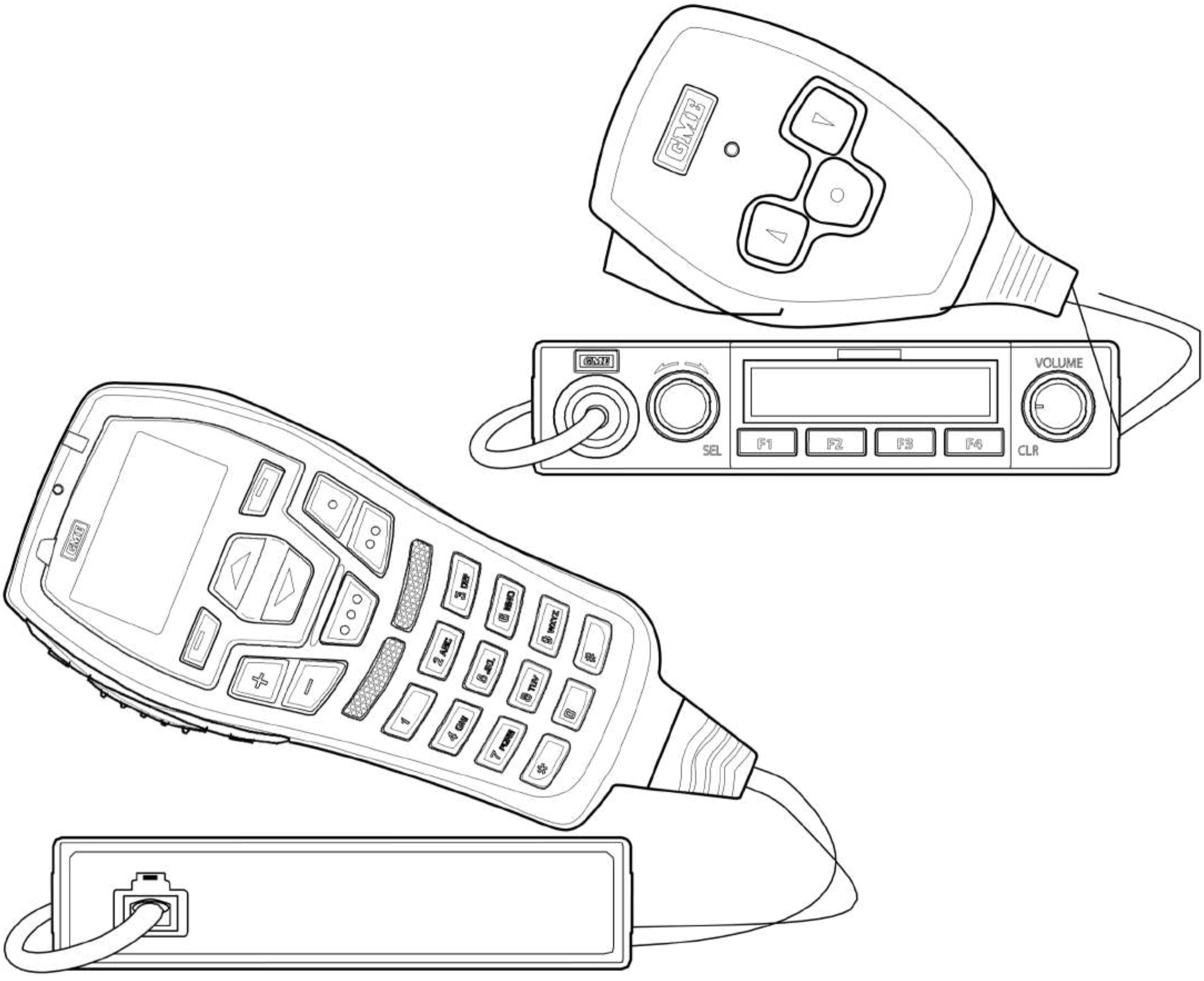
GME COMMERCIAL

CM40 & CM50 Series

Commercial Analogue Mobile Radios



AUSTRALIAN MADE

SERVICE MANUAL

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RADIO FREQUENCY EXPOSURE HAZARD

Attention

This radio should be used only in an occupational (work related) environment where the user is aware of and able to exercise control over their exposure to RF energy.

To ensure your safety please read the following information before installing and using the radio.

- Use the radio only within the guidelines of this manual.
- Use only with an approved antenna.
- Ensure your antenna is installed as described under 'Antenna Installation' in this manual.
- Do not transmit longer than the rated duty cycle of 50% talk-50% listen.

Interference with Vehicle Electronics

Some of the electronics in your vehicle may be susceptible to RF energy when your radio is transmitting. Examples of electronic devices in your vehicle that could be affected are anti-lock/ anti- skid braking systems, cruise control systems and fuel injection systems. If your vehicle is fitted with any of these systems please consult your vehicle manufacturer to determine whether these systems are likely to be affected by your radio when it is transmitting. Careful selection of mounting locations and good installation techniques should generally minimise any interference to your vehicle electronics.

Using the Radio in Explosive Atmospheres or Blasting Areas

Switch off your radio before entering any area where there may be inflammable gas, liquids or dust. An explosion could result in serious injury or death.

Switch off your radio when approaching a blasting area. Blasting areas are usually sign posted with instructions to users to turn off two way radios. Strong radio transmissions could ignite blasting caps resulting in an unscheduled explosion resulting in serious injury or death.

Installation Guidelines

- Do not install the radio near an airbag or in an area where an airbag may deploy. If an airbag is obstructed by the radio, it may not deploy as expected. It could also propel the radio with enough force to cause serious injury.
- Avoid touching the heat sink at the rear of the radio while the radio is in use. The heat sink can become hot during prolonged use.
- Do not install the radio in front of a vehicle heater. The radio requires a cool airflow over the rear heat sink when transmitting to maintain efficiency.
- Do not make unapproved modifications to the radio. Such modifications could void the warranty and cause the radio to operate outside its approved specifications.

SPECIFICATIONS

General

Type	CM40	CM50
Frequency Band	UHF 450-520 MHz	UHF 450-520 MHz VHF 136 - 174MHz
Number of Channels	199 (80 CB)	2000 (80 CB)
Number of Zones	10	50
Channel Spacing	12.5 kHz	
Channel Steps	12.5kHz, 6.25kHz, 5kHz, 2.5kHz	
Frequency Stability	±1.5ppm for -20°C to 60°C	
Modulation	FM	
Antenna Impedance	50Ω	
Antenna Connector	BNC	
Supply Voltage	13.8 V Negative Earth	
Operating Voltage Range	10.8 V to 15.6 V	
Reverse Polarity Protection	Diode	
Over Voltage Protection	18V crowbar	
Fuse	2 x 10A blade type in-line fuse	
Current Consumption	RX Muted: 220 mA RX Full Audio: 1A TX 2A (5W)	RX Muted: 220 mA RX Full Audio: 1A TX 6A (25W)

Transmitter

Type	CM40	CM50
Power Output	Max: 5W	Min: 5W | Max 25W
Modulation Type	FM	
Deviation Limiting	5 kHz, 2.5 kHz at 20dB AF Limiting	
TX Audio Frequency Response	+6dB/octave, +1dB/-3dB, 300Hz to 3kHz	
AF Distortion	3% below limiting	
TX Audio Residual Noise and Hum	-40dB	
Spurious Emissions	-36dBm	
Adjacent Channel Power	-60dBc	

SPECIFICATIONS

Receiver

Type	CM40	CM50
Circuit Type	Double Conversion Superheterodyne, DC coupled, DSP audio processing	
IF Frequencies	21.4Mhz (VHF) 38.85 MHz (UHF) 450KHz	
Analog Sensitivity	-122dBm for 12dB SINAD unweighted	
Adjacent Channel Selectivity	60 dB	
Spurious Rejection	80 dB	
Intermodulation Rejection	75 dB	
Blocking	100 dB	
RF Switching Bandwidth	VHF 38Mhz UHF 70 MHz	
Conducted Spurious Emissions	-80 dBm	

Audio

Type	CM40	CM50
RX Audio Frequency Response	+6dB/octave, +1dB/-3dB, 300Hz to 3kHz	
RX Audio Residual Noise and Hum	-40 dB	
Audio Rated Power - Radio	3W (RMS) into 4Ω	
Audio Output Power Internal Speaker	3W (RMS)	
Audio Rated power - UIC500	2W into 8 Ω	
Audio Rated power - UIC600	2W into 8 Ω	

Mechanical

Type	CM40	CM50
Dimensions	28.9mm (H) x127mm (W) x 143 mm (D)	28.9mm (H) x 127mm (W) x 162.8mm (D)
Weight	620g (Chassis)	
Operating Temperature Range	-20 to +60 Deg C	

Overview

The CM40 mobile is available in UHF (450-520 MHz) and has a maximum 5W transmission power. The CM50 series is available in UHF (450-520 MHz) and VHF (136-174 MHz) and has a maximum 25W transmission power.

Available Models

Radios

The table below lists the CM40 & CM50 Series of radio models.

Model	Control Interface	Frequency Range	Transmission Power
CM40-U5	Local	450 – 520MHz	5W
CM40-U5B	Remote (base)	450 – 520MHz	5W
CM50-U25	Local	450 – 520MHz	25W
CM50-U25B	Remote (base)	450 – 520MHz	25W
CM50-V25	Local	136 – 174 MHz	25W
CM50-V25B	Remote (base)	136 – 174 MHz	25W

Microphones

The table below lists the recommended microphones for use with the CM40-50 radios.

Model	Description
MP600B	Heavy Duty IP67 Fist Mic to suit CM & TX Series
UIC500B	Compact OLED Controller Microphone to suit CM Series - Black
UIC600B	Advanced OLED Controller Microphone to suit CM Series – Black
UIC600G	Advanced OLED Controller Microphone to suit CM Series – Green

MP600B Fist Microphone

The IP67 rated MP600B fist microphone has the following keys:

- PTT
- CALL
- MENU
- Channel Up, and
- Channel Down

The microphone connects to the front panel of the local and remote control heads.

UIC500 Compact Controller Microphone

The UIC500B compact controller microphone has the following keys:

- PTT
- Emergency
- Volume up
- Volume down
- Power
- Up scroll
- Down scroll
- F1 - F4 Programmable keys
- A button
- B button

The UIC500B is used as standalone device with CM40/50 base radios and attaches directly to the front RJ45 connector on the front panel of the radio.

UIC600 Advanced Controller Microphone

The UIC600 advanced controller microphone has the following keys:

- PTT
- Emergency
- Volume up
- Volume down
- Power
- Up scroll
- Down scroll
- 12 Alphanumeric keys
- F1 - F5 Programmable keys
- A button
- B button

The UIC600 is used as standalone device with CM40/50 base radios and attaches directly to the front RJ45 connector on the front panel of the radio.

DESCRIPTION

Overview

The section describes the connection and control interfaces of the CM40/50 series radios and the technical details of the design.

Physical Description

The CM40/50 radio can be set up in the following configurations:

- **Local setup**
  Local control head is fitted to the radio and used with an fist microphone.
- **Remote Head setup**
  Remote control head is fitted to a radio and used with a fist microphone.
- **Extended setup**
  The radio with a remote control panel is used with a controller microphone.

Local Setup

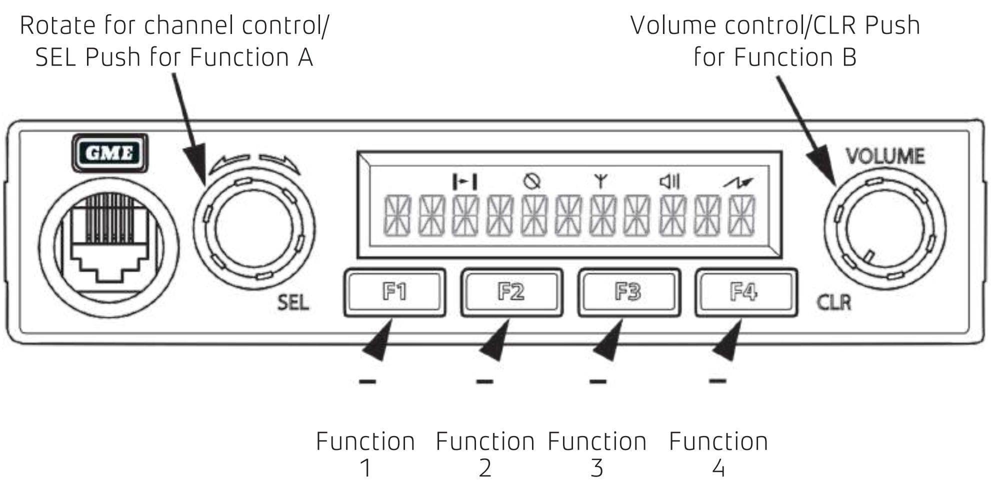


Figure 1: Local Control Head Radio Front View A

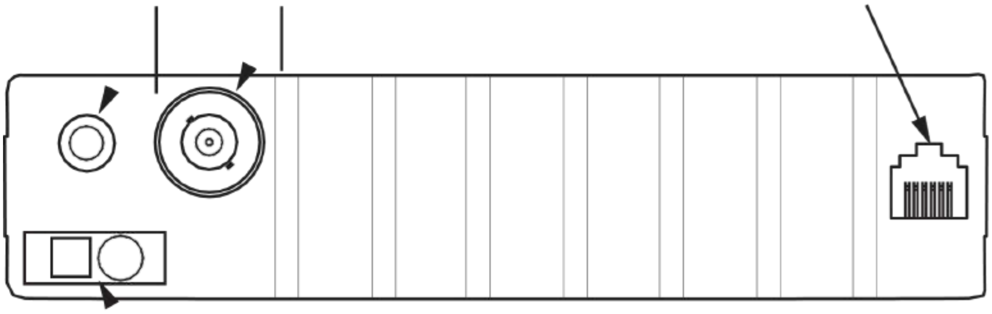


Figure 2: Local Control CM40/50 Radio Rear View

NOTE: The RJ12 Rear Socket does not support TX/RX Audio and is for Factory use only

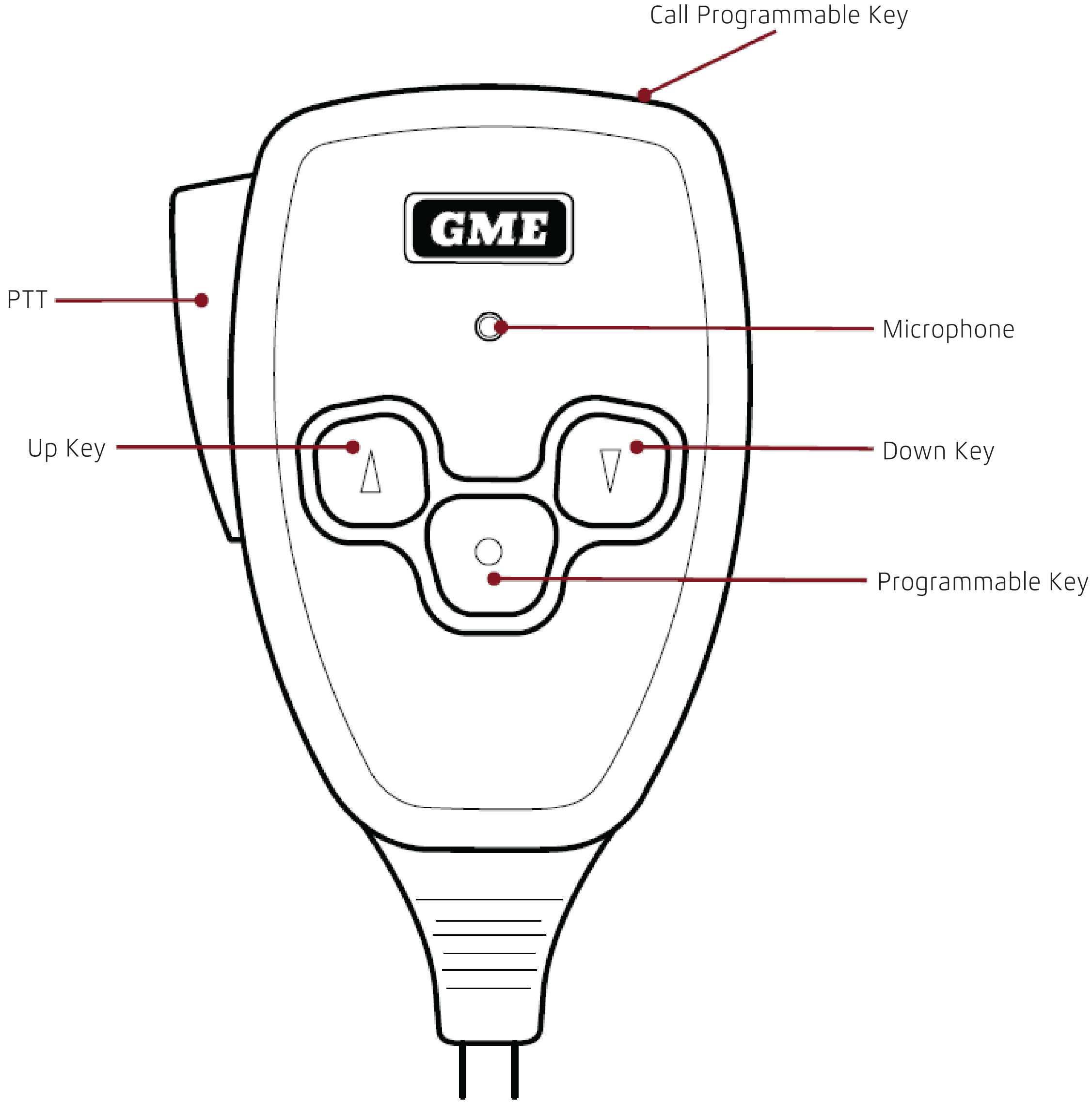


Figure 3: MP600 Fist Microphone

Remote Setup

NOTE: The RJ45 socket on the remote control panel is only used with a UIC500/600 controller microphone or the RH006 Remote Head.

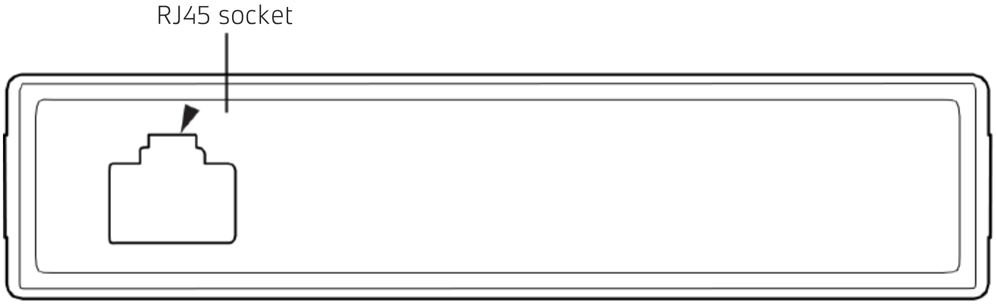


Figure 4: Base Radio Front View

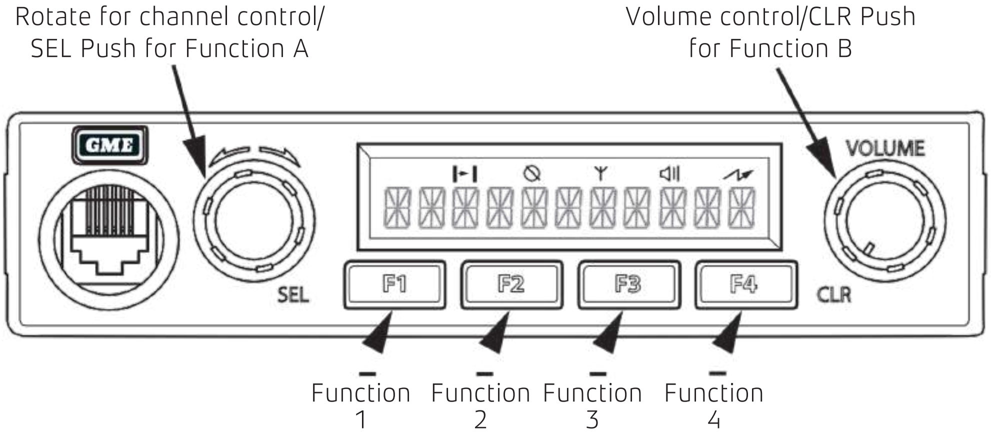


Figure 5: RH006 Remote Head Front View

Extended Setup

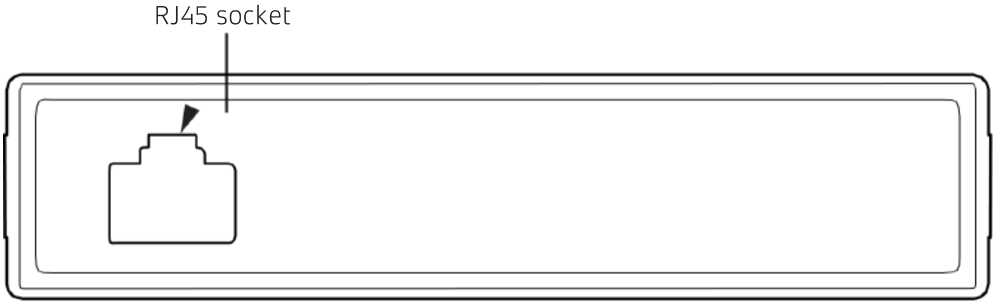


Figure 6: Remote Control CM40-50 Radio Front View

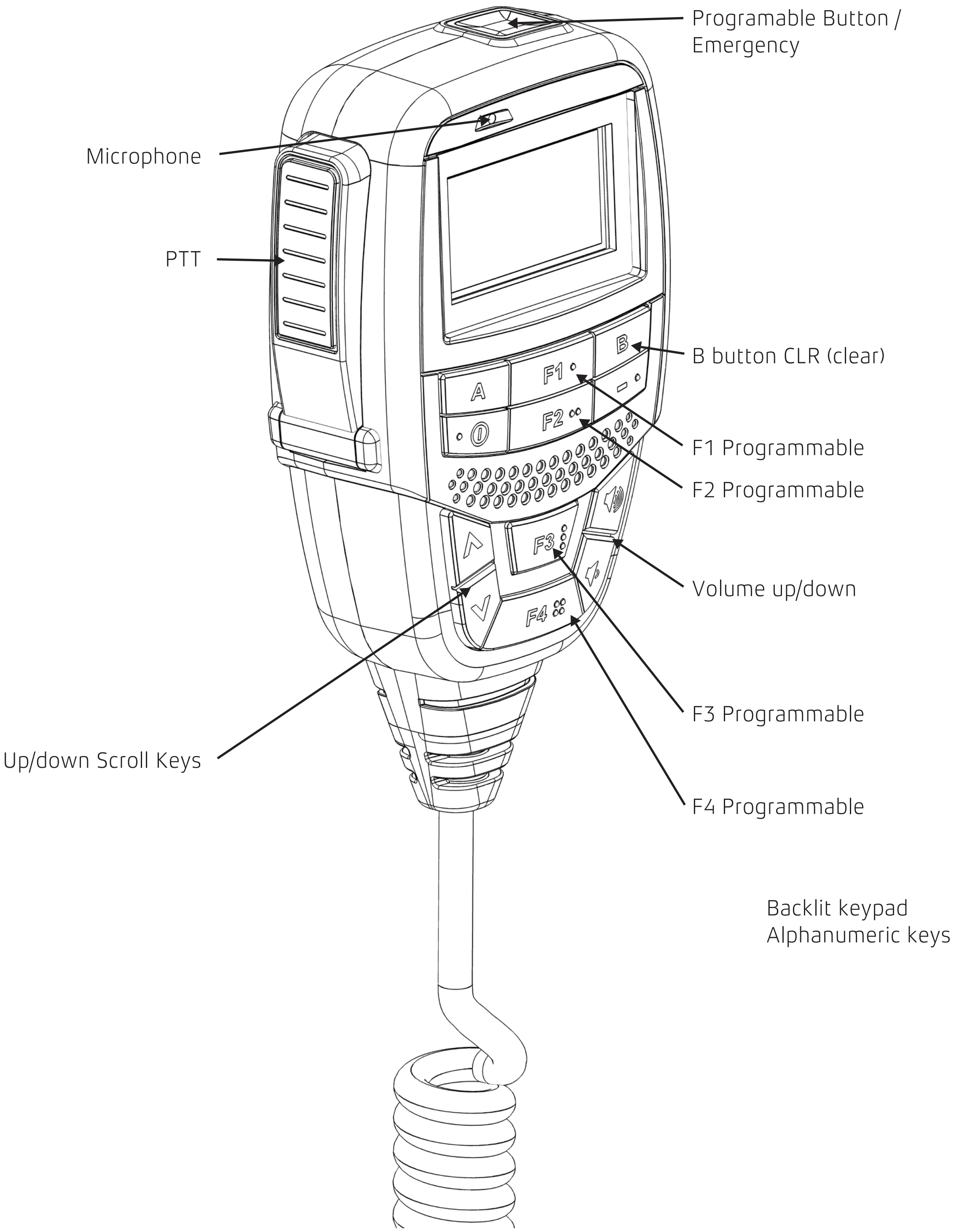


Figure 7: UIC500 Controller Microphone

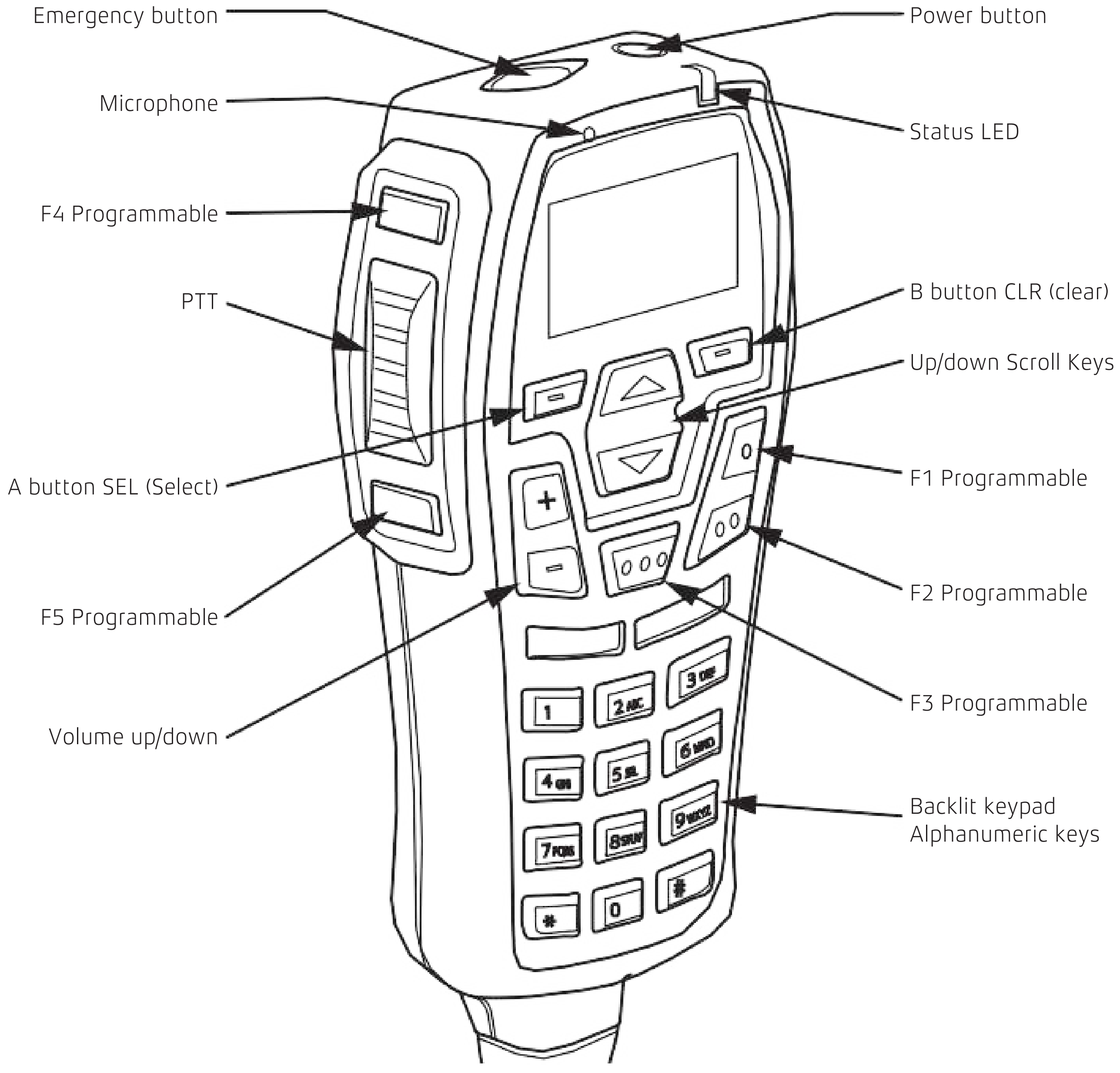


Figure 8: UIC600 Controller Microphone

Power Supply

The CM40/50 radios are designed to operate from a nominal 13.8V DC power source via DC input socket SK901. Excessive voltage and reverse polarity protection are provided by asymmetrical suppression diode D902.

+3.3V Supply

The +3.3V supply is obtained from the +13.8V_SWITCHED supply using the DC/DC converter IC U903 which performs PWM regulation control. The circuit below is configured as a buck regulator with an output of 3.3V DC.

The resistive divider of R917, R920 is set to balance the internal comparator when the output is 3.3V. This regulator supplies the following:

- CPU U801
- RS232 Transceiver U803
- Electronic Potentiometers U404, U702
- CODEC U402
- EEPROM U802

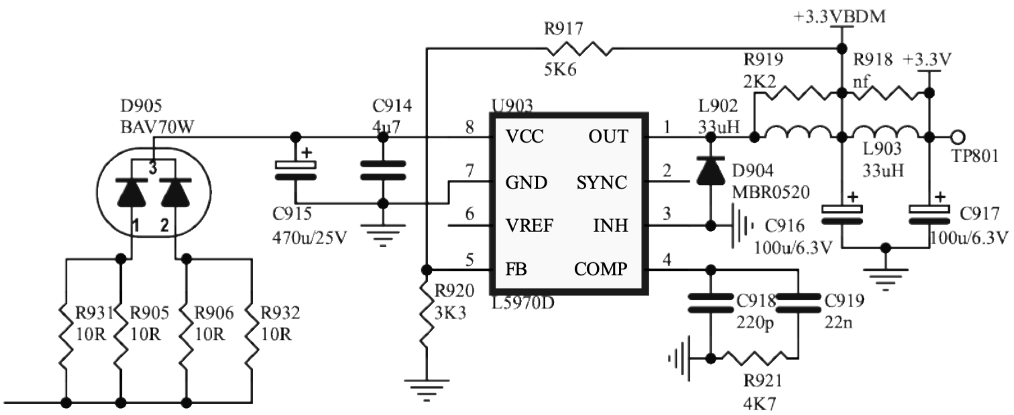


Figure 9: +3.3V and +3.3VBDM Power Supplies

+3.3VBT Supply

The +3.3VBT supply is generated from the +13.8V_SWITCHED supply using 3.3V linear regulator U800. This provides and independent supply for accessory modules connected to J806.

+1.8V Supply

The +1.8V supply is generated from the +3.3V supply using the 1.8V linear regulator U403. It supplies power to the CODEC IC U402.

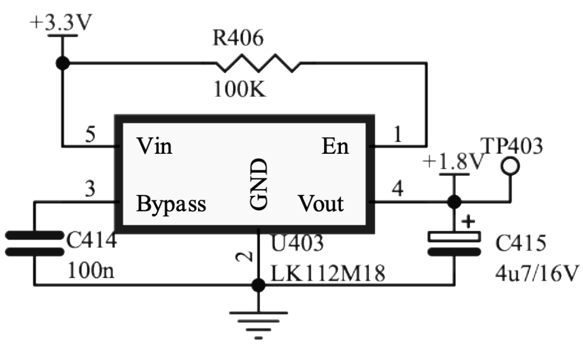


Figure 10: +1.8V Supply

+5V Supply

The +5V supply is generated from the +13.8V_SWITCHED power supply using the 5V linear regulator U902. It supplies power to:

- DAC U806
- IF IC U301
- Op-amps U701, U807
- Buffers U804, U805
- Switches U303, U304

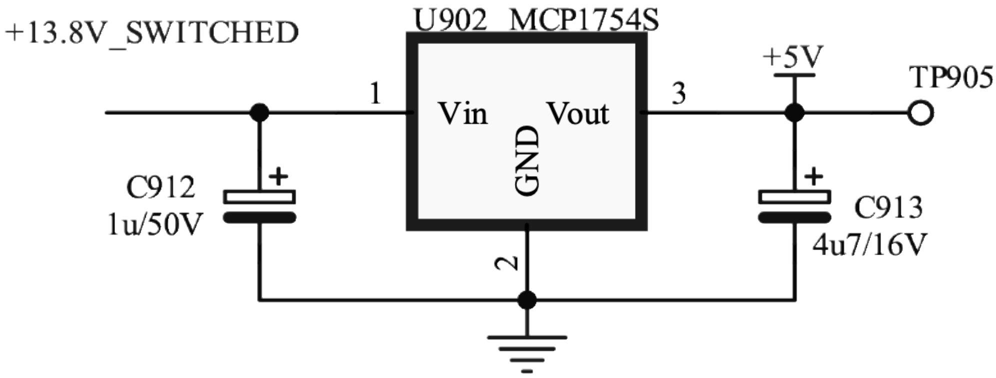


Figure 11: +5V Power Supply

+8V Supply

The +8V supply is generated from the +13.8V_SWITCHED power supply using the 8V linear regulator U901. It supplies power to the VCO via Q104. The +8V output is also switched to provide the +8VRX and +8VTX supplies.

The +8VRX is switched by Q906 and supplies power to the following:

- LNA Q201
- Mixer Q202
- IF Amplifiers Q203, Q204
- Antenna Switch Q601

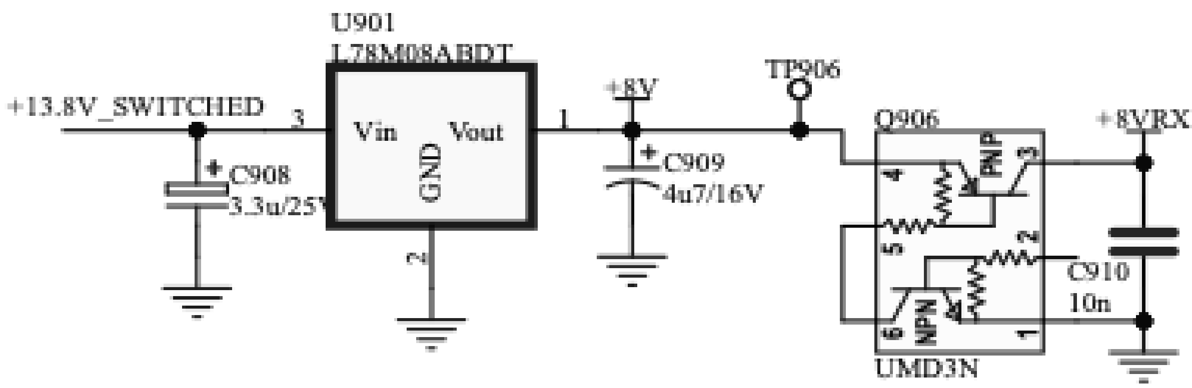


Figure 12: +8V & +8VRX Power Supply

The +8VTX is switched by Q905 and Q907 and supplies power to the following:

- TX Driver U601
- Antenna Switch Q601
- ALC Op-amp U603

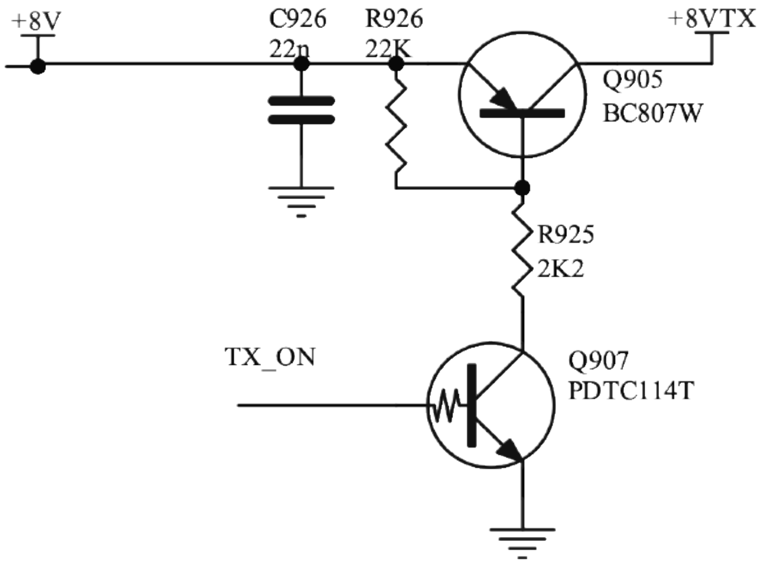


Figure 13: +8VTX Switched Supply

+3.3VPLL Supply

The +3.3VPLL supply is generated from the +8V supply using the 3.3V linear regulator U503. It provides a clean 3.3V supply to the following:

- PLL U501
- TCXO U502

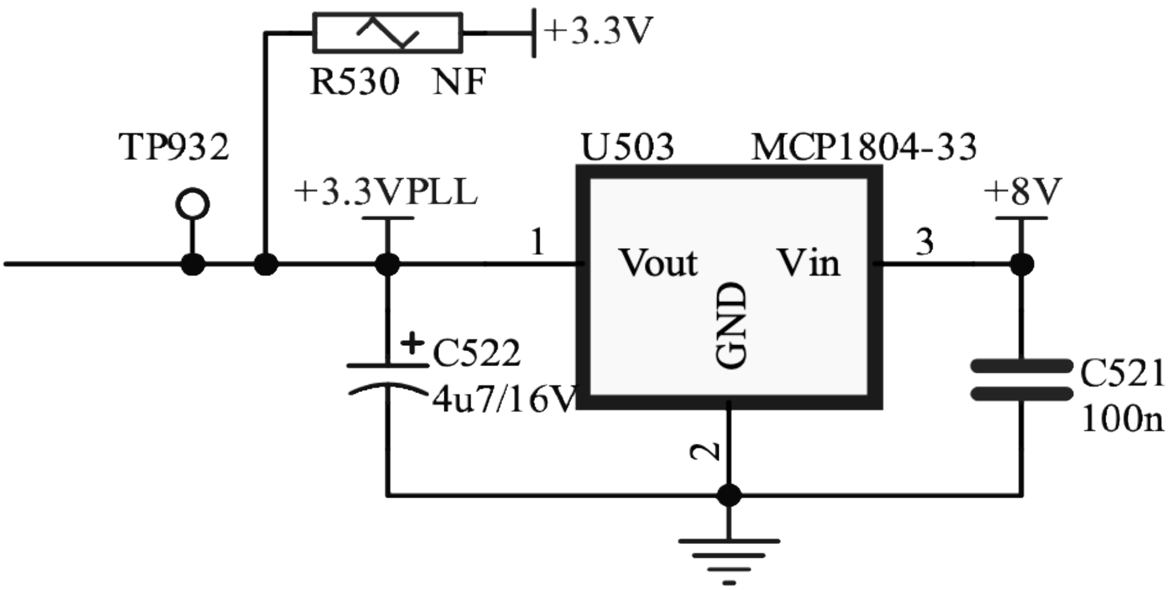


Figure 14: +3.3VPLL Power Supply

+13.8V_Filtered Supply (25W UHF/VHF)

Transistors Q901 and Q902 are configured as an active impulse noise reject filter. The output voltage of this circuit follows the average negative peak of the battery voltage with a small adjustable offset. Positive spikes are suppressed. Feedback is provided by the error amplifier Q902 and its collector current drives the pass transistor Q901. The steady state voltage drop of the regulator is set by the trimmer potentiometer RV901.

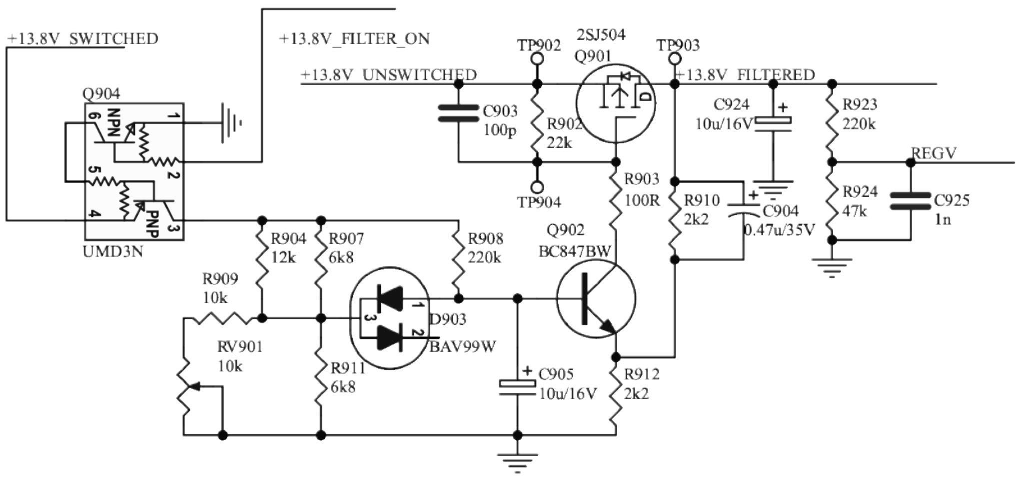


Figure 15:. +13.8V_FILTERED Power Supply

+11V Supply (5W)

Transistors Q901 and Q902 are configured as an active impulse noise reject filter. The output voltage of this circuit follows the average negative peak of the battery voltage with a small adjustable offset. Positive spikes are suppressed. Feedback is provided by the error amplifier Q902 and its collector current drives the pass transistor Q901.

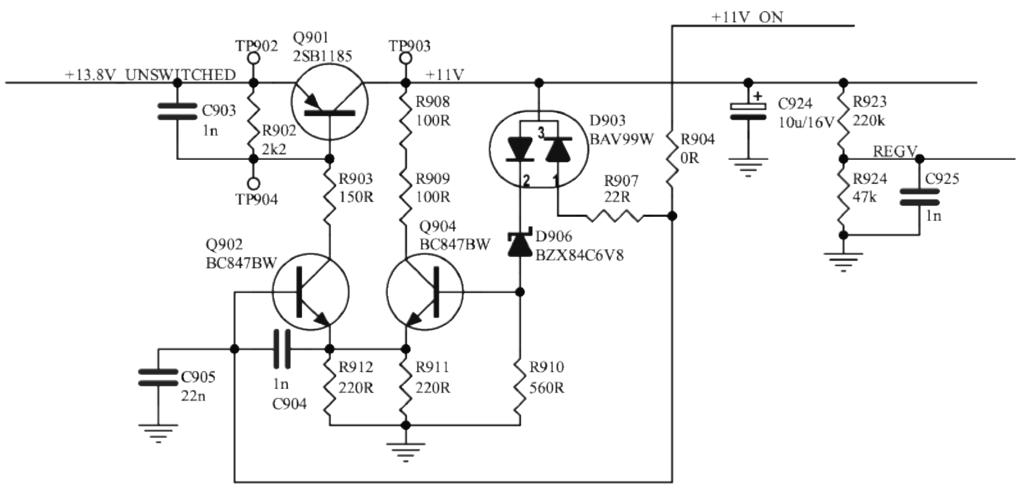


Figure 16: +11V Power Supply

Microprocessor

The CPU is a dsPIC 16-bit combined CPU and DSP device. The 16MHz crystal XT801 is used to generate the CPU timing clock. Power is provided by the 3.3V switching regulator U903.

The resistive divider R913, R914 is used to generate the power fail signal at pin 24. The CPU regularly reads this pin to ensure that the +13.8V supply is sufficiently maintained.

EEPROM

EEPROM U802 stores radio calibration data and user settings when the radio is powered off. The CPU stores and retrieves data from the EEPROM using the I2C bus.

Phase Locked Loop (PLL)

The frequency reference for the PLL U501 is taken from the temperature compensated crystal oscillator (TCXO) U502 (UHF 19.2 MHz) or the crystal oscillator XT501 (VHF 19.2 MHz). The oscillator output is AC coupled to the reference input of the PLL (pin 8). It is divided down by the PLL to produce a phase comparator frequency of 2.4MHz.

The charge pump output (PLL pin 2) is connected to the voltage-controlled oscillator (VCO) tuning varactors (UHF: D103-106, VHF: D103-D108) in order to alter the VCO frequency to align its phase with the 2.4MHz comparator frequency. A passive loop filter is used to set the bandwidth of the PLL response and to suppress any sideband products. The PLL bandwidth is set to 1kHz to achieve a fast lock time response.

The VCO output is connected to the RF inputs of the PLL (pins 5, 6) and divided down by the fractional-N PLL so that can be compared to the 2.4MHz reference frequency. The comparator output then drives the PLL charge pump output.

Modulation of the VCO is achieved using a 2-point modulation method. The microphone audio is fed from the front panel connector J802 or rear microphone socket J808 to the CODEC U402 where it is band-pass filtered. From there the microphone audio is routed to two locations, TX_MOD and TX_BAL.

The TX_MOD signal is injected into the base of the PLL loop filter at the cathodes of C515, C516 and C517. This modulates the frequencies above the PLL loop bandwidth.

The TX_BAL signal is connected to the op-amp U701A. It is combined with the digital to analog converter (DAC) output FREF (used to tune the VCO frequency error) and then connected to the TCXO voltage control input where it modulates the TCXO frequency. This modulates the frequencies below the PLL loop bandwidth.

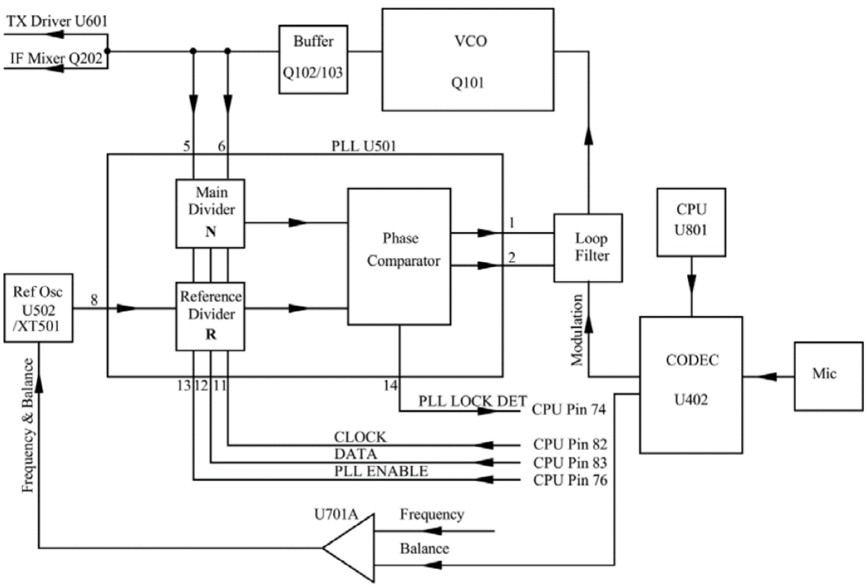


Figure 17: PLL Block Diagram

Voltage Controlled Oscillator (VCO)

VCO is a conventional common collector stage based around Q101. The main tuning elements are the capacitor C109, inductor L103 and the microstrip inductor between L103 and ground.

Frequency tuning is achieved by varactors (UHF: D103-106, VHF: D103-D108).

When in transmit mode, the transistor Q105 switches on the diode D102. This shorts the microstrip inductor causing the frequency range of the VCO to shift upwards.

The frequency range of the VCO in receive and transmit modes are shown in the table below for each CM60 model.

Model	Frequency Range	VCO Range - Receive	VCO Range - Transmit
CM40-U5	450 – 520MHz	411.15 - 481.15MHz	450 – 520MHz
CM50-U25	450 – 520MHz	411.15 - 481.15MHz	450 – 520MHz
CM50-V25	136 – 174MHz	122.6 – 164.4MHz	136 - 174MHz

The VCO output is applied to a buffer amplifier stage Q102, Q103. The output of this stage is connected to three locations and:

- Drives the TX driver IC U601
- Drives the RX mixer Q202
- Is amplified by Q106 (UHF) or U504 (VHF) and then connected to the PLL RF inputs

The series pass transistor Q104 provides a well-filtered supply voltage for the VCO by effectively creating a virtual capacitor in the emitter circuit.

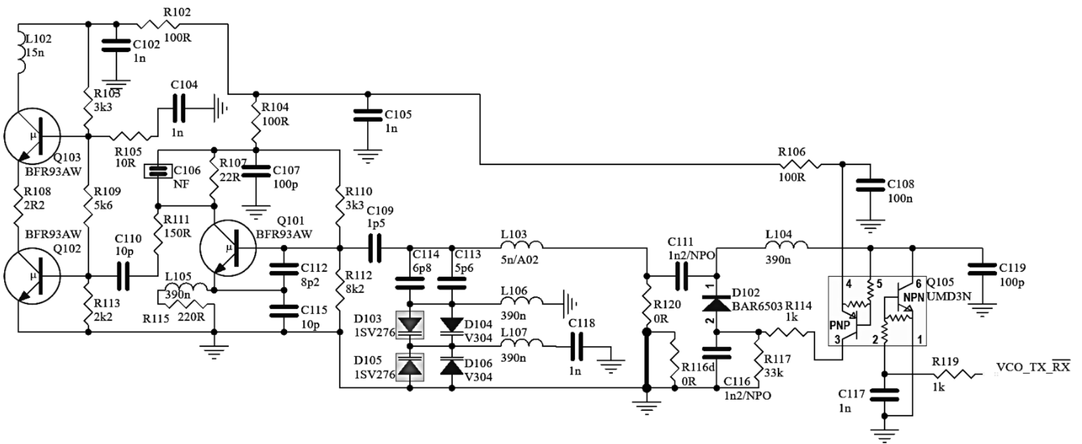


Figure 18: Voltage Controlled Oscillator - UHF

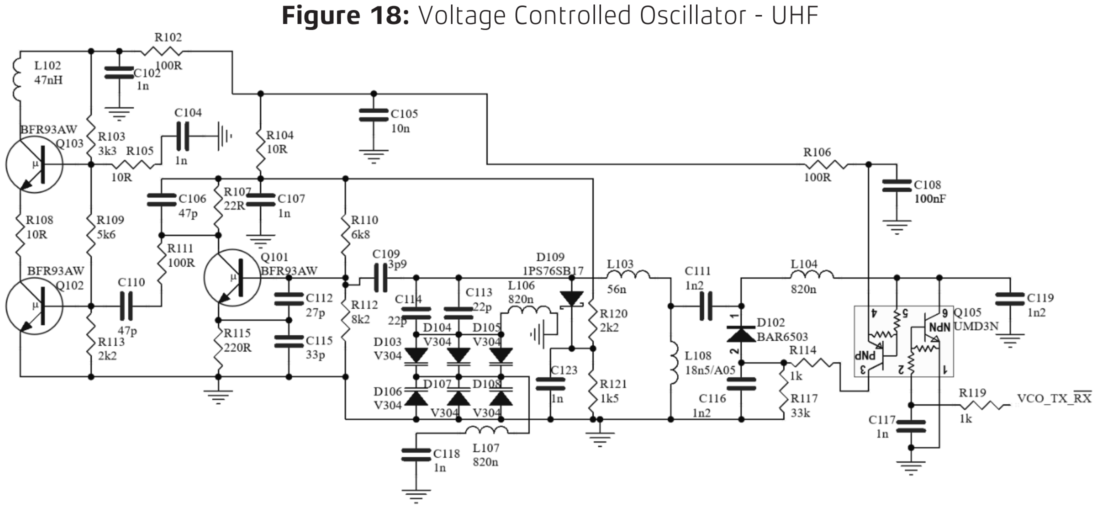


Figure 19: Voltage Controlled Oscillator - VHF

Antenna Switching

The antenna RX/TX switching is achieved using two switching diodes, D603 and D605. The low pass filter (LPF) that connects the antenna to this switch attenuates out-of-band signals and provides impedance matching between the TX output module U602 and the antenna.

In receive mode, Q601 is off and D603, D605 are reverse biased. This allows the signal to flow from the antenna to the receive circuit. D603 isolates the TX module during receive.

In transmit mode, Q601 is on and D603, D605 are forward biased. This connects the TX module to the antenna through the LPF and isolates the receive circuit. The receive circuit is further isolated by forward biasing D604.

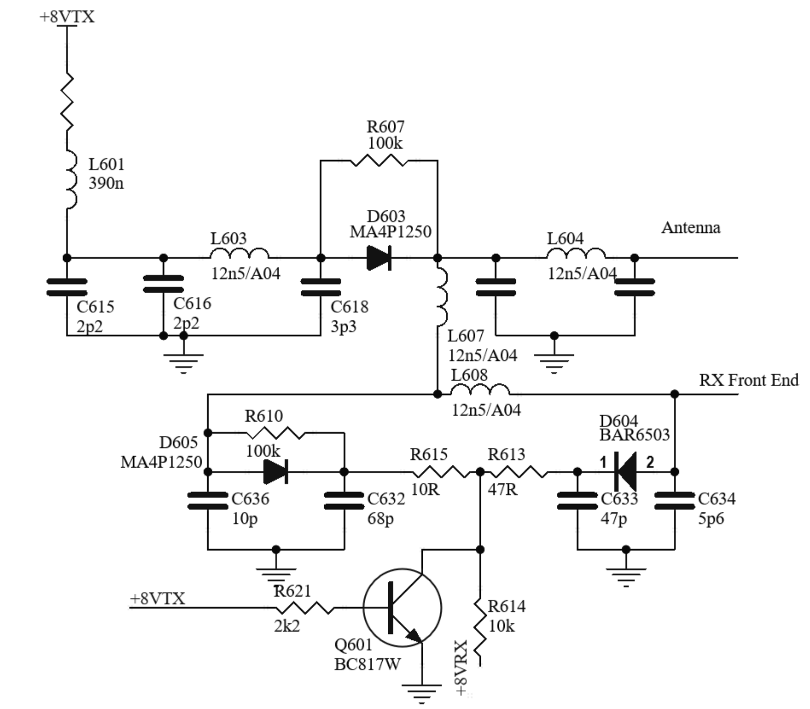


Figure 20: Antenna Switching Circuit

Receiver - UHF

RF Amplifier

The incoming RF signal is, after passing through the antenna low pass filter (LPF), coupled to the notch filter C204, D201, L202. The center of the notch filter is tuned using varactor D201 and shunts the first image of the receiver, (fRX – (2x38.85)) MHz, to ground. The signal then passes to the low noise amplifier (LNA) Q201.

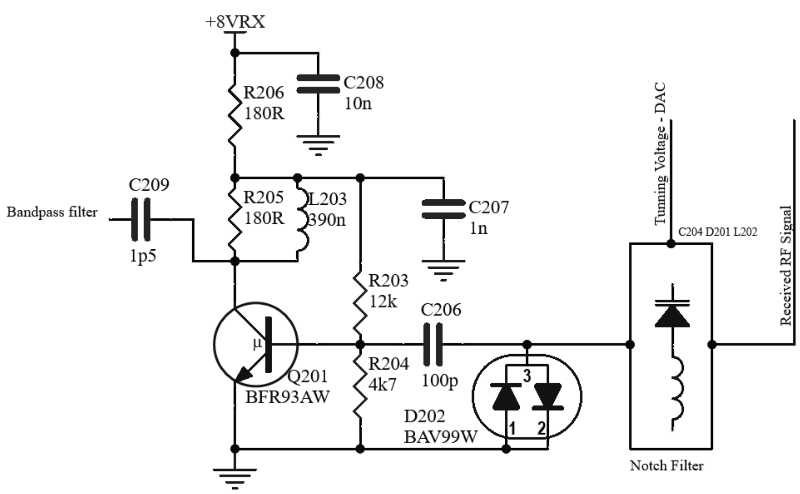


Figure 21: UHF Low Noise Amplifier and Notch

RF Amplifier Cont.

Following the LNA is a 3-section parallel LC tank. This forms a band pass filter (BPF) centered around the receive frequency, rejecting out-of-band signals.
The BPF is tuned using varactors D203-205.
Tuning voltages for the notch and BPFs are supplied by the DAC U806.

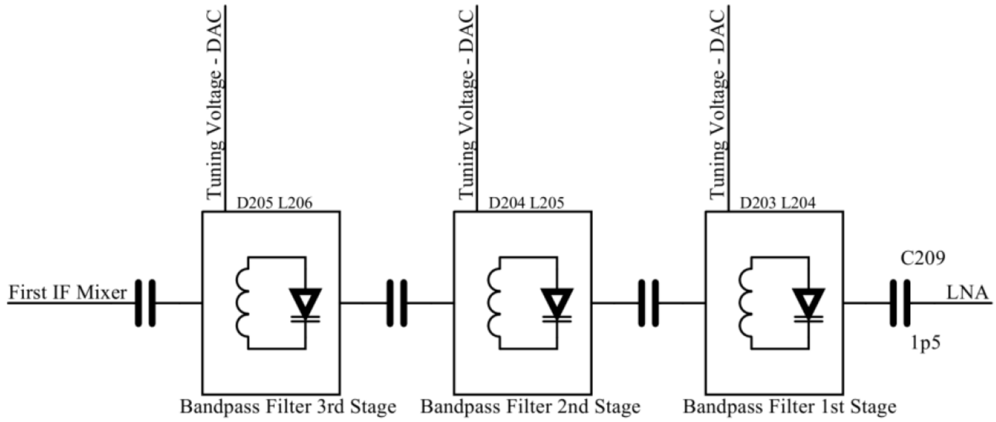


Figure 22: UHF Band Pass Filter

First Mixer and IF Section

After the BPF, the signal passes to the first mixer stage. This mixer is a dual-gate MOSFET Q202. The RF signal is applied to gate 2 of Q202 and the VCO output is applied to gate 1.

The VCO is tuned to 38.85MHz below the wanted RF signal such that the output of the mixer is an IF signal at 38.85MHz.

The IF signal is then switched to either the wideband crystal filter XF201 or the narrowband crystal filter XF202 using the switching diodes D206, D207. The crystal filter rejects unwanted mixer products and provides adjacent channel filtering.

Following the crystal filters is an IF amplifier stage Q203 which provides impedance matching for the crystals and drives the RF input of the IF IC U301. The IF amplifier output is switched to the IF IC by diodes D208 and D209.

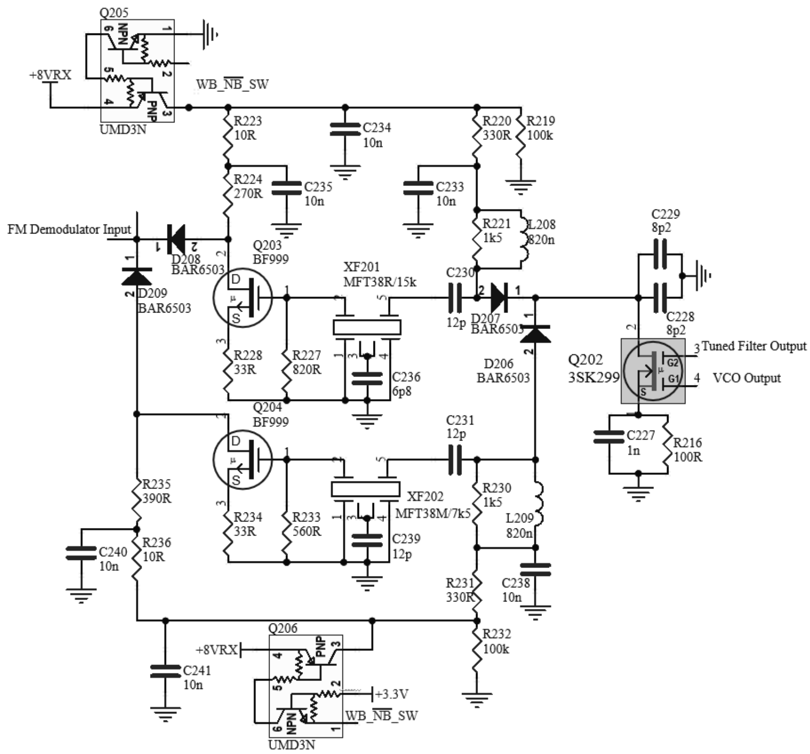


Figure 23: UHF First Mixer

FM Demodulator

FM demodulation is performed by the IF IC U301. The 38.85MHz signal is coupled to the RF input of U301 where it is mixed with the 38.4MHz oscillator signal generated by XT301. This produces a second IF signal at 450kHz.
The second IF signal is then switched to either the wideband ceramic filter CF301 or narrowband ceramic filter CF303 using the switch ICs U303, U304. The ceramic filters reject unwanted mixer products and provide further adjacent channel filtering.
The ceramic discriminator CF302 then provides quadrature demodulation of the second IF signal and produces the demodulated FM audio at pin 9 of U301.

CODEC

The demodulated FM audio is then sampled by the sigma-delta ADC in the CODEC U402. The CODEC samples at 16ksps at 16-bit resolution and the digital samples are sent to the CPU over the CODEC I2S serial bus (CODEC pins 38-41).
The CPU then digitally filters the FM audio and returns the samples to the CODEC over the same bus. The resultant filtered audio is regenerated using the CODEC DAC at pin 23. This is connected to the audio amplifier.
The CODEC also contains internal variable gain amplifiers in the DAC output path that are used to set the audio volume.

Receiver - VHF

RF Amplifier

The incoming RF signal is passed through a 4-section parallel LC tank that forms a BPF centered around the receive frequency, rejecting out-of-band signals. The BPF is tuned using varactors D201(A), D202(A), D204(A) and D205(A), with tuning voltages supplied by the DAC U806.
The LNA Q201 is between the second and third stages of the BPF.

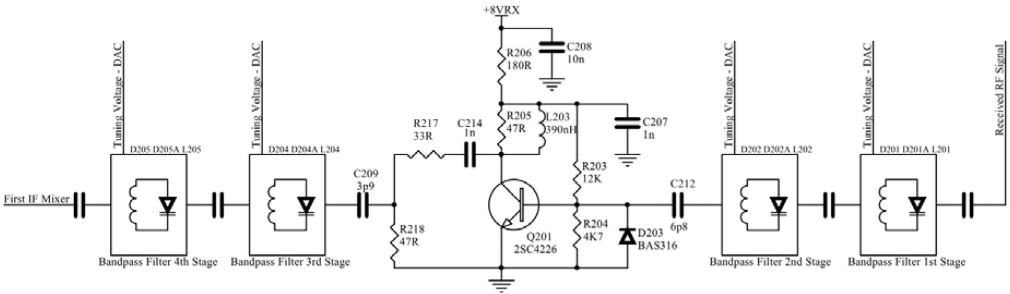


Figure 24: VHF Band Pass Filter and Low Noise Amplifier

First Mixer and IF Section

After the BPF, the signal passes to the first mixer stage. This mixer is a dual-gate MOSFET Q202. The RF signal is applied to gate 2 of Q202 and the VCO output is applied to gate 1.
The VCO is tuned to 21.4MHz below the wanted RF signal such that the output of the mixer is an IF signal at 21.4MHz.
The IF signal is then switched to either the wideband crystal filter XF201 or the narrowband crystal filter XF202 using the switching diodes D206, D207. The crystal filter rejects unwanted mixer products and provides adjacent channel filtering.
Following the crystal filters is an IF amplifier stage which provides impedance matching for the crystals and drives the RF input of the IF IC U301. The IF amplifier output is switched to the IF IC by diodes D208 and D209.

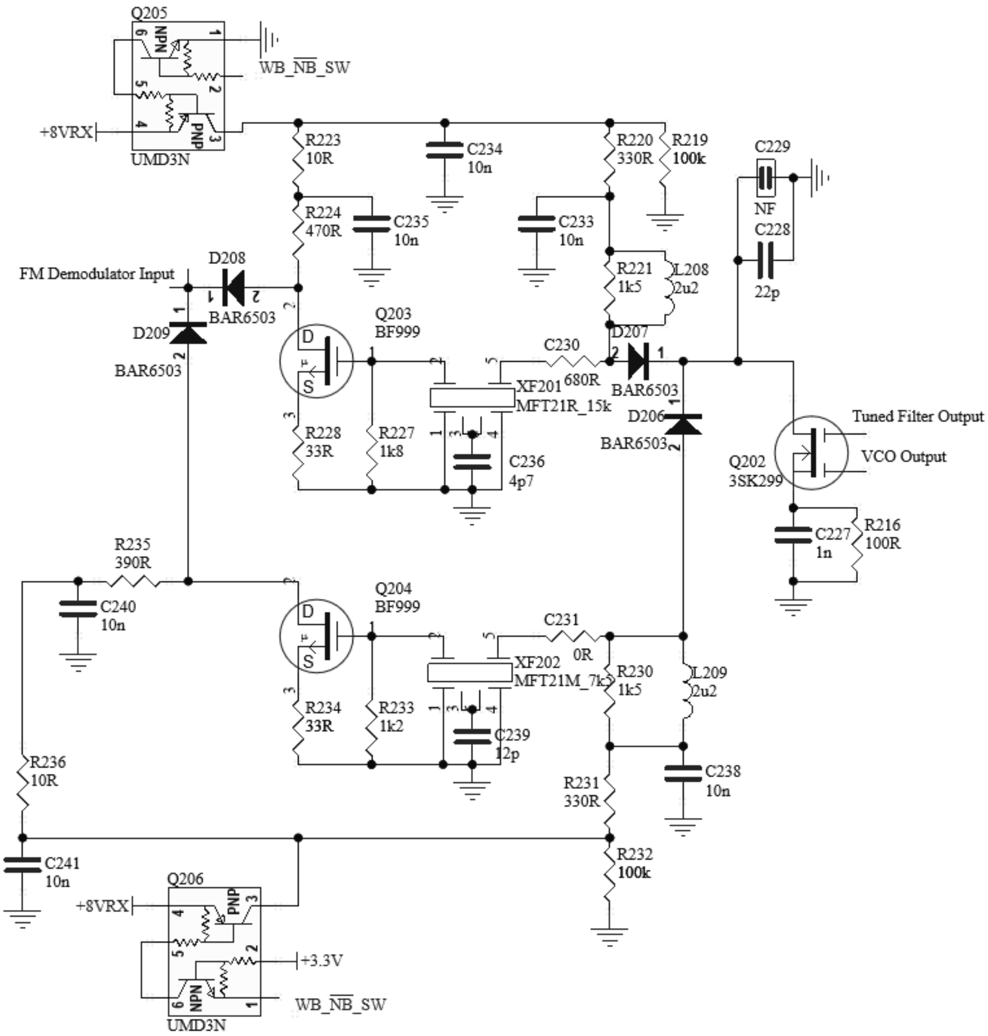


Figure 25: VHF First Mixer

FM Demodulator

FM demodulation is performed by the IF IC U301. The 21.4MHz signal is coupled to the RF input of U301 where it is mixed with the 20.95MHz oscillator signal generated by XT301. This produces a second IF signal at 450 kHz.

This second IF signal is then switched to either the wideband ceramic filter CF301 or narrowband ceramic filter CF303 using the switch ICs U303, U304. The ceramic filters reject unwanted mixer products and provide further adjacent channel filtering.

The ceramic discriminator CF302 then provides quadrature demodulation of the second IF signal and produces the demodulated FM audio at pin 9 of U301.

CODEC

The demodulated FM audio is then sampled by the sigma-delta ADC in the CODEC U402. The CODEC samples at 16ksps at 16-bit resolution and the digital samples are sent to the CPU over the CODEC I2S serial bus (CODEC pins 38-41).

The CPU then digitally filters the FM audio and returns the samples to the CODEC over the same bus. The resultant filtered audio is regenerated using the CODEC DAC at pin 23. This is connected to the audio amplifier.

The CODEC also contains internal variable gain amplifiers in the DAC output path that are used to set the audio volume.

Audio Power Amplifier

The filtered FM audio from the CODEC is coupled to the input of the audio amplifier U401. This amplifier is configured to have a flat frequency response. The output of the amplifier is coupled to the internal speaker J402 and external socket J401.

The amplifier is placed in standby mode when Q402 is driven on by the CPU, pulling pin 8 of the audio amplifier low. In this scenario, the DC bias is removed, and the power consumption of the amplifier is reduced.

TX Driver and Output Stages

The transmit driver IC U601 is driven by the VCO buffer amplifier Q102, Q103. The output of U601 is coupled to the input of the TX power module U602. The output of U602 is then coupled to the output LPF and antenna.

Power Control

The output from U602 is sampled by diode detectors D601 and D602 to obtain a DC voltage proportional to the RF power. This DC voltage is buffered using op-amp U603B and connected to the negative input of op-amp comparator U603A. The positive input of U603A is connected to the DAC output RF_POWER and sets the required RF power level.

The comparator U603A then adjusts the power module control voltage (pin 2 Vgg) until the detected DC level from D601 and D602 matches the required level. The negative feedback loop will maintain a constant power level.

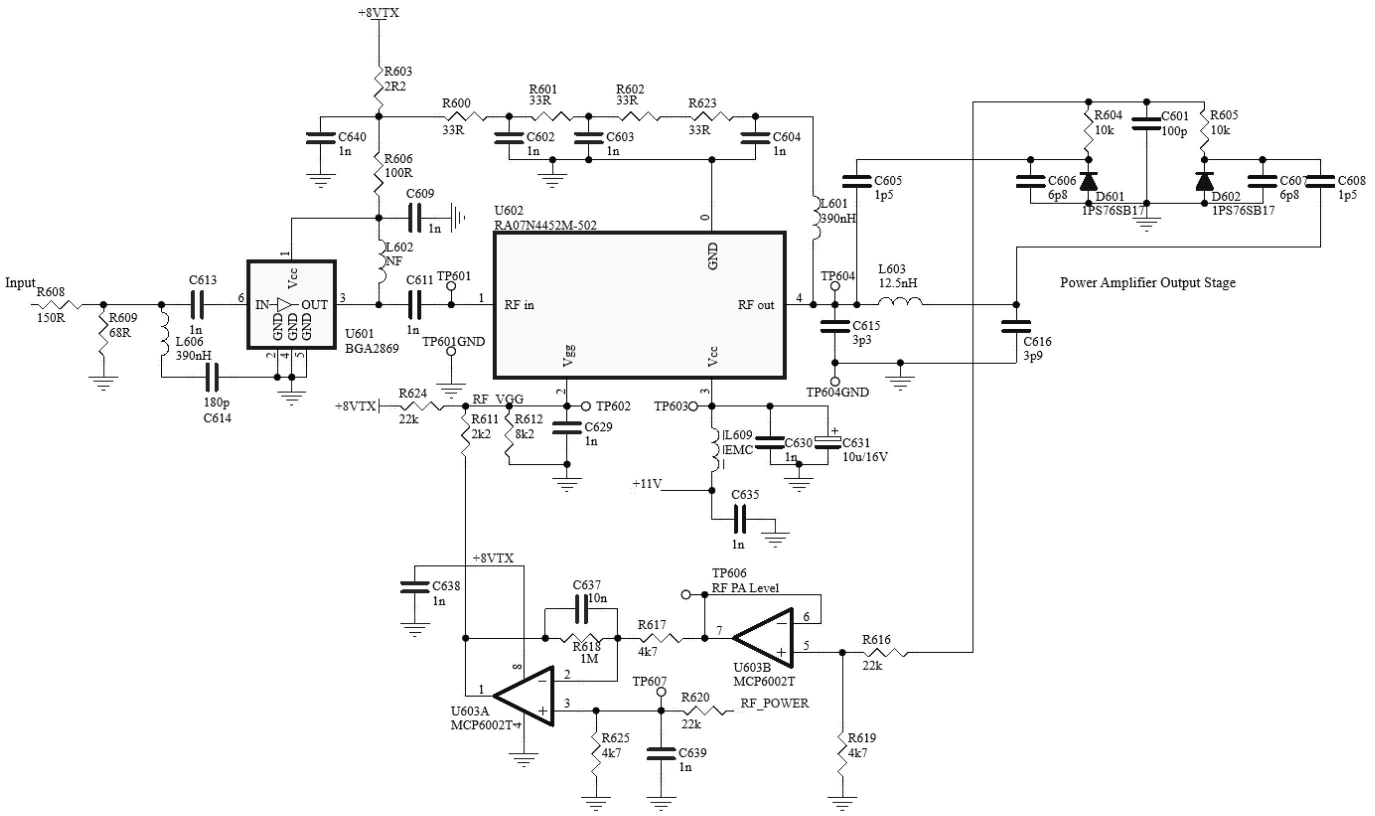


Figure 26: 5W UHF Power Amplifier

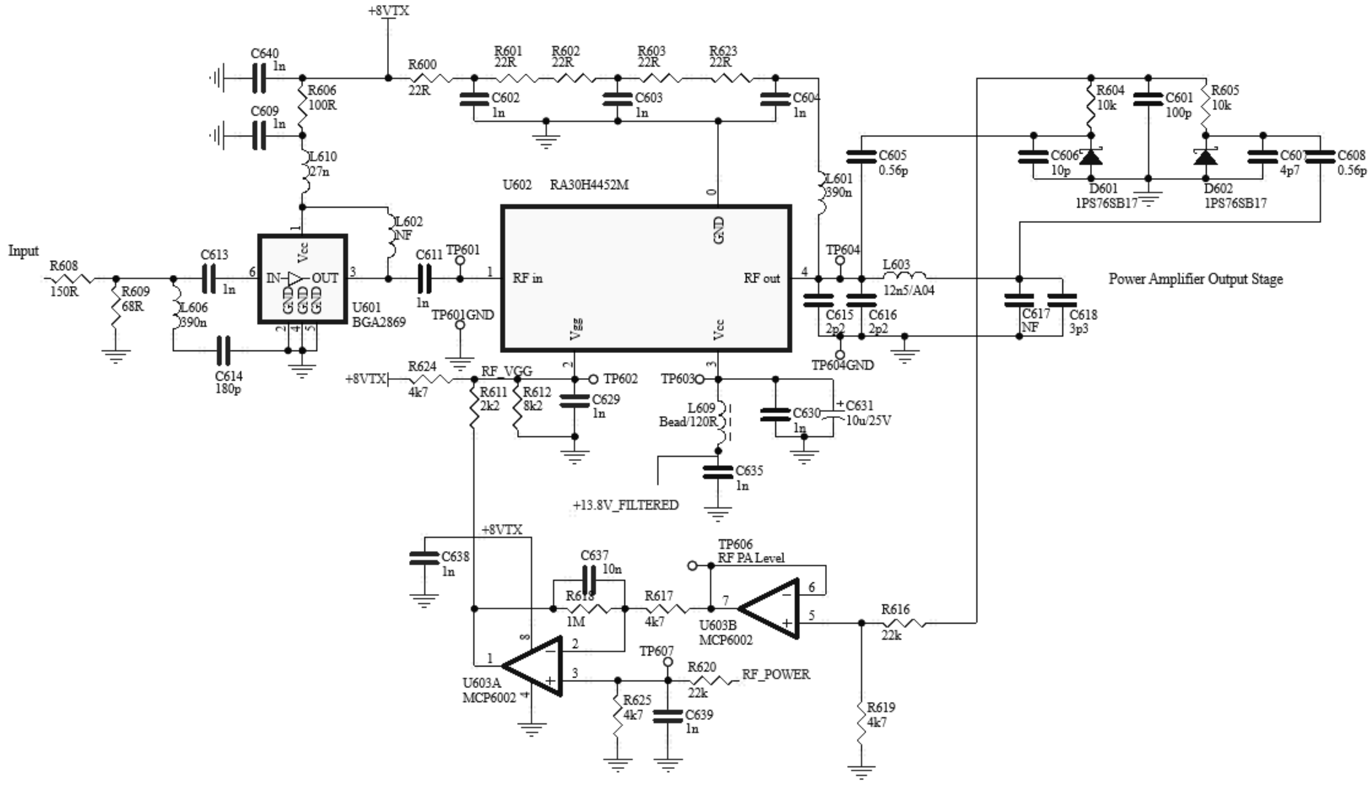


Figure 27: 25W UHF Power Amplifier

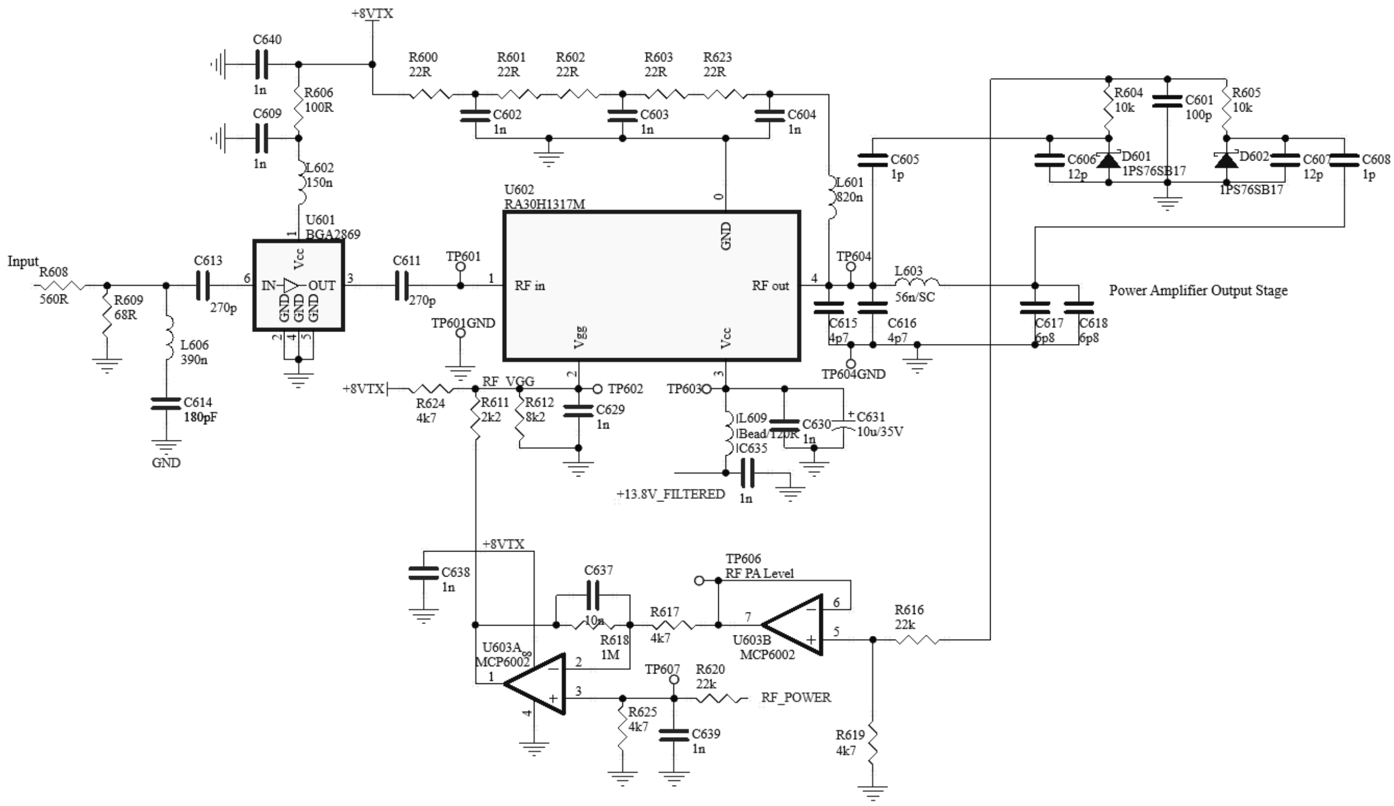


Figure 28: VHF Power Amplifier

Connectivity

Front Panel

Connector J802 provides connectivity between the radio base and the radio control interface. It carries the +13.8V supplies, microphone audio, volume control signals and UART RX/TX.

The level converters U804 and U805 convert the CPU 3.3V UART interface to 5V for the front panel.

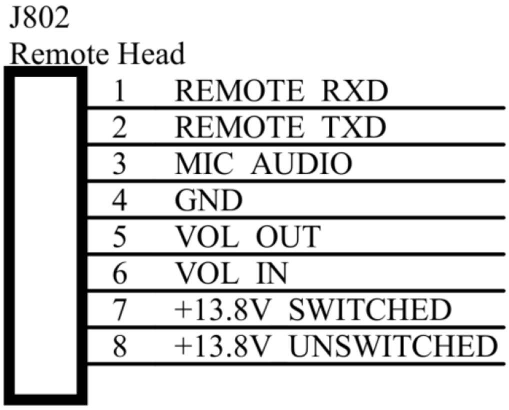


Figure 29: J802 Controller Connector

Wireless Header

Connector J806 is a socket into which expansion modules may be plugged to extend radio functionality. It currently carries 3.3V level UART RX/TX, SPI lines from the microprocessor and audio input and output lines routed to the CODEC.

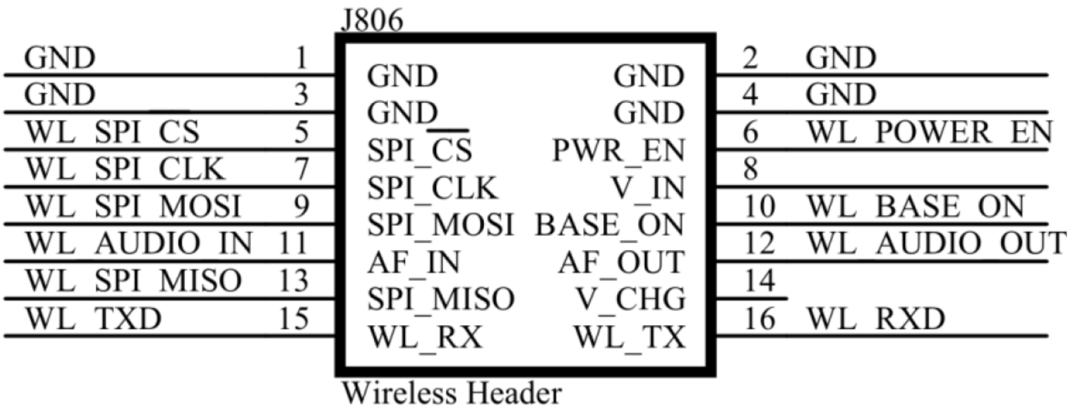


Figure 30: J806 Wireless Accessory Header

Auxiliary Interface

Connector J801 is a socket intended for use with auxiliary cables. The cables provide an interface for external control of the radio for third-party applications. It carries the +13.8V_SWITCHED supply, RS232 level RX/TX, PTT input, BUSY output, TX/RX audio and several reconfigurable I/Os.

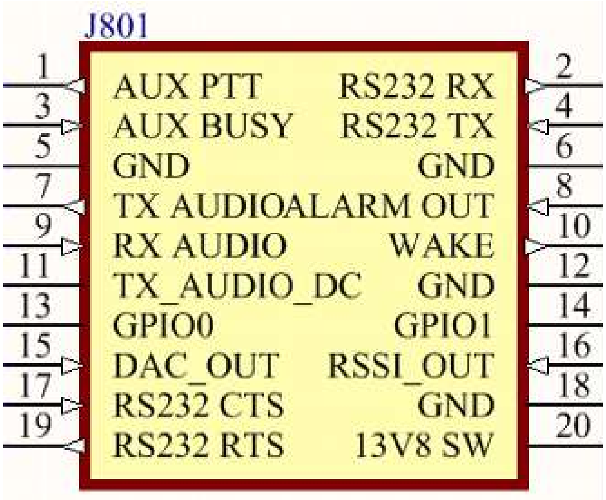
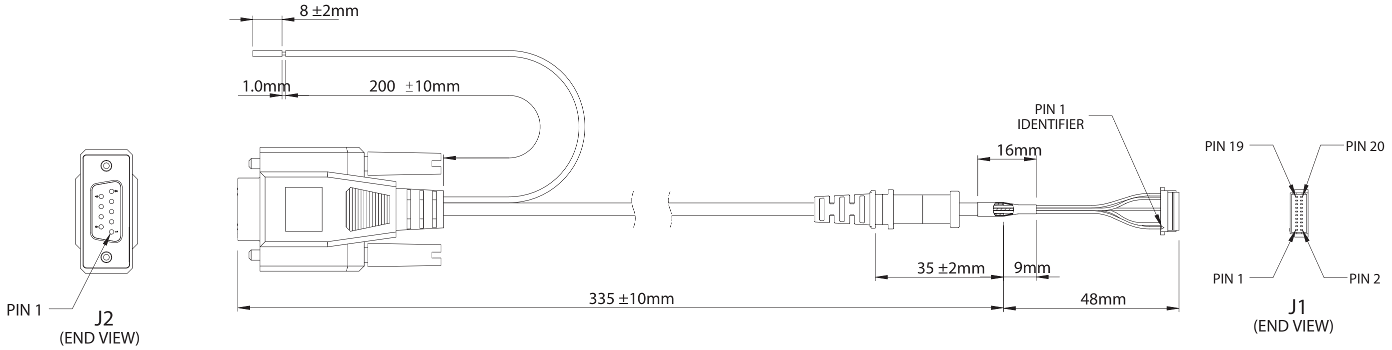


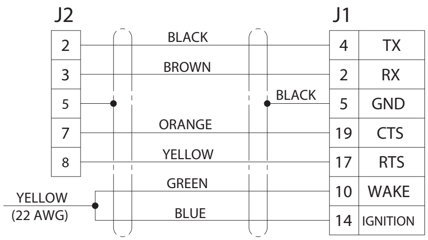
Figure 31: CM Series Auxiliary Connector J801

Note: Refer to the CM Series AT Command Reference Manual for working instructions on available AT Commands for the CM Series.

#	Name	Description	Levels
1	AUX_PTT	PTT indicator to radio.	0 to supply voltage (+13.8V). Active low.
3	AUX_BUSY	Busy out indicator from radio.	0 to +3.3V. Programmable polarity and function.
2	RS232_RX	Serial transmit from DTE to radio.	-15 to +15V. 0 (space): +2.4 to +15V. 1 (mark): -15 to +1.2V.
4	RS232_TX	Serial transmit from radio to DTE.	-5 to 5V. 0 (space): -5V. 1 (mark): +5V.
5,6	GND	Signal ground.	-
7	TX_AUDIO	AC coupled audio input signal to radio (AUX_AUDIO_IN).	0 to 3.3V. 1Vpp nominal. Programmable gain.
8	ALARM_OUT	Programmable open-collector alarm output.	0 to supply voltage (+13.8V). 100mA max. Programmable function.
9	RX_AUDIO	Audio output signal from radio (AUX_AUDIO_OUT).	0 to 3.3V. 1Vpp nominal. Programmable gain.
10	WAKE	Wake input to turn radio on, independent of control head switch.	0 to supply voltage (+13.8V). Active high.
11	TX_AUDIO_DC	DC coupled audio input signal to radio (AUX_AUDIO_IN).	0 to 3.3V. 1Vpp nominal. Programmable gain.
12	GND	Signal ground.	-
13	GPIO0	General purpose IO. Programmable function.	0 to +3.3V. Programmable polarity and function.
14	GPIO1	General purpose IO / ignition sense input. Programmable function.	0 to supply voltage (+13.8V). Programmable polarity and function.
15	DAC_OUT	Reserved for future use. Do not connect.	-
16	RSSI_OUT	Received signal strength output.	0 to +3.3V.
17	RS232_CTS	Flow control from radio to DTE.	-15 to +15V. Clear to send: +2.4 to +15V. Do not send: -15 to +1.2V.
18	GND	Signal ground.	-
19	RS232_RTS	Flow control from DTE to radio.	-15 to +15V. Clear to send: +2.4 to +15V. Do not send: -15 to +1.2V.

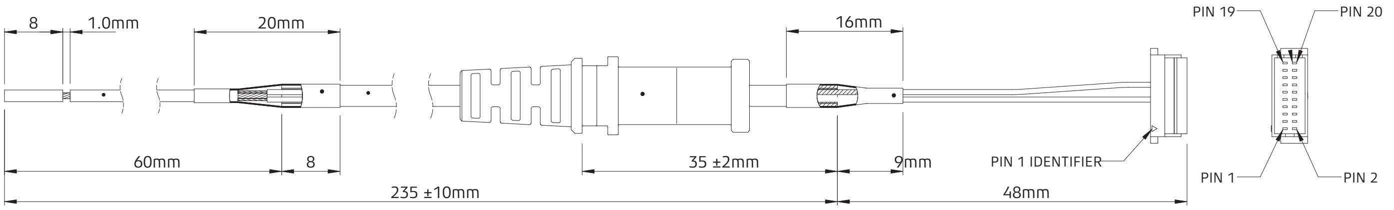
LE111: Ignition Sense Lead (RS232) to suit CM Series

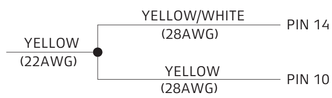




WIRING DIAGRAM

LE112: Ignition Sense Lead to suit CM Series

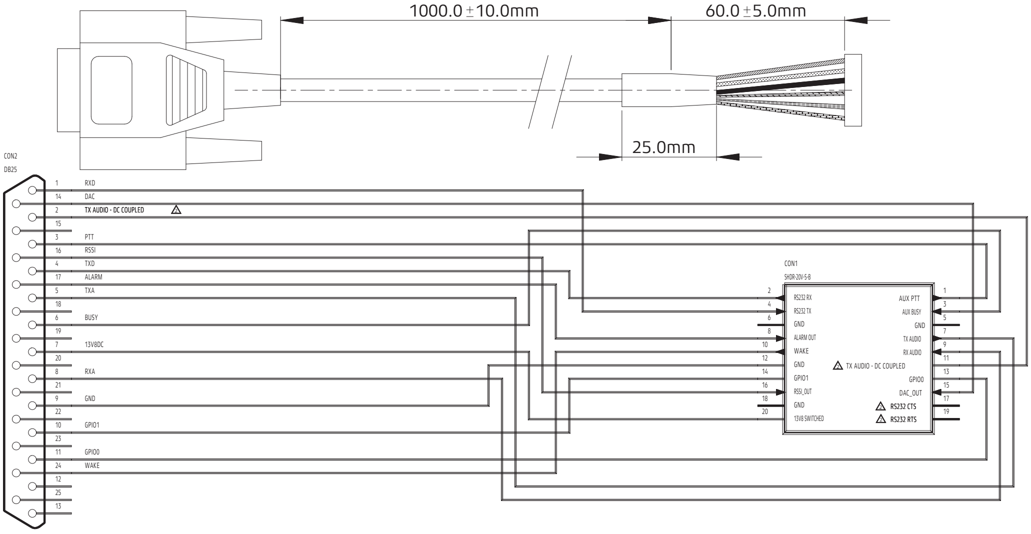




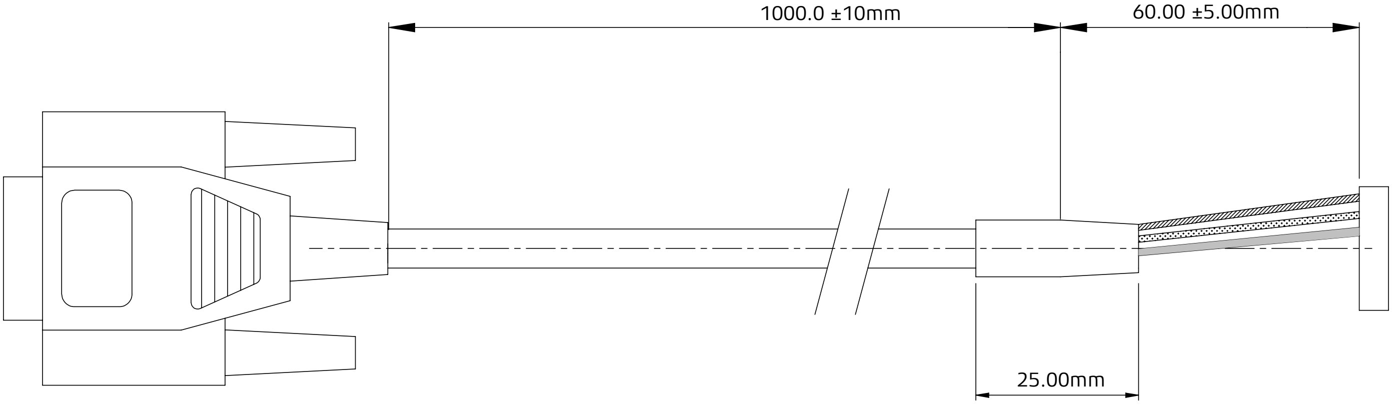
WIRING DIAGRAM

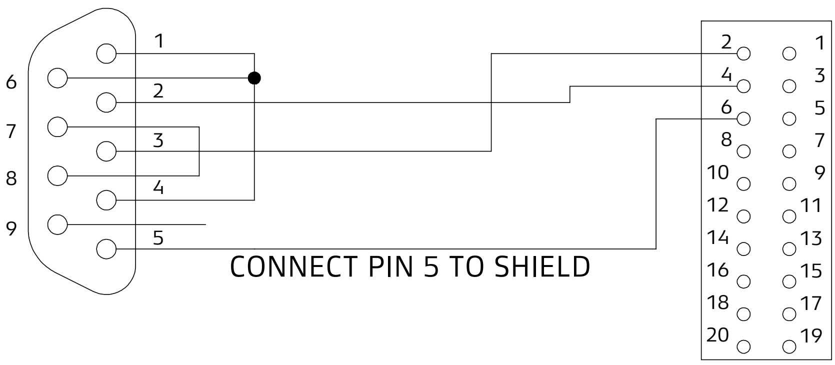
LE114: 1M Auxiliary Cable with DB25 (Male) Connector to suit CM Series

DB25 Male	SHDR-20V-S-B
1	4
2	11
3	1
4	2
5	7
6	3
7	20
8	9
9	12
10	14
11	13
12	NC
13	NC
14	15
15	NC
16	16
17	8
18	NC
19	NC
20	NC



LE115: 9 Pin “D” (Female) Data Lead to suit CM Series





Overview

The CM40/50 radio is supplied with a slide-on mounting bracket. The bracket is screwed or bolted in a convenient location in a vehicle using the mounting slots provided in the base.

The CM40/50 radio has a built-in speaker and may be installed with the speaker facing upwards or downwards to ensure the receiver audio is projected clearly. The CM40/50 may be fitted with an extension speaker if required.

Avoid mounting the radio close to heaters or air conditioners. Screw the mounting bracket to a firm surface.

Mounting Bracket

The MB009 mounting bracket may be used to mount the CM40/50 in a vehicle.

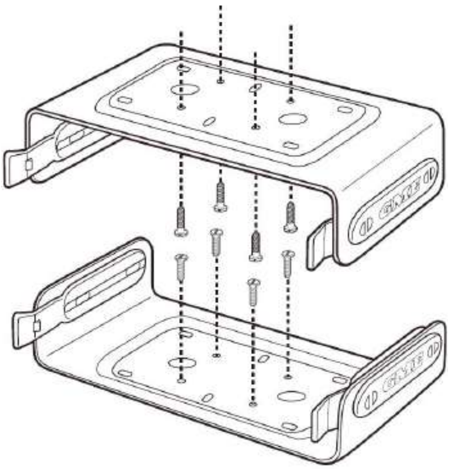


Figure 33: MB009 Mounting Bracket

Fitting the Radio

To mount the radio, slide the CM40/50 into the mounting bracket from the front until it clicks into place. Plug the power and antenna leads to the sockets at the rear of the radio.

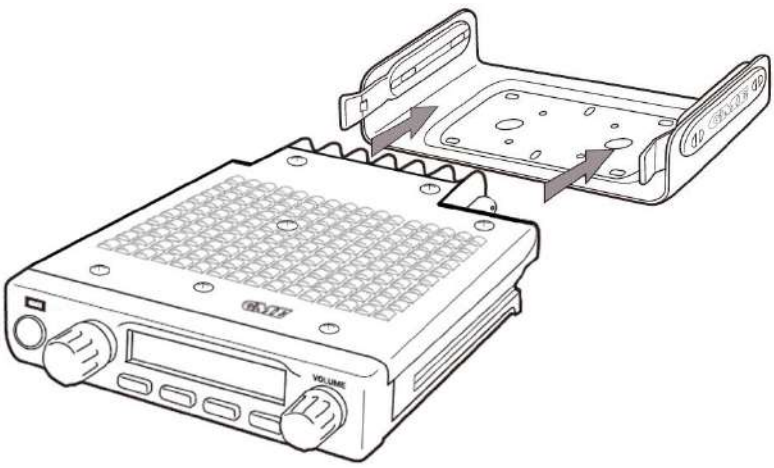


Figure 34: Fitting the CM40/50 Radio in the MB009 Mounting Bracket

Removing the Radio

To remove the radio from the mounting bracket, pull the two tabs on either side of the mounting bracket outwards until the radio releases. Slide out the radio.

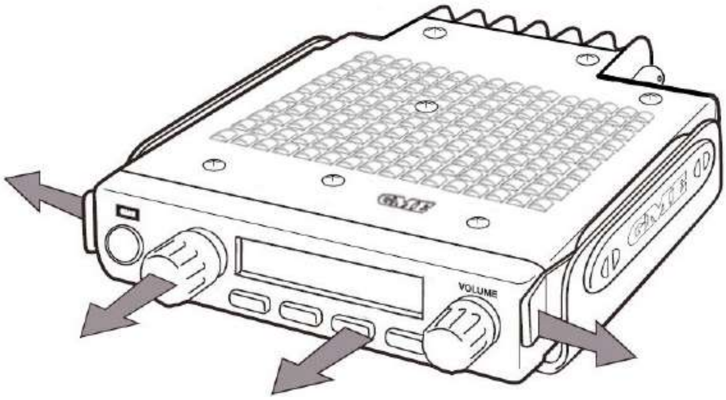


Figure 35: Removing the Radio

DC Power Connection

The CM40/50 radio is designed for 13.8V DC, negative earth installations only (i.e. where the negative terminal of the battery is connected to the chassis or frame of the vehicle).
Two in-line 10A fuses are supplied. Connect fuses as close to the battery as possible. The radio's positive (red) lead is connected via a 10A fuse directly to the battery's positive terminal. Connect the radio's negative (black) lead via a 10A fuse directly to the battery's negative terminal.

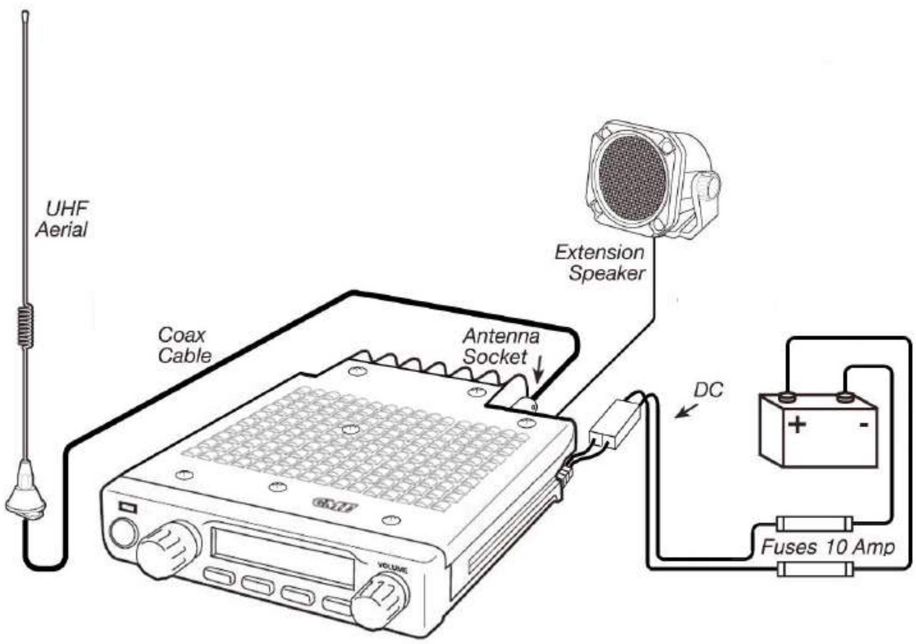


Figure 36: DC Power Connection Diagram

Fitting and Removing the MP600B Fist Microphone

The MP600B fist microphone is supplied with a mounting clip. Screw the MP600B microphone mounting clip to a firm surface. The MP600B microphone uses an RJ12 6-pin style plug and socket.

To fit the MP600B microphone:

1. Position the MP600B microphone plug so the plastic tab faces downwards. Press the plug into the socket until it clicks into place.
2. Gently press the rubber strain relief into the hole surrounding the socket so that the slot around the strain relief fits neatly inside the lip of the hole.

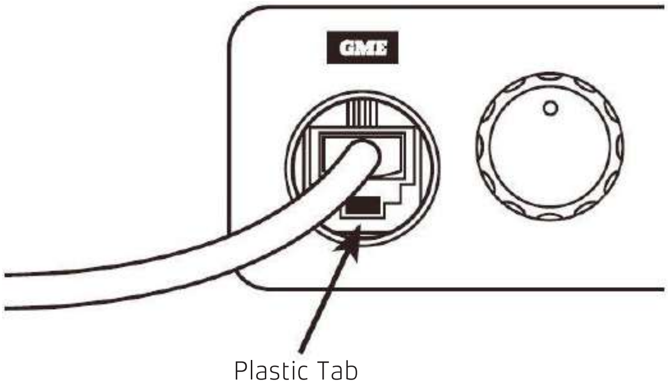


Figure 37: Front MP600B Microphone Input

To remove the MP600B microphone:

1. Squeeze the rubber strain relief near the front panel to disengage the slot. Slide the strain relief back along the microphone cord.
2. Squeeze the plastic tab on the microphone plug towards the plug to unlock it while gently pulling the plug outwards.

If the plug does not come out easily, the tab has not released correctly. Squeeze the tab again to release the plug.

Fitting and removing a UIC500/600 Controller Microphone

Screw the UIC500/600 controller microphone mounting clip to a firm surface. The UIC500/600 controller microphone uses an RJ45 style plug and socket.
To fit the UIC500/600 controller microphone, position the UIC500/600 controller microphone plug so the plastic tab faces downwards. Press the plug into the socket until it clicks into place.

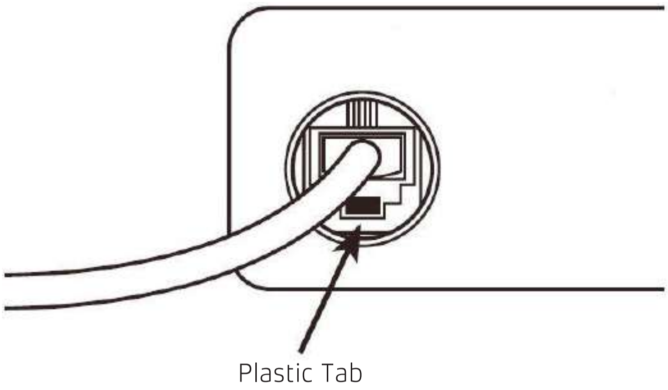


Figure 38: UIC500/600 Controller Microphone Input

NOTE: Socket damage will occur if RJ12 mic style plug is inserted into the RJ45 socket. To remove the UIC500/600 controller microphone, squeeze the plastic tab on the microphone plug towards the plug to unlock it while gently pulling the plug outwards. If the plug does not come out easily, the tab has not released correctly. Squeeze the tab again to release the plug.

Antenna

To comply with FCC exposure limits the radio must be installed using an externally mounted antenna with a gain of either 2.15dBi or 5.15dBi. For best results your antenna should be professionally installed using industry standard techniques. Transmit only when bystanders are at a minimum safe distance of 0.9m (35”) from the antenna.

Alignment Procedure

The equipment required to perform the alignment procedure is listed below.

- Radio communications test set
- 13.8V DC power supply
- LS1-USB programming cable
- LS002 programming adapter (local/control head)
- LS003 programming adapter (base radio)
- Windows computer with USB port running the CM40/50 Series Radio Programmer

The figures below shows examples of connecting the CM40/50 Series radio configurations to a computer and a radio communications test set.

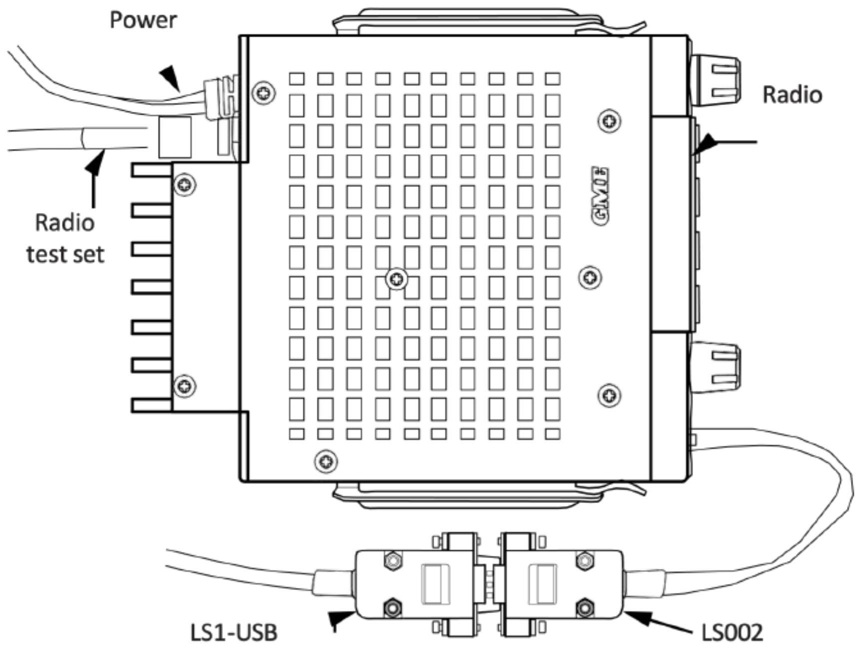


Figure 39: Connecting the local control head to a computer

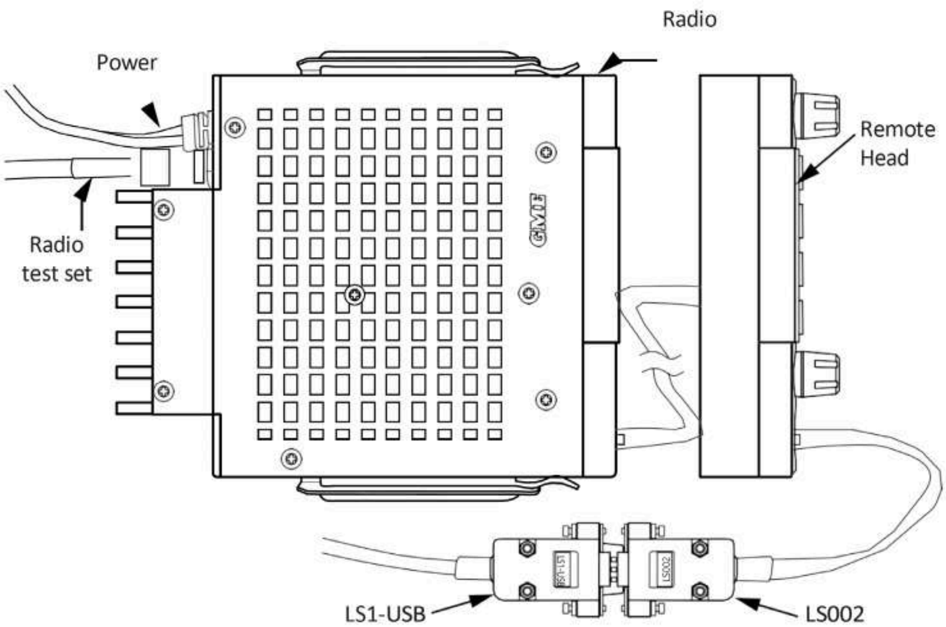


Figure 40: Connecting the remote head to the computer

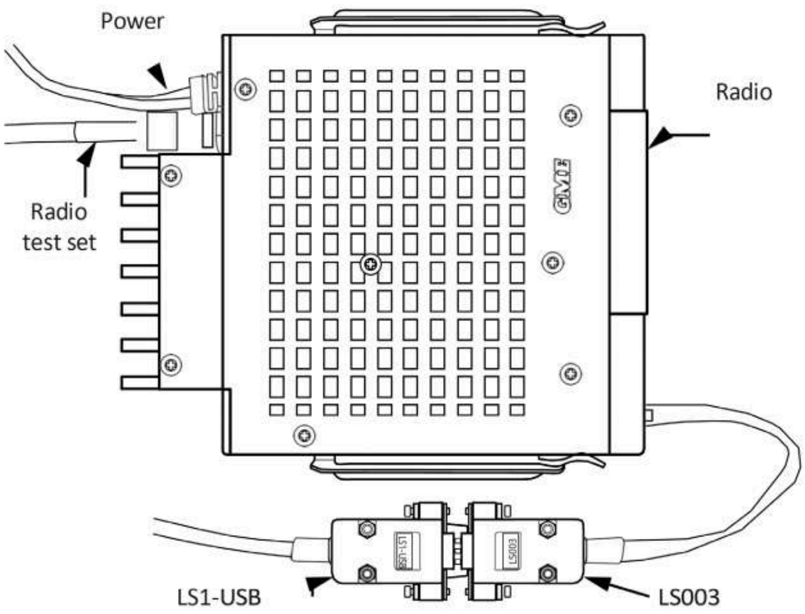


Figure 41: Connecting the radio (in the extended setup) to the computer

To run the programming software:

1. Connect the CM40/50 radio to the computer USB port using the LS1-USB programming cable assembly.
2. Turn the radio on.
3. Run CM40.exe/CM50.exe to open the CM40/50 series radio programmer software.

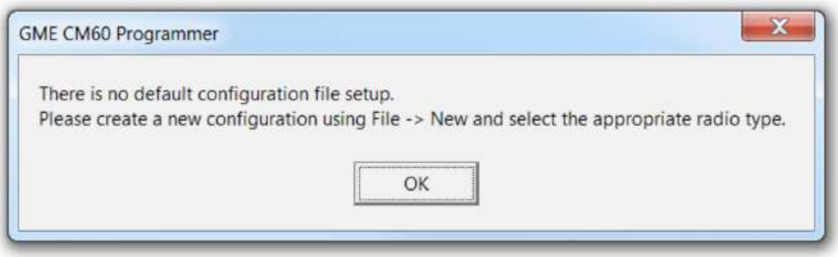


Figure 42: GME Radio Programmer Message

4. Click OK.

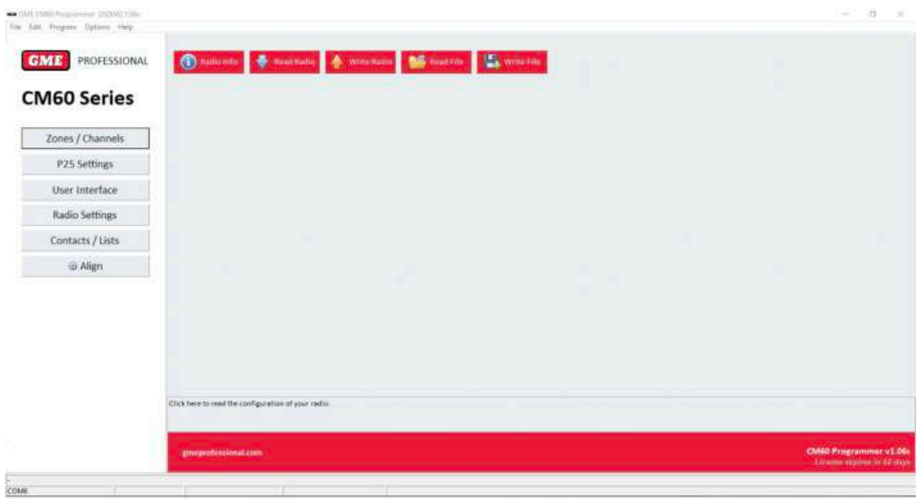


Figure 43: GME Radio Programmer

5. Ensure correct port settings using Program > Serial Port Auto Detect.
6. Click the Read Radio button The program will read MSM and EEPROM.
7. Click the Align button. The Alignment section will open.

Transmitter Center Frequency Alignment

To align transmitter center frequency:

1. Select the Frequency tab.
2. Set the radio to an analog channel. Or select an option from Alignment Frequency.
3. Set the service monitor to transmitter test mode.
4. Click the PTT button in the upper left of the screen.
   The radio will switch to transmit mode.
5. Observe the service monitor and adjust the Frequency Alignment value to achievenominal frequency (+/- 50Hz).
6. Click the PTT button to return to Receive mode.

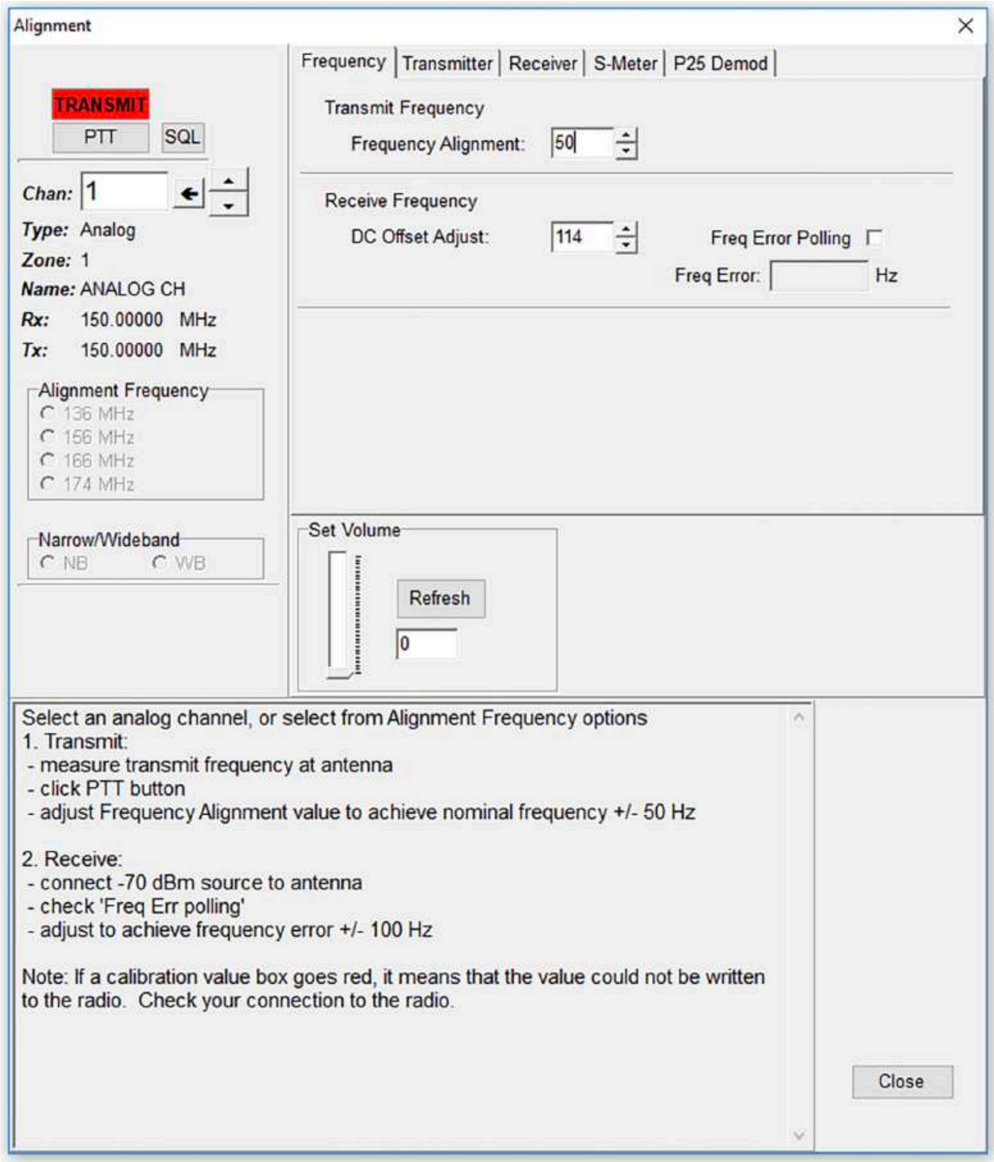


Figure 44: Reference Frequency Alignment

Receive Frequency DC Offset Alignment

To align receive frequency DC offset:

1. Select the Frequency tab.
2. Set the radio to an analog channel, or select Frequency from Alignment Frequency options.
3. Set the service monitor to Receiver Test mode.
4. Inject a -70dBm unmodulated signal into the radio from the service monitor at the alignment frequency.
5. Enable the Freq Error Polling check box.
6. Adjust the DC Offset Adjust value to achieve Freq Error +/- 100Hz.
7. Untick the Freq Error Polling check box when done.

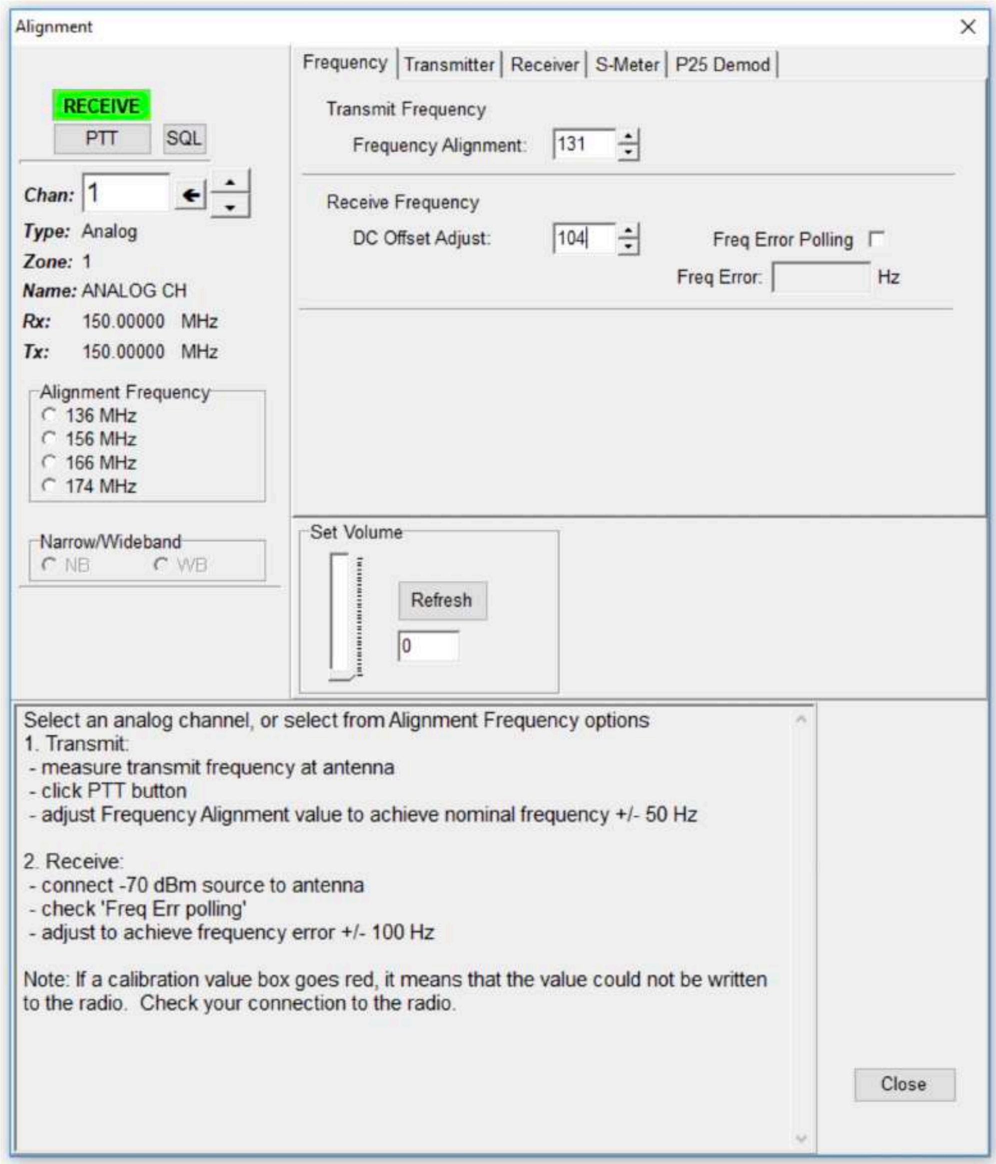


Figure 45: Receive Frequency Offset Alignment

Transmitter Output Power Alignment

To align transmitter output power:

1. Select the Transmitter tab.
2. Select the 25W output in the Power Output section.
3. Select the frequency under the Alignment Frequency section.
4. Click the PTT button at the upper left of the screen to transmit.
5. Change the Power Adjust value for the chosen alignment frequency until the service monitor reads 25W.
6. Click the PTT button to stop transmitting.

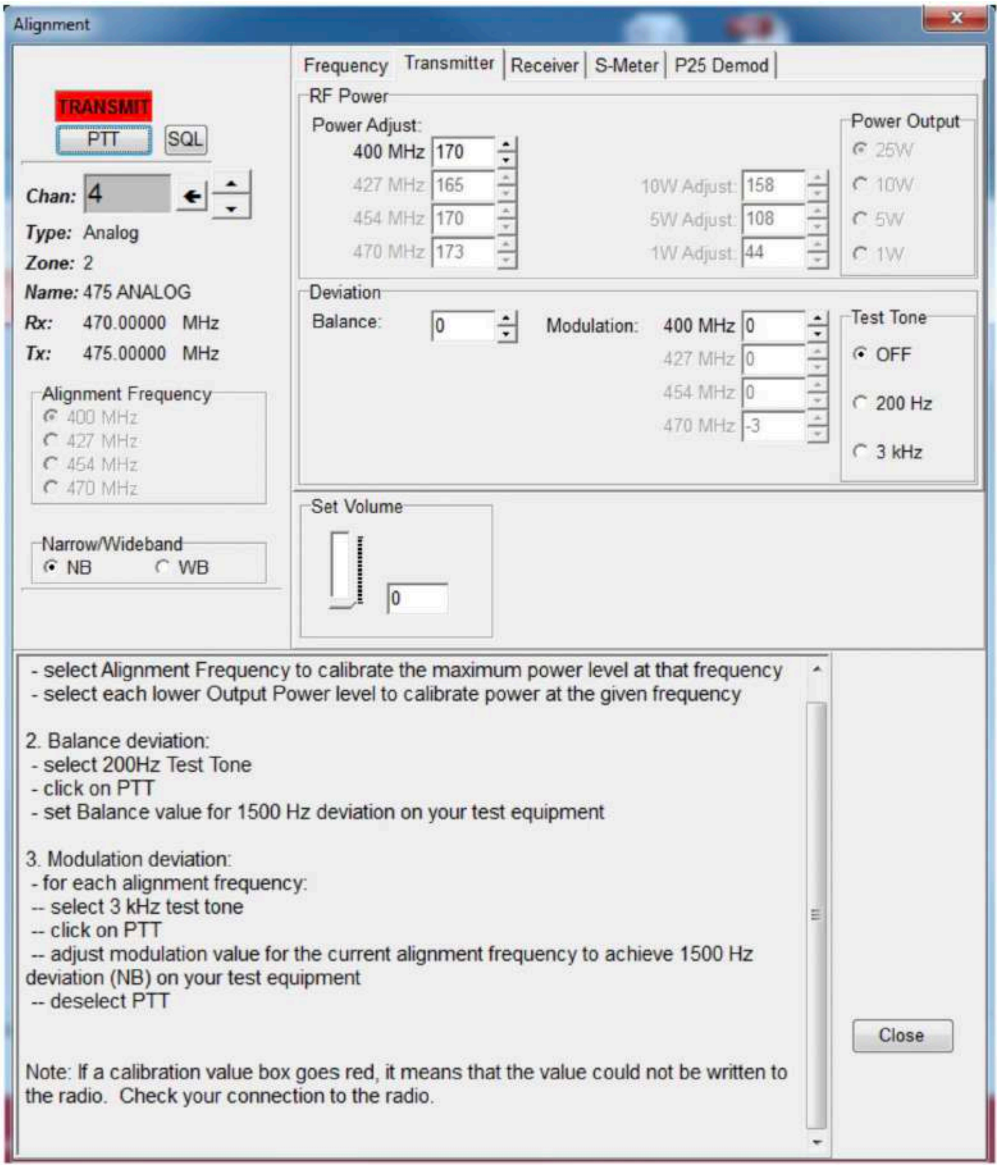


Figure 46: Transmitter Output Power Alignment

7. Repeat the steps for the remaining alignment frequencies.
8. Select the 10W output in the Power Output box.
9. Select the first frequency in the Alignment Frequency section.
10. Click the PTT button to transmit.
    Note: The Alignment Frequency and Power Output options will be disabled while in transmit mode.
11. Adjust the Power Adjust value for the chosen power level until the service monitor reads 10W.
12. Click the PTT button to stop transmitting.
13. Repeat these steps for 5W and 1W output power levels.

Transmitter Deviation/Modulation Alignment

Note: Ensure that the Transmit Modulation AF Filter has been correctly set on test equipment (15kHz LPF recommended).

To align transmitter modulation:

FOR BALANCE

1. Click the Transmitter tab.
2. Set the radio to an analog channel, or select frequency in the Alignment Frequency section.
3. Ensure that NB is selected to use a narrowband channel for alignment.
4. In the Narrow/Wideband section, ensure that NB is selected to use a narrowband-channel for alignment.
5. Click the PTT button to transmit.
6. Select 200Hz in the Test Tone section.
7. Adjust the value in the Balance field until the peak deviation measures 1500 Hz devition on the service monitor.
8. Click the PTT button to stop transmitting.

FOR MODULATION

1. Set the radio to an analog channel or select the frequency from the Alignment Frequency section.
2. Select 3kHz test tone.
3. Click the PTT button.
4. Adjust the value in the Alignment Frequency field until modulation measures +/-1500 Hz on the service test monitor.
5. Click the PTT button to stop transmitting.
6. Repeat the process for the remaining alignment frequency points.

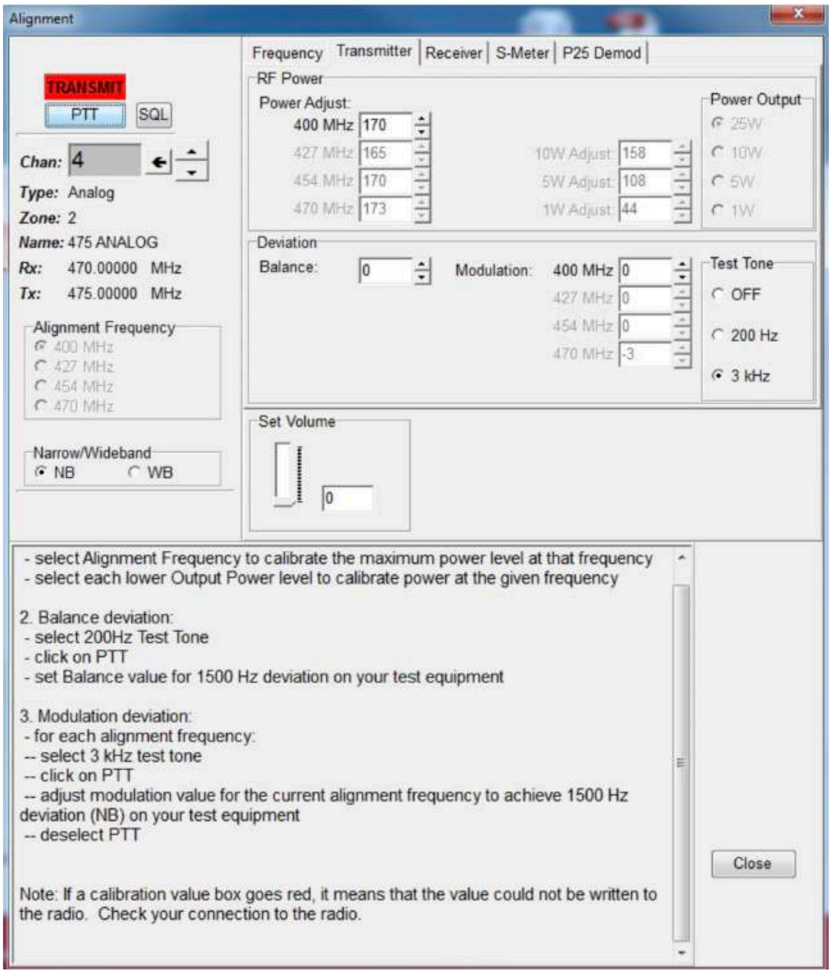


Figure 47: Transmitter Modulation Alignment

Receiver Front-End Band Pass Alignment - UHF

To align receiver band pass filter alignment - UHF RSSI polling method:

1. Select the Receiver tab.
2. Set the radio to an analog channel, or select the frequency from the Alignment Frequency options.
3. Select the first frequency option in the Alignment Frequency section.
4. Set the service monitor to RF Generate.
5. Inject a -90dBm unmodulated signal into the radio at the alignment frequency.
6. Tick the RSSI polling checkbox at the bottom of the screen to enable continuous RSSI reading.
7. Adjust T1, T2 and T3 for the chosen alignment frequency to achieve a maximum RSSI reading, or adjust for best -12 dB SINAD (unsquelched).

To align receiver bandpass -12dBm SINAD:

1. Connect -116dBm signal source to the antenna, set the deviation ±1.5kHz and set the modulation feed to 1kHz.
2. Select a frequency from the Alignment Frequency with NB mode selected.
3. Click the SQL button to unmute receiver and adjsut the set volume to level 3.

Note: A pre-assembled cable with appropriate connectors is required for step 4.

4. Connect the demodulated audio output from the radio to the service monitor audio frequency input.
5. Adjust T1, T2 and T3 values for best SINAD reading.

Note: To obtain a SINAD reading ensure the service monitor has sufficient audio level. Increase the set volume if necessary.

6. Reduce the signal source down to -122dBm and readjust T1, T2 and T3 values for best SINAD reading.
7. Check that the receiver sensitivity is within specifications.

To perform notch alignment:

1. Inject a modulated signal into the radio from the service monitor at the image frequency (which is 2 times the IF Frequency) at -30dBm. For the UHF model, the image frequency is 77.7MHz (2 times the IF Frequncy of 38.35 Mhz) below the alignment frequency (e.g. 372.3MHz for an alignment frequency of 450MHz).
2. Tick RSSI polling.
3. Adjust the notch value for the chosen alignment frequency to achieve a minimum RSSI reading.
4. Repeat these steps for the remaining alignment frequencies.
5. Untick the RSSI polling.

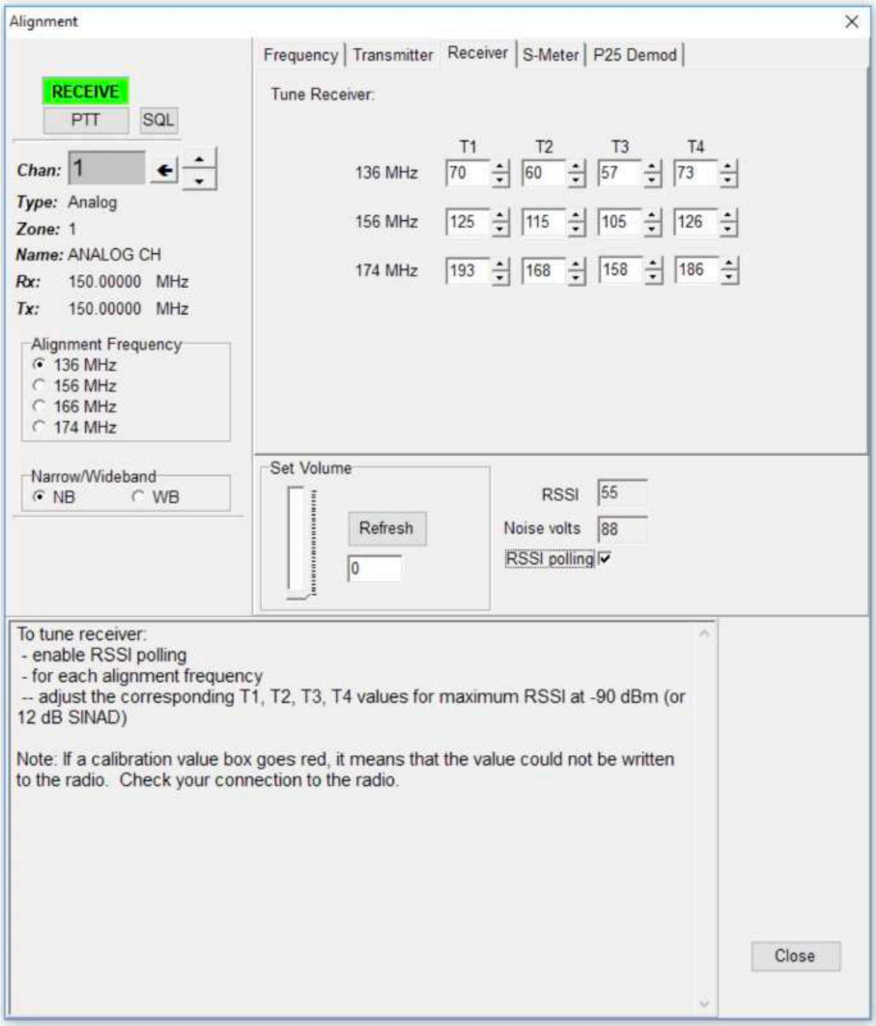


Figure 48: UHF Receiver BPF Alignment

Receiver Band Pass Filter Alignment - VHF

To align receiver band pass filter - VHF RSSI polling method:

1. Select the Receiver tab.
2. Set the radio to an analog channel, or select the frequency from Alignment Frequency options.
3. Select the first option in the Alignment Frequency section.
4. Set the service monitor to RF Generate.
5. Inject a -90dBm unmodulated signal into the radio at the alignment frequency.
6. Tick the RSSI polling checkbox at the bottom of the screen to enable continuous RSSI reading.
7. Adjust T1, T2, T3 and T4 for the chosen alignment frequency to achieve a maximum RSSI reading. For SINAD reading refer to SINAD alignment section.
8. Repeat these steps for the remaining alignment frequencies.

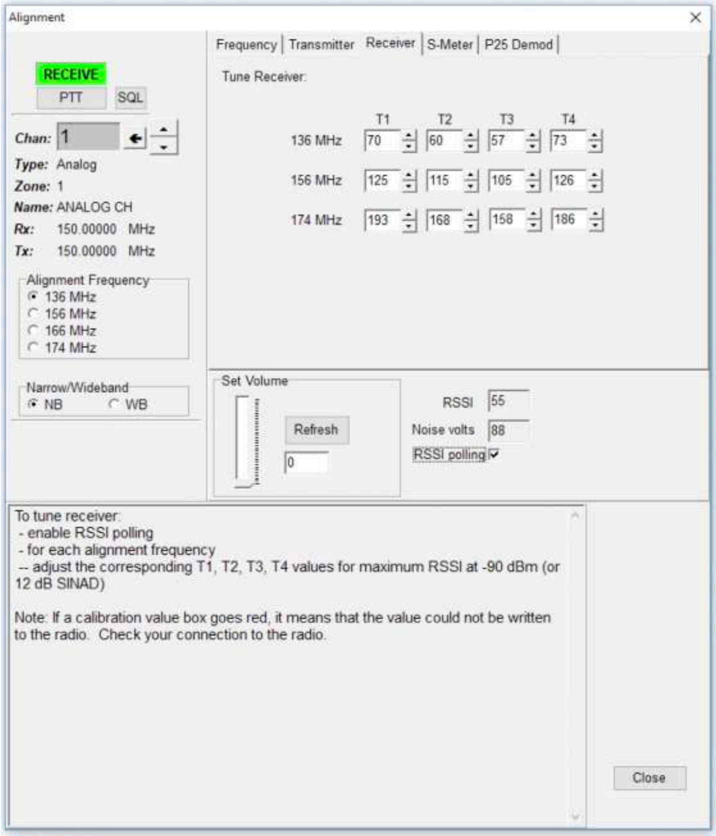


Figure 49: VHF Receiver BPF Alignment

To align receiver bandpass -12dB SINAD:

1. Connect -116dB signal source to the antenna, set the deviation ±1.5kHz and set the modulation feed to 1kHz.
2. Select a frequency from the Alignment Frequency with NB mode selected.
3. Click the SQL button to unmute receiver and adjsut the set volume to level 3.

Note: A pre-assembled cable with appropriate connectors is required for step 4.

4. Connect the demodulated audio output from the radio to the service monitor audio frequency input.
5. Adjust T1, T2, T3 and T4 values for best SINAD reading.

Note: To obtain a SINAD reading ensure the service monitor has sufficient audio level. Increase the set volume if necessary.

6. Reduce the signal source down to -122dBm and readjust T1, T2, T3 and T4 values for best SINAD reading.
7. Check that the receiver sensitivity is within specifications.

Receiver S-Meter Alignment

To align the receiver S-meter:

1. Select the S-meter tab.
2. Select the second option in the Alignment Frequency section.
3. Inject a -121dBm signal into the radio from the service monitor at the alignment frequency.
4. Click the Set S1 button.
5. Inject a -73dBm signal into the radio from the service monitor at the alignment frequency.
6. Click the Set S9+ button.

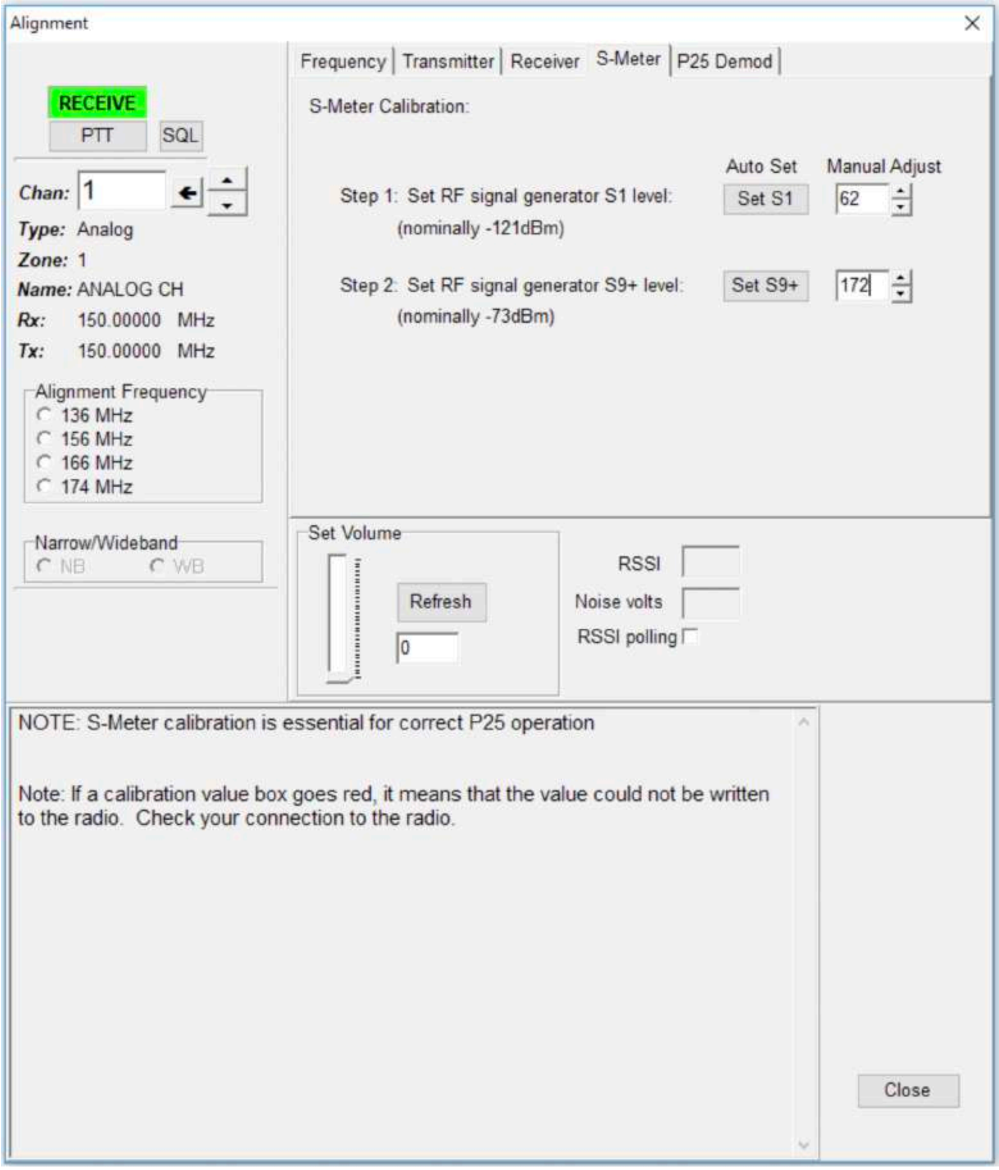


Figure 50: Receiver S-Meter Alignment

VCO Control Voltage Check

Required equipment also includes a CRO (Oscilloscope) or DVM (Digital Voltage Meter) for measuring VCO Control Voltage.

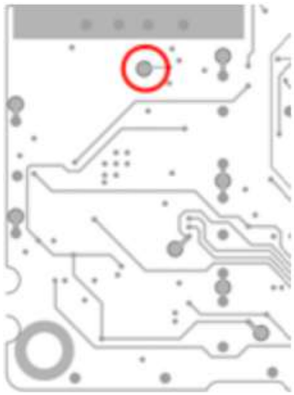


Figure 51: VCO Control Voltage Test Point (PCB Bottom View)

To check VCO control voltage for UHF:

1. Click Align to open the alignment screen.
2. Select the Transmitter tab.
3. Select the first option (450 MHz) from the Alignment Frequency section.
4. Measure the VCO control voltage at the test point shown in Figure 70 on the component side of the radio main PCB. Ensure that it is between 0.9V and 1.7V DC in receive.
5. Click the PTT button to transmit. Ensure that the VCO control voltage is between 1.2V and 2.0V DC in transmit.
6. Repeat these steps for the highest Alignment Frequency and ensure that the VCO control voltage is between 4.3V and 5.1V DC in receive and between 3.2V and 4.0V DC in transmit.

To check VCO control voltage for VHF:

1. Click Align to open the alignment screen.
2. Select the Transmitter tab.
3. Tune the radio to 144MHz.
4. Measure the VCO control voltage at the test point shown in Figure 70 on the component side of the radio main PCB. Ensure that it is between 1.0V and 1.8V DC in receive.
5. Click PTT to transmit. Ensure that the VCO control voltage is between 0.6V and 1.4VDC in transmit.
6. Repeat these steps for the highest Alignment Frequency and ensure that the VCO control voltage is between 3.5V and 4.3V DC in receive and between 3.7V and 4.5V DC in transmit.

CM40/50 Radio Parts List: Mechanical

Part Number	Description	Circuit Reference
46A0439	Clamp - DC Lead Clip	
730171	Connector - 20 Way HST SHD Aux Socket SMD	J801
730170	Connector - 40 Way Hirose DF12 P25 Socket SMD	J805
730135	Connector - 8 Pin [Interconnect Board]	J901
730201	Connector - BNC Coaxial	
730154	Connector - Header Skt SMT 16 Pin Vertical	J806
730114	Connector - SMD 2 Pin Vertical	J402
730135	Connector - SMD 8 Pin Vertical	J802
46A0947	Cover - Bottom	
38DC	DC Power Lead (PCB)	
60E	Extension Speaker Socket	J401
61A1004	Front Panel (remote model)	
34MPH	Lead - Harness 8 Way Interconnect	
34ICS	Mic Socket - Front	J101
730130	Mic Socket - Rear	J808
74J2506PEB	Screw - PCB CHASSIS	
62CREW	Screw - Chassis Speaker Cover	
74J3006CEF	Screw - Speaker	
38SCREWL	Screw - Chassis Top Cover	
32A	Speaker	
46A0948	Speaker Bracket	
41B0235	Speaker Lead - 2 Pin	
352ICB	Interconnect PCB Assy	
46A0995	Chassis - Diecast	

CM40/50 Radio Parts List: Electrical

Part Number	Description	Circuit Reference
10A027	Filter - 450KHz C24	CF302
10A029	Filter - CFWM450E	CF301
10A047	Filter - LTM450IW	CF303
77MAX3232E	IC	U803
77R2A20168	IC	U806
77UMD3N	IC	Q105 Q205 Q206 Q904 Q906
77MCP6002M	IC - Amplifier	U701 U703 U807
77MCP6002T	IC - Amplifier	U603
77BGA2869	IC - Amplifier	U601
77LM4952	IC - Audio	U401
7774H1GT50	IC - CMOS	U805 U804
77NLSB3157	IC - CMOS	U303 U304
77AIC3106	IC - CODEC	U402
77BA4116	IC - Demodulator	U301
77M4632103	IC - Digital Pot 10K	U702
77M4017T50	IC - Digital Pot 50K	U404
7724FC1025	IC - EEprom	U802
77FIN1001	IC - LVDS 1-bit Driver	U504
77DSPE810M	IC - Microprocessor	U801
77ADF4156	IC - PLL	U501
77L5970DTR	IC - Regulator	U903
77LK112M18	IC - Regulator 1.8V	U403
77L78L33AB	IC - Regulator 3.3V	U503
77MC180433	IC - Regulator 3.3V	U503
77MCP1754S	IC - Regulator 5V	U902
77L78M08AB	IC - Regulator 8V	U901
12D222	Inductor Coil 2.2uH	L208 L209
12J82105	Inductor Coil 820nH 0805	L208 L209
12D821	Inductor Coil 820nH 2520	L208 L209
12W15102	Inductor Coil 150nH	L602 L207
12A016	Inductor Coil EMC Ferrite	L609 L901
12FA05T	Inductor Coilcraft A05T	L108
77BFR93AW	Transistor	Q101 Q102 Q103 Q201
14E25223B	Transistor	Q901
773SK299	Transistor	Q202
77BF999	Transistor	Q203 Q204
77PDTC144V	Transistor	Q806
77SI2301	Transistor	Q903
77BC807W	Transistor	Q905

CM40/50 Radio Parts List: Electrical

Part Number	Description	Circuit Reference
77BC817W	Transistor	Q601 Q804
77BC847BW	Transistor	Q104 Q502 Q503 Q902
77BC857CW	Transistor	Q501
77PDTC114T	Transistor	Q402 Q801 Q805 Q807 Q907
56SMD14	Trim Pot 10K	RV901
771SV276	Diode	D501 D503
771SV304	Diode	D103 D104 D105 D106 D107 D108 D201 D201A D205
77MBR0520L	Diode	D904
77PS76SB17	Diode	D109 D601 D602
77BAR6503	Diode	D102 D206 D207 D208 D209
771SV276	Diode	D203
77BAS316	Diode	D203
77BAV70W	Diode	D101 D504 D801 D802 D905
77BAV99W	Diode	D210 D502 D903
77MA4P1250	Diode	D603 D605
77BAR6503	Diode	D603
77SMBJ16	Diode	D902
771N5404	Diode	D901
10B055	Crystal 16Mhz	XT801
10B068	Crystal 19.2Mhz (VHF model)	XT501
10B050	Crystal 20.950Mhz	XT301
10B048	Crystal 38.4Mhz (UHF Model)	XT301
10C017	Crystal Filter 21.4MHz 4 Pole 15KHz	XF201
10C016	Crystal Filter 38.85MHz 4 Pole 15KHz	XF201
10C018	Crystal Filter 21.4MHz 4 Pole 7.5KHz	XF202
10C019	Crystal Filter 21.4MHz 4 Pole 7.5KHz	XF202
12J22005	Coil 22nH 5% 0805	L207
12K22005	Coil 22nH 5% 0603	L207
12J82105	Coil 820nH	L104
12K39105	Coil 390nH	L104 L203 L501 L606

CM40-UHF-5W (Top View)

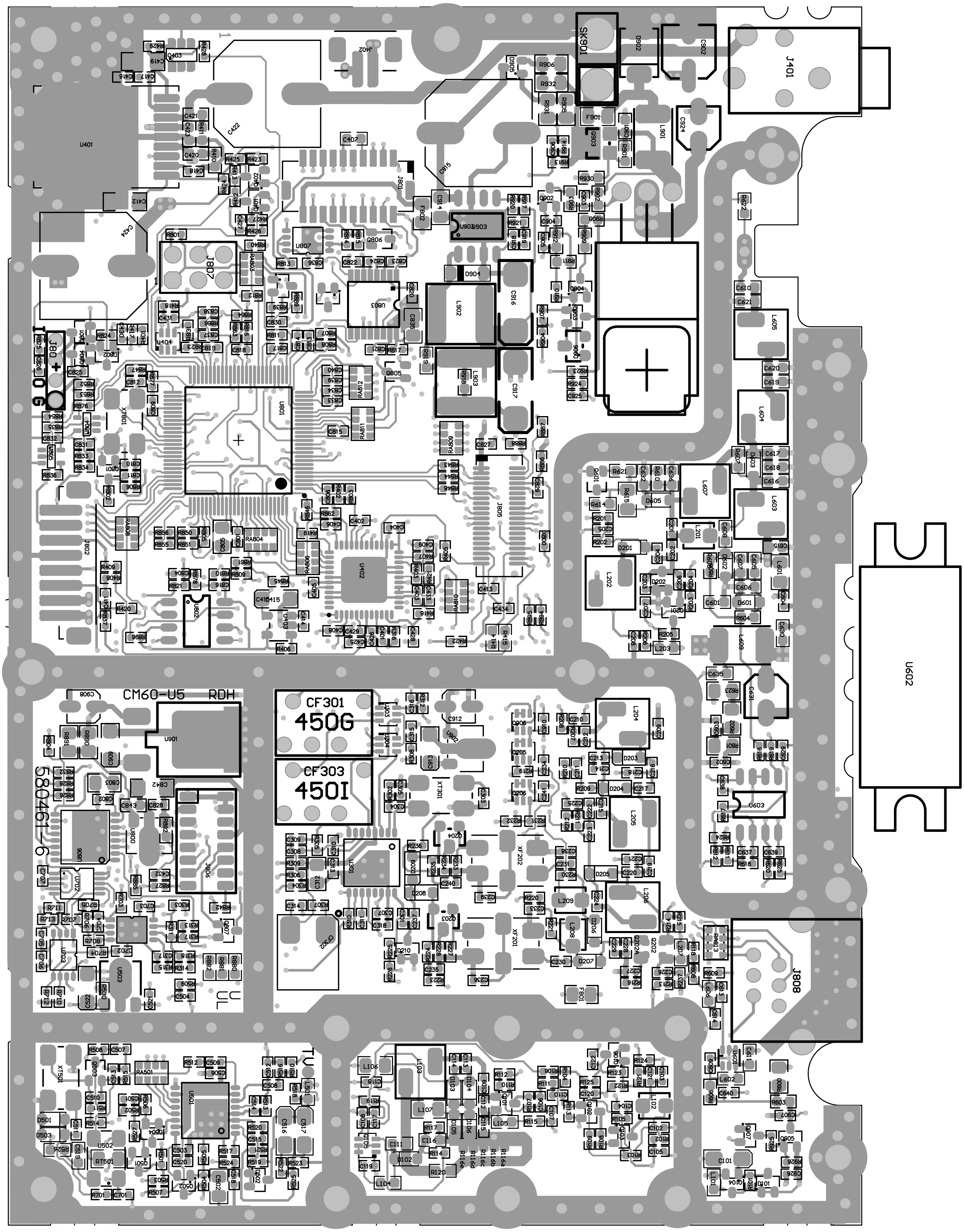


Figure 52: Top view of the PCB 580461-6

CM40-UHF-5W (Bottom View)

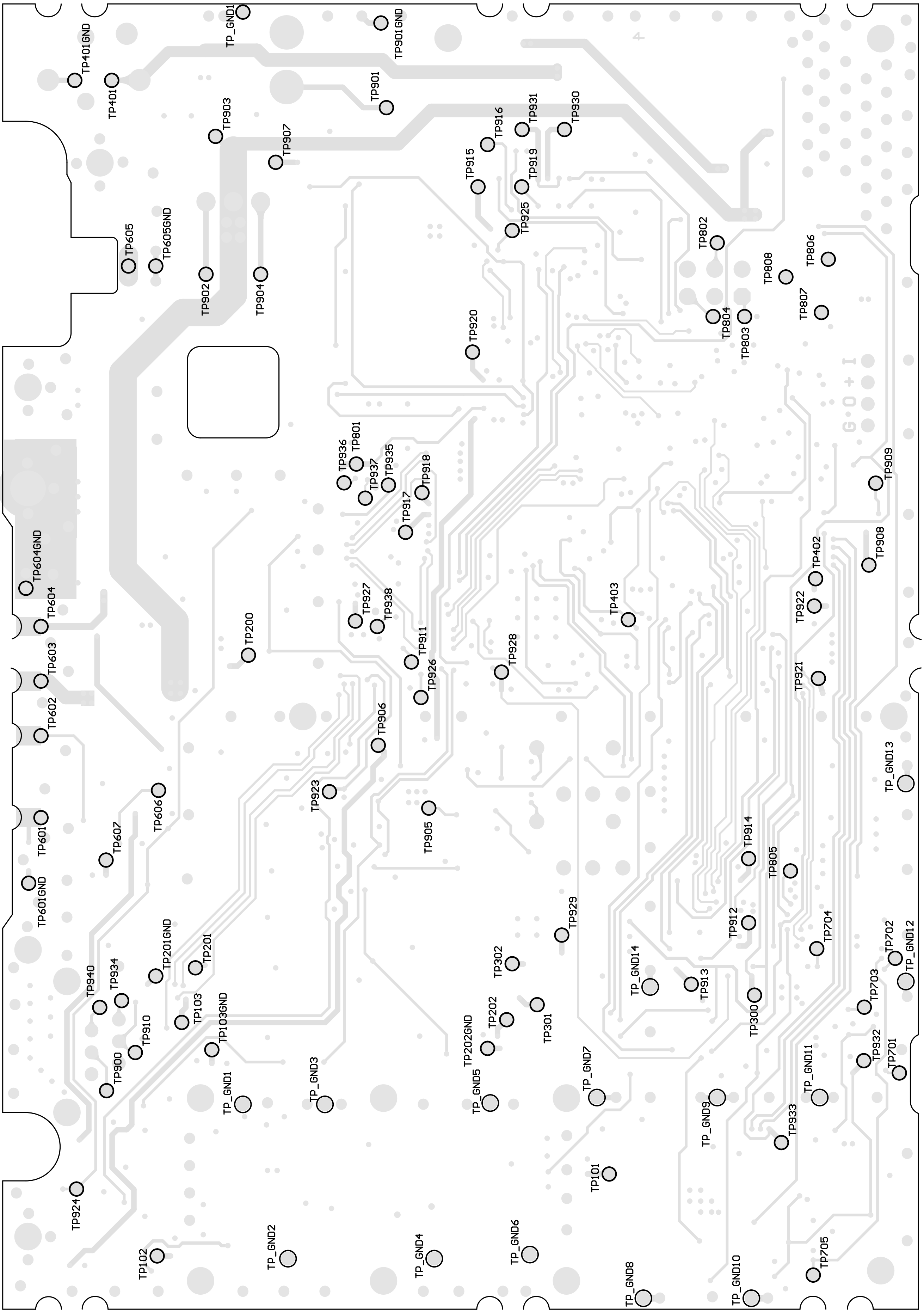


Figure 53: Bottom view of the PCB 580461-6

CM50-UHF-25W (Top View)

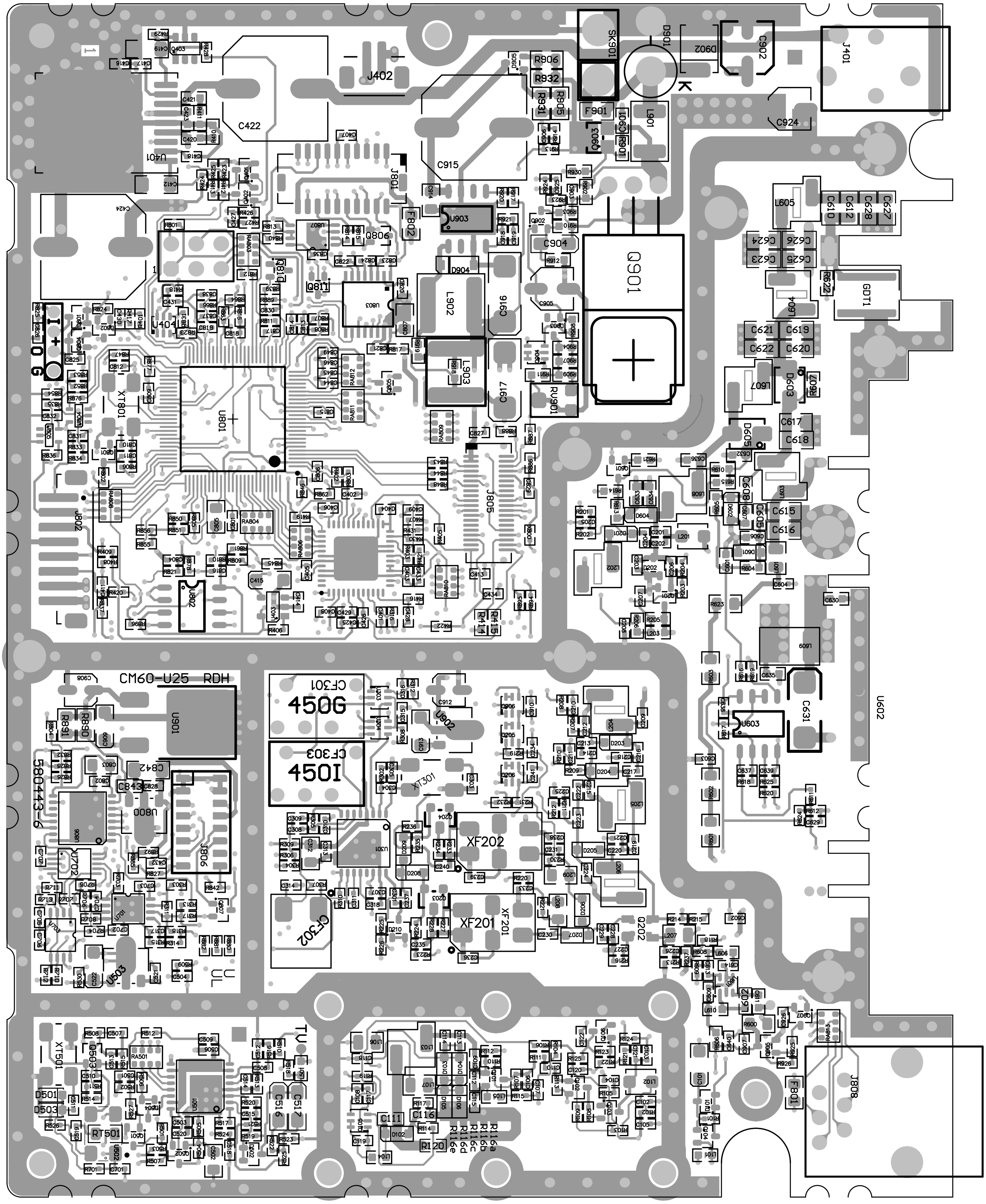


Figure 54: Top view of the PCB 580443-6

CM50-UHF-25W (Bottom View)

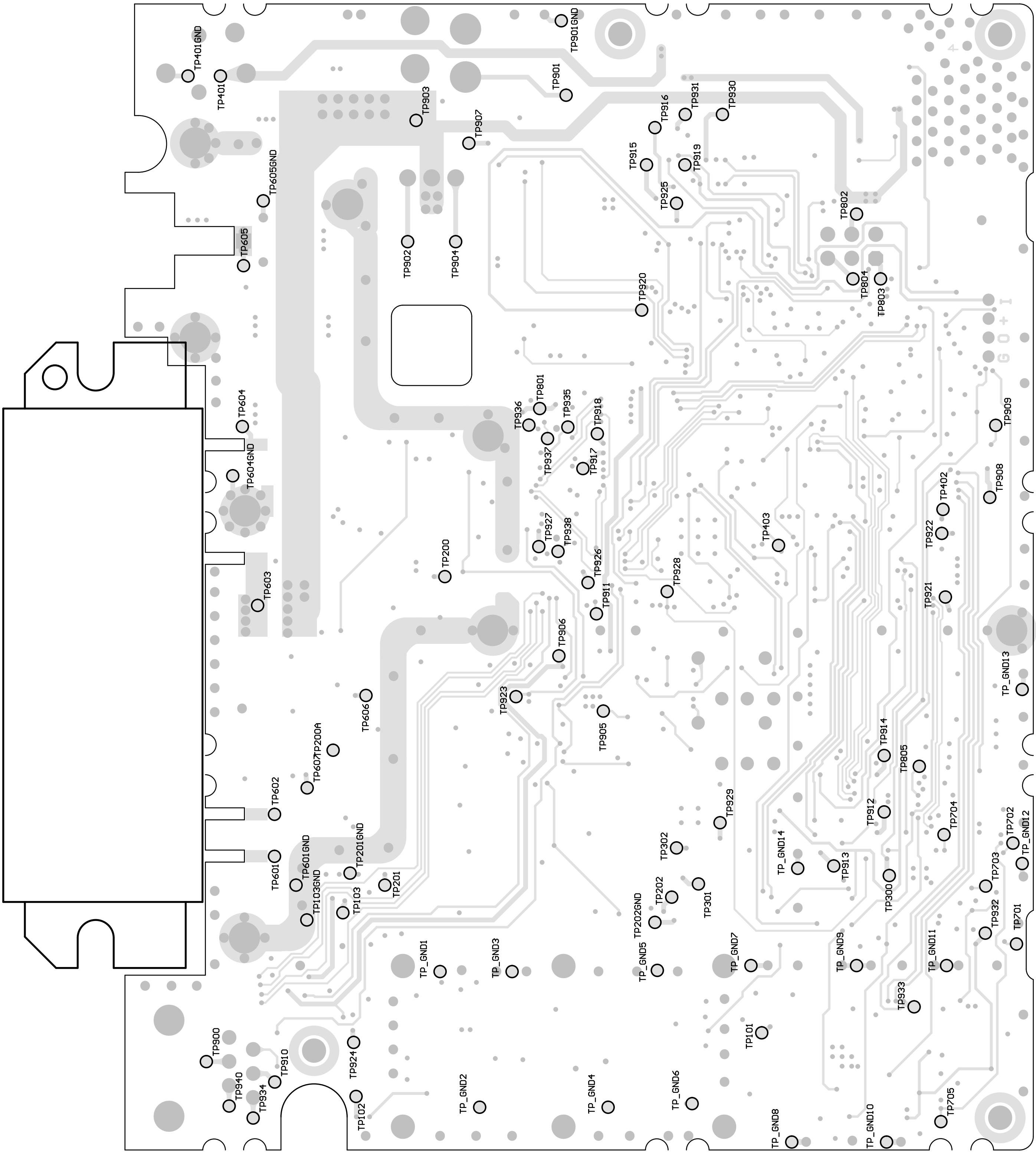


Figure 55: Bottom view of the PCB 580443-6

CM50-VHF-25W (Top View)

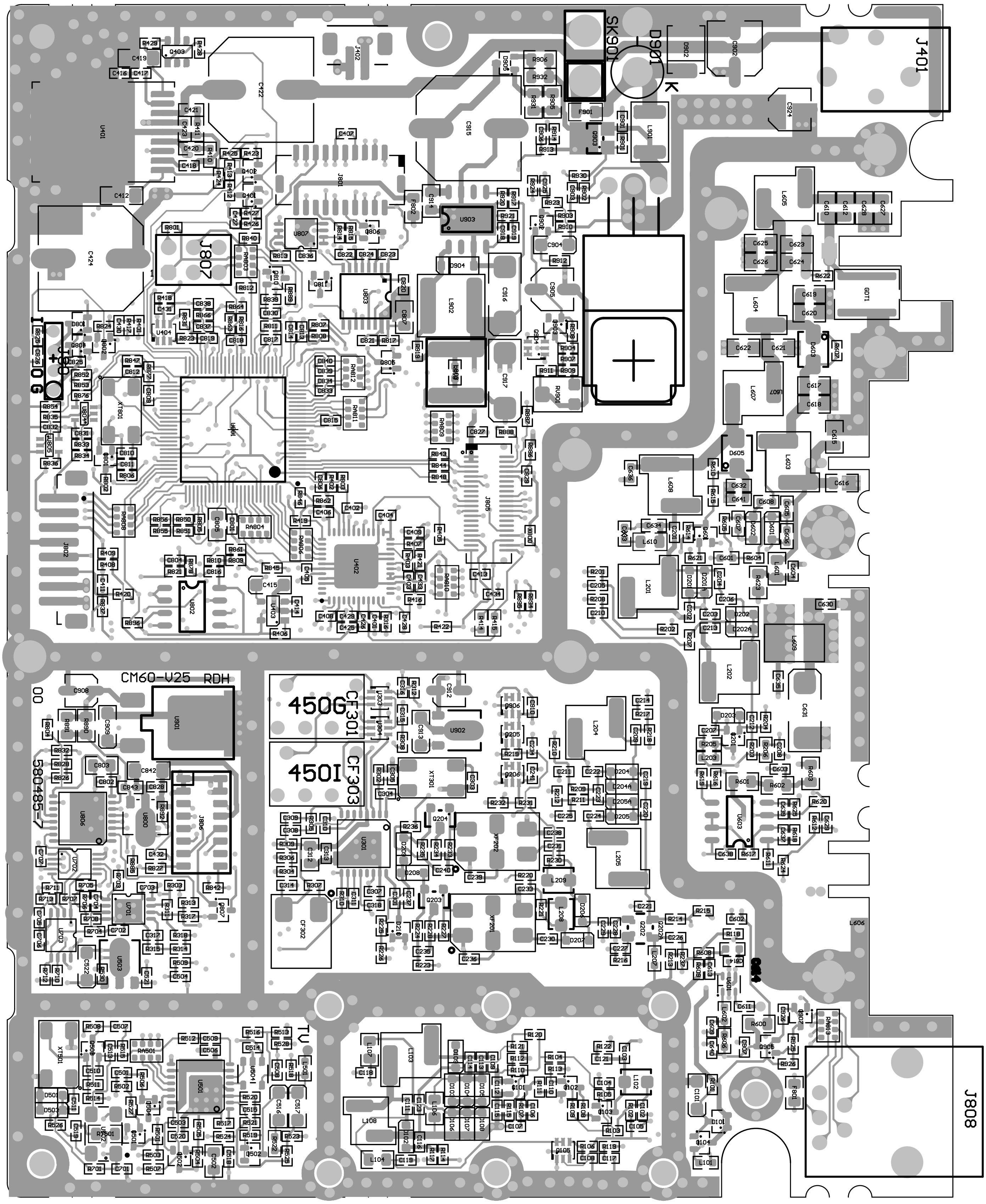


Figure 56: Top view of the PCB 580485-07

CM50-VHF-25W (Bottom View)

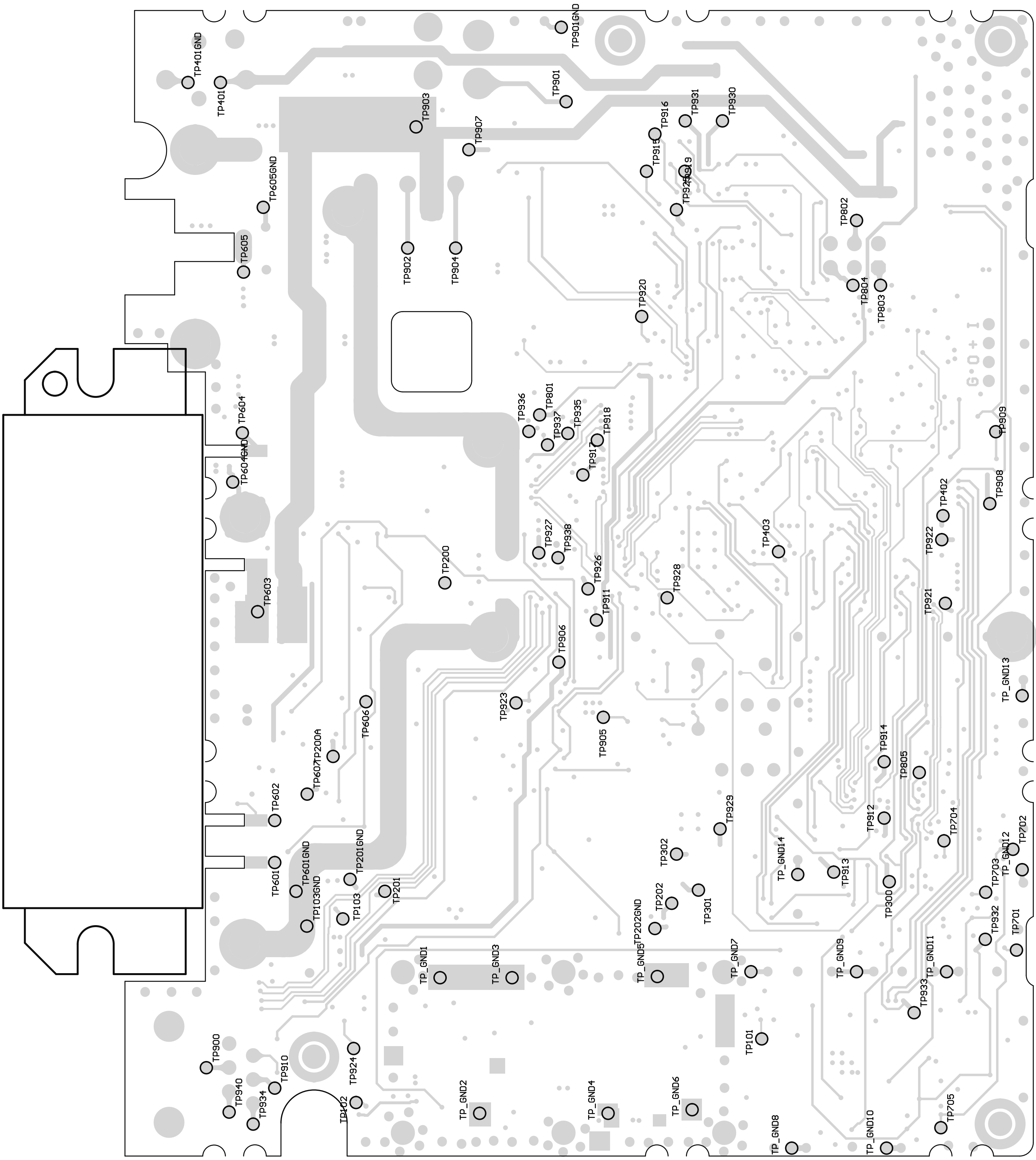


Figure 57: Bottom view of the PCB 580485-7

CM40-UHF-5W

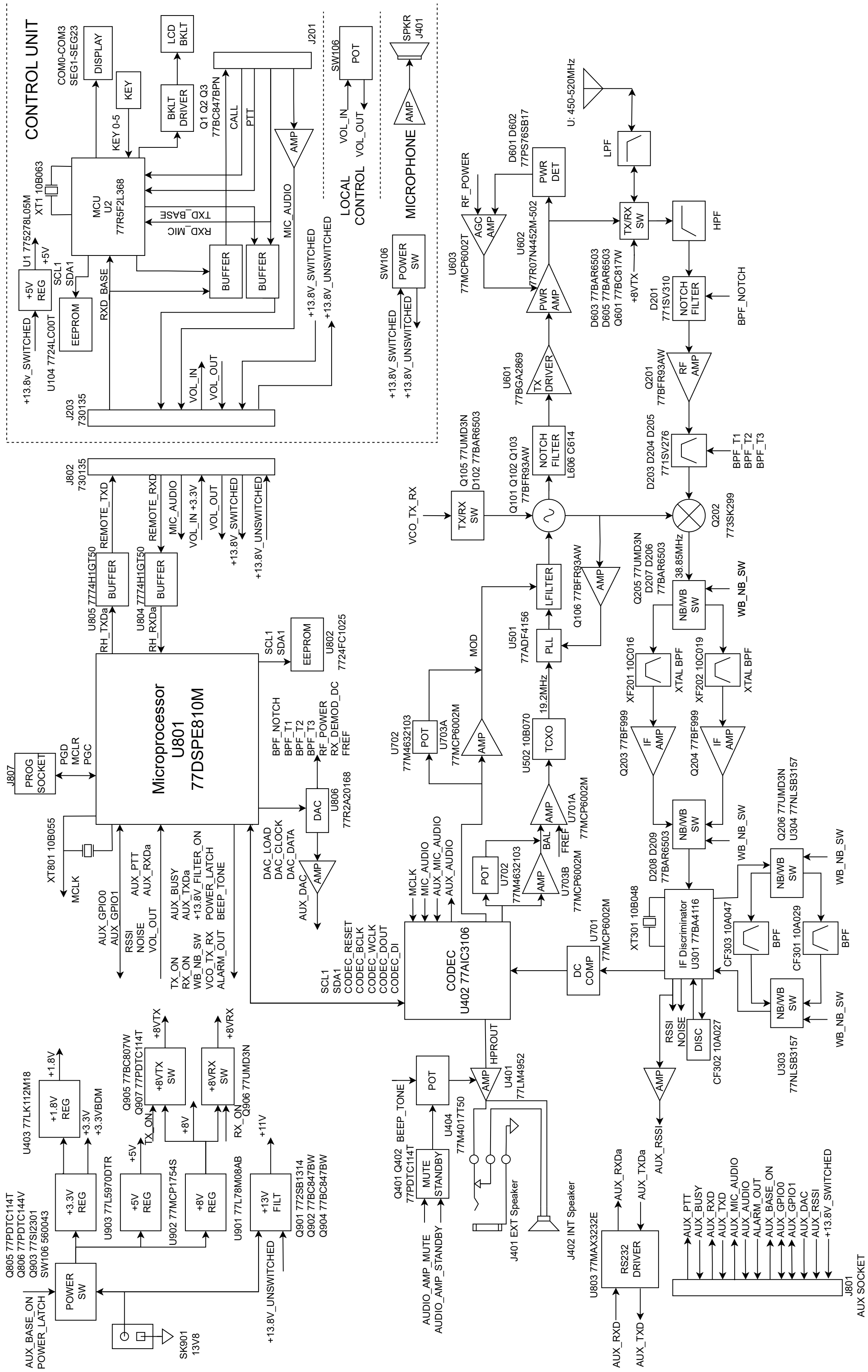


Figure 58: CM40-50 UHF Block diagram

CM50-UHF-25W

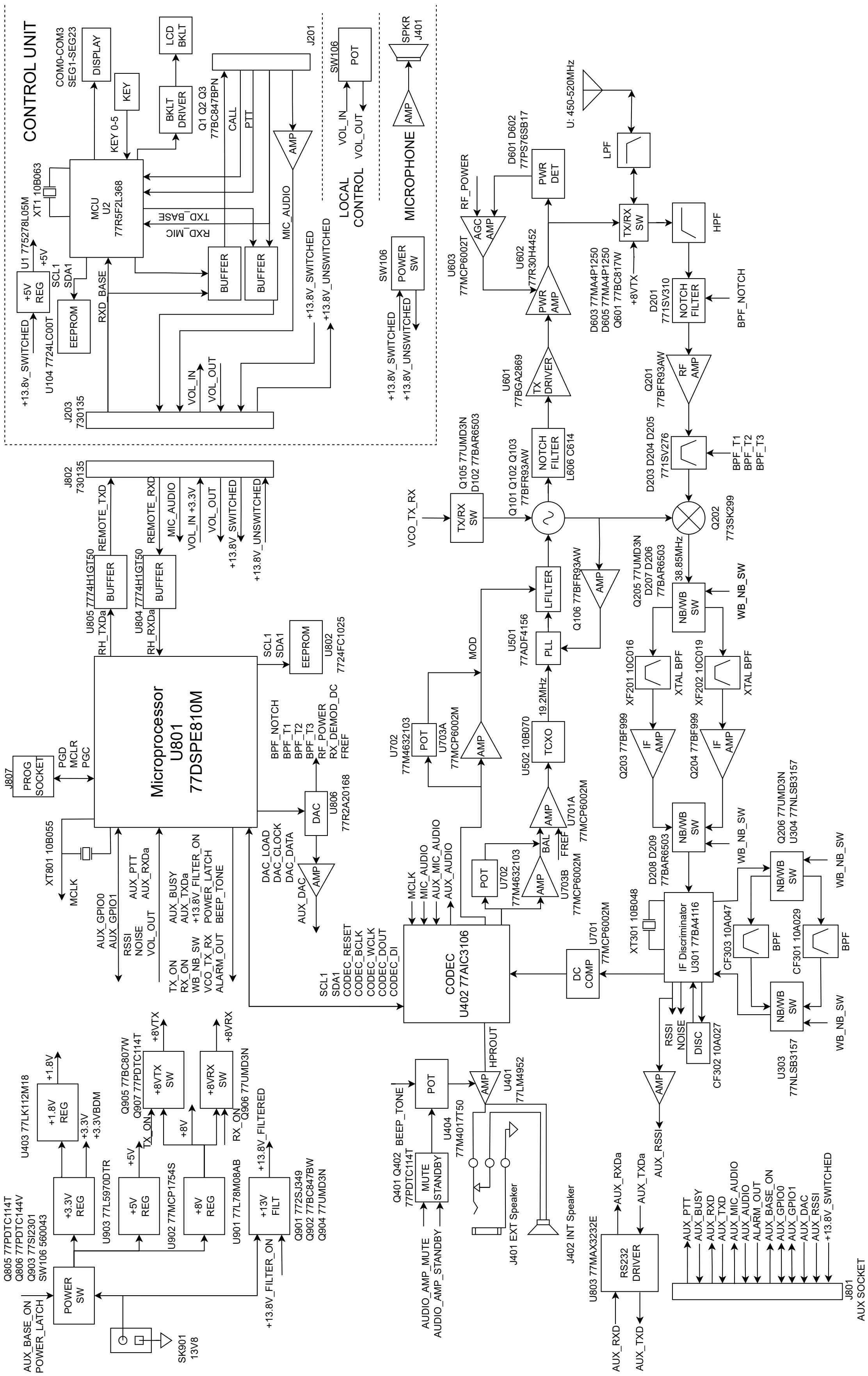
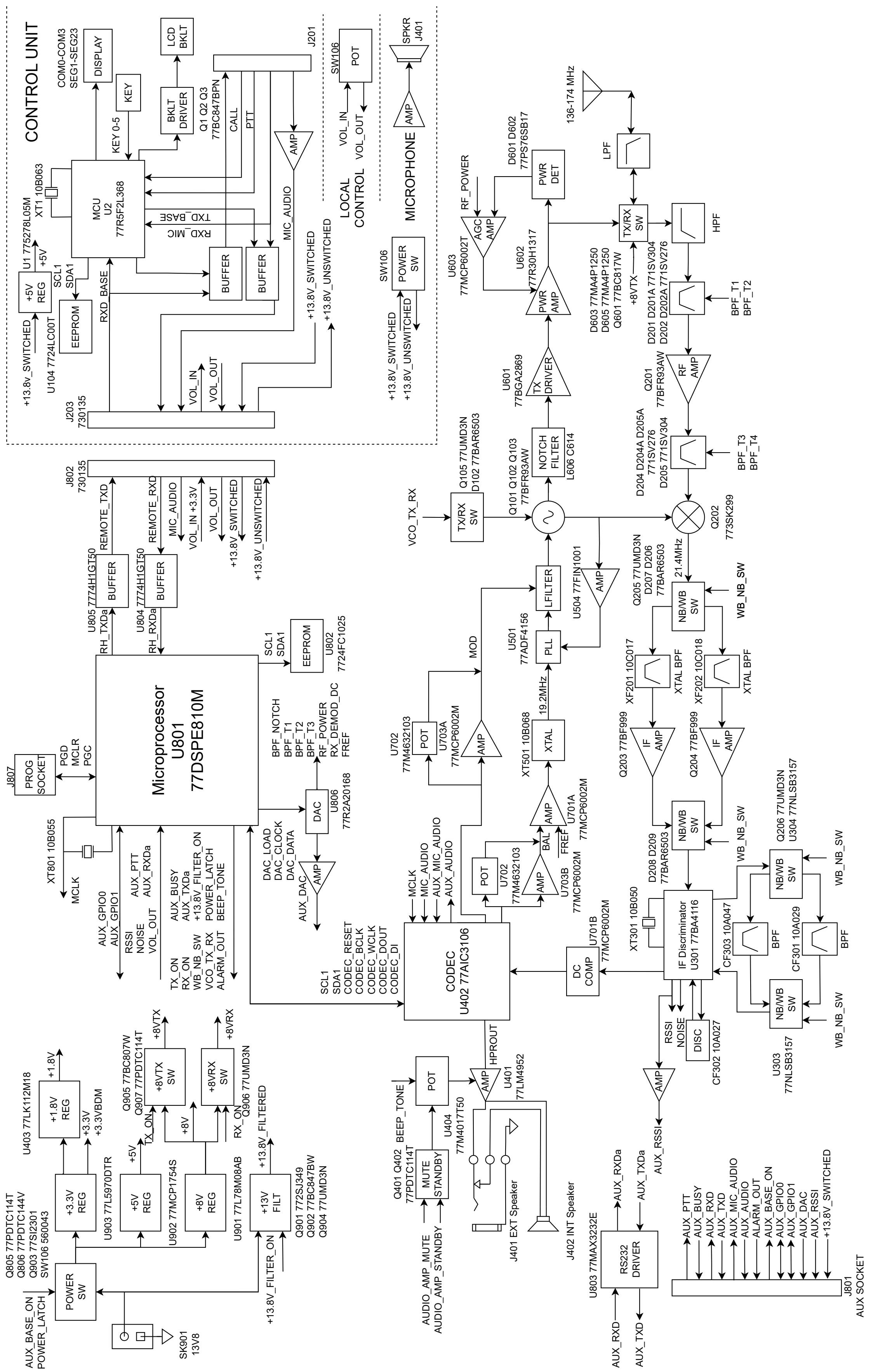
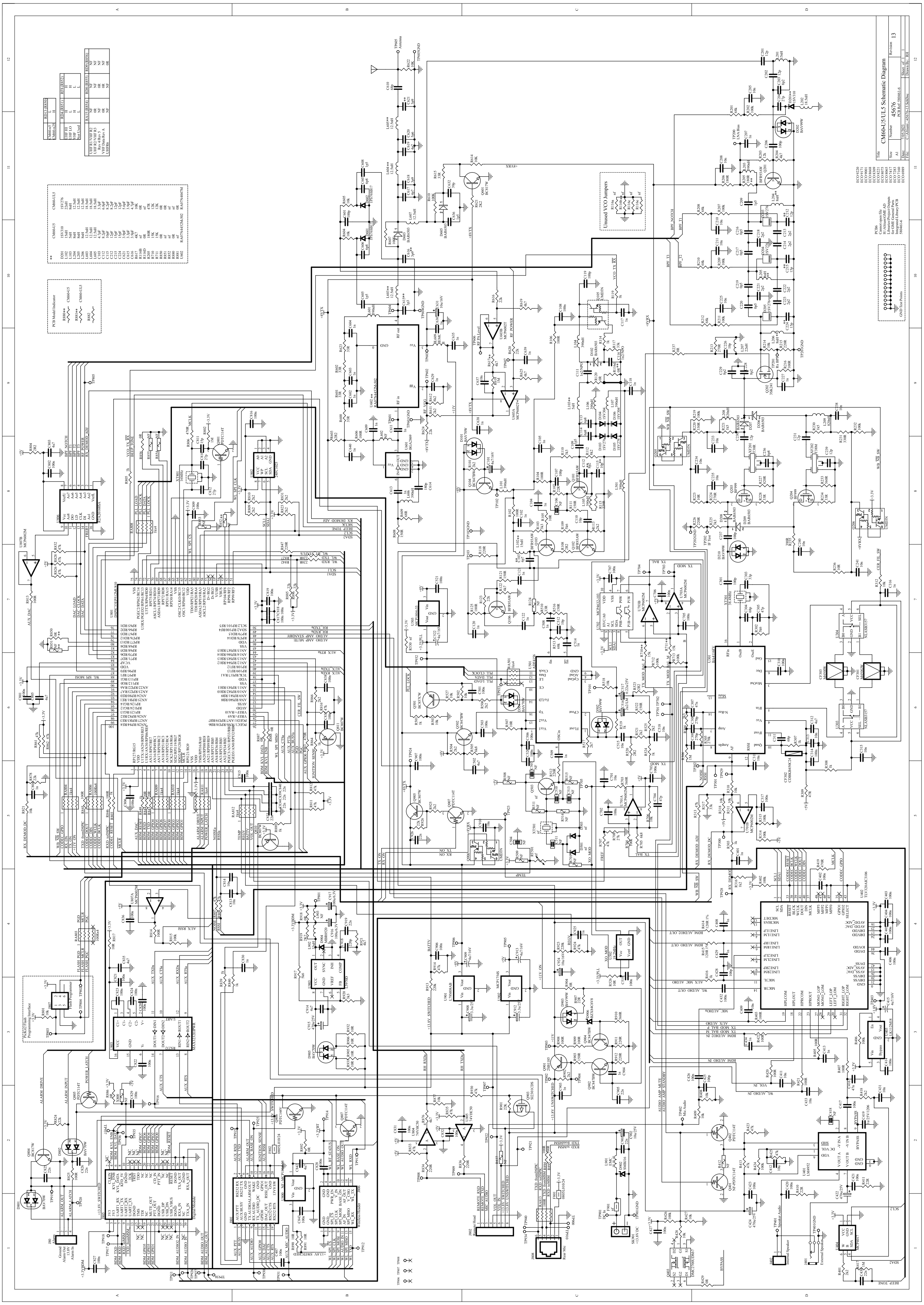


Figure 59: CM50 VHF Block Diagram

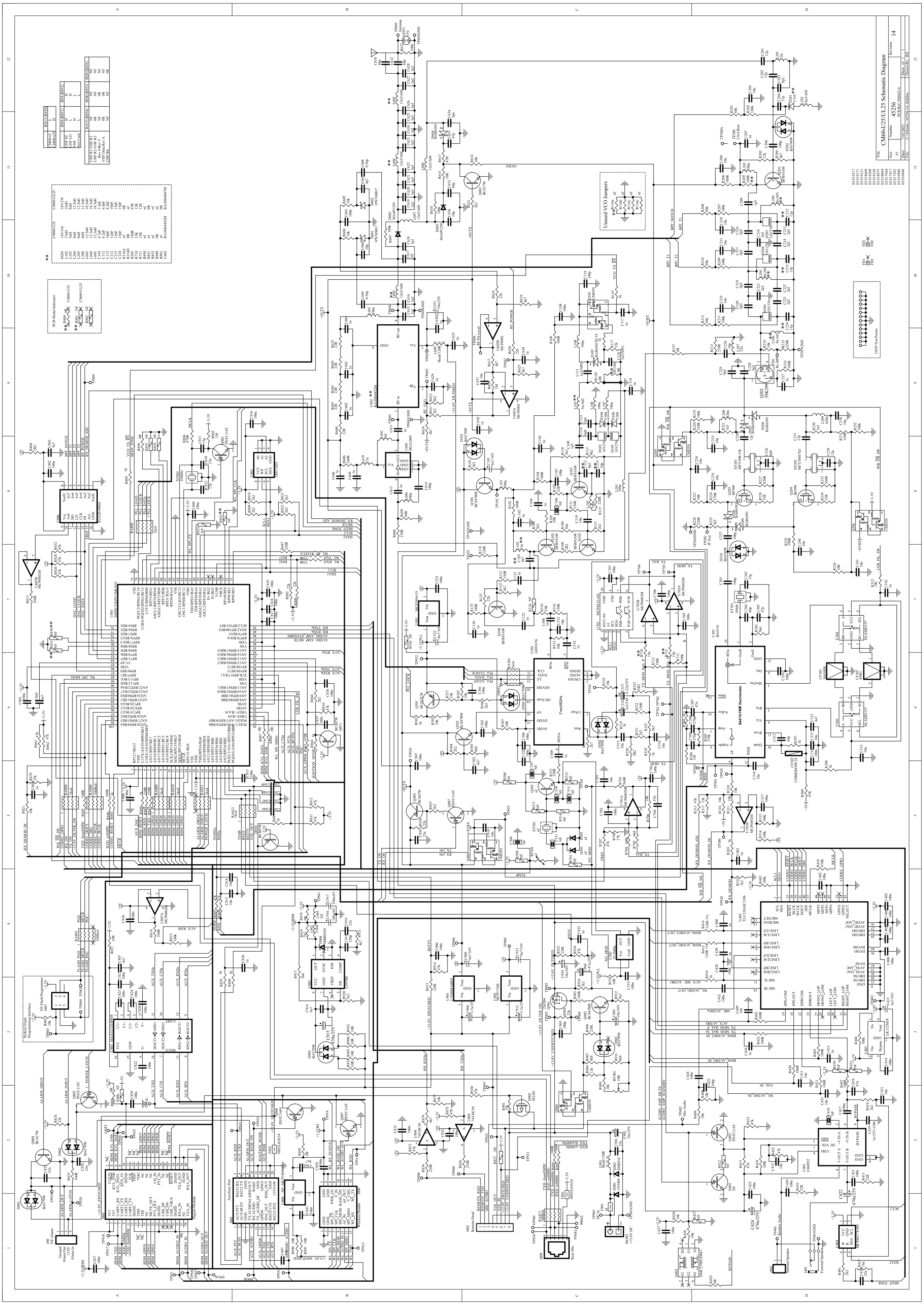
CM50-VHF-25W


CONTROL UNIT
DISPLAY
KEY
LCD BKLT
BKLT DRIVER
MCU U2 77R5F2L368
EEPROM
+5V REG
BUFFER
LOCAL CONTROL
MICROPHONE
SPKR J401
POT
POWER SW
Microprocessor U801 77DSPE810M
PROG SOCKET
DAC
CODEC U402 77AIC3106
DC COMP
IF Discriminator U301 77BA4116
DISC
RS232 DRIVER
AUX SOCKET
J401 EXT Speaker
J402 INT Speaker
MUTE STANDBY
PWR DET
PWR AMP
TX DRIVER
NOTCH FILTER
TX/RX SW
LPF
HPF
RF AMP
PLL
LFILTER
XTAL
NB/WB SW
XTAL BPF
IF AMP
BPF
+3.3V REG
+5V REG
+8V REG
+13V FILT
+1.8V REG
+8VTX SW
+8VRX SW
136-174 MHz
21.4MHz
19.2MHz

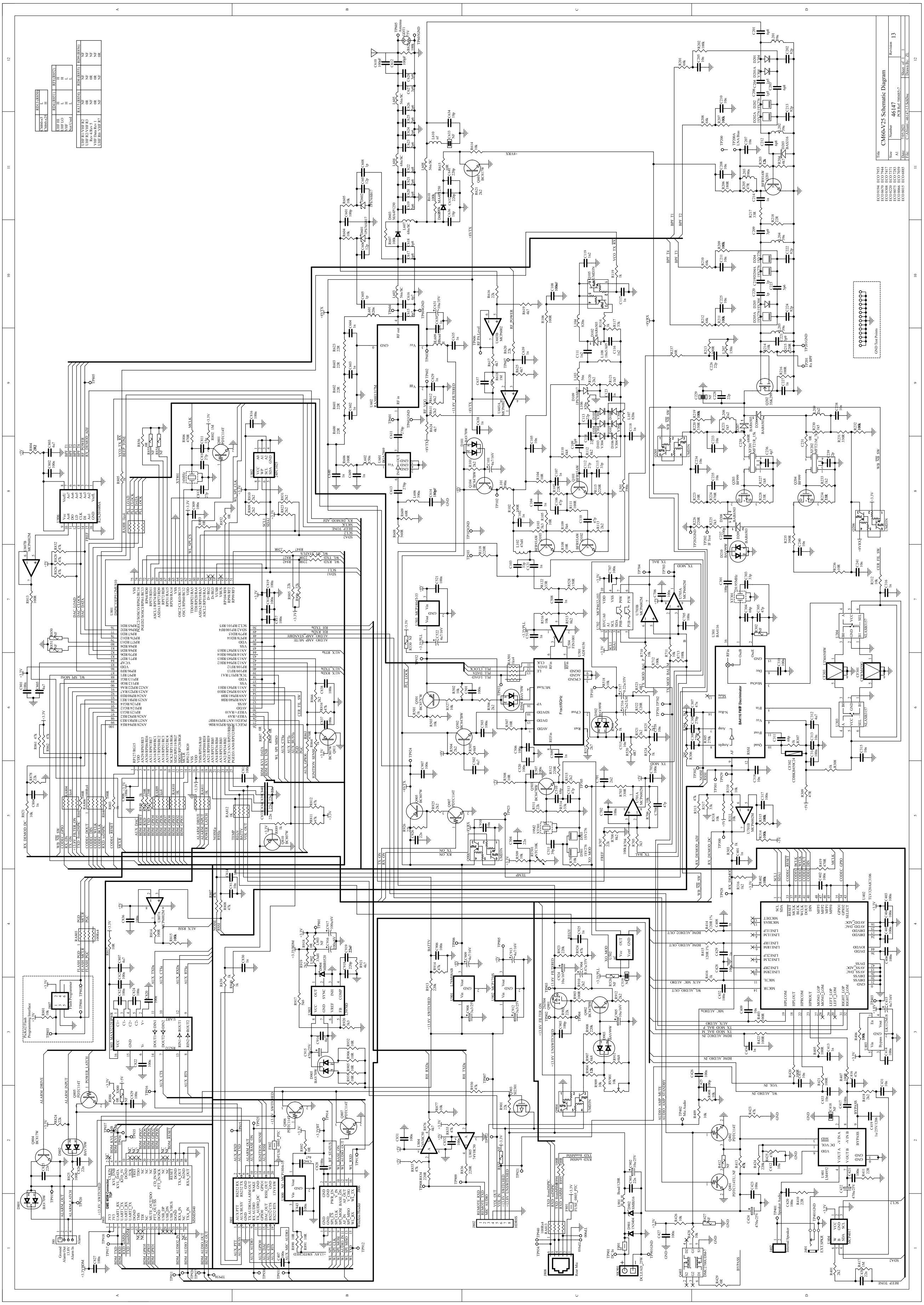
CM40-UHF-5W



CM50-UHF-25W



CM50-VHF-25W



Copyright Notice:

Information Concerning UHF CB Radio:

IMPORTANT

The use of the Citizen Band radio service is licensed in Australia by the ACMA Radio communications (Citizens Band Radio Stations) Class Licence and in New Zealand by the Ministry of Economic Development New Zealand (MED). A General User Radio Licence for Citizens Band radio and operation is subject to conditions contained in those licences. The class licence for users and equipment operating in the CB/PRS 477 MHz band has been amended. This radio meets the new 80 channel standard.

In simple terms the same amount of spectrum is available; however, radio transceivers can now operate in a narrower bandwidth and hence use less spectrum per channel. These radios are generally referred to as narrowband or 12.5 kHz radios. By using 12.5 kHz channel spacing instead of 25 kHz, the 40 channels originally allocated can now be expanded to 80 channels thereby

doubling the channel capacity and relieving congestion in the UHF CB/PRS band. Older 40 channel wideband radios will continue to operate on the original 40 channels, however they will not be able to converse on the newer channels 41 – 80. The newer narrowband radios will be able to converse with all older 40 channel wideband radios on all channels 1 – 40 as well as the newer channels allocated from 41 – 80.

The mixing of narrowband and wideband radios in the same spectrum may possibly cause operating issues of interference and varying levels of received volume. For example, when a new narrowband radio receives a transmission from an older wideband radio the speech may sound loud and distorted. Alternatively, when an older wideband radio receives a signal from a new narrowband radio, the speech may sound quiet. In each case, simply adjust your radio volume for best performance.

Depending on how close your receiving radio is to another transmitting radio, there might be interference from the transmitting radio if it is using a channel adjacent to the channel you are listening to. Simply switch up or down a few channels from the currently selected channel.

The above situations are not a fault of the radio but a symptom of operating wideband and narrowband radios in the same bandwidth. These minor issues should decrease over time as the population of wideband radios ages and decreases.

Further information and updates are available from the Australian Communications and Media Authority (ACMA) at www.acma.gov.au and the Ministry of Economic Development (MED), Radio Spectrum Management at www.rsm.govt.nz.

Repeater Channels:

Duplex operation allows the radio to transmit on a different frequency to that which it receives. This allows operation through repeater stations.

A repeater station consists of a linked transmitter/receiver combination installed in a prominent location. The repeater is designed to receive signals on a designated channel and retransmit them on another channel. Repeaters are usually mounted on hills or tall buildings. The increased elevation greatly improves both the receiving and transmitting range of the repeater allowing it to receive and retransmit signals to radios that would otherwise be out of range of each other.

Normally, UHF CB radios transmit and receive on the same frequency - known as Simplex operation. However, to communicate through repeaters, your radio must be able to transmit and receive on different channels - otherwise known as Duplex operation. Your radio may be programmed with a Talkaround key to allow you to choose between Duplex and Simplex operation.

The Duplex function can only be selected on UHF CB channels 1 - 8 and 41 - 48 as these are the channels that have been allocated for repeater use. When Duplex is selected, your radio receives on the selected channel (e.g. CH 1) but transmits 30 channels higher (CH 31). The repeater hears your signal on CH 31 and retransmits it on CH 1 for others to hear. Your CM40/CM50 radio allows you to enable or disable Duplex mode on individual repeater channels. In this way any repeater channels that are not being used with repeaters in your area can be used in Simplex mode for normal direct radio-to-radio communications. When a repeater channel is selected the Talkaround icon will be displayed when the channel is in Simplex mode and will be cleared when it is in Duplex mode.

IMPORTANT: UHF CB channels 1 - 8, 31 - 38, 41 - 48 and 71 - 78 should only be used in Simplex mode if there are no repeaters in or near your location that operate on the selected channel. In particular, avoid operating in Simplex mode on any of the repeater input channels 31 - 38 and 71 - 78 unless you are absolutely sure that there are no repeaters in range using that channel. Inadvertently transmitting on an active repeater input frequency in simplex mode could cause interference to other users on that repeater who might not be audible to your radio.

Selective Calling:

When using selective calling on UHF CB channels, the ACMA CBRS Class License (Australia)/MED GURL (New Zealand) regulations require that the operator of a UHF CB station limit the cumulative transmission time of tones used for selective calling to a maximum of 3 seconds in any 60-second period. In the default configuration this will equate to placing no more than 6 selective calls in any 60-second period, but may change depending on the configuration of your radio.

Emergency Channels: (Applies to Australia only)

The ACMA has allocated channels 5/35 for emergency use only. Channel 5 is the primary Simplex Emergency Channel. Where a channel 5 repeater is available, you should select Duplex on channel 5.

Channel 35 is the input channel for the channel 5 repeater. Therefore channel 35 should also not be used for anything other than emergency transmissions.

Telemetry Channels:

ACMA regulations have allocated channels 22 and 23 for telemetry-only applications and have prohibited the transmission of speech on these channels. Consequently the radio has a transmit inhibit applied to channels 22 and 23.

In the event that additional telemetry/telecommand channels are approved by the ACMA, these channels shall be added to those currently listed where voice transmission is inhibited. Currently, transmissions on channels 61, 62 and 63 are also inhibited and these channels are reserved for future allocation.

GME WARRANTY AGAINST DEFECTS

This warranty against defects is given by GME Pty Ltd ACN 000 346 814 (We, us, our or GME). Our contact details are set out in clause 2.7. This warranty statement only applies to products purchased in Australia. Please contact your local GME distributor for products sold outside of Australia. Local distributor details at www.gme.net.au/export

1. Consumer guarantees:

1.1 Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and for compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

1.2 To the extent we are able, we exclude all other conditions, warranties and obligations which would otherwise be implied.

2. Warranty against defects:

2.1 This Warranty is in addition to and does not limit, exclude or restrict your rights under the Competition and Consumer Act 2010 (Australia) or any other mandatory protection laws that may apply.

2.2 We warrant our goods to be free from defects in materials and workmanship for the warranty period (see warranty table) from the date of original sale (or another period we agree to in writing). Subject to our obligations under clause 1.2, we will at our option, either repair or replace goods which we are satisfied are defective. We warrant any replacement parts for the remainder of the period of warranty for the goods into which they are incorporated.

2.3 To the extent permitted by law, our sole liability for breach of a condition, warranty or other obligation implied by law is limited.

(a) In the case of goods we supply, to any one of the following as we decide –

(i) The replacement of the goods or the supply of equivalent goods.

(ii) The repair of the goods.

(iii) The cost of repairing the goods or of acquiring equivalent goods.

(b) In the case of services we supply, to any one of the following as we decide –

(i) The supplying of the services again

(ii) The cost of having the services supplied again.

2.4 For repairs outside the warranty period, we warrant our repairs to be free from defects in materials and workmanship for three months from the date of the original repair. We agree to re-repair or replace (at our option) any materials or workmanship which we are satisfied are defective.

2.5 We warrant that we will perform services with reasonable care and skill and agree to investigate any complaint regarding our services made in good faith. If we are satisfied that the complaint is justified, and as our sole liability to you under this warranty (to the extent permitted at law), we agree to supply those services again at no extra charge to you.

2.6 To make a warranty claim you must before the end of the applicable warranty period (see warranty table), at your own cost, return the goods you allege are defective, provide written details of the defect, and give us an original or copy of the sales invoice or some other evidence showing details of the transaction.

Before returning any goods you will be required to follow the available options:

Contact our Customer Support Team on 1300 463 463 or techsupport@gme.net.au.

A customer support team member will troubleshoot and validate if your product is faulty. If so, they will email you a product RMA (Return Material Authorisation).

Products that are authorised to be returned to GME must include the following:

RMA form (Return Material Authorisation)

A copy of your proof of purchase, the faulty product, including all accessories

2.7 Send your claim to:

Australia

GME Pty Ltd

17 Gibbon Rd, Winston Hills

NSW 2153, Australia

T: (02) 8867 6000 | F: (02) 8867 6199

E: servadmin@gme.net.au

RMA Request : rma@gme.ne.au

New Zealand

GME Communications (NZ) Limited

Unit A, 11 Echelon Place, East Tamaki

Auckland 2013, New Zealand

T: (09) 274 0955 | F: (09) 274 0959

E: nzbranch@gme.net.au

RMA Request: nzrma@gme.net.au

2.8 If we determine that your goods are defective, we will pay for the cost of returning the repaired or replaced goods to you, and reimburse you for your reasonable expenses of sending your warranty claim to us.

3. What this warranty does not cover:

3.1 This warranty will not apply in relation to:

(a) Goods modified or altered in any way.

(b) Defects and damage caused by use with non GME products.

(c) Repairs performed other than by our authorised representative.

(d) Defects or damage resulting from misuse, accident, impact or neglect.

(e) Goods improperly installed or used in a manner contrary to the relevant instruction manual; or

(f) Goods where the serial number has been removed or made illegible.

4. Warranty period:

4.1 We provide the following warranty on GME Commercial Products. No repair or replacement during the warranty period will renew or extend the warranty period past the period from original date of purchase.

Product Type	Warranty Period
CM40 & CM50 Radio	5 Years
UIC & Accessories	1 Year

GME COMMERCIAL

gmecommercial.com.au

GME Pty Ltd.

17 Gibbon Road, Winston Hills NSW 2153, Australia

D/N: 52957-1

DEC 2023