MCS 2000 Mobile Radio Service Instructions

Volume 2a

800-MHz Frequency Range Specific

8000 West Sunrise Boulevard
Ft. Lauderdale, FL 33322

68P81080C43-C, Issued 7/98

Safety Information

Every radio, when transmitting, radiates energy into the atmosphere which may, under certain conditions, cause the generation of a spark.

All users of vehicles fitted with radios should be aware of the following warnings:

Do not operate radio near flammable liquids or in the vicinity of explosive devices.

To ensure personal safety, please observe the following simple rules:

Check the laws and regulations on the use of two-way mobile radios in the areas where you drive. Always obey them. Also, when using your radio while driving, please:

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

Airbag Warning

VEHICLES EQUIPPED WITH AIR BAGS

An air bag inflates with great force. DO NOT place objects, including communication equipment, in the area over the air bag or in the air bag deployment area. If the communication equipment is improperly installed and the air bag inflates, this could cause serious injury.

Installation of vehicle communication equipment should be performed by a professional installer/technician qualified in the requirements for such installations.

An air bag's size, shape and deployment area can vary by vehicle make, model and front compartment configuration (e.g., bench seat vs. bucket seats). Contact the vehicle manufacturer's corporate headquarters, if necessary, for specific air bag information for the vehicle make, model and front compartment configuration involved in your communication equipment installation.

LP Gas Warning

It is mandatory that radios installed in vehicles fuelled by liquefied petroleum gas conform to the National Fire Protection Association standard NFPA 58, which applies to vehicles with a liquid propane (LP) gas container in the trunk or other sealed off space within the interior of the vehicle. The NFPA58 requires the following:

- Any space containing radio equipment shall be isolated by a seal from the space in which the LP gas container and its fittings are located.

- Removable (outside) filling connections shall be used.
- The container space shall be vented to the outside.

Anti-Lock Braking System (ABS) and Anti-Skid Braking System Precautions

WARNING

Disruption of the anti-skid/anti-lock braking system by the radio transmitter may result in unexpected vehicle motion.

Motorola recommends the following radio installation precautions and vehicle braking system test procedures to ensure that the radio, when transmitting, does not interfere with operation of the vehicle braking system.

Installation Precautions

1. Always provide as much distance as possible between braking modulator unit and radio, and between braking modulator unit and radio antenna and associated antenna transmission line. Before installing radio, determine location of braking modulator unit in vehicle. Depending on make and model of vehicle, braking modulator unit may be located in trunk, under dashboard, in engine compartment, or in some other cargo area. If you cannot determine location of braking modulator unit, refer to vehicle service manual or contact a dealer for the particular make of vehicle.
2. If braking modulator unit is located on left side of the vehicle, install radio on right side of vehicle, and conversely.
3. Route all radio wiring including antenna transmission line as far away as possible from braking modulator unit and associated braking system wiring.
4. Never activate radio transmitter while vehicle is in motion and vehicle trunk lid is open.

Braking System Tests

The following procedure checks for the most common types of interference that may be caused to vehicle braking system by a radio transmitter.

1. Run vehicle engine at idle speed and set vehicle transmission selector to PARK. Release brake pedal completely and key radio transmitter. Verify that there are no unusual effects (visual or audible) to vehicle lights or other electrical equipment and accessories while microphone is NOT being spoken into.
2. Repeat step 1. except do so while microphone IS being spoken into.
3. Press vehicle brake pedal slightly just enough to light vehicle brake light(s). Then repeat step 1. and step 2.
4. Press the vehicle brake pedal firmly and repeat step 1. and step 2.
5. Ensure that there is a minimum of two vehicle lengths between front of vehicle and any object in vehicle's forward path. Then, set vehicle

transmission selector to DRIVE. Press brake pedal just far enough to stop vehicle motion completely. Key radio transmitter. Verify that vehicle does not start to move while microphone is NOT being spoken into.

6. Repeat step 5. except do so while microphone IS being spoken into.
7. Release brake pedal completely and accelerate vehicle to a speed between 15 and 25 miles/25 and 40 kilometers per hour. Ensure that a minimum of two vehicle lengths is maintained between front of vehicle and any object in vehicle's forward path. Have another person key radio transmitter and verify that vehicle can be braked normally to a moderate stop while microphone is NOT being spoken into.
8. Repeat step 7. except do so while microphone IS being spoken into.
9. Release brake pedal completely and accelerate vehicle to a speed of 20 miles/30 kilometers per hour. Ensure that a minimum of two vehicle lengths is maintained between front of vehicle and any object in vehicle's forward path. Have another person key radio transmitter and verify that vehicle can be braked properly to a sudden (panic) stop while microphone is NOT being spoken into.
10. Repeat step 9. except do so while microphone IS being spoken into.
11. Repeat step 9. and step 10. except use a vehicle speed of 30 miles/50 kilometers per hour.

LIST OF EFFECTIVE PAGES

MCS 2000 Mobile Radio Service Instructions

Volume 2a

800-MHz Frequency Range Specific Information

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Page Number	Revision Letter	Page Number	Revision Letter
Front cover	O	1 through 88	C
Inside front cover (blank)	O	Questionnaire (Front)	O
Title	C	Questionnaire (Back)	O
Safety 0 through Safety 2	C	Inside Back Cover (Replacement Parts Ordering)	C
A and B	C	Back Cover (Not Marked with Revision Letter	A
i and ii	C		

Note: The letter O in the Revision Letter column of the table above denotes an original page. Original pages ARE NOT identified as such in the page footors except by the absence of a change letter and date.

NOTES

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Note: Troubleshooting charts are listed on page 17; Component location, schematic diagram, and parts list illustrations are listed on page 31.

Introduction

1

This publication (Service Manual Volume 2a, Motorola Publication 68P81080C43) provides frequency-range-specific information for the 15-Watt and 35-Watt MCS 2000 radios for which the transceiver board kit numbers are listed in Table 1. These radios operate in the 800-MHz frequency range. The coverage in this publication includes non-data-capable and data-capable radios.

This publication is a companion volume to Service Manual Volume 1 for MCS 2000 Radios, Motorola Publication Number 68P81083C20, which provides non-frequency-range-specific information for all MCS 2000 Radios. Service personnel must have both Volume 1 and Volume 2d of this Service Manual in order to have all service information for 15-Watt and 35-Watt MCS 2000 Radios that operate in the 800-MHz frequency range.

There are other Volume 2 service manuals (e.g., Volume 2b, 2c, 2d,), which cover models of the MCS 2000 Radio for other frequency ranges and power levels. Refer to Volume 1 of this service manual for a list of the manuals related to operation and maintenance of all models of the MCS 2000 Radio, and the Motorola publication numbers for those manuals.

Hereafter in this manual, the MCS 2000 Radio is referred to as the radio. The specific hardware portions of the radio covered in this volume of the service manual are as follows:

- Receiver Front End
- Receiver Intermediate Frequency (IF)
- Receiver Back End
- 15-Watt Power Amplifier
- 35-Watt Power Amplifier
- Synthesizer

This volume (Volume 2a) of the service manual covers the following five topics for the specific hardware portions of the 800-MHz radios:

- Theory of operation
- Troubleshooting
- Component locations
- Parts lists

- Schematic diagrams and associated interconnect information

The five topics listed above for the controller section and for the control heads are covered in Volume 1 of this service manual, Motorola Publication Number 68P81083C20.

All the radios covered in this service manual contain a single circuit card assembly (a printed circuit board with components mounted), which is called the transceiver board. The transceiver board in each version of the radio is identified by a unique Motorola kit number (e.g., FLF5579C). The kit number varies according to the RF output power level of the radio (15-Watts or 35-Watts) and also according to whether or not the radio is data capable. Table 1 crossreferences each kit number covered in this service manual to the page number where the specified information is located.

Table 1: Transceiver Board Kit Numbers v.s. Service Manual Page Numbers for Specific Information

Kit Number	RF Power Level	Printed Circuit Board (PCB)		Functional Sections Intercon-nection Information	Controller		Receiver Front End (Page No.)				Receiver Intermediate Frequency (IF) (Page No.)			
		Part No.	Functional Section Locations (Page No.)		Main Controller Section	Power Control Section	Theory of Operation	Trouble shooting Chart	Component Locations and Parts List	Schematic Diagram	Theory of Operation	Trouble shooting Chart	Component Locations and Parts List	Schematic Diagram
FLF5579C, D, E Not Data Capable	15	8404416P04 Issue P4	32	57	Refer to Service Manual Volume 1 Motorola Publication 68P81083C20	Refer to Service Manual Volume 1 Motorola Publication 68P81083C20	9	23	34	35	9	24	36	37
FLF5574D, E, F Not Data Capable	35	8404994E05 Issue P5	32	57			9	23	34	35	9	24	36	37
FLF5600A Data Capable	15	8404416P05 Issue P5	32	57			9	23	34	35	9	24	36	37
FLF5950A Data Capable	15	8408497Y01 Issue P1	32	57			9	23	34	35	9	24	38	39
FLF5607A Data Capable	35	8408537Y01 Issue P1	32	57			9	23	34	35	9	24	38	39
HUF1188A Data Capable	15	8404416P05 Issue P5	32	57			9	23	34	35	9	24	36	37
HUF1189A Not Data Capable	35	8404994E05 Issue P5	32	57			9	23	34	35	9	24	36	37

Table 1: Transceiver Board Kit Numbers v.s. Service Manual Page Numbers for Specific Information (Continued)

Kit Number	RF Power Level	Printed Circuit Board (PCB) Part No.	Receiver Back End (Page No.)				Synthesizer (Page No.)				Power Amplifier (PA) (Page No.)				
			Theory of Operation	Trouble shooting Chart	Parts List and Component Locations	Schematic Diagram	Theory of Operation	Trouble shooting Chart	Parts List and Component Locations	Schematic Diagram	Theory of Operation	Trouble shooting Chart	Repair	Parts List and Component Locations	Schematic Diagram
FLF5579C, D, E Not Data Capable	15	8404416P04 Issue P4	10	24	40	41	14	28	54	55	11	30	N/A	46	47
FLF5574D, E, F Not Data Capable	35	8404994E05 Issue P5	10	24	40	41	14	28	54	55	13	31	18	50	51
FLF5600A Data Capable	15	8404416P05 Issue P5	10	24	42	43	14	28	54	55	11	30	N/A	46	47
FLF5950A Data Capable	15	8408497Y01 Issue P1	10	24	44	45	14	28	54	55	11	30	N/A	48	49
FLF5607A Data Capable	35	8408537Y01 Issue P1	10	24	44	45	14	28	54	55	13	31	18	52	53
HUF1188A Data Capable	15	8404416P05 Issue P5	10	24	42	43	14	28	54	55	11	30	N/A	46	47
HUF1189A Not Data Capable	35	8404994E05 Issue P5	10	24	40	41	14	28	54	55	13	31	18	50	51

Theory of Operation

2

This chapter provides theory of operation information for the radio. It starts with a block diagram level functional description of the entire radio. This is followed by a detailed functional description for each of the four major functions of the radio.

Introduction

The radio is composed of the following four major functions:

- Receiver
- Transmitter
- Dc Power Control and Regulation
- Operator Interface (Control Head)

The receiver, transmitter, and dc power control and regulation functions are all located on a single circuit card assembly (CCA) in the main body of the radio. The CCA is called the transceiver board. The operator interface function consists of the control head, which plugs into the main body of the radio. There are three different control head types: the Model I for the Model I Radio; the Model II for the Model II Radio; and the Model III for the Model III Radio. The three control heads are covered in their entirety in Volume 1 of this service manual.

The transceiver board in the main body of the radio is physically separated into six functional sections as follows:

- Receiver Front End
- Receiver Intermediate Frequency (IF)
- Receiver Back End
- Power Amplifier (PA)
- Synthesizer
- Controller

The controller section is further divided into two sub-sections: main controller; and power control. The mechanical layout of the transceiver board is illustrated in Chapter 4.

Separate component location diagrams, parts lists, and schematic diagrams are provided in this service manual for each of the six physical sections of the transceiver board and for the control heads.

The component location diagrams, parts lists, and schematic diagrams for the controller section of the transceiver board and for the three types of control heads are located in Volume 1 of this service manual. The component location diagrams, parts lists, and schematic diagrams for the other five physical sections of the transceiver board are located in this volume (Volume 2a).

Block Diagram Level Theory of Operation

The following discussion refers to the functional block diagram for the radio, Figure 1.

The receiver function of the radio detects, demodulates, amplifies, and outputs via the loudspeaker, radio signals picked up by the vehicle or fixed-station antenna. The radio signal input reaches the receiver from the antenna via the antenna switch, which is located in the transmitter function of the radio. The radio signals picked up by the antenna are signals that have been re-broadcast by trunked or conventional repeaters, or that have been broadcast directly by other mobile or fixed station radios.

The receiver function of the radio consists of: the receiver front end section; the receiver intermediate frequency (IF) amplifier section; the receiver back end section; and the audio signal filter (ASFIC) and receiver audio power amplifier circuits in the controller section.

The receiver function of the radio uses the double conversion superheterodyne design to optimize image rejection and selectivity. The receiver front end section converts the receiver input signal to a first IF of 73.35 MHz. The frequency upon which the receiver operates is determined by a first local oscillator signal generated by the synthesizer section. For the purpose of this discussion, the synthesizer section is considered to be part of the transmitter function of the radio.

The 73.35 MHz IF output signal from the receiver front end section passes through the receiver IF amplifier section where it is filtered and amplified. The output of the receiver IF amplifier section goes to the receiver back end section. In the receiver back end section, which contains the zero intermediate frequency (ZIF) integrated circuit (IC), the receiver IF signal is demodulated to produce receiver audio and squelch signals.

The receiver audio and squelch signal outputs from the receiver back end section are processed by the audio signal filter integrated circuit (ASFIC) in the controller section of the radio to generate receiver audio (filtered) and squelch detect signals. The filtering characteristics and other processes of the ASFIC are controlled by the central processor unit in the controller section.

The receiver audio signal (filtered) from the output of the ASFIC goes to the input of the receiver audio power amplifier circuit, which is located in the controller section of the radio. The receiver audio power amplifier circuit does not pass the receiver audio signal to the loudspeaker until it receives an audio PA enable signal from the controller section of the radio. The reason is that the receiver portion of the radio includes a squelch function, which prevents receiver noise from passing to the loudspeaker during periods of no signal reception.

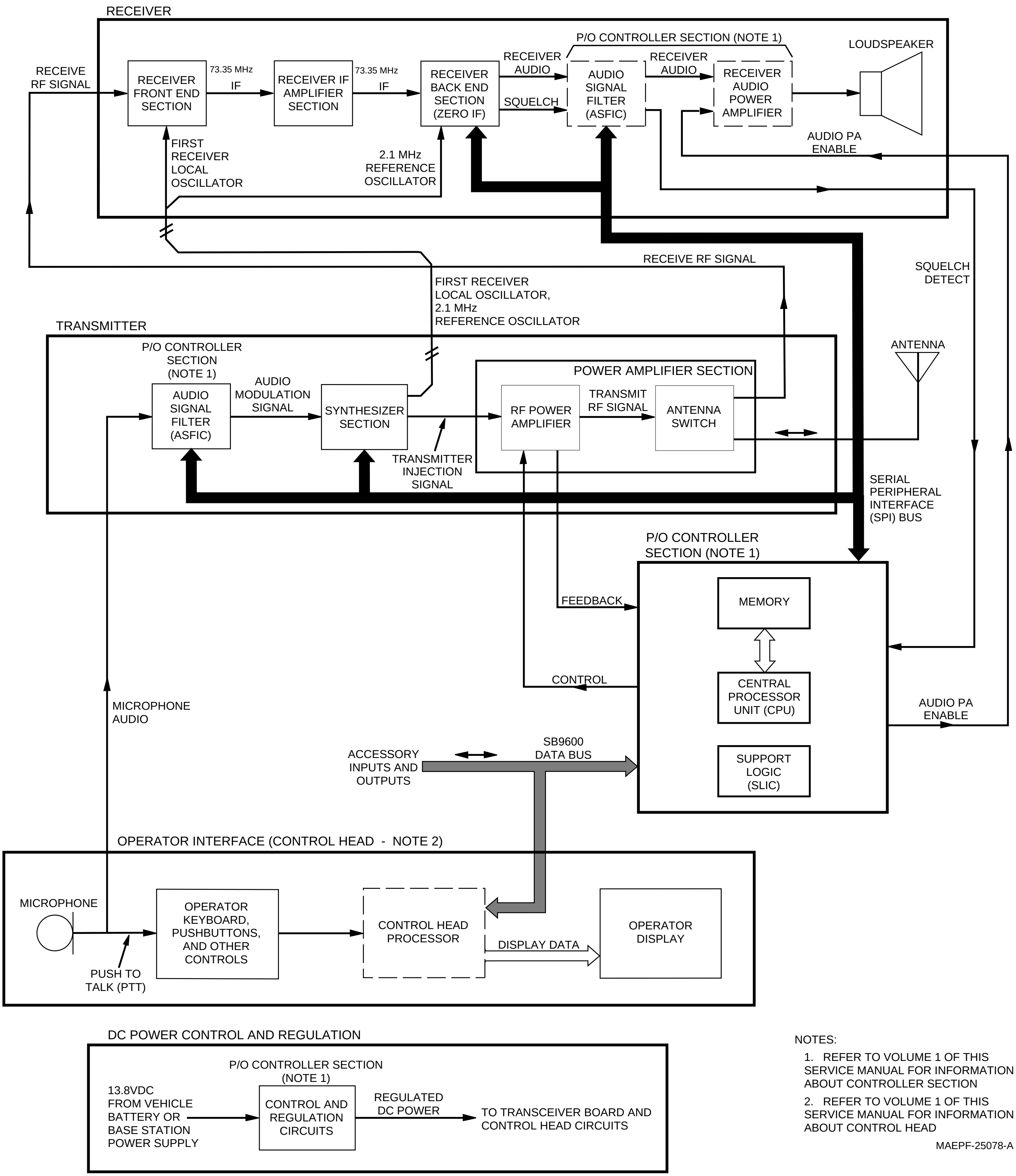


Figure 1 . 800-MHz Radio Functional Block Diagram

The controller generates the audio PA enable signal based on such variables as the level of the received signal, the frequency channel, and the operating mode of the radio. When the audio PA enable signal is generated, the audio power amplifier (PA) is activated and passes the receiver audio signal to the loudspeaker.

The transmitter function of the radio produces either a 15-Watt or a 35-Watt radio frequency output signal, depending on the model of the radio. The radio frequency output signal is frequency modulated by an audio signal from the microphone or from another source such as a telephone keypad or handset.

The transmitter function of the radio consists of: the audio signal filter integrated circuit (ASFIC) in the controller section; the synthesizer section; and the transmitter power amplifier (PA) section. The ASFIC develops a modulation signal by amplifying an audio signal from the microphone, keypad, or handset. The synthesizer section generates a radio frequency carrier signal upon which the transmitter portion of the radio operates.The radio frequency carrier signal generated by the synthesizer section is frequency modulated in the synthesizer section by the modulation signal output from the ASFIC.

The frequency modulated output signal from the synthesizer section is amplified to the required 15-Watt or 35-Watt power level by the power amplifier (PA) section.The output of the PA section passes through the antenna switch and is radiated by the vehicle antenna or fixed-station antenna.

The controller section of the radio contains a microprocessor that controls the radio in accordance with its built in programming as well as commands input manually by the radio operator. The radio operator inputs manual commands to the controller section using the pushbuttons and other controls located on the control head. In addition to its controlling functions, the controller section provides audio amplification of the audio output signal in the receiver function. It also contains squelch detect circuitry based on a buffered discriminator signal from the Zero Intermediate Frequency Integrated Circuit (ZIF IC).

The operator interface function of the radio consists of: a microphone or the microphone portion of a telephone handset; a telephone keypad if used; the pushbuttons and other controls on the control head; and the digital and graphics displays on the control head. The pushbuttons and other controls on the control head provide digital commands to the controller section, and in some instances, hardwired commands to controlled circuits. The digital and graphics displays receive display data from the controller section. The control head contains its own microprocessor, which communicates with the controller section of the radio via an SB9600 serial digital data bus.

The DC power control and regulation function regulates and distributes to the various sections of the radio, DC power from the vehicle battery or fixed station power supply.

Receiver Detailed Functional Description

The portion of the receiver function that is not part of the controller section of the radio is composed of three sections: receiver front end; receiver If, and receiver back end.

Receiver Front End (All Kits)

The following discussion is based on the schematic diagram for the receiver front end section on page 35. The received RF signal (RX_IN) from the antenna switch in the PA section of the radio enters the first bandpass filter FL6250. The first bandpass filter has three poles, a 938-MHz center frequency, a 6-MHz wide passband, and a 45-dB ultimate rejection for frequencies outside the passband.

After the first bandpass filter, the received RF signal goes to a pair of hot carrier limiting diodes (CR6250). The hot carrier diodes limit strong signals to prevent them from over driving and damaging RF preamplifier Q6271.

The main purpose of RF preamplifier Q6271 is to set the noise figure of the receiver. Q6271 is actively biased through Q6272. During transmit, the RF preamplifier is shut off by the K9.1 line via switch Q6250 and bias transistor Q6272. After the signal leaves the RF preamplifier, it enters second bandpass filter FL6251, which is identical to FL6250.

When the RF signal leaves the second bandpass filter, it goes into mixer U6251. The mixer is the double balanced active Gallium Arsenide type. The RF signal is applied to the mixer through balun transformer T6251. The first injection local oscillator is applied to the mixer via balun transformer T6252 and is 73.35 MHz below the RF signal frequency. The bias for the mixer is set by resistors R6285, R6286, and R6287. The IF output signal from the mixer, which is at a frequency of 73.35 MHz, is fed to the receiver IF section as IF_OUT through transformer T6253.

Receiver Intermediate Frequency (IF) (All Kits)

The following discussion is based on the schematic diagram for the receiver IF section on page 37 for kits FLF5574D, E, F; FLF5579C, D, E; FLF5600A; HUF1188A and HUF189A and on page 39 for kits FLF5607A and FLF5950A.

The IF_OUT signal from the receiver front end section enters the receiver IF section as the IF_IN signal. The first circuit in the receiver IF section is a resistive pad (R6376, R6377, R6378, R6392), which stabilizes the impedance presented to the output of the mixer in the receiver front end section. It also stabilizes the impedance presented to the input of the first 73.35-MHz crystal filter, Y6376.

From the resistive pad, the signal passes through to the first 73.35-MHz crystal filter, Y6376 whose surrounding components match it to 50-ohms and to the input of IF amplifier Q6388. A matching network, which follows Q6388, matches the IF amplifier output impedance to the input impedance of the second 73.35-MHz crystal filter, Y6377. Both crystal filters have two-poles and have a bandwidth of 13kHz to accommodate the bandwidth requirements for digital data. Matching elements, which follow the second crystal filter, match the output of the second crystal filter to the input of the receiver back end section.

The signal out of the receiver IF section (IF_V_OUT) passes through connector J6400 and jumper plug J6401 to the input of the receiver back end section.

Receiver Back End (All Kits)

The following discussion is based on the schematic diagram for the receiver back end section on page 41 for kits FLF5574D, E, F; FLF5579C,D, E; and HUF1189A; on page 43 for kits FLF5600A and HUF1188A; and on page 45 for kits FLF5607A. and FLF5950A.

From the output of the receiver IF section, the IF signal (IF_IN) enters IF amplifier Q6203. A pair of hot carrier limiter diodes (CR6202) at the base of IF amplifier Q6203 protect Zero Intermediate Frequency Integrated Circuit (ZIF IC) U6201 from strong-signal overloading.

With kits FLF5591A, B, C and FLF5592A, B, C, the output of IF amplifier Q6203 is fed to shunt pin diode attenuator CR6203. The attenuation provided by the pin diode attenuator is a function of the signal level detected by the internal automatic gain control (AGC) circuit in the ZIF IC. As the RF level increases, the attenuation increases. This ensures that the ZIF IC, whose dynamic range is much less than that of the radio, is not over driven by strong signals, causing distortion in the detected signal.

With kits FLF5607A and FLF5950A, this attenuation function is performed by attenuator stages in the receiver IF section and, therefore, this ACG mechanism in the receiver back end section is bypassed. To do this, shorting resistor R6224 is mounted bypassing CR6203, which is not mounted, an additional shorting resistor is placed on the pads of L6208 instead of the 1 microHenry inductor, and CR6204 is not placed.

At the output of Q6203, there is a notch filter, for the third harmonic of 73.35 MHz, made up of components C6249 and inductor L6207. Transistor Q6201 and varactor diode CR6201 form the second local oscillator (LO). The LO operates as a voltage controlled oscillator (VCO), which is controlled by the ZIF IC.

The ZIF IC is a down converter, a filter, a limiter, and an FM demodulator. The IF signal going into the ZIF IC at 73. 35MHz is down converted, filtered, limited, and demodulated. Demodulated audio comes out of the ZIF IC from pin 28 and is fed to the ASFIC audio signal filtering IC, which is part of the controller section of the radio.

In addition to the audio output signal, the receiver section provides a squelch signal output, which also is processed and used by the controller section of the radio to mute the receiver output during periods of no signal reception.

Refer to the discussion under the title *Receive Audio Circuits*, which is located in the *Controller Section Theory of Operation* portion in Volume 1 of this service manual.

Transmitter Detailed Functional Description

The transmitter function of the radio is distributed between the controller, the synthesizer, and the power amplifier (PA) sections. This is shown on the functional block diagram for the radio, Figure 1. The portion of the transmitter function physically located in the controller section is described in the *Controller Section Theory of Operation* located in Volume 1 of this service manual. That portion includes the audio circuits that filter, amplify, and otherwise process the audio signal from the microphone and/or telephone handset. The portion of the transmitter function located in the synthesizer section of the radio is described in the *Synthesizer Detailed Functional Description* in this volume of the service manual. The synthesizer section of the transmitter receives the amplified and processed audio signal from the controller section and produces a frequency-modulated radio frequency carrier (injection) signal, which is input to the transmitter power amplifier (PA) section.

The remaining part of the transmitter function of the radio is located in the PA section. The following discussion covers the part of the transmitter function that is physically located in the PA section.

There are two different configurations of the PA section; one for the 12-Watt radio, and the other for the 30-Watt radio.

15-Watt Power Amplifier (Kits FLF5579C, D, E; FLF5600A, FLF5950A; HUF1188A)

The following discussion is based on the schematic diagram for the 15-Watt power amplifier (PA), on page 47 for kits FLF5579C, D, E, FLF5600A, and HUF1188A and on page 49 for kit FLF5950A.

The power amplifier (PA) is a radio frequency (rf) power amplifier, which amplifies the output from the injection string (TX_INJ) to an RF output power level of 12 Watts. It consists of a driver stage Q6501, followed by a power amplifier module U6501.

In kits FLF5579C, D, E and FLF5600A, the second and third stages of U6501 operate directly from the A+ supply voltage received from connector J6502 via current sense resistor R6520. To protect the input stage from voltage transients on the A+ line, the first stage of U6501 is operated from the keyed K9.1 voltage, which is provided by the controller section of the radio.

In kit FLF5950A, two DC supply inputs for U6501 (+DCISUP and +DCISUPP) are obtained directly from the A+ line via R6520. The transmit enable input (+DCBIAS) is obtained from the A+ line via R6520 and switch U6502, which is controlled by the keyed K9.1 voltage.

The rf drive, which is routed into transistor Q6501, is controlled from Q6506 via the PA control line. A rising control voltage on the PA control line causes a rising collector voltage on Q6501. This causes more power to be delivered into the next stage. Conversely, a decreasing control line voltage decreases the power delivered into the next stage. By controlling the drive power to U6501 and the following stages in the power amplifier lineup, automatic level control (ALC) is accomplished, which regulates the output power of the transmitter.

The output of U6501 goes to the antenna switch. The antenna switch is switched by the keyed 9.1 voltage. In the transmit mode, the keyed K9.1 voltage is high. In kits FLF5579C, D, E and FLF5600A, the high K9.1 voltage turns on diodes CR6502, CR6503, and CR7504. When CR6502 is turned on, it forms a low impedance to the RF transmit path and allows the signal to pass through. Diode CR6503 forms a low impedance that is transformed to an open circuit through a quarter wavelength transmission line. This prevents transmitter power from being delivered into the receiver. Diode CR7504 is also turned on in the transmit mode, further isolating the receiver port from transmitter energy. In the receive mode, all these diodes are off. The off capacitance of CR6502 is tuned by L6508 to form a high impedance looking into the transmitter. Therefore, energy coming in the receive mode is channeled to the RX port.

In kit FLF5950A, the antenna switch has only two diodes (CR6502 and CR6504). The two diodes are forward biased by the K9.1 voltage in transmit mode and zero biased in receive mode.

Harmonics of the transmitter are attenuated by the harmonic filter. In kits FLF5591A, B, C and FLF5604A, the harmonic filter is formed by two inductors (L6512 and L6513) and six capacitors (C6539, C6540, C6542, C6543, C6544, C6546). This network forms a low-pass filter to attenuate harmonic energy of the transmitter to an acceptable level. In kit FLF5952A, there are only three capacitors (C6543, C6544, and C6546).

A forward power detector follows the harmonic filter. This forward power detector is a microstrip printed circuit, which couples a small amount of the forward power going out of the radio to diode CR6506 where it is rectified. This rectified signal forms a voltage that is proportional to forward power out of the radio. A power control circuit in the controller section of the radio holds this voltage constant, which ensures the forward power out of the radio is held constant.

In the PA compartment, 50k thermistor R6519 senses the temperature in the area of the power module. The resultant signal is fed back to the power control circuit to protect the power amplifier against over-temperature conditions. Resistor R6520, in series with the A+ line supply, feeds voltage to the power module. The voltage across R6520 is sensed and the resultant two inputs are channeled to the power control circuit. The power control circuit senses the voltage drop across this resistor, which is determined by the magnitude of the drain current in U6501. It uses this as a limit mechanism whereby the power control circuit limits the magnitude of current that can be drawn by U6501. This protects the device from excessive power dissipation.

Reverse polarity protection for the transmitter is provided by diode CR6508. The cathode is soldered to the A+ line while the anode is shorted to the chassis via a spring. In kit FLF5950A, the diode is a surface mount device and the anode is soldered to the printed circuit board ground plane.Under reverse polarity conditions to the radio, this diode conducts and protects the radio from damage. This diode also provides transient over-voltage protection by breaking down when the supply voltage to the radio exceeds 24 volts.

35-Watt Power Amplifier (Kits FLF5574D, E, F; HUF1189A; FLF5607A)

The following discussion is based on the schematic diagram for the 35-Watt power amplifier (PA) on page 51 for kits FLF5574D, E, F and HUF1189A, and on page 53 for kit FLF5607A.

The power amplifier (PA) is a radio frequency (rf) power amplifier, which amplifies the output from the injection string (TX_INJ) to an RF output power level of 12 Watts. It consists of a driver stage Q6501, followed by a power amplifier module U6501.

In kits FLF5574D, E, F and HUF1189A, the second and third stages of U6501 operate directly from the A+ supply voltage received from connector J6502 via current sense resistor R6520. To protect the input stage from voltage transients on the A+ line, the first stage of U6501 is operated from the keyed K9.1 voltage, which is provided by the controller section of the radio.

In kit FLF5607A, two DC supply inputs for U6501 (+DCISUP and +DCISUPP) are obtained directly from the A+ line via R6520. The transmit enable input (+DCBIAS) is obtained from the A+ line via R6520 and switch U6502, which is controlled by the keyed K9.1 voltage.

The rf drive, which is routed into transistor Q6501, is controlled from Q6506 via the PA control line. A rising control voltage on the PA control line causes a rising collector voltage on Q6501. This causes more power to be delivered into the next stage. Conversely, a decreasing control line voltage decreases the power delivered into the next stage. By controlling the drive power to U6501 and the following stages in the power amplifier lineup, automatic level control (ALC) is accomplished, which regulates the output power of the transmitter.

The output of U6501 goes to an additional power amplifier stage (Q6505) whose output is coupled to the antenna switch via a matching hybrid (H6501). Transistor Q6505 raises the 12-Watt RF power output level of U6501 to the required 30 Watts. Matching hybrid H6501 ensures the proper collector load for Q6505 and provides correct impedance matching between the output of Q6505 and the antenna switch.

The antenna switch is switched by the keyed 9.1 voltage. In the transmit mode, this 9.1 voltage is high turning on diodes CR6502, CR6503, and CR1. When CR6502 is turned on, it forms a low impedance to the RF transmit path and allow the signal to pass through. Diode CR1 forms a low impedance that is transformed up to an open circuit through a quarter wavelength transmission line. This prevents transmitter power from being delivered into the receiver. Diode CR6503 is also turned on in the transmit mode further isolating the receiver port from transmitter energy.

In the receive mode all these diodes are off. The off capacitance of CR6502 is tuned by L6508 to form a high impedance looking into the transmitter. Therefore, energy coming in the receive mode is channeled to the RX port. Harmonics of the transmitter are attenuated by the harmonic filter. The harmonic filter is formed by components L2, L3, and L4, and capacitors C3, C5, C7, and C9. This network forms a low-pass filter to attenuate harmonic energy of the transmitter to an acceptable level.

A forward power detector follows the harmonic filter. This forward power detector is a microstrip printed circuit, which couples a small amount of the forward power going out of the radio to diode CR2 where it is rectified. This rectified signal forms a voltage that is proportional to forward power out of the radio. A power control circuit in the controller section of the radio holds this voltage constant, which ensures the forward power out of the radio is held constant.

In the PA compartment, 50k thermistor R6519 senses the temperature in the area of the power module. The resultant signal is fed back to the power control circuit, in the controller section of the radio, which protects U6501 by reducing the power output in the event of an over-temperature condition. Resistor R6520, in series with the A+ line supply, feeds voltage to the power transistor. The voltage across R6520 is sensed and the resultant two inputs are channeled to the power control circuit. The power control circuit senses the voltage drop across this resistor, which is determined by the magnitude of the drain current in Q6505. It uses this as a limit mechanism whereby the power control circuit limits the magnitude of current that can be drawn by Q6505. This protects the device from excessive power dissipation.

Reverse polarity protection for the transmitter is provided by diode CR6508. The cathode is soldered to the A+ line while the anode is shorted to the chassis via a spring. In kit FLF5607A, the diode is a surface mount device and the anode is soldered to the printed circuit board ground plane.Under reverse polarity conditions to the radio, this diode conducts and protects the radio from damage. This diode also provides transient over-voltage protection by breaking down when the supply voltage to the radio exceeds 24 volts.

Synthesizer Detailed Functional Description (All Kits)

The synthesizer section of the radio generates the first conversion local oscillator signal and the second conversion reference oscillator for the receiver portion of the radio. It also generates the transmitter rf carrier signal, which is frequency modulated by the amplified and processed audio signal from the output of the audio signal filter IC (ASFIC) in the controller section of the radio. The frequency modulated transmitter rf carrier signal is amplified by the transmitter PA section of the radio.

The following discussion is based on the schematic diagram for the synthesizer section on page 55. The synthesizer section consists of a pendulum reference oscillator (U6704) and a phase locked loop (PLL), which is made up of a fractional-N synthesizer integrated circuit (IC), (U6702), a loop filter, two voltage controlled oscillators (VCO) (U6711 and U6712), a buffer amplifier (U6703), and a feedback amplifier (Q6710).

The pendulum reference oscillator (U6704) contains a temperature compensated crystal, which has an oscillation frequency of 16.8 MHz. The output of the oscillator (pin 10 of U6704) is applied to pin 14 (XTAL1) of U6702 via C6717 and R6701. VCOs U6711 and U6712 are varactor tuned. The VCO frequencies are controlled by the voltage applied to pin 10 of U6711 and U6712. This control voltage ranges from about 2.5 to10.5Vdc. A small control voltage produces a lower frequency and a large control voltage produces a high frequency, respectively.

The RX VCO U6712 (861 - 867 MHz frequency range) provides the first LO injection frequency for the receiver, which is 73.35 MHz below the carrier frequency. The RX VCO is selected by setting pin 7 high on U6712.

The TX VCO U6711 (896 - 941 MHz frequency range) provides the transmit frequency in conventional mode and the transmit frequencies in talk around mode. The Tx VCO is selected by setting pin 8 high on U6711.

The buffer stage (U6703) and the feedback amplifier (Q6710) provide the necessary gain and isolation for the phase locked loop.

The fractional-N synthesizer IC, U6702, consists of a prescaler, a programmable loop divider, control divider logic, a phase detector, a charge pump, an A/D converter for low frequency digital modulation, a balance attenuator to balance the high and low frequency analog modulation, a 13V positive voltage multiplier, a serial interface for control, and a super filter for the regulated 9.3 volts. Q6709 is used as a current amplifier for the super filter. The output voltage of the super filter (collector of Q6709) drops from 9.3V to about 8.5V. This filtered 8.5Vdc supplies the voltage for the VCOs (U6711 and U6712), the TX/RX VCO switches (U6708 and U6710), the feedback amplifier (Q6710), and the synthesizer charge pump resistor network (R6705, R6706 and R6755).

The synthesizer supply voltage is provided by the 5V regulator (U6705). The 2.1 MHz reference signal (pin 10 of U6702) is generated by dividing down the signal of the reference oscillator U6704 after it is applied to pin 14 of U6702.

In order to generate a high voltage that supplies the charge pump output stage at pin VCP (pin 36 of U6702), 13 V is generated at pin 1 of CR6701 by the positive voltage multiplier circuitry (CR6701). This voltage multiplier is basically a diode capacitor network driven by two 1.05 Mhz, 180 degrees out of phase signals (pins 8 and 9 of U6702).

The serial interface (SRL) is connected to the controller section of the radio via the data line (pin 2 of U6702), clock line (pin 3 of U6702), and chip enable line (pin 4 of U6702). Proper enabling of these lines allows the controller section to load the fractional-N synthesizer IC.

The output of the VCO (pin 4 of U6712 or pin 6 of U6711) is fed into the buffer input port (pin 1) of U6703 through an attenuator network (R6707, R6708, R6709). The output of the buffer, pin 5 of U6703, is applied to the input of the feedback amplifier (Q6710) through an attenuator network (R6749, R6750, R6751). To close the synthesizer loop, the output of Q6710 is connected to the PREIN port (pin 21) of synthesizer U6702. The buffer output (pin 5 of U6703) also provides signal for the receiver LO injection and the transmit injection string circuit. The charge pump current is present at pin 31 of U6702.

The loop filter (which consists of R6702, R6703, R6704, C6732, C6734, C6735, C6736, C6737, C6785, C6786, C6817, C6818) transforms this current into a voltage. That voltage is applied to pin 8 of the TX VCO (U6711) or pins 7 of RX VCO (U6712), which alters the output frequency.

The phase locked loop is frequency modulated by the transmit audio signal from the controller section. To accomplish this, the audio signal from the controller section is applied to pin 5 of fractional-N synthesizer IC U6702.

An A/D converter in the fractional-N synthesizer IC converts the analog modulating signal into a digital code, which is applied to a loop divider. This causes the carrier frequency to deviate. A balanced attenuator is used to adjust the VCO's deviation sensitivity to high frequency modulating signals. The output of the balanced attenuator is present at the MOD OUT port (pin 30 of U6702).

The transmit injection string in the synthesizer consists of two amplifier stages (Q6702 and Q6704) whose main purpose is to maintain a constant output to drive the RF power amplifier and to provide isolation. The two stages (Q6704 and Q6702) are actively biased through Q6701 and Q6703. The TX injection string is on only during the transmit mode with K 9.1V.

Controller Detailed Functional Description

The theory of operation for the controller section of the radio is located in Volume 1 of this service manual.

Dc Power Control and Regulation Detailed Functional Description

The theory of operation for the dc power control and regulation section of the radio is located in Volume 1 of this service manual.

Troubleshooting and Repair

3

This chapter is divided into two sections: 3-1, Troubleshooting; and 3-2 Repair.

Section 3-1 provides troubleshooting charts for the receiver, synthesizer, and power amplifier sections of the radio. The receiver, synthesizer, and power amplifier sections of the radio are unique for each frequency range. (Troubleshooting Charts for the overall radio and for the sections of the radio that are common in design for all frequency ranges (i.e., controller, power control, and control heads) are provided in Volume 1 of this Service Manual, Motorola Publication Number 68P81083C20.)

Section 3-2 provides a replacement procedure for the RF power Output transistor (Q6505) used only in the 35-Watt version of the radio.

Troubleshooting information and troubleshooting Charts related to the SECURENET Option for the radio are located in the SECURENET Option Service Manual, Motorola Publication 68P81083C25.

Option Service Manual, Motorola Publication 68P81083C25.

Section 3-1 - Troubleshooting

This section contains the following troubleshooting charts for the receiver, synthesizer, and transmitter sections of the radio.

NOTE: Troubleshooting charts 1-1 through 1-13 are located in Volume 1 of this Service Manual, Motorola Publication 68P81083C20, because these troubleshooting charts are common to all models of the radio.

- **Receiver:**
  - Troubleshooting Chart 2a-1, Receiver Front End - Page 23
  - Troubleshooting Chart 2a-2, Receiver IF and Receiver Back End - Page 24
- **Synthesizer:**
  - Troubleshooting Chart 2a-3, Synthesizer Deviation - Page 25

- Troubleshooting Chart 2a-4, Synthesizer Pendulum Oscillator - Page 26
- Troubleshooting Chart 2a-5, Synthesizer Main - Page 27
- Troubleshooting Chart 2a-6, Synthesizer No Transmitter Injection Signal - Page 28

- **Power Amplifiers:**
  - Troubleshooting Chart 2a-7, 15-Watt Power Amplifier - Page 29
  - Troubleshooting Chart 2a-8, 35-Watt Power Amplifier - Page 30

Section 3-2 - Repair

This section provides a replacement procedure for Q6505, the rf power output transistor in the 30-Watt power amplifier.

Replacement of Transistor Q6505

To replace Q6505, proceed as follows:

Tools and Materials Required

Before proceeding, ensure that the following tools and materials are on hand:

- Alcohol (isopropyl)
- High temperature solder, SN96AG04 composition, Motorola Part No 1180433L04
- Hot air gun (600 degrees maximum temperature)
- Low lint wipers or rag
- Soldering station including a soldering iron with chisel-style tip which is approximately 1/8-inch in size.
- Solder flux.
- Solder wick
- Stiff brush, natural bristles approximately 1-cm high and 1-cm wide.
- Thermal compound, Motorola Part No. 111022D23.
- Transistor assembly tool, Motorola Part No. 0186126F01, Motorola kit No. FLN9037A
- Thermal pad for heatsink block B6501, Motorola part number 7508184K01.

Disassembly of Radio

1. Remove transceiver board from radio chassis following procedure provided in Volume 1 of this service manual, Motorola Publication 68P81083C20.
2. After transceiver board is removed from radio chassis, clean off thermal paste from all surfaces that have thermal paste on them using low lint wipers or rag.

Removing Faulty Transistor

1. Before removing faulty transistor, observe carefully how flange capacitors C6567 and C6568 are mounted. This will help you later in mounting new capacitors.
2. Set hot air gun for medium temperature and low air speed. This will ensure that other components in vicinity of Q6505 will not get dislodged and moved accidently.
3. Train hot air gun on flanges of transistor. After a few moments, the solder holding flanges will reflow enabling transistor and flange capacitors C6567 and C6568 to be lifted off transceiver board together.

Preparing Transceiver Board for New Transistor

1. Using solder wick, isopropyl alcohol, and stiff bristle brush, remove excess solder and clean pads on transceiver board where transistor was soldered.
2. Place transceiver board, with its heavy side up, on transistor assembly tool. Heavy side is side with DC-power and antenna connectors. Make certain that all four guide pins on transistor assembly tool are engaged into their corresponding holes in transceiver board.
3. Identify the six pads on transceiver board corresponding to the six flanges on transistor. The four corner pads are ground; the middle pad towards antenna connector is the transistor collector; and the opposite middle pad is the transistor emitter.

   NOTE: In next step, be certain to tin transistor pads and fill via holes with high temperature solder, composition SN96PB04.

4. Using solder iron, carefully tin each of the six pads so that they are covered with a thin coat of solder and all via holes are filled.

Positioning New Transistor

1. Place a small spot of flux on each of the six transceiver-board pads to which the flanges of transistor are to be soldered.
2. Insert the narrow-diameter side of a spacer, Motorola Part Number 4380545K01, into each of the two transistor mounting holes in transceiver board.
3. Ensure that new transistor is correct replacement type by verifying that M25C17 is printed on transistor face.

   NOTE: Collector flange of transistor is the one with its corner cut off.

4. Position new transistor onto transceiver board with collector flange oriented towards antenna connector. Ensure that transistor is sitting snug on transceiver board with all six flanges flat on their corresponding transceiver-board pads.
5. Lower arm of Distaco clamp on transistor assembly tool. Then lock clamp with its lever to clamp transistor in place on transceiver board.

Soldering Transistor

1. Place a small spot of flux on each of the six transistor flanges.
2. Solder each transistor flange to transceiver board as follows:
    1. - Set soldering iron temperature to approximately 400 degrees Centigrade.
    2. - Melt a small mound of solder onto flat face of soldering iron.

Caution

In next step, to avoid damage to transistor and capacitors, ensure that each soldering operation takes *no more* than three to four seconds to accomplish.

3. Press face of soldering iron firmly to flange for *no more* than three to four seconds.
4. Inspect transistor flange carefully to ensure it is soldered securely, and that it is not shorted to any of the other flanges or to the transistor heat sink.

Installing Flange Capacitors C6567 and C6568.

NOTE: Capacitors C6567 and C6568 get mounted flat on transistor collector and ground flanges with non-solderable edge flush against transistor body. Each capacitor is attached by soldering its outside solderable edge to one of the transistor ground flanges and its inside solderable edge to transistor collector flange. There must be a gap of approximately 2 millimeters between the two capacitors (i.e., room to insert a chisel style solder iron tip) to ensure that good solder joints can be made between capacitor leads and collector flange of transistor.

1. Ensure that both capacitors C6567 and C6568 are correct replacement type by verifying that Motorola Part Number is 2113742B25, value is 18pF, and marking is G1.

Caution

In next two steps, to avoid damage to transistor and capacitors, ensure that soldering operations take *no more* than three to four seconds to accomplish.

2. Solder outside solderable edge of each capacitor to one transistor ground flange, being certain that each capacitor is flat on transistor flange with non-solderable edge flush against transistor body.

3. Place a small drop of flux on transistor collector flange between capacitors. Place chisel style solder iron tip between capacitors and onto collector flange of transistor. Feed in some high temperature solder (SN96PB04) so that inside solderable edges of both capacitors are soldered securely to collector flange of transistor.
4. Examine soldered capacitors. Ensure that they are reasonably flush against transistor body and are not shorting transistor collector flange to transistor heat sink.
5. Examine surrounding components to ensure that none of them have been damaged or displaced.

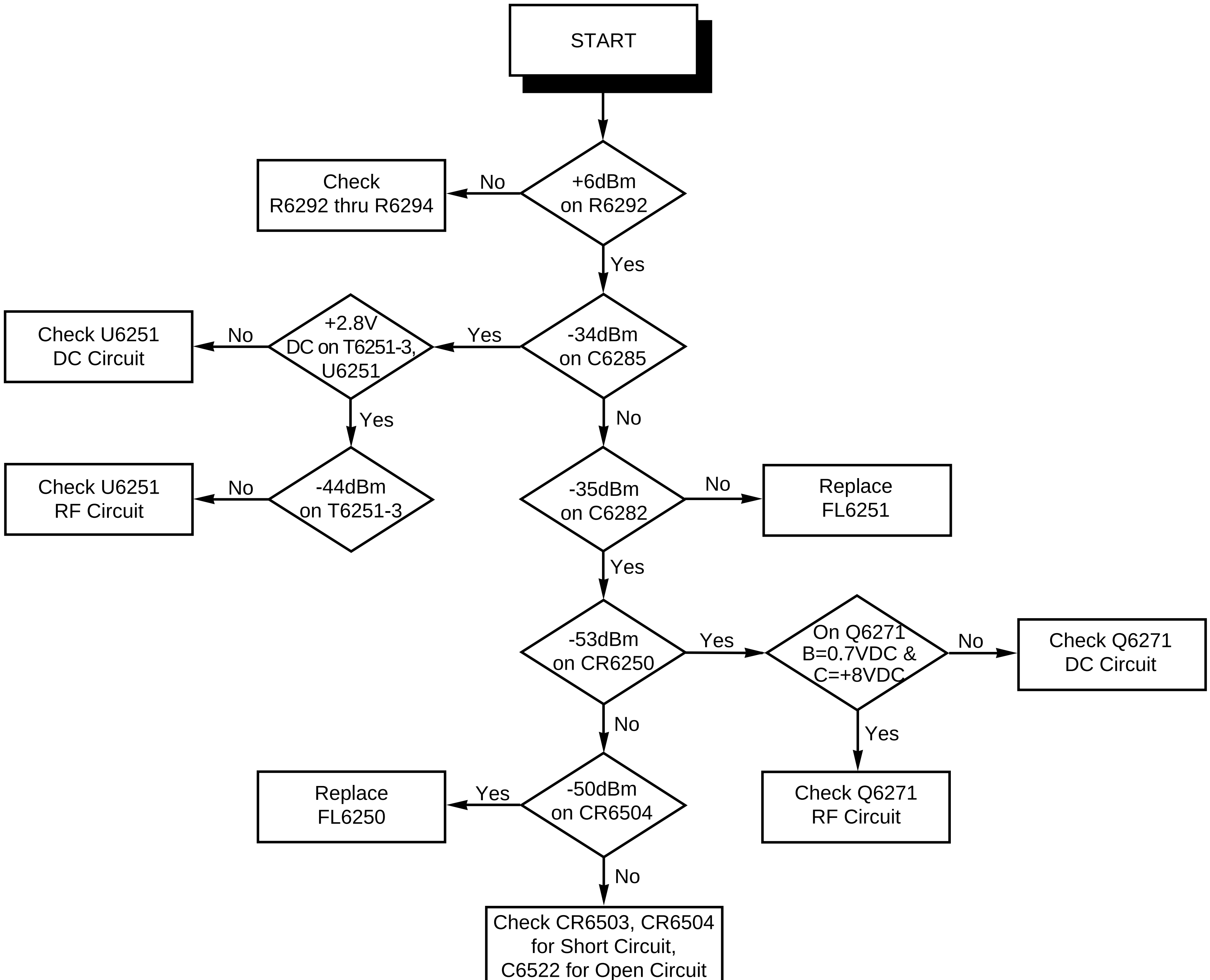
Reassembly of Radio

1. Examine face of transistor heat sink. Ensure that it is free from burrs and flux, which could prevent a good thermal contact to radio chassis.
2. Spread thermal compound on heat sink of the following components:

- Transistor Q6505
- PA module U6501
- Audio PA module U0203
- +5V regulator U0500
- +9.3V voltage regulator U0501

3. Place a new thermal pad, Motorola Part No. 7508184K01, on heat sink block B6501.
4. Install transceiver board into radio chassis following procedure provided in Volume 1 of this service manual, Motorola Publication 68P81083C20.

NOTES



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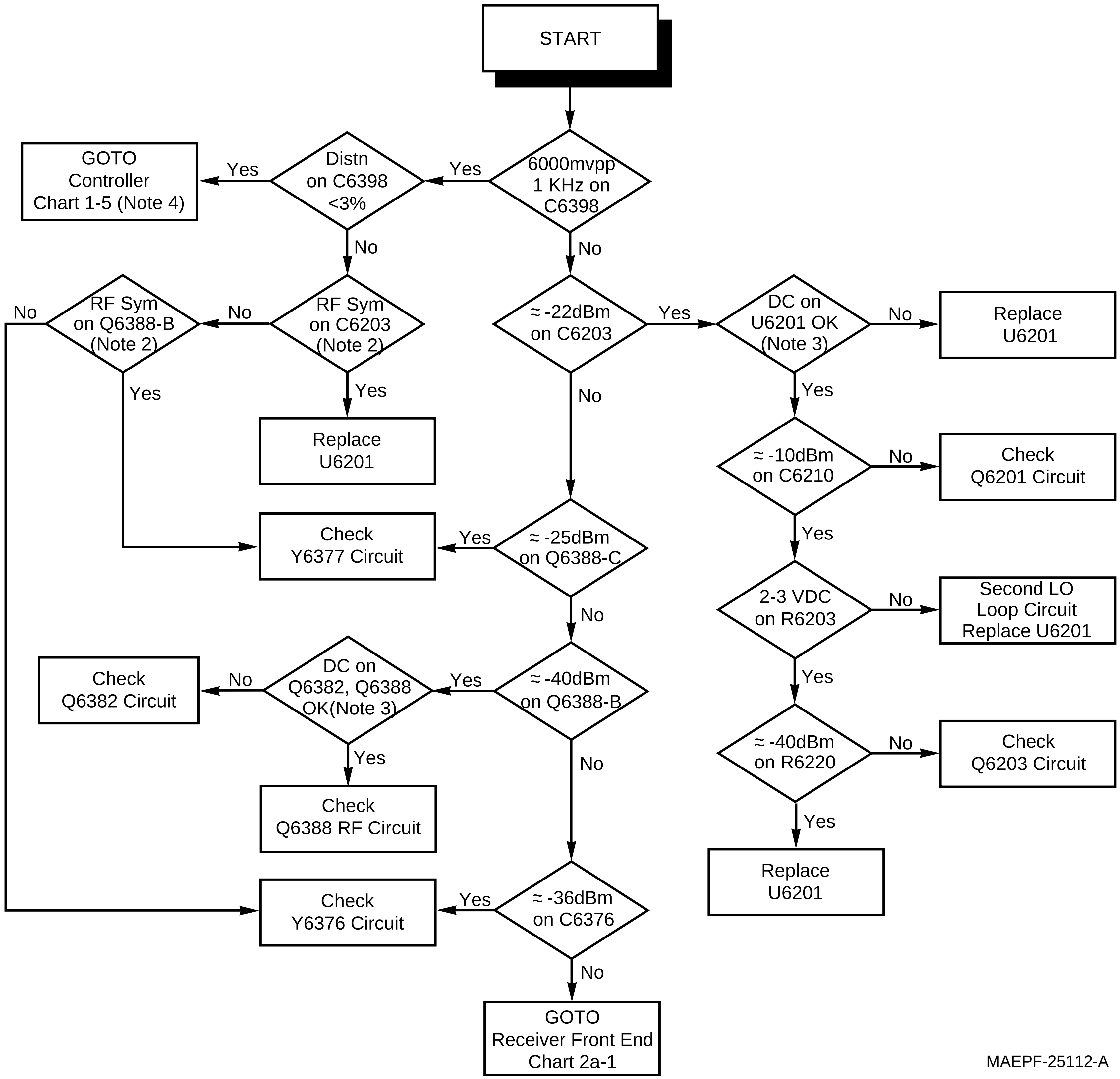

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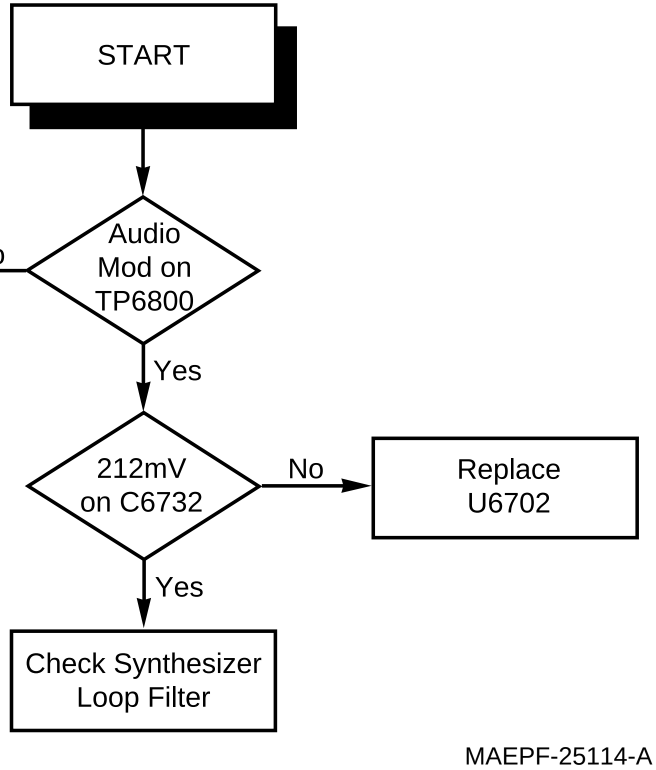
NOTES:
1. Check distortion with HP8903B using either CCITT, C-MESSAGE, or PSHOMETRIC audio filter.
2. At F_0 ±3, 6, 9 KHz (No Modulation) RF Symnetry should be ±1dB.
3. DC Voltages for Q6382, Q6388, and U6201 are:

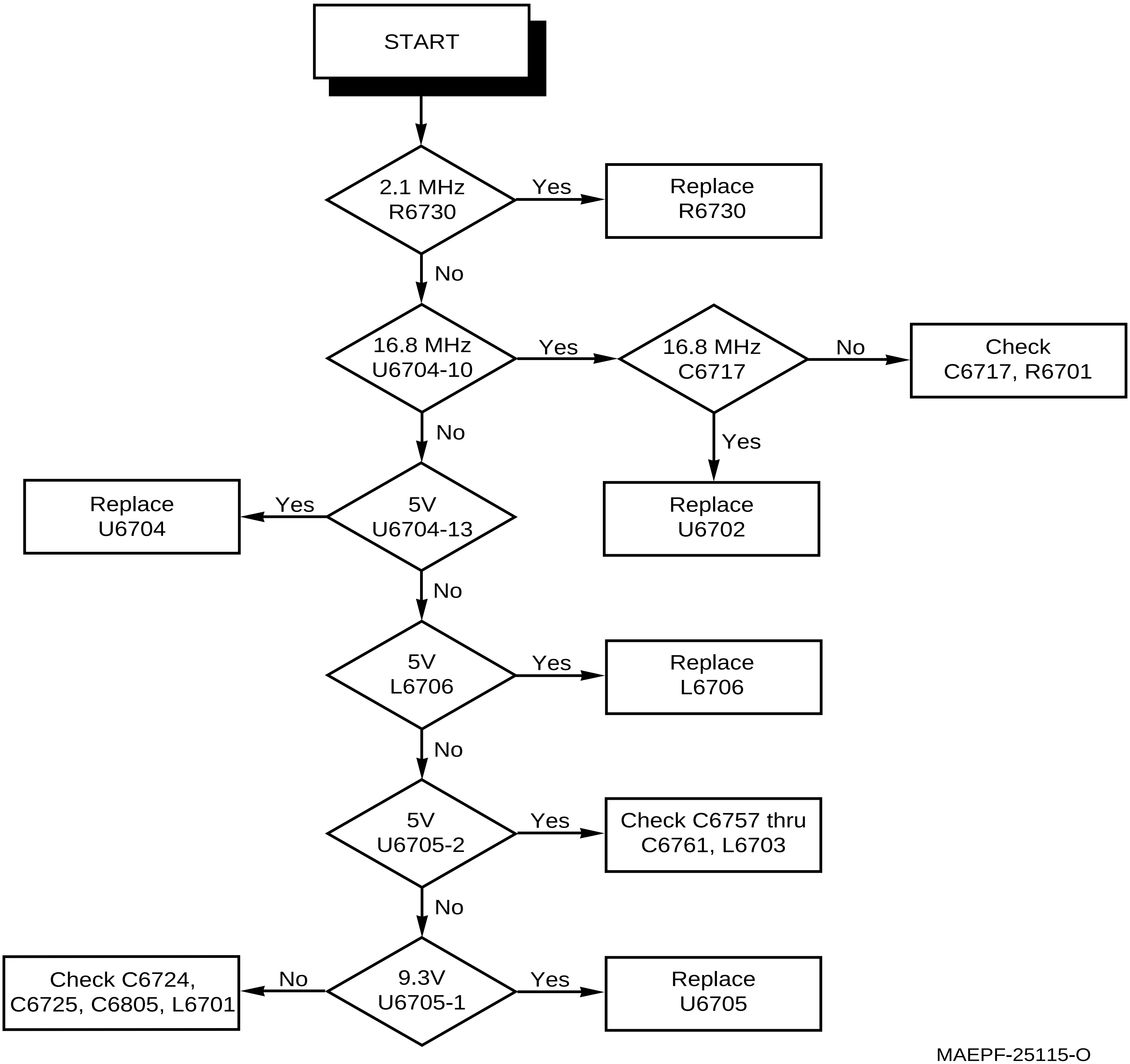
Device	Emitter	Base	Collector
Q6382	6.25	5.7	1.05
Q6388	0.1	0.85	6.2
U6201	1.7	2.3	3.3

4. Chart 1-5 is located in Volume 1 of this service manual.

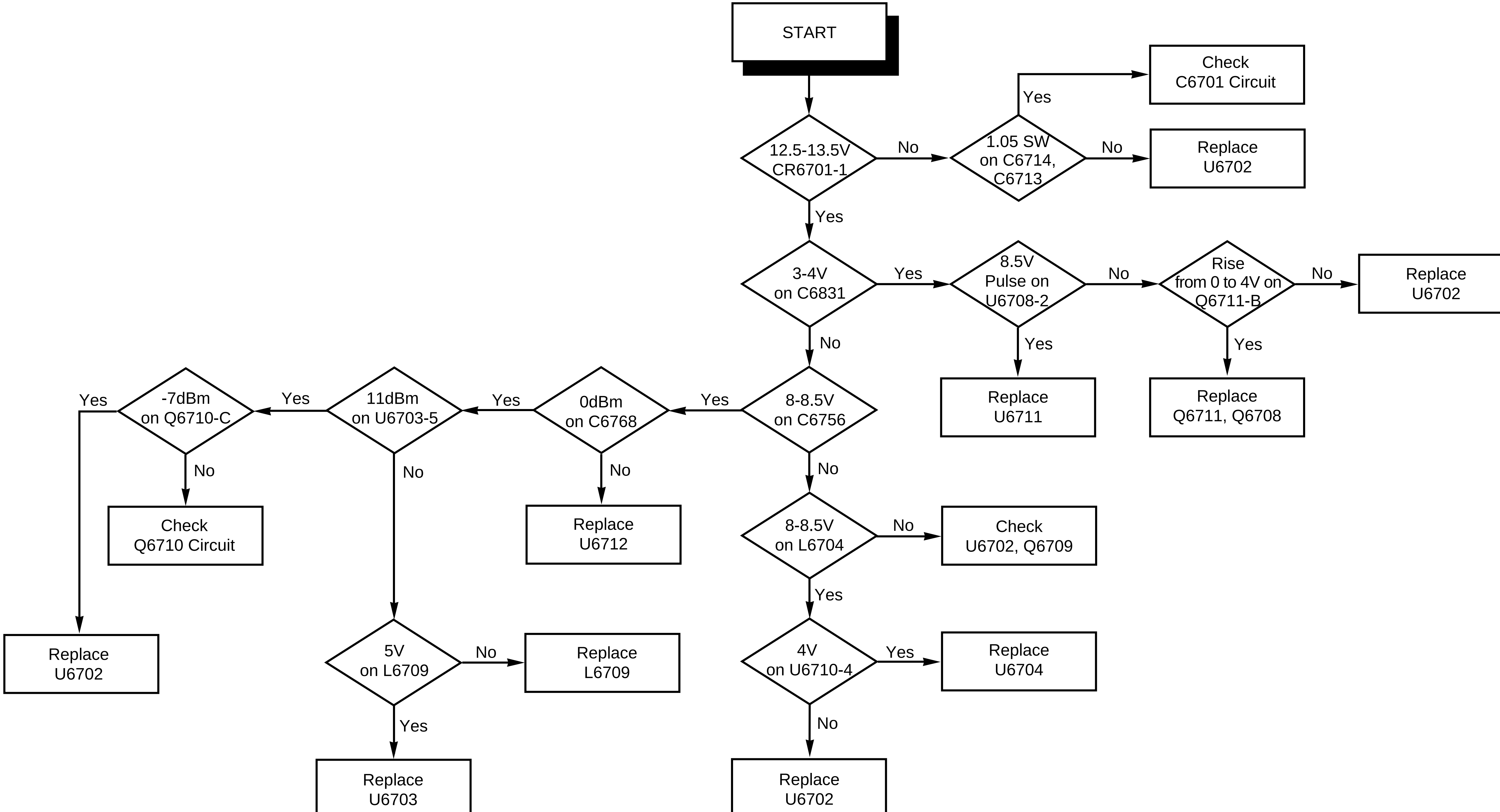
Troubleshooting Chart 2a-2
Receiver IF and Receiver Back End



NOTE: 1. Chart 1-4 is located in Volume 1 of this service manual.



Troubleshooting Chart 2a-4
Synthesizer Pendulum Oscillator



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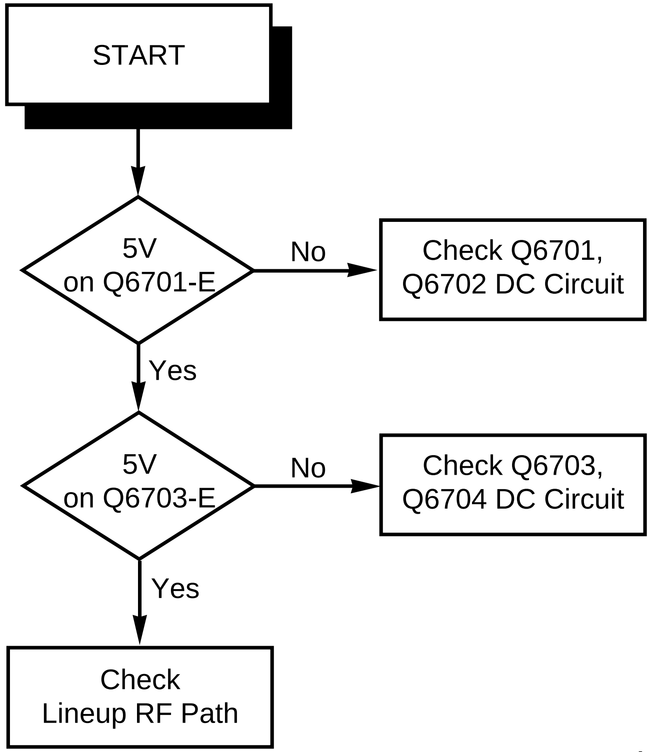

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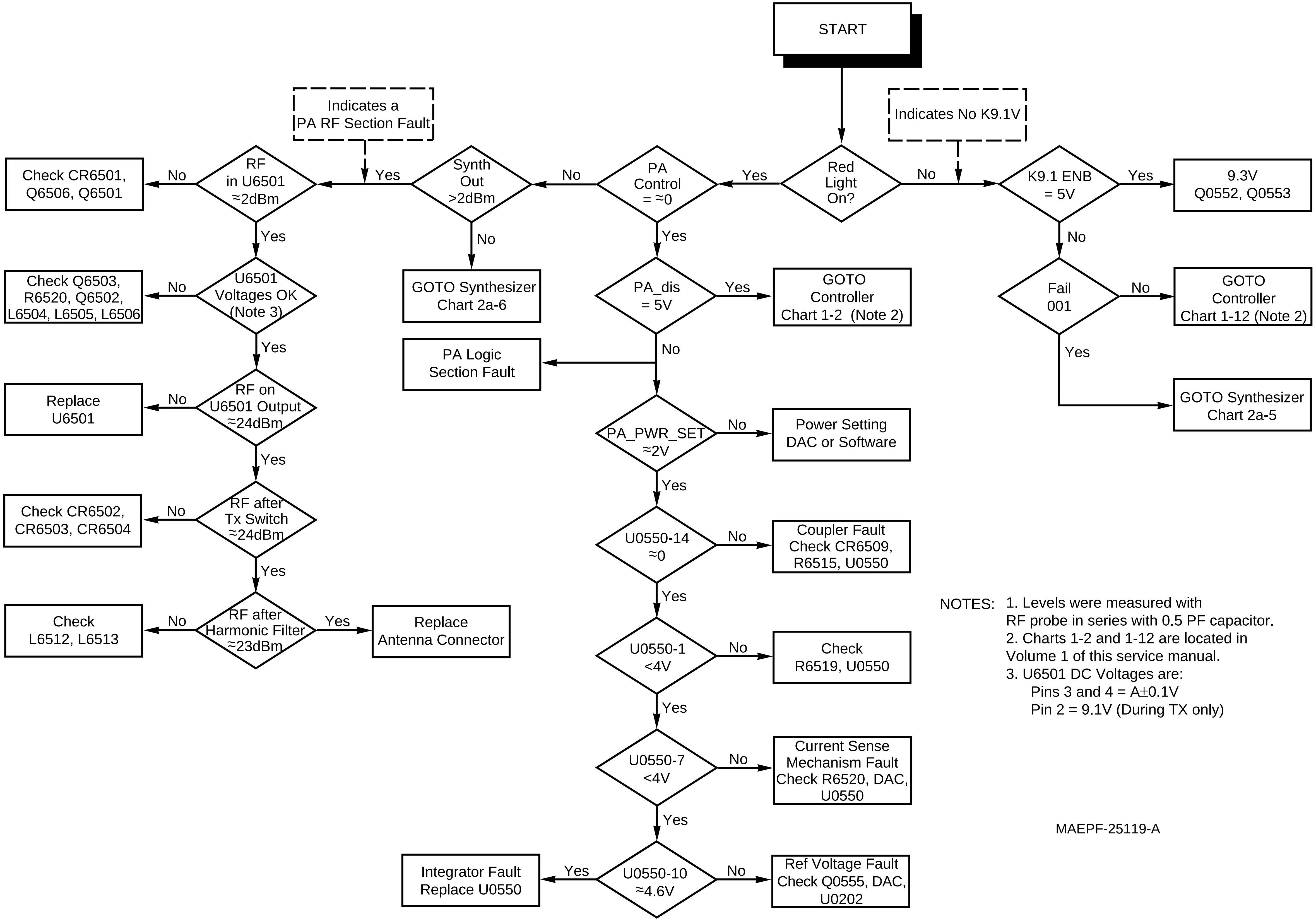
**Troubleshooting Chart 2a-6 Synthesizer -
No Transmitter Injection Signal**



NOTES:
1. Levels were measured with RF probe in series with 0.5 PF capacitor.
2. Charts 1-2 and 1-12 are located in Volume 1 of this service manual.
3. U6501 DC Voltages are:
   Pins 3 and 4 = A±0.1V
   Pin 2 = 9.1V (During TX only)

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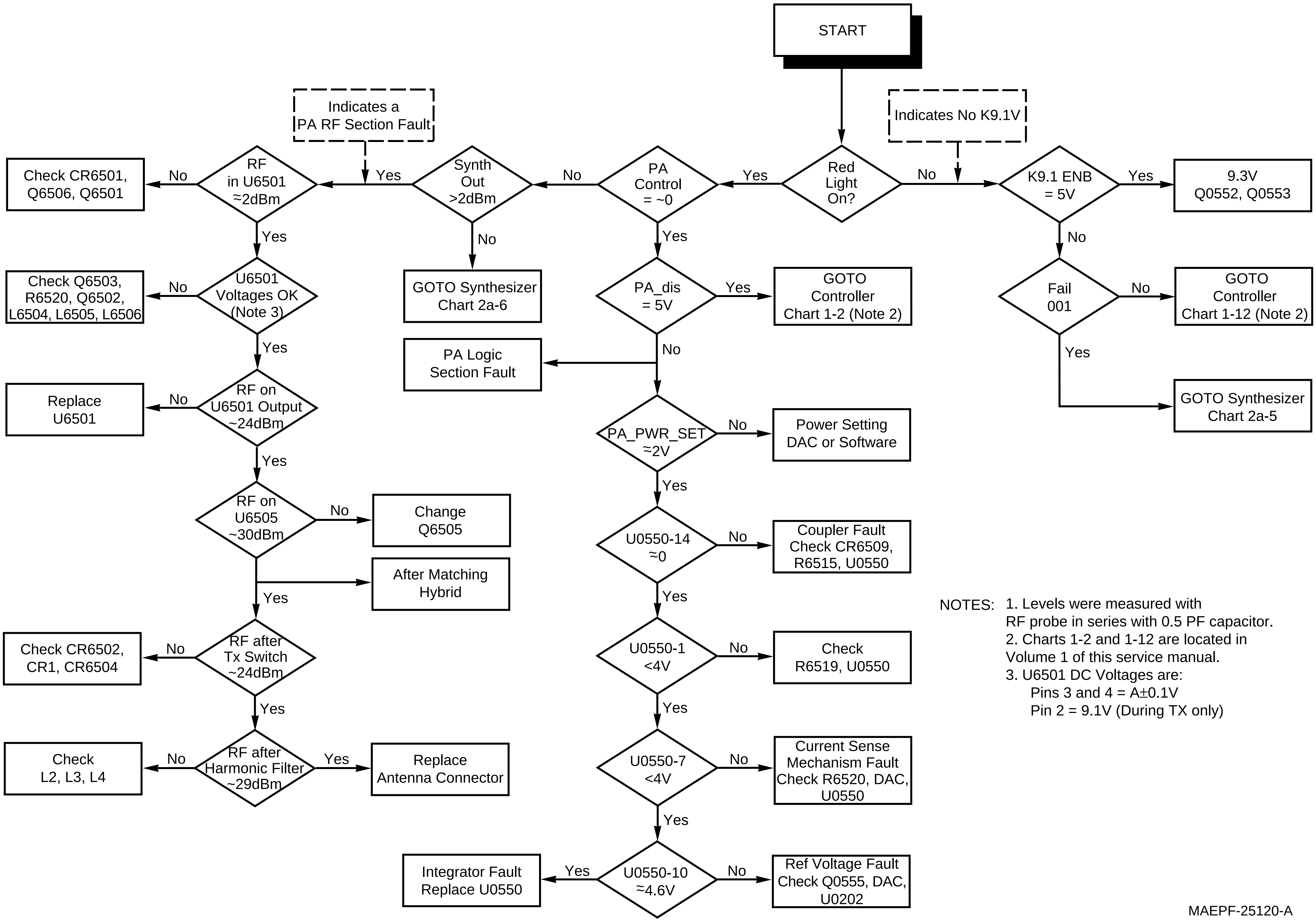

NOTES:
1. Levels were measured with RF probe in series with 0.5 PF capacitor.
2. Charts 1-2 and 1-12 are located in Volume 1 of this service manual.
3. U6501 DC Voltages are:
   Pins 3 and 4 = A±0.1V
   Pin 2 = 9.1V (During TX only)

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Troubleshooting Chart 2a-8 35Watt Power Amplifier No RF Power Output

Reference Drawings

4

This section contains the reference drawings listed below for the receiver (front end, IF, and back end), transmitter, and synthesizer portions of the radio.

- **Overall Radio:**
  - Transceiver Board Section Locations - Page 32
  - Schematic Diagram Interconnection List, Table 2 - Page 57
- **Receiver:**
  - Receiver Front End Component Locations and Parts List - Page 34
  - Receiver Front End Schematic Diagram - Page 35
  - Receiver IF Component Locations and Parts List - Pages 36 and 38
  - Receiver IF Schematic Diagram - Pages 37 and 39
  - Receiver Back End Component Locations and Parts List - Pages 40, 42, and 44
  - Receiver Back End Schematic Diagram - Pages 41, 43, and 45
- **Power Amplifiers:**
  - 15-Watt Power Amplifier Component Locations and Parts List - Pages 46 and 48
  - 15-Watt Power Amplifier Schematic Diagram - Pages 47 and 49
  - 35-Watt Power Amplifier Component Locations and Parts List - Pages 50 and 52
  - 35-Watt Power Amplifier Schematic Diagram - Pages 51 and 53
- **Synthesizer:**
  - Synthesizer Component Locations and Parts List - Page 54
  - Synthesizer Schematic Diagram - Page 55

Refer to Volume 1 of this service manual (Motorola Publication 68P81083C20) for reference drawings for the controller and control head portions of the radio.

Refer to the Secure Option service manual (Motorola Publication 68P81083C25) for reference drawings for the secure option for the radio.

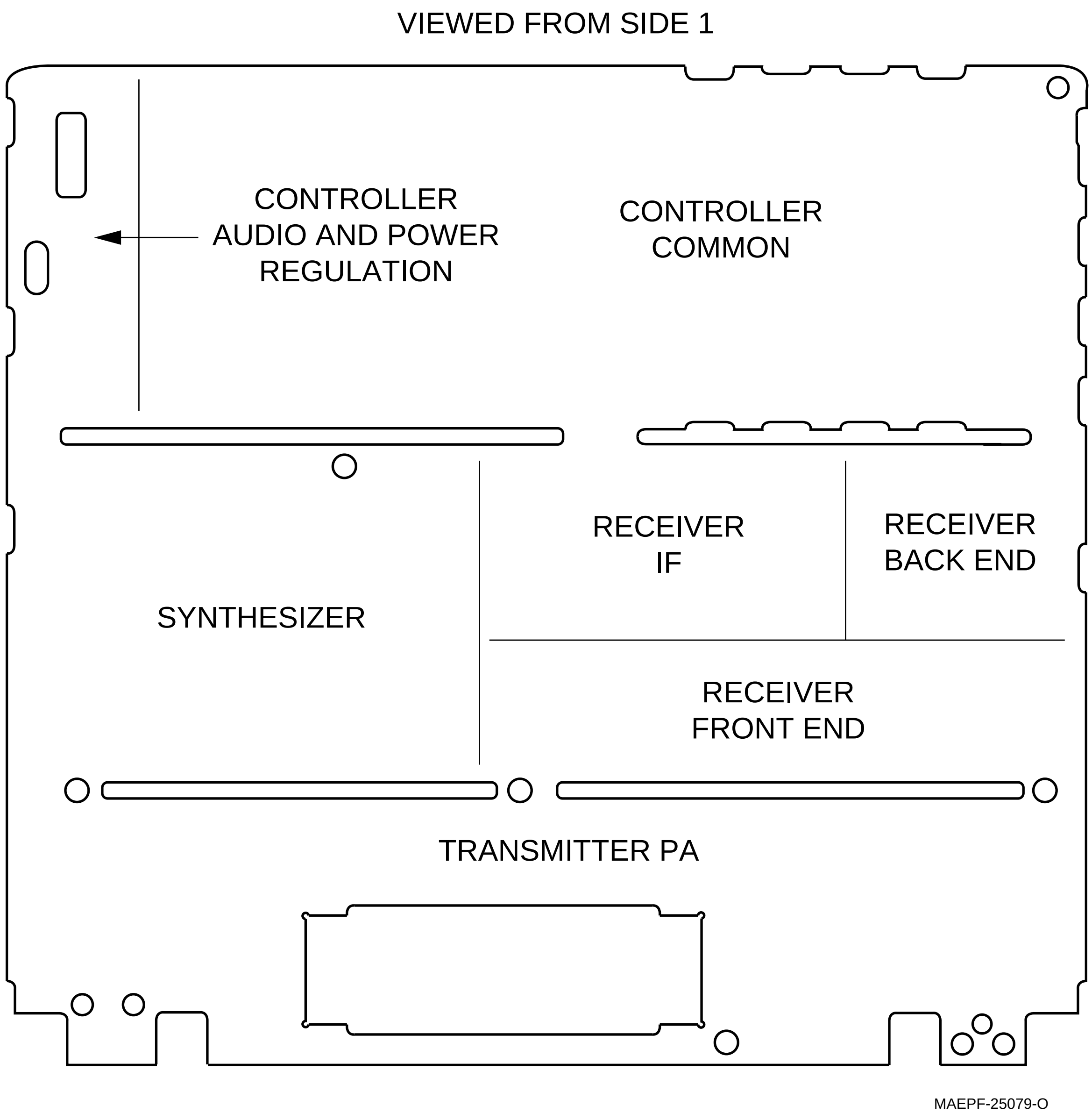
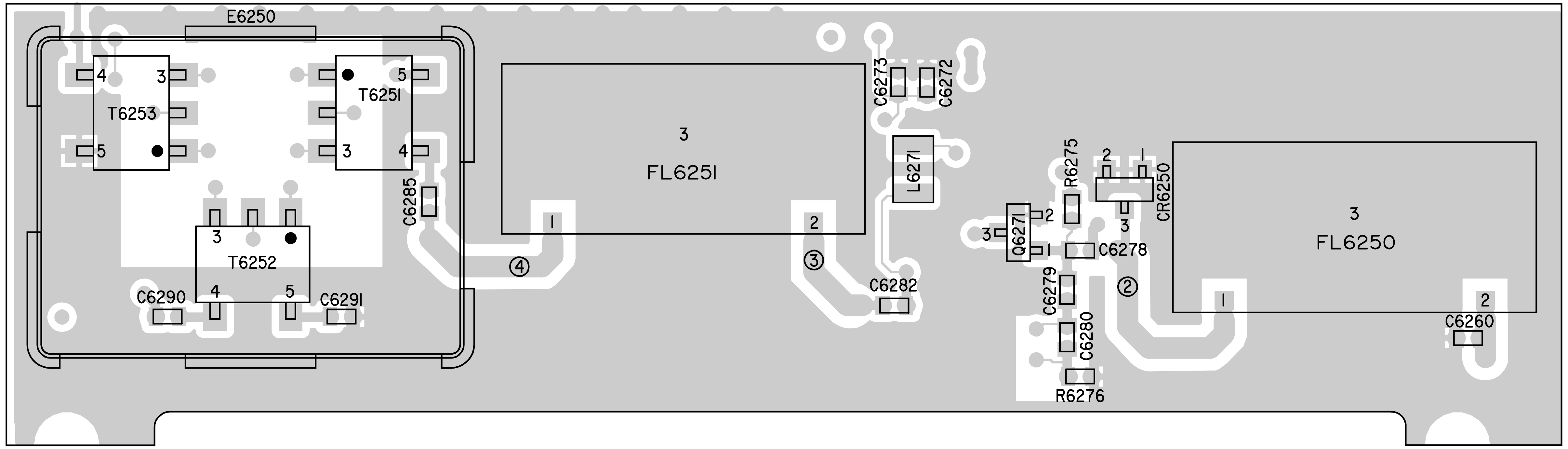


Figure 2 Transceiver Board Section Locations

NOTES

RECEIVER FRONT END COMPONENT LOCATIONS



HEAVY COMPONENTS SIDE

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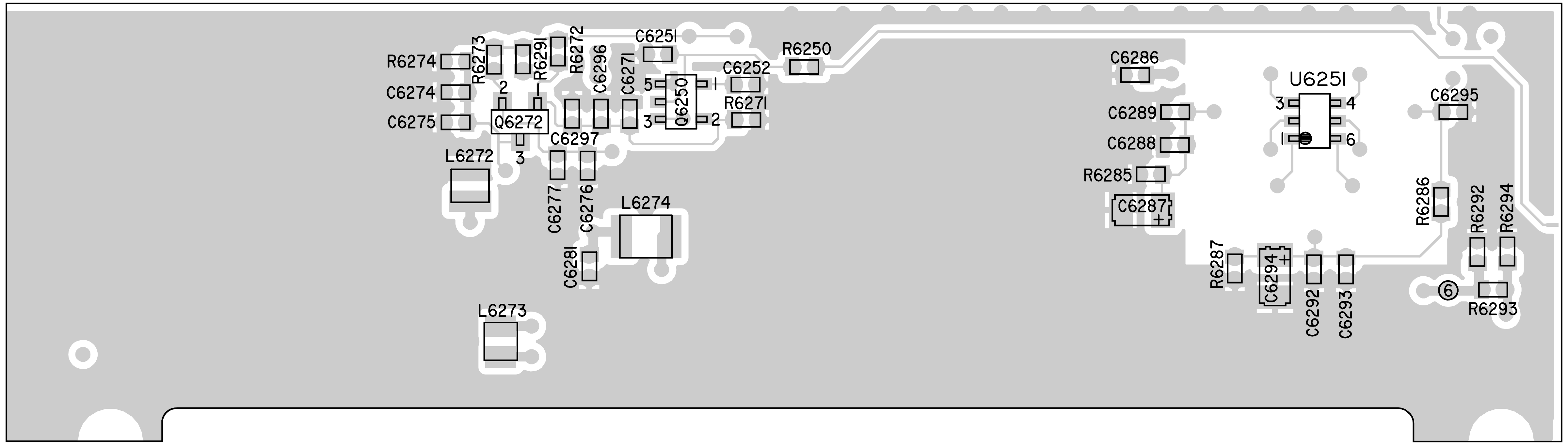

LIGHT COMPONENTS SIDE

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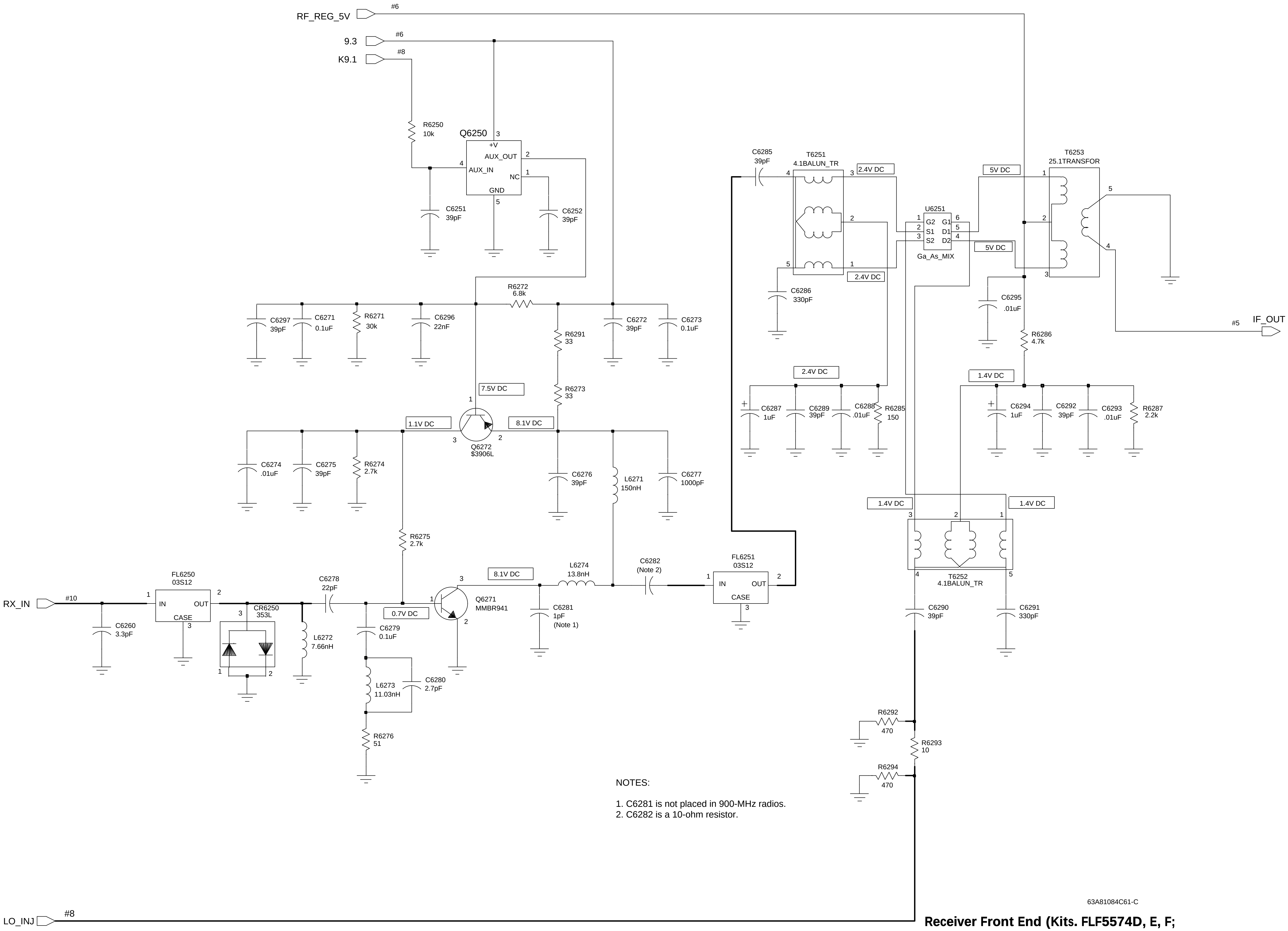
RECEIVER FRONT END PARTS LIST

REFERENCE SYMBOL	MOTOROLA PART NUMBER	DESCRIPTION
		CAPACITORS:
C6251	2113740F41	39pF
C6252	2113740F41	39pF
C6271	2113743K15	0.1uF
C6272	2113740F41	39pF
C6273	2113743K15	0.1uF
C6274	2113741F49	10nF
C6275	2113740F41	39pF
C6276	2113740F41	39pF
C6277	2113741F25	1nF
C6278	2113740F35	22pF
C6279	2113743K15	0.1uF
C6280	2113740F13	2.7pF
C6281	2113740F03	1.0pF
C6282	0662057A01	10-Ohm Resistor
C6285	2113740F41	39pF
C6286	2113741F13	330pF
C6287	2311049A07	1uF
C6288	2113741F49	10nF
C6289	2113740F41	39pF
C6290	2113740F41	39pF
C6291	2113741F13	330pF
C6292	2113740F41	39pF
C6293	2113741F49	10nF
C6294	2311049A07	1uF
C6295	2113741F49	10nF
C6296	2113743E07	22nF
C6297	2113740F41	39pF
		DIODES:
CR6250	4880154K03	Dual Schottky Mixer
		FILTERS:
FL6250	9102603S10	860-MHz Filter
FL6251	9102603S10	860-MHz Filter
		INDUCTORS:
L6271	2462587T17	150nH
L6272	2460591A11	7.6nH
L6273	2460591B04	11.03nH
L6274	2460591C23	13.8nH
		TRANSISTORS:
Q6250	4805921T02	Special Rf Power Amplifier
Q6271	4882022N70	NPN
Q6272	4813824A17	PNP
		RESISTORS:
R6250	0662057A73	10K
R6271	0662057A84	30K
R6272	0662057A69	6.8K
R6273	0662057A13	33
R6274	0662057A59	2.7K
R6275	0662057A59	2.7K
R6276	0662057A18	51
R6285	0662057A29	150

REFERENCE SYMBOL	MOTOROLA PART NUMBER	DESCRIPTION
R6286	0662057A65	4.7K
R6287	0662057A57	2.2K
R6291	0662057A13	33
R6292	0662057A41	470
R6293	0662057A01	10
R6294	0662057A41	470
		TRANSFORMERS:
T6251	2505515V03	4:1 BALUN
T6252	2505515V03	4:1 BALUN
T6253	2505515V07	Transformer, 25:1
		INTEGRATED CIRCUITS:
U6251	5105625U28	Balanced GaAs Mixer
		SHIELDS:
SH6201	2602660J01	TX Inj Shield
SH6202	2605261V01	2nd L.O. Shield
SH6250	2605915V01	TX Pwr Ampl Shield
		Printed Circuit Boards (For Reference Only):
	8404994E05 Issue P5	For Kits FLF5574D, E, F
	8404416P04 Issue P4	For kits FLF5579C, D, E
	8404416P05 Issue P5	For Kit FLF5600A
	8408537Y01 Issue P1	For Kit FLF5607A
	8408497Y01 Issue P2	For Kit FLF5950A
	8404416P05 Issue P5	For Kit HUF1188A
	8404994E05 Issue P5	For Kit HUF1189A

NOTES:

1. All resistance values are in ohms unless indicated otherwise.
2. Components shown on component location and schematic diagrams but not included in parts list are not placed.

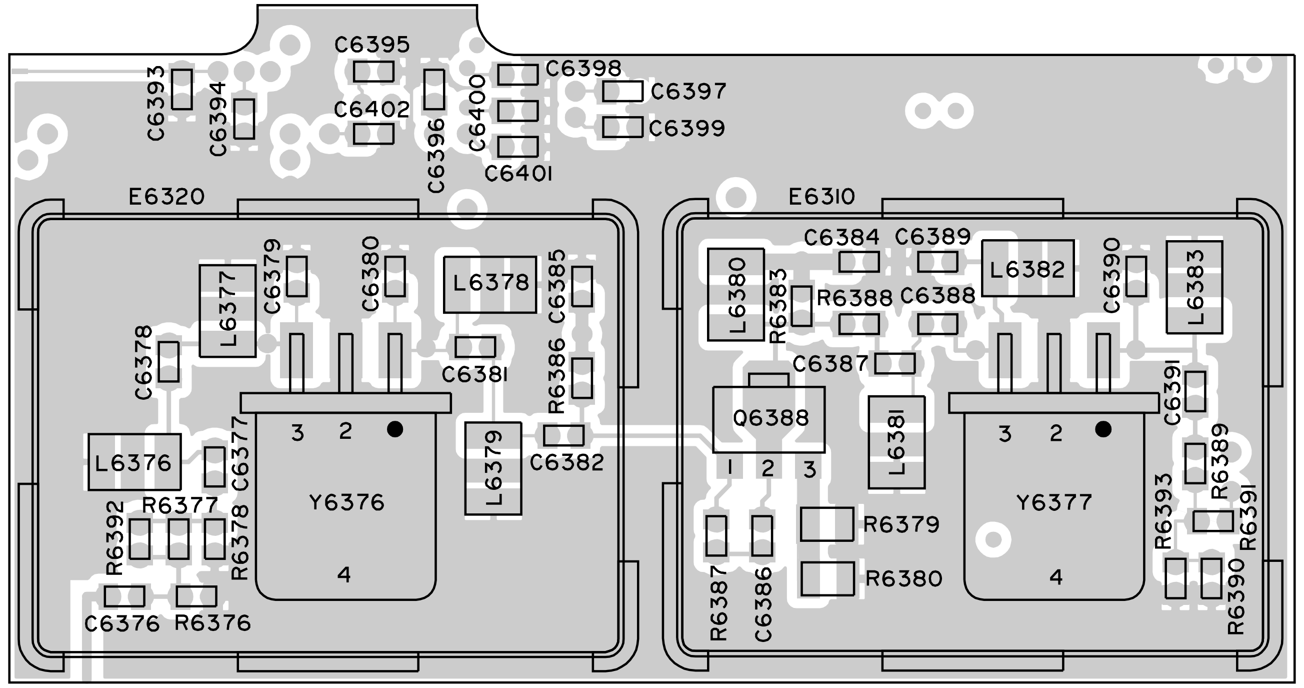


NOTES:

1. C6281 is not placed in 900-MHz radios.
2. C6282 is a 10-ohm resistor.

Receiver Front End (Kits. FLF5574D, E, F; FLF5579C, D, E; FLF5600A, FLF5607A; FLF5950A; HUF1188A; HUF1189A) Schematic Diagram

RECEIVER IF COMPONENT LOCATIONS



HEAVY COMPONENTS SIDE

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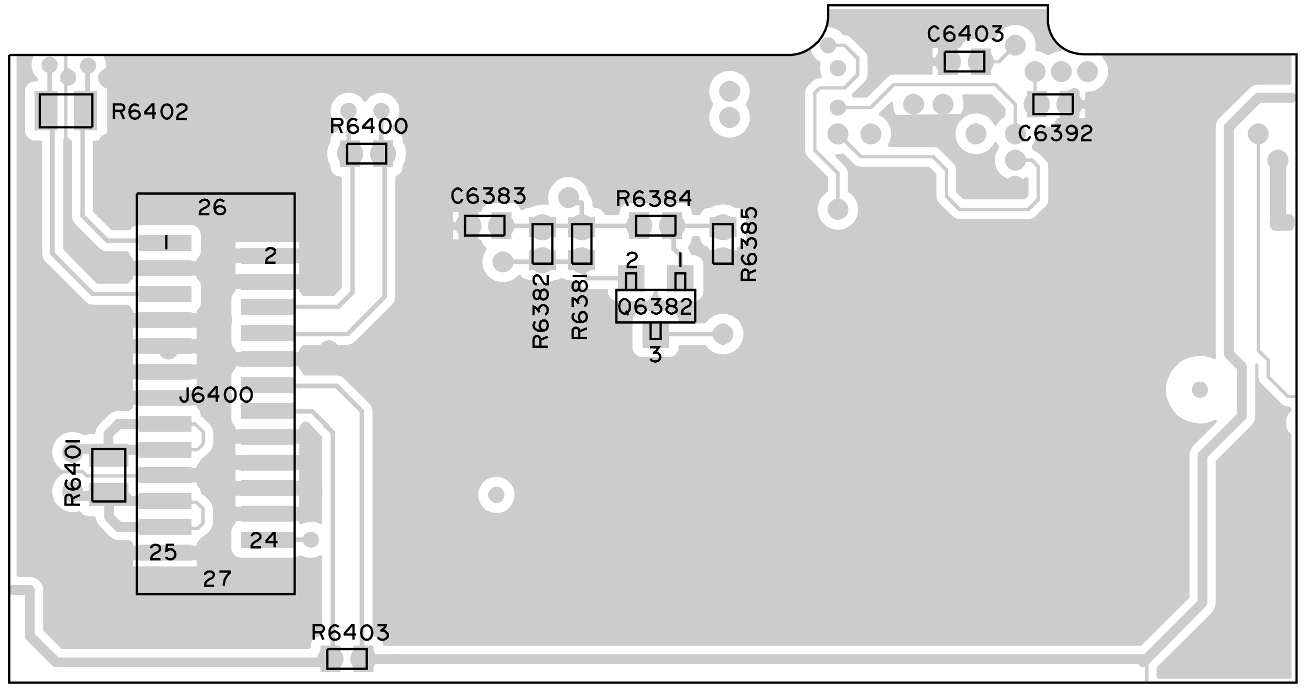


LIGHT COMPONENTS SIDE

MAEPF-25084-O

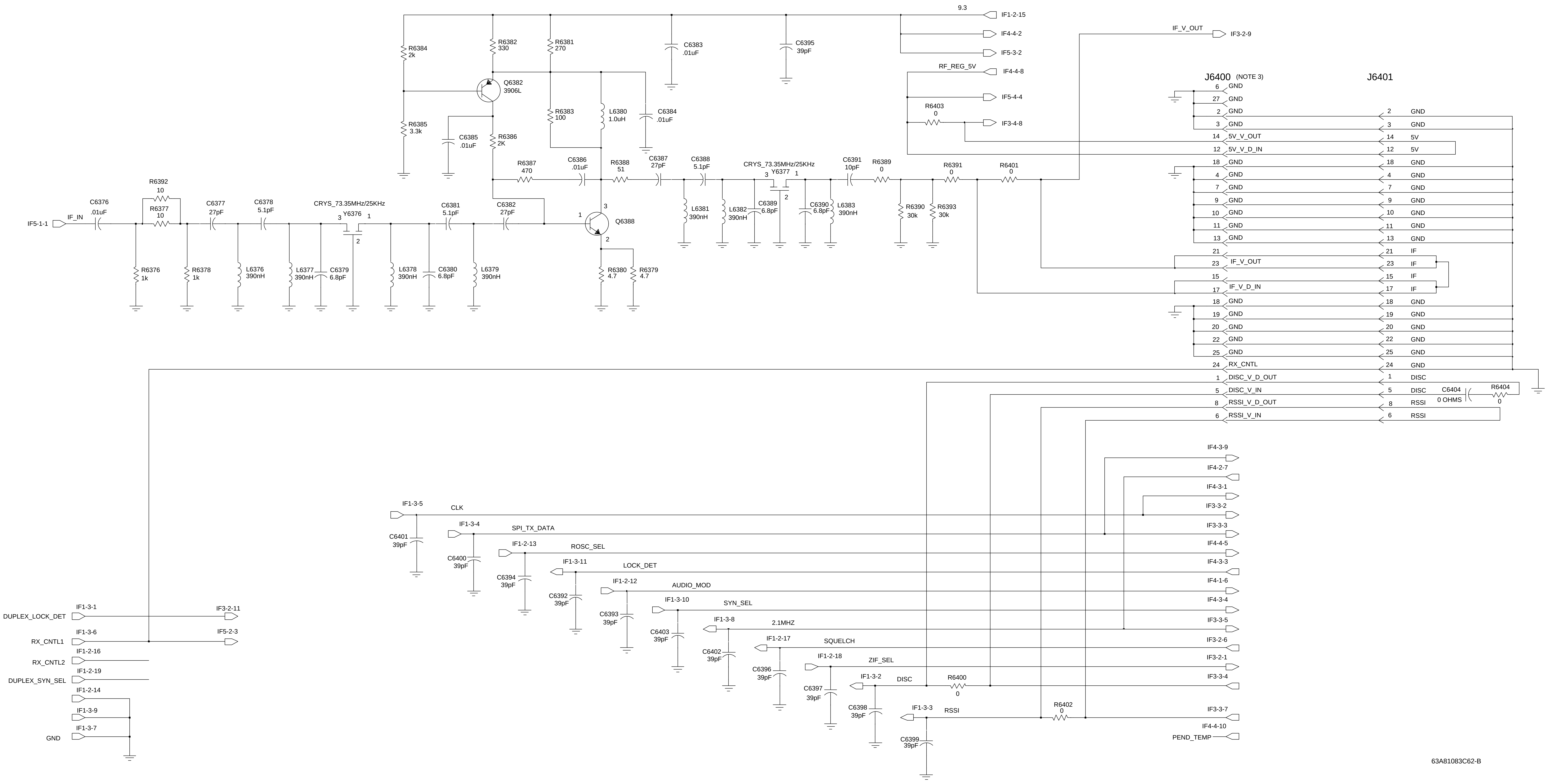
RECEIVER IF PARTS LIST

REFERENCE SYMBOL	MOTOROLA PART NUMBER	DESCRIPTION
		CAPACITORS:
C6376	2113741F49	0.01uF
C6377	2113740F37	27pF
C6378	2113740F20	5.1pF
C6379	2113740F23	6.8pF
C6380	2113740F23	6.8pF
C6381	2113740F20	5.1pF
C6382	2113740F36	24pF
C6383	2113741F49	0.01uF
C6384	2113741F49	0.01uF
C6385	2113741F49	0.01uF
C6386	2113741F49	0.01uf
C6387	2113740F36	24pF
C6388	2113740F20	5.1pF
C6389	2113740F23	6.8pF
C6390	2113740F23	6.8pF
C6391	2113740F31	15pF
C6392	2113740F41	39pF
C6393	2113740F41	39pF
C6394	2113740F41	39pF
C6395	2113740F41	39pF
C6396	2113740F41	39pF
C6397	2113740F41	39pF
C6398	2113740F41	39pF
C6399	2113740F41	39pF
C6400	2113740F41	39pF
C6401	2113740F41	39pF
C6402	2113740F41	39pF
C6403	2113740F41	39pF
C6404	0662057C01	0-ohm Resistor
		CONNECTORS:
J6400	0913915A18	Receptacle
		INDUCTORS:
L6376	2462587T22	390nH
L6377	2462587T22	390nH
L6378	2462587T22	390nH
L6379	2462587T22	390nH
L6380	2462587T30	1000nH
L6381	2462587T22	390nH
L6382	2462587T22	390nH
L6383	2462587T22	390nH
		TRANSISTORS:
Q6382	4813824A17	PNP
Q6388	4882971R01	NPN
		RESISTORS:
R6376	0662057A49	1K
R6377	0662057A01	10
R6378	0662057A49	1K
R6380	0662057C19	4.7
R6381	0662057A35	270
R6382	0662057A37	330
R6383	0662057A25	100
R6384	0662057A56	2K
R6385	0662057A61	3.3K
R6386	0662057A56	2K

REFERENCE SYMBOL	MOTOROLA PART NUMBER	DESCRIPTION
R6387	0662057A41	470
R6388	0662057A18	51
R6389	0662057A29	150
R6391	0662057B47	0
R6392	0662057A01	10
R6400	0662057B47	0
R6401	0662057C01	0
R6402	0662057C01	0
R6403	0662057B47	0
R6404	0662057B47	0 **(On jumper plug J6401)**
		SHIELDS:
SH6310	2605915V01	Power Amplifier
SH6320	2605915V01	Power Amplifier
		FILTERS:
Y6376	9102867C07	Crystal BP 73.35/25; 80dB
Y6377	9102867C08	Crystal BP 73.35/25; 60dB
		PRINTED CIRCUIT BOARDS (For Reference Only):
	8404994E05 Issue P5	For Kits FLF5574D, E, F
	8404416P04 Issue P4	For Kit s FLF5579C, D, E
	8404416P05 Issue P5	For Kit FLF5600A
	8404416P05 Issue P5	For Kit HUF1188A
	8404994E05 Issue P5	For Kit HUF1189A

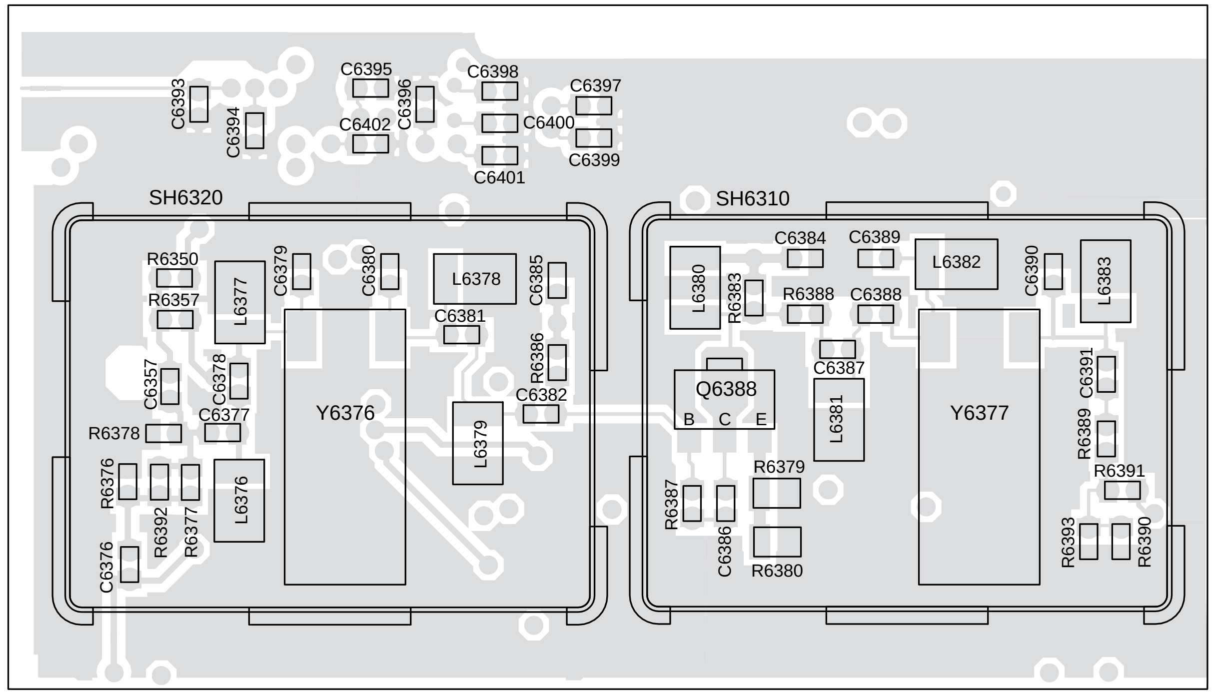
NOTES:

1. All resistance values are in ohms unless indicated otherwise.
2. Components shown on component location and schematic diagrams but not included in parts list are not placed.



Receiver IF (Kits FLF5574D, E, F; FLF5579C, D, E; FLF5600A; HUF1188A; HUF1189A)

RECEIVER IF COMPONENT LOCATIONS



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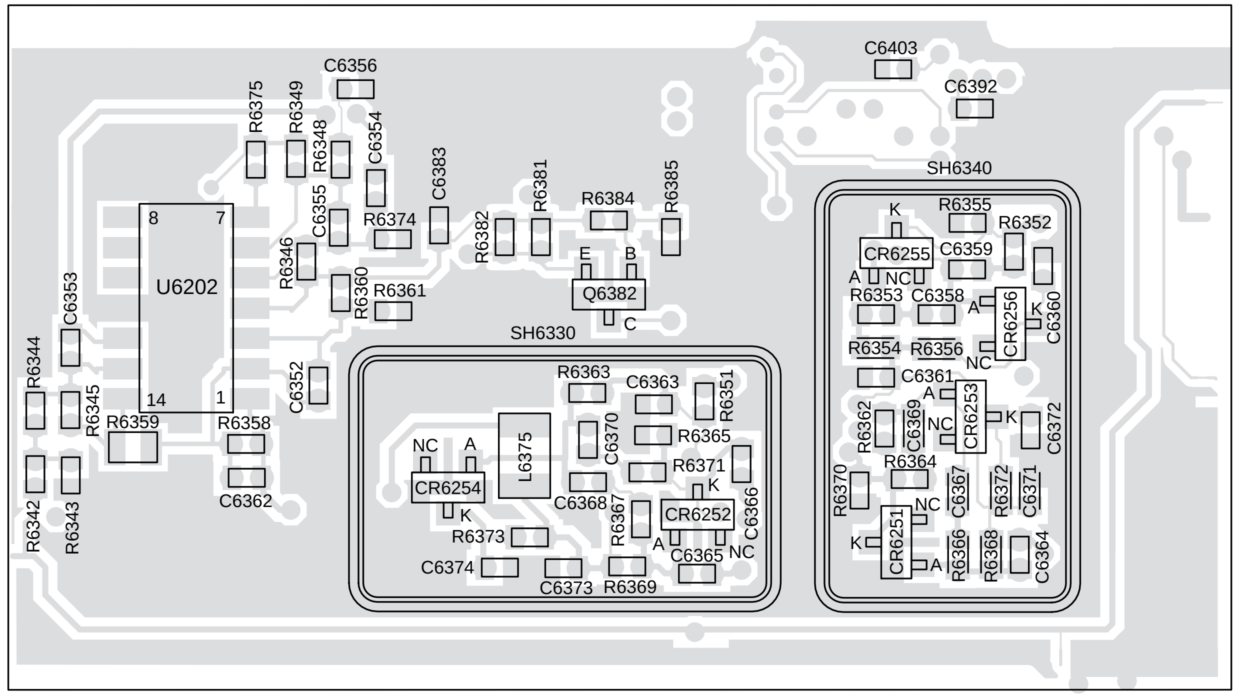
HEAVY COMPONENTS SIDE



LIGHT COMPONENTS SIDE

MAEPF-26322-O

RECEIVER IF PARTS LIST

REFERENCE SYMBOL	MOTOROLA PART NUMBER	DESCRIPTION
		CAPACITORS:
C6354	2113743K16	0.22uF
C6355	2113741F17	470pF
C6356	2113743K16	0.22uF
C6376	2113741F49	0.01uF
C6377	2113740F37	27pF
C6378	2113740F18	4.3pF
C6379	2113740F23	6.8pF
C6380	2113740F23	6.8pF
C6381	2113740F18	4.3pF
C6382	2113740F37	27pF
C6383	2113741F49	0.01uF
C6384	2113741F49	0.01uF
C6385	2113741F49	0.01uF
C6386	2113741F49	0.01uf
C6387	2113740F37	27pF
C6388	2113740F18	4.3pF
C6389	2113740F23	6.8pF
C6390	2113740F23	6.8pF
C6391	2113740F27	10pF
C6392	2113740F41	39pF
C6393	2113740F41	39pF
C6394	2113740F41	39pF
C6395	2113740F41	39pF
C6396	2113740F41	39pF
C6397	2113740F41	39pF
C6398	2113740F41	39pF
C6399	2113740F41	39pF
C6400	2113740F41	39pF
C6401	2113740F41	39pF
C6402	2113740F41	39pF
C6403	2113740F41	39pF
		INDUCTORS:
L6376	2462587T22	390uH
L6377	2462587T22	390nH
L6378	2462587T22	390nH
L6379	2462587T22	390nH
L6380	2462587T30	1000nH
L6381	2462587T22	390nH
L6382	2462587T22	390nH
L6383	2462587T22	390nH
		TRANSISTORS:
Q6382	4813824A17	PNP
Q6388	4804188K01	NPN
		RESISTORS:
R6346	0662057A89	47K
R6348	0662057A73	10K
R6349	0662057A73	10K
R6374	0662057A89	47K
R6375	0662057B47	0
R6376	0662057A49	1K
R6377	0662057A01	10
R6378	0662057A49	1K
R6380	0662057C19	4.7
R6381	0662057A35	270
R6382	0662057A37	330
R6383	0662057A25	100
R6384	0662057A56	2K
R6385	0662057A61	3.3K
R6386	0662057A56	2K

REFERENCE SYMBOL	MOTOROLA PART NUMBER	DESCRIPTION
R6387	0662057A41	470
R6388	0662057A18	51
R6389	0662057B47	0
R6391	0662057B47	0
R6392	0662057A01	10
		SHIELDS:
SH6310	2605915V01	Crystal Filter
SH6320	2605915V01	Crystal Filter
		INTEGRATED CIRCUIT:
U6202	5113819A04	Quad Operational Amplifier MC3303
		FILTERS:
Y6376	9102867C07	Crystal BP 73.35/25; 80dB
Y6377	9102867C08	Crystal BP 73.35/25; 60dB
		PRINTED CIRCUIT BOARDS (For Reference Only):
	8408537Y01 Issue P2	For Kit FLF5607A
	8408537Y01 Issue P2	For Kit FLF5950A

NOTES:

1. All resistance values are in ohms unless indicated otherwise.
2. Components shown on component location and schematic diagrams but not included in parts list are not placed.

NOTES:

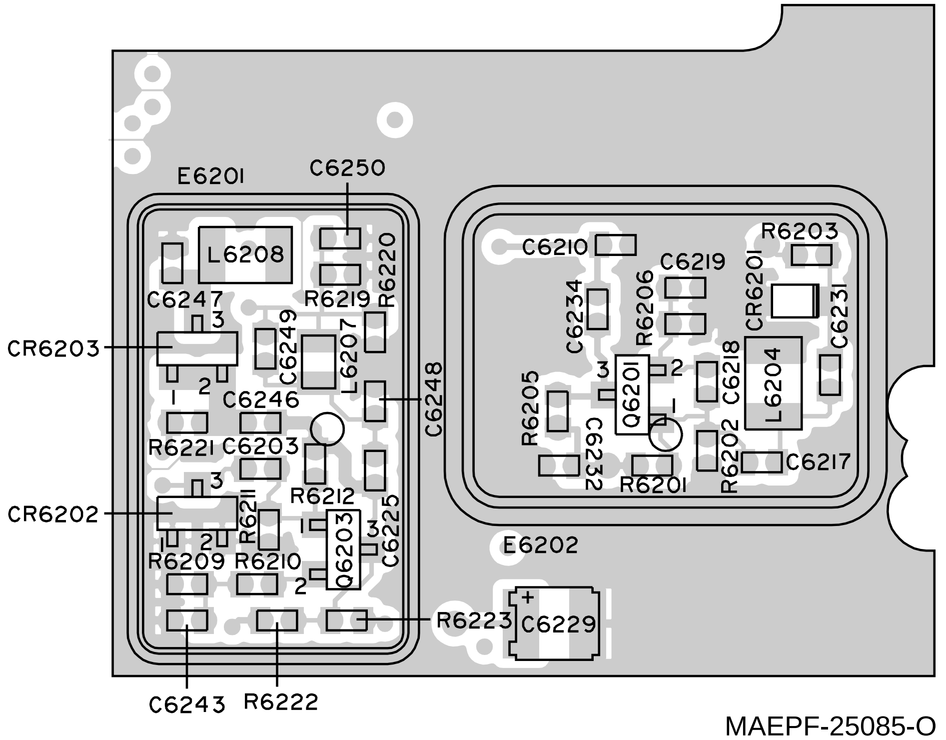
1: THESE COMPONENTS ARE PLACED ONLY FOR 900MHz RADIOS.

2: THESE COMPONENTS ARE NOT PLACED.

3: THESE COMPONENTS ARE PLACED ONLY FOR 800MHz RADIOS.

Receiver IF (Kits FLF5607A, FLF5950A)
Schematic Diagram

RECEIVER BACK END COMPONENT LOCATIONS



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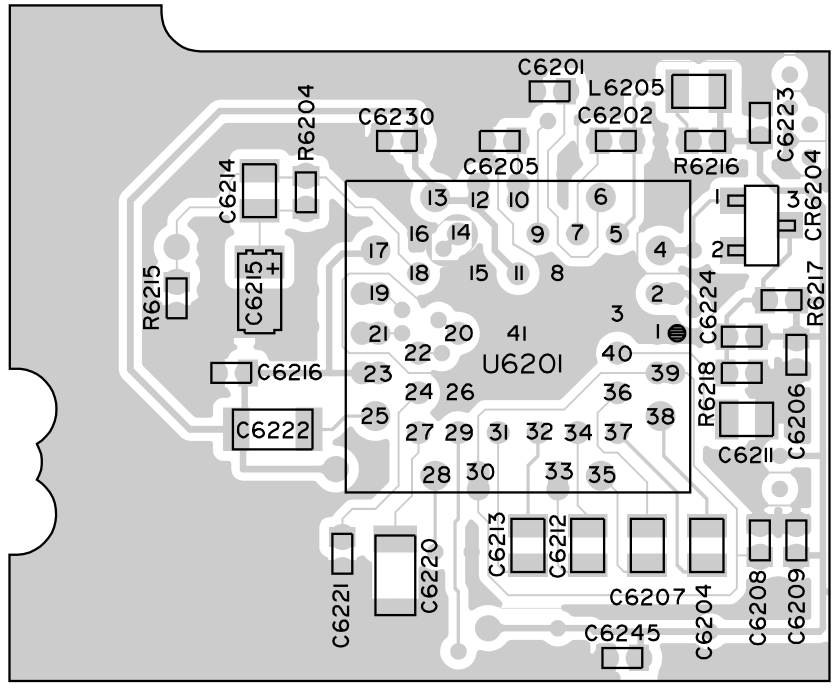
HEAVY COMPONENTS SIDE



MAEPF-25086-O

LIGHT COMPONENTS SIDE

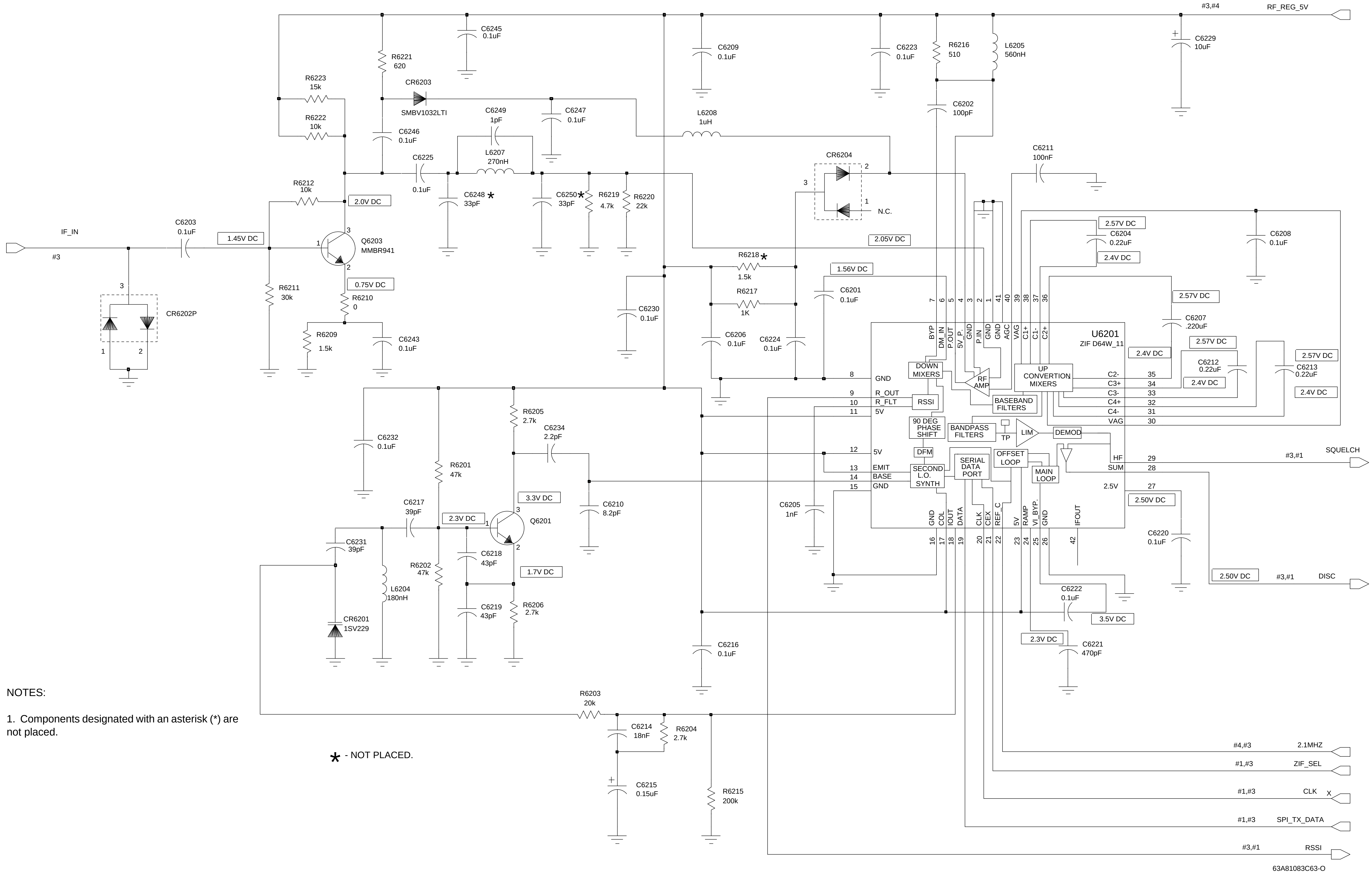
RECEIVER BACK END PARTS LIST

REFERENCE SYMBOL	MOTOROLA PART NUMBER	DESCRIPTION
		CAPACITORS:
C6201	2113743K15	0.1uF
C6202	2113740F51	100pF
C6203	2113743K15	0.1uF
C6204	2113743A23	0.22uF
C6205	2113741F25	1nF
C6206	2113743K15	0.1uF
C6207	2113743A23	0.22uF
C6208	2113743K15	0.1uF
C6209	2113743K15	0.1uF
C6210	2113740F25	8.2pF
C6211	2113743A19	0.1uF
C6212	2113743A23	0.22uF
C6213	2113743A23	0.22uF
C6214	2113741A51	18pF
C6215	2311049A02	0.15uF
C6216	2113743K15	0.1uF
C6217	2113740F41	39pF
C6218	2113740F42	43pF
C6219	2113740F42	43pF
C6220	2109720D14	0.1uF
C6221	2113741F17	470pF
C6222	2109720D14	0.1uF
C6223	2113743K15	0.1uF
C6224	2113743K15	0.1uF
C6225	2113743K15	0.1uF
C6229	2311049J23	10uF
C6230	2113743K15	0.1uF
C6231	2113740F41	39pF
C6232	2113743K15	0.1uF
C6234	2113740F11	2.2pF
C6243	2113743K15	0.1uF
C6245	2113743K15	0.1uF
C6246	2113743K15	0.1uF
C6247	2113743K15	0.1uF
C6248		Not placed
C6249	2113740F03	1pF
C6250		Not placed
		DIODES:
CR6201	4862824C01	Varactor
CR6202		Not placed
CR6203	4805129M96	Dual
CR6204	4880154K03	Dual Schottky Mixer
		CONNECTORS:
J6400	0913915A18	Receptacle
J6401	2813916B13	Jumper Plug
		INDUCTORS:
L6204	2462587T18	180 nH
L6205	2462587Q44	560 nH
L6207	2462587Q40	270 nH
L6208	2462587T30	1000nH

REFERENCE SYMBOL	MOTOROLA PART NUMBER	DESCRIPTION
		TRANSISTORS:
Q6201	4882022N70	NPN
Q6203	4882022N70	NPN
		RESISTORS:
R6201	0662057A89	47K
R6202	0662057A89	47K
R6203	0662057A80	20K
R6204	0662057A59	2.7K
R6205	0662057A59	2.7K
R6206	0662057A59	2.7K
R6209	0662057A53	1.5K
R6210	0662057B47	0 Ohm
R6211	0662057A84	30K
R6212	0662057A73	10K
R6215	0662057B05	200K
R6216	0662057A42	510
R6217	0662057A49	1K
R6218		Not placed
R6219	0662057A65	4.7K
R6220	0662057A81	22K
R6221	0662057A44	620
R6222	0662057A73	10K
R6223	0662057A77	15K
		INTEGRATED CIRCUITS:
U6201	5105457W11	Zero IF I.C.
		PRINTED CIRCUIT BOARDS (FOR REFERENCE ONLY)
	8404416P04 Issue P4	For Kits FLF5574D, E, F
	8404994E05 Issue P5	For KIts FLF5579C, D, E, HUF1189A

NOTES:

1. All resistance values are in ohms unless indicated otherwise.
2. Components shown on component location and schematic diagrams but not included in parts list are not placed

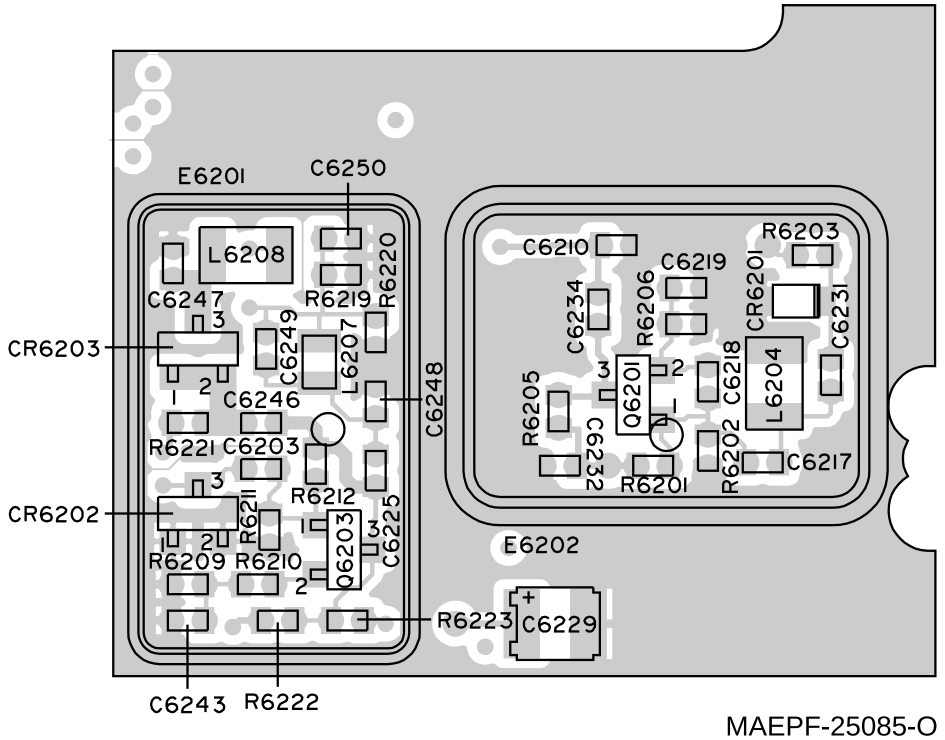


NOTES:

1. Components designated with an asterisk (*) are not placed.

* - NOT PLACED.

Receiver Back End (Kits FLF5574D, E, F; FLF5579C, D, E; HUF1189A) Schematic Diagram



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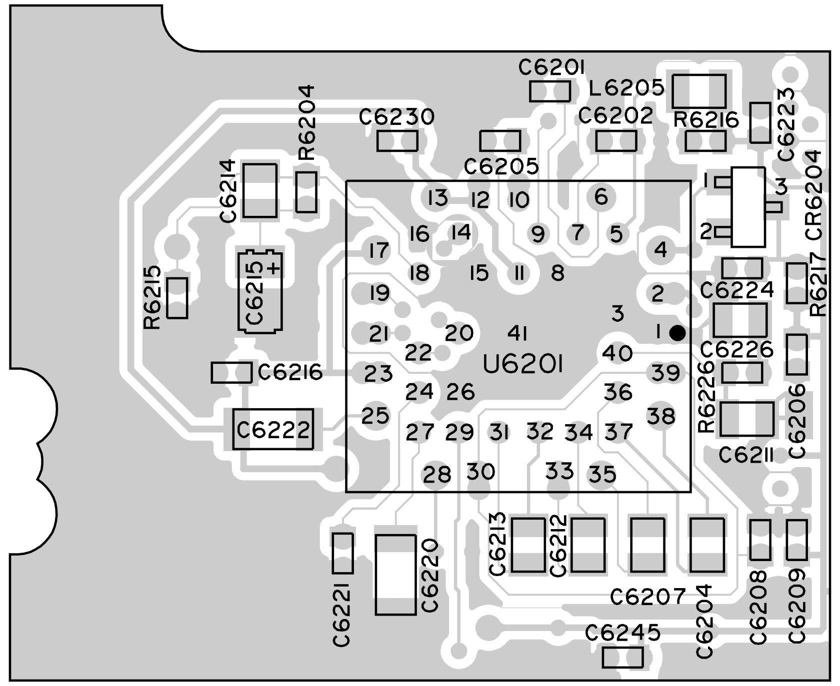
HEAVY COMPONENTS SIDE



MAEPF-26160-O

LIGHT COMPONENTS SIDE

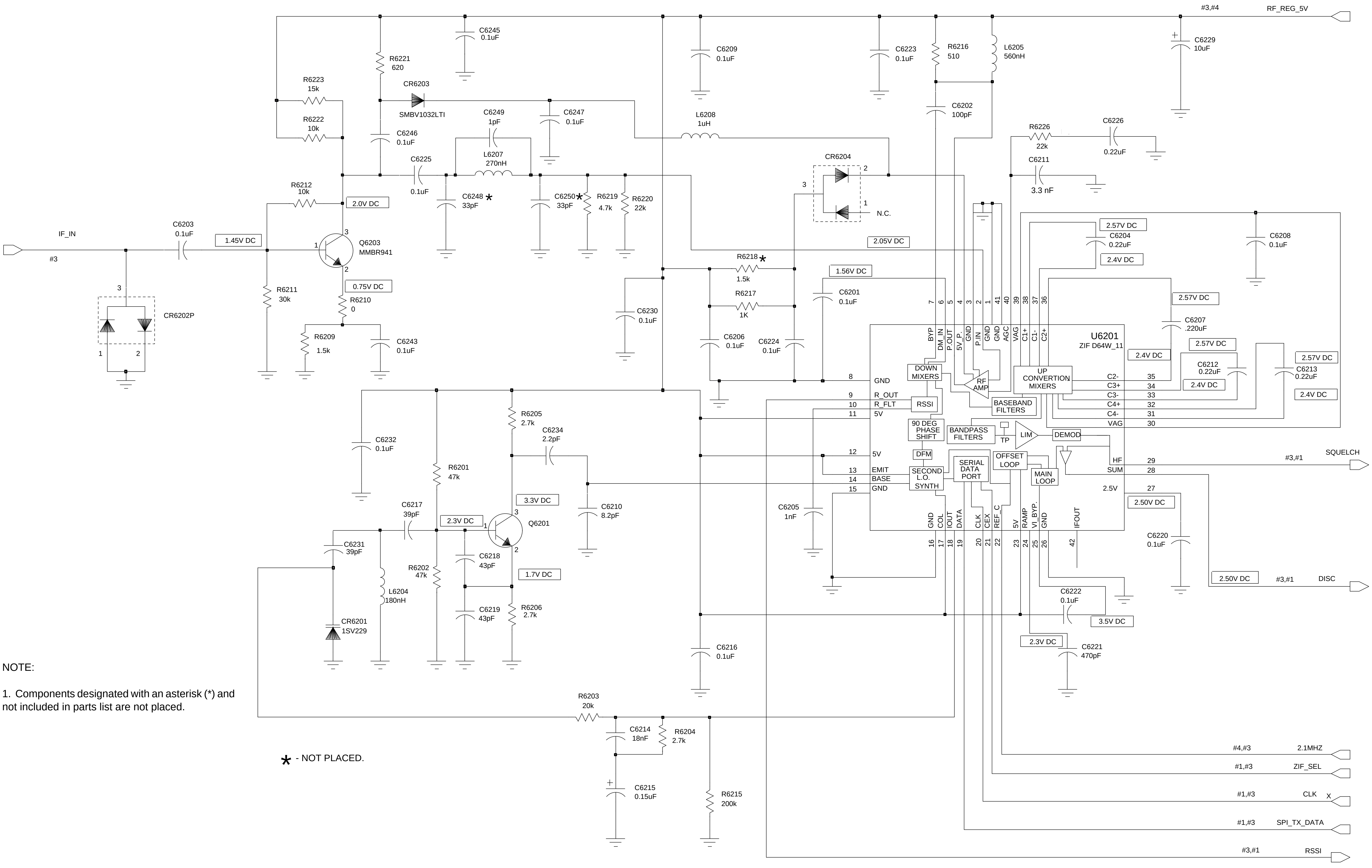
RECEIVER BACK END PARTS LIST

REFERENCE SYMBOL	MOTOROLA PART NUMBER	DESCRIPTION
		CAPACITORS:
C6201	2113743K15	0.1uF
C6202	2113740F51	100pF
C6203	2113743K15	0.1uF
C6204	2113743A23	0.22uF
C6205	2113741F25	1nF
C6206	2113743K15	0.1uF
C6207	2113743A23	0.22uF
C6208	2113743K15	0.1uF
C6209	2113743K15	0.1uF
C6210	2113740F25	8.2pF
C6211	2113741A33	3.3nF
C6212	2113743A23	0.22uF
C6213	2113743A23	0.22uF
C6214	2113741A51	18pF
C6215	2311049A02	0.15uF
C6216	2113743K15	0.1uF
C6217	2113740F41	39pF
C6218	2113740F42	43pF
C6219	2113740F42	43pF
C6220	2109720D14	0.1uF
C6221	2113741F17	470pF
C6222	2109720D14	0.1uF
C6223	2113743K15	0.1uF
C6224	2113743K15	0.1uF
C6225	2113743K15	0.1uF
C6226	2113743A23	0.22uF
C6229	2311049J23	10uF
C6230	2113743K15	0.1uF
C6231	2113740F41	39pF
C6232	2113743K15	0.1uF
C6234	2113740F11	2.2pF
C6243	2113743K15	0.1uF
C6245	2113743K15	0.1uF
C6246	2113743K15	0.1uF
C6247	2113743K15	0.1uF
C6248		Not placed
C6249	2113740F03	1pF
C6250		Not placed
C6404	0662057C01	0 Ohm Resistor (On, jumper plug J6401)
		DIODES:
CR6201	4862824C01	Varactor
CR6202		Not placed
CR6203	4805129M96	Dual
CR6204	4880154K03	Dual Schottky Mixer
		CONNECTORS:
J6400	0913915A18	Receptacle
J6401	2813916B13	Jumper Plug
		INDUCTORS:
L6204	2462587T18	180 nH
L6205	2462587Q44	560 nH
L6207	2462587Q40	270 nH
L6208	2462587T30	1000nH

REFERENCE SYMBOL	MOTOROLA PART NUMBER	DESCRIPTION
		TRANSISTORS:
Q6201	4882022N70	NPN
Q6203	4882022N70	NPN
		RESISTORS:
R6201	0662057A89	47K
R6202	0662057A89	47K
R6203	0662057A80	20K
R6204	0662057A59	2.7K
R6205	0662057A59	2.7K
R6206	0662057A59	2.7K
R6209	0662057A53	1.5K
R6210	0662057B47	0 Ohm
R6211	0662057A84	30K
R6212	0662057A73	10K
R6215	0662057B05	200K
R6216	0662057A42	510
R6217	0662057A49	1K
R6219	0662057A65	4.7K
R6220	0662057A81	22K
R6221	0662057A44	620
R6222	0662057A73	10K
R6223	0662057A77	15K
R6226	0662057A81	22K
		INTEGRATED CIRCUITS:
U6201	5105835U69	Zero IF I.C.
		PRINTED CIRCUIT BOARDS (For Reference Only):
	8404416P05 Issue P5	For Kit FLF5600A, HUF1188A

NOTES:

1. All resistance values are in ohms unless indicated otherwise.
2. Components shown on schematic diagram but not included in parts list are not placed.



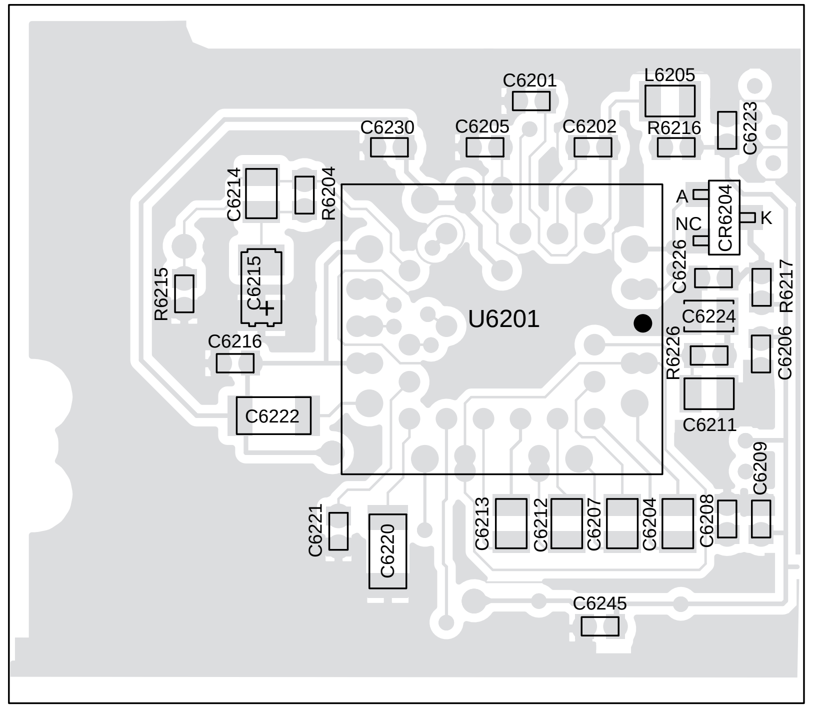
NOTE:

1. Components designated with an asterisk (*) and not included in parts list are not placed.

* - NOT PLACED.

Receiver Back End (Kits FLF5600A, HUF1188A) Schematic Diagram

RECEIVER BACK END COMPONENT LOCATIONS



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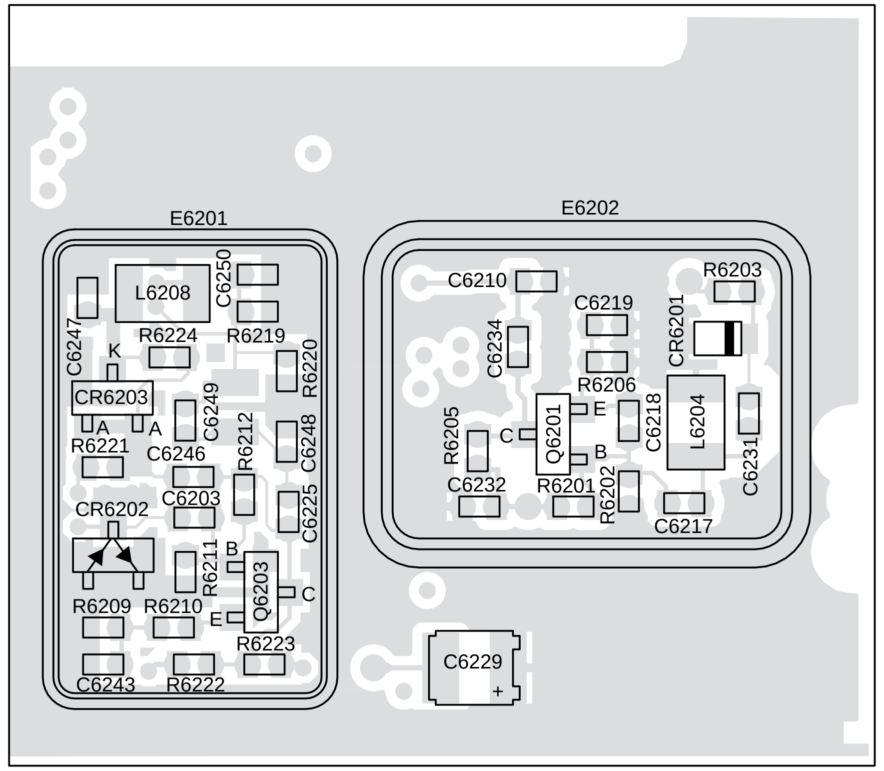
HEAVY COMPONENTS SIDE



MAEPF-26324-O

LIGHT COMPONENTS SIDE

RECEIVER BACK END PARTS LIST

REFERENCE SYMBOL	MOTOROLA PART NUMBER	DESCRIPTION
		CAPACITORS:
C6201	2113743K15	0.1uF
C6202	2113740F51	100pF
C6203	2113743K15	0.1uF
C6204	2113743A23	0.22uF
C6205	2113741F25	1nF
C6206	2113743K15	0.1uF
C6207	2113743A23	0.22uF
C6208	2113743K15	0.1uF
C6209	2113743K15	0.1uF
C6210	2113740F25	8.2pF
C6211	2113741A33	3.3nF
C6212	2113743A23	0.22uF
C6213	2113743A23	0.22uF
C6214	2113741A51	18pF
C6215	2311049A02	0.15uF
C6216	2113743K15	0.1uF
C6217	2113740F41	39pF
C6218	2113740F42	43pF
C6219	2113740F42	43pF
C6220	2109720D14	0.1uF
C6221	2113741F17	470pF
C6222	2109720D14	0.1uF
C6223	2113743K15	0.1uF
C6224	2113743K15	0.1uF
C6225	2113743K15	0.1uF
C6229	2311049J23	10uF
C6230	2113743K15	0.1uF
C6231	2113740F41	39pF
C6232	2113743K15	0.1uF
C6234	2113740F11	2.2pF
C6243	2113743K15	0.1uF
C6245	2113743K15	0.1uF
C6247	2113743K15	0.1uF
C6249	2113740F03	1pF
		DIODES:
CR6201	4862824C01	Varactor
CR6202		Not placed
		INDUCTORS:
L6204	2462587T18	180 nH
L6205	2462587Q44	560 nH
L6207	2462587Q40	270 nH
L6208	0611077A01	0-ohm resistor
		TRANSISTORS:
Q6201	4882022N70	NPN
Q6203	4882022N70	NPN
		RESISTORS:
R6201	0662057A89	47K
R6202	0662057A89	47K
R6203	0662057A80	20K
R6204	0662057A59	2.7K
R6205	0662057A59	2.7K
R6206	0662057A59	2.7K

REFERENCE SYMBOL	MOTOROLA PART NUMBER	DESCRIPTION
R6209	0662057A53	1.5K
R6210	0662057B47	0 Ohm
R6211	0662057A84	30K
R6212	0662057A73	10K
R6215	0662057B05	200K
R6216	0662057A42	510
R6217	0662057A49	1K
R6219	0662057A65	4.7K
R6220	0662057A81	22K
R6221	0662057A44	620
R6222	0662057A73	10K
R6223	0662057A77	15K
R6224	0662057B47	0 Ohm
		INTEGRATED CIRCUIT:
U6201	5105457W11	Zero IF I.C.
		PRINTED CIRCUIT BOARDS (For Reference Only):
	8408537Y01 Issue P2	For Kit FLF5607A
	8408497Y01 Issue P2	For Kit FLF5950A

NOTES:

1. All resistance values are in ohms unless indicated otherwise.
2. Components shown on component location and schematic diagrams but not ncluded in parts list are not placed.

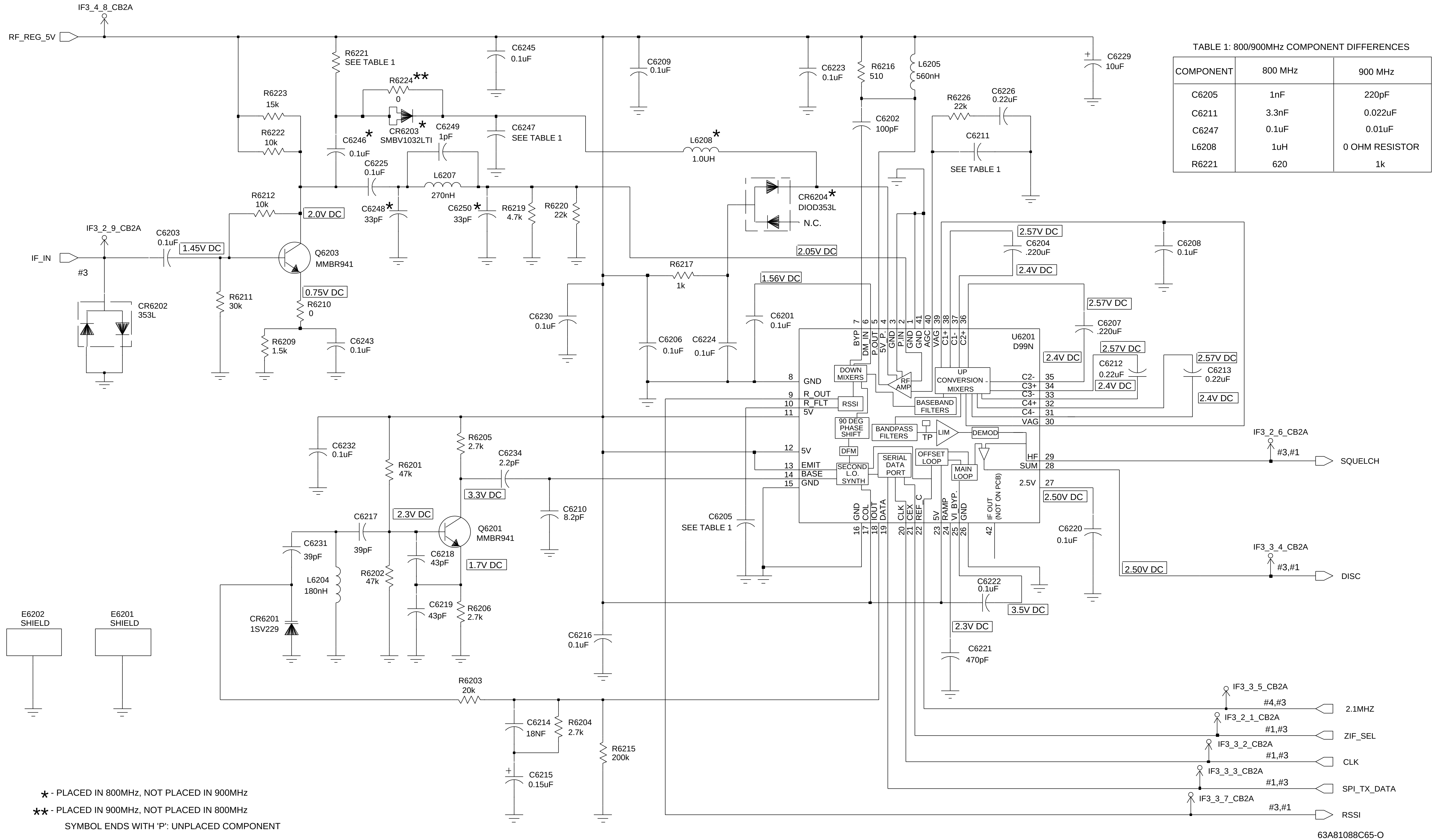
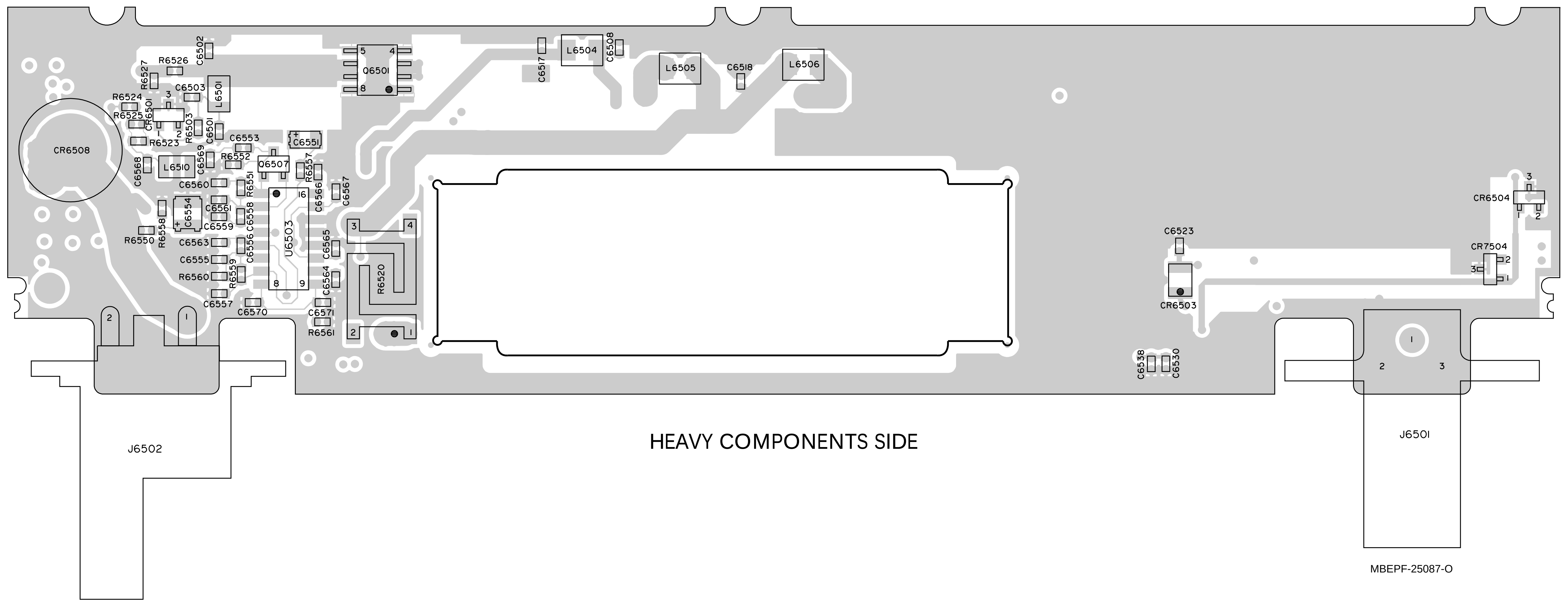


TABLE 1: 800/900MHz COMPONENT DIFFERENCES

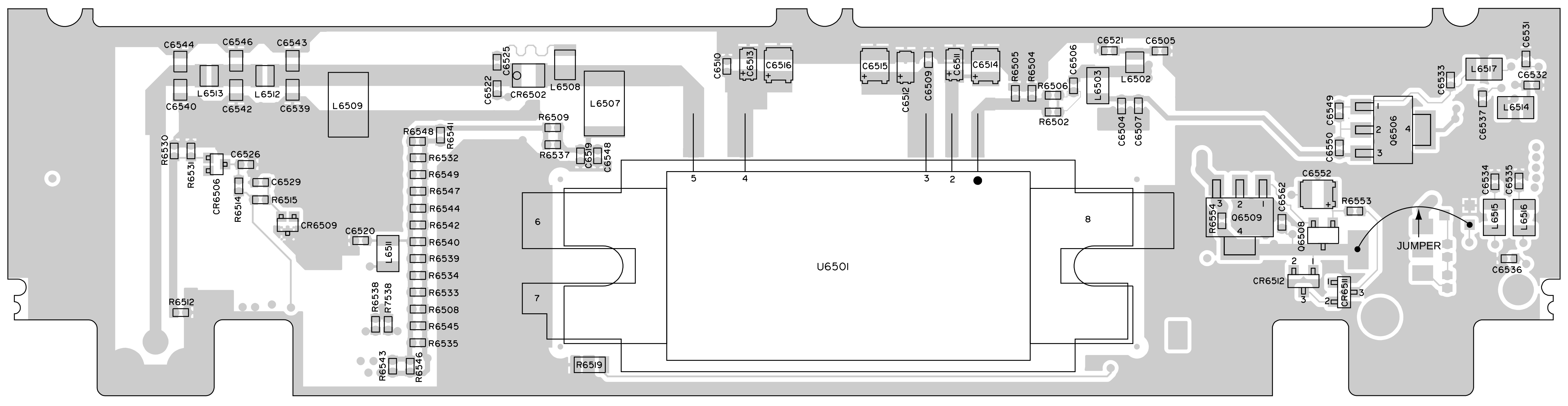
COMPONENT	800 MHz	900 MHz
C6205	1nF	220pF
C6211	3.3nF	0.022uF
C6247	0.1uF	0.01uF
L6208	1uH	0 OHM RESISTOR
R6221	620	1k

15-WATT POWER AMPLIFIER COMPONENT LOCATIONS



HEAVY COMPONENTS SIDE

MBEPF-25087-O



LIGHT COMPONENTS SIDE

MBEPF-25088-O

15-WATT POWER AMPLIFIER PARTS LIST

REFERENCE SYMBOL	MOTOROLA PART NUMBER	DESCRIPTION
		CAPACITORS:
C6502	2113740F20	5.1pF
C6503	2113740F41	39pF
C6504	2113740F41	39pF
C6505	2113740F41	39pF
C6506	2113740F41	39pF
C6507	2113741F49	0.01uF
C6508	2113741F49	0.01uF
C6509	2113741F49	0.01uF
C6510	2113741F49	0.01uF
C6511	2311049A01	0.1uF
C6512	2311049A01	0.1uF
C6513	2311049A01	0.1uF
C6514	2311049A08	1uF
C6515	2311049A08	1uF
C6516	2311049A08	1uF
C6517	2113740F41	39pF
C6518	2113740F41	39pF
C6519	2113741F49	0.01uF
C6520	2113740F41	39pF

REFERENCE SYMBOL	MOTOROLA PART NUMBER	DESCRIPTION
C6521	2113741F49	0.01pF
C6522	2113740F41	39pF
C6523	2113740F29	12pF
C6525	2113741F25	1000pF
C6526	2113740F27	10pF
C6529	2113740F41	39pF
C6531	2113740F41	39pF
C6532	2113740F41	39pF
C6533	2113740F41	39pF
C6534	2113740F41	39pF
C6535	2113740F41	39pF
C6536	2113740F41	39pF
C6537	2113740F41	39pF
C6538	2113740F41	39pF
C6539	2111078A09	1.8pF
C6540	2111078A09	1.8pF
C6542	2111078A17	3.3pF
C6543	2111078A09	1.8pF
C6544	2111078A09	1.8pF
C6546	2111078A17	3.3pF
C6548	2113740F41	39pF
C6549	2113741F49	0.01uF

REFERENCE SYMBOL	MOTOROLA PART NUMBER	DESCRIPTION
C6550	2113741F49	0.01uF
		DIODES:
CR6501	4813833C02	Dual 70V
CR6502	4802482J02	PIN
CR6503	4802482J02	PIN
CR6504	4805129M96	Dual (Note 3)
CR6504	4802482J02	PIN (Note 4)
CR6506	4805218N57	Dual Schottky
CR6508	4880222R01	Zener
CR6509	4805218N57	Dual Schottky
		CONNECTORS:
J6501	2804613P01	Antenna
J6502	0905902V01	Dc Power
		INDUCTORS:
L6501	2462587T13	68nH
L6502	2460591B04	11.03nH
L6503	2462587T13	68nH
L6504	2484657R01	Ferrite Bead
L6505	2484657R01	Ferrite Bead
L6506	2484657R01	Ferrite Bead
L6507	2460591R53	82nH
L6508	2460591E24	23.75nH
L6509	2460591R53	82nH
L6511	2462587T13	68nH
L6512	2460591A11	7.6nH

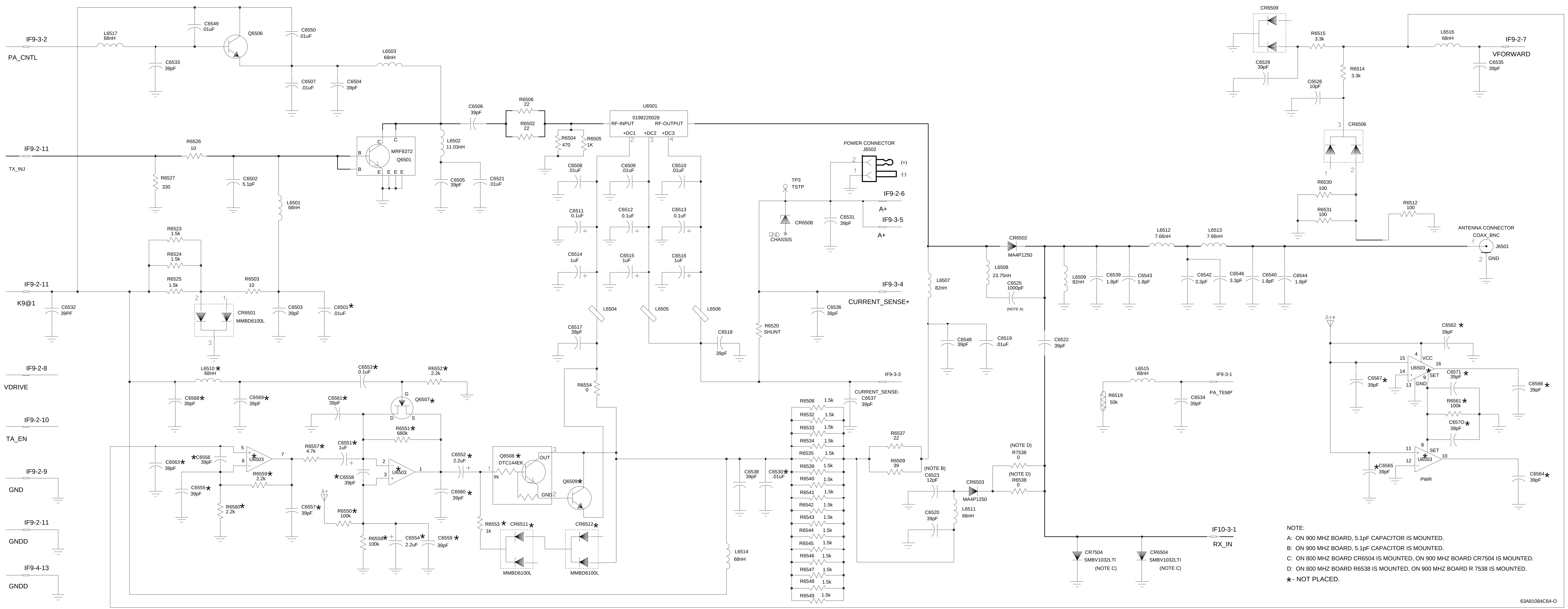
REFERENCE SYMBOL	MOTOROLA PART NUMBER	DESCRIPTION
L6513	2460591A11	7.6nH
L6514	2462587T13	68nH
L6515	2462587T13	68nH
L6516	2462587T13	68nH
L6517	2462587T13	68nH
		TRANSISTORS:
Q6501	4813827A26	NPN
Q6506	4813824B01	NPN
		RESISTORS:
R6502	0662057A09	22
R6503	0662057A01	10
R6504	0662057A41	470
R6505	0662057A49	1K
R6506	0662057A09	22
R6508	0662057A53	1.5K
R6509	0662057A15	39
R6512	0662057A25	100
R6514	0662057A61	3.3K
R6515	0662057A61	3.3K
R6519	0605621T02	Thermistor
R6520	1705603W01	Special Shunt
R6523	0662057A53	1.5K
R6524	0662057A53	1.5K
R6525	0662057A53	1.5K
R6526	0662057A01	10
R6527	0662057A37	330

REFERENCE SYMBOL	MOTOROLA PART NUMBER	DESCRIPTION
R6530	0662057A25	100
R6531	0662057A25	100
R6532	0662057A53	1.5K
R6533	0662057A53	1.5K
R6534	0662057A53	1.5K
R6535	0662057A53	1.5K
R6537	0662057A09	22
R6538	0662057B47	0
R6539	0662057A53	1.5K
R6540	0662057A53	1.5K
R6541	0662057A53	1.5K
R6542	0662057A53	1.5K
R6543	0662057A53	1.5K
R6544	0662057A53	1.5K
R6545	0662057A53	1.5K
R6546	0662057A53	1.5K
R6547	0662057A53	1.5K
R6548	0662057A53	1.5K
R6549	0662057A53	1.5K
R6554	0662057B47	0
		INTEGRATED CIRCUITS:
U6501	0198220028	Rf Power Amplifier Module

REFERENCE SYMBOL	MOTOROLA PART NUMBER	DESCRIPTION
		PRINTED CIRCUIT BOARDS (FOR REFERENCE ONLY)
	8404416P04 Issue P4	For Kits FLF5579C, D, E
	8404416P05 Issue P5	For Kits FLF5600A, HUF1188A

NOTES:

1. All resistance values are in ohms unless indicated otherwise.
2. Components shown on component location and schematic diagrams but not included in parts list are not placed.
3. This part is used on transceiver board 8404416P04 Revision P4, kit number FLF5579C.
4. This part is used on transceiver board 8404416P05 Revision P5, kit number FLF5600A.



15-Watt Power Amplifier (Kits FLF5579C, D, E; FLF5600A, HUF1188A) Schematic Diagram