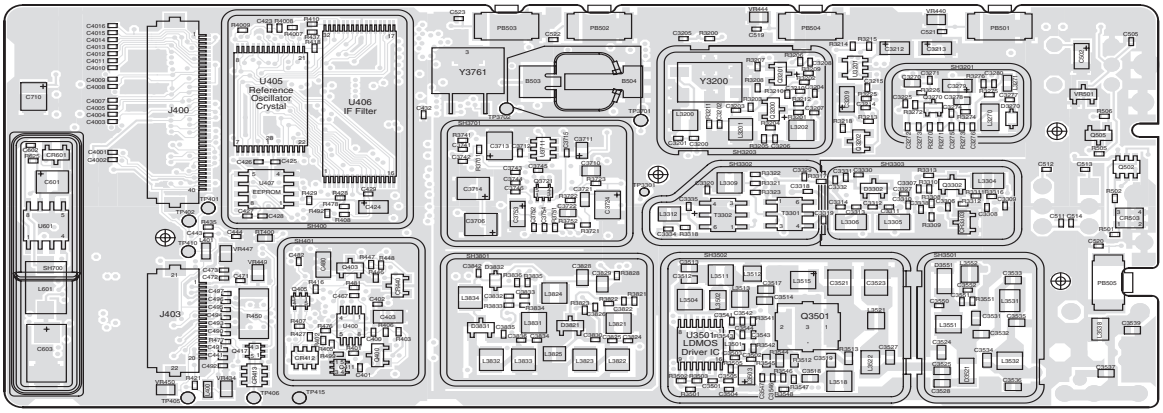
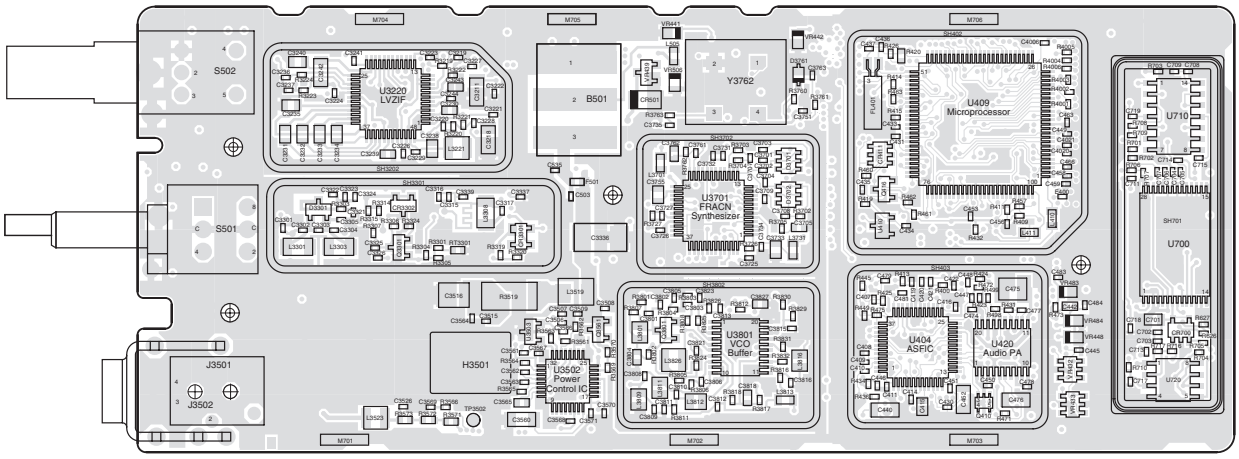
4.0 VHF PCB 8486101B09 / Schematics (GP1280)

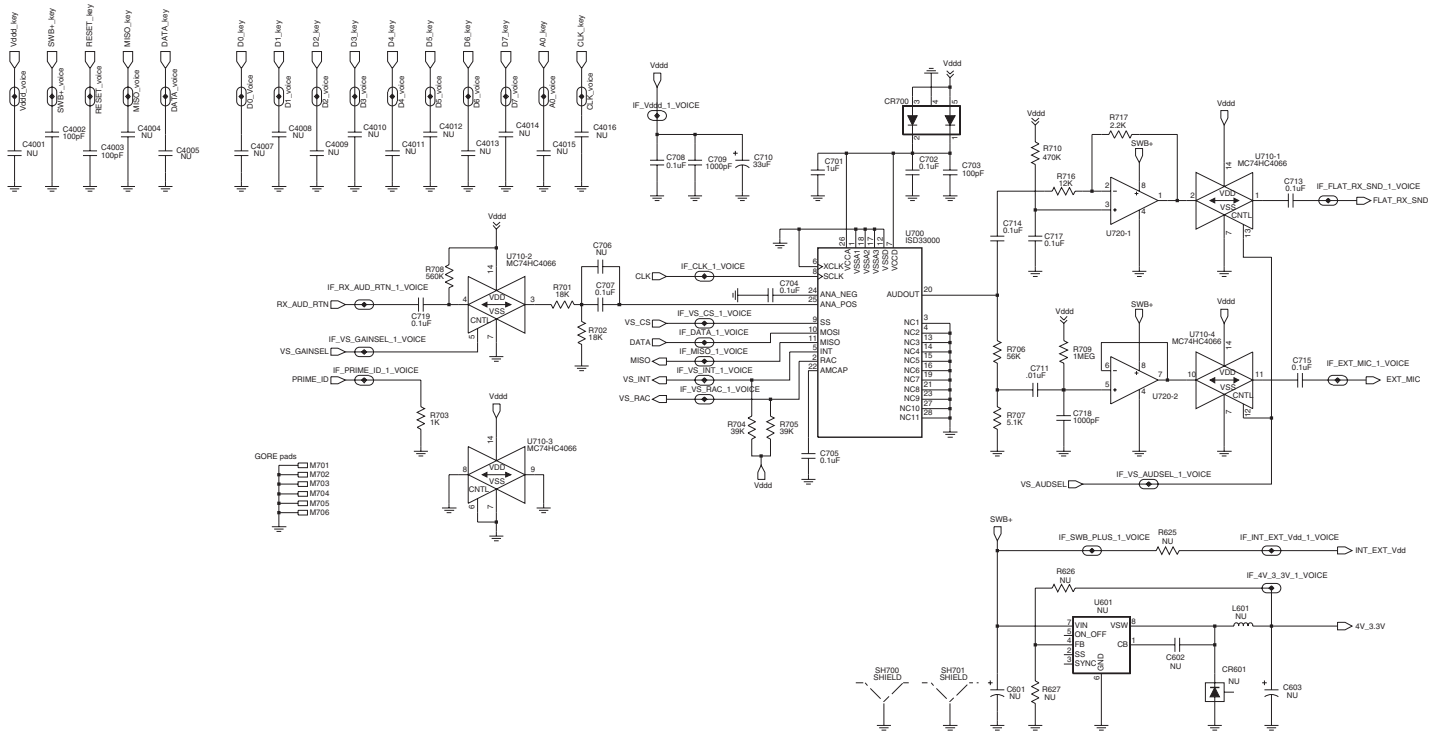


ZWG0130096-B

VHF (136-174 MHz) Main Board Top Side



VHF (136-174 MHz) Main Board Bottom Side



ZMY0130493-O

VHF (136-174 MHz) GP1280 - Voice Storage Schematic

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5.0 VHF PCB 8086101B09 Parts List (GP1280)

Circuit Ref	Motorola Part No	Description
B501	0986237A01	CONN, CONTACT BATTERY
B503	3980502Z01	CONTACT, BACKUP B+
B504	3980501Z01	CONTACT, BACKUP B-
C3200	2113743N31	16.0 PF 5%
C3203	2113743N50	100 PF 5%
C3204	2113743L41	10000 PF 10%
C3205	2113928N01	0.1UF 10% 6.3
C3206	2113743L41	10000 PF 10%
C3207	2113743N10	2.2 PF +-.25PF
C3209	2311049A07	TANT 10% 1.0UF
C3210	2113743L17	1000 PF 10%
C3211	2311049A56	TAN CHIP A/P 4.7 20 10
C3212	2311049A07	TANT 10% 1.0UF
C3213	2311049A56	TAN CHIP A/P 4.7 20 10
C3214	2113928N01	CERAMIC CHIP 10.0UF
C3215	2113743N26	10.0 PF 5%
C3218	2311049A56	TAN CHIP A/P 4.7 20 10
C3219	2113928N01	CERAMIC CHIP 10.0UF
C3220	2113743N26	10.0 PF 5%
C3221	2113743L41	10000 PF 10%
C3222	2113928N01	CERAMIC CHIP 10.0UF
C3223	2113928N01	0.1UF 10% 6.3
C3224	2113928N01	0.1UF 10% 6.3
C3225	2113928N01	0.1UF 10% 6.3
C3226	2113928N01	0.1UF 10% 6.3
C3227	2113743L41	10000 PF 10%
C3228	2113743L41	10000 PF 10%
C3229	2113743N50	100 PF 5%
C3230	2113740F51	REEL CL1 +/-30 100
C3231	2180478Z20	MONOLITH CERAMIC (1.0UF)
C3232	2180478Z20	MONOLITH CERAMIC (1.0UF)
C3233	2180478Z20	MONOLITH CERAMIC (1.0UF)
C3234	2180478Z20	MONOLITH CERAMIC (1.0UF)
C3235	2113743A23	.220UF 10%
C3238	2113743A24	.330 UF 10% 16V
C3239	2113743E07	.022UF
C3240	2113743A23	.220UF 10%
C3241	2113743L19	1200 PF 10%
C3242	2109720D14	LOW DIST 0.1UF
C3243	2113743E07	.022UF
C3244	2113743L41	10000 PF 10%
C3270	2113743E07	.022UF
C3271	2113743L05	330 PF 10%
C3272	2113743N18	4.7 PF +-.25PF
C3273	2113743N26	10.0 PF 5%
C3274	2113743N38	33.0 PF 5%
C3275	2113743N44	56.0 PF 5%
C3276	2113743N42	47.0 PF 5%
C3277	2113743N48	82.0 PF 5%
C3278	2113743E07	.022UF
C3279	2311049A40	GLOBAL TANT 10% 2.2 UF
C3280	2113743L41	10000 PF 10%
C3301	2113743N20	5.6 PF +-.5PF
C3302	2113743N54	150 PF 5%
C3303	2113743N30	15.0PF 5%
C3304	2113743N54	150 PF 5%
C3306	2113928N01	0.1UF 10% 6.3
C3307	2113743N50	100 PF 5%
C3308	2113743L05	330 PF 10%
C3309	2113928N01	0.1UF 10% 6.3
C3311	2113743N54	150 PF 5%
C3312	2113743N31	16.0 PF 5%
C3313	2113743N54	150 PF 5%
C3315	2113743N26	10.0 PF 5%
C3316	2113743N14	3.3 PF +-.25PF
C3317	2113743N40	39.0 PF 5%
C3318	2113743M08	22000PF +80-20% Y5V
C3320	2113743N48	82.0 PF 5%
C3321	2113743L05	330 PF 10%
C3322	2113743N50	100 PF 5%
C3323	2113743N50	100 PF 5%
C3324	2113743N38	33.0 PF 5%
C3325	2113743L17	1000 PF 10%
C3327	2113743L05	330 PF 10%
C3329	2113743L05	330 PF 10%
C3330	2113743N50	100 PF 5%
C3331	2113743N50	100 PF 5%
C3332	2113743N40	39.0 PF 5%
C3334	2113743N33	20.0 PF 5%
C3335	2113743N34	22.0 PF 5%
C3336	2311049A18	CAP. TANT 10% 10UF
C3337	2113743M08	22000PF +80-20% Y5V
C3338	2113743L09	470 PF 10%
C3339	2113743N26	10.0 PF 5%
C3501	2113743L05	330 PF 10%
C3502	2113743N38	33.0 PF 5%
C3503	2113743N38	33.0 PF 5%
C3504	2113743M08	22000PF +80-20% Y5V
C3505	2113743N38	33.0 PF 5%
C3508	2113743M08	22000PF +80-20% Y5V
C3509	2113743L05	330 PF 10%
C3512	2113740F43	REEL CL1 +/-30 47
C3513	2113740F38	REEL CL1 +/-30 30
C3514	2113740F67	CL1 +/-30 470 5%
C3515	2113743L29	3300PF 10%
C3516	2311049A08	KEMET CAPS
C3517	2113740F51	REEL CL1 +/-30 100
C3518	2113740F63	CL1 +/-30 330 5%
C3519	2113740F35	REEL CL1 +/-30 22
C3521	2111078B51	RF 220 5 NPO 100V
C3523	2111078B44	RF 120 5 NPO 100V
C3524	2113740F33	REEL CL1 +/-30 18
C3525	2113740F27	REEL CL1 +/-30 10
C3526	2113743M08	22000PF +80-20% Y5V
C3528	2113740F26	REEL CL1 +/-30 9.1
C3531	2113740F34	REEL CL1 +/-30 20
C3532	2113740F47	REEL CL1 +/-30 68
C3533	2113740F24	REEL CL1+/-30 7.5
C3534	2113740F19	CHIP CAP, CER 4.7PF
C3535	2113740F37	REEL CL1+/-30 27
C3536	2113740F31	REEL CL1 +/-30 15
C3537	2113740F33	REEL CL1 +/-30 18
C3539	2113740F21	REEL CL1+/-30 5.6
C3541	2113743M08	22000PF +80-20% Y5V
C3542	2113743L05	330 PF 10%
C3543	2113743M08	22000PF +80-20% Y5V
C3544	2113743L05	330 PF 10%
C3546	2113743L05	330 PF 10%
C3547	2113743M08	22000PF +80-20% Y5V
C3550	2113743N23	7.5 PF +-.5PF
C3551	2113743N46	68.0 PF 5%
C3552	2113743N44	56.0 PF 5%
C3560	2311049A07	TANT 10% 1.0UF
C3561	2113743M08	22000PF +80-20% Y5V
C3562	2113743L29	3300PF 10%
C3563	2113743L29	3300PF 10%
C3564	2113743L01	220 PF 10%
C3565	2113743E07	.022UF
C3566	2113743N50	100 PF 5%
C3567	2113743L05	330 PF 10%
C3568	2113743L29	3300PF 10%
C3569	2113743M08	22000PF +80-20% Y5V
C3570	2113743L05	330 PF 10%
C3571	2113743L09	470 PF 10%
C3701	2113743L41	10000 PF 10%
C3702	2113743L41	10000 PF 10%
C3703	2113743L41	10000 PF 10%
C3704	2113743L41	10000 PF 10%
C3705	2113743E20	CHIP. 10 UF 10%
C3706	2311049J11	CAPACITOR TANT 10% 4.7UF
C3707	2113743N34	22.0 PF 5%
C3708	2113743M24	100000 PF +80-20% Y5V
C3709	2113743M24	100000 PF +80-20% Y5V
C3710	2104993J02	MONOLITH CERAMIC (2.2UF)
C3711	2311049A69	TAN CHIP 10.0 UF 20% 6.3V
C3712	2113743M24	100000 PF +80-20% Y5V
C3713	2311049A09	TANT 2.2 UF 10%
C3714	2311049J11	CAPACITOR TANT 10% 4.7UF
C3715	2113743L09	470 PF 10%
C3721	2113743E20	CHIP. 10 UF 10%
C3722	2113743E20	CHIP. 10 UF 10%
C3724	2311049A08	KEMET CAPS
C3726	2113743N24	8.2 PF + -.5PF
C3727	2113743N50	100 PF 5%
C3731	2113743L41	10000 PF 10%
C3732	2113743L41	10000 PF 10%
C3733	2104993J02	MONOLITH CERAMIC (2.2UF)
C3734	2113743L41	10000 PF 10%
C3742	2113743L01	220 PF 10%
C3743	2113743L01	220 PF 10%
C3744	2113743L01	220 PF 10%
C3745	2113743L01	220 PF 10%
C3746	2113743L01	220 PF 10%
C3752	2113743L17	1000 PF 10%
C3753	2311049A56	TAN CHIP A/P 4.7 20 10
C3754	2113743M24	100000 PF +80-20% Y5V
C3755	2104993J02	MONOLITH CERAMIC (2.2UF)
* C3761	2113743N44	56.0 PF 5%
* C3762	2113740F63	330 CL1 +/-30 5%
* C3763	2113743N08	1.6 PF +-.25PF
C3801	2113743N18	4.7 PF +-.25PF
C3803	2113743L17	1000 PF 10%
C3804	2113743E20	CHIP. 10 UF 10%
C3805	2113743N18	4.7 PF +-.25PF
C3806	2113743N50	100 PF 5%
C3808	2113743N30	15.0PF 5%
C3809	2113743N36	27.0 PF 5%
C3811	2113743M24	100000 PF +80-20% Y5V
C3812	2113743M24	100000 PF +80-20% Y5V
C3813	2113743L41	10000 PF 10%
C3815	2113743L17	1000 PF 10%
C3816	2113743N22	6.8 PF +-.5PF
C3818	2113743E07	.022UF
C3821	2113743L41	10000 PF 10%
C3822	2113743L17	1000 PF 10%
C3823	2113743L41	10000 PF 10%
C3824	2113743N44	56.0 PF 5%
C3825	2113743N30	15.0PF 5%
C3826	2113743N18	4.7 PF +-.25PF
C3827	2113743E07	.022UF
C3828	2109720D01	LOW DIS T .01UF
C3829	2109720D01	LOW DIS T .01UF
C3830	2113743N46	68.0 PF 5%
C3832	2113743L17	1000 PF 10%
C3833	2113743N18	4.7 PF +-.25PF
C3834	2113743N44	56.0 PF 5%
C3835	2113743N22	6.8 PF +-.5PF
C3836	2113743N30	15.0PF 5%
C3842	2113743L17	1000 PF 10%
C400	2113743L41	10000 PF 10%

Circuit Ref	Motorola Part No	Description
C4001	2113743N50	100 PF 5%
C4002	2113743N50	100 PF 5%
C4003	2113743N50	100 PF 5%
C401	2113743M24	100000 PF +80-20% Y5V
C402	2113743M24	100000 PF +80-20% Y5V
C4020	2113743L17	1000 PF 10%
C4021	2113743L17	1000 PF 10%
C403	2113928D08	CERAMIC CHIP 10.0UF
C407	2113928N01	0.1UF 10% 6.3
C408	2113743N50	100 PF 5%
C409	2113743M24	100000 PF +80-20% Y5V
C410	2113928N01	0.1UF 10% 6.3
C411	2113743M24	100000 PF +80-20% Y5V
C414	2113743M24	100000 PF +80-20% Y5V
C415	2109720D01	LOW DIS T .01UF
C416	2113928N01	0.1UF 10% 6.3
C419	2113743L41	10000 PF 10%
C420	2113743L41	10000 PF 10%
C421	2113928N01	0.1UF 10% 6.3
C422	2113743M24	100000 PF +80-20% Y5V
C423	2113743N50	100 PF 5%
C424	2311049A59	TANT CHIP A/P 10UF 10% 6V
C425	2113743M24	100000 PF +80-20% Y5V
C426	2113743N50	100 PF 5%
C427	2113743N50	100 PF 5%
C428	2113743M24	100000 PF +80-20% Y5V
C429	2113743M24	100000 PF +80-20% Y5V
C430	2113928N01	0.1UF 10% 6.3
C431	2113743N50	100 PF 5%
C433	2113743L41	10000 PF 10%
C434	2113743M24	100000 PF +80-20% Y5V
C435	2113743M24	100000 PF +80-20% Y5V
C436	2113743N34	22.0 PF 5%
C437	2113743N34	22.0 PF 5%
C440	2113743G26	4.7UF 16V + 80-20%
C441	2113743L09	470 PF 10%
C442	2113743E20	10 UF 10%
C443	2113928N01	CERAMIC CHIP 10.0UF
C444	2113743N50	100 PF 5%
C445	2113743L09	470 PF 10%
C446	2113743L09	470 PF 10%
C447	2113928N01	CERAMIC CHIP 10.0UF
C448	2113928N01	CERAMIC CHIP 10.0UF
C449	2113743N50	100 PF 5%
C451	2113743M08	22000PF +80-20% Y5V
C452	2113743G26	4.7UF 16V + 80-20%
C453	2113743N50	100 PF 5%
C456	2113743N50	100 PF 5%
C458	2113743N50	100 PF 5%
C459	2113743N50	100 PF 5%
C463	2113743N50	100 PF 5%
C466	2113743N50	100 PF 5%
C467	2113928N01	0.1UF 10% 6.3
C471	2113743L09	470 PF 10%
C472	2113743L09	470 PF 10%
C473	2113743L09	470 PF 10%
C474	2113743L41	10000 PF 10%
C475	2113743H14	10.0 UF 16V +80-20%
C476	2113928D08	CERAMIC CHIP 10.0UF
C477	2113743L17	1000 PF 10%
C478	2113743L17	1000 PF 10%
C479	2113928N01	0.1UF 10% 6.3
C480	2113928D08	CERAMIC CHIP 10.0UF
C481	2113928N01	0.1UF 10% 6.3
C482	2113928N01	0.1UF 10% 6.3
C483	2113743L09	470 PF 10%
C484	2113743L09	470 PF 10%
C490	2113743L09	470 PF 10%
C491	2113743L09	470 PF 10%
C492	2113743L09	470 PF 10%
C493	2113743N50	100 PF 5%
C494	2113743N50	100 PF 5%
C495	2113743L09	470 PF 10%
C496	2113743L09	470 PF 10%
C497	2113743L09	470 PF 10%
C502	2311049A05	TANT 10% 0.47UF
C503	2113743N50	100 PF 5%
C505	2113743N50	100 PF 5%
C511	2113743N50	100 PF 5%
C512	2113743N50	100 PF 5%
C513	2113743N50	100 PF 5%
C514	2113743N50	100 PF 5%
C520	2113743L41	10000 PF 10%
C521	2113743L41	10000 PF 10%
C522	2113743L41	10000 PF 10%
C523	2113743L41	10000 PF 10%
C535	2113743L17	1000 PF 10%
C701	2180478Z20	MONOLITHIC CER (1.0UF)
C702	2113928N01	0.1UF 10% 6.3
C703	2113743N50	100 PF 5%
C704	2113928N01	0.1UF 10% 6.3
C705	2113928N01	0.1UF 10% 6.3
C707	2113928N01	0.1UF 10% 6.3
C708	2113928N01	0.1UF 10% 6.3
C709	2113743L17	1000 PF 10%
C711	2113743L41	10000 PF 10%
C713	2113928N01	0.1UF 10% 6.3
C714	2113928N01	0.1UF 10% 6.3
C715	2113928N01	0.1UF 10% 6.3
C717	2113928N01	0.1UF 10% 6.3
C718	2113743L17	1000 PF 10%
C719	2113928N01	0.1UF 10% 6.3
CR3301	4802245J42	RING QUAD SOT-143 PKG
CR3302	4805129M96	DIODE DUAL
CR3303	4880154K03	SOT MMBD353 DUAL SCHTKY
CR411	4802245J47	SCHOTTKY BARIER(RB471E)
CR411	4802245J62	DIODE SCHOTTKY, RB731U
CR412	4802245J62	DIODE SCHOTTKY, RB731U
CR413	4802245J62	DIODE SCHOTTKY, RB731U
CR440	4813833C02	DUAL 70V '5B' COMM CATH
CR501	4880107R01	RECTIFIER
CR503	4805729G49	DIODE RED/YEL
CR700	4802245J47	SCHOTTKY BARIER(RB471E)
D3270	4862824C01	DIODE VARACTOR
D3301	4802081B58	DUAL SILCON (VARICAP)
D3302	4802081B58	DUAL SILCON (VARICAP)
D3521	4880973Z02	PIN DIODE
D3551	4880973Z02	PIN DIODE
D3701	4802233J09	DIODE TRIPLE SOT25-RH
D3702	4802233J09	DIODE TRIPLE SOT25-RH
* D3761	4862824C03	DIODE VARACTOR
D3821	4805649Q13	DIODE VCTR ISV 228
D3831	4805649Q13	DIODE VCTR ISV 228
D3832	4862824C01	DIODE VARACTOR
E400	2480640Z01	C/IND BK1005HM471 BEAD
F501	6580542Z01	FUSE SMT TR/1608FF 3A
FL401	4870368G02	REFLOW CLOCK OSC XTAL
H3501	2680499Z01	HEAT SPREADER
J3501	0180117S05	RF JACK ASSEMBLY
J3502	0280519Z02	NUT, ANTENNA
J400	0905505Y04	CONN ZIF HORIZONTAL
J403	0905505Y02	CONN MALE 20 PIN ZIF
L3200	2462587N68	CHIP IND 1000 NH 5%
L3202	2462587N68	CHIP IND 1000 NH 5%
L3221	2462587N68	CHIP IND 1000 NH 5%
L3270	2462587T15	IND 100NH 5% LOW PRO
L3271	2462587Q20	IND CHIP 2,200NH 20%
L3301	2462587T35	IND CHIP 12NH 5% LOW PRO
L3303	2462587T35	IND CHIP 12NH 5% LOW PRO
L3304	2462587T23	IND CHIP 470NH 5%LOW PRO
L3305	2462587T35	IND CHIP 12NH 5% LOW PRO
L3306	2462587T35	IND CHIP 12NH 5% LOW PRO
L3308	2462587T34	IND CHIP 10NH 5% LOW PRO
L3309	2462587N55	CHIP IND 150 NH 5%
L3312	2462587V28	CHIP IND 33 NH 5% 0805
L3501	2413926H09	IND CHIP 5.6 NH +/- 0.3NH
L3503	2462587V32	CHIP IND 68NH 5% 0805
L3504	2462587N51	CHIP IND 68 NH 5%
L3511	2462587N44	CHIP IND 18 NH 5%
L3512	2479990B01	AIR WND COIL/GRN 11.03NH
L3513	2479990A02	AIR WND COIL/GRN 7.66NH
L3515	2479990C03	AIR WND COIL/GRN 13.85NH
L3518	2462587N48	CHIP IND 39 NH 5%
L3519	2484657R01	INDUCTOR BEAD CHIP
L3521	2479990A02	AIR WND COIL/GRN 7.66NH
L3522	2479990E01	COIL AIR WND/GRN 23.75
L3523	2462587N68	CHIP IND 1000 NH 5%
L3531	2479990N01	AIR WND COIL/GRN 43.67NH
L3532	2479990N01	AIR WND COIL/GRN 43.67NH
L3538	2479990M01	AIR WND COIL/GRN 30.54NH
L3551	2479990N01	AIR WND COIL/GRN 43.67NH
L3552	2479990A02	AIR WND COIL/GRN 7.66NH
L3701	2462587Q42	IND CHIP 390NH 10%
L3731	2462587Q20	IND CHIP 2,200NH 20%
L3801	2462587V34	CHIP IND 100NH 5% 0805
L3809	2462587V27	CHIP IND 27 NH 5% 0805
L3811	2462587V34	CHIP IND 100NH 5% 0805
L3812	2462587V34	CHIP IND 100NH 5% 0805
L3813	2462587Q47	IND CHIP 1000 NH 10%
L3816	2462587V34	CHIP IND 100NH 5% 0805
L3821	2462587N50	CHIP IND 56 NH 5%
L3822	2462587N49	CHIP IND 47 NH 5%
L3823	2462587N49	CHIP IND 47 NH 5%
L3824	2462587N68	CHIP IND 1000 NH 5%
L3825	2462587V34	CHIP IND 100NH 5% 0805
L3826	2462587N68	CHIP IND 1000 NH 5%
L3831	2462587N50	CHIP IND 56 NH 5%
L3832	2462587N51	CHIP IND 68 NH 5%
L3833	2462587N50	CHIP IND 56 NH 5%
L3834	2462587N68	CHIP IND 1000 NH 5%
L400	2462587Q42	IND CHIP 390NH 10%
L401	2462587Q42	IND CHIP 390NH 10%
L410	2462587Q42	IND CHIP 390NH 10%
L411	2462587Q42	IND CHIP 390NH 10%
L505	2462587Q42	IND CHIP 390NH 10%
M701	7585651Z01	PAD, FLEXIBLE
M702	7585651Z01	PAD, FLEXIBLE
M703	7585651Z01	PAD, FLEXIBLE
M704	7585651Z01	PAD, FLEXIBLE
M705	7585651Z01	PAD, FLEXIBLE
M706	7585651Z01	PAD, FLEXIBLE
PB501	4080523Z01	SWITCH, TACT
PB502	4080523Z01	SWITCH, TACT
PB503	4080523Z01	SWITCH, TACT
PB504	4080523Z01	SWITCH, TACT
PB505	4080523Z01	SWITCH, TACT
Q3200	4813827A07	NPNSML SIG MMBR941LT1 7Y
Q3201	4880214G02	TSTR MMBT3904
Q3202	4880214G02	TSTR MMBT3904
Q3270	4805218N63	RF TRANS SOT 323 BFQ67W
Q3301	4880214G02	TSTR MMBT3904
Q3302	4813827A07	NPNSML SIG MMBR941LT1 7Y
Q3501	4802245J55	POWER FIELD EFFECT
Q3561	4813824A17	XSTR PNP40V .2A B=100-300

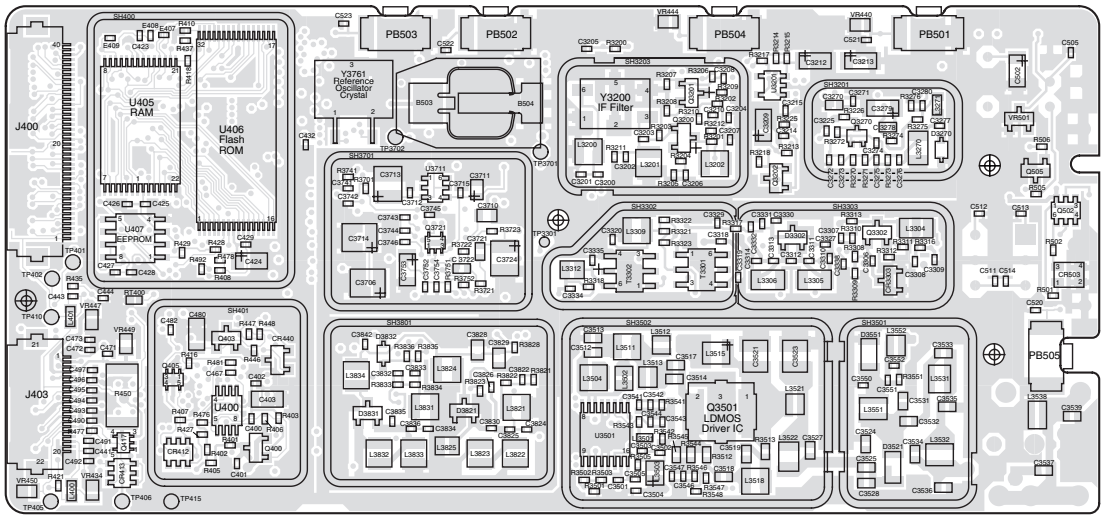
Circuit Ref	Motorola Part No	Description
Q3721	4802245J50	DUAL NPN/PNP UMC5N
Q3801	4813827A07	NPNSML SIG MMBR941LT1 7Y
Q400	4809579E18	MOSFET P-CHAN TP010IT
Q403	4880214G02	TSTR MMBT3904
Q405	4802245J54	UMG5N DIGITAL TRANSIS-TOR
Q410	4802245J54	UMG5N DIGITAL TRANSIS-TOR
Q416	4809579E18	MOSFET P-CHAN TP010IT
Q417	4802245J50	DUAL NPN/PNP UMC5N
Q502	5180159R01	DUAL TRANS NPNS
Q505	4880214G02	TSTR MMBT3904
R3200	0662057M54	150 5% 20X40
R3201	0662057M82	2200 5% 20X40
R3202	0662057M90	4700 5% 20X40
R3203	0662057M98	10K 5% 20X40
R3204	0662057M26	10 5% 20X40
R3205	0662057M74	1000 5% 20X40
R3206	0662057N23	100K 5% 20X40
R3207	0662057N13	39K 5% 20X40
R3208	0662057M50	100 5% 20X40
R3209	0662057M74	1000 5% 20X40
R3210	0662057M82	2200 5% 20X40
R3211	0662057M82	2200 5% 20X40
R3212	0662057M90	4700 5% 20X40
R3213	0662057M82	2200 5% 20X40
R3214	0662057M34	22 5% 20X 40
R3219	0662057M50	100 5% 20X40
R3220	0662057M90	4700 5% 20X40
R3221	0662057M50	100 5% 20X40
R3224	0662057M26	10 5% 20X40
R3225	0662057M74	1000 5% 20X40
R3226	0662057M26	10 5% 20X40
R3270	0662057M74	1000 5% 20X40
R3271	0662057M42	47 5% 20X40
R3272	0662057N15	47K 5% 20X40
R3273	0662057N15	47K 5% 20X40
R3274	0662057M83	2400 5% 20X40
R3275	0662057M74	1000 5% 20X40
R3276	0662057N30	200K 5% 20X40
R3303	0662057N23	100K 5% 20X40
R3304	0662057N23	100K 5% 20X40
R3305	0662057N19	68K 5% 20X40
R3306	0662057M82	2200 5% 20X40
R3307	0662057N11	33K 5% 20X40
R3308	0662057M78	1500 5% 20X40
R3309	0662057M92	5600 5% 20X40
R3310	0662057M98	10K 5% 20X40
R3311	0662057M26	10 5% 20X40
R3312	0662057M38	33 5% 20X40
R3313	0662057M34	22 5% 20X 40
R3314	0662057M26	10 5% 20X40
R3315	0662057M62	330 5% 20X40
R3316	0662057M66	470 5% 20X40
R3317	0662057N23	100K 5% 20X40
R3318	0662057M66	470 5% 20X40
R3321	0662057M54	150 5% 20X40
R3322	0662057M58	220 5% 20X40
R3323	0662057M32	18 5% 20X40
R3324	0662057M58	220 5% 20X40
R3501	0662057M61	300 5% 20X40
R3502	0662057M32	18 5% 20X40
R3503	0662057M61	300 5% 20X40
R3505	0662057M62	330 5% 20X40
R3512	0662057A27	120 OHMS 5%
R3513	0662057A25	100 OHMS 5%
R3519	0680539Z01	PWR METAL STRIP RES
R3542	0662057M92	5600 5% 20X40
R3543	0662057M50	100 5% 20X40
R3544	0662057A25	100 OHMS 5%
R3545	0662057A25	100 OHMS 5%
R3546	0662057N11	33K 5% 20X40
R3547	0662057N01	12K 5% 20X40
R3548	0662057M95	7500 55 20X40
R3551	0662057M40	39 5% 20X40
R3561	0662057N01	12K 5% 20X40
R3562	0662057N11	33K 5% 20X40
R3563	0662057N33	270K 5% 20X40
R3564	0662057N35	330K 5% 20X40
R3569	0662057M92	5600 5% 20X40
R3570	0662057M98	10K 5% 20X40
R3571	0662057A27	120 OHMS 5%
R3572	0662057A27	120 OHMS 5%
R3573	0662057A27	120 OHMS 5%
R3701	0662057M50	100 5% 20X40
R3703	0662057M54	150 5% 20X40
R3704	0662057M54	150 5% 20X40
R3705	0662057N11	33K 5% 20X40
R3721	0662057M66	470 5% 20X40
R3722	0662057M74	1000 5% 20X40
R3723	0662057M50	100 5% 20X40
R3727	0662057N23	100K 5% 20X40
R3741	0662057M50	100 5% 20X40
R3751	0662057N30	200K 5% 20X40
R3752	0662057N35	330K 5% 20X40
R3761	0662057N15	47K 5% 20X40
R3802	0662057M50	100 5% 20X40
R3803	0662057M58	220 5% 20X40
R3804	0662057M98	10K 5% 20X40
R3805	0662057N08	24K 5% 20X40
R3806	0662057M34	22 5% 20X 40
R3808	0662057M26	10 5% 20X40
R3811	0662057M50	100 5% 20X40
R3816	0662057M74	1000 5% 20X40
R3817	0662057M01	0 5% 20X40
R3821	0662057M58	220 5% 20X40
R3822	0662057M42	47 5% 20X40
R3823	0662057N11	33K 5% 20X40
R3824	0662057N07	22K 5% 20X40
R3825	0662057M38	33 5% 20X40
R3826	0662057M32	18 5% 20X40
R3828	0662057M50	100 5% 20X40
R3829	0662057M01	0 5% 20X40
R3831	0662057M98	10K 5% 20X40
R3832	0662057N01	12K 5% 20X40
R3833	0662057M58	220 5% 20X40
R3834	0662057M42	47 5% 20X40
R3835	0662057N15	47K 5% 20X40
R3836	0662057M98	10K 5% 20X40
R400	0662057N15	47K 5% 20X40
R4001	0662057M74	1000 5% 20X40
R4002	0662057M74	1000 5% 20X40
R4003	0662057M74	1000 5% 20X40
R4004	0662057M74	1000 5% 20X40
R4005	0662057M74	1000 5% 20X40
R4006	0662057M74	1000 5% 20X40
R4007	0662057M74	1000 5% 20X40
R4008	0662057M74	1000 5% 20X40
R4009	0662057M74	1000 5% 20X40
R401	0662057M01	0 5% 20X40
R405	0662057M01	0 5% 20X40
R406	0662057N20	75K 5% 20X40
R407	0662057N19	68K 5% 20X40
R409	0662057M98	10K 5% 20X40
R410	0662057N23	100K 5% 20X40
R411	0662057M98	10K 5% 20X40
R413	0662057M01	0 5% 20X40
R414	0662057V34	180K 1% 1/16W
R415	0662057V26	91K 1% 1/16W
R416	0662057N13	39K 5% 20X40
R418	0662057M01	0 5% 20X40
R419	0662057M67	0 5% 20X40
R420	0662057B46	10.0 MEG OHMS 5%
R421	0662057M81	2000 5% 20X40
R423	0662057N21	82K 5% 20X40
R424	0662057N12	36K 5% 20X40
R425	0662057N10	30K 5% 20X40
R426	0662057N35	330K 5% 20X40
R427	0662057M84	2700 5% 20X40
R428	0662057M10	2.2 5% 20X40
R429	0662057M98	10K 5% 20X40
R431	0662057N39	470K 5% 20X40
R432	0662057N16	51K 5% 20X40
R434	0662057M62	330 5% 20X40
R435	0662057M81	2000 5% 20X40
R436	0662057M01	0 5% 20X40
R445	0662057N08	24K 5% 20X40
R446	0662057N31	220K 5% 20X40
R447	0662057N51	1.5 MEG 5% 20X40
R448	0662057N33	270K 5% 20X40
R449	0662057N08	24K 5% 20X40
R450	0683962T45	68 5-1
R457	0662057M98	10K 5% 20X40
R460	0662057M90	4700 5% 20X40
R461	0662057M56	180 5% 20X40
R462	0662057M98	10K 5% 20X40
R463	0662057M61	300 5% 20X40
R471	0662057M92	5600 5% 20X40
R472	0662057M93	6200 5% 20X40
R473	0662057M26	10 5% 20X40
R475	0662057M01	0 5% 20X40
R476	0662057N08	24K 5% 20X40
R477	0662057M74	1000 5% 20X40
R478	0662057M98	10K 5% 20X40
R481	0662057N08	24K 5% 20X40
R492	0662057M01	0 5% 20X40
R499	0662057M98	10K 5% 20X40
R501	0662057M70	680 5% 20X40
R502	0662057M56	180 5% 20X40
R505	0662057M98	10K 5% 20X40
R506	0662057N15	47K 5% 20X40
R701	0662057N05	18K 5% 20X40
R702	0662057N05	18K 5% 20X40
R703	0662057M74	1000 5% 20X40
R704	0662057N13	39K 5% 20X40
R705	0662057N13	39K 5% 20X40
R706	0662057N17	56K 5% 20X40
R707	0662057M91	5100 5% 20X40
R708	0662057N41	560K 5% 20X40
R709	0662057N47	1.0 MEG 5% 20X40
R710	0662057N39	470K 5% 20X40
R716	0662057N01	12K 5% 20X40
R717	0662057M82	2200 5% 20X40
RT400	0680590Z01	THERMISTOR_33K
S501	4080710Z02	SWITCH (FREQUENCY)
S502	1880619Z01	POTENTIOMETER, VOLUME
SH3201	2602023X08	SHIELD
SH3202	2686081B02	SHIELD
SH3203	2686081B03	SHIELD
SH3301	2686081B01	SHIELD
SH3302	2686081B05	SHIELD
SH3303	2686081B06	SHIELD
SH3501	2686081B03	SHIELD
SH3502	2686081B04	SHIELD

Circuit Ref	Motorola Part No	Description
SH3701	2680511Z01	SHIELD SYNTHESIZER
SH3702	2680511Z01	SHIELD SYNTHESIZER
SH3801	2680513Z01	SHIELD VCO TOP
SH3802	2680514Z01	SHIELD VCO BOTTOM/LVZIF
SH400	2680505Z01	CTRL TOP LEFT
SH401	2680506Z01	CTRL TOP RIGHT
SH402	2680515Z01	CTRL BOTTOM LEFT
SH403	2680516Z01	CTRL BTM RIGHT
SH701	2680677Z01	(VOICE STORAGE BOTTOM)
T3301	2580541Z01	BALUN TRANSFORMER
T3302	2580541Z01	BALUN TRANSFORMER
U3201	5102463J58	3.3V REG IN SOT23-5 PKG
U3220	5109632D83	LVZIF 2.2 H60G 48TQFP
U3501	5105109Z67	IC LDMOS DRIVER VHF/UHF
U3502	5185765B01	IC PWR CONTROL PASS 2.3
U3503	5185963A15	IC TEMP SENSOR 1M50C
U3701	5185963A27	IC AT25016 48 PIN GFP
U3711	5105739X05	IC SOT 5V HI-PRECISION REG
U3801	5105750U54	IC PKG DIE VCO BUFFER
U400	5102463J40	REG 3.3V, LP2951CMM-3.3
U404	5185963A53	IC ASFIC CMP TQFP 48 PIN
U405	5102463J36	STATIC_RAM_32KX8
* U406	5102463J60	512X8 FLASH (AT49LV040)
* U407	5102463J64	16KX8 SPI SERIAL EEPROM
U409	5102226J56	68HC11FLO_PASS5 TQFP
U410	5102463J57	REG 3.3V, ILC7062CM-33
U411	4802245J54	UMG5N DIGITAL TRANSISTOR
U420	5102463J44	AUDIO AMP TDA8547TS
U700	5109152M01	IC EEPROM ISD3312OE1
U710	5102463J52	74HC4066D QUAD ANLOG SW
U720	5113818A01	SING SPLY LM2904DR
VR432	4805656W08	DIODE ZENER QUAD
VR433	4805656W08	DIODE ZENER QUAD
VR434	4802245J51	ZENER DIODE; BZX284-C6V8
VR439	4880140L15	10V ZENER
VR447	4802245J53	ZENER_DIODE; BZX284-C10
VR448	4802245J53	ZENER_DIODE; BZX284-C10
VR449	4802245J53	ZENER_DIODE; BZX284-C10
VR450	4802245J53	ZENER_DIODE; BZX284-C10
VR483	4802245J53	ZENER_DIODE; BZX284-C10
VR484	4802245J53	ZENER_DIODE; BZX284-C10
VR501	4813830A18	6.8V 5% 225MWMMBZ5235B_
VR506	4802245J51	ZENER DIODE; BZX284-C6V8
Y3200	4802245J43	MONOLITH/ XTAL FLTR
Y3761	4802245J49	XTAL 16.8MHZ WITH CLIP
	8486101B09	PCB WARIS P VHF GP1280

* Motorola Depot Servicing only

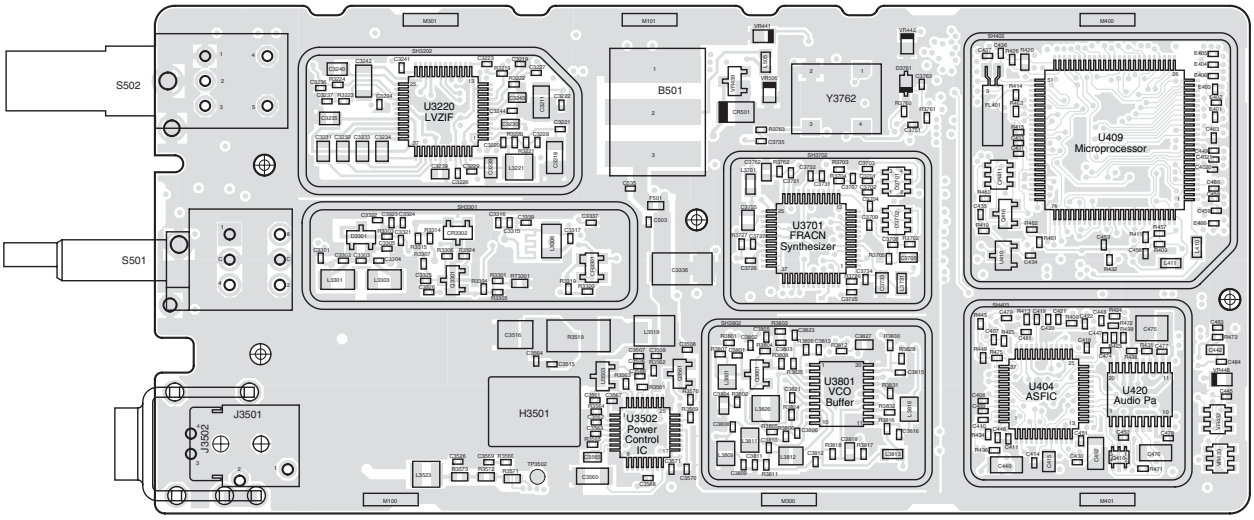
Reference designators with an asterisk indicate components which are not field replaceable because they need to be calibrated with specialized factory equipment after installation. Radios in which these parts have been replaced in the field will be off frequency at temperature extremes.

6.0 VHF PCB 8486062B14



ZWG0130072-E

VHF (136-174 MHz) Main Board Top Side



ZWG0130073-D

VHF (136-174 MHz) Main Board Bottom Side

7.0 VHF PCB 8486062B14 Parts List

Circuit Ref	Motorola Part No	Description
B501	0986237A02	CONN, CONTACT BATT
B503	3980502Z01	CONTACT, BACKUP B+
		only GP360, GP380, GP680
B504	3980501Z01	CONTACT, BACKUP B-
		only GP360, GP380, GP680
C3200	2113743N31	16.0 PF 5% COG
C3203	2113743N50	100 PF 5% COG
C3204	2113743L41	10000 PF 10%
C3205	2113928N01	CER CHIP 0.1UF 10% 6.3
C3206	2113743L41	10000 PF 10%
C3207	2113743N10	2.2 PF +-.25PF COG
C3209	2311049A07	TANT 10% 1.0UF
C3210	2113743L17	1000 PF 10%
C3211	2311049A56	TAN CHIP A/P 4.7 20 10
C3212	2311049A07	TANT 10% 1.0UF
C3213	2311049A56	TAN CHIP A/P 4.7 20 10
C3214	2113928N01	CER CHIP 0.1UF 10% 6.3
C3215	2113743N26	10.0 PF 5% COG
C3218	2311049A56	TAN CHIP A/P 4.7 20 10
C3219	2113928N01	CER CHIP 0.1UF 10% 6.3
C3220	2113743N26	10.0 PF 5% COG
C3221	2113743L41	10000 PF 10%
C3222	2113928N01	CER CHIP 0.1UF 10% 6.3
C3223	2113928N01	CER CHIP 0.1UF 10% 6.3
C3224	2113928N01	CER CHIP 0.1UF 10% 6.3
C3225	2113928N01	CER CHIP 0.1UF 10% 6.3
C3226	2113928N01	CER CHIP 0.1UF 10% 6.3
C3227	2113743L41	10000 PF 10%
C3228	2113743L41	10000 PF 10%
C3229	2113743N50	100 PF 5% COG
C3230	2113740F51	REEL CL1 +/-30 100
C3231	2180478Z20	MONOLITHIC CERAMIC (1.0UF)
C3232	2180478Z20	MONOLITHIC CERAMIC (1.0UF)
C3233	2180478Z20	MONOLITHIC CERAMIC (1.0UF)
C3234	2180478Z20	MONOLITHIC CERAMIC (1.0UF)
C3235	2113743A23	.220UF 10%
C3238	2113743A24	.330 UF 10% 16V
C3239	2113743E07	CER CHIP .022UF
C3240	2113743A23	.220UF 10%
C3241	2113743L19	1200 PF 10%
C3242	2109720D14	CER CHIP LOW DIST 0.1UF
C3243	2113743E07	CER CHIP .022UF
C3244	2113743L41	10000 PF 10%
C3270	2113743E07	CER CHIP .022UF
C3271	2113743L05	330 PF 10%
C3272	2113743N18	4.7 PF +-.25PF COG
C3273	2113743N26	10.0 PF 5% COG
C3274	2113743N38	33.0 PF 5% COG
C3275	2113743N44	56.0 PF 5% COG
C3276	2113743N42	47.0 PF 5% COG
C3277	2113743N48	82.0 PF 5% COG
C3278	2113743E07	CER CHIP .022UF
C3279	2311049A40	GLOBAL TANT 10% 2.2 UF
C3280	2113743L41	10000 PF 10%
C3301	2113743N20	5.6 PF +-.5PF COG
C3302	2113743N54	150 PF 5% COG
C3303	2113743N30	15.0PF 5% COG
C3304	2113743N54	150 PF 5% COG
C3306	2113928N01	CER CHIP 0.1UF 10% 6.3
C3307	2113743N50	100 PF 5% COG
C3308	2113743L05	330 PF 10%
C3309	2113928N01	CER CHIP 0.1UF 10% 6.3
C3311	2113743N54	150 PF 5% COG
C3312	2113743N31	16.0 PF 5% COG
C3313	2113743N54	150 PF 5% COG
C3315	2113743N26	10.0 PF 5% COG
C3316	2113743N14	3.3 PF +-.25PF COG
C3317	2113743N40	39.0 PF 5% COG
C3318	2113743M08	22000PF +80-20% Y5V
C3320	2113743N48	82.0 PF 5% COG
C3321	2113743L05	330 PF 10%
C3322	2113743N50	100 PF 5% COG
C3323	2113743N50	100 PF 5% COG
C3324	2113743N38	33.0 PF 5% COG
C3325	2113743L17	1000 PF 10%
C3327	2113743L05	330 PF 10%
C3329	2113743L05	330 PF 10%
C3330	2113743N50	100 PF 5% COG
C3331	2113743N50	100 PF 5% COG
C3332	2113743N40	39.0 PF 5% COG
C3334	2113743N33	20.0 PF 5% COG
C3335	2113743N34	22.0 PF 5% COG
C3336	2311049A18	TANT 10% 10UF
C3337	2113743M08	22000PF +80-20% Y5V
C3338	2113743L09	470 PF 10%
C3339	2113743N26	10.0 PF 5% COG
C3501	2113743L05	330 PF 10%
C3502	2113743N38	33.0 PF 5% COG
C3503	2113743N38	33.0 PF 5% COG
C3504	2113743M08	22000PF +80-20% Y5V
C3505	2113743N38	33.0 PF 5% COG
C3508	2113743M08	22000PF +80-20% Y5V
C3509	2113743L05	330 PF 10%
C3512	2113740F43	REEL CL1 +/-30 47
C3513	2113740F38	REEL CL1 +/-30 30
C3514	2113740F67	CL1 +/-30 470 5%
C3515	2113743L29	3300PF 10%
C3516	2311049A08	KEMET CAPS
C3517	2113740F51	REEL CL1 +/-30 100
C3518	2113740F63	CL1 +/-30 330 5%
C3519	2113740F35	REEL CL1 +/-30 22
C3521	2111078B51	RF 220 5 NPO 100V
C3523	2111078B44	RF 120 5 NPO 100V
C3524	2113740F33	REEL CL1 +/-30 18
C3525	2113740F27	REEL CL1 +/-30 10
C3526	2113743M08	22000PF +80-20% Y5V
C3528	2113740F26	REEL CL1 +/-30 9.1
C3531	2113740F34	REEL CL1 +/-30 20
C3532	2113740F47	REEL CL1 +/-30 68
C3533	2113740F24	REEL CL1+/-30 7.5
C3534	2113740F19	CHIP CAP, CER 4.7PF
C3535	2113740F37	REEL CL1+/-30 27
C3536	2113740F31	REEL CL1 +/-30 15
C3537	2113740F33	REEL CL1 +/-30 18
C3539	2113740F21	REEL CL1+/-30 5.6
C3541	2113743M08	22000PF +80-20% Y5V
C3542	2113743L05	330 PF 10%
C3543	2113743M08	22000PF +80-20% Y5V
C3544	2113743L05	330 PF 10%
C3546	2113743L05	330 PF 10%
C3547	2113743M08	22000PF +80-20% Y5V
C3550	2113743N23	7.5 PF +-.5PF COG
C3551	2113743N46	68.0 PF 5% COG
C3552	2113743N44	56.0 PF 5% COG
C3560	2311049A07	TANT 10% 1.0UF
C3561	2113743M08	22000PF +80-20% Y5V
C3562	2113743L29	3300PF 10%
C3563	2113743L29	3300PF 10%
C3564	2113743L01	220 PF 10%
C3565	2113743E07	CER CHIP .022UF
C3566	2113743N50	100 PF 5% COG
C3567	2113743L05	330 PF 10%
C3568	2113743L29	3300PF 10%
C3569	2113743M08	22000PF +80-20% Y5V
C3570	2113743L05	330 PF 10%
C3571	2113743L09	470 PF 10%
C3701	2113743L41	10000 PF 10%
C3702	2113743L41	10000 PF 10%
C3703	2113743L41	10000 PF 10%
C3704	2113743L41	10000 PF 10%
C3705	2113743E20	CHIP. 10 UF 10%
C3706	2311049J11	CAPACITOR TANT 10% 4.7UF
C3707	2113743N34	22.0 PF 5% COG
C3708	2113743M24	100000 PF +80-20% Y5V
C3709	2113743M24	100000 PF +80-20% Y5V
C3710	2104993J02	MONOLITHIC CERAMIC (2.2UF)
C3711	2311049A69	TAN CHIP 10.0 UF 20% 6.3V
C3712	2113743M24	100000 PF +80-20% Y5V
C3713	2311049A09	TANT 2.2 UF 10%
C3714	2311049J11	CAPACITOR TANT 10% 4.7UF
C3715	2113743L09	470 PF 10%
C3721	2113743E20	CHIP. 10 UF 10%
C3722	2113743E20	CHIP. 10 UF 10%
C3724	2311049A08	KEMET CAPS
C3726	2113743N24	8.2 PF + -.5PF COG
C3727	2113743N50	100 PF 5% COG
C3731	2113743L41	10000 PF 10%
C3732	2113743L41	10000 PF 10%
C3733	2104993J02	MONOLITHIC CERAMIC (2.2UF)
C3734	2113743L41	10000 PF 10%
C3742	2113743L01	220 PF 10%
C3743	2113743L01	220 PF 10%
C3744	2113743L01	220 PF 10%
C3745	2113743L01	220 PF 10%
C3746	2113743L01	220 PF 10%
C3752	2113743L17	1000 PF 10%
C3753	2311049A56	TAN CHIP A/P 4.7 20 10
C3754	2113743M24	100000 PF +80-20% Y5V
C3755	2104993J02	MONOLITHIC CERAMIC (2.2UF)
* C3761	2113743N44	56.0 PF 5% COG
* C3762	2113740F63	CL1 +/-30 330 5%
* C3763	2113743N08	1.6 PF +-.25PF COG
C3801	2113743N18	4.7 PF +-.25PF COG
C3803	2113743L17	1000 PF 10%
C3804	2113743E20	CHIP. 10 UF 10%
C3805	2113743N18	4.7 PF +-.25PF COG
C3806	2113743N50	100 PF 5% COG
C3808	2113743N30	15.0PF 5% COG
C3809	2113743N36	27.0 PF 5% COG
C3811	2113743M24	100000 PF +80-20% Y5V
C3812	2113743M24	100000 PF +80-20% Y5V
C3813	2113743L41	10000 PF 10%
C3815	2113743L17	1000 PF 10%
C3816	2113743N22	6.8 PF +-.5PF COG
C3818	2113743E07	CER CHIP .022UF
C3821	2113743L41	10000 PF 10%
C3822	2113743L17	1000 PF 10%
C3823	2113743L41	10000 PF 10%
C3824	2113743N44	56.0 PF 5% COG
C3825	2113743N30	15.0PF 5% COG
C3826	2113743N18	4.7 PF +-.25PF COG
C3827	2113743E07	CER CHIP .022UF
C3828	2109720D01	CER CHIP LOW DIS T .01UF
C3829	2109720D01	CER CHIP LOW DIS T .01UF
C3830	2113743N46	68.0 PF 5% COG
C3832	2113743L17	1000 PF 10%
C3833	2113743N18	4.7 PF +-.25PF COG
C3834	2113743N44	56.0 PF 5% COG
C3835	2113743N22	6.8 PF +-.5PF COG
C3836	2113743N30	15.0PF 5% COG
C3842	2113743L17	1000 PF 10%
C400	2113743L41	10000 PF 10%
C401	2113743M24	100000 PF +80-20% Y5V
C402	2113743M24	100000 PF +80-20% Y5V
C403	2113928D08	CERAMIC CHIP 10.0UF
C407	2113928N01	CER CHIP 0.1UF 10% 6.3
C408	2113743N50	100 PF 5% COG
C409	2113743M24	100000 PF +80-20% Y5V
C410	2113928N01	CER CHIP 0.1UF 10% 6.3
C411	2113743M24	100000 PF +80-20% Y5V
C414	2113743M24	100000 PF +80-20% Y5V
C415	2109720D01	CER CHIP LOW DIS T .01UF
C416	2113928N01	CER CHIP 0.1UF 10% 6.3
C419	2113743L41	10000 PF 10%
C420	2113743L41	10000 PF 10%
C421	2113928N01	CER CHIP 0.1UF 10% 6.3
C422	2113743M24	100000 PF +80-20% Y5V
C423	2113743N50	100 PF 5% COG
C424	2311049A59	TANT CHIP A/P 10UF 10% 6V
C425	2113743M24	100000 PF +80-20% Y5V
C426	2113743N50	100 PF 5% COG

Circuit Ref	Motorola Part No	Description
C427	2113743N50	100 PF 5% COG
C428	2113743M24	100000 PF +80-20% Y5V
C429	2113743M24	100000 PF +80-20% Y5V
C430	2113928N01	CER CHIP 0.1UF 10% 6.3
C431	2113743N50	100 PF 5% COG
C433	2113743L41	10000 PF 10%
C434	2113743M24	100000 PF +80-20% Y5V
		only GP360, GP380, GP680
C435	2113743M24	100000 PF +80-20% Y5V
C436	2113743N34	22.0 PF 5% COG
		only GP360, GP380, GP680
C437	2113743N34	22.0 PF 5% COG
		only GP360, GP380, GP680
C440	2113743G26	4.7UF 16V + 80-20%
C441	2113743L09	470 PF 10%
C442	2113743E20	CHIP. 10 UF 10%
C443	2113928N01	CER CHIP 0.1UF 10% 6.3
C444	2113743N50	100 PF 5% COG
C445	2113743L09	470 PF 10%
C446	2113743L09	470 PF 10%
C447	2113928N01	CER CHIP 0.1UF 10% 6.3
C448	2113928N01	CER CHIP 0.1UF 10% 6.3
C449	2113743N50	100 PF 5% COG
C451	2113743M08	22000PF +80-20% Y5V
C452	2113743G26	4.7UF 16V + 80-20%
C453	2113743N50	100 PF 5% COG
C456	2113743N50	100 PF 5% COG
C458	2113743N50	100 PF 5% COG
C459	2113743N50	100 PF 5% COG
C463	2113743N50	100 PF 5% COG
C466	2113743N50	100 PF 5% COG
C467	2113928N01	CER CHIP 0.1UF 10% 6.3
C471	2113743L09	470 PF 10%
C472	2113743L09	470 PF 10%
C473	2113743L09	470 PF 10%
C474	2113743L41	10000 PF 10%
C475	2113743H14	10.0 UF 16V +80-20%
C476	2113928D08	CERAMIC CHIP 10.0UF
C477	2113743L17	1000 PF 10%
C478	2113743L17	1000 PF 10%
C479	2113928N01	CER CHIP 0.1UF 10% 6.3
C480	2113928D08	CERAMIC CHIP 10.0UF
C481	2113928N01	CER CHIP 0.1UF 10% 6.3
C482	2113928N01	CER CHIP 0.1UF 10% 6.3
C483	2113743L09	470 PF 10%
C484	2113743L09	470 PF 10%
C490	2113743L09	470 PF 10%
C491	2113743L09	470 PF 10%
C492	2113743L09	470 PF 10%
C493	2113743N50	100 PF 5% COG
C494	2113743N50	100 PF 5% COG
C495	2113743L09	470 PF 10%
C496	2113743L09	470 PF 10%
C497	2113743L09	470 PF 10%
C4020	2113743L17	1000PF 10%
		Placed on PCB 8486062B14 only

Circuit Ref	Motorola Part No	Description
C4021	2113743L17	1000PF 10%
		Placed on PCB 8486062B14 only
C502	2311049A05	TANT 10% 0.47UF
C503	2113743N50	100 PF 5% COG
C505	2113743N50	100 PF 5% COG
C511	2113743N50	100 PF 5% COG
C512	2113743N50	100 PF 5% COG
C513	2113743N50	100 PF 5% COG
C514	2113743N50	100 PF 5% COG
C520	2113743L41	10000 PF 10%
C521	2113743L41	10000 PF 10%
C522	2113743L41	10000 PF 10%
C523	2113743L41	10000 PF 10%
C535	2113743L17	1000 PF 10%
CR3301	4802245J42	RING QUAD SOT-143 PKG
CR3302	4805129M96	DIODE SMBV1032
CR3303	4880154K03	SOT MMBD353 DUAL SCHKY
CR411**	4802245J47	SCHOTTKY BARRIER(RB471E)
CR412**	4802245J47	SCHOTTKY BARRIER(RB471E)
CR413**	4802245J47	SCHOTTKY BARRIER(RB471E)
	**Placed on	PCB 8486062B12 only
CR411***	4802245J62	SCHOTTKY BARRIER(RB731U)
CR412***	4802245J62	SCHOTTKY BARRIER(RB731U)
CR413***	4802245J62	SCHOTTKY BARRIER(RB731U)
	***Placed on	PCB 8486062B14 only
CR440	4813833C02	DUAL 70V '5B' COMM CATH
CR501	4880107R01	RECTIFIER
CR503	4805729G49	LED RED/YEL
D3270	4862824C01	VARACTOR
D3301	4802081B58	DUAL SILCON (VARICAP)
D3302	4802081B58	DUAL SILCON (VARICAP)
D3521	4880973Z02	PIN DIODE
D3551	4880973Z02	PIN DIODE
D3701	4802233J09	TRIPLE SOT25-RH
D3702	4802233J09	TRIPLE SOT25-RH
* D3761	4862824C03	VARACTOR
D3821	4805649Q13	VCTR ISV 228
D3831	4805649Q13	VCTR ISV 228
D3832	4862824C01	VARACTOR
E400	2480640Z01	C/IND BK1005HM471 BEAD
E401	2480640Z01	C/IND BK1005HM471 BEAD
E402	2480640Z01	C/IND BK1005HM471 BEAD
E403	2480640Z01	C/IND BK1005HM471 BEAD
E404	2480640Z01	C/IND BK1005HM471 BEAD
E405	2480640Z01	C/IND BK1005HM471 BEAD
E406	2480640Z01	C/IND BK1005HM471 BEAD
E407	2480640Z01	C/IND BK1005HM471 BEAD
E408	2480640Z01	C/IND BK1005HM471 BEAD
E409	2480640Z01	C/IND BK1005HM471 BEAD
F501	6580542Z01	FUSE CHIP SMT TR/1608FF 3A
FL401	4870368G02	CLOCK OSC XTAL
		only GP360, GP380, GP680
H3501	2680499Z01	HEAT SPREADER
J3501	0180117S05	RF JACK ASSEMBLY
J3502	0280519Z02	NUT, ANTENNA
J400	0905505Y04	CONN ZIF 40Pin

Circuit Ref	Motorola Part No	Description
		not in GP320
J403	0905505Y02	CONN ZIF MALE 20 PIN
L3200	2462587N68	CHIP IND 1000 NH 5%
L3202	2462587N68	CHIP IND 1000 NH 5%
L3221	2462587N68	CHIP IND 1000 NH 5%
L3270	2462587T15	IND CHIP 100NH 5% LOW PRO
L3271	2462587Q20	IND CHIP 2,200NH 20%
L3301	2462587T35	IND CHIP 12NH 5% LOW PRO
L3303	2462587T35	IND CHIP 12NH 5% LOW PRO
L3304	2462587T23	IND CHIP 470NH 5% LOW PRO
L3305	2462587T35	IND CHIP 12NH 5% LOW PRO
L3306	2462587T35	IND CHIP 12NH 5% LOW PRO
L3308	2462587T34	IND CHIP 10NH 5% LOW PRO
L3309	2462587N55	CHIP IND 150 NH 5%
L3312	2462587V28	CHIP IND 33 NH 5% 0805
L3501	2413926H09	IND CHIP 5.6 NH +/- 0.3NH
L3503	2462587V32	CHIP IND 68NH 5% 0805
L3504	2462587N51	CHIP IND 68 NH 5%
L3511	2462587N44	CHIP IND 18 NH 5%
L3512	2479990B01	AIR WOUND GREEN 11.03NH
L3513	2479990A02	AIR WOUND GREEN 7.66NH
L3515	2479990C03	AIR WOUND GREEN 13.85NH
L3518	2462587N48	CHIP IND 39 NH 5%
L3519	2484657R01	INDUCTOR BEAD CHIP
L3521	2479990A02	AIR WOUND GREEN 7.66NH
L3522	2479990E01	COIL AIR WOUND GREEN 23.75
L3523	2462587N68	CHIP IND 1000 NH 5%
L3531	2479990N01	AIR WOUND GREEN 43.67NH
L3532	2479990N01	AIR WOUND GREEN 43.67NH
L3538	2479990M01	AIR WOUND GREEN 30.54NH
L3551	2479990N01	AIR WOUND GREEN 43.67NH
L3552	2479990A02	AIR WOUND GREEN 7.66NH
L3701	2462587Q42	IND CHIP 390NH 10%
L3731	2462587Q20	IND CHIP 2,200NH 20%
L3801	2462587V34	CHIP IND 100NH 5% 0805
L3809	2462587V27	CHIP IND 27 NH 5% 0805
L3811	2462587V34	CHIP IND 100NH 5% 0805
L3812	2462587V34	CHIP IND 100NH 5% 0805
L3813	2462587Q47	IND CHIP 1000 NH 10%
L3816	2462587V34	CHIP IND 100NH 5% 0805
L3821	2462587N50	CHIP IND 56 NH 5%
L3822	2462587N49	CHIP IND 47 NH 5%
L3823	2462587N49	CHIP IND 47 NH 5%
L3824	2462587N68	CHIP IND 1000 NH 5%
L3825	2462587V34	CHIP IND 100NH 5%
L3826	2462587N68	CHIP IND 1000 NH 5%
L3831	2462587N50	CHIP IND 56 NH 5%
L3832	2462587N51	CHIP IND 68 NH 5%
L3833	2462587N50	CHIP IND 56 NH 5%
L3834	2462587N68	CHIP IND 1000 NH 5%
L400	2462587Q42	IND CHIP 390NH 10%
L401	2462587Q42	IND CHIP 390NH 10%
L410	2462587Q42	IND CHIP 390NH 10%
L411	2462587Q42	IND CHIP 390NH 10%
L505	2462587Q42	IND CHIP 390NH 10%
PB501	4080523Z01	SWITCH, TACT

Circuit Ref	Motorola Part No	Description
PB502	4080523Z01	SWITCH, TACT
PB503	4080523Z01	SWITCH, TACT
		not in GP320
PB504	4080523Z01	SWITCH, TACT
PB505	4080523Z01	SWITCH, TACT
		not in GP320
Q3200	4813827A07	TSTR NPN SML SIG MMBR941LT1
Q3201	4880214G02	TSTR MMBT3904
Q3202	4880214G02	TSTR MMBT3904
Q3270	4805218N63	RF TRANS SOT 323 BFQ67W
Q3301	4880214G02	TSTR MMBT3904
Q3302	4813827A07	TSTR NPN MMBR941LT1
Q3501	4802245J55	TSTR POWER FIELD EFFECT
Q3561	4813824A17	XSTR PNP40V .2A B=100-300
Q3721	4802245J50	TSTR DUAL NPN/PNP UMC5N
Q3801	4813827A07	TSTR NPN MMBR941LT1
Q400	4809579E18	MOSFET P-CHAN TP010IT
Q403	4880214G02	TSTR MMBT3904
Q405	4802245J54	UMG5N DIGITAL TRANSISTOR
Q410	4802245J54	UMG5N DIGITAL TRANSISTOR
Q416	4809579E18	MOSFET P-CHAN TP010IT
		only GP360, GP380, GP680
Q417	4802245J50	TSTR DUAL NPN/PNP UMC5N
Q502	5180159R01	DUAL TRANS NPNS
Q505	4880214G02	TSTR MMBT3904
R3200	0662057M54	150 5% 20X40
R3201	0662057M82	2200 5% 20X40
R3202	0662057M90	4700 5% 20X40
R3203	0662057M98	10K 5% 20X40
R3204	0662057M26	10 5% 20X40
R3205	0662057M74	1000 5% 20X40
R3206	0662057N23	100K 5% 20X40
R3207	0662057N13	39K 5% 20X40
R3208	0662057M50	100 5% 20X40
R3209	0662057M74	1000 5% 20X40
R3210	0662057M82	2200 5% 20X40
R3211	0662057M82	2200 5% 20X40
R3212	0662057M90	4700 5% 20X40
R3213	0662057M82	2200 5% 20X40
R3214	0662057M34	22 5% 20X 40
R3219	0662057M50	100 5% 20X40
R3220	0662057M90	4700 5% 20X40
R3221	0662057M50	100 5% 20X40
R3224	0662057M26	10 5% 20X40
R3225	0662057M74	1000 5% 20X40
R3226	0662057M26	10 5% 20X40
R3270	0662057M74	1000 5% 20X40
R3271	0662057M42	47 5% 20X40
R3272	0662057N15	47K 5% 20X40
R3273	0662057N15	47K 5% 20X40
R3274	0662057M83	2400 5% 20X40
R3275	0662057M74	1000 5% 20X40
R3276	0662057N30	200K 5% 20X40
R3303	0662057N23	100K 5% 20X40
R3304	0662057N23	100K 5% 20X40

Circuit Ref	Motorola Part No	Description
R3305	0662057N19	68K 5% 20X40
R3306	0662057M82	2200 5% 20X40
R3307	0662057N11	33K 5% 20X40
R3308	0662057M78	1500 5% 20X40
R3309	0662057M92	5600 5% 20X40
R3310	0662057M98	10K 5% 20X40
R3311	0662057M26	10 5% 20X40
R3312	0662057M38	33 5% 20X40
R3313	0662057M34	22 5% 20X 40
R3314	0662057M26	10 5% 20X40
R3315	0662057M62	330 5% 20X40
R3316	0662057M66	470 5% 20X40
R3317	0662057N23	100K 5% 20X40
R3318	0662057M66	470 5% 20X40
R3321	0662057M54	150 5% 20X40
R3322	0662057M58	220 5% 20X40
R3323	0662057M32	18 5% 20X40
R3324	0662057M58	220 5% 20X40
R3501	0662057M61	300 5% 20X40
R3502	0662057M32	18 5% 20X40
R3503	0662057M61	300 5% 20X40
R3505	0662057M62	330 5% 20X40
R3512	0662057A27	120 OHMS 5%
R3513	0662057A25	100 OHMS 5%
R3519	0680539Z01	POWER METAL STRIP
R3542	0662057M92	5600 5% 20X40
R3543	0662057M50	100 5% 20X40
R3544	0662057A25	100 OHMS 5%
R3545	0662057A25	100 OHMS 5%
R3546	0662057N11	33K 5% 20X40
R3547	0662057N01	12K 5% 20X40
R3548	0662057M95	7500 55 20X40
R3551	0662057M40	39 5% 20X40
R3561	0662057N01	12K 5% 20X40
R3562	0662057N11	33K 5% 20X40
R3563	0662057N33	270K 5% 20X40
R3564	0662057N35	330K 5% 20X40
R3569	0662057M92	5600 5% 20X40
R3570	0662057M98	10K 5% 20X40
R3571	0662057A27	120 OHMS 5%
R3572	0662057A27	120 OHMS 5%
R3573	0662057A27	120 OHMS 5%
R3701	0662057M50	100 5% 20X40
R3703	0662057M54	150 5% 20X40
R3704	0662057M54	150 5% 20X40
R3705	0662057N11	33K 5% 20X40
R3721	0662057M66	470 5% 20X40
R3722	0662057M74	1000 5% 20X40
R3723	0662057M50	100 5% 20X40
R3727	0662057N23	100K 5% 20X40
R3741	0662057M50	100 5% 20X40
R3751	0662057N30	200K 5% 20X40
R3752	0662057N35	330K 5% 20X40
R3761	0662057N15	47K 5% 20X40
R3802	0662057M50	100 5% 20X40
R3803	0662057M58	220 5% 20X40

Circuit Ref	Motorola Part No	Description
R3804	0662057M98	10K 5% 20X40
R3805	0662057N08	24K 5% 20X40
R3806	0662057M34	22 5% 20X 40
R3808	0662057M26	10 5% 20X40
R3811	0662057M50	100 5% 20X40
R3816	0662057M74	1000 5% 20X40
R3817	0662057M01	0 5% 20X40
R3821	0662057M58	220 5% 20X40
R3822	0662057M42	47 5% 20X40
R3823	0662057N11	33K 5% 20X40
R3824	0662057N07	22K 5% 20X40
R3825	0662057M38	33 5% 20X40
R3826	0662057M32	18 5% 20X40
R3828	0662057M50	100 5% 20X40
R3829	0662057M01	0 5% 20X40
R3831	0662057M98	10K 5% 20X40
R3832	0662057N01	12K 5% 20X40
R3833	0662057M58	220 5% 20X40
R3834	0662057M42	47 5% 20X40
R3835	0662057N15	47K 5% 20X40
R3836	0662057M98	10K 5% 20X40
R400	0662057N15	47K 5% 20X40
R401	0662057M01	0 5% 20X40
R405	0662057M01	0 5% 20X40
R406	0662057N20	75K 5% 20X40
R407	0662057N19	68K 5% 20X40
R409	0662057M98	10K 5% 20X40
R410	0662057N23	100K 5% 20X40
R411	0662057M98	10K 5% 20X40
R413	0662057M01	0 5% 20X40
R414	0662057V34	180K 1% 1/16W
R415	0662057V26	91K 1% 1/16W
R416	0662057N13	39K 5% 20X40
R418	0662057M01	0 5% 20X40
R419	0662057M67	0 5% 20X40 only GP360, GP380, GP680
R420	0662057B46	10.0 MEG OHMS 5% only GP360, GP380, GP680
R421	0662057M81	2000 5% 20X40
R423	0662057N21	82K 5% 20X40
R424	0662057N12	36K 5% 20X40
R425	0662057N10	30K 5% 20X40
R426	0662057N35	330K 5% 20X40 only GP360, GP380, GP680
R427	0662057M84	2700 5% 20X40
R428	0662057M10	2.2 5% 20X40
R429	0662057M98	10K 5% 20X40
R431	0662057N39	470K 5% 20X40
R432	0662057N16	51K 5% 20X40
R434	0662057M62	330 5% 20X40
R435	0662057M81	2000 5% 20X40
R436	0662057M01	0 5% 20X40
R445	0662057N08	24K 5% 20X40
R446	0662057N31	RES, CHIP 220K 5% 20X40
R447	0662057N51	RES, CHIP 1.5 MEG 5% 20X40
R448	0662057N33	270K 5% 20X40

Circuit Ref	Motorola Part No	Description
R449	0662057N08	24K 5% 20X40
R450	0683962T45	68 5-1
R457	0662057M98	10K 5% 20X40
R460	0662057M90	4700 5% 20X40
R461	0662057M56	180 5% 20X40 only GP360, GP380, GP680
R462	0662057M98	10K 5% 20X40 only GP360, GP380, GP680
R463	0662057M61	300 5% 20X40
R471	0662057M92	5600 5% 20X40
R472	0662057M93	6200 5% 20X40
R473	0662057M26	10 5% 20X40
R475	0662057M01	0 5% 20X40
R476	0662057N08	24K 5% 20X40
R477	0662057M74	1000 5% 20X40
R478	0662057M98	10K 5% 20X40
R481	0662057N08	24K 5% 20X40
R492	0662057M01	0 5% 20X40
R498	0662057M98	10K 5% 20X40 Placed on PCB 8486062B14 only
R499	0662057M98	10K 5% 20X40 Placed on PCB 8486062B14 only
R501	0662057M70	680 5% 20X40
R502	0662057M56	180 5% 20X40
R505	0662057M98	10K 5% 20X40
R506	0662057N15	47K 5% 20X40
RT400	0680590Z01	THERMISTOR_33K
S501	4080710Z01	SWITCH (FREQUENCY) only GP340, GP640
S501	4080710Z02	SWITCH (FREQUENCY) only GP360, GP380, GP680
S502	1880619Z01	POTENTIOMETER, VOLUME
SH3201	2602023X08	SHIELD
SH3202	2686081B02	SHIELD
SH3203	2686081B03	SHIELD
SH3301	2686081B01	SHIELD
SH3302	2686081B05	SHIELD
SH3303	2686081B06	SHIELD
SH3501	2686081B03	SHIELD
SH3502	2686081B04	SHIELD
SH3701	2680511Z01	SHIELD SYNTHESIZER
SH3702	2680511Z01	SHIELD SYNTHESIZER
SH3801	2680513Z01	SHIELD VCO TOP
SH3802	2680514Z01	SHIELD VCO BOTTOM/LVZIF
SH400	2680505Z01	CONTROLLER TOP LEFT
SH401	2680506Z01	CONTROLLER TOP RIGHT
SH402	2680515Z01	CONTROLLER BOTTOM LEFT
SH403	2680516Z01	CONTROLLER BTM RIGHT
T3301	2580541Z01	BALUN TRANSFORMER
T3302	2580541Z01	BALUN TRANSFORMER
U3201	5102463J58	3.3V REG IN SOT23-5 PKG
U3220	5109632D83	IC LVZIF 2.2 H60G 48TQFP
U3501	5105109Z67	IC LDMOS DRIVER VHF/UHF
U3502	5185765B01	IC POWER CONTROL PASS 2.3
U3503	5185963A15	IC TEMP SENSOR 1M50C
U3701	5185963A27	IC FRACN AT25016 48 PIN GFP

Circuit Ref	Motorola Part No	Description
U3711	5105739X05	IC 5V REGULATOR
U3801	5105750U54	IC VCO BUFFER
U400	5102463J40	REG 3.3V, LP2951CMM-3.3
U404	5185963A53	IC ASFIC CMP TQFP 48PIN PKG
U405	5102463J36	STATIC_RAM_32KX8
* U406	5102463J60	IC 512KX8 FLASH ROM
* U407	5102463J64	16KX8 SPI SERIAL EEPROM
U409	5102226J56	68HC11FLO_PASS5 TQFP
U410	5102463J57	REG 3.3V, ILC7062CM-33 only GP360, GP380, GP680
U420	5102463J44	AUDIO AMPLIFIER TDA8547TS
VR432	4805656W08	ZENER QUAD
VR433	4805656W08	ZENER QUAD
VR434	4802245J51	ZENER DIODE; BZX284-C6V8*
VR439	4880140L15	10V ZENER
VR447	4802245J53	ZENER_DIODE; BZX284-C10
VR448	4802245J53	ZENER_DIODE; BZX284-C10
VR449	4802245J53	ZENER_DIODE; BZX284-C10
VR450	4802245J53	ZENER_DIODE; BZX284-C10
VR501	4813830A18	6.8V 5% 225MWMMBZ5235B_
VR506	4802245J51	ZENER DIODE; BZX284-C6V8
Y3200	9186153B01	XTAL FILTER, SMD 45.1MHz
Y3761	4802245J49	CRYSTL 16.8MHZ WITH CLIP
	8486062B12/ 8486062B14	PCB WARIS VHF GP680

* Motorola Depot Servicing only

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

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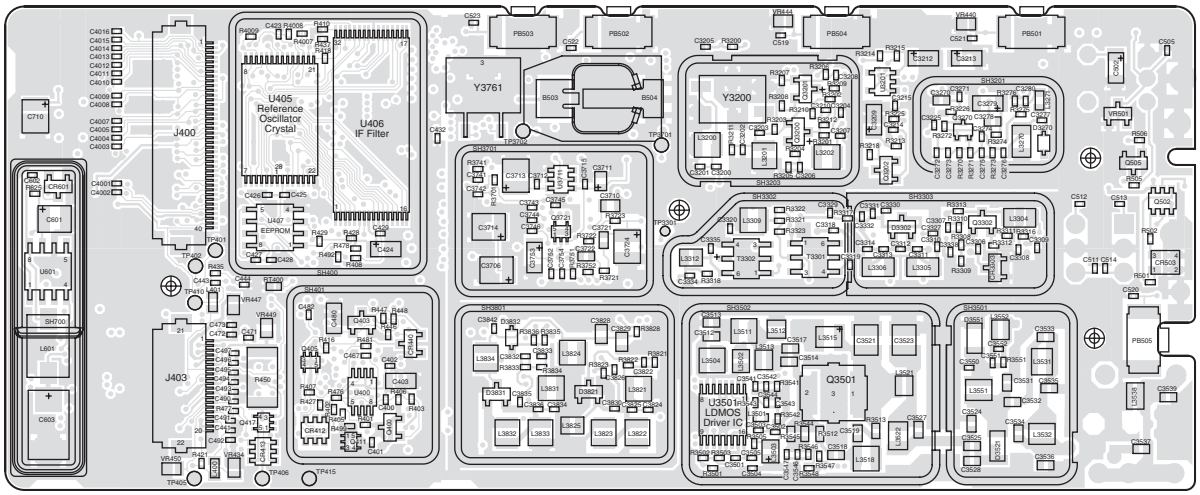
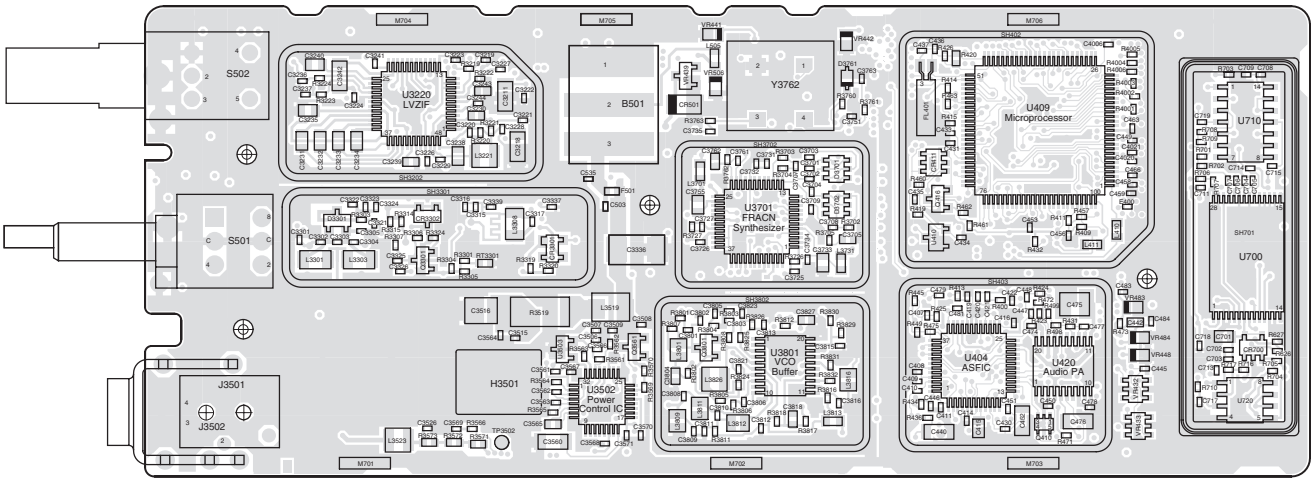
8.0 VHF PCB 8486101B10



ZWG0130096-B

VHF (136-174 MHz) Main Board Top Side



VHF (136-174 MHz) Main Board Bottom Side

9.0 VHF PCB 8486101B10 Parts List (GP1280)

Circuit Ref	Motorola Part No	Description
B501	0986237A01	CONN, CONTACT BATTERY
B503	3980502Z01	CONTACT, BACKUP B+
B504	3980501Z01	CONTACT, BACKUP B-
C3200	2113743N31	16.0 PF 5%
C3203	2113743N50	100 PF 5%
C3204	2113743L41	10000 PF 10%
C3205	2113928N01	0.1UF 10% 6.3
C3206	2113743L41	10000 PF 10%
C3207	2113743N10	2.2 PF +-.25PF
C3209	2311049A07	TANT 10% 1.0UF
C3210	2113743L17	1000 PF 10%
C3211	2311049A56	TAN CHIP A/P 4.7 20 10
C3212	2311049A07	TANT 10% 1.0UF
C3213	2311049A56	TAN CHIP A/P 4.7 20 10
C3214	2113928N01	CERAMIC CHIP 10.0UF
C3215	2113743N26	10.0 PF 5%
C3218	2311049A56	TAN CHIP A/P 4.7 20 10
C3219	2113928N01	CERAMIC CHIP 10.0UF
C3220	2113743N26	10.0 PF 5%
C3221	2113743L41	10000 PF 10%
C3222	2113928N01	CERAMIC CHIP 10.0UF
C3223	2113928N01	0.1UF 10% 6.3
C3224	2113928N01	0.1UF 10% 6.3
C3225	2113928N01	0.1UF 10% 6.3
C3226	2113928N01	0.1UF 10% 6.3
C3227	2113743L41	10000 PF 10%
C3228	2113743L41	10000 PF 10%
C3229	2113743N50	100 PF 5%
C3230	2113740F51	REEL CL1 +/-30 100
C3231	2180478Z20	MONOLITH CERAMIC (1.0UF)
C3232	2180478Z20	MONOLITH CERAMIC (1.0UF)
C3233	2180478Z20	MONOLITH CERAMIC (1.0UF)
C3234	2180478Z20	MONOLITH CERAMIC (1.0UF)
C3235	2113743A23	.220UF 10%
C3238	2113743A24	.330 UF 10% 16V
C3239	2113743E07	.022UF
C3240	2113743A23	.220UF 10%
C3241	2113743L19	1200 PF 10%
C3242	2109720D14	LOW DIST 0.1UF
C3243	2113743E07	.022UF
C3244	2113743L41	10000 PF 10%
C3270	2113743E07	.022UF
C3271	2113743L05	330 PF 10%
C3272	2113743N18	4.7 PF +-.25PF
C3273	2113743N26	10.0 PF 5%
C3274	2113743N38	33.0 PF 5%
C3275	2113743N44	56.0 PF 5%
C3276	2113743N42	47.0 PF 5%
C3277	2113743N48	82.0 PF 5%
C3278	2113743E07	.022UF
C3279	2311049A40	GLOBAL TANT 10% 2.2 UF
C3280	2113743L41	10000 PF 10%
C3301	2113743N20	5.6 PF +-.5PF
C3302	2113743N54	150 PF 5%
C3303	2113743N30	15.0PF 5%
C3304	2113743N54	150 PF 5%
C3306	2113928N01	0.1UF 10% 6.3
C3307	2113743N50	100 PF 5%
C3308	2113743L05	330 PF 10%
C3309	2113928N01	0.1UF 10% 6.3
C3311	2113743N54	150 PF 5%
C3312	2113743N31	16.0 PF 5%
C3313	2113743N54	150 PF 5%
C3315	2113743N26	10.0 PF 5%
C3316	2113743N14	3.3 PF +-.25PF
C3317	2113743N40	39.0 PF 5%
C3318	2113743M08	22000PF +80-20% Y5V
C3320	2113743N48	82.0 PF 5%
C3321	2113743L05	330 PF 10%
C3322	2113743N50	100 PF 5%
C3323	2113743N50	100 PF 5%
C3324	2113743N38	33.0 PF 5%
C3325	2113743L17	1000 PF 10%
C3327	2113743L05	330 PF 10%
C3329	2113743L05	330 PF 10%
C3330	2113743N50	100 PF 5%
C3331	2113743N50	100 PF 5%
C3332	2113743N40	39.0 PF 5%
C3334	2113743N33	20.0 PF 5%
C3335	2113743N34	22.0 PF 5%
C3336	2311049A18	CAP. TANT 10% 10UF
C3337	2113743M08	22000PF +80-20% Y5V
C3338	2113743L09	470 PF 10%
C3339	2113743N26	10.0 PF 5%
C3501	2113743L05	330 PF 10%
C3502	2113743N38	33.0 PF 5%
C3503	2113743N38	33.0 PF 5%
C3504	2113743M08	22000PF +80-20% Y5V
C3505	2113743N38	33.0 PF 5%
C3508	2113743M08	22000PF +80-20% Y5V
C3509	2113743L05	330 PF 10%
C3512	2113740F43	REEL CL1 +/-30 47
C3513	2113740F38	REEL CL1 +/-30 30
C3514	2113740F67	CL1 +/-30 470 5%
C3515	2113743L29	3300PF 10%
C3516	2311049A08	KEMET CAPS
C3517	2113740F51	REEL CL1 +/-30 100
C3518	2113740F63	CL1 +/-30 330 5%
C3519	2113740F35	REEL CL1 +/-30 22
C3521	2111078B51	RF 220 5 NPO 100V
C3523	2111078B44	RF 120 5 NPO 100V
C3524	2113740F33	REEL CL1 +/-30 18
C3525	2113740F27	REEL CL1 +/-30 10
C3526	2113743M08	22000PF +80-20% Y5V
C3528	2113740F26	REEL CL1 +/-30 9.1
C3531	2113740F34	REEL CL1 +/-30 20
C3532	2113740F47	REEL CL1 +/-30 68
C3533	2113740F24	REEL CL1+/-30 7.5
C3534	2113740F19	CHIP CAP, CER 4.7PF
C3535	2113740F37	REEL CL1+/-30 27
C3536	2113740F31	REEL CL1 +/-30 15
C3537	2113740F33	REEL CL1 +/-30 18
C3539	2113740F21	REEL CL1+/-30 5.6
C3541	2113743M08	22000PF +80-20% Y5V
C3542	2113743L05	330 PF 10%
C3543	2113743M08	22000PF +80-20% Y5V
C3544	2113743L05	330 PF 10%
C3546	2113743L05	330 PF 10%
C3547	2113743M08	22000PF +80-20% Y5V
C3550	2113743N23	7.5 PF +-.5PF
C3551	2113743N46	68.0 PF 5%
C3552	2113743N44	56.0 PF 5%
C3560	2311049A07	TANT 10% 1.0UF
C3561	2113743M08	22000PF +80-20% Y5V
C3562	2113743L29	3300PF 10%
C3563	2113743L29	3300PF 10%
C3564	2113743L01	220 PF 10%
C3565	2113743E07	.022UF
C3566	2113743N50	100 PF 5%
C3567	2113743L05	330 PF 10%
C3568	2113743L29	3300PF 10%
C3569	2113743M08	22000PF +80-20% Y5V
C3570	2113743L05	330 PF 10%
C3571	2113743L09	470 PF 10%
C3701	2113743L41	10000 PF 10%
C3702	2113743L41	10000 PF 10%
C3703	2113743L41	10000 PF 10%
C3704	2113743L41	10000 PF 10%
C3705	2113743E20	CHIP. 10 UF 10%
C3706	2311049J11	CAPACITOR TANT 10% 4.7UF
C3707	2113743N34	22.0 PF 5%
C3708	2113743M24	100000 PF +80-20% Y5V
C3709	2113743M24	100000 PF +80-20% Y5V
C3710	2104993J02	MONOLITH CERAMIC (2.2UF)
C3711	2311049A69	TAN CHIP 10.0 UF 20% 6.3V
C3712	2113743M24	100000 PF +80-20% Y5V
C3713	2311049A09	TANT 2.2 UF 10%
C3714	2311049J11	CAPACITOR TANT 10% 4.7UF
C3715	2113743L09	470 PF 10%
C3721	2113743E20	CHIP. 10 UF 10%
C3722	2113743E20	CHIP. 10 UF 10%
C3724	2311049A08	KEMET CAPS
C3726	2113743N24	8.2 PF + -.5PF
C3727	2113743N50	100 PF 5%
C3731	2113743L41	10000 PF 10%
C3732	2113743L41	10000 PF 10%
C3733	2104993J02	MONOLITH CERAMIC (2.2UF)
C3734	2113743L41	10000 PF 10%
C3742	2113743L01	220 PF 10%
C3743	2113743L01	220 PF 10%
C3744	2113743L01	220 PF 10%
C3745	2113743L01	220 PF 10%
C3746	2113743L01	220 PF 10%
C3752	2113743L17	1000 PF 10%
C3753	2311049A56	TAN CHIP A/P 4.7 20 10
C3754	2113743M24	100000 PF +80-20% Y5V
C3755	2104993J02	MONOLITH CERAMIC (2.2UF)
* C3761	2113743N44	56.0 PF 5%
* C3762	2113740F63	330 CL1 +/-30 5%
* C3763	2113743N08	1.6 PF +-.25PF
C3801	2113743N18	4.7 PF +-.25PF
C3803	2113743L17	1000 PF 10%
C3804	2113743E20	CHIP. 10 UF 10%
C3805	2113743N18	4.7 PF +-.25PF
C3806	2113743N50	100 PF 5%
C3808	2113743N30	15.0PF 5%
C3809	2113743N36	27.0 PF 5%
C3811	2113743M24	100000 PF +80-20% Y5V
C3812	2113743M24	100000 PF +80-20% Y5V
C3813	2113743L41	10000 PF 10%
C3815	2113743L17	1000 PF 10%
C3816	2113743N22	6.8 PF +-.5PF
C3818	2113743E07	.022UF
C3821	2113743L41	10000 PF 10%
C3822	2113743L17	1000 PF 10%
C3823	2113743L41	10000 PF 10%
C3824	2113743N44	56.0 PF 5%
C3825	2113743N30	15.0PF 5%
C3826	2113743N18	4.7 PF +-.25PF
C3827	2113743E07	.022UF
C3828	2109720D01	LOW DIS T .01UF
C3829	2109720D01	LOW DIS T .01UF
C3830	2113743N46	68.0 PF 5%
C3832	2113743L17	1000 PF 10%
C3833	2113743N18	4.7 PF +-.25PF
C3834	2113743N44	56.0 PF 5%
C3835	2113743N22	6.8 PF +-.5PF
C3836	2113743N30	15.0PF 5%
C3842	2113743L17	1000 PF 10%
C400	2113743L41	10000 PF 10%

Circuit Ref	Motorola Part No	Description
C4001	2113743N50	100 PF 5%
C4002	2113743N50	100 PF 5%
C4003	2113743N50	100 PF 5%
C401	2113743M24	100000 PF +80-20% Y5V
C402	2113743M24	100000 PF +80-20% Y5V
C4020	2113743L17	1000 PF 10%
C4021	2113743L17	1000 PF 10%
C403	2113928D08	CERAMIC CHIP 10.0UF
C407	2113928N01	0.1UF 10% 6.3
C408	2113743N50	100 PF 5%
C409	2113743M24	100000 PF +80-20% Y5V
C410	2113928N01	0.1UF 10% 6.3
C411	2113743M24	100000 PF +80-20% Y5V
C414	2113743M24	100000 PF +80-20% Y5V
C415	2109720D01	LOW DIS T .01UF
C416	2113928N01	0.1UF 10% 6.3
C419	2113743L41	10000 PF 10%
C420	2113743L41	10000 PF 10%
C421	2113928N01	0.1UF 10% 6.3
C422	2113743M24	100000 PF +80-20% Y5V
C423	2113743N50	100 PF 5%
C424	2311049A59	TANT CHIP A/P 10UF 10% 6V
C425	2113743M24	100000 PF +80-20% Y5V
C426	2113743N50	100 PF 5%
C427	2113743N50	100 PF 5%
C428	2113743M24	100000 PF +80-20% Y5V
C429	2113743M24	100000 PF +80-20% Y5V
C430	2113928N01	0.1UF 10% 6.3
C431	2113743N50	100 PF 5%
C433	2113743L41	10000 PF 10%
C434	2113743M24	100000 PF +80-20% Y5V
C435	2113743M24	100000 PF +80-20% Y5V
C436	2113743N34	22.0 PF 5%
C437	2113743N34	22.0 PF 5%
C440	2113743G26	4.7UF 16V + 80-20%
C441	2113743L09	470 PF 10%
C442	2113743E20	10 UF 10%
C443	2113928N01	CERAMIC CHIP 10.0UF
C444	2113743N50	100 PF 5%
C445	2113743L09	470 PF 10%
C446	2113743L09	470 PF 10%
C447	2113928N01	CERAMIC CHIP 10.0UF
C448	2113928N01	CERAMIC CHIP 10.0UF
C449	2113743N50	100 PF 5%
C451	2113743M08	22000PF +80-20% Y5V
C452	2113743G26	4.7UF 16V + 80-20%
C453	2113743N50	100 PF 5%
C456	2113743N50	100 PF 5%
C458	2113743N50	100 PF 5%
C459	2113743N50	100 PF 5%
C463	2113743N50	100 PF 5%
C466	2113743N50	100 PF 5%
C467	2113928N01	0.1UF 10% 6.3
C471	2113743L09	470 PF 10%
C472	2113743L09	470 PF 10%
C473	2113743L09	470 PF 10%
C474	2113743L41	10000 PF 10%
C475	2113743H14	10.0 UF 16V +80-20%
C476	2113928D08	CERAMIC CHIP 10.0UF
C477	2113743L17	1000 PF 10%
C478	2113743L17	1000 PF 10%
C479	2113928N01	0.1UF 10% 6.3
C480	2113928D08	CERAMIC CHIP 10.0UF
C481	2113928N01	0.1UF 10% 6.3
C482	2113928N01	0.1UF 10% 6.3
C483	2113743L09	470 PF 10%
C484	2113743L09	470 PF 10%
C490	2113743L09	470 PF 10%
C491	2113743L09	470 PF 10%
C492	2113743L09	470 PF 10%
C493	2113743N50	100 PF 5%
C494	2113743N50	100 PF 5%
C495	2113743L09	470 PF 10%
C496	2113743L09	470 PF 10%
C497	2113743L09	470 PF 10%
C502	2311049A05	TANT 10% 0.47UF
C503	2113743N50	100 PF 5%
C505	2113743N50	100 PF 5%
C511	2113743N50	100 PF 5%
C512	2113743N50	100 PF 5%
C513	2113743N50	100 PF 5%
C514	2113743N50	100 PF 5%
C520	2113743L41	10000 PF 10%
C521	2113743L41	10000 PF 10%
C522	2113743L41	10000 PF 10%
C523	2113743L41	10000 PF 10%
C535	2113743L17	1000 PF 10%
C701	2180478Z20	MONOLITHIC CER (1.0UF)
C702	2113928N01	0.1UF 10% 6.3
C703	2113743N50	100 PF 5%
C704	2113928N01	0.1UF 10% 6.3
C705	2113928N01	0.1UF 10% 6.3
C707	2113928N01	0.1UF 10% 6.3
C708	2113928N01	0.1UF 10% 6.3
C709	2113743L17	1000 PF 10%
C711	2113743L41	10000 PF 10%
C713	2113928N01	0.1UF 10% 6.3
C714	2113928N01	0.1UF 10% 6.3
C715	2113928N01	0.1UF 10% 6.3
C717	2113928N01	0.1UF 10% 6.3
C718	2113743L17	1000 PF 10%
C719	2113928N01	0.1UF 10% 6.3
CR3301	4802245J42	RING QUAD SOT-143 PKG
CR3302	4805129M96	DIODE DUAL
CR3303	4880154K03	SOT MMBD353 DUAL SCHTKY
CR411	4802245J47	SCHOTTKY BARIER(RB471E)
		Placed on PCB 8486101B09 only
CR412	4802245J62	DIODE SCHOTTKY, RB731U
CR413	4802245J62	DIODE SCHOTTKY, RB731U
CR440	4813833C02	DUAL 70V '5B' COMM CATH
CR501	4880107R01	RECTIFIER
CR503	4805729G49	DIODE RED/YEL
CR700	4802245J47	SCHOTTKY BARIER(RB471E)
D3270	4862824C01	DIODE VARACTOR
D3301	4802081B58	DUAL SILCON (VARICAP)
D3302	4802081B58	DUAL SILCON (VARICAP)
D3521	4880973Z02	PIN DIODE
D3551	4880973Z02	PIN DIODE
D3701	4802233J09	DIODE TRIPLE SOT25-RH
D3702	4802233J09	DIODE TRIPLE SOT25-RH
* D3761	4862824C03	DIODE VARACTOR
D3821	4805649Q13	DIODE VCTR ISV 228
D3831	4805649Q13	DIODE VCTR ISV 228
D3832	4862824C01	DIODE VARACTOR
E400	2480640Z01	C/IND BK1005HM471 BEAD
F501	6580542Z01	FUSE SMT TR/1608FF 3A
FL401	4870368G02	REFLOW CLOCK OSC XTAL
H3501	2680499Z01	HEAT SPREADER
J3501	0180117S05	RF JACK ASSEMBLY
J3502	0280519Z02	NUT, ANTENNA
J400	0905505Y04	CONN ZIF HORIZONTAL
J403	0905505Y02	CONN MALE 20 PIN ZIF
L3200	2462587N68	CHIP IND 1000 NH 5%
L3202	2462587N68	CHIP IND 1000 NH 5%
L3221	2462587N68	CHIP IND 1000 NH 5%
L3270	2462587T15	IND 100NH 5% LOW PRO
L3271	2462587Q20	IND CHIP 2,200NH 20%
L3301	2462587T35	IND CHIP 12NH 5% LOW PRO
L3303	2462587T35	IND CHIP 12NH 5% LOW PRO
L3304	2462587T23	IND CHIP 470NH 5%LOW PRO
L3305	2462587T35	IND CHIP 12NH 5% LOW PRO
L3306	2462587T35	IND CHIP 12NH 5% LOW PRO
L3308	2462587T34	IND CHIP 10NH 5% LOW PRO
L3309	2462587N55	CHIP IND 150 NH 5%
L3312	2462587V28	CHIP IND 33 NH 5% 0805
L3501	2413926H09	IND CHIP 5.6 NH +/- 0.3NH
L3503	2462587V32	CHIP IND 68NH 5% 0805
L3504	2462587N51	CHIP IND 68 NH 5%
L3511	2462587N44	CHIP IND 18 NH 5%
L3512	2479990B01	AIR WND COIL/GRN 11.03NH
L3513	2479990A02	AIR WND COIL/GRN 7.66NH
L3515	2479990C03	AIR WND COIL/GRN 13.85NH
L3518	2462587N48	CHIP IND 39 NH 5%
L3519	2484657R01	INDUCTOR BEAD CHIP
L3521	2479990A02	AIR WND COIL/GRN 7.66NH
L3522	2479990E01	COIL AIR WND/GRN 23.75
L3523	2462587N68	CHIP IND 1000 NH 5%
L3531	2479990N01	AIR WND COIL/GRN 43.67NH
L3532	2479990N01	AIR WND COIL/GRN 43.67NH
L3538	2479990M01	AIR WND COIL/GRN 30.54NH
L3551	2479990N01	AIR WND COIL/GRN 43.67NH
L3552	2479990A02	AIR WND COIL/GRN 7.66NH
L3701	2462587Q42	IND CHIP 390NH 10%
L3731	2462587Q20	IND CHIP 2,200NH 20%
L3801	2462587V34	CHIP IND 100NH 5% 0805
L3809	2462587V27	CHIP IND 27 NH 5% 0805
L3811	2462587V34	CHIP IND 100NH 5% 0805
L3812	2462587V34	CHIP IND 100NH 5% 0805
L3813	2462587Q47	IND CHIP 1000 NH 10%
L3816	2462587V34	CHIP IND 100NH 5% 0805
L3821	2462587N50	CHIP IND 56 NH 5%
L3822	2462587N49	CHIP IND 47 NH 5%
L3823	2462587N49	CHIP IND 47 NH 5%
L3824	2462587N68	CHIP IND 1000 NH 5%
L3825	2462587V34	CHIP IND 100NH 5% 0805
L3826	2462587N68	CHIP IND 1000 NH 5%
L3831	2462587N50	CHIP IND 56 NH 5%
L3832	2462587N51	CHIP IND 68 NH 5%
L3833	2462587N50	CHIP IND 56 NH 5%
L3834	2462587N68	CHIP IND 1000 NH 5%
L400	2462587Q42	IND CHIP 390NH 10%
L401	2462587Q42	IND CHIP 390NH 10%
L410	2462587Q42	IND CHIP 390NH 10%
L411	2462587Q42	IND CHIP 390NH 10%
L505	2462587Q42	IND CHIP 390NH 10%
M701	7585651Z01	PAD, FLEXIBLE
M702	7585651Z01	PAD, FLEXIBLE
M703	7585651Z01	PAD, FLEXIBLE
M704	7585651Z01	PAD, FLEXIBLE
M705	7585651Z01	PAD, FLEXIBLE
M706	7585651Z01	PAD, FLEXIBLE
PB501	4080523Z01	SWITCH, TACT
PB502	4080523Z01	SWITCH, TACT
PB503	4080523Z01	SWITCH, TACT
PB504	4080523Z01	SWITCH, TACT
PB505	4080523Z01	SWITCH, TACT
Q3200	4813827A07	NPNSML SIG MMBR941LT1 7Y
Q3201	4880214G02	TSTR MMBT3904
Q3202	4880214G02	TSTR MMBT3904
Q3270	4805218N63	RF TRANS SOT 323 BFQ67W
Q3301	4880214G02	TSTR MMBT3904
Q3302	4813827A07	NPNSML SIG MMBR941LT1 7Y
Q3501	4802245J55	POWER FIELD EFFECT
Q3561	4813824A17	XSTR PNP40V .2A B=100-300

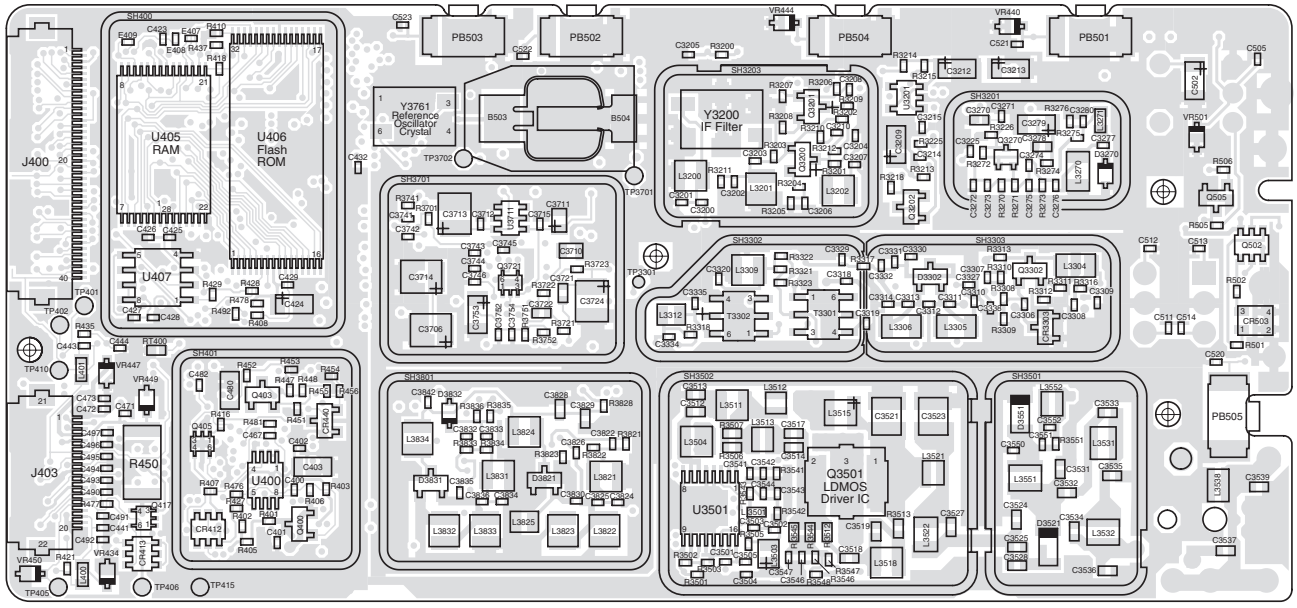
Circuit Ref	Motorola Part No	Description
Q3721	4802245J50	DUAL NPN/PNP UMC5N
Q3801	4813827A07	NPNSML SIG MMBR941LT1 7Y
Q400	4809579E18	MOSFET P-CHAN TP010IT
Q403	4880214G02	TSTR MMBT3904
Q405	4802245J54	UMG5N DIGITAL TRANSISTOR
Q410	4802245J54	UMG5N DIGITAL TRANSISTOR
Q416	4809579E18	MOSFET P-CHAN TP010IT
Q417	4802245J50	DUAL NPN/PNP UMC5N
Q502	5180159R01	DUAL TRANS NPNS
Q505	4880214G02	TSTR MMBT3904
R3200	0662057M54	150 5% 20X40
R3201	0662057M82	2200 5% 20X40
R3202	0662057M90	4700 5% 20X40
R3203	0662057M98	10K 5% 20X40
R3204	0662057M26	10 5% 20X40
R3205	0662057M74	1000 5% 20X40
R3206	0662057N23	100K 5% 20X40
R3207	0662057N13	39K 5% 20X40
R3208	0662057M50	100 5% 20X40
R3209	0662057M74	1000 5% 20X40
R3210	0662057M82	2200 5% 20X40
R3211	0662057M82	2200 5% 20X40
R3212	0662057M90	4700 5% 20X40
R3213	0662057M82	2200 5% 20X40
R3214	0662057M34	22 5% 20X 40
R3219	0662057M50	100 5% 20X40
R3220	0662057M90	4700 5% 20X40
R3221	0662057M50	100 5% 20X40
R3224	0662057M26	10 5% 20X40
R3225	0662057M74	1000 5% 20X40
R3226	0662057M26	10 5% 20X40
R3270	0662057M74	1000 5% 20X40
R3271	0662057M42	47 5% 20X40
R3272	0662057N15	47K 5% 20X40
R3273	0662057N15	47K 5% 20X40
R3274	0662057M83	2400 5% 20X40
R3275	0662057M74	1000 5% 20X40
R3276	0662057N30	200K 5% 20X40
R3303	0662057N23	100K 5% 20X40
R3304	0662057N23	100K 5% 20X40
R3305	0662057N19	68K 5% 20X40
R3306	0662057M82	2200 5% 20X40
R3307	0662057N11	33K 5% 20X40
R3308	0662057M78	1500 5% 20X40
R3309	0662057M92	5600 5% 20X40
R3310	0662057M98	10K 5% 20X40
R3311	0662057M26	10 5% 20X40
R3312	0662057M38	33 5% 20X40
R3313	0662057M34	22 5% 20X 40
R3314	0662057M26	10 5% 20X40
R3315	0662057M62	330 5% 20X40
R3316	0662057M66	470 5% 20X40
R3317	0662057N23	100K 5% 20X40
R3318	0662057M66	470 5% 20X40
R3321	0662057M54	150 5% 20X40
R3322	0662057M58	220 5% 20X40
R3323	0662057M32	18 5% 20X40
R3324	0662057M58	220 5% 20X40
R3501	0662057M61	300 5% 20X40
R3502	0662057M32	18 5% 20X40
R3503	0662057M61	300 5% 20X40
R3505	0662057M62	330 5% 20X40
R3512	0662057A27	120 OHMS 5%
R3513	0662057A25	100 OHMS 5%
R3519	0680539Z01	PWR METAL STRIP RES
R3542	0662057M92	5600 5% 20X40
R3543	0662057M50	100 5% 20X40
R3544	0662057A25	100 OHMS 5%
R3545	0662057A25	100 OHMS 5%
R3546	0662057N11	33K 5% 20X40
R3547	0662057N01	12K 5% 20X40
R3548	0662057M95	7500 55 20X40
R3551	0662057M40	39 5% 20X40
R3561	0662057N01	12K 5% 20X40
R3562	0662057N11	33K 5% 20X40
R3563	0662057N33	270K 5% 20X40
R3564	0662057N35	330K 5% 20X40
R3569	0662057M92	5600 5% 20X40
R3570	0662057M98	10K 5% 20X40
R3571	0662057A27	120 OHMS 5%
R3572	0662057A27	120 OHMS 5%
R3573	0662057A27	120 OHMS 5%
R3701	0662057M50	100 5% 20X40
R3703	0662057M54	150 5% 20X40
R3704	0662057M54	150 5% 20X40
R3705	0662057N11	33K 5% 20X40
R3721	0662057M66	470 5% 20X40
R3722	0662057M74	1000 5% 20X40
R3723	0662057M50	100 5% 20X40
R3727	0662057N23	100K 5% 20X40
R3741	0662057M50	100 5% 20X40
R3751	0662057N30	200K 5% 20X40
R3752	0662057N35	330K 5% 20X40
R3761	0662057N15	47K 5% 20X40
R3802	0662057M50	100 5% 20X40
R3803	0662057M58	220 5% 20X40
R3804	0662057M98	10K 5% 20X40
R3805	0662057N08	24K 5% 20X40
R3806	0662057M34	22 5% 20X 40
R3808	0662057M26	10 5% 20X40
R3811	0662057M50	100 5% 20X40
R3816	0662057M74	1000 5% 20X40
R3817	0662057M01	0 5% 20X40
R3821	0662057M58	220 5% 20X40
R3822	0662057M42	47 5% 20X40
R3823	0662057N11	33K 5% 20X40
R3824	0662057N07	22K 5% 20X40
R3825	0662057M38	33 5% 20X40
R3826	0662057M32	18 5% 20X40
R3828	0662057M50	100 5% 20X40
R3829	0662057M01	0 5% 20X40
R3831	0662057M98	10K 5% 20X40
R3832	0662057N01	12K 5% 20X40
R3833	0662057M58	220 5% 20X40
R3834	0662057M42	47 5% 20X40
R3835	0662057N15	47K 5% 20X40
R3836	0662057M98	10K 5% 20X40
R400	0662057N15	47K 5% 20X40
R4001	0662057M74	1000 5% 20X40
R4002	0662057M74	1000 5% 20X40
R4003	0662057M74	1000 5% 20X40
R4004	0662057M74	1000 5% 20X40
R4005	0662057M74	1000 5% 20X40
R4006	0662057M74	1000 5% 20X40
R4007	0662057M74	1000 5% 20X40
R4008	0662057M74	1000 5% 20X40
R4009	0662057M74	1000 5% 20X40
R401	0662057M01	0 5% 20X40
R405	0662057M01	0 5% 20X40
R406	0662057N20	75K 5% 20X40
R407	0662057N19	68K 5% 20X40
R409	0662057M98	10K 5% 20X40
R410	0662057N23	100K 5% 20X40
R411	0662057M98	10K 5% 20X40
R413	0662057M01	0 5% 20X40
R414	0662057V34	180K 1% 1/16W
R415	0662057V26	91K 1% 1/16W
R416	0662057N13	39K 5% 20X40
R418	0662057M01	0 5% 20X40
R419	0662057M67	0 5% 20X40
R420	0662057B46	10.0 MEG OHMS 5%
R421	0662057M81	2000 5% 20X40
R423	0662057N21	82K 5% 20X40
R424	0662057N12	36K 5% 20X40
R425	0662057N10	30K 5% 20X40
R426	0662057N35	330K 5% 20X40
R427	0662057M84	2700 5% 20X40
R428	0662057M10	2.2 5% 20X40
R429	0662057M98	10K 5% 20X40
R431	0662057N39	470K 5% 20X40
R432	0662057N16	51K 5% 20X40
R434	0662057M62	330 5% 20X40
R435	0662057M81	2000 5% 20X40
R436	0662057M01	0 5% 20X40
R445	0662057N08	24K 5% 20X40
R446	0662057N31	220K 5% 20X40
R447	0662057N51	1.5 MEG 5% 20X40
R448	0662057N33	270K 5% 20X40
R449	0662057N08	24K 5% 20X40
R450	0683962T45	68 5-1
R457	0662057M98	10K 5% 20X40
R460	0662057M90	4700 5% 20X40
R461	0662057M56	180 5% 20X40
R462	0662057M98	10K 5% 20X40
R463	0662057M61	300 5% 20X40
R471	0662057M92	5600 5% 20X40
R472	0662057M93	6200 5% 20X40
R473	0662057M26	10 5% 20X40
R475	0662057M01	0 5% 20X40
R476	0662057N08	24K 5% 20X40
R477	0662057M74	1000 5% 20X40
R478	0662057M98	10K 5% 20X40
R481	0662057N08	24K 5% 20X40
R492	0662057M01	0 5% 20X40
R498	0662057M98	10K 5% 20X40
		Placed not on PCB 8486101B09
R499	0662057M98	10K 5% 20X40
R501	0662057M70	680 5% 20X40
R502	0662057M56	180 5% 20X40
R505	0662057M98	10K 5% 20X40
R506	0662057N15	47K 5% 20X40
R701	0662057N05	18K 5% 20X40
R702	0662057N05	18K 5% 20X40
R703	0662057M74	1000 5% 20X40
R704	0662057N13	39K 5% 20X40
R705	0662057N13	39K 5% 20X40
R706	0662057N17	56K 5% 20X40
R707	0662057M91	5100 5% 20X40
R708	0662057N41	560K 5% 20X40
R709	0662057N47	1.0 MEG 5% 20X40
R710	0662057N39	470K 5% 20X40
R716	0662057N01	12K 5% 20X40
R717	0662057M82	2200 5% 20X40
RT400	0680590Z01	THERMISTOR_33K
S501	4080710Z02	SWITCH (FREQUENCY)
S502	1880619Z01	POTENTIOMETER, VOLUME
SH3201	2602023X08	SHIELD
SH3202	2686081B02	SHIELD
SH3203	2686081B03	SHIELD
SH3301	2686081B01	SHIELD
SH3302	2686081B05	SHIELD
SH3303	2686081B06	SHIELD
SH3501	2686081B03	SHIELD
SH3502	2686081B04	SHIELD

Circuit Ref	Motorola Part No	Description
SH3701	2680511Z01	SHIELD SYNTHESIZER
SH3702	2680511Z01	SHIELD SYNTHESIZER
SH3801	2680513Z01	SHIELD VCO TOP
SH3802	2680514Z01	SHIELD VCO BOTTOM/LVZIF
SH400	2680505Z01	CTRL TOP LEFT
SH401	2680506Z01	CTRL TOP RIGHT
SH402	2680515Z01	CTRL BOTTOM LEFT
SH403	2680516Z01	CTRL BTM RIGHT
SH701	2680677Z01	(VOICE STORAGE BOTTOM)
T3301	2580541Z01	BALUN TRANSFORMER
T3302	2580541Z01	BALUN TRANSFORMER
U3201	5102463J58	3.3V REG IN SOT23-5 PKG
U3220	5109632D83	LVZIF 2.2 H60G 48TQFP
U3501	5105109Z67	IC LDMOS DRIVER VHF/UHF
U3502	5185765B01	IC PWR CONTROL PASS 2.3
U3503	5185963A15	IC TEMP SENSOR 1M50C
U3701	5185963A27	IC AT25016 48 PIN GFP
U3711	5105739X05	IC SOT 5V HI-PRECISION REG
U3801	5105750U54	IC PKG DIE VCO BUFFER
U400	5102463J40	REG 3.3V, LP2951CMM-3.3
U404	5185963A53	IC ASFIC CMP TQFP 48 PIN
U405	5102463J36	STATIC_RAM_32KX8
* U406	5102463J60	512X8 FLASH (AT49LV040)
* U407	5102463J64	16KX8 SPI SERIAL EEPROM
U409	5102226J56	68HC11FLO_PASS5 TQFP
U410	5102463J57	REG 3.3V, ILC7062CM-33
U411	4802245J54	UMG5N DIGITAL TRANSISTOR
		Placed on PCB 8486101B09 only
U420	5102463J44	AUDIO AMP TDA8547TS
U700	5109152M01	IC EEPROM ISD3312OE1
U710	5102463J52	74HC4066D QUAD ANLOG SW
U720	5113818A01	SING SPLY LM2904DR
VR432	4805656W08	DIODE ZENER QUAD
VR433	4805656W08	DIODE ZENER QUAD
VR434	4802245J51	ZENER DIODE; BZX284-C6V8
VR439	4880140L15	10V ZENER
VR447	4802245J53	ZENER_DIODE; BZX284-C10
VR448	4802245J53	ZENER_DIODE; BZX284-C10
VR449	4802245J53	ZENER_DIODE; BZX284-C10
VR450	4802245J53	ZENER_DIODE; BZX284-C10
VR483	4802245J53	ZENER_DIODE; BZX284-C10
VR484	4802245J53	ZENER_DIODE; BZX284-C10
VR501	4813830A18	6.8V 5% 225MWMMBZ5235B_
VR506	4802245J51	ZENER DIODE; BZX284-C6V8
Y3200	4802245J43	MONOLITH/ XTAL FLTR
Y3761	4802245J49	XTAL 16.8MHZ WITH CLIP
	8486101B09	PCBs WARIS VHF GP1280
	8486101B10	

* Motorola Depot Servicing only

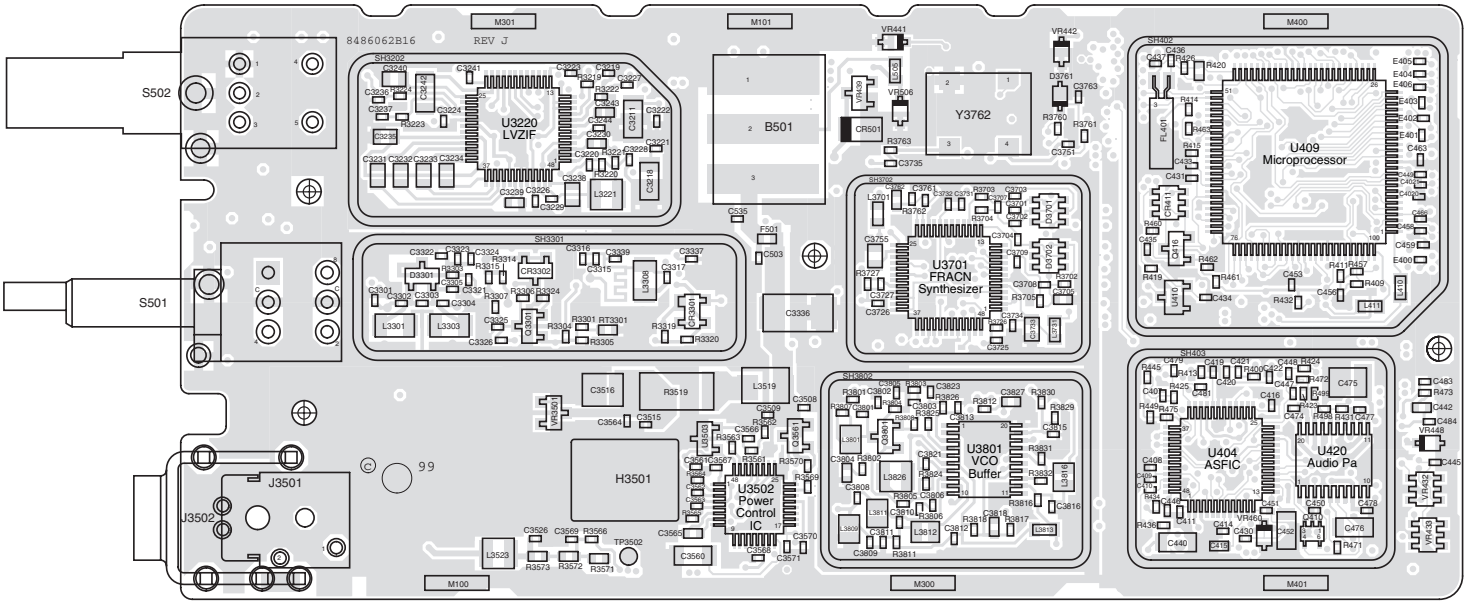
Reference designators with an asterisk indicate components which are not field replaceable because they need to be calibrated with specialized factory equipment after installation. Radios in which these parts have been replaced in the field will be off frequency at temperature extremes.

10.0 VHF PCB 8486062B16 / Schematics

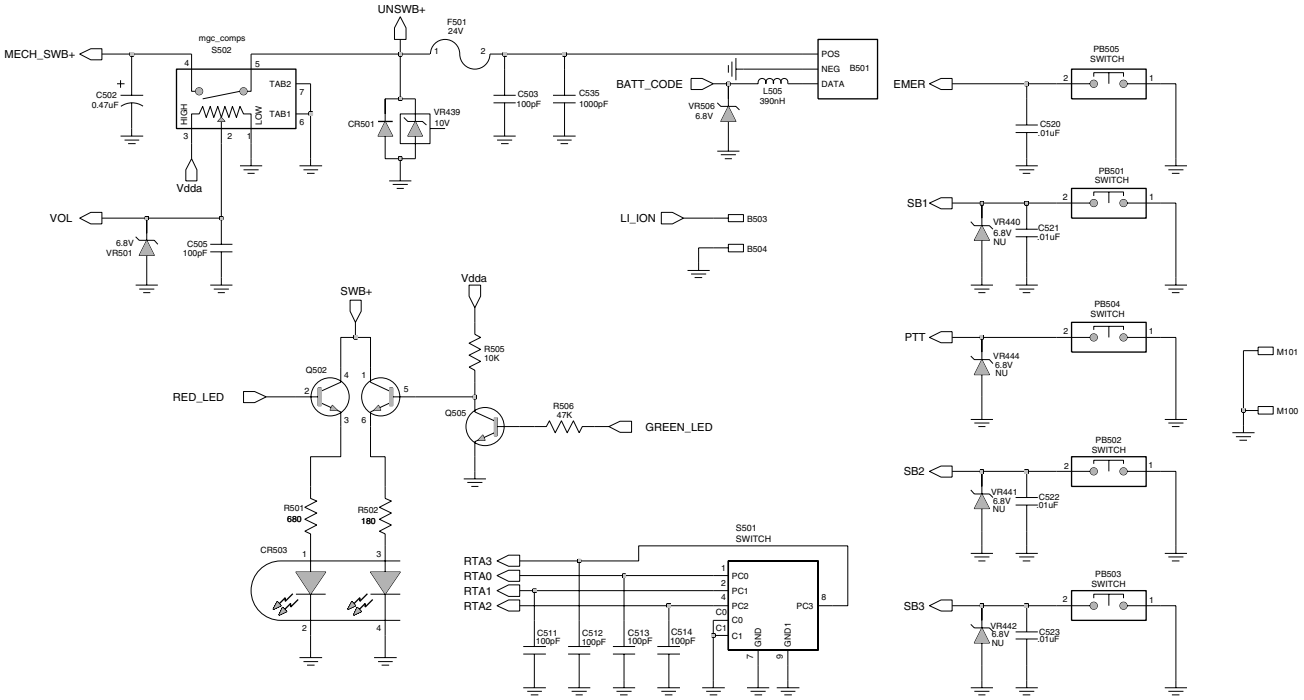


ZWG0130561-O

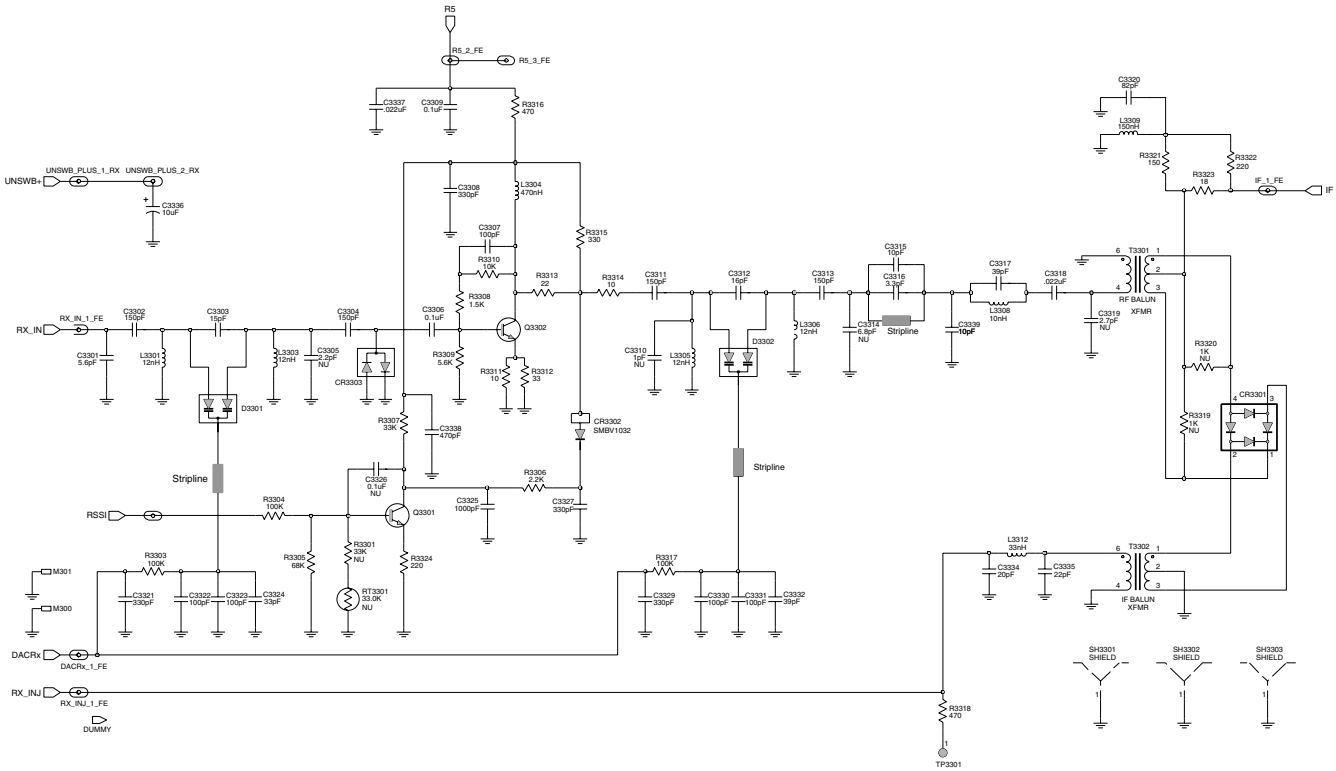
VHF (136-174 MHz) Main Board Top Side



VHF (136-174 MHz) Main Board Bot Side

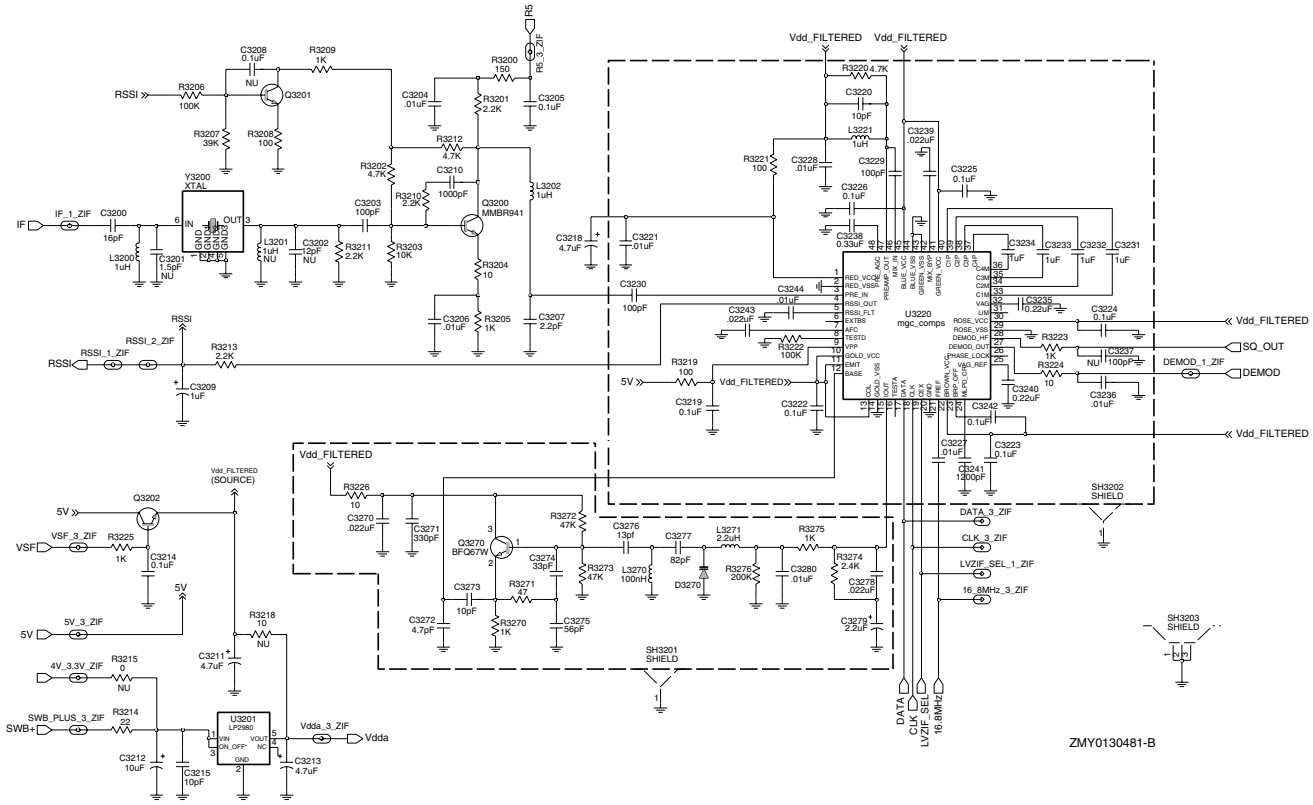


ZMY0130482-A

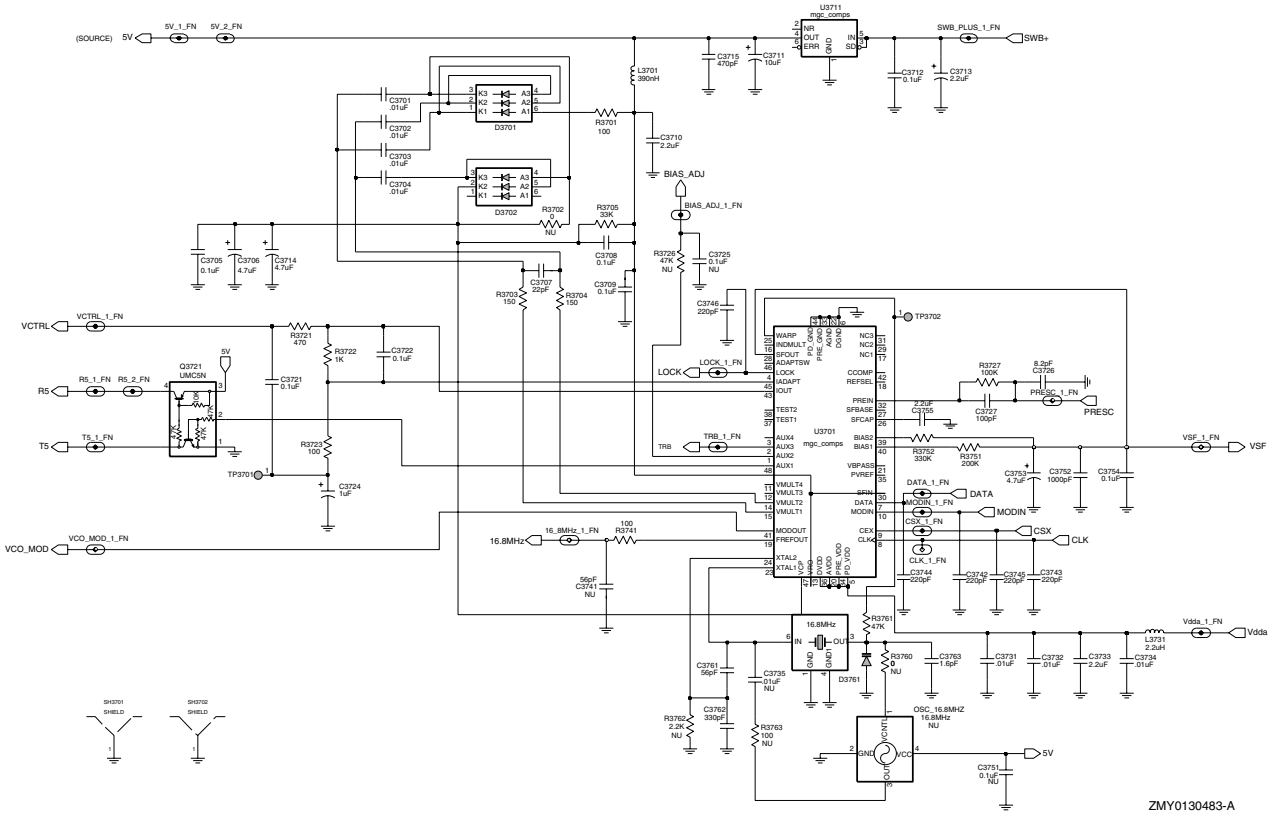


ZMY0130456-A

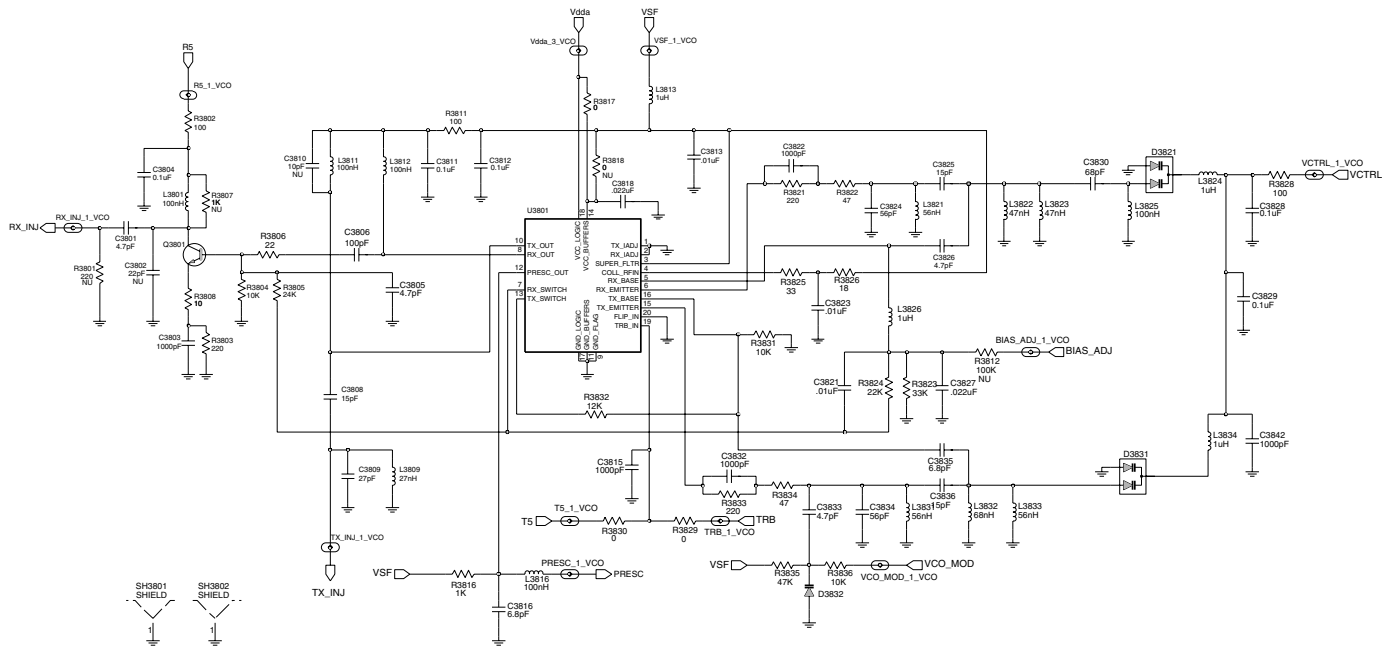
VHF (136-174 MHz) Receiver Front End



VHF (136-174 MHz) Receiver Back End

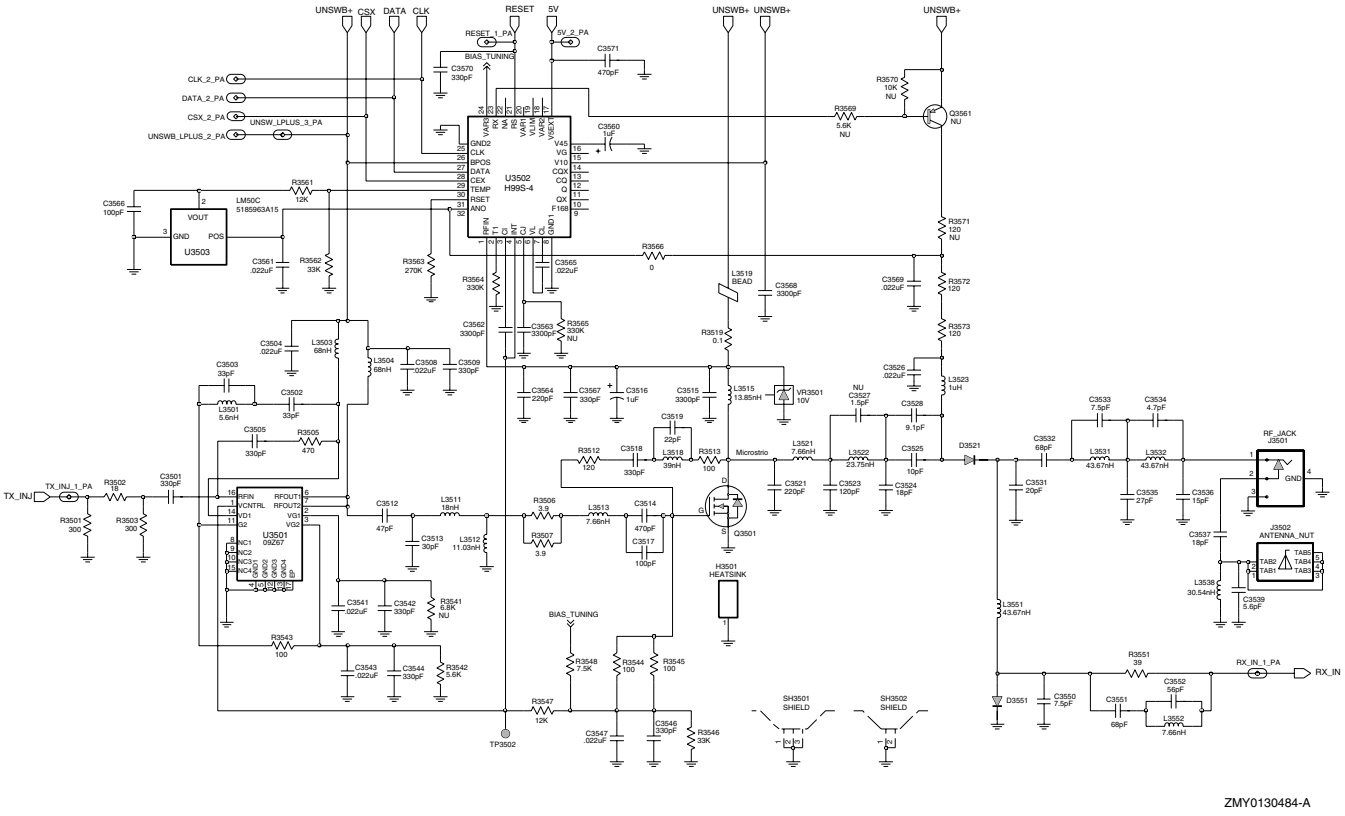


VHF (136-174 MHz) Synthesizer



ZMY0130485-A

VHF (136-174 MHz) Voltage Controlled Oscillator



ZMY0130484-A

VHF (136-174 MHz) Transmitter

11.0 VHF PCB 8486062B16 Parts List

Circuit Ref	Motorola Part No	Description
B501	0986237A02	Connector, Contact Battery
B503	3980502Z01	Backup battery B+ only GP360, GP380, GP680
B504	3980501Z01	Backup battery B- only GP360, GP380, GP680
C3200	2113743N31	16pF
C3203	2113743N50	100pF
C3204	2113743L41	10000pF, 10%
C3205	2113928N01	0.1uF, 10%
C3206	2113743L41	10000pF, 10%
C3207	2113743N10	2.2pF
C3209	2311049A07	1uF
C3210	2113743L17	1000pF, 10%
C3211	2311049A56	4.7uF, 20%, 10V
C3212	2311049A57	10uF
C3213	2311049A56	4.7uF, 20%, 10V
C3214	2113928N01	0.1uF, 10%
C3215	2113743N26	10pF
C3218	2311049A56	4.7uF, 20%, 10V
C3219	2113928N01	0.1uF, 10%
C3220	2113743N26	10pF
C3221	2113743L41	10000pF, 10%
C3222	2113928N01	0.1uF, 10%
C3223	2113928N01	0.1uF, 10%
C3224	2113928N01	0.1uF, 10%
C3225	2113928N01	0.1uF, 10%
C3226	2113928N01	0.1uF, 10%
C3227	2113743L41	10000pF, 10%
C3228	2113743L41	10000pF, 10%
C3229	2113743N50	100pF
C3230	2113740F51	100pF
C3231	2180478Z20	1uF
C3232	2180478Z20	1uF
C3233	2180478Z20	1uF
C3234	2180478Z20	1uF
C3235	2113743A23	0.220uF
C3238	2113743A24	0.330uF
C3239	2113743E07	0.022uF
C3240	2113743A23	0.220uF
C3241	2113743L19	1200pF
C3242	2109720D14	0.1uF
C3243	2113743E07	0.022uF
C3244	2113743L41	10000pF, 10%
C3270	2113743E07	0.022uF
C3271	2113743L05	330pF
C3272	2113743N18	4.7pF
C3273	2113743N26	10pF
C3274	2113743N38	33pF
C3275	2113743N44	56pF
C3276	2113743N42	47pF
C3277	2113743N48	82pF
C3278	2113743E07	0.022uF
C3279	2311049A40	2.2uF, 10%, 16V
C3280	2113743L41	10000pF, 10%
C3301	2113743N20	5.6pF
C3302	2113743N54	150pF
C3303	2113743N30	15pF
C3304	2113743N54	150pF
C3306	2113928N01	0.1uF, 10%
C3307	2113743N50	100pF
C3308	2113743L05	330pF
C3309	2113928N01	0.1uF, 10%
C3311	2113743N54	150pF
C3312	2113743N31	16pF
C3313	2113743N54	150pF
C3315	2113743N26	10pF
C3316	2113743N14	3.3pF
C3317	2113743N40	39pF
C3318	2113743M08	22000pF, +80/-20%
C3320	2113743N48	82pF
C3321	2113743L05	330pF
C3322	2113743N50	100pF
C3323	2113743N50	100pF
C3324	2113743N38	33pF
C3325	2113743L17	1000pF, 10%
C3327	2113743L05	330pF
C3329	2113743L05	330pF
C3330	2113743N50	100pF
C3331	2113743N50	100pF
C3332	2113743N40	39pF
C3334	2113743N33	20pF
C3335	2113743N34	22pF
C3336	2311049A18	10uF
C3337	2113743M08	22000pF, +80/-20%
C3338	2113743L09	470pF, 10%
C3339	2113743N26	10pF
C3501	2113743L05	330pF
C3502	2113743N38	33pF
C3503	2113743N38	33pF
C3504	2113743M08	22000pF, +80/-20%
C3505	2113743N38	33pF
C3508	2113743M08	22000pF, +80/-20%
C3509	2113743L05	330pF
C3512	2113740F43	47pF
C3513	2113740F38	30pF
C3514	2113740F47	68pF
C3515	2113743L29	3300pF
C3516	2311049A08	1uF
C3517	2113740F47	68pF
C3521	2111078B51	220pF
C3523	2111078B44	120pF
C3524	2113740F33	18pF
C3525	2113740F27	10pF
C3526	2113743M08	22000pF, +80/-20%
C3528	2113740F27	10pF
C3531	2113740F34	20pF
C3532	2113740F47	68pF
C3533	2113740F24	7.5pF
C3534	2113740F19	4.7pF
C3535	2113740F37	27pF
C3536	2113740F31	15pF
C3537	2113740F33	18pF
C3539	2113740F29	12pF
C3541	2113743M08	22000pF, +80/-20%
C3542	2113743L05	330pF
C3543	2113743M08	22000pF, +80/-20%
C3544	2113743L05	330pF
C3546	2113743L05	330pF
C3547	2113743M08	22000pF, +80/-20%
C3550	2113743N23	7.5pF
C3551	2113743N46	68pF
C3552	2113743N44	56pF
C3560	2311049A07	1uF
C3561	2113743M08	22000pF, +80/-20%
C3562	2113743L29	3300pF
C3563	2113743L29	3300pF
C3564	2113743L01	220pF
C3565	2113743E07	0.022uF
C3566	2113743N50	100pF
C3567	2113743L05	330pF
C3568	2113743L29	3300pF
C3569	2113743M08	22000pF, +80/-20%
C3570	2113743L05	330pF
C3571	2113743L09	470pF, 10%
C3701	2113743L41	10000pF, 10%
C3702	2113743L41	10000pF, 10%
C3703	2113743L41	10000pF, 10%
C3704	2113743L41	10000pF, 10%
C3705	2113743E20	0.10uF, 10%
C3706	2311049J11	4.7uF
C3707	2113743N34	22pF
C3708	2113928N01	0.1uF, 10%
C3709	2113928N01	0.1uF, 10%
C3710	2104993J02	2.2uF
C3711	2311049A69	10uF
C3712	2113928N01	0.1uF, 10%
C3713	2311049A09	2.2uF
C3714	2311049J11	4.7uF
C3715	2113743L09	470pF, 10%
C3721	2113743E20	0.10uF, 10%
C3722	2113743E20	0.10uF, 10%
C3724	2311049A08	1uF
C3726	2113743N24	8.2pF
C3727	2113743N50	100pF
C3731	2113743L41	10000pF, 10%
C3732	2113743L41	10000pF, 10%
C3733	2104993J02	2.2uF
C3734	2113743L41	10000pF, 10%
C3742	2113743L01	220pF
C3743	2113743L01	220pF
C3744	2113743L01	220pF
C3745	2113743L01	220pF
C3746	2113743L01	220pF
C3752	2113743L17	1000pF, 10%
C3753	2311049A56	4.7uF, 20%, 10V
C3754	2113928N01	0.1uF, 10%
C3755	2104993J02	2.2uF
* C3761	2113743N44	56pF
* C3762	2113740F63	330pF
* C3763	2113743N08	1.6pF
C3801	2113743N18	4.7pF
C3803	2113743L17	1000pF, 10%
C3804	2113743E20	0.10uF, 10%
C3805	2113743N18	4.7pF
C3806	2113743N50	100pF
C3808	2113743N30	15pF
C3809	2113743N36	27pF
C3811	2113928N01	0.1uF, 10%
C3812	2113928N01	0.1uF, 10%
C3813	2113743L41	10000pF, 10%
C3815	2113743L17	1000pF, 10%
C3816	2113743N22	6.8pF
C3818	2113743E07	0.022uF
C3821	2113743L41	10000pF, 10%
C3822	2113743L17	1000pF, 10%
C3823	2113743L41	10000pF, 10%
C3824	2113743N44	56pF
C3825	2113743N30	15pF
C3826	2113743N18	4.7pF
C3827	2113743E07	0.022uF
C3828	2185895Z01	0.01uF, 10%
C3829	2185895Z01	0.01uF, 10%
C3830	2113743N46	68pF
C3832	2113743L17	1000pF, 10%
C3833	2113743N18	4.7pF
C3834	2113743N44	56pF
C3835	2113743N22	6.8pF
C3836	2113743N30	15pF
C3842	2113743L17	1000pF, 10%
C400	2113743L41	10000pF, 10%
C401	2113928N01	0.1uF, 10%

Circuit Ref	Motorola Part No	Description
C402	2113928N01	0.1uF, 10%
C4020	2113743L17	1000pF, 10%
C4021	2113743L17	1000pF, 10%
C403	2113928D08	10uF, +/-80%/-20%
C407	2113928N01	0.1uF, 10%
C408	2113743N50	100pF
C409	2113928N01	0.1uF, 10%
C410	2113928N01	0.1uF, 10%
C411	2113928N01	0.1uF, 10%
C414	2113928N01	0.1uF, 10%
C415	2185895Z01	0.01uF, 10%
C416	2113928N01	0.1uF, 10%
C419	2113743L41	10000pF, 10%
C420	2113743L41	10000pF, 10%
C421	2113928N01	0.1uF, 10%
C422	2113928N01	0.1uF, 10%
C423	2113743N50	100pF
C424	2311049A59	10uF, 10%, 6V
C425	2113928N01	0.1uF, 10%
C426	2113743N50	100pF
C427	2113743N50	100pF
C428	2113928N01	0.1uF, 10%
C429	2113928N01	0.1uF, 10%
C430	2113928N01	0.1uF, 10%
C431	2113743N50	100pF
C433	2113743L41	10000pF, 10%
C434	2113928N01	0.1uF, 10% only GP360, GP380, GP680
C435	2113928N01	0.1uF, 10%
C436	2113743N34	22pF only GP360, GP380, GP680
C437	2113743N34	22pF only GP360, GP380, GP680
C440	2113743G26	4.7F, + 80/-20%
C441	2113743L09	470pF, 10%
C442	2113743E20	0.10uF, 10%
C443	2113928N01	0.1uF, 10%
C444	2113743N50	100pF
C445	2113743L09	470pF, 10%
C446	2113743L09	470pF, 10%
C447	2113928N01	0.1uF, 10%
C448	2113928N01	0.1uF, 10%
C449	2113743N50	100pF
C451	2113743M08	22000pF, +80/-20%
C452	2113743B29	1uF
C453	2113743N50	100pF
C456	2113743N50	100pF
C458	2113743N50	100pF
C459	2113743N50	100pF
C463	2113743N50	100pF
C466	2113743N50	100pF

Circuit Ref	Motorola Part No	Description
C467	2113928N01	0.1uF, 10%
C471	2113743L09	470pF, 10%
C472	2113743L09	470pF, 10%
C473	2113743L09	470pF, 10%
C474	2113743L41	10000pF, 10%
C475	2113743H14	10uF, +80/-20%
C476	2113928D08	10uF, +/-80%/-20%
C477	2113743L17	1000pF, 10%
C478	2113743L17	1000pF, 10%
C479	2113928N01	0.1uF, 10%
C480	2113928D08	10uF, +/-80%/-20%
C481	2113928N01	0.1uF, 10%
C482	2113928N01	0.1uF, 10%
C483	2113743L09	470pF, 10%
C484	2113743L09	470pF, 10%
C490	2113743L09	470pF, 10%
C491	2113743L09	470pF, 10%
C492	2113743L09	470pF, 10%
C493	2113743N50	100pF
C494	2113743N50	100pF
C495	2113743L09	470pF, 10%
C496	2113743L09	470pF, 10%
C497	2113743L09	470pF, 10%
C502	2311049A05	0.47uF, 10%, 25V
C503	2113743N50	100pF
C505	2113743N50	100pF
C511	2113743N50	100pF
C512	2113743N50	100pF
C513	2113743N50	100pF
C514	2113743N50	100pF
C520	2113743L41	10000pF, 10%
C521	2113743L41	10000pF, 10%
C522	2113743L41	10000pF, 10%
C523	2113743L41	10000pF, 10%
C535	2113743L17	1000pF, 10%
CR3301	4802245J42	Ring Quad diode
CR3302	4805129M96	Dual Bonds Pin Diode, RH Reeled
CR3303	4880154K03	Dual common anode-cathode diode
CR411	4802245J62	Schottky diode
CR412	4802245J62	Schottky diode
CR413	4802245J62	Schottky diode
CR440	4813833C02	Dual Diode Common Cathode
CR501	4880107R01	Rectifier
CR503	4805729G49	LED Red/Yellow
D3270	4862824C01	Varactor
D3301	4802081B58	Dual Diode
D3302	4802081B58	Dual Diode
D3521	4880973Z02	Pin diode
D3551	4880973Z02	Pin diode

Circuit Ref	Motorola Part No	Description
D3701	4802233J09	Triple diode
D3702	4802233J09	Triple diode
* D3761	4862824C03	Varactor
D3821	4805649Q13	Varactor
D3831	4805649Q13	Varactor
D3832	4862824C01	Varactor
E400	2480640Z01	Ferrite bead
E401	2480640Z01	Ferrite bead
E402	2480640Z01	Ferrite bead
E403	2480640Z01	Ferrite bead
E404	2480640Z01	Ferrite bead
E405	2480640Z01	Ferrite bead
E406	2480640Z01	Ferrite bead
E407	2480640Z01	Ferrite bead
E408	2480640Z01	Ferrite bead
E409	2480640Z01	Ferrite bead
F501	6580542Z01	3A Fuse
FL401	4870368G02	Real Time Clock Osciall XTAL only GP360, GP380, GP680
H3501	2680499Z01	Heat spreader
J3501	0985613Z01	RF Jack
J3502	0280519Z02	Antenna_Nut
J400	0905505Y04	40-pin connector
J403	0905505Y02	20-pin connector
L3200	2462587N68	1uH
L3202	2462587N68	1uH
L3221	2462587N68	1uH
L3270	2462587T15	100nH
L3271	2462587Q20	2.2uF
L3301	2462587T35	12nH
L3303	2462587T35	12nH
L3304	2462587T23	470nH
L3305	2462587T35	12nH
L3306	2462587T35	12nH
L3308	2462587T34	10nH
L3309	2462587N55	150nH
L3312	2462587V28	33nH
L3501	2413926H09	5.6nH
L3503	2462587V32	68nH
L3504	2462587N51	68nH
L3511	2462587N44	18nH
L3512	2479990B01	11.03nH
L3513	2479990A02	7.66nH, 10%
L3515	2479990C03	13.85nH
L3519	2484657R01	Ferrite bead
L3521	2479990A02	7.66nH, 10%
L3522	2479990E01	23.75nH
L3523	2462587N68	1uH
L3531	2479990N01	43.67nH
L3532	2479990N01	43.67nH
L3538	2479990M01	30.54nH

Circuit Ref	Motorola Part No	Description
L3551	2479990N01	43.67nH
L3552	2479990A02	7.66nH, 10%
L3701	2462587Q42	390nH, 10%
L3731	2462587Q20	2.2uF
L3801	2462587V34	100nH
L3809	2462587V27	27nH
L3811	2462587V34	100nH
L3812	2462587V34	100nH
L3813	2462587Q47	1000nH, 10%, QF45
L3816	2462587V34	100nH
L3821	2462587N50	56nH
L3822	2462587N49	47nH
L3823	2462587N49	47nH
L3824	2462587N68	1uH
L3825	2462587V34	100nH
L3826	2462587N68	1uH
L3831	2462587N50	56nH
L3832	2462587N51	68nH
L3833	2462587N50	56nH
L3834	2462587N68	1uH
L400	2462587Q42	390nH, 10%
L401	2462587Q42	390nH, 10%
L410	2462587Q42	390nH, 10%
L411	2462587Q42	390nH, 10%
L505	2462587Q42	390nH, 10%
PB501	4080523Z01	Tactile, Pushbutton
PB502	4080523Z01	Tactile, Pushbutton
PB503	4080523Z01	Tactile, Pushbutton not in GP320
PB504	4080523Z01	Tactile, Pushbutton
PB505	4080523Z01	Tactile, Pushbutton not in GP320
Q3200	4813827A07	NPN Transistor
Q3201	4880214G02	NPN Transistor
Q3202	4880214G02	NPN Transistor
Q3270	4805218N63	RF Transistor
Q3301	4880214G02	NPN Transistor
Q3302	4813827A07	NPN Transistor
Q3501	4813828A08	FET
Q3561	4813824A17	PNP Transistor
Q3721	4802245J50	Dual NPN/PNP Transistor
Q3801	4813827A07	NPN Transistor
Q400	4809579E18	Mosfet P - channel
Q403	4813824A17	PNP Transistor
Q405	4802245J54	Dual NPN Transistor
Q410	4802245J54	Dual NPN Transistor
Q416	4809579E18	Mosfet P - channel only GP360, GP380, GP680
Q417	4802245J50	Dual NPN/PNP Transistor
Q502	5180159R01	Dual NPN Transistor
Q505	4880214G02	NPN Transistor

Circuit Ref	Motorola Part No	Description
R3200	0662057M54	150
R3201	0662057M82	2200
R3202	0662057M90	4700
R3203	0662057M98	10k
R3204	0662057M26	10
R3205	0662057M74	1000
R3206	0662057N23	100K
R3207	0662057N13	39K
R3208	0662057M50	100
R3209	0662057M74	1000
R3210	0662057M82	2200
R3211	0662057M82	2200
R3212	0662057M90	4700
R3213	0662057M82	2200
R3214	0662057M34	22
R3219	0662057M50	100
R3220	0662057M90	4700
R3221	0662057M50	100
R3224	0662057M26	10
R3225	0662057M74	1000
R3226	0662057M26	10
R3270	0662057M74	1000
R3271	0662057M42	47
R3272	0662057N15	47K
R3273	0662057N15	47K
R3274	0662057M83	2400
R3275	0662057M74	1000
R3276	0662057N30	200K
R3303	0662057N23	100K
R3304	0662057N23	100K
R3305	0662057N19	68K
R3306	0662057M82	2200
R3307	0662057N11	33K
R3308	0662057M78	1500
R3309	0662057M92	5600
R3310	0662057M98	10k
R3311	0662057M26	10
R3312	0662057M38	33
R3313	0662057M34	22
R3314	0662057M26	10
R3315	0662057M62	330
R3316	0662057M66	470
R3317	0662057N23	100K
R3318	0662057M66	470
R3321	0662057M54	150
R3322	0662057M58	220
R3323	0662057M32	18
R3324	0662057M58	220
R3501	0662057M61	300
R3502	0662057M32	18
R3503	0662057M61	300

Circuit Ref	Motorola Part No	Description
R3505	0662057M62	330
R3506	0662057B62	3.9
R3507	0662057B62	3.9
R3519	0680539Z01	0.1
R3541	0662057N13	39K
R3542	0662057M92	5600
R3543	0662057M50	100
R3544	0662057A25	100
R3545	0662057A25	100
R3546	0662057N01	12K
R3547	0662057N11	33K
R3548	0662057N07	22K
R3551	0662057M40	39
R3561	0662057N01	12K
R3562	0662057N11	33K
R3563	0662057N33	270K
R3564	0662057N35	330K
R3569	0662057M92	5600
R3570	0662057M98	10k
R3571	0662057A27	120
R3572	0662057A27	120
R3573	0662057A27	120
R3701	0662057M50	100
R3703	0662057M54	150
R3704	0662057M54	150
R3705	0662057N11	33K
R3721	0662057M66	470
R3722	0662057M74	1000
R3723	0662057M50	100
R3727	0662057N23	100K
R3741	0662057M50	100
R3751	0662057N30	200K
R3752	0662057N35	330K
R3761	0662057N15	47K
R3802	0662057M50	100
R3803	0662057M58	220
R3804	0662057M98	10k
R3805	0662057N08	24K
R3806	0662057M34	22
R3808	0662057M26	10
R3811	0662057M50	100
R3816	0662057M74	1000
R3817	0662057M01	0
R3821	0662057M58	220
R3822	0662057M42	47
R3823	0662057N11	33K
R3824	0662057N07	22K
R3825	0662057M38	33
R3826	0662057M32	18
R3828	0662057M50	100
R3829	0662057M01	0

Circuit Ref	Motorola Part No	Description
R3831	0662057M98	10k
R3832	0662057N01	12K
R3833	0662057M58	220
R3834	0662057M42	47
R3835	0662057N15	47K
R3836	0662057M98	10k
R400	0662057N15	47K
R401	0662057M01	0
R405	0662057M01	0
R406	0662057N20	75K
R407	0662057N19	68K
R409	0662057M98	10k
R410	0662057N23	100K
R411	0662057M98	10k
R413	0662057M01	0
R414	0662057V34	180K
R415	0662057V26	91K
R416	0662057M98	10k
R418	0662057M01	0
R419	0662057M67	510 only GP360, GP380, GP680
R420	0662057B46	10M only GP360, GP380, GP680
R421	0662057M81	2000
R423	0662057N21	82K
R424	0662057N12	36K
R425	0662057N10	30K
R426	0662057N35	330K only GP360, GP380, GP680
R427	0662057M84	2700
R428	0662057M10	2.2
R429	0662057M98	10k
R431	0662057N39	470K
R432	0662057N16	51K
R434	0662057M62	330
R435	0662057M81	2000
R436	0662057M01	0
R445	0662057N08	24K
R447	0662057N51	1.5M
R448	0662057M98	10k
R449	0662057N08	24K
R450	0683962T45	68 ohms, 1W
R451	0662057N03	15K
R452	0662057N23	100K
R456	0662057M01	0
R457	0662057M98	10k
R460	0662057M90	4700
R461	0662057M56	180 only GP360, GP380, GP680
R462	0662057M98	10k only GP360, GP380, GP680

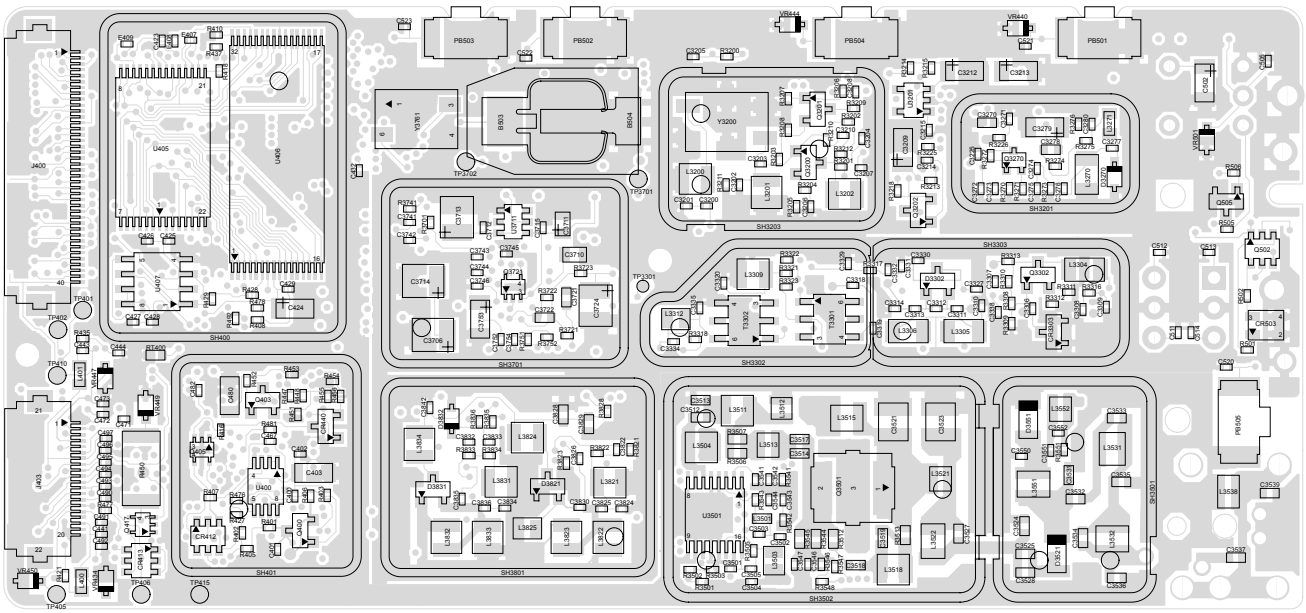
Circuit Ref	Motorola Part No	Description
R463	0662057M61	300
R471	0662057M92	5600
R472	0662057M93	6200
R473	0662057M26	10
R475	0662057M01	0
R476	0662057N08	24K
R477	0662057M74	1000
R478	0662057M98	10k
R481	0662057N08	24K
R492	0662057M01	0
R498	0662057M98	10k
R499	0662057M98	10k
R501	0662057M70	680
R502	0662057M56	180
R505	0662057M98	10k
R506	0662057N15	47K
RT400	0680590Z01	THERMISTOR 33K
S501	4080710Z01	Frequency Switch only GP340, GP640
S501	4080710Z02	Frequency Switch only GP360, GP380, GP680
S502	1880619Z02	Volume Switch
SH3201	2602023X08	Rx Backend Top Shield
SH3202	2686081B02	LVZIF shields
SH3203	2686081B03	45.1MHz Xtal Filter Shield
SH3301	2686081B01	Rx Frontend Bottom Shield
SH3302	2686081B05	Mixer Shield
SH3303	2686081B06	Rx Frontend Top Shield
SH3501	2686081B03	Harmonic Filter Shield
SH3502	2686081B04	PA driver Shield
SH3701	2680511Z01	Synthesizer top shield
SH3702	2680511Z01	Synthesizer bottom shield
SH3801	2680513Z01	VCO Top Shield
SH3802	2680514Z01	VCO Bottom Shield
SH400	2680505Z01	Controller Memory Shield
SH401	2680506Z01	Controller on-off shield
SH402	2680515Z01	Controller Microprocessor shield
SH403	2680516Z01	Controller Asfic_Cmp/Audio PA shield
T3301	2580541Z01	Balun transformer
T3302	2580541Z01	Balun transformer
U3201	5102463J58	3.3V Regulator
U3220	5109632D83	LVZIF IC
U3501	5185130C65	VHF/UHF/800 MHZ LDMOS Driver
U3502	5185765B28	PCIC
U3503	5185963A15	Temperature Sense
U3701	5185963A27	LVFRACN Synthesizer IC
U3711	5105739X05	5V Regulator
U3801	5105750U54	VCO BUFFER IC

Circuit Ref	Motorola Part No	Description
U400	5102463J40	3.3V Regulator
U404	5185963A53	ASFIC_CMP
U405	5102463J36	Static_RAM_32KX8
* U406	5102463J60	512K X 8 Flash Memory
* U407	5102463J64	16k X 8 EEPROM
U409	5102226J56	Microprocessor IC
U410	5102463J57	3.3V Regulator only GP360, GP380, GP680
U420	5102463J44	Audio PA
VR3501	4880140L17	Zener diode-12V
VR432	4805656W08	5.6V Zener diode
VR433	4805656W08	5.6V Zener diode
VR434	4802245J73	ZENER DIODE-6.8V
VR439	4880140L17	Zener diode-12V
VR447	4802245J74	ZENER DIODE-10V
VR448	4802245J74	ZENER DIODE-10V
VR449	4802245J74	ZENER DIODE-10V
VR450	4802245J74	ZENER DIODE-10V
VR460	4802245J73	ZENER DIODE-6.8V
VR501	4802245J73	ZENER DIODE-6.8V
VR506	4802245J73	ZENER DIODE-6.8V
Y3200	9186153B01	Crystal Filter
Y3761	4805875Z04	16.8MHz Xtal oscillator (SMD)
	5480678Z01	PCB Bar Code Label
	8486062B16	VHF main PC Board

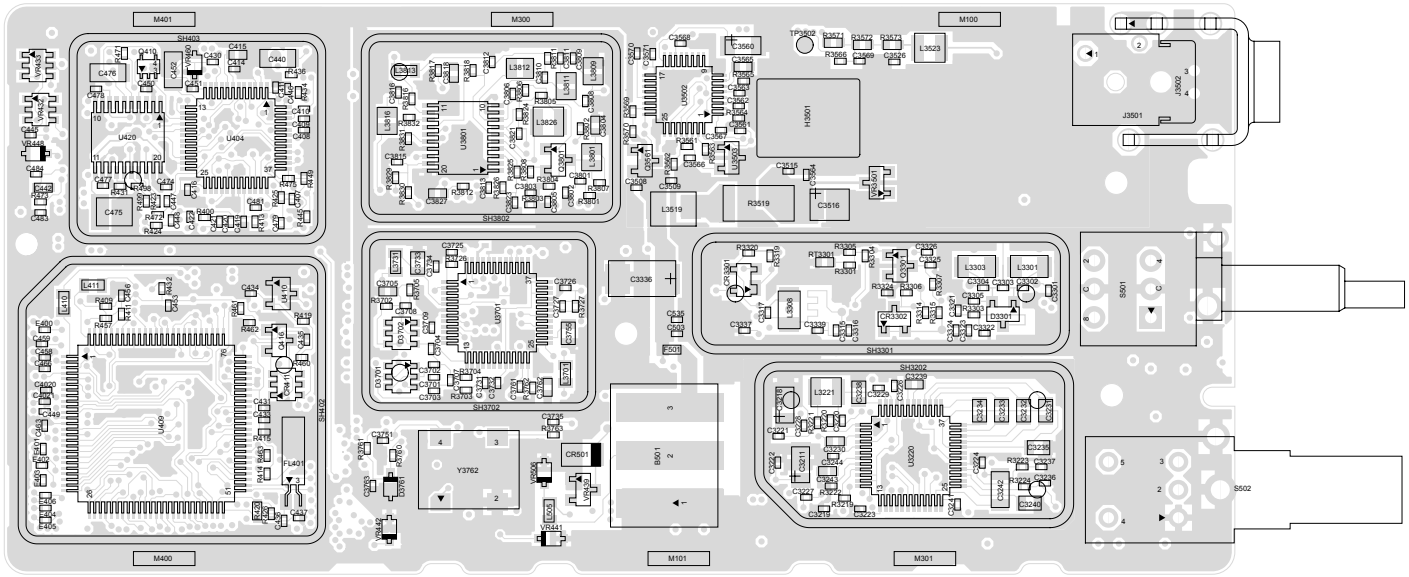
* Motorola Depot Servicing only

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

12.0 VHF PCB 8486062B17 / Schematics



VHF (136-174 MHz) Main Board Top Side



VHF (136-174 MHz) Main Board Bot Side

13.0 VHF PCB 8486062B17

Circuit Ref	Motorola Part No	Description
B501	0986237A02	Connector, Contact Battery
B503	3980502Z01	Backup battery B+ only GP360, GP380, GP680
B504	3980501Z01	Backup battery B- only GP360, GP380, GP680
C3200	2113743N31	16pF
C3203	2113743N50	100pF
C3204	2113743L41	10000pF, 10%
C3205	2113928N01	0.1uF, 10%
C3206	2113743L41	10000pF, 10%
C3207	2113743N10	2.2pF
C3209	2311049A07	1uF
C3210	2113743L17	1000pF, 10%
C3211	2311049A56	4.7uF, 20%, 10V
C3212	2311049A57	10uF
C3213	2311049A56	4.7uF, 20%, 10V
C3214	2113928N01	0.1uF, 10%
C3215	2113743N26	10pF
C3218	2311049A56	4.7uF, 20%, 10V
C3219	2113928N01	0.1uF, 10%
C3220	2113743N26	10pF
C3221	2113743L41	10000pF, 10%
C3222	2113928N01	0.1uF, 10%
C3223	2113928N01	0.1uF, 10%
C3224	2113928N01	0.1uF, 10%
C3225	2113928N01	0.1uF, 10%
C3226	2113928N01	0.1uF, 10%
C3227	2113743L41	10000pF, 10%
C3228	2113743L41	10000pF, 10%
C3229	2113743N50	100pF
C3230	2113740F51	100pF
C3231	2180478Z20	1uF
C3232	2180478Z20	1uF
C3233	2180478Z20	1uF
C3234	2180478Z20	1uF
C3235	2113743A23	0.220uF
C3238	2113743A24	0.330uF
C3239	2113743E07	0.022uF
C3240	2113743A23	0.220uF
C3241	2113743L19	1200pF
C3242	2109720D14	0.1uF
C3243	2113743E07	0.022uF
C3244	2113743L41	10000pF, 10%
C3270	2113743E07	0.022uF
C3271	2113743L05	330pF
C3272	2113743N18	4.7pF
C3273	2113743N26	10pF
C3274	2113743N38	33pF
C3275	2113743N44	56pF
C3276	2113743N42	47pF
C3277	2113743N48	82pF
C3278	2113743E07	0.022uF
C3279	2311049A40	2.2uF, 10%, 16V
C3280	2113743L41	10000pF, 10%
C3301	2113743N20	5.6pF
C3302	2113743N54	150pF
C3303	2113743N30	15pF
C3304	2113743N54	150pF
C3306	2113928N01	0.1uF, 10%
C3307	2113743N50	100pF
C3308	2113743L05	330pF
C3309	2113928N01	0.1uF, 10%
C3311	2113743N54	150pF
C3312	2113743N31	16pF
C3313	2113743N54	150pF
C3315	2113743N26	10pF
C3316	2113743N14	3.3pF
C3317	2113743N40	39pF
C3318	2113743M08	22000pF, +80/-20%
C3320	2113743N48	82pF
C3321	2113743L05	330pF
C3322	2113743N50	100pF
C3323	2113743N50	100pF
C3324	2113743N38	33pF
C3325	2113743L17	1000pF, 10%
C3327	2113743L05	330pF
C3329	2113743L05	330pF
C3330	2113743N50	100pF
C3331	2113743N50	100pF
C3332	2113743N40	39pF
C3334	2113743N33	20pF
C3335	2113743N34	22pF
C3336	2311049A18	10uF
C3337	2113743M08	22000pF, +80/-20%
C3338	2113743L09	470pF, 10%
C3339	2113743N26	10pF
C3501	2113743L05	330pF
C3502	2113743N38	33pF
C3503	2113743N38	33pF
C3504	2113743M08	22000pF, +80/-20%
C3505	2113743N38	33pF
C3508	2113743M08	22000pF, +80/-20%
C3509	2113743L05	330pF
C3512	2113740F43	47pF
C3513	2113740F38	30pF
C3514	2113740F47	68pF
C3515	2113743L29	3300pF
C3516	2311049A08	1uF
C3517	2113740F47	68pF
C3521	2111078B51	220pF
C3523	2111078B44	120pF
C3524	2113740F33	18pF
C3525	2113740F27	10pF
C3526	2113743M08	22000pF, +80/-20%
C3528	2113740F27	10pF
C3531	2113740F34	20pF
C3532	2113740F47	68pF
C3533	2113740F24	7.5pF
C3534	2113740F19	4.7pF
C3535	2113740F37	27pF
C3536	2113740F31	15pF
C3537	2113740F33	18pF
C3539	2113740F29	12pF
C3541	2113743M08	22000pF, +80/-20%
C3542	2113743L05	330pF
C3543	2113743M08	22000pF, +80/-20%
C3544	2113743L05	330pF
C3546	2113743L05	330pF
C3547	2113743M08	22000pF, +80/-20%
C3550	2113743N23	7.5pF
C3551	2113743N46	68pF
C3552	2113743N44	56pF
C3560	2311049A07	1uF
C3561	2113743M08	22000pF, +80/-20%
C3562	2113743L29	3300pF
C3563	2113743L29	3300pF
C3564	2113743L01	220pF
C3565	2113743E07	0.022uF
C3566	2113743N50	100pF
C3567	2113743L05	330pF
C3568	2113743L29	3300pF
C3569	2113743M08	22000pF, +80/-20%
C3570	2113743L05	330pF
C3571	2113743L09	470pF, 10%
C3701	2113743L41	10000pF, 10%
C3702	2113743L41	10000pF, 10%
C3703	2113743L41	10000pF, 10%
C3704	2113743L41	10000pF, 10%
C3705	2113743E20	0.10uF, 10%
C3706	2311049J11	4.7uF
C3707	2113743N34	22pF
C3708	2113928N01	0.1uF, 10%
C3709	2113928N01	0.1uF, 10%
C3710	2104993J02	2.2uF
C3711	2311049A69	10uF
C3712	2113928N01	0.1uF, 10%
C3713	2311049A09	2.2uF
C3714	2311049J11	4.7uF
C3715	2113743L09	470pF, 10%
C3721	2113743E20	0.10uF, 10%
C3722	2113743E20	0.10uF, 10%
C3724	2311049A08	1uF
C3726	2113743N24	8.2pF
C3727	2113743N50	100pF
C3731	2113743L41	10000pF, 10%
C3732	2113743L41	10000pF, 10%
C3733	2104993J02	2.2uF
C3734	2113743L41	10000pF, 10%
C3742	2113743L01	220pF
C3743	2113743L01	220pF
C3744	2113743L01	220pF
C3745	2113743L01	220pF
C3746	2113743L01	220pF
C3752	2113743L17	1000pF, 10%
C3753	2311049A56	4.7uF, 20%, 10V
C3754	2113928N01	0.1uF, 10%
C3755	2104993J02	2.2uF
* C3761	2113743N44	56pF
* C3762	2113740F63	330pF
* C3763	2113743N08	1.6pF
C3801	2113743N18	4.7pF
C3803	2113743L17	1000pF, 10%
C3804	2113743E20	0.10uF, 10%
C3805	2113743N18	4.7pF
C3806	2113743N50	100pF
C3808	2113743N30	15pF
C3809	2113743N36	27pF
C3811	2113928N01	0.1uF, 10%
C3812	2113928N01	0.1uF, 10%
C3813	2113743L41	10000pF, 10%
C3815	2113743L17	1000pF, 10%
C3816	2113743N22	6.8pF
C3818	2113743E07	0.022uF
C3821	2113743L41	10000pF, 10%
C3822	2113743L17	1000pF, 10%
C3823	2113743L41	10000pF, 10%
C3824	2113743N44	56pF
C3825	2113743N30	15pF
C3826	2113743N18	4.7pF
C3827	2113743E07	0.022uF
C3828	2185895Z01	0.01uF, 10%
C3829	2185895Z01	0.01uF, 10%
C3830	2113743N46	68pF
C3832	2113743L17	1000pF, 10%
C3833	2113743N18	4.7pF
C3834	2113743N44	56pF
C3835	2113743N22	6.8pF
C3836	2113743N30	15pF
C3842	2113743L17	1000pF, 10%
C400	2113743L41	10000pF, 10%
C401	2113928N01	0.1uF, 10%
C402	2113928N01	0.1uF, 10%

Circuit Ref	Motorola Part No	Description
C4020	2113743L17	1000pF, 10%
C4021	2113743L17	1000pF, 10%
C403	2113928D08	10uF, +/-80%/-20%
C407	2113928N01	0.1uF, 10%
C408	2113743N50	100pF
C409	2113928N01	0.1uF, 10%
C410	2113928N01	0.1uF, 10%
C411	2113928N01	0.1uF, 10%
C414	2113928N01	0.1uF, 10%
C415	2185895Z01	0.01uF, 10%
C416	2113928N01	0.1uF, 10%
C419	2113743L41	10000pF, 10%
C420	2113743L41	10000pF, 10%
C421	2113928N01	0.1uF, 10%
C422	2113928N01	0.1uF, 10%
C423	2113743N50	100pF
C424	2311049A59	10uF, 10%, 6V
C425	2113928N01	0.1uF, 10%
C426	2113743N50	100pF
C427	2113743N50	100pF
C428	2113928N01	0.1uF, 10%
C429	2113928N01	0.1uF, 10%
C430	2113928N01	0.1uF, 10%
C431	2113743N50	100pF
C433	2113743L41	10000pF, 10%
C434	2113928N01	0.1uF, 10% only GP360, GP380, GP680
C435	2113928N01	0.1uF, 10%
C436	2113743N34	22pF only GP360, GP380, GP680
C437	2113743N34	22pF only GP360, GP380, GP680
C440	2113743G26	4.7F, + 80/-20%
C441	2113743L09	470pF, 10%
C442	2113743E20	0.10uF, 10%
C443	2113928N01	0.1uF, 10%
C444	2113743N50	100pF
C445	2113743L09	470pF, 10%
C446	2113743L09	470pF, 10%
C447	2113928N01	0.1uF, 10%
C448	2113928N01	0.1uF, 10%
C449	2113743N50	100pF
C451	2113743M08	22000pF, +80/-20%
C452	2113743B29	1uF
C453	2113743N50	100pF
C456	2113743N50	100pF
C458	2113743N50	100pF
C459	2113743N50	100pF
C463	2113743N50	100pF
C466	2113743N50	100pF
C467	2113928N01	0.1uF, 10%

Circuit Ref	Motorola Part No	Description
C471	2113743L09	470pF, 10%
C472	2113743L09	470pF, 10%
C473	2113743L09	470pF, 10%
C474	2113743L41	10000pF, 10%
C475	2113743H14	10uF, +80/-20%
C476	2113928D08	10uF, +/-80%/-20%
C477	2113743L17	1000pF, 10%
C478	2113743L17	1000pF, 10%
C479	2113928N01	0.1uF, 10%
C480	2113928D08	10uF, +/-80%/-20%
C481	2113928N01	0.1uF, 10%
C482	2113928N01	0.1uF, 10%
C483	2113743L09	470pF, 10%
C484	2113743L09	470pF, 10%
C490	2113743L09	470pF, 10%
C491	2113743L09	470pF, 10%
C492	2113743L09	470pF, 10%
C493	2113743N50	100pF
C494	2113743N50	100pF
C495	2113743L09	470pF, 10%
C496	2113743L09	470pF, 10%
C497	2113743L09	470pF, 10%
C502	2311049A05	0.47uF, 10%, 25V
C503	2113743N50	100pF
C505	2113743N50	100pF
C511	2113743N50	100pF
C512	2113743N50	100pF
C513	2113743N50	100pF
C514	2113743N50	100pF
C520	2113743L41	10000pF, 10%
C521	2113743L41	10000pF, 10%
C522	2113743L41	10000pF, 10%
C523	2113743L41	10000pF, 10%
C535	2113743L17	1000pF, 10%
CR3301	4802245J42	Ring Quad diode
CR3302	4805129M96	Dual Bonds Pin Diode, RH Reeled
CR3303	4880154K03	Dual common anode-cathode diode
CR411	4802245J62	Schottky diode
CR412	4802245J62	Schottky diode
CR413	4802245J62	Schottky diode
CR440	4813833C02	Dual Diode Common Cathode
CR501	4880107R01	Rectifier
CR503	4805729G49	LED Red/Yellow
D3270	4862824C01	Varactor
D3301	4802081B58	Dual Diode
D3302	4802081B58	Dual Diode
D3521	4880973Z02	Pin diode
D3551	4880973Z02	Pin diode
D3701	4802233J09	Triple diode

Circuit Ref	Motorola Part No	Description
D3702	4802233J09	Triple diode
* D3761	4862824C03	Varactor
D3821	4805649Q13	Varactor
D3831	4805649Q13	Varactor
D3832	4862824C01	Varactor
E400	2480640Z01	Ferrite bead
E401	2480640Z01	Ferrite bead
E402	2480640Z01	Ferrite bead
E403	2480640Z01	Ferrite bead
E404	2480640Z01	Ferrite bead
E405	2480640Z01	Ferrite bead
E406	2480640Z01	Ferrite bead
E407	2480640Z01	Ferrite bead
E408	2480640Z01	Ferrite bead
E409	2480640Z01	Ferrite bead
F501	6580542Z01	3A Fuse
FL401	4870368G02	Real Time Clock Osciall XTAL only GP360, GP380, GP680
H3501	2680499Z01	Heat spreader
J3501	0985613Z01	RF Jack
J3502	0280519Z02	Antenna_Nut
J400	0905505Y04	40-pin connector
J403	0905505Y02	20-pin connector
L3200	2462587N68	1uH
L3202	2462587N68	1uH
L3221	2462587N68	1uH
L3270	2462587T15	100nH
L3271	2462587Q20	2.2uF
L3301	2462587T35	12nH
L3303	2462587T35	12nH
L3304	2462587T23	470nH
L3305	2462587T35	12nH
L3306	2462587T35	12nH
L3308	2462587T34	10nH
L3309	2462587N55	150nH
L3312	2462587V28	33nH
L3501	2413926H09	5.6nH
L3503	2462587V32	68nH
L3504	2462587N51	68nH
L3511	2462587N44	18nH
L3512	2479990B01	11.03nH
L3513	2479990A02	7.66nH, 10%
L3515	2479990C03	13.85nH
L3519	2484657R01	Ferrite bead
L3521	2479990A02	7.66nH, 10%
L3522	2479990E01	23.75nH
L3523	2462587N68	1uH
L3531	2479990N01	43.67nH
L3532	2479990N01	43.67nH
L3538	2479990M01	30.54nH
L3551	2479990N01	43.67nH

Circuit Ref	Motorola Part No	Description
L3552	2479990A02	7.66nH, 10%
L3701	2462587Q42	390nH, 10%
L3731	2462587Q20	2.2uF
L3801	2462587V34	100nH
L3809	2462587V27	27nH
L3811	2462587V34	100nH
L3812	2462587V34	100nH
L3813	2462587Q47	1000nH, 10%, QF45
L3816	2462587V34	100nH
L3821	2462587N50	56nH
L3822	2462587N49	47nH
L3823	2462587N49	47nH
L3824	2462587N68	1uH
L3825	2462587V34	100nH
L3826	2462587N68	1uH
L3831	2462587N50	56nH
L3832	2462587N51	68nH
L3833	2462587N50	56nH
L3834	2462587N68	1uH
L400	2462587Q42	390nH, 10%
L401	2462587Q42	390nH, 10%
L410	2462587Q42	390nH, 10%
L411	2462587Q42	390nH, 10%
L505	2462587Q42	390nH, 10%
PB501	4080523Z01	Tactile, Pushbutton
PB502	4080523Z01	Tactile, Pushbutton
PB503	4080523Z01	Tactile, Pushbutton not in GP320
PB504	4080523Z01	Tactile, Pushbutton
PB505	4080523Z01	Tactile, Pushbutton not in GP320
Q3200	4813827A07	NPN Transistor
Q3201	4880214G02	NPN Transistor
Q3202	4880214G02	NPN Transistor
Q3270	4805218N63	RF Transistor
Q3301	4880214G02	NPN Transistor
Q3302	4813827A07	NPN Transistor
Q3501	4813828A08	FET
Q3561	4813824A17	PNP Transistor
Q3721	4802245J50	Dual NPN/PNP Transistor
Q3801	4813827A07	NPN Transistor
Q400	4809579E18	Mosfet P - channel
Q403	4813824A17	PNP Transistor
Q405	4802245J54	Dual NPN Transistor
Q410	4802245J54	Dual NPN Transistor
Q416	4809579E18	Mosfet P - channel only GP360, GP380, GP680
Q417	4802245J50	Dual NPN/PNP Transistor
Q502	5180159R01	Dual NPN Transistor
Q505	4880214G02	NPN Transistor
R3200	0662057M54	150

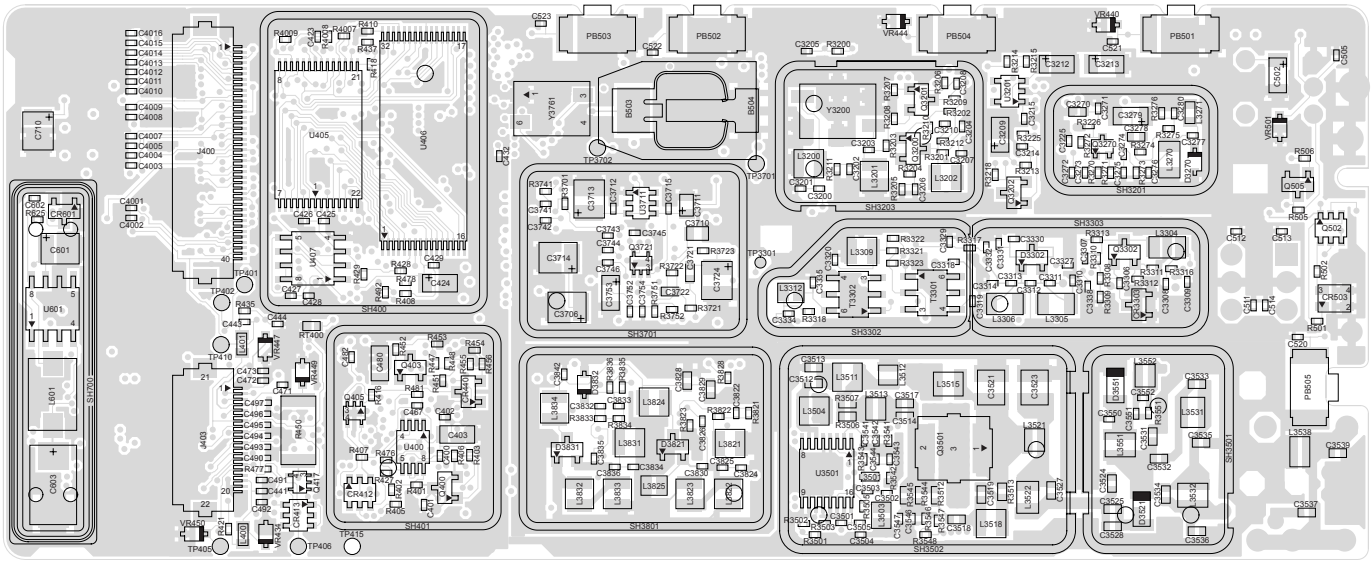
Circuit Ref	Motorola Part No	Description
R3201	0662057M82	2200
R3202	0662057M90	4700
R3203	0662057M98	10k
R3204	0662057M26	10
R3205	0662057M74	1000
R3206	0662057N23	100K
R3207	0662057N13	39K
R3208	0662057M50	100
R3209	0662057M74	1000
R3210	0662057M82	2200
R3211	0662057M82	2200
R3212	0662057M90	4700
R3213	0662057M82	2200
R3214	0662057M34	22
R3219	0662057M50	100
R3220	0662057M90	4700
R3221	0662057M50	100
R3224	0662057M26	10
R3225	0662057M74	1000
R3226	0662057M26	10
R3270	0662057M74	1000
R3271	0662057M42	47
R3272	0662057N15	47K
R3273	0662057N15	47K
R3274	0662057M83	2400
R3275	0662057M74	1000
R3276	0662057N30	200K
R3303	0662057N23	100K
R3304	0662057N23	100K
R3305	0662057N19	68K
R3306	0662057M82	2200
R3307	0662057N11	33K
R3308	0662057M78	1500
R3309	0662057M92	5600
R3310	0662057M98	10k
R3311	0662057M26	10
R3312	0662057M38	33
R3313	0662057M34	22
R3314	0662057M26	10
R3315	0662057M62	330
R3316	0662057M66	470
R3317	0662057N23	100K
R3318	0662057M66	470
R3321	0662057M54	150
R3322	0662057M58	220
R3323	0662057M32	18
R3324	0662057M58	220
R3501	0662057M61	300
R3502	0662057M32	18
R3503	0662057M61	300
R3505	0662057M62	330
R3506	0662057B62	3.9
R3507	0662057B62	3.9
R3519	0680539Z01	0.1
R3541	0662057N13	39K
R3542	0662057M92	5600
R3543	0662057M50	100
R3544	0662057A25	100
R3545	0662057A25	100
R3546	0662057N01	12K
R3547	0662057N11	33K
R3548	0662057N07	22K
R3551	0662057M40	39
R3561	0662057N01	12K
R3562	0662057N11	33K
R3563	0662057N33	270K
R3564	0662057N35	330K
R3569	0662057M92	5600
R3570	0662057M98	10k
R3571	0662057A27	120
R3572	0662057A27	120
R3573	0662057A27	120
R3701	0662057M50	100
R3703	0662057M54	150
R3704	0662057M54	150
R3705	0662057N11	33K
R3721	0662057M66	470
R3722	0662057M74	1000
R3723	0662057M50	100
R3727	0662057N23	100K
R3741	0662057M50	100
R3751	0662057N30	200K
R3752	0662057N35	330K
R3761	0662057N15	47K
R3802	0662057M50	100
R3803	0662057M58	220
R3804	0662057M98	10k
R3805	0662057N08	24K
R3806	0662057M34	22
R3808	0662057M26	10
R3811	0662057M50	100
R3816	0662057M74	1000
R3817	0662057M01	0
R3821	0662057M58	220
R3822	0662057M42	47
R3823	0662057N11	33K
R3824	0662057N07	22K
R3825	0662057M38	33
R3826	0662057M32	18
R3828	0662057M50	100
R3829	0662057M01	0
R3831	0662057M98	10k
R3832	0662057N01	12K
R3833	0662057M58	220
R3834	0662057M42	47
R3835	0662057N15	47K
R3836	0662057M98	10k
R400	0662057N15	47K
R401	0662057M01	0
R405	0662057M01	0
R406	0662057N20	75K
R407	0662057N19	68K
R409	0662057M98	10k
R410	0662057N23	100K
R411	0662057M98	10k
R413	0662057M01	0
R414	0662057V34	180K
R415	0662057V26	91K
R416	0662057M98	10k
R418	0662057M01	0
R419	0662057M67	510 only GP360, GP380, GP680
R420	0662057B46	10M only GP360, GP380, GP680
R421	0662057M81	2000
R423	0662057N21	82K
R424	0662057N12	36K
R425	0662057N10	30K
R426	0662057N35	330K only GP360, GP380, GP680
R427	0662057M84	2700
R428	0662057M10	2.2
R429	0662057M98	10k
R431	0662057N39	470K
R432	0662057N16	51K
R434	0662057M62	330
R435	0662057M81	2000
R436	0662057M01	0
R445	0662057N08	24K
R447	0662057N51	1.5M
R448	0662057M98	10k
R449	0662057N08	24K
R450	0683962T45	68 ohms, 1W
R451	0662057N03	15K
R452	0662057N23	100K
R456	0662057M01	0
R457	0662057M98	10k
R460	0662057M90	4700
R461	0662057M56	180 only GP360, GP380, GP680
R462	0662057M98	10k only GP360, GP380, GP680
R463	0662057M61	300
R471	0662057M92	5600
R472	0662057M93	6200
R473	0662057M26	10
R475	0662057M01	0
R476	0662057N08	24K
R477	0662057M74	1000
R478	0662057M98	10k
R481	0662057N08	24K
R492	0662057M01	0
R498	0662057M98	10k
R499	0662057M98	10k
R501	0662057M70	680
R502	0662057M56	180
R505	0662057M98	10k
R506	0662057N15	47K
RT400	0680590Z01	THERMISTOR 33K
S501	4080710Z01	Frequency Switch only GP340, GP640
S501	4080710Z02	Frequency Switch only GP360, GP380, GP680
S502	1880619Z02	Volume Switch
SH3201	2602023X08	Rx Backend Top Shield
SH3202	2686081B02	LVZIF shields
SH3203	2686081B03	45.1MHz Xtal Filter Shield
SH3301	2686081B01	Rx Frontend Bottom Shield
SH3302	2686081B05	Mixer Shield
SH3303	2686081B06	Rx Frontend Top Shield
SH3501	2686081B03	Harmonic Filter Shield
SH3502	2686081B04	PA driver Shield
SH3701	2680511Z01	Synthesizer top shield
SH3702	2680511Z01	Synthesizer bottom shield
SH3801	2680513Z01	VCO Top Shield
SH3802	2680514Z01	VCO Bottom Shield
SH400	2680505Z01	Controller Memory Shield
SH401	2680506Z01	Controller on-off shield
SH402	2680515Z01	Controller Microprocessor shield
SH403	2680516Z01	Controller Asfic_Cmp/Audio PA shield
T3301	2580541Z01	Balun transformer
T3302	2580541Z01	Balun transformer
U3201	5102463J58	3.3V Regulator
U3220	5109632D83	LVZIF IC
U3501	5185130C65	VHF/UHF/800 MHZ LDMOS Driver
U3502	5185765B28	PCIC
U3503	5185963A15	Temperature Sense
U3701	5185963A27	LVFRACN Synthesizer IC
U3711	5105739X05	5V Regulator
U3801	5105750U54	VCO BUFFER IC
U400	5102463J40	3.3V Regulator

Circuit Ref	Motorola Part No	Description
U404	5185963A53	ASFIC_CMP
U405	5102463J36	Static_RAM_32KX8
* U406	5102463J60	512K X 8 Flash Memory
* U407	5102463J64	16k X 8 EEPROM
U409	5102226J56	Microprocessor IC
U410	5102463J57	3.3V Regulator only GP360, GP380, GP680
U420	5102463J44	Audio PA
VR3501	4880140L17	Zener diode-12V
VR432	4805656W08	5.6V Zener diode
VR433	4805656W08	5.6V Zener diode
VR434	4802245J73	ZENER DIODE-6.8V
VR439	4880140L17	Zener diode-12V
VR447	4802245J74	ZENER DIODE-10V
VR448	4802245J74	ZENER DIODE-10V
VR449	4802245J74	ZENER DIODE-10V
VR450	4802245J74	ZENER DIODE-10V
VR460	4802245J73	ZENER DIODE-6.8V
VR501	4802245J73	ZENER DIODE-6.8V
VR506	4802245J73	ZENER DIODE-6.8V
Y3200	9186153B01	Crystal Filter
Y3761	4805875Z04	16.8MHz Xtal oscillator (SMD)
	5480678Z01	PCB Bar Code Label
	8486062B16	VHF main PC Board
	8486062B17	VHF main PC Board

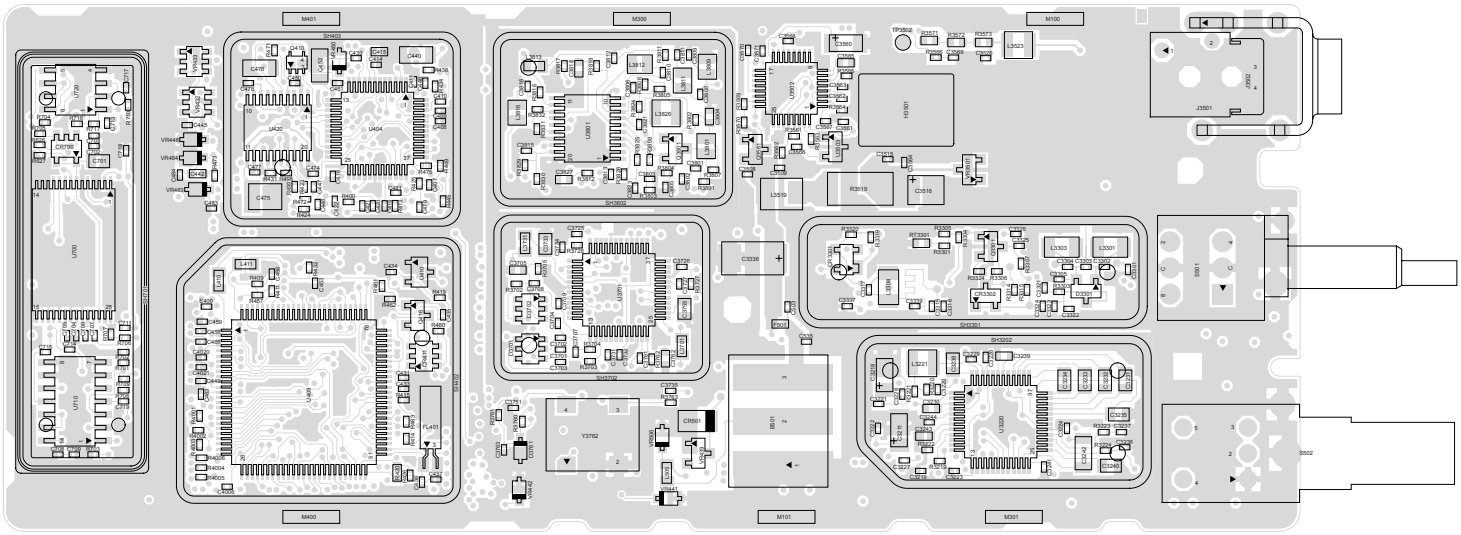
* Motorola Depot Servicing only

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

14.0 VHF PCB 8486101B11 / Schematic



VHF (136-174 MHz) Main Board Top Side



VHF (136-174 MHz) Main Board Bot Side

15.0 VHF PCB 8486101B11 Parts List

Circuit Ref.	Motorola Part No.	Description
B501	0986237A02	Battery Contact Module
B503	3980502Z01	Backup Contact, B +
B504	3980501Z01	Backup Contact, B -
C3200	2113743N31	16pF
C3201	NOTPLACED	
C3202	NOTPLACED	
C3203	2113743N50	100pF
C3204	2113743L41	10000pF
C3205	2113928N01	0.1uF
C3206	2113743L41	10000pF
C3207	2113743N10	2.2pF
C3208	NOTPLACED	
C3209	2311049A07	1uF
C3210	2113743L17	1000pF
C3211	2311049A56	4.7uF
C3212	2311049A57	10uF
C3213	2311049A56	4.7uF
C3214	2113928N01	0.1uF
C3215	2113743N26	10pF
C3218	2311049A56	4.7uF
C3219	2113928N01	0.1uF
C3220	2113743N26	10pF
C3221	2113743L41	10000pF
C3222	2113928N01	0.1uF
C3223	2113928N01	0.1uF
C3224	2113928N01	0.1uF
C3225	2113928N01	0.1uF
C3226	2113928N01	0.1uF
C3227	2113743L41	10000pF
C3228	2113743L41	10000pF
C3229	2113743N50	100pF
C3230	2113740F51	100
C3231	2180478Z20	1uF
C3232	2180478Z20	1uF
C3233	2180478Z20	1uF
C3234	2180478Z20	1uF
C3235	2113743A23	0.220uF
C3236	NOTPLACED	
C3237	NOTPLACED	
C3238	2113743A24	0.330uF
C3239	2113743E07	0.022uF
C3240	2113743A23	0.220uF
C3241	2113743L19	1200pF
C3242	2109720D14	0.1uF
C3243	2113743E07	0.022uF
C3244	2113743L41	10000pF
C3270	2113743E07	0.022uF
C3271	2113743L05	330pF
C3272	2113743N18	4.7pF
C3273	2113743N26	10pF
C3274	2113743N38	33pF
C3275	2113743N44	56pF
C3276	2113743N42	47pF
C3277	2113743N48	82pF
C3278	2113743E07	0.022uF
C3279	2311049A40	2.2uF
C3280	2113743L41	10000pF
C3301	2113743N20	5.6pF
C3302	2113743N54	150pF
C3303	2113743N30	15pF
C3304	2113743N54	150pF
C3305	NOTPLACED	
C3306	2113928N01	0.1uF
C3307	2113743N50	100pF
C3308	2113743L05	330pF
C3309	2113928N01	0.1uF
C3310	NOTPLACED	
C3311	2113743N54	150pF
C3312	2113743N31	16pF
C3313	2113743N54	150pF
C3314	NOTPLACED	
C3315	2113743N26	10pF
C3316	2113743N14	3.3pF
C3317	2113743N40	39pF
C3318	2113743M08	22000pF
C3319	NOTPLACED	
C3320	2113743N48	82pF
C3321	2113743L05	330pF
C3322	2113743N50	100pF
C3323	2113743N50	100pF
C3324	2113743N38	33pF
C3325	2113743L17	1000pF
C3326	NOTPLACED	
C3327	2113743L05	330pF
C3329	2113743L05	330pF
C3330	2113743N50	100pF
C3331	2113743N50	100pF
C3332	2113743N40	39pF
C3334	2113743N33	20pF
C3335	2113743N34	22pF
C3336	2311049A96	33uF
C3337	2113743M08	22000pF
C3338	2113743L09	470pF
C3339	2113743N26	10pF
C3501	2113743L05	330pF
C3502	2113743N38	33pF
C3503	2113743N38	33pF
C3504	2113743M08	22000pF
C3505	2113743N38	33pF
C3508	2113743M08	22000pF
C3509	2113743L05	330pF
C3512	2113740F43	47
C3513	2113740F38	30
C3514	2113740F47	68
C3515	2113743L29	3300pF
C3516	2311049A08	1uF
C3517	2113740F47	68
C3518	NOTPLACED	
C3519	NOTPLACED	
C3521	2111078B51	220
C3523	2111078B44	120
C3524	2113740F34	20
C3525	2113740F27	10
C3526	2113743M08	22000pF
C3527	NOTPLACED	
C3528	2113740F27	10
C3531	2113740F36	24
C3532	2113740F52	110
C3533	2113740F24	7.5
C3534	2113740F23	6.8
C3535	2113740F37	27
C3536	2113740F31	15
C3537	2113740F33	18
C3539	2113740F29	12
C3541	2113743M08	22000pF
C3542	2113743L05	330pF
C3543	2113743M08	22000pF
C3544	2113743L05	330pF
C3546	2113743L05	330pF
C3547	2113743M08	22000pF
C3550	2113743N23	7.5pF
C3551	2113743N46	68pF
C3552	2113743N44	56pF
C3560	2311049A07	1uF
C3561	2113743M08	22000pF
C3562	2113743L29	3300pF
C3563	2113743L29	3300pF
C3564	2113743L01	220pF
C3565	2113743E07	0.022uF
C3566	2113743N50	100pF
C3567	2113743L05	330pF
C3568	2113743L29	3300pF
C3569	2113743M08	22000pF
C3570	2113743L05	330pF
C3571	2113743L09	470pF
C3701	2113743L41	10000pF
C3702	2113743L41	10000pF
C3703	2113743L41	10000pF
C3704	2113743L41	10000pF
C3705	2113743E20	0.1uF
C3706	2311049J11	4.7uF
C3707	2113743N34	22pF
C3708	2113928N01	0.1uF
C3709	2113928N01	0.1uF
C3710	2104993J02	2.2uF
C3711	2311049A69	10uF
C3712	2113928N01	0.1uF
C3713	2311049A09	2.2uF
C3714	2311049J11	4.7uF
C3715	2113743L09	470pF
C3721	2113743E20	0.1uF
C3722	2113743E20	0.1uF
C3724	2311049A08	1uF
C3725	NOTPLACED	
C3726	2113743N24	8.2pF
C3727	2113743N50	100pF
C3731	2113743L41	10000pF
C3732	2113743L41	10000pF
C3733	2104993J02	2.2uF
C3734	2113743L41	10000pF
C3735	NOTPLACED	
C3741	NOTPLACED	
C3742	2113743L01	220pF
C3743	2113743L01	220pF
C3744	2113743L01	220pF
C3745	2113743L01	220pF
C3746	2113743L01	220pF
C3751	NOTPLACED	
C3752	2113743L17	1000pF
C3753	2311049A56	4.7uF
C3754	2113928N01	0.1uF
C3755	2104993J02	2.2uF
C3761	2113743N42	47pF
C3762	2113740F63	330
C3763	NOTPLACED	
C3801	2113743N18	4.7pF
C3802	NOTPLACED	

Circuit Ref.	Motorola Part No.	Description
C3803	2113743L17	1000pF
C3804	2113743E20	0.1uF
C3805	2113743N18	4.7pF
C3806	2113743N50	100pF
C3808	2113743N30	15pF
C3809	2113743N36	27pF
C3810	NOTPLACED	
C3811	2113928N01	0.1uF
C3812	2113928N01	0.1uF
C3813	2113743L41	10000pF
C3815	2113743L17	1000pF
C3816	2113743N22	6.8pF
C3818	2113743E07	0.022uF
C3821	2113743L41	10000pF
C3822	2113743L17	1000pF
C3823	2113743L41	10000pF
C3824	2113743N44	56pF
C3825	2113743N30	15pF
C3826	2113743N18	4.7pF
C3827	2113743E07	0.022uF
C3828	2185895Z01	0.01uF
C3829	2185895Z01	0.01uF
C3830	2113743N46	68pF
C3832	2113743L17	1000pF
C3833	2113743N18	4.7pF
C3834	2113743N44	56pF
C3835	2113743N22	6.8pF
C3836	2113743N30	15pF
C3842	2113743L17	1000pF
C400	2113743L41	10000pF
C4001	NOTPLACED	
C4002	NOTPLACED	
C4003	NOTPLACED	
C4004	NOTPLACED	
C4005	NOTPLACED	
C4007	NOTPLACED	
C4008	NOTPLACED	
C4009	NOTPLACED	
C401	2113928N01	0.1uF
C4010	NOTPLACED	
C4011	NOTPLACED	
C4012	NOTPLACED	
C4013	NOTPLACED	
C4014	NOTPLACED	
C4015	NOTPLACED	
C4016	NOTPLACED	
C402	2113928N01	0.1uF

Circuit Ref.	Motorola Part No.	Description
C4020	2113743L17	1000pF
C4021	2113743L17	1000pF
C403	2113743G24	2.2uF
C407	2113928N01	0.1uF
C408	2113743N50	100pF
C409	2113928N01	0.1uF
C410	2113928N01	0.1uF
C411	2113928N01	0.1uF
C414	2113928N01	0.1uF
C415	2185895Z01	0.01uF
C416	2113928N01	0.1uF
C419	2113743L41	10000pF
C420	2113743L41	10000pF
C421	2113928N01	0.1uF
C422	2113928N01	0.1uF
C423	2113743N50	100pF
C424	2311049A59	10uF
C425	2113928N01	0.1uF
C426	2113743N50	100pF
C427	2113743N50	100pF
C428	2113928N01	0.1uF
C429	2113928N01	0.1uF
C430	2113928N01	0.1uF
C431	2113743N50	100pF
C432	NOTPLACED	
C433	2113743L41	10000pF
C434	2113928N01	0.1uF
C435	2113928N01	0.1uF
C436	2113743N34	22pF
C437	2113743N34	22pF
C440	2113743G26	4.7uF
C441	2113743L09	470pF
C442	2113743E20	0.1uF
C443	2113928N01	0.1uF
C444	2113743N50	100pF
C445	2113743L09	470pF
C446	2113743L09	470pF
C447	2113928N01	0.1uF
C448	2113928N01	0.1uF
C449	2113743N50	100pF
C450	NOTPLACED	
C451	2113743M08	22000pF
C452	2113743B29	1uF
C453	2113743N50	100pF
C456	2113743N50	100pF
C458	2113743N50	100pF
C459	2113743N50	100pF

Circuit Ref.	Motorola Part No.	Description
C463	2113743N50	100pF
C466	2113743N50	100pF
C467	2113928N01	0.1uF
C471	2113743L09	470pF
C472	2113743L09	470pF
C473	2113743L09	470pF
C474	2113743L41	10000pF
C475	2113743H14	10uF
C476	2113928D08	10uF
C477	2113743L17	1000pF
C478	2113743L17	1000pF
C479	2113928N01	0.1uF
C480	2113928D08	10uF
C481	2113928N01	0.1uF
C482	2113928N01	0.1uF
C483	2113743L09	470pF
C484	2113743L09	470pF
C490	2113743L09	470pF
C491	2113743L09	470pF
C492	2113743L09	470pF
C493	2113743N50	100pF
C494	2113743N50	100pF
C495	2113743L09	470pF
C496	2113743L09	470pF
C497	2113743L09	470pF
C502	2311049A05	0.47uF
C503	2113743N50	100pF
C505	2113743N50	100pF
C511	2113743N50	100pF
C512	2113743N50	100pF
C513	2113743N50	100pF
C514	2113743N50	100pF
C520	2113743L41	10000pF
C521	2113743L41	10000pF
C522	2113743L41	10000pF
C523	2113743L41	10000pF
C535	2113743L17	1000pF
C601	NOTPLACED	
C602	NOTPLACED	
C603	NOTPLACED	
C701	2180478Z20	1uF
C702	2113928N01	0.1uF
C703	2113743N50	100pF
C704	2113928N01	0.1uF
C705	2113928N01	0.1uF
C706	NOTPLACED	
C707	2113928N01	0.1uF

Circuit Ref.	Motorola Part No.	Description
C708	2113928N01	0.1uF
C709	2113743L17	1000pF
C711	2113743L41	10000pF
C713	2113928N01	0.1uF
C714	2113928N01	0.1uF
C715	2113928N01	0.1uF
C717	2113928N01	0.1uF
C718	2113743L17	1000pF
C719	2113928N01	0.1uF
CR3301	4802245J42	Ring Quad Diode
CR3302	4805129M96	Dual Bonds Pin Diode
CR3303	4880154K03	Dual Schottky Diode
CR411	4802245J62	Schottky diode
CR412	4802245J62	Schottky diode
CR413	4802245J62	Schottky diode
CR440	4813833C02	Dual Common Cathode Diode
CR501	4880107R01	Rectifier
CR503	4805729G49	Red/Yellow LED
CR601	NOTPLACED	
CR700	4802245J47	Diode Schottky
D3270	4862824C01	Varactor
D3301	4802081B58	Dual Diode
D3302	4802081B58	Dual Diode
D3521	4880973Z02	Pin Diode
D3551	4880973Z02	Pin Diode
D3701	4802233J09	Triple diode
D3702	4802233J09	Triple diode
D3761	4862824C03	Varactor
D3821	4805649Q13	Varactor
D3831	4805649Q13	Varactor
D3832	4862824C01	Varactor
E400	2480640Z01	Ferrite Bead
F501	6580542Z01	Fuse 3A
FL401	4870368G02	Real Time Clock Oscillator Xtal 38.4kHz
H3501	2680499Z01	Heat Spreader
J3501	0985613Z01	RF Jack
J3502	0280519Z02	Antenna Nut
J400	0905505Y04	40-Pin Connector
J403	0905505Y02	20-Pin Connector
L3200	2462587N68	1000nH
L3201	NOTPLACED	
L3202	2462587N68	1000nH
L3221	2462587N68	1000nH
L3270	2462587T15	100nH
L3271	2462587Q20	2,200nH

Circuit Ref.	Motorola Part No.	Description
L3301	2462587T35	12nH
L3303	2462587T35	12nH
L3304	2462587T23	470nH
L3305	2462587T35	12nH
L3306	2462587T35	12nH
L3308	2462587T34	10nH
L3309	2462587N55	150nH
L3312	2462587V28	33nH
L3501	2413926H09	5.6nH
L3503	2462587V32	68nH
L3504	2462587N51	68nH
L3511	2462587N44	18nH
L3512	2479990B01	11.03nH
L3513	2479990A02	7.66nH
L3515	2479990C03	13.85nH
L3518	NOTPLACED	
L3519	2484657R01	Ferrite Bead
L3521	2479990A02	7.66nH
L3522	2479990E01	23.75nH
L3523	2462587N68	1000nH
L3531	2479990N01	43.67nH
L3532	2479990N01	43.67nH
L3538	2479990M01	30.54nH
L3551	2479990N01	43.67nH
L3552	2479990A02	7.66nH
L3701	2462587Q42	390nH
L3731	2462587Q20	2,200nH
L3801	2462587V34	100nH
L3809	2462587V27	27nH
L3811	2462587V34	100nH
L3812	2462587V34	100nH
L3813	2462587Q47	1000nH
L3816	2462587V34	100nH
L3821	2462587N50	56nH
L3822	2462587N49	47nH
L3823	2462587N49	47nH
L3824	2462587N68	1000nH
L3825	2462587V34	100nH
L3826	2462587N68	1000nH
L3831	2462587N50	56nH
L3832	2462587N51	68nH
L3833	2462587N50	56nH
L3834	2462587N68	1000nH
L400	2462587Q42	390nH
L401	2462587Q42	390nH
L410	2462587Q42	390nH
L411	2462587Q42	390nH

Circuit Ref.	Motorola Part No.	Description
L505	2462587Q42	390nH
L601	NOTPLACED	
M100	7585651Z01	EMI Pad
M101	7585651Z01	EMI Pad
M300	7585651Z01	EMI Pad
M301	7585651Z01	EMI Pad
M400	7585651Z01	EMI Pad
M401	7585651Z01	EMI Pad
PB501	4080523Z02	Tactile Switch
PB502	4080523Z02	Tactile Switch
PB503	4080523Z02	Tactile Switch
PB504	4080523Z02	Tactile Switch
PB505	4080523Z02	Tactile Switch
Q3200	4802197J95	NPN Transistor
Q3201	4880214G02	NPN Transistor
Q3202	4880214G02	NPN Transistor
Q3270	4805218N63	RF NPN Transistor
Q3301	4880214G02	NPN Transistor
Q3302	4802197J95	NPN Transistor
Q3501	4813828A08	RF Power Amplifier
Q3561	4813824A17	PNP Transistor
Q3721	4809939C05	DUAL NPN/PNP Transistor
Q3801	4802197J95	NPN Transistor
Q400	4809579E18	MOSFET P-Channel
Q403	4813824A17	NPN Transistor
Q405	4802245J54	Dual NPN Transistor
Q410	4802245J54	Dual NPN Transistor
Q416	4809579E18	MOSFET P-Channel
Q417	4809939C05	DUAL NPN/PNP Transistor
Q502	5180159R01	Dual NPN Transistor
Q505	4880214G02	NPN Transistor
R3200	0662057M54	150
R3201	0662057M82	2.2K
R3202	0662057M90	4.7K
R3203	0662057M98	10K
R3204	0662057M26	10
R3205	0662057M74	1K
R3206	0662057N23	100K
R3207	0662057N13	39K
R3208	0662057M50	100
R3209	0662057M74	1K
R3210	0662057M82	2.2K
R3211	0662057M82	2.2K
R3212	0662057M90	4.7K
R3213	0662057M82	2.2K
R3214	0662057M34	22
R3215	NOTPLACED	

Circuit Ref.	Motorola Part No.	Description
R3218	NOTPLACED	
R3219	0662057M50	100
R3220	0662057M90	4.7K
R3221	0662057M50	100
R3222	NOTPLACED	
R3223	NOTPLACED	
R3224	0662057M26	10
R3225	0662057M74	1K
R3226	0662057M26	10
R3270	0662057M74	1K
R3271	0662057M42	47
R3272	0662057N15	47K
R3273	0662057N15	47K
R3274	0662057M83	2.4K
R3275	0662057M74	1K
R3276	0662057N30	200K
R3301	NOTPLACED	
R3303	0662057N23	100K
R3304	0662057N23	100K
R3305	0662057N19	68K
R3306	0662057M82	2.2K
R3307	0662057N11	33K
R3308	0662057M78	1.5K
R3309	0662057M92	5.6K
R3310	0662057M98	10K
R3311	0662057M26	10
R3312	0662057M38	33
R3313	0662057M34	22
R3314	0662057M26	10
R3315	0662057M62	330
R3316	0662057M66	470
R3317	0662057N23	100K
R3318	0662057M66	470
R3319	NOTPLACED	
R3320	NOTPLACED	
R3321	0662057M54	150
R3322	0662057M58	220
R3323	0662057M32	18
R3324	0662057M58	220
R3501	0662057M61	300
R3502	0662057M32	18
R3503	0662057M61	300
R3505	0662057M62	330
R3506	0662057B62	3.9
R3507	0662057B62	3.9
R3512	NOTPLACED	
R3513	NOTPLACED	

Circuit Ref.	Motorola Part No.	Description
R3519	0680539Z01	0.1
R3541	0662057N13	39K
R3542	0662057M92	5.6K
R3543	0662057M50	100
R3544	0662057A25	100
R3545	0662057A25	100
R3546	0662057N01	12K
R3547	0662057N11	33K
R3548	0662057N07	22K
R3551	0662057M40	39
R3561	0662057N01	12K
R3562	0662057N11	33K
R3563	0662057N33	270K
R3564	0662057N35	330K
R3565	NOTPLACED	
R3566	NOTPLACED	
R3569	0662057M92	5.6K
R3570	0662057M98	10K
R3571	0662057A27	120
R3572	0662057A27	120
R3573	0662057A27	120
R3701	0662057M50	100
R3702	NOTPLACED	
R3703	0662057M54	150
R3704	0662057M54	150
R3705	0662057N11	33K
R3721	0662057M66	470
R3722	0662057M68	560
R3723	0662057M50	100
R3726	NOTPLACED	
R3727	0662057N23	100K
R3741	0662057M50	100
R3751	0662057N30	200K
R3752	0662057N29	180K
R3760	NOTPLACED	
R3761	0662057N15	47K
R3762	NOTPLACED	
R3763	NOTPLACED	
R3801	NOTPLACED	
R3802	0662057M50	100
R3803	0662057M58	220
R3804	0662057M98	10K
R3805	0662057N08	24K
R3806	0662057M34	22
R3807	NOTPLACED	
R3808	0662057M26	10
R3811	0662057M50	100

Circuit Ref.	Motorola Part No.	Description
R3812	NOTPLACED	
R3816	0662057M74	1K
R3817	0662057M01	0
R3818	NOTPLACED	
R3821	0662057M58	220
R3822	0662057M42	47
R3823	0662057N11	33K
R3824	0662057N07	22K
R3825	0662057M38	33
R3826	0662057M32	18
R3828	0662057M50	100
R3829	0662057M01	0
R3830	NOTPLACED	
R3831	0662057M98	10K
R3832	0662057N01	12K
R3833	0662057M58	220
R3834	0662057M42	47
R3835	0662057N15	47K
R3836	0662057M98	10K
R400	0662057N15	47K
R4001	0662057M74	1K
R4002	0662057M74	1K
R4003	0662057M74	1K
R4004	0662057M74	1K
R4005	0662057M74	1K
R4006	0662057M74	1K
R4007	0662057M74	1K
R4008	0662057M74	1K
R4009	0662057M74	1K
R401	0662057M01	0
R402	NOTPLACED	
R403	NOTPLACED	
R405	0662057M01	0
R406	0662057N20	75K
R407	0662057N19	68K
R408	NOTPLACED	
R409	0662057M98	10K
R410	0662057N23	100K
R411	0662057M98	10K
R413	0662057M01	0
R414	0662057V34	180K
R415	0662057V26	91K
R416	0662057M98	10K
R418	0662057M01	0
R419	0662057M67	510
R420	0662057B46	10M
R421	0662057M81	2K

Circuit Ref.	Motorola Part No.	Description
R423	0662057N21	82K
R424	0662057N12	36K
R425	0662057N10	30K
R426	0662057N35	330K
R427	0662057M84	2.7K
R428	0662057M10	2.2
R429	0662057N20	75K
R431	0662057N39	470K
R432	0662057N16	51K
R434	0662057M62	330
R435	0662057M81	2K
R436	0662057M01	0
R437	NOTPLACED	
R445	0662057N08	24K
R447	0662057N23	100K
R448	0662057M98	10K
R449	0662057N08	24K
R450	0683962T45	68
R451	0662057N03	15K
R452	0662057N23	100K
R453	NOTPLACED	
R454	NOTPLACED	
R455	NOTPLACED	
R456	0662057M01	0
R457	0662057M98	10K
R460	0662057M90	4.7K
R461	0662057M56	180
R462	0662057M98	10K
R463	0662057M61	300
R471	0662057N06	20K
R472	0662057M93	6.2K
R473	0662057M26	10
R475	0662057M01	0
R476	0662057N35	330K
R477	0662057M74	1K
R478	0662057M98	10K
R481	0662057N08	24K
R492	0662057M01	0
R498	0662057M98	10K
R499	0662057M98	10K
R501	0662057M70	680
R502	0662057M56	180
R505	0662057M98	10K
R506	0662057N15	47K
R625	NOTPLACED	
R626	NOTPLACED	
R627	NOTPLACED	

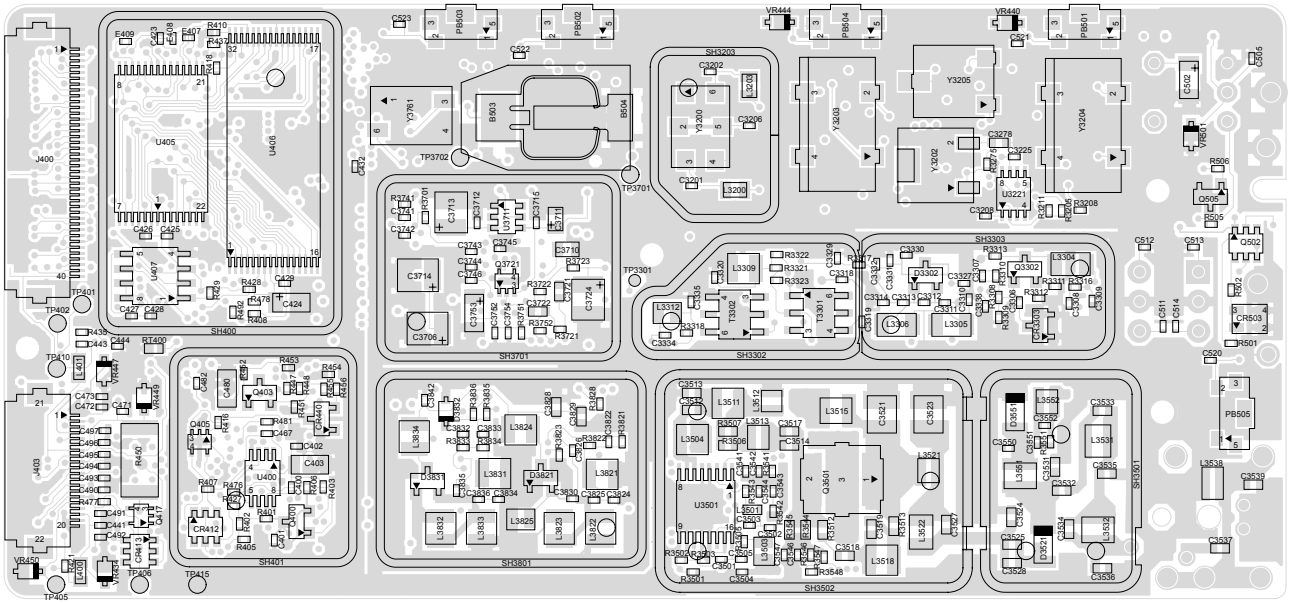
Circuit Ref.	Motorola Part No.	Description
R701	0662057N05	18K
R702	0662057N05	18K
R703	0662057M74	1K
R704	0662057N13	39K
R705	0662057N13	39K
R706	0662057N17	56K
R707	0662057M91	5.1K
R708	0662057N41	560K
R709	0662057N47	1M
R710	0662057N39	470K
R716	0662057N01	12K
R717	0662057M82	2.2K
RT3301	NOTPLACED	
RT400	0680590Z01	THERMISTOR_33K
S501	4080710Z02	Frequency Switch
S502	1880619Z02	POTENTIOMETER (VOLUME)
SH3201	2602023X08	Rx Backend Top Shield
SH3202	2686081B02	LVZIF shields
SH3203	2686081B03	45.1MHz Xtal Filter Shield
SH3301	2686081B01	Receiver Front-End Bottom Shield
SH3302	2686081B05	Mixer Shield
SH3303	2686081B06	Receiver Front-End Top Shield
SH3501	2686081B03	Harmonic Filter Shield
SH3502	2686081B04	PA driver Shield
SH3701	2680511Z01	Synthesizer Top Shield
SH3702	2680511Z01	Synthesizer Bottom Shield
SH3801	2680513Z01	VCO Resonators Shield
SH3802	2680514Z01	VCO Buffer IC Shield
SH400	2680505Z01	Controller Memory Shield
SH401	2680506Z01	Controller On-off Shield
SH402	2680515Z01	Microprocessor Shield
SH403	2680516Z01	Asfic_Cmp, Audio PA Shield
SH701	2680677Z01	Voice Storage Shield
T3301	2580541Z02	Balun Transformer
T3302	2580541Z02	Balun Transformer
U3201	5102463J58	3.3V Regulator
U3220	5109632D83	LVZIF IC
U3501	5185130C65	LDMOS Driver IC
U3502	5185765B26	PCIC
U3503	5185963A15	Temperature sensor
U3701	5185963A27	LVFRACN Synthesizer IC
U3711	5105739X05	5V Regulator
U3801	5105750U54	VCO BUFFER IC
U400	5102463J40	3.3V Regulator

Circuit Ref.	Motorola Part No.	Description
U404	5185130C53	ASFIC_CMP IC
U405	5102463J36	Static RAM_32K X 8
U406	5102463J60	Flash ROM_512K X 8
U407	5102495J05	EEPROM_16K X 8
U409	5102226J56	Micro Processor
U410	5102463J57	3.3V Regulator
U420	5102463J44	Audio PA
U601	NOTPLACED	
U700	5185770M01	IC Voice Storage
U710	5102463J52	QUAD ANALOG SWITCH IC
U720	5113818A01	SING Supply IC
VR3501	4880140L17	ZENER DIODE - 12V
VR432	4805656W08	5.6V Zener diode
VR433	4805656W08	5.6V Zener diode
VR434	4802245J73	ZENER DIODE-6.8V
VR439	4880140L17	ZENER DIODE - 12V
VR440	NOTPLACED	
VR441	NOTPLACED	
VR442	NOTPLACED	
VR444	NOTPLACED	
VR447	4802245J74	ZENER DIODE-10V
VR448	4802245J74	ZENER DIODE-10V
VR449	4802245J74	ZENER DIODE-10V
VR450	4802245J75	ZENER DIODE-12V
VR460	4802245J73	ZENER DIODE-6.8V
VR483	4802245J74	ZENER DIODE-10V
VR484	4802245J74	ZENER DIODE-10V
VR501	4802245J73	ZENER DIODE-6.8V
VR506	4802245J73	ZENER DIODE-6.8V
Y3200	9186153B01	Crystal Filter
Y3761	4805875Z04	16.8MHz Xtal Oscillator
Y3762	NOTPLACED	
	8486101B11	VHF GP1280 Main PC Board

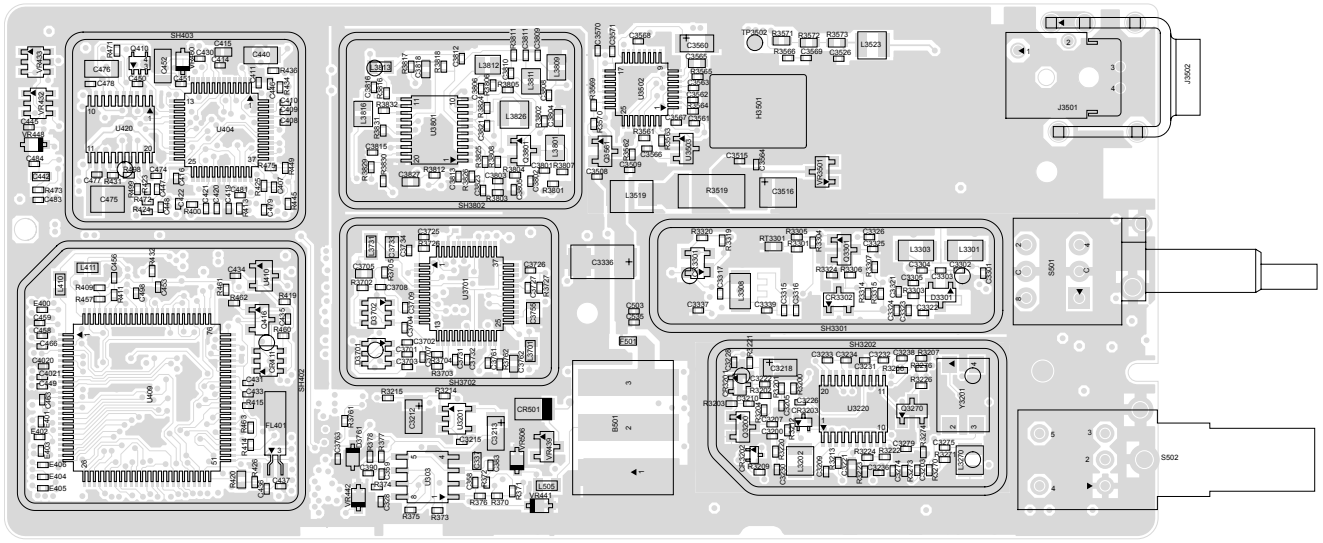
* Motorola Depot Servicing only

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

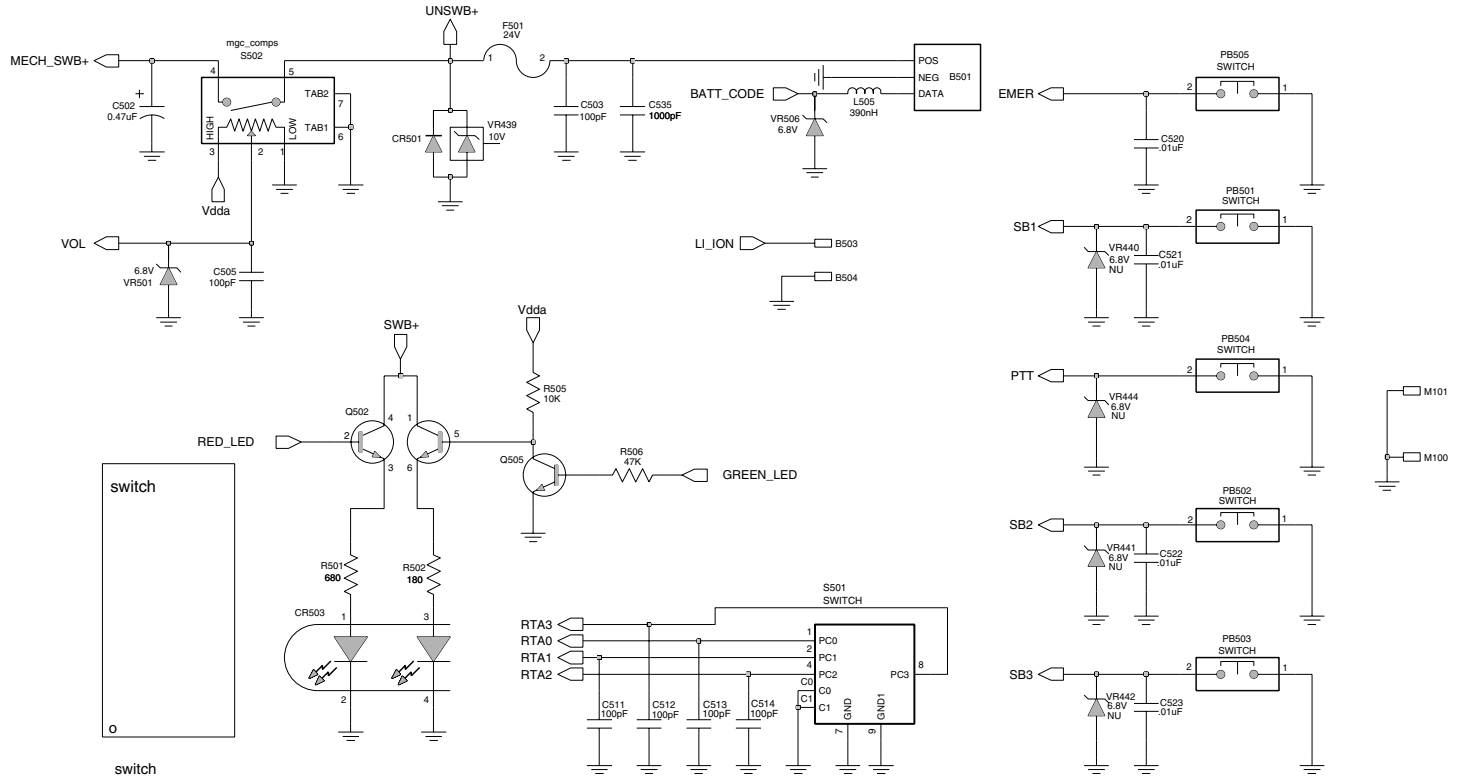
16.0 VHF PCB 8486473Z04 / Schematics



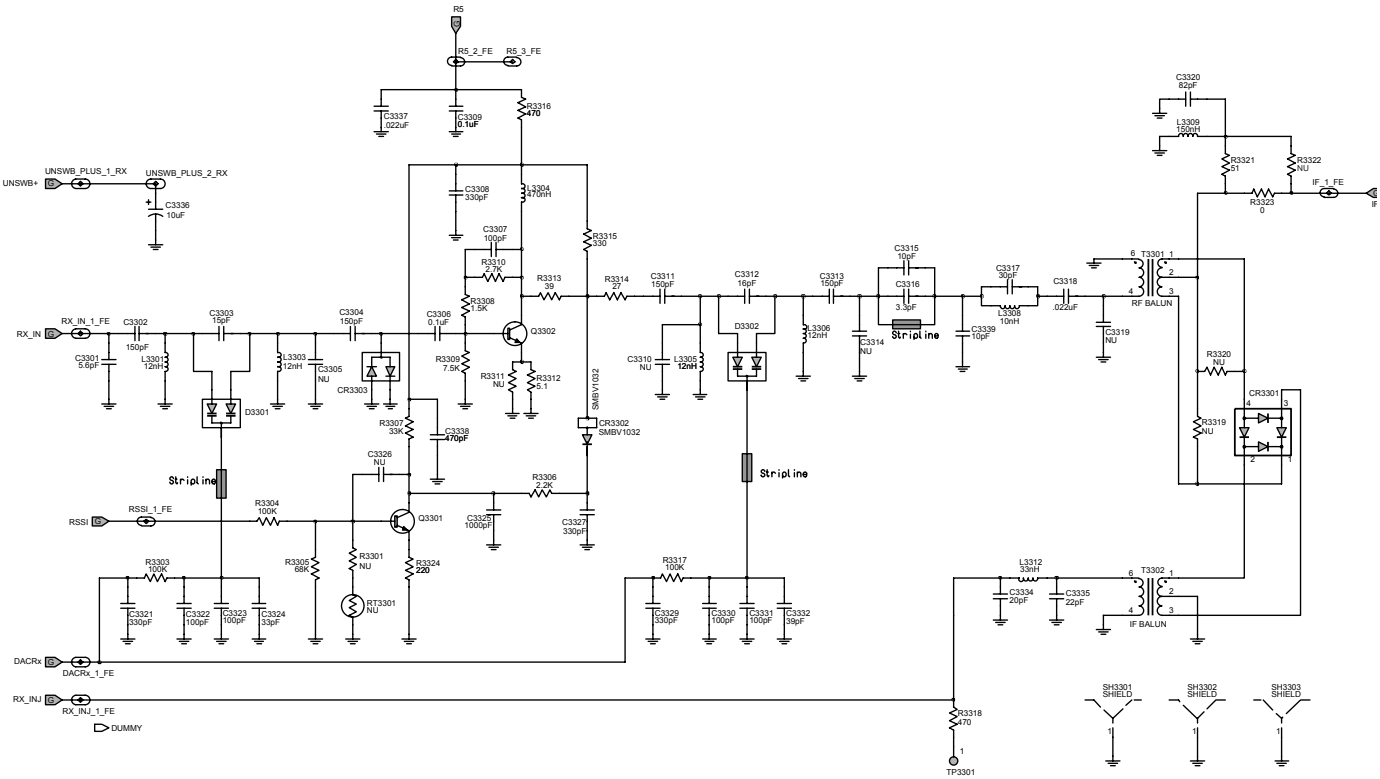
VHF (136-174 MHz) Main Board Top Side



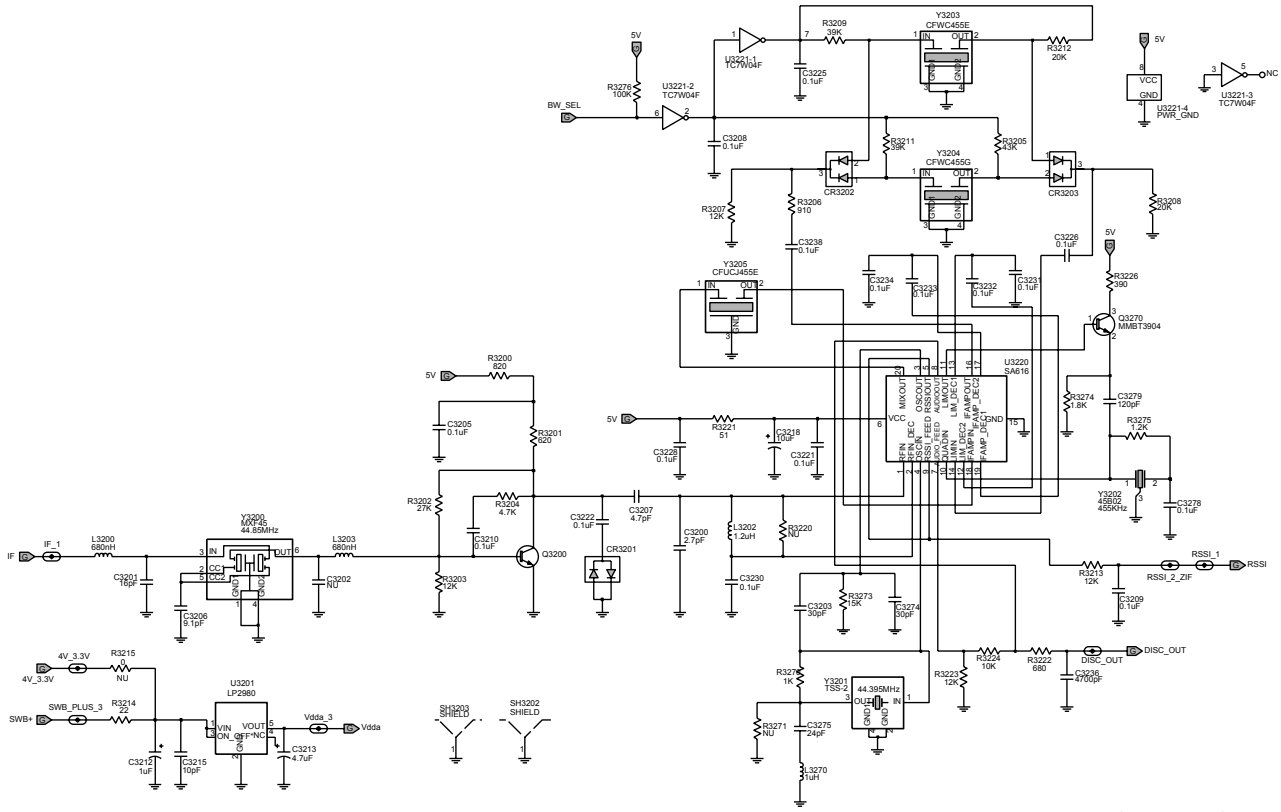
VHF (136-174 MHz) Main Board Bottom Side



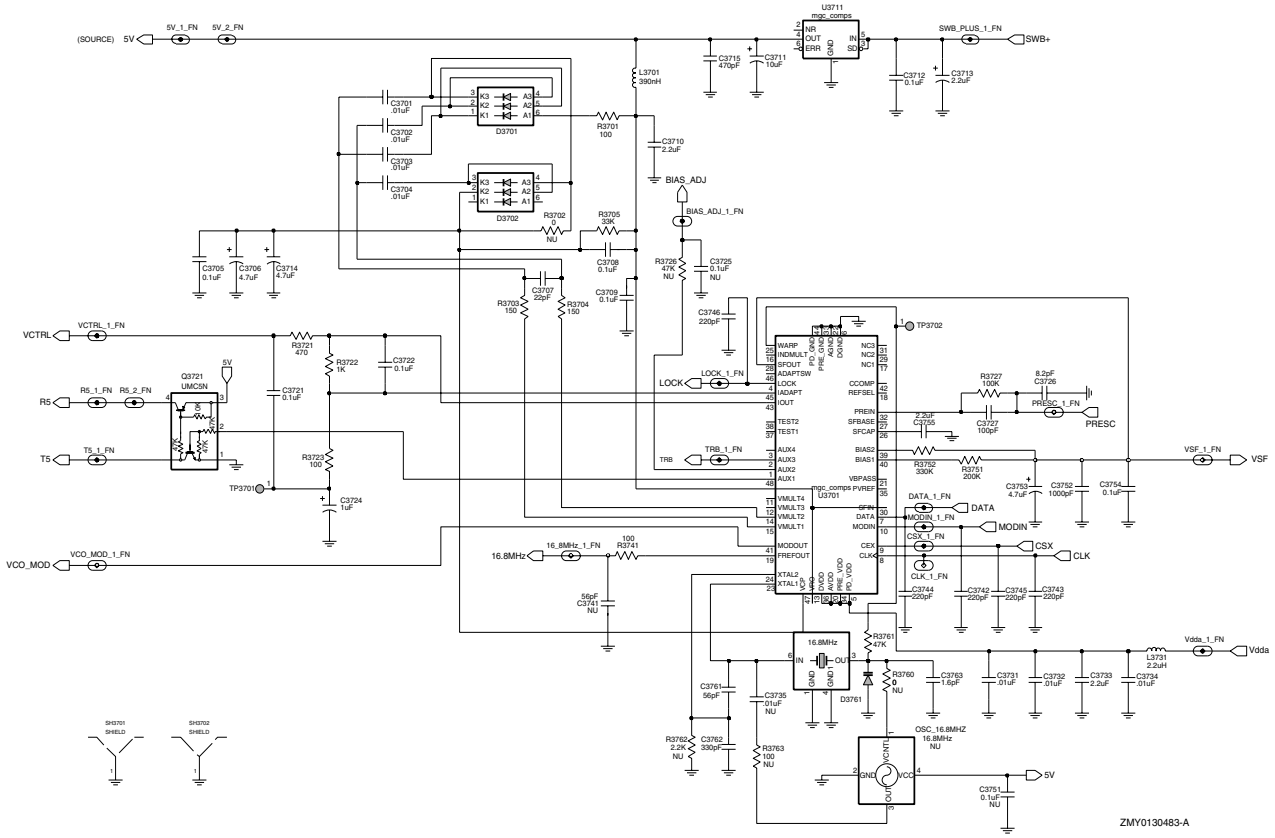
VHF (136-174 MHz) Controls and Switches



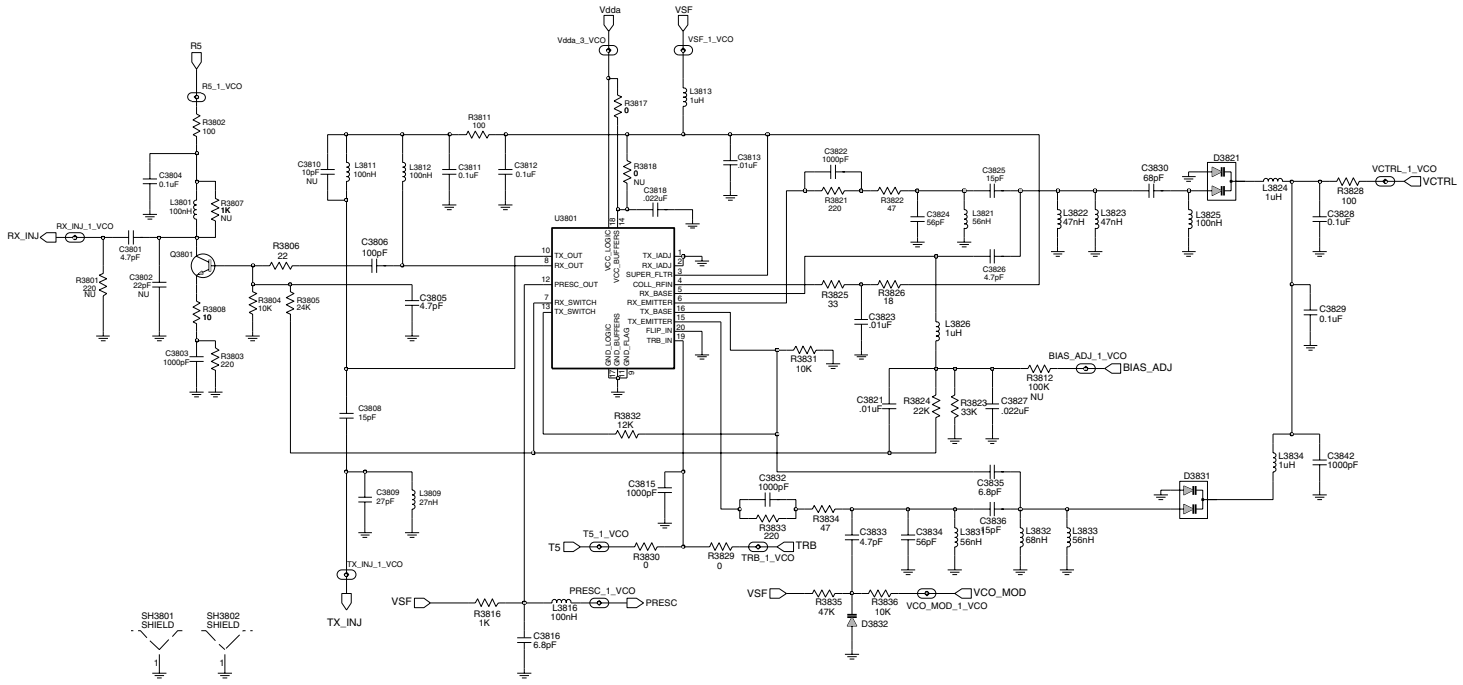
VHF (136-174 MHz) Receiver Front End



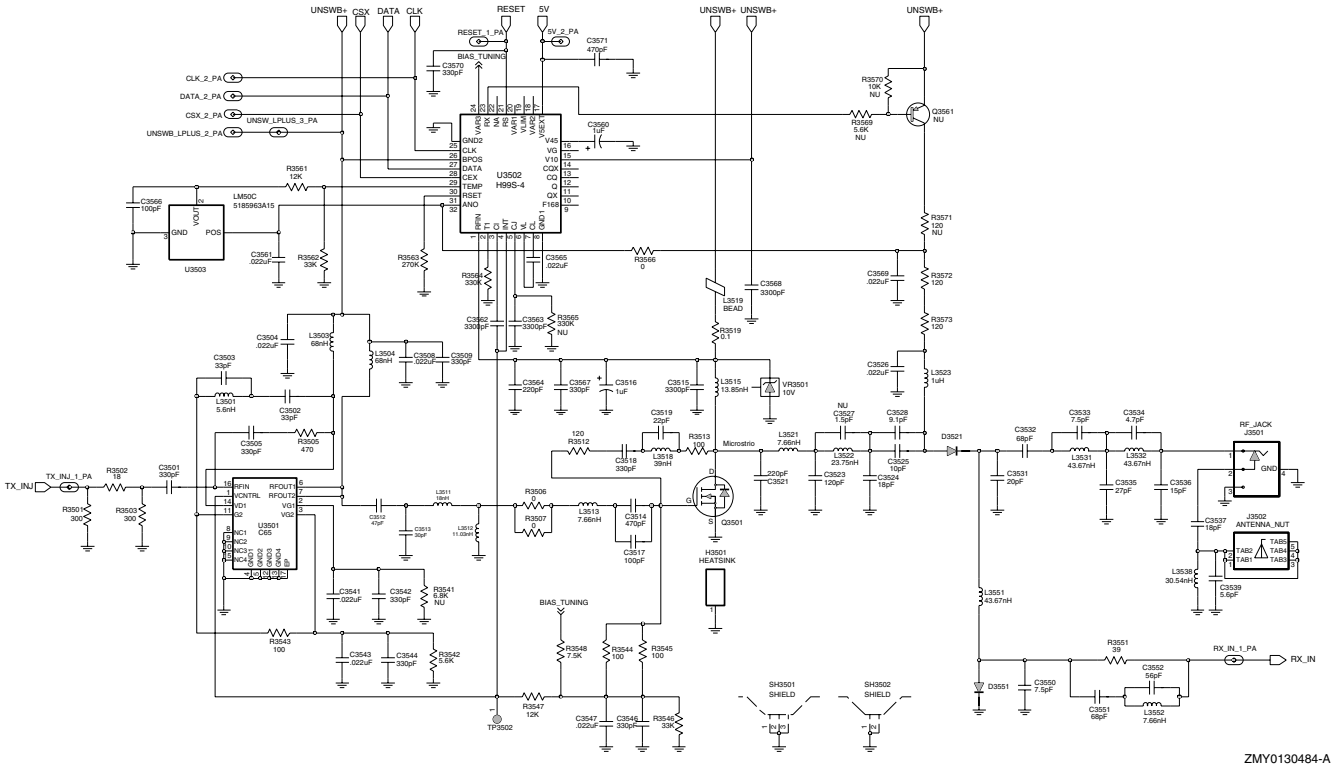
VHF (136-174 MHz) Receiver Back End



VHF (136-174 MHz) Synthesizer



VHF (136-174 MHz) Voltage Controlled Oscillator



ZMY0130484-A

VHF (136-174 MHz) Transmitter

17.0 VHF PCB 8486473Z04 Radio Parts List

Circuit Ref	Motorola Part No.	Description
B501	0986237A02	Battery Contact Module
B503	3980502Z01	Backup Contact, B + (not placed in non-display radios)
B504	3980501Z01	Backup Contact, B - (not placed in non-display radios)
C3200	2113743N12	2.7pF
C3201	2113743N31	16pF
C3202	NOT PLACED	
C3203	2113743N37	30pF
C3205	2113743M24	100000pF
C3206	2109445U26	9.1
C3207	2113743N18	4.7pF
C3208	2113743M24	100000pF
C3209	2113743M24	100000pF
C3210	2113743M24	100000pF
C3212	2311049A07	1uF
C3213	2311049A56	4.7uF
C3215	2113743N26	10pF
C3218	2311049A59	10uF
C3221	2113743E20	0.1uF
C3222	2113743M24	100000pF
C3225	2113743M24	100000pF
C3226	2113743M24	100000pF
C3228	2113743M24	100000pF
C3230	2113743M24	100000pF
C3231	2113743M24	100000pF
C3232	2113743M24	100000pF
C3233	2113743M24	100000pF
C3234	2113743M24	100000pF
C3236	2113743L33	4700pF
C3238	2113743M24	100000pF
C3274	2113743N37	30pF
C3275	2113743N35	24pF
C3278	2113743E20	0.1uF
C3279	2113743N52	120pF
C328	2113743M24	100000pF
C3301	2113743N20	5.6pF
C3302	2113743N54	150pF
C3303	2113743N30	15pF
C3304	2113743N54	150pF
C3305	NOT PLACED	
C3306	2113928N01	0.1uF
C3307	2113743N50	100pF
C3308	2113743L05	330pF
C3309	2113928N01	0.1uF
C3310	NOT PLACED	
C3311	2113743N54	150pF
C3312	2113743N31	16pF
C3313	2113743N54	150pF
C3314	NOT PLACED	
C3315	2113743N26	10pF
C3316	2113743N14	3.3pF
C3317	2113743N37	30pF
C3318	2113743M08	22000pF
C3319	NOT PLACED	
C3320	2113743N48	82pF
C3321	2113743L05	330pF
C3322	2113743N50	100pF
C3323	2113743N50	100pF
C3324	2113743N38	33pF
C3325	2113743L17	1000pF
C3326	NOT PLACED	
C3327	2113743L05	330pF
C3329	2113743L05	330pF
C3330	2113743N50	100pF
C3331	2113743N50	100pF
C3332	2113743N40	39pF
C3334	2113743N33	20pF
C3335	2113743N34	22pF
C3336	2311049A96	33uF
C3337	2113743M08	22000pF
C3338	2113743L09	470pF
C3339	2113743N26	10pF
C337	2113928P04	1uF
C3501	2113743L05	330pF
C3502	2113743N38	33pF
C3503	2113743N38	33pF
C3504	2113743M08	22000pF
C3505	2113743N38	33pF
C3508	2113743M08	22000pF
C3509	2113743L05	330pF
C3512	2113740F43	47pF
C3513	2113740F38	30pF
C3514	2113740F47	68pF
C3515	2113743L29	3300pF
C3516	2311049A08	1uF
C3517	2113740F47	68pF
C3518	NOT PLACED	
C3519	NOT PLACED	
C3521	2111078B51	220pF
C3523	2111078B44	120pF
C3524	2113740F34	20pF
C3525	2113740F27	10pF
C3526	2113743M08	22000pF
C3527	NOT PLACED	
C3528	2113740F27	10pF
C3531	2113740F34	20pF
C3532	2113740F47	68pF
C3533	2113740F24	7.5pF
C3534	2113740F19	4.7pF
C3535	2113740F37	27pF
C3536	2113740F31	15pF
C3537	2113740F33	18pF
C3539	2113740F29	12pF
C3541	2113743M08	22000pF
C3542	2113743L05	330pF
C3543	2113743M08	22000pF
C3544	2113743L05	330pF
C3546	2113743L05	330pF
C3547	2113743M08	22000pF
C3550	2113743N23	7.5pF
C3551	2113743N46	68pF
C3552	2113743N44	56pF
C3560	2311049A07	1uF
C3561	2113743M08	22000pF
C3562	2113743L29	3300pF
C3563	2113743L29	3300pF
C3564	2113743L01	220pF
C3565	2113743E07	0.022uF
C3566	2113743N50	100pF
C3567	2113743L05	330pF
C3568	2113743L29	3300pF
C3569	2113743M08	22000pF
C3570	2113743L05	330pF
C3571	2113743L09	470pF
C358	2113743N22	6.8pF
C359	2113743N31	16pF
C3701	2113743L41	10000pF
C3702	2113743L41	10000pF
C3703	2113743L41	10000pF
C3704	2113743L41	10000pF
C3705	2113743E20	0.1uF
C3706	2311049J11	4.7uF
C3707	2113743N34	22pF
C3708	2113928N01	0.1uF
C3709	2113928N01	0.1uF
C3710	2104993J02	2.2uF
C3711	2311049A69	10uF
C3712	2113928N01	0.1uF
C3713	2311049A09	2.2uF
C3714	2311049J11	4.7uF
C3715	2113743L09	470pF
C3721	2113743E20	0.1uF
C3722	2113743E20	0.1uF
C3724	2311049A08	1uF
C3725	NOT PLACED	
C3726	2113743N24	8.2pF
C3727	2113743N50	100pF
C3731	2113743L41	10000pF
C3732	2113743L41	10000pF
C3733	2104993J02	2.2uF

Circuit Ref	Motorola Part No.	Description
C3734	2113743L41	10000pF
C3741	NOT PLACED	
C3742	2113743L01	220pF
C3743	2113743L01	220pF
C3744	2113743L01	220pF
C3745	2113743L01	220pF
C3746	2113743L01	220pF
C3752	2113743L17	1000pF
C3753	2311049A56	4.7uF
C3754	2113928N01	0.1uF
C3755	2104993J02	2.2uF
C3761	2113743N42	47pF
C3762	2113740F63	330pF
C3763	NOT PLACED	
C3801	2113743N18	4.7pF
C3802	NOT PLACED	
C3803	2113743L17	1000pF
C3804	2113743E20	0.1uF
C3805	2113743N18	4.7pF
C3806	2113743N50	100pF
C3808	2113743N30	15pF
C3809	2113743N36	27pF
C3810	NOT PLACED	
C3811	2113928N01	0.1uF
C3812	2113928N01	0.1uF
C3813	2113743L41	10000pF
C3815	2113743L17	1000pF
C3816	2113743N22	6.8pF
C3818	2113743E07	0.022uF
C3821	2113743L41	10000pF
C3822	2113743L17	1000pF
C3823	2113743L41	10000pF
C3824	2113743N44	56pF
C3825	2113743N30	15pF
C3826	2113743N18	4.7pF
C3827	2113743E07	0.022uF
C3828	2185895Z01	0.01uF
C3829	2185895Z01	0.01uF

Circuit Ref	Motorola Part No.	Description
C383	2113743N43	51pF
C3830	2113743N46	68pF
C3832	2113743L17	1000pF
C3833	2113743N18	4.7pF
C3834	2113743N44	56pF
C3835	2113743N22	6.8pF
C3836	2113743N30	15pF
C3842	2113743L17	1000pF
C390	2113743N43	51pF
C400	2113743L41	10000pF
C401	2113928N01	0.1uF
C402	2113928N01	0.1uF
C4020	NOT PLACED	
C4021	NOT PLACED	
C403	2113743G24	2.2uF
C407	2113928N01	0.1uF
C408	2113743N50	100pF
C409	2113928N01	0.1uF
C410	2113928N01	0.1uF
C411	2113928N01	0.1uF
C414	2113928N01	0.1uF
C415	2185895Z01	0.01uF
C416	2113928N01	0.1uF
C419	2113743L41	10000pF
C420	2113743L41	10000pF
C421	2113928N01	0.1uF
C422	2113928N01	0.1uF
C423	2113743N50	100pF
C424	2311049A59	10uF
C425	2113928N01	0.1uF
C426	2113743N50	100pF
C427	2113743N50	100pF
C428	2113928N01	0.1uF
C429	2113928N01	0.1uF
C430	2113928N01	0.1uF
C431	2113743N50	100pF
C432	NOT PLACED	
C433	2113743L41	10000pF

Circuit Ref	Motorola Part No.	Description
C434	2113928N01	0.1uF (not placed in non-display radios)
C435	2113928N01	0.1uF
C436	2113743N34	22pF (not placed in non-display radios)
C437	2113743N34	22pF (not placed in non-display radios)
C440	2113743G26	4.7uF
C441	2113743L09	470pF
C442	2113743E20	0.1uF
C443	2113928N01	0.1uF
C444	2113743N50	100pF
C445	2113743L09	470pF
C446	2113743L09	470pF
C447	2113928N01	0.1uF
C448	2113928N01	0.1uF
C449	2113743N50	100pF
C450	NOT PLACED	
C451	2113743M08	22000pF
C452	2113743B29	1uF
C453	2113743N50	100pF
C456	2113743N50	100pF
C458	2113743N50	100pF
C459	2113743N50	100pF
C463	2113743N50	100pF
C466	2113743N50	100pF
C467	2113928N01	0.1uF
C471	2113743L09	470pF
C472	2113743L09	470pF
C473	2113743L09	470pF
C474	2113743L41	10000pF
C475	2113743H14	10uF
C476	2113928D08	10uF
C477	2113743L17	1000pF
C478	2113743L17	1000pF
C479	2113928N01	0.1uF
C480	2113928D08	10uF
C481	2113928N01	0.1uF
C482	2113928N01	0.1uF

Circuit Ref	Motorola Part No.	Description
C483	2113743L09	470pF
C484	2113743L09	470pF
C490	2113743L09	470pF
C491	2113743L09	470pF
C492	2113743L09	470pF
C493	2113743N50	100pF
C494	2113743N50	100pF
C495	2113743L09	470pF
C496	2113743L09	470pF
C497	2113743L09	470pF
C498	NOT PLACED	
C502	2311049A05	0.47uF
C503	2113743N50	100pF
C505	2113743N50	100pF
C511	2113743N50	100pF
C512	2113743N50	100pF
C513	2113743N50	100pF
C514	2113743N50	100pF
C520	2113743L41	10000pF
C521	2113743L41	10000pF
C522	2113743L41	10000pF
C523	2113743L41	10000pF
C535	2113743L17	1000pF
CR3201	4813825A19	Schottky Diode
CR3202	4802245J97	Band Switching Diode
CR3203	4802245J97	Band Switching Diode
CR3301	4802245J42	Ring Quad Diode
CR3302	4805129M96	Dual Diode
CR3303	4880154K03	Dual Diode
CR411	4802245J62	Schottkt Diode
CR412	4802245J62	Schottkt Diode
CR413	4802245J62	Schottkt Diode
CR440	4813833C02	Dual Diode
CR501	4880107R01	Rectifier
CR503	4805729G49	Red / Yellow LED
D3301	4802081B58	Dual Diode
D3302	4802081B58	Dual Diode
D3521	4880973Z02	Pin Diode

Circuit Ref	Motorola Part No.	Description
D3551	4880973Z02	Pin Diode
D3701	4802233J09	Triple Diode
D3702	4802233J09	Triple Diode
D3761	4862824C03	Varactor Diode
D3821	4805649Q13	Varactor Diode
D3831	4805649Q13	Varactor Diode
D3832	4862824C01	Varactor Diode
E400	2480640Z01	Ferrite Bead
E401	2480640Z01	Ferrite Bead
E402	2480640Z01	Ferrite Bead
E403	2480640Z01	Ferrite Bead
E404	2480640Z01	Ferrite Bead
E405	2480640Z01	Ferrite Bead
E406	2480640Z01	Ferrite Bead
E407	2480640Z01	Ferrite Bead
E408	2480640Z01	Ferrite Bead
E409	2480640Z01	Ferrite Bead
F501	6580542Z01	Fuse 3A
FL401	4870368G02	Real Time Clock Xtal Oscillator 38.4kHz (not placed in non-display radios)
H3501	2680499Z01	Heat Spreader
J3501	0985613Z01	RF Jack
J3502	0280519Z02	Antenna Nut
J400	0905505Y04	40-Pin Connector
J403	0905505Y02	20-Pin Connector
L3200	2413926K33	680nH
L3202	2413923A25	1200nH
L3203	2413926K33	680nH
L3270	2462587N68	1000nH
L3301	2462587T35	12nH
L3303	2462587T35	12nH
L3304	2462587T23	470nH
L3305	2462587T35	12nH
L3306	2462587T35	12nH
L3308	2462587T34	10nH
L3309	2462587N55	150nH
L3312	2462587V28	33nH
L3501	2413926H09	5.6nH

Circuit Ref	Motorola Part No.	Description
L3503	2462587V32	68nH
L3504	2462587N51	68nH
L3511	2462587N44	18nH
L3512	2479990B01	11.03nH
L3513	2479990A02	7.66nH
L3515	2479990C03	1385nH
L3518	NOT PLACED	
L3519	2484657R01	Ferrite Bead
L3521	2479990A02	7.66nH
L3522	2479990E01	23.75nH
L3523	2462587N68	1000nH
L3531	2479990N01	43.67nH
L3532	2479990N01	43.67nH
L3538	2479990M01	30.54nH
L3551	2479990N01	43.67nH
L3552	2479990A02	7.66nH
L3701	2462587Q42	390nH
L3731	2462587Q20	2200nH
L3801	2462587V34	100nH
L3809	2462587V27	27nH
L3811	2462587V34	100nH
L3812	2462587V34	100nH
L3813	2462587Q47	1000nH
L3816	2462587V34	100nH
L3821	2462587N50	56nH
L3822	2462587N49	47nH
L3823	2462587N49	47nH
L3824	2462587N68	1000nH
L3825	2462587V34	100nH
L3826	2462587N68	1000nH
L3831	2462587N50	56nH
L3832	2462587N51	68nH
L3833	2462587N50	56nH
L3834	2462587N68	1000nH
L400	2462587Q42	390nH
L401	2462587Q42	390nH
L410	2462587Q42	390nH
L411	2462587Q42	390nH

Circuit Ref	Motorola Part No.	Description
L505	2462587Q42	390nH
PB501	4086470Z01	Tactile Switch
PB502	4086470Z01	Tactile Switch
PB503	4086470Z01	Tactile Switch
PB504	4086470Z01	Tactile Switch
PB505	4086470Z01	Tactile Switch
Q3200	4802197J95	NPN Transistor
Q3270	4813824A10	NPN Transistor
Q3301	4880214G02	NPN Transistor
Q3302	4802197J95	NPN Transistor
Q3501	4813828A08	RF Power Amplifier
Q3561	4813824A17	PNP Transistor
Q3721	4809939C05	Dual NPN/PNP Transistor
Q3801	4802197J95	NPN Transistor
Q400	4809579E18	MOSFET P-chan Transistor
Q403	4813824A17	PNP Transistor
Q405	4802245J54	Dual NPN Transistor
Q410	4802245J54	Dual NPN Transistor
Q416	4809579E18	MOSFET P-chan Transistor (not placed in non-display radios)
Q417	4809939C05	Dual NPN/PNP Transistor
Q502	5180159R01	Dual NPN Transistor
Q505	4880214G02	NPN Transistor
R3200	0662057M72	820
R3201	0662057M69	620
R3202	0662057N09	27K
R3203	0662057N01	12K
R3204	0662057M90	4700
R3205	0662057N06	20K
R3206	0662057M73	910
R3207	0662057N01	12K
R3208	0662057N06	20K
R3209	0662057N13	39K
R3211	0662057N13	39K
R3212	0662057N06	20K
R3213	0662057N01	12K
R3214	0662057M34	22
R3215	0662057M01	0

Circuit Ref	Motorola Part No.	Description
R3220	NOT PLACED	
R3221	0662057M43	51
R3222	0662057M70	680
R3223	0662057V04	12K
R3224	0662057V02	10K
R3226	0662057M64	390
R3270	0662057M74	1000
R3271	NOT PLACED	
R3273	0662057N03	15K
R3274	0662057M80	1800
R3275	0662057M76	1200
R3276	0662057N23	100K
R3301	NOT PLACED	
R3303	0662057N23	100K
R3304	0662057N23	100K
R3305	0662057N18	62K
R3306	0662057M82	2200
R3307	0662057N11	33K
R3308	0662057M78	1500
R3309	0662057M95	7500
R3310	0662057M84	2700
R3311	NOT PLACED	
R3312	0662057M19	5.1
R3313	0662057M40	39
R3314	0662057M35	24
R3315	0662057M62	330
R3316	0662057M66	470
R3317	0662057N23	100K
R3318	0662057M66	470
R3319	NOT PLACED	
R3320	NOT PLACED	
R3321	0662057M43	51
R3322	NOT PLACED	
R3323	0662057M01	0
R3324	0662057M58	220
R3501	0662057M61	300
R3502	0662057M32	18
R3503	0662057M61	300

Circuit Ref	Motorola Part No.	Description
R3505	0662057M62	330
R3506	0662057B62	3.9
R3507	0662057B62	3.9
R3512	NOT PLACED	
R3513	NOT PLACED	
R3519	0680539Z01	0.1
R3541	0662057N13	39K
R3542	0662057M92	5600
R3543	0662057M50	100
R3544	0662057A25	100
R3545	0662057A25	100
R3546	0662057N01	12K
R3547	0662057N11	33K
R3548	0662057N07	22K
R3551	0662057M40	39
R3561	0662057N01	12K
R3562	0662057N11	33K
R3563	0662057N33	270K
R3564	0662057N35	330K
R3565	NOT PLACED	
R3566	NOT PLACED	
R3569	0662057M92	5600
R3570	0662057M98	10K
R3571	0662057A27	120
R3572	0662057A27	120
R3573	0662057A27	120
R370	NOT PLACED	
R3701	0662057M50	100
R3702	NOT PLACED	
R3703	0662057M54	150
R3704	0662057M54	150
R3705	0662057N11	33K
R371	0662057N23	100K
R372	0662057N28	160K
R3721	0662057M66	470
R3722	0662057M68	560
R3723	0662057M50	100
R3726	NOT PLACED	

Circuit Ref	Motorola Part No.	Description
R3727	0662057N23	100K
R373	NOT PLACED	
R374	0662057N23	100K
R3741	0662057M50	100
R375	NOT PLACED	
R3751	0662057N30	200K
R3752	0662057N29	180K
R376	0662057M01	0
R3761	0662057N15	47K
R3762	NOT PLACED	
R377	0662057N23	100K
R378	0662057N23	100K
R3801	NOT PLACED	
R3802	0662057M50	100
R3803	0662057M58	220
R3804	0662057M98	10K
R3805	0662057N08	24K
R3806	0662057M34	22
R3807	NOT PLACED	
R3808	0662057M26	10
R3811	0662057M50	100
R3812	NOT PLACED	
R3816	0662057M74	1000
R3817	0662057M01	0
R3818	NOT PLACED	
R3821	0662057M58	220
R3822	0662057M42	47
R3823	0662057N11	33K
R3824	0662057N07	22K
R3825	0662057M38	33
R3826	0662057M32	18
R3828	0662057M50	100
R3829	0662057M01	0
R3830	NOT PLACED	
R3831	0662057M98	10K
R3832	0662057N01	12K
R3833	0662057M58	220
R3834	0662057M42	47

Circuit Ref	Motorola Part No.	Description
R3835	0662057N15	47K
R3836	0662057M98	10K
R400	0662057N15	47K
R401	0662057M01	0
R402	NOT PLACED	
R403	NOT PLACED	
R405	0662057M01	0
R406	0662057N20	75K
R407	0662057N19	68K
R408	NOT PLACED	
R409	0662057M98	10K
R410	0662057N23	100K
R411	0662057M98	10K
R413	0662057M01	0
R414	0662057V34	180K
R415	0662057V26	91K
R416	0662057M98	10K
R418	0662057M01	0
R419	0662057M67	510 (not placed in non-display radios)
R420	0662057B46	10M (not placed in non-display radios)
R421	0662057M81	2000
R423	0662057N21	82K
R424	0662057N12	36K
R425	0662057N10	30K
R426	0662057N35	330K (not placed in non-display radios)
R427	0662057M84	2700
R428	0662057M10	2.2
R429	0662057N20	75K
R431	0662057N39	470K
R432	0662057N16	51K
R434	0662057M62	330
R435	0662057M81	2000
R436	0662057M01	0
R437	NOT PLACED	
R445	0662057N08	24K
R447	0662057N23	100K

Circuit Ref	Motorola Part No.	Description
R448	0662057M98	10K
R449	0662057N08	24K
R450	0683962T45	68
R451	0662057N03	15K
R452	0662057N23	100K
R453	NOT PLACED	
R454	NOT PLACED	
R455	NOT PLACED	
R456	0662057M01	0
R457	0662057M98	10K
R460	0662057M90	4700
R461	0662057M56	180 (not placed in non-display radios)
R462	0662057M98	10K (not placed in non-display radios)
R463	0662057M61	300
R471	0662057N06	20K
R472	0662057M93	6200
R473	0662057M26	10
R475	0662057M01	0
R476	0662057N35	330K
R477	0662057M74	1000
R478	0662057M98	10K
R481	0662057N08	24K
R492	0662057M01	0
R498	0662057M98	10K
R499	0662057M98	10K
R501	0662057M70	680
R502	0662057M56	180
R505	0662057M98	10K
R506	0662057N15	47K
RT3301	NOT PLACED	
RT400	0680590Z01	Thermistor_33K
S501	4080710Z01	Frequency Switch (For non-display radios only)
S501	4080710Z02	Frequency Switch (For display radios only)
S502	1880619Z02	Volume / On-off Switch
SH3202	2686539Z01	IFIC Shield

Circuit Ref	Motorola Part No.	Description
SH3203	2686527Z01	Crystal Filter Shield
SH3301	2686081B01	Receiver Back-End Bottom Shield
SH3302	2686081B05	Mixer Diode Shield
SH3303	2686081B06	Receiver Front-End Shield
SH3501	2686081B03	Harmonic Filter Shield
SH3502	2686081B04	PA Shield
SH3701	2680511Z01	Synthesizer Top Shield
SH3702	2680511Z01	Synthesizer Bottom Shield
SH3801	2680513Z01	VCO Top Shield
SH3802	2680514Z01	VCO Buffer IC Shield
SH400	2680505Z01	Controller Memory Shield
SH401	2680506Z01	Controller On-off Shield
SH402	2680515Z01	Microprocessor Shield
SH403	2680516Z01	Asfic_Cmp, Audio PA Shield
T3301	2580541Z02	Balun Transformer
T3302	2580541Z02	Balun Transformer
U303	5113818A01	IC Sing Supply
U3201	5102463J58	3.3V Regulator
U3220	5186144B01	IF IC
U3221	5109522E10	Inverter IC
U3501	5185130C65	ASFIC CMP IC
U3502	5185765B26	LDMOS Driver IC
U3503	5185963A15	PCIC
U3701	5185963A27	Temperature Sensor
U3711	5105739X05	5V Regulator
U3801	5105750U54	VCO Buffer IC
U400	5102463J40	3.3V Regulator
U404	5185130C53	LV FRAC-N IC
U405	5102463J36	Static RAM 32K X 8
U406	*5102463J60	Flash ROM 512K X 8
U407	*5102495J05	EEPROM 16K X 8
U409	5102226J56	Microprocessor IC
U410	5102463J57	3.3V Regulator (not placed in non-display radios)
U420	5102463J44	Audio PA
VR3501	4880140L17	Zener Diode
VR432	4805656W08	Zener Diode
VR433	4805656W08	Zener Diode

Circuit Ref	Motorola Part No.	Description
VR434	4802245J73	Zener Diode 6.8V
VR439	4880140L17	Zener Diode
VR440	NOT PLACED	
VR441	NOT PLACED	
VR442	NOT PLACED	
VR444	NOT PLACED	
VR447	4802245J74	Zener Diode 10V
VR448	4802245J74	Zener Diode 10V
VR449	4802245J74	Zener Diode 10V
VR450	4802245J75	Zener Diode 12V
VR460	4802245J73	Zener Diode 6.8V
VR501	4802245J73	Zener Diode 6.8V
VR506	4802245J73	Zener Diode 6.8V
Y3200	9180022M11	44.85MHZ Crystal Filter
Y3201	4802245J84	44.395MHz Crystal Oscillator
Y3202	9186145B02	455KHZ Discriminator
Y3203	9180469V05	455KHz 6-Pole Ceramic Filter
Y3204	9180469V03	455KHz 6-Pole Ceramic Filter
Y3205	9180468V05	455KHz 4-Pole Ceramic Filter
Y3761	4805875Z04	16.8 MHz Crystal Oscillator
	8486473Z04	VHF PC Board

* Motorola Depot Servicing only

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

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MOTOROLA

Professional Radio
GP Series

Lowband (29.7-42MHz and 35-50MHz)
Service Information

Issue: November 2004

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Table of Contents

Chapter 1

MODEL CHART AND TECHNICAL SPECIFICATIONS

1.0 GP340 / GP380 Model Chart

Professional GP300 Series (LB)						
Model						Description
MDH25BEC9AN3_E						GP340 LB1 29.7-42 MHz 6W 16-Ch
	MDH25BEH9AN6_E					GP380 LB1 29.7-42 MHz 6W 255-Ch
		MDH25CEC9AN3_E				GP340 LB2 35-50 MHz 6W 16-Ch
			MDH25CEH9AN6_E			GP380 LB2 35-50 MHz 6W 255-Ch
					Item	Description
X					PMLB4006_	GP340 LB1 Back Cover Kit
	X				PMLB4016_	GP380 LB1 Back Cover Kit
		X			PMLB4012_	GP340 LB2 Back Cover Kit
			X		PMLB4017_	GP380 LB2 Back Cover Kit
X		X			6864110B13	GP340 Basic User Guide
	X		X		6864110B18	GP380 Basic User Guide
X	X	X	X		NAB6064_	Low/Mid Band (29-50MHz) Heliflex, Trimmable Antenna
X	X	X	X		HNN9008_	Battery, NiMH Standard

x = Indicates one of each is required.

2.0 Technical Specifications

Data is specified for +25°C unless otherwise stated.

General Specifications		
Channel Capacity **GP340** **GP380**	 16 255	
Power Supply	Rechargeable battery 7.5v	
Dimensions: H x W x D (mm) With standard high capacity NiMH battery With ultra high capacity NiMH battery With NiCD battery With Lilon battery	Height excluding knobs 137 x 57.5 x 37.5 137 x 57.5 x 40.0 137 x 57.5 x 40.0 137 x 57.5 x 33.0	
Weight: (gm) With Standard high capacity NiMH battery With Ultra high capacity NiMH battery With NiCD battery With Lilon battery	**GP340** 420 500 450 350	**GP380** 428 508 458 358
Average Battery Life @5/5/90 Cycle: With Standard high capacity NiMH battery With Ultra high capacity NiMH battery With NiCD battery With Lilon battery	Low Power 11 hours 14 hours 12 hours 11 hours	High Power 8 hours 11 hours 9 hours 8 hours
Sealing:	Withstands rain testing per MIL STD 810 C/D /E and IP54	
Shock and Vibration:	Protection provided via impact resistant housing exceeding MIL STD 810-C/D /E and TIA/EIA 603	
Dust and Humidity:	Protection provided via environment resistant housing exceeding MIL STD 810 C/D /E and TIA/EIA 603	

Transmitter	LB
*Frequencies - Full Bandsplit	LB1 29.7-42 MHz LB2 35-50 MHz
Channel Spacing	12.5/20/25 kHz
Frequency Stability (-25°C to +55°C, +25° Ref.)	±10ppm
Power	1-6W
Modulation Limiting	±2.5 @ 12.5 kHz ±4.0 @ 20 kHz ±5.0 @ 25 kHz
FM Hum & Noise	-40 dB typical
Conducted/Radiated Emission	-36 dBm <1 GHz -30 dBm >1 GHz
Adjacent Channel Power	-60 dB @ 12.5 kHz -70 dB @ 25 kHz
Audio Response (300 - 3000 Hz)	+1 to -3 dB
Audio Distortion	<3% typical

Receiver	LB
*Frequencies - Full Bandsplit	LB1 29.7-42 MHz LB2 35-50 MHz
Channel Spacing	12.5/20/25 kHz
Sensitivity (12 dB SINAD) EIA Sensitivity (20 dB SINAD) ETS	0.25 µV typical 0.50 µV typical
Intermodulation EIA	65 dB
Adjacent Channel Selectivity	60 dB @ 12.5 kHz 70 dB @ 25 kHz
Spurious Rejection	>70 dB
Rated Audio	0.5W
Audio Distortion @ Rated Audio	<3% typical
Hum & Noise	-45 dB @ 12.5 kHz -50 dB @ 20/25 kHz
Audio Response (300 - 3000 Hz)	+1 to -3 dB
Conducted Spurious Emission	-57 dBm <1 GHz -47 dBm >1 GHz ETS 300 086

*Availability subject to the laws and regulations of individual countries.

Chapter 2

THEORY OF OPERATION

1.0 Introduction

This chapter provides a detailed theory of operation for the radio RF circuits. Refer to the relevant section of this manual for details of the operation of the Controller Circuits.

2.0 Lowband Transmitter

(*Refer to Figure 2-1 and the Lowband Transmitter schematic diagram*)

The Lowband transmitter consists of the following basic circuits :

- Power amplifier (PA).
- Antenna switch/harmonic filter.
- Antenna matching network.
- Power Control Integrated Circuit (PCIC).

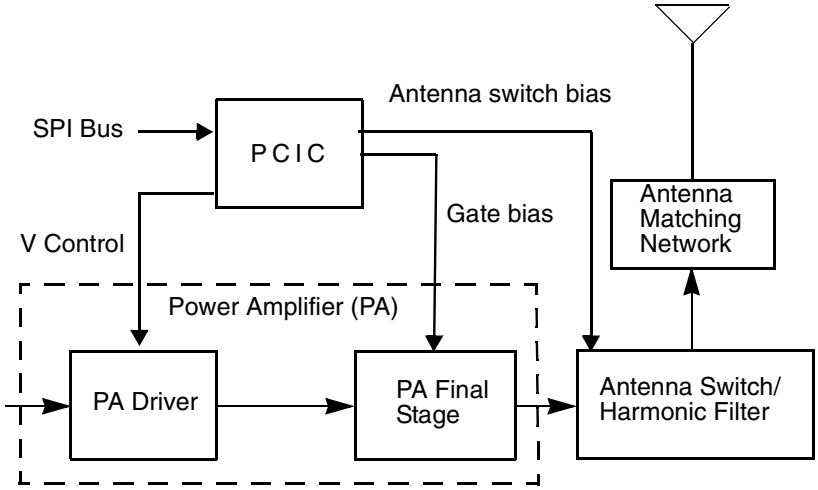


Figure 2-1 Lowband Transmitter Block Diagram.

2.1 Power Amplifier (PA)

The power amplifier (PA) consists of two LDMOS devices:

1. PA driver IC, U101.
2. PA final stage, Q100.

The LDMOS driver (U101) provides 2-stage amplification using a supply voltage of 7.3V. The amplifier is capable of supplying an output power of 0.3W (pins 6 and 7) with an input signal of 2mW at (pin16). The current drain is typically 120mA while operating in the frequency range of 29.7 - 50 MHz. The power output of this stage is varied by the power control loop which controls the voltage on pin 1.

The LDMOS PA is capable of supplying an output power of 8W with an input signal of 0.3W. The current drain is typically 2000 mA while operating in the frequency range of 29.7 - 50 MHz. The final stage gate is bias by a voltage from PCIC pin 24. This voltage is the output of a programmable DAC inside the PCIC and the output is adjustable with the radio tuner.

2.2 Antenna Switch

The antenna switch circuit consists of two pin diodes (D100 and D101), a RF network (C147 and L103), and a DC feed network (L104, C144 and current limiting resistor R101). In the transmit mode, PCIC (U102) pin 32 goes high supplying current via the feed network to bias the diodes “on”. The shunt diode (D101) shorts out the receiver port and L103 is connected from the RF path to ground. L103 and the input capacitance of the lowpass filter form a parallel resonant circuit, effectively disconnecting the receiver port from the antenna while not loading the transmit path. In the receive mode, pin 32 goes low and the diodes are off. D100 looks like a high impedance disconnecting the transmitter from the antenna while L103 and C147 form a series resonant circuit to connect the receiver to the antenna.

2.3 Harmonic Filter

The harmonic filter consists of components C103, C106, C107, C110, C111, C114, C115 and inductors L100, L101 and L102, which are a part of the SH100 assembly. The harmonic filter for lowband is pole zero design which gives greater attenuation in low frequencies where the harmonic energy of the transmitter is the greatest and less attenuation in high frequencies where there is less harmonic energy. The harmonic filter insertion loss is typically less than 0.8 dB.

2.4 Antenna Matching Network

The antenna matching network (T100) matches the antenna impedance with the harmonic filter to optimize the performance of the transmitter and receiver.

2.5 Power Control Integrated Circuit (PCIC)

The transmitter uses the PCIC (U102) to regulate the power output of the radio. To accomplish this, the voltage across R102 is sensed. This voltage drop is directly proportional to the current drawn in the final stage of the transmitter. This voltage is compared to a programmable reference inside the PCIC and the voltage on PCIC pin 4 adjusted. Pin 4 connects to the PA driver IC (U101) pin 1 via resistor R100 and varies RF output power of the driver. This controls the current drain of the final stage and sets the output power.

2.6 Temperature Cut Back Circuit

Temperature sensor VR101 and associated components are part of a temperature cut back circuit. This circuit senses the printed circuit board temperature around the transmitter circuits and outputs a DC voltage to the PCIC. If the DC voltage produced exceeds the set threshold of the PCIC, the transmitter output power decreases to reduce the transmitter temperature.

3.0 Lowband Receiver

(*Refer to Figure 2-2 and the Receiver Front End and Receiver Back End schematic diagrams)*

The Lowband receiver consists of a front end, back end, and automatic gain control circuits. Detailed descriptions of these stages are contained in the paragraphs that follow.

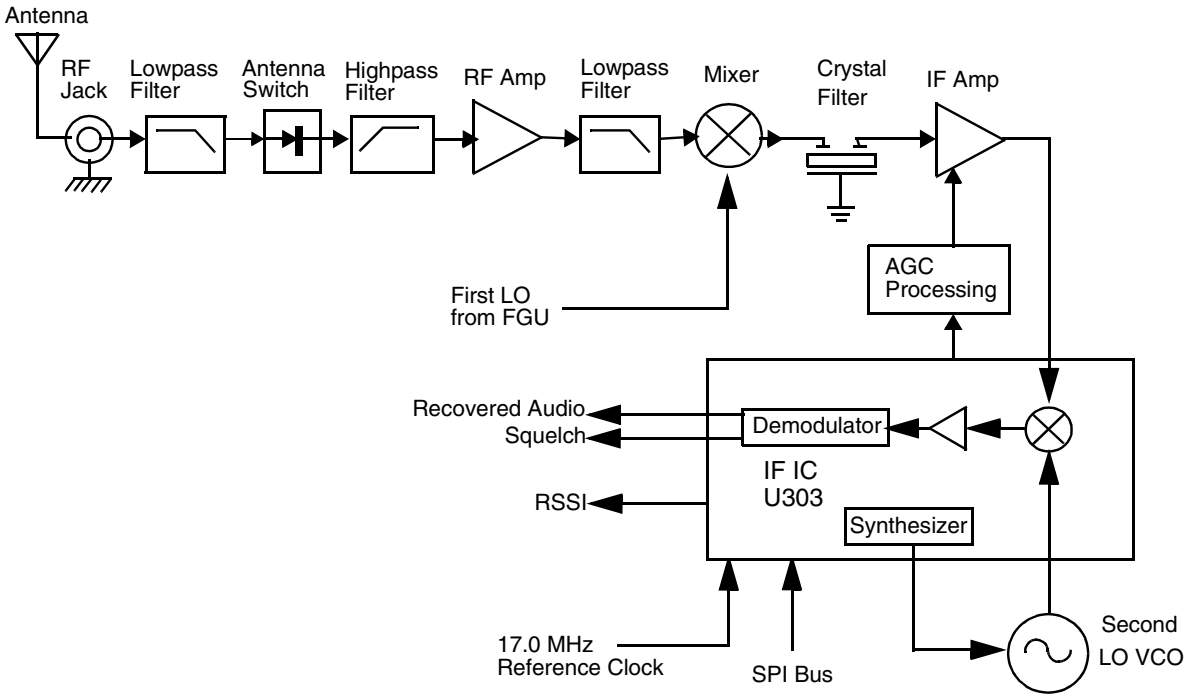


Figure 2-2 Lowband Receiver Block Diagram.

3.1 Receiver Front-End

(*Refer to the Receiver Front End, Receiver Back end and Transmitter schematic diagrams*)

The RF signal received by the antenna is routed through the transmitter lowpass filter and antenna switch. These circuits are described in the transmitter section.The signal next passes through a highpass filter consisting of L501, L502, C538, C533 and C504. This filter serves to reject below band signals and has a 3 dB corner frequency of 27 MHz.

The output of the highpass filter is connected to an RF amp consisting of Q509 and associated biasing components. This is a BJT amplifier powered off 5 volts and has 13 dB of gain. The amplifier drives a lowpass filter consisting of L503, L504, L507, C534, C535, C536, C537 and C515. This filter is a pole zero design that filters off harmonic components from the RF amp. The 3 dB corner of this filter is at 56 MHz.

The output of the lowpass filter is connected to the passive double balanced mixer consisting of components T501, T502 and D501. After mixing with the first local oscillator up-converted to a 109.65 MHz IF signal.

The IF signal coming out of the mixer is transferred to the crystal filter (FL301) through a resistor pad (R507, R508 and R509) and a diplexer (C516 and L508). Matching to the input of the crystal filter is provided by L301, L302, C301 and C302. The 3 pole crystal filter provides the necessary selectivity and intermodulation protection.

3.2 Receiver Back-End

(*Refer to the Receiver Back End schematic diagram*)

The output of crystal filter FL301 is connected to the input of IF amplifier transistor U301. Components L303 and C348 and R301 form the termination for the crystal filter and the signal is coupled to one gate of U301 by C303. The IF amplifier is a dual gate MOSFET powered off of the 5 volt supply. The first gate receives the IF signal as indicated previously. The second gate receives a DC voltage from U302 which serves as an AGC control signal. This signal reduces the gain of the IF amplifier to prevent overload of the IF IC, U303. The gain can be varied from a maximum of 13 dB to an attenuation of 55 dB. The output IF signal from U301 is coupled into U303 (pin 3) via C306, R304 and L304 which provides matching for the IF amplifier and U303.

The IF signal applied to pin 3 of U303 is amplified, down-converted, filtered, and demodulated, to produce recovered audio at pin 27 of U303. This IF IC is electronically programmable, and the amount of filtering, which is dependent on the radio channel spacing, is controlled by the microprocessor. Additional filtering, once externally provided by the conventional ceramic filters, is replaced by internal filters in IF IC U303.

The IF IC uses a type of direct conversion process, whereby the externally generated second LO frequency is divided by two in U303 so that it is very close to the first IF frequency. The IF IC (U303) synthesizes the second LO and phase-locks the VCO to track the first IF frequency. The second LO is designed to oscillate at twice the first IF frequency because of the divide-by-two function in the IF IC.

In the absence of an IF signal, the VCO searches for a frequency, or its frequency will vary close to twice the IF frequency. When an IF signal is received, the VCO locks onto the IF signal. The second LO/VCO is a Colpitts oscillator built around transistor Q301. The VCO has a varactor diode, CR301, to adjust the VCO frequency. The control signal for the varactor is derived from a loop filter consisting of components C308, C309, and R310.

The IF IC (U303) also performs several other functions. It provides a received signal-strength indicator (RSSI) and a squelch output. The RSSI voltage is also used to control the automatic gain control (AGC) circuit at the back end.

The demodulated signal on pin 27 of U303 is also used for squelch control. The signal is routed to U404 (ASFIC) where squelch signal shaping and detection takes place. The demodulated audio signal is also routed to U404 for processing before going to the audio amplifier for amplification.

3.3 Automatic Gain Control (AGC)

(Refer to the Receiver Front End and Receiver Back End schematic diagrams)

The automatic gain control circuit provides automatic reduction of gain to prevent overloading of backend circuits. This is achieved by lowering the voltage on one gate of U301 which will reduce the drain current in that part and lower its gain.

The Radio Signal Strength Indicator (RSS I) voltage signal for the IF IC (U303) is used to drive the AGC processing circuitry consisting of R306, R307, R308, R309, C307 and U302. As the received signal gets stronger, the RSSI line will rise. When the RSSI line passes a certain threshold, the voltage at the output of U302 will begin to drop. This voltage is connected to one gate of IF amplifier U301 through resistor R305. As this voltage decreases, it will lower the drain current in U301 and reduce the gain of the stage. This will limit the power incident on the IF IC, U303.

4.0 Frequency Generation Circuit

(*Refer to Figure 2-3, the Synthesizer and Voltage controlled Oscillator schematic diagrams*)

The frequency generation circuit is composed of Low Voltage Fractional-N synthesizer U205 and discrete RX VCO, TX VCO and buffers as well other supporting circuitry. The synthesizer block diagram illustrates the interconnect and support circuitry used in the region. Refer to the schematic for the reference designators.

The synthesizer is powered by regulated 5V and 3.3V. The 5 volt signal to the synthesizer as well as the rest of the radio is provided by U204. The 3.3 v signal is provided from U200 in the controller. The 5V signal goes to pins 13 and 30 while the 3.3V signal goes to pins 5, 20, 34 and 36 of U201. The synthesizer in turn generates a superfiltered 4.3V which powers the VCOs and buffers.

In addition to the VCO, the synthesizer also interfaces with the logic and ASFIC circuitry. Programming for the synthesizer is accomplished through the data, clock and chip select lines (pins 7, 8 and 9) from the microprocessor, U409. A 3.3V dc signal from pin 4 indicates to the microprocessor that the synthesizer is locked.

Transmit modulation from the ASFIC is supplied to pin 10 of U205. Internally the audio is digitized by the Fractional-N and applied to the loop divider to provide the low-port modulation. The audio runs through an internal attenuator for modulation balancing purposes before going out at pin 41 to the VCO.

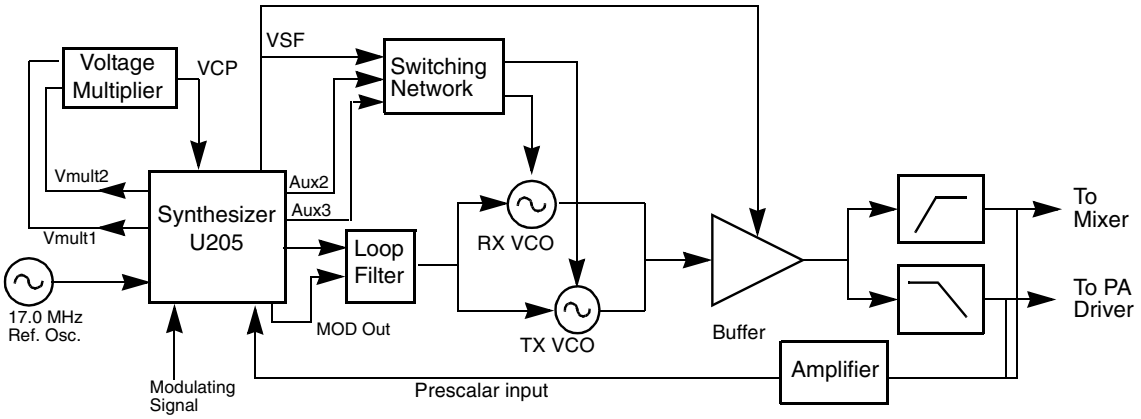


Figure 2-3 Lowband Frequency Generation Unit Block Diagram

4.1 Synthesizer

(Refer to Figure 2-4 and the Synthesizer schematic diagram)

The Fractional-N synthesizer, shown in Figure 2-4, uses a 17.0 MHz crystal (Y201) to provide a reference for the system. Along with being used in the LVFracN, the 17.0 MHz signal is provided at pin 19 of U205 for use by the ASFIC and LVZIF.

The LVFractN IC (U205) further divides this by 8 internally to give 2.125 MHz to be used as the reference frequency in the frequency synthesis. While UHF and VHF can use other references, (divide by 7 or divide by 7/8), only the divide by 8 function is valid for lowband.

The internal oscillator device in the LVFracN together with C236, C237, C242, R219, CR211 and Y201 comprise the reference oscillator. This oscillator is temperature compensated is capable of 2.5 ppm stability over temperatures of -30 to 85°C. There is temperature compensation information that is unique to each crystal contained on Y201 that is programmed into the radio when built.

The loop filter consists of components C256, C257, C259, R224, R225 and R228. This circuit provides the necessary dc steering voltage for the VCO and determines the amount of noise and spur passing through.

To achieve fast locking for the synthesizer, an internal adapt charge pump provides higher current at pin 45 of U205 to put the synthesizer within lock range. The required frequency is then locked by normal mode charge pump at pin 43.

Both the normal and adapt charge pumps get their supply from the inductive voltage multiplier made up of C247, C249, C283-C286, D210, D211, R285 and R286.
This circuit provides 13.3V at U205, pin 47.

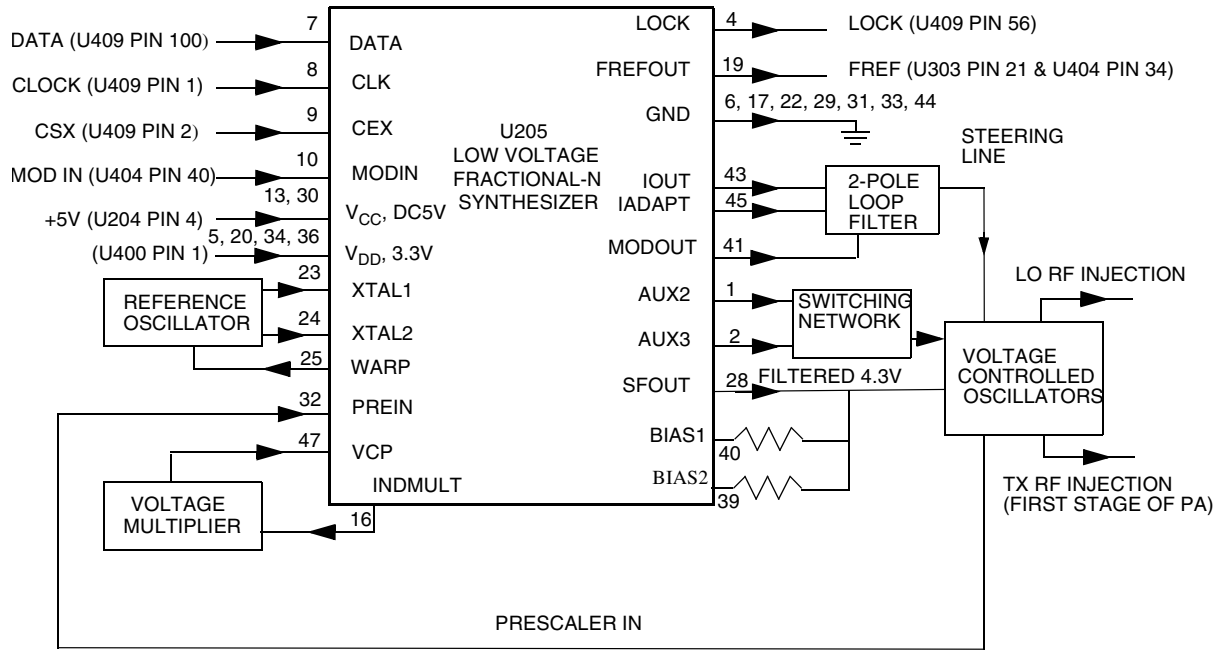


Figure 2-4 Lowband Synthesizer Block Diagram.

4.2 Voltage Controlled Oscillator (VCO)

(*Refer to the Voltage Controlled Oscillator schematic diagram*)

4.2.1 Receive VCO

The receive VCO is a Colpitts type design and using two active devices in parallel, Q202 and Q204. The oscillator is powered off of the 4.3 volt super filter supply when the AUX3 line goes low. The oscillator operates from 139 to 152 MHz for range 1 and 145 to 160 MHz for range 2. The frequency is tuned by varactor diodes CR201 and CR202.

4.2.2 Transmit VCO

The transmit VCO is a Hartley type design with active devices Q203. The oscillator is powered off of the 4.3 volt super filter supply when the AUX2 line goes low. The oscillator operates from 29.7 to 42 MHz for Range 1 and 35 to 50 MHz for Range 2. The frequency is tuned by varactor diodes in U203. Note that the values of the inductive tap, L208 and L209, and the capacitor C215 which couples the varactor to the oscillator tank vary between the ranges.

4.2.3 Buffer

Both the receive and transmit VCO are fed to a buffer amplifier Q201. This is a BJT amplifier that boosts the signal levels to +4 dBm and provides reverse isolation to the oscillators. The amplifier is powered off the 4.3 volt super filter supply and the feed network is combined with the transmit filter.

4.2.4 Diplexer and Output Filters

The output of the buffer drives a pair of parallel filters. One filter is a lowpass filter in the TX path that passes 29.7 - 50 MHz signals for the transmitter into the power amplifier while rejecting the receive LO injection signals at 139 - 160 MHz. This filter is comprised of L204, L211, L212, C230 and C231.

The other filter is a highpass filter which passes 139 - 160 MHz signals for the receive LO into the mixer while rejecting the transmit injection signals at 29.7 -50 MHz. This filter is comprised of C228,C229,C235 and L215.

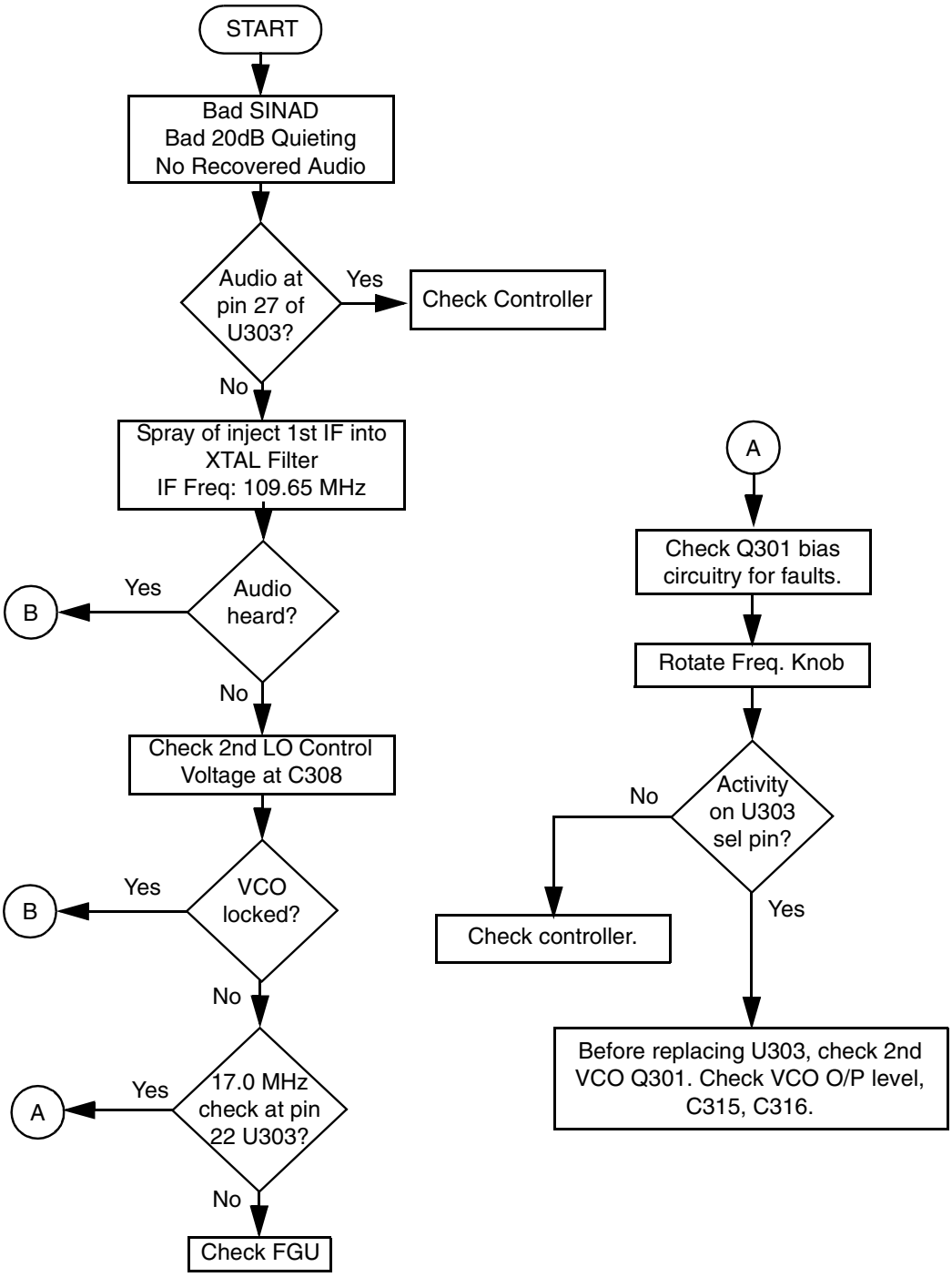
4.2.5 Prescaler Feedback

The prescaler input signal for receive and transmit is tapped off the outputs of each filter by resistors R234 and R238. This signal is routed to the buffer amplifier consisting of components C287, Q288, R287, R288 and R289. The output of this buffer feeds U205 pin 32. After frequency comparison in the synthesizer, current is transferred in the loop filter and a control voltage is generated at the output of the loop filter to adjust the frequency of the VCO. This voltage is a DC voltage between 3.5V and 9.5V when the PLL is locked on frequency.

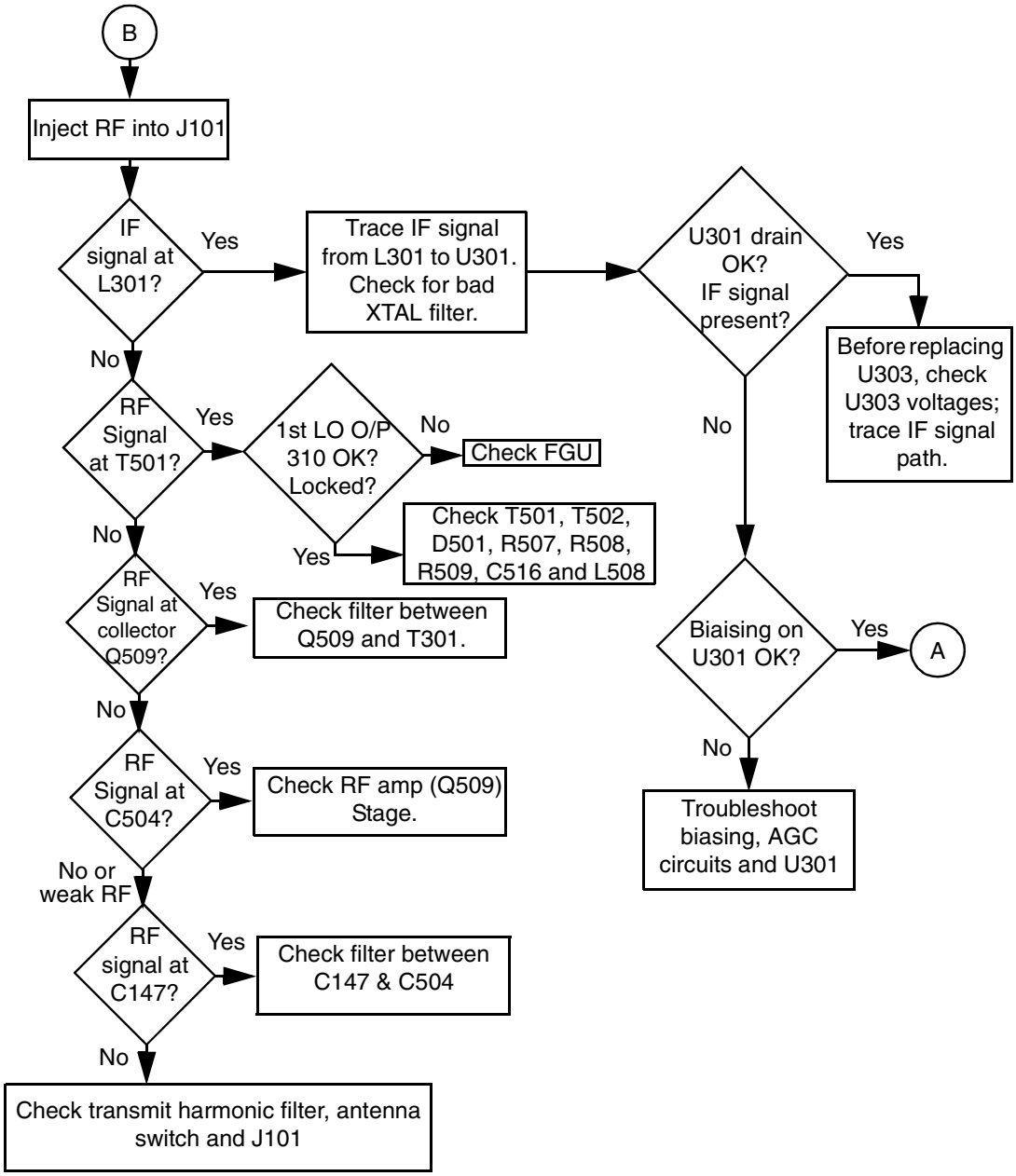
Chapter 3

TROUBLESHOOTING CHARTS

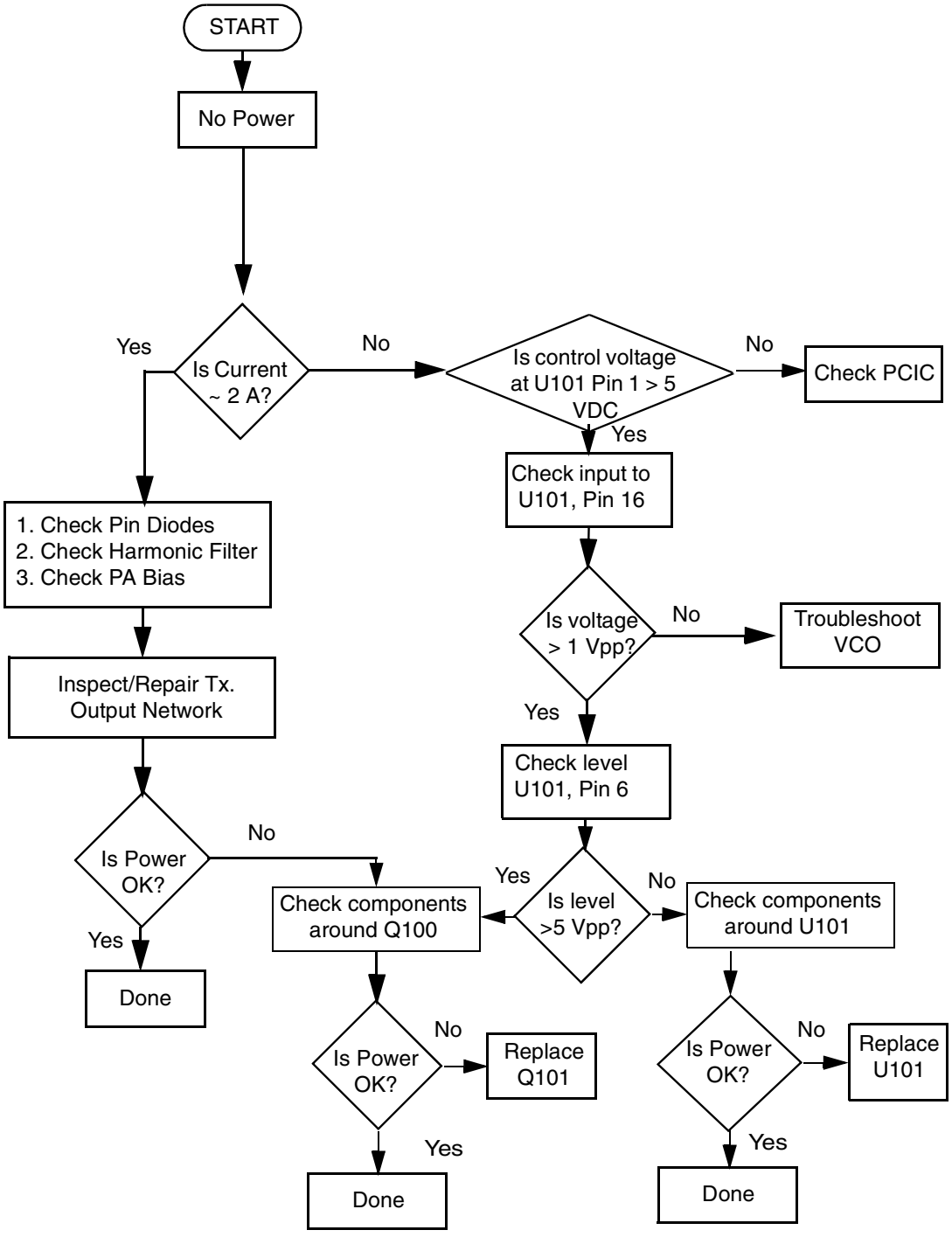
1.0 Receiver (Sheet 1 of 2)



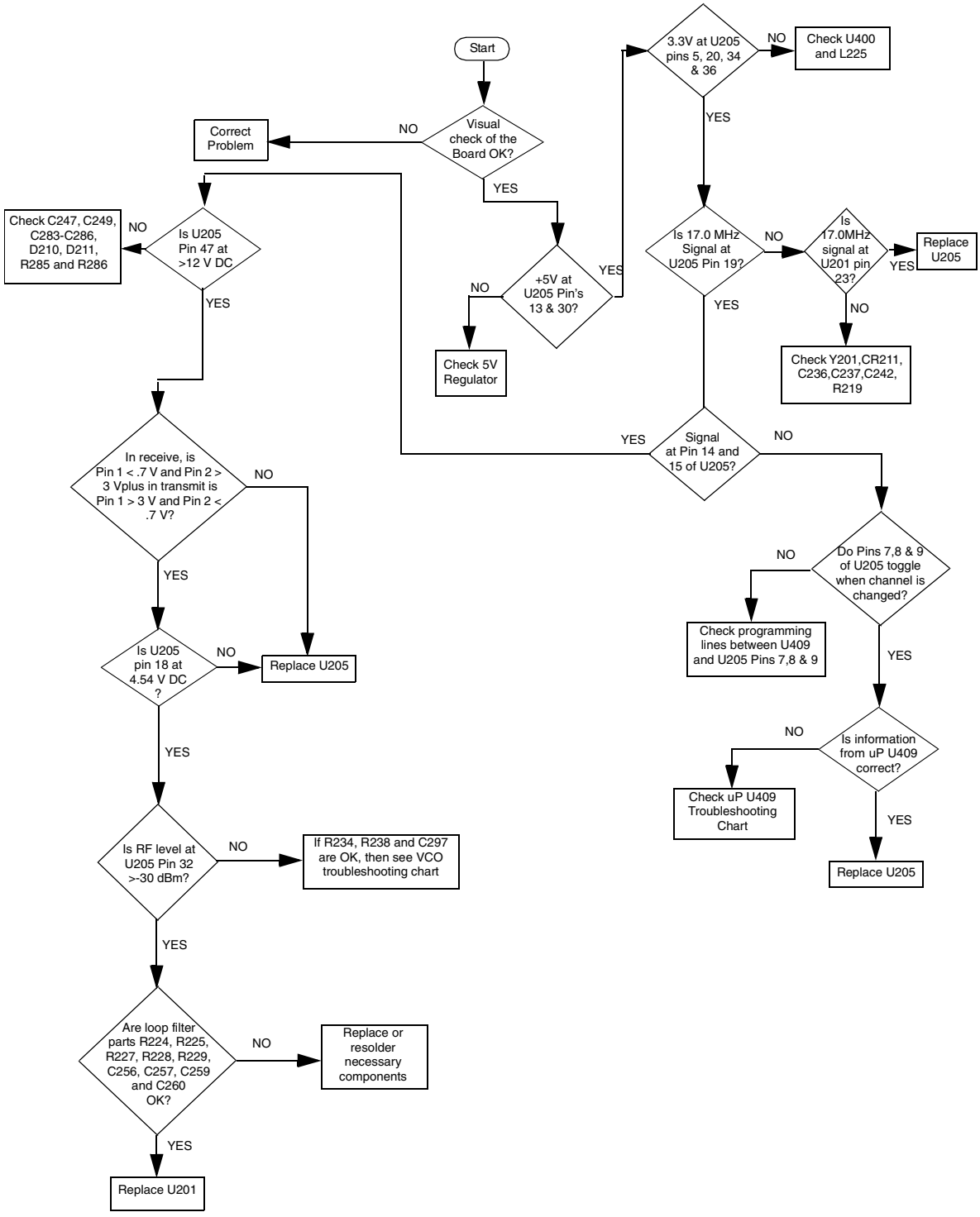
2.0 Receiver (Sheet 2 of 2)



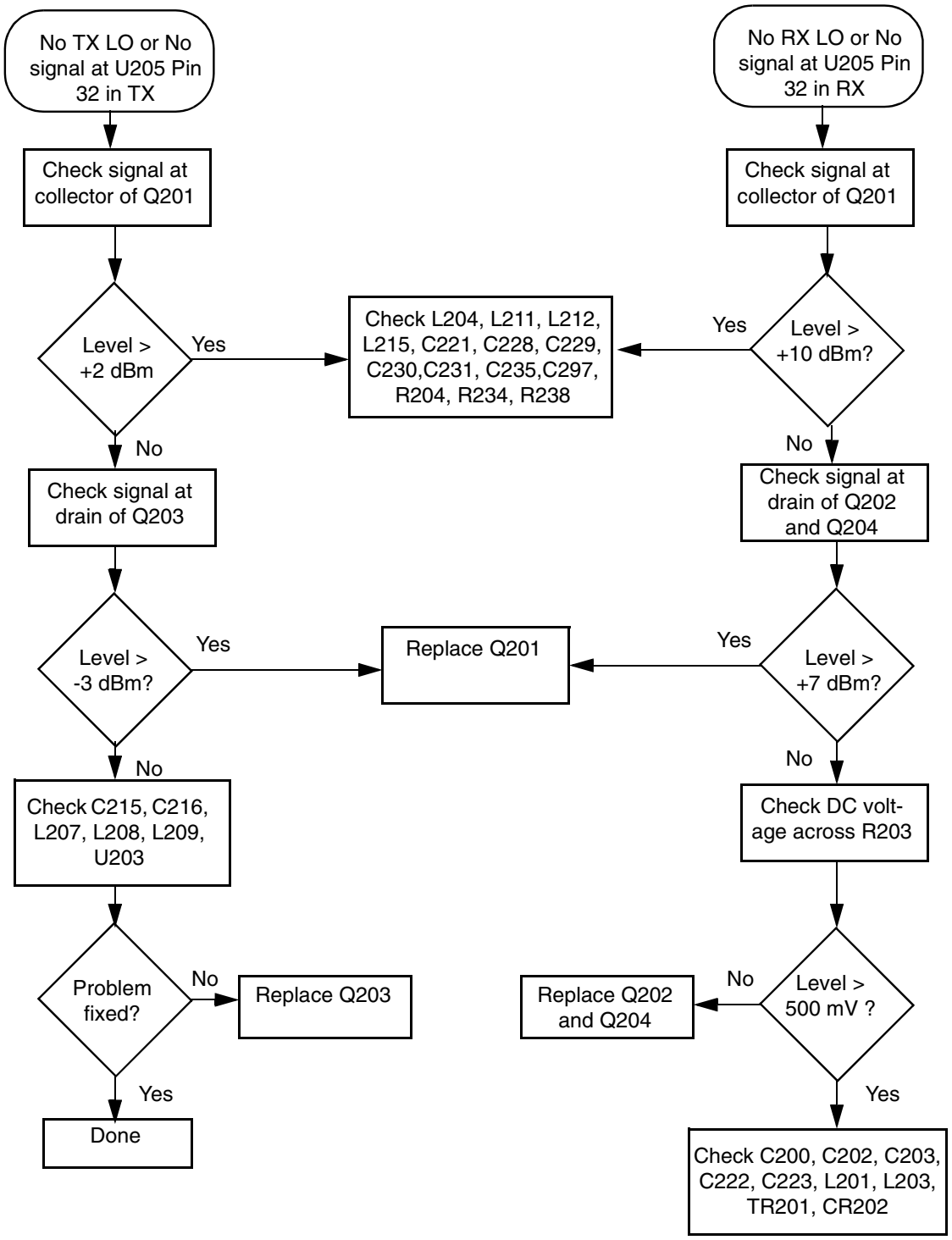
3.0 Transmitter



4.0 Synthesizer



5.0 Voltage Controlled Oscillator



Chapter 4

LOWBAND PCB/SCHEMATICS/PARTS LIST

1.0 Allocation of Schematics and Circuit Boards

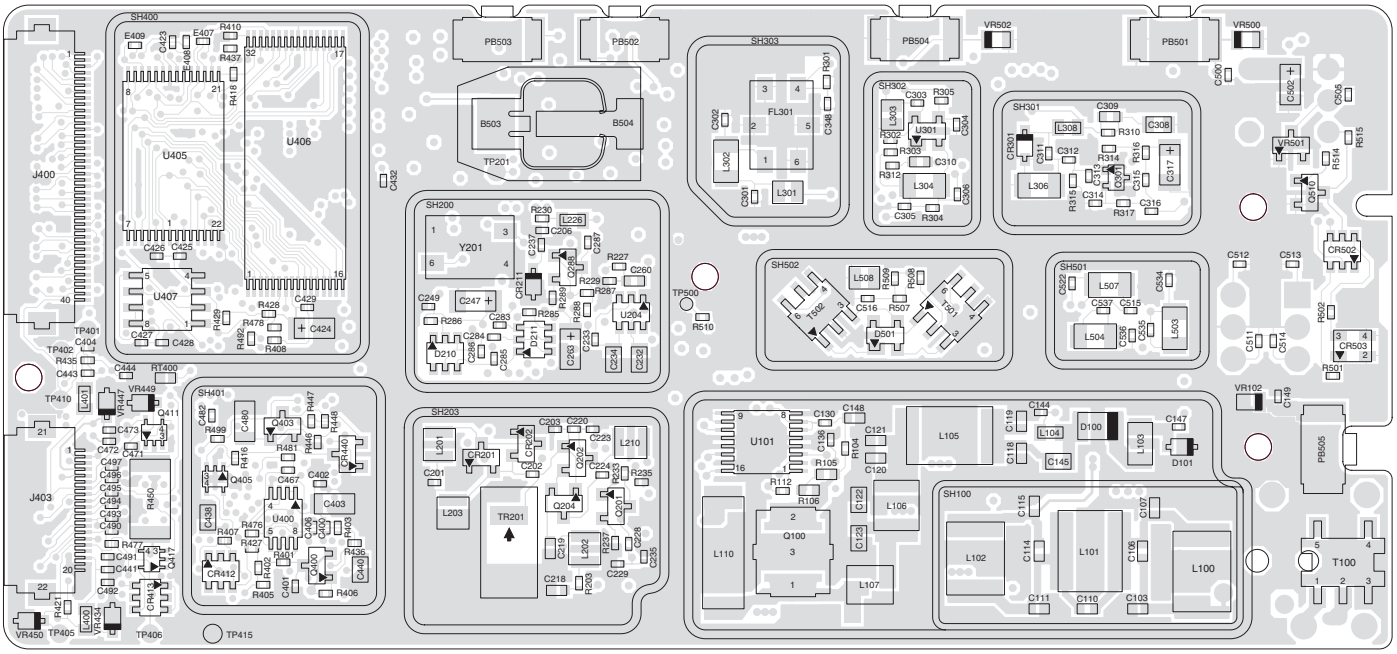
1.1 Controller Circuits

The Lowband circuits are contained on the printed circuit board (PCB) which also contains the Controller circuits. This chapter shows the schematics for the Lowband circuits only, refer to the Controller section for details of the related Controller circuits. The PCB component layouts and the Parts Lists in this chapter show both the Controller and Lowband circuit components. The Lowband schematics and the related PCB and parts list are shown in the Table below.

Table 4-1 Lowband Diagrams and Parts

2.0 Lowband PCB 8485658Z03 / Schematics

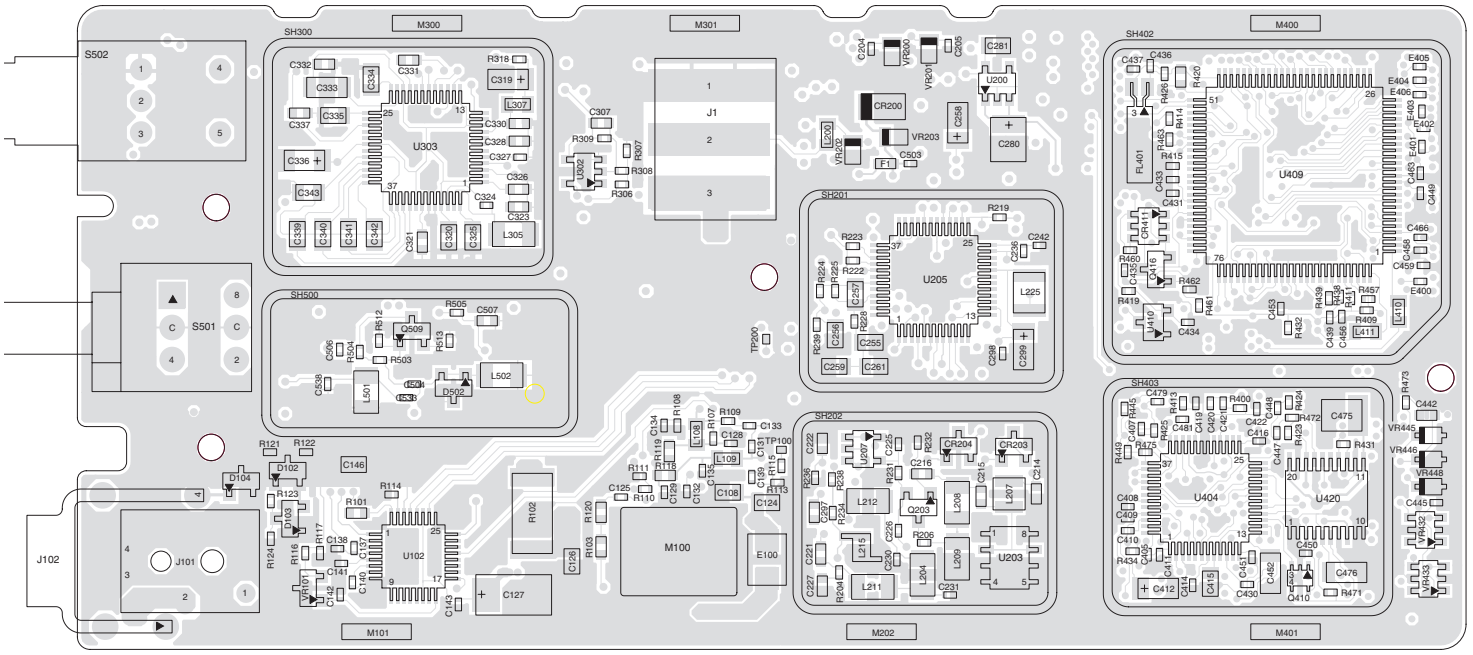
VIEWED FROM SIDE 1



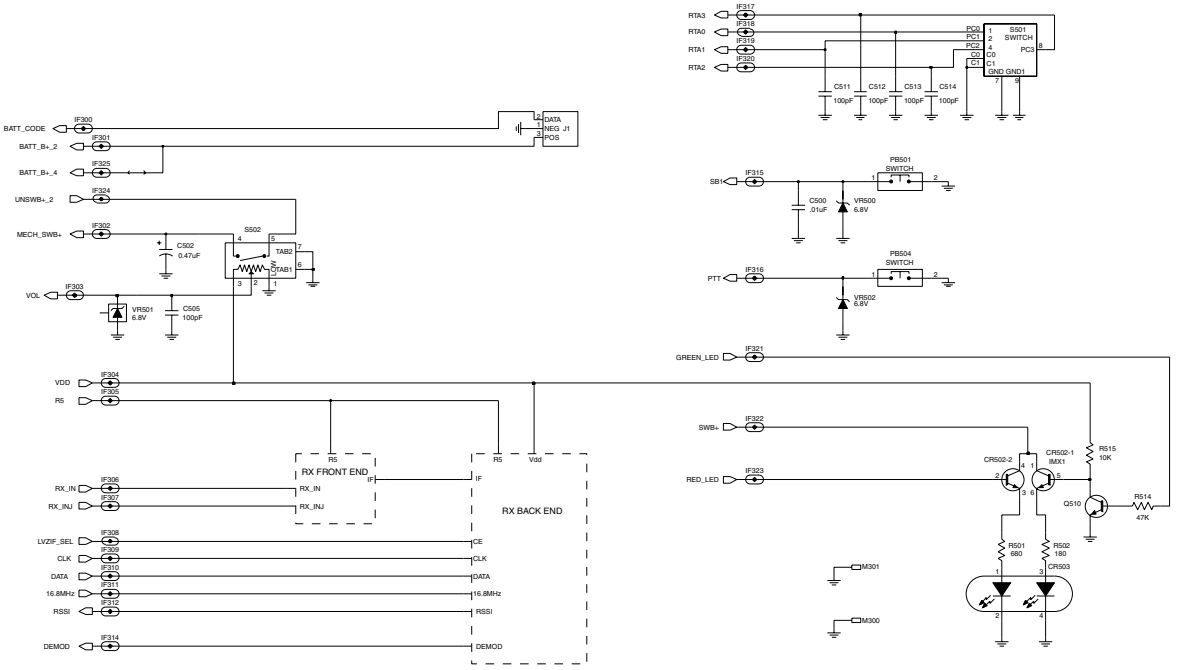
FL0830829-O

Lowband (30-50 MHz) Main Board Top Side

VIEWED FROM SIDE 2

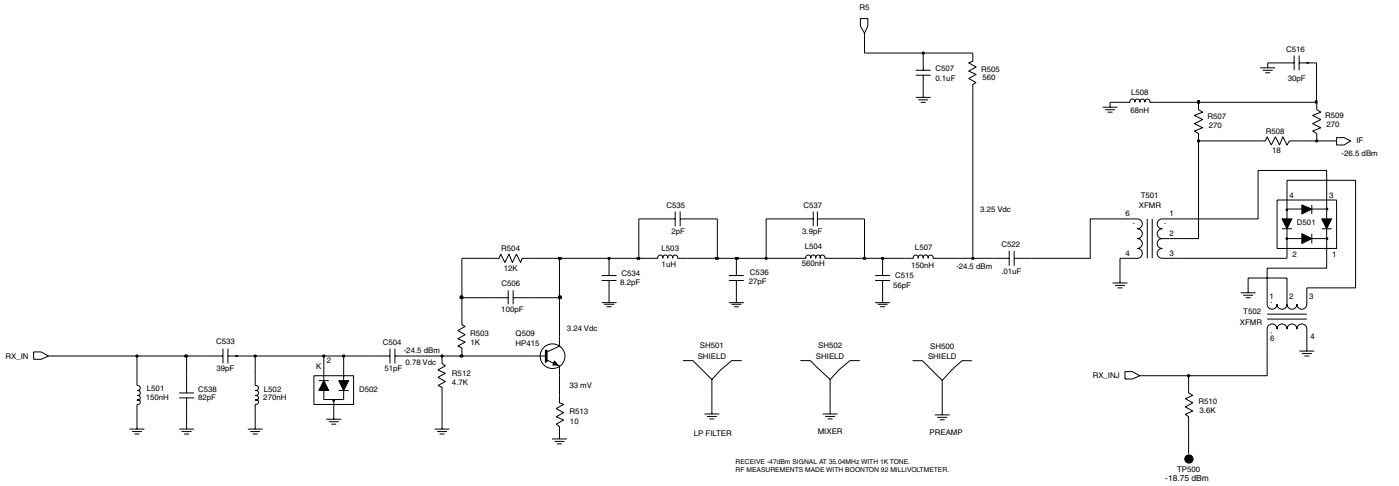


Lowband (30-50 MHz) Main Board Bottom Side



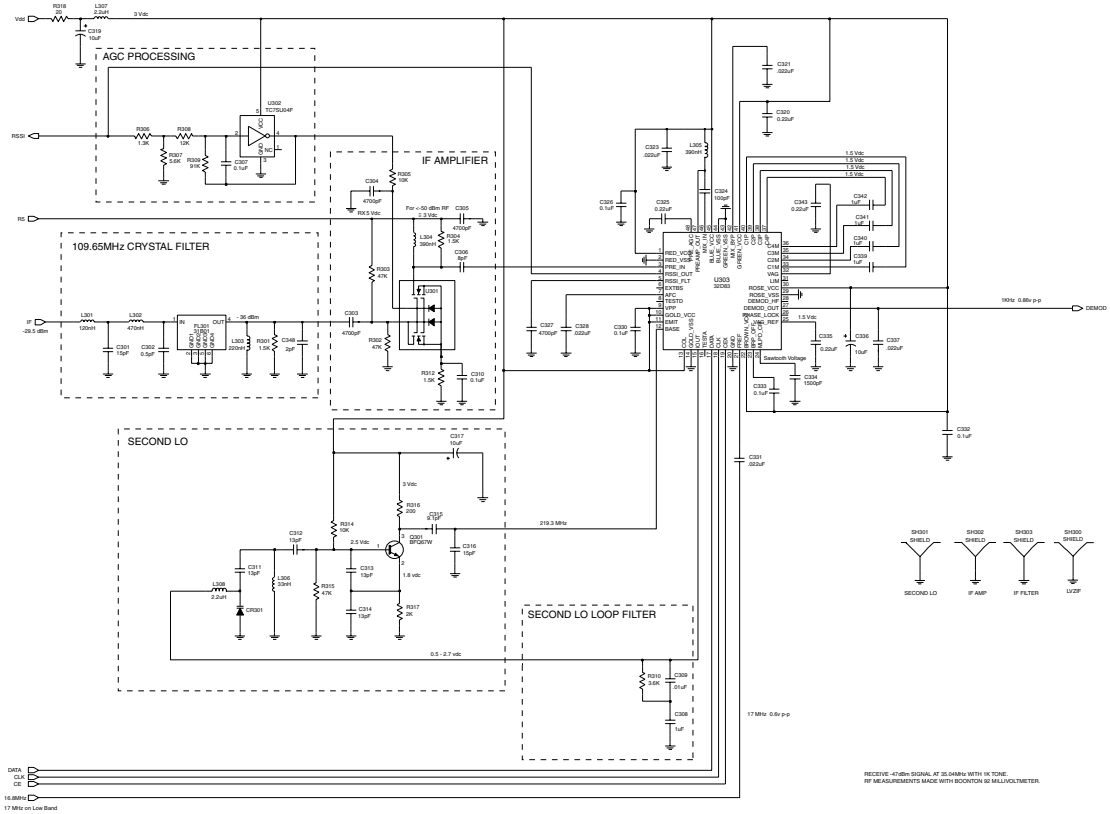
FL0830470-O

Lowband (30-50 MHz) Receiver Overall Schematic



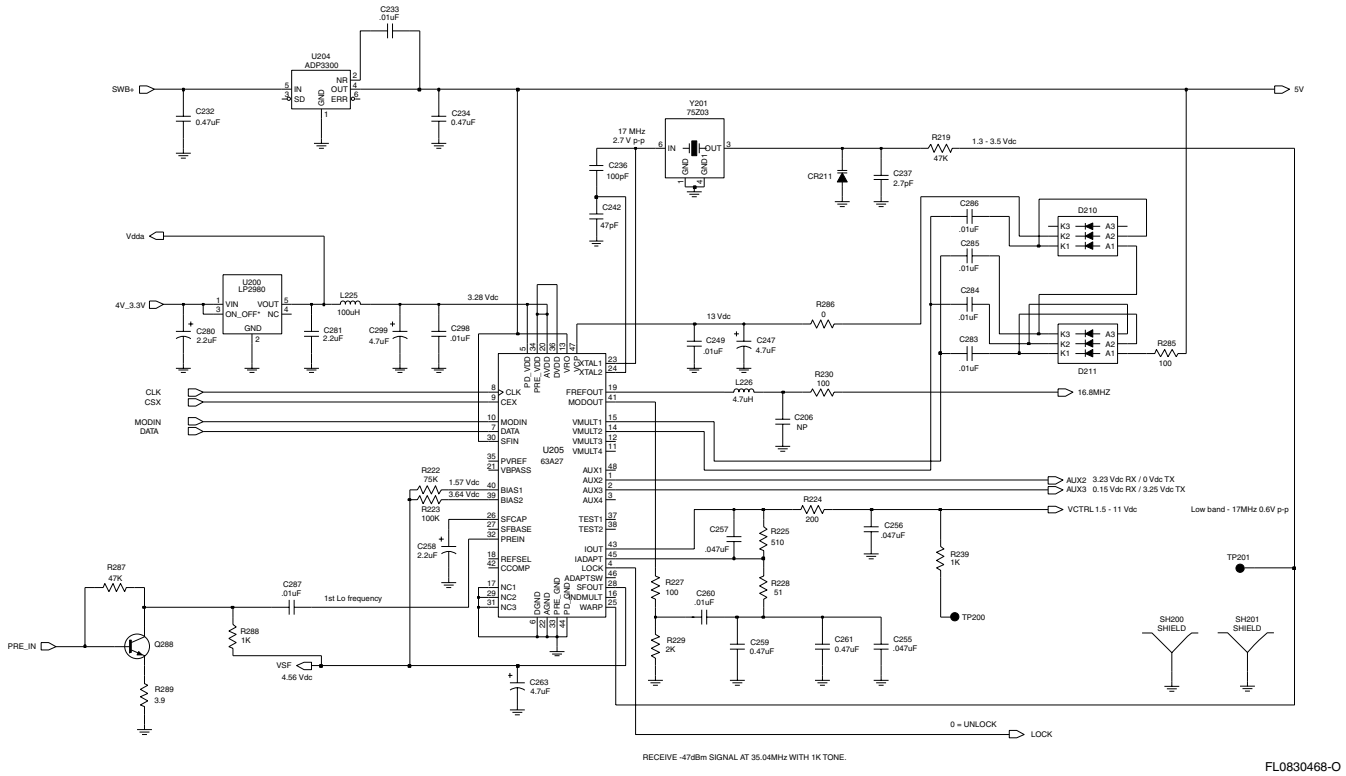
FL0830471-O

Lowband (30-50 MHz) Receiver Front End



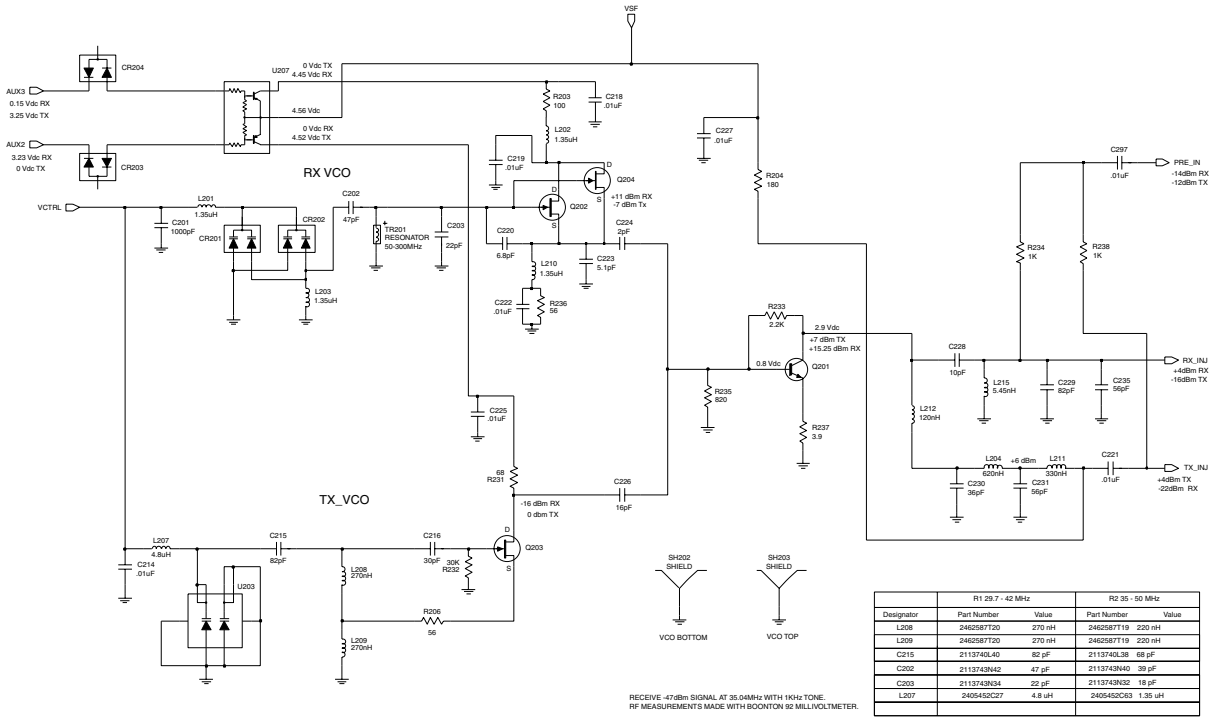
FL0830472-O

Lowband (30-50 MHz) Receiver Back End



FL0830468-O

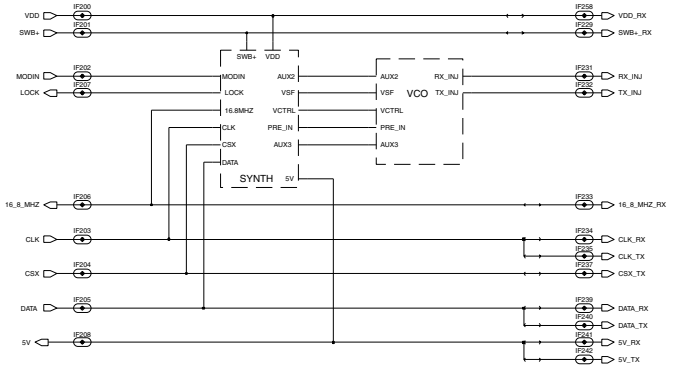
Lowband (30-50 MHz) Synthesizer



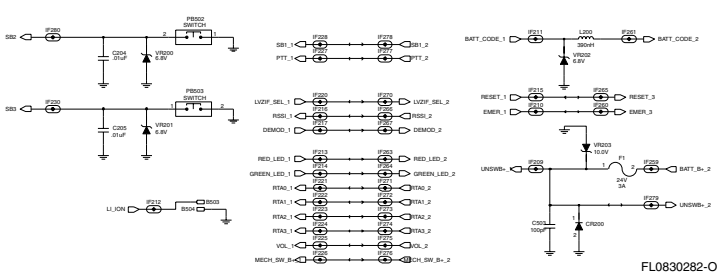
	R1 29.7 - 42 MHz		R2 35 - 50 MHz	
Designator	Part Number	Value	Part Number	Value
L208	2462587T20	270 nH	2462587T19	220 nH
L209	2462587T20	270 nH	2462587T19	220 nH
C215	2113740L40	82 pF	2113740L38	68 pF
C202	2113743N42	47 pF	2113743N40	39 pF
C203	2113743N34	22 pF	2113743N32	18 pF
L207	2405452C27	4.8 uH	2405452C63	1.35 uH

FL0830469-O

Lowband (30-50 MHz) Voltage Controlled Oscillator

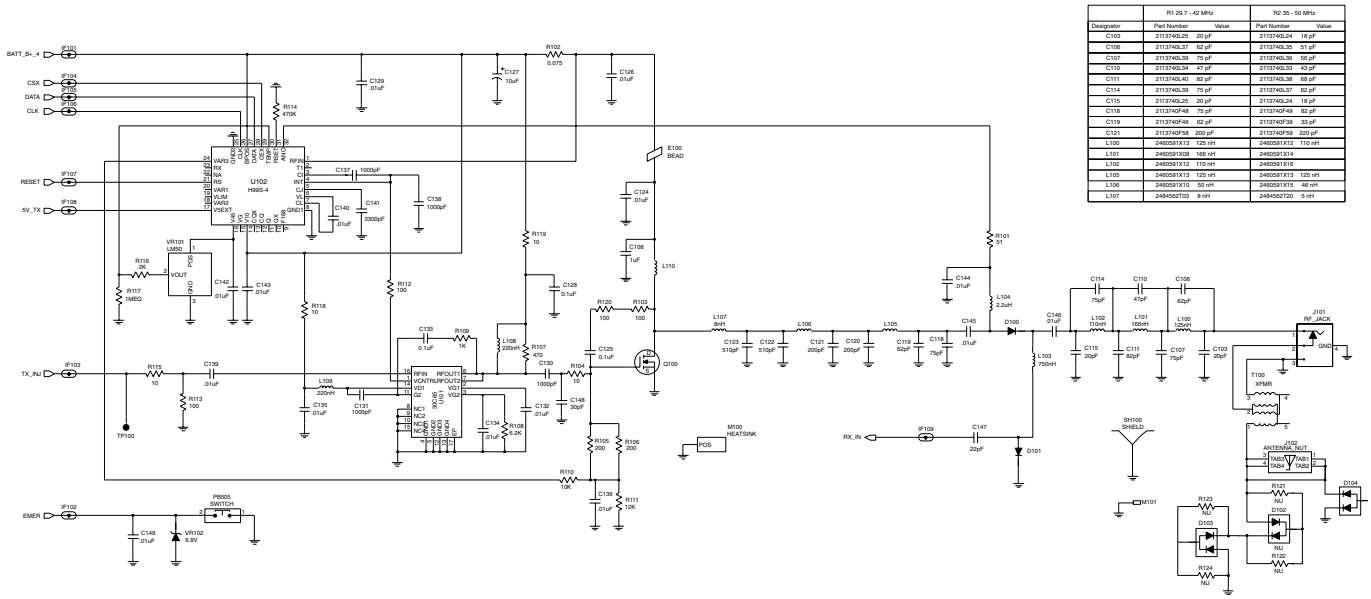


FL0830281-O



FL0830282-O

Lowband (30-50 MHz) Overall Synthesizer Schematic



	R1 29.7 - 42 MHz		R2 35 - 50 MHz	
Designator	Part Number	Value	Part Number	Value
C103	2113740L25	20 pF	2113740L24	18 pF
C106	2113740L37	82 pF	2113740L35	51 pF
C107	2113740L39	75 pF	2113740L36	56 pF
C110	2113740L34	47 pF	2113740L33	43 pF
C111	2113740L40	82 pF	2113740L38	68 pF
C114	2113740L39	75 pF	2113740L37	62 pF
C115	2113740L25	20 pF	2113740L24	18 pF
C118	2113740F48	75 pF	2113740F49	82 pF
C119	2113740F46	62 pF	2113740F39	33 pF
C121	2113740F58	200 pF	2113740F59	220 pF
L100	2460591X13	125 nH	2460591X12	110 nH
L101	2460591X08	166 nH	2460591X14	
L102	2460591X12	110 nH	2460591X16	
L105	2460591X13	125 nH	2460591X13	125 nH
L106	2460591X10	50 nH	2460591X15	46 nH
L107	2484562T03	8 nH	2484562T20	5 nH

FL0830473-A

Lowband (30-50 MHz) Transmitter

3.0 Lowband PCB 8485658Z03 Parts List

Circuit Ref	Motorola Part No.	Description
C103	2113740L25	20pF
C103*	2113740L24	18pF
C106	2113740L37	62pF
C106*	2113740L35	51pF
C107	2113740L39	75pF
C107*	2113740L36	56pF
C108	2113743F16	1.0uF
C110	2113740L34	47pF
C110*	2113740L33	43pF
C111	2113740L40	82pF
C111*	2113740L38	68pF
C114	2113740L39	75pF
C114*	2113740L37	62pF
C115	2113740L25	20pF
C115*	2113740L24	18pF
C118	2113740F48	47pF
C118*	2113740F49	82pF
C119	2113740F46	62pF
C119	2113740F39	33pF
C120	2113740F58	200pF
C121	2113740F58	200pF
C121*	2113740F59	220pF
C122	2113740A72	510pF
C123	2113740A72	510pF
C124	2113741A45	56pF
C125	2113743M24	0.01uF
C126	2113741A45	56pF
C127	2311049A18	10uF
C128	2113743M24	0.01uF
C129	2113743L41	0.01uF
C130	2113743L17	1000pF
C131'	2113743L17	1000pF
C132	2113743L41	0.01uF
C133	2113743M24	0.01uF
C134	2113743L41	0.01uF
C135	2113743L41	0.01uF
C136	2113743L41	0.01uF
C137	2113743L17	1000pF
C138	2113743L17	1000pF
C139	2113743L41	0.01uF
C140	2113743L41	0.01uF
C141	2113743L29	3300pF
C142	2113743L41	0.01uF
C143	2113743L41	0.01uF
C144	2113743L41	0.01uF
C145	2113741A45	56pF
C146	2113741A45	56pF
C147	2113743N34	22pF
C148	2113740F38	30pF
C149	2113743L41	0.01uF
C201	2113743L17	1000pF
C202	2113743N42	47pF
C203	2113743N34	18pF
C204	2113743L41	0.01uF
C205	2113743L41	0.01uF
C206	2113743N42	47pF
C214	2113741F49	0.1uF
C215	2113740L40	82pF
C216	2113740F38	30pF
C218	2113741F49	0.1uF
C219	2113741F49	0.1uF
C220	2113743N22	15pF
C221	2113741F49	0.1uF
C222	2113741F49	0.1uF
C223	2113743N19	5.1pF
C224	2113743N09	2pF
C225	2113743L41	0.1uF
C226	2113743N31	16pF
C227	2113741F49	0.1uF
C228	2113743N26	10pF
C229	2113743N48	82pF
C230	2113743N39	36pF
C231	2113743N44	56pF
C232	2113743A27	0.47uF
C233	2113743L41	0.01uF
C234	2113743A27	0.47uF
C235	2113932N44	56pF
C236	2113743N50	100pF
C237	2113743N12	2.7pF
C242	2113743N42	47pF
C247	2311049A56	4.7uF
C249	2113743L41	0.01uF
C255	2113741A61	0.047uF
C256	2113741A61	0.047uF
C257	2113741A61	0.047uF
C258	2311049F16	2.2uF
C259	2113743A27	0.47uF
C260	2113743F49	0.01uF
C261	2113741A27	0.47uF
C263	2311049A56	4.7uF
C280	2311049A09	2.2uF
C281	2104993J02	2.2uF
C283	2113743L41	0.01uF
C284	2113743L41	0.01uF
C285	2113743L41	0.01uF
C286	2113743L41	0.01uF
C287	2113743L41	0.01uF
C297	2113741F49	0.1uF
C298	2113743L41	0.01uF
C299	2311049A56	4.7uF
C301	2113743N30	15pF
C302	Not Placed	
C303	2113743R33	4700pF
C304	2113743R33	4700pF
C305	2113743R33	4700pF
C306	2113743N65	8pF
C307	2113743E20	0.1uF
C308	2180478Z20	1uF
C309	2113741F49	0.1uF
C310	2113743E20	0.1uF
C311	2113743N29	13pF
C312	2113743N29	13pF
C313	2113743N29	13pF
C314	2113743N29	13pF
C315	2113743N25	9.1pF
C316	2113743N30	15pF
C317	2311049A59	10uF
C319	2311049A59	10uF
C320	2113743A23	0.22uF
C321	2113743E07	0.022uF
C323	2113743E07	0.022uF
C324	2113743N50	100pF
C325	2113743A23	0.22uF
C326	2113743E20	0.1uF
C327	2113743R33	4700pF
C328	2113743E07	0.022uF
C330	2113743E20	0.1uF
C331	2113743E07	0.022uF
C332	2113743E20	0.1uF
C333	2109720D14	0.1uF
C334	2113740A82	1500pF
C335	2113743A23	0.22uF
C336	2311049A59	10uF
C337	2113743E07	0.022uF
C339	2113743F16	1uF
C340	2113743F16	1uF
C341	2113743F16	1uF
C342	2113743F16	1uF
C343	2113743A23	0.22uF
C348	2113743N09	2pF
C400	2113743L41	.01uF
C401	2113743M24	0.1uF
C402	2113743M24	0.1uF
C403	2113928D08	10uF
C404	Not Placed	
C405	Not Placed	
C406	Not Placed	
C407	2113928N01	0.1uF
C408	2113743N50	100pF
C409	2113743M24	0.1uF
C410	2113928N01	0.1uF
C411	2113743M24	0.1uF
C412	2311049A59	10uF
C414	2113743M24	0.1uF
C415	2109720D01	0.1uF
C416	2113928N01	0.1uF
C419	Not Placed	
C420	2113743L41	.01uF
C421	2113928N01	0.1uF
C422	2113743M24	0.1uF
C423	2113743N50	100pF
C424	2311049A59	10uF
C425	2113743M24	0.1uF
C426	2113743N50	100pF
C427	2113743N50	100pF
C428	2113743M24	0.1uF
C429	2113743M24	0.1uF
C430	2113928N01	0.1uF
C431	2113743N50	100pF
C432	Not Placed	
C433	2113743L41	.01uF
C434	2113743M24	0.1uF
C435	2113743M24	0.1uF
C436	2113743N34	22pF
C437	2113743N34	22pF
C438	2113743F18	2.2pF
C440	2113743F18	2.2pF
C441	2113743N50	100pF
C442	2113743E20	0.1uF
C443	2113928N01	0.1uF
C444	2113743N50	100pF
C445	2113743N50	100pF
C447	2113743M08	0.022uF
C448	2113928N01	0.1uF
C449	2113743N50	100pF
C450	Not Placed	
C451	2113743M08	0.022uF
C452	2113743G26	4.7uF
C453	2113743N50	100pF
C456	2113743N50	100pF
C458	2113743N50	100pF
C459	2113743N50	100pF
C463	2113743N50	100pF
C466	2113743N50	100pF
C467	2113928N01	0.1uF
C471	2113743N50	100pF
C472	2113743N50	100pF
C473	2113743N50	100pF
C475	2113743H14	10uF
C476	2113928D08	10uF
C479	2113928N01	0.1uF

Circuit Ref	Motorola Part No.	Description
C480	2113743G24	0.1uF
C481	2113928N01	0.1uF
C482	2113928N01	0.1uF
C490	2113743N50	100pF
C491	2113743N50	100pF
C492	2113743N50	100pF
C493	2113743N50	100pF
C494	2113743N50	100pF
C495	2113743N50	100pF
C496	2113743N50	100pF
C497	2113743N50	100pF
C500	2113743L41	0.01uF
C502	2311049A05	0.47uF
C503	2113743N50	100pF
C504	2113743N43	51pF
C505	2113743N50	100pF
C506	2113743N50	100pF
C507	2113743K15	0.1uF
C511	2113743N50	100pF
C512	2113743N50	100pF
C513	2113743N50	100pF
C514	2113743N50	100pF
C515	2113743N44	56pF
C516	2113928N37	30pF
C522	2113743L41	0.01uF
C533	2113743N40	100pF
C534	2113743N24	8.2pF
C535	2113743N09	2pF
C536	2113743N36	27pF
C537	2113743N16	3.9pF
C538	2113743N48	82pF
CR200	4880107R01	Varactor
CR201	4805648Q13	Dual Varactor
CR202	4805648Q13	Dual Varactor
CR203	4813833C07	Varactor
CR204	4813833C07	Varactor
CR211	4813833C03	Varactor
CR301	4813833C01	Varactor
CR411	4802245J62	Schottky Diode
CR412	4802245J62	Schottky Diode
CR413	4802245J62	Schottky Diode
CR440	4813833C02	Dual Diode Common Cathode
CR502	4880107R01	Rectifier
CR503	4805729G49	LED Red/Yellow
D100	4802482J02	Pin Diode
D101	4809948D23	Pin Diode
D102	NOT PLACED	
D103	NOT PLACED	
D104	4813833C06	Dual Shottky Diode
D210	4802233J09	Triple Diode
D211	4802233J09	Triple Diode

Circuit Ref	Motorola Part No.	Description
D501	4802245J42	Ring Quad Diode
D502	4805129M06	Dual Diode
E100	2480640R01	Ferrite Bead
E400	2480640Z01	Ferrite Bead
E401	2480640Z01	Ferrite Bead
E402	2480640Z01	Ferrite Bead
E403	2480640Z01	Ferrite Bead
E404	2480640Z01	Ferrite Bead
E405	2480640Z01	Ferrite Bead
E406	2480640Z01	Ferrite Bead
E407	2480640Z01	Ferrite Bead
E408	2480640Z01	Ferrite Bead
E409	2480640Z01	Ferrite Bead
F1	6580542Z01	Fuse 3A
FL301	4885631B01	109.65MHz Crystal Filter
FL401	4870368G02	38.4kHz Crystal Oscillator
J1	0986237A02	Connector
J101	0985613Z01	RF Jack
J102	0280519Z01	Antenna Nut
J400	0905505Y04	40-pins Connector
J403	0905505Y02	20-pins Connector
L100	2460591X13	125nH
L100*	2460591X12	110nH
L101	2460591X08	166nH
L101*	2460591X14	
L102	2460591X12	110nH
L102*	2460591X16	
L103	2462587T27	750nH
L104	2462587Q20	2.2uH
L105	2460591X13	125nH
L106	2460591X10	50nH
L106*	2460591X15	46nH
L107	2484562T03	8nH
L107*	2484562T20	5nH
L108	2462587Q08	220nH
L109	2462587Q08	220nH
L110	2460591X11	100nH
L200	2462587Q42	390nH
L201	2405452C63	1.35uH
L202	2405452C63	1.35uH
L203	2405452C63	1.35uH
L204	2462587T25	620nH
L207	2405452C27	4.7uH
L207*	2405452C63	1.35uH
L208	2462587T20	270nH
L208*	2462587T19	220nH
L209	2462587T20	270nH
L209*	2462587T19	220nH
L210	2405452C63	1.35uH
L211	2462587T21	330nH
L212	2462587T16	5.45nH

Circuit Ref	Motorola Part No.	Description
L215	2409348J04	13.85nH
L225	2462587L50	100uH
L226	2462587Q24	4.7uH
L301	2462587V35	120nH
L302	2462587T23	470nH
L303	2462587V38	220nH
L304	2462587T22	390nH
L305	2462587T22	390nH
L306	2462587T40	33nH
L307	2462587Q20	2.2uH
L308	2462587Q20	2.2uH
L400	2462587Q42	390nH
L401	2462587Q42	390nH
L410	2462587Q42	390nH
L411	2462587Q42	390nH
L501	2462587T17	150nH
L502	2462587T20	270nH
L503	2462587T30	1nH
L504	2462587T24	560nH
L507	2462587T17	150nH
L508	2462587V32	68nH
PB501	4080523Z01	Tactile, Push-button
PB502	4080523Z01	Tactile, Push-button
PB503	4080523Z01	Tactile, Push-button
PB504	4080523Z01	Tactile, Push-button
PB505	4080523Z01	Tactile, Push-button
Q100	4813828A08	FET
Q201	4802245J44	NPN
Q202	4805218N82	FET
Q203	4805218N82	FET
Q204	4805218N82	FET
Q288	4802245J44	NPN
Q301	4805218N63	NPN
Q400	4809579E18	MOSFET P-Channel
Q403	4880214G02	NPN
Q405	4802245J54	Dual NPN
Q410	4802245J54	Dual NPN
Q411	Not Placed	
Q416	4809579E18	MOSFET P-Chan
Q417	4802245J50	Dual NPN/PNP
Q509	4880214J44	NPN
Q510	4880214G02	NPN
R101	0662057A18	51
R102	0680735Z01	0.075
R103	0662057A25	100
R104	0662057M26	10
R105	0662057A32	200
R106	0662057A32	200
R107	0662057M66	470
R108	0662057M93	6.2K
R109	0662057M74	1K

Circuit Ref	Motorola Part No.	Description
R110	0662057M98	10K
R111	0662057N01	12K
R112	0662057M50	100
R113	0662057M50	100
R114	0662057N39	470K
R115	0662057M26	10
R116	0662057M81	2K
R117	0662057N47	1M
R118	0662057A01	10
R119	0662057A01	10
R120	0662057A25	100
R203	0662057M50	100
R204	0662057M56	180
R206	0662057U45	56
R219	0662057N15	47K
R222	0662057N20	75K
R223	0662057N23	100K
R224	0662057M57	200
R225	0662057M67	510
R227	0662057M50	100
R228	0662057M43	51
R229	0662057M81	2K
R230	0662057M50	100
R231	0662057M46	68
R232	0662057N10	30K
R233	0662057M82	2.2K
R234	0662057A41	470
R235	0662057M72	820
R236	0662057M44	56
R237	0662057M16	3.9
R238	0662057M74	1K
R239	0662057M74	1K
R285	0662057M50	100
R286	0662057M01	0
R287	0662057N15	47K
R288	0662057M74	1K
R289	0662057M16	3.9
R301	0662057M78	1.5K
R302	0662057N15	47K
R303	0662057N15	47K
R304	0662057M78	1.5K
R305	0662057M98	10K
R306	0662057M77	1.3K
R307	0662057M92	5.6K
R308	0662057N01	12K
R309	0662057N22	91K
R310	0662057M87	3.6K
R312	0662057M78	1.5K
R314	0662057M98	10K
R315	0662057N15	47K
R316	0662057M57	200

Circuit Ref	Motorola Part No.	Description
R317	0662057M81	2K
R318	0662057M33	20
R400	0662057N15	47K
R401	0662057M01	0
R402	Not Placed	
R403	Not Placed	
R405	0662057M01	0
R406	0662057N20	75K
R407	0662057N19	68K
R408	Not Placed	
R409	0662057M98	10K
R410	0662057N23	100K
R411	0662057M98	10K
R413	0662057M01	0
R414	0662057V34	180K
R415	0662057V26	91K
R416	0662057N13	39K
R418	Not Placed	
R419	0662057M67	510
R420	0662057B46	10M
R421	0662057M81	2K
R423	0662057N21	82K
R424	0662057N12	36K
R425	0662057N10	30K
R426	0662057M35	330
R427	0662057M84	2.7K
R428	0662057M10	2.2
R429	0662057M98	10K
R431	0662057N39	470K
R432	0662057N16	51K
R434	0662057M62	330
R435	0662057M81	2K
R436	0662057M74	1K
R437	0662057M01	0
R445	0662057N08	24K
R446	0662057N30	220K
R447	0662057N52	1.6M
R448	0662057N33	270K
R449	0662057N08	24K
R450	0662057T45	68
R457	0662057M98	10K
R460	0662057M90	4.7K
R461	0662057M56	180
R462	0662057M98	10K
R463	0662057M61	300
R471	0662057M92	5.6K
R472	0662057M93	6.2K
R473	0662057M26	10
R475	0662057M01	0
R476	0662057N08	24K
R477	0662057M74	1K

Circuit Ref	Motorola Part No.	Description
R478	0662057M98	10K
R481	0662057N08	24K
R492	0662057M01	0
R499	Not Placed	
R501	0662057M70	680
R502	0662057M56	180
R503	0662057M74	1K
R504	0662057N01	12K
R505	0662057M68	10K
R507	0662057M60	270
R508	0662057M32	18
R509	0662057M60	270
R510	0662057M87	3.6K
R512	0662057M90	4.7K
R513	0662057M26	10
R514	0662057N15	47K
R515	0662057M98	10K
RT400	0680590Z01	Thermistor 33K
S501	4080710Z01	Channel Switch
S502	1880619Z01	Volume Switch
SH100	2686076A01	Shield
SH200	2685709B02	Shield
SH201	2680511Z01	Shield
SH202	2680511Z01	Shield
SH203	2686079A01	Shield
SH300	2680516Z01	Shield
SH301	2680508Z01	Shield
SH302	2680697Z01	Shield
SH303	2680553Z01	Shield
SH400	2680505Z01	Controller Memory Shield
SH401	2680506Z01	Controller On/Off Shield
SH402	2680515Z01	Controller Microprocessor Shield
SH403	2680516Z01	Controller ASFIC Cmp/Audi PA Shield
SH500	2680555Z01	Shield
SH501	2680697Z01	Shield
SH502	2680696Z01	Shield
T100	2505515V03	Transformer Coil
T501	2580541Z01	Transformer Coil
T502	2580541Z01	Transformer Coil
TR201	2460593D01	Resonator, 50-300MHz
U101	5105109Z67	LDMOS Driver
U102	5185765B01	Power Control
U200	5102463J58	3.3V Regulator
U203	4805649Q14	Varactor Diode
U204	5105739X05	Linear Regulator
U205	5185963A27	LV Fractional N Synthesizer
U207	4805921T06	Dual PNP
U301	4885622B01	Dual Gate MOSFET
U302	5185623B01	3.3V Regulator

Circuit Ref	Motorola Part No.	Description
U303	5109632D83	Low Voltage ZIF
U400	5102463J40	3.3V Regulator
U404	5185963A53	ASFIC
U405	Not Placed	
U406**	5102463J59	ROM 256K
U407**	5102463J64	EEPROM 16Kx8
U409	5102226J56	Microcontroller
U410	5102463J57	3.3V Regulator
U420	5102463J44	Audio PA
VR101	5185963A15	Temperature Sense
VR102	4802245J51	6.8V Zener
VR200	4802245J51	6.8V Zener
VR201	4802245J51	6.8V Zener
VR202	4802245J51	6.8V Zener
VR203	4802245J53	6.8V Zener
VR432	4805656W08	5.6V Zener
VR433	4805656W08	5.6V Zener
VR434	4802245J51	6.8V Zener
VR445	4802245J53	10V Zener
VR446	4802245J53	10V Zener
VR447	4802245J53	10V Zener
VR448	4802245J53	10V Zener
VR449	4802245J53	10V Zener
VR450	4802245J53	10V Zener
VR500	4800245J51	6.8V Zener
VR501	4813830A18	6.8V Zener
VR502	4802245J51	6.8V Zener
Y201	4805875Z03	Crystal Oscillator

** Motorola Depot Servicing only.

* Range 2 Only.