



COLT

product manual

Installation

Step #1 – Configuring your PC for RS-232 Control

If you have a built-in RS-232 connector

1. Proceed to Step #2, it should be properly installed and ready to use.

If you plan on using the supplied USB-to-RS-232 Cable for Windows

1. Unpackage the supplied USB-to-RS-232 and following the instructions. The cable uses the Prolific chipset. A driver disk is supplied should you need to install drivers.

If you plan on using the USB-to-RS-232 Cable for Ubuntu, also applies to Linux

1. This is a very useful page:
<http://blog.mypapit.net/2008/05/how-to-use-usb-serial-port-converter-in-ubuntu.html>
2. Plug in the Prolific USB to RS-232 serial adapter
3. Terminal: “dmesg” -- you should see something like this that is near the end

```
[349112.120020] usb 4-1: new full speed USB device using uhci_hcd and address 2  
[349112.330207] usb 4-1: configuration #1 chosen from 1 choice
```

4. Unplug Prolific USB to RS-232 adapter
5. Terminal: “lsusb” -- you should see something like this

```
Bus 004 Device 001: ID 1d6b:0001 Linux Foundation 1.1 root hub  
Bus 003 Device 003: ID 046d:c018 Logitech, Inc. Optical Wheel Mouse  
Bus 003 Device 002: ID 045e:00db Microsoft Corp. Natural Ergonomic Keyboard 4000 V1.0
```

Bus 003 Device 001: ID 1d6b:0001 Linux Foundation 1.1 root hub
Bus 002 Device 001: ID 1d6b:0001 Linux Foundation 1.1 root hub
Bus 005 Device 001: ID 1d6b:0001 Linux Foundation 1.1 root hub
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub

6. Plug in the USB to RS-232 adapter
7. Terminal: “lsusb” -- you should see an additional line like this

Bus 004 Device 001: ID 1d6b:0001 Linux Foundation 1.1 root hub
Bus 003 Device 003: ID 046d:c018 Logitech, Inc. Optical Wheel Mouse
Bus 003 Device 002: ID 045e:00db Microsoft Corp. Natural Ergonomic Keyboard 4000 V1.0
Bus 003 Device 001: ID 1d6b:0001 Linux Foundation 1.1 root hub
Bus 002 Device 003: ID 067b:2303 Prolific Technology, Inc. PL2303 Serial Port
Bus 002 Device 001: ID 1d6b:0001 Linux Foundation 1.1 root hub
Bus 005 Device 001: ID 1d6b:0001 Linux Foundation 1.1 root hub
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub

8. The 067b:2303 before the word Prolific in the above messaging, shown in YELLOW is key for the next step. If it is not this number combination then make note of the number combination and fill it in the next step.
9. Terminal: “sudo modprobe usbserial vendor=0x067b product=0x2303”
10. Terminal: “dmesg” -- you should see something like this

```
[349112.120020] usb 4-1: new full speed USB device using uhci_hcd and address 2
[349112.330207] usb 4-1: configuration #1 chosen from 1 choice
[349112.488663] usbcore: registered new interface driver usbserial
[349112.488705] USB Serial support registered for generic
[349112.488766] usbcore: registered new interface driver usbserial_generic
[349112.488772] usbserial: USB Serial Driver core
[349112.498155] USB Serial support registered for pl2303
[349112.498187] pl2303 4-1:1.0: pl2303 converter detected
[349112.510161] usb 4-1: pl2303 converter now attached to ttyUSB0
[349112.510192] usbcore: registered new interface driver pl2303
[349112.510196] pl2303: Prolific PL2303 USB to serial adaptor driver
[349133.824053] usb 4-1: USB disconnect, address 2
[349133.824297] pl2303 ttyUSB0: pl2303 converter now disconnected from ttyUSB0
[349133.824324] pl2303 4-1:1.0: device disconnected
[349136.976016] usb 4-2: new full speed USB device using uhci_hcd and address 3
[349137.126236] usb 4-2: configuration #1 chosen from 1 choice
[349137.130137] pl2303 4-2:1.0: pl2303 converter detected
[349137.144232] usb 4-2: pl2303 converter now attached to ttyUSB0
[349141.264054] usb 4-2: USB disconnect, address 3
[349141.264290] pl2303 ttyUSB0: pl2303 converter now disconnected from ttyUSB0
[349141.264315] pl2303 4-2:1.0: device disconnected
[349152.852020] usb 2-2: new full speed USB device using uhci_hcd and address 2
[349153.062171] usb 2-2: configuration #1 chosen from 1 choice
[349153.066027] pl2303 2-2:1.0: pl2303 converter detected
[349153.079158] usb 2-2: pl2303 converter now attached to ttyUSB0
[349388.272054] usb 2-2: USB disconnect, address 2
```

```
[349388.272300] pl2303 ttyUSB0: pl2303 converter now disconnected from ttyUSB0
[349388.272325] pl2303 2-2:1.0: device disconnected
[349433.488021] usb 2-2: new full speed USB device using uhci_hcd and address 3
[349433.642174] usb 2-2: configuration #1 chosen from 1 choice
[349433.646023] pl2303 2-2:1.0: pl2303 converter detected
[349433.658155] usb 2-2: pl2303 converter now attached to ttyUSB0
```

11. As you can see from the messages above, the new serial port device is mapped to /dev/ttyUSB0. You can instruct Ubuntu to load this module automatically by include the following line inside “/etc/modules” file:

```
“modprobe usbserial vendor=0x067b product=0x2303”
```

It should look something like this in the file and make sure the command is after the "lp". You add the line shown in YELLOW

```
# /etc/modules: kernel modules to load at boot time.
#
# This file contains the names of kernel modules that should be loaded
# at boot time, one per line. Lines beginning with "#" are ignored.

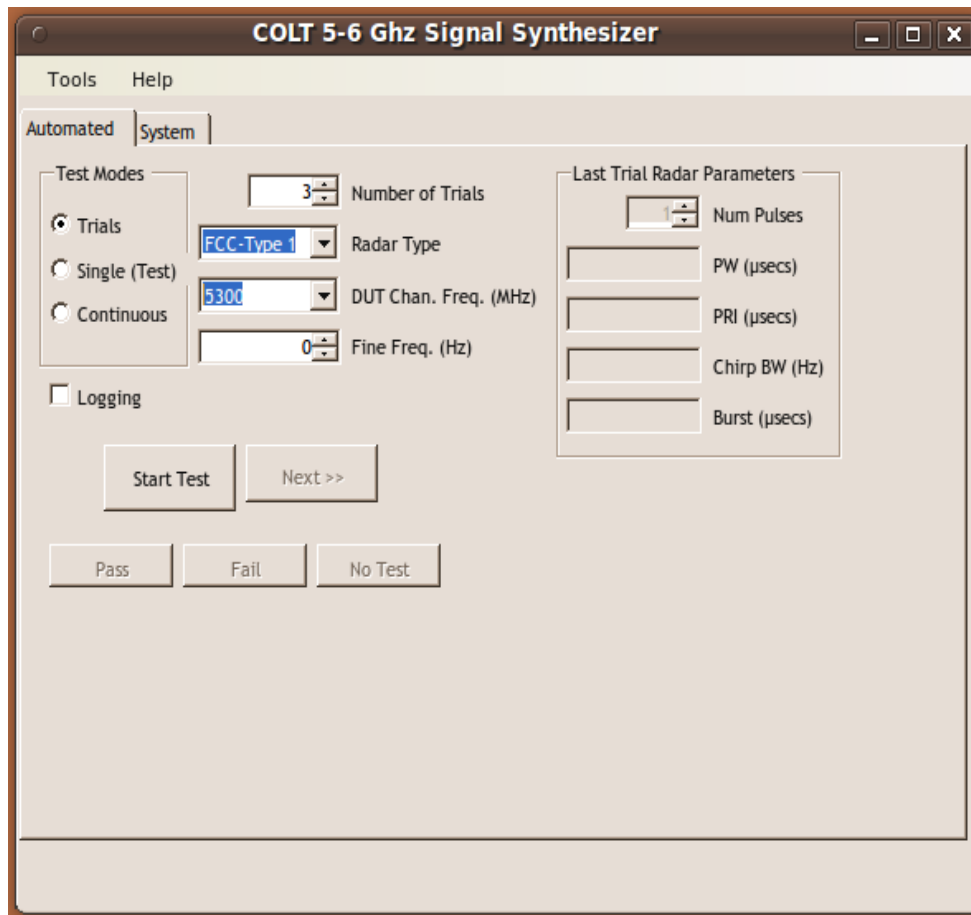
lp
modprobe usbserial vendor=0x067b product=0x2303
```

Step #2 – Get the latest Colt UI from the www.benchforge.com Website in downloads and place it in a convenient location in your PC.

Step #3 - Running the Colt UI

Windows

1. Insure that you have .Net 2.0 or later on your machine. If not, install it now.
2. Also, insure your USB-to-RS-232 cable is plugged into your PC if you are using one.
3. Double click the ColtSynthesizer.exe and it should launch with the following screen. Once it does proceed to Step #4.

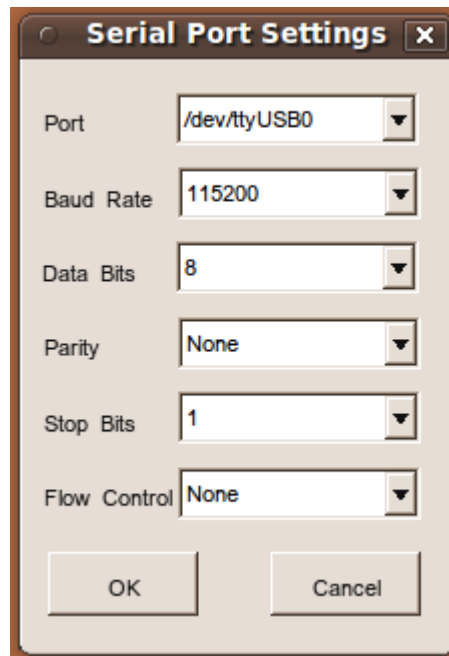


Ubuntu/Linux

1. Terminal: `mono -V`; version must be 2.10.5 or later, if an earlier version you must install latest.
2. The UI was tested using Ubuntu 10.04 LTS
3. Terminal: `cd` to the location of the `ColtSynthesizer.exe`
4. Also, insure your USB-to-RS-232 cable is plugged into your PC if you are using one.
5. Terminal: `"mono ColtSynthesizer.exe"`
6. If you get a series of error messages with the following content: `.....Could not load file or assembly 'System.Windows.Forms'.....` chances are you are missing the following library, execute the following command and repeat step 3.
7. Terminal: `"sudo apt-get install libmono-winforms2.0-cil"`
8. Once you get the above screen, then proceed to Step #4.

Step #4 – setting up the Serial Port

1. For a first time install, you will be asked to set the Serial Port because one was not assigned. Go to the Serial Setup men under Tools and set the appropriate serial port that is connected to your Colt. Below is the screen to set up the serial port.
2. IMPORTANT: DO NOT CHANGE ANY OTHER SETTINGS, ONLY CHANGE THE SERIAL PORT.
3. Click OK when done.



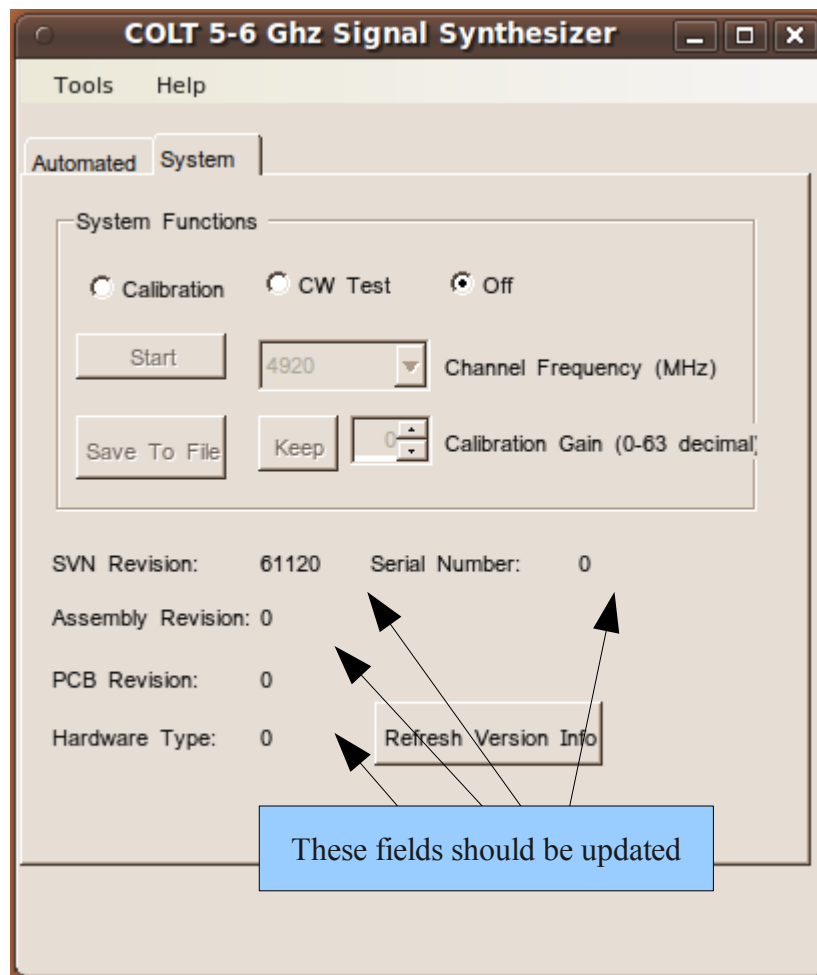
Step #6 – Connect your RS-232 cable to Colt

Step #5 – Connect the included AC Power Adapter to Colt

1. The Power LED should be on.
2. You should see all other LEDs momentarily turn on then off.
3. The Heart Beat LED should continuously flash on and off.

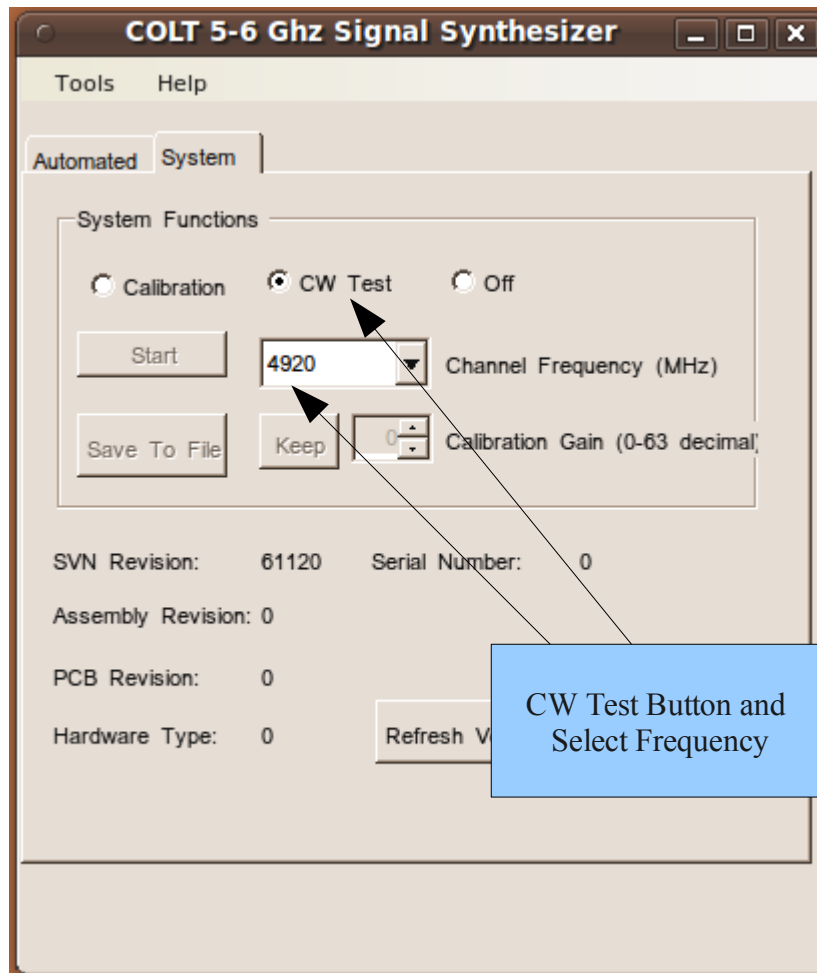
Step #7 – RS-232 Interface check

1. Click on the System Tab.
2. Click on the Refresh Version Info button and observe the RS-232 interface LED flash for each click of the Refresh Version Info button.
3. Plus you should see the Revision fields in the System Tab update. Having this confirms that the RS-232 has two way connection with Colt.



Step #7 – RF check

1. Click on the System Tab.
2. Click the CW Test button, this will produce a CW (continuous wave) at the desired RF frequency. You can view the RF signal on a spectrum analyzer, high speed scope or power meter.
3. Set the desired Channel Frequency from the pull down tab.
4. Also, the Radar Active LED will be on.
5. Click the Off button when finished.

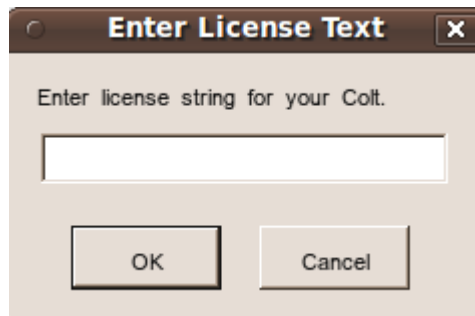


Congratulations, you are done with the install and the quick check-out and are ready to use your Colt!!

Step #8 – Using the License File (for ETSI and Japan radar types)

If your license agreement includes ETSI and Japanese radar types, then you must install the license file provided to you.

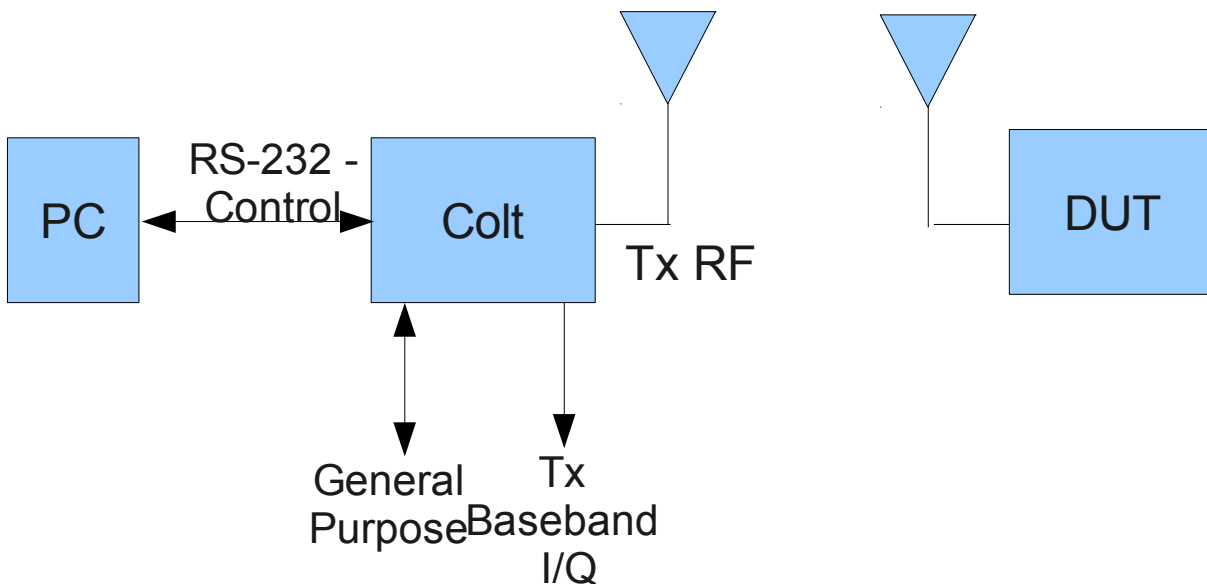
1. Get the .If file from the Colt download web site, that matches to the Serial Number of your Colt. It will be in the license file folder in a sub-folder that has your serial number.
2. Drop that xxx.If file into the Colt executable directory. Note, there can be only one license file in this location.
3. Lanuch the Colt UI if not already launched.
4. Select Help | Enter License Information from the menu.
5. In the Enter License Text screen, enter the same String ID text of the purchasers email address (see figure below), and Click the OK button. If you are uncertain of the email address used to generate the license file, contact Benchforge for this String ID.
6. Close the Colt UI.
7. Run the Colt UI again. The radar options should be available now.
8. An error occurred loading the .If file if only the "basic" types (FCC and custom) appear, contact Benchforge for assitance.



Background

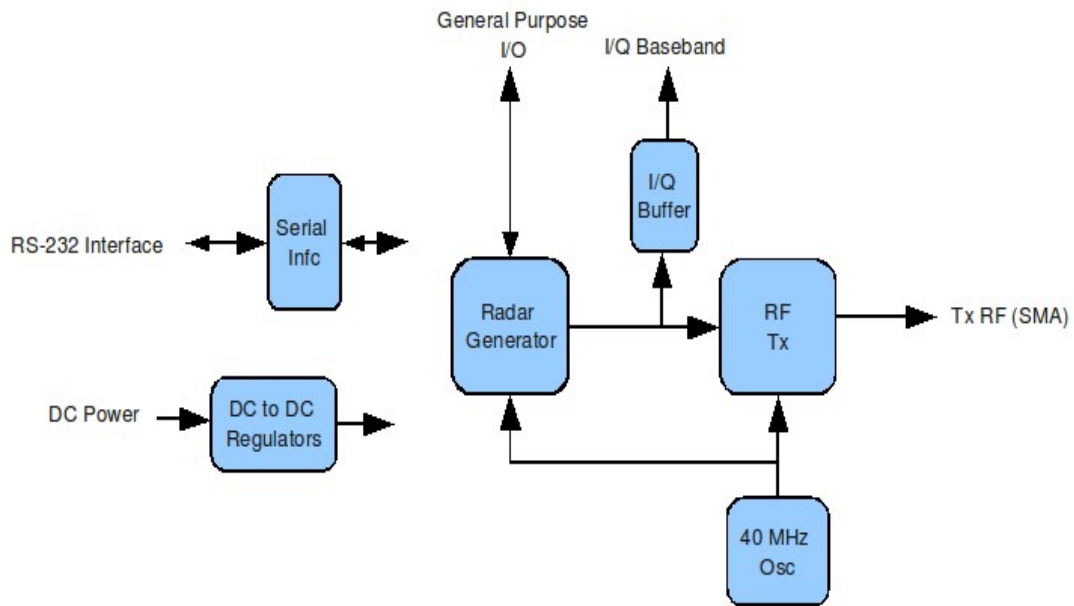
Colt is a 5-6 Ghz Signal Synthesizer which generates all FCC and other country UNII/DFS radar signals. Colt has implemented the FCC radar signal types contained in FCC-06-096A1 in a small self contained box. The box is controlled over RS-232 and has a simple but powerful User Interface that allows the user to set up for a test of their DUT or to run a series of 30 trails and record the results of each for logging purposes.

See the following block diagram for an example use of Colt. Colt works with any RS-232 connected to a PC. Colt is powered from an AC-DC transformer supplied with Colt. The normal polarity SMA antenna provided with Colt can be directly connected to Colt or you can wire your DUT directly to Colt.



We offer two convenient interfaces for test interfaces. One is the I/Q baseband output of Colt. This is available using two BNC connectors on the front panel of Colt. The other is available via a straight pin header on the backpanel of Colt. In it we supply two useful debug outputs which is 1) beginning of the burst (HWSTAT[0]) and 2) when each burst is sent (HWSTAT[1]. Both are 3.3 V logic level signals. HWSTAT[4:7] have dual use because they drive the front 3 LEDs of the front panel LED. Presently HWSTAT[4] is the Heart Beat LED, HWSTAT[5] is the RS232 ACTIVE LED and HWSTAT[6] is the RADAR ACTIVE LED. Keep in mind however that the RADAR ACTIVE is not actual Tx time but persistence has been added so that the LED is visually seen. Some radar pulses are sent faster than the eye can perceive it thus the reason for adding persistence.

Note on the backpanel there is RS232-OUTPUT. It is not presently used but is reserved for future use. Below is the block diagram of the internals of Colt. Colt is driven off an internal 40 Mhz clock oscillator.



Radar Operation

Radar operation is designed to be simple to use. The Automated tab, is the UI that controls the radar. There are two modes of operation; 1) Single and 2) Trials. Single is to be used for equipment set and debug. It will send a single radar pulse stream for the Radar Type selected. For FCC Type 1-5 you set the DUT channel frequency. For Type 6, hopper, the DUT frequency is grayed out.

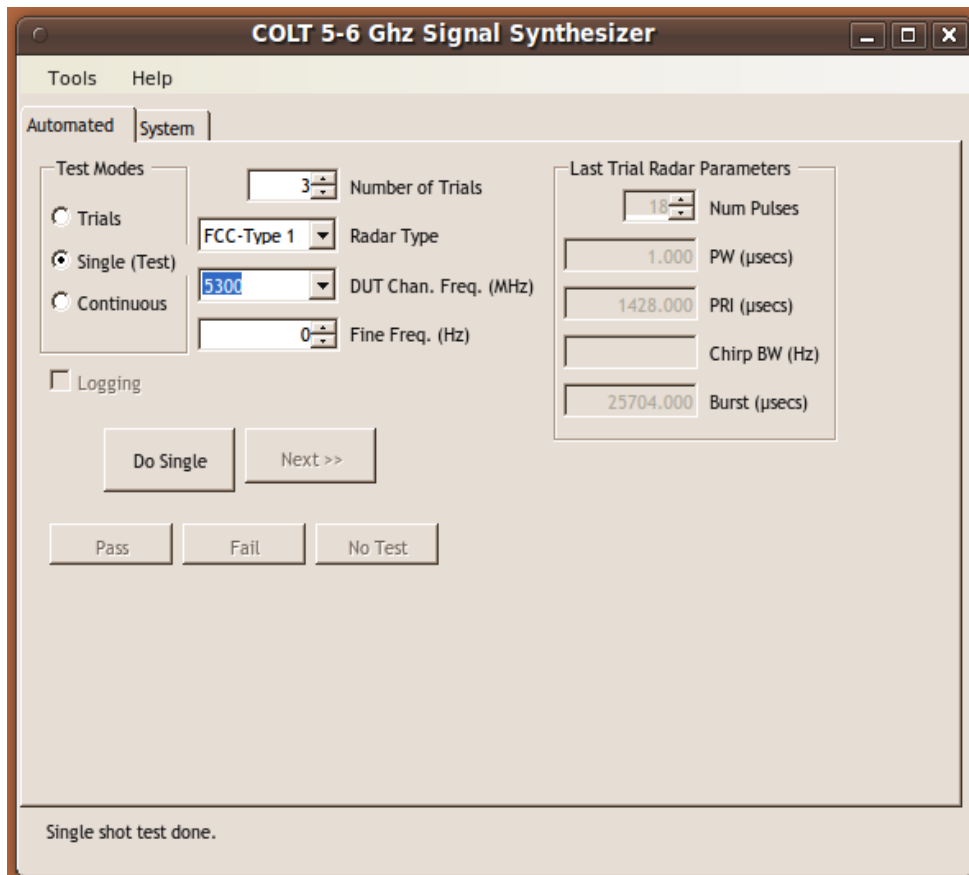
To send a Single radar burst; set the Test Mode to Single and then click on the Do Single button. Each time you click on the Do Single it will send a burst. Fine frequency and Relative Gain offset are also selectable should you desire to adjust either.

The Test Mode Trials is to be used when you are running a sequence of trails for recording. To run the Trials, set the test mode then set up the radar type and the number of trails. Click on the Start Test button. After the radar burst is sent, the Next button will highlight and you then click Next until the test completes.

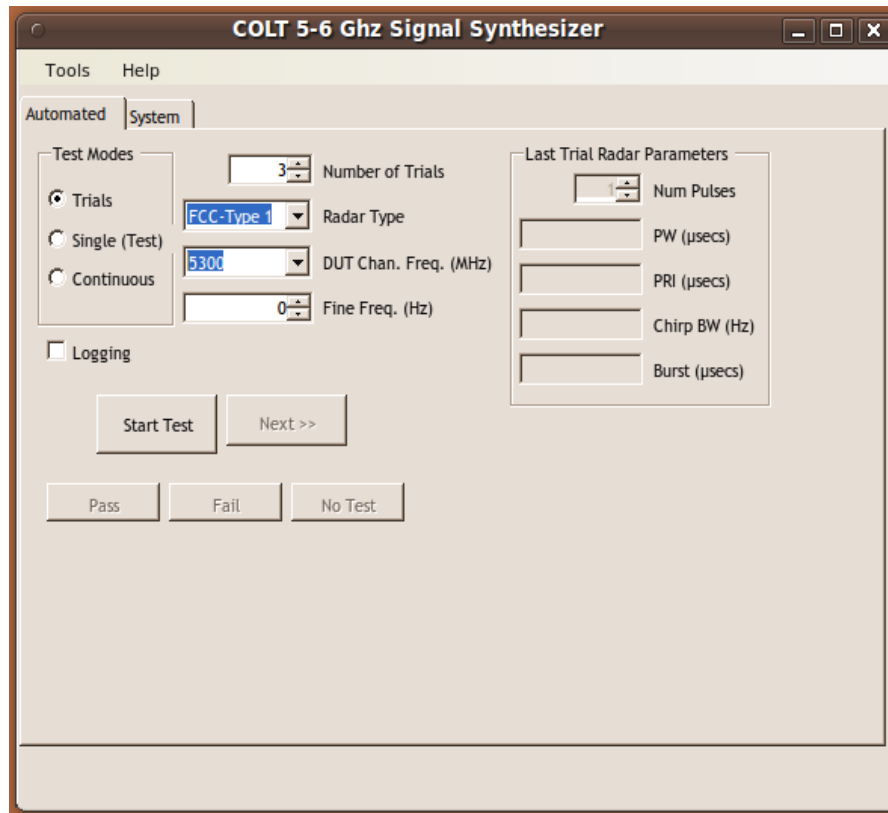
If you set the logging button, then after each radar burst sent, it will ask you click on either PASS, FAIL or NO TEST, before you can advance to the next burst. This answer will then be logged to the file along with the details of the trail.

Note also that as you run a radar, the parameters of the trial are shown in the Last Trail Radar shown in grey.

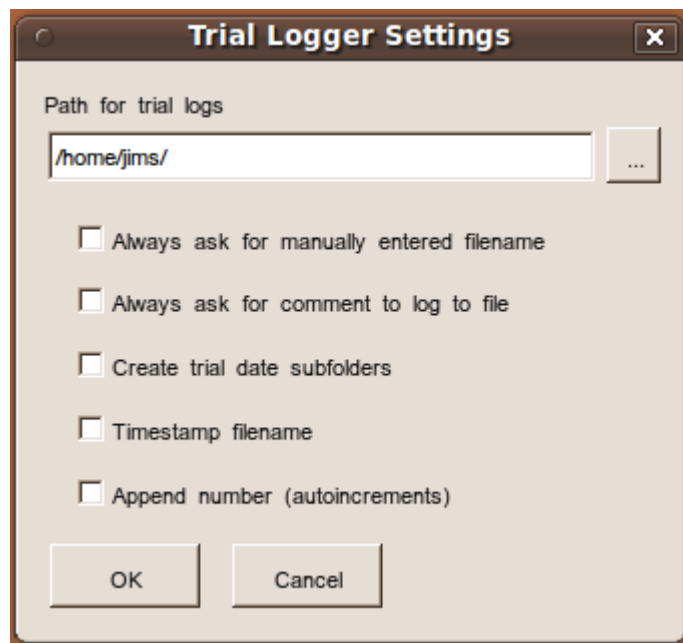
Example of Setting up for Trials



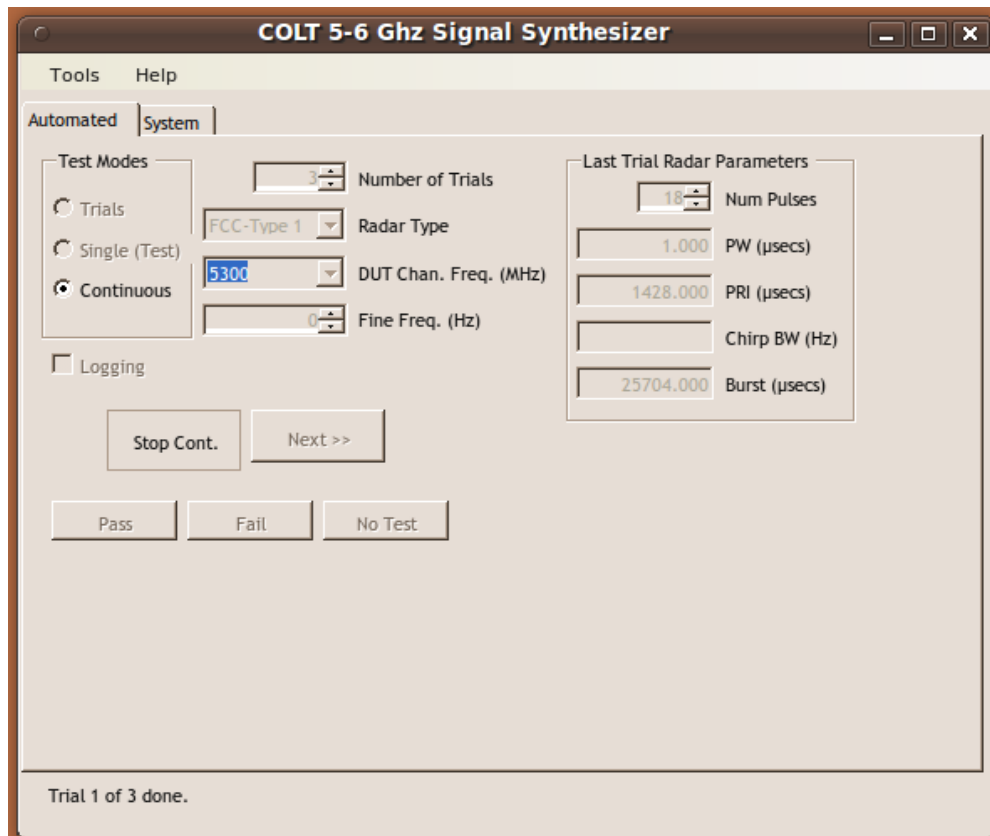
Example of Setting up for Trials



When you want to run Trials, you customize the trial using this dialogue box selected from the Tools menu of Colt. In it you can choose to place the log file into a customized location and customize logging.



You can run continuously a radar using the continuous button. Here is the screen condition when in continuous, also the Radar will be active. Click the Stop Cont. To stop continuous.



You can also customize Colt using the Custom radar mode. In this mode you specify the number of pulses, tpw, tpri and Chirp BW. Burst is updated after you run a radar burt. This is fixed there is no randomization to the radar parameters.

The range of each paramter is as follows:

- 1.Num Pulses: 1 to 255
- 2.PW (usec): 0.025 to 419430.425
- 3.PRI (usec): 0.075 to 419430.475
- 4.Chirp BW (Hz): 0 to 20,000,000

