

SD125 Radio Data Modem



Service Manual

maxon

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All amendments to this manual should be incorporated as soon as they are received and recorded below:

[illegible]

Please read the WARNINGS on the next page before referring to subsequent sections.

WARNINGS

- **Components containing beryllium oxide are used in the equipment. Dust from this material is a health hazard if inhaled or allowed to come into contact with the skin. Great care must be taken when handling these components. They must not be broken or subjected to excessive heat.**
- **Never operate the radio transmitter without the correct Maxon antenna, or a suitable artificial load, connected.**
- **Never modify a radio, or accessory, except as instructed in the Service Manual, Engineering Bulletins or formal communication as this may invalidate any warranty, guarantee or type approval.**
- **Do not operate this equipment in environments containing explosive materials or vapour.**

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1 INTRODUCTION

This Maxon Service Manual is a comprehensive guide to the maintenance and field repair of the SD125 Radio Data Modem.

Before using this manual please read the whole of this introductory chapter, this will help you to make the best use of it. If you have not done so already, please also read the warnings immediately in front of this chapter before proceeding any further.

Applications information is available in the Applications Note, ME820061.

1.1 Using this Manual

At any one time you will need to refer to only a small part of the manual. It has been organised as follows to make this as easy and as quick as possible.

Chapter 2 - Specification, gives the detailed specification.

Chapter 3 - Pre-install check, Accessories and Options. Lists what you should have received and the Accessories and Options that are available.

Chapter 4 - Installation, Commissioning & Alignment. Describes connections to the radio, how to commission it and how to Align the radio should this becomes necessary. You will also find it helpful to read the operating instructions in the User Manual and Chapter 7 on Programming.

Chapter 5 - Detailed Functional Description.

Chapter 6 - Troubleshooting and PCB Drawings.

Chapter 7 - Programming.

Chapter 8 - Exploded Mechanical Drawings and Parts Lists.

Chapter 9 - Circuit Diagrams and PCB Layouts.

1.2 Amendments to this Manual

From time to time during its lifetime this product will be changed and improved. To cover such changes, amendments to this manual will be issued in the form of replacement and/or additional pages. It is important that anyone working on a product has all the relevant information. Therefore you should incorporate amendments to this manual on receipt. Please follow the instructions accompanying the amendment (in the form of an Engineering Bulletin) and be sure to complete the amendment record at the front of this manual.

On occasions it may be necessary to issue product information more quickly than can be achieved with an amendment. In this case the information will be distributed as a Maxon Engineering Bulletin. Engineering Bulletin numbers are prefixed with a category letter – A, B or C. e.g.,

CATEGORY C - ENGINEERING BULLETIN 120

Category definitions are:

'A' Category A Engineering Bulletins will only be released if, by using the equipment manufactured by Maxon or its subcontractors, a risk to operator safety or an infringement of Type Approval is probable.

All units affected should be returned for modification to Maxon Europe Works Department on receipt of such a Bulletin.

-
- B'** Category B Engineering Bulletins are for equipment manufactured by Maxon that may have component batch problems.

All equipment's affected, that are in service, are to be returned to the Distributor or Dealer workshop for modification. Maxon will supply replacement components free of charge.

- 'C'** Category C Engineering Bulletins are for improvement or modification to equipment manufactured by Maxon.

Dealer/Distributor to modify affected units in the field on the next service call. Maxon will supply components free of charge.

Note: Please place any amendment at the back of this manual and refer to them before carrying out any work. This Service Manual should be updated with any accompanying replacement pages. You may wish to retain the previous issue pages for future reference.

1.3 Contact Information

Should you have any queries regarding this manual, or the information within it, please contact:

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2 SPECIFICATIONS

Performance Specifications	FCC Parts 22, 74, 90 and 210
RF Output Power	1W / 5W nominal (programmable)
Modulation Type	EXTERNAL
Intermediate Frequencies	45MHz 455kHz
Frequency Source	Synthesiser
No. of channels	16
Channel Spacing	12.5kHz 20kHz 25kHz all by software selection
Receiver sensitivity	<-110dBm (0.28 μ V) for 12dB SINAD at data port (<-117dBm for 12dB SINAD from Audio port)
Selectivity	>50dB (12.5kHz >60dB (25kHz)
Intermodulation Receiver stability	>65dB <+/- 5ppm
Audio Output	2.5V @ 600 ohms for <10% THD (250mV rms – Data Output pin 2)
Audio Distortion	<10% at rated modulation <5% at 1kHz
Operational rating	Intermittent, 90:5:5 (Standby:Rx:Tx)
Transmit attack time	<25mS
Spurious and Harmonic Emissions	<-60dBc

SIGNALLING OPTIONS

Modulation type	External (analogue input / output) ONLY d.c. or optional a.c. coupled transmitter / receiver for modulation down to d.c. (15Hz approx.). Bit rate dependent upon chosen modulation scheme. 100mV rms @ 60% Peak Deviation
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GENERAL

Temperature Range

Operating (to specification)	-10 to +45°C -20 to +55°C (extreme)
Storage	+25°C nominal -40 to +80°C (extreme)
Weight	218 grams

Current consumption

Transmit <2.3A @ 5W RF output, <1A @ 1W RF output

Receive <75mA

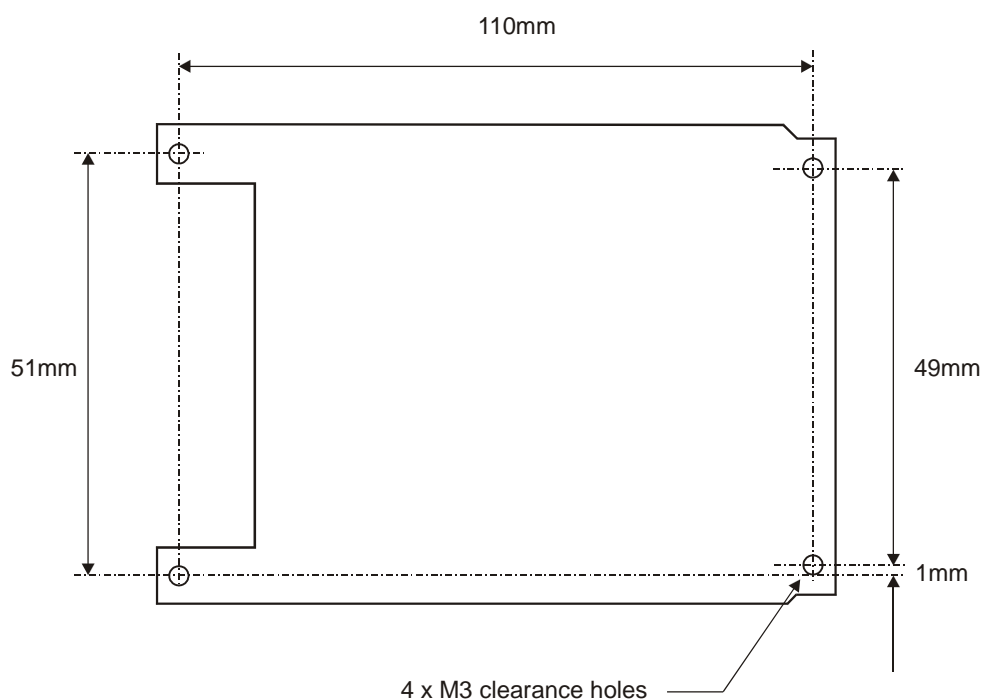
Supply Voltage +12V d.c. nominal (+9 to +18V)

Switching range Tx and Rx (without tuning)

BAND	VHF				BAND	UHF			
	TX		RX			TX		RX	
	MIN	MAX	MIN	MAX		MIN	MAX	MIN	MAX
V2	148	174	148	174	U1	400	430	400	430
					U2	440	470	440	470

Table 2-1 - Tx / Rx Operating Range**Dimensions (mm)**

118 (L) x 62 (W) x 30 (D)

**Figure 2-1 - Hole Fixing Centres****Antenna / RF connector**

BNC type nominal 50Ω impedance

Programmer

SMP7125

DOS based programmer allowing personalisation of the SD125 via the RS232 port.

Note: Maxon Europe reserves the right to alter these specifications without prior notification as part of our continuous improvement policy.

3 ACCESSORIES & OPTIONS

3.1 Pre-Installation

As standard the SD125 radio, which you have purchased, is supplied without any accessories.

3.2 Accessories

The following Accessories are available:

Order Code	Description
Antennas	
CA1506-MB	VHF Helical Antenna 148 - 162MHz
CA1506-HB	VHF Helical Antenna 160 - 174MHz
CA4502	UHF Quarterwave Whip Antenna 420 – 470MHz
Cables	
ME420030	Universal Programming Cable
ME420046	Radio Adaptor Programming Cable
CA8299	PC Data Connecting Cable (9 pin D-Type to 9 pin D-Type)
Documentation	
ME820061	SD125 Applications Notes
Programmer	
SMP7125	SD125 Programming kit. Allows frequencies and features to be changed. Includes ME420030 and ME420046 Cables.
ACC-2000	Programming Box
Testing	
593517	Extender Board

4 INSTALLATION, COMMISSIONING & ALIGNMENT

4.1 Installation

The SD125 usually requires mounting in a suitable location. Attention should be given to the heatsinking of the radio if prolonged transmission is envisaged, see Section 2, which also includes details of the mounting hole dimensions.

Note: Continuous transmission is not possible at high power (5W) without a suitable heatsink.

The SD125 can be used with helical or whip aerials or may be connected to an external antenna, via a suitable connecting cable.

4.2 External Connections

Connection is made to the SD125 via an external 50 ohm BNC socket (RF signal) and a 9-way "D"-type socket (monitoring and data signals) with 4-40 UNC threaded jack posts for more permanent connection

4.3 D-Type Interconnections

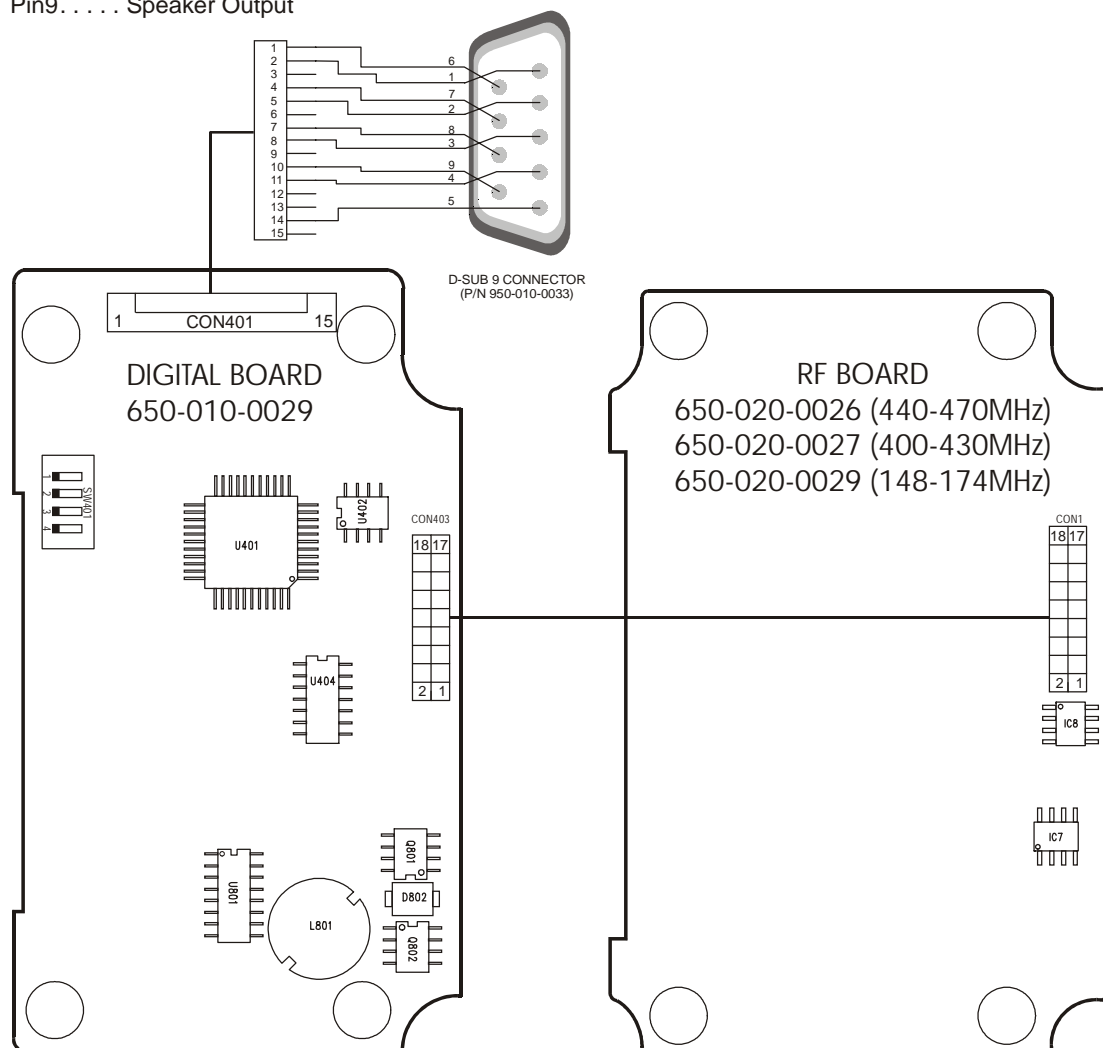
Pin	Function	Type	Range	Description
J1-1	Audio In (Data Tx)	Input	100mV rms nominal	
J1-2	Audio Out (Data Rx)	Output	250mV rms nominal	
J1-3	PTT	Input		
J1-4	GND (Ground)	GND	0V	Signal Ground
J1-5	Power Supply	Input	+9 to +18V DC	
J1-6	Carrier Detect (Squelch)	Output	0V	Signal Present
J1-7	Mic Input		50mV rms nominal	
J1-8	Switch			
J1-9	Speaker	Output	2.5V pk-pk nominal	

Table 4-1 – D-Type Connections

Note: If the mic input is used pin 8 must be grounded and pin 7 must be taken to earth via a 2k2 resistor to activate the transmitter.

4.3.1 Wiring Diagram

- Pin1. Audio In (Data Tx)
 Pin2. Audio Out (Data Rx)
 Pin3. PTT
 Pin4. GND (Ground)
 Pin5. B+ (8-18 Volts DC)
 Pin6. Carrier Detect (Squelch)
 Pin7. Mic Input
 Pin9. Speaker Output



4.4 Commissioning

This section covers the tests, which should be undertaken prior to handover of the radio modem to the end user. All of the following tests can be carried out without having to gain access to the interior of the radio.

Recommended Test Equipment

The alignment and performance test procedures assume the use of the following equipment. The functions of most of the equipment may be found in a "Communications Test Set". This type of equipment is available from a number of test equipment manufacturers.

Throughout this book reference will be made to the use of the Communications Test Set. Where applicable, the equivalent discrete item of test equipment may be used. For example, if measuring power, a stand-alone power meter and a dummy load could be used instead of the Test Set.

Discrete Test Equipment

RF Signal Generator
 RF Power Meter
 RF Frequency Counter
 Spectrum Analyser and notch filter (optional)
 Audio Signal Generator
 Audio Power Meter
 SINAD Meter
 Modulation Meter
 Oscilloscope
 Voltmeter
 DC Power Supply, 0 - 15V 2A min.

Combined Equipment

Communications Test Set (e.g. Marconi TF2955, Stabilock 4015 or similar).

Accessories

ME420046	Radio Programming Lead
ME420030	Universal Programming Lead

Note ME420046 & ME420030 leads are part of the SMP7125 Kit

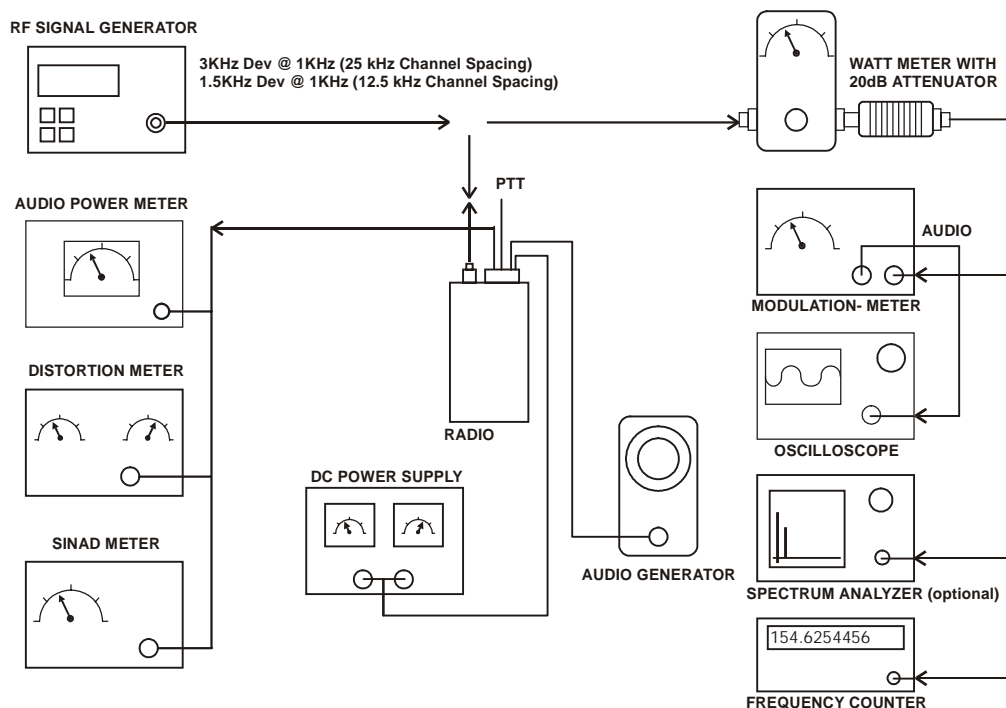


Figure 4-1 - Test Equipment Configuration

Prerequisites

For the following tests, signal generator modulation level should be set to Average System Deviation, i.e. 60% of maximum system deviation.

The level should therefore be set to:

1.5 kHz for 12.5 kHz channel spacing
2.4 kHz for 20 kHz channel spacing
3.0 kHz for 25 kHz channel spacing

If the radio has had components installed to change the channel spacing and/or operating band from those installed at the factory, ensure that the correct components are installed in the receiver and transmitter stages prior to testing.

Refer to the appropriate Electrical Parts List if necessary.

The channel can only be changed by opening up the top of the radio and altering the DIP switch. Channel 1 = all four switches down.

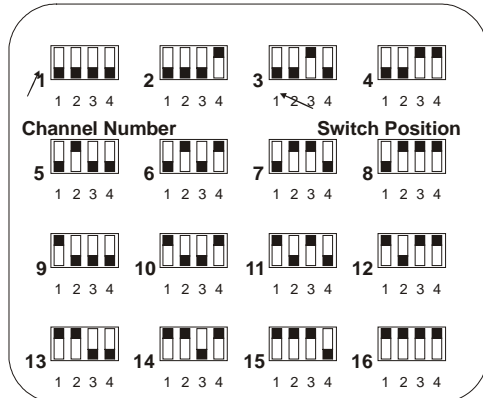


Figure 4-2 – Channel Switch Settings

For details of how to open the radio see Section 4.5.

EEPROM programming

Ensure that the EEPROM has the required customer parameters programmed, otherwise ensure that a test EEPROM is programmed with at least the lowest, middle and highest Rx/Tx frequencies prior to aligning the radio.

The middle Rx/Tx frequencies should be halfway between the lowest and the highest frequencies.

Programming details are given in the SD125 Programming Manual.

4.4.1 Test Equipment Connection

Connect the relevant pins on the D-type connector to the power supply. The positive pin connects to +12Vdc (nominal). The negative pin connects to the negative terminal of the power supply.

4.4.2 Transmitter Performance Tests

Power Output

- Connect the transmitter to the Communications Test Set (CTS) with the power meter set to read 10W.
- Set the power supply to 12Vdc and connect a dc voltmeter across the power supply to monitor the supply voltage.
- Set the CTS to the same frequency as the radio and PTT by connecting pin 3 on the 9 way D-type to ground. Check and record the power output. The nominal power output is 5W when set to high power or 1W when set to low power.

Frequency Error

- Using the frequency counter check that the transmit frequency is within +/- 500Hz (VHF) or +/- 750Hz (UHF) of the frequency which is programmed into the radio.

Spot Deviation and Distortion

- Set the radio to the middle Tx frequency. Connect the oscilloscope to the output of the modulation meter.
- Set the audio signal generator to 1kHz tone, low output impedance and adjust its level for 60% system deviation (around 100mV rms):

12.5kHz channel spacing 1.5kHz dev.
20kHz channel spacing 2.4kHz dev.
25kHz channel spacing 3kHz dev.

- c. Connect the audio generator to pin 1. of the 9 way D-type and connect the modulation meter to pin 2.
- d. Measure the audio distortion. This should be less than 5%.
- e. Increase the audio signal generator level by 20dB (10x voltage). The peak deviation should be:

12.5kHz channel spacing \leq 2.25kHz dev.

20kHz channel spacing \leq 3.6kHz dev.

25kHz channel spacing \leq 4.5kHz dev.

4.4.3 Receiver Performance Tests

Sensitivity

The SINAD performance test may be used to test the sensitivity of the receiver.

- a. Connect the RF signal generator, modulated with a 1kHz tone, to the radio.
- b. Set the frequency to correspond to the Rx frequency of one of the channels programmed into the radio.
- c. Connect the SINAD voltmeter to pin 9 of the D-type (speaker output).
- d. Set the RF signal generator deviation to:

12.5kHz channel spacing 1.5kHz dev.

20kHz channel spacing 2.4kHz dev.

25kHz channel spacing 3kHz dev.

- e. Adjust the RF signal generator level until the SINAD meter reads 12dB.
- f. Check that the signal generator RF level is $< -117\text{dBm}$ (UHF) or $< -118\text{dBm}$ (VHF). **Note:** If the data port, pin 1 is used the signal generator RF level will be $< -110\text{dBm}$.

Squelch (RSSI Setting)

Squelch is set using the Programming Box, please refer to the Programming Manual.

4.5 Alignment

The following tests should only be performed if the radio fails the Performance Tests or after any Service Repairs.

CAUTION

This radio contains static sensitive devices. Static safe precautions should be observed, in particular we would recommend the use of a suitable floor mat, table mat, bonding cords and a wrist strap. The soldering iron should have an earthed tip.

Care should be exercised in the handling of static sensitive components and they should always be transported in the correct containers.

Never remove, or insert, static sensitive devices with the power applied.

Handle static sensitive components by their package rather than by their leads.

Any repairs or adjustments should only be carried out by, or under the supervision of, a qualified radio service technician.

All servicing work should be performed in accordance with the recommendations laid down in DTI (UK) Code of Practice MPT1372, or equivalent National Standard.

4.5.1 Disassembly and Re-assembly of the Radio

Radio

In order to carry out the following Test and Alignment procedures it will be necessary to gain access to the inside of the radio.

Care should be exercised when opening up the radio for maintenance or repair.

REMOVING AND REPLACING THE TOP COVER

Removal

Using a cross-head screwdriver, undo the four screws in the lid.

Replacement

Replace the four screws and tighten.

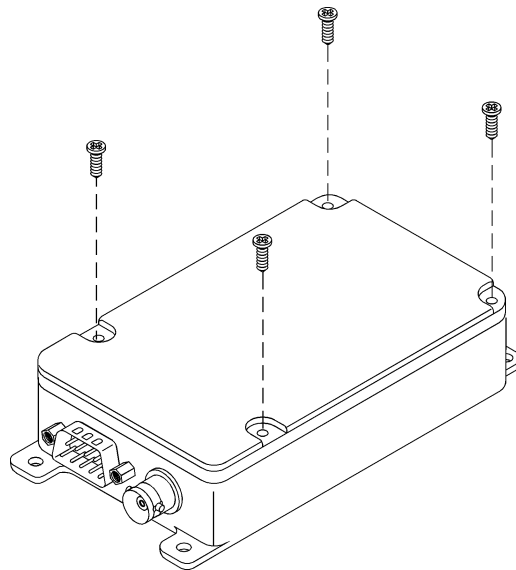


Figure 4-3 - Removal of top cover

REMOVING AND REPLACING THE DIGITAL BOARD AND SHIELD PLATE

Removal

Remove the upper cover.

Disconnect the DB9 pin connector from CON401 on the PCB.

Unscrew the four mounting screws.

Remove the Digital Board Assembly.

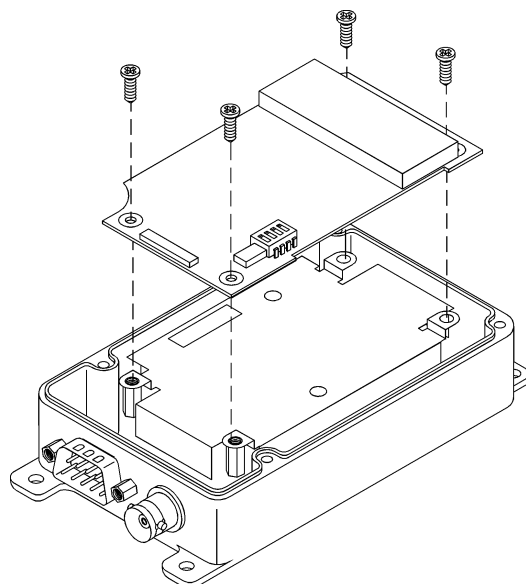


Figure 4-4 – Digital Board Assembly Removal

Remove the Shield Plate.

Replacement

Reverse the steps taken for removal.

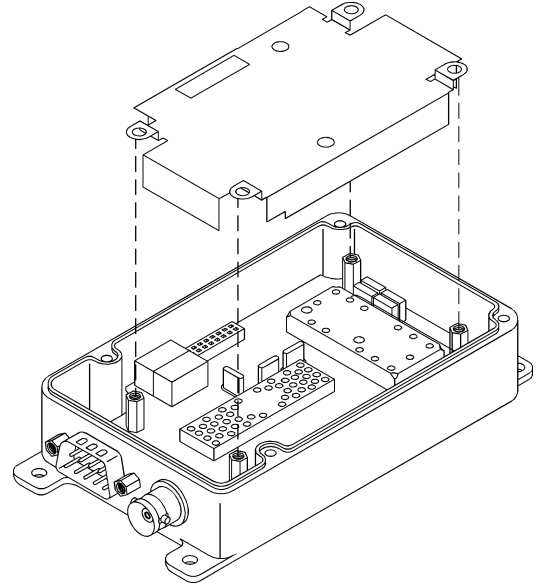


Figure 4-5 - Removal of shield

REMOVING AND REPLACING THE RF BOARD**Removal**

Remove the Upper Cover and the Digital Board Assembly and Shield Plate.

Unscrew the four mounting standoffs.

Unsolder the antenna connector cable.

Remove the RF Board Assembly.

Replacement

Reverse the steps taken for removal.

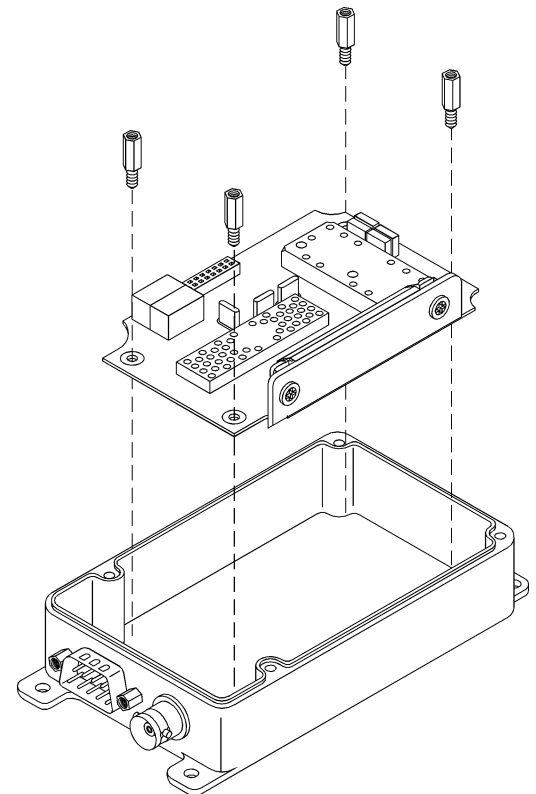


Figure 4-6 - Removal of RF board

4.5.2 PLL Alignment

Preparation

To perform the following tests it is necessary to program the radio as follows:

VHF

Ch.	Tx(MHz)	Rx(MHz)	Power
1	146.025	146.025	Low
2	160.025	160.025	High
3	160.025	160.025	Low
4	173.975	173.975	Low
5	173.975	173.975	Low
6	173.975	173.975	Low

UHF

Ch.	Tx(MHz)	Rx(MHz)	Power
1	440.025	440.025	Low
2	455.025	455.025	High
3	455.025	455.025	Low
4	469.975	469.975	Low
5	469.975	469.975	Low
6	469.975	469.975	Low

Channel spacing as required.

Before any alignment is carried out to the transmitter, or receiver, it is necessary to align the Phase Locked Loop (PLL). The PLL consists of the Rx VCO, Tx VCO and TCXO.

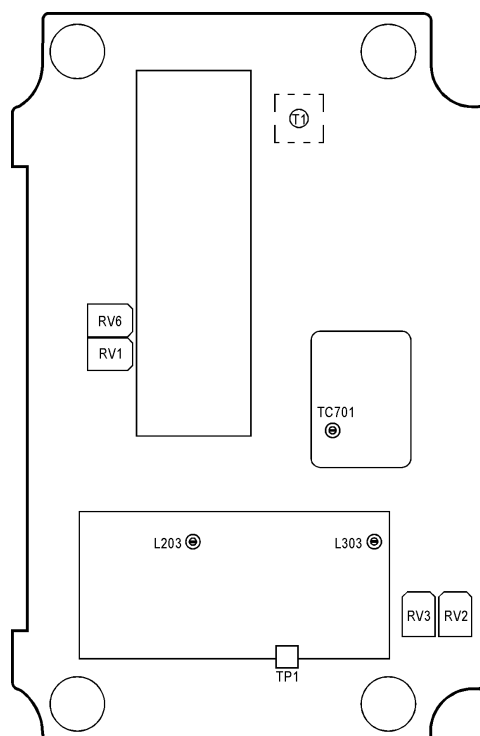
Ensure that the Power Save is OFF.

Note: If the power save parameter is programmed there will be a periodic change at TP1. Measurement should be based on the steady state voltage, with power save off.

Connect the radio under test as shown in Figure 4-5.

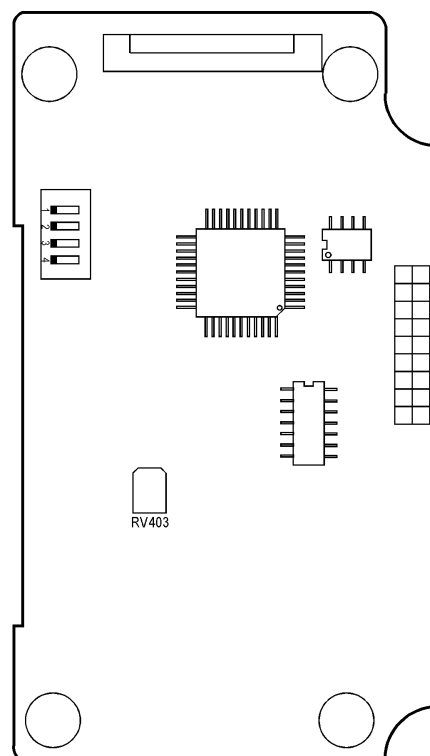
Rx VCO

- Select Channel 1.
- Check that the VCO tuning voltage at TP1 is >1.5V. If not adjust L303 for >1.5V.
- Select Channel 3



RF BOARD
ALIGNMENT POINTS

Figure 4-7 - RF Alignment Points



DIGITAL BOARD
ALIGNMENT POINTS

Figure 4-8 - Digital Alignment Points

- d. Check that the voltage at TP1 is <12.5V.
- e. If the voltage is >12.5V it will be necessary to repeat paras a to d, reducing the voltage set in para b nearer to 1.5V.

Tx VCO

- a. Select Channel 1.
- b. Set the PTT switch to on. Check that the VCO tuning voltage at TP1 is >1.5V. If not adjust L203 for >1.5V.
- c. Set the PTT switch to off. Select Channel 3.
- d. Set the PTT switch to on and check that the voltage at TP1 is <12.5V.
- e. If the voltage is >12.5V it will be necessary to repeat paras a to d, reducing the voltage set in para b nearer to 1.5V.
- f. Set the PTT switch to off.

TCXO

- a. Select Channel 2.
- b. Set the PTT switch to on.
- c. Using the frequency counter, adjust the TCXO control, TC701 (VHF) or RV5 (UHF), so that the transmit frequency is within +/- 200Hz of the required frequency.

Note: During the life of this radio a number of versions of TCXO have been used. The TCXO may, or may not, have a metal shield can.

The TCXO fitted to your radio will have either a trimmer capacitor or a trimmer resistor. In either case the alignment procedure is the same.

- d. Set the PTT switch to off.

If no further alignment is to be carried out, it may be necessary to reset the squelch.

Please refer to the section on Squelch performance on page 4-6.

4.5.3 Transmitter Alignment**Automatic Power Adjustment**

Note: Transmit periods longer than 5 minutes are to be avoided.

- a. Select Channel 2.
- b. Set the PTT switch to on.
- c. Adjust RV1 to give the desired transmit Power (5W nominal).
- d. Set the PTT switch to off.
- e. Select channel 3
- f. Set the PTT switch to on.
- g. Adjust RV6 to give the desired transmit power (1W nominal).
- h. Set the PTT switch to off.

Balance Adjustment

- a. Select Channel 3.
- b. Set the audio generator to a 310Hz tone, low output impedance, at a level of 400mV.
- c. Set the PTT switch to on.
- d. Adjust RV3 to give a square wave on the oscilloscope.
- e. Set the PTT switch to off.

Audio deviation adjustment

- a. Select Channel 3 and set the PTT switch to on.
- b. Set the audio generator to 1kHz and adjust its level for 60% peak system deviation (around 100mV rms). Connect to pin 1 of the D-type. Ensuring that, depending upon the channel spacing of channel 3, the deviation is either:

12.5kHz channel spacing 1.5kHz dev.
or 20kHz channel spacing 2.4kHz dev.
or 25kHz channel spacing 3kHz dev.

- c. Measure the audio distortion. This should be less than 5%.
- d. Increase the audio level by 20dB (10x voltage).

- e. Adjust RV2 to set the deviation to:

12.5kHz channel spacing 2.25kHz dev.
or 20kHz channel spacing 3.6kHz dev.
or 25kHz channel spacing 4.5kHz dev.

- f. Slowly sweep the audio signal generator between 300Hz and 3kHz. Record the peak deviation. The peak deviation should be:

12.5kHz channel spacing \leq 2.5kHz dev.
or 20kHz channel spacing \leq 4kHz dev.
or 25kHz channel spacing \leq 5kHz dev.

If necessary, adjust RV2 to keep within the system deviation.

- g. Repeat para. f with the radio set to Channel 1.

If necessary, adjust RV2 to keep within the system deviation.

- h. Set the PTT switch to off.

This completes the transmitter alignment process.

4.5.4 Receiver Alignment

Note: It is important that the TCXO and PLL are correctly aligned before commencing work on the receiver. See section 4.4.2 on Transmitter alignment.

The receiver is, by design, a broadband device. It should require no special alignment unless repairs are performed on the receiver.

The following alignment may be performed:

- Select Channel 2 on the radio.
- Set the RF generator to the receiver frequency and the RF level to 1mV pd (-47dBm).
- Set the AF signal to 1kHz.
- Set the deviation to:

12.5kHz channel spacing 1.5kHz deviation
or 20kHz channel spacing 2.4kHz deviation
or 25kHz channel spacing 3kHz deviation

- Monitor the audio output level and the Distortion on pin 2 or pin 10 via RV403 (volume pot) setting the volume control to mid-range.

- Adjust T1 for maximum audio output, with minimum distortion.

Squelch

- With the above setting, reduce the RF level to -130dBm. The radio should be mute.
- Adjust the RF level until the SINAD meter reads 10dB. The radio should unmute.

This completes the receiver alignment process.

To adjust the squelch, see Section 7.16.

4.5.5 Receiver Performance Tests

See Section 4.4.3.

4.6 Component Replacement

Surface mount components
Surface mount components should always be replaced using a temperature controlled soldering system.

The soldering tools may be either a temperature controlled soldering iron or a temperature controlled hot-air soldering station.

A hot-air system is recommended for the removal of components on the multi-layered boards used in the radio.

With either soldering system, the component manufacturer's recommended temperature should be maintained.

The following procedures outline the removal and replacement of surface mount components. If a hot-air soldering system is employed, see the manufacturer's operating instructions for detailed information on the use of your system.

CAUTION: Avoid applying heat to the body of any surface mount component using standard soldering method. Heat should be applied only to the metallised terminals of the components. Hot-air systems minimise the risk of damage to components since the heat is quickly and evenly distributed to the external surface of the component.

CAUTION: The CMOS integrated circuit devices used in this equipment can be destroyed by static discharges.

Before handling any of these devices, service technicians should discharge themselves by touching the case of a bench test instrument that has a 3-prong power cord connected to an outlet with a known good earth ground.

When soldering or desoldering a CMOS device, the soldering equipment should have a known good earth ground.

Surface mount removal

1. Grip the component with tweezers or sill needle nose pliers.
2. Alternately heat the metallised terminal ends of the surface mount component with the soldering iron. If a hot-air system is used, direct the heat to the terminals of the component.

Use extreme care with the soldering equipment to prevent damage to the printed circuit board (PCB) and the surrounding components.

3. When the solder on all terminals is liquefied, gently remove the component. Excessive force may cause the PCB pads to separate from the board if all solder is not completely liquefied.
4. It may be necessary to remove excess solder using a vacuum de-soldering tool or solder wick. Again, use great care when de-soldering or soldering on the printed circuit boards.

It may be necessary to remove the epoxy adhesive that was under the surface mount component and any flux on the PCB.

Surface mount component replacement

1. "Tin" one terminal end of the new component and the corresponding pad of the PCB. Use as little solder as possible.
2. Place the component on the PCB pads, observing proper orientation for capacitors, diodes, transistors, etc.
3. Simultaneously touch the "tinned" terminal end and the "tinned" pad with the soldering iron. Slightly press the component down on the board as the solder liquefies.

Solder all terminals, allowing the component time to cool between each application of heat.

Do not apply heat for an excessive length of time and do not use excessive solder.

With a hot-air system, apply hot air until all "tinned" areas are melted and the component is seated in place. It may be necessary to slightly press the component down onto the board.

Touch-up the soldered connections with a standard soldering iron as needed. Do not use excessive solder.

CAUTION: Some chemicals may damage the internal and external plastic parts of the radio.

4. Allow the component and the board to cool and then remove all flux from the area using alcohol or another approved flux remover.

Surface mounted integrated circuit replacement

Soldering and de-soldering techniques of the surface mounted IC's are similar to the above outlined procedures for the surface mounted chip components.

Use extreme care and observe static precautions when removing or replacing the defective (or suspect) IC's. This will prevent any damage to the printed circuit board or the surrounding circuitry.

The hot-air soldering system is the best method of replacing surface mount IC's. The IC's can -easily be removed and installed using the hot-air system. See the manufacturer's instructions for complete details on tip selection and other operating instructions unique to your system.

If a hot-air systems is not available, the service technician may wish to clip the pins near the body of the defective IC and remove it. The pins can then be removed from the PCB with a standard iron and tweezers, and the new IC installed following the Surface Mount Component Replacement procedures.

Provided that the IC is relatively new, It will not be necessary to 'tin', all (or any) of the IC pins before the installation process.

If the IC has been in stock for some time, cleaning, and tinning of the pins may be necessary.

5 DETAILED FUNCTIONAL DESCRIPTION

5.1 Introduction

The VHF and UHF radios are comprised of two PCB's (a RF PCB and a digital PCB). These boards are connected with an 18 pin male and female connector pair. The digital board is interfaced with external data equipment through the 9 pin D-type connector, which controls the radio and data sending and receiving.

5.1.1 Digital Circuits

The Digital circuit contains the CPU, the channel select switch and associated digital circuits.

Tx Signal Circuit

The Tx data signal (Audio In) comes from Pin 2 of Con 401 and goes through U404D. The Tx signal is amplified by U406C. The Tx signal is filtered by U405A & B, which is a 4th order low pass filter. The output of U405A is then fed to the RF board for Tx modulation. Mic input can be applied to pin 7 of the 9-way D-type (pin 4 of CON401). This is routed via IC404c through two additional LPF stages to follow the same route as the TX data signal. Mic input is activated by grounding via a 2k2 resistor. Note that pin 8 (switch) should also be grounded. This will disable the Data signal (Audio In) and prevent pin 3 of the D-type (PTT) from working. Tx data can be routed via U404b (switched via pin 9 CON404) from the option board (CON404), if fitted.

Rx Signal Circuit

The Rx data signal comes from the RF board via pin 10 of CON 403. The Rx signal is switched via U404A by the busy/carrier detect from CPU and filtered by U406b (LPF). The audio output appears on pin 5 of CON 401. It is also routed via RV403 and amplified by U407 and switched by the mute from CPU. The amplified signal goes to pin 10 of Con 401, the speaker output. Raw Rx is also routed to the option board connector.

RSSI Detector

From the RF board the Received Signal Strength Indicator (RSSI) signal flows to U403A & B through R461. The pulse is injected from pin 5 of U403B every 1mS and C451 is discharged. It is then charged by R464. The RSSI signal is simultaneously input to pin 7 of U403A and those signals are compared. The compared signal is output from U403A. Pin 1 of U403A and the CPU detects the pulse width. The pulse width is varied by RSSI DC voltage, therefore, the carrier detection is controlled by the CPU.

EEPROM

Tx/Rx channel and RSSI detection level as well as other data from the programmer are stored in the EEPROM. The data stored is retained without power supplied. This is a non-volatile memory. The EEPROM may have information reprogrammed or erased. U402 is an EEPROM with 2048 (8 x 256) capacity and data is written and read serially.

Channel Selector

One of 16 channels may be selected using the DIP switch (SW401). SW401 encodes the selected channel number into 4-bit binary code. The binary code plus one equals the channel number. The binary code is decoded by the CPU enabling the appropriate Rx or Tx frequency and associated data to be selected from the EEPROM.

DC to DC Converter

The main DC power is injected to the DC to DC converter. The DC to DC converter provides a constant 7.5VDC. This voltage is a source for all of the RF and Digital circuits.

The DC to DC converter is formed by U801, Q801, Q802, L801 and R804. U801 is a switch-mode DC to DC converter IC. Input DC variations appear as voltage variations through R804. U801 detects the voltage and controls the switching pulse.

5.1.2 Common RF Circuits

PLL Synthesiser

The PLL synthesiser circuit is common to both the transmitter and receiver, with the exception that a separate VCO is used for transmit and receive.

The synthesiser comprises:

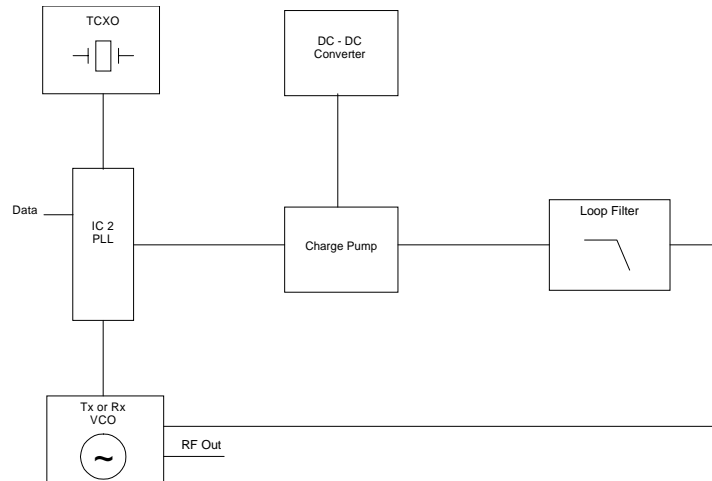


Figure 5-1 - PLL Block Diagram

12.8 MHz TCXO

The TCXO contains a crystal oscillator, which has 3-stage thermistor network compensation, and a modulation port. Compensation is ± 5 PPM from -30°C to $+60^{\circ}\text{C}$. Frequency adjustment is provided by TC701 (VHF), or RV5 (UHF), depending upon whether the TCXO is a VHF or UHF module.

VCO

The SD125 radio has two separate VCO's in one module, one each for transmit and receive. Both have a similar theory of operation, but the transmit VCO has additional circuitry to provide modulation.

The desired VCO is selected by applying 5V to Q13 (RX) or Q14 (TX). The TX/RX 5 volt rail is controlled from Q2 (TX) and Q3 (RX) which in turn are controlled from pins 26 (TX EN) and 79 (RX EN) on the microcontroller (U1).

Components associated with Q13 and Q14 provide additional ripple filtering of the supply rail.

The VCO's are configured as Colpitts oscillators using transistors Q202 (Tx) / Q302 (Rx), varactor diodes D201 / 301, frequency setting inductors L203 / 303 and associated components. Cascade bias is provided by Q203 / 303.

The frequency of operation is controlled by reverse biasing D201 / 301 in the range of 2 to 11 V dc.

The transmit VCO has modulation from the audio processing circuitry applied to D202. C204 is used to provide compensation for non-linearity caused by the modulation diode and maintains a constant modulation regardless of the frequency of operation.

PLL IC

The reference frequency from the TCXO, at 12.8 MHz, is connected to pin 20 of IC2 (MC145191). The appropriate VCO is connected to pin 11.

IC2 has two dividers. The reference divider (REFDIV) is set to divide by 2048 for 12.5kHz or 25kHz channels or to divide by 2560 for 20kHz channels. The 12.8MHz TCXO is divided down to give either 5kHz or 6.25kHz, depending upon channel spacing. This is known as the reference frequency, F_r .

The comparison frequency is determined by the settings which are stored within the EEPROM (IC408). Choice of these comparison frequencies means that the minimum step size of the synthesiser is either 5kHz or 6.25kHz and therefore, 12.5kHz, 20kHz and 25kHz channel spacings can be accommodated.

IC2 is programmed on pin 19, to obtain the desired frequency, by serial data from the microcontroller (IC409 pin 1). IC2 Pin 19 is the data input and pin 18 is the clock input.

The appropriate VCO frequency is divided down by the programmable divider (VARDIV) to, again, produce 5kHz or 6.25kHz. This frequency is known as the variable frequency, F_v .

In the comparator, the phase difference between the reference frequency and the VCO signal is compared.

When $F_v = F_r$, the phase detector output (pins 3 and 4, IC2) produces narrow negative pulses and F_v and F_r pulse widths are identical. When $F_v > F_r$, pin 4 (V) pulses negative, with pin 3 (R) remaining high. When $F_v < F_r$, pin 3 (R) pulses negative with pin 4 (V) remaining high. The signal at pins 3 and 4 is smoothed by the loop filter and applied to the VCO.

Out-of-Lock Detector

The out-of-lock detector produces a series of logic level pulses when the loop is out of lock at pin 2 of IC2. The pulses at pin 2 are buffered by Q5 and then integrated by R1 and C11. The resultant voltage is fed to the microcontroller, U1, pin 25.

IC2 has two output ports:

Port A pin 16	tx enable 2, which controls the application of volts to the PA stage.
Port B pin 15	prescaler power save control in PLL IC

Pin 13 labelled test2 allows the technician to see the output of the dual modules prescaler for trouble shooting purposes, no connection should be made to this pin.

Charge Pump and Loop Filter

Transistors Q6 to Q8 and Q11, and associated components, form the charge pump. The phase detector output from IC2 pins 3 and 4 are combined by the charge pump to produce a 0 to 15V tuning voltage.

The voltage signal is filtered by the loop filter (R12 – R14, C21 - C24) to remove harmonics of the reference frequency.

DC to DC Converter

The DC to DC converter, converts the +7.5 V to a 14-16 V supply. This is used to provide the tuning voltage for the VCO. A wide voltage range is required to allow for the wideband operation of the radio.

Q904, Q905 and associated components, form a 200kHz oscillator. The output of the oscillator is rectified (voltage doubled) by D901 and D902. C901 and C902 provide filtering. The resultant 16Vdc is passed to R909 and then becomes the supply rail for the charge pump.

5.1.3 Transmitter

The transmitter comprises:

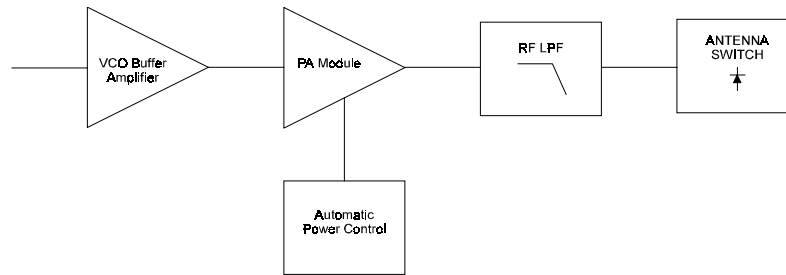


Figure 5-2 - Transmitter Block Diagram

Buffer

The RF output level from the Tx or Rx VCO is -6 dBm. This is amplified to +6 dBm (VHF), and + 10 dBm (UHF) by the buffer amplifier consisting of Q16, Q17 and associated components. Both stages are simple common-emitter amplifiers with resistive biasing and tuned collectors. A pi-type attenuator (R31, 32 and 34) is used between the two stages.

PA module

The PA module consists of a three stage amplifier, Q501, Q502 and Q503. Q501 amplifies the TX signal from the buffer stage, Q17, to 100mW. Q502 amplifies this to 0.5 W. Q503 amplifies this to 5 W. Each stage of amplification features LC matching which provides filtering of the output, in addition a low pass filter is used.

Low pass filter

L7, L8, L11, C72, C73, C74 and C75 form a 7th order Chebyshev low pass filter. Unwanted harmonics are reduced by 70 dB.

Antenna Switch

When transmitting, the diodes D5 and D6 are forward biased, allowing the RF to pass to the antenna. D6 is shorted to ground which makes L13 look open circuit (1/4 wave tuned stub). This prevents the Tx signal from passing to the receiver stage.

In receive, the diodes D5 and D6 are reverse biased. L13 is now in circuit, passing the signal from the antenna to the front end without signal loss.

Automatic power control (APC) circuits

The APC circuit consists of IC3A & B, Q19, Q21, Q22 and associated components. Supply voltage to Q503 (PA) is via R109, the potential difference developed across R109 is amplified by IC3A. IC3A controls Q19 such that the voltage across RV1 is representative of the current drawn by Q503.

High Power

The voltage on the wiper of RV1 is passed to IC3B and compared with the fixed reference voltage developed by the potential divider R45 and R46. The output of IC3B, pin 7, controls Q21 and Q22 to provide supply voltage to the PA driver transistors Q501 and Q502.

A change in PA output will result in an inverse change in driver supply voltage maintaining a constant RF output.

Low Power

Low power is achieved by altering the reference voltage on R45/46 by switching Q34, RV6 and R118 in parallel with R46. When a channel is selected with low power programmed, Q34 is turned on by the CPU. This places RV6 & R118 in parallel with R46, thus decreasing the reference voltage to IC3B pin 5 and causing the output to reduce at pin 7, which in turn reduces the voltage to the driver stages.

5.1.4 Receiver

The receiver comprises:

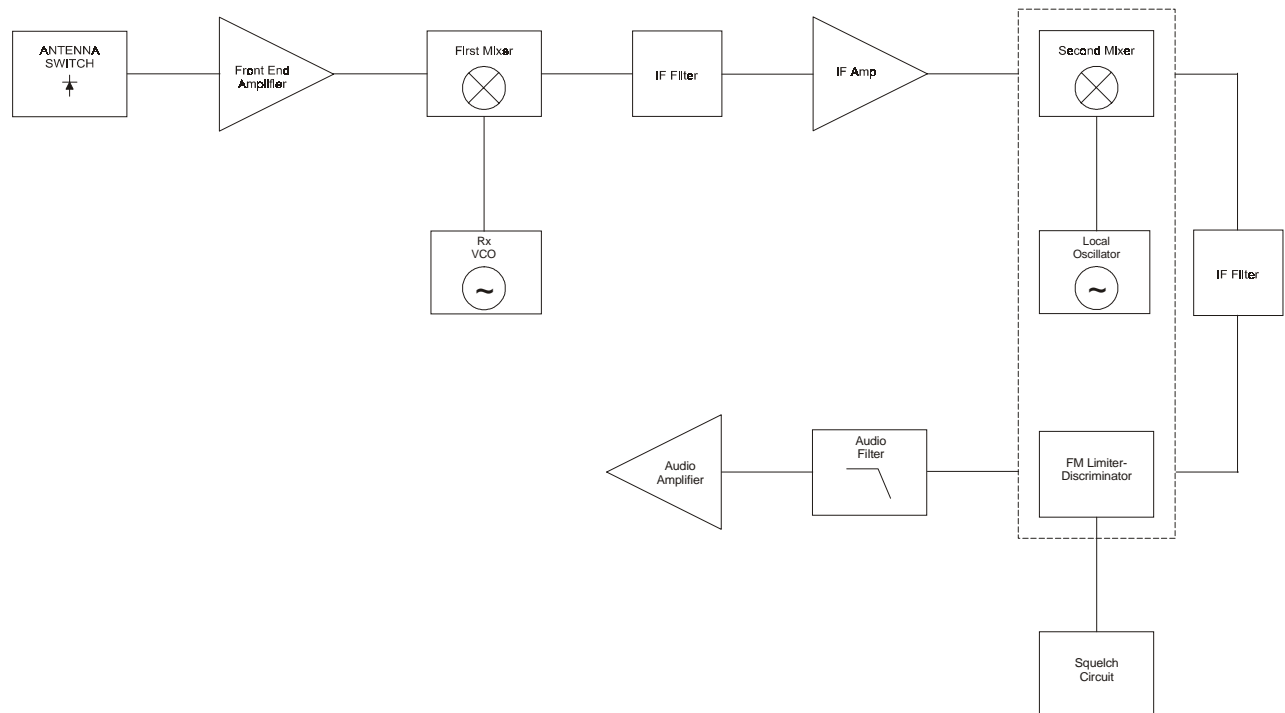


Figure 5-3 - Receiver Block Diagram

Antenna Switch

In receive, the diodes D5 and D6 are reverse biased. L13 is now in circuit, passing the signal from the antenna to the front end without signal loss.

Front End

The receive signal is routed to the RF Front End module, pin 1. It passes through the band pass filter consisting of C608 to C622 / L604 to L607 (VHF) or C601 to C610 / L601 to L603 (UHF).

Diode D601 serves as protection from RF overload from nearby transmitters.

The input signal is coupled to the base of Q601, which serves as an RF amplifier. The output of Q601 is then coupled to a second bandpass filter consisting of C601 to C607 / L601 to L603 (VHF) or C612 to C623 / L604 to L607 (UHF).

The output of the front end module, pin 6, is then coupled to the double-balanced mixer D9 (ND433G).

The receiver front end module is factory pre-tuned and requires no adjustment. Repair is effected by replacement of the entire module.

The modules are:

VHF	136 to 162MHz and 148 MHz to 174 MHz
UHF	400 to 430MHz and 440 MHz to 470 MHz.

First Mixer

D9, T2 and T3 form a double balanced mixer, which provides the 45.1MHz intermediate frequency output. The filtered frequency from the front end module is coupled to T2.

The Local oscillator input from the receive VCO is coupled to T3.

The output of the mixer is taken from the tap on transformer T2 and fed to the single pole diplexer, comprising L15 / C93 and R65 (High-pass terminating filter) and L14 / C92 (Low-pass coupling filter)

The 45.1MHz crystal filter provides a bandwidth of +/-7.2 kHz. This filter provides a high degree of protection from spurious and intermodulation products. Additionally, a 90 MHz trap (C93 / L15) is placed at the filter input.

The output of the filter is coupled by C97 to the base of the post filter IF amplifier Q25.

Second mixer, Second IF, FM detector

The output of the IF amplifier is fed into the narrowband FM IF Integrated Circuit, IC5 (MC3371). This is a single conversion FM receiver which contains the second mixer, second IF amplifier, and FM detector.

The second local oscillator frequency is determined by the crystal X1 connected to pin 1 of IC5. In this case the crystal has a frequency of 44.645MHz. The first IF signal is applied to the mixer and the resultant frequency of 455KHz, is the difference between the IF signal and second local oscillator.

The 455KHz IF signal is output from pin 3 and is applied to a 455KHz band-pass filter, CF1 (20/25 kHz channel spacing) or CF2 (12.5 kHz channel spacing). The selection of the filters is accomplished by diodes D13 (input) and D14 (output) whose bias is controlled by the N/S SW line on the microcontroller (IC409, pin 23).

The microcontroller takes the relevant channel spacing data from the EEPROM. A High on the N/S SW line switches the 455kHz signal to CF1, a low switches the signal to CF2.

The output of the relevant IF filter is passed to pin 5, which is the input to the limiting amplifier.

The output of the limiting amplifier is applied to an adjustable quadrature detector coil T1 (pin 8). The quadrature circuitry provides a 90° phase shift at the IF centre frequency, which enables audio to be recovered. Any detected signal is produced at pin 9 of IC5.

Received Signal Strength Indicator (RSSI)

The RSSI signal is output from IC5 pin 13. DC voltage varies in proportion to the received signal strength. Thermistor TH1 provides temperature compensation.

6 TROUBLESHOOTING

This section includes voltage and troubleshooting charts which should assist the engineer to isolate and repair the fault. Voltage measurements should be made using a high-impedance voltmeter and the values given are with respect to ground.

Symptoms	Causes	Remedy
Unit does not work	<ol style="list-style-type: none"> 1. Incomplete connection 2. Defective DC/DC Converter 3. 5V Voltage Source 4. PLL Error 5. Filtering Error 6. EEPROM fail 	<ol style="list-style-type: none"> 1. Check CON401 connection 2. Check U801 3. Check IC1 (5V +/-0.2V) 4. Check TCXO/VCO/PLL IC 5. Check LPF (IC407) 6. Re-Programming
Bad Rx Sensitivity (-10dB to -60dB)	<ol style="list-style-type: none"> 1. Defective Antenna Switch 2. Defective Front End 3. Defective Mixer 4. IF IC 5. VCO level too low 6. Local Oscillator Frequency 	<ol style="list-style-type: none"> 1. Check D5, D6 2. Check Q601 3. Check D9, T2, T3 4. Replace IC5 5. Rx VCO level 0.2dBm 6. Re-tune TCXO
Defective Rx	<ol style="list-style-type: none"> 1. VCO Frequency error or level 2. Defective Voltage Source 	<ol style="list-style-type: none"> 1. Repair Rx VCO 2. Defective IF IC (IC5) 3. IC1, Q1, Q3
PLL ERROR	<ol style="list-style-type: none"> 1. Defective 12.8MHz TCXO 2. Voltage for Rx/Tx VCOs 3. Defective PLL IC 	<ol style="list-style-type: none"> 1. Replace TCXO 2. Check Rx/Tx VCOs 3. Replace IC2
Low Tx Power	<ol style="list-style-type: none"> 1. APC 	<ol style="list-style-type: none"> 1. Re-adjust RV1
No Tx Power	<ol style="list-style-type: none"> 1. Tx Buffer 2. Power Module 3. APC Control 	<ol style="list-style-type: none"> 1. Check Q16, 17 2. Check Q501, 502, 503 3. Check Q22, D4
No Modulation	<ol style="list-style-type: none"> 1. SW IC & MIC Amp IC 	<ol style="list-style-type: none"> 1. Check U404, 405, 406
No Programming	<ol style="list-style-type: none"> 1. Short Protector Vcc 	<ol style="list-style-type: none"> 1. Defective Programming Lead

Table 6-1 – Troubleshooting Chart

6.1 Voltage Charts

6.1.1 Transistors (Control Circuit)

Ref. No.	B	Rx C	E	B	Tx C	E
Q401	5.0	0	5.0	5.0	0	5.0
Q402	5.0	GND	5.0	5.0	0	5.0
Q403	4.7	0	5.0	4.7	0	5.0
Q404	4.8	0	GND	-	0	GND
Q405	4.6	1.8	1.8	4.6	1.8	1.8
Q406	4.8	0	0	0	5.0	0
Q407	7.5	4.0	7.5	7.5	4.0	7.5
Q408	0	7.5	0	0	7.5	0

Table 6-2 - Control Circuit Transistor Voltages

6.1.2 Transistors (RF Board)

Ref. No.	B	Rx C	E	B	Tx C	E
Q2	4.7	0	5.0	0	4.7	5.0
Q3	0	4.7	5.0	4.7	0	5.0
Q4	0	5.0	5.0	0	5.0	5.0
Q5	5.0	0	5.0	5.0	0	5.0
Q6	4.0	18.0	5.0	4.2	18.0	5.0
Q7	18.0	6.3	18.0	18.0	6.3	18.0
Q8	5.0	0	5.0	5.0	0	5.0
Q11	0	6.3	0	0	6.3	0
Q12	2.0	4.7	1.2	0	0	0
Q13	4.6	4.6	4.0	0	0	0
Q14	0	0	0	4.6	4.6	4.0
Q16	0	0	0	1.6	4.8	0.8
Q17	0	0	0	0.6	3.0	GND
Q18	0	0	0	5.0	0.2	GND
Q19	1.0	7.5	0.5	1.6	7.5	1.0
Q21	0	7.5	0	1.6	6.6	1.2
Q22	7.5	0	7.5	6.8	5.0	7.5
Q25	0.7	4.0	GND	0	0	GND

Table 6-3 - Main Circuit Transistor Voltages

6.1.3 Integrated Circuits (RF Board)

Pin	IC1	IC2	Receive		IC7	IC8
			IC3	IC5		
1	GND	N/C	-	OSC1	-	-
2	GND	5.0	-	OSC2	-	-
3	GND	5.0	-	-	-	-
4	5.0	5.0	-	4.7	-	-
5	GND	5.0	-	3.3	-	-
6	7.5	N/C	-	3.3	-	-
7		GND	-	3.3	-	-
8		N/C	-	4.7	-	-
9		N/C	-	AUDIO	-	-
10		AUDIO	-	N/C	-	-
11		AUDIO	-	N/C	-	-
12		5.0	-	N/C	-	-
13		N/C	-	-	-	-
14		5.0	-	N/C	-	-
15		0	-	GND	-	-
16		0	-	1.8	-	-
17		4.6	-	-	-	-
18		0	-	-	-	-
19		4.7	-	-	-	-
20		OSC1	-	-	-	-

Table 6-4 - Integrated Circuit Voltages (Receive)

Pin	IC1	IC2	Transmit		IC7	IC8
			IC3	IC5		
1	GND	N/C	1.6	-	1.8	0.7
2	GND	5.0	3.0	-	1.8	0.3
3	GND	5.0	3.0	-	1.8	0.3
4	5.0	5.0	GND	-	GND	GND
5	GND	5.0	0.8	-	1.8	1.88
6	7.5	N/C	0.3	-	1.8	1.88
7	-	GND	4.0	-	1.8	1.88
8	-	N/C	5.0	-	5.0	5.0
9	-	N/C	-	-	-	-
10	-	AUDIO	-	-	-	-
11	-	AUDIO	-	-	-	-
12	-	5.0	-	-	-	-
13	-	N/C	-	-	-	-
14	-	5.0	-	-	-	-
15	-	0	-	-	-	-
16	-	5.0	-	-	-	-
17	-	4.6	-	-	-	-
18	-	0	-	-	-	-
19	-	4.7	-	-	-	-
20	-	OSC1	-	-	-	-

Table 6-5 - Integrated Circuit Voltages (Transmit)

6.1.4 Integrated Circuits (Control Board)

Pin	IC402	IC403	Receive		IC406	IC407	IC408
			IC404	IC405			
1	0	1.3	-	-	1.8	AUDIO	-
2	0	0	-	-	1.8	GND	-
3	0.7	5.0	-	-	1.8	AUDIO	-
4	5.0	1.8	-	-	5.0	GND	-
5	GND	2.0	GND	-	AUDIO	AUDIO	-
6	4.7	5.0	0	-	1.8	7.5	-
7	4.7	0.3	GND	-	AUDIO	4.0	-
8	4.7	0	0	AUDIO	-	AUDIO	-
9	-	1.8	AUDIO	-	-	-	-
10	-	AUDIO	1.8	1.8	-	-	-
11	-	AUDIO	-	GND	-	-	-
12	-	GND	0	1.8	-	-	-
13	-	-	0	AUDIO	-	-	-
14	-	-	5.0	AUDIO	-	-	-
15	-	-	-	-	-	-	-
16	-	-	-	-	-	-	-
17	-	-	-	-	-	-	-
18	-	-	-	-	-	-	-
19	-	-	-	-	-	-	-
20	-	-	-	-	-	-	-

Pin	IC401		Receive			Pin	IC401
1	4.63					23	4.7
2	4.63					24	4.7
3	0					25	4.7
4	5.0					26	0
5	0					27	5.0
6	0					28	4.6
7	2.0					29	GND
8	4.6					30	4.6
9	4.6					31	0
10	4.6					32	4.6
11	0					33	0
12	0					34	0
13	0					35	0.9
14	4.6					36	OSC2
15	4.7					37	OSC1
16	N/C					38	7.5
17	GND					39	N/C
18	5.0					40	N/C
19	0					41	4.6
20	0					42	4.6
21	0					43	GND
22	N/C					44	0

Table 6-6 - Integrated Circuit Voltages (Receive)


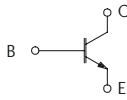
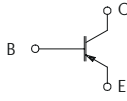
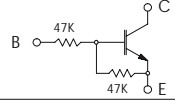
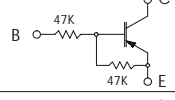
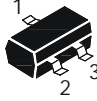
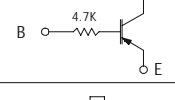




6.1.5 Integrated Circuits (Control Board)


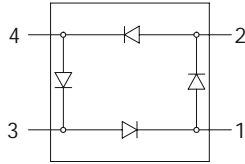

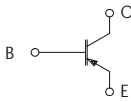
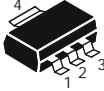
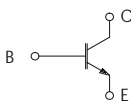
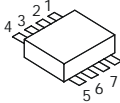







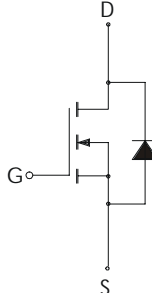
Pin	IC402	IC403	Transmit		IC406	IC407	IC408
			IC404	IC405			
1	0	-	-	AUDIO	1.8	-	-
2	0	-	-	AUDIO	1.8	-	-
3	4.7	-	AUDIO	AUDIO	1.8	-	-
4	5.0	-	AUDIO	5.0	5.0	-	-
5	GND	-	0	AUDIO	-	-	-
6	4.7	-	-	AUDIO	-	-	-
7	4.7	-	GND	AUDIO	-	-	-
8	4.7	-	-	1.8	AUDIO	-	-
9	-	-	-	1.8	AUDIO	-	-
10	-	-	AUDIO	1.8	1.8	-	-
11	-	-	AUDIO	GND	GND	-	-
12	-	-	4.6	0	AUDIO	-	-
13	-	-	-	1.8	AUDIO	-	-
14	-	-	-	1.8	-	-	-
15	-	-	-	-	-	-	-
16	-	-	-	-	-	-	-
17	-	-	-	-	-	-	-
18	-	-	-	-	-	-	-
19	-	-	-	-	-	-	-
20	-	-	-	-	-	-	-

Pin	IC401		Transmit			Pin	IC401
1	0					23	4.7
2	0					24	4.7
3	4.6					25	4.7
4	5.0					26	0
5	0					27	5.0
6	0					28	4.6
7	4.6					29	GND
8	4.6					30	4.6
9	4.6					31	0
10	0					32	4.6
11	0					33	0
12	0					34	0
13	4.6					35	0
14	0.4					36	OSC2
15	0.4					37	OSC1
16	N/C					38	4.6
17	GND					39	N/C
18	5.0					40	N/C
19	0					41	4.6
20	0					42	4.6
21	4.7					43	GND
22	0					44	0

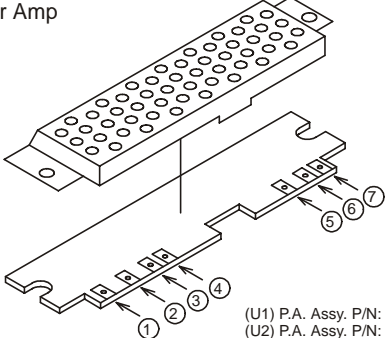
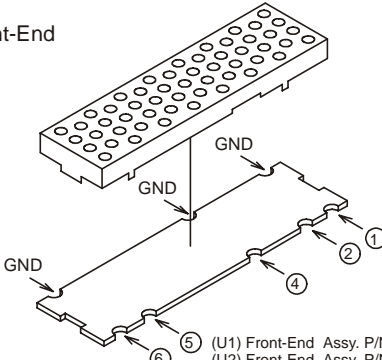
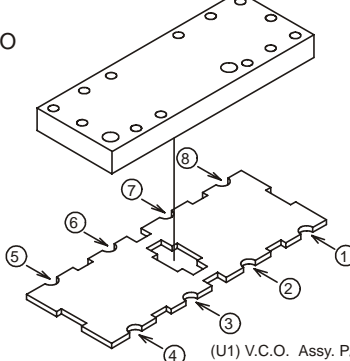
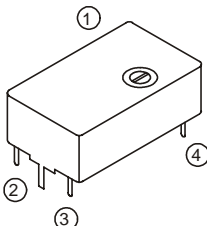
Table 6-7 - Integrated Circuit Voltages (Transmit)

Component Pinouts

BASE DIAGRAM	MANUFACTURER'S PART NUMBER	REFERENCE NO.	SCHEMATIC
	2SC5084	Q202,203,302,303	
	MMBR951	Q16,17,501,601	
	BFR92A	Q12,25	
	KTC3875S (ALG)	Q6,11,13,14,19,21	
	KTC4075	Q901,903,904,905	
	KTA2014	Q902	
	KTA1504S (ASG)	Q7,8,407	
	KRC104S (ND)	Q18,31,32,34, Q404,406,408	
	KRA104S (PD)	Q5,401,402,403,405	
	KRA110S (NK)	Q2,3,4	
	KDS181 (A3)	D13,14	
	KDS193 (F3)	D12,406	
	KDS226 (C3)	D903,904	
	MMBD101 MMBV3401 (4D)	D4,5,6	
	Zener 5.6V	D401,402,403,404,405 D407,408,409,410	

BASE DIAGRAM	MANUFACTURER'S PART NUMBER	REFERENCE NO.	SCHEMATIC
	HSMS2817	D9	
 1.BASE 2.COLLECTOR 3.EMITTER	KTA1663	Q22	
 1.EMITTER 2.BASE 3.EMITTER 4.COLLECTOR	BFG35 BLT50	Q502	
 1,4,5,8:EMITTER 2,3:BASE 6,7:COLLECTOR	BLT52	Q503	
	1SV229 1SV217	D201,202,301	
	KDS160	D801	
	MMBR140T3	D802	
	UPP9401	D5,6	
	SI4412	Q801,802	

BASE DIAGRAM	MANUFACTURER'S PART NUMBER	REFERENCE NO.	IC'S
	MC68HC705C8FB	U401	CPU IC
	MC14519IF	IC2	PLL IC
	LTC1435	U801	DC/DC Convertor
 1:VCC 2:GND 3:OUTPUT 4:GND	KIA7042P/F	U408	Voltage Regulator
	LM339	U403	Comparator
	MC14066	U404	Analog SW IC
	LM324	U405,406	OP AMP
	LM358	IC3,7	OP AMP
	AT93C56-10S1	U402	EEPROM
	LM386	U407	Audio AMP
	TL062	IC8	OP AMP
	MC3371DR2	IC5	IF IC
	KT11450	IC1	

BASE DIAGRAM	PIN DESCRIPTION
<p>RF Power Amp</p>  <p>(U1) P.A. Assy. P/N: 650-230-0017 (U2) P.A. Assy. P/N: 650-230-0016 (V2) P.A. Assy. P/N: 650-230-0012</p>	<p>No Description</p> <p>① Input ② GND ③ Vcc (Pre Drive) ④ Vcc Control (Drive) ⑤ Vcc (Final) ⑥ Output ⑦ GND</p>
<p>RX Front-End</p>  <p>(U1) Front-End Assy. P/N: 650-110-0019 (U2) Front-End Assy. P/N: 650-110-0017 (V2) Front-End Assy. P/N: 650-110-0012</p>	<p>① Input ② GND ④ B+(4V) ⑤ GND ⑥ Output</p>
<p>RX/TX VCO</p>  <p>(U1) V.C.O. Assy. P/N: 650-030-0026 (U2) V.C.O. Assy. P/N: 650-030-0023 (V2) V.C.O. Assy. P/N: 650-030-0025</p>	<p>① NC ② RX Streering ③ TX Modulation ④ TX Streering ⑤ TX Vcc ⑥ TX Out ⑦ RX Vcc ⑧ TX Out</p>
<p>12.8 MHz TCXO</p>  <p>TCXO Assy. P/N: 650-100-0002</p>	<p>① Modulation ② GND ③ Out ④ Vcc (5V)</p>

7 PROGRAMMING

Please refer to ME820062 – SD125 Programming Manual for details of loading the software.

7.1 Introduction

7.1.1 Keyboard

On each menu, Commands or Parameters may be selected. The Up/Down keys are used to highlight the desired Command or Parameter and the ENTER key is used to select. Menu items can also be selected by pressing the “Hot-Key” or highlighted number associated with the desired command parameter.

7.1.2 Help Screens

Help screens, where available, can be accessed by pressing the ‘F1’ Function Key.

7.1.3 Menus and Displays

The ACC-900 programming software enables the user to set up and modify various programmable features of the SD-125 radio. This is done through the use of user-friendly menus that appear on the video display. There are four main menu pages:

- A. Model Selection Menu
- B. Set Up and Select Data Source Menu
- C. Programming Menu
- D. Select Features Menu

The programming system can be run from either a hard drive or from a floppy disk. Ensure that the programmer is connected properly. Perform one of the following two options to start the programming procedure.

7.2 Operating from a floppy disk

At the DOS prompt, type the disk drive letter, followed by a colon (:) and a backslash (\) and the word ACC900. For example your screen might look like;

```
C:\>A:\ACC900
```

From Windows 3.x: From the File Manager, select File\Run and type A:\ACC900 (or whichever drive is appropriate).

From Windows 95: Click on the Start button, select Run and type A:\ACC900 (or whichever drive is appropriate).

Press ENTER.

Note: When the ACC-900 is run from a floppy drive, unless specified, the parameters will be saved on the same floppy from which the program was run. See the “Set Path to Data Files” section under “Using The Programmer” chapter for more information.

7.3 Operating from a hard disk

7.3.1 DOS

Boot the system in the normal fashion and perform the following procedure:

1. At the command prompt, type CD and a backslash (\) and the word ACC900 (or the directory where the software is located). For example the screen might look like:

```
C:\ACC900\ACC900
```

7.3.2 Microsoft Windows

Note: The following are guidelines that should be used when ACC-900 is to be used under Microsoft Windows. Refer to the Microsoft Windows manual for more details.

The ACC-900 programmer will also run from Microsoft Windows. If an icon is being used, use the Windows pick tool to select the ACC-900 icon and double click it to launch the application. If the RUN command is being used type the following:

From Windows 3.x: From the File Manager, select File\Run and type C:\ACC900\ACC900 (or whichever drive is appropriate).

From Windows 95: Click on the Start button, select Run and type C:\ACC900\ACC900 (or whichever drive is appropriate).

Press ENTER.

7.4 Radio Model Menu

The "Radio Model" menu will appear as the initial menu, which will be similar to the diagram shown below. Using the UP/DOWN arrow keys, select the radio model, as shown in the diagram below. Press the ENTER key (the radio model may also be selected by using the appropriate Hot-Key).

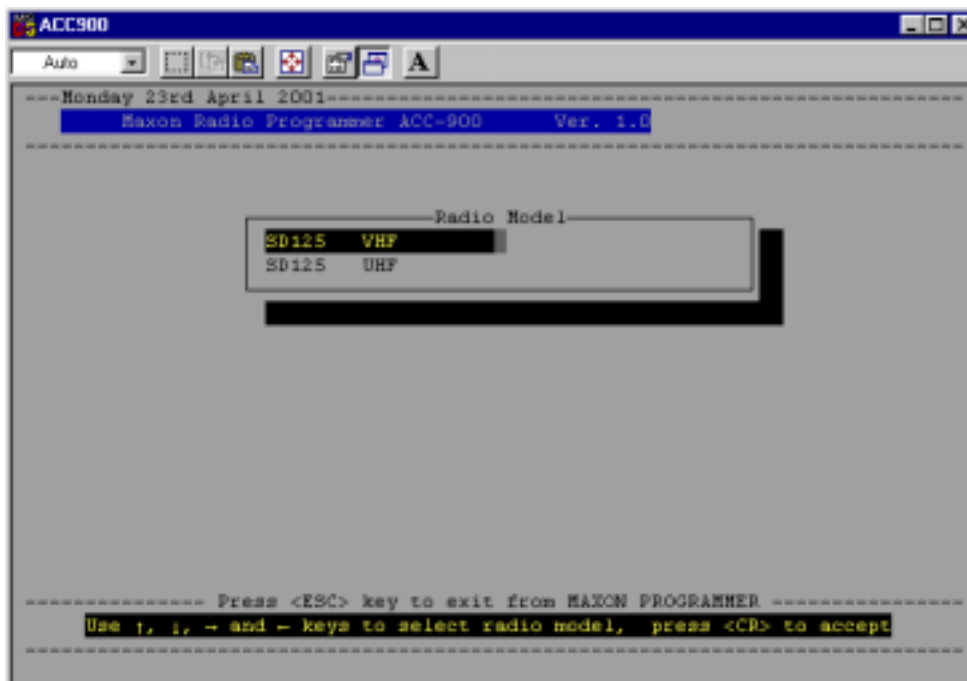


Figure 7-1 – Radio Model Menu

7.5 Set-up & Select Data Source

The “Set-up & Select Data Source” menu will appear after the radio model has been selected. This menu will resemble the diagram shown below.

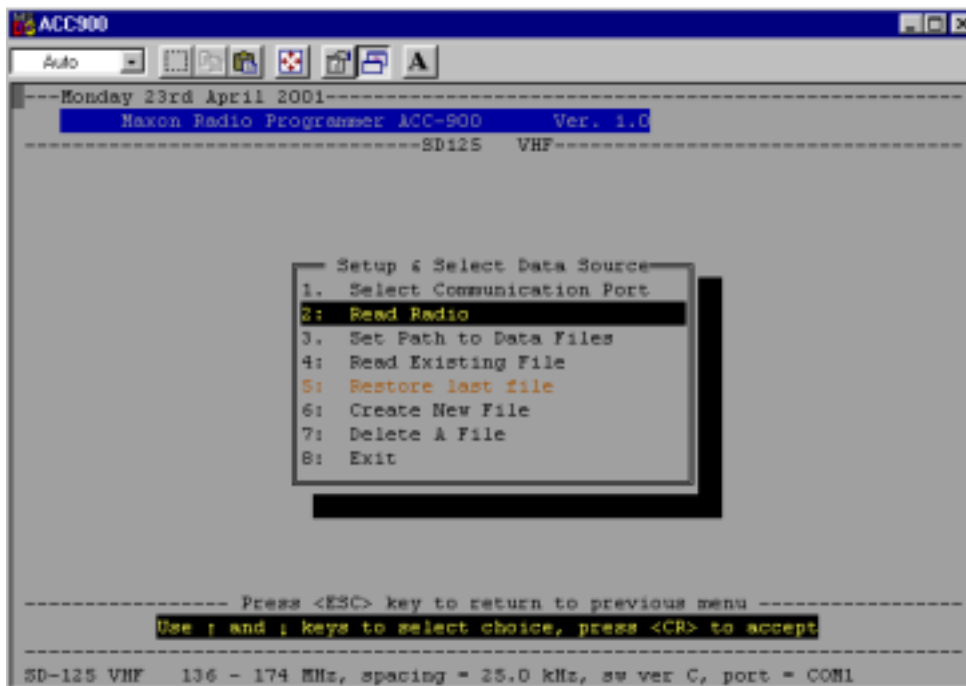


Figure 7-2 – Main Selection Menu

7.6 Selecting Communication Ports

1. Using the UP/DOWN arrow keys, select “1. Select Communication Port” from the menu and press the ENTER key (the option may also be selected by using the appropriate Hot Key). The screen that you see now should resemble the picture below:

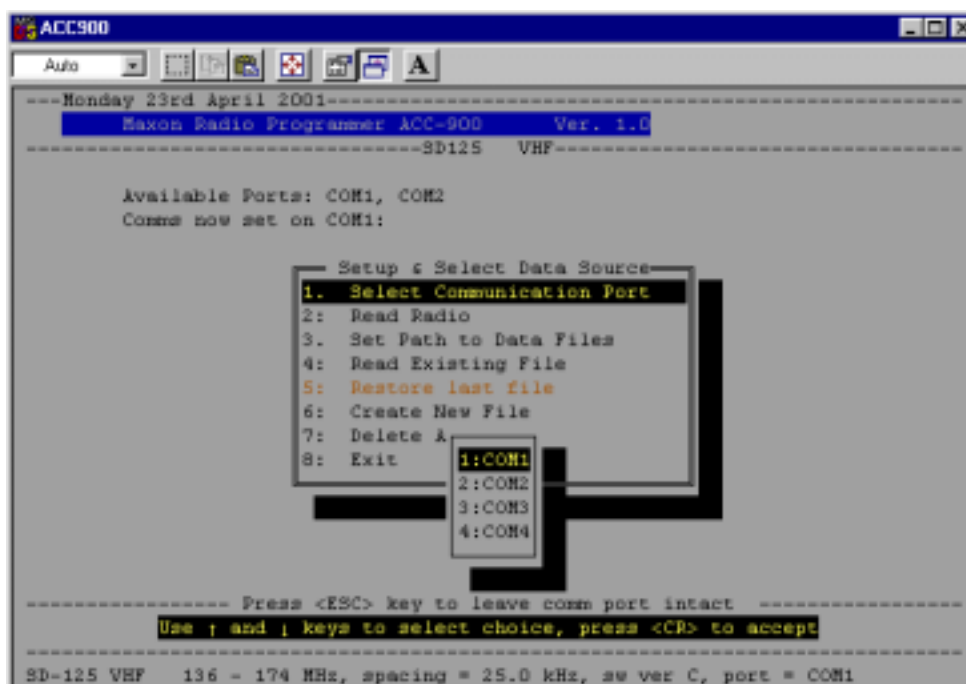


Figure 7-3 – Setting Communication Ports

- Using the UP/DOWN arrow keys, select an available Serial Communications Port. Press the ENTER key.

Note: ACC-900 will use the same serial communications port until a different one is selected. The program remembers which COM port was used last, so the COM port will not have to be selected each time the program is run.

7.7 Read Radio

Programming parameters may be retrieved from two different data sources. The first data source is to read from a radio that has already been programmed. Using the UP/DOWN arrow keys, highlight the "2. Read Radio" option, then press ENTER (the option may also be selected by using the appropriate Hot Key). The following prompt will appear on the page:

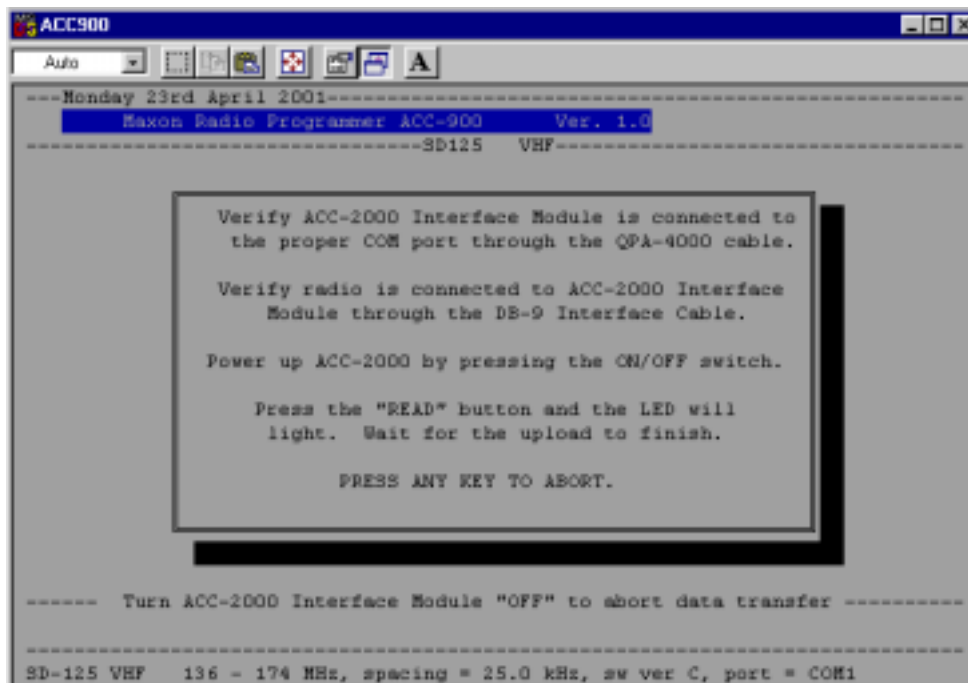


Figure 7-4 – Reading Radio

Follow the instructions shown in Figure 6-4, then push and hold the "Read" button on the PB-SD125 Interface Box until the LED glows red and then release the button. The approximate wait time is 10 to 15 seconds before data is downloaded from the SD-125 to the computer.

The screen will go blank and then the downloaded data will appear.

Note: If the Programming Cable is not connected properly or is connected to the wrong part, an error message will appear.

7.8 Set Path to Data Files

If the Data Files are not to be stored in the same directory or on the same disk as the program files use this choice to specify the location (you must type in the full path) in which they are to be stored. The path entered using this screen will become the default path for future programming until it is changed.

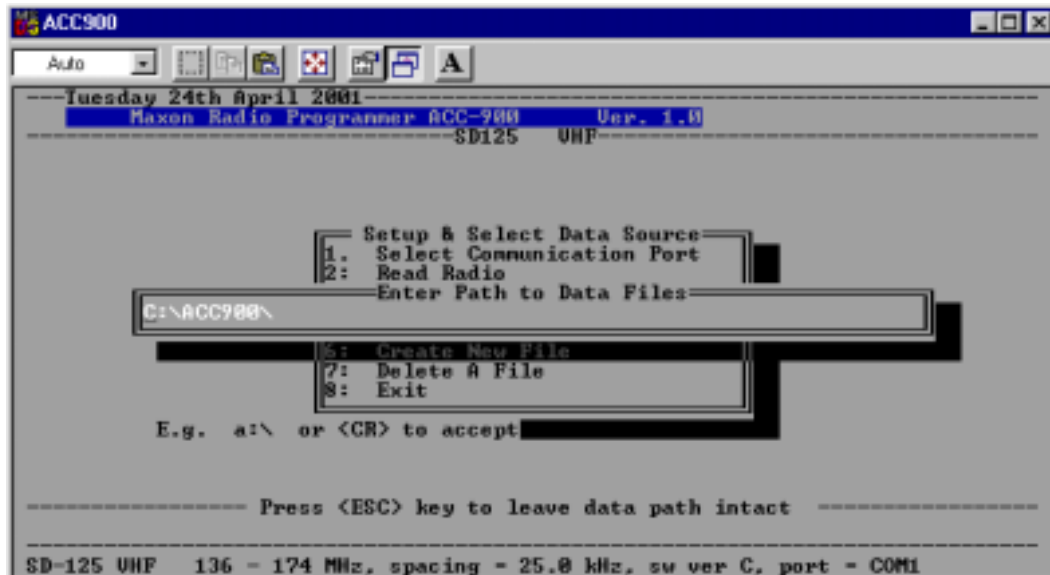


Figure 7-5 – Setting the Data Path

To alter type in the required location, i.e. C:.....

7.9 Read Existing File

This option allows the programmer to recall a file that has been saved in order to program additional radios or modify that file. When selected, this option will produce a list of all of the files for the current radio model being used and place them in the path set in the previous command. If no files are present, a screen will display “No personality files found!!!” and the programmer will return to the Set-up & Select Data Source menu after selecting any key.

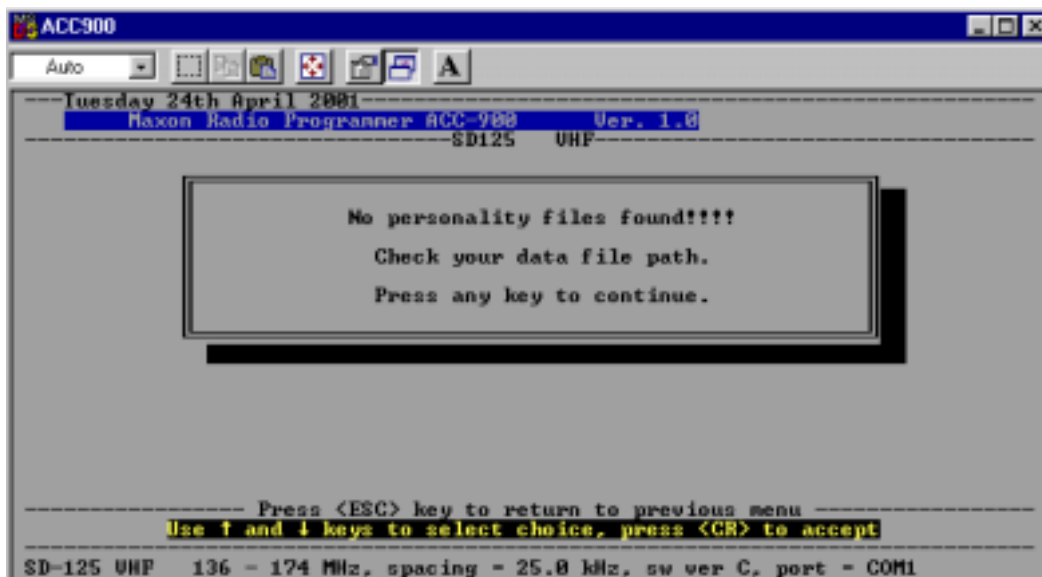


Figure 7-6 – Reading Existing Files

7.10 Restore last file

This option allows the user to restore the last file that was worked on. This option will come in handy if you accidentally exit the Programming Parameters menu without saving your channel data to a file. If the "Restore Last File" option is greyed out, you will not be able to use it, because you have either switched radio models or have not used the Programming Parameters menu for the current radio model.

7.11 Create New File

Using the UP/DOWN arrow keys, select the "6. Create New File" from the menu and press the ENTER key (the option may also be selected by using the appropriate Hot Key). The appropriate programming parameter menu will appear depending on the radio model that you have selected. Refer to "Programming Parameters Menu" section to enter all the necessary channel parameters and to download programming data from the computer to the SD-125.

Press the right arrow key to choose the "Select Features" menu. From the "Select Features" menu choose "Program/Print/Save" then choose "Program Radio" from the sub-menu and then follow the instructions displayed on the monitor to program the SD-125.

Press and hold the "WRITE" button on the PB-SD125 Interface Box until the red LED lights and then release the button. The approximate wait time is 10 to 15 seconds before data is downloaded from the SD-125 to the computer.

Note: Press the "ON/OFF" button on the PB-SD125 Module to reset every time you attempt to READ from or WRITE to the SD-125. Then ensure that the button is in the "ON" position.

7.12 Delete a File

This option allows you to delete an existing data file. When selected, this option will produce a list of all of the files located in the path that has been previously set. Once a file is selected, a warning screen will display the name of the file to be deleted and offer two options:

1. Using the UP/DOWN arrow keys, select "1. Delete This File" option and press the ENTER key to delete the file (the option may also be selected by using the appropriate Hot Key).
2. Using the UP/DOWN arrow keys, select "2. Don't Delete This File" option and press the ENTER key to abort deleting the file (the option may also be selected by using the appropriate Hot Key).

The program will then return to the "Set-up & Select Data Source" menu.

7.13 Exit

Using the UP/DOWN arrow keys, select "8. Exit" option and press the ENTER key (the option may also be selected by using the appropriate Hot Key). The ACC900 programmer will be terminated and return to the DOS prompt.

7.14 Programming Parameters Menu

7.14.1 Changing Programming Parameters

After the programmer has retrieved programming parameters or created a new file, the parameters may be changed. Up to 16 channels can be programmed into the SD-125. However, depending upon the channel dipswitch setting, each channel will activate accordingly. Default setting of the channel dipswitch is Channel 1. An example of a typical Programming Parameters Menu is shown below.

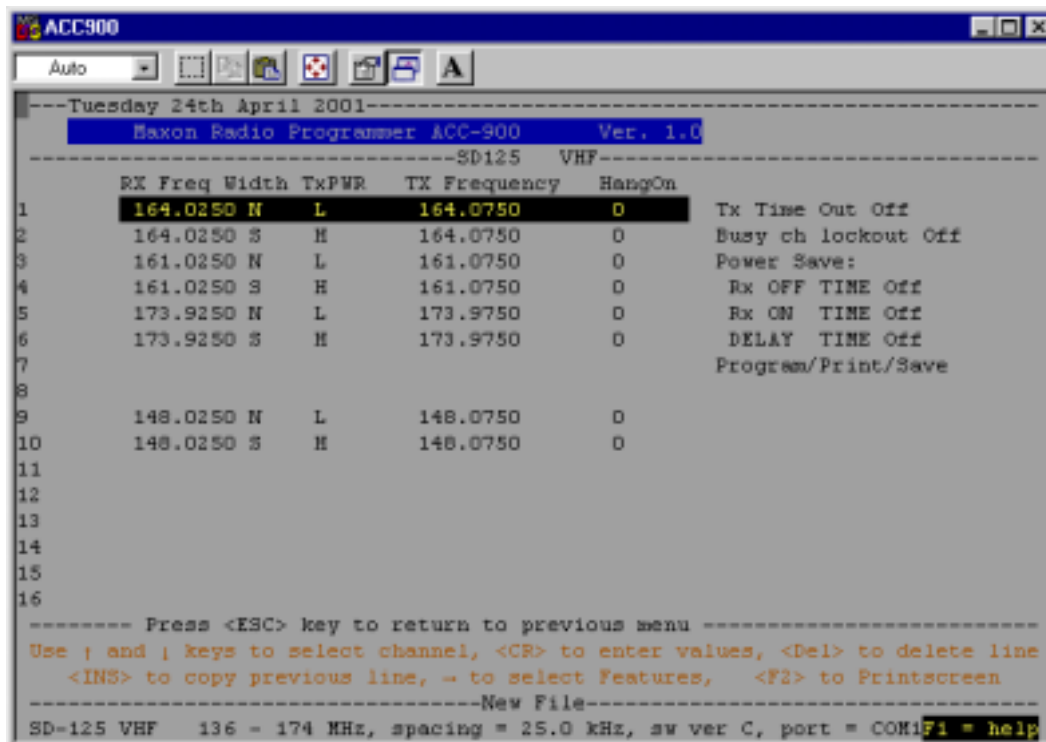


Figure 7-7 – Main Program Parameters

“Rx Freq.” Is the receiver frequency. Please refer to the radio specification for the appropriate model before programming the radio.

“Width” is the channel spacing. Use the UP/DOWN arrow key to select W/N (25kHz / 12.5kHz).

“TxPWR” is the transmitter output power. Use the UP/DOWN arrow key to select H/L (5W / 1W).

“Tx Frequency” is the transmitter frequency. Please refer to the radio specification for the appropriate model before programming the radio.

“HangOn” will allow the radio to remain in transmit for up to five seconds after initial transmission. This allows the radio the opportunity to ensure that all of the data has been transmitted. It is suggested that this parameter is set to the default setting of “0” for optimal performance.

“Tx Time Out”: Enter the required time out for Tx (the recommended value is 60 seconds). The use of this feature is a practical way to prevent permanent Tx, in the case of an application software problem which results in the PTT line being held permanently active.

“Busy Ch lockout”: This feature set up depends upon the application.

“Power Save”: This feature can be used to reduce power consumption and would usually be used when operating from a battery. This feature includes three different sub-feature set-ups. Please use this carefully as it can result in missed messages. It may also affect the Rx to Tx turn around time. Suggested values are:

Rx Off Time 100mS (0.1S)
 Rx On Time 40mS (0.04S)
 Delay Time 1 second

ACC-900 provides a hard copy printout. Please disregard the scanning feature at the bottom of the printout. Due to continuous research and development, this feature is not currently available.

7.15 Program/Print/Save

When all of the required channel and radio operating parameters have been entered or changed the information may be programmed into the radio by pressing 1, printed to whatever device is connected to LPT1 by pressing 3 or saved to a file by pressing 4. Option 5 will return to the Select Features box. Option 2 will write to the radio and then read back.

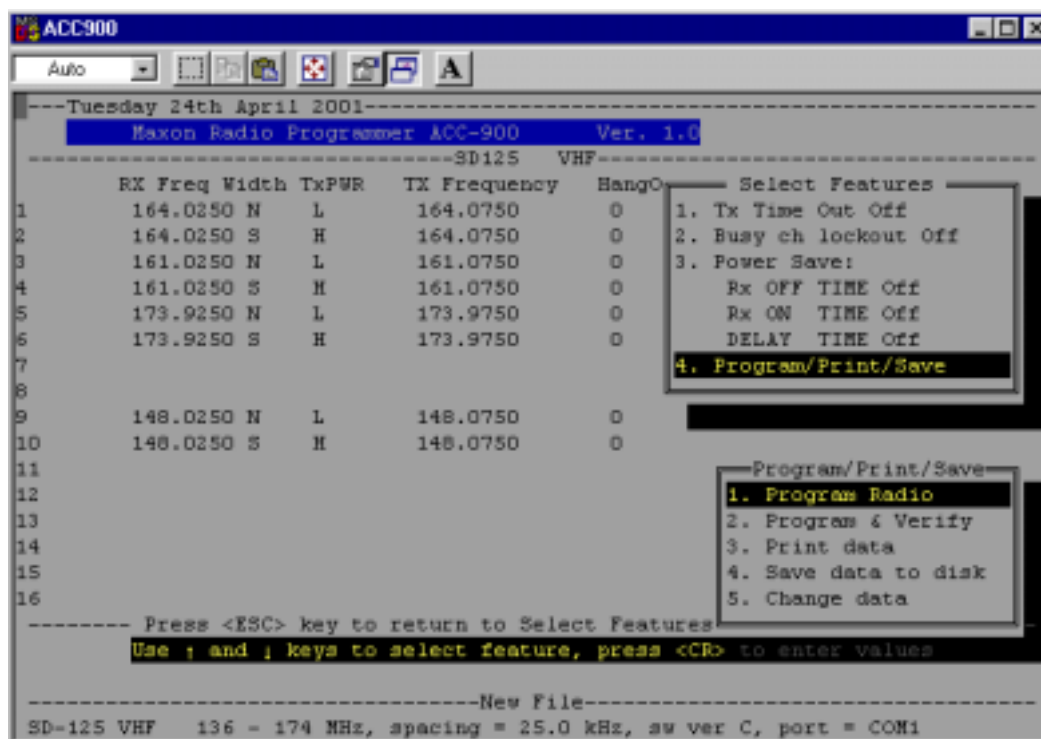


Figure 7-8 – Programming Menu

7.16 Squelch setting using the PB-SD125 Interface Box

Squelch is set on the SD-125 under software control using the PB-SD125 Interface Box.

The RSSI line from the demodulator is A/D converted and fed to the microprocessor. The microprocessor controls the mute.

The default setting for the squelch level on the SD-125 is set at approximately:

Open -113 to -114dBm (0.45 to 0.5 μ V Rx signal strength)

Close: -116 to -117dBm (0.3 to 0.35 μ V Rx signal strength)

Changing the default squelch setting requires the use of the PB-SD125 Interface Box plus, at minimum, a RF Signal Generator. A Radio Communication Test Set is recommended.

To adjust the squelch, proceed as follows:

1. Apply power to the PB-SD125 Interface Box.
2. Hook up the SD125 to the PB-SD125 via the DB-9 Interface connector.
3. Connect a BNC cable from the antenna socket on the SD125 to the RF input port on the signal generator.
4. With the PB-SD125 switched off, simultaneously press and hold both the "ON/OFF" and "WRITE" buttons down.
5. Release the "ON/OFF" button first followed by the "WRITE" button. The LED indicator on the box will flash twice. The LED will stay illuminated if in the receiving mode, or off if the radio is in the standby mode.
6. Adjust the RF signal generator for the desired signal strength to OPEN the squelch (around -113dBm).
7. Press and release the "READ" button. The LED indicator will flash three times and then stay on.
8. Adjust the RF signal generator for the desired signal strength to CLOSE the squelch (-116dBm).
9. Press and release the "READ" button. The LED indicator will flash once and then remain off.
10. Press and release the "WRITE" button. The LED indicator will flash twice.
11. The squelch level is now set. The squelch setting can be checked by increasing and decreasing the RF signal generator.

8 PARTS LISTS

8.1 Parts List

The following pages detail the mechanical and electronic parts for the Maxon SD125 Data Radio.

When ordering individual components, please refer to the detailed parts lists that follow. You will notice that each part number has been allocated a category: A, B or C. The definitions of these categories are as follows:

A = An item which is manufactured by Maxon Korea and can be ordered as a stock item.

B = An item which is manufactured in the Far East and can be ordered as a stock item.

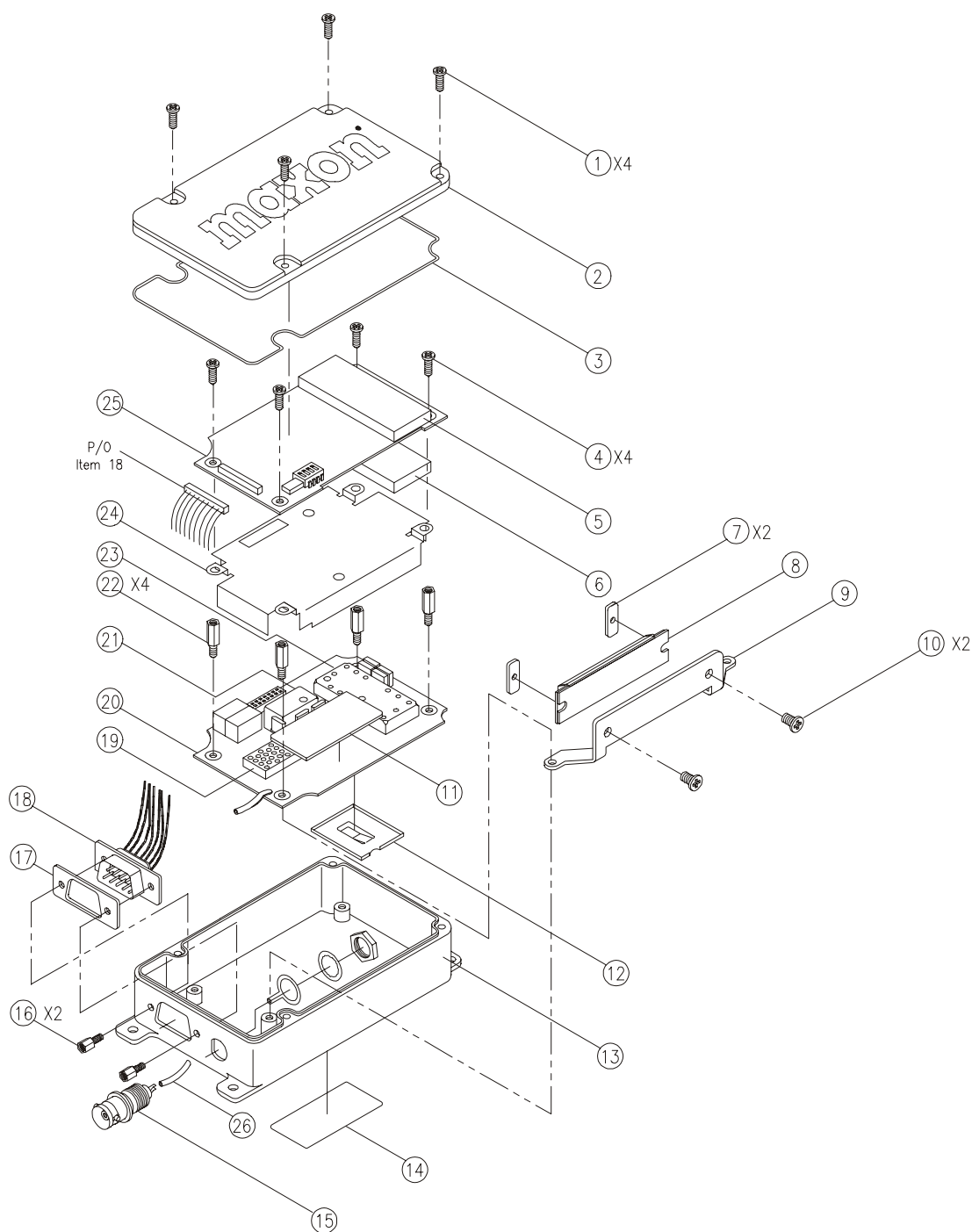
C = An item which may be sourced locally and is therefore not available as a stock item.

H = An item which is only available as part of an assembly (see table below) and is therefore not available as a stock item.

8.2 Spare Parts

Category	Code & Part No.	Description	Qty	Location
A		Digital PCB (assembled)	1	
A		U2 RF PCB (assembled)	1	
A		V2 RF PCB (assembled)	1	
B	0751036	10k variable resistor	1	RV1, RV6
B	2634180	44.545MHz crystal	1	X1
A	2690148	TCXO Module	1	
B	2700070Z	455kHz ceramic filter	1	CF2
B	2700278Z	455kHz ceramic filter	1	CF1
B	2710723	45.1MHz crystal filter pair	1	XF1 / XF2
			(pair)	
B	3117439	12uH chip inductor	1	L801
B	3117594	3u3 chip inductor	1	L802
B	3210796	Quad IFT Coil 455kHz	1	T1
B	4207450	BNC Connector	1	
B	4210368	15 way SMD Connector	1	
B	4211507	18 way PCB socket	1	CON403
B	4211788	18 way PCB Plug	1	CON403
B	4311830	DIP Switch	1	SW401
B	505012	9 way D connector assembly	1	
A	593529	P.A. Module (148-174MHz)	1	
A	593530	P.A. Module (400-430MHz)	1	
A	593531	P.A. Module (440-470MHz)	1	
A	593533	Front-End Module (148-174MHz)	1	
A	593534	Front-End Module (400-430MHz)	1	
A	593535	Front-End Module (440-470MHz)	1	
A	593537	VCO Module (148-174MHz)	1	
A	593538	VCO Module (400-430MHz)	1	
A	593539	VCO Module (440-470MHz)	1	
B	611290	M2 x 6 screw	4	
B	613323	M3 x 8 screw	4	
A	718458	Shield Plate	1	
A	719574	Upper Cover (lid)	1	
A	719575	Lower Cover (box)	1	
A	723671	Bracket	1	
A	772295A	PA Shield Can	1	
B	853166A	Hexagonal Post	4	

8.3 Mechanical Parts



BNC CONNECTOR (ITEM 15) INCLUDES ALL NECESSARY HARDWARE TO MOUNT CONNECTOR.

8.3.1 Mechanical Parts List

Category	Code & Part No.	Description	Qty	Location
	613323	M3 x 8 screw	4	1
	719574	Upper Cover (lid)	1	2
	895189	Gasket	1	3
	611290	M2 x 6 screw	1	4
	723671	Bracket	2	7
	593530	P.A. Module (400-430MHz)	1	8
	593531	P.A. Module (440-470MHz)	1	8
	593529	P.A. Module (148-174MHz)	1	8
	772363A	Shield	1	12
	719575	Bottom Cover (box)	1	13
	4207450	BNC Connector	1	15
	895157	Gasket	1	17
	503012	D-Sub 9 connector	1	18
	593534	Front-End Module (400-430MHz)	1	19
	593535	Front-End Module (440-470MHz)	1	19
	593533	Front-End Module (148-174MHz)	1	19
	2690148	TCXO Module	1	21
	853166A	M2 x 6 stand-off	4	22
	593538	VCO Module (400-430MHz)	1	23
	593539	VCO Module (440-470MHz)	1	23
	593537	VCO Module (148-174MHz)	1	23
	718458	Shield Plate	1	24
	4274158	Coax Cable	1	26

8.4 SD125 U2 Parts

Category	Code & Part No.	Description	Qty	Location
	544-04S-C	SHIELD COVER ASS'Y	1	
	718-458	COVER SHIELD BSP T0.25 NI-PLAT	1	
	906-542	INSULATION PLATE FIBER T0.3	1	

8.4.1 TCXO

Category	Code & Part No.	Description	Qty	Location
	544-04T-CXO	TCXO ASS'Y(LMR)	1	
	544-04T-B	TCXO BOARD ASS'Y	1	
	175-010-6	CHIP TRIMMER 5-20PF TSW-S3-180	1	TC701
	263-020-3	CRYSTAL HC49T 12.8M -30 10PM 20P OSC FUND	1	X701
	860-129	PIN CU & 1.1X13(101-01)	5	
	894-785	RUBBER CAP SILICONE RUBBER HS50' GRAY	1	
	894-787	SILICONE RUBBER HS50' GRAY	1	
	544-04T-BS	TCXO B'D SMD ASS'Y	1	
C	05B-222-9Z	CHIP RESISTOR 2.2K 1/16W 5% T 1608	3	R710.714.715
C	05B-393-0Z	CHIP RESISTOR 39K 1/16W 5% T 1608	2	R709.712
C	05B-472-8Z	CHIP RESISTOR 4.7K 1/16W 5% T 1608	1	R711
C	05B-473-9Z	CHIP RESISTOR 47K 1/16W 5% T 1608	5	R705.706.707.708.713
C	098-103-7	THERMISTOR CHIP 10K NTCCS32163NH103KC	1	TH701
C	098-333-8	THERMISTOR CHIP 33K NTCCS32163SH333KC	1	TH702
C	098-502-4	THERMISTOR CHIP 150K NTCCS32164CH154KC	1	TH703
C	131-093-9Z	CHIP CERAMIC 100PF CM105 CG 101J 50V AT	3	C701.702.705
C	131-835-3Z	CHIP CERAMIC 180PF CM105 CG 181J 50V AT	1	C704
C	132-260-8Z	CHIP CERAMIC 220PF CM105 CG 221J 50V AT	1	C706
C	139-103-5Y	CHIP CERAMIC 91PF GRM39 COG910J 50V PT	1	C703
B	203-109-3	TRANSISTOR LMMBT9426CLT1 (SOT-23)	2	Q701.702
B	242-010-3	DIODE VARICAP MMBV105G	1	D701
B	242-011-4	DIODE VARICAP MMBV109	1	D702

C	416-981-C 544-04T-S	P.C.B TCXO 19 X11 X1.0 FR4 1/1 TCXO SELECTION ASS'Y SELECT ON TEST RESISTOR	1	R701.702.703. 704
			1	
			4	

8.4.2 General

Category	Code & Part No.	Description	Qty	Location
	565-49C-A	COVER ASS'Y	1	
	421-036-8	CONNECTOR PLUG UG-1094/U(F)	1	CON2
	427-415-8	WIRE COAXIAL SHD-60503	1	CABLE1
	505-012	15P+9P D-SUB ASS'Y SHD-7B03	1	CON1
	611-290	(+)MACHINE SCREW(BH) M2.6X6 (+)BH NI-PLAT	4	FOR POST + DIG PCB MTG
	613-323	(+)MACHINE SCREW(BH) M3X8 (+)BH NI-PLAT	4	FOR COVER MTG
	719-574	COVER UPPER ALDC12	1	
	719-575	COVER BOTTOM ALDC12	1	
	853-166-A	POST BSBM NI-PLATE	4	
	895-157	GASKET NEOPRENE 3M4262 DM-2000	1	
	895-189	GASKET(SP-2850C) 0.4&X1.2&X260 SILI.RUBB BLK	0.3	m
	959-823	LABEL CLEAR POLYESTER 40X21	1	
	565-49C-A1	COVER ASS'Y	1	CT09
	959-046-AA	LABEL NAME POLYESTER 39.5X20.5	1	
	565-49C-A2	COVER ASS'Y	1	CT37
	959-046-B	LABEL NAME POLYESTER 39.5X20.5	1	

8.4.3 Channel Spacing

Category	Code & Part No.	Description	Qty	Location
	565-49C-SA2	CH SPACING ASS'Y	1	
	263-208-7	CRYSTAL HC-45 44.645M -30 15PM 32P RX 3RD	1	X1
	270-007-0Z	FILTER CERAMIC LT455HT	1	CF2
	270-027-8Z	FILTER CERAMIC LT-455FW	1	CF1
	271-072-3	CRYSTAL FILTER KFN1045AA(45.1M) (BMO-U)	1	XF1

8.4.4 DC to DC Converter

Category	Code & Part No.	Description	Qty	Location
	565-49D-DC	DC TO DC CONVER.ASSY	1	
C	05B-222-9Z	CHIP RESISTOR 2.2K 1/16W 5% T 1608	2	R901.902
C	05B-273-5Z	CHIP RESISTOR 27K 1/16W 5% T 1608	2	R905.907
C	05B-470-6Z	CHIP RESISTOR 47 1/16W 5% T 1608	1	R908
C	05B-471-7Z	CHIP RESISTOR 470 1/16W 5% T 1608	1	R909
C	05B-472-8Z	CHIP RESISTOR 4.7K 1/16W 5% T 1608	1	R903
C	05B-752-1Z	CHIP RESISTOR 7.5K 1/16W 5% T 1608	2	R904.906
C	130-A73-6Y	CHIP CERAMIC 0.01UF GRM39 X7R103K 25V	5	C901.902.904.907. 909
C	132-260-8Y	CHIP CERAMIC 220PF GRM39 COG221J 50V PT	1	C906
C	136-839-2Y	CHIP CERAMIC 68PF GRM39 COG680J 50V PT	1	C905
B	200-113-1	TRANSISTOR KTC4075	4	Q901.903.904.905
B	200-114-2	TRANSISTOR KTA2014 (MAX-900K)	1	Q902
B	243-049-4Z	DIODE CHIP KDS226	2	D903.904
	772-403	SHIELD CAN(FORCOVER)NSP T0.3	1	

8.4.5 Digital PCB

Category	Code & Part No.	Description	Qty	Location
	565-49D-PM	DIGITAL PCB MAN.ASSY	1	
	421-178-8	CONNECTOR GDH2-18DBCW-A	1	CON403
	565-49D-PS	DIGITAL PCB SMD ASSY	1	
C	05B-000-5Z	CHIP RESISTOR 0 1/16W 5% T 1608	3	R485.(LK2.10)
C	05B-100-2Z	CHIP RESISTOR 10 1/16W 5% T 1608	1	R490
C	05B-101-3Z	CHIP RESISTOR 100 1/16W 5% T 1608	5	R446.474.475.476. 477
C	05B-102-4Z	CHIP RESISTOR 1K 1/16W 5% T 1608	5	R423.481.482.483. 484
C	05B-103-5Z	CHIP RESISTOR 10K 1/16W 5% T 1608	27	R403,7,15,6,7,8,9, 21,2,4,5,6,8,35,7,4 0,7,54,60,1,5,8,78, 87,8,9.801

Digital PCB continued

Category	Code & Part No.	Description	Qty	Location
C	05B-104-6Z	CHIP RESISTOR 100K 1/16W 5% T 1608	14	R409,11,4,45,51,2,8,69,70,80,92,3,4,5
C	05B-105-7Z	CHIP RESISTOR 1M 1/16W 5% T 1608	2	R430.448
C	05B-124-4Z	CHIP RESISTOR 120K 1/16W 5% T 1608	1	R472
C	05B-184-8Z	CHIP RESISTOR 180K 1/16W 5% T 1608	1	R413
C	05B-203-2Z	CHIP RESISTOR 20K 1/16W 5% T 1608	2	R449.806
C	05B-222-9Z	CHIP RESISTOR 2.2K 1/16W 5% T 1608	1	R438
C	05B-223-0Z	CHIP RESISTOR 22K 1/16W 5% T 1608	3	R406.455.457
C	05B-224-1Z	CHIP RESISTOR 220K 1/16W 5% T 1608	2	R410.471
C	05B-332-5Z	CHIP RESISTOR 3.3K 1/16W 5% T 1608	1	R412
C	05B-333-6Z	CHIP RESISTOR 33K 1/16W 5% T 1608	1	R450
C	05B-363-3	CHIP RESISTOR 36K 1/16W 5% T 1608	1	R802
C	05B-471-7Z	CHIP RESISTOR 470 1/16W 5% T 1608	1	R456
C	05B-472-8Z	CHIP RESISTOR 4.7K 1/16W 5% T 1608	4	R433.434.436.439
C	05B-473-9Z	CHIP RESISTOR 47K 1/16W 5% T 1608	11	R404,29,31,2,41,2,3,4,64,6,7
C	05B-563-7Z	CHIP RESISTOR 56K 1/16W 5% T 1608	1	R491
C	05B-683-2Z	CHIP RESISTOR 68K 1/16W 5% T 1608	2	R473.486
C	05B-912-9Z	CHIP RESISTOR 9.1K 1/16W 5% T 1608	1	R420
C	05C-683-2Z	CHIP RESISTOR 68K 1/16W 1% T 1608	1	R805
C	059-000-0Z	CHIP RESISTOR 0 1/8W 5% T 3216	1	R496
C	06B-018-9	CHIP RESISTOR 0.033 1/10W 1% T 2012	1	R804
C	060-000-8Z	CHIP RESISTOR 0 1/10W 5% T 2012	2	RV402.404
C	060-185-2Z	CHIP RESISTOR 1.8M 1/10W 5% T 2012	1	R463
C	075-223-1	RES.CHIP TRIMMER 22K RH03E1CJ4X	1	RV403
C	130-A48-4Y	CHIP CERAMIC 0.0015UF GRM39 X7R152K 50V PT	1	C413
C	130-A73-6Y	CHIP CERAMIC 0.01UF GRM39 X7R103K 25V	2	C451.810
C	130-A74-7Y	CHIP CERAMIC 0.1UF GRM39 Y5V104Z 25V PT	2	C404,7,16,7,22,36,50,3,63,4.802,8
C	130-A75-8Y	CHIP CERAMIC 0.001UF GRM39 X7R102K 50V PT	5	C402,29,30,1,2,3,4,41,2,3,4,5,6,9,52
C	130-250-9	CHIP CERAMIC 0.0027UF GRM39 X7R272J 50V PT	2	C411.466
C	130-261-9Y	CHIP CERAMIC 0.022UF GRM39 X7R223K 50V PT	2	C403.406
C	130-333-1Y	CHIP CERAMIC 0.0039UF GRM39 X7R392K 50V PT	1	C414
C	130-340-7Y	CHIP CERAMIC 0.0033UF GRM39 X7R332K 50V PT	1	C465
C	130-432-7Y	CHIP CERAMIC 0.0047UF GRM39 X7R472K 50V PT	1	C412
C	130-440-4Y	CHIP CERAMIC 0.047UF GRM39 Y5V473Z 25V PT	3	C409.423.426
C	130-517-1Y	CHIP CERAMIC 0.0056UF GRM39 X7R562K 50V PT	1	C410
C	131-089-7Y	CHIP CERAMIC 1UF GRM40 Y5V105Z 16V PT	1	C401
C	131-093-9Y	CHIP CERAMIC 100PF GRM39 COG101J 50V PT	3	C805.806.812
C	133-350-1Y	CHIP CERAMIC 330PF GRM39 COG331J 50V PT	1	C803
C	133-930-5Y	CHIP CERAMIC 39PF GRM39 COG390J 50V PT	2	C437.438
C	134-757-1Y	CHIP CERAMIC 47PF GRM39 COG470J 50V PT	5	C405.408.415.458.459
C	134-770-2Y	CHIP CERAMIC 470PF GRM39 X7R471K 50V PT	1	C424
C	135-107-9Y	CHIP CERAMIC 51PF GRM39 COG510J 50V PT	2	C801.804
C	141-052-5Z	100UF 293D107X0006E2T6V	1	C427
C	141-059-2	CHIP TANTALUM 10UF 293D106X06R3A2T6.3V	3	C425.440.460
C	141-060-2	CHIP TANTALUM 1UF 293D105X0025A2T25V	2	C439.461
C	141-067-6	CHIP TANTALUM 100UF TA-016TCMS101M-ER 16V	2	C811.815
C	143-320-7Y	CHIP TANTALUM 33UF TSM1E336DSSB 25V	2	C447.807
C	144-722-2Z	CHIP TANTALUM 4.7UF 293D475X0010A2T10V	6	C435.454.455.456.457.813
C	144-729-8Z	CHIP TANTALUM 47UF 293D476X0016E2T16V	1	C428
B	200-190-0	FET MOS SI4412DY	2	Q801.802
B	202-095-8Z	TRANSISTOR KRC104SND	3	Q404.406.408
B	202-106-5	TRANSISTOR KTA1504SY (SOT-23)	1	Q407
B	218-057-7Z	TRANSISTOR KRA104S	4	Q401.402.403.405
B	221-114-3	I.C DC/DC CONVERTOR LTC1435CS (SO-16)	1	U801
B	222-018-5A	I.C. KIA324F-EL (SL70WU-IC)	2	U405.406
B	222-023-9A	I.C DETECTOR KIA7042F (SOT89) (CP-701)	1	U408
B	223-157-2	I.C LM339	1	U403

Digital PCB Continued

Category	Code & Part No.	Description	Qty	Location
B	223-224-9	I.C MC14066BDR2 (SO-14) (TP-4800)	1	U404
B	223-277-7A	I.C OTP MC68HC705C8FB (CP7100M)	1	U401
B	229-463-8A	I.C EEPROM AT93C56-10SI (SO-08) (SP-2850)	1	U402
B	231-038-1	I.C LM386MX-1 (SO-08)	1	U407
B	241-179-8	DIODE ZENER CHIP Z02W5.6Y 5.6V 0.2W (SOT-23)	9	D401-405.407-410
B	243-052-6	DIODE SI CHIP KDS193	1	D406
B	243-104-0	DIODE	1	D801
B	243-127-1	DIODE SCHOTTKY MBRS140T3 (403A-03)	1	D802
	270-160-4	RESONATOR CERAMIC CSAC3.58MGC	1	X401
C	311-743-9	COIL INDUCTOR 12UH A814AY-120M=P3	1	L801
C	311-759-4	COIL INDUCTOR CHIP 3.3UH 636CY-3R3M=P3	1	L802
	416-078-A	P.C.B DIGITAL 85 X48.5 X1.2 FR4 1/1	1	
	421-160-6	CONNECTOR 53261-1590	1	CON401
	431-183-0	SW DIP KSD-04	1	SW401
	565-49F-U1S	FRONT-END U1 BAND AS	1	
C	05B-101-3Z	CHIP RESISTOR 100 1/16W 5% T 1608	1	R602
C	05B-563-7Z	CHIP RESISTOR 56K 1/16W 5% T 1608	1	R601
C	131-092-8Y	CHIP CERAMIC 10PF GRM39 COG100D 50V PT	1	C606
C	131-105-7Y	CHIP CERAMIC 11PF GRM39 COG110J 50V PT	5	C601.602.603.616.619
C	131-405-8Y	CHIP CERAMIC 14PF GRM39 COG140J 50V PT	5	C604.608.617.620.621
C	131-563-7Y	CHIP CERAMIC 1.5PF GRM39 COG1R5C 50V PT	1	C624
C	131-564-8Y	CHIP CERAMIC 15PF GRM39 COG150J 50V PT	1	C615
C	132-025-3Y	CHIP CERAMIC 20PF GRM39 COG200J 50V PT	2	C614.623
C	132-410-7Y	CHIP CERAMIC 24PF GRM39 COG240J 50V PT	1	C622
C	133-349-1Y	CHIP CERAMIC 33PF GRM39 COG330J 50V PT	2	C610.613
C	134-757-1Y	CHIP CERAMIC 47PF GRM39 COG470J 50V PT	1	C609
C	134-772-4Y	CHIP CERAMIC 470PF GRM39 COG471J 50V PT	1	C612
C	136-014-3Y	CHIP CERAMIC 6PF GRM39 COG060D 50V PT	1	C618
C	137-013-7Y	CHIP CERAMIC 7PF GRM39 COG070D 50V PT	1	C605
B	200-067-3	TRANSISTOR 2SC5084-O	1	Q601
B	243-049-4Z	DIODE CHIP KDS226	1	D601
	310-913-1	COIL SPRING 1.0X0.45X4T:R(SMD)	7	L601-L607
	4A6-082-A	P.C.B ASS'Y 135 X120.8X0.8 FR4 1/1	1	
	406-733	P.C.B SUB 22.86X12.7 X1.0 FR4 1/1 SEA700	1	
	406-762-A	P.C.B PWR 52 X16 X0.8 FR4 1/1	1	
	406-763-A	P.C.B FRONT-END 40.5 X11.9 X0.8 FR4 1/1	1	

8.4.6 Front End U2 Band Assembly

Category	Code & Part No.	Description	Qty	Location
	565-49F-U2S	FRONT-END U2 BAND ASS	1	
C	05B-101-3Z	CHIP RESISTOR 100 1/16W 5% T 1608	1	R602
C	05B-563-7Z	CHIP RESISTOR 56K 1/16W 5% T 1608	1	R601
C	131-092-8Y	CHIP CERAMIC 10PF GRM39 COG100D 50V PT	1	C601
C	131-105-7Y	CHIP CERAMIC 11PF GRM39 COG110J 50V PT	1	C602
C	131-604-1Y	CHIP CERAMIC 16PF GRM39 COG160J 50V PT	1	C607
C	131-834-2Y	CHIP CERAMIC 18PF GRM39 COG180J 50V PT	2	C609.622
C	132-025-3Y	CHIP CERAMIC 20PF GRM39 COG200J 50V PT	1	C604
C	132-259-8Y	CHIP CERAMIC 22PF GRM39 COG220J 50V PT	1	C623
C	132-410-7Y	CHIP CERAMIC 24PF GRM39 COG240J 50V PT	1	C608
C	133-348-0Y	CHIP CERAMIC 3.3PF GRM39 COG3R3C 50V PT	1	C614
C	133-349-1Y	CHIP CERAMIC 33PF GRM39 COG330J 50V PT	2	C610.621
C	134-012-1Y	CHIP CERAMIC 4PF GRM39 COG040C 50V PT	2	C617.624
C	134-770-2Y	CHIP CERAMIC 470PF GRM39 X7R471K 50V PT	1	C612
C	135-631-5Y	CHIP CERAMIC 5.6PF GRM39 COG5R6C 50V PT	1	C613
C	136-014-3Y	CHIP CERAMIC 6PF GRM39 COG060D 50V PT	1	C619
C	137-013-7Y	CHIP CERAMIC 7PF GRM39 COG070D 50V PT	6	C603.605.606.615.616.618
B	200-067-3	TRANSISTOR 2SC5084-O	1	Q601
B	243-049-4	DIODE SI CHIP KDS226 (SOT-23)	1	D601

U2 Front End Assembly continued

Category	Code & Part No.	Description	Qty	Location
	310-913-1	COIL SPRING 1.0X0.45X4T:R(SMD)	7	L601-607
	4A6-082-A	P.C.B ASS'Y 135 X120.8X0.8 FR4 1/1	1	
	406-733	P.C.B SUB 22.86X12.7 X1.0 FR4 1/1 SEA700	1	
	406-762-A	P.C.B PWR 52 X16 X0.8 FR4 1/1	1	
	406-763-A	P.C.B FRONT-END 40.5 X11.9 X0.8 FR4 1/1	1	

8.4.7 U1 Low Pass Filter Assembly

Category	Code & Part No.	Description	Qty	Location
	565-49L-FU1	LPF U1 BAND PASS	1	
C	131-030-2Y	CHIP CERAMIC 1PF GRM40 COG010C 50V PT	1	C76
C	131-816-6Y	CHIP CERAMIC 18PF GRM40 COG180J 50V PT	1	C74
C	134-007-7Y	CHIP CERAMIC 4PF GRM40 COG040C 50V PT	1	C75
C	137-013-7Y	CHIP CERAMIC 7PF GRM39 COG070D 50V PT	1	C83
C	139-003-8Y	CHIP CERAMIC 9PF GRM40 COG090D 50V PT	1	C73
	311-167-9	COIL SPRING 1X0.35X7T:R	1	L13
	311-301-3	COIL SPRING 2X0.75X3T:L SMD	3	L7.8.11

8.4.8 U2 Low Pass Filter Assembly

Category	Code & Part No.	Description	Qty	Location
	565-49L-FU2	LPF U2 BAND PASS	1	
C	131-030-2Y	CHIP CERAMIC 1PF GRM40 COG010C 50V PT	1	C76
C	131-039-1Y	CHIP CERAMIC 10PF GRM40 COG100C 50V PT	1	C73
C	131-603-0	CHIP CERAMIC 16PF GRM40 COG160J 50V PT	1	C74
C	135-010-4Y	CHIP CERAMIC 5PF GRM40 COG050C 50V PT	1	C75
C	137-013-7Y	CHIP CERAMIC 7PF GRM39 COG070D 50V PT	1	C83
	311-167-9	COIL SPRING 1X0.35X7T:R	1	L13
	311-301-3	COIL SPRING 2X0.75X3T:L SMD	3	L7.8.11
	565-49P-A	PACKING ASS'Y	1	

8.4.9 U1 Power Module

Category	Code & Part No.	Description	Qty	Location
	565-49P-OU1	U1 BAND PWR MODU.ASS	1	
C	060-220-0Z	CHIP RESISTOR 22 1/10W 5% T 2012	1	R506
C	060-222-2Z	CHIP RESISTOR 2.2K 1/10W 5% T 2012	1	R504
C	060-272-7Z	CHIP RESISTOR 2.7K 1/10W 5% T 2012	1	R501
C	060-330-6Z	CHIP RESISTOR 33 1/10W 5% T 2012	1	R505
C	060-689-5Z	CHIP RESISTOR 6.8 1/10W 5% T 2012	1	R503
C	060-822-4Z	CHIP RESISTOR 8.2K 1/10W 5% T 2012	1	R502
C	130-A17-6Y	CHIP CERAMIC 0.001UF GRM40 X7R102K 50V PT	1	C511
C	131-103-5Y	CHIP CERAMIC 11PF GRM40 COG110J 50V PT	1	C502
C	131-511-0Y	CHIP CERAMIC 15PF GRM40 COG150J 50V PT	1	C501
C	131-816-6Y	CHIP CERAMIC 18PF GRM40 COG180J 50V PT	1	C514
C	132-012-1Y	CHIP CERAMIC 20PF GRM40 COG200J 50V PT	1	C507
C	132-220-2Y	CHIP CERAMIC 220PF GRM40 COG221J 50V PT	4	C500.503.506.512
C	132-714-2Y	CHIP CERAMIC 27PF GRM40 COG270J 50V PT	1	C505
C	133-014-8Y	CHIP CERAMIC 3PF GRM40 COG030C 50V PT	1	C513
C	133-306-2Y	CHIP CERAMIC 33PF GRM40 COG330J 50V PT	1	C508
C	133-611-7Y	CHIP CERAMIC 36PF GRM40 COG360J 50V PT	1	C515
C	136-833-6Y	CHIP CERAMIC 6.8PF GRM40 COG6R8D 50V PT	1	C504
B	200-115-3	TRANSISTOR BLT52 (SOT409)	1	Q503
B	200-116-4	TRANSISTOR BLT50 (SOT223)	1	Q502
B	203-181-7	TRANSISTOR MMBR951 (SOT-23)	1	Q501
B	243-063-6	DIODE SWITCHING KDS181SA3	1	D501
	310-913-1	COIL SPRING 1.0X0.45X4T:R(SMD)	1	L501
	311-080-3	COIL CHIP 1.2UH:NL252018T-1R2J	2	L502.504
	311-167-9	COIL SPRING 1X0.35X7T:R	2	L503.505

8.4.10 U2 Power Module

Category	Code & Part No.	Description	Qty	Location
	565-49P-OU2	U2 BAND PWR MODU.ASS	1	
C	060-220-0Z	CHIP RESISTOR 22 1/10W 5% T 2012	1	R506
C	060-222-2Z	CHIP RESISTOR 2.2K 1/10W 5% T 2012	1	R504
C	060-272-7Z	CHIP RESISTOR 2.7K 1/10W 5% T 2012	1	R501
C	060-620-8Z	CHIP RESISTOR 62 1/10W 5% T 2012	1	R505
C	060-689-5Z	CHIP RESISTOR 6.8 1/10W 5% T 2012	1	R503
C	060-822-4Z	CHIP RESISTOR 8.2K 1/10W 5% T 2012	1	R502
C	130-A17-6Y	CHIP CERAMIC 0.001UF GRM40 X7R102K 50V PT	1	C511
C	131-404-7Y	CHIP CERAMIC 14PF GRM40 COG140J 50V PT	1	C514
C	132-012-1Y	CHIP CERAMIC 20PF GRM40 COG200J 50V PT	1	C505
C	132-216-9Y	CHIP CERAMIC 22PF GRM40 COG220J 50V PT	2	C501.507
C	132-220-2Y	CHIP CERAMIC 220PF GRM40 COG221J 50V PT	4	C500.503.506.512
C	133-306-2Y	CHIP CERAMIC 33PF GRM40 COG330J 50V PT	1	C509
C	134-007-7Y	CHIP CERAMIC 4PF GRM40 COG040C 50V PT	1	C513
C	134-301-1Y	CHIP CERAMIC 43PF GRM40 COG430J 50V PT	1	C515
C	136-816-5Y	CHIP CERAMIC 68PF GRM40 COG680J 50V PT	1	C508
C	137-007-1Y	CHIP CERAMIC 7PF GRM40 COG070D 50V PT	1	C504
C	138-004-4Y	CHIP CERAMIC 8PF GRM40 COG080D 50V PT	1	C502
B	200-115-3	TRANSISTOR BLT52 (SOT409)	1	Q503
B	200-116-4	TRANSISTOR BLT50 (SOT223)	1	Q502
B	203-181-7	TRANSISTOR MMBR951 (SOT-23)	1	Q501
B	243-063-6	DIODE SWITCHING KDS181SA3	1	D501
	310-913-1	COIL SPRING 1.0X0.45X4T:R(SMD)	1	L501
	311-080-3	COIL CHIP 1.2UH:NL252018T-1R2J	2	L502.504
	311-167-9	COIL SPRING 1X0.35X7T:R	2	L503.505
	612-284	(+)MACHINE SCREW(FH)M2X6 (+)FH ZN-PLAT	2	
	723-671	BRACKET SPC T1 ZN-PLAT	2	
	761-783	HEAT SINK CUP T1.0 SN-PLATING (SP-120V)	1	
	761-787	HEAT SINK AL PLATE T2	1	
	772-295-A	SHIELD CAN NSP T0.2 (SP-120V)	1	

Category	Code & Part No.	Description	Qty	Location
	565-49R-CA	RF CIRCUIT ASS'Y	1	
C	05B-000-5Z	CHIP RESISTOR 0 1/16W 5% T 1608	4	R36.49.116.129
C	05B-100-2Z	CHIP RESISTOR 10 1/16W 5% T 1608	1	R79
C	05B-101-3Z	CHIP RESISTOR 100 1/16W 5% T 1608	7	R11.15.23.41.66.9 7.124
C	05B-102-4Z	CHIP RESISTOR 1K 1/16W 5% T 1608	3	R54.71.94
C	05B-103-5Z	CHIP RESISTOR 10K 1/16W 5% T 1608	8	R1.43.53.76.98.103.1 04.111
C	05B-104-6Z	CHIP RESISTOR 100K 1/16W 5% T 1608	1	R2
C	05B-105-7Z	CHIP RESISTOR 1M 1/16W 5% T 1608	1	R50
C	05B-121-1Z	CHIP RESISTOR 120 1/16W 5% T 1608	1	R56
C	05B-122-2Z	CHIP RESISTOR 1.2K 1/16W 5% T 1608	2	R37.77
C	05B-123-3Z	CHIP RESISTOR 12K 1/16W 5% T 1608	3	R17.42.45
C	05B-152-9Z	CHIP RESISTOR 1.5K 1/16W 5% T 1608	1	R55
C	05B-180-4Z	CHIP RESISTOR 18 1/16W 5% T 1608	2	R26.34
C	05B-182-6Z	CHIP RESISTOR 1.8K 1/16W 5% T 1608	3	R4.5.7
C	05B-183-7Z	CHIP RESISTOR 18K 1/16W 5% T 1608	1	R75
C	05B-202-1Z	CHIP RESISTOR 2K 1/16W 5% T 1608	1	R6
C	05B-203-2Z	CHIP RESISTOR 20K 1/16W 5% T 1608	1	R83
C	05B-220-7Z	CHIP RESISTOR 22 1/16W 5% T 1608	1	R64
C	05B-221-8Z	CHIP RESISTOR 220 1/16W 5% T 1608	1	R28
C	05B-222-9Z	CHIP RESISTOR 2.2K 1/16W 5% T 1608	2	R3.46
C	05B-223-0Z	CHIP RESISTOR 22K 1/16W 5% T 1608	6	R74.78.102.105.10 6.112
C	05B-272-4Z	CHIP RESISTOR 2.7K 1/16W 5% T 1608	2	R13.14
C	05B-301-7Z	CHIP RESISTOR 300 1/16W 5% T 1608	2	R31.32
C	05B-330-3Z	CHIP RESISTOR 33 1/16W 5% T 1608	1	R21

RF PCB Continued

Category	Code & Part No.	Description	Qty	Location
C	05B-331-4Z	CHIP RESISTOR 330 1/16W 5% T 1608	1	R110
C	05B-332-5Z	CHIP RESISTOR 3.3K 1/16W 5% T 1608	1	R52
C	05B-333-6Z	CHIP RESISTOR 33K 1/16W 5% T 1608	1	R82
C	05B-390-7Z	CHIP RESISTOR 39 1/16W 5% T 1608	1	R59
C	05B-393-0Z	CHIP RESISTOR 39K 1/16W 5% T 1608	1	R96
C	05B-470-6Z	CHIP RESISTOR 47 1/16W 5% T 1608	1	R125
C	05B-472-8Z	CHIP RESISTOR 4.7K 1/16W 5% T 1608	3	R22.25.27
C	05B-473-9Z	CHIP RESISTOR 47K 1/16W 5% T 1608	1	R115
C	05B-474-0Z	CHIP RESISTOR 470K 1/16W 5% T 1608	4	R58.69.70.72
C	05B-475-1Z	CHIP RESISTOR 4.7M 1/16W 5% T 1608	1	R92
C	05B-510-9Z	CHIP RESISTOR 51 1/16W 5% T 1608	1	R65
C	05B-562-6Z	CHIP RESISTOR 5.6K 1/16W 5% T 1608	3	R12.24.35
C	05B-563-7Z	CHIP RESISTOR 56K 1/16W 5% T 1608	1	R108
C	05B-681-0Z	CHIP RESISTOR 680 1/16W 5% T 1608	1	R118
C	05B-682-1Z	CHIP RESISTOR 6.8K 1/16W 5% T 1608	1	R33
C	05B-684-3Z	CHIP RESISTOR 680K 1/16W 5% T 1608	1	R68
C	05B-823-2Z	CHIP RESISTOR 82K 1/16W 5% T 1608	1	R95
C	05C-104-6Z	CHIP RESISTOR 100K 1/16W 1% T 1608	2	R57.99
C	05C-683-2Z	CHIP RESISTOR 68K 1/16W 1% T 1608	2	R61.100
C	06F-108-3	CHIP RESISTOR 0.1 1W 1% 1218	1	R109
C	060-229-9Z	CHIP RESISTOR 2.2 1/10W 5% T 2012	3	R47.48.51
C	060-911-1Z	CHIP RESISTOR 910 1/10W 5% T 2012	2	R8.16
C	075-103-6	RES.CHIP TRIMMER 10K RH03E1CJ4X	2	RV1.6
C	075-104-7	RES.CHIP TRIMMER 100K RH03E1CJ5X	1	RV2
C	075-473-0	RES.CHIP TRIMMER 47K RH03E1CS4X	1	RV3
C	101-058-9R	ELECT CAPACITOR 10UF 16V 20% 3X5 5.0PT	1	C129
C	130-A60-4Y	CHIP CERAMIC 0.1UF GRM40 X7R104K 25V PT	3	C79.124.125
C	130-A73-6Y	CHIP CERAMIC 0.01UF GRM39 X7R103K 25V	7	C13.63.96.122.123 .126.127
C	130-A74-7Y	CHIP CERAMIC 0.1UF GRM39 Y5V104Z 25V PT	6	C11.15.17.26.88.1 33
C	130-A75-8Y	CHIP CERAMIC 0.001UF GRM39 X7R102K 50V PT	4	C18.98.102.131
C	130-443-7	CHIP CERAMIC 0.47UF GRM40 Y5V474Z 16V PT	1	C59
C	131-089-7Y	CHIP CERAMIC 1UF GRM40 Y5V105Z 16V PT	4	C25.44.53.94
C	131-240-5Y	CHIP CERAMIC 12PF GRM39 COG120J 50V PT	1	C50
C	131-511-0Y	CHIP CERAMIC 15PF GRM40 COG150J 50V PT	1	C38
C	132-024-2Y	CHIP CERAMIC 2PF GRM39 COG020C 50V PT	1	C16
C	132-025-3Y	CHIP CERAMIC 20PF GRM39 COG200J 50V PT	1	C121
C	132-260-8Y	CHIP CERAMIC 220PF GRM39 COG221J 50V PT	5	C19.34.45.47.54
C	132-410-7Y	CHIP CERAMIC 24PF GRM39 COG240J 50V PT	1	C92
C	132-714-2Y	CHIP CERAMIC 27PF GRM40 COG270J 50V PT	1	C42
C	133-102-4Y	CHIP CERAMIC 3PF GRM39 COG030C 50V PT	1	C46
C	133-103-5Y	CHIP CERAMIC 30PF GRM39 COG300J 50V PT	1	C97
C	133-349-1Y	CHIP CERAMIC 33PF GRM39 COG330J 50V PT	1	C118
C	134-757-1Y	CHIP CERAMIC 47PF GRM39 COG470J 50V PT	1	C117
C	134-761-4Y	CHIP CERAMIC 470PF GRM40 COG471J 50V PT	2	C68.77
C	134-767-0Y	CHIP CERAMIC 4.7PF GRM40 COG47C 50V PT	1	C49
C	134-770-2Y	CHIP CERAMIC 470PF GRM39 X7R471K 50V PT	25	C1.3-5.7- 9.14.35,9.55,7.8, 62,4,6,7.78.80,1,2, 4.103,11,52
C	135-021-4Y	CHIP CERAMIC 5PF GRM39 COG050C 50V PT	1	C43
C	135-631-5Y	CHIP CERAMIC 5.6PF GRM39 COG5R6C 50V PT	1	C37
C	136-005-5Y	CHIP CERAMIC 6PF GRM40 COG060D 50V PT	1	C41
C	136-838-1Y	CHIP CERAMIC 6.8PF GRM39 COG6R8D 50V PT	2	C51.56
C	137-007-1Y	CHIP CERAMIC 7PF GRM40 COG070D 50V PT	1	C36
C	137-013-7Y	CHIP CERAMIC 7PF GRM39 COG070D 50V PT	1	C90
C	138-232-3Y	CHIP CERAMIC 82PF GRM39 COG820J 50V PT	1	C93
C	139-005-0Y	CHIP CERAMIC 9PF GRM39 COG090D 50V PT	1	C87
C	141-046-0Z	CHIP TANTALUM 10UF 293D106X0010B2T10V	1	C65

RF PCB Continued

Category	Code & Part No.	Description	Qty	Location
C	141-059-2	CHIP TANTALUM 10UF 293D106X06R3A2T6.3V	5	C2.12.61.100.101
C	141-060-2	CHIP TANTALUM 1UF 293D105X0025A2T25V	1	C104
C	144-722-2Z	CHIP TANTALUM 4.7UF 293D475X0010A2T10V	3	C6.60.128
C	180-126-6	METAL POLY CAP 0.01UF 103K 63V BOX	2	C23.24
C	180-209-8	METAL POLY CAP 0.022UF 223K 63V BOX	1	C22
C	180-301-7	METAL POLY CAP 0.33UF 334K 63V BOX	1	C21
B	200-003-5	TRANSISTOR BFR92A REEL (SOT-23)	3	Q12.16.25
B	202-092-5	BRT KRA110SPK (SOT-23)	3	Q2.3.4
B	202-095-8Z	TRANSISTOR KRC104SND	4	Q18.31.32.34
B	202-106-5	TRANSISTOR KTA1504SY (SOT-23)	2	Q7.8
B	202-113-1	TRANSISTOR KTC3875S(BL)	6	Q6.11.13.14.19.21
B	202-116-4	TRANSISTOR KTA1663	1	Q22
B	203-181-7	TRANSISTOR MMBR951 (SOT-23)	1	Q17
B	218-057-7Z	TRANSISTOR KRA104S	1	Q5
B	220-028-4	I.C REGULATOR TK11450MTR (TP-4800)	1	IC1
B	220-131-3	I.C PLL MC145191F (SO-20) (RS-440)	1	IC2
B	220-571-7	I.C OP AMP TL062CDR	1	IC8
B	223-421-0	I.C POWER FM IF MC3371DR2 (19-1120)	1	IC5
B	231-064-4	I.C OP AMP LM358MX	2	IC3.7
B	243-052-6	DIODE SI CHIP KDS193	1	D12
B	243-063-6	DIODE SWITCHING KDS181SA3	2	D13.14
B	243-087-8	DIODE CHIP UPP9401(T&R)50V 2.5W	2	D5.6
B	243-122-6	DIODE SCHOTTKY CHIP HSMP-2817-TR1	1	D9
	300-223-8	TRANSFORMERS CHIP 617PT-1019	2	T2.3
C	310-659-2	COIL CHIP 10UH:LER015T100K	1	L19
C	310-859-6	COIL CHIP 18NH:LL2012-F18NM	5	L1.2.3.4.5
C	311-069-4	COIL CHIP 0.15UH:NL252018T-R15J	1	L15
C	311-075-9	COIL CHIP 0.47UH:NL252018T-R47J	1	L14
C	311-078-2	COIL CHIP 0.82UH:NL252018T-R82J	1	L6
C	311-079-3	COIL CHIP 1.0UH:NL252018T-1R0J	1	L18
C	311-080-3	COIL CHIP 1.2UH:NL252018T-1R2J	1	L12
C	321-079-6	COIL IFT SMD 455KHZ QUAD IFT SMD	1	T1
	421-150-7	CONNECTOR PCB TO PCB TDH2-18SG-SMD	1	CON1
	772-296	SHIELD CAN FRONT-END NSP T0.2 (PIONEER-V)	1	
	772-363-A	SHIELD CAN NSP T0.2	1	
	772-378	SHIELD CAN(VCO)NSP T0.3 (SP-130V)	1	
	772-404	SHIELD PLATE NSP T0.3	1	
	906-724	INSULATION PLATE 37X10XT0.18 INSU.PAP.(SP-120V)	1	
	906-775	INSULATION PLATE 3.8X42.5XT0.18 INSUPAPER	1	
	906-776	INSULATION PLATE 10X42.5XT0.18 INSUPAPER	1	
	565-49R-PS	RF PCB SMD ASS'Y	1	
	416-074-B	P.C.B RF 83 X53.7 X1.6 FR4 2/S	1	

8.4.11 U1 Rx VCO

	565-49R-XU1	RX VCO U1 BAND ASS'Y	1	
C	05B-000-5Z	CHIP RESISTOR 0 1/16W 5% T 1608	1	R309
C	05B-101-3Z	CHIP RESISTOR 100 1/16W 5% T 1608	1	R306
C	05B-222-9Z	CHIP RESISTOR 2.2K 1/16W 5% T 1608	2	R304.305
C	05B-271-3Z	CHIP RESISTOR 270 1/16W 5% T 1608	1	R307
C	05B-472-8Z	CHIP RESISTOR 4.7K 1/16W 5% T 1608	1	R303
C	131-105-7Y	CHIP CERAMIC 11PF GRM39 COG110J 50V PT	2	C306.314
C	131-405-8Y	CHIP CERAMIC 14PF GRM39 COG140J 50V PT	1	C302
C	132-260-8Y	CHIP CERAMIC 220PF GRM39 COG221J 50V PT	3	C301.312.316
C	133-102-4Y	CHIP CERAMIC 3PF GRM39 COG030C 50V PT	1	C313
C	134-012-1Y	CHIP CERAMIC 4PF GRM39 COG040C 50V PT	1	C317
C	136-014-3Y	CHIP CERAMIC 6PF GRM39 COG060D 50V PT	1	C308
C	137-013-7Y	CHIP CERAMIC 7PF GRM39 COG070D 50V PT	1	C311

U2 RX VCO Continued

Category	Code & Part No.	Description	Qty	Location
B	200-067-3	TRANSISTOR 2SC5084-O	2	Q302.303
B	242-022-4	DIODE VARICAP CHIP 1SV229 15V	1	D301
C	311-051-7	COIL CHIP 0.033UH:NL252018T-033J	1	L305
C	311-067-2	COIL CHIP 0.1UH:NL252018T-R10J	1	L301
C	311-218-2	COIL CHIP VCOOSC1.2T E558AN-100040-P3	1	L303

8.4.12 U2 Rx VCO

Category	Code & Part No.	Description	Qty	Location
	565-49R-XU2	RX VCO U2 BAND ASS'Y	1	
C	05B-101-3Z	CHIP RESISTOR 100 1/16W 5% T 1608	1	R306
C	05B-222-9Z	CHIP RESISTOR 2.2K 1/16W 5% T 1608	2	R304.305
C	05B-271-3Z	CHIP RESISTOR 270 1/16W 5% T 1608	1	R307
C	05B-472-8Z	CHIP RESISTOR 4.7K 1/16W 5% T 1608	1	R303
C	060-000-8Z	CHIP RESISTOR 0 1/10W 5% T 2012	1	R309
C	131-092-8Y	CHIP CERAMIC 10PF GRM39 COG100D 50V PT	1	C314
C	131-306-2Y	CHIP CERAMIC 13PF GRM39 COG130J 50V PT	1	C302
C	132-260-8Y	CHIP CERAMIC 220PF GRM39 COG221J 50V PT	3	C301.312.316
C	133-102-4Y	CHIP CERAMIC 3PF GRM39 COG030C 50V PT	1	C313
C	134-012-1Y	CHIP CERAMIC 4PF GRM39 COG040C 50V PT	2	C308.317
C	137-013-7Y	CHIP CERAMIC 7PF GRM39 COG070D 50V PT	1	C311
C	139-005-0Y	CHIP CERAMIC 9PF GRM39 COG090D 50V PT	1	C306
B	200-067-3	TRANSISTOR 2SC5084-O	2	Q302.303
B	242-022-4	DIODE VARICAP CHIP 1SV229 15V	1	D301
C	311-051-7	COIL CHIP 0.033UH:NL252018T-033J	1	L305
C	311-067-2	COIL CHIP 0.1UH:NL252018T-R10J	1	L301
C	311-218-2	COIL CHIP VCOOSC1.2T E558AN-100040-P3	1	L303

8.4.13 U1 Tx VCO

Category	Code & Part No.	Description	Qty	Location
	565-49T-XU1	TX VCO U1 BAND ASS'Y	1	
C	05B-101-3Z	CHIP RESISTOR 100 1/16W 5% T 1608	1	R206
C	05B-104-6Z	CHIP RESISTOR 100K 1/16W 5% T 1608	1	R202
C	05B-222-9Z	CHIP RESISTOR 2.2K 1/16W 5% T 1608	2	R204.205
C	05B-271-3Z	CHIP RESISTOR 270 1/16W 5% T 1608	1	R207
C	05B-472-8Z	CHIP RESISTOR 4.7K 1/16W 5% T 1608	1	R203
C	130-A75-8Y	CHIP CERAMIC 0.001UF GRM39 X7R102K 50V PT	1	C215
C	130-704-3Y	CHIP CERAMIC 0.75PF GRM39 COG0R75C50V PT	1	C203
C	131-092-8Y	CHIP CERAMIC 10PF GRM39 COG100D 50V PT	1	C214
C	131-240-5Y	CHIP CERAMIC 12PF GRM39 COG120J 50V PT	1	C202
C	131-563-7Y	CHIP CERAMIC 1.5PF GRM39 COG1R5C 50V PT	1	C204
C	132-024-2Y	CHIP CERAMIC 2PF GRM39 COG020C 50V PT	1	C205
C	132-260-8Y	CHIP CERAMIC 220PF GRM39 COG221J 50V PT	2	C212.216
C	133-102-4Y	CHIP CERAMIC 3PF GRM39 COG030C 50V PT	1	C213
C	134-012-1Y	CHIP CERAMIC 4PF GRM39 COG040C 50V PT	1	C217
C	134-770-2Y	CHIP CERAMIC 470PF GRM39 X7R471K 50V PT	1	C201
C	135-021-4Y	CHIP CERAMIC 5PF GRM39 COG050C 50V PT	1	C208
C	137-013-7Y	CHIP CERAMIC 7PF GRM39 COG070D 50V PT	1	C206
B	200-067-3	TRANSISTOR 2SC5084-O	2	Q202.203
B	242-022-4	DIODE VARICAP CHIP 1SV229 15V	2	D201.202
C	311-051-7	COIL CHIP 0.033UH:NL252018T-033J	1	L205
C	311-067-2	COIL CHIP 0.1UH:NL252018T-R10J	1	L201
C	311-075-9	COIL CHIP 0.47UH:NL252018T-R47J	1	L202
C	311-078-2	COIL CHIP 0.82UH:NL252018T-R82J	1	L204
C	311-218-2	COIL CHIP VCOOSC1.2T E558AN-100040-P3	1	L203

8.4.14 U2 Tx VCO

Category	Code & Part No.	Description	Qty	Location
	565-49T-XU2	TX VCO U2 BAND ASS'Y	1	
C	05B-101-3Z	CHIP RESISTOR 100 1/16W 5% T 1608	1	R206
C	05B-104-6Z	CHIP RESISTOR 100K 1/16W 5% T 1608	1	R202
C	05B-222-9Z	CHIP RESISTOR 2.2K 1/16W 5% T 1608	2	R204.205
C	05B-271-3Z	CHIP RESISTOR 270 1/16W 5% T 1608	1	R207
C	05B-472-8Z	CHIP RESISTOR 4.7K 1/16W 5% T 1608	1	R203
C	130-A75-8Y	CHIP CERAMIC 0.001UF GRM39 X7R102K 50V PT	1	C215
C	130-515-9Y	CHIP CERAMIC 0.5PF GRM39 COG0R5C 50V PT	1	C205
C	131-091-7Y	CHIP CERAMIC 1PF GRM39 COG010C 50V PT	1	C203
C	131-092-8Y	CHIP CERAMIC 10PF GRM39 COG100D 50V PT	2	C202.214
C	131-563-7Y	CHIP CERAMIC 1.5PF GRM39 COG1R5C 50V PT	1	C204
C	132-260-8Y	CHIP CERAMIC 220PF GRM39 COG221J 50V PT	2	C212.216
C	133-102-4Y	CHIP CERAMIC 3PF GRM39 COG030C 50V PT	1	C213
C	134-012-1Y	CHIP CERAMIC 4PF GRM39 COG040C 50V PT	2	C208.217
C	134-770-2Y	CHIP CERAMIC 470PF GRM39 X7R471K 50V PT	1	C201
C	135-021-4Y	CHIP CERAMIC 5PF GRM39 COG050C 50V PT	1	C206
C	137-013-7Y	CHIP CERAMIC 7PF GRM39 COG070D 50V PT	1	C211
B	200-067-3	TRANSISTOR 2SC5084-O	2	Q202.203
B	242-022-4	DIODE VARICAP CHIP 1SV229 15V	2	D201.202
C	311-051-7	COIL CHIP 0.033UH:NL252018T-033J	1	L205
C	311-067-2	COIL CHIP 0.1UH:NL252018T-R10J	1	L201
C	311-075-9	COIL CHIP 0.47UH:NL252018T-R47J	1	L202
C	311-078-2	COIL CHIP 0.82UH:NL252018T-R82J	1	L204
C	311-218-2	COIL CHIP VCOOSC1.2T E558AN-100040-P3	1	L203

8.5 SD125 V2 Parts List

Category	Code & Part No.			Qty	Location
	544-04S-C	SHIELD COVER ASS'Y		1	
	718-458	COVER SHIELD	BSP T0.25 NI-PLAT	1	
	906-542	INSULATION PLATE	FIBER T0.3	1	

8.5.1 TCXO

Category	Code & Part No.			Qty	Location
	544-04T-CXO	TCXO ASS'Y(LMR)		1	
	544-04T-B	TCXO BOARD ASS'Y		1	
	175-010-6	CHIP TRIMMER	5-20PF TSW-S3-180	1	TC701
	263-020-3	CRYSTAL HC49T	12.8M -30 10PM 20P OSC FUND	1	X701
	860-129	PIN	CU & 1.1X13(101-01)	5	
	894-785	RUBBER CAP	SILICONE RUBBER HS50' GRAY	1	
	894-787	RUBBER HOLDER	SILICONE RUBBER HS50' GRAY	1	
	544-04T-BS	TCXO B'D SMD ASS'Y		1	
C	05B-222-9Z	CHIP RESISTOR	2.2K 1/16W 5% T 1608	3	R710.714.715
C	05B-393-0Z	CHIP RESISTOR	39K 1/16W 5% T 1608	2	R709.712
C	05B-472-8Z	CHIP RESISTOR	4.7K 1/16W 5% T 1608	1	R711
C	05B-473-9Z	CHIP RESISTOR	47K 1/16W 5% T 1608	5	R705.706.707.708.713
C	098-103-7	THERMISTOR CHIP	10K NTCCS32163NH103KC	1	TH701
C	098-333-8	THERMISTOR CHIP	33K NTCCS32163SH333KC	1	TH702
C	098-502-4	THERMISTOR CHIP	150K NTCCS32164CH154KC	1	TH703
C	131-093-9Z	CHIP CERAMIC	100PF CM105 CG 101J 50V AT	3	C701.702.705
C	131-835-3Z	CHIP CERAMIC	180PF CM105 CG 181J 50V AT	1	C704
C	132-260-8Z	CHIP CERAMIC	220PF CM105 CG 221J 50V AT	1	C706
C	139-103-5Y	CHIP CERAMIC	91PF GRM39 COG910J 50V PT	1	C703
B	203-109-3	TRANSISTOR	LMMBT9426CLT1 (SOT-23)	2	Q701.702
B	242-010-3	DIODE VARICAP	MMBV105G	1	D701
B	242-011-4	DIODE VARICAP	MMBV109	1	D702
	416-981-C	P.C.B TCXO	19 X11 X1.0 FR4 1/1 SL70WU	1	
	544-04T-S	TCXO SELECTION ASS'Y		1	
	06B-000-1	TCXO RESISTOR	SELECT ON TEST	4	R701.702.703.704

8.5.2 Digital PCB

Category	Code & Part No.			Qty	Location
	565-49D-PS	DIGITAL PCB SMD ASSY		1	
C	05B-000-5Z	CHIP RESISTOR	0 1/16W 5% T 1608	3	R485.(LK2.10)
C	05B-100-2Z	CHIP RESISTOR	10 1/16W 5% T 1608	1	R490
C	05B-101-3Z	CHIP RESISTOR	100 1/16W 5% T 1608	5	R446.474.475.476.477
C	05B-102-4Z	CHIP RESISTOR	1K 1/16W 5% T 1608	5	R423.481.482.483.484
C	05B-103-5Z	CHIP RESISTOR	10K 1/16W 5% T 1608	27	R403,7,15,6,7,8,9,21,2,4,5,6,8,35,7,40,7,54,60,1,5,8,78+87,8,9,801
C	05B-104-6Z	CHIP RESISTOR	100K 1/16W 5% T 1608	14	R409,11,4,45,51,2,8,69,70,80,92,3,4,5
C	05B-105-7Z	CHIP RESISTOR	1M 1/16W 5% T 1608	2	R430.448
C	05B-124-4Z	CHIP RESISTOR	120K 1/16W 5% T 1608	1	R472

Digital PCB Continued

Category	Code & Part No.			Qty	Location
C	05B-184-8Z	CHIP RESISTOR	180K 1/16W 5% T 1608	1	R413
C	05B-203-2Z	CHIP RESISTOR	20K 1/16W 5% T 1608	2	R449.806
C	05B-222-9Z	CHIP RESISTOR	2.2K 1/16W 5% T 1608	1	R438
C	05B-223-0Z	CHIP RESISTOR	22K 1/16W 5% T 1608	3	R406.455.457
C	05B-224-1Z	CHIP RESISTOR	220K 1/16W 5% T 1608	2	R410.471
C	05B-332-5Z	CHIP RESISTOR	3.3K 1/16W 5% T 1608	1	R412
C	05B-333-6Z	CHIP RESISTOR	33K 1/16W 5% T 1608	1	R450
C	05B-363-3	CHIP RESISTOR	36K 1/16W 5% T 1608	1	R802
C	05B-471-7Z	CHIP RESISTOR	470 1/16W 5% T 1608	1	R456
C	05B-472-8Z	CHIP RESISTOR	4.7K 1/16W 5% T 1608	4	R433.434.436.439
C	05B-473-9Z	CHIP RESISTOR	47K 1/16W 5% T 1608	11	R404,29,31,2,41,2,3,4,64,6,7
C	05B-563-7Z	CHIP RESISTOR	56K 1/16W 5% T 1608	1	R491
C	05B-683-2Z	CHIP RESISTOR	68K 1/16W 5% T 1608	2	R473.486
C	05B-912-9Z	CHIP RESISTOR	9.1K 1/16W 5% T 1608	1	R420
C	05C-683-2Z	CHIP RESISTOR	68K 1/16W 1% T 1608	1	R805
C	059-000-0Z	CHIP RESISTOR	0 1/8W 5% T 3216	1	R496
C	06B-018-9	CHIP RESISTOR	0.033 1/10W 1% T 2012	1	R804
C	060-000-8Z	CHIP RESISTOR	0 1/10W 5% T 2012	2	RV402.404
C	060-185-2Z	CHIP RESISTOR	1.8M 1/10W 5% T 2012	1	R463
C	075-223-1	RES.CHIP TRIMMER	22K RH03E1CJ4X	1	RV403
C	130-A48-4Y	CHIP CERAMIC	0.0015UF GRM39 X7R152K 50V PT	1	C413
C	130-A73-6Y	CHIP CERAMIC	0.01UF GRM39 X7R103K 25V	2	C451.810
C	130-A74-7Y	CHIP CERAMIC	0.1UF GRM39 Y5V104Z 25V PT	12	C404,7,16,7,22,36,50,3,63,4.802,8
C	130-A75-8Y	CHIP CERAMIC	0.001UF GRM39 X7R102K 50V PT	15	C402,29,30,1,2,3,4,41,2,3,4,5,6,9,52
C	130-250-9	CHIP CERAMIC	0.0027UF GRM39 X7R272J 50V PT	2	C411.466
C	130-261-9Y	CHIP CERAMIC	0.022UF GRM39 X7R223K 50V PT	2	C403.406
C	130-333-1Y	CHIP CERAMIC	0.0039UF GRM39 X7R392K 50V PT	1	C414
C	130-340-7Y	CHIP CERAMIC	0.0033UF GRM39 X7R332K 50V PT	1	C465
C	130-432-7Y	CHIP CERAMIC	0.0047UF GRM39 X7R472K 50V PT	1	C412
C	130-440-4Y	CHIP CERAMIC	0.047UF GRM39 Y5V473Z 25V PT	3	C409.423.426
C	130-517-1Y	CHIP CERAMIC	0.0056UF GRM39 X7R562K 50V PT	1	C410
C	131-089-7Y	CHIP CERAMIC	1UF GRM40 Y5V105Z 16V PT	1	C401
C	131-093-9Y	CHIP CERAMIC	100PF GRM39 COG101J 50V PT	3	C805.806.812
C	133-350-1Y	CHIP CERAMIC	330PF GRM39 COG331J 50V PT	1	C803
C	133-930-5Y	CHIP CERAMIC	39PF GRM39 COG390J 50V PT	2	C437.438
C	134-757-1Y	CHIP CERAMIC	47PF GRM39 COG470J 50V PT	5	C405.408.415.458.459
C	134-770-2Y	CHIP CERAMIC	470PF GRM39 X7R471K 50V PT	1	C424
C	135-107-9Y	CHIP CERAMIC	51PF GRM39 COG510J 50V PT	2	C801.804
C	141-052-5Z	CHIP TANTALUM	100UF 293D107X0006E2T6V	1	C427
C	141-059-2	CHIP TANTALUM	10UF 293D106X06R3A2T6.3V	3	C425.440.460
C	141-060-2	CHIP TANTALUM	1UF 293D105X0025A2T25V	2	C439.461
C	141-067-6	CHIP TANTALUM	100UF TA-016TCMS101M-ER 16V	2	C811.815
C	143-320-7Y	CHIP TANTALUM	33UF TSM1E336DSSB 25V	2	C447.807
C	144-722-2Z	CHIP TANTALUM	4.7UF 293D475X0010A2T10V	6	C435.454.455.456.457.813
C	144-729-8Z	CHIP TANTALUM	47UF 293D476X0016E2T16V	1	C428
B	200-190-0	FET MOS	SI4412DY	2	Q801.802
B	202-095-8Z	TRANSISTOR	KRC104SND	3	Q404.406.408
B	202-106-5	TRANSISTOR	KTA1504SY (SOT-23)	1	Q407
B	218-057-7Z	TRANSISTOR	KRA104S	4	Q401.402.403.405
B	221-114-3	I.C DC/DC CONVERTOR	LTC1435CS (SO-16)	1	U801
B	222-018-5A	I.C	KIA324F-EL (SL70WU-IC)	2	U405.406
B	222-023-9A	I.C DETECTOR	KIA7042F (SOT89) (CP-701)	1	U408
B	223-157-2	I.C	LM339	1	U403
B	223-224-9	I.C	MC14066BDR2 (SO-14) (TP-4800)	1	U404

Digital PCB Continued

Category	Code & Part No.			Qty	Location
B	223-277-7A	I.C OTP	MC68HC705C8FB (CP7100M)	1	U401
B	229-463-8A	I.C EEPROM	AT93C56-10SI (SO-08) (SP-2850)	1	U402
B	231-038-1	I.C	LM386MX-1 (SO-08)	1	U407
B	241-179-8	DIODE ZENER CHIP	Z02W5.6Y 5.6V 0.2W (SOT-23)	9	D401-405.407-410
B	243-052-6	DIODE SI CHIP	KDS193	1	D406
B	243-104-0	DIODE	KDS160	1	D801
B	243-127-1	DIODE SCHOTTKY	MBRS140T3 (403A-03)	1	D802
	270-160-4	RESONATOR CERAMIC	CSAC3.58MGC	1	X401
C	311-743-9	COIL INDUCTOR	12UH A814AY-120M=P3	1	L801
C	311-759-4	COIL INDUCTOR CHIP	3.3UH 636CY-3R3M=P3	1	L802
	416-078-A	P.C.B DIGITAL	85 X48.5 X1.2 FR4 1/1	1	
	421-160-6	CONNECTOR	53261-1590	1	CON401
	431-183-0	SW DIP	KSD-04	1	SW401
	565-60C-A	COVER ASS'Y		1	
	421-036-8	CONNECTOR PLUG	UG-1094/U(F)	1	CON2
	427-415-8	WIRE COXIAL	SHD-60503	1	CABLE1
	611-290	(+)MACHINE SCREW(BH)	M2.6X6 (+)BH NI-PLAT	4	FOR POST + DIG PCB MTG
	613-323	(+)MACHINE SCREW(BH)	M3X8 (+)BH NI-PLAT	4	FOR COVER MTG
	719-574	COVER UPPER	ALDC12	1	
	719-575	COVER BOTTOM	ALDC12	1	
	853-166-A	POST	BSBM NI-PLATE	4	
	895-157	GASKET	NEOPRENE 3M4262 DM-2000	1	
	895-189	GASKET(SP- 2850C)	0.4&X1.2&X260 SILI.RUBB BLK	0.3	metre
	421-178-8	CONNECTOR	GDH2-18DBCW-A	1	CON403

8.5.3 Channel Spacing

Category	Code & Part No.			Qty	Location
	565-60C-SA2	CH SPAING ASS'Y		1	
	263-208-7	CRYSTAL HC-45	44.645M -30 15PM 32P RX 3RD	1	X1
	270-007-0Z	FILTER CERAMIC	LT455HT	1	CF2
	270-027-8Z	FILTER CERAMIC	LT-455FW	1	CF1
	271-072-3	CRYSTAL FILTER	KFN1045AA(45.1M) (BMO-U)	1	XF1

8.5.4 DC to DC Converter

Category	Code & Part No.			Qty	Location
	565-60D-DC	DC TO DC CONVER ASSY		1	
C	05B-222-9Z	CHIP RESISTOR	2.2K 1/16W 5% T 1608	2	R901.902
C	05B-273-5Z	CHIP RESISTOR	27K 1/16W 5% T 1608	2	R905.907
C	05B-470-6Z	CHIP RESISTOR	47 1/16W 5% T 1608	1	R908
C	05B-471-7Z	CHIP RESISTOR	470 1/16W 5% T 1608	1	R909
C	05B-472-8Z	CHIP RESISTOR	4.7K 1/16W 5% T 1608	1	R903
C	05B-752-1Z	CHIP RESISTOR	7.5K 1/16W 5% T 1608	2	R904.906
C	130-A73-6Y	CHIP CERAMIC	0.01UF GRM39 X7R103K 25V	5	C901.902.904.907. 909
C	132-260-8Y	CHIP CERAMIC	220PF GRM39 COG221J 50V PT	1	C906
C	136-839-2Y	CHIP CERAMIC	68PF GRM39 COG680J 50V PT	1	C905
B	200-113-1	TRANSISTOR	KTC4075	4	Q901.903.904.905
B	200-114-2	TRANSISTOR	KTA2014	1	Q902
B	243-049-4Z	DIODE CHIP	KDS226	2	D903.904
	772-403	SHIELD CAN(FORCOVER)	NSP T0.3	1	

8.5.5 Front End Assembly – V2

Category	Code & Part No.			Qty	Location
	565-60F-V2S	FRONT-END V2 BAND AS		1	
C	05B-181-5Z	CHIP RESISTOR	180 1/16W 5% T 1608	1	R601
C	05B-229-6Z	CHIP RESISTOR	2.2 1/16W 5% T 1608	1	R604
C	05B-332-5Z	CHIP RESISTOR	3.3K 1/16W 5% T 1608	1	R605
C	05B-682-1Z	CHIP RESISTOR	6.8K 1/16W 5% T 1608	1	R602
C	05B-821-0Z	CHIP RESISTOR	820 1/16W 5% T 1608	1	R603
C	130-A73-6Y	CHIP CERAMIC	0.01UF GRM39 X7R103K 25V	1	C622
C	130-A75-8Y	CHIP CERAMIC	0.001UF GRM39 X7R102K 50V PT	1	C605
C	131-093-9Y	CHIP CERAMIC	100PF GRM39 COG101J 50V PT	3	C604.611.621
C	131-241-6Y	CHIP CERAMIC	120PF GRM39 COG121J 50V PT	2	C606.614
C	133-349-1Y	CHIP CERAMIC	33PF GRM39 COG330J 50V PT	1	C608
C	133-930-5Y	CHIP CERAMIC	39PF GRM39 COG390J 50V PT	4	C602.607.613.623
C	134-757-1Y	CHIP CERAMIC	47PF GRM39 COG470J 50V PT	2	C612.617
C	135-632-6Y	CHIP CERAMIC	56PF GRM39 COG560J 50V PT	1	C603
C	136-840-2Y	CHIP CERAMIC	680PF GRM39 X7R681K 50V PT	1	C601
C	139-005-0Y	CHIP CERAMIC	9PF GRM39 COG090D 50V PT	1	C616
B	203-181-7	TRANSISTOR	MMBR951 (SOT-23)	1	Q601
B	243-049-4Z	DIODE CHIP	KDS226	1	D601
	311-158-1	COIL SPRING	1.5X0.45X6T:L	7	L601-607
	4A6-056	P.C.B ASS'Y	160 X135 X0.8 FR4 1/1 SP120V	1	
	406-336	P.C.B MODULE	52 X15.5 X0.8 FR4 1/1 BMOVHF	1	
	406-704	P.C.B VCO	38.6 X17 X0.8 FR4 1/1 BMOVHF	1	
	406-706	P.C.B FRONTEND	40.5 X11.9 X0.8 FR4 1/1 BMOVHF	1	
	406-708	P.C.B PTT	42.5 X7.5 X0.8 FR4 1/1 BMOVHF	1	

8.5.6 V2 Low Pass Filter

Category	Code & Part No.			Qty	Location
	565-60L-FV2	LPF V2 BAND ASS'Y		1	
C	132-216-9Y	CHIP CERAMIC	22PF GRM40 COG220J 50V PT	1	C75
C	133-010-4Y	CHIP CERAMIC	30PF GRM40 COG300J 50V PT	1	C73
C	133-611-7Y	CHIP CERAMIC	36PF GRM40 COG360J 50V PT	1	C74
C	136-833-6Y	CHIP CERAMIC	6.8PF GRM40 COG6R8D 50V PT	1	C76
C	137-013-7Y	CHIP CERAMIC	7PF GRM39 COG070D 50V PT	1	C83
C	139-003-8Y	CHIP CERAMIC	9PF GRM40 COG090D 50V PT	1	C72
	311-297-3	COIL SPRING	3X0.55X5T:L SMD	2	L8.11
	311-298-4	COIL SPRING	3X0.55X4T:L SMD	1	L7
	311-323-3	COIL SPRING	2.8X0.4X8T:L	1	L13

8.5.7 V2 Power Module

Category	Code & Part No.			Qty	Location
	565-60P-OV2	V2 BAND PWR MODU.ASS		1	
C	060-000-8Z	CHIP RESISTOR	0 1/10W 5% T 2012	1	R510
C	060-201-3Z	CHIP RESISTOR	200 1/10W 5% T 2012	1	R503
C	060-220-0Z	CHIP RESISTOR	22 1/10W 5% T 2012	1	R506
C	060-272-7Z	CHIP RESISTOR	2.7K 1/10W 5% T 2012	1	R501
C	060-330-6Z	CHIP RESISTOR	33 1/10W 5% T 2012	1	R505
C	060-560-7Z	CHIP RESISTOR	56 1/10W 5% T 2012	1	R509
C	060-820-2Z	CHIP RESISTOR	82 1/10W 5% T 2012	2	R507.508
C	060-822-4Z	CHIP RESISTOR	8.2K 1/10W 5% T 2012	1	R502
C	130-172-2Y	CHIP CERAMIC	0.01UF GRM40 X7R103K 50V PT	4	C503.506.512.515
C	131-208-7Y	CHIP CERAMIC	12PF GRM40 COG120J 50V PT	1	C509
C	131-816-6Y	CHIP CERAMIC	18PF GRM40 COG180J 50V PT	1	C504
C	132-216-9Y	CHIP CERAMIC	22PF GRM40 COG220J 50V PT	1	C517

V2 Power Module Continued

Category	Code & Part No.			Qty	Location
C	132-407-5Y	CHIP CERAMIC	24PF GRM40 COG240J 50V PT	1	C514
C	133-014-8Y	CHIP CERAMIC	3PF GRM40 COG030C 50V PT	1	C501
C	133-932-7Y	CHIP CERAMIC	39PF GRM40 COG390J 50V PT	2	C502.505
C	134-722-1Y	CHIP CERAMIC	47PF GRM40 COG470J 50V PT	1	C507
C	138-210-3Y	CHIP CERAMIC	82PF GRM40 COG820J 50V PT	1	C513
B	200-115-3	TRANSISTOR	BLT52 (SOT409)	1	Q503
B	200-116-4	TRANSISTOR	BLT50 (SOT223)	1	Q502
B	203-181-7	TRANSISTOR	MMBR951 (SOT-23)	1	Q501
	310-860-6	COIL CHIP	27NH:LL2012-F27NM	1	L502
	310-913-1	COIL SPRING	1.0X0.45X4T:R(SMD)	2	L505.507
C	311-064-9	COIL CHIP	0.056UH:NL252018T-056J	1	L501
C	311-069-4	COIL CHIP	0.15UH:NL252018T-R15J	1	L503
C	311-083-6	COIL CHIP	2.2UH:NL252018T-2R2J	1	L506
	311-299-5	COIL SPRING	2X0.45X8T:L SMD	2	L504.509
	311-300-2	COIL SPRING	2X0.45X5T:L SMD	1	L508
	612-284	(+)MACHINE SCREW(FH)	M2X6 (+)FH ZN-PLAT	2	
	723-671	BRACKET	SPC T1 ZN-PLAT	2	
	761-783	HEAT SINK	CUP T1.0 SN-PLATING (SP-120V)	1	
	761-787	HEAT SINK	AL PLATE T2	1	
	772-295-A	SHIELD CAN	NSP T0.2 (SP-120V)	1	

8.5.8 V2 RF

Category	Code & Part No.			Qty	Location
	565-60R-CA	RF CIRCUIT ASS'Y		1	
C	05B-000-5Z	CHIP RESISTOR	0 1/16W 5% T 1608	5	R36.49.116.129.(C56)
C	05B-100-2Z	CHIP RESISTOR	10 1/16W 5% T 1608	1	R79
C	05B-101-3Z	CHIP RESISTOR	100 1/16W 5% T 1608	7	R11.15.21.41.66.97.124
C	05B-102-4Z	CHIP RESISTOR	1K 1/16W 5% T 1608	3	R54.71.94
C	05B-103-5Z	CHIP RESISTOR	10K 1/16W 5% T 1608	8	R1.43.53.76.98.103.104.111
C	05B-104-6Z	CHIP RESISTOR	100K 1/16W 5% T 1608	1	R2
C	05B-105-7Z	CHIP RESISTOR	1M 1/16W 5% T 1608	1	R50
C	05B-121-1Z	CHIP RESISTOR	120 1/16W 5% T 1608	1	R23
C	05B-122-2Z	CHIP RESISTOR	1.2K 1/16W 5% T 1608	1	R77
C	05B-123-3Z	CHIP RESISTOR	12K 1/16W 5% T 1608	3	R17.42.45
C	05B-180-4Z	CHIP RESISTOR	18 1/16W 5% T 1608	3	R26.34.(C87)
C	05B-182-6Z	CHIP RESISTOR	1.8K 1/16W 5% T 1608	3	R4.5.7
C	05B-202-1Z	CHIP RESISTOR	2K 1/16W 5% T 1608	1	R6
C	05B-203-2Z	CHIP RESISTOR	20K 1/16W 5% T 1608	1	R83
C	05B-220-7Z	CHIP RESISTOR	22 1/16W 5% T 1608	2	R64.125
C	05B-222-9Z	CHIP RESISTOR	2.2K 1/16W 5% T 1608	2	R3.46
C	05B-223-0Z	CHIP RESISTOR	22K 1/16W 5% T 1608	6	R74.78.102.105.106.112
C	05B-271-3Z	CHIP RESISTOR	270 1/16W 5% T 1608	1	R56
C	05B-272-4Z	CHIP RESISTOR	2.7K 1/16W 5% T 1608	3	R13.14.55
C	05B-301-7Z	CHIP RESISTOR	300 1/16W 5% T 1608	4	R31.32.90.91
C	05B-331-4Z	CHIP RESISTOR	330 1/16W 5% T 1608	1	R110
C	05B-332-5Z	CHIP RESISTOR	3.3K 1/16W 5% T 1608	4	R25.33.37.52
C	05B-333-6Z	CHIP RESISTOR	33K 1/16W 5% T 1608	1	R82
C	05B-390-7Z	CHIP RESISTOR	39 1/16W 5% T 1608	1	R59
C	05B-393-0Z	CHIP RESISTOR	39K 1/16W 5% T 1608	1	R96
C	05B-472-8Z	CHIP RESISTOR	4.7K 1/16W 5% T 1608	2	R22.27
C	05B-473-9Z	CHIP RESISTOR	47K 1/16W 5% T 1608	2	R75.115
C	05B-474-0Z	CHIP RESISTOR	470K 1/16W 5% T 1608	4	R58.69.70.72
C	05B-475-1Z	CHIP RESISTOR	4.7M 1/16W 5% T 1608	1	R92
C	05B-510-9Z	CHIP RESISTOR	51 1/16W 5% T 1608	1	R65

RF PCB continued

Category	Code & Part No.			Qty	Location
C	05B-560-4Z	CHIP RESISTOR	56 1/16W 5% T 1608	1	R28
C	05B-562-6Z	CHIP RESISTOR	5.6K 1/16W 5% T 1608	2	R12.24
C	05B-563-7Z	CHIP RESISTOR	56K 1/16W 5% T 1608	1	R108
C	05B-681-0Z	CHIP RESISTOR	680 1/16W 5% T 1608	1	R118
C	05B-684-3Z	CHIP RESISTOR	680K 1/16W 5% T 1608	1	R68
C	05B-822-1Z	CHIP RESISTOR	8.2K 1/16W 5% T 1608	1	R35
C	05B-823-2Z	CHIP RESISTOR	82K 1/16W 5% T 1608	1	R95
C	05C-104-6Z	CHIP RESISTOR	100K 1/16W 1% T 1608	2	R57.99
C	05C-683-2Z	CHIP RESISTOR	68K 1/16W 1% T 1608	2	R61.100
C	06F-108-3	CHIP RESISTOR	0.1 1W 1% 1218	1	R109
C	060-000-8Z	CHIP RESISTOR	0 1/10W 5% T 2012	1	R(L2)
C	060-180-7Z	CHIP RESISTOR	18 1/10W 5% T 2012	3	R47.48.51
C	060-911-1Z	CHIP RESISTOR	910 1/10W 5% T 2012	2	R8.16
C	075-103-6	RES.CHIP TRIMMER	10K RH03E1CJ4X	2	RV1.6
C	075-104-7	RES.CHIP TRIMMER	100K RH03E1CJ5X	1	RV2
C	075-473-0	RES.CHIP TRIMMER	47K RH03E1CS4X	1	RV3
C	101-058-9R	ELECT CAPACITOR	10UF 16V 20% 3X5 5.0PT	1	C129
C	130-A17-6Y	CHIP CERAMIC	0.001UF GRM40 X7R102K 50V PT	3	C42.68.77
C	130-A60-4Y	CHIP CERAMIC	0.1UF GRM40 X7R104K 25V PT	3	C79.124.125
C	130-A73-6Y	CHIP CERAMIC	0.01UF GRM39 X7R103K 25V	7	C13.63.96.122.123 .126.127
C	130-A74-7Y	CHIP CERAMIC	0.1UF GRM39 Y5V104Z 25V PT	6	C11.15.17.26.88.1 33
C	130-A75-8Y	CHIP CERAMIC	0.001UF GRM39 X7R102K 50V PT	12	C1.3.4.7.18.35.39. 54.84.98.102.131
C	130-443-7	CHIP CERAMIC	0.47UF GRM40 Y5V474Z 16V PT	1	C59
C	131-089-7Y	CHIP CERAMIC	1UF GRM40 Y5V105Z 16V PT	4	C25.44.53.94
C	131-092-8Y	CHIP CERAMIC	10PF GRM39 COG100D 50V PT	1	C45
C	131-404-7Y	CHIP CERAMIC	14PF GRM40 COG140J 50V PT	1	C36
C	132-024-2Y	CHIP CERAMIC	2PF GRM39 COG020C 50V PT	1	C16
C	132-025-3Y	CHIP CERAMIC	20PF GRM39 COG200J 50V PT	1	C121
C	132-259-8Y	CHIP CERAMIC	22PF GRM39 COG220J 50V PT	1	C51
C	132-260-8Y	CHIP CERAMIC	220PF GRM39 COG221J 50V PT	1	C34
C	132-410-7Y	CHIP CERAMIC	24PF GRM39 COG240J 50V PT	2	C50.92
C	133-102-4Y	CHIP CERAMIC	3PF GRM39 COG030C 50V PT	1	C43
C	133-349-1Y	CHIP CERAMIC	33PF GRM39 COG330J 50V PT	3	C37.97.118
C	134-301-1Y	CHIP CERAMIC	43PF GRM40 COG430J 50V PT	1	C38
C	134-757-1Y	CHIP CERAMIC	47PF GRM39 COG470J 50V PT	1	C117
C	134-770-2Y	CHIP CERAMIC	470PF GRM39 X7R471K 50V PT	19	C5.8.9.14.19.47.55 .57.58.62.64.66.67 .78.80.81.82.103. 111
C	137-013-7Y	CHIP CERAMIC	7PF GRM39 COG070D 50V PT	1	C90
C	138-232-3Y	CHIP CERAMIC	82PF GRM39 COG820J 50V PT	1	C93
C	139-005-0Y	CHIP CERAMIC	9PF GRM39 COG090D 50V PT	1	C46
C	141-046-0Z	CHIP TANTALUM	10UF 293D106X0010B2T10V	1	C65
C	141-059-2	CHIP TANTALUM	10UF 293D106X06R3A2T6.3V	5	C2.12.61.100.101
C	141-060-2	CHIP TANTALUM	1UF 293D105X0025A2T25V	1	C104
C	144-722-2Z	CHIP TANTALUM	4.7UF 293D475X0010A2T10V	3	C6.60.128
C	180-126-6	METAL POLY CAP	0.01UF 103K 63V BOX	2	C23.24
C	180-209-8	METAL POLY CAP	0.022UF 223K 63V BOX	1	C22
C	180-301-7	METAL POLY CAP	0.33UF 334K 63V BOX	1	C21
B	200-003-5	TRANSISTOR	BFR92A REEL (SOT-23)	2	Q12.25
B	202-092-5	BRT	KRA110SPK (SOT-23)	3	Q2.3.4
B	202-095-8Z	TRANSISTOR	KRC104SND	4	Q18.31.32.34
B	202-106-5	TRANSISTOR	KTA1504SY (SOT-23)	2	Q7.8
B	202-113-1	TRANSISTOR	KTC3875S(BL)	6	Q6.11.13.14.19.21

RF PCB continued

Category	Code & Part No.			Qty	Location
B	202-116-4	TRANSISTOR	KTA1663	1	Q22
B	203-181-7	TRANSISTOR	MMBR951 (SOT-23)	2	Q16.17
B	218-057-7Z	TRANSISTOR	KRA104S	1	Q5
B	220-028-4	I.C REGULATOR	TK11450MTR (TP-4800)	1	IC1
B	220-131-3	I.C PLL	MC145191F (SO-20) (RS-440)	1	IC2
B	220-571-7	I.C OP AMP	TL062CDR	1	IC8
B	223-421-0	I.C POWER FM IF	MC3371DR2 (19-1120)	1	IC5
B	231-064-4	I.C OP AMP	LM358MX	2	IC3.7
B	243-052-6	DIODE SI CHIP	KDS193	1	D12
B	243-063-6	DIODE SWITCHING	KDS181SA3	2	D13.14
B	243-087-8	DIODE CHIP	UPP9401(T&R)50V 2.5W	2	D5.6
B	243-122-6	DIODE SCHOTTKY CHIP	HSMP-2817-TR1	1	D9
B	300-223-8	TRANSFORMERS CHIP	617PT-1019	2	T2.3
C	310-659-2	COIL CHIP	10UH:LER015T100K	1	L19
C	310-861-7	COIL CHIP	47NH:LL2012-F47NM	1	L1
C	311-067-2	COIL CHIP	0.1UH:NL252018T-R10J	2	L4.5
C	311-069-4	COIL CHIP	0.15UH:NL252018T-R15J	1	L15
C	311-075-9	COIL CHIP	0.47UH:NL252018T-R47J	1	L14
C	311-079-3	COIL CHIP	1.0UH:NL252018T-1R0J	2	L6.18
C	311-080-3	COIL CHIP	1.2UH:NL252018T-1R2J	2	L3.12
	321-079-6	COIL IFT SMD	455KHZ QUAD IFT SMD	1	T1
	416-074-B	P.C.B RF	83 X53.7 X1.6 FR4 2/S	1	
	772-296	SHIELD CAN FRONT-END	NSP T0.2 (PIONEER-V)	1	
	772-363-A	SHIELD CAN	NSP T0.2	1	
	772-378	SHIELD CAN(VCO)	NSP T0.3 (SP-130V)	1	
	772-404	SHIELD PLATE	NSP T0.3	1	
	906-724	INSULATION PLATE	37X10XT0.18 INSU.PAP.(SP-120V)	1	
	906-775	INSULATION PLATE	3.8X42.5XT0.18 INSUPAPER	1	
	906-776	INSULATION PLATE	10X42.5XT0.18 INSUPAPER	1	

8.5.9 V2 Rx VCO

Category	Code & Part No.			Qty	Location
	565-60R-XV2	RX VCO V2 BAND ASS'Y		1	
C	05B-101-3Z	CHIP RESISTOR	100 1/16W 5% T 1608	1	R306
C	05B-221-8Z	CHIP RESISTOR	220 1/16W 5% T 1608	1	R307
C	05B-222-9Z	CHIP RESISTOR	2.2K 1/16W 5% T 1608	2	R304.305
C	05B-472-8Z	CHIP RESISTOR	4.7K 1/16W 5% T 1608	1	R303
C	130-A75-8Y	CHIP CERAMIC	0.001UF GRM39 X7R102K 50V PT	4	C301.312.315.316
C	130-515-9Y	CHIP CERAMIC	0.5PF GRM39 COG0R5C 50V PT	1	C306
C	131-105-7Y	CHIP CERAMIC	11PF GRM39 COG110J 50V PT	1	C302
C	131-240-5Y	CHIP CERAMIC	12PF GRM39 COG120J 50V PT	1	C314
C	131-604-1Y	CHIP CERAMIC	16PF GRM39 COG160J 50V PT	1	C311
C	132-258-7Y	CHIP CERAMIC	2.2PF GRM39 COG2R2C 50V PT	1	C308
C	134-012-1Y	CHIP CERAMIC	4PF GRM39 COG040C 50V PT	2	C313.317
B	200-067-3	TRANSISTOR	2SC5084-O	2	Q302.303
B	242-027-9	DIODE VARICAP CHIP	1SV217	1	D301
C	311-067-2	COIL CHIP	0.1UH:NL252018T-R10J	1	L305
C	311-080-3	COIL CHIP	1.2UH:NL252018T-1R2J	1	L301
C	311-083-6	COIL CHIP	2.2UH:NL252018T-2R2J	1	L304
	320-859-9	COIL CHIP	VCOOSC4.5T(E558CN-100023)	1	L303

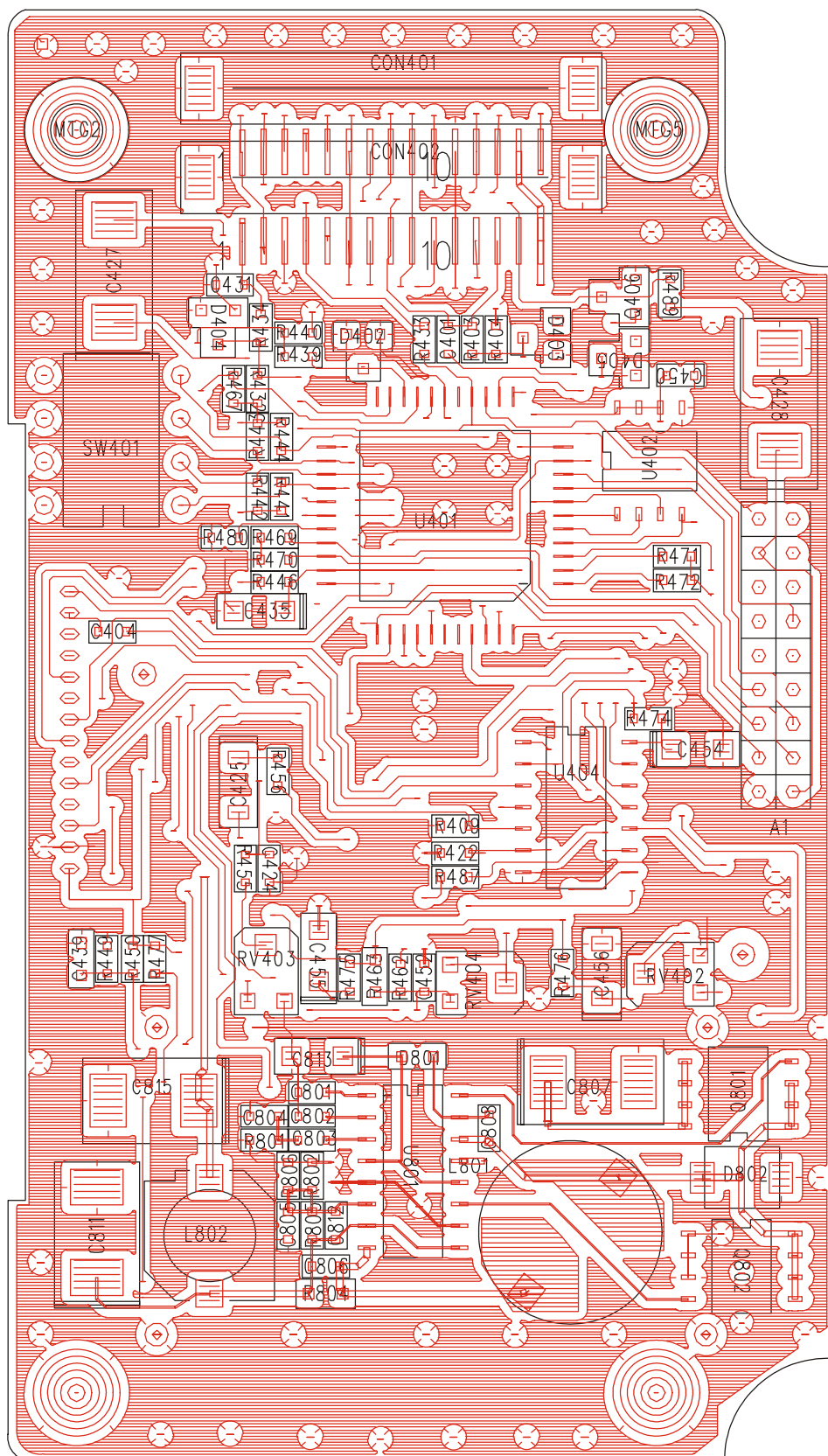
8.5.10 V2 Tx VCO

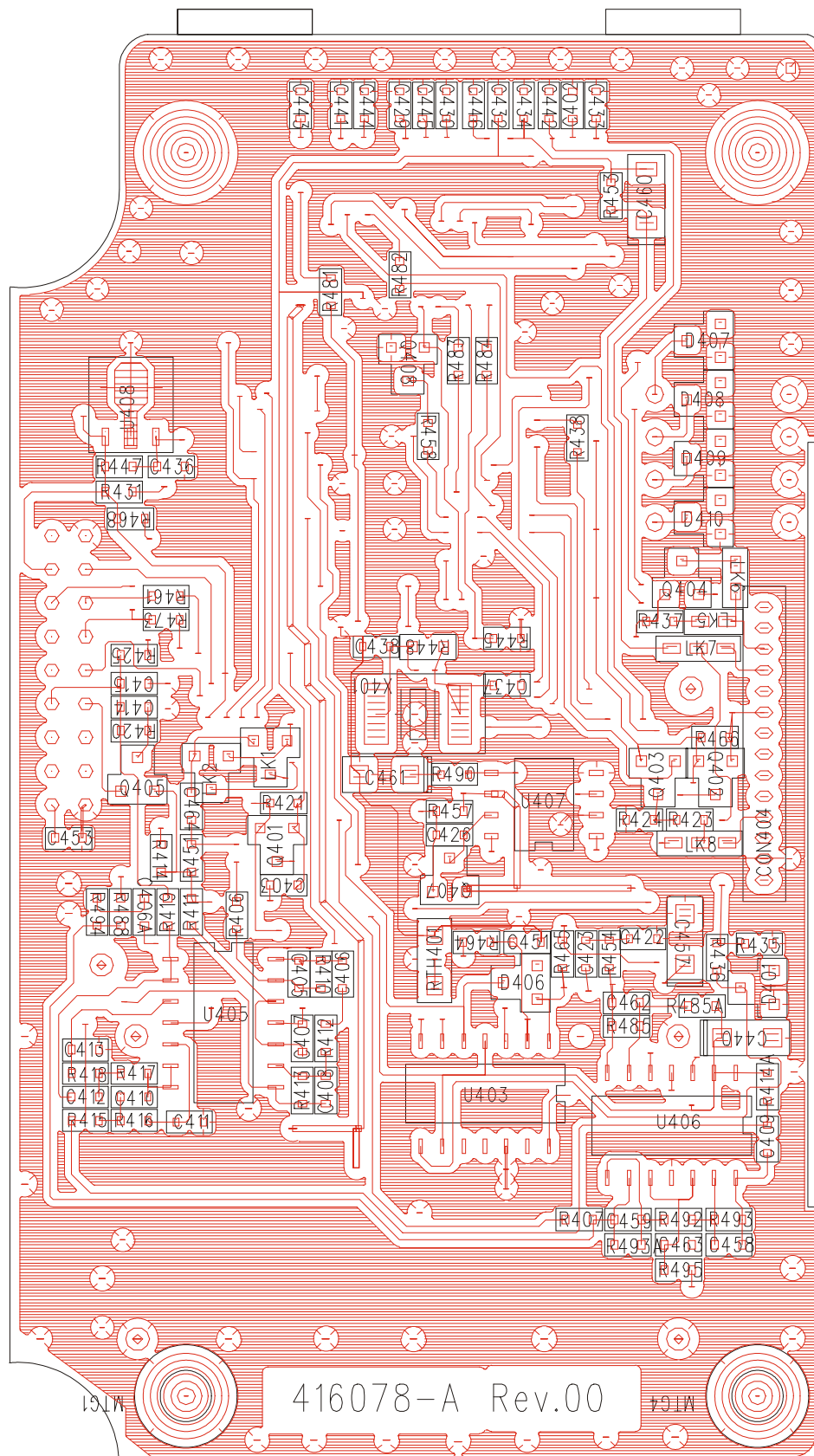
Category	Code & Part No.			Qty	Location
	565-60T-XV2	TX VCO V2 BAND ASS'Y		1	
C	05B-101-3Z	CHIP RESISTOR	100 1/16W 5% T 1608	1	R206
C	05B-104-6Z	CHIP RESISTOR	100K 1/16W 5% T 1608	1	R202
C	05B-221-8Z	CHIP RESISTOR	220 1/16W 5% T 1608	1	R207
C	05B-222-9Z	CHIP RESISTOR	2.2K 1/16W 5% T 1608	2	R204.205
C	05B-472-8Z	CHIP RESISTOR	4.7K 1/16W 5% T 1608	1	R203
C	060-104-9Z	CHIP RESISTOR	100K 1/10W 5% T 2012	1	R201
C	130-A75-8Y	CHIP CERAMIC	0.001UF GRM39 X7R102K 50V PT	4	C201.212.215.216
C	131-239-5Y	CHIP CERAMIC	1.2PF GRM39 COG1R2C 50V PT	3	C203.204.205
C	131-306-2Y	CHIP CERAMIC	13PF GRM39 COG130J 50V PT	2	C211.214
C	131-834-2Y	CHIP CERAMIC	18PF GRM39 COG180J 50V PT	1	C202
C	132-733-9Y	CHIP CERAMIC	2.7PF GRM39 COG2R7C 50V PT	1	C206
C	134-012-1Y	CHIP CERAMIC	4PF GRM39 COG040C 50V PT	1	C217
C	134-756-0Y	CHIP CERAMIC	4.7PF GRM39 COG4R7C 50V PT	2	C208.213
B	200-067-3	TRANSISTOR	2SC5084-O	2	Q202.203
B	242-027-9	DIODE VARICAP	1SV217	2	D201.202
C	311-070-4	CHIP			
C	311-070-4	COIL CHIP	0.18UH:NL252018T-R18J	1	L205
C	311-080-3	COIL CHIP	1.2UH:NL252018T-1R2J	1	L201
C	311-083-6	COIL CHIP	2.2UH:NL252018T-2R2J	1	L204
	320-859-9	COIL CHIP	VCOOSC4.5T(E558CN-100023)	1	L203

9 CIRCUIT DIAGRAMS & PCB LAYOUTS

The following Circuit Schematics and PCB Layouts are included:

P416078	Digital PCB Top side layout
P416078	Digital PCB Bottom side layout
P416074	RF PCB Top side layout
P416074	RF PCB Bottom side layout

P416078-A Digital PCB – Top Side**Figure 9-1 - Digital PCB Top Side**

P416078-A Digital PCB – Bottom Side**Figure 9-2 - Digital PCB Bottom Side**

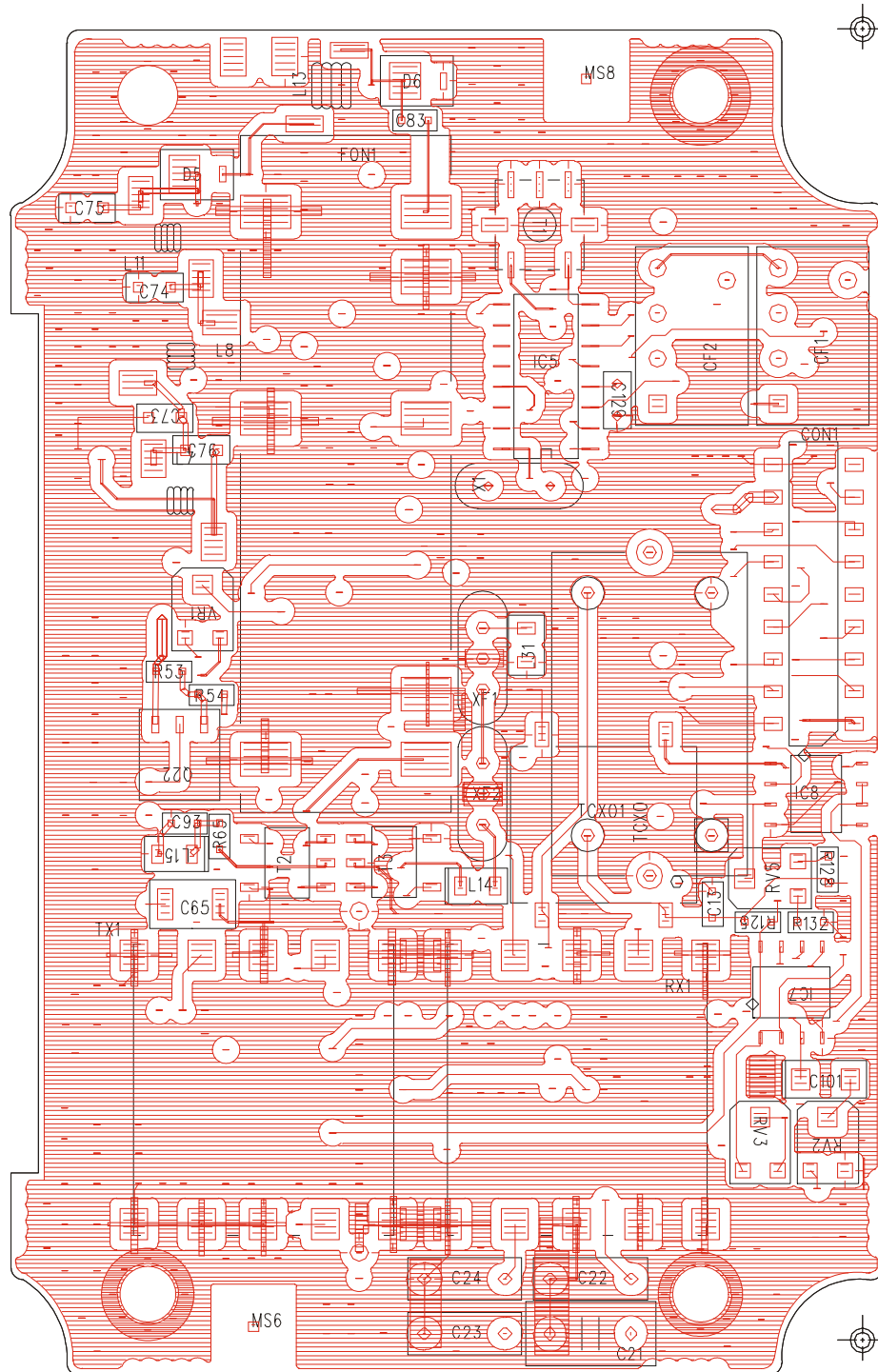
P416074 RF PCB – Top Side**Figure 9-3 - RF PCB Top Side**

Figure 9-4 - RF PCB Bottom Side

