User Manual - PTC Radio Control and Status Application

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Revision History

Revision	Date	Summary of Changes
1.0	04/16/2012	First draft of FRA grant document.

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1. Introduction

This document describes how to use the PTC Radio Control and Status Application. This application is a soft front panel to the radio. It decodes messages from the radio and displays the information in indicators, tables, and graphs. It provides controls to send commands to change the state of the radio. This application works with Base, Loco, and Wayside radios.

1.1 Overview

The PTC radios developed by Meteorcomm have a TCP-IP interface that allows maintenance to be performed over an Ethernet network connection. The interface sends and receives text messages (it is very similar to the text-based protocol Telnet). The PTC Radio Control and Status application described in this document communicates to the radio over the TCP-IP interface.

The PTC Radio Control and Status application is written in LabVIEW (by National Instruments) and runs on computers with a Windows operating system.

The application has a front panel window with a control section on the left and a display section on the right. The control section provides a list of different categories. When a category is selected, the display on the right changes to the page for that category. Each page provides information and controls related to that category of radio features.

The application supports different user levels. There is a LogOn menu item in the top menu bar. By default the operator is logged on as an "Observer". This mode displays status and has very limited access to control of the radio. By selecting different user levels more control of the radio is obtained. To log on at higher user levels, a password is required.

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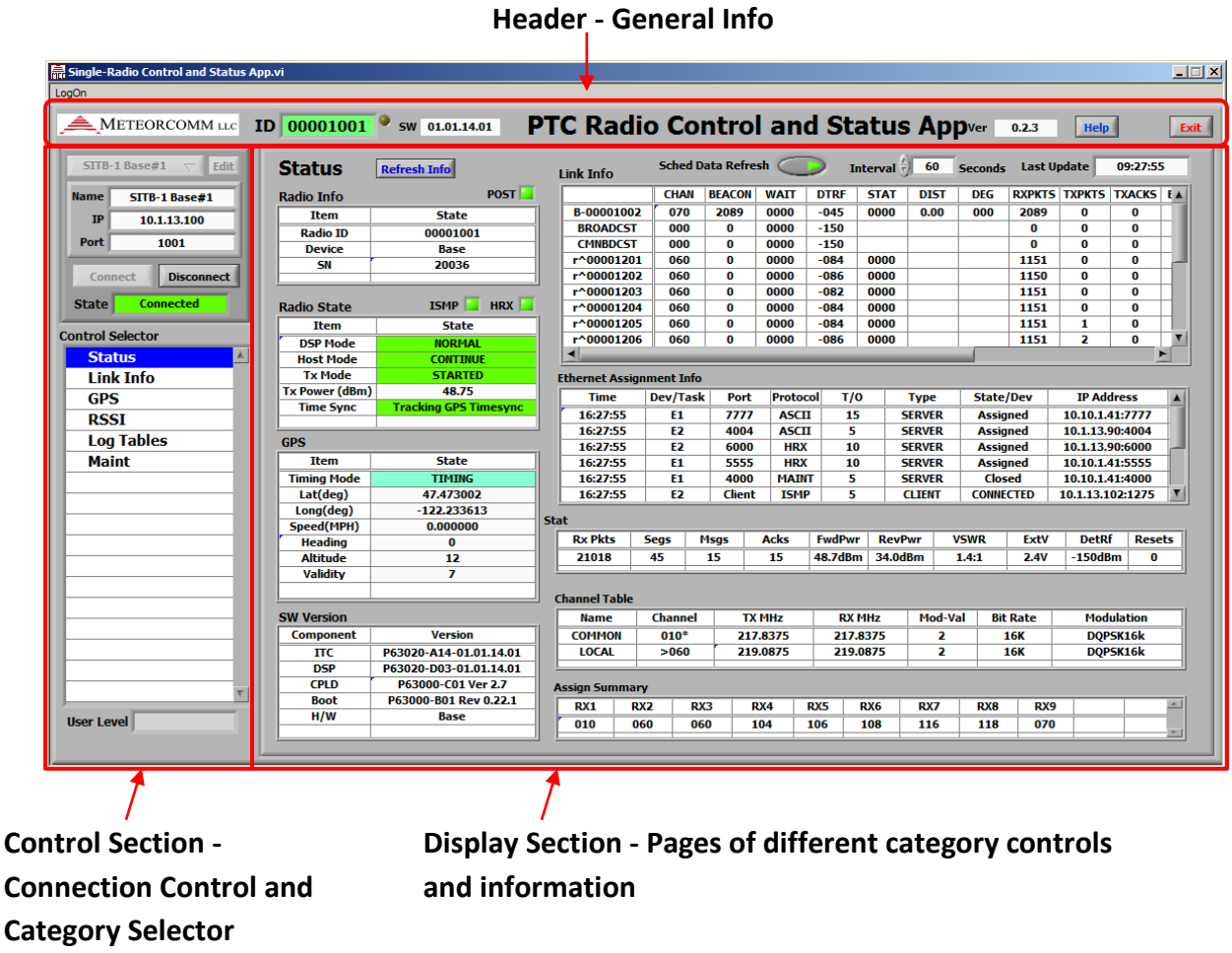

PTC Radio Control and Status App

1.1.1.1 Purpose

The purpose of this document is to provide instructions to use the PTC Radio Control and Status Application.

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1.2 Organization

This document is organized with sections that cover information about the application in the sequence that an operator would need to know as they use the application. The order is:

- Installation of the application
- Basic usage of the application
- Details about each Radio control/status category

1.3 Scope

The scope of this document is to provide instructions to use the PTC Radio Control and Status application. This document does not describe all the controls, status, and capabilities of the PTC Radio. It is assumed that the operator has a basic understanding of the PTC radio. See the Meteorcomm documentation on the PTC Radio for detailed information about the radio.

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1.4 Acronyms

Acronym/Abbreviation	Description
App	Application
HW	Hardware
MCC	Meteorcomm LLC
MS	Microsoft
PTC	Positive Train Control
SW	Software
TCP-IP	Transmission Control Protocol/Internet Protocol

1.5 References

[1] ITCR 1.0.5.0 Command Line Interface (CLI) Reference for Administration and Service

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2. Application Installation

2.1 PC Hardware Requirements

This application will run on basically any recent model desktop or laptop. The following table lists the minimum requirements:

PC Component/Feature	Requirements
Processor	Pentium III/Celeron 866 MHz or equivalent
RAM	256 MB
Screen Resolution	1024 x 768 pixels
Operating System	Windows 7/Vista/XP SP2/Windows Server 2003 R2 (32-bit)/Windows Server 2008 R2 (64-bit)
Disk Space	340 MB
Network Port or WIFI	1MB/s or better

2.2 SW Installation

This application comes with an installer that automatically installs all the components you need. You can obtain the installer from your Meteorcomm representative. The installer will install:

- The LabVIEW Runtime Engine (LRTE)
  - This will take about 10 minutes to install. It needs to be installed only one time. When you install updates to this application the LRTE install part will be skipped.
- This application

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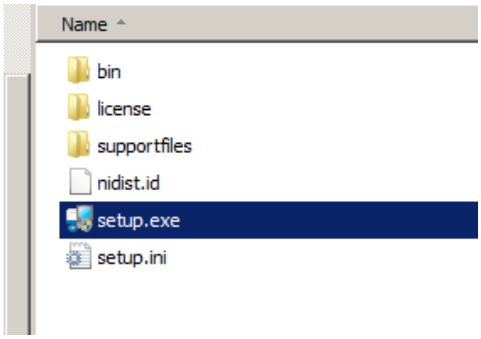
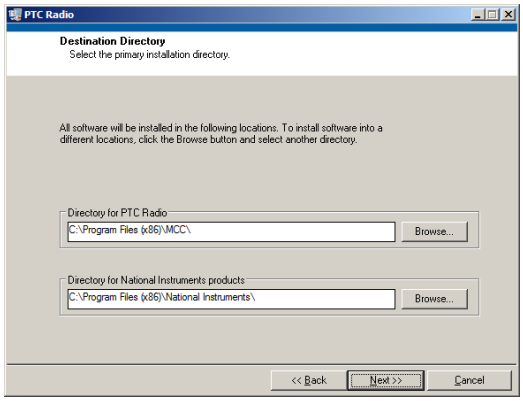
To install this application:

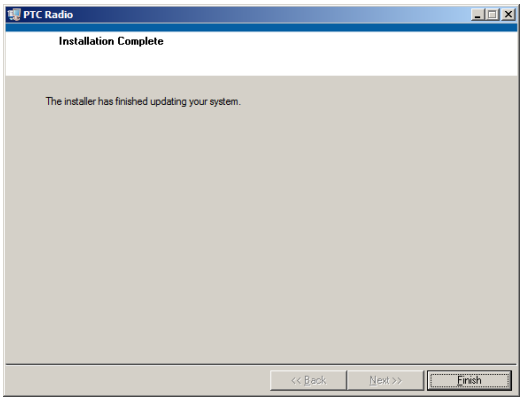
1) Run the setup.exe file in the installation folder.



Setup.exe Install File

2) The installer will provide several info and prompt popup windows. Use the default settings and click "Next". There will be a license agreement popup window. Review and accept the license agreement.





Installer Popup Windows

You may receive a popup window indicating your PC needs to be rebooted. If so then reboot your PC.

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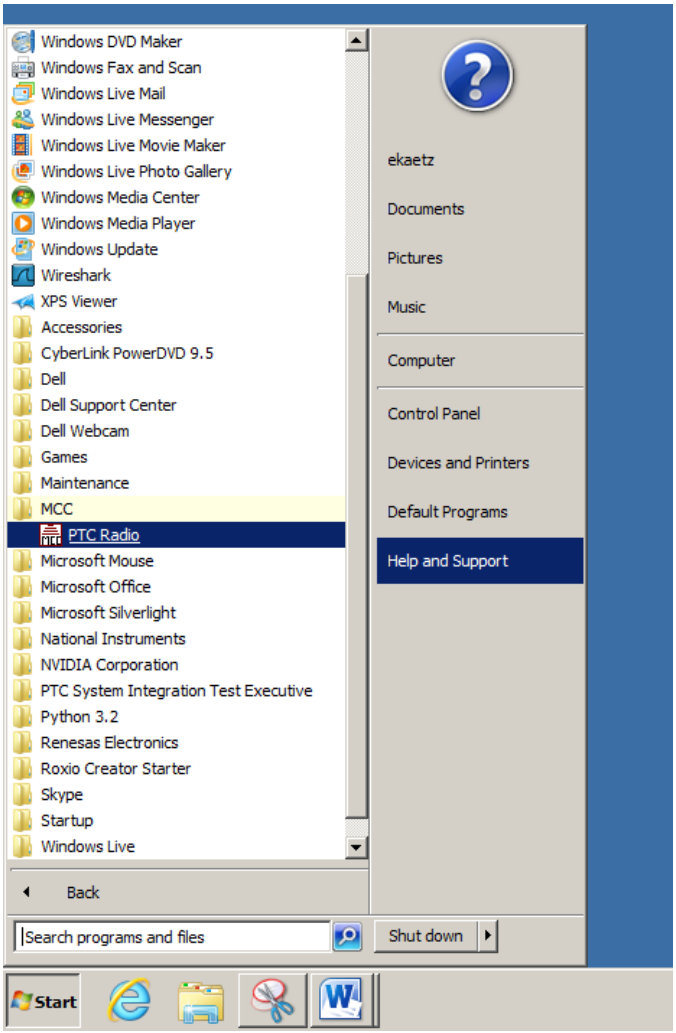
3. Launching the PTC Radio Control and Status App

When the Radio Control and Status Application is installed, short cuts are created on the desktop and in the All Programs Start menu MCC folder. Double click the icon to launch the application.

Desktop Icon



All Programs -> MCC -> PTC Radio

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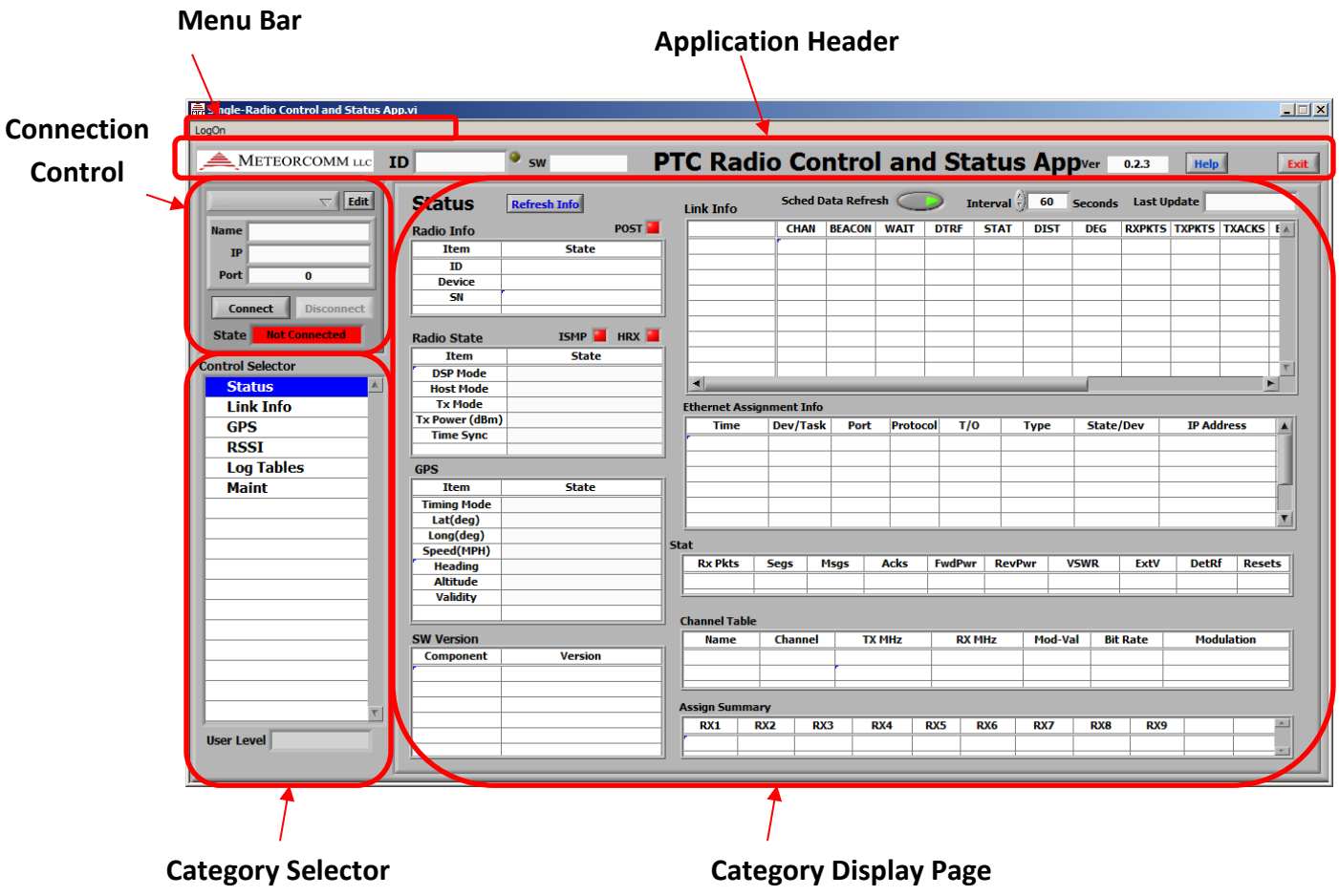
4. PTC Radio Control and Status App Front Panel

The PTC Radio Control and Status App front panel consists of several sections:



PTC Radio Control and Status App

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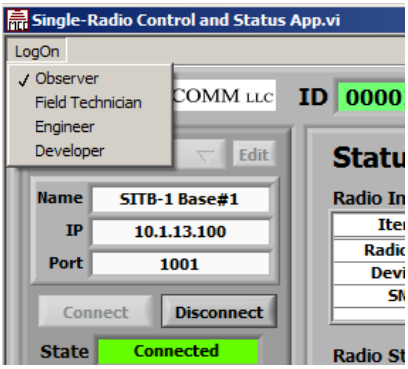
4.1 Menu Bar

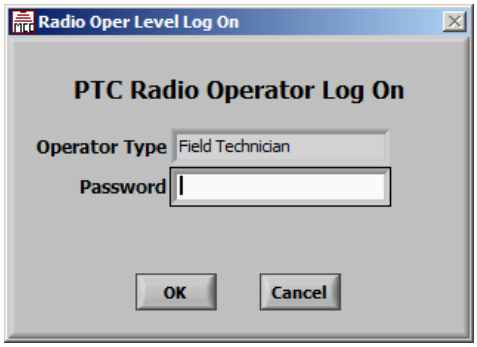
4.1.1 LogOn

The LogOn menu is used to log on at different operator levels.



Log On Menu

By default the operator is logged on as Observer. This level allows the operator to monitor status of the radio but not to change state of the radio. When a higher level is selected a popup window will appear requesting a password. When a lower level is selected, there will not be a prompt for a password.



Log On Popup Window

Supervisors must contact the Meteorcomm representative for instructions to obtain the default passwords and for setting custom passwords.

Higher user levels will expose more items to select from in the category control selector.

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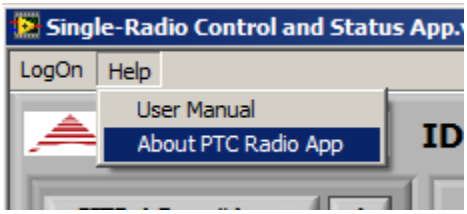
4.1.2 Help

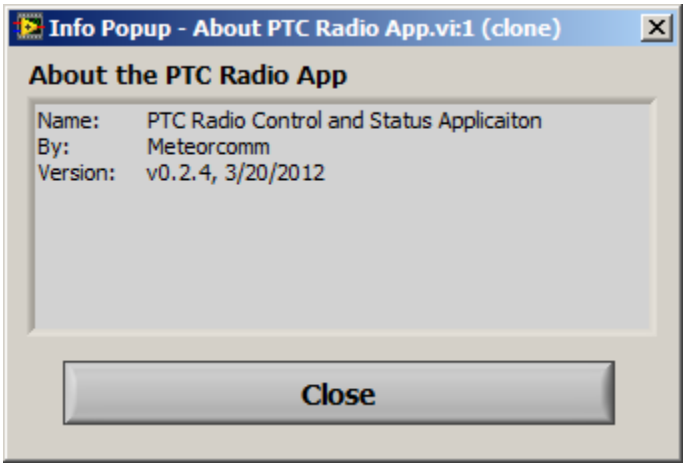


Help Menu

- User Manual

  Opens this user manual document.About

  Opens a popup window with version information



About PTC Radio App

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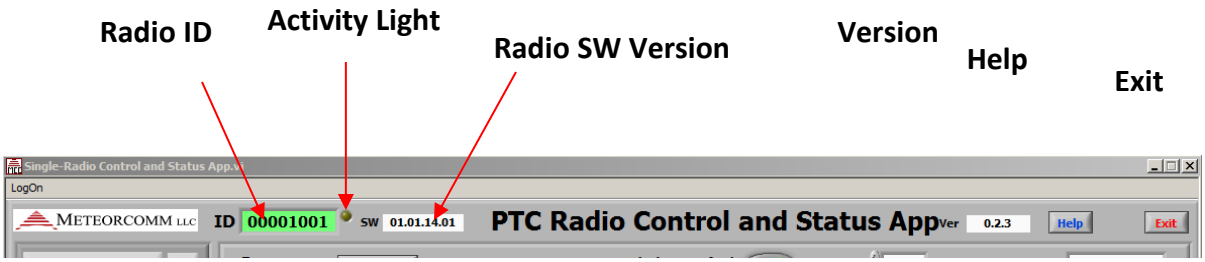
4.2 Application Header

The application header contains general information and controls.



Application Header

- Radio ID - This is the ID of the radio the application is connected to.
- Activity Light - this light blinks each time data is transferred from the radio to this application. (This is synonymous to the activity light of an Ethernet connection).
- Radio SW Version - this is the SW version of the connected rasio.
- Version - this is the version of the PTC Radio Control and Status Application.
- Help Button - By clicking this button this user manual will be opened.
- Exit Button - Click this button to exit the application.

4.3 Connection Control

This control is used to connect the application to a radio.

When the radio app is opened it is in the Not Connected state. For details on how to connect to radios, see the "Setting Up Radio Connection Configuration" and the "Connect to a Radio" sections.

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4.4 Category Selector

This section displays controls and status for the selected category. This section is referred to as a "Page". Each category has a different looking page. See the

When the application opens it will be in the "Not Connected" state. The section in the top left corner is the Connection Control. The first time the App is used this will need to be configured - see section "Setting Up Radio Connection Configuration" for instructions to configure the connections. If you already have your connections configured then go to the "Connect to a Radio" section for info about connecting to radios.

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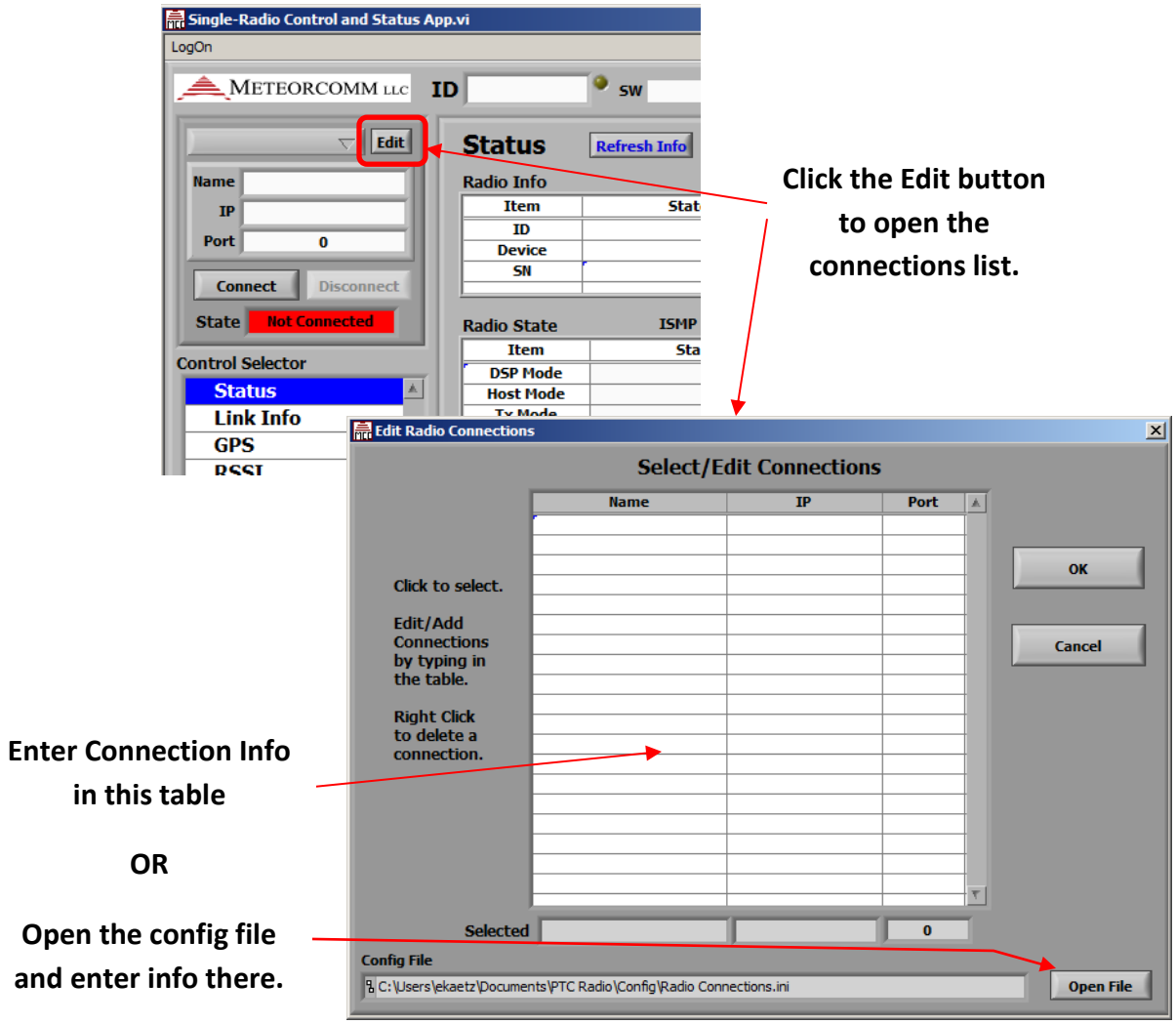
5. Setting Up Radio Connection Configuration

The first time the Radio Control and Status App is used it will not have any radio connection configuration. To setup connections click the Edit button in the top left connection control section.



Enter Connection Edit Connections Controls

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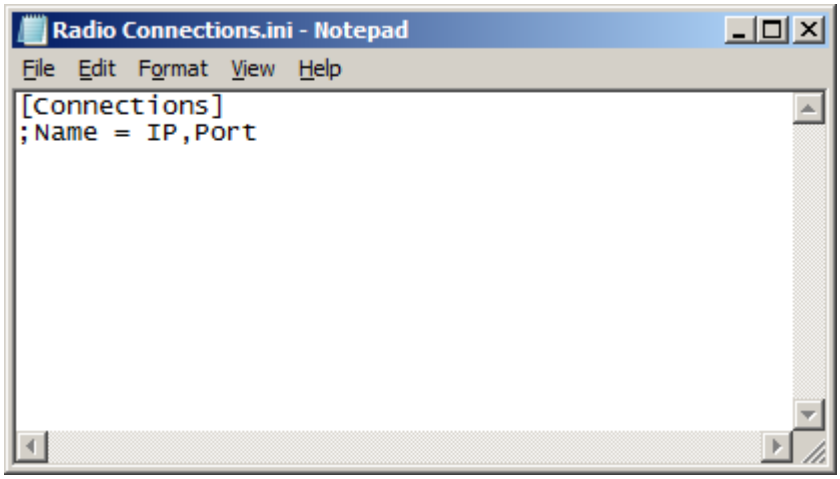
Each connection has the following properties:

- Name - The name is anything you want to call your connection. This is to help you identify your radio.
- IP - This is the IP address of the radio
- Port - this is the port the radio is configured to listen on for maintenance.

Configuration information may be entered in either of two methods:

- Enter Name, IP, and Port info in the "Edit Radio Connections" pop up window.
    - When you are done, select the radio in your list then click OK. That radio will appear in the Connection Control section when the Edit Radio Connections pop up window closes.
    - The Radio Connection file will be populated with the data you entered.
- Open the config file and enter the information in to the file.
    - In the Edit Radio Connections pop up window, click the "Open File" button. The Radio Connection file will open:



Empty Radio Connection File

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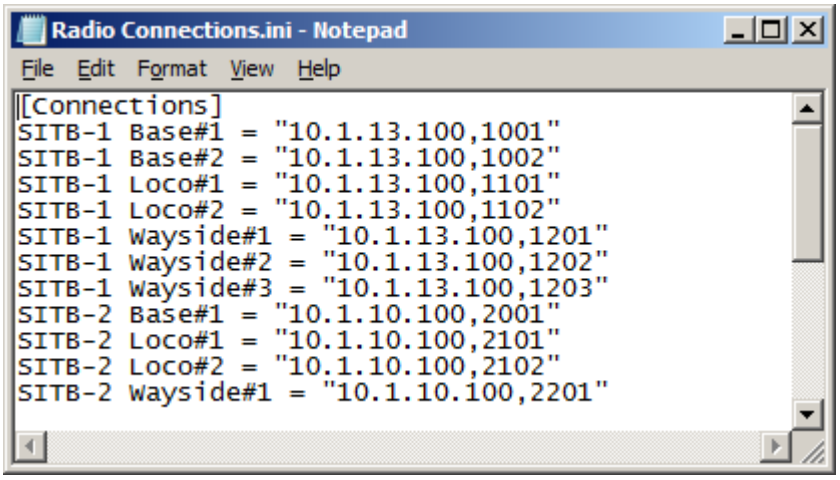
- Enter your radio connections using the "Name = IP,Port" format then save the file.



Populated Radio Connection File

- After you manually entered info to the file you will need to select "Cancel" in the Edit Radio Connections pop up window then click the Connection Control "Edit" button again. Now your radios will be shown in the connection table.

- Select the radio in your list then click OK. That radio will appear in the Connection Control section when the Edit Radio Connections pop up window closes.

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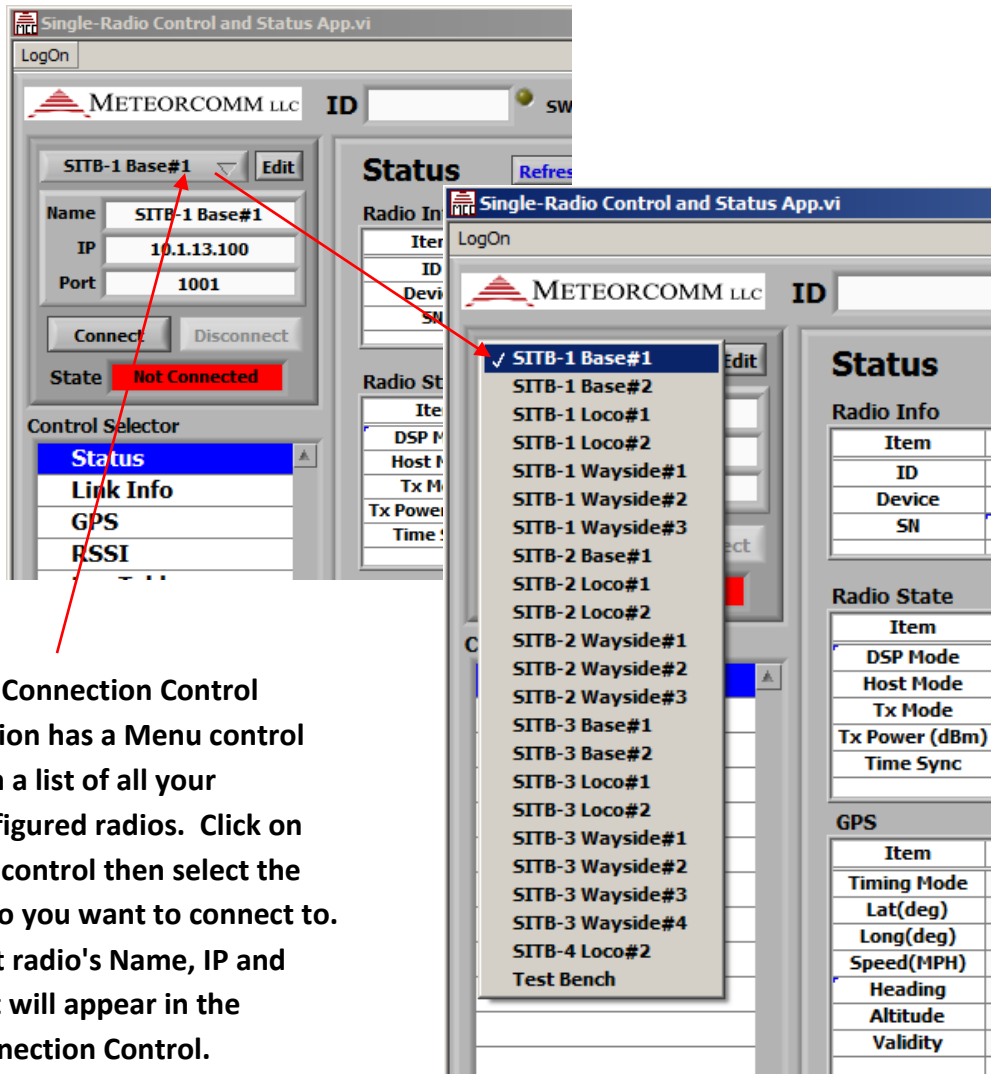
Once your connections have been setup you can quickly select a radio using the Connection Control section. The Connection Control section has a menu with a list of all your configured radios. Click on this menu control then select the radio you want to connect to. That radio's Name, IP and Port will appear in the Connection Control section.



The Connection Control section has a Menu control with a list of all your configured radios. Click on this control then select the radio you want to connect to. That radio's Name, IP and Port will appear in the Connection Control.

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6. Connect to a Radio

In order to connect to a radio over the network you need:

- Network connectivity between your PC and the radio.
- The radio needs to be configured to accept network connections. (See radio installation documentation to configure this)
- The IP address and port of the radio you want to connect to.

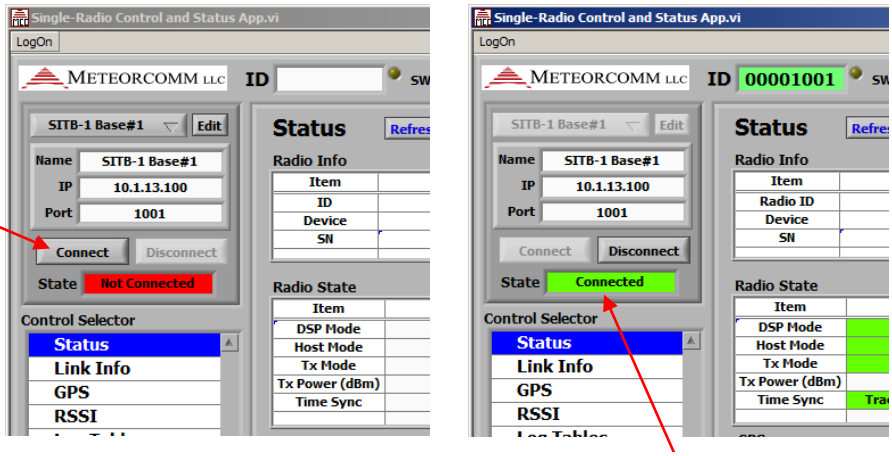
NOTE

The eassign command is used to configure network connections. The connection is assigned a protocol. The connections assigned as ASCII or MAINT protocol maybe used by this application. The MAINT is preferred since this is the connection the radio traces are usually configured to be sent to.

Connect to a radio:

1. Select the radio you want to connect to using the menu in the Connection Control section.
2. Click the Connect button.

Click the Connect button.



The State will indicate "Connected" and will turn green.

Connect to a Radio

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7. Getting Information From the Radio

The radio sends information under the following situations:

- Response to a command
    - A command is sent to the radio and it responds back
- Scheduled events
    - The radio "Sched" command is used to schedule the radio to perform actions that it performs when commands are sent to it.
- Trace events
    - The radio has the ability to send notification messages when certain events occur. There are several different categories of traces: RF, GPS, TX, RX, DSP, HRX, ...
    - The level of messages is configurable from 0 for All Traces (the highest level) to 7 for only error messages (the lowest level).
    - Traces can also be turned completely OFF.

The radio must be setup to send information to this application or the information being displayed will be stale (old) and may not reflect the current state of the radio.

By default the PTC Radio a Control and Status App polls the radio for high level Status information at a rate of once per minute (60 seconds). See the "Control and Status Categories" -> "Status" section for info on how to change this interval.

Each Control and Status Category page provides controls to turn on the capability to get the radio to send the information it displays.

See the "Control and Status Categories" -> "Scheduler" section for info on how to control the flow of information provided by the radio.

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8. Control and Status Categories

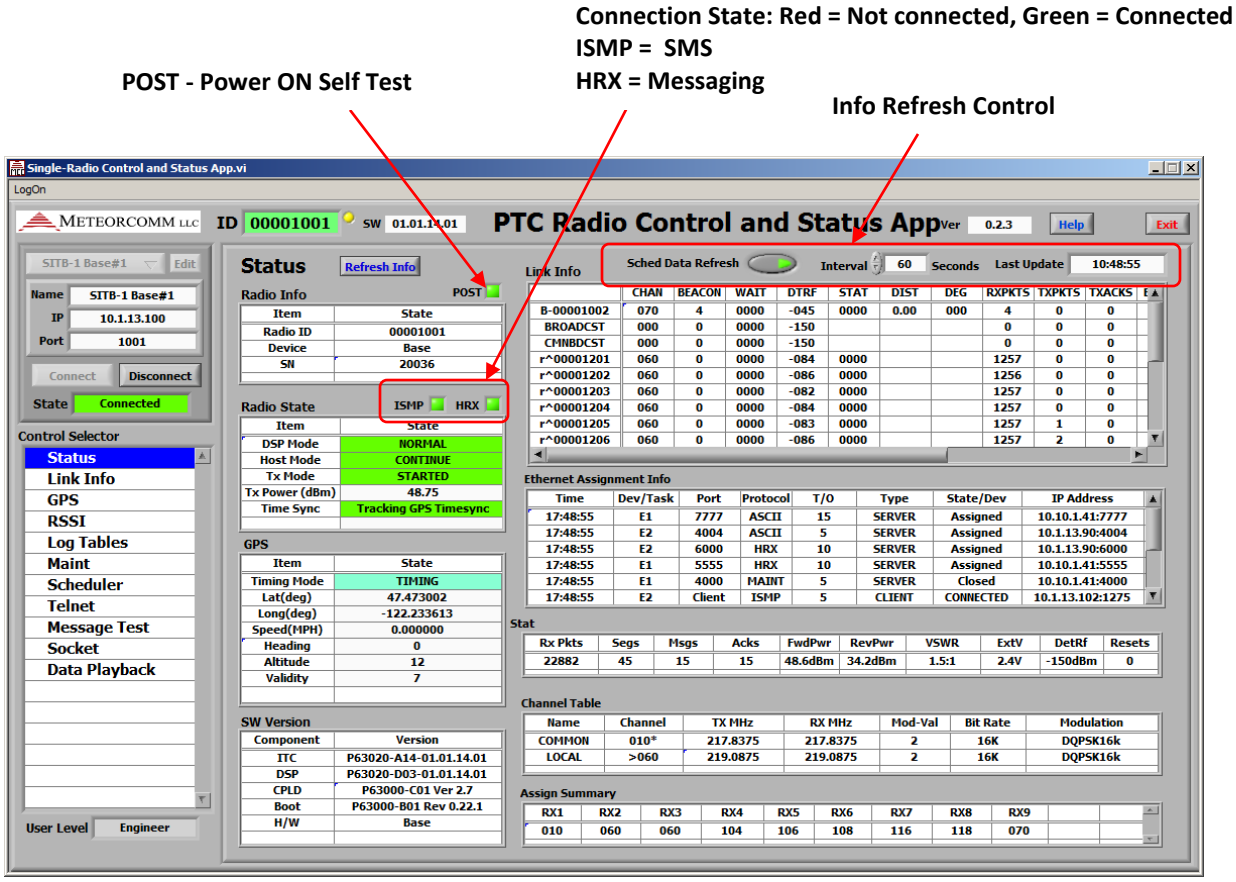
8.1 Status

The Status page provides general status information about the radio.

When the app connects to a radio it polls the radio for information to populate each indicator on this page.

The status information is refreshed at regular intervals. By default this interval is once every 60 seconds. This refresh maybe turned OFF and/or the interval may be changed by the refresh controls at the top of this page.

Certain status items are color coded to indicate the health of the state it is in.



Status Page

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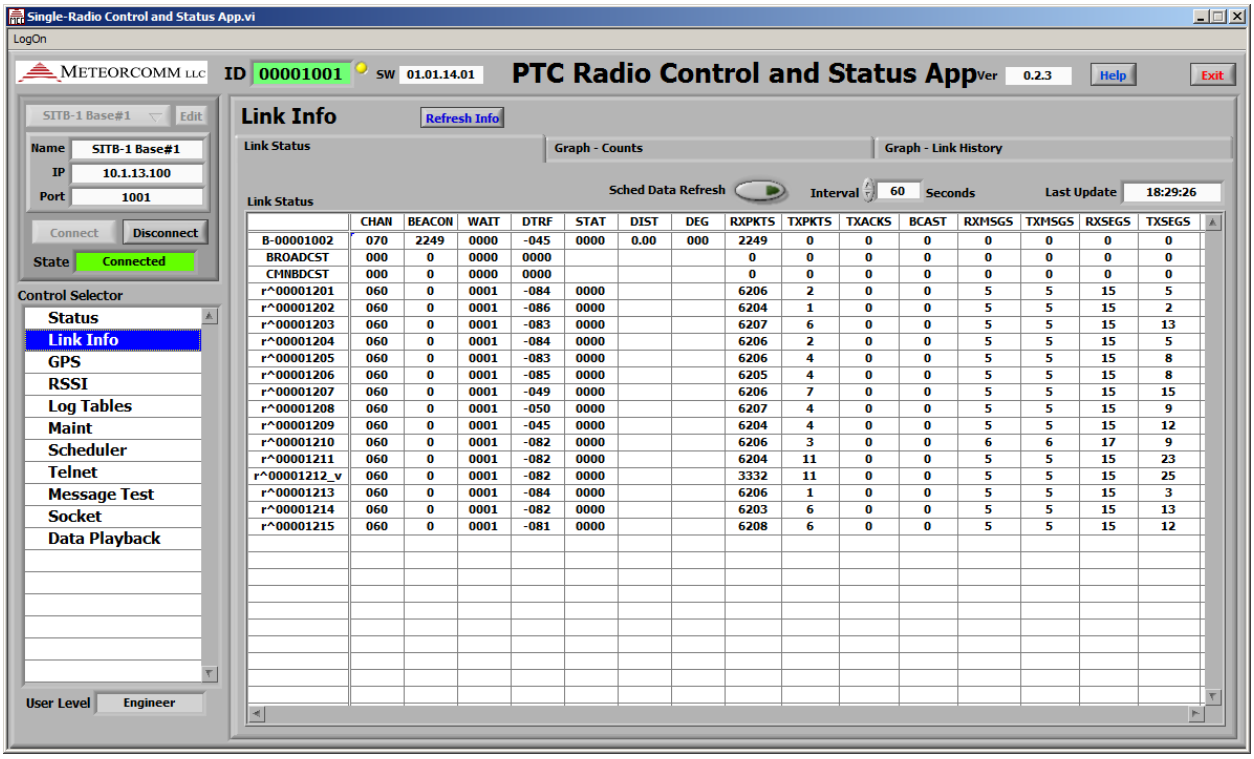
8.2 Link Info

The Link Info page provides information about the Link Status.



	CHAN	BEACON	WAIT	DTRF	STAT	DIST	DEG	RXPKTS	TXPKTS	TXACKS	BCAST	RXMSGS	TXMSGS	RXSEGS	TXSEGS
B-00001002	070	2249	0000	-045	0000	0.00	000	2249	0	0	0	0	0	0	0
BROADCST	000	0	0000	0000				0	0	0	0	0	0	0	0
CMNBDCST	000	0	0000	0000				0	0	0	0	0	0	0	0
r^00001201	060	0	0001	-084	0000			6206	2	0	0	5	5	15	5
r^00001202	060	0	0001	-086	0000			6204	1	0	0	5	5	15	2
r^00001203	060	0	0001	-083	0000			6207	6	0	0	5	5	15	13
r^00001204	060	0	0001	-084	0000			6206	2	0	0	5	5	15	5
r^00001205	060	0	0001	-083	0000			6206	4	0	0	5	5	15	8
r^00001206	060	0	0001	-085	0000			6205	4	0	0	5	5	15	8
r^00001207	060	0	0001	-049	0000			6206	7	0	0	5	5	15	15
r^00001208	060	0	0001	-050	0000			6207	4	0	0	5	5	15	9
r^00001209	060	0	0001	-045	0000			6204	4	0	0	5	5	15	12
r^00001210	060	0	0001	-082	0000			6206	3	0	0	6	6	17	9
r^00001211	060	0	0001	-082	0000			6204	11	0	0	5	5	15	23
r^00001212_v	060	0	0001	-082	0000			3332	11	0	0	5	5	15	25
r^00001213	060	0	0001	-084	0000			6206	1	0	0	5	5	15	3
r^00001214	060	0	0001	-082	0000			6203	6	0	0	5	5	15	13
r^00001215	060	0	0001	-081	0000			6208	6	0	0	5	5	15	12

Link Status
The Radio response to the "linkstat" message is displayed in a table.

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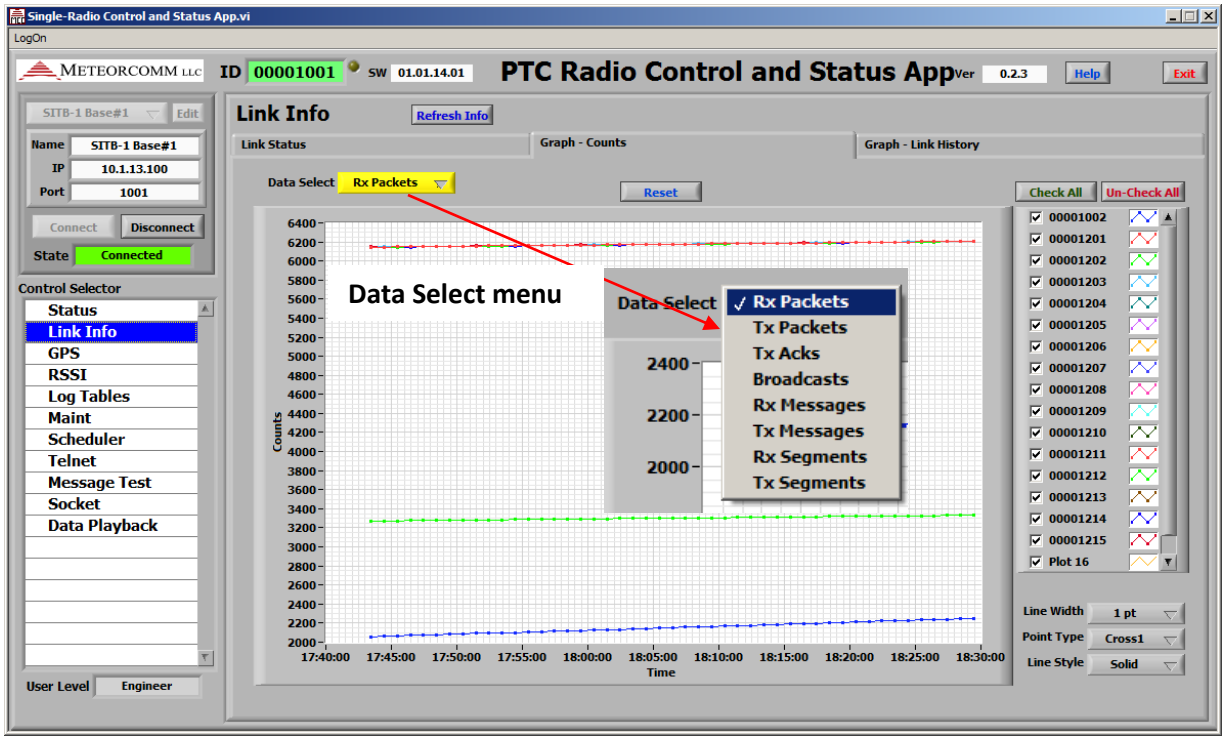
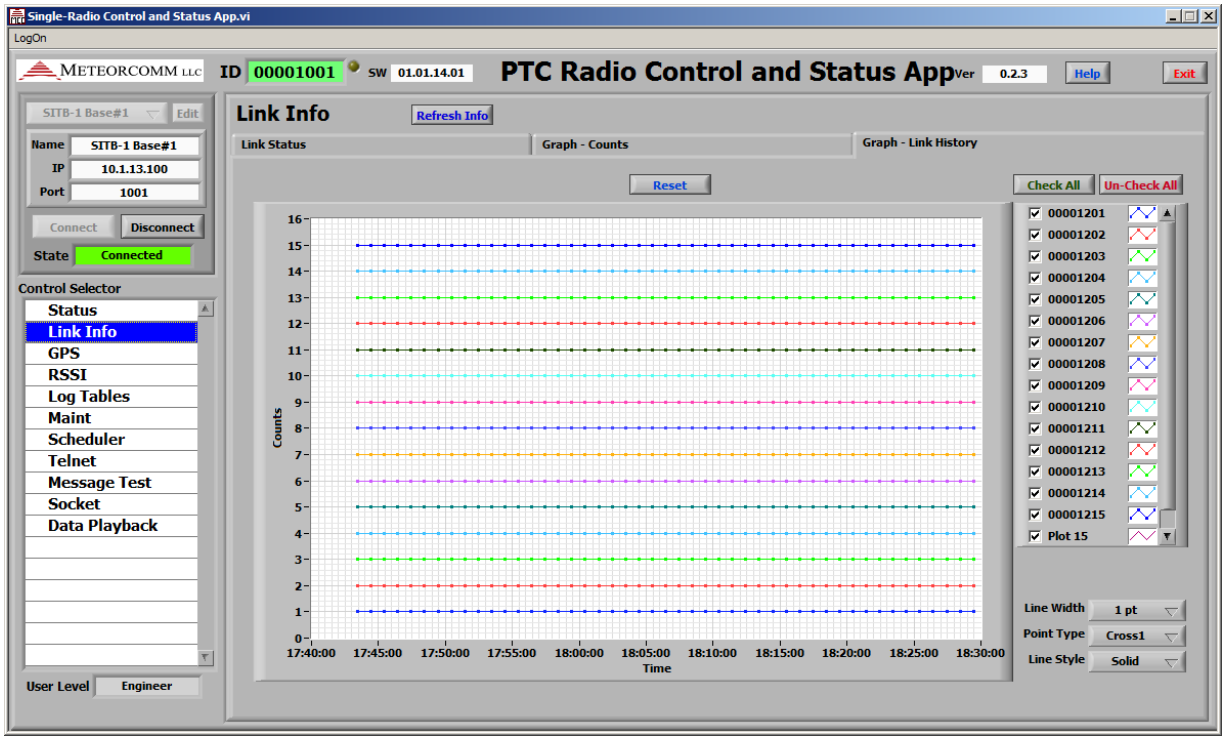


Graph - Counts

The counts from the "linkstat" message is displayed in the "Graph - Counts" tab. Use the Data Select menu to choose the category of counts to display in the graph.



Graph - Link History

The "Graph - Link History" tab displays the linked radios versus time.

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8.3 GPS

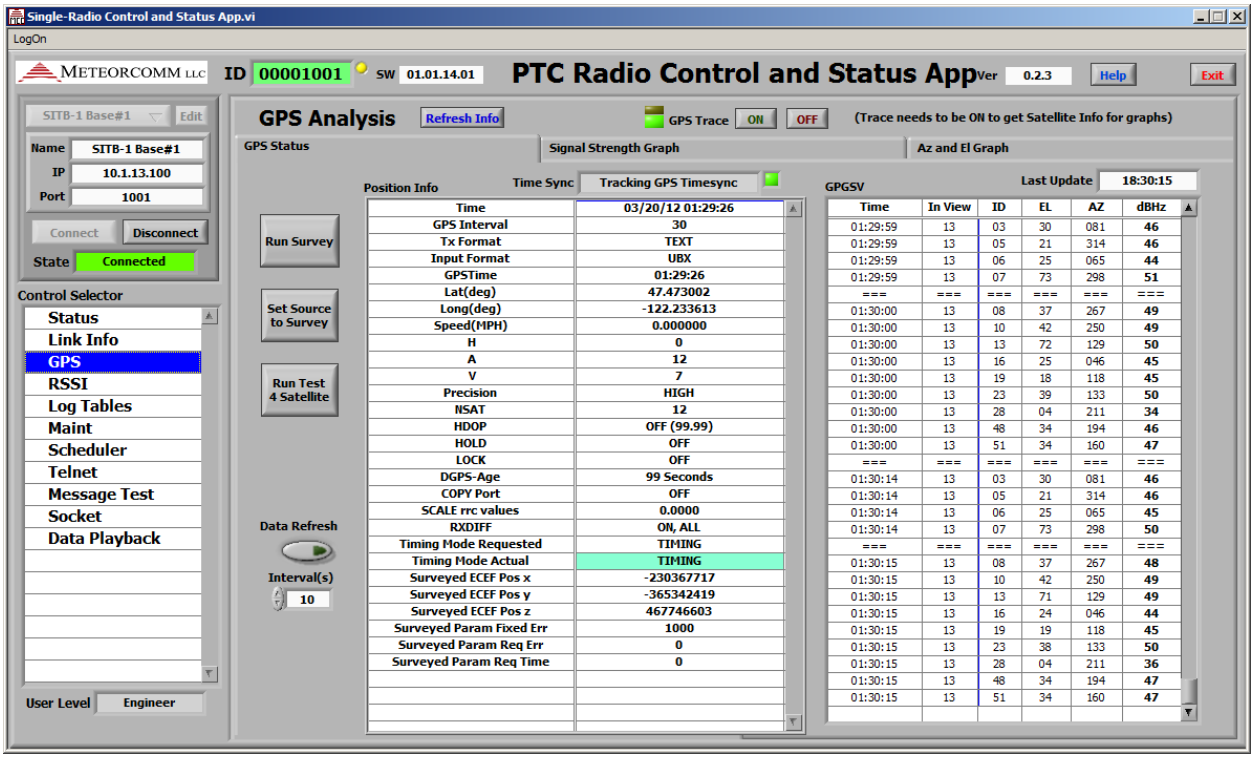
The Link Info page provides information about position and GPS tracking.

The Position Info table lists the information provided from the radio "pos" command.

The GPGSV table lists information provided in the GPS Trace GPGSV.

The Refresh Info" button sends a "pos" command to the radio. The radio's response will update the Position Info Table. The Data Refresh control can be used to cause regular updates of the Position Info.

At the top of the page is a GPS Trace control. Turn this ON to receive GPGSV trace information. This trace is sent every 15 seconds. This information is used to update the Signal Strength and the AZ and EL Graphs. The Green light indicates if the trace is in the ON or OFF state. The yellow light flashes each time trace info is received.



GPS Status Tab

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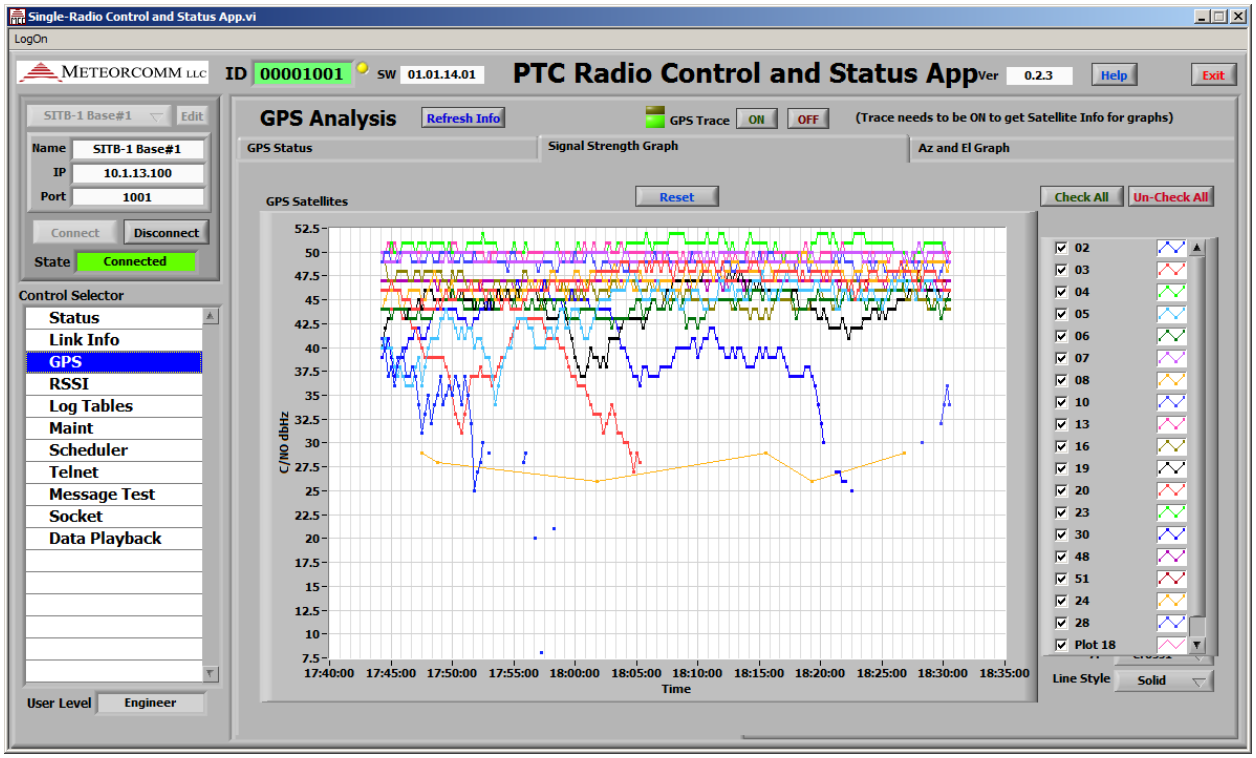
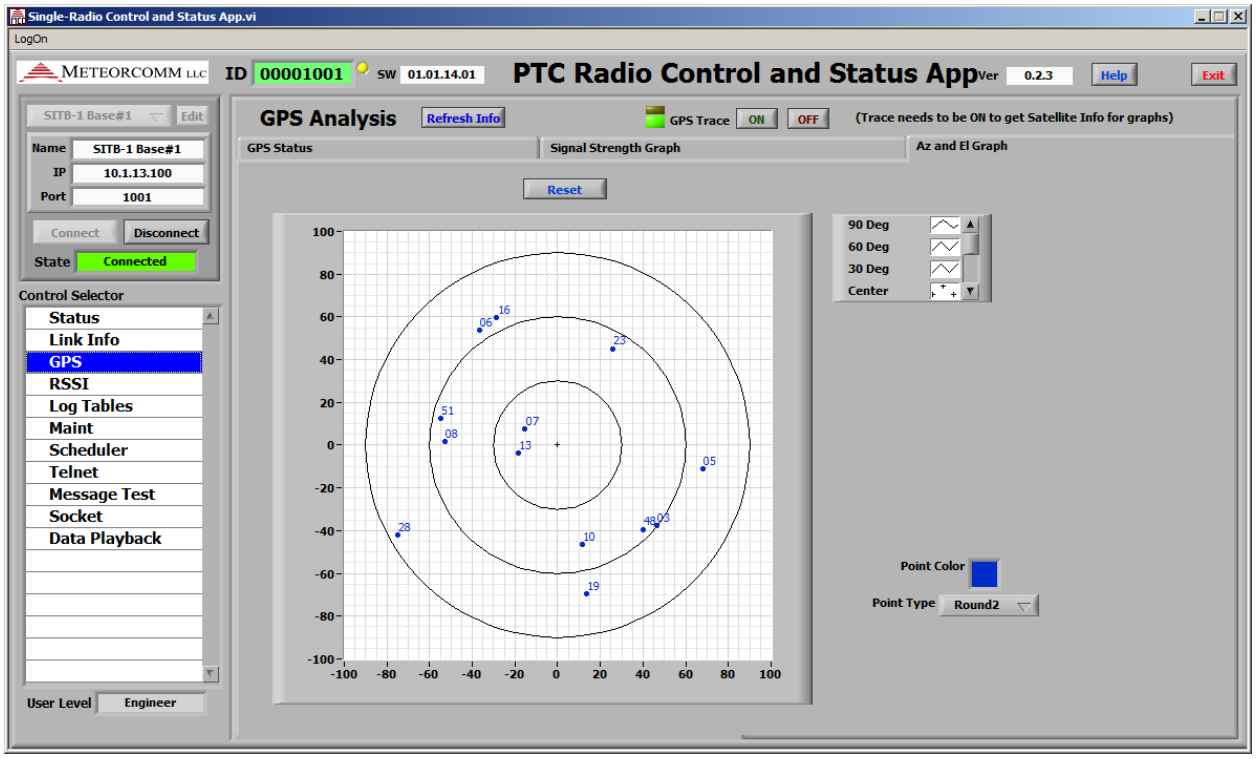


GPS Signal Strength Graph Tab



GPS AZ and EL Graph Tab

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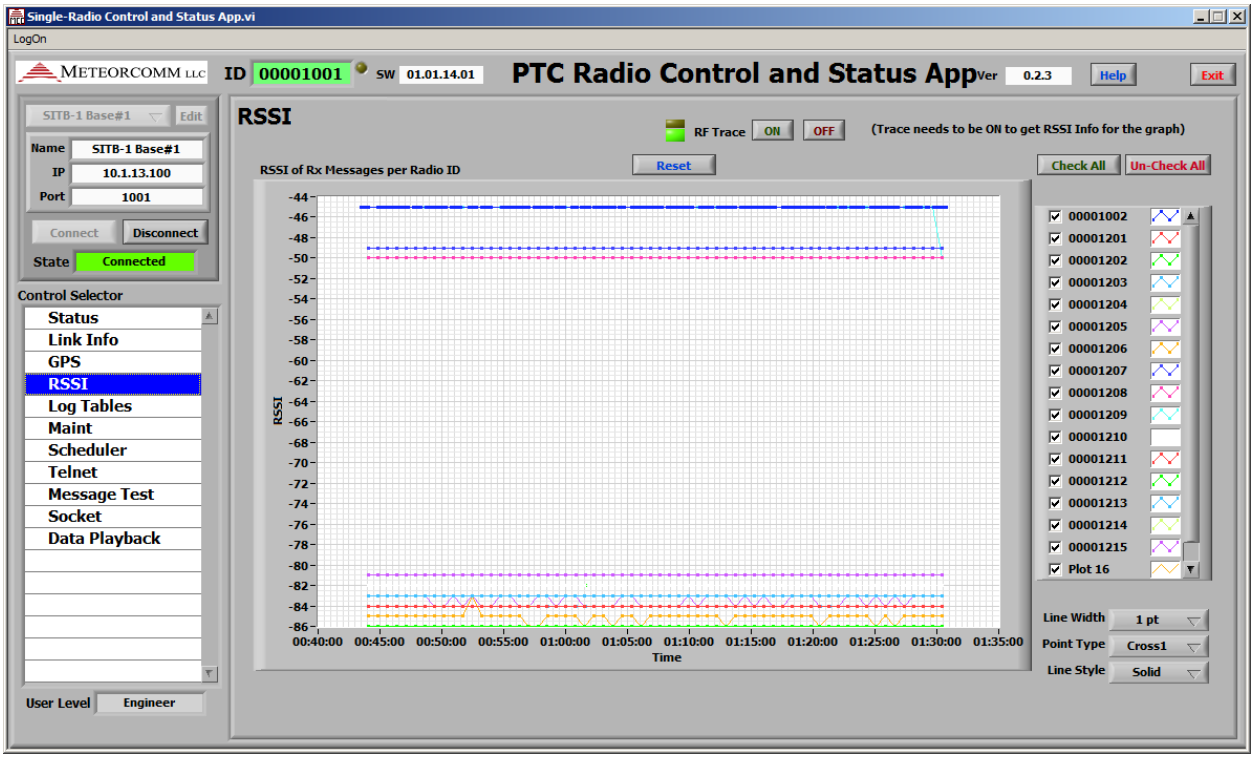
8.4 RSSI

The RSSI page shows Receiver Signal Strength Indication of all received packets. To receive this information, both the RX and RF traces need to be turned ON. The RSSI from the RF trace info is mated with the Radio ID in the RX trace info.

At the top of the page is a RF Trace control. Turn this ON to receive RSSI information. The graph is updated as trace information is received. The Green light indicates if the trace is in the ON or OFF state. The yellow light flashes each time trace info is received.



RSSI Page

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8.5 Log Tables

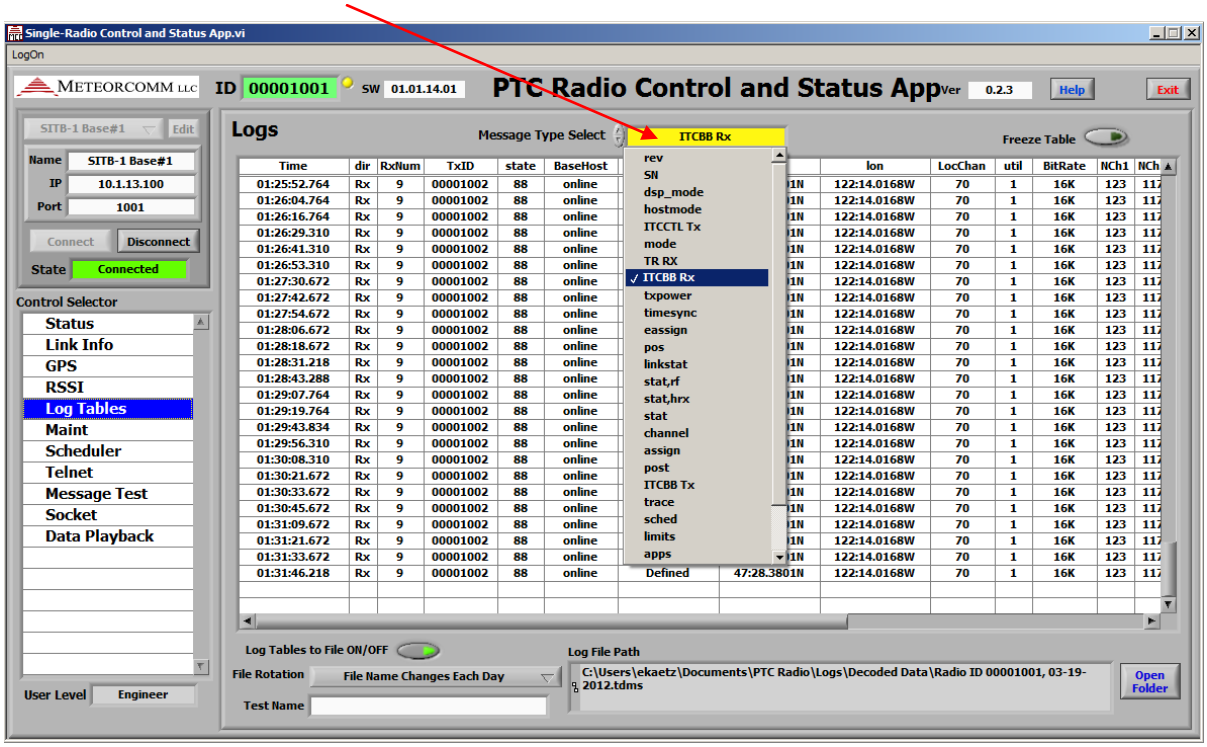
Each time a recognized message is received form the radio it is logged to a table. A table is created for each message type. These tables are displayed in the "Log tables" page.

The Log Table page has a selector called "Message Type Select" to select which message table to display.

These tabled can be logged to a file. The file format is TDMS which is a very efficient data file format developed by National Instruments. These files can be viewed in Microsoft Excel where each table is a separate Excel tab. To be able to view these files an Excel Add-In needs to be installed. The Add-In can be obtained from the National Instruments website:

http://zone.ni.com/devzone/cda/epd/p/id/2944

Selector control for the Table to be displayed. It lists the different decoded messaged received form the radio.



Log Table Page

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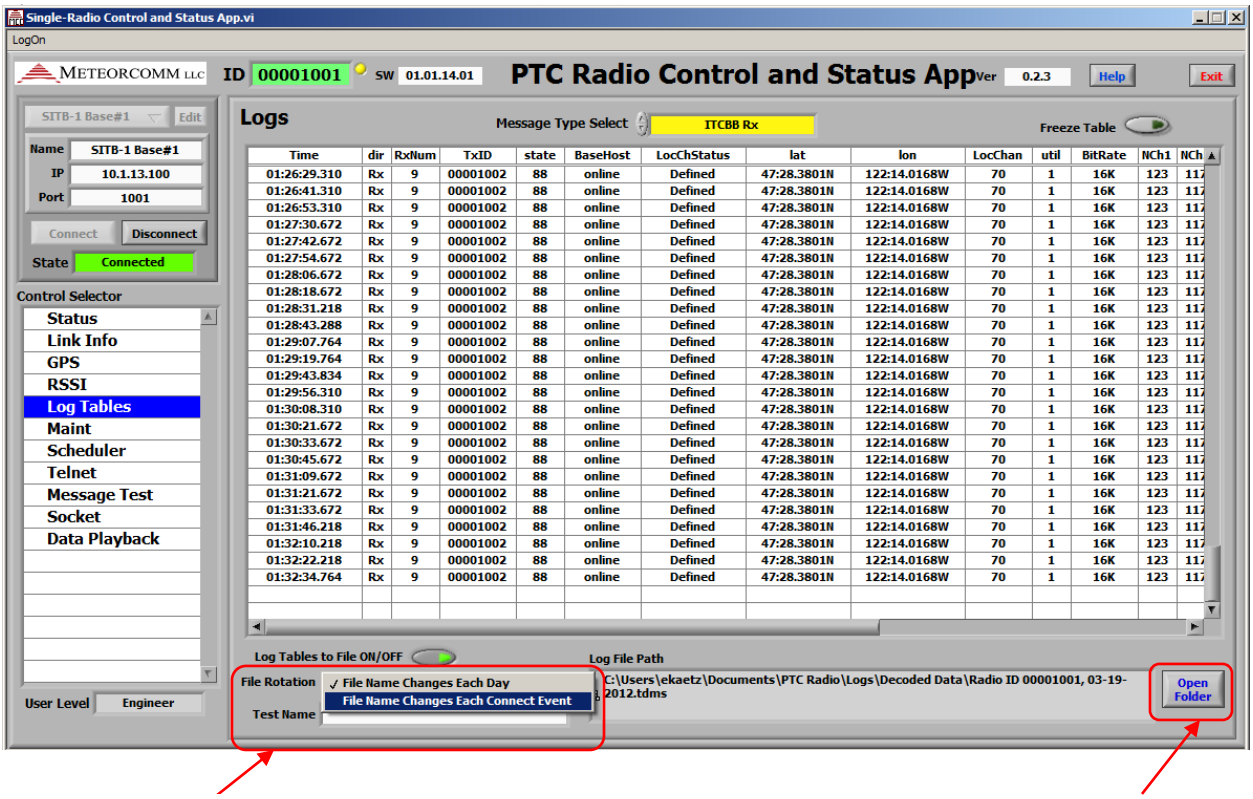
The format of the log file name can be modified by the operator. This makes it easy to separate the logged data into separate files based on the activities performed with the radios.

- Test Name
  - There is a control called Test Name at the bottom of the page. If this is not empty then the text entered in this field is appended to the log file name.
- File Rotation Control - File Name Changes Each Day
  - This Setting causes the file name to have the date in the file name. When the day changes the file name will be changed. This causes log files to only be as large as what is collected in one day.
- File Rotation Control - File Name Changes Each Connect Event
  - This Setting causes the file name to have the tome stamp of when the App connected to the radio in the file name. This is useful if there are different tests being performed and the operator wants the file name to change with each connection.



Controls to change log file name

Log Table Page

Opens log folder

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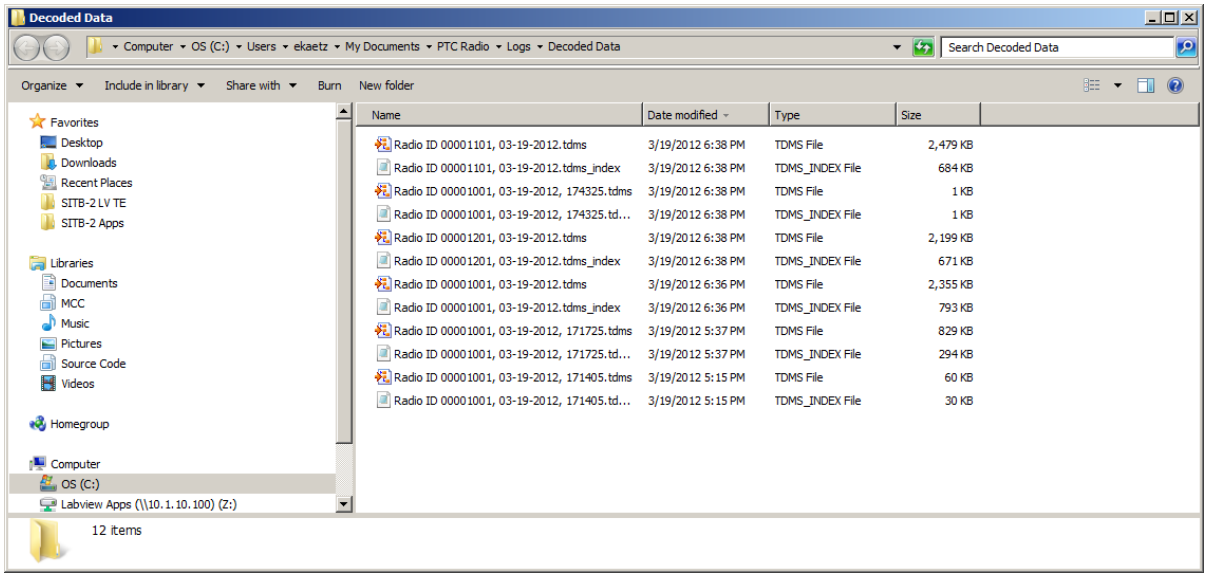
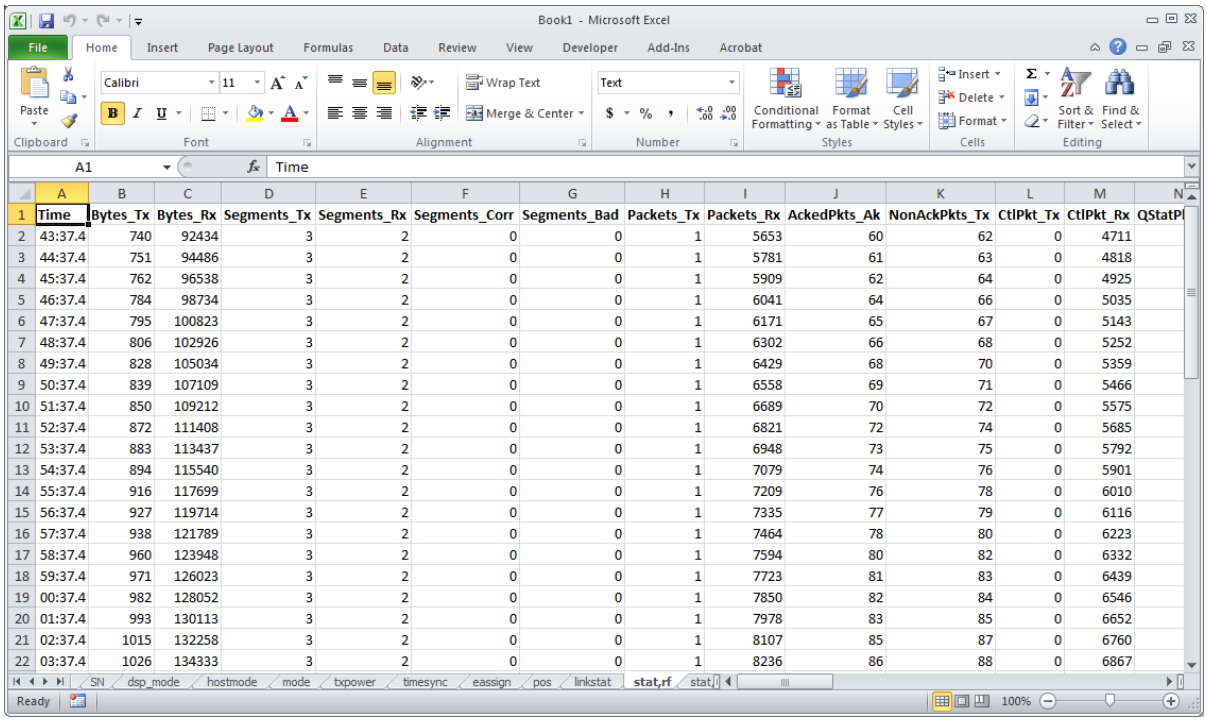


Log Folder



	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Time	Bytes_Tx	Bytes_Rx	Segments_Tx	Segments_Rx	Segments_Corr	Segments_Bad	Packets_Tx	Packets_Rx	AckedPkts_Ak	NonAckPkts_Tx	CtlPkt_Tx	CtlPkt_Rx	QStatPl
2	43:37.4	740	92434	3	2	0	0	1	5653	60	62	0	4711	
3	44:37.4	751	94486	3	2	0	0	1	5781	61	63	0	4818	
4	45:37.4	762	96538	3	2	0	0	1	5909	62	64	0	4925	
5	46:37.4	784	98734	3	2	0	0	1	6041	64	66	0	5035	
6	47:37.4	795	100823	3	2	0	0	1	6171	65	67	0	5143	
7	48:37.4	806	102926	3	2	0	0	1	6302	66	68	0	5252	
8	49:37.4	828	105034	3	2	0	0	1	6429	68	70	0	5359	
9	50:37.4	839	107109	3	2	0	0	1	6558	69	71	0	5466	
10	51:37.4	850	109212	3	2	0	0	1	6689	70	72	0	5575	
11	52:37.4	872	111408	3	2	0	0	1	6821	72	74	0	5685	
12	53:37.4	883	113437	3	2	0	0	1	6948	73	75	0	5792	
13	54:37.4	894	115540	3	2	0	0	1	7079	74	76	0	5901	
14	55:37.4	916	117699	3	2	0	0	1	7209	76	78	0	6010	
15	56:37.4	927	119714	3	2	0	0	1	7335	77	79	0	6116	
16	57:37.4	938	121789	3	2	0	0	1	7464	78	80	0	6223	
17	58:37.4	960	123948	3	2	0	0	1	7594	80	82	0	6332	
18	59:37.4	971	126023	3	2	0	0	1	7723	81	83	0	6439	
19	00:37.4	982	128052	3	2	0	0	1	7850	82	84	0	6546	
20	01:37.4	993	130113	3	2	0	0	1	7978	83	85	0	6652	
21	02:37.4	1015	132258	3	2	0	0	1	8107	85	87	0	6760	
22	03:37.4	1026	134333	3	2	0	0	1	8236	86	88	0	6867	

SN | dsp_mode | hostmode | mode | txpower | timesync | eassign | pos | linkstat | stat,rf | stat

Log File being displayed in Excel

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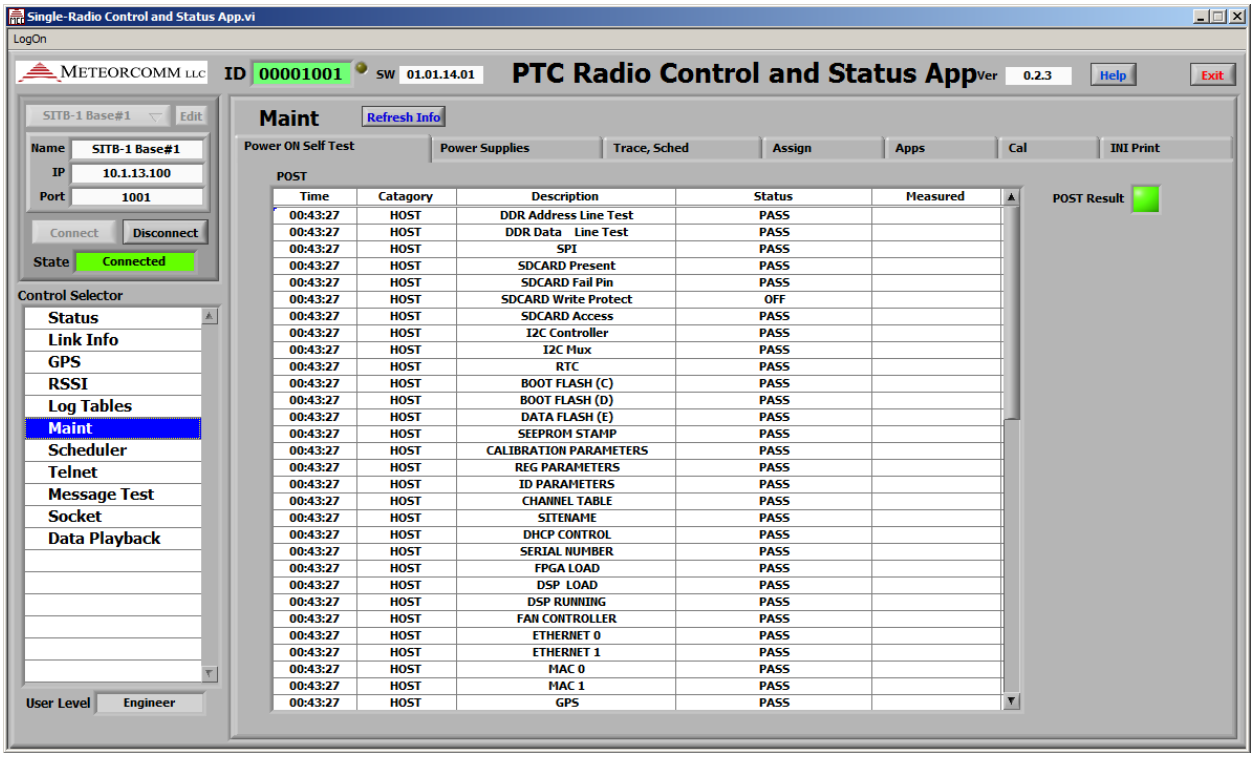
8.6 Maint

The Maint page has several tabs each with information about the radio state and health that may be used for maintenance.



Maint - POST (Power ON Self Test)

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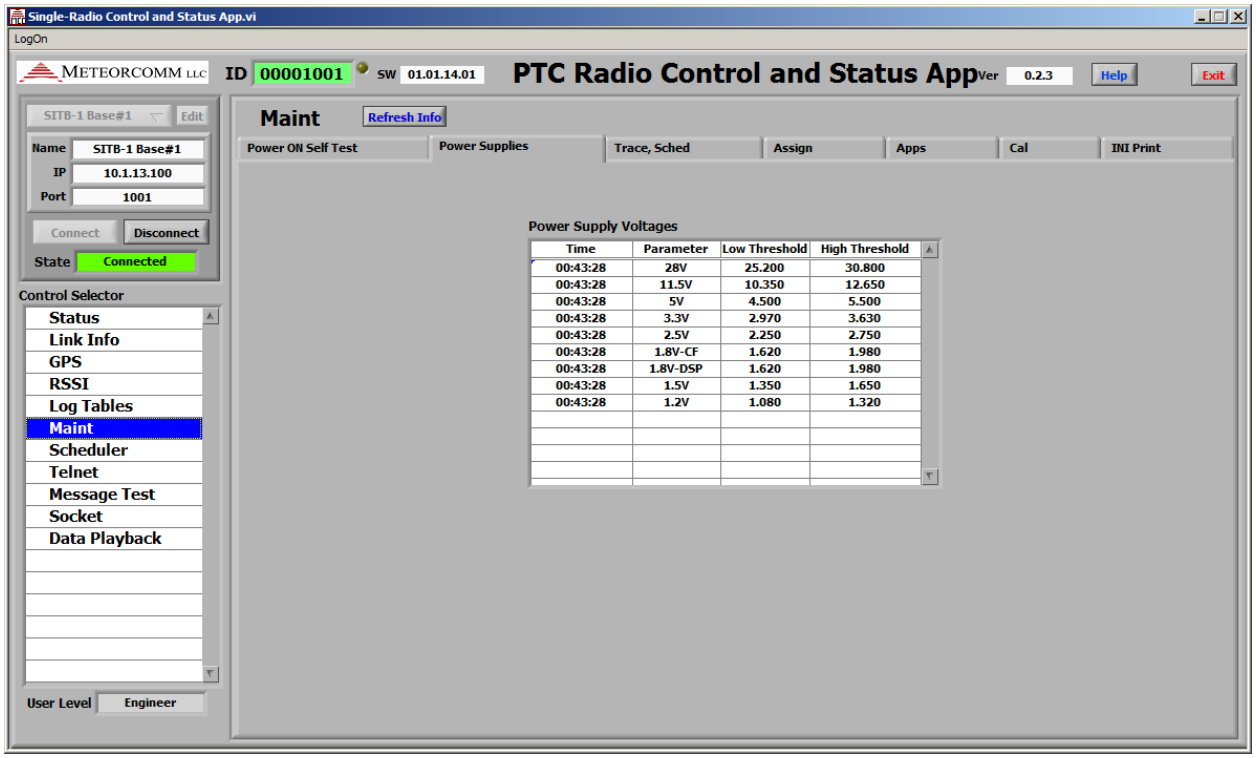
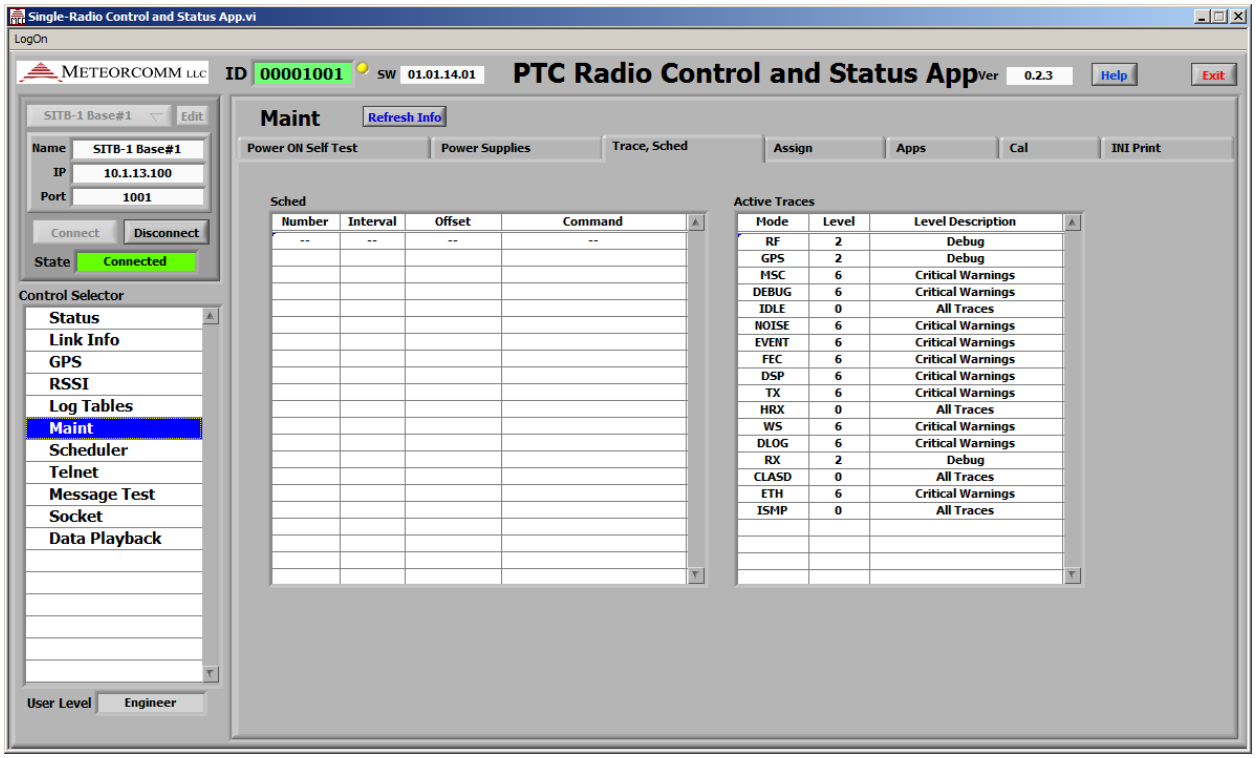


Maint - Power Supplies



Maint - Traces and Scheduled Commands

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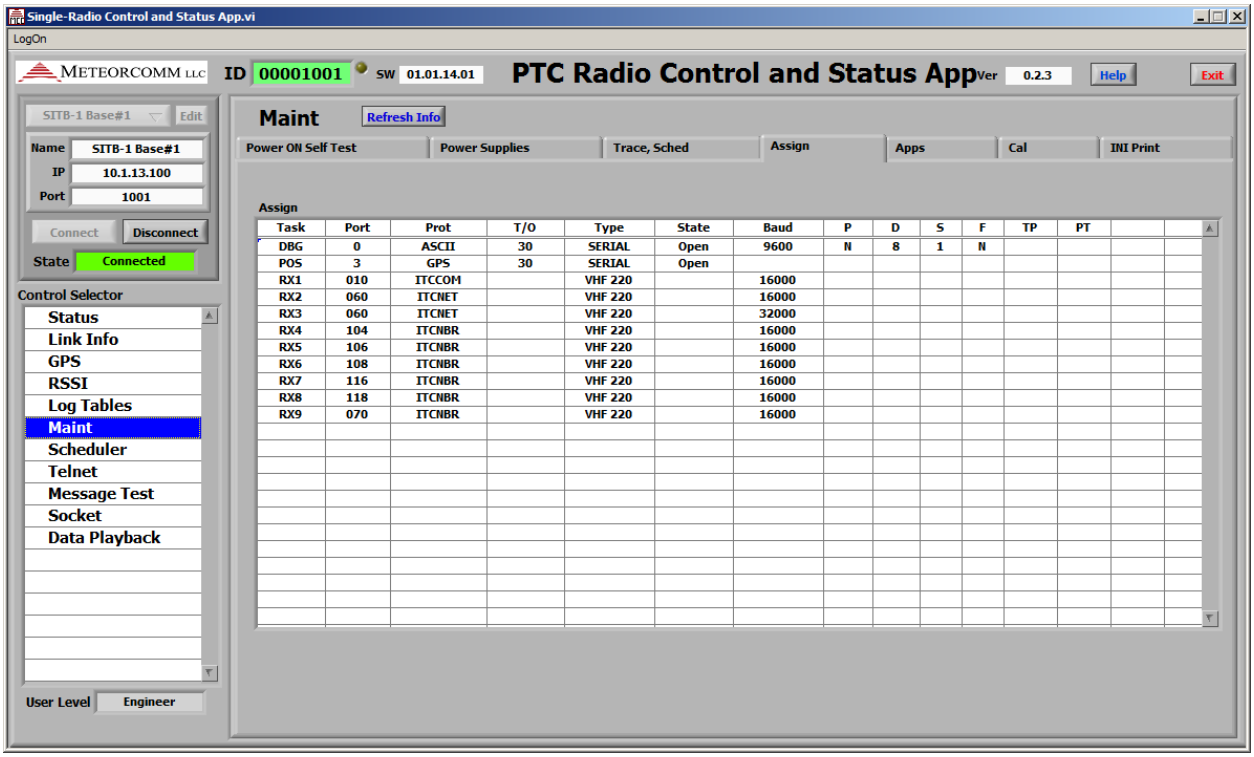
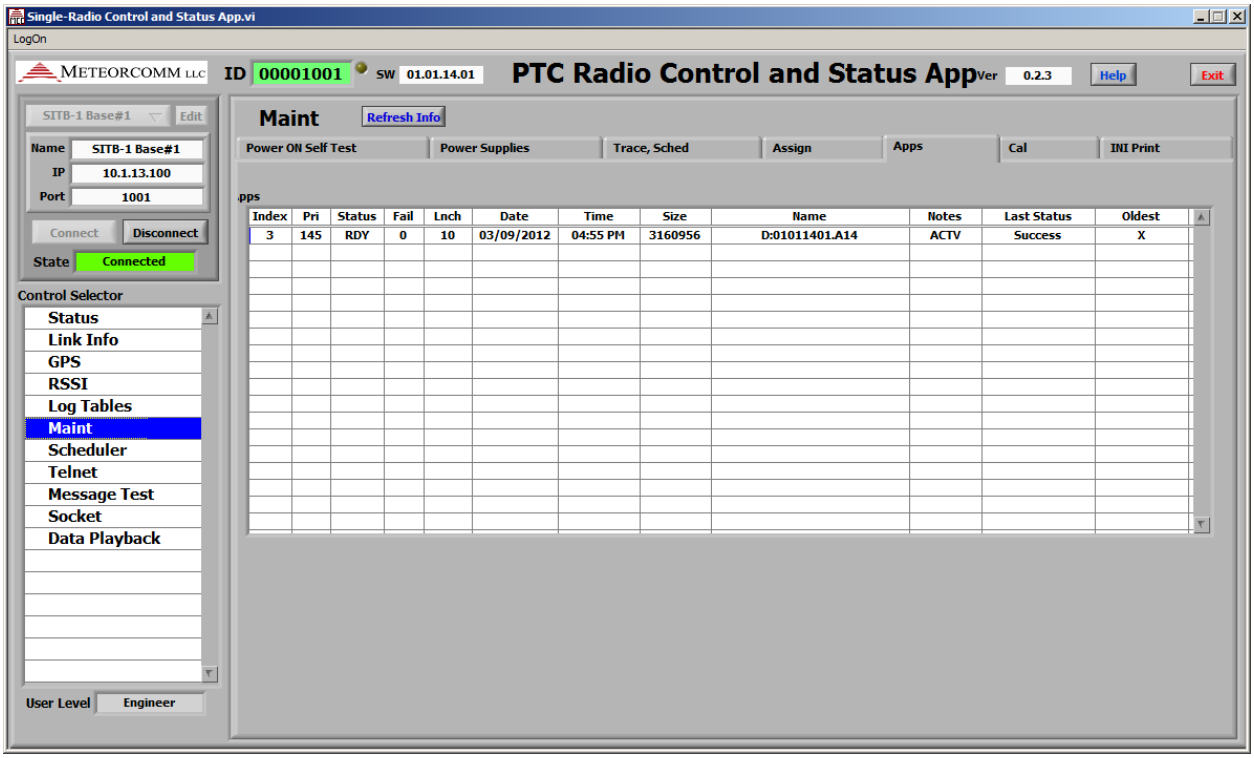


Maint - Assign



Maint - Apps

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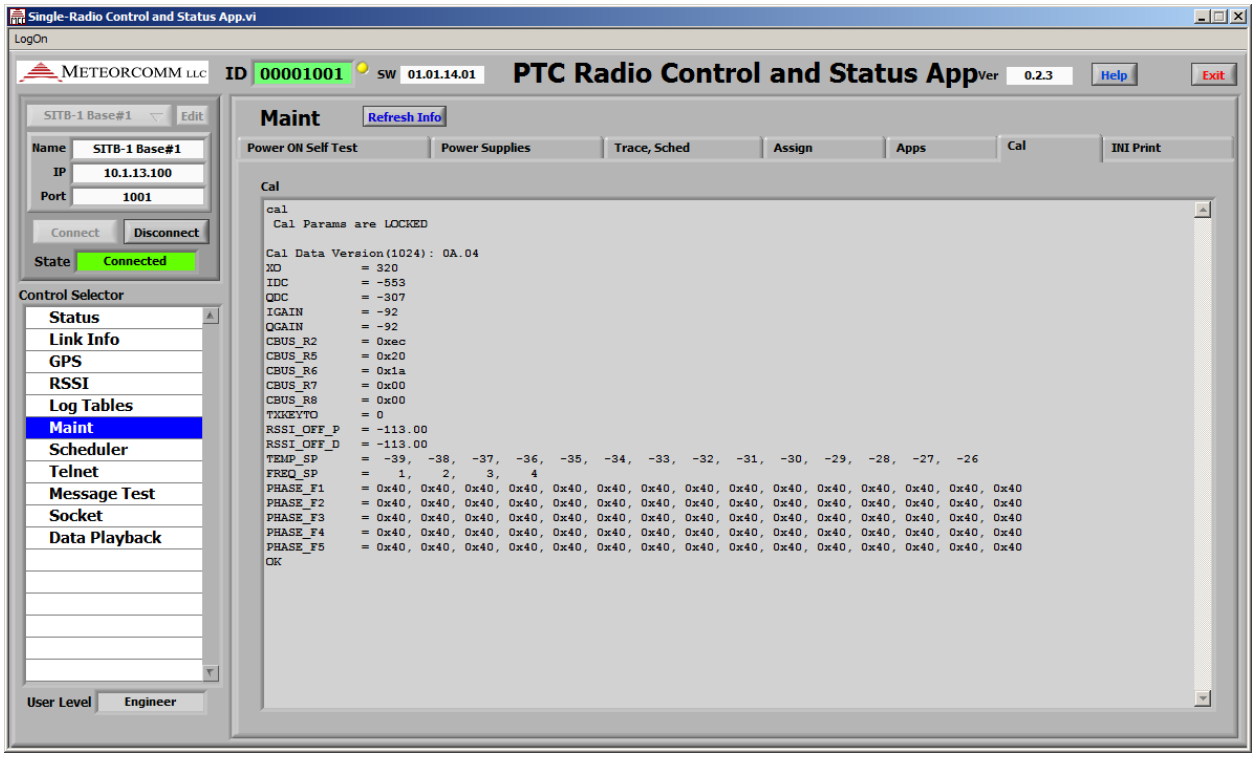

Maint - INI Print

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8.7 Scheduler

The scheduler provided 3 methods to get info from the radio.

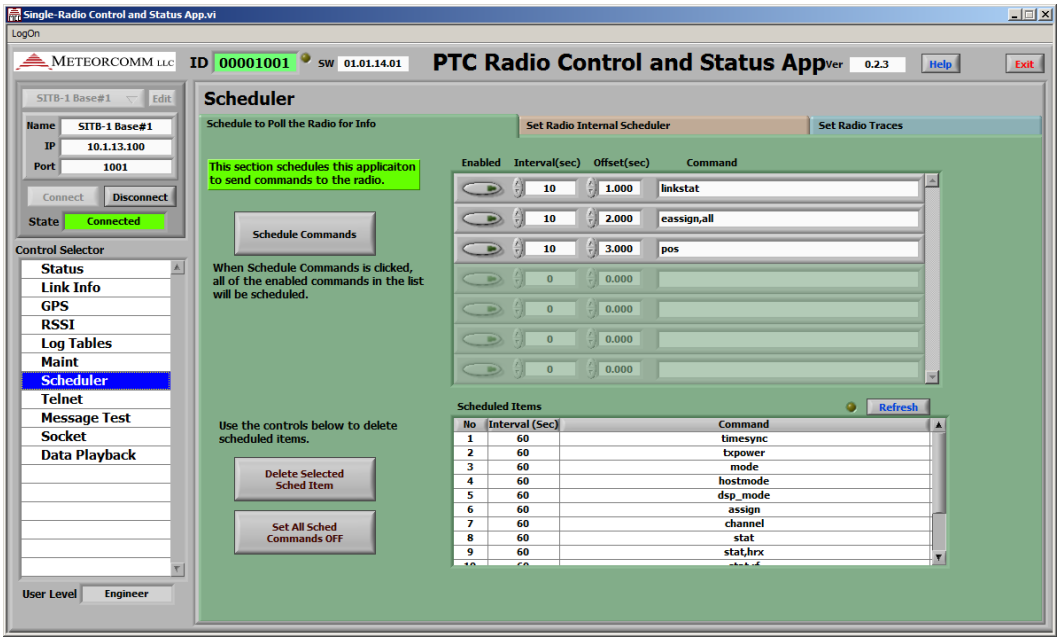
8.7.1 Schedule to Poll the Radio for Info

The PTC Radio App schedules to send commands to the radio. The radio responds with information.

- Added Scheduled Items
  Use the upper table to enter the Interval, Offset, and command you want to schedule. Click the enable button to enable your entered item. You can enter several rows in this table. To add new items just click in an empty row of the table and enter info. To delete an item right click and select to Delete Element. Once you entered all your scheduled items, click the "Schedule Commands" button.

- Delete Scheduled Items
  Click on the item to delete in the Scheduled Items table (lower table). Then click the Delete Selected Sched Item button.

- Delete All Scheduled Items
  Click on the Set All Sched Commands OFF button.



Schedule to Poll the Radio for Info

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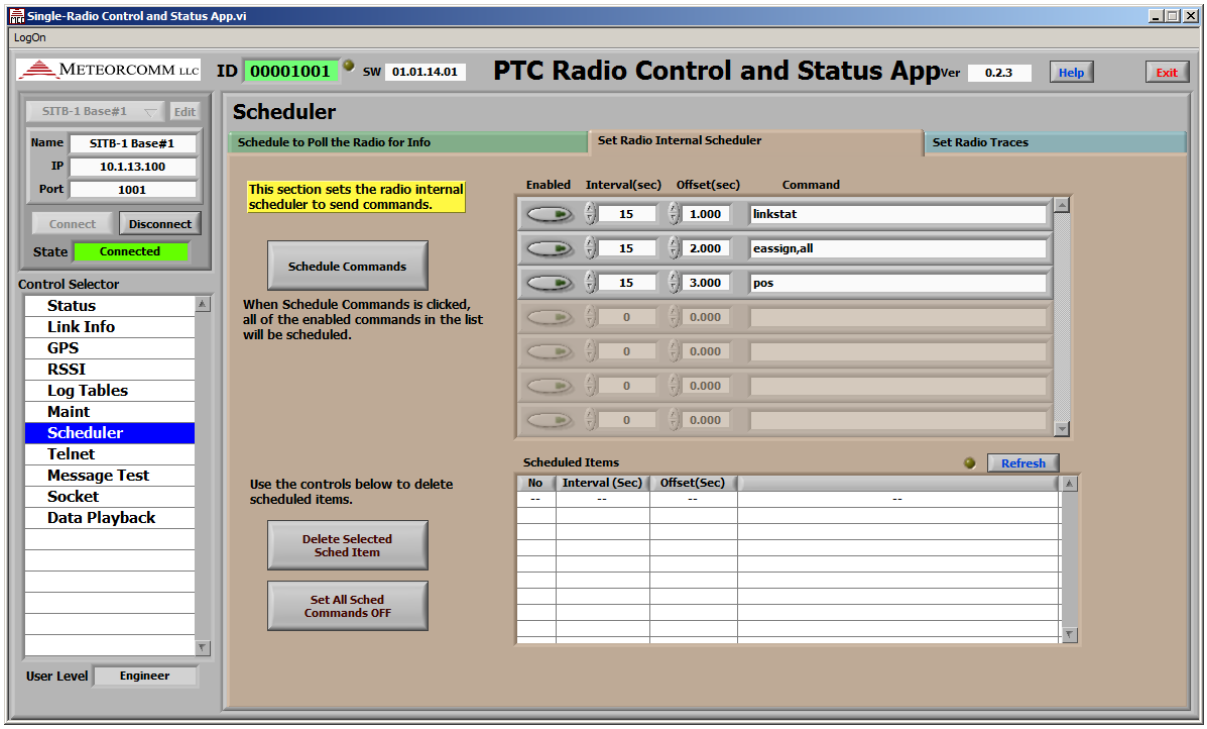
8.7.2 Set Radio Internal Scheduler

This control will set the radio's internal scheduler. The command "sched" is used.

- Added Scheduled Items
  Use the upper table to enter the Interval, Offset, and command you want to schedule. Click the enable button to enable your entered item. You can enter several rows in this table. To add new items just click in an empty row of the table and enter info. To delete an item right click and select to Delete Element. Once you entered all your scheduled items, click the "Schedule Commands" button.

- Delete Scheduled Items
  Click on the item to delete in the Scheduled Items table (lower table). Then click the Delete Selected Sched Item button.

- Delete All Scheduled Items
  Click on the Set All Sched Commands OFF button.



Set Radio Internal Scheduler

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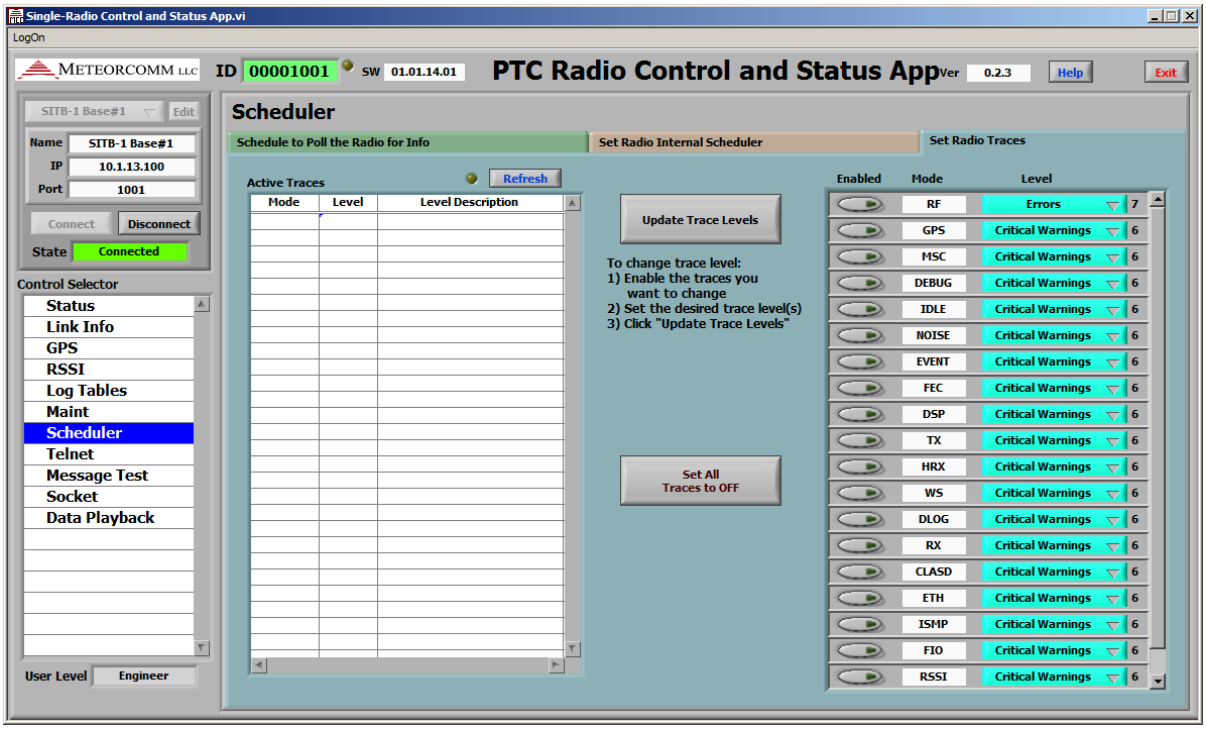
8.7.3 Set Radio Traces

This control will set the radio's trace levels. The command "trace" is used.

- Set Trace Levels
  Use the table on the right to enter the desired trace levels for the desired Modes. Click the Enable button for the items you want to be changed. Click the "Update Trace Level" button to send command to the radio to change the trace levels.

- Stop All Traces
  Click on the "Set All Traces to OFF" button.



Set Radio Traces

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8.8 Telnet

The Telnet page provides information similar to XTerm (another MCC tool used to communicate with the radio).

Data being received from the radio is displayed in the "Radio Message Log".

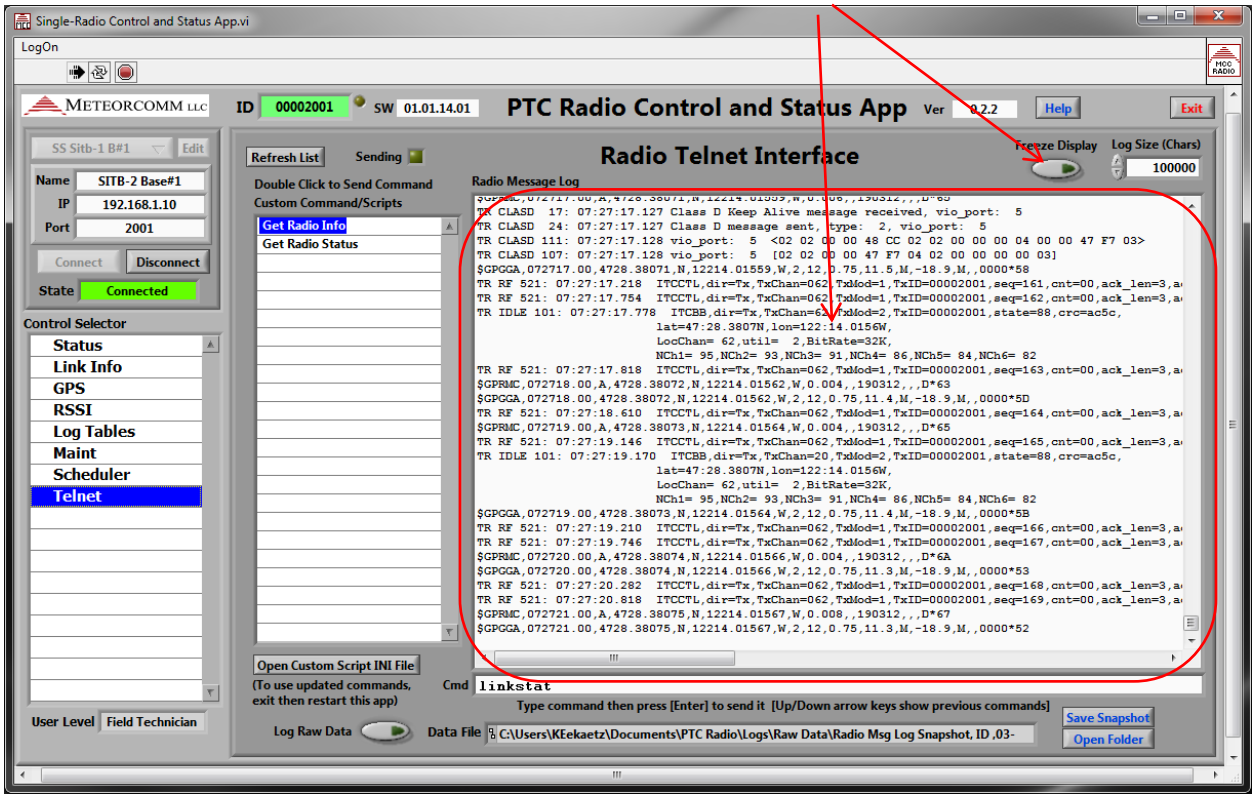
Freeze the log by:

- **Clicking Freeze button**
- **Mouse click in the log**

Unfreeze the log by:

- **Clicking Freeze button**
- **Mouse double-click in the log**

Data from the radio is displayed in the Radio Message Log



Telnet Page

To send commands to the radio, enter the command in the "Cmd" text box then type the Enter key. The command will be sent to the radio. If the display was frozen when a command is sent, it will automatically unfreeze.

The size of the log is by default set to 100,000 characters. It can be changed by modifying the "Log Size" control (Top Right).

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To continuously log the radio raw data click the "Log Raw Data" button (Bottom Left). Every 30 seconds any captured data will be appended to the Raw Data Log File. The file is named with the radio ID and the current date:

Radio Raw Data, ID [Radio ID], [MMDDYYYY].txt

The log buffer can be written to a file by clicking the "Save Snapshot" button (Bottom Right). The file is named with radio ID, the date, and a timestamp of the time it is written.

Radio Msg Log Snapshot, ID [Radio ID],
[MMDDYYYY_HHMMSS].txt

The snapshot tool is convenient to capture radio messages of interest during debugging issues.

Radio Logs are saved to the "Documents\PTC Radio\Logs\Raw Data" folder. Click the "Open Log Folders" (Bottom Right) to open this folder.

The Telnet provides the capability to create custom radio commands. These commands are displayed in the list to the left of the page. Double click on an item and the commands assigned to that item are sent to the radio. To create custom commands click the "Open Custom Script INI File" button (Bottom Left). An INI file will be opened. The top of the INI file has a comment section that describes the format of the items in the file.

Each section represents a command name. The section is text enclosed in brackets:

EXAMPLE: [My Command Script]

Once the Custom Command file has been edited the file must be saved then the "Refresh" button (Top Left) must be pressed for the file is re-read. Any new commands will now show up in the command list.

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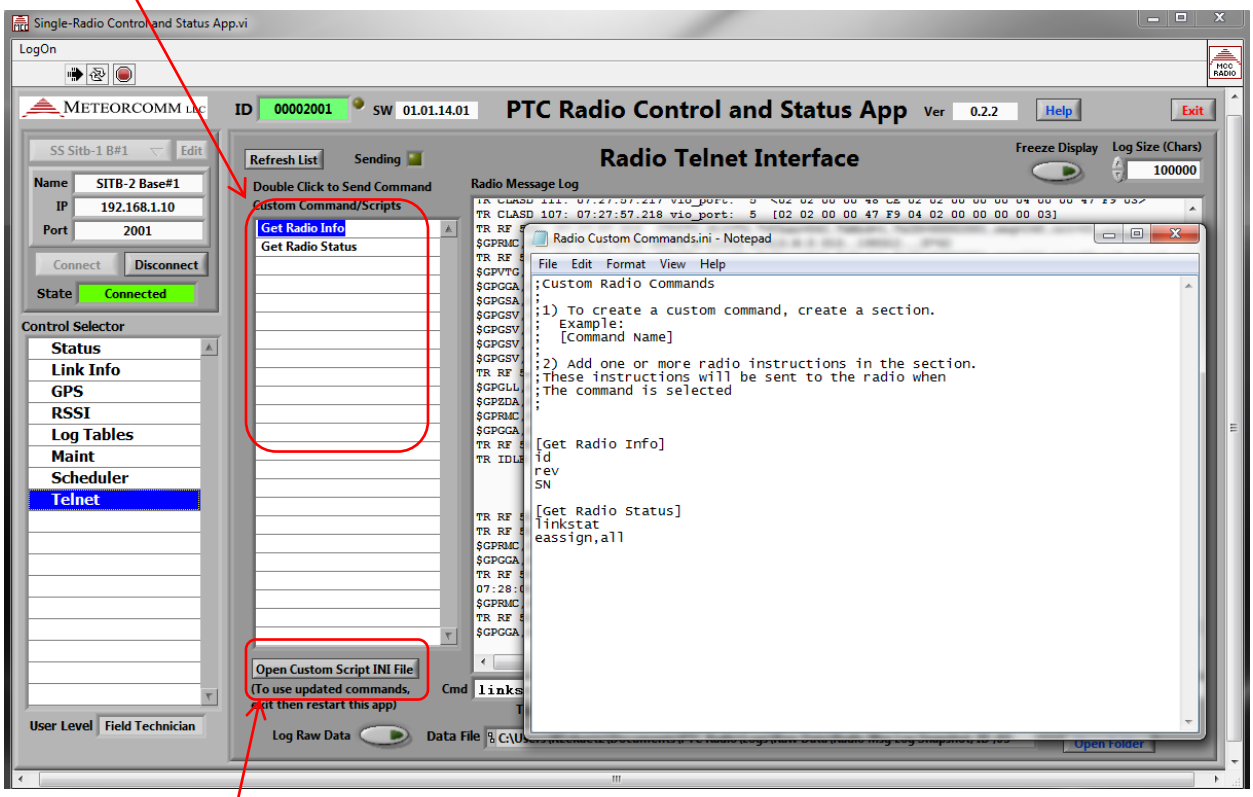
Custom Command List. Double Click on an item to send the commands.



Telnet Page - Custom Command INI File

This button opens the custom command file so it can be edited.

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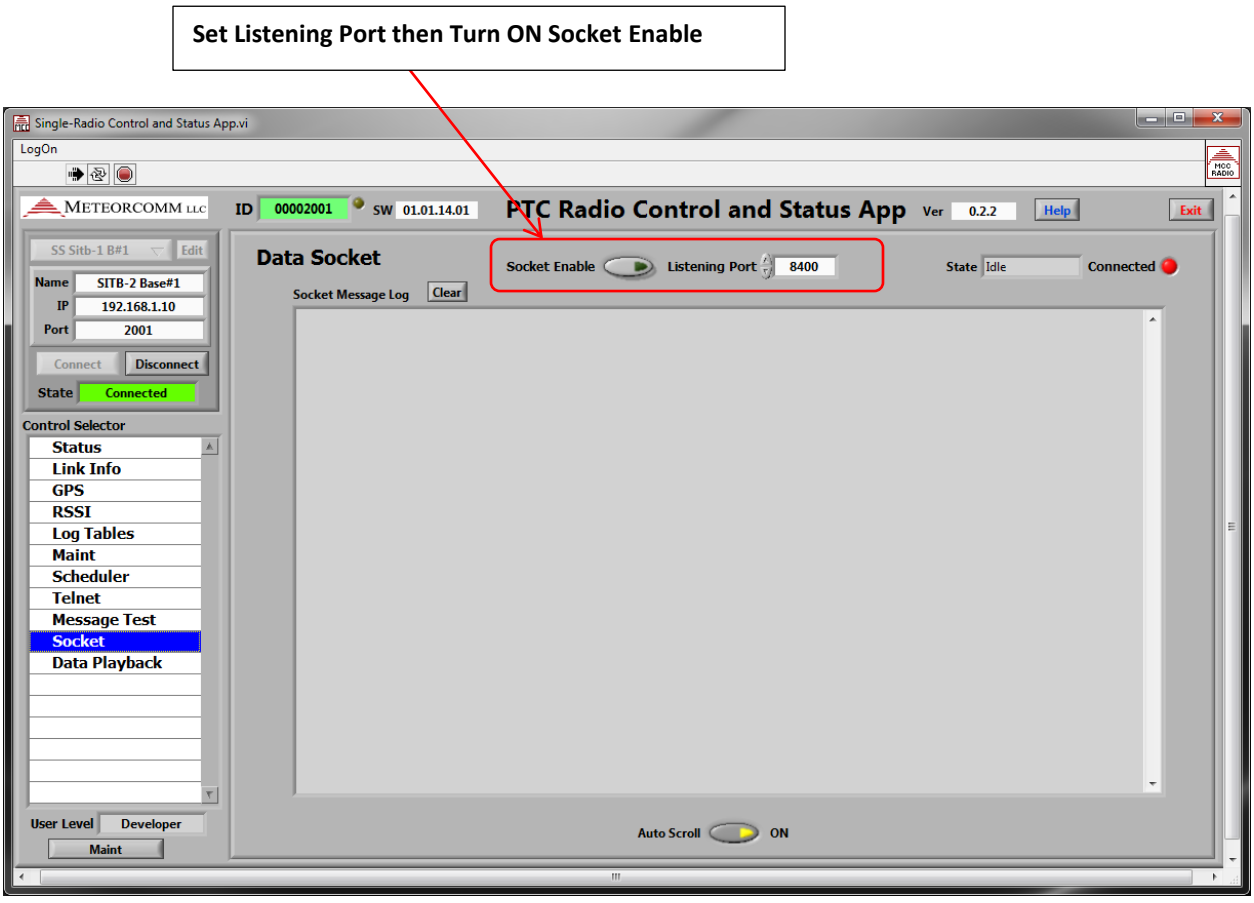
8.9 Socket

The Socket page controls settings for connecting to the Radio App via data socket and controlling it remotely.

To connect remotely to the Radio app via data socket the Listening Port must be set to the desired port (default is 8400) and then the Socket Enable must be turned ON.

Once you turn on the listening port you will likely get a popup window from your Windows firewall indicating that it is blocking a feature of a program. You must select to Allow Access to this application.



Socket Page

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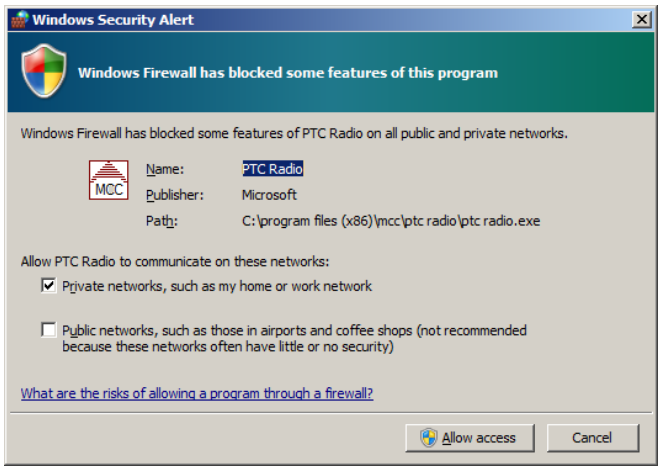
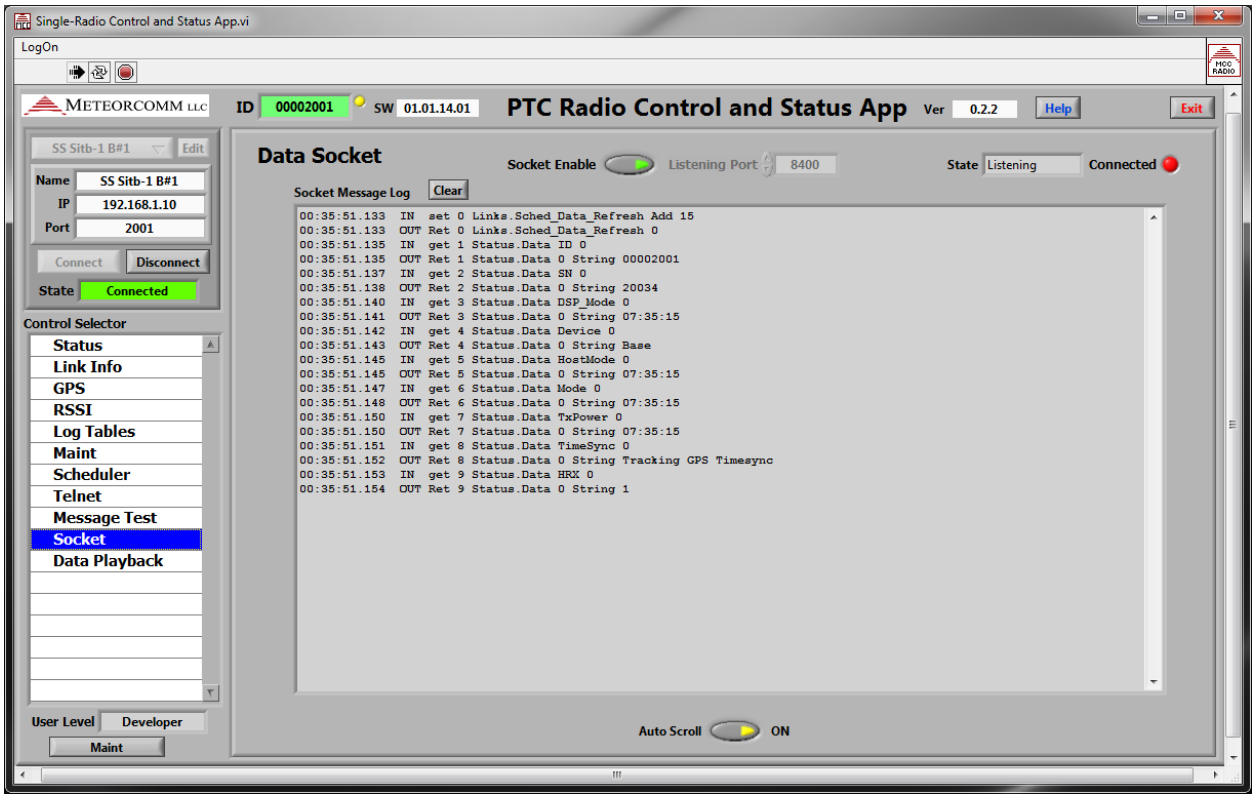


Windows Firewall Message



Socket Page with Data

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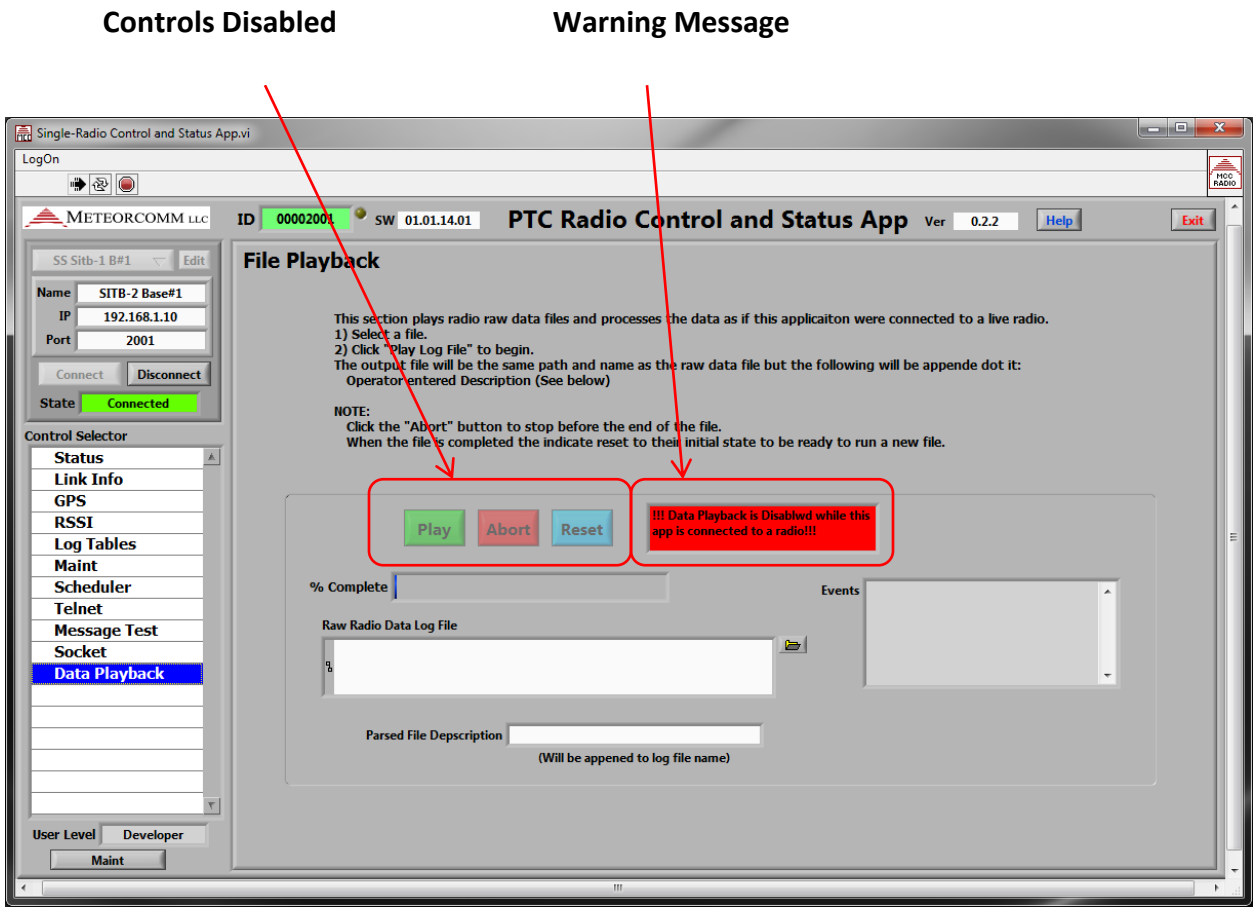
8.10 Data Playback

The Data Playback feature is used to play back raw data files. The data will be treated as if the data was read from a real radio. This feature is useful to parse data collected from a radio into the TDMS log file of decoded messages.

The data playback is disabled when the Radio App is connected to a real radio.

When a file is played the Log Tables page is notified and the logged TDMS file is named after the raw data file. The TDMS file will be written to the Logs\Decoded Data folder.



Data Playback - Disabled because the Radio App is connected to a Real Radio

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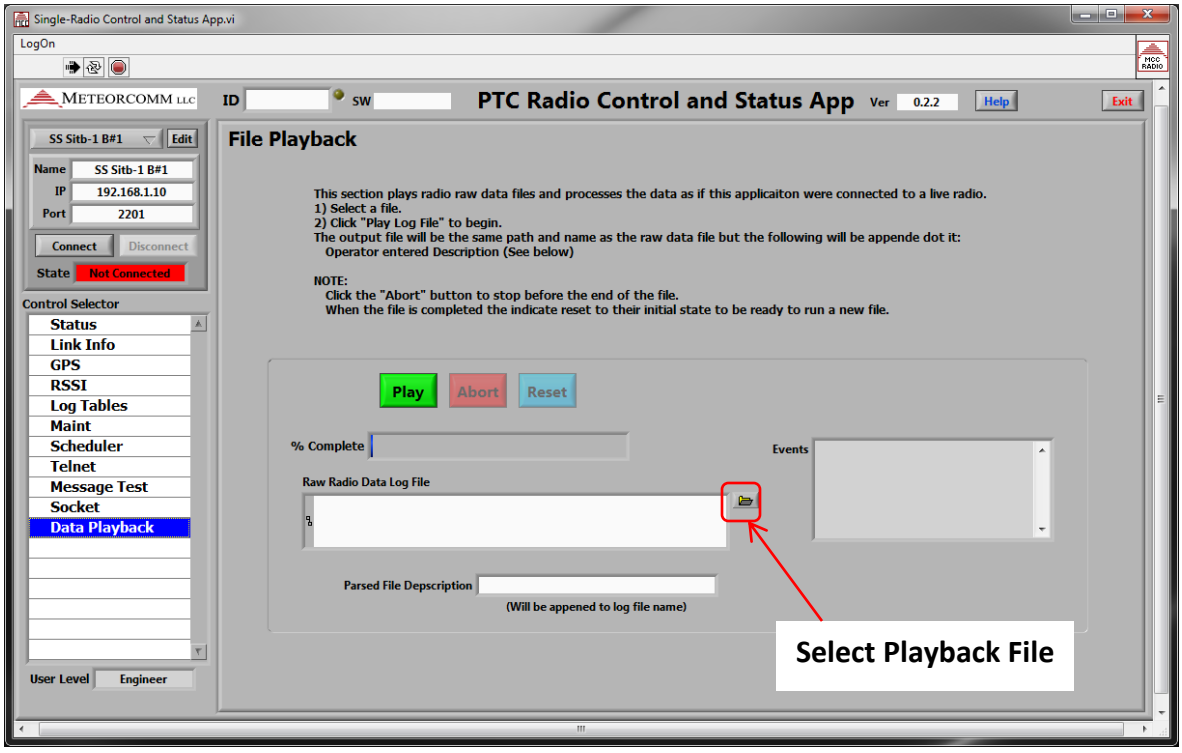
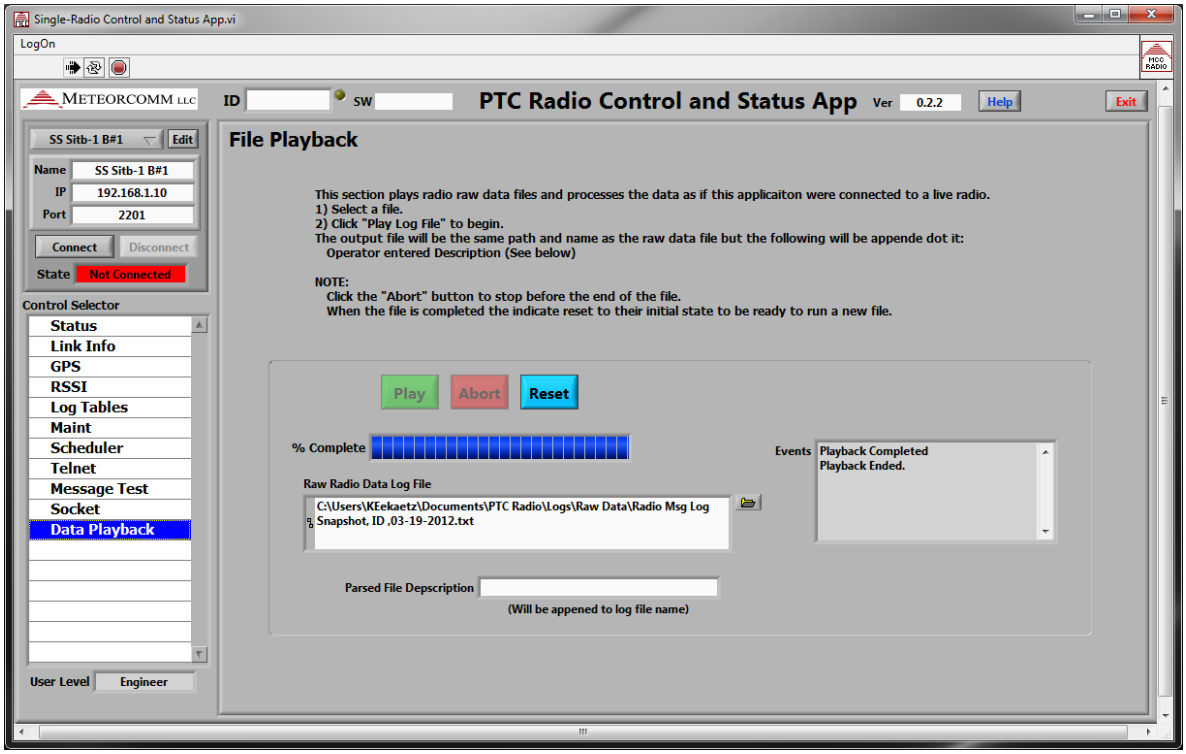


Data Playback - Ready State (Not connected to a Radio)



Data Playback - Playing a file

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