## SST-454 ALIGNMENT PROCEDURE

Test and alignment of the SST-454 must be performed by an authorized RF service technician. Do not attempt service of the SST-454 if not completely familiar with the operation of frequency synthesized radio operation. The SST-454 can operate in either Narrow Band (2.5 KHz deviation) or Wide Band (5 KHz deviation) systems.

### RECOMMENDED TEST EQUIPMENT

1) 0 to +15 VDC, 2A current-limited power supply
2) RF Communications Test Set (to 470 MHz) with:
   - FM Deviation Meter
   - RF Wattmeter
   - Frequency Counter (to 470 MHz)
   - SINAD Measuring Device
3) Oscilloscope (to 20 MHz)
4) VTVM or DMM
5) RITRON PC Programming Kit
6) RITRON SST-SRVBD Test Module

### RADIO PREPARATION

1) Make sure the radio battery is fully charged.
2) Install the RITRON SST-SRVBD test assembly and serial programming cable as follows:
   a) Remove the SST-454 antenna from the radio.
   b) Plug the SST-SRVBD into the 2.5 mm and 3.5 mm jacks on top of the radio.
   c) Screw the SST-SRVBD antenna nut fully into the SST-454 antenna connector.
   d) Set the jumper on the SST-SRVBD assembly to the "UHF" position.
   e) Connect the serial programming cable from the PC computer (with the RITRON PC programming kit software installed) to the SST-SRVBD test assembly
3) Connect the FM communications test set to the BNC connector on the SST-SRVBD test assembly.
4) Turn on the radio to place it in operating mode.
5) From the PC Programmer on-screen menu, select "SST Alignment". This will program the radio to temporarily operate on the following frequencies:

| Alignment Step | Frequency | Tone | TX Power |
|---|---|---|---|
| Reference Frequency | 460.075 MHz | No tone | Low power |
| Modulation Balance | 460.075 MHz | 20 Hz - Square wave | Low power |
| Deviation - Low Frequency | 450.075 MHz | 100.0 Hz - CTCSS | Low power |
| Deviation - High Frequency | 470.075 MHz | 100.0 Hz - CTCSS | Low power |
| Medium TX Power - Low Frequency | 470.075 MHz | No tone | Medium power |
| Medium TX Power - High Frequency | 450.075 MHz | No tone | Medium power |
| High TX Power - Low Frequency | 450.075 MHz | No tone | High power |
| High TX Power - High Frequency | 470.075 MHz | No tone | High power |
| Squelch | 460.075 MHz | No tone | Low power |

6) After you have completed alignment of the SST-454, turn the radio off. This will remove the test frequencies and return to operation on the customer's programmed frequencies.

### TUNING MODE

Authorized service personal can perform adjustments to the radio from within the PC Programming software.

1) From the PC programmer on-screen menu, select "Access Radio Tech Fields."
2) Type "Tune" to allow adjustments using the PC programmer.

## REFERENCE FREQUENCY

1) Make sure that the unit has been switched on and is at room temperature (approximately +25° C)
2) Select "Reference Frequency" from the PC Programmer "SST-454 Alignment" screen.
3) Set the RF communications test set to the transmit frequency on the screen.
4) Press and hold the PTT switch (SW304) to activate the transmitter.
5) Transmitter frequency error should be less than +/- 500 Hz.
6) If frequency adjustment is required, select "Reference Frequency Adjust" from the PC programmer menu. The "F7" key will lower the frequency; the "F8" key will raise it.
7) Press "F5" to write the new value to memory.

## MODULATION BALANCE

Transmitter modulation balance has been set at the factory and should not require adjustment.

1) Select "Modulation Balance" from the PC Programmer "SST-454 Alignment" screen.
2) Set the RF communications test set to the transmit frequency on the screen.
3) With the PTT switch pressed and no voice applied to the microphone, check the de-modulated waveform for a 20 Hz square wave.
4) If adjustment of the modulation balance is required to flatten the top of the waveform or reduce overshoot:
   a) Select "Modulation Balance Adjust" from the PC Programmer menu.
   b) The "F7" key will lower the balance; the "F8" key will raise it.
   c) Press "F5" to write the new value to memory.

## TRANSMITTER TONE DEVIATION

Transmitter tone deviation has been set at the factory and should not require adjustment.

1) Select "Deviation - Low Frequency" from the PC Programmer "SST-454 Alignment" screen.
2) Set the RF communications test set to the transmit frequency on the screen.
3) Select "Narrow Band" from the PC Programmer "SST-454 Alignment" screen.
4) With the PTT switch pressed and no voice applied to the microphone, check for 400 to 500 Hz deviation of the programmed tone.
5) If adjustment of the tone deviation is required:
   a) Select "Tone Deviation Adjust" from the PC Programmer menu.
   b) The "F7" key will lower the deviation; the "F8" key will raise it.
   c) Press "F5" to write the new value to memory.
6) Select "Wide Band" from the PC Programmer "SST-454 Alignment" screen.
7) With the PTT switch pressed and no voice applied to the microphone, check for 700 to 800 Hz deviation of the programmed tone.
8) If adjustment of the tone deviation is required:
   a) Select "Tone Deviation Adjust" from the PC Programmer menu.
   b) The "F7" key will lower the deviation; the "F8" key will raise it.
   c) Press "F5" to write the new value to memory.
9) Select "Deviation - High Frequency" from the PC Programmer "SST-454 Alignment" screen.
10) Set the RF communications test set to the transmit frequency on the screen.
11) Repeat Steps 3 - 8 for the High transmit frequency.

## TRANSMITTER VOICE DEVIATION

Transmitter voice deviation has been set at the factory and should not require adjustment.

1) Select "Deviation - Low Frequency" from the PC Programmer "SST-454 Alignment" screen.
2) Set the RF communications test set to the transmit frequency on the screen.
3) Select "Narrow Band" from the PC Programmer "SST-454 Alignment" screen.

4) With the PTT switch pressed, talk loudly into the SST-454 microphone. Check for +/- 2.5 KHz maximum combined voice and tone deviation.
5) If adjustment of the voice deviation is required:
   a) Select "Voice Deviation Adjust" from the PC Programmer menu.
   b) The "F7" key will lower the deviation; the "F8" key will raise it.
   c) Press "F5" to write the new value to memory.
6) Select "Wide Band" from the PC Programmer "SST-454 Alignment" screen.
7) With the PTT switch pressed, talk loudly into the SST-454 microphone. Check for +/- 5 KHz maximum combined voice and tone deviation.
8) If adjustment of the voice deviation is required:
   a) Select "Voice Deviation Adjust" from the PC Programmer menu.
   b) The "F7" key will lower the deviation; the "F8" key will raise it.
   c) Press "F5" to write the new value to memory.
9) Select "Deviation - High Frequency" from the PC Programmer "SST-454 Alignment" screen.
10) Set the RF communications test set to the transmit frequency on the screen.
11) Repeat Steps 3 - 8 for high transmit frequency.

**TRANSMITTER POWER**

Transmitter power has been set at the factory and should not require adjustment.

1) Select "Low Power - Low Frequency" from the PC Programmer "SST-454 Alignment" screen.
2) Set the RF communications test set to the transmit frequency on the screen.
3) With the PTT switch pressed, check for 1 Watt of RF power as indicated on the Wattmeter.
4) If adjustment of the Transmitter low power is required:
   a) Select "Low Power Adjust" from the PC Programmer menu.
   b) The "F7" key will lower the power; the "F8" key will raise it.
   c) Press "F5" to write the new value to memory.
5) Select "Medium Power - Low Frequency" from the PC Programmer "SST-454 Alignment" screen.
6) With the PTT switch pressed, check for 2 Watts of RF power as indicated on the Wattmeter.
7) If adjustment of the Transmitter medium power is required:
   a) Select "Medium Power Adjust" from the PC Programmer menu.
   b) The "F7" key will lower the power; the "F8" key will raise it.
   c) Press "F5" to write the new value to memory.
8) Select "High Power - Low Frequency" from the PC Programmer "SST-454 Alignment" screen.
9) With the PTT switch pressed, check for 5 Watts or less of RF power as indicated on the Wattmeter.
10) If adjustment of the Transmitter high power is required:
   a) Select "High Power Adjust" from the PC Programmer menu.
   b) The "F7" key will lower the power; the "F8" key will raise it
      NOTE: The maximum value is limited to prevent damage to the RF final device or from exceeding the SST-454 rated limits.
   c) Press "F5" to write the new value to memory.
11) Select "Low Power - High Frequency" from the PC Programmer "SST-454 Alignment" screen.
12) Set the RF communications test set to the transmit frequency on the screen.
13) Repeat Steps 3 - 10 for the High transmit frequency at low, medium and high power.

**RECEIVER SENSITIVITY AND SQUELCH**

The SST-454 receiver is fixed tuned for a frequency range of 450 - 470 MHz, there are no tuning adjustments required for receiver sensitivity. The SST-454 receiver is configured from the factory for Wide Band operation, with a Narrow Band Model available as an option. The SST-454 receiver bandwidth is configured on a per radio basis , it cannot be switched on a per channel basis. The noise squelch sensitivity is adjusted for a "local" and "distance" level using the PC Programmer, and programmed on a per channel basis to either one of these two settings.

Local and Distance squelch has been set at the factory and should not require adjustment.

1) Select "Squelch" from the PC Programmer "SST-454 Alignment" screen.
2) Select "Distance Squelch" from the PC Programmer "SST-454 Alignment" screen.
3) Connect an 8 Ohm speaker to the 3.5 mm audio jack on the SST-SRVBD test assembly.
4) Set the RF communications test set to:
   a) Generate the radio receive frequency on the screen.
   b) Set the RF output to a level required to produce a 12 dB SINAD measurement across the speaker, typically -119 dBm.
   c) Modulate the RF signal with a 1 KHz tone at 60% system deviation (3 KHz for Wide band receiver and 1.5 KHz for Narrow band).
5) Reduce the RF signal level until the radio squelches, then slowly raise the level until squelch opens. This should be at the level required for 12 dB SINAD receiver sensitivity.
6) If adjustment of distance squelch is required:
   a) Select "Distance Squelch Adjust" from the PC Programmer menu.
   b) The "F7" key will lower the squelch sensitivity; the "F8" key will raise it.
   c) Press "F5" to write the new value to memory.
7) Slowly reduce the RF signal level until the radio is squelched. This level should be 3 - 5 dB below that required to open squelch in Step 5.
8) If adjustment of squelch hysteresis is required:
   a) Select "Squelch Hysteresis Adjust" from the PC Programmer menu.
   b) The "F7" key will decrease the squelch hysteresis; the "F8" key will increase it.
   c) Press "F5" to write the new value to memory.
9) Select "Local Squelch" from the PC Programmer "SST-454 Alignment" screen.
10) Set the RF output to a level required to produce a 20 dB SINAD measurement across the speaker, typically -114 dBm.
11) Reduce the RF signal level until the radio squelches, then slowly raise the level until squelch opens. This should be at the level required for 20 dB SINAD receiver sensitivity.
12) If adjustment of local squelch is required:
   a) Select "Local Squelch Adjust" from the PC Programmer menu.
   b) The "F7" key will lower the squelch sensitivity; the "F8" key will raise it.
   c) Press "F5" to write the new value to memory.

**SYNTHESIZER**

The synthesizer is preset at the factory for operation between 450 and 470 MHz. There is no manual adjustment to center the control voltage, with all adjustment performed by the factory selection of fixed capacitor C425. Do not attempt to adjust the synthesizer control unless a key component in the synthesizer has been replaced. Key components do not include the Y302 reference frequency TCVCXO or IC401 synthesizer IC. Synthesizer alignment errors cause poor operation at temperature extremes.

Should adjustment of the VCO control voltage be necessary, the radio must first be disassembled and powered up at 7.5 VDC. The following procedure defines testing of the VCO control voltage:

1) Select the channel with the lowest receive frequency.
2) Connect a VTVM, DVM or oscilloscope to Test Point 400 and measure the VCO control voltage. This voltage should be no less than 1.5 VDC.
3) Select the channel with the highest receive frequency and measure Test Point 400. The control voltage should be no higher than 4.5 VDC.
4) If adjustment of the VCO control voltage is required:
   a) Remove the shield top from the synthesizer module.
   b) Replace C425 with a capacitor value that allows VCO control voltages between 1.5 and 4.5 VDC for the operating frequencies desired. Decreasing the value of C425 will raise the operating frequency of the VCO while increasing the value will lower the VCO frequency.
   c) Replace the top of the synthesizer shield.

## SST-454 VOLTAGE CHART

**MEASUREMENT CONDITIONS:**

Supply voltage at 7.5 VDC, radio in operating mode, volume control at minimum, power strobe enabled, transmitter set for full power,.

IMPORTANT: Because the SST-454 portable is constructed with grounding sub-planes, use a system ground in the same proximity as the circuit being measured. All readings indicated as GND are true system ground.

KEY: All measurements are in VDC unless indicated otherwise.

| | | | | | |
|---|---|---|---|---|---|
| NC | = | No connection | → | = | See note in right column |
| GND | = | Ground | * | = | Voltage is strobed in Power Saver mode |

### SST-454 VOLTAGES

| DEVICE | PIN | Transmit | Receive | Standby | DESCRIPTION |
|---|---|---|---|---|---|
| CR101 | 1 | 0.7 | 0.0 | 0.0 | TX/RX switching |
| | 2 | NC | NC | NC | |
| | 3 | GND | GND | GND | |
| CR102 | 1 | GND | GND | GND | Voltage clamp |
| | 2 | GND | GND | GND | |
| | 3 | 0.0 | 0.0 | * | |
| CR103 | 1 | GND | GND | GND | Noise detection |
| | 2 | 0.0 | → | * | → amplified receiver noise |
| | 3 | 0.0 | < 0.5 | * | |
| CR201 | 1 | 1.4 | 0.0 | 0.0 | TX/RX switching |
| | 2 | NC | NC | NC | |
| | 3 | 0.7 | 0.0 | 0.0 | |
| CR301 | C | 7.5 | 7.5 | 7.5 | Overvoltage protection |
| | A | GND | GND | GND | |
| CR302 | C | 7.5 | 7.5 | 7.5 | Reverse voltage protection |
| | A | 2.2 | 4.8 | 4.8 | |
| CR303 | 1 | NC | NC | NC | Turn-on detection |
| | 2 | 6.8 | 6.8 | 6.8 | |
| | 3 | 5.0 | 5.0 | 5.0 | |
| CR304 | 1 | 2.0 | 5.0 | 5.0 | PTT switching |
| | 2 | 2.2 | 4.8 | 4.8 | |
| | 3 | 2.5 | 5.0 | 5.0 | |
| CR305 | 1 | GND | GND | GND | Voltage clamp |
| | 2 | 5.0 | 5.0 | 5.0 | |
| | 3 | 5.0 | 5.0 | 5.0 | |
| CR306 | C | 7.5 | 7.5 | 7.5 | Reverse voltage protection |
| | A | 0.0 | → | * | → receive audio amp output |
| CR307 | C | 7.5 | 7.5 | 7.5 | Reverse voltage protection |
| | A | GND | GND | GND | |

## SST-454 VOLTAGES

| DEVICE | PIN | Transmit | Receive | Standby | DESCRIPTION |
|---|---|---|---|---|---|
| CR308 | 1 | 2.0 | 2.0 | 2.0 | Voltage clamp |
| | 2 | NC | NC | NC | |
| | 3 | 2.0 | 2.0 | 2.0 | |
| CR309 | 1 | 6.2 | 5.6 | 6.2 | TX/RX indicator LED |
| | 2 | 5.2 | 6.0 | 6.0 | |
| | 3 | 7.5 | 7.5 | 7.5 | |
| CR310 | 1 | 5.0 | 5.0 | 5.0 | Voltage clamp |
| | 2 | NC | NC | NC | |
| | 3 | 5.0 | 5.0 | 5.0 | |
| IC101 | 1 | 0.0 | 4.9 | * | RX FM-IF subsystem |
| | 2 | NC | NC | NC | |
| | 3 | 0.0 | 4.0 | * | |
| | 4 | 0.0 | 5.0 | * | |
| | 5 | 0.0 | 4.0 | * | |
| | 6 | 0.0 | 4.0 | * | |
| | 7 | 0.0 | 4.0 | * | |
| | 8 | 0.0 | 5.0 | * | |
| | 9 | 0.0 | 2.0 | * | |
| | 10 | 0.0 | 0.6 | * | |
| | 11 | 0.0 | 2.8 | * | |
| | 12 | 0.0 | 0.0 | * | |
| | 13 | NC | NC | NC | |
| | 14 | NC | NC | NC | |
| | 15 | GND | GND | GND | |
| | 16 | 0.0 | 1.8 | * | |
| IC102 | 1 | NC | NC | NC | Double balanced mixer |
| | 2 | 0.0 | 5.0 | * | |
| | 3 | 0.0 | 5.0 | * | |
| | 4 | 0.0 | 5.0 | * | |
| | 5 | 0.0 | 5.0 | * | |
| | 6 | 0.0 | 5.0 | * | |
| | 7 | GND | GND | GND | |
| | 8 | 0.0 | 0.8 | * | |
| IC301 | 1 | 5.0 | 5.0 | 5.0 | +5 VDC voltage regulator |
| | 2 | GND | GND | GND | |
| | 3 | GND | GND | GND | |
| | 4 | NC | NC | NC | |
| | 5 | NC | NC | NC | |
| | 6 | GND | GND | GND | |
| | 7 | GND | GND | GND | |
| | 8 | 7.5 | 7.5 | 7.5 | |
| IC302 | 1 | 0.0 | 5.0 | 5.0 | Microcontroller |
| | 2 | 0.0 | 5.0 | 5.0 | |
| | 3 | 5.0 | 5.0 | 5.0 | |
| | 4 | 5.0 | 5.0 | 5.0 | |
| | 5 | 5.0 | 0.0 | 0.0 | |
| | 6 | 0.0 | 0.0 | 5.0 | |
| | 7 | 5.0 | 5.0 | 5.0 | |
| | 8 | → | 0.0 | 0.0 | → 0-5 VDC 15KHz pulses |
| | 9 | NC | NC | NC | |
| | 10 | NC | NC | NC | |

## SST-454 VOLTAGES

| DEVICE | PIN | Transmit | Receive | Standby | DESCRIPTION |
|---|---|---|---|---|---|
| IC302 | 11 | NC | NC | NC | Microcontroller |
| | 12 | 5.0 | 5.0 | 5.0 | |
| | 13 | 0.0 | 5.0 | 0.0 | |
| | 14 | 5.0 | 0.0 | 0.0 | |
| | 15 | 0.0 | 0.0 | 0.0 | |
| | 16 | 0.0 | 0.0 | 0.0 | |
| | 17 | → | 2.0 | 2.0 | → 0-5 VDC tone encode waveform |
| | 18 | → | 2.0 | 2.0 | → 0-5 VDC tone encode waveform |
| | 19 | 5.0 | 5.0 | 5.0 | |
| | 20 | 5.0 | 0.0 | 0.0 | |
| | 21 | GND | GND | GND | |
| | 22 | 5.0 | 5.0 | 5.0 | |
| | 23 | 0.0 | 5.0 | 5.0 | |
| | 24 | 5.0 | 5.0 | 5.0 | |
| | 25 | 0.0 | 0.0 | 0.0 | |
| | 26 | 5.0 | 5.0 | 5.0 | |
| | 27 | 0.0 | 0.0 | 0.0 | |
| | 28 | NC | NC | NC | |
| | 29 | NC | NC | NC | |
| | 30 | 5.0 | 0.0 | 0.0 | |
| | 31 | NC | NC | NC | |
| | 32 | 5.0 | 0.0 | 5.0 | |
| | 33 | 0.0 | 0.0 | 0.0 | |
| | 34 | 0.0 | 5.0 | 0.0 | |
| | 35 | 0.0 | 0.0 | 0.0 | |
| | 36 | → | → | 0.0 | → low-pass filtered waveforms for decode |
| | 37 | → | → | 0.0 | → processed voice waveforms |
| | 38 | 3.7 | 3.7 | 3.7 | |
| | 39 | 0.0 | 0.2 | 0.0 | |
| | 40 | 5.0 | 5.0 | 5.0 | |
| | 41 | 0.0 | 0.0 | 0.0 | |
| | 42 | 5.0 | 5.0 | 5.0 | |
| | 43 | NC | NC | NC | |
| | 44 | 5.0 | 5.0 | 5.0 | |
| | 45 | GND | GND | GND | |
| | 46 | NC | NC | NC | |
| | 47 | NC | NC | NC | |
| | 48 | NC | NC | NC | |
| | 49 | NC | NC | NC | |
| | 50 | NC | NC | NC | |
| | 51 | NC | NC | NC | |
| | 52 | NC | NC | NC | |
| | 53 | NC | NC | NC | |
| | 54 | 5.0 | 5.0 | 5.0 | |
| | 55 | 5.0 | 5.0 | 5.0 | |
| | 56 | GND | GND | GND | |
| | 57 | 2.0 | 2.0 | 2.0 | |
| | 58 | → | → | → | → 8 MHz reference clock |
| | 59 | → | → | → | → 8 MHz reference clock |
| | 60 | 5.0 | 5.0 | 5.0 | |
| | 61 | GND | GND | GND | |
| | 62 | 0.0 | 0.0 | 0.0 | |
| | 63 | 5.0 | 5.0 | 5.0 | |
| | 64 | 5.0 | 5.0 | 5.0 | |

## SST-454 VOLTAGES

| DEVICE | PIN | Transmit | Receive | Standby | DESCRIPTION |
|---|---|---|---|---|---|
| IC304 | 1 | 0.0 | 0.0 | * | Audio signal switching |
| | 2 | 2.0 | 2.0 | * | |
| | 3 | 2.0 | 2.0 | * | |
| | 4 | 2.0 | 2.0 | * | |
| | 5 | 0.0 | 5.0 | * | |
| | 6 | 0.0 | 0.0 | 0.0 | |
| | 7 | GND | GND | GND | |
| | 8 | GND | GND | GND | |
| | 9 | 5.0 | 0.0 | 0.0 | |
| | 10 | 5.0 | 0.0 | 0.0 | |
| | 11 | 5.0 | 0.0 | 0.0 | |
| | 12 | 2.0 | 2.0 | * | |
| | 13 | NC | NC | NC | |
| | 14 | 0.0 | 2.0 | * | |
| | 15 | 0.0 | 2.0 | * | |
| | 16 | 5.0 | 5.0 | 5.0 | |
| IC305 | 1 | 2.0 | 2.0 | * | Audio processing |
| | 2 | 2.0 | 2.0 | * | |
| | 3 | 2.0 | 2.0 | * | |
| | 4 | GND | GND | GND | |
| | 5 | 2.0 | 2.0 | * | |
| | 6 | 2.0 | 2.0 | * | |
| | 7 | 2.5 | 2.5 | * | |
| | 8 | 6.0 | 6.0 | * | |
| IC306 | 1 | 2.0 | 2.0 | * | Audio processing |
| | 2 | 2.0 | 2.0 | * | |
| | 3 | 2.0 | 2.0 | * | |
| | 4 | GND | GND | GND | |
| | 5 | 2.0 | 2.0 | * | |
| | 6 | 2.0 | 2.0 | * | |
| | 7 | 2.0 | 2.0 | * | |
| | 8 | 5.0 | 5.0 | * | |
| IC307 | 1 | 2.0 | 2.0 | * | Tone low pass filter |
| | 2 | 2.0 | 2.0 | * | |
| | 3 | 2.0 | 2.0 | * | |
| | 4 | 2.0 | 2.0 | * | |
| | 5 | 2.0 | 2.0 | * | |
| | 6 | 5.0 | 5.0 | * | |
| | 7 | 2.0 | 2.0 | * | |
| | 8 | 2.0 | 2.0 | * | |
| | 9 | 2.5 | 2.5 | * | |
| | 10 | GND | GND | GND | |
| | 11 | 2.5 | 2.5 | * | |
| | 12 | GND | GND | GND | |
| | 13 | 2.0 | 2.0 | * | |
| | 14 | 2.0 | 2.0 | * | |
| IC308 | 1 | 1.5 | 1.5 | * | Audio signal level control |
| | 2 | 1.6 | 1.6 | * | |
| | 3 | GND | GND | GND | |
| | 4 | 1.5 | 1.5 | * | |
| | 5 | 2.0 | 2.0 | * | |
| | 6 | 2.0 | 2.0 | * | |
| | 7 | 2.0 | 2.0 | * | |

## SST-454 VOLTAGES

| DEVICE | PIN | Transmit | Receive | Standby | DESCRIPTION |
|---|---|---|---|---|---|
| IC308 | 8 | 0.0 | 0.0 | * | Audio signal level control |
| | 9 | 0.0 | 0.0 | * | |
| | 10 | GND | GND | GND | |
| | 11 | NC | NC | NC | |
| | 12 | 0.0 | 0.0 | * | |
| | 13 | 2.0 | 2.0 | * | |
| | 14 | 2.0 | 2.0 | * | |
| | 15 | 2.0 | 2.0 | * | |
| | 16 | 2.0 | 2.0 | * | |
| | 17 | 2.0 | 2.0 | * | |
| | 18 | 5.0 | 5.0 | * | |
| | 19 | 5.0 | 5.0 | * | |
| | 20 | 5.0 | 5.0 | * | |
| IC309 | 1 | NC | NC | NC | Audio amplifier |
| | 2 | 0.0 | 0.0 | 0.0 | |
| | 3 | GND | GND | GND | |
| | 4 | GND | GND | GND | |
| | 5 | 0.0 | 3.7 | 0.0 | |
| | 6 | 0.0 | 7.5 | 0.0 | |
| | 7 | 0.0 | 3.7 | 0.0 | |
| | 8 | NC | NC | NC | |
| Q 101 | 1 | 0.0 | 0.7 | * | RX RF amplifier |
| | 2 | GND | GND | GND | |
| | 3 | 0.0 | 2.7 | * | |
| Q 102 | 1 | 0.0 | 0.7 | * | RX 1st LO multiplier/amp |
| | 2 | GND | GND | GND | |
| | 3 | 0.0 | 4.3 | * | |
| Q 103 | 1 | 0.0 | 0.7 | * | RX IF amplifier |
| | 2 | GND | GND | GND | |
| | 3 | 0.0 | 1.2 | * | |
| Q 201 | 1 | 4.5 | 0.0 | 0.0 | PWM TX power control |
| | 2 | 3.8 | 0.0 | 0.0 | |
| | 3 | 6.0 | 0.0 | 0.0 | |
| Q 202 | 1 | 5.1 | 0.0 | 0.0 | TX +V switching |
| | 2 | 4.5 | 0.0 | 0.0 | |
| | 3 | 6.8 | 7.5 | 7.5 | |
| Q 203 | 1 | 0.0 | 0.0 | 0.0 | TX RF final amplifier |
| | 2 | 3.8 | 0.0 | 0.0 | |
| | 3 | 7.5 | 7.5 | 7.5 | |
| | 4 | 0.0 | 0.0 | 0.0 | |
| | 5 | GND | GND | GND | |
| Q 204 | 1 | 6.8 | 7.5 | 7.5 | TX +V switching |
| | 2 | 7.5 | 7.5 | 7.5 | |
| | 3 | 6.0 | 0.0 | 0.0 | |
| Q 205 | 1 | 0.9 | 0.0 | 0.0 | TX RF driver amplifier |
| | 2 | 0.3 | 0.0 | 0.0 | |
| | 3 | 6.0 | 0.0 | 0.0 | |

## SST-454 VOLTAGES

| DEVICE | PIN | Transmit | Receive | Standby | DESCRIPTION |
|---|---|---|---|---|---|
| Q 301 | 1 | 5.0 | 0.0 | 0.0 | PTT detection |
| | 2 | GND | GND | GND | |
| | 3 | 0.0 | 5.0 | 5.0 | |
| Q 302 | 1 | 4.4 | 5.0 | 5.0 | PTT detection |
| | 2 | 5.0 | 5.0 | 5.0 | |
| | 3 | 5.0 | 0.0 | 0.0 | |
| Q 303 | 1 | 7.0 | 7.0 | * | +6V switching |
| | 2 | 7.5 | 7.5 | 7.5 | |
| | 3 | 6.0 | 6.0 | * | |
| Q 304 | 1 | 5.0 | 5.0 | * | +6V switching |
| | 2 | 4.4 | 4.4 | * | |
| | 3 | 7.0 | 7.0 | * | |
| Q 305 | 1 | 4.4 | 4.4 | 4.4 | Battery +V switching |
| | 2 | 5.0 | 5.0 | 5.0 | |
| | 3 | 7.5 | 7.5 | 7.5 | |
| | 4 | 7.5 | 7.5 | 7.5 | |
| | 5 | 6.8 | 6.8 | 6.8 | |
| | 6 | 6.8 | 6.8 | 6.8 | |
| Q 307 | 1 | 4.3 | 4.3 | * | +5V switching |
| | 2 | 5.0 | 5.0 | 5.0 | |
| | 3 | 5.0 | 5.0 | * | |
| Q 308 | 1 | 5.0 | 4.3 | * | RX +V switching |
| | 2 | 5.0 | 5.0 | 5.0 | |
| | 3 | 0.0 | 5.0 | * | |
| Q 310 | 1 | 0.0 | 5.0 | 0.0 | LED indicator switching |
| | 2 | GND | GND | GND | |
| | 3 | 5.0 | 0.0 | 0.0 | |
| | 4 | 0.0 | 6.2 | 6.2 | |
| | 5 | 6.2 | 0.0 | 6.2 | |
| Q 312 | 1 | 0.0 | 5.0 | 0.0 | Audio amplifier enable |
| | 2 | 0.0 | 4.3 | 0.0 | |
| | 3 | 7.5 | 6.8 | 7.5 | |
| Q 313 | 1 | 7.5 | 6.8 | 7.5 | Audio amplifier +V switching |
| | 2 | 7.5 | 7.5 | 7.5 | |
| | 3 | 0.0 | 7.5 | 0.0 | |

## SST-454 SYNTHESIZER VOLTAGES

| DEVICE | PIN | Transmit | Receive | Standby | DESCRIPTION |
|---|---|---|---|---|---|
| CR401 | 1 | 6.0 | 6.0 | * | Biasing |
| | 2 | 5.8 | 5.8 | * | |
| | 3 | NC | NC | NC | |

## SST-454 SYNTHESIZER VOLTAGES

| DEVICE | PIN | Transmit | Receive | Standby | DESCRIPTION |
|---|---|---|---|---|---|
| CR402 | 1 | GND | GND | GND | VCO tuning |
| | 2 | NC | NC | NC | |
| | 3 | → | → | * | → 1.5 - 5 VDC VCO tuning voltage |
| CR403 | 1 | GND | GND | GND | VCO modulation |
| | 2 | GND | GND | GND | |
| | 3 | 2.2 | 2.2 | * | |
| CR404 | 1 | 0.8 | 0.0 | * | TX/RX VCO switching |
| | 2 | NC | NC | NC | |
| | 3 | 0.0 | 4.8 | * | |
| IC401 | 1 | NC | NC | NC | Frequency synthesizer |
| | 2 | 5.0 | 5.0 | * | |
| | 3 | NC | NC | NC | |
| | 4 | NC | NC | NC | |
| | 5 | 6.0 | 6.0 | * | |
| | 6 | → | → | * | → 1.5 - 5 VDC VCO tuning voltage |
| | 7 | GND | GND | GND | |
| | 8 | 2.2 | 2.2 | * | |
| | 9 | NC | NC | NC | |
| | 10 | 2.7 | 2.7 | * | |
| | 11 | 2.7 | 2.7 | * | |
| | 12 | 5.0 | 5.0 | * | |
| | 13 | NC | NC | NC | |
| | 14 | 5.0 | 5.0 | * | |
| | 15 | 0.0 | 0.0 | * | |
| | 16 | NC | NC | NC | |
| | 17 | 5.0 | 5.0 | * | |
| | 18 | 0.0 | 0.0 | * | |
| | 19 | 0.0 | 0.0 | * | |
| | 20 | 2.2 → | 2.2 → | * | → 14.4 MHz reference signal |
| Q 401 | 1 | 0.7 | 0.7 | * | VCO buffer amplifier |
| | 2 | GND | GND | GND | |
| | 3 | 2.8 | 2.8 | * | |
| Q 402 | 1 | 5.7 | 5.7 | * | VCO voltage de-coupling |
| | 2 | 5.0 | 5.0 | * | |
| | 3 | 6.0 | 6.0 | * | |
| Q 403 | 1 | 0.7 | 0.7 | * | VCO buffer amplifier |
| | 2 | GND | GND | GND | |
| | 3 | 2.9 | 2.9 | * | |
| Q 404 | 1 | 2.3 | 2.3 | * | VCO oscillator |
| | 2 | 1.6 | 1.6 | * | |
| | 3 | 4.7 | 4.7 | * | |
| Q 406 | 1 | 0.0 | 5.0 | * | TX/RX VCO switching |
| | 2 | 5.0 | 5.0 | * | |
| | 3 | 4.9 | 0.0 | * | |
| Q 407 | 1 | 0.0 | 5.0 | * | TX/RX VCO switching |
| | 2 | GND | GND | GND | |
| | 3 | 5.0 | 0.0 | * | |

## SST-454 SCHEMATIC REFERENCE PARTS LIST

NOTE: This parts list reflects the most current component values. If a component value given in the schematic differs from this list, the parts list should be considered the most current.

| Ref # | RITRON# | Description | Main PCB Coordinates | | |
|---|---|---|---|---|---|
| **CAPACITORS** | | | | | |
| C 101 | 151708A2 | 8.2pF NPO 0603 50V CHIP CAPACITOR | 0.859 | 4.302 | B |
| C 102 | 15170150 | 15PF NPO 0603 50V CHIP CAPACITOR | 0.919 | 4.367 | B |
| C 103 | 151706A8 | 6.8pF NPO 0603 50V CHIP CAPACITOR | 1.099 | 4.367 | B |
| C 104 | 15170120 | 12PF NPO 0603 50V CHIP CAPACITOR | 1.224 | 4.367 | B |
| C 105 | 151706A8 | 6.8pF NPO 0603 50V CHIP CAPACITOR | 1.224 | 4.292 | B |
| C 106 | 151708A2 | 8.2pF NPO 0603 50V CHIP CAPACITOR | 1.324 | 4.322 | B |
| C 107 | 15170120 | 12PF NPO 0603 50V CHIP CAPACITOR | 1.354 | 4.422 | B |
| C 108 | 15170120 | 12PF NPO 0603 50V CHIP CAPACITOR | 1.424 | 4.352 | B |
| C 109 | 151705A6 | 5.6pF NPO 0603 50V CHIP CAPACITOR | 1.504 | 4.259 | B |
| C 110 | 15170330 | 33pF NPO 0603 50V CHIP CAPACITOR | 1.724 | 4.290 | B |
| C 111 | 15170151 | 150PF NPO 0603 50V CHIP CAPACITOR | - 1.719 | 4.230 | T |
| C 112 | 15170101 | 100PF NPO 0603 50V CHIP CAPACITOR | 1.634 | 3.325 | B |
| C 113 | 15170151 | 150PF NPO 0603 50V CHIP CAPACITOR | 1.569 | 4.260 | B |
| C 114 | 151703A3 | 3.3pF NPO 0603 50V CHIP CAPACITOR | - 1.454 | 3.985 | T |
| C 115 | 151703A3 | 3.3pF NPO 0603 50V CHIP CAPACITOR | - 1.454 | 4.045 | T |
| C 116 | 15170120 | 12PF NPO 0603 50V CHIP CAPACITOR | - 1.225 | 3.888 | T |
| C 117 | 15170120 | 12PF NPO 0603 50V CHIP CAPACITOR | - 1.170 | 3.888 | T |
| C 118 | 151708A2 | 8.2pF NPO 0603 50V CHIP CAPACITOR | - 1.280 | 3.828 | T |
| C 119 | 151703A9 | 3.9pF NPO 0603 50V CHIP CAPACITOR | - 1.419 | 3.715 | T |
| C 120 | 15170120 | 12PF NPO 0603 50V CHIP CAPACITOR | - 1.559 | 3.810 | T |
| C 121 | 151708A2 | 8.2pF NPO 0603 50V CHIP CAPACITOR | - 1.419 | 3.655 | T |
| C 122 | 15170100 | 10 PF NPO 0603 50V CHIP CAPACITOR | - 1.214 | 3.555 | T |
| C 123 | 15170120 | 12PF NPO 0603 50V CHIP CAPACITOR | - 1.154 | 3.555 | T |
| C 124 | 151706A8 | 6.8pF NPO 0603 50V CHIP CAPACITOR | - 1.184 | 3.460 | T |
| C 125 | 15170180 | 18pF NPO 0603 50V CHIP CAPACITOR | 1.229 | 3.478 | B |
| C 126 | 151708A2 | 8.2pF NPO 0603 50V CHIP CAPACITOR | 1.368 | 3.525 | B |
| C 127 | 15170101 | 100PF NPO 0603 50V CHIP CAPACITOR | 1.554 | 3.420 | B |
| C 128 | 15170150 | 15PF NPO 0603 50V CHIP CAPACITOR | - 1.254 | 3.259 | T |
| C 129 | 151703A9 | 3.9pF NPO 0603 50V CHIP CAPACITOR | 1.623 | 3.482 | B |
| C 130 | 15179103 | .01UF X7R 0603 25V CHIP CAPACITOR | 1.549 | 3.010 | B |
| C 131 | 151708A2 | 8.2pF NPO 0603 50V CHIP CAPACITOR | 1.429 | 3.030 | B |
| C 132 | 15119104 | .1uF X7R 0805 25V CERAMIC CHIP CAP | 1.305 | 2.620 | B |
| C 133 | 15119104 | .1uF X7R 0805 25V CERAMIC CHIP CAP | 1.354 | 2.762 | B |
| C 134 | 15179102 | .001UF X7R 0603 25V CHIP CAPACITOR | 1.429 | 2.920 | B |
| C 135 | 152B6106 | 10uF 10V 3.4 X 2.8 CHIP TANTALUM | - 1.424 | 2.880 | T |
| C 136 | 15179102 | .001UF X7R 0603 25V CHIP CAPACITOR | 1.478 | 2.492 | B |
| C 137 | 15179102 | .001UF X7R 0603 25V CHIP CAPACITOR | 1.494 | 2.600 | B |
| C 138 | 15119104 | .1uF X7R 0805 25V CERAMIC CHIP CAP | 1.646 | 2.710 | B |
| C 139 | 15179103 | .01UF X7R 0603 25V CHIP CAPACITOR | 1.232 | 2.631 | B |
| C 140 | 15179103 | .01UF X7R 0603 25V CHIP CAPACITOR | 1.734 | 2.191 | B |
| C 141 | 15170220 | 22pF NPO 0603 50V CHIP CAPACITOR | 1.704 | 1.975 | B |
| C 142 | 15170330 | 33pF NPO 0603 50V CHIP CAPACITOR | 1.739 | 2.395 | B |
| C 143 | 15119104 | .1uF X7R 0805 25V CERAMIC CHIP CAP | 1.734 | 2.602 | B |
| C 144 | 15119104 | .1uF X7R 0805 25V CERAMIC CHIP CAP | 1.734 | 2.522 | B |
| C 145 | 15119104 | .1uF X7R 0805 25V CERAMIC CHIP CAP | 1.357 | 1.793 | B |
| C 146 | 15170390 | 39pF NPO 0603 50V CHIP CAPACITOR | 1.739 | 2.450 | B |

| Ref # | RITRON# | Description | Main PCB Coordinates | | |
|---|---|---|---|---|---|
| C 201 | 15170101 | 100PF NPO 0603 50V CHIP CAPACITOR | 0.471 | 3.815 | B |
| C 202 | 15179103 | .01UF X7R 0603 25V CHIP CAPACITOR | 0.561 | 3.165 | B |
| C 203 | 15179103 | .01UF X7R 0603 25V CHIP CAPACITOR | 0.737 | 3.030 | B |
| C 204 | 15119104 | .1uF X7R 0805 25V CERAMIC CHIP CAP | - 0.354 | 2.153 | T |
| C 205 | 15170101 | 100PF NPO 0603 50V CHIP CAPACITOR | - 0.394 | 2.256 | T |
| C 206 | 15170100 | 10 PF NPO 0603 50V CHIP CAPACITOR | 0.005 | 2.368 | T |
| C 208 | 15170560 | 56pF NPO 0603 50V CHIP CAPACITOR | - 0.070 | 2.167 | T |
| C 209 | 15170101 | 100PF NPO 0603 50V CHIP CAPACITOR | 0.485 | 2.947 | B |
| C 210 | 15170101 | 100PF NPO 0603 50V CHIP CAPACITOR | 0.044 | 3.305 | B |
| C 211 | 15179102 | .001UF X7R 0603 25V CHIP CAPACITOR | 0.044 | 3.095 | B |
| C 212 | 15179102 | .001UF X7R 0603 25V CHIP CAPACITOR | 0.682 | 3.760 | B |
| C 213 | 152A8105 | 1MFD 16V ~3.2 X 1.6~ CHIP TANTALUM | - 0.983 | 3.425 | T |
| C 214 | 15170150 | 15PF NPO 0603 50V CHIP CAPACITOR | - 0.262 | 3.816 | T |
| C 215 | 15179102 | .001UF X7R 0603 25V CHIP CAPACITOR | 0.513 | 3.318 | B |
| C 217 | 151704A7 | 4.7pF NPO 0603 50V CHIP CAPACITOR | - 0.142 | 4.128 | T |
| C 218 | 15170100 | 10 PF NPO 0603 50V CHIP CAPACITOR | - 0.419 | 4.018 | T |
| C 219 | 151704A7 | 4.7pF NPO 0603 50V CHIP CAPACITOR | - 0.699 | 3.845 | T |
| C 220 | 15170101 | 100PF NPO 0603 50V CHIP CAPACITOR | - 0.671 | 3.938 | T |
| C 301 | 15179102 | .001UF X7R 0603 25V CHIP CAPACITOR | 0.905 | 0.663 | B |
| C 302 | 15179102 | .001UF X7R 0603 25V CHIP CAPACITOR | 1.312 | 0.767 | B |
| C 303 | 152B4226 | 22uF 6.3V 3.4 X 2.8 CHIP TANTALUM CAP | - 1.119 | 0.737 | T |
| C 304 | 15179102 | .001UF X7R 0603 25V CHIP CAPACITOR | 0.539 | 4.587 | B |
| C 305 | 15170101 | 100PF NPO 0603 50V CHIP CAPACITOR | 1.479 | 0.442 | B |
| C 306 | 15179103 | .01UF X7R 0603 25V CHIP CAPACITOR | 1.038 | 1.459 | B |
| C 307 | 15179103 | .01UF X7R 0603 25V CHIP CAPACITOR | 1.614 | 4.497 | B |
| C 308 | 15179103 | .01UF X7R 0603 25V CHIP CAPACITOR | 1.089 | 4.497 | B |
| C 309 | 15179102 | .001UF X7R 0603 25V CHIP CAPACITOR | 1.604 | 3.010 | B |
| C 310 | 15179102 | .001UF X7R 0603 25V CHIP CAPACITOR | 0.039 | 1.265 | B |
| C 312 | 15179102 | .001UF X7R 0603 25V CHIP CAPACITOR | 0.377 | 1.886 | B |
| C 313 | 15119104 | .1uF X7R 0805 25V CERAMIC CHIP CAP | 0.377 | 0.927 | B |
| C 314 | 15179102 | .001UF X7R 0603 25V CHIP CAPACITOR | 1.189 | 1.332 | B |
| C 315 | 15179102 | .001UF X7R 0603 25V CHIP CAPACITOR | 0.255 | 1.886 | B |
| C 316 | 15170330 | 33pF NPO 0603 50V CHIP CAPACITOR | 0.432 | 0.579 | B |
| C 317 | 15170330 | 33pF NPO 0603 50V CHIP CAPACITOR | 0.632 | 0.579 | B |
| C 318 | 15179102 | .001UF X7R 0603 25V CHIP CAPACITOR | 1.552 | 3.841 | B |
| C 319 | 15119104 | .1uF X7R 0805 25V CERAMIC CHIP CAP | - 1.629 | 0.680 | T |
| C 320 | 15179103 | .01UF X7R 0603 25V CHIP CAPACITOR | 1.190 | 1.934 | B |
| C 321 | 15111333 | .033MFD X7R 0805 50V CHIP CAP | 1.109 | 2.867 | B |
| C 322 | 15179472 | .0047UF X7R 0603 25V CHIP CAPACITOR | 1.566 | 1.597 | B |
| C 323 | 15179472 | .0047UF X7R 0603 25V CHIP CAPACITOR | 1.536 | 1.507 | B |
| C 324 | 15119473 | .047uF X7R 0805 25V CHIP CAPACITOR | 1.754 | 1.423 | B |
| C 325 | 15170180 | 18pF NPO 0603 50V CHIP CAPACITOR | 1.715 | 1.320 | B |
| C 326 | 15111333 | .033MFD X7R 0805 50V CHIP CAP | 1.743 | 1.711 | B |
| C 327 | 15179222 | .0022UF X7R 0603 25V CHIP CAPACITOR | 0.610 | 2.635 | B |
| C 328 | 15170100 | 10 PF NPO 0603 50V CHIP CAPACITOR | 0.610 | 2.744 | B |
| C 329 | 15179102 | .001UF X7R 0603 25V CHIP CAPACITOR | 0.322 | 1.886 | B |
| C 330 | 15179102 | .001UF X7R 0603 25V CHIP CAPACITOR | 1.030 | 1.153 | B |
| C 331 | 15179102 | .001UF X7R 0603 25V CHIP CAPACITOR | 0.744 | 1.887 | B |
| C 332 | 15179102 | .001UF X7R 0603 25V CHIP CAPACITOR | 0.039 | 1.679 | B |
| C 333 | 15179102 | .001UF X7R 0603 25V CHIP CAPACITOR | 0.039 | 1.569 | B |
| C 334 | 15170101 | 100PF NPO 0603 50V CHIP CAPACITOR | 0.564 | 2.367 | B |
| C 335 | 15179102 | .001UF X7R 0603 25V CHIP CAPACITOR | 0.031 | 1.775 | B |
| C 336 | 15179102 | .001UF X7R 0603 25V CHIP CAPACITOR | 0.689 | 1.886 | B |
| C 337 | 15170101 | 100PF NPO 0603 50V CHIP CAPACITOR | 1.038 | 1.349 | B |
| C 338 | 15179102 | .001UF X7R 0603 25V CHIP CAPACITOR | 1.039 | 1.237 | B |

| Ref # | RITRON# | Description | Main PCB Coordinates | | |
|---|---|---|---|---|---|
| C 339 | 152A6475 | 4.7UF 10V A-SIZE TANTALUM CHIP CAP | 1.139 | 2.778 | B |
| C 340 | 15170101 | 100PF NPO 0603 50V CHIP CAPACITOR | 1.183 | 2.372 | B |
| C 341 | 15179102 | .001UF X7R 0603 25V CHIP CAPACITOR | 1.238 | 2.373 | B |
| C 342 | 152B6106 | 10uF 10V 3.4 X 2.8 CHIP TANTALUM | 1.056 | 1.785 | B |
| C 343 | 15179103 | .01UF X7R 0603 25V CHIP CAPACITOR | 1.438 | 1.541 | B |
| C 344 | 152A8105 | 1MFD 16V ~3.2 X 1.6~ CHIP TANTALUM | 1.559 | 1.203 | B |
| C 345 | 15111122 | .0012MF X7R 0805 50V CHIP | - 1.294 | 2.166 | T |
| C 346 | 15110821 | 820PF NPO 0805 50V CHIP CAP | 1.062 | 1.998 | B |
| C 347 | 15170221 | 220PF NPO 0603 50V CHIP CAPACITOR | - 1.227 | 2.556 | T |
| C 348 | 15179122 | .0012UF X7R 0603 25V CHIP CAPACITOR | - 1.210 | 2.425 | T |
| C 349 | 15179122 | .0012UF X7R 0603 25V CHIP CAPACITOR | - 1.210 | 2.365 | T |
| C 350 | 15119104 | .1uF X7R 0805 25V CERAMIC CHIP CAP | - 1.428 | 2.265 | T |
| C 351 | 15170100 | 10 PF NPO 0603 50V CHIP CAPACITOR | - 1.070 | 2.221 | T |
| C 352 | 15179102 | .001UF X7R 0603 25V CHIP CAPACITOR | - 0.875 | 2.318 | T |
| C 353 | 15179102 | .001UF X7R 0603 25V CHIP CAPACITOR | - 0.865 | 2.589 | T |
| C 354 | 15119104 | .1uF X7R 0805 25V CERAMIC CHIP CAP | 0.756 | 2.947 | B |
| C 355 | 15170101 | 100PF NPO 0603 50V CHIP CAPACITOR | 1.287 | 4.005 | B |
| C 356 | 15119104 | .1uF X7R 0805 25V CERAMIC CHIP CAP | 1.108 | 3.102 | B |
| C 357 | 15119104 | .1uF X7R 0805 25V CERAMIC CHIP CAP | 0.806 | 3.525 | B |
| C 358 | 152B6106 | 10uF 10V 3.4 X 2.8 CHIP TANTALUM | - 0.984 | 3.570 | T |
| C 359 | 01503212 | 220MF 10V ELT CAPACITOR, 5mm HEIGHT | - 1.025 | 3.940 | T |
| C 360 | 15119104 | .1uF X7R 0805 25V CERAMIC CHIP CAP | 0.947 | 3.412 | B |
| C 361 | 15119104 | .1uF X7R 0805 25V CERAMIC CHIP CAP | 0.775 | 3.234 | B |
| C 362 | 15170101 | 100PF NPO 0603 50V CHIP CAPACITOR | 1.446 | 2.254 | B |
| C 363 | 15179102 | .001UF X7R 0603 25V CHIP CAPACITOR | 0.039 | 1.210 | B |
| C 364 | 15179102 | .001UF X7R 0603 25V CHIP CAPACITOR | 0.039 | 1.320 | B |
| C 365 | 15179103 | .01UF X7R 0603 25V CHIP CAPACITOR | 1.033 | 2.539 | B |
| C 366 | 15170101 | 100PF NPO 0603 50V CHIP CAPACITOR | 0.039 | 1.624 | B |
| C 367 | 15179102 | .001UF X7R 0603 25V CHIP CAPACITOR | 1.039 | 1.292 | B |
| C 368 | 15170101 | 100PF NPO 0603 50V CHIP CAPACITOR | 0.711 | 0.836 | B |
| C 369 | 15179103 | .01UF X7R 0603 25V CHIP CAPACITOR | 0.039 | 1.155 | B |
| C 370 | 15179103 | .01UF X7R 0603 25V CHIP CAPACITOR | 0.634 | 1.886 | B |
| C 371 | 15170101 | 100PF NPO 0603 50V CHIP CAPACITOR | 0.039 | 1.375 | B |
| C 372 | 15179102 | .001UF X7R 0603 25V CHIP CAPACITOR | 0.094 | 1.465 | B |
| C 373 | 15179102 | .001UF X7R 0603 25V CHIP CAPACITOR | - 0.583 | 2.698 | T |
| C 374 | 15111102 | .001MF X7R 0805 50V CHIP CAP | | | |
| C 375 | 15179102 | .001UF X7R 0603 25V CHIP CAPACITOR | 0.800 | 2.003 | B |
| C 376 | 15179102 | .001UF X7R 0603 25V CHIP CAPACITOR | 1.022 | 2.960 | B |
| C 377 | 15179102 | .001UF X7R 0603 25V CHIP CAPACITOR | 1.526 | 1.125 | B |
| C 378 | 15119104 | .1uF X7R 0805 25V CERAMIC CHIP CAP | 1.184 | 1.228 | B |
| C 379 | 15179103 | .01UF X7R 0603 25V CHIP CAPACITOR | 1.038 | 1.404 | B |
| C 380 | 15119104 | .1uF X7R 0805 25V CERAMIC CHIP CAP | 0.473 | 0.917 | B |
| C 381 | 15179102 | .001UF X7R 0603 25V CHIP CAPACITOR | 1.102 | 1.627 | B |
| C 382 | 15179102 | .001UF X7R 0603 25V CHIP CAPACITOR | 1.102 | 1.682 | B |
| C 383 | 15179103 | .01UF X7R 0603 25V CHIP CAPACITOR | 0.876 | 0.837 | B |
| C 384 | 15179103 | .01UF X7R 0603 25V CHIP CAPACITOR | 0.305 | 0.937 | B |
| C 385 | 15170101 | 100PF NPO 0603 50V CHIP CAPACITOR | 1.457 | 4.005 | B |
| C 386 | 15170101 | 100PF NPO 0603 50V CHIP CAPACITOR | 1.637 | 0.880 | B |
| C 387 | 152A8105 | 1MFD 16V ~3.2 X 1.6~ CHIP TANTALUM | 1.615 | 0.804 | B |
| C 388 | 15179102 | .001UF X7R 0603 25V CHIP CAPACITOR | 1.076 | 1.572 | B |
| C 389 | 15179102 | .001UF X7R 0603 25V CHIP CAPACITOR | 1.042 | 1.517 | B |
| C 390 | 15179102 | .001UF X7R 0603 25V CHIP CAPACITOR | 0.487 | 1.887 | B |
| C 391 | 15179102 | .001UF X7R 0603 25V CHIP CAPACITOR | 0.971 | 1.091 | B |

| Ref # | RITRON# | Description | Main PCB Coordinates | | |
|---|---|---|---|---|---|
| **DIODES** | | | | | |
| CR101 | 48D100A2 | MA4CP101A PIN DIODE, SOT-23 | 0.968 | 4.077 | B |
| CR102 | 48A1005C | MMBD7000 DUAL DIODE SOT-23 | 1.559 | 4.392 | B |
| CR103 | 48A1005C | MMBD7000 DUAL DIODE SOT-23 | 1.464 | 2.762 | B |
| CR201 | 48D100A2 | MA4CP101A PIN DIODE, SOT-23 | - 0.254 | 3.934 | T |
| CR301 | 48B61012 | 1N4742A ZENER DIODE, 12V 1W DL-41 | - 1.284 | 0.507 | T |
| CR302 | 48A60001 | 1N4001 DIODE, 50V DL-41 MELF | - 1.463 | 0.507 | T |
| CR303 | 48A1005C | MMBD7000 DUAL DIODE SOT-23 | 1.133 | 0.626 | B |
| CR304 | 48A100A3 | MMBD2835, DUAL DIODE SOT-23 | - 1.624 | 0.427 | T |
| CR305 | 48A1005C | MMBD7000 DUAL DIODE SOT-23 | 0.174 | 0.764 | B |
| CR306 | 48A60001 | 1N4001 DIODE, 50V DL-41 MELF | - 0.929 | 3.710 | T |
| CR307 | 48A60001 | 1N4001 DIODE, 50V DL-41 MELF | - 1.124 | 0.507 | T |
| CR308 | 48A1005C | MMBD7000 DUAL DIODE SOT-23 | 1.337 | 2.236 | B |
| CR309 | 24510001 | LED, RED/GREEN, SOT-23 | - 1.349 | 4.310 | T |
| CR310 | 48A1005C | MMBD7000 DUAL DIODE SOT-23 | 1.161 | 1.086 | B |
| **FUSE** | | | | | |
| F 301 | 06000040 | WIRE; #40AWG TINNED BUS (INCHES) | 0.935 | 0.598 | B |
| **INTEGRATED CIRCUITS** | | | | | |
| IC101 | 31030003 | MC3371D SUBSYSTEM IC, SO-16 | - 1.594 | 2.592 | T |
| IC102 | 31510001 | MIXER, DOUBLE BALANCED, MC13143D | - 1.464 | 3.310 | T |
| IC301 | 31010006 | LM2931 5vDC Low Volt Reg, SO-8 | - 1.394 | 0.822 | T |
| IC302 | 314J0005 | MCU,FLASH,64-PIN QFP,AZ60 FP | 0.544 | 1.397 | B |
| IC304 | 311k0003 | SWITCH,ANALOG,TRIPLE SPDT,4053,TSSOP-16 | 0.857 | 2.786 | B |
| IC305 | 31010008 | LM2904D DUAL OP AMP SO-8 | - 1.014 | 2.460 | T |
| IC306 | 31010008 | LM2904D DUAL OP AMP SO-8 | 1.504 | 1.364 | B |
| IC307 | 31020001 | MF6CWM-50 6 POLE FILT. SOLIC | 0.906 | 2.263 | B |
| IC308 | 310K0001 | DS1806E 6 PROG POTS 10K OHM 20-PIN | - 0.644 | 2.467 | T |
| IC309 | 31010004 | LM386MX-1 AUDIO AMP SO-8 | 1.013 | 3.257 | B |
| **JACKS** | | | | | |
| J 301 | 02100001 | 2.5MM PC-MT JACK; ANT-CHGR | - 0.611 | 4.668 | T |
| J 303 | 02100053 | 3.5MM STEREO JACK; PANEL MOUNT | - 0.229 | 4.646 | T |
| **INDUCTORS** | | | | | |
| L 101 | 18433103 | 3T AIRCOIL, SMT, 8.0nH, .120 X .145 | - 0.914 | 4.280 | T |
| L 102 | 18433103 | 3T AIRCOIL, SMT, 8.0nH, .120 X .145 | - 1.149 | 4.305 | T |
| L 103 | 18414105 | 5.5T AIRCOIL #24AWG .0625"ID RHH SMT | - 1.514 | 4.280 | T |
| L 104 | 18414104 | 4.5T AIRCOIL #24AWG .0625"ID RHH SMT | - 1.699 | 4.120 | T |
| L 105 | 18433103 | 3T AIRCOIL, SMT, 8.0nH, .120 X .145 | - 1.269 | 4.025 | T |
| L 106 | 18433103 | 3T AIRCOIL, SMT, 8.0nH, .120 X .145 | - 1.444 | 3.850 | T |
| L 107 | 18433103 | 3T AIRCOIL, SMT, 8.0nH, .120 X .145 | - 1.229 | 3.690 | T |
| L 108 | 18433103 | 3T AIRCOIL, SMT, 8.0nH, .120 X .145 | - 1.399 | 3.530 | T |
| L 109 | 18110391 | CHIP INDUCTOR .39uhy | - 1.367 | 3.031 | T |
| L 110 | 18110391 | CHIP INDUCTOR .39uhy | - 1.505 | 3.030 | T |

| Ref # | RITRON# | Description | Main PCB Coordinates | | |
|---|---|---|---|---|---|
| L 111 | 18110681 | CHIP INDUCTOR .68uhy | - 1.684 | 2.298 | T |
| L 201 | 18110150 | INDUCTOR, CHIP, 15nH | - 0.283 | 2.301 | T |
| L 208 | 18414104 | 4.5T AIRCOIL #24AWG .0625"ID RHH SMT | - 0.804 | 3.505 | T |
| L 209 | 18110102 | CHIP INDUCTOR 1.0uhy | - 0.565 | 3.736 | T |
| L 210 | 18414105 | 5.5T AIRCOIL #24AWG .0625"ID RHH SMT | - 0.060 | 3.973 | T |
| L 211 | 18414104 | 4.5T AIRCOIL #24AWG .0625"ID RHH SMT | - 0.288 | 4.080 | T |
| L 212 | 18414104 | 4.5T AIRCOIL #24AWG .0625"ID RHH SMT | - 0.529 | 3.949 | T |
| L 213 | 18414105 | 5.5T AIRCOIL #24AWG .0625"ID RHH SMT | - 0.748 | 4.112 | T |
| **MICROPHONE** | | | | | |
| M 301 | 05500037 | MICROPHONE; ELECTRET, MINIATURE | | | |
| **HEADERS** | | | | | |
| P 201 | 25500700 | CONTACT, PCB MNT, ANTENNA,SST | - 0.892 | 4.550 | T |
| P 302 | 21310021 | HEADER, 2 PIN SIDE ENTRY SHROUDED | - 0.935 | 0.737 | T |
| **PRINTED CIRCUIT BOARD** | | | | | |
| PC301 | 1750120F | PCB ML4 FR4 5UPM .062 MIX, SST450+ | | | |
| **TRANSISTORS** | | | | | |
| Q 101 | 4821007Y | MMBR941LT1 LO POWER RF, SOT-23 | 1.714 | 4.120 | B |
| Q 102 | 4821003B | MMBT918LT1 VHF SOT23 (3B) | 1.724 | 2.292 | B |
| Q 103 | 4821003B | MMBT918LT1 VHF SOT23 (3B) | 1.354 | 3.130 | B |
| Q 201 | 4801001Q | MMBT-5088 "SOT-23" | 0.590 | 2.968 | B |
| Q 202 | 4801001Q | MMBT-5088 "SOT-23" | 0.682 | 3.629 | B |
| Q 203 | 04801503 | M68710H 2W RF MODULE 450-470 MHz 6.0V | 0.030 | 2.710 | T |
| Q 204 | 4801002A | MMBT3906 "SOT23" | 0.576 | 3.753 | B |
| Q 205 | 4821007Y | MMBR941LT1 LO POWER RF, SOT-23 | - 0.109 | 2.299 | T |
| Q 301 | 48010R02 | MUN2211T1 NPN W/BIAS RES. SOT-23 | 1.265 | 0.937 | B |
| Q 302 | 4801002A | MMBT3906 "SOT23" | - 1.629 | 0.787 | T |
| Q 303 | 480100DH | BCW68GLT1 .8AMP PNP SOT-23 | 1.619 | 0.487 | B |
| Q 304 | 4801001Q | MMBT-5088 "SOT-23" | 1.629 | 0.687 | B |
| Q 305 | 480A0001 | TRANSISTOR,DUAL,PNP/NPN,UMZINTR | 1.390 | 0.587 | B |
| Q 307 | 4801002A | MMBT3906 "SOT23" | 1.395 | 1.178 | B |
| Q 308 | 4801002A | MMBT3906 "SOT23" | 0.103 | 1.877 | B |
| Q 310 | 480A0002 | TRANSISTOR, DUAL NPN W/10K UMG9N | 1.371 | 4.107 | B |
| Q 312 | 4801001Q | MMBT-5088 "SOT-23" | 0.947 | 3.578 | B |
| Q 313 | 480100DH | BCW68GLT1 .8AMP PNP SOT-23 | 0.803 | 3.416 | B |
| **RESISTORS** | | | | | |
| R 101 | 47170223 | 22K OHM 0603 1/16W CHIP RESISTOR | - 1.719 | 4.290 | T |
| R 102 | 47170153 | 15K OHM 0603 1/16W CHIP RESISTOR | 1.724 | 4.220 | B |
| R 103 | 47170470 | 47 OHM 0603 1/16W CHIP RESISTOR | 1.579 | 3.325 | B |
| R 104 | 47170470 | 47 OHM 0603 1/16W CHIP RESISTOR | 1.524 | 3.325 | B |
| R 105 | 47170223 | 22K OHM 0603 1/16W CHIP RESISTOR | 1.459 | 3.125 | B |
| R 106 | 47170221 | 220 OHM 0603 1/16W CHIP RESISTOR | 1.524 | 3.125 | B |

| Ref # | RITRON# | Description | Main PCB Coordinates | | |
|---|---|---|---|---|---|
| R 107 | 47170152 | 1.5K OHM 0603 1/16W CHIP RESISTOR | 1.429 | 2.975 | B |
| R 108 | 47170122 | 1.2K OHM 0603 1/16W CHIP RESISTOR | 1.494 | 2.655 | B |
| R 109 | 47170154 | 150K OHM 0603 1/16W CHIP RESISTOR | 1.558 | 2.420 | B |
| R 110 | 47170224 | 220K OHM 0603 1/16W CHIP RESISTOR | 1.538 | 2.545 | B |
| R 111 | 47170123 | 12K OHM 0603 1/16W CHIP RESISTOR | 1.423 | 2.545 | B |
| R 112 | 47170104 | 100K OHM 0603 1/16W CHIP RESISTOR | 1.409 | 2.632 | B |
| R 113 | 47170103 | 10K OHM 0603 1/16W CHIP RESISTOR | 1.279 | 2.752 | B |
| R 114 | 47170152 | 1.5K OHM 0603 1/16W CHIP RESISTOR | 1.294 | 2.528 | B |
| R 115 | 47170103 | 10K OHM 0603 1/16W CHIP RESISTOR | 1.459 | 1.938 | B |
| R 116 | 47170471 | 470 OHM 0603 1/16W CHIP RESISTOR | - 1.719 | 4.350 | T |
| R 117 | 47170681 | 680 OHM 0603 1/16W CHIP RESISTOR | 1.737 | 2.030 | B |
| R 118 | 47170103 | 10K OHM 0603 1/16W CHIP RESISTOR | 1.704 | 2.130 | B |
| R 119 | 47170102 | 1K OHM 0603 1/16W CHIP RESISTOR | 1.618 | 2.283 | B |
| R 202 | 47170153 | 15K OHM 0603 1/16W CHIP RESISTOR | 0.746 | 3.158 | B |
| R 203 | 47170153 | 15K OHM 0603 1/16W CHIP RESISTOR | 0.654 | 3.135 | B |
| R 204 | 47170223 | 22K OHM 0603 1/16W CHIP RESISTOR | 0.485 | 3.062 | B |
| R 205 | 47100121 | 120 OHM 0805 CHIP RES | 0.657 | 3.400 | B |
| R 206 | 47170103 | 10K OHM 0603 1/16W CHIP RESISTOR | 0.742 | 3.760 | B |
| R 208 | 47170181 | 180 OHM 0603 1/16W CHIP RESISTOR | 0.552 | 3.539 | B |
| R 209 | 47170102 | 1K OHM 0603 1/16W CHIP RESISTOR | - 0.726 | 3.938 | T |
| R 211 | 47170182 | 1.8K OHM 0603 1/16W CHIP RESISTOR | - 0.135 | 2.168 | T |
| R 213 | 47100270 | 27 OHM 0805 CHIP RESISTOR | 0.003 | 2.219 | T |
| R 214 | 47170471 | 470 OHM 0603 1/16W CHIP RESISTOR | 0.667 | 3.486 | B |
| R 215 | 47170822 | 8.2K OHM 0603 1/16W CHIP RESISTOR | - 0.221 | 2.153 | T |
| R 301 | 47170103 | 10K OHM 0603 1/16W CHIP RESISTOR | 1.629 | 0.588 | B |
| R 302 | 47170472 | 4.7K OHM 0603 1/16W CHIP RESISTOR | 1.432 | 0.757 | B |
| R 303 | 47170103 | 10K OHM 0603 1/16W CHIP RESISTOR | 1.479 | 0.507 | B |
| R 304 | 47170104 | 100K OHM 0603 1/16W CHIP RESISTOR | 1.134 | 0.475 | B |
| R 305 | 47170103 | 10K OHM 0603 1/16W CHIP RESISTOR | 1.487 | 0.757 | B |
| R 306 | 47170104 | 100K OHM 0603 1/16W CHIP RESISTOR | 1.266 | 0.475 | B |
| R 307 | 47170471 | 470 OHM 0603 1/16W CHIP RESISTOR | 1.261 | 0.592 | B |
| R 308 | 47170102 | 1K OHM 0603 1/16W CHIP RESISTOR | 1.502 | 0.597 | B |
| R 309 | 47170104 | 100K OHM 0603 1/16W CHIP RESISTOR | 1.133 | 0.757 | B |
| R 310 | 47170104 | 100K OHM 0603 1/16W CHIP RESISTOR | 0.080 | 1.100 | B |
| R 311 | 47170104 | 100K OHM 0603 1/16W CHIP RESISTOR | 0.579 | 1.886 | B |
| R 312 | 47170104 | 100K OHM 0603 1/16W CHIP RESISTOR | 1.266 | 1.071 | B |
| R 313 | 47170104 | 100K OHM 0603 1/16W CHIP RESISTOR | 0.910 | 1.887 | B |
| R 314 | 47170472 | 4.7K OHM 0603 1/16W CHIP RESISTOR | 1.244 | 1.332 | B |
| R 315 | 47170103 | 10K OHM 0603 1/16W CHIP RESISTOR | 0.208 | 1.784 | B |
| R 316 | 47170105 | 1M OHM 0603 1/16W CHIP RESISTOR | 0.531 | 0.609 | B |
| R 317 | 47170103 | 10K OHM 0603 1/16W CHIP RESISTOR | - 1.634 | 0.595 | T |
| R 318 | 47170103 | 10K OHM 0603 1/16W CHIP RESISTOR | - 1.634 | 0.535 | T |
| R 319 | 47170103 | 10K OHM 0603 1/16W CHIP RESISTOR | 1.135 | 1.934 | B |
| R 320 | 47170153 | 15K OHM 0603 1/16W CHIP RESISTOR | 1.137 | 2.662 | B |
| R 321 | 47170154 | 150K OHM 0603 1/16W CHIP RESISTOR | 1.749 | 1.568 | B |
| R 322 | 47170104 | 100K OHM 0603 1/16W CHIP RESISTOR | 1.506 | 1.597 | B |
| R 323 | 47170473 | 47K OHM 0603 1/16W CHIP RESISTOR | 1.775 | 1.320 | B |
| R 324 | 47170273 | 27K OHM 0603 1/16W CHIP RESISTOR | 1.750 | 1.495 | B |
| R 325 | 47170102 | 1K OHM 0603 1/16W CHIP RESISTOR | 0.609 | 2.854 | B |
| R 326 | 47170104 | 100K OHM 0603 1/16W CHIP RESISTOR | 0.609 | 2.799 | B |
| R 327 | 47170224 | 220K OHM 0603 1/16W CHIP RESISTOR | 0.610 | 2.689 | B |
| R 328 | 47170103 | 10K OHM 0603 1/16W CHIP RESISTOR | 0.564 | 2.312 | B |
| R 329 | 47170473 | 47K OHM 0603 1/16W CHIP RESISTOR | 0.922 | 2.539 | B |
| R 330 | 47170563 | 56K OHM 0603 1/16W CHIP RESISTOR | 0.867 | 2.539 | B |
| R 331 | 47170103 | 10K OHM 0603 1/16W CHIP RESISTOR | 1.294 | 1.186 | B |

| Ref # | RITRON# | Description | Main PCB Coordinates | | |
|---|---|---|---|---|---|
| R 332 | 47170393 | 39K OHM 0603 1/16W CHIP RESISTOR | 1.183 | 2.487 | B |
| R 334 | 47170104 | 100K OHM 0603 1/16W CHIP RESISTOR | 1.294 | 2.373 | B |
| R 335 | 47170103 | 10K OHM 0603 1/16W CHIP RESISTOR | - 0.864 | 2.465 | T |
| R 336 | 47170273 | 27K OHM 0603 1/16W CHIP RESISTOR | 1.300 | 1.332 | B |
| R 337 | 47170183 | 18K OHM 0603 1/16W CHIP RESISTOR | 1.383 | 1.541 | B |
| R 338 | 47100333 | 33K OHM 0805 CHIP RES. | 1.194 | 2.243 | B |
| R 339 | 47170394 | 390K OHM 0603 1/16W CHIP RESISTOR | - 1.226 | 2.611 | T |
| R 340 | 47170104 | 100K OHM 0603 1/16W CHIP RESISTOR | - 1.270 | 2.480 | T |
| R 341 | 47170104 | 100K OHM 0603 1/16W CHIP RESISTOR | - 1.300 | 2.394 | T |
| R 342 | 47170184 | 180K OHM 0603 1/16W CHIP RESISTOR | - 1.210 | 2.310 | T |
| R 343 | 47170473 | 47K OHM 0603 1/16W CHIP RESISTOR | 0.977 | 2.539 | B |
| R 344 | 47170104 | 100K OHM 0603 1/16W CHIP RESISTOR | - 1.355 | 2.342 | T |
| R 345 | 47170471 | 470 OHM 0603 1/16W CHIP RESISTOR | 0.184 | 0.869 | B |
| R 346 | 47170103 | 10K OHM 0603 1/16W CHIP RESISTOR | 0.164 | 0.659 | B |
| R 347 | 47170471 | 470 OHM 0603 1/16W CHIP RESISTOR | 0.277 | 0.734 | B |
| R 348 | 47170473 | 47K OHM 0603 1/16W CHIP RESISTOR | - 1.070 | 2.166 | T |
| R 349 | 47170563 | 56K OHM 0603 1/16W CHIP RESISTOR | - 0.607 | 2.228 | T |
| R 350 | 47170474 | 470K OHM 0603 1/16W CHIP RESISTOR | - 0.662 | 2.228 | T |
| R 351 | 47100475 | 4.7M OHM 0805 CHIP RESISTOR | - 0.735 | 2.196 | T |
| R 352 | 47170683 | 68K OHM 0603 1/16W CHIP RESISTOR | - 0.810 | 2.204 | T |
| R 353 | 47170274 | 270K OHM 0603 1/16W CHIP RESISTOR | - 0.928 | 2.189 | T |
| R 354 | 47170103 | 10K OHM 0603 1/16W CHIP RESISTOR | 0.821 | 0.837 | B |
| R 355 | 47170103 | 10K OHM 0603 1/16W CHIP RESISTOR | 0.766 | 0.836 | B |
| R 356 | 47170102 | 1K OHM 0603 1/16W CHIP RESISTOR | 1.081 | 3.615 | B |
| R 357 | 47170102 | 1K OHM 0603 1/16W CHIP RESISTOR | 1.213 | 3.132 | B |
| R 358 | 47170153 | 15K OHM 0603 1/16W CHIP RESISTOR | 1.213 | 3.262 | B |
| R 359 | 47170103 | 10K OHM 0603 1/16W CHIP RESISTOR | 0.816 | 3.608 | B |
| R 360 | 47170273 | 27K OHM 0603 1/16W CHIP RESISTOR | 0.763 | 3.315 | B |
| R 361 | 47170100 | 10 OHM 0603 1/16W CHIP RESISTOR | 1.081 | 3.412 | B |
| R 362 | 47170103 | 10K OHM 0603 1/16W CHIP RESISTOR | 0.482 | 2.129 | B |
| R 363 | 47170224 | 220K OHM 0603 1/16W CHIP RESISTOR | 1.404 | 2.372 | B |
| R 364 | 47170103 | 10K OHM 0603 1/16W CHIP RESISTOR | 0.432 | 1.887 | B |
| R 365 | 47170823 | 82K OHM 0603 1/16W CHIP RESISTOR | 1.349 | 2.372 | B |
| R 366 | 47170103 | 10K OHM 0603 1/16W CHIP RESISTOR | 0.623 | 2.205 | B |
| R 367 | 47170102 | 1K OHM 0603 1/16W CHIP RESISTOR | 1.645 | 0.975 | B |
| R 368 | 47170221 | 220 OHM 0603 1/16W CHIP RESISTOR | - 1.404 | 4.176 | T |
| R 369 | 47170221 | 220 OHM 0603 1/16W CHIP RESISTOR | - 1.339 | 4.175 | T |
| R 370 | 47170824 | 820K OHM 0603 1/16W CHIP RESISTOR | 0.855 | 1.887 | B |
| R 371 | 47170104 | 100K OHM 0603 1/16W CHIP RESISTOR | 0.800 | 1.887 | B |
| R 372 | 47170104 | 100K OHM 0603 1/16W CHIP RESISTOR | 0.960 | 0.867 | B |
| R 373 | 47170222 | 2.2K OHM 0603 1/16W CHIP RESISTOR | 1.030 | 1.036 | B |
| R 374 | 47170102 | 1K OHM 0603 1/16W CHIP RESISTOR | 0.892 | 2.624 | B |
| R 375 | 47170103 | 10K OHM 0603 1/16W CHIP RESISTOR | 0.238 | 0.957 | B |
| R 376 | 47170153 | 15K OHM 0603 1/16W CHIP RESISTOR | | | |

**SPEAKER**

| | | | | | |
|---|---|---|---|---|---|
| SP301 | 05500045 | SPEAKER, 45MM, 1W, LOW PROFILE SST | | | |

| Ref # | RITRON# | Description | Main PCB Coordinates | | |
|---|---|---|---|---|---|
| **SWITCHES** | | | | | |
| SW301 | 05100024 | MINIATURE PTT SWITCH | - 1.521 | 4.587 | T |
| SW302 | 05100024 | MINIATURE PTT SWITCH | - 1.001 | 4.588 | T |
| SW303 | 05100046 | SWITCH, TACT LO PROFILE RT ANGLE | - 1.657 | 2.999 | T |
| SW304 | 05100046 | SWITCH, TACT LO PROFILE RT ANGLE | | | |
| **CRYSTALS** | | | | | |
| Y 101 | 02302004 | CERAMIC DISCRIMINATOR, CDBM450C18 | - 1.389 | 1.999 | T |
| Y 301 | 02300115 | 8 MHz AT-49 uP REFERENCE CRYSTAL | - 0.432 | 0.700 | T |
| Y 302 | 23050003 | TCVCXO, 14.400 MHz, 1.5 PPM, VC=30 | - 1.643 | 1.055 | T |
| **FILTERS** | | | | | |
| YF101 | 02301403 | 43.650 MHz Crystal Filter +/-6.0KHz UM-1 | - 1.734 | 3.455 | T |
| YF102 | 02301013 | FILTER,CERAMIC,450KHz,+/-7.5KHz,6 POLE | - 1.669 | 1.997 | T |

**MAIN PCB HARDWARE**

| | |
|---|---|
| 06001021 | #28 AWG STRANDED WIRE; RED (INCHES) |
| 06001023 | #28 AWG STRANDED WIRE;GREEN INCHES |
| 06001026 | #28 AWG STRANDED WIRE; BLACK INCHES |
| 06001029 | #28 AWG STRANDED WIRE; BLUE INCHES |
| 25500700 | CONTACT, PCB MNT, ANTENNA,SST |
| 25603000 | FOAM, MOUNTING, SPEAKER,SST |
| 25605700 | MICROPHONE HOLDER, SST-PLUS |
| 25603900 | SPACER, MIC FOAM, SST |
| 25900700 | ADHESIVE, MTG, MIC HOLDER |
| 26200800 | HEATSINK, TOP, SST+ |
| 26200900 | HEATSINK, BOTTOM, SST+ |
| 2811H401 | SCREW #4-40 X .25 LG TRIM HEAD PHILLIPS |

## SST-454 SYNTHESIZER SCHEMATIC REFERENCE PARTS LIST

| Ref # | RITRON# | Description | Synthesizer PCB Coordinates | | |
|---|---|---|---|---|---|
| **CAPACITORS** | | | | | |
| C 401 | 15170101 | 100PF NPO 0603 50V CHIP CAPACITOR | 0.872 | 1.090 | T |
| C 402 | 15170101 | 100PF NPO 0603 50V CHIP CAPACITOR | 1.043 | 1.090 | T |
| C 403 | 15179102 | .001UF X7R 0603 25V CHIP CAPACITOR | 0.989 | 0.975 | T |
| C 404 | 15179102 | .001UF X7R 0603 25V CHIP CAPACITOR | 0.412 | 1.056 | T |
| C 405 | 15170101 | 100PF NPO 0603 50V CHIP CAPACITOR | 0.603 | 0.699 | T |
| C 406 | 15170101 | 100PF NPO 0603 50V CHIP CAPACITOR | 1.000 | 0.458 | T |
| C 407 | 15179102 | .001UF X7R 0603 25V CHIP CAPACITOR | 0.320 | 0.485 | T |
| C 408 | 15179103 | .01UF X7R 0603 25V CHIP CAPACITOR | 0.641 | 0.845 | T |
| C 409 | 15170101 | 100PF NPO 0603 50V CHIP CAPACITOR | 0.872 | 0.798 | T |
| C 410 | 151701A5 | 1.5pF NPO 0603 50V CHIP CAPACITOR | 0.465 | 0.909 | T |
| C 411 | 15170101 | 100PF NPO 0603 50V CHIP CAPACITOR | 0.003 | 0.459 | T |
| C 412 | 15179102 | .001UF X7R 0603 25V CHIP CAPACITOR | 0.322 | 1.136 | T |
| C 413 | 151704A7 | 4.7pF NPO 0603 50V CHIP CAPACITOR | 0.276 | 0.776 | T |
| C 414 | 151704A7 | 4.7pF NPO 0603 50V CHIP CAPACITOR | 0.465 | 0.799 | T |
| C 415 | 15170101 | 100PF NPO 0603 50V CHIP CAPACITOR | 0.646 | 1.111 | T |
| C 416 | 15170101 | 100PF NPO 0603 50V CHIP CAPACITOR | 0.499 | 0.361 | T |
| C 417 | 15110A68 | .68pf NPO 0805 50V CHIP CAP | 0.001 | 0.699 | T |
| C 419 | 15170101 | 100PF NPO 0603 50V CHIP CAPACITOR | 0.377 | 1.196 | T |
| C 420 | 15179102 | .001UF X7R 0603 25V CHIP CAPACITOR | 0.131 | 0.224 | T |
| C 421 | 15111222 | .0022uF X7R 0805 50V CHIP CAPACITOR | 0.905 | 0.189 | T |
| C 422 | 152AB334 | .33MF 35V ~3.2X1.6~ CHIP TANTALUM | 1.015 | 0.243 | T |
| C 423 | 15111333 | .033MFD X7R 0805 50V CHIP CAP | 1.037 | 0.588 | T |
| C 424 | 15170101 | 100PF NPO 0603 50V CHIP CAPACITOR | 0.945 | 0.717 | T |
| C 425 | 151101A2 | CAPACITOR, CHIP 0805 1.2PF NPO 50V | 0.169 | 0.592 | T |
| C 426 | 15179102 | .001UF X7R 0603 25V CHIP CAPACITOR | 0.619 | 0.173 | T |
| C 427 | 151704A7 | 4.7pF NPO 0603 50V CHIP CAPACITOR | 0.177 | 0.721 | T |
| C 428 | 152B6106 | 10uF 10V 3.4 X 2.8 CHIP TANTALUM | 0.006 | 0.835 | T |
| C 429 | 15170101 | 100PF NPO 0603 50V CHIP CAPACITOR | 0.669 | 0.314 | T |
| C 430 | 15170101 | 100PF NPO 0603 50V CHIP CAPACITOR | 0.540 | 0.699 | T |
| C 431 | 151708A2 | 8.2pF NPO 0603 50V CHIP CAPACITOR | 0.276 | 0.717 | T |
| C 432 | 15119104 | .1uF X7R 0805 25V CERAMIC CHIP CAP | 0.249 | 1.076 | T |
| C 433 | 15179102 | .001UF X7R 0603 25V CHIP CAPACITOR | 0.674 | 0.173 | T |
| C 434 | 15179102 | .001UF X7R 0603 25V CHIP CAPACITOR | 0.730 | 0.172 | T |
| **DIODES** | | | | | |
| CR401 | 48A1005C | MMBD7000 DUAL DIODE SOT-23 | 0.002 | 1.022 | T |
| CR402 | 48C1004E | MMBV-105G DIODE VVC, SOT-23 | 0.281 | 0.616 | T |
| CR403 | 48C1004G | MMBV-2101L DIODE VVC SOT-23 | 0.140 | 1.174 | T |
| CR404 | 48A1004D | MMBV3401TI UHF DIODE SOT-23 | 0.216 | 0.414 | T |
| **INTEGRATED CIRCUIT** | | | | | |
| IC401 | 313K0002 | SYNTHESIZER, MC145190DT,TSSOP20 PIN | 0.801 | 0.517 | T |

| Ref # | RITRON# | Description | Synthesizer PCB Coordinates | | |
|---|---|---|---|---|---|
| **INDUCTORS** | | | | | |
| L 401 | 18414107 | 7.5T AIRCOIL #24 .0625"ID RHH SMT | 0.025 | 0.330 | T |
| L 402 | 18110101 | CHIP INDUCTOR 0.1uhy | 0.772 | 0.800 | T |
| L 403 | 18433209 | 9T AIRCOIL, SMT, 9.85 nH, .159 X .056 | 0.086 | 0.568 | T |
| L 404 | 18110101 | CHIP INDUCTOR 0.1uhy | 0.431 | 0.695 | T |
| L 405 | 18110820 | INDUCTOR, CHIP 82nH | 0.261 | 0.269 | T |
| **HEADERS** | | | | | |
| P 401 | 21344051 | HEADER, 5-PIN VERT .344H .064SO .079LS | | | |
| P 402 | 21344081 | HEADER, 8-PIN VERT .344H .064SO .079LS | | | |
| **TRANSISTORS** | | | | | |
| Q 401 | 4821007Y | MMBR941LT1 LO POWER RF, SOT-23 | 0.600 | 1.010 | T |
| Q 402 | 4801001Q | MMBT-5088 "SOT-23" | 0.156 | 0.968 | T |
| Q 403 | 4821007Y | MMBR941LT1 LO POWER RF, SOT-23 | 0.769 | 1.010 | T |
| Q 404 | 4821007Y | MMBR941LT1 LO POWER RF, SOT-23 | 0.312 | 0.877 | T |
| Q 406 | 4801006A | TRANSISTOR, PNP W/10K BIAS, SC-59 | 0.424 | 0.559 | T |
| Q 407 | 48010R02 | MUN2211T1 NPN W/BIAS RES. SOT-23 | 0.397 | 0.354 | T |
| **RESISTORS** | | | | | |
| R 401 | 47170471 | 470 OHM 0603 1/16W CHIP RESISTOR | 0.531 | 1.111 | T |
| R 402 | 47170272 | 2.7K OHM 0603 1/16W CHIP RESISTOR | 0.496 | 1.001 | T |
| R 403 | 47170102 | 1K OHM 0603 1/16W CHIP RESISTOR | 0.593 | 0.909 | T |
| R 404 | 47170472 | 4.7K OHM 0603 1/16W CHIP RESISTOR | 0.002 | 1.123 | T |
| R 406 | 47170221 | 220 OHM 0603 1/16W CHIP RESISTOR | 0.934 | 0.975 | T |
| R 407 | 47170272 | 2.7K OHM 0603 1/16W CHIP RESISTOR | 0.761 | 1.111 | T |
| R 408 | 47170470 | 47 OHM 0603 1/16W CHIP RESISTOR | 0.322 | 1.008 | T |
| R 409 | 47170561 | 560 OHM 0603 1/16W CHIP RESISTOR | 0.465 | 0.854 | T |
| R 410 | 47170153 | 15K OHM 0603 1/16W CHIP RESISTOR | 0.177 | 0.836 | T |
| R 411 | 47170153 | 15K OHM 0603 1/16W CHIP RESISTOR | 0.122 | 0.776 | T |
| R 412 | 47170104 | 100K OHM 0603 1/16W CHIP RESISTOR | 0.292 | 1.227 | T |
| R 414 | 47170103 | 10K OHM 0603 1/16W CHIP RESISTOR | 0.554 | 0.361 | T |
| R 415 | 47170102 | 1K OHM 0603 1/16W CHIP RESISTOR | 0.399 | 0.224 | T |
| R 416 | 47170102 | 1K OHM 0603 1/16W CHIP RESISTOR | 0.884 | 0.116 | T |
| R 417 | 47170473 | 47K OHM 0603 1/16W CHIP RESISTOR | 1.000 | 0.116 | T |
| R 418 | 47170153 | 15K OHM 0603 1/16W CHIP RESISTOR | 0.909 | 0.287 | T |
| R 419 | 47170103 | 10K OHM 0603 1/16W CHIP RESISTOR | 0.909 | 0.342 | T |
| R 420 | 47170223 | 22K OHM 0603 1/16W CHIP RESISTOR | 1.000 | 0.717 | T |
| R 421 | 47170102 | 1K OHM 0603 1/16W CHIP RESISTOR | 0.730 | 0.910 | T |
| R 422 | 47170101 | 100 OHM 0603 1/16W CHIP RESISTOR | 0.958 | 1.060 | T |
| R 423 | 47170470 | 47 OHM 0603 1/16W CHIP RESISTOR | 0.411 | 1.111 | T |
| R 425 | 47100100 | 10 ohm 0805 CHIP RESISTOR | 0.563 | 0.556 | T |
| R 426 | 47170221 | 220 OHM 0603 1/16W CHIP RESISTOR | 0.872 | 0.975 | T |
| **SYNTHESIZER PCB HARDWARE** | | | | | |
| | 25105500 | SHIELD, SST-PLUS SYNTHESIZER | | | |

## SST-454 CASE ASSEMBLY PARTS LIST

| Ref # | RITRON# | Description |
|---|---|---|
| | 13250000 | CASE W/INSERT, PLASTIC, SST BLACK |
| | 13564000 | CASE, BOTTOM, PLASTIC, SST 2-PC |
| | 13578000 | DOOR, BATTERY, PLASTIC, SST 2-PC |
| | 13588000 | LATCH, BATTERY DOOR, PLASTIC SST 2-PC |
| | 14220006 | LABEL, CONTROLS, SST+ |
| | 14222060 | LABEL, NAMEPLATE, SST PLUS SERIES |
| | 2142D021 | CONNECTOR, CABLE ASSEMBLY, 2-POS, SST+ |
| | 25201500 | RETAINER, PLASTIC, PTT, SST |
| | 25202300 | LIGHT PIPE, SST+ |
| | 25300600 | INSULATOR, BATTERY, FIBRE, SST |
| | 25400600 | BUSHING, THREADED, PLATED, ANTENNA SST |
| | 25400800 | SPRING CONTACT, BATTERY, SST W/O TABSC |
| | 25400900 | CONTACT BATTERY SST-PLUS (POLARIZED) |
| | 25604800 | SPACER, PCB, FOAM, SST 2-PC |
| | 25603300 | GRILLE CLOTH, SPEAKER, SST |
| | 25603400 | DUAL JACK PLUG, RUBBER,SST |
| | 25800500 | ACTUATOR, RUBBER,PTT,SST |
| | 25800600 | ACTUATOR, RUBBER, TACT, SST |
| | 28233G02 | SPANNER NUT, ANTENNA SST |
| | 02802026 | NUT; KNURLED; M4PO.5;/2.5MM JACK |
| | 02802027 | NUT; KNURLED; M6PO.5/3.5MM JACK |
| | 28112401 | SCREW 4-40 X 1/4" PHFLST |
| | 25601600 | BATTERY SHIM; ASSEMBLY ~X~ SERIES |
| | AFS-450 | ANTENNA UHF MOLDED, 450-470 REG LEN SST |
| | 14200037 | LABEL SST/JMX MFG DATE CODE |
| | 14200067 | LABEL, FCC SERIAL, SST-454 |
| | 14210004 | LOW BATTERY NOTICE LABEL |
| | 25201600 | BELT CLIP, PLASTIC, SST BLACK |
| | 2811B600 | SCREW 6-32 X 1/4" PHTRST |

## BATTERY PACK

| | | |
|---|---|---|
| | BPS-6N-MH | BATTERY,RECHG,7.2V,NIMH,1500 mAH,SST+ |

## SHIPPING MATERIALS

| | | |
|---|---|---|
| | 01451188 | MANUAL, USER, SST |
| | 14312006 | SHIPPING CARTON, CARDBOARD,SST |
| | 14321002 | FOAM INSERT, PACKING, SST/MINI |

**TYPE OF EXHIBIT:** SEMICONDUCTOR FUNCTION

**FCC PART:** 2.983 (d) (6)

**MANUFACTURER:** RITRON, INC.
505 West Carmel Drive
Carmel, IN 46032

**MODEL:** SST-454

**TYPE OF UNIT:** UHF-FM Handheld Transceiver

**FCC ID:** AIERIT06-450

**DATE:** December 28, 1998

**DESCRIPTION:**

The following list specifies the manufacturer, identification and function of each semiconductor device used in the SST-454 handheld transceiver.

| Schem ID | RITRON PN# | Manufacturer | Manufacturer ID | Function |
|---|---|---|---|---|
| CR101 | 48D100A2 | M/A Com, Inc. | MA4CP101A | TX/RX switching |
| CR102 | 48A1005C | Motorola Semiconductors | MMBD7000LT1 | Voltage clamp |
| CR103 | 48A1005C | Motorola Semiconductors | MMBD7000LT1 | Noise detection |
| CR201 | 48D100A2 | M/A Com, Inc. | MA4CP101A | TX/RX switching |
| CR301 | 48B61012 | Diodes, Inc. | ZM4742A-07 | Overvoltage protection |
| CR302 | 48A60001 | Diodes, Inc. | DL4001T | Reverse voltage protection |
| CR303 | 48A1005C | Motorola Semiconductors | MMBD7000LT1 | Turn-on detection |
| CR304 | 48A100A3 | Motorola Semiconductors | MMBD2835LT1 | PTT switching |
| CR305 | 48A1005C | Motorola Semiconductors | MMBD7000LT1 | Voltage clamp |
| CR306 | 48A60001 | Diodes, Inc. | DL4001T | Reverse voltage protection |
| CR307 | 48A60001 | Diodes, Inc. | DL4001T | Reverse voltage protection |
| CR308 | 48A1005C | Motorola Semiconductors | MMBD7000LT1 | Voltage clamp |
| CR309 | 24510001 | Sun LED | ZMGUR48M-CA | TX/RX indicator LED |
| CR310 | 48A1005C | Motorola Semiconductors | MMBD7000LT1 | Voltage clamp |
| CR401 | 48A1005C | Motorola Semiconductors | MMBD7000LT1 | Biasing |
| CR402 | 48C1004E | Motorola Semiconductors | MMBV-105GLT! | VCO tuning |
| CR403 | 48C1004G | Motorola Semiconductors | MMBV-2101L | VCO modulation |
| CR404 | 48A1004D | Motorola Semiconductors | MMBV3401TI | TX/RX VCO switching |
| IC101 | 31030003 | Motorola Semiconductors | MC3371BD | RX FM-IF subsystem |
| IC102 | 31510001 | Motorola Semiconductors | MC13143D | Double balanced mixer |
| IC301 | 31010006 | Motorola Semiconductors | LM2931AD-5.0R2 | +5 VDC voltage regulator |
| IC302 | 314J0005 | Motorola Semiconductors | MC68HC908AZ60CFU | Microcontroller |
| IC304 | 311K0003 | Philips Components | 74LV4053PWDH | Audio signal switching |
| IC305 | 31010008 | Motorola Semiconductors | LM2904D | Audio processing |
| IC306 | 31010008 | Motorola Semiconductors | LM2904D | Audio processing |
| IC307 | 31020001 | National Semiconductors | MF6CWM-50 | Tone low pass filter |
| IC308 | 310K0001 | Dallas Semiconductor | DS1806E | Audio signal level control |
| IC309 | 31010004 | National Semiconductors | LM386MX-1 | Audio amplifier |
| IC401 | 313K0002 | Motorola Semiconductors | MC145190DT | Frequency synthesizer |

| Schem ID | RITRON PN# | Manufacturer | Manufacturer ID | Function |
|---|---|---|---|---|
| Q 101 | 4821007Y | Motorola Semiconductors | MMBR941LT1 | RX RF amplifier |
| Q 102 | 4821003B | Motorola Semiconductors | MMBT918LT1 | RX 1st LO multiplier/amp |
| Q 103 | 4821003B | Motorola Semiconductors | MMBT918LT1 | RX IF amplifier |
| Q 201 | 4801001Q | Motorola Semiconductors | MMBT-5088LT1 | PWM TX power control |
| Q 202 | 4801001Q | Motorola Semiconductors | MMBT-5088LT1 | TX +V switching |
| Q 203 | 04801503 | Misubishi Electronic Device | M68710H | TX RF final amplifier |
| Q 204 | 4801002A | Motorola Semiconductors | MMBT3906LT1 | TX +V switching |
| Q 205 | 4821007Y | Motorola Semiconductors | MMBR941LT1 | TX RF driver amplifier |
| Q 301 | 48010R02 | Motorola Semiconductors | MUN2211T1 | PTT detection |
| Q 302 | 4801002A | Motorola Semiconductors | MMBT3906LT1 | PTT detection |
| Q 303 | 480100DH | Motorola Semiconductors | BCW68GLT1 | +6V switching |
| Q 304 | 4801001Q | Motorola Semiconductors | MMBT-5088LT1 | +6V switching |
| Q 305 | 480A0001 | Rohm Electronics | UMZINTR | Battery +V switching |
| Q 307 | 4801002A | Motorola Semiconductors | MMBT3906LT1 | +5V switching |
| Q 308 | 4801002A | Motorola Semiconductors | MMBT3906LT1 | RX +V switching |
| Q 310 | 480A0002 | Rohm Electronics | UMG9N | LED indicator switching |
| Q 312 | 4801001Q | Motorola Semiconductors | MMBT-5088LT1 | Audio amplifier enable |
| Q 313 | 480100DH | Motorola Semiconductors | BCW68GLT1 | Audio amplifier +V switching |
| Q 401 | 4821007Y | Motorola Semiconductors | MMBR941LT1 | VCO buffer amplifier |
| Q 402 | 4801001Q | Motorola Semiconductors | MMBT-5088LT1 | VCO voltage de-coupling |
| Q 403 | 4821007Y | Motorola Semiconductors | MMBR941LT1 | VCO buffer amplifier |
| Q 404 | 4821007Y | Motorola Semiconductors | MMBR941LT1 | VCO oscillator |
| Q 406 | 4801006A | Motorola Semiconductors | MUN2111LT1 | TX/RX VCO switching |
| Q 407 | 48010R02 | Motorola Semiconductors | MUN2211T1 | TX/RX VCO switching |

| | |
|---|---|
| **TYPE OF TEST:** | PHOTOGRAPHS AND DRAWINGS |
| **FCC PART:** | 2.983 (f) (g) |
| **MANUFACTURER:** | RITRON, INC.<br>505 West Carmel Drive<br>Carmel, IN 46032 |
| **MODEL:** | SST-454 |
| **TYPE OF UNIT:** | UHF-FM Handheld Transceiver |
| **FCC ID:** | AIERIT06-450 |
| **DATE:** | December 28, 1998 |

The following 8" x 10" photographs are of the RITRON Model SST-454 UHF-FM handheld transceiver.

Thes photographs are of sufficient clarity to indicate:

1. Equipment construction
2. Printed circuit board layout
3. Labels for controls
4. Internal construction to define component placement and chassis assembly
5. Location of FCC ID label
6. Nameplate label