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www.quonsetmicrowave.com

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North Kingstown, RI 02852
Tel: 401-267-8750
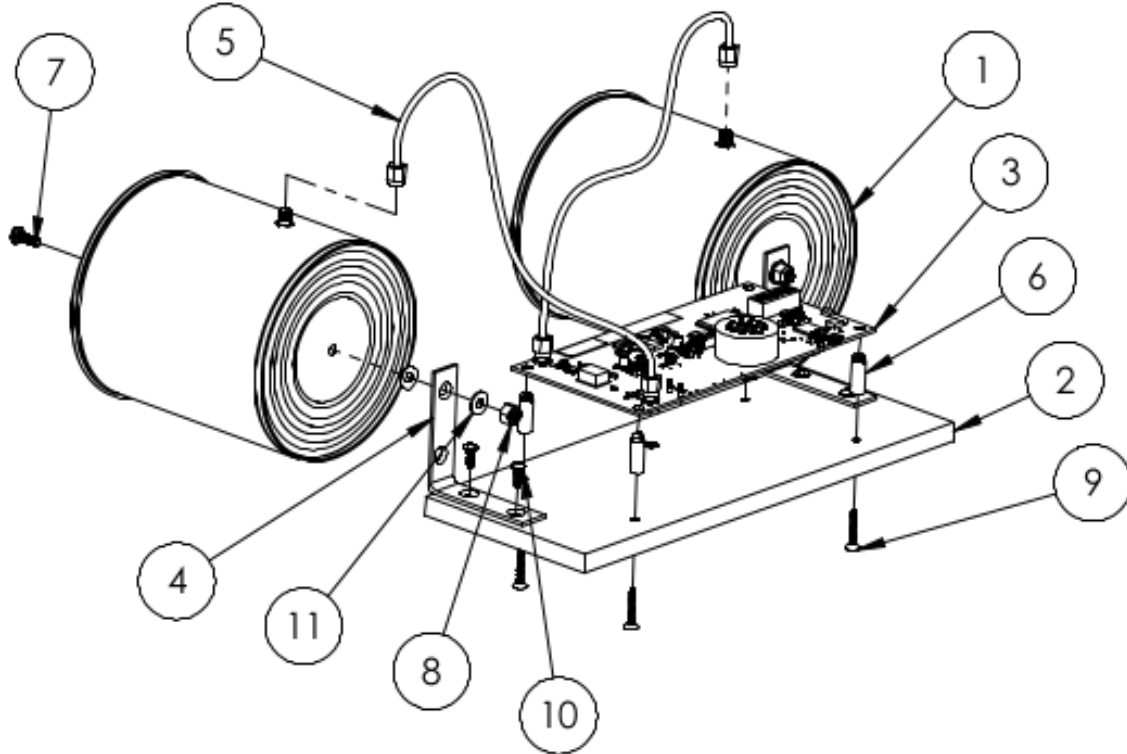Fax: 401-667-2912

QM-RDK Quick Start Guide and Application Notes

Figure 1: Assembly Diagram

1) **Assemble the RDK Kit**

   a. Assembly will vary based on the kit you have ordered, kits 2 and 3 include the mounting plate while kit 1 does not. Order of hardware assembly is not important but the recommended order is as follows:

      i. Loosely mount the 4X plastic standoffs [6] to the mounting plate [2] using 4X #6-19 X ¾" self-tapping flat head Philips screws [9] as shown. The mounting plate comes with clearance holes pre-drilled and countersunk form the bottom side.

      ii. Carefully push the RDK board [3] onto the four standoffs. Hand-tighten the 4X mounting screws until the standoffs are firmly seated onto the mounting plate.

      iii. Attach the L-brackets [4] to the Cantennas [1] as shown in the assembly diagram using a #8-32 X ½" pan head Philips screw [7], 2X #8 washers [11], and #8-32 nylon nut [8]. Be sure to place one washer on either side of the L-bracket.

      iv. Screw the L-bracket/Cantenna assembly to the mounting plate using 2X #8-18 X 3/8" self-tapping pan head Philips screws [10]. Holes are pre-drilled into the mounting plate to accept these screws. **DO NOT** over-torque these screws.

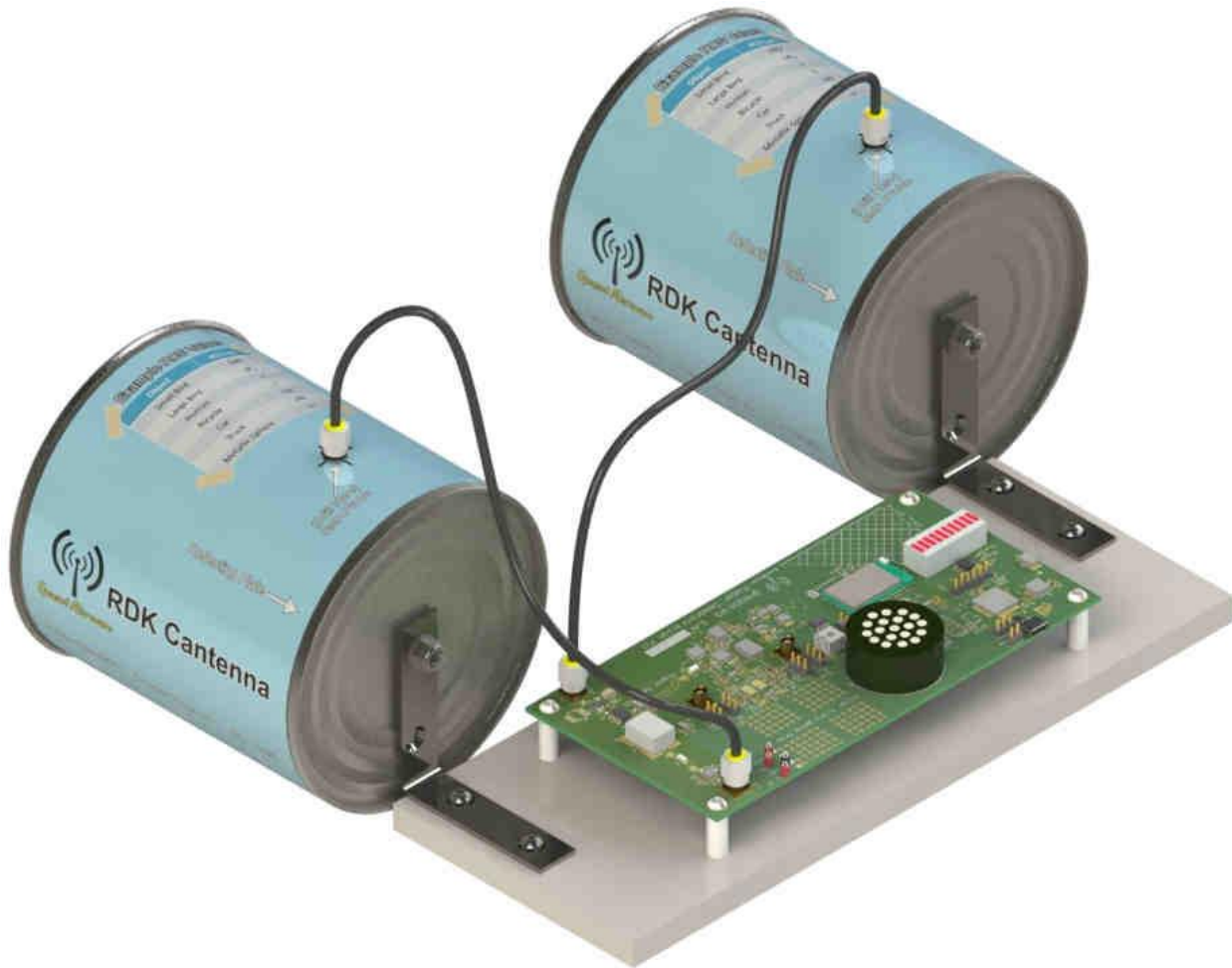   v. Connect each Cantenna to the RDK board's TX and RX ports using the supplied SMA cables [5].

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Figure 2: Assembled RDK

b. The RDK (kits 2 and 3) should resemble Figure 2 above. You are now ready to connect your RDK to your computer.

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2) **Connecting the QM-RDK to a Windows Computer Using USB**

   a. Before connecting the RDK, install the QM-RDK GUI (provided on the included CD, or downloadable from quonsetmicrowave.com). Follow the installation guide on the screen. When asked to install the NI-VISA Runtime Engine, be sure to say yes if you do not have any VISA drivers installed on your computer. If you are not sure, click yes.

   b. After the QM-RDK GUI is installed, connect the RDK to your computer using the supplied micro USB cable.

Figure 3: RDK Connected to Laptop Using a USB Cable

   c. If this is the first time connecting your RDK to a computer, Windows will find the new hardware and install the appropriate drivers. Once the hardware is installed, three LEDs should be powered 'ON' on the RDK board, as shown in Figure 4.
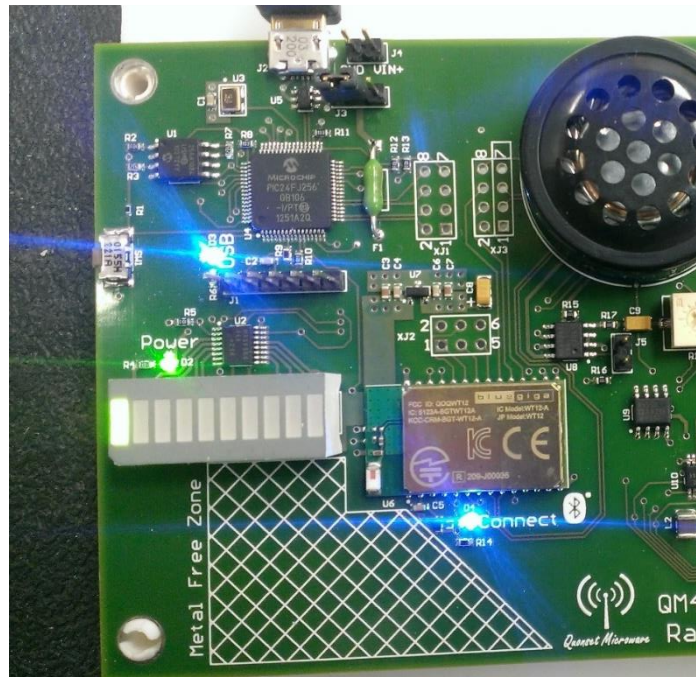
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Figure 4: Power, USB and Connect LEDs

d. After confirming all three LEDs are lit, run the QM-RDK GUI.
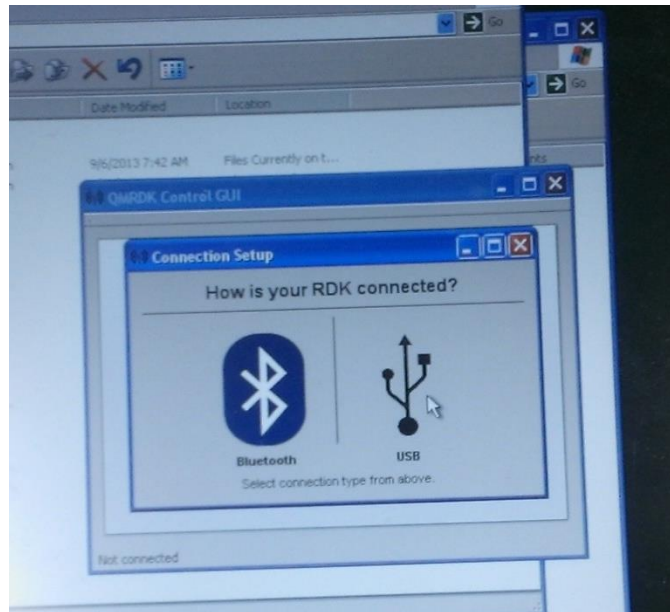e. The GUI will ask how your RDK is connected, Click on the USB icon.

Figure 5: GUI Connection Prompt

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f. If your RDK is connected correctly the main GUI window will be displayed and you can now collect and plot data using the GUI. If clicking the USB icon does not display the GUI's Main Window, your USBTMC VISA drivers may not be installed properly. Use of the National Instruments Measurement & Automation Explorer (NI MAX), must be installed separately from the NI website, can be used to manually find the RDK. Please contact customer support (see website listed in header) if you have issues connecting to your RDK board.
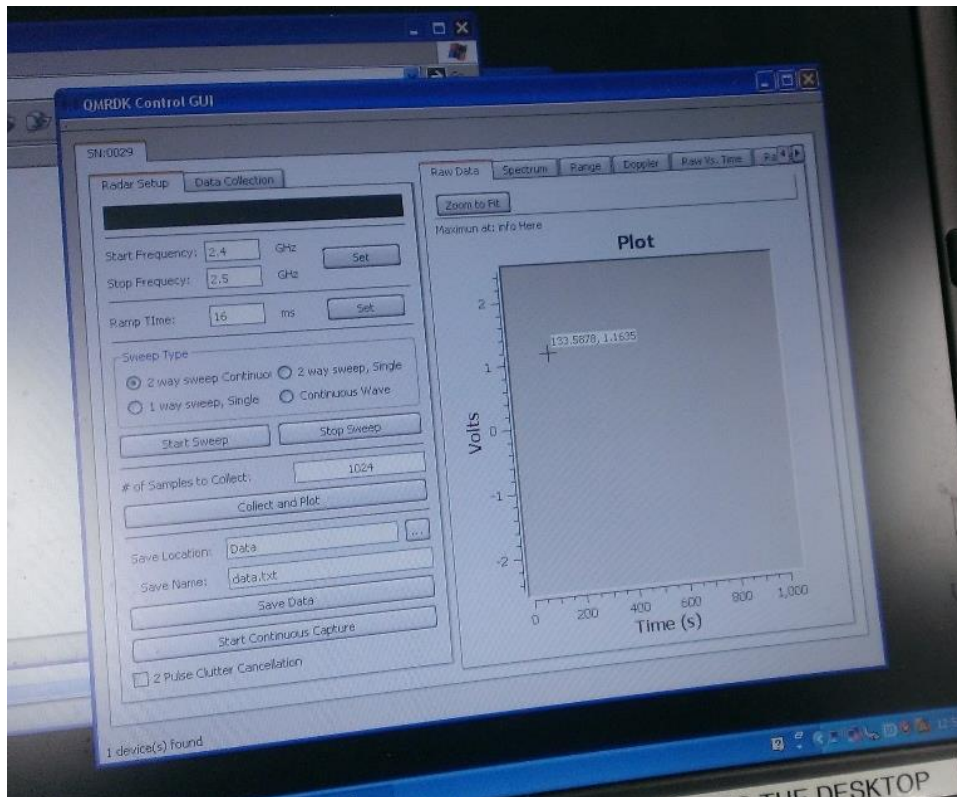

Figure 6: QM-RDK GUI Main Window

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1) **Connecting the QM-RDK to a Windows Computer Using Bluetooth**
    a. First, power the RDK board by connecting the USB port on the RDK to a 5 volt USB socket. The USB socket can be a computer, wall adapter, or USB battery (supplied with RDK Kit 3).
    b. After the RDK Board is powered up (no LEDs flashing), press the push-button (sw1) located at the edge of the board between the USB connection and LED light bar. This enables Bluetooth communication on the RDK board. If sw1 is not pressed you will be able to connect to the board over Bluetooth, but you will **NOT** be able to communicate with it.
    c. The RDK board can now be paired with your Bluetooth enabled computer. This process will vary from computer to computer but the basic process is as follows:
        i. Open the Bluetooth configuration window/program
        ii. Search for nearby devices (Your device will show up as "RDK <your device's serial number>")
        iii. Pair with the RDK
        iv. Set up your newly paired RDK as a serial port (consult your Bluetooth provider for details)
        v. Be sure to make note of the ports name (ex. "COM11")
    d. Your RDK board should now be paired and configured as a serial port on your computer. Start the QM-RDK GUI (see section 2a for installation).
    e. When asked how to connect to the RDK, select Bluetooth.
    f. Next, choose the port associated with the RDK (from part c above).
    g. Click Connect. The GUI's main window should be displayed and you can now control the RDK over Bluetooth.
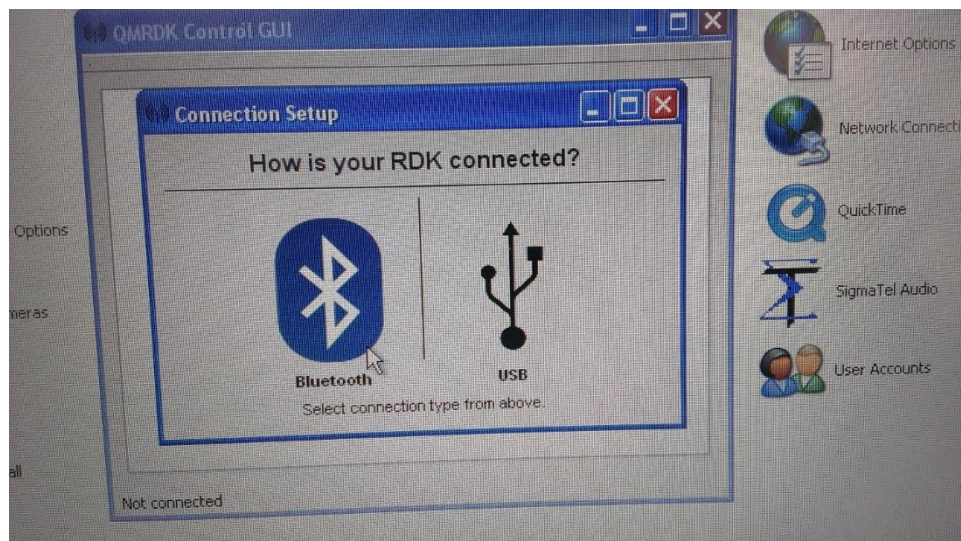   h. Similar methods can be used to control the RDK using serial object in Matlab.

Figure 7: Select Bluetooth Connection

![Quonset Microwave logo]

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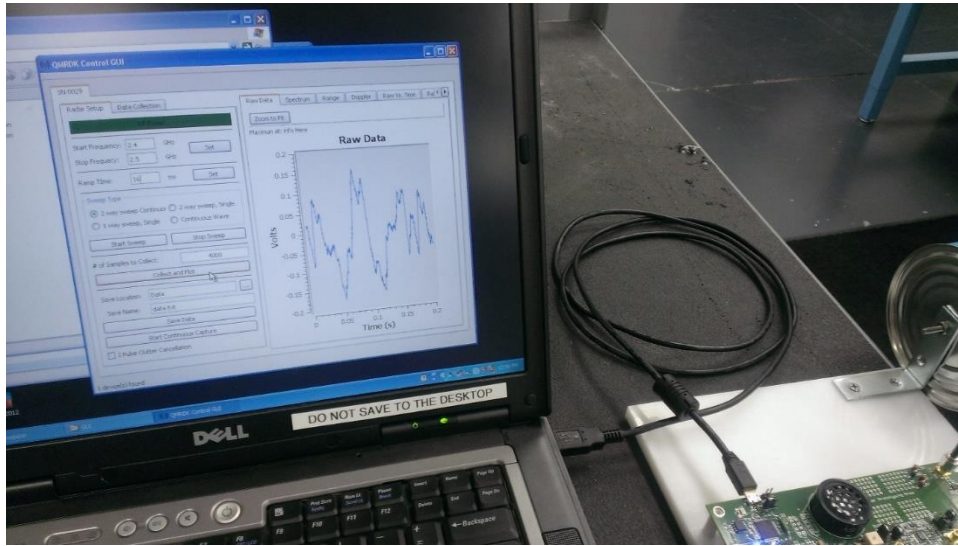Tel: 401-267-8750
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Figure 8: Data captured with the QM-RDK GUI

For more information on the RDK GUI, see the QM-RDK Software Guide provided on the CD that came with your RDK system.

Doppler Experiment

The following assumes that you are able to connect to the RDK using USB or Bluetooth on a Windows computer and control the RDK using the QM-RDK GUI software.

1. Configure the CW Frequency
   a. In CW mode the transmit frequency is equal to the Start frequency, the Stop frequency can be ignored
2. Change the Sweep Type to Continuous wave
3. The RDK is now transmitting a CW
4. Collecting data with no moving targets will return all zeroes. If a moving target is present, the Doppler frequency shift will be visible. It is sometimes best to collect a high number of samples in order to get a full period of the frequency shift (4096 max for USB, 40000 max for BT)
5. Clicking on the Doppler tab will show the spectrum of the raw data collected.